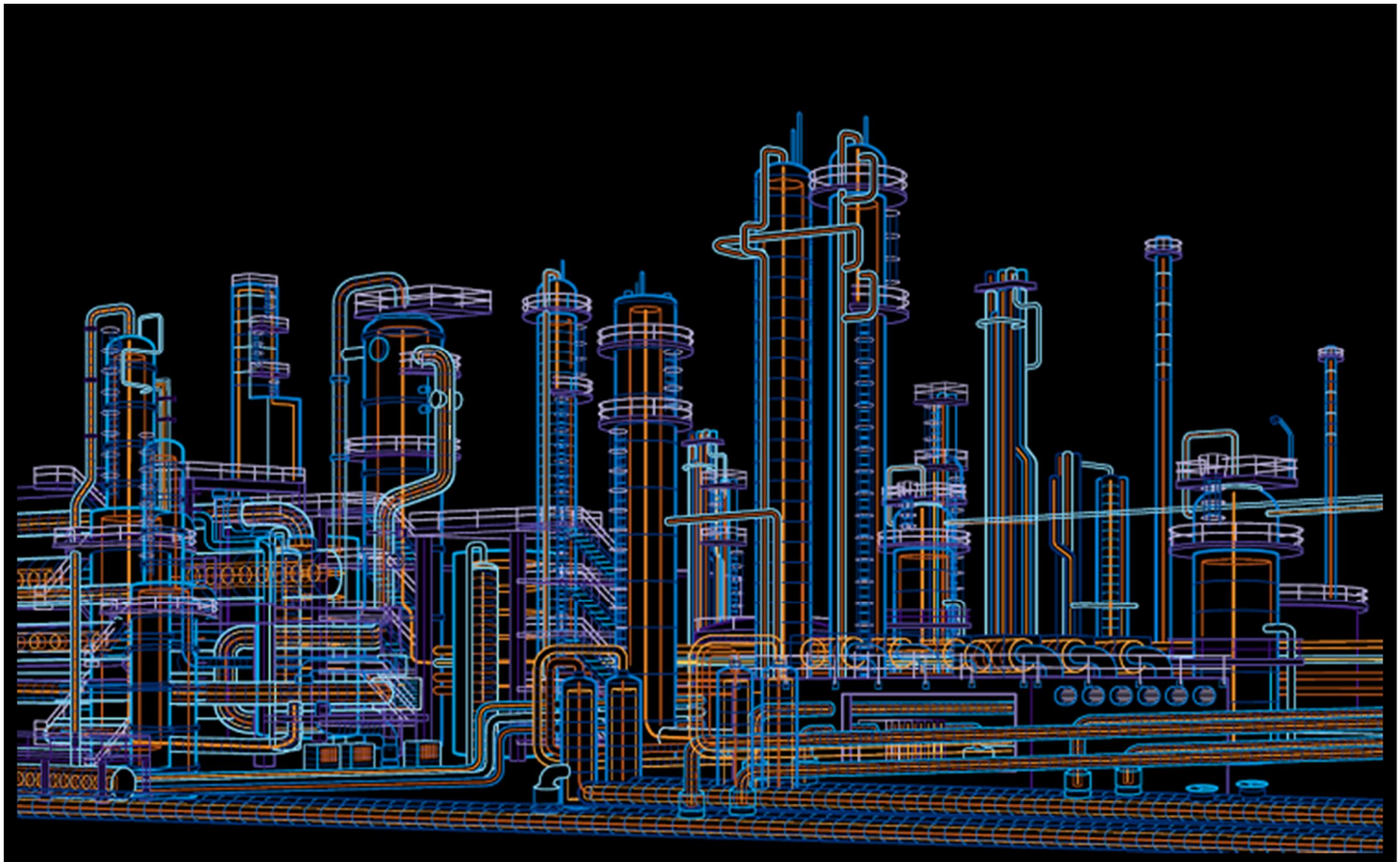

System 800xA
Free Graphic Elements for PC Toolkit Libraries User Manual

System Version 6.0

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Purpose

The purpose of this document is to describe the free graphic elements for System 800xA. The graphic elements are part of an 800xA System Extension, which will be used mainly in the Petrochemical Industry but also in other Process industries. This document defines the ABB Control System standards for the Human Machine Interface (HMI).

