

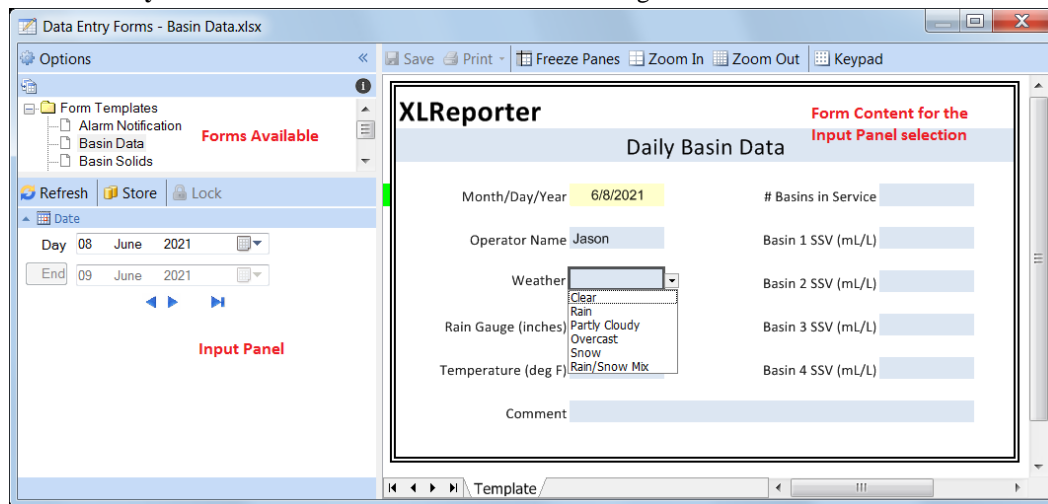
Data Entry Forms

Overview

Data Entry Forms are used to manage manual data entry such as operator rounds, laboratory results and process readings. If paper forms are currently being used, they can be easily transformed to an electronic form and have their content stored to a central database and not to a filing cabinet.

By storing information electronically, users can easily access a historical knowledge base in order to make more informed decisions to keep the plant running safely and efficiently.

The **Data Entry Form** interface looks similar to the following:

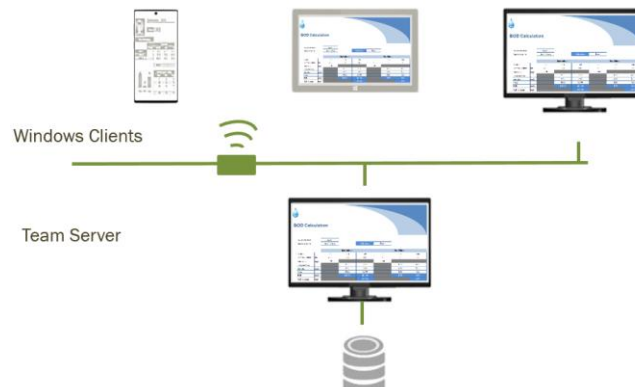


In the top left are the **Form Templates** available to the active user. Selecting a form refreshes the **Input Panel** section which is used to determine the form displayed. The **Input Panel** is configured during the design of the form and can offer input methods such as a date calendar or a list retrieved by a database query.

The user saves entries, or edits, to a database by pressing the **Store** button. At any time, any user with the right privilege can **Lock** form data to prevent any changes to the data.

Implementation

Data Entry Forms can start on a standalone workstation and grow over time to a team of workstations and tablet devices (Windows), with each client submitting its own completed forms. Since no knowledge of SQL or software programming is required, it can be implemented easily by anyone with a basic understanding of a workbook like those used in Microsoft Excel.



Once the purpose of the form has been decided, the steps required to implement **Data Entry Forms** are:

- Define a **Data Entry Connector**.
- Define a **Database Table** to store the data entered via the form.
- Design a **Data Entry Template** and any **Form Variables**.
- Deploy the **Data Entry Template**.

These steps are explained in later sections of this document.

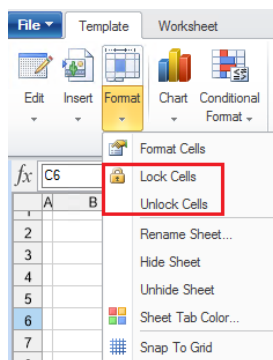
The data collected in the database can be used in reports with a **History Data Group** or a **Database Data Group**. It is suggested that the database group is only used if the history group does not provide the results you are requiring.

Workbook Primer

This section of the document reviews workbook concepts that are relevant to data entry. An understanding of workbook technology facilitates more effective and user-friendly forms.

Cell Protection

By default, all the cells are locked which prevents any changes when they are used. During the design of the form cells can be **Unlocked** to allow data entry by the user. To unlock a cell, use the **Format** drop-down list on the **Template** tab in the Design Studio.



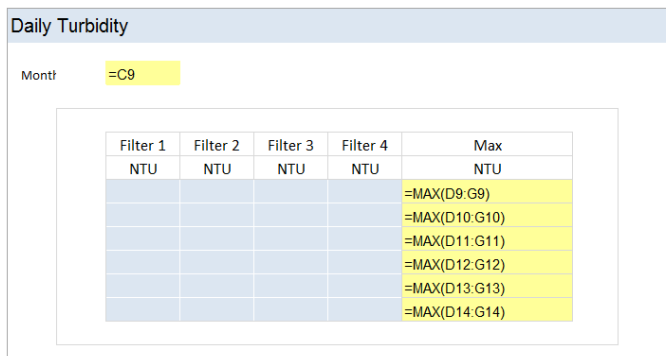
From Excel, this is accessed by right clicking a cell or range, selecting **Format Cells** then the **Protection** tab.

If the form is tabular in nature, only the cells representing the first entry need to be unlocked. For example, in the image below, only the first row of blue-background cells need to be unlocked.

Note, this option has no affect on the template itself, it is only applied in the **Data Entry Forms** application to only allow data entry in specific cells.

Formulas

Workbooks provide an extensive list of cell formulas. For example:



Daily Turbidity

Month: =C9

Filter 1	Filter 2	Filter 3	Filter 4	Max
NTU	NTU	NTU	NTU	NTU
				=MAX(D9:G9)
				=MAX(D10:G10)
				=MAX(D11:G11)
				=MAX(D12:G12)
				=MAX(D13:G13)
				=MAX(D14:G14)

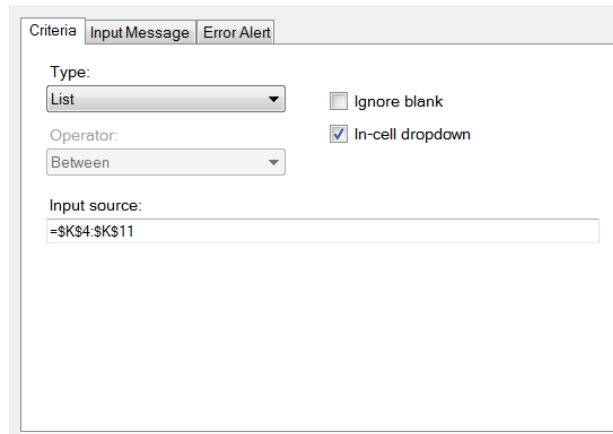
In this example, the user enters values in the blue cell and the formula update the yellow (which are not shown in practice). When a cell contains a formula, it is automatically locked so that the user cannot change its value.

