

MCS™ Star Configuration Software – Tutorial

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 TEMPERATURE RISE
 CALCULATION SOFTWARE
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 WORK COMMUNICATION
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 ADVANCED MOTOR PROTECTION
 ELECTRONIC MOTOR PROTECTION
 DISCRIMINATION
 CERTIFICATION & APPROVALS
 SCREWLESS TERMINATIONS
 SWITCH GEAR
 UL 489
 CONTROL GEAR
 FUSELESS PROTECTION
 SHORT CIRCUIT CURRENT RATINGS
 LOW VOLTAGE SWITCHING
 INTELLIGENT MOTOR
 BRANCH CIRCUIT

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The following tutorial requires that you have the MCS Star Configuration Software installed on your computer. If you do not have it installed, you can install it from the “Line-to-Load” DVD.

Go to:

Learning Modules > MCS Star Configuration Software > and click on Download MCS Star > Follow the prompts to complete the install.

Open MCS Star by double clicking on the short cut from your desktop or by going to the following: Start Menu > Programs > Rockwell Automation > MCS Star

When you run MCS Star and are connected to the Internet, select “Yes” in the first popup window. This will check for updates to the software and prompt you to run Current Program Updater if any updates are available.

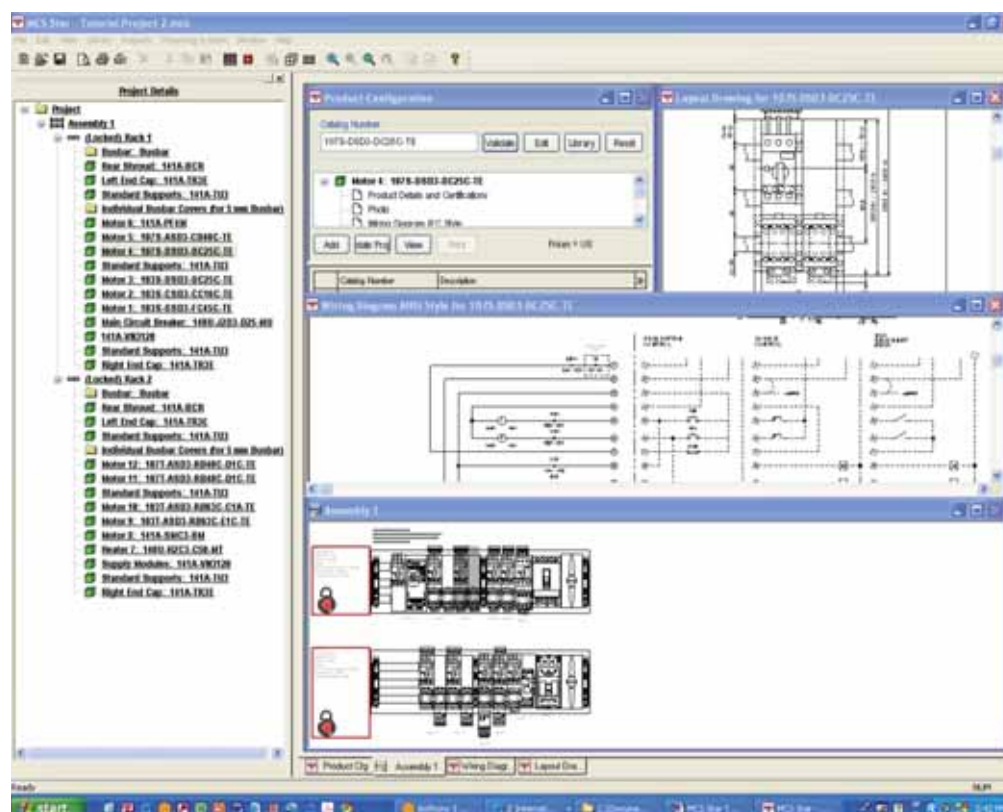
In the next popup window, **select “Configure a Busbar Assembly”;**
then select [OK] button.



Designing a Mounting System Solution

Introduction

MCS Star is a powerful product selection and system planning software as well as a graphical design tool. It allows the user to configure a multitude of starter and loadfeeder variations and then visually represents the configuration on the graphical interface. The software can help design systems compliant with UL/CSA or IEC standards. It also calculates wire sizing, support spacing and dimensional restrictions. Once the layout is completed, it can easily be exported to the user's CAD system. In addition, MCS Star can generate wiring diagrams, dimension drawings and bills of material.



MCS Star Tutorial

With MCS Star, there are certain planning steps required before using the software. The user must first gather information about the assembly they will be creating. Things such as:

- Identifying system parameters and loads
- Determining if the assembly will be busbar mount or panel mount
- Estimating the total current and dimensional restrictions
- Considering the layout of the rack(s)
- Determine what electrical standards must be met

Step 1: Identify System Loads and Parameters

Below is the list of motors and loads that will be used in our tutorial. We need to configure a horizontally mounted busbar assembly for a line voltage of 480V 60 Hz, control voltage 120V 60 Hz, designed per UL standards, in a 900 mm wide cabinet and have a short-circuit current rating (SCCR) of 5 kA. The 12 loads are as follows:

Motor 1	DOL	30.0 Hp	40.0 A
Motor 2	DOL	10.0 Hp	14.0 A
Motor 3	DOL	15.0 Hp	21.0 A
Motor 4	Reversing	15.0 Hp	21.0 A
Motor 5	Reversing	1.5 Hp	3.0 A
Motor 6	Drive	0.5 Hp	1.1 A
Resistive 7	Circuit Breaker	–	40.0 A
Motor 8	Soft Starter	10.0 Hp	14.0 A
Motor 9	DOL w/E1+ OLR	3.0 Hp	4.8 A
Motor 10	DOL w/E3 OLR	3.0 Hp	4.8 A
Motor 11	Reversing w/E1+ OLR	2.0 Hp	3.4 A
Motor 12	Reversing w/E1+ OLR	2.0 Hp	3.4 A
Estimated Total Ampacity:			170.5 A

In North America, busbar should be sized at 125% of the FLA of the largest motor + the sum of all other motor FLAs + 125% of all non-motor loads. Based upon the loads above, the busbar needs to be rated at least 190.5 A. Let's use the 20x5 busbar rated 320 A.

We also need to decide how we will feed power to the racks, as well as protect them. If we choose a circuit breaker to do both jobs, it will save us time and space. Circuit breakers in North America should be sized at least 125% of the total load and up to 250% of the load. Let's choose a 250 A circuit breaker for this application.

We now have enough information to design a system using MCS Star.

To save your design, click on the File Menu > Save Project. If you have not saved the project previously, you will be presented with a standard windows save dialog where you can browse to a folder, specify a filename and save your project.

Saving this project will allow you to download the project output to Rockwell Automation Temperature Rise Calculation Software (TRCS).

Be sure to save your project often to ensure that configuration work is not lost.

Step 2: Enter System Information

In the appearing configurator window, select the busbar system parameters. Here you specify the electrical standards, the units of measure you prefer to use, supply voltage and SCCR requirements. **Enter the “System Information”** per the following example.

SYSTEM INFORMATION	
Please Note:	Note: All selections under the SYSTEM INFORMATION section will be required for all items (including starters) that are to be mounted on the system. You will not be able to edit these selections once you have begun to create the system.
Electrical Standards	UL Standards 508A compliant
Units of Measure	Millimeters
Supply Voltage	480V 60Hz
Max. Available Fault Current (rms of system)	5 kA
Max. Prospective Short-Circuit Current (Ipk - Peak let through current of protective device)	5.5A
Mounting Type	Busbar
RACK DATA	
Orientation	Horizontal

MESSAGES

Step 3: Enter Rack Data

As you scroll down the left hand side of the window, you can now enter the rack data. This is where you enter the rack orientation, the busbar length and size, and support information. Some items will automatically be completed, based upon previous selections. **Enter “Rack Data”** per the following example.

RACK DATA	
Orientation	Horizontal
Rack Length	800 Millimeters
Busbar Size	20 x 5 mm (320 Amps) (Sizing see User's Guide)
Maximum Support Spacing	600 mm (23.62 inches) @ 5 kA (Ipk)
Busbar Supports	3 Pole 3 line phases only
Space Between Racks (Wiring Channel)	120 Millimeters
Is a Rear Busbar Shroud Required?	Yes UL: According UL 508A, insulation against mounting plate must be provided

SUPPLY DATA

Step 4: Enter Supply Data

Finally, you will enter the supply information such as supply type, position and terminal size.
Enter “Supply Data” per the following example. Then **select the [Accept] button**.

SUPPLY DATA	
Supply Type	Rack Circuit Breaker (140U MCCB) <i>Not capable of supplying power through to subsequent racks. (This will default the Max. Prospective Short-Circuit Current (I_{pk}) to the peak let through current of the selected Circuit Breaker.)</i>
Supply Module Position	Right
Do you want to feed power through to the next rack?	No

You will now configure the feeder circuit breaker.
Enter the “Circuit Breaker Data” per the following example.

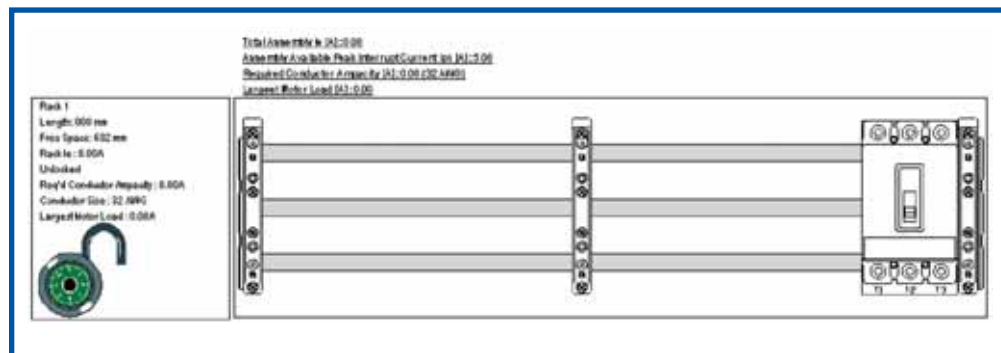
System Data		Rating / Frame Size
Supply Voltage	480V 60Hz	250A, J-Frame
Maximum Available Fault Current (at the Breaker)	5 kA	
Circuit Breaker Data		
Is a Current Limiting Circuit Breaker Required?	No, a Current Limiting Circuit Breaker is Not Required	
Pole Configuration	3 Poles	
Interrupt Rating [kA]	25 kA	
Protection	T/M - Fixed Thermal / Adjustable Magnetic <i>Available with:</i> - 250A J-Frame - 400A K-Frame - 600A Q-Frame - 600A L-Frame - 800A M-Frame	
Rated Current (A)	250	
Motor Current	190.5 A	
Rating / Frame Size	250A, J-Frame	
Manufacturing		

You will also need lugs on the line side of the circuit breaker for the incoming power.
Enter the “Terminal Lug Data” per the following example. Then **select the [Accept] button**.

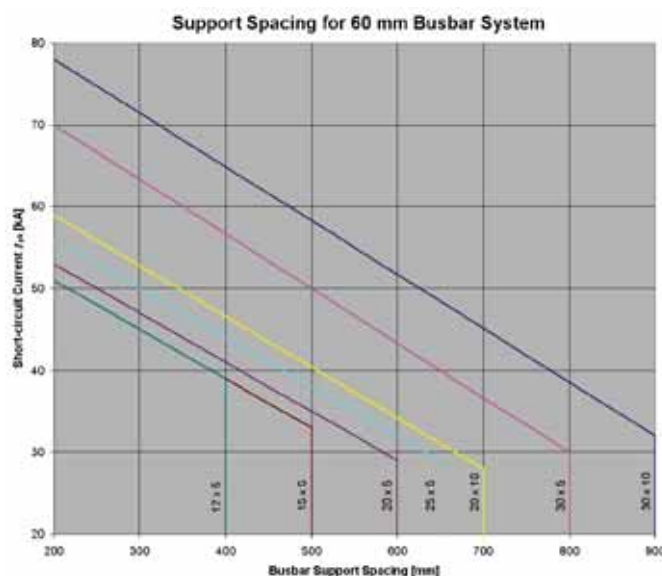
Terminal Lug Data	
Important Information!	Terminal Lugs are not Factory Installed. See below to order.
Terminal Lugs	(3) J-Frame, Stainless Steel Box Lug (Pkg. Qty. 1) - Copper wire only - (1) 4/0...350 MCM
Mounting Data	
Busbar Mounting (Only for Use with 141A Mounting System)	Standard Bus Bar Mount, Universal

Step 4: Enter Supply Data (continued)

You will now see a graphical representation of the busbar rack. MCS Star adds additional busbar supports if the rack length exceeds the allowable support spacing. This is based upon the SCCR requirements and the size of the busbar. You will also notice that a bill of material is being created on the left hand side of the window for all the components required to assemble the system.



Note: The center support was added because of the mechanical strength of the busbar. It is based upon the graph below.



The force between conductors is proportional to the square of the instantaneous current. In case of a short circuit, which is protected by a short-circuit protective device (SCPD), the maximum force occurs at the peak let-through current of the protective SCPD (circuit breaker or fuse). The higher the forces during a short-circuit are, the narrower the spacing between busbar supports needs to be. Observe that the peak value of the s-c current is plotted on the y-axis. The maximum support distances for smaller cross-section conductors are given by pure mechanical considerations, i.e. static loads and plugging forces.

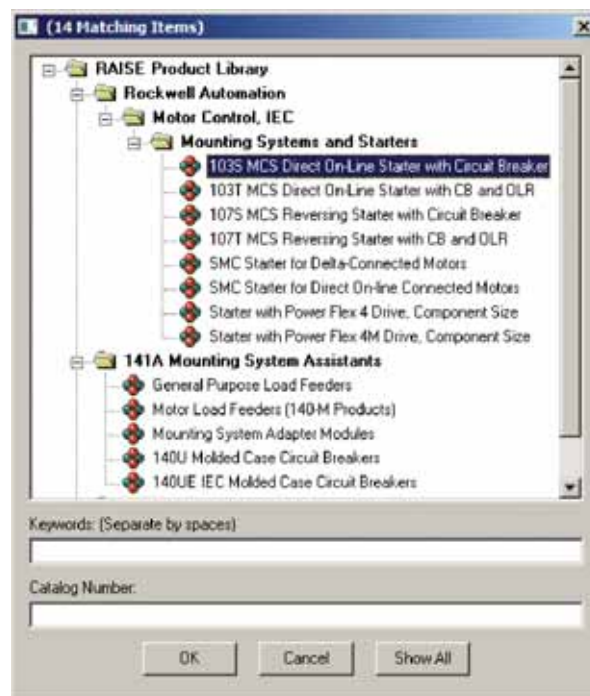
Step 5: Configuring Two Component Starters

The next step is to configure two component starters.

