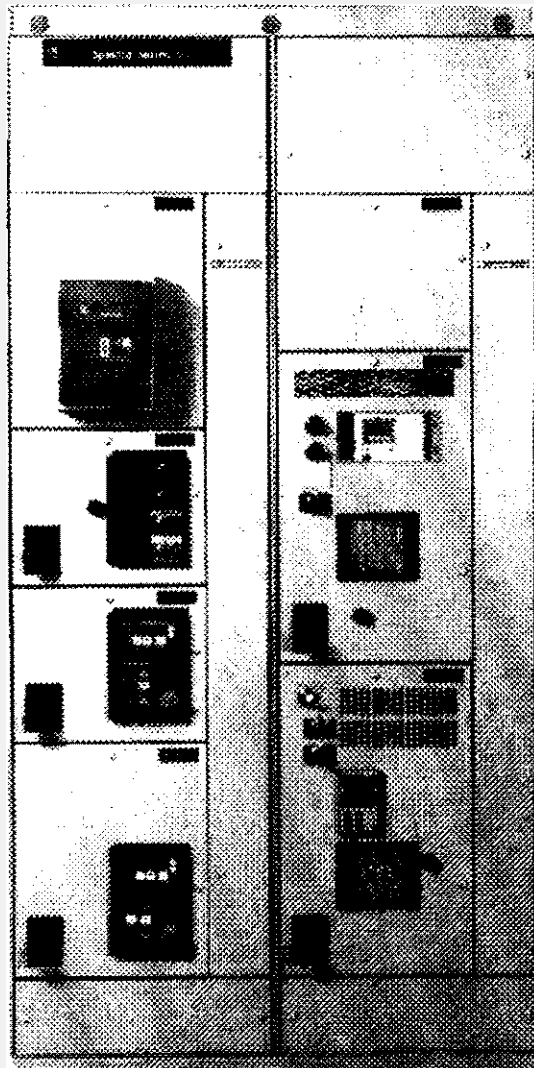


INSTALLATION AND MAINTENANCE INSTRUCTIONS

Spectra Series™/8000-Line Motor Control Centers

GE legacy product
documentation



In 2018 ABB acquired General Electric Industrial Solutions. Spectra Series™/8000-Line Motor Control Centers are now serviced and maintained by ABB. If you need spare parts or your installed equipment has aged and requires modernization or replacement – ABB is your first point of contact (look for contact details on the last page).

ABB provides comprehensive maintenance, diagnostics, and repair services for medium voltage and low voltage electrical apparatus.

The ABB Electrification Service offering is comprised of services that will help you to take care of the equipment, modernize it, and recommend the most appropriate business decisions to guarantee the availability, reliability and sustainability of critical assets and meet your evolving needs.

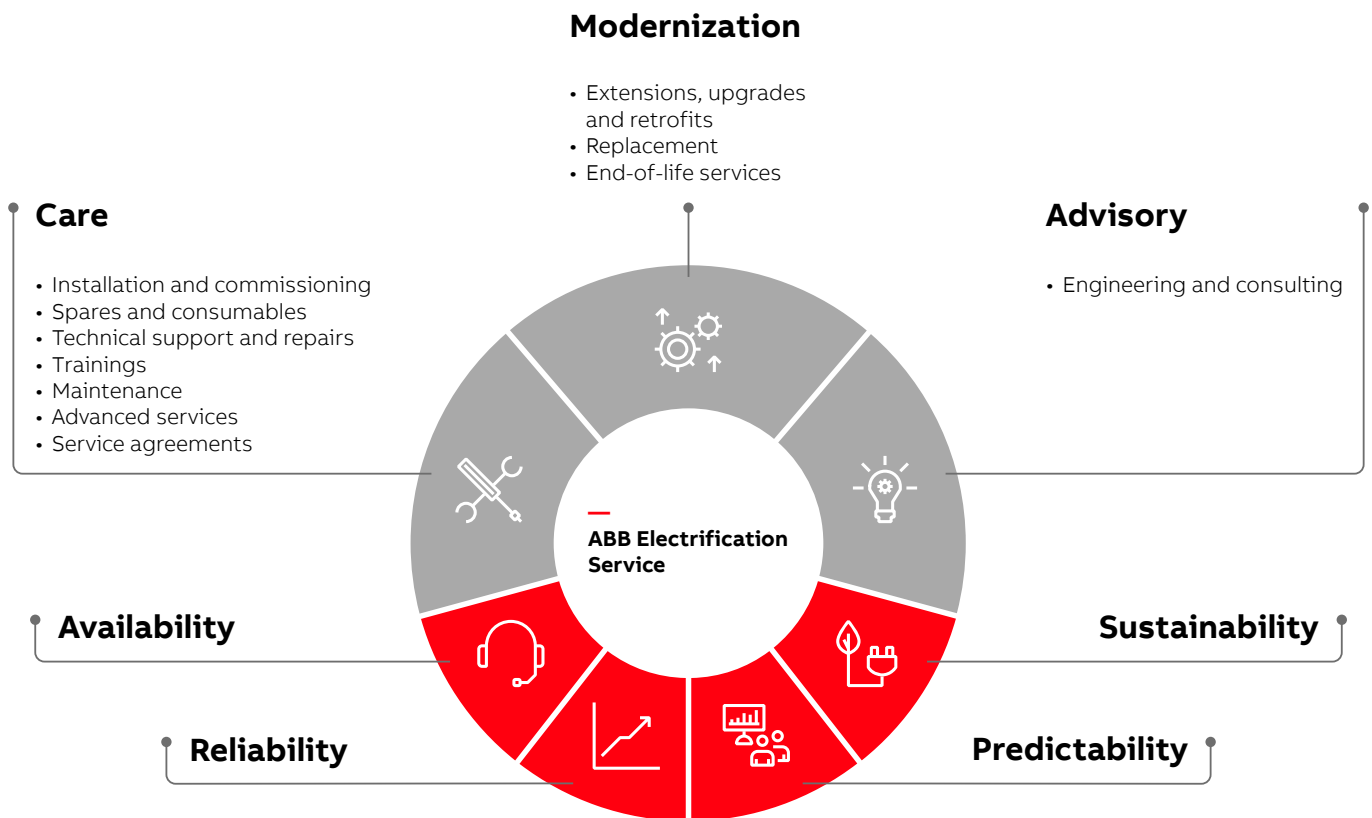


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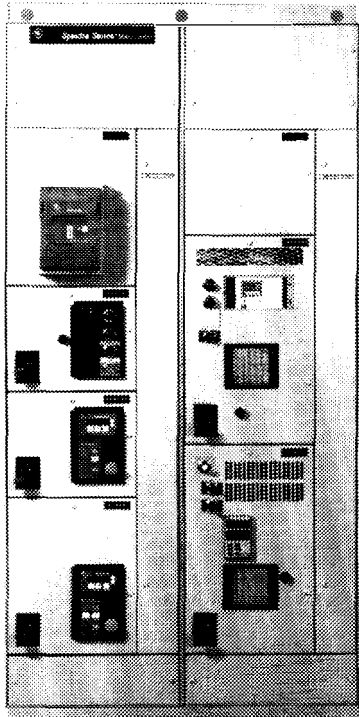


Figure 1. Typical Spectra MCC motor control center with separate vertical wiring trough open on one section.

Caution: Extreme care should be taken when servicing control wiring or removing units for any purpose from an energized control center since power from an external source may still be applied.

General Description

The standard Spectra MCC/8000-Line motor control center vertical section is 20-inches wide by 90-inches high (508 mm by 2286 mm) by 22-inches, 20-inches* or 13-inches deep (558 mm, 508 mm or 330.2 mm) (outside dimensions). Sections are fabricated from 13 gauge sheet steel, shaped, and reinforced to form a rigid, enclosed structure in single- or multiple-section lineups.

One and one-half-inch (38.1 mm) removable floor sills and 3-inch (76.2 mm) lifting angles are furnished as standard. Floor sills and lifting angles add 4½ inches (114.3 mm) to the over-all control center height.

Each vertical section is provided with a minimum 6-inch (152.4 mm) high compartment for horizontal wiring and a 12-inch (304.8 mm) high compartment for horizontal wiring. Master terminal boards are furnished on Type C equipment. 6, 12 or 18" compartments may be located at the top of the section. In back-to-back construction, the 12- (or 18-inch) compartment is always at the top on the rear. If a 12-inch (304.8 mm) compartment is also required at rear bottom, only 5½ X (or 5X) spaces can be used for mounting starters.

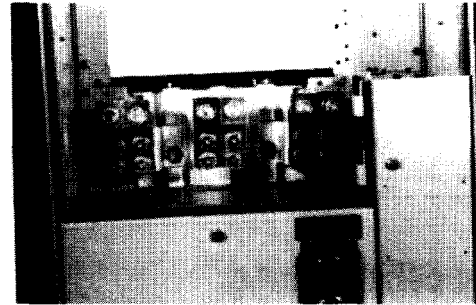


Figure 2. Isolating panel allows access to main and vertical bus joints.

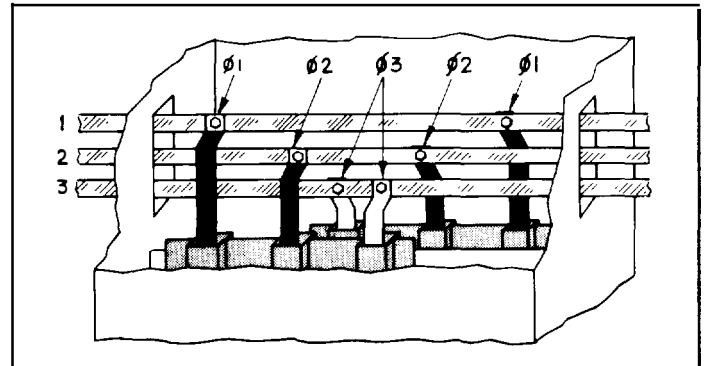


Figure 3. Phase relation of bus in back-to-back sections furnished with two vertical bus assemblies.

Control Center Bus

Each section has a large, full-height separate vertical wiring trough with separate removable hinged door located to the right of draw-out units. See Figure 1.

The main horizontal bus is located at the top of the section. The bus is front accessible by opening the glass polyester isolating panel which isolates the main bus from the top horizontal wiring compartment, Figure 2. All electrical joints and mechanical bracing bolts are front accessible.

Vertical bus, 300, 450, or 600 amperes*, is bolted to the main bus, making the phase relation of main and vertical bus 1-2-3 top-to-bottom and left-to-right respectively, as viewed from the front. A second vertical bus is added, if required, for mounting units in the rear of the section. This requires a minimum 20-inch (508 mm) deep section. The phase relation, shown in Figure 3, of this vertical bus is 1-2-3 left-to-right as viewed from the rear.

Ground bus and/or neutral bus, if required, are located near the bottom of the vertical section. When neutral bus is supplied, each section will have bottom plates.

*Consult motor control center outline drawings for dimensions and ratings of equipment on specific installations.

Spectra Series™/8000-Line Motor Control Centers

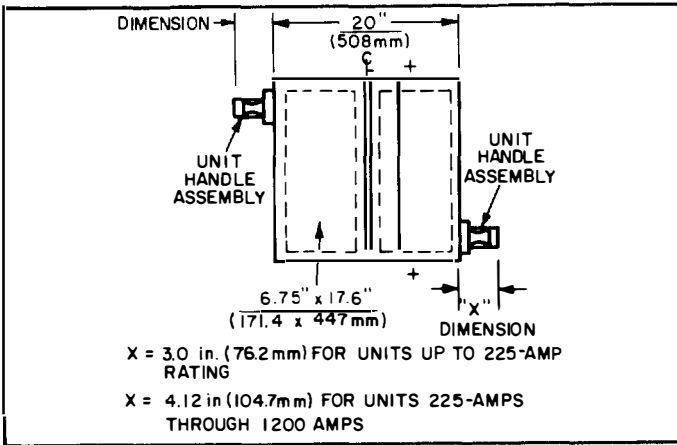


Figure 4. Top view of Spectra MCC/8000-Line illustrating typical unit disconnect handle protrusion.

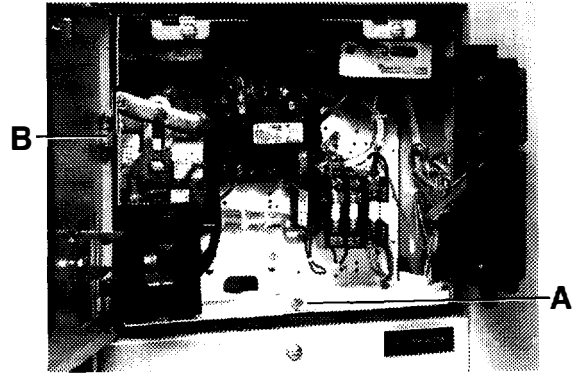


Figure 5. Typical control center starter unit showing (A) disconnect screw and (B) three-piece hinge.

Control Center Units

Consult publication GET-6728 Selection and Application for detailed listings of units available in the Spectra MCC/8000-Line motor control center.

A unit disconnect screw (A), Figure 5, near the base of the draw-out units is used for insertion and removal of units. An optional cover for the unit disconnect screw may be provided to prevent access to the screw unless the unit line disconnect is switched to the OFF position.

Unit stabs are rated 225 amperes maximum; control terminal blocks are rated 25 amperes continuous duty; Size 1 and 2 draw-out power terminal blocks are rated 50 amperes continuous duty. Size 3 and Size 4 power blocks are rated 100 amperes and 150 amperes continuous duty, respectively.

Receiving, Handling, Storage

Receiving

Before leaving the factory, the motor control center is given a final mechanical and electrical inspection and is packed in keeping with best practices for electrical equipment.

Upon receipt of any apparatus, an immediate inspection should be made for any damage or loss of equipment in transit. Information such as description of damage, shipping crate numbers, requisition numbers and panel catalog number should accompany the claim. **Do not remove banding, if present, on vertical bus assembly,** this is required by UL to achieve short circuit ratings.

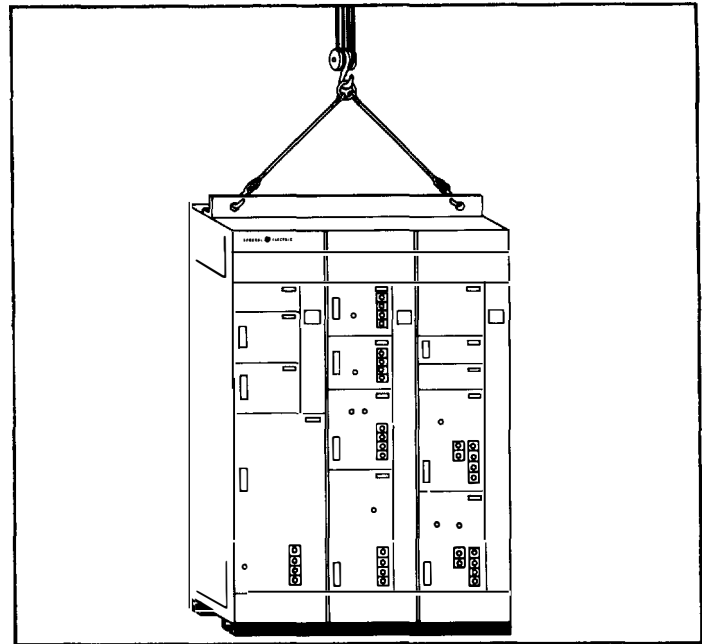


Figure 6. Using standard lifting angles to hoist the control center.

