iSMA-B-MAC36NL

User Manual

iSMA-B-LIB-GRAPH

Global Control 5 Sp. z o.o.
Warsaw, Poland
www.gc5.pl

Table of contents

1 Introduction

1.1 History of the revisions

Rev	Date	Description
1.0	28.03.2019	First version

Table 1 - History of the revisions

1.2 iSMA-B-MAC36NL Overview

iSMA-B-MAC36NL is a new generation Hybrid IoT Controller equipped with 36I/O and powered by Niagara 4 framework. It supports many protocols including BACnet IP, BACnet MS/TP. Modbus TCP, Modbus RTU, LON IP, KNX IP and many more. iSMA-B-MAC36NL beside great hardware features and outstanding software functionality, offers many additional packages which builds superb competitive advantage. One of the package is described below.

1.3 iSMA-B-LIB-GRAPH Overview

iSMA-B-LIB-GRPAH is a library containing a graphical pallet, allowing the integrator to use ready-made graphic components. The palette contains graphic objects, such as ventilation ducts, air dampers, coolers, heaters, air filters, sensors, humidifiers, fans, heat exchangers, free-standing HVAC devices, grids, devices, graphic representations of devices on a floor plan, hydraulic systems with valves and pumps. The iSMA_Graphics.jar graphics palette is an ideal addition to the iSMA-B-MAC36NL controller set with HDMI port and iSMA-B-PD-10-TB touchpad.

1.4 Key features:

- Niagara 4.6 and later
- Prepared Bindings
- Animated components
- Components representing alarm conditions
- Components representing switching on and off states
- Components of 0-100% controlled values
- Multi-state components

1.5 Information about the software license

This product is licensed. The iSMA-B-MAC36NL driver is licensed for iSMA-B-LIB-GRAPH as standard. The license is in the format of an additional GC5.lic file available on the Niagara Central server. If there is no license, after adding a component to the PX worksheet, the following watermark will appear on the component only in the web browser. The components in the Workbench looks as usual.

Figure 1 - watermark

2   Description of the pallet

Most graphics objects have **light shadows**, so the palette is dedicated to **dark background**, and looks best with **black backgrounds**. When using **iSMA-B-LIB-GRAPH**, remember that the PX file on which graphic components are placed must have the **Scale** property set to **Ratio Fit** for another resolution then default (for full screen mode). For default resolution can be set as **Ratio Fit** or **None**.

The whole pallet is divided into folders structure, which is described according to the nomenclature and order given in the following subsections.

2.1   Airflow
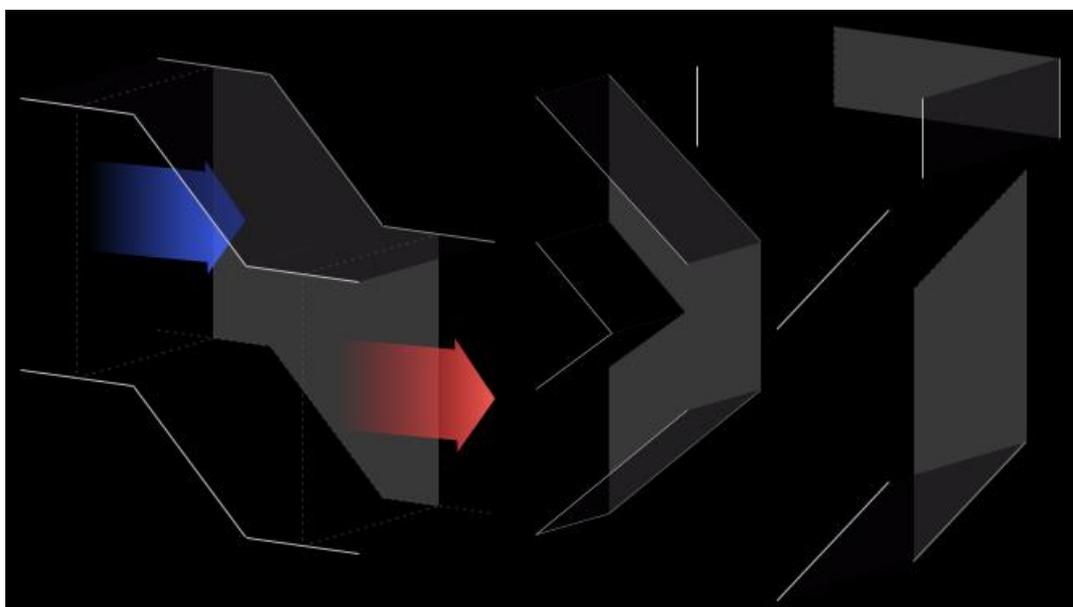
Figure 2 - sample graphic components from the Airflow folder

The Airflow folder contains **static** images representing **ventilation ducts**. Due to the features described above, graphic components in the folder with prefixes "**duct_air**", "**duct_h**" and "**duct_v**" must be distributed in the appropriate order in the PX file. Ventilation ducts on the right-hand side must be positioned higher (in display order - on a higher layer) than the ducts on the left-hand side.