First, **select the [Product Library] button** in the main tool bar.



In the Product Library window, **select the desired starter type**. Since Motor 1 requires a DOL starter with no special overload requirements, you can **select the Bulletin 103S** and **select the [OK] button**.



You will notice that some parameters may be pre-loaded. The supply voltage is inherited from the busbar rack parameters. To save time, most other parameters are inherited from previous configurations. It is usually good practice to place the largest loads closest to the incoming feed. It will reduce the overall heating affect on the busbars.

Step 6: Enter Starter Parameters

Here you will enter the control voltage, the type of short-circuit coordination required, the SCCR required, horsepower or motor FLA, the starter style and the type of mounting module desired. Let's choose a Type F starter which will also require the Type E spacing adapter. The starter will be mounted on the MCS Iso busbar module.

Enter the “Starter Parameters” for Motor 1 per the following example.

103S MCS Direct On-Line Starter with Circuit Breaker
Product Configuration Assistant

Enter the order code for the desired 103S MCS Direct On-Line Starter with Circuit Breaker:

103S-CSD3-FC45C-TE

OR, make the selections for the product that you need using the interactive selection chart

Accept Validate Cancel Reset Undo Back

SYSTEM VOLTAGE DATA

Supply Voltage 400V 60Hz
Control Voltage 120V 60Hz

GENERAL STARTER DATA

Short Circuit Coordination Type F
Manual, Self-Protected Starter and Contactor Combination

Rated Conditional Short-circuit Current (kA) 6 kA

Horsepower 30 HP

Motor Current 40 A

Motor Current Information Please Note:
The motor current is the default value taken from MCC Table 430-152. A different motor current may require another starter size. You may override motor current with the exact value if available.

Starter Type 103S - MCS Direct On-Line Starter with Circuit Breaker

Style MCS Iso Busbar System
Isolated busbar system. When removing / disconnecting a starter, the busbars remain energized. Plug-in connector for control circuits included.

Style

☒ MCS Iso Busbar System
Isolated busbar system. When removing / disconnecting a starter, the busbars remain energized. Plug-in connector for control circuits included.

☐ MCS Standard Busbar System
Module to plug onto busbars. Plug-in connector for control circuits optional.

MESSAGES

Scrolling down the window, you can now enter the parameters for the contactor, circuit breaker, factory installed options and separate accessories.

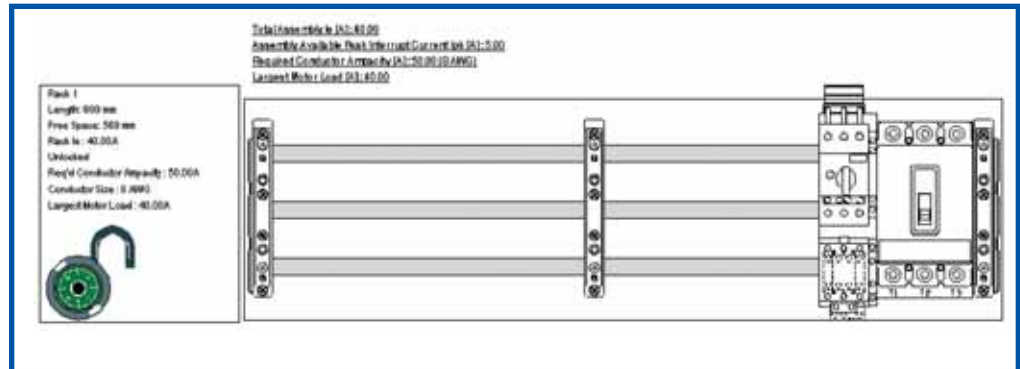
Enter the “Control Circuit Data, Circuit Breaker Data and Options” per the following example. When completed, **select the [Accept] button.**

CONTROL CIRCUIT DATA	
Contactor Size	100-C43 <i>Contactor oversizing will increase the electrical lifetime. In some cases, the rated conditional S.C. current may be higher than indicated.</i>
Coil Voltage	120V 60Hz
Auxiliary Contacts	1 N.O., 1 N.C.
CIRCUIT BREAKER DATA	
Frame Size	140M-F8E (F-Frame), High Break Plus Standard Magnetic Trip (13 x 1e) (Current Ranges 6.3...45A) Overload Protection (Trip Class 10)
Thermal Current Range (A)	32 - 45 A
Auxiliary Contacts	Internal Auxiliary Contact 1 N.O. + 1 N.C.
Side Mount Aux. or Trip Contacts	No Side Mount Aux. or Trip Contacts
OPTIONS	
Optional Selections	<ul style="list-style-type: none"> UL508 Type E Spacing Module <i>The spacing module is also required by UL508A for feeder circuit applications</i> 

Step 6: Enter Starter Parameters

(continued)

Once you select the [**Accept**] button below the catalog number, the starter drawing will be added to the rack in the graphical interface, as well as the product detail in the bill of material.



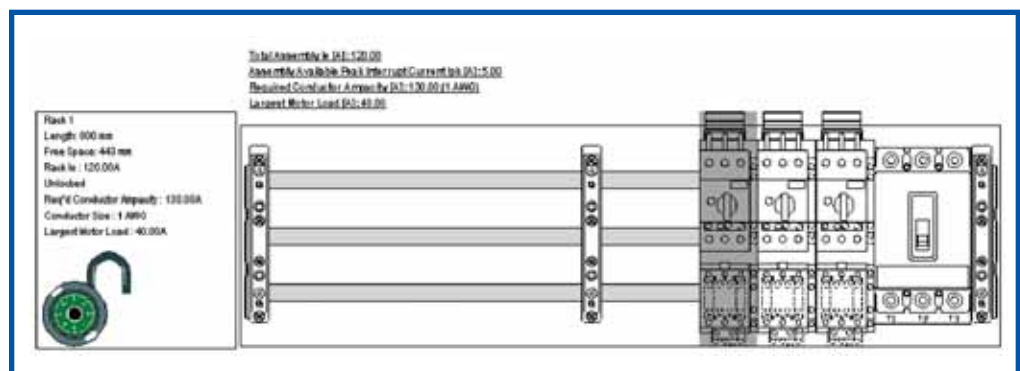
You could configure the next starter by repeating the same steps for Motor 2. Since this is a DOL starter, you would choose Bulletin 103S from the Product Library. After entering all the starter parameters for Motor 2, **select the [Accept] button**. The starter is then added to the rack and BOM.

However, a faster method would be to “copy” the starter configuration you just created and edit the starter parameters

Step 7: Copying Components

Since all the parameters for the next two starters (Motors 2 & 3) are very similar, you can copy the starter for Motor 1 and edit the horsepower requirements. To copy a starter:

- Click on the starter with the mouse cursor
- Press and hold the “Control” key and the left mouse button simultaneously
- Drag and drop the copy of the starter to the left
- Repeat this sequence one more time for Motor 3

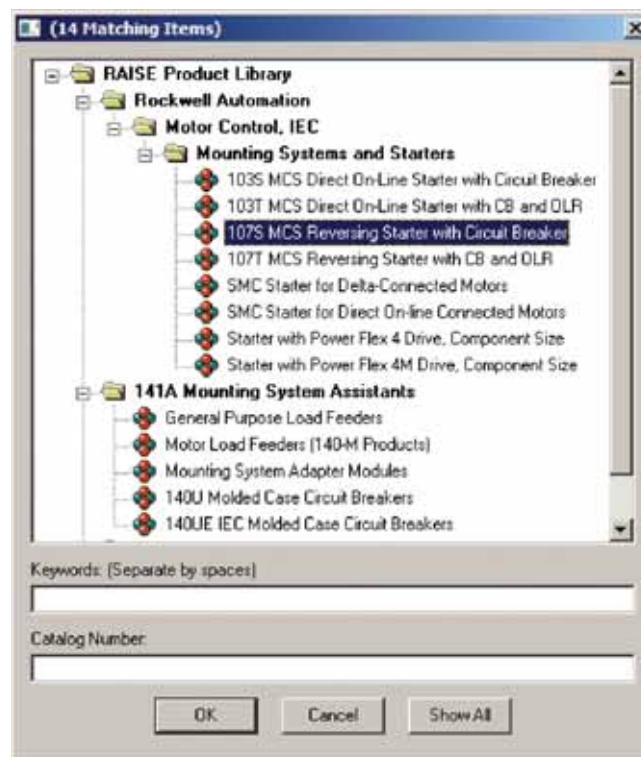


Step 8: Editing Component Attributes

You can now edit the parameters of the copied starters to match the loads for Motors 2 and 3.
To edit the starters:

- **Right-click on the starter for Motor 2 to show the popup menu**
- **Select “Edit” to open the configurator window or just double click on the starter you wish to edit**
- **Adjust the contactor Hp rating and Frame Size of the circuit breaker according the load list**
 - Horsepower = 10 Hp, Frame Size = 140M-C2E (C-Frame)
- **Select the “Accept” button**
- **Repeat this sequence for the Motor 3 starter**
 - Horsepower = 15 Hp, Frame Size = 140M-D8E (D-Frame)

For Motors 4 & 5, the application requires reversing starters. **Repeat the process you used for Motor 1, except configure Bul. 107S reversing starters, beginning with Step 5.**



Step 8: Editing Component Attributes

(continued)

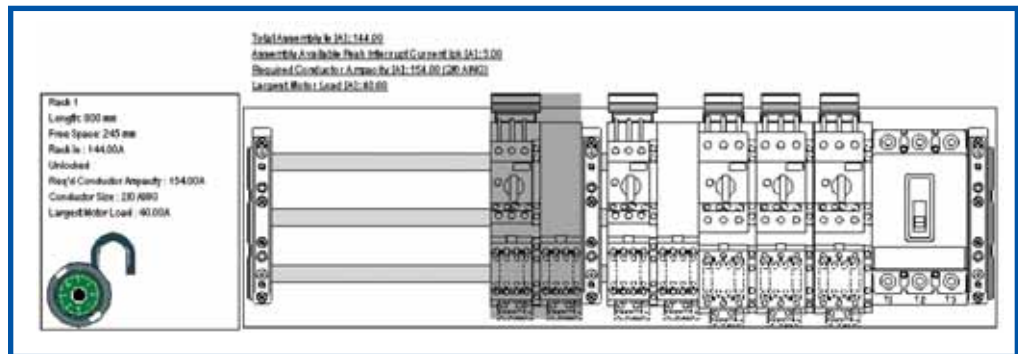
Configurator selections for Motor 4:

- **Rated Conditional Short-circuit Current (I_q) = 5 kA**
- **Horsepower = 5 Hp**
- **Starter Type = 107S**
- **Press Accept**

Once you configure the first reversing starter, you can copy it and adjust the Hp requirements as you did for Motor 2.

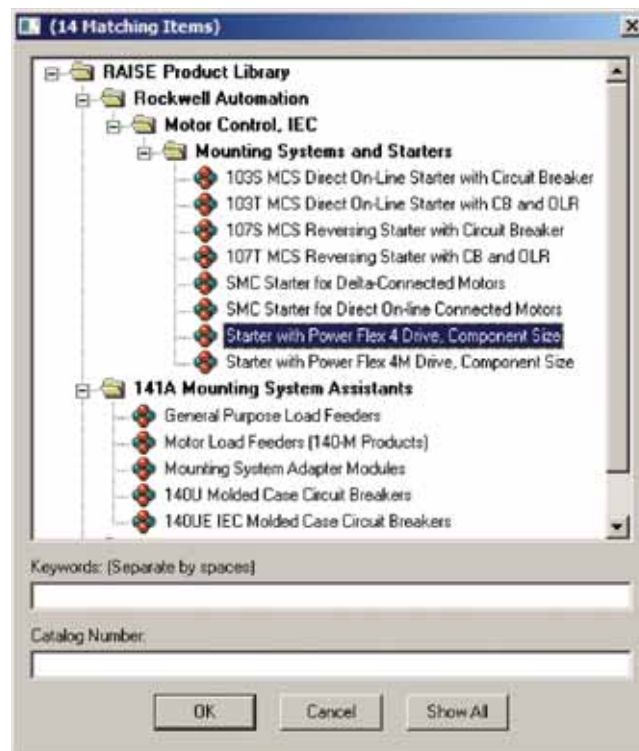
Configurator selections for Motor 5:

- **Horsepower = 1.5 Hp**
- **Press Accept**



Step 9: Configuring a Drive

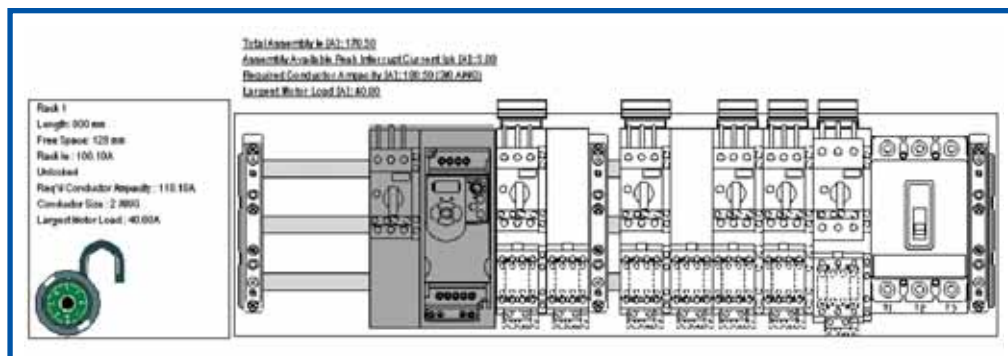
Select the [**Product Library**] icon in the main tool bar as you did in Step 5.
Select “**Starter with PowerFlex 4 Drive**” and select the [**OK**] button.



