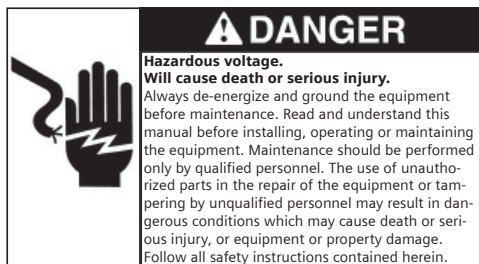


## Installation Instructions

July, 2015

# tiastar™ Motor Control Center Installation Instructions For Motor Control Center (MCC) Units





THIS EQUIPMENT CONTAINS HAZARDOUS VOLTAGES. DEATH, SERIOUS PERSONAL INJURY, OR PROPERTY DAMAGE CAN RESULT IF SAFETY INSTRUCTIONS ARE NOT FOLLOWED. ONLY QUALIFIED PERSONNEL SHOULD WORK ON OR AROUND THIS EQUIPMENT AFTER BECOMING THOROUGHLY FAMILIAR WITH ALL WARNINGS, SAFETY NOTICES, AND MAINTENANCE PROCEDURES CONTAINED HEREIN.

THE SUCCESSFUL AND SAFE OPERATION OF THIS EQUIPMENT IS DEPENDENT UPON PROPER HANDLING, INSTALLATION, OPERATION AND MAINTENANCE.

### SIGNAL WORDS

The signal words "**DANGER**", "**WARNING**" and "**CAUTION**" used in this manual indicate the degree of hazard that may be encountered by the user. These words are defined as:

**DANGER** - For the purpose of this manual and product labels, **DANGER** indicates an imminently hazardous situation which, if not avoided will result in death or serious injury.

**WARNING** - For the purpose of this manual and product labels, **WARNING** indicates a potentially hazardous situation which, if not avoided, could result in death or serious injury.

**CAUTION** - For the purpose of this manual and product labels, **CAUTION** indicates a potentially hazardous situation which, if not avoided, may result in minor or moderate injury.

### QUALIFIED PERSON

For the purposes of this manual and product labels, a qualified person is one who is familiar with the installation, construction, operation or maintenance of the equipment and the hazards involved. In addition this person has the following qualifications:

- (a) is trained and authorized to energize, de-energize, clear, ground and tag circuits and equipment in accordance with established safety practices.
- (b) is trained in the proper care and use of protective equipment such as rubber gloves, hard hat, safety glasses or face shields, flash clothing, etc., in accordance with established safety practices.
- (c) is trained in rendering first aid.

### IMPORTANT

These instructions do not purport to cover all details or variations in equipment, nor to provide for every possible contingency to be met in connection with installation, operation or maintenance. Should further information be desired or should particular problems arise which are not covered sufficiently for the purchaser's purposes, the matter should be referred to the local Siemens sales office. The contents of this instruction manual shall not become part of or modify any prior or existing agreement, commitment or relationship. The sales contract contains the entire obligation of Siemens. The warranty contained in the contract between the parties is the sole warranty of Siemens. Any statements contained herein do not create new warranties or modify the existing warranty.

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# 1 Receiving

- 1.1 Carefully remove all packaging material from the unit.
- 1.2 Read the entire unit installation guide.
- 1.3 Inspect the unit for damage.
- 1.4 Become familiar with unit and unit support components

