



**Critical**  
manufacturing  
an ASM PT company

# BI Cards

## 10.2

March 2024

### DOCUMENT ACCESS

Public

### DISCLAIMER

The contents of this document are under copyright of Critical Manufacturing S.A. it is released on condition that it shall not be copied in whole, in part or otherwise reproduced (whether by photographic, or any other method) and the contents therefore shall not be divulged to any person other than that of the addressee (save to other authorized offices of his organization having need to know such contents, for the purpose for which disclosure is made) without prior written consent of submitting company.

# BI Cards

Estimated time to read: 29 minutes

With the use of BI Cards you have a flexible infrastructure that will permit the definition and visualization of KPIs, as well as other data.

Available as widgets, BI Cards can be used in a dashboard to create and define KPIs with different dimensions, collect data from different data sources and apply business rules for complex data calculations, and present information using a set of visually rich widgets. All of this provides you with increased visibility and monitoring possibilities.

*i*
**Info**

BI Cards are part of the Core module.

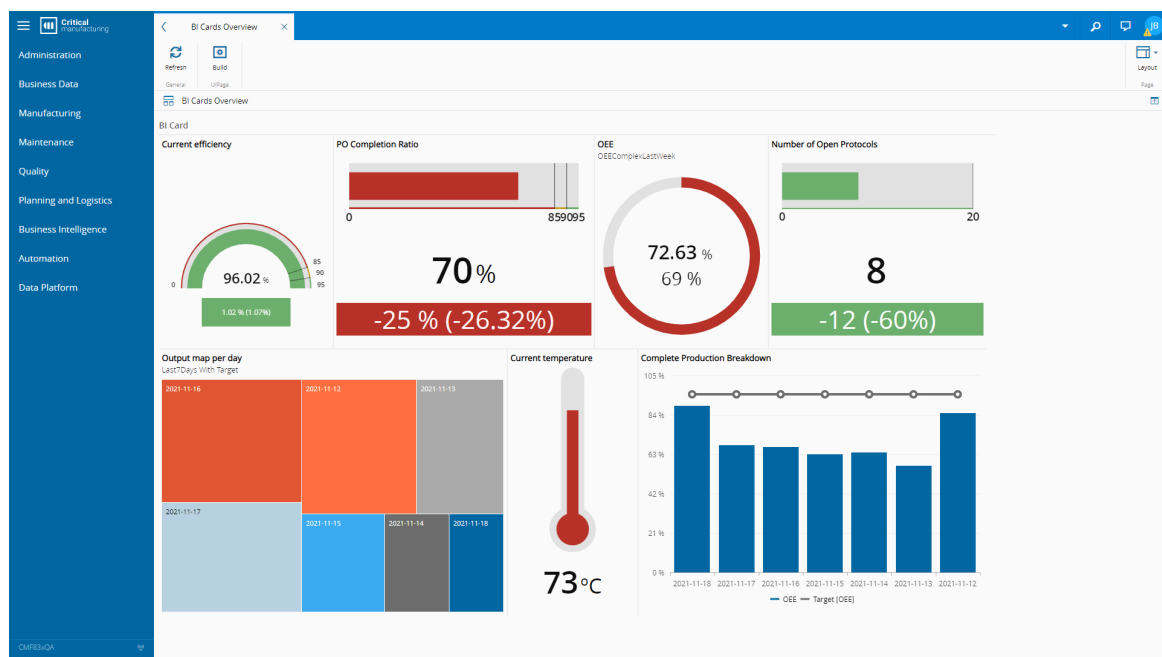
This document will guide you through the setup and usage of BI Cards.

## Overview

BI Cards are a visual representation of KPI values that display real-time information. They provide a low-effort way of building highly visual dashboards, by displaying data for several KPIs using different visualization options. This enables the highlight of the performance of an entity so that key users can control the production status and take preventive or corrective actions.

A UI Page can contain multiple BI Cards displaying different KPIs for the same or different entities. The UI Page can be made dynamic by linking other widgets (for example, a **Query**) with the BI Card widgets. Thus, a visual-rich and powerful dashboard can be easily created and made available for several users.

The image below shows an example of a dashboard with BI Cards:



### Info

BI Cards must be configured as a Widget in a UI Page.

## Concepts

The table below describes the main concepts related to BI Cards:

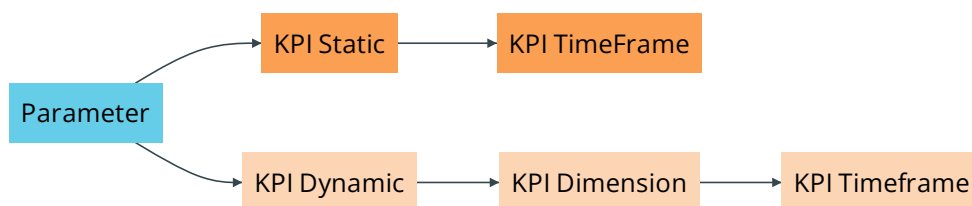
Concept	Description
<b>UI Page</b>	A configurable GUI page that can be used to display information and interact with the system. There are different page elements that can be used to build a UI Page.
<b>Widget</b>	Visual elements used to build a UI Page, such as BI Cards, queries, buttons, and filters.
<b>Parameter</b>	A value to be monitored in a KPI.
<b>Static KPI</b>	A KPI structure that allows users to insert values for defined timeframes.
<b>Dynamic KPI</b>	A KPI which is associated with an entity's properties and its value is calculated considering a time window.
<b>KPI Type</b>	Defines which is the goal of the KPI: maximum, minimum, or deviation.
<b>Entity Type</b>	An entity (object type) for which the KPI is calculated.
<b>Dimension</b>	For dynamic KPIs, it defines the scope variation of the defined KPI, for example, <b>Last 7 Days</b> or <b>Current Shift</b> .
<b>Timeframe</b>	A time window associated with a KPI for which a certain value is considered.
<b>Visualization</b>	How the KPI values will be displayed in the Widget.

Table: BI Cards main concepts

## KPI

A KPI is an object that can be used to store and organize data in order to be displayed in reports and widgets. The KPI object model is shown in image below.

There are two types of KPIs: **Static** and **Dynamic**.



Static KPIs store data in defined time frames for a configured numeric **Parameter**. You must select a **Frequency** calculation (Daily, Weekly, Monthly, or Yearly) that defines the time interval for which data will

be inserted into the KPI. Dynamic KPIs are associated with an **Entity Type** and **KPI Dimensions**. Each KPI Dimension corresponds to a variation of the scope of the KPI.

For both KPIs, a goal type (**KPI Type**) needs to be defined, such as maximization, minimization, or deviation from a target value.

KPIs are referenced in Widgets of UI Pages and, during runtime, the GUIs will request the application server to retrieve the KPI values.

