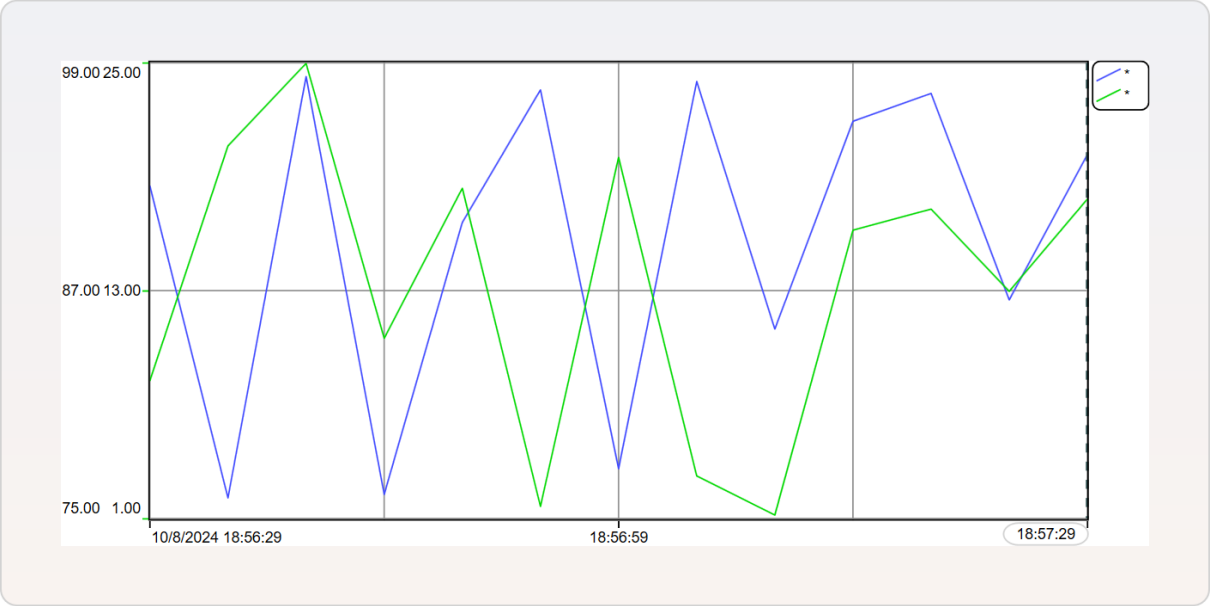
TrendChart Control Reference

Plot time-series data in real time.

Reference **Controls** **Charts** TrendChart

The TrendChart is a graphical tool for visualizing data trends. Its purpose is to display and analyze time-series data for process monitoring. Key functionalities include customizable Y and X axes, label and grid line settings, pen configurations, and SPC settings. Applications include monitoring production metrics and quality control. Configuration requires setting control names, binding tags, and defining pen properties. Usage involves selecting trend objects, setting up axes, and configuring visual elements for data display and interaction.

Requirements
Responsive Sizing
Configuration
Trend Annotations
HasLegend Property
Runtime Execution
TrendChart Advanced Settings



Requirements

This component is Portable. It runs both on Windows (WPF) and on Web Pages hosted in any platform.

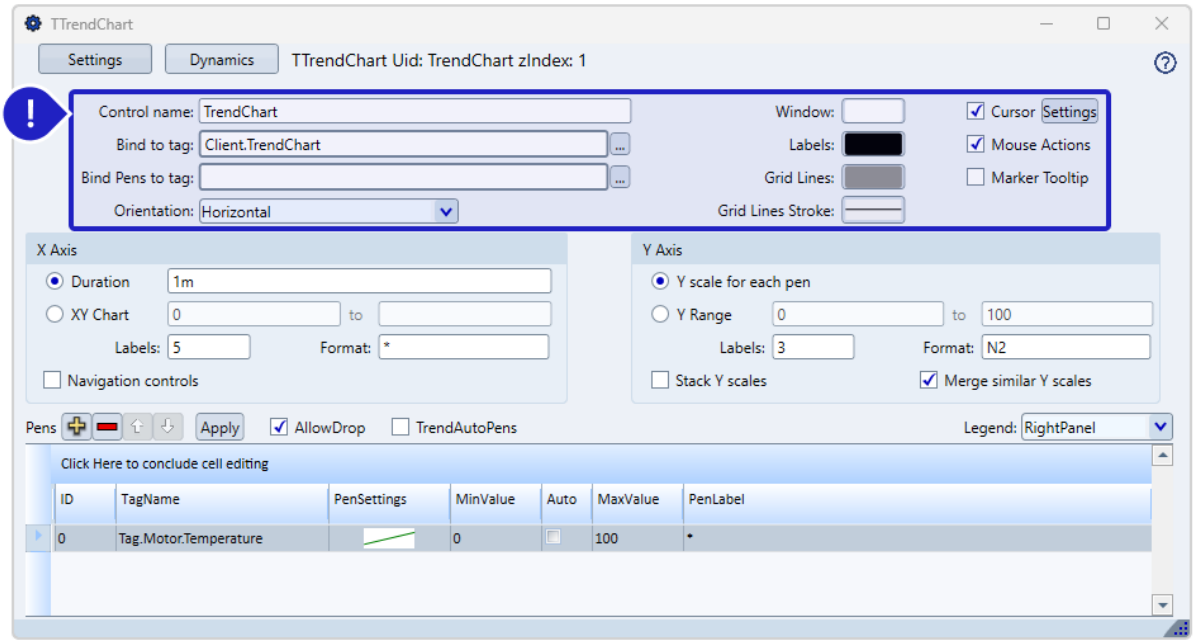
Responsive Sizing

The TrendChart is a canonical "prominent resizable element." To make it fill and grow as the Display resizes, set the Display's **OnResize** to **Responsive** and enable **IsWidthAlign** and **IsHeightAlign** on the TrendChart. These flat element properties stretch the control with its container and are effective only when the Display is set to Responsive mode.

See Responsive Design and RESS for the full Display-level configuration.

Configuration

1. Go to **Displays / Draw**.
2. On the Components Panel, select **Charts**, then **TrendChart**.
3. Click or drag-and-drop it on the Drawing area to use it.
4. Double-click the object to open the configuration window.



