Design Master Electrical
RT User Manual

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Design Master Electrical RT

You are reading the user manual for Design Master Electrical RT 2.1.1.

You can **download a PDF version of the user manual** for printing and offline documentation purposes.

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Overview

Design Master Electrical RT is an add-in that adds a number of electrical engineering improvements to Revit.

One-Line Riser Diagram: Create your Revit MEP model and one-line riser diagram simultaneously. Automatically keep your one-line riser diagram up-to-date as your project changes.

Feeder Sizing: Feeders are size automatically based upon the upstream overcurrent protection (OCP) for a piece of distribution equipment. You have complete control of the chosen feeder size and can override it when necessary.

Branch Circuit Sizing: Branch circuit breakers and wire sizes are sized automatically based upon the connected load. You have complete control of the breaker and wire size and can override it when necessary. Size motor breakers based upon equipment MCA and MOCP.

Fault Calculations: Available fault current is calculated for each piece of distribution equipment. The calculated fault current can be used to set the AIC rating for the device.

Voltage Drop Calculations: The voltage drop is calculated between each piece of distribution equipment. Feeders that exceed the maximum 3% voltage drop allowed can be easily resized.

Arc-Flash Calculations: Arc-flash calculations are performed at each piece of distribution equipment. An arc-flash schedule can be created that displays the calculated values. Arc-flash warning labels can be printed to be put on devices in the field.

Getting Started

This section walks you through getting starting with Design Master Electrical RT. It does not cover all of the information about every command. For complete details, see the **DM Electrical Ribbon Command Reference** and **DM One-Line Ribbon Command Reference** sections.

The Ribbon Tabs: How to find the Design Master Electrical RT commands in Revit.

Editing Panels: How to add information to distribution equipment necessary for calculations and one-line diagrams.

One-Line Diagram: How to create a one-line diagram connected to your Revit model.

Editing Circuits: How to set the sizing settings for branch circuits and view the values in the panel schedule.

Circuit Descriptions: How to set descriptions on circuits.

Motor and Mechanical Equipment Sizing: How to size branch circuit breakers and conductors correctly for motors and mechanical equipment.

Calculating: How to run the calculations.

Viewing Schedules: How to view the calculated values in schedules.

Arc-Flash Basics: How to calculate arc-flash.

Customization Basics: How to customize Design Master Electrical RT.

The Ribbon Tabs

All of the commands for Design Master Electrical RT are on ribbon tabs labeled **DM Electrical** and **DM One-Line**.

To access the commands, select either tab from the list.

In a project, the **DM Electrical** tab looks like this:

The **DM One-Line** tab looks like this:

In a family, the **DM Electrical** tab looks like this:

The **DM One-Line** tab looks like this:

Definitions: Distribution Equipment and Branch Circuit Device

We have two definitions that are unique to our software: distribution equipment and branch circuit device. Revit

does not have categories that exactly match these terms. The electrical industry as a whole does not have words that match these terms. We use these terms in our software because they help explain how our calculations use the Revit model.

Distribution Equipment

Distribution equipment refers to the equipment in the project that provides power to other equipment or devices.

In real-world terms, distribution equipment includes panels, transformers, switchboards, bus ducts, and other similar equipment.

In Revit, distribution equipment includes all of the electrical equipment that have their *Part Type* set to **Panelboard**, **Other Panel**, **Transformer**, or **Switchboard**.

In Design Master Electrical RT, the settings for distribution equipment are set in the **Panel Edit** command. They are fed by feeders. Arc-flash calculations only happen at distribution equipment.

Branch Circuit Device

Branch circuit device refers to electrical devices that are connected to distribution equipment and do not have anything else connected to them.

In real-world terms, branch circuit devices include receptacles, light fixtures, switches, mechanical equipment, kitchen equipment, and other similar devices.

In Revit, branch circuit devices are either electrical fixtures or electrical equipment with their *Part Type* set to **Equipment Switch**.

In Design Master Electrical RT, branch circuit device settings are set in the **Instance Edit** and the **Circuit Edit** command. They are fed by branch circuits.

Making Changes: Don't Modify the Shared Parameters

When using Design Master Electrical RT, make changes to the model using the **Panel Edit**, **Circuit Edit**, and **Instance Edit** commands.

Do not make changes to the shared parameters that are used by the add-in, either through the **Properties** panel, **Schedules**, or **Panel Schedules**. Those values are used only for output purposes. They are not used for input. The add-in will overwrite any changes you make to those values the next time an update happens.

The built-in circuit *Rating* value for electrical systems is also controlled by our add-in. Previously, to change a breaker size, you would set it in the panel schedule. That does not work using our add-in. Instead, you need to change the value that controls the breaker size. For feeders, use the **Panel Edit** command to change the overcurrent protection (OCP) value for the distribution equipment. For branch circuits, use the **Circuit Edit** command to change the size of a breaker. You can also use the **Instance Edit** and **Family Edit** commands to set breaker sizing values for mechanical equipment and motors.

The built-in circuit description value for electrical systems can also be controlled by our add-in. The **Circuit Descriptions** section describes how to change the description using Design Master commands.

Editing Panels

To use Design Master Electrical RT on a project that is in-progress, you need to add some additional information to your current electrical model.

Start by going to the **Panel Edit** command. All of the distribution equipment in your project will be listed here. You will need to:

- Review the feeder settings for each piece of equipment and confirm they are correct.
- Set the kVA for each transformer.
- Set the starting fault at the equipment connected to the utility.

Review Feeder Settings

Go to the *Feeder* section for each piece of distribution equipment. The feeder size is based upon the *Conductor Size* setting. *Conductor Size* will default to **Size Automatically**, which means the feeder size will be based upon the *OCP Trip* setting in the *Upstream Connection* section.

For panels, the default value of *OCP Trip* is **Same as main disconnect or bus amps**. The feeder will be sized based upon the *Bus Size / Mains* value in the *Definition* section.

For transformers, the default value of *OCP Trip* is **Size to match kVA**. The feeder will be sized based upon the *Size* value in the *Definition* section.

To override the feeder size, use the *Conductor Size*, *Neutral*, and *Ground* fields.

The feeder length is calculated automatically and displayed in the dialog box. You can override the length if necessary. You do not have to use the calculated length.

Set Transformer kVA

For transformers, you need to specify the *Size* in the *Definition* section. Using a standard Revit model, there is no standard transformer kVA field. You have to manually set the kVA a second time if you do not make any changes to your families.

Set Starting Fault

Go to the transformer connected to the utility or the topmost piece of distribution equipment in your model. In the *Fault Calculations* section, set the *Utility Fault at Device* to the appropriate value.

If you do not enter the fault at the distribution equipment at the top of the tree in your model, an infinite fault from the utility is assumed. The fault schedule will display UTILITY for the fault value.

One-Line Diagram

Visit the **Starting a New Project** section of the Design Master Electrical RT tutorial to learn how to create your one-line diagram while also building your Revit model.

Customization

The one-line diagram graphics likely will not match your existing company standards. The following training

videos show you how to customize one-line diagram graphics and labels:

- **One-Line Diagram Graphic Families in Revit**
- **Custom Wire Sizes and One-Line Diagram Graphics in Revit**

If you need help customizing the graphics, you can send a sample of a one-line diagram to **support@designmaster.biz**. We will help you configure your customization so that the one-line diagram matches your current graphics.

Editing Circuits

Branch circuit breakers and wire sizes can be set automatically based upon the connected load of the branch circuit.

On new projects, the breaker sizes will be set to **Size Automatically**. They will be sized based upon 125% of the connected load of the branch circuit.

On current projects, when you run the **Calculate Whole Project** or **Calculate Part of Project** command, breakers will be sized as though they were set to **Size Automatically** unless otherwise configured using Design Master commands. Any breaker sizes that had been manually changed in Revit without using Design Master may be changed, which can impact wire sizing, voltage drop calculations, and other parts of the design.

To override the sizes, use the **Circuit Edit** command. This command allows you to set specific breaker and wire sizes. This functionality is useful when you need to adjust a breaker size for a piece of equipment or the wire size to account for voltage drop.

The branch circuit breaker size uses the *Rating* value of the circuit. It should be displayed automatically for you in your panel schedule.

The branch circuit wire sizes use custom shared parameter values. You have to manually modify your panel schedule to display these values. See the **Modifying Panel Schedules** section for more information about how to make these values appear.

Circuit Descriptions

With Design Master Electrical RT, circuit descriptions can be changed in a number of different places to give you greater control over the values displayed in the panel schedule.

By default, this functionality is bypassed so you can continue to set circuit descriptions through typical Revit methods if you prefer. To control your circuit descriptions using Design Master Electrical RT, set *Circuit description method* in the **Project Options** command to **Use Design Master circuit descriptions**.

The sections below explain how the workflow for setting circuit descriptions is different when using Design Master Electrical RT.

Do Not Change Descriptions in Panel Schedules or Circuits

Do not change the circuit description in the panel schedule. Do not change the *Load Name* Revit parameter in the electrical circuit.

These values are now controlled by our add-in, and any changes made directly to these values will be overwritten. Instead, use the various `Edit` commands to set the circuit description.

How to Use Design Master Circuit Description Settings

For projects that have Design Master circuit descriptions enabled, the circuit description is controlled by the settings in the family, instance, and circuit.

You can change the circuit description for a family, and each type in the family, using the **Family Edit** command. This will ensure every family instance inserted in the model will have the same default circuit description.

You can change the circuit description for a specific device in a project using the **Instance Edit** command. It can override the value set in the **Family Edit** command or specify one if the family has not been modified with our add-in. This will ensure the device keeps its circuit description if it is moved to a different circuit later.

Finally, you can add additional information to a circuit description or replace it entirely at the circuit level using the **Circuit Edit** command.

Families that have not been modified with the **Family Edit** command are ignored when setting the circuit description. If all of the families on a circuit are ignored, the default circuit description from Revit is used. To change the circuit description, use the **Circuit Edit** command or the **Instance Edit** command. Do not use the *Load Name* field in the electrical circuit. Changes to that field will appear to be saved, but will be lost if a family that is not ignored is added to the circuit. Using the **Circuit Edit** command or the **Instance Edit** command ensures the changes you make will be preserved no matter what happens to the circuit.

Motor and Mechanical Equipment Sizing

Breakers and conductors can be sized using *NEC 430.52* and *440.22*. You can specify the FLA, BCSC, MCA, MOCP, and specific criteria for sizing the breaker and conductors.

To set these values for a single instance in a project, use the **Instance Edit** command.

To set these values for an entire family, edit the family and use the **Family Edit** command. Change the *Device Type* to **Branch circuit device: Equipment connnection**.

Calculating

After you make changes to your model using any of our `Edit` commands or the standard Revit interface, you will need to manually run the **Calculate** command.

Automatically running the calculations slows down the software significantly. Calculations are run manually for this reason.

Viewing Schedules

Once you enter the necessary information for your panels and run the calculations, you can then view the results in the included schedules. To view the schedules, use the **Schedules->Fault** and **Schedules->Voltage Drop** commands.

The schedules display shared parameters filled in by Design Master Electrical RT. Once the schedules are created, you can modify them as needed for your purposes. You are also able to use the shared parameters anywhere else in Revit where they are appropriate.

To make any changes, use the **Panel Edit** command. Do not make changes using the shared parameters. Any changes to the shared parameter values on the distribution equipment will be overwritten the next time the

Calculate command is run.

Panel Schedules

Design Master Electrical RT uses standard Revit panel schedules.

You will need to modify your panel schedule to use our shared parameters. A complete list of parameters that are available can be found in the **Circuit Shared Parameters** section.

There are two built-in Revit parameters in particular you will continue to use: the *Rating* Revit parameter is used for the breaker trip size on a circuit; the *Load Name* Revit parameter is used for the circuit description on a circuit.

Arc-Flash Basics

Design Master Electrical RT can also calculate arc-flash values for each piece of distribution equipment. Calculating arc-flash requires additional information, such as the electrode configuration of the device and the arcing time for the breaker. The arcing time is based upon the fault at the device and the time-current curve from the manufacturer.

Run the Panel Edit command and enter values in the *Arc-Flash Calculations* section for the panels you want to calculate arc-flash for.

Once the values are input and you have run the calculations, you can view the final values in-schedule using the **Schedules->Arc-Flash** command. You can also print stickers using the **Schedules->Arc-Flash Stickers** command.

Customization Basics

Feeder Sizing

Design Master Electrical RT sizes feeders using its own settings, rather than the ones included in Revit. You have complete control over how the feeders are sized. Use the commands in the **Customization** tab to customize the sizing.

The **Wire Sizes** command is used to add or remove wire sizes and to create new wire materials.

The **Conduit Sizes** command is used to add or remove conduit sizes and to create new conduit materials.

> A common request is to not use 1/2" conduit for feeders. That easily be done by using this command and deleting the 1/2" conduit size.

The **Wire Ampacities** command is used to specify the wire sizes used for a specific feeder ampacity. This command also sets the impedance for the feeders. The default impedances are based upon *NEC Table 9*, but can be changed if desired.

Other Customization Settings

The **Project Options** command has several other options you can set, from changing the appearance of wire callouts to modifying how wire lengths and voltage drop are calculated.

The **Family Edit** command allows you to set default values in your families. You can set information about your

families with this command instead of modifying them for every project using the **Panel Edit** or **Instance Edit** commands.

The **Customization** commands on the **DM One-Line** ribbon allow you to customize the graphic families used to create your one-line diagram, and how they are listed and categorized in dialog boxes. You can also set which Revit model families are always available for selection, even if they are not loaded into the current project.

Where to Learn More

This section covers the basics of Design Master Electrical RT. It does not cover all of the features and functionality you might use on a project. Here are a few ways you can learn more about the add-in.

Complete the Tutorial

The **Design Master Electrical RT Tutorial** teaches you how to use our add-in through firsthand experience in a controlled setting.

Visit the Knowledge Base

The **Knowledge Base** on our website features in-depth articles covering more features of Design Master Electrical RT.

Send Us Your Project

For specific questions, sending us a copy of the project is usually the fastest way to get help.

Use the **Send Project** command to send us a copy of your project. Run the command in the Revit project you have a question about.

Once we receive your project, we will take a look at it and get back to you with an answer.

Our official support hours are Monday through Friday, 9am to 5pm Eastern time.

Limited support is available evenings and weekends if you send a project or an email.

Call Us

You can call us for support at 866-516-9497 x2.

Our official support hours are Monday through Friday, 9am to 5pm Eastern time.

Phone support is only available during our official support hours.

For evening and weekend support, send us a project or an email.

Attend Online Training

We offer online training for Design Master Electrical RT. Visit the **Online Training** page on our website for

recordings of previous trainings and the current training schedule.

DM Electrical Ribbon Command Reference

This section explains the commands on the **DM Electrical** ribbon tab in Revit.

Project: Commands for working with a project.

Selective Coordination: Commands for creating and modifying selective coordination graphs.

Schedules: Commands for creating and viewing the schedules that display the values calculated by Design Master Electrical RT.

Export: Commands for exporting project information to other programs.

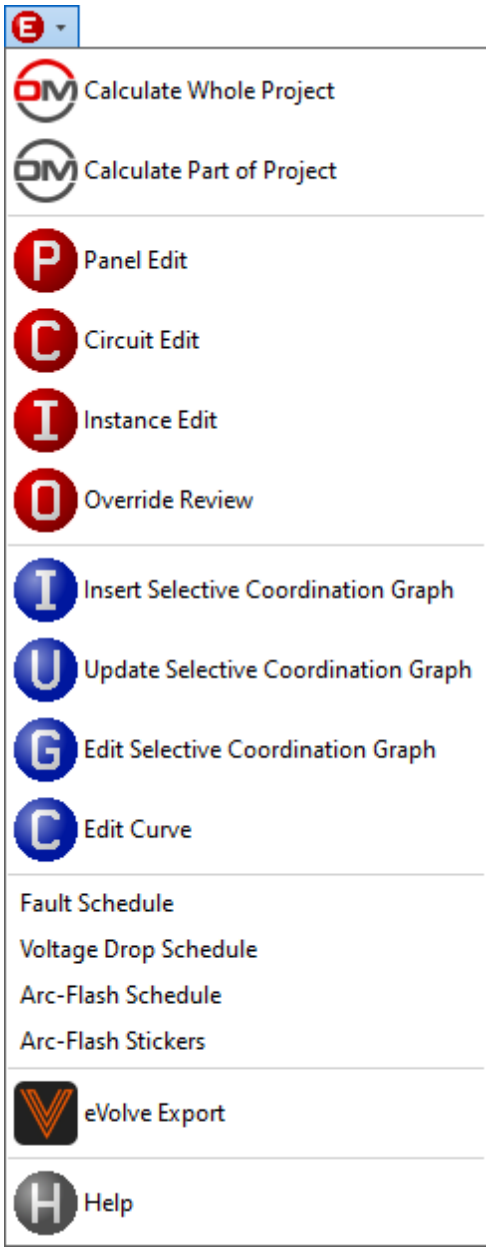
Customization: Commands for customizing Design Master Electrical RT.

Family: Commands for working with a family.

Help: Commands for obtaining help and managing your Design Master Electrical RT installation.

DM Electrical Pulldown

The **DM Electrical Pulldown** menu appears on the **DM Electrical** tab when you have a project open in Revit. It provides many of the commands on the **DM Electrical** tab in a single menu and is meant to be used on the Quick Access Toolbar.



Project

The **Project** panel appears on the **DM Electrical** tab when you have a project open in Revit. It includes commands for making changes to the electrical settings in your project.

Calculate Whole Project: Performs all of the electrical calculations in the project.

Calculate Part of Project: Performs all of the electrical calculations for part of the project.

Panel Edit: Allows you to add additional information to distribution equipment used in the calculations.

Circuit Edit: Allows you to add sizing information to branch circuits.

Instance Edit: Allows you to make changes to a specific family instance in the project.

Override Review: Allows you to review device and circuit settings that are being overridden and document the reason when needed.

Calculate Whole Project

Calculates all of the values for the entire electrical model and updates the associated shared parameters and graphics. This includes:

- Feeder sizes
- Branch circuit wire sizes
- Breaker sizes
- Fault
- Voltage drop
- Arc-flash
- Selective coordination graphs
- Feeder schedules in drafting views
- One-line diagram graphics and labels

You will be prompted for confirmation.

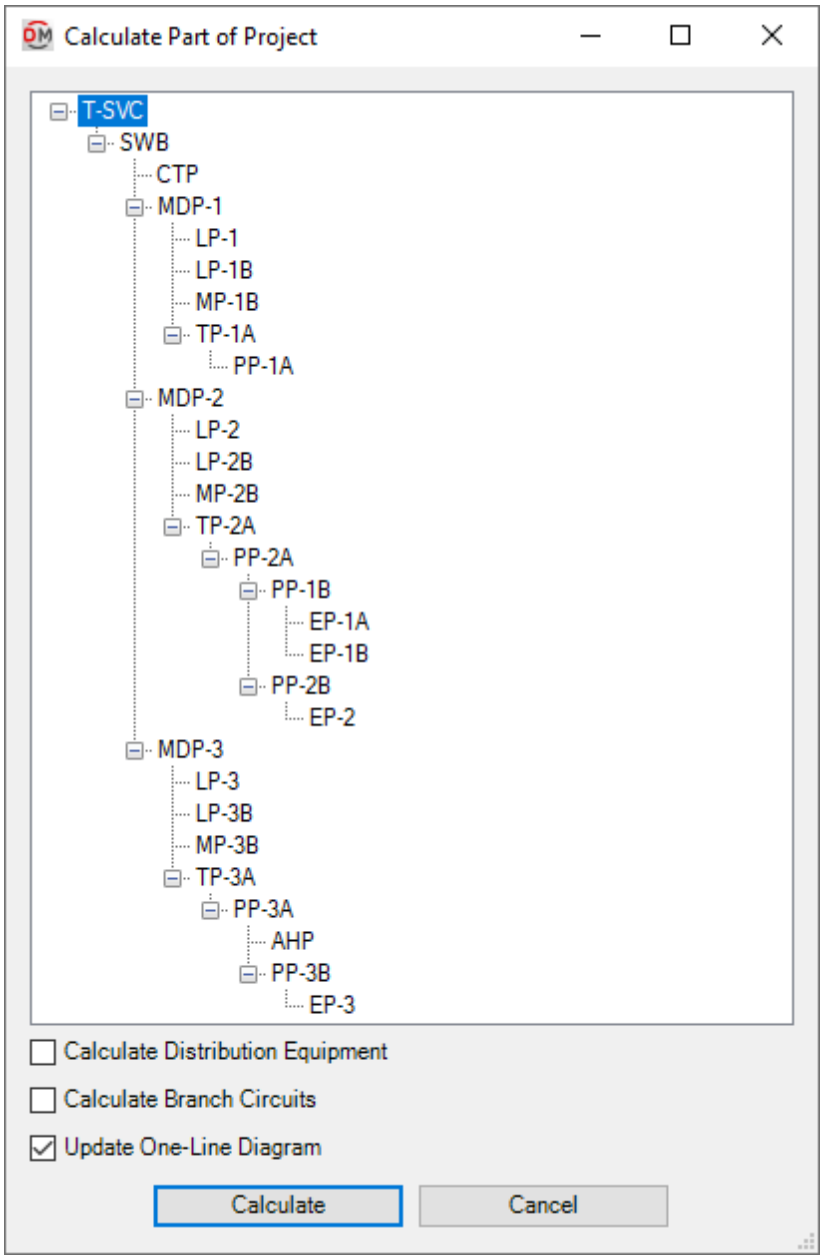
Run this command after you make changes to your model using either Revit commands or one of the other Design Master Electrical RT commands. Not all values are not calculated automatically when you make changes to the model.

The first time you run this command in a project, you will be warned that any breaker sizes not configured using Design Master commands may change. See the **Editing Circuits** section for more information.

Calculate Part of Project

Calculates all of the values for part of the electrical model and updates the associated shared parameters. Opens the **Calculate Part of Project** dialog box:

Calculate Part of Project Dialog Box



Tree: All of the distribution equipment in your project. They are organized based upon the connections in the model.

Calculate Distribution Equipment: The values for the affected distribution equipment will be calculated. This calculation includes fault, voltage drop, and arc-flash. Branch circuits for the affected distribution equipment will not be calculated.

Calculate Branch Circuits: The values for the branch circuits connected to the affected distribution equipment will be calculated. This calculation includes fault and voltage drop. Values for the affected distribution equipment feeding the branch circuits will not be calculated.

Update One-Line Diagram: Labels and graphics for the affected distribution equipment will be updated on the one-line diagram. Calculated values such as fault, voltage drop, and arc-flash will not be calculated.

Select the distribution equipment to start the calculation from and specify the calculation settings, then press the **Calculate** button. The selected values will be calculated for the selected distribution equipment and everything below it in the tree. Other distribution equipment will not be calculated. Distribution equipment with multiple sources, such as transfer switches, may not be calculated correctly depending upon the model.

In the dialog box shown above, MDP-2 and everything below it will be calculated. Other distribution equipment, such as MDP-1 and MDP-3, will not be calculated.

The first time you run this command in a project, you will be warned that any breaker sizes not configured using Design Master commands may change. See the **Editing Circuits** section for more information.

Panel Edit

Allows you to view and edit the information about distribution equipment in your project.

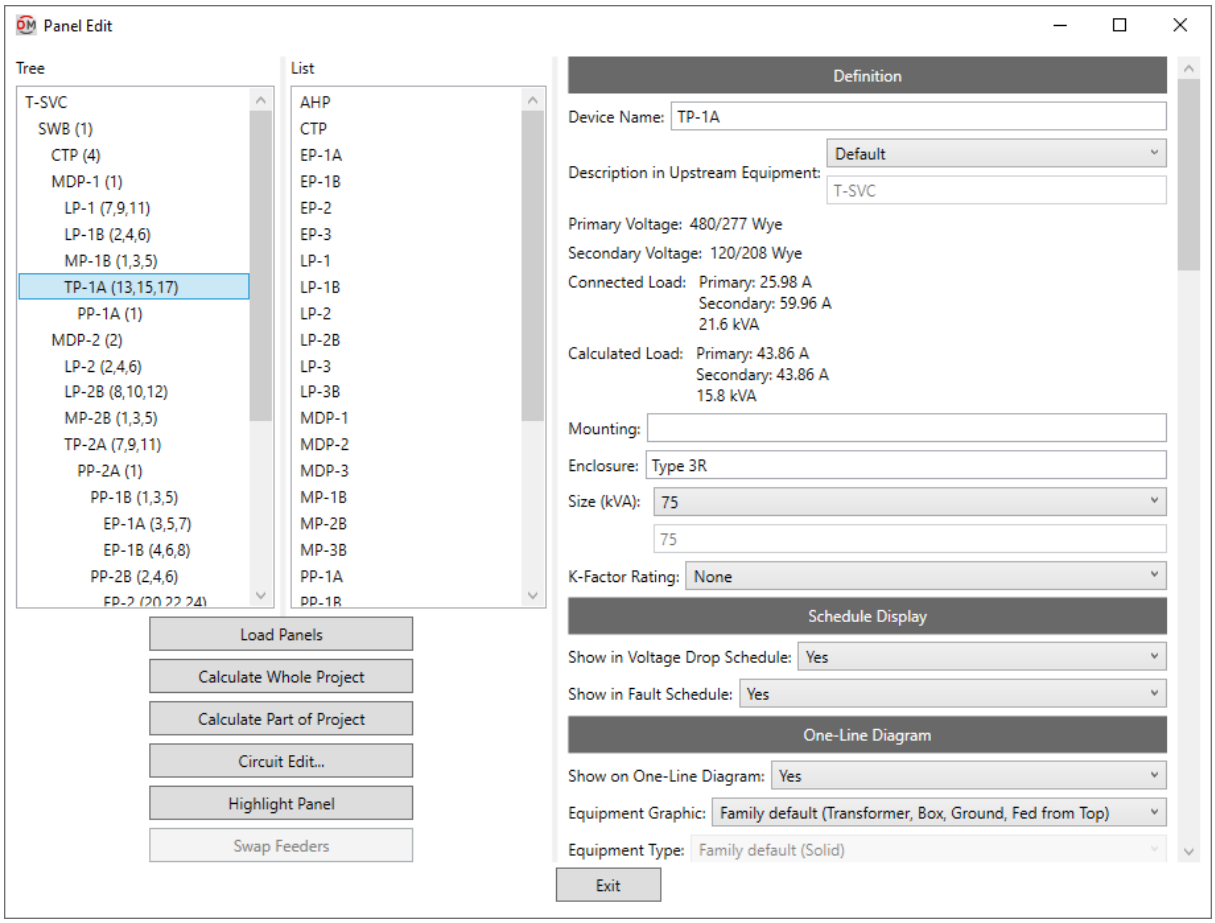
If you are in a drafting view, you will be prompted to specify a distribution equipment in the view or press **ESC**.

Training Videos

- **The Panel Edit Command**

Opens the **Panel Edit** dialog box:

Panel Edit Dialog Box



Tree / List: All of the distribution equipment in your project. They are organized based upon the connections in the model, and listed alphabetically by *Device Name*.

You can select multiple equipment in the tree and list using the **SHIFT** or **CTRL** keys. Only fields shared by all of the selected equipment will be shown. Fields that have different values across the selected equipment will display **<Varies>**.

Load Panels: If you run the `Panel Edit` command with a distribution equipment selected, only the selected equipment will appear in the *Tree / List*. Press this button to display the rest of the distribution equipment in the model.

Calculate Whole Project: Press this button to run the **Calculate Whole Project** command. You will be prompted for confirmation.

Calculate Part of Project: Press this button to run the **Calculate Part of Project** command beginning at the selected distribution equipment. You will be prompted for confirmation.

Circuit Edit: Press this button to close this dialog box and run the **Circuit Edit** command. The currently selected distribution equipment will be selected in the **Circuit Edit** dialog box.

Highlight Panel: Press this button to highlight the selected distribution equipment in the model or on the one-line diagram, similar to the Revit **`Highlight in Model`** command. If the device exists on multiple views, you will be prompted to specify a view.

Swap Feeders: This button is enabled when you select a piece of distribution equipment with two feeders. The two feeders are arbitrarily assigned to be feeder 1 or feeder 2. Feeder 1 is considered the main feeder for the equipment and should lead back to the utility. Feeder 2 should be used for the emergency or bypass feeder. Press this button to change which feeder is assigned which number.

Definition

Device Name: The name of the distribution equipment. This is the same value as the *Panel Name* Revit parameter. Changing the *Device Name* in this dialog box will also change the *Panel Name*. It will also update the name of the panel schedule associated with this distribution equipment.

Description in Upstream Equipment: The description for the distribution equipment that will appear in the circuit description of the upstream panel schedule.

- **Default:** The description in the upstream panel schedule will be the same as the device name.
- **Custom:** Enter a custom description in the field provided.
- **Controlled by Revit:** If *Circuit description method* in the **Project Options** command is set to **Use Revit circuit descriptions**, this field is disabled.

Primary Voltage: The primary voltage of the distribution equipment. This is the same value as the *Distribution System* Revit parameter. Use the standard Revit interface to change this value.

Secondary Voltage: The secondary voltage of the distribution equipment. This is the same value as the *Secondary Distribution System* Revit parameter. Use the standard Revit interface to change this value. This field is only displayed for transformers.

Connected Load: The total connected load on the distribution equipment. These fields are the same values as the *Total Connected* and *Total Connected Current* Revit parameters.

- **Primary/Secondary:** The total connected current at the primary and secondary voltages on the distribution equipment.The *Secondary* field is the same value as the *Total Connected Current* Revit parameter.These fields are only displayed for transformers.

Calculated Load: The total calculated demand load on the distribution equipment. These fields are the same values as the *Total Estimated Demand* and *Total Estimated Demand Current* Revit parameters.

- **Primary/Secondary:** The total calculated demand current at the primary and secondary voltages on the distribution equipment.The *Secondary* field is the same value as the *Total Estimated Demand Current* Revit parameter.These fields are only displayed for transformers.

Bus Size / Mains: The size of the bus. This field is the same value as the *Mains* Revit parameter that can be set in the *Electrical - Circuiting* section of the **Properties** panel for distribution equipment. This field is only displayed for panels and switchboards.

- **Specific ampacity:** The mains value is set to the specific size chosen from the list.
- **Custom:** Enter a custom mains value in the field provided.

This value can be set in the family definition using the **Family Edit** command. If it is, the value cannot be changed in the instance in the project.

Main Disconnect Type: The type of disconnect for the device. If you are creating the one-line diagram in AutoCAD, the graphics on the bus bar are controlled by this field. This field is only displayed for panels and switchboards.

- **Family default:** The type has been set in the family using the **Family Edit** command. The value from the family will be used.
- **Main Lugs Only:** The bus bar on the one-line diagram does not have a disconnect.
- **Breaker:** The bus bar on the one-line diagram includes a breaker graphic.

- **Fused Switch:** The bus bar on the one-line diagram includes a fused switch graphic.

Main Disconnect Trip: The trip rating of the main disconnect breaker or fused switch. This field is only displayed for panels and switchboards.

- **Family default:** The trip rating has been set in the family using the **Family Edit** command. The value from the family will be used.
- **Same as bus amps:** The trip rating is the same as the *Mains / Bus Amps* value.
- **Specific ampacity:** The trip rating is set to the specific size chosen from the list.

Select Breaker Curve: Press this button to configure the curve for the main disconnect breaker or fused switch. The **OCP Device Settings** dialog box will appear. If *Main Disconnect Type* is set to **Main Lugs Only**, this button is disabled. This button is only displayed for panels and switchboards.

Main Disconnect Frame: The frame size of the main disconnect breaker or fused switch. This field is only displayed for panels and switchboards.

- **Family default:** The frame size has been set in the family using the **Family Edit** command. The value from the family will be used.
- **Same as bus amps:** The frame size is the same as the *Mains / Bus Amps* value.
- **Specific ampacity:** The frame size is set to the specific size chosen from the list.

Mounting: The *Mounting* Revit parameter that can be set in the *General* section of the **Properties** panel for distribution equipment.

Enclosure: The *Enclosure* Revit parameter that can be set in the *General* section of the **Properties** panel for distribution equipment.

Lugs: The lugs used on the distribution equipment. This setting controls the type of connection you can make on downstream distribution equipment. The one-line diagram graphics for the bus bar are also affected by this setting.

This value is set in the panel definition. It cannot be set in this dialog box. If the *Feed Through Lugs* Revit parameter is enabled, this field will be set to **Feed Through**. If the *Feed Through Lugs* and *SubFeed Lugs* Revit parameters are enabled, this field will be set to **Double**. If neither parameter is enabled, this field will be set to **Standard**.

Size: The size of the transformer in kVA. Select the size from the list or manually enter the value. The sizes in the list are based upon the **Transformer OCP Sizes** command. This field is only displayed for transformers.

This value can be set in the family definition using the **Family Edit** command. If it is, the value cannot be changed in the instance in the project.

K-Factor Rating: The specific K-factor rating of the transformer for handling the harmonic content of the load. This field is only displayed for transformers.

This value can be set in the family definition using the **Family Edit** command. If it is, the value cannot be changed in the instance in the project.

Schedule Display

Show in Voltage Drop Schedule: Whether the distribution equipment is displayed in the voltage drop schedule.

Show in Fault Schedule: Whether the distribution equipment is displayed in the fault current schedule.

One-Line Diagram

Show on One-Line Diagram: Whether the distribution equipment is inserted on the one-line diagram when using the **Generate One-Line** or **Export to AutoCAD** commands, and whether it is displayed in the **Insert Link** and **Copy Link** commands. The default setting for distribution equipment is **Yes**.

Equipment Graphic: The default graphic family used for the distribution equipment when it is inserted on the one-line diagram. The values in this list are based upon the **One-Line Diagram Device Graphics** command.

- **Family or project default:** The *One-Line Graphic* specified in the distribution equipment family will be used. If one has not been set, the *Default panel graphic* or *Default transformer graphic* specified in the **Project Options** command will be used.

Equipment Type: The graphic type used for the distribution equipment. The values in this list are based upon the selected *Equipment Graphic*.

Upstream OCP Graphic: The graphic family used for the upstream OCP when the distribution equipment is inserted on the one-line diagram. The values in this list are based upon the **One-Line Diagram Feeder Graphics** command.

- **Family or project default:** The *Upstream OCP Graphic* specified in the distribution equipment family will be used. If one has not been set, the *Default OCP graphic* specified in the **Project Options** command will be used.
- **None:** No OCP graphic will be inserted.

Upstream OCP Type: The graphic type used for the upstream OCP. The values in this list are based upon the selected *Upstream OCP Graphic*.

Default Downstream OCP Graphic: The graphic family used for the OCP when devices connected to the distribution equipment are first inserted on the one-line diagram. The values in this list are based upon the **One-Line Diagram Feeder Graphics** command.

- **Family or project default:** The *Downstream OCP Graphic* specified in the distribution equipment family will be used. If one has not been set, the *Default OCP graphic* specified in the **Project Options** command will be used.
- **None:** No OCP graphic will be inserted.

Default Downstream OCP Type: The graphic type used for the OCP. The values in this list are based upon the selected *Default Downstream OCP Graphic*.

Feeder ID Graphic: The graphic family used for the feeder ID when the distribution equipment is inserted on the one-line diagram. The values in this list are based upon the **One-Line Diagram Feeder Graphics** command.

- **Family or feeder group default:** The *Feeder ID Graphic* specified in the distribution equipment family will be used. If one has not been set, the feeder ID graphic set for the group in the **Project Feeder ID Schedule** will be used.
- **None:** No feeder ID graphic will be inserted.

Feeder ID Type: The graphic type used for the feeder ID. The values in this list are based upon the selected *Feeder ID Graphic*.

Upstream Connection

OCP Trip: The trip rating of the OCP in the device upstream of the distribution equipment. Used to set the *Rating* value of the connected circuit.

- **Same as main disconnect or bus size / lugs if transformer:** The OCP is sized to match the *Mains*

parameter. If the upstream distribution equipment is a transformer, no OCP will be used and the *Rating* value of the connected electrical system will be set to 0. This choice is available for panels and switchboards.

- **Same as main disconnect or bus size / breaker if transformer:** The OCP is sized to match the *Mains* parameter. This choice is available for panels and switchboards.
- **Size to match kVA:** The OCP is sized to match the *Transformer kVA* field set in this dialog box. This choice is available for transformers.
- **Lugs or N/A:** There is no OCP for this device. The *Rating* value of the connected electrical system is set to 0.
- **Specific ampacity:** The OCP is set to the specific size chosen from the list.

Select Breaker Curve: Press this button to configure the curve for the upstream OCP. The **OCP Device Settings** dialog box will appear. If *OCP Trip* is set to **Lugs or N/A**, this button is disabled.

OCP Frame: The frame size of the OCP in the device upstream of the distribution equipment. Used to set the *Rating* value of the connected circuit.

- **Same as main disconnect or bus size:** The frame is sized to match the *Mains* parameter. This choice is available for panels and switchboards.
- **Size to match kVA:** The frame is sized to match the *Transformer kVA* field set in this dialog box. This choice is available for transformers.
- **Specific ampacity:** The frame size is set to the specific size chosen from the list.

Feeder

Fed From: The upstream distribution equipment to which this distribution equipment is connected.

Callout: The callout for the feeder, listing all of the wire sizes.

Voltage Drop from Upstream Equipment: The voltage drop in the feeder to this distribution equipment.

Voltage Drop from Utility: The cumulative voltage drop from the utility to this distribution equipment.

Conductor: The ampacity of the feeder conductors.

- **Default:** The conductors are sized based upon the *OCP Trip* setting according to the active sizing option in the **Wire Ampacities** command.
- **Sizing option:** The conductors are sized based upon the *OCP Trip* setting according to the sizing option chosen from the list.
- **Custom:** The *Callout*, *Neutral*, *Ground*, *IG Conductor*, *Conduit*, *Conduit Fill*, and *Ambient Temperature* fields will be disabled. The following fields will be provided.
  - **Callout:** Enter the callout for the feeder.
  - **Conduit:** Sets the conduit size that is exported when using the **eVolve** command. This value is not otherwise used.
  - **Parallel Runs:** Sets the number of parallel runs that is exported when using the **eVolve** command. This value is not otherwise used.
  - **Feeder ID:** Enter the feeder ID to be used on the one-line diagram for the feeder.
  - **X:** Enter the reactance per 1000' for the feeder.
  - **R:** Enter the resistance per 1000' for the feeder.
- **None:** There is no feeder to this distribution equipment. The *Callout* will be blank.
- **Specific ampacity:** The conductors are sized to match the wire ampacity chosen from the list.

Neutral: Sets the size of the neutral wire in the feeder.

- **Family default:** The neutral size has been set in the family using the **Family Edit** command. The value from the family will be used.
- **Same as phase:** The neutral wire is the same size as the phase wires specified in the *Conductor* field.

- **Double phase:** The neutral wire is twice the size of the phase wires specified in the *Conductor* field. This is accomplished by using two neutral wires. The ampacity of the conductor wires will be derated 80% based upon *NEC Table 310.15(C)(1)*.
- **None:** No neutral wire is included in the feeder. See the **Neutrals** section for more information about this option.
- **Specific wire size:** The neutral wire is sized to match the wire size chosen from the list.

Ground: Sets the size of the ground wire in the feeder.
- **Family default:** The ground size has been set in the family using the **Family Edit** command. The value from the family will be used.
- **Size automatically:** The ground wire is sized based upon the *OCP Trip* setting. If the distribution equipment is fed from a transformer, the service ground size is used. Otherwise, the equipment ground size is used.
- **NEC 250.122 Equipment:** The ground wire is sized based upon the *Ground Wire Size, Equipment* setting for the wire ampacity specified in the *Conductor* field.
- **NEC 250.102 Service:** The ground wire is sized based upon the *Ground Wire Size, Service* setting for the wire ampacity specified in the *Conductor* field.
- **None:** No ground wire is included in the feeder.
- **Specific wire size:** The ground wire is sized to match the wire size chosen from the list.

IG Conductor: Whether the feeder includes an isolated ground.
- **Family default:** The need for an isolated ground has been set in the family using the **Family Edit** command. The value from the family will be used.
- **Yes:** An isolated ground will be included in the feeder.
- **No:** An isolated ground will not be included in the feeder.

Conduit: Sets the size of the conduit for the feeder.
- **Size automatically:** The conduit is sized automatically based upon the wires in the feeder. All conduits are sized using a 40% conduit fill (*NEC Table 1*).
- **None:** No conduit is included for the feeder.
- **Specific conduit size:** The conduit is sized to match the conduit size chosen from the list.

Conduit Fill: The conduit fill percentage for the feeder.

Ambient Temperature: The ambient temperature at the location of the feeder.
- **Default:** The feeder will be sized based upon the *Ambient temperature* option set in the **Project Options** command.
- **Custom:** Enter the ambient temperature in °C in the field provided. Select this option to size the feeder based upon the outdoor temperature or *NEC 310.15(B)(2)*.

Length: The length of the feeder.
- **Default:** The length is calculated using the *Feeder length calculation method* option set in the upstream distribution equipment.
- **Straight line:** The length is calculated based upon the straight line distance between the distribution equipment and upstream distribution equipment. This calculation approximates lengths for wires running directly between devices, typically underground.
- **Right angles:** The length is calculated based upon the distance along the axes of the building between the distribution equipment and upstream distribution equipment. This calculation approximates lengths for wires running along the walls of the building.
- **Revit calculated length:** The feeder length is based upon the distance that Revit calculates using the **Circuit Path** feature.
- **Fixed:** Enter the length of the feeder in feet in the field provided.

Building Angle: The orientation of the building used when *Feeder Length* is set to **Right angles**. See the **How**

Building Angle Affects Calculations article in the knowledge base for more information about this setting.

Wire Make-Up: Additional length of wire added to automatically calculated feeder lengths to represent make-up in the field. If *Length* is set to **Fixed**, this field is disabled.

- **Default:** The length is based upon the *Feeder wire make-up length* option set in the **Project Options** command.
- **Custom:** Enter a custom length in the field provided.

Conduit Run Id: The ID that corresponds to the feeder when using the **eVolve** command.

Upstream Connection 2

If the distribution equipment has two feeders, the settings for the second upstream connection are listed in this section. The settings are the same as the ones available in the **Upstream Connection Settings** section described above.

Feeder 2

If the distribution equipment has two feeders, the settings for the second feeder are listed in this section. The settings are the same as the ones available in the **Feeder Settings** section described above.

Circuit Lengths

Downstream Feeder Length Calculation Method: How the lengths are calculated for feeders between this distribution equipment and distribution equipment connected to it.

- **Default:** The lengths are calculated based upon the *Feeder length calculation method* option set in the **Project Options** command.
- **Straight line:** The lengths are calculated based upon the straight line distance between the distribution equipment and other distribution equipment connected to it. This calculation approximates lengths for wires running directly between devices, typically underground.
- **Right angles:** The lengths are calculated based upon the distance along the axes of the building between the distribution equipment and other distribution equipment connected to it. This calculation approximates lengths for wires running along the walls of the building.
- **Revit calculated length:** The lengths are based upon the distance that Revit calculates using the **Circuit Path** feature.

Branch Circuit Length Calculation Method: How the lengths are calculated for branch circuits between this distribution equipment and devices connected to it.

- **Default:** The lengths are calculated based upon the *Branch circuit length calculation method* option set in the **Project Options** command.
- **Straight line:** The lengths are calculated based upon the straight line distance between the distribution equipment and devices connected to it. This calculation approximates lengths for wires running directly between devices, typically underground.
- **Right angles:** The lengths are calculated based upon the distance along the axes of the building between the distribution equipment and devices connected to it. This calculation approximates lengths for wires running along the walls of the building.
- **Revit calculated length:** The lengths are based upon the distance that Revit calculates using the **Circuit Path** feature.

Building Angle: The orientation of the building used when the *Feeder Length Calculation Method* or *Branch Circuit Length Calculation Method* is set to **Right angles**. See the **How Building Angle Affects Calculations** article in the knowledge base for more information about this setting.

Branch Circuit Wire Make-Up: Additional length of wire added to automatically calculated branch circuit lengths to represent make-up in the field.

- **Default:** The length is based upon the *Branch circuit wire make-up length* option set in the **Project Options** command.
- **Custom:** Enter a custom length in the field provided.

Add Branch Circuit Wire Make-Up for Each Device: Whether the length specified in *Branch Circuit Wire Make-Up* is added for each device on the circuit. The default is based upon the *Add branch circuit wire make-up for each device* option set in the **Project Options** command.

- **Yes:** The length is added for each device on the circuit.
- **No:** The length is added once, regardless of the number of devices on the circuit.

Fault Calculations

Total Fault Including Motors: The total fault at the distribution equipment including both utility fault and motor fault. This field is for informational purposes to be used while defining the distribution equipment. To set a specific fault value, use the *Utility Fault at Device* field below.

Utility Fault at Device: The fault at the distribution equipment from the utility. Motor fault values are not included in this value.

- **Calculated:** The fault at the distribution equipment is calculated based upon the model.
- **Fixed:** Enter the fault at the distribution equipment in the field provided.

Utility Fault X/R Ratio: The X/R ratio of the utility fault at the device. If *Utility Fault at Device* is set to **Fixed**, you can manually set this value.

Transformer Impedance % : The impedance through the transformer, as a percentage. As this value increases, the fault current on the secondary of the transformer decreases. This field is only displayed for transformers.

- **Calculated:** A default transformer impedance is used based upon the kVA of the transformer:

Transformer kVA	Default Transformer Impedance %
0 - 100	1.75%
112.5 - 300	2%
500	2.5%
750+	5.75%

- **Fixed:** Enter the transformer impedance in the field provided. It can typically be obtained from the transformer manufacturer.

This value can be set in the family definition using the **Family Edit** command. If it is, the value cannot be changed in the instance in the project.

Transformer X/R Ratio: The X/R Ratio of the transformer. This field is only displayed for transformers.

- **Calculated:** A default X/R ratio of 5 is used for the transformer.
- **Fixed:** Enter the X/R ratio in the field provided. It can typically be obtained from the transformer manufacturer.

This value can be set in the family definition using the **Family Edit** command. If it is, the value cannot be changed in the instance in the project.

AIC Rating: The ampere interrupting capacity (AIC) rating for the distribution equipment. This value is not automatically calculated. You must specify this value for all of the distribution equipment in the project. This field is the same value as the *Short Circuit Rating* Revit parameter set in the *Electrical - Circuiting* section of the **Properties** panel for distribution equipment.

- **Specific AIC Rating:** A list of common AIC ratings is available. Choose a value from the list to use it as the AIC rating for the distribution equipment.
- **Custom:** Choose this selection when the AIC rating for the distribution equipment is not available in the default list. Enter the AIC rating in the field provided.

Arc-Flash Calculations

Calculate Arc-Flash: Whether arc-flash is calculated for the distribution equipment. Equipment that is not calculated will not be displayed in the arc-flash schedule and will not have stickers created. Because it is difficult to sustain an arc-flash below 208V, equipment with voltages below 208V do not need arc-flash calculations performed and will have this option set to **No** by default.

Electrode Configuration: The electrode configuration as described in *IEEE Std 1584-2018 Table 9*. Horizontal configurations generally have higher incident energy than vertical configurations. Enclosed configurations generally have higher incident energy than open configurations. Most distribution equipment inside buildings should be set to an enclosed configuration. See the **Electrode Configurations for Arc-Flash Calculations** article in the knowledge base for more information about these configurations.

- **Unknown:** This setting should be used if the electrode configuration is unknown. The calculations provide conservative results.
- **Vertical conductors or electrodes inside a metal box or enclosure:** This setting has the lowest incident energy among enclosed configurations.
- **Vertical conductors or electrodes terminated in an insulating barrier inside a metal box or enclosure:** This setting has a lower incident energy than **Horizontal conductors or electrodes inside a metal box or enclosure**, but higher than **Vertical conductors or electrodes inside a metal box or enclosure**.
- **Horizontal conductors or electrodes inside a metal box or enclosure:** This setting has the highest incident energy among all configurations.
- **Vertical conductors or electrodes in open air:** This setting has the lowest incident energy among all configurations.
- **Horizontal conductors or electrodes in open air:** This setting has the highest incident energy among open configurations.

Enclosure Size: The dimensions of the enclosure. The smaller the enclosure, the higher the incident energy. The size of the enclosure does not affect arcing current and arcing times.

- **Unknown:** This setting should be used if the dimensions are unknown. The calculations will be based upon a 20" x 20" x 9" enclosure.
- **Known:** Enter values for the *Enclosure Width* and *Enclosure Height* fields and set **Enclosure Depth** manually. If possible, set the dimensions based upon the manufacturer's specifications. Typical enclosure dimensions are listed in *IEEE Std 1584-2018 Table 8*. Dimensions for equipment between 208V and 600V are listed in the table below.

Equipment Type	Enclosure Size (H x W x D)
Switchgear	20" x 20" x 20"
MCC	14" x 12" x 8"
Panel	14" x 12" x 8"
Cable Junction Box	14" x 12" x 8"

Enclosure Width: The width of the enclosure.

Enclosure Height: The height of the enclosure.

Enclosure Depth: The depth of the enclosure.

- **Typical:** The calculations will be based upon a depth greater than 8".
- **Shallow:** The calculations will be based upon a depth of 8" or less.
- **Specific:** Enter a value for the *Enclosure Depth* field manually.

Gap Between Conductors: The gap between the conductors. For devices between 208V and 600V, the most accurate calculation can be used when the gap between conductors is between 0.25" and 3". Within that range, the larger the gap, the higher the incident energy. For gaps outside this range, the calculations provide conservative results.

- **Unknown:** This setting should be used if the gap is unknown. For devices between 208V and 600V, the calculations will be based upon a gap of 3". For devices above 600V, the calculations will be based upon a gap of 10".
- **Known:** Enter a value for the *Gap Between Conductors* manually. If possible, set the gap based upon the manufacturer's specifications. Typical gaps between conductors are listed in *IEEE Std 1584-2018 Table 8* . Gaps for devices between 208V and 600V are listed in the table below.

Equipment Type	Gap Between Conductors
Switchgear	1.25"
MCC	1"
Panel	1"
Cable Junction Box	0.5"

Working Distance: The distance from the possible arc point to the torso of the person working on the distribution equipment. The incident energy will be calculated at this distance from the equipment. The farther away from the equipment, the lower the incident energy. Any part of the body closer to the equipment than this distance will be exposed to higher incident energy than is calculated.

- **Unknown:** This setting should be used if the working distance is unknown. The calculations will be based upon a working distance of 12".
- **Known:** Enter a value for the *Working Distance* manually.If possible, set the working distance based upon the actual dimensions of the equipment. Typical working distances are listed in *IEEE Std 1584-2018 Table 10*. Working distances for equipment between 208V and 600V are listed in the table below.

Equipment Type	Working Distance
Switchgear	24"
MCC	18"
Panel	18"
Cable Junction Box	18"

Arcing Current (Maximum): The maximum predicted three-phase arcing current used to determine the operating time for the protective devices.

Arcing Current (Reduced): The minimum predicted three-phase arcing current used to determine the operating

time for the protective devices.

Manually Set Arcing Time: Whether the arcing times are entered manually or set automatically based upon time-current curves set in the **OCP Device Settings** dialog box.

- **Yes:** Enter values for the arcing times manually.
- **No:** The arcing times will be set automatically based upon the next protective device that is upstream of the equipment. If an upstream protective device has not been set, the arcing times will be set to 2 seconds.

Arcing Time @ Maximum Current and Reduced Current: The duration of the arc-flash at the *Arcing Current (Maximum)* and *Arcing Current (Reduced)*. The duration has a significant impact on the incident energy in seconds. The longer you are exposed to the flash, the more intense the burn. The arcing time is based upon the time-current curve for the specific breaker you are using. These values are provided by the manufacturer and can typically be found on their website.

The incident energy is a function of the arcing current and the duration. Lower arcing currents that take longer to close the breaker can result in higher incident energy values than high arcing currents. To account for this, incident energy is calculated using both the *Arcing Current (Maximum)* and *Arcing Current (Reduced)*.

Fuses must be handled differently from breakers. The time-current curves for fuses may include both melting and clearing times. Use the clearing time if it is provided. If only the melting time is provided, you can approximate the clearing time by adding 10% to the melting time if it is greater than 0.3 seconds, or 15% if it is less than 0.3 seconds.

If the arcing current is above the total clearing time at the bottom of the curve (0.01 seconds), use 0.01 seconds.

Incident Energy @ Maximum Current and Reduced Current: The total incident energy based upon the arcing current, arcing times, and working distance.

Arc-Flash Boundary Distance: The limited approach boundary for unprotected workers. At this distance, the harm inflicted upon an unprotected worker during an arc-flash incident will be limited to second-degree burns.

Related Options

Default OCP graphic / type: Sets the project defaults for the *Upstream OCP Graphic*, *Default Downstream OCP Graphic*, *Upstream OCP Type*, and *Default Downstream OCP Type* fields.

