iSMACONTROLLI

iClib

User Manual

iSMA CONTROLLI Solutions Library for Niagara 4

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1 Introduction

The iClib (iSMA CONTROLLI Solutions Library) is a palette designed for the Niagara Framework to facilitate configuring and integrating iSMA CONTROLLI products in the Niagara 4 environment. The palette contains device components and points grouped by the iSMA CONTROLLI Solutions (Multiprotocol I/O Modules, Modbus I/O Modules, HVAC & Plant Control, Comfort Management, Gateways, and Actuators) allowing for an easy identification of the device.

The iSMA_CONTROLLI_Library (a Niagara JAR module) contains components for all Modbus (ModbusAsyncNetwork, ModbusTcpGatewayNetwork, and ModbusTcpNetwork) and BACnet predefined points.

The module supports below listed devices:

- iSMA MINI family;
- iSMA MIX family;
- iSMA MAX family;
- iSMA-B-AAC20;
- iSMA-B-FCU;
- iSMA-B-MG-IP;
- iSMA-B-W0202;
- iSMA-B-2D;
- iSMA-B-2D1B;
- iSMA-B-LP;
- Touch Point;
- SfAR-S family;
- SfAR-M family;
- EBV actuator;
- MVC503R-MB actuator;
- MVE-2-RS actuator.

1.1 Revision History

Rev.	Date	Description
1.0	20 Feb 2023	First edition

Table 1. Revision history

2 Palette Structure

The iSMA_CONTROLLI_Library palette is structured into folders by functionalities, and each main folder has subfolders categorized by solutions to facilitate identification of a required device. The main folders of the palette are the following:

- **ModbusAsync:** contains device components and pre-configured network points for iC devices working in the Modbus Acync network;
- **ModbusTCPGateway:** contains device components and pre-configured network points for iC devices working as the Modbus TCP gateway;
- **ModbusTCP:** contains device components and pre-configured network points for iC devices working in the Modbus TCP network;
- **Components:** contains components including all digital inputs/outputs (or inputs/outputs working in the digital mode) for the available devices;
- **BACnetNetwork:** contains device components and pre-configured network points for iC devices working in the BACnet network.
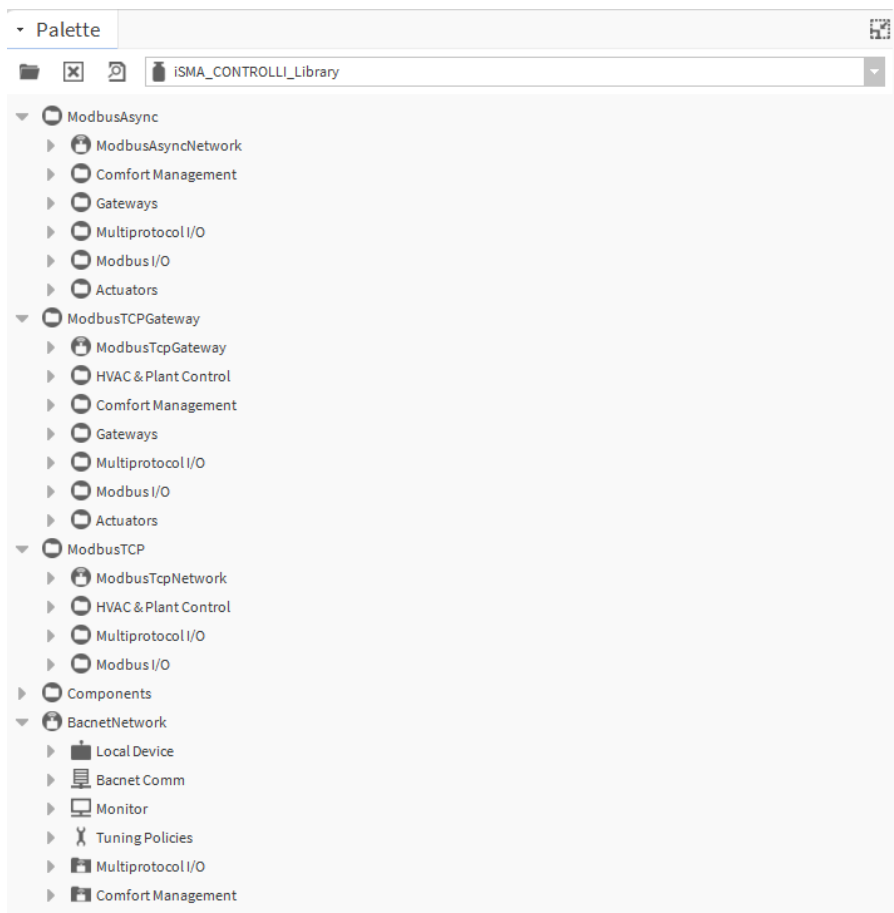