The picture below shows the effects of incorrect (connection between duct 2 and duct 3) and correct (connection between duct 3 and duct 1) placement of objects in the PX file, where component numbers correspond to their order in the "Widget Tree".
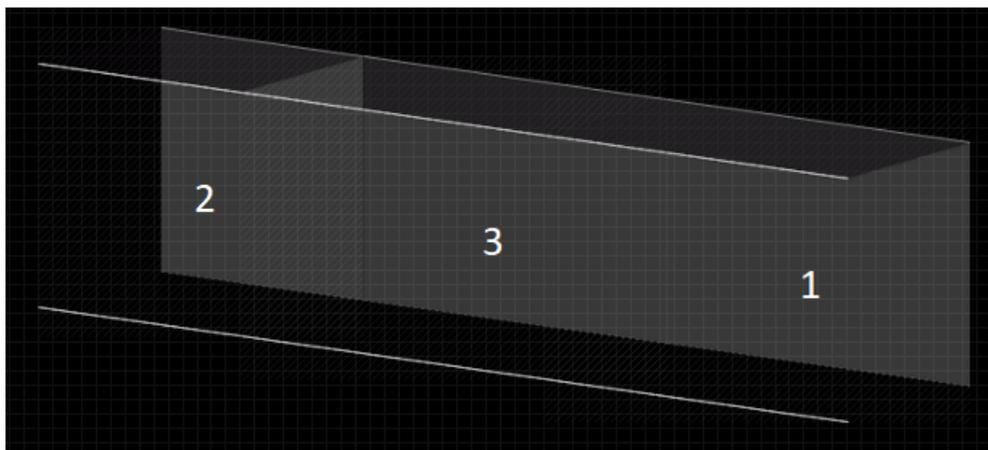
Figure 3 - Effects of Airflow folder components placement

For ducts "**duct_v**", at the bottom of the PX file there should be an object that is first in order in the "Widget Tree".

2.2 Dampers

Figure 4 - sample graphic components from the Dampers folder

The Dampers folder contains dynamic images representing air dampers. Due to the features described in the section 2, graphic components from the folder with the prefixes "**damper_round**" and "**damper_square**" must be placed in the appropriate order in the PX file. This principle is the same as for the static images described in the chapter 2.1.

2.2.1 Alarm components

Components with the suffix "alarm" in the name are dedicated to bind Boolean variables signalling an alarm or failure. Graphics representing the alarm status of the device have been added to these objects. The component has one control value (Value Binding), which affects

the Visibility property. The value of the true component of the Boolean type causes the graphics to be shown, while false causes the graphics to be hidden.

2.2.2 On/Off components

Components with the suffix "off-on" in the name are dedicated to binding Boolean variables signalling operation or switching on. Graphics representing the status of switch-off and switch-on of a given device have been added to these objects. The component has two control values (Value Binding). The first one affects switching between switching off graphics (false for horizontal, true for vertical) and operation (true for horizontal, false for vertical) of the device. The second value affects the Visibility property, where false causes the graphics to be shown, while true causes the graphics to be hidden (same variable as for the alarm component above).

Dragging a Boolean component from the Nav tree to a PX file and selecting "From Palette" in the Make Widget window, and then selecting "From Palette" from the palette of the object with the "off-on" suffix will automatically pinpoint the dragged component to the control value described as switching between switch-off and switch-on graphics.

2.2.3 0-100% components

Components with the suffix "0-100" in the name are dedicated to binding Numeric type variables containing analogue control value in the range of 0% - 100%. Graphics have been added to these objects to represent the percentage of opening or closing a device. The component has two control values (Value Binding). The first one affects the switching between the graphics responsible for the level of opening (or closing) depending on the entered value from 0 to 100. The second value affects the Visibility property, where false causes the graphics to be shown, while true causes the graphics to be hidden (same variable as for the alarm component above).

Dragging a Numeric component from the Nav tree to a PX file and selecting "From Palette" in the Make Widget window, and then selecting "From Palette" from the palette of the object with the suffix "0-100" will automatically bind the dragged component to the control value described as switching between the graphics responsible for the opening (or closing) level.