Default panel / transformer graphic / type: Sets the project defaults for the *Equipment Graphics* and *Equipment Type* fields.

Display neutral wire count separately from phase wire count: Sets whether the neutral wire is displayed in the *Callout*.

Conduit location: Sets where the conduit size is displayed in the *Callout*.

Ambient temperature: Sets the default for the *Ambient Temperature* field.

Feeder length calculation method: Sets the default for the *Length* and *Downstream Feeder Length Calculation Method* fields.

Building angle: Sets the default value for the *Building Angle* field.

Feeder wire make-up length: Sets the default value for the *Wire Make-Up* field.

Branch circuit wire make-up length: Sets the default value for the *Branch Circuit Wire Make-Up* field.

Add branch circuit wire make-up for each device: Sets the default value for the *Add Branch Circuit Wire Make-Up For Each Device* field.

Circuit Edit

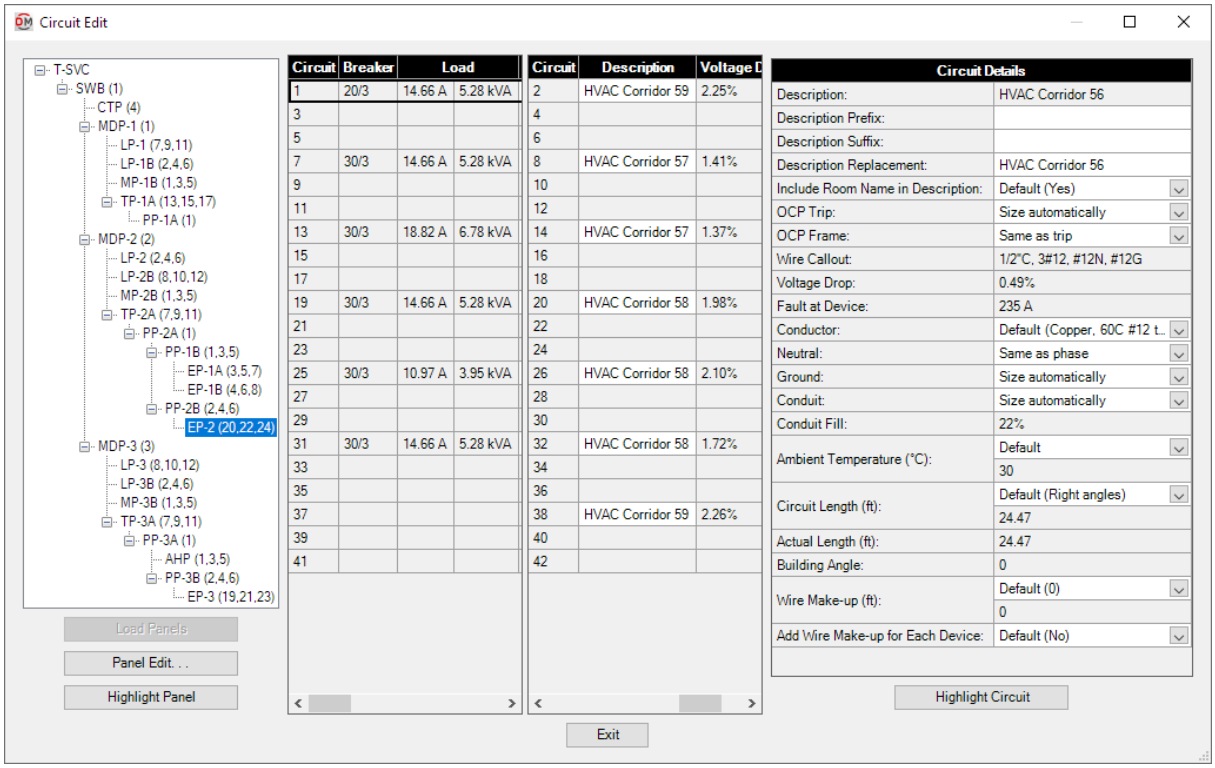
Allows you to set information used for sizing branch circuits.

Training Videos

- The Circuit Edit Command

Opens the **Circuit Edit** dialog box:

Circuit Edit Dialog Box



The wire size values that are calculated are stored in shared parameters on the circuits. These shared parameters can be displayed in your panel schedule in addition to or instead of built-in Revit parameters. See the **Modifying Panel Schedules** section for more information.

Distribution Equipment Tree

The tree on the left side of the dialog box lists all of the distribution equipment in your project. The equipment is organized based upon the connections in the model.

Load Panels: If you run the `Circuit Edit` command with a distribution equipment selected, only the selected equipment will appear in the *Distribution Equipment Tree*. Press this button to display the rest of the distribution equipment in the model.

Panel Edit: Press this button to close this dialog box and run the **Panel Edit** command. The currently selected distribution equipment will be selected in the **Panel Edit** dialog box.

Highlight Panel: Press this button to highlight the selected distribution equipment in the model or on the one-line diagram, similar to the Revit **`Highlight in Model`** command. If the device exists on multiple views, you will be prompted to specify a view.

Circuit Lists

The two middle sections list all of the circuits on the selected distribution equipment. If the distribution equipment is a panel with odd and even sides, the odd circuits are listed on the left and the even circuits are listed on the right. Otherwise, all of the circuits are listed on the left and the grid on the right will be blank.

Circuit Details

Information about the selected circuit is displayed in this section.

When a feeder to a downstream piece of distribution equipment is selected, basic information about the feeder is displayed. To make changes to the feeder, use the **Panel Edit** command. Select the distribution equipment connected to the circuit and make changes in the **Feeder Settings** section.

When a space is selected that has nothing connected to it, you will not be able to make any changes.

When a branch circuit is selected, changes can be made to the circuit using the fields described below.

Description: The description for the circuit as it will appear on the distribution equipment schedule. This value is added before any other descriptions on the circuit from connected devices.

If *Circuit description method* in the **Project Options** command is set to **Use Revit circuit descriptions**, the *Description* value is followed by **(Controlled by Revit)**. The *Description Prefix*, *Description Suffix*, *Description Replacement*, and *Include Room Name in Description* fields are not available.

Description Prefix: Text that will be added to the front of the circuit description.

Description Suffix: Text that will be added to the end of the circuit description. It will be added before the room names if they are included.

Description Replacement: Text that will completely replace the circuit description. The circuit description on the device, *Description Prefix*, and *Description Suffix* will not be used.

Include Room Name in Description: Whether the rooms served by the circuit are included in the circuit

description.

- **Default:** Use the *Include Room Name in Description* option set in the **Project Options** command.
- **Yes:** Include room names at the end of the circuit description. The names of each area containing devices on this circuit will be listed. This list of rooms may be different from what Revit would show. Revit only shows a single room name if multiple rooms are on the circuit.
- **No:** Room names are not included in the circuit description.

OCP Trip: Sets the size of the breaker for the branch circuit. Used to set the *Rating* value of the branch circuit.

- **Size automatically:** The breaker is sized to 125% of the connected load.
- **None:** No breaker is used for the branch circuit. The *Rating* value is set to 0.
- **Specific ampacity:** The breaker is sized to match the ampacity chosen from the list.

OCP Frame: Sets the size of the frame for the branch circuit. Used to set the *Frame* value of the branch circuit.

- **Same as trip:** The frame is sized to match the *OCP Trip* value.
- **None:** No frame is used for the branch circuit. The *Rating* value is set to 0.
- **Specific ampacity:** The breaker is sized to match the ampacity chosen from the list.

Wire Callout: The callout for the branch circuit, listing all of the wire sizes.

Voltage Drop: The voltage drop on the branch circuit. This value is based upon the load on the circuit, the wire size, and the circuit length. The calculation assumes the whole load is located at a distance equal to the *Circuit Length* away from the distribution equipment.

Fault at Device: The fault at the device connected to the branch circuit including both utility fault and motor fault. This value is based upon the wire size and length of the circuit. This value is not calculated if there are multiple devices on the circuit.

Conductor: Sets the size of the conductors.

- **Default:** The conductors are sized based upon the *OCP Trip* ampacity according to the active sizing option in the **Wire Ampacities** command.
- **Sizing option:** The conductors are sized based upon the *OCP Trip* ampacity according to the sizing option chosen from the list.
- **Custom:** Enter a custom callout, reactance per 1000', and impedance per 1000' for the feeder in the fields provided. The *Neutral*, *Ground*, *Conduit*, *Conduit Fill*, and *Ambient Temperature* fields will be disabled.
- **None:** The branch circuit does not have any wires. The *Wire Callout* will be blank.
- **Specific ampacity:** The conductors are sized to match the wire ampacity chosen from the list.

Neutral: Sets the size of the neutral wire.

- **Same as phase:** The neutral wire is the same size as the phase wires specified in the *Conductor* field.
- **Double phase:** The neutral wire is twice the size of the phase wires specified in the *Conductor* field. This is accomplished by using two neutral wires. The ampacity of the conductor wires will be derated 80% based upon *NEC Table 310.15(C)(1)*.
- **None:** No neutral wire is included. See the **Neutrals** section for more information about this option.
- **Specific wire size:** The neutral wire is sized to match the wire size chosen from the list.

Ground: Sets the size of the ground wire.

- **Size automatically:** The ground wire is sized automatically based upon the *Equipment* ground setting of the ampacity of the branch circuit.
- **NEC 250.122 Equipment:** The ground wire is sized based upon the *Equipment Ground* setting for the wire ampacity specified in the *Conductor* field.
- **NEC 250.102 Service:** The ground wire is sized based upon the *Service Ground* setting for the wire ampacity specified in the *Conductor* field.
- **None:** No ground wire is included.

- **Specific wire size:** The ground wire is sized to match the wire size chosen from the list.

Conduit: Sets the size of the conduit.
- **Size automatically:** The conduit is sized automatically based upon the wires. All conduits are sized using a 40% conduit fill (*NEC Table 1*).
- **None:** No conduit is included for the feeder.
- **Specific conduit size:** The conduit is sized to match the conduit size chosen from the list.

Conduit Fill: The conduit fill percentage for the branch circuit wire.

Ambient Temperature: The ambient temperature at the location of the branch circuit.
- **Default:** The branch circuit will be sized based upon the *Ambient temperature* option set in the **Project Options** command.
- **Custom:** Enter the ambient temperature in °C in the field provided. Select this option to size the branch circuit based upon the outdoor temperature or *NEC 310.15(B)(2)*.

Circuit Length: The average distance from the distribution equipment to the devices on the branch circuit.
- **Default:** The lengths are calculated based upon the *Circuit Calculation Method* option set in the panel in the **Panel Edit** command.
- **Straight line:** The lengths are calculated based upon the straight line distance between the distribution equipment and the devices on this circuit. This calculation approximates lengths for wires running directly between devices, typically underground.
- **Right angles:** The lengths are calculated based upon the distance along the axes of the building between the distribution equipment and the devices on this circuit. This calculation approximates lengths for wires running along the walls of the building.
- **Revit calculated length:** The lengths are based upon the distance that Revit calculates using the **Circuit Path** feature.
- **Fixed:** Enter the length of the branch circuit in feet in the field provided.

Actual Length: The total calculated length of the branch circuit. If *Circuit Length* is set to **Fixed**, this field displays the sum of the *Circuit Length* value and any wire make-up. Otherwise, this field displays the same value as *Circuit Length*.

Building Angle: The orientation of the building used when *Circuit Length* is set to **Right angles**. See the **How Building Angle Affects Calculations** article in the knowledge base for more information about this setting.

Wire Make-up: Additional length of wire added to automatically calculated branch circuit lengths to represent make-up in the field.
- **Default:** The length is based upon the *Branch Circuit Wire Make-Up* option set in the panel in the **Panel Edit** command.
- **Custom:** Enter a custom length in the field provided.

Add Wire Make-Up for Each Device: Whether the length specified in *Wire Make-up* is added for each device on the circuit. The default is based upon the *Add Branch Circuit Wire Make-Up for Each Device* option set in the panel in the **Panel Edit** command.
- **Yes:** The length is added for each device on the circuit.
- **No:** The length is added once, regardless of the number of devices on the circuit.

Highlight Circuit: Press this button to highlight the device(s) on the selected circuit in the model or on the one-line diagram, similar to the Revit `Highlight in Model` command. If the device(s) exists on multiple views, you will be prompted to specify a view.

Related Options

Include room names in circuit descriptions: Sets the default for the *Include Room Name in Description* setting.

Display neutral wire count separately from phase wire count: Sets whether the neutral wire is displayed in the *Wire Callout*.

Conduit location: Sets where the conduit size is displayed in the *Wire Callout*.

Ambient temperature: Sets the default for the *Ambient Temperature* setting.

Branch circuit length calculation method: Sets the default for the *Circuit Length* setting.

Building angle: Sets the default value for the *Building Angle* field.

Instance Edit

Training Videos

- The Instance Edit Command

Allows you to edit information about a specific family instance in your project.

If nothing is selected, you will be prompted to select a family instance to edit.

If a family instance is selected, or after you select a family instance, one of the following **Instance Edit** dialog boxes will appear:

Branch circuit device: Other: The settings displayed when the selected family instance has the type set to **Branch circuit device: Other** or has not been configured using the **Family Edit** command.

Branch circuit Device: Equipment connection: The settings displayed when the selected family instance has the type set to **Branch circuit device: Equipment connection**.

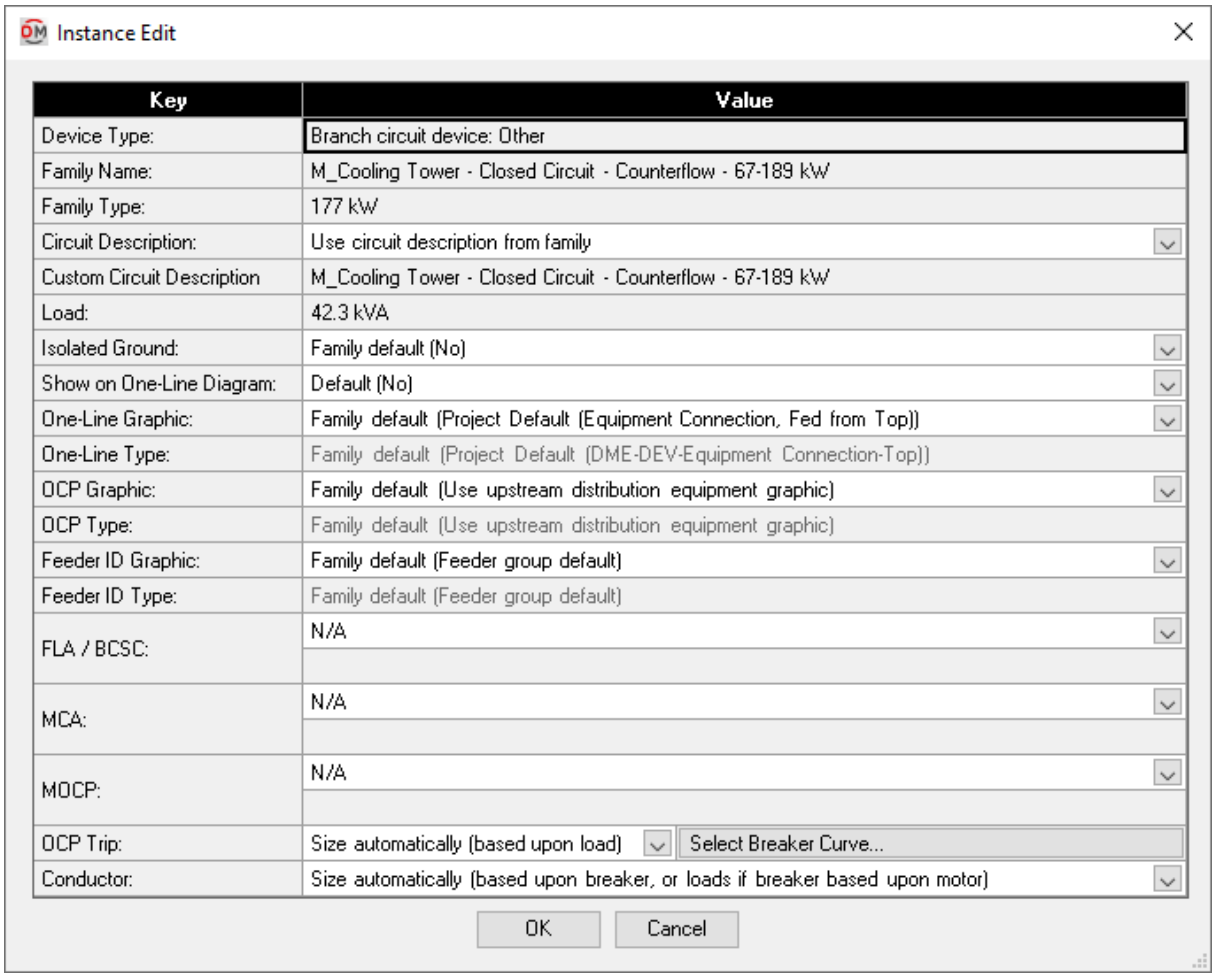
Distribution Equipment: The settings displayed when the selected family instance is not a piece of electrical equipment and has the type set to **Distribution equipment: Other**, **Distribution equipment: Panel**, or **Distribution equipment: Transformer**.

If a piece of electrical equipment is selected, the **Panel Edit** dialog box will open with the selected electrical equipment active.

Branch circuit device: Other

When the selected family instance has the type set to **Branch circuit device: Other** or has not been configured using the **Family Edit** command, this **Instance Edit** dialog box appears:

Instance Edit Dialog Box



Device Type: The *Device Type* set for the family in the **Family Edit** command.

Family Name: The name of the Revit family for the selected instance.

Family Type: The type of the Revit family for the selected instance.

Circuit Description: The circuit description for the selected instance.

- **Use circuit description from family:** Use the circuit description set for the family in the **Family Edit** command.
- **Set circuit description in instance:** Enter a circuit description in the field provided.
- **Controlled by Revit:** If *Circuit description method* in the **Project Options** command is set to **Use Revit circuit descriptions**, this field is disabled.

Load: The load of the selected instance as set in Revit.

Isolated Ground: Whether the branch circuit requires an isolated ground wire. If set to **Yes**, an isolated ground wire is included in the wire callout for the branch circuit connected to this device.

Show on One-Line Diagram: Whether the device is inserted on the one-line diagram when using the **Generate One-Line** or **Export to AutoCAD** commands, and whether it is displayed in the **Insert Link** and **Copy Link** commands. The default setting for branch circuit devices is **No**.

One-Line Graphic: The default graphic family used for the device when it is inserted on the one-line diagram. The values in this list are based upon the **One-Line Diagram Device Graphics** command.

- **Family default / Project default:** The *One-Line Graphic* specified in the device family will be used. If one has not been set, the *Default branch circuit device graphic* specified in the **Project Options** command will be used.

One-Line Type: The graphic type used for the device. The values in this list are based upon the selected *One-Line Graphic*.

OCP Graphic: The graphic family used for the upstream OCP when the device is inserted on the one-line diagram. The values in this list are based upon the **One-Line Diagram Feeder Graphics** command.

- **Family default / Project default:** The *OCP Graphic* specified in the device family will be used. If one has not been set, the *Default OCP graphic* specified in the **Project Options** command will be used.
- **Use upstream distribution equipment graphic:** The *Default Downstream OCP Graphic* and *Default Downstream OCP Type* set in the upstream distribution equipment will be used.
- **None:** No OCP graphic will be inserted.

OCP Type: The graphic type used for the upstream OCP. The values in this list are based upon the selected *OCP Graphic*.

Feeder ID Graphic: The graphic family used for the feeder ID when the device is inserted on the one-line diagram. The values in this list are based upon the **One-Line Diagram Feeder Graphics** command.

- **Family default:** The *Feeder ID Graphic* specified in the device family will be used. If one has not been set, the feeder ID graphic set for the group in the **Project Feeder ID Schedule** will be used.
- **Feeder group default:** The feeder ID graphic set for the group in the **Project Feeder ID Schedule** will be used.
- **None:** No feeder ID graphic will be inserted.

Feeder ID Type: The graphic type used for the feeder ID. The values in this list are based upon the selected *Feeder ID Graphic*.

FLA / BCSC: The full load amps (FLA) or branch circuit selection current (BCSC).

- **N/A:** The default value. The device does not have an FLA or BCSC.
- **Custom:** Specify the value for the FLA or BCSC in the field provided.

MCA: The minimum circuit amps (MCA).

- **N/A:** The default value. The device does not have an MCA.
- **Custom:** Specify the value for the MCA in the field provided.

MOCP: The maximum overcurrent protection (MOCP).

- **N/A:** The default value. The device does not have an MOCP.
- **Custom:** Specify the value for the MOCP in the field provided.

OCP Trip: How to size the breaker for the branch circuit to which the equipment is connected.

- **Size automatically (based upon load):** The breaker is sized based upon 125% of the connected load. FLA / BCSC, MCA, and MOCP are all ignored.
- **Motor-compressor, <= MOCP:** The breaker is sized to be less than the MOCP (see *NEC 440.22(C)*).
- **Motor-compressor, <= 175% of BCSC, <= MOCP:** The breaker is sized to be less than 175% of the BCSC and less than the MOCP (see *NEC 440.22(A) & (C)*).
- **Motor-compressor, <= 225% of BCSC, <= MOCP:** The breaker is sized to be less than 225% of the BCSC and less than the MOCP (see *NEC 440.22(A) Exception no. 2 & (C)*).
- **Motor, dual element fuse, <= 175% of FLA:** The breaker is sized to be less than 175% of the FLA (see *NEC 430.52*).

- **Motor, dual element fuse, <= 225% of FLA:** The breaker is sized to be less than 225% of the FLA (see *NEC 430.52(C)(1)(b)(2)*).
- **Motor, inverse time breaker, <= 250% of FLA:** The breaker is sized to be less than 250% of the FLA (see *NEC 430.52*).
- **Specific ampacity:** The breaker size is set to the specific size chosen from the list.

Select Breaker Curve: Press this button to configure the curve for the breaker. The **OCP Device Settings** dialog box will appear.

Conductor: How to size the conductors for the branch circuit to which the equipment is connected.

- **Size automatically (based upon breaker, or loads if breaker based upon motor):** The conductors are sized automatically. The conductors are sized to match the breaker, or match the load if *OCP Trip* is set to one of the Motor choices.
- **Multimotor, >= MCA:** The conductors are sized to be greater than the MCA (see *NEC 440.35*).
- **Motor-compressor, >= 100% of BCSC + 25% of max BCSC:** The conductors are sized to be greater than 100% of the combined BCSC, plus 25% of the largest BCSC on the circuit (see *NEC 440.32 & 33*).
- **Size based upon loads:** The conductors are sized based upon 125% of the connected load.
- **Size based upon breaker:** The conductors are sized based upon the breaker size.
- **Specific ampacity:** The wire size is set to the specific size chosen from the list.

Related Options

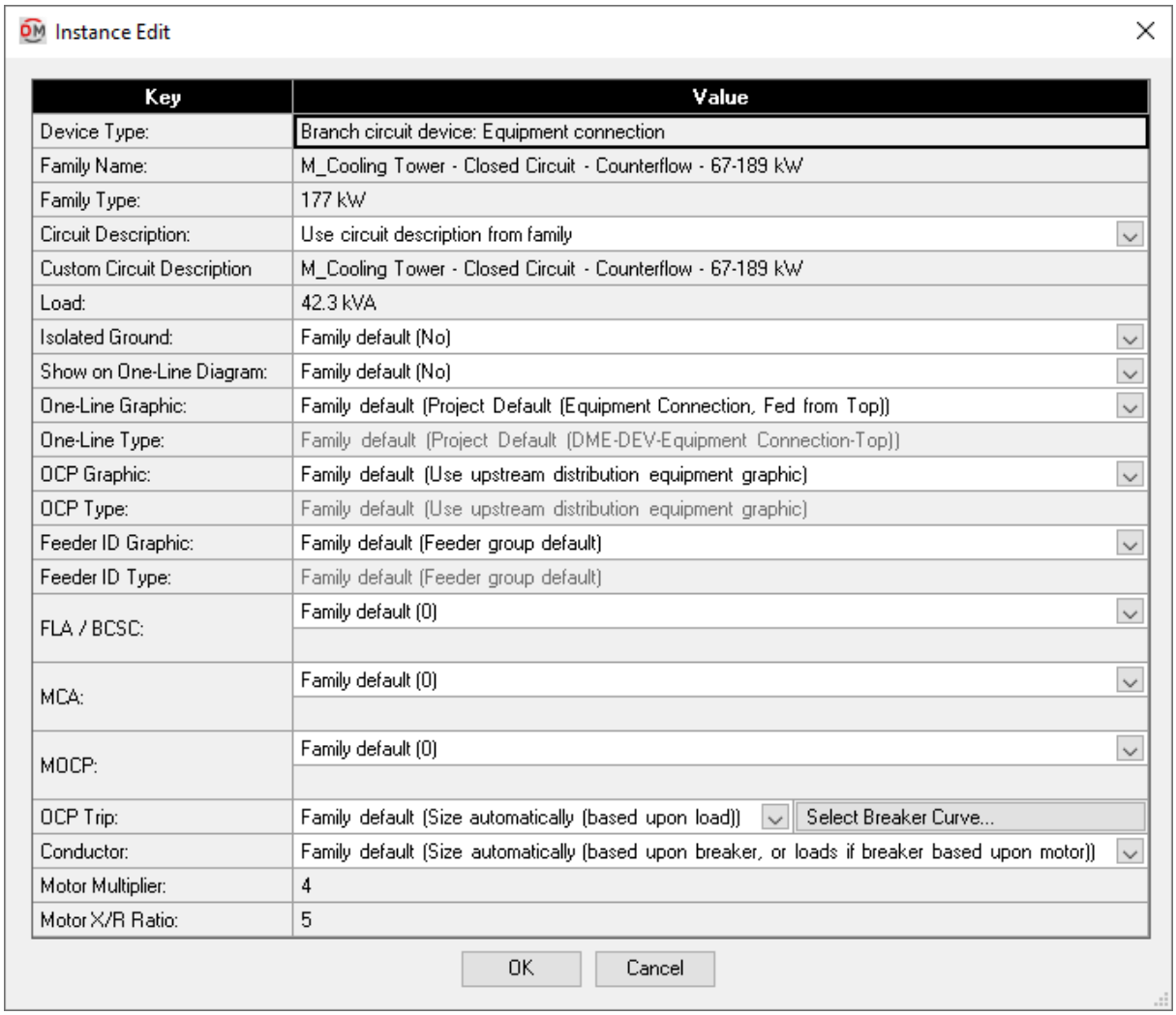
Default OCP graphic / type: Sets the project defaults for the *OCP Graphic* and *OCP Type* fields.

Default branch circuit device graphic / type: Sets the project defaults for the *One-Line Graphic* and *One-Line Type* fields.

Branch circuit device: Equipment connection

When the selected family instance has the type set to **Branch circuit device: Equipment connection**, this **Instance Edit** dialog box appears:

Instance Edit Dialog Box



Device Type: The *Device Type* set for the family in the **Family Edit** command.

Family Name: The name of the Revit family for the selected instance.

Family Type: The type of the Revit family for the selected instance.

Circuit Description: The circuit description for the selected instance.

- **Use circuit description from family:** Use the circuit description set for the family in the **Family Edit** command.
- **Set circuit description in instance:** Enter a circuit description in the field provided.
- **Controlled by Revit:** If *Circuit description method* in the **Project Options** command is set to **Use Revit circuit descriptions**, this field is disabled.

Load: The load of the selected instance as set in Revit.

Isolated Ground: Whether the equipment requires an isolated ground wire. If set to **Yes**, an isolated ground wire is included in the wire callout for the branch circuit connected to this device.

Show on One-Line Diagram: Whether the device is inserted on the one-line diagram when using the **Generate**

One-Line or **Export to AutoCAD** commands, and whether it is displayed in the **Insert Link** and **Copy Link** commands. The default setting for branch circuit devices is **No**.

One-Line Graphic: The default graphic family used for the device when it is inserted on the one-line diagram. The values in this list are based upon the **One-Line Diagram Device Graphics** command.

- **Family default / Project default:** The *One-Line Graphic* specified in the device family will be used. If one has not been set, the *Default branch circuit device graphic* specified in the **Project Options** command will be used.

One-Line Type: The graphic type used for the device. The values in this list are based upon the selected *One-Line Graphic*.

OCP Graphic: The graphic family used for the upstream OCP when the device is inserted on the one-line diagram. The values in this list are based upon the **One-Line Diagram Feeder Graphics** command.

- **Family default / Project default:** The *OCP Graphic* specified in the device family will be used. If one has not been set, the *Default OCP graphic* specified in the **Project Options** command will be used.
- **Use upstream distribution equipment graphic:** The *Default Downstream OCP Graphic* and *Default Downstream OCP Type* set in the upstream distribution equipment will be used.
- **None:** No OCP graphic will be inserted.

OCP Type: The graphic type used for the upstream OCP. The values in this list are based upon the selected *OCP Graphic*.

Feeder ID Graphic: The graphic family used for the feeder ID when the device is inserted on the one-line diagram. The values in this list are based upon the **One-Line Diagram Feeder Graphics** command.

- **Family default:** The *Feeder ID Graphic* specified in the device family will be used. If one has not been set, the feeder ID graphic set for the group in the **Project Feeder ID Schedule** will be used.
- **Feeder group default:** The feeder ID graphic set for the group in the **Project Feeder ID Schedule** will be used.
- **None:** No feeder ID graphic will be inserted.

Feeder ID Type: The graphic type used for the feeder ID. The values in this list are based upon the selected *Feeder ID Graphic*.

FLA / BCSC: The full load amps (FLA) or branch circuit selection current (BCSC). BCSC is used to size the breaker and wires for motor-compressors (see *NEC 440.22 (A) & (C), NEC 440.32 & 33*). FLA is used to size breakers for motors (see *NEC 430.52*).

- **Family default:** The FLA or BCSC is based upon the value set in the **Family Edit** command.
- **N/A:** The default value. The device does not have an FLA or BCSC.
- **Custom:** Specify the value for the FLA or BCSC in the field below.

MCA: The minimum circuit amps (MCA). Used to size wires for multimotors (see *NEC 440.35*).

- **Family default:** The MCA is based upon the value set in the **Family Edit** command.
- **N/A:** The default value. The device does not have an MCA.
- **Custom:** Specify the value for the MCA in the field below.

MOCP: The maximum overcurrent protection (MOCP). Used to size the breaker for motor-compressors (see *NEC 440.22(A) & (C)*).

- **Family default:** The MOCP is based upon the value set in the **Family Edit** command.
- **N/A:** The default value. The device does not have an MOCP.
- **Custom:** Specify the value for the MOCP in the field below.

OCP Trip: How to size the breaker for the branch circuit to which the equipment is connected.

- **Family default:** The breaker is sized based upon the value set in the **Family Edit** command.
- **Size automatically (based upon load):** The breaker is sized based upon 125% of the connected load. FLA / BCSC, MCA, and MOCP are all ignored.
- **Motor-compressor, <= MOCP:** The breaker is sized to be less than the MOCP (see *NEC 440.22(C)*).
- **Motor-compressor, <= 175% of BCSC, <= MOCP:** The breaker is sized to be less than 175% of the BCSC and less than the MOCP (see *NEC 440.22(A) & (C)*).
- **Motor-compressor, <= 225% of BCSC, <= MOCP:** The breaker is sized to be less than 225% of the BCSC and less than the MOCP (see *NEC 440.22(A) Exception no. 2 & (C)*).
- **Motor, dual element fuse, <= 175% of FLA:** The breaker is sized to be less than 175% of the FLA (see *NEC 430.52*).
- **Motor, dual element fuse, <= 225% of FLA:** The breaker is sized to be less than 225% of the FLA (see *NEC 430.52(C)(1)(b)(2)*).
- **Motor, inverse time breaker, <= 250% of FLA:** The breaker is sized to be less than 250% of the FLA (see *NEC 430.52*).
- **Specific ampacity:** The breaker size is set to the specific size chosen from the list.

Select Breaker Curve: Press this button to configure the curve for the breaker. The **OCP Device Settings** dialog box will appear.

Conductor: How to size the conductors for the branch circuit to which the equipment is connected.

- **Family default:** The wire is sized based upon the value set in the **Family Edit** command.
- **Size automatically (based upon breaker, or loads if breaker based upon motor):** The conductors are sized automatically. The conductors are sized to match the breaker, or match the load if *OCP Trip* is set to one of the Motor choices.
- **Multimotor, >= MCA:** The conductors are sized to be greater than the MCA (see *NEC 440.35*).
- **Motor-compressor, >= 100% of BCSC + 25% of max BCSC:** The conductors are sized to be greater than 100% of the combined BCSC, plus 25% of the largest BCSC on the circuit (see *NEC 440.32 & 33*).
- **Size based upon loads:** The conductors are sized based upon 125% of the connected load.
- **Size based upon breaker:** The conductors are sized based upon the breaker size.
- **Specific ampacity:** The wire size is set to the specific size chosen from the list.

Motor Multiplier: The multiplier used in fault calculations set in the **Family Edit** command.

Motor X/R Ratio: The X/R ratio used in fault calculations set in the **Family Edit** command.

Related Options

Default OCP graphic / type: Sets the project defaults for the *OCP Graphic* and *OCP Type* fields.

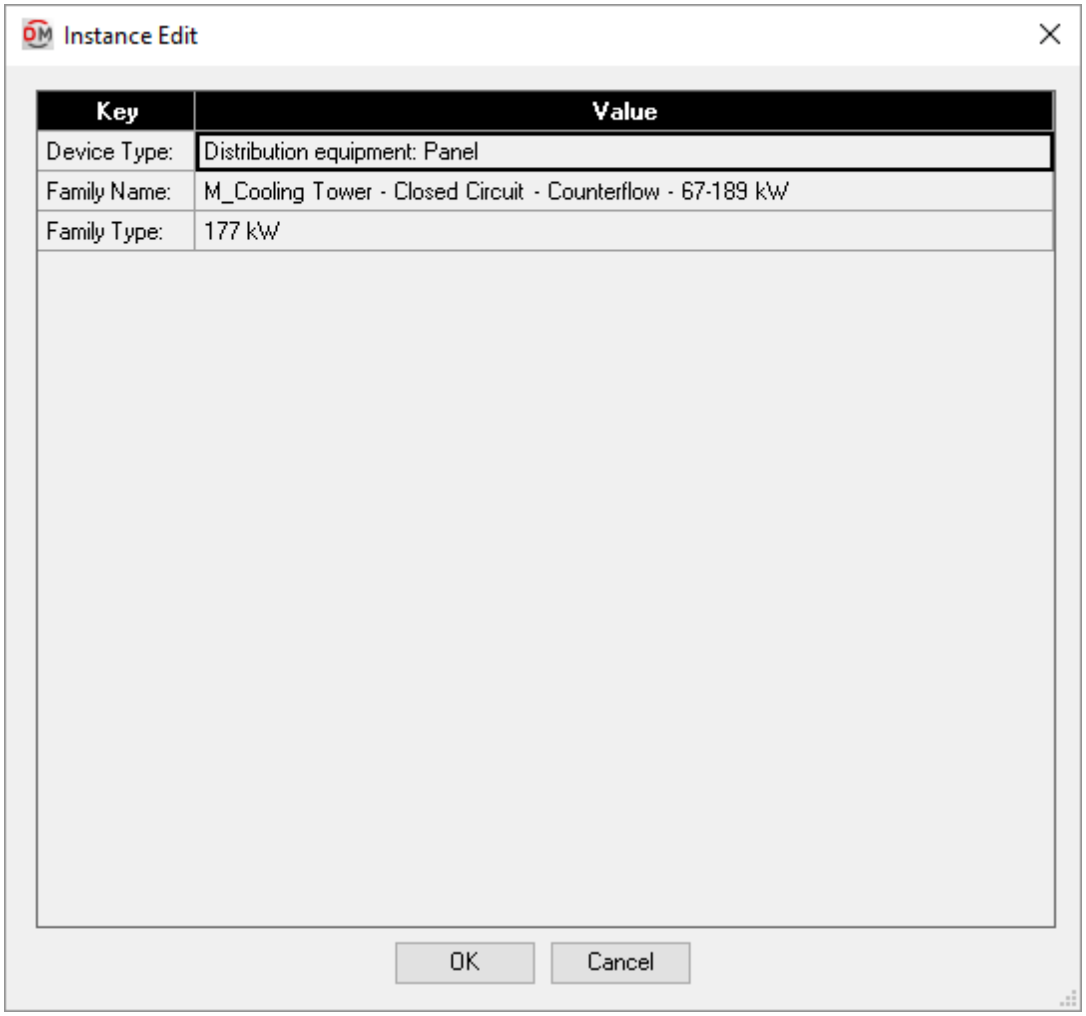
Default branch circuit device graphic / type: Sets the project defaults for the *One-Line Graphic* and *One-Line Type* fields.

Distribution Equipment

When the selected family instance is not a piece of electrical equipment and has the type set to **Distribution equipment: Other**, **Distribution equipment: Panel**, or **Distribution equipment: Transformer**, the **Instance Edit** dialog box below appears.

If the family instance is a piece of electrical equipment, the **Panel Edit** command will open instead. In general, the **Distribution equipment** types should only be used with electrical equipment. The values displayed in this dialog box are for informational purposes only.

Instance Edit Dialog Box



Device Type: The *Device Type* set for the family in the **Family Edit** command.

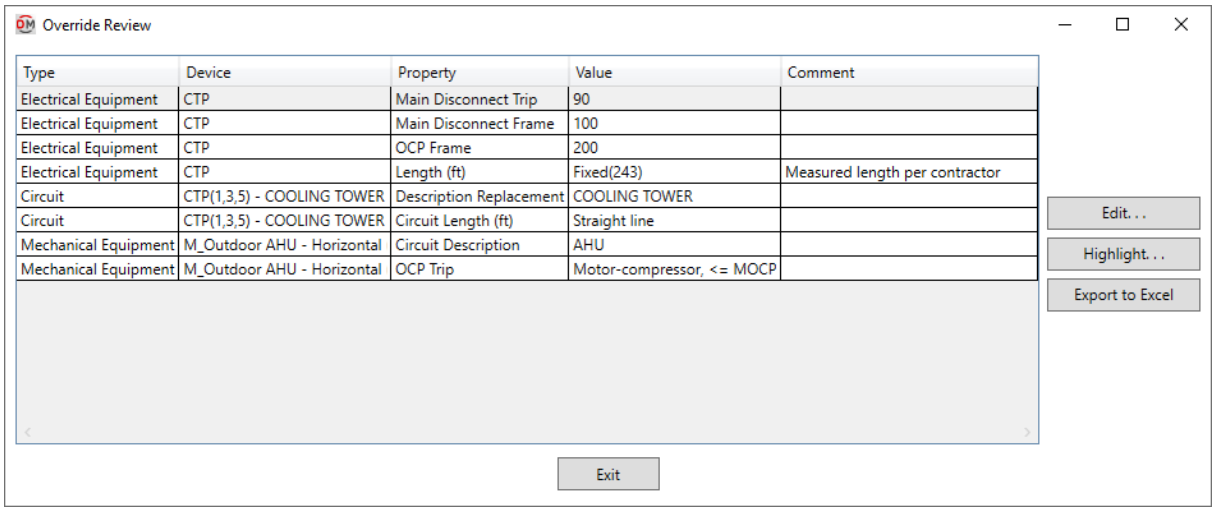
Family Name: The name of the Revit family for the selected instance.

Family Type: The type of the Revit family for the selected instance.

Override Review

Allows you to review device and circuit settings that are being overridden and document the reason when needed. Opens the **Override Review** dialog box:

Override Review Dialog Box



Type: The family category of the device.

Device: The name of the device. For circuits, the circuit number and description will be displayed.

Property: The setting that is being overridden on the device or circuit.

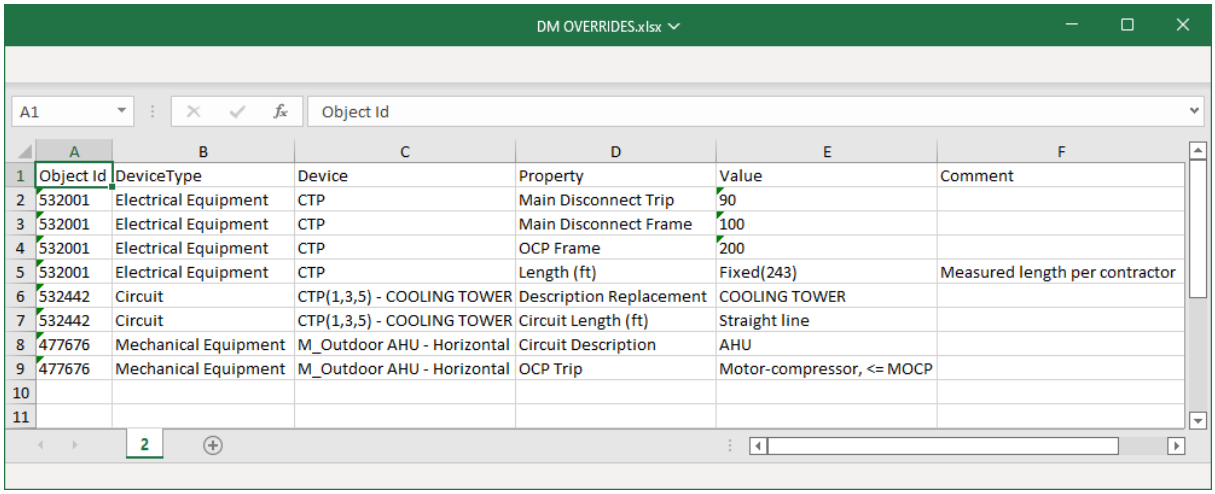
Value: The value that has been entered for the setting.

Comment: Enter a comment describing the reason for overriding the setting.

Edit: Press this button to close this dialog box and run the appropriate **Edit** command for the selected device or circuit.

Highlight: Press this button to highlight the selected device or circuit in the model or on the one-line diagram, similar to the Revit **`Highlight in Model`** command. If the device or circuit exists on multiple views, you will be prompted to specify a view.

Export to Excel: Press this button to export the contents of this dialog box to an XLSX or CSV file that can be opened in Excel.



Selective Coordination

The **Selective Coordination** panel appears on the **DM Electrical** tab when you have a project open in Revit. It includes commands for creating and modifying selective coordination graphs and modifying breaker curves.

Graph Insert: Creates a coordination graph for breakers and fuses on the equipment in the project.

Graph Update: Updates a selective coordination graph to reflect any changes to the design.

Graph Edit: Allows you to modify a selective coordination graph in the project.

Curve Edit: Allows you to set or modify a curve in a selective coordination graph.

Training Videos

- **Breaker Curves in Revit**

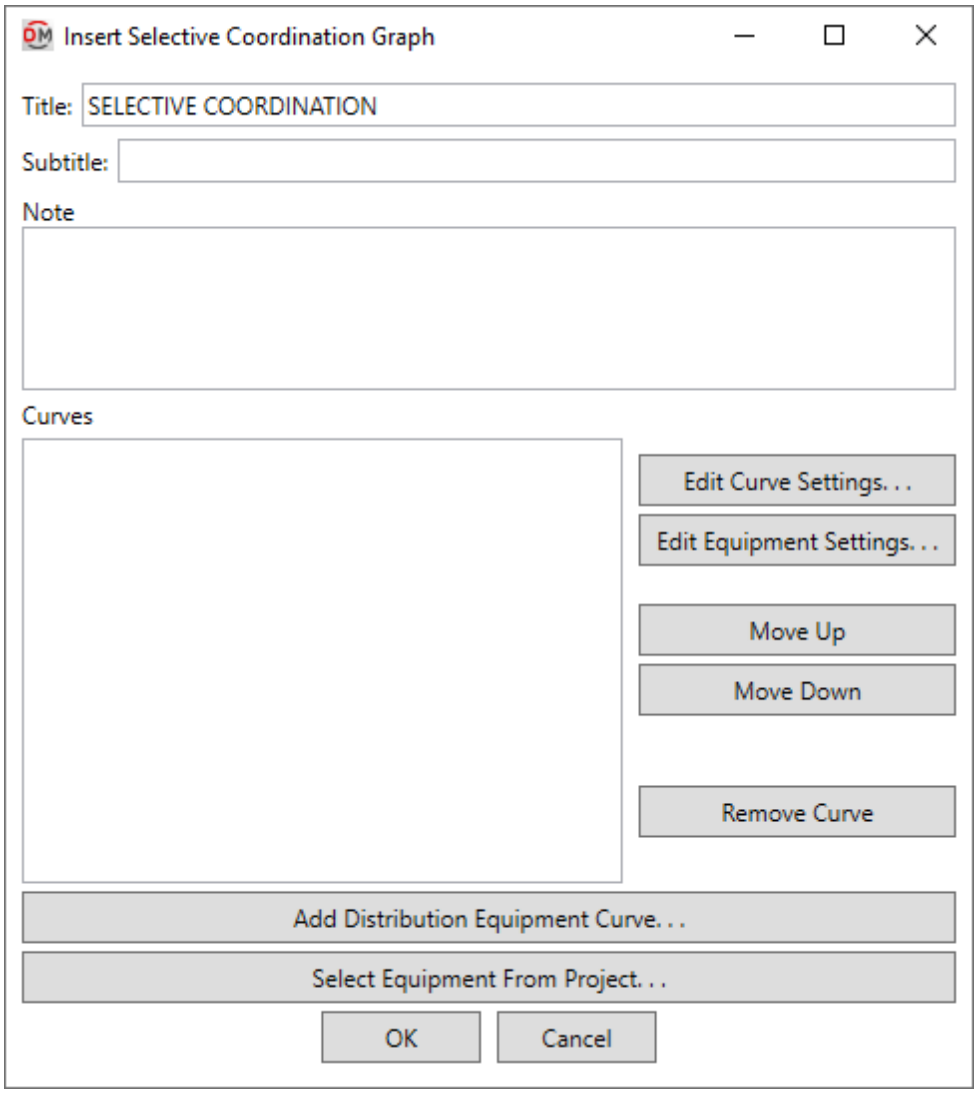
Graph Insert

Creates a coordination graph for breakers and fuses on the distribution equipment and branch circuit devices in the project. Distribution equipment curves are defined in the **Panel Edit** command. Branch circuit device curves are defined in the **Instance Edit** command.

You must be in a drafting view to use this command.

Opens the **Insert Selective Coordination Graph** dialog box:

Insert Selective Coordination Graph Dialog Box



Title: The title to be used for the graph.

Subtitle: A subtitle to be added below the title for the graph.

Note: A note that will appear below the graph when it is inserted on the drafting view.

Curves: A list of the curves to be displayed in the graph.

Edit Curve Settings: Press this button to edit the selected curve. The **OCP Device Settings** dialog box will appear.

Edit Equipment Settings: Press this button to open the **Panel Edit** dialog box for the selected distribution equipment, or the **Instance Edit** dialog box for the selected branch circuit device.

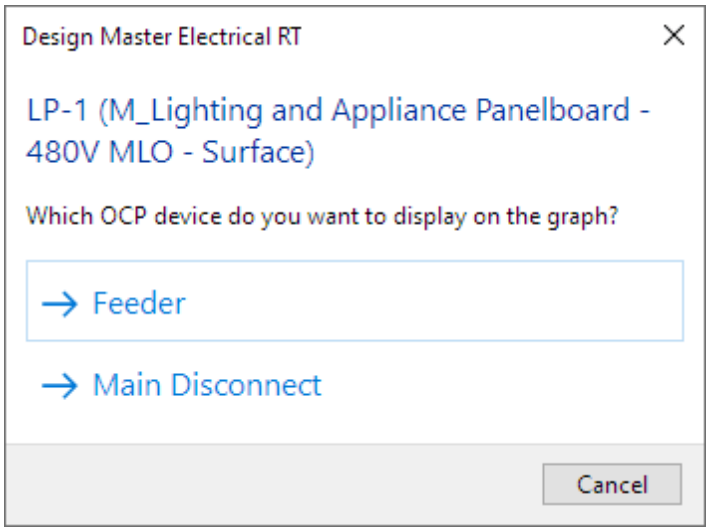
Move Up: Press this button to move the selected row up in the list of curves.

Move Down: Press this button to move the selected row down in the list of curves.

Remove Curve: Press this button to remove the selected row from the list of curves.

Add Distribution Equipment Curve: Press this button to add a distribution equipment curve to the list of curves.

If the selected distribution equipment has curves defined for the feeder and main disconnect, you will be prompted to specify which curve to add.



Select Equipment From Project: Press this button to select a distribution equipment or branch circuit device on the model or on the one-line diagram to add to the list of curves.

The dialog box will close and you will be prompted to specify a device.

Select family instance to edit:

The dialog box will reopen with the curve for the selected device added.If you selected a distribution equipment that has curves defined for the feeder and main disconnect, you will be prompted to specify which curve to add.

Inserting the Selective Coordination Graph on the Drafting View

To insert the selective coordination graph on the drafting view, press the **OK** button. The settings you specified in the dialog box will be used for the graph you insert.

You will be prompted for the insertion location of the graph.

Specify insertion point of selective coordination graph:

The location you specify will be used as the top-left corner for the graph.

Related Options

There are several options that affect the default settings and overall appearance of the selective coordination

graph. See the *Selective Coordination Graph* section of **Project Options** for more information.

Graph Update

Updates a selective coordination graph to reflect any changes to the design. Graphs are not automatically updated when changes are made to the electrical model. You must manually update them.

You must be in a drafting view to use this command.

You will be prompted to select a graph to be updated.

Select selective coordination graph:

The selected graph will be updated.

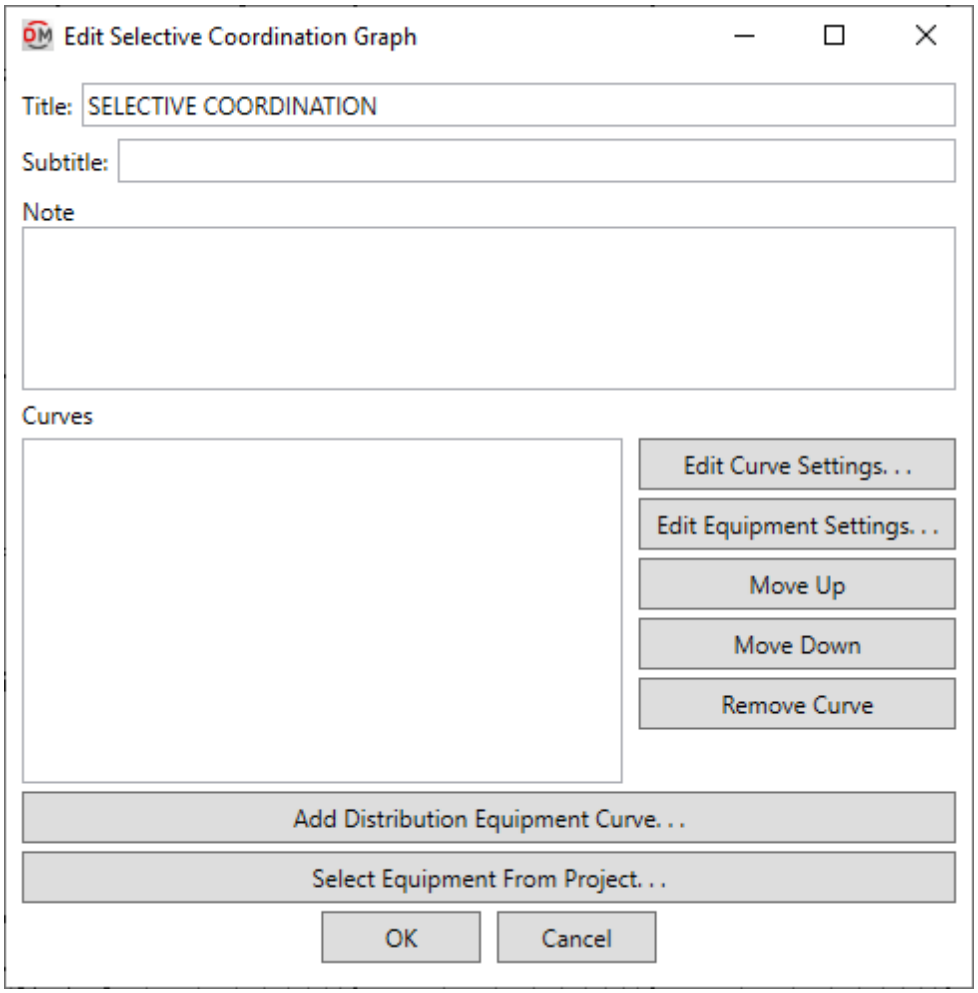
Graph Edit

Allows you to modify a selective coordination graph that is inserted on the model.

You must be in a drafting view to use this command.