Figure 1. The iSMA_CONTROLLI_Library palette

2.1 Modbus Devices

Components and points for the Modbus protocol are available for the following devices:

- iSMA-B-AAC20 (iSMA solution: HVAC & Plant Control);
- iSMA-B-2D (Comfort Management);
- iSMA-B-2D1B (Comfort Management);
- iSMA-B-FCU (Comfort Management);
- iSMA-B-LP (Comfort Management);

- Touch Point (Comfort Management);
- iSMA-B-MG-IP (Gateways);
- iSMA-B-W0202 (Gateways);
- iSMA-B-8I (Multiprotocol I/O Modules);
- iSMA-B-8U (Multiprotocol I/O Modules);
- iSMA-B-4I4O-H (Multiprotocol I/O Modules);
- iSMA-B-4U4O-H (Multiprotocol I/O Modules);
- iSMA-B-4U4A-H (Multiprotocol I/O Modules);
- iSMA-B-4O-H (Multiprotocol I/O Modules);
- iSMA-B-4TO-H (Multiprotocol I/O Modules);
- iSMA-B-MIX18 (Multiprotocol I/O Modules);
- iSMA-B-MIX38 (Multiprotocol I/O Modules);
- iSMA-B-12O-H (Multiprotocol I/O Modules);
- iSMA-B-24I (Multiprotocol I/O Modules);
- SfAR-1M-1AI1DO (Modbus I/O Modules);
- SfAR-1M-1TI1DO (Modbus I/O Modules);
- SfAR-1M-2DI1AO (Modbus I/O Modules);
- SfAR-1M-2DI2DO (Modbus I/O Modules);
- SfAR-1M-4DI (Modbus I/O Modules);
- SfAR-1M-4DI-M (Modbus I/O Modules);
- SfAR-1M-4DO (Modbus I/O Modules);
- SfAR-S-6RO (Modbus I/O Modules);
- SfAR-S-6TI (Modbus I/O Modules);
- SfAR-S-8AI2DO (Modbus I/O Modules);
- SfAR-S-8AO (Modbus I/O Modules);
- SfAR-S-8DI8DO (Modbus I/O Modules);
- SfAR-S-8DI8RO (Modbus I/O Modules);
- SfAR-S-8TO (Modbus I/O Modules);
- SfAR-S-16D (Modbus I/O Modules)I;
- SfAR-S-16DI-M (Modbus I/O Modules);
- SfAR-S-16DO (Modbus I/O Modules);
- SfAR-S-16RO (Modbus I/O Modules);
- SfAR-S-ETH (Modbus I/O Modules);
- EBV (Actuators);
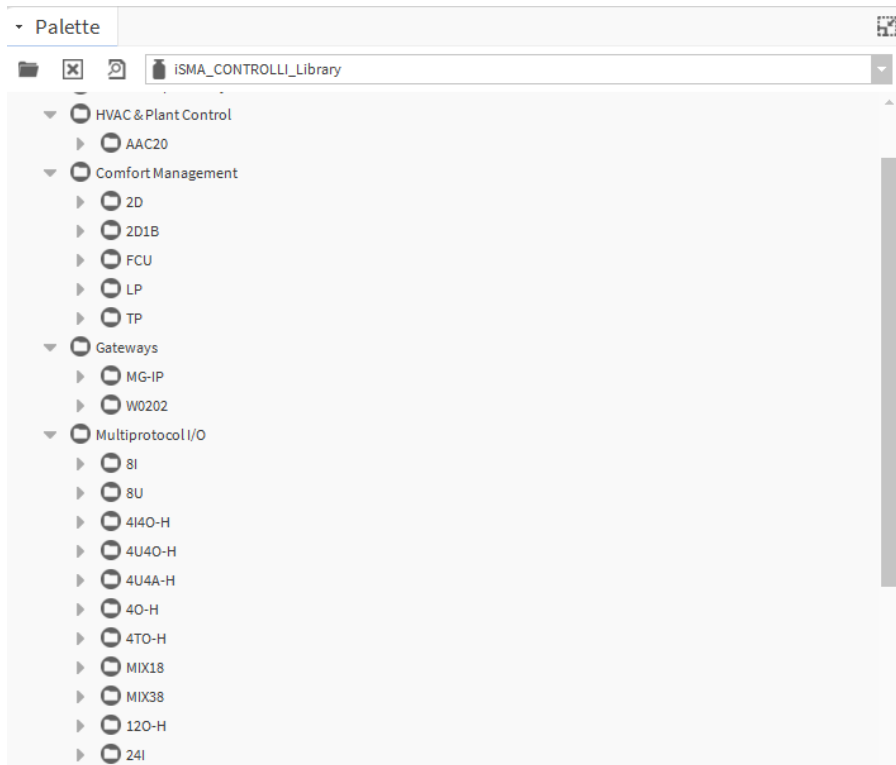- MVC503R-MB (Actuators);
- MVE-2-RS (Actuators).