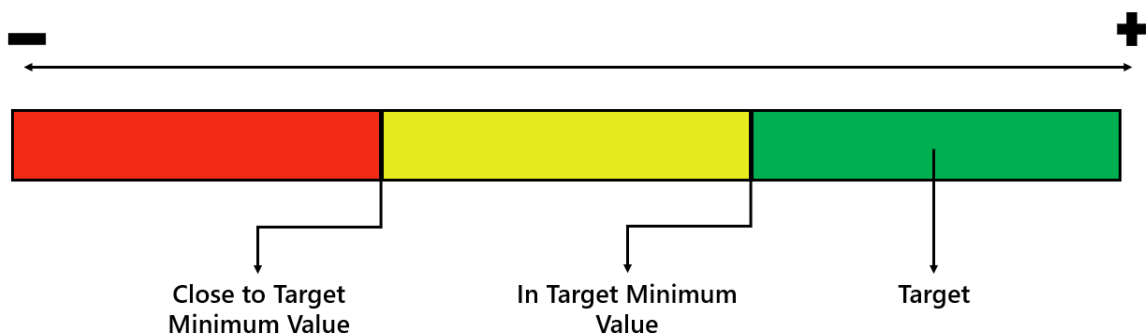
## Setting Up BI Cards

### Create the KPIs

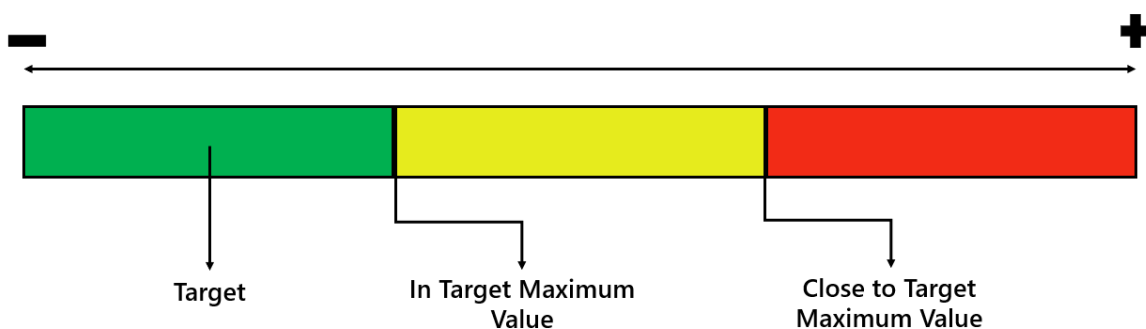
As BI Cards display information that is obtained from KPIs, you need to ensure that the desired KPIs are available before creating the BI Card itself.

For a KPI, it is mandatory to define the KPI Type (Maximum, Minimum, or Deviation) and, for each KPI Type, targets must be configured to allow you to visually assess, on the BI Card, how the current value compares with the target value.

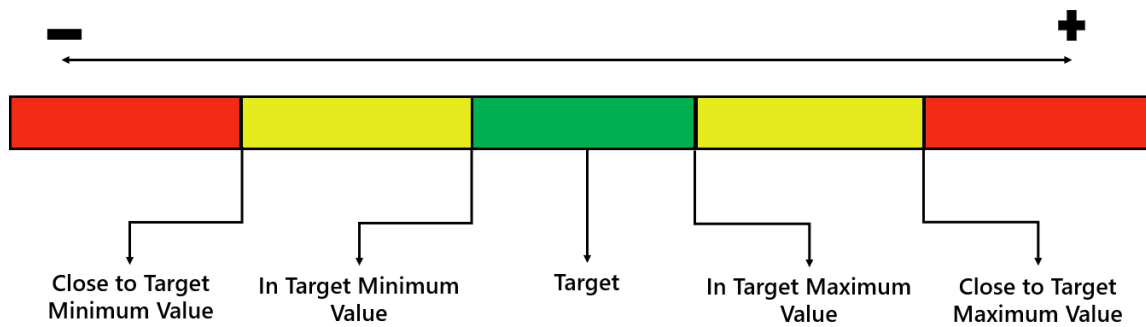
For the KPI of type Maximum, the limits, as shown below, should be configured:



For the KPI of type Minimum, the limits, as shown below, should be configured:



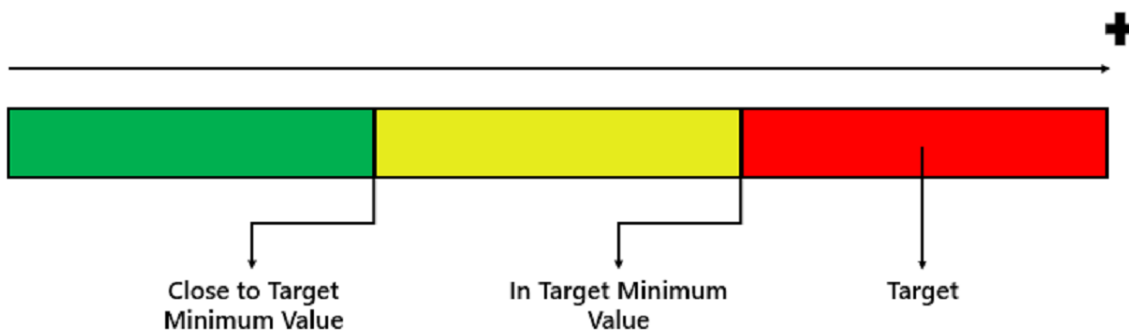
For the KPI of type Deviation, the limits, as shown below, should be configured:



For a KPI linked to a Parameter with Data Type DateTime, the KPI Type should be defined as Minimum. The limits, as shown below, should be configured:

#### Info

The KPI limits must be defined in the KPI Dimension.



Static and Dynamic KPIs have different configurations, as explained in the sub-sections below.

### Static KPIs

For a Static KPI you should define:

- The **Parameter** - a numeric value that will be monitored in the KPI. Its data type and boundaries must be aligned with the KPI scope.
- The **Frequency** - defines the time intervals for which values will be specified for the KPI.

#### Note

Units (of Measure) that are defined for the Parameter associated with the KPI will determine the Unit that is shown in the BI Card.