You will be prompted to select a graph to edit. The **Edit Selective Coordination Graph** dialog box will appear:

Edit Selective Coordination Graph Dialog Box



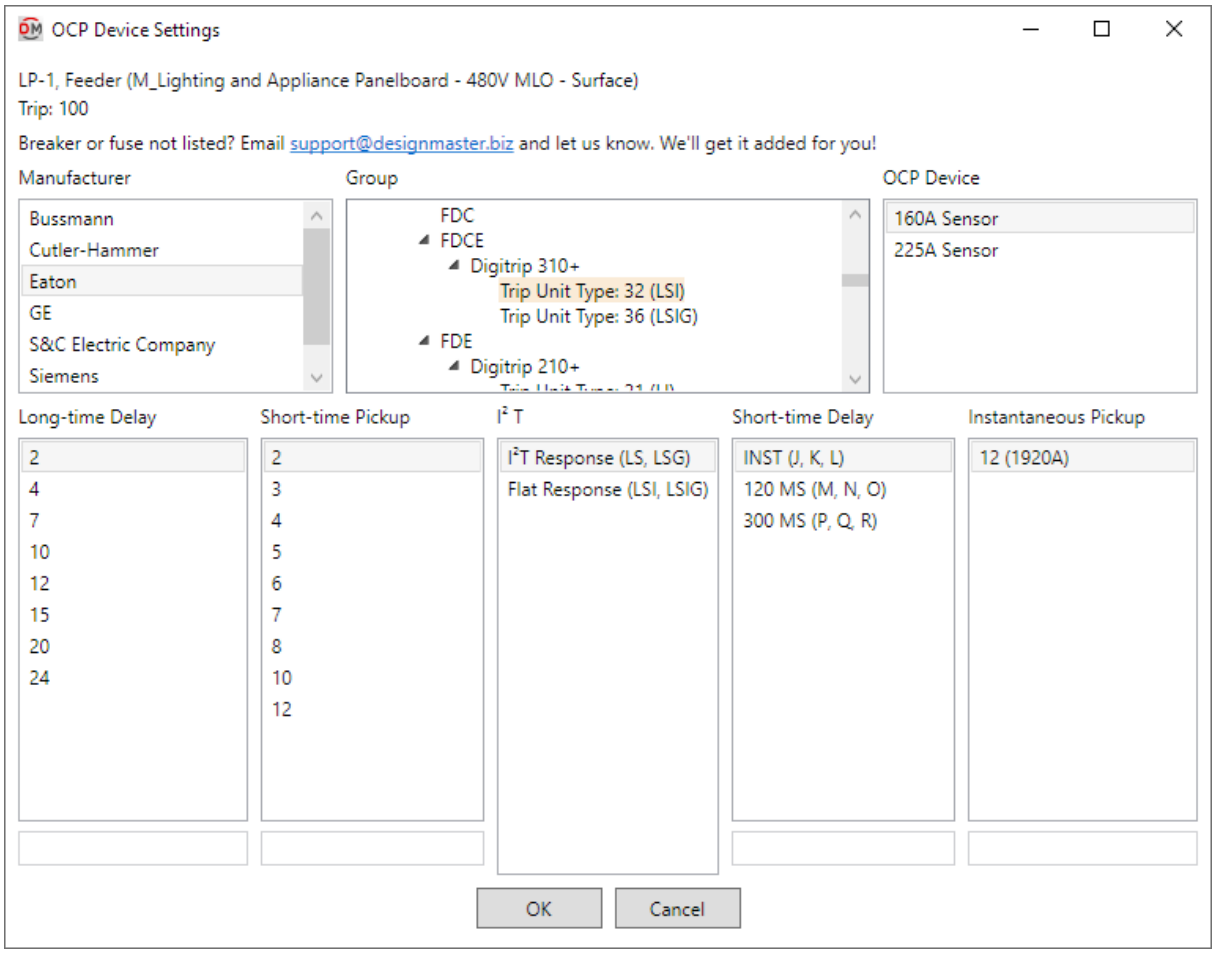
Changes can be made to the graph in the same way as when it was inserted. See the **Insert Selective Coordination Graph** section for more information.

Curve Edit

Allows you to set or modify the curve for a distribution equipment or branch circuit device in a selective coordination graph. See the **Reading and Configuring Time-Current Curves** article in the knowledge base for more information about how the settings in this dialog box affect the curve.

You will be prompted to specify a curve on a selective coordination graph to edit. The **OCP Device Settings** dialog box will appear:

OCP Device Settings Dialog Box



The curves displayed in this dialog box change depending upon the trip size of the breaker. If the breaker or fuse you want to use is not available, **contact us** so we can add it to the database.

Device Name: The name and family of the distribution equipment or branch circuit device. Whether the curve for the main disconnect or upstream OCP is being set is also specified.

Trip: The *Main Disconnect Trip* or *OCP Trip* value set in the **Panel Edit** command, or the *OCP Trip* value set in the **Instance Edit** command.

Manufacturer: The list of manufacturers for the specified *Trip*.

Group: The list of breaker types for the specified *Manufacturer* and *Trip*.

Breaker / Fuse: The list of breaker/fuse models for the specified *Manufacturer*, *Trip*, and *Group*.

Long-time Delay: This value determines how long the breaker will allow lower current increases before tripping. Applies to electronic trip breakers.

If the selected breaker allows the installer to input values digitally, the range and increments that can be input for this value will be displayed. Enter the value in the field below this list.

Short-time Pickup: This value determines the current at which the trip switches from the *Long-time Delay* to the

Short-time Delay. Applies to electronic trip breakers.

If the selected breaker allows the installer to input values digitally, the range and increments that can be input for this value will be displayed. Enter the value in the field below this list.

I^2 T: This value determines whether the *Short-time Delay* value stays constant or varies depending upon the current. Applies to electronic trip breakers.

Short-time Delay: This value determines how long the breaker will allow higher current increases before tripping. Applies to electronic trip breakers.

If the selected breaker allows the installer to input values digitally, the range and increments that can be input for this value will be displayed. Enter the value in the field below this list.

Instantaneous Pickup: This value determines the current at which the breaker trips immediately.

If the selected breaker allows the installer to input values digitally, the range and increments that can be input for this value will be displayed. Enter the value in the field below this list.

Schedules

The **Schedules** panel appears on the **DM Electrical** tab when you have a project open in Revit. It includes commands for creating and viewing the schedules that display the calculated electrical values.

Fault: Goes to a schedule that displays the fault at each piece of distribution equipment. Creates the schedule if it does not already exist.

Voltage Drop: Goes to a schedule that displays the voltage drop on the feeder to each piece of distribution equipment. Creates the schedule if it does not already exist.

Arc-Flash: Goes to a schedule that displays the arc-flash values at each piece of distribution equipment. Creates the schedule if it does not already exist.

Arc-Flash Stickers: Prints the arc-flash values on a sticker that can be placed on the equipment in the field.

Training Videos

- **Fault, Voltage Drop, and Arc-Flash Schedules**

Fault

Creates a schedule called **FAULT CURRENT SCHEDULE** and sets it to the active view. If a schedule of that name already exists, this command sets the schedule to the active view but does not otherwise modify it.

The default schedule layout is shown below. Information about the fault at each piece of distribution equipment in the project is listed. The devices are ordered based upon the connections between devices in the model.

The *FAULT AT DEVICE* column uses the **DMET_Fault_FaultAtDevice** shared parameter by default. This parameter displays a warning in the value for any fault values that exceed that **AIC Rating** of the distribution equipment. To display the fault without any warnings, replace the column with the

DMET_Fault_FaultAtDevice_NoWarnings shared parameter.

Once the schedule is created, you can modify it using standard Revit tools.

<FAULT CURRENT SCHEDULE>								
A	B	C	D	E	F	G	H	I
				FEEDER		TRANSFORMER		
DEVICE	FAULT AT DEVICE	AIC RATING	VOLTAGE	SIZE	LENGTH	KVA	Z%	FAULT AT PRIMARY
T-SVC	65,000		480V	2/0		100	1.75	
...SWB	51,407		480V	350kcmil	23'-3"			
.....CTP	6,982		480V	#1	231'-4"			
.....MDP-1	39,306		480V	#1	15'-2"			
.....LP-1B	35,305		480V	#1	6'-4"			
.....MP-1B	33,230		480V	#1	10'-0"			
.....TP-1A	13,228		480V	2/0	21'-10"	100	1.75	30,291
.....PP-1A	12,708		208V	#1	4'-1"			
.....MDP-2	34,588		480V	#1	22'-9"			
.....LP-2	7,456		480V	#1	192'-5"			
.....LP-2B	31,608		480V	#1	5'-8"			
.....MP-2B	29,628		480V	#1	9'-11"			
.....TP-2A	13,219		480V	2/0	12'-10"	100	1.75	29,855
.....PP-2A	12,587		208V	#1	4'-11"			
.....PP-1B	3,356		208V	#1	185'-4"			
.....EP-1	3,294		208V	#1	4'-4"			
.....EP-1	3,267		208V	#1	6'-4"			
.....PP-2B	3,503		208V	#1	175'-7"			
.....EP-2	3,434		208V	#1	4'-6"			
.....MDP-3	29,072		480V	#1	33'-11"			
.....LP-3	6,646		480V	#1	210'-3"			
.....LP-3B	26,923		480V	#1	5'-5"			
.....MP-3B	25,528		480V	#1	9'-4"			
.....TP-3A	12,953		480V	2/0	12'-7"	100	1.75	25,600
.....PP-3A	12,324		208V	#1	4'-11"			
.....AHP	3,079		208V	#1	204'-2"			
.....PP-3B	3,253		208V	#1	190'-8"			
.....EP-3	3,189		208V	#1	4'-9"			

Related Options

Output shared parameter values as uppercase: Sets whether shared parameter outputs are displayed only in uppercase letters.

Feeder wire make-up length: Sets additional length to be added to feeders for connections.

Voltage Drop

Creates a schedule called **VOLTAGE DROP SCHEDULE** and sets it to the active view. If a schedule of that name already exists, this command sets the schedule to the active view but does not otherwise modify it.

The default schedule layout is shown below. Information about the voltage drop at the upstream feeder for each piece of distribution equipment in the project is listed. The devices are ordered based upon the connections between devices in the model.

The *VOLTAGE DROP* column uses the **DMET_VoltageDrop_Feeder** shared parameter by default. This parameter displays a warning in the value for any voltage drop that exceeds 3%. To display the fault without any warnings, replace the column with the **DMET_VoltageDrop_Feeder_NoWarnings** shared parameter.

Once the schedule is created, you can modify it using standard Revit tools.

<VOLTAGE DROP SCHEDULE>

A	B	C	D	E	F	G
	FEEDER		BRANCH CIRCUIT			TOTAL
DEVICE	VOLTAGE DROP	WIRE SIZE	MAX VOLTAGE DROP	CIRCUIT NUMBER	WIRE SIZE	VOLTAGE DROP
T-SVC	0.00 %	2/0				0.00 %
. SWB	0.12 %	600kcmil				0.12 %
. CTP	0.78 %	#1	0.03 %	1,3,5	1/0	0.81 %
. MDP-1	0.15 %	#1	0.21 %	8,10,12	#12	0.36 %
. LP-1	0.15 %	#1				0.15 %
. LP-1B	0.15 %	#1				0.15 %
. MP-1B	0.15 %	#1				0.15 %
. TP-1A	0.17 %	2/0				0.45 %
. PP-1A	0.08 %	#1	!!! 6.97 % !!!	3	#12	!!! 7.49 % !!!
. MDP-2	0.35 %	#1				0.35 %
. LP-2	0.52 %	#1	0.72 %	12	#12	1.24 %
. LP-2B	0.35 %	#1				0.35 %
. MP-2B	0.35 %	#1				0.35 %
. TP-2A	0.45 %	2/0				2.03 %
. PP-2A	0.47 %	#1	0.24 %	7	#12	2.74 %
. PP-1B	0.70 %	#1	1.01 %	2	#12	3.75 %
. EP-1A	0.70 %	#1				2.73 %
. EP-1B	0.70 %	#1				2.73 %
. PP-2B	!!! 6.36 % !!!	#1	!!! 10.36 % !!!	2	#12	!!! 18.75 % !!!
. EP-2	!!! 6.66 % !!!	#1	2.34 %	31,33,35	#10	!!! 11.03 % !!!
. MDP-3	0.55 %	#1				0.55 %
. LP-3	0.70 %	#1	0.73 %	20	#12	1.44 %
. LP-3B	0.55 %	#1				0.55 %
. MP-3B	0.55 %	#1				0.55 %
. TP-3A	0.71 %	2/0				3.12 %
. PP-3A	0.71 %	#1				3.84 %
. AHP	!!! 4.11 % !!!	#1	!!! 7.27 % !!!	1,3,5	#12	!!! 14.51 % !!!
. PP-3B	!!! 7.27 % !!!	#1	!!! 9.89 % !!!	9	#12	!!! 20.28 % !!!
. EP-3	!!! 7.59 % !!!	#1	!!! 3.70 % !!!	37,39,41	#10	!!! 14.42 % !!!

Training Videos

- Voltage Drop Calculations in Revit

Related Options

Transformer voltage drop calculation method: Sets how voltage drop is calculated through transformers.

Feeder voltage drop percentage limit: Sets the maximum voltage drop percentage allowed on feeders.

Output shared parameter values as uppercase: Sets whether shared parameter outputs are displayed only in uppercase letters.

Feeder wire make-up length: Sets additional length to be added to feeders for connections.

Calculate feeder voltage drop based upon 80% of panel capacity: Sets whether voltage drop for each distribution equipment is based upon its calculated load or 80% of total capacity.

Calculate branch circuit voltage drop based upon 80% of breaker capacity: Sets whether voltage drop for each

branch circuit is based upon its calculated load or 80% of total capacity.

Voltage drop power factor: Sets whether the power factor is based upon the settings for the family or a fixed value.

Arc-Flash

Creates a schedule called **ARC-FLASH SCHEDULE** and sets it to the active view. If a schedule of that name already exists, this command sets the schedule to the active view but does not otherwise modify it.

The default schedule layout is shown below. Information about the arc-flash for each piece of distribution equipment in the project is listed. The devices are ordered based upon the connections between devices in the model.

Once the schedule is created, you can modify it using standard Revit tools.

<ARC-FLASH SCHEDULE>

A	B	C	D	E
DEVICE	VOLTAGE	INCIDENT ENERGY	WORKING DISTANCE	ARC-FLASH BOUNDARY
T-SVC	480V	143.12 cal/cm²	1'-0"	10'-7"
SWB	480V	79.86 cal/cm²	1'-0"	7'-11"
CTP	480V	50.98 cal/cm²	1'-0"	6'-4"
MDP-1	480V	75.50 cal/cm²	1'-0"	7'-8"

Related Options

Output shared parameter values as uppercase: Sets whether shared parameter outputs are displayed only in uppercase letters.

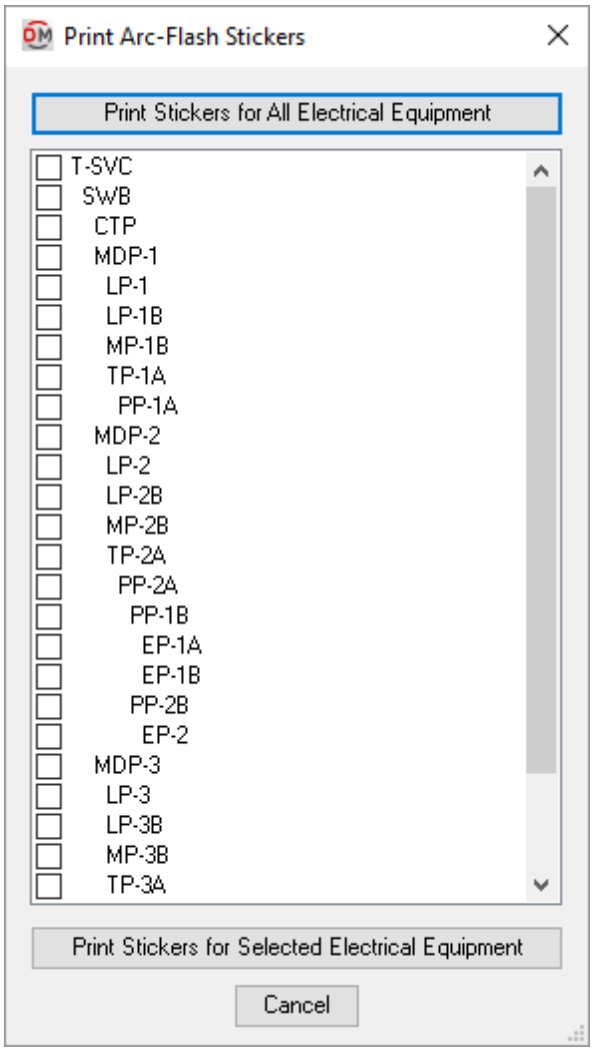
Arc-Flash Stickers

Allows you to create arc-flash stickers for distribution equipment.

The sticker will also display the shock protection information for the device. Shock protection is a function of the voltage of the distribution equipment. Shock protection values are based upon *NFPA 70E-2018, Table 130.4 (D)(a)*.

Opens the **Print Arc-Flash Stickers** dialog box:

Print Arc-Flash Stickers Dialog Box



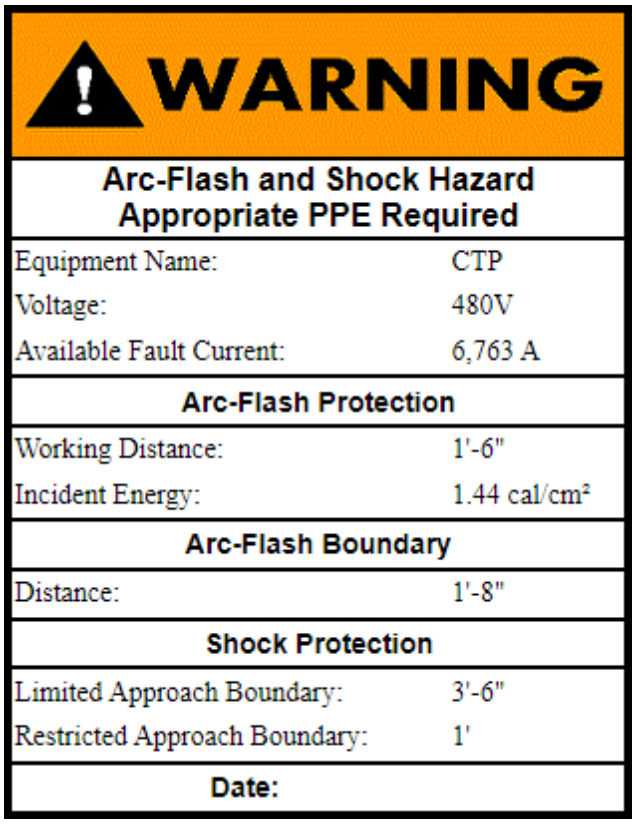
Distribution Equipment List: A list of each piece of distribution equipment that has *Calculate Arc-Flash* set to **Yes** using the **Panel Edit** command.

Print Stickers for All Electrical Equipment: Press this button to print stickers for all of the distribution equipment in the project.

Print Stickers for Selected Electrical Equipment: Press this button to print stickers for the selected distribution equipment.

Printing Arc-Flash Stickers

An example arc-flash sticker is shown below.



Export

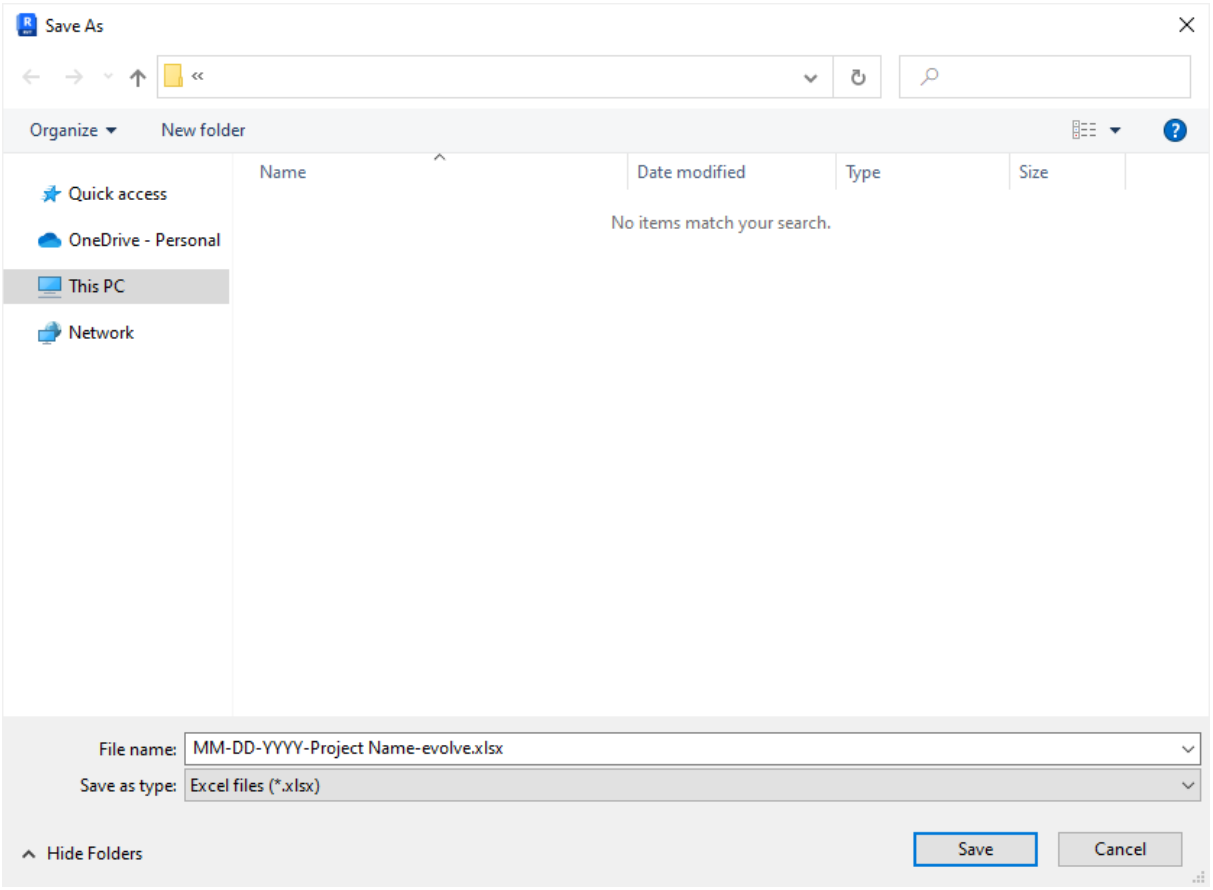
The **Export** panel appears on the **DM Electrical** tab when you have a project open in Revit. It includes a single command for exporting a conduit run schedule that can then be imported to **eVolve Electrical**.

eVolve: Exports a conduit run schedule as an Excel file that can then be imported to eVolve Electrical.

eVolve

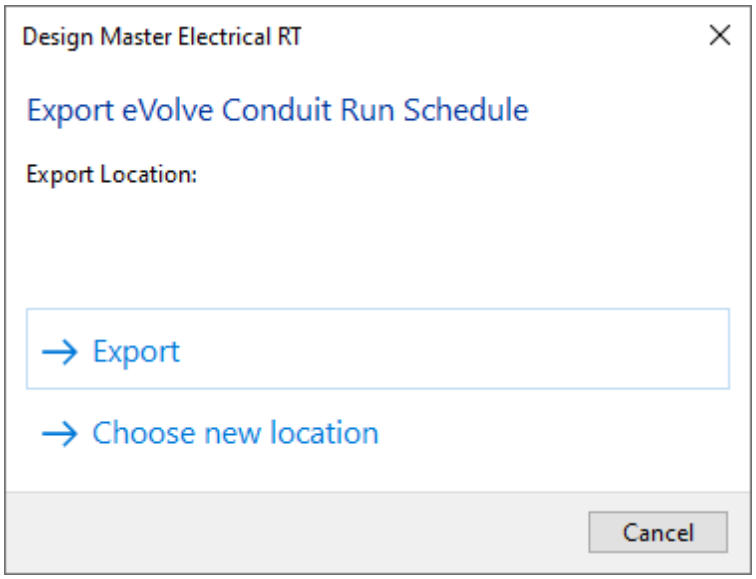
Exports a schedule of the conduit runs in the project to an Excel file that can then be imported to **eVolve Electrical** .

The first time you run the command in a project, the **Save As** dialog box will open:



Select the location to which you want to export the file.

The next time you run the command in a project, a **Design Master Electrical RT** dialog box will open:



The location to which the file will be exported is listed.

Export: Press this button to export the file to the listed location.

Choose new location: Press this button to choose a new location to which to export the file. The **Save As** dialog box will open.

Values Exported to eVolve Electrical

When you import the Excel file to eVolve Electrical, the **Project Conduit Run Schedule** fields listed below will be populated with values from Design Master.

The *Wire Fill Id*, *Material*, and *Insulation* fields will not be populated. As a result, the *Conduit Fill* will be incorrect until those fields are populated within eVolve Electrical.

Run Id: Taken from the *Conduit Run Id* field in the **Panel Edit** command.

Start: Taken from the *Fed From* field in the **Panel Edit** command.

Finish: The name of the distribution equipment associated with the feeder. Taken from the *Device Name* field in the **Panel Edit** command.

Parallel Qty: Taken from the *Parallel Runs* column for the feeder definition in the **Wire Ampacities** command.

Conduit Size: Taken from the *Revit Trade Size* column for the conduit definition in the **Conduit Sizes** command.

Conduit Standard: Taken from the *Group* name for the conduit definition in the **Conduit Sizes** command.

Voltage: Taken from the Revit *Distribution System* parameter for the distribution equipment.

Amperage: Taken from the *OCP Trip* field in the **Panel Edit** command.

Wire Description: Taken from the *Callout* field in the **Panel Edit** command.

Estimated Length: Taken from the *Length* field in the **Panel Edit** command.

Circuit: Taken from the Revit *Circuit Number* parameter for the distribution equipment circuit.

Customization

The **Customization** panel appears on the **DM Electrical** tab when you have a project open in Revit. It includes commands for customizing the settings used by Design Master Electrical RT.

User Options: Sets user-specific information such as the customization filepath.

Project Options: Sets various options that control how Design Master Electrical RT works.

Wire Sizes: Sets the wire materials and sizes available for sizing feeders.

Conduit Sizes: Sets the conduit materials and sizes available for sizing feeders.

Wire Ampacities: Sets the wire configuration options available for each wire ampacity.

Transformer OCP Sizes: Sets overcurrent protection sizing options for transformers.

Project Feeder ID Schedule: Allows you to customize the feeder IDs available to be used on the one-line diagram for the current project.

Master Feeder ID Schedule: Allows you to customize the master schedule of feeder IDs available to be used on the one-line diagram.

One-Line Diagram Device Graphics: Customizes graphic families used for equipment on the one-line diagram.

One-Line Diagram Feeder Graphics: Customizes graphic families used for feeder graphics on the one-line diagram.

Export: Exports customization settings to an external file.

Import: Imports customization settings from an external file.

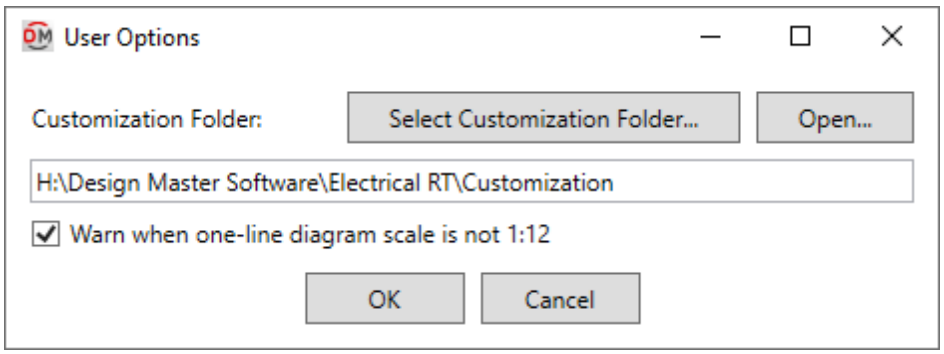
Training Videos

- Wire Sizing Customization in Revit
- Options in Revit
- Transformer OCP Sizes

User Options

Allows you to customize settings that are specific to you. These settings are stored on your computer, not in the project. Opens the **User Options** dialog box:

User Options Dialog Box



Customization Folder: The folder where customization files, such as one-line diagram graphic families, are stored.

Select Customization Folder: Press this button to select a new folder for the customization path.

Open: Press this button to open Windows Explorer to the folder listed in the *Customization Folder* field.

Warn when one-line diagram scale is not 1:12: Whether you receive a warning when you attempt to insert a

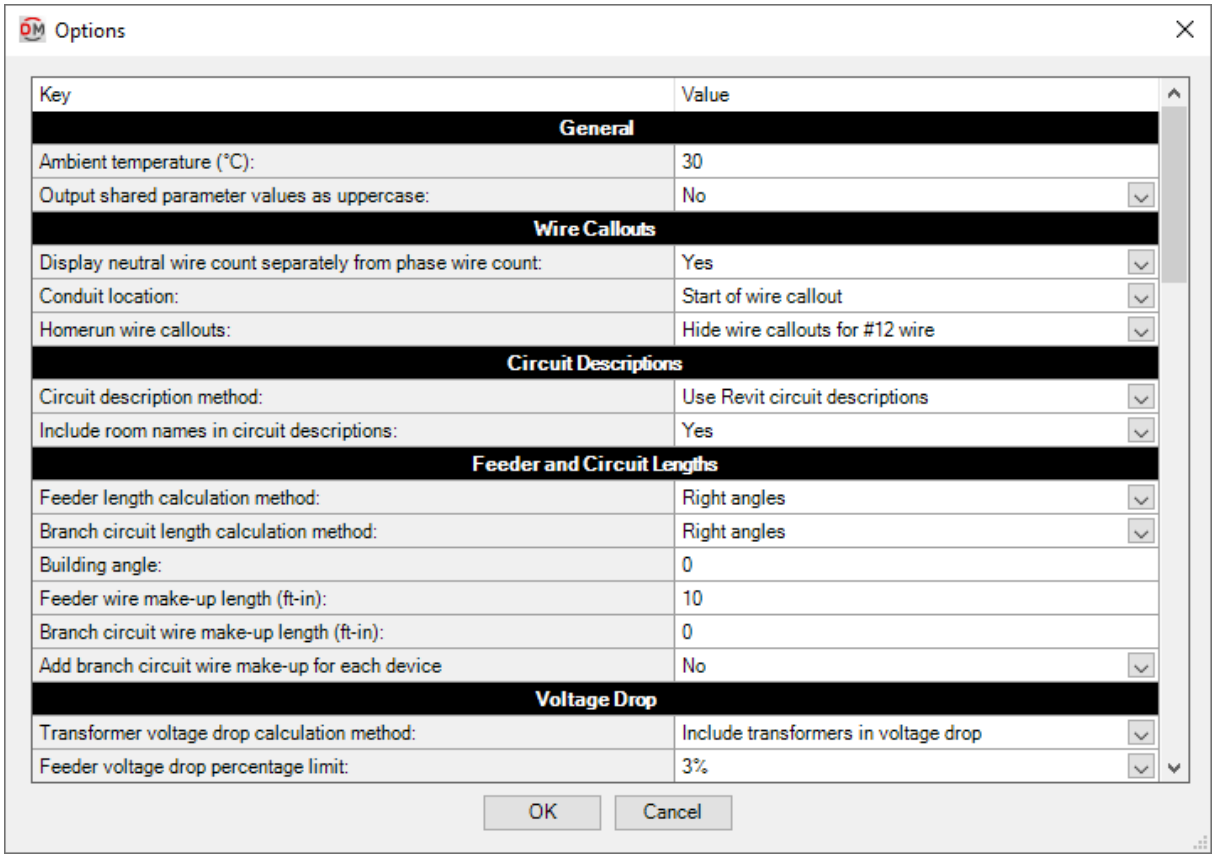
one-line diagram graphic in a view that is not 1:12 scale.

If this is checked, an alert dialog box will appear displaying the scale of the current view and an explanation that default one-line diagram graphics work best at 1:12 scale. The dialog box will also ask if you want to continue receiving this warning.

Project Options

Allows you to control the output of Design Master Electrical RT to match your preferred standards. Opens the **Options** dialog box:

Options Dialog Box



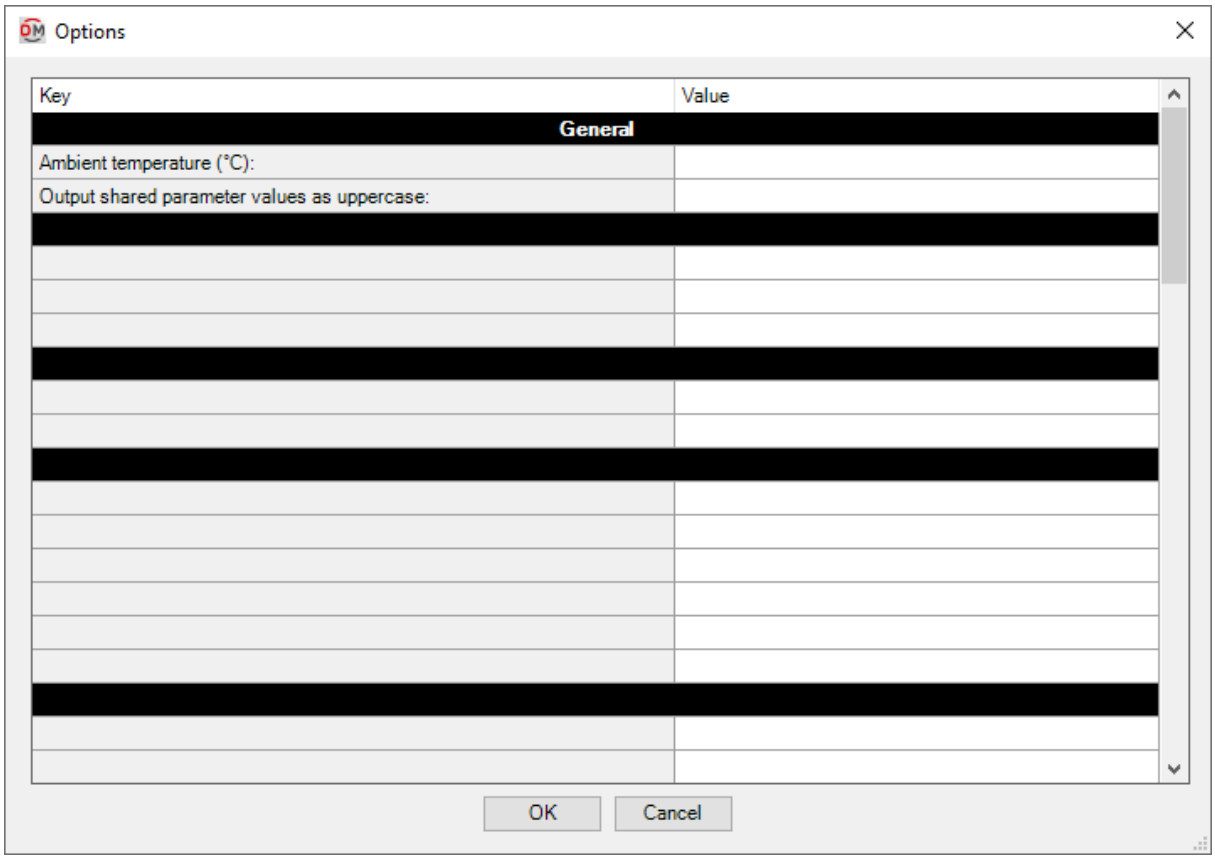
Editing a Setting

To edit an option setting, select the *Value* in the list and enter a new value.

Press the **OK** button to save your changes.

General

This section describes the options available in the **General** section of the **Options** dialog box:



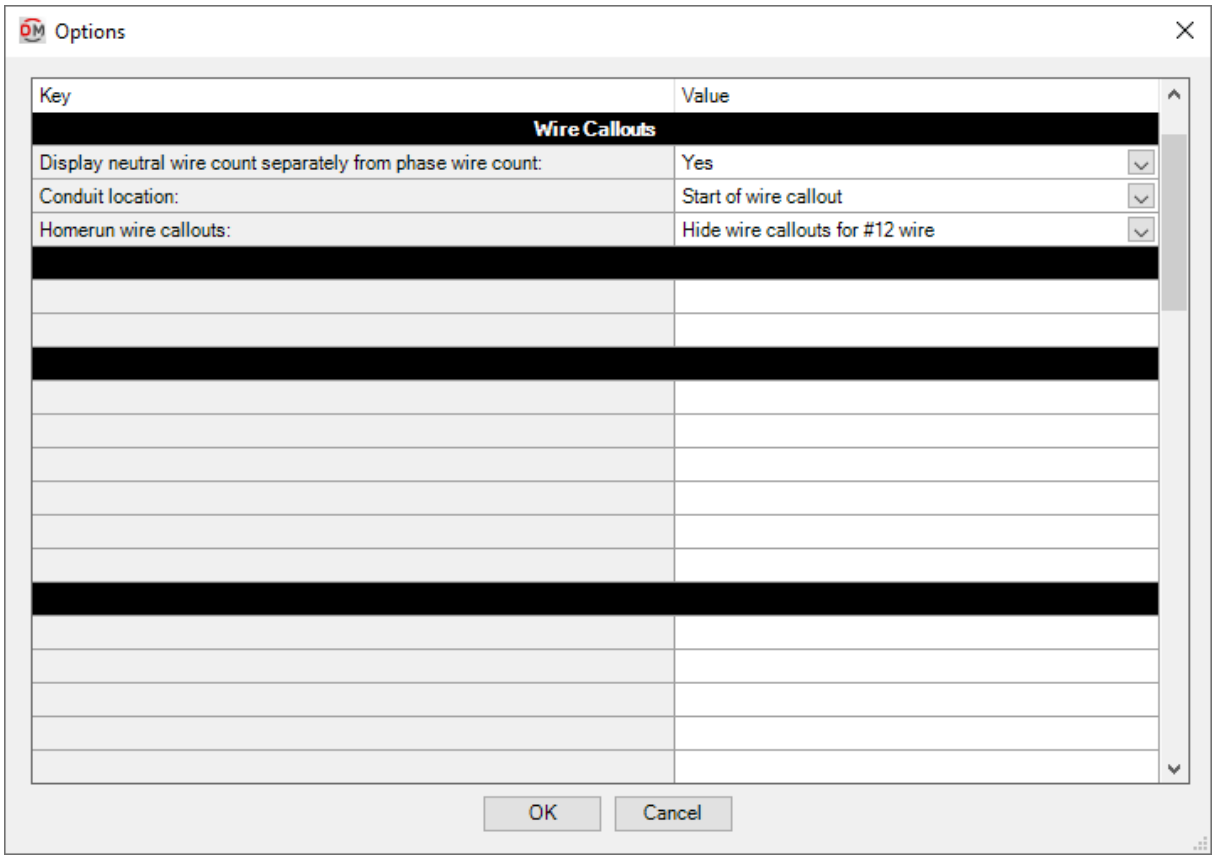
Ambient temperature: The ambient temperature in °C used to determine the ampacities of conductors based upon *NEC 310.15(B)*. The recommended value for most projects is 30.

Output shared parameter values as uppercase: The format used for the case of default shared parameter values. User-specified values always use the text exactly as input by the user.

- **Yes:** Shared parameters use all uppercase letters for fixed values.
- **No:** Shared parameters use a mix of uppercase and lowercase letters for fixed values.

Wire Callouts

This section describes the options available in the **Wire Callouts** section of the **Options** dialog box:



Display neutral wire count separately from phase wire count: Whether neutral and hot wires are listed together or separately when they are the same size.

- **Yes:** The neutral wire count is listed separately from the phase wire count. Example: 1/2"C,3#12,#12N,#12G
- **No:** The neutral wire count and the phase wire count are added together. Example: 1/2"C,4#12,#12G

Conduit location: Where the conduit size is displayed in the wire callout.

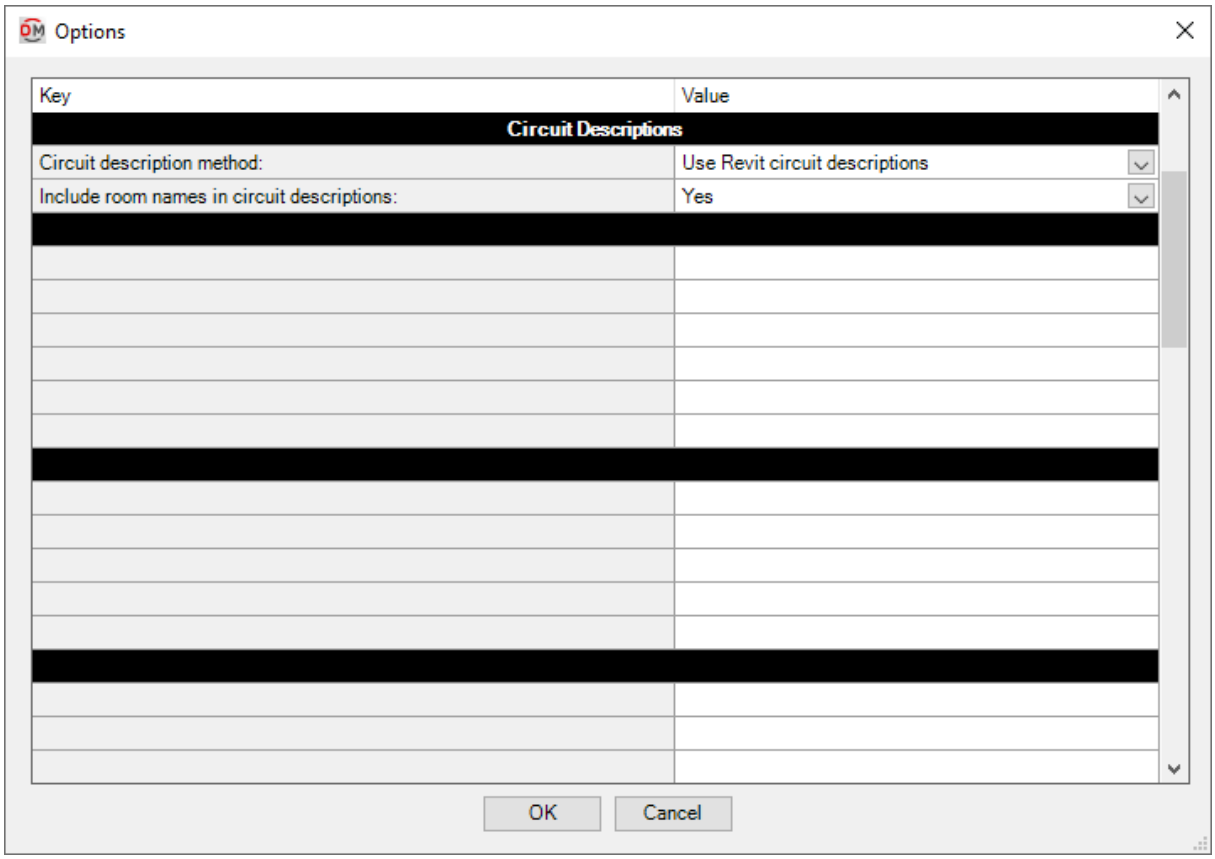
- **Start of wire callout:** The conduit size is located at the start of the wire callout. Example: 1/2"C,3#12,#12N, #12G
- **End of wire callout:** The conduit size is located at the end of the wire callout. Example: 3#12,#12N, #12G,1/2"C

Homerun wire callouts: Whether the wire callout is displayed for homeruns.

- **Display wire callout for all homeruns:** The wire callout is always displayed.
- **Hide wire callouts for #12 wire:** The wire callout is not displayed for #12 homeruns. Wire callouts are displayed for larger homeruns.
- **Hide wire callouts for #12 wire on 1-pole circuits:** The wire callout is not displayed for #12 homeruns on single-pole circuits. Wire callouts are displayed for larger homeruns or #12 homeruns on multi-pole circuits.

Circuit Descriptions

This section describes the options available in the **Circuit Descriptions** section of the **Options** dialog box:



Circuit description method: Whether circuit descriptions are controlled through Design Master commands.

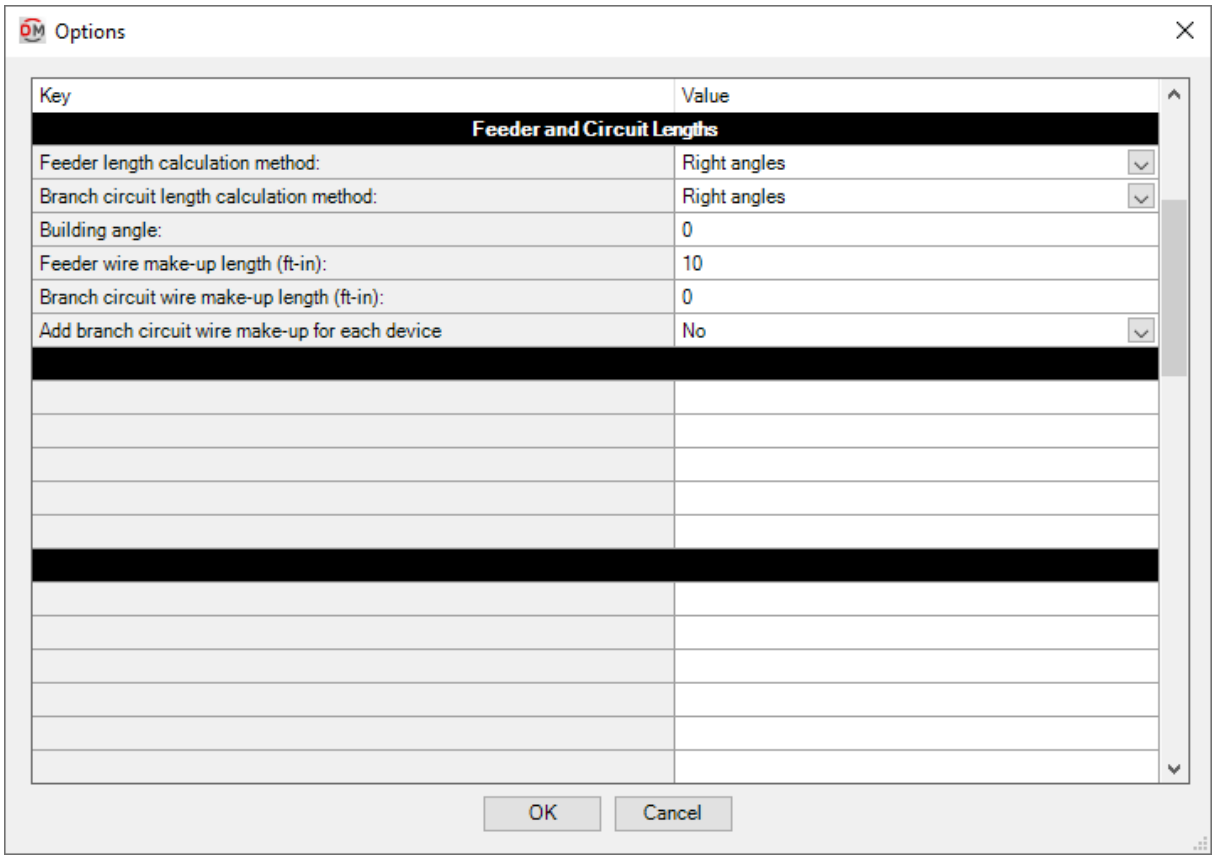
- **Use Revit circuit descriptions:** Circuit descriptions are set in the panel schedule or *Load Name* parameter using standard Revit functionality. Circuit descriptions set using the **Family Edit** command are ignored. Circuit description settings in other `Edit` commands are removed or locked with **Controlled by Revit** displayed.
- **Use Design Master circuit descriptions:** Circuit descriptions are set using the `Edit` commands. See **Circuit Descriptions** for more information.

Include room names in circuit descriptions: Whether circuit descriptions include room names. If *Circuit description method* is set to **Use Revit circuit descriptions**, this option is ignored.

- **Yes:** Circuit descriptions include a list of all of the rooms served by the circuits. The names of each area containing devices on the circuit will be listed. Each area is listed once in the circuit description.
- **No:** Circuit descriptions do not include room names.

Feeder and Circuit Lengths

This section describes the options available in the **Feeder and Circuit Lengths** section of the **Options** dialog box:



Feeder length calculation method: How the feeder lengths are calculated between distribution equipment.

- **Straight line:** The lengths are calculated based upon the straight line distance between the distribution equipment and item connected to it. This calculation approximates lengths for wires running directly between devices, typically underground.
- **Right angles:** The lengths are calculated based upon the distance along the axes of the building between the distribution equipment and item connected to it. This calculation approximates lengths for wires running along the walls of the building.

Branch circuit length calculation method: How the branch circuit lengths are calculated between distribution equipment and connected devices.

- **Straight line:** The lengths are calculated based upon the straight line distance between the distribution equipment and item connected to it. This calculation approximates lengths for wires running directly between devices, typically underground.
- **Right angles:** The lengths are calculated based upon the distance along the axes of the building between the distribution equipment and item connected to it. This calculation approximates lengths for wires running along the walls of the building.

Building angle: The orientation of the building used when the *Feeder length calculation method* or *Branch circuit length calculation method* is set to **Right angles**. See the **How Building Angle Affects Calculations** article in the knowledge base for more information about this setting.

Feeder wire make-up length: Additional length of wire added to automatically calculated feeder lengths to represent make-up in the field.

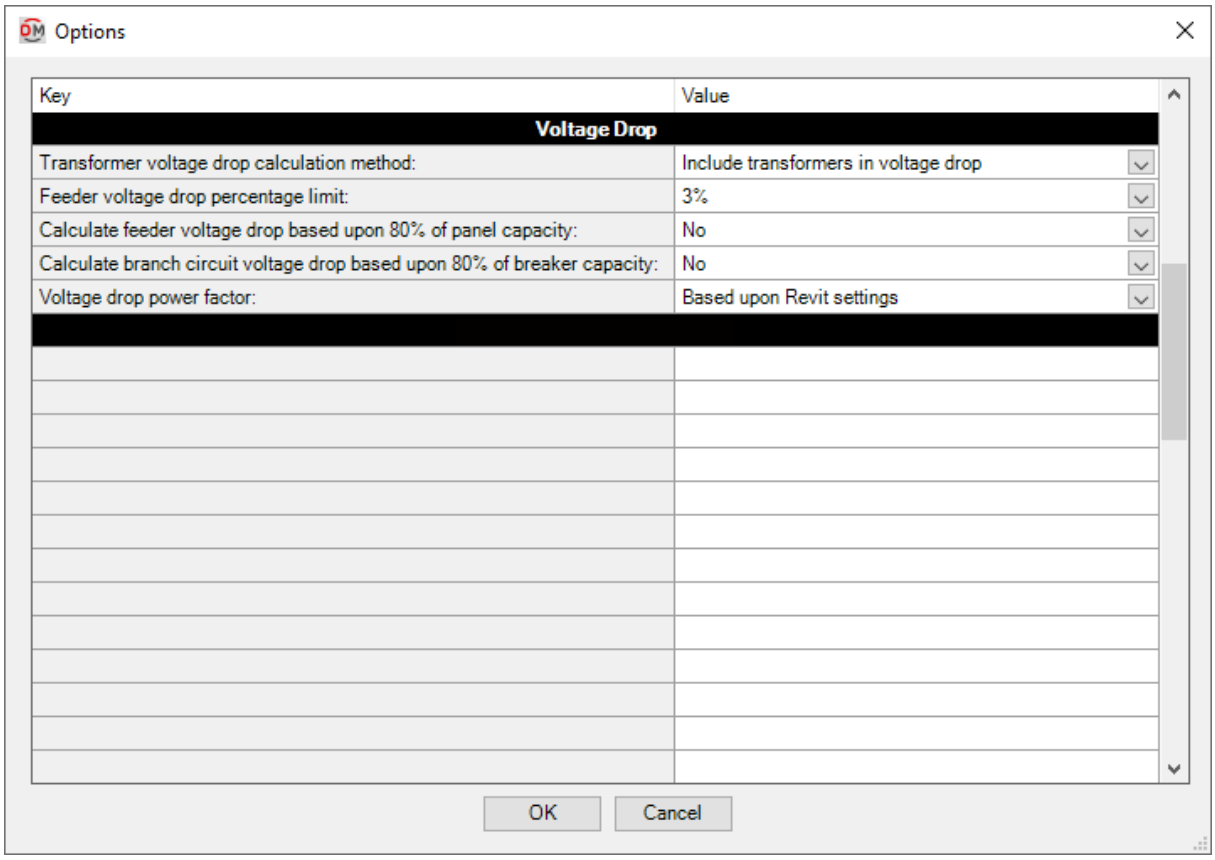
Branch circuit wire make-up length: Additional length of wire added to automatically calculated branch circuit lengths to represent make-up in the field.