For horizontal graphic components, the value 0 represents a closing and 100 an opening, while for vertical components, the value 0 represents an opening and 100 a closing.
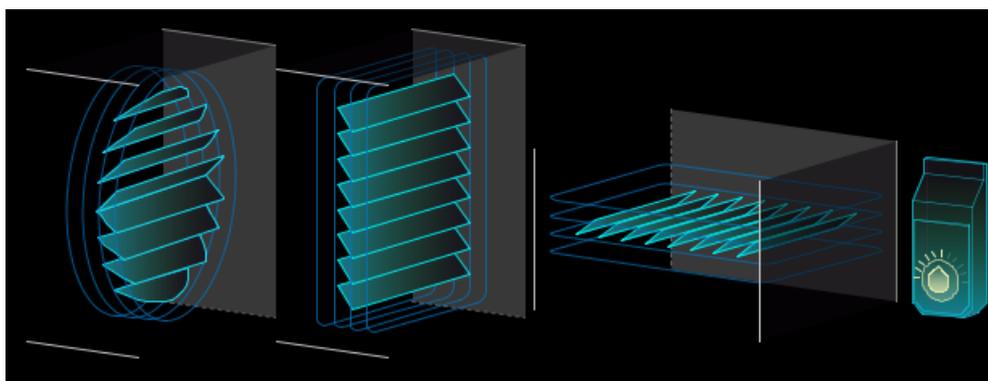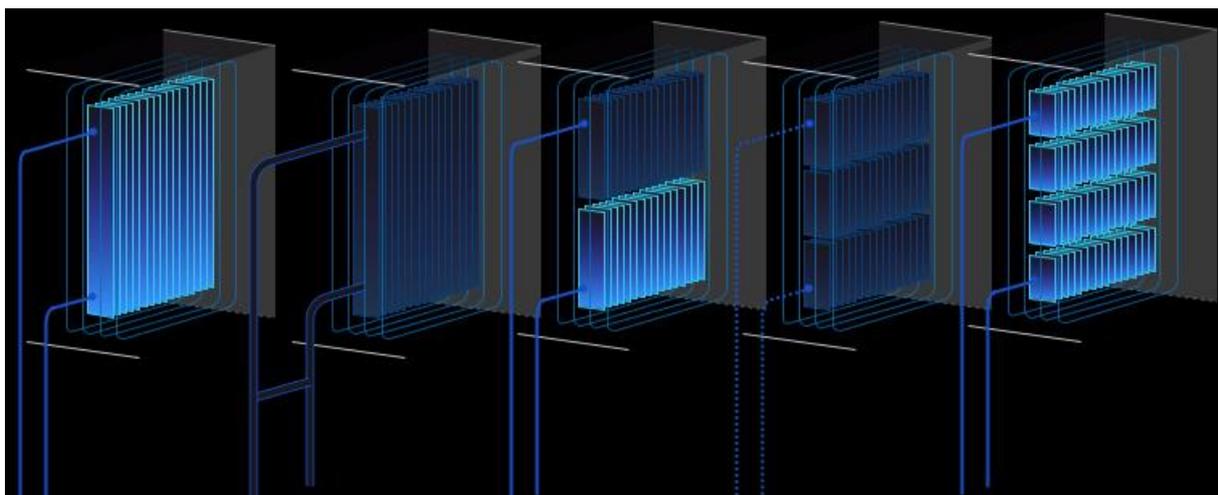
2.3 Cooling

Figure 5 - sample graphic components from the Cooling folder

The Cooling folder contains dynamic images representing air coolers. Due to the features described in section 2, the graphic components in the folder must be arranged in the correct order in the PX file. This principle is the same as for the static images described in the chapter 2.1.

2.3.1 Alarm components

Components with the suffix "alarm" in the name are dedicated to bind Boolean variables signalling an alarm or failure. Graphics representing the alarm status of the device have been added to these objects. The component has one control value (Value Binding), which affects the Visibility property. The value of the true component of the Boolean type causes the graphics to be shown, while false causes the graphics to be hidden.

2.3.2 On/Off components

Components with the suffix "off-on" in the name are dedicated to binding Boolean variables signalling operation or switching on. Graphics representing the status of switch-off and switch-on of a given device have been added to these objects. The component has two control values (Value Binding). The first one affects the switching between switching off graphics (false value) and operation (true value) of the device. The second value affects the Visibility property, where false causes the graphics to be shown, while true causes the graphics to be hidden (same variable as for the alarm component above).

Dragging a Boolean component from the Nav tree to a PX file and selecting "From Palette" in the Make Widget window, and then selecting "From Palette" from the palette of the object with the "off-on" suffix will automatically pinpoint the dragged component to the control value described as switching between switch-off and switch-on graphics.

2.3.3   0-100% components

Components with the suffix "0-100" in the name are dedicated to binding Numeric type variables containing analogue control value in the range of 0% - 100%. Graphics have been added to these objects to represent the percentage adjustment of the device. The component has two control values (Value Binding). The first one affects the switching between the graphics responsible for the level of adjustment depending on the entered value from 0 to 100. The second value affects the Visibility property, where false causes the graphics to be shown, while true causes the graphics to be hidden (same variable as for the alarm component above).

Dragging a Numeric component from the Nav tree to a PX file and selecting "From Palette" in the Make Widget window, and then selecting "From Palette" from the palette of the object with the suffix "0-100" will automatically bind the dragged component to the control value described as switching between the graphics responsible for the adjustment level.
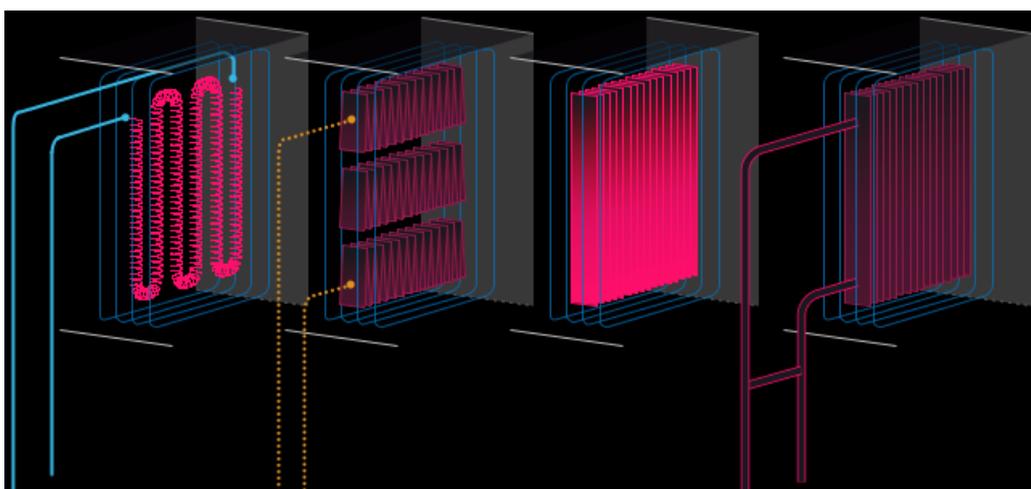
2.4 Heating