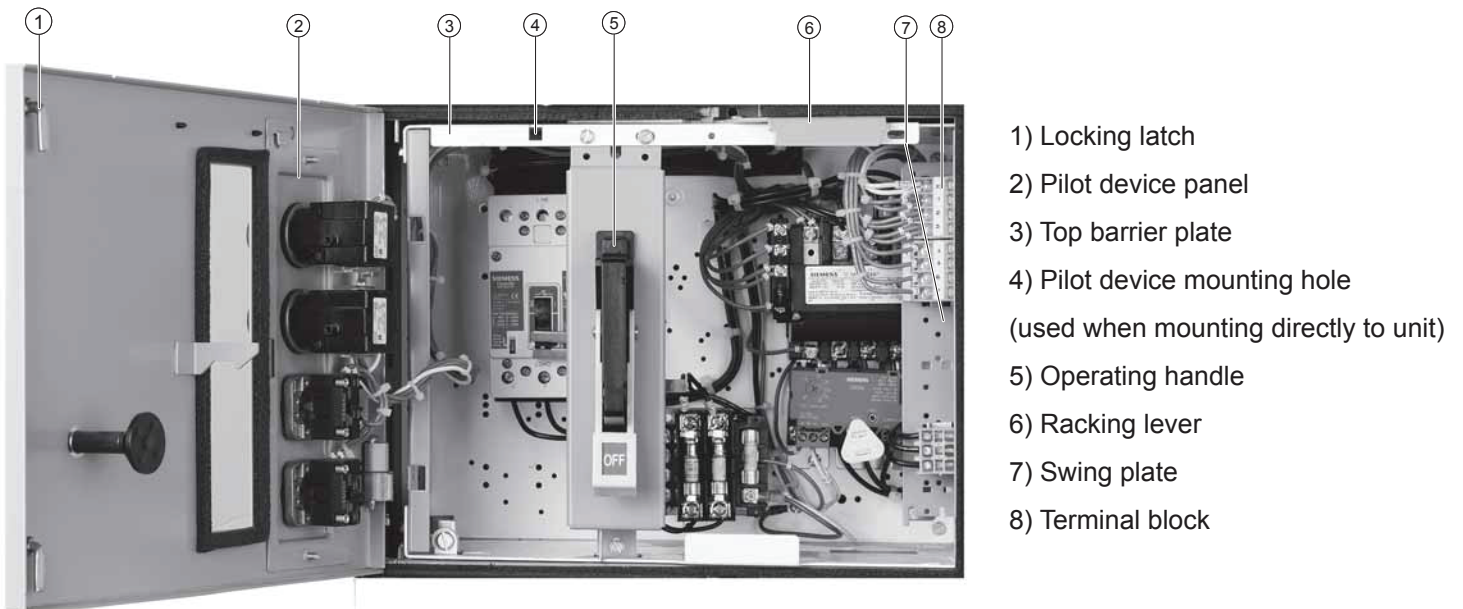


Figure 1 - Unit Components

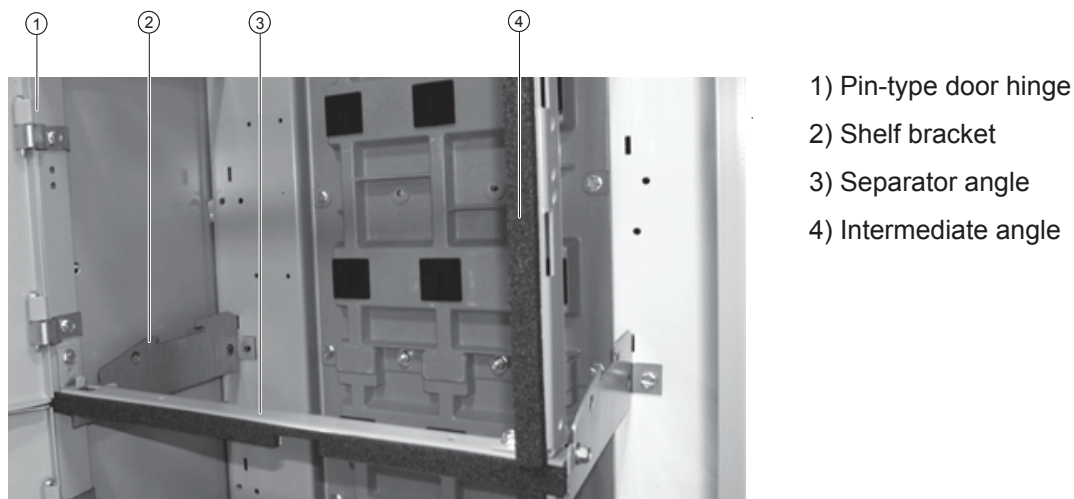


Figure 2 - Unit Support Components

**If damage or loss is discovered, file a claim with the carrier who delivered the control unit. As much identification as possible should accompany the claim, together with a full description of the damage. When filing a claim with the carrier, photographs of the damage are very helpful.**

## 2. Removing Existing Unit

### Recommended Tools:

- Flat-head screwdriver
- Phillips-head screwdriver
- Multimeter with pointed probes

2.1. Put disconnect operating handle in the PARK position (See Figure 3).

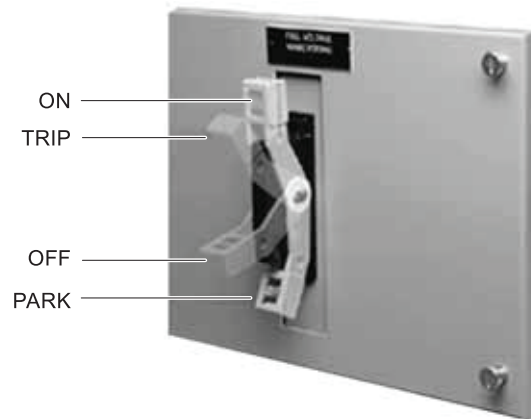


Figure 3 - Operating Handle Positions

2.2. Unscrew latch located at the bottom of the unit  
Rotate the latch until it disengages from the separator angle (See Figure 4).