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1. Inserting free graphic elements to display

Free graphic elements are part of “PC High Performance HMI Elements” toolbox. In graphic editor they can be inserted directly from “ToolBoxes” control. Select required element type from “ToolBoxes” and drag it to graphic display. Connect and customize element properties to obtain required behavior. Refer to “Configuration” sections in following chapters for detailed information.

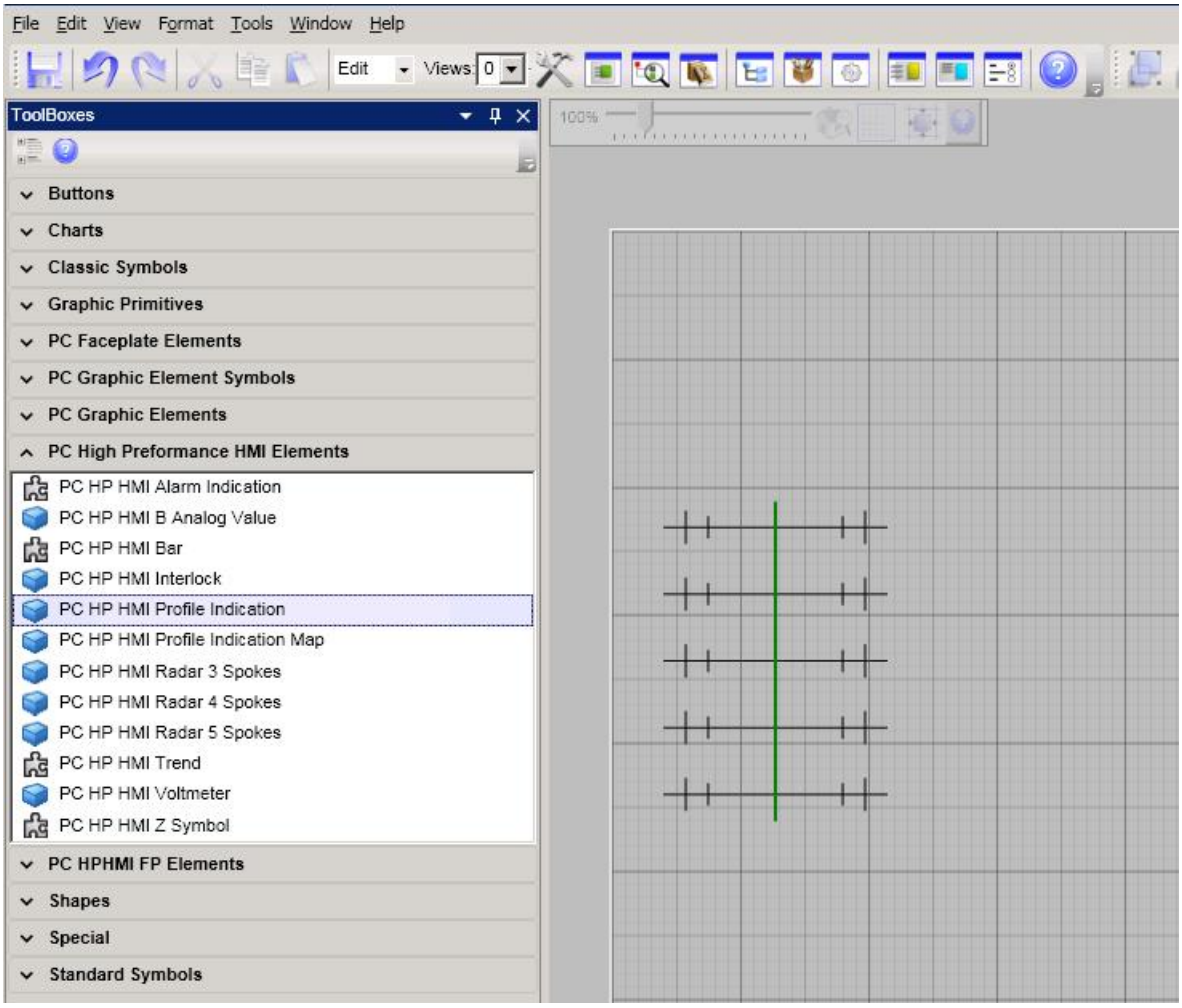

Figure 1.1 Inserting free graphic elements

2. Radar Diagrams

Purpose of radar diagram is to give quick view of more analog values in one element. There exist 3 similar predefined HP HMI elements which differ by number of spokes.

Radar diagram elements are universal. The usage is independent from type of control module. When configuring the graphics each signal for actual value, ranges and limits is connected separately. This gives opportunity to use any module type supporting analog value monitoring (typically an analog input module or PID module).

