

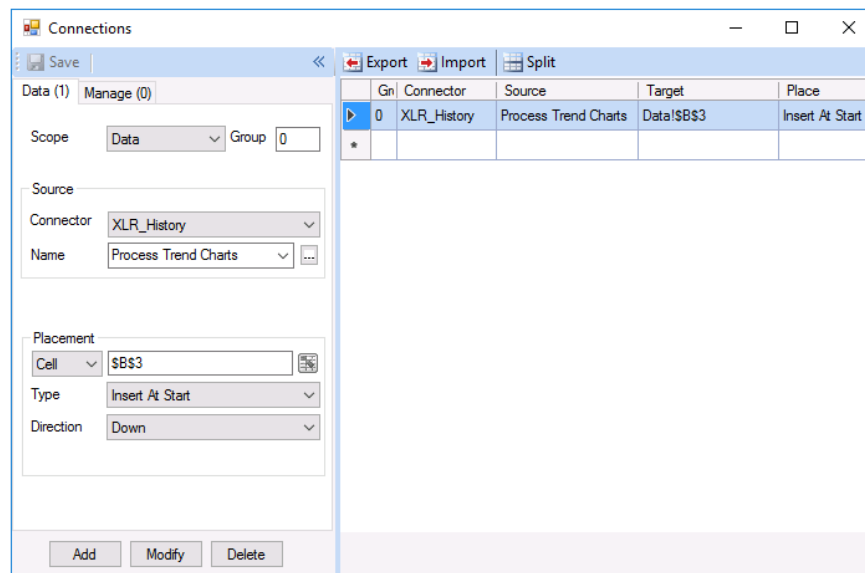
Data Connect

Overview

Data Connect is used to configure data connections and data management to the template. When a report is created from the template, the data connections provide the information for the report.

Configuration

To open from the **XLReporter Template Studio**, select **Template, Data, Connect**. To open in Excel, from the ribbon, select **XLReporter, Data, Connect**.



The display is a pane that is moved by holding the left click on the title and dragging.

The configuration is performed on two tabs: **Data** and **Manage**. This document focuses on **Data**.

Up to 500 **Data** and 100 **Manage** connections can be configured for a single template with each connection returning a single value or in the case of a data group multiple rows and columns.

Menu Options

The **Data** and **Manage** can be shown together by clicking the **Split** pushbutton.

To create a new connection, specify the settings in the left panel and click **Add** to add a new row in the grid. To modify a connection, highlight the connection in the grid to copy it into the left panel, make changes, and then click **Modify**.

If bulk changes are required, click **Export** which exports the grid to a worksheet. Note that it is not recommended to add *new* connections on this sheet. Make the changes on the worksheet and then click **Import** to bring the settings back.

When grid entry is made, a comment is automatically added to the cell to reflect the setting. The comments are purely cosmetic and can be removed or **Reset**. Comments can be turned off by clicking the arrow to the left of **Reset**. Comments are not supported in the standalone Template Studio.

Left Panel

The **Left Panel** is where settings are made and changed.

The screenshot shows a configuration window with the following sections:

- Data (1) Manage (0)**
- Scope:** Data (dropdown), Group: 0 (text input)
- Source:**
 - Connector:** XLR_History (dropdown)
 - Name:** Process Trend Charts (dropdown with browse button)
- Placement:**
 - Cell:** \$B\$3 (text input with grid icon)
 - Type:** Insert At Start (dropdown)
 - Direction:** Down (dropdown)

The **Scope** indicates which worksheet the connection applies to. By selecting **Any Sheet**, the connection is applied to all worksheets. The **Any Sheet** setting is typically used in cases where multiple worksheets use the same connection. When a template update occurs involving a worksheet, only the connections with Scope set to the worksheet or **Any Sheet** are updated.

The **Group** is another mechanism to control which connections are active at any one time. By default, all connections are assigned to group 0 (*all groups*). When a template update occurs with a group number (*UpdateGroupBook* and *UpdateGroupSheet*), only the connections configured with that specific group number (or group 0) are updated.

Example: Update a report every 15 minutes and export the totals at the end of the day.

Assign the connection for the 15-minute updates to group 1 and the export to group 2. In the **Scheduler** add actions that refer to group 1 every 15 minutes and group 2 every day.

Group numbers between 0 and 99 can be assigned.

Source

This section defines the data source of the connection. Select a **Connector** and a data group given by **Name**. If no data groups are defined, select *<add group...>* and then click the browse [...] pushbutton to define a new group.

Array/Clone Connections

In the case of a **Real Time** connector the *<add tag...>* is used for single values or arrays.

