



AVEVA Electrical (12.1)

Engineer

TM-6502

TRAINING GUIDE

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Revision Log

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Updates

Significant changes to content have been made for AVEVA Electrical SP4. Due to the scope and scale of these changes they have not been highlighted.

For smaller changes, change highlighting will be employed in future revisions. Where new or changed information is presented section headings will be highlighted.

Suggestion / Problems

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1 Introduction

This training guide has been developed for the electrical engineer user who will be responsible for the equipment definition and specification. The sections covered within this guide attempts to describe all the relevant activities required in AVEVA Electrical Engineer Module.

1.1 Aim

The AVEVA Electrical Engineer Training Manual will show the user how to perform tasks typically handled by Electrical Engineers during a project life cycle using the Electrical Engineer module of AVEVA Electrical.

1.2 Objectives

At the end of this training course, the user will be able to:

At the end of this training course, the administrator(s) will be able to:

- Manage all of the Electrical Project Data
- Generate/Create Key One Line Diagrams
- Generate Single Line Diagrams
- Create/Import Load Lists
- Create/Import Supply Lists
- Size Cables
- Create Datasheets.
- Create Reports

1.3 Prerequisites

Trainees ideally should come from an Electrical Engineering/Design background and have a clear understanding of Electrical Engineering from a design or operations perspective.

AVEVA Electrical has been installed on the Trainee's computers that they will be using for the duration of this training course.

Microsoft Office 2007, 2010, 2013 and 365 (Excel) has been installed on the Trainee's computers that they will be using for the duration of this training course.

Enterprise, Standard or Express versions of Microsoft SQL Server 2008 R2 (SP3) or 2012 (SP3) or 2014 (SP1) must be installed on each Trainee's computer, or each Trainee must have access to an instance of Microsoft SQL Server installed elsewhere on the network the Trainees might be connected to.

The name of the instance of Microsoft SQL Server that the Trainee has access to must be known to each Trainee.

AutoCAD 2014, 2015 or 2016 is a prerequisite for this training course.

- ① If training is to be conducted in a stand-alone environment, then all four of the AVEVA Electrical modules are to be installed on each users machine. This will include Security Manager. Each user is to have read and write access to the instance of the SQL server used for training, and have permissions set to be able to create databases on the instance of the SQL server used for training.
- ① If training is to be conducted in an administrative environment, then all four of the AVEVA Electrical Modules are to be installed on the AVEVA Electrical project administrators machine. This will include Security Manager. The AVEVA Electrical project administrator is to have read and write access to the instance of the SQL server used for training, and have permissions set to be able to create databases on the instance of the SQL server used for training.

 For any details about the hardware and software requirement and assistance with SQL Server installation please refer to the AVEVA Electrical Installation guide.

1.4 Course Structure

Training will consist of oral and visual presentations, demonstrations and set exercises. Each workstation will have a training project and supporting material. These will be used by the trainees to practice their methods, and complete the set exercises.

1.5 Using this guide

Certain text styles are used to indicate special situations throughout this document, here is a summary;

Menu pull downs and button press actions are indicated by **bold dark turquoise text**.

Information the user has to Key-in **will be in bold, red text**.

Annotation for trainees benefit:

- ① Additional information
-  Refer to other documentation

System prompts will be bold italic and in inverted commas i.e. '***Choose function***'

Example files or inputs will be in the **courier new font**.

2 AVEVA Electrical Training Workflow

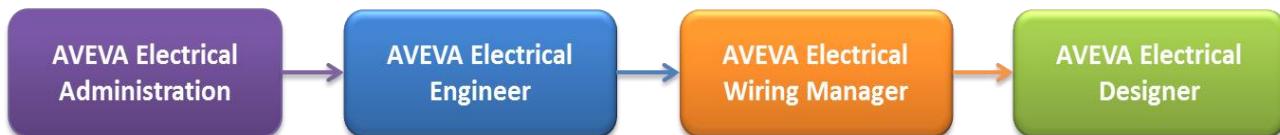
The AVEVA Electrical product suite consists of four modules:

- AVEVA Electrical Engineer
- AVEVA Electrical Wiring Manager
- AVEVA Electrical Designer
- AVEVA Electrical Security Manager

The AVEVA Electrical Training Manuals give an overview to the user on how to setup and, configure a project; create and manipulate engineering data and generate project deliverables during a project life cycle using AVEVA Electrical.

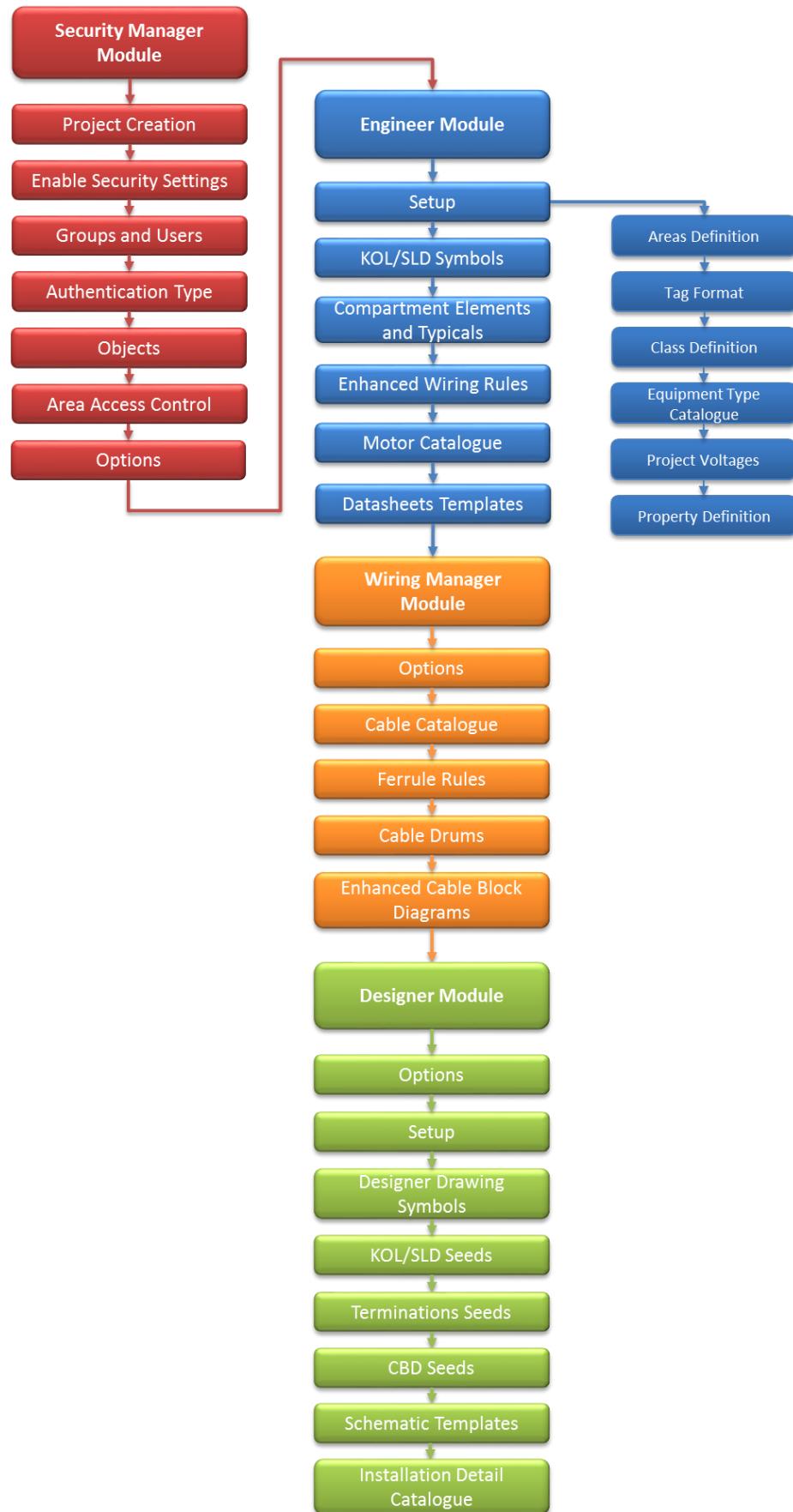
AVEVA Electrical (12.1) training has been designed to be presented to four different groups and follows the workflow shown below:

- AVEVA Electrical Administration (TM-6501): Project Administrators
- AVEVA Electrical Engineer (TM-6502): Electrical Engineers
- AVEVA Electrical Wiring Manager (TM-6503): Electrical Designers
- AVEVA Electrical Designer (TM-6504): Electrical Designers and CAD operators

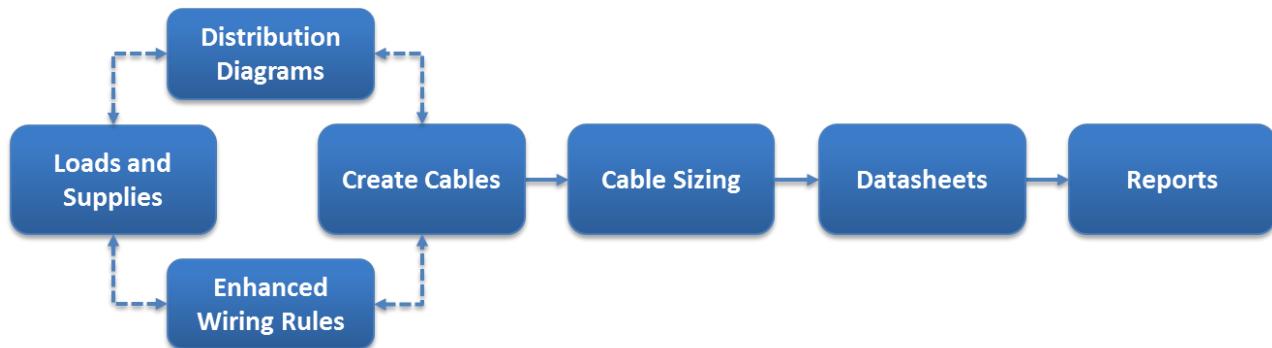


The Trainee is recommended to refer the flowchart while working through the Training Manual(s).

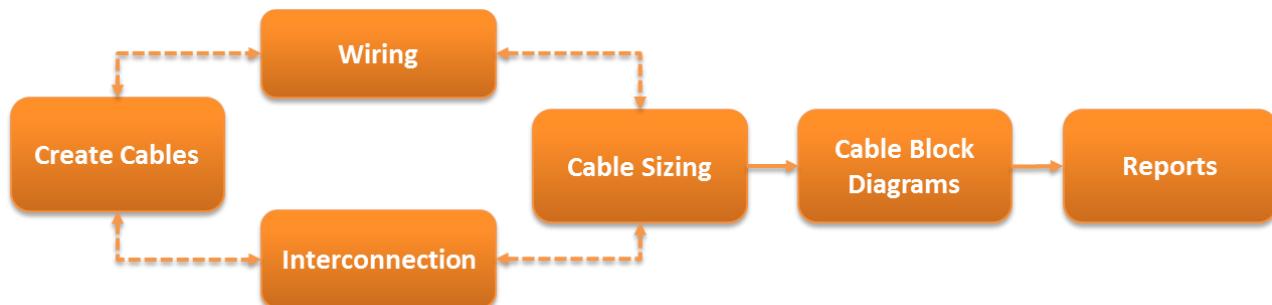
2.1 AVEVA Electrical Administration Training Guide Workflow



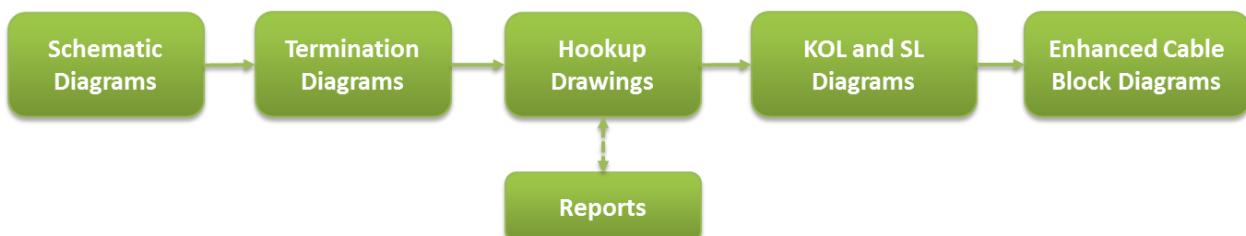
2.2 AVEVA Electrical Engineer Training Guide Workflow



2.3 AVEVA Electrical Wiring Manager Training Guide Workflow



2.4 AVEVA Electrical Designer Training Guide Workflow



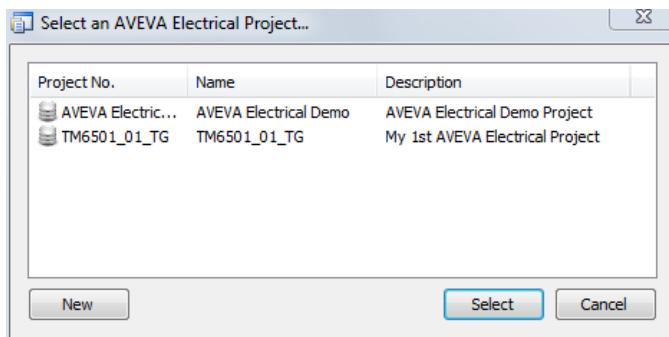
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3 Loads and Supplies

3.1 Starting AVEVA Electrical Engineer

AVEVA Electrical Engineer can be started from the windows desktop:

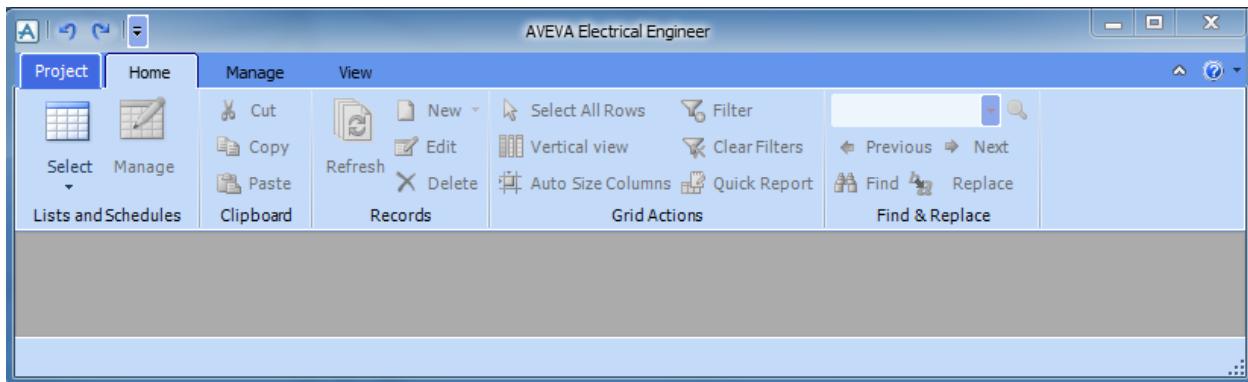
Start Menu > All Programs > AVEVA > Engineer > AVEVA Electrical 12.1.4 > Electrical Engineer 12.1.SP4.



Select Project **TM6501_01_XX** (where XX are the trainee's initials).

Click **Select**

The AVEVA Electrical Engineer Application Window opens.



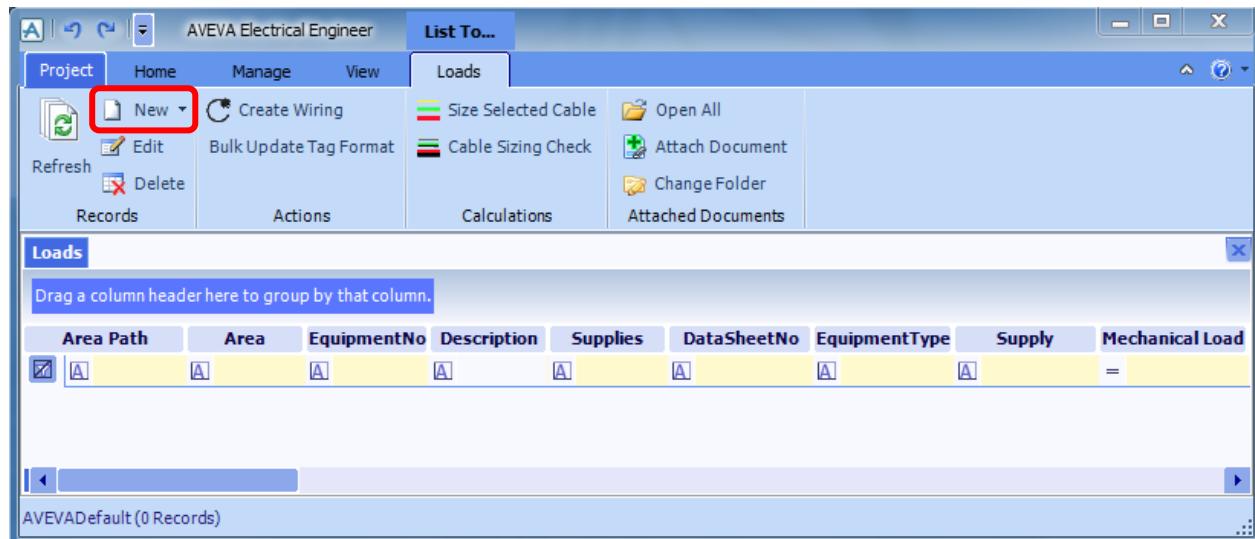
- i AVEVA Electrical Engineer can also be started by double clicking on the Plant Engineer icon on the windows desktop.
- i Detail of all of the features available in AVEVA Electrical Engineer will not be given in this training guide. For a detailed explanation of all of the features of AVEVA Electrical Engineer, please consult the AVEVA Electrical Engineer user guide.

3.2 Loads List

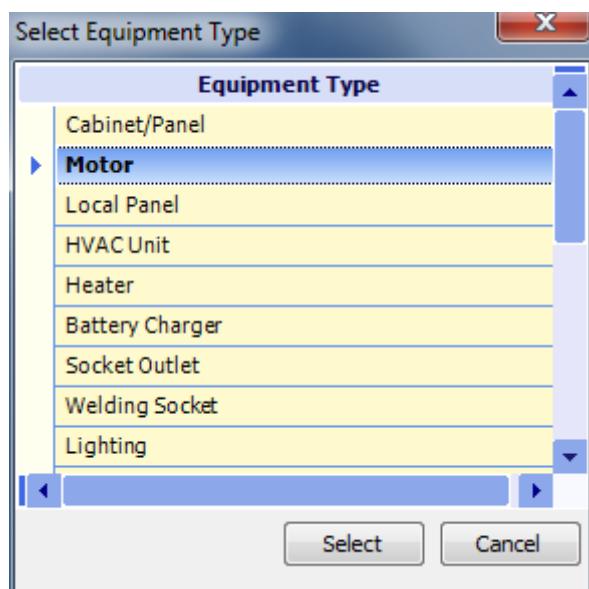
Open the **Loads** grid selecting **Home > Select > Loads**, the load grid will open. Cells that are coloured yellow cannot be edited directly in the grid. Cells that are not coloured yellow can be edited directly from the grid.

When the **Loads** grid is opened, a contextual tab **Loads** is also made available and is given the focus. Most of the features on this tab will be covered in later chapters of this training guide.

On the **Loads** tab on the **Records** pane select **New**.

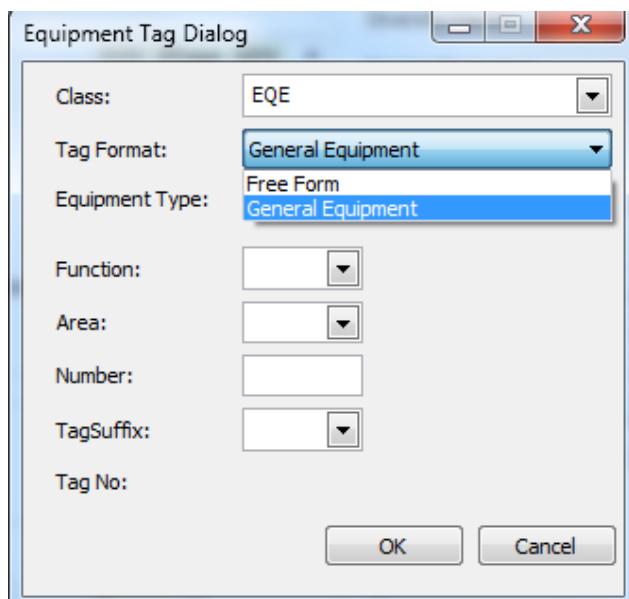
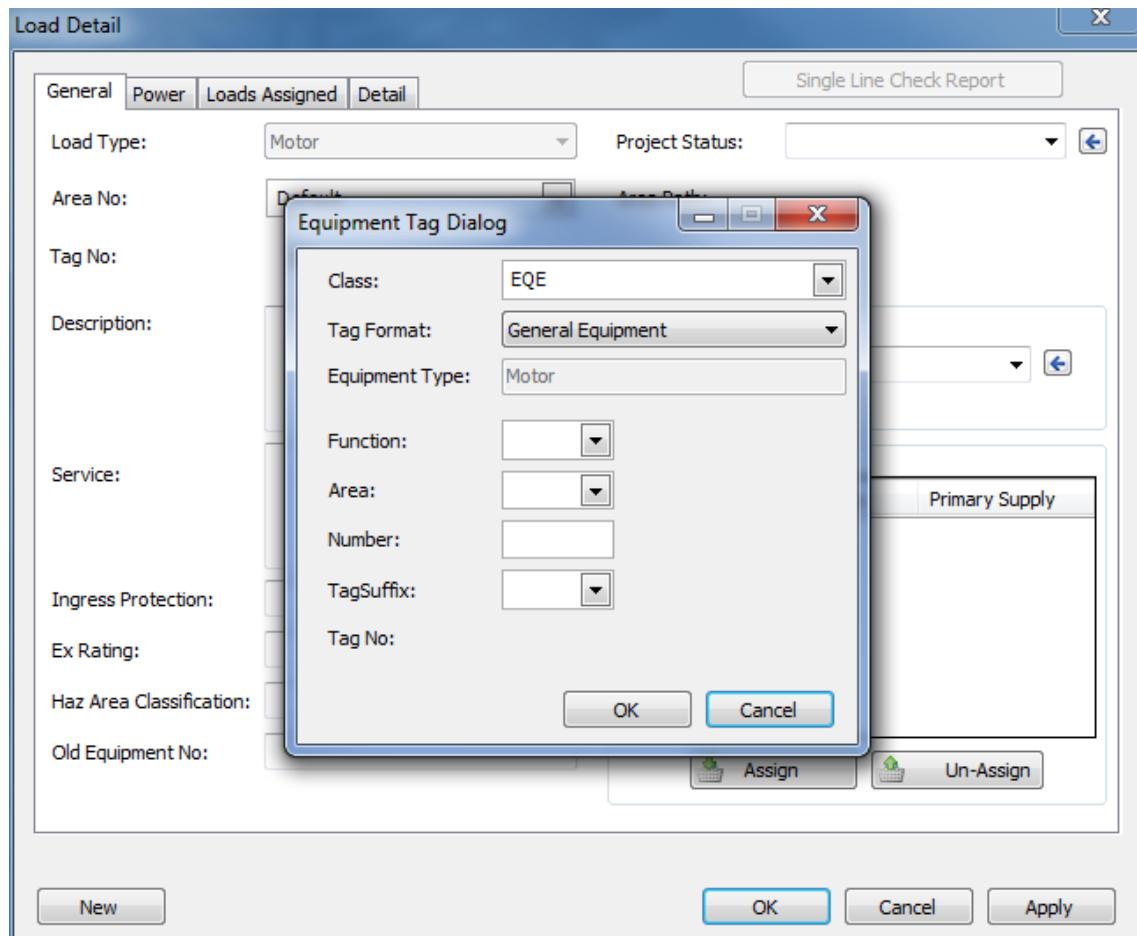


The **Load Type** is first selected here, the user presses the **Select** button and then the **Load Detail** form opens.



Select the equipment type **Motor**.

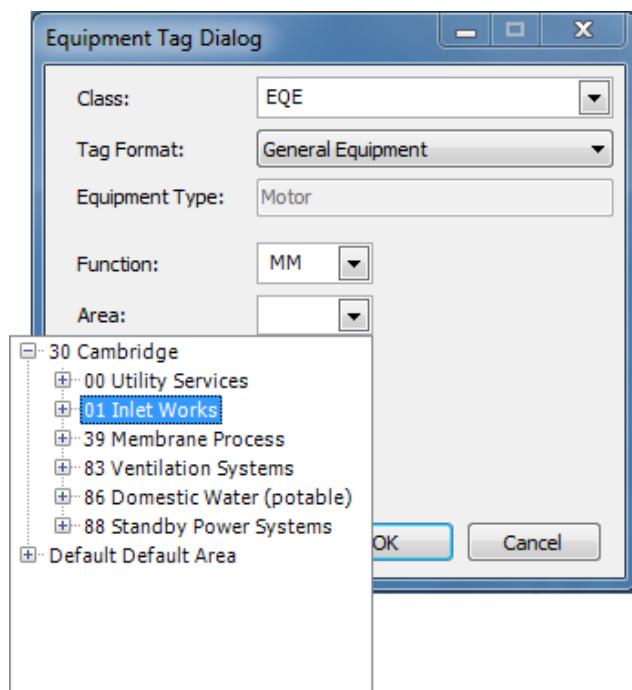
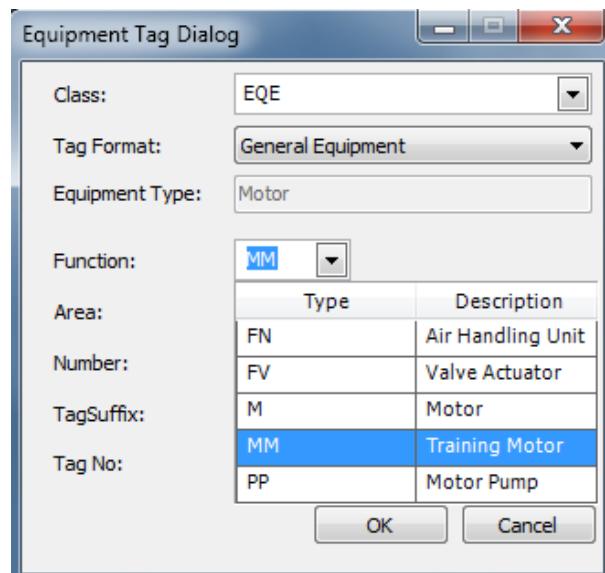
The **Load Detail** form opens along with Equipment tag dialogue.



The tag format **General Equipment** was selected as the primary tag and is made available as the default, selecting the arrow will open a pick list which will contain all other tags that were assigned, in this example only the two that were assigned are displayed.

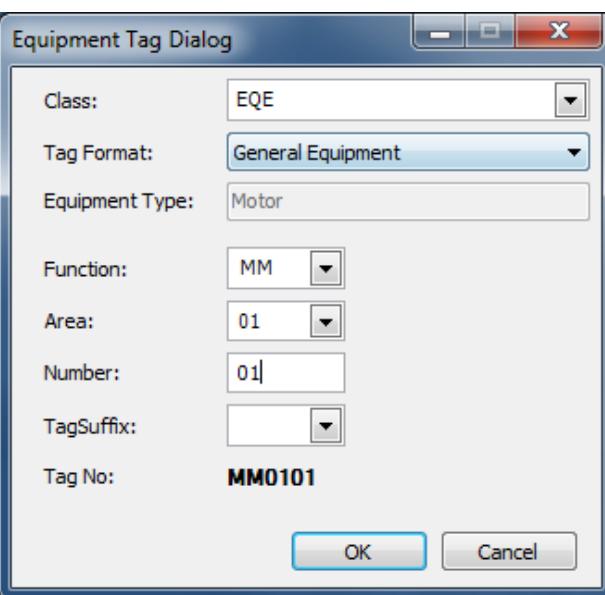
Selecting the pick list of the function text box will display the tags code assigned to the equipment type of motor.

Select Function: MM

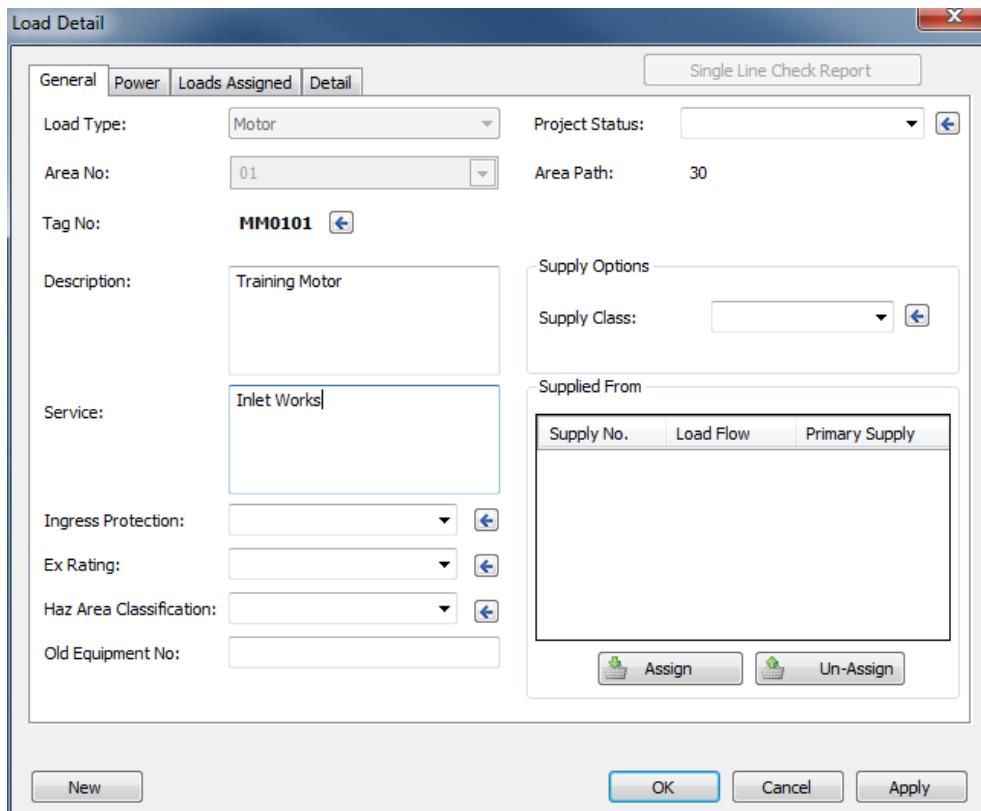


Enter Number: 01

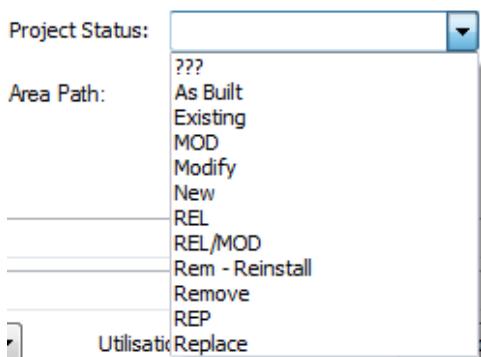
Click OK to close the form.



The **General** tab is then displayed. In the **Service** text box type **Inlet Works**.



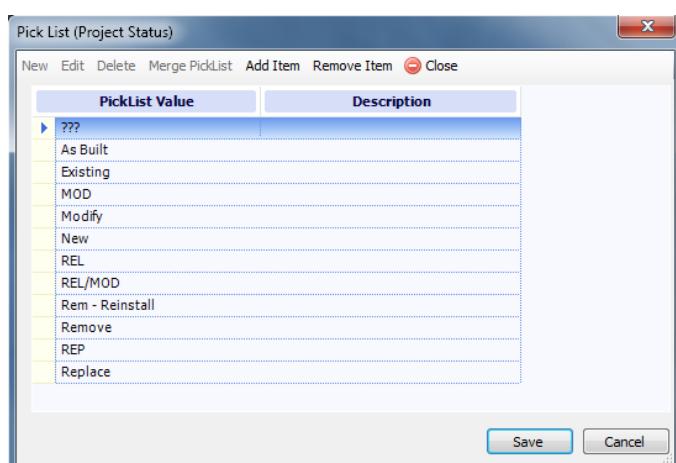
i Description has been populated from the Equipment Type Code Catalogue.



On the right hand side of the **Load Detail** form (see above) are text boxes that have down arrows to the right of them. When clicked these show a pick list of options to choose from.

Project Status is shown here to the left as an example.

Further to the right of these text boxes are buttons with an arrow pointing to the left. .



When pressed a **Pick List** window opens. **Project Status** is given as an example to the right. This gives flexibility to the content of pick lists. Items can be added or removed from the list.

This is a common feature throughout the AVEVA Electrical Product Suite.

Pick lists can also be locked to prevent users from adding items that are not listed to the list by typing directly into the text box.

Set the following using the information in the pick lists:

Project Status: [New](#)

Supply Class: [Essential](#)

Ingress Protection: [IP55](#)

Haz Area Classification: [Safe](#)

Haz Area Classification pick list is empty. Pick the button to the right of the text box to open the Pick List window to add an item to the list. Select [Add Item](#) then type **Safe** into the box that appears below **PickList Value** column. Press the [Save](#) button. Now the Classification **Safe** appears in the pick list.

The screenshot shows two windows side-by-side. On the left is the 'Load Detail' dialog box, which contains fields for Load Type (Motor), Project Status (New), Area No (01), Area Path (30), Tag No (MM0101), Description (Training Motor), Service (Inlet Works), Ingress Protection (IP55), Ex Rating, Haz Area Classification (Safe), Old Equipment No, Supply Options (Supply Class: Essential), and a Supplied From section. At the bottom are buttons for New, OK, Cancel, and Apply. On the right is the 'Pick List (Haz Area Classification)' dialog box, which has a header with New, Edit, Delete, Merge PickList, Add Item, Remove Item, and Close buttons. It contains a table with columns 'PickList Value' and 'Description'. A single row with 'Safe' in the 'PickList Value' column is selected. A red box highlights the 'Add Item' button in the header and the 'Safe' entry in the list. To the right of the pick list are other input fields: Ex Rating, Haz Area Classification (set to Safe), Old Equipment No (set to Safe), Supply Options (Supply Class: Essential), and Supply Class.

The load may also be assigned to a supply by clicking the **Assign** button. Later on in this guide, users will be taught how to assign loads to supplies.

Select the **Power** tab. Set the following data using the information below:

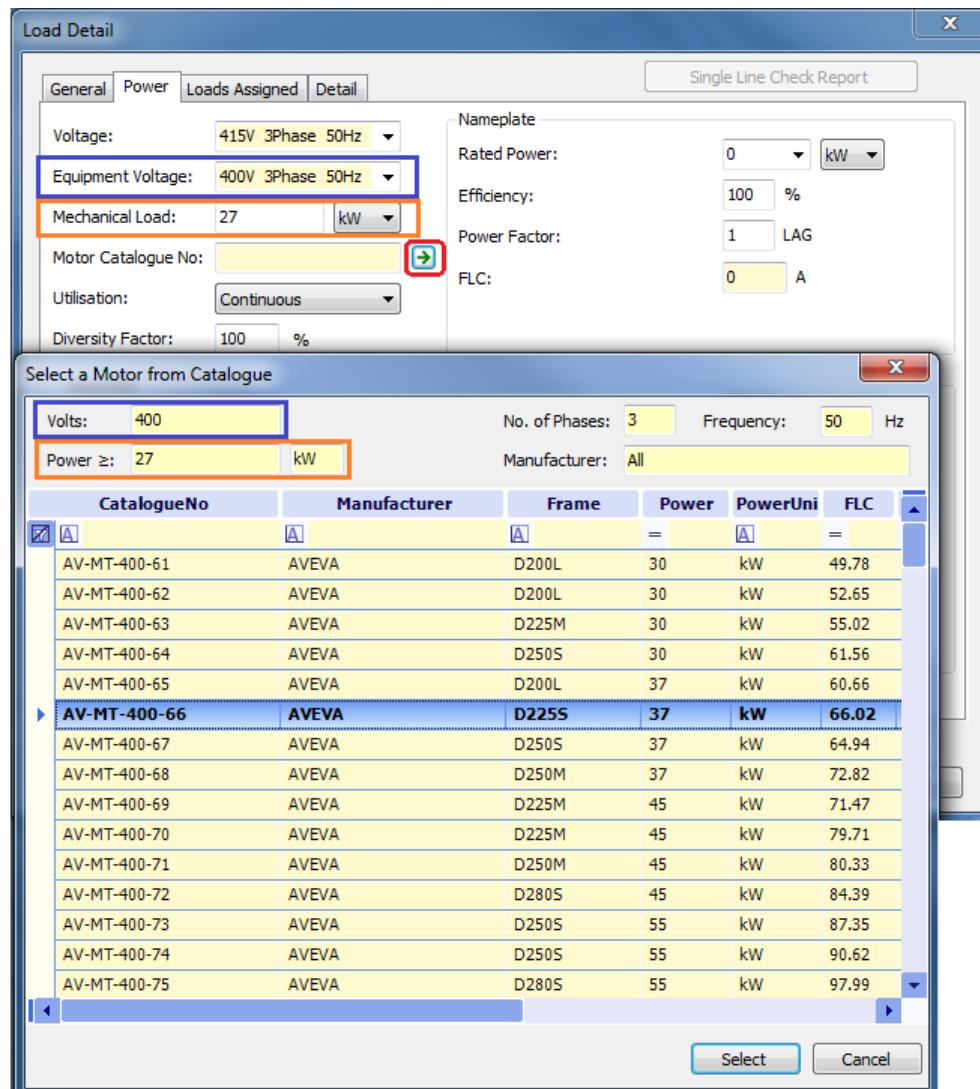
Equipment Voltage: **400V 3Phase 50Hz**

Mechanical Load: **27**

- ⓘ The **Voltage** field corresponds to the **Project Voltage**, which is the **Supply** equipment voltage.
- ⓘ The **Equipment Voltage** is the nominal **Load** equipment voltage. It is used in Nameplate, Absorbed power and Cable Sizing calculations.
- ⓘ By default the **Equipment Voltage** is equal to the **Project Voltage** and also multiple **Equipment Voltages** may also be defined. As shown in the AVEVA Electrical Administration Training Manual.

Pressing the button to the right of the **Motor Catalogue No** box will open the motor catalogue showing suitable motors for the specified **Equipment Voltage** and **Mechanical Load**.

Select the **AV-MT-400-66, 37 kW** 4 pole motor.



Press the **Select** button on the **Select a Motor from Catalogue** form.

The user is returned to the **Load Detail** form.

The screenshot shows the 'Load Detail' dialog box with the 'Power' tab selected. It displays various parameters for a motor load:

- Voltage:** 415V 3Phase 50Hz
- Equipment Voltage:** 400V 3Phase 50Hz
- Mechanical Load:** 27 kW
- Motor Catalogue No:** AV-MT-400-66
- Utilisation:** Continuous
- Diversity Factor:** 100 %
- Nameplate** section:
 - Rated Power:** 37 kW
 - Efficiency:** 92.5 %
 - Power Factor:** 0.84 LAG
 - FLC:** 66.02 A
- Absorbed** section:
 - Loading Factor:** 100 %
 - Power:** 37 kW
 - Efficiency:** 92.5 %
 - Electrical Power:** 40 kW
 - Power Factor:** 0.84 LAG
- Data Source for Calculation:** Motor Catalogue
- Calculated Values:**
 - Apparent Power: 47.62 kVA
 - Reactive Power: 25.84 kVar
 - Power Factor Correction: 0 VAr
 - Corrected Power Factor: 0.84 LAG
 - Current: 66.02 A

All of the motor data text boxes are populated with information contained in the motor catalogue. Yellow text boxes are either pre-selected fields (Read Only Access) or calculated fields and cannot be edited.

- When a motor catalogue is selected for a motor tag the Nameplate and Absorbed values are set according to the information defined in the motor catalogue. The user can type the details directly into the text boxes on the form, if a suitable motor cannot be found in the motor catalogue or a special motor type is required.*

The **Data Source for Calculation** field displays **Motor Catalogue** as data source. If the motor is imported from ETAP the value will be **ETAP** or **Manual** if the user entered the data.

In the **Loading Factor** text box type **80**.

The screenshot shows the 'Load Detail' dialog box with the 'Power' tab selected. The 'Absorbed' section has been modified:

- Loading Factor:** 80 %
- Power:** 29.6 kW
- Efficiency:** 92.58 %
- Electrical Power:** 31.97 kW
- Power Factor:** 0.816 LAG
- Data Source for Calculation:** Motor Catalogue
- Calculated Values:**
 - Apparent Power: 39.18 kVA
 - Reactive Power: 22.65 kVar
 - Power Factor Correction: 0 VAr
 - Corrected Power Factor: 0.816 LAG
 - Current: 56.55 A

The Absorbed values are updated and calculated based on the motor catalogue information using the linear extrapolation methodology. **Data source for Calculation** is not changed.

- If the Absorbed Efficiency or Absorbed Power Factor or Nameplate Rated Power is modified manually, it will remove the catalogue link. The **Motor Catalogue No** will get 'empty' and the **Data Source for Calculation** will change to 'Manual'.*

Select the utilisation type of the load from the **Utilisation** list. Making a selection automatically populates the Diversity Factor field.

General	Power	Loads Assigned	Detail
Voltage:	415V 3Phase 50Hz	Default Diversity Factor values are:	
Equipment Voltage:	400V 3Phase 50Hz	<ul style="list-style-type: none"> Continuous: 100% Intermittent: 50% Standby: 0% Spare: none (the field is disabled) 	
Mechanical Load:	27	kW	
Motor Catalogue No:	AV-MT-400-66		
Utilisation:	Continuous		
Diversity Factor:	Continuous		
Absorbed Loading Factor:	100	%	
Power:	37	kW	
Efficiency:	92.5	%	
Electrical Power:	40	kW	
Power Factor:	0.84	LAG	

Default Diversity Factor values are:

- Continuous: 100%
- Intermittent: 50%
- Standby: 0%
- Spare: none (the field is disabled)

Unless Spare was selected, the user may then amend the default value as required. The maximum value that can be entered is 150%.

i A load cannot be set to Spare if it is linked to either a load or supply tag.

Press **Apply**. The new Motor is now displayed in the **Loads** grid.

The **Loads Assigned tab** is used to link a load to the current load, so that the current load is effectively the supplier of the linked load.

Select the **Detail** tab. Using the down arrow to the right of the **Design Status** text box, set the status to **In Progress**.

Load Detail

General	Power	Loads Assigned	Detail	Properties	Single Line Check Report	
Design Status:	In Progress	Rev:		Schematic Dwg Req'd:	<input type="checkbox"/>	
Load Remarks:				External Cable Sizing Template :	<input type="button" value=""/>	
Wiring Rule	Rule name:	<input type="button" value=""/>	<input type="button" value="Unassign"/>	<input type="button" value="Create Wiring"/>		
Motor Infomation						
Speed:	1460 rpm	Starter type:	<input type="button" value=""/>	High Torque:	<input type="checkbox"/>	
No. of Poles:	4	Starting Current:	376 A	Multi Speed	<input type="checkbox"/>	
					<input type="checkbox"/> Synchronous	
General	Datasheet	Project Defined Fields				
Position / Size	Ex Certification					
Geographical Location:	<input type="text"/>					
Location Drawing:	<input type="text"/>					
Size						
X: <input type="text"/>	Y: <input type="text"/>	Z: <input type="text"/>	Name: <input type="text"/>	Authority: <input type="text"/>	Number: <input type="text"/>	
						Expiry Date: <input type="text"/>
Attached Documents (Count= 0)						
New	Last Edit: <input type="text"/>	<input type="button" value=""/>	<input type="button" value="OK"/>	<input type="button" value="Cancel"/>	<input type="button" value="Apply"/>	

For the purposes of this training, the rest of the form can remain as it is. **Schematic Dwg Req'd:**, **Wiring Rule:** and **Create Wiring** will be addressed as the training progresses.

The tab includes additional fields for entering motor information. *No. of poles*, *Speed* and *Starting Current* text boxes are populated with information contained in the motor catalogue.

There are three additional tabs in the bottom half of the form:

- The **General** tab is for information that can be used in reports and data sheets.
- The **Datasheet** tab, as its name suggests is for information that will be included on the datasheet. Datasheets will be addressed as the training progresses.
- The **Project Defined Fields** tab is used to enter load data in the project defined fields.

The **Properties** tab is where the user can add additional property values that can be displayed in data sheets.

Click **OK** to close the form.

The new Motor is now displayed in the **Loads** grid:

Area Path	Area	EquipmentNo	Description	Supplies	DataSheetNo	EquipmentType	Supply	Mechanical Load	Nameplate Power	EquipmentVoltage
30	01	MM0101	Training Mot	A	A	Motor	=	27	37	400

Exercise 1 – Add Loads

In this exercise the user will add a mixture of three phase and single phase loads. Using the table below and the worked example above as a guide create the following loads:

Equipment No.	Area	Type	Rated Power	Power Factor	Voltage/ Equipment Voltage	Utilisation	Diversity
X8301	83	Welding Socket	18kW	0.8	415 3ph	Intermittent	30%
X8302	83	Welding Socket	18kW	0.8	415 3ph	Intermittent	30%
X8303	83	Lighting	2kW	0.4	240 1ph	Intermittent	50%
X8304	83	Lighting	2kW	0.4	240 1ph	Intermittent	50%
X8305	83	Lighting	2kW	0.4	240 1ph	Intermittent	50%
X8306	83	Socket Outlet	4kW	1.0	240 1ph	Intermittent	30%

Apply the following to all of the items in the table:

Absorbed Power Factor equals to Nameplate Power Factor.

Equipment Tag Dialog:

Class: EQE
Tag Format: General Equipment

On the General tab:

Service: Building Services
Project Status: New
Haz Area Classification: Safe
Supply Class: Normal

On the Detail tab:

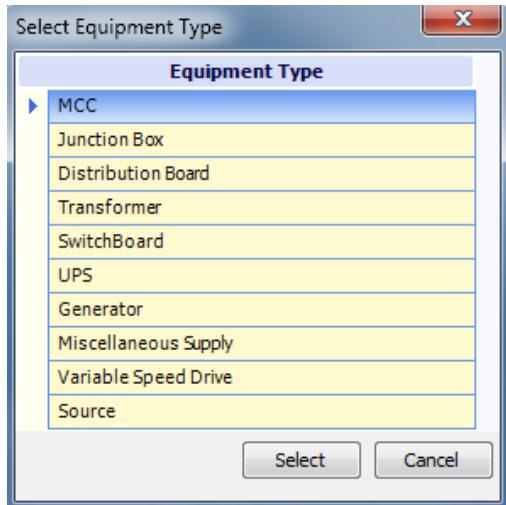
Design Status: In Progress

Select **OK** to close the form as each form is completed.

3.3 Supplies List (Worked Example)

Open the **Supplies** grid selecting **Home > Select > Supplies**, the Supplies grid will open.

Adding a new supply item to the project follows the same process as adding a load.



When the user selects **New** on the **Supply List** tab in the **Records** pane or, the user selects **New** on the **Home** tab in the **Records** pane when the supply grid is active, a selection window **Select Equipment Type** pops up. The **Supply Type** is first selected here, the user presses the **Select** button and then the **Supply Details** form opens

Using the information given below, create a new Switchboard. Only the **General Tab** needs to be completed on the **Supply Details** form at this point in the training.

Supply Type:	SwitchBoard	Project Status	New
Class:	EQE	Location:	Leave Blank
Tag Format:	General Equipment	Spare Capacity:	25%
Equipment No.	SB0001		
Plant Area:	00		
Service:	Main LV Sw. Board		
Supply Class:	Normal		
Voltage:	415V 3Phase 50Hz		
Load:	1200 000		

- i** When entering the load, the units initially show VA. Enter the load as indicated above and the units will change to MVA automatically with the value 1.2 in the text box.

The form should now look similar to the image below:

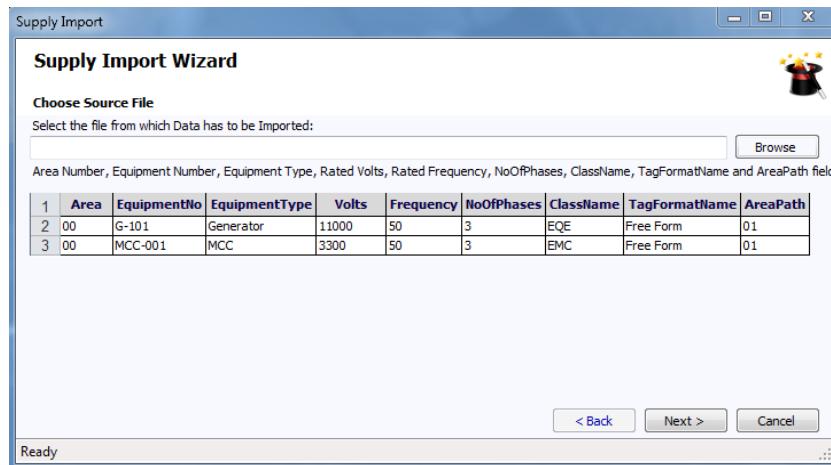
When completed, press **OK** to exit the form.

3.3.1 Import Supplies from Excel

Other applications that do not have a direct interface with AVEVA Electrical invariably will have the ability to export data into Microsoft Excel. This data can then be imported into AVEVA Electrical.

AVEVA Electrical will import the connectivity of loads and supplies. To be successful, supply equipment items should be imported first and then additional busbars and circuits can be added once the items have been imported. When done, import the load equipment items.

Select the **Manage** tab. Click the **From Excel** button under the **Import** pane. This will open the **Supply Import Wizard**.



The mandatory fields must be mapped to fields in the spread sheet that is to be imported for the import to be successful:

- **AreaNo**
- **AreaPath**
- **Class Name**
- **TagFormatName**
- **EquipmentNo**
- **EqType**
- **ElecVolts**
- **ElecRatedFrequency**
- **ElecNoOfPhases**

Tag codes must be included according to the project tag format(s), in this example:

- **ISAFunc**
- **LNumber**
- **TagSuffix**

Select the **Browse** button and browse to the location where the files supplied by your trainer are located:

C:\AVEVA_ElectricalTraining\ExcelFiles\SuppliesNoRules.xls

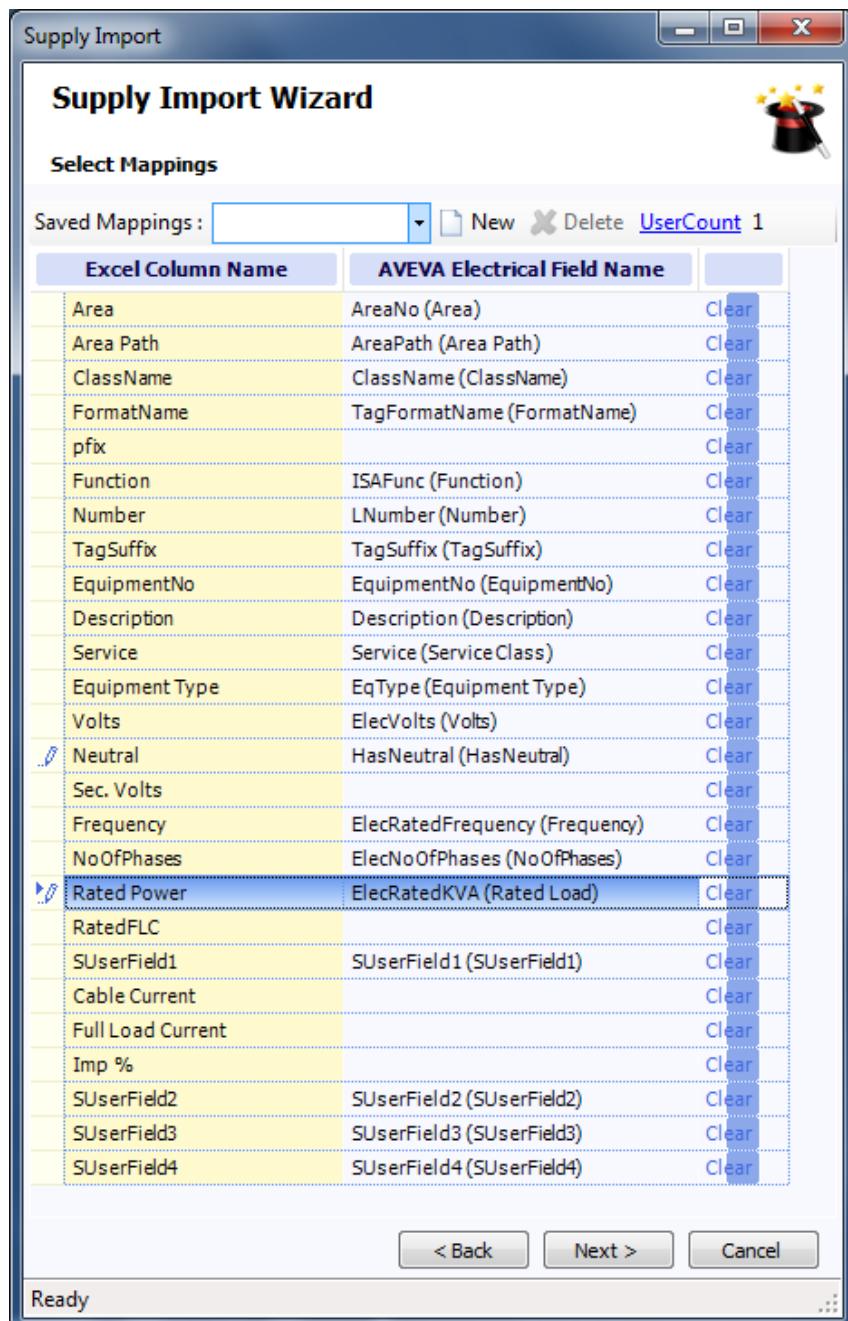
Click the **Open** button on the **Select Import File** form.

Click the **Next** button on the **Supply Import Wizard** form.

AVEVA Electrical **Engineer** will scan the spread sheet to be imported and list the spread sheet column headers in the left hand column of the **Supply Import** form. The right hand column lists the **AVEVA Electrical Field Name** that will be mapped to the adjacent **Excel Column Name**.

AVEVA Electrical **Engineer** will attempt to automatically map the first row of the Excel column headers to AVEVA Electrical Field Names if the names appear to be a logical match.

If the mouse cursor is hovered over a cell in the **AVEVA Electrical Field Name** column an arrow becomes available. Clicking on this down arrow will present a drop down list of all the available AVEVA Electrical Engineer field names available to map to the Excel spread sheet.



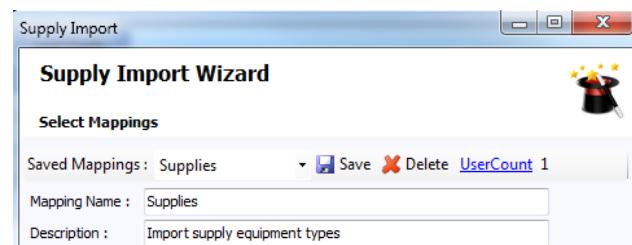
Using the screen shot on the left as a guide map, AVEVA Electrical Engineer field names to Excel column names.

- ① Some of the AVEVA Instrumentation Fields were mapped manually to each Excel Field Name.
- ① Ensure that the Excel columns names mapped for data import do not contain leading or trailing spaces.
- ① AVEVA Electrical allows both fields and properties to be imported from MS Excel via the grids. Exposing all the existing properties has led to some instances where fields and properties with the same name and caption are displayed in the mapping. To enable users to differentiate between the two fields it is recommended that the captions are updated.

Users can save mapping configurations. Click the **New** button on the **Equipment Import Wizard** and enter the details as below:

Click the **Save** button.

And the mappings configuration is saved under the **Saved Mappings** combobox.



Select the **Next** button.

The next form is a confirmation form for the user to select the items to import. This selection can be done individually by selecting each check box in turn, or globally, by checking the **Select All** check box.

Check the **Select All** check box. When the selections are completed, select the **Next** Button.

This screenshot shows the 'Supply Import Wizard' window titled 'Select Valid Records'. It displays a grid of data rows with columns including RecordStatus, Area, Area Path, ClassName, FormatName, pfix, Function, Number, TagSuffix, and EquipmentNo. A 'Select' column contains checkboxes, with the first row having all checkboxes checked. A 'Select All' checkbox is located at the top left of the grid. At the bottom right are buttons for '< Back', 'Next >', and 'Cancel'.

Select	RecordStatus	Area	Area Path	ClassName	FormatName	pfix	Function	Number	TagSuffix	EquipmentNo
<input checked="" type="checkbox"/>	New	00	30	EQE	General Equipmen	HV	01			HV0001
<input checked="" type="checkbox"/>	New	00	30	EQE	General Equipmen	TX	01			TX0001
<input checked="" type="checkbox"/>	New	86	30	EQE	General Equipmen	DB	01			DB8601
<input checked="" type="checkbox"/>	New	86	30	EQE	General Equipmen	DB	02			DB8602
<input checked="" type="checkbox"/>	New	86	30	EQE	General Equipmen	DB	03			DB8603
<input checked="" type="checkbox"/>	New	86	30	EQE	General Equipmen	DB	04			DB8604
<input checked="" type="checkbox"/>	New	86	30	EQE	General Equipmen	MC	02			MC8602
<input checked="" type="checkbox"/>	New	86	30	EQE	General Equipmen	MC	01			MC8601
<input checked="" type="checkbox"/>	New	86	30	EQE	General Equipmen	TX	01			TX8601
<input checked="" type="checkbox"/>	New	88	30	EQE	General Equipmen	GX	01			GX8801
<input checked="" type="checkbox"/>	New	86	30	EQE	General Equipmen	MC	04			MC8604
<input checked="" type="checkbox"/>	New	86	30	EQE	General Equipmen	MC	03			MC8603
<input checked="" type="checkbox"/>	New	86	30	EQE	General Equipmen	JB	01			JB8601
<input checked="" type="checkbox"/>	New	86	30	EQE	General Equipmen	JB	02			JB8602
<input checked="" type="checkbox"/>	New	86	30	EQE	General Equipmen	JB	03			JB8603

This screenshot shows the 'Supply Import Wizard' window titled 'Valid List'. It displays a scrollable list of valid supply records: HV0001, TX0001, DB8601, DB8602, DB8603, DB8604, MC8602, MC8601, TX8601, GX8801, MC8604, MC8603, JB8601, JB8602, and JB8603. At the bottom are buttons for '< Back', 'Import', and 'Cancel'.

An **Import** alert form is displayed to confirm the import function.

Click the **OK** button on the form.

The final form to be loaded in the **Supply Import Wizard** is the **Valid List** form. This has a scrollable window that the user can use to check the tags that are to be imported.

If changes are to be made, the user selects the **Back** button.

If everything is as required, then the user selects the **Import** button.

This screenshot shows the 'Supply Import Wizard' window titled 'Import Log'. It displays a log entry for 'JB8603' under the 'Created' column. An 'Import' dialog box is overlaid on the main window, showing an information icon and the message 'Import completed'. At the bottom are buttons for '< Back', 'Import', 'Close', and a status message 'Import completed'.

A log file (.csv) is created and opened automatically in Microsoft Excel which contains the imported status for all the items.

	A1	Equipment No
1	Equipment No	Result
2	[HV0001]	[Created]
3	[TX0001]	[Created]
4	[DB8601]	[Created]
5	[DB8602]	[Created]
6	[DB8603]	[Created]
7	[DB8604]	[Created]
8	[MC8602]	[Created]
9	[MC8601]	[Created]
10	[TX8601]	[Created]

- ① The log file is created with time and date file name, and saved in the same imported file folder.
- ① After an import finishes AVEVA Electrical just delegates the responsibility of opening .csv file to the Operating System and as in most cases .csv file is attached to Microsoft Excel, so Excel starts up. If user associates another software with .csv files then OS will always open csv file in that software.

Close the file and the Supply Import Wizard to return to the **Supplies** grid.

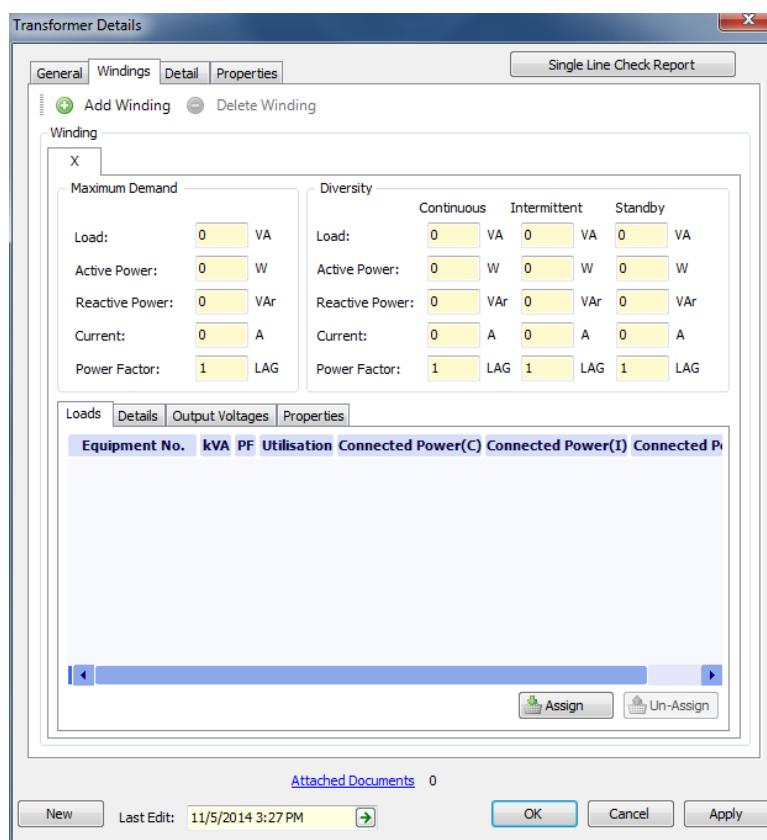
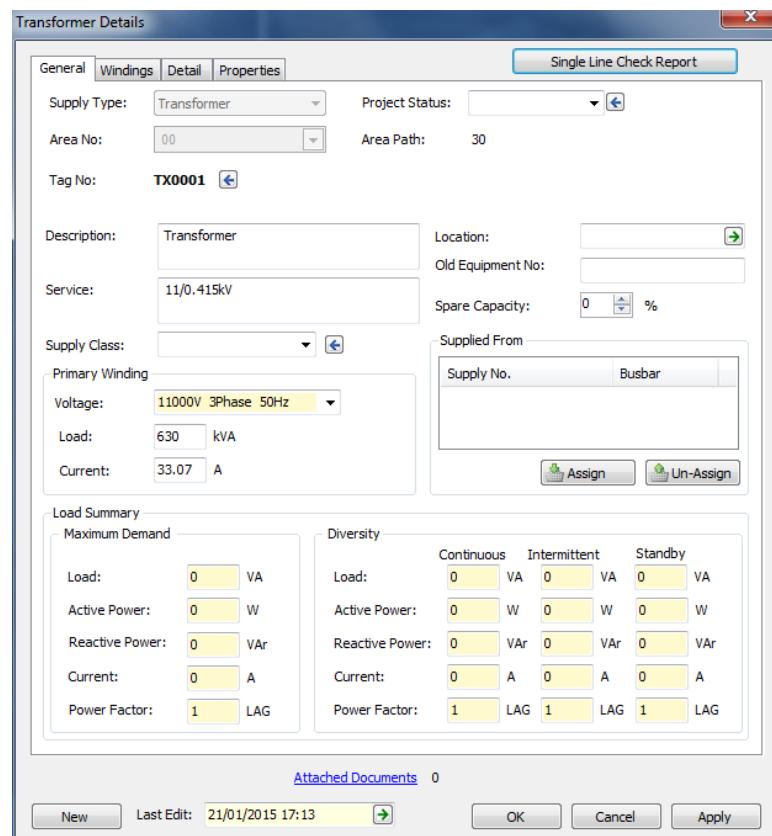
The new supplies are displayed in the grid:

Area Path	Area	EquipmentNo	Description	EquipmentType	DataSheetNo	Volts	Frequency	NoOfPhases	Rated Load	RatedFLC	SUserField1	Cable Current	Full Load Current
30 00	HV0001	Source	Source		11000	50	3	2000	104.97		104.97	104.97	
30 00	SB8001	SwitchBoard	SwitchBoard		415	50	3	1200	1669		1669.4	1669	
30 00	TX0001	Transformer	Transformer		11000	50	3	630	33.066		33.066	33.066	
30 86	DB8601	Distribution Board	Distribution Board		415	50	3	50	69.56		69.56	69.56	
30 86	DB8602	Distribution Board	Distribution Board		415	50	3	25	34.78		34.78	34.78	
30 86	DB8603	Distribution Board	Distribution Board		415	50	3	50	69.56		69.56	69.56	
30 86	DB8604	Distribution Board	Distribution Board		110	50	1	5	45.455		45.455	45.455	
30 86	JB8601	Junction Box	Junction Box		240	50	1	25	104.17		104.17	104.17	
30 86	JB8602	Junction Box	Junction Box		240	50	1	25	104.17		104.17	104.17	
30 86	JB8603	Junction Box	Junction Box		240	50	1	25	104.17		104.17	104.17	
30 86	MC8601	MCC	MCC		415	50	3	600	834.72		834.72	834.72	
30 86	MC8602	MCC	MCC		415	50	3	15	20.868		20.868	20.868	
30 86	MC8603	MCC	MCC		415	50	3	600	834.72		834.72	834.72	
30 86	MC8604	MCC	MCC		415	50	3	15	20.868		20.868	20.868	
30 86	TX8601	Transformer	Transformer		240	50	1	5	20.833		20.833	20.833	
30 88	GX8801	Generator	Generator		415	50	3	175	243.46		243.46	243.46	

- ① To demonstrate the import connectivity AVEVA Electrical has when importing supplies and loads, the user must first edit supply equipment items:

3.3.2 Transformer Detail Window

Select the transformer **TX0001** and select **Edit** on the records pane.



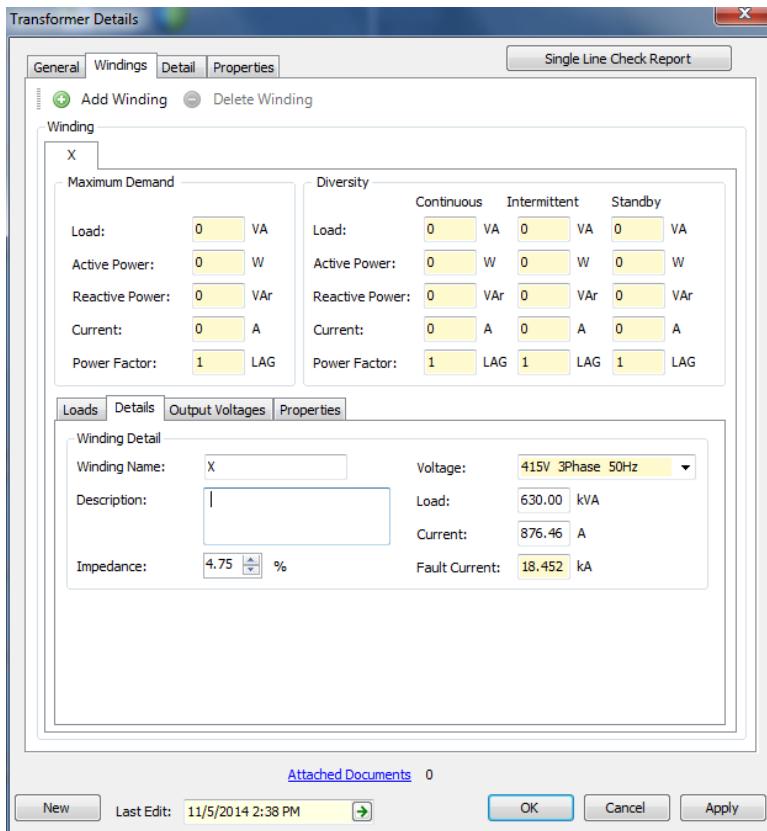
Select the **Windings** tab.

By default, new equipment has a single winding. If another winding is required, click **Add Winding**. Another sub-tab is added to the tab.

The **Loads** sub-tab is used to allocate loads to a transformer winding.

To assign a load to the winding, click the **Assign** button.