Figure 6 - sample graphic components from the Heating folder

The Heating folder contains dynamic images representing air heaters. Due to the features described in section 2, the graphic components in the folder must be arranged in the correct

order in the PX file. This principle is the same as for the static images described in the chapter 2.1.

2.4.1 Alarm components

Components with the suffix "alarm" in the name are dedicated to bind Boolean variables signalling an alarm or failure. Graphics representing the alarm status of the device have been added to these objects. The component has one control value (Value Binding), which affects the Visibility property. The value of the true component of the Boolean type causes the graphics to be shown, while false causes the graphics to be hidden.

2.4.2 On/Off components

Components with the suffix "off-on" in the name are dedicated to binding Boolean variables signalling operation or switching on. Graphics representing the status of switch-off and switch-on of a given device have been added to these objects. The component has two control values (Value Binding). The first one affects the switching between switching off graphics (false) and operation (true) of the device. The second value affects the Visibility property, where false causes the graphics to be shown, while true causes the graphics to be hidden (same variable as for the alarm component above).

Dragging a Boolean component from the Nav tree to a PX file and selecting "From Palette" in the Make Widget window, and then selecting "From Palette" from the palette of the object with the "off-on" suffix will automatically pinpoint the dragged component to the control value described as switching between switch-off and switch-on graphics.
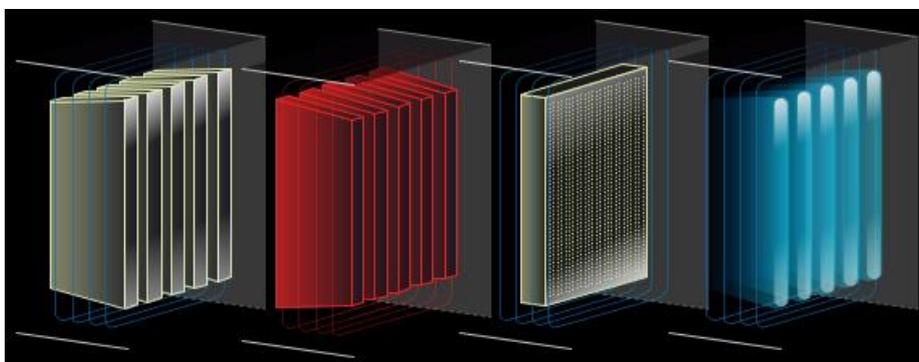
2.5 Filters

Figure 7 - sample graphic components from the Filters folder

The Filters folder contains dynamic images representing air filters. Due to the features described in section 2, the graphic components in the folder must be arranged in the correct order in the PX file. This principle is the same as for the static images described in the chapter 2.1.

2.5.1   Normal / alarm components

Components with the suffix "normal-alarm" in the name are dedicated to bind Boolean variables indicating normal state or alarm/failure. Graphics representing normal and alarm status of the device have been added to these objects. The component has one control value (Value Binding), which causes switching between the graphics of the normal state (false) and the alarm (true) device.

2.5.2   Alarm components

Components with the suffix "alarm" in the name are dedicated to bind Boolean variables signalling an alarm or failure. Graphics representing the alarm status of the device have been added to these objects. The component has one control value (Value Binding), which affects the Visibility property. The value of the true component of the Boolean type causes the graphics to be shown, while false causes the graphics to be hidden.

2.5.3   On/Off components

Components with the suffix "off-on" in the name are dedicated to binding Boolean variables signalling operation or switching on. Graphics representing the status of switch-off and switch-on of a given device have been added to these objects. The component has two control values (Value Binding). The first one affects the switching between switching off graphics (false) and operation (true) of the device. The second value affects the Visibility property, where false causes the graphics to be shown, while true causes the graphics to be hidden (same variable as for the alarm component above).

Dragging a Boolean component from the Nav tree to a PX file and selecting "From Palette" in the Make Widget window, and then selecting "From Palette" from the palette of the object with the "off-on" suffix will automatically pinpoint the dragged component to the control value described as switching between switch-off and switch-on graphics.
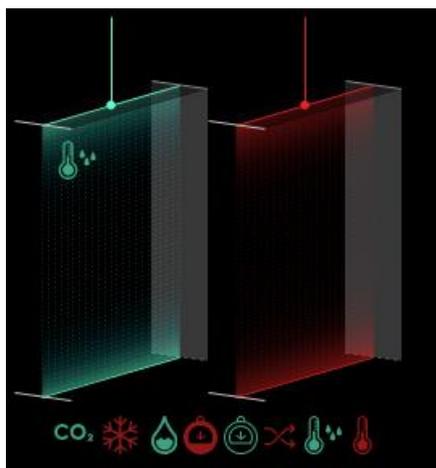
2.6 Sensors

Figure 8 - sample graphic components from the Sensors folder

The Sensors folder contains dynamic and static images representing sensors. Due to the features described in section 2, the graphic components in the folder must be arranged in the correct order in the PX file. This principle is the same as for the static images described in the chapter 2.1.