(continued)

following example. Then **select the [Accept] button.**

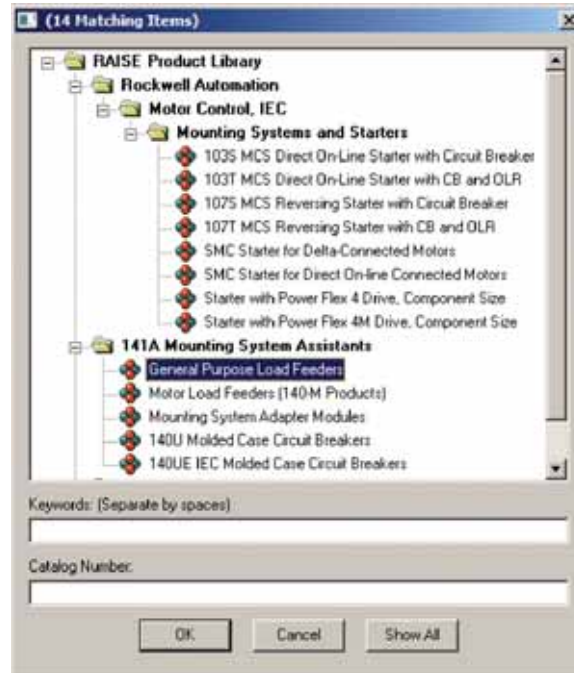
GENERAL STARTER DATA	
Horsepower	1/2 HP
Motor Current	1.1 A
Motor Current Information	<p>Please Note:</p> <p><i>The motor current is the default value taken from NEC Table 430-150. A different motor current may require another starter size. You may overwrite motor current with the exact value if available.</i></p>
PowerFlex 4 DATA	
Input Voltage	380...480V AC, 3-Phase
Output Current	1.4 Amps
Human Interface Module (Type)	LED Display, Fixed Digital Keypad
Internal EMC Filtering	No CE Compliant Filter
Communication Module	RS485
SCPD DATA	
SCPType	Fuseless
Frame Size	140M-C2E (C-Frame), High Break
Thermal Current Range (A)	1.6 - 2.5 A



Since we know the remaining starters will not fit on the existing busbar rack, we will need to add another rack to the assembly. Before we do this, we will need to add a supply module to the first rack in order to distribute power to the second.

Step 9: Configuring a Drive (continued)

Click on the [Product Library] icon. Select “General Purpose Load Feeders” and select the [OK] button.



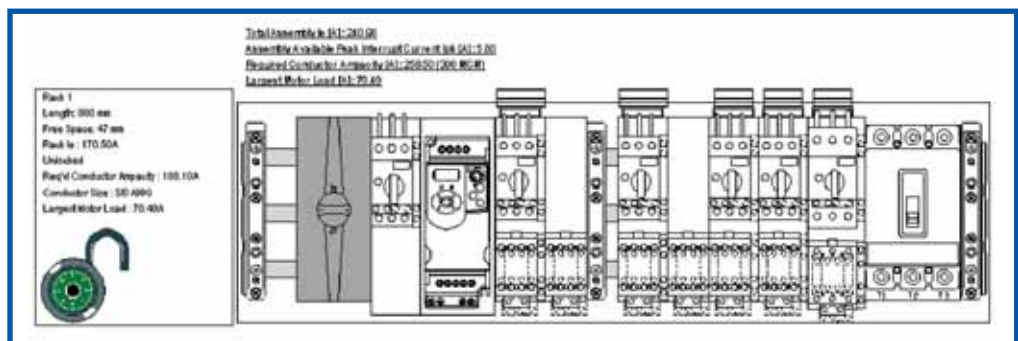
Since we know that the FLA of the remaining loads is 70.4 A, we can enter this in the Load FLA section, then choose the “Supply Module” as the supply type.

Enter the “Supply Module” data per the following example. Then select the [Accept] button.

141A MCS Mounting System Supply Module Assistant Product Configuration Assistant

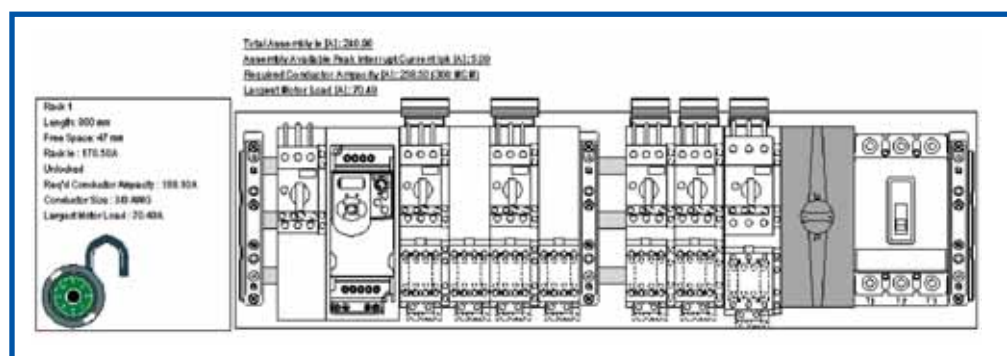
**Rockwell
Automation**

LOAD SPECIFICATIONS		Terminal Size
Type of Load	General Purpose Load	<input type="checkbox"/> 6...50 mm ² (10...14 AWG) (508A Compliant)
Supply Voltage	480V 60Hz	<input checked="" type="checkbox"/> 35...120 mm ² (2 AWG...250 MCM) (508A Compliant)
Phases	3 Phase	<input type="checkbox"/> 95...185 mm ² (4/0 AWG...350 MCM)
LOAD DETAILS		<input type="checkbox"/> 150...300 mm ² (300...500 MCM)
Load ID	- NO VALUE	<input type="checkbox"/> 120...300 mm ² (250...600 MCM) (508A Compliant)
Load FLA (Nameplate Value)	71 Amps	<input type="checkbox"/> Flat Conductors 12 x 5...30 x 10 mm
LOAD SUPPLY DATA		<input type="checkbox"/> Flat Conductors 32 x 20 mm (508A Compliant)
Supply Type	Supply Module 3-phase module	
Terminal Size	35...120 mm ² (2 AWG...250 MCM) (508A Compliant)	
Busbar Width	for 5 and 10 mm busbars (and TT)	

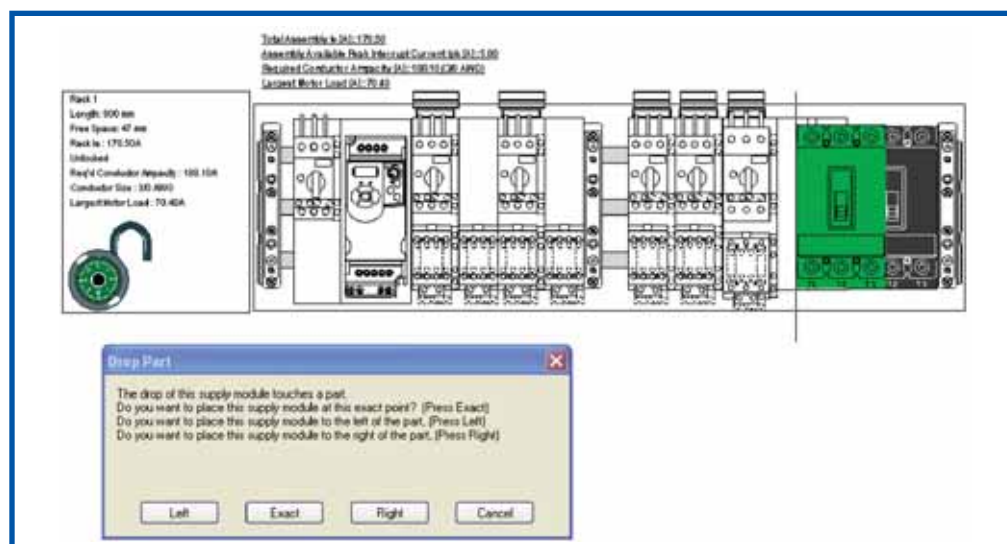


Step 10: Moving Components

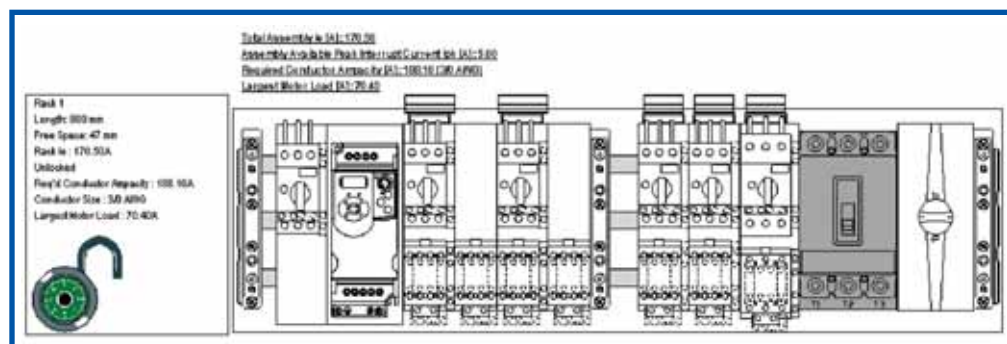
Sometimes you will need to move components around on the busbar rack to make the most efficient use of space. Let's move the supply module to the far right-hand side of the rack. To move a component, **press and hold the left mouse button on the object to be moved.** **Then, simply drag it to the desired position and let go of the button.** You will notice that the program only allows the supply module to be positioned to the left of the main circuit breaker. Also, the center support moved to the right to maintain the proper support spacing.



However, the software will allow the main circuit breaker to be moved. Move the circuit breaker to the left so it is touching (overlapping) the supply module. The program will ask if you want the circuit breaker to be positioned to the left or right side of the object it is touching.

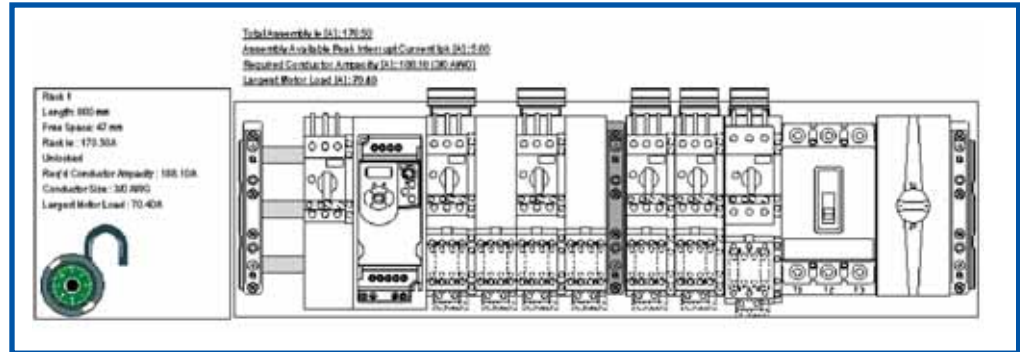


Since we want the circuit breaker on the left side of the supply module, you would **choose the [Left] button.** It will then position the circuit breaker automatically.



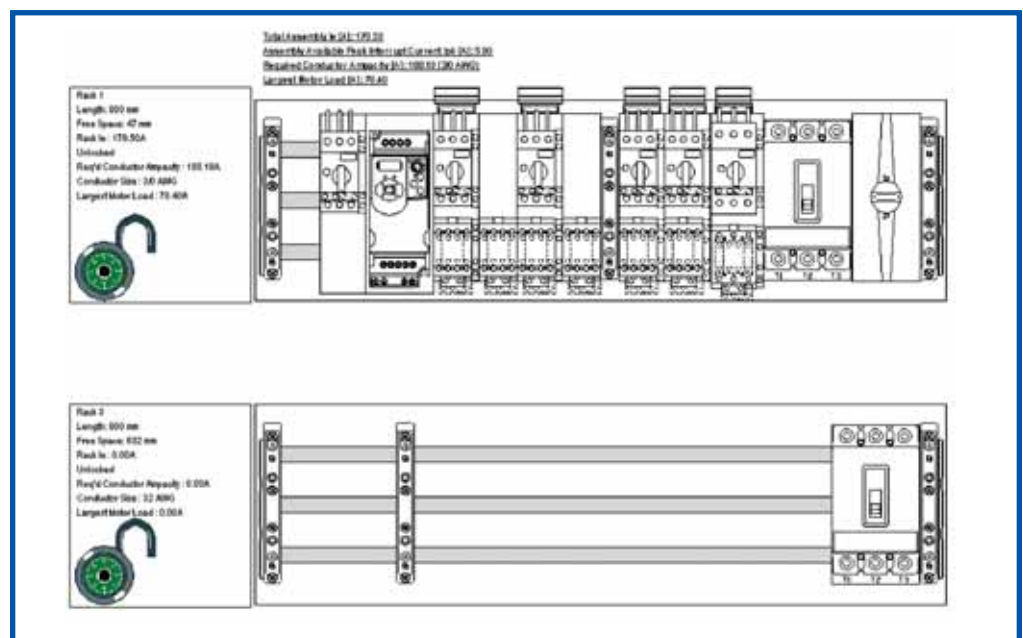
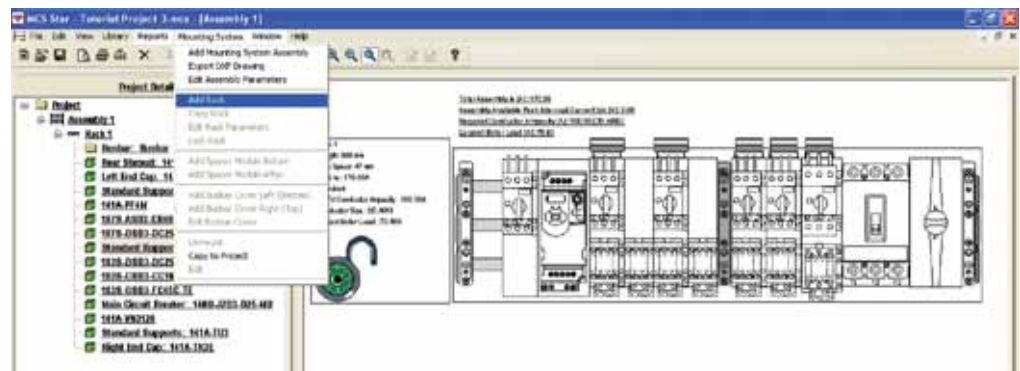
Step 10: Moving Components (continued)

Now let's tighten up the spacing by moving the middle busbar support to the right, up against the motor starter 3. Notice the other components will move to the right along with it.



