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# Instrument Designer User Guide

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1 Introduction

The Instrument Designer User Guide is designed to help the user learn Instrument Designer in just a short amount of time. Along the way, the user will learn the basic steps of creating automated Loop and Termination diagrams from cable and wiring data and also learn from tips so you can be really productive with Instrument Designer.

Refer to System Requirements for running Instrument Designer.

1.1 What is Instrument Designer

Instrument Designer manages all tasks typically handled by an Instrument Designer during a project life cycle including CAD drawing generation, drawing list management, updating of revisions and printing of CAD files for loop diagrams, termination diagrams, Hookups etc. Instrument Designer will:

- Manage all project drawings and drawing revisions (including batch update, batch revision changes and plotting) from a easy to use Graphical User Interface
- Generate loop drawings from templates automatically updating data from the AVEVA Instrumentation database including:
  - Data from Instrument Engineer (Manufacturer, model number, range, P&ID drawing nos., I/O etc)
  - Data from AVEVA Instrumentation Wiring Manager (Cables, terminations, wire numbers etc)
- Data from the Instrument Designer drawing register (e.g Drawing No, Title, Drawn By, Date etc) & revision history is automatically updated on all drawings
- Generate Termination drawings parametrically from the AVEVA Instrumentation database including:
  - Data from AVEVA Instrumentation Wiring Manager (terminal strips & devices, cables & core markings/wire numbers etc).
  - Data from the Designer drawing register (e.g Drawing No, Title, Drawn By, Date etc) & revision history is automatically updated on all drawings
- Generate Hookup drawings with Bill of Materials and create bulk Bill of Materials reports for an entire project
- Access Engineering Data created with other AVEVA Instrumentation applications including:
  - Instrument & Loop data created with the Instrument Engineer application.
  - Auto generate field device wiring including Junction Box termination via AVEVA Instrumentation Using Wiring Rules to Create Data.
- Access Termination data created with the AVEVA Instrumentation Wiring Manager application.
- Produce reports:
AVEVA Instrumentation Designer utilises Autodesk's AutoCAD application to allow:

- Industry standard drawing/document exchange (data is never lost in a proprietary database)
- AutoCAD is used to define loop diagram layout. You have total control over drawing standards, symbology & drawing format.
- AutoCAD attributes are "linked" to the to the Instrumentation Design Office database (Microsoft Access or Microsoft SQL Server) for data transfer to each drawing. That is any information that is changed in the AVEVA Instrumentation database (e.g. a Tag Number, Cable No, wire marking etc) is automatically updated to the appropriate drawing (the next time it is Updated - updating can be done in batch mode).
- Print/Update any number of selected drawings via the Drawing List (Drawing Register).

You can also easily access Loop data entry forms found in Instrument Engineer and Wiring Termination forms found in AVEVA Instrumentation Wiring Manager directly from within Instrument Designer. (Licenses for AVEVA Instrumentation Engineer/Wiring Manager are required to access this info).

**Important:** Instrument Designer uses data created by Instrument Engineer and AVEVA Instrumentation Wiring Manager to generate CAD drawing files automatically from the AVEVA Instrumentation project database. Normally this is the last AVEVA Instrumentation module used on a project as Instrument Engineer is used to create instruments tags and assign tags into 'loops'. AVEVA Instrumentation Wiring Manager is used to create equipment, cables and wiring including terminations. Without this data Instrument Designer can not create completed drawing files.

For more information refer to *Instrument Designer Features*.

### 1.2 Benefits from using AVEVA Instrumentation

Projects will be completed on a shortened schedule, consuming fewer man-hours:

- More efficient data entry than conventional practice (e.g. Stand-alone drawings, documents, and databases/spreadsheets versus integrated database system). In many cases the data is automatically created from "rules".
- Documents can be auto-generated from the database (DWG's, PDF and XLS's) - resulting in major productivity gains.
- Easier to produce large (or small) scale design changes.

Your project is less error prone than conventional design methods:

- Data is checked and validated by the database system.
- Data is electronically transferred - reducing errors and associated checking time.
- Relational database means "change once - change everywhere"
- Information is accurate and reliable (and self-checking).

Construction and commissioning time is reduced through improved design accuracy.

AVEVA Instrumentation is more cost effective and productive than competitor software (spend less and achieve more!):
• Easier to learn and use than competitors
• Lower cost of ownership & more flexible licensing including short/long term rental
• More productive and efficient.

1.3 Guide Structure

Introduction  a brief description of Instrument Designer.
System Requirements  the minimum system configuration for Instrument Designer.
Instrument Designer Features  handles automated generation of CAD drawings from the multi-user project/plant database.
User Interface  begins by displaying the View ribbon menu.
Drawing List  is the main Designer dialog for adding/editing and accessing drawings.
Drawing Generation  how Designer generates CAD drawings from the Drawing List.
Hookups  drawings are created by assigning a pre-defined Hookup Template to each project hookup drawing.
Engineering Data  allows access to the Instrument Engineering data normally created by the Engineer application.
Using Wiring Rules to Create Data  to auto generate typical field instrument wiring/cabling.
Change Reports  has an in-built Audit Manager that enables users to view database changes made during your project in the database audit log.
Report Manager  that enables users to create and modify reports.
2 System Requirements

AVEVA Instrumentation requires the following minimum system configuration to run:

2.1 Hardware

The minimum hardware requirements are:

- **CPU**: Pentium II or later
- **Memory**: 512MB or greater
- **Monitor**: XGA (1024 x 768) or greater
- **Available disk space**: 100Mb+ per project database (approx)

AVEVA Instrumentation recommends the following configuration:

- Pentium IV (or equivalent) based processor (3.0 GHz or above) or any Intel Core 2 or Duo processor (2.0GHz+) or equivalent
- 1Gb RAM min (2 Gb for Vista)
- 1280 x 1024 or higher resolution Monitor

2.2 Software

The minimum software requirements for Instrument Designer are:

- **Operating System**: Windows Xp or Vista
- **Other software**: AutoCAD 2000 to 2009 to create drawing files
  - Microsoft .NET 3.5.SP1 framework runtime (free from Microsoft)

AVEVA Instrumentation recommends Windows Xp Pro or Vista Business.

**Note**: AVEVA Instrumentation requires Microsoft .NET 3.5 framework runtime which supports Windows Xp and Vista only. Microsoft .NET 3.5 cannot be installed on Windows 2000 or earlier operating systems.

2.3 Licensing

AVEVA Instrumentation is licensed per application (module) per workstation. Licenses can be purchased outright or rented on a monthly basis (conditions apply).
AVEVA Instrumentation applications can be activated with a Software License, which locks the applications to a specific computer or can use a Floating Network License (FNL), which utilises a special USB key on a server to allow licenses to ‘float’ over your network. The FNL enables any computer (with AVEVA Instrumentation installed) to run an AVEVA Instrumentation module if the specific module has ‘spare’ (or unused) license available at the time the user starts-up the application module from Windows.

By default AVEVA Instrumentation uses the Software License. To use the FNL you will need to purchase the optional FNL USB key, install the additional drivers and USB key on a server and configure your local AVEVA Instrumentation programs to use the FNL License instead of the Software License. Refer the AVEVA Instrumentation FNL documentation for details.

2.4 Database Systems

AVEVA Instrumentation Version supports two database systems:

1. Microsoft Access 2002 (or later) and

AVEVA Instrumentation also supports SQL Server Express - a free client server database system that can be downloaded from Microsoft's website.

AVEVA Instrumentation includes the Microsoft Access database file so clients are not required to have a Microsoft Access licence to use AVEVA Instrumentation.


Access is suitable for smaller projects requiring no more than 5 users approx. Access can support over 200 concurrent users, however, our testing has shown more than 3 or so users will cause AVEVA Instrumentation to slow significantly. Even with a small number of users SQL Server performance is better.

SQL Server is ideal for projects with larger numbers of users but is also more complex to manage and administer than Access. However, SQL Server will not slow AVEVA Instrumentation even with 30 or more users (assuming you have a reasonable network and server performance i.e a 100Mb/s LAN and dedicated Server).

Apart from speed, where SQL Server is king, AVEVA Instrumentation is functionally identical on either database except the following features which are supported on SQL Server only:

- SQL Server contains an auto generated audit log* of all changes, additions, deletions and AVEVA Instrumentation provides an Audit Manager to allow users to view and query changes by object type (i.e. Instruments, Datasheets, Cable, Drawings etc).
- AVEVA Instrumentation on SQL Server will support user security where users can be restricted to only certain object types (i.e. User ‘A’ can edit instruments but not datasheets etc).

* AVEVA Instrumentation allows users to view changes between database revisions to view changes, additions and deletions in both Access and SQL Server. However this requires a user to Save a revision at certain key dates or milestones prior to running a 'compare' report. AVEVA Instrumentation then reports differences between the current database and any previous (selected) saved revision.
Currently there is no AVEVA Instrumentation utility that allows users to automatically convert one database type to another, so you should consider your choice final for a particular project. (AVEVA Instrumentation can convert databases for a fee).

AVEVA Instrumentation recommends either SQL Server or SQL Server Express.
3 Instrument Designer Features

The AVEVA Instrumentation application, Instrument Designer handles automated generation of CAD drawings from the multi-user project/plant database. It manages the process of CAD drawing creation, drawing revision update, transferring of data to drawings, parametric creation of termination (wiring) drawings and printing CAD files. Designer also contains a Hookup module enabling fast installation detail generation and accurate Bill of Materials. Here is a feature summary:

3.1 Foreign Languages

All AVEVA Instrumentation application modules and project databases support foreign language data entry using Unicode text including a mixture of languages (e.g. English and Russian in the same dialog, datasheet, drawing and/or report).

Additionally AVEVA Instrumentation supports translation of application dialogs, grid captions, picklists and application messages into foreign languages. At release in September 2008 AVEVA Instrumentation has full translations for English and Japanese, part translation for Farsi (Persian) plus 'machine' translations for Chinese (Simplified), Korean, Russian, Ukrainian, Spanish, Portuguese, French, German, Italian, Dutch, Norwegian, Swedish, Danish, Finnish, Czech, Romanian, Bulgarian, Polish, Arabic, Vietnamese and Indonesian. These 'machine' translations are not 100% accurate but should make using AVEVA Instrumentation easier for non-English or Japanese users.

If your company or customers would like to update these translations or add a new foreign language AVEVA Instrumentation can provide users with a software tool that will allow an engineer to update translations for all dialog captions/labels by entering the appropriate text in your desired language. This translator tool is available free of charge, however your translations will need to be returned to AVEVA Instrumentation so they can be included in AVEVA Instrumentation after we regenerate the associated language files.

3.1.1 Drawing List Management

- Add/Edit/Update/Delete/Open drawings from the Drawing List (register) manually
- Add loop drawings automatically from Instrument Engineer's Loop List
- Add termination drawings automatically from Wiring Manager's Equipment List
- Manage drawing revisions (update all selected in "batch" mode)
- Create new revision using next revision number or Update current revisions with new information
- Updates all drawing data:
  - Drawing title block from Drawing List (titles, drawing no, plant area etc)
  - Revisions from Revisions history
  - Engineering Data from any Instrumentation Design Office database field
• Link drawing text fields to any user defined database field using AVEVA Instrumentation Datalinks or SQL queries
• Create/Update and print selected drawings in batch mode
• Print selected drawings in batch mode.

3.1.2 Loop Drawing Generation
• Create multiple drawings based on user templates (fully user definable)
• Edit drawings and update existing drawings without templates
• Updates cable/termination data from Wiring Manager (e.g. Cable, Terminal & Wire Nos etc.)
• Updates Instrument data from Instrument Engineer (e.g. P&ID No, Manufacturer, Model No., Range, DCS/PLC I/O information etc.)
• Updates title block information (titles, revisions etc) and stacks revision history.

3.1.3 Termination Drawing Generation
• Creates drawings based on:
  • Templates (typically termination schedules)
  • Parametrics/Automated drawing (typically termination diagrams) - user defined parameters - fully automated drawing creation
• Updates cable/termination data from Wiring Manager (e.g. Cable, Terminal & Wires No.’s)
• Supports cross-patch wiring and links between terminals
• Supports automatic continuation over multiple drawings (e.g. Marshalling Racks etc)
• Supports automatic reference drawing numbers to loop diagrams for field cables & To/From equipment & drawing numbers for termination drawings
• Updates title block information (titles, revisions etc) and stacks revision history.

3.1.4 Hookup/Installation Drawings
• Assign tags to Hookup Type (Hookup drawings are user definable using AutoCAD)
• Assign Hookup Items from user definable catalogue (AVEVA Instrumentation currently has over 3000 catalogue items already entered)
• Auto create Drawings with Bill of Materials and Tag List
• Project Bill Of Materials (BOM) reports (by Plant Area and Total Project BOM).

3.1.5 Change Management
• Report all drawings added / deleted & renamed.
• Report detail changes in each field (e.g. Drawing No. now ABCD was XYZ)
• Log changes for future reporting (e.g. 8/7/99 Drawing No. XYZ: Cable No. 1234 was 4567 etc)
• Audit Manager (SQL Server databases only) enable users to view changes by object type.

3.1.6 Integration
The Designer is integrated with other AVEVA Instrumentation applications.
• Loop Drawings automatically added to Drawing List from Engineer
• Tag Numbers, service, range, manufacturer, model no. etc updated from Engineer
• Equipment, cables, terminations, wire nos. etc automatically updated from Wiring Manager
• Loop Drawing No. is passed to Instrument Engineer's Instrument List (Index)
• Hookup Drawing number is passed to Instrument Engineer's Instrument List (Index).

Designer can be used on any existing AutoCAD drawings and allows drawings to be updated from the Instrument Design Office databases (Instrument Engineer, Wiring Manager or user defined) without requiring use of templates. For example, several loop drawings could be initially generated from a standard loop definition (template), then any number can be edited and made non-standard, but the information can still be updated automatically from the original databases.

3.1.7 User Security Rights

When using AVEVA Instrumentation with a SQL Server project database an AVEVA Instrumentation administrator can set security rights for users to enable/disable access to AVEVA Instrumentation functionality including:

• Access to AVEVA Instrumentation application modules - users can be restricted from using any module (license).
• Access to AVEVA Instrumentation objects can be restricted to read-only (e.g. a user cannot add/edit a drawings) or no access (i.e. the user cannot view an instrument etc.).

AVEVA Instrumentation objects include project entities such as cables, instruments, drawings, reports etc and catalogues, importing of data etc.

By default all new projects have the Security Rights features disabled for backward compatibility with earlier versions of AVEVA Instrumentation. If Security is required it must be turned on using the Security Manager, users must then be setup into 'Security Groups' such as Engineers and Designers, Read-Only Users etc. Refer to the Security Manager documentation for more information.

3.2 AVEVA Instrumentation

AVEVA Instrumentation is software for managing Instrumentation design data and documentation. The suite of applications uses an advanced graphical user interface to relational database (Microsoft Access 2000 or SQL Server). Much of the data is created through automated functions, design rules, picklists and use of catalogue data, with a reduction in manual data entry. Reports in AutoCAD DWG, Excel spreadsheet, Access report and PDF formats can be generated instantly. Automated production of design documentation ensures superior design integrity and efficiency.

AVEVA Instrumentation will:

• Manage instrument data (typical instrument Index).
• Produce instrument datasheets.
• Manage project cables, equipment terminal arrangements and wire terminations.
• Produce Cable Schedules / BOM, instrument and other reports.
• Produce detailed cable and wiring termination reports in PDF format.
• Manage CAD drawings, allow bulk assignment of revisions, bulk printing etc
• Automate production of loop diagrams, junction box & marshalling cabinet termination diagrams (data from Instrument Index and data sheets can be shared with drawings).
Applications in AVEVA Instrumentation Suite are:

- Instrument Designer
- Instrument Engineer
- Instrument Wiring Manager

3.2.1 Other Engineering Application created by AVEVA Instrumentation

IntelliLink P&ID

This new applications family enables P&ID drawings drawn in AutoCAD (or LT) to be electronically 'scanned' to check instrument data contained in drawings against data in the AVEVA Instrumentation Instrument Index. Any differences are reported and can (optionally) be imported/changed in the index. IntelliLink P&ID should work with most drawing symbols and is user configurable. IntelliLink P&ID can import tags directly from P&IDs into AVEVA Instrumentation.

IntelliLink P&ID does not require AutoCAD for auto tag checking/scanning. However IntelliLink P&ID can use AutoCAD to create connectivity including line lists (with source/destination) and update AVEVA Instrumentation 'Plant Connection' data (i.e. line number/equipment number each instrument is connected to) from most existing AutoCAD P&ID drawings. You will not need to redraw P&IDs to get intelligent drawings!
4 User Interface

**Important:** Instrument Designer uses data created by Instrument Engineer and Instrument Wiring Manager to generate CAD drawing files automatically from the AVEVA Instrumentation project database. Normally this is the last AVEVA Instrumentation module used on a project as Instrument Engineer is used to create instruments tags and assign tags into 'loops'. Instrument Wiring Manager is used to create equipment, cables and wiring including terminations. Without this data Instrument Designer can not create completed drawing files.