2.6.1 Static components

Static components are those, that do not have the suffixes described below. When added to a PX file, they are immediately connected to the graphic file.

2.6.2 Normal / alarm components

Components with the suffix "normal-alarm" in the name are dedicated to bind Boolean variables indicating normal state or alarm/failure. Graphics representing normal and alarm status of the device have been added to these objects. The component has one control value (Value Binding), which causes switching between the graphics of the normal state (false) and the alarm (true) device.

2.6.3 Alarm components

Components with the suffix "alarm" in the name are dedicated to bind Boolean variables signalling an alarm or failure. Graphics representing the alarm status of the device have been added to these objects. The component has one control value (Value Binding), which affects the Visibility property. The value of the true component of the Boolean type causes the graphics to be shown, while false causes the graphics to be hidden.
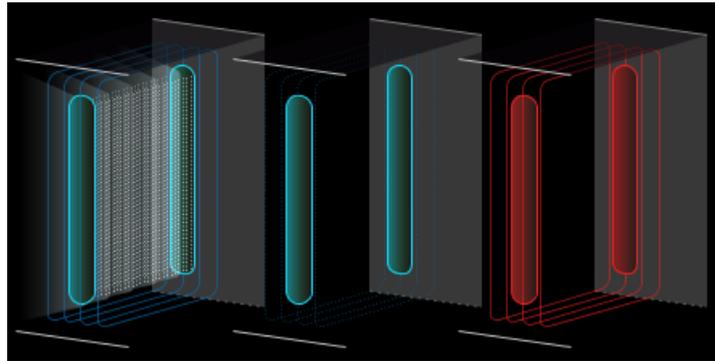
2.7 Humidifier

Figure 9 - sample graphic components from the Humidifier folder

The Humidifier folder contains dynamic images representing air humidifier. Due to the features described in section 2, the graphic components in the folder must be arranged in the correct order in the PX file. This principle is the same as for the static images described in the chapter 2.1.

2.7.1 Alarm components

Components with the suffix "alarm" in the name are dedicated to bind Boolean variables signalling an alarm or failure. Graphics representing the alarm status of the device have been added to these objects. The component has one control value (Value Binding), which affects the Visibility property. The value of the true component of the Boolean type causes the graphics to be shown, while false causes the graphics to be hidden.

2.7.2 On/Off components

Components with the suffix "off-on" in the name are dedicated to binding Boolean variables signalling operation or switching on. Graphics representing the status of switch-off and switch-on of a given device have been added to these objects. The component has two control values (Value Binding). The first one affects the switching between switching off graphics (false) and operation (true) of the device. The second value affects the Visibility property, where false causes the graphics to be shown, while true causes the graphics to be hidden (same variable as for the alarm component above).

Dragging a Boolean component from the Nav tree to a PX file and selecting "From Palette" in the Make Widget window, and then selecting "From Palette" from the palette of the object

with the "off-on" suffix will automatically pinpoint the dragged component to the control value described as switching between switch-off and switch-on graphics.
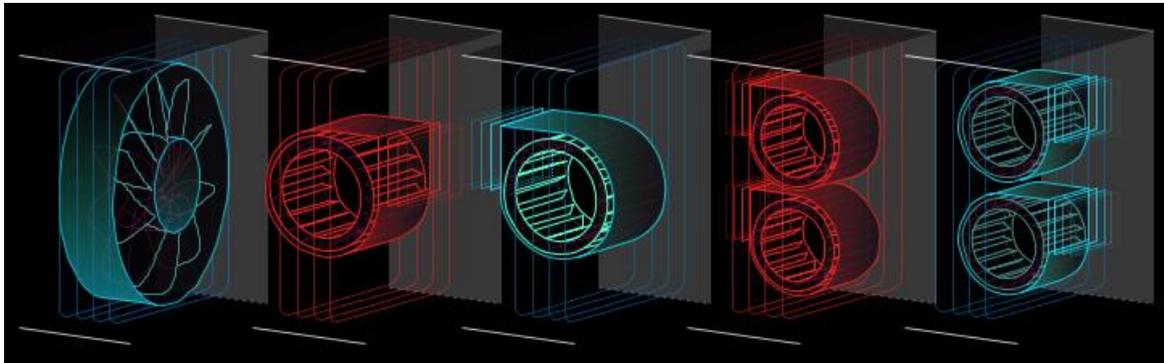
2.8 Fans

Figure 10 - sample graphic components from the Fans folder

The Fans folder contains dynamic images representing duct fans. Due to the features described in section 2, the graphic components in the folder must be arranged in the correct order in the PX file. This principle is the same as for the static images described in the chapter 2.1.

2.8.1 Alarm components

Components with the suffix "alarm" in the name are dedicated to bind Boolean variables signalling an alarm or failure. Graphics representing the alarm status of the device have been added to these objects. The component has one control value (Value Binding), which affects the Visibility property. The value of the true component of the Boolean type causes the graphics to be shown, while false causes the graphics to be hidden. Components with the suffix "alarm-anim" work in the same way as "alarm", the difference is that this component does not have a background in the form of a ventilation duct and must be placed above the layer with a fan and ventilation duct.