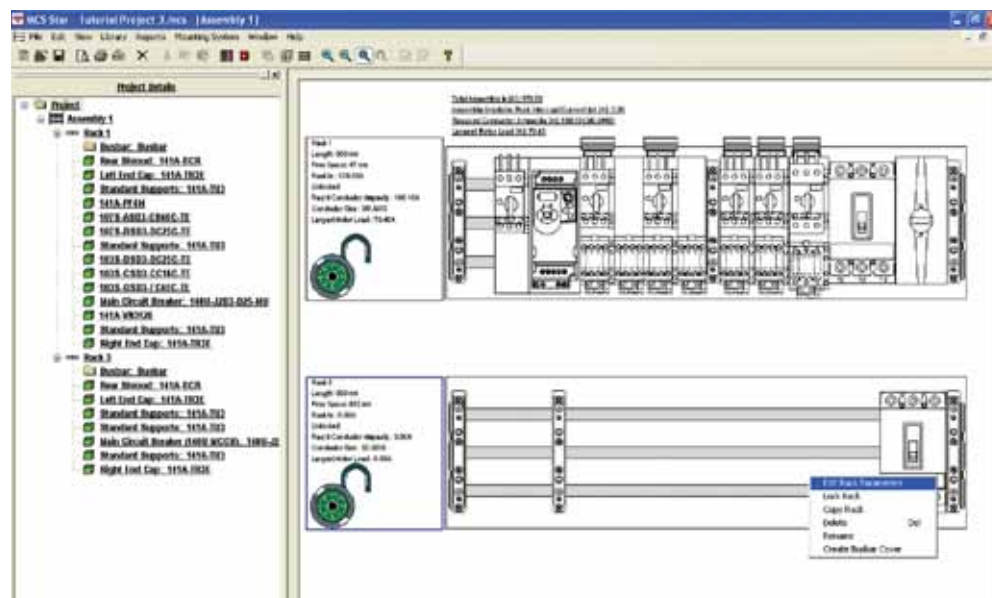
Step 11: Adding Additional Racks

Now we need to add the second rack. This can be done by **clicking on “Mounting System”** in the main tool bar and then **selecting “Add Rack”**. Note: You will notice that the new rack will contain the Main Circuit Breaker as the supply type, as was used when you created the first rack.



Step 12: Changing Supply Type

The additional rack will be identical to the first one we set up. Since the main circuit breaker was sized for all the loads, we can feed the second rack with a supply module. To change the supply type in the second rack, **right mouse click somewhere on the second rack**. You will see a drop down menu. **Click on “Edit Rack Parameters”**.

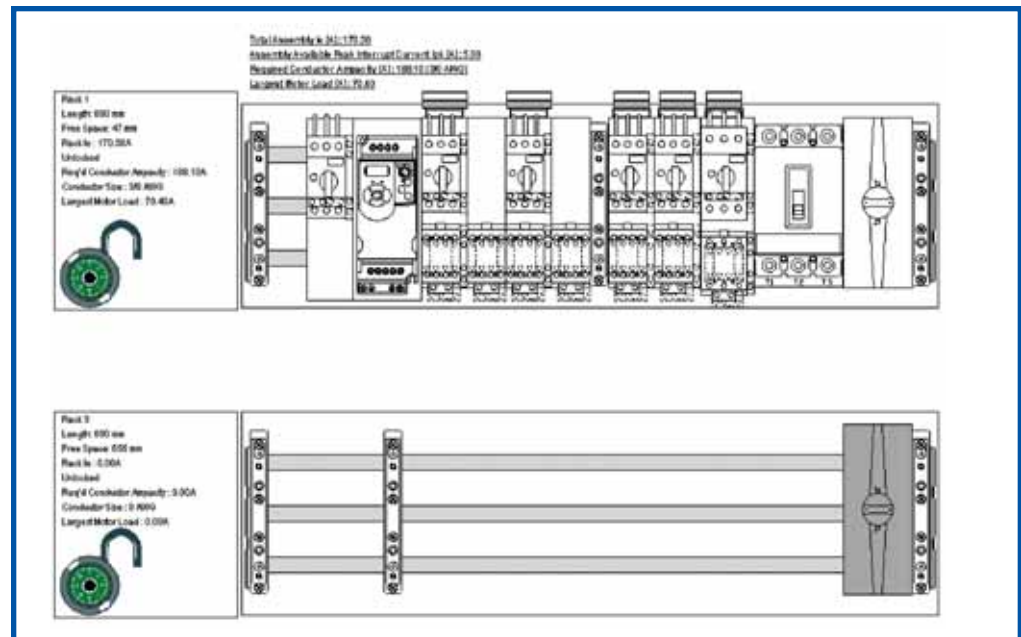


You can then change the supply type to a “supply module”.

Enter the “Supply Data” per the following example. Then **select the [Accept] button**.

RACK DATA	
Rack Length	800 Millimeters
Busbar Length	0.8 meters
Is a Rear Busbar Shroud Required?	Yes <i>UL: According UL 508A, insulation against mounting plate must be provided</i>
SUPPLY DATA	
Supply Type	Supply Module <i>3-phase module</i>
Terminal Size	35...120 mm² (2...4/0 AWG) (508A Compliant)
Supply Module Position	Right
Do you want to feed power through to the next rack?	No

Step 12: Changing Supply Type (continued)

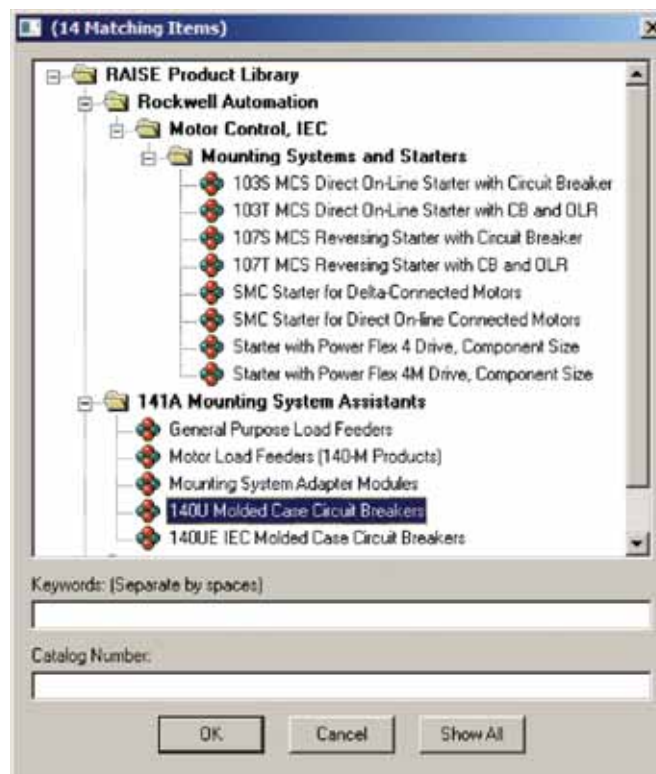


We can now add the rest of the components to the second rack.

Step 13: Adding a Circuit Breaker

For the Resistive Load 7, we can add the circuit breaker in the same way we added the supply module to the first rack.

Click on the [[Product Library](#)] icon again. Select “140U Molded Case Circuit Breakers” and select the [OK] button.



Step 13: Adding a Circuit Breaker

(continued)

You will now have to configure the circuit breaker.

Enter the “140U Molded Case Circuit Breaker” data per the following example. Then select the [Accept] button.

Product Configurator - Powered by RAISE...

140U Molded Case Circuit Breakers

Product Configuration Assistant

Enter the order code for the desired 140U Molded Case Circuit Breakers...

140U-H2C3-CS0-MT

OR, make the selections for the product that you need using the interactive selection chart.

Accept Validate Cancel Reset Make Help

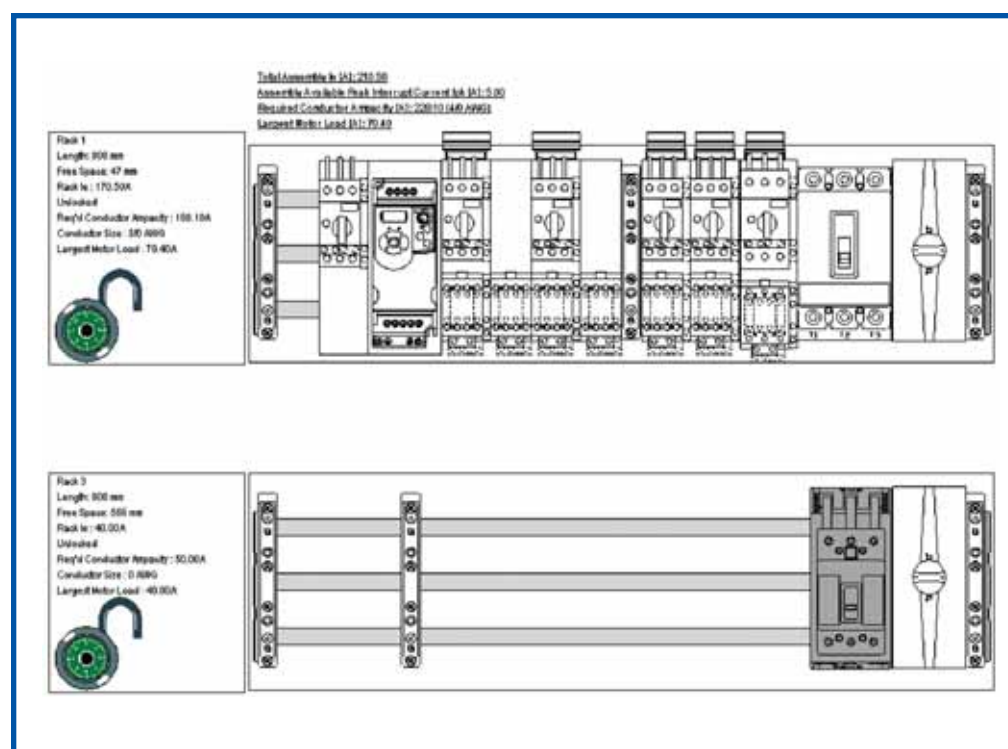
Representative Photo Only



System Data	
Supply Voltage	480V 60Hz
Maximum Available Fault Current (at the Breaker)	5 kA

Circuit Breaker Data	
Is a Current Limiting Circuit Breaker Required?	No, a Current Limiting Circuit Breaker is Not Required
Pole Configuration	3 Poles
Interrupt Rating [kA]	25 kA
Protection	T/M - Fixed Thermal / Fixed Magnetic Available with: - 100A G-Frame - 125A H-Frame
Rated Current (A)	50
Motor Current	40 A
Rating / Frame Size	125A, H-Frame

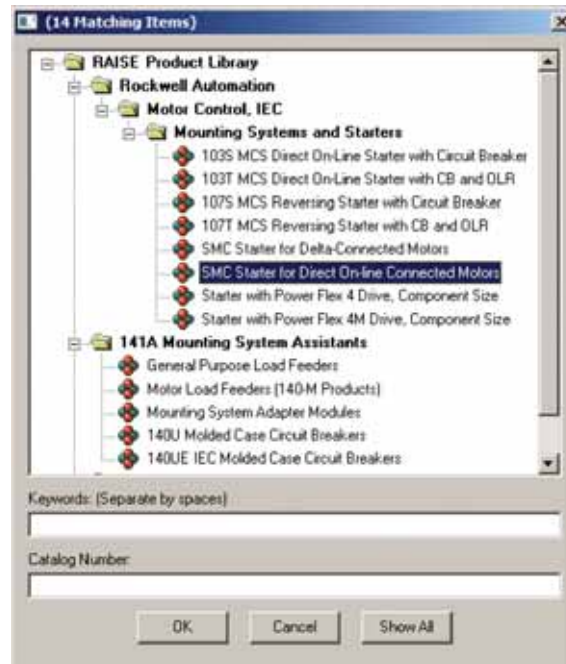
Protection	
<input checked="" type="checkbox"/> T/M - Fixed Thermal / Fixed Magnetic	Available with: - 100A G-Frame - 125A H-Frame
<input type="checkbox"/> T/M - Fixed Thermal / Adjustable Magnetic	Available with: - 250A J-Frame - 400A K-Frame - 600A Q-Frame - 600A L-Frame - 800A M-Frame
<input type="checkbox"/> Electronic LS - Long & Short Time	Available with: - 250A J-Frame - 400A K-Frame - 600A L-Frame - 600A Q-Frame - 800A M-Frame - 1200A N-Frame - 2500A R-Frame



Step 14: Configuring a Soft-Starter

Now we need to add the SMC-3 to the busbar assembly. Repeat the process you used for Motor 1, except we need to configure a SMC Starter with the following steps.

Click on the [Product Library] icon. Select “SMC Starter for Direct On-line Connected Motors” and select the [OK] button.



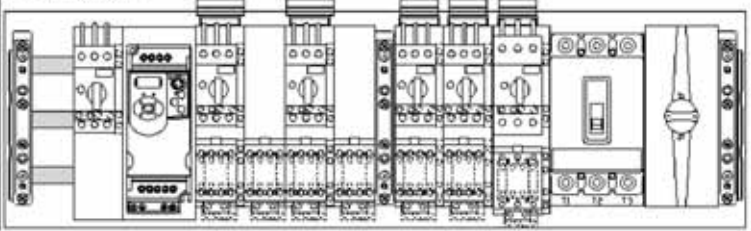
Enter the “SMC Starter” data for Motor 8 per the following example. Then select the [Accept] button.

