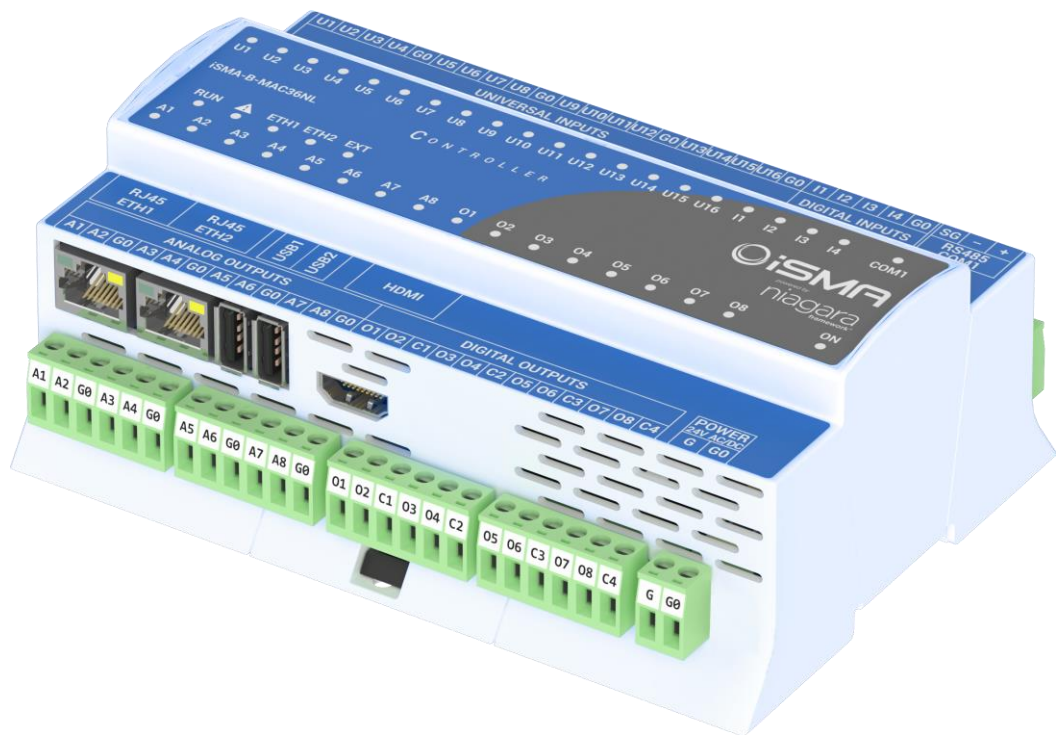


iSMA-B-MAC36NL

User Manual

Local IO



powered by
niagara⁴
framework

Global Control 5 S.A.
Warsaw, Poland
www.gc5.pl

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1 Introduction

1.1 Revision History

Rev	Date	Description
1.0	01.10.2018	First edition
1.1	31.10.2019	New temperature sensors supported. New features: Universal Input Resistance Offset, Linear Conversion, Custom Table, Analog Output Linear Conversion.
1.2	31.03.2020	Rotary and DIP switches support added

Table 1. Revision history

1.2 Overview

The iSMA-B-MAC36NL is a compact Master Application Controller with built-in different types of I/O and operating in the Niagara Framework environment.

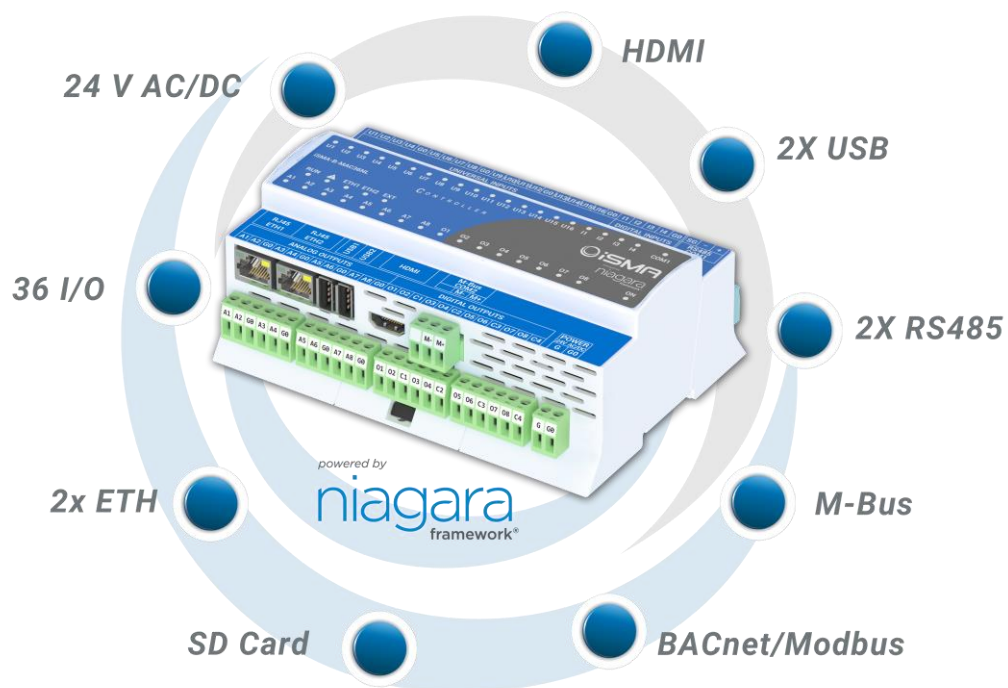


Figure 1. iSMA-B-MAC36NL Key Features

2 Local IO Hardware Specification

The iSMA-B-MAC36NL has built-in different types of I/O. The specific local I/O set 16x UI, 8x AO, 4xDI and 8x DO allows using the device in different applications.

2.1 Terminals and Internal Connection Diagram

The iSMA-B-MAC36NL controller can be supplied by 24 V AC/DC. The power supply block is separated. The grounding pin located next to power supply terminals must be connected to the ground.

The device has 36x local I/O on board:

- 8x Digital Outputs (8DO), relay output with max. load 3 A @ 230 V AC/30 V DC.
- 8x Analog Outputs (8AO), voltage output 0-10 V DC maximum load up to 20 mA.
- 16x Universal Inputs (16UI), temperature, voltage, current, resistive or dry contact.
- 4x Digital Inputs (4DI), dry contact inputs or fast counter up to 100 Hz.