Numeric value texts inside the diagram can be shown or hidden by input property. Additional elements such a alarm indications, different numeric indications or tag name texts can be placed over or next to element in required position. They are not included in this graphic element.

2.1 Layout

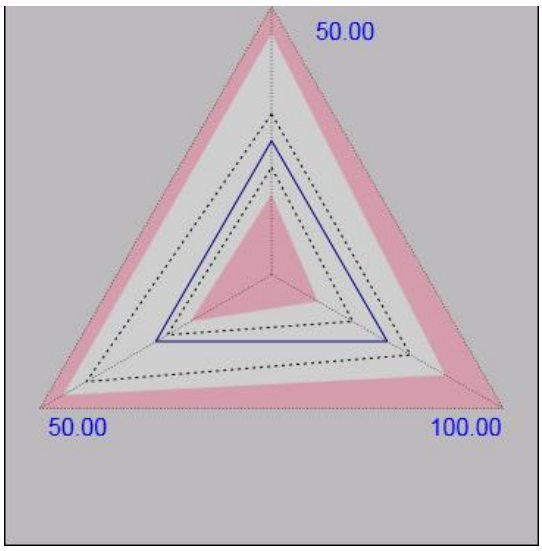

Figure 2.1 Radar diagram with 3 spokes

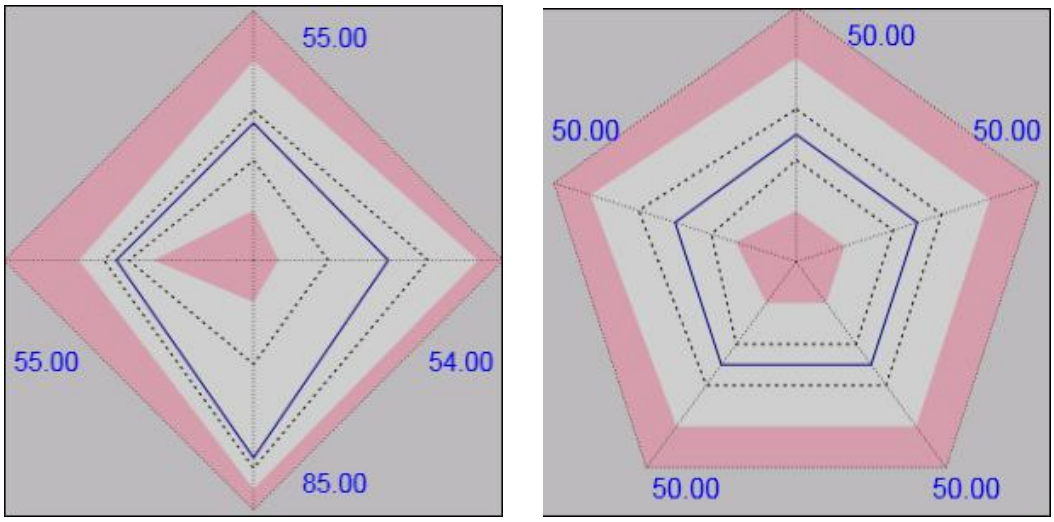

Figure 2.2 Radar diagram with 4 and 5 spokes

2.2 Features

There are different areas on Radar diagram showing normal value range and areas with or without alarm.

Normal value range is highlighted by two dash lines. Gray background means there is no alarm if value is inside this area. A red background indicates areas of alarms.

Actual values are shown by a blue line. When any of values exceeds High alarm limit or Low alarm limit then it becomes highlighted by additional red line.