SYSTEM VOLTAGE DATA	
Electrical Standards	UL Standards 508A compliant
Motor Voltage	480V 60Hz
GENERAL STARTER DATA	
Horsepower	10 HP
Motor Current	14 A
Motor Current Information	Please Note: The motor current is the default value taken from NEC Table 430-150. A different motor current may require another starter size. You may override motor current with the exact value if available.
SMC-3 DATA	
Current Rating	16A 5.3 - 16A
Control Voltage	100...240V AC
SCPD DATA	
SCPDType	Fuseless
Frame Size	140M-08E (D-Frame), High Break Plus
Thermal Current Range (A)	14.5 - 20 A
ISOLATING CONTACTOR DATA	
Isolating Contactor	With Isolating Contactor
Contactor Size	100-C16
Coil Voltage	120V 60Hz
LAYOUT DATA	
Layout	Standard

(continued)



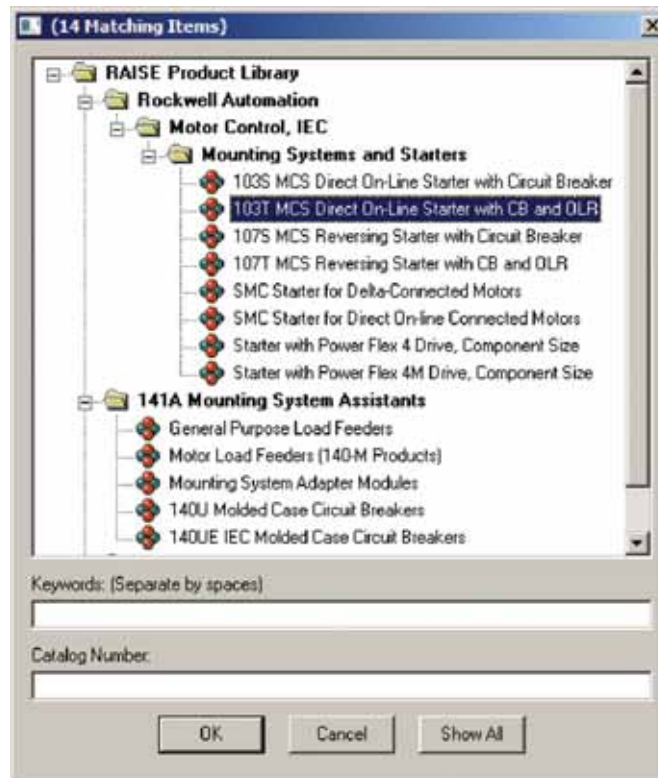
Total Assembly is 141:228.59
Assembly Available Peak Interrupt Current is 141:1.00
Required Conductor Area for 141:242.18/250 MCM
Largest Motor Load 141:70.80



All that's left is to add the remaining 4 Three Component Starters. Because more advanced overload protection is required for these motors, we need to select the 103T and 107T, Three Component Starters.

Step 15: Configuring Three Component Starters

As before, [click on the \[Product Library \] icon](#) and from the window select 103T starters and select the [\[OK \] button](#).



Step 15: Configuring Three Component Starters (continued)

Because we need more information about the overload protection, we need to fill in the type of overload required. Let's fill in all of the parameters and choose the 193-EE.

Enter the "103T Starter" data for Motor 9 per the following example.
Then select the [Accept] button.

Product Configurator - Powered by RAISE...


103T MCS Direct On-Line Starter with CB and OLR Product Configuration Assistant

Enter the order code for the desired 103T MCS Direct On-Line Starter with CB and OLR...

103T-ASD3-RB63C-E1C-TE

OR, make the selections for the product that you need using the interactive selection chart.

Accept Cancel Reset Undo



Representative Photo Only


SYSTEM VOLTAGE DATA		Full Load Current Range (A)
Supply Voltage	480V 60Hz	Ⓐ 1.0 - 5.0A (3 Phase)
Control Voltage	120V 60Hz	Ⓒ 3.2 - 16A (3 Phase)

GENERAL STARTER DATA	
OLR Trip Class	Trip Class 10 Starting Time <= 10 seconds
Short Circuit Coordination	Type 1 In case of a short-circuit, damage requiring the exchange of components or the entire starter is permissible
Rated Conditional Short-circuit Current (I _{sc})	5 kA
Horsepower	3 HP
Motor Current	4.8 A
Motor Current Information	Please Note: The motor current is the default value taken from IEC Table 430-150. A different motor current may require another starter size. You may override motor current with the exact value if available.
Style	MCS Iso Busbar System Isolated busbar System. When removing / disconnecting a starter, the busbars remain covered. Plug-in connector for control circuits included.

CONTROL CIRCUIT DATA	
Contactor Size	100 C09 Contactor oversizing will increase the electrical lifetime. In some cases, the rated conditional S.C. current may be higher than indicated.
Coil Voltage	120V 60Hz
Auxiliary Contacts	1 N.O. 1 N.C.

CIRCUIT BREAKER DATA	
Frame Size	140M-D8N (D-Frame), High Break Plus Magnetic Only Trip (13 x Ie) (Trip Current 1.6 - 25A) No Overload Protection
Rated Operational Current (A)	6.3 A
Auxiliary Contacts	Internal Auxiliary Contact 1 N.O. + 1 N.C.
Side Mount Aux. or Trip Contacts	No Side Mount Aux. or Trip Contacts

OVERLOAD RELAY DATA	
Overload Relay Type	193-EE, Adjustable Trip Class 10...30, Automatic/Manual Reset
Full Load Current Range (A)	1.0 - 5.0A (3 Phase)

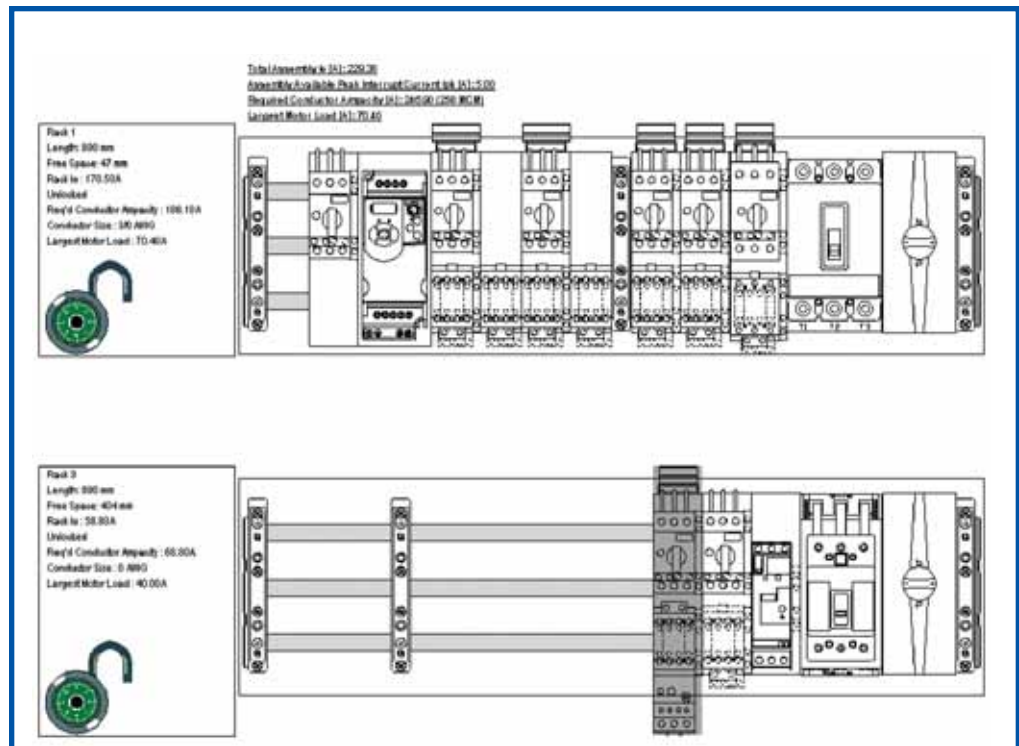
OPTIONS	
Optional Selections	<ul style="list-style-type: none"> UL508 Type E Spacing Module The spacing module is also required by UL508A for feeder circuit applications. 

ACCESSORIES	
Accessories	- NO SELECTION

MANUFACTURING	
Assembly	User Assembled The selected starter will appear as a list of components.

MESSAGES

Step 15: Configuring Three Component Starters (continued)

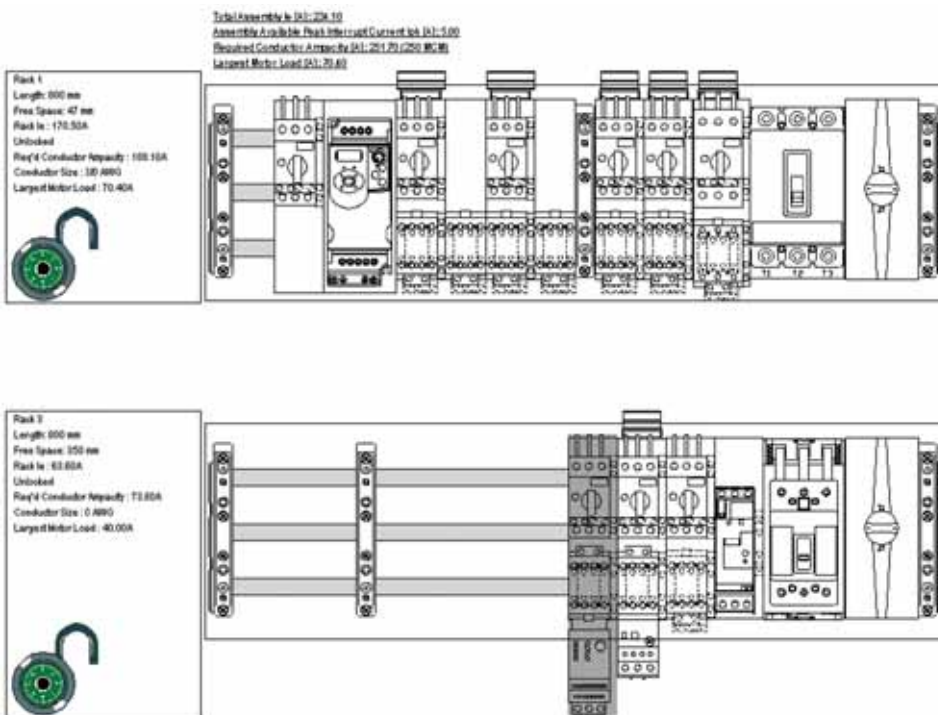


As before, we can copy the starter and change the parameters for Motor 10. All we have to change is the overload relay type. In this case, we need the 193-EC.

Change the “Overload Relay Type” to 193-EC for Motor 10 per the following example. Then **select the [Accept] button**.

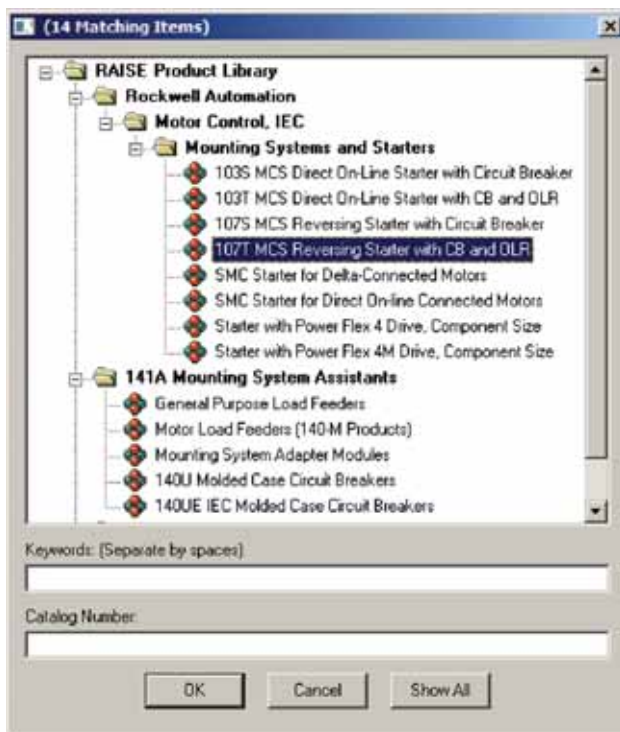
OVERLOAD RELAY DATA	
Overload Relay Type	193-EC, Direct Contactor Mount, 2 Inputs 1 Output
Full Load Current Range (A)	1.0 - 5.0A (3 Phase)
OPTIONS	
Optional Selections	<ul style="list-style-type: none"> UL508 Type E Spacing Module <i>The spacing module is also required by UL508A for feeder circuit applications.</i>
ACCESSORIES	
Accessories	- NO SELECTION
MANUFACTURING	
Assembly	Factory Assembled <i>The selected starter will appear as one item with one catalog number</i>

(continued)



Let's create the last two reversing starters by selecting the 107T from the Product Library window.

Click on the [Product Library] icon and from the window select 107T starters and select the [OK] button.



Step 15: Configuring Three Component Starters

(continued)

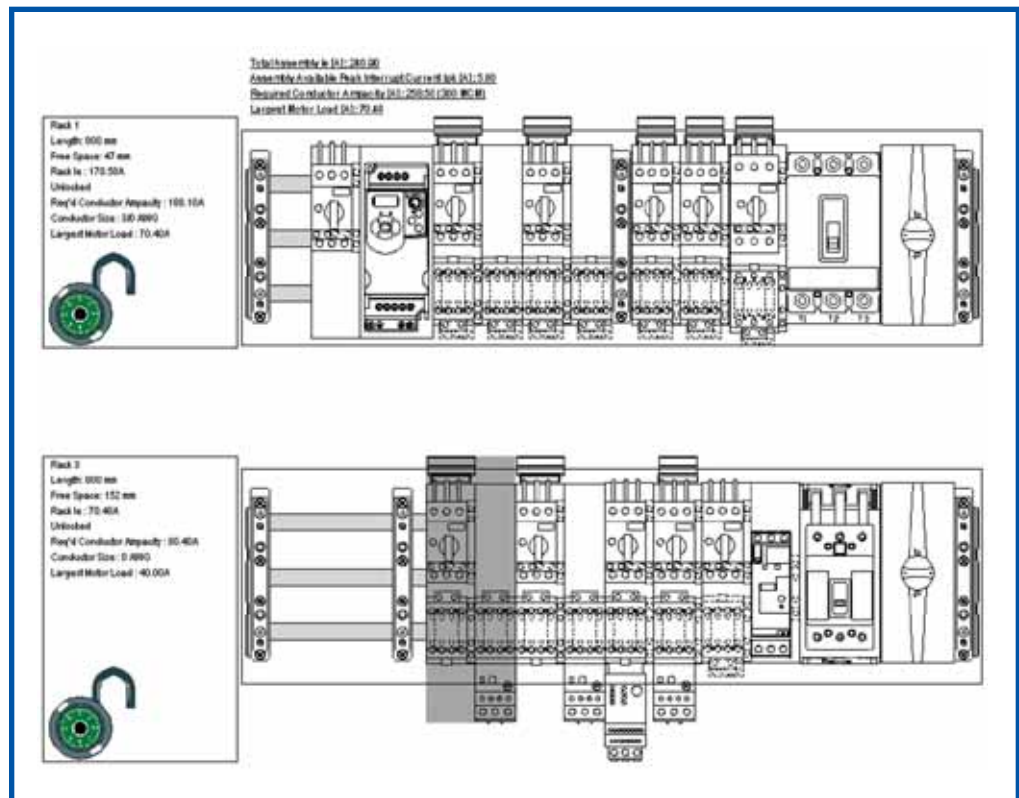
Enter the “107T Starter” data for Motor 11 per the following example.
Then select the [Accept] button.