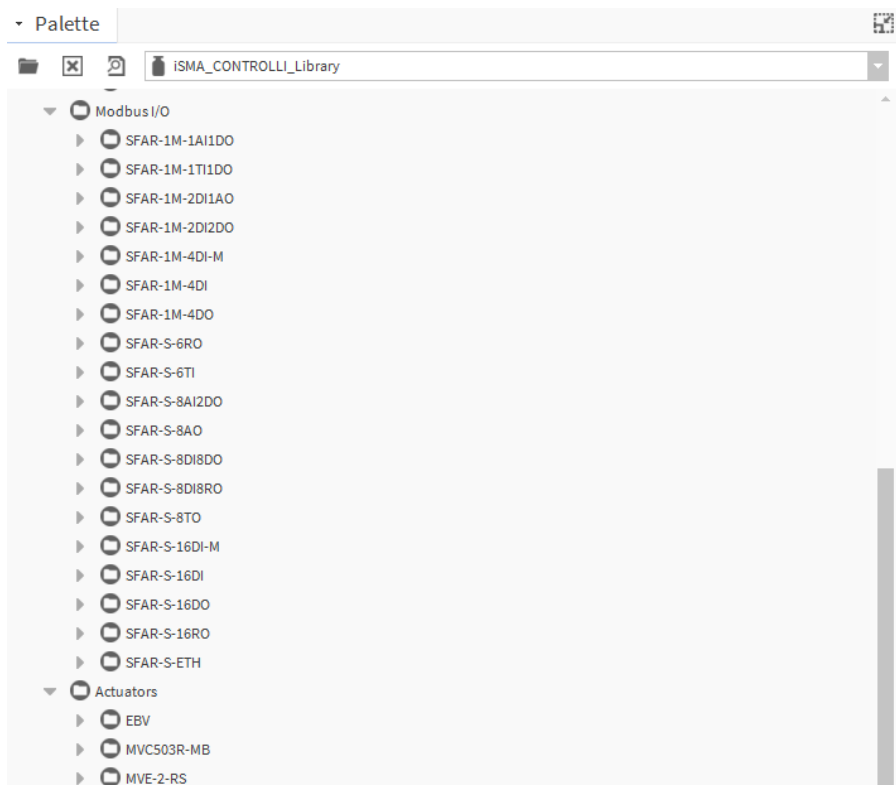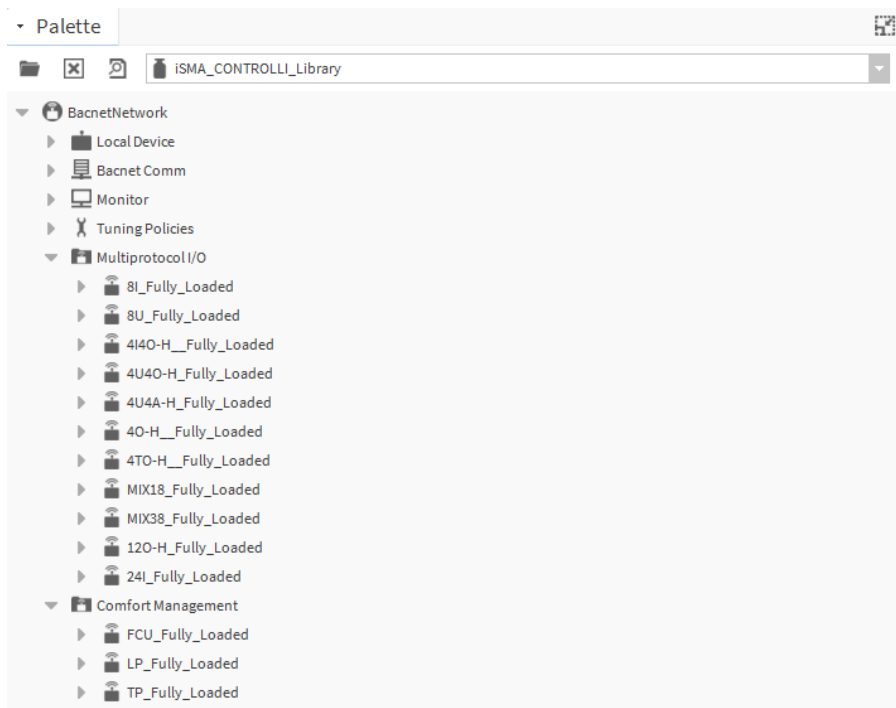*Figure 2. Devices available in the Modbus protocol*