Add branch circuit wire make-up for each device: Whether the length specified in *Branch circuit wire make-up length* is added for each device on the circuit.

- **Yes:** The length is added for each device on the circuit.
- **No:** The length is added once, regardless of the number of devices on the circuit.

Voltage Drop

This section describes the options available in the **Voltage Drop** section of the **Options** dialog box:



Transformer voltage drop calculation method: There are three options for addressing transformers when calculating voltage drop. See the [Voltage Drop and Transformers Options] article in the knowledge base for more information.

- **Include transformers in voltage drop:** The voltage drop through the transformer is calculated and added to the voltage drop on the feeder. The voltage drop through the upstream feeders is carried through the transformer.
- **Ignore transformers:** The voltage drop through the transformer is ignored when the voltage drop for the system is calculated. The voltage drop through the upstream feeders is carried through the transformer.
- **Reset voltage drop at transformers:** The voltage drop is reset to 0% at each transformer. The voltage drop through the transformer is ignored. The voltage drop through the upstream feeders is ignored.

Feeder voltage drop percentage limit: The maximum voltage drop percentage allowed on feeders. Voltage drop percentages above this value will be highlighted in the parameter output.

- **3% :** Feeders are allowed to have a 3% voltage drop as described in *NEC 215.2(A)(2) Informational Note No. 2*.
- **2% :** Feeders are limited to a 2% voltage drop. Some state energy codes impose this requirement.

Calculate feeder voltage drop based upon 80% of panel capacity: The load used when calculating voltage drop on distribution equipment.

- **Yes:** The calculation is made based upon 80% of panel capacity.
- **No:** The calculation is made based upon the calculated load on the distribution equipment.

Calculate branch circuit voltage drop based upon 80% of breaker capacity: The load used when calculating voltage drop on branch circuits.

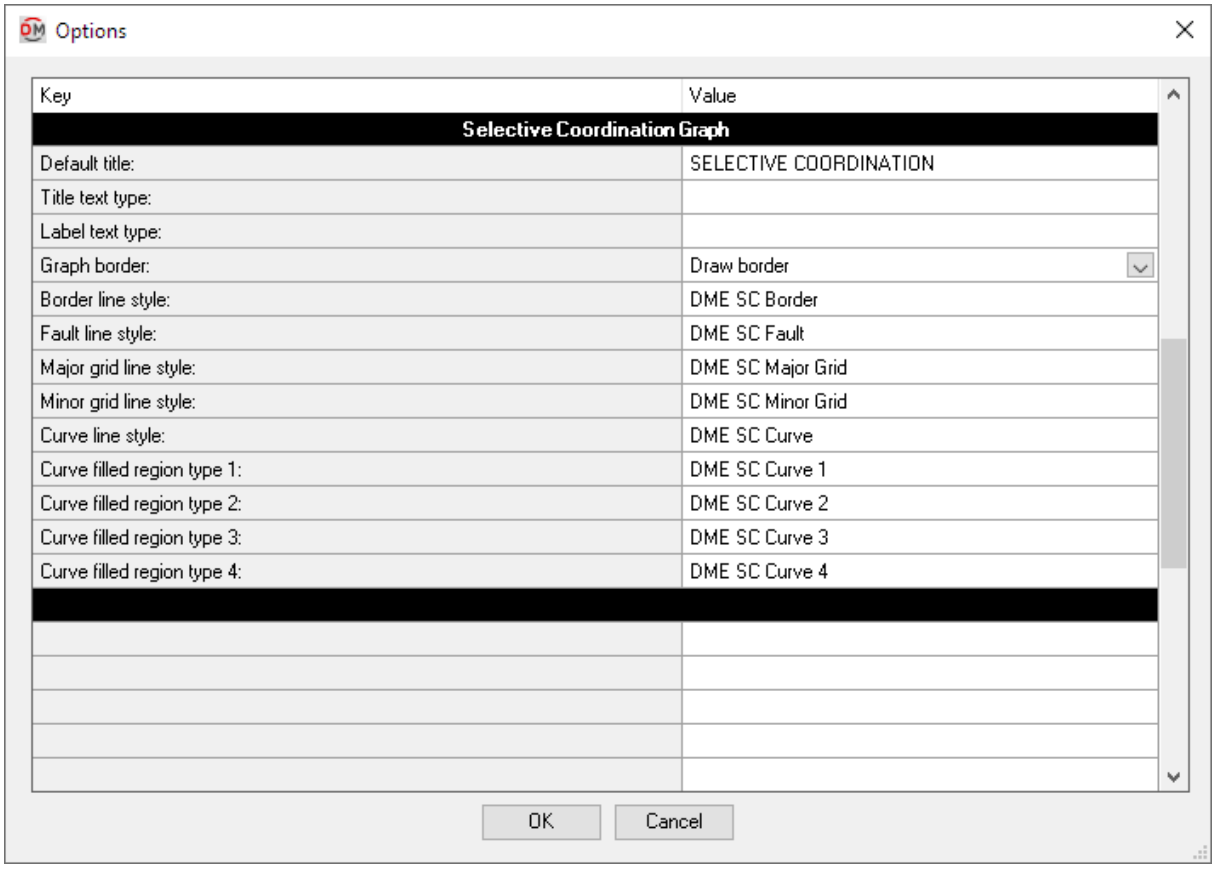
- **Yes:** The calculation is made based upon 80% of breaker capacity.
- **No:** The calculation is made based upon the calculated load on the branch circuit.

Voltage drop power factor: The power factor used when calculating voltage drop.

- **Based upon Revit settings:** The power factor is based upon the connector settings for the family.
- **Fixed at 0.85:** The power factor is set to 0.85.

Selective Coordination Graph

This section describes the options available in the **Selective Coordination Graph** section of the **Options** dialog box:



These options are used to customize selective coordination graphs created using the **Graph Insert** command. See the **Customizing Selective Coordination Graphs in Revit** article in the knowledge base for more information.

Default title: The default text that is entered in the *Title* field when running the **Graph Insert** command.

Title text type: The default text type for the title of the graph. If this field is blank, the title will use the last active text type in the project.

Label text type: The default text type for all of the text on the graph except for the title. If this field is blank, the labels will use the last active text type in the project.

Graph border: Whether a border is drawn around the graph.

- **Draw border:** Graphs will be drawn with a border.
- **No border:** Graphs will be drawn without a border.

Border line style: The line style used to draw the border around the graph.

Fault line style: The line style used to draw the device fault on the graph.

Major grid line style: The line style used to draw the major grid lines on the graph, such as those at 1 second and 10 seconds.

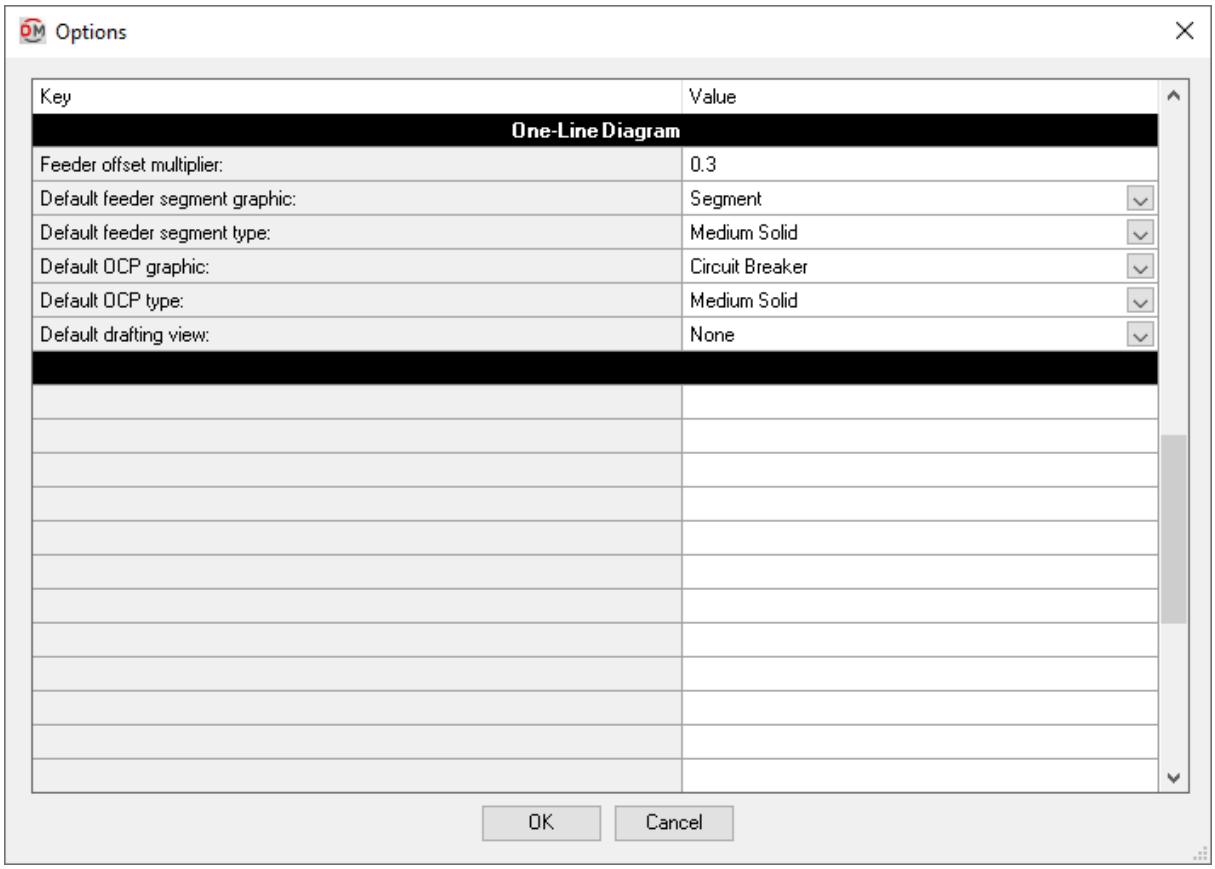
Minor grid line style: The line style used to draw the minor grid lines on the graph, such as those between 1 second and 10 seconds.

Curve line style: The line style used to draw the curves on the graph.

Curve filled region type 1, Curve filled region type 2, Curve filled region type 3, Curve filled region type 4: The filled region used for the first, second, third, and fourth curve on the graph, respectively.

One-Line Diagram

This section describes the options available in the **One-Line Diagram** section of the **Options** dialog box:



One-Line Diagram

Feeder offset multiplier: The distance between feeders inserted using the **Insert Create**, **Copy Create**, **Power**, **Insert Link**, and **Generate One-Line** commands.

Default feeder segment graphic: The graphic family used by feeder segments that do not have additional graphics. The values in this list are based upon the **One-Line Diagram Feeder Graphics** command.

Default feeder segment type: The graphic type used for the selected *Default feeder segment graphic*.

Default OCP graphic: The graphic family used for the OCP on feeders inserted using the **Insert Create**, **Copy Create**, **Power**, **Insert Link**, and **Generate One-Line** commands. The values in this list are based upon the **One-Line Diagram Feeder Graphics** command.

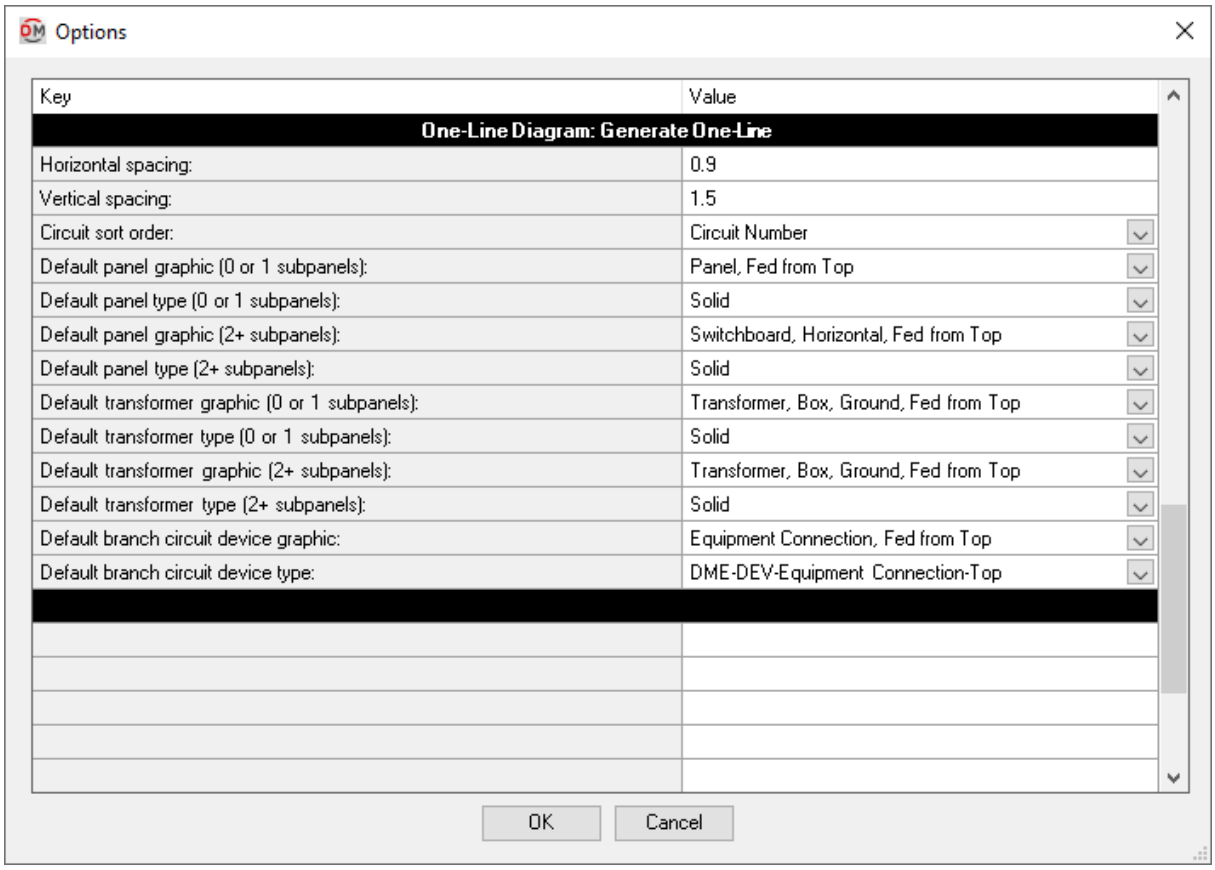
Default OCP type: The graphic type used for the selected *Default panel OCP graphic*.

Default drafting view: The drafting view onto which device graphics will be inserted when using the **Insert Link** command.

- **None:** You will be prompted to select a drafting view each time.
- **Specific drafting view:** The device graphic will be added to the drafting view chosen from the list. The values in this list are based upon the drafting views in the project.

Generate One-Line

This section describes the options available in the **One-Line Diagram: Generate One-Line** section of the **Options** dialog box:



These options set the graphics and other settings used when one-line diagram graphics are inserted using the Generate One-Line command.

Horizontal spacing: The minimum horizontal distance between equipment inserted on the drafting view, as a multiple of the drawing scale.

Vertical spacing: The minimum vertical distance between equipment inserted on the drafting view, as a multiple of the drawing scale.

Circuit sort order: The order in which equipment will be inserted on the drafting view from left to right.

- **Breaker Size:** Equipment will be inserted by OCP size from largest to smallest. Equipment with the same OCP size will be inserted by name in alphabetical order.
- **Circuit Number:** Equipment will be inserted by circuit number beginning with circuit 1. Equipment downstream from panels will be inserted beginning with odd circuits, then even circuits.
- **Equipment Name:** Equipment will be inserted by name in alphabetical order.

Default panel graphic (0 or 1 subpanels): The graphic family used by panels with 0 or 1 downstream equipment. The values in this list are based upon the One-Line Diagram Device Graphics command.

Default panel type (0 or 1 subpanels): The graphic type used for the selected *Default panel graphic (0 or 1*

subpanels).

Default panel graphic (2+ subpanels): The graphic family used by panels with 2 or more downstream equipment. The values in this list are based upon the **One-Line Diagram Device Graphics** command.

Default panel type (2+ subpanels): The graphic type used for the selected *Default panel graphic (2+ subpanels)*.

Default transformer graphic (0 or 1 subpanels): The graphic family used by transformers with 0 or 1 downstream equipment. The values in this list are based upon the **One-Line Diagram Device Graphics** command.

Default transformer type (0 or 1 subpanels): The graphic type used for the selected *Default transformer graphic (0 or 1 subpanels)*.

Default transformer graphic (2+ subpanels): The graphic family used by transformers with 2 or more downstream equipment. The values in this list are based upon the **One-Line Diagram Device Graphics** command.

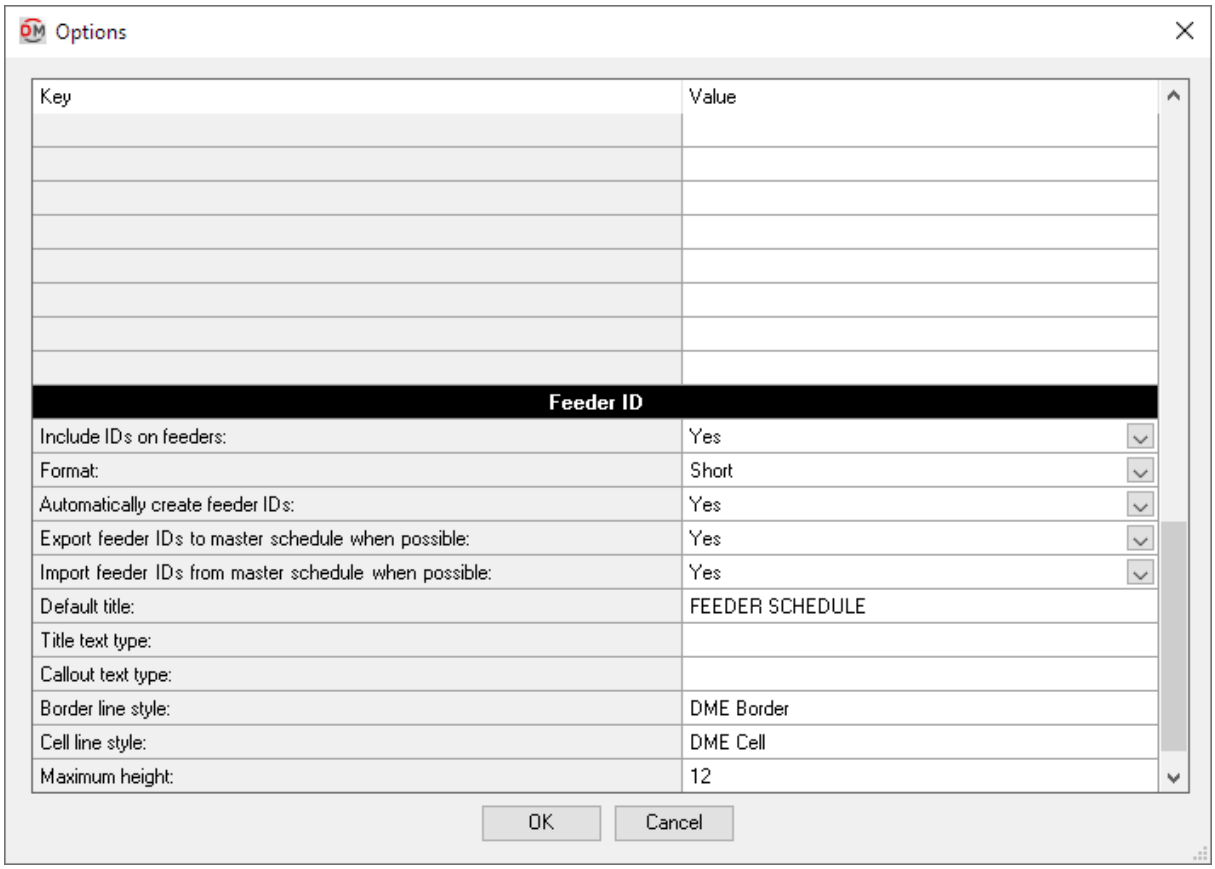
Default transformer type (2+ subpanels): The graphic type used for the selected *Default transformer graphic (2 + subpanels)*.

Default branch circuit device graphic: The graphic family used by branch circuit devices. The values in this list are based upon the **One-Line Diagram Device Graphics** command.

Default branch circuit device type: The graphic type used for the selected *Default branch circuit device graphic*.

Feeder ID

This section describes the options available in the **Feeder ID** section of the **Options** dialog box:



Include IDs on feeders: Whether feeder IDs appear on the one-line diagram.

Format: Sets how feeder IDs are generated. See the **Feeder ID Formats** article in the knowledge base for more information.

Automatically create feeder IDs: Whether feeder IDs are automatically generated.

- **Yes:** Feeder IDs are generated automatically based upon the *Feeder ID format*.
- **No:** When a feeder ID is generated, the **New Feeder Callout ID** dialog box will appear. You can then set the feeder ID, feeder ID group, and whether feeder IDs should be automatically generated in the future.

Export feeder IDs to master schedule when possible: Whether feeder IDs are copied to the **Master Feeder ID Schedule** when they are generated.

Import feeder IDs from master schedule when possible: When a feeder ID is generated with the same specifications as an existing feeder ID in the master schedule, this option sets whether a new feeder ID is generated or the existing feeder ID is used.

Default title: The default text that is entered in the feeder schedule title when running the **Schedule Insert** command.

Title text type: The default text type for the feeder schedule title. If this field is blank, the feeder schedule title will use the last active text type in the project.

Callout text type: The default text type for the feeder callouts in the feeder schedule. If this field is blank, the feeder callouts will use the last active text type in the project.

Border line style: The line style used to draw the border around the feeder schedule and title.

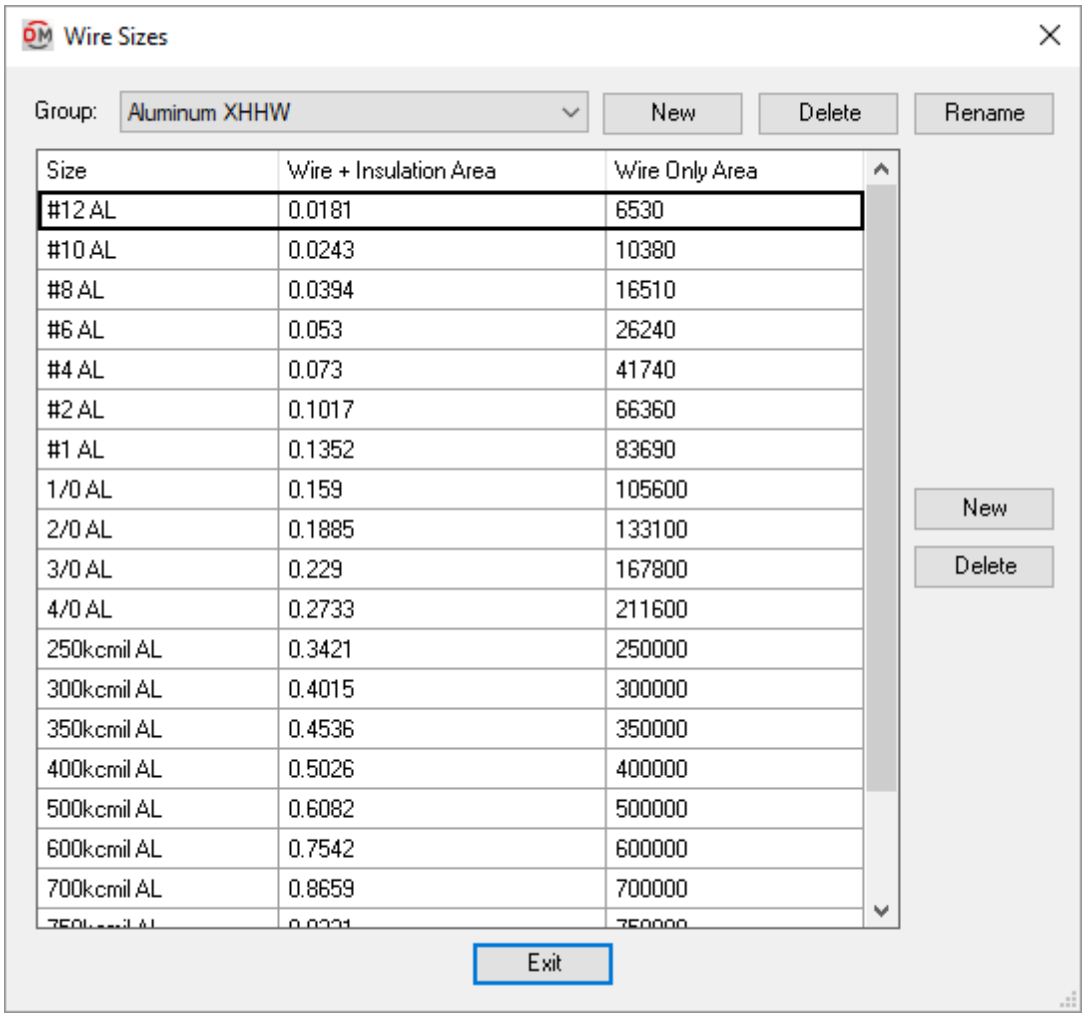
Cell line style: The line style used to draw the lines between cells in the feeder schedule.

Maximum height: The maximum height of the feeder schedule. This value corresponds to inches on the printed page. When the schedule exceeds this height, it will be continued in subsequent schedules next to the first.

Wire Sizes

Allows you to create and modify wire sizes and wire size groups. Opens the **Wire Sizes** dialog box:

Wire Sizes Dialog Box



Group Section

Wire size groups are used to organize wire sizes. In general, each group corresponds to a different wire material type. All of the wires in a specific ampacity configuration must come from the same group.

Group: Sets the current group. The wire sizes listed all belong to the current group.

New: Creates a new group.

Delete: Deletes the current group.

Rename: Renames the current group.

Wire Size Section

Each row in the grid lists a wire size in the current group.

Size: A description of the size of the wire. This value is for informational purposes and is used when selecting the wire in other dialog boxes. It is also used in the feeder callout.

Wire + Insulation Area: The area of the wire with insulation. The wires are sorted based upon the area. Used to calculated the conduit fill.

The units for this value are left undefined intentionally. The default values are square inches, based upon *NEC Table 5* and *NEC Table 5A*. You can use any units you want as long as they match the units used for conduit area.

Wire Only Area: The area of the wire itself, in circular mils.

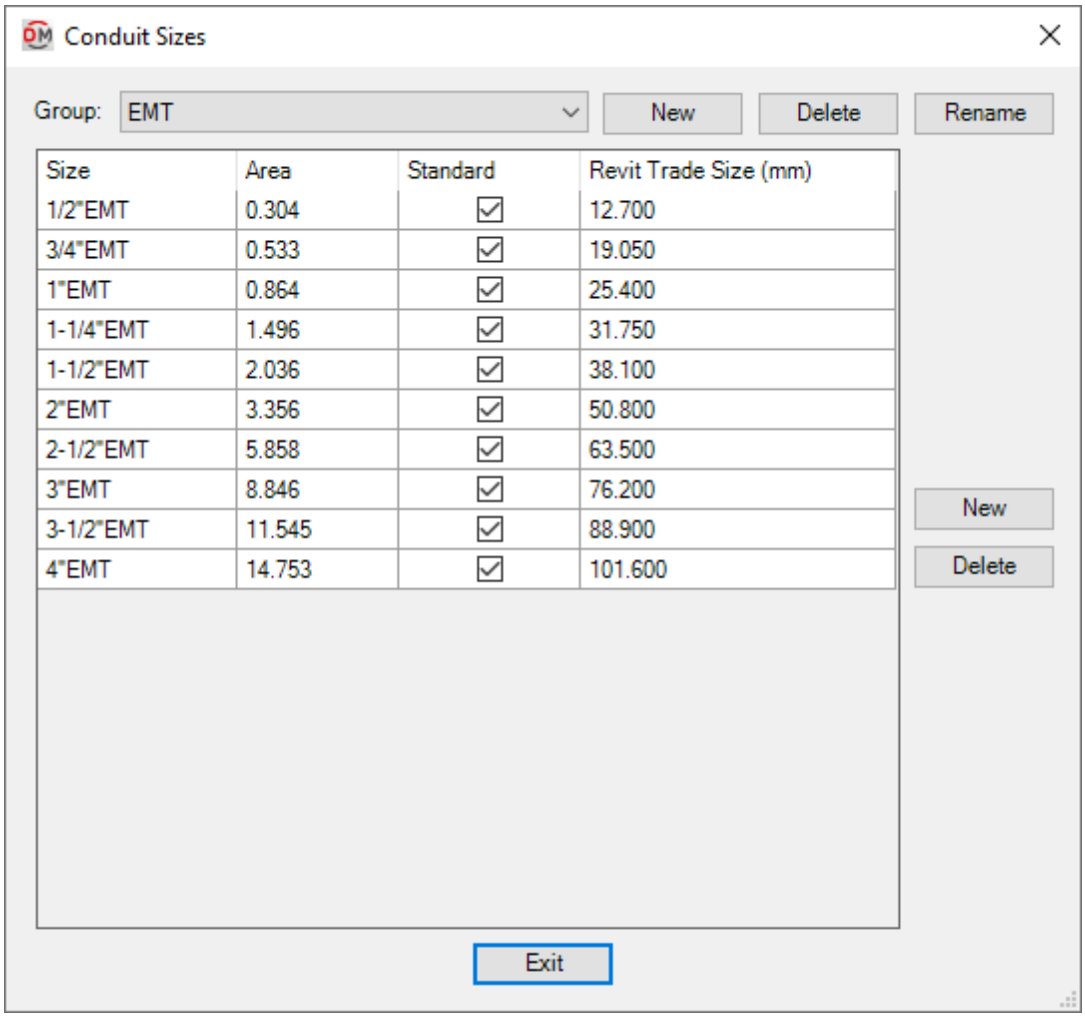
New: Creates a new wire size. The new wire size will be added to the bottom of the list when it is created. When you close and reopen the dialog box, the size will be sorted to the correct location in the list based upon the area.

Delete: Deletes the current wire size.

Conduit Sizes

Allows you to create and modify conduit sizes and conduit size groups. Opens the **Conduit Sizes** dialog box:

Conduit Sizes Dialog Box



Group Section

Conduit size groups are used to organize conduit sizes. In general, each group corresponds to a different conduit material type. All of the conduits in a specific ampacity configuration must come from the same group.

Group: Sets the current group. The conduit sizes listed all belong to the current group.

New: Creates a new group.

Delete: Deletes the current group.

Rename: Renames the current group.

Conduit Size Section

Each row in the grid lists a conduit size in the current group.

Size: A description of the size of the conduit. This value is for informational purposes and is used when selecting the conduit in other dialog boxes. It is also used in the feeder callout.

Area: The area of the conduit. The conduits are sorted based upon the area. The conduit fill is calculated using the area.

The units for this value are left undefined intentionally. The default values are square inches. You can use any units you want as long as they match the units used for wire size area.

Standard: Whether the conduit size is used when automatically sizing. Conduit sizes that do not have this value checked can be chosen manually, but they will not be used automatically.

Revit Trade Size: The trade size of the conduit in millimeters. This value is used to coordinate the conduit sizes in this dialog box with those defined in the Revit **`Electrical Settings`** command. See the **eVolve** section for more information.

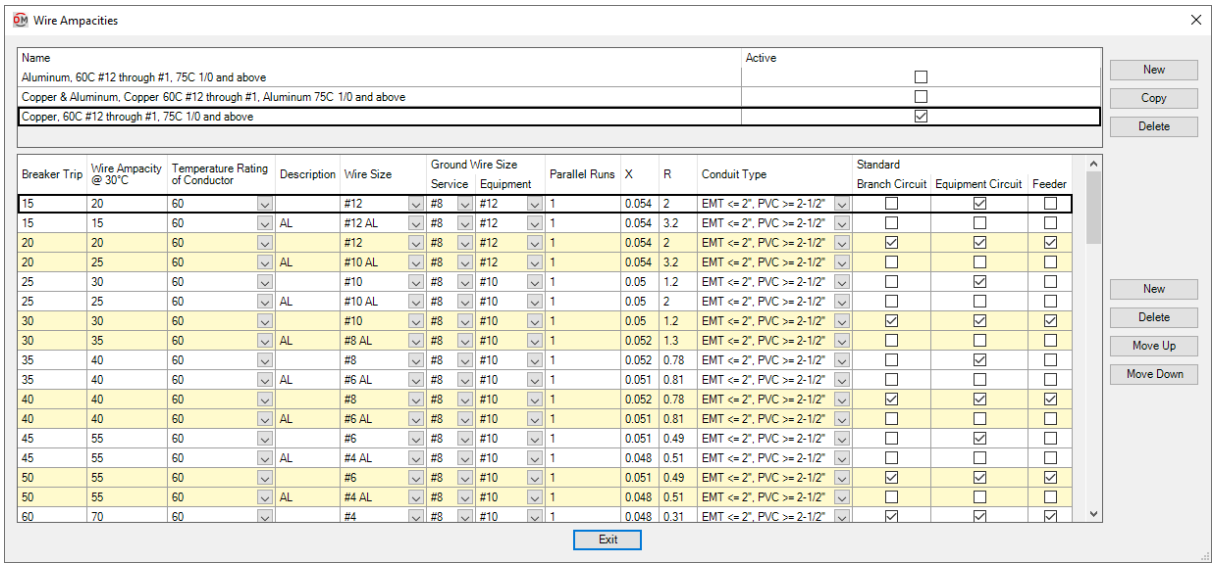
New: Creates a new conduit size. The new conduit size will be added to the bottom of the list when it is created. When you close and reopen the dialog box, the size will be sorted to the correct location in the list based upon the area.

Delete: Deletes the current conduit size.

Wire Ampacities

Allows you to create and modify wire ampacity configurations and wire sizing options. Opens the **Wire Ampacities** dialog box:

Wire Ampacities Dialog Box



Sizing Option Section

Each row in the grid lists a sizing option. Each sizing option controls which wire ampacity configurations are used when sizing wires automatically. The selected sizing option controls the values displayed in the *Standard* column in the wire ampacity section.

Name: The name of the sizing option.

Active: The sizing option that is currently being used to size feeders.

New: Creates a new sizing option.

Copy: Creates a copy of the selected sizing option.

Delete: Deletes the current sizing option.

Wire Ampacity Section

Each row in the grid lists a wire ampacity configuration. Each ampacity can have multiple configurations. One configuration will be selected as the default and used when sizing feeders automatically. The other configurations can be chosen when sizing feeders manually.

Breaker Trip: The trip rating of the breaker.

Wire Ampacity @ 30°C: The ampacity of the wire at an ambient temperature of 30°C. This value is multiplied by the number of parallel runs to determine the final wire ampacity.

Temperature Rating of Conductor: The temperature rating of the phase wires.

Description: A label used to differentiate wire ampacities of the same size. The combination of the *Ampacity* and *Description* fields must be unique for each row. The label will be displayed in other dialog boxes. It is not displayed in the schedules or on the plan.

Wire Size: The size of the phase wires.

Ground Wire Size, Service: The size of the service ground. This sizing should be selected based upon *NEC Table 250.102(C)(1)*.

Ground Wire Size, Equipment: The size of the equipment ground. This sizing should be selected based upon *NEC Table 250.122*.

Parallel Runs: The number of parallel runs of conduits. Each run contains the same size wires

X: The reactance for a single run of this size wire. See *NEC Table 9* for values. This value is divided by the number of parallel runs to determine the final reactance for the wire ampacity.

R: The resistance for a single run of this size wire. See *NEC Table 9* for values. This value is divided by the number of parallel runs to determine the final reactance for the wire ampacity.

Conduit Type: The conduit group that will be used when sizing the conduit.

Standard, Branch Circuit: Whether the breaker size is used when sizing standard branch circuits. Only one breaker of each size can have this box checked. You do not need to have this box checked for each size breaker.

Standard, Equipment Circuit: Whether the breaker size is used when sizing branch circuits based upon the MCA and MOCP of equipment connected to them. Only one breaker of each size can have this box checked. You do not need to have this box checked for each size breaker.

Standard, Feeder: Whether the wire ampacity is used when sizing feeders. Only one wire ampacity of each size can have this box checked. You do not need to have this box checked for each wire ampacity.

New: Creates a new wire ampacity. The settings for the current wire ampacity will be duplicated to create the new wire ampacity.

Delete: Deletes the current wire ampacity.

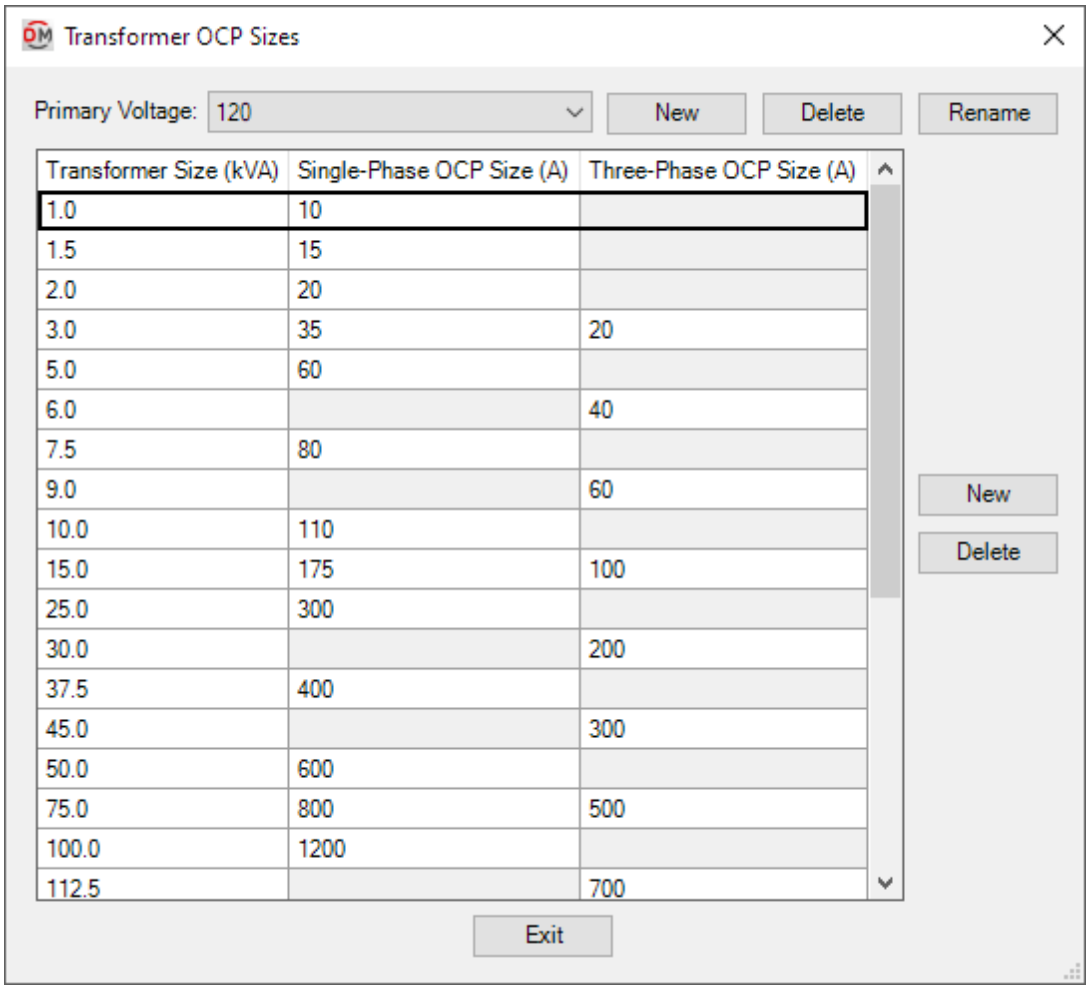
Move Up: Moves the current wire ampacity up in the list. Use this button to sort wire ampacities of the same size in the list. It cannot be used to move wire ampacities so they are no longer in numerical order.

Move Down: Moves the current wire ampacity down in the list. Use this button to sort wire ampacities of the same size in the list. It cannot be used to move wire ampacities so they are no longer in numerical order.

Transformer OCP Sizes

Allows you to create and modify OCP sizing options for transformers. Opens the **Transformer OCP Sizes** dialog box:

Transformer OCP Sizes Dialog Box



Voltage Section

OCP sizing options are organized by the primary voltage of the transformer.

Each voltage can have up to one OCP sizing option. If a voltage does not have a sizing option, the OCP for the transformer will be sized the same way as other distribution equipment.

Primary Voltage: Sets the current OCP sizing option. The OCP sizes listed correspond to the current voltage.

New: Creates a new voltage.

Delete: Deletes the current voltage.

Rename: Renames the current voltage.

OCP Size Section

Each row in the grid lists a transformer size for the current voltage.

Transformer Size: The size of the transformer in kVA.

Single-Phase OCP Size: The ampacity of the upstream OCP for a single-phase transformer.

If "0" or no value is entered, the *Transformer Size* will not be listed as a *Size* in the **Panel Edit** command for single-phase transformers. The OCP for the transformer will be sized the same way as other distribution equipment.

Three-Phase OCP Size: The ampacity of the upstream OCP for a three-phase transformer.

If "0" or no value is entered, the *Transformer Size* will not be listed as a *Size* in the **Panel Edit** command for three-phase transformers. The OCP for the transformer will be sized the same way as other distribution equipment.

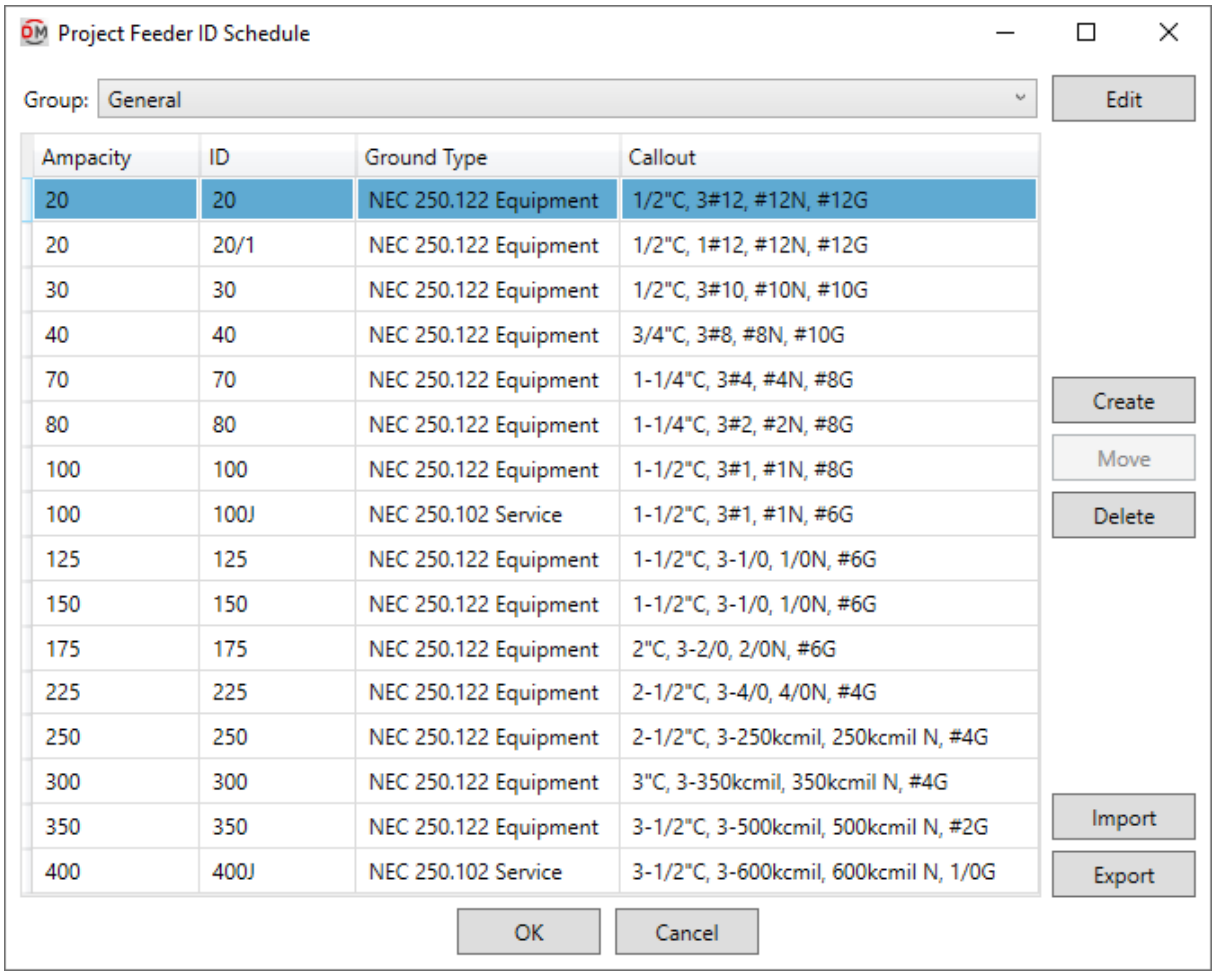
New: Creates a new kVA. The new kVA will be the next largest after the largest kVA in the grid and will be added to the bottom of the list with default settings.

Delete: Deletes the current kVA.

Project Feeder ID Schedule

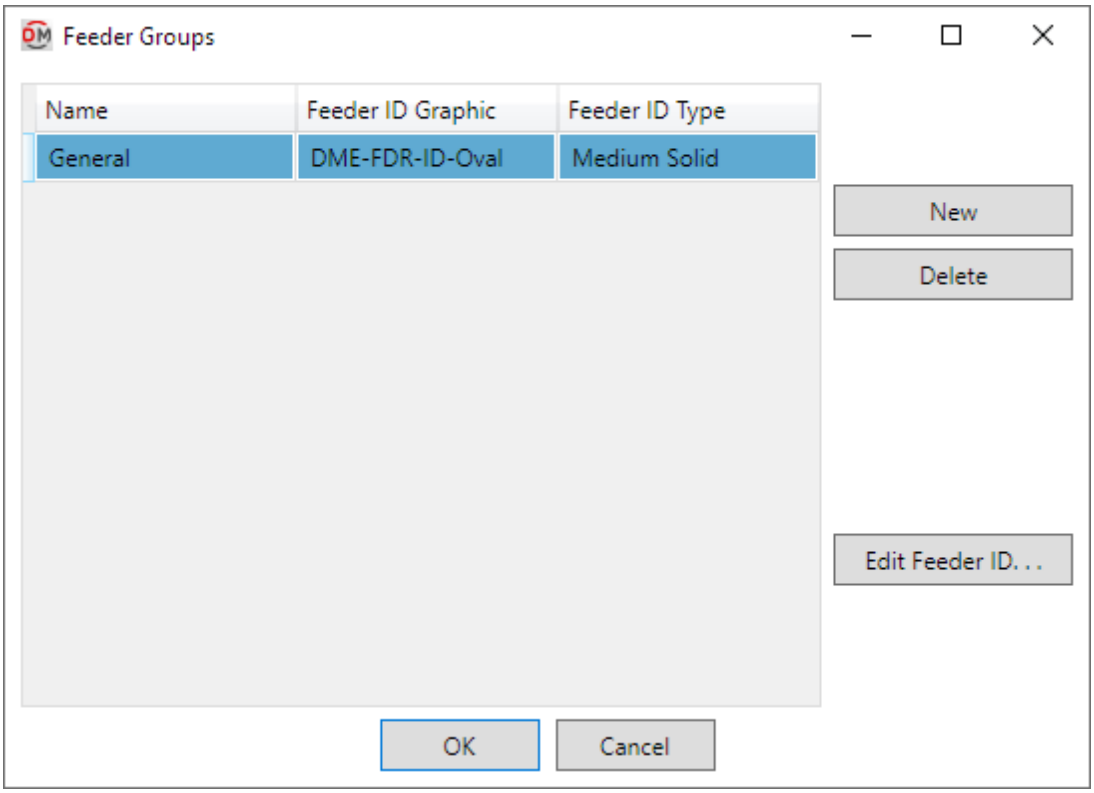
Allows you to customize the feeder IDs available to be used on the one-line diagram for the current project. Opens the **Project Feeder ID Schedule** dialog box:

Project Feeder ID Schedule Dialog Box



Group: The active feeder ID group. All of the IDs that are created and modified will be associated with the selected group.

Edit: Opens the **Feeder Groups** dialog box:



Name: The name of the feeder ID group.

Feeder ID Graphic: The graphic family used when feeder IDs in the group are inserted on the one-line diagram.

Feeder ID Type: The graphic type that will be used for the feeder ID.

New: Creates a new feeder ID group.

Delete: Deletes the current feeder ID group.

Edit Feeder ID: Sets the *Feeder ID Graphic* and *Feeder ID Type* for the current feeder ID group.

Ampacity: The ampacity of the feeder.

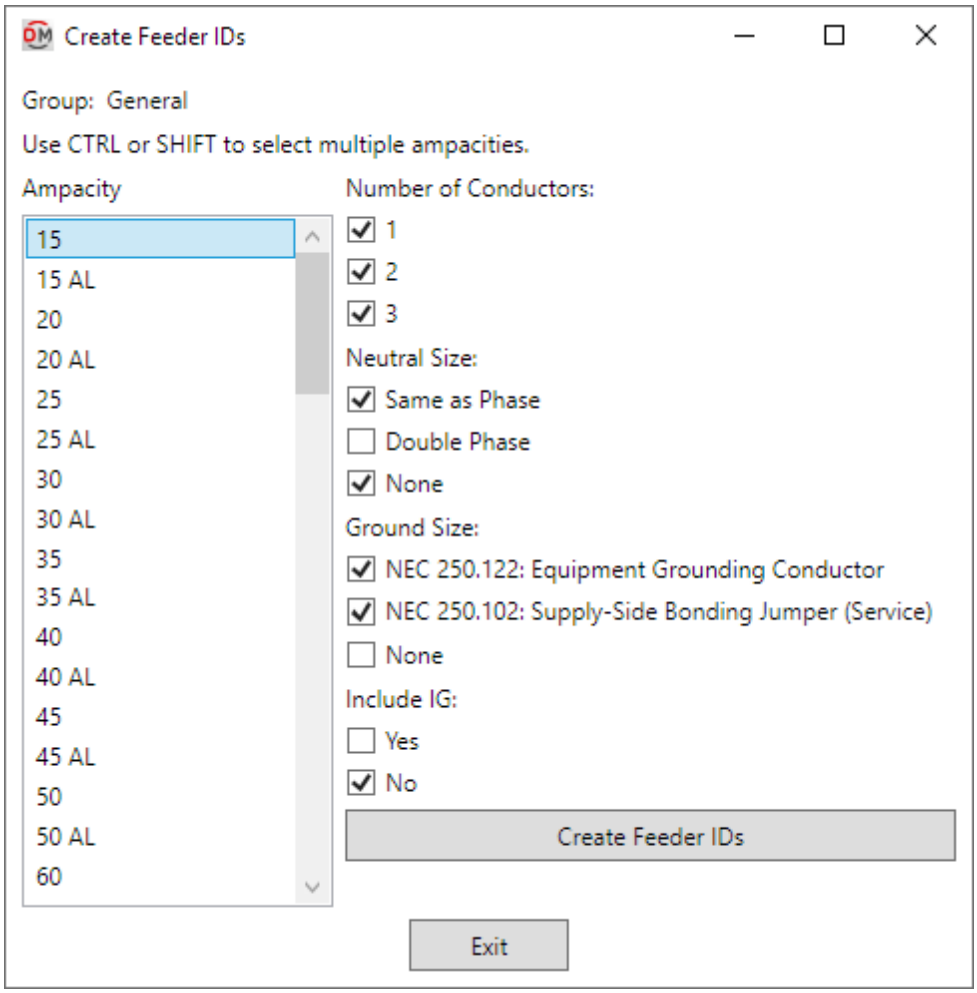
ID: The name of the feeder ID. This will be displayed when the feeder ID is inserted on the one-line diagram.

Callout: The full callout of the feeder.

Ground Type: Whether the ground wire of the feeder is sized based upon the *Ground Wire Size, Service* setting or the *Ground Wire Size, Equipment* setting for the feeder ampacity.

If the ground wire of the feeder has been set manually, or if the feeder has no ground wire, **NEC 250.122 Equipment** will be displayed.

Create: Opens the **Create Feeder IDs** dialog box:



The **Create Feeder ID** dialog box is used to manually create one or more feeder IDs. Multiple settings can be selected to create feeder IDs for each combination of the selected settings.

Ampacity: The ampacity of the feeder.

Number of Conductors: The number of conductor wires.

Neutral Size: The size of the neutral wires.

Ground Size: The size of the ground wires.

Include IG: Whether the ground will be isolated.