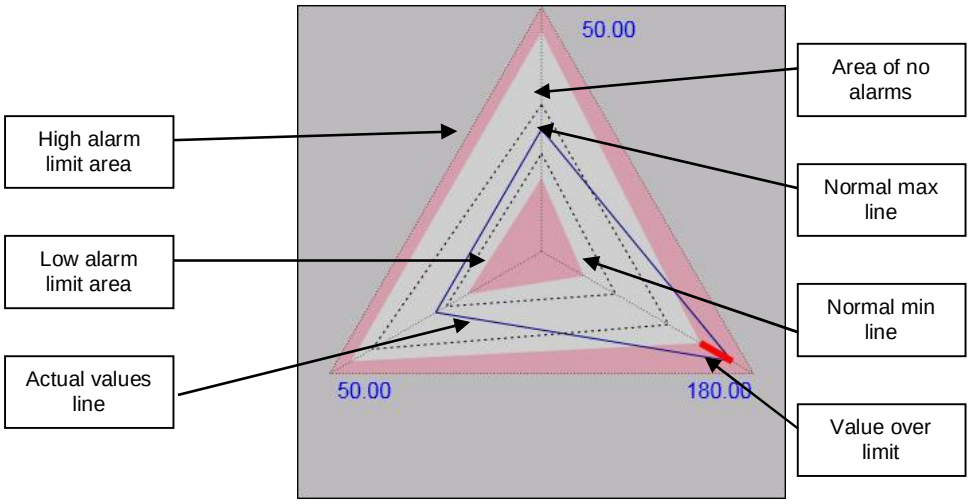

Figure 2.3 Element areas and value 2 over high limit

Additional configurable features are

- Actual values can be shown by additional numeric string. Text font and color are configurable
- Number of grid lines inside the radar diagram
- Color and width of element outline
- Line color and style for normal Min and normal Max lines
- Tooltip when mouse is over the diagram. Tooltip can be different for each spoke area
- Link to faceplate or graphic display when user clicks on diagram. Separated for each spoke area

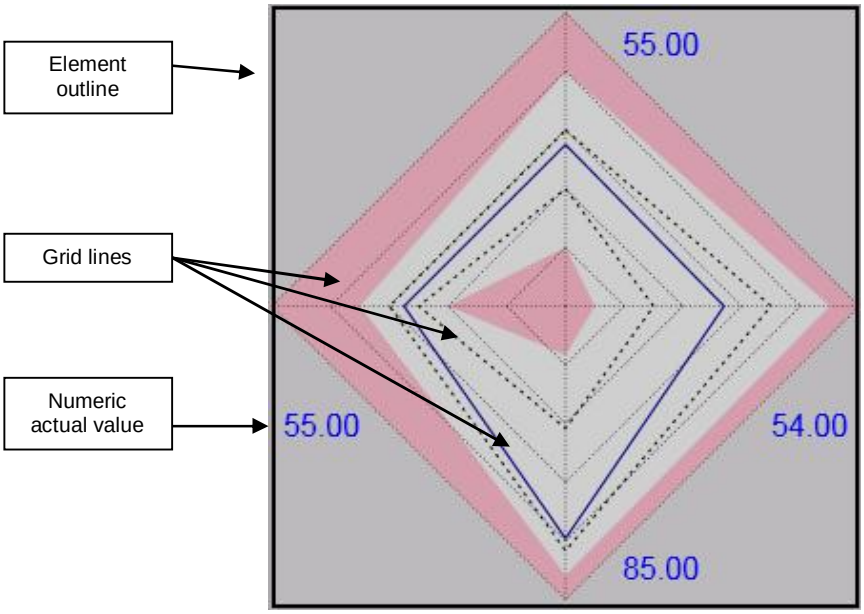

Figure 2.4 Additional radar diagram features

2.3 Configuration

As first connect the signals for actual value, limits and ranges to input properties starting with “Spoke” prefix.

Define tooltip strings for each spoke. Typically use the object name,

Define Viewreference for each spoke. View reference is definition of aspect view which is opened when user clicks on the element.

It is possible to define appearance settings such as outline color and width or style of lines showing normal max and normal min range. Choose if numeric texts with actual values should be visible and define the color and font of texts. If required specify the parameters of grid using NumberOfGridLines property.

Standard properties

Property	Data type	Default value	Description
EnableInput	Boolean	True	Enables input handling of the element, if false the element it self can’t selected.
Height	Float	400	Height of the element
Name	String	-	Name of the element instance in a graphic display. Is set automatically by the Graphics Builder (Name of the element + index).
Rotation	Rotation	0	Rotation angle
SubscriptionRate	Integer	0	Update rate for all properties subscribed for

Property	Data type	Default value	Description
Transform	Transform	Empty	Enables animation like scaling, moving and rotation. It is intended only for dynamic values.
Visible	Boolean	True	Visibility of the element in the graphic display.
Width	Float	400	Height of the element
XPos	Float	-	X position of the upper left corner of the element
YPos	Float	-	Y position of the upper left corner of the element