A formula can be manually entered into the cell or can be constructed by clicking the **fx** button in the formula bar both in the Design Studio and Excel.

Data Validation

Data Validation is used to limit the type of data or values that a user can enter into a cell on the form. This feature is useful to maintain the integrity of the data for later analysis. Custom messages are supported to assist the user.

Select a cell and then choose **Data Validation** from the **Worksheet** tab of the **Design Studio** or the **Data** tab of Excel.



The screenshot shows the 'Data Validation' dialog box with the 'Criteria' tab active. The 'Type' dropdown is set to 'List'. The 'Operator' dropdown is set to 'Between'. The 'Input source' text box contains the formula '=\$K\$4:\$K\$11'. There are checkboxes for 'Ignore blank' (unchecked) and 'In-cell dropdown' (checked).

Select the **Type** and enter the appropriate settings. In the above the **Type** is set to *List* and the list items are determined from the **Input Source** $=\$K\$4:\$K\11 . For simple lists, this could be entered directly, separated by commas e.g., *Yes, No*.

If the cell cannot be left empty then uncheck **Ignore Blank**.

Criteria Tab

- **Any value**
No validation is performed (default).
- **Whole Number**
Whole number satisfying the criteria.
- **Decimal**
Decimal value satisfying the criteria.
- **List**
Values from a predefined list or a list from a range of cells.
- **Date**
Dates in a specified range.
- **Time**
Times in a specified range.
- **Text Length**
Text of a certain length.
- **Custom**
Formula evaluating to True/False (used for alerts).

Input Message Tab

Criteria | **Input Message** | Error Alert

Show input message when cell is active

Title:
Weather Conditions

Message
Select the weather condition from the list

When the cell is active this message will appear to the user.

Error Alert Tab

Criteria | Input Message | **Error Alert**

Show error alert when validation fails

Alert style: Stop

Title:
Invalid Value

Message:
The temperature must be between 35 and 95 degrees

In the event of an invalid value, this message will appear.

Form Examples

Before any configuration is performed, review the form requirement. This usually involves understanding the parameters to display the form, the information entered by the user and the filters used when the form is stored.

XLReporter provides two styles of forms: **By Column** and **By Table**. The **By Column** style is used with forms that operate on a single record in the database where as the **By Table** operates on multiple records.

By Column

This style of form operates on a single record which is selected by either **Date** or **Custom** settings. In the following a few examples are presented of this style of form.

Operator Round (Date)

Forms can be used every day, week, or month to capture readings.

Form Templates

- Alarm Notification
- Basin Data**
- Basin Solids
- Basin Turbidity
- Compressor Data
- Operator Logbook
- Water MOR

Refresh Store Lock

Date

Day 01 August 2021

End 02 August 2021

Daily Basin Data

Month/Day/Year	8/1/2021	# Basins in Service	2
Operator Name	Jason	Basin 1 SSV (mL/L)	520
Weather	Rain	Basin 2 SSV (mL/L)	525
Rain Gauge (inches)	1.00	Basin 3 SSV (mL/L)	
Temperature (deg F)	56	Basin 4 SSV (mL/L)	
Comment	Maintenance on Basin 3 and 4		

In the example, the desired day is selected in the **Input Panel**. The form is filled out by the operator while performing their rounds and **Stores** the edits (which can be done locally or across the network). Pick lists and value limits are used to contain the data entry.

BOD Calculations (Date)

Forms can be used to store the results from calculations.

Suspended And Volatile Solids					
Date 8/5/2021					
Influent	WAS B1	WAS B2	WAS B3	WAS B4	
Initial Weight	1472.9 mg	mg	mg	mg	mg
Dried Weight	1457.2 mg	mg	mg	mg	mg
Ignition Weight	mg	mg	mg	mg	mg
Solids	15.7 mg	mg	mg	mg	mg
Volatile Solids	1457.2 mg	mg	mg	mg	mg
Sample Volume	100 mL	mL	mL	mL	mL
Suspended Solids	157 mg/L	mg/L	mg/L	mg/L	mg/L
Volatile Solids	mg/L	mg/L	mg/L	mg/L	mg/L

Effluent	Basin 1	Basin 2	Basin 3	Basin 4	
Initial Weight	1408.2 mg	2358.2 mg	2331.4 mg	2369.2 mg	2313.1 mg
Dried Weight	1405.5 mg	2204.7 mg	2193.6 mg	2180.3 mg	2184 mg
Ignition Weight	mg	mg	mg	mg	mg
Solids	2.7 mg	153.5 mg	137.8 mg	188.9 mg	129.1 mg
Volatile Solids	1405.5 mg	2204.7 mg	2193.6 mg	2180.3 mg	2184 mg
Sample Volume	1000 mL	35 mL	35 mL	35 mL	35 mL
Suspended Solids	3 mg/L	4,386 mg/L	3,937 mg/L	5,397 mg/L	3,689 mg/L
Volatile Solids	mg/L	mg/L	mg/L	mg/L	mg/L

When laboratory results become available, the time period is selected in the **Input Panel** and the results are entered. Cell colors (blue) guide the user to the input fields. The form contains calculations (yellow) which depend on the values entered. When complete, the operator **Stores** the edits (which can be done locally or across the network).

Alarm Notification (Custom)

Forms can be created by the occurrence of process events. In practice, the detection of the events is either by the **XLReporter** scheduler or by a third-party software interface.

In this example, the alarms database is monitored periodically for a critical alarm. When a critical alarm is detected, a form is produced and automatically populated with the date and tag of the alarm.

ALARM NOTIFICATION

Reported By: _____ Report Date: _____

Notifications

Name	Dept	Name	Dept
Name	Dept	Name	Dept
Name	Dept	Name	Dept

Alarm Information

Tag Name: Boiler Side Pressure Alarm Active: Hi Alarm Alarm Date: 8/1/2021 1:23

Supporting Documentation

Work Request #: _____ Alarm Report: FALSE Other: _____

Potential Root Cause and Corrective Action

Root Cause: _____

Action: _____

Event Assessment (to be performed by affected departments)

TW Deviation: _____ TW Deviation: FALSE

Dept. Reviewed By: _____ Date: _____

QA Reviewed By: _____ Date: _____

Incomplete forms are listed in the **Input Panel**. The user selects an entry, adds comments and **Stores** the edits (which can be done locally or across the network). The **Store** operation writes the form content back to the database. When the form is complete, it is removed from the list by clicking the **Lock** pushbutton.

Equipment Maintenance (Custom)

Forms can be created by the occurrence of process events. In practice, the detection of the events is either by the **XLReporter** scheduler or by a third-party software interface.

In this example, the runtime of the compressors is monitored periodically for the exceedance of a specified condition e.g., runtime hours. When the condition is met, a maintenance form is produced with the runtime hours automatically populated.

Compressor Maintenance		8/24/2021 0:00	
COMPRESSOR		OPERATOR	
Name	C11-231B	Name	Shawn White
Description	Left Intake		
PRESSURE (psi)		PERFORMANCE (measured from process)	
Compressor Outlet	238.1	Running Hours	12317
Drop Air Filter		Loaded Hours	9213
Oil Pressure	34.5	Motor Start	47
Intercooler		Module Hours	17
TEMPERATURE (F)		CHECKS PERFORMED	
Compressor Outlet		Grease Inlet Valve	Yes
Element 1 Outlet		Grease Outlet Valve	Yes
Element 2 Inlet		Change Filters	Yes
Element 2 Outlet		Oil Reservoir	No
Cooling Water In		Return Valve	Closed
LP Cooling Water Out			
Cooling Water Out			
COMMENT			
Oil reserve did not require attention			

Like the previous example, the form is selected from a list in the **Input Panel**. The operator selects the date, enters the checks performed, adds notes and records other current running conditions.