TrendChart Settings	
Field	Description
Control Name	Defines the name for the control, allowing it to be accessed in scripts. See Display CodeBehind.
Bind to Tag	Specifies an object to map the TrendChart Control properties.
Bind Pens to Tag	Specifies an object to map Pens Configuration properties.
Orientation	Sets the orientation of the TrendChart (Horizontal or Vertical). Options available: 1. **Horizontal**: Sets the TrendChart to display data horizontally. 2. **Vertical (Top to Bottom)**: Sets the TrendChart to display data vertically, starting from the top and moving to the bottom. 3. **Vertical (Bottom to Top)**: Sets the TrendChart to display data vertically, starting from the bottom and moving to the top.
Window	Sets the background color of the trend control.
Labels	Defines the color of the trend control labels.
Grid Lines	Sets the color of the grid lines in the trend control.
Grid Lines Stroke	Defines the settings for the grid line stroke.
Cursor	Enables or disables cursor settings in the trend control.
Mouse Actions	Enables or disables mouse actions on the trend control.
Marker Tooltip	Enables or disables tooltips for markers on the trend control.

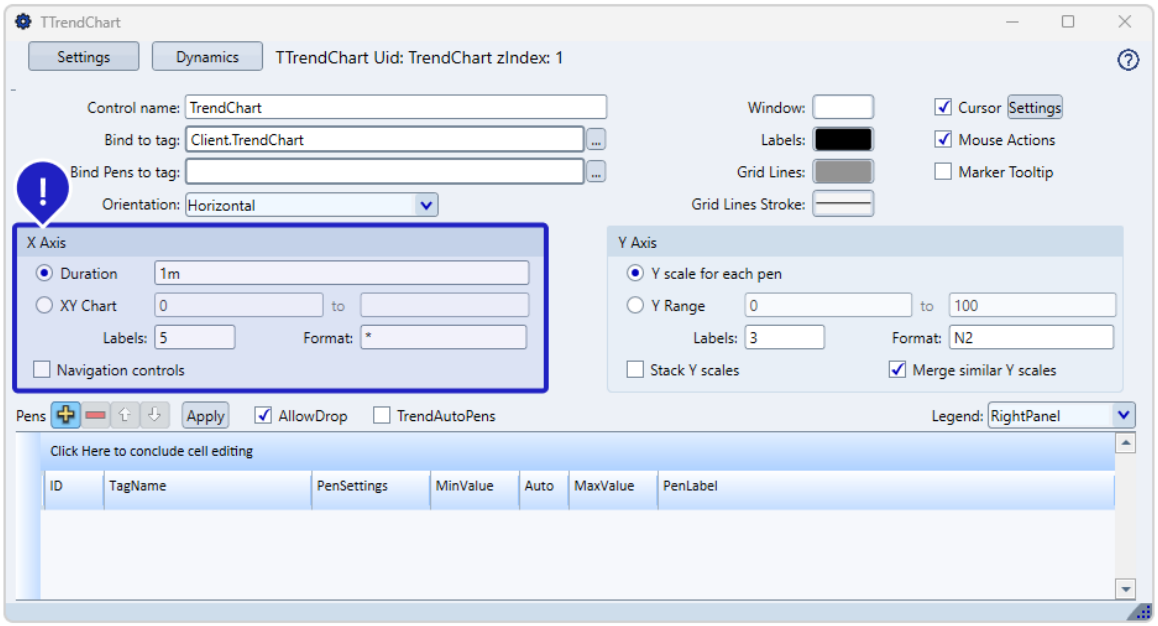
By default, the **Bind Pens to Tags** property will be empty. If you want to dynamically change pens for a single Trend Chart or create specific tags for multiple charts, you need to manually configure the **Client.TrendChart.Pens**

If the **Bind Pens to Tags** property is configured and the chart already has default pens set in its configuration, these default pens will be applied to the pen list when no tag names are specified.

Check out our TrendChart Properties to see this control in action.

X Axis

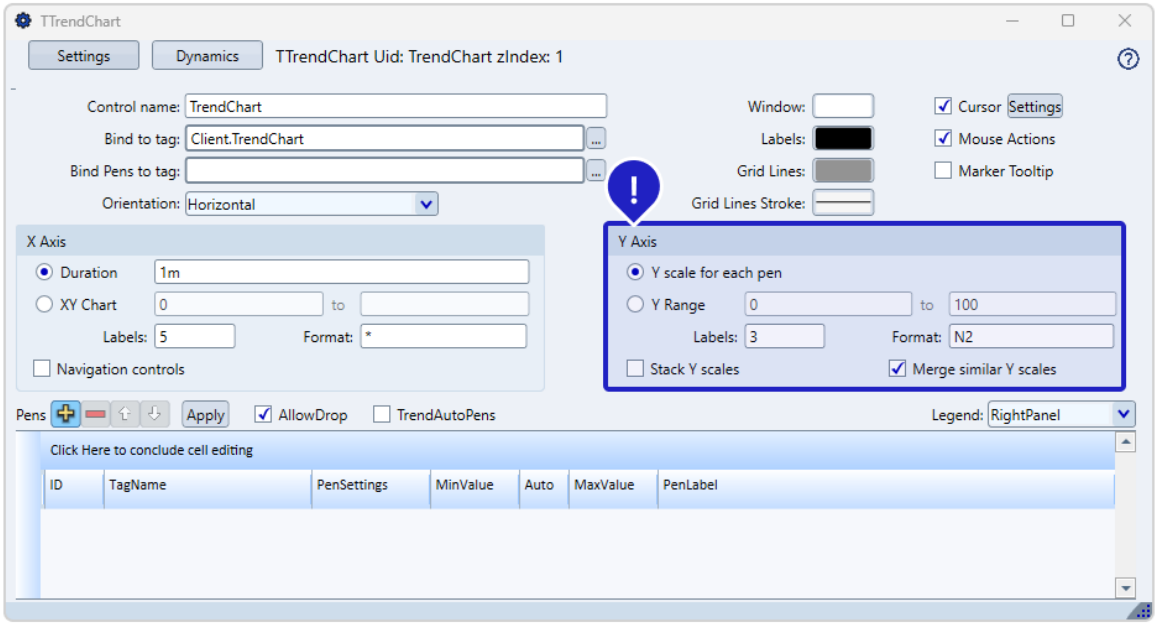
The X-axis is the horizontal axis of the chart and typically represents time or another continuous variable, such as distance, depth, or volume. When time is represented on the X-axis, the chart allows visualization of how a variable changes over time. The X-axis configurations allow users to customize how time or sequential data will be displayed in the chart.