When Instrument Designer starts up the AVEVA Instrumentation Designer window is displayed showing the View tab of the main ribbon menu.
4.1 Ribbon Menus

View

<table>
<thead>
<tr>
<th>Menu Command</th>
<th>Description</th>
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</thead>
<tbody>
<tr>
<td>Lists</td>
<td></td>
</tr>
<tr>
<td>Drawing List</td>
<td>Displays the <em>Drawing List</em> gridview.</td>
</tr>
<tr>
<td>Template List</td>
<td>Displays the Template window showing all project Template files (enables opening selected template in AutoCAD). Refer to <em>Open a Template Drawing with AutoCAD</em>.</td>
</tr>
<tr>
<td>Seed List</td>
<td>Displays the <em>Seed Drawings List</em> grid view.</td>
</tr>
<tr>
<td>Hookup Drawing List</td>
<td>Displays the <em>Hookup (Installation) Drawings List</em> - showing only hookup drawings &amp; hookup specific commands.</td>
</tr>
<tr>
<td>Catalogues</td>
<td></td>
</tr>
<tr>
<td>Hookup Catalogue</td>
<td>Displays the <em>Hookups Template Catalogue</em> grid view.</td>
</tr>
<tr>
<td>Hookup Items Catalogue</td>
<td>Displays the <em>Hookup Items Catalogue</em> (parts) grid view.</td>
</tr>
</tbody>
</table>

Once one of the View Menu options is selected the Tools ribbon menu is displayed.

Tools

**Grid**

- **Grid Manager**: Loads the *Grid Manager* allowing user defined layout of the Drawing List grid
- **Select a Grid View**: Brings up a list of grid Views previously defined for the current Grid to allow user selection
- **Auto Size Columns**: Automatically size each column to fit the longest text in each
- **Select All Rows**: Select all rows in the currently displayed - **Note**: Any rows filtered out are not selected
- **Edit Selected Rows**: Pivots selected rows into a vertical format (columns) for 'side by side' editing

**Import & Export**

- **Imports**: Provides access to Import commands menu
- **Exports**: Provides access to Export commands menu
Misc

Check for New Loops Checks the Drawing List against the Wiring Manager for changes in equipment (i.e. recently added, deleted or renamed Junction Boxes, Marshalling Cabinets etc) and updates the drawing list with any such changes.

Check for New Terminations Checks the Drawing List against the Wiring Manager for changes in equipment (i.e. recently added, deleted or renamed Junction Boxes, Marshalling Cabinets etc) and updates the drawing list with any such changes.

Termination Ref Drawing Nos Enables editing of external Drawing Number references (non-AVEVA Instrumentation)

Clear Locks Clears any multi-user locks placed on grid records

View Audit Log Displays the database Audit Log showing all changes to the data (Only available if using SQL Server databases).

Reports

<table>
<thead>
<tr>
<th>Main</th>
<th>Report Manager</th>
<th>Displays the AVEVA Instrumentation Report Manager which enables user defined reports to be created/printed.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Custom Reports</td>
<td>Displays the AVEVA Instrumentation Report Manager window.</td>
</tr>
<tr>
<td></td>
<td>Print Grid</td>
<td>Brings up a Print Preview of current Grid (screen capture).</td>
</tr>
<tr>
<td></td>
<td>Print Grid View</td>
<td>Brings up a Print Preview of the Drawing List using the current Grid View fields.</td>
</tr>
</tbody>
</table>

Drawings

DataLinks for Selected Drawing If a single Drawing is selected, this command shows all available DataLinks Report Dialogs for the drawing, including values returned by each DataLink based on current project data.
4.2 Application Menus

To access the Application Menu options the user must click the button displayed in the top left of the AVEVA Instrumentation Designer window.

When clicked the following options are available to the user.

**Open Project**
Allows another AVEVA Instrumentation Project database to be selected closing the current project database.

**Edit Project**
Allows editing/viewing of some project information and folders/file locations.
### Setup Sub Menu

Selecting the Setup Menu provides these options:

<table>
<thead>
<tr>
<th>Option</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Project Revisions</td>
<td>Allows the current project database to be saved as new Revision and reports showing the differences between any previously saved Database Revision and the current (working) database - Refer to Database Revision Change Reports topic.</td>
</tr>
<tr>
<td>Work Packs</td>
<td>Enables activation of 'WorkPack' mode (highlighting of items in the currently selected WorkPack).</td>
</tr>
<tr>
<td>Setup</td>
<td>The Setup option pops the Setup sub menu providing access to the Setup sub menu (see below for details).</td>
</tr>
<tr>
<td>Preferences</td>
<td>Allows editing/viewing of program user preferences.</td>
</tr>
</tbody>
</table>

### Language

AVEVA Instrumentation supports multiple foreign language interface. On release in September 2008 AVEVA Instrumentation has both English and Japanese. Future updates may provide additional language support. Future languages support will be based on user demand and our partners providing translation services.

Selecting a different language from this menu requires AVEVA Instrumentation to restart the application. AVEVA Instrumentation applications always start in the last selected language.

### Colour Schemes

AVEVA Instrumentation supports multiple colour schemes (skins).

Selecting a different colour scheme from this menu immediately changes grid and ribbon bar skins. AVEVA Instrumentation applications always start in the last selected colour scheme. Each AVEVA Instrumentation module uses independent skins so each can have its own colour scheme.
4.3 Working with the Data Grid

The following section describes the generic functionality of the Data Grid used in all AVEVA Instrumentation applications:

Right-Click Context Menu

A context menu will pop-up when a user right-clicks on a record. The menu provides quick access to most common grid commands.

Rows (Records)

Selecting a Single Row

Click in the inner column immediately to the left of the first column.

Selecting Multiple rows

1. Hold the control key (Ctrl) and select individual rows as described above. Holding the Ctrl key while selecting a row adds the rows to the selected rows if the row is not currently selected, or removes the selected row if the row is currently selected.
2. Hold the shift key (Shift) and select all rows between a selected row and the row you select while holding the shift key down (standard windows method).
3. Ctrl-A selects all rows in the current grid, excluding any rows filtered out.

Pin Rows

By clicking on the Pin icon on the left side of a row the user can pin the selected row to the top of the grid. When the row is pinned it remains at the top of the grid even when the grid is scrolled so that it is always in view.

Columns (Fields)

Resizing

Click on the divider line between columns and drag the column to make it larger or smaller.

Swap Order

Click on the column header and drag the column either left or right into a new position.
Locking Columns during Scrolling

You may lock a column(s) to prevent it from scrolling. Select the vertical line between the left horizontal scroll arrow and the left bar and drag to the right to create two scroll regions. When scrolling in the right region the left region remains static.

Filtering the Data Grid

The user can filter the Data Grid to show only certain records. For example, only items of a particular type.

AVEVA Instrumentation supports instant 'on the fly' filtering by selecting the small icon to the right of a column (field) caption. Then selecting a value from the drop-down list.
AVEVA Instrumentation supports complex filters by clicking on the **Filter** command in the dialog command toolbar. This brings up a dialog box that enables you to select a field(s) and advanced filter criteria.

**Sorting the Data Grid**

You may Sort the Data Grid on any combination of fields by clicking on column (field) name. To sort multiple fields hold the `<Shift>` key while making selections. The grid will be sorted in the order you select each column.

**Grid Manager**

The Grid Manager application enables users to select their own sub-set of columns/fields for the current grid including presetting column order & size, caption, predefined sort order and predefined filters. Refer to the **Grid Manager** for more information.

### 4.4 Advanced Grid Filters

To add or change an advanced (complex) Filter to your current grid view:

From the Grid Toolbar menu, click on the **Filter** button, this brings up the following dialog:

![Filter Dialog](image)

**Add a New Criteria**

Select the Field by selecting from the list of fields in the 'Field' cell combo box.

Select a Filter Criteria from the list of criteria in the 'Filter Criteria' cell combo box.

Enter a value in the 'Value' cell (or select from the list of values in the 'Value' cell combo box.

**Add Additional Criteria**

Select Join + **Filter** from the lower menu bar.
You can change the default 'AND' logical join to 'OR' by clicking on the blue 'AND' text that appears between filter records.

Enter new 'Field', 'Filter Criteria' and 'Value' information as required.

To Apply the Filter, click **Apply** from the toolbar.

**Note:** Some filter criteria such as 'Begins With' use a wild card match to filter values. Do not supply any wild card characters such as '*' or '%' as AVEVA Instrumentation handles this for you.

**More about Filter Criteria**

<table>
<thead>
<tr>
<th>Filter Criteria</th>
<th>Description</th>
<th>Example Value</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Exact Match</td>
<td>Field = Value</td>
<td>1234</td>
<td>Shows all records where Field = 1234</td>
</tr>
<tr>
<td>Begins With Partial Match</td>
<td>Field like XX*</td>
<td>XX</td>
<td>Shows all records where Field begins with two characters XX</td>
</tr>
<tr>
<td>Ends With Partial Match</td>
<td>Field like *XX</td>
<td>XX</td>
<td>Shows all records where Field ends with two characters XX</td>
</tr>
<tr>
<td>Contains Partial Match</td>
<td>Field like <em>XX</em></td>
<td>XX</td>
<td>Shows all records where Field contains two characters XX</td>
</tr>
<tr>
<td>In List</td>
<td>Field = A or B or C</td>
<td>A, B, C</td>
<td>Shows all records where Field exact matches any values in list</td>
</tr>
<tr>
<td>Not Exact Match</td>
<td>Not Field =</td>
<td>1234</td>
<td>Shows all records where Field does not = 1234</td>
</tr>
<tr>
<td>Not Empty</td>
<td>Not Field = (nothing)</td>
<td></td>
<td>Shows all records where Field is not empty (no characters)</td>
</tr>
<tr>
<td>Not Null</td>
<td>Not Field = Null</td>
<td></td>
<td>Shows all records where Field is not Null</td>
</tr>
<tr>
<td>Greater Than</td>
<td>Field &gt; Value</td>
<td>10</td>
<td>Shows all records where Field &gt; 1234</td>
</tr>
</tbody>
</table>

**Note:** A database NULL means nothing has ever been entered in this field, whereas Empty means that current value is empty (no characters).

**Command Buttons**

- **Apply** Exits the Filter dialog and applies your filter to the current grid
- **Cancel** Exits the Filter dialog without changing any filters in the current grid
- **Clear Filters** Exits the Filter dialog and clears any previous filter in the current grid
- **Remove Filter** Removes the last filter row in the Filter dialog
**Toolbar Commands**

- **+ Filter**  
  Adds a new Filter row to the Filter definition

- **- Filter**  
  Removes the selected row from the filter definition

- **Change Join**  
  Toggles the selected logical join between AND and OR

- **+ (**  
  Adds a left bracket to the filter expression

- **- (**  
  Removes a left bracket to the filter expression

- **+ )**  
  Adds a right bracket to the filter expression

- **- )**  
  Removes a right bracket to the filter expression

### 4.5 Grid Manager

The Grid Manager allows users to define their own sets of data fields (columns), default column order, default sorting and predefined data filters for most AVEVA Instrumentation data grids available in AVEVA Instrumentation application modules. These sets of fields are called 'Views' and typically contain a subset of all fields available.

Grid Manager is currently available in the following data grids in Designer:

<table>
<thead>
<tr>
<th>Data Grid</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Drawing List</td>
<td>Project Drawing List or Index</td>
</tr>
<tr>
<td>Hookup Drawing List</td>
<td>Project Hookup Drawing List or Index</td>
</tr>
<tr>
<td>Hookup Templates Catalogue</td>
<td>Project Hookup Templates Catalogue</td>
</tr>
<tr>
<td>Hookup Items Catalogue</td>
<td>Hookup Items (or Parts) Catalogue</td>
</tr>
</tbody>
</table>

The feature enables each user to have access to only those fields that are required for their current task. So instead of dealing with huge amounts of data you can set a View to contain only the data you are interested in for the current task. For example, in the Engineer Instrument List data grid you can select from any of the available database fields to define your own customised set and name that View. If you were to select fields related to Calibration data you may select fields TagNo, Service, P&ID, Range, CalibratedRange, Alarms etc and name this view 'Calibration'.

Users can easily change between Views from within AVEVA Instrumentation by selecting from a list of Views created in your project. New Views can be created by any user and can be set to **Public** which allows any other AVEVA Instrumentation user to use the view or set to **Private** which restricts access to only the user that created the View.

**Note:** All examples in this document refer to Designer's Drawing List. However, all functionality described can be applied to any Data Grid listed above.

**Changing a View**

From the AVEVA Instrumentation application Data Grid:

Activate the **Tools** ribbon menu, click **Select a Grid View**.
The AVEVA Instrumentation application will bring up a dialog containing a list of all the previously defined Views for the current data grid that are 'Public' or were created by the current user:

To select a new View:
Either:
Click on the View name, click **Apply**
Or:
Double-click on the View name.
Once selected your AVEVA Instrumentation data grid will refresh with the View's fields, sort order and data filters (if any).

### 4.5.1 Creating a New Grid View

To create a new user defined View using Grid Manager:

From the **Tools** menu, select **Grid Manager**.

AVEVA Instrumentation will display the Grid Views window showing all the current Views defined in the current AVEVA Instrumentation module (Designer - Drawing List Gridview):
Users can add a new View by clicking the **New** command button or an existing View can be copied and then modified. To copy a View select the existing View record and click **Copy Selected** from the Pull-down menu next to the **New** command button.

To Create a New View, click **New**.

AVEVA Instrumentation brings up a dialog enabling View definition:

The Grid Name is the name of the current data grid and is non-editable (this View is based on the Drawing List data grid).

Enter a meaningful View Name and optional Description.

Views can be marked ‘Public’ which allows any other AVEVA Instrumentation user to use this View or set to ‘Private’ which restricts access to only the user that creates this View.
Field Definition

All view must contain at least one database field (column). To define the View fields, click Fields tab.

AVEVA Instrumentation will bring up a dialog enabling selection of from a list of AVEVA Instrumentation fields available for the current data grid:

To select/de-select fields click on each field's checkbox in the 'Select' column. By default the 'DrawingNo' field is always selected (since this is a Drawing List View it does not make sense not to include the drawing name). You can add as many fields that you require.

Renaming Captions: AVEVA Instrumentation allows you to rename the field/column captions seen in the Grid View when viewing Instruments by editing the 'Caption' value in this dialog. For example you can change the Caption of field 'UserField1' to 'OldDrawingNo'. Whenever this database field is view in the AVEVA Instrumentation data grid users will see the new caption.

Once you have selected the fields, click Save to save the fields to the New View.

Note: You can edit any existing View by adding or removing fields as required from the Grid Manager's Edit command.

Note: You cannot edit any existing View named 'IDODefault'. This is a system protected View. You can however, copy the IDODefault view and modify the copied version.
Default Layout

AVEVA Instrumentation enables all the fields selected in a View to be located in any order or sequence within the data grid and to have their default widths preset.

To define the default Layout, click Layout (you must select fields prior to defining the Layout).

AVEVA Instrumentation brings up the Grid Layout dialog showing your selected fields:

![Grid Layout Dialog]

To change a order of fields/columns, click on the field Caption/Column Header and 'drag' the column to the desired location (Horizontally).

To change the default column width, click on the vertical dividing line (between column headers) and 'drag' the dividing line to the desired width.

To save the new Layout, click Save.

Default Sort Order

Use the Sort command button to define a default Sort Order for the View.

Data Filter

Use the Filter command button to force the View to be filtered. For example only show only loop diagrams (e.g. DrawingType = 'Loop Diagram').
5 Drawing List

The Drawing List is the Instrument Designer window for adding/editing and accessing drawings. By default all drawings for the project are shown in the grid however the user can filter the data by using the column 'on-the-fly' filters or advanced filter dialog or create new grid views containing user-defined sets of columns using the Grid Manager.

To access the Drawing List,

Activate the View ribbon menu, click Drawing List option.

Note: Refer to Working with Data Grids for information on the grid control including how to select a record (a Drawing).

Generally whenever you see a grid in AVEVA Instrumentation you may edit data directly within a cell (a field). However, some cells may be protected to ensure data integrity. If you cannot edit a specific cell within the grid you should use the 'Edit' command to access an edit dialog box.

The grid provides details on each project drawing, including Drawing Number, Loop No (if a Loop Diagram), Title, Current Revision, Equipment No (if a Termination Diagram) and dates/times for Last Updated, Last Printed etc.

Mandatory Data

To produce a drawing you must enter a Drawing Number. Designer uses this field and the Sheet field to create a file name. For example: Drawing No: 123456 and Sheet No: 1 are combined to create a file name: 123456-1.dwg.
Special Instrument List Grid Features

Some cells within the grid will show a small button in the right side of the cell when the mouse cursor hovers over it indicating that you can access additional information related to the cell's instrument and cell name. These cells are:

Loop No: Selecting the 'Loop No' cell button will allow viewing/editing of the Loop data by bringing up the Loop Edit dialog.

Equipment No: Selecting the 'Equipment No' cell button will allow viewing/editing of the associated Equipment using Wiring Manager.

Drawing List Layout

The Drawing List grid layout can be set by the user using the AVEVA Instrumentation Grid Manager utility (Tools menu > Grid Manager). The Grid Manager allows users to define Views, that is, which fields should be viewable in the Drawing List grid, their default position (column order), column size, default sort order and whether a data filter is applied (e.g. Show only 'New Loop Diagram' drawings). New Grid Views can be saved for use by individuals or for entire project teams. To load a previously created Grid View use the command: Tools menu > Select a View. Refer to the Grid Manager help for more information. Grid Manager features are available in most AVEVA Instrumentation applications. All data contained within a View can be printed and/or exported to Microsoft Excel in the format defined in the Grid View by Grid Manager.