Press the **Create Feeder IDs** button to create the feeder IDs.

Move: Moves the currently selected feeder IDs to another group.

Delete: Deletes the currently selected feeder IDs.

Import: Imports feeder IDs from the **Master Feeder ID Schedule**. New feeder IDs will be created in the project for

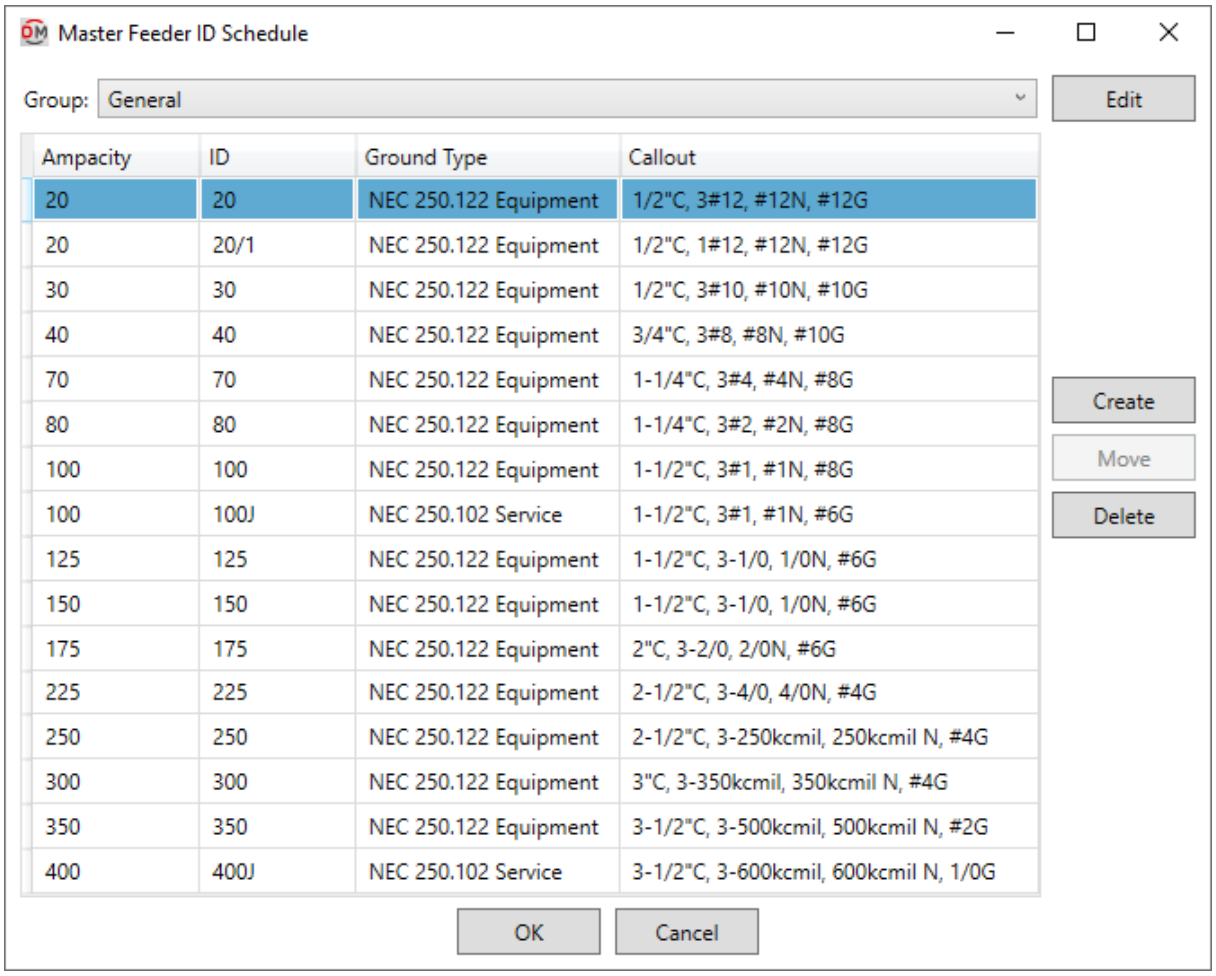
each ID being imported. If an ID already exists in the current schedule, the information will be overwritten.

Export: Exports feeder IDs from the current schedule to the master schedule. New feeder IDs will be created in the master schedule for each ID being imported. If an ID already exists in the master schedule, the information will be overwritten.

Master Feeder ID Schedule

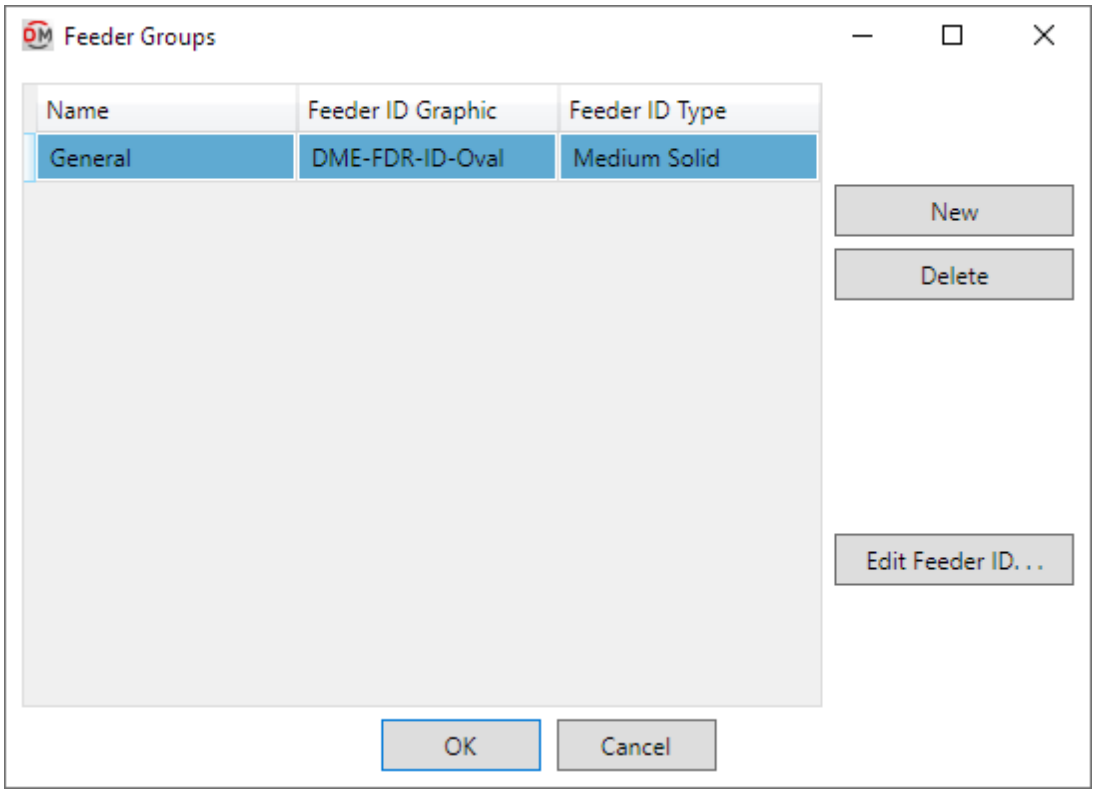
Allows you to customize the master schedule of feeder IDs available to be used on the one-line diagram. Opens the **Master Feeder ID Schedule** dialog box:

Master Feeder ID Schedule Dialog Box



Group: The active feeder ID group. All of the IDs that are created and modified will be associated with the selected group.

Edit: Opens the **Feeder Groups** dialog box:



Name: The name of the feeder ID group.

Feeder ID Graphic: The graphic family used when feeder IDs in the group are inserted on the one-line diagram.

Feeder ID Type: The graphic type that will be used for the feeder ID.

New: Creates a new feeder ID group.

Delete: Deletes the current feeder ID group.

Edit Feeder ID: Sets the *Feeder ID Graphic* and *Feeder ID Type* for the current feeder ID group.

Ampacity: The ampacity of the feeder.

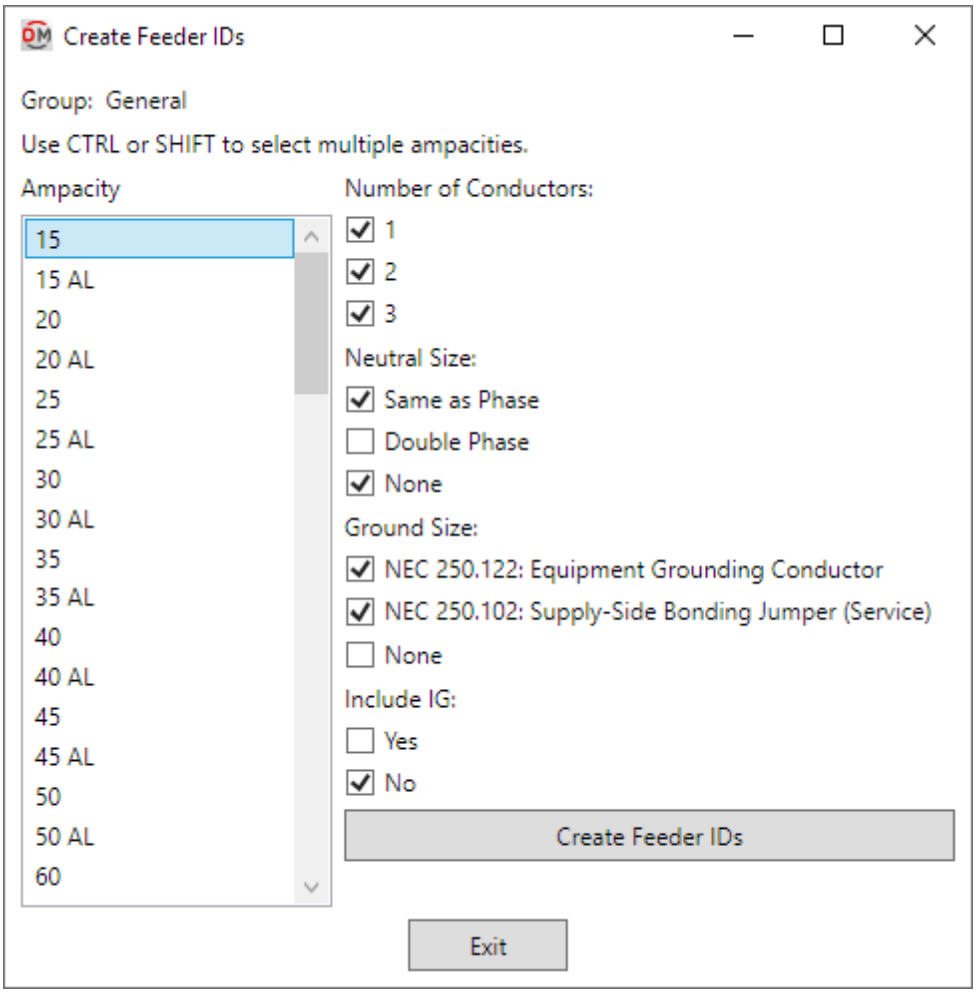
ID: The name of the feeder ID. This will be displayed when the feeder ID is inserted on the one-line diagram.

Callout: The full callout of the feeder.

Ground Type: Whether the ground wire of the feeder is sized based upon the *Ground Wire Size, Service* setting or the *Ground Wire Size, Equipment* setting for the feeder ampacity.

If the ground wire of the feeder has been set manually, or if the feeder has no ground wire, **NEC 250.122 Equipment** will be displayed.

Create: Opens the **Create Feeder IDs** dialog box:



The **Create Feeder ID** dialog box is used to manually create one or more feeder IDs. Multiple settings can be selected to create feeder IDs for each combination of the selected settings.

Ampacity: The ampacity of the feeder.

Number of Conductors: The number of conductor wires.

Neutral Size: The size of the neutral wires.

Ground Size: The size of the ground wires.

Include IG: Whether the ground will be isolated.

Press the **Create Feeder IDs** button to create the feeder IDs.

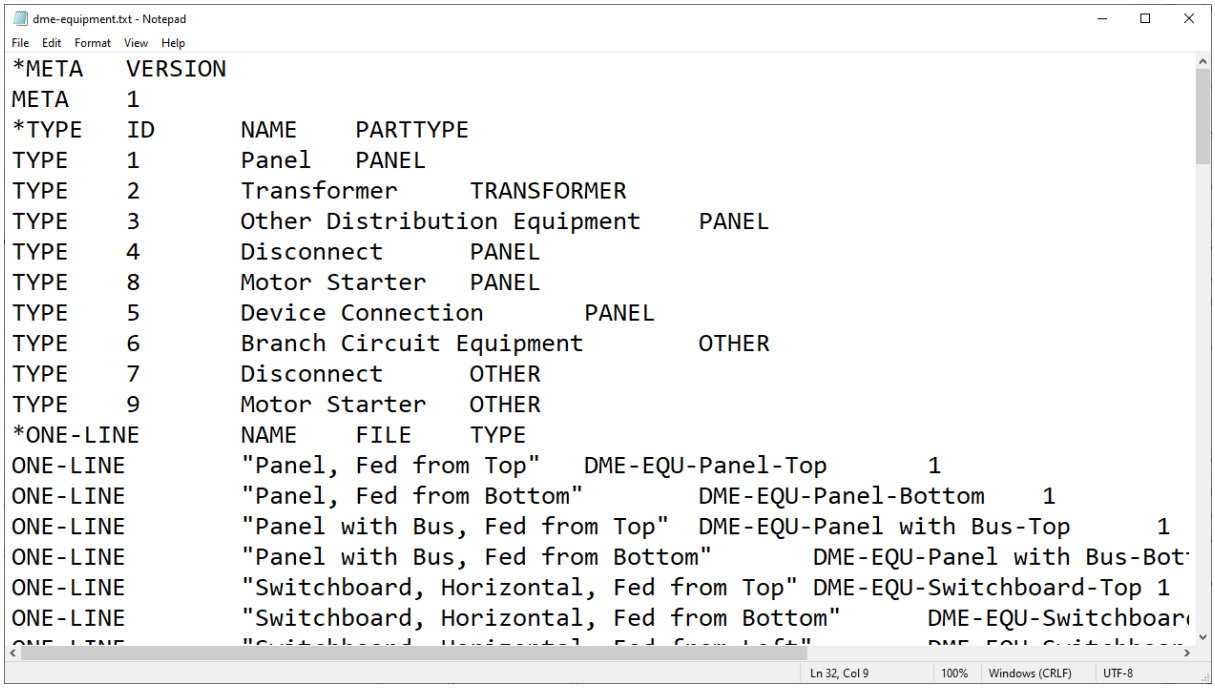
Move: Moves the currently selected feeder IDs to another group.

Delete: Deletes the currently selected feeder IDs.

One-Line Diagram Device Graphics

Allows you to customize the list of graphic families available to be used for equipment on the one-line diagram.

Opens the "dme-equipment.txt" file located in your customization folder:



The information is arranged in tab-delimited columns. Each section is separated by a heading row that begins with *. When modifying the file, do not change the **META* section, the first column, or any rows that begin with *.

*TYPE

This section is used to determine how graphic families are grouped and displayed in the **Insert Create** and **Insert Link** commands, and how model families are grouped and displayed in the **Insert Create** command.

ID: An identifying number associated with the equipment type.

NAME: The name of the equipment type that is displayed in the *Equipment Type* field.

PARTTYPE: The model families loaded in the current project that will be displayed in the *Model Family* list. This value must be **PANEL**, **TRANSFORMER**, or **OTHER**.

- **PANEL:** Equipment families that have their *Part Type* set to **Panelboard**, **Other Panel**, or **Switchboard** will be displayed.
- **TRANSFORMER:** Equipment families that have their *Part Type* set to **Transformer** will be displayed. The *Secondary Distribution System* field will be available in the **Insert Create** command.
- **OTHER:** Electrical fixtures and equipment families that have their *Part Type* set to **Equipment Switch** will be displayed.

*ONE-LINE

This section is used to determine which graphic families are available in the **Insert Create** and **Insert Link** commands.

NAME: The name of the graphic family that is displayed in the *One-Line Diagram Graphic* list.

FILE: The file name of the graphic family displayed on the one-line diagram, not including the file extension.

TYPE: The *Equipment Type* under which the graphic family will be displayed. Corresponds to the *ID* column in the **TYPE* section.

*MODEL

This section is used to organize the *Model Family* list in the **Insert Create** command.

FAMILY: The file name of the model family that is displayed in the *Model Family* list, not including the file extension.

TYPE: The group under which the model family will be displayed. Corresponds to the *ID* column in the **TYPE* section.

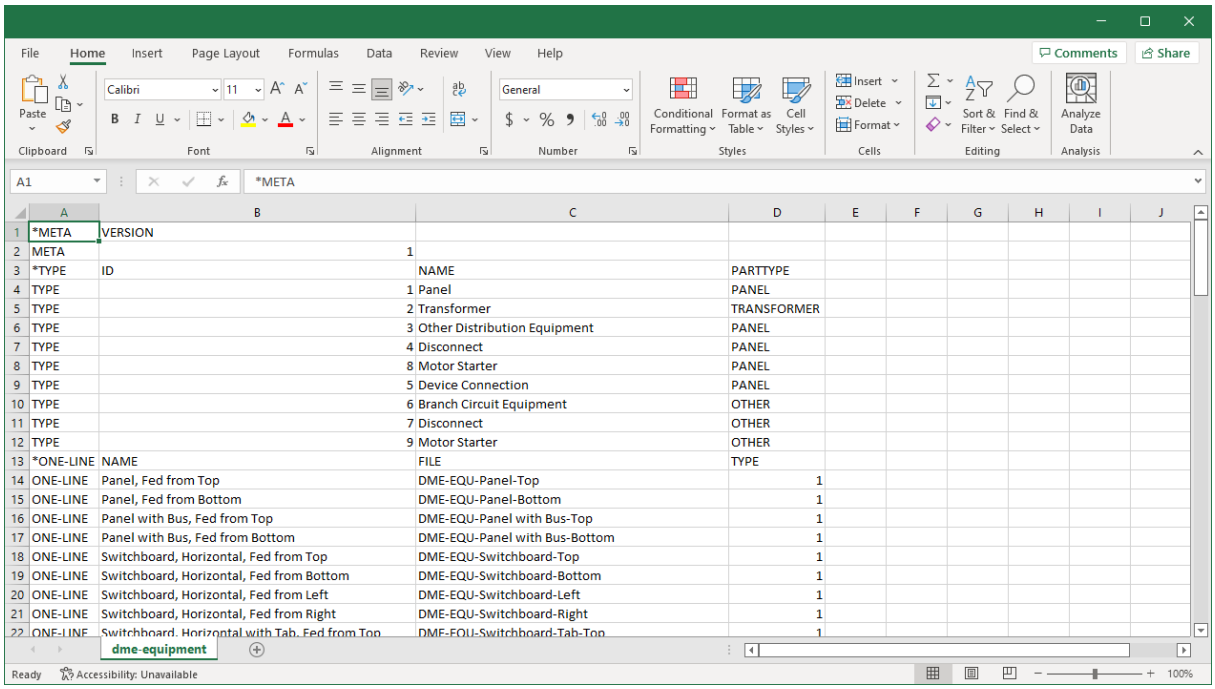
Using Excel to Modify Device Graphics

When making several changes to the device graphics customization file, using Excel is recommended.

To edit the file, in Excel, run the `Open` command and browse to the "dme-equipment.txt" file located in your customization folder. You may need to filter the files by **All Files** or **Text Files**.

After selecting the file, a **Text Import Wizard** dialog box may appear. Press the **Next** button twice, then the **Finish** button to use the default settings.

Each section is separated by a heading row that begins with *. When modifying the file, do not change the **META* section, the first column, or any rows that begin with *.

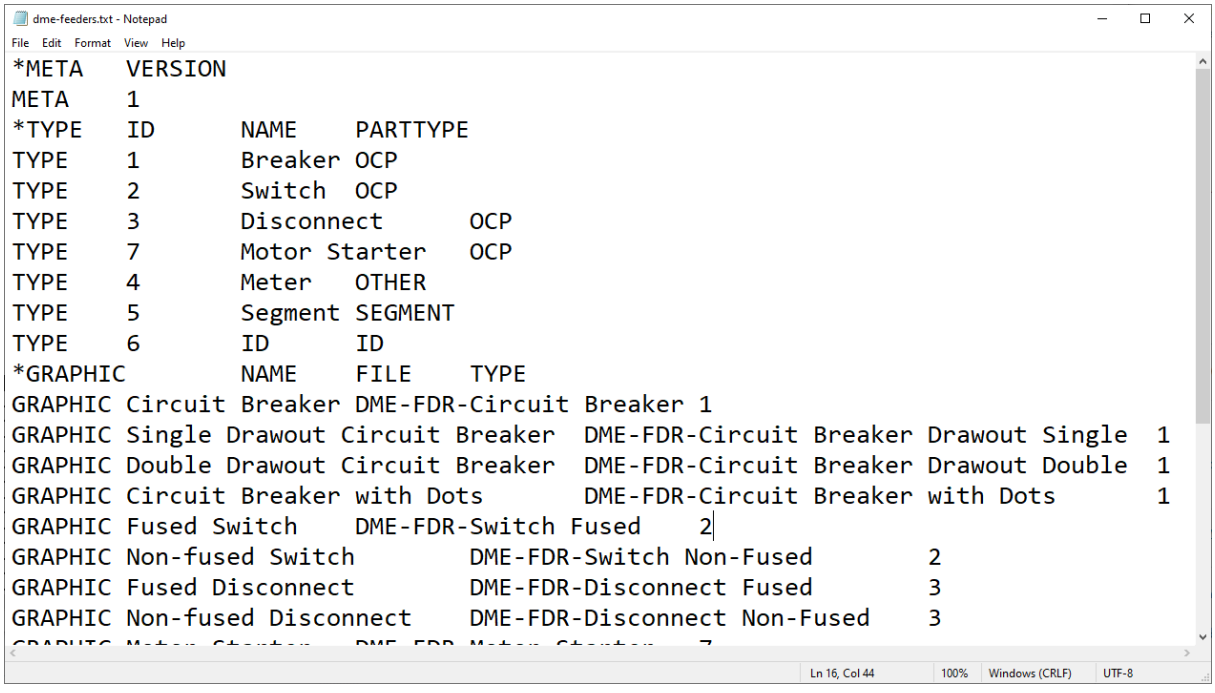


	A	B	C	D
1	*META	VERSION		
2	META	1		
3	*TYPE	ID	NAME	PARTTYPE
4	TYPE	1	Panel	PANEL
5	TYPE	2	Transformer	TRANSFORMER
6	TYPE	3	Other Distribution Equipment	PANEL
7	TYPE	4	Disconnect	PANEL
8	TYPE	8	Motor Starter	PANEL
9	TYPE	5	Device Connection	PANEL
10	TYPE	6	Branch Circuit Equipment	OTHER
11	TYPE	7	Disconnect	OTHER
12	TYPE	9	Motor Starter	OTHER
13	*ONE-LINE	NAME	FILE	TYPE
14	ONE-LINE	Panel, Fed from Top	DME-EQU-Panel-Top	1
15	ONE-LINE	Panel, Fed from Bottom	DME-EQU-Panel-Bottom	1
16	ONE-LINE	Panel with Bus, Fed from Top	DME-EQU-Panel with Bus-Top	1
17	ONE-LINE	Panel with Bus, Fed from Bottom	DME-EQU-Panel with Bus-Bottom	1
18	ONE-LINE	Switchboard, Horizontal, Fed from Top	DME-EQU-Switchboard-Top	1
19	ONE-LINE	Switchboard, Horizontal, Fed from Bottom	DME-EQU-Switchboard-Bottom	1
20	ONE-LINE	Switchboard, Horizontal, Fed from Left	DME-EQU-Switchboard-Left	1
21	ONE-LINE	Switchboard, Horizontal, Fed from Right	DME-EQU-Switchboard-Right	1
22	ONE-LINE	Switchboard, Horizontal with Tab, Fed from Top	DME-EQU-Switchboard-Tab-Top	1

One-Line Diagram Feeder Graphics

Allows you to customize the list of graphic families available to be used on feeders on the one-line diagram.

Opens the "dme-feeders.txt" file located in your customization folder:



```
*META    VERSION
META     1
*TYPE    ID       NAME     PARTTYPE
TYPE     1        Breaker  OCP
TYPE     2        Switch   OCP
TYPE     3        Disconnect       OCP
TYPE     7        Motor Starter    OCP
TYPE     4        Meter    OTHER
TYPE     5        Segment  SEGMENT
TYPE     6        ID       ID
*GRAPHIC         NAME     FILE     TYPE
GRAPHIC Circuit Breaker DME-FDR-Circuit Breaker 1
GRAPHIC Single Drawout Circuit Breaker  DME-FDR-Circuit Breaker Drawout Single  1
GRAPHIC Double Drawout Circuit Breaker  DME-FDR-Circuit Breaker Drawout Double  1
GRAPHIC Circuit Breaker with Dots       DME-FDR-Circuit Breaker with Dots       1
GRAPHIC Fused Switch    DME-FDR-Switch Fused    2
GRAPHIC Non-fused Switch        DME-FDR-Switch Non-Fused        2
GRAPHIC Fused Disconnect        DME-FDR-Disconnect Fused        3
GRAPHIC Non-fused Disconnect    DME-FDR-Disconnect Non-Fused    3
```

The information is arranged in tab-delimited columns. Each section is separated by a heading row that begins with

*. When modifying the file, do not change the **META* section, the first column, or any rows that begin with *.

*TYPE

This section is used to determine how graphic families are grouped and displayed in the **Add/Modify Graphic** and **Circuit Insert** commands.

ID: An identifying number associated with the group.

NAME: The name of the group that is displayed in the *Group* field.

PARTTYPE: The type of feeder graphic for which the group will be available in the *Group* field. This value must be **OCP**, **SEGMENT**, **ID**, or **OTHER**.

- **OCP:** The group will be displayed when specifying an OCP graphic in the **Circuit Insert** command and when adding or modifying any graphic in the **Add/Modify Graphic** command.
- **SEGMENT:** The group will be displayed when adding or modifying a non-OCP graphic in the **Add/Modify Graphic** command. Graphic families in this group will be available in the *Default feeder segment graphic* option in the **Project Options** command.
- **ID:** The group will be displayed when specifying a feeder ID graphic in the **Circuit Insert** command and when adding or modifying a non-OCP graphic in the **Add/Modify Graphic** command.
- **OTHER:** The group will be displayed when adding or modifying a non-OCP graphic in the **Add/Modify Graphic** command.

*GRAPHIC

This section is used to determine which graphic families are available in the **Add/Modify Graphic** and **Circuit Insert** commands when adding a new feeder graphic or replacing an existing feeder graphic.

NAME: The name of the graphic family that is displayed in the *OCP Graphic* or *ID Graphic* list.

FILE: The file name of the graphic family displayed on the one-line diagram, not including the file extension.

TYPE: The *Group* under which the graphic family will be displayed. Corresponds to the *ID* column in the **TYPE* section.

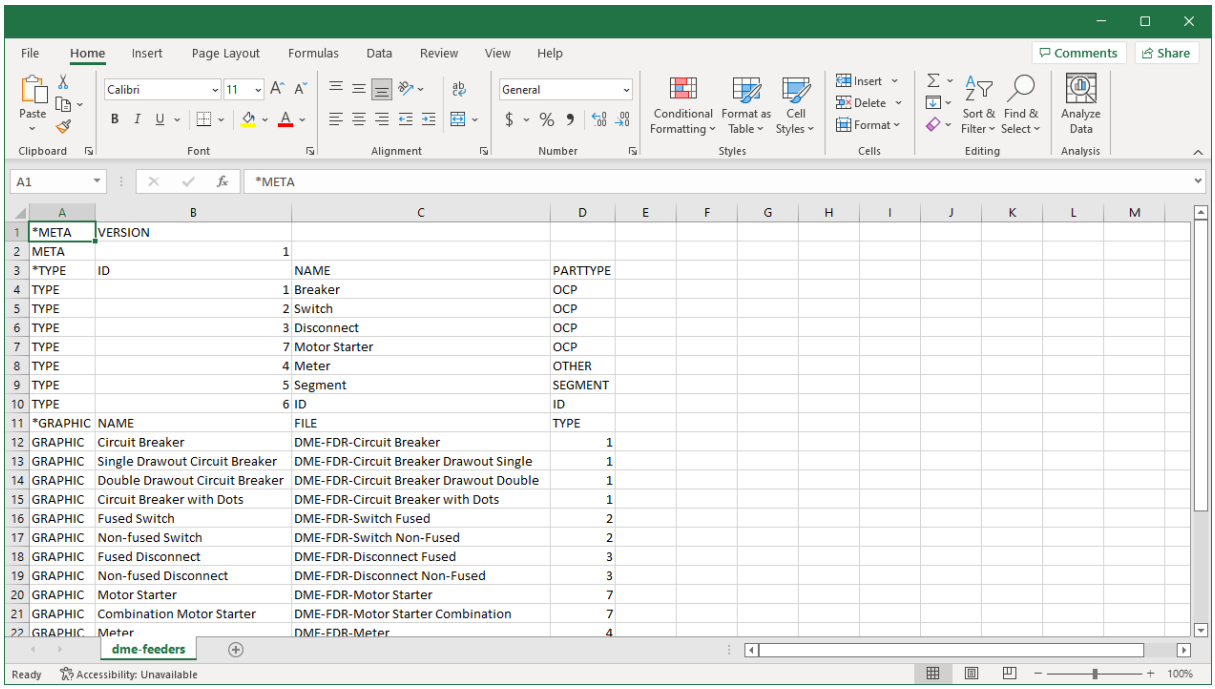
Using Excel to Modify Feeder Graphics

When making several changes to the feeder graphics customization file, using Excel is recommended.

To edit the file, in Excel, run the `Open` command and browse to the "dme-feeders.txt" file located in your customization folder. You may need to filter the files by **All Files** or **Text Files**.

After selecting the file, a **Text Import Wizard** dialog box may appear. Press the **Next** button twice, then the **Finish** button to use the default settings.

Each section is separated by a heading row that begins with *. When modifying the file, do not change the **META* section, the first column, or any rows that begin with *.

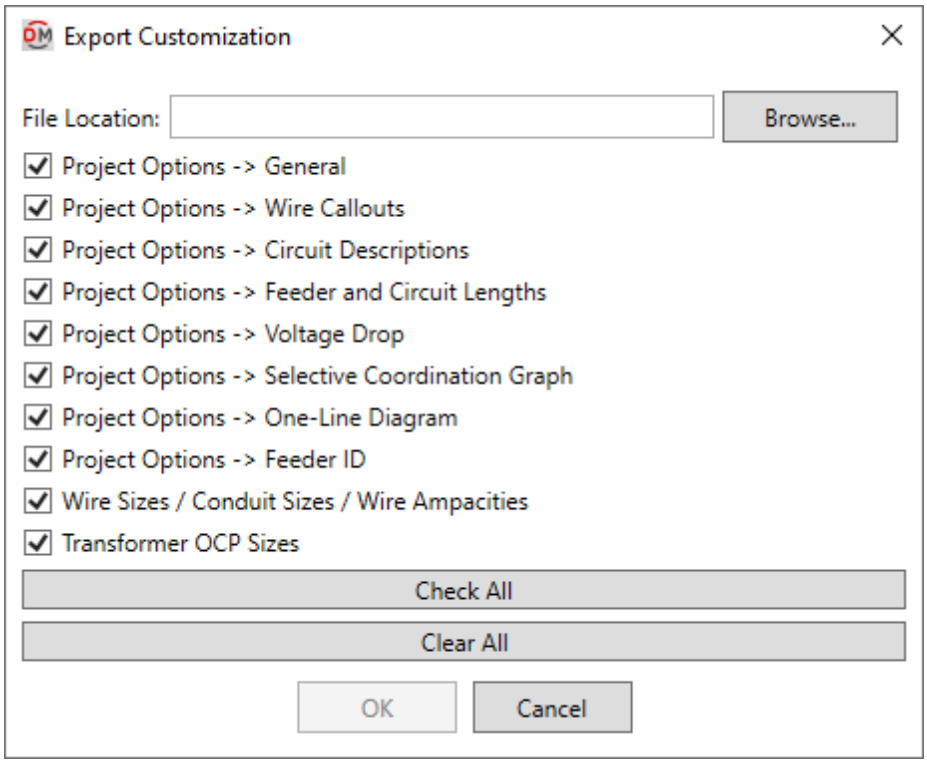


	A	B	C	D
1	*META	VERSION		
2	META	1		
3	*TYPE	ID	NAME	PARTTYPE
4	TYPE	1	Breaker	OCP
5	TYPE	2	Switch	OCP
6	TYPE	3	Disconnect	OCP
7	TYPE	7	Motor Starter	OCP
8	TYPE	4	Meter	OTHER
9	TYPE	5	Segment	SEGMENT
10	TYPE	6	ID	ID
11	*GRAPHIC	NAME	FILE	TYPE
12	GRAPHIC	Circuit Breaker	DME-FDR-Circuit Breaker	1
13	GRAPHIC	Single Drawout Circuit Breaker	DME-FDR-Circuit Breaker Drawout Single	1
14	GRAPHIC	Double Drawout Circuit Breaker	DME-FDR-Circuit Breaker Drawout Double	1
15	GRAPHIC	Circuit Breaker with Dots	DME-FDR-Circuit Breaker with Dots	1
16	GRAPHIC	Fused Switch	DME-FDR-Switch Fused	2
17	GRAPHIC	Non-fused Switch	DME-FDR-Switch Non-Fused	2
18	GRAPHIC	Fused Disconnect	DME-FDR-Disconnect Fused	3
19	GRAPHIC	Non-fused Disconnect	DME-FDR-Disconnect Non-Fused	3
20	GRAPHIC	Motor Starter	DME-FDR-Motor Starter	7
21	GRAPHIC	Combination Motor Starter	DME-FDR-Motor Starter Combination	7
22	GRAPHIC	Meter	DME-FDR-Meter	4

Export

Exports customization settings to an external ".dmc" file. This file can be imported into other projects. Opens the **Export Customization** dialog box:

Export Customization Dialog Box



Multiple customization settings can be selected to be exported.

File Location: The file name and location to which the customization settings will be exported.

Browse: Press this button to select a name and location for the file.

Project Options -> <Section>: Options set in the specified section of the **Project Options** command.

Wire Sizes / Conduit Sizes / Wire Ampacities: Settings in the **Wire Sizes**, **Conduit Sizes**, and **Wire Ampacities** commands.

Transformer OCP Sizes: Settings in the **Transformer OCP Sizes** command.

Check All: Press this button to check all of the customization settings boxes.

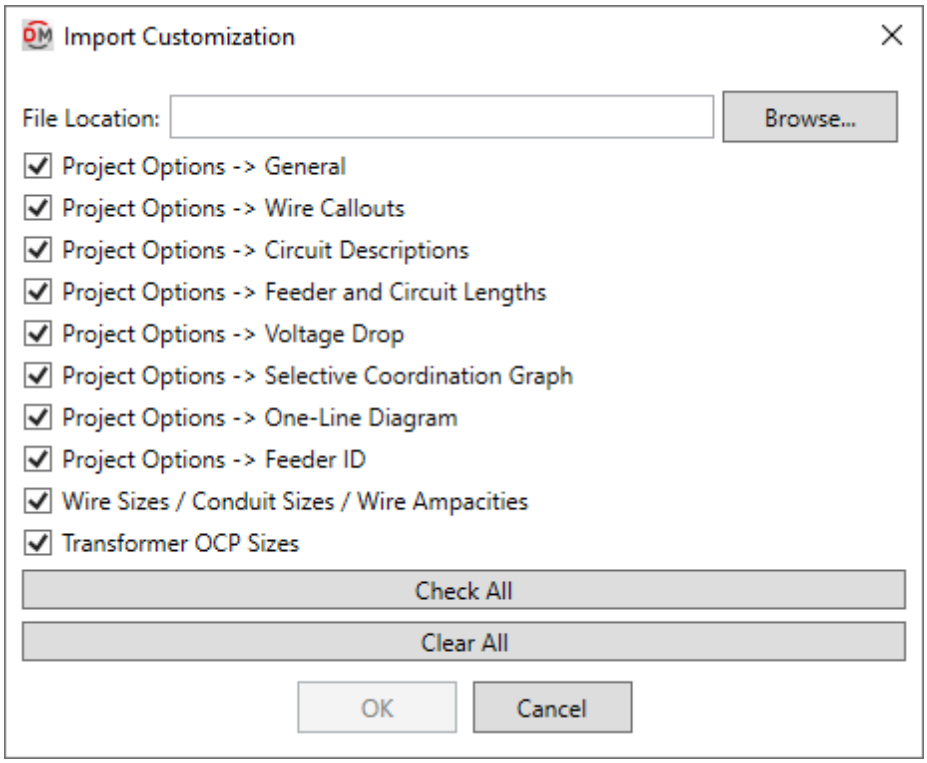
Clear All: Press this button to check none of the customization settings boxes.

Press the **OK** button to export the file.

Import

Imports customization settings previously exported to a ".dmc" file using the **Customization->Export** command. Opens the **Import Customization** dialog box:

Import Customization Dialog Box



Multiple customization settings can be selected to be imported. Settings not present in the specified file cannot be selected.

File Location: The file name and location from which the customization settings will be imported.

Browse: Press this button to specify the name and location of the file.

Project Options -> <Section>: Options set in the specified section of the **Project Options** command.

Wire Sizes / Conduit Sizes / Wire Ampacities: Settings in the **Wire Sizes**, **Conduit Sizes**, and **Wire Ampacities** commands.

Transformer OCP Sizes: Settings in the **Transformer OCP Sizes** command.

Check All: Press this button to check all of the customization settings boxes. Settings not present in the specified file will not be checked.

Clear All: Press this button to check none of the customization settings boxes.

Press the **OK** button to import the file. All of the selected customization settings will be overwritten.

Family

The **Family** panel appears on the **DM Electrical** tab when you have a family open in Revit. It includes a single command for adding information specific to Design Master Electrical RT to a family.

Family Edit: Allows you to add additional electrical information to your families.

Family Edit

Allows you to view and edit additional electrical information added to a family.

Training Videos

- **The Family Edit Command**

Opens the **Family Edit** dialog box:

Family Edit Dialog Box

Family Edit

Family Settings

Device Type:	Branch circuit device: Other
Circuit Description:	M_Cooling Tower - Closed Circuit - Counterflow - 67-189 kW
Load:	42.3 kVA
Isolated Ground:	No
Show on One-Line Diagram:	Default (Device = No, Distribution Equipment = Yes)
One-Line Graphic:	Use project options setting
One-Line Type:	Use project options setting
OCP Graphic:	Use upstream distribution equipment graphic
OCP Type:	Use upstream distribution equipment graphic
Feeder ID Graphic:	Feeder group default
Feeder ID Type:	Feeder group default

Type Settings

	177 kW
Circuit Description:	Same as Family Settings
	M_Cooling Tower - Closed Circuit - Counterflow - 67-189 kW
Load:	42.3 kVA
Isolated Ground:	Same as Family Settings (No)
Show on One-Line Diagram:	Same as Family Settings (Default (Device = No, Distribution Equipment = Yes))
One-Line Graphic:	Same as Family Settings (Use project options setting)
One-Line Type:	Same as Family Settings (Use project options setting)
OCP Graphic:	Same as Family Settings (Use upstream distribution equipment graphic)
OCP Type:	Same as Family Settings (Use upstream distribution equipment graphic)
Feeder ID Graphic:	Same as Family Settings (Feeder group default)
Feeder ID Type:	Same as Family Settings (Feeder group default)

Device Type: Controls how the family is handled by Design Master Electrical RT. Each selection provides a different set of values that can be specified.

- **Branch circuit device: Other:** A generic branch circuit device. Includes the option to set the circuit description, whether the device needs an isolated ground, and nothing else.
- **Branch circuit device: Equipment connection:** An equipment connection. Includes options for setting breaker and wire sizing as well as some motor-specific values for fault calculations.
- **Distribution equipment: Other:** A generic distribution equipment. Includes options for ground and neutral wire sizing, setting descriptions in the upstream distribution equipment, and nothing else.
- **Distribution equipment: Panel:** A panel. Includes options for setting main disconnect information.
- **Distribution equipment: Transformer:** A transformer. Includes options for setting transformer-specific information.

Branch circuit device: Other

These values are displayed when the *Device Type* is set to **Branch circuit device: Other**.

Family Edit Dialog Box

Family Edit

Family Settings

Device Type:	Branch circuit device: Other
Circuit Description:	M_Cooling Tower - Closed Circuit - Counterflow - 67-189 kW
Load:	42.3 kVA
Isolated Ground:	No
Show on One-Line Diagram:	Default (Device = No, Distribution Equipment = Yes)
One-Line Graphic:	Use project options setting
One-Line Type:	Use project options setting
OCP Graphic:	Use upstream distribution equipment graphic
OCP Type:	Use upstream distribution equipment graphic
Feeder ID Graphic:	Feeder group default
Feeder ID Type:	Feeder group default

Type Settings

	177 kW
Circuit Description:	Same as Family Settings
	M_Cooling Tower - Closed Circuit - Counterflow - 67-189 kW
Load:	42.3 kVA
Isolated Ground:	Same as Family Settings (No)
Show on One-Line Diagram:	Same as Family Settings (Default (Device = No, Distribution Equipment = Yes))
One-Line Graphic:	Same as Family Settings (Use project options setting)
One-Line Type:	Same as Family Settings (Use project options setting)
OCP Graphic:	Same as Family Settings (Use upstream distribution equipment graphic)
OCP Type:	Same as Family Settings (Use upstream distribution equipment graphic)
Feeder ID Graphic:	Same as Family Settings (Feeder group default)
Feeder ID Type:	Same as Family Settings (Feeder group default)

Family Settings

The settings for the family. The values set in this section are used unless they are overridden by settings in the bottom *Type Settings* section.

Device Type: The type of electrical device. Each type has different values that can be set. Displayed here are the settings for **Branch circuit device: Other**.

Circuit Description: The description that will be displayed on circuits to which this device is connected.

Load: The load defined on the connectors in the family. This value is read-only and cannot be changed in this dialog box. Modify the values in the connectors to change this value.

Isolated Ground: Whether the branch circuit needs an isolated ground wire. If set to **Yes**, an isolated ground wire is included in the wire callout for the branch circuit connected to this device.

Show on One-Line Diagram: Whether the device is inserted on the one-line diagram when using the **Generate One-Line** or **Export to AutoCAD** commands, and whether it is displayed in the **Insert Link** and **Copy Link** commands.

One-Line Graphic: The default graphic family used for the device when it is inserted on the one-line diagram. The values in this list are based upon the **One-Line Diagram Device Graphics** command.

- **Use project options setting:** The *Default branch circuit device graphic* specified in the **Project Options** command for the project will be used.

One-Line Type: The graphic type used for the device. The values in this list are based upon the selected *One-Line Graphic*.

OCP Graphic: The graphic family used for the upstream OCP when the device is inserted on the one-line diagram. The values in this list are based upon the **One-Line Diagram Feeder Graphics** command.

- **Use upstream distribution equipment graphic:** The *Default Downstream OCP Graphic* and *Default Downstream OCP Type* set in the upstream distribution equipment will be used.
- **None:** No OCP graphic will be inserted.

OCP Type: The graphic type used for the upstream OCP. The values in this list are based upon the selected *OCP Graphic*.

Feeder ID Graphic: The graphic family used for the feeder ID when the device is inserted on the one-line diagram. The values in this list are based upon the **One-Line Diagram Feeder Graphics** command.

- **Feeder group default:** The feeder ID graphic set for the group in the **Project Feeder ID Schedule** will be used.
- **None:** No feeder ID graphic will be inserted.

Feeder ID Type: The graphic type used for the feeder ID. The values in this list are based upon the selected *Feeder ID Graphic*.

Type Settings

The settings for specific types in the family. Values set here override the values set in the *Family Settings* section.

Circuit Description: The circuit description for this family type.

- **Same as Family Settings:** Use the circuit description set in the *Family Settings* section.
- **Set in Type Settings:** Enter a circuit description in the field provided.

Branch circuit device: Equipment connection

These values are displayed when the *Device Type* is set to **Branch circuit device: Equipment connection**.

Family Edit Dialog Box

Family Edit

Family Settings

Device Type:	Branch circuit device: Equipment connection
Circuit Description:	M_Cooling Tower - Closed Circuit - Counterflow - 67-189 kW
Load:	42.3 kVA
Isolated Ground:	No
Show on One-Line Diagram:	Default (Device = No, Distribution Equipment = Yes)
One-Line Graphic:	Use project options setting
One-Line Type:	Use project options setting
OCP Graphic:	Use upstream distribution equipment graphic
OCP Type:	Use upstream distribution equipment graphic
Feeder ID Graphic:	Feeder group default
Feeder ID Type:	Feeder group default
FLA / BCSC:	0
MCA:	0
MOCP:	0
OCP Trip:	Size automatically (based upon load)
Conductor:	Size automatically (based upon breaker, or loads if breaker based upon motor)
Motor Multiplier:	Default
	4
Motor X/R Ratio:	Default
	5

Type Settings

	177 kW
Circuit Description:	Same as Family Settings
	M_Cooling Tower - Closed Circuit - Counterflow - 67-189 kW
Load:	42.3 kVA
Isolated Ground:	Same as Family Settings (No)
Show on One-Line Diagram:	Same as Family Settings (Default (Device = No, Distribution Equipment = Yes))
One-Line Graphic:	Same as Family Settings (Use project options setting)
One-Line Type:	Same as Family Settings (Use project options setting)
OCP Graphic:	Same as Family Settings (Use upstream distribution equipment graphic)
OCP Type:	Same as Family Settings (Use upstream distribution equipment graphic)
Feeder ID Graphic:	Same as Family Settings (Feeder group default)
Feeder ID Type:	Same as Family Settings (Feeder group default)
Override Equipment Values:	No
FLA / BCSC:	0
MCA:	0
MOCP:	0
OCP Trip:	Size automatically (based upon load)
Conductor:	Size automatically (based upon breaker, or loads if breaker based upon motor)
Motor Multiplier:	Default
	4
Motor X/R Ratio:	Default
	5

Family Settings

The settings for the family. The values set in this section are used unless they are overridden by settings in the bottom *Type Settings* section.

Device Type: The type of electrical device. Each type has different values that can be set. Displayed here are the settings for **Branch circuit device: Equipment connection**.

Circuit Description: The description that will be displayed on circuits to which this device is connected.

Load: The load defined on the connectors in the family. This value is read-only and cannot be changed in this dialog box. Modify the values in the connectors to change this value.

Isolated Ground: Whether the equipment needs an isolated ground wire. If set to **Yes**, an isolated ground wire is included in the wire callout for the branch circuit connected to this device.

Show on One-Line Diagram: Whether the device is inserted on the one-line diagram when using the **Generate One-Line** or **Export to AutoCAD** commands, and whether it is displayed in the **Insert Link** and **Copy Link** commands.

One-Line Graphic: The default graphic family used for the device when it is inserted on the one-line diagram. The values in this list are based upon the **One-Line Diagram Device Graphics** command.

- **Use project options setting:** The *Default branch circuit device graphic* specified in the **Project Options** command for the project will be used.

One-Line Type: The graphic type used for the device. The values in this list are based upon the selected *One-Line Graphic*.

OCP Graphic: The graphic family used for the upstream OCP when the device is inserted on the one-line diagram. The values in this list are based upon the **One-Line Diagram Feeder Graphics** command.

- **Use upstream distribution equipment graphic:** The *Default Downstream OCP Graphic* and *Default Downstream OCP Type* set in the upstream distribution equipment will be used.
- **None:** No OCP graphic will be inserted.

OCP Type: The graphic type used for the upstream OCP. The values in this list are based upon the selected *OCP Graphic*.

Feeder ID Graphic: The graphic family used for the feeder ID when the device is inserted on the one-line diagram. The values in this list are based upon the **One-Line Diagram Feeder Graphics** command.

- **Feeder group default:** The feeder ID graphic set for the group in the **Project Feeder ID Schedule** will be used.
- **None:** No feeder ID graphic will be inserted.

Feeder ID Type: The graphic type used for the feeder ID. The values in this list are based upon the selected *Feeder ID Graphic*.

FLA / BCSC: The full load amps (FLA) or branch circuit selection current (BCSC). BCSC is used to size the breaker and wires for motor-compressors (see *NEC 440.22 (A) & (C), NEC 440.32 & 33*). FLA is used to size breakers for motors (see *NEC 430.52*).

MCA: The minimum circuit amps (MCA). Used to size wires for multimotors (see *NEC 440.35*).

MOCP: The maximum overcurrent protection (MOCP). Used to size the breaker for motor-compressors (see *NEC 440.22(A) & (C)*).

OCP Trip: How to size the breaker for the branch circuit to which the equipment is connected.

- **Size automatically (based upon load):** The breaker is sized based upon 125% of the connected load. FLA / BCSC, MCA, and MOCP are all ignored.
- **Motor-Compressor, <= MOCP:** The breaker is sized to be less than the MOCP (see *NEC 440.22(C)*).
- **Motor-Compressor, <= 175% of BCSC, <= MOCP:** The breaker is sized to be less than 175% of the BCSC and less than the MOCP (see *NEC 440.22(A) & (C)*).
- **Motor-Compressor, <= 225% of BCSC, <= MOCP:** The breaker is sized to be less than 225% of the BCSC and less than the MOCP (see *NEC 440.22(A) Exception no. 2 & (C)*).
- **Motor, Dual Element Fuse, <= 175% of FLA:** The breaker is sized to be less than 175% of the FLA (see *NEC 430.52*).
- **Motor, Dual Element Fuse, <= 225% of FLA:** The breaker is sized to be less than 225% of the FLA (see *NEC 430.52(C)(1)(b)(2)*).
- **Motor, Inverse Time Breaker, <= 250% of FLA:** The breaker is sized to be less than 250% of the FLA (see *NEC 430.52*).
- **Custom:** The breaker size is set to the value you specify. Enter a value that corresponds to an ampacity in the **Wire Ampacities** command in your project.

Conductor: How to size the conductors for the branch circuit to which the equipment is connected.

- **Size automatically (based upon breaker, or loads if breaker based upon motor):** The conductors are sized automatically. The conductors are sized to match the breaker, unless the *OCP Trip* is set to one of the Motor choices. Then the conductors are sized to match the load.
- **Multimotor, >= MCA:** The conductors are sized to be greater than the MCA (see *NEC 440.35*).
- **Motor-Compressor, >= 100% of BCSC + 25% of max BCSC:** The conductors are sized to be greater than 100% of the combined BCSC, plus 25% of the largest BCSC on the circuit (see *NEC 440.32 & 33*).
- **Size based upon loads:** The conductors are sized based upon 125% of the connected load.
- **Size based upon breaker:** The conductors are sized based upon the breaker size.
- **Custom:** The conductors are sized based upon the ampacity value you specify. Enter a value that corresponds to an ampacity in the **Wire Ampacities** command in your project.

Motor Multiplier: The multiplier applied to the motor load when it is used during fault calculations.

Motor X/R Ratio: The X/R ratio of the motor load when it is used during fault calculations.

Type Settings

The settings for specific types in the family. Values set here override the values set in the *Family Settings* section.

Circuit Description: The circuit description for this family type.

- **Same as Family Settings:** Use the circuit description set in the *Family Settings* section.
- **Set in Type Settings:** Enter a circuit description in the field provided.

Override Equipment Values: Whether to override the equipment connection values set in the *Family Settings* section for this family type.

Distribution equipment: Other

These values are displayed when the *Device Type* is set to **Distribution equipment: Other**.

Family Edit Dialog Box

Family Edit

Family Settings

Device Type:	Distribution equipment: Other
Upstream Description Prefix:	
Upstream Description Suffix:	
Neutral:	Same as phase
Ground:	Size automatically
IG Conductor:	No
Show on One-Line Diagram:	Default (Device = No, Distribution Equipment = Yes)
One-Line Graphic (0 or 1 subpanels):	Use project options setting
One-Line Type (0 or 1 subpanels):	Use project options setting
One-Line Graphic (2+ subpanels):	Use project options setting
One-Line Type (2+ subpanels):	Use project options setting
Upstream OCP Graphic:	Use upstream distribution equipment graphic
Upstream OCP Type:	Use upstream distribution equipment graphic
Downstream OCP Graphic:	Use project options setting
Downstream OCP Type:	Use project options setting
Feeder ID Graphic:	Feeder group default
Feeder ID Type:	Feeder group default

Type Settings

	177 kW
Override Family Values:	No
Upstream Description Prefix:	
Upstream Description Suffix:	
Neutral:	Same as phase
Ground:	Size automatically
IG Conductor:	No
Show on One-Line Diagram:	Same as Family Settings (Default (Device = No, Distribution Equipment = Yes))
One-Line Graphic (0 or 1 subpanels):	Same as Family Settings (Use project options setting)
One-Line Type (0 or 1 subpanels):	Same as Family Settings (Use project options setting)
One-Line Graphic (2+ subpanels):	Same as Family Settings (Use project options setting)
One-Line Type (2+ subpanels):	Same as Family Settings (Use project options setting)
Upstream OCP Graphic:	Same as Family Settings (Use upstream distribution equipment graphic)
Upstream OCP Type:	Same as Family Settings (Use upstream distribution equipment graphic)
Downstream OCP Graphic:	Same as Family Settings (Use project options setting)
Downstream OCP Type:	Same as Family Settings (Use project options setting)
Feeder ID Graphic:	Same as Family Settings (Feeder group default)
Feeder ID Type:	Same as Family Settings (Feeder group default)

Family Settings

The settings for the family. The values set in this section are used unless they are overridden by settings in the bottom *Type Settings* section.