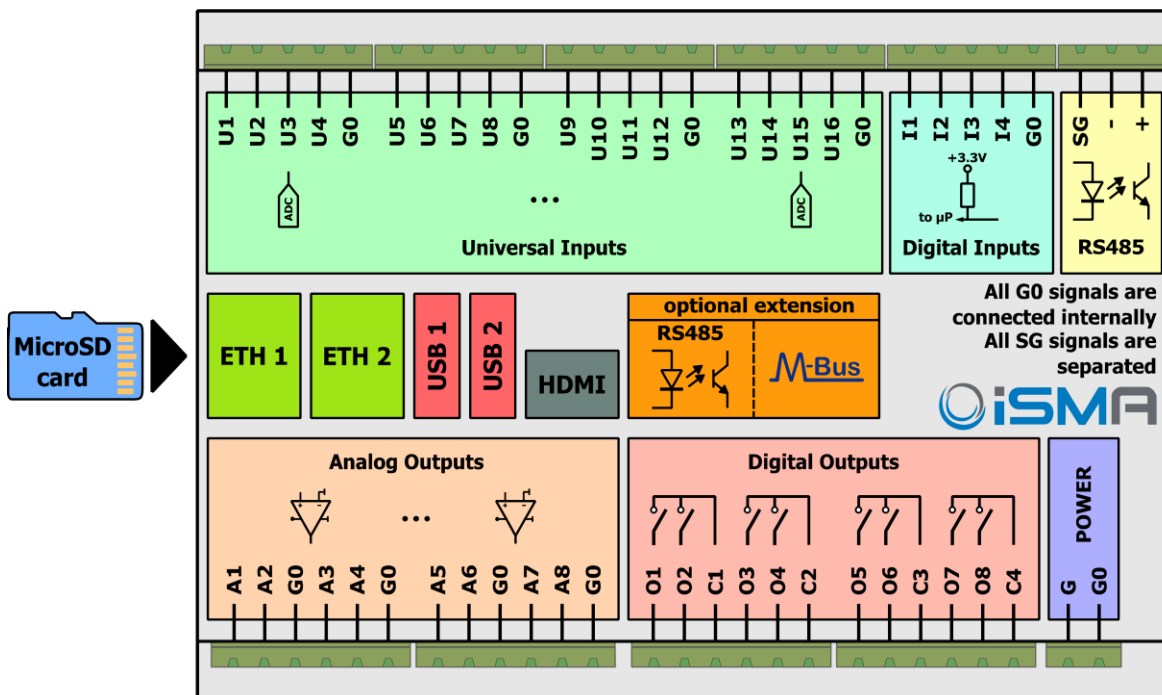


Figure 2. iSMA-B-MAC36NL Block Diagram

2.2 LED Indicators

The device is equipped with LEDs for quick status checking and diagnostics:

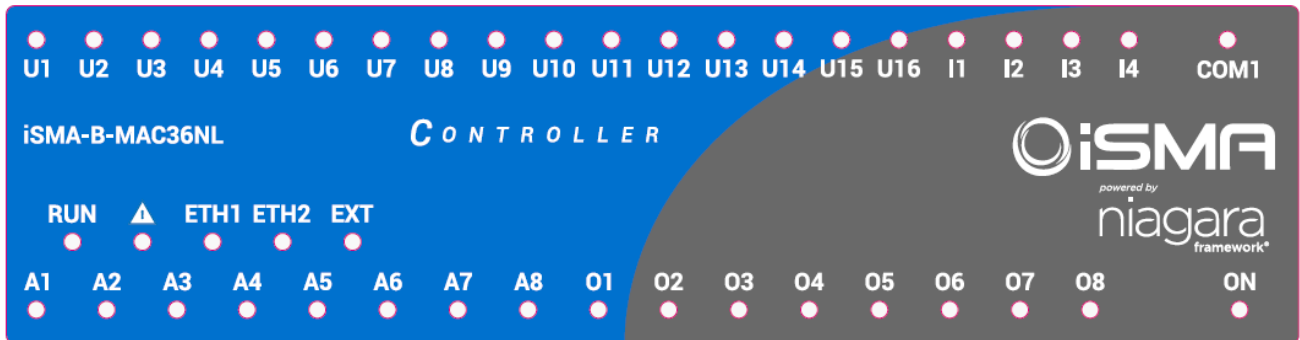


Figure 3. LEDs on the front panel of iSMA-B-MAC36NL.

1. The Universal Inputs LEDs **U1-U16** indicate the statuses of the Universal Inputs. When the LED is ON, the resistance value connected to the input is lower than the switching threshold value (Dry Contact input is active).

Note: The LED also lights up when the voltage connected to the input has very low potential.

2. The Digital Inputs LEDs **I1-I4** indicate the statuses of the Digital Inputs. When the LED is ON, the Input is active (resistance value connected to the input is lower than the switching threshold value).
3. The Analog Outputs LEDs **A1-A8** indicate the statuses of the Analog Outputs. When the LED is ON the Output voltage or PWM factor is different than 0.
4. The Digital Outputs LEDs **O1-O8** indicate the statuses of the Digital Outputs. When the LED is ON the Outputs is active (closed circuit).

2.3 Universal Inputs (16x UI)

All the Universal Inputs have 16-bit ADC, which support the following types of the input signals:

- Voltage Input (0 – 10 V DC)
- Current Input (0 – 20 mA)
- Resistive Input (0-1000 kΩ)
- Temperature Input
- Dry Contact Input (Digital Input)

2.3.1 Voltage Input Connection (0 – 10 V DC)

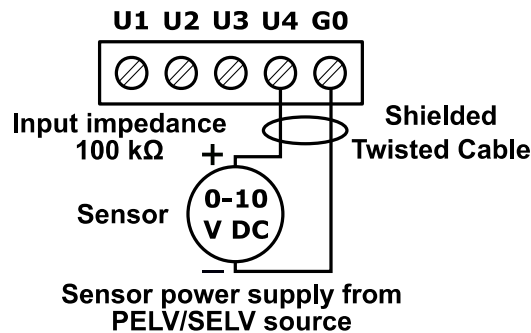


Figure 4. Connection of UI to measure voltage 0-10 V DC.

2.3.2 Current Input Connection (0 – 20 mA)

Current measurement is realized by voltage measurement and 200 Ω resistance.

According to Ohm's law, the current is directly proportional to the voltage and the resistance is the constant of proportionality.

$$I = \frac{U}{R}$$

According to the Ohm's law equation, for 20 mA current with 200 Ω resistance the output voltage is 4 V.

It means that the 4 V voltage measured on the Universal Input corresponds to 20 mA current.

The result is expressed in millivolts.

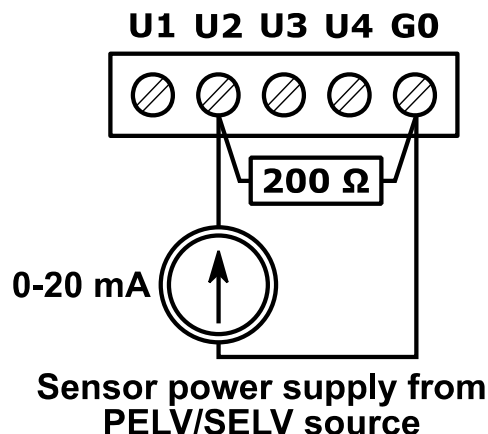


Figure 5. Connection of UI to measure current 0-20 mA.

2.3.3 Temperature Input Connection

Temperature measurement based on resistance.

The Universal Inputs working as Temperature Inputs support the following types of sensors: series NTC 10K3A1, 10K4A1, Carel 10K, 20K6A1, 2.2K3A1, 3K3A1, 30K6A1, SIE1, TAC1, SAT1 and Pt1000, Ni1000.