Figure 3. Devices available in the Modbus protocol

2.2 BACnet Devices

Components and points for the BACnet protocol are available for the following devices:

- iSMA-B-8I (iSMA solution: Multiprotocol I/O Modules);
- iSMA-B-8U (Multiprotocol I/O Modules);
- iSMA-B-4I4O-H (Multiprotocol I/O Modules);

- iSMA-B-4U4O-H (Multiprotocol I/O Modules);
- iSMA-B-4U4A-H (Multiprotocol I/O Modules);
- iSMA-B-4O-H (Multiprotocol I/O Modules);
- iSMA-B-4TO-H (Multiprotocol I/O Modules);
- iSMA-B-MIX18 (Multiprotocol I/O Modules);
- iSMA-B-MIX38 (Multiprotocol I/O Modules);
- iSMA-B-12O-H (Multiprotocol I/O Modules);
- iSMA-B-24I (Multiprotocol I/O Modules);
- iSMA-B-FCU (Comfort Management);
- iSMA-B-LP (Comfort Management);
- Touch Point (Comfort Management).

Figure 4. Devices available in the BACnet protocol

3 Device Points

3.1 iSMA-B-2D

For the iSMA-B-2D Light Controller, the iClib palette includes input points for controlling light switches and DALI networks, PIR sensors in the LLC mode, motion sensors, and presence detectors and output points for controlling light outputs.
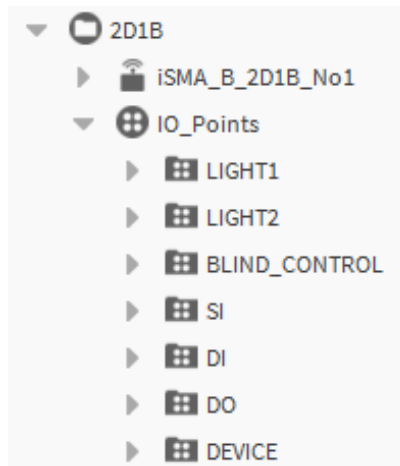

Figure 5. Points for the iSMA-B-2D controller

3.2 iSMA-B-2D1B

For the iSMA-B-2D1B Light and Blind Controller, the iClib palette includes input points for controlling light switches and DALI networks, blind movement, motion sensors, and presence detectors and output points for controlling light and blind outputs.

Figure 6. Points for the iSMA-B-2D1B controller

3.3 iSMA-B-FCU

For the iSMA-B-FCU Fan Coil Unit controller, the iClib palette includes points for controlling temperature and fan, second stage heating/cooling, inputs and outputs management, LCD operating, and network settings.
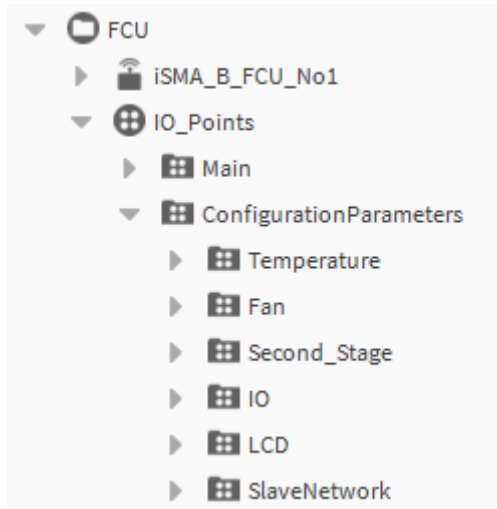
Figure 7. Points for the iSMA-B-FCU controller