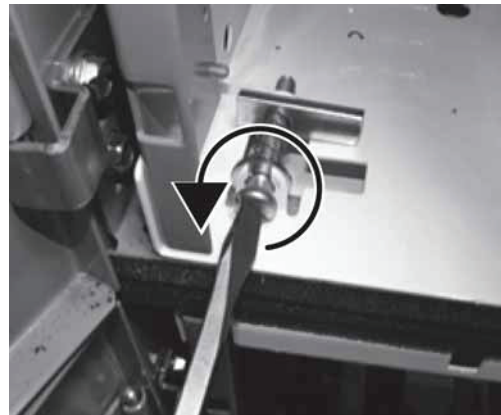


Figure 4 - Disengaging latch

2.3. Transfer pilot device panel from door to slot on unit.  
Remove panel by removing the screws located at the top and bottom of the panel.

2.4. Open vertical wireway door.

2.5. Move unit to "Test" position by opening racking lever in the top barrier plate (See Figure 6a).

2.6. Disconnect control and load wiring.

2.7. Remove unit by slightly tilting the front of the unit downward and sliding it out. This is to insure that the unit doesn't get caught on the shelf bracket.

### 2.8. If rearranging units of different sizes, perform the following tasks:

2.8.1. Remove all unit support assemblies by unfastening the screws for each assembly, tilting upward and sliding out of their holes.

2.8.2. Realign support assemblies as needed.

2.8.3. Include intermediate angles in all spaces (See Figure 2).

2.8.4. Remove stab hole covers at appropriate heights and replace covers on unused stab holes. Stab hole covers should be arranged so that the only uncovered openings are those to which a unit will be connected (See Figure 5).

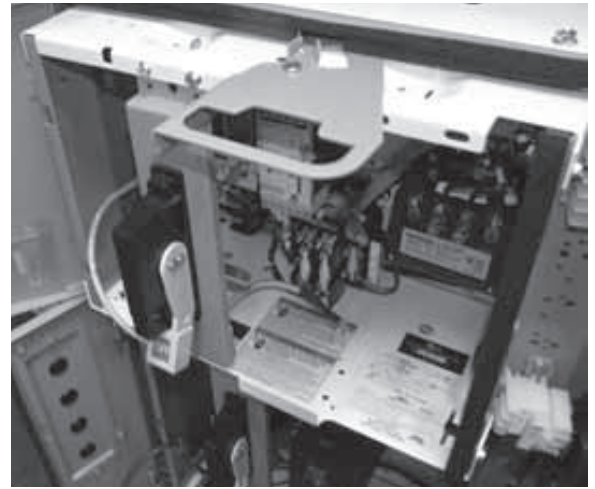


Figure 5 - Stab Hole Covers

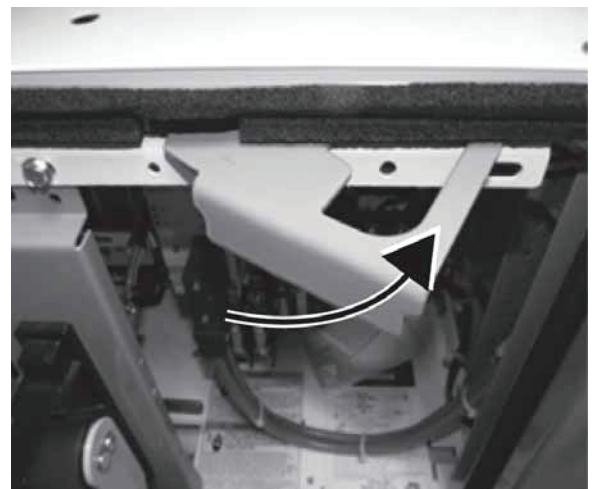
2.8.4a MCCs with automatic shutters; tiastar Shutter Mechanism Kit 8PG1191-2MA00 is available if additional shutters are needed.

### 3. Installing Unit

- 3.1. If present, remove existing door by first withdrawing its hinge pins and then closing it halfway before sliding it off its hinges.
- 3.2. Remove Intermediate angle by removing the screw which fastens it to the Separator Angle and tipping slightly to remove formed tab at top from slot in shelf bracket above.
- 3.3. If necessary, install unit support assembly by inserting shelf brackets at a slight angle into the appropriate holes in the vertical bus support angle and snapping into place. Secure support assembly with the two screws provided. One screw fastens the right-hand shelf bracket to the vertical bus support angle. The second screw fastens the separator angle to the left side of the structure. For additional information on unit support installation, please refer to section 8.2.
- 3.4. If necessary, remove appropriate unit stab hole covers.
- 3.5. Install unit door by sliding it onto the hinges while half open. Once on the hinges, open the door completely and insert hinge pins.
- 3.6. Place plug-in unit inside of enclosure (Figure 6a).
  - 3.6.1. With the handle in the PARK position, slide unit into place on support assembly.
  - 3.6.2. Slightly tilt the front of the unit downwards in order to slide the back of the unit over the shelf brackets.
  - 3.6.3. Once the unit has been pushed in as far as it can go, close the racking lever in top barrier plate (Figure 6b).
  - 3.6.4. Engage locking latch at lower left of the unit to the separator angle and tighten it using a flat-head screwdriver (latch is shown above in Figure 4 on page 4).