For arrays the syntax is *Name[start, direction, end]* where *Start* is the start register *Direction* is the symbol | (array is placed in a column) or – (array is placed in a row) and *end* is the end register.

Example:

[01 12]Temp	01Temp to 12Temp in a column
Pressure[1-5]	Pressure1 to Pressure5 in a row

In addition, **Variables** can be used as part of a **Real Time** connection. For example, when the connection Flow{RG000} is used, the current value of RG000 is substituted in the Real Time connection. If the current value of RG000 is “01”, then the value for “Flow01” is used in the report.

The **Expressions** and **Variables** Connectors are always listed and represent date/time keywords and project variables.

Placement

This section defines the placement of the **Source**. Select a **Cell** where the source is placed by either entering it directly or placing the cursor in the edit box and then clicking the cell on the worksheet.

As an alternative to a cell reference like $\$A\1 , **Cell** can be specified as a named cell or range by toggling the option to **Name**.

The following **Placement Types** are available:

- **Direct**
The **Source** is placed directly into the cell given by the **Cell**.
- **Offset**
The **Source** is placed in a row or column (see **Direction**) relative to the **Cell** according to the value of the **Offset**. The **Offset** can be an **XLReporter** counter variable (e.g., *CRO00*) or a time-based calculation (e.g., *mM/15*, 15-minute offset of the month).
- **Append**
The **Source** is appended onto the end of the existing data in the row or column relative to the **Cell** according to the **Direction**.
- **Insert At Start**
The **Source** is inserted at the **Cell** in the specified **Direction**. Any content below or to the right of the insertion is moved down or across.

When inserting, if the top row/left column is blank, that row/column is used by the connection. For example, if the connection is configured to cell $\$B\4 with **Direction Down** and returns 24 rows by 4 columns, if cells $\$B\$4:\$E\4 is empty, 23 rows of data are inserted starting in $\$B\$5:\$E\5 . The data is then written starting in row 4.

When inserting, if the **Direction** is *Down* and the row(s) inserted are part of an outline that is collapsed, the outline remains collapsed after the rows are inserted and the data is written.

- **Insert At End**
The **Source** is inserted at the end of the existing data in the row or column relative to the **Cell** according to the **Direction**. Any content below or to the right of the insertion is moved down or across.

When inserting, if the top row/left column is blank, that row/column is used by the connection. For example, if the connection is configured to cell $\$B\4 with **Direction Down** and returns 24 rows by 4 columns, if cells $\$B\$4:\$E\4 is empty, 23 rows of data are inserted starting in $\$B\$5:\$E\5 . The data is then written starting in row 4.

When inserting, if the **Direction** is *Down* and the row(s) inserted are part of an outline that is collapsed, the outline remains collapsed after the rows are inserted and the data is written.

- **Insert At Start (full)**
The **Source** is inserted at the **Cell** in the specified **Direction** by inserting entire rows or columns (depending on **Direction**). Any content below the **Cell** row or to the right of the **Cell** column of the insertion is moved down or across.
- **Insert At End (full)**
The **Source** is inserted at the end of the existing data by inserting entire rows or columns in the row or column relative to the **Cell** according to the **Direction**. Any content in rows below the **Cell** row or to the right of the **Cell** column is moved down or across.

Understanding Insert Placement

There are many advantages to using the *Insert Placement* settings for data connections, especially in conjunction with data groups that return an unknown number of rows or columns. These include:

- The formatting from the topmost row (or leftmost column depending on **Direction**) is applied to every other row (or column) inserted into the worksheet.
- If the data connection is a data group any columns (or rows) contained within the range of the data connection that contain formulas are automatically filled down (or across) for the number of rows (or columns) inserted.

Consider the following template:

fx: E7 =AVERAGE(C7:D7)							
A	B	C	D	E	F	G	H
5			Mixer			Extruder	
6	Date/Time	Zone 1	Zone 2	Average	Zone 1	Zone 2	Average
7				#DIV/0!			#DIV/0!

Values in the *B*, *C*, *D*, *F* and *G* columns will come from the underlying data group. Columns *E* and *H* are formulas to average the **Zone 1** and **Zone 2** values of the **Mixer** and **Extruder**, respectively.