Knowledge Base (Custom)

This example represents a form based on custom setting such as a Ticket ID.

Setting	Value
KBID	9999

The user selects a form by entering an ID. If a form with the ID had been previously created, it is opened for editing otherwise a new form is created using the ID specified.

By Table

With the **By Column** form style, the user operates on a single record. The **By Table** style operates on multiple records which are selected by either by **Date** or **Custom** settings. In the following a few examples are presented of this style of form.

Turbidity (Date)

In this example, a daily form is filled out every 4 hours with the turbidity readings.

	Filter 1	Filter 2	Filter 3	Filter 4	Max
	NTU	NTU	NTU	NTU	NTU
0:00	0.31	0.35	0.40	0.30	0.40
4:00		0.45		0.30	0.45
8:00		0.45		0.10	0.45
12:00	0.29	0.34	0.50	0.42	0.50
16:00	0.33	0.36	0.44		0.44
20:00		0.34		0.56	0.56

The form is filled out incrementally over the day. The **Max** column is read only and uses workbook formula to derive their values.

Monthly Operating Report (Date)

In this example, a monthly form is updated every day. The values entered can be manual or a combination of manual data and values automatically retrieved from the process. When process data is used, it is added to the form automatically, with the option to edit anomalies.

Water Plant/Distribution System Monthly Operating Report (MOR)																	
PWS ID# 24680																	
Facility ID# Canton WTP																	
Reporting Lab Cert. # 99909914																	
Rpt. Month / Year March-21																	
Date	Plant Production (MGD)	Fluoride Reporting			Plant Tap / Entry Point												
		Calculated Fluoride Dosage (mg/L)	Plant Lab Analysis		pH	Alkalinity		Stability (mg/L)	Hardness (mg/L)	Phosphorus as Total P (mg/L)	Ortho-phosphate as POC (mg/L)	Iron (mg/L)	Manganese (mg/L)	Copper (mg/L)	Chlorine Dioxide (mg/L)		
Raw (mg/L)	Plant Tap (mg/L)	Distribution (mg/L)	Phenol (mg/L)	Total (mg/L)													
1, Mon	5.31100	0.60		0.93	0.60												
2, Tue	5.68300	0.59		0.96	1.03												
3, Wed	7.33500	0.59		1.00	0.83												
4, Thu	7.52300	0.63		0.97	0.92												
5, Fri	5.45700	0.64	0.16	1.01	0.90												
6, Sat	6.65900	0.62		1.01	0.90												
7, Sun	6.13000	0.63		1.08	0.84												
8, Mon	6.17000	0.65		1.07	0.83												
9, Tue	5.69000	0.65		0.88	0.84												
10, Wed	6.61900	0.64	0.15	0.94	0.87												
11, Thu																	
12, Fri																	
13, Sat																	
14, Sun																	
15, Mon																	
16, Tue																	
17, Wed																	
18, Thu																	
19, Fri																	
20, Sat																	
21, Sun																	
22, Mon																	
23, Tue																	
24, Wed																	
25, Thu																	
26, Fri																	
27, Sat																	
28, Sun																	
29, Mon																	
30, Tue																	
31, Wed																	
Max	5.31100	0.59000	0.15000	0.88000	0.80000												
Min	7.52300	0.65000	0.16000	1.08000	1.03000												
Avg	6.25770	0.62400	0.15500	0.98500	0.85600												
Total	62.57700																

The input to the form uses data validation to limit the values to a certain range. On completion of the report, it can be saved as an eDMR XML file and submitted to the States web site.

Operator Logbook (Custom)

When Custom settings are used, highly customizable forms can be designed.

In this example, an operator logbook allows shift/daily tickets to be created when condition occur in the process that the operator needs to report. These tickets can be shared from shift-to-shift, day-to-day.

Operator Logbook			
17	Reported Date	8/1/2021 1:20	Shift Shift 1 (00-08)
	Reported By	fred	Classification QA
	Log Notes	BLK-130 was sticky due to humidity	
	Action Date		
	Action By		
	Action Notes		
19	Reported Date	8/1/2021 4:00	Shift Shift 1 (00-08)
	Reported By	Joe	Classification Maintenance
	Log Notes	Vibration on MOT-12-AC	
	Action Date	8/1/2021 15:45	
	Action By	Jill	
	Action Notes	Lubricated the bearings in the leftmost axle	
	Reported Date		Shift
	Reported By		Classification
	Log Notes		
	Action Date		
	Action By		
	Action Notes		

In the above example, all the tickets that are “open” are displayed for the date specified. Since there are numerous data items in a ticket they have been arranged in multiple rows and also grouped by “report” items and “action” items.

When a ticket is opened, the user enters the information and Stores to the database which stores the edits to the database and creates a new blank ticket. When the actions taken for remedy or comment are added, they also become part of the ticket.

Record Indicator

The A column of a form is used by **XLReporter** as a record indicator.

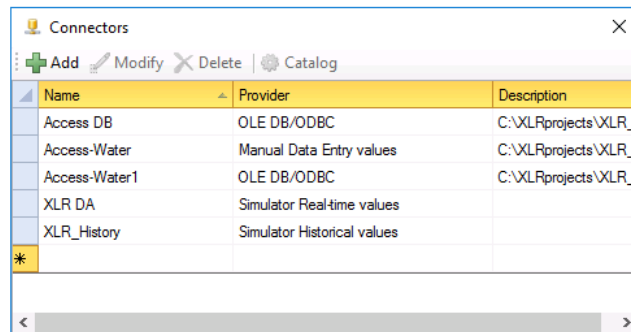
- No color
The row is empty; no data has been entered
- Grey
The record is saved in the database
- Green
The entry is edited but not saved to the database
- Red
The entry is invalid and cannot be saved to the data
- Yellow
The form is locked in the database
- Dark Yellow
The record is locked in the database

Right-click on the indicator to display a context menu to **Cancel** an edit, **Delete** a record or **Lock** a record.

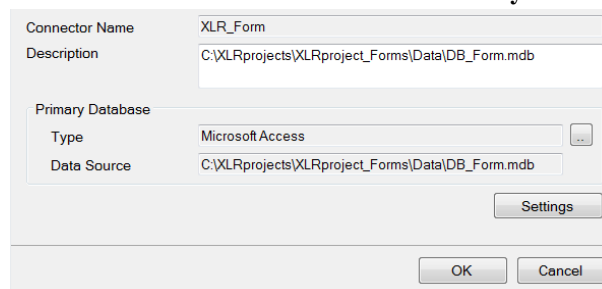
Data Entry with Date Settings

Setup a Data Entry Connector

From the **Data** tab of the **Project Explorer** select **Data, Connectors**.



- Click **Add**.
- Expand **XLReporter** and select the **Manual Data Entry values** connector.
- Enter the Connector **Name** and the connection to the **Primary Database**.