Configurator selections for Motor 11:

- Rated Conditional Short-circuit Current (I_q) = 5 kA
- Horsepower = 2 Hp
- Starter Type = 107T
- Overload Type = 193-ED
- Press Accept

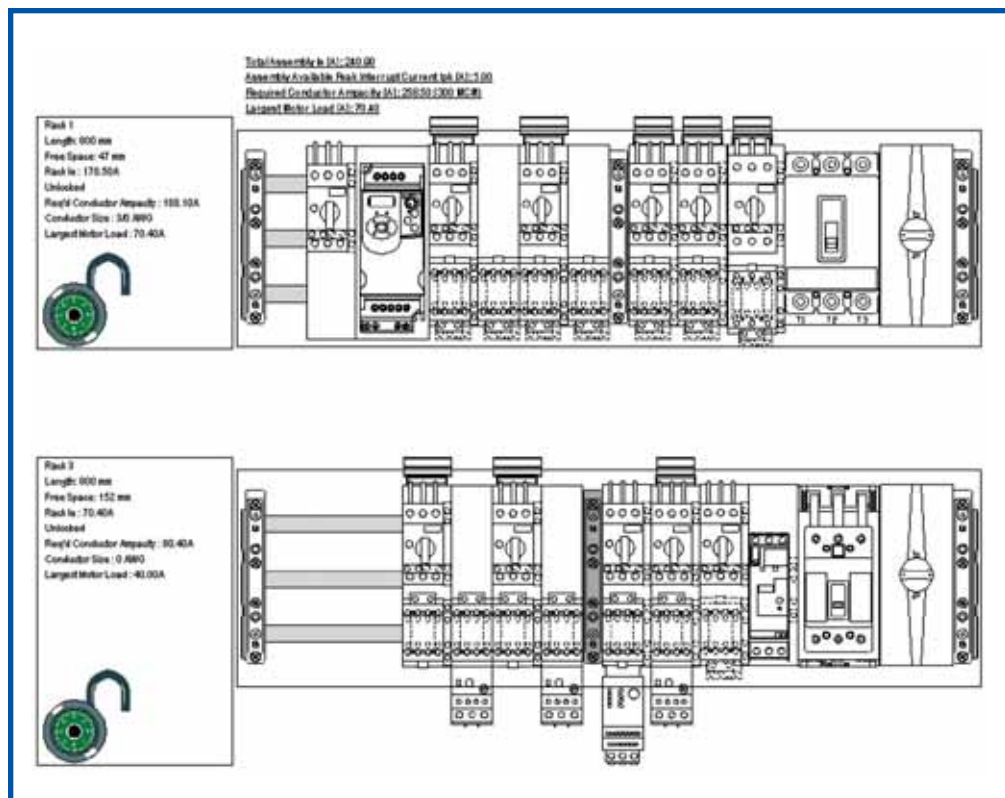
Since Motor 12 is identical to Motor 11, just copy it.

- Click on the starter for Motor 11 with the mouse cursor
- Press and hold the “Control” key and the left mouse button simultaneously
- Drag and drop the copy of the starter to the left



Step 15: Configuring Three Component Starters (continued)

Now let's tighten up the spacing by moving the middle support to the right of the 107Ts. This will move it more towards the center of the rack. **Press and hold the left mouse button on the object to be moved. Then, simply drag it to the right side, touching (overlapping) the starter for Motor 11.** The program will ask if you want the support to be positioned to the left or right side of the object it is touching, select **"Right" side**.

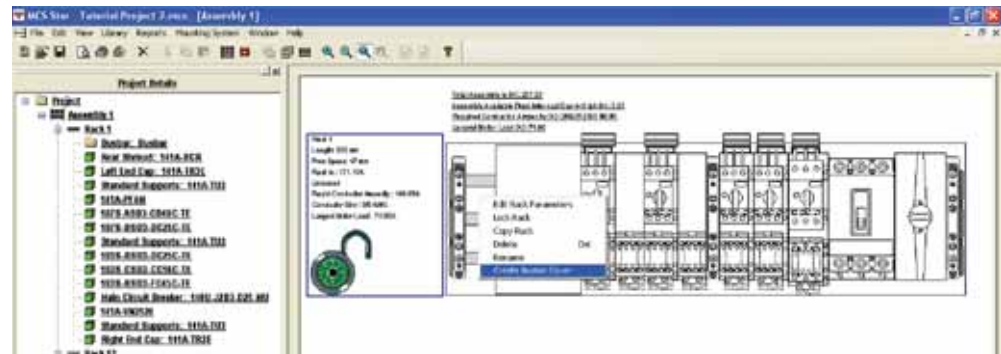


Congratulations! You have just configured a double rack 141A Mounting System Solution using MCS Star Configuration Software.

Additional MCS Star Configuration Software Functionality

Adding Busbar Covers

To cover up the exposed busbar, we should add busbar covers to provide finger-safe protection on both racks. **Right click on the exposed busbar and select “Create Busbar Cover” from the pop-up window.**



Let's go with the individual covers. These come in 1000 mm lengths and can be cut to the required length to cover the exposed busbar. **Select the “Individual Busbar Covers” and select the [Accept] button.**

141A MCS Mounting System Busbar Cover Assistant Product Configuration Assistant

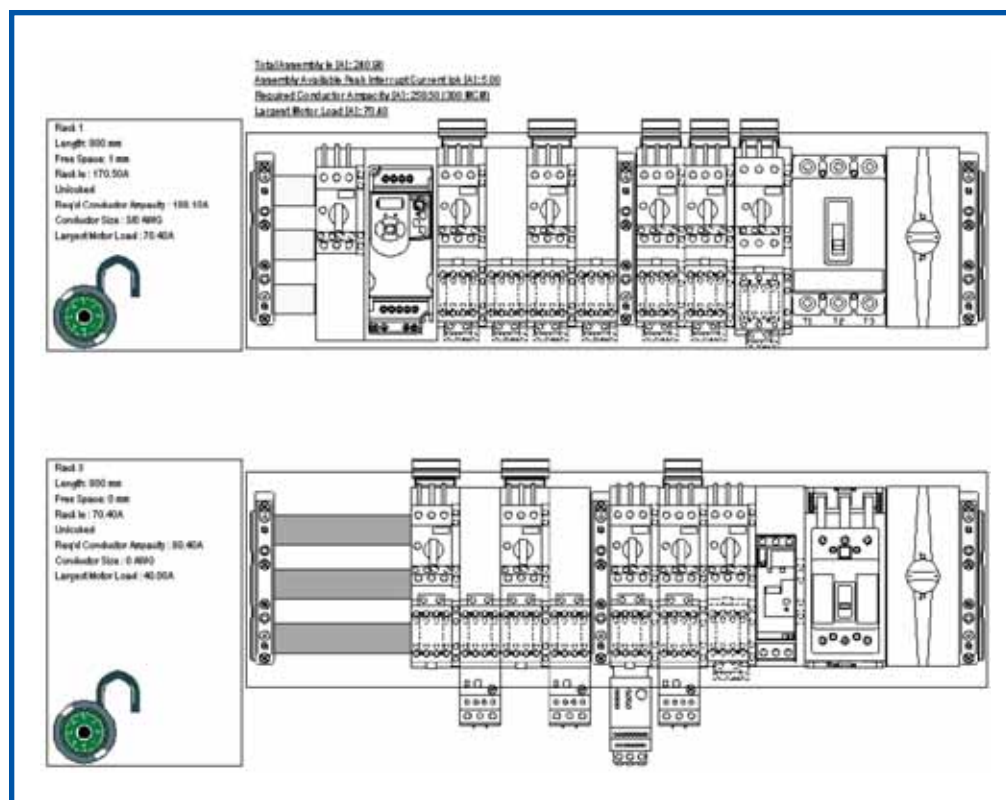
**Rockwell
Automation**



Repeat these steps for the second rack.

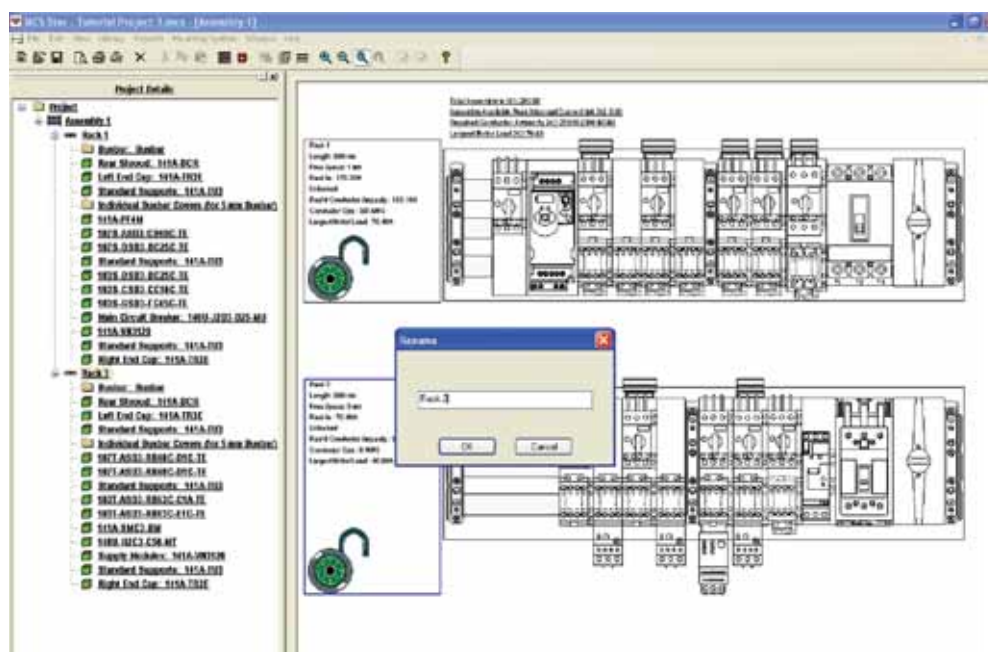
Adding Busbar Covers

(continued)



Creating Labels for the Racks or Components

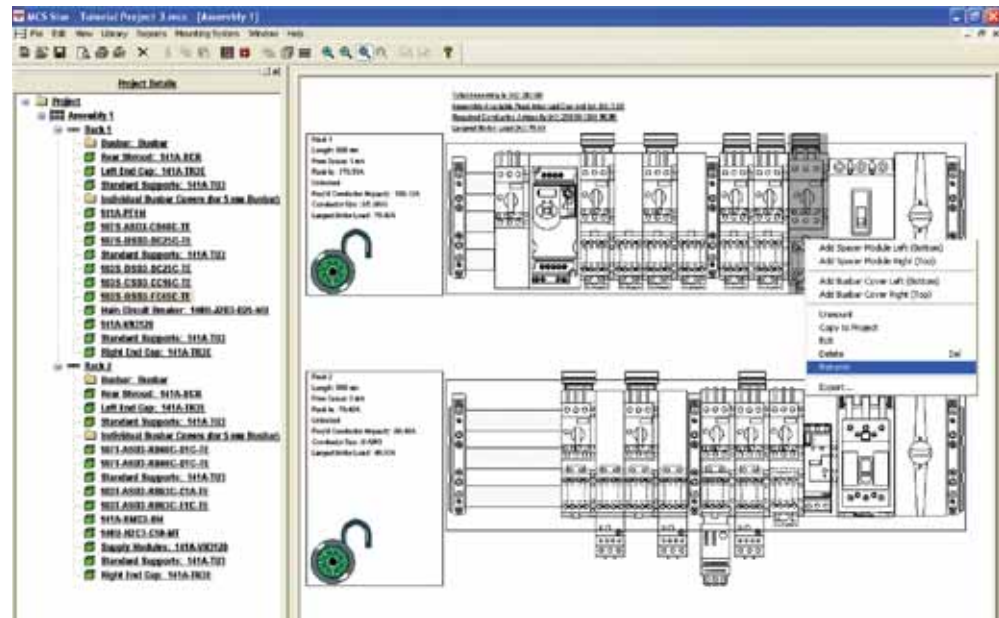
If you wish to change the names of your racks, simply **right mouse click in the area near the padlock symbol**. Click on the “Rename” option and type in the new name.