Table 2.1 Standard Properties

Element specific Properties

Property	Data type	Default value	Description
NumberOfGridLines	Integer	1	"Number of grid lines inside radar diagram"
OutlineColor	Color	Black	"Color of object outline"
OutlineWidth	Real	1.	"Width of object outline"
OutsideLimitsMarkerPen	Pen	Pen(Red, 5.)	“Color of the marker pen when value is outside limits”
OutsideLimitsPen	Pen	Pen(Crimson, 0.)	“Color pen for limit area”
PenNormalMax	Pen	DashDotPen(Black, 1., Dot, Flat, Bevel)	"Line style of normal max line"
PenNormalMin	Pen	DashDotPen(Black, 1., Dot, Flat, Bevel)	"Line style of normal min line"
PenValues	Pen	Pen(PCHPHMIValues, 1.)	“Line style of value line”
ShowValues	Boolean	True	"Show actual values as text"
Spoke**X**LimitH	Real	80.	"High limit spoke **X**"
Spoke**X**LimitL	Real	20.	"Low limit spoke **X**"
Spoke**X**LimitNormMax	Real	60.	"Normal max value spoke **X**"
Spoke**X**LimitNormMin	Real	40.	"Normal min value spoke **X**"
Spoke**X**RangeMax	Real	100.	"Maximum range value for spoke **X**"
Spoke**X**RangeMin	Real	0.	"Minimum range value for spoke **X**"

Property	Data type	Default value	Description
Spoke**X**Value	Real	50.	"Current value spoke **X**"
Tooltip**X**	String	“”	"Tooltip text for spoke **X**"
ValuesColor	Color	PCHPHMIValues	"Color for numeric values"
ValuesFont	Font	Font("Arial" ,12 ,Regular, Normal)	"Font for numeric values"
ValuesFraction	Integer	2	"Fraction for numeric values"
ViewReferenceX	ViewReference	null	"View reference for spoke X"

Table 2.2 Elements specific properties

3. Profile indication

Purpose of temperature profiles is to give quick view of more analog values typically the temperatures in different areas of tank. There exist 2 similar predefined HP HMI elements:

- *Profile indication* element shows the limits as single lines
- *Profile indication map* element shows the limits as curves

Profile indication elements are universal. The usage is independent from type of control module. When configuring the graphics each signal for actual value, ranges and limits is connected separately. This gives opportunity to use any control module type supporting analog value monitoring (typically an analog input module or PID module).

Numeric value texts inside the diagram can be shown or hidden by input property. They can be connected to any signal – therefore actual value, deviation from normal value or other calculations can be used. Refer to Figure 3.4 for examples.

Additional elements such an alarm indications, different numeric indications or tag name texts can be placed over or next to element in required position when building graphic display. They are not included in this element.

3.1 Layout

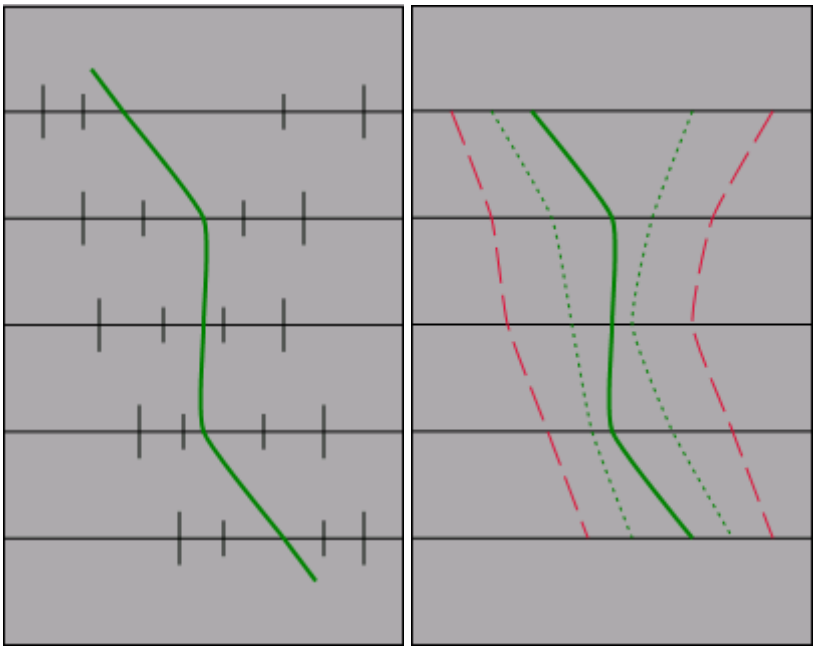

Figure 3.1 Basic temperature profile and profile map

3.2 Features

Similar to function of Radar diagram there are different areas showing normal value range and areas with or without alarm.