Select the **Details** sub-tab:



Select

Voltage: 415V 3Phase 50Hz

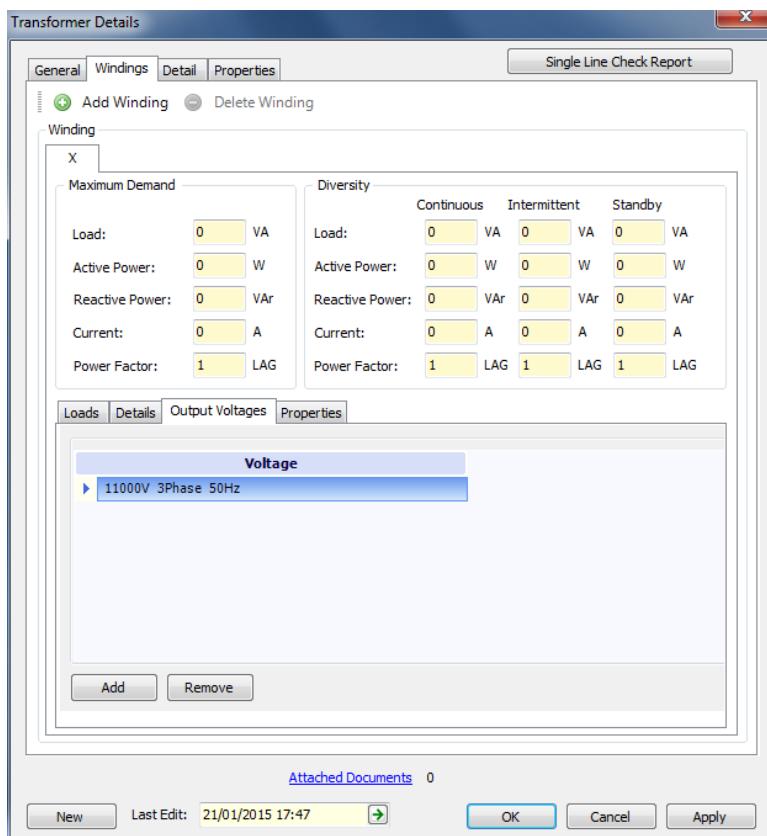
Type the following into the text boxes as listed below:

Load: 630 000

Impedance: 4.75

Select **Apply**

Select **Output Voltages** tab.



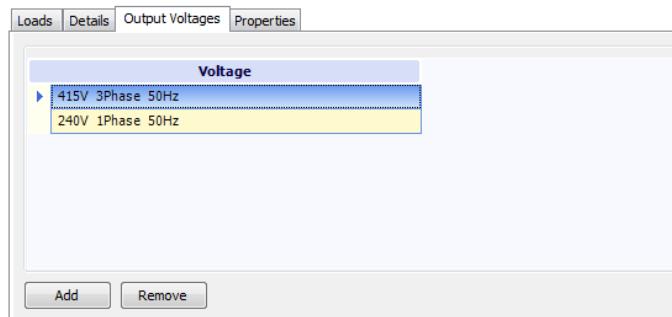
Loads fed by windings must have a voltage matching one of the supply output voltages listed on this tab.

The default output voltage is according to the Primary Voltage (in this example 11000V 3Phase 50hz).

Output voltages can be added and removed from this list as required

Clicking the **Add** bottom include the **415V 3Phase 50Hz** and **240V 1Phase 50Hz** project voltages and clicking the **Remove** bottom delete the **11000V** to get the window shown on the left..

A message will then be displayed requesting that the deletion be confirmed. Click **Yes** to continue.



- i** A supply voltage cannot be deleted either if it is in use by a fed item. A message will be displayed to inform the user of this and the deletion will be cancelled.

Press **OK** to exit the form.

-  For detailed information about the Detail and Properties tabs, please refer the AVEVA Electrical Engineer User Guide.

Exercise 2 – Edit Supplies Items

Transformer

Edit transformer TX8601 and edit the windings tab as follows:

Voltage: 110V 1Phase 50Hz
Load: 5000
Impedance: 6
Output Voltage: 110V 1Phase 50Hz

MCC

Supply Details

General Loads Assigned Detail Properties Compartments Single Line Check Report

Busbars

Busbar 1 Busbar 2

Maximum Demand

Load:	0 VA
Active Power:	0 W
Reactive Power:	0 VAr
Current:	0 A
Power Factor:	1 LAG

Diversity

Continuous Load:	0 VA	0 VA	0 VA
Active Power:	0 W	0 W	0 W
Reactive Power:	0 VAr	0 VAr	0 VAr
Current:	0 A	0 A	0 A
Power Factor:	1 LAG	1 LAG	1 LAG
Diversity Factor:	100	100	0 %

Loads Details Output Voltages Properties

Busbar Name: 2

Description:

Voltage: 415V 3Phase 50Hz

Rated Load: 200 kVA

Rated Current: 278.24 A

Fault Current: 25 kA

Supply Class: Emergency

Incomers

Compartment No.	Load Flow	From	Ext.C

Assign Un-Assign

Coupler

Compartment No.	To

Couple Decouple

Attached Documents (Count= 0)

New Last Edit: 18/01/2016 15:18 OK Cancel Apply

Select Edit supply item MCC MC8601 and on the **Loads Assigned** tab add a second busbar by selecting the + button, select Yes to the save prompt dialogue box

When the 2nd busbar is created, edit the **Details** tab to reflect:

Rated Load: 200kVA
Fault Current: 25kA
Supply Class: Emergency

Supply Details

General Loads Assigned Detail Properties Compartments Single Line Check Report

Busbars

Busbar 1 Busbar 2

Maximum Demand

Load:	0 VA
Active Power:	0 W
Reactive Power:	0 VAr
Current:	0 A
Power Factor:	1 LAG

Diversity

Continuous Load:	0 VA	0 VA	0 VA
Active Power:	0 W	0 W	0 W
Reactive Power:	0 VAr	0 VAr	0 VAr
Current:	0 A	0 A	0 A
Power Factor:	1 LAG	1 LAG	1 LAG
Diversity Factor:	100	100	0 %

Loads Details Output Voltages Properties

Busbar Name: 1

Description:

Voltage: 415V 3Phase 50Hz

Rated Load: 600 kVA

Rated Current: 834.72 A

Fault Current: 25 kA

Supply Class: Normal

Incomers

Compartment No.	Load Flow	From	Ext.C

Assign Un-Assign

Coupler

Compartment No.	To

Couple Decouple

Attached Documents (Count= 0)

New Last Edit: 18/01/2016 15:18 OK Cancel Apply

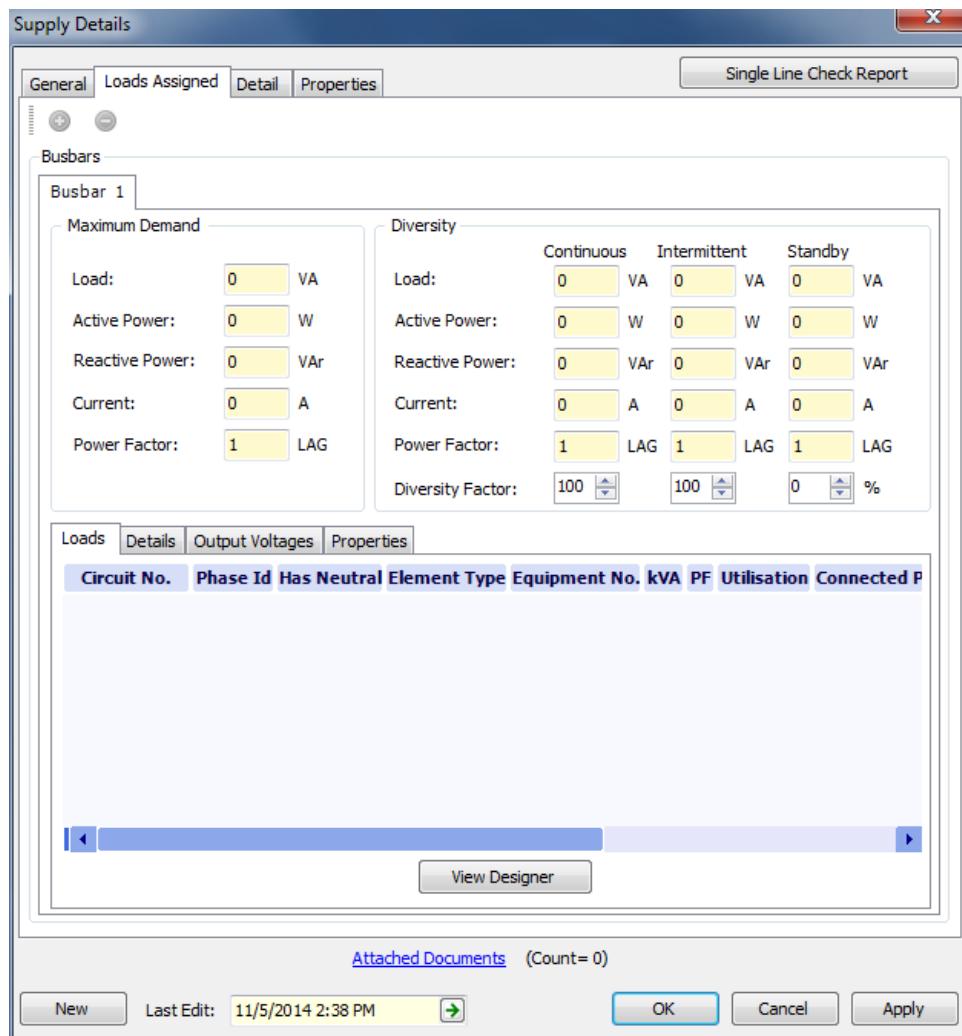
Select the **Busbar 1** tab and edit the **Details** tab to reflect:

Rated Load: 600kVA
Fault Current: 25kA
Supply Class: Normal

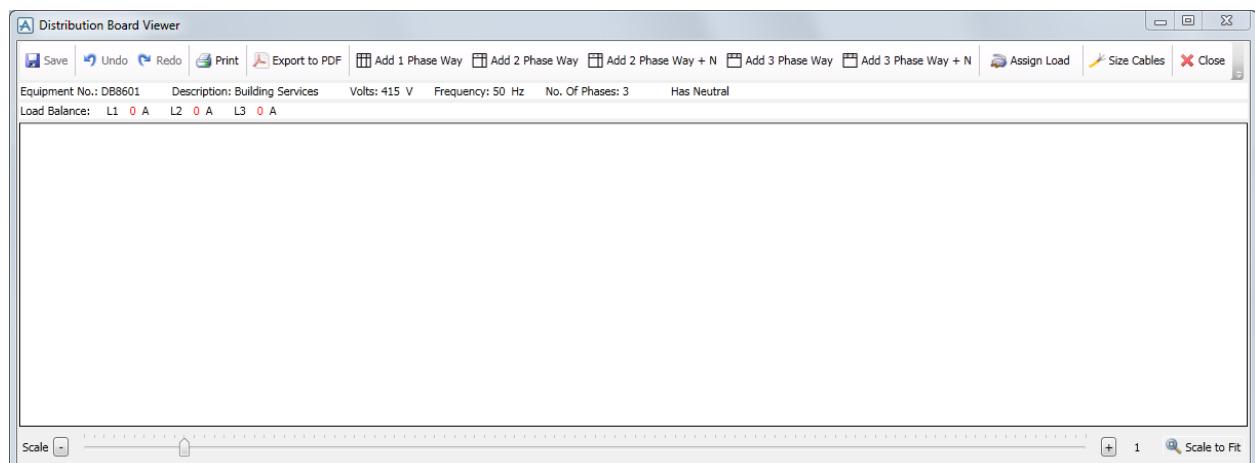
When finished, select **OK**

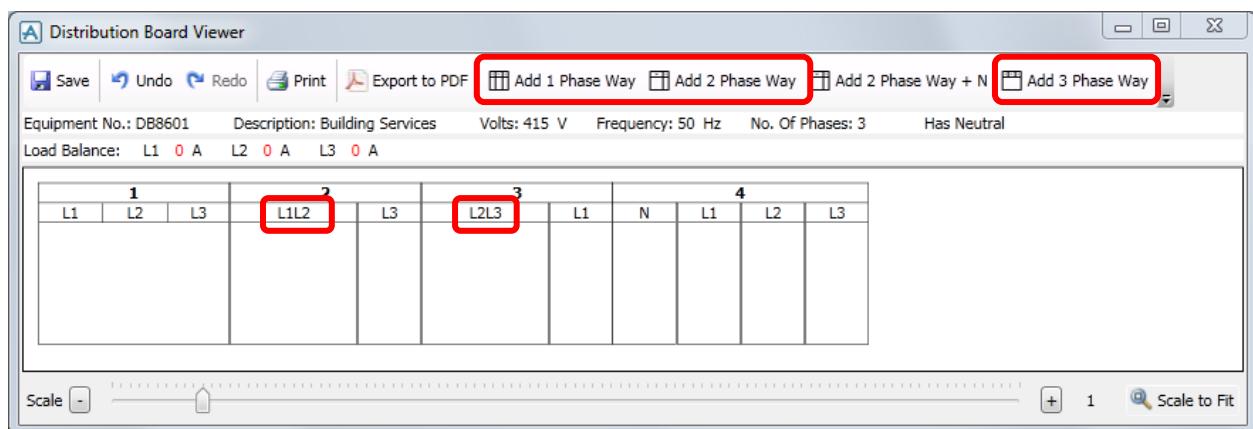
Distribution Board

Edit Supply item DB8601. On the **Loads Assigned** tab select **View Designer**:



This will open the **Distribution Board Viewer**:





Using the buttons **Add 3 Phase Way**, **Add 2 Phase Way**, **Add 1 Phase Way** add the circuits shown above. For the 2 x 2 Phase Ways, the first should have Phase identifiers **L1L2** and the second should have Phase identifiers **L2L3**.

When completed, select **Save > Close > OK** to close the **Distribution Board Viewer** and **Supply Details** form for **DB8601**.

The path is now set to import loads into the project.

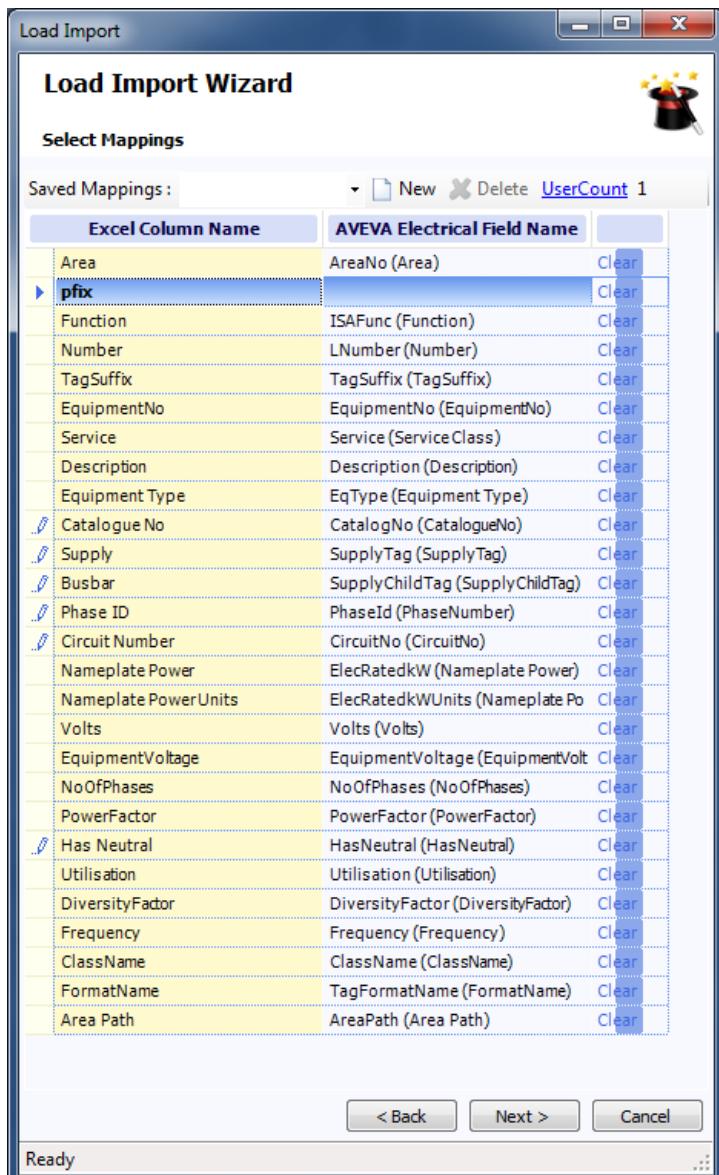
Exercise 3 – Import Loads

Paragraph 3.3.1 above gives a worked example of how to import a **Supply List** from Microsoft Excel. The method for importing a **Load List** is exactly the same. Follow this paragraph to import the load list file indicated below, remember, **Loads** are being imported.

The file to Import is **C:\AVEVA_ElectricalTraining\ExcelFiles\LoadsNoRulesWithMotorCata.xls**

- i** Before creating the mappings, create a new mapping name, and then select **Save**. The order on the mapping form will then match the table below.
- i** PowerFactor and Utilisation have been omitted from the table (not required to be mapped).

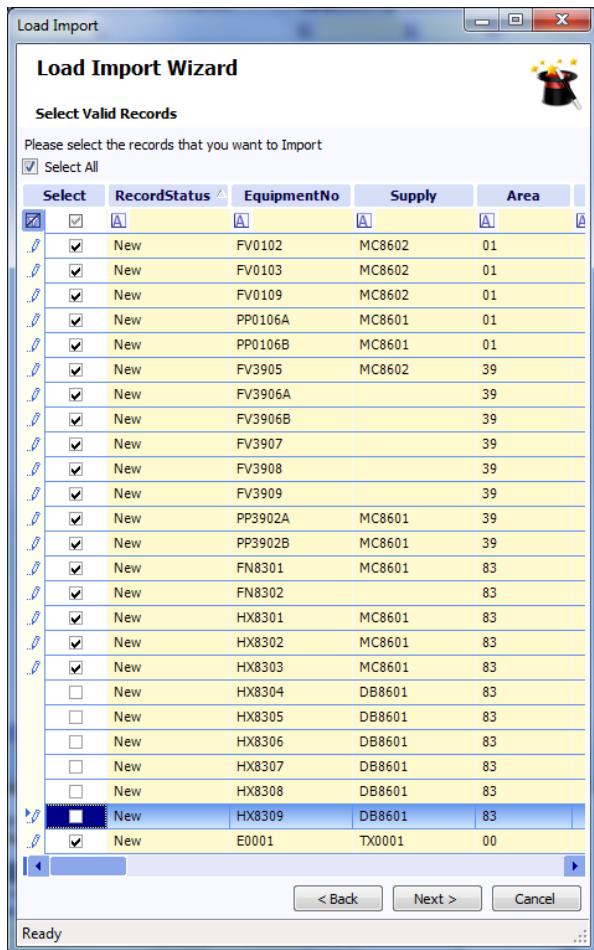
Use the following table to complete mappings:



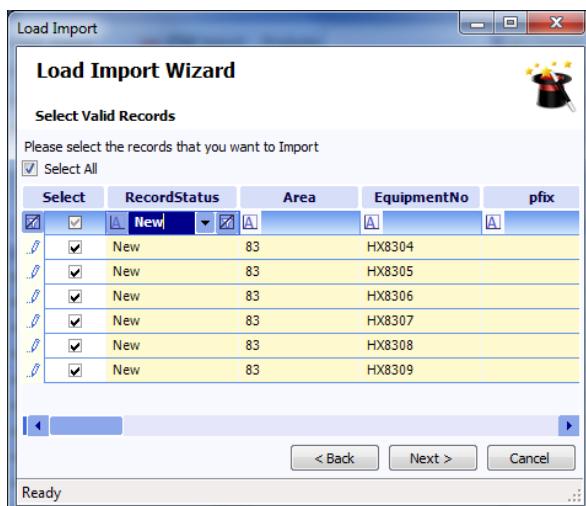
Save the mapping configuration.

Run the process twice:

- Select only the items not associated to the Distribution Panel **DB-8601**:



- In the **RecordStatus** Column filter for **New** as shown below. Select all the New items:

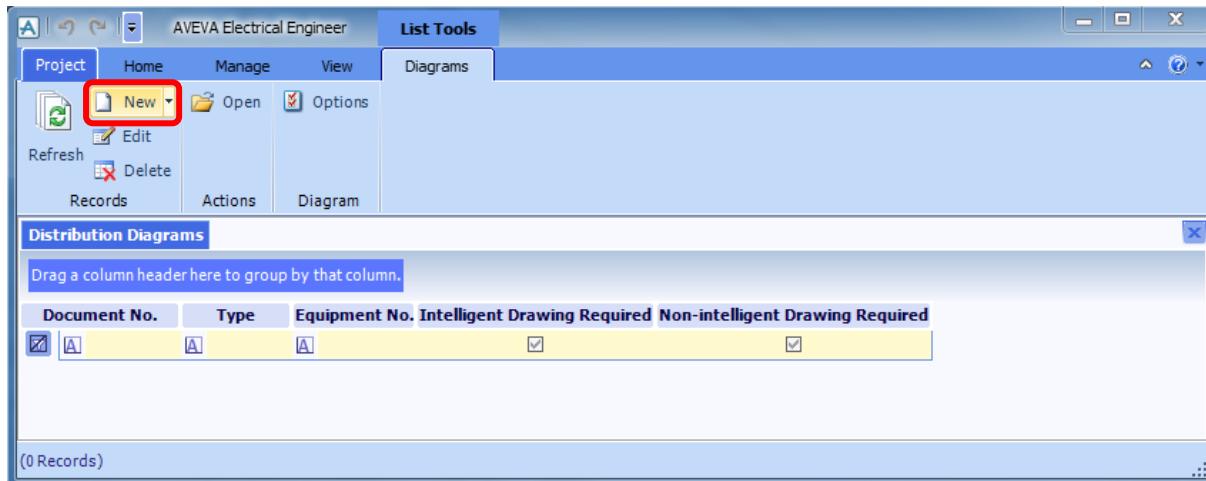


When the import is completed, have a look at the **Supplies** grid and notice that the connectivity for **MC8601** and **DB8601** has been imported and that loads have been assigned to them.

3.4 Distribution Diagrams Interface

Equipment can also be added to the **Loads** and **Supplies** grids using the graphical interface that AVEVA Electrical has.

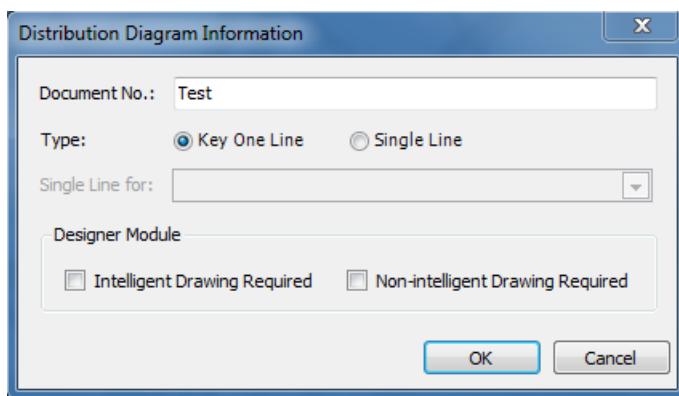
Give the **Home** tab focus by selecting it, click **Select > Distribution Diagrams** from the **Lists and Schedules** pane. This will open the **Distribution Diagrams** grid together with the contextual tab **Diagrams**:



3.4.1 Add Loads and Supplies (Worked Example)

To create a new diagram, select the **New** button from the **Records** pane.

The **Distribution Diagram Information** window is displayed.



Document No.: **Test**

Select the **Key One Line** radio button.

i Selecting the **Key One Line** radio button will disable the **Single Line for:** text box.

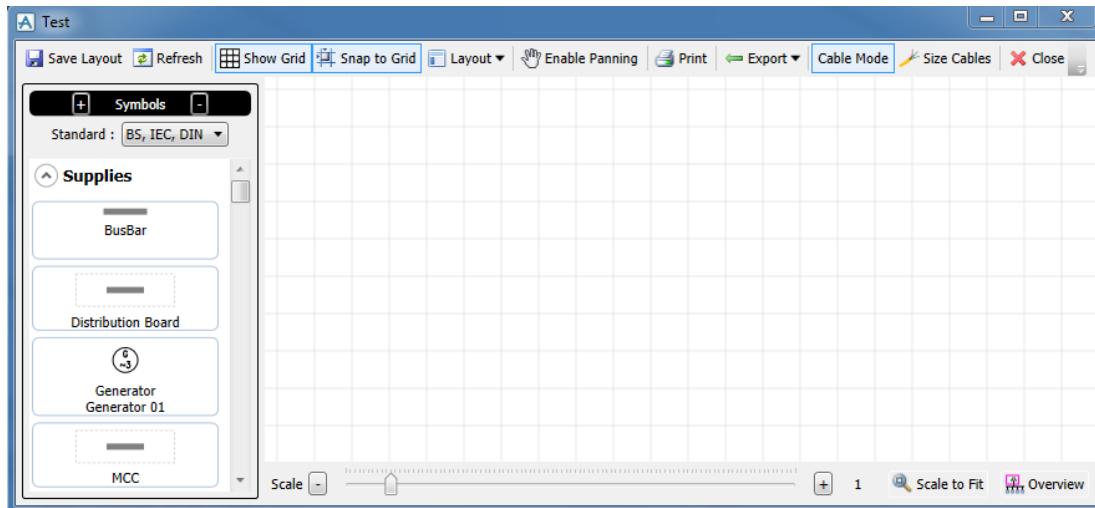
The **Designer Module** check boxes will allow to create two kinds of KOL/SLD diagrams in the Designer Module:

- **Designer Drawing - Intelligent Drawing:** Distribution diagrams are imported from Engineer to Designer as a starting point. Then the final drawing is defined in the Designer Drawing interface. No link is maintained between the diagram in Engineer and the drawing in Designer.
- **Distribution Diagrams - Non-intelligent Drawing:** The content of these drawings is defined in the Engineer module and imported to a final AutoCAD drawing in the Designer module.

Select **OK**.

i The radio button **Key One Line** equates to **Distribution Diagram Editor**.

The AVEVA Electrical Graphical KOL Interface will open.



Maximise or re-size the graphics window to give a larger canvas if required.

On the left hand side of the graphics window a scrollable list of symbols is displayed. These are the symbols that had the check box **For Key One Line** checked in the **User Defined Symbol List**.

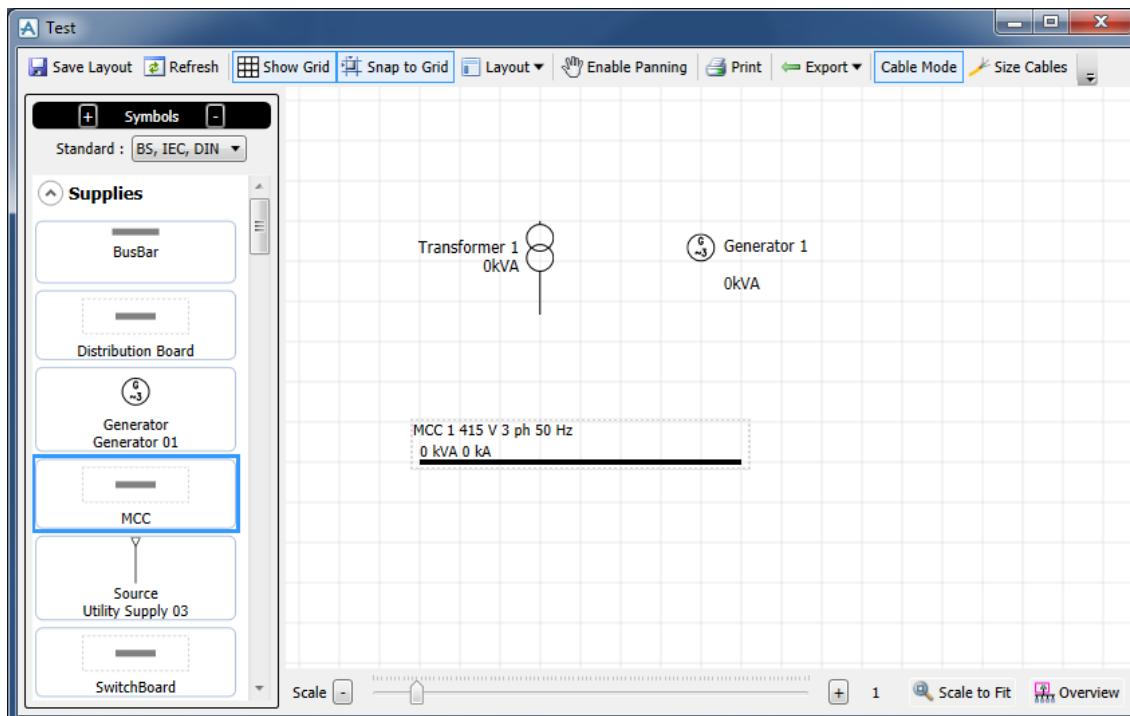
Symbol groups exist: **Supplies**, **Loads** and **Compartment Element equipment types**. These can be expanded and collapsed as required by selecting the arrow to the left of each section heading.

New Load Items, Supply items and compartment elements can be added to the database simply by dragging new items from the symbol lists on the left onto the graphics area.

Select the **Transformer**, and drag it onto the graphics area.

Do the same for the **Generator** and the **MCC** symbol.

Arrange the symbols so that they are arranged in a fashion similar to that shown below:



Drag a Bus Bar into the MCC.



- i** The bus bar **MUST** be dragged into the light grey box that makes up the MCC. The user will not be permitted to drag a bus bar onto the general graphics area.
- i** Couplers linking the busbars of an MCC or Switchboard are created in the Coupler section of the Details tab.

Double click on the MCC to open Supply Detail window.

Supply Details

General		Loads Assigned		Detail		Properties		Compartments		Single Line Check Report	
Supply Type:	MCC	Project Status:		Area No:	Default	Area Path:					
Tag No:	MCC 1	Location:		Old Equipment No:		Spare Capacity:	0 %				
Description:		Supplied From									
Service:		Supply No.									
Supply Class:		Busbar									
Rated Data											
Voltage:	415V 3Phase 50Hz										
Load:	0 VA										
Current:	0 A										
Load Summary											
Maximum Demand				Diversity							
Load:	0 VA	Continuous	0 VA	Intermittent	0 VA	Standby	0 VA				
Active Power:	0 W	Load:	0 W	Active Power:	0 W	Standby	0 W				
Reactive Power:	0 VAr	Active Power:	0 VAr	Reactive Power:	0 VAr	Standby	0 VAr				
Current:	0 A	Reactive Power:	0 A	Current:	0 A	Standby	0 A				
Power Factor:	1 LAG	Current:	1 LAG	Power Factor:	1 LAG	Standby	1 LAG				
Attached Documents (Count= 0)											
New	Last Edit: 07/01/2016 17:49	OK	Cancel	Apply							

Click **Details** sub-tab in the **Load Assigned** Tab:

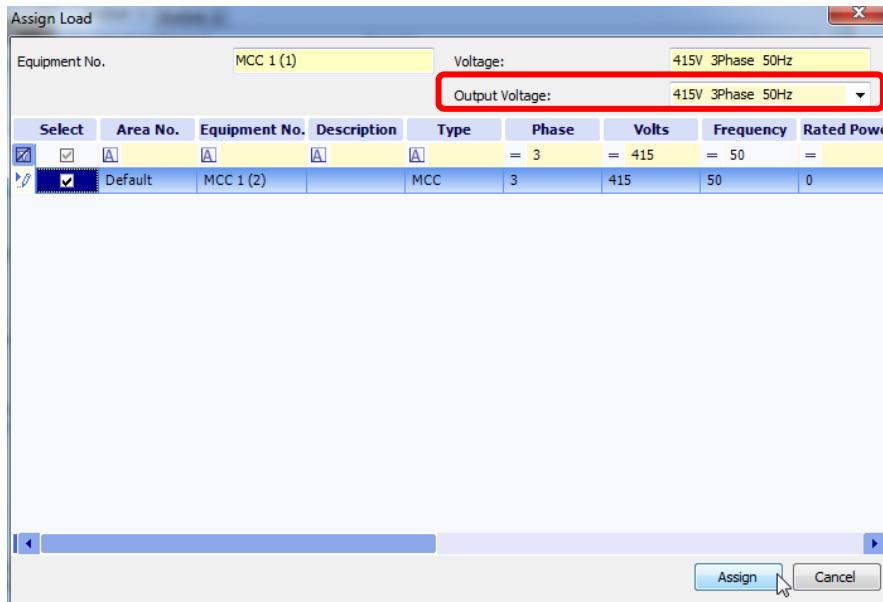
Loads	Details	Output Voltages	Properties												
Busbar Name: 1 Description: Voltage: 415V 3Phase 50Hz Rated Load: 100 kVA Rated Current: 139.12 A Fault Current: 0 A Supply Class:	Incomers <table border="1"> <thead> <tr> <th>Compartment No.</th> <th>Load Flow</th> <th>From</th> <th>Ext.C</th> </tr> </thead> <tbody> <tr> <td></td> <td></td> <td></td> <td></td> </tr> </tbody> </table> Coupler <table border="1"> <thead> <tr> <th>Compartment No.</th> <th>To</th> </tr> </thead> <tbody> <tr> <td></td> <td></td> </tr> </tbody> </table>	Compartment No.	Load Flow	From	Ext.C					Compartment No.	To				
Compartment No.	Load Flow	From	Ext.C												
Compartment No.	To														

Load value has to be entered into the **Load** field.

In the load text box enter the value **100000** the units will change automatically.

To create a coupler or couplers linking the busbars of the MCC, click the **Couple** Button.

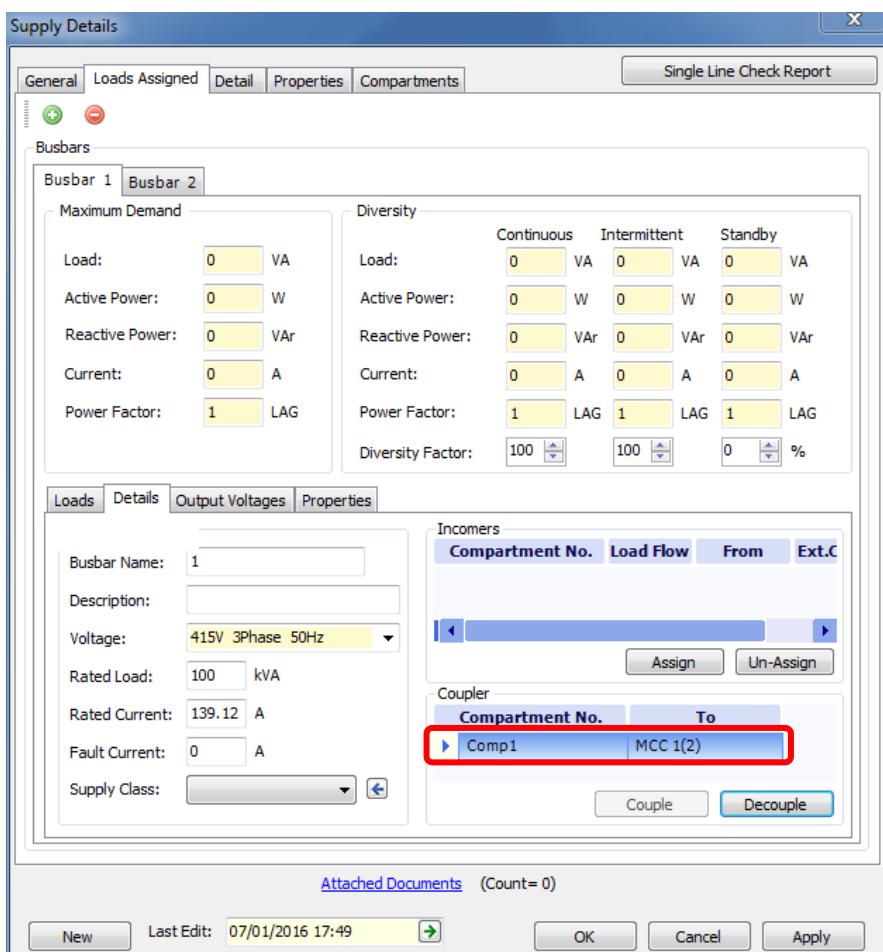
The **Assign Load** window is then displayed:



The window lists the busbars with matching voltages according to the **Output Voltages** selected in the **Output Voltages** tab

Tick the Select checkbox and click the **Assign** button

A coupler compartment **Comp1** has been created automatically and it is listed in the Coupler section:



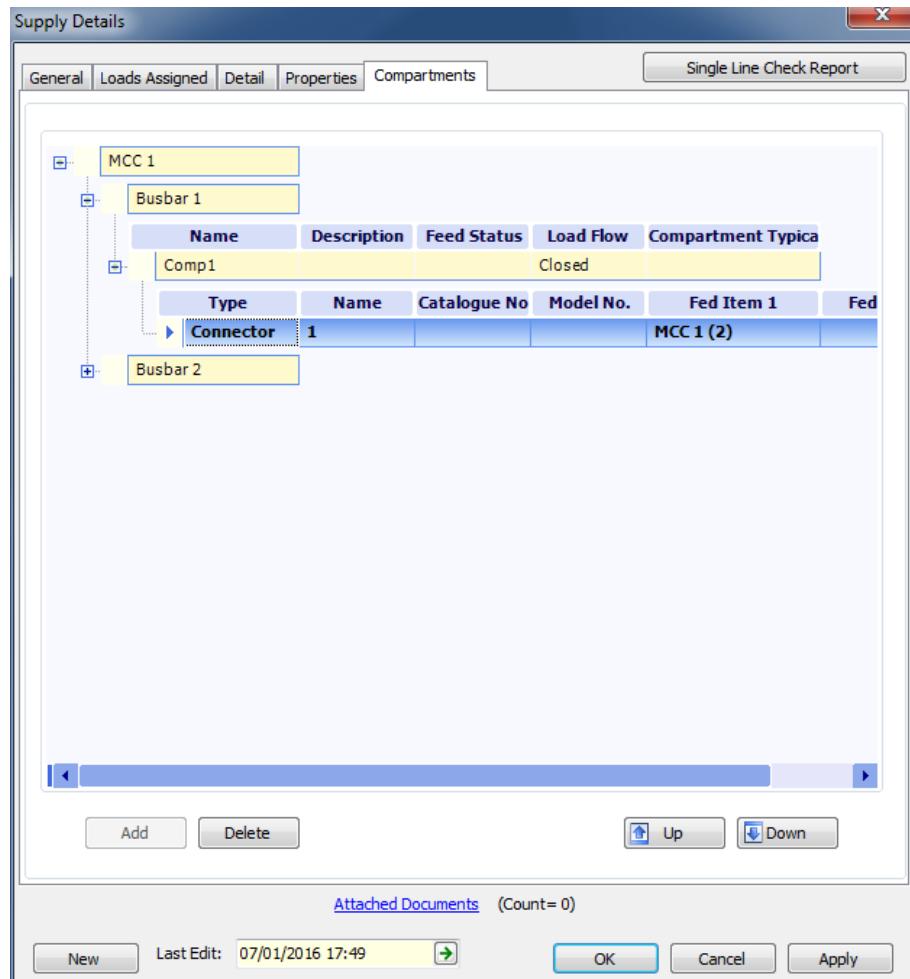
i The busbar is assigned to the first available spare compartments of the busbar. If there are no spare compartments, the required compartment will be automatically generated.

Select the **Compartments** Tab in the Supply Detail Window.

Details of MCC and Switchboard compartments, including compartment elements and their details, are viewed, added and specified using the Compartments tab.

Expand the **MCC 1** equipment node to view the busbars.

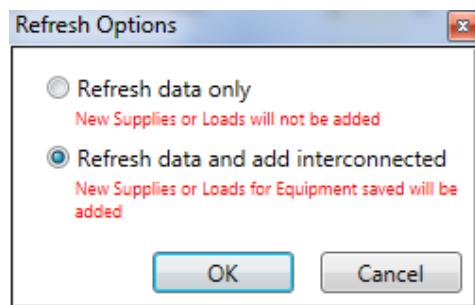
Expand the **Busbar 1** to view the compartments in that busbar. The **Comp1** is listed:



The coupler **MCC 1(2)** has been assigned to a default “Connector” element created with the automatically generated compartment.

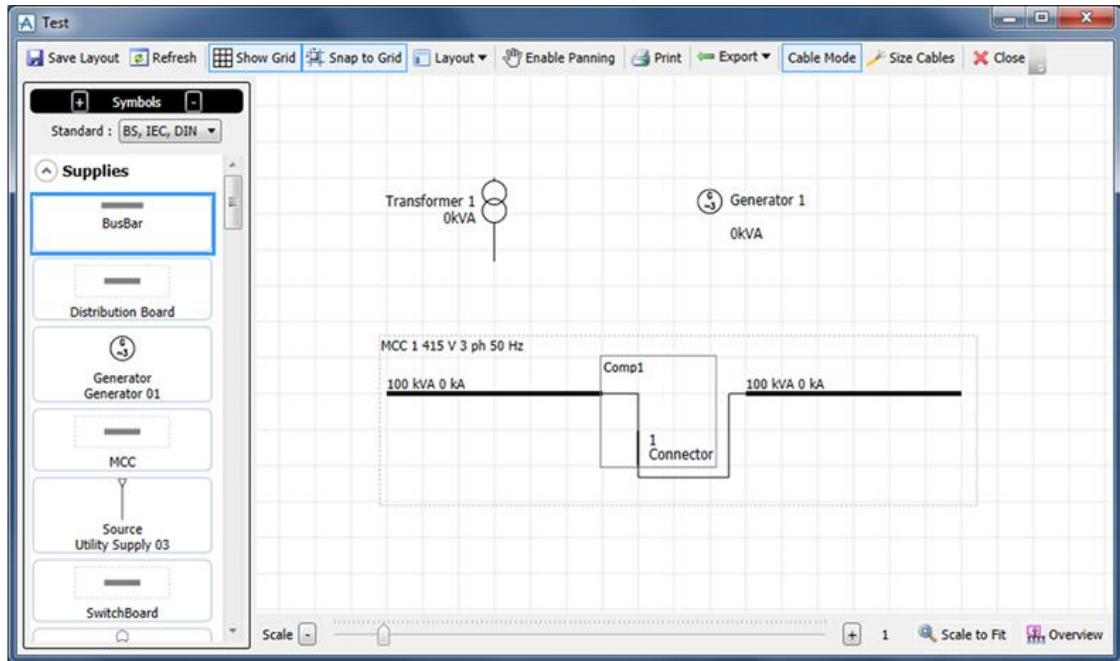
i Default “Connector” elements created with automatically generated compartments can subsequently be replaced in this tab.

Select **OK** to close the Supply Detail Window.

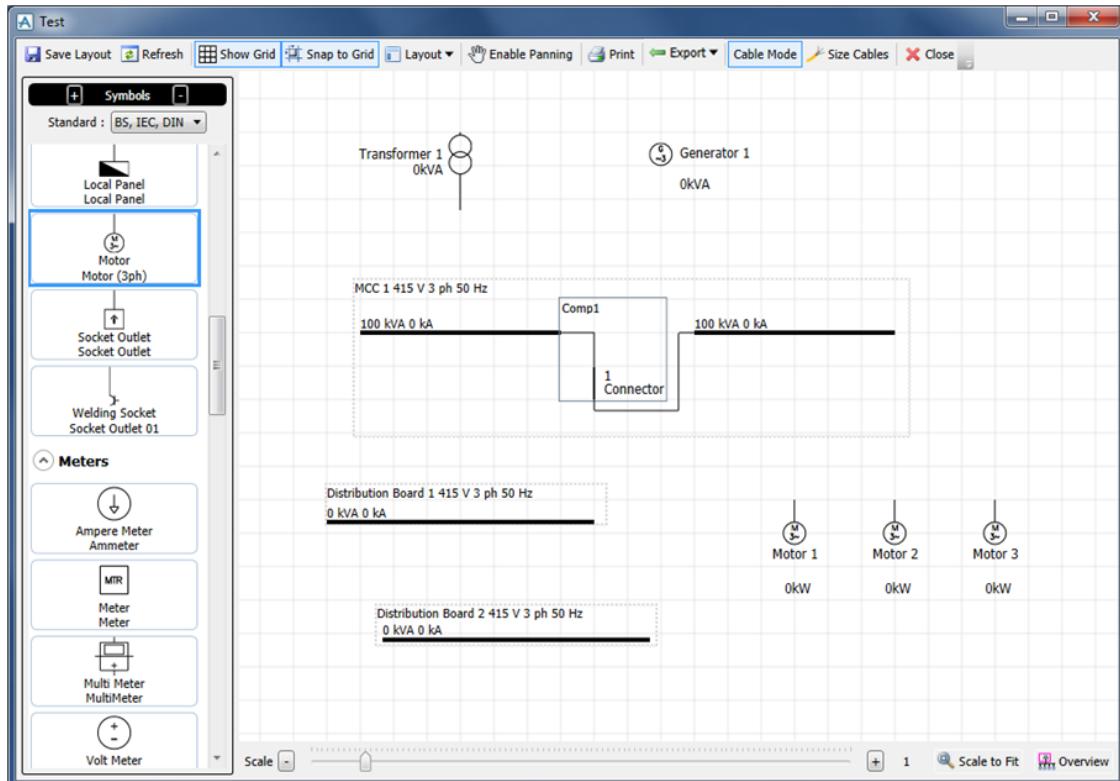


Select **Refresh data and add interconnected** and then **OK**.

The second bus bar and associated compartment coupler can be dragged around to make for a more suitable arrangement as shown in the next Image:

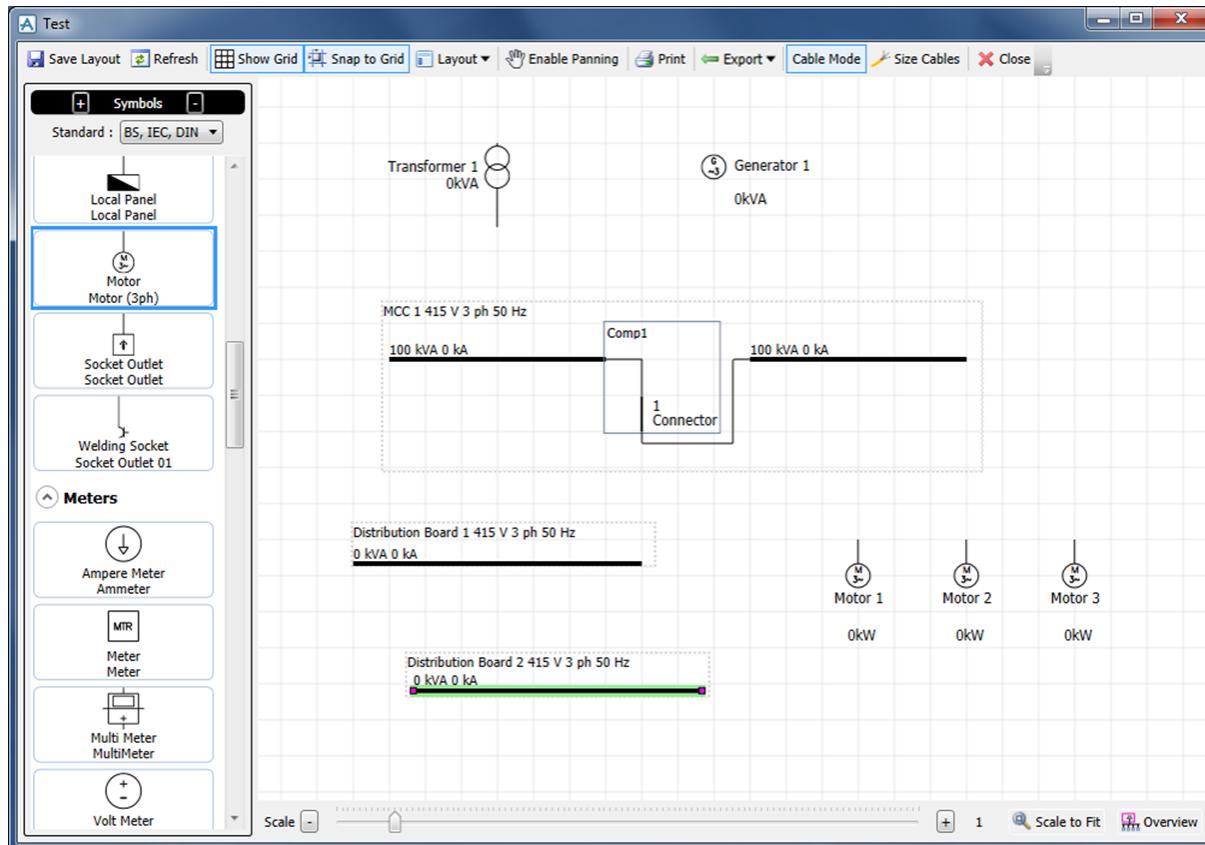


Next, add three motors below the right hand bus bar and two distribution boards below the left hand bus bar:



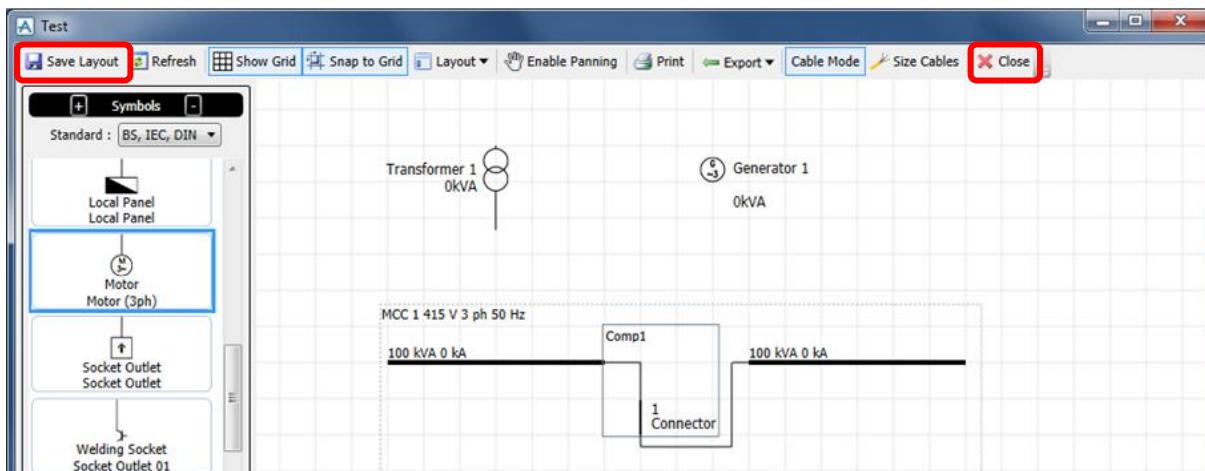
- (i) The user can zoom in and out of the diagram by using the <Ctrl> key and the middle mouse button.*
- (i) The user can pan across the drawing using the left mouse button when the **Enable Panning** button on the tool bar is pressed.*

Arrange the items of equipment so that they appear in a similar arrangement to that shown in the image below.



- i** The bus bars of the two distribution boards can be shortened (or lengthened) by selecting the bus bars and then dragging either one of the two grips that will appear at the end of the bus bars once selected.

Perform a **Save Layout** by selecting the **Save Layout** button, and then close the graphics window by selecting the **Close** button.



- i** To change the default symbols, right click on the equipment that requires changing, select **Change Symbol** and then select the required symbol from the selection displayed in the **Symbol List** that displays.

To confirm that the items dragged onto the graphics window have been added to the database, open the Loads grid and Supply Grid and examine the contents. It will be found that the items are listed:

Loads Added

Area Path	Area	EquipmentNo	Description	Supplies	DataSheetNo	EquipmentT	Supply	Mechanical L	Nameplate P	EquipmentV	Mechanical L	Nameplate P	Loading F	Power	ElecRate	PowerU	
	Default	Motor 1				Motor			0	0	415		kW	100	0	100	kW
	Default	Motor 2				Motor			0	0	415		kW	100	0	100	kW
	Default	Motor 3				Motor			0	0	415		kW	100	0	100	kW
30	00	E0001	Earth Resistor			Earth Resist			0	10	415		kW	100	10	100	kW
30	83	HX8301	Heater			Heater			0	4	415		kW	100	4	100	kW
30	83	HX8302	Heater			Heater			0	4	415		kW	100	4	100	kW
30	83	HX8303	Heater			Heater			0	4	415		kW	100	4	100	kW
30	83	X8303	Lighting			Lighting			0	18	240		kW	100	18	100	kW
30	83	X8304	Lighting			Lighting			0	18	240		kW	100	18	100	kW
30	83	X8305	Lighting			Lighting			0	18	240		kW	100	18	100	kW
30	01	FV0102	Motor			Motor			0	0.25	415		kW	100	0.25	66.3	kW

AVEVA Default (29 Records)

Supplies Added

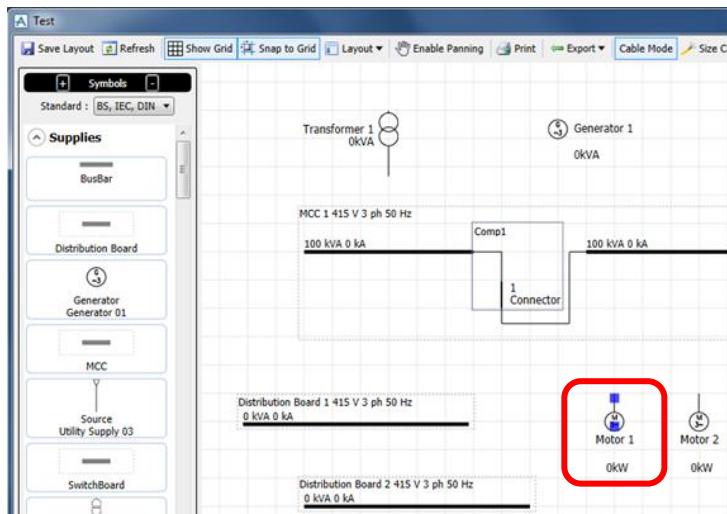
Area Path	Area	EquipmentNo	Description	EquipmentType	DataSheetNo	Volts	Frequency	NoOfPhases	Rated Load	RatedFLC	UserField1	Cable Current	Full Load Current		
	Default	Distribution Board 1		Distribution Board		415	50	3	0	0	0	0	0		
	Default	Distribution Board 2		Distribution Board		415	50	3	0	0	0	0	0		
	Default	Generator 1		Generator		415	50	3	0	0	0	0	0		
	Default	MCC 1		MCC		415	50	3	100	139.12	139.12	139.12	139.12		
	Default	Transformer 1		Transformer		415	50	3	0	0	0	0	0		
30	88	GX8801	Generator	Generator		415	50	3	175	243.46	243.46	243.46	243.46		
30	86	DB8601	Distribution Board	Distribution Board		415	50	3	50	69.56	69.56	69.56	69.56		
30	86	DB8602	Distribution Board	Distribution Board		415	50	3	25	34.78	34.78	34.78	34.78		
30	86	DB8603	Distribution Board	Distribution Board		415	50	3	50	69.56	69.56	69.56	69.56		
30	86	DB8604	Distribution Board	Distribution Board		110	50	1	5	45.455	45.455	45.455	45.455		
30	86	JB8601	Junction Box	Junction Box		240	50	1	25	104.17	104.17	104.17	104.17		

AVEVA Default (21 Records)

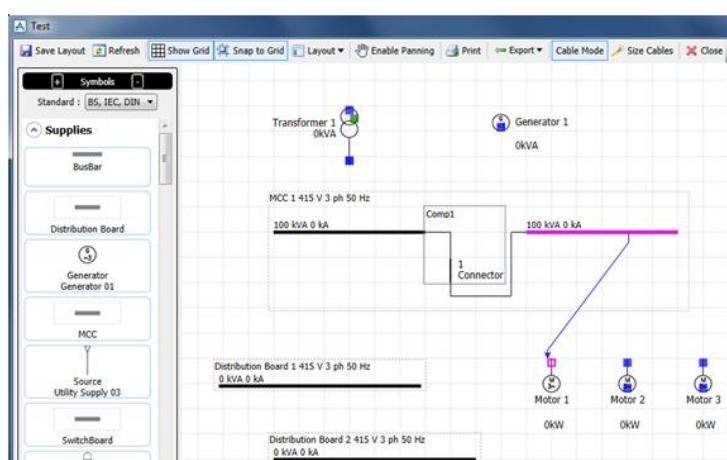
3.4.2 Assign Loads to Supplies (Worked Example)

Loads can be assigned to Switchboard and MCC items either graphically or by using the grid. Open the distribution diagram **Test** created in the last work example.

Loads can be assigned to Switchboard and MCC items either graphically or by using the grid. Open the distribution diagram **Test** created in the last work example.

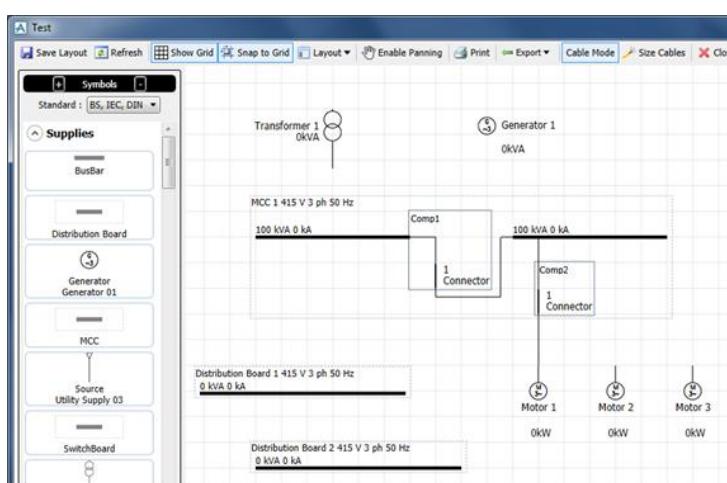


Move the mouse cursor over the symbol for **Motor**. Two rips willpear.



Select the top grip with the left mouse button and hold down the left mouse button and drag upward towards the middle of the bus bar on the right.

All available connections will be highlighted. When the bus bar turns to the colour magenta, release the left mouse button.



Motor 1 has now been assigned as a load to the right hand bus bar (2) of **MCC 1**.

A new compartment **Comp2** with a default “Connector” element has been created automatically.

i The compartment is listed in the Compartments tab as well.

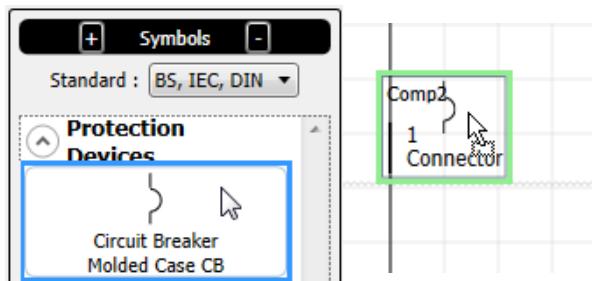
i **Motor 1** has not been connected to the MCC just merely assigned to **MCC 1**. Connections/ terminations are explained in AVEVA Electrical Wiring Manager Training Guide TM6503.

- i** Compartments can be added automatically when loads are assigned, when incoming protection devices are added, when couplers are created, and when busbars are added using the Loads Assigned tab.

3.4.3 Add Compartments Elements (Worked Example)

There are two ways in the Distribution Diagram view of including an element within the compartment.

1. Dragging a Compartment Element symbol from the Symbol list into the compartment container.

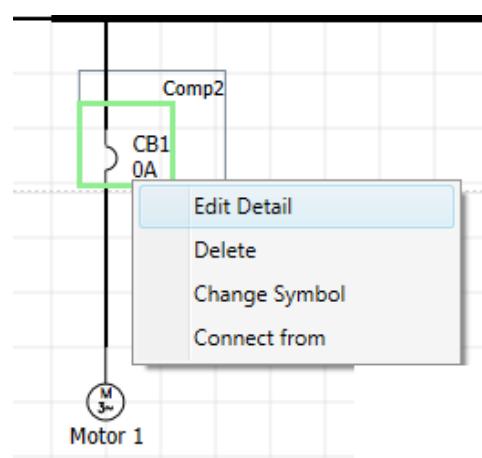


In the **Protection Devices** Symbol list category select the **Circuit Breaker Molded Case CB_SLD** symbol and drag it onto the **Comp2** container.

Circuit Breaker **CB1** is added to the compartment. The **Connector** has been removed

- Connector type compartment elements cannot be edited. These are "place-holder" elements which are automatically added/removed.*

Right mouse button click on the protective device **CB 1**, and then select **Edit Detail** to open the **Circuit Breaker Detail** form.



- Compartment Elements can be defined manually filling all the information or selecting a Compartment Element Catalogue number.*

Circuit Breaker Detail

Type Group:	Protection Device	Compartment Ref.:	Comp2																											
Type:	Circuit Breaker	Compartment Desc.:																												
Name:	CB01	Load Flow:	<input checked="" type="radio"/> Closed <input type="radio"/> Open																											
Catalogue Information		Symbols																												
Catalogue No.:		KOL:	Molded Case CB_SLD																											
Manufacturer:		SLD:																												
Model No.:		No. of Terminals																												
Description:	Circuit Breaker	Left:	3																											
Rated Current:	32 A	Right:	3																											
Properties		Property Name Property Caption Property Value																												
<table border="1"> <thead> <tr> <th>Property Name</th> <th>Property Caption</th> <th>Property Value</th> </tr> </thead> <tbody> <tr> <td>AuxiliaryContacts</td> <td>Auxiliary Contacts</td> <td></td> </tr> <tr> <td>AuxiliaryControlVoltage</td> <td>Auxiliary Control Voltage</td> <td></td> </tr> <tr> <td>BreakingCurrent</td> <td>Breaking Current</td> <td></td> </tr> <tr> <td>MakingCurrent</td> <td>Making Current</td> <td></td> </tr> <tr> <td>MaximumMotorRating</td> <td>Maximum Motor Rating</td> <td></td> </tr> <tr> <td>Model</td> <td>Model</td> <td></td> </tr> <tr> <td>Mounting</td> <td>Mounting</td> <td></td> </tr> <tr> <td>NumberOfPoles</td> <td>No of Poles</td> <td></td> </tr> </tbody> </table>		Property Name	Property Caption	Property Value	AuxiliaryContacts	Auxiliary Contacts		AuxiliaryControlVoltage	Auxiliary Control Voltage		BreakingCurrent	Breaking Current		MakingCurrent	Making Current		MaximumMotorRating	Maximum Motor Rating		Model	Model		Mounting	Mounting		NumberOfPoles	No of Poles			
Property Name	Property Caption	Property Value																												
AuxiliaryContacts	Auxiliary Contacts																													
AuxiliaryControlVoltage	Auxiliary Control Voltage																													
BreakingCurrent	Breaking Current																													
MakingCurrent	Making Current																													
MaximumMotorRating	Maximum Motor Rating																													
Model	Model																													
Mounting	Mounting																													
NumberOfPoles	No of Poles																													
Attached Documents 0 <input type="button"/> OK <input type="button"/> Cancel																														

Complete the window as shown on the left

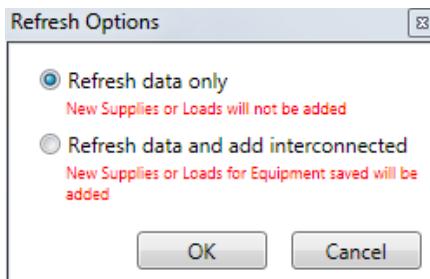
Name: CB01

Description: Circuit Breaker

Rated Current: 32

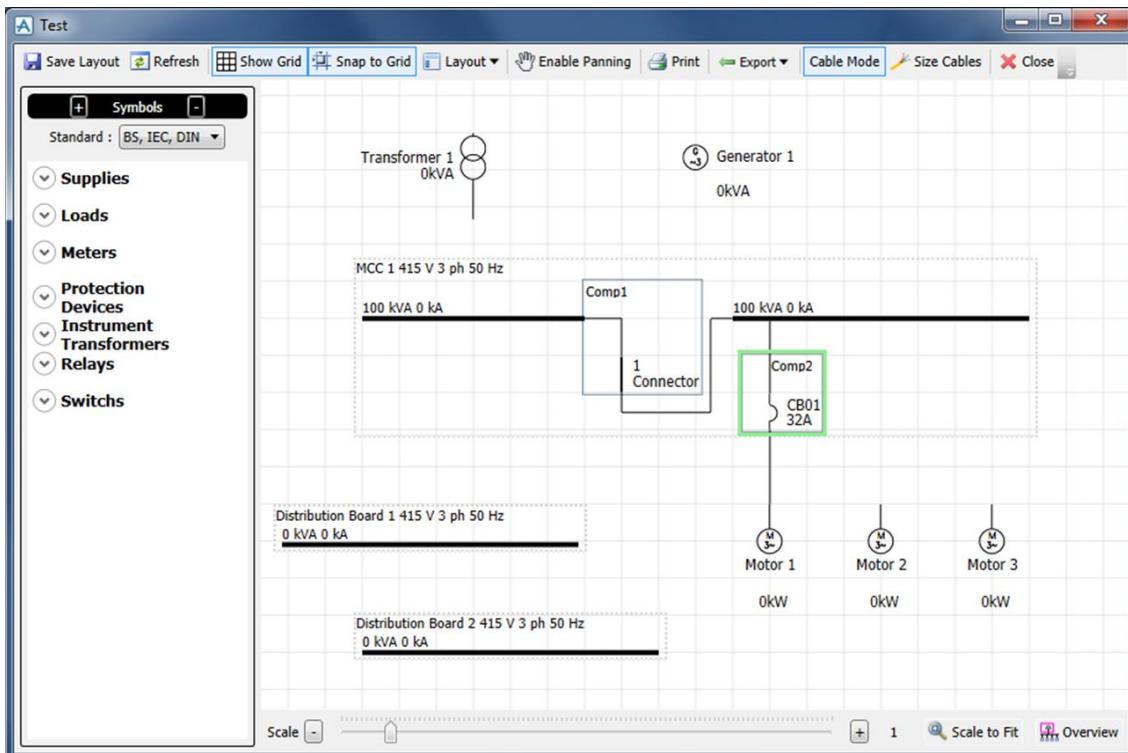
Rated Voltage: 415

Select **Ok** to close the form.

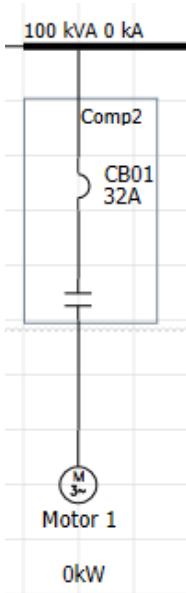


The **Refresh Options** dialogue pops up, select the option **Refresh data only** and then select **OK**.

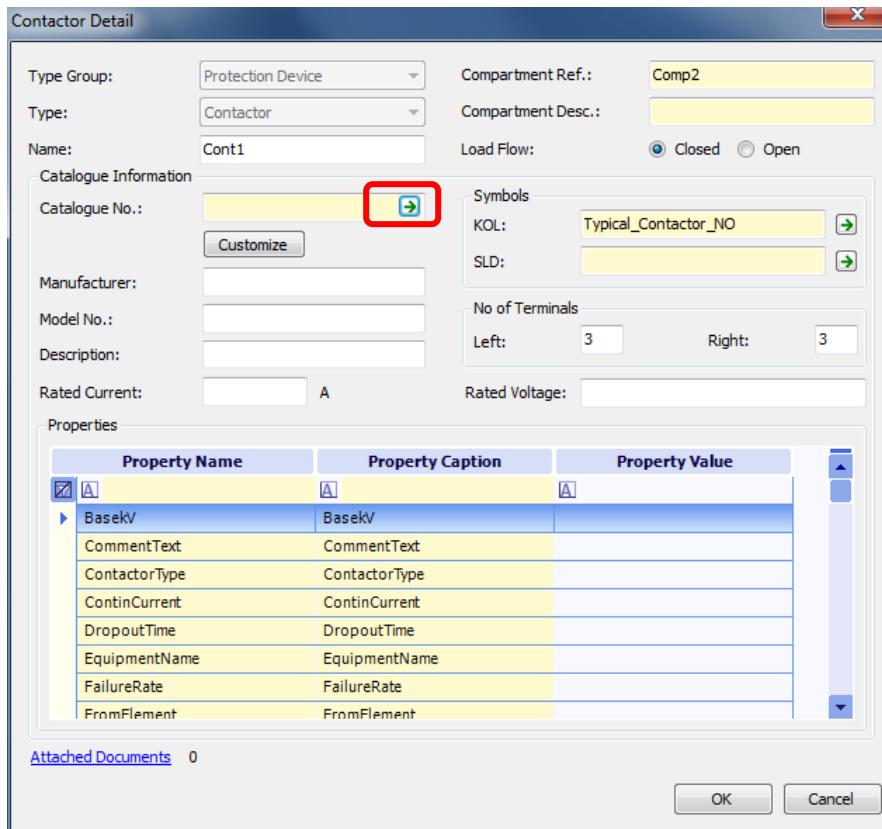
The Circuit Breaker is shown updated on the diagram:



Repeat the process to add a **Contactor** Compartment Element. In the **Protection Devices** Symbol list category select the **Typical_Contactor_NO symbol** and drag it onto the **Comp2** container.