Trend X Axis configuration	
Field	Description
Duration	Sets the time span for the X-axis defining a specific time window for the X-Axis and displays the trend over that period. In this mode, the X-Axis represents time.
XY Chart	Enables or disables the definition of a range for the X-axis. You must define two values (X and Y) to plot against each other. In this mode, the X-Axis does not necessarily represent time.
Labels	Specifies the number of labels on the X-axis.
Format	Controls how the time or value format appears defining the format of the X-axis labels.
Navigation Controls	Enables scrolling and zooming along the X-Axis, providing user-friendly data exploration.

Y Axis

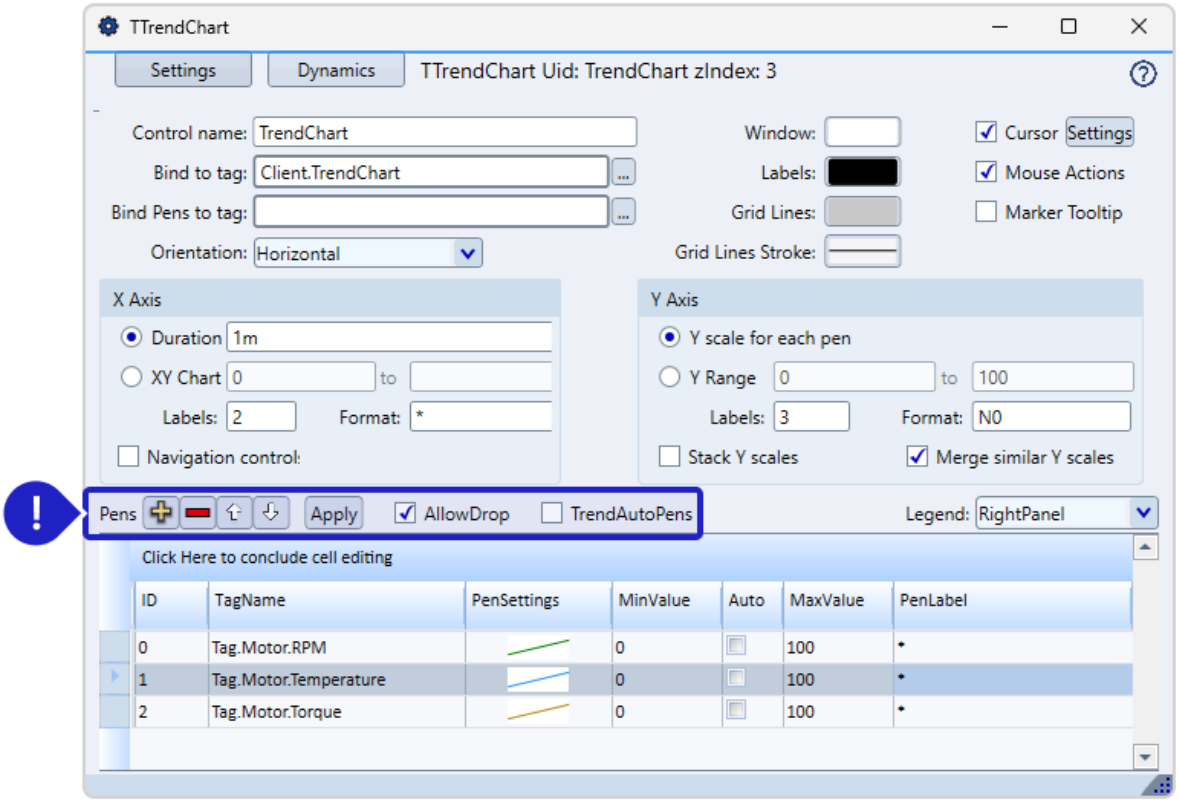
The **Y-Axis** is the vertical axis of a chart and represents the range or scale of the values of the data being plotted. It shows how variables change relative to the time or another variable represented on the X-Axis.