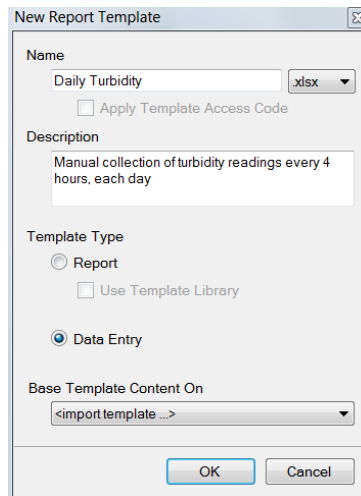
If you do not have a database, use or make a copy of the Access database called *DB_Form.mdb*, located in the **Data** folder of the project.

Design a Data Entry Template

Data Entry Forms can address a wide range of data entry requirements and can contain powerful features such as calculations, formatting, and validation. Their design is performed in the **Design Studio** or from the add-in in Microsoft Excel.

Open the Design Studio from the **Project Explorer** by selecting **Home** tab, **Template, Studio**

- Select **XLReporter, Template New (Excel)** or **File, New (XLReporter Design Studio)**.



- For the **Name** enter *Daily Turbidity* and an optional **Description**
- Under **Template Type**, select **Data Entry**
- Under **Base Template Content On** select *<import template>* and choose the file *basin-turbidity.xlsx*

Layout

The form contains workbook features such as labels, headings, formatting, and formula in the *H* column. The formula in *D4* equals *C9* and is formatted just to show the date.

Filter 1	Filter 2	Filter 3	Filter 4	Max
NTU	NTU	NTU	NTU	NTU
				0.00
				0.00
				0.00
				0.00
				0.00
				0.00

The above example is a daily form requiring 4-hour turbidity readings of the process which will be entered in the blue cells.

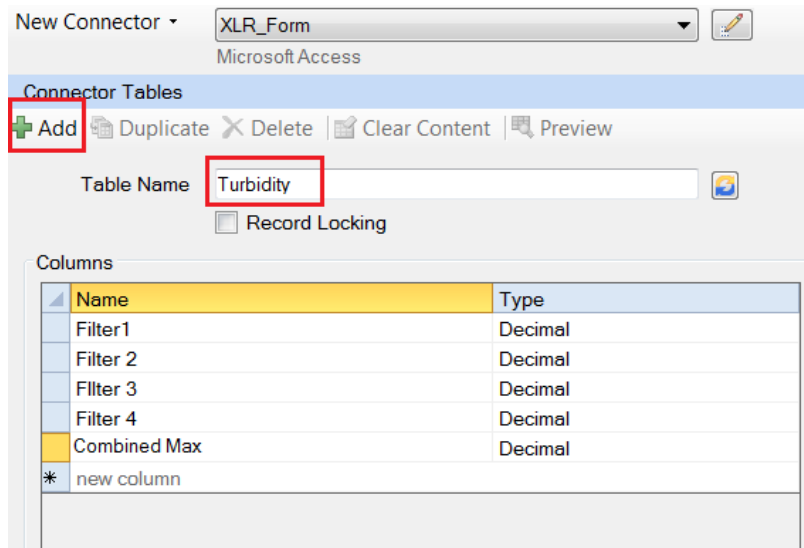
Unlock the cells that are used for data entry, i.e., the blue cells in the above example.

- Highlight *\$D\$9* to *\$G\$14*.
- Select **Format** from the menu and click **Unlock Cells** (Design Studio) or right click, select **Format Cells** and under the **Protection** tab uncheck **Locked** (Excel).

Create a Database Table

A database table is needed to receive the data entry values when they are entered. When creating a database table, specify column names that reflect the information in the form.

Open the **Database Manager** by selecting **Template, Tools, Database Manager** (Design Studio) or **XLReporter, Tools, Database Manager** (Excel).



- Select the data connector defined in the previous section.
- Click **Add** to add a new table.
- Enter a **Table Name**
- Under **Columns**, specify the column **Name** and **Type** for each entry field as shown in the above image.
- Click **Accept** and **Close**

Note that *DateAndTime* is a reserved column name and is automatically added to any tables created for a **Manual Data Entry values** connector.

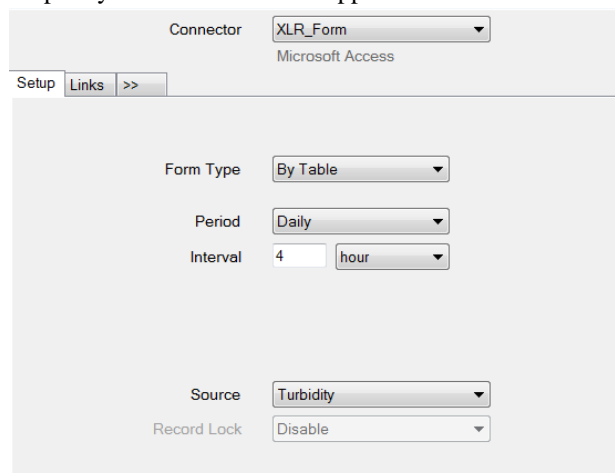
Data Link

To link the template to the table created in the previous section, first select cell $CC9$ and then select **XLReporter, Data, Link (Excel)** or **Template, Data, Link (Design Studio)**.

Note that by selecting cell $CC9$ before opening **Data Link**, a level of configuration is performed automatically.

Setup Tab

The **Setup** tab is used to specify the connection and appearance of the form.



Set the **Connector** to a form connector defined in the previous section.

The **Form Type** selection determines if the form will use one or multiple records for displaying and editing.

- **By Column**
Display one record which is selected by Date or Custom settings

- **By Table**
Display multiple records which is selected by Date, Time, or Custom settings

In this example, there are multiple records being displayed, one for each 4-hour period of the day.

- Select **Form Type** *By Table*.
- Select **Period** *Daily*.
- Select the **Interval** *4 hour*.

The **Source** shows a dropdown list of all the tables in the **Connector**. Only one table may be specified for each data entry form.

- Select the table created in the previous section.

Links Tab

The **Links** tab determines associates the **Cell(s)** on the form and **Column(s)** in the database table.

No database links can be configured for the **A** column. This column is reserved by the application to indicate the status of the row by a color indicator.

Cell	Column	Transfer	Type
\$CS\$	DateAndTime	Read Write	DateTime
\$DS\$	Filter1	Read Write	Decimal
\$ES\$	Filter2	Read Write	Decimal
\$FS\$	Filter3	Read Write	Decimal
\$GS\$	Filter4	Read Write	Decimal
\$HS\$	Combined Max	Write	Decimal
*			

This tab is filled automatically using the selected cell on the template form.

Cell

The values are edited manually or by first clicking into a row in the grid and then clicking the cell on the worksheet.

Column

This is a drop-down list of all the columns in the form table.

Transfer

The transfer mode determines the transfer mode of data between the form and the database. Make sure any formula that is written to the database has a **Transfer** of *Write* otherwise it will be overwritten when the form is refreshed. In the above example, the *Combined Max* column is set to *Write* because it is a formula on the form.

Display Tab

The **Display** tab is an advanced setting and is shown by clicking >>. The settings on this tab are automatically updated except when the *Custom* option is selected on the **Setup** tab.