**Figure 6a - Placing Unit on Support Assembly and in test position**



**Figure 6b - Closing Racking Lever**



## 4. Handle Adjustment

Note: Additional handle adjustment information can be found in section 11

### Recommended Tools:

- 2 – 5/16 in. socket wrenches for adjusting unit handle

- 4.1. Perform all disconnect operating handle adjustments with the unit removed from the motor control center or in the "Test" position (See Figure 6a).
- 4.2. The adjustable link rod can adjust to increase or decrease its overall length by rotating the sleeve. By rotating the sleeve clockwise the length is increased and by rotating it counterclockwise the length is decreased. A hex nut is provided as part of the adjustable link rod and is tightened against the sleeve to prevent it from going out of adjustment. The hex nut must be loose and sufficiently away from the sleeve to allow it to rotate during the adjustment of the handle.  
  
**Note:** Always use two wrenches when loosening, adjusting, or tightening the adjustable link rod. One wrench adjusts the hex sleeve while the second wrench holds the hex nut.
- 4.3. The handle assembly must be adjusted to perform the following functions:
- 4.4. Unit must turn ON; Unit must turn OFF; Unit must indicate TRIP; Unit must RESET.
- 4.5. Operate the handle from the ON position to the OFF position and disconnect will turn OFF.
- 4.6. Return the handle to the ON position and the disconnect will turn ON. If it does not, rotate the sleeve slightly clockwise and try again. Repeat this step until the handle assembly turns the unit ON. Then, repeat step 4.5. Note: To perform this operation with the door open it will be necessary to push down on the exposed interlock arm lever.

### For Circuit Breaker Units Only

- 4.7. Trip the circuit breaker and the handle should move to a position between the ON and OFF positions. (Most circuit breakers can be manually tripped by pressing a red or black button on the front of the device).
- 4.8. Move the handle down past the OFF position to reset the circuit breaker. If the circuit breaker resets and can be returned to the ON position by the handle, the adjustment has been completed and the hex nut should be tightened against the sleeve. If the circuit breaker does not reset, turn the sleeve counterclockwise slightly and try again. Repeat this step until the breaker resets. Then repeat steps 4.5 – 4.8 to verify operation.

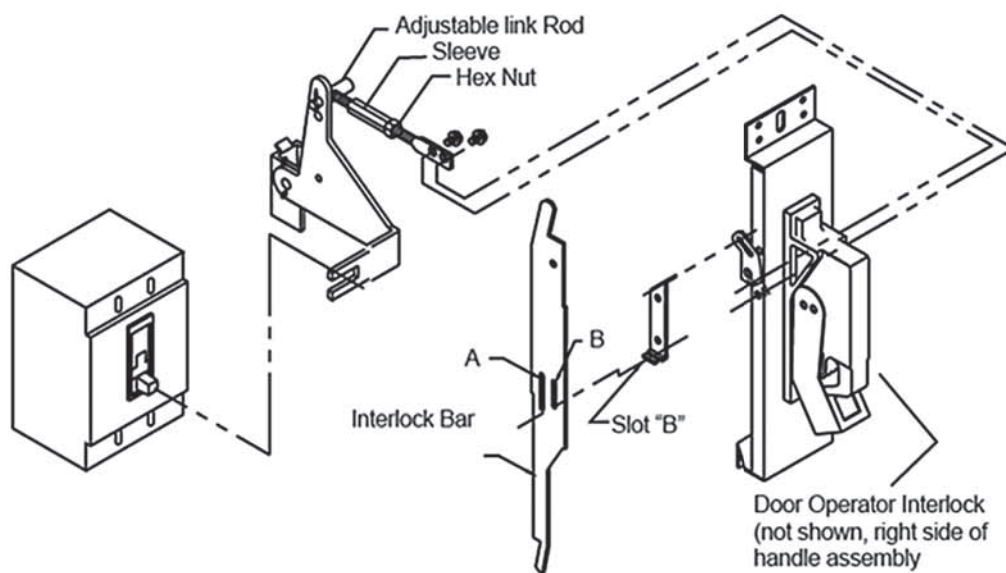


Figure 7 - Operating Handle Adjustment

## 5. Outgoing Power and Control Wiring

- 5.1. Connect power and control wires for the unit with the unit stabs disengaged from the vertical bus.
- 5.2. Wiring between control units is pulled through the vertical wireway at the right side of the section. These wires can be fastened with the wireform wireties provided. Route wiring to control units in other sections through the horizontal wireways.
- 5.3. When load cable conduit is in the bottom of a Motor Control Center, additional room for pulling cable may be obtained by removing bottom plug-in units.
- 5.4. For rear units of back-to-back Motor Control Centers, connect motor T1 to terminal unit T3 and motor T3 to terminal unit T1 in order to obtain the same motor rotation as for motors controlled by front units.