3.4 iSMA-B-LP

For the iSMA-B-LP room panel, the iClib palette includes points for controlling temperature, CO2, and humidity sensors, occupancy and fan menus settings, LCD and keypad settings, and time and device configuration.
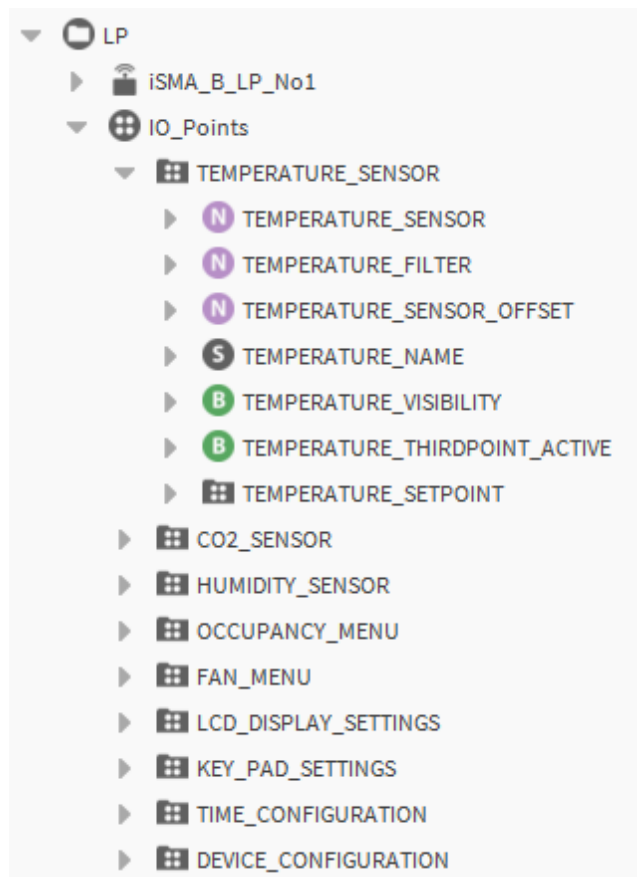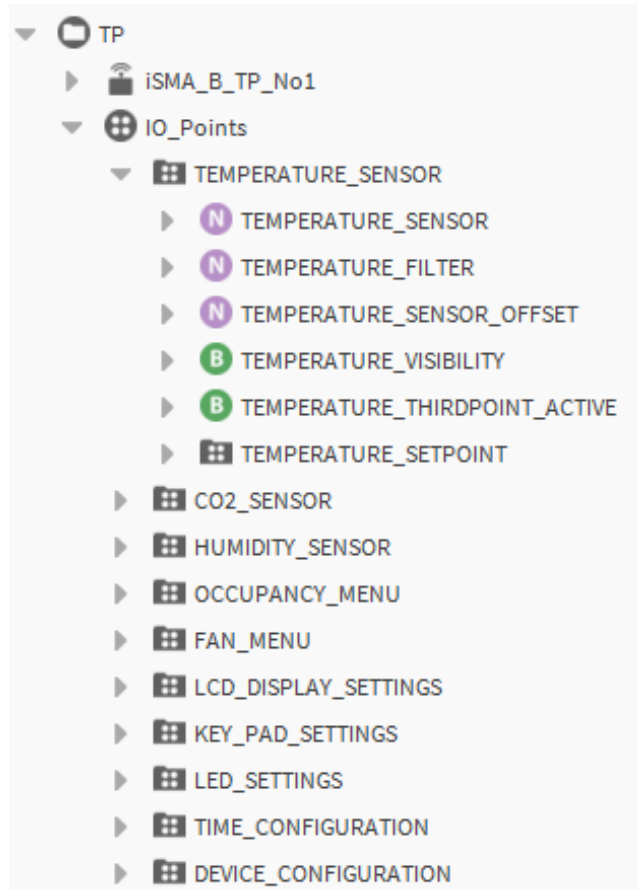

Figure 8. Points for the iSMA-B-LP panel

3.5 Touch Point

For the Touch Point panel, the iClib palette includes points for controlling temperature, CO2, and humidity sensors, occupancy and fan menus settings, LCD and keypad settings, and time and device configuration.