Auto Generation of Drawings

AVEVA Instrumentation uses special 'DataLinks' to map database data to AutoCAD drawing attributes. DataLinks are automatically updated by Designer when a drawing is opened or updated from the Drawing List toolbar. For information on using Designer's DataLinks to update: Drawing Title Block (Drawing Border) - including revisions history, Loop Diagram technical data (tag, cable, wire numbers, terminal markings etc) or to generate Termination Diagrams refer to Drawing Generation.

Drawing List Command Buttons

New 
Brings up a dialog box for Add a New Drawing

Edit 
Brings up the Drawing Information for editing existing drawing data (you can also double-Click on any drawing record to bring up the edit dialog). This allows editing of Title block & Revision information. Note: Use Open to view the actual CAD drawing.

Delete 
Allows deletion of any selected drawing(s). Brings up a Delete Options confirmation dialog box for you to confirm deletion.

Open 
Open the selected drawing for reviewing/printing etc in AutoCAD (Editing title block & revision information should be done from the Edit button above.

Update 
Updates selected drawing(s) - forces DataLinks in each CAD drawing to be updated with current project data from the AVEVA Instrumentation database.
Note: If the drawing file does not exist the file is created by copying a) the template file (if drawing uses a template drawing) or b) the seed file (if drawing uses a seed drawing). Refer to the Drawing Generation for more information.

Print
Print selected drawing(s) - if the drawing file exists.

Select All
Select all drawings in current grid (i.e. only those shown in grid if a grid filter is active).

Find
Brings up a dialog allowing a "Find" any Text string (anywhere within the grid).

Filter
Brings up a Advanced Grid Filters dialog for you to define the current Drawing List filter criteria (e.g Only Loop Diagrams).

Refresh
Update entire grid with latest database information (useful in multi-user project environments).

Revisions
Brings up a list of all drawings with revisions (and their revisions).
Sub Menus are:
Add Revision
Brings up a list of all drawings with revisions (and their revisions).
Edit Revisions
This command allows changing of Revision Entry (Multiple Drawings) selected.

Refer to the User Interface for information on the Explorer Bar menus.

5.1 Add a New Drawing
This topic describes manual addition of drawings in Instrument Designer's Drawing List.

Important: Drawings can also be added to the drawing list automatically by:
1. Checking the Engineer's Loop List for new loops
   Any new loops that have been marked as 'Drawing Required' will be imported into the Drawing List as a Loop Diagram.
   To import any Instrument Loops from Engineer use the 'Check for New Loops' command in the Tools ribbon menu.
2. Checking the Wiring Manager's Equipment List for new equipment
   Any equipment added that has been marked as Termination Dwg Required' will be imported into the Drawing List as a Termination Diagram.
   To import any Equipment from Wiring Manager use the 'Check for New Terminations' command in the Tools ribbon menu.

Note: These two methods are the preferred way to populate the Drawing List as they automatically create the new Drawing List entry, assign the Drawing Type and populate the drawing titles based on your engineering data. The drawing title formats used can be user defined in the Drawing Title setup preferences dialog described later in this document.

For more information refer to Import Drawings into the Drawing List topic.
To Manually add a new Drawing to your Project

From the Drawing List, click on New, to display the following Drawing Information window:

**Note:** Existing drawing entries can be copied to create a new drawing record in the Drawing List by selecting an existing record then using the 'Copy' command in the drop down menu next to New in the toolbar menu.

**Note:** All of the data entry fields in this Drawing Information Dialog can automatically update each drawing by using DataLinks to link the database data to drawing attributes.

**Things to Know about this Drawing Information dialog**

The only text box that requires data is Drawing No. This field is used to create the drawing file name. The file name is always DrawingNo + '-' + SheetNo (e.g XXXXX-1). However, every drawing must have either a Template or a Seed file associated with the drawing.

The Template combo shows a list of all templates drawings created for the current project (all drawings in the Project Template directory).

The Seed combo shows a list of all Seed drawings created for the current project (all drawings in the Project Seed directory).

Loop No should be entered if the drawing will represent a Loop. This loop number is used by Designer to locate all relevant engineering data for the loop (and its associated instruments) from the AVEVA Instrumentation project database.
Equipment No should be entered if the drawing will represent an equipment Termination Diagram. This equipment number is used by Designer to locate all relevant Wiring/Cable data for the loop (and its associated instruments) from the AVEVA Instrumentation project wiring database.

**Note:** Double-click on any date field to bring up the Date Selection dialog (or press the Enter key when the date field has focus).

### Create a Loop Diagram

If the drawing is a Loop Diagram, you must assign the Engineering Loop Number by clicking on the small command button next to the Loop No text box (which is shown when the 'Drawing Type' combo box is set to 'Loop Diagram'). This will bring up the Loop Selection dialog which provides a list of Loops defined in the Instrument Engineer application.

These fields are mandatory:
- A valid Loop Number from the Engineer Loop List must be entered in the 'Loop No' text box (as described above)
- A drawing number must be entered in the 'Drawing' No text box
- A valid Template drawing must be entered in the 'Template' text box

It is possible to create a multiple drawing sheet loop diagram by creating multiple records in the Drawing List (each with a different sheet number). Users can assign a different Template to each drawing if required.

### Create a Termination Diagram

If the drawing is a Termination Diagram, you may assign the Equipment Number by clicking on the small command button next to the Equipment No text box (which is shown when the 'Drawing Type' combo box is set to 'Termination Diagram').

These fields are mandatory:
- A valid Equipment Number from the Wiring Manager Equipment List must be entered in the 'Equipment No' text box (as described above)
- A drawing number must be entered in the 'Drawing' No text box
- A valid Seed drawing must be entered in the 'Seed' text box

### Revision History

The Revision History list (in the 'Revisions' tab) shows all revisions for the current drawing:
Revisions Tab Command Buttons

**Add** allows a new revision to be added to the current datasheet by bringing up the Revision Entry (Single Drawings) dialog.

**Edit** allows editing the currently selected revision by bringing up the Revision Entry (Single Drawings) dialog.

**Note:** Double-clicking on any existing Revision will also bring up the revision entry dialog.

**Delete** allows deletion of the currently selected revision.

**Note:** Pressing the <Delete> key on any existing Revision will also delete the currently selected revision.

AVEVA Instrumentation also allows addition of revisions to multiple drawings in one command. For information on this feature refer to Revision Entry (Multiple Drawings) topic.

**Note:** Adding a new Revision changes the Current Revision of the drawing in the Drawing List to the new Revision Number.

**Drawing Notes**

Drawing Notes (in the 'Notes' tab) shows all notes for the current drawing:

<table>
<thead>
<tr>
<th>Author(s)</th>
<th>Title</th>
<th>Revisions</th>
<th>Notes</th>
<th>Reference Dwgs</th>
<th>User Fields</th>
</tr>
</thead>
<tbody>
<tr>
<td>Note 1:</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Note 2:</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Note 3:</td>
<td></td>
<td></td>
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<tr>
<td>Note 4:</td>
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<tr>
<td>Note 5:</td>
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<td></td>
</tr>
<tr>
<td>Note 6:</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Reference Drawings**

This tab enables a user to add manual drawing references for the current drawing:
5.2 Drawing Information

To edit or view an existing Drawing Information in your project:

From the Drawing List, click on Edit, or double-click on the drawing record in the Drawing List grid this brings up the following Drawing Information dialog:

<table>
<thead>
<tr>
<th>Author(s)</th>
<th>Title</th>
<th>Revisions</th>
<th>Notes</th>
<th>Reference Dwgs</th>
<th>User Fields</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Drawing No:</th>
<th>Description:</th>
</tr>
</thead>
<tbody>
<tr>
<td>1:</td>
<td></td>
</tr>
<tr>
<td>2:</td>
<td></td>
</tr>
<tr>
<td>3:</td>
<td></td>
</tr>
<tr>
<td>4:</td>
<td></td>
</tr>
</tbody>
</table>

- **Plant Area:** 01
- **Drawing Type:** Loop Diagram
- **Drawing No.:** 01-00001
- **Sheet No.:** 1 of 1
- **Template:** DCS-AI-Transmitter
- **Seed:**
- **Loop No.:** 01-F-510
- **Equipment No.:**
- **Last Updated:** 05/26/2008 15:06:44
- **Last Printed:**

**Authors/Approvals**

- **Drawn By:** GRH  **Date Drawn:** 06/01/2005
- **Designed by:** MAC  **Date Designed:** 15/07/2005
- **Checked By:** YOU  **Date Checked:** 17/07/2005
- **Approved By:**  **Date Approved:**

**Design Status:**

- **Checked:**

---

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Note: All of the data entry fields in this the Drawing Information Dialog can be automatically updated for each drawing by using DataLinks to link the database data to drawing attributes.

Things to Know about this Drawing Information Dialog

To Create a Loop Diagram
- A valid Loop Number from the Engineer Loop List must be entered in the 'Loop No' text box
- A valid Template drawing must be entered in the 'Template' text box

If the drawing is a Loop Diagram, you may edit the Engineering Loop data by clicking on the small command button next to the Loop No text box (if the drawing represents a loop diagram). This will bring up the Loop Data Edit dialog enabling full editing of both loop definition and instrument definitions. These dialogs come from the Instrument Engineer application, only if it is installed.

To Create a Termination Diagram
- A valid Equipment Number from the Wiring Manager Equipment List must be entered in the 'Equipment No' text box
- A valid Seed drawing must be entered in the 'Seed' text box

If the drawing is a Termination Diagram, you may edit the equipment's Termination by clicking on the small command button next to the Equipment No text box (if the drawing represents a Termination diagram). This brings up the Termination Editing dialog. This functionality comes from the Wiring Manager application (and only available if Wiring Manager is installed).

Note: Double-click on any date field to bring up the Date Selection dialog (or press the Enter key when the date field has focus).

Revision History

The Revision History list (in the 'Revisions' tab) shows all revisions for the current drawing:
Revisions Tab Command Buttons:

**Add** allows a new revision to be added to the current datasheet by bringing up the *Revision Entry (Single Drawings)* dialog.

**Edit** allows editing the currently selected revision by bringing up the *Revision Entry (Single Drawings)* dialog.

**Note:** Double-clicking on any existing Revision will also bring up the revision entry dialog.

**Delete** allows deletion of the currently selected revision.

**Note:** Pressing the <Delete> key on any existing Revision will also delete the currently selected revision.

AVEVA Instrumentation also allows addition of revisions to multiple drawings in one command. For information on this feature refer to *Revision Entry (Multiple Drawings)* topic.

**Note:** Adding a new Revision changes the Current Revision of the drawing in the Drawing List to the new Revision Number.

**Drawing Notes**

Drawing Notes (in the 'Notes' tab) shows all notes for the current drawing:

<table>
<thead>
<tr>
<th>Author(s)</th>
<th>Title</th>
<th>Revisors</th>
<th>Notes</th>
<th>Reference Dwgs</th>
<th>User Fields</th>
</tr>
</thead>
<tbody>
<tr>
<td>Note 1:</td>
<td></td>
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<tr>
<td>Note 2:</td>
<td></td>
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<tr>
<td>Note 3:</td>
<td></td>
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<td></td>
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<td>Note 4:</td>
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<td>Note 6:</td>
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</tr>
</tbody>
</table>

**Reference Drawings**

This tab enables a user to add manual drawing references for the current drawing:
5.3 Import Drawings into the Drawing List

Instrument Designer allows importing of loop diagram and termination diagram drawing records from other AVEVA Instrumentation applications:

<table>
<thead>
<tr>
<th>Drawing Type</th>
<th>Application</th>
<th>From</th>
</tr>
</thead>
<tbody>
<tr>
<td>Loop Diagrams</td>
<td>Engineer</td>
<td>When the 'Drawing Required' option is selected in the Loop List (or Loop Detail dialog)</td>
</tr>
<tr>
<td>Termination Diagrams</td>
<td>Wiring Manager</td>
<td>When the 'Termination Dwg Required' option is selected in the Equipment List (or Equipment Detail dialog)</td>
</tr>
</tbody>
</table>

Loop Diagram Import

To check Engineer’s Loop List for loop drawings:

From the Drawing List, activate the Tools menu, click Check for New Loops command.

Designer imports any additional loops with ‘Drawing Required’ option selected. If new loops are found, for each new loop in the Engineer Loop List a new drawing record is created in the drawing list as a Loop Diagram.

The following table shows where the data from the Loop List goes in the Drawing list:

<table>
<thead>
<tr>
<th>Drawing List Column</th>
<th>Loop List Column</th>
</tr>
</thead>
<tbody>
<tr>
<td>Drawing No</td>
<td>Loop No</td>
</tr>
<tr>
<td>Loop No</td>
<td>Loop No</td>
</tr>
<tr>
<td>Type</td>
<td>(the words 'Loop Diagram')</td>
</tr>
<tr>
<td>Title 1</td>
<td>As user defined in Drawing Title Setup Preferences</td>
</tr>
</tbody>
</table>
Furthermore, on each subsequent operation of the 'Check for New Loops' command, Designer will update the Drawing List columns with these values in affect keeping the loop list & drawing list aligned. That is any change in Loop No, Service & Area will be auto updated in Designer. Any Loops deleted in Engineer Loop List will be deleted from the Drawing List.

Termination Diagram Import

To check Wiring Manager's Equipment List for termination drawings:

From the Drawing List, activate the Tools menu, click Check for New Terminations command.

Designer imports any additional equipment with 'Termination Dwg Required' option selected. If new equipment is found, for each new equipment tag in the Wiring Manager Equipment List a new drawing record is created in the drawing list as a Termination Diagram.

The following table shows where the data from the Equipment List goes in the Drawing list:

<table>
<thead>
<tr>
<th>Drawing List Column</th>
<th>Equipment List Column</th>
</tr>
</thead>
<tbody>
<tr>
<td>Drawing Number</td>
<td>Equipment No</td>
</tr>
<tr>
<td>Equipment No</td>
<td>Equipment No</td>
</tr>
<tr>
<td>Type</td>
<td>(the words 'Termination Diagram')</td>
</tr>
<tr>
<td>Title 1</td>
<td>As user defined in Drawing Title Setup Preferences</td>
</tr>
<tr>
<td>Title 2</td>
<td>As user defined in Drawing Title Setup Preferences</td>
</tr>
<tr>
<td>Title 3</td>
<td>As user defined in Drawing Title Setup Preferences</td>
</tr>
</tbody>
</table>

Furthermore, on each subsequent operation of the 'Check for New Terminations' command, Designer will update the Drawing List columns with these values in affect keeping the equipment list & drawing list aligned. That is any change is Equipment No, Equipment Type & Area will be auto updated in Designer. Any equipment deleted in Wiring Manager's Equipment List will be deleted from the Drawing List.

5.4 Drawing Title Setup Preferences

Designer allows importing of loop diagram and termination diagram drawing records from other AVEVA Instrumentation applications as described in Import Drawings into the Drawing List topic.

AVEVA Instrumentation enables users to define how the drawing titles will be created based on values assigned to the loop or equipment engineering data.

To Define Loop Diagram Drawing Titles

From the Application menu, click Setup option, click Loop Titles (Import format) command this brings up the following dialog:
The dialog contains three text boxes that defines each of the Drawing List's title data fields. Each title can contain a mixture of text and DataLinks. On importing a new loop diagram from Engineer's Loop List AVEVA Instrumentation will replace the DataLinks with the value for the database field within the DataLink. For example: Title 1 above is defined as: AREA {AreaNo}. On 'Check for New Loops' if AVEVA Instrumentation found a new loop in area 21 then Title 1 would be: AREA 21.

To edit each import Title, open the combo box button on right of Title text box for the desired title field.

To select a DataLink, check the checkbox for the DataLink(s) required.

AVEVA Instrumentation will add the selected DataLink to the Title Format text box.

The 'Title Format' text box can be edited manually, text added or deleted as required.

Use **Save** to save the Title Format back to the previous Loop Import Drawing Title Settings dialog.

Each Title Format can be set by again clicking on each command button as described above.

**To Define Termination Diagram Drawing Titles**

From the Application menu, click **Setup** option, click **Termination Titles** (Import format) command this brings up the following dialog:

The dialog contains three text boxes that defines each of the Drawing List's title data fields. Each title can contain a mixture of text and DataLinks. On importing a new termination diagram from Wiring Manager's Equipment List AVEVA Instrumentation will replace the DataLinks with the value for the database field within the DataLink. For example: Title 1

---

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above is defined as: AREA {AreaNo}. On 'Check for New Terminations' if AVEVA Instrumentation found a new equipment in area 21 then Title 1 would be: AREA 21.

To edit each import Title, open the combo box button on right of Title text box for the desired title field, this brings up the list of available DataLinks for a Termination diagram.

To select a DataLink, check the checkbox for the DataLink(s) required.

AVEVA Instrumentation will add the selected DataLink to the Title Format text box.

The 'Title Format' text box can be edited manually, text added or deleted as required.

Use **Save** to save the Title Format back to the previous Termination Import Drawing Title Settings dialog.

Each Title Format can be set by again clicking on each command button as described above.