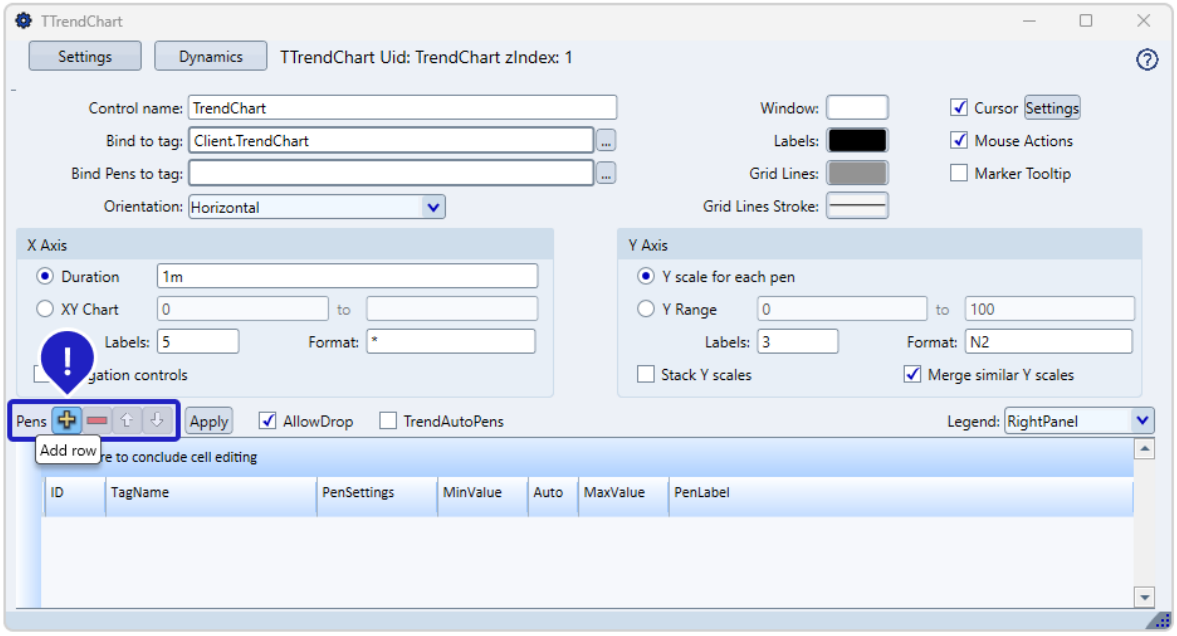


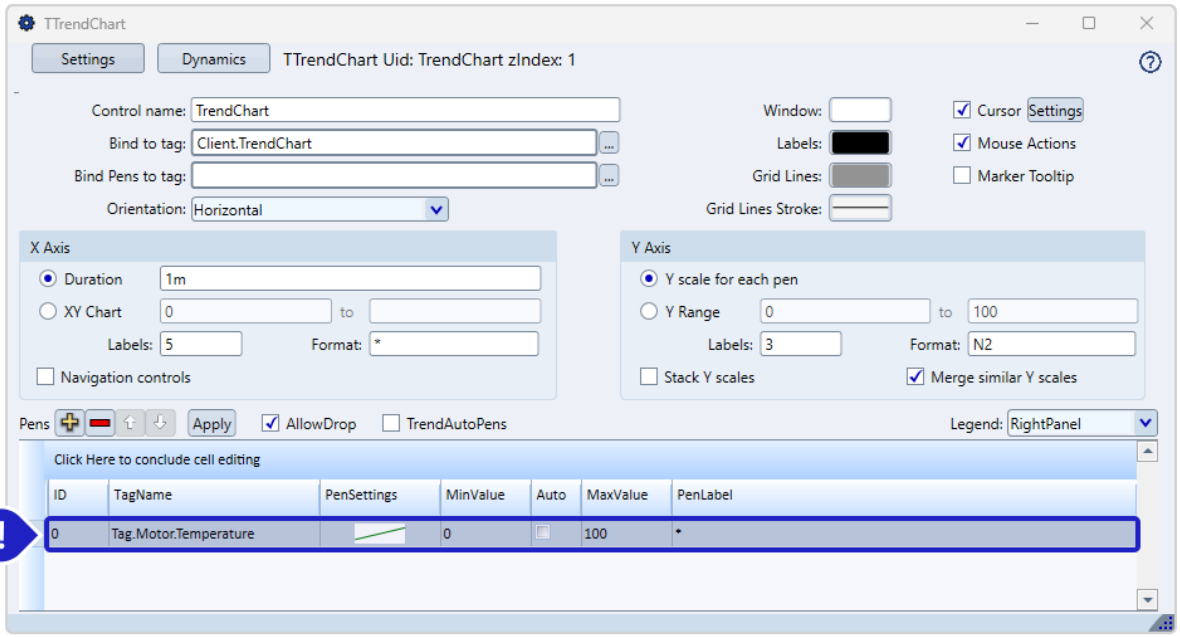
Trend Y Axis settings	
Field	Description
Y scale for each pen	Uses the min and max values of each pen for the Y-axis scale.
Y Range	Defines a fixed range for the Y-axis.
Labels	Specifies the number of labels on the Y-axis.
Format	Defines the format of the Y-axis labels.
Stack Y scales	Enables stacking of similar Y scales.
Merge similar Y scales	Merges similar Y scales.