The next image shows the creation page for a Static KPI:

**Create New KPI**

**GENERAL DATA**

General Data

Name: KPI Example

Description:

Type: Quality

Settings

Source Type: ☒ Static ☐ Dynamic

Entity Type:

Parameter: KPI Decimal

KPI Type: Minimum

Frequency: Daily

Owner Role:

Default Values

Close to Target Minimum Value:

In Target Minimum Value:

Target Value:

Comments:

Cancel Create

After creating the KPI, data must be inserted into its time frames, as shown below:

**Manage Dimensions and Time Frames**

**TIME FRAMES**

OVEN-95\_BeltSpeed

Time Frames

From: 11/01/2018 12:00 AM / To: 11/01/2019 12:00 AM

Time Frames Details

From Date: 11/01/2018 12:00 AM

To Date: 11/01/2019 12:00 AM

Parameter Values

Close to Target Minimum Value: 80

In Target Minimum Value: 90

Target Value: 100

Actual Value: 92

Delta: -8

Comments:

Cancel Update

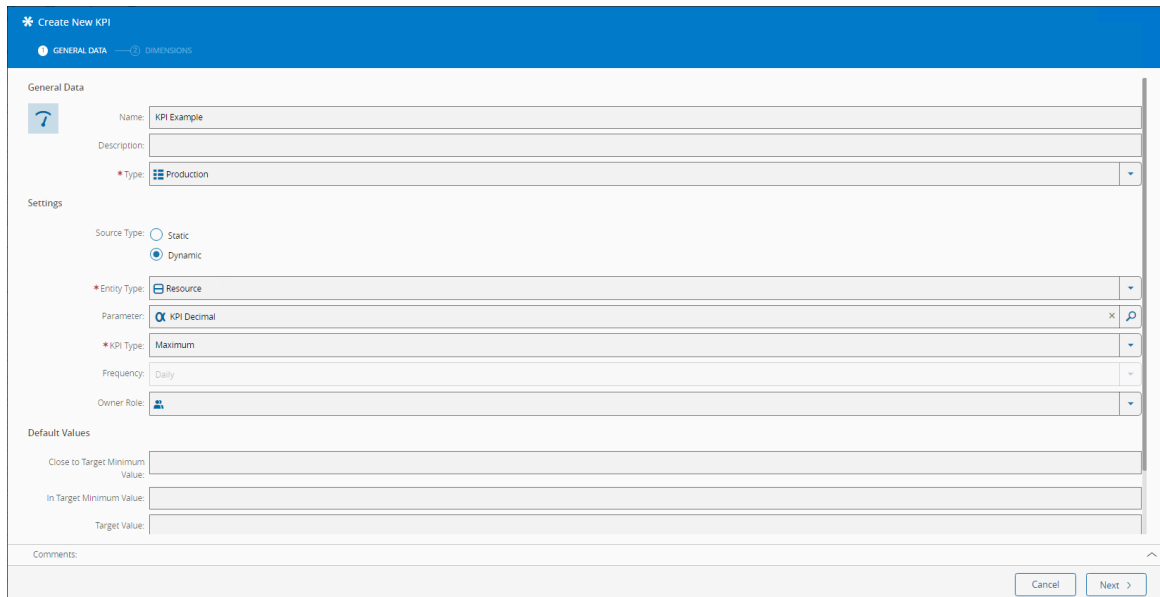
## Dynamic KPIs

For a Dynamic KPI you should define:

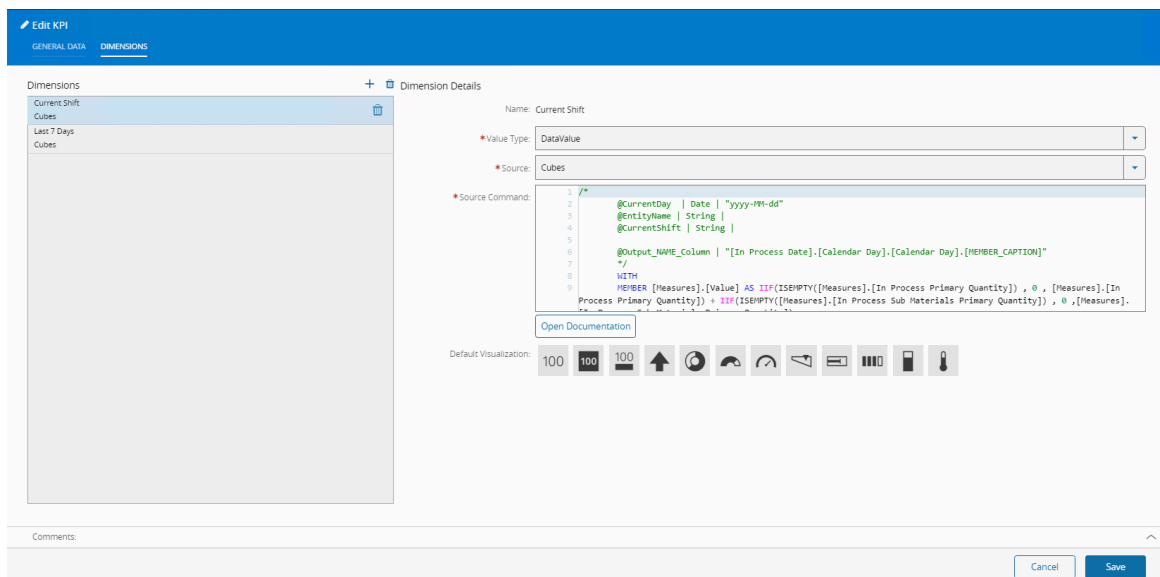
- The **Entity type** - system's entity for which the KPI will be applied.
- The **Parameter** - a value that will be monitored in the KPI. Its data type and boundaries must be aligned with the KPI scope.
- For each **Dimension** you need to define:
- The **Value Type** - if the KPI calculation will return a Data Value (single value) or Data Series:
  - Data Value - the dataset is expected to have only one row representing a single value. If multiple rows are present, only one is presented.
  - Data Series - the dataset is expected to have multiple rows. Each row representing a value of the current dimension.
- The **Source** - which source will be considered for calculating the KPI:
- Business Rule - will execute a Rule.

- Operational Data Store - will trigger a T-SQL query in the ODS Database.
- Data Warehouse - will trigger a T-SQL query in the DWH Database.
- Cubes - will trigger an MDX query in the Data Warehouse Cubes.  
If the source is not a **Business Rule**, you need to enter the **Source Command**, otherwise, a **Business Rule** must be selected from the ones available in the system.
- The **Default Visualization** - the default visualization for the presentation of the BI Card.

The image below shows the Create New KPI wizard for a Dynamic KPI:



To add a KPI Dimension, you can do it through the Create KPI wizard, through the Edit KPI wizard, or through the Manage Dimensions and Time Frames wizard, as displayed in the image below:



### Info

For the KPI Dimension **Source Command**, there is a special convention in place to return values to the application KPI infrastructure. The detailed documentation about this convention can be found by selecting the **Open Documentation** button that is available in the Wizard or in the [Developer Guide](#) section of the MES Help.