## 6. Pre-operation Checks

Before energizing and operating the motor control center, perform the following checks

- 6.1. Operate all magnetic devices by hand to be sure that all parts operate freely. Check all interlocks for proper contact operation
- 6.2. Current transformers for customer remote devices are shipped with their secondaries shorted out. Be sure all such shunts are removed when the metering circuits are completed.
- 6.3. Be sure that each motor is connected with the proper starter
- 6.4. Check the overload setting or overload heater element against the full load current shown on the nameplate of each motor.
- 6.5. Check all heater elements to insure that they are properly installed.
- 6.6. Check all timers for proper time interval setting and contact operations.
- 6.7. If instantaneous trip circuit breakers are used, adjust as follows:
  - 6.7.1. Determine motor full load current from the motor nameplate data. Use screwdriver to set indicator on adjustment screw to the appropriate position.
  - 6.7.2. For maximum protection, the trip position should be set as low as possible. Turn the adjustment screw counterclockwise to successively lower positions until the breaker trips on motor starting. After this position is determined, turn the adjustment screw clockwise to the next higher setting for normal operation.  
If the breaker does not trip at the lowest setting, leave the indicator at this setting.
  - 6.7.3. If tripping occurs at highest setting; re-check motor nameplate information, then check voltage and load with peak reading ammeter to locate problem.
- 6.8. If fusible disconnect type starters are used, check for proper fuse size. Fuse size should not exceed 150% FLA for RK5 and 300% FLA for Type J.
- 6.9. Clean the motor control center and be sure that all extraneous material has been removed.
- 6.10. Check the torque value of each connection. Factory connections may loosen during shipment storage. It is of utmost importance to inspect all connections and bolted joints for tightness PRIOR TO energizing the equipment. Follow torque requirements of individual components for motor / load connections.
- 6.11. Close all access plates and doors before the motor control center is energized.
- 6.12. Jog motors to determine proper rotation.

## 7 High Density Units

E87010-A0401-T002-A5-MCC

tiastar™ Motor Control Center

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### Coil Removal

1. For easy coil replacement, remove the unit from the structure.
2. Loosen screw "A" which secures the cover.
3. Rotate the cover as shown in Figure 8 around the pivot point.
4. Disconnect wiring to coil.
5. Remove coil through top of unit.

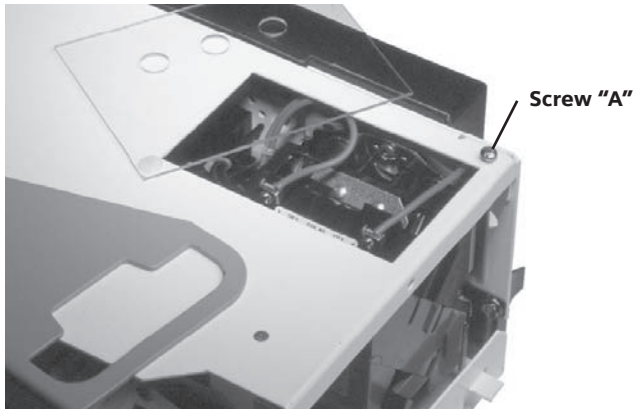


Figure 8

### Terminal Block Swing Plate

1. To wire the unit, rotate the terminal block swing plate as shown in Figure 9.
2. Route the wires from the vertical wireway into the unit behind the right unit side angle.

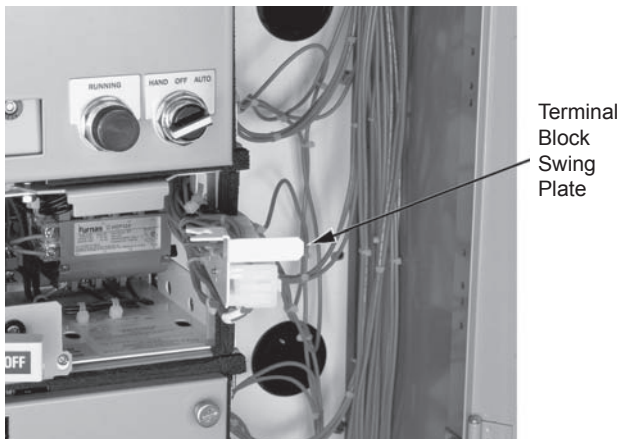


Figure 9

### Arc Cover Access Slots

Withdraw the unit for access to the arc cover screws through the slots in the unit bottom plate as shown in Figure 10.