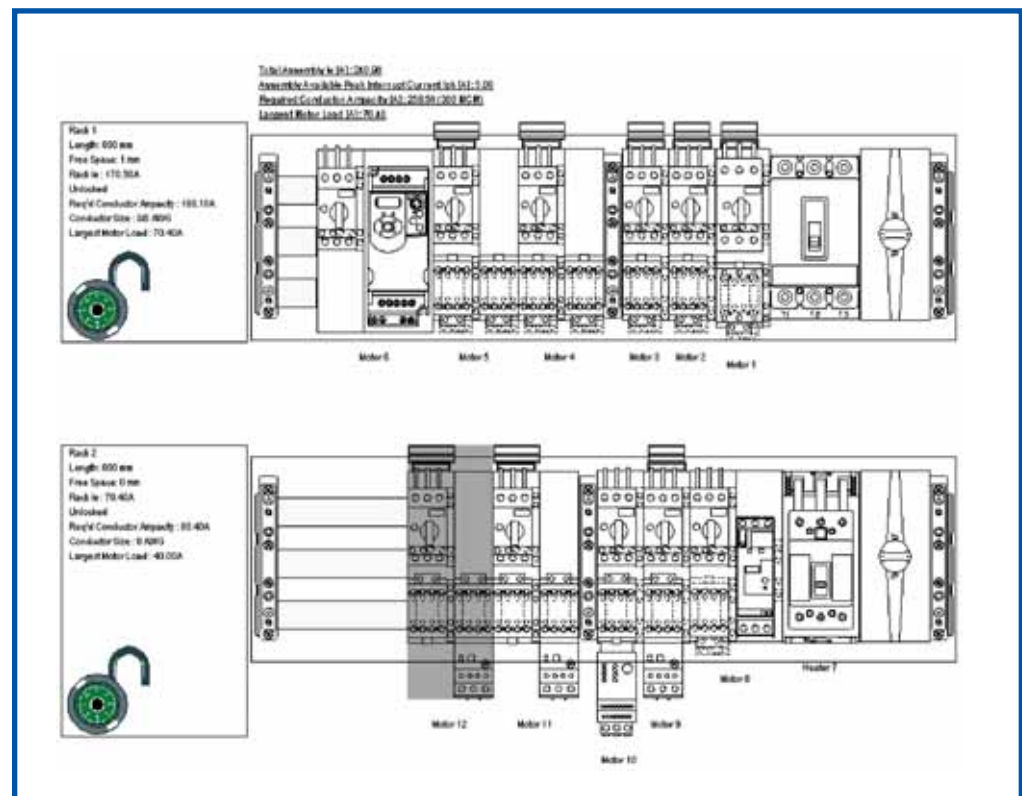
Creating Labels for the Racks or Components

(continued)

To add labels to the components on the busbar, **right click on the component, choose the “Rename” option and type in the new name.**

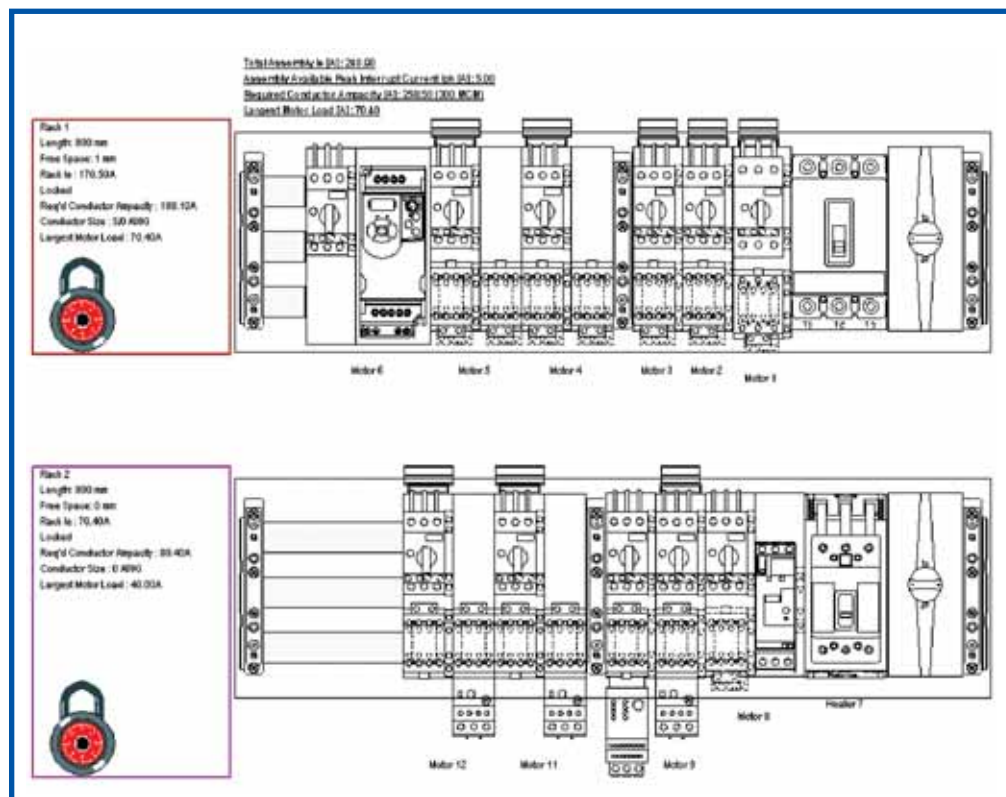


Repeat this step for all the other components.



Locking the Rack Design

Now that the rack design is complete, we can **lock** the configurations by **double clicking on the unlocked padlock symbol**. If you need to make changes later, you can unlock the rack by **double clicking on the locked padlock symbol**.



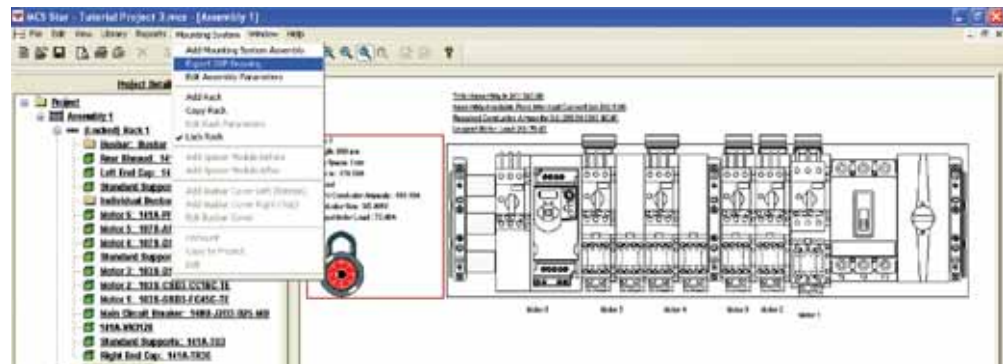
You will notice that MCS Star calculates the conductor size requirements. Because we included the total load of the second rack as a load through the supply module in Rack 1, we can use the conductor size calculated by the software for Rack 1 to feed the main circuit breaker (3/0 AWG).

For the conductors between the supply modules feeding Rack 2, it shows we can use a smaller conductor (0 AWG).

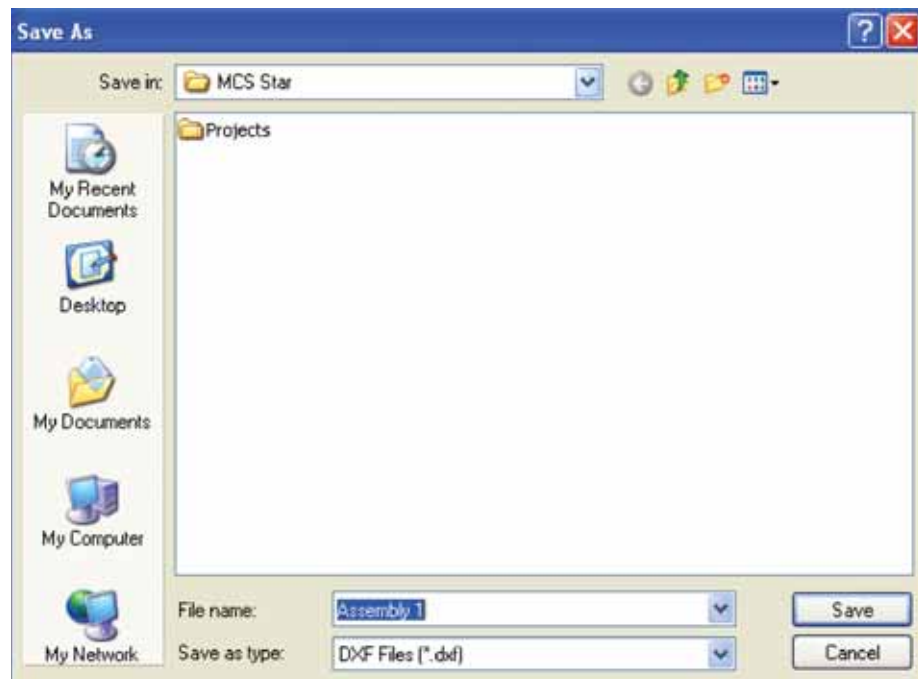
Exporting Drawings

MCS Star provides drawing export capability in the universal DXF format (Drawings EXchange Format). Almost all CAD/CAE programs can import this format. This way, MCS Star drawings can be integrated in complete panel layouts.

To export the assembly layout drawing, from the menus at the top of the screen, select **“Mounting System”** and **“Export DXF Drawing”**.



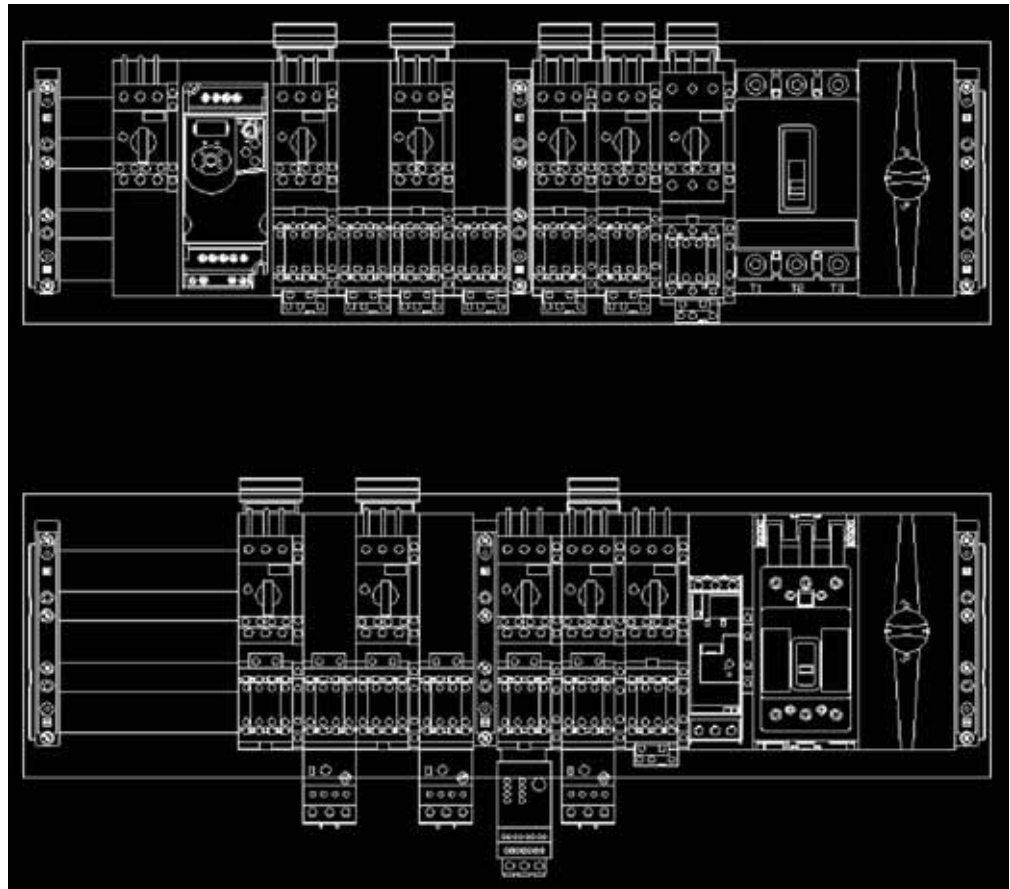
You will be asked to name the file and where you would like it saved.



Exporting Drawings

(continued)

Once saved, you can open the file with your CAD/CAE software.



Exporting Assembly to TRCS (Temperature Rise Calculation Software)

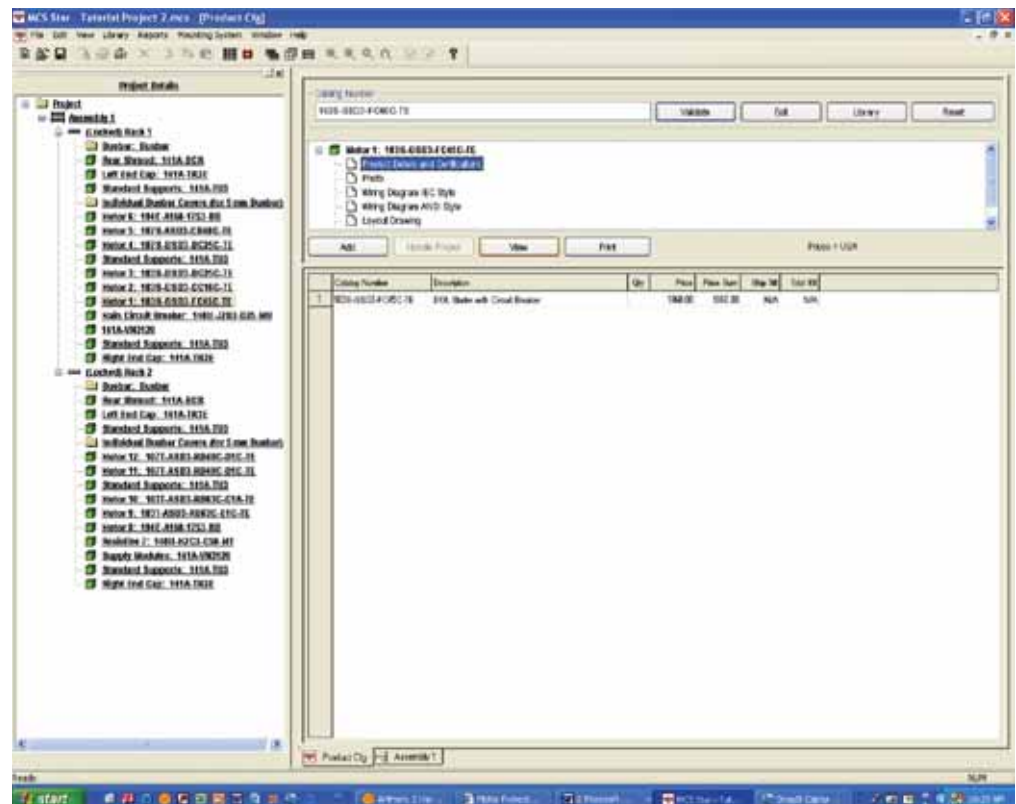
To export your assembly to a file that can be imported into TRCS, [click on the File Menu > Export > Temperature Rise Calculation \(TRCS\) File link](#). This will bring up a dialog box that allows you to save a DBF file that can be imported into TRCS.