Handling

Control center sections are always shipped in an upright position, in single or group sections. Sections must be maintained in an upright position during all handling.

Never attempt to jack, lift, or move the equipment at points other than the lifting angle or floor sills. Use two or more chains or cables to distribute weight more evenly. Pinch-bars, pipe rollers, or slings are useful implements for handling equipment; but care must be taken to maintain distributed loading and to always apply leverage at the floor sills and/or lifting angle. Figures 6 and 7 show typical handling techniques.

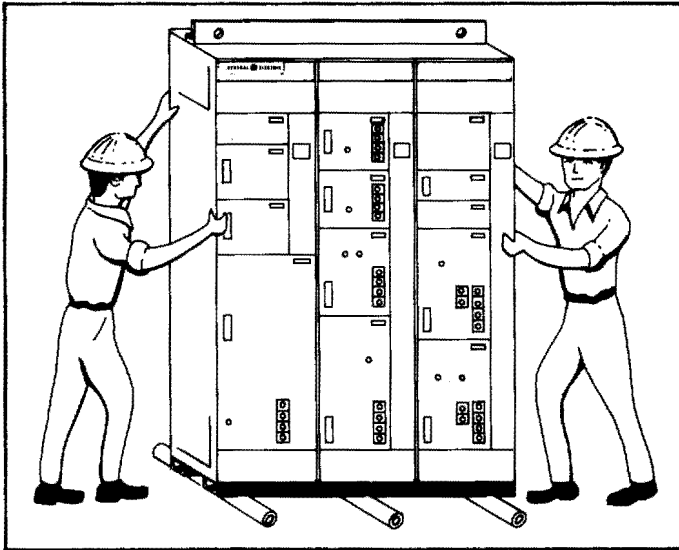


Figure 7. Positioning the control center with rollers.

Storage

Note: If it is necessary to store the equipment for any length of time, the following precautions should be taken:

1. *Uncrate equipment.*
2. *Store in a clean, dry area at moderate temperature. Cover with a suitable canvas or heavy-duty plastic cover to prevent entrance of foreign material.*
3. *If equipment must be stored in cool or damp areas, not only should the equipment be completely covered, but heat should be provided to prevent condensation of moisture in the equipment. Energize space heaters (if furnished in the equipment) or place a standard 120-volt lamp rated 75 watts inside the bottom of each vertical section.*

Before any installation work is done, consult all drawings as well as all applicable contract drawings for the particular installation. Particular attention should be given to the physical location of units in the motor control center and their relation to existing or planned conduits, busways, etc.

Care should be taken to plan for any future conduit entrance in advance of control center installation.

Installation

Installation of Bottom Entry Conduits

Conduits can be stubbed in, once the location of the motor control center lineup has been established.

Conduit should be stubbed approximately 2 inches (51 mm) above the finished floor line. Figures 8 and 9 show conduit entrance space available at the bottom of standard sections. Exceptions to this available space will be indicated on drawings furnished by the Company for specific installations.

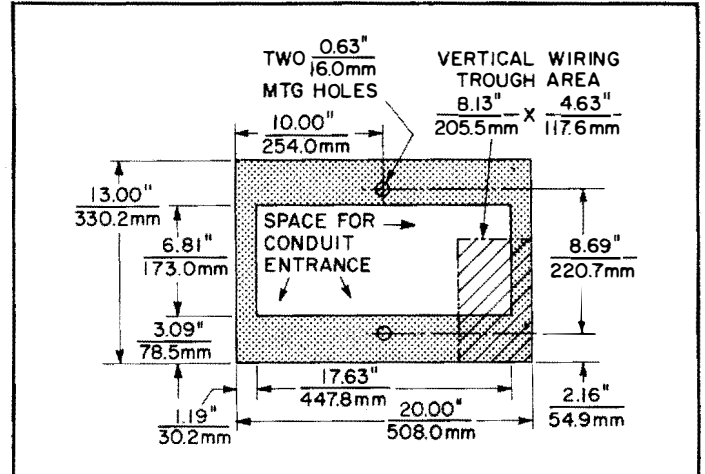


Figure 8. Bottom conduit entrance space 13-inch (330.2 mm) deep section.

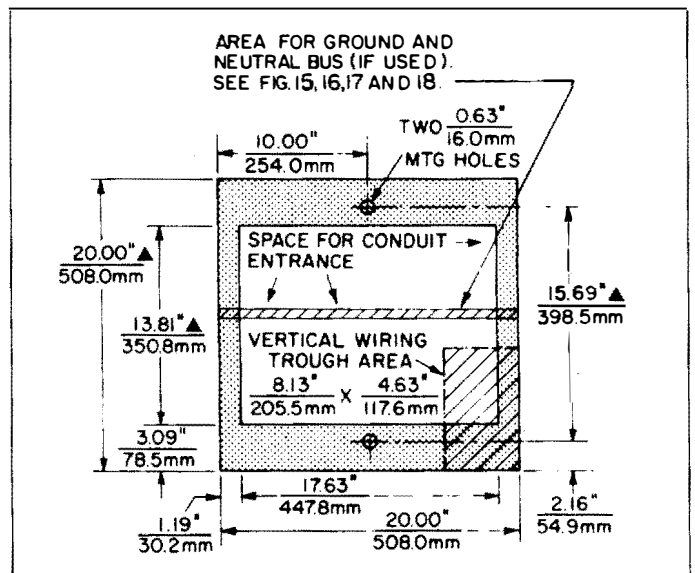


Figure 9. Bottom conduit entrance space 20-inch (508.0 mm) deep section. For 22-inch deep sections, add 2" (50.8 mm) to ▲ dimensions.

Note that if both 20-inch (508.0 mm) deep and 13-inch (330.2 mm) deep sections are in a single lineup, front lineup is required to properly align main bus bars. (See Figure 10.) Additional bracing for Seismic Zones 3 and 4 will restrict this area.

Preparation of Flooring

Attention should be given to providing a level, even foundation for the equipment. The Purchaser may elect, as shown in Figure 10, to install steel members in the floor, properly leveled and grouted, although not normally required.

The over-all height of the equipment should be considered with respect to head room, top conduit entry space, and line-up with other equipment.

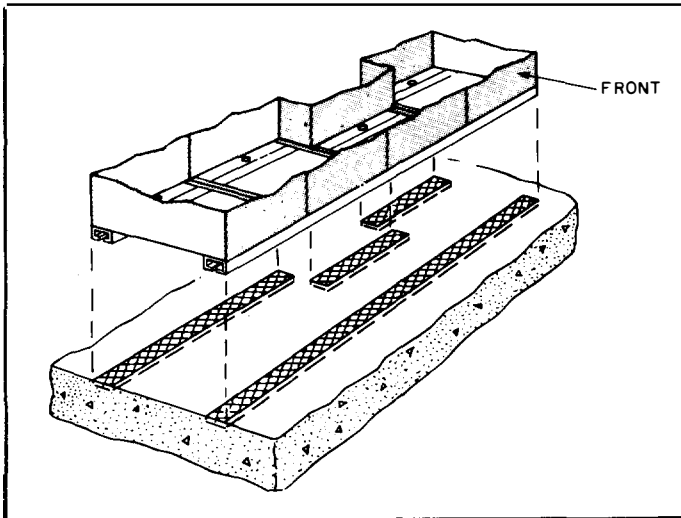


Figure 10. Installing steel floor members (Note front line-up of 13-inch [330.2 mm] deep section.

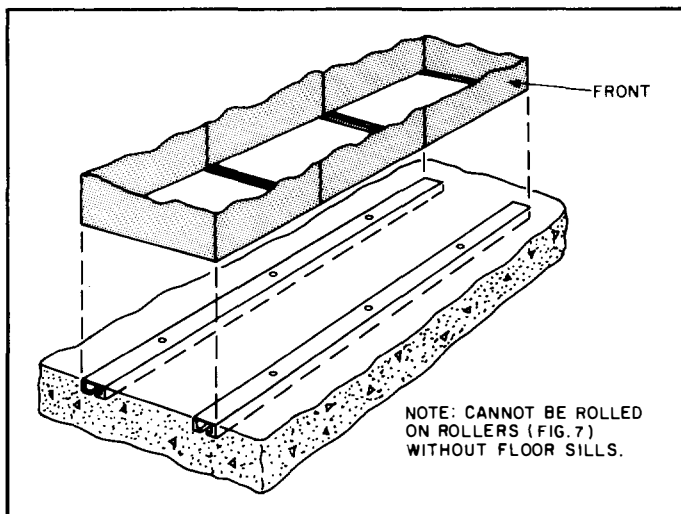


Figure 11. Control center floor sills grouted to floor prior to installation to provide level foundation.

Note: For handle height to be less than 78 inches (198.1 cm) on sections with 6-inch (152.4 mm) wire way on top, the MCC floor sills should be grouted into the floor or removed after MCC has been placed in final position. See Figure 11.

Anchor bolts may be imbedded in the foundation prior to installation, but they must be prelocated per details of Figures 8 and 9, or per drawings furnished by the Company. For shallow-depth (13-inch [330.2 mm]) sections, anchor bolts or some other form of external bracing is needed.

Positioning and Joining Sections

If groups of sections are to be joined together in a final line-up, remove the end cover plates and the plug buttons, Figure 12, from the sides of the section to be joined.

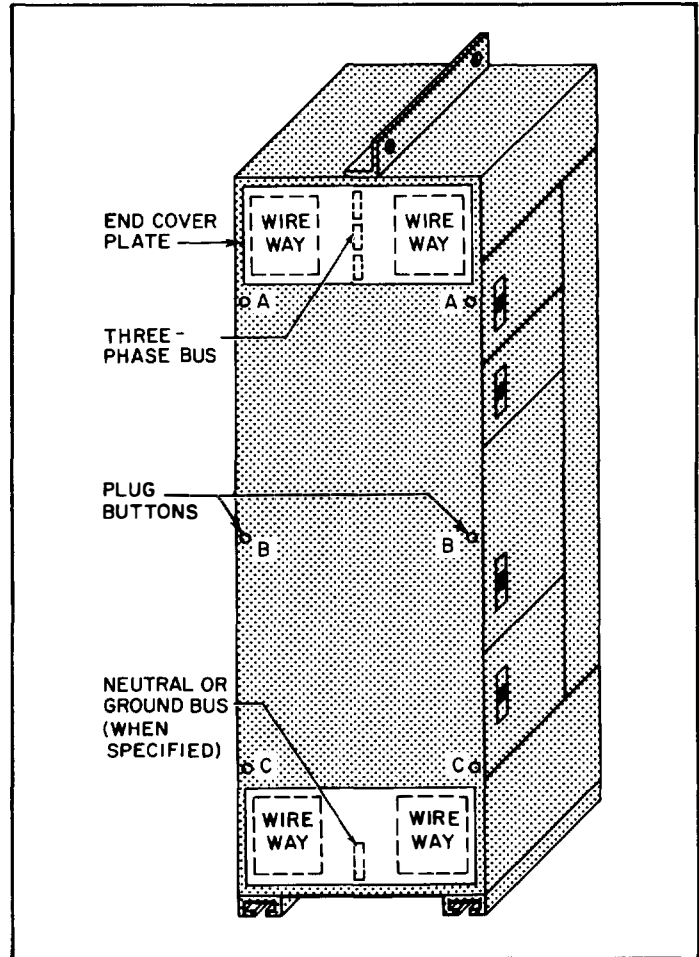


Figure 12. Side view showing cover plates, plug buttons and joining points for 20-inch (508 mm) deep section.

Carefully check and remove any dirt, dust, or bits of packing material from the interior of all sections. Use of a brush, soft cloth, or vacuum cleaner is recommended.

Note: Do not use compressed air if it contains moisture. Remove all hardware packages, drawings, etc., which are shipped with the equipment. Check all nuts, bolts, and electrical joints for tightness.

All cables should be pulled through conduits to a point where they will be accessible after the equipment is in place. Sections can be moved to their final position and properly leveled.

Section side plates, where sections are joined together at installation, should be bolted together at points A, B and C, Figure 12.

Main, neutral, and ground bus splice bars (with all associated hardware) are furnished, as necessary, to join sections together. They are located in the first section to the right of the joint. See Figures 13 through 18 for approximate dimensional data for main, neutral and ground bus. If the sections are furnished with the 6-inch (152.4 mm) horizontal wiring compartment at the top, removal of the top unit and top horizontal barrier is necessary to gain access to the main bus.

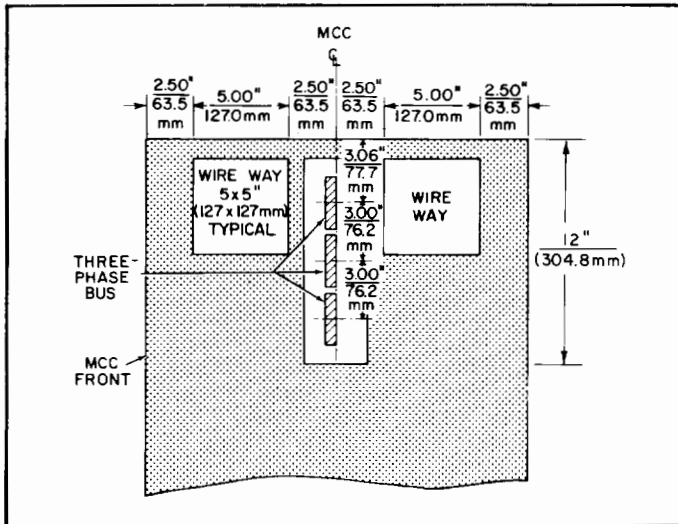


Figure 13. Side view showing top area dimensions for 20-inch (508 mm) deep section with 2-inch (50.8 mm) bus bars.

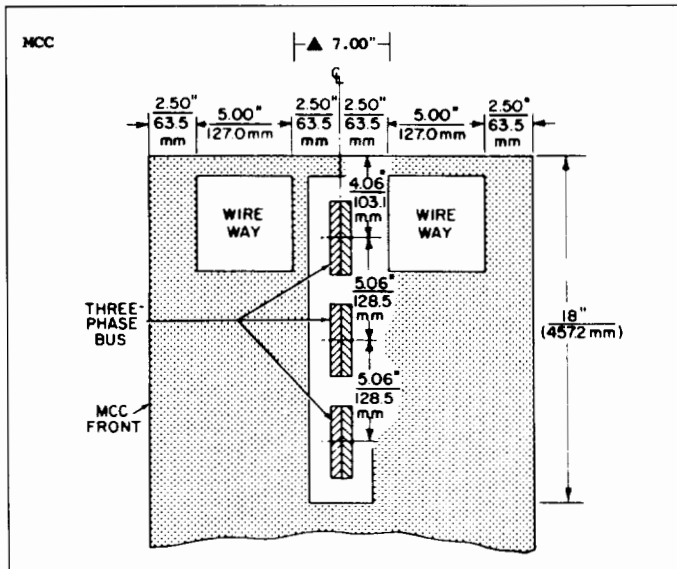


Figure 14. Side view showing top area dimensions for 4" (101.6 mm) bus bars, 20-inch depth shown, 22" deep (▲) has increased main bus depth.