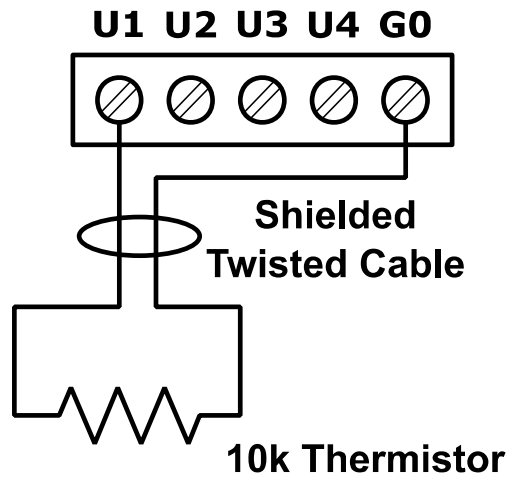


Figure 6. Connection of UI to measure temperature

2.3.4 Dry Contact Input Connection (Digital Input)

Universal Inputs can operate as standard Digital Inputs (Dry Contact Inputs).

The Input is active when it is connected to the ground (G0).

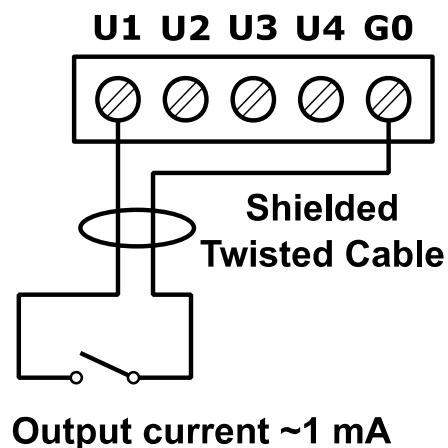


Figure 7. Connection of UI as Dry Contact Input (Digital Input)

2.4 Digital Inputs (4x DI)

In addition to the standard Dry Contact Input, Universal Inputs can operate as fast pulse counters with up to 100 Hz impulse frequency counting.

The Input is active when it is connected to the ground (G0).

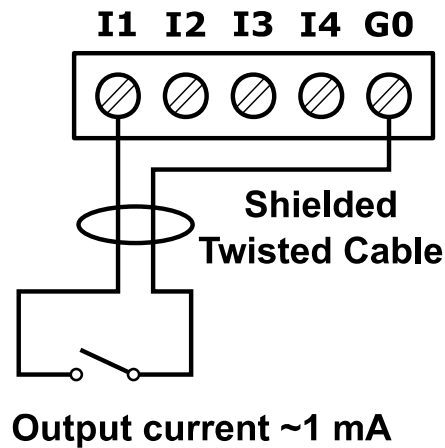


Figure 8. Connection to the Digital Input.

2.5 Analog Outputs (8x AO)

All the Analog Outputs have 12-bit ADC, provide 10 mV resolution and accuracy less than $\pm 0,5\%$. They support the following types of output signals:

- Voltage Output (0 – 10 V DC) with max. load up to 20 mA
- PWM: 0,01 Hz, 0,1 Hz, 1 Hz, 10 Hz, 100 Hz

2.5.1 Voltage Output Connection (0 – 10 V DC)

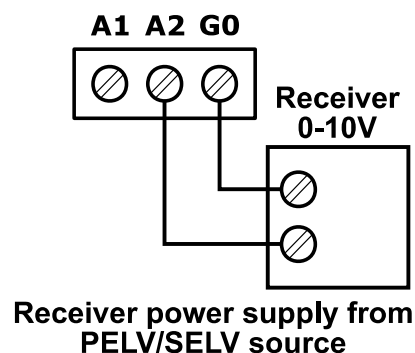


Figure 9. Connection of the 0 – 10 V DC signal from the Analog Output.

2.5.2 Relay to Analog Output Connection

There is an option to control the 12 V DC relay from the Analog Outputs (max. load cannot exceed 20 mA!).

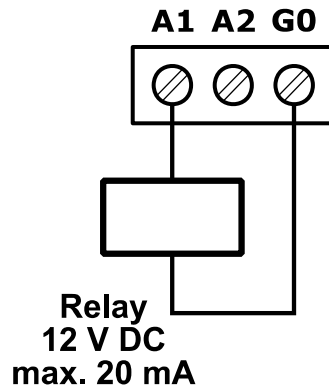


Figure 10. Relay connection to the Analog Output.

2.6 Digital Outputs (8x DO)

Relay Outputs (NO) have max. resistive load up to 3 A @ 230 V AC and 3 A @ 30 V DC.

2.6.1 Resistive Load Connection

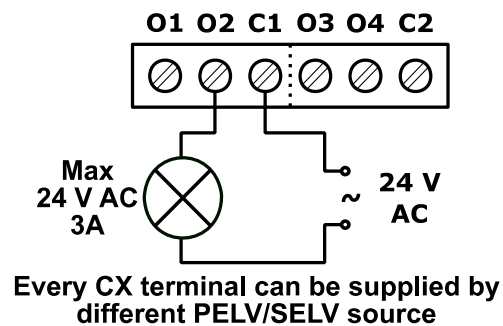


Figure 11. Connection of the resistive load to the Digital Output.

2.6.2 Solenoid Valve Connection

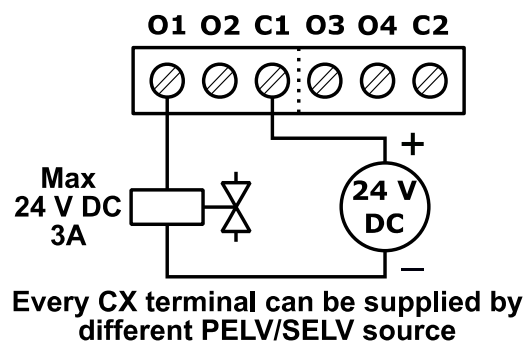


Figure 12. Connection of the solenoid valve to the Digital Output.

3 Local IO Driver

The Local IO Driver is dedicated to service, program and maintain local IOs.

The driver and Local IO points added under Local IO Network do not need a license – they are **free of charge** and **do not consume points from the license**.

The driver contains the following components:

- iSMA IO Network
- Local IO Device
- Universal Input
- Digital Input
- Digital Input Counter
- Analog Output Voltage
- Digital Output

3.1 iSMA IO Network

The iSMA IO Network component is a network component for the Local IO Device such as the iSMA-B-MAC36NL devices (added using Local IO Device component). The iSMA IO Network component is the only right parent component for Local IO Device components. All the iSMA-B-MAC36NL devices with the points inside iSMA IO Network do not consume any of the license points.

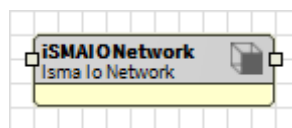


Figure 13. iSMA IO Network component

The iSMA IO Network component consists of the following slots:

1. Status - defines the current status of the component.
 - Ok** - the component is working correctly,
 - Disabled** - the component has disabled communication - the "Enabled" slot is set to "false",
 - Fault** - indicates an incorrect configuration of the component.