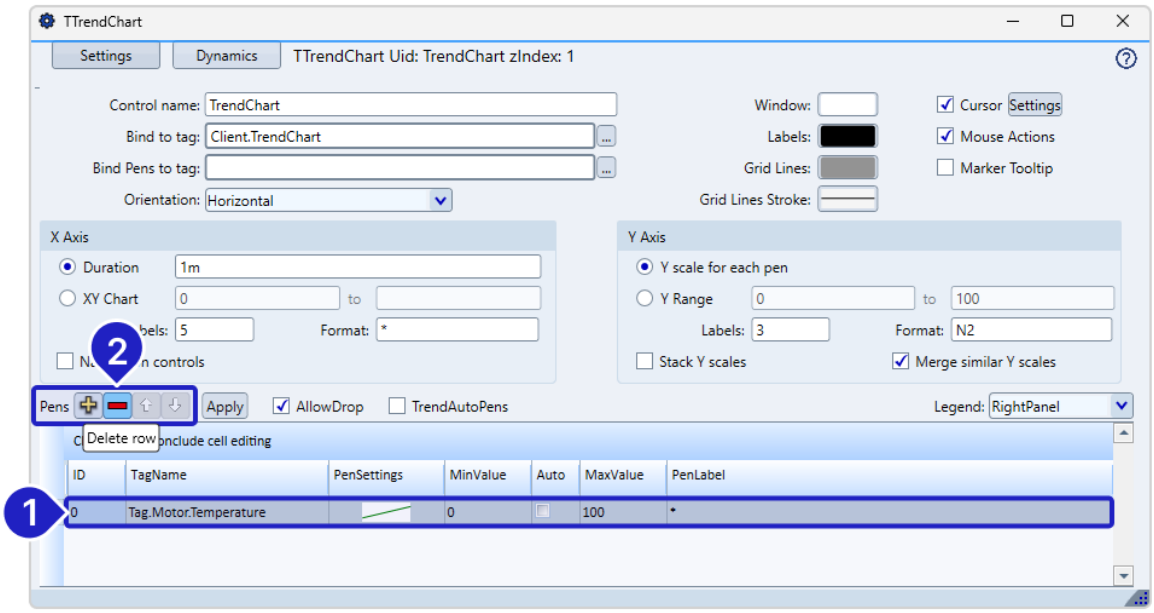
Pens

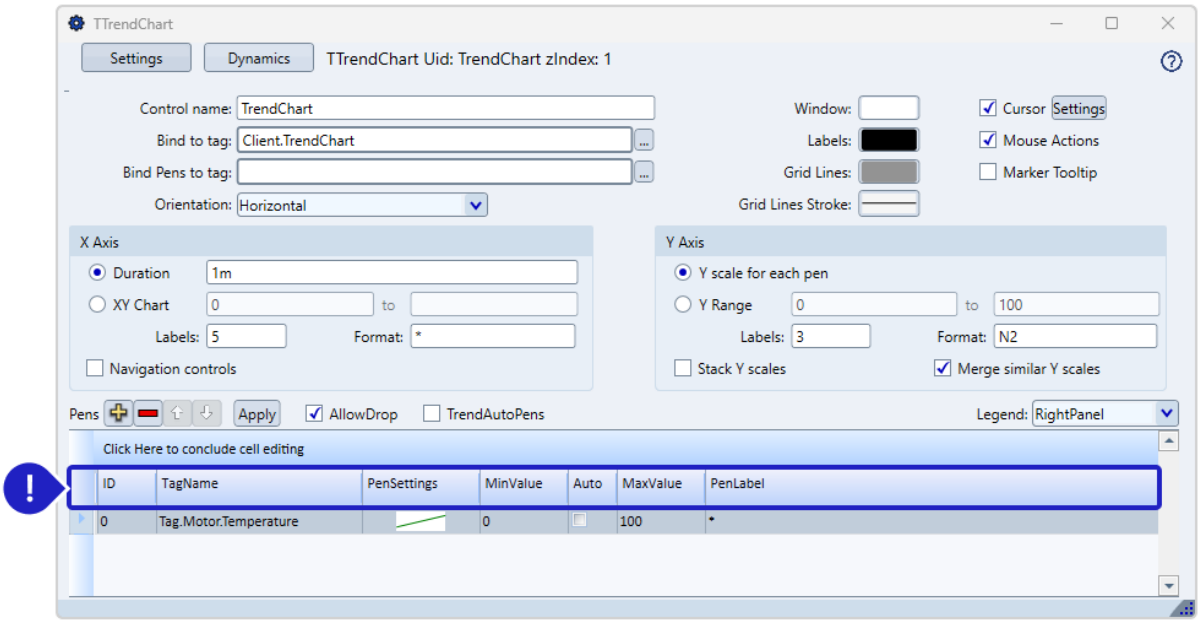
Pens represent individual data series, variables, or metrics that are displayed on the chart. Each pen typically has its own color, style, and scale.


TTrendChart
Settings
Dynamics
TTrendChart Uid: TrendChart zIndex: 3
Control name: TrendChart
Bind to tag: Client.TrendChart
Bind Pens to tag:
Orientation: Horizontal
Window:
Labels:
Grid Lines:
Grid Lines Stroke:
Cursor
Settings
Mouse Actions
Marker Tooltip
X Axis
Duration 1m
XY Chart 0 to
Labels: 2
Format: *
Navigation control
Y Axis
Y scale for each pen
Y Range 0 to 100
Labels: 3
Format: N0
Stack Y scales
Merge similar Y scales
Pens
Apply
AllowDrop
TrendAutoPens
Legend: RightPanel
Click Here to conclude cell editing
ID
TagName
PenSettings
MinValue
Auto
MaxValue
PenLabel
0
Tag.Motor.RPM
0
100
*
1
Tag.Motor.Temperature
0
100
*
2
Tag.Motor.Torque
0
100
*

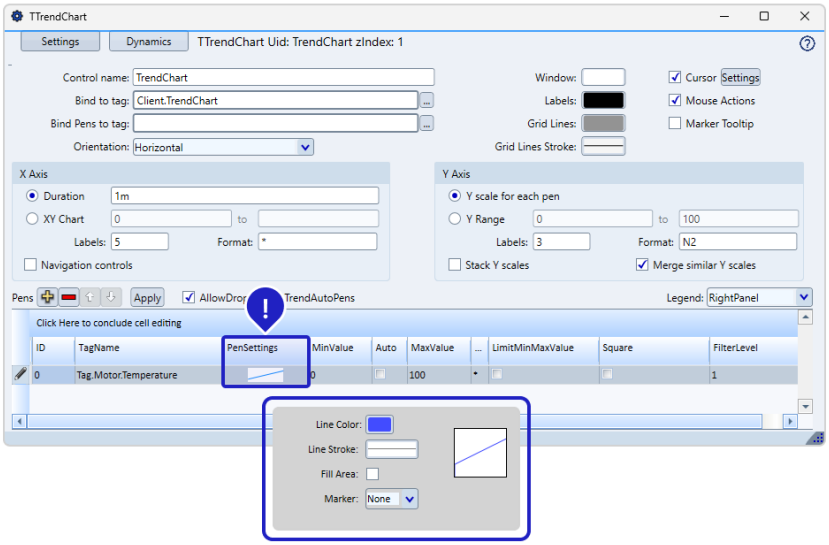

TTrendChart
Settings
Dynamics
TTrendChart Uid: TrendChart zIndex: 1
Control name: TrendChart
Bind to tag: Client.TrendChart
Bind Pens to tag:
Orientation: Horizontal
Window:
Labels:
Grid Lines:
Grid Lines Stroke:
Cursor
Settings
Mouse Actions
Marker Tooltip
X Axis
Duration
1m
XY Chart
0
to
Labels: 5
Format: *
Navigation controls
Y Axis
Y scale for each pen
Y Range
0
to
100
Labels: 3
Format: N2
Stack Y scales
Merge similar Y scales
Pens
Add row
Apply
AllowDrop
TrendAutoPens
Legend: RightPanel
Click Here to conclude cell editing
ID
TagName
PenSettings
MinValue
Auto
MaxValue
PenLabel


TTrendChart
Settings
Dynamics
TTrendChart Uid: TrendChart zIndex: 1
Control name: TrendChart
Bind to tag: Client.TrendChart
Bind Pens to tag:
Orientation: Horizontal
Window:
Labels:
Grid Lines:
Grid Lines Stroke:
Cursor
Settings
Mouse Actions
Marker Tooltip
X Axis
Duration
1m
XY Chart
0
to
Labels: 5
Format: *
Navigation controls
Y Axis
Y scale for each pen
Y Range
0
to
100
Labels: 3
Format: N2
Stack Y scales
Merge similar Y scales
Pens
Apply
AllowDrop
TrendAutoPens
Legend: RightPanel
Click Here to conclude cell editing
ID
TagName
PenSettings
MinValue
Auto
MaxValue
PenLabel
0
Tag.Motor.Temperature
0
100
*





Pens Properties	
Field	Description
ID	Identifier for each pen.
TagName	Sets the tag that provides the value for each pen. It is possible to associate 2 Tags to the same Pen by using array notation (for example, “Tag.x; Tag.y”. This allows users to use pens’ **ShowValueArea** property.