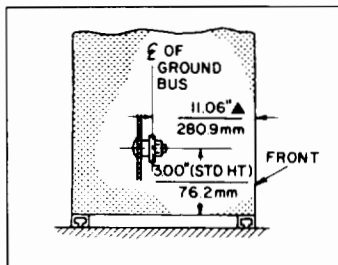


Figure 15. Ground bus bolted directly to section frame.
▲ 13" for 22-inch deep (330.2mm).

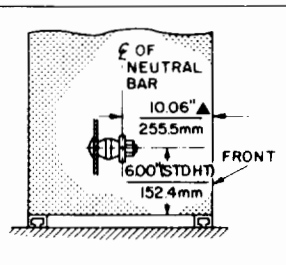


Figure 16. Insulated neutral bus.
▲ 11.5" for 22-inch deep (293mm).

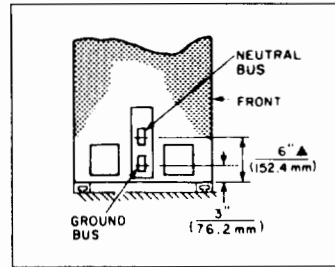


Figure 17. Standard location of ground and neutral bus for the 12-inch (304.8 mm) compartment at the bottom of MCC ("normal position"). ▲ 7" for 22-inch deep (178mm).

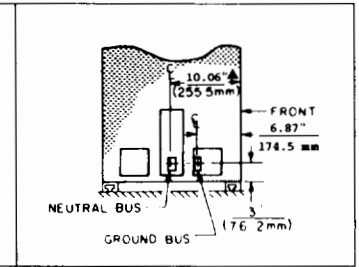


Figure 18. Standard location of ground and neutral bus for the 12-inch (304.8 mm) compartment at the top of MCC ("lowered position"). ▲ 11.5" for 22-inch deep (293mm).

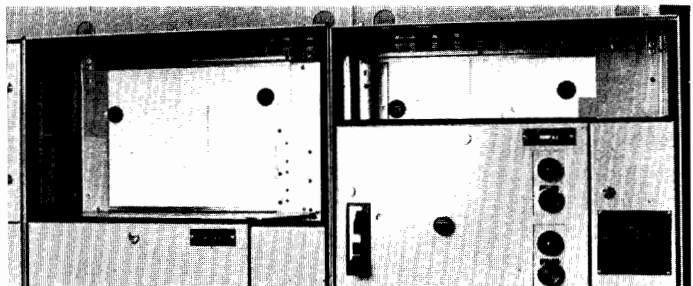


Figure 19. Remove top unit and shelf.

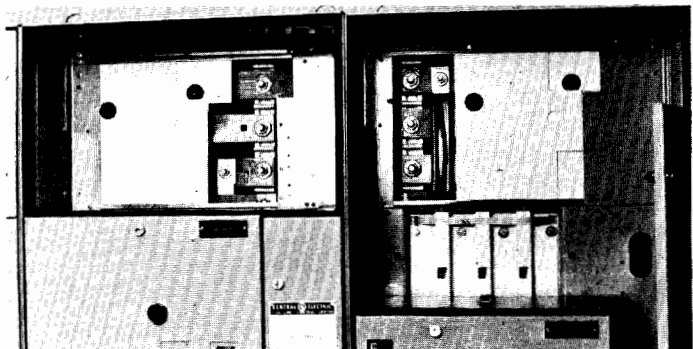


Figure 20. Remove top horizontal shelf and nuts from main bus support studs.

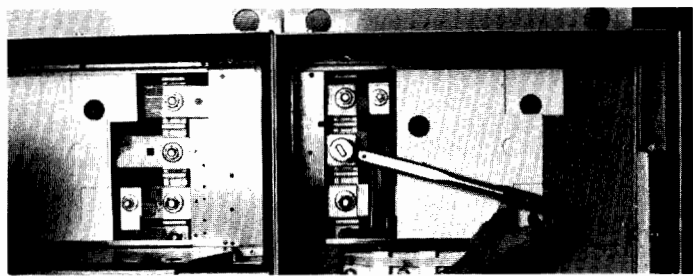


Figure 21. Insert splice bus bar in left-hand section, extend to right-hand section and secure. All joints should be tightened per torque values (TABLE 1). Close isolating panels before replacing top shelves and units.

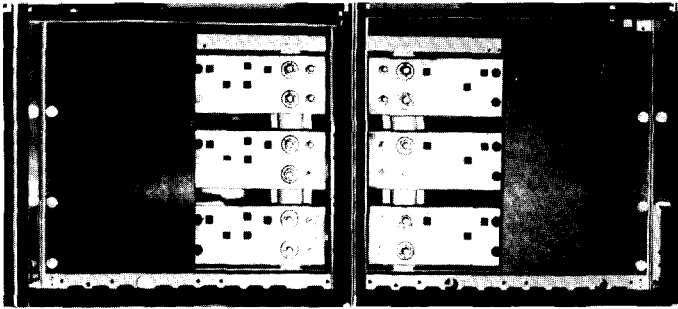


Figure 22. Remove top horizontal shelves (if required), nuts and washers from main bus support studs.

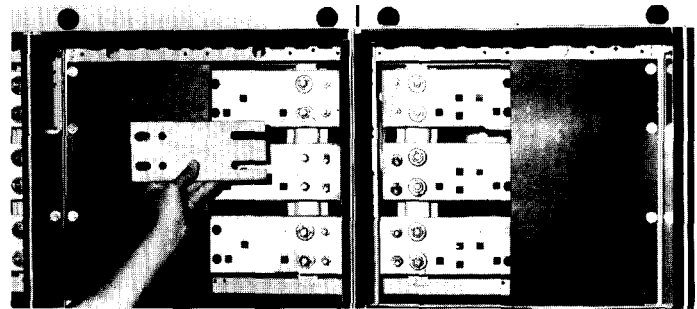


Figure 23. Insert splice plates so that the slotted side is on the right. Replace nuts and washers on bus support studs and tighten per TABLE 1.

Figures 19 through 21 illustrate progressive steps in installing main bus splice plates for the 2-inch (50.8 mm) bus. Figures 22 and 23 illustrate installing main bus splice plates for the 4-inch (101.6 mm) bus. The procedure for installing either bus splice is basically the same. Ground or neutral bus splice plates are similarly installed in the bottom wiring compartment; however, units need not be removed when making neutral and ground bus splices in the bottom horizontal wiring compartment.

After completing main bus splices, all joints should be tightened per TABLE 1 and the main bus isolating panel fully closed.

Table 1. Torque values for medium carbon steel bolts used in motor control center buswork.

Bolt Size	Copper Joints		Aluminum Joints	
	Lb-ft Min	(kg-m)† Max	Lb-ft Min	(kg-m)† Max
3/8 - 16	12 - 16 (1.66-2.21)		11 - 14* (1.52-1.94)	
1/2 - 13	30 - 39 (4.15-5.39)		24 - 27* (3.32-3.73)	
2-inch (50.8 mm) Bus Splice Plate	1/2 - 13	24 - 27* (3.32-3.73)	24 - 27* (3.32-3.73)	
4-inch (101.6 mm) Bus Splice Plate	3/8 - 16	11 - 14* (1.52-1.94)	11 - 14* (1.52-1.94)	
	1/2 - 13	24 - 27* (3.32-3.73)	24 - 27* (3.32-3.73)	
Special 1/2 - 13 Incoming Line Main Lug "T" Bolt		25 - 30 (3.46-4.15)	—	

* Denotes torque requirements for bus joints used in conjunction with a Bellville spring-lock washer. DO NOT OVERTIGHTEN.

† Also known as Newton meter (Nm).

Note: When assembling or connecting to aluminum bus, care should be taken to apply suitable joint compound between contacting surfaces.

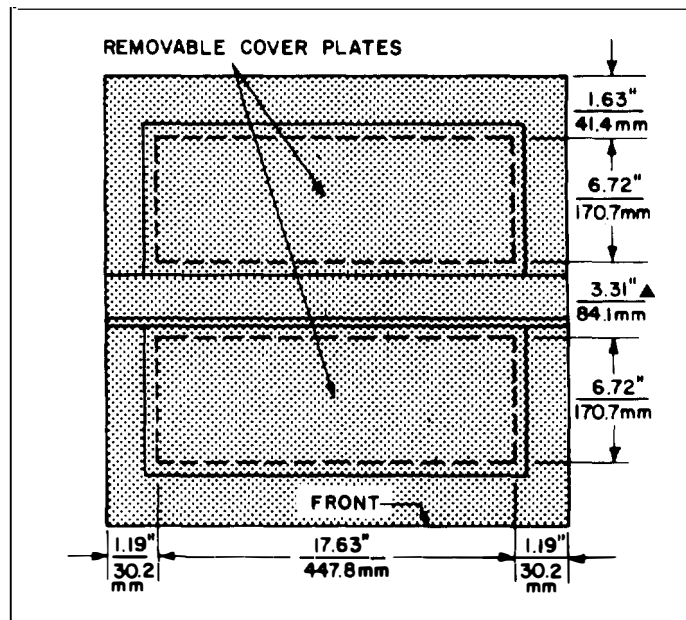


Figure 24. Top conduit entrance space for 22-inch and 20-inch (508 mm) deep section.
▲ 5.51" (138.9mm) for 22-inch deep .

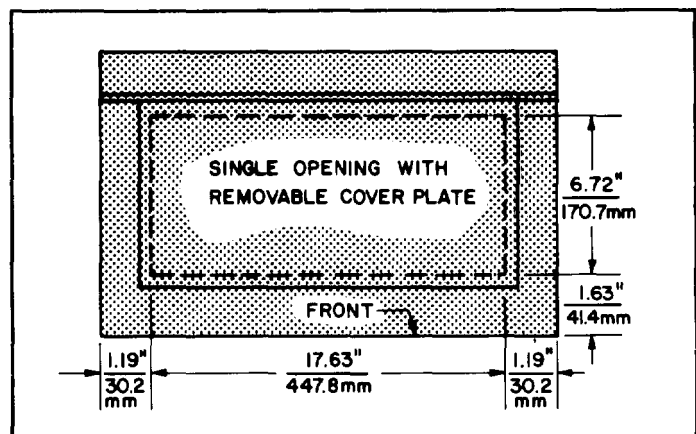


Figure 25. Top conduit entrance space 13-inch (330 mm) deep section.

Installation of Top Entry Conduits

After the motor control center is in place, leveled, and sections joined together, conduits can be brought into the top of sections as required. Figures 24 and 25 show conduit entry space available for conduits entering the top of standard sections. Refer to drawings for deviations on specific installations.

Caution: Always remove top cover plates when drilling holes for conduits. This procedure prevents small metal chips from falling into the panels and causing serious damage.

Equipment Wiring

Main Incoming Power Cables

Main cables normally terminate at the line side of the main motor control center disconnect or at an incoming line lug compartment.

The incoming line lug compartment is normally located approximately 15½ inches (393.7 mm) from either top or bottom of any section, or as specified by the Purchaser. Figures 26 and 27 give details of these lug compartment arrangements.

Note: Refer to motor control center outline drawings for the quantity and size of the in-coming line lugs.

Incoming line lugs are located in the front of the motor control center. When locating conduit for a 20-inch (508.0 mm) deep section, care must be taken to locate conduit in the front portion of available conduit entrance space to avoid any sharp cable bends.

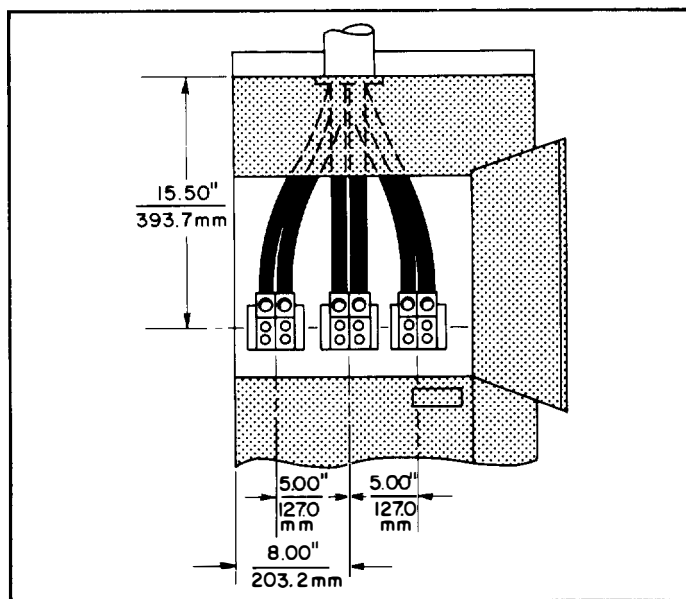


Figure 26. Typical top entry of main cables to incoming line lug compartment.

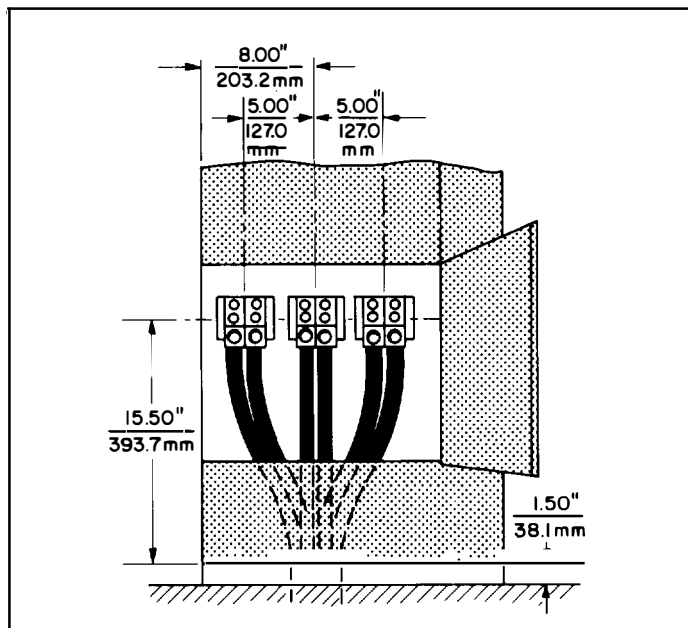


Figure 27. Typical bottom entry of main cables to incoming line lug compartment.

Where the system available short circuit is greater than 14,000 amperes RMS symmetrical, cables should be firmly secured between the top of the enclosure and incoming lugs. If incoming cables run through wire troughs, the cables should be securely clamped on 12-inch (304.8 mm) centers. An insulated bushing at the conduit termination is also recommended.