2. Fault Cause – describes the cause of the error if there is a fault or down status

None - no fault

Bad Parent – iSMA IO Network component has been placed in the wrong place (Drivers only)

Duplicated Component – iSMA IO Network component has been placed twice

Invalid Hardware – iSMA IO Driver has been used on a device other than iSMA-B-MAC36NL device

3. Enabled – enable/disable iSMA IO Network component

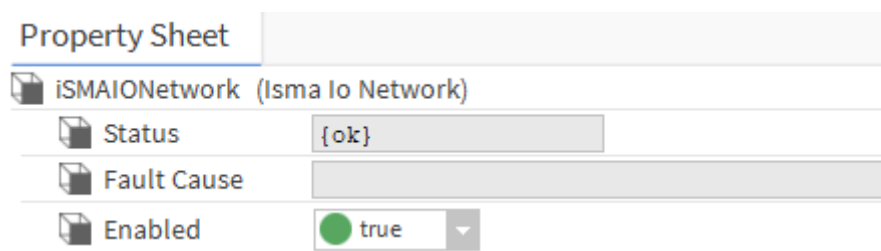


Figure 14. iSMAIONetwork AX Property Sheet View

3.2 Local IO Device

The Local IO Device is the component which represents local IO of the iSMA-B-MAC36NL device.

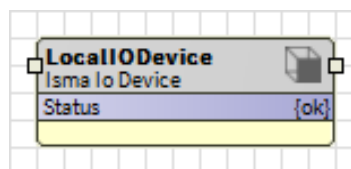


Figure 15. LocalIODevice Component

The component must be placed under iSMA IO Network component.

All the local IO points, which belong to the particular iSMA-B-MAC36NL device must be placed under Local IO Device.

Local IO component has the following slots:

1. Status – device status, available states:

Ok – component is working properly

Disabled – component or his parent (network) is disabled (Slot “Enable” is in “false”)

Fault – there is a fault described in the Fault Cause slot.

2. Fault Cause - describes the cause of the fault if a fault or down occurs

None – no fault

Bad Parent - component inserted in the wrong place in the structure (the only correct place is the Device component or a subfolder of the Device component)

Duplicated Component - when a component with a given address already exists (prevents double representation of input/output within an application).

3. Enabled - Enable/disable the component
4. Fast Rate – time interval that specifies the target poll interval for components assigned to this rate group.
5. Normal Rate - time interval that specifies the target polling interval for the component that can be polled and are assigned to a normal polling rate.
6. Slow Rate – time interval that specifies the target polling interval for components that can be polled and are assigned to a slow polling rate.

Slots hidden by default:

7. Write On Start – do the write action in a device „Writable” components in IO Network after reset or power-up
8. Write On Up - do the write action in a device „Writable” components in IO Network after restoring the connection with the device
9. Write On Enable - do the write action in a device „Writable” components in IO Network after enabling the device

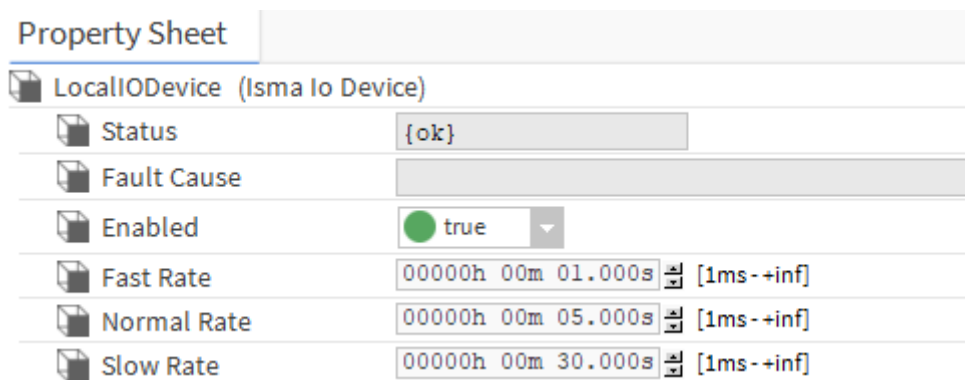


Figure 16. LocalIODevice AX Property Sheet View

3.3 Universal Input

Universal Input component is used for supporting physical local Universal Inputs.

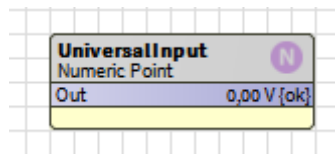


Figure 17. Universal Input Component

The component must be placed under LocalIODevice component.

The component can be configured to work in all modes of the Universal Input (resistance, temperature, voltage, current and digital).

Property Sheet

N UniversalInput (Numeric Point)

Facets units=V,precision=2V,min=-infV,max=+infV >> ⌚

Proxy Ext Universal Input Proxy Ext

Status	{ok}
Fault Cause	
Enabled	<input checked="" type="checkbox"/> true
Poll Frequency	Normal
Input Number	1
Max Input Number	16
Input Type	Voltage
Resolution	<input checked="" type="radio"/> 12bit
Filter Time	2 [0 - 60]
Resistance Offset	0
Linear Conversion	Scale 1,0 Offset 0,0
Out	0,00 V {ok}

Figure 18. Universal Input Component AX Property Sheet View

The Universal Input has the following slots:

1. Facets - determines how the input value is displayed on the available views in the station with its unit and decimal point accuracy. By default, the value of the Facets slot depends on the type of input selected in ProxyExt/Input Type. If you set the resistive input type, facets will be set to Ohm and the number of decimal places to 0.
2. Proxy Ext – component's extension that handles the point configuration and has the

following slots:

2.1. Status - the current status of the component.

Ok - the component is working correctly.

Disabled – the component or its parent (device or network) is disabled (“Enable” slot is set to “false”)

Fault- there is a fault described in the Fault Cause slot.

Down – no response from the point.

2.2. Fault Cause - describes the cause of the fault if a fault or down occurs

None – no fault

Bad Parent - component inserted in the wrong place in the structure (the only correct place is the Device component or a subfolder of the Device component)

Duplicated Component - when a component with a given address already exists (prevents double representation of input/output within an application).

Invalid Type – a type of component not supported by the device.

Parent Disabled - Parent (device or network) disabled.

Point Down – the point is unavailable.

2.3. Enabled - Enable/disable the component

2.4. Poll Frequency - Selection of the poll frequency of the points, the available options: Fast, Normal, Slow

2.5. Input Number - Selecting an input number; if a point is added to the device, the component selects the first unused input number automatically.

2.6. Max Input Number – the number of available inputs in the device

2.7. Input Type - Selection of the input type (voltage, current, digital, resistive, temperature).

The following types are available:



Figure 19. Universal Input: Input Type List

- Voltage – The Universal Input works as a voltage input: 0 - 10 VDC. Resistance measurement is disabled.
- Current - The universal input works as a current input: 0 - 20 mA. Resistance measurement is disabled.
- Digital – The Universal Input works like a digital input. (Dry Contact Input - output current ~1 mA). Voltage measurement is disabled.
- Resistance - The Universal Input works in resistive measurement mode (0 - 1000 k Ω). Voltage measurement is disabled.
- Reading one of the supported types of temperature sensors (Voltage measurement is disabled):

Temperature sensor type NTC 10K3A1 ($^{\circ}\text{C}$)

Temperature sensor type NTC 10K4A1 ($^{\circ}\text{C}$)

Temperature sensor type NTC 10K Carel ($^{\circ}\text{C}$)

Temperature sensor type NTC 20K6A1 ($^{\circ}\text{C}$)

Temperature sensor type NTC 2,2K3A1 ($^{\circ}\text{C}$)

Temperature sensor type NTC 3K3A1 ($^{\circ}\text{C}$)