PenSettings	Configures the pen settings, including line color, stroke, and marker type. 
MinValue	Defines the minimum value for the pen according to the Y-axis range.
Auto	Automatically sets the pen value based on the defined range.
MaxValue	Defines the maximum value for the pen according to the Y-axis range.
SPCEnabled	Enables the DrillingChart to display a set of extra pens describing the pen's statistical process control (SPC).
SPCSettings	Defines what SPC pens to display. The following options are available: **Minimum:** The minimum value in the tag's history. **Maximum:** The maximum value in the tag's history. **Mean:** The mean or average of values in the tag's history. **Median:** The middle value that separates the lower and upper halves of values in the tag's history. **Sum:** The sum of values in the tag's history. **DeviationPlus (+ 2 Sigma):** The mean plus twice the standard deviation of the tag's history. **DeviationLess (- 2 Sigma):** The mean minus twice the standard deviation of the tag's history.
ShowValueArea	Defines the behavior of pens containing two tags. The possible values are: **0:** Plots the two tags and tints the area between them. **1:** Plots the two tags without tinting the area between them. **2:** Plots the mean value of the tags at each point. **Other values:** Plots the first tag, just like a pen with a single tag.
PenLabel	Sets the name of the pen.
LimitMinMaxValue	Removes points less than the tag's Min value and greater than the tag's Max value.
Square	Fills the pen points with a square wave.
FilterLevel	Specifies the filter level to group points on the XY axis, calculating the average.
Legend	Defines the position of the legend in the trend control (e.g., RightPanel). Options available: **None**: No legend is displayed. **TopLeft**: Positions the legend at the top left of the trend control. **TopRight**: Positions the legend at the top right of the trend control. **BottomLeft**: Positions the legend at the bottom left of the trend control. **BottomRight**: Positions the legend at the bottom right of the trend control. **RightPanel**: Positions the legend in the right panel of the trend control. **BottomPanel**: Positions the legend in the bottom panel of the trend control.

Trend Annotations

Trend Annotations are operator-placed markers attached to a specific timestamp on the trend. Each annotation carries a timestamp and a free-text comment, is persisted alongside the historical samples, and remains visible to other operators reviewing the same time range.

Use annotations to record operator context against the time series: a process upset, a manual intervention, a shift handover note, or a quality-event tag. Annotations are part of the trend data, not the Display configuration — they survive Display edits, navigation, and runtime restart.

Enabling Annotations on a TrendChart

On the Display, select the TrendChart and check the **Show Tag Notes** property (also exposed via the `ShowTagNotes` template member documented in the table below). When enabled, existing annotations render as markers along the time axis, and operators can author new ones at runtime.

Authoring an Annotation at Runtime

1. Right-click on the trend at the time point you want to annotate.
2. Choose **Add Annotation** from the context menu.
3. Type the comment in the dialog and confirm.

The marker appears immediately on the trend at the captured timestamp and is persisted to the underlying note store. Other clients viewing the same trend pick up the new annotation on their next refresh.

Querying Annotations from a Script

Annotations are exposed to Scripts through the trend chart's annotation collection. From a Display CodeBehind or Server Script, access the annotations attached to the visible time range, iterate them, and read timestamp and comment for each entry. Typical patterns:

- Iterate annotations for the currently displayed time window to build a summary panel beside the chart.
- Filter annotations by author or by a comment prefix to drive a custom event list.
- Read annotation count at the start of a shift handover and emit a checklist of items to review.

Each annotation entry exposes the timestamp, the comment text, and identifying metadata (author, creation time). Treat the annotation collection as read-iterate from the Script layer; new annotations are authored through the operator gesture, not through Script writes.

HasLegend Property

The TrendChart honors the standard **HasLegend** property added in 10.1.5. When checked, the trend renders an associated legend element following the same conventions as other Display controls; see Display Legends for the general legend behavior. The trend-specific **Legend** position field documented in the Pens table (RightPanel, BottomPanel, TopLeft, etc.) controls the pen-list rendering inside the chart area and is independent of the symbol-style HasLegend label.

Runtime Execution

When the runtime environment is initiated, the TrendChart Window displays the configured data trends. Users can interact with the chart, adjusting axes and visual elements to refine their data analysis. The TrendChart dynamically updates to reflect real-time data changes, providing a comprehensive view of production metrics and quality control parameters. This tool facilitates detailed process monitoring and supports informed decision-making based on the visualized data trends.



> **Note**
>
> **Online mode and update rate.** In online mode the chart plots the values the client receives from the server, at the rate the source publishes them. If a tag changes faster than the read rate of its source — a device scan, a TagProvider read cycle, or a relayed solution's update cycle — only the latest state of each cycle reaches the client, so a very short spike or a brief bad-quality interval may not appear on the live curve. No data is lost: the Historian records every change server-side, so those transitions are always present in historical mode, and the same chart shows them as soon as it reads historical data (change the time range or zoom).

TrendChart Advanced Settings

The Trend Window object is included in the version 2014.2 or newer. You can find the Trend Window object in the **Display Drawing** environment in the Drawing toolbar. See the image below for the exact location.

Select the Trend object and draw in the display. Double-click the object to open the TrendWindow configuration dialog.

Trend Chart Properties

The trend is able to work with only the Trend Window configuration dialog. However, if you need some advanced requirement, you can create two templates, TrendChart and TrendPen, with some trend properties. See the supported properties named below. Then, bind the main tags of those templates to the Trend Window object. When you change the members, the trend properties changes in Runtime.