Column	Variable
DateAndTime	>= {Form Start}
DateAndTime	< {Form End}
*	

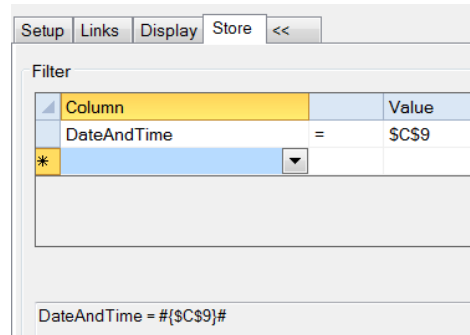
DateAndTime >= #{Form Start}# AND DateAndTime < #{Form End}#

Note that the display of the form is driven by the variables *Form Start* and *Form End* which represent the start and end date selected by the user.

Store Tab

The **Store** tab is an advanced setting and is shown by clicking >>. The settings on this tab are automatically updated except when the **Custom** option is selected on the **Setup** tab.

Note that when the form is stored, the date and time in cell *\$C\$9* and down is used to update the database table.

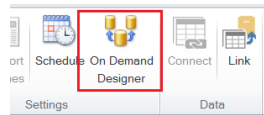


Click **Save** to save the changes. Close the **Data Link** window.

On Demand Designer

The **On Demand Designer** is used to provide methods for setting the variables in the form. Except for **Custom** forms, the settings in here are managed automatically.

To view the settings for the above example, select **On Demand Designer**.



Note that the variables *Form Start* and *Form End* used in the form configuration are driven by a **Date Interval** control.

Variable	Prompt	Panel
DATE		
Form Start	Start Date	Date Interval
Form End	End Date	Date Interval
PARAMETER		
TAG		
DATABASE		

Deploy the Template

To perform data entry, open the **Data Entry Forms** application which can be done from the command line, clicking **Preview** in the Design Studio or from the **Project Explorer** under **Home, Interactive Data Entry Forms**.

The screenshot shows the 'Data Entry Forms - Daily Turbidity.xlsx' application. The left sidebar contains a 'Form Templates' list with 'Daily Turbidity' selected (indicated by a red box and '1.'). Below the list are 'Refresh', 'Store', and 'Lock' buttons, with 'Store' highlighted (indicated by a red box and '4.'). A 'Date' field is set to '01 March 2021' (indicated by a red box and '2.'). The main area displays the 'Daily Turbidity' form with a date field set to '03/01/21' and a table with columns for 'Filter 1', 'Filter 2', 'Filter 3', 'Filter 4', and 'Max' (all in NTU). The table rows are for times 0:00, 4:00, 8:00, 12:00, 16:00, and 20:00, with values of 0.00. A red box highlights the table area (indicated by '3.').

	Filter 1	Filter 2	Filter 3	Filter 4	Max
	NTU	NTU	NTU	NTU	NTU
0:00					0.00
4:00					0.00
8:00					0.00
12:00					0.00
16:00					0.00
20:00					0.00

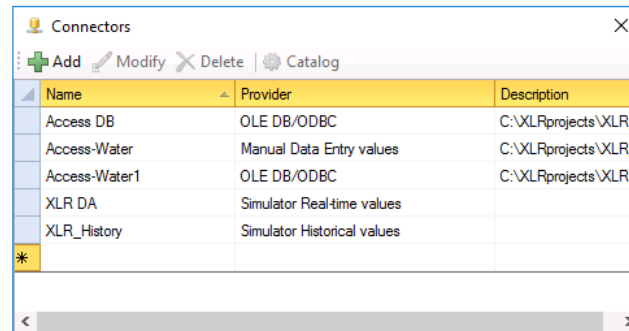
1. Select the **Daily Turbidity** form.
2. Select the **Day**.
3. Add entries to the form.
4. Click **Store** to save the entries to the table in the database.

Data Entry with Custom Settings

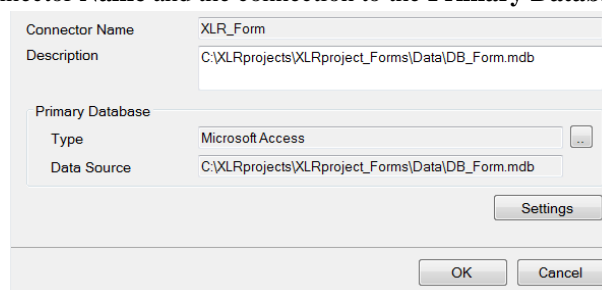
Setup a Data Entry Connector

This section can be skipped if the connector was setup in the previous chapter.

From the **Data** tab of the **Project Explorer** select **Data, Connectors**.



- Click **Add**.
- Expand **XLReporter** and select the **Manual Data Entry values** connector.
- Enter the Connector **Name** and the connection to the **Primary Database**.



If you do not have a database, use or make a copy of the Access database called *DB_Form.mdb*, located in the **Data** folder of the project.

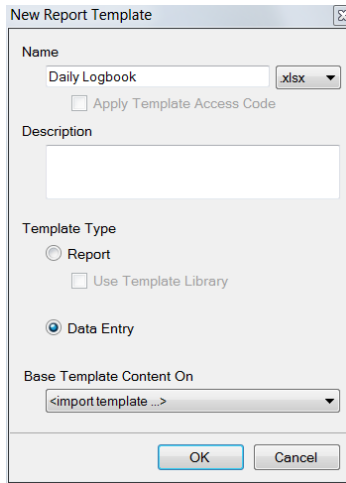
Design a Data Entry Template

Data Entry Form can address a wide range of data entry requirements and can contain powerful features such as calculations, formatting, and validation. Their design is performed in the **Design Studio** or from the add-in in Microsoft Excel.

This example will demonstrate the flexibility of data entry forms by a **Custom** template.

Open the Design Studio from the **Project Explorer** by selecting **Home** tab, **Template, Studio**

- Select **XLReporter, Template New (Excel)** or **File, New (XLReporter Design Studio)**.



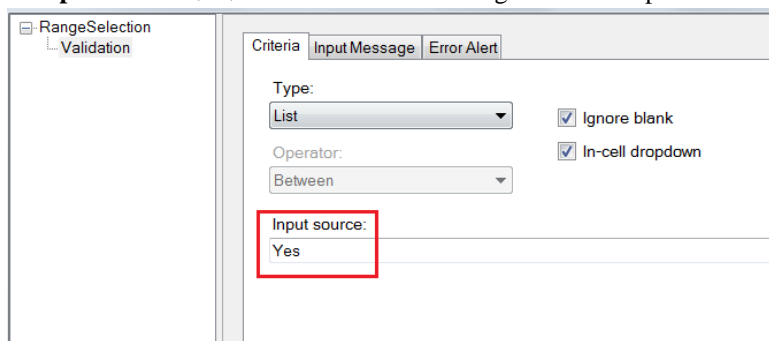
- For the **Name** enter *Daily Logbook* and an optional **Description**.
- Under **Template Type**, select **Data Entry**.
- Under **Base Template Content On** select *<import template>* and choose the file *operator-logbook.xlsx*.

Layout

The form contains workbook features such labels, headings, formatting.

	A	B	C	D	E	F	G	H
1								
2			Operator Logbook					
3								
4			Reported Date		Shift			
5			Reported By		Classification			
6			Log Notes					
7								
8			Action Date					
9			Action By					
10			Action Notes					
11								
12								Completed?
13								
14								
15								

The above form example requires logs to be entered as events occur in the process. A key element of the form is the **Completed?** cell $HH12$. This has been configured as a drop-down list.