### 5.5 Revision Entry (Single Drawings)

Revisions for an individual drawing can be added/edited by the Revision Entry dialog accessed from the **Drawing Information**:

![Revision Entry Dialog](image)

**Note:** Double-click on the Date text box to bring up a date selection form (you can also press the Enter key when the Date text box has focus).

**Note:** The Description combo box contains a list of all previously created revision descriptions. You can add a new description by entering any desired description. Any new descriptions will be available in future Revision Entry.
Command Buttons

Create New  Creates a new Revision with data entered in the Revision Details fields.

Note: When creating a new revision leaving the Revision No text box blank will cause Designer to use the next revision number. e.g. if the current revision is "A", then the next is "B" or if current revision is "2", then the next is "3" etc.

Edit Current  Changes the current revision record to data entered in the dialog fields above.

Cancel  Exits without saving changes or adding a revision.

Designer also supports adding/editing revisions with multiple datasheets. This is done from the Drawing List. Refer to Revision Entry (Multiple Drawings) topic.

5.6 Revision Entry (Multiple Drawings)

Revisions for multiple drawings can be added/edited by the Revision Entry dialog accessed from the Drawing List dialog:

From the Revisions toolbar pull-down command, select: either, Add Revision command option, or Edit Revisions command option.

When revision entries are added or edited from this command the Revision Entry dialog entries (below) are assigned to ALL selected drawings, enabling assignment or modification to multiple drawings in a single command.

Note: Double-click on the Date text box to bring up a date selection form (you can also press the Enter key when the Date text box has focus).

Note: The Description combo box contains a list of all previously created revision descriptions. You can add a new description by entering any desired description. Any new descriptions will be available in future Revision Entry.
Command Buttons

Create New  Creates a new Revision with data entered in the Revision Details fields for ALL selected drawings.

Note:  When creating a new revision leaving the Revision No text box blank will cause Designer to use the next revision number. e.g. if the current revision is "A", then the next is "B", this occurs for ALL selected drawings which allows AVEVA Instrumentation to increment each drawing revision based on each drawings current revision.

Edit Current  Changes the current revision record to data entered in the fields above for ALL selected drawings.

Note:  If a drawing does not have a current revision (i.e. no revision has previously been added) then a revision is created from the entered data. If 'Revision No' is left blank the first revision will become 'A'.

Cancel  Exits without saving changes or adding any revision.
6 Drawing Generation

The following section describes how Designer generates CAD drawings from the Drawing List. However, before any CAD drawing can be created a drawing record must exist in the Drawing List for each drawing you wish to create as a CAD file. This topic assumes drawing records already exist.

Note: To add a drawing record to the drawing List use either the Add a New Drawing command button or import drawings from the Engineer's instrument list (loop diagrams) or Wiring Manager's equipment list (termination diagrams) using the Import Drawings into the Drawing List commands.

Updating CAD Text/Attributes

Designer uses DataLinks to establish a link between a value in the AVEVA Instrumentation project database and a drawing block attribute so that when a drawing is generated by Designer the CAD attribute is automatically updated with the data from the database. DataLinks can be linked to data such as project name or number or client name from Project Data, or drawing number or title from the Drawing List, Loop No, Tag No, Cable No or other engineering data from Engineer or Wiring Manager data. Once the DataLinks are added to a drawing they ensure the engineering data is always updated so your drawings always reflect your current project database. Refer to the DataLinks Reference for more information.

Loop Diagrams and Hookup Drawings

Template files are used as templates for both loop diagrams and Hookup (installation) drawings. Templates are copied to create the drawing file and are not modified graphically, except for text values (AutoCAD attribute values) that have DataLinks assigned. When a drawing based on a Template is updated every DataLink is evaluated and translated into a value based on the current drawing's data and is placed into its corresponding drawing attribute. DataLinks are easily placed into templates file blocks, refer to Assigning DataLinks in AutoCAD.

To create a loop diagram the Loop No field for the drawing must contain a valid project loop number from the Engineer Loop List. To create a Hookup drawing the drawing must be assigned to a Hookup template via the Add a New Hookup Drawing dialog.
Loop and Hookup Drawing Creation

There are two Designer Drawing List commands that can create a CAD drawing 'Open' and 'Update':

<table>
<thead>
<tr>
<th>Command</th>
<th>Functionality</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>Open</td>
<td>Opens drawing file, no data is updated</td>
<td>Only applicable to one drawing at a time</td>
</tr>
<tr>
<td>Update</td>
<td>Opens drawing file and updates data via AVEVA Instrumentation DataLinks</td>
<td>Can be used on any number of selected drawings</td>
</tr>
</tbody>
</table>

Think of these commands as:
- Open - View the current drawing in CAD.
- Update - update the drawing with database information (DataLinks -if any), then view the updated drawing in CAD.

When either of these commands is used Designer does the following:

If Drawing file Exists

Opens the drawing file in CAD

If Updating, then DataLinks are updated (design data is copied from the database)

If Drawing file does NOT Exist

If drawing has a Template then the Template file is copied to create the Drawing file.

Opens the drawing file in CAD

If Updating, then DataLinks are updated (design data is copied from the database into the drawing block attributes).

Important: This means that the template is only copied if the drawing file does not exist. Therefore, any changes you make in a drawing once created from a template will remain in the drawing & those changes will NOT be overwritten. This gives you the flexibility to start a drawing based on a template, then modify that drawing as required, in affect making the drawing a template for itself.

Termination Diagrams

Seed Files are used as a base to start parametric (automated) drawing activity and are used to create termination drawings. Typically a Seed file contains the drawing title block, (and company logos) revision blocks etc with attributes and DataLinks attached). When a drawing based on a Seed file is updated, every DataLink is evaluated and any change is placed into its associated drawing attribute (e.g. Title Block & revision data is updated in the drawing).

If the drawing being updated is a Termination Diagram (actually if it has an Equipment No value, in the Drawing List), then the existing drawing file (if any) is deleted and created again by copying the seed file, then terminations are parametrically (automatically) drawn based on the Wiring Manager’s termination data for that equipment number and the Seed drawings parameter data.
Seed File parameters include drawing sheet size (physical dimensions), the maximum number of terminal strips per drawing, maximum number of terminals per terminal strip/Din Rail, spacing between terminal strips etc. Refer to Seed Drawings List for more information.

In addition to the Seed File parameters, which are defined per Seed File, AVEVA Instrumentation provides user Project definable preference settings that control drawing parameters such as terminal height/width, cable core/wire length, text heights etc. These Project preferences are set in Designer's Termination Drawing Preference Settings dialog.

To create a termination diagram the Equipment No field must contain a valid project equipment number from the Wiring Manager's Equipment List (or Equipment View) and there must be internal terminals/devices with cable/wire connections.

Termination Drawing Creation

There are two Designer Drawing List commands that can create a CAD drawing Open and Update:

<table>
<thead>
<tr>
<th>Command</th>
<th>Functionality</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>Open</td>
<td>Opens drawing file, no data is updated</td>
<td>Only applicable to one drawing at a time</td>
</tr>
<tr>
<td>Update</td>
<td>Recreates drawing file and updates data via AVEVA Instrumentation DataLinks</td>
<td>Can be used on any number of selected drawings</td>
</tr>
</tbody>
</table>

Think of these commands as:
- Open - View the current drawing in CAD.
- Update - Recreate the drawing with database information (if any), then view the updated drawing in CAD.

When Update is used Designer does the following:

If Drawing file exists or If Drawing file does NOT exist:

The Seed file is copied to create the Drawing file.

Opens the drawing file in CAD then DataLinks are updated (design data is copied from the database into the drawing block attributes).

Terminations are parametrically (automatically) drawn based on the equipment layout/ terminations designed in the project database.

6.1 Open a Template Drawing with AutoCAD

To open a template file in AutoCAD the user can start AutoCAD and then use the file open command and navigate to the project template folder. Use the Project menu -> Edit menu option (from the Drawing List dialog) to view the template folder name.

Alternatively you see all the current template files for your project and open them in AutoCAD from within Designer:

Activate the View ribbon menu, select Template List option.

This brings up the Template List dialog below:
This dialog contains a list of all drawing files in the project template folder. 'Times Used' shows the number of drawings in the Drawing list that use each template.

**Note:** If you have created templates in another folder copy them to the project Template folder and they will appear in this list the next time the Templates list is opened.

**Note:** To find out what the project template folder is use the Project menu's **Edit** option. This brings up a dialog that contains all your project settings including the names of folders being used by AVEVA Instrumentation.

To Open a Template in AutoCAD:

Select the template file name, click **Open File** AutoCAD then starts (if not already running) and the file is opened.

**Note:** This dialog allows you to open templates drawings only. To create a new Template you should copy the templates you create into your project's Template folder or use AutoCAD's **Save As** command to save to that folder.

### 6.2 Assigning DataLinks in AutoCAD

To assign or modify DataLinks to an AutoCAD template or seed drawing file the file needs to be opened using AutoCAD.

Refer to *Open a Template Drawing with AutoCAD* to learn how to open a Template drawing file.

Refer to Opening a *Seed Drawings List* with AutoCAD to learn how to open a Seed drawing file.

**Use the Designer AutoCAD Menu**

To assign new DataLinks (or modify DataLinks already assigned) you need to ensure the Designer AutoCAD menu is loaded into AutoCAD. This toolbar menu should be automatically loaded when an AutoCAD drawing is opened from Designer.
Note: If the 'iDesigner' menu is not auto loaded you will need to load the following menu manually (using the AutoCAD 'menu' command):

<table>
<thead>
<tr>
<th>AutoCAD Version</th>
<th>Designer AutoCAD Menu</th>
</tr>
</thead>
<tbody>
<tr>
<td>AutoCAD 2000, 2000i, 2002</td>
<td>Designer.mns</td>
</tr>
<tr>
<td>AutoCAD 2004</td>
<td>Designer2004.mns</td>
</tr>
</tbody>
</table>

These menu files are located in the AVEVA Instrumentation program installation folder (typically: 'c:\program files\AVEVA Instrumentation\AVEVA Instrumentation').

To Assign/Edit DataLinks

Once the AutoCAD iDesigner menu is loaded select:

iDesigner from the pull-down menus > Edit DataLinks

This brings up a Dialog showing all attributes in the selected AutoCAD block.

AutoCAD will prompt you to 'Select Objects:', go ahead a select a block with attributes, then press enter. AutoCAD will bring up the DataLinks Edit dialog as below:

This dialog shows all attributes defined in the block selected. The text boxes all contain DataLinks.

Note: To view available Keyword DataLinks for any drawing in the Designer's Drawing List bring up the DataLinks Report Dialog. This dialog enables 'copy and paste' of DataLinks from the report dialog into your AutoCAD 'Edit DataLinks' dialog above.

To assign a DataLink you can type in a valid DataLink or you can copy from the DataLinks Dialog report created for a drawing that will use this template or seed. DataLinks can be copied from the DataLinks Report dialog (using Windows copy and paste - Ctrl-C / Ctrl-V etc) or dragged and dropped (hold the Ctrl key and drag the report DataLink to a text box above.

Refer to DataLinks Reference for more information on DataLinks.
Copying Blocks with DataLinks in AutoCAD

Since DataLinks are defined as Extended Entity Data within AutoCAD their behaviour is same as Xdata. That is, if you copy a block with DataLinks attached the DataLinks are copied too. This can drastically reduce your data entry to set up DataLinks.

For example, you can attach your required DataLinks to a block that may represent a Field Device. Then copy that block to as many drawings as you wish, saving you the effort of reentering the DataLinks each time. Another example is the Title block used in all drawings. Set up the first drawing with all DataLinks, once tested then copy that Title Block (which may contain multiple AutoCAD blocks) to your other drawings.

Auto-Erasing Blocks with DataLinks in AutoCAD

Designer provides an 'Auto-Erase' (or auto-delete) function where a block will be automatically erased from a drawing if a specific DataLink returns nothing. If you prefix your DataLink attribute with `<DEL>` and AVEVA Instrumentation evaluates the following DataLink with nothing (no value) then Designer will erase the block containing the `<DEL>` DataLink.

For example you may wish to erase a block if there is no tag number for {TAG10}. So entering: `<DEL>{TAG10}` in for an attribute in a block will tell AVEVA Instrumentation to erase the block if {TAG10} evaluates to nothing (i.e. there is no TAG10 for this drawing).

6.3 DataLinks Report Dialog

To View DataLinks for any Drawing in your Project

First, select a Drawing from the Drawing List, then, click Reports ribbon menu, click DataLinks (selected drawing) menu option.

Or, right-click on a Drawing in the Drawing List click, Show DataLinks from the context menu.

This brings up the following DataLinks dialog which shows all DataLinks generated for the selected drawing. DataLinks are grouped into logical groups.

Note: DataLinks are created based on the current drawing type (i.e Loop, Termination or Hook-up Diagram) AND the current engineering data assigned to the AVEVA Instrumentation object type (i.e Loop, Equipment or Hookup Type). A complete set of DataLinks is not available to each drawing until the engineering data is complete (i.e. The loop wiring, equipment terminations or hookup template is finished).

To view DataLinks for a group select the '+' box at the left of the group name:
The example above shows DataLinks for the **Drawing List Data** group. If the DataLink \{DWGNO\} is placed in the AutoCAD drawing file then it will be updated during auto generation with the value "01-80001". For more technical information about DataLinks refer to [DataLinks Reference](#). The DataLinks are grouped by Type (e.g. Project Data, Drawing List, Loop List, Instrument List, DCS I/O, Wiring etc). This grid can be printed for reference or users can copy and paste into AutoCAD Templates etc via Designer.

DataLinks can be copied from this DataLinks dialog directly into the AutoCAD symbols (blocks) used as templates for loop diagrams and/or title blocks used as Seeds. To copy a DataLink select one (click on the DataLink) and use the Ctrl + C keys to copy to the Windows clipboard. Then select the AutoCAD DataLink text box and paste the DataLink value. Refer to [Assigning DataLinks in AutoCAD](#).

DataLinks can also be copied by 'drag and drop' selecting one (click in the white space immediately to the left of the DataLink field) drag the DataLink into an AutoCAD DataLink text box and drop it (release the mouse button).

When copied to an AutoCAD attribute the DataLink is stored within the Block inside AutoCAD. You may copy blocks (including DataLinks) within an AutoCAD drawing file or between drawing files using standard AutoCAD commands (copy, insert etc), any DataLinks will remain within the copied blocks and drawings. This means you can set up DataLinks for your typical blocks and then copy the block to make up new templates without having to assign DataLinks again to those blocks.

Refer to [Assigning DataLinks in AutoCAD](#).
The following tables show typical DataLinks shown for each group:

<table>
<thead>
<tr>
<th>Group Name</th>
<th>DataLink</th>
<th>Example Value</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Project Data:</strong></td>
<td>{ProjectNo}</td>
<td>25400</td>
</tr>
<tr>
<td></td>
<td>{ProjectName}</td>
<td>FuelX Modernisation</td>
</tr>
<tr>
<td></td>
<td>{ProjectDesc}</td>
<td>Refinery Clean Fuels</td>
</tr>
<tr>
<td></td>
<td>{PlantName}</td>
<td>FuelX</td>
</tr>
</tbody>
</table>

**Drawing Data:**

<table>
<thead>
<tr>
<th>DataLink</th>
<th>Example Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>{DwgNo}</td>
<td>340-07-1045</td>
</tr>
<tr>
<td>{Sheet}</td>
<td>1</td>
</tr>
<tr>
<td>{NoOfSheets}</td>
<td>1</td>
</tr>
<tr>
<td>{Title1}</td>
<td>Area 340</td>
</tr>
</tbody>
</table>

**Drawing Revisions:**

<table>
<thead>
<tr>
<th>DataLink</th>
<th>Example Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>{RevNo1}</td>
<td>A</td>
</tr>
<tr>
<td>{Date1}</td>
<td>7/7/2003</td>
</tr>
<tr>
<td>{Revision1}</td>
<td>ISSUED FOR REVIEW</td>
</tr>
<tr>
<td>{By1}</td>
<td>GRH</td>
</tr>
</tbody>
</table>

**Instrument Tag Data:**

<table>
<thead>
<tr>
<th>DataLink</th>
<th>Example Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>{TAG1}</td>
<td>34-FT-1005</td>
</tr>
<tr>
<td>{TAG1Manufact}</td>
<td>Honeywell</td>
</tr>
<tr>
<td>{TAG1Model}</td>
<td>TBA</td>
</tr>
</tbody>
</table>

**Tag Wiring Data:**

<table>
<thead>
<tr>
<th>DataLink</th>
<th>Example Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>{TAG1T1}</td>
<td>+</td>
</tr>
<tr>
<td>{TAG1W1C1CableNo}</td>
<td>C34FT1005</td>
</tr>
<tr>
<td>{TAG1W1C1CableType}</td>
<td>1Pr</td>
</tr>
<tr>
<td>{TAG1W1C1Core}</td>
<td>WH</td>
</tr>
<tr>
<td>{TAG1W1E1}</td>
<td>34-JB-114</td>
</tr>
</tbody>
</table>

DataLinks for Project Data, Drawing Data and Drawing Revisions are always the same regardless of drawing type being generated (Whether the drawing is based on a Template or Seed or whether it is a Loop Diagram, Termination Diagram, Hookup or any other type). However, The Revision DataLinks always end in a number corresponding to Revision history sequence (example: {RevNo1} is always earliest Revision, {RevNo2} is the 2nd earliest etc).