Individual Unit Wiring

Remove the top and bottom horizontal shelf extensions (Figure 28) to allow full access to the vertical wiring trough for “lay-in” wiring. See Figure 29.

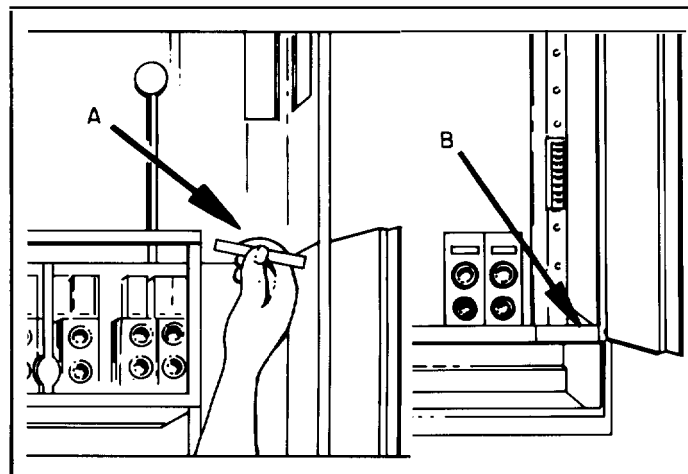


Figure 28. Horizontal shelf extensions (A and B) are removable to facilitate lay-in wiring in the vertical wire trough. Replace shelf extensions when wiring is completed.

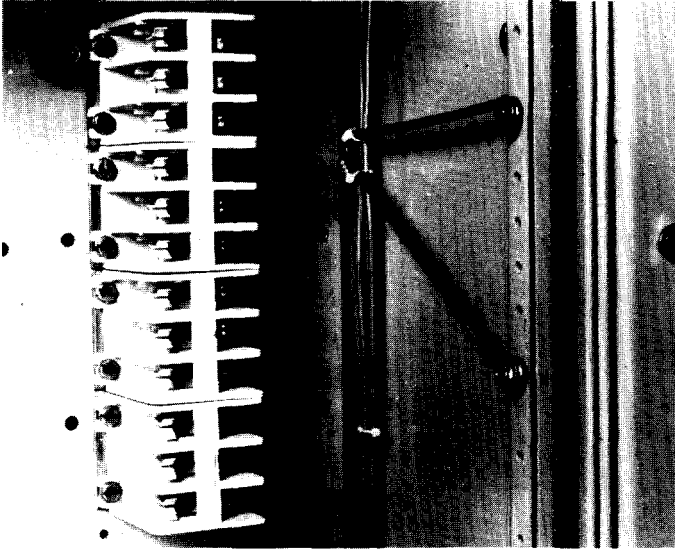


Figure 29. Easily accessible lay-in wiring in vertical wiring trough.

Note: All power wiring from units should be securely tied to the brackets mounted along the right-hand side of the vertical section. Control wiring from each unit should be neatly bundled and wrapped.

Figure 31 shows new style terminal block with locking screw and cam operation.

When making connections with aluminum cable, care should be taken to apply suitable joint compound and to adhere to the instructions of the cable manufacturers.

Note: When installing cables, attention should be given to avoid the possibility of cable insulation being damaged by any sharp edges (steelwork, screws, etc.).

Where access to the rear of section is available, cables can be brought into the space behind the vertical bus and brought forward into the front wire trough area through any of the modular openings in the right-hand steel support plate.

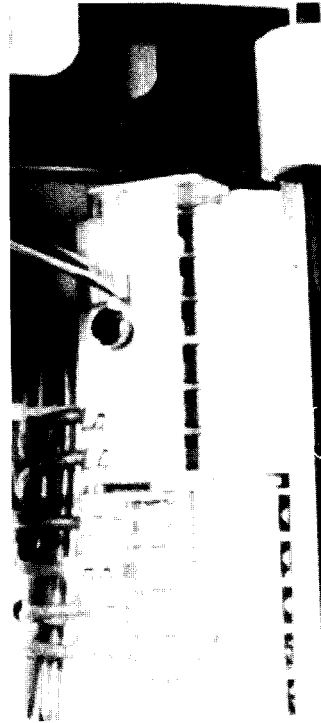


Figure 31. Cam operated pull apart terminal block.

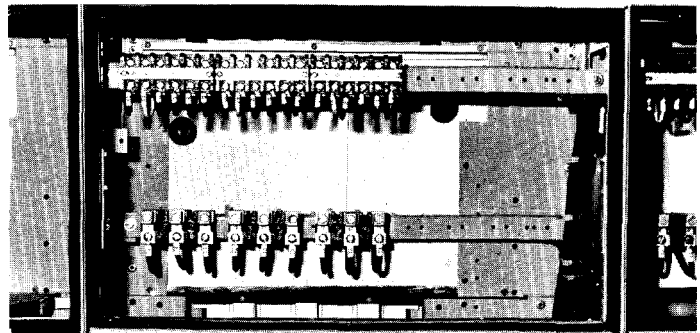


Figure 32. Typical Type C terminal board at top of section.

Wiring Type C Terminal Boards

Type C master terminal boards are always located within the 12-inch (304.8 mm) horizontal wiring compartment.

Figures 32 and 33 show a typical Type C terminal board arrangement. Brackets can be removed and swung outward for easy accessibility without disturbing wiring. Sufficient slack should be allowed in cables connected to terminals so that the terminal boards can be swung out during maintenance.



Figure 33. Typical Type C terminal board at bottom of section.

Wiring Between Sections

See Figure 13 for dimensions of the side cutouts in each vertical section for wiring between sections. Cross wiring may be accomplished at both top and bottom of sections.

Installation of Motor Control Center Units

Any unit ordered separately is shipped from the factory complete with door and associated hardware. The horizontal shelf assembly should be ordered separately if required.

If the space available is larger than the new unit requires, a blank filler door, spacer, and shelf will have to be ordered.

The general procedure for mounting a draw-out unit horizontal shelf assembly, door and associated hardware, in a section is as follows:

1. Select the proper holes in left- and right-hand vertical steel plates for mounting the horizontal shelf (A) and support Bracket (B), Figure 34. The vertical distance (C) is equal to the height of the unit to be installed.
2. Mount shelf assembly (A) and support bracket with 1/4-20 self-threading screws at points (E) as shown in Figure 34.
3. If draw-out terminal blocks are furnished with the unit, install the fixed half of all draw-out blocks in the intended unit space in the section. Figures 35 and 36 show details of mounting. Location of these blocks is determined by alignment with the terminal blocks mounted on the right side of the starter unit. Insert slotted mounting tabs under screw heads (A), Figure 36. Snap dart clip (B) into hole (C), to retain terminal block in proper position. (To aid in the assembly of the dart clip, tool No. 272A5622NXG1 is available as an accessory.) Tighten screws (A). Power blocks to be mounted in the sections are furnished with a box-type lug and are normally to be mounted below control blocks. New style TB are mounted inside the unit, facing the wireway.
4. Before installing the unit, attach the door hinges to the left hand side of the case and mount the door to the case with the hinge pins. Open wiring gutter door, and turn the upper unit latches (A), Figure 37, to a horizontal position. (Larger units are furnished with one or two latches at the top of the unit.)

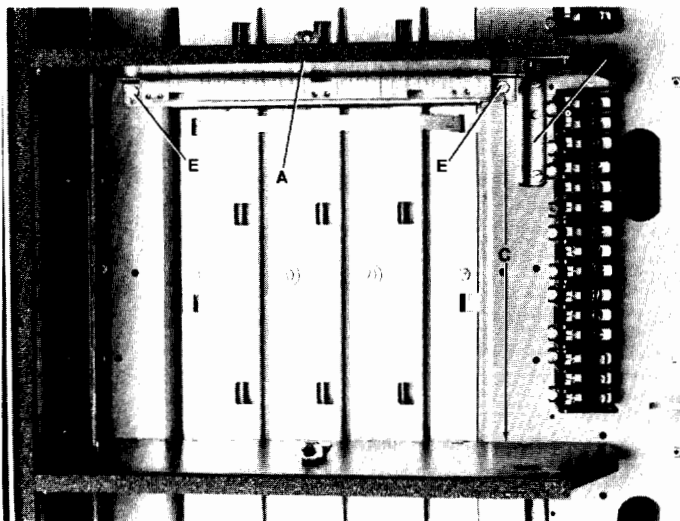


Figure 34. Mounting the horizontal shelf assembly.

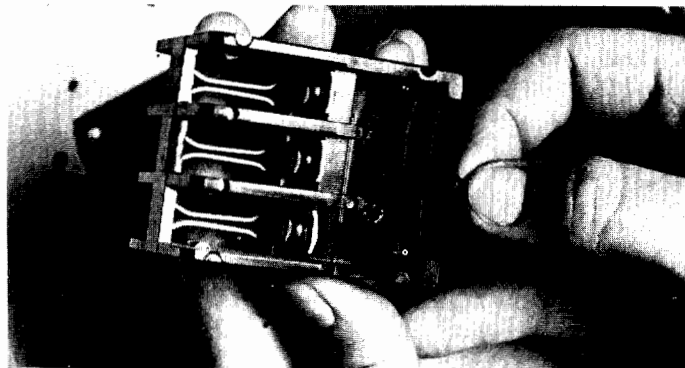


Figure 35. Position snap dart clip to retain terminal block.

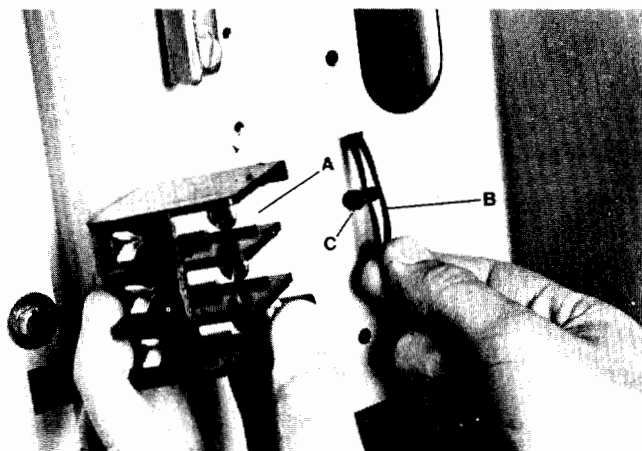


Figure 36. Mounting terminal block.

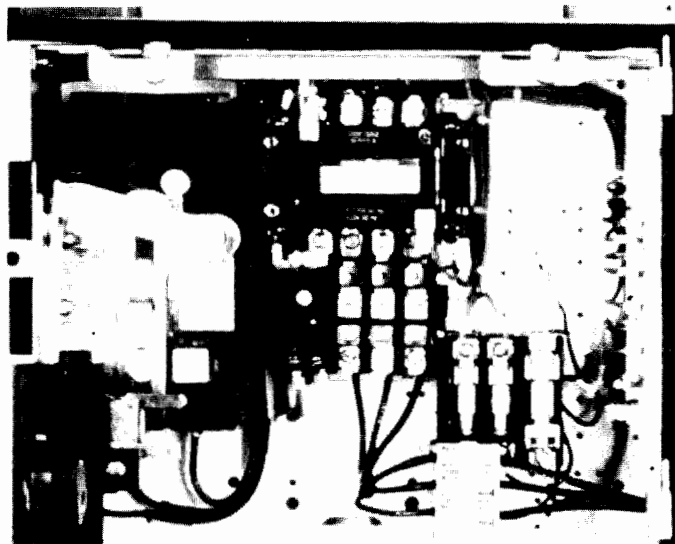


Figure 37. Front view showing the two upper unit latches in the vertical position. Units built after 6/93 have these latches on front crossbar. Prior to this date, latches were located on rear plate.



5. Install the unit by placing the base of the unit on the forward portion of the shelf and sliding the unit into the section. The guide should engage with the slot in the base of the unit.

Note: The unit line disconnect must be in the OFF position to allow access to the unit disconnect screw (when optional cover is provided).

When the disconnect screw engages with the guide, the stabs are not yet in contact with the vertical bus bars. This unit disconnect screw must then be turned by a screwdriver to complete the unit stab engagement with the control center bus. Should any binding be noted during this operation, a careful check should be made for interference with drawout terminal blocks, etc. When the unit is fully racked into the section, the upper unit latches, Figure 37, should be turned one-quarter turn to lock the unit in place. Visually check for full engagement of all terminal blocks on unit with adjacent fixed blocks in section.

6. Tighten screws.

Larger units (reduced voltage starter units, large, two-speed starters, etc.) are normally furnished bolted to the section structure.

All Spectra MCC doors will have the 3 piece hinge configuration on the doors. 8000-Line MCC doors may have an alternate hinge.

Though these units can generally be added in the field, details and degree of complexity will vary.

Optional Shutter Assembly

The unit shutter slides down to cover the stab holes when the draw-out feeder or starter is removed. On racking-in a unit, the back of the unit saddle presses against point A, Figure 37, forcing cover to rise vertically exposing the stab holes in bus. To field install shutter assembly, refer to Figure 38.

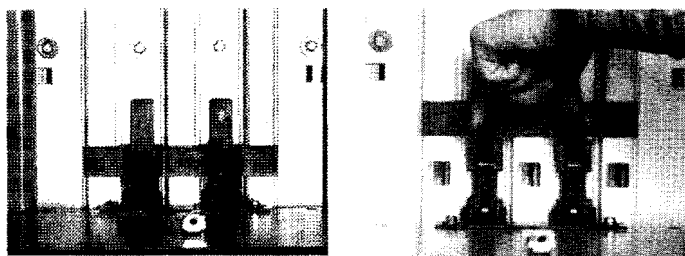


Figure 38. Optional shutter assembly.

Warning: De-energize the control center bus before performing any work in this area.

1. Loosen two screws at Point B, Figure 38, to make a gap of approximately 0.125 inch (3.17 mm) between the flat washer and vertical bus insulator.
2. Insert shutter-assembly mounting tabs under screw heads (B) being certain that mounting slots have bottomed.
3. Tighten two mounting screws (B) to secure shutter assembly to structure.
4. Manually operate shutter assembly to ensure smooth, free vertical movement.
5. Motor control center unit can now be installed.

Warning: Since some units may still have control power applied from an external source even though the unit disconnect has been switched to the off position, extreme care should be taken in removing units from an energized control center.

Removal of Draw-out Control Center Units

Generally, the procedure for removing units is the reverse of that observed for installing units.

1. Switch the unit disconnect to the OFF position; then open unit door and wiring gutter door.
2. Turn one-quarter turn latches on door to open door.
3. Turn upper unit latches one-quarter turn to release top of unit.
4. Turn one-quarter turn latches on wire trough door and open.
5. Actuate cam on new style hi density TB to pull apart terminal blocks.
6. Using screwdriver, rack out unit by turning lower unit disconnect screw counter-clockwise until screw disengages from guide.
7. Slide unit remaining distance out of section, taking care that unit does not drop as it is withdrawn.

Optional Power Lockout Device

The power lockout device is an option available with Size 5 starter units and feeder units rated over 225 amperes. This option allows the unit disconnect to be de-energized from the line power source without having to remove the motor control center from service. The power lockout device may be padlocked in the de-energized position.