Temperature sensor type NTC 30K6A1 ($^{\circ}\text{C}$)

Temperature sensor type SIE1 ($^{\circ}\text{C}$)

Temperature sensor type TAC1 (°C)

Temperature sensor type SAT1 (°C)

Temperature sensor type PT1000 (16-bit resolution pre-set by the manufacturer) (°C)

Temperature sensor type NI1000 (16-bit resolution pre-set by the manufacturer) (°C)

Temperature sensor type NI1000 LG (°C)

Temperature sensor type NI1000 21C (°C)

Temperature sensor type NTC 10K Type 2 (°F)

Temperature sensor type NTC 10K Type 3 (°F)

Temperature sensor type NTC 20K (°F)

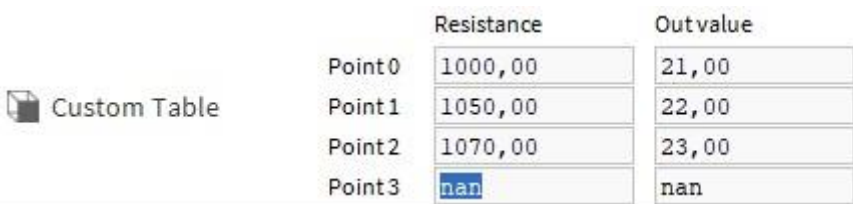
Temperature sensor type NTC 3K (°F)

Temperature sensor type PT1000 (°F)

Temperature sensor type NI1000 32F (°F)

Temperature sensor type NI1000 70F (°F)

Custom Table - users can enter their own sensor characteristics using up to 32 points of the characteristics.



	Resistance	Out value
Point0	1000,00	21,00
Point1	1050,00	22,00
Point2	1070,00	23,00
Point3	nan	nan

Figure 20. Universal Input: Input Type - Custom Table

After selecting from the Custom Table drop-down list, an additional Custom Table slot is displayed. This slot has 'Resistance' and 'Out value' subslots for the next points of the characteristics. When both subslots are filled in and approved with the Enter key, the next subslots open in the next row. It is possible to enter up to 32 points of characteristics (32 rows of Point 0...31). The characteristics are saved in the component in the station. If the user changes the input mode, the characteristic will be saved and you can return to it by selecting Custom Table again. To delete the entered characteristic, right-click on the Custom Table slot and select Delete. A UI component with a saved characteristic can be copied and used

repeatedly without having to re-enter it. The UI component can also be copied between stations, both online and offline (PC copy). You can also copy the Custom Table slot itself and paste it into a new UI component under ProxyExt (where there is no Custom Table yet). There can only be one Custom Table slot in the UI component.

2.8. Resolution - Selection of resolution bits (16 bit is recommended for PT1000 and NI100 sensors)

2.9. Filter Time - Setting the filter time 0-60s.

2.10. Resistance Offset – offsetting the resistance value with an entered value

2.11. Linear Conversion - conversion of the input value according to the formula $y=ax+b$, where x = read input value; a = slot Scale; b = slot Offset.

3. Out - provides real-time information about the current value of the input data together with the units selected in the facets slot and the current state of the point. If the input works correctly, the status is considered normal and the value is displayed with the default status {ok}.

The ProxyExt component has the following actions:

Force Write Config - instantly saves point configurations to the physical device.

Force Read - sending a query immediately, despite the settings in Poll Frequency.

Any change of Input Number, Input Type, Resolution or Filter Time slots results in sending this configuration to the device immediately.

3.4 Digital Input

Digital Input component is designed for supporting physical local Digital Inputs.

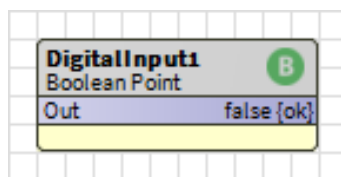


Figure 21. Digital Input Component

The component must be placed under Local IO Device component.

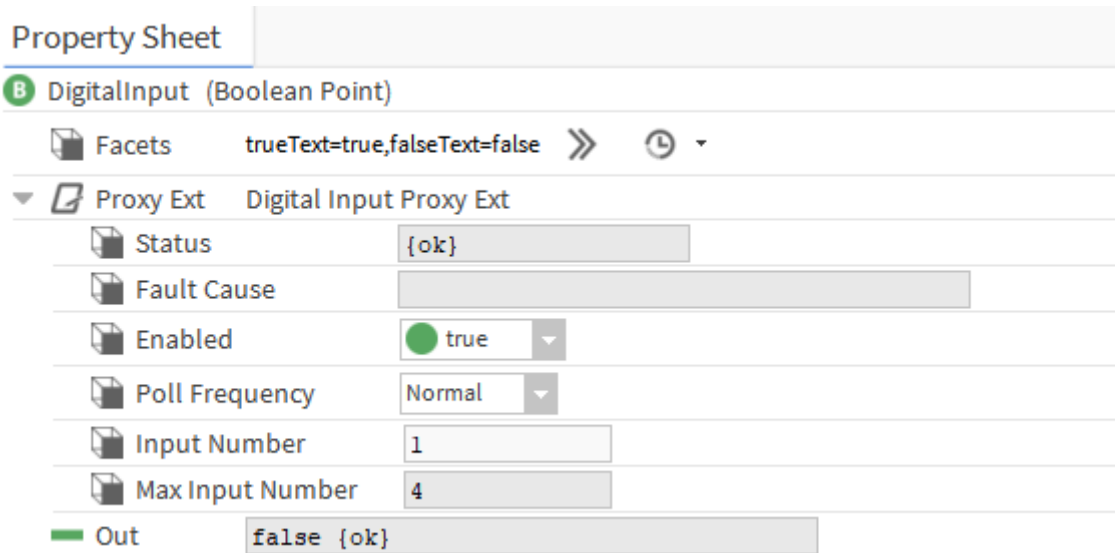


Figure 22. Digital Input Component AX Property Sheet View

The Digital Input component has the following slots:

- 1 Facets - determines how the input value will be displayed.
- 2 Proxy Ext - component handles the point configuration and has the following slots:
 - 2.1 Status - the current status of the component.
 - Ok** - the component is working correctly.
 - Disabled** - component or parent (device or network) is disabled (the "Enable" slot is set to "false")
 - Fault**- there is a fault described in the Fault Cause slot.
 - Down** – no response from the point.
 - 2.2 Fault Cause - describes the cause of the fault in case of a fault or down status.
 - None** - no fault
 - Bad Parent** - component inserted in the incorrect place in the structure (the only correct place is the Device component or a subfolder of the Device component).
 - Duplicated Component** - when a component with a given address already exists (prevents double representation of input/output within a given application)
 - Invalid Type** - a type of component not supported by the device.
 - Parent disabled** - Parent (device or network) disabled
 - Point down** – the point is unavailable

- 2.3 Enabled - Enable/disable the component
- 2.4 Poll Frequency - Selection of the poll frequency of the points, the available options: Fast, Normal, Slow.
- 2.5 Input Number - Selecting an input number, if a point is added to a device, the component selects the first unused input number automatically
- 2.6 Max Input Number – information about the number of available inputs in the device
- 3 Out - provides real-time information about the current value of the input data together with the units selected in the facets slot and the current state of the point. If the value of the out slot is forced by one of the available component actions, the value is followed by information about the executed action, e.g. {overridden}. If the component is working correctly, the status is considered normal and the value appears with the default status {ok}.