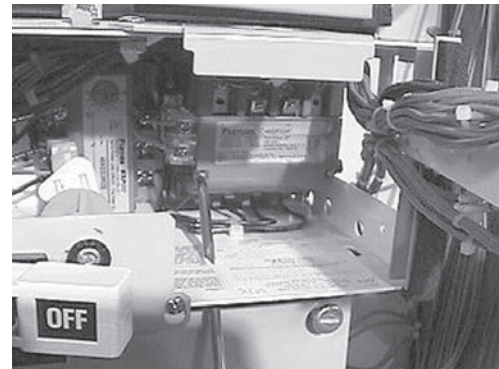


Figure 10

### Hinge Installation

1. Remove the existing hinge (if present) in the 6 in space. See Figure 11.
2. Install the unit support bracket per "Adding To A Blank Unit Space" on page 4.
3. Locate and install the new hinge with the two mounting screws.
4. Install the door using two new hinge pins supplied with the unit.

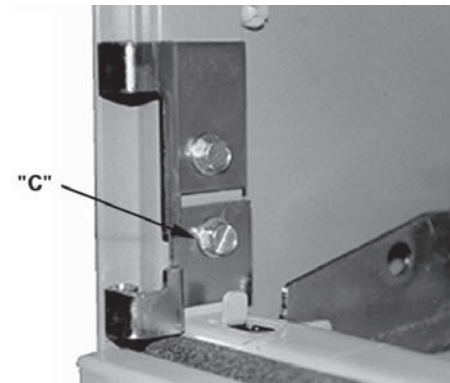


Figure 11

### Unit Access For Maintenance

1. Remove the unit from the structure.
2. Loosen screw "B" shown in Figure 12.
3. Lift the handle bracket and pull forward to disengage.
4. Rotate the left side of the unit open as shown in Figure 12.
5. When closing the unit, the handle must be in the OFF position.

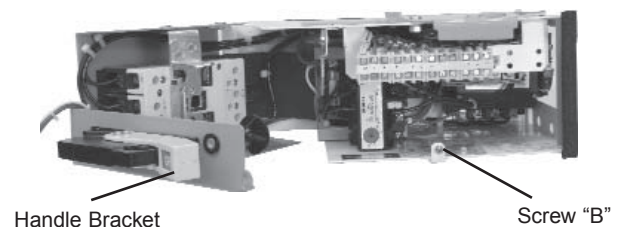
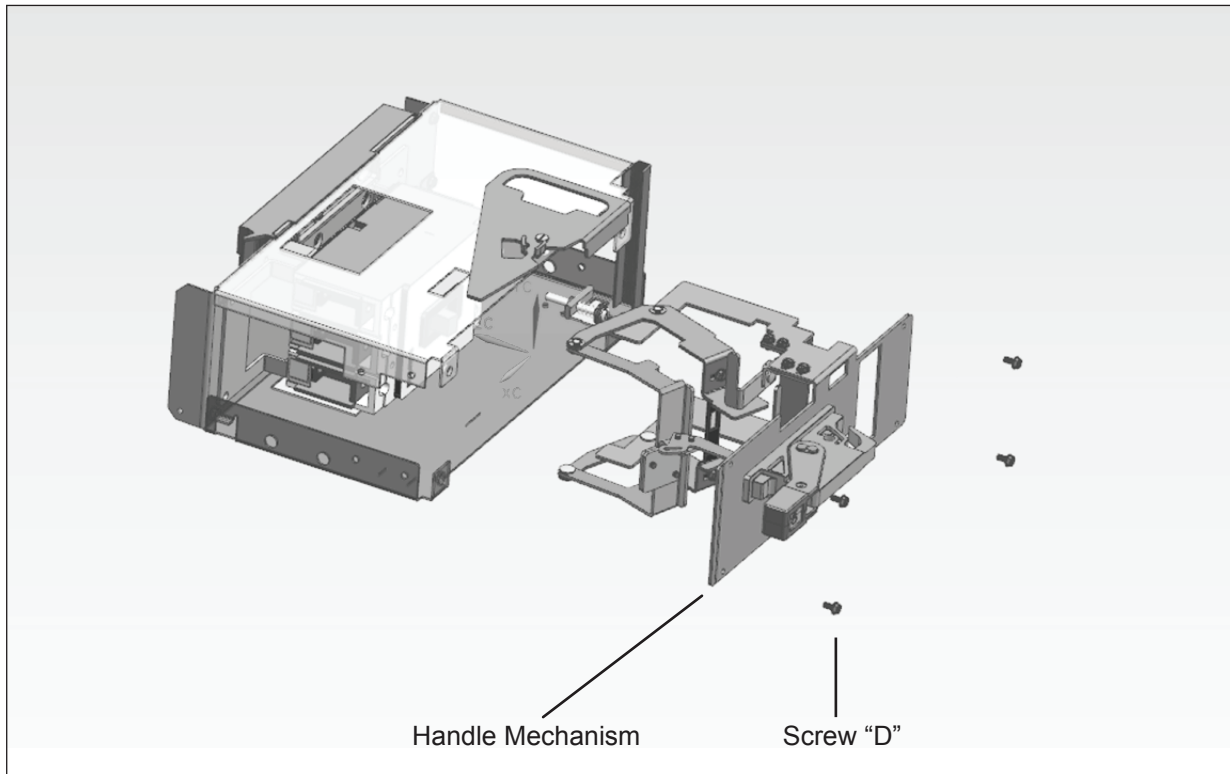