Operating Handles and Door Interlocks

All 8000-Line draw-out motor control center units are furnished with the operating handle mounted integral with the unit structure. The integral handle mechanism is equipped with an interlock arm which engages with a catch on the inside of the unit door to prevent inadvertent opening of the door when the branch circuit disconnect is switched ON. Switching to OFF, or turning access screw (A) clockwise, allows access to the unit. See Figure 39.

An optional cover for the unit disconnect screw may be provided to prevent access to this screw unless the branch circuit disconnect is switched to the OFF position. This cover is mechanically linked with the vertical handle such that the branch circuit disconnect must be switched to the OFF position before cover can be actuated to expose the unit disconnect screw.

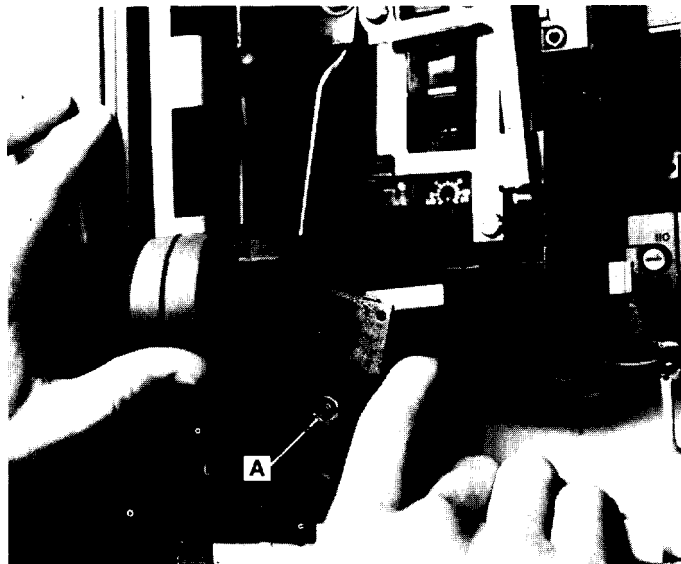


Figure 39. Operating handle and door interlocks.

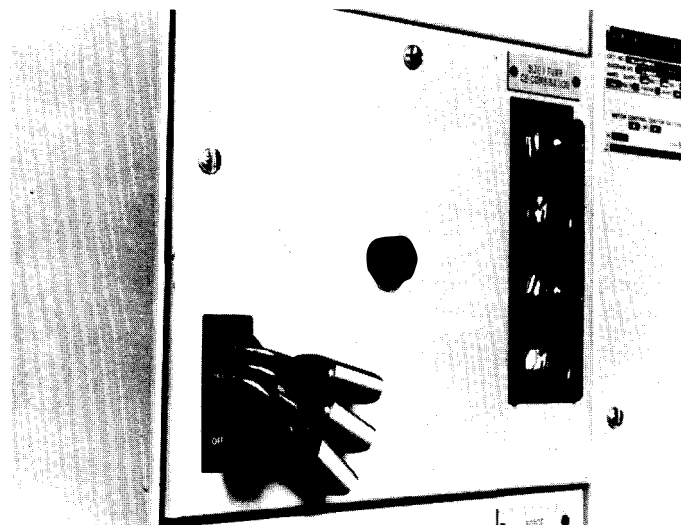


Figure 40. Vertical handle padlocked in OFF position.

Figure 40 also shows the method provided for locking the vertical handle in the OFF position. A drilling pattern is furnished for padlocking in the ON position if desired.

With the unit door open, an interlock prevents switching the branch circuit disconnect ON without first defeating the interlock. To operate any branch circuit disconnect, the interlock arm, Figure 39, must be held in a depressed position while switching the handle to the ON position.

All vertical handles on circuit breakers are trip-indicating. To reset a circuit breaker that has tripped, the handle must be depressed past OFF to the RESET position.

Note: To gain access to fuses on fused-switch units, refer to instructions on unit to lift integral handle mechanism.

Assembly of Standard NEMA 3R

Figure 43 below shows typical assembly of standard non-walk-in NEMA 3R. Construction is similar to GE switchboard design. Refer to MCC drawings for location of bolt-down holes in floor sills.

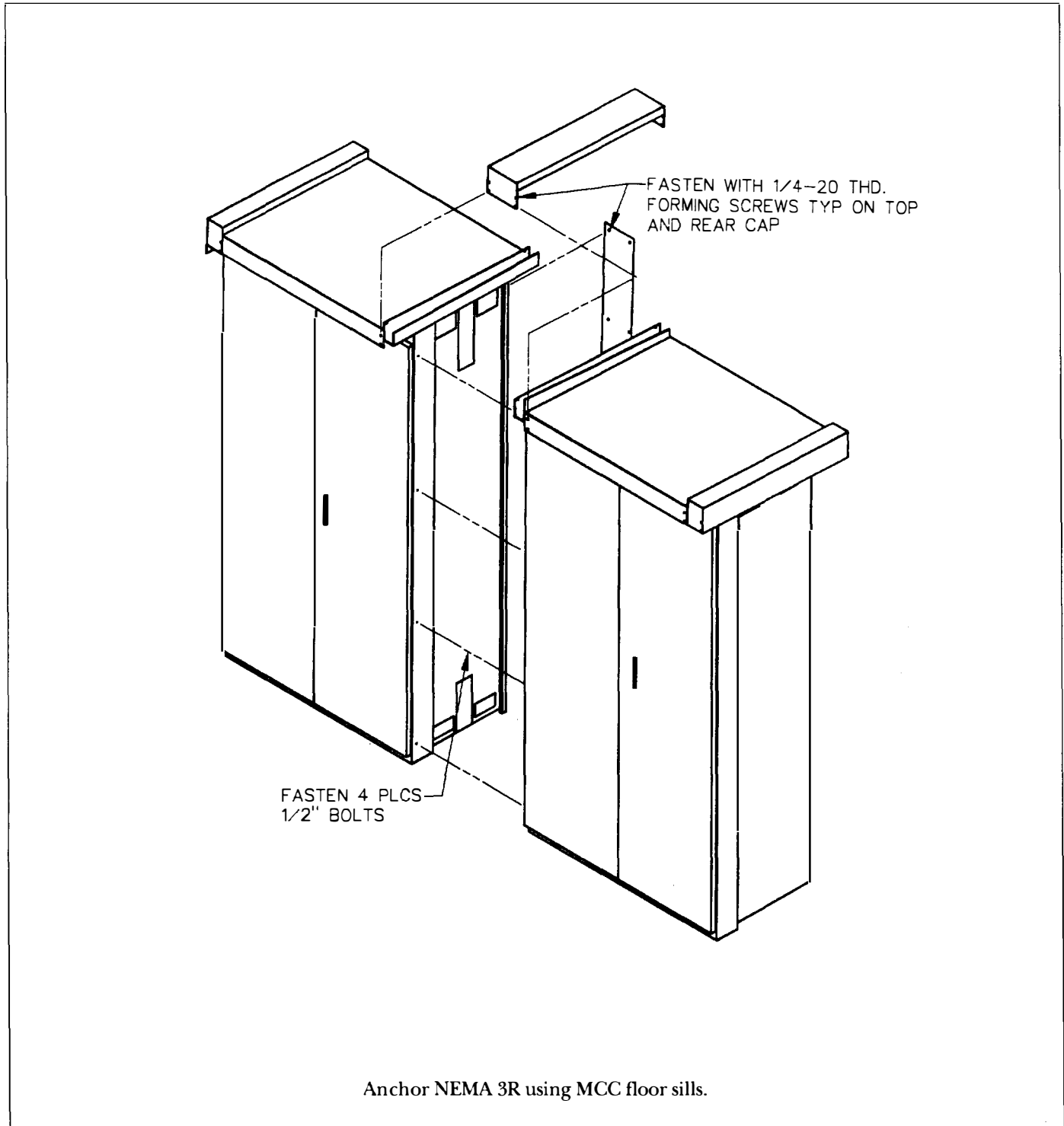


Figure 43. NEMA 3R non-walk-in enclosure standard design – front only.

Assembly of Outdoor Enclosures (cont'd)

Figures 43 through 45 illustrate assembly of outdoor enclosures. Figure 46 shows "details" and "section details" for these drawings. Figure 47 illustrates NEMA 3R recommended anchorage.

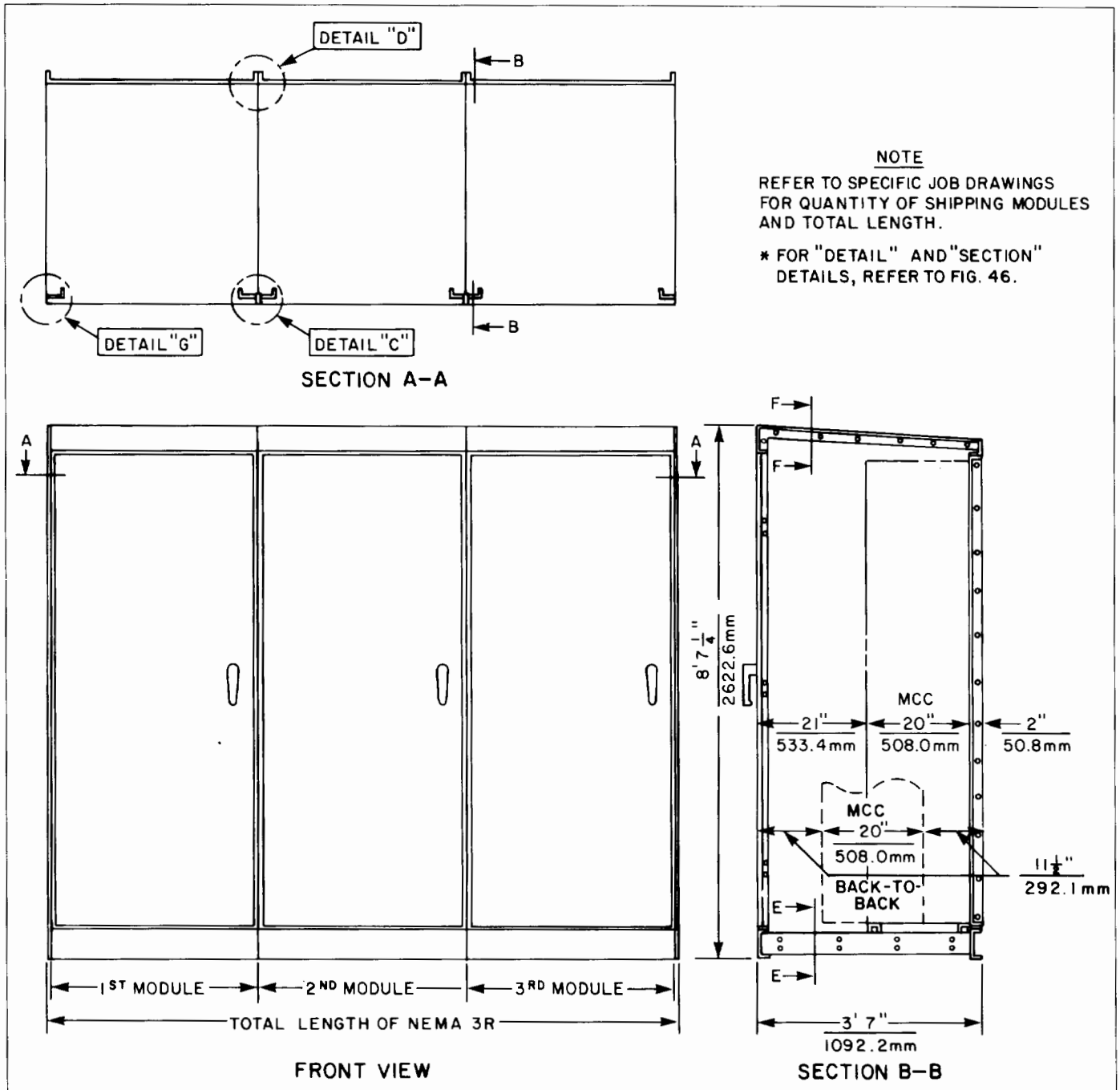


Figure 43A. NEMA 3R non-walk-in enclosure (front only and back-to-back).

Assembly of Outdoor Enclosures (cont'd)

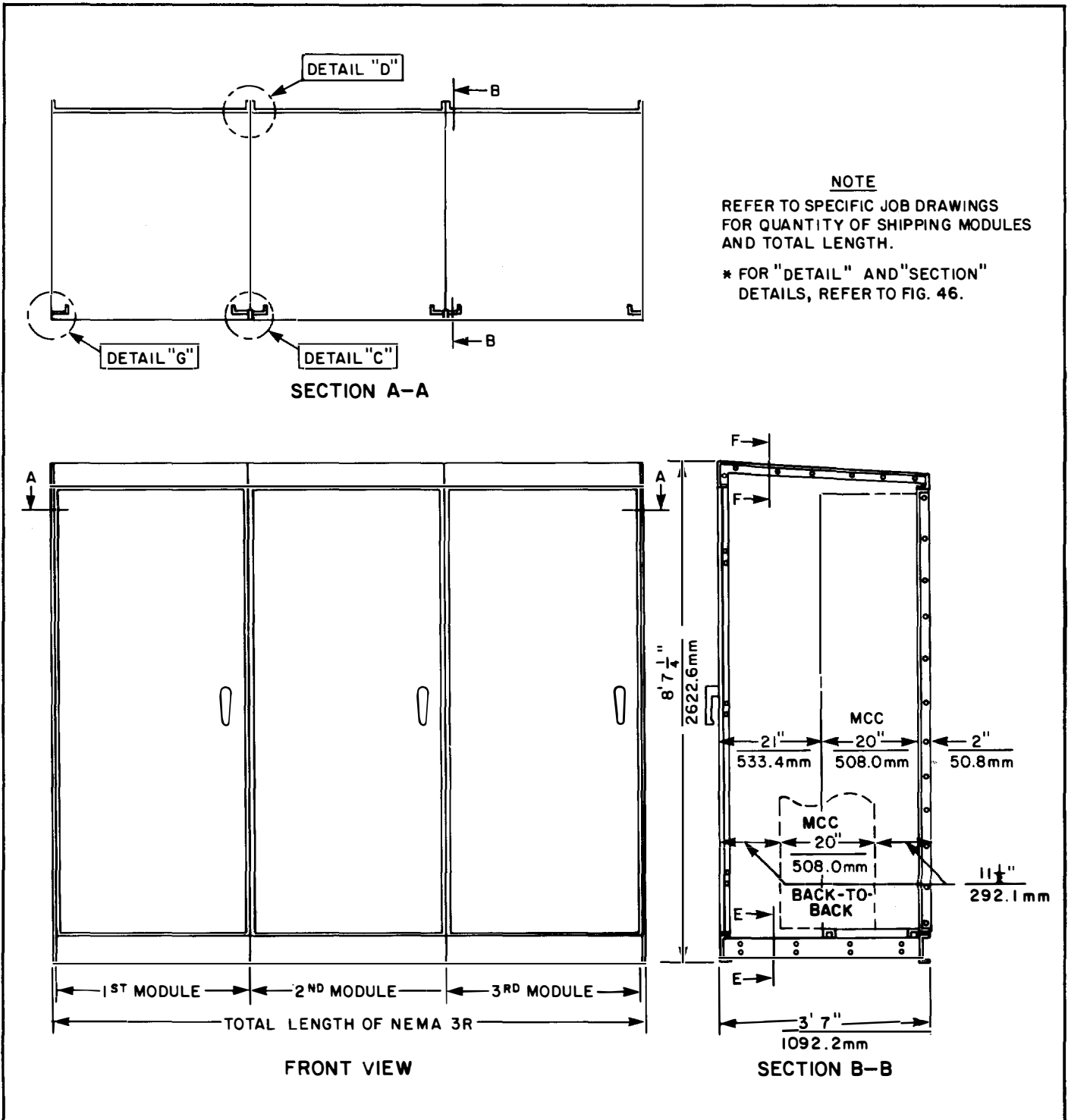


Figure 44. NEMA 3R walk-in enclosure.