TrendChart Template Members Configuration

Name	Type	Description
AllowRuntimeSettings	Digital	Enables to change the trend settings in Runtime. E.g.: AllowRuntimeSettings = true
BackZoom	Digital	Enables the back zoom. E.g.: BackZoom = false
CanBackZoom	Digital	Checks if there is back zoom in the current trend view. E.g.: CanBackZoom = false

CanNextZoom	Digital	Checks if there is next zoom in the current trend view. E.g.: CanNextZoom = false
ChartArea	Rectangle*	Gets the trend chart area. E.g.: ChartArea = Rectangle *Create a rectangle template with top, bottom, left, right, width, and height.
CursorBrush	Text	Color of the primary cursor. E.g.: CursorBrush = “#FF0000FF”
CursorOutput	DateTime	Current X axis value for the primary cursor. E.g.: CursorOutput = “15/01/2019 11:30:00.000”
CursorOutputTooltip	Digital	Enables the primary cursor output tooltip. E.g.: CursorOutputTooltip = true
CursorPosition	Double	Position of the primary cursor related to the trend object area (percentage 0-100). E.g.: CursorPosition = 100
Duration	Text	Duration time of the X axis. E.g.: Duration = "1m"
EnableMouseActions	Digital	Enables mouse actions in the trend object. E.g.: EnableMouseActions = true
EnableMouseCursorConnection	Digital	Connects the mouse with the primary cursor. E.g.: EnableMouseCursorConnection = false
EnablePrimaryCursorAfterMouseClick	Digital	Enable to show the primary cursor after clicking the mouse. E.g.: EnablePrimaryCursorAfterMouseClick = false
EnableSecondaryCursorAfterMouseClick	Digital	Enable to show the secondary cursor after clicking the mouse. E.g.: EnableSecondaryCursorAfterMouseClick = false
EnableYLabelsStackPensMode	Digital	Enables YLabels subdivisions view. E.g.: EnableYLabelsStackPensMode = 1
EnableYScaleForEachPen	Digital	Enables individual pen scale for the Y axis. E.g.: EnableYScaleForEachPen = true
ExpandedMargin	Text	Margin for the trend object when expanded. E.g.: ExpandedMargin = "0,100,0,200"

GridLinesBrush	Text	Color of the grid line. E.g.: GridLinesBrush = “#FF0000FF”
HighlightPens	Digital	Enable to **highlight** the pens when the mouse is over the pen label in the legend. E.g.: HighlightPens = true
HistoryUpdateTimer	TimeSpan	Periodically re-fetches historical samples from the Historian and rebinds the chart. Use when displayed history may receive late or revised samples after the original write. Default: zero (disabled). When set, the interval is clamped to a maximum of 60 seconds. Each tick re-queries the entire visible time range for every pen, so size the interval based on chart range and pen count to avoid unnecessary load. E.g.: HistoryUpdateTimer = "00:00:30"
IntervalBetweenCursors	TimeSpan	Interval value between the primary and secondary cursors. E.g.: IntervalBetweenCursors = “00:10:00”
IsExpanded	Digital	Checks if the current trend is expanded. E.g.: IsExpanded = false
LabelsBrush	Text	Color of the labels. E.g.: LabelsBrush = “#FFFF00FF”
LimitBrush	Text	This property fills the limit with the chosen color in Hexadecimal format. To make it work, you have to set the "LimitMaxValue" and/or "LimitMinValue". E.g.: LimitBrush = “#FFFF00FF”;
LimitFillOpacity	Double	This property defines the limit opacity. The number goes from 0.0 to 1.0. By default, it is set to 0. To make it work, you have to set the "LimitMaxValue" and/or "LimitMinValue". E.g.: LimitFillOpacity = 0.5
LimitMaxValue	Double	This property will display a maximum horizontal line. To make it work, you have to choose the color using the property "LimitBrush". E.g.: LimitMaxValue = 85
LimitMinValue	Double	This property will display a minimum horizontal line. To make it work, you have to choose the color using the property "LimitBrush". E.g.: LimitMinValue = 22
MarkerTooltip	Digital	Shows the tooltip when the mouse is over the markers. E.g.: MarkerTooltip = false
MergeSameYScales	Digital	Merges the same scaling values of the Y axis. E.g.: MergeSameYScales = true
NavigationControls	Digital	Shows the navigation controls in the bottom of the trend object. E.g.: NavigationControls = false
NextZoom	Digital	Enables the next zoom. E.g.: NextZoom = false

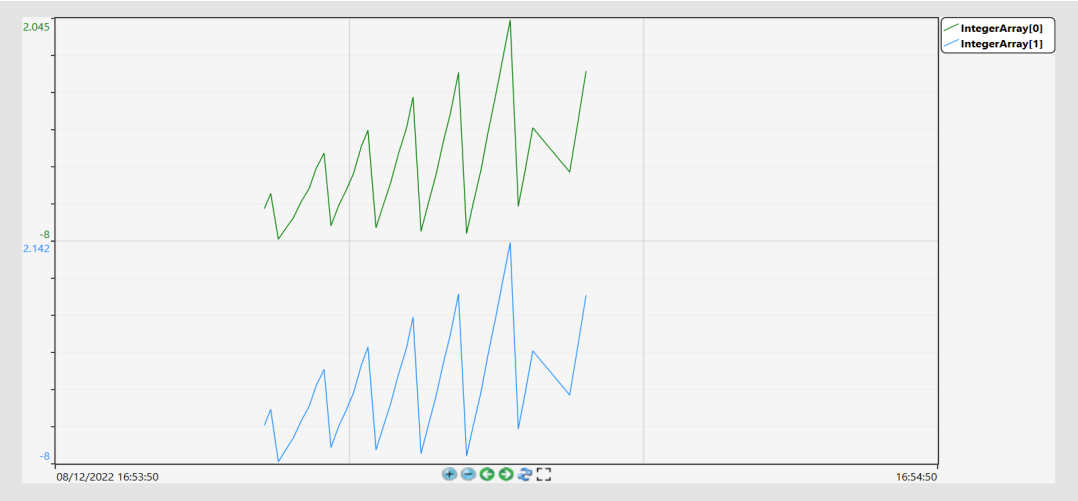
OnlyZoomXAxis	Digital	Enables zoom only along the X axis. E.g.: OnlyZoomXAxis = false
Orientation	Integer	Orientation of the trend drawing. 0 - Horizontal 1- Vertical, Top to Bottom 2- Vertical, Bottom To Top E.g.: Orientation = 0
Paused	Digital	Pauses the plotting of the trend object. E.g.: Paused = false
SecondaryCursorBrush	Text	Color of the secondary cursor. E.g.: SecondaryCursorBrush = “#FFFF00FF”
SecondaryCursorOutput	DateTime	Current X axis value for the secondary cursor. E.g.: SecondaryCursorOutput = “15/01/2019 11:30:00.000”
SecondaryCursorOutputTooltip	Digital	Enables the secondary cursor output tooltip. E.g.: SecondaryCursorOutputTooltip = false
SecondaryCursorPosition	Double	Position of the secondary cursor relative to the trend object area (percentage 0-100). E.g.: SecondaryCursorPosition = 0
SecondaryVerticalCursor	Digital	Enables the secondary vertical cursor. E.g.: SecondaryVerticalCursor = false
ShowAlarms	Digital	Enable to show alarm markers for the pens in the trend chart area. When enabled, the chart reads the alarm history of all its pens from the Alarm Historian when it loads, and reads it again each time a new alarm is recorded. The read covers the chart period and every pen, including pens that have no alarms configured. Set to false on charts that do not need alarm markers. The chart then does not read the alarm history, which reduces the load on the Alarm Historian database, especially with long periods, many pens or large alarm tables. Alarm markers are separate from Trend Annotations, which are controlled by Show Tag Notes. E.g.: ShowAlarms = false
ShowDuration	Integer	Enable to show the duration value in the vertical cursors. E.g.: ShowDuration = 0
ShowNoteDetails	Digital	Enable to show the note details in the trend chart area. E.g.: ShowNoteDetails = false
ShowPrimaryCursorCloseButton	Digital	Enable to show the close button in the primary cursor. E.g.: ShowPrimaryCursorCloseButton = false
ShowPrimaryCursorValues	Digital	Enable to show the pens value in the primary cursor. E.g.: ShowPrimaryCursorValues = false