Figure 9. Points for the Touch Point panel

3.6 iSMA-B-MG-IP

For the MG-IP Meter Gateway, the iClib palette includes points for M-Bus network and module settings.

Figure 10. Points for the iSMA-B-MG-IP gateway

3.7 iSMA-B-W0202

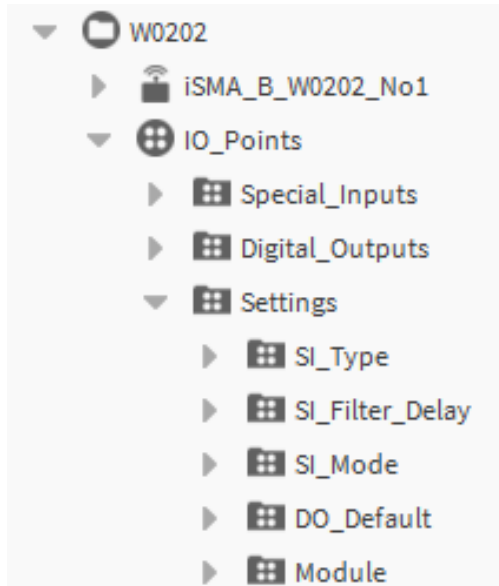For the iSMA-B-W0202 wireless module, the iClib palette includes points for inputs, outputs, and device configuration.

Figure 11. Points for the iSMA-B-W0202 module

3.8 MINI/MIX/MAX Modules

For the iSMA-B-MINI/MIX/MAX modules, the iClib palette includes points for inputs, outputs, and device configuration.
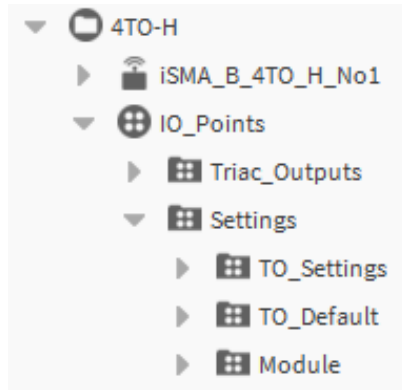

Figure 12. Points for the iSMA-B-MINI/MIX/MAX modules

Figure 13. Points for the iSMA-B-4TO-H module

3.9 SfAR-S/SfAR-1M

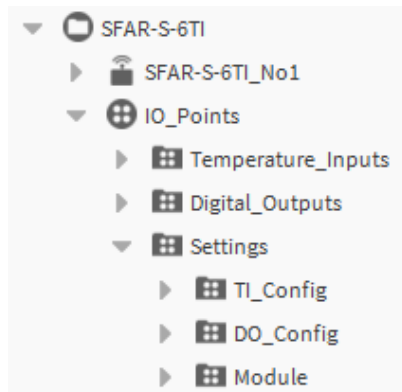For SfAR-S and SfAR-1M Modbus modules, the iClib palette includes points for inputs, outputs, and device configuration.
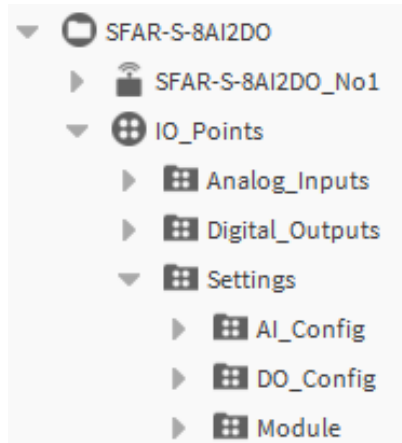

Figure 14. Points for the SfAR-S-6TI module

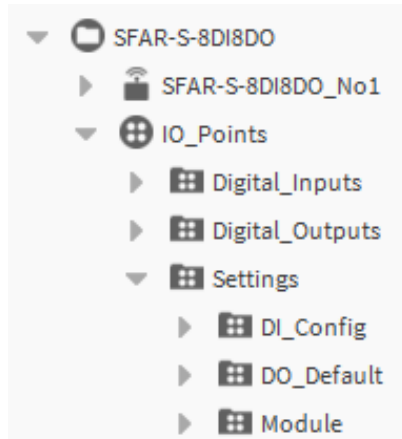
Figure 15. Points for the SfAR-S-8AI2DO module