The source code snippet below shows an example of a **Source Command** that calculates the total primary and secondary quantity of WIP for the Area of a certain Facility (supplied as the variable **@EntityName**) for the current Employee's User (variable **@UserId**). In this example, the KPI type should be configured as a minimum and must be linked to the Entity Type **Facility**. For the KPI Dimension, it must be configured to return a **Data Value** and the Source must be defined as the **Operational Data Store**.

```
SELECT f.[Name], (SUM(ISNULL(m.PrimaryQuantity,@)) + SUM(ISNULL (m.SecondaryQuantity, @) )) AS
[Value]
FROM CoreDataModel.T_Material m
INNER JOIN CoreDataModel.T_StepArea sa ON sa.SourceEntityId = m.StepId
INNER JOIN CoreDataModel.T_Area a ON sa.TargetEntityId = a.AreaId
INNER JOIN CoreDataModel.T_Employee e ON e.AreaId = sa.TargetEntityId
INNER JOIN CoreDataModel.T_Facility f ON f.FacilityId = m.FacilityId AND f.FacilityId =
a.FacilityId
INNER JOIN Security.T_User u ON u.UserId = e.UserId
WHERE u.UserId = @UserId AND f.[name] = @EntityName AND m.UniversalState <> 4
GROUP BY f.[Name];
```

Although it is mandatory that the Source Command returns the Entity Name and Value columns, it is also possible to override the KPI, KPI Time Frames, and KPI Parameter's definitions by specifying these values in the correct column of the Dimension's Source Command. For example, if the **Units** column is added in the Source Command, and it is the specified value to be shown in the BI Card, that value will be shown instead of the **Unit** defined in the associated Parameter. For more information, see the table below:

Column	Output Source Definition	For Data Value	For Data Series
<b>Category</b>	It is the Category name displayed for the Data Series in the x-axis.	Optional	Mandatory
<b>EntityName</b>	It is obtained from the Source Command column.	Optional	Optional
<b>Name</b>	It is obtained from the Source Command column.	Mandatory	Mandatory
<b>Value</b>	It is obtained from the Source Command column.	Mandatory	Mandatory
<b>TargetValue</b>	It is obtained from the Source Command column if defined or from the <i>Target Value</i> defined in the KPI.	Optional	Optional
<b>DisplayValue</b>	It is obtained from the Source Command column.	Optional	Optional
<b>Axis</b>	It is obtained from the Source Command column. The index of the series axis - 0 is the left axis, 1 if the right axis.	Optional	Optional
<b>Units</b>	It is obtained from the Source Command column if defined or from the <i>Units</i> defined in the Parameter linked to the KPI.		



Column	Output Source Definition	For Data Value	For Data Series
<b>Maximum</b>	It is obtained from the Source Command column if defined or from the <i>Maximum Value</i> defined in the Parameter linked to the KPI. It is the maximum value of the left axis.	Optional	Optional
<b>Minimum</b>	It is obtained from the Source Command column if defined or from the <i>Minimum Value</i> defined in the Parameter linked to the KPI. It is the minimum value of the left axis.	Optional	Optional
<b>CloseToTargetMinimumValue</b>	It is obtained from the Source Command column if defined or from the <i>Close to Target Minimum Value</i> defined in the KPI/KPI Time Frame.	Optional	Optional
<b>CloseToTargetMaximumValue</b>	It is obtained from the Source Command column if defined or from the <i>Close to Target Maximum Value</i> defined in the KPI/KPI Time Frame.	Optional	Optional
<b>InTargetMinimumValue</b>	It is obtained from the Source Command column if defined or from the <i>In Target Minimum Value</i> defined in the KPI/KPI Time Frame.	Optional	Optional
<b>InTargetMaximumValue</b>	It is obtained from the Source Command column if defined or from the <i>In Target Maximum Value</i> defined in the KPI/KPI Time Frame.	Optional	Optional
<b>SecondAxisMax</b>	It is obtained from the Source Command column if defined or from the <i>Maximum Value</i> defined in the Parameter linked to the KPI. It is the maximum value of the right axis.	Optional	Optional
<b>SecondAxisMin</b>	It is obtained from the Source Command column if defined or from the <i>Minimum Value</i> defined in the Parameter linked to the KPI. It is the minimum value of the right axis.	Optional	Optional
<b>SecondAxisUnits</b>	It is obtained from the Source Command column if defined or from the <i>Units</i> defined in the Parameter linked to the KPI. It is the units of the right axis.	Optional	Optional
<b>FromDate</b>	It is obtained from the Source Command column if defined or from the <i>From Date</i> defined in the Timeframe of the KPI.	Optional	Optional

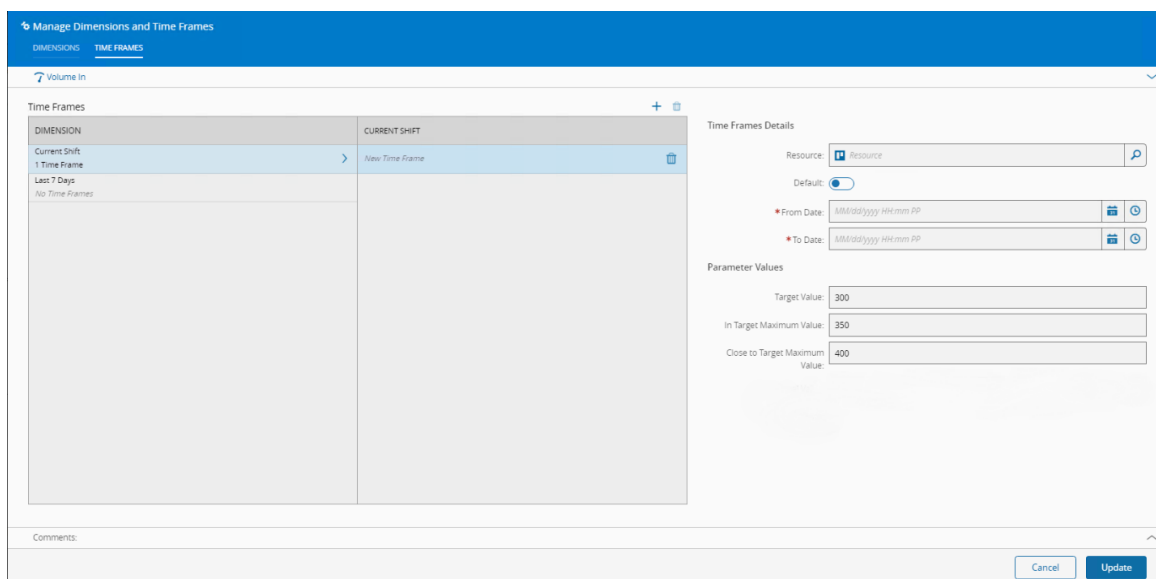
Column	Output Source Definition	For Data Value	For Data Series
<b>ToDate</b>	It is obtained from the Source Command column if defined or from the <i>To Date</i> defined in the Timeframe of the KPI.	Optional	Optional
<b>Color</b>	It is a named or HTML color in which the KPI will be displayed in the BI Card. It is possible to define a different Color per data series.	Optional	Optional
<b>[Name1,Value1], [Name2,Value2]...</b>	Additional columns to display Data Series' information.	Optional	Optional

Table: Dynamic KPI output definition

For Dynamic KPIs, Time Frames can be added, as shown in the image below. When adding a Time Frame for a Dynamic KPI, you can define specific target values to be applied when displaying data for that corresponding Time Frame.

If an Entity is selected, then the Time Frame will only be applied for this Entity.