Right mouse button click on the contactor **Cont1**, and then select **Edit Detail** to open the **Contactor Detail** form:



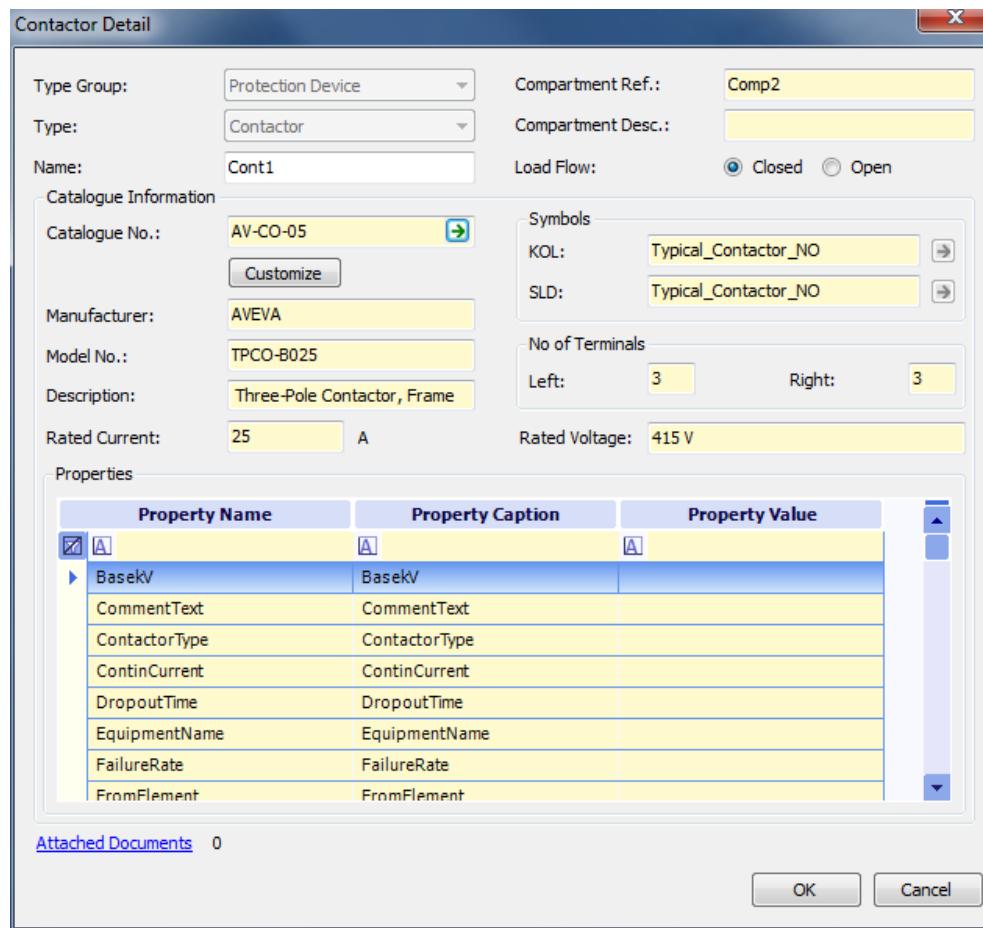
Press the button to the right of the **Catalogue No.**

It will open the Compartment Element Catalogue showing suitable contactor catalogue items.

CatalogNo	Description	Manufacturer	ModelNo	NoOfTermi	NoOfTer	RatedCurrent	RatedVoltage
AV-CO-01	Three-Pole Contactor, Frame B	AVEVA	TPCO-B007	3	3	7	415 V
AV-CO-02	Three-Pole Contactor, Frame B	AVEVA	TPCO-B009	3	3	9	415 V
AV-CO-03	Three-Pole Contactor, Frame B	AVEVA	TPCO-B012	3	3	12	415 V
AV-CO-04	Three-Pole Contactor, Frame C	AVEVA	TPCO-B018	3	3	18	415 V
AV-CO-05	Three-Pole Contactor, Frame C	AVEVA	TPCO-B025	3	3	25	415 V
AV-CO-06	Three-Pole Contactor, Frame C	AVEVA	TPCO-B032	3	3	32	415 V
AV-CO-07	Three-Pole Contactor, Frame D	AVEVA	TPCO-B040	3	3	40	415 V
AV-CO-08	Three-Pole Contactor, Frame D	AVEVA	TPCO-B050	3	3	50	415 V
AV-CO-09	Three-Pole Contactor, Frame F	AVEVA	TPCO-B080	3	3	80	415 V
AV-CO-10	Three-Pole Contactor, Frame G	AVEVA	TPCO-B115	3	3	115	415 V

Select the **AV-CO-05** Three-Pole Contactor and then **Select** button.

The **Contactor Detail** is updated with the catalogue information. Attributes are not accessible by the user.



If an element is selected from the catalogue, the details of the element in the compartment are automatically changed when the details of the catalogue element is changed.

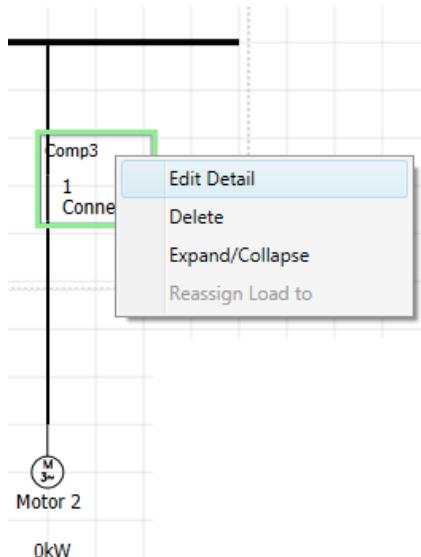
- i** Details of elements selected from the catalogue can only be changed directly by “customising” them. It breaks the link between the element in the compartment and the catalogue element, i.e. changes to the catalogue element will no longer result in the compartment element being changed.

Click the **Customize** button. A message is then displayed requesting that the user confirm that customisation is required. Click **Yes**. The fields in the Catalogue Information section then become editable

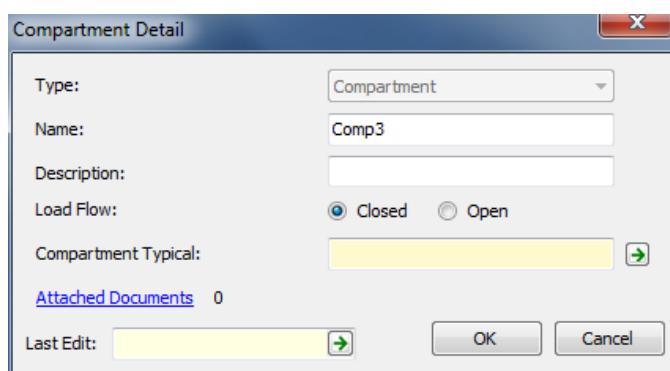
Select **OK** to close the form and **Refresh data only** in the **Refresh Options** dialogue pops up, and then **OK**.

2. Assign Elements from Compartment Typicals

Assigned **Motor 2** to the bus bar 2 of **MCC 1**, a new compartment **Comp3** with a default “Connector” element has been created automatically.

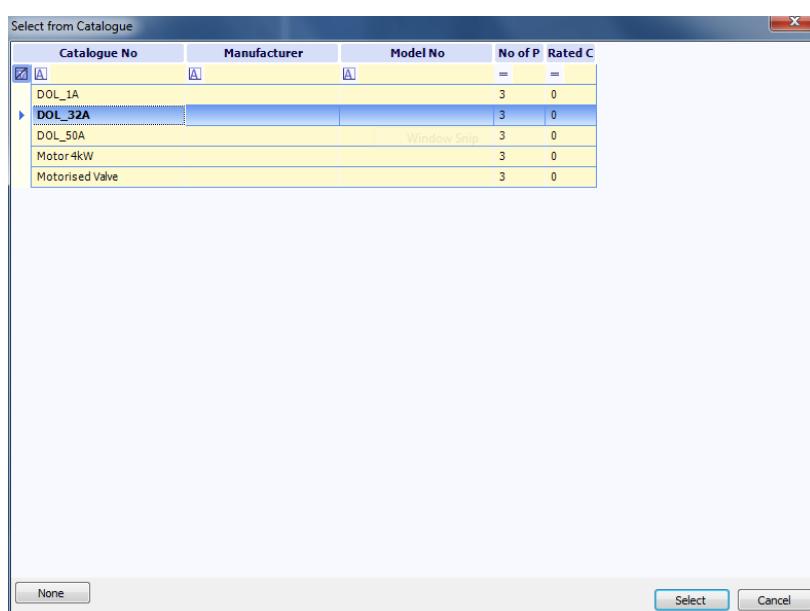


Right mouse button click on the **Comp3**, and then select **Edit Detail**, this will open the **Compartment Detail** form:



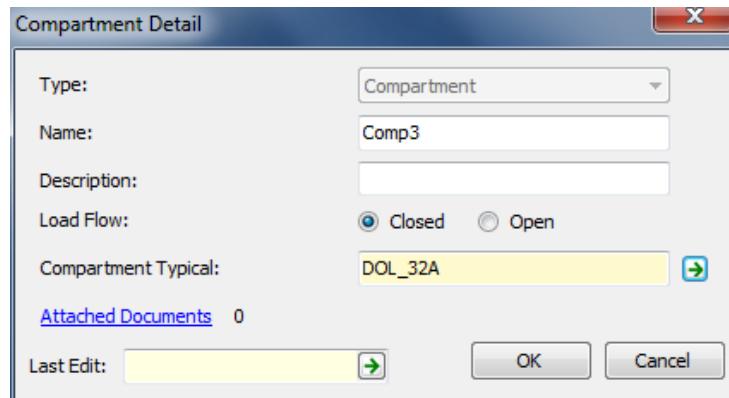
Press the button to the right of the **Compartment Typical** field.

The **Select from Catalogue** window is then displayed: The window lists the compartment typicals from the Compartment Typicals Catalogue.

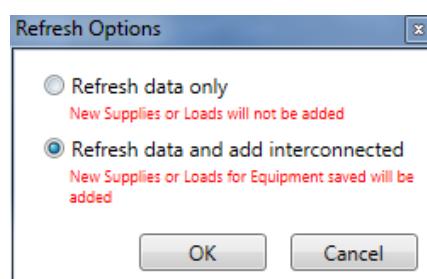


Double-click or click on **DOL_32A** and then click **Select**.

The **Select from Catalogue** window then closes and the selected typical is displayed in the **Compartment Typical** field in the **Compartment Detail** window:

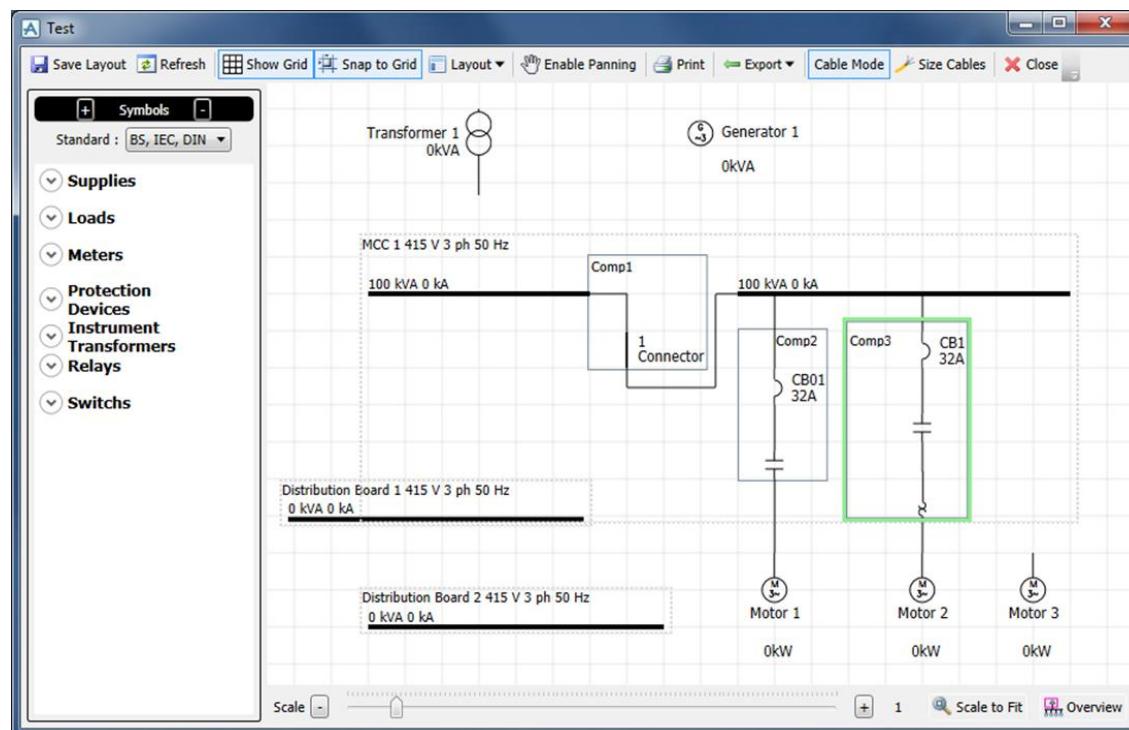


Select **OK**.



The **Refresh Options** dialogue pops up, select the option **Refresh data and add interconnected** and then select **OK**.

The diagram is updated with the elements contained in the compartment typical. Attributes or graphical arrangement cannot be modified.



Select the **Save Layout** button and then select the **Close**.

Changes in the compartment typical can be applied to those compartments to which the compartment typical has already been applied. Please refer to the AVEVA Electrical Engineer user guide chapter 10.2.4.

3.5 MCC's and Switchboards Compartments (Worked Example)

Open the **Supplies** grid:

Area Path	Area	EquipmentNo	Description	EquipmentType	DataSheetNo	Volts	Frequency	NoOfPhases	Rated Load	RatedFL
	Default	Distribution Board 2		Distribution Board		415	50	3	0	0
	Default	Generator 1		Generator		415	50	3	0	0
	Default	MCC 1		MCC		415	50	3	100	139.12
	Default	Transformer 1		Transformer		415	50	3	0	0

Select the row that holds the data for **MCC 1** and then select the **Edit** button. The **Supply Details** form for **MCC 1** will open.

Select the **Compartments** tab. Expand the **MCC 1** and **Busbar 2** to view the compartments in that busbar.

Name	Description	Feed Status	Load Flow	Compartment Typical
Comp3	Motor 15kW	Out	Closed	DOL_32A
Type	Name	Catalogue N	Model No.	Fed Item 1
Circuit Break	CB1	AV-CB-03	MCCB-M32	Cont1
Contactor	Cont1	AV-CO-06	TPCO-B032	MR1
Motor Relay	MR1	AV-OR-07	THOR-D016	Motor 2

Name	Description	Feed Status	Load Flow	Compartment Typical
Comp2		Out	Closed	
Type	Name	Catalogue N	Model No.	Fed Item 1
Circuit Break	CB01			Cont1
Contactor	Cont1	AV-CO-05	TPCO-B025	Motor 1

Select **Busbar 2** and then click **Add**.

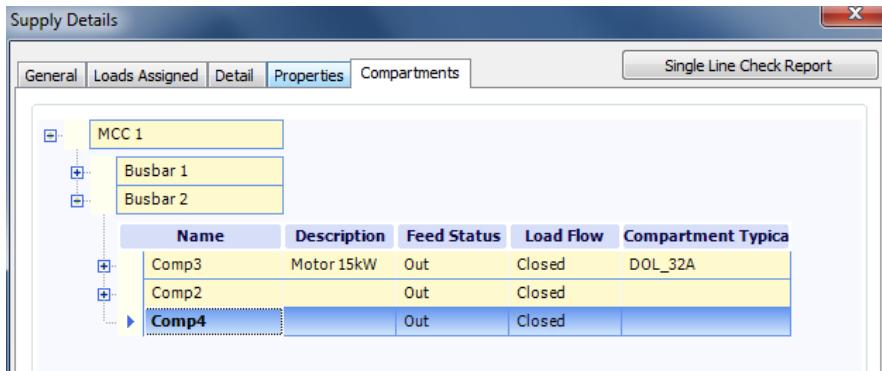
Compartment nodes can then be expanded to view the devices in a busbar.

Comp3 has the elements added from the compartment typical.

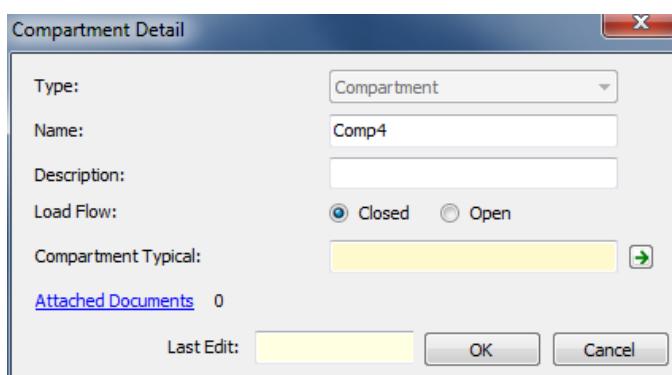
i To see and edit the details of a compartment or any element double-click on the compartment/element row to open the Element window.

i When an element is added, it will automatically be assigned a fed item of the previous item. Its name will be displayed in the **Fed Item 1** field for that element in the compartment:

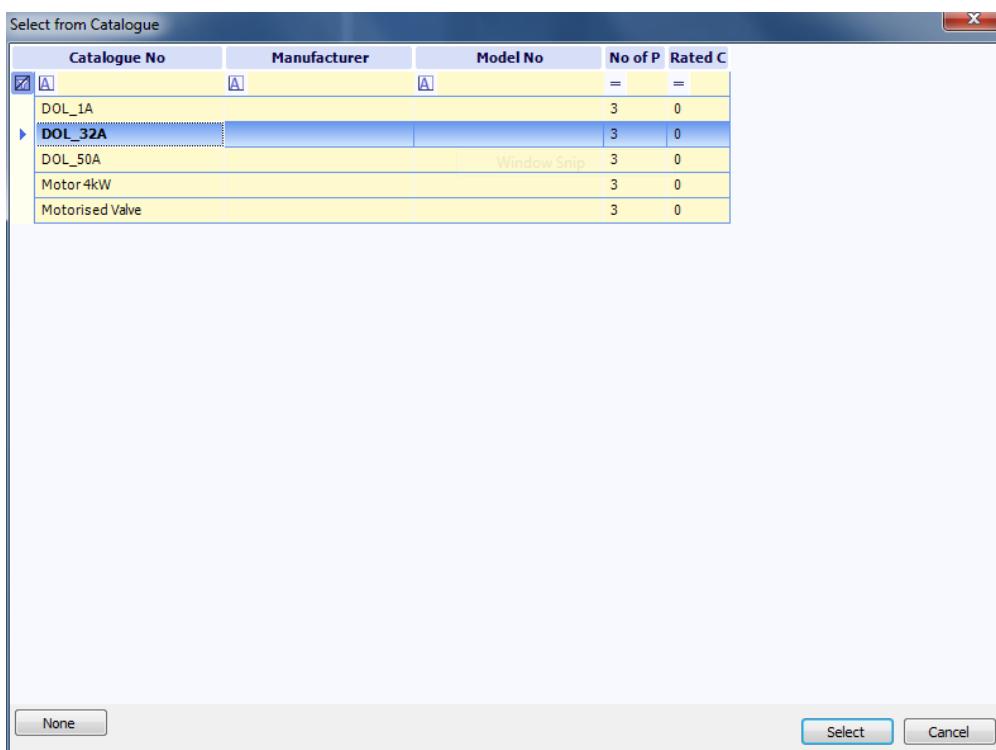
A new compartment **Comp4** is added to the MCC:



Double-click on the **Comp4** to display the **Compartment Detail** window.

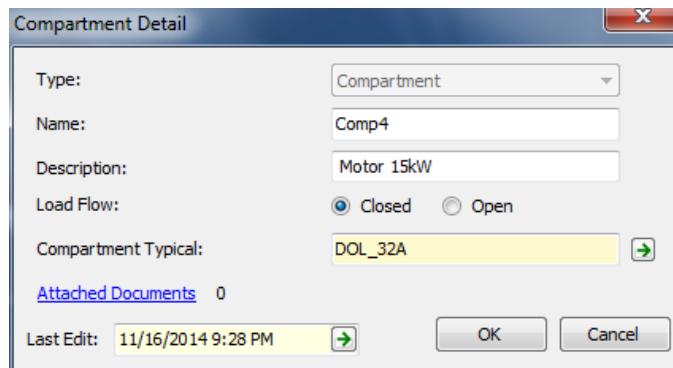


Press the button to the right of the **Compartment Typical** field.



Double-click or click on **DOL_32A** and then click **Select**.

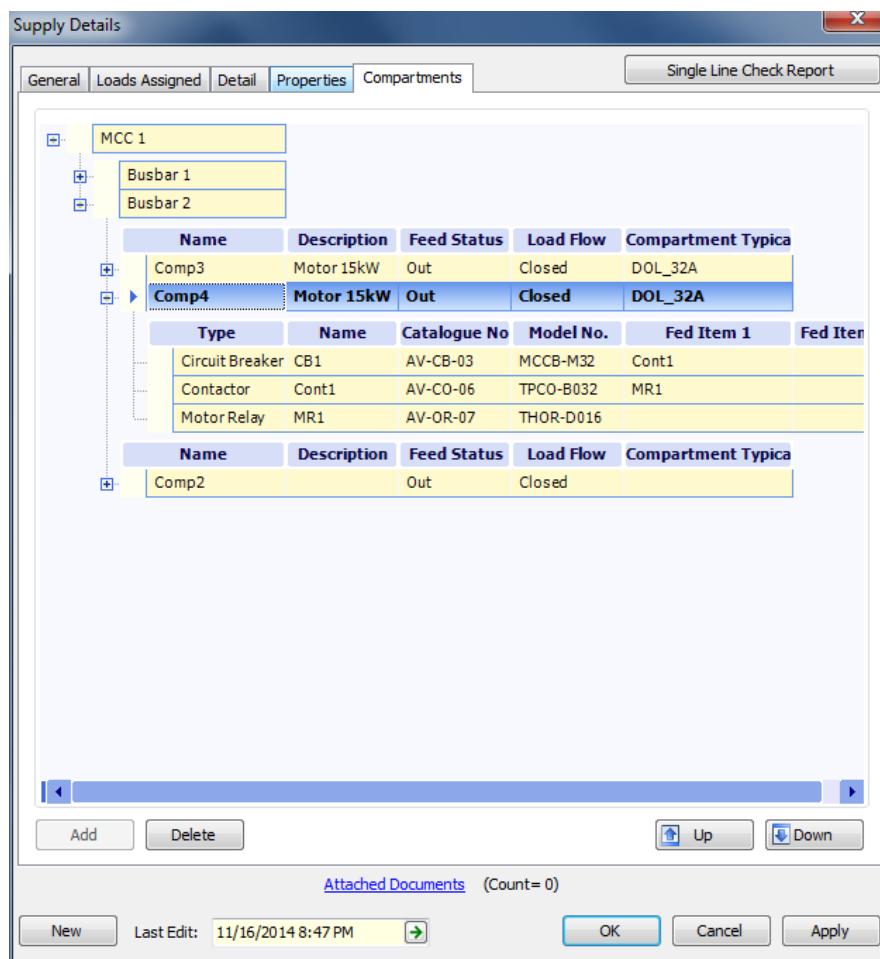
The **Select from Catalogue** window then closes and the selected typical is displayed in the **Compartment Typical** field in the **Compartment Detail** window:



Select **OK**.

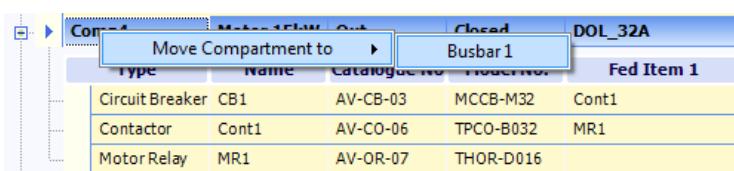
- i** The Name and Description of the compartment can be modified in this window,

New elements have been automatically added to the compartment according to the compartment typical:

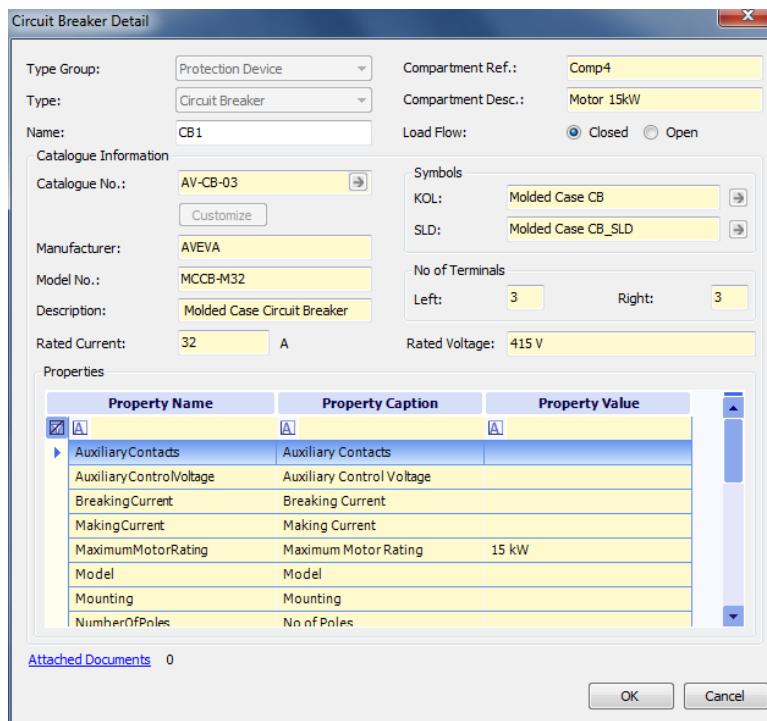


- i** To change the position of a compartment in the list, select it and use the Up and Down buttons.

- i** To move a compartment to a different busbar, right-click on it. A list of the other busbars of the supply is then displayed. Click on the required busbar to complete the re-assignment.



- i** Attributes or the order of the elements cannot be modified. If an element is selected and then double click, the **Element Detail Window** is displayed but the values cannot be updated:



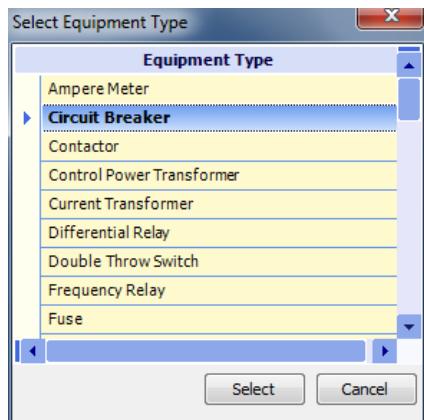
Select **Busbar 2** and then click **Add** a new compartment:

Name	Description	Feed Status	Load Flow	Compartment Typical
Comp3	Motor 15kW	Out	Closed	DOL_32A
Comp4	Motor 15kW	Out	Closed	DOL_32A
Comp2		Out	Closed	
Comp5		Out	Closed	

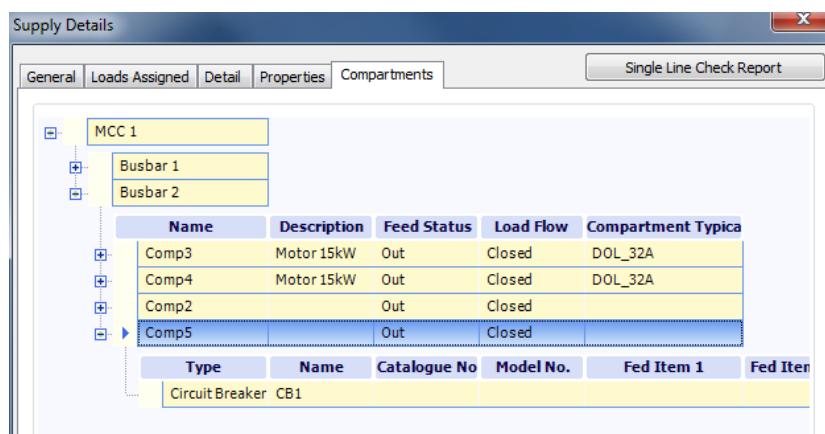
Elements can be added to compartments individually without a Compartment Typical link.

Select **Comp5** and then click **Add**.

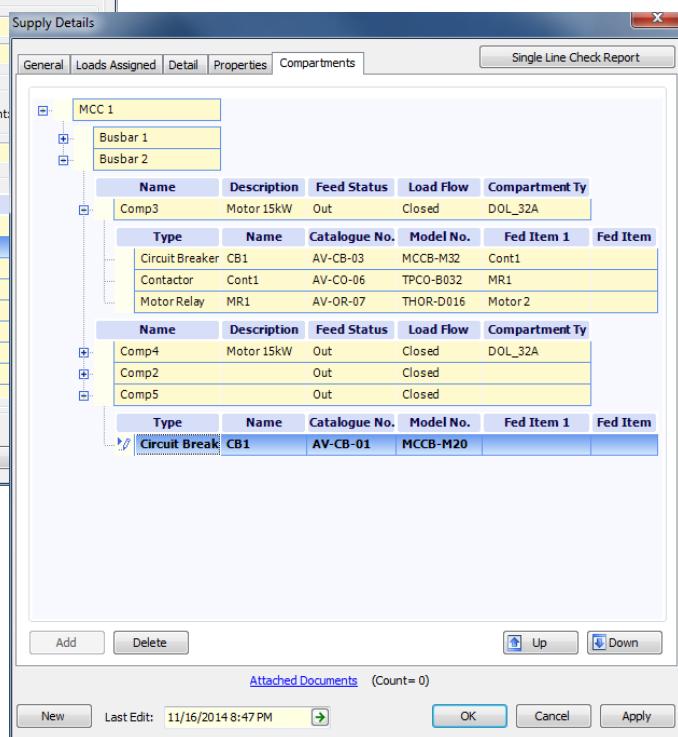
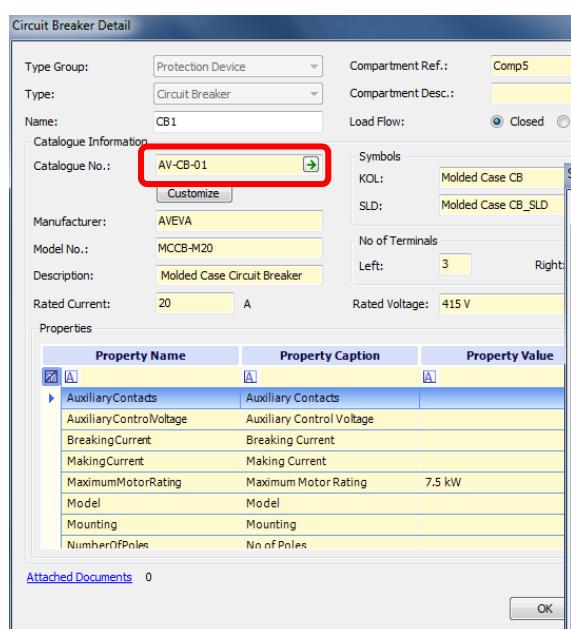
The **Select Equipment Type** window is then displayed.



Select a **Circuit Breaker** and click **Select**.



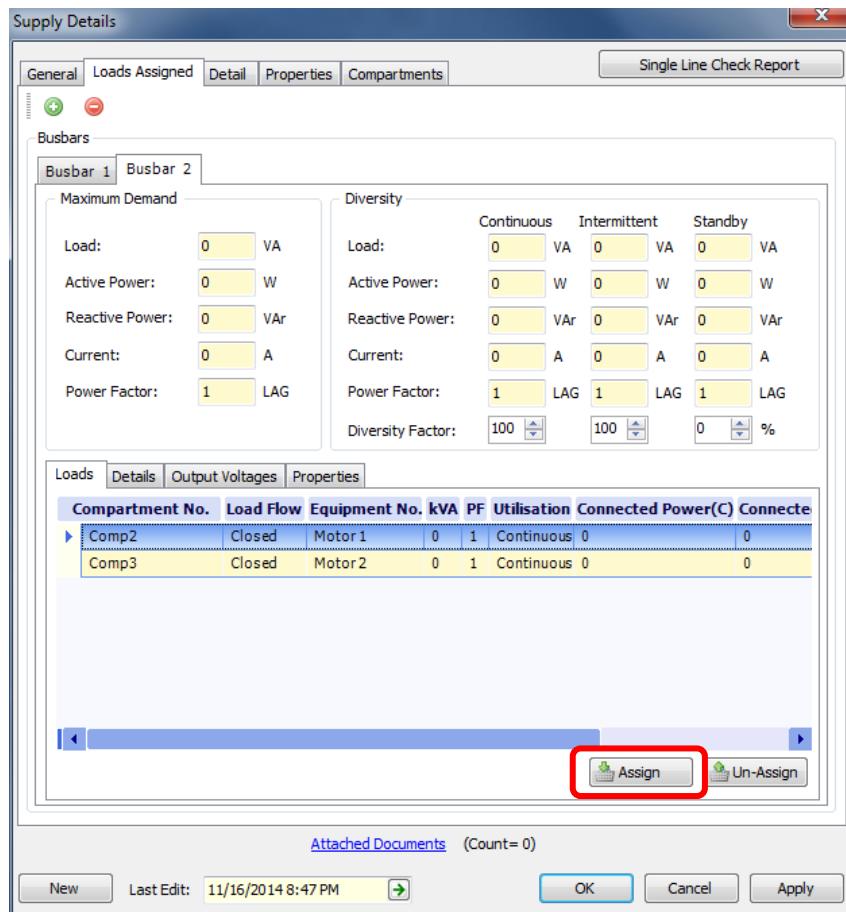
Double-click on the Circuit Breaker **CB1** to open the **Circuit Breaker Detail** window.



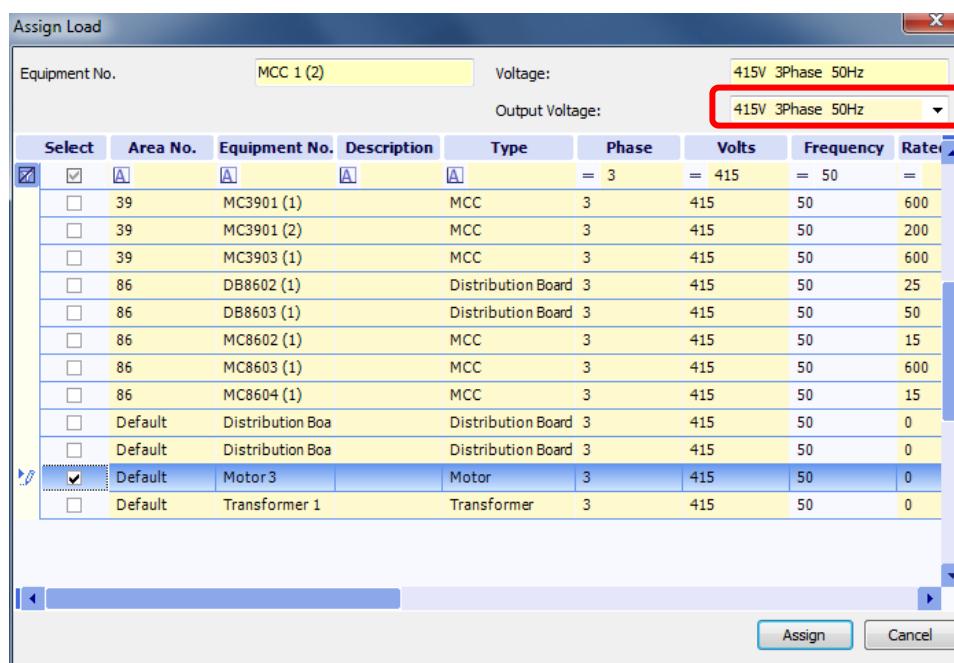
Select Catalogue on **AV-CB-01** and then **OK** and then **Apply**.

3.5.1 Assign Loads (Worked Example)

Select the **Loads Assigned** tab, and then select the **Busbar 2** tab.

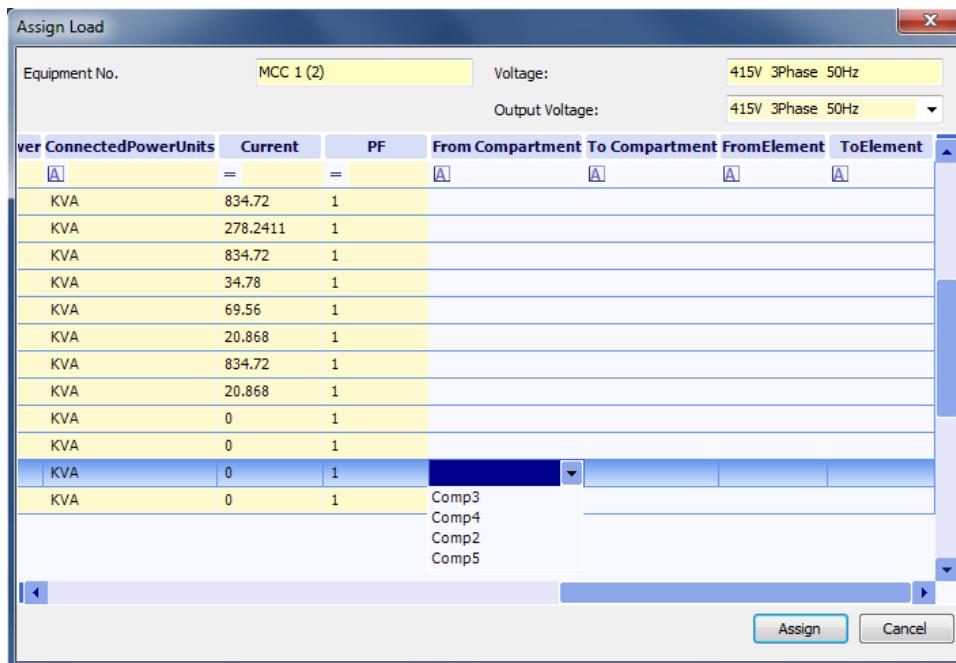


The **Assign Load** window is displayed:

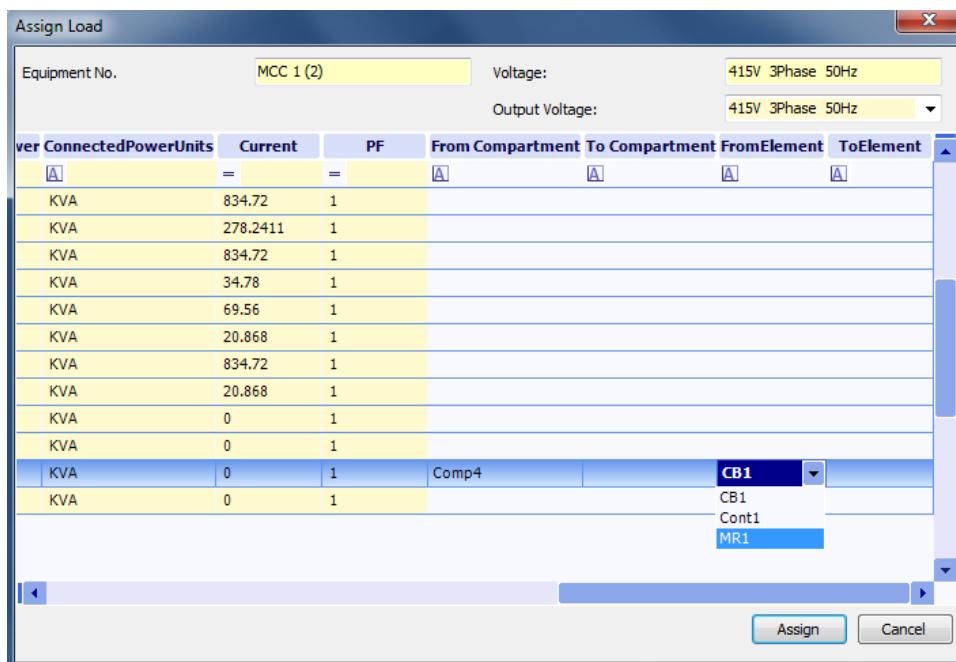


The window lists the busbars with matching voltages according to the **Output Voltages** selected in the **Output Voltages** tab

Check the **Motor 3** checkbox in the Select column.



- Compartment may feed more than one Loads, hence the **From Compartment** column will display all the compartments contain in the busbar.*



Loads can be assigned to a particular compartment:

Go to the **From Compartment** column.
All the compartments are listed.

Select **Comp4**.

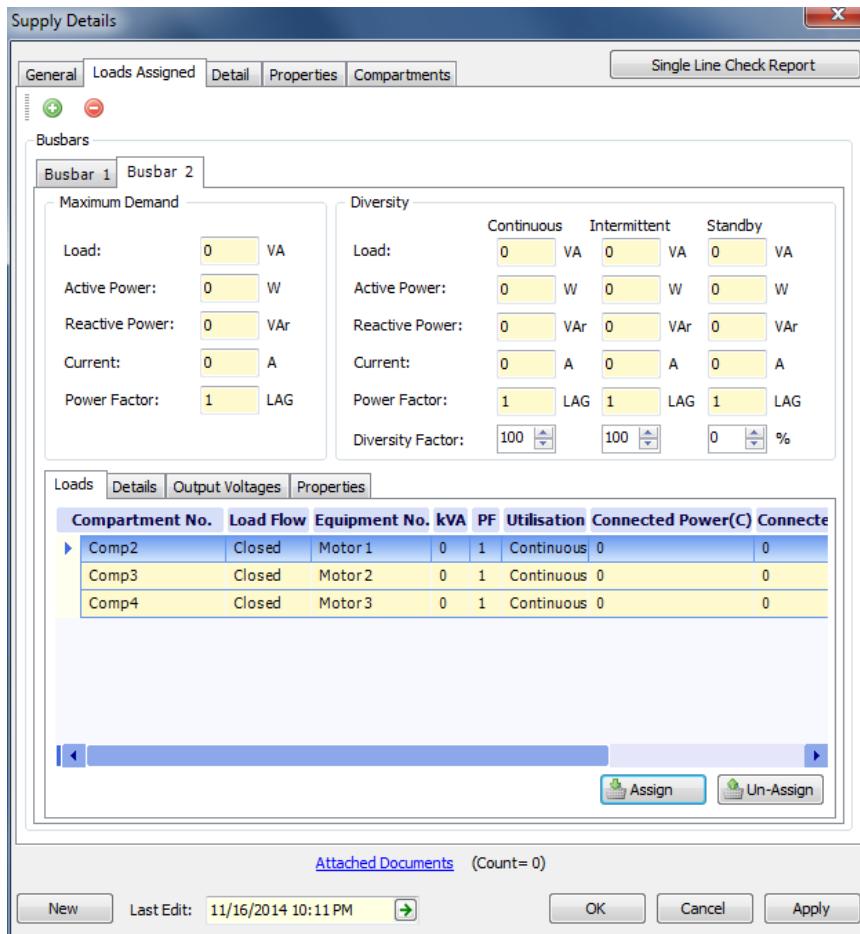
Go to the **From Element** column.
All the compartment elements contained in the selected compartment are listed.

Select **CB1** and then click **Assign** button

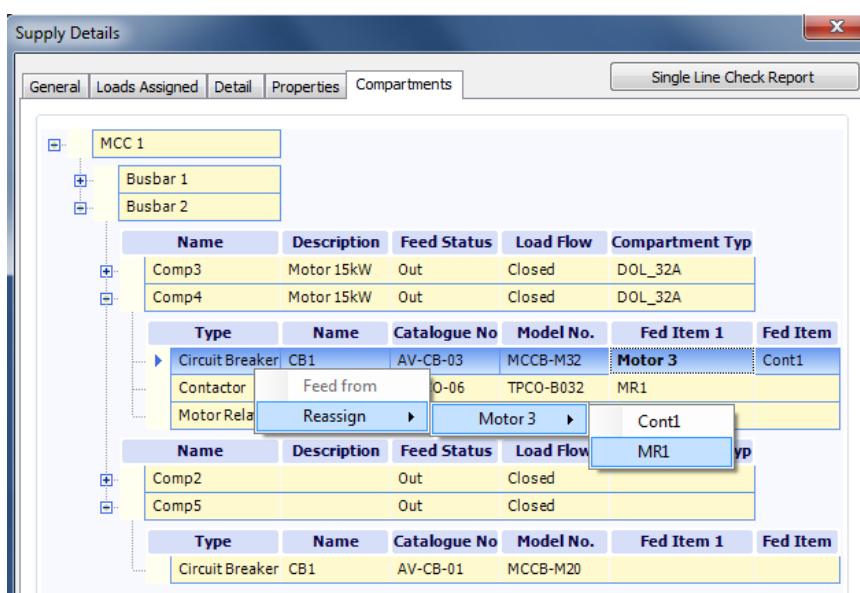
The Load will be fed from the selected element.

- The Loads can be assigned to the busbar without selecting a particular compartment. They are assigned to the first available spare compartments of the busbar. If there are no or not enough spare compartments, the required compartment or compartments will be automatically generated. The loads will be assigned to a default "Connector" element created with the automatically generated compartments.*
- If, with the addition of the selected loads, the sum of the rated power of the loads assigned to the supply would be greater than the supplies rated power, a warning message is displayed.*

The **Loads** list is updated:



Double-click on the **Comp4**. The **Compartments** tab is displayed and the **Motor 3** is connected to the **CB1**.



The load can be reassigned to be fed from a different element in the compartment:

Right click on the **Motor 3** row.

Select **Reassign** and then select **MR1**.

- i** Compartment elements can also be reassigned to be fed from a different element. Right-click on it and select **Feed from** from the menu that is then displayed, then select the required element from the submenu.

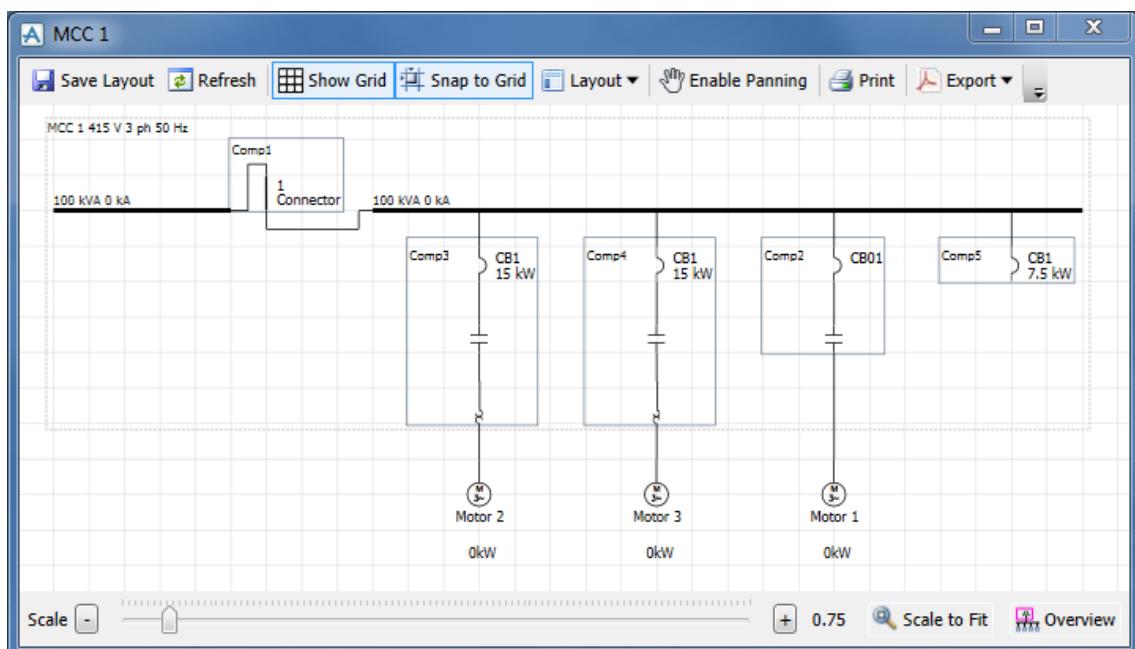
Motor 3 is fed from the MR1:

Supply Details

Compartments						Single Line Check Report																																										
<table border="1"> <thead> <tr> <th>Name</th> <th>Description</th> <th>Feed Status</th> <th>Load Flow</th> <th>Compartment Type</th> <th></th> </tr> </thead> <tbody> <tr> <td>Comp3</td> <td>Motor 15kW</td> <td>Out</td> <td>Closed</td> <td>DOL_32A</td> <td></td> </tr> <tr> <td>Comp4</td> <td>Motor 15kW</td> <td>Out</td> <td>Closed</td> <td>DOL_32A</td> <td></td> </tr> <tr> <td>Type</td> <td>Name</td> <td>Catalogue No</td> <td>Model No.</td> <td>Fed Item 1</td> <td>Fed Item 2</td> </tr> <tr> <td>Circuit Breaker</td> <td>CB1</td> <td>AV-CB-03</td> <td>MCCB-M32</td> <td>Cont1</td> <td></td> </tr> <tr> <td>Contactor</td> <td>Cont1</td> <td>AV-CO-06</td> <td>TPCO-B032</td> <td>MR1</td> <td></td> </tr> <tr> <td>Motor Relay</td> <td>MR1</td> <td>AV-OR-07</td> <td>THOR-D016</td> <td>Motor 3</td> <td></td> </tr> </tbody> </table>						Name	Description	Feed Status	Load Flow	Compartment Type		Comp3	Motor 15kW	Out	Closed	DOL_32A		Comp4	Motor 15kW	Out	Closed	DOL_32A		Type	Name	Catalogue No	Model No.	Fed Item 1	Fed Item 2	Circuit Breaker	CB1	AV-CB-03	MCCB-M32	Cont1		Contactor	Cont1	AV-CO-06	TPCO-B032	MR1		Motor Relay	MR1	AV-OR-07	THOR-D016	Motor 3		Single Line Check Report
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<input type="button" value="New"/> Last Edit: 11/16/2014 10:11 PM <input type="button" value="Save"/>																																																

- i** If an item is already feeding another element, the element will be added as a second fed item, and listed in the Fed Item 2 field.
- i** Compartment elements may feed more than two other elements, but the window will only display the first two.

Select the **Single Line Check Report** button at the top right of the form.



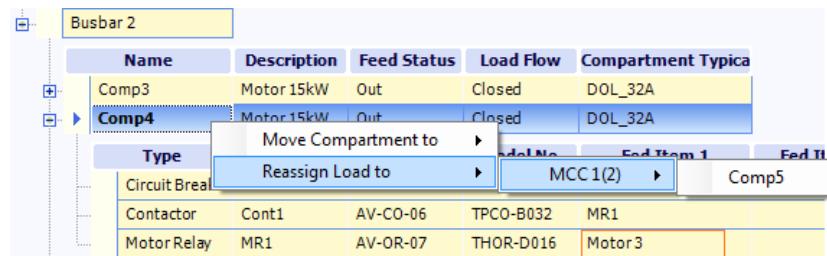
When the image opens, some adjustments can be made to give a result similar to that shown above. Select **Save Layout** and close the form.

Select **OK** to close the Supply Detail form.

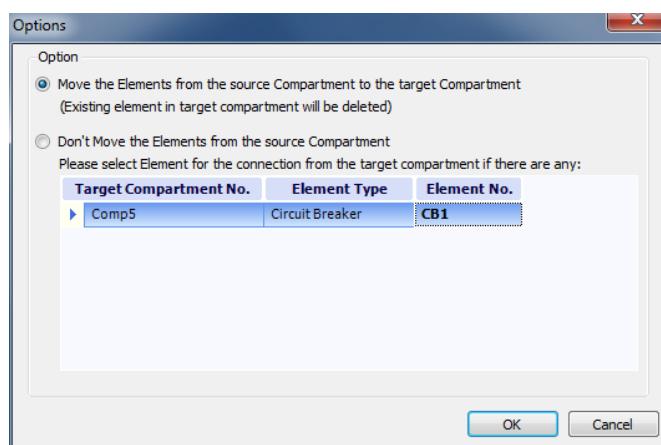
3.5.2 Reassign Loads to Other Compartments

Loads can be reassigned to be fed from a different compartment of the MCC/Switchboard.

Right click on the compartment row, the **Reassign Load to** option lists all busbars with free compartments that have compatibles voltages:



Select the required compartment.



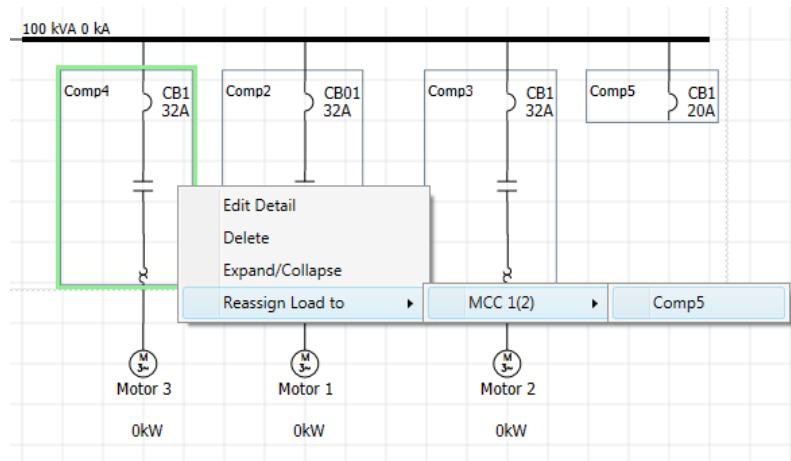
The Options window is displayed.

Move the Elements from the source Compartment to the target Compartment: the elements in the source compartment are also to be moved to the target compartment and the elements in the target compartment will be deleted.

Don't move the Elements from the source Compartment: the elements in the source compartment are to be left in the source compartment. A list of compartment elements contained in the target compartment is displayed below this option.

Select the compartment element that the load will be assigned to as its fed item and then click **OK** to complete the reassignment.

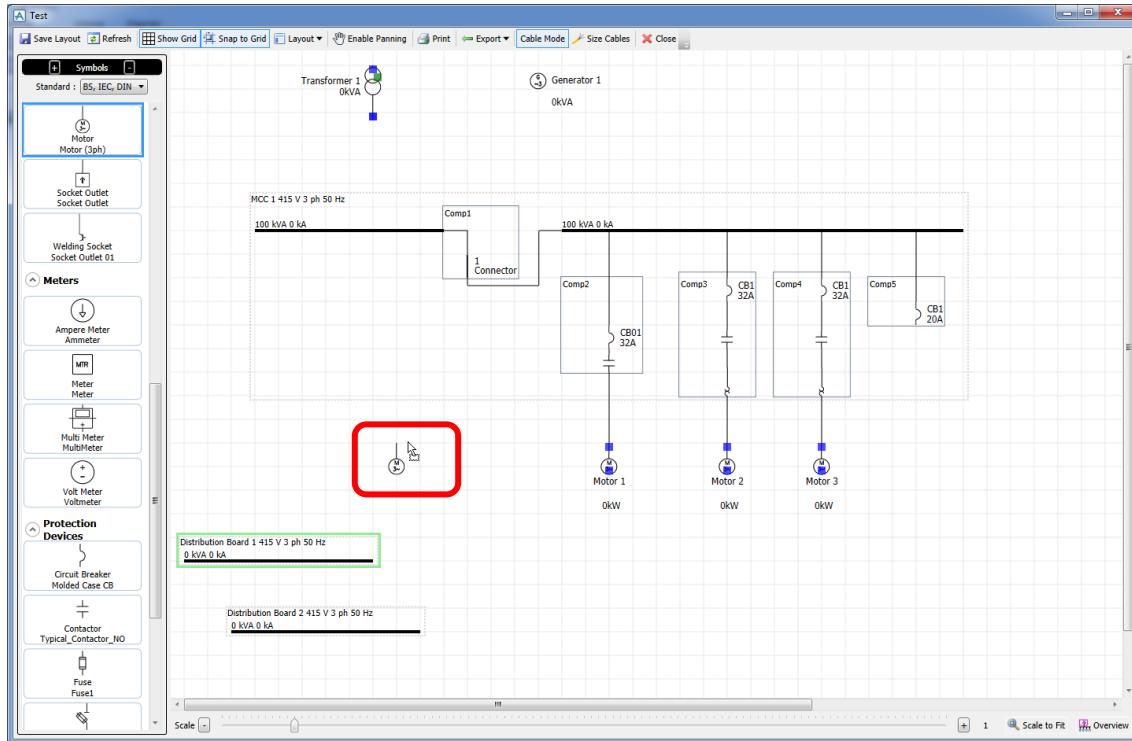
i The **Reassign Load to** option is available on the KOL Distribution Diagram as well:



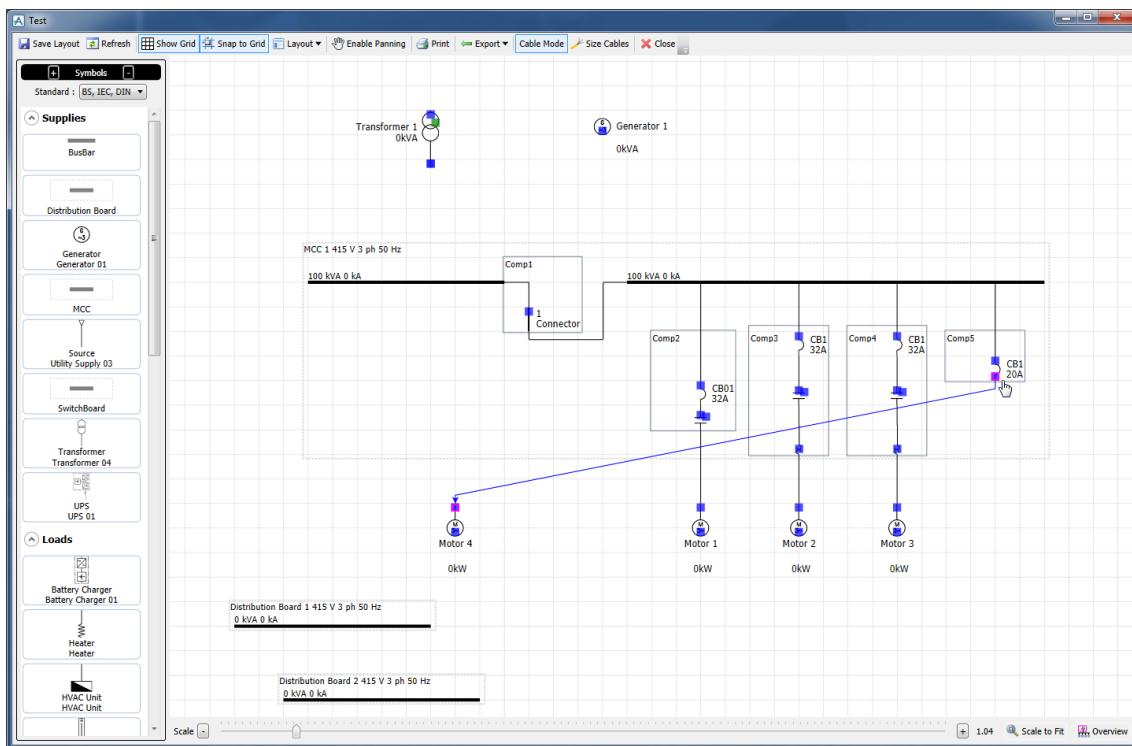
3.5.3 Dual or Quad Redundancy for Load (Worked Example)

Loads can be connected to several supplies. It works in such a way that any outgoing or incoming feeder can be supplied while connected in parallel to multiple sources.

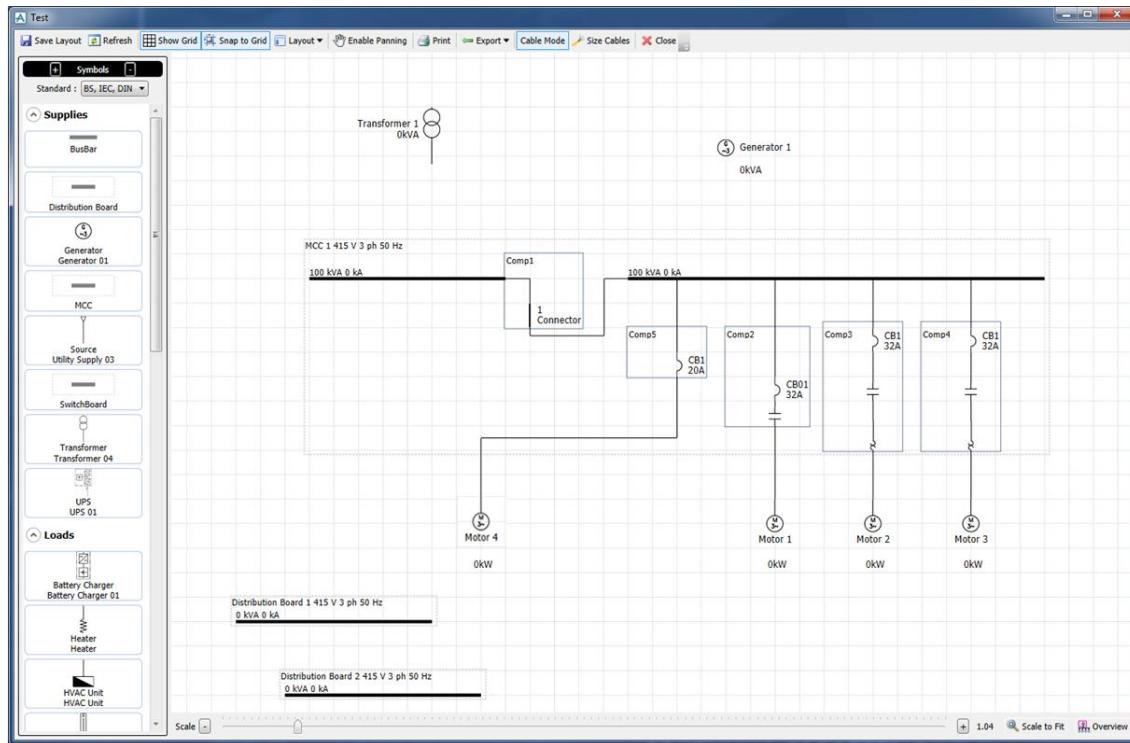
This can be done either graphically or by using the Load/Supply detail windows. Open the distribution diagram **Test** created previously; and from the symbol list drag and drop a **Motor** and place it in a similar position shown in the next image:



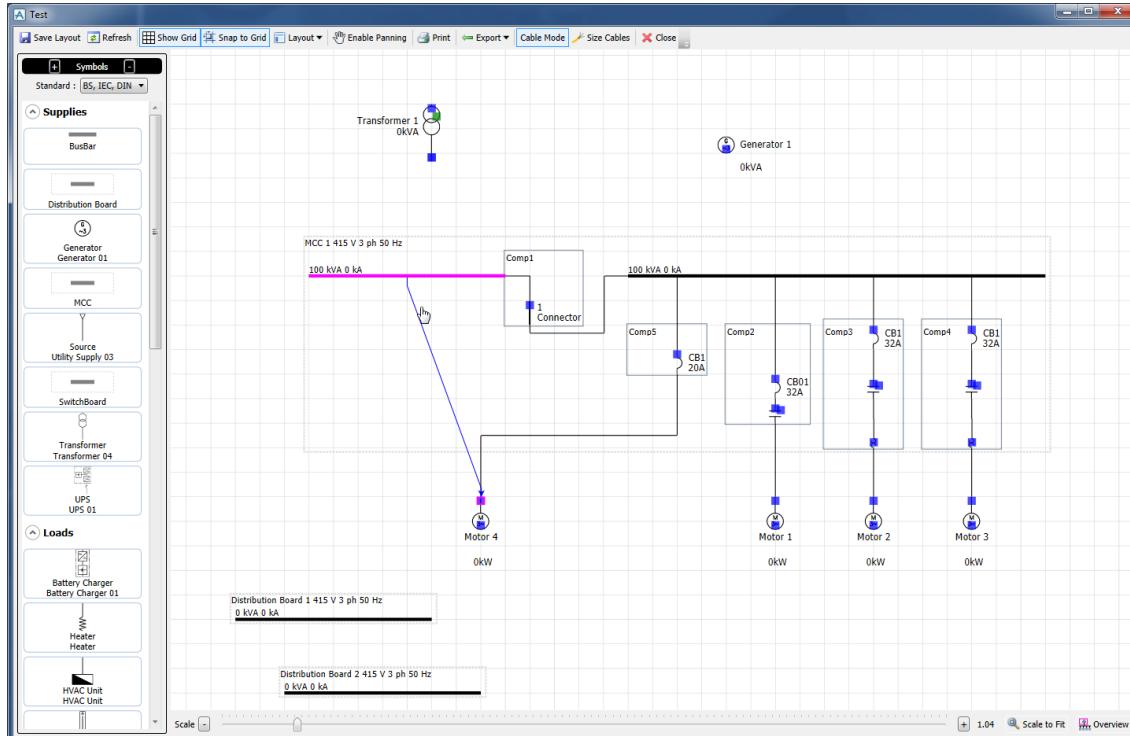
Next, select the top grip of **Motor 4** and connect it to the **Comp5** located in **Busbar 2**



Arrange the **Comp5** as image below by dragging it along the busbar to the other end.

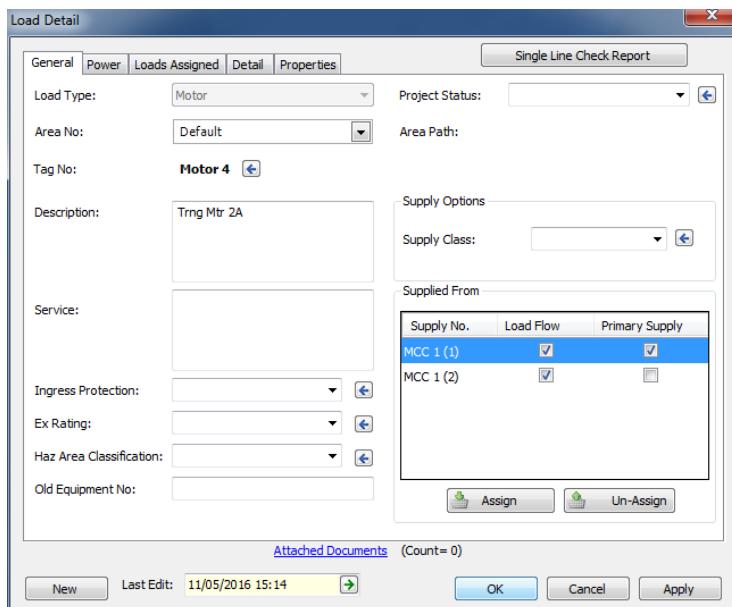


Next, repeat the above step but this time makes the connection to **Busbar 1** as imagine shown below:



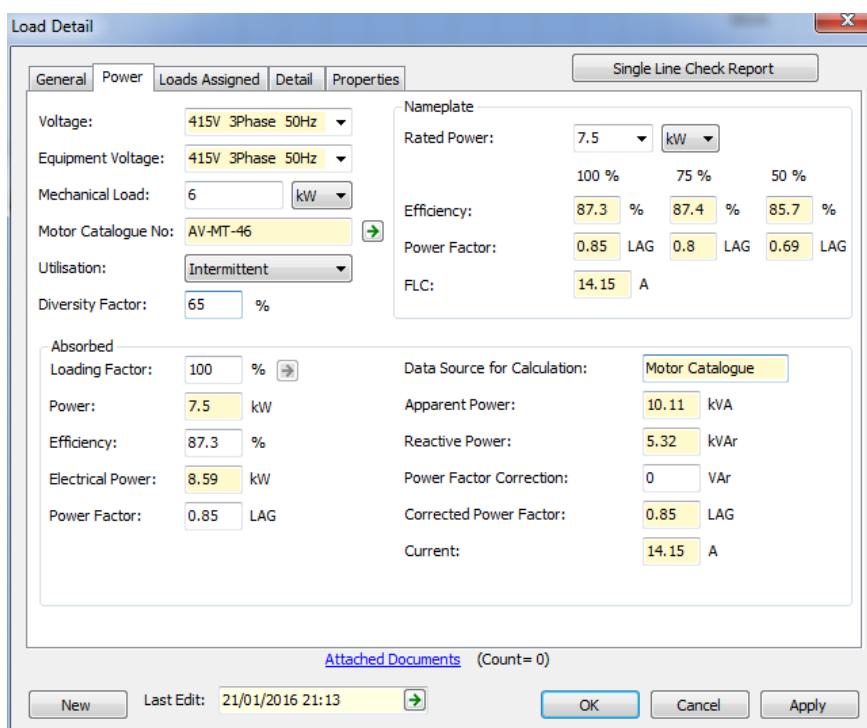
A new compartment **Comp** with a default “Connector” element has been created automatically.

Open the **Load detail** window for the **Motor 4**.



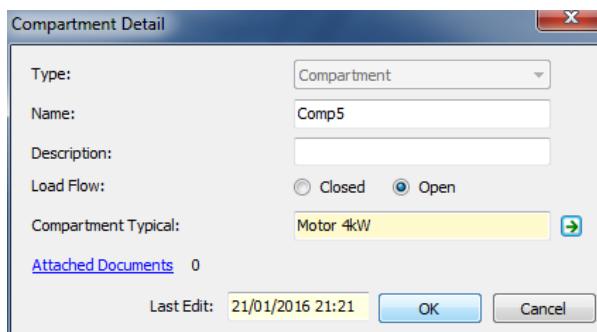
In the Supplied From section check the Primary Supply for the MCC1 (1)

Fill the **Load detail** tab as show below:



Select **OK**.

Right mouse button click on the **Comp5**, and then select **Edit Detail**. Then press the button to the right of the **Compartment Typical** field and select the **Motor 4kW** compartment typical from the list provided.



Select **OK**.