The ProxyExt component has the following actions:

Force Write Config that instantly saves point configurations to the device.

Force Read - sending a query immediately despite the settings in Poll Frequency.

Any change to the Input Number configuration slot results in sending this configuration to the device automatically.

3.5 Digital Input Counter

Digital Input Counter component is designed for reading high-speed counter of Digital Inputs.

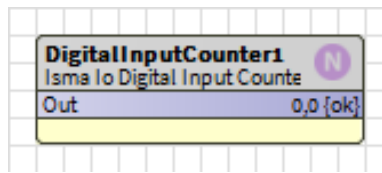


Figure 23. Digital Input Counter Component

The component must be placed under Local IO Device component.

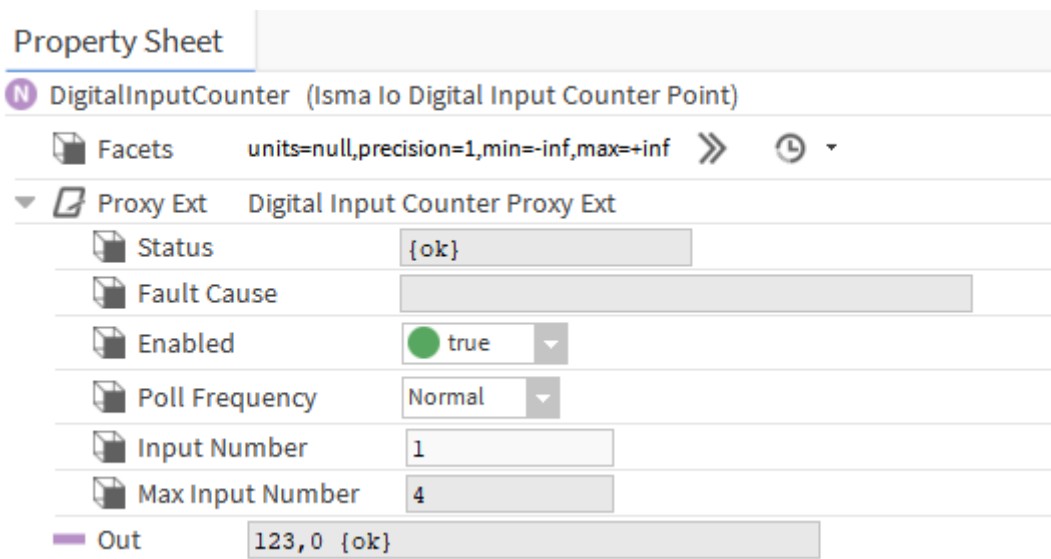


Figure 24. Digital Input Counter Component AX Property Sheet View

The Digital Input Counter component has the following slots:

- 1 Facets - determines how the input value will be displayed.
- 2 Proxy Ext - component handles the point configuration and has the following slots:
 - 2.1 Status - the current status of the component.
 - Ok** - the component is working correctly.
 - Disabled** - component or parent (device or network) is disabled (the "Enable" slot is set to "false")
 - Fault**- there is a fault described in the Fault Cause slot.
 - Down** – no response from the point.
 - 2.2 Fault Cause - describes the cause of the fault in case of a fault or down status.
 - None** - no fault

Bad Parent - component inserted in the incorrect place in the structure (the only correct place is the Device component or a subfolder of the Device component).

Duplicated Component - when a component with a given address already exists (prevents double representation of input/output within a given application)

Invalid Type - a type of component not supported by the device.

Parent disabled - Parent (device or network) disabled

Point down – the point is unavailable

- 2.3 Enabled - Enable/disable the component
- 2.4 Poll Frequency - Selection of the poll frequency of the points, the available options: Fast, Normal, Slow.
- 2.5 Input Number - Selecting an input number, if a point is added to a device, the component selects the first unused input number automatically
- 2.6 Max Input Number – information about the number of available inputs in the device
- 3 Out - provides real-time information about the current value of the input data together with the units selected in the facets slot and the current state of the point. If the value of the out slot is forced by one of the available component actions, the value is followed by information about the executed action, e.g. {overridden}. If the component is working correctly, the status is considered normal and the value appears with the default status {ok}.

Component Digital Input Counter has the following actions:

Set – setting the value of the counter. The action overwrites the Out and In slots.

Reset – resetting the value of the counter to 0. The action overwrites the Out and In slots.

Additionally, the ProxyExt component's extension has the following actions:

Force Write Config that saves the point configuration to the device automatically.

Force Read - sending a query automatically despite the settings in Poll Frequency.

Any change to the Input Number configuration slot causes the configuration to be sent to the device automatically.

3.6 Analog Output

Analog Output component is designed for supporting physical local Analog Outputs working as voltage output (range 0 V – 10 V) or PWM.

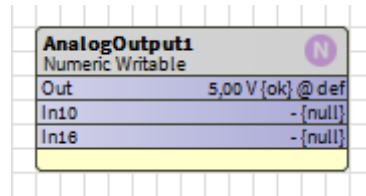


Figure 25. Analog Output Component

The component must be placed under Local IO Device component.

The default value of the component is 0,00 V.

N AnalogOutput (Numeric Writable)

Facets units=V,precision=2 V,min=-inf V,max=+inf V >> ⌚

Proxy Ext Analog Output Proxy Ext

Status {ok}

Fault Cause

Enabled true

Poll Frequency Normal

Output Number 1

Max Output Number 8

Analog Type Voltage

Linear Conversion Scale 1,0 Offset 0,0

Out	0,00 V {ok}
In1	- {null}
In2	- {null}
In3	- {null}
In4	- {null}
In5	- {null}
In6	- {null}
In7	- {null}
In8	- {null}
In9	- {null}
In10	- {null}
In11	- {null}
In12	- {null}
In13	- {null}
In14	- {null}
In15	- {null}
In16	- {null}
Fallback	- {null}

Override Expiration null

Figure 26. Analog Output Component AX Property Sheet View

Analog Output component has the following slots:

- 1 Facets - determines how the input value will be displayed.
- 2 Proxy Ext - component handles the point configuration and has the following slots:
 - 2.1 Status - the current status of the component.
 - Ok** - the component is working correctly.
 - Disabled** - component or parent (device or network) is disabled (the "Enable" slot is set to "false")
 - Fault**- there is a fault described in the Fault Cause slot.
 - Down** – no response from the point.
 - 2.2 Fault Cause - describes the cause of the fault in case of a fault or down status.
 - None** - no fault
 - Bad Parent** - component inserted in the incorrect place in the structure (the only correct place is the Device component or a subfolder of the Device component)
 - Duplicated Component** - when a component with a given address already exists (prevents double representation of input/output within a given application)
 - Invalid Type** - a type of component not supported by the device.
 - Parent disabled** - Parent (device or network) disabled
 - Point down** – the point is unavailable.
 - 2.3 Enabled - Enable/disable the component
 - 2.4 Poll Frequency - Selection of the poll frequency of the points, the available options: Fast, Normal, Slow.
 - 2.5 Output Number - Selecting the output number. If the point is added to the device, the component selects the first unused output number automatically.
 - 2.6 Max Output Number – information about the number of available outputs in the device
 - 2.7 Analog Type – allows you to select the mode in which the analog output works.