Device Type: The type of electrical device. Each type has different values that can be set. Displayed here are the settings for **Distribution equipment: Other**.

Upstream Description Prefix: A prefix added to the start of the circuit description in the upstream equipment. The default description is the name of the family instance.

Upstream Description Suffix: A suffix added to the end of the circuit description in the upstream equipment. The default description is the name of the family instance.

Neutral: Sets the size of the neutral wire in the feeder.

- **Same as phase:** The neutral wire will be the same size as the phase wires.
- **Double phase:** The neutral wire will be twice the size of the phase wires. This is accomplished by using two neutral wires.
- **None:** No neutral wire will be included in the feeder.
- **Custom:** The neutral wire is set to the value you specify. Enter a value that corresponds to a *Wire Size* value set in the **Wire Sizes** command in your project.

Ground: Sets the size of the ground wire in the feeder.

- **Size automatically:** The ground wire is sized based upon the *OCP Trip* setting. If the distribution equipment is fed from a transformer, the *Service Ground* setting for the conductor ampacity is used. Otherwise, the *Equipment Ground* setting for the conductor ampacity is used.
- **NEC 250.122 Equipment:** The ground wire is sized based upon the *Equipment Ground* setting for the conductor ampacity.
- **NEC 250.102 Service:** The ground wire is sized based upon the *Service Ground* setting for the conductor ampacity.
- **None:** No ground wire is included in the feeder.
- **Custom:** The ground wire is set to the value you specify. Enter a value that corresponds to a *Wire Size* value set in the **Wire Sizes** command in your project.

IG Conductor: Whether the feeder includes an isolated ground.

- **Yes:** An isolated ground will be included in the feeder.
- **No:** An isolated ground will not be included in the feeder.

Show on One-Line Diagram: Whether the distribution equipment is inserted on the one-line diagram when using the **Generate One-Line** or **Export to AutoCAD** commands, and whether it is displayed in the **Insert Link** and **Copy Link** commands. The default setting for distribution equipment is **Yes**.

One-Line Graphic: The default graphic family used for the distribution equipment when it is inserted on the one-line diagram. The values in this list are based upon the **One-Line Diagram Device Graphics** command.

- **Use project options setting:** The *Default panel graphic* specified in the **Project Options** command for the project will be used.

One-Line Type: The graphic type used for the distribution equipment. The values in this list are based upon the selected *One-Line Graphic*.

Upstream OCP Graphic: The graphic family used for the upstream OCP when the distribution equipment is inserted on the one-line diagram. The values in this list are based upon the **One-Line Diagram Feeder Graphics**

command.

- **Use project options setting:** The *Default OCP graphic* specified in the **Project Options** command will be used.
- **None:** No OCP graphic will be inserted.

Upstream OCP Type: The graphic type used for the upstream OCP. The values in this list are based upon the selected *Upstream OCP Graphic*.

Downstream OCP Graphic: The graphic family used for the OCP when devices connected to the distribution equipment are first inserted on the one-line diagram. The values in this list are based upon the **One-Line Diagram Feeder Graphics** command.

- **Use project options setting:** The *Default OCP graphic* specified in the **Project Options** command will be used.
- **None:** No OCP graphic will be inserted.

Downstream OCP Type: The graphic type used for the OCP. The values in this list are based upon the selected *Downstream OCP Graphic*.

Feeder ID Graphic: The graphic family used for the feeder ID when the distribution equipment is inserted on the one-line diagram. The values in this list are based upon the **One-Line Diagram Feeder Graphics** command.

- **Feeder group default:** The feeder ID graphic set for the group in the **Project Feeder ID Schedule** will be used.
- **None:** No feeder ID graphic will be inserted.

Feeder ID Type: The graphic type used for the feeder ID. The values in this list are based upon the selected *Feeder ID Graphic*.

Type Settings

The settings for specific types in the family. Values set here override the values set in the *Family Settings* section.

Override Family Values: Whether to override the settings in the *Family Settings* section for this family type.

Distribution equipment: Panel

These values are displayed when the *Device Type* is set to **Distribution equipment: Panel**.

Family Edit Dialog Box

Family Edit

Family Settings

Device Type:	Distribution equipment: Panel
Upstream Description Prefix:	
Upstream Description Suffix:	
Neutral:	Same as phase
Ground:	Size automatically
IG Conductor:	No
Bus Size / Mains:	100
	100
Main Disconnect Type:	Main lugs only
Main Disconnect Trip:	Main lugs only
	Main lugs only
Main Disconnect Frame:	Main lugs only
	Main lugs only
Show on One-Line Diagram:	Default (Device = No, Distribution Equipment = Yes)
One-Line Graphic (0 or 1 subpanels):	Use project options setting
One-Line Type (0 or 1 subpanels):	Use project options setting
One-Line Graphic (2+ subpanels):	Use project options setting
One-Line Type (2+ subpanels):	Use project options setting
Upstream OCP Graphic:	Use upstream distribution equipment graphic
Upstream OCP Type:	Use upstream distribution equipment graphic

Type Settings

	177 kW
Override Family Bus Size / Mains:	No
Bus Size / Mains:	100
	100
Override Family Values:	No
Upstream Description Prefix:	
Upstream Description Suffix:	
Neutral:	Same as phase
Ground:	Size automatically
IG Conductor:	No
Main Disconnect Type:	Main lugs only
Main Disconnect Trip:	Main lugs only
	Main lugs only
Main Disconnect Frame:	Main lugs only
	Main lugs only
Show on One-Line Diagram:	Same as Family Settings (Default (Device = No, Distribution Equipment =...
One-Line Graphic (0 or 1 subpanels):	Same as Family Settings (Use project options setting)
One-Line Type (0 or 1 subpanels):	Same as Family Settings (Use project options setting)
One-Line Graphic (2+ subpanels):	Same as Family Settings (Use project options setting)
One-Line Type (2+ subpanels):	Same as Family Settings (Use project options setting)
Upstream OCP Graphic:	Same as Family Settings (Use upstream distribution equipment graphic)
Upstream OCP Type:	Same as Family Settings (Use upstream distribution equipment graphic)

Family Settings

The settings for the family. The values set in this section are used unless they are overridden by settings in the bottom *Type Settings* section.

Device Type: The type of electrical device. Each type has different values that can be set. Displayed here are the settings for **Distribution equipment: Panel**.

Upstream Description Prefix: A prefix added to the start of the circuit description in the upstream equipment. The default description is the name of the family instance.

Upstream Description Suffix: A suffix added to the end of the circuit description in the upstream equipment. The default description is the name of the family instance.

Neutral: Sets the size of the neutral wire in the feeder.

- **Same as phase:** The neutral wire will be the same size as the phase wires.
- **Double phase:** The neutral wire will be twice the size of the phase wires. This is accomplished by using two neutral wires.
- **None:** No neutral wire will be included in the feeder.
- **Custom:** The neutral wire is set to the value you specify. Enter a value that corresponds to a *Wire Size* value set in the **Wire Sizes** command in your project.

Ground: Sets the size of the ground wire in the feeder.

- **Size automatically:** The ground wire is sized based upon the *OCP Trip* setting. If the distribution equipment is fed from a transformer, the *Service Ground* setting for the conductor ampacity is used. Otherwise, the *Equipment Ground* setting for the conductor ampacity is used.
- **NEC 250.122 Equipment:** The ground wire is sized based upon the *Equipment Ground* setting for the conductor ampacity.
- **NEC 250.102 Service:** The ground wire is sized based upon the *Service Ground* setting for the conductor ampacity.
- **None:** No ground wire is included in the feeder.
- **Custom:** The ground wire is set to the value you specify. Enter a value that corresponds to a *Wire Size* value set in the **Wire Sizes** command in your project.

IG Conductor: Whether the feeder includes an isolated ground.

- **Yes:** An isolated ground will be included in the feeder.
- **No:** An isolated ground will not be included in the feeder.

Bus Size / Mains: The size of the bus.

- **Specific ampacity:** The value is set to the specific size chosen from the list.
- **Custom:** Enter a custom value in the field provided.

Main Disconnect Type: The type of disconnect for the device. The graphics on the panel bus on the one-line diagram are controlled by this field.

- **Main Lugs Only:** The bus bar on the one-line diagram does not have a disconnect in it.
- **Breaker:** The bus bar on the one-line diagram includes a breaker graphic.
- **Fused Switch:** The bus bar on the one-line diagram includes a fused switch graphic.

Main Disconnect Trip: The trip rating of the main disconnect breaker or fused switch.

- **Same as bus amps:** The trip rating is the same as the *Bus Size / Mains* value.
- **Custom:** The trip rating is set to the specific size chosen from the list.

Main Disconnect Frame: The frame size of the main disconnect breaker or fused switch.

- **Same as bus amps:** The frame size is the same as the *Bus Size / Mains* value.
- **Custom:** The frame size is set to the specific size chosen from the list.

Show on One-Line Diagram: Whether the distribution equipment is inserted on the one-line diagram when using the **Generate One-Line** or **Export to AutoCAD** commands, and whether it is displayed in the **Insert Link** and **Copy Link** commands. The default setting for distribution equipment is **Yes**.

One-Line Graphic: The default graphic family used for the distribution equipment when it is inserted on the one-line diagram. The values in this list are based upon the **One-Line Diagram Device Graphics** command.

- **Use project options setting:** The *Default panel graphic* specified in the **Project Options** command for the project will be used.

One-Line Type: The graphic type used for the distribution equipment. The values in this list are based upon the selected *One-Line Graphic*.

Upstream OCP Graphic: The graphic family used for the upstream OCP when the distribution equipment is inserted on the one-line diagram. The values in this list are based upon the **One-Line Diagram Feeder Graphics** command.

- **Use project options setting:** The *Default OCP graphic* specified in the **Project Options** command will be used.
- **None:** No OCP graphic will be inserted.

Upstream OCP Type: The graphic type used for the upstream OCP. The values in this list are based upon the selected *Upstream OCP Graphic*.

Downstream OCP Graphic: The graphic family used for the OCP when devices connected to the distribution equipment are first inserted on the one-line diagram. The values in this list are based upon the **One-Line Diagram Feeder Graphics** command.

- **Use project options setting:** The *Default OCP graphic* specified in the **Project Options** command will be used.
- **None:** No OCP graphic will be inserted.

Downstream OCP Type: The graphic type used for the OCP. The values in this list are based upon the selected *Downstream OCP Graphic*.

Feeder ID Graphic: The graphic family used for the feeder ID when the distribution equipment is inserted on the one-line diagram. The values in this list are based upon the **One-Line Diagram Feeder Graphics** command.

- **Feeder group default:** The feeder ID graphic set for the group in the **Project Feeder ID Schedule** will be used.
- **None:** No feeder ID graphic will be inserted.

Feeder ID Type: The graphic type used for the feeder ID. The values in this list are based upon the selected *Feeder ID Graphic*.

Type Settings

The settings for specific types in the family. Values set here override the values set in the *Family Settings* section.

Override Family Bus Amps: Whether to override the *Bus Amps* value in the *Family Settings* section for this family type.

Override Family Values: Whether to override the settings in the *Family Settings* section for this family type.

Distribution equipment: Transformer

These values are displayed when the *Device Type* is set to **Distribution equipment: Transformer**.

Family Edit Dialog Box

Family Edit

Family Settings

Device Type:	Distribution equipment: Transformer
Upstream Description Prefix:	
Upstream Description Suffix:	
Neutral:	Same as phase
Ground:	Size automatically
IG Conductor:	No
Size (kVA):	75
	75
K-Factor Rating:	None
Impedance %:	Default
	1.75
X/R Ratio:	Default
	5
Show on One-Line Diagram:	Default (Device = No, Distribution Equipment = Yes)
One-Line Graphic (0 or 1 subpanels):	Use project options setting
One-Line Type (0 or 1 subpanels):	Use project options setting
One-Line Graphic (2+ subpanels):	Use project options setting
One-Line Type (2+ subpanels):	Use project options setting
Upstream OCP Graphic:	Use upstream distribution equipment graphic
Upstream OCP Type:	Use upstream distribution equipment graphic

Type Settings

	177 kW
Override Family Values:	No
Upstream Description Prefix:	
Upstream Description Suffix:	
Neutral:	Same as phase
Ground:	Size automatically
IG Conductor:	No
Size (kVA):	75
	75
K-Factor Rating:	None
Impedance %:	Default
	1.75
X/R Ratio:	Default
	5
Show on One-Line Diagram:	Same as Family Settings (Default (Device = No, Distribution Equipment =...
One-Line Graphic (0 or 1 subpanels):	Same as Family Settings (Use project options setting)
One-Line Type (0 or 1 subpanels):	Same as Family Settings (Use project options setting)
One-Line Graphic (2+ subpanels):	Same as Family Settings (Use project options setting)
One-Line Type (2+ subpanels):	Same as Family Settings (Use project options setting)
Upstream OCP Graphic:	Same as Family Settings (Use upstream distribution equipment graphic)
Upstream OCP Type:	Same as Family Settings (Use upstream distribution equipment graphic)
Downstream OCP Graphic:	Same as Family Settings (Use project options setting)

Family Settings

The settings for the family. The values set in this section are used unless they are overridden by settings in the bottom *Type Settings* section.

Device Type: The type of electrical device. Each type has different values that can be set. Displayed here are the settings for **Distribution equipment: Transformer**.

Upstream Description Prefix: A prefix added to the start of the circuit description in the upstream equipment. The default description is the name of the family instance.

Upstream Description Suffix: A suffix added to the end of the circuit description in the upstream equipment. The default description is the name of the family instance.

Neutral: Sets the size of the neutral wire in the feeder.

- **Same as phase:** The neutral wire will be the same size as the phase wires.
- **Double phase:** The neutral wire will be twice the size of the phase wires. This is accomplished by using two neutral wires.
- **None:** No neutral wire will be included in the feeder.
- **Custom:** The neutral wire is set to the value you specify. Enter a value that corresponds to a *Wire Size* value set in the **Wire Sizes** command in your project.

Ground: Sets the size of the ground wire in the feeder.

- **Size automatically:** The ground wire is sized based upon the *OCP Trip* setting. If the distribution equipment is fed from a transformer, the *Service Ground* setting for the conductor ampacity is used. Otherwise, the *Equipment Ground* setting for the conductor ampacity is used.
- **NEC 250.122 Equipment:** The ground wire is sized based upon the *Equipment Ground* setting for the conductor ampacity.
- **NEC 250.102 Service:** The ground wire is sized based upon the *Service Ground* setting for the conductor ampacity.
- **None:** No ground wire is included in the feeder.
- **Custom:** The ground wire is set to the value you specify. Enter a value that corresponds to a *Wire Size* value set in the **Wire Sizes** command in your project.

IG Conductor: Whether the feeder includes an isolated ground.

- **Yes:** An isolated ground will be included in the feeder.
- **No:** An isolated ground will not be included in the feeder.

Size: The size of the transformer in kVA.

K-Factor Rating: The specific K-factor rating of the transformer for handling the harmonic content of the load.

Impedance % : The impedance of the transformer for fault calculations and voltage drop calculations.

X/R Ratio: The X/R ratio of the transformer for fault calculations.

Show on One-Line Diagram: Whether the distribution equipment is inserted on the one-line diagram when using the **Generate One-Line** or **Export to AutoCAD** commands, and whether it is displayed in the **Insert Link** and **Copy Link** commands. The default setting for distribution equipment is **Yes**.

One-Line Graphic: The default graphic family used for the distribution equipment when it is inserted on the one-line diagram. The values in this list are based upon the **One-Line Diagram Device Graphics** command.

- **Use project options setting:** The *Default transformer graphic* specified in the **Project Options** command for the project will be used.

One-Line Type: The graphic type used for the distribution equipment. The values in this list are based upon the selected *One-Line Graphic*.

Upstream OCP Graphic: The graphic family used for the upstream OCP when the distribution equipment is inserted on the one-line diagram. The values in this list are based upon the **One-Line Diagram Feeder Graphics** command.

- **Use project options setting:** The *Default OCP graphic* specified in the **Project Options** command will be used.
- **None:** No OCP graphic will be inserted.

Upstream OCP Type: The graphic type used for the upstream OCP. The values in this list are based upon the selected *Upstream OCP Graphic*.

Downstream OCP Graphic: The graphic family used for the OCP when devices connected to the distribution equipment are first inserted on the one-line diagram. The values in this list are based upon the **One-Line Diagram Feeder Graphics** command.

- **Use project options setting:** The *Default OCP graphic* specified in the **Project Options** command will be used.
- **None:** No OCP graphic will be inserted.

Downstream OCP Type: The graphic type used for the OCP. The values in this list are based upon the selected *Downstream OCP Graphic*.

Feeder ID Graphic: The graphic family used for the feeder ID when the distribution equipment is inserted on the one-line diagram. The values in this list are based upon the **One-Line Diagram Feeder Graphics** command.

- **Feeder group default:** The feeder ID graphic set for the group in the **Project Feeder ID Schedule** will be used.
- **None:** No feeder ID graphic will be inserted.

Feeder ID Type: The graphic type used for the feeder ID. The values in this list are based upon the selected *Feeder ID Graphic*.

Type Settings

The settings for specific types in the family. Values set here override the values set in the *Family Settings* section.

Override Family Values: Whether to override the settings in the *Family Settings* section for this family type.

Help

The **Help** panel includes commands for obtaining help and managing the installation of Design Master Electrical RT.

Help: Displays this user manual.

Remote Support: Allows you to connect your computer to the support team at Design Master Software so we can assist you with a problem you are having.

Send Email: Creates an email addressed to us.

Send Project: Takes you to a website where you can upload a project for us to review.

Update License: Allows you to enter new license information after you have purchased Design Master Electrical RT.

Check In Floating License: Allows you to check in a floating license so another user can start using the add-in immediately.

Check for Updates: Checks if an update to the add-in is available.

Update Breaker Database: Updates the database of breaker and fuse curves used for selective coordination.

Remove Parameters: Removes all of the shared parameters added to the current project by Design Master Electrical RT.

About: Displays information about your current version of Design Master Electrical RT.

Help

Opens this user manual on our website.

Remote Support

Allows Design Master support staff to connect to your computer over the internet. We will be able to see your screen and perform actions on your computer.

The remote support program will run and allow us to connect to your computer. An ID number will be displayed, which you will need to read aloud to us.

We use TeamViewer for our remote support. You can visit their website at **http://www.teamviewer.com**. Information about security is available at **http://www.teamviewer.com/en/products/security.aspx**.

Send Email

Opens a draft email in your preferred email client addressed to **support@designmaster.biz**.

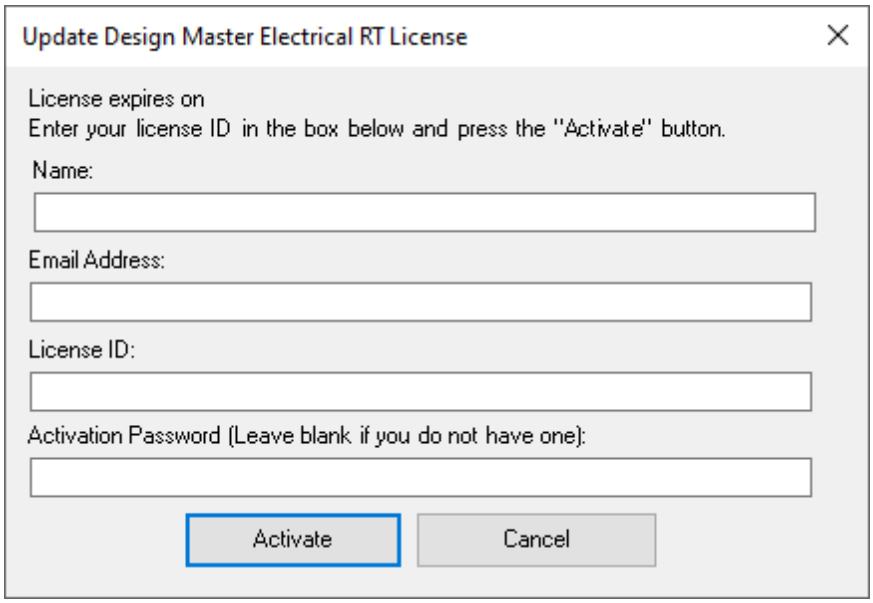
Send Project

Allows you to send us a copy of your project for technical support purposes. The command opens your web browser to **http://www.designmaster.biz/send/**.

Providing us with your project helps us recreate the problem you are having and find a solution to it. It is our preferred way for you to report a problem or ask a question. Many problems are specific to a project and having that immediately helps us assist you.

Update License

Allows you to activate or update the license for Design Master Electrical RT.



Enter your *Name*, *Email Address*, *License ID*, and *Activation Password* in the fields provided. If you did not receive a password, leave the *Activation Password* field blank.

Press the **Activate** button to update your license.

Check In Floating License

Used with floating licenses to immediately check in the license so that another person can use the add-in. Floating licenses are checked out in 10-minute intervals. If no commands are run for 10 minutes, the license is automatically released and another person can use the add-in.

If another person attempts to use the add-in before the license is released, a warning message will be displayed for the new user, stating that no license is available. The new user can choose to ignore the warning and immediately start using the add-in. However, a license overuse exception will be recorded in the license database. The license database is reviewed each year when you renew the add-in. If there are too many overuse exceptions, you will need to purchase another license.

Using this command, the original user can check in the floating license when they are done with it. The new user can then use the add-in immediately without causing a license overuse exception to be recorded.

Check for Updates

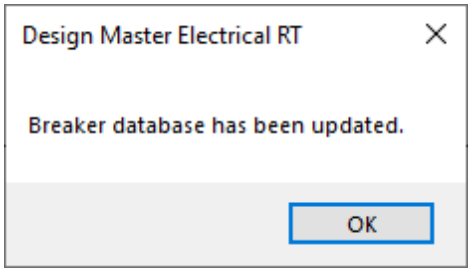
Checks if an update to the add-in is available.

If an update is available, you will be prompted to go to our website to see the changes in the new version. You can download and install the update from our website.

Update Breaker Database

Updates the database of breaker and fuse curves used for selective coordination. This command guarantees you will have the most complete list of breakers and fuses.

A **Design Master Electrical RT** dialog box will appear confirming the update was successful.



Generally, this command does not need to be run. The breaker database is automatically updated once each day that a command attempts to access it. You should only need to run this command if you need immediate access to curves that have been added to the breaker database since the last automatic update.

Remove Parameters

Removes all of the shared parameters added by Design Master Electrical RT to the current project. Use this command if shared parameters were accidentally added to a project where you are not using Design Master Electrical RT.

This command will also remove all customization settings, such as wire sizes, conduit sizes, and wire ampacities, defined in Design Master Electrical RT.

This command does not remove device information set by Design Master Electrical RT. The device information is kept to protect the data in your model if you run this command accidentally.

If you run this command accidentally, the shared parameters will be reloaded the next time you run a Design Master Electrical RT command in the project. Values in the **Customization** commands will return to the default settings and can be changed manually or overwritten using the **Customization->Import** command.

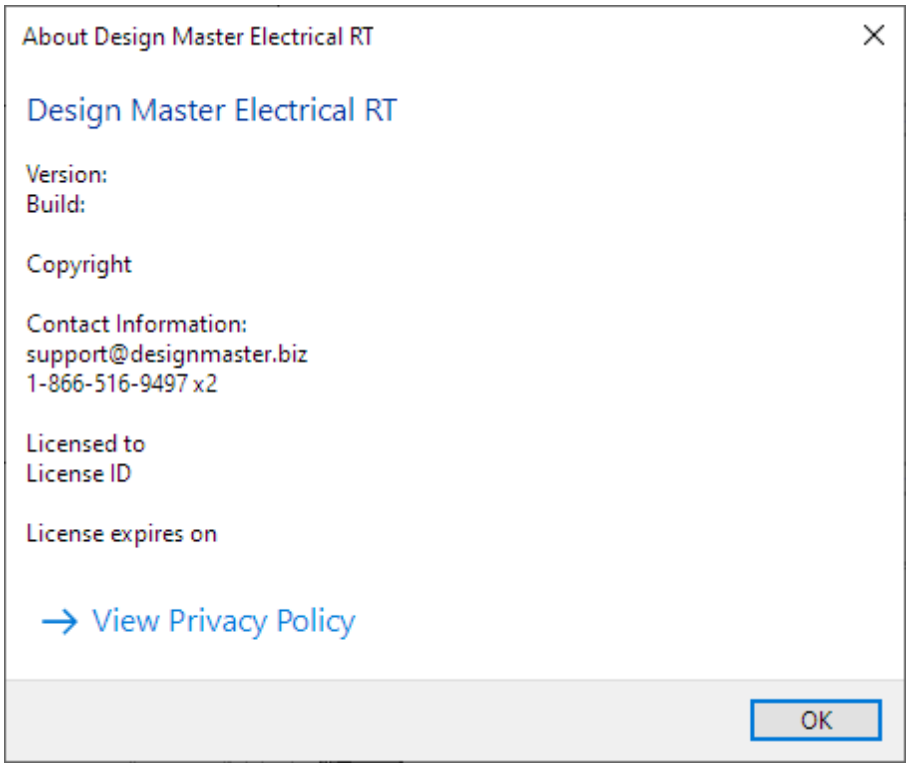
About

Displays information about Design Master and the installation of Design Master Electrical RT you are currently running.

When providing you with support, we may ask you to provide us with the version and build number from this dialog box. This tells us exactly which version of the add-in you are running.

Opens the **About Design Master Electrical RT** dialog box:

About Design Master Electrical RT Dialog Box


About Design Master Electrical RT
Design Master Electrical RT
Version:
Build:
Copyright
Contact Information:
support@designmaster.biz
1-866-516-9497 x2
Licensed to
License ID
License expires on
View Privacy Policy
OK

DM One-Line Ribbon Command Reference

This section explains the commands on the **DM One-Line** ribbon tab in Revit.

You must be in a drafting view to use most of these commands.

Project: Commands for making changes to the electrical model.

Equipment: Commands for creating equipment.

Feeders: Commands for working with feeders.

Utility: Commands for for maintaining your one-line diagram and electrical model.

Export: Commands for exporting one-line diagram information to AutoCAD.

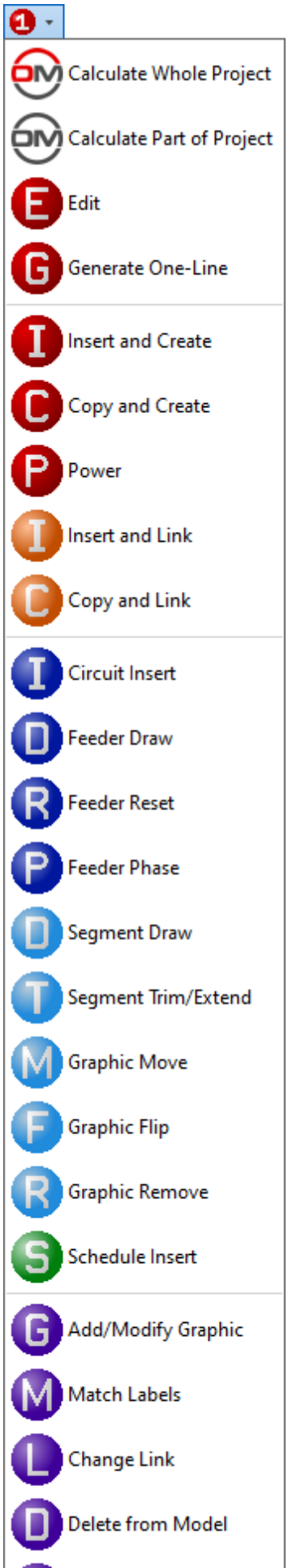
Customization: Commands for customizing one-line diagram graphics.

Family: Commands for working with one-line diagram graphic families.

Help: Commands for obtaining help and managing your Design Master Electrical RT installation.

DM One-Line Pulldown

The **DM One-Line Pulldown** menu appears on the **DM One-Line** tab when you have a project open in Revit. It provides many of the commands on the **DM One-Line** tab in a single menu and is meant to be used on the Quick Access Toolbar.


Calculate Whole Project
Calculate Part of Project
Edit
Generate One-Line
Insert and Create
Copy and Create
Power
Insert and Link
Copy and Link
Circuit Insert
Feeder Draw
Feeder Reset
Feeder Phase
Segment Draw
Segment Trim/Extend
Graphic Move
Graphic Flip
Graphic Remove
Schedule Insert
Add/Modify Graphic
Match Labels
Change Link
Delete from Model

Project

The **Project** panel appears on the **DM One-Line** tab when you have a project open in Revit. It includes commands for making changes to the electrical settings in your project.

Calculate Whole Project: Performs all of the electrical calculations in the project.

Calculate Part of Project: Performs all of the electrical calculations for part of the project.

Edit: Allows you to make changes to equipment and circuits on the one-line diagram.

Generate One-Line: Creates a diagram for distribution equipment and any downstream distribution equipment and equipment connections in a vertical, one-line configuration.

Edit

Allows you to view and edit the information about devices and circuits on the one-line diagram.

You will be prompted to specify a device or circuit to edit.

Select one-line diagram item to edit:

Selecting a Distribution Equipment or Upstream Feeder

Opens the **Panel Edit** dialog box with the selected equipment active.

Selecting a Branch Circuit Device

Opens the **Instance Edit** dialog box with the selected device active.

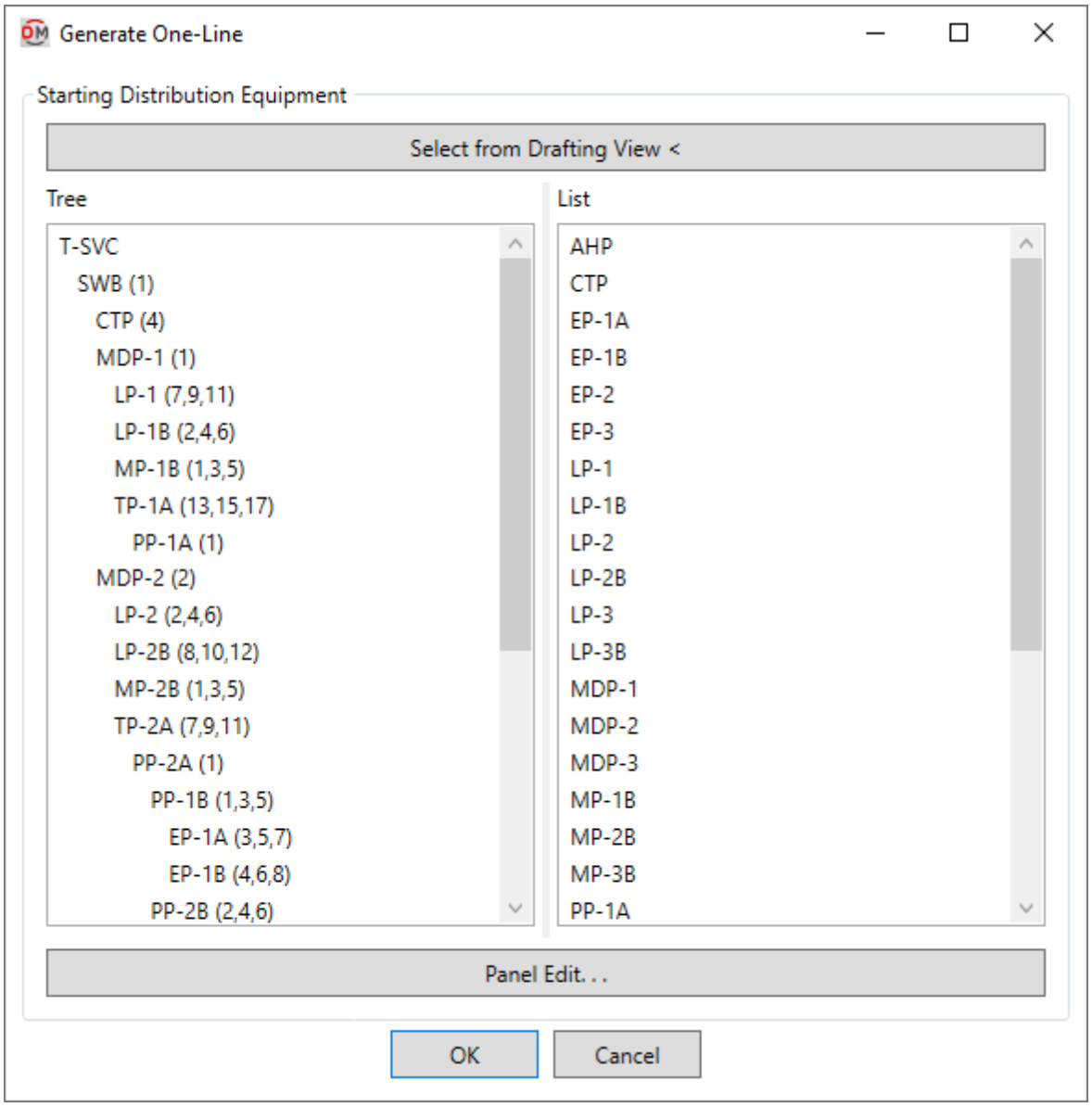
Selecting a Branch Circuit

Opens the **Circuit Edit** dialog box with the selected branch circuit active.

Generate One-Line

Allows you to create a diagram for distribution equipment and any downstream distribution equipment and equipment connections in a vertical, one-line configuration. Opens the **Generate One-Line** dialog box:

Generate One-Line Dialog Box



Select from Drafting View

Press the **Select from Drafting View** button to generate a one-line from an existing distribution equipment graphic on the drafting view.

You will be prompted to select a distribution equipment on the drafting view.

Select distribution equipment to start at:

Any downstream distribution equipment and devices connected to the equipment will be generated. Feeders will be inserted between anything that is connected.

Select from Tree / List

All distribution equipment in the current project is listed in a tree corresponding to how the equipment are connected to each other, and alphabetically by callout.

Press the **Panel Edit** button to open the **Panel Edit** dialog box for the selected equipment.

Press the **OK** button to insert the selected equipment on the drafting view.

You will be prompted for the insertion point.

Specify insertion point:

The selected distribution equipment and any downstream equipment and devices will be generated. Feeders will be inserted between anything that is connected.

Equipment

The **Equipment** panel appears on the **DM One-Line** tab when you have a project open in Revit. It includes commands for adding equipment to the one-line diagram.

Insert Create: Allows you to insert an equipment on the one-line diagram and create it in the electrical model.

Copy Create: Allows you to copy an equipment or feeder on the one-line diagram and create it in the electrical model.

Power: Allows you to circuit equipment together on the one-line diagram and in the electrical model.

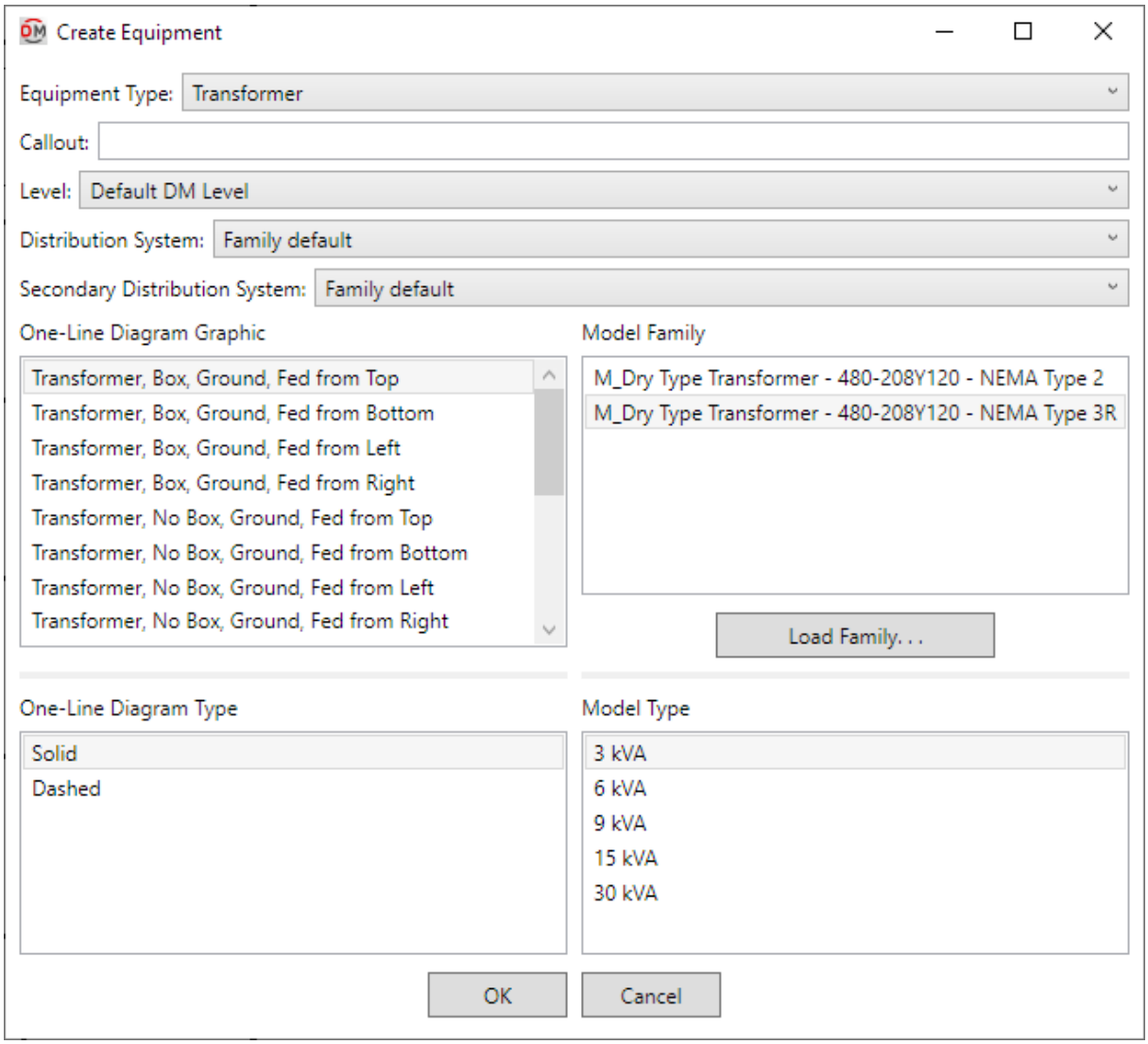
Insert Link: Allows you to insert an equipment on the one-line diagram and link it to an existing equipment in the electrical model.

Copy Link: Allows you to copy an equipment graphic or feeder on the one-line diagram and link it to an existing equipment or circuit from the electrical model.

Insert Create

Allows you to create an equipment on the one-line diagram and in the electrical model. Opens the **Create Equipment** dialog box:

Create Equipment Dialog Box



Equipment Type: The type of equipment to be created. The types available and their corresponding Revit *Part Types* can be viewed and modified in the **One-Line Diagram Device Graphics** command.

Callout: The name of the equipment. For distribution equipment, the *Panel Name* Revit parameter will use this value. For branch circuit devices, this field is disabled.

Level: The level on which the equipment will be inserted in the model. The values available are based upon the levels defined in the model.

- **Default DM Level:** The equipment will be inserted on a level defined by Design Master that is high above the model.

Distribution System: The primary voltage of the equipment. This is the same value as the *Distribution System* Revit parameter. The values available are based upon the *Distribution Systems* set in the **`Electrical Settings`** command. For branch circuit devices, this field is disabled.

- **Family default:** A distribution system will not be set for the equipment. When the equipment is created, the *Distribution System* will be set to the family default if it exists, or set to **<None>**.

Secondary Distribution System: The secondary voltage of the equipment. This is the same value as the

Secondary Distribution System Revit parameter. The values available are based upon the *Distribution Systems* set in the `Electrical Settings` command. This field is only displayed if the *Equipment Type* is set to display transformers.

- **Family default:** A secondary distribution system will not be set for the equipment. When the equipment is created, the *Secondary Distribution System* will be set to the family default if it exists, or set to **<None>**.

One-Line Diagram Graphic: The graphic family that will be used for the equipment.

One-Line Diagram Type: The graphic type that will be used for the equipment. The values in this list are based upon the selected *One-Line Diagram Graphic*.

Model Family: The Revit family that will be used for the equipment. All of the Revit families loaded into the project that match the specified *Equipment Type* will be listed unless otherwise specified in the **One-Line Diagram Device Graphics** command.

Load Family: Press this button to load a Revit family into the project. You will be prompted to select a ".rfa" file to load. The loaded family will then be selected in *Model Family*.

Model Type: The Revit type that will be used for the equipment. The values in this list are based upon the selected *Model Family*.

Press the **OK** button to insert the equipment on the one-line diagram and in the electrical model.

Inserting the Equipment

You will be prompted for the insertion point of the equipment graphic.

Click to place a free instance (Space Bar to Rotate)

The equipment will be inserted on the one-line diagram and created in the electrical model. You will then be prompted to specify an upstream distribution equipment or existing branch circuit to which the new equipment will be connected.

Select upstream distribution equipment or circuit to connect to or press ESC for no connection:

A feeder will be inserted between the equipment and the specified upstream distribution equipment or existing branch circuit. The equipment will be circuited to the upstream distribution equipment or existing branch circuit in the electrical model.

Copy Create

Allows you to copy an equipment or feeder on the one-line diagram. If you copy an equipment, the copy will also be created in the electrical model.

You will be prompted to specify an equipment or feeder to be copied.

Select one-line diagram item to copy:

Copying an Equipment

You will be prompted for the insertion point of the copy.

Click to place a free instance (Space Bar to Rotate)

The copy will be inserted on the one-line diagram and created in the electrical model. You will then be prompted to specify an upstream distribution equipment or existing branch circuit to which the new equipment will be connected.

Select upstream distribution equipment or circuit to connect to or press ESC for no connection:

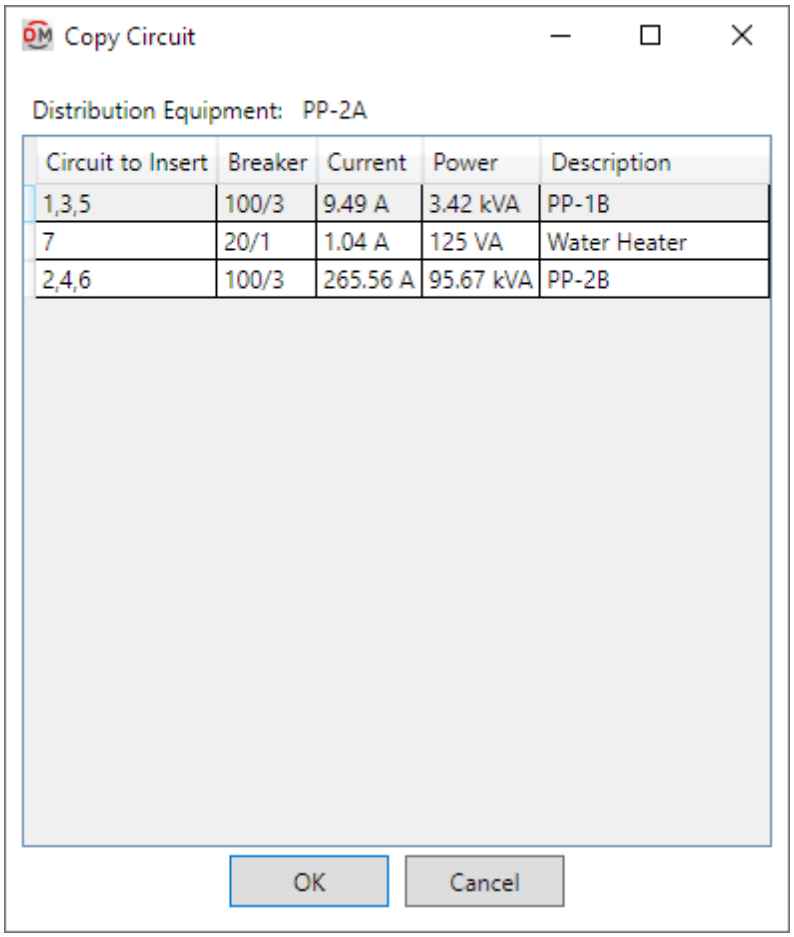
A feeder will be inserted between the equipment and the specified upstream distribution equipment or existing branch circuit. The equipment will be circuited to the upstream distribution equipment or existing branch circuit in the electrical model.

Copying a Feeder

You will be prompted to specify the distribution equipment from which the feeder will be drawn.

Select distribution equipment to link copied circuit to:

Opens the **Copy Circuit** dialog box:



Distribution Equipment: The selected distribution equipment. The circuits listed are associated with the *Distribution Equipment*.

Select a circuit from the list and press the **OK** button. You will then be prompted to specify the starting point of the feeder.

Specify starting point of feeder:

A copy of the selected feeder will be drawn.

Power

Allows you to circuit equipment together on the one-line diagram and in the electrical model.

You will be prompted to specify the downstream equipment to be powered.

Select distribution equipment or device to be powered:

You will then be prompted to specify the upstream distribution equipment or existing branch circuit that will power the equipment.

Select upstream distribution equipment or circuit to power it from:

A feeder will be inserted between the equipment and the upstream distribution equipment or existing branch circuit. The downstream equipment will be circuited to the upstream distribution equipment or existing branch circuit in the electrical model.

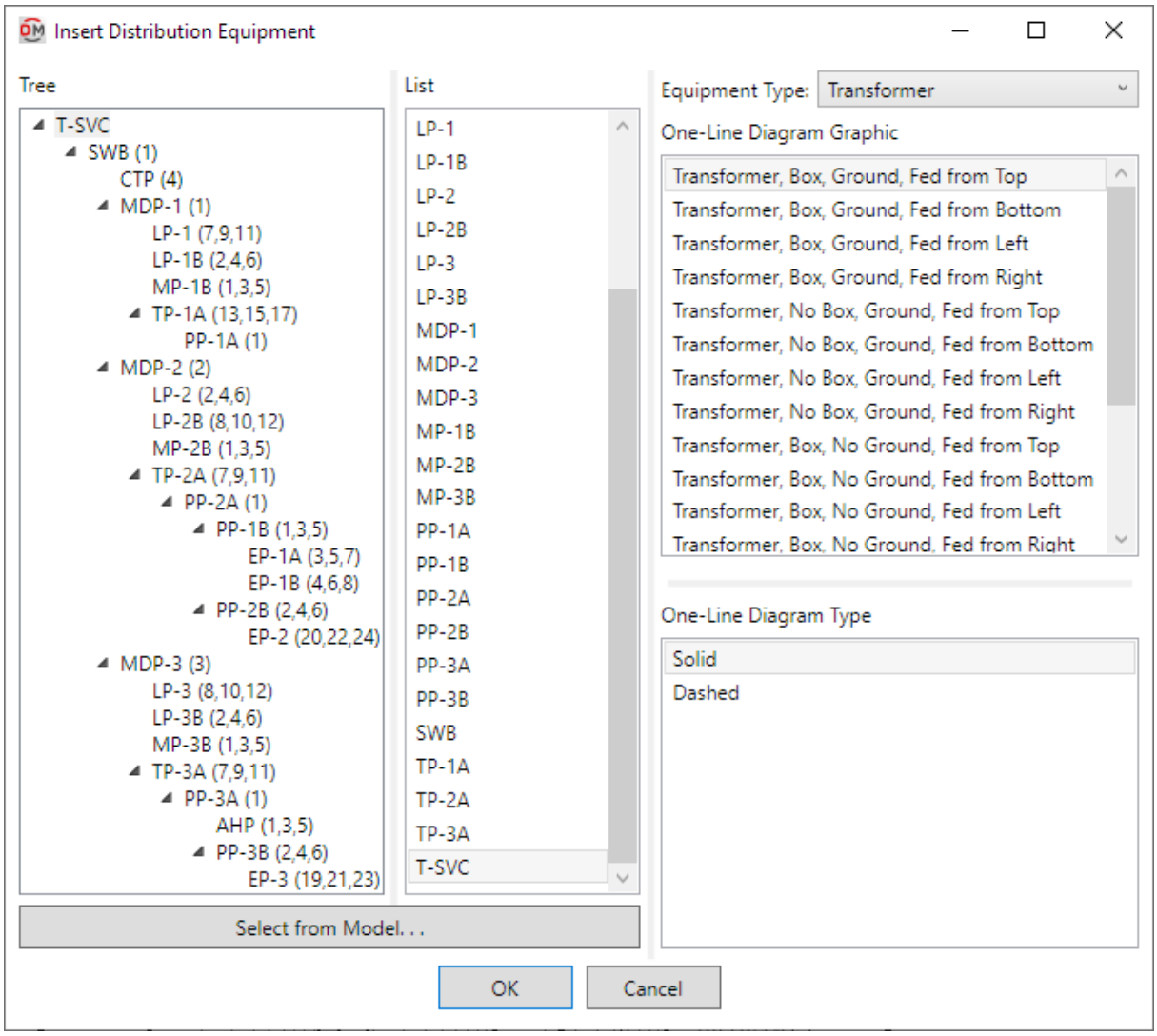
Insert Link

Allows you to add an equipment from the electrical model to the one-line diagram.

If you are in a model view, you will be prompted to specify an equipment in the view or press **ESC**.

Opens the **Insert Distribution Equipment** dialog box:

Insert Distribution Equipment Dialog Box



Tree / List: All of the distribution equipment in the current project. They are listed in a tree corresponding to how the equipment are connected to each other, and alphabetically by callout. Equipment that has been inserted on the one-line diagram will be highlighted.

Equipment Type: The type of equipment to be inserted. The types available and their corresponding Revit *Part Types* can be viewed and modified in the **One-Line Diagram Device Graphics** command.

One-Line Diagram Graphic: The graphic family that will be used for the equipment.

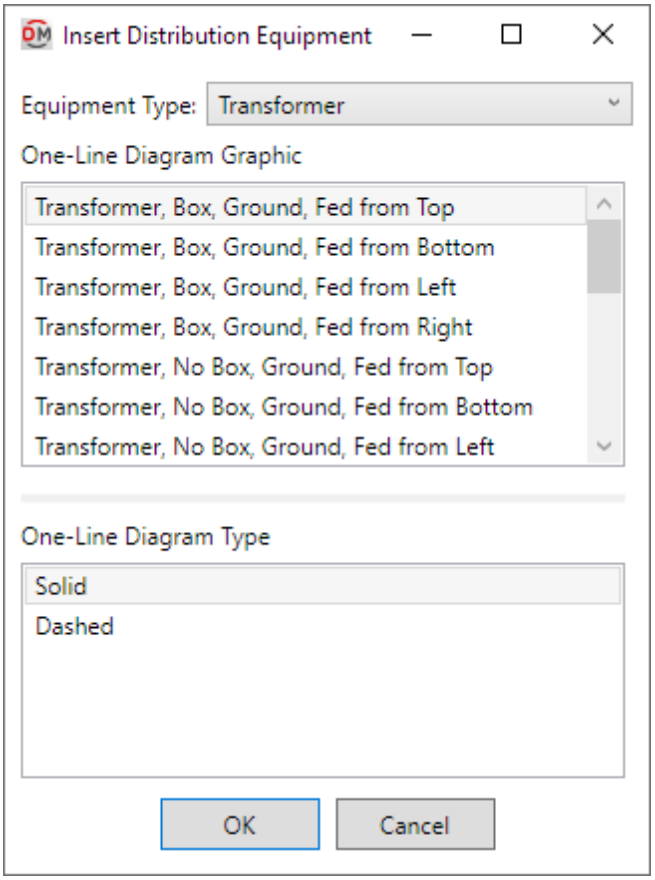
One-Line Diagram Type: The graphic type that will be used for the equipment. The values in this list are based upon the selected *One-Line Diagram Graphic*.

Select from Model: Press this button to select a distribution equipment or branch circuit device on the model.

The dialog box will close and you will be prompted to specify a device.

Select device in model to insert in one-line diagram:

Specify an equipment using a view of the electrical model. Opens the **Insert Distribution Equipment** dialog box:



Equipment Type: The type of equipment to be inserted. The types available and their corresponding Revit *Part Types* can be viewed and modified in the **One-Line Diagram Device Graphics** command.