Normal value range is highlighted by short marks for temperature profile and by dotted lines for profile map. Low and High alarm limits are shown by longer marks and dash lines.

The curve showing actual values has by default green color. If any current value is out of normal value range then curve color changes to orange. Red color indicates that any of values is over alarm limits.

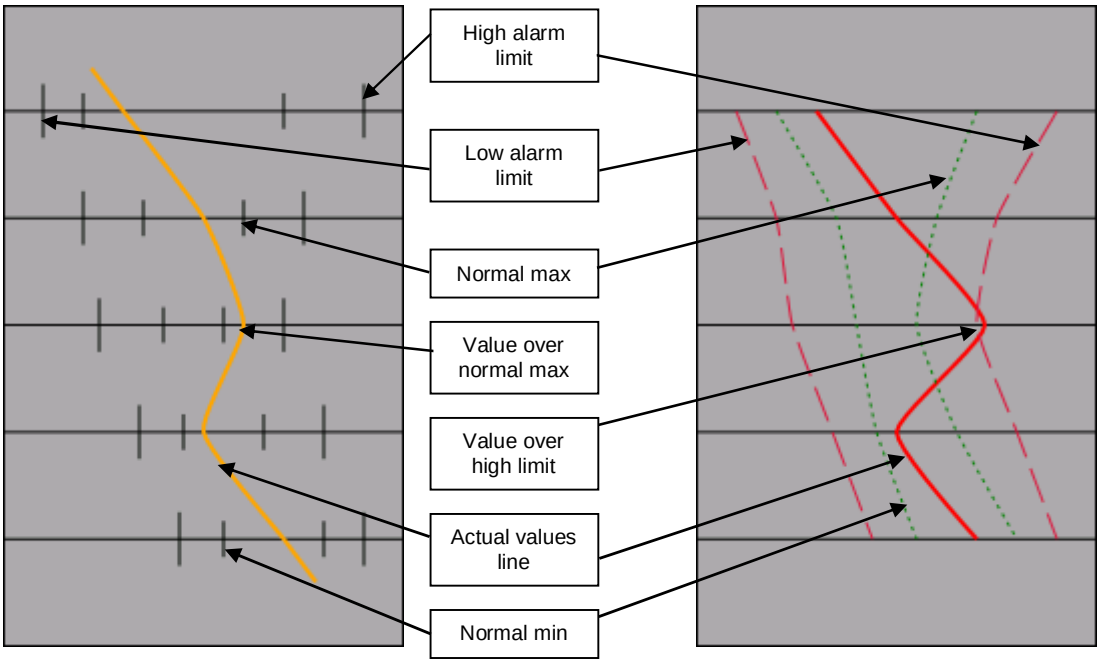

Figure 3.2 Element areas and values over limits

Additional configurable features

- Curves can be shown with or without overlap. When overlap is enabled then all curves continue over first and last segment
- Number of segments is configurable between 3 and 5
- Color and width of element outline
- Line color and style for normal range and alarm limit range lines (only Profile map element)
- Color of curve when any actual value is over limit
- Tooltip when mouse is over the element. Tooltip can be different for each segment
- Link to faceplate or graphic display when user clicks on element. Separated for each segment
- Additional values can be shown on right side of elements. Font and color are configurable
- In addition to the two limit pairs per value a good range can be configured (only Profile indication element)

- Limit lines can be en- or disabled for each limit (only Profile indication element)