2.8.2 On/Off components

Components with the suffix "off-on" in the name are dedicated to binding Boolean variables signalling operation or switching on. Graphics representing the status of switch-off and switch-on of a given device have been added to these objects. The component has two control values (Value Binding). The first one affects the switching between switching off

graphic (false) and operation (true) of the device. The second value affects the Visibility property, where false causes the graphics to be shown, while true causes the graphics to be hidden (same variable as for the alarm component above).

Components with the suffix "off-on-anim" work in the same way as "off-on", the difference is that "off-on" is not animated, while "off-on-anim" is animated in the on state and the animated component in comparison to the static component does not have a background in the form of a ventilation duct and must be placed above the layer with a ventilation duct.

Dragging a Boolean component from the Nav tree to a PX file and selecting "From Palette" in the Make Widget window, and then selecting "From Palette" from the palette of the object with the "off-on" suffix will automatically pinpoint the dragged component to the control value described as switching between switch-off graphics and switch-on animation.

2.9 Heat Exchange
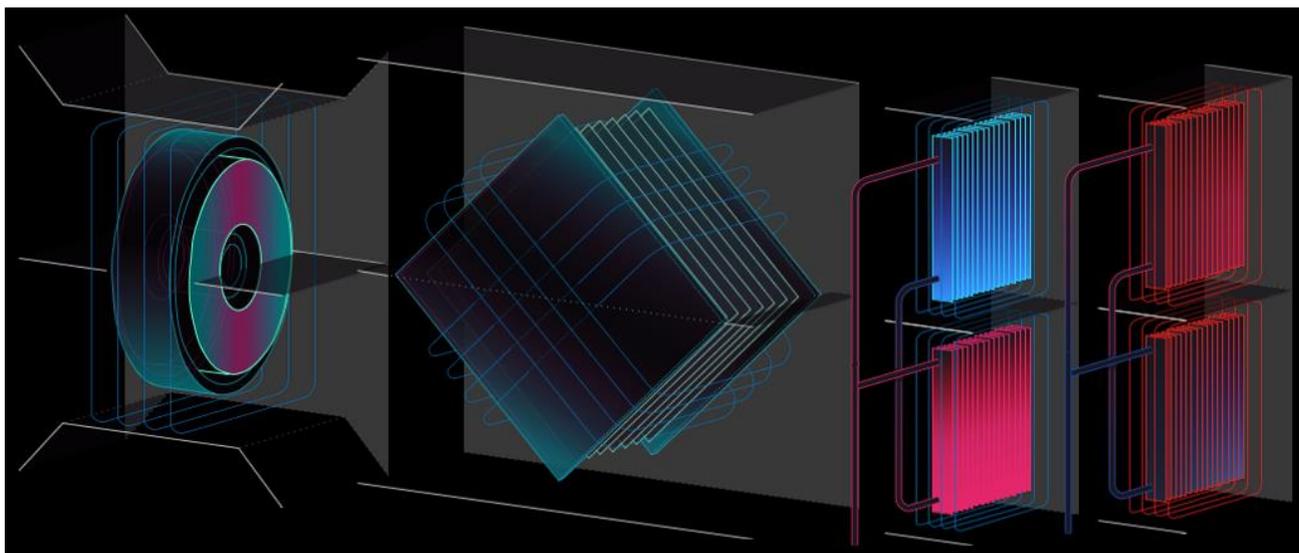

Figure 11 - sample graphic components from the Heat Exhange folder

The Heat Exchange folder contains dynamic images representing the heat exchangers of air handling units. Due to the features described in section 2, the graphic components in the folder must be arranged in the correct order in the PX file. This principle is the same as for the static images described in the chapter 2.1.

2.9.1 Alarm components

Components with the suffix "alarm" in the name are dedicated to bind Boolean variables signalling an alarm or failure. Graphics representing the alarm status of the device have been added to these objects. The component has one control value (Value Binding), which affects the Visibility property. The value of the true component of the Boolean type causes the graphics to be shown, while false causes the graphics to be hidden. Components with the suffix "alarm-anim" work in the same way as "alarm", the difference is that this component does not have a background in the form of a ventilation duct and must be placed above the layer with a fan and ventilation duct.

2.9.2 On/Off components

Components with the suffix "off-on" in the name are dedicated to binding Boolean variables signalling operation or switching on. Graphics representing the status of switch-off and switch-on of a given device have been added to these objects. The component has two control values (Value Binding). The first one affects the switching between switching off graphics (false) and operation (true) of the device. The second value affects the Visibility property, where false causes the graphics to be shown, while true causes the graphics to be hidden (same variable as for the alarm component above).

Components with the suffix "off-on-anim" work in the same way as "off-on", the difference is that "off-on" is not animated, while "off-on-anim" is animated in the on state and the animated component in comparison to the static component does not have a background in the form of a ventilation duct and must be placed above the layer with a ventilation duct.