DataLinks for Instrument Tag Data always end in a number corresponding to the 'Loop Dwg Code' set for each instrument in the Instrument List. This number must be unique for each
instrument in a loop and is used to identify each instrument in the loop drawing. This 'Loop Dwg Code' can be modified from Instrument Engineer or Designer from the *Drawing Information* dialog or the 'LoopDwgCode' field can be added to a GridView in Engineer’s Instrument List for bulk editing.

**Note:** You may consider setting 'Loop Dwg Code' by instrument type. For example, Transmitters = 11, Solenoid Valves = 51, Control Valves 61 etc. Why? To reduce editing associated with each DataLink in the AutoCAD templates. You can easily set up a set of blocks to represent a Transmitter and all its associated wiring, junction boxes, marshalling cabinet all using DataLinks like {TAG11. Once done you can copy this set of symbols to make up more complex loops containing transmitter, I/P, Limit switches etc.

### 6.4 Seed Drawings List

Seed drawings are used by Designer to create termination drawings. Seed drawings are normally just an empty drawing file containing a drawing title block (drawing frame with attributes). The title block will have attributes linked to the project database using DataLinks. In addition to the title block AVEVA Instrumentation requires specific parameters to enable termination diagrams to be auto-drawn. These parameters are set in the Seed Drawing List dialog.

**Note:** To use a Seed file to auto-generate drawings all the Seed parameters below must be entered for the Seed file and the Seed file must be located in the AVEVA Instrumentation project 'Seed' folder.

To open a the Seed Drawing List dialog which contains a list of all Seed files for your project:

Activate the View ribbon menu click, **Seed List** menu option.

This brings up the Seed List dialog below showing typical metric units:

This dialog contains a list of all Seed drawing files added to the project database through this dialog.

**Note:** You must ensure that a Seed file is copied (or saved in AutoCAD) to the project seed folder with the same file name as the 'Seed File' name entered in the Seed List otherwise Designer cannot use the seed drawing to generate termination drawings.

This Seed Drawing List contains important information used by Designer when termination drawings are parametrically created. The following parameters are required to be entered for all Seed drawings:
Parameter | Description
--- | ---
Seed File | A unique name that matches the Seed File name (the AutoCAD drawing file name).
Description | User defined description *(optional).*
Size | User defined size - used to help a user select the appropriate seed drawing size *(optional).*
MaxNoOfTStrips | Maximum number of Terminal Strips you want placed on the drawing (See NOTE 1 below).
MaxNoOfTerminals | Maximum number of Terminals to draw in a single vertical set of terminals before starting at top again.
DefaultSpacing | Horizontal spacing between terminal strips.
TStripStartX | X coordinate where the first terminal strip will be started (the top left of the strip).
TStripStartY | Y coordinate where the first terminal strip will be started (the top left of the strip).
ExtentsMinY | Minimum Y coordinate in which AutoCAD can draw within the title block (affects bottom of vertically drawn cable).
AllCablesVertical | Defines whether all cables will be drawn to the bottom of the drawing sheet (to the ExtentsMinY above) - see Exceptions below.

Notes:

1. If the Equipment being drawn has multiple terminal strips or the number of terminals in a single terminal strip exceeds the MaxNoOfTerminals parameter then Designer will start a new strip of terminals. If the MaxNoOfTStrips is exceeded for the current equipment, then AVEVA Instrumentation will automatically create a new drawing sheet and continue to draw terminals/terminal strips until there are no more terminals/terminal strips for the Equipment. AVEVA Instrumentation will continue to create new sheets if required.

2. If the Equipment being drawn has terminal strips containing more terminals in a single terminal than the MaxNoOfTerminals parameter then Designer will start a new Terminal Strip to continue until all terminals are drawn. If the MaxNoOfTStrips in not exceeded the continuation Terminal Strip is drawn on the same drawing sheet. If the MaxNoOfTStrips is exceeded for the current equipment, then AVEVA Instrumentation will automatically create a new drawing sheet and continue to draw terminals/terminal strips until their are no more terminals.

3. ExtentsMinY controls the positioning of cables drawn to the bottom of the drawing. AVEVA Instrumentation will not draw below the ExtentsMinY.

To Open a Seed in AutoCAD

Select the Seed file name, click Open from the toolbar menu, AutoCAD then starts (if not already running) and the file is opened.
To Add a new Seed file, click **New** from the toolbar (existing seed records can be copied by using the 'copy' drop down toolbar command next to the **New** command).

AVEVA Instrumentation will bring up the new seed dialog (the following figure shows the dialog after typical parameter have been entered for a metric drawing):

You should complete all parameters as described in the drawing units required in your AutoCAD drawing files (i.e. mm or inches)

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Seed File Name</strong></td>
<td>A unique name that matches the Seed File name (the AutoCAD drawing file name).</td>
</tr>
<tr>
<td><strong>Description</strong></td>
<td>User defined description <em>(optional).</em></td>
</tr>
<tr>
<td><strong>Size</strong></td>
<td>User defined size - used to help a user select the appropriate seed drawing size <em>(optional).</em></td>
</tr>
<tr>
<td><strong>Max No. of TStrips</strong></td>
<td>Maximum number of Terminal Strips you want placed on the drawing <em>(See NOTE 1 above).</em></td>
</tr>
<tr>
<td><strong>Max No. of Terminals</strong></td>
<td>Maximum number of Terminals to draw in a single vertical set of terminals before start at top again.</td>
</tr>
<tr>
<td><strong>TStrip Start X</strong></td>
<td>X coordinate where the first terminal strip will be started (the top left of the strip).</td>
</tr>
<tr>
<td><strong>TStrip Start Y</strong></td>
<td>Y coordinate where the first terminal strip will be started (the top left of the strip).</td>
</tr>
<tr>
<td><strong>TStrip Spacing</strong></td>
<td>Horizontal spacing ('X') between terminal strips.</td>
</tr>
<tr>
<td><strong>Extents Min Y</strong></td>
<td>Minimum Y coordinate in which AutoCAD can draw within the title block (affects bottom of Vertically drawn cables).</td>
</tr>
</tbody>
</table>
Note: Remember that to use a new Seed file an AutoCAD drawing file with the same name as the seed entry must exist in the AVEVA Instrumentation project 'Seed Folder'.

6.5 Termination Drawing Preference Settings

AVEVA Instrumentation provides user definable preference settings that control the drawing parameters when termination diagrams are being auto-generated from Designer.

To access the Termination Drawing Preference Settings:
From the Drawing List, click Project menu > Preferences menu option.
The Designer Preferences dialog appears, click the Terminations tab.
The following figure shows the default preference settings for Designer on a metric project:

Note: For drawings in imperial (US) units we suggest dividing the above units by 25 to provide units in inches.

These settings are saved on a per project basis, so all settings are shared for all termination drawings for your current project.
The figure below shows how these settings control the drawing parameters:

This example was drawn with the setting 'Draw Wire Nos Inside Wire' set to 'True' (yes) - if this is set to 'False' then Core/Wire Numbers are drawn above the above the wire.

Note: Cable No Width is used by AVEVA Instrumentation to break the cable line it does not define the actual block width. To change the Cable No block width the block 'CableNo' must be redefined. See: Cable Number Block definition on the next page.

Additional Parameters Not Shown Above

- **Cable No Offset**: This is the vertical distance from the centre of the Cable No block to the cable. The default zero (0) places the Cable No within the cable.

- **Cable Spacing**: This is the horizontal distance between cables when more than one cable is drawn to the same terminal strip and cabled are being drawn vertically.

- **Draw Core Marking on Outside**: Draws core markings on right side of Wire No. when drawing wires on right side of a terminal.

- **Links and Looping Wires**: Are drawn using the TerminalHeight parameter to offset from the terminals.
Text Styles/Fonts Definition

AVEVA Instrumentation draws all Wire/Ferrule Nos and reference text in the Seed File Drawing's current text style. By setting the current text style in the Seed Drawing File(s) the final text style (font) can be user defined.

Line Weights/Line Colours Definition

AVEVA Instrumentation uses 3 predefined layers to draw the graphics. You may change the layer colours to change the line weights to your client's standards if required in the Seed Drawing File(s) used to generate termination diagrams.

Layers used are:

- **L2** Default colour is White. This is the Layer associated with a 0.25mm pen width and 2.5mm text height.
- **L3** Default colour is Yellow. This is the Layer associated with a 0.35mm pen width and 3.5mm text height.
- **L5** Default colour is Red. This is the Layer associated with a 0.5mm pen width and 5mm text height.

Cable Number Block Definition

AVEVA Instrumentation uses a Cable Number block named 'CableNo' which is inserted into the drawing for each cable number. The Cable Number block can be redefined to change its appearance (for example, change text height, use rounded ends or make longer etc). The block should be defined with a single attribute and redefined within each Seed Drawing File used by AVEVA Instrumentation for your project. If AVEVA Instrumentation does not find a block named 'CableNo' it is inserted from a file named: AVEVA InstrumentationTermDefaults (or AVEVA InstrumentationTermDefaultsImperial if using non-metric settings) located in the 'DwgExamples\Seeds' folder in the AVEVA Instrumentation program files folder. Opening AVEVA InstrumentationTermDefaults (or AVEVA InstrumentationTermDefaultsImperial) and redefining the Block 'CableNo' will affect all termination drawings where the Seed file does not contain any 'CableNo' block reference.

Device and I/O Module Description Text

In the Device and I/O Module Catalogues in Wiring Manager, the 'Description on Drawing' textbox can be used to change the default drawing description to the value entered in that textbox. Using the <Enter> key will add a line-break in the drawing to create multiple lines of text. Up to three (3) lines will be created for the description in both AutoCAD termination diagrams created in Designer and Termination PDF reports created in Wiring Manager. If the Catalogue Definition 'Description on Drawing' textbox if left empty the default description will be used which is the Manufacturer and Model No. concatenated together with a 'space'.

### 6.6 Auto Inserting Blocks

Designer allows auto insertion of user defined blocks into any AVEVA Instrumentation generated drawing by adding block names to the Drawing List for any or all drawings. The inserted blocks can contain DataLinks that will be updated by AVEVA Instrumentation with project data. AVEVA Instrumentation supports up to 6 blocks per drawing. Blocks are always inserted at drawing coordinates 0,0.
This feature was added to AVEVA Instrumentation to allow users to reduce the number of seed and template drawings since often the only difference between drawings is a different set of drawing notes etc. This can also be used in a situation where you are required to show detailed process data, such as a detailed 'P&ID' type bubble diagram on Loop Diagrams. In this case although the wiring is standardised and a simple template could be used on say 50 loops (e.g 2 Wire Analog input to DCS), the process connections may be quite different. Auto Inserting Blocks can be used here as only one template (wiring) is required but maybe 3 or 4 different 'P&ID' Blocks can be used depending on whether the transmitter is a D/P Flow connected to an orifice plate, a D/P Level transmitter connected to a vessel etc.

Add an Auto Inserting Block

To enable Designer to locate the user defined blocks, each block must reside in the current projects 'CAD Block/Circuit' folder as defined in the Project Setup dialog (Drawing Manager Project menu > Edit command.

To assign blocks to a specific AVEVA Instrumentation Drawing add the block name to one of the Drawing List's six block fields (Block1, Block2, ..., Block6). The easiest way here is to add the Block fields to a GridView using AVEVA Instrumentation Grid Manager (Drawing List Tools menu > Grid Manager command.

Once the Block fields are in your Drawing List data grid select from the pull down list that appears in each 'Block' cell of the grid when the mouse is hovered over the cell.

When generating the drawing AVEVA Instrumentation inserts any defined Blocks just prior to updating DataLink data so DataLinks can be embedded in the Auto Inserting Blocks successfully.

Note: AVEVA Instrumentation only inserts these Blocks if the drawing is being created (i.e. The drawing file does not currently exist). If you wish to add Blocks to an existing drawing you will need to delete the drawing file prior to Update for the blocks to be auto-inserted.

6.7 DataLinks

6.7.1 DataLinks Reference

Designer allows any attribute within any AutoCAD drawing to be updated from the Instrument Design Office Project Database. A DataLink is attached to each block's attributes in a Template file or Seed file as Extended Entity Data (Xdata). Extended Entity data is invisible in AutoCAD, so the DataLinks will not effect the CAD file visually.

Note: DataLink definitions are invisible within the drawing file and can only be accessed by an applications program such as Designer (or AutoLisp/Visual Basic etc).

An AVEVA Instrumentation DataLink represents a data value that is replaced by the actual project data when updated by Designer. When a drawing is updated by Designer all AutoCAD attributes that contain a DataLink are automatically updated with the current data from the AVEVA Instrumentation project database. This data could include title block and revision information as well as engineering, wiring or other project data.

Types of DataLinks

Designer uses two types of DataLinks:

• **Keywords.** These are always enclosed in curly brackets {}
Examples:

- `{DwgNo}` returns the value of the Drawing Number field for the current drawing.
- `{Title1}` returns the value of the Title1 field of the Drawing List for the current drawing.
- `{Tag1}` returns the Tag No of the first instrument in current loop (if the current drawing is a Loop Diagram).

**Note:** Refer to DataLink Keyword Samples for a comprehensive list of Keyword DataLink definitions used within Designer.

- **SQL Statements.** These are always enclosed in curved brackets ( ) and are written in the form of a standard SQL (Structured Query Language) query definition for database access:

  ```sql
  (SELECT Field1 FROM TableName WHERE Field2 = Value)
  ```

  **For Example:**

  ```sql
  (SELECT ModelNo FROM InstrumentList where TagNo = 'FT-600')
  ```

Returns the ModelNo field value from the InstrumentList table where the TagNo field is equal to FT-600.

Keyword DataLinks are predefined within the Designer and cannot be user defined.

SQL Statements are user definable and are included to enable advanced users to access data that has not been defined as a Keyword DataLink. SQL Statements are generally not required by clients but have been included for advanced users.

**Note:** To view available Keyword DataLinks for any drawing in the Designer's Drawing List bring up the *DataLinks Report Dialog*.

**Multiple DataLinks**

Designer supports multiple DataLinks for each Block Attribute. They can be used to update multiple values within a single attribute.

For example:

**Attribute with DataLinks:** `{DwgNo} {Rev1}` would fetch the current drawings 'Drawing No' and 'Rev1' fields and append them together with a space in between (such as D1234 A - if 'Drawing No was: 'D1234' and Revision 1 was 'A').

You may also concatenate character or numerical values within the DataLink definition.

**For Example:**

**Attribute with DataLinks:** `Dwg No. {DwgNo}-{Rev1}` would fetch the current drawings 'Drawing No field value from the InstrumentList table where the TagNo field is equal to FT-600).

**Nested DataLinks**

Designer supports Nested DataLinks for each Block Attribute. They can be used to update multiple values within a single attribute or used as a lookup value in a SQL type DataLink.

**For Example:**

**Attribute with DataLink:** `(SELECT DrawnBy FROM Drawings WHERE DwgID = {DwgID})`
Here the Keyword DataLink \{DwgID\} is being used as the value to search for in the DwgID field of the Drawings table.

Another Example:

Here's how you can get access to any data from the InstrumentList:

In the following DataLink the Keyword DataLink \{TAG1Key\} is unique name of instrument 1 in the loop currently being created/updated. We use that value to lookup a field in the AVEVA Instrumentation InstrumentList table. Here we are returning the value of 'UserField1'.

\[
(SELECT \text{UserField1} \text{FROM InstrumentList WHERE InstKey=} \{\text{TAG1Key}\})
\]

Attaching DataLinks to Attributes in AutoCAD

Open the Template, Seed or Drawing File using Designer's Open Template List or Open Seed List as this ensures the AutoCAD VBA (Visual Basic for Applications) program is loaded into AutoCAD. If the 'AVEVA Instrumentation' tools menu is not visible the menu has not yet been changed, so select the appropriate AutoCAD menu: Designer, Designer2004 or Designer2005 from the Program Files\AVEVA Instrumentation\AVEVA Instrumentation folder (or wherever you installed AVEVA Instrumentation). Refer to the Assigning DataLinks in AutoCAD for more information.

Editing DataLinks in AutoCAD

Refer to the Assigning DataLinks in AutoCAD for more information.

Auto-Erase Block in AutoCAD using DataLinks

Designer provides an 'Auto-Erase' (or auto-delete) function where a block will be automatically erased from a drawing if a specific DataLink returns nothing. If you prefix your DataLink attribute with <DEL> and AVEVA Instrumentation evaluates the following DataLink with nothing (no value) then Designer will erase the block containing the <DEL> Datalink.

For example you may wish to erase a block if there is no tag number for \{\text{TAG10}\}. So entering: <DEL>{\text{TAG10}} in for an attribute in a block will tell AVEVA Instrumentation to erase the block if \{\text{TAG10}\} evaluates to nothing (i.e. there is no TAG10 for this drawing). <DEL> must be the first text in the attribute for AVEVA Instrumentation to recognise this operation.