Figure 12



*Section 7 continued*

**6" Unit Access for Maintenance 150-250A Circuit Breaker Units**



**Unit Access for Maintenance**

1. Remove unit from structure
2. Remove screws "D" shown in figure 13- qty 4
3. Remove the handle mechanism from the unit
4. When reinserting the handle mechanism, the handle must be in the OFF position.

## 8. 400A and 600A Bolted Clamp Assembly

The clamp assembly is required for replacement or assembly of 400A and 600A circuit breakers or disconnect switches that are mounted directly to the vertical bus.

- A - Vertical Bus Bar
- B - Carriage Bolt
- C - Flat Washer
- D - 3/8" Standard Hex Nut
- E - Clamping Spring
- F - Bar
- G - Tie Bar
- H - Carriage Bolt
- I - Flat Washer
- J - 3/8" Standard Hex Nut
- K - Riser from breaker / disconnect

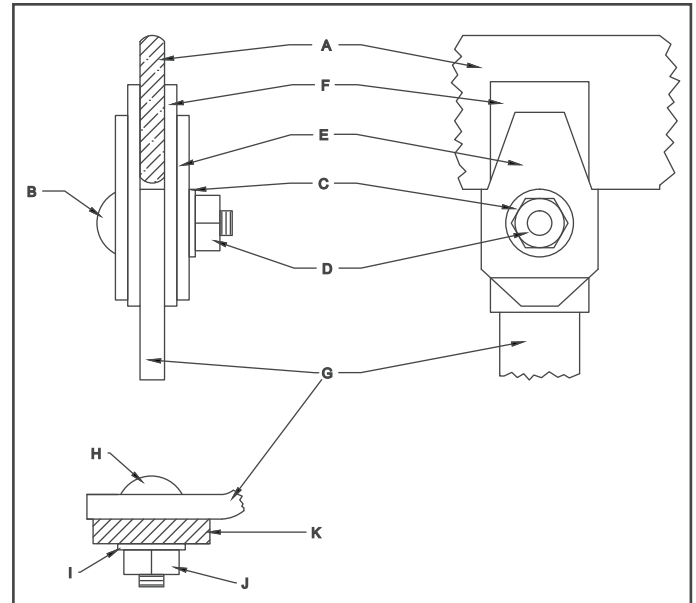


Figure 14

### Clamp Removal

1. Refer to Figure 14 for parts identification.  
Loosen nut J and remove bolt H, washer I, and nut from riser.
2. Loosen nut D and remove bolt B, washer C, and nut from the clamp assembly.
3. Remove tie bar and clamp assembly simultaneously.
4. Repeat steps 1 - 4 for each phase.

### Clamp Assembly

**Notice:** To be installed on 600A or 800A vertical bus only.

1. Connect tie bar riser by sliding bolt H through tie bar and riser. Fasten with washer I and torque nut J and bolt H securing to 280 in-lbs.
2. Loosely assemble the clamp assembly, making sure that clamp spring E will compress against bar F, when the the bolt is drawn tight.
3. Slide carriage bolt B through one side of the clamp assembly and tie bar until it protrudes through the other side of the clamp assembly. Fasten with washer C and torque nut D to bolt B securing to 280 in-lbs.
4. Repeat steps 1 - 3 for all phases.
5. Refer to Figure 15 for completed assembly.