Figure 16. Points for the SfAR-S-8DI8DO module
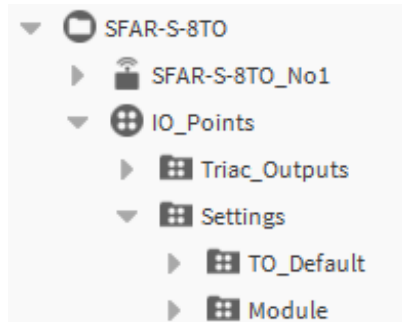

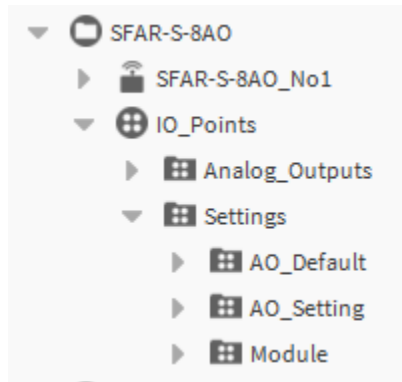*Figure 17. Points for the SfAR-S-8TO module*

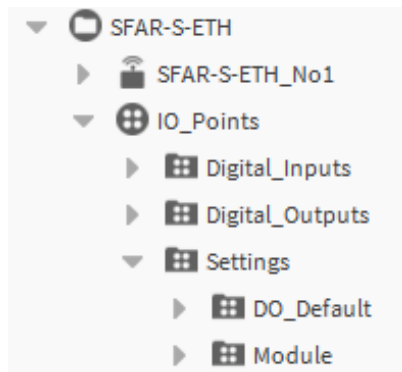*Figure 18. Points for the SfAR-S-8AO module*

Figure 19. Points for the SfAR-S-ETH module

3.10 EBV

For the EBV actuators, the iClib palette includes points for device configuration, alarms and diagnostics configuration, input points for modulating control and output points for

feedback output signal, configuration of the dynamic balancing functions and temperature control loop, and for energy functions and power control.
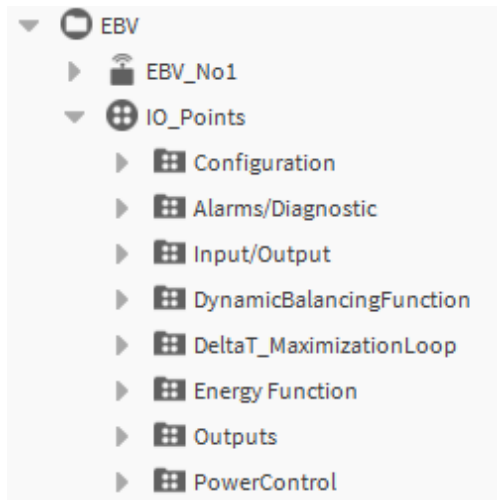

Figure 20. Points for the EBV valves

3.11 MVC503R-MB

For MVC actuators, the iClib palette includes points for device configuration, alarms and diagnostics configuration, and inputs and outputs configuration.
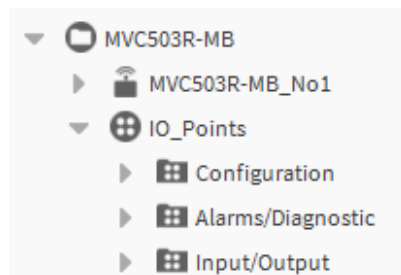

Figure 21. Points for the MVC actuators

3.12 MVE-2-RS

For the MVE actuators, the iClib palette includes points for device configuration, alarms and diagnostics configuration, input points for modulating control and output points for feedback output signal, configuration of setpoints, temperature sensors, and temperature control loop, and for energy functions.
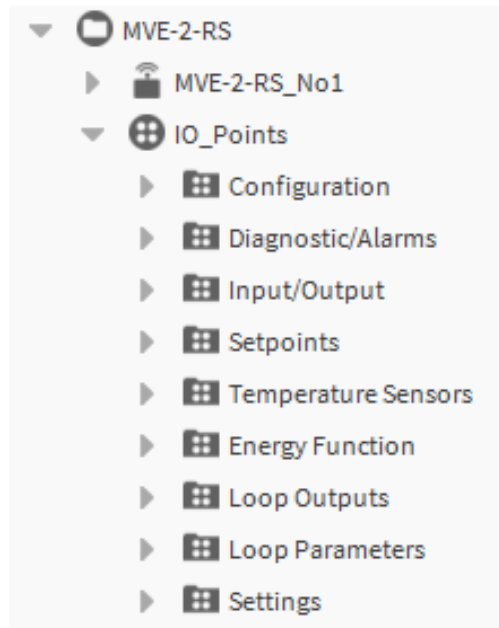
Figure 22. Points for the MVE actuators