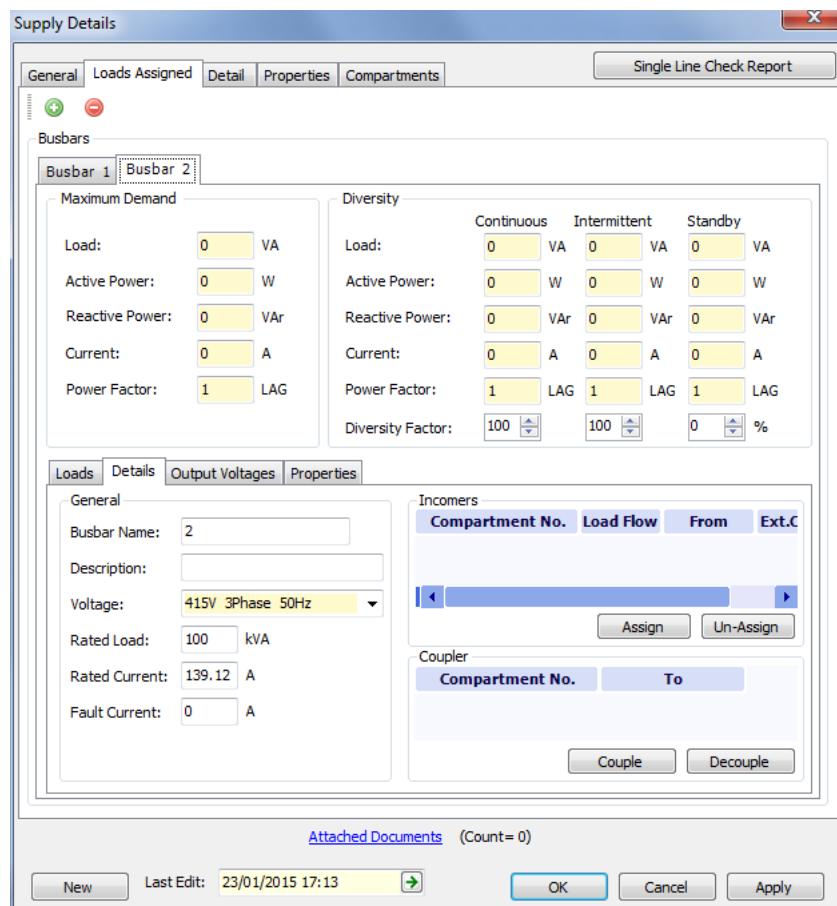
Exercise 4 – Create a Compartment

Select **MCC 1**, **Busbar 2** and create a new compartment (**Comp 6**). Add a **Circuit Breaker** compartment element (**CB1**)

3.5.4 Assign Supplies (Worked Example)

Supplies are assigned to a specific busbar of a MCC or a Switchboard. An incomer compartment can be created and defined with all the required elements.

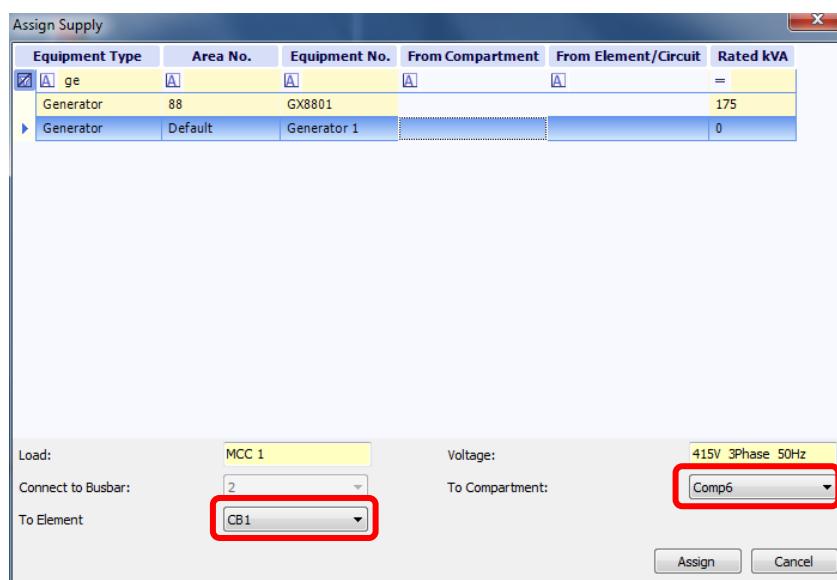
Open the **MCC 1** detail window. Select **Load Assigned -> Busbar 2 -> Details**:



Click the **Assign** button in the Incomers section to open the **Assign Supply** window.

The **Assign Supply** window lists all available supplies.

Select **Generator 1**. The available compartment and compartment elements to connect the Generator are listed in the **To Compartment** and **To Element** drop down lists.



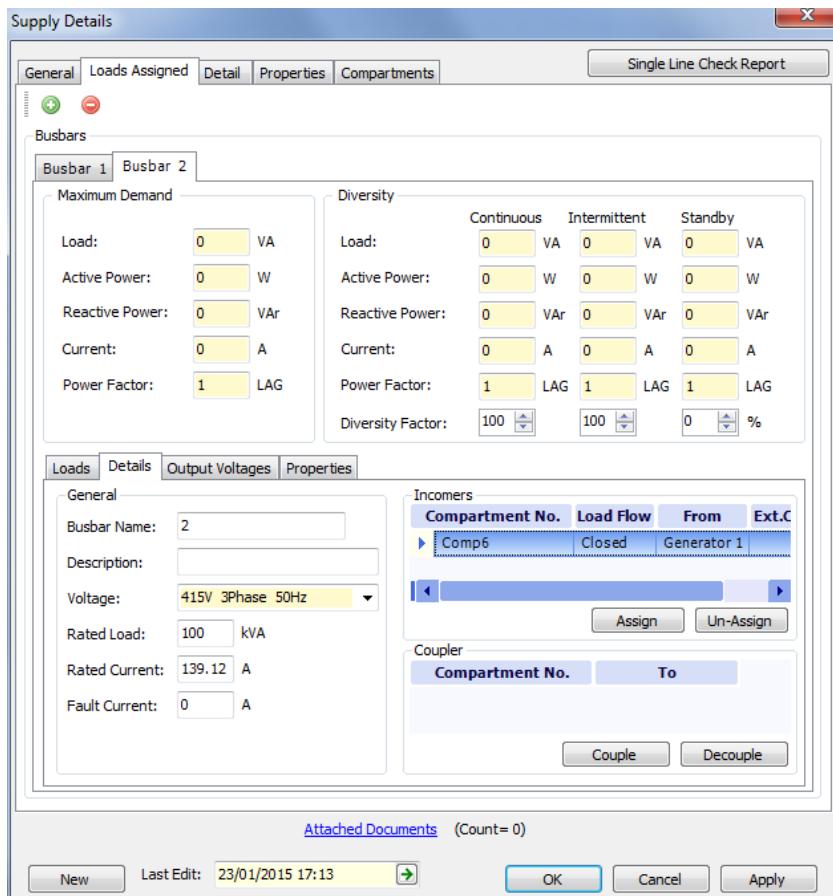
Select **Comp6** and CB1 created previously.

Click **Assign** button

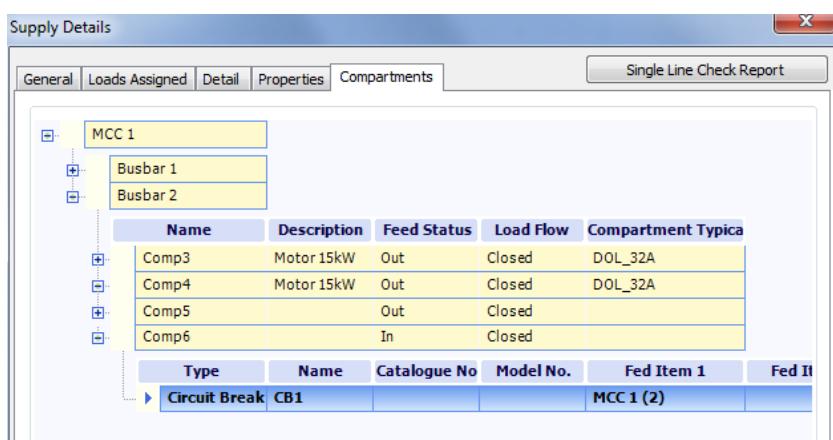
i If there are no spare compartments, the required compartment will be automatically generated.

- i** If the Supply is a MCC or Switchboard the **From Compartment** and **From Element/Circuit** will list the available spare compartments and compartments in the supply. If there are no spare compartments, the required compartment will be automatically generated.

The Incomer compartment is listed in the Incomers section:

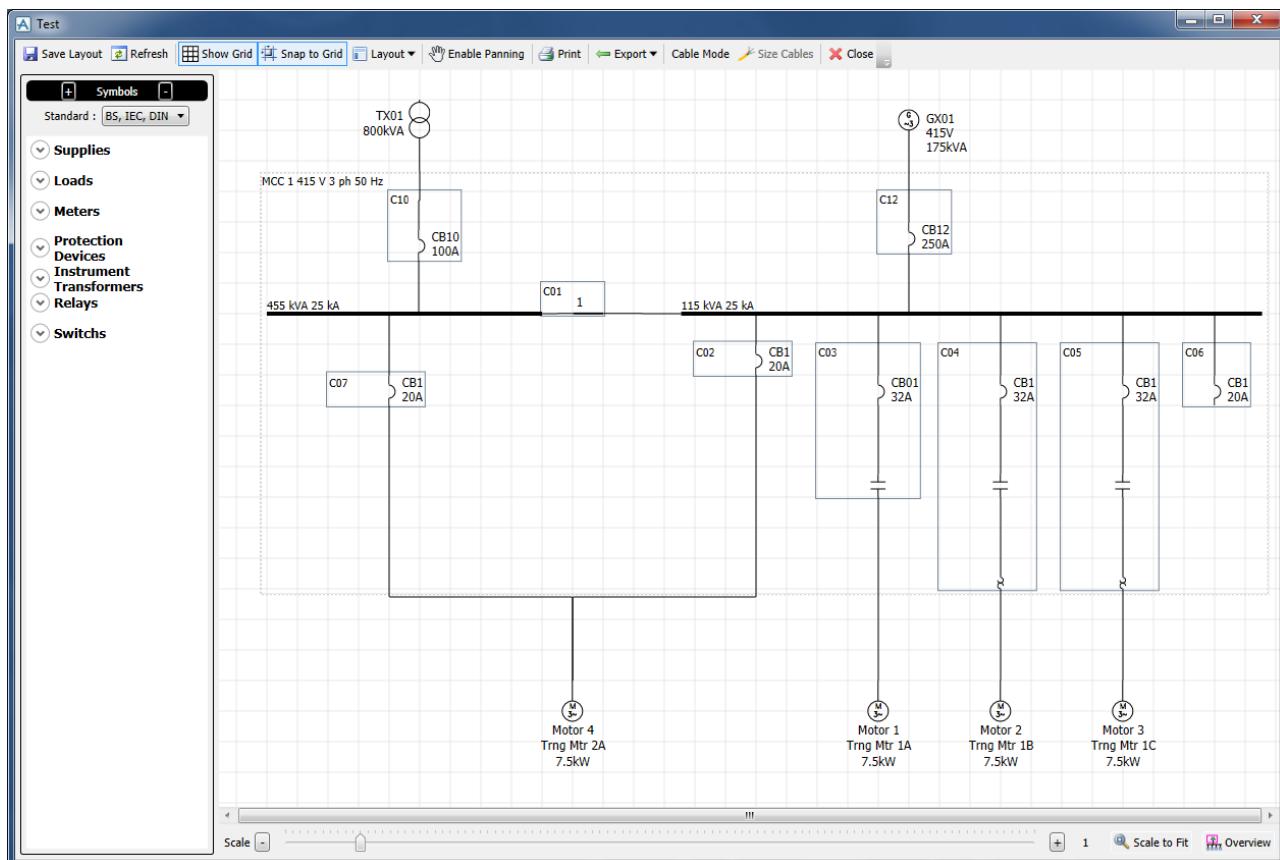


The **Compartments** tab is updated:



Exercise 5 – Complete the Worked Example

Using the image below as a guide line and previous chapters as a guide complete the KOL that has been started. Do not be too concerned about technical accuracy here; users are encouraged to “Free Form” as they wish.



For the equipment that is already inserted onto the KOL the equipment can be edited directly from the KOL in two ways:

- Double click on the item with the left mouse button.
- Select the equipment, right mouse button click on the equipment and then select **Edit Detail**.

Either one of these methods will open the **Load Detail**, **Supply Details**, **Compartment Detail** or **Compartment Element Detail** forms subject to which item type is selected for editing.

i Equipment can be edited from the appropriate Supplies or Loads grid as well.

For Motors, complete the following information on the Load detail form:

- **Mechanical Load:** **6**.
- **Catalogue:** **Aveva D132M 7.5kW 4 pole Motor**.
- **Utilisation:** **Continuous** (Motor 1, 3 and 4) and **Standby** (Motor 2)
- **Ingress Protection:** **IP55**
- **Haz Area Classification:** **Safe**
- **Supply Class:** **Essential**.
- **Starter type:** **DOL**

3.6 Manage Grids

The user can manage their Grid views by defining their own sets of data fields (columns), default column order; default sorting and predefined data filters for most data grids available in AVEVA Electrical.

The Grid views are currently available in the following data grids in Electrical Engineer.

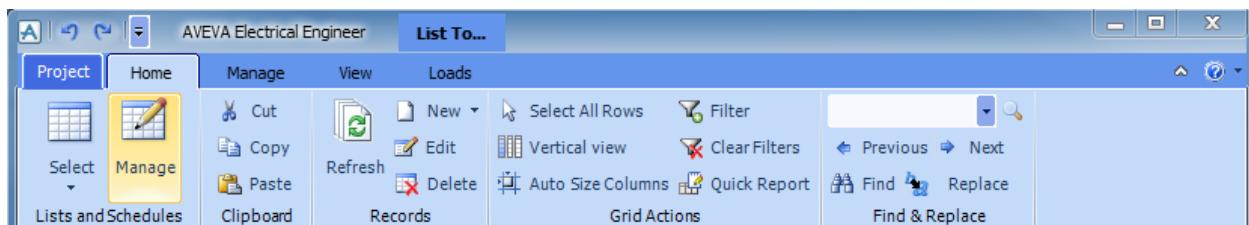
Data Grid	Description
Loads List	Loads Schedule
Supplies List	Supplies Schedule
Equipment List	Equipment List
Datasheet List	Datasheet Documents List
Document List	Documents List
Packages List	Equipment Packages List
Instrument Loads	Instrument Loads List
Reports	Reports Documents List

This feature enables the user to only have access to those fields and properties that are required for their current task. The user can create multiple views and easily change between the views within the modules in AVEVA Electrical

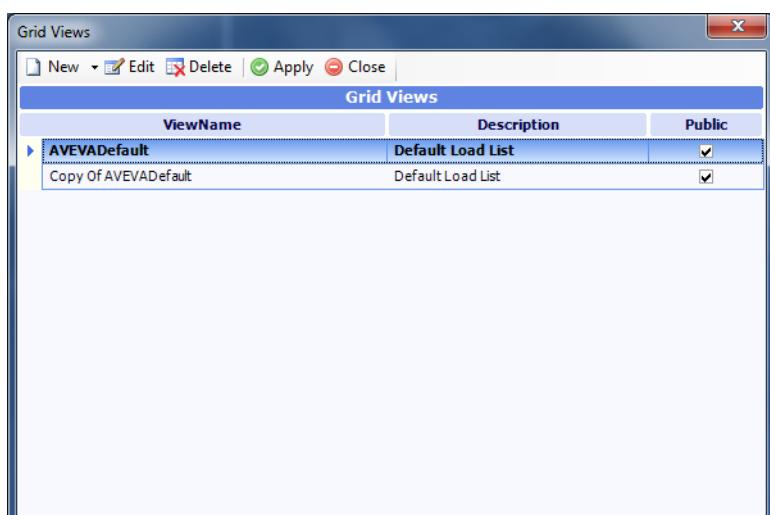
3.6.1 Create a New Grid View (Worked Example)

Open the **Loads** grid selecting **Home > Select > Loads**.

Select **Home**, and click the **Manage** button.

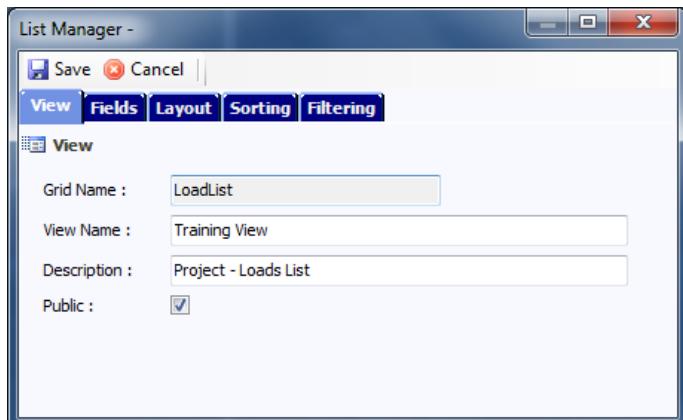


The **Grid Views** form is displayed.



Click the **New** button and enter the details on each tab as specified below on the **List Manager** form.

On the **View** tab;



View Name text box: **Training View**

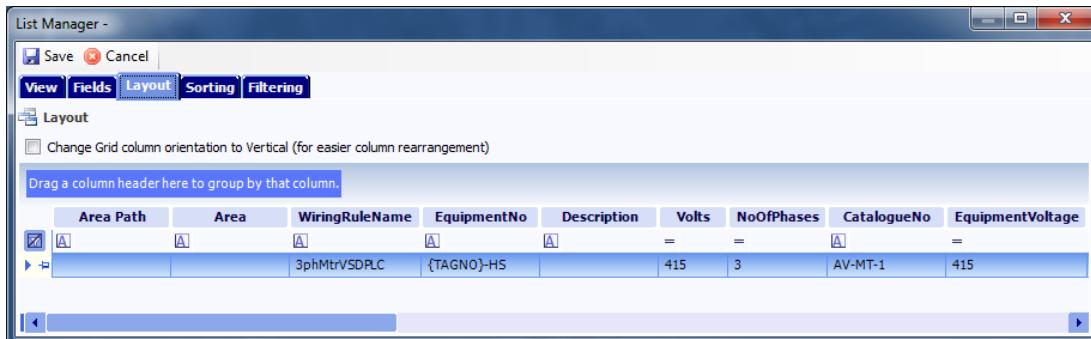
Description text box: **Project – Loads List**

Check the **Public** check box: doing so allows other users to use or manipulate the view or data set.

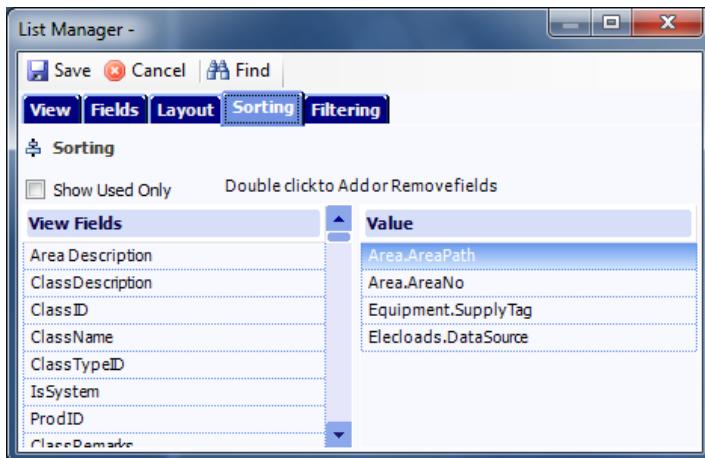
Select the **Fields** tab and check the check boxes under the **Select** column to select the following **Field Names**:

Table (Source)	Field Name	Caption
Area	AreaPath	Area Path
Area	AreaNo	Area
ElecWiringRules	WiringRuleName	WiringRuleName
Equipment	EquipmentNo	EquipmentNo
Equipment	Description	Description
ElecLoads	Volts	Volts
Equipment	ElecNoOfPhases	NoOfPhases
ElecMotorCatalog	CatalogNo	CatalogueNo
VwElecEquipmentVoltage	EquipmentVoltage	EquipmentVoltage
Equipment	ElecRatedkW	Nameplate Power
Equipment	ElecRatedkWUnits	Nameplate Power Units
Equipment	ElecRatedkPFactor	Rated Power Factor
Equipment	ElecRatedEff	ElecRatedEff
vwEquipmentAndElecParent	ElecPEquipmentNo	SupplyTag
vwCompartmentRefAndElement	CompartmentRef	CompartmentRef
vwCompartmentRefAndElement	CompartmentElementNo	CompartmentElementNo
ElecLoads	DataSource	DataSource
ElecLoads	LoadingFactor	Loading Factor
ElecLoads	Power	Power
ElecLoads	Efficiency	Efficiency
ElecLoads	ElectricalPower	Electrical Power
ElecLoads	Pfactor	Pfactor
ElecLoads	Utilisation	Utilisation
EquipmentData	TrnProperty	Training Property

Select the **Layout** tab, and this gives the user a preview of the new grid.



i User may check the **Change Grid column orientation to Vertical** checkbox to assist rearrangement.
Select the **Sorting** tab; firstly by double clicking on the field names already in the **Value** column, remove all field names from here and select the following fields under the **View Fields** column to sort the grid view:

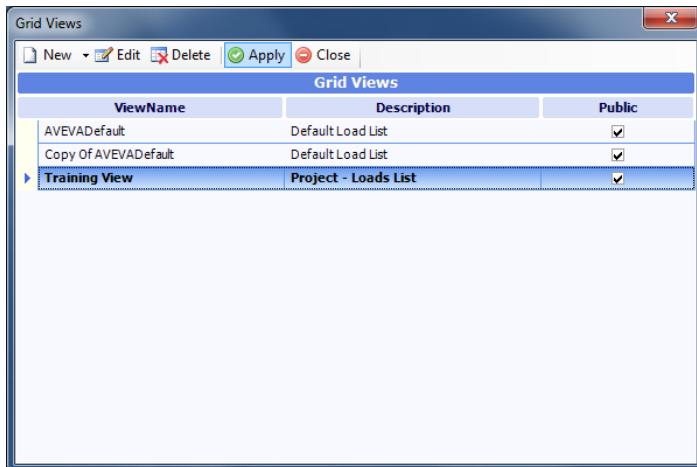


- AreaPath
- AreaNo
- SupplyTag (First Instance)
- DataSource

The Value list should look as shown.

i Double click to Add or Remove Fields from the View Fields column.

Ignore the **Filtering** tab and click the **Save** button on the menu.



The new grid view **Training View** is now listed on the **Grid Views** form.

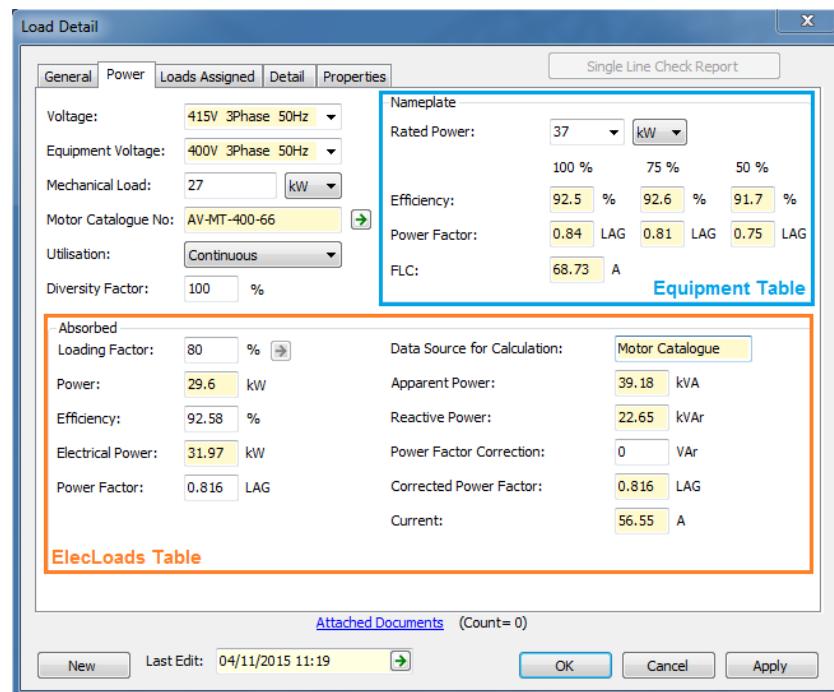
Select the new grid view and click the **Apply** button on the menu.

This displays the new View (**Training**) for the **Loads** grid.

Area Path	Area	WiringRuleName	EquipmentNo	Description	Volts	NoOfPhases	CatalogueNo	EquipmentVoltage	Nameplate Power	Nameplate Power Units
					=	=		=	=	
	Default		Motor1	Trng Mtr 1A	415	3	AV-MT-46	415	7.5	kW
	Default		Motor2	Trng Mtr 1B	415	3	AV-MT-46	415	7.5	kW
	Default		Motor3	Trng Mtr 1C	415	3	AV-MT-46	415	7.5	kW
	Default		Motor4	Trng Mtr 2A	415	3		415	7.5	kW
30	00		E0001	Earth Resistor	415	3		415	10	kW
30	01		FV0100	Motor	415	3	AV-MT-258	415	0.25	kW
30	01		FV0102	Motor	415	3	AV-MT-258	415	0.25	kW
30	01		FV0103	Motor	415	3	AV-MT-258	415	0.25	kW
30	01		FV0109	Motor	415	3	AV-MT-258	415	0.25	kW

Training View (37 Records)

- i** Nameplate and Absorbed values (Rated Power, Efficiency and Power Factor) are saved in the Equipment and Elecloads tables respectively.



List Manager - Training View																																																																																																																													
Save Cancel Find Export to Excel View Fields Layout Sorting Filtering																																																																																																																													
Fields <table border="1"> <thead> <tr> <th>Source</th><th>Field Name</th><th>Caption</th><th>Pick List</th><th>Select</th></tr> </thead> <tbody> <tr> <td>Area</td><td>AreaNo</td><td>Area</td><td><Not Applicable</td><td><input checked="" type="checkbox"/></td></tr> <tr> <td>Area</td><td>AreaPath</td><td>Area Path</td><td><Not Applicable</td><td><input checked="" type="checkbox"/></td></tr> <tr> <td>ElecLoads</td><td>DataSource</td><td>DataSource</td><td><Not Applicable</td><td><input checked="" type="checkbox"/></td></tr> <tr> <td>ElecLoads</td><td>Efficiency</td><td>Efficiency</td><td><Not Applicable</td><td><input checked="" type="checkbox"/></td></tr> <tr> <td>ElecLoads</td><td>ElectricalPower</td><td>Electrical Power</td><td><Not Applicable</td><td><input checked="" type="checkbox"/></td></tr> <tr> <td>ElecLoads</td><td>LoadingFactor</td><td>Loading Factor</td><td><Not Applicable</td><td><input checked="" type="checkbox"/></td></tr> <tr> <td>ElecLoads</td><td>Pfactor</td><td>Pfactor</td><td><Not Applicable</td><td><input checked="" type="checkbox"/></td></tr> <tr> <td>ElecLoads</td><td>Power</td><td>Power</td><td><Not Applicable</td><td><input checked="" type="checkbox"/></td></tr> <tr> <td>ElecLoads</td><td>Utilisation</td><td>Utilisation</td><td><Not Applicable</td><td><input checked="" type="checkbox"/></td></tr> <tr> <td>ElecMotorCatalog</td><td>CatalogNo</td><td>CatalogueNo</td><td><Not Applicable</td><td><input checked="" type="checkbox"/></td></tr> <tr> <td>Equipment</td><td>Description</td><td>Description</td><td></td><td><input checked="" type="checkbox"/></td></tr> <tr> <td>Equipment</td><td>ElecNoOfPhases</td><td>NoOfPhases</td><td><Not Applicable</td><td><input checked="" type="checkbox"/></td></tr> <tr> <td>Equipment</td><td>ElecRatedEff</td><td>ElecRatedEff</td><td><Not Applicable</td><td><input checked="" type="checkbox"/></td></tr> <tr> <td>Equipment</td><td>ElecRatedkW</td><td>Nameplate Power</td><td><Not Applicable</td><td><input checked="" type="checkbox"/></td></tr> <tr> <td>Equipment</td><td>ElecRatedkWUnits</td><td>Nameplate Power Un</td><td><Not Applicable</td><td><input checked="" type="checkbox"/></td></tr> <tr> <td>Equipment</td><td>ElecRatedPFactor</td><td>Rated Power Factor</td><td><Not Applicable</td><td><input checked="" type="checkbox"/></td></tr> <tr> <td>Equipment</td><td>ElecVolts</td><td>Volts</td><td><Not Applicable</td><td><input checked="" type="checkbox"/></td></tr> <tr> <td>Equipment</td><td>EquipmentNo</td><td>EquipmentNo</td><td><Not Applicable</td><td><input checked="" type="checkbox"/></td></tr> <tr> <td>EquipmentData</td><td>TrnProperty</td><td>Training Property</td><td><Not Applicable</td><td><input checked="" type="checkbox"/></td></tr> <tr> <td>vwCompartmentRefA</td><td>CompartmentElement</td><td>CompartmentElemen</td><td><Not Applicable</td><td><input checked="" type="checkbox"/></td></tr> <tr> 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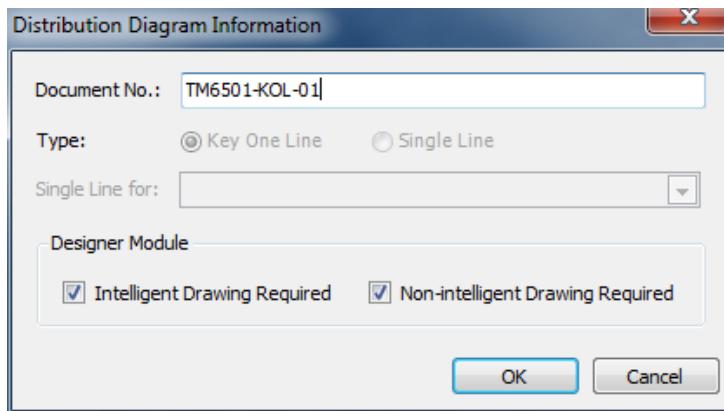
Exercise 6 – Build the Project KOL

Using the KOL diagram below as a guide and the knowledge gained thus far from attending this training session, construct the project KOL that will be used for the remainder of this training session.

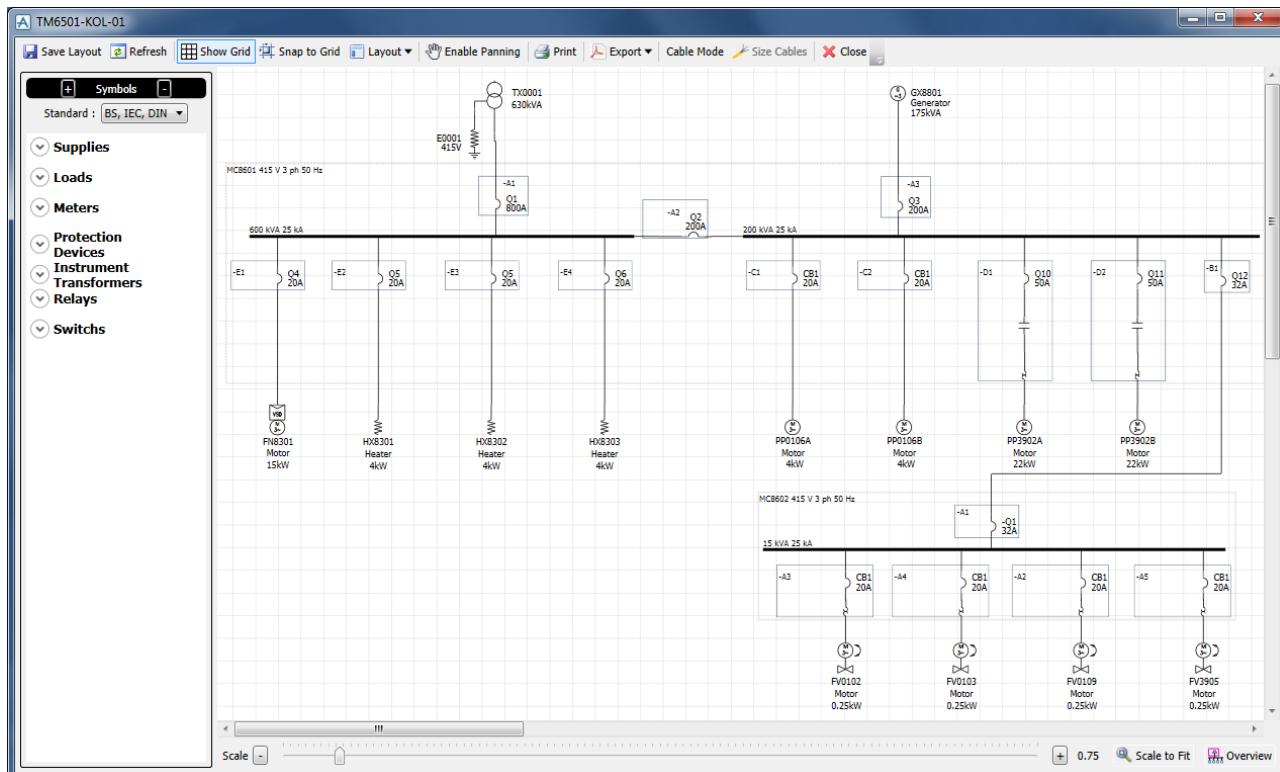
Apply the following compartment typicals:

- Motor 4kW:** FN8301, HX8301, HX8302, HX8303, PP0106B, PP0106A
- DOL_50A:** PP3902A, PP3902B
- Motorised Valve:** FV0102, FV0103, FV0109, FV3905

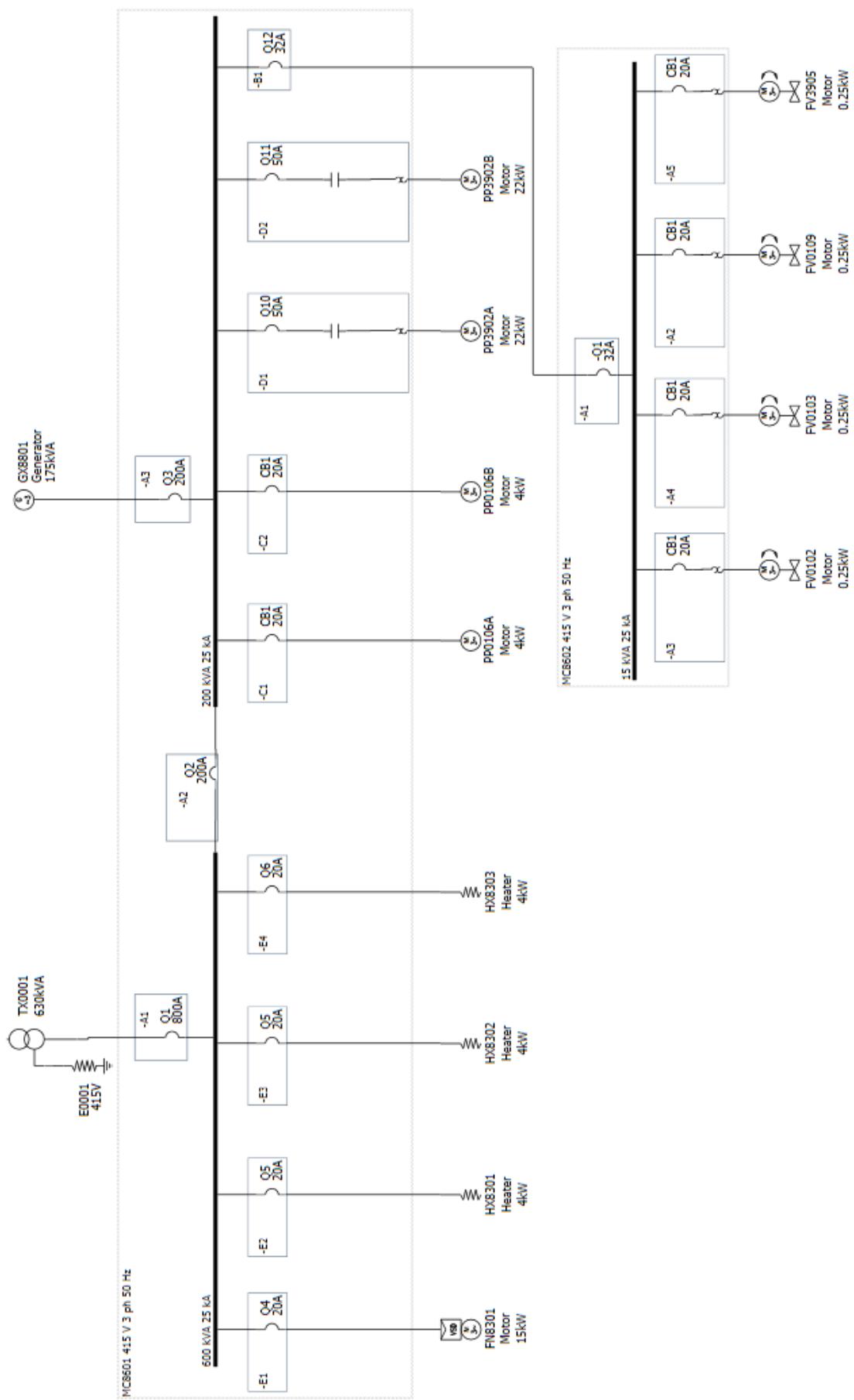
Create a new KOL named **TM6501-KOL-01**. Check the **Intelligent Drawing Required** and **Non-intelligent Drawing Required** check boxes.



Drag in the loads and supplies shown in the following screen.



(i) Earth Resistor symbol needs to be modified.



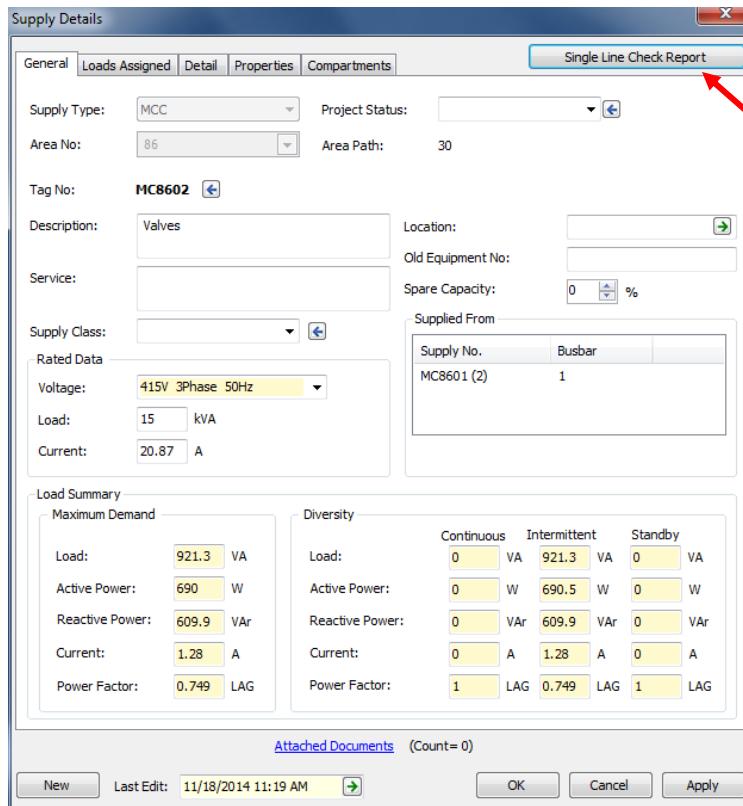
3.7 Single Line Diagrams (Worked Example)

Single line diagrams for supply items can be created using two methods in AVEVA Electrical Engineer:

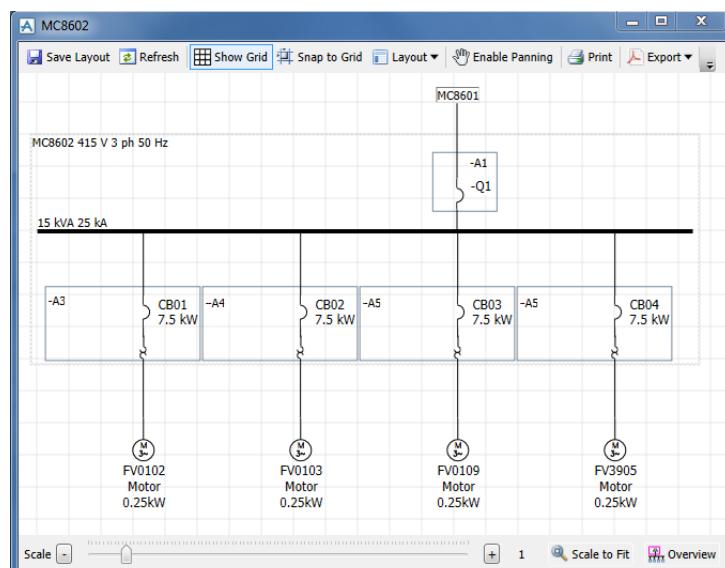
- Using the **Supplies** grid by editing a supply item.
- Using the **Distribution Diagrams** grid and creating a new SLD.

3.7.1 Using the Supplies Grid

If AVEVA Electrical Engineer is not open, open it. Open the Supplies grid and Edit MC8602. The **Supply Details** window will open:



Select the **Single Line Check Report** button.

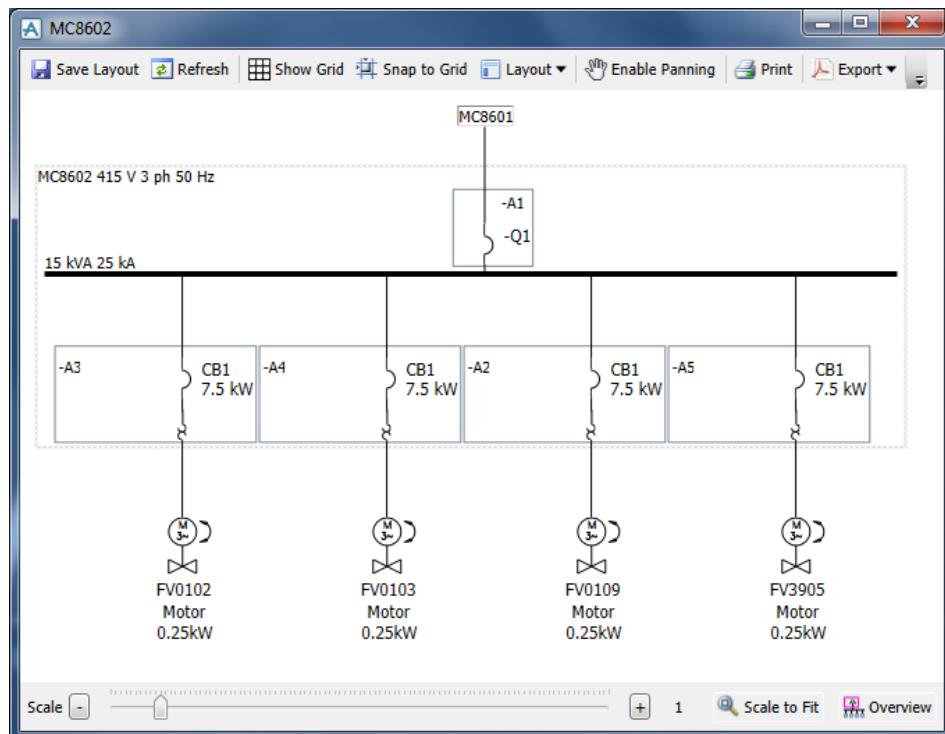


This action will automatically create a Single Line Diagram for MC8602.

The items can be moved around the window by dragging in the same way as for KOL diagrams created earlier.

Symbols can be changed using the right mouse button click context menu and selecting **Change Symbol**.

The next screen shot shows what can be achieved.



Save the Single Line Diagram by selecting **Save Layout** from the tool bar, and then close the window.

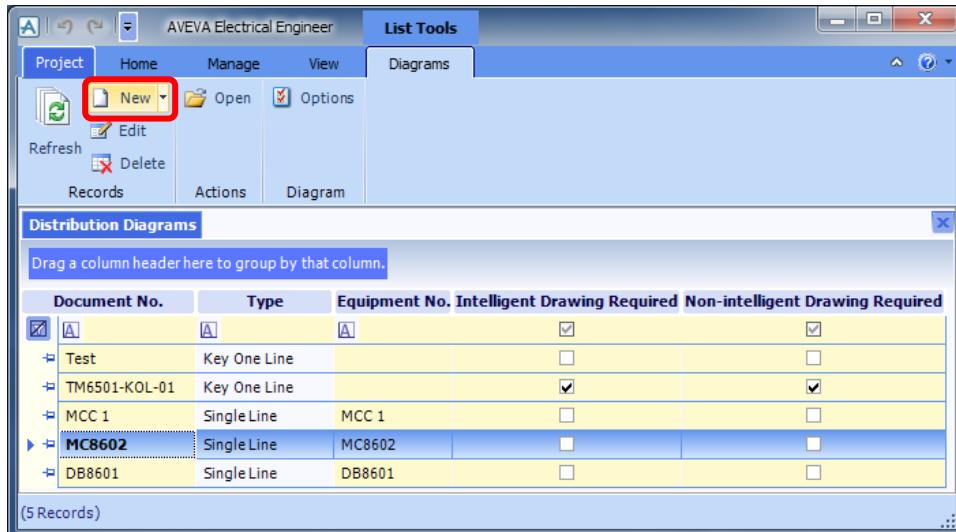
Select **Save** in the supply details form.

Open the **Distribution Diagrams** grid. Notice that A Single Line Diagram MC8602 has been added automatically to the **Distributions Diagrams** list.

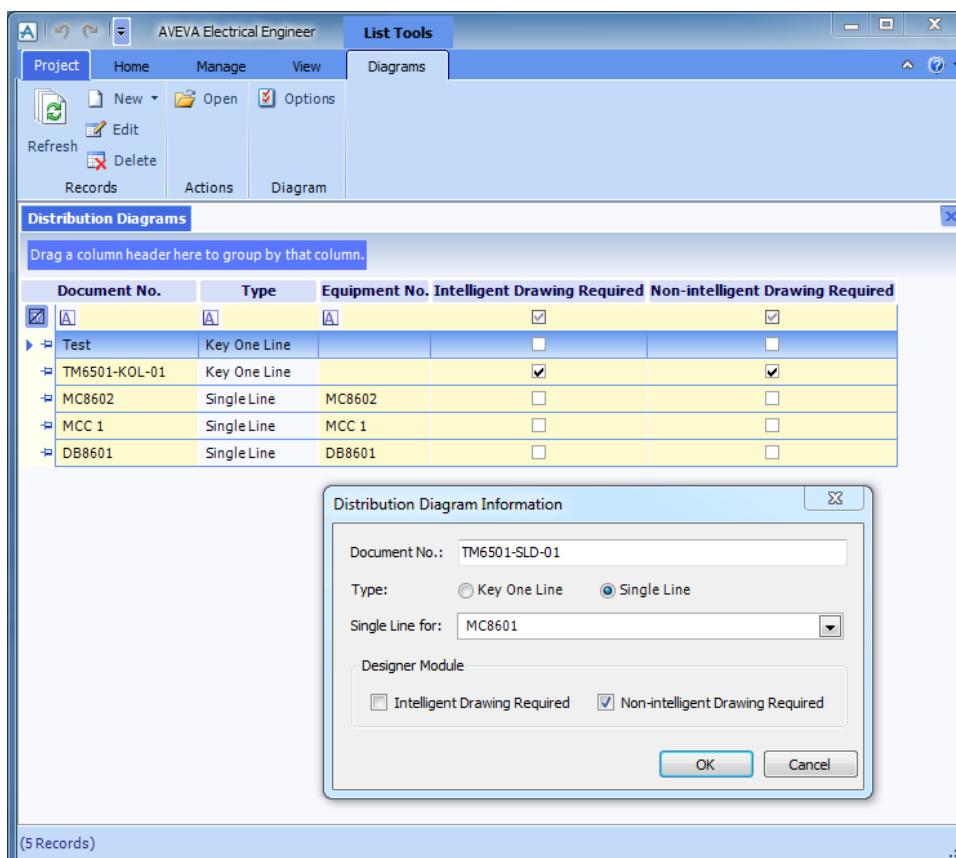
Document No.	Type	Equipment No.	Intelligent Drawing Required	Non-intelligent Drawing Required
Test	Key One Line		<input type="checkbox"/>	<input type="checkbox"/>
TM6501-KOL-01	Key One Line		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
MCC 1	Single Line	MCC 1	<input type="checkbox"/>	<input type="checkbox"/>
MC8602	Single Line	MC8602	<input type="checkbox"/>	<input type="checkbox"/>
DB8601	Single Line	DB8601	<input type="checkbox"/>	<input type="checkbox"/>

3.7.2 Distribution Diagrams Grid (Worked Example)

If the **Distribution Diagrams** grid is not open, open it and then give the **Diagrams** tab the focus by selecting it.

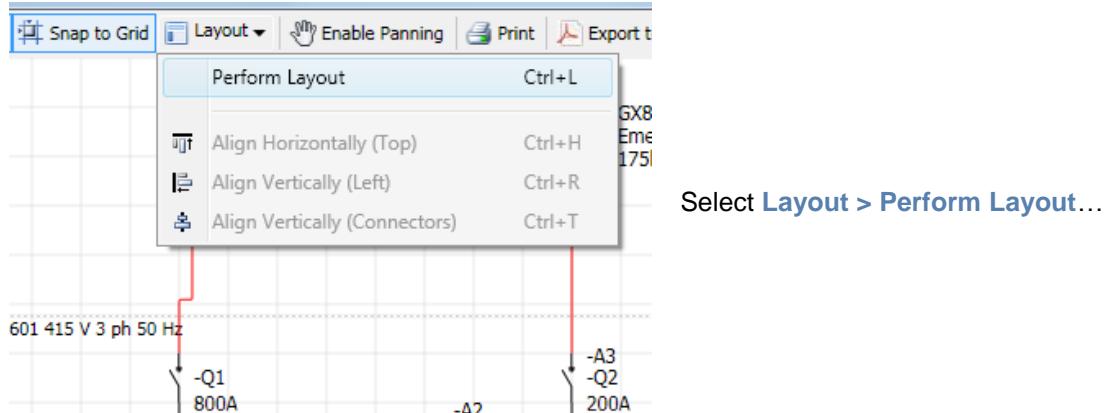


Select **New** from the **Records** pane. This will open the **Distribution Diagram Information Window**.

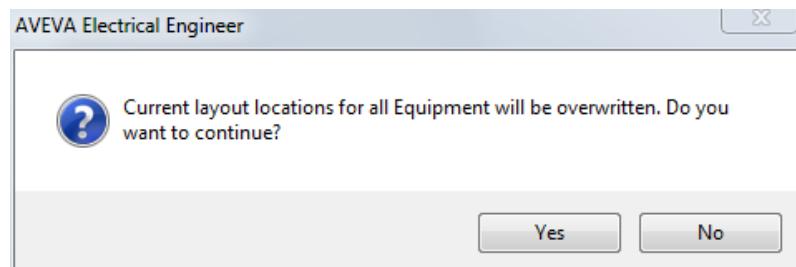


In the **Document No.** text box type: **TM6501-SLD-01**. Select the **Single Line** radio button. Using the pull down list for **Single Line for:** select **MC8601**. In the Designer Module section check the **Non-intelligent Drawing Required** and then select **OK**.

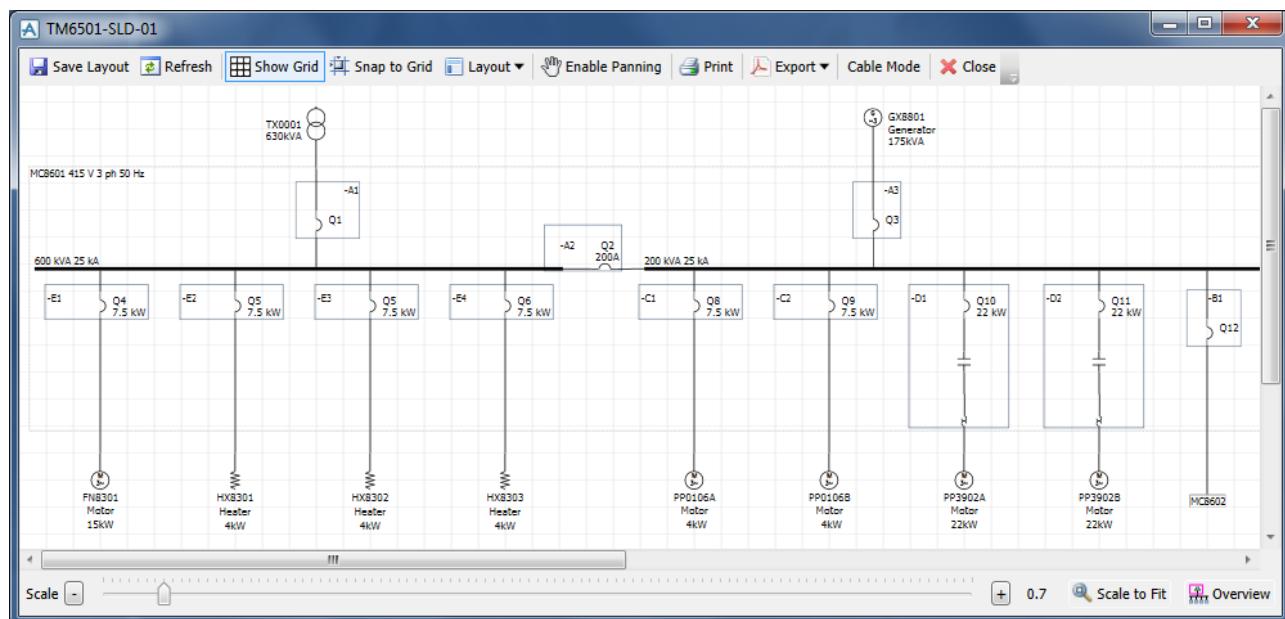
A single line diagram will be created automatically. This first result is not what a user would expect. On the tool bar, there is a button labelled **Layout**.



A message box will appear informing the user that layout locations for all equipment will be overwritten... Select **Yes**.



A more favourable result is given. The user can now drag and manipulate the SLD to produce the desired result:



3.8 Distribution Boards – Optional

Assigning loads to Distribution Boards differs to the method employed for Motor Control Centres and Switchboards:

If not already open, open AVEVA Electrical Engineer, give focus to the **Home** tab by selecting it, click **Select > Supplies**.

Edit **DB8601 Building Services** by either double clicking in the grid or selecting the row and then select **Edit** on the **Records** pane on the **Home** tab.

Area Path	Area	EquipmentNo	Description	EquipmentType	DataSheetNo	Volts	Frequency	NoOfPhases	Rated Load	RatedFLC
30	00	SB0001	SwitchBoard	SwitchBoard		415	50	3	1200	1669
30	00	TX0001	Transformer	Transformer		11000	50	3	630	33.066
30	86	DB8601	Distribution Board	Distribution Board		415	50	3	50	69.56
30	86	DB8602	Distribution Board	Distribution Board		415	50	3	25	34.78
30	86	DB8603	Distribution Board	Distribution Board		415	50	3	50	69.56

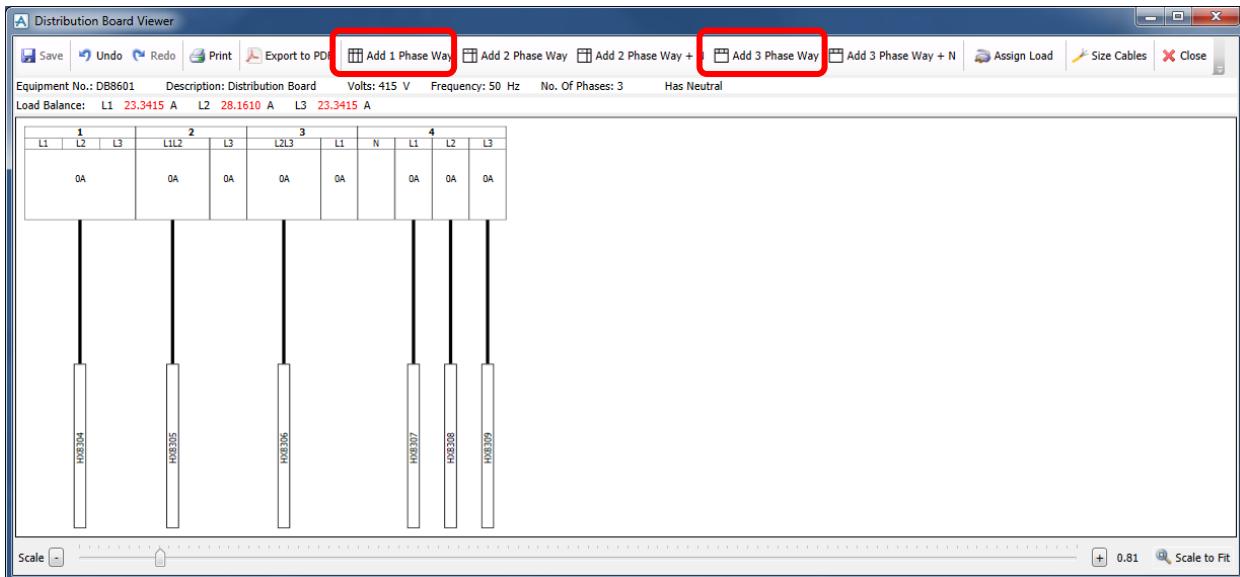
The **Supply Details** form for **DB8601** will open. Select the **Loads Assigned** tab:

Circuit No.	Phase Id	Has Neutral	Element Type	Equipment No.	kVA	PF	Utilisation	Connected
1	L1L2L3		Circuit Breaker	HX8304	4	1	Intermitte	0
2	L1L2		Circuit Breaker	HX8305	4	1	Intermitte	0
2	L3		Circuit Breaker		0	1		0
3	L1		Circuit Breaker		0	1		0
3	L2L3		Circuit Breaker	HX8306	4	1	Intermitte	0
4	L1	Yes	Circuit Breaker	HX8307	4	1	Intermitte	0
4	L2	Yes	Circuit Breaker	HX8308	4	1	Intermitte	0
4	L3	Yes	Circuit Breaker	HX8309	4	1	Intermitte	0

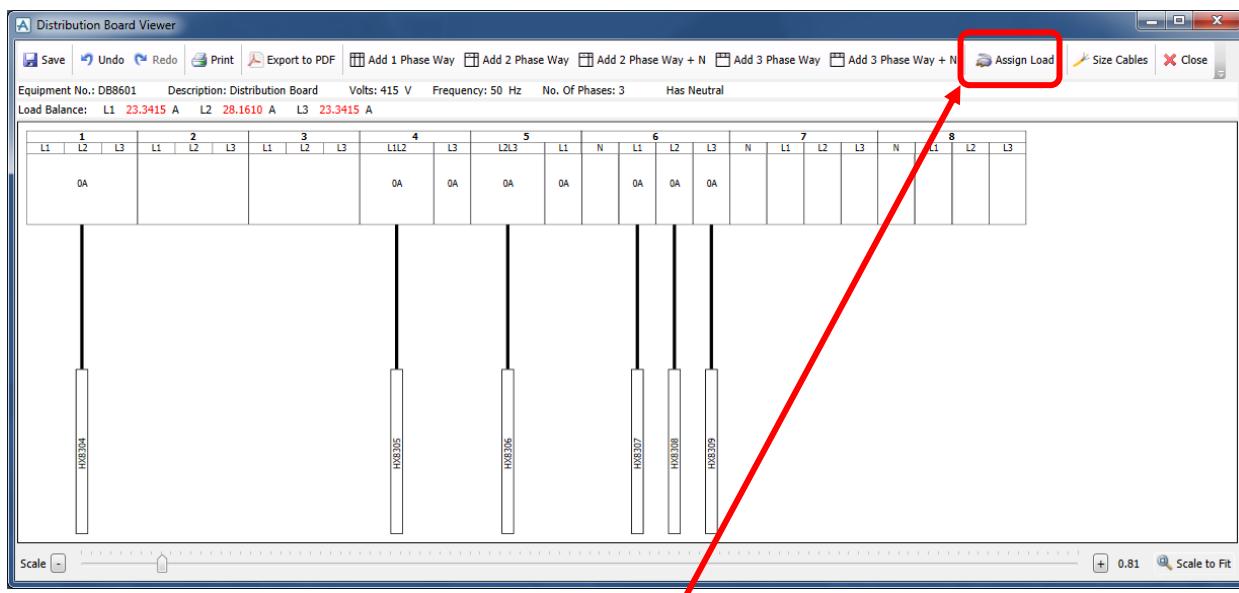
Because of the connectivity of the excel import, loads have already been assigned to the Distribution Board.

Give the **Loads** tab at the bottom half of the form the focus by selecting it (if it is not already selected). Select **View Designer**.

This will open the **Distribution Board Viewer**:

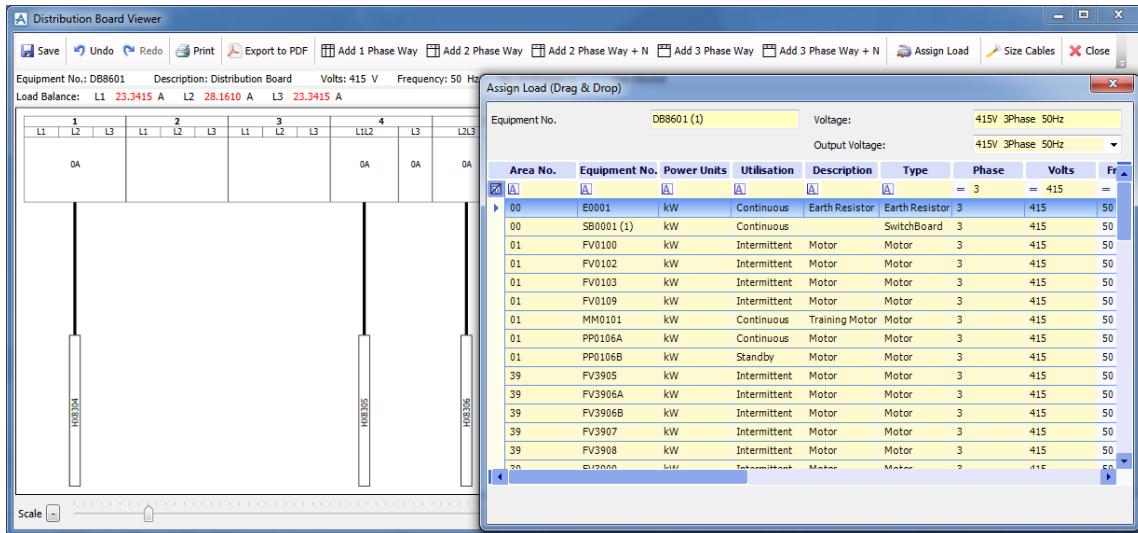


Earlier in this training guide loads were created for 2x 3ph Welding Sockets, 3x 1ph Lighting Circuits, and 1x 1ph Small Power circuit. Using the buttons: **Add 1 Phase Way** and **Add 3 Phase Way** on the tool bar, add two **3 Phase Ways** and two **1 Phase Ways** (6x single phase circuits). Arrange the circuits as shown in the screen shot below (drag the ways with the left mouse button).



To assign loads to the Distribution Board, select **Assign Load**. This will open the **Assign Load (Drag & Drop)** window:

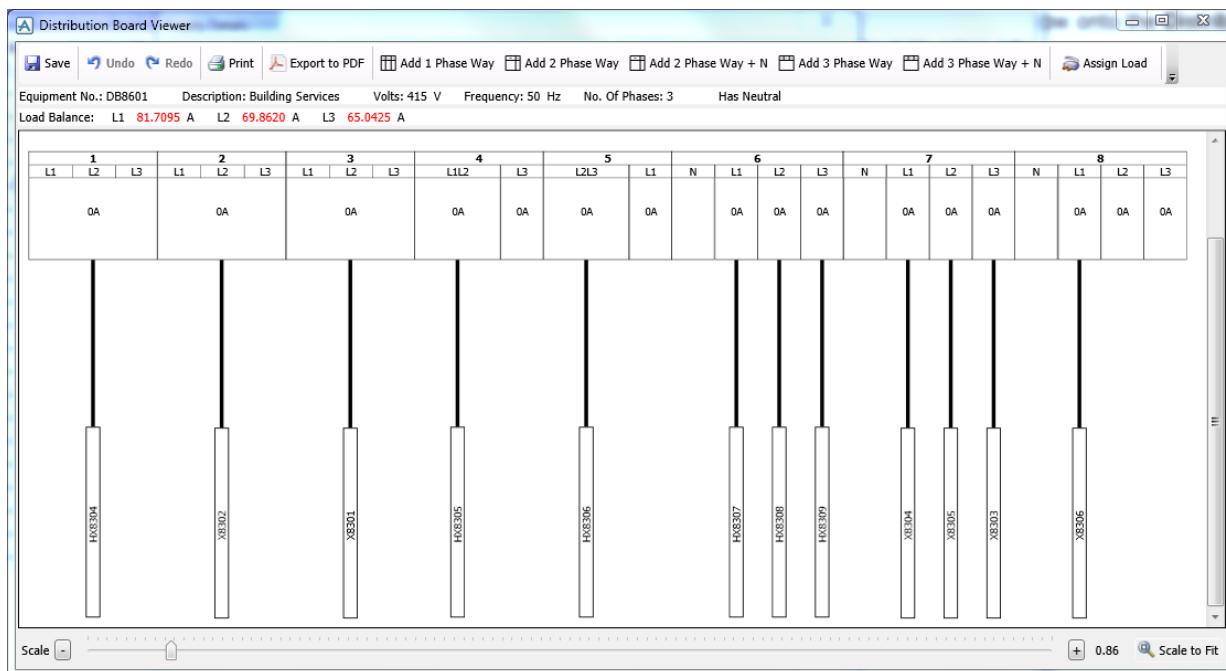
The window lists the equipment with matching voltages according to the **Output Voltages** selected in the **Output Voltages tab**



Position the **Assign Load (Drag & Drop)** window to a position that will facilitate easy dragging from the **Assign Load** window onto the **Distribution Board Viewer** (an example is given above).

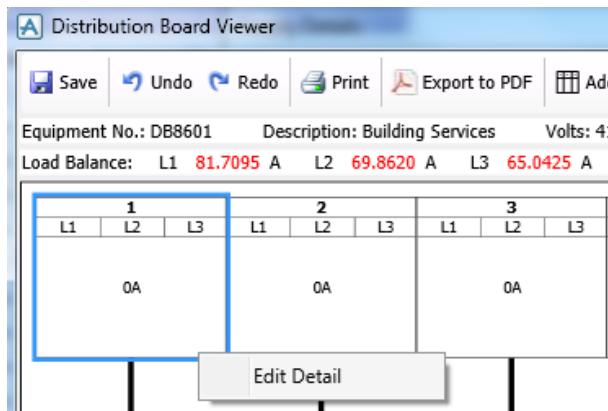
Using the image below as a guide, drag loads X8301, X8302, X8303, X8304, X8305 and X8306 from the **Assign Load** window, onto the ways in the **Distribution Board Viewer**.

- i** Select one by one the output voltages from the Output Voltage list to get all the loads.

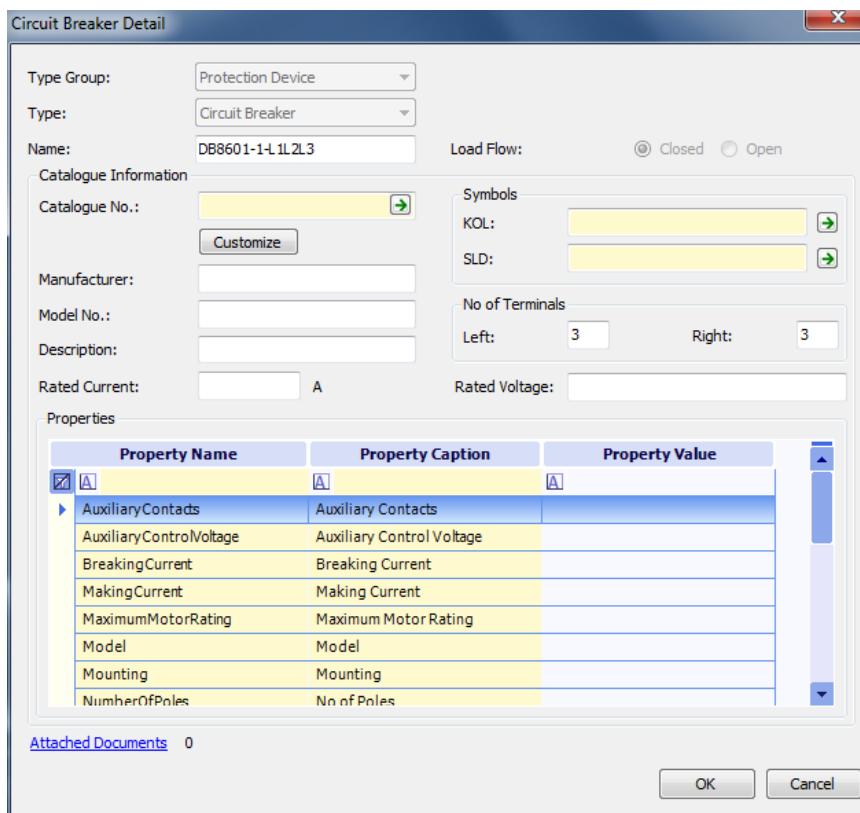


The user can re-arrange the **Load Balance** by dragging loads around the distribution board, the load balance values **L1**, **L2**, **L3** shown above the circuit ways change dynamically as the items are dropped to the new location.

Close the **Assign Load (Drag & Drop)** window. Select **Save**, the new circuit ways will be populated with current rating values of 0A. To edit the protection devices for a Distribution Board, select the way that requires editing by left mouse button click on the way, and then right mouse button click and then select **Edit Detail**.