It is only possible to define one default Time Frame per Entity. If there are other Time Frames defined for a KPI which have a default Time Frame, then the non-default target values will be applied when displaying data for those Time Frames.



## Out-of-the-Box Dynamic KPIs

There is a set of available Dynamic KPIs that are provided out-of-the-box and that are ready to use, as listed in the table below:

KPI	Entity Type	Description	Dimension	KPI Type	Parameter
-----	-------------	-------------	-----------	----------	-----------

KPI	Entity Type	Description	Dimension	KPI Type	Parameter
<b>Average Assist Time</b>	- Resource	The average time between the start and end of Assist Events for the selected Resource.	- Current Day - Current Shift - Last 3 Days - Last 7 Days - Current Week - Current Month - Current Order	Minimum	KPI Hours
<b>Average Changeover Time</b>	- Resource	The average Setup Time of complete Setup transitions for the selected Resource.	- Current Day - Current Shift - Last 3 Days - Last 7 Days - Current Week - Current Month	Minimum	KPI Minutes
<b>Closed Protocol Duration by Type and Severity</b>	- Protocol Instance	The duration of Protocol Instances having the System State Closed by Type and Severity.	- Current Day - Current Week - Current Month	Minimum	KPI Hours
<b>Closed Protocol Duration by Type</b>	- Protocol Instance	The duration of Protocol Instances having the System State Closed by Type.	- Current Day - Current Week - Current Month	Minimum	KPI Long
<b>Closed Protocol Instances</b>	- Protocol Instance	The Number of Protocol Instances in SystemState = Closed	- Current Day - Current Week - Current Month	Minimum	KPI Long

KPI	Entity Type	Description	Dimension	KPI Type	Parameter
<b>Completed Production Orders</b>	- Facility - Product Group	The number of Completed Production Orders for the selected entity.	- Current Day - Current Shift - Last 3 Days - Last 7 Days - Current Week - Current Month - Current Order	Maximum	KPI Long
<b>Completed Quantity</b>	- Facility - Product Group	The Quantity Completed for the selected entity.	- Current Day - Current Shift - Last 3 Days - Last 7 Days - Current Week - Current Month	Maximum	KPI Decimal
<b>Components Placed Per Hour</b>	- Resource	The average number of components placed per hour registered on component placement Events for the selected Resource.	- Current Day - Current Shift - Last 3 Days - Last 7 Days - Current Week - Current Month - Current Order	Maximum	KPI Decimal

KPI	Entity Type	Description	Dimension	KPI Type	Parameter
<b>Defective Units Count</b>	- Area - Facility - Resource	The Material Primary Quantity Loss for the selected entity.	- Current Day - Current Shift - Last 3 Days - Last 7 Days - Current Week - Current Month	Minimum	KPI Decimal
<b>Down Reason Count</b>	- Resource	The Reasons for the changes to Universal State Unscheduled Down for the selected Resource.	- Current	Maximum	None
<b>Down Reason</b>	- Resource	The Down Reason for the selected Resource with System State set as Down.	- Last 7 Days	Deviation	None
<b>Equipment Recipe</b>	- Resource	The Recipe of the selected Resource.	- Current	Deviation	None
<b>Equipment State</b>	- Resource	The Universal State of the selected Resource.	- Current - Last 7 Days	Deviation	None
<b>Fault Count</b>	- Resource	The number of Fault Events for the selected Resource.	- Current Day - Current Shift - Last 3 Days - Last 7 Days - Current Week - Current Month - Current Order	Minimum	KPI Decimal

KPI	Entity Type	Description	Dimension	KPI Type	Parameter
<b>First Pass Yield</b>	- Resource	The number of OK Units Inspected Events divided by the number of OK and NOK Units Inspected Events for the selected Resource.	- Current Day - Current Shift - Last 3 Days - Last 7 Days - Current Week - Current Month	Maximum	KPI Decimal
<b>Job Remaining Time</b>	- Resource	The remaining process time of the last tracked-in Material in the selected Resource.	- Current	Maximum	KPI Decimal
<b>Loss Reason Sum</b>	- Area	The sum of the losses per Reason recorded in the selected Area.	- Last 7 Days	Minimum	KPI Decimal
<b>Material Completed Quantity</b>	- Material	The Processed Quantity of the oldest tracked-in Material in the selected Resource.	- Current	Maximum	KPI Long
<b>Material Customer</b>	- Resource	The Customer of the Production Order of the oldest tracked-in Material in the selected Resource.	- Current	Deviation	None
<b>Material Elapsed Time</b>	- Material	The start processing date of the oldest Material tracked-in in the Resource.	- Current	Minimum	KPI DateTime
<b>Material Estimated Remaining Time</b>	- Material	The time until the Planned End Date of the oldest tracked-in Material in the selected Resource.	- Current	Minimum	KPI DateTime
<b>Material Product Description</b>	- Resource	The Product Description of the oldest tracked-in Material in the selected Resource.	- Current	Deviation	None
<b>Material Product</b>	- Resource	The Product of the oldest tracked-in Material in the selected Resource.	- Current	Deviation	None

KPI	Entity Type	Description	Dimension	KPI Type	Parameter
<b>Material Progress</b>	- Material	The progress of the Material's Completed Quantity of the oldest tracked-in Material in the selected Resource.	- Current	Maximum	KPI Percentage
<b>Material Quantity</b>	- Material	The Quantity to Process of the oldest tracked-in Material in the selected Resource.	- Current	Deviation	KPI Long
<b>Material Remaining Quantity</b>	- Material	The remaining Quantity to Process the oldest tracked-in Material in the selected Resource.	- Current	Minimum	KPI
<b>Material Units Produced</b>	- Resource	The number of Units Produced Events for the selected Resource.	- Current Order	-	KPI Decimal
<b>Medium Time Between Assists</b>	- Resource	The average time between Assist Events for the selected Resource.	- Current Day - Current Shift - Last 3 Days - Last 7 Days - Current Week - Current Month - Current Order	Minimum	KPI Hours
<b>Missing Volume by Item</b>	- Plan	The delta between the Planned Volume and the Actual Volume - the unfulfilled volume per Time Frame, per Item	- User Defined	-	KPI Decimal

KPI	Entity Type	Description	Dimension	KPI Type	Parameter
<b>MTBF</b> .....	- Area - Facility - Resource	The Mean Time Between Failures for the selected entity.	- Current Day - Current Shift - Last 3 Days - Last 7 Days - Current Week - Current Month	Maximum	KPI Hours
<b>MTTR</b> .....	- Area - Facility - Resource	The Mean Time To Repair for the selected entity.	- Current Day - Current Shift - Last 3 Days - Last 7 Days - Current Week - Current Month	Minimum	KPI Hours
<b>OEE</b> .....	- Area - Facility - Resource	The Overall Equipment Effectiveness for the selected entity.	- Current Day - Current Shift - Last 3 Days - Last 7 Days - Current Week - Current Month	Maximum	KPI Percentage
<b>On Hold Quantity</b>	- Area - Facility - Step	The total Quantity placed on Hold in the selected entity.	- Current Day - Current Shift - Last 3 Days - Last 7 Days - Current Week - Current Month	Minimum	KPI Decimal