One-Line Diagram Graphic: The graphic family that will be used for the equipment.

One-Line Diagram Type: The graphic type that will be used for the equipment. The values in this list are based upon the selected *One-Line Diagram Graphic*.

Press the **OK** button to insert the equipment on the one-line diagram.

Inserting the Equipment

You will be prompted for the insertion point of the equipment graphic.

Click to place a free instance (Space Bar to Rotate)

The equipment will be inserted on the one-line diagram.

Copy Link

Allows you to copy an equipment graphic or feeder on the one-line diagram and link it to an existing equipment or circuit from the electrical model.

You will be prompted to specify an equipment or feeder.

Select one-line diagram item to copy:

If you specify a feeder, the command will continue similar to the **Copy Create** command.

After you select a circuit, you will be prompted to specify the base point from which the existing feeder will be copied.

Specify base point of copy:

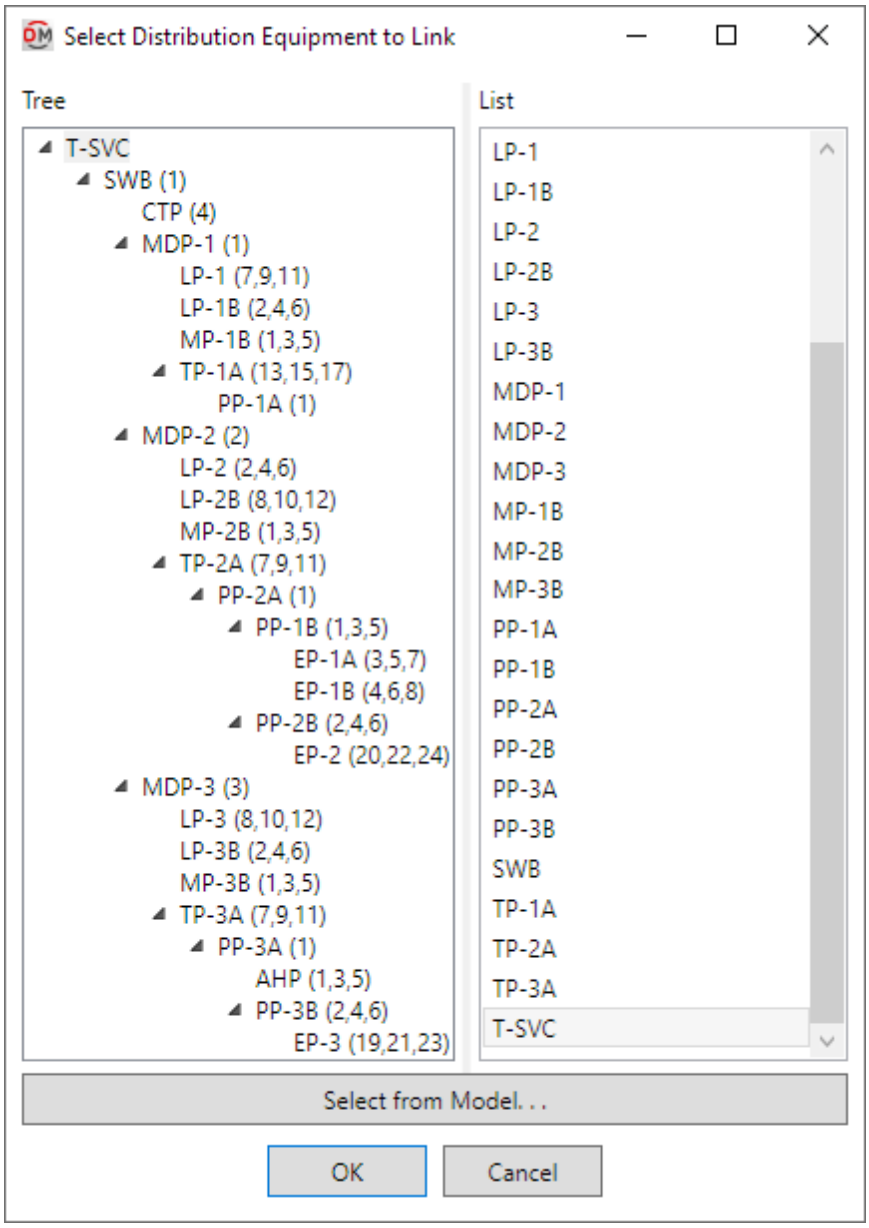
You will then be prompted to specify the starting point of the new feeder.

Specify second point of copy:

A copy of the selected feeder will be drawn.

If you specify an equipment, the **Select Distribution Equipment to Link** dialog box will open:

Select Distribution Equipment to Link Dialog Box



Tree / List: All of the distribution equipment in the current project. They are listed in a tree corresponding to how the equipment are connected to each other, and alphabetically by callout. Equipment that has been inserted on the one-line diagram will be highlighted.

Select from Model: Press this button to select a distribution equipment or branch circuit device on the model.

The dialog box will close and you will be prompted to specify a device.

Select instance in model to link to one-line diagram:

Specify an equipment using a view of the electrical model. You will then be prompted for the insertion point of the equipment graphic.

Click to place a free instance (Space Bar to Rotate)

The copy will be inserted on the one-line diagram. If the equipment graphic being copied has a feeder, a copy of the feeder graphic will also be inserted.

Press the **OK** button to insert the equipment on the one-line diagram. You will be prompted for the insertion point of the equipment graphic.

Click to place a free instance (Space Bar to Rotate)

The copy will be inserted on the one-line diagram. If the equipment graphic being copied has a feeder, a copy of the feeder graphic will also be inserted.

Feeders

The **Feeders** panel appears on the **DM One-Line** tab when you have a project open in Revit. It includes commands for modifying feeders and graphics that appear on feeders.

Circuit Insert: Allows you to insert feeders on the one-line diagram.

Feeder Draw: Allows you to redraw feeders on the one-line diagram.

Feeder Reset: Redraws a feeder in its default location on the one-line diagram.

Feeder Phase: Allows you to set the feeder segment family and type for a feeder on the one-line diagram.

Segment Draw: Allows you to redraw part of a feeder on the one-line diagram.

Segment Trim/Extend: Allows you to reconnect two disconnected feeder segments at a corner on the one-line diagram.

Graphic Move: Allows you to move a graphic from one feeder segment to another.

Graphic Flip: Flips the graphic on a feeder.

Graphic Remove: Removes the graphic from a feeder.

Schedule Insert: Inserts or updates the feeder schedule for the one-line diagram.

Circuit Insert

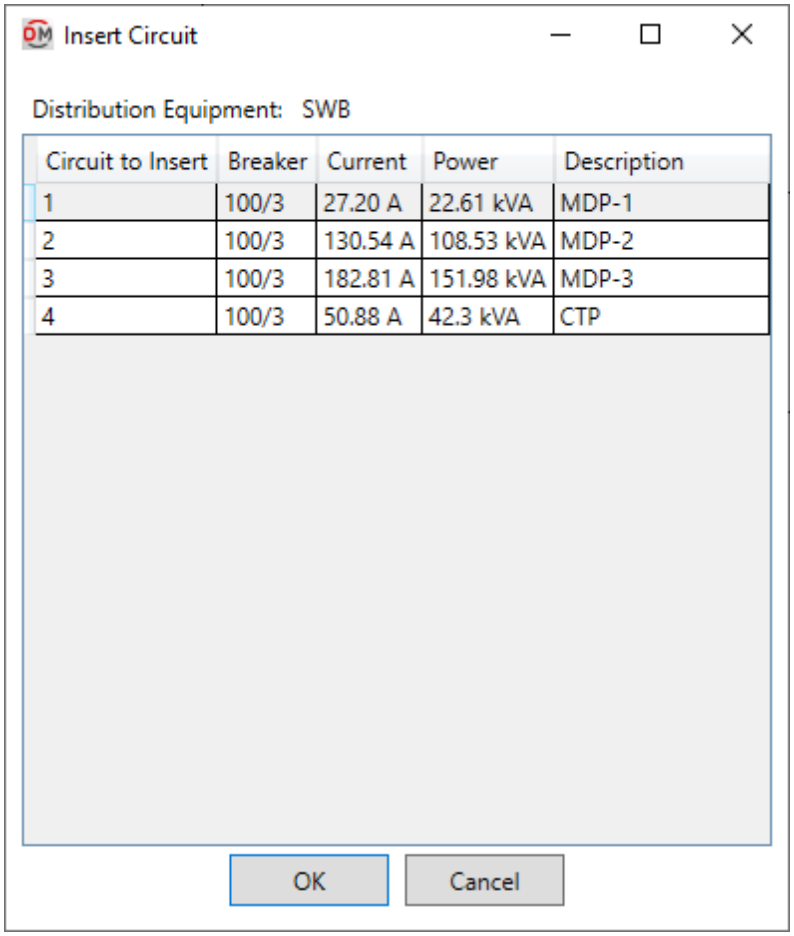
Allows you to insert feeders on the one-line diagram.

You will be prompted to specify the upstream distribution equipment from which the feeder will be drawn.

Select distribution equipment to insert circuit from or press ESC to draft a circuit not connected to the model:

Specify a distribution equipment to open the **Insert Circuit** dialog box, or press `ESC` to open the **Select Circuit Graphics** dialog box:

Insert Circuit Dialog Box



Distribution Equipment: The selected distribution equipment. The circuits listed are associated with the *Distribution Equipment*.

Select a circuit from the list and press the **OK** button. You will then be prompted to specify the starting point of the feeder.

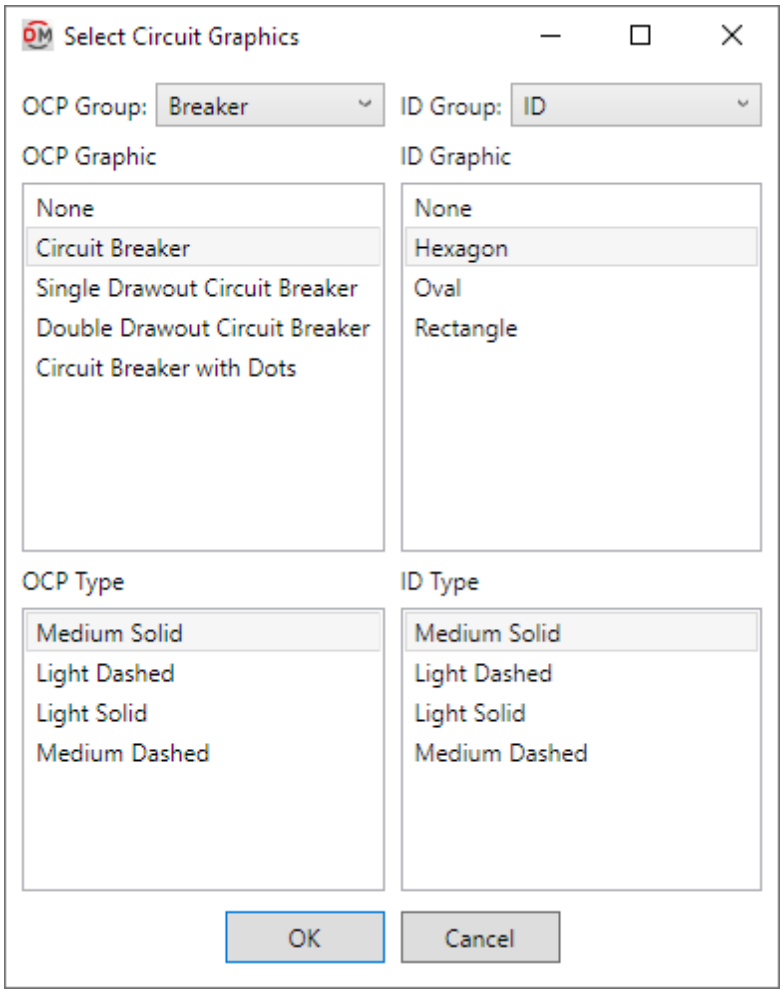
Specify starting point of feeder:

You will then be prompted to specify additional points to which the feeder will be drawn.

Specify next point of feeder:

The feeder will be drawn to the specified point in a straight line from the previous point. Continue specifying points, or press **ESC** to finish the command.

Select Circuit Graphics Dialog Box



OCP Group: The type of OCP graphic to be inserted on the feeder. The groups available are based upon settings in the **One-Line Diagram Feeder Graphics** command.

OCP Graphic: The graphic used for the OCP on the feeder. The graphics available are based upon settings in the **One-Line Diagram Feeder Graphics** command.

OCP Type: The graphic type that will be used for the OCP. The values in this list are based upon the selected *OCP Graphic*.

ID Group: The type of feeder ID graphic to be inserted on the feeder. The groups available are based upon settings in the **One-Line Diagram Feeder Graphics** command.

ID Graphic: The graphic used for the feeder ID. The graphics available are based upon settings in the **One-Line Diagram Feeder Graphics** command.

ID Type: The graphic type that will be used for the feeder ID. The values in this list are based upon the selected *ID Graphic*.

Press the **OK** button. You will then be prompted to specify the starting point of the feeder.

Specify starting point of feeder:

You will then be prompted to specify additional points to which the feeder will be drawn.

Specify next point of feeder:

The feeder will be drawn to the specified point in a straight line from the previous point. Continue specifying points, or press **ESC** to finish the command. Feeders inserted this way are for informational purposes only and do not reflect connections in the electrical model.

Feeder Draw

Allows you to redraw feeders on the one-line diagram.

You will be prompted to specify a feeder or downstream equipment.

Select feeder or downstream equipment being fed by feeder to redraw:

If you specify a feeder that is connected to multiple branch circuit devices, you will be asked whether to delete only the feeder segments leading to the specified device, or to delete the feeder for every device on the circuit. Only the feeder segments for the specified device will be drawn.

You will then be prompted to specify the starting point of the feeder. The starting point of the previous feeder will be marked as a guide.

Specify starting point of feeder:

You will then be prompted to specify additional points to which the feeder will be drawn.

Specify next point of feeder:

The feeder will be drawn to the specified point in a straight line from the previous point. Continue specifying points, or press **ESC** to finish the command.

If the feeder has an OCP graphic, you will be prompted to specify a feeder segment onto which the graphic will be inserted.

Select segment to insert <graphic> on:

The OCP graphic will be inserted on the specified feeder segment.

Feeder Reset

Redraws a feeder in its default location on the one-line diagram.

You will be prompted to specify a feeder or downstream equipment.

Select feeder or downstream equipment being fed by feeder to redraw:

If you specify a feeder that is connected to multiple branch circuit devices, you will be asked whether to delete only the feeder segments leading to the specified device, or to delete the feeder for every device on the circuit.

Only the feeder segments for the specified device will be reset.

You will then be prompted to specify the starting point of the feeder at the upstream distribution equipment. The starting point of the previous feeder will be marked as a guide.

Specify starting point of feeder or press ESC for the default location:

Specify a point on the upstream equipment to draw the feeder from that point, or press **ESC** to have the feeder drawn from the default connection point for the upstream equipment.

If the feeder has an OCP graphic, the graphic will be inserted in the default location.

Feeder Phase

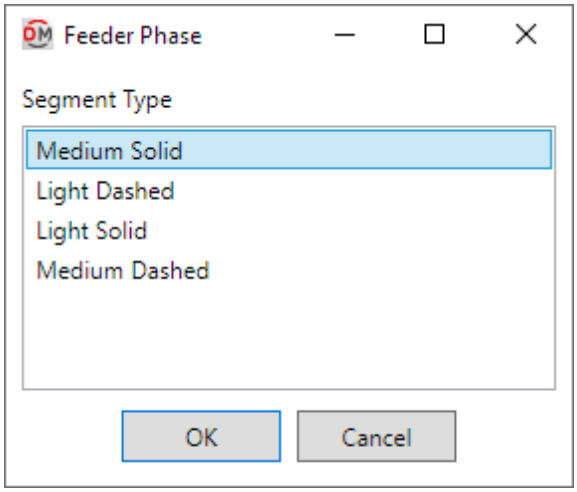
Allows you to modify the feeder segment family and type for a feeder on the one-line diagram. You can use this command to change the line type for every segment of a feeder.

You will be prompted to specify a feeder segment.

Select segment on feeder to change:

Opens the **Feeder Phase** dialog box:

Feeder Phase Dialog Box



Segment Type: The graphic type that will be used for the feeder.

Press the **OK** button. The graphic types for each segment on the specified feeder will be updated.

Segment Draw

Allows you to redraw part of a feeder on the one-line diagram. You can use this command to add segments to a feeder.

You will be prompted to specify a feeder segment.

Select feeder segment to redraw:

You will then be prompted to specify the starting point of the feeder segment.

Specify starting point of feeder segment:

You will then be prompted to specify additional points to which the feeder will be drawn.

Specify next point of feeder:

The feeder will be drawn to the specified point in a straight line from the previous point. Continue specifying points, or press **ESC** to finish the command.

If the original feeder segment had a graphic, the graphic will be inserted on the first new feeder segment.

Segment Trim/Extend

Allows you to reconnect two non-parallel feeder segments that have become disconnected on the one-line diagram.

You will be prompted to specify a feeder segment.

Select the first feeder segment to trim or extend:

You will then be prompted to specify a second feeder segment.

Select the second feeder segment to trim or extend:

If one or both feeder segments need to be trimmed, you will then be prompted to specify a point on the drafting view inside the corner where you want the feeder segments to connect.

Specify point on inside of corner made by feeder segments:

The feeder segments will be adjusted to form a corner.

Graphic Move

Allows you to move a feeder graphic to another segment on a feeder.

You will be prompted to specify a feeder segment with a graphic.

Select feeder segment with graphic to move:

You will then be prompted to specify the feeder segment onto which the graphic will be moved.

Select new location for graphic:

The graphic will be moved to the feeder segment specified. If both feeder segments have graphics, the graphics will be swapped.

Graphic Flip

Flips the graphic on a feeder.

You will be prompted to specify a feeder segment with a graphic.

Select feeder segment with graphic to flip:

The graphic will be flipped.

Graphic Remove

Removes the graphic from a feeder.

You will be prompted to specify a feeder segment with a graphic.

Select feeder segment with graphic to delete:

The graphic will be removed.

Schedule Insert

Inserts or updates the feeder schedule for the one-line diagram.

Only the feeders on the one-line diagram in the current drafting view will be displayed in the schedule. The graphics will be displayed in the schedule as they appear on the one-line diagram.

If the feeder schedule is not currently inserted on the drafting view, you will be prompted for the insertion location of the schedule.

Specify insertion point of feeder schedule:

The location you specify will be used as the top-left corner for the feeder schedule.

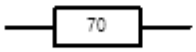
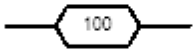
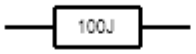
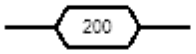
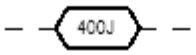
Updating the Schedule Already on the Drafting View

If the feeder schedule is already inserted on the drafting view, it will be updated in its current location.

You must update the schedule when changes are made to the project. The schedule will not update automatically.

The feeder schedule will also be updated when the **Calculate Whole Project** command is run.

If additional graphics, such as revision clouds, have been inserted over the schedule, be sure to check their location after updating the schedule.

FEEDER SCHEDULE	
	1-1/4"C, 3#4, #4N, #8G
	1-1/2"C, 3#1, #1N, #8G
	1-1/2"C, 3#1, #1N, #6G
	1-1/2"C, 3-1/0, 1/0N, #6G
	1-1/2"C, 3-1/0, 1/0N, #6G
	2"C, 3-2/0, 2/0N, #6G
	2"C, 3-3/0, 3/0N, #6G
	3-1/2"C, 3-600kcmil, 600kcmil N, 1/0G

Related Options

There are several options that affect the default settings and overall appearance of the feeder schedule. See the *Feeder ID* section of **Project Options** for more information.

Utility

The **Utility** panel appears on the **DM One-Line** tab when you have a project open in Revit. It includes commands for maintaining your one-line diagram and electrical model.

Add/Modify Graphic: Allows you to add a graphic to a feeder segment, or modify the graphic for an equipment or feeder segment already inserted on the one-line diagram.

Match Labels: Changes the labels of one or more distribution equipment or feeders to match an existing equipment or feeder on the one-line diagram.

Change Link: Allows you to change which distribution equipment or circuit is represented by a graphic on the one-line diagram.

Delete from Model: Removes an equipment or power connection from the one-line diagram and the electrical model.

Highlight Device: Highlights a device selected from the one-line diagram in the electrical model, or highlights a device selected from the electrical model on the one-line diagram.

Add/Modify Graphic

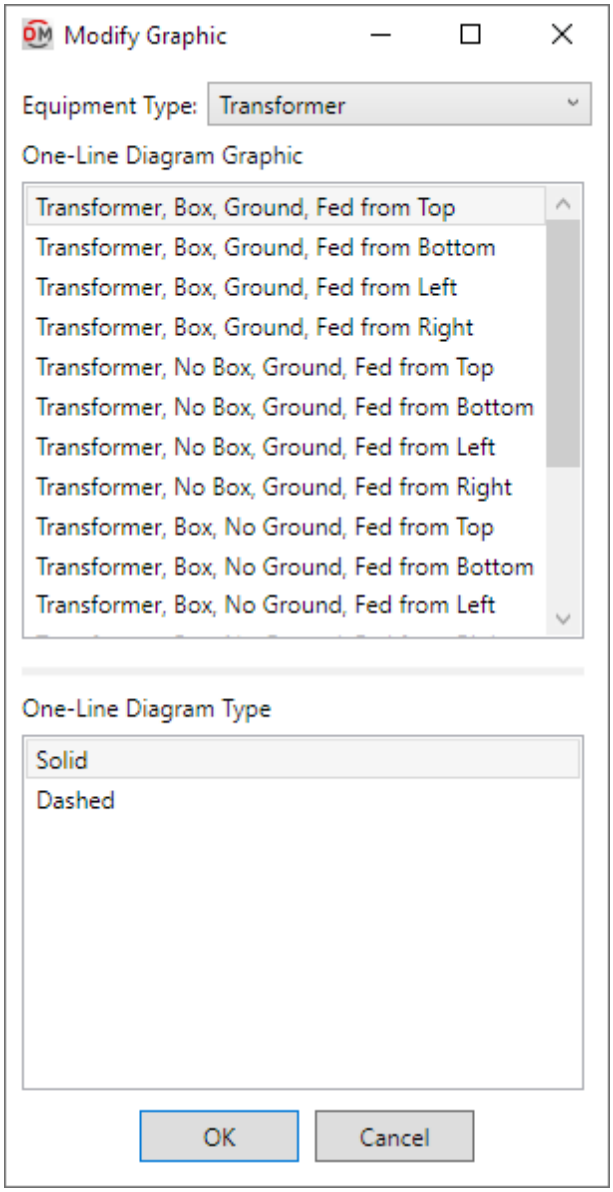
Allows you to add a graphic to a feeder segment, or modify the graphic for an equipment or feeder segment already inserted on the one-line diagram.

You will be prompted to specify an equipment or feeder.

Select one-line diagram item to change graphic of:

Modifying an Equipment Graphic

Specify an equipment to open the **Modify Graphic** dialog box:



Equipment Type: The type of equipment graphic to be used. The default types available are described below and can be modified in the **One-Line Diagram Device Graphics** command.

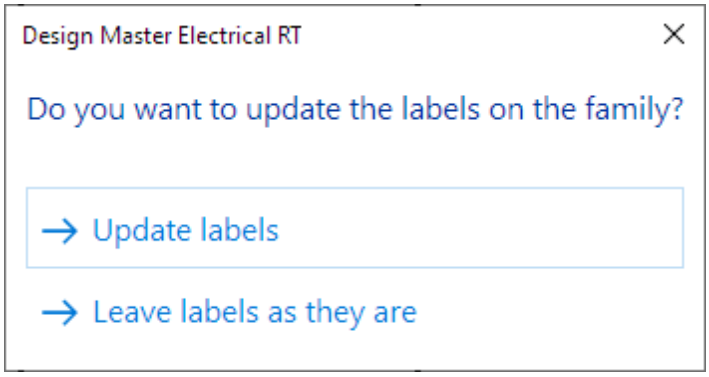
- **Panel:** The *One-Line Diagram Graphic* list will display panel and switchboard graphic families.
- **Transformer:** The *One-Line Diagram Graphic* list will display transformer graphic families.
- **Other Distribution Equipment:** The *One-Line Diagram Graphic* list will display transfer switch and generator graphic families.
- **Branch Circuit Equipment:** The *One-Line Diagram Graphic* list will display graphic families of equipment and motor connections, junction boxes, and other branch circuit devices.

One-Line Diagram Graphic: The graphic family that will be used for the equipment.

One-Line Diagram Type: The graphic type that will be used for the equipment. The values in this list are based upon the selected *One-Line Diagram Graphic*.

Press the **OK** button to change the equipment graphic on the one-line diagram.

You will be asked whether to update the labels for the equipment:

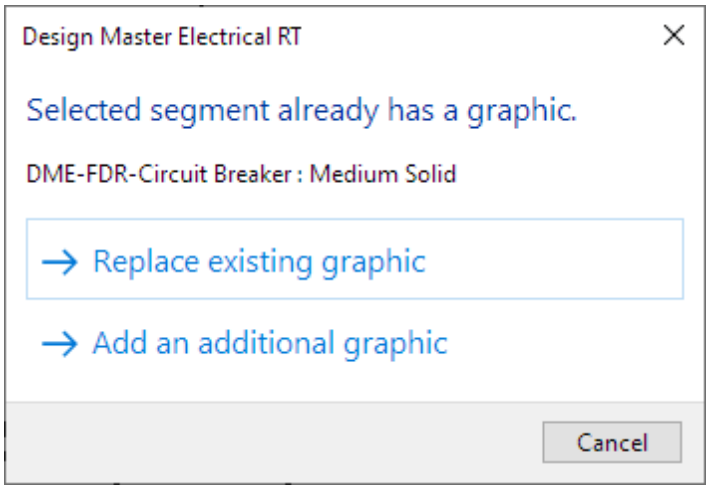


Update labels: The labels will update to the default location and tags for the equipment graphic.

Leave labels as they are: The location and tags will not be updated. The information for the existing tags will be updated.

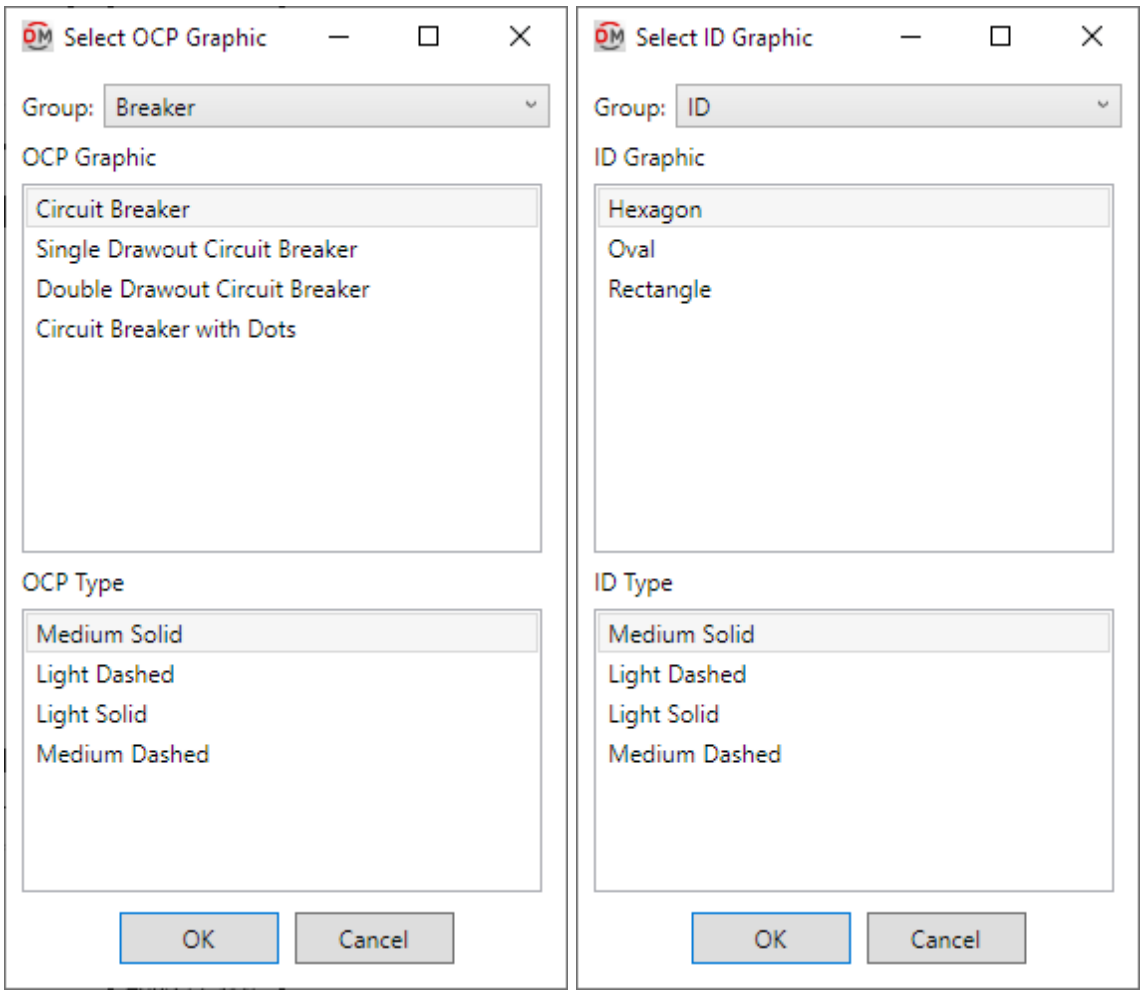
Adding or Modifying a Feeder Graphic

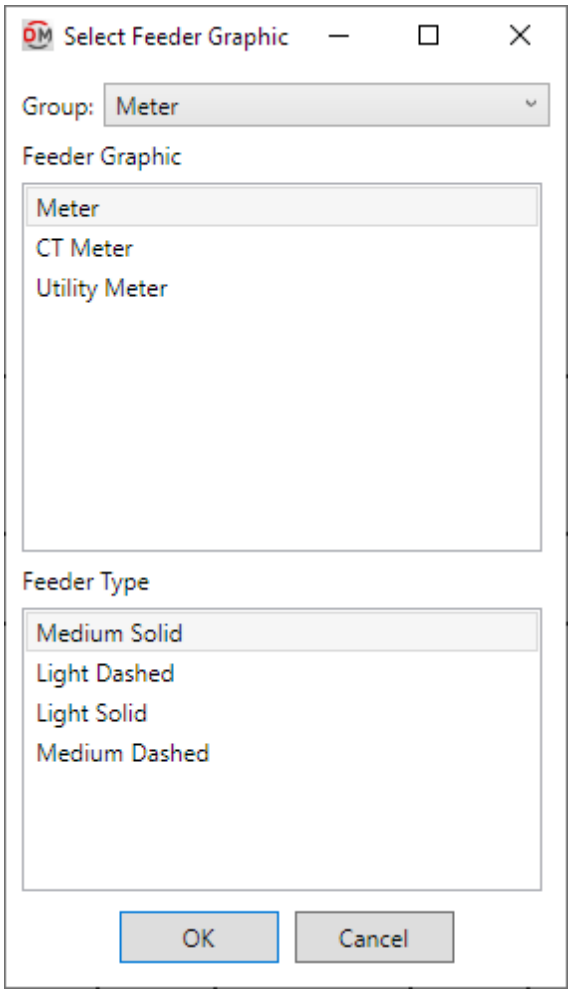
If you specify a feeder segment that already has a graphic, you will be asked whether to replace the existing graphic, add an additional graphic, or cancel the command:



The **Select OCP Graphic** dialog box, **Select ID Graphic** dialog box, or **Select Feeder Graphic** dialog box will open, based upon your selections:

Select OCP / ID / Feeder Graphic Dialog Box





Match Labels

Changes the labels of one or more distribution equipment or feeders to match an existing equipment or feeder on the one-line diagram.

You will be prompted to select a distribution equipment or feeder from which the labels will be copied.

Select one-line diagram device to copy labels from:

You will then be prompted to select one or more distribution equipment or feeders, depending upon your source, to change.

Select one-line diagram <Source type> to copy labels to:

The labels of the selected distribution equipment or feeder will be changed. Continue specifying distribution equipment or feeders, or press **ESC** to finish the command.

Change Link

Allows you to change which distribution equipment or circuit in the model is represented by a graphic on the one-line diagram.

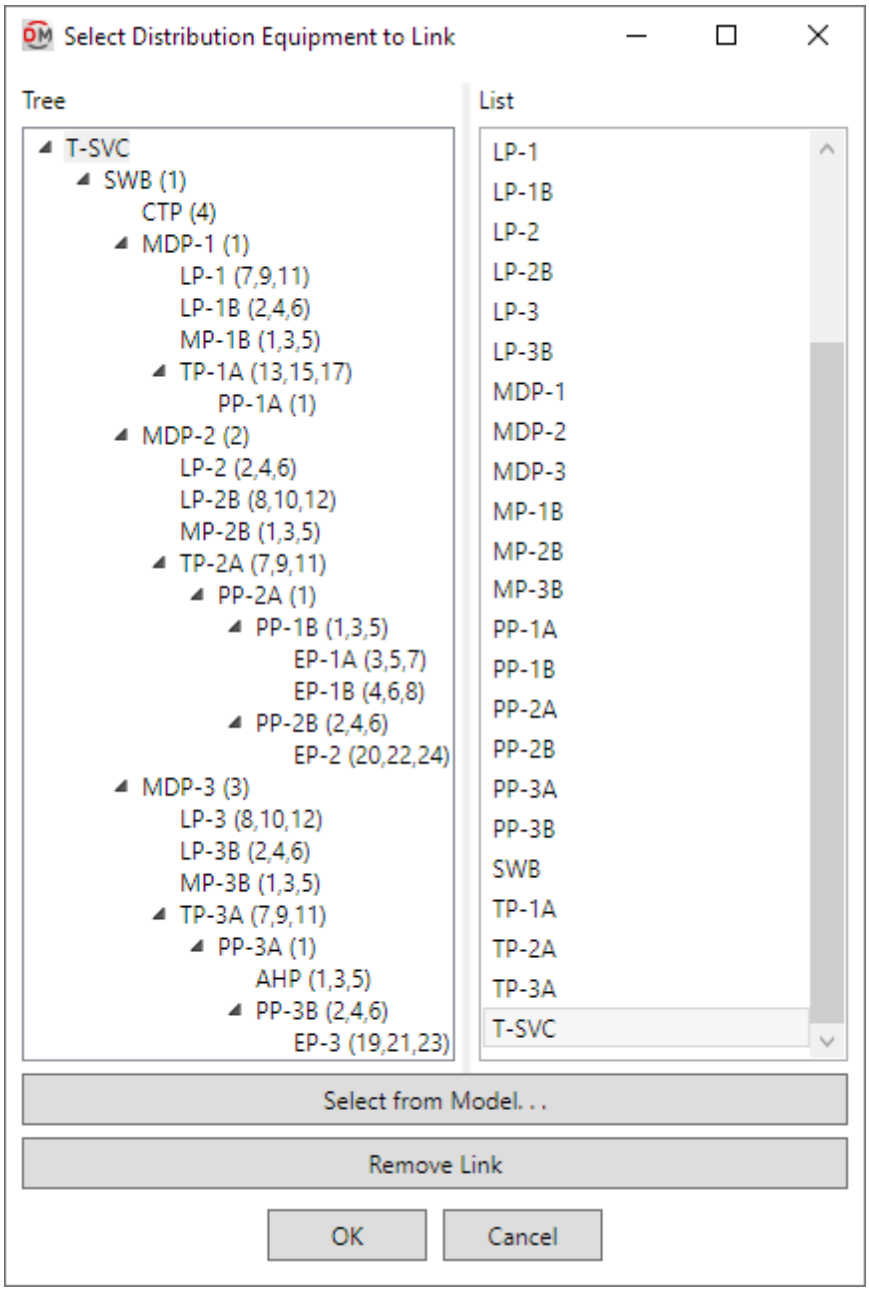
If you copy one-line diagram graphics using the Revit **Copy** command, the copied graphics will not be linked to the model. Use this command to link the copied graphics.

You will be prompted to specify an equipment or feeder.

Select one-line diagram device to link to different device in model:

Changing an Equipment Link

If you specify an equipment, the **Select Distribution Equipment to Link** dialog box will open:



Tree / List: All of the distribution equipment in the current project. They are listed in a tree corresponding to how the equipment are connected to each other, and alphabetically by callout.

Select from Model: Press this button to select a distribution equipment or branch circuit device on the model.

The dialog box will close and you will be prompted to specify a device.

Select instance in model to link to one-line diagram:

Specify an equipment using a view of the electrical model. The device graphic labels will be updated to reflect the new equipment. If the new equipment has a feeder, its labels and graphics will also be updated.

If the new equipment has different upstream or downstream connections than the old equipment, you will be asked whether to leave each feeder in its current location, redraw the feeder when possible, or erase the feeder.

Remove Link: Press this button to unlink the selected graphic from the electrical model.

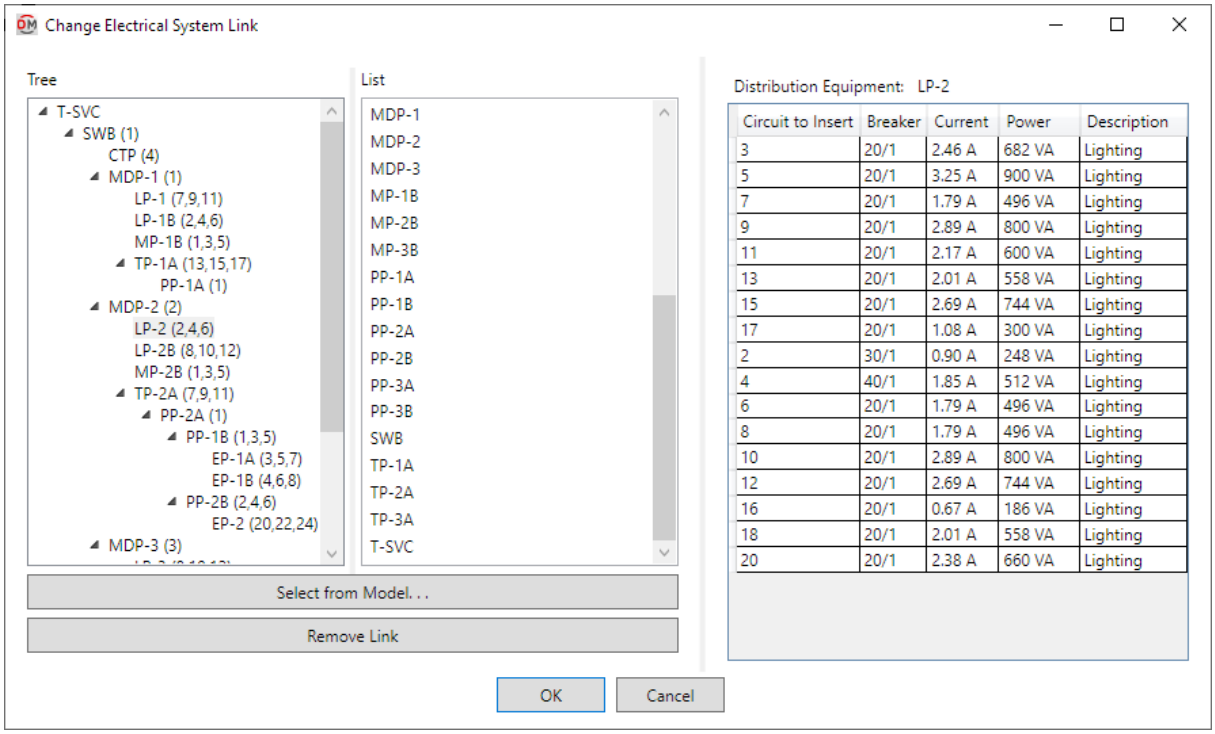
Press the **OK** button to select an equipment. The device graphic labels will be updated to reflect the new equipment. If the new equipment has a feeder, its labels and graphics will also be updated.

If the new equipment is connected to a different piece of equipment than the old equipment, you will be asked whether to leave the feeder in its current location, redraw the feeder, or erase the feeder.

Changing a Feeder Link

If you specify a feeder that is connected to an equipment on the one-line diagram, the command will end. You will be asked to run the command again and instead specify the connected equipment.

If you specify a feeder inserted with the **Circuit Insert** command or connected to an unlinked device graphic, the **Change Electrical System Link** dialog box will open:



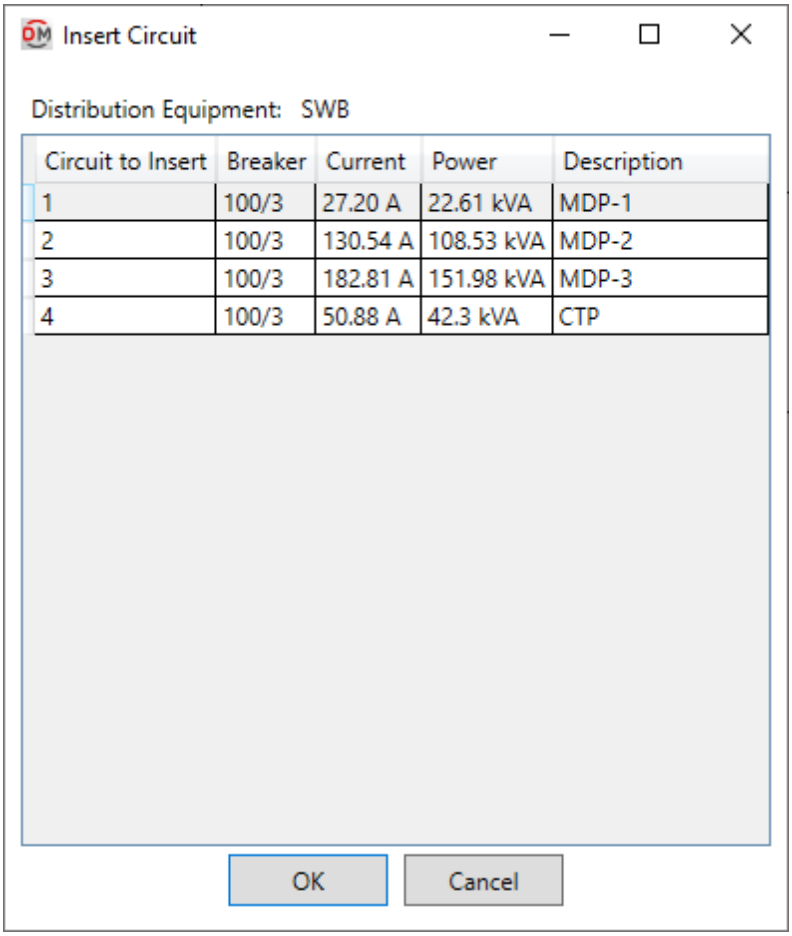
Tree / List: All of the distribution equipment in the current project. They are listed in a tree corresponding to how the equipment are connected to each other, and alphabetically by callout.

Select from Model: Press this button to select a distribution equipment on the model.

The dialog box will close and you will be prompted to specify an equipment.

Select distribution equipment with circuit to link to:

Specify an equipment on the one-line diagram or in the electrical model. The **Insert Circuit** dialog box will open:



Select a circuit from the list and press the **OK** button. The feeder graphics and labels will be updated to reflect the new circuit.

Remove Link: Press this button to unlink the selected graphic from the electrical model.

Distribution Equipment: The selected distribution equipment. The circuits listed are associated with the *Distribution Equipment*.

Select a circuit from the list and press the **OK** button. The feeder graphics and labels will be updated to reflect the new circuit.

Delete from Model

Removes an equipment or power connection from the one-line diagram and the electrical model. To remove entities from the one-line diagram without affecting the electrical model, use the **`DEL`** key or the standard Revit **`Delete`** command.

You will be prompted to specify an equipment or feeder to delete.

Select one-line diagram element to delete:

If you select an equipment, it will be removed from the one-line diagram and the electrical model. Any power connections to the equipment will be disconnected.

If you select a feeder, it will be removed from the one-line diagram and the connected equipment will be disconnected.

Highlight Device

Highlights a device in another view, similar to the Revit **`Highlight in Model`** command.

Highlight a Device in the Model

If you run the command in a drafting view, you will be prompted to specify a device on the one-line diagram.

Select one-line element to highlight in model:

The specified device will be highlighted in a view of the model. If no open view shows the specified device, you will be asked whether to search through closed views to find an appropriate view.

Highlight a Device on the One-Line Diagram

If you run the command in a model view, you will be prompted to specify a device in the model.

Select model element to highlight in one-line diagram:

The specified device will be highlighted on the one-line diagram. If the drafting view with the one-line diagram is closed, you will be asked whether to search through closed views to find the one-line diagram.

Export

The **Export** panel appears on the **DM One-Line** tab when you have a project open in Revit. It includes a single command for exporting one-line diagram information to AutoCAD.

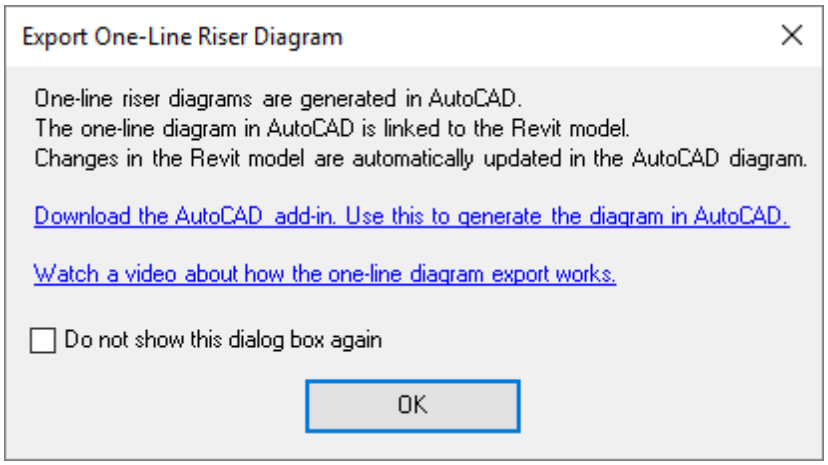
Export to AutoCAD: Exports the electrical model to AutoCAD for the one-line diagram.

Export to AutoCAD

This command is intended for use on projects created using older versions of Design Master Electrical RT and is not recommended for new projects.

Exports the information from the Revit model to AutoCAD for use in creating a one-line diagram.

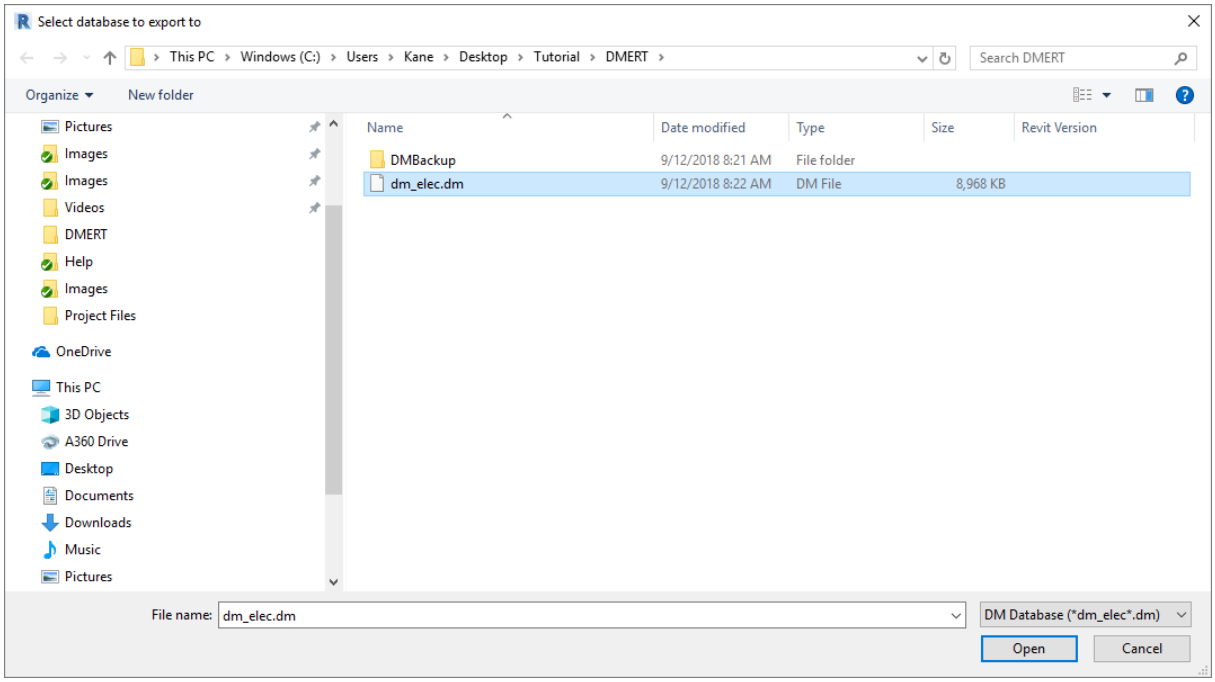
The first time you run the command, the **Export One-Line Riser Diagram** dialog box will open:



This dialog box explains how the one-line diagram in AutoCAD works with the Revit model. Links are provided to download the AutoCAD add-in from the website and watch a video describing the process.

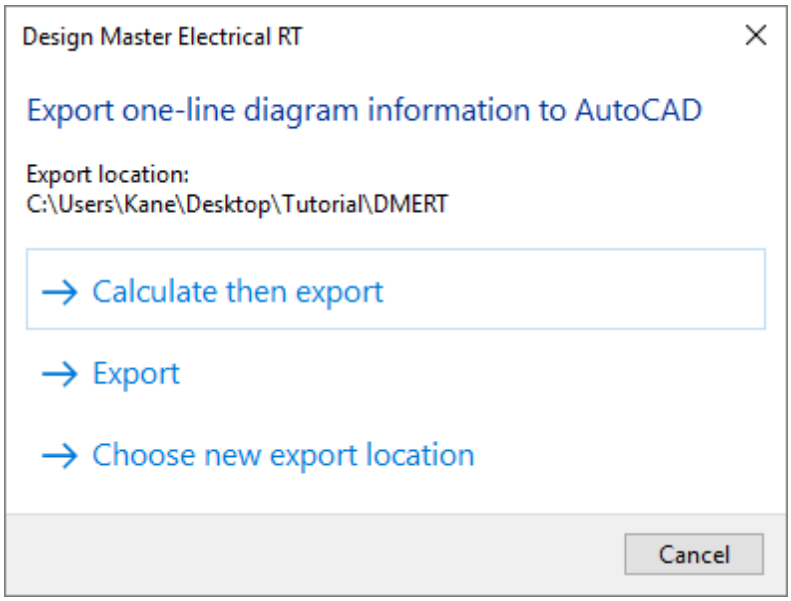
Check **Do not show this dialog box again** to prevent this dialog box from appearing in the future.

The first time you run the command in a project, the **Select database to export to** dialog box will open:



Select the DM file to which you want to export the information. The DM file must be created in AutoCAD using the **Start New Electrical RT Project (Links to 2.0 user manual)** command before you run this command.

The next time you run the command in a project, a **Design Master Electrical RT** dialog box will open:



The location of the folder to which the information will be exported is listed.

Calculate then export: Press this button to run the **Calculate Whole Project** command before exporting the information. This action will update all of the information in the model so that it is correct, but will take a moment to run.

Export: Press this button to export the information as it currently exists. This action allows you to export immediately if you have recently run the **Calculate Whole Project** command command or know your model has not changed since your last export.

Choose new export location: Press this button to choose a new location to which to export the information. The **Select database to export to dialog box** will be shown.

After the information has been exported, go to AutoCAD and use the **Update One-Line Diagram (Links to 2.0 user manual)** command to update the values on your AutoCAD drawing.

Customization

The **Customization** panel includes commands for customizing the settings used by Design Master Electrical RT. It is identical to the **Customization** panel on the **DM Electrical** tab.

Family

The **Family** panel appears on the **DM One-Line** tab when you have a family open in Revit. It includes a single command for adding information specific to Design Master Electrical RT one-line diagram graphics to a family.

Insert Connection Point: Allows you to add feeder connection points to your one-line diagram graphic families.

Insert Connection Point

Allows you to add feeder connection points to your one-line diagram graphic families.

You will be prompted to specify the type of upstream or downstream connection you want to insert. The different types are detailed below.

You will then be prompted to specify the point at which feeders will connect to the equipment graphic.