Forcing Uppercase Text in AutoCAD

Designer provides a method to force any DataLink values retrieved from the AVEVA Instrumentation Database to become uppercase. For Example the database value for \{\text{Client}\} may be 'Oz Oil Company. To force this to become 'OZ OIL COMPANY' prefix your DataLink attribute with <UCASE> and AVEVA Instrumentation will update to uppercase. If you require both the <DEL> operator (see above) and the <UCASE> operator then <DEL> must be the first within the attribute (e.g. <DEL><UCASE>{\text{TAG1Manufacturer}})

Copying Blocks with DataLinks in AutoCAD

Since DataLinks are defined as Extended Entity Data within AutoCAD their behaviour is same as Xdata. That is, if you copy a block with DataLinks attached the DataLinks are copied too. This can drastically reduce your data entry to set up DataLinks.

For example, you can attach your required DataLinks to a block that may represent a Field Device. Then copy that block to as many drawings as you wish, saving you the effort of re-entering the DataLinks each time. Another example is the Title block used in all drawings.
Set up the first drawing with all DataLinks, once tested then copy that Title Block (which may contain multiple AutoCAD blocks) to your other drawings.

Summary

We learnt the following about DataLinks in this section:

- DataLinks are used to define where data comes from in the database and are attached to Attributes as Extended Entity Data.
- There are two types of DataLinks: Keywords (predefined) and SQL statements (which are User definable)
- You can use multiple DataLinks to fill in values to a single attribute and you may nest DataLinks within each other and/or concatenate them with character strings
- DataLinks are attached and edited from within AutoCAD by selecting the desired block containing attributes with the menu AVEVA Instrumentation > Edit DataLinks command.
- You can copy blocks with DataLinks within AutoCAD to reduce your setup time (and copy entire drawings!)
- You may get a list of predefined Keywords within the Designer Drawing List for any selected drawing by using the Show DataLinks menu option, under the Reports menu (after selecting a drawing in the Drawing List) to bring up the DataLinks Report Dialog.
7 Hookups

7.1 Hookup (Installation) Drawings

Hookup drawings are created by assigning a pre-defined Hookup Template to each project hookup drawing. The Hookup Template is made up of two parts: An AutoCAD drawing that contains the graphics representation of the installation detail and a Bill of Materials or Parts List that is assigned from the Designer Hookup parts catalogue.

When the project Hookup Drawing is created AVEVA Instrumentation updates the Hookup Template drawing with all parts and all tags assigned to the drawing.

The Hookup Drawing List is the main Designer Hookup module dialog for adding/editing and accessing Hookup drawings.

Access the Hookup Drawing List

Activate the View ribbon menu click Hookup Drawings List option.

This brings up the Hookup Drawing List in the following figure. By default all Hookup drawings for your project are shown in the grid. You may use the Display by Area combo box to filter the list by plant area.

![Hookup Drawing List](image)

Note: Refer to Working with Data Grids for information on the grid control including how to select a record (a Drawing).
Generally whenever you see a grid in AVEVA Instrumentation you may edit data directly within a cell (a field). However, some cells may be protected to ensure data integrity. If you cannot edit a specific cell within the grid you should use the 'Edit' command to access an edit dialog box.

The grid provides details on each project Hookup drawing, including Drawing Number, Hookup Type, Title, Current Revision etc.

This dialog is very similar to the Designer Drawing List, except that it is filtered to show only Hookup Drawings.

**Mandatory Data**

To produce a drawing you must enter a Drawing Number. Designer uses this field and the Sheet field to create a file name. For example: Drawing No: 123456 and Sheet No: 1 are combined to create a file name: 123456-1.dwg.

To produce project Hookup Drawings you must assign a pre-defined Hookup Template to each of the drawings in this Hookup Drawing List.

**Auto Generation of Drawings**

AVEVA Instrumentation uses special 'DataLinks' to map database data to AutoCAD drawing attributes. DataLinks are automatically updated by Designer when a drawing is updated from the Drawing List toolbar command 'Update'. For information on using Designer's DataLinks to update Drawing Title Block (Drawing Border) - including revisions history, Tags numbers assigned to the hookup and the Bill of Materials (or Parts List).

**Hookup Drawing List Command Buttons**

- **New**
  Brings up a dialog box for *Add a New Hookup Drawing*

- **Edit**
  Brings up the *Editing Hookup Details* dialog for editing existing drawing data (you can also double-Click on any drawing record to bring up the edit dialog). This allows editing of Title block & Revision information.

  **Note:** Use Open to view the actual CAD drawing.

- **Delete**
  Allows deletion of any selected drawing(s). Brings up a Delete Options confirmation dialog box for you to confirm deletion.

- **Open**
  Open the selected drawing for reviewing/printing etc in AutoCAD (Editing title block & revision information should be done from the Edit button above.

- **Update**
  Updates selected drawing(s) - forces DataLinks in each CAD drawing to be updated with current project data from the AVEVA Instrumentation database.

  **Note:** If the drawing file does not exist the file is created by copying a) the template file (if drawing uses a template drawing) or b) the seed file (if drawing uses a seed drawing). Refer to Drawing Generation for more information.

- **Print**
  Print selected drawing(s) - if the drawing file exists.

- **Select All**
  Select all drawings in current grid (i.e. only those shown in grid if a Advanced Grid Filters is active).
Find    Brings up a dialog allowing a "Find" any Text string (anywhere within the grid).

Filter    Brings up Advanced Grid Filters dialog for you to define the current Drawing List filter criteria (e.g. Only Loop Diagrams).

Refresh    Update entire grid with latest database information (useful in multi-user project environments).

Revisions    Brings up a list of all drawings with revisions (and their revisions). Sub Menus are:

   Add Revisions    Brings up a list of all drawings with revisions (and their revisions)

   Edit Revisions    This command allows changing of Revision Entry (Multiple Drawings) selected

Refer to User Interface for information on the Explorer Bar menus

7.2 Add a New Hookup Drawing

Add a new Hookup Drawing to your Project

From the Hookup (Installation) Drawings List, click on the New button this brings up the following dialog:
Things to Know about this Hookup Drawing Information Dialog

Double-click on any date field to bring up the Date Selection dialog (or press the Enter key when the date field has focus).

This dialog is identical to the normal Designer Drawing Information dialog except it has two additional sections:

**Hookup Template Type**

This contains information about the Hookup Template to be used when creating the Hookup Drawing

**Tags Assigned**

This list contains a list of all tags assigned to the current Hookup Drawing

**Assign a Hookup Template Type**

Click the *Select Type* command button.

This brings up the *Assigning a Hookup Template* selection dialog.

Once you have selected the Hookup Template AVEVA Instrumentation completes the 'Hookup Template Type' details in the dialog (fields with a yellow background above) based on the template selected.

**To Assign a new Tag to the Hookup Drawing**

Double-Click on any empty Tag Number record in the 'Tags Assigned' list.

This brings up the *Assigning Tags to a Hookup* dialog which allows you to select single or multiple tags to the current drawing.

**Note:** A double-click on any Tag Number already assigned to a hookup will bring up the detailed *Edit Instrument Data* dialog enabling viewing/editing of detailed data as required. This is the only dialog in Designer that allows changing of Tag Numbers.

**Reassign a Tag Position in the Current Hookup Drawing**

Select a Tag and drag it into a new position.

The figure below shows four tags, drag the 2nd tag and "drop" it onto the first position to move the selected tag to position one. This will automatically move all tag data on the corresponding hookup drawing to the new positions next time the drawing is updated.

![Tags Assigned](image)

**Remove a Tag from the Current Hookup Drawing**

Select a Tag and press the <Delete> key.
Note: Removing a tag does not delete its data only this only unassigns the tag from the drawing.

To Pack Tags assigned in the Tags Assigned List
If you remove tags and gaps appear in the Tags Assigned List, you can remove gaps and 'pack' the tags by using the Pack Tags command button. Packing Tags also re-sorts the order based on the Tag Number.

The other section handles drawing revisions.

Revision History List
The Revision History list shows all revisions for the current drawing.

Revisions Tab Command Buttons

Add Revision allows a new revision to be added to the current datasheet by bringing up the Revision Entry (Single Drawings) dialog.

Edit Revision allows editing the currently selected revision by bringing up the Revision Entry (Single Drawings) dialog box.

Note: Double-clicking on any existing Revision will also bring up the revision entry dialog.

Delete Revision allows deletion of the currently selected revision.

Note: Pressing the <Delete> key on any existing Revision will also delete the currently selected revision.

AVEVA Instrumentation also allows addition of revisions to multiple drawings in one command. For information on this feature refer to Revision Entry (Multiple Drawings) topic.

7.3 Assigning a Hookup Template

Assign a Hookup Template type to a Hookup Drawing
From the Hookup Drawing Information dialog click the Assign Type command button.

This brings up the Hookup Template selection dialog showing the current Hookup Drawing Catalogue template drawings:
To assign a Template either:

- double-click on the Hookup Template record
- click on the Hookup Template record and then click Assign

To add new template drawings to your project refer to *Hookup Items Catalogue*.

### 7.4 Assigning Tags to a Hookup

To assign an instrument tag to a specific Hookup Drawing:

From the *Editing Hookup Details* dialog double-click on an empty tag number record in the 'Tags Assigned' list.

This brings up the Assign Tag Numbers dialog as follows:
This list shows all tags not yet assigned to any Hookup Drawing.

To assign a Tag to the current Hookup Drawing, double-click on a Tag Number to assign the selected tag to the current hookup drawing.

You may repeat the double-click selection to assign more than one tag (if the current drawing has multiple tags that are yet to be assigned).

Click on Exit to exit assigning tag numbers.

If you wish to assign multiple tags you can also select 'check' the Tag Numbers you want to assign, then click [Assign] to assign all selected tags to the hookup drawing.

Note: The selected tag(s) are allocated to the next available spare tag position on the hookup. If you wish to change tag positions then the tags can be dragged into a new position in the Editing Hookup Details dialog.

The tags list can be filtered by Plant Area (Display by Area combo box) to enable easier access to tags.

You can also click on the list column headers to sort on the selected column and use Ctrl-F to bring up a Find Tag Number dialog.

### 7.5 Editing Hookup Details

**To edit or view an existing Hookup Drawing Information in your project:**

From the Hookups Drawing List, click on the Edit button,

Or

Double-Click on the Hookup drawing record in the Hookup Drawing List grid this brings up the following Hookup Drawing Information dialog:
Things to Know about this Hookup Drawing Information Dialog

Double-click on any date field to bring up the Date Selection dialog (or press the Enter key when the date field has focus).

This dialog is identical to the normal Designer Drawing Information dialog except it has two additional sections:

**Hookup Template Type**  
This contains information about the Hookup Template to be used when creating the Hookup Drawing

**Tags Assigned**  
This list contains a list of all tags assigned to the current Hookup Drawing

**Assign a Hookup Template Type**

click the **Assign Type** command button.

This brings up the **Assigning a Hookup Template** selection dialog.

Once you have selected the Hookup Template, AVEVA Instrumentation completes the 'Hookup Template Type' details in the dialog (fields with a yellow background above) based on the template selected.
Assign a new Tag to the Hookup Drawing

Double-Click on any empty Tag Number record in the 'Tags Assigned' list

This brings up the Assigning Tags to a Hookup dialog.

**Note:** A double-click on any Tag Number already assigned to a hookup will bring up the detailed Edit Instrument Data dialog enabling viewing/editing of detailed data as required. This is the only dialog in Designer that allows changing of Tag Numbers.

Reassign a Tag Position in the Current Hookup Drawing

Select a Tag and drag it into a new position.

The figure below shows four tags, drag the 2nd tag and "drop" it onto the first position to move the selected tag to position one. This will automatically move all tag data on the corresponding hookup drawing to the new positions next time the drawing is updated.

Remove a Tag from the Current Hookup Drawing

Select a Tag and press the <Delete> key.

**Note:** Removing a tag does not delete its data only this only unassigns the tag from the drawing.

Pack Tags Assigned in the Tags Assigned List

If you remove tags and gaps appear in the Tags Assigned List, you can remove gaps and 'pack' the tags by using the Pack Tags command button. Packing Tags also re-sorts the order based on the Tag Number.

The other section handles drawing revisions.

Revision History List

The Revision History list shows all revisions for the current drawing.

Revisions Tab command buttons

- **Add Revision** allows a new revision to be added to the current datasheet by bringing up the Revision Entry (Single Drawings) dialog.
- **Edit Revision** allows editing the currently selected revision by bringing up the Revision Entry (Single Drawings) dialog box.
Note: Double-clicking on any existing Revision will also bring up the revision entry dialog.

Delete Revision allows deletion of the currently selected revision.

Note: Pressing the <Delete> key on any existing Revision will also delete the currently selected revision.

AVEVA Instrumentation also allows addition of revisions to multiple drawings in one command. For information on this feature refer to Revision Entry (Multiple Drawings) topic.

7.6 Hookups Template Catalogue

The Hookup Template Catalogue contains definitions of all the template drawings that will be used to create project hookup drawings. A Hookup Template drawing contains the graphic representation of the installation/hookup and also contains place holders so the component items/parts list can be created by AVEVA Instrumentation and instrument tags assigned to each drawing can be listed. The place holders are AutoCAD blocks with attributes. AVEVA Instrumentation uses Datalinks to map each attribute to a database field so that when the Template is used to generate a project CAD drawing, all the component items and all tags are automatically updated by AVEVA Instrumentation.

The Hookup Template Catalogue is accessed from the Main dialog:

Activate the View ribbon menu click Hookup Catalogue menu option.

The following figure shows a typical Hookup Catalogue dialog:
Hookup Template Catalogue Command Buttons

**New** Brings up a dialog box for *Adding a New Hookup Template* drawing.

**Edit** Brings up a the *Editing Template Data* dialog for editing existing template drawing data (you can also double-click on any drawing record to bring up the edit dialog). This allows editing of Bill of Materials information.

**Delete** Allows deletion of any selected drawing(s). Brings up a Delete Options confirmation dialog box for you to confirm deletion.

**Find** Brings up a dialog allowing a "Find' any Text string (anywhere within the grid).

**Filter** Brings up *Advanced Grid Filters* dialog for you to define the current Drawing List filter criteria (e.g Only Loop Diagrams).

**Refresh** Update entire grid with latest database information (useful in multi-user project environments).

### 7.6.1 Adding a New Hookup Template

**Add a new Hookup Template Drawing to your Project**

From the *Hookups Template Catalogue*, click on the **New** button, this brings up the following dialog:

Enter a Category, Description, Template name and the maximum Number of Tags that can be assigned to the Hookup drawing.

**Copy an existing AutoCAD drawing to be used as the Hookup Template**

click the **Open Drawing** command button.

This will pop-up a dialog asking you to locate the existing drawing file. Once you have selected the drawing it is copied into the project hookup template drawings folder. To
complete the definition you should apply the appropriate DataLinks to each of the template drawings attributes to map fields to update:

- Title Block information
- Drawing Revision history
- Tags Assigned
- Bill of Materials

**Assign a new Bill of Materials Catalogue Item to your new Hookup Template**

click **New Item** command button this pops-up the Find a Component dialog to allow Assigning Hookup Items.

To Change the Quantity of any items assigned, click in the ‘QTY’ grid column and edit the value.

**Remove an Item from the Bill of Materials**

Select an Item record, click **Remove Item** command button.

**To assign a Template Drawing**

click **Open Drawing** command button.

If the drawing is not found in the current project Hookup Template drawings folder AVEVA Instrumentation will allow you to select an existing drawing file which will be copied to the current project Hookup Template folder. Once the drawing is opened in AutoCAD appropriate DataLinks must be assigned to each block attribute so AVEVA Instrumentation can update the attribute values with hookup item bill of materials, tags assigned and title block information. Refer to Assigning Hookup DataLinks in AutoCAD.

**Note:** Once the AVEVA Instrumentation DataLinks have been assigned to the Template drawing, **Open Drawing** will automatically update the DataLinks with the current Bill of Materials saved to the database.

To save changes click **Save**.

### 7.6.2 Editing Template Data

**Edit a Hookup Template Data for your Project**

From the **Hookups Template Catalogue**, either:

- Click on the **Edit** button,
- Or, double-click on the template record this brings up the following dialog:
Copy an existing AutoCAD Drawing to be used as the Hookup Template

click the **Open Drawing** command button.

This will pop-up a dialog asking you to locate the existing drawing file. Once you have selected the drawing it is copied into the project hookup template drawings folder. To complete the definition you should apply the appropriate DataLinks to each of the template drawings attributes to map fields to update:

- Title Block information
- Drawing Revision history
- Tags Assigned
- Bill of Materials

**Assign a new Bill of Materials Catalogue Item to your new Hookup Template**

Click **New Item** command button, this pops-up the Find a Component dialog to allow **Assigning Hookup Items**.

**Change the Quantity of any Items Assigned**

Click in the ‘QTY’ grid column and edit the value.

**Remove an Item from the Bill of Materials**

Select an Item record, click **Remove Item** command button.

**Assign a Template drawing**

Click **Open Drawing** command button.

If the drawing is not found in the current project Hookup Template drawings folder AVEVA Instrumentation will allow you to select an existing drawing file which will be copied to the current project Hookup Template folder. Once the drawing is opened in AutoCAD appropriate DataLinks must be assigned to each block attribute so AVEVA Instrumentation
can update the attribute values with hookup item bill of materials, tags assigned and title block information. Refer to Assigning Hookup DataLinks in AutoCAD.

**Note:** Once the AVEVA Instrumentation DataLinks have been assigned to the Template drawing, Open Drawing will automatically update the DataLinks with the current Bill of Materials saved to the database.

To save changes click **Save**.