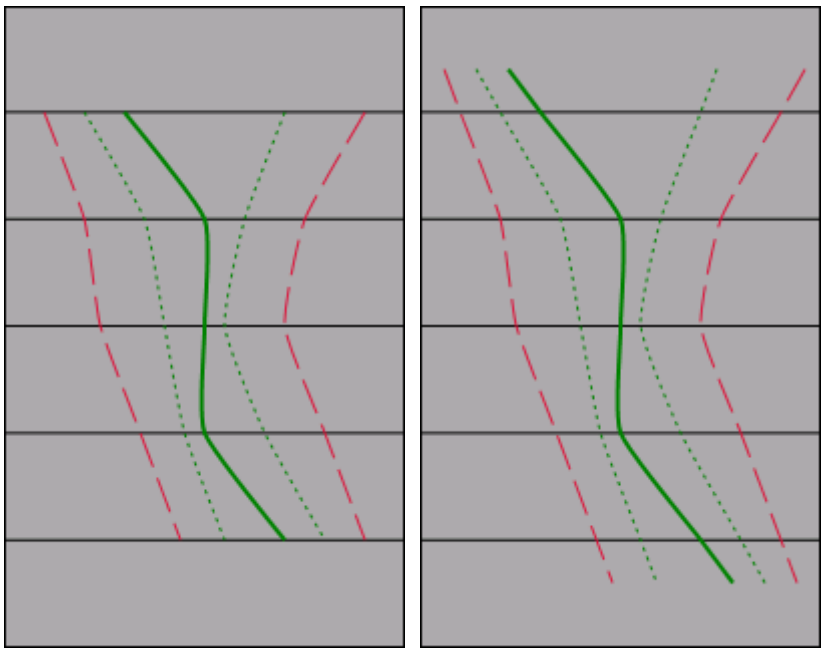

Figure 3.3 Overlap of curves

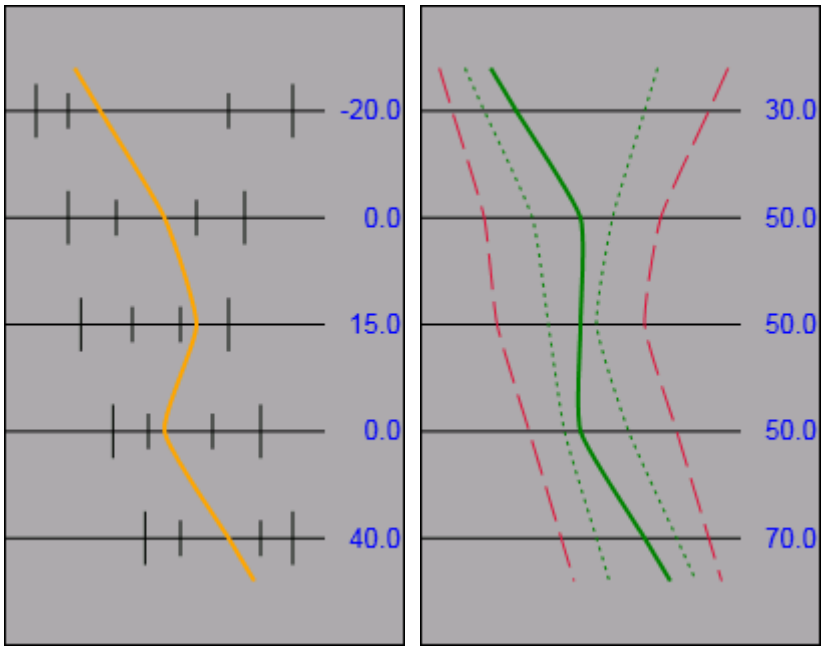

Figure 3.4 Additional numeric values

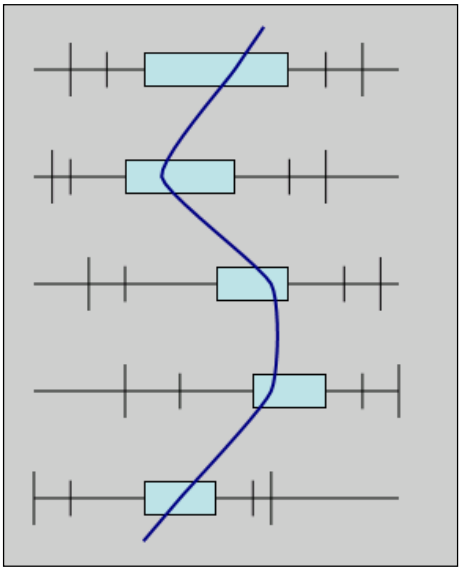

Figure 3.5 Profile indication with additional good range

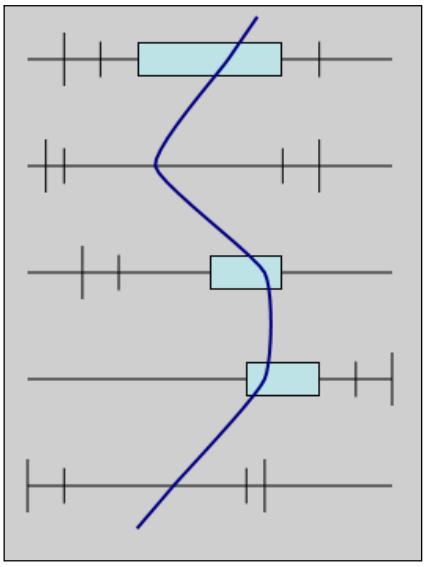

Figure 3.6 Profile indication with some inactive limits

3.3 Configuration

As first connect the signals for actual value, limits and ranges to input properties starting with “Segment” prefix.