Dragging a Boolean component from the Nav tree to a PX file and selecting "From Palette" in the Make Widget window, and then selecting "From Palette" from the palette of the object with the "off-on" suffix will automatically pinpoint the dragged component to the control value described as switching between switch-off and switch-on graphics.
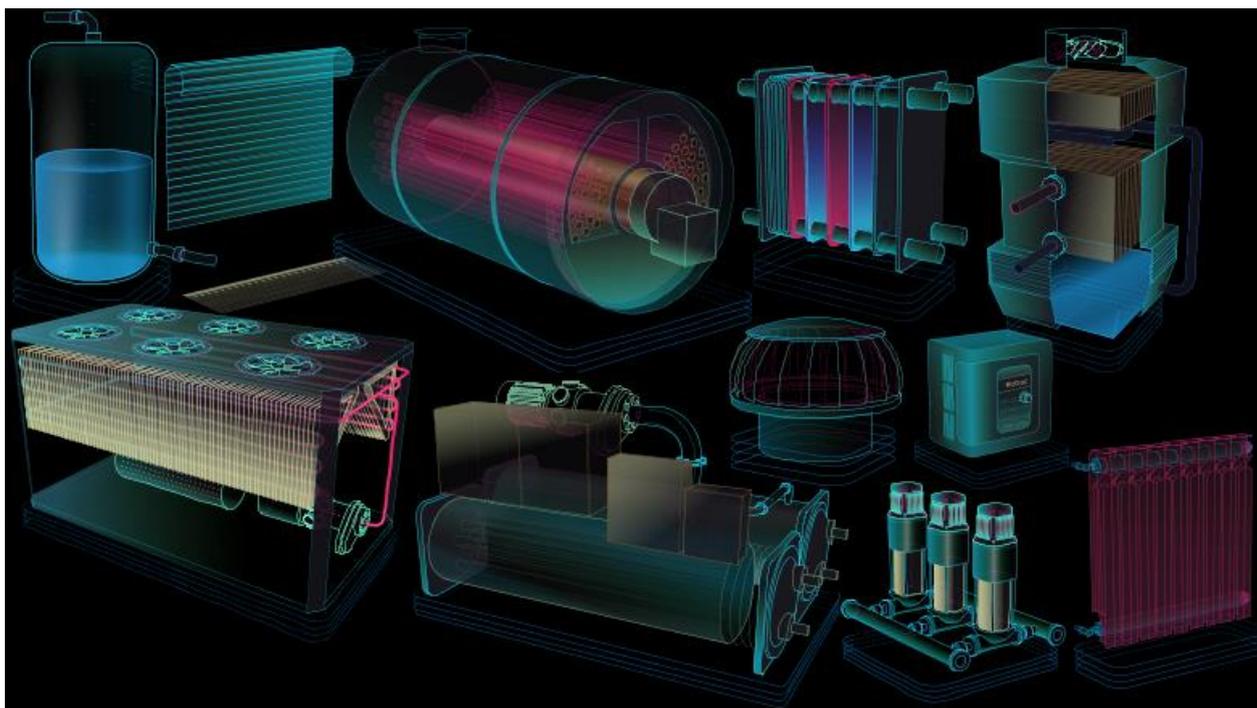
2.10 Standalone HVAC

Figure 12 - sample graphic components from the Standalone HVAC folder

The HVAC Standalone Folder contains dynamic images representing stand-alone devices. They include air handling units, blinds/rollers, boilers, chillers, compressors, control units, roof fans, heat exchangers, pumps, radiators, tanks, cooling towers.

2.10.1 Alarm components

Components with the suffix "alarm" in the name are dedicated to bind Boolean variables signalling an alarm or failure. Graphics representing the alarm status of the device have been added to these objects. The component has one control value (Value Binding), which affects the Visibility property. The value of the true component of the Boolean type causes the graphics to be shown, while false causes the graphics to be hidden.

2.10.2 On/Off components

Components with the suffix "off-on" in the name are dedicated to binding Boolean variables signalling operation or switching on. Graphics representing the status of switch-off and switch-on of a given device have been added to these objects. The component has two control values (Value Binding). The first one affects the switching between switching off graphics (false) and operation (true) of the device. The second value affects the Visibility

property, where false causes the graphics to be shown, while true causes the graphics to be hidden (same variable as for the alarm component above).

Dragging a Boolean component from the Nav tree to a PX file and selecting "From Palette" in the Make Widget window, and then selecting "From Palette" from the palette of the object with the "off-on" suffix will automatically pinpoint the dragged component to the control value described as switching between switch-off and switch-on graphics.

2.10.3 0-100% components

Components with the suffix "0-100" in the name are dedicated to binding Numeric type variables containing analogue control value in the range of 0% - 100%. Graphics have been added to these objects to represent the percentage drive of the device. The component has two control values (Value Binding). The first one affects the switching between the graphics responsible for the level of adjustment depending on the entered value from 0 to 100. The second value affects the Visibility property, where false causes the graphics to be shown, while true causes the graphics to be hidden (same variable as for the alarm component above).

Dragging a Numeric component from the Nav tree to a PX file and selecting "From Palette" in the Make Widget window, and then selecting "From Palette" from the palette of the object with the suffix "0-100" will automatically bind the dragged component to the control value described as switching between the graphics responsible for the adjustment level.

In the case of tanks, the control value is the level of filling of the tank.