The following types of modes are available:

0-10V – The Analog Output works as a voltage output in the range of 0-10V.

PWM1Hz - The Analog Output operates in PWM mode with a frequency of 1 Hz.

PWM10Hz - The Analog Output operates in PWM mode with a frequency of 10 Hz

PWM100Hz - The Analog Output operates in PWM mode with a frequency of 100 Hz

PWM01Hz - The Analog Output operates in PWM mode with a frequency of 0,1 Hz

PWM001Hz - The Analog Output operates in PWM mode with a frequency of 0,01 Hz

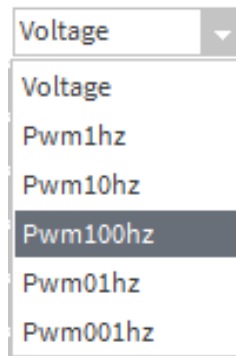


Figure 27. Analog Output Types

- 2.8 Linear Conversion - conversion of the out-slot value according to the formula $y=ax+b$, where x = value of the in-slot with the highest priority other than null; a = slot Scale; b = the Offset slot. Incorrect setting of scaling results in the calculated value exceeding the available range for the device (e.g. 0-10V), which results in indicating a different value on the input and on the Out slot. If the scaling is correct, the values are identical.
- 3 Out - provides real-time information about the current value of the input data together with the units selected in the facets slot and the current state of the point. If the value of the out slot is forced by one of the available component actions, the value is followed by information about the executed action, e.g. {overridden}. If the component is working correctly, the status is considered normal and the value appears with the default status {ok}.
- 4 In1 – In16 - input slots; the value of the highest priority slot different from null is rewritten into the out slot. In1 has the highest priority while In16 has the lowest priority.
- 5 Fallback - If the component has a null value or is incorrect on all In1-In16 slots, the Out slot takes the value entered into this slot. The value of the Fallback slot can be set with the Set action.
- 6 Override Expiration - the time after which the Override action expires.

Analog Output component has the following actions:

Emergency Override - overwrites the value of the component with the highest priority (In1), this action does not expire automatically in order to disable it, enable the Emergency Auto action.

Emergency Auto – restores the component to automatic operation; disables Emergency Override actions.

Override – overwrites the component value (priority In8). The action is disabled after the time set in the Override Expiration slot.

Auto – set the point for automatic operation.

Set – change in the value of the Fallback slot.

Additionally, the ProxyExt component’s extension has the following actions:

Force Write Config - saves the point configurations to the device.

Force Read - sends a query automatically despite the settings in Poll Frequency.

Force Write - sends the overwrite command automatically despite the values set in Poll Frequency.

Any change of the configuration slots such as Input Number, Analog Type or Default Output results in sending this configuration to the device automatically.

3.7 Digital Output

Digital Output component is designed for servicing physical local Digital Outputs.

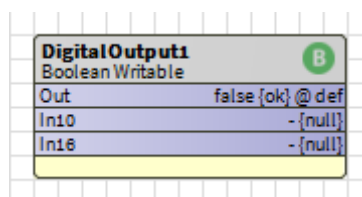


Figure 28. Digital Output Component

The component must be placed under Local IO Device component.

The default value of the component is false.

B DigitalOutput (Boolean Writable)

Facets trueText=true,falseText=false >> ⌚ ▾

Proxy Ext Digital Output Proxy Ext

Status	{ok}
Fault Cause	
Enabled	<input checked="" type="radio"/> true ▾
Poll Frequency	Normal ▾
Output Number	1
Max Output Number	8
Out	false {ok}
In1	- {null}
In2	- {null} ▾
In3	- {null} ▾
In4	- {null} ▾
In5	- {null} ▾
In6	- {null}
In7	- {null} ▾
In8	- {null}
In9	- {null} ▾
In10	- {null} ▾
In11	- {null} ▾
In12	- {null} ▾
In13	- {null} ▾
In14	- {null} ▾
In15	- {null} ▾
In16	- {null} ▾
Fallback	- {null} ▾
Override Expiration	null
Min Active Time	+00000h 00m 00s ▾
Min Inactive Time	+00000h 00m 00s ▾
Set Min Inactive Time On Start	<input type="radio"/> false ▾

Figure 29. Digital Output Component AX Property Sheet View

The Digital Output component has the following slots:

- 1 Facets - determines how the input value will be displayed.
- 2 Proxy Ext - component handles the point configuration and has the following slots:
 - 2.1 Status - the current status of the component.
 - Ok - the component is working correctly.

Disabled - component or parent (device or network) is disabled (the "Enable" slot is set to "false")

Fault- there is a fault described in the Fault Cause slot.

Down – no response from the point.

2.2 Fault Cause - describes the cause of the fault in case of a fault or down status.

None - no fault

Bad Parent - component inserted in the incorrect place in the structure (the only correct place is the Device component or a subfolder of the Device component).

Duplicated Component - when a component with a given address already exists (prevents double representation of input/output within a given application)

Invalid Type - a type of component not supported by the device.

Parent disabled - Parent (device or network) disabled

Point down – the point is unavailable

2.3 Enabled - Enable/disable the component

2.4 Poll Frequency - Selection of the poll frequency of the points, the available options: Fast, Normal, Slow.

2.5 Output Number - Selecting the output number. If the point is added to the device, the component selects the first unused output number automatically.

2.6 Max Output Number – information about the number of available outputs in the device.

3 Out - provides real-time information about the current value of the input data together with the units selected in the facets slot and the current state of the point. If the slot out value was forced by one of the available component actions, the value is followed by information about the executed action, e.g. {overridden}. If the component is working properly, the status is considered normal and the value appears with the default status {ok}.

4 In1 – In16 – input slots; the value of the highest priority slot different from null is rewritten into the out slot. In1 has the highest priority while In16 has the lowest priority.

5 Fallback - If the component has a null or incorrect value on all In1-In16 slots, the Out slot takes the value entered in this parameter. The value of the Fallback slot can be set with the Set action.

6 Override Expiration - the time after which the Override action expires.

7 Min Active Time - timer to specify the minimum active time. Typical usage is to prevent

short cycling of equipment controlled by the point.

- 8 Min Inactive Time - timer to specify the minimum inactive time. Typical usage is to prevent short cycling of equipment controlled by the point.
- 9 Set Min Inactive Time on Start - If the slot value is set to true, the Min Inactive Time timer is enabled from the start of the station.

The Digital Output component has the following actions:

Emergency Override - overwrites the value of the component with the highest priority (In1), this action does not expire automatically. To disable it, activate the Emergency Auto action.

Emergency Auto – restores the component to automatic operation; disables Emergency Override actions.

Override – overwrites the component value (priority In8). The action is disabled after the time set in the Override Expiration slot.

Auto – set the point for automatic operation.

Set – change in the value of the Fallback slot.

Additionally, the ProxyExt component's extension has the following actions:

Force Write Config that saves the point configuration to the device automatically.

Force Read - sends a query automatically despite the settings in Poll Frequency.