### 7.6.3 Assigning Hookup Items

To assign a component item or part from the Hookup Items Catalogue to a hookup drawing you must assign the item to the hookup template.

From the **Editing Template Data**, click **New Item** command button.

This brings up the Find a Component dialog below:

You may filter the items catalogue by selecting any combination of: Category, Size, Material or Manufacturer. The ‘Show All’ command resets your filter so that all items are shown.

**Note:** Only those Hookup items in the Hookup Items Catalogue that have been marked with ‘Allow’ are shown in this selection list. ‘Allow’ predefines the catalogue items that can be used for the current project. See the Hookup Items Catalogue for more information.

**Select an Item or Component to use on your Hookup**

Double-click on the desired item.

**Select Multiple Items**

Continue to double-click on as many items as required.

To exit the dialog, click **Close**.

**Note:** Each time you select an item (double-click) the item is added to the list of items in the template information dialog. If you select the same item the quantity of that item is
incremented. You can also manually change the quantity by editing the number required in the template information dialog.

**Filtering the Catalogue Items List**

Use the predefined filter combo boxes to filter by Category, Size, Material and/or Manufacturer. AVEVA Instrumentation will filter on all the combo box filters as a logical 'AND'. For example: Category = ‘Ball Valve’ AND Size = "1/4". To reset the filters and show all catalogue items click the [Show All] command button.

**Note:** When selecting a Size, AVEVA Instrumentation finds any component matching the size anywhere within the catalogue size field. You can also type in a Size (e.g 1/4"OD and press the <Enter> key to filter on an exact size entered.

You create a more complex filter by using the Filter toolbar command which brings up the Advanced Grid Filters dialog.

Use the Find toolbar command to search for any specific text in the grid.

**7.6.4 Assigning Hookup DataLinks in AutoCAD**

To assign or modify DataLinks to an AutoCAD Hookup template the template drawing file the file needs to be opened using AutoCAD.

The Hookup Template can be opened in AutoCAD by using the 'Open Drawing' command button from the Editing Template Data.

**Use the AVEVA Instrumentation Designer AutoCAD Menu**

To assign new DataLinks (or modify DataLinks already assigned) you need to ensure the AVEVA Instrumentation Designer AutoCAD menu is loaded into AutoCAD. This toolbar menu should be automatically loaded when an AutoCAD drawing is opened from AVEVA Instrumentation Designer.

**Note:** If the 'iDesigner' menu is not auto loaded you will need to load the following menu manually (using the AutoCAD 'menu' command):  

<table>
<thead>
<tr>
<th>AutoCAD Version</th>
<th>Designer AutoCAD Menu</th>
</tr>
</thead>
<tbody>
<tr>
<td>AutoCAD 2000, 2000i, 2002</td>
<td>Designer.mns</td>
</tr>
<tr>
<td>AutoCAD 2004</td>
<td>Designer2004.mns</td>
</tr>
</tbody>
</table>

These menu files are located in the AVEVA Instrumentation program installation folder (typically: ‘c:\program files\AVEVA Instrumentation\AVEVA Instrumentation’)

**Assign/Edit DataLinks**

Once the AutoCAD iDesigner menu is loaded select:  

**iDesigner** from the pull-down menus > **Edit DataLinks**.  

This brings up a Dialog showing all attributes in the selected AutoCAD block.

AutoCAD will prompt you to 'Select Objects:'

Go ahead a select a block with attributes, then press enter.
AutoCAD will bring up the DataLinks Edit dialog as below:

![Edit DataLinks dialog](image)

This dialog shows all attributes defined in the block selected. The text boxes all contain DataLinks.

**Note:** To view available Keyword DataLinks for any drawing in the Designer's Drawing List bring up the DataLinks Report Dialog. This dialog enables ‘copy and paste’ of DataLinks from the report dialog into your AutoCAD 'Edit DataLinks' dialog above.

In the example above the Description attribute has three DataLinks assigned. This will update the attribute value with item Description, Size and Material for the first item assigned to the hookup (e.g. Description1, Size1 and Material1 return the values for Item 1).

To assign a DataLink you can type in a valid DataLink or you can copy from the DataLinks Report Dialog report created for a drawing that will use this template or seed. DataLinks can be copied from the DataLinks Report dialog (using Windows copy and paste - Ctrl-C / Ctrl-V etc) or dragged and dropped (hold the Ctrl key and drag the report DataLink to a text box above.

Refer to DataLinks Reference for more information on DataLinks.

**Copying Blocks with DataLinks in AutoCAD**

Since DataLinks are defined as Extended Entity Data within AutoCAD their behaviour is same as Xdata. That is, if you copy a block with DataLinks attached the DataLinks are copied too. This can drastically reduce your data entry to set up DataLinks.

For example, you can attach your required DataLinks to a block that may represent a Field Device. Then copy that block to as many drawings as you wish, saving you the effort of reentering the DataLinks each time. Another example is the Title block used in all drawings. Set up the first drawing with all DataLinks, once tested then copy that Title Block (which may contain multiple AutoCAD blocks) to your other drawings.

**Auto-Erasing Blocks with DataLinks in AutoCAD**

AVEVA Instrumentation Designer provides an 'Auto-Erase' (or auto-delete) function where a block will be automatically erased from a drawing if a specific DataLink returns nothing. If you prefix your DataLink attribute with <DEL> and AVEVA Instrumentation evaluates the following DataLink with nothing (no value) then Designer will erase the block containing the <DEL> DataLink.
For example you may wish to erase a block if there is no tag number for {TAG10}. So entering: <DEL>{TAG10} in for an attribute in a block will tell AVEVA Instrumentation to erase the block if {TAG10} evaluates to nothing (i.e. there is no TAG10 for this drawing).

7.7 Hookup Items Catalogue

The Hookup Items (or Parts) Catalogue enables catalogue components to be added/edited to the project database.

To access the Hookup Items Catalogue:

From the View ribbon menu, click **Hookup Items Catalogue** menu option.

This brings up the following typical grid:

### Hookup Catalogue Fields

#### Field Information

Category can be any text value that allows you to easily locate the item. For example 'Ball Valve' or 'Male Elbow' etc. You can create your own new categories by entering them when creating new items and they will appear when adding future items to the catalog.

Description is the detailed information you will see on the hookup drawing.

Size and Material are more information to describe the item.

Unit is the unit of measure (e.g. each, metre, ft etc).

Manufacturer and Catalogue Number are the manufacturer and model number details used to purchase the item.

Allow Use defines whether the item can be selected and added to Hookup drawing for the current project.

User Code is the code that will appear on your Hookup Drawing. This is a simplified code that for example could be a 3 digit number, so that all 1/2" Unions would be a 101 etc.
Note: The User Code is optional. You can also use the Bill of Materials sequence number to refer to Bill of Materials items. The sequence number starts at 1 for all hookup drawings.

Contingency enables the final bill of materials quantity to be increased by a percentage or a finite quantity. For a percentage increase add a percent character (%). If you do not enter a percent character AVEVA Instrumentation will add the Contingency quantity instead. For example '5%' will add 5% whereas '5' will add five (5) items to the final BOM quantity.

Hookup Item Catalogue Command Buttons

New

Brings up a dialog box for Adding a New Catalogue Item

Note: You can copy any existing item by selecting the desired item record then click on the pull-down menu button next to New. From the menu that appears click Copy selected. All component data from the selected item is copied to the new item, bringing up the Edit Detail dialog for you to change item catalogue number and other details as required.

Edit

Brings up a the Hookup item Detail dialog for editing existing components (you can also double-click on any item record to bring up the edit dialog).

Delete

Allows deletion of any selected item(s).

Find

Brings up a dialog allowing a “Find’ any Text string (anywhere within the grid).

Filter

Brings up Advanced Grid Filters for you to define the current Items List filter criteria (e.g Only Male Connectors).

Refresh

Update entire grid with latest database information (useful in multi-user project environments).

7.7.1 Adding a New Catalogue Item

To add a new Hookup Item to the Items Catalogue for your project:

From the Hookup Items Catalogue, click on the New button, this brings up the following dialog:
Field Information

Category can be any text value that allows you to easily locate the item. For example 'Ball Valve' or 'Male Elbow' etc. The category combo box is automatically filled with all the unique Categories already defined in the catalog. You can create your own new categories by entering them here and they will appear when adding future items to the catalog.

User Code is the code that will appear on your Hookup Drawing. This is a simplified code that for example could be a 3 digit number, so that all 1/2” Unions would be a 101 etc.

User Catalogue Number is an Optional field used to enable your own materials management system to track the component. For example you may have a SAP code. MESC number etc.

Contingency allows the project Bill of Materials report to be increased by a specific number of items to allow for spares or runover. You can enter an exact number (e.g 2 or 10 etc) or apply a percentage by entering a number and the percentage character '%' (e.g 2% or 5% etc). Both these methods enable you to increase your total quantities by some figure. This is ideal for tube and/or unions where you may just allow some additional quantity to ensure your site has some extra items.

Details

Description is the detailed information you will see on the hookup drawing.

Manufacturer and Catalogue Number are the manufacturer and model number details used to purchase the item.

Size and Material are more information to describe the item.

Unit is the unit of measure (e.g each, metre, ft etc).

Add a New Item

Enter the field information as required click Allow Use checkbox to allow the item to be selected and used on the project click Save.
8 Engineering Data

8.1 Loop Data

AVEVA Instrumentation Designer allows access to the Instrument Engineering data normally created by the Engineer application. The Loop Data dialog is accessed from Designers Drawing Information if the drawing is a Loop Diagram (i.e., it has a Loop Number that is valid for the project).

To Access the Loop Data Dialog

This dialog can be accessed from two places in Designer:

1. From the Drawing Information
   In the Loop No text box, click on the [ ] command button (only available if the Drawing is a Loop Diagram)

   Or

2. From the Drawing List, click the 'Loop No' cell command button which appears when your mouse hovers over the 'Loop No' cell.

Selecting the option, Edit Loop Detail will bring up the Loop Data dialog showing the loop info:
This dialog is a very powerful re-entry point into the Engineer application and enables you to:

- Edit Loop information (including checking 'Drawing Required').
- Editing Instrument Tag data (double-click on any tag in the Loop Instruments list will bring up the Instrument Data dialog).
- Add new tags/instruments to the current loop (use the Add Tag command button to bring up the Assigning Tags to Loops).
- Check current loop instrument wiring including terminations (use the Loop Check Wiring command button).
- Create Loop Wiring for current Loop based on user defined Wiring Rules. (use the Create Loop Wiring command - Learn more about Using Wiring Rules to Create Data here).
- Remove Loop Wiring created previously with the 'Create Loop Wiring' command.

Related Loops
You may assign up to two 'related loops' which enables AVEVA Instrumentation to place information for related loops (including their instrument tag data) on any Loop Diagram created with Designer. To assign a related loop select a command inside the related loop text boxes. This brings up a Loop Selection dialog enabling selection of any loop defined in Engineer's Loop List.
Loop Instruments List

The 'Loop Instruments' list at the bottom of the dialog shows all instruments assigned to the current loop.

To assign Instrument Tag Numbers to this loop click the Add Tag button (refer to Assigning Tags to Loops).

To edit instrument data, double-click on the desired tag number.

To remove a tag from the current loop, select the instrument tag record and press the <Delete> key.

To change the loop order of instruments drag & drop each to the desired position.

Special Loop Command Buttons

The three loop command buttons: Loop Wiring Check, Create Loop Wiring and Remove Loop Wiring are typically used by designers to view and build loop wiring details from wiring rules.

Loop Wiring Check: Brings up the loop wiring print preview dialog showing all instrument wiring in the AVEVA Instrumentation database for the current loop.

Create Loop Wiring: Allows auto creation of instrument field wiring for instruments in the current loop. Brings up the Creating Loop Wiring using Wiring Rules dialog.

Remove Loop Wiring: Removes all field wiring/cables & terminations for the current loop instruments previously created with 'Create Loop Wiring'

8.1.1 Assigning Tags to Loops

To Assign a Tag(s) to a Loop

From the Edit Loop Data dialog, click Add Tag to display the Add Instruments to Loop window.

The left hand list shows typical tags and descriptions for the Engineer's ISA tag catalogue built using the current loop Function prefix in the Edit Loop Data dialog.

The right list shows all tags assigned to the current loop (if any).
To assign a tag to the current loop you may use two methods:

1. **Build a Tag Number using the ISA tag catalogue (left list)**
   Double-click on the desired tag and the full tag number is added to the 'Tags to Add' list (right list)

   **Note:** If the tag you build does not exist in Engineer’s Instrument List it will be added. If it does exist AVEVA Instrumentation will reassign the tag to the current loop.

2. **Pick an existing tag number from the Instrument List**
   Click the From Instrument List button, which brings up a dialog for Selecting Existing Tags not assigned to any loop.

   - **Save** Saves assignment changes (if any)
   - **Cancel** Cancels assignment changes (if any)

### 8.1.2 Selecting Existing Tags

After clicking the From Instrument List command button in the Assigning Tags to Loops the following dialog appears:

![Select Instrument to add to Loop dialog](image)

This dialog contains only those tags yet to be assigned to a loop. The tag list can be filtered to enable easy access to tags by Plant Area ('Display by Area' combo box).

**Assign a Tag to the Current Loop**

To assign a single tag:
Double-Click on a Tag Number to assign the selected tag to the current Loop.
Or:
To assign multiple tags:
Click the check boxes for all the tag number to assign,
Click the **Assign** button.
The **Exit** button cancels any tag assignment.
Use Ctrl-F to bring up a search dialog, where you can locate a tag number faster if the list of instruments is large.

### 8.2 Instrument Data

#### 8.2.1 Instrument Data Dialog

Designer allows access to the Instrument Engineering data normally created by the Instrument Engineer application. The Instrument Data dialog is accessed from the Designer's **Loop Data** dialog (which is accessed from the **Drawing Information**).

**To Access an Instrument Data Dialog**

From the **Drawing Information**

In the Loop No text box, click on the [ ] command button (only available if the Drawing is a Loop Diagram).

This brings up the Loop Data dialog (not shown here), from the Loop Data Dialog:

Double-click on any tag listed in the Loop Instruments list.

The following figure shows the Instrument Data dialog showing a typical instrument:
The two important fields for loop drawing generation are found under the 'Detail' tab:

1. Wiring Config - This applies the Wiring Rules Overview for the current instrument tag.
2. Loop Dwg Code - This is the code number used when Designer creates DataLinks. In the example above the Loop Dwg Code is 10 meaning that all tag DataLinks will be created prefixed '{TAG10}'. If the code was 51 then all DataLinks would be created prefixed '{TAG51}' This field is only used for generation of DataLinks used to create loop drawings from templates.

Note: AVEVA Instrumentation recommends using the same Loop Dwg Code for each instrument type. e.g Always use 10 for transmitters, 50 for Control Valves etc. This
means the Datalinks you embed into the CAD symbols can be copied without too much thought since it is likely you will use the same CAD symbol for each transmitter, control valve etc.

Click on this link to view information on *Edit Tag Details - Tabs*.

Many combo boxes have a user definable PickList associated. Clicking on the [#] command button next to a combo box brings up the PickList Management dialog.

### 8.2.2 Edit Tag Details - Tabs

PickList (combo boxes) can be updated with new values to choose from by selecting the [#] button to the right of most combo boxes.

The following screen captures show the seven (7) instrument edit tabs:

**Note:** The combo boxes (drop-down lists) allow selection from user defined Picklists and manual data entry.

**General**

The General tab is used to enter typical common data for most instruments on your project.

**Detail**
The Detail tab is used for more detailed design data and includes data typically required for wiring and installation information.

The Wiring Configuration PickList is used to assign a Wiring Rule to the instrument. This name is used to auto generate the instrument termination arrangement including terminal details, cable type, connection arrangement & wire ferrule numbers etc. Typically this choice is made by the person responsible for detail wiring design. It can also be edited from the Designer application.

The Junction Box in-cell command button enables assignment of the current instrument to a Junction Box. The pop-list is populated from junction box equipment tags created in Wiring Manager.

The Hookup Config in-cell command button enables assignment of the current instrument to a Hookup type. The pop-up list is populated from a list of Hookup templates created in Designer.

**Datasheet**

<table>
<thead>
<tr>
<th>Operating Principle</th>
<th>Pressure</th>
</tr>
</thead>
<tbody>
<tr>
<td>Datasheet No.</td>
<td>700001-1</td>
</tr>
<tr>
<td>Requisition No.</td>
<td></td>
</tr>
<tr>
<td>Requisition Date</td>
<td>2/2/05</td>
</tr>
<tr>
<td>Manufacturer</td>
<td>Yokogawa</td>
</tr>
<tr>
<td>Model No.</td>
<td>EJA110A</td>
</tr>
<tr>
<td>Supplier</td>
<td></td>
</tr>
<tr>
<td>Cost</td>
<td>1000</td>
</tr>
<tr>
<td>Installation Cost</td>
<td>0</td>
</tr>
</tbody>
</table>

Operating Principle PickList is used to pre assign an instrument to a data sheet form type. The button Datasheet No. in-cell command button [...] allows direct access to the datasheet (if exists). If the tag is not yet assigned to a datasheet the user is allowed to assign the current tag to an existing data sheet (if the project utilises multiple tags per data sheet) or you can create a new datasheet 'on the fly'.
DCS System

This tab is used to assign DCS I/O information for the current tag (if the current tag will be connected to the DCS System).