Assembly of Outdoor Enclosures (cont'd)

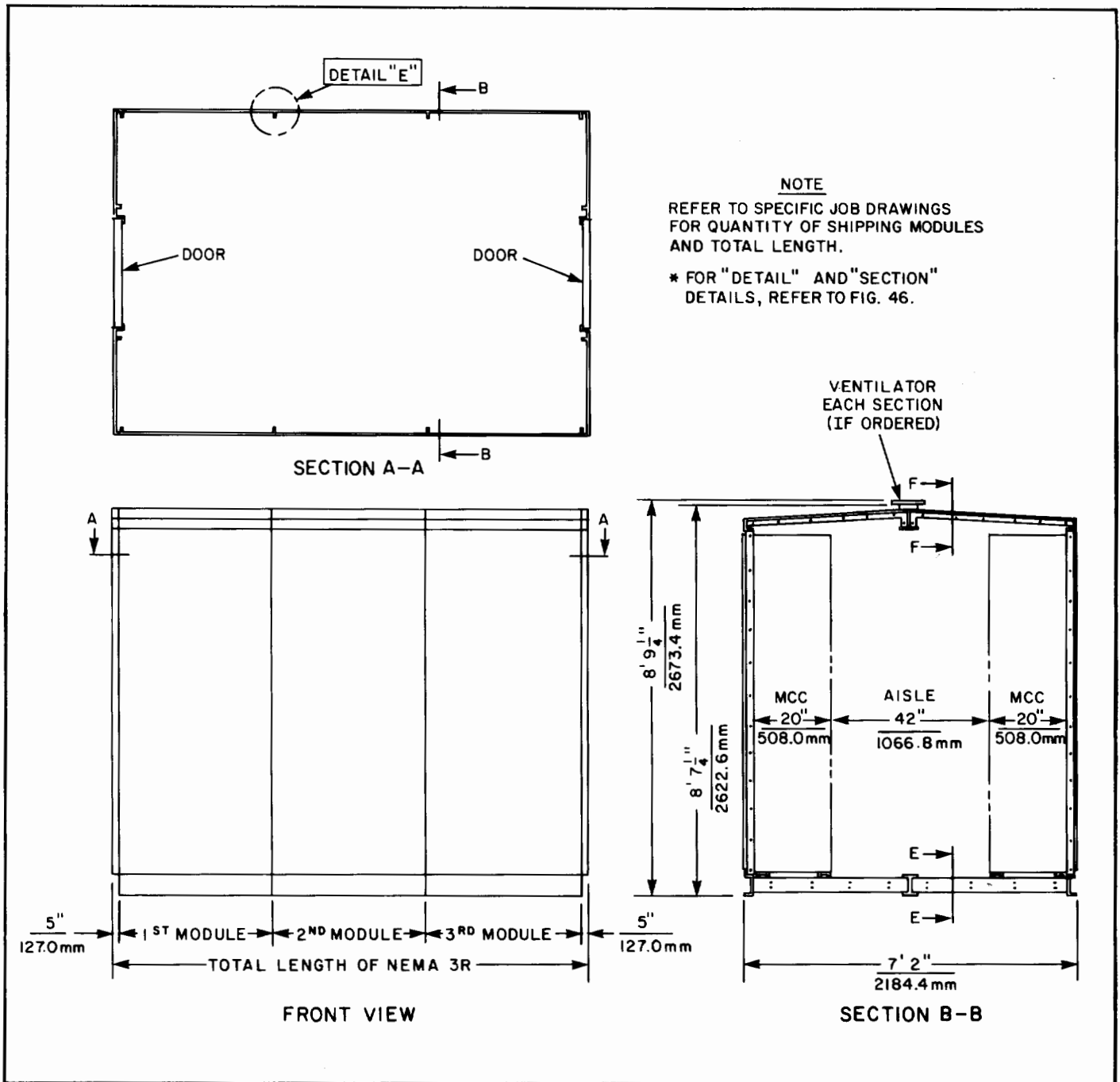


Figure 45. NEMA 3R walk-thru enclosure.

Assembly of Outdoor Enclosures (cont'd)

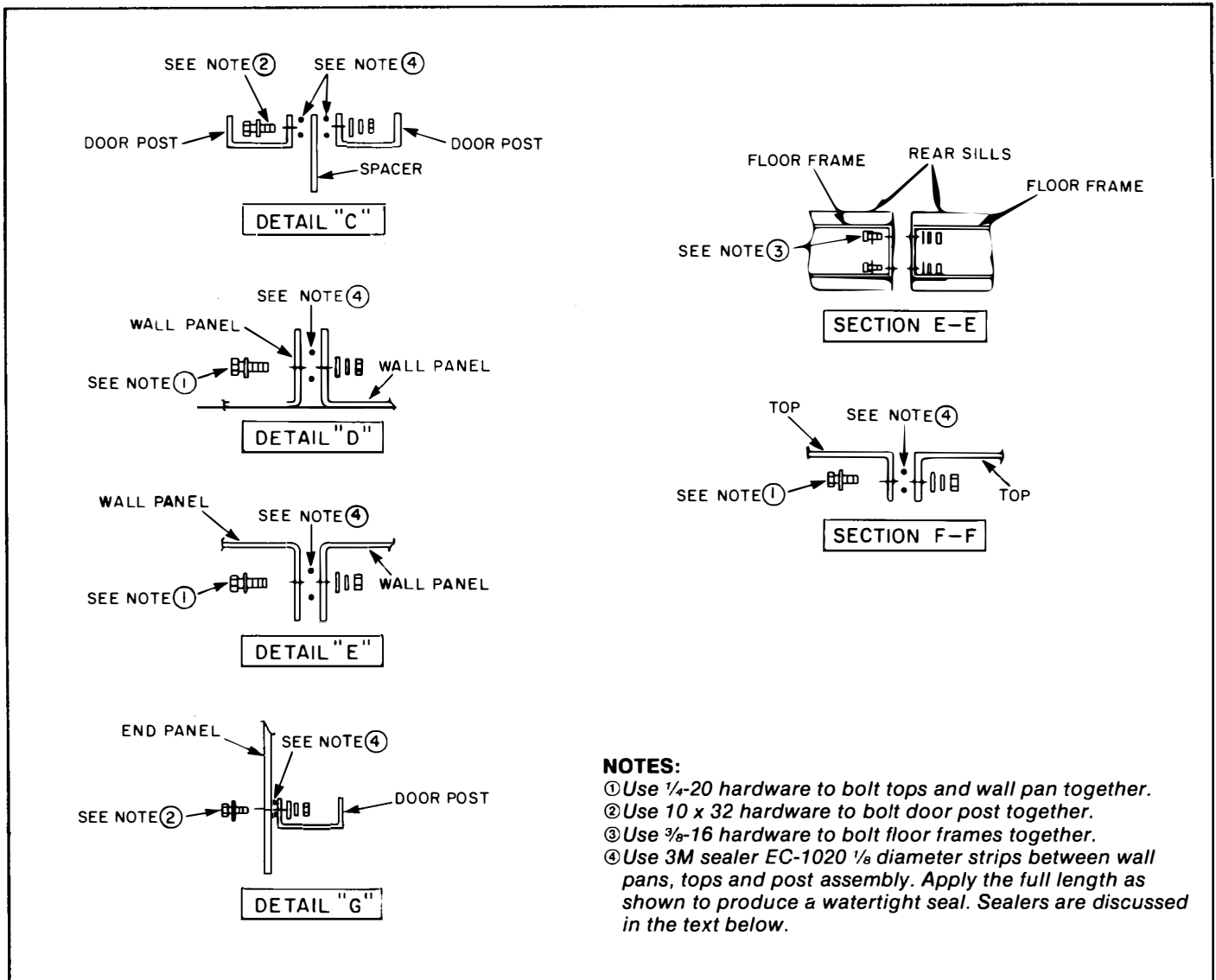


Figure 46. Details for assembly of outdoor enclosure.

Sealers

Purpose

The purpose of the sealer is to form a weathertight seal between exposed joints of enclosures.

Method of application

Place the extruded sealer strip with slight pressure 1/2 inch in from front and rear edge of side of case, except in 1/4 inch in at cutouts. Use two strips, side-by-side, the full height of the case. Also, apply the sealer strip across the top of the side of the case 1/2-inch down.

The approximate total length of sealer required at each junction will be 42 feet for non-walk-in enclosures, 46 feet for walk-in enclosures, and 48 feet for walk-thru enclosures.

Material

The material is 3M sealer, formula EC1020, 1/8-inch diameter extruded bead x 30-inch long strips. It is a product of Minnesota Mining and Manufacturing Co., 700 Grand Ave., Ridgefield, New Jersey.

Assembly of Outdoor Enclosures (cont'd)

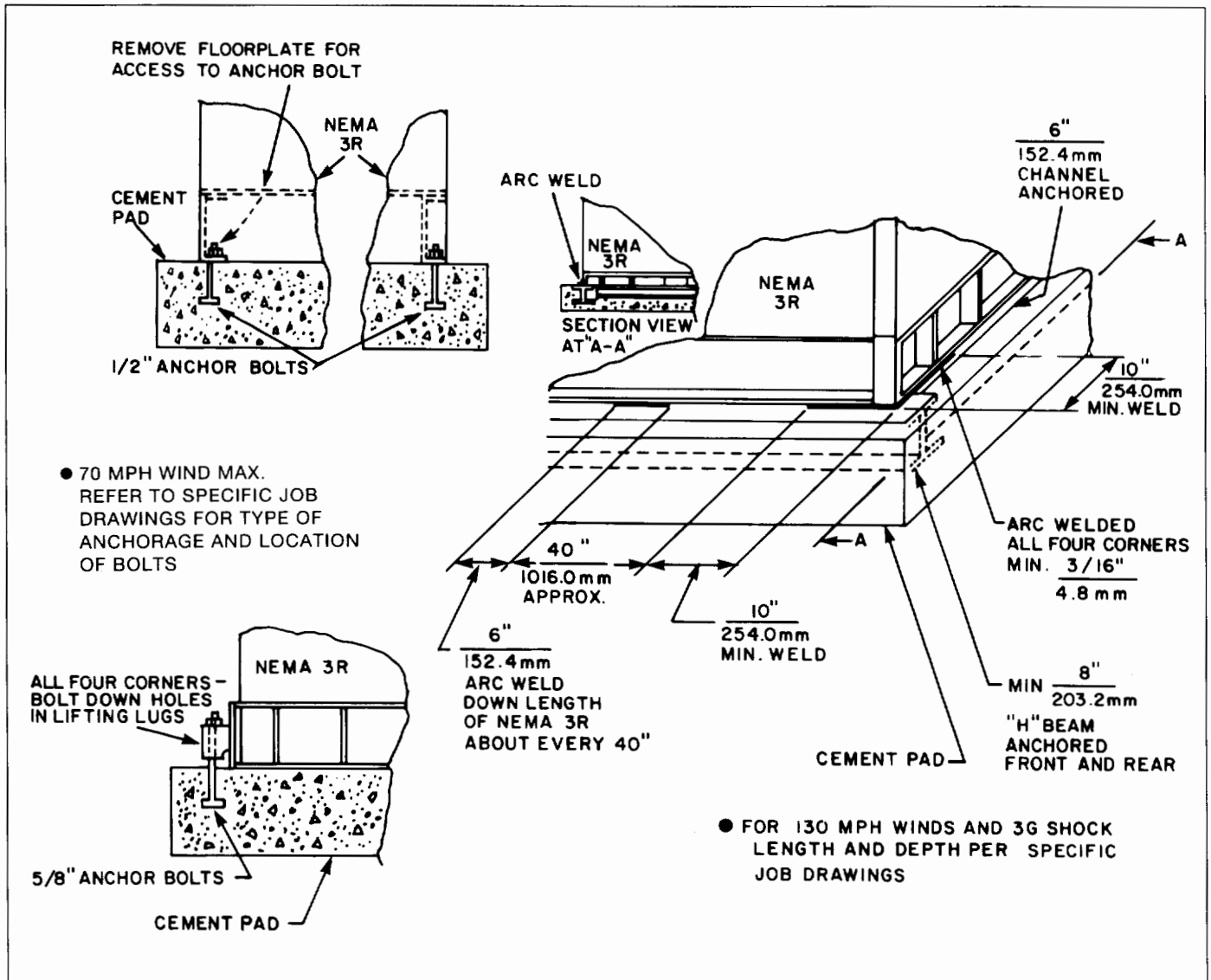


Figure 47. NEMA 3R recommended anchorage.

Operation

Preparation for Initial Operation

In addition to the normal circuit checking after wiring is completed, the following specific actions should be taken before energizing the equipment:

1. Check and tighten any electrical connections (lugs, bus splices, etc.) that may have loosened during shipping, handling and installation. Although all connections are carefully checked at the factory before shipment, good practice dictates that connections, particularly throughout the power circuit, be checked prior to operation. For all bus connections use torque ratings, TABLE 1, page 8.

2. Megger all terminals and bus for grounds. Instruments or control devices sensitive to megger voltage should be isolated from the circuit.

3. Operate each magnetic device by hand to see that all moving parts operate freely. Check all electrical interlock contacts for proper operation.

Note: Certain parts, such as arc chutes, are tied to prevent breakage during shipment. Remove all such ties and make sure the arc chutes are seated properly.

Caution: Do not remove horizontal steel bandings, if present, from vertical bus assembly.

4. Current transformers are shipped with a shunt across the secondary if the circuit is not complete. Remove the shunt after completing connections to transformer secondary.

5. Make sure that the horsepower rating and voltage of the motor agree with the rating stamped on the nameplate of the unit to which it is connected.

6. Check each overload heater against the full-load current listed on each motor nameplate.

Caution: Check current transformer-operated overload relays to be certain an overload heater is in place. Starters should not be operated without overload protection.

7. Check all pneumatic or motor-driven timers for proper time interval settings.

8. Clean interior of equipment with a clean brush, soft cloth, or vacuum cleaner.

9. Close and latch all doors and turn all branch circuit disconnects to the OFF position before energizing the motor control center.