Printing and Exporting Data

Depending upon your configuration, several documents are provided for each starter:

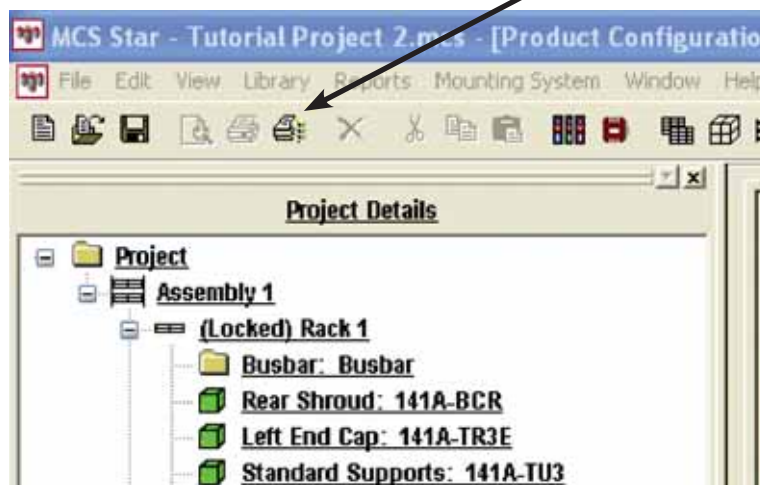
- Configuration sheet
- Wiring diagram (IEC or ANSI)
- Layout drawing

To view or print the documents of a particular starter, **click the “Product Cfg” tab** at the bottom of the screen. Then, **highlight the desired starter in the “Project Details” window**. Once the starter catalog number appears in the upper right window, **highlight the required document** and **select the [View] or [Print] button**.

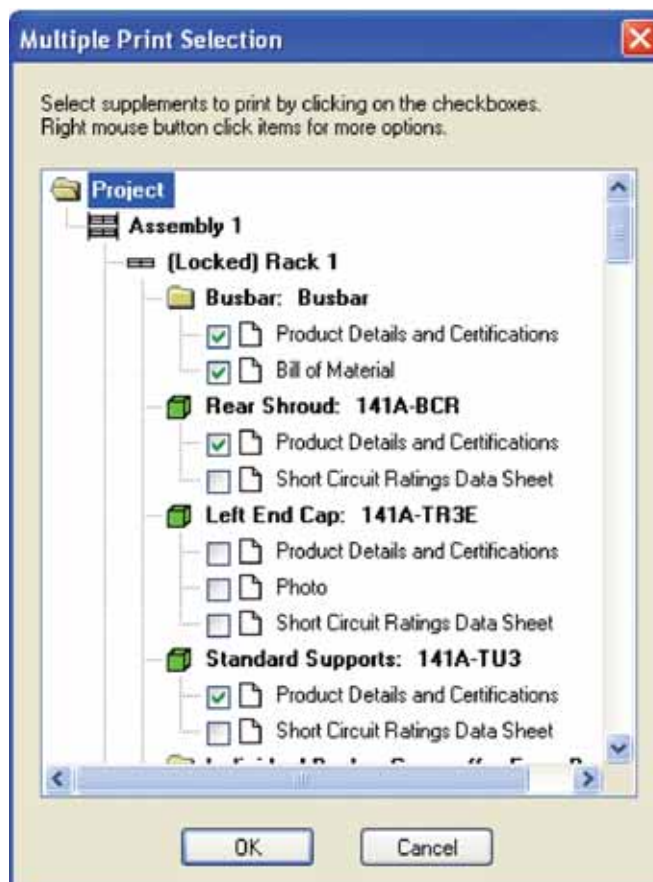


Printing and Exporting Data (continued)

If you wish to print multiple documents at once, from the menus at the top of the screen, select **"File"** and then **"Print Multiple"**. You can also select the **[Print Multiple]** icon from the toolbar.



Check the desired documents you wish to print and select the **[OK]** button.



Printing and Exporting Data (continued)

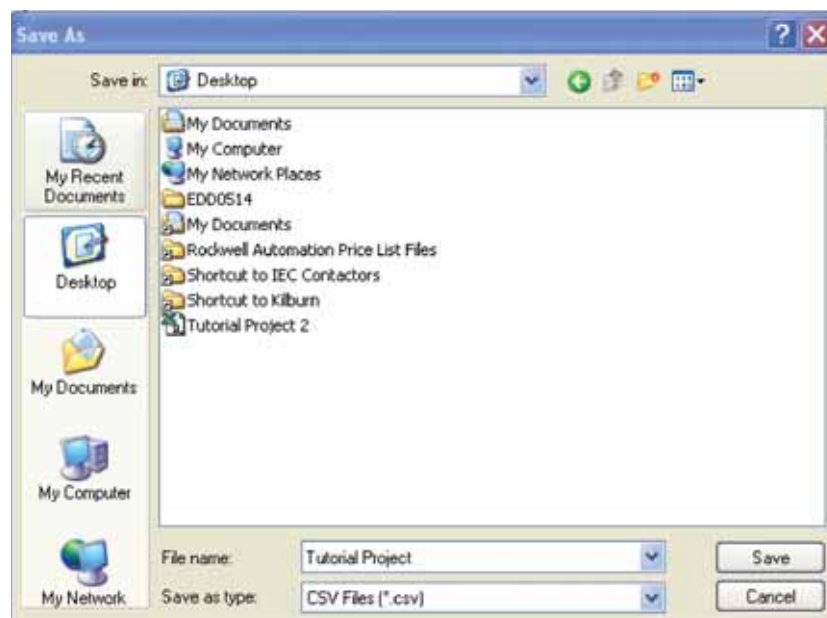
You can also export the project list as a CSV file which can be opened and saved in Excel.
Select the [Export] icon and click on “Project List”.



You will then be asked what format you would like the file to be saved as.
Click on CSV and select the [OK] button.



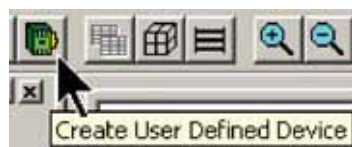
Choose the directory and file name, then select the [Save] button.



User Defined Devices

Let's say you decide the busbar assembly shall contain a 194E-A160-1753 load break switch, mounted on a busbar adapter. This device is not available in MCS Star, but the program provides a solution called User Defined Devices (UDD). This is a separate part of the software that allows the configuration of non-standard busbar mounted devices and adds them to your Product Library. For more information, see the "User Guide" in the UDD wizard "Help" file.

First, **select the User Defined Device Wizard.**

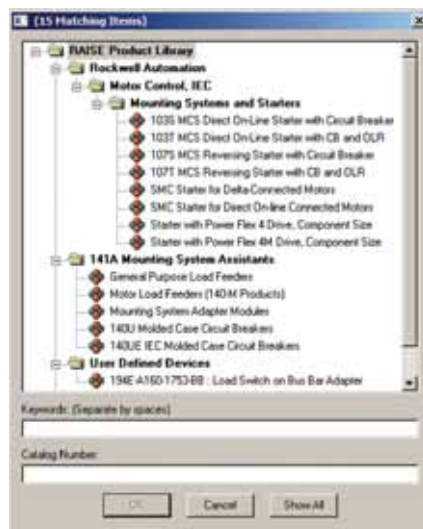


Then, **enter the minimal required parameters for the UDD:**

Application:	MCS Star
Catalog Number:	194E-A160-1753-BB (can be any string)
Part Description:	Load Switch on Busbar Adapter
Enter 1 for List Price, 0 for Discount Schedule and Price Group Code, .1 for shipping weight	
Units of Measure:	Millimeters
Dimensions:	Width = 114, Height = 222, Depth = 150
Block Offset:	48 mm
CAD Drawings:	No
Power Consuming:	No
Mounting Type:	Busbar

UDD can be mounted on a busbar rack only when "Busbar" is selected as the "Mounting Type". UDD's are configurable only within the User Defined Device Maintenance program, but not in MCS Star. UDD's will automatically be added to the Product Library when you select "Accept" and close the User Defined Device Maintenance program.

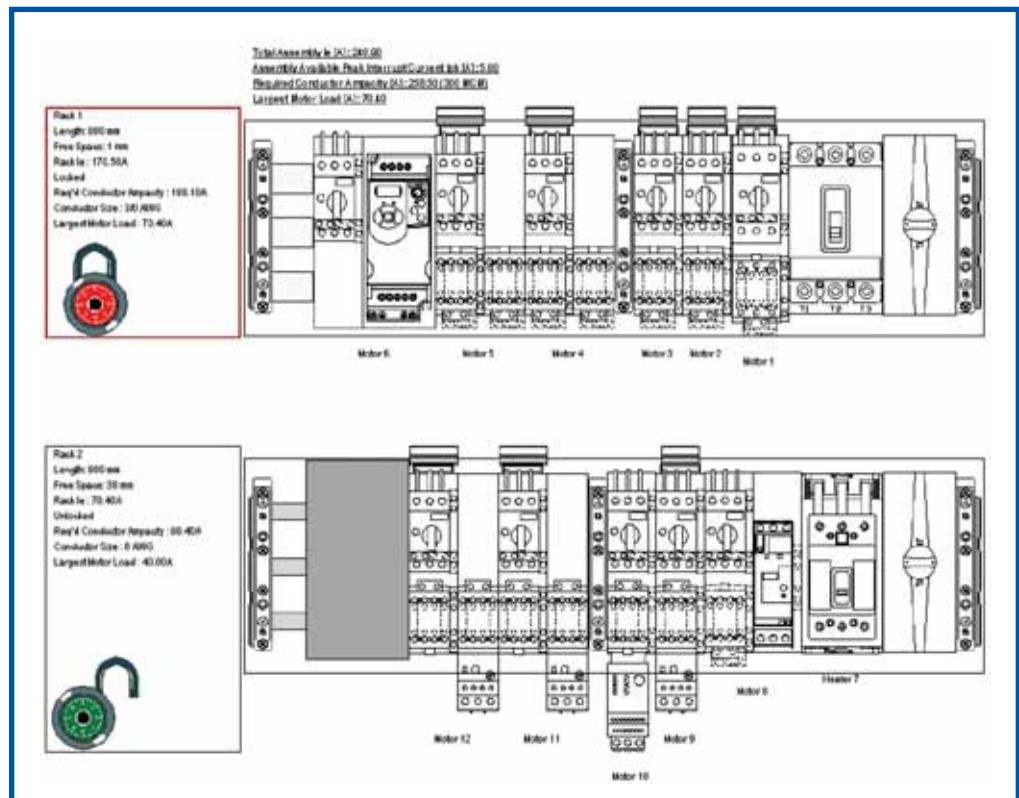
Before adding the UDD to the rack, **unlock it by double clicking on the red padlock.** Delete the busbar covers by **right mouse clicking on the cover and clicking on "Delete"**. To add the UDD to the rack, **open the Product Library and double-click on the new part number.**



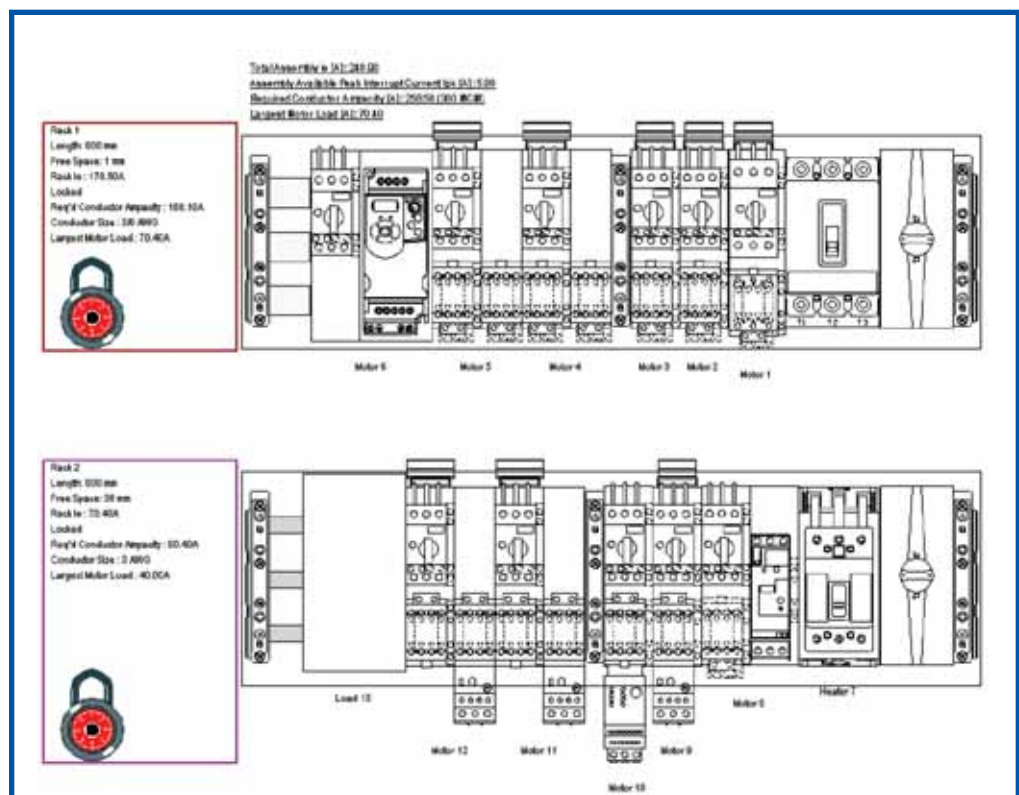
User Defined Devices

(continued)

It will then be added to the busbar assembly.



Add the bus bar covers, name the UDD and re-lock the rack.



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