This will open the **Circuit Breaker Detail** form.



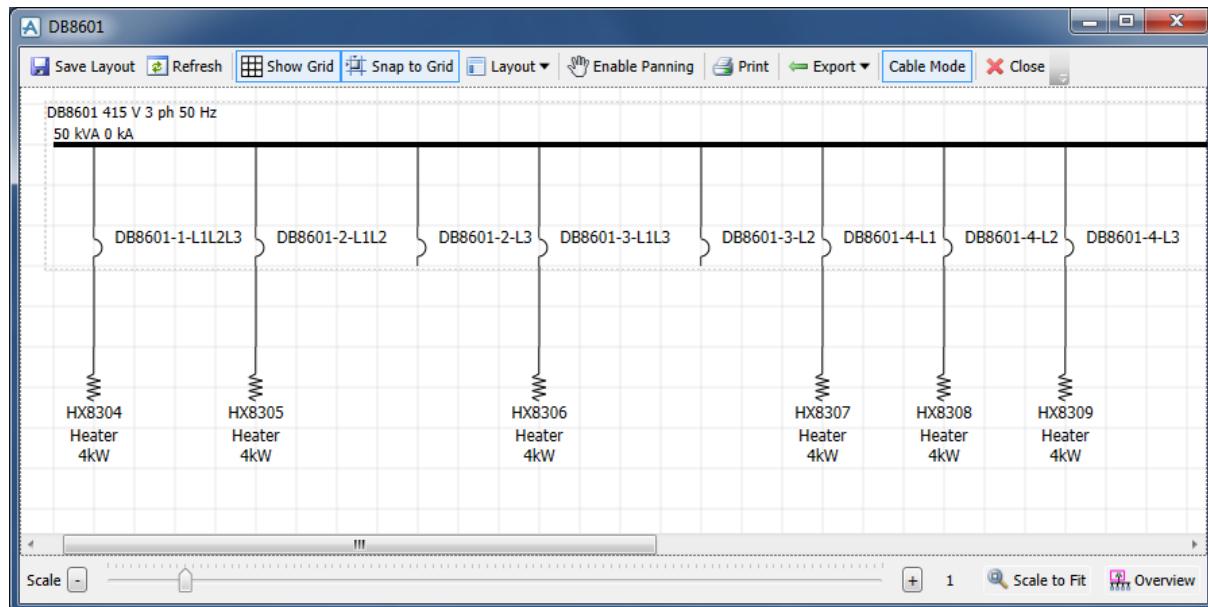
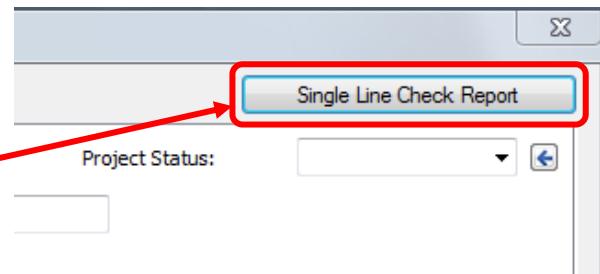
Circuit Breaker details can be filled manually or linked with the Compartment Elements Catalogue.

Leave the form as it is and select **Cancel** or **OK** to close the form.

i To use a Catalogue reference press the button to the right of the Catalogue No. It will open the Compartment Element Catalogue showing suitable contactor catalogue items

To close the **Distribution Board Viewer**, select **Close** on the far right of the tool bar. The **Supply Details** form is still open. Notice that circuits have been added and loads have been assigned.

To view the effect of assigning loads to the Distribution Board, Select the **Single Line Check Report** button top right in the **Supply Details** form.



The Single Line Diagram can be manipulated and have symbols changed to suit the user's requirements. When finished, select **Save Layout**, to save the Single Line Diagram and select **Close** to close the window and return the user to the **Supply Details** form.

Select **OK** to close the form.

4 Cable Definition

Before starting this chapter, the user is to have completed all of the previous chapters. In doing so, the Training Project will be ready to add cables to the supplies and loads.

AVEVA Electrical can create cables using any one or a combination of 6 methods:

1. **Engineer > Assign Wiring Rule > Create Wiring**
2. **Engineer > Cable Sizing.**
3. **Engineer Distribution Diagram Editor.**
4. **Wiring Manager > Cable Schedule.**
5. **Wiring Manager > Cable Schedule > Excel Import**
6. **Wiring Manager > Cable Block Diagram (Only Control Cables)**

In this training guide, the first three items are demonstrated.

4.1 Wiring Rules

Load equipment items that are to have specific cabling configurations must have wiring rules assigned to them before cables can be created. Supply equipment items do not require wiring rules to create cables.

 Enhanced wiring rules have been created when running the AVEVA Electrical Administration Training Manual

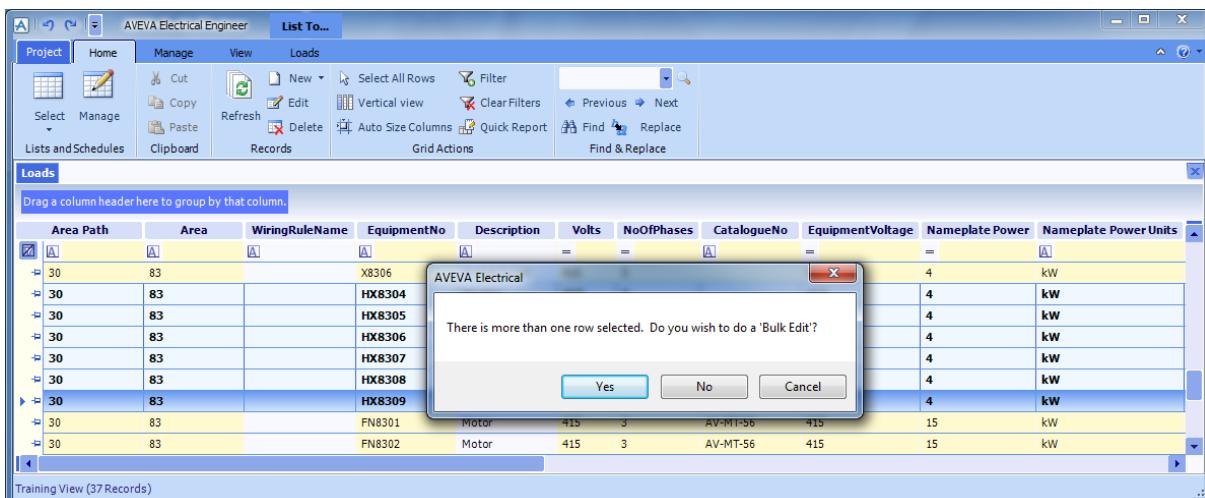
4.1.1 Assign Wiring Rules

To assign a wiring rule to a load equipment item, open the **Loads** grid. Wiring rules can be assigned to a load in three different ways:

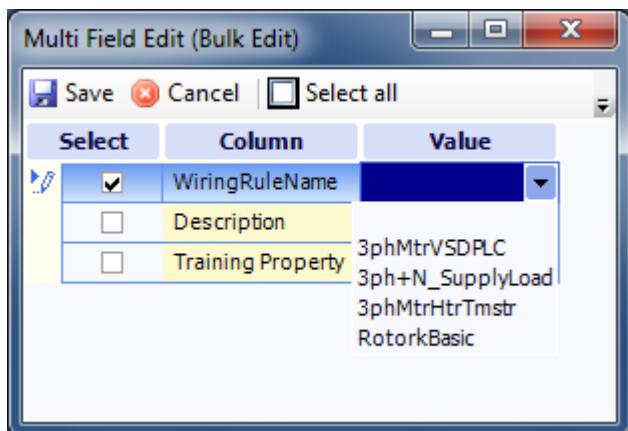
- To multiple items using the **Bulk Edit Feature**.
- To individual load items directly from the grid.
- To Individual load items using the **Load Detail** form.

4.1.1.1 Bulk Edit

Wiring Rules can be assigned to more than one load equipment item simultaneously: In the **Loads Grid**, select more than one item of equipment using the left mouse button +ctrl key. On the **Home** tab select **Edit** as shown in the next image:



Select **Yes** to the bulk edit prompt.



This will open the **Multi Field Edit (Bulk Edit)** window, with a list of values that the user can change to multiple items. The user places a check mark against the property that is to change (in this instance **WiringRuleName**).

In the values column, a down arrow appears as the mouse cursor hovers over the Value cell. Selecting this arrow will produce a pick list of Wiring Rules. The user selects which one to assign to the multiple items.

4.1.1.2 Individual Load Items Using the Loads Grid

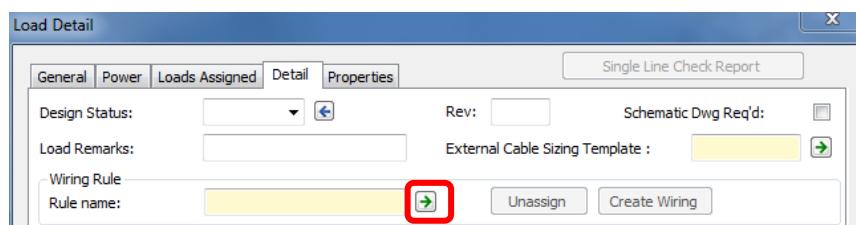
Let the mouse cursor hover over the **WiringRuleName** cell of the equipment that is to have a wiring rule assigned to it, an arrow will appear, selecting this arrow opens a drop down list of available wiring rules.

EquipmentNo	Description	WiringRuleName
FCV0102	RW Inlet Vlv	
FCV0103	RW Inlet Vlv	
FCV0109	CIP/Divert	
FCV3905	CIP/Divert	
FCV3906A	Co Valve	

From this list, the user selects the wiring rule to be used for the highlighted equipment.

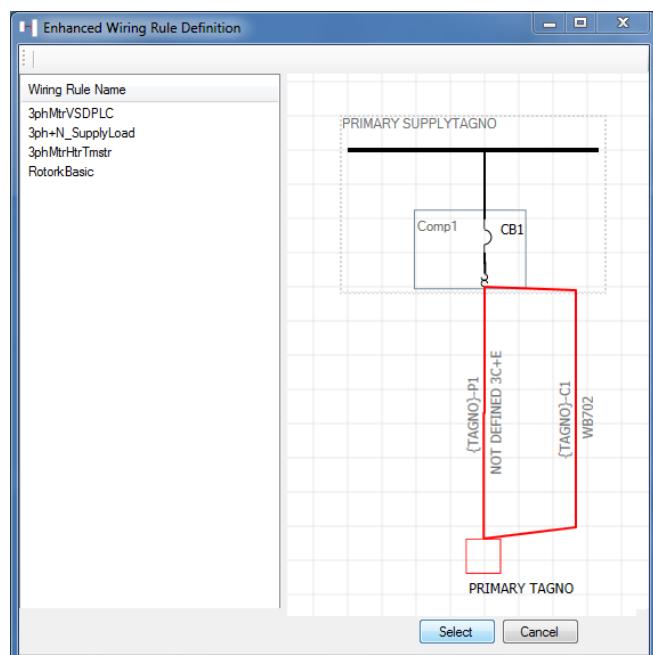
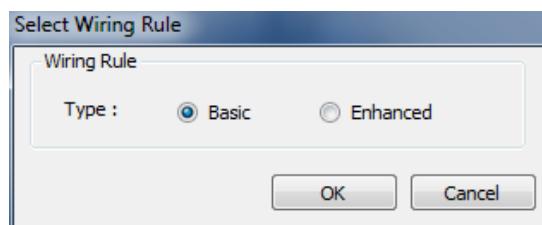
4.1.1.3 Individual Load Items Using the Load Detail form

Open the **Load Detail** form for the equipment item that a wiring rule is going to be assigned. Select the **Detail** tab:



Clicking on the arrow to the right of the **Rule Name** text box opens the **Select Wiring Rule** window.

The **Select Wiring Rule** window gives both Basic and Enhanced wiring rule type radio button option.



Selecting any wiring rule type will display the list of available wiring rule definition and that rule will be assigned to the load equipment item for which the **Load Detail** form.

Exercise 7 – Assign Wiring Rules

Using any of the methods explained above assign the wiring rule for the following items:

Tag No.	Wiring Rule
FV0102	RotorkBasic
FV0103	RotorkBasic
FV0109	RotorkBasic
FV3905	RotorkBasic

4.1.2 Create Load Cables Using Wiring Rules (Worked Example)

Once wiring rules have been assigned to load equipment items, cables can be created using the **Create Wiring** feature. This can be done from:

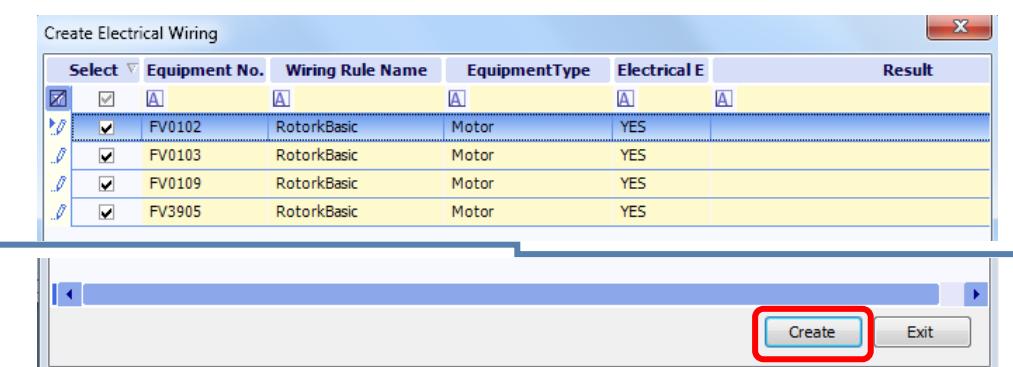
- Loads Grid using the **Create Wiring**.
- **Load Detail** form.
- Distribution Diagrams using the **Cable Mode**.

4.1.2.1 Loads Grid

On the **Loads** grid, select **FV0102**, **FV0103**, **FV0109** and **FV3905** using the left mouse button and the **Ctrl** key together. When selected, select **Create Wiring** on the **Actions** pane.

The screenshot shows the AVEVA Electrical Engineer interface with the 'Loads' tab selected. The 'Actions' pane on the right side has the 'Create Wiring' option highlighted. The main area displays a table of equipment records with columns for Area Path, Area, WiringRuleName, EquipmentNo, Description, Volts, NoOfPhases, CatalogueNo, EquipmentVoltage, and Nameplate Power. The rows for FV0102, FV0103, FV0109, and FV3905 are selected, indicated by a blue selection bar on the left.

The **Create Electrical Wiring** window opens with a check mark to the left of each valve indicating that these items have been selected to have electrical wiring created based on the assigned wiring rule.



Selecting the **Create** button at the bottom of the window, will create the wiring and add cables to the cable schedule in **AVEVA Electrical Wiring Manager**.

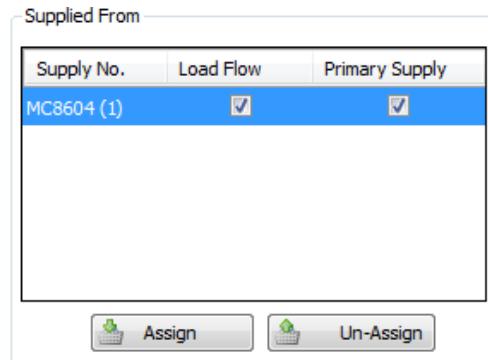
The screenshot shows the 'Create Electrical Wiring' dialog box after the 'Create' button was clicked. The 'Select' column for the first four rows now has a checked checkbox. The 'Equipment No.' column lists FV0102, FV0103, FV0109, and FV3905. The 'Wiring Rule Name' column lists 'RotorkBasic' for all. The 'EquipmentType' column lists 'Motor' for all. The 'Electrical Equ' column lists 'YES' for all. The 'Result' column now contains the message 'Wiring created successfully.' for each row. The 'Create' and 'Exit' buttons are visible at the bottom.

When completed, select the **Exit** button to close the window.

4.1.3 Load Detail Form

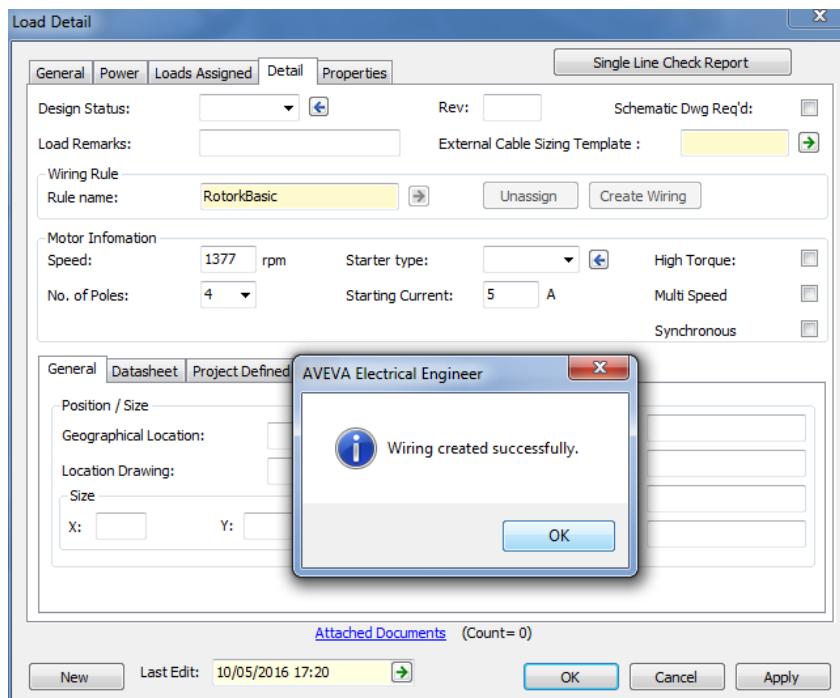
On the **Loads** grid select **FV3906A** and then select **Edit** on either the **Home** tab or the **Loads** tab.

This will open the **Load Detail** form for **FV3906A**.



On the **Load** tab **Assign** supply **MC8604** to the load by selecting the **Assign** button bottom right of the form and selecting **MC8604** from the list that opens and then selecting the **Assign** button to close the list.

Select the **Detail** tab.



Select the **Enhanced** Wiring Rule **RotorkBasic** using the arrow next to the **Rule name** text box.

Once a wiring rule has been assigned, the **Create Wiring** button can be selected to create the wiring.

If successful, a message box will be displayed informing the user that Wiring Rule was created successfully, and cables will be added to the cable schedule.

Select **OK** and then select **OK** on the **Load Detail** form to close it.

- ⓘ Loads must be assigned to a supply before wiring can be created.

Exercise 8 – Create Load Cables

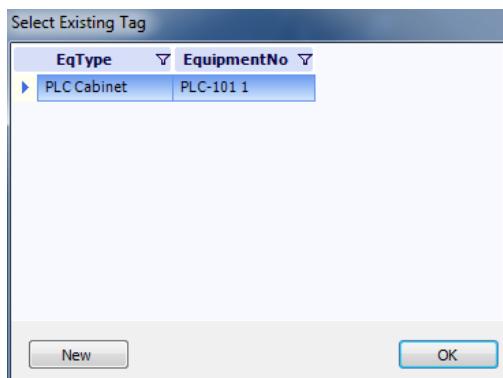
Create load cables for the following items of equipment listed in the table below. The left hand column lists the tag numbers, the right hand column lists the Enhanced Wiring Rule to be assigned to that item of equipment:

Tag No.	Enhanced Wiring Rule
PP0106A	3phMtrVSDPLC
PP0106B	3phMtrVSDPLC
PP3902A	3phMtrHtrTmstr
PP3902B	3phMtrHtrTmstr
FN8301	3phMtrVSDPLC
HX8301	3ph+N_SupplyLoad
HX8302	3ph+N_SupplyLoad
HX8303	3ph+N_SupplyLoad
E0001	3ph+N_SupplyLoad

- i To view the cables that have been created the user is required to open AVEVA Electrical Wiring Manager and open the Cable Schedule.*

Creating an Enhanced wiring rule for **3phMtrVSDPLC** which includes a PLC equipment gives the user the option to use a pre-existing tag or create a new tag and allocate it to the wiring connection.

Click **OK** to create the new PLC tag **PLC-101 1** and assign for both **PP0106A** and **PP0106B** tag.

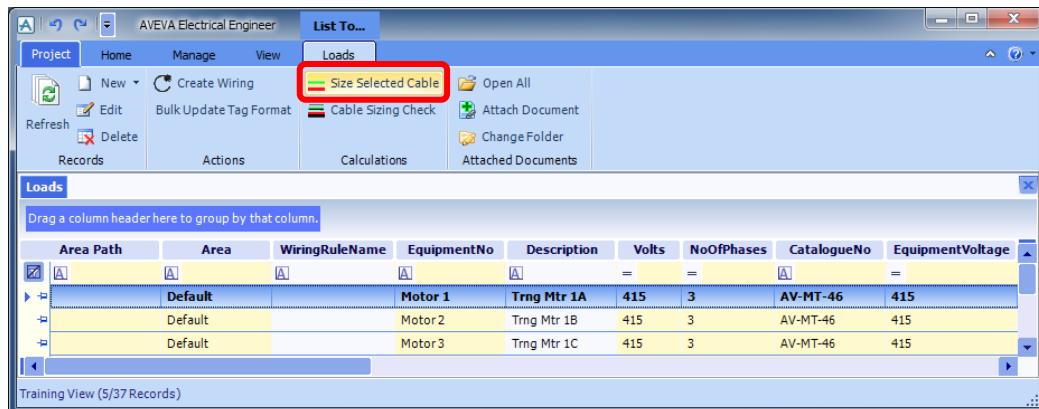


- i The intermediate equipment (VSD) for the Enhanced Wiring Rule 3phMtrVSDPLC will not show up in the distribution diagram.*

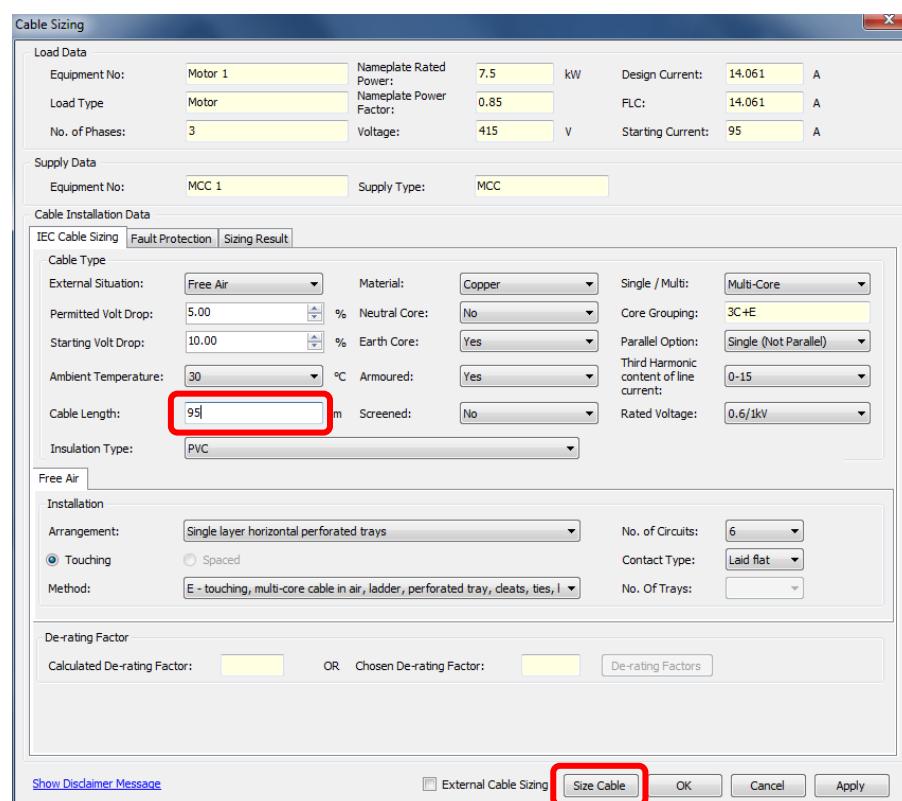
Select **Exit** to close the Create Electrical Wiring window

4.2 Create Cables using Engineer Cable Sizing Form (Worked Example)

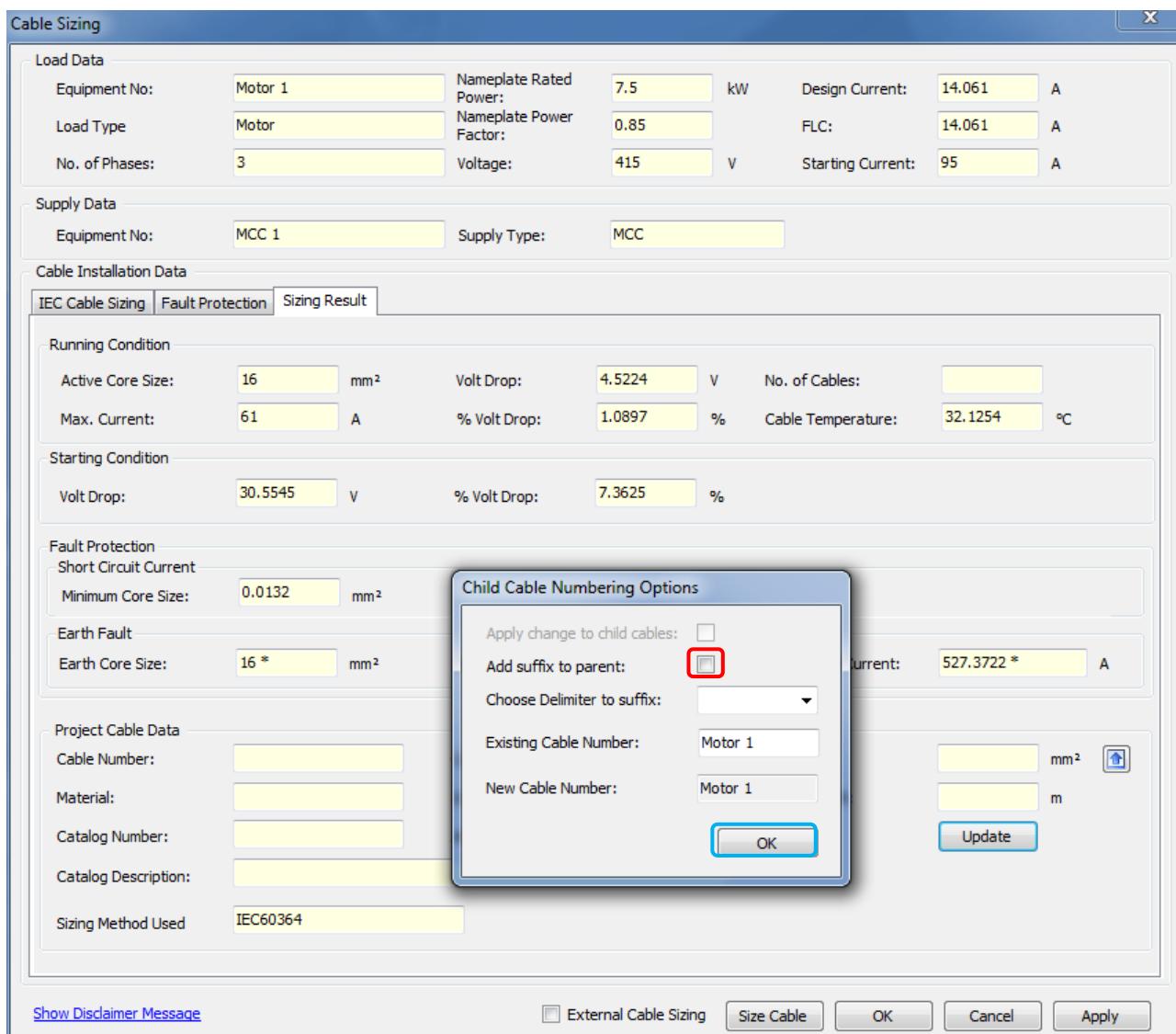
If the Loads grid is not open, on the **Home** tab in the **Lists and Schedules Pane**, click **Select > Loads**. Give the **Loads** tab the focus by selecting it. Select the row **Motor 1 Trng Mtr 1A** that was created in an earlier chapter of this training guide. Select **Size Selected Cable**.



The **Cable Sizing** form will open. Enter **95** in the **Cable Length** text box and Select the **Size Cable** button.



The **Sizing Result** tab will open giving the results. Select the **Update** button.



The **Child Cable Numbering Options** window is displayed to allow the cable renaming from the **Existing Cable Number** field.

Uncheck the **Add suffix to parent** checkbox and click **OK**.

The **Apply change to child cables** checkbox is only relevant when editing existing parent cables and is disabled when creating new cables.

The **Project Cable Data** at the bottom of the **Cable Sizing** form is updated with an available cable from the cable catalogue.

Cable Sizing

Load Data		Nameplate Rated Power: 7.5 kW	Design Current: 14.061 A																														
Equipment No:	Motor 1	Nameplate Power Factor: 0.85	FLC: 14.061 A																														
Load Type	Motor	Voltage: 415 V	Starting Current: 95 A																														
No. of Phases:	3																																
Supply Data																																	
Equipment No:	MCC 1	Supply Type:	MCC																														
Cable Installation Data																																	
<input checked="" type="radio"/> IEC Cable Sizing <input type="radio"/> Fault Protection <input type="radio"/> Sizing Result																																	
Running Condition <table border="1"> <tr> <td>Active Core Size:</td> <td>16 mm²</td> <td>Volt Drop:</td> <td>4.5224 V</td> <td>No. of Cables:</td> <td>1</td> </tr> <tr> <td>Max. Current:</td> <td>61 A</td> <td>% Volt Drop:</td> <td>1.0897 %</td> <td>Cable Temperature:</td> <td>32.1254 °C</td> </tr> </table>				Active Core Size:	16 mm ²	Volt Drop:	4.5224 V	No. of Cables:	1	Max. Current:	61 A	% Volt Drop:	1.0897 %	Cable Temperature:	32.1254 °C																		
Active Core Size:	16 mm ²	Volt Drop:	4.5224 V	No. of Cables:	1																												
Max. Current:	61 A	% Volt Drop:	1.0897 %	Cable Temperature:	32.1254 °C																												
Starting Condition <table border="1"> <tr> <td>Volt Drop:</td> <td>30.5545 V</td> <td>% Volt Drop:</td> <td>7.3625 %</td> </tr> </table>				Volt Drop:	30.5545 V	% Volt Drop:	7.3625 %																										
Volt Drop:	30.5545 V	% Volt Drop:	7.3625 %																														
Fault Protection <table border="1"> <tr> <td>Short Circuit Current:</td> <td>0.0132 mm²</td> </tr> </table>				Short Circuit Current:	0.0132 mm ²																												
Short Circuit Current:	0.0132 mm ²																																
Earth Fault <table border="1"> <tr> <td>Earth Core Size:</td> <td>16 mm²</td> <td>Earth Core:</td> <td>Yes</td> <td>Earth Fault Current:</td> <td>527.3722 * A</td> </tr> </table>				Earth Core Size:	16 mm ²	Earth Core:	Yes	Earth Fault Current:	527.3722 * A																								
Earth Core Size:	16 mm ²	Earth Core:	Yes	Earth Fault Current:	527.3722 * A																												
Project Cable Data <table border="1"> <tr> <td>Cable Number:</td> <td>Motor 1</td> <td>Cable Type:</td> <td>3C+E</td> <td>Core Size:</td> <td>16 mm² </td> </tr> <tr> <td>Material:</td> <td>Aluminium</td> <td>Screened:</td> <td>No</td> <td>Cable Length:</td> <td>95 m</td> </tr> <tr> <td>Catalog Number:</td> <td>FNHA15</td> <td>Armoured::</td> <td>Yes</td> <td colspan="2"><input type="button" value="Update"/></td> </tr> <tr> <td>Catalog Description:</td> <td colspan="5">PVC/SWA/PVC</td> </tr> <tr> <td>Sizing Method Used</td> <td colspan="5">IEC60364</td> </tr> </table>				Cable Number:	Motor 1	Cable Type:	3C+E	Core Size:	16 mm ² 	Material:	Aluminium	Screened:	No	Cable Length:	95 m	Catalog Number:	FNHA15	Armoured::	Yes	<input type="button" value="Update"/>		Catalog Description:	PVC/SWA/PVC					Sizing Method Used	IEC60364				
Cable Number:	Motor 1	Cable Type:	3C+E	Core Size:	16 mm ² 																												
Material:	Aluminium	Screened:	No	Cable Length:	95 m																												
Catalog Number:	FNHA15	Armoured::	Yes	<input type="button" value="Update"/>																													
Catalog Description:	PVC/SWA/PVC																																
Sizing Method Used	IEC60364																																
Show Disclaimer Message		<input type="checkbox"/> External Cable Sizing	<input type="button" value="Size Cable"/>	<input type="button" value="OK"/>	<input type="button" value="Cancel"/>	<input type="button" value="Apply"/>																											

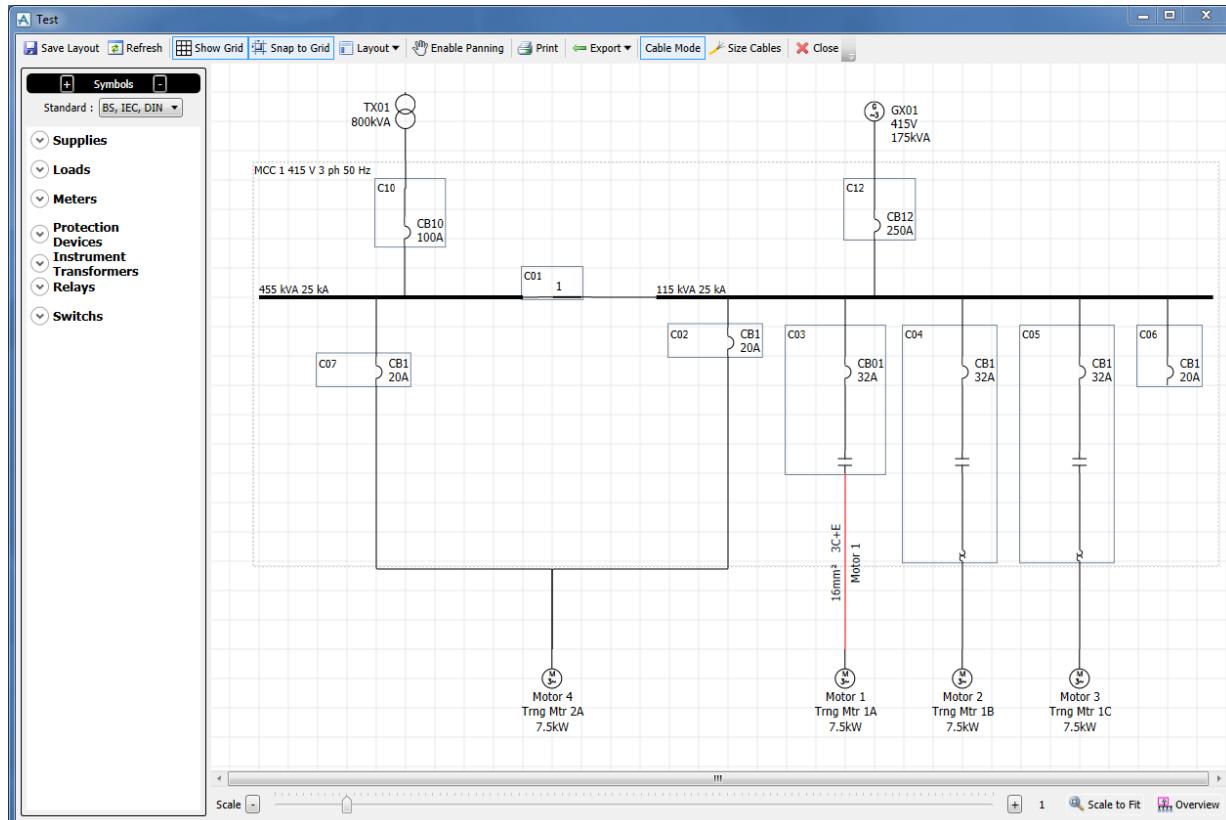
By clicking the arrow button to the right of the **Core Size** text box the increases the calculated core size

Select **OK** to close the form.

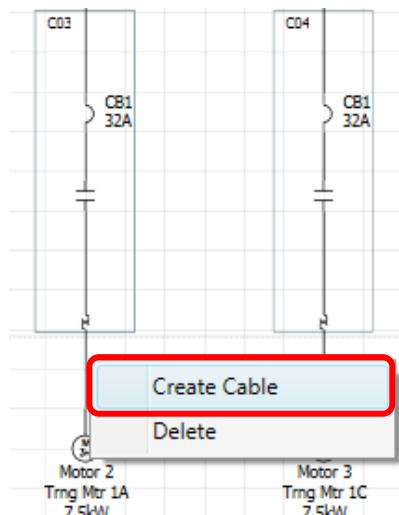
4.3 Create Cables using Engineer Distribution Diagram (Worked Example)

If the **Distribution Diagrams** grid is not open, click **Select > Distribution Diagrams** and then open **Test Key One Line Diagram**.

Select the **Cable Mode** button and notice how connection to **Motor 1** is red indicating that a cable has been created. **Motor 2** and **Motor 3** are black indicating that a cable still needs to be created.

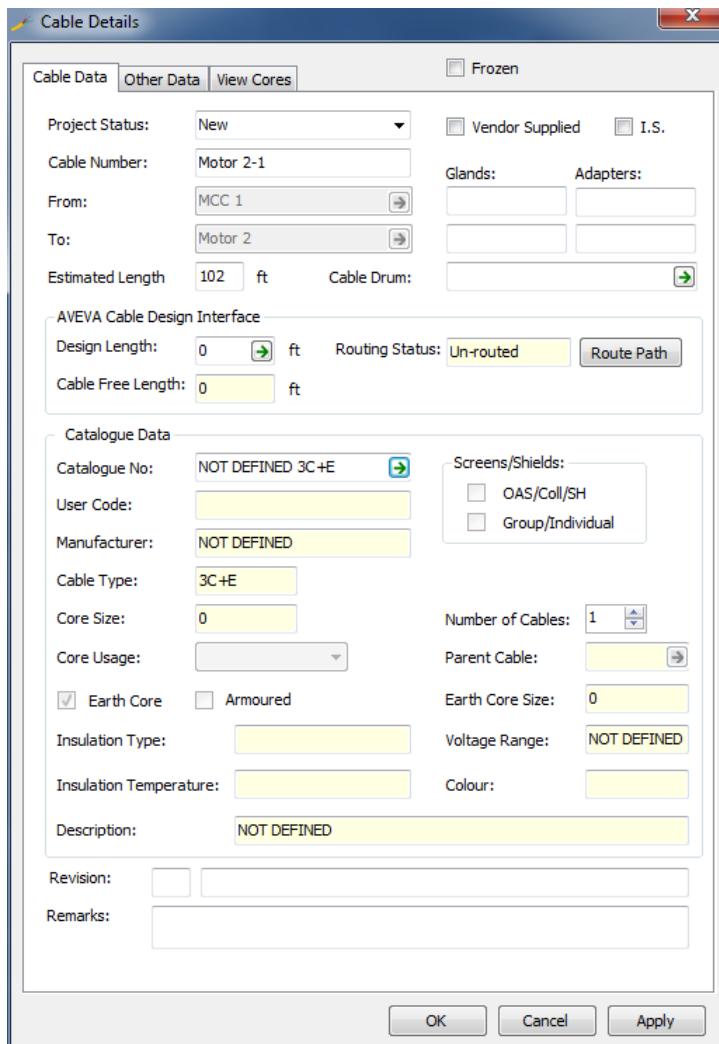


Right click on the connector to **Motor 2**:



Select **Create Cable**.

This opens the **Cable Details** form.



Enter the following:

Project Status: New

Cable Number: Motor 2-1

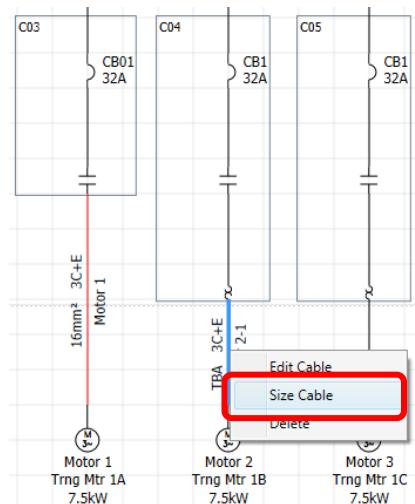
Estimated Length: 102

From the **Catalogue No:** text box select the right pointing Arrow and select **NOT DEFINED 3C+E Power** cable from the cable catalogue. The user will size this cable later in the project (for example).

Select **OK**.

The cable will be created, and the connector in the KOL will be red.

i Open the cable schedule in Wiring Manager to view the results of the two cables that have just been created.



Now the cable can be sized from within the distribution diagram:

Right mouse button click on the connector to **Motor 2** and select **Size Cable** from the context menu.

The cable sizing form will open. The length has already been entered (when the cable was created).

Select **Size Cable** and then select **Update > OK** to close the form.

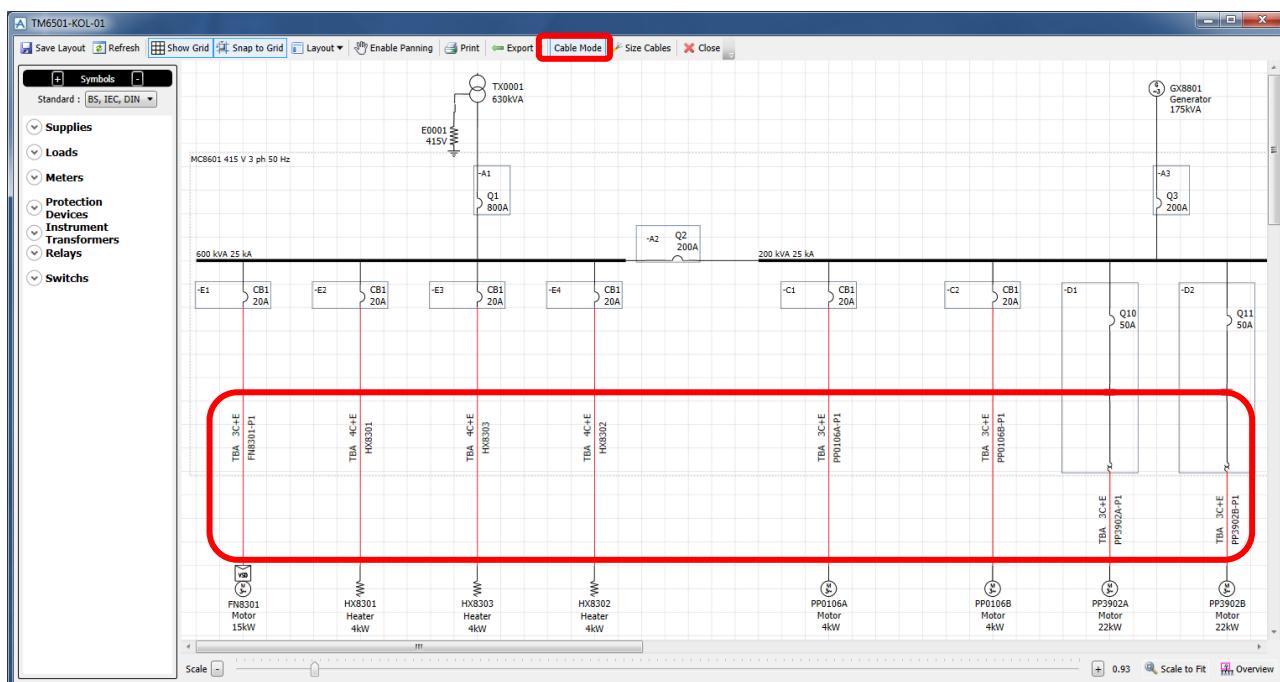
In the KOL Editor select **Refresh > Refresh data only > OK** to update the KOL. Select **Save Layout > Close** to close the editor.

4.4 Create Supply Cables

Supply cables can be created in the AVEVA Electrical Engineer Module from the KOL Diagram Graphical Interface.

Open the Training Project KOL **TM6501-KOL-01** that was created before.

On the tool bar at the top of the window there is a button labelled **Cable Mode**. In Exercise 9 load cables were created. If the cables created are not highlighted in red in the KOL, then select the button **Cable Mode**, the connecting lines between the protective devices and load items that have had wiring rules assigned to them and have had wiring created are highlighted in red indicating that cables have been created for those items.



If the **Cable Mode** button is deselected, the red highlighting disappears.

To the right of the **Cable Mode** button on the KOL graphical Interface toolbar, is a button labelled **Size Cables**. Selecting the **Size Cables** button opens the **Cable Creation List**

Create	From	CableNumber	Preview	To	Run Wiring Rule	Size Cable	External Cable Sizing	Add Suffix To Parent	Delimiter
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/> MC8601	A	A	A	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	A
<input type="checkbox"/>	MC8601	HX8303	HX83031	HX8303	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
<input type="checkbox"/>	GX8801	GX8801/MC8601	GX8801/MC86011	MC8601	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
<input type="checkbox"/>	MC8601	PP0106A-P1	PP0106A-P11	PP0106A	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
<input type="checkbox"/>	MC8601	PP0106B-P1	PP0106B-P11	PP0106B	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
<input type="checkbox"/>	MC8601	PP3902A-P1	PP3902A-P11	PP3902A	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
<input type="checkbox"/>	MC8601	PP3902B-P1	PP3902B-P11	PP3902B	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	

Scrolling down through the list, the user is able to see which cables have been created and which cables have not been created. Cables that have already been created have their cable numbers greyed out, cables available to be created have their cable numbers displayed in **bold text**. At the bottom left of the **Cable Creation List** window are two check box buttons and four radio buttons.



By using a combination of the Select/Deselect All buttons and radio buttons, the user can perform the following actions:

- **Select All** selected, and **Create** radio button selected will check all **Create** boxes in the grid for **All** items that have not had cables created, and that have wiring rules assigned to them.
- **Select All** selected and **Run Wiring Rule** radio button selected will check all **Run Wiring Rule** boxes for all items of equipment that have had wiring rules assigned to them.
- **Select All** selected and **Size Cable** radio button selected will check all **Size Cable** boxes for all items that have been created and are available to be sized.
- **Select All** selected and **External Cable Sizing** radio button selected will check all **External Cable Sizing** boxes for all items that have been created and are available to be sized.
- *Wiring rules are only assigned to load cables, supply cables do not require wiring rules to create cables.*

In the case of parent cables (cables with child cables), if the **Add suffix to parent** checkbox is checked (the default setting), the number of the parent cable will automatically be suffixed with "1". The numbers of child cables will be the number of the parent cable suffixed with "2", "3" etc.

If the checkbox is not checked, a suffix is not added. The first child cable will instead be the parent cable number suffixed with "1", and additional child cables suffixed with "2", "3" etc.

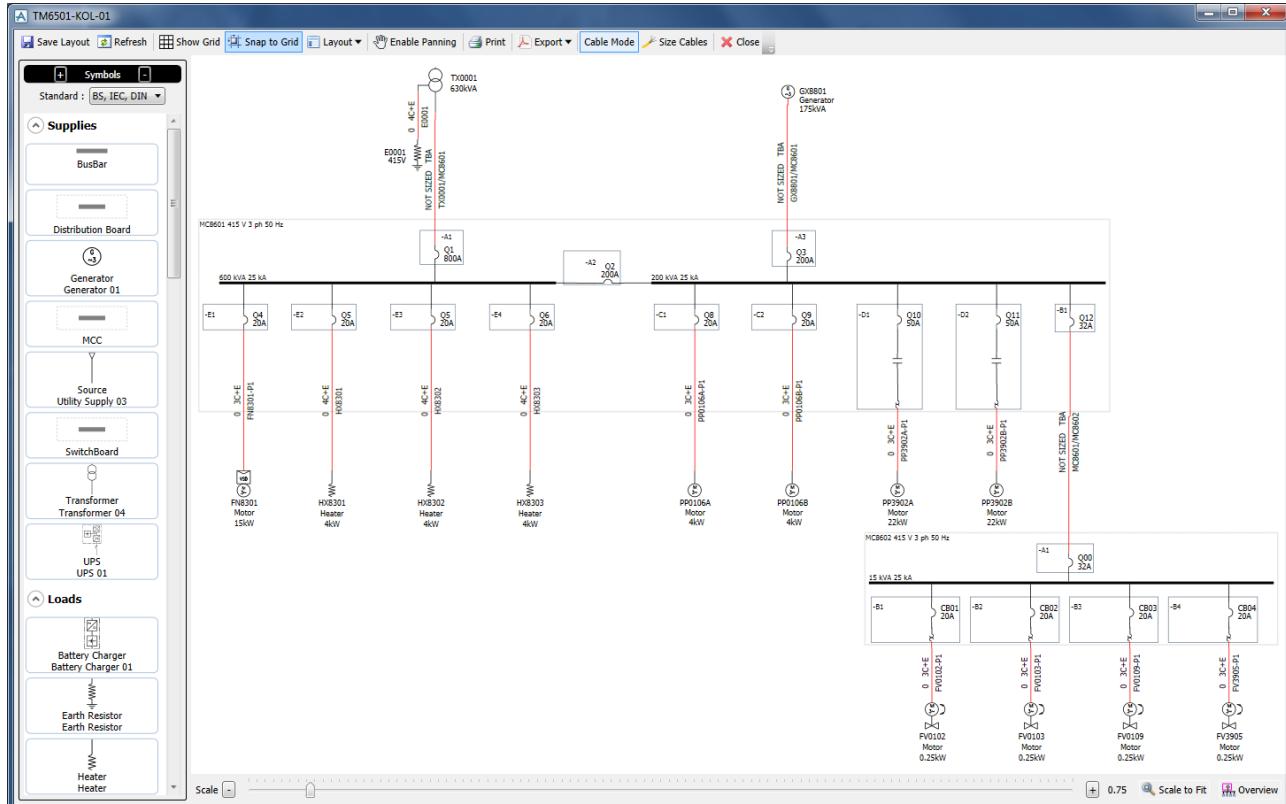
If there is to be a delimiter between the cable number and the suffix, select or enter it in the Choose Delimiter to suffix field.

The **Preview** field displays what the parent cable number will be once any changes

Exercise 9 – Create Supply Cables

Using the information above, create the supply cables. When making your selections, select the **Create** radio button and then select the **Select All rows** button (checked check box). Once the selections have been made, select the **OK** button located in the bottom right corner of the **Cable Creation List Window**.

The KOL should now resemble like the image below:



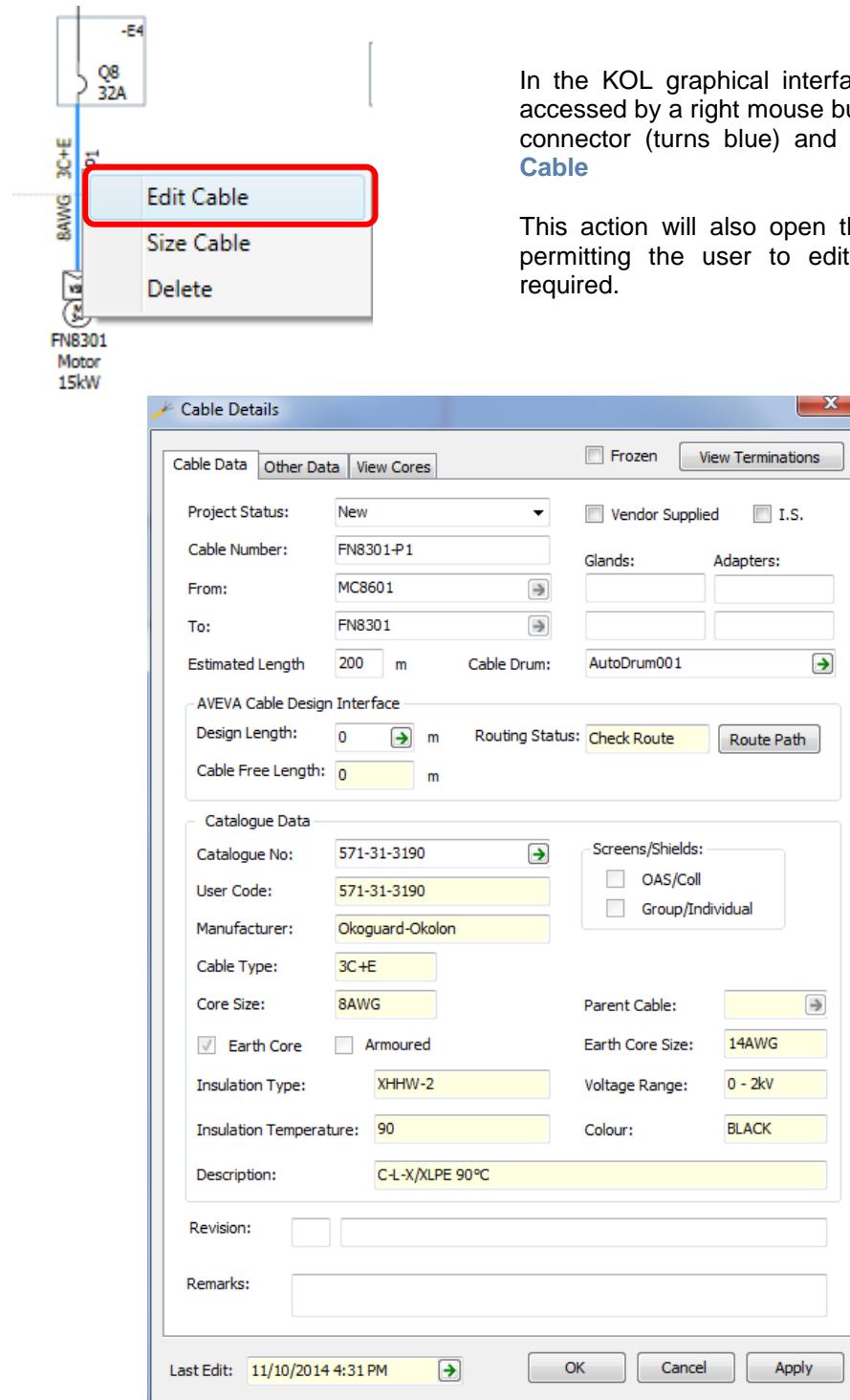
4.5 Edit the Cable Data

The user can access cables for editing using two methods

- Directly from the cable schedule in AVEVA Electrical Wiring Manager.
- From The KOL diagram in AVEVA Electrical Engineer.

Here the latter will be demonstrated:

4.5.1 Key One Line Diagram



In the KOL graphical interface, a context menu is accessed by a right mouse button click on the logical connector (turns blue) and then by selecting **Edit Cable**

This action will also open the **Cable Details** form permitting the user to edit the cable details as required.

4.6 Load Voltage Cable Sizing

AVEVA Electrical divides equipment into two main types: Supplies and Loads. It is accepted that Supply equipment types such as MCC's DB's etc. are at times Loads to other Supply equipment types. As a result, different approaches to the cable sizing application are available and differ slightly for each equipment type. The table below indicates what approaches are available to the equipment types to size cables:

Equipment Type	Loads Grid	Supplies Grid	KOL Diagram	Cable Schedule
Supplies	-	NO	YES	YES
Loads	YES	-	YES	YES

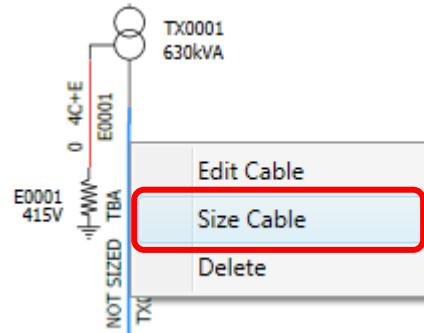
A suggested workflow for cable sizing would be the hierachal method beginning with the start of the network, in this case TX0001, and then working down through the Supply equipment types. Once all of the Supply equipment type cables have been sized, then progress through the load equipment types.

4.6.1 Supply Cables (Worked Example)

Open the KOL diagram **TM6501-KOL-01**.

Right mouse button click on the cable that feeds MCC MC8601 from transformer TX0001.

From the context menu select **Size Cable**. This will open the cable sizing form.



Notice that the Supply equipment type **MC8601** is listed under the **Load Data** frame.

The default values for the **Cable Installation Data** are the values that were set earlier on in the AVEVA Electrical Administration training guide selecting: **Project > Setup > Cable Sizing Configuration**.

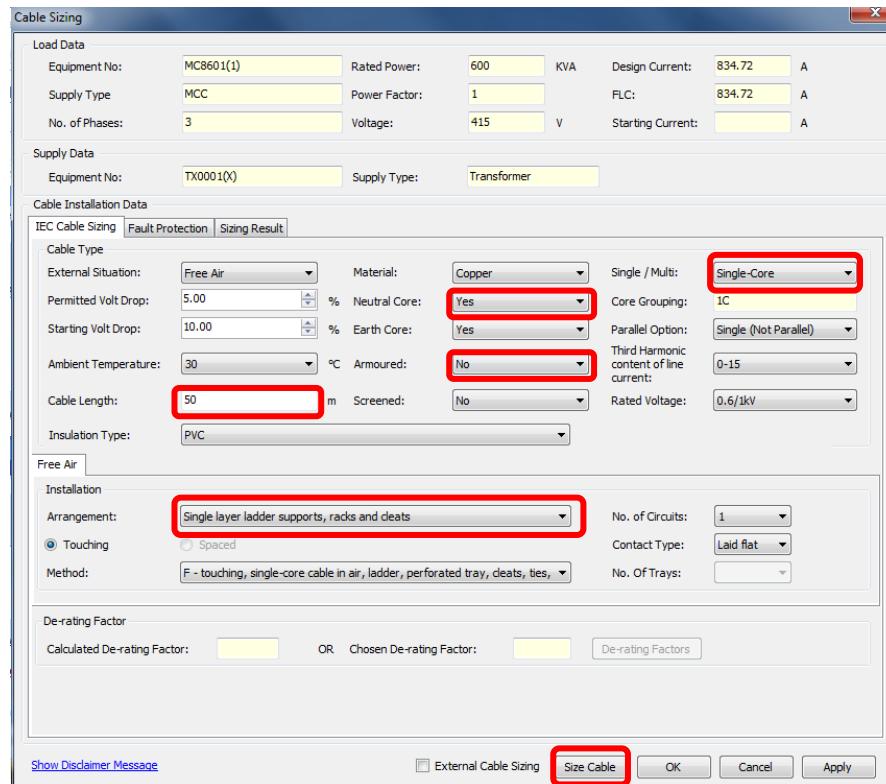
IEC Cable Sizing is shown because that is the standard that was selected selecting **Project > Options** and then selecting **IEC 60364-5-52 (2009)** from a pull down list.

Some parameters are required to be changed on the form to accommodate single core cables feeding the MCC.

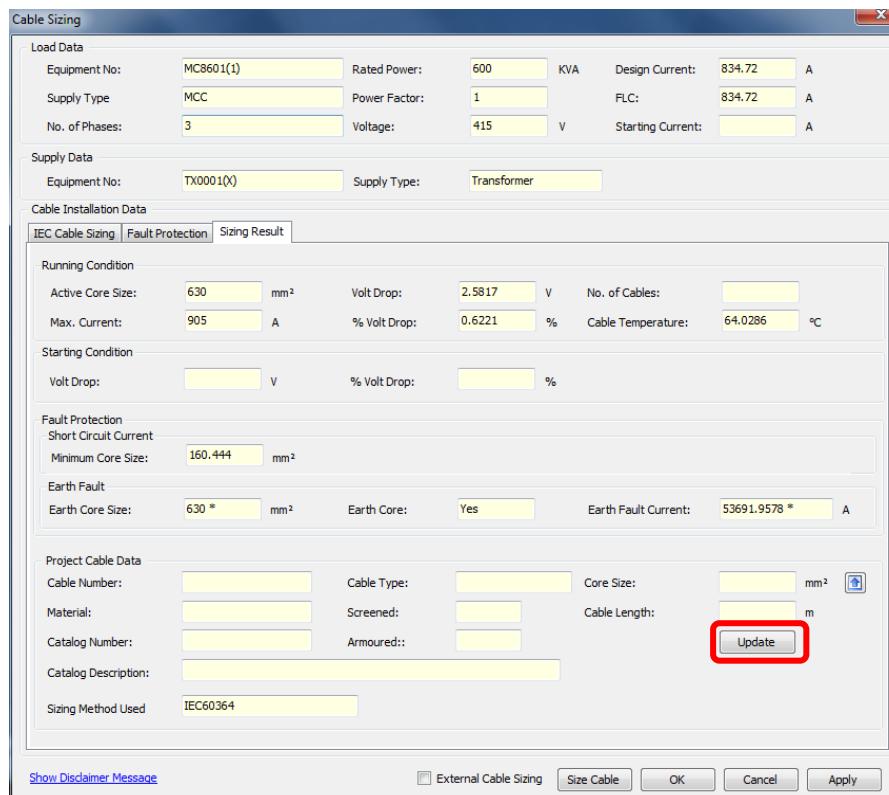
Update the following:

Cable Length:	50
Neutral Core:	Yes
Armoured:	No
Single / Multi:	Single Core
Arrangement:	Single layer ladder supports, racks and cleats.

The completed form should look like the following image:

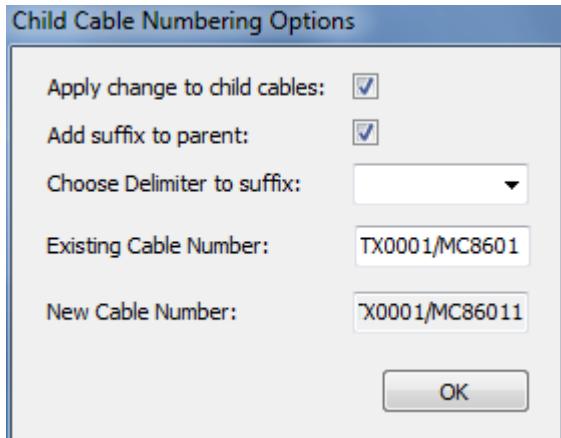


Select **Size Cable**. This will open the **Sizing Result**:



Select **Update**.

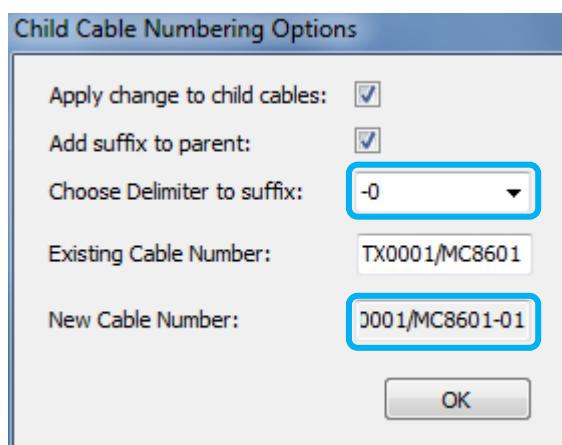
The **Child Cable Numbering Options** window is displayed as a parent cable (cable with child cables) is being created (single conductor).



If the **Apply change to child cables** and **Add suffix to parent** checkboxes are checked the number of the parent cable will automatically be suffixed with "1".

The numbers of child cables will be the number of the parent cable suffixed with "2", "3" etc.

If the **Add suffix to parent** checkbox is not checked, a suffix is not added. The first child cable will instead be the parent cable number suffixed with "1", and additional child cables suffixed with "2", "3" etc.



Type **-0** on the **Choose Delimiter to suffix** field.

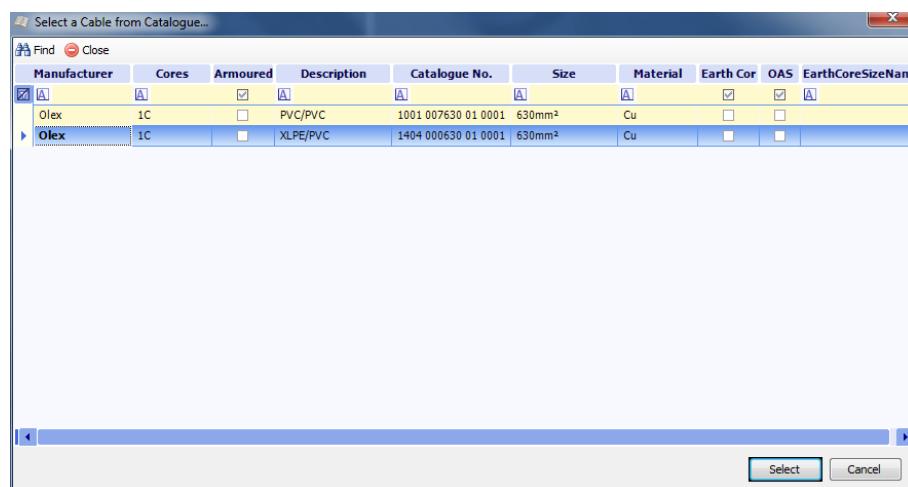
The **New Cable Number** field displays what the parent cable number will be once any changes

Click **OK**.

i The **Existing Cable Number** can be modified if it is required.

- i** During Cable Re-sizing (single or multi) the **Child Cable Numbering Options** window will come up when Phases of Fed tag or Neutral or Earth or Multicore/Single core or Parallel Option value has changed since last sizing.

A window listing available cables opens. Select the XLPE/PVC option.



The cable data is updated and the **Cable Number** is populated with the delimiter:

The screenshot shows the 'Cable Sizing' dialog box. In the 'Project Cable Data' section, the 'Cable Number' field contains the value 'TX0001/MC8601-01', which is highlighted with a blue border. Other fields in this section include 'Material: Copper', 'Catalog Number: 1404 000630 01 0001', 'Catalog Description: XLPE/PVC', and 'Sizing Method Used: IEC60364'. At the bottom of the dialog, there are buttons for 'Show Disclaimer Message', 'External Cable Sizing', 'Size Cable', 'OK', 'Cancel', and 'Apply'.

Select **OK** to close the form.

- i** The **Cable Schedule** in AVEVA Electrical Wiring Manager will show a 5 conductors cable: 3 phases + earth + neutral.

The screenshot shows the 'Cable Schedule' table. The columns are labeled 'Cable No', 'From', 'To', 'Cores', and 'Size'. The table contains the following data:

Cable No	From	To	Cores	Size
TX0001/MC8601-01	TX0001	MC8601	1C	630mm ²
TX0001/MC8601-02	TX0001	MC8601	1C	630mm ²
TX0001/MC8601-03	TX0001	MC8601	1C	630mm ²
TX0001/MC8601-04	TX0001	MC8601	1C	630mm ²
TX0001/MC8601-05	TX0001	MC8601	1C	630mm ²

Exercise 10 – Size Supply Cables

Using the table below, size the project cables in the order that they appear in the table:

Seq.	From Location	To Location	Single/Multi	Length (m)
1	GX8801	MC8601	Single +N+E	70
2	MC8601	MC8602	Multi 4C+N+E	100

For the MC8601 fed cable:

Cable Length: **50**
Neutral Core: Yes
Armoured: No
Single / Multi: Single Core
Arrangement: Single layer ladder supports, racks and cleats.

Do not check the **Add suffix to parent** checkbox.

- i** When sizing the cable from GX8801 to MC8601, edit the bus coupler so that it is open, and edit the generator incomer – Q3 so that it is closed. After the cable has been sized, reset the bus coupler to closed and the Generator Incomer to open.

4.6.2 Load Cables

A user can size Load Cables using one of two methods:

- From the **Loads** grid:

Open the **Loads** grid, select a load and then select **Size Selected Cable** on the **Calculations** pane of the **Loads** tab.



This will open the **Cable** sizing form as before. The same procedure that was followed to size supply cables is used here to size the load cables

- From the **KOL Distribution Diagram** interface:

The same procedure is followed here as is followed for Supply cables when sizing cables using the KOL diagram.

The screenshot shows the 'Cable Creation List' dialog box. It contains a table with columns: Create, From, CableNumber, Preview, To, Run Wiring Rule, Size Cable, External Cable Sizing, Add Suffix To Parent, and Delimiter. There are 12 rows of data. At the bottom, there are radio buttons for 'Create', 'Run Wiring Rule', 'Size Cable' (selected), 'External Cable Sizing', and 'Add Suffix To Parent'. There are also 'OK' and 'Cancel' buttons.

The screenshot shows the 'Cable Creation List' dialog box with specific cells highlighted by red boxes. The 'From' column for the second row ('HX8301') and the 'To' column for the third row ('HX8302') are highlighted. The 'External Cable Sizing' and 'Add Suffix To Parent' columns for the third row are also highlighted. The rest of the dialog box is identical to the previous screenshot.