Caution: Make sure that the motor control center enclosure is solidly grounded.

Maintenance of Equipment

The Purchaser should prepare a maintenance program consisting of a checklist of items to be covered periodically on the installed equipment. Although the frequency and extent of the maintenance program will vary with equipment usage, environmental conditions, etc., the following actions should be included in any prepared checklist:

After De-energizing the Equipment

1. Remove accumulated dust and dirt. Use brush, soft cloth or vacuum cleaner.
2. Wipe all main bus insulators and vertical bus barriers.
3. Inspect main and vertical bus joints and main bus supports and tighten if necessary. Refer to TABLE 1, page 8.
4. Inspect all wiring from units for deterioration of insulation.
5. Remove draw-out units and check stabs and all unit wiring. Remove accumulated dust from horizontal shelves and in area of stabs.

6. Check all starter contacts. They need only be replaced when nearly all the silver tip is gone and the contact tip support is exposed. Do not file the contacts. Filing or otherwise dressing the contacts only results in lost tip material and reduces starter life.

7. Check all unit wiring for deterioration of insulation and tighten all connections.

8. Visually check meters and instruments and check critical instrument calibrations.

9. Check unit door interlocks for proper operation.

10. Check all indicating lights and replace as required.

11. If fuse replacement is necessary, always install the same type and rating fuses furnished with the motor control center. Evolution in fuse design has produced fuses which are mechanically equivalent but not electrically equivalent. They may not have the same short-circuit withstandability and current-limiting ability.

Caution: Due to unit interconnections, there may be voltage present in circuits even though branch circuit disconnect is open.

Renewal Parts

Due to the variety of components furnished in the 8000-Line motor control center, stock of spare parts will vary. Consideration should be given, however, to maintaining an adequate supply of the following:

1. Overload heaters
2. Power and control circuit fuses
3. Replacement (starter) contact kits
4. Starter coils
5. Pilot lights
6. Pushbuttons
7. Circuit breakers/fusible switches
8. Extra draw-out terminal blocks
9. Complete starters and/or spare units as warranted by installation needs.

ABB will be glad to assist you in the preparation of recommended parts list tailored to your specific installation.

Ordering Additional or Replacement Units

The following information is needed for the proper equipment to be supplied.

1. All data on motor control center master nameplate.
2. If unit is to be a duplicate of any existing unit, all data on that unit nameplate, located on right side of unit.
3. NEMA control center class: I or II.
4. NEMA wiring type: A, B or C.
5. NEMA enclosure type: 1, 1 Gasketed, 2, 3R, or 12.
6. Power supply: ____ volts, ____ phase, ____ Hertz.
7. Control power: ____ volts, ____ Hertz.
8. Designation: nameplate and title.
9. Motor characteristics: ____ HP, ____ RPM, C° temp. rise, ____ amps FLC, ____ secs. accelerating time, ____ service factor.
10. Disconnect:
 - a. Fusible switch ____ amps, fuse type and clips.
 - b. Circuit breaker: ____ frame, ____ amps.
11. NEMA starter size: 1, 2, 3, 4, 5, 6, or 7.
12. Starter type: FVNR, FVR, RVNR, 2-speed ____ winding.
13. Accessories
 - a. Pushbuttons: START-STOP, FORWARD, REVERSE, UP, DOWN, etc.
 - b. Transfer switch: H-O-A.
 - c. Pilot lights: quantity, color and type.
 - d. Interlocks: quantity NO and NC.
 - e. Control power transformer.
14. Unit X height or space available.
15. Are horizontal shelves or other parts required?
16. Circuitry.
17. All other modifications.

Additional Information

For other information, refer to the nearest sales office of ABB and give full details, including equipment nameplate data. Nameplates are prominently displayed on the motor control center lineup, giving details of service, voltage, frequency, factory order number, etc. Similar nameplates are mounted on each motor control center unit.

Overload Heater Tables

Heaters for Ther-Mag Circuit Breaker Controllers

For continuous rated motors with a service factor of 1.15 to 1.25, select heaters from the heater table. For continuous

rated motors with a service factor of 1.0, multiply the motor full-load current by 0.9 and use this value to select heaters.

Overload relay tripping current in 40°C ambient is the minimum value of full load current multiplied by 1.25.

Warning: *Overload relays with automatic reset may automatically start a motor connected to a 2-wire control circuit. When automatic restarting is not desired, use a 3-wire control circuit.*

Size 0 and 1 (Standard and Ambient Comp.)

Motor Full-Load Amps 3-Ph, 3 Heater	Heater Number CR 123	Motor Full-Load Amps 3-Ph, 3 Heater	Heater Number CR 123
.41-.45	C054A	4.96-5.49	C592A
.46-.49	C060A	5.50-5.91	C630A
.59-.53	C066A	5.92-6.47	C695A
.54-.59	C071A	6.48-7.20	C778A
.60-.65	C078A	7.21-8.22	C867A
.66-.76	C087A	8.23-8.72	C955A
.77-.84	C097A	8.73-9.67	C104B
.85-.93	C109A	9.68-10.4	C113B
.94-1.04	C118A	10.5-11.0	C125B
1.05-1.15	C131A	11.1-12.4	C137B
1.16-1.27	C148A	12.5-13.2	C151B
1.28-1.39	C163A	13.3-15.4	C163B
1.40-1.55	C184A	15.5-17.1	C180B
1.56-1.73	C196A	17.2-18.0	C198B
1.74-1.89	C220A		
1.90-2.05	C239A	Size 1	
2.06-2.28	C268A	17.2-18.1	C198B
2.29-2.47	C301A	18.2-20.0	C214B
2.48-2.79	C326A	20.1-21.5	C228B
2.80-3.31	C356A	21.6-22.5	C250B
3.32-3.70	C379A	22.6-23.9	C273B
3.71-4.06	C419A	24.0-26.3	C303B
4.07-4.47	C466A	26.4-27.0	C330B
4.48-4.95	C526A		

Size 2 (Standard and Ambient Comp.)

Motor Full-Load Amps 3-Ph, 3 Heater	Heater Number CR 123
5.48-5.85	C630A
5.86-6.47	C695A
6.48-7.35	C778A
7.36-8.06	C867A
8.07-9.03	C955A
9.04-9.61	C104B
9.62-10.5	C113B
10.6-11.6	C125B
11.7-12.5	C137B
12.6-13.6	C151B
13.7-16.7	C163B
16.8-17.9	C180B
18.0-18.7	C198B
18.8-20.4	C214B
20.5-22.7	C228B
22.8-24.7	C250B
24.8-26.3	C273B
26.4-29.5	C303B
29.6-32.5	C330B
32.6-36.7	C366B
36.8-41.9	C400B
42.0-43.2	C440B
43.3-45.0	C460B

Note: Data subject to change without notice.

Overload Heater Tables (cont'd)

Provide short circuit protection in accordance with the National Electrical Code.

Warning: Opening of the circuit breaker may be an indication that a fault current has been interrupted. To provide continued protection against fire or shock hazard, all current-carrying parts and other components of the motor controller should be examined and replaced if damaged. If heater burnout occurs, the complete overload relay must be replaced.

Size 3

(Standard)		(Ambient Comp.) (Red Reset)	
Motor Full-Load Amps 3-Ph, 3 Heater	Heater Number CR 123	Motor Full-Load Amps 3-Ph, 3 Heater	Heater Number CR 123
19.0-19.3	F233B	17.8-18.4	F233B
19.4-22.1	F243B	18.5-21.1	F243B
22.2-23.4	F270B	21.2-22.1	F270B
23.5-27.0	F300B	22.2-26.1	F300B
27.1-29.1	F327B	26.2-28.0	F327B
29.2-31.8	F357B	28.1-31.3	F357B
31.9-33.9	F395B	31.4-33.3	F395B
34.0-37.6	F430B	33.4-34.3	F430B
37.7-41.9	F487B	34.4-40.9	F487B
42.0-47.7	F567B	41.0-44.7	F567B
47.8-52.1	F614B	44.8-51.0	F614B
52.2-55.8	F658B	51.1-52.0	F658B
55.9-59.7	F719B	52.1-55.4	F719B
59.8-68.1	F772B	55.5-63.3	F772B
68.2-71.5	F848B	63.4-66.1	F848B
71.6-78.2	F914B	66.2-73.5	F914B
78.3-87.5	F104C	73.6-82.2	F104C
87.6-90.0	F114C	82.3-90.0	F114C

Size 4

(Standard)		(Ambient Comp.) (Red Reset)	
Motor Full-Load Amps 3-Ph, 3 Heater	Heater Number CR 123	Motor Full-Load Amps 3-Ph, 3 Heater	Heater Number CR 123
27.1-32.2	F357B	28.8-32.0	F357B
32.3-34.0	F395B	32.1-34.2	F395B
34.1-36.8	F430B	34.3-36.7	F430B
36.9-44.6	F487B	36.8-43.9	F487B
44.7-48.4	F567B	44.0-46.6	F567B
48.5-53.9	F614B	46.7-52.6	F614B
54.0-57.4	F658B	52.7-55.6	F658B
57.5-60.0	F719B	55.7-58.7	F719B
60.1-69.5	F772B	58.8-67.1	F772B
69.6-71.7	F848B	67.2-70.6	F848B
71.8-79.9	F914B	70.7-76.3	F914B
80.0-92.3	F104C	76.4-88.7	F104C
92.4-97.0	F114C	88.8-93.4	F114C
97.1-108	F118C	93.5-105	F118C
109-118	F133C	106-114	F133C
119-131	F149C	115-128	F149C
132-135	F161C	129-131	F161C
		132-135	F174C

Size 5 (Standard and Ambient Comp.)

Motor Full-Load Amps 3-Ph, 3 Heater	Heater Number CR 123	Motor Full-Load Amps 3-Ph, 3 Heater	Heater Number CR 123
109-118	C592A	185-200	C104B
119-128	C630A	201-221	C113B
129-138	C695A	222-237	C125B
139-155	C778A	238-262	C137B
156-168	C867A	263-270	C151B
169-184	C955A		

Heaters for Mag-Break® Controllers

The Mag-Break protector is factory adjusted to the minimum trip setting.

Warning: To maintain overload, short circuit, and ground fault protection, use the following instructions to select heaters and to adjust the Mag-Break trip setting.

For continuous rated motors with a service factor of 1.15 to 1.25, select heaters from the heater table. For continuous rated motors with a service factor of 1.0, multiply motor full load current by 0.9 and use this value to select heaters.

Use the heater table to verify that the Mag-Break and current limiter rating is correct for the motor full load current. Then set the Mag-Break trip setting to the recommended value.

If the Mag-Break trips when starting the motor, increase trip setting one step at a time until the motor can be consistently started. Do not exceed the maximum trip setting shown in the heater table.

Size 0 and 1 (Standard)

Motor Full-Load Amps 3-Ph, 3 Heater	Heater Number CR 123	TEC & TECL Rating	Mag-Break Trip Setting	
			Rec.	Max.
.65-.74	C087A	3	LO	LO
.75-.84	C097A	3	LO	LO
.85-.92	C109A	3	LO	1
.93-1.02	C118A	3	LO	1
1.03-1.10	C131A	3	LO	2
1.11-1.23	C148A	3	LO	2
1.24-1.38	C163A	3	LO	3
1.39-1.49	C184A	3	LO	4
1.50-1.67	C196A	3	1	4
1.68-1.79	C220A	3	1	5
1.80-1.98	C239A	3	1	6
1.99-2.24	C268A	3	2	7
2.25-2.43	C301A	3	3	8
2.25-2.43	C301A	7	LO	1
2.44-2.75	C326A	7	LO	2
2.76-3.25	C356A	7	LO	3
3.26-3.43	C379A	7	LO	4
3.44-4.03	C419A	7	1	4
4.04-4.43	C466A	7	1	5
4.44-4.94	C526A	7	2	6
4.95-5.36	C592A	7	2	7
5.37-5.77	C630A	7	3	6
5.37-5.77	C630A	15	LO	2
5.78-6.35	C695A	15	LO	2
6.36-6.92	C778A	15	LO	3
6.93-7.99	C867A	15	LO	3
8.00-8.47	C955A	15	1	4
8.48-9.19	C104B	15	1	5
9.20-10.0	C113B	15	1	6
10.1-10.7	C125B	15	2	6
10.8-12.0	C137B	15	2	7
10.8-12.0	C137B	30	LO	2
12.1-12.9	C151B	15	3	8
12.1-12.9	C151B	30	LO	2
13.0-15.1	C163B	30	LO	3
15.2-16.3	C180B	30	LO	4
16.4-17.9	C198B	30	1	4

Size 1

18.0-19.7	C214B	30	1	5
19.8-21.2	C228B	30	1	6
21.3-22.3	C250B	30	2	7
22.4-23.5	C273B	30	2	8
23.6-25.5	C303B	30	3	8
23.6-25.5	C303B	50	LO	3
25.6-27.0	C330B	50	LO	3

Note: Data subject to change without notice.

**Overload Heater Tables
Heaters for Mag-Break® Controllers**

Overload relay tripping current in 40°C ambient is the minimum value of heater full load current multiplied by 1.25.

Warning: Overload relays with automatic reset may automatically start a motor connected to a 2-wire control circuit. When automatic restarting is not desired, use a 3-wire control circuit.

Warning: Tripping of the mag-break may be an indication that a fault current has been interrupted. To provide continued protection against fire or shock hazard, all current-carrying parts and other components of the motor controller should be examined and be replaced if damaged. If heater burnout occurs, the complete overload relay must be replaced.