KPI	Entity Type	Description	Dimension	KPI Type	Parameter
<b>On-Time Delivery (%)</b>	- Facility - Product Group	The percentage of Production Orders closed at least until their Due Date for the selected entity.	- Current Day - Current Shift - Last 3 Days - Last 7 Days - Current Week - Current Month	Maximum	KPI Percentage
<b>On-Time MAOs</b>	- Area - Facility	The ratio of on time completed MAOs (before Late Due) for the selected entity.	- Current Day - Current Shift - Last 3 Days - Last 7 Days - Current Week - Current Month	Maximum	KPI Percentage
<b>Open Protocol Instances by Type</b>	- Protocol Instance	The Number of Protocol Instances having the System State Open by Type.	- Current	Minimum	KPI Long
<b>Open Protocol Instances</b>	- Protocol Instance	The Number of Protocol Instances having the System State Open.	- Current	Minimum	KPI Long
<b>Pending Corrective MAOs</b>	- Area - Facility	The Pending Corrective MAOs for the selected entity.	- Total - By State	Minimum	KPI Long
<b>Pending Late Production Orders</b>	- Facility - Product Group	The number of Pending Late Production Orders for the selected entity.	- Current	Minimum	KPI Long
<b>Pending Late Quantity</b>	- Facility - Product Group	The Pending Late Quantity for the selected entity.	- Current	Minimum	KPI Decimal
<b>Pending Preventive MAOs</b>	- Area - Facility	The Pending Preventive MAOs for the selected entity.	- Total - By State	Minimum	KPI Long

KPI	Entity Type	Description	Dimension	KPI Type	Parameter
<b>Performance Efficiency</b>	- Resource	The Performance Efficiency percentage for the selected Resource.	- Current Day - Current Shift - Last 3 Days - Last 7 Days - Current Week - Current Month	Maximum	KPI Percentage
<b>Placement Efficiency</b>	- Resource	The number of placed components divided by the number of placed and misplaced components registered on component placement Events for the selected Resource.	- Current Day - Current Shift - Last 7 Days - Current Week - Current Month	Maximum	KPI Percentage
<b>Quality Affected Quantity Dataset</b>	- Area - Facility - Step	A Dataset containing information about the Quantity put on Hold, sent to Rework, and/or Lost for the selected entity.	- Last 7 Days	Minimum	KPI Decimal
<b>Rate of Quality</b>	- Resource	The Rate of Quality percentage for the selected Resource.	- Current Day - Current Shift - Last 3 Days - Last 7 Days - Current Week - Current Month	Maximum	KPI Percentage

KPI	Entity Type	Description	Dimension	KPI Type	Parameter
<b>Reject Rate</b>	- Resource	The number of rejected components divided by the number of total components for the selected Resource.	- Current Day - Current Shift - Last 7 Days - Current Week - Current Month	Minimum	KPI Percentage
<b>Resources Down</b>	- Area	The number of Resources with System State Down for the selected Area.	- Current	Minimum	KPI Decimal
<b>Resources Up</b>	- Area	The number of Resources with System State Up for the selected Area.	- Current	Maximum	KPI Decimal
<b>State</b>	- Resource	The Universal State for the selected Resource.	- Current - Last 7 Days	-	None
<b>Throughput Rate</b>	- Plan	The Produced Quantity per Unit Time, per Manufacturing Unit, connected to a Plan	- User Defined	-	KPI Decimal
<b>Top Products by Loss Quantity</b>	- Facility - Product Group	The Products with the highest Loss Quantities for the selected Product Group.	- Current Day Top 10 - Current Shift Top 10 - Current Week Top 10 - Current Month Top 10	Minimum	KPI Decimal
<b>Top Reasons by Lost Quantity</b>	- Facility - Product Group	The Loss Reasons with the highest Lost Quantity for the selected Product Group.	- Current Day - Current Shift - Current Week - Current Month	Minimum	KPI Decimal

KPI	Entity Type	Description	Dimension	KPI Type	Parameter
<b>Top Reasons by Quantity on Hold</b>	- Facility - Product Group	The Hold Reasons with the highest Quantity on Hold for the selected Product Group.	- Current Day - Current Shift - Current Week - Current Month	Minimum	KPI Decimal
<b>Top Resources with AdHoc Maintenance</b>	- Area - Facility	The Resources with the most requests for AdHoc Activities for the selected Facility.	- Current Day - Current Shift - Last 3 Days - Last 7 Days - Current Week - Current Month	Minimum	KPI Long
<b>Unit Cycle Time</b>	- Resource	The average processing time per unit for the selected Resource.	- Current Day - Current Shift - Last 3 Days - Last 7 Days - Current Week - Current Month	Minimum	KPI Seconds
<b>Uptime %</b>	- Resource	The Up Time percentage of the selected Resource.	- Current Day - Current Shift - Last 3 Days - Last 7 Days - Current Week - Current Month	Maximum	KPI Percentage
<b>Volume Fulfilment</b>	- Plan	The Percentage of the Total Planned Volume in the Plan that was achieved.	- User Defined	-	KPI Percentage

KPI	Entity Type	Description	Dimension	KPI Type	Parameter
<b>Volume In</b>	- Resource - Step	The In Process Quantity registered for the selected entity.	- Current Shift - Last 7 Days	Maximum	KPI Decimal
<b>Volume Out</b>	- Resource - Step	The Processed Quantity registered for the selected entity.	- Current Shift - Last 7 Days	Maximum	KPI Decimal
<b>Yield</b>	- Area - Facility - Resource - Step	The Processed Quantity divided by the Processed Quantity plus the In Process and the Processed Quantity Losses registered for the selected entity.	- Current Day - Current Shift - Last 3 Days - Last 7 Days - Current Week - Current Month	Maximum	KPI Percentage

Table: Dynamic KPIs available out-of-the-box

A set of available industry-specific Dynamic KPIs is included and provided out-of-the-box. These are linked to Business Rules (deployed as **DEE Actions**) in order to retrieve data from shop-floor Equipment which must be integrated with the Critical Manufacturing MES. The limits for the out-of-the-box KPIs (In Target, Close to Target, and Target) are taken automatically for the ones linked to the Parameter **KPI Percentage**. For other KPIs, the limits should be manually defined so you can correctly compare the current value to the target value.

For more information about KPI calculations, see the [Cubes](#) section.

#### Info

The implementation of the **Material Estimated Remaining Time** KPI is dependent on the Planned End Date property entered in the Material Resource relation. For this to occur, the DEE action **ElMaterialResourceEstimatedRemainingTime** must be enabled and associated with the **BusinessObjects.MaterialCollection.TrackIn.Post** action group.

## Configure the BI Card Widget

Having the necessary KPIs available, their visualization can be configured in a UI Page, using the **BI Card** widget.