Exercise 11 – Size Load Cables

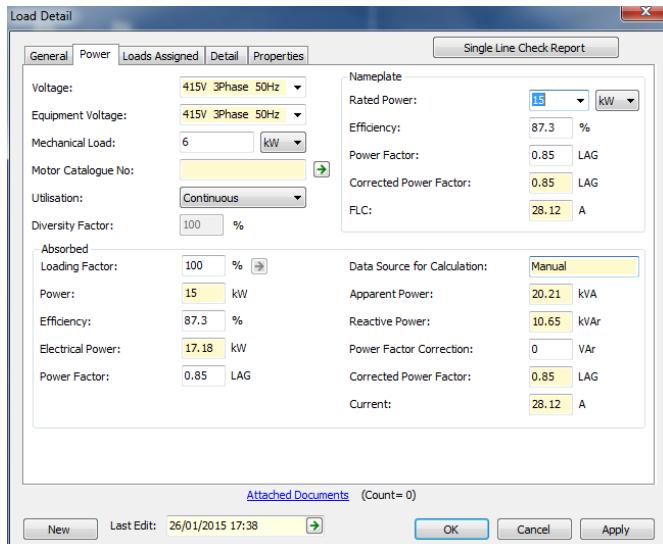
Using any of the methods above, size the project cables for the following loads:

- FV0102
- FV0103
- FV0109
- FV3905
- PP0106A
- PP0106B
- FN8301
- HX8301
- HX8302
- HX8303
- E0001

The user can add their own lengths to the load cables.

4.7 Cable Sizing Check Report (Worked Example)

The Cable Sizing Check Report lists differences between current and sized cable sizing related values. The values to be analysed were configured in the AVEVA Electrical Administration Training Guide.



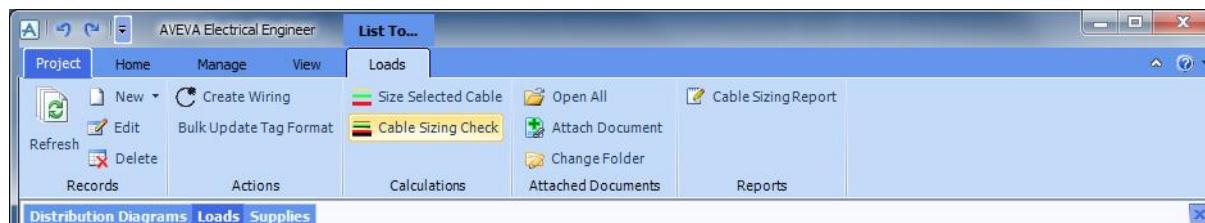
Open the **Loads** grid. Select edit the **Motor 1**.

Select the **Power tab** on the **Load Detail** window.

Type **15** on the **Rated Power** field.

Click **OK**.

Select the **Motor 1** and then select **Cable Sizing Check** on the **Calculations** pane of the **Loads** tab.



This will open the **Cable Sizing Check Report** form:

CableNo	EquipmentNo	Field	CableSizingField	CurrentValue	SizedValue	IsSized	NeedsReSizing	Drummed	DrumLocke	CableFroz	Result
Motor 1	Motor 1	CableCurrent	DesignCurrent	28.122	14.061	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Difference

The report shows a difference in the **Design Current** as the Nameplate power has changed. The **NeedsReSizing** check box is checked.

- i** The Cable Sizing Check Report is also available from the Cable Schedule grid in AVEVA Electrical Wiring Manager module.

5 Datasheets

AVEVA Electrical is equipped with a catalogue of sample datasheets. This catalogue is sufficient to get the user started with creating equipment datasheets. Datasheets can be imported from Excel and mapped to AVEVA Electrical fields, giving the user a powerful tool to create customised datasheets with.

To view the catalogue, start AVEVA Electrical Engineer, open the training project developed using this guide. Select **Home > Select > Datasheets** (under Catalogues).

A user can create a data sheet for equipment using one of four methods:

1. From the **Loads** or **Supplies** grid:

Select **Home > Select > Loads** to open the loads grid.

Move the mouse cursor into the cell **DataSheetNo** of the equipment that requires a datasheet.

A button appears. Select the button:

Area	EquipmentNo	Description	EquipmentType	DataSheetNo
01	FCV0102	RW Inlet Vlv	Motor	
01	FCV0103	RW Inlet Vlv	Motor	
01	FCV0109	CIP/Divert	Motor	
01	FK0101	Re-circ valves local control panel	Local Panel	
01	PP0106A	Raw Water Pmp	Motor	
01	PP0106B	Raw Water	Motor	

This opens the **Add Datasheet for:** form:

The dialog box has the following fields and data:

- Datasheet No.: [empty input field]
- Area No.: 01
- Sheet/Page No.: 1 Use Next Sheet No.
- Equipment Type: Motor
- Form Type: All
- Select a Datasheet Form:

Form Name	Description	Form Type
AEMotor	Motor Datasheet	DataSheet
AC_TEFC-Motor	AC Totally Enclosed Fan Cooled Motor	DataSheet
MMCL	Manufacturer Motor Check List	Other
- Buttons: Next > (highlighted), Cancel

2. From the within Load Detail or Supply Detail Forms:

To view this, select a load from the **Loads** grid (this example uses PP0106A), select the **Detail** tab, at the bottom half of the form select the **Datasheet** tab:

The screenshot shows a software interface with three tabs at the top: General, Datasheet (which is selected and highlighted in blue), and Project Defined Fields. Below the tabs is a section labeled 'Datasheet No.' containing a text input field with a green arrow command button at its right end, which is circled in red. Underneath this are four dropdown menus for 'Manufacturer', 'Model No.', 'Supplier', and 'Vendor Supplied', each with a small blue arrow command button to its right.

Click the arrow command button at the end of **Datasheet No:** text box, this opens the **Add Datasheet for:** form, similar to the one above.

This opens the **Add Datasheet for:** form shown above.

3. From the Datasheet grid:

Select **Home > Select > Datasheets** (under Lists). This will open an empty data sheet grid and a contextual tab **Datasheets**.

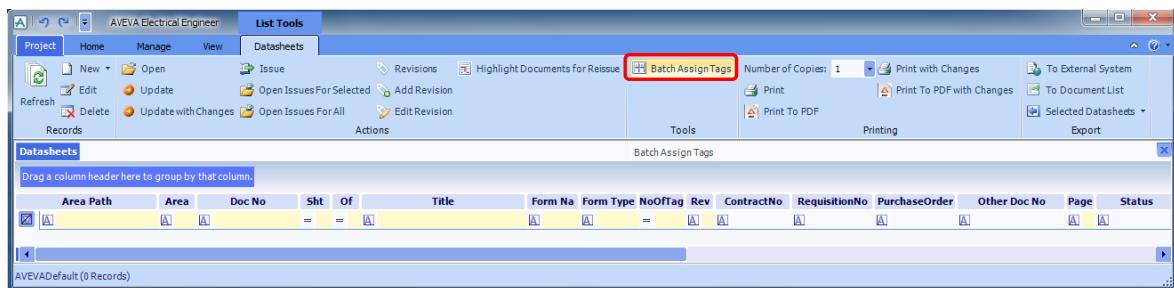
Select **Datasheets** tab, select **New** in the **Records** pane.

Because the application does not know what equipment type the new datasheet is being created for, an **Add a new Datasheet** is opened. This form is similar to the previous one opened but gives the user a choice of forms to use:

Form Name	Description	Form Type
AEMCC	MCC Datasheet	DataSheet
AETransformer	Transformer Datasheet	DataSheet
AEGenerator	Generator Datasheet	DataSheet
AESwitchboard	SwitchBoard Datasheet	DataSheet
AEDistBoard	Dist Board Datasheet	DataSheet
AEUPS	UPS Datasheet	DataSheet
AEVSD	VSD Datasheet	DataSheet
AEMotor	Motor Datasheet	DataSheet
AELCS	LCS Datasheet	DataSheet
AEHeater	Heater Template	DataSheet
AEJunctionBox	Junction Box	DataSheet
AC_TEFC-Motor	AC Totally Enclosed Fan Cooled Motor	DataSheet
MMCL	Manufacturer Motor Check List	Other

4. From the **Datasheets** grid:

Click the **Batch Assign Tags** button from the **Tools** pane.



This opens the **Batch Assign Tags to Datasheets** form.

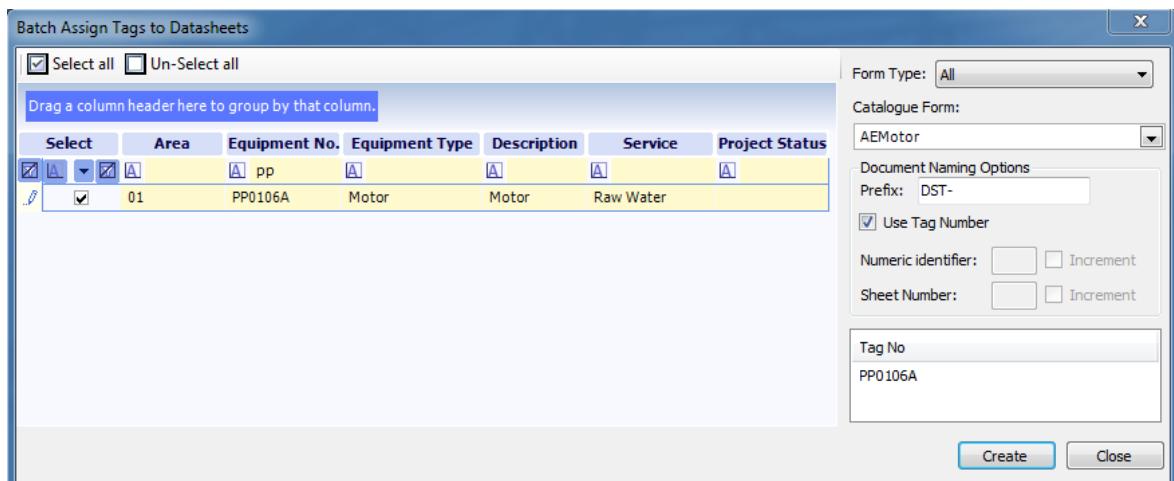
For example:

Select from type datasheet and then select the **AEMotor** from the **Catalogue Form** pull down list.

By using the filters provided, type the function **PP** on the **Equipment No.** text box.

Click the **Select all** button check box for the Instrument Tags which will be assigned to the selected Catalogue Form.

Check the **Use Tag Number** check box and type **DST-** in the **Prefix:** text box.

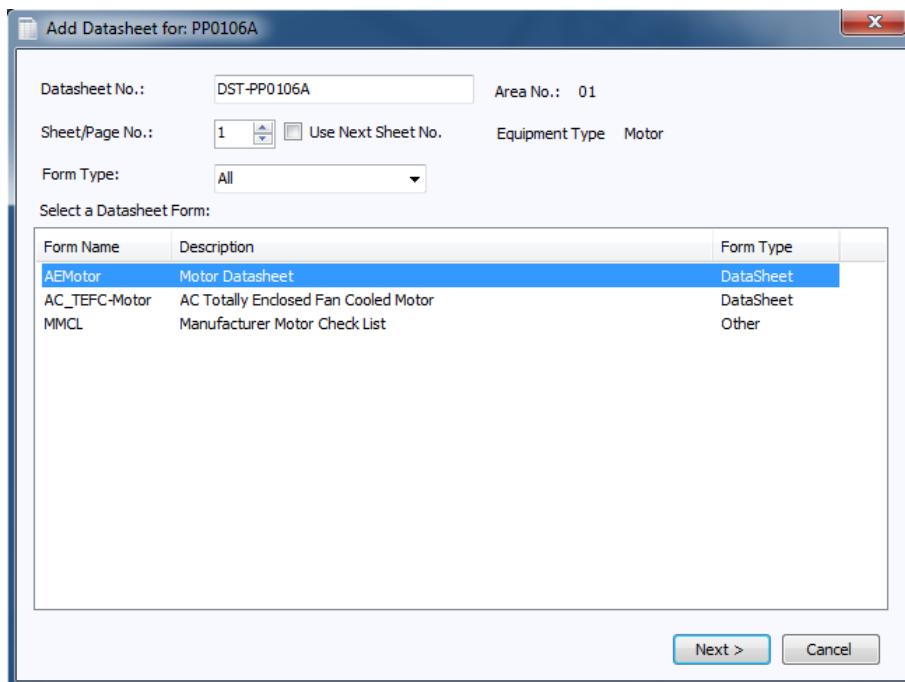


Click the **Create** button to create Datasheets for the checked Instrument Tags.

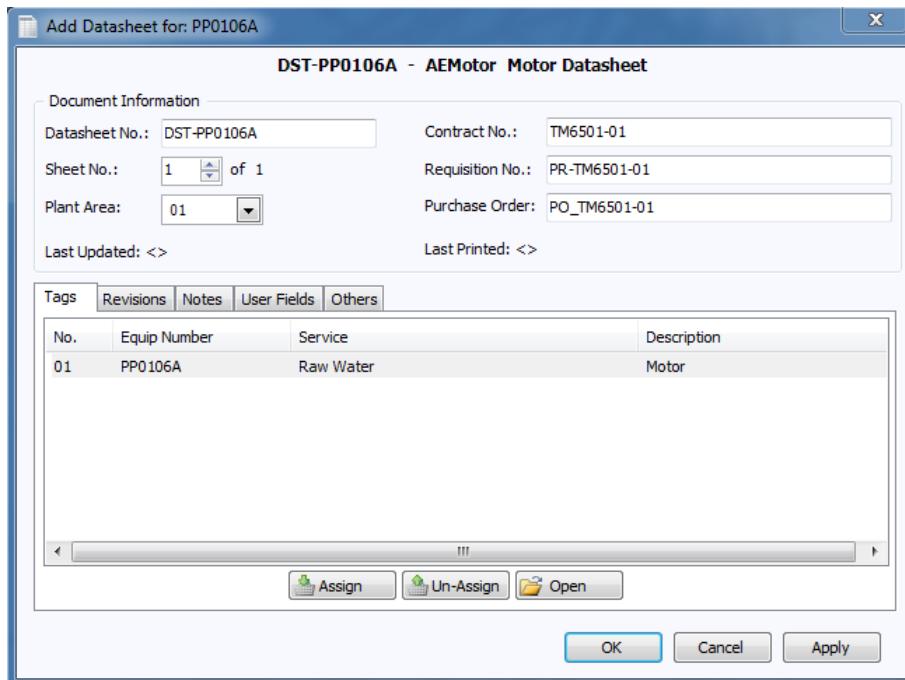
5.1 Generate a Datasheet (Worked Example)

In this example a datasheet for pump **PP0106A** will be created.

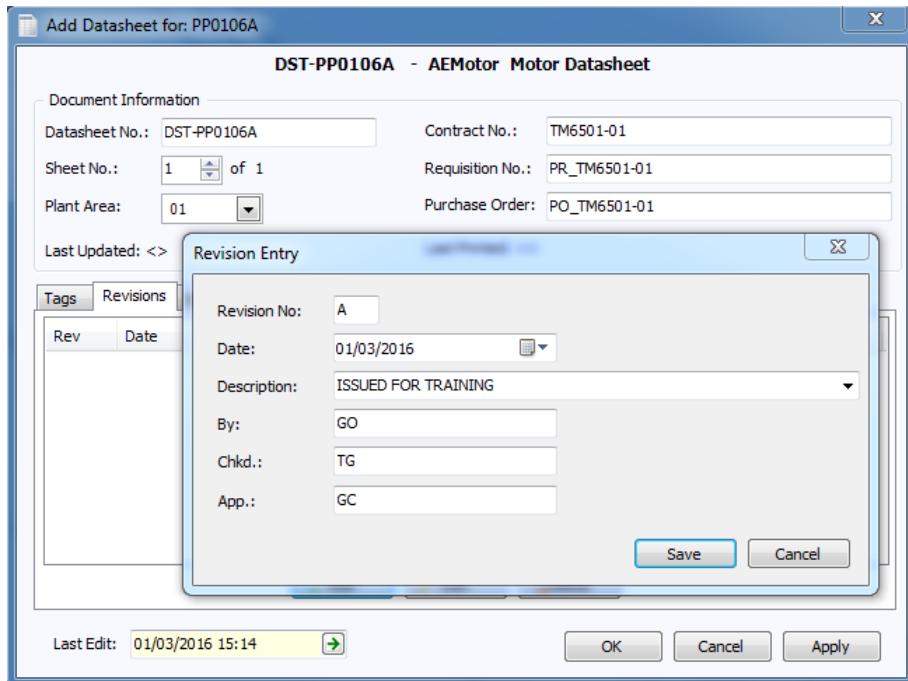
Give the **Loads** grid the focus by selecting and edit the detail for pump **PP0106A**. Open the **Add Datasheet for:** as described in method 2 above.



Complete the form as shown in the next image:



Complete the form as shown below:



Select **Save**.

The user is encouraged to view the contents of the other tabs: **Notes**, **User Fields** and **Others**.

On the **Others** tab, set the **Design Status**: to **In Progress** by selecting it from the pick list, select **OK** to close the **Add Datasheet for: PP0106A** form.

Select **OK** to close the **Load Detail** form for Pump **PP0106A**.

Exercise 12 – Assign Equipment Tag to Datasheet

Assign the following Equipment Tags to a Datasheet using **Method 1 or 2** (Grid Approach):

Tag	Datasheet No	Form Name
PP0106B	DST-PP0106B	AEMotor
PP3902A	DST-PP3902A	
TX8601	DST-TX86021	AETransformer

Assign the following Equipment Tags to a Datasheet using **Method 4** (Batch Assign): Select from type **Other** Form type

Tag	Datasheet No	Form Name
PP0106A	MCL- PP0106A	MMCL
PP0106B	MCL- PP0106B	
PP3902A	MCL- PP3902A	

5.2 Datasheet Data Entry (Worked Example)

The user can access the data entry window for the selected Datasheet, which looks just like a Microsoft Excel spread sheet by clicking the button in the **DataSheetNo** cell on the **Loads** grid. Click on the **DataSheet** cell for **PP0106A**:

SupplyTag	Area	Area Path	Equipment	Description	EquipmentType	DataSheetNo	Supply	Mechanical Load	Nameplate Power
MC8601	01	30	PP0106A	Motor	Motor	MC8601 (2)	0	4	
MC8601	01	30	PP0106B	Motor	Motor	MC8601 (2)	0	4	
MC8601	39	30	PP3902A	Motor	Motor	MC8601 (2)	0	22	
MC8601	39	30	PP3902B	Motor	Motor	MC8601 (2)	0	22	

This opens the Datasheet **DST-PP0106A**:

Electrical Datasheet		INDUCTION MOTOR		
1	Tag No	PP0106A	Client	AVEVA Solutions Ltd
2	Service	Raw Water	Project No	TM6501_01_FF
3	Reference SLD No		Location	My Location
4	Reference PID No		Specification Number	
5	Equipment Type		Issue Purpose	
6				
SITE CONDITION DATA				
8	Ambient Temperature		Installation Type	
9	Design Temperature		Hazardous Area	
10	Temperature Rise		Gas Group	
11	Altitude			
12	Relative Humidity			
13				
14				
ELECTRICAL DATA				
16	Motor Voltage Class		Normal Speed	1443
17	Motor Type		No of Poles	4
18	No Of Phases	3	Starting Method	
19	Rated Voltage	415	Starting Current	56.00
20	Rated Power Factor	0.82	Start Up Time	
21	Rated Frequency	50	Winding Connection	
22	Rated Power	4	Winding Temperature Detector	
23	Motor Duty Type		Bearing Temperature Detector	
24	Electrical Power	4.717	Full Load Current	8.003
25			Power Factor Correction	0.00
26			Corrected Power Factor	0.82
MECHANICAL / CONSTRUCTIONAL DATA				
28	Mounting Arrangement		Insulation Class	
29	Casting Material		Cooling Method	
30	Degree of Protection		Painting Specification	
31	Ex Classification		Color Code	

To enter data directly on a cell, double click with the mouse cursor and type in the desired information or select a value from the pull down list (if available).

Enter some basic specifications on the spread sheet corresponding to each field and change the process units where necessary (This option is available in the right click context menu on the required value cell).

SITE CONDITION DATA:

Ambient Temperature: 30°C
Design Temperature: 110°C
Temperature Rise: 200°C
Altitude: 402m

MECHANICAL / CONSTRUCTIONAL DATA:

Degree of Protection: IP55

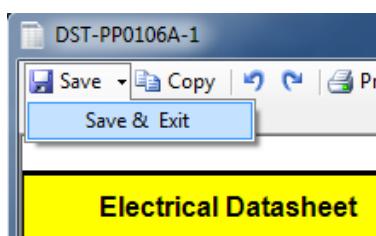
Ex Classification: Safe Area

Test Certificate Details: TBA

MECHANICAL DRIVE DATA:

Rated Speed: 2900rpm

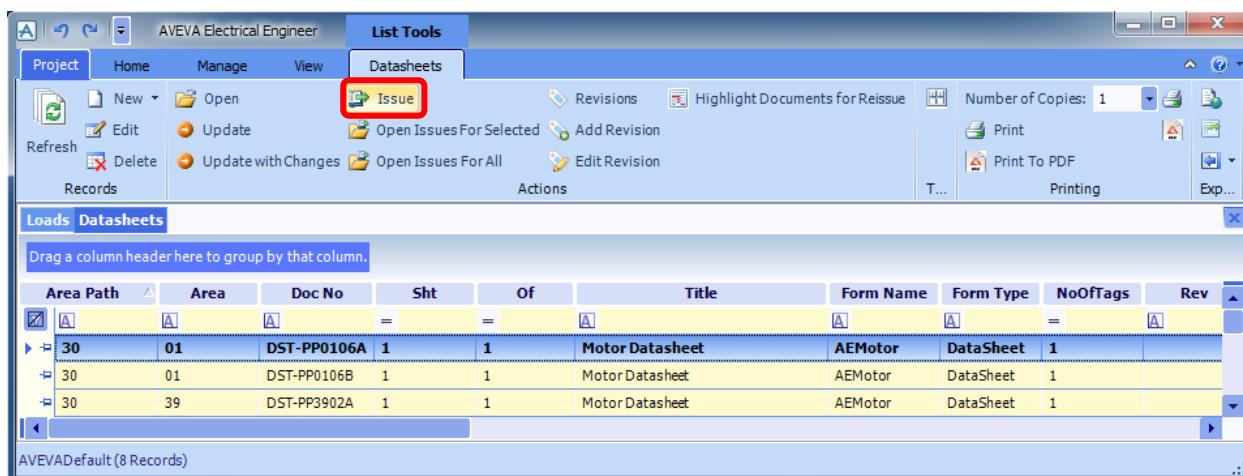
Click the **Save & Exit** button to save the changes and exit the data entry form.



5.3 Issue Datasheets (Worked Example)

Once the technical specifications have been updated on the spread sheets, the user must now issue these Specification Sheets (Datasheet), which are time stamped and linked to a Revision. If the Datasheet has previously been issued, then the user will have to create a new revision before issuing again.

To issue a Datasheet: Select **Home > Select > Datasheets** (under Lists). Give focus to the **Datasheets** contextual tab, select the Datasheet **DST-PP0106A** and click the **Issue** button under the **Actions** pane.



A progress bar opens, and then closes when the application has completed the process.

AVEVA Electrical **Engineer** issues the Datasheet with a time stamp (date) and Revision.

PurchaseOrder	Other Doc No	Page	Status	% Complete	Changed	Updated	Printed	Issued	Published
PO_TM6501-01-01			In Progress		10/11/2015	10/11/2015 12:10		02/03/2016	
PO_TM6501-01-01			In Progress			10/11/2015 12:24			
			In Progress						

AVEVA Electrical **Engineer** saves all previous Issues of Datasheets, which enables the user to access any previously issued Datasheet for information or reference.

To access previous issues of Datasheet: Select the Datasheet **DST-FVPP0106A** from the **Datasheet List** grid. Give focus to the **Datasheet** tab and Click **Open Issues for Selected** button from the **Actions** pane.

PurchaseOrder	Other Doc No	Page	Status	% Complete	Changed	Updated	Printed	Issued	Published
PO_TM6501-01-01			In Progress		10/11/2015	10/11/2015 12:10		02/03/2016	
PO_TM6501-01-01			In Progress			10/11/2015 12:24			
			In Progress						

This opens the **Issues** window, which lists the different issues for the Datasheet.

Area	Doc No	sheet	of	User Name	Cancelled	Rev	Date	Remarks
01	DST-PP0106A	1	1	AVEVA\felipe.furini	<input checked="" type="checkbox"/>	<input type="checkbox"/>	02/03/2016	

Hence, the user can view/delete any issue of the Datasheet using the options available on the toolbar.

- i** The user can select **Open Issues For All** to display a list of all the datasheets that have been issued:

Click the **Close** button from the menu.

5.4 Import Datasheet (Worked Example)

Consider a situation when a Datasheet is issued and exported for a Vendor to include the specifications of the Equipment (Manufacturer, Model No, etc.) and the updated Datasheet should be imported back and issued again. AVEVA Electrical **Engineer** will alert the user about the changes made to the Datasheet and assign a new Revision prior to issuing the datasheet.

Open the Datasheet **DST-PP0106A-1** from the folder **Datasheets**:

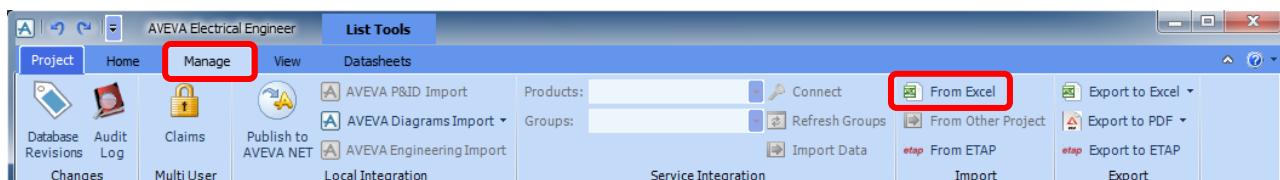
C:\AVEVA_ElectricalTraining\Projects\TM6501_01_XX\Datasheets\Documents

Edit the datasheet using the information in the following table:

ELECTRICAL DATA	
Caption:	Value
Motor Type	Squirrel Cage Induction
Motor Duty Type	Continuous AC3
Winding Connection	Delta 240V 3ph 50Hz Star 415V 3ph 50Hz
Winding Temperature Detector	Thermistor Widget Co 12345
Bearing Temperature Detector	No
MECHANICAL / CONSTRUCTIONAL DATA	
Caption:	Value
Mounting Arrangement	Flange
Casting Material	Aluminium
Degree of Protection	IP56
Cooling Method	Fan
Color Code	RAL GY563

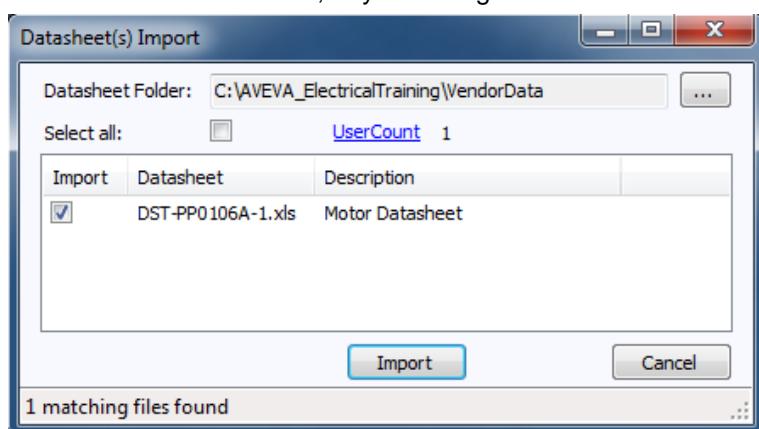
When finished, **save** the data sheet in the C:\AVEVA_ElectricalTraining\VendorData folder and **close** the Excel.

To Import the modified Datasheet: On the **Datasheets** grid, select the **Manage** tab and click the **From Excel** button under the **Import** pane.



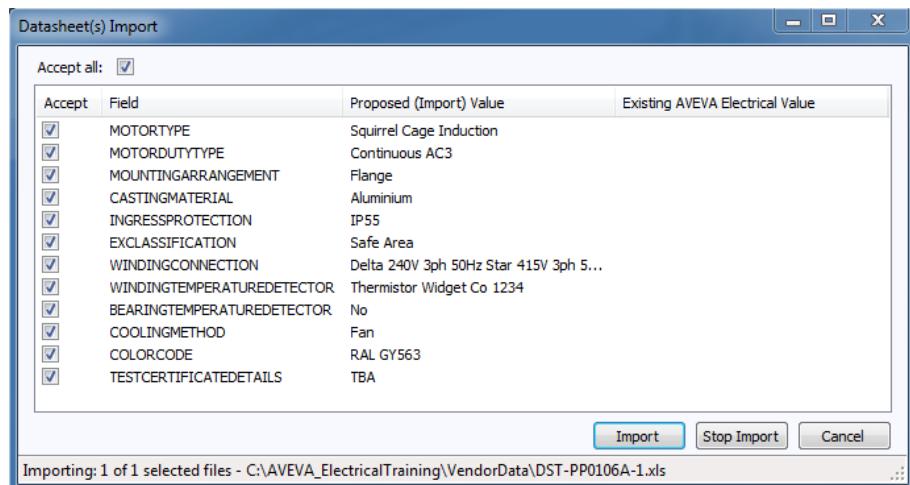
This will open the **Datasheet(s) Import** form. Browse to where the vendors copy of the spread sheet is stored.

When the folder is selected, any matching file names that match the datasheet file names will be displayed.



Place a check mark on the file(s) to import and select **Import**. In this instance select **DST-PP0106A-1** that datasheet that was edited earlier.

A second window opens showing the fields that have changed from the datasheet that was issued. If there was a previous value for a field it will be listed under the **Existing AVEVA Electrical Value** column. The user can select each item individually or the user can place a check mark in the **Accept all:** check box.



To import the selected items, select **Accept all** and then select the **Import** button.

An **Import log** is displayed with the details updated.

1	Result
2	Imported C:\AVEVA_ElectricalTraining\VendorData\YST-PP0106A-1.xls
3	EQUIPMENTDATA.MOTORTYPE > Squirrel Cage Induction
4	EQUIPMENTDATA.MOTORDUTYTYPE > Continuous AC3
5	EQUIPMENTDATA.MOUNTINGARRANGEMENT > Flange
6	EQUIPMENTDATA.CASTINGMATERIAL > Aluminium
7	EQUIPMENT.INGRESSPROTECTION > IP55
8	EQUIPMENTDATA.EXCLASSIFICATION > Safe Area
9	EQUIPMENTDATA.WINDINGCONNECTION > Delta 240V 3ph 50Hz Star 415V 3ph 50Hz
10	EQUIPMENTDATA.WINDINGTEMPERATUREDETECTOR > Thermistor Widget Co 1234
11	EQUIPMENTDATA.BEARINGTEMPERATUREDETECTOR > No
12	EQUIPMENTDATA.COOLINGMETHOD > Fan
13	EQUIPMENTDATA.COLORCODE > RAL GY563
14	EQUIPMENTDATA.TESTCERTIFICATEDETAILS > TBA
15	EQUIPMENT.INGRESSPROTECTION > IP55
16	EQUIPMENTDATA.WINDINGCONNECTION > Delta 240V 3ph 50Hz Star 415V 3ph 50Hz
17	EQUIPMENTDATA.CASTINGMATERIAL > Aluminium
18	EQUIPMENTDATA.COOLINGMETHOD > Fan
19	EQUIPMENTDATA.COLORCODE > RAL GY563
20	EQUIPMENTDATA.MOUNTINGARRANGEMENT > Flange
21	EQUIPMENTDATA.TESTCERTIFICATEDETAILS > TBA
22	-----
23	
24	
25	Imported 1 of 1 files

Click the **Close** button.

5.4.1 Highlight Documents for Reissue

Select the **Datasheets** contextual tab and select all records. Click the **Highlight Documents for Reissue** button under the **Actions** pane.

The screenshot shows the AVEVA Electrical Engineer interface. The 'Datasheets' contextual tab is selected. In the 'Actions' pane, the 'Highlight Documents for Reissue' button is highlighted with a red box. The main area displays a table of datasheet records. One record, 'DST-PP0106A', has its revision field 'Rev' set to 'A*'.

Area Path	Area	Doc No	Sht	Of	Title	Form Name	Form Type	NoOffTags	Rev	ContractN
30	01	DST-PP0106A	1	1	Motor Datasheet	AEMotor	DataSheet	1	A	TM6501-01
30	01	DST-PP0106B	1	1	Motor Datasheet	AEMotor	DataSheet	1		TM6501-01
30	39	DST-PP3902A	1	1	Motor Datasheet	AEMotor	DataSheet	1		
30	86	DST-TX8601	1	1	Transformer Datasheet	AETransform	DataSheet	1		
30	01	MCL-PP0106A	1	1	Manufacturer Motor Check	MMCL	Other	1		

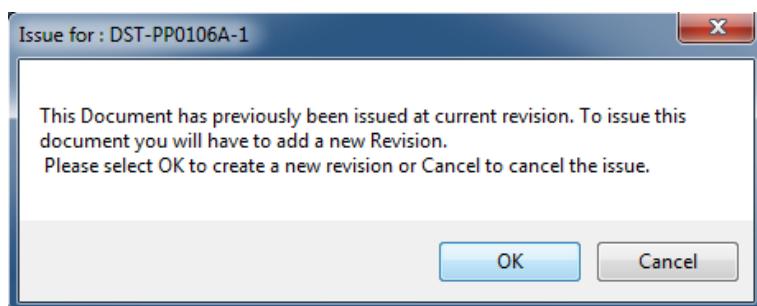
The revision field will be updated with an * for the records that have been updated since last revision.

The screenshot shows the AVEVA Electrical Engineer interface. The 'Datasheets' contextual tab is selected. In the 'Actions' pane, the 'Issue' button is highlighted with a red box. The main area displays a table of datasheet records. One record, 'DST-PP0106A', has its revision field 'Rev' set to 'A*'.

Area Path	Area	Doc No	Sht	Of	Title	Form Name	Form Type	NoOffTags	Rev	ContractN
30	01	DST-PP0106A	1	1	Motor Datasheet	AEMotor	DataSheet	1	A*	TM6501-01
30	01	DST-PP0106B	1	1	Motor Datasheet	AEMotor	DataSheet	1		TM6501-01
30	39	DST-PP3902A	1	1	Motor Datasheet	AEMotor	DataSheet	1		
30	86	DST-TX8601	1	1	Transformer Datasheet	AETransform	DataSheet	1		
30	01	MCL-PP0106A	1	1	Manufacturer Motor Check	MMCL	Other	1		

Select the record **DST-PP0106A**. Click the **Issue** button under the **Actions** pane to reissue the modified Datasheet.

An **Issue for: DST-PP0106A-1** alert form is displayed



Click **OK** to add a new revision to the document.

The **Revision Entry** form is displayed with the next Revision No. Edit the **Description** text box and enter **ISSUED WITH VENDOR INFORMATION.**

The screenshot shows the 'Revision Entry' dialog box. It contains the following fields:

Revision No:	B
Date:	02/03/2016
Description:	1st DRAFT FOR REVIEW
By:	GO
Chkd.:	TG
App.:	GC

At the bottom right of the dialog box are two buttons: 'Save' and 'Cancel'.

Click the **Save** button on the **Revision Entry** form.

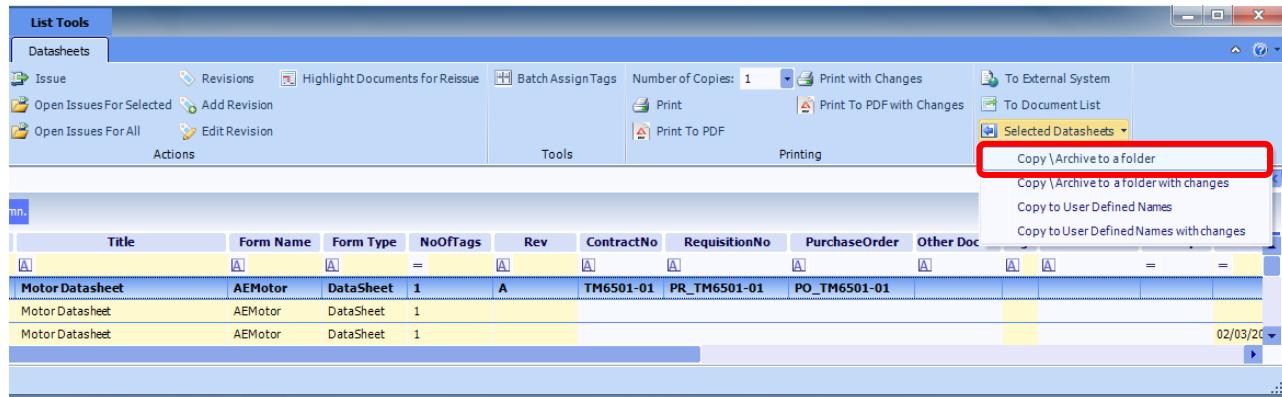
The Datasheet **DST-PP0106A** for the Water Pump is now updated with the new Revision 'B'.

5.5 Export Datasheet(s) to a Folder

The user can export the selected datasheet files (.xls format) in the Datasheet list grid to:

- A specified folder with file names formed from the document number (Datasheet No.)
- A pre-defined folder(s) with file names in a pre-defined, user defined format.

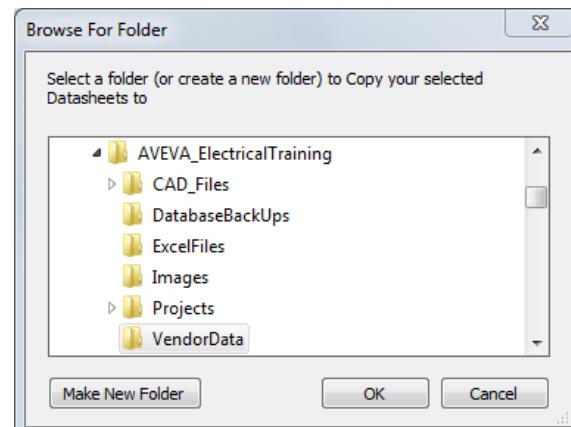
On the **Datasheets** tab, select **Selected Datasheets > Copy\Archive to a folder**:



This will open the **Browse For Folder** window.
Select a folder or create a new folder.

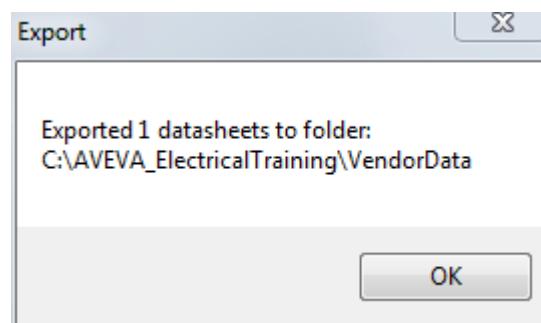
This example shows a folder named <VendorData>

Select **OK**.



An exporting progress bar is initiated, when completed the user is notified.

Select **OK**



Exercise 13 – Change Highlighting

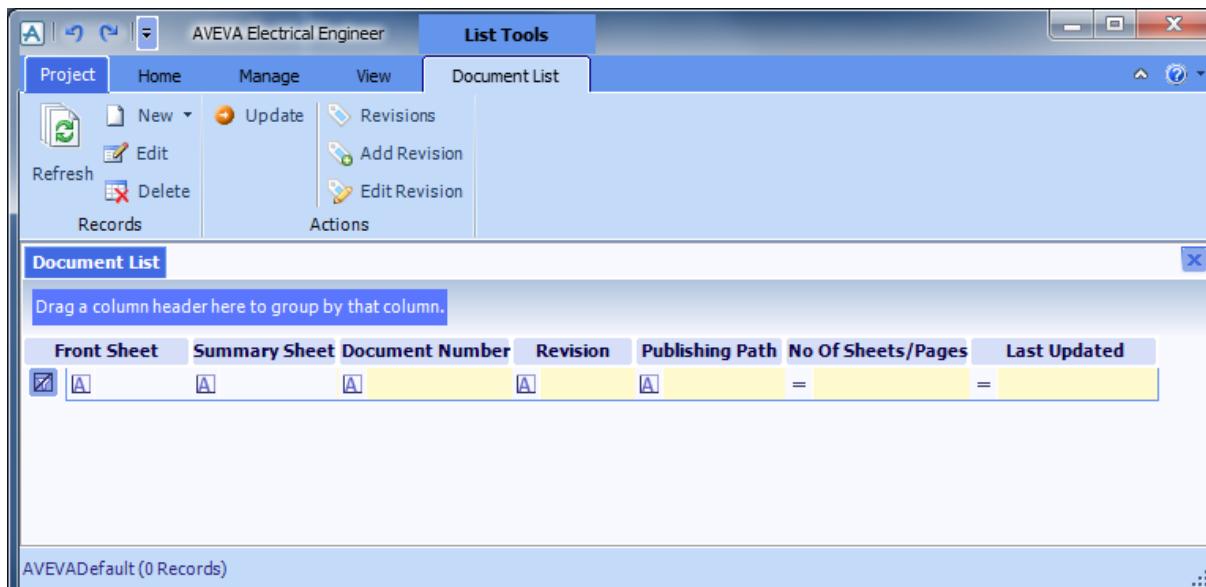
Following the steps in the previous chapter above issue a datasheet for **DST-PP3902B**, create a copy of the issue created by the application to a different location, edit some fields (any fields will do). Save the copied file with the changes.

Import the changed file into AVEVA Electrical Engineer.

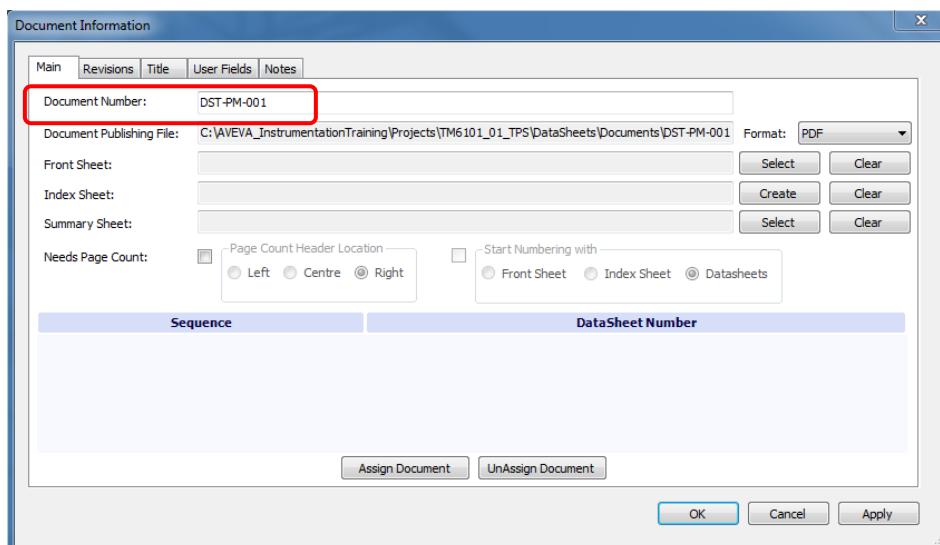
5.6 Document List (Worked Example)

AVEVA Electrical allows the creation of a single document containing several Datasheet. This document can contain a front, Index and Summary Sheet for easy classification.

To create a Document List select **Home > Select > Document List** (under Lists).

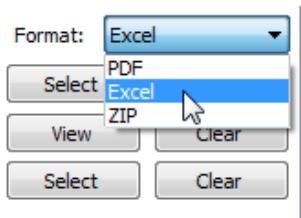


Select **New** from the **Records** pane. The **Document Information** form opens.



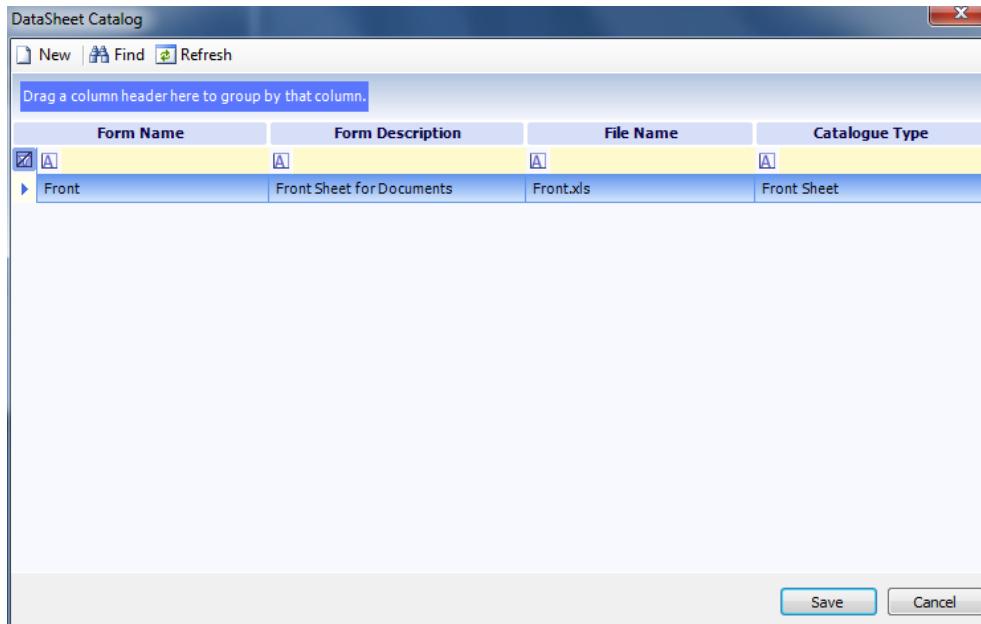
Input DST-PM-001 into the Document Number field.

The file path holding the document will automatically be mapped and shown in the **Document Publishing File Path**.



Using the pull down list option of **Format**, select the format file: PDF, Excel or ZIP. Leave the **PDF** default format.

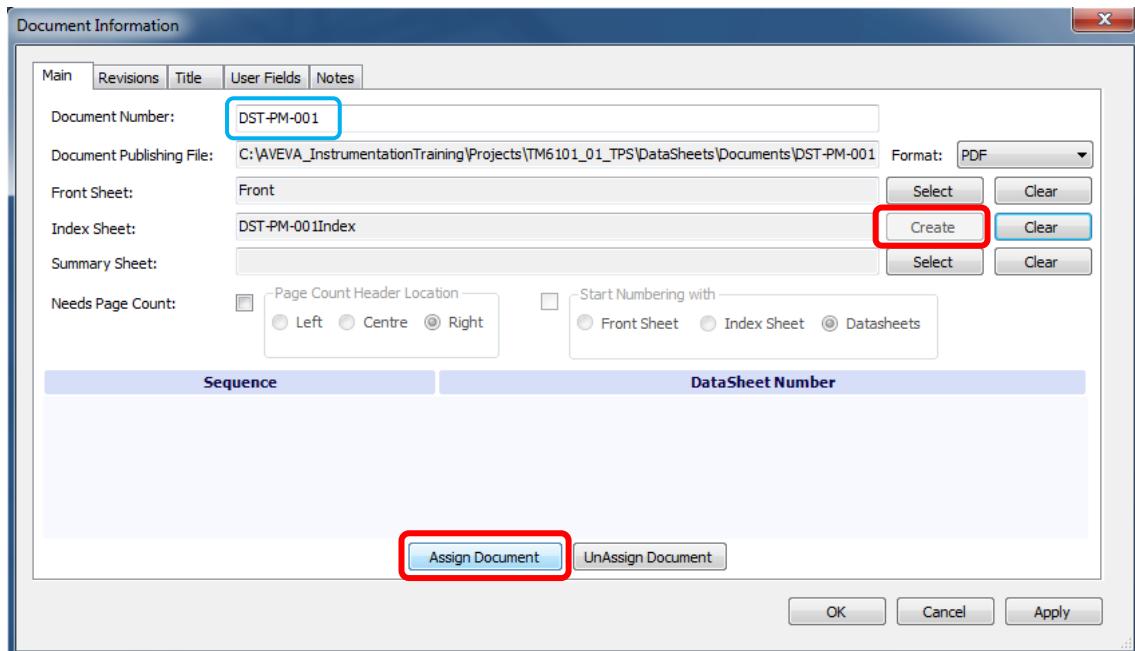
Click the **Select** button on the **Front Page** field. This opens the **Datasheet Catalogue** form for the Front Sheet Catalogue Type.



Give the **Front** the focus by selecting it and click the **Save** button which closes the form.

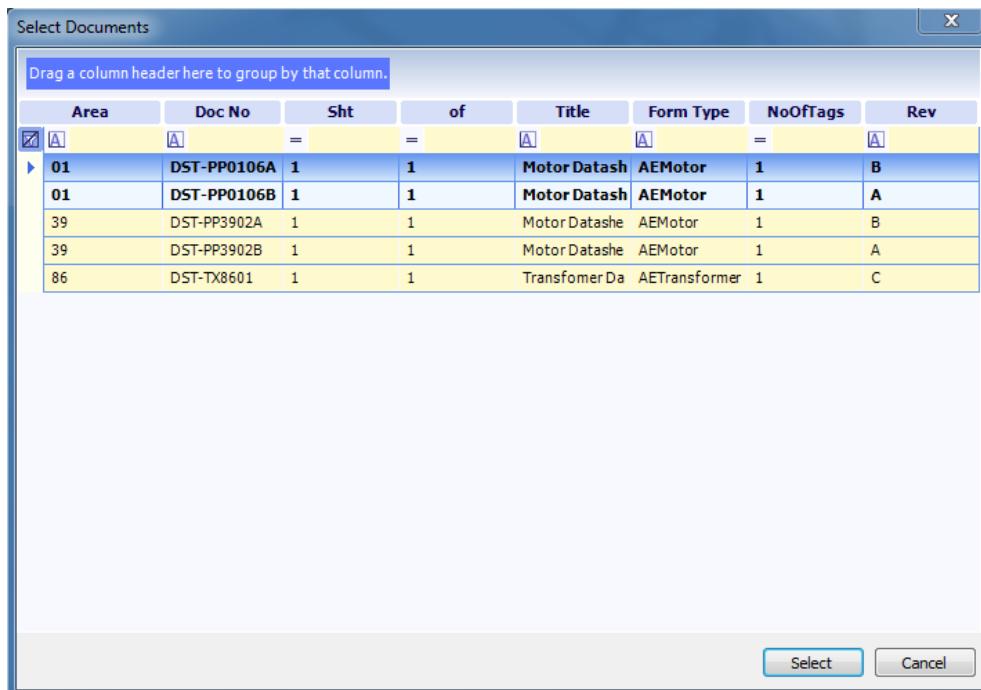
The Index Sheet is created automatically.

Click the **Create** button and this creates an **Index Sheet** using the Document Number and a Suffix name of Index.



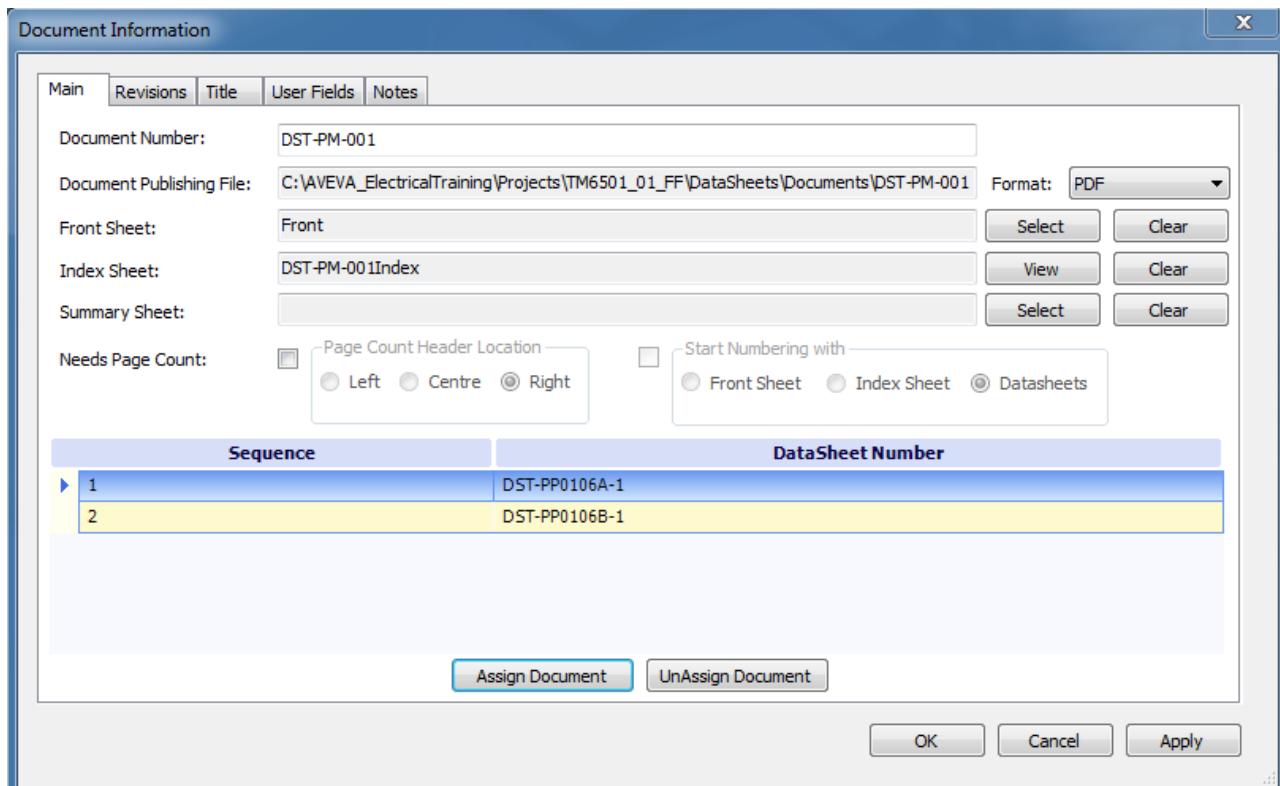
Click the **Assign DataSheet** button to assign Datasheets to this Document.

This opens the list of available Datasheets.



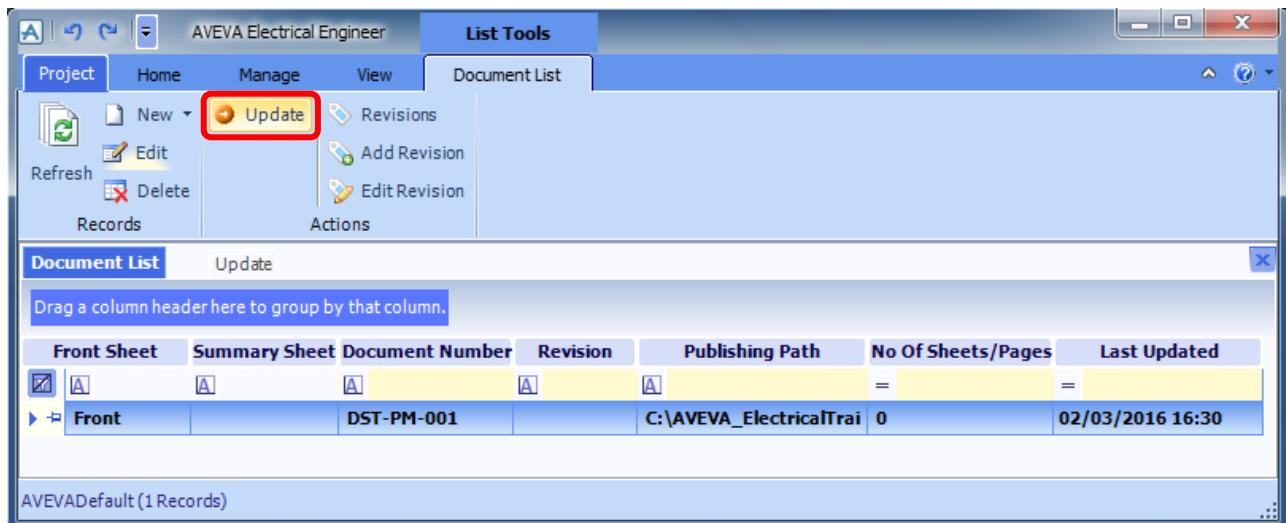
Select **PP0106A** and **PP0106B** datasheets and click the **Select** button.

The **Document Information** form should look like the window below.

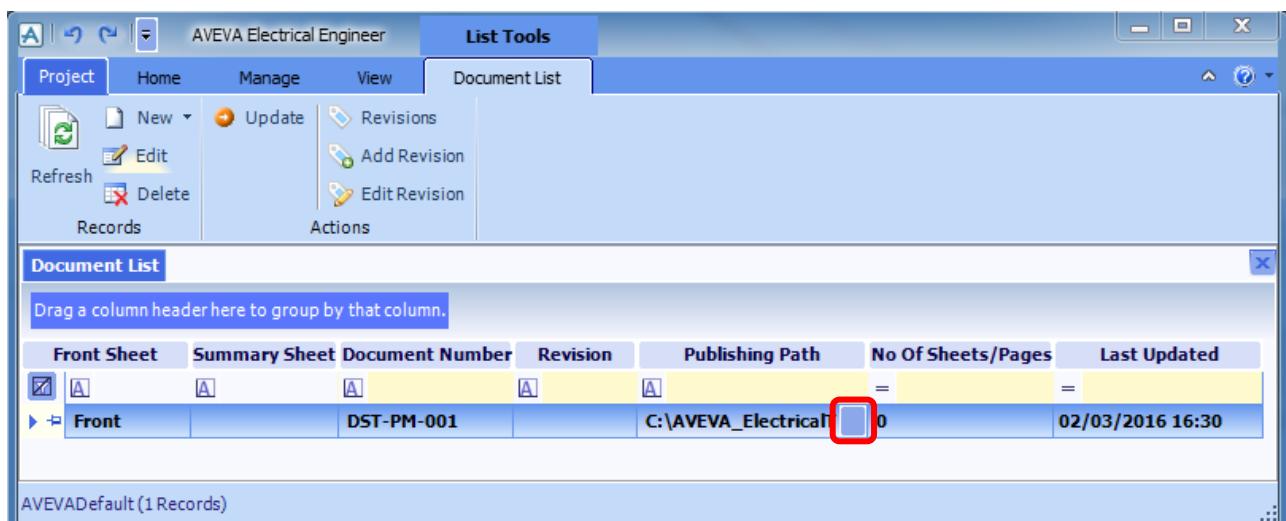


Click on the **OK** button to save the documents and close the form.

The document is listed on the **Document List** grid, from where it can be viewed, edited and published



To publish the document. Click on the **Update** button.

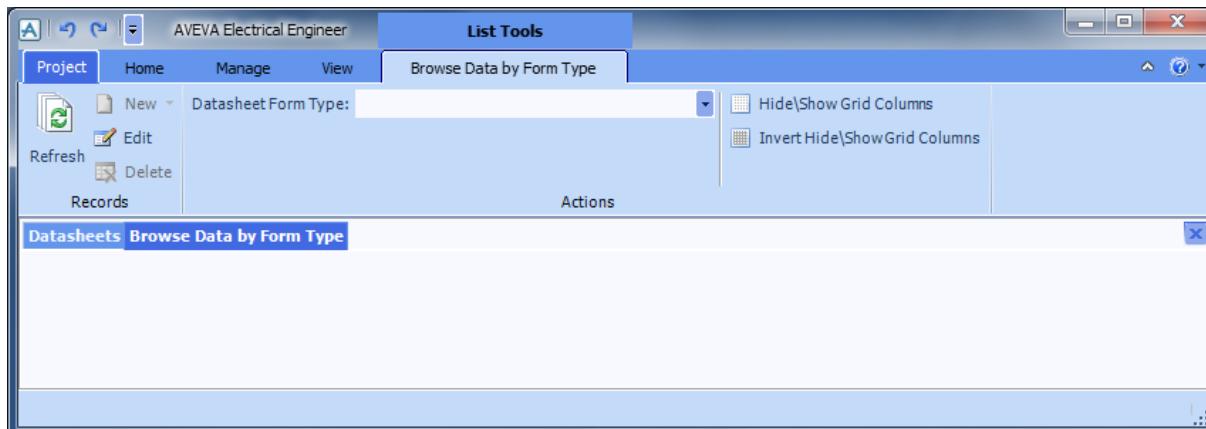


Once a document has been published, it may be opened by clicking on the button that is displayed in the Publishing Path field when the mouse cursor is hovered over it.

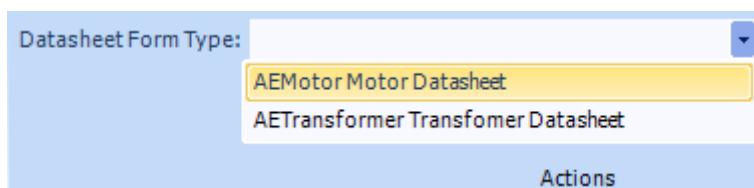
5.7 Browse Data by Form Type

Datasheets are defined by a specific Equipment type (Form Type) such as Motor, MCC, Transformer, etc. This Equipment type is used to automatically match equipment from the Loads/Supplies/Equipment Lists with the form type definition.

To filter for a **Datasheet form type**: Select **Home > Select > Browse Data by Form Type** (under Lists)



Click the **Datasheet Form Type** in the **Actions** section. Select **AEMotor Motor Datasheet** from the dropdown list



A list of Motor tags assigned to the datasheet form type is shown below. The grid shows the Datasheet List, Equipment attributes and Properties information. The user is encouraged to explore all of the Form Type Column.

Browse Data by Form Type									
Drag a column header here to group by that column.									
EquipmentNo	AreaPath	AreaNo	EquipmentType	DocNo	SHT	OtherDocNo	Page		
PP0106A	30	01	Motor	DST-PP0106A	1				
PP0106B	30	01	Motor	DST-PP0106B	1				
PP3902A	30	39	Motor	DST-PP3902A	1				
PP3902B	30	39	Motor	DST-PP3902B	1				

6 Reporting

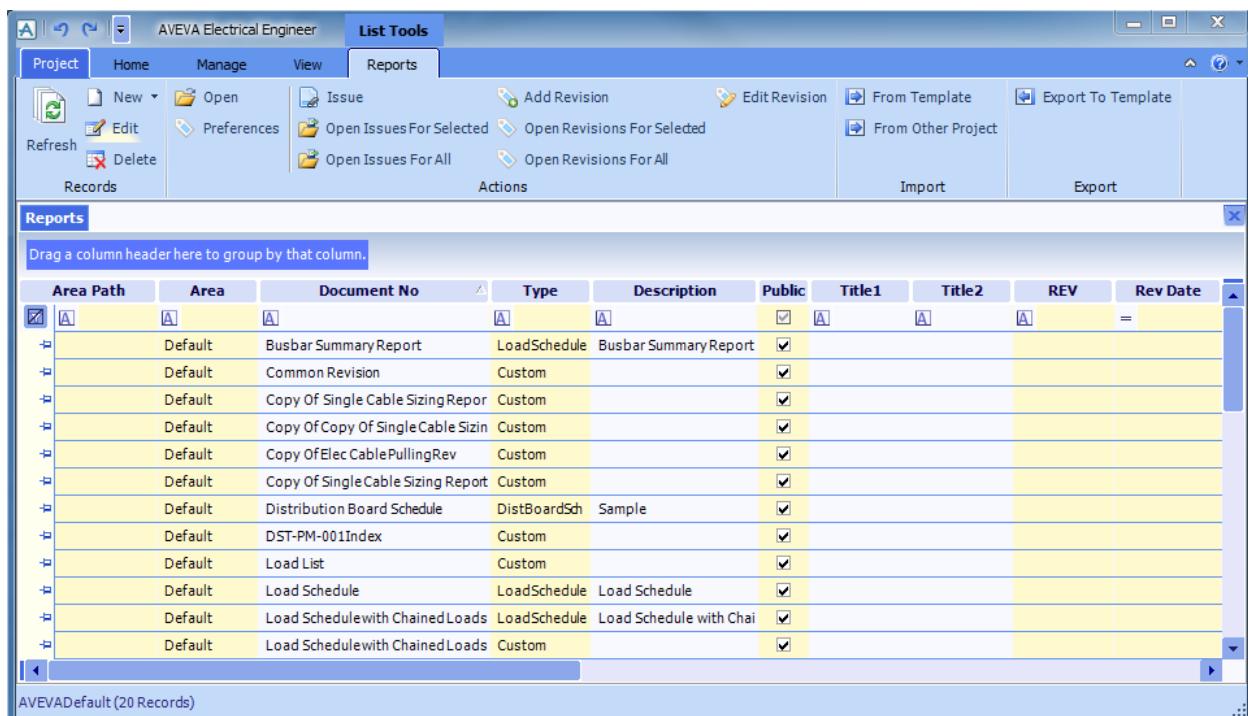
AVEVA Electrical has an in-built reporting tool called **Reports** that enables users to format report data which can be created and modified in various report types. The Report tool is available for creating reports within each AVEVA Electrical module. The tool offers various reports to facilitate the creation of specific types.

6.1 Report Types

AVEVA Electrical supports the following Report Types:

- **Basic Report:** This is used to create and modify user-created reports. The report data available for this reports limited to a specific Database source and its related source field in each module.
- **Fixed Report:** Displays the list of “fixed” non-user generated reports supplied with the AVEVA Instrumentation for the particular module.
- **Custom Report:** This provides the same facilities as the other two non-custom reports, as described previously, except that it gives the user access to every available database source across the entire application.

Open the **Reports** by selecting **Home > Select > Reports**, the reports grid will open.



The screenshot shows the AVEVA Electrical Engineer software interface. The top menu bar includes 'AVEVA Electrical Engineer' and 'List Tools'. Below the menu is a toolbar with icons for New, Open, Refresh, Edit, Delete, and various actions like Issue, Add Revision, Edit Revision, From Template, Export To Template, From Other Project, and Import/Export. The main window is titled 'Reports' and contains a grid of report records. The columns are labeled: Area Path, Area, Document No, Type, Description, Public, Title1, Title2, REV, and Rev Date. The grid shows 20 records, with the last record being 'AVEVADefault'. The interface is designed for managing and viewing multiple report types.

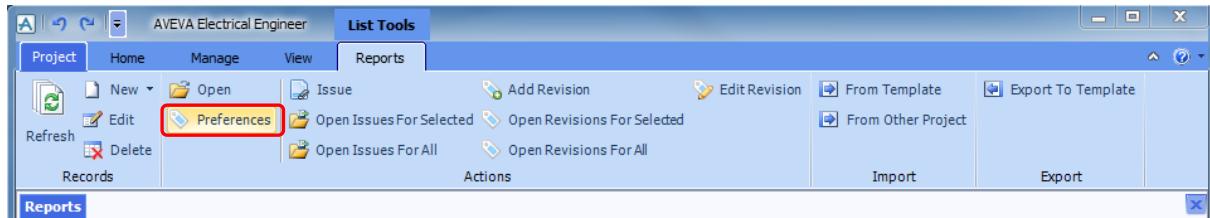
Area Path	Area	Document No	Type	Description	Public	Title1	Title2	REV	Rev Date
[A]	[A]	[A]	[A]	[A]	[A]	[A]	[A]	[A]	=
Default	Busbar Summary Report	LoadSchedule	Busbar Summary Report	<input checked="" type="checkbox"/>					
Default	Common Revision	Custom		<input checked="" type="checkbox"/>					
Default	Copy Of Single Cable Sizing Repor	Custom		<input checked="" type="checkbox"/>					
Default	Copy Of Copy Of Single Cable Sizin	Custom		<input checked="" type="checkbox"/>					
Default	Copy OfElec CablePullingRev	Custom		<input checked="" type="checkbox"/>					
Default	Copy Of Single Cable Sizing Report	Custom		<input checked="" type="checkbox"/>					
Default	Distribution Board Schedule	DistBoardSh	Sample	<input checked="" type="checkbox"/>					
Default	DST-PM-001Index	Custom		<input checked="" type="checkbox"/>					
Default	Load List	Custom		<input checked="" type="checkbox"/>					
Default	Load Schedule	LoadSchedule	Load Schedule	<input checked="" type="checkbox"/>					
Default	Load Schedulewith Chained Loads	LoadSchedule	Load Schedule with Chai	<input checked="" type="checkbox"/>					
Default	Load Schedulewith Chained Loads	Custom		<input checked="" type="checkbox"/>					

This shows multiple AVEVA Reports on the grid consisting of various Report Types. The user can run those reports by either Double clicking on the report record or Selecting a specific report and then click the **Open** button found in the **Actions** section on the **Reports** tab. This opens the Report view.

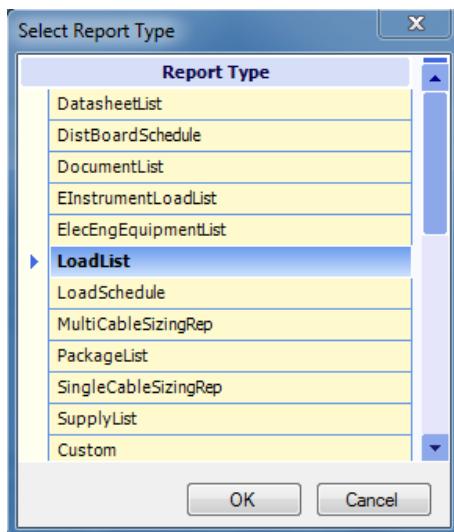
6.2 Preferences

Give the Home tab focus by clicking **Select > Reports** from the **Lists and Schedules** pane. This opens the **Reports** grid together with the contextual tab **Reports**.

The preference can be used to Configure each report type specific text characters and typeface and other to give the desired Font.