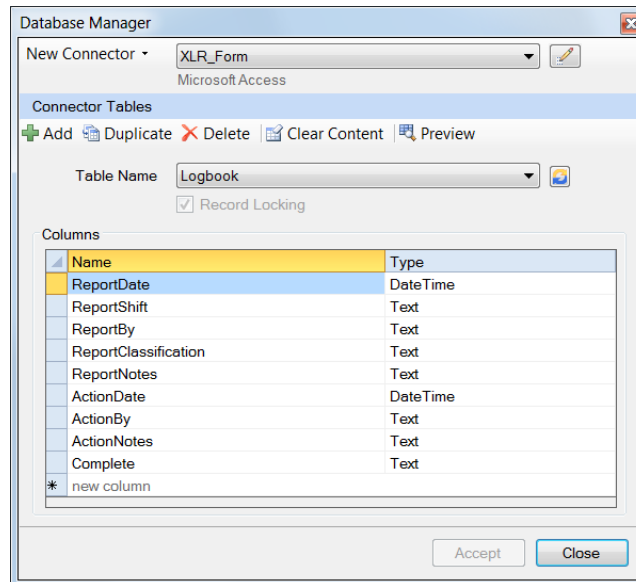
To view the settings,

- Select cell $HH12$
- From the **Worksheet** tab (Design Studio) or **Data** tab (Excel), select **Data Validation**.

Create a Database Table

A database table is needed to store the data entry values when they are entered. When creating a database table, choose column names that reflect the information in the form.

Open the **Database Manager** by selecting **Template, Tools, Database Manager** (Design Studio) or **XLReporter, Tools, Database Manager** (Excel).



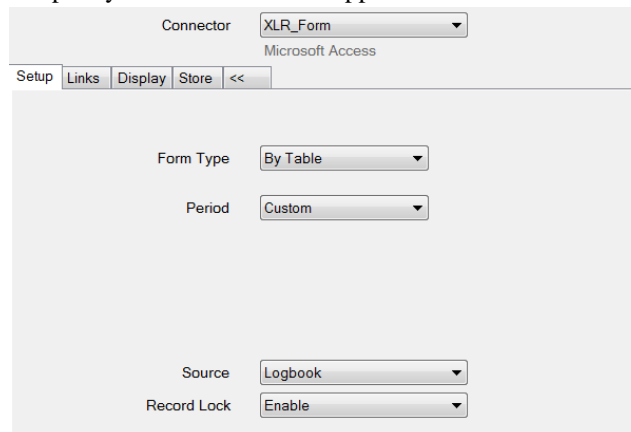
- Select the data connector defined in the previous section.
- Click **Add** to add a new table.
- Enter a **Table Name** e.g., *Logbook*.
- Check **Record Locking**.
- Under **Columns**, specify the column **Name** and **Type** according to the above image.
- Click **Accept** and **Close**.

Data Link

To link the template to the table created in the previous section, select **XLReporter, Data, Link** (Excel) or **Template, Data, Link** (Design Studio).

Setup Tab

The **Setup** tab is used to specify the connection and appearance of the form.



Set the **Connector** to the form connector configured in the previous section.

- Select **Form Type** *By Table*.
- Select **Period** *Custom*.

The **Source** shows a dropdown list of all the tables in the connector. Only one table may be specified for each data entry form.

- Select the table created in the previous section.

The **Record Lock** option can be changed if the option is set when the table was created in the **Database Manager**. This setting takes effect when the form is deployed.

- **Enable**
The Lock option is enabled for users with appropriate credentials to lock the form from edits.
- **Enable and Refresh**
The Lock option is enabled for users with appropriate credentials to lock the form from edits and to refresh the input panel.

Links Tab

The **Links** tab associates the **Cell(s)** on the form and **Column(s)** in the database table.

No database links can be configured for the **A** column. This column is reserved by the application to indicate the status of the row by a color indicator.

Cell	Column	Transfer	Type
SD\$4	ReportDate	Read Write	DateTime
SF\$4	ReportShift	Read Write	Text
SD\$5	ReportBy	Read Write	Text
SF\$5	ReportClassification	Read Write	Text
SD\$6	ReportNotes	Read Write	Text
SD\$8	ActionDate	Read Write	DateTime
SD\$9	ActionBy	Read Write	Text
SD\$10	ActionNotes	Read Write	Text
SH\$12	Complete	Read Write	Text

- Assign the **Cells** and **Columns** as displayed in the image above

Display Tab

The **Display** tab is used to determine what is displayed on the form.

Column	Variable	Cell
Complete	IS	NULL

Column	Order
ReportDate	DESC

The above configuration displays all incomplete records in descending order by *ReportDate*, using the status of the *Complete* field.

- Configure to match the image above. Note that *NULL* will have to be manually entered in the **Variable** column.

For **Custom Periods**, the **Custom** option is provided for the **Filter**. When checked, the **Filter** grid is disabled, and the text area is enabled for the filter to be manually entered. This allows for more complex filter conditions to be manually specified.

For example, if the **Filter** requires two conditions that where if either one is true, it should evaluate true, this can be set here using the *OR* operator.

Please note that if the **Filter** is manually entered it must follow SQL syntax exactly otherwise an error will result.

Store Tab

The **Store** tab indicates which record in the database will be updated. Careful selection of this setting is required to make sure only one record is updated. In this example, it is assumed that no 2 entries are entered for the same date/time

- Configure to match the image above

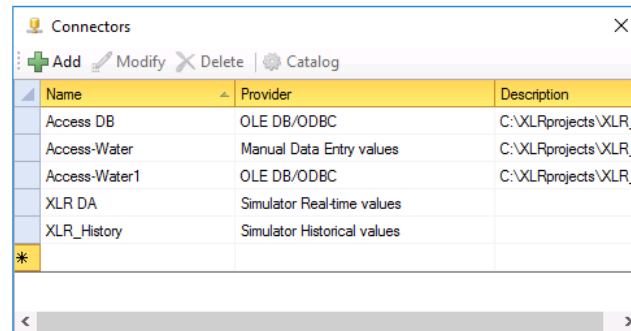
Click **Save** to save the changes. Close the **Data Link** window.

Data Entry with Advanced Settings

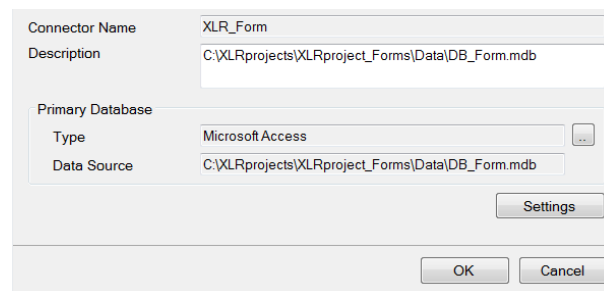
Setup a Data Entry Connector

This section can be skipped if the connector was setup in the previous chapter.

From the **Data** tab of the **Project Explorer** select **Data, Connectors**.



- Click **Add**.
- Expand **XLReporter** and select the **Manual Data Entry values** connector.
- Enter the Connector **Name** and the connection to the **Primary Database**.



If you do not have a database, use or make a copy of the Access database called *DB_Form.mdb*, located in the **Data** folder of the project.

Variables

As you have seen the variables *{Form Start}* and *{Form End}* are used in Data Entry Forms to restrict what the user is shown in the form. However, these are not the only variables that can be used in a Data Entry Form.