Define tooltip strings for each segment. Typically use the object name,

Define Viewreference for each segment. View reference is definition of aspect view which is opened when user clicks on the element.

It is possible to define appearance settings such as outline color and color of the limit curves. Define behavior of curve color if any value reaches one of the limits.

Choose if numeric texts should be visible and define the color and font of texts. Connect numeric values to custom signal or calculation.

Standard properties

Property	Data type	Default value	Description
EnableInput	Boolean	True	Enables input handling of the element, if false the element it self can’t selected.
Height	Float	250	Height of the element
Name	String	-	Name of the element instance in a graphic display. Is set automatically by the Graphics Builder (Name of the element + index).
Rotation	Rotation	0	Rotation angle
SubscriptionRate	Integer	0	Update rate for all properties subscribed for
Transform	Transform	Empty	Enables animation like scaling, moving and rotation. It is intended only for dynamic values.
Visible	Boolean	True	Visibility of the element in the graphic display.
Width	Float	100	Height of the element
XPos	Float	-	X position of the upper left corner of the element
YPos	Float	-	Y position of the upper left corner of the element

Table 3.1 Standard Properties

Element specific Properties

Property	Data type	Default value	Description
CurveColor	Color	PCHPHMIValues	"Color of the curve in normal range"
CurveColorLimit1	Color	PCHPHMILimit1Act	"Color of the curve if any Limit H or L is reached"
CurveColorLimit2	Color	PCHPHMILimit2Act	"Color of the curve if any Limit HH or LL is reached"
EnableOverlap	Boolean	True	"If enabled then curves continue over first and last segment"
Limit1RangeColor	Color	Black	"Color of curves for limit ranges H and L"
Limit2RangeColor	Color	Black	"Color of curves for limit ranges HH and LL"
NumberOfSegments	Integer	5	"Number of segments (3-5)"
NumericValueX	Real	0.	"Value to be shown for segment X"
NumericValuesColor	Color	PCHPHMIValues	"Color for numeric values"
NumericValuesFont	Font	Font("Arial" ,10 ,Regular, Normal)	"Font for numeric values"
NumericValuesFraction	Integer	1	"Fraction for numeric values"
NumericValuesWidth	Real	40.	"Width of area reserved for numeric elements"
OutlineColor	Color	Black	"Color of object outline"
OutlineWidth	Real	1.	"Width of object outline"
Segment**X**LimitH	Real	80.	"Segment **X** limit H"
Segment**X**LimitHH	Real	60.	"Segment **X** limit HH"
Segment**X**LimitL	Real	20.	"Segment **X** limit L"
Segment**X**LimitLL	Real	40.	"Segment **X** limit LL"
Segment**X**LimitUsedH	Boolean	True	"Segment **X** limit H Used"
Segment**X**LimitUsedHH	Boolean	True	"Segment **X** limit HH Used"
Segment**X**LimitUsedL	Boolean	True	"Segment **X** limit L Used"
Segment**X**LimitUsedLL	Boolean	True	"Segment **X** limit LL Used"
Segment**X**NormalRangeMax	Real	70.	"Segment **X** limit normal max"
Segment**X**NormalRangeMin	Real	30.	"Segment **X** limit normal min"
Segment**X**NormalRangeUsed	Boolean	False	“Visibility of normal range for segment **X**“

Property	Data type	Default value	Description
Segment**X**RangeMax	Real	100.	"Segment **X** Range Max"
Segment**X**RangeMin	Real	0.	"Segment **X** Range Min"
Segment**X**Value	Real	50.	"Current value segment **X**"
ShowNumericValues	Boolean	True	"Show/Hide numeric values"
Tooltip**X**	String	“”	"Tooltip text for segment **X**"
ViewReference**X**	ViewReference	null	"View reference for segment **X**"

Table 3.2 Element specific properties

4. References

Reference	Document title	Document number
/1/	PC Toolkit for AC800M Operation Overview	3BDA035321R5021
/2/	Industrial IT, 800xA - System, System Version 5.0 SP2, Basic Operation	3BSE036903R5021A
/3/	Industrial IT, 800xA - System, System Version 5.0 SP2, Extended Operation	3BSE036904R5021A

Table 4.1 References

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