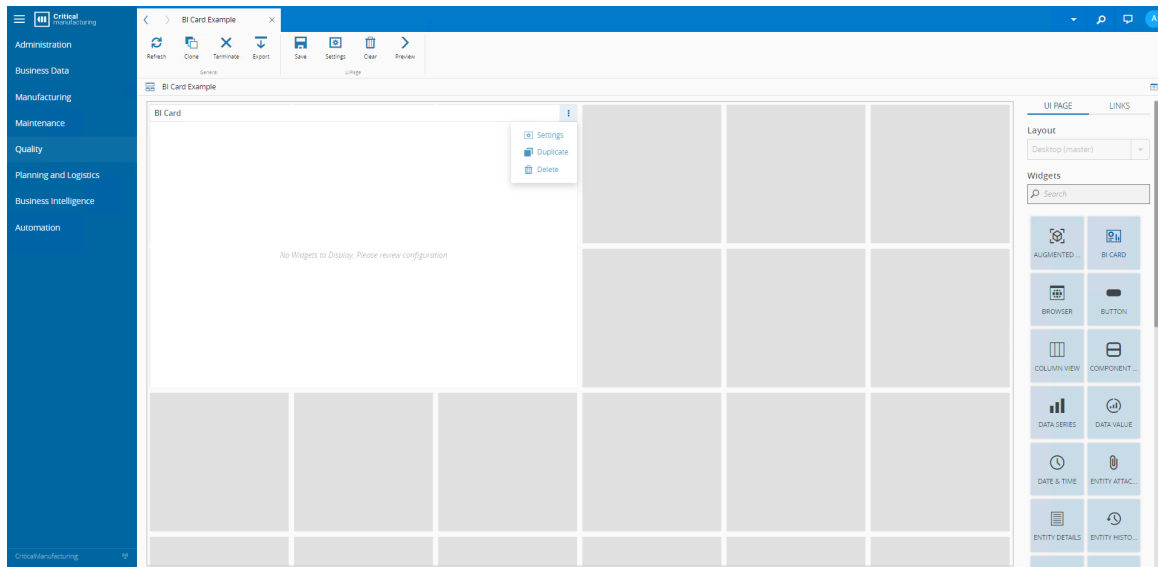
#### Info

Each BI Card widget can only be associated with one Entity Type.

## Creation of a UI Page

When creating a UI Page, enter **Build** mode to drag and drop the BI Card widget.

To start configuring the BI Card, select **Settings** as shown below:



## Configuration of the BI Card

In the **Setup** tab, select an Entity Type that has associated KPIs and, optionally, an Entity for which the information is going to be displayed.

In the **Layout** tab add the desired KPIs, as shown in the image below.

For Dynamic KPIs, the properties listed in the table below should be defined.

Property	Description
<b>Name</b>	The Name of the KPI to be displayed.
<b>Dimension</b>	The Dimension of the KPI to be displayed in the BI Card.
<b>Show-Caption</b>	Whether the Caption of the series will be displayed.
<b>Show Title</b>	Whether the Name of the KPI will be displayed.
<b>Show Sub-Title</b>	Whether the name of the Dimension of the KPI will be displayed.
<b>Visualization</b>	How the KPI Dimension value or values will be displayed.
<b>Is Percentage Value</b>	If set to True, the system will identify the value as a percentage and will only fill the circle visualizations until the corresponding percentage value. Otherwise, the system will handle the value as a regular number and will fill the circle visualizations depending on the defined target. Available for selection for the Full Circle and Half Circles visualizations.

Property	Description
<b>Decimal Places</b>	The number of decimal places to be displayed. Available for selection for the Value display, Delta indicator, Delta Percentage display, Number & Delta indicator - Side by Side, and Number & Delta indicator visualizations.
<b>Show Secondary Axis Series</b>	Whether the secondary Axis series will be displayed. Available for selection for the Vertical Bars, Area, and Line visualizations.
<b>Secondary Axis Visualization</b>	The visualization for the secondary axis. Available for selection if the property Show Secondary Axis is set to True. The visualizations available for selection are the Vertical Bars, Area, and Line.
<b>Shorten Axis Labels</b>	Whether the chart labels will be trimmed depending on the available space. Available for selection for the Vertical Bars, Area, and Line visualizations.
<b>Show Category Label on Tooltip</b>	Whether the Category label will be available on the tooltip. Available for selection for the Vertical Bars, Area, and Line visualizations.
<b>Always Show Axis</b>	Whether the axis will be displayed.
<b>Show Secondary Axis</b>	If the property <i>Show Secondary Axis Series</i> is set to True, whether the secondary Axis will be displayed.
<b>Show Series Axis in Labels</b>	Whether the secondary series axis is pointed out in the axis labels.
<b>Show Target Values</b>	Whether the target values are displayed.

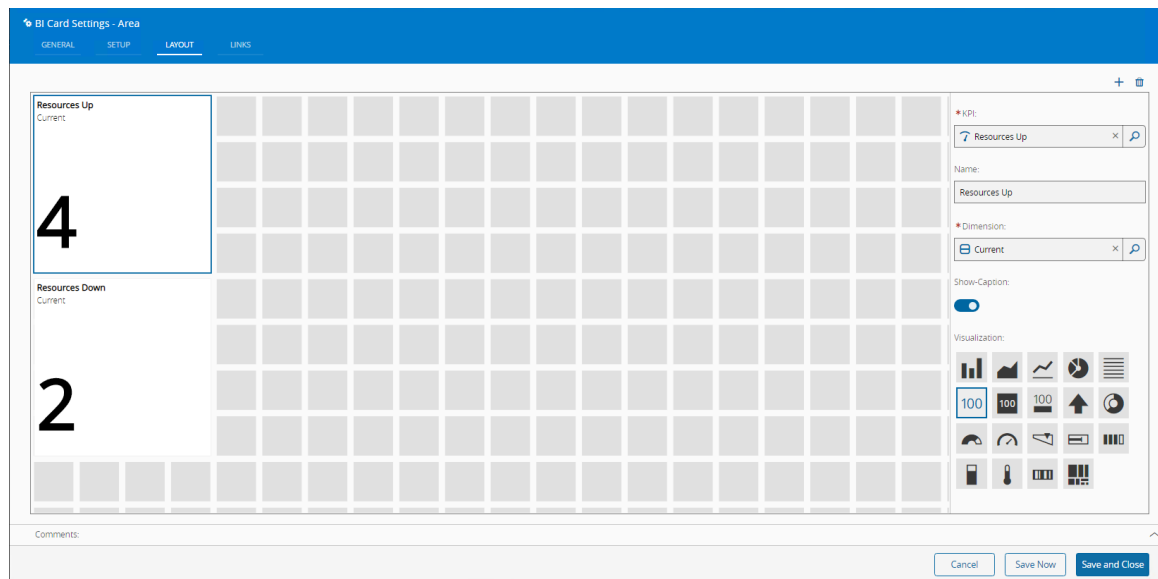
Table: Dynamic KPIs BI Cards properties

For Static KPIs, the properties listed in the table below should be defined.