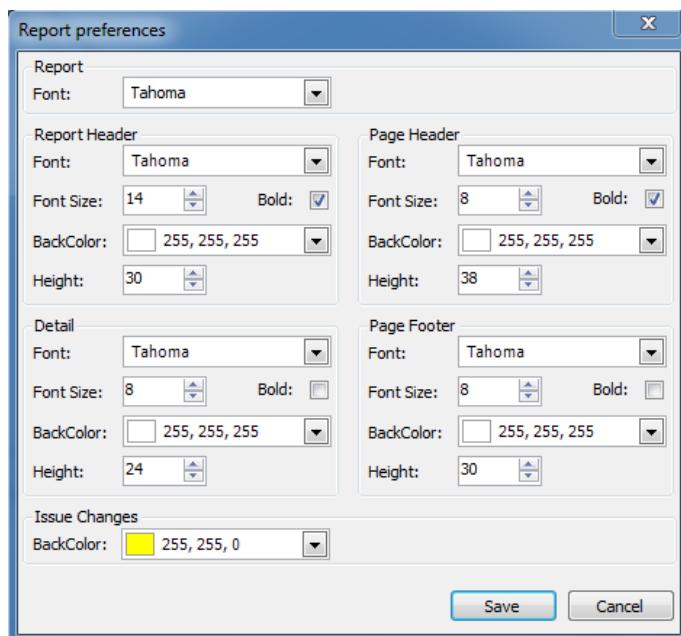


To open the report preference, select **Preferences** from the **Reports** contextual tab. This opens the **Report Type** list.



Select the **LoadList** and click the **OK** button.

This opens the **Report Preferences** window:



Click the **Save** button to close the window.

6.3 Create a New Report (Worked Example)

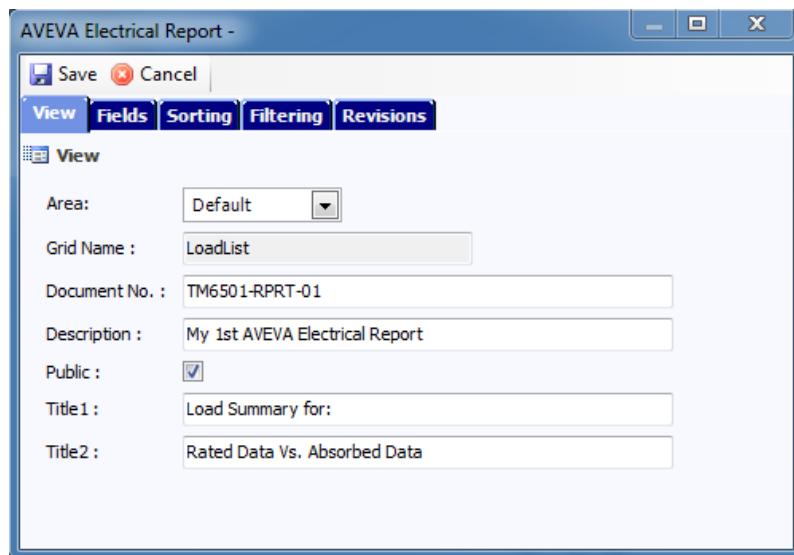
Click the **New** button from the menu to create a new report. This opens the **Report Type** list.

Select the **LoadList** and click the **OK** button

This opens the AVEVA Instrumentation Report form with five tabs: **View**, **Fields**, **Sorting**, **Filtering** and **Revisions**.

On the **View** tab, enter the following details:

Area dropdown list:	Default
Document No:	TM6501-RPRT-01
Description:	My 1st AVEVA Electrical Report
Public:	Place a check mark in the check box.
Title 1:	Load Summary for:
Title 2:	Rated Data Vs. Absorbed Data



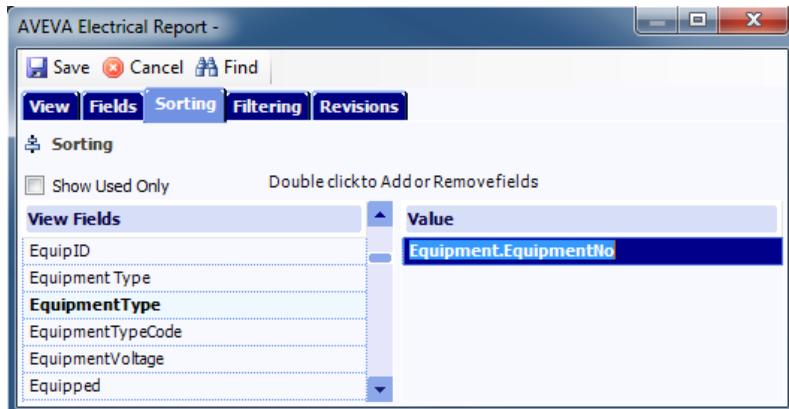
Select the **Fields** tab and check the required field name check boxes from the **Select** column.

Select the following **Field names**:

Table (Source)	Field Name	Caption
vwEquipAndElecParent	EquipNoWithElecParent	Supply
Equipment	EquipmentNo	EquipmentNo
Equipment	Description	Description
Equipment	ElecVolts	Volts
Equipment	ElecNoOfPhases	NoOfPhases
Equipment	ElecRatedFrequency	Frequency
Equipment	FullLoadCurrent	Full Load Current
Equipment	ElecRatedPFactor	Rated Power Factor
Equipment	ElecRatedkW	Nameplate Power
Equipment	ElecRatedCurrent	RatedFLC
Equipment	ElecRatedKVA	Rated Load
ElecLoads	Pfactor	Pfactor
ElecLoads	ElectricalPower	Electrical Power
ElecLoads	Efficiency	Efficiency

(i) The user must make sure to follow a sequence while selecting the field names.

Select the **Sorting** tab; firstly by double clicking on the field names already in the **Value** column, remove all field names from here and select the following fields under the **View Fields** column to sort the grid view:



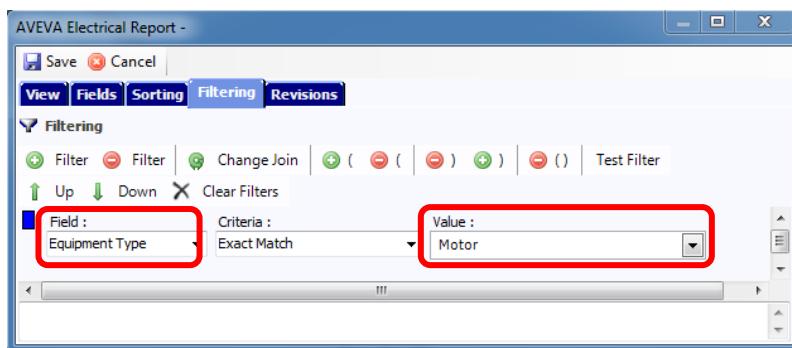
Select the following **Value**:

- **EquipmentNo**

The Value list should look as shown on the left.

i Double click to Add or Remove Fields from the View Fields column.

If the user selects the **Filtering** tab, the user can filter by specific equipment type by selecting **EquipmentType** from the **Field:** pick list and the type of equipment from the **Value** pick list:

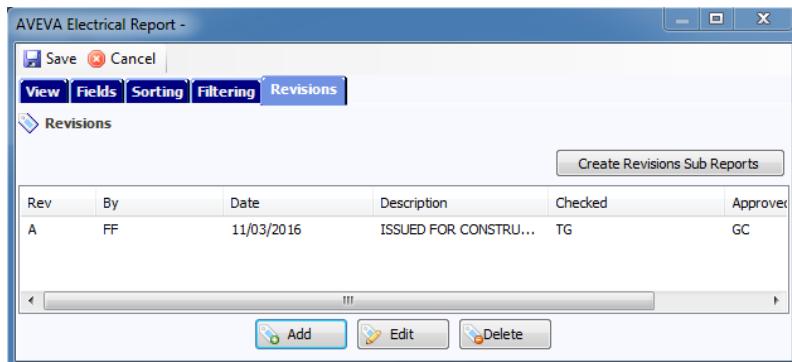


Ignore this tab.

Select the **Revisions** tab and click the **Add** button to enter a new revision entry to the report.

Enter the details as per the **Revision Entry** form (left) and click the **Save** button.

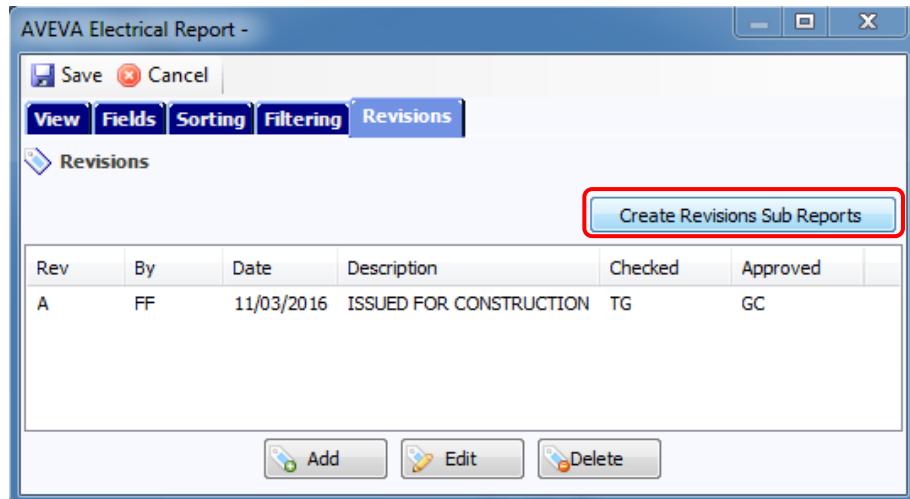
The updated AVEVA Instrumentation Report form will appear as shown below:



Click the **Save** button.

Reopen the Report: Select the Report and click the **Edit** button on the menu on **Reports** tab.

Select the **Revisions** tab and click the **Create Revisions Sub Report** button on the form to create a sub report of the revision history.



Click the **Yes** to save all current changes.

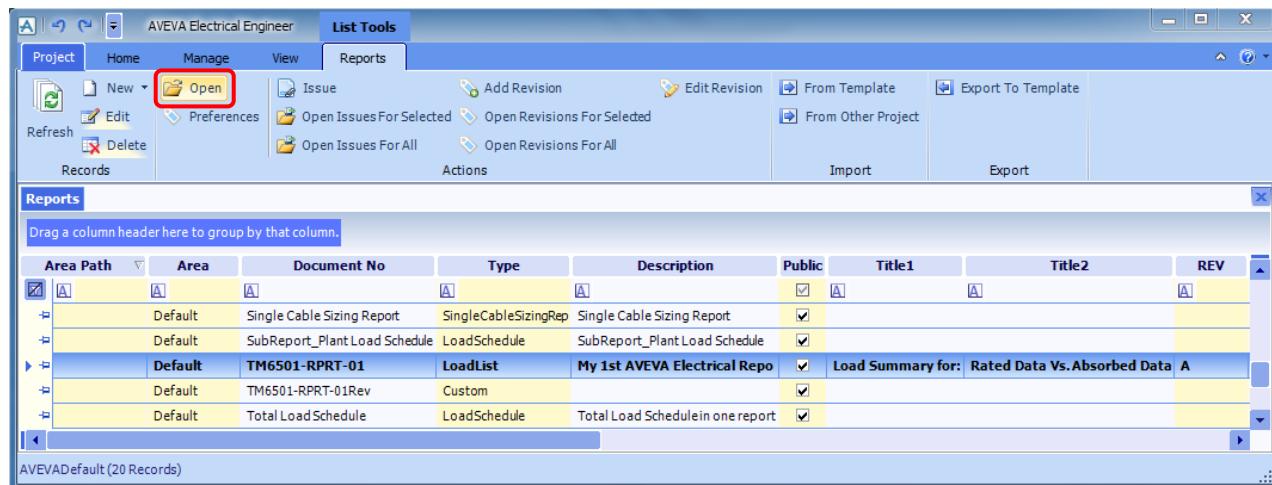
The user can view the revision history in a sub-report by clicking **View Revisions Sub Reports** to display the **Custom Report** window.

Click the **Save** button to save and exit the **Report** form.

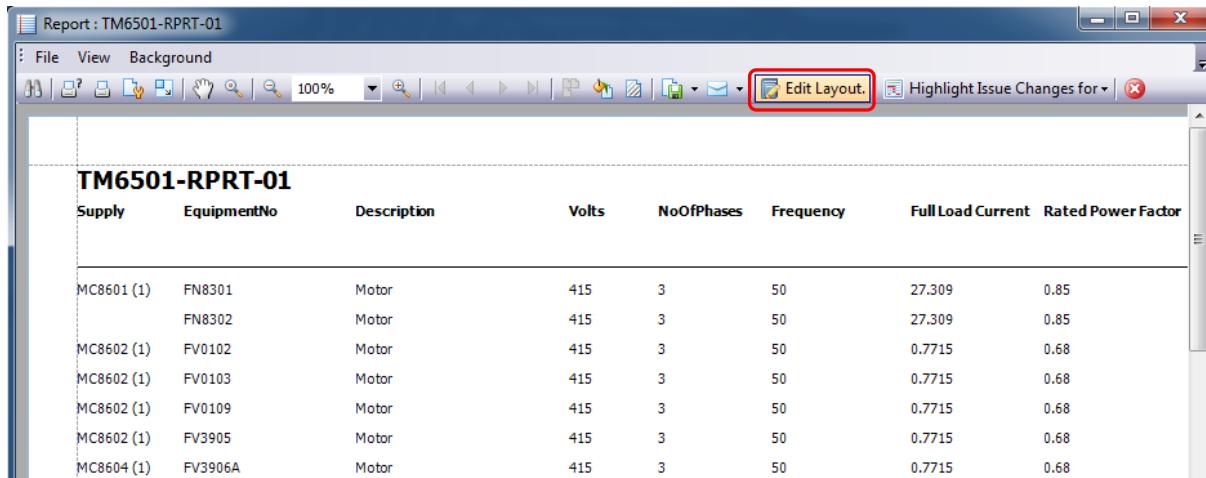
6.4 Format the Report

Once the basic report is generated with the selected fields, the report can be formatted to give a more pleasing result. A cover page can be created, the data can be grouped by group field, and calculation fields can be inserted into the report to give results based on data in the report. There are many tools and options open to the user to create some stylish looking reports.

Select the **TM6501-RPRT-01** Report Document and click the **Open** button in the Reports Tab



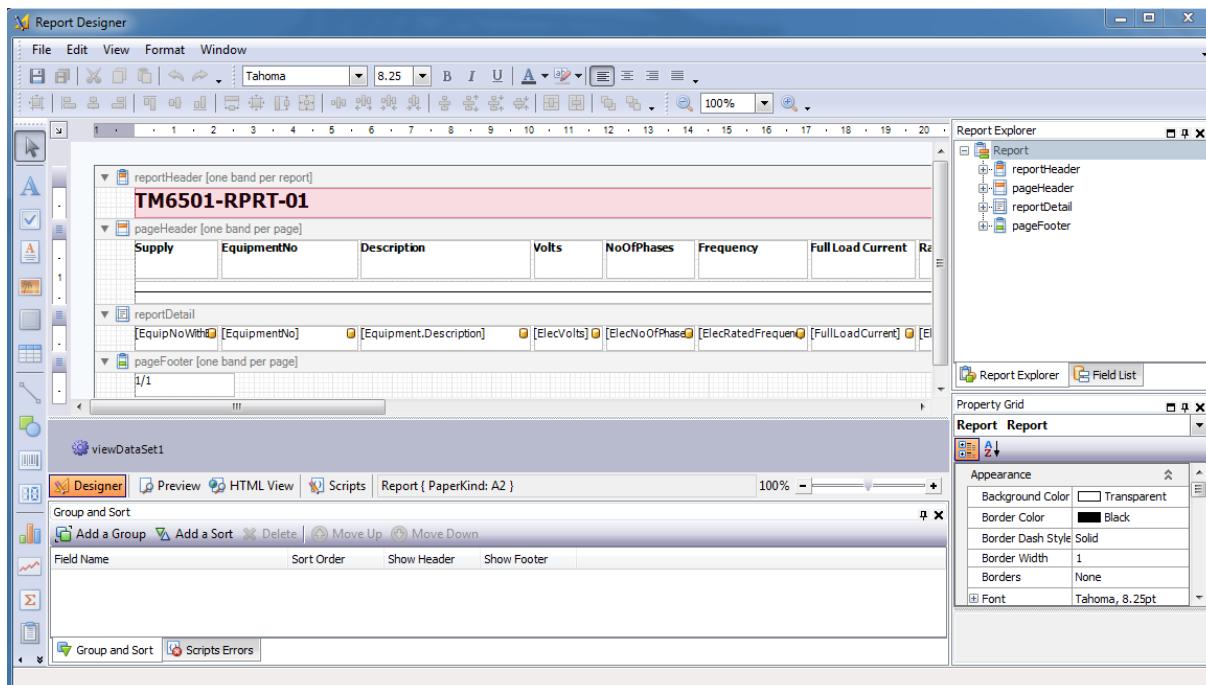
The Report **TM6501-RPRT-01** is generated and displayed:



A screenshot of the AVEVA Electrical Report Manager window. The title bar says "Report : TM6501-RPRT-01". The toolbar includes standard file operations like File, View, Background, and a "Edit Layout" button which is highlighted with a red box. Below the toolbar is a search bar and a zoom level of 100%. The main area displays a table titled "TM6501-RPRT-01" with columns: Supply, EquipmentNo, Description, Volts, NoOfPhases, Frequency, Full Load Current, and Rated Power Factor. The table contains 8 rows of data, all related to different types of motors.

Supply	EquipmentNo	Description	Volts	NoOfPhases	Frequency	Full Load Current	Rated Power Factor
MC8601 (1)	FN8301	Motor	415	3	50	27.309	0.85
	FN8302	Motor	415	3	50	27.309	0.85
MC8602 (1)	FV0102	Motor	415	3	50	0.7715	0.68
MC8602 (1)	FV0103	Motor	415	3	50	0.7715	0.68
MC8602 (1)	FV0109	Motor	415	3	50	0.7715	0.68
MC8602 (1)	FV3905	Motor	415	3	50	0.7715	0.68
MC8604 (1)	FV3906A	Motor	415	3	50	0.7715	0.68

To open the report editor, with the report manager open select the **Edit Layout** button. The **Report Designer** window opens (a partial view is shown below):



The report that is generated is separated into four different sections called bands:

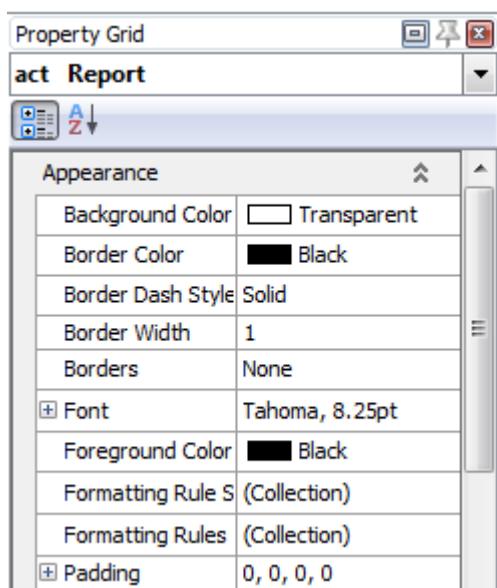
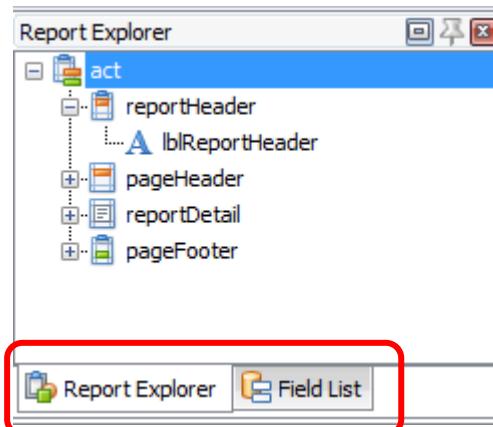
- **Report Header:**
 - The Report Header contains only one band per report. It is this band that is going to be edited to create a cover page for the report that is going to be created using this training guide.
- **Page Header:**
 - The page header contains one band per page at the top of the report. For the report that is going to be created using this training guide, this band will be used to hold the column headings for the report.
- **Report Detail:**
 - This band holds the details of the report, which is generated from the fields that have been selected for use in the report.

- **Report Footer:**

- The page footer contains one band per page at the bottom of the report. Typically page numbers and the like are placed in this band.

Missing from the list above are **Groups** and **Page Breaks**. These will be demonstrated later on in this guide.

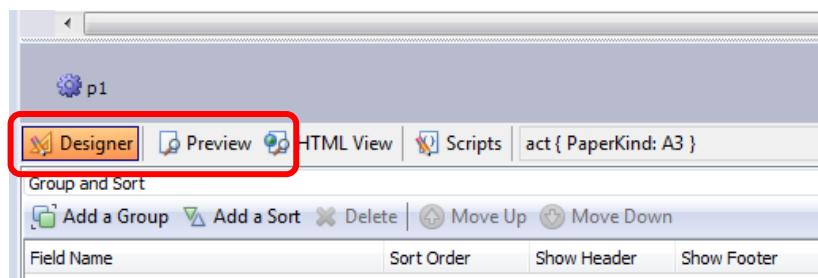
Top right of **Report Designer** window is a window that will display a **Report Explorer** or a **Field List** subject to which tab is selected.



Below the **Report Explorer / Field List** window is a **Property Grid** window. This will display the properties of the items selected in the **Report Explorer** window (not the Field List window).

Here the user can alter the properties of any item that is contained in the report.

The user is encouraged to explore the Explorer and Field List windows and view the associated properties. While the report is being formatted, the user can check the progress and select the **Preview** button bottom left of the **Report Designer** to view the result of proposed changes to the report.

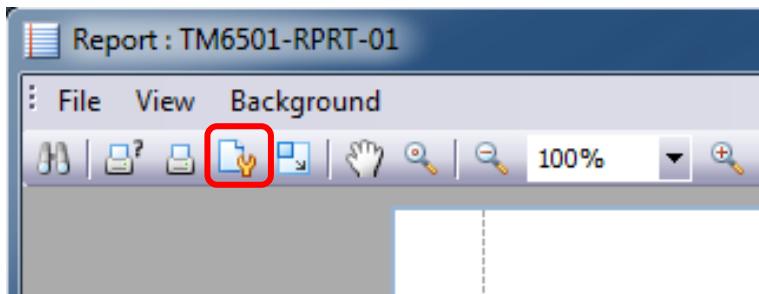


The user can switch back and forth between the **Report Designer** and a preview of the report by selecting either the **Designer** button or the **Preview** button.

- ⓘ The user is encouraged to explore the report designer and hover the mouse cursor over some of the buttons to see what functions they perform.

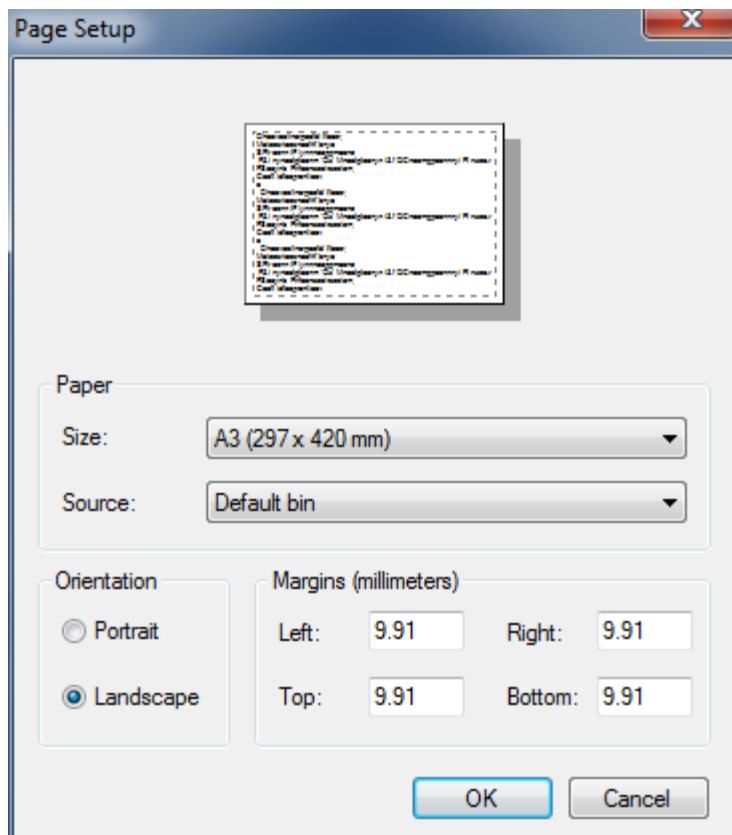
6.4.1 Page Setup (Worked Example)

The amount of data that is going to be placed on this report is not really suitable for an A4 piece of paper that is the default size. First set the paper size to A3 Landscape: If the **Report** window is open close it to reveal the Report Manager.



Select the **Page Setup** button on the **Report View**:

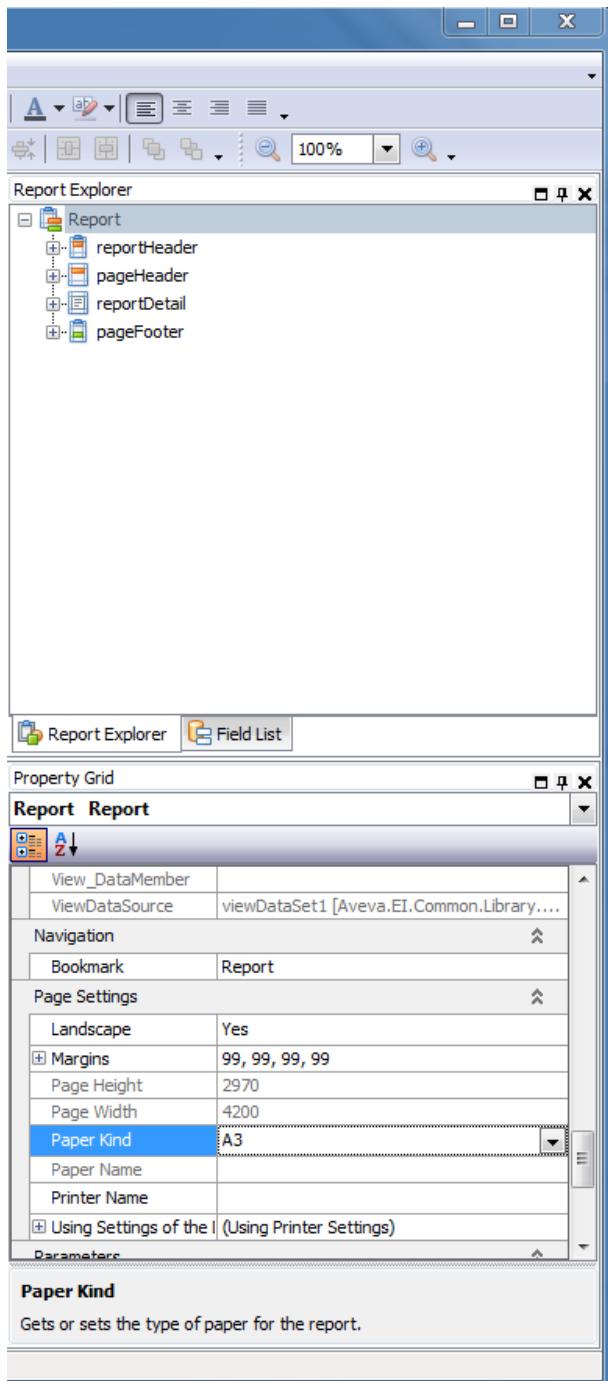
The **Page Setup** form is displayed:



Select **A3 (297 x 420mm)** from the pull down list and select the **Landscape** radio button. Select **OK**.

Select the **Edit Layout** button to open the **Report Designer** window.

In the **Report Manager** select **Report Explorer**.



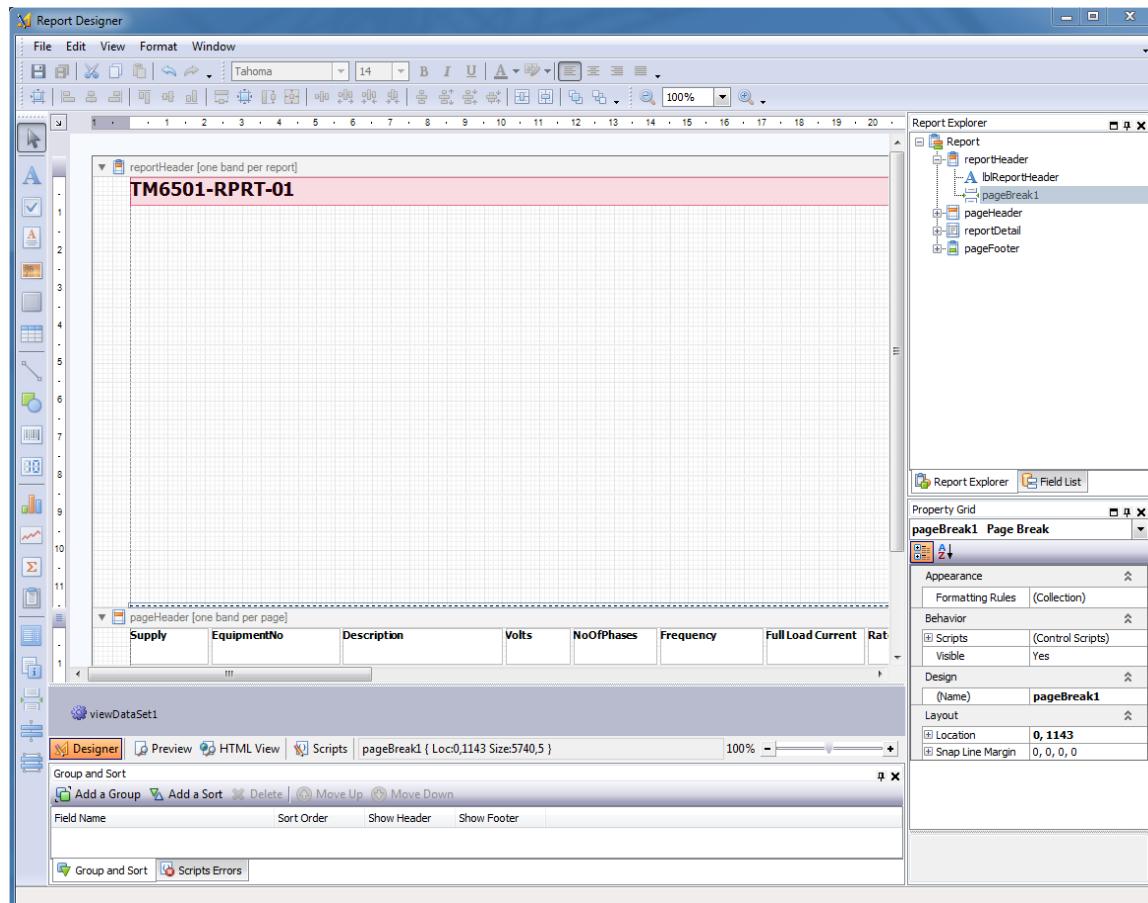
In the **Report Explorer** select **Report**.

In the **Property Grid** select **A3** from the **Paper Kind** pick list.

Save the report.

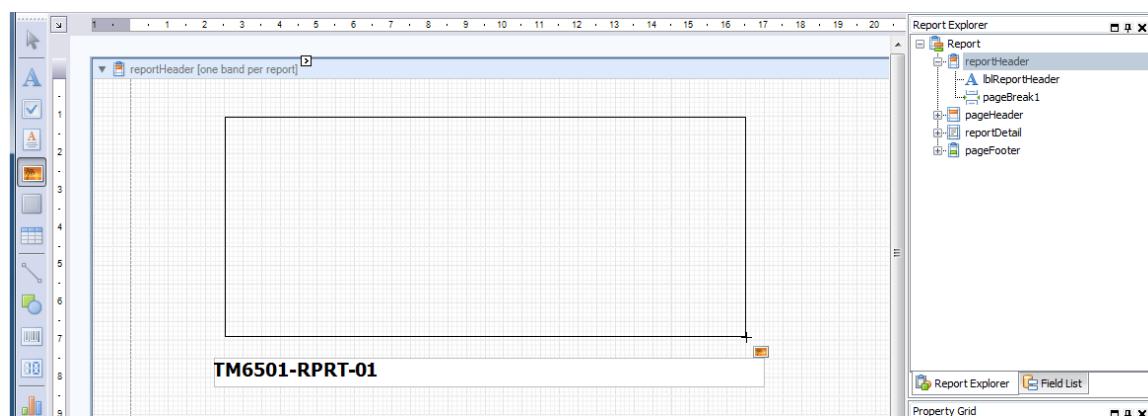
6.4.2 Create a Cover Sheet (Worked Example)

Continue in the **Report Designer** window and using the scroll bar on **report Header** section, drag to expand (using the mouse cursor) the height of the section and add a **page break** at the end of the section using the option from the toolbar on the left.



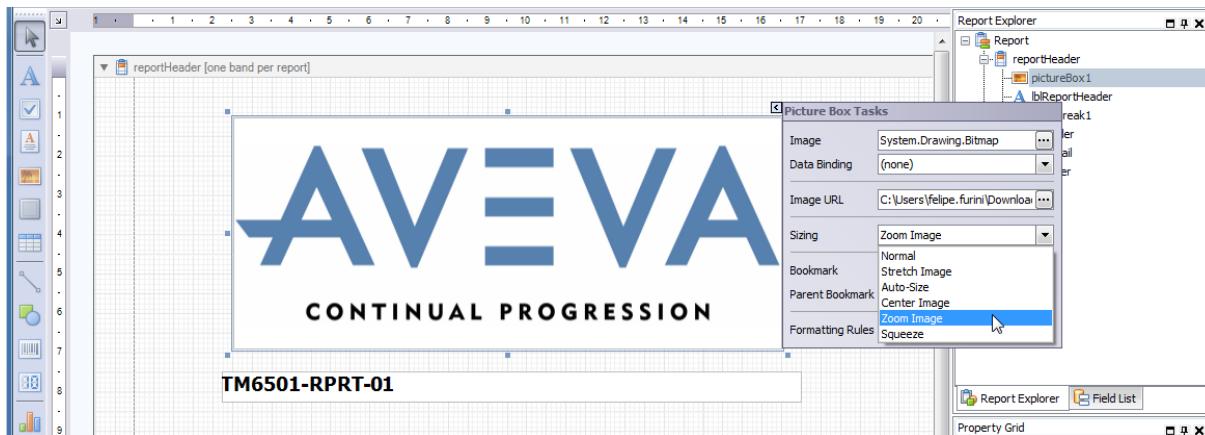
Select the **TM6501-RPRT-01** text label and using the mouse cursor drag it across to the centre (vertically) of the section or use the alignment options from the toolbar menu. Adjust the length of the label to fit inside the margin of the report.

Click the **Picture Box** button on the toolbar and insert it on the top of the section.

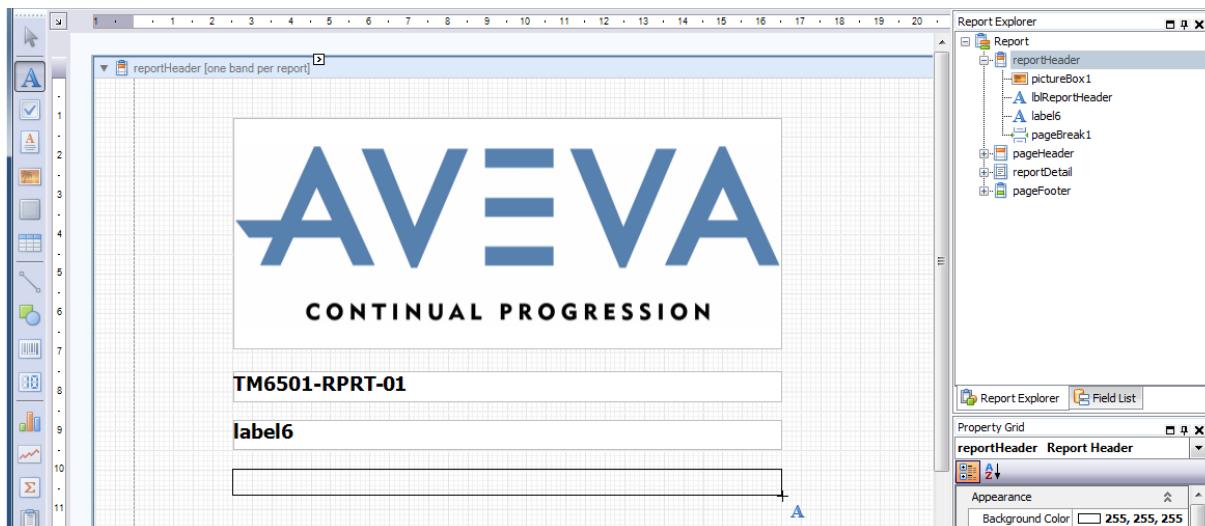


Click the **Picture Box** link button and click the browse button under **Image** for the **logo.bmp** file provided by the Trainer.

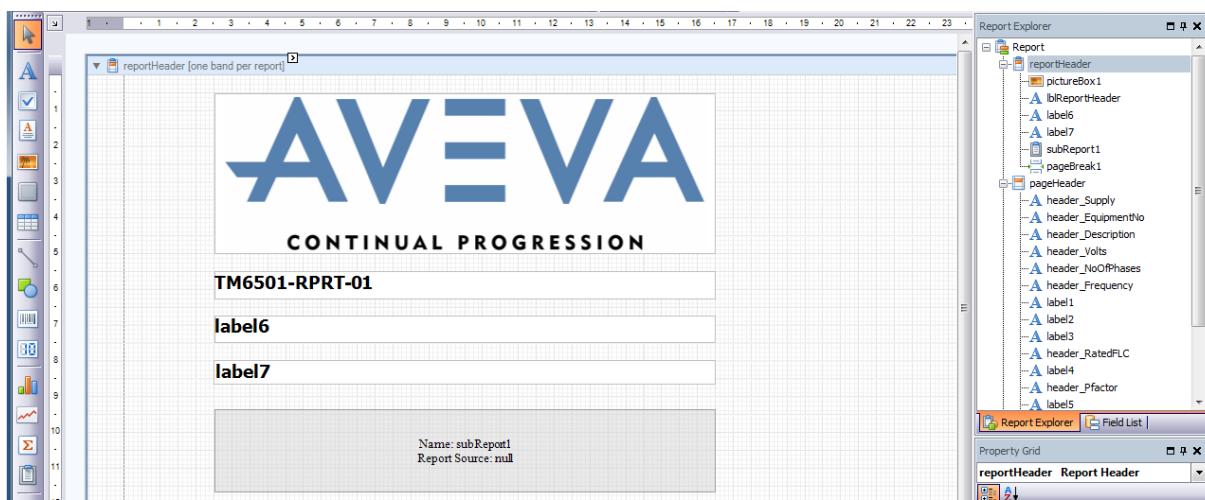
Select **Zoom Image** from the **Sizing** combo box:



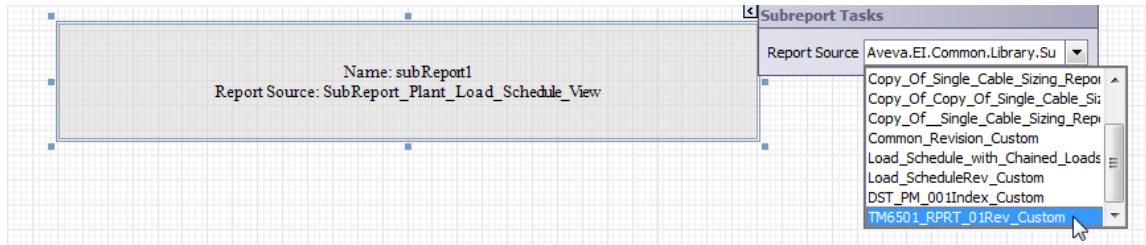
Adjust the width of **TM6501-RPRT-01** text label using the mouse cursor and arrange the text label below the image. Click the **Label** button on the toolbar menu (left) and add **two** text labels below **TM6501-RPRT-01**.



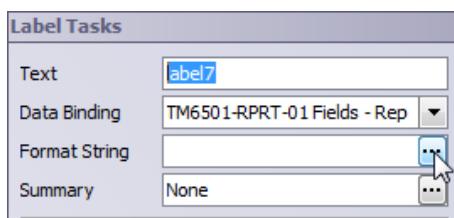
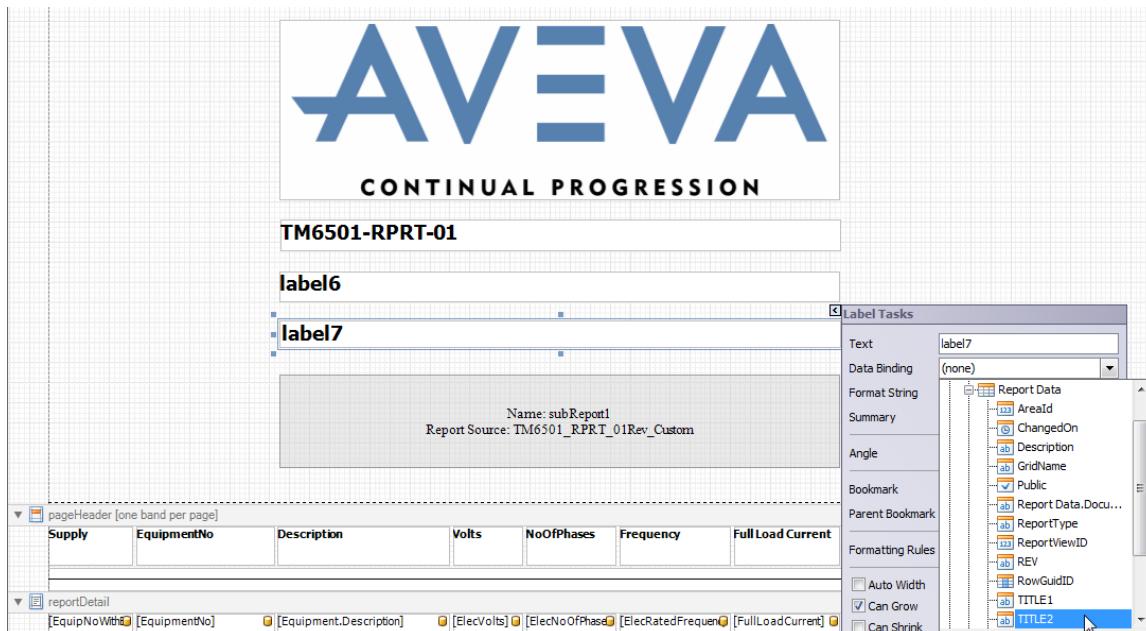
Click the **SubReport** option from the bottom of the toolbar menu (left) and insert it at the end of the section (below text **label7**).



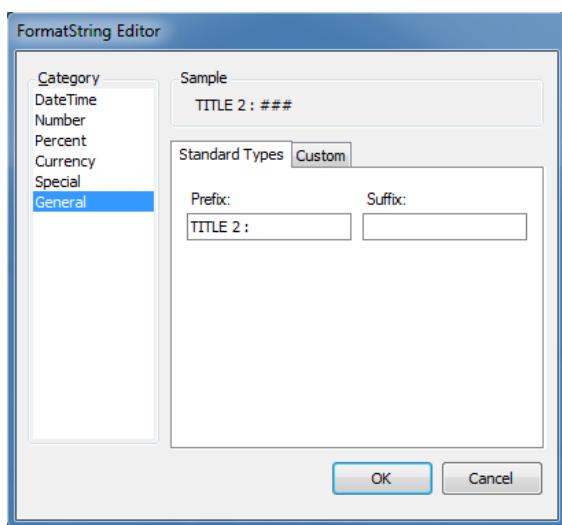
Click the **SubReport** link button  and select **TM6501_RPRT_01Rev_Custom** from **Report Source** combo box.



Click the link button  for text **label7** and from **Data Binding** combo box select **TITLE2** under **Report Data**.



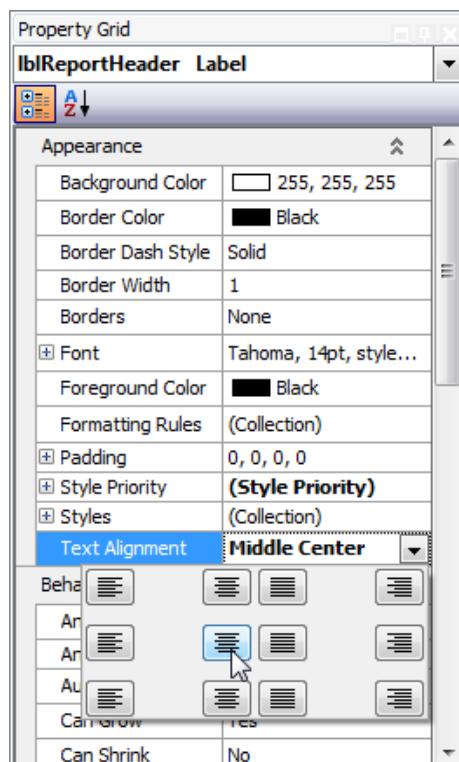
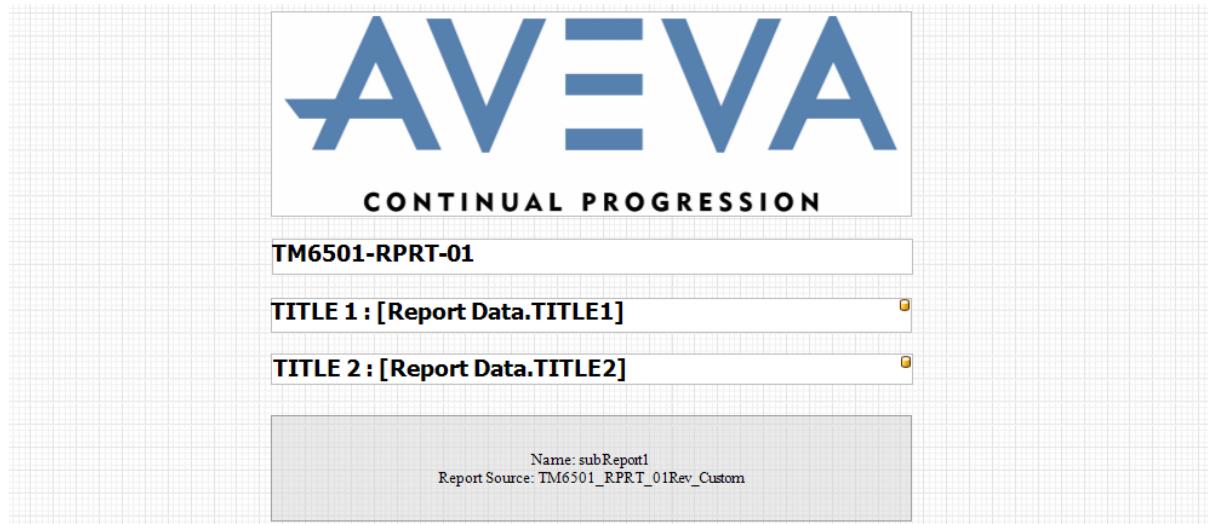
To include a text in the label, from **Format String** combo box click on the  Button



In the **Standard Types** tab type from the General Category type **TITLE 2:** in the Prefix field.

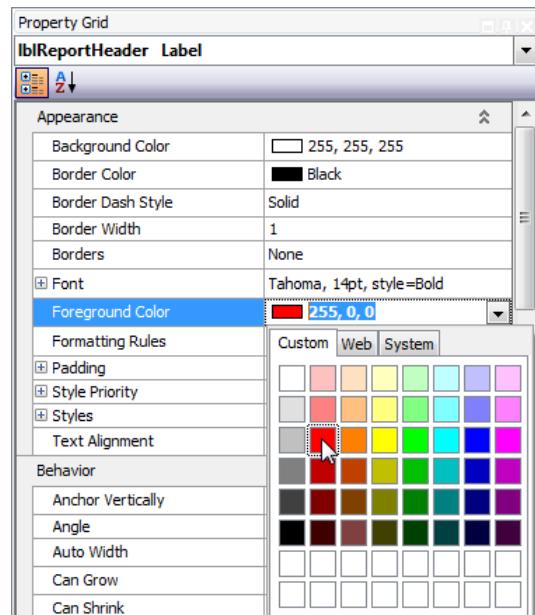
Click **OK**

Similarly, select text **label6** and change the **Data Binding** and **Format String** as shown below:

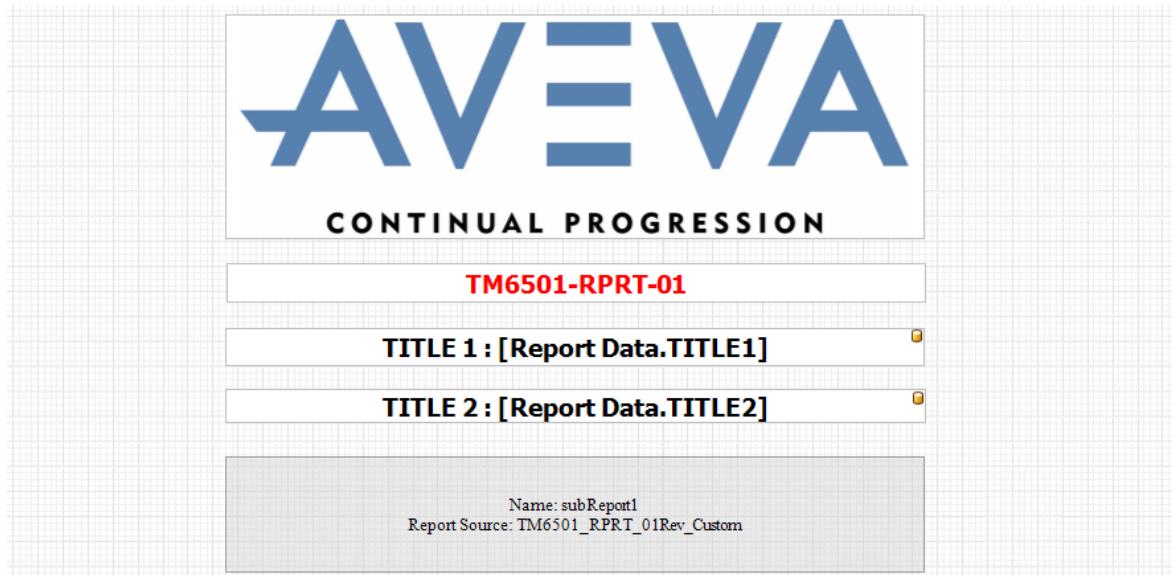


Select the **TM6501-RPRT-01** text label and change the text alignment from **Top Left** to **Middle Centre** under the section **Appearance** in the **Properties** form.

Change the colour of text label **TM6501-RPRT-01** from **Black** to **Red** from the option under **Foreground Color**.



Change the text alignment for **TITLE1** and **TITLE2** to **Middle Centre**.



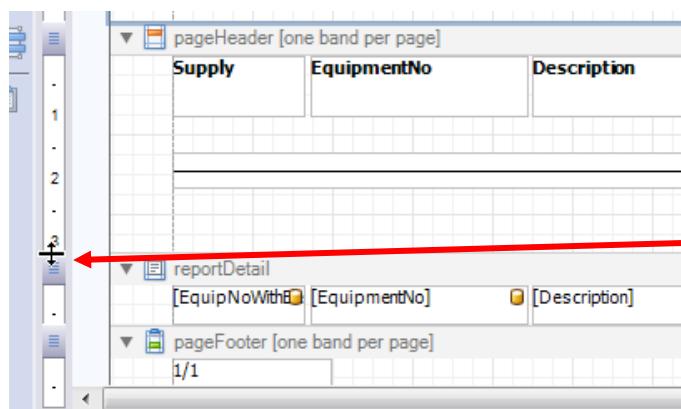
Click the **Preview** button to generate and view the report **TM6501-RPRT-01** and use the scroll bar to view the pages of the report.

Select **Save** button and then select the **Designer** button to return the **Report Designer**.

6.4.3 Edit Column Headers (Worked Example)

The report that was created, created column headers using label controls. Tables can also be used to create column headers.

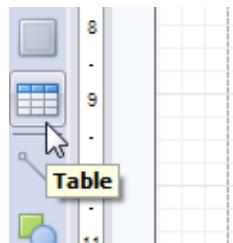
Return to the **Report Designer** and lengthen the **page Header** band slightly:



This is achieved using the same method that was used to lengthen the **reportHeader** by dragging the slider that marks the bottom of the **pageHeader**.

Delete the existing label controls by selecting the first control on the far left and press the **Delete** on the computer keyboard repeatedly until all of the headers have been deleted.

Next, move the **Line** control to the bottom of the **pageHeader** by selecting it and dragging it to the bottom.



The column headers are going to be created using tables. To insert a table, select the **Table** button, and then draw a rectangle in the **pageHeader** starting with the top left corner and finishing with bottom right corner:

i A table can also be dragged directly onto the graphics area from the tool bar.

A table with one row and three columns is created:

The screenshot shows the AVEVA Electrical interface with a table component. The table has one row and three columns. The columns are labeled 'tableCell1', 'tableCell2', and 'tableCell3'. Below the table, there is a 'reportDetail' section containing several data fields.

In the left hand column replace the text **tableCell1** with **Supplied By:**, the text **tableCell2** in the middle column with the **Tag No:** and the text **tableCell3** in the right hand column with **Description:**.

The screenshot shows the AVEVA Electrical interface with the table updated. The left column now contains the text 'Supplied By:', the middle column contains 'Tag No:', and the right column contains 'Description:'. The 'reportDetail' section below remains the same.

Justify the text **Middle Centre** (as performed earlier in this guide with the cover sheet) in each column.

- i* Multiple cells can be selected with the combination of the left mouse button and the **ctrl** key on the computer keyboard and text formatting can be applied to multiple cells simultaneously.

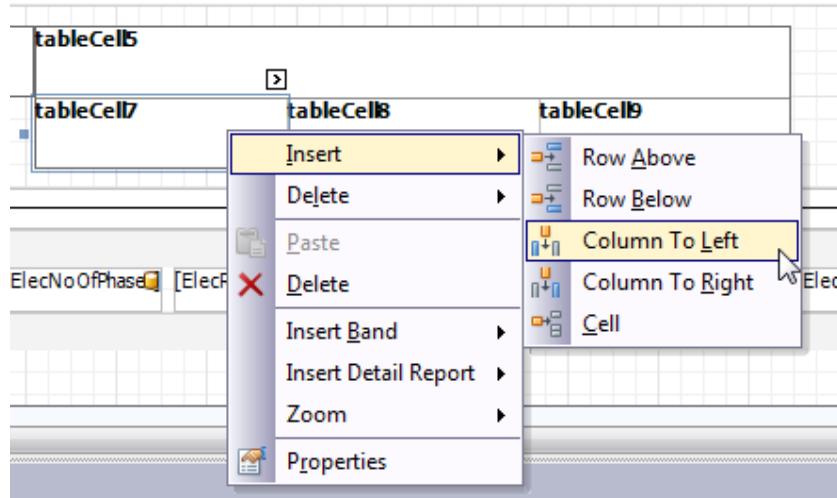
Insert another table and align it with the first table inserted. Select each table in turn, and using the **Properties Grid** set the height to **100**.

The screenshot shows the AVEVA Electrical interface with the Properties Grid open for 'tableRow2'. In the 'Layout' section, the 'Height' field is set to '100'. Below the Properties Grid, there is a table with three columns labeled 'tableCell5', 'tableCell7', 'tableCell8', and 'tableCell9'.

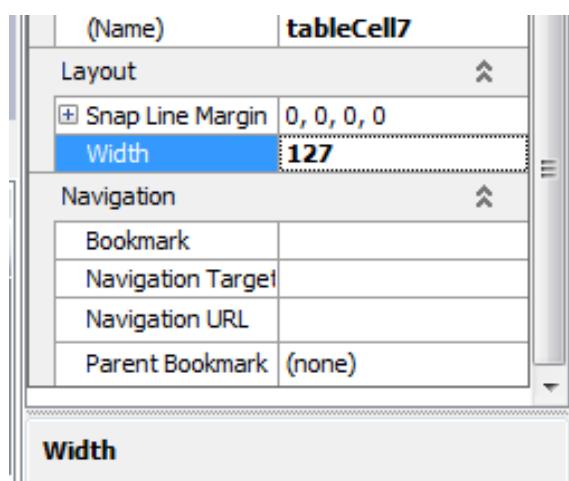
Right Mouse button click on the new table and select **Insert > Row Below**.

In the top Row delete two of the cells.

Another five cells are required on the bottom row. To create additional columns, right mouse button click in a cell and then select **Insert > Column To Left**.



This effectively halves the size of the cell that is used to add a column.



When finished, select the eight cells using a combination of the left mouse button and the ctrl key on the computer keyboard, and set their width to 127 using the **Properties Grid**.

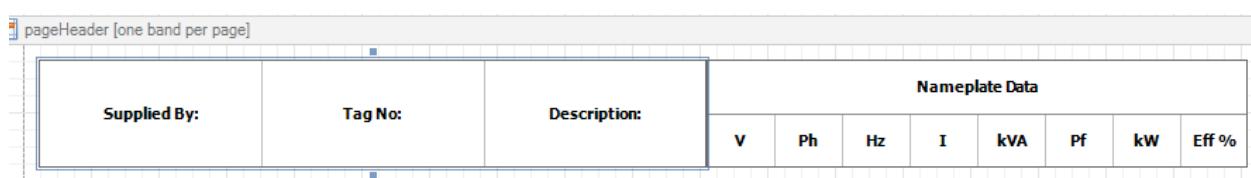
Set the text alignment to **Middle Centre** for all cells.

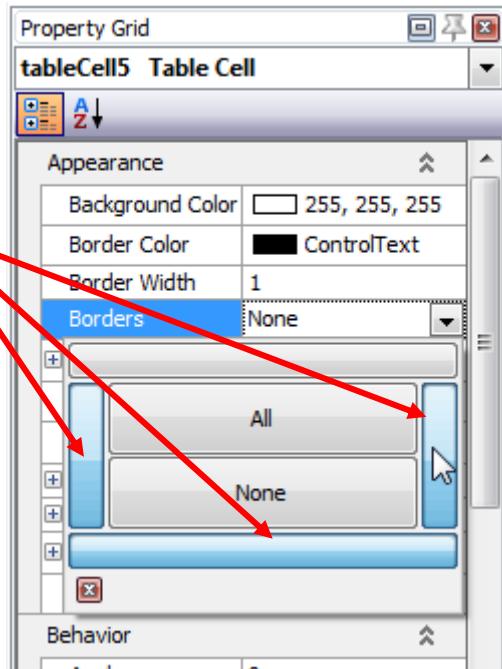
Delete the additional cells from the top row that were created when inserting columns.

Change labels in the cells to match the following image:

Nameplate Data							
V	Ph	Hz	I	kVA	Pf	kW	Eff %

The first table can now be stretched to match the combined height of the two row table next to it. Select the table, and then drag the bottom of the table to match the bottom of the two row table:





Select the top row (Nameplate Data) of the second table, then using the **Properties Grid** and a border to the bottom, left and right sides.

Add a border to the left side of the cell containing the text **V** and a border to the right side of the cell containing the text **Eff%**.

Save the report. To see the effect of adding the borders, select the **Preview** button (bottom left of the graphics area).

Here's the result:

Supplied By:	Tag No:	Description:	Nameplate Data							
			V	Ph	Hz	I	kVA	Pf	kW	Eff %

Exercise 14 – Create Column Headers for Absorbed Data

Using the Worked example above create a group column Header labelled **Absorbed Data** with the same sub headings as the **Nameplate Data** group.

Supplied By:	Tag No:	Description:	Nameplate Data								Absorbed Data							
			V	Ph	Hz	I	kVA	Pf	kW	Eff %	V	Ph	Hz	I	kVA	Pf	kW	Eff %

i When creating the borders, omit the borders on the left hand side of labels **Absorbed Data** and **V**.

Do not forget to **Save** the report.

6.4.4 Rearrange Database Fields (Worked Example)

Now that the column headers are completed, the next task is to align the database fields to the column headers and resize them to suit.

First adjust the width of column headers (pageHeader band) **Supplied By:** and **Tag No:** to **254** each using the **Properties Grid**.

Design	
(Name)	tableCell1
Layout	
+ Snap Line Margin	0, 0, 0, 0
Width	254
Navigation	
Bookmark	
Navigation Target	
Navigation URL	
Parent Bookmark	(none)

- ⓘ Fields that are already in the **reportDetail** band can be moved out to another area of the report to make room for manoeuvring and then moved back in again. Or they can be deleted from the report and then dragged back in again from the **Field List**.

Layout	
+ Location	
- Size	
Height	
Width	127
+ Snap Line Margin	0, 0, 0, 0
Navigation	
Bookmark	
Navigation Target	
Navigation URL	

Drag in the following additional fields (place them temporarily on the cover sheet):

ElecVolts, ElecNoOfPhases,
ElecRatedFrequency.

Give all of the field controls a width of 127 using the **Properties Grid**.

To align the Fields with the column headers, drag the fields and using the guide lines that appear line them up.

Exercise 15 – Align Fields and Headers

Align the Headers and Fields with each other in accordance with the following table:

i Field names can be identified by selecting the field and then viewing filed list tree.

Column Header:	Field Name
Supplied By:	EquipNoWithElecParent
Tag No:	EquipmentNo
Description:	Description:
Nameplate Data – V	ElecVolts
Nameplate Data – Ph	ElecNoOfPhases
Nameplate Data – Hz	ElecRatedFrequency
Nameplate Data – I	FullLoadCurrent
Nameplate Data – kVA	
Nameplate Data – Pf	ElecRatedPFactor
Name Plate Data - kW	ElecRatedkW
Nameplate Data – Eff %	
Absorbed Data – V	ElecVolts
Absorbed Data – Ph	ElecNoOfPhases
Absorbed Data – Hz	ElecRatedFrequency
Absorbed Data – I	ElecRatedCurrent
Absorbed Data - kVA	ElecRatedKVA
Absorbed Data – Pf	Pfactor
Absorbed Data - kW	ElectricalPower
Absorbed Data – Eff %	Efficiency

The user will notice that two field names have been left blank, these will be addressed in the next chapter.

The three views below illustrate how the **pageHeader** and **reportDetail** should now appear:

The figure consists of three vertically stacked screenshots from a software application. The top screenshot shows a table with three columns: 'Supplied By:', 'Tag No:', and 'Description:'. The middle screenshot shows a 'portDetail' section with a table containing the fields 'EquipNoWithElec' and 'EquipmentNo', and a list of fields including 'Description', 'ElecVolts', 'ElecNoOfPhases', 'ElecRatedFrequency', 'FullLoadCurrent', 'ElecRatedPFactor', 'ElecRatedkW', 'Pfactor', 'ElectricalPower', and 'Efficiency'. The bottom screenshot shows a table titled 'Nameplate Data' with columns labeled 'V', 'Ph', 'Hz', 'I', 'kVA', 'Pf', 'kW', and 'Eff %'. Below this table is a list of fields: 'ElecVolts', 'ElecNoOfPhases', 'ElecRatedFrequency', 'FullLoadCurrent', 'ElecRatedPFactor', and 'ElecRatedkW'.

Absorbed Data							
V	Ph	Hz	I	kVA	Pf	kW	Eff %
[ElecVol]	[ElecNo]	[ElecRa]	[ElecRat]	[ElecRat]	[Pfactor]	[Electric]	[Efficien]

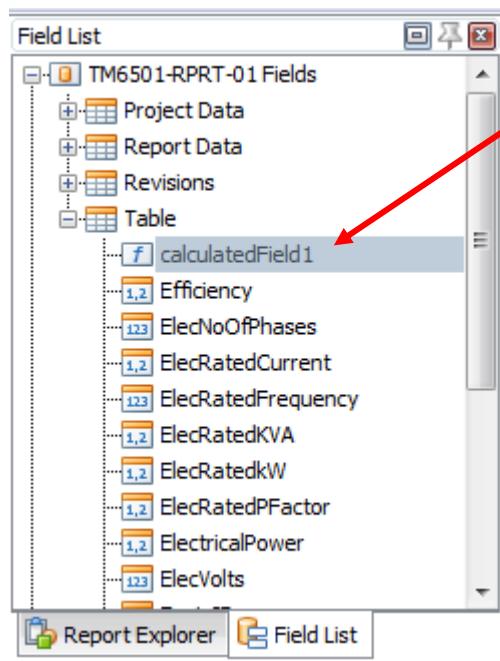
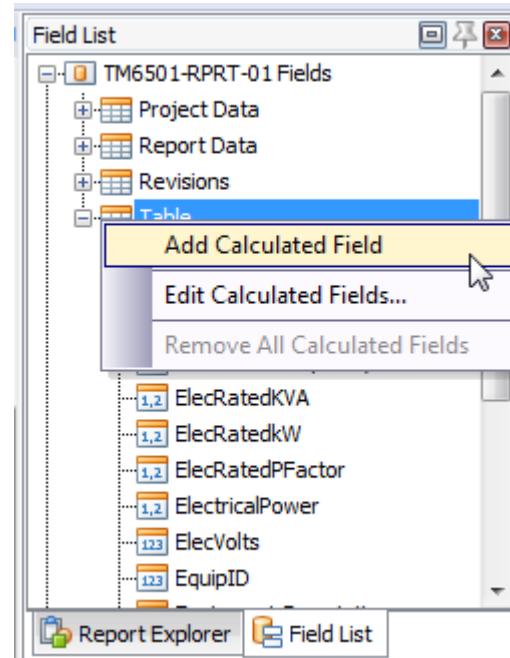
Select the **Preview** button to view how the report looks now. When finished, select the **Designer** button.

Supplied By:	Tag No.:	Description:	Name Plate Data							Absorbed Data								
			V	Ph	Hz	I	kVA	pF	kW	Eff %	V	Ph	Hz	I	kVA	pF	kW	Eff %
MC8601(1)	FN8301		415	3	50	24.84	0.84	15			415	3	50	27.6	19.841	0.84	16.67	90
	FN8302		415	3	50	24.84	0.84	15			415	3	50	27.6	19.841	0.84	16.67	90
MC8602(1)	FV0102		415	3	50	0.713	0.41	0.21			415	3	50	1.34	0.966	0.41	0.396	53
MC8602(1)	FV0103		415	3	50	0.713	0.41	0.21			415	3	50	1.34	0.966	0.41	0.396	53
MC8602(1)	FV0109		415	3	50	0.713	0.41	0.21			415	3	50	1.34	0.966	0.41	0.396	53
MC8602(1)	FV3905		415	3	50	0.713	0.41	0.21			415	3	50	1.34	0.966	0.41	0.396	53
MC8604(1)	FV3906A		415	3	50	0.713	0.41	0.21			415	3	50	1.34	0.966	0.41	0.396	53
	FV3906B		415	3	50	0.713	0.41	0.21			415	3	50	1.34	0.966	0.41	0.396	53
	FV3907		415	3	50	0.713	0.41	0.21			415	3	50	1.34	0.966	0.41	0.396	53
	FV3908		415	3	50	0.713	0.41	0.21			415	3	50	1.34	0.966	0.41	0.396	53
	FV3909		415	3	50	0.713	0.41	0.21			415	3	50	1.34	0.966	0.41	0.396	53
	MM0101		415	3	50	66.01	0.843	37			415	3	50	66.01	47.45	0.843	40	92.5
MCC 1(2)	Motor 1		415	3	50	14.14	0.845	7.5			415	3	50	14.14	10.167	0.845	8.59	87.3
MCC 1(2)	Motor 2		415	3	50	14.14	0.845	7.5			415	3	50	14.14	10.167	0.845	8.59	87.3
MCC 1(2)	Motor 3		415	3	50	33.72	0.85	18.5			415	3	50	33.72	24.237	0.85	20.6	89.8

6.4.5 Calculated Fields (Worked Example)

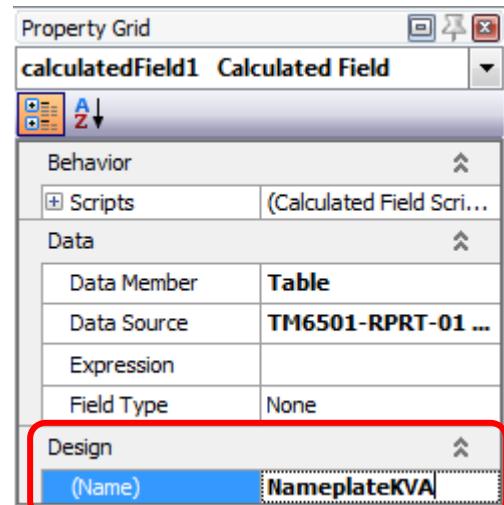
The user can add calculated fields to display values that aren't readily available from the Field List or the database for that matter.

To add a calculated field, right click on **Table** in the **Field List** window and select **Add Calculated Field**.



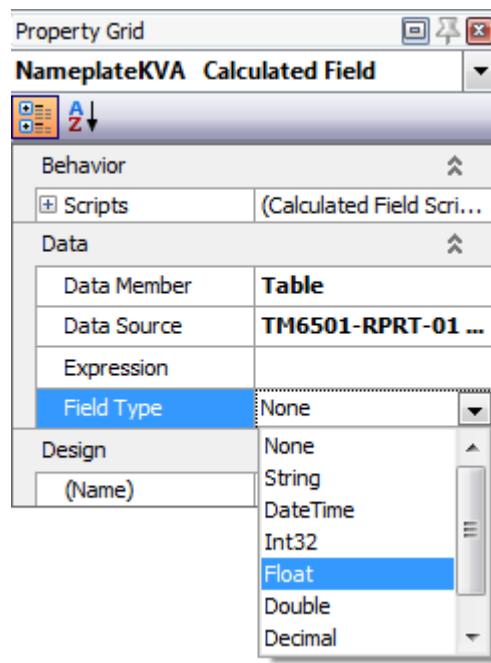
This will add a calculated field to the table.