The **Columns** tab of the underlying data group is configured like this:

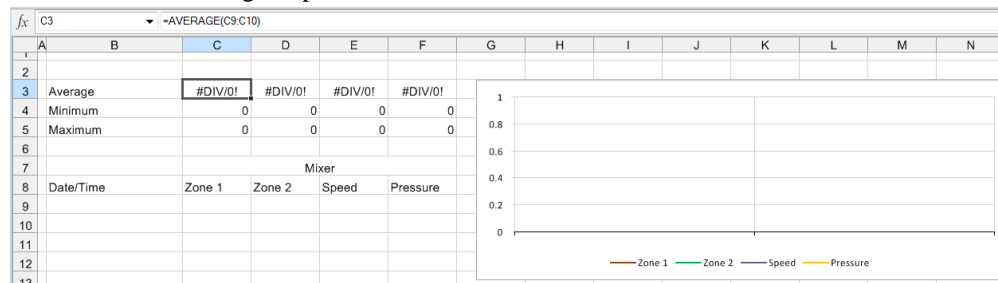
Setup	Columns	Time Period	
Selected Columns			
Name	Calculation	Scaling	Heading
MIXER_ZONE1_TEMP	first sample		MIXER_ZONE1_TEMP first sample
MIXER_ZONE2_TEMP	first sample		MIXER_ZONE2_TEMP first sample
EXTR_ZONE1_TEMP	first sample		EXTR_ZONE1_TEMP first sample
EXTR_ZONE2_TEMP	first sample		EXTR_ZONE2_TEMP first sample
*			

Notice an empty row is left between the *Mixer* and *Extruder* items. This is to accommodate the formula in the *E* column of the worksheet. Also notice the * in the last column. This is configured to accommodate the formula in the *H* column of the worksheet.

If this data group is configured with any of the *Insert Placement* types (and **Direction Down**), the formulas in the *E* and *H* columns on the worksheet will automatically fill down based on the number of rows inserted for the group.

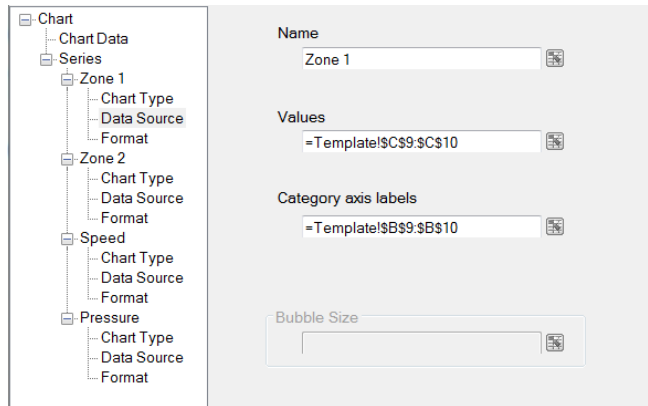
- Any worksheet formula or chart that references where the data is inserted are automatically adjusted for the number of rows (or columns) inserted. Basically, the cell references should encompass the first two rows (or columns) where the data connection is configured.

Consider the following template:



The range from $C3:F5$ contains summary formulas to get the **Average**, **Minimum** and **Maximum** from the range of data starting in row 9. Notice that the range for the formula is $C9:C10$.

The data series of the chart are also configured for the top two rows of data.



Notice that both the Values and Category axis labels are configured for the first two rows of data.

If the data connection configured for cell B9$ is configured with any of the *Insert Placement* types, the formulas and chart series will all automatically adjust to the number of rows inserted into the report.

Insert At Start vs. Insert At End

If the report is only updated once, either *Insert At Start* or *Insert At End* can be used as either produces the same result.

However, if the report is updated multiple times, *Insert At Start* should be used to order the data descending so the latest results are at the top. *Insert At End* should be used to order the data ascending so that oldest results are at the top.

Do keep in mind that if the data group itself returns multiple rows, the order of records returned from the group should be on the timestamp *Ascending* or *Descending* depending on the **Placement** specified.

Full Insert

The full options available with the *Insert At Start* and *Insert At End Placement* types insert entire rows (or columns depending on Direction) before data is written to the report. Here are the typical scenarios where a full insert should be used:

- The row height of the top row is not the default height and every row inserted must adopt this row height.
- There are cells that are not directly underneath (or to the right) or the range to insert but must be shifted based on the number of rows (or columns) inserted.

Data Group Connections

When a data group is added to the template, the number format of the cells where the data is written is updated to reflect what the group returns.

If the column in the group returns a timestamp, the cells in that column are formatted as either a date, time or date and time depending on the Time Period of the group. If the column returns a number, cells in that column are formatted as a number with 2 decimal places.

If the number of rows from the group can be determined, that number of rows is formatted in the template. However, if the number of rows cannot be determined, only the top row is formatted.

For example, a group is configured to return a timestamp and the hourly averages of four pump stations over the day. The data group connection is configured for cell B4$.

On the template worksheet cells B4:B27$ are formatted as time while cells C4:F27$ are formatted as a number with 2 decimal places.

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