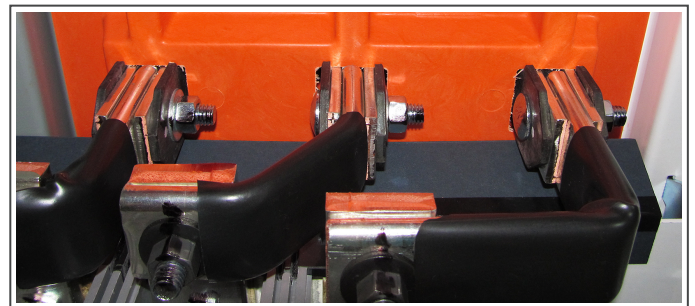
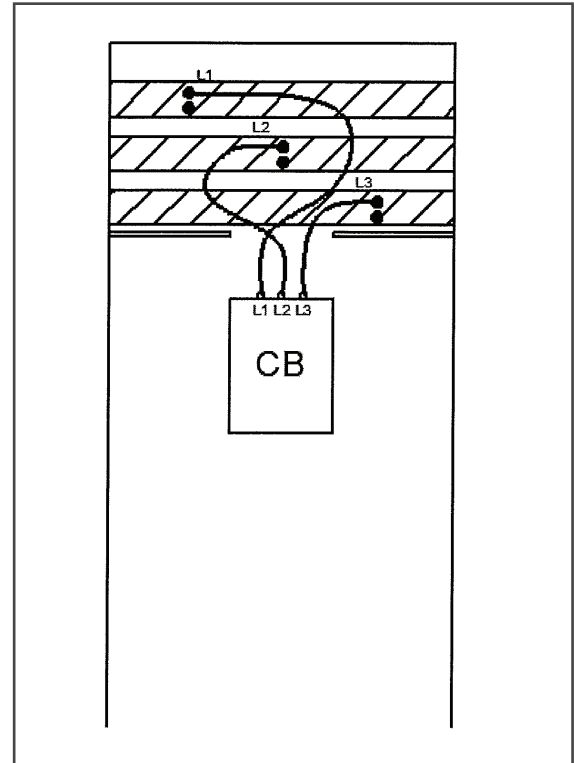


Figure 15

**Figure 16**

Units with large circuit breakers (> 300A) positioned at the very top of a section

- Pass L1, L2, and L3 cables through the section top plate barrier and connect them to the appropriate bus bars, as shown in Figure 16.
- Bundle all cables together above circuit breaker with wire ties.

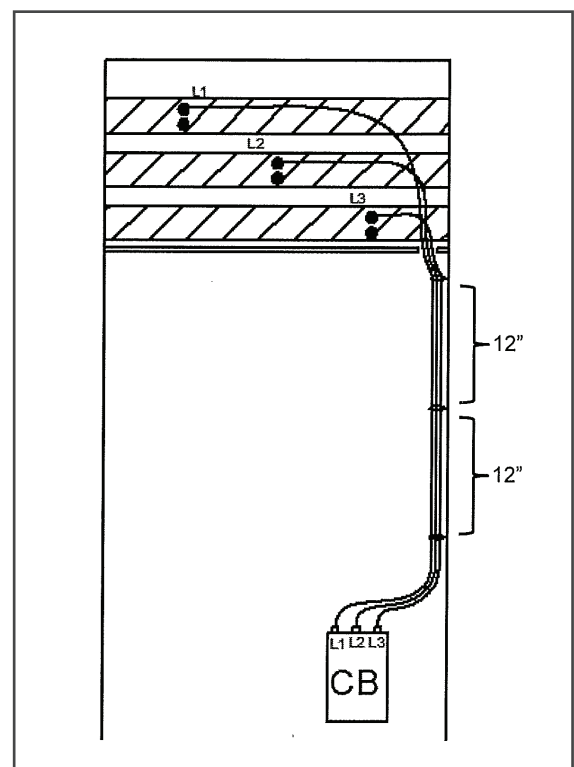


**Figure 16**

**Figure 17**

Units with smaller circuit breakers (< 300A) positioned **anywhere** within a section

- Carefully bend L1, L2, and L3 cables towards the vertical wireway and bundle all three together with a provided wire tie within unit space.
- In 12" increments, secure the bundled cables to the MCC back panel with a provided wire clamp. (See detail in Figure 17).
- Once the bundled cables have been passed into the busway region, connect them to the appropriate busbars, as shown in Figure 17.
- Add wire ties where cables enter into busway region.



**Figure 17**

## 10. Recommended Tightening Torques

When making bolted assemblies, the following considerations should be generally followed:

### 10.1 Metal-to-Metal

Thread Size	Torque (lb-in.)
8 – 32	20
10 – 32	27 – 32
1/4 – 20	75
5/16 – 18	100
3/8 – 16	247
1 – 13	613

10.2 Control Terminals – 11 lb-in  
Apply 2/3 of standard tightening torque.

10.3 400A and 600A fixed mounted unit clamp assembly  
bolts should be tightened to 280 in-lbs.

10.4 Follow torque requirements of individual components  
for motor / load connections.

## 11. Additional Resources

**11.1 MCC Installation Guide:**  
E87010-A0156-T003-A5-MCC

**11.2 Unit Support Assembly Guides:**  
E87010-A0279-T002-A5-MCC  
E87010-A0280-T002-A5-MCC  
E87010-A0281-T002-A5-MCC

### 11.3 6" Unit Handle Instruction Sheets:

11.3.1 125A CB w/Reset –  
E87010-A0269-T003-A5-MCC

11.3.2 125A EG CB w/Reset –  
E87010-A0276-T003-A5-MCC

11.3.3 125A EG CB –  
E87010-A0277-T003-A5-MCC