To change the name of the calculated field use the **Properties Grid**:

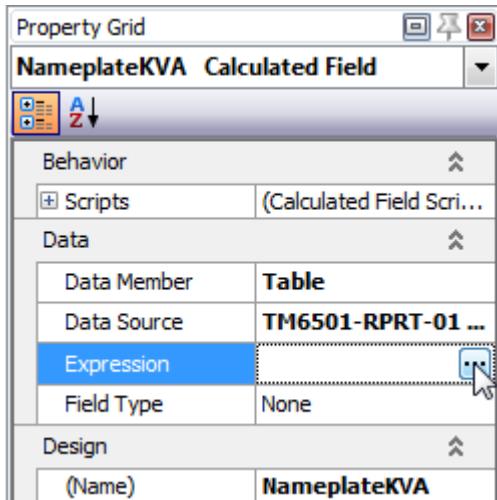


Rename the calculated field just created to **NameplateKVA**.

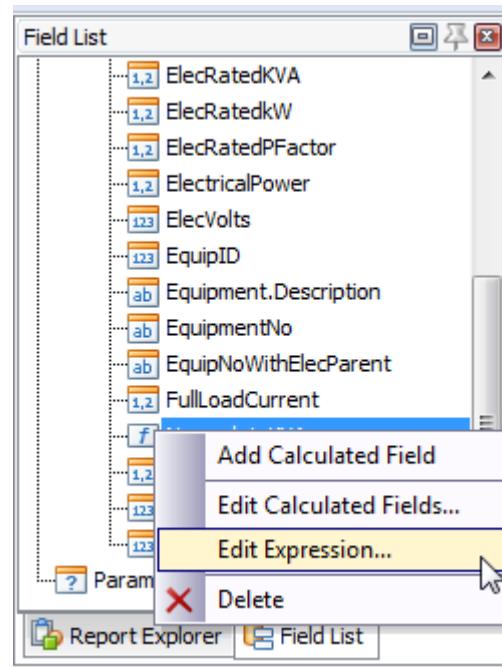
Set the **Field Type** property to **Float**. This is selectable from a pick list.



Calculated fields require **Expressions** to calculate values from. The expression editor can be accessed using one of two methods:



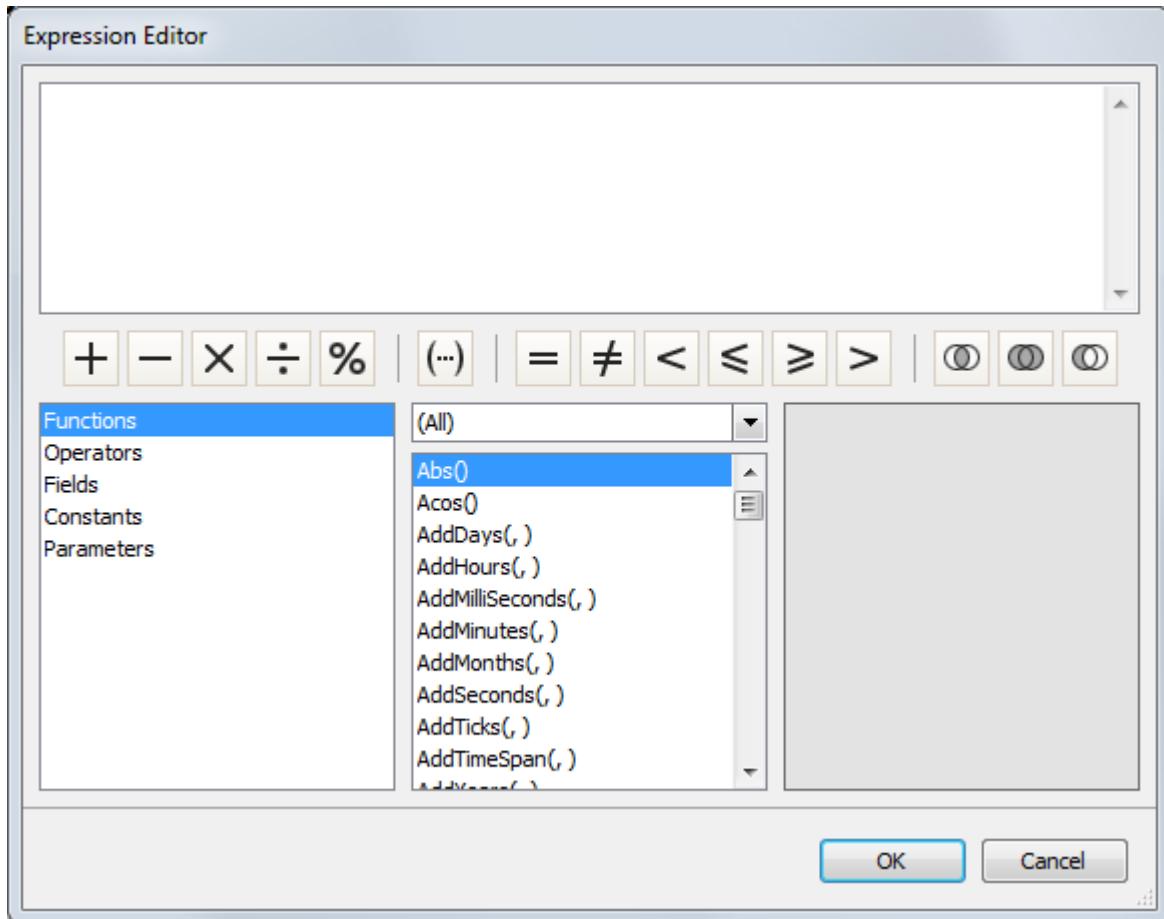
Or



By using the **Property Grid**...

...Performing a Right Mouse button click on the calculated field in the **Field List** window and selecting **Edit Expression....**

Either one of the methods described above will open the **Expression Editor**:



Select the calculated field **NameplateKVA** from the field list and open the **Expression Editor** (using any of the methods described above).

This calculated field is going to calculate the Nameplate rated kVA by dividing the Nameplate kW value by the Nameplate Power Factor Value.

In the bottom left window of the **Expression Editor** select **Fields** to display the field list in the middle window of the **Expression Editor**.

Double left mouse button click on the field **ElecRatedkW** this will add the field to the expression window.



Next select the division symbol this will add a forward slash to the expression.

Next double left mouse button click on the field **ElecRatedPFactor**

The expression should now contain this expression:

[ElecRatedkW] / [ElecRatedPFactor]

Select **OK** to close the **Expression Editor**.

To add the calculated field to the report, drag the calculated field **NameplateKVA** to under the column header **Nameplate Data – kVA**.

Nameplate Data							
V	Ph	Hz	I	kVA	Pf	kW	Eff %
[ElecVol]	[ElecNo]	[ElecRat]	[FullLoad]	[Table.Nameplate]	[ElecRat]		

The field will come into the graphics area shaded red. This indicates that it overlaps or clashes with another control.

To rectify this, using the **Property Grid** set the width of the control to **127...**

...and the problem goes away:

Nameplate Data							
V	Ph	Hz	I	kVA	Pf	kW	Eff %
[ElecVol]	[ElecNo]	[ElecRat]	[FullLoad]	[Table.N]	[ElecRat]	[ElecRat]	

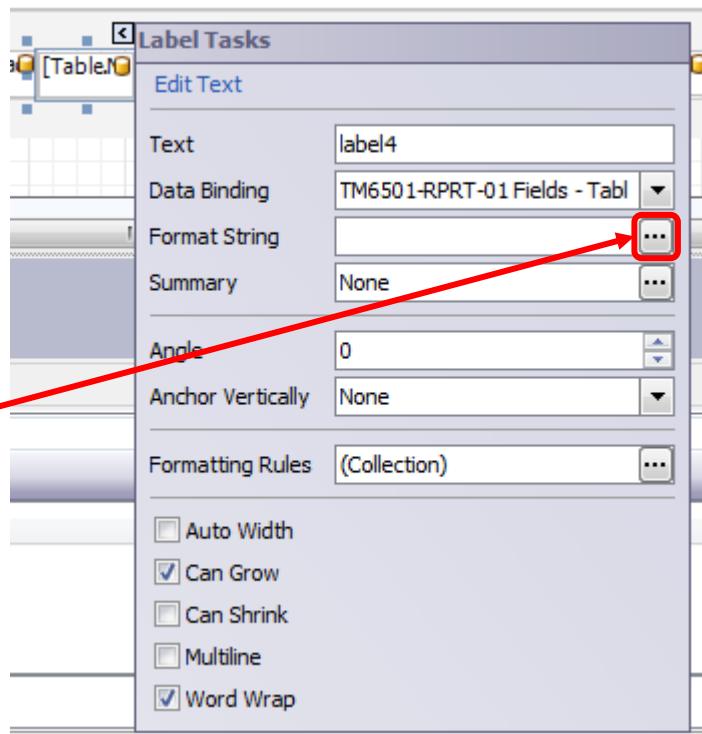
Have a preview of the report by selecting by selecting the **Preview** button.

Nameplate Data								Absorbed Data							
V	Ph	Hz	I	kVA	Pf	kW	Eff %	V	Ph	Hz	I	kVA	Pf	kW	Eff %
415	3	50	1.34	0.512195 0.41 1	0.21	415	3	50	1.34	0.966	0.41	0.396	53		
415	3	50	1.34	0.512195 0.41 1	0.21	415	3	50	1.34	0.966	0.41	0.396	53		
415	3	50	1.34	0.512195 0.41 1	0.21	415	3	50	1.34	0.966	0.41	0.396	53		

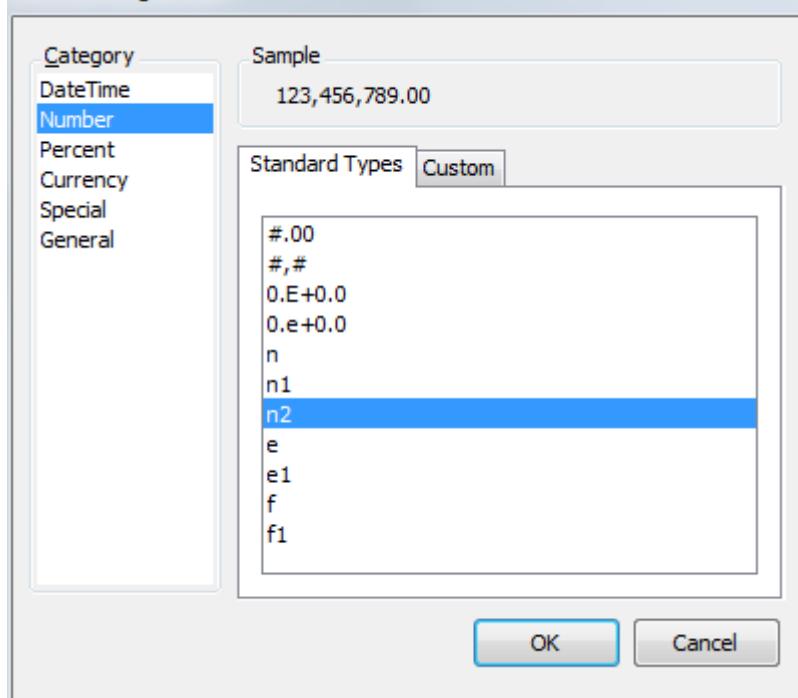
Notice the format of the returned value. This can be changed in the **Report Designer**, return to the **Report Designer** by selecting the **Designer** button.

Select the calculated field **NameplateKVA** and select the small arrow top right of the field control.

A **Label Tasks** form opens. Select the browse button next to the **Format String** text box...



FormatString Editor



The **Format String** form opens. The user is encouraged to explore the form further.

Select **Number > n2** this will format the field to display a number with two decimal places. Select **OK**.

Take a preview of the report to view the results and then return to the **Report Designer**.

Here's the result:

Supplied By:	Tag No.	Description:	Nameplate Data							
			V	Ph	Hz	I	kVA	Pf	kW	Eff %
MC8601	FN8301		415	3	50	27.24	17.61	0.852	15	
	FN8302		415	3	50	27.24	17.61	0.852	15	
MC8602	FV0102		415	3	50	0.768	0.37	0.683	0.25	
MC8602	FV0103		415	3	50	0.768	0.37	0.683	0.25	

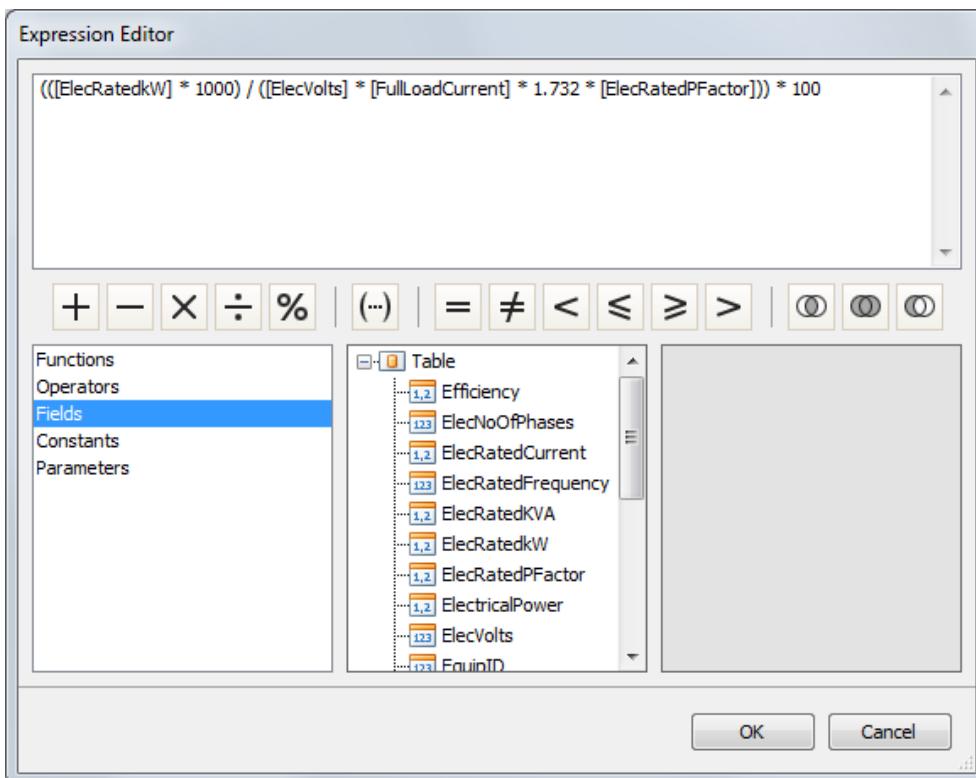
Exercise 16 – Create Calculated Fields & Format Strings - Optional

In this exercise, the user is to create a calculated field called **NameplateEff** and place it under the **Nameplate Data – Eff %** column header. The **Width** of this field is to be set to **127** and the **Field Type** is to be set as **Float**.

The expression to be used is as follows:

$$([ElecRatedkW] * 1000) / ([ElecVolts] * [FullLoadCurrent] * 1.732 * [ElecRatedPFactor]) * 100$$

The user is to use the selection methods and operators as described above to build the expression



i Expressions can also be typed in manually

i The numbers 1000, 1.732 and 100 are entered manually.

With the exception of the fields beneath **V**, **Ph** and **Hz** all of the **Nameplate Data** and **Absorbed Data** fields are to have the **String Type** set to **Number n2**.

The result should be similar the image below:

Name Plate Data								Absorbed Data							
V	Ph	Hz	I	kVA	pf	kW	Eff %	V	Ph	Hz	I	kVA	pf	kW	Eff %
415	3	50	27.24	17.61	0.852	15.00	89.92	415	3	50	27.24	19.58	0.85	16.69	89.90
415	3	50	27.24	17.61	0.852	15.00	89.92	415	3	50	27.24	19.58	0.85	16.69	89.90
415	3	50	1.34	0.51	0.41	0.21	53.18	415	3	50	1.34	0.97	0.41	0.40	53.00
415	3	50	1.34	0.51	0.41	0.21	53.18	415	3	50	1.34	0.97	0.41	0.40	53.00
415	3	50	1.34	0.51	0.41	0.21	53.18	415	3	50	1.34	0.97	0.41	0.40	53.00
415	3	50	1.34	0.51	0.41	0.21	53.18	415	3	50	1.34	0.97	0.41	0.40	53.00
415	3	50	1.34	0.51	0.41	0.21	53.18	415	3	50	1.34	0.97	0.41	0.40	53.00

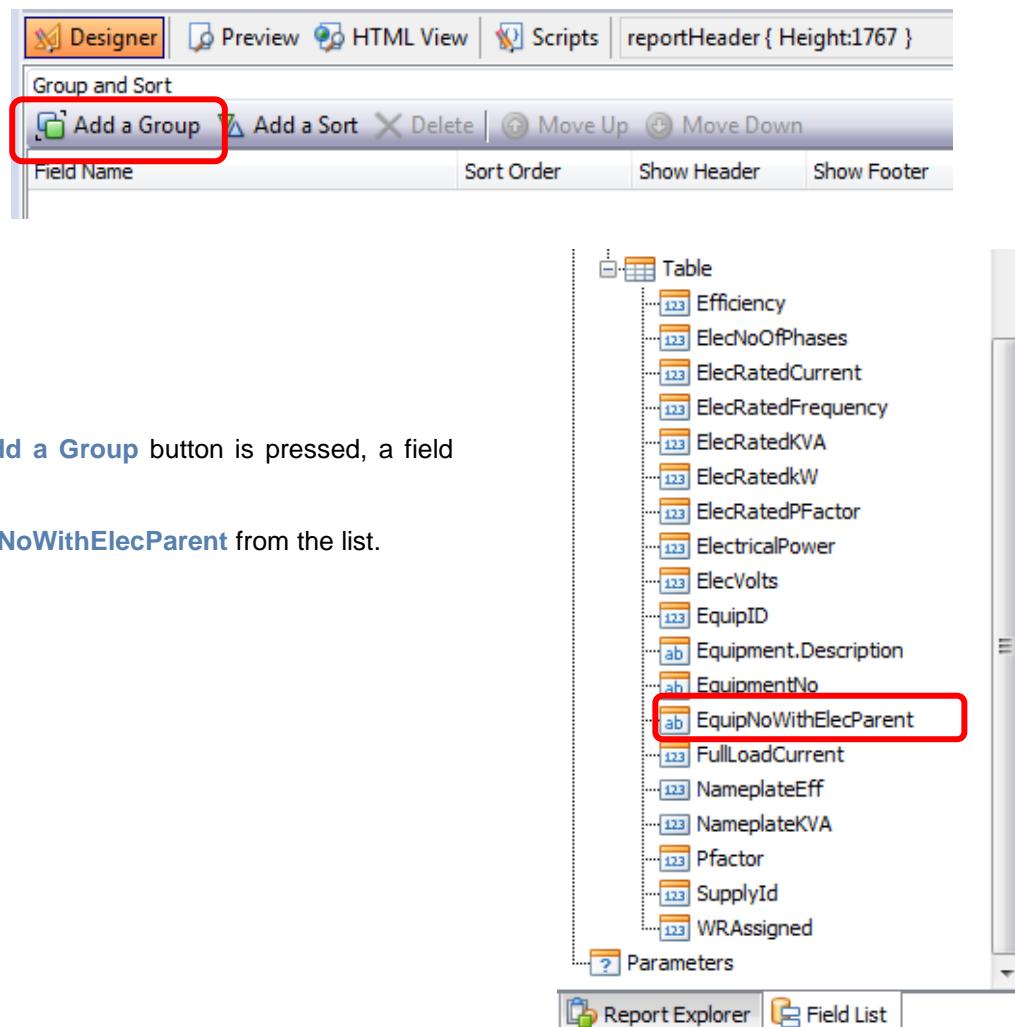
Do not forget to **Save** the report.

6.4.6 Group Headers (Worked Example) - Optional

The data contained in the **reportDetail** can be grouped. In this example, the **reportDetail** is going to be grouped on the column **Supplied By:** which is the field **EquipNoWithElecParent**.

Open the report and select **Edit Layout** to open the **Report Designer**.

At the bottom left of the report designer, there is a menu bar with an **Add a Group** button:



When the **Add a Group** button is pressed, a field list pops up.

Select **EquipNoWithElecParent** from the list.

A new band named **GroupHeader1** is inserted into the **Report Designer** above the **reportDetail** band.

This screenshot shows the Report Designer with the newly inserted 'GroupHeader1' band. The 'GroupHeader1' band is positioned above the 'reportDetail' band. The 'reportDetail' band contains a table with columns for 'Supplied By:', 'Tag No.', 'Description', and 'Nameplate Data'. The 'Nameplate Data' column has sub-columns for V, Ph, Hz, I, kVA, Pf, kW, and Eff %. Below the 'reportDetail' band is the 'pageFooter' band, which contains the page number '1/1'.

Narrow the **GroupHeader1** band slightly and drag the **[EquipNoWithElecParent]** field from the **reportDetail** band into the **GroupHeader1** band.

Take a preview to see what the report looks like:

Supplied By:	Tag No:	Description:	Nameplate Data										Absorbed Data									
			V	Ph	Hz	I	kVA	Pf	kW	Eff %	V	Ph	Hz	I	kVA	Pf	kW	Eff %				
MC8601(1)	FCV3909		415	3	50	1.34	0.51	0.41	0.21	53.18	415	3	50	1.34	0.97	0.41	0.40	53.00				
	MM0101		415	3	50	66.01	43.89	0.84	37.00	92.51	415	3	50	66.01	47.45	0.84	40.00	92.50				
MC8601(2)	FN8301		415	3	50	24.84	17.86	0.84	15.00	100.01	415	3	50	27.60	19.84	0.84	16.67	90.00				
	PP0106A		415	3	50	7.87	4.76	0.84	4.00	84.18	415	3	50	6.13	4.41	0.80	3.53	85.10				
MC8602(1)	PP0106B		415	3	50	7.87	4.76	0.84	4.00	84.18	415	3	50	6.13	4.41	0.80	3.53	85.10				
	PP3902A		415	3	50	37.93	25.00	0.88	22.00	91.70	415	3	50	29.45	21.17	0.85	17.99	91.70				
MC8602(1)	PP3902B		415	3	50	37.93	25.00	0.88	22.00	91.70	415	3	50	29.45	21.17	0.85	17.99	91.70				
	FCV0102		415	3	50	1.34	0.51	0.41	0.21	53.18	415	3	50	1.34	0.97	0.41	0.40	53.00				
MC8602(2)	FCV0103		415	3	50	1.34	0.51	0.41	0.21	53.18	415	3	50	1.34	0.97	0.41	0.40	53.00				
	FCV0109		415	3	50	1.34	0.51	0.41	0.21	53.18	415	3	50	1.34	0.97	0.41	0.40	53.00				
MC8602(2)	FCV3905		415	3	50	0.71	0.51	0.41	0.21	99.94	415	3	50	1.34	0.97	0.41	0.40	53.00				

The report has now grouped the data the Supply Equipment Type.

Return to the **Report Designer**:

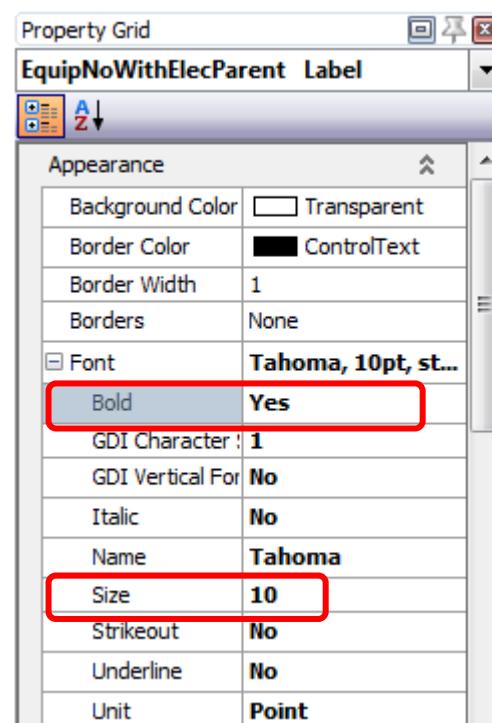
Select the **[ElecPEquipmentNo]** field in the **GroupHeader1** band.

In the **Property Grid** expand the **Font** property and change **Bold** property to **Yes** and the **Size** and the size property to **10**

Select **Preview** to check the effect this has on the report:

MC8601 (2)
PP0106A
PP0106B
PP3902A
PP3902B

Select **Designer** to return to the **Report Designer**.



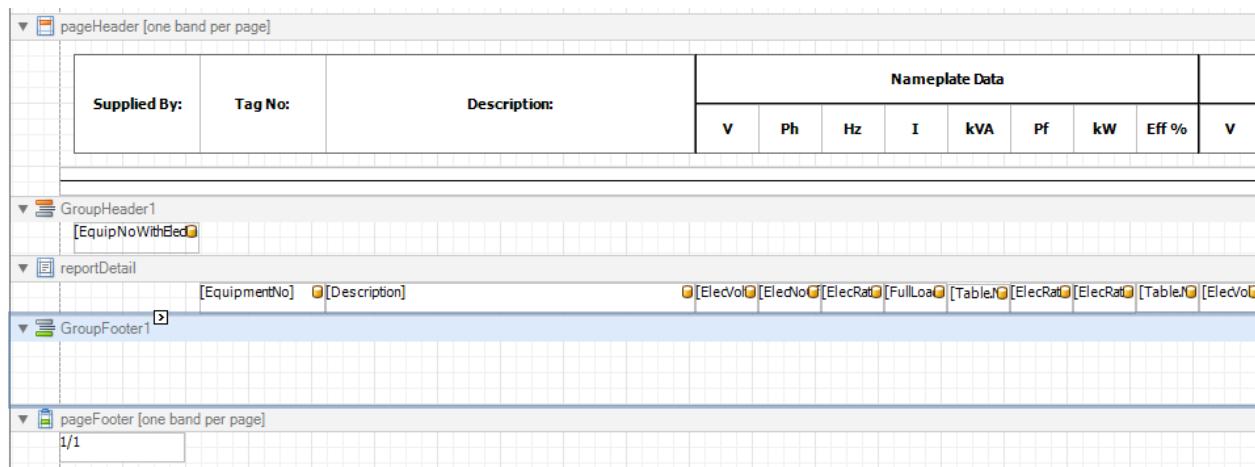
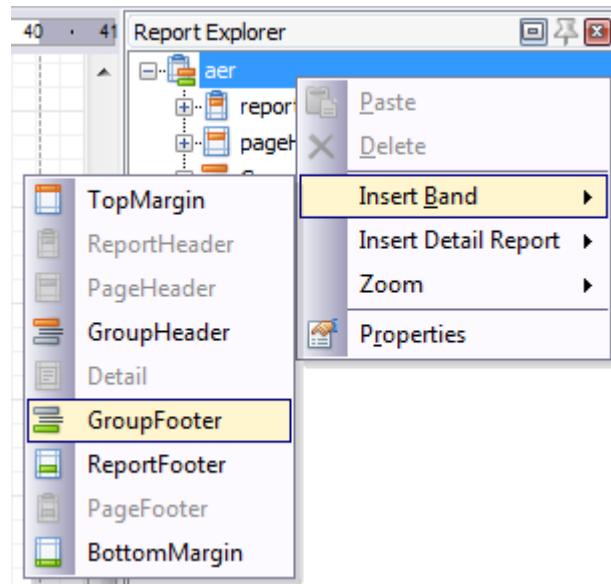
6.4.7 Sub Totals (Worked Example) - Optional

Open the training report and open the **Report Designer**.

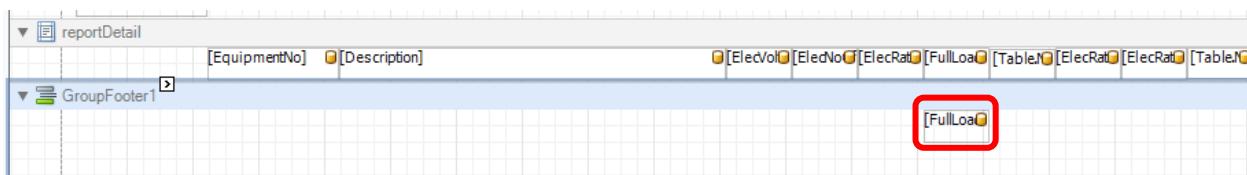
In the **Report Explorer** window, right mouse button click on the **aer** group and select **Insert Band > GroupFooter**.

This will add **GroupFooter1** band to the report.

Shorten the band so that it is approximately one major grid high.

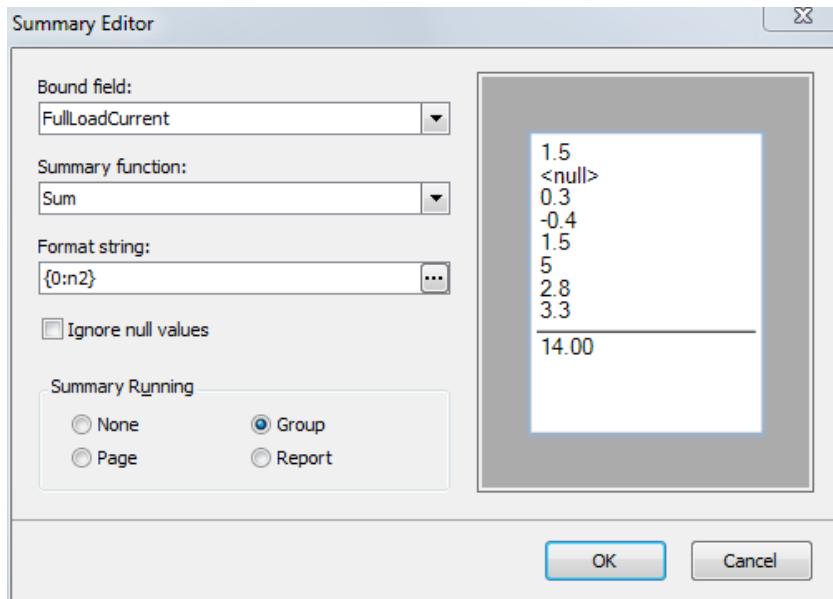
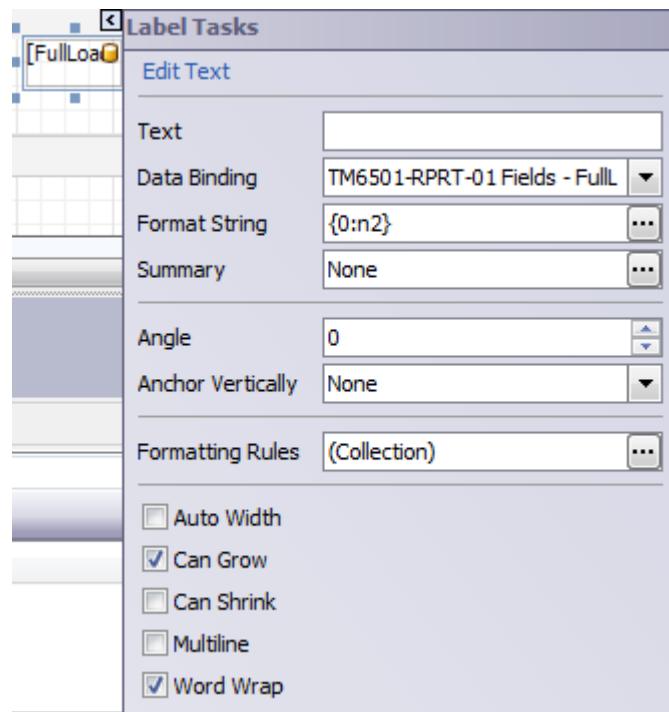


Using a combination of the mouse left button and the ctrl key on the computer keyboard select and drag the **[FullLoadCurrent]** field in the reportDetail band into the **GroupFooter1** band. This creates a copy of the field.



Select the newly created field, select the little arrow top right of the control; This opens the **Label Tasks** form.

Select the browse button to the right of the **Summary** textbox...



...this opens the **Summary Editor**
select **Sum** from the **Summary function:** pick list.

Select **Number > n2** using the
browse button to the right of the
Format String text box.

Select the **Group** radio button.

Select **OK** to close the **Summary Editor**.

Select the little arrow top right of
the control to close the **Label Tasks** form.

Select the field again, and using the **Property Grid** place a border line to the top with a thickness of 2.

Select the **Preview** button to see the effect. Return to the **Report Editor** and save the report.

Exercise 17 – Add Sub Totals to the Report - Optional

Applying what has been learned in the worked example above, add sub totals to the following:

Nameplate Data:

kVA
kW

Absorbed Data:

I
kVA
kW

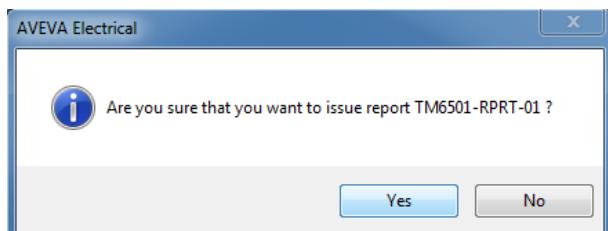
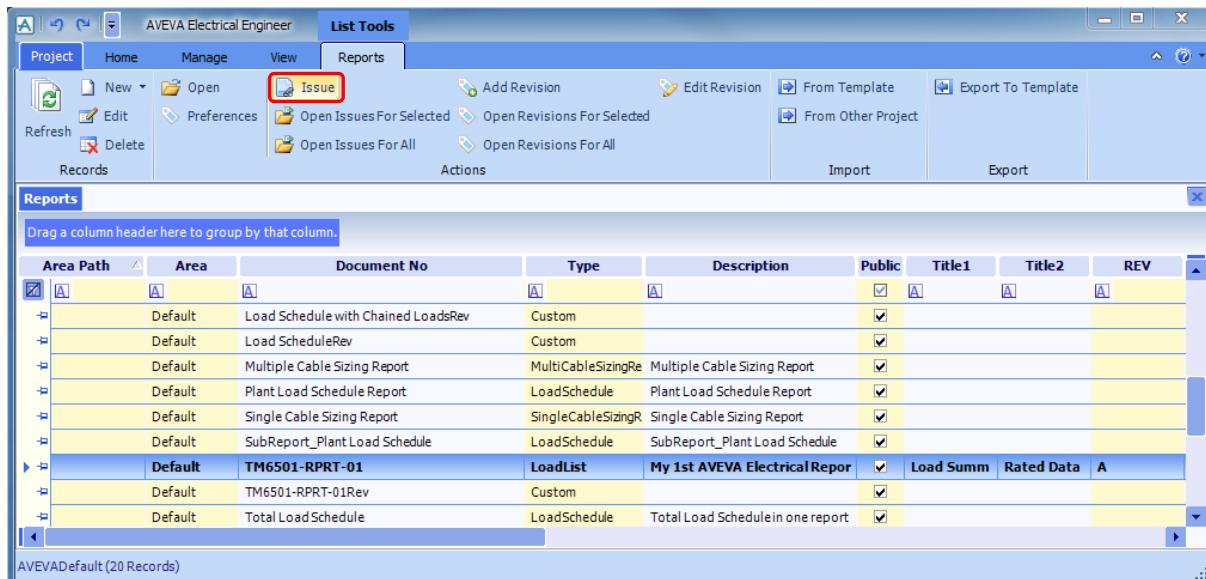
Add a border line to the top of each control with a thickness of 2.

The result should be similar to the image below:

Name Plate Data									Absorbed Data								
V	Ph	Hz	I	kVA	pf	kW	Eff %	V	Ph	Hz	I	kVA	pf	kW	Eff %		
415	3	50	27.24	17.61	0.852	15.00	89.92	415	3	50	27.24	19.58	0.85	16.69	89.90		
415	3	50	1.34	0.51	0.41	0.21	53.18	415	3	50	1.34	0.97	0.41	0.40	53.00		
415	3	50	1.34	0.51	0.41	0.21	53.18	415	3	50	1.34	0.97	0.41	0.40	53.00		
415	3	50	1.34	0.51	0.41	0.21	53.18	415	3	50	1.34	0.97	0.41	0.40	53.00		
415	3	50	1.34	0.51	0.41	0.21	53.18	415	3	50	1.34	0.97	0.41	0.40	53.00		
415	3	50	66.01	43.89	0.843	37.00	92.51	415	3	50	66.01	47.45	0.84	40.00	92.50		
			98.61	63.55		52.84					98.61	70.90		58.27			
240	1	50	16.67	4.00	1	4.00	57.73	240	1	50	16.67	4.00	1.00	4.00	100.00		
			16.67	4.00		4.00					16.67	4.00		4.00			
415	3	50	27.24	17.61	0.852	15.00	89.92	415	3	50	27.24	19.58	0.85	16.69	89.90		
			27.24	17.61		15.00					27.24	19.58		16.69			
415	3	50	6.70	4.82	0.83	4.00	100.07	415	3	50	7.89	5.67	0.83	4.71	85.00		
415	3	50	6.70	4.82	0.83	4.00	100.07	415	3	50	7.89	5.67	0.83	4.71	85.00		
415	3	50	36.44	26.19	0.84	22.00	99.99	415	3	50	40.04	28.78	0.84	24.18	91.00		
415	3	50	36.44	26.19	0.84	22.00	99.99	415	3	50	40.04	28.78	0.84	24.18	91.00		
			86.28	62.02		52.00					95.86	68.90		57.78			

6.5 Issue Reports (Worked Example)

To issue a Report: Select **Home > Select > Reports** (under Lists). Give focus to the **Reports** contextual tab, select the Report **TM6501-RPRT-01** and click the **Issue** button under the **Records** pane.



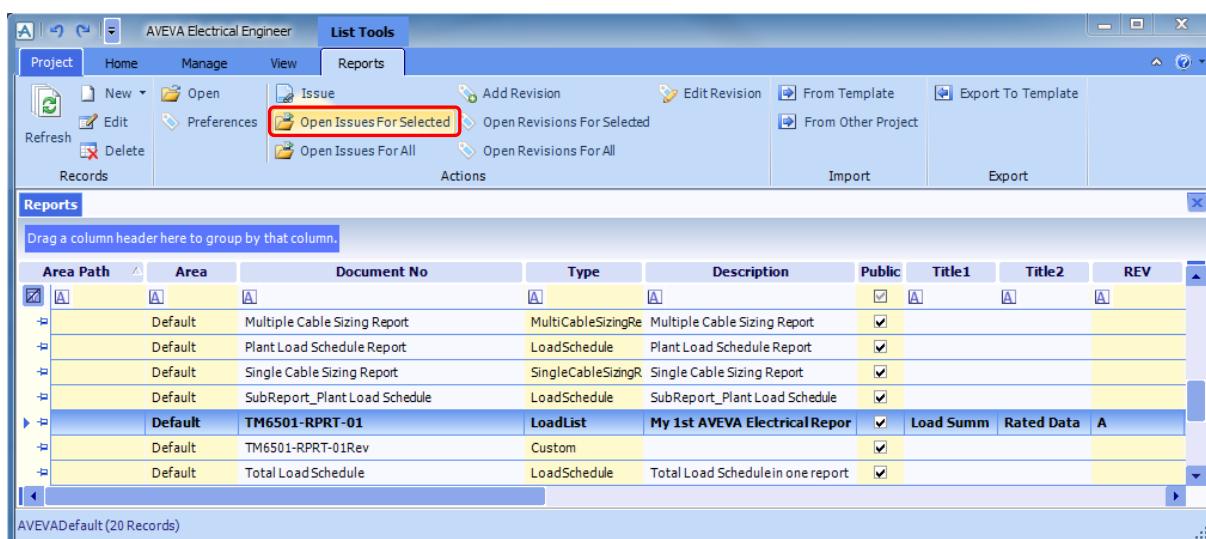
A dialog box appears informing the user that there are no revisions for the current report.

Click the **Yes** button.

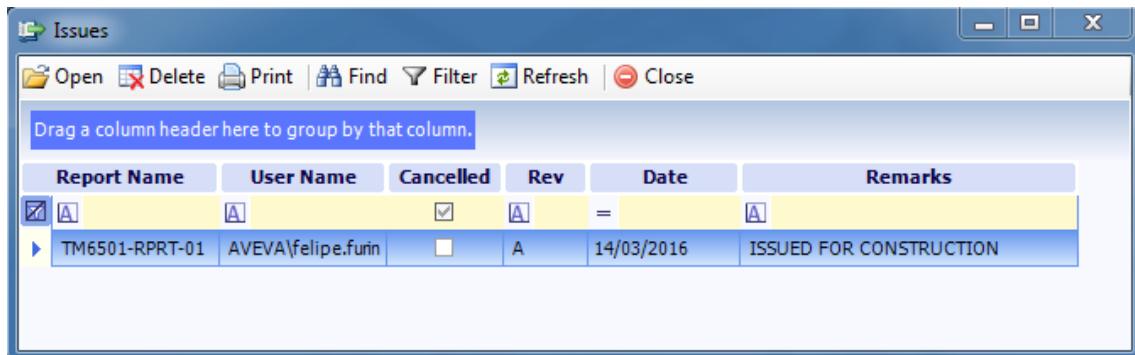
AVEVA Instrumentation will issue the Report and assign it to the current Revision.

All previous issues of Report are saved and can be accessed by the user for information or reference.

Select the Report **TM6501-RPRT-01** from the Reports grid. Give focus to the **Reports** tab and Click **Open Issues for Selected** button from the **Actions** pane.



This opens the **Issues** window, which shows the issue for the Reports:



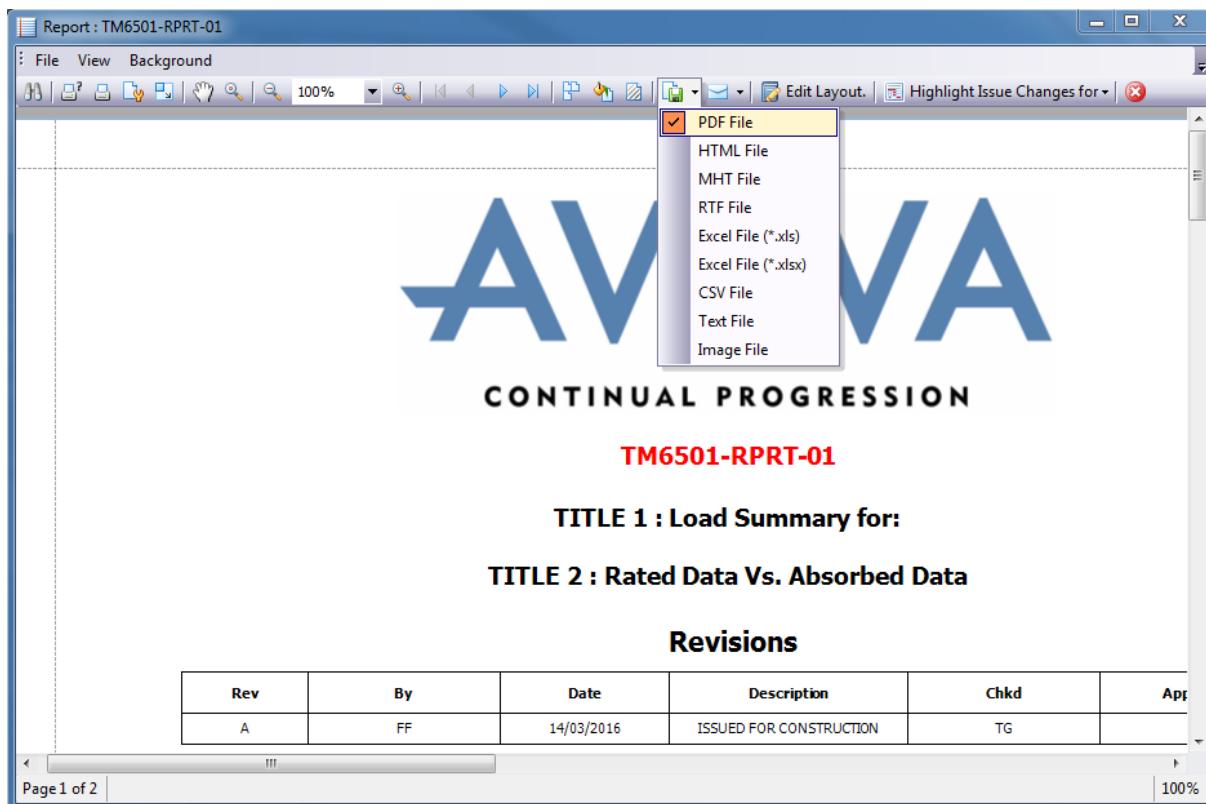
Hence, the user can view/delete any issue of the Report using the options available on the toolbar.

Click the **Close** button from the menu.

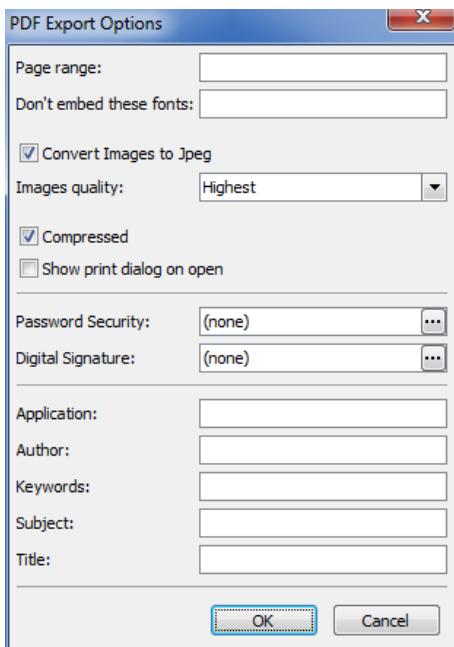
6.6 Export the Report

Once issued, the user can now export the Report to HTML, PDF, Excel, etc. formats.

Click the **Export Document** button and select the **PDF File** option from the menu.

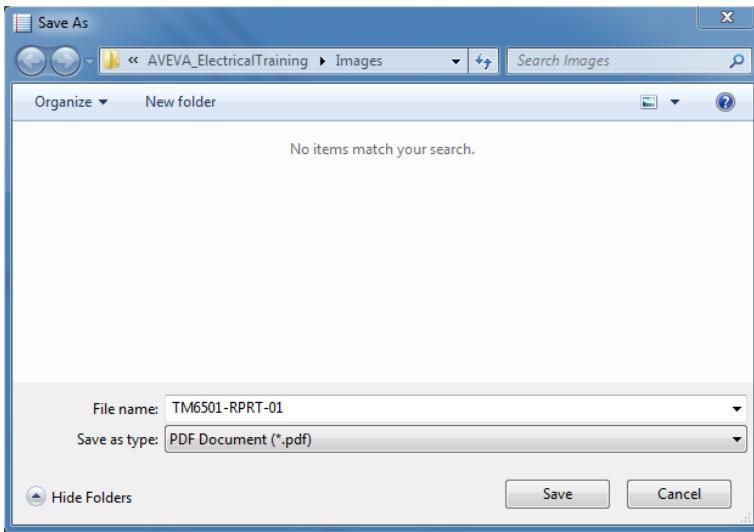


This opens the **PDF Export Options** form.

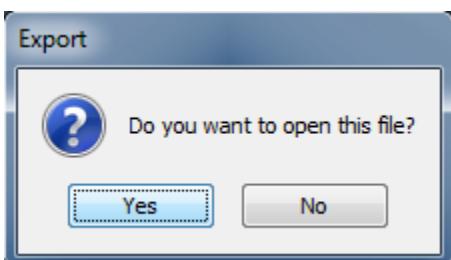


Keep the default settings and click the **OK** button on the form.

The **Save As** window is displayed. Include **TM6501-RPRT-01** in the **File Name** text box and select a suitable folder and click the **Save** button to export the Report.

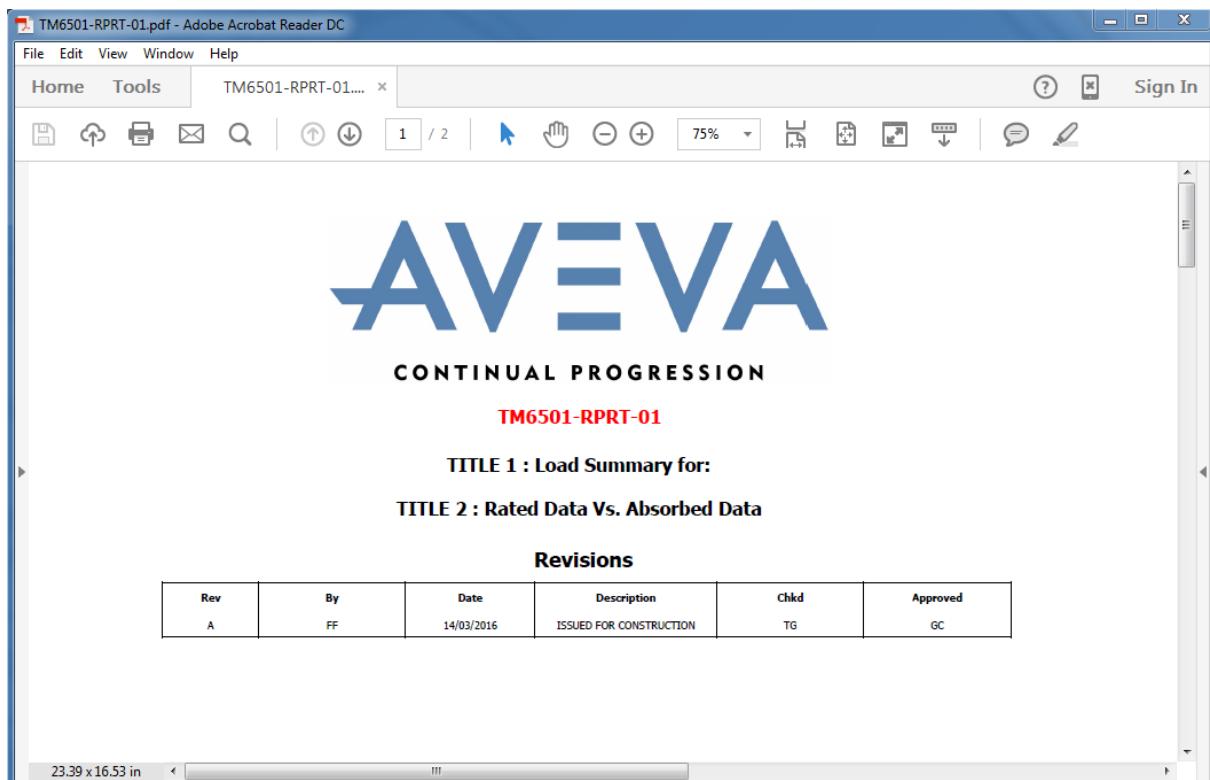


An **Export** alert form is displayed.



Click **Yes** to open the Report.

The report **TM6501-RPRT-01** is generated in PDF format.



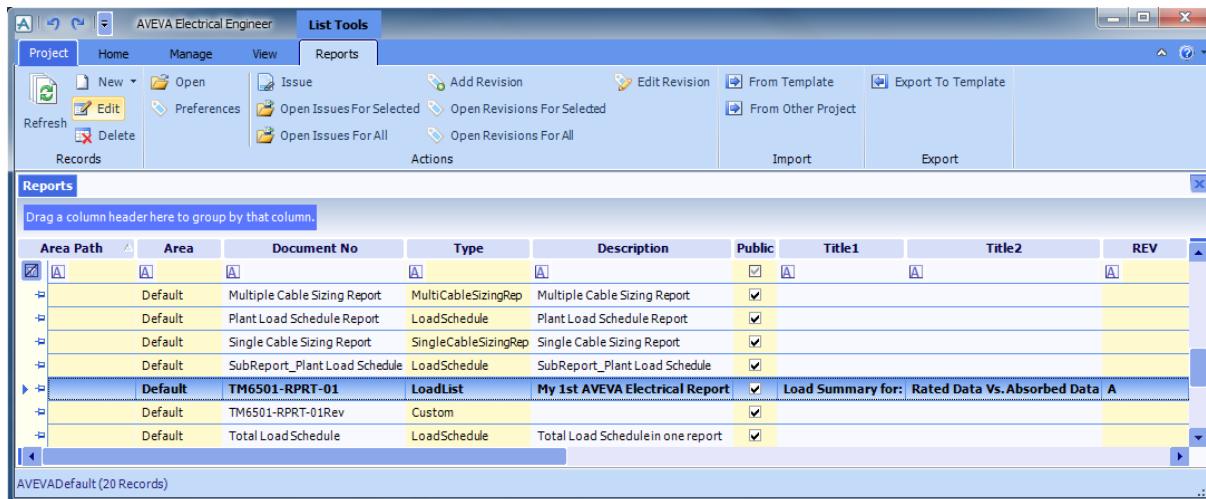
Click the **Close** button to exit the Report.

6.7 Custom Reports

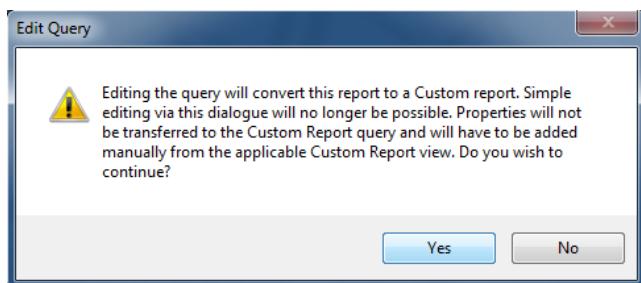
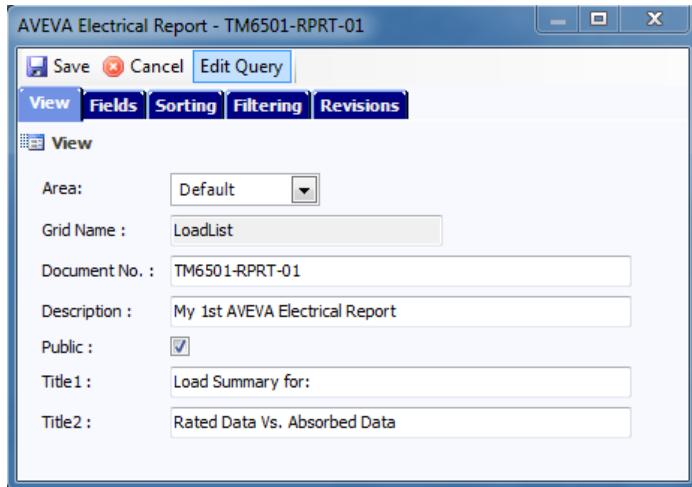
The Customer Report provides a wider array of data for the user to access from AVEVA Instrumentation database. SQL queries can be created and edited that define custom reports using the SQL Query Maker interface.

Customer Reports can be created from scratch just as the Basic reports example shown above or by converting an already defined Basic report into a custom report.

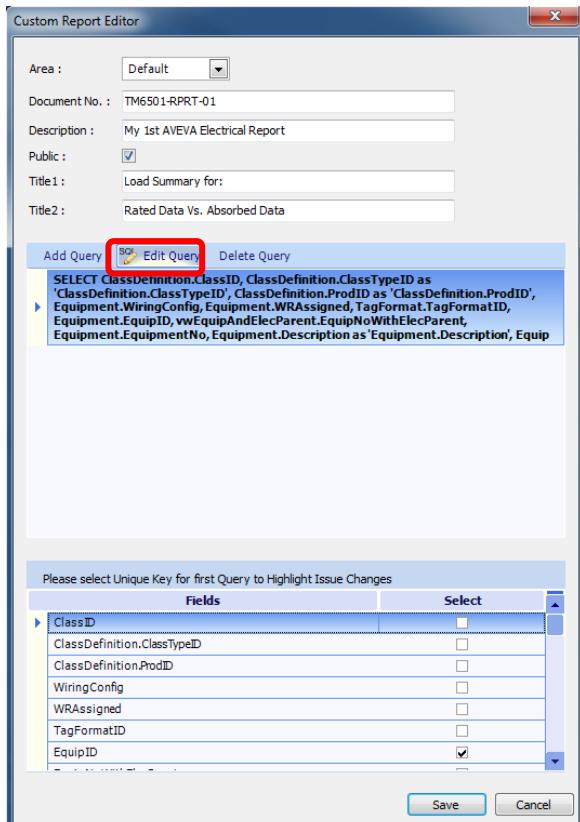
To convert to a Custom Report type select any Basic report and click the **Edit** button.



Select the **Edit Query** to open the **Custom Report Editor**.



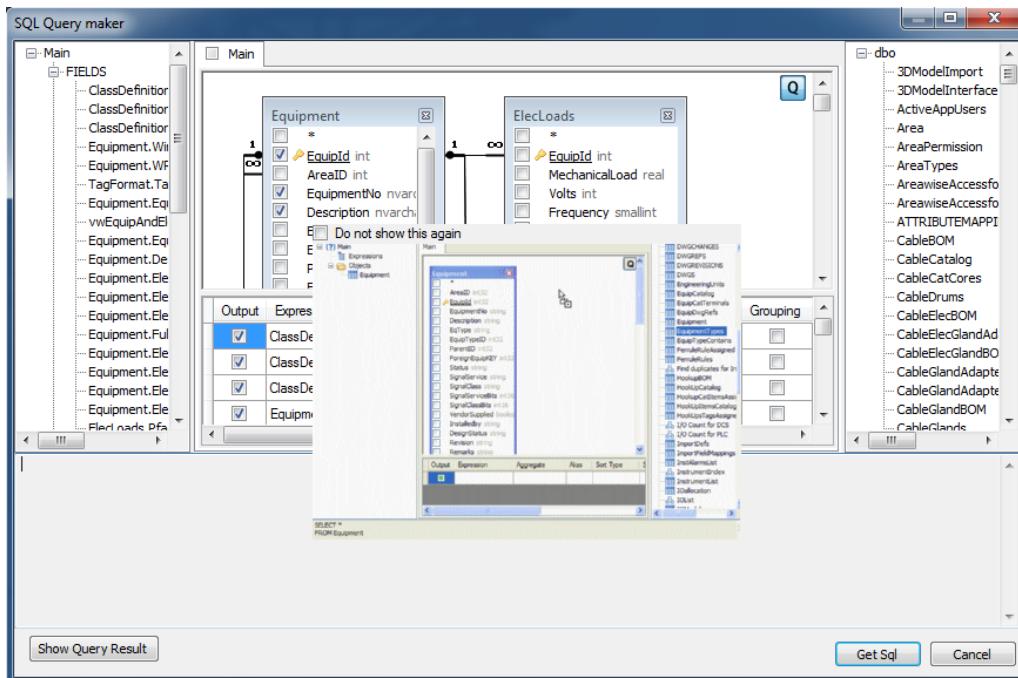
Click **Yes** on the **Edit Query** window.



To add a new SQL query click the **Add Query** button or to edit an existing query, select any query from the list available and click the **Edit Query** button.

After performing any of the above action the **SQL Query Maker** is then displayed.

A short demo shows how to add grouped objects in the dbo Schema by selecting on the desired object and using the drag and drop function to place it in the main window interface.



Click the **Get Sql** button to return to the **Custom Report Editor** and click **Save** to save any changes.

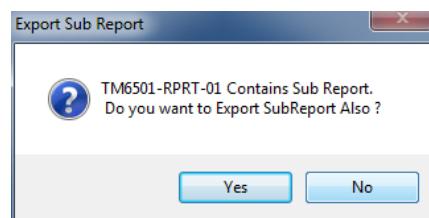
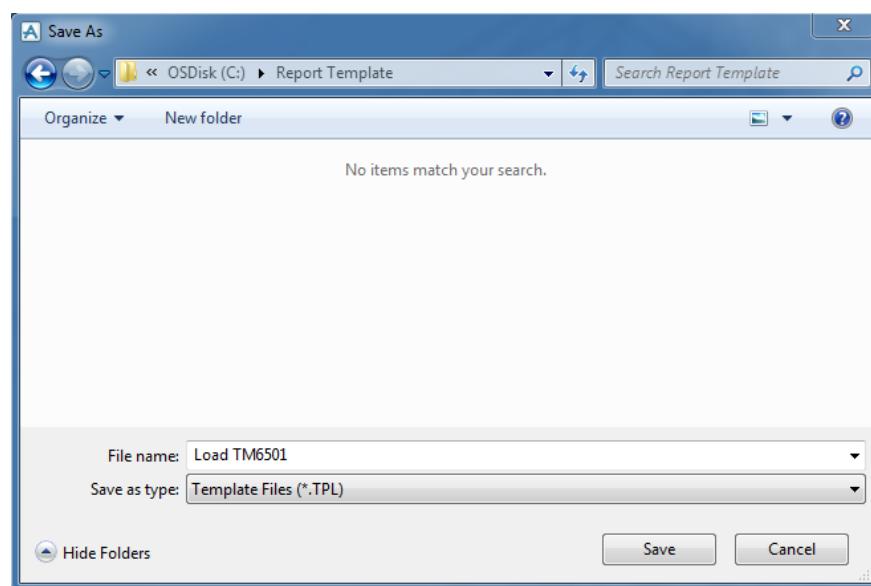
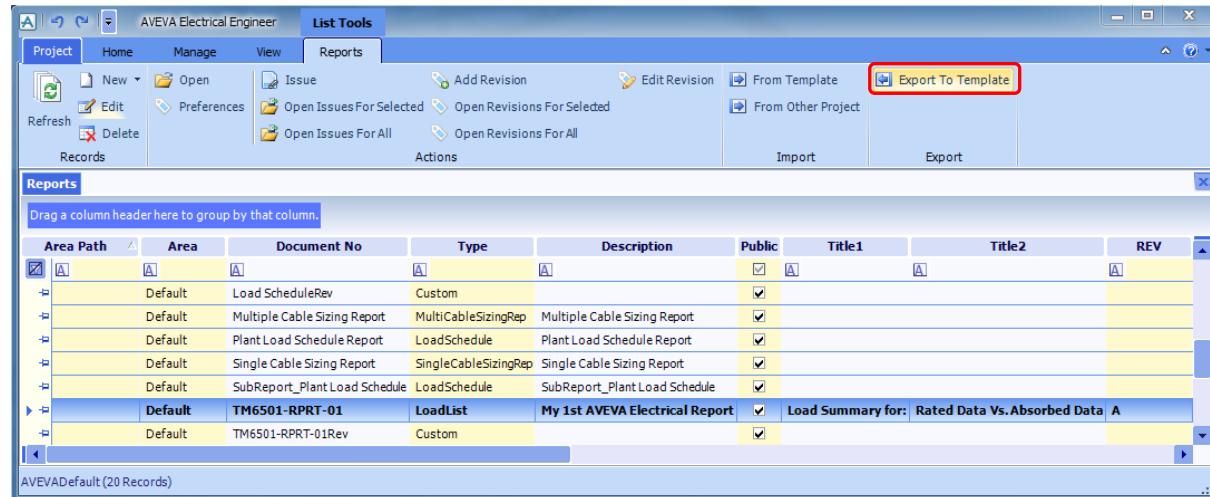
For information on how to use the SQL Query maker, refer to the Active Query Builder User Guide or visit www.activequerybuilder.com.

6.8 Report Template

AVEVA Electrical provides the option of Importing and Exporting Reports as a TPL file extension for a template. The template includes the layout and database source to create a new report.

6.8.1 Export Reports Template (Worked Example)

Select the Report **TM6501-RPRT-01** from the Reports list grid. Under the **Export** pane in the Reports Contextual tab, click the **Export To Template** button.

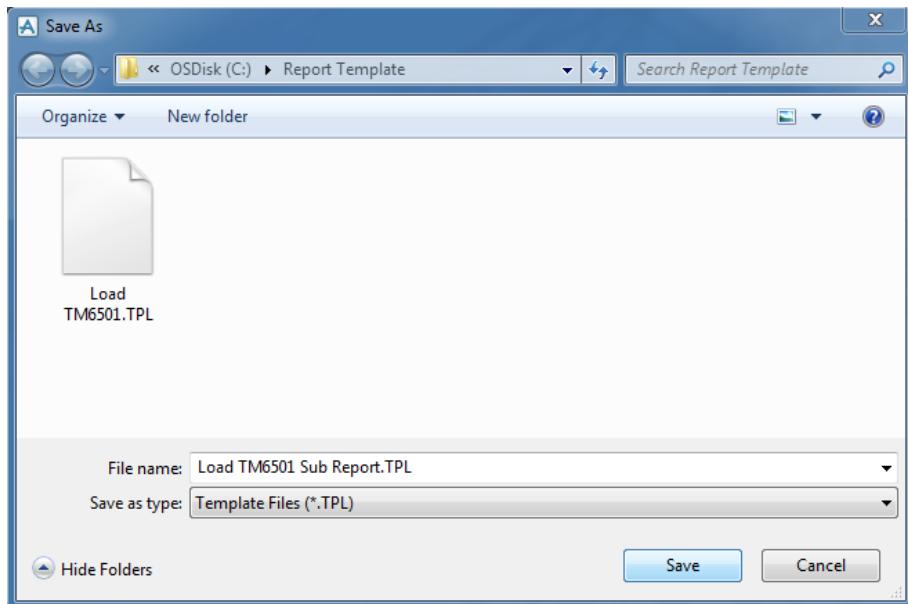


A dialogue box appears informing the user about exporting the Sub Report.

Click the **NO** button.

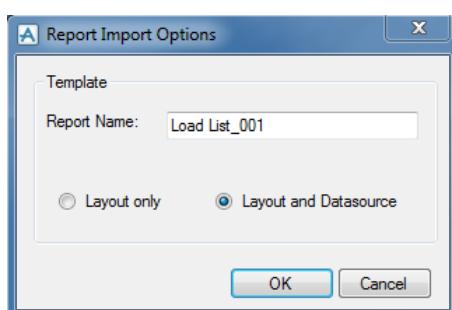
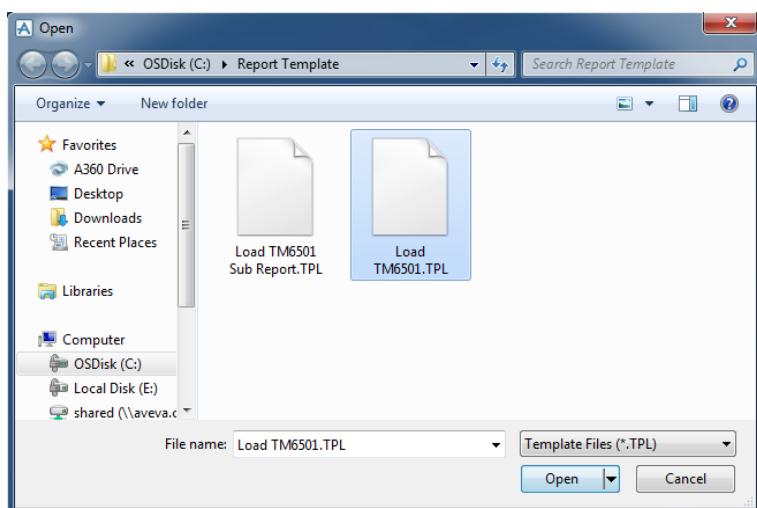
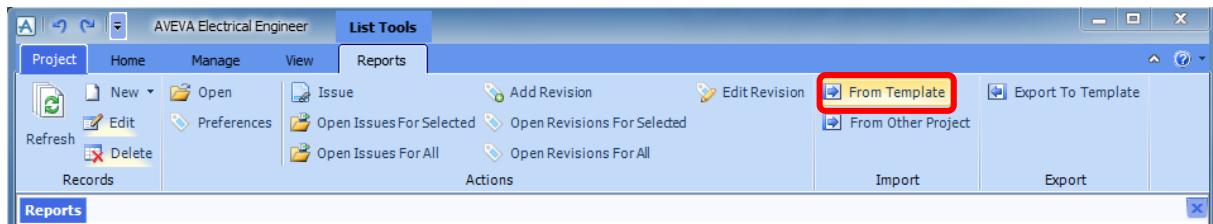
The **Save As** window is displayed. Include **Load TM6501** in the **File Name** text box and select a suitable folder and click the **Save** button to export the Report.

The **Save As** form is displayed. Enter **Load TM6501 Sub Report** in the **File name** and click the **Save** button to export the Report.



Exercise 18 – Import Report Template

Create a New Report using the previously created **Load TM6501** template by using **Import From Template** functionality and selecting the **Layout and Datasource** radio button option.



Area Path	Area	Document No	Type	Description	Public	Title1	Title2	REV
	Default	Load Schedule with Chained Loads	LoadSchedule	Load Schedule with Chained Loads	<input checked="" type="checkbox"/>			
	Default	Multiple Cable Sizing Report	MultiCableSizingRep	Multiple Cable Sizing Report	<input checked="" type="checkbox"/>			
	Default	Load List_001	LoadList	My 1st AVEVA Electrical Report	<input checked="" type="checkbox"/>	Load Summary for:	Rated Data Vs. Absorbed Data	
	Default	TM6501-RPT-01	LoadList	My 1st AVEVA Electrical Report	<input checked="" type="checkbox"/>	Load Summary for:	Rated Data Vs. Absorbed Data	A
	Default	Plant Load Schedule Report	LoadSchedule	Plant Load Schedule Report	<input checked="" type="checkbox"/>			
	Default	Distribution Board Schedule	DistBoardSchedule	Sample	<input checked="" type="checkbox"/>			

AVEVA Default (21 Records)