In the case of blinds/roller blinds, the control value is the opening level (0 is a complete closure). The components "h-spin_0-100" and "v-spin_0-100" from 0 to 50 % open the blinds and from 51 to 100 % raise them. The "outdoor_0-100" component causes lift over the whole range from 0 to 100 %.

2.11 Grids

Figure 13 - sample graphic components from the Grids folder

The Grids folder contains **static** images representing **grids**. By adding these graphics to your PX file, you can build triangular, square and hexagonal grids.

2.12 Floor plan

Figure 14 - sample graphic components from the Floor plan folder

The Floor plan folder contains dynamic images representing lighting, sensors, counters and connectors placed on the floor plan.

2.12.1 Normal / alarm components

Components with the suffix "normal-alarm" in the name are dedicated to bind Boolean variables indicating normal state or alarm/failure. Graphics representing normal and alarm status of the device have been added to these objects. The component has one control value (Value Binding), which causes switching between the graphics of the normal state (false) and the alarm (true) device.

2.12.2 Alarm components

Components with the suffix "alarm" in the name are dedicated to bind Boolean variables signalling an alarm or failure. Graphics representing the alarm status of the device have been added to these objects. The component has one control value (Value Binding), which affects the Visibility property. The value of the true component of the Boolean type causes the graphics to be shown, while false causes the graphics to be hidden.

2.12.3 On/Off components

Components with the suffix "off-on" in the name are dedicated to binding Boolean variables signalling operation or switching on. Graphics representing the status of switch-off and switch-on of a given device have been added to these objects. The component has two control values (Value Binding). The first one affects the switching between switching off graphics (false) and operation (true) of the device. The second value affects the Visibility property, where false causes the graphics to be shown, while true causes the graphics to be hidden (same variable as for the alarm component above).

Dragging a Boolean component from the Nav tree to a PX file and selecting "From Palette" in the Make Widget window, and then selecting "From Palette" from the palette of the object with the "off-on" suffix will automatically pinpoint the dragged component to the control value described as switching between switch-off and switch-on graphics.
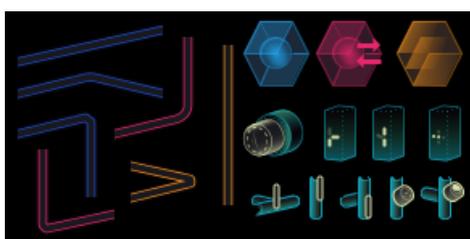
2.13 Piping

Figure 15 - sample graphic components from the Piping folder

The Piping folder contains dynamic and static images representing the pump, flow meters, meters, pipes and valves (manual, electrical and pneumatic).

2.13.1 Static components

Static components are those placed in the subfolders "pipes_cold", "pipes_hot" and "pipes_mix". When added to a PX file, they are immediately connected to the graphic file.

2.13.2 Normal / alarm components

Components with the suffix "normal-alarm" in the name are dedicated to bind Boolean variables indicating normal state or alarm/failure. Graphics representing normal and alarm status of the device have been added to these objects. The component has one control value (Value Binding), which causes switching between the graphics of the normal state (false) and the alarm (true) device.

2.13.3 Alarm components

Components with the suffix "alarm" in the name are dedicated to bind Boolean variables signalling an alarm or failure. Graphics representing the alarm status of the device have been added to these objects. The component has one control value (Value Binding), which affects the Visibility property. The value of the true component of the Boolean type causes the graphics to be shown, while false causes the graphics to be hidden.

2.13.4 On/Off components

Components with the suffix "off-on" in the name are dedicated to binding Boolean variables signalling operation or switching on. Graphics representing the status of switch-off and switch-on of a given device have been added to these objects. The component has two control values (Value Binding). The first one affects switching between switching off graphics (false for horizontal, true for vertical) and operation (true for horizontal, false for vertical) of the device. The second value affects the Visibility property, where false causes the graphics to be shown, while true causes the graphics to be hidden (same variable as for the alarm component above).

Components with the suffix "off-on-anim" work in the same way as "off-on", the only difference is that "off-on" is not animated, while "off-on-anim" is animated in the on state.

Dragging a Boolean component from the Nav tree to a PX file and selecting "From Palette" in the Make Widget window, and then selecting "From Palette" from the palette of the object with the "off-on" suffix will automatically pinpoint the dragged component to the control value described as switching between switch-off and switch-on graphics.

2.13.5 Multi-condition

Components with suffixes "0-2" or "0-4" in the name are dedicated to binding Numeric type variables containing an integer. Graphics have been added to these objects to represent the appropriate device condition depending on the input. The component has two control values (Value Binding). The first one affects the switching between the graphics responsible for the condition depending on the entered value (0, 1, 2, 3, 4). Entering a value outside the range of the device will display the same status as if you had entered 0. The value (0-4) of the variable presents the flow direction of the medium in the graphics, not the valve opening level (components dedicated for coil installations). The value (0-2) of the variable presents similar as above in the graphics (components dedicated for pipe installations). The second value affects the Visibility property, where false causes the graphics to be shown, while true causes the graphics to be hidden.

Dragging a Numeric component from the Nav tree to a PX file and selecting "From Palette" in the Make Widget, and then selecting "From Palette" from the palette an object with the suffix "0-2" or "0-4" will automatically bind the dragged component to the control value described as switching between graphics responsible for the device condition.