4 Components

4.1 DigitalInputs

The DigitalInputs component is a bulk component to service all digital inputs (or inputs working in the digital mode) in the devices covered in the iClib.

Figure 23. The DigitalInputs component

The DigitalInputs component has the following slots:

- **In:** a 24-bit numeric value representing Di1-Di12 inputs of the iSMA-B-MAX module or Di1-Di16 and Ui1-Ui8 inputs of other families and depending on the Max Device slot value:
    - if the Max Device slot is true:
      first 12 bits (0x000FFF mask) transfer values to the Di1-Di12 slots;
    - if the Max Device slot is false:
      first 16 bits (0x00FFFF mask) transfer values to the Di1-Di16 slots;
      17-24 bits (0xFF0000 mask) transfer values to the Ui1-Ui8 slots;
- **In2:** a 12-bit numeric value representing bits of the iSMA-B-MAX device Di13-Di24 digital inputs;

Note: The In2 slot is active only if the Max Device slot is true.

- **Di1-Di12:** slots of 1-12 digital inputs channels;
    - state of first 12 bits of the In slot;

- **Di13-Di16:** slots of 13-16 digital inputs channels;
  - state of 13-16 bits of the In slot if the Max Device slot is false;
  - state of 1-4 bits of the In2 slot if the Max Device slot is true;
- **Di17-Di24:** slots of 17-24 digital inputs channels;
  - state of 5-12 bits of the In2 slot if the Max Device slot is true;
- **Ui1-Ui8:** slots of 1-8 universal inputs working as digital inputs channels;
  - state of 17-24 bits of the In slot if the Max Device slot is false;
- **Max Device:** allows to change a control algorithm between the one specific for the iSMA-B-MAX module and others devices.

> **Worth to notice:**
>
> For the iSMA-B-MAX device, the In slot needs to be linked from the Modbus register value configured as an integer (16-bit) value (decimal: 15), and the In2 slot needs to be linked from the Modbus numeric value configured as an integer (16-bit) value (decimal: 215).
>
> For devices equipped only with digital inputs, the In slot needs to be linked from the Modbus numeric value configured as an integer (16-bit) value (decimal: 15).
>
> For devices equipped only with universal inputs only or with digital inputs and universal inputs, the In slot needs to be linked from the Modbus numeric value configured as a long (32-bit) value (decimal: 15).

4.2 DigitalOutputs

The DigitalOutputs component is a bulk component to service all digital outputs (or outputs working in the digital mode) for devices covered in the iClib.

Figure 24. The DigitalOutputs components

The DigitalOutputs component has the following slots:

- **Out:** 24-bit numeric value representing Do1-Do16 and Ao1-Ao8 outputs:
  - firsts 16 bits (0x00FFFF mask) are affected by state of DI1-DI16 slots.
  - 17-24 bits (0xFF0000 mask) are affected by state of AO1-AO8 slots
- **Do1-Do16:** slots of 1-16 digital outputs channels (transferring values to first 16 bits of the Out slot);
- **Ao1-Ao8:** slots of 1-8 analog outputs working as digital outputs channels (transferring values to 17-24 bits of the Out slot).

Worth to notice:

For devices equipped only with digital outputs, the Out slot needs to be linked to the Modbus numeric value configured as an integer (16-bit) value (decimal: 17).

For devices equipped only with analog outputs or digital outputs and analog outputs, the Out slot needs to be linked to the Modbus numeric value configured as a long (32-bit) value (decimal: 17).

4.3 ModbusClientStringWritable

The ModbusClientStringWritable component is a network point that writes and reads 2 ASCII characters in one Modbus register. It is required to send up to 4 characters of the main menu to the iSMA-B-LP device.

Figure 25. The ModbusClientStringWritable component