ShowRangeEvents	Digital	Enable to show the range events in the trend chart area. E.g.: ShowRangeEvents = true
ShowRefreshButton	Digital	Enable to show the refresh button over the trend object. E.g.: ShowRefreshButton = false
ShowSecondaryCursorCloseButton	Digital	Enable to show the close button in the secondary cursor. E.g.: ShowSecondaryCursorCloseButton = false
ShowSecondaryCursorValues	Digital	Enable to show the pens value in the secondary cursor. E.g.: ShowSecondaryCursorValues = false
ShowTagNotes	Digital	Enable to show the tag notes in the trend chart area. E.g.: ShowTagNotes = true
ShowTimeNotes	Digital	Enable to show the time notes in the trend chart area. E.g.: ShowTimeNotes = true
ShowXValueNotes	Digital	Enable to show X axis values in the trend chart area. E.g.: ShowXValueNotes = true
StackPens	Digital	Enable the stack pens for Y axis. E.g.: StackPens = false
StartDateTime	DateTime	Start date time of X axis. E.g.: StartDateTime = “15/01/2019 9:00:0.000”
TimeBeforeNow	TimeSpan	Time value before the current time. E.g.: TimeBeforeNow = “02:00:00”
VerticalCursor	Digital	Enable to show the primary vertical cursor. E.g.: VerticalCursor = true
WindowBrush	Text	Color of the trend background window. E.g.: WindowBrush = “#FFFF00FF”
XEndValue	DateTime	End value for the X axis. E.g.: XEndValue = “15/01/2019 11:00:0.000”
XGridLines	Text	Number of grid lines for the X axis. E.g.: XGridLines = "4"
XLabelDegrees	Double	Skew degree of the labels in the X axis. E.g.: XLabelDegrees = 0

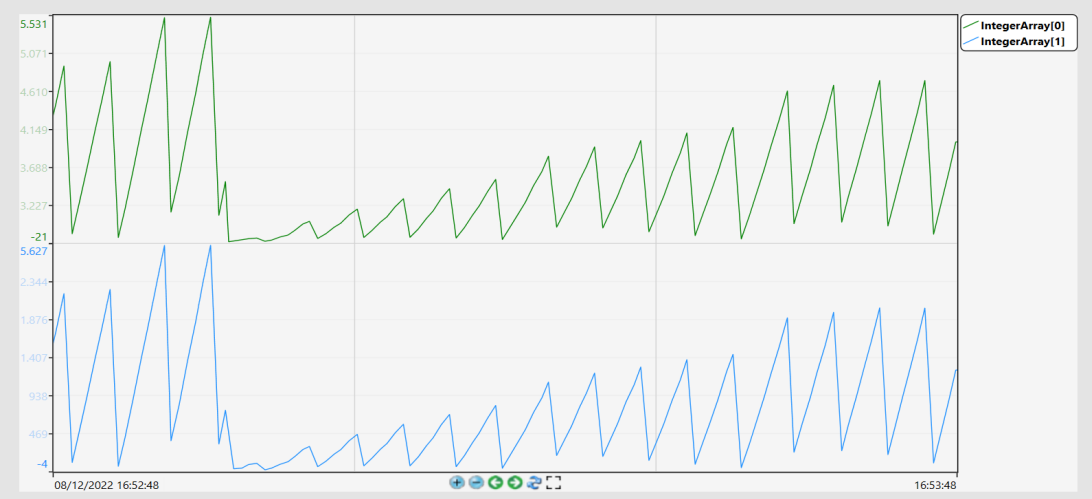
XLabelFormat	Text	Format of the labels in the X axis. E.g.: XLabelFormat = "dd/MM/yy HH:mm:ss"
XLabels	Text	Number of labels in the X axis. E.g.: XLabels = "2"
XLabelsEditable	Digital	Enable the X labels for editing. E.g.: XLabelsEditable = false
XPadding	Double	Space from the trend bottom to starting the chart area. E.g.: XPadding = 0
XStartValue	DateTime	Start value for the X axis. E.g.: “15/01/2019 9:00:0.000”
YGridLines	Text	Number of grid lines for the Y axis. E.g.: YGridLines = "5"
YLabelFormat	Text	Format of the labels in the Y axis. E.g.: YLabelFormat = “N1”
YLabels	Text	Number of labels in the Y axis. E.g.: YLabels = "3"
YLabelsEditable	Digital	Enables the Y labels for editing. E.g.: YLabelsEditable = true
YMaxValue	Double	Maximum value for the Y axis. E.g.: YMaxValue = 100
YMinValue	Double	Minimum value for the Y axis. E.g.: YMinValue = 0
YPadding	Double	Starting position of the chart area from the trend left side. E.g.: YPadding = 0

StackPens Details

When more than one tag is being measured and the StackPens property is set to "true", the chart will turn into a stack chart-like visualization by dividing it in as many portions as measured tags. See image below for an example. Mouse over the image to see the property used.



Also, you can set the EnableYLabelsStackPensMode property to show YLabels subdivisions. See an example below. Mouse over the image to see the property used.



In this section...