All field captions are user definable. To change captions use the Grid Manager accessed from the Instrument List Tools menu.

PLC/ESD System

This tab is used to assign PLC or ESD (Emergency/Safety Shutdown) I/O information for the current tag (if the current tag will be connected to the PLC or ESD System).

All field captions are user definable. To change captions use the Grid Manager accessed from the Instrument List Tools menu.
User

<table>
<thead>
<tr>
<th>Date Required</th>
<th>UserField09</th>
</tr>
</thead>
<tbody>
<tr>
<td>UserField02</td>
<td>FEED estimate</td>
</tr>
<tr>
<td>UserField03</td>
<td>UserField11</td>
</tr>
<tr>
<td>UserField04</td>
<td>UserField12</td>
</tr>
<tr>
<td>UserField05</td>
<td>UserField13</td>
</tr>
<tr>
<td>UserField06</td>
<td>UserField14</td>
</tr>
<tr>
<td>UserField07</td>
<td>UserField15</td>
</tr>
<tr>
<td>UserField08</td>
<td>UserField16</td>
</tr>
</tbody>
</table>

Engineer has sixteen(24) user defined fields (UserField1 to UserField24) these can have their captions changed to any value. In the example above UserField1 has its caption set to ‘Date Required, UserField10 caption is ‘FEED Estimate’ etc. To change captions use the Grid Manager accessed from the Instrument List Tools menu.

Alarms/Settings

Use this tab to enter Alarm and Settings data required for your project.

8.3 Loop Check Wiring Reports

Loop Wiring Check Reports show a graphical 'loop diagram' type report of all wiring for current loop. The report may be printed or saved as a PDF file. This report is only available if the drawing has a valid loop number and wiring exists in the project wiring database for the instruments in the current loop.

Create a Loop Wiring Check Report

From the Drawing Information, in the Loop No text box. Click on the [ ] command button (only available if the Drawing is a Loop Diagram).
This brings up the Loop Data dialog (not shown here), from the Loop Data Dialog:

Click on the Loop Wiring Check command button. The following figure shows a typical report:

![Loop Data dialog](image)

You may print the report to a printer or save the report to a file in Adobe Acrobat PDF format by clicking the relevant Print or Export to PDF buttons. The Setup button allows you to change print properties such as page size and orientation etc.

When exporting to PDF AVEVA Instrumentation creates a file named after the Loop Number. The file name for this example would be: 00-F-100.pdf

You may Double-click on the report to zoom in or select a zoom ratio from the list of options after selecting the Zoom button:

Note: If your PC has a license for Wiring Manager when you right-click on any equipment tag AVEVA Instrumentation will bring up an option to allow access to the Wiring Manager's Terminations dialog which allows drag & drop editing of cable/wire terminations or to generate termination reports for the selected equipment.

Note: If your PC has a license for Wiring Manager when you right-click on any cable AVEVA Instrumentation will bring up an option to allow access to the Wiring Manager's Cable Detail dialog which allows viewing/editing for the selected cable.

### 8.4 Termination Editing

Designer allows access to the Wiring Manager's data normally created by the Wiring Manager application. The Termination dialog enables editing of wiring terminations and rearrangement of terminal strips etc.

**Access a Termination Diagrams termination Dialog**

This dialog can be accessed from two places in Designer:

1. From the Drawing Information
Click on the [...] command button next to 'Equipment No' text field (only available if the Drawing is a Termination Diagram). This brings up the Termination dialog

Or

2. From the Drawing List, click the 'Equipment No' cell command button which appears when your mouse hovers over the 'Equipment No' cell.

The following figure shows a typical Termination Dialog:

This dialog enables full editing of terminations for the drawing's equipment through the drag and drop user interface. For more information on Equipment Terminations, refer to the Wiring Manager's help file.
Using Wiring Rules to Create Data

9.1 Wiring Rules Overview

AVEVA Instrumentation uses 'Wiring Rules' to auto generate typical field instrument wiring/cabling. By using the Wiring Rules features you can save many hours otherwise required to build devices and their associated terminal arrangements, cables, terminations etc in Wiring Manager.

To apply a Wiring Rule refer to Creating Loop Wiring using Wiring Rules

By applying a Wiring Rule to a field instrument, you are defining a specific:

- Terminal Arrangement - number of terminals, their markings, sequence
- Default wire numbers to be used on wire terminations
- Default Cable Type - type of cable (individual cores, pairs or triad etc), whether shielded/screened, and whether armoured etc
- Default Cable Number, based of the instruments tag number fields from Instrument Engineer
- Default Wire terminations at field device - how the cable is connected to the field device terminals (core 1 to terminal 1, core 2 to terminal 2 etc)
- Default wire terminations at non-field device - how the cable is connected at the other end.

When you Create Wiring based on a Wiring Rule, AVEVA Instrumentation creates all the above for you. Just prior to saving this data AVEVA Instrumentation allows you to:

- Change the default Cable Number created by the Wiring Rule
- Select equipment the cable will terminate to at the other end (provides a list of Junction Boxes, Cabinets etc).

After accepting defaults (or making changes as required) the Field Device and terminals are created, cable created and terminated at both ends (if you have selected equipment at the other end). At the other end AVEVA Instrumentation always uses the next available spare terminals.

At any time after a Wiring rule is applied you can easily edit data that has been generated by:

1. Re-running the Create Wiring command using same Wiring Rule - this allows you to reassign a Cable No, reassign a Junction Box etc.
2. Re-running the Create Wiring command using a new Wiring Rule - this updates terminal arrangements, cable type, terminations AND allows you to reassign a Cable No, reassign a Junction Box etc.
3. Edit the cable details/type using Wiring Manager - Cables (the AVEVA Instrumentation Cable Schedule user interface).
4. Edit terminations using Wiring Manager - Equipment (the AVEVA Instrumentation Terminations editing user interface).

**Note:** You can also access Equipment Terminations directly from Designer - refer to *Termination Editing*.

### 9.2 Using Wiring Rules

Designer allows access to two Wiring Rules commands from the Loop Data dialog. The Loop Data dialog is access from the Designer's *Drawing Information* if the drawing is a Loop Diagram (i.e. it has a Loop Number that is valid for the project).

**Note:** AVEVA Instrumentation uses Wiring Rules when you assign tags to Junction Boxes in Wiring Manager. Refer to the Wiring Manager Help/Documentation for more information.

**Access the Loop Data Dialog**

From the *Drawing Information*, in the Loop No text box, click on the [ ] command button (only available if the Drawing is a Loop Diagram).

The following figure shows the Loop Data dialog showing a typical loop:

Just below the Loop Instruments list there are three buttons:

- **Loop Check Wiring Reports:** This command shows all instrument wiring associated with the current loop.
• **Creating Loop Wiring using Wiring Rules**: This command Creates Loop Wiring from Wiring Rules applied to each field instrument in current loop.

• **Remove Loop Wiring**: This command removes anything previously created by Wiring Rules for each field instrument in current loop.

**Note**: The Loop Instruments list shows the name of a Wiring Rule associated with each instrument (Wiring Config column).

### 9.3 Creating Loop Wiring using Wiring Rules

**Note**: Although you can use Wiring Rules to create field cables/terminations from Designer, this is limited to working on a Loop by Loop basis. AVEVA Instrumentation recommends creating your field wiring using Wiring Rules from the Wiring Manager's Equipment View or Cable Block Diagram by assigning (allocating) field tags to Junction Boxes which is more efficient than doing it in Designer by each Loop.

Designer will auto create the field device, terminals, cables, cores and wire numbers and terminate cable cores at both the field device and Junction box cable ends based on assigned **Wiring Rules Overview** for each specific Loop instrument. This effectively completes field wiring in a very efficient and simple manner that can save hundreds on man-hours on a large project!

**Note**: The loop must have tags assigned. To assign tags to a loop you must use the Instrument Engineer application.

**Note**: AVEVA Instrumentation uses Wiring Rules when you assign tags to Junction Boxes in Wiring Manager. See the Wiring Manager Help/Documentation for more information.

#### Create Loop Wiring using Wiring Rules

From the **Loop Data** Dialog, click on the **Create Loop Wiring** command button Designer will bring up the following dialog:

![Create Loop Wiring Dialog](image)

This dialog shows all instruments assigned to the current loop. Only those instruments **selected** will be processed by the **Create** command.
Columns Explanation

Select 
Only those instruments selected are processed when the Create command is used

TagNo 
The instrument tag number - Non editable (tags can only be assigned to a loop using Engineer)

Note: Although the Wiring Rule (Wiring Config) defines the terminal arrangement of the Field Device you can select a different type by clicking on the 'Tag No' cell button that appears when the mouse hover over this cell.

Code 
The 'Loop Code' is used by AVEVA Instrumentation Datalinks to map information into a loop drawing template when generating CAD drawings. It is ONLY required if you intend to generate CAD loop drawings in Designer. This 'Loop Code' must be unique for the current loop for CAD loop drawing creation.

WiringConfig 
The name of the Wiring Rule to apply to the tag. This cell is a combo box (PickList) so you can easily apply a rule (or change). This combo box only appears when your mouse pointer hovers over the WiringConfig cell.

JBox 
This holds the name of the equipment the cable will run to. This cell has a small command button embedded at the right side of each cell. Clicking on that button will brings up Assigning a Junction Box dialog. This button only appears when your mouse pointer hovers over the JBox cell.

Terminate 
When 'checked' cores will be terminated at the JBox end (on the next available spare terminals). When 'unchecked' cores will not be terminated at the JBox end. The cores will need to be terminated manually using Wiring Manager by dragging the cable or cores to the desired terminals.

CableNo 
This shows the default cable number as created by the wiring rule or the actual cable number from the AVEVA Instrumentation Cable Schedule (if the cable has been created previously). You may enter a new value if you require.

Cable Type 
This shows the base cable type. It can be changed by selecting the cell command button that appears when you hover your mouse over this columns cell. The initial cable type comes from the Wiring Rule catalogue cable (if the cable is not yet created) or from the Cable Schedule (if the cable has been created previously). Clicking the 'Cable Type' cell button brings up the Catalogue Cable selection dialog allowing a new catalogue cable to be selected.

Length 
You can enter a Cable Length here. This length is saved in Wiring Manager's Cable Schedule.

Command Buttons

Create 
Goes ahead and Creates all selected tags, cables, termination and other wiring data from the Wiring Rules & data in this grid.
Note: Create will make the field device(s), terminals & wire markings, the field cable(s) and cores & terminate the field cable(s) at both the field device and Junction Box ends. This effectively completes field wiring in a very simple and efficient manner.

Save Saves changed data in the grid, but does not go ahead and create Wiring Rule data. This allows you to pre-assign junction boxes etc prior to cable/device creation.

Cancel Quits the dialog, not saving or creating.

Note: Wiring Manager allows limited editing of the predefined Wiring Rules. Limitations are that only Cable No, Wire No, Terminal Marking and Cable Types can be changed. Currently creation of new wiring rules is outside the scope of this document.

9.4 Assigning a Junction Box

When selecting a Junction Box when running Wiring Rules, the following dialog appears showing all junction boxes defined in the current plant area:

This dialog initially shows all Junction Boxes in the instrument's plant area. You may select the 'All Areas' option to view equipment in all plant areas.

Assign the Instrument to a Junction Box
double-click on the desired equipment tag.

Junction Boxes and other Equipment (other than field devices) can only be created by Wiring Manager - Equipment module

Note: The instrument Signal Type is shown near the top of this dialog. This comes from the Instrument's Signal Type field in the AVEVA Instrumentation Instrument Data dialog. There is nothing to stop you assigning any instrument to any junction box, regardless of signal type. This is a guide only in this release of AVEVA Instrumentation.
10 Change Reports

10.1 Audit Manager

AVEVA Instrumentation has an in-built Audit Manager that enables users to view database changes made during your project in the database audit log.

**Note:** Audit Manager supports SQL Server databases only. Audit Manager is not available if your project database uses Access.

The Audit Manager is available from most Grid Views within each AVEVA Instrumentation module by selecting:

**Tools** from the top menu bar, then **View Audit Log** option, AVEVA Instrumentation will open the Audit Manager main dialog:

By default the Audit Manager displays all database changes for the current AVEVA Instrumentation module and Grid. The grid shows the most recent change at the top.

The Audit log includes the User Name and Date/time of the change. The User Name is the Windows login name for the user who changed the data in AVEVA Instrumentation.
Data from other AVEVA Instrumentation objects can be selected from 'AVEVA Instrumentation Object Type' list (more than one can be selected).

The 'Apply Date/Time' filter enables the list to be filtered between user defined dates/times.

The 'Apply Limit' enables the list to be limited to a user defined maximum. The most current changes are always included, effectively removing the early project changes from the list.

The Tools menu includes an Export to Excel command to export the grids data to Excel if required.

### 10.2 Database Revisions

#### 10.2.1 Project Database Revisions

AVEVA Instrumentation allows users to make a copy of the current database state by saving the database as a Database Revision and at any time compare changes between the current database and a previously saved Database Revision. This feature can be used to track changes between key milestones in the project, for example between data when documents were 'Issued for Tender', 'Issued for Purchase' or 'Issued for Construction'. This feature works with project's using SQL Server and Access database formats.

**Database Revisions**

Prior to comparing changes a Database Revision must be saved. A 'Compare Changes' report always compares a previously saved Database Revision to the current database.

To access Database Revisions:

From the Application menu, click Setup option, then click Project Revisions option AVEVA Instrumentation will open the Project Revisions dialog:

![Project Revisions dialog](image)

This dialog shows all previously saved Database Revisions (if any have been saved).
10.2.2 Saving a Database Revision

Prior to comparing changes a Database Revision must be saved. A 'Compare Changes' report always compares a previously saved Database Revision to the current database.

To Save a Database Revision

From the Database Revisions dialog, click New from the toolbar menu. This pops up the New Database Revision dialog:

![Save a Project Revision dialog]

To save the current database state as a Database Revision enter unique Revision Number and (optionally) descriptions and a user name, click Save to save the revision.

Note: If the current database is large (i.e. there are many entries) this action may take a few minutes to complete.

Note: We recommend that Database Revisions are saved only when all other engineers and designers have exited AVEVA Instrumentation application modules.

10.2.3 Compare Changes between Db Revisions

Prior to comparing changes a Database Revision must be saved. A 'Compare Changes' report always compares a previously saved Database Revision to the current database.
To Compare Changes to a saved Database Revision:
From the *Database Revisions* dialog, click Compare from the toolbar menu.

This pops up the Compare Database Revisions dialog:

![Compare Database Revisions dialog](image)

To compare the current database state to the Database Revision selected in the previous Database Revision list:

First: Select the Change Report type from the list on the right of the above dialog.

**Note:** Multiple Change Reports may be selected by clicking on any number of names in the list.

To run the Compare Reports, click **Compare**.

**Note:** If the current database is large (i.e. there are many entries) this action may take a few minutes to complete particularly if you run multiple detail reports.

When the comparison reports are completed AVEVA Instrumentation will display any differences in the Changes grid as shown in this next example:
This grid shows all changes for the selected Change Report (in this example 'Drawing List'). The changes can be printed or exported to Excel by using the appropriate toolbar commands.
11 Report Manager

AVEVA Instrumentation has an in-built **Report Manager** that enables users to create and modify reports.

The Report Manager is available from most Grid Views within each AVEVA Instrumentation module by selecting:

From the Ribbon menu select **Reports**, then **Report Manager** to display the AVEVA Instrumentation Report Manager window.

The Report Manager shows a list of all previously defined reports for the current AVEVA Instrumentation Grid in the list on the left hand side. In the example above only one report has been created. If there are multiple reports already created the user can run those reports by clicking on the report name (in the list of Reports on the left side).

The Report Manager supports printing to your printer and PDF file format as well as to Excel and other formats. The data is formatted as defined within the report design. The report design is created and modified by AVEVA Instrumentation users using the Report Designer.
Create a New Report (for the current Grid)

Click **New** (or select an existing report and click the small drop-down menu arrow next to new to 'Copy Selected'), to display the AVEVA Instrumentation Report window.

The user must create a Report Name by entering a name for the report in the View Name field and a Description for the report.

**Note**: The View Name and Description are mandatory fields.

Click the **Fields** tab to show a list of fields available for use in the report.
The user can select multiple fields as required from the Fields list.

Define a Sort Order, by clicking **Sorting** to select a field(s) to sort by in the new report.
To select a field double-click the field from the list of View Fields.

The user can also set a data filter to apply to your report (to limit the data to certain criteria) by clicking Filtering.

Once the user has defined all the fields, sort order and any Filters, click Save.

AVEVA Instrumentation will then build the report and display it in the Report Manager window.

To edit the layout, click Edit Layout - located at the top right of the Report window to display the Report Designer window.
The Report Designer enables the user to:

Layout your selected fields on the page
Set font details (font name, font size, whether bold or italic) etc
Set colours (both foreground and background)
Attach pictures/logos etc
Set Page headers/footers, grouping etc

**Note:** To add additional fields to your report drag the field name onto the page (from the Fields List tab tree view) at the middle right of this window. If you need to add a new field that is not yet in that tree view then you will need to save the layout and select your new fields from the Grid fields list as described in 'Second: Select the Grid Fields above'.
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