Property	Description
<b>Dimension</b>	The Dimension of the KPI to be displayed in the BI Card.
<b>Visualization</b>	How the KPI Dimension value or values will be displayed.
<b>Time Frame</b>	Defines which KPI values will be displayed, whether using a time interval or the last number of occurrences.
<b>Show Terminated</b>	Whether the values of terminated Time Frames will be displayed.

Table: Static KPIs BI Cards properties

In the **Links** tab, you can pass the Entity to be considered, by linking the widget from another source.

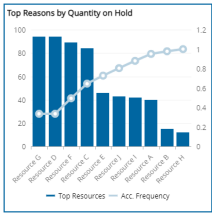
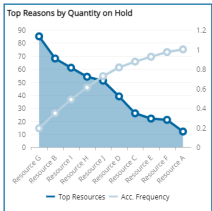


### Info

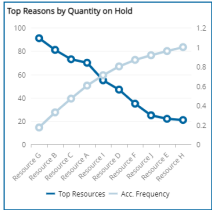





When selecting the visualization control, it is important to consider whether the KPI will display a data value (for a single value) or a data series (one or more series of data).

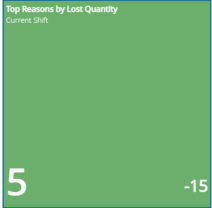
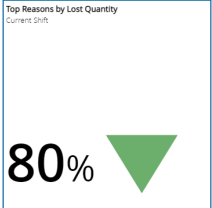
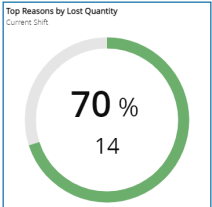
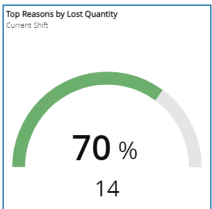


## Available visualizations

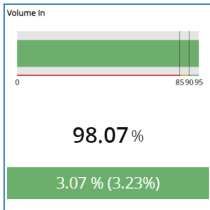
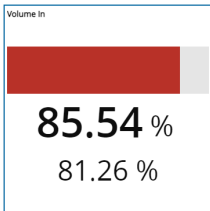
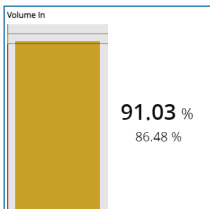
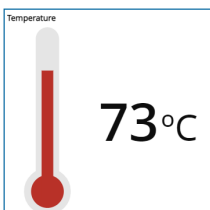
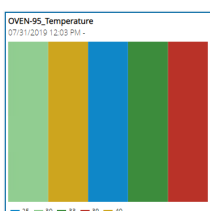

The table below presents the available KPI visualization options:

Visualization	Example	Description
<b>Vertical bars</b>		This visualization displays in the graph each value of the series of the KPI, in its own bar. Hovering the mouse over the bar displays the value and the delta to the target value.
<b>Area</b>		This visualization displays the points in the graph for each value of the series of the KPI.



Visualization	Example	Description
Line		This visualization displays the points in the graph for each value of the series of the KPI.
Donut		This visualization slices a pie according to the proportion of each value of the series.
List		This visualization lists the values of the KPI for the dimension or time frame defined.
Value display		This visualization displays the current value of the KPI.
Delta indicator		<p>This visualization displays the absolute difference of the KPI (actual value vs. target).</p> <p>Note: The color is associated with the limits defined for the KPI (green, yellow and red).</p>
Delta percentage display		This visualization displays the current value of the KPI, and the absolute and percentage delta to the target value are shown at the bottom.

Visualization	Example	Description
Number and delta indicator - side by side		This visualization displays the current value side by side with the KPI percentage delta to the target value.
Number and delta indicator		This visualization displays the KPI percentage delta to the target value.
Full circle		This visualization displays the percentage completion for the KPI target, in the circle bar, and the current value.
Half circle		This visualization displays the percentage completion for the KPI target, in a half-circle bar, and the current value.
Radial gauge		This visualization displays the current value of the KPI, in a radial gauge control, and the absolute and percentage delta to the target value.
Linear gauge		This visualization displays the current value of the KPI, in a linear gauge control, and the absolute and percentage delta to the target value.

Visualization	Example	Description
<b>Bullet linear gauge</b>		This visualization displays the current value of the KPI, in a bullet linear gauge, and the absolute and percentage delta to the target value.
<b>Progress bar</b>		This visualization displays the percentage completion for the KPI target and the current value.
<b>Vertical bar</b>		This visualization displays the percentage completion for the KPI target and the current value.
<b>Thermometer</b>		This visualization displays the current value of the KPI.
<b>Timeline chart</b>		This visualization displays the values of the KPI for the defined time frame (time interval or last number of occurrences).
<b>Text</b>		This visualization displays the current text of the KPI.

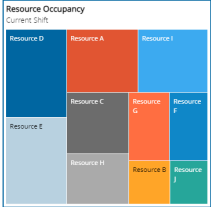

Visualization	Example	Description
<b>Tree map chart widget</b>		This visualization displays a rectangle with different areas according to the percentage of each value of the series. Hovering the mouse over the area displays the value.
<b>Timer</b>		This visualization displays the countdown timer to the target date of the KPI.

Table: KPI visualization options



# Legal Information

## **Disclaimer**

The information contained in this document represents the current view of Critical Manufacturing on the issues discussed as of the date of publication. Because Critical Manufacturing must respond to changing market conditions, it should not be interpreted to be a commitment on the part of Critical Manufacturing, and Critical Manufacturing cannot guarantee the accuracy of any information presented after the date of publication. This document is for informational purposes only.

Critical Manufacturing makes no warranties, express, implied or statutory, as to the information herein contained.

## **Confidentiality Notice**

All materials and information included herein are being provided by Critical Manufacturing to its Customer solely for Customer internal use for its business purposes. Critical Manufacturing retains all rights, titles, interests in and copyrights to the materials and information herein. The materials and information contained herein constitute confidential information of Critical Manufacturing and the Customer must not disclose or transfer by any means any of these materials or information, whether total or partial, to any third party without the prior explicit consent by Critical Manufacturing.

## **Copyright Information**

All title and copyrights in and to the Software (including but not limited to any source code, binaries, designs, specifications, models, documents, layouts, images, photographs, animations, video, audio, music, text incorporated into the Software), the accompanying printed materials, and any copies of the Software, and any trademarks or service marks of Critical Manufacturing are owned by Critical Manufacturing unless explicitly stated otherwise. All title and intellectual property rights in and to the content that may be accessed through use of the Software is the property of the respective content owner and is protected by applicable copyright or other intellectual property laws and treaties.

## **Trademark Information**

Critical Manufacturing is a registered trademark of Critical Manufacturing.

All other trademarks are property of their respective owners.