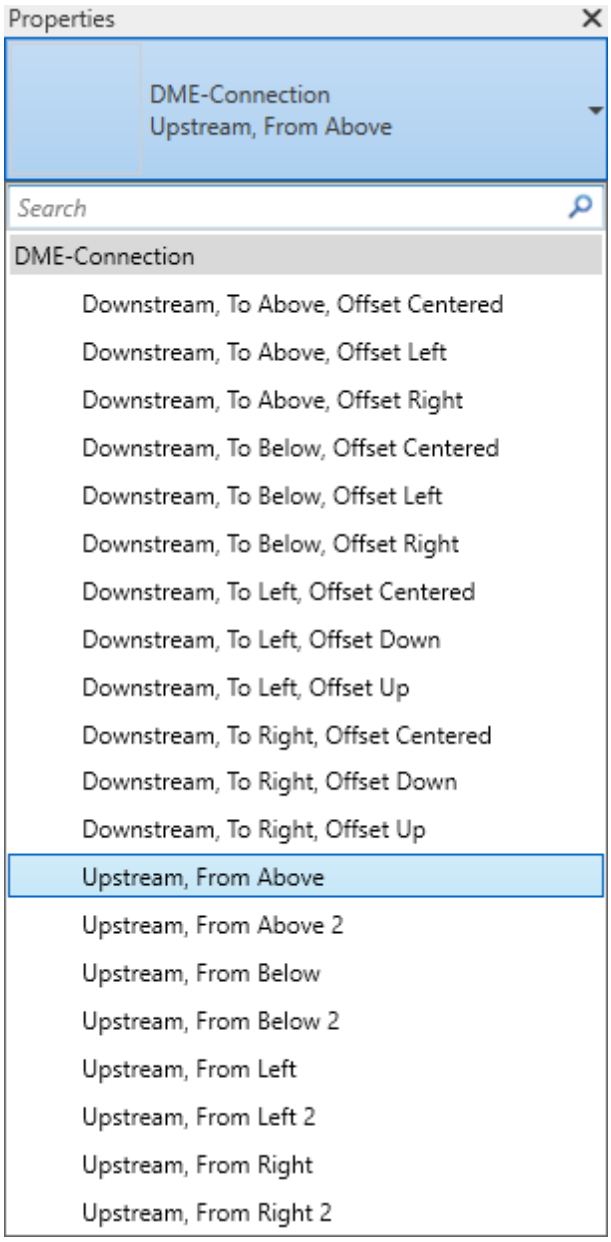
Click to place a free instance (Space Bar to Rotate)

The connection point will be inserted.

Configuring Your Connection Points

When they are first inserted, upstream connection points will lead out of the top of the graphic. Downstream connection points will lead out of the bottom of the graphic and offset to both sides.

To change whether the connection point is upstream or downstream and which direction feeders should extend, use the **Type Selector** in the Revit **Properties** panel:



Each connection point is differentiated by whether it is upstream or downstream, the direction of the feeder connection, and the direction in which additional feeders are offset.

Downstream / Upstream

Upstream connection points will be displayed in the family as arrows with "IN" text. The feeder to the upstream equipment will connect to this point.

Upstream 2 connection points are used for the secondary source of an equipment with two feeders, such as a transfer switch.

Downstream, Circuit connection points will be displayed in the family as arrows with "OUT" text. The first feeder to a downstream equipment will connect to this point. Additional feeders will be offset from this point as

described in the *Offset* section.

Downstream, Top Lugs connection points will be displayed in the family as arrows with "TOP OUT" text. The first feeder to a downstream equipment that is circuited to the top lugs will connect to this point. Additional feeders will be offset from this point as described in the *Offset* section.

Downstream, Bottom Lugs connection points will be displayed in the family as arrows with "BOTTOM OUT" text. The first feeder to a downstream equipment that is circuited to the bottom lugs will connect to this point. Additional feeders will be offset from this point as described in the *Offset* section.

Above / Below / Left / Right

The direction of the arrow displayed for the connection point indicates how feeders will connect to and from the equipment.

Rotating or mirroring the connection point will not change how feeders connect to it. To change the direction, you must select a different type.

Feeders will connect to the top of **To Above / From Above** connection points.

Feeders will connect to the bottom of **To Below / From Below** connection points.

Feeders will connect to the left of **To Left / From Left** connection points.

Feeders will connect to the right of **To Right / From Right** connection points.

Offset

Offset Left / Offset Right / Offset Down / Offset Up connection points will offset feeders after the first feeder in the direction specified.

To Above, Offset Centered / To Below, Offset Centered connection points will alternate offsetting feeders after the first feeder to the right and to the left of the connection point.

To Left, Offset Centered / To Right, Offset Centered connection points will alternate offsetting feeders after the first feeder below and above the connection point.

Help

The **Help** panel includes commands for obtaining help and managing the installation of Design Master Electrical RT. It is identical to the **Help** panel on the **DM Electrical** tab.

Advanced Topics

This section covers advanced topics about Design Master Electrical RT.

Feeder Sizing Basis: How feeders are sized.

Fault Calculation Basis: How fault current is calculated.

Voltage Drop Calculation Basis: How voltage drop is calculated.

Arc-Flash Calculation Basis: How arc-flash is calculated.

Modifying Panel Schedules: How to modify panel schedules to use the calculated branch circuit wire sizes.

Setting Default Customization Values: How to change the default customization settings and use the settings in new projects.

Neutrals: How neutral wires are used in feeders and branch circuits.

Schedule Fields / Shared Parameters: Descriptions of all of the shared parameters added by Design Master Electrical RT.

Feeder Sizing Basis

The wire size for a given ampacity is set in the **Wire Ampacities** dialog box. See the **Wire Ampacities** section for more information about setting these values.

The default wire sizes are based upon *NEC Table 310.16*. These wire sizes are used when the wire size is chosen automatically. By default, the *60°C Copper* column is used for wires up to #1, and the *75°C Copper* column is used for wires 1/0 and larger.

Wire sizing adjustments due to ambient temperature are based upon *NEC 310.15(B)*. The variable T_a in the equation is assumed to be 30.

Fault Calculation Basis

The fault calculations are based upon *IEEE Std 242-2001: IEEE Recommended Practice for Protection and Coordination of Industrial and Commercial Power Systems*.

The fault that is calculated is the three-phase line-to-line fault.

$Fault = Voltage / v(Resistance^2 + Reactance^2)$

The fault calculation includes motor contributions for all devices that have the *Load Sub-Classification Motor* Revit parameter enabled. This parameter is set on the connector element of the device family, in the *Electrical - Loads* section of the **Properties** panel.

The *Circuit Length* from the motor to the panel is accounted for. By default, the motor current is equal to 4 times the rated current of the motor and the X/R ratio of motors is 4. These values can be modified using the **Instance Edit** command or **Family Edit** command.

The fault is not calculated for circuits that have more than three branch circuit devices connected.

The feeder impedance values are based upon *NEC Table 9*. These values can be modified by the user using the **Wire Ampacities** command.

The transformer impedance values are for dry-type indoor transformers. These values can be modified using the **Panel Edit** command or **Family Edit** command.

Voltage Drop Calculation Basis

*Three-Phase % Voltage Drop = Calculated Load in Amps * Effective Z* * (*Wire Length* / 1,000) * 100 / *Line-to-Neutral Voltage*

*Single-Phase % Voltage Drop = Calculated Load in Amps * Effective Z* * (*Wire Length* / 1,000) * 100 * 2 / *Voltage*

Effective Z = *R* cos(*theta*) + *X* sin (*theta*) (See *NEC Table 9 Note 2*)

R = *Resistance* set in the **Wire Ampacities** command.

X = *Reactance* set in the **Wire Ampacities** command.

theta = Power factor of the electrical system. This value is based upon the *Voltage drop power factor* option in the **Project Options** command.

Line-to-Neutral Voltage is used for three-phase calculations based upon *NEC Table 9 Note 2*: "Multiplying current by effective impedance gives a good approximation for line-to-neutral voltage drop."

Voltage is the line-to-neutral voltage for single-pole circuits and line-to-line voltage for two-pole circuits.

The feeder impedance values are based upon *NEC Table 9*. These values can be modified by the user using the **Wire Ampacities** command.

Feeder Values

Calculated Load in Amps is the *Total Estimated Demand Current* on the distribution equipment. This load is calculated by Revit based upon the loads connected to the distribution equipment and the demand factors.

Wire Length is the *Feeder Length* value for the panel. Set the feeder length using the **Panel Edit** command.

Branch Circuit Values

Calculated Load in Amps is the the *Apparent Current* on the circuit. This load is calculated by Revit based upon the devices connected to the circuit.

Wire Length is the *Circuit Length* value for the circuit. Set the circuit length using the **Circuit Edit** command. The voltage drop calculation assumes the entire circuit load is located this distance from the panel.

Transformer Voltage Drop Basis

The transformer impedance values are for dry-type indoor transformers. These values can be modified by the user using the **Panel Edit** command or **Family Edit** command.

The voltage drop through transformers can be included, ignored, or reset to 0%. Use the *Transformer voltage drop calculation method* option in the **Project Options** command to control how the voltage drop is calculated.

Arc-Flash Calculation Basis

Arc-flash calculations are based upon *IEEE Std 1584-2018*.

Training Videos

- **Arc-Flash Calculations**

Modifying Panel Schedules

The wire sizes calculated by Design Master Electrical RT do not use the built-in wire size parameters in Revit. To display the values in your panel schedules, you need to modify your schedule template and change the values that are displayed.

Visit the **Modifying Panel Schedules** page in the Design Master Electrical RT Tutorial to learn more.

Setting Default Customization Values

Default customization values can be set using either a Revit template or the **Customization->Export** and **Customization->Import** commands.

Revit Template

Open the project template in Revit. Use the **Customization** commands to make changes to the wire sizes, conduit sizes, and wire ampacities.

When you start a new project using the template, the new project will use the modified customization values.

To make changes to your default customization, open the Revit template and modify the customization settings there.

Export Customization and Import Customization Commands

Open a project in Revit. Use the **Customization** commands to make changes to the wire sizes, conduit sizes, and wire ampacities.

Save the customization to a file using the **Customization->Export** command.

When you start a new project, load the customization using the **Customization->Import** command.

To make changes, open a new project and import the customization. Modify the customization settings, then export the customization to a file again.

Neutrals

Design Master Electrical RT includes neutrals in feeders and branch circuits based upon settings in Revit.

Distribution Equipment

A neutral is included on the feeder to a piece of distribution equipment based upon the settings of the *Distribution System* chosen for the equipment.

Three-Phase, with Neutral: Set *Phase* to **Three** and *Wires* to **4**.

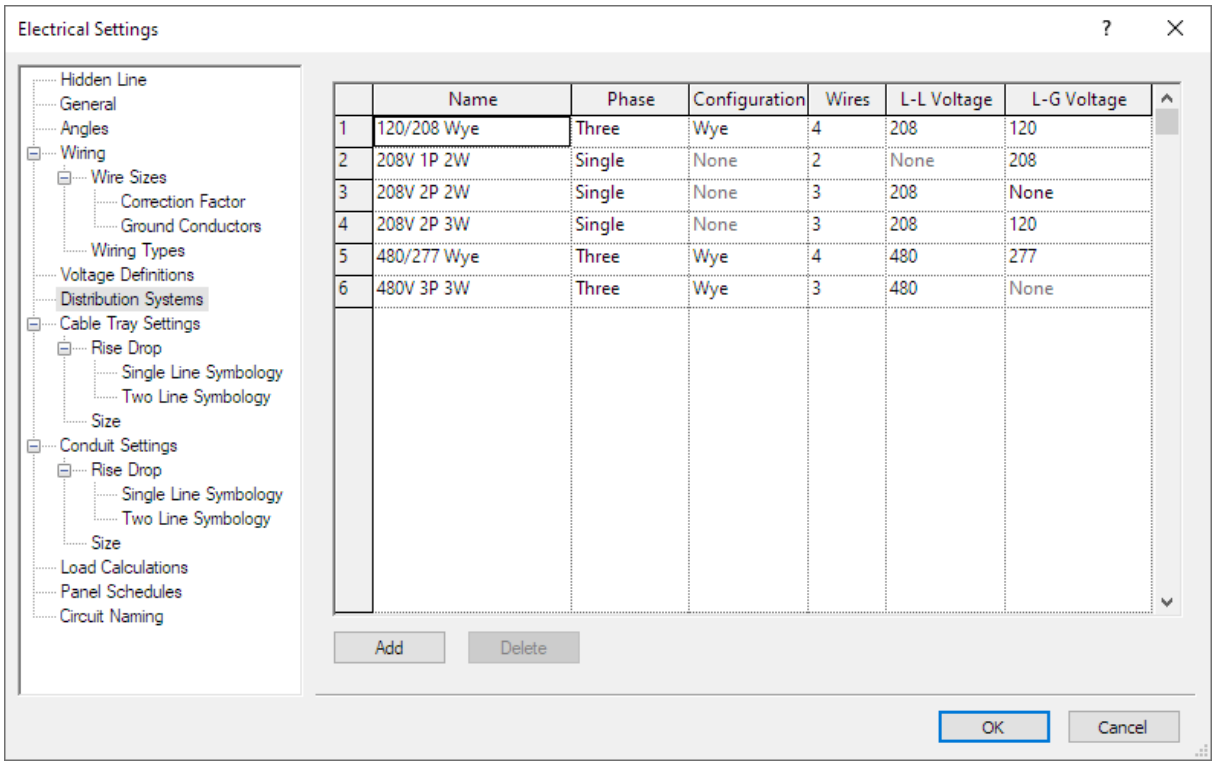
Three-Phase, no Neutral: Set *Phase* to **Three** and *Wires* to **3**.

Single-Phase, Single Pole, with Neutral: Set *Phase* to **Single** and *Wires* to **2**. Single-pole equipment always has a neutral.

Single-Phase, Two Pole, with Neutral: Set *Phase* to **Single** and *Wires* to **3**. Set *L-G Voltage* to the appropriate voltage value.

Single-Phase, Two Pole, no Neutral: Set *Phase* to **Single** and *Wires* to **3**. Set *L-G Voltage* to **None**.

You can modify the *Distribution System* settings by using the **`Manage->MEP Settings->Electrical Settings`** command. Select **Distribution Systems** from the tree on the left.



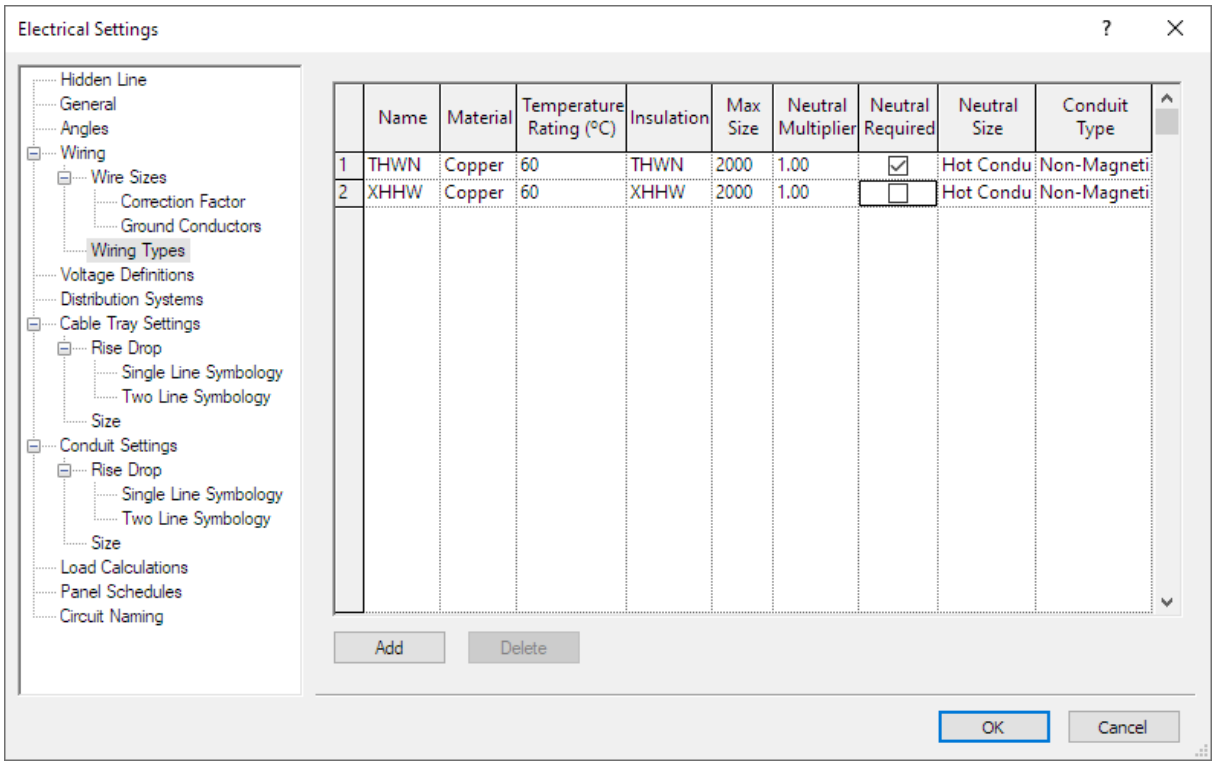
Branch Circuits

Revit includes a neutral on branch circuits if the load is unbalanced or the wiring type requires a neutral.

Edit the family to set the *System Type* on the connector to **Power - Balanced** or **Power - Unbalanced**.

To set the neutral requirement, use the **`Manage->MEP Settings->Electrical Settings`** command. Select **Wiring->Wiring Types** from the tree on the left. Check or uncheck the *Neutral Required* box as appropriate.

To change the *Wire Type* of a circuit, select an instance connected to the circuit. Select the **Electrical Circuits** tab on the ribbon. In the **Properties** panel, you can change the *Wire Type* value.



Video Demonstration

To watch a video demonstrating how to set up neutrals, see the **Configuring Neutrals** article in the knowledge base.

Schedule Fields / Shared Parameters

Design Master Electrical RT adds shared parameters to distribution equipment and branch circuits in Revit. These are standard shared parameters and can be used like any other shared parameters. The add-in uses some of them in the default schedules that are created.

To make them easy to find, all of the shared parameters are prefixed with **DME**.

Shared parameters starting with **DMET** are text values.

Shared parameters starting with **DMEN** are numeric values. These parameters use appropriate units where possible.

Shared parameters starting with **DMEB** are yes/no values.

Panel Shared Parameters: Shared parameters for distribution equipment.

Transformer Shared Parameters: Shared parameters for transformers.

Feeder Shared Parameters: Shared parameters related to feeders.

Branch Circuit Device Shared Parameters: Shared parameters added to branch circuit devices.

Circuit Shared Parameters: Shared parameters added to circuits.

Arc-Flash Shared Parameters: Shared parameters related to arc-flash calculations.

Fault Shared Parameters: Shared parameters related to fault calculations.

Voltage Drop Shared Parameters: Shared parameters related to voltage drop calculations.

Shared Parameter Files

Shared parameter files that contain Design Master shared parameters are located where Design Master Electrical RT is installed. The default install location is `C:\Program Files\Design Master Software\Electrical RT`.

The name of each file corresponds to its intended Revit version. For example, DesignMasterElectricalRT2021.txt should be used with Revit 2021.

Related Options

Output shared parameter values as uppercase: Sets whether shared parameter outputs are displayed only in uppercase letters.

Panel Shared Parameters

The general shared parameters added to distribution equipment.

Numeric Parameters

Parameter types in this section are set to number unless otherwise noted.

DMEN_Panel_LineToLineVoltage: The line-to-line voltage of the distribution equipment as an electrical potential parameter.

DMEN_Panel_LineToNeutralVoltage: The line-to-neutral voltage of the distribution equipment as an electrical potential parameter.

DMEN_Panel_MainDisconnectFrameSize: The frame size of the main disconnect as a current parameter.

DMEN_Panel_MainDisconnectPoles: The number of poles of the main disconnect as an integer parameter.

DMEN_Panel_MainDisconnectTripSize: The trip size of the main disconnect as a current parameter.

DMEN_Panel_MainDisconnectType: The type of main disconnect as an integer parameter.

- **0:** The main disconnect is main lugs only.
- **1:** The main disconnect is a main circuit breaker.
- **2:** The main disconnect is a fused switch.

Text Parameters

Parameter types in this section are set to text.

DMET_Panel_BusAmps: The bus amps of the distribution equipment.

DMET_Panel_Distribution_System: The distribution system of the distribution equipment. The built-in Revit *Distribution System* property cannot be included in schedules. Use this parameter to include the value in a schedule.

DMET_Panel_FedFrom: The upstream device feeding the distribution equipment.

DMET_Panel_FedFrom2: The upstream device connected to the second feeder of the distribution equipment.

DMET_Panel_FedFromCircuit: The circuit on the upstream device to which the distribution equipment is connected.

DMET_Panel_FedFromCircuit2: The circuit on the upstream device to which the second feeder of distribution equipment is connected.

DMET_Panel_LineToLineVoltage: The line-to-line voltage of the distribution equipment.

DMET_Panel_LineToNeutralVoltage: The line-to-neutral voltage of the distribution equipment.

DMET_Panel_Lugs: The type of lugs specified for the distribution equipment.

DMET_Panel_MainDisconnect: The main disconnect type, trip, and frame size, together in a single shared parameter. The numbers listed below are example values.

- **MLO:** The main disconnect is main lugs only.
- **MCB 100A:** The main disconnect is a main circuit breaker with the same size frame and trip.
- **MCB 60AT, 100AF:** The main disconnect is a main circuit breaker with different frame and trip sizes. The trip size is labeled AT (for "amps trip") and the frame size is labeled AF (for "amps frame").
- **FS 100A:** The main disconnect is a fused switch with the same size frame and trip.
- **FS 60AT, 100AF:** The main disconnect is a fused switch with different frame and trip sizes. The trip size is labeled AT (for "amps trip") and the frame size is labeled AF (for "amps frame").

DMET_Panel_MainDisconnectFrameSize: The frame size of the main disconnect.

DMET_Panel_MainDisconnectPoles: The number of poles of the main disconnect.

DMET_Panel_MainDisconnectTripSize: The trip size of the main disconnect.

DMET_Panel_MainDisconnectType: The type of main disconnect.

- **MLO:** The main disconnect is main lugs only.
- **MCB:** The main disconnect is a main circuit breaker.
- **FS:** The main disconnect is a fused switch.

DMET_PanelTree_Label: The name of the distribution equipment, indented based upon its position in the model. The indent begins with a period because Revit removes any leading spaces in the value.

DMET_PanelTree_SortOrder: A number representing the position of the distribution equipment in the panel tree. When the schedule is sorted by this parameter, the **DMET_PanelTree_Label** will display the panel tree.

DMET_Panel_UpstreamDescription: The description for the distribution equipment as it appears in the circuit description of the upstream panel schedule.

DMET_Panel_UpstreamDescription2: The description for the second feeder of the distribution equipment as it appears in the circuit description of the upstream panel schedule.

Transformer Shared Parameters

The shared parameters added to transformers.

Numeric Parameters

Parameter types in this section are set to number unless otherwise noted.

DMEN_Transformer_PrimaryCurrent_Calculated: The total calculated demand current of the transformer at the primary voltage.

DMEN_Transformer_PrimaryCurrent_Connected: The total connected current of the transformer at the primary voltage.

DMEN_Transformer_VA: The size of the transformer as a power parameter.

DMEN_Transformer_XRRatio: The X/R ratio of the transformer.

DMEN_Transformer_Z: The impedance of the transformer.

Text Parameters

Parameter types in this section are set to text.

DMET_Transformer_KFactor: The K-factor rating of the transformer.

DMET_Transformer_kVA: The size of the transformer in kVA.

DMET_Transformer_Secondary_Distribution_System: The secondary distribution system of the distribution equipment. The built-in Revit *Secondary Distribution System* property cannot be included in schedules. Use this parameter to include the value in a schedule.

DMET_Transformer_XRRatio: The X/R ratio of the transformer.

DMET_Transformer_Z: The impedance of the transformer.

Feeder Shared Parameters

The shared parameters added to distribution equipment related to the feeder to the distribution equipment.

Numeric Parameters

Parameter types in this section are set to number unless otherwise noted.

DMEN_Feeder_ConductorWireArea: The area of the conductor wire as an area parameter. The area is for a single conductor wire. It does not account for parallel runs or the number of poles.

DMEN_Feeder_ConduitArea: The area of the conduit as an area parameter.

DMEN_Feeder_ConduitFill: The conduit fill as a percentage.

DMEN_Feeder_EffectiveZPer1000ft: The effective Z per 1,000' for the feeder. Used to calculate voltage drop.

DMEN_Feeder_FrameSize: The frame size of the upstream OCP for the distribution equipment as a current parameter.

DMEN_Feeder_GroundWireArea: The area of the ground wire as an area parameter.

DMEN_Feeder_Length: The length of the feeder as a length parameter.

DMEN_Feeder_NeutralWireArea: The area of the neutral wire as an area parameter.

DMEN_Feeder_NeutralWireCount: The number of neutral wires.

DMEN_Feeder_ParallelRuns: The number of parallel runs.

DMEN_Feeder_RPer1000ft: The resistance per 1,000' for the feeder.

DMEN_Feeder_TripSize: The trip size of the upstream OCP for the distribution equipment as a current parameter.

DMEN_Feeder_WireAmpacity: The ampacity of the feeder as a current parameter.

DMEN_Feeder_XPer1000ft: The reactance per 1,000' for the feeder.

DMEN_Feeder_ZPer1000ft: The impedance per 1,000' for the feeder.

DMEN_Feeder2_ConductorWireArea: The area of the conductor wire of the second feeder as an area parameter. The area is for a single conductor wire. It does not account for parallel runs or the number of poles.

DMEN_Feeder2_ConduitArea: The area of the conduit of the second feeder as an area parameter.

DMEN_Feeder2_ConduitFill: The conduit fill of the second feeder as a percentage.

DMEN_Feeder_EffectiveZPer1000ft: The effective Z per 1,000' for the second feeder. Used to calculate voltage drop.

DMEN_Feeder2_FrameSize: The frame size of the upstream OCP of the second feeder for the distribution

equipment as a current parameter.

DMEN_Feeder2_GroundWireArea: The area of the ground wire of the second feeder as an area parameter.

DMEN_Feeder2_Length: The length of the feeder of the second feeder as a length parameter.

DMEN_Feeder2_NeutralWireArea: The area of the neutral wire of the second feeder as an area parameter.

DMEN_Feeder2_NeutralWireCount: The number of neutral wires of the second feeder.

DMEN_Feeder2_ParallelRuns: The number of parallel runs of the second feeder.

DMEN_Feeder2_RPer1000ft: The resistance per 1,000' for the second feeder.

DMEN_Feeder2_TripSize: The trip size of the upstream OCP for the distribution equipment of the second feeder as a current parameter.

DMEN_Feeder2_WireAmpacity: The ampacity of the second feeder as a current parameter.

DMEN_Feeder2_XPer1000ft: The reactance per 1,000' for the second feeder.

DMEN_Feeder2_ZPer1000ft: The impedance per 1,000' for the second feeder.

Text Parameters

Parameter types in this section are set to text.

DMET_Feeder_ConductorWireArea: The area of the conductor wire. The area is for a single conductor wire. It does not account for parallel runs or the number of poles. If there are two feeders, both conductor sizes are shown, separated by a slash. The default feeder schedule includes this parameter as a hidden column and sorts the schedule using it.

DMET_Feeder_ConductorWireSize: The number of parallel runs and the size of the conductor wires. Displayed in the default fault current schedule. If there are two feeders, both feeder sizes are shown, separated by a slash.

DMET_Feeder_ConductorWireSizeOnly: The size of the conductor wires. If there are two feeders, both feeder sizes are shown, separated by a slash.

DMET_Feeder_ConduitFill: The conduit fill as a percentage. If there are two feeders, both conduit fills are shown, separated by a slash.

DMET_Feeder_ConduitSize: The size of the conduit. If there are two feeders, both conduit sizes are shown, separated by a slash.

DMET_Feeder_Display: A **Yes** or **No** value that indicates whether the feeder should be displayed in the feeder schedule. The default feeder schedule includes this parameter as a hidden column. Any distribution equipment with the value set to **No** is not included in the schedule. Pieces of electrical equipment with their *Part Type* set to **Equipment Switch** are automatically set to **No** so they are not displayed in the schedule.

DMET_Feeder_EffectiveZPer1000ft: The effective Z per 1,000' for the feeder. Used to calculate voltage drop. If there are two feeders, both values are shown, separated by a slash.

DMET_Feeder_FeederID: The feeder ID on the one-line diagram of the first feeder.

DMET_Feeder_FrameSize: The frame size of the upstream OCP of the first feeder for the distribution equipment.

DMET_Feeder_GroundWireSize: The size of the ground wire. If there are two feeders, both ground wire sizes are shown, separated by a slash.

DMET_Feeder_IGConductor: A **Yes** or **No** value that indicates whether the first feeder includes an IG conductor.

DMET_Feeder_Length_ft: The length of the feeder in feet. If there are two feeders, both lengths are shown, separated by a slash. Displayed in the default fault current schedule.

DMET_Feeder_Length_m: The length of the feeder in meters. If there are two feeders, both lengths are shown, separated by a slash.

DMET_Feeder_NeutralWireSize: The size of the neutral wire. If there are two feeders, both neutral wire sizes are shown, separated by a slash.

DMET_Feeder_ParallelRuns: The number of parallel runs of the first feeder.

DMET_Feeder_RPer1000ft: The resistance of the feeder per 1,000'. If there are two feeders, both resistances are shown, separated by a slash.

DMET_Feeder_Trip_Poles: The trip size and number of poles of the upstream OCP of the first feeder for the distribution equipment. The trip and poles are separated by a slash, for example, 100/3.

DMET_Feeder_TripSize: The trip size of the upstream OCP of the first feeder for the distribution equipment.

DMET_Feeder_WireAmpacity: The ampacity of the feeder wire of the first feeder.

DMET_Feeder_WireCallout: The callout of the first feeder. The callout lists the conduit size and all of the wire sizes, separated by a comma and a space.

DMET_Feeder_WireCalloutCompact: The callout of the first feeder. The callout lists the conduit size and all of the wire sizes, separated by a comma.

DMET_Feeder_XPer1000ft: The reactance of the feeder per 1,000'. If there are two feeders, both reactances are shown, separated by a slash.

DMET_Feeder_ZPer1000ft: The impedance of the feeder per 1,000'. If there are two feeders, both impedances are shown, separated by a slash.

DMET_Feeder1_ConductorWireArea: The area of the conductor wire of the first feeder. The area is for a single conductor wire. It does not account for parallel runs or the number of poles.

DMET_Feeder1_ConductorWireSize: The number of parallel runs and the size of the conductor wires of the first feeder.

DMET_Feeder1_ConductorWireSizeOnly: The size of the conductor wires of the first feeder.

DMET_Feeder1_ConduitSize: The size of the conduit of the first feeder.

DMET_Feeder1_EffectiveZPer1000ft: The effective Z per 1,000' of the first feeder. Used to calculate voltage drop.

DMET_Feeder1_GroundWireSize: The size of the ground wire of the first feeder.

DMET_Feeder1_Length_ft: The length in feet of the first feeder.

DMET_Feeder1_Length_m: The length in meters of the first feeder.

DMET_Feeder1_NeutralWireSize: The size of the neutral wire of the first feeder.

DMET_Feeder1_RPer1000ft: The resistance per 1,000' of the first feeder.

DMET_Feeder1_XPer1000ft: The reactance per 1,000' of the first feeder.

DMET_Feeder1_ZPer1000ft: The impedance per 1,000' of the first feeder.

DMET_Feeder2_ConductorWireArea: The area of the conductor wire of the second feeder. The area is for a single conductor wire. It does not account for parallel runs or the number of poles.

DMET_Feeder2_ConductorWireSize: The number of parallel runs and the size of the conductor wires of the second feeder.

DMET_Feeder2_ConductorWireSizeOnly: The size of the conductor wires of the second feeder.

DMET_Feeder2_ConduitFill: The conduit fill of the second feeder as a percentage.

DMET_Feeder2_ConduitSize: The size of the conduit of the second feeder.

DMET_Feeder2_Display: A **Yes** or **No** value that indicates whether the feeder should be displayed in the feeder schedule. Pieces of electrical equipment with their *Part Type* set to **Equipment Switch** are automatically set to **No** so they are not displayed in the schedule.

DMET_Feeder2_FeederID: The feeder ID on the one-line diagram of the second feeder.

DMET_Feeder2_FrameSize: The frame size of the upstream OCP of the second feeder for the distribution equipment.

DMET_Feeder2_EffectiveZPer1000ft: The effective Z per 1,000' of the second feeder. Used to calculate voltage drop.

DMET_Feeder2_GroundWireSize: The size of the ground wire of the second feeder.

DMET_Feeder2_IGConductor: A **Yes** or **No** value that indicates whether the second feeder includes an IG conductor.

DMET_Feeder2_Length_ft: The length in feet of the second feeder.

DMET_Feeder2_Length_m: The length in meters of the second feeder.

DMET_Feeder2_NeutralWireSize: The size of the neutral wire of the second feeder.

DMET_Feeder2_ParallelRuns: The number of parallel runs of the second feeder.

DMET_Feeder2_RPer1000ft: The resistance per 1,000' of the second feeder.

DMET_Feeder2_TripSize: The trip size of the upstream OCP of the second feeder for the distribution equipment.

DMET_Feeder2_WireAmpacity: The ampacity of the second feeder.

DMET_Feeder2_WireCallout: The callout of the second feeder. The callout lists the conduit size and all of the wire sizes, separated by a comma and a space.

DMET_Feeder2_WireCalloutCompact: The callout of the second feeder. The callout lists the conduit size and all of the wire sizes, separated by a comma.

DMET_Feeder2_XPer1000ft: The reactance per 1,000' of the second feeder.

DMET_Feeder2_ZPer1000ft: The impedance per 1,000' of the second feeder.

Yes/No Parameters

Parameter types in this section are set to yes/no.

DMEB_Feeder_NeutralDouble: Whether the neutral wire of the first feeder is set to double the phase wire.

DMEB_Feeder2_NeutralDouble: Whether the neutral wire of the second feeder is set to double the phase wire.

Branch Circuit Device Shared Parameters

The shared parameters added to branch circuit devices.

Numeric Parameters

Parameter types in this section are set to number unless otherwise noted.

DMEN_Fixture_Elevation: The elevation of the device as a length parameter. Uses the built-in *Elevation* parameter if it exists. Otherwise uses the maximum Z value of the family geometry.

DMEN_Equipment_FLA: The FLA or BCSC of the fixture as a current parameter.

DMEN_Equipment_MCA: The MCA of the fixture as a current parameter.

DMEN_Equipment_MOCP: The MOCP of the fixture as a current parameter.

DMEN_Feeder_ConductorWireArea: The area of the conductor wire of the branch circuit connected to this device as an area parameter. The area is for a single conductor wire. It does not account for parallel runs or the number of poles.

DMEN_Feeder_ConduitArea: The area of the conduit of the branch circuit connected to this device as an area parameter.

DMEN_Feeder_FrameSize: The frame size of the branch circuit connected to this device as a current parameter.

DMEN_Feeder_GroundWireArea: The area of the ground wire of the branch circuit connected to this device as an area parameter.

DMEN_Feeder_Length: The length of the branch circuit connected to this device as a length parameter. If multiple devices are on the branch circuit, the average distance from the distribution equipment to the devices on the branch circuit will be displayed.

DMEN_Feeder_NeutralWireArea: The area of the neutral wire of the branch circuit connected to this device as an area parameter.

DMEN_Feeder_ParallelRuns: The number of parallel runs of the branch circuit connected to this device.

DMEN_Feeder_TripSize: The trip size of the branch circuit connected to this device as a current parameter.

DMEN_VoltageDrop_Feeder: The voltage drop on the branch circuit connected to this device.

Text Parameters

Parameter types in this section are set to text.

DMET_Feeder_ConductorWireSize: The number of parallel runs and the size of the conductor wires of the branch circuit connected to this device.

DMET_Feeder_ConductorWireSizeOnly: The size of the conductor wires of the branch circuit connected to this device.

DMET_Feeder_ConduitSize: The size of the conduit of the branch circuit connected to this device.

DMET_Feeder_FeederID: The feeder ID on the one-line diagram of the branch circuit connected to this device.

DMET_Feeder_FrameSize: The frame size of the branch circuit connected to this device.

DMET_Feeder_GroundWireSize: The size of the ground wire of the branch circuit connected to this device.

DMET_Feeder_Length_ft: The length of the branch circuit connected to this device in feet. If multiple devices are on the branch circuit, the average distance from the distribution equipment to the devices on the branch circuit will be displayed.

DMET_Feeder_Length_m: The length of the branch circuit connected to this device in meters. If multiple devices are on the branch circuit, the average distance from the distribution equipment to the devices on the branch circuit will be displayed.

DMET_Feeder_NeutralWireSize: The size of the neutral wire of the branch circuit connected to this device.

DMET_Feeder_ParallelRuns: The number of parallel runs of the branch circuit connected to this device.

DMET_Feeder_TripSize: The trip size of the branch circuit connected to this device.

DMET_Feeder_Trip_Poles: The trip size and number of poles of the branch circuit connected to this device. The

trip and poles are separated by a slash, for example, 100/3.

DMET_Feeder_WireCallout: The callout of the branch circuit connected to this device. The callout lists the conduit size and all of the wire sizes.

DMET_Instance_CircuitDescription: The circuit description of the branch circuit connected to this device.

DMET_Instance_ThisDescription: The circuit description of this device.

DMET_VoltageDrop_Feeder: The voltage drop on the branch circuit connected to this device.

Circuit Shared Parameters

The shared parameters added to circuits.

Numeric Parameters

Parameter types in this section are set to number unless otherwise noted.

DMEN_Circuit_ConductorWireArea: The area of the conductor wire as an area parameter. The area is for a single conductor wire. It does not account for parallel runs or the number of poles.

DMEN_Circuit_ConduitArea: The area of the conduit as an area parameter.

DMEN_Circuit_ConduitFill: The conduit fill as a percentage.

DMEN_Circuit_FaultAtDevice: The available fault current at the distribution equipment or branch circuit device connected to the circuit as a current parameter. Includes both the utility fault and motor contributions.

DMEN_Circuit_FaultMotorDirectlyConnected: The fault due to the branch circuit device, or due to motors directly connected to the distribution equipment connected to the circuit as a current parameter.

DMEN_Circuit_FaultMotorTotal: The total fault due to all motors in the system at the distribution equipment or branch circuit device connected to the circuit as a current parameter.

DMEN_Circuit_FaultUtility: The fault from the utility at the distribution equipment or branch circuit device connected to the circuit as a current parameter.

DMEN_Circuit_GroundWireArea: The area of the ground wire as an area parameter.

DMEN_Circuit_Length: The length of the circuit as a length parameter. If multiple devices are on the circuit, the average distance from the distribution equipment to the devices on the circuit will be displayed.

DMEN_Circuit_NeutralWireArea: The area of the neutral wire as an area parameter.

DMEN_Circuit_ParallelRuns: The number of parallel runs.

DMEN_Circuit_Poles: The number of poles.

DMEN_Circuit_VoltageDrop: The voltage drop of the circuit.

Text Parameters

Parameter types in this section are set to text.

DMET_Circuit_ConductorWireSize: The number of parallel runs and the size of the conductor wires.

DMET_Circuit_ConductorWireSizeOnly: The size of the conductor wires.

DMET_Circuit_ConduitFill: The conduit fill as a percentage.

DMET_Circuit_ConduitSize: The size of the conduit.

DMET_Circuit_FaultAtDevice: The available fault current at the distribution equipment or branch circuit device connected to the circuit. A warning is displayed if the fault exceeds the AIC rating of the distribution equipment. Includes both the utility fault and motor contributions.

DMET_Circuit_FaultAtDevice_NoWarnings: The available fault current at the distribution equipment or branch circuit device connected to the circuit. Includes both the utility fault and motor contributions.

DMET_Circuit_FaultMotorDirectlyConnected: The fault due to the branch circuit device, or due to motors directly connected to the distribution equipment connected to the circuit.

DMET_Circuit_FaultMotorTotal: The total fault due to all motors in the system at the distribution equipment connected to the circuit.

DMET_Circuit_FaultUtility: The fault from the utility at the distribution equipment connected to the circuit.

DMET_Circuit_FeederID: The feeder ID used for the circuit on the one-line diagram.

DMET_Circuit_GroundWireSize: The size of the ground wire.

DMET_Circuit_Length_ft: The length of the circuit in feet. If multiple devices are on the circuit, the average distance from the distribution equipment to the devices on the circuit will be displayed.

DMET_Circuit_Length_m: The length of the circuit in meters. If multiple devices are on the circuit, the average distance from the distribution equipment to the devices on the circuit will be displayed.

DMET_Circuit_NeutralWireSize: The size of the neutral wire.

DMET_Circuit_Number: The circuit number.

DMET_Circuit_ParallelRuns: The number of parallel runs.

DMET_Circuit_VoltageDrop: The voltage drop of the circuit.

DMET_Circuit_WireCallout: The wire callout for the circuit using the calculated or specified wire size settings. Wire sizes are separated by a comma and a space.

DMET_Circuit_WireCalloutCompact: The wire callout for the circuit using the calculated or specified wire size settings. Wire sizes are separated by a comma.

DMET_Circuit_WireCalloutHR: The wire callout for the circuit using the calculated or specified wire size settings. Wire sizes are separated by a comma. Some callouts are hidden depending upon the *Homerun wire callouts* option set in the **Project Options** command.

Arc-Flash Shared Parameters

The shared parameters added to distribution equipment related to arc-flash calculations.

Numeric Parameters

Parameter types in this section are set to number unless otherwise noted.

DMEN_ArcFlash_ArcingCurrentMaximum: The maximum arcing current in amps.

DMEN_ArcFlash_ArcingCurrentReduced: The reduced arcing current in amps.

DMEN_ArcFlash_ConductorGap: The conductor gap in inches.

DMEN_ArcFlash_EnclosureDepth: The depth of the enclosure in inches.

DMEN_ArcFlash_EnclosureHeight: The height of the enclosure in inches.

DMEN_ArcFlash_EnclosureWidth: The width of the enclosure in inches.

DMEN_ArcFlash_IncidentEnergyAtMaximumCurrent: The incident energy at maximum arcing current in Joules/cm².

DMEN_ArcFlash_IncidentEnergyAtReducedCurrent: The incident energy at reduced arcing current in Joules/cm².

DMEN_ArcFlash_MaximumIncidentEnergy: The maximum arc-flash incident energy in Joules/cm².

DMEN_ArcFlash_ProtectionBoundaryDistance: The arc-flash-protection boundary distance as a length parameter.

DMEN_ArcFlash_WorkingDistance: The working distance as a length parameter.

Text Parameters

Parameter types in this section are set to text.

DMET_ArcFlash_ArcingCurrentMaximum: The maximum arcing current in amps.

DMET_ArcFlash_ArcingCurrentReduced: The reduced arcing current in amps.

DMET_ArcFlash_Calculate: A **Yes** or **No** value that indicates whether the arc-flash is calculated for the distribution equipment. It also is used to indicate whether the distribution equipment should be displayed in the arc-flash schedule. The default arc-flash schedule includes this parameter as a hidden column. Any distribution equipment with the value set to **No** is not included in the schedule. Pieces of electrical equipment with their *Part Type* set to **Equipment Switch** are automatically set to **No** so they are not displayed in the schedule.

DMET_ArcFlash_ConductorGap_inch: The conductor gap in inches.

DMET_ArcFlash_ConductorGap_mm: The conductor gap in millimeters.

DMET_ArcFlash_ElectrodeConfiguration: The electrode configuration for the distribution equipment.

DMET_ArcFlash_EnclosureDepth_inch: The depth of the enclosure in inches.

DMET_ArcFlash_EnclosureDepth_mm: The depth of the enclosure in millimeters.

DMET_ArcFlash_EnclosureHeight_inch: The height of the enclosure in inches.

DMET_ArcFlash_EnclosureHeight_mm: The height of the enclosure in millimeters.

DMET_ArcFlash_EnclosureWidth_inch: The width of the enclosure in inches.

DMET_ArcFlash_EnclosureWidth_mm: The width of the enclosure in millimeters.

DMET_ArcFlash_IncidentEnergyAtMaximumCurrent_cal: The incident energy at maximum arcing current in calories/cm².

DMET_ArcFlash_IncidentEnergyAtMaximumCurrent_J: The incident energy at maximum arcing current in Joules/cm².

DMET_ArcFlash_IncidentEnergyAtReducedCurrent_cal: The incident energy at reduced arcing current in calories/cm².

DMET_ArcFlash_IncidentEnergyAtReducedCurrent_J: The incident energy at reduced arcing current in Joules/cm².

DMET_ArcFlash_MaximumIncidentEnergy_cal: The maximum arc-flash incident energy in calories/cm².

DMET_ArcFlash_MaximumIncidentEnergy_J: The maximum arc-flash incident energy in Joules/cm².

DMET_ArcFlash_ProtectionBoundaryDistance_ft: The arc-flash-protection boundary distance in feet.

DMET_ArcFlash_ProtectionBoundaryDistance_mm: The arc-flash-protection boundary distance in millimeters.

DMET_ArcFlash_WorkingDistance_ft: The working distance in feet.

DMET_ArcFlash_WorkingDistance_mm: The working distance in millimeters.

Fault Shared Parameters

The shared parameters added to distribution equipment related to fault calculations.

Numeric Parameters

Parameter types in this section are set to number unless otherwise noted.

DMEN_Fault_FaultAtDevice: The available fault current at the distribution equipment or branch circuit device as a current parameter. Includes both the utility fault and motor contributions.

DMEN_Fault_FaultMotorDirectlyConnected: The fault due to motors directly connected to the distribution equipment as a current parameter.

DMEN_Fault_FaultMotorTotal: The total fault due to all motors in the system as a current parameter.

DMEN_Fault_FaultUtility: The fault at the distribution equipment or branch circuit device from the utility as a current parameter.

DMEN_Fault_FedFromFault: The available fault current at the upstream distribution equipment as a current parameter.

DMEN_Fault_FedFromFault1: The available fault current at the upstream distribution equipment connected to feeder 1 as a current parameter.

DMEN_Fault_FedFromFault2: The available fault current at the upstream distribution equipment connected to feeder 2 as a current parameter.

DMEN_Fault_Transformer_FaultAtPrimary: The available fault at the primary of a transformer as a current parameter. Set to 0 if the distribution equipment is not a transformer.

Text Parameters

Parameter types in this section are set to text.

DMET_Fault_Display: A **Yes** or **No** value that indicates whether the distribution equipment should be displayed in the fault current schedule. The default fault current schedule includes this parameter as a hidden column. Any distribution equipment with the value set to **No** is not included in the schedule. Pieces of electrical equipment with their *Part Type* set to **Equipment Switch** are automatically set to **No** so they are not displayed in the schedule.

DMET_Fault_FaultAtDevice: The available fault current at the distribution equipment or branch circuit device. A warning is displayed if the fault exceeds the AIC rating of the distribution equipment. Includes both the utility fault and motor contributions.

DMET_Fault_FaultAtDevice_NoWarnings: The available fault current at the distribution equipment or branch circuit device. Includes both the utility fault and motor contributions.

DMET_Fault_FaultMotorDirectlyConnected: The fault due to motors directly connected to the distribution equipment.

DMET_Fault_FaultMotorTotal: The total fault due to all motors in the system.

DMET_Fault_FaultUtility: The fault at the distribution equipment or branch circuit device from the utility.

DMET_Fault_FedFromFault: The available fault current at the upstream distribution equipment.

DMET_Fault_Transformer_FaultAtPrimary: The available fault at the primary of a transformer. Blank if the distribution equipment is not a transformer.

Voltage Drop Shared Parameters

The shared parameters added to distribution equipment related to voltage drop calculations.

Numeric Parameters

Parameter types in this section are set to number unless otherwise noted.

DMEN_VoltageDrop_Feeder: The cumulative voltage drop on the feeder to the distribution equipment. If the distribution equipment has two feeders, this value is the largest of the two voltage drops.

DMEN_VoltageDrop_Feeder1: The voltage drop on feeder 1 to the distribution equipment.

DMEN_VoltageDrop_Feeder2: The voltage drop on feeder 2 to the distribution equipment.

DMEN_VoltageDrop_MaxCircuit: The largest voltage drop on all of the branch circuits on the distribution equipment.

DMEN_VoltageDrop_MaxCircuit_Length: The length of the branch circuit with the largest voltage drop as a length parameter

DMEN_VoltageDrop_Total: The total voltage drop from the utility to the branch circuit devices. It is calculated as the sum of the largest branch circuit voltage drop and the larger of the two feeder voltage drops.

DMEN_VoltageDrop_Transformer: The voltage drop through the transformer if the distribution equipment is a transformer.

Text Parameters

Parameter types in this section are set to text.

DMET_VoltageDrop_Display: A **Yes** or **No** value that indicates whether the distribution equipment should be displayed in the voltage drop schedule. The default voltage drop schedule includes this parameter as a hidden column. Any distribution equipment with the value set to **No** is not included in the schedule. Pieces of electrical equipment with their *Part Type* set to **Equipment Switch** are automatically set to **No** so they are not displayed in the schedule.

DMET_VoltageDrop_Feeder: The cumulative voltage drop on the feeder to the distribution equipment. If the distribution equipment has two feeders, this value is the largest of the two voltage drops. A warning is displayed if this value exceeds 2% or 3%, depending upon the *Feeder voltage drop percentage limit* setting in the **Project Options** command.

DMET_VoltageDrop_Feeder_NoWarnings: The cumulative voltage drop on the feeder to the distribution equipment. If the distribution equipment has two feeders, this value is the largest of the two voltage drops.

DMET_VoltageDrop_Feeder1: The non-cumulative voltage drop on feeder 1 to the distribution equipment.

DMET_VoltageDrop_Feeder2: The non-cumulative voltage drop on feeder 2 to the distribution equipment.

DMET_VoltageDrop_MaxCircuit: The largest voltage drop on all of the branch circuits on the distribution equipment. A warning is displayed if this value exceeds 3%.

DMET_VoltageDrop_MaxCircuit_ConductorWireSize: The number of parallel runs and the size of the conductor wires of the branch circuit with the largest voltage drop.

DMET_VoltageDrop_MaxCircuit_ConductorWireSizeOnly: The size of the conductor wires of the branch circuit with the largest voltage drop.

DMET_VoltageDrop_MaxCircuit_Length_ft: The length of the branch circuit with the largest voltage drop in feet.

DMET_VoltageDrop_MaxCircuit_Length_m: The length of the branch circuit with the largest voltage drop in meters.

DMET_VoltageDrop_MaxCircuit_NoWarnings: The largest voltage drop on all of the branch circuits on the distribution equipment.

DMET_VoltageDrop_MaxCircuit_Number: The circuit number of the branch circuit with the largest voltage drop.

DMET_VoltageDrop_MaxCircuit_WireCallout: The callout of the branch circuit with the largest voltage drop. The callout lists the conduit size and all of the wire sizes, separated by a comma and space.

DMET_VoltageDrop_MaxCircuit_WireCalloutCompact: The callout of the branch circuit with the largest voltage drop. The callout lists the conduit size and all of the wire sizes, separated by a comma.

DMET_VoltageDrop_Total: The total voltage drop from the utility to the branch circuit devices. It is calculated as the sum of the largest branch circuit voltage drop and the larger of the two feeder voltage drops. A warning is displayed if this value exceeds 5%.

DMET_VoltageDrop_Total_NoWarnings: The total voltage drop from the utility to the branch circuit devices. It is calculated as the sum of the largest branch circuit voltage drop and the larger of the two feeder voltage drops.

DMET_VoltageDrop_Transformer: The voltage drop through the transformer if the distribution equipment is a transformer.

Technical Support

Technical support is available by phone, email, or live chat on our website. We are available Monday through Friday, 9am to 5pm Eastern time.

Limited support by email is available evenings, weekends, and holidays.

Email: support@designmaster.biz

Phone: 1-866-516-9497 x2

Live Chat: http://www.designmaster.biz/chat/

System Requirements

To run the latest version of Design Master Electrical RT, you need:

A computer capable of running Autodesk Revit 2020 or later.

Autodesk Revit 2020 or later, including:

- Autodesk Revit 2024
- Autodesk Revit 2023
- Autodesk Revit 2022
- Autodesk Revit 2021
- Autodesk Revit 2020

The following versions of Revit are supported by older releases, indicated in parentheses:

- Autodesk Revit 2019 (version 2.0.5)
- Autodesk Revit 2018 (version 2.0.5)
- Autodesk Revit 2017 (version 1.4.11)
- Autodesk Revit 2016 (version 1.4.11)
- Autodesk Revit MEP 2015 (version 1.4.11)
- Autodesk Revit MEP 2014 (version 1.4.11)

Older versions of Revit are not supported.

Legacy User Manuals

Use the links below to access user manuals for older versions of Design Master Electrical RT:

- **Version 1.4**
- **Version 2.0**

Purchasing

Pricing information and purchase links are available on our website.