Force Write - sends the overwrite command automatically despite the values set in Poll Frequency

Any change of configuration slots, such as Input Number or Default Output results in sending this configuration to the device automatically.

3.8 Rotary Switch

The Rotary Switch S1 and Rotary Switch S2 components support physical rotary switches located under the top cover of the controller.

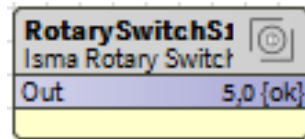


Figure 30. Rotary Switch Component

The component must be placed under the Local IO Device component. Components Rotary Switch S1 and S2 are not visible on the Isma Point Manager view (if ISMA_IO.wb is installed).

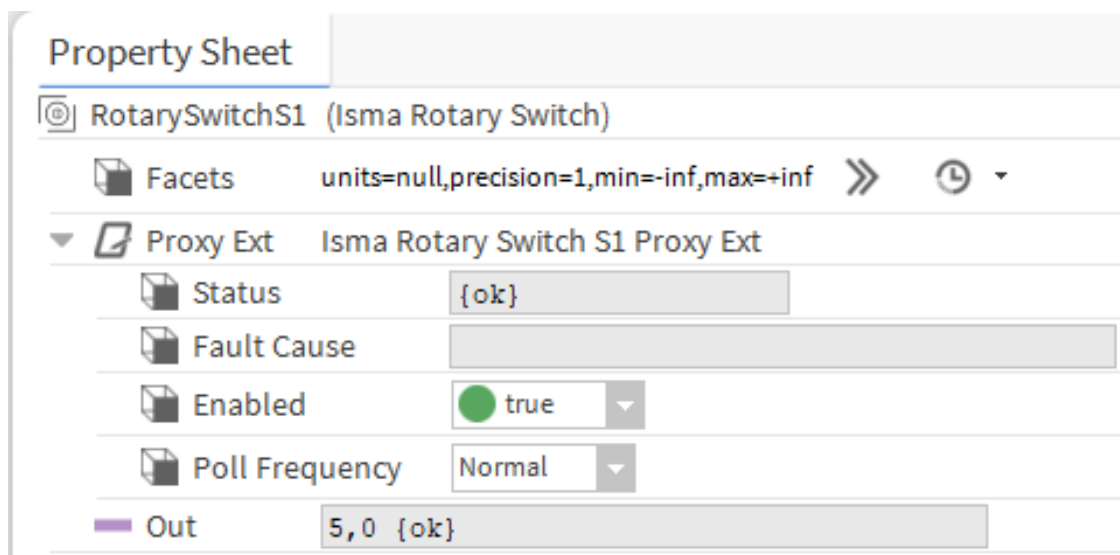


Figure 31. Rotary Switch Component AX Property Sheet View

The Rotary Switch component has the following slots:

1. Facets – determines how the output value will be displayed.
2. Proxy Ext – component's extension that handles its configuration with the following slots:
 - 2.1. Status – the current status of the component:
 - Ok** – component is working correctly,
 - Disabled** – component or parent (device or network) is disabled (the "Enable" slot is set to "false"),
 - Fault** – there is a fault described in the Fault Cause slot,

Down – no response from the point;

2.2. Fault Cause – describes the cause of a fault or down status:

None – no fault,

Bad Parent – the component is incorrectly placed in the structure (the only correct place is the Device component or a subfolder of the Device component),

Disabled – the component is disabled,

Duplicated Component – a component with a given address already exists (prevents double representation of input/output within a given application),

Parent disabled – the parent (device or network) is disabled,

Parent Not Ok – the component's parent has the "{fault}" status,

Parent Down – the component's parent has the "{down}" status,

Point Down – the point is unavailable;

2.3. Enabled – Enables/disables the component;

2.4. Poll Frequency – Selection of the poll frequency of the points, the available options: Fast, Normal, Slow.

3. Out – provides real-time information about the current value set on the selected rotary switches S1/S2, in the range of 0 to 9, together with the units selected in the Facets slot and the current status of the point. If the component is working correctly, the status is considered normal and the value appears with the default status {ok}.

The ProxyExt component's extension has the following actions:

Force Write Config – instantly saves the component's existing configuration to the device;

Force Read – sends a query immediately, despite the settings in Poll Frequency.

3.9 DIP Switch

The Dip Switch S3 and Dip Switch S4 components support physical DIP switches located under the top cover of the controller.

Dip Switch S4	
Isma Dip Switch S4	
Out	- {fault,null}
Out1	false
Out2	false
Out3	false
Out4	false
Out5	false
Out6	false
Out7	false
Out8	false

Figure 33. Dip Switch Component

The component must be placed under the Local IO Device component. Components Dip Switch S3 and S4 are not visible on the Isma Point Manager view (if ISMA_IO.wb is installed).

Property Sheet

DipSwitchS4 (Isma Dip Switch S4)

Facets units=null,precision=1,min=-inf,max=+inf

Proxy Ext Isma Dip Switch S4 Proxy Ext

- Status {fault}
- Fault Cause Parent Not OK
- Enabled true
- Poll Frequency Normal

Out	- {fault,null}
Out1	<input type="checkbox"/> false
Out2	<input type="checkbox"/> false
Out3	<input type="checkbox"/> false
Out4	<input type="checkbox"/> false
Out5	<input type="checkbox"/> false
Out6	<input type="checkbox"/> false
Out7	<input type="checkbox"/> false
Out8	<input type="checkbox"/> false

Figure 34. Dip Switch Component AX Property Sheet View

The DIP Switch component has the following slots:

1. Facets – determines how the output value will be displayed.
2. Proxy Ext – component's extension that handles its configuration with the following slots:
 - 2.1. Status – the current status of the component:
 - Ok** – component is working correctly,
 - Disabled** – component or parent (device or network) is disabled (the "Enable" slot is set to "false"),
 - Fault** – there is a fault described in the Fault Cause slot,
 - Down** – no response from the point;
 - 2.2. Fault Cause – describes the cause of a fault or down status:
 - None** – no fault,
 - Bad Parent** – the component is incorrectly placed in the structure (the only correct place is the Device component or a subfolder of the Device component),
 - Disabled** – the component is disabled,
 - Duplicated Component** – a component with a given address already exists (prevents double representation of input/output within a given application),
 - Parent disabled** – the parent (device or network) is disabled,
 - Parent Not Ok** – the component's parent has the "{fault}" status,
 - Parent Down** – the component's parent has the "{down}" status,
 - Point Down** – the point is unavailable;
 - 2.3. Enabled – Enables/disables the component;
 - 2.4. Poll Frequency – Selection of the poll frequency of the points, the available options: Fast, Normal, Slow.
3. Out – provides real-time information about the current value set on the selected DIP switches S3/S4. The value is represented as the sum of the values of the set switches in binary code (switch 1 has a weight of 2^0 , switch 2 has a weight of 2^1 , etc.), together with the units selected in the Facets slot and the current status of the point. If the component is working correctly, the status is considered normal and the value appears with the default status {ok}.
4. Out1–Out8 (for S3 up to Out6) – provides real-time information about the current state set

on the selected DIP switch S3/S4.

The ProxyExt component's extension has the following actions:

Force Write Config – instantly saves the component's existing configuration to the device;

Force Read – sends a query immediately, despite the settings in Poll Frequency.