This chapter takes you through an advanced, custom form where not only is the date specified but also the specific name of a compressor to populate the form.

Before creating the form, define this variable for later use. From the **Project Explorer**, under the **Data** tab, open **Variables**.

- Under **Base Template Content On** select *<import template>* and choose the file *maintenance-log.xlsx*

Layout

The form contains workbook features such labels, headings, formatting.

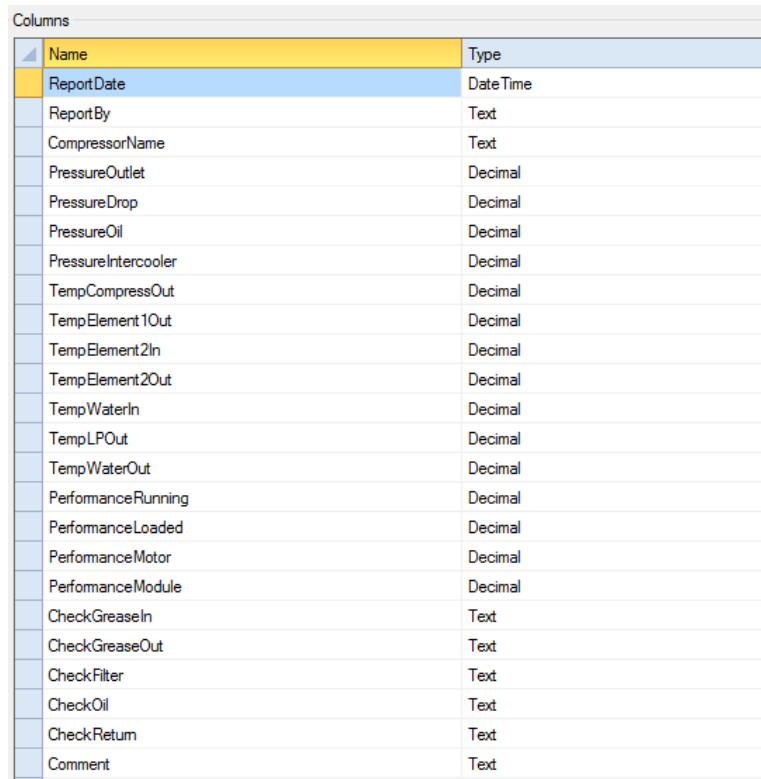
	A	B	C	D	E	F
1						
2	Compressor Maintenance					
3						
4	COMPRESSOR			OPERATOR		
5	Name			Name		
6						
7	PRESSURE (psi)			PERFORMANCE (measured from process)		
8	Compressor Outlet			Running Hours		
9	Drop Air Filter			Loaded Hours		
10	Oil Pressure			Motor Start		
11	Intercooler			Module Hours		
12						
13	TEMPERATURE (F)			CHECKS PERFORMED		
14	Compressor Outlet			Grease Inlet Valve		
15	Element 1 Outlet			Grease Outlet Valve		
16	Element 2 Inlet			Change Filters		
17	Element 2 Outlet			Oil Reservoir		
18	Cooling Water In			Return Valve		
19	LP Cooling Water Out					
20	Cooling Water Out					
21						
22	COMMENT					
23						
24						
25						

The above form example requires the data collected during the maintenance of compressors. If sensors are fitted, the shaded cells are filled automatically otherwise this would also be done manually.

Create a Database Table

A database table is needed to receive the data entry values when they are entered. When creating a database table, choose column names that reflect the information in the form.

Open the **Database Manager** by selecting **Template, Tools, Database Manager** (Design Studio) or **XLReporter, Tools, Database Manager** (Excel).



Name	Type
ReportDate	Date Time
ReportBy	Text
CompressorName	Text
PressureOutlet	Decimal
PressureDrop	Decimal
PressureOil	Decimal
PressureIntercooler	Decimal
TempCompressOut	Decimal
TempElement1Out	Decimal
TempElement2In	Decimal
TempElement2Out	Decimal
TempWaterIn	Decimal
TempLPOut	Decimal
TempWaterOut	Decimal
PerformanceRunning	Decimal
PerformanceLoaded	Decimal
PerformanceMotor	Decimal
PerformanceModule	Decimal
CheckGreaseIn	Text
CheckGreaseOut	Text
CheckFilter	Text
CheckOil	Text
CheckReturn	Text
Comment	Text

- Select the data connector defined in the previous section.
- Click **Add** to add a new table.
- Enter a **Table Name** e.g., *Compressor*.
- Check **Record Locking**.
- Under **Columns**, specify the column **Name** and **Type** according to the above image.
- Click **Accept** and **Close**.

Data Link

To link the template to the table created in the previous section, select **XLReporter, Data, Link** (Excel) or **Template, Data, Link** (Design Studio).

Setup Tab

The **Setup** tab is used to specify the connection and appearance of the form.

Connector: XLR_Form
Microsoft Access

Setup | **Links** | Display | Store | <<

Form Type: By Column

Period: Custom

Source: Compressor

Record Lock: Disable

Set the **Connector** to the form connector configured in the previous section.

Select **Form Type** *By Column*

- **Period** *Custom*

The **Source** shows a dropdown list of all the tables in the connector.

- Select the table created in the previous section

Links Tab

The **Links** tab determines associates the **Cell(s)** on the form and **Column(s)** in the database table.

No database links can be configured for the **A** column. This column is reserved by the application to indicate the status of the row by a color indicator.

Cell	Column	Transfer	Type
\$F\$2	ReportDate	Read Write	Date/Time
\$F\$5	ReportBy	Read Write	Text
\$C\$5	CompressorName	Read Write	Text
\$C\$8	PressureOutlet	Read Write	Decimal
\$C\$9	PressureDrop	Read Write	Decimal
\$C\$10	PressureOil	Read Write	Decimal
\$C\$11	PressureIntercooler	Read Write	Decimal
\$C\$14	TempCompressOut	Read Write	Decimal
\$C\$15	TempElement1Out	Read Write	Decimal
\$C\$16	TempElement2In	Read Write	Decimal
\$C\$17	TempElement2Out	Read Write	Decimal
\$C\$18	TempWaterIn	Read Write	Decimal
\$C\$19	TempLPOut	Read Write	Decimal
\$C\$20	TempWaterOut	Read Write	Decimal
\$F\$8	PerformanceRunning	Read Write	Decimal
\$F\$9	PerformanceLoaded	Read Write	Decimal
\$F\$10	PerformanceMotor	Read Write	Decimal
\$F\$11	PerformanceModule	Read Write	Decimal
\$F\$14	CheckGreaseIn	Read Write	Text
\$F\$15	CheckGreaseOut	Read Write	Text
\$F\$16	CheckFilter	Read Write	Text
\$F\$17	CheckOil	Read Write	Text
\$F\$18	CheckReturn	Read Write	Text
\$B\$23	Comment	Read Write	Text
*	add link		

- Assign the **Cells** and **Columns** as displayed in the image above

Display Tab

The **Display** tab is used to determine what is displayed on the form.

Column	Variable	Cell
ReportDate	= {Form Start}	SF\$2
CompressorName	= {Compressor}	SC\$5
* add filter		

ReportDate = #{Form Start}# AND CompressorName = '{Compressor}'

Column	ASC
ReportDate	ASC
* add order	

- Set the **Filter** and **Order** as displayed in the image. Note that for *CompressorName* the drop down in the **Variable** column gives *{Compressor}* as a choice.

Whenever variables are used in a form, consideration must be given on the input mechanism that is used to assign its value (this is by the **On-Demand Designer** discussed later). By default, variables representing a date use a date picker and all the other variable types use a text box.

Note that the variable values are placed in the cells indicated by the **Cell** parameter.

Store Tab

The **Store** tab indicates which record is updated in the database. Careful selection of this setting is required to make sure only one record is updated. In this example, the **ReportDate** and the **CompressorName** columns are used.

Column	Value
ReportDate	= SF\$2
CompressorName	= SC\$5
* add link	

ReportDate = #{SF\$2}#
AND CompressorName = '{SC\$5}'

- Configure to match the image above
Click **Save** to save the changes. Close the **Data Link** window.

Deploy the Template

To perform data entry, open the **Data Entry Forms** application which can be done from the command line, clicking **Preview** in the Design Studio or from the **Project Explorer** under **Home, Interactive Data Entry Forms**.

The screenshot shows the 'Data Entry Forms - Daily Maintenance.xlsx' application. On the left is a tree view of 'Form Templates' including Alarm Notification, Basin Data, Basin Solids, Basin Turbidity, Compressor Data, Daily Logbook, Daily Maintenance, Daily Turbidity, Operator Logbook, and Water MOR. Below the tree is a 'Parameter' table:

Setting	Value
Form Start	2021-08-02
Compressor	C123-47

The main form is titled 'Compressor Maintenance' and is dated 'Mon, August 2, 2021'. It contains several sections:

- COMPRESSOR**: Fields for Name (C123-47) and OPERATOR Name.
- PRESSURE (psi)**: Fields for Compressor Outlet, Drop Air Filter, Oil Pressure, and Intercooler.
- PERFORMANCE (measured from process)**: Fields for Running Hours, Loaded Hours, Motor Start, and Module Hours.
- TEMPERATURE (F)**: Fields for Compressor Outlet, Element 1 Outlet, Element 2 Inlet, Element 2 Outlet, Cooling Water In, LP Cooling Water Out, and Cooling Water Out.
- CHECKS PERFORMED**: Fields for Grease Inlet Valve, Grease Outlet Valve, Change Filters, Oil Reservoir, and Return Valve. The 'Return Valve' field is highlighted in red.
- COMMENT**: A text area for additional notes.

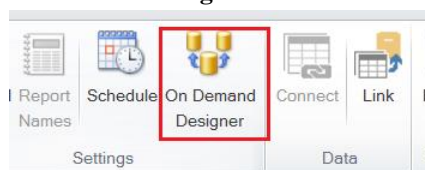
Enter a value for the **Form Start** and **Compressor**. If a record exists, it will be displayed otherwise a new form is shown prefilled with the values entered.

A form cannot be saved until all the required field are complete (shown in red).

On Demand Designer

The input panel to drive the content of the form consisted of a date picker and text box. Using the **On Demand Designer**, these input methods can be refined.

From the **Design Studio** select **On-Demand Designer**.

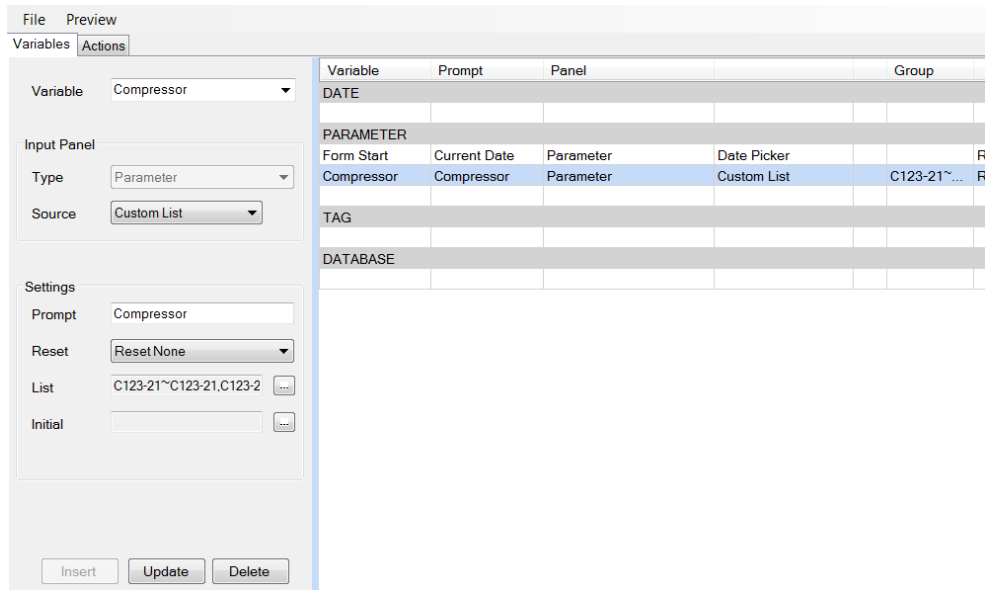


Highlight the row containing *Form Start*.

- Change the **Prompt** to *Current Date*.
- Click **Update**.

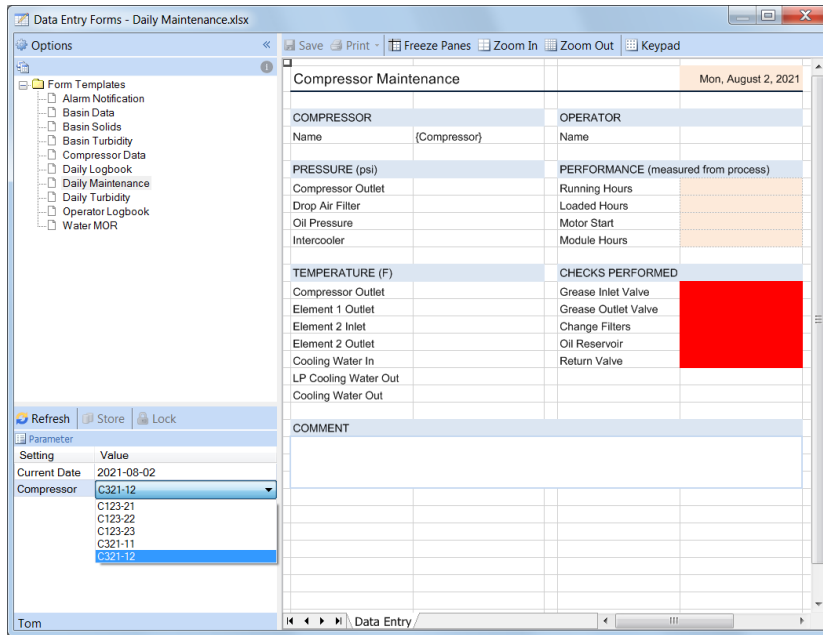
Highlight the row containing *Compressor*.

- Change the **Source** to *Custom List*
- Click [...] to the right of **List** and enter a list of compressor names. The **Display** parameter is shown to the user and the **Value** parameter is stored to the database.
- Click **Update**.



- Click **Preview**. This shows you what the left side of the **Data Entry Forms** application will present.
- Click **File, Save** and exit

When the form is opened for data entry, the changes made above will appear.



Please refer to the **Design On-Demand Reports** documentation for detailed information on **Input Panels**.

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