Size 0 and 1 (Ambient Comp.) (Red Reset Arm)

Motor Full-Load Amps 3-Ph, 3 Heater	Heater Number CR 123	TEC & TECL Rating	Mag-Break Trip Setting	
			Rec.	Max.
.66-.76	C087A	3	LO	LO
.77-.84	C097A	3	LO	LO
.85-.93	C109A	3	LO	1
.94-1.04	C118A	3	LO	1
1.05-1.15	C131A	3	LO	2
1.16-1.27	C148A	3	LO	2
1.28-1.39	C163A	3	LO	3
1.40-1.55	C184A	3	LO	4
1.56-1.73	C196A	3	1	4
1.74-1.89	C220A	3	1	5
1.80-2.05	C239A	3	2	6
2.06-2.28	C268A	3	2	7
2.29-2.47	C301A	3	3	8
2.29-2.47	C301A	7	LO	1
2.48-2.79	C326A	7	LO	2
2.80-3.31	C356A	7	LO	3
3.32-3.70	C379A	7	LO	4
3.71-4.06	C419A	7	1	5
4.07-4.47	C466A	7	1	5
4.48-4.95	C526A	7	2	6
4.95-5.49	C592A	7	2	7
4.95-5.49	C592A	15	LO	1
5.50-5.91	C630A	7	3	8
5.50-5.91	C630A	15	LO	2
5.92-6.47	C695A	15	LO	2
6.48-7.20	C778A	15	LO	3
7.21-8.22	C867A	15	LO	3
8.23-8.72	C955A	15	1	4
8.73-9.67	C104B	15	1	5
9.68-10.4	C113B	15	1	6
10.5-11.0	C125B	15	2	7
11.1-12.4	C137B	15	2	7
11.1-12.4	C137B	30	LO	2
12.5-13.2	C151B	30	LO	2
13.3-15.4	C163B	30	LO	3
15.5-17.1	C180B	30	LO	4

Size 1

17.2-18.1	C198B	30	1	5
18.2-20.0	C214B	30	1	5
20.1-21.5	C228B	30	2	6
21.6-22.5	C250B	30	2	7
22.6-23.9	C273B	30	2	8
22.6-23.9	C273B	50	LO	2
24.0-26.0	C303B	30	3	8
24.0-26.0	C303B	50	LO	3
26.1-27.0	C330B	50	LO	4

Size 2 (Standard)

Motor Full-Load Amps 3-Ph, 3 Heater	Heater Number CR 123	TEC & TECL Rating	Mag-Break Trip Setting	
			Rec.	Max.
8.81-9.27	C104A	15	2	5
9.28-9.99	C113A	15	2	6
10.0-11.1	C125B	15	3	6
11.2-12.1	C137B	15	3	7
11.2-12.1	C137B	30	LO	2
12.2-13.0	C151B	15	4	8
12.2-13.0	C151B	30	LO	2
13.1-15.5	C163B	30	1	3
15.6-16.8	C180B	30	1	4
16.9-18.0	C198B	30	2	5
18.1-19.7	C214B	30	2	5
19.8-21.6	C228B	30	2	6
21.7-23.9	C250B	30	3	7
21.7-23.9	C250B	50	LO	2
24.0-25.5	C273B	30	3	8
24.0-25.5	C273B	50	LO	3
25.6-26.0	C303B	30	3	9
25.6-28.2	C303B	50	LO	3
28.3-31.6	C330B	50	1	4
31.7-34.7	C366B	50	2	5
34.8-37.8	C400B	50	2	6
37.9-40.6	C440B	50	3	7
40.7-43.4	C460B	50	3	8

Size 2 (Ambient Comp.) (Red Reset Arm)

Motor Full-Load Amps 3-Ph, 3 Heater	Heater Number CR 123	TEC & TECL Rating	Mag-Break Trip Setting	
			Rec.	Max.
9.04-9.61	C104A	15	2	5
9.62-10.5	C113A	15	2	6
10.6-11.6	C125B	15	3	7
11.7-12.5	C137B	15	3	8
11.7-12.5	C137B	30	LO	2
12.6-13.0	C151B	15	4	9
12.6-13.6	C151B	30	LO	3
13.7-16.7	C163B	30	1	3
16.8-17.9	C180B	30	1	5
18.0-18.7	C198B	30	2	5
18.8-20.4	C214B	30	2	6
20.5-22.7	C228B	30	2	7
22.8-24.7	C250B	30	3	8
22.8-24.7	C250B	50	LO	2
24.8-26.0	C273B	30	4	9
24.8-26.3	C273B	50	LO	4
26.4-29.5	C303B	50	LO	4
29.6-32.5	C330B	50	1	4
32.6-36.7	C366B	50	2	6
36.8-41.9	C400B	50	2	7
42.0-43.2	C440B	50	3	9
43.3-43.4	C460B	50	3	9

Note: Data subject to change without notice.

Spectra Series™/800-Line Motor Control Centers

Size 3 (Standard and Ambient Comp.)

Motor Full-Load Amps 3-Ph, 3 Heater	Heater Number CR 123	TEC & TECL Rating	Mag-Break Trip Setting	
			Rec.	Max.
17.8-18.4	F233B	30	1	5
18.5-21.1	F243B	30	1	6
21.2-22.1	F270B	30	2	7
22.2-26.0	F300B	30	3	7
26.1-28.0	F327B	50	LO	4
28.1-31.3	F357B	50	LO	4
31.4-33.3	F395B	50	1	5
33.4-34.3	F430B	50	1	6
34.4-40.9	F487B	50	1	6
41.0-43.4	F567B	50	2	8
43.5-44.7	F567B	100	LO	3
44.8-51.0	F614B	100	LO	3
51.1-52.0	F658B	100	1	4
52.1-55.4	F719B	100	1	4
55.5-63.3	F772B	100	1	5
63.4-66.1	F848B	100	2	6
66.2-73.5	F914B	100	2	6
73.6-82.2	F104C	100	2	7
82.3-86.9	F114C	100	3	9

Size 4 (Standard)

Motor Full-Load Amps 3-Ph, 3 Heater	Heater Number CR 123	TEC & TECL Rating	Mag-Break Trip Setting	
			Rec.	Max.
28.8-32.0	F357B	50	1	4
32.1-34.2	F395B	50	2	5
34.3-36.7	F430B	50	2	6
36.8-43.4	F487B	50	3	7
43.5-43.9	F487B	100	1	3
44.0-46.6	F567B	100	1	3
46.7-52.6	F614B	100	1	3
52.7-55.6	F658B	100	1	4
55.7-58.7	F719B	100	2	5
58.8-67.1	F772B	100	2	5
67.2-70.6	F848B	100	3	6
70.7-76.3	F914B	100	3	7
70.7-76.3	F914B	150	LO	1
76.4-86.9	F104C	100	4	8
76.4-88.7	F104C	150	LO	2
88.8-93.4	F114C	150	1	3
93.5-102	F118C	150	1	3
103-110	F133C	150	1	4
111-122	F149C	150	1	4
123-131	F161C	150	2	5

Size 4 (Ambient Comp.) (Red Reset Arm)

Motor Full-Load Amps 3-Ph, 3 Heater	Heater Number CR 123	TEC & TECL Rating	Mag-Break Trip Setting	
			Rec.	Max.
28.8-32.0	F357B	50	2	4
32.1-34.2	F395B	50	2	5
34.3-36.7	F430B	50	2	6
36.8-43.4	F487B	50	3	7
36.8-43.8	F487B	100	LO	2
43.9-46.6	F567B	100	2	3
46.7-52.6	F614B	100	1	3
52.7-55.6	F658B	100	1	4
55.7-58.7	F719B	100	2	5
58.8-67.1	F772B	100	2	5
67.2-70.6	F848B	100	3	6
70.7-76.3	F914B	100	3	7
76.4-86.9	F104C	100	4	8
76.4-88.7	F104C	150	LO	2
88.8-93.4	F114C	150	1	3
93.5-105	F118C	150	1	3
106-114	F133C	150	1	4
115-128	F149C	150	2	5
129-130	F161C	150	2	6

Size 5 (Standard and Ambient Comp.)

Motor Full-Load Amps 3-Ph, 3 Heater	Heater Number CR 123	TJC Adjustable Trip Range	Mag-Break Trip Setting	
			Rec.	Max.
106-115	C592A	550-1670	2	6
116-125	C630A	550-1670	3	7
126-135	C695A	550-1670	3	7
126-135	C695A	1000-3300	LO	3
136-151	C778A	1000-3300	LO	3
152-164	C867A	1000-3300	LO	4
165-179	C955A	1000-3300	1	5
180-195	C104B	1000-3300	2	5
196-215	C113B	1000-3300	2	6
216-231	C125B	1000-3300	3	6
232-255	C137B	1000-3300	4	7
256-270	C151B	1000-3300	4	HI

Size 5 (Standard and Ambient Comp. Overload Relays, Ct Ratio 300/5)

Motor Full-Load Amps 3-Ph, 3 Heater	Heater Number CR 123	Max. TJC Rating	Mag-Break Trip Setting	
			Rec.	Max.
107-119	C268A	400	749	1547
120-129	C301A	400	840	1677
130-145	C326A	400	910	1885
146-173	C356A	400	1022	2249
174-193	C379A	400	1218	2509
194-212	C419A	400	1358	2756
213-233	C466A	400	1491	3000
234-258	C526A	400	1638	3354
259-270	C592A	400	1813	3510

Note: Data subject to change without notice.

**Overload Heater Tables
Heaters for Mag-Break® Controllers**

Size 0 and 1 (Standard)

Motor Full-Load Amps 3-Ph, 3 Heater	Heater Number CR 123	SE Rating Plug	Mag-Break Trip Setting	
			Rec.	Max.
.65-.74	C087A	3	MIN	MIN
.75-.84	C097A	3	MIN	MIN
.85-.92	C109A	3	MIN	MIN
.93-1.02	C118A	3	MIN	2
1.03-1.10	C131A	3	MIN	2
1.11-1.23	C148A	3	MIN	2
1.24-1.38	C163A	3	MIN	3
1.39-1.49	C184A	3	MIN	4
1.50-1.67	C196A	3	MIN	4
1.68-1.79	C220A	3	MIN	5
1.80-1.98	C239A	3	2	5
1.99-2.24	C268A	3	3	5
2.25-2.43	C301A	3	3	6
2.44-2.75	C326A	7	MIN	3
2.76-3.25	C356A	7	MIN	4
3.26-3.43	C379A	7	MIN	4
3.44-4.03	C419A	7	2	4
4.04-4.43	C466A	7	2	5
4.44-4.94	C526A	7	3	5
4.95-5.36	C592A	7	3	6
5.37-5.77	C630A	7	4	6
5.37-5.77	C630A	15	MIN	3
5.78-6.35	C695A	15	MIN	3
6.36-6.92	C778A	15	MIN	4
6.93-7.99	C867A	15	2	4
8.00-8.47	C955A	15	2	5
8.48-9.19	C104B	15	3	5
9.20-10.0	C113B	20	2	4
10.01-10.07	C125B	20	2	5
10.08-12.0	C137B	20	2	5
12.1-12.9	C151B	20	3	5
13.0-15.1	C163B	20	4	6
12.1-12.9	C151B	20	3	5
13.0-15.1	C163B	20	4	6
15.2-16.3	C180B	25	3	5
16.4-17.9	C198B	25	3	6
Size 1 (Standard)				
18.0-19.7	C214B	30	3	5
19.8-21.2	C228B	30	3	5
21.3-22.3	C250B	30	3	5
22.4-23.5	C273B	40	2	5
23.6-25.5	C303B	40	3	5
25.6-27.0	C330B	40	3	5

Size 0 and 1 (Ambient Comp.)

Motor Full-Load Amps 3-Ph, 3 Heater	Heater Number CR 123	SE Rating Plug	Mag-Break Trip Setting	
			Rec.	Max.
.66-.76	C087A	3	MIN	MIN
.77-.84	C097A	3	MIN	MIN
.85-.93	C109A	3	MIN	MIN
.94-1.04	C118A	3	MIN	2
1.05-1.15	C131A	3	MIN	2
1.16-1.27	C148A	3	MIN	3
1.28-1.39	C163A	3	MIN	3
1.40-1.55	C184A	3	MIN	4
1.56-1.73	C196A	3	2	4
1.74-1.89	C220A	3	2	5
1.90-2.05	C239A	3	2	5
2.06-2.28	C268A	3	3	5
2.29-2.47	C301A	3	3	6
2.48-2.79	C326A	7	MIN	3
2.80-3.31	C356A	7	MIN	4
3.32-3.70	C379A	7	2	4
3.71-4.06	C419A	7	2	4
4.07-4.47	C466A	7	2	5
4.48-4.95	C526A	7	3	5
4.96-5.49	C592A	7	3	6
5.50-5.91	C630A	15	4	6
5.92-6.47	C695A	15	MIN	3
6.48-7.20	C778A	15	MIN	3
7.21-8.22	C867A	15	2	4
8.23-8.72	C955A	15	2	4
8.73-9.67	C104B	15	3	5
9.68-10.4	C113B	20	2	4
10.5-11.0	C125B	20	2	4
11.1-12.4	C137B	20	2	5
12.5-13.2	C151B	20	3	5
13.3-15.4	C163B	20	4	5
15.5-17.1	C180B	25	3	6
Size 1 (Ambient Comp.)				
17.2-18.1	C198B	25	3	5
18.2-20.0	C214B	30	3	5
20.1-21.5	C228B	30	3	5
21.6-22.5	C250B	30	3	5
22.6-23.9	C273B	40	2	5
24.0-26.0	C303B	40	3	5
26.1-27.0	C330B	40	3	5

Note: Data subject to change without notice.

**Overload Heater Tables
Heaters for Mag-Break® Controllers**

Size 2 (Standard)

Motor Full-Load Amps 3-Ph, 3 Heater	Heater Number CR 123	SE Rating Plug	Mag-Break Trip Setting	
			Rec.	Max.
8.81-9.27	C104A	15	3	5
9.28-9.99	C113A	20	2	4
10.0-11.1	C125B	20	2	5
11.2-12.1	C137B	20	3	5
12.2-13.0	C151B	20	3	5
13.1-15.5	C163B	20	4	6
15.6-16.8	C180B	25	3	5
16.9-18.0	C198B	25	3	6
18.1-19.7	C214B	30	3	5
19.8-21.6	C228B	30	3	5
21.7-23.9	C250B	40	2	5
24.0-25.5	C273B	40	2	5
25.6-28.2	C303B	50	2	5
28.3-31.6	C330B	50	3	5
31.7-34.7	C366B	50	3	6
34.8-37.8	C400B	60	3	6
37.9-40.6	C440B	60	3	5
40.7-43.4	C460B	60	3	6

Size 2 (Ambient Comp.)

Motor Full-Load Amps 3-Ph, 3 Heater	Heater Number CR 123	SE Rating Plug	Mag-Break Trip Setting	
			Rec.	Max.
9.04-9.61	C104A	15	3	5
9.62-10.5	C113A	20	3	4
10.6-11.6	C125B	20	2	5
11.7-12.5	C137B	20	3	5
12.6-13.6	C151B	20	3	5
13.7-16.7	C163B	20	4	6
16.8-17.9	C180B	25	3	5
18.0-18.7	C198B	25	3	5
18.8-20.4	C214B	30	3	5
20.5-22.7	C228B	30	3	6
22.8-24.7	C250B	40	2	5
24.8-26.0	C273B	40	2	5
24.8-26.3	C273B	40	2	5
26.4-29.5	C303B	50	2	5
29.6-32.5	C330B	50	3	5
32.6-36.7	C366B	50	3	5
36.8-41.9	C400B	50	3	5
42.0-43.2	C440B	60	3	5
43.3-43.4	C460B	60	3	6

Note: Data subject to change without notice.

Size 3 (Standard and Ambient Comp.)

Motor Full-Load Amps 3-Ph, 3 Heater	Heater Number CR 123	SE Rating Plug	Mag-Break Trip Setting	
			Rec.	Max.
17.8-18.4	F233B	30	2	5
18.5-21.1	F243B	30	3	5
21.2-22.1	F270B	30	3	5
22.2-26.0	F300B	40	3	5
26.1-28.0	F327B	40	3	5
28.1-31.3	F357B	50	3	5
31.4-33.3	F395B	50	3	5
33.4-34.3	F430B	50	3	5
34.4-40.9	F487B	70	2	5
41.0-43.4	F567B	70	3	5
44.8-51.0	F614B	100	MIN	4
51.1-52.0	F658B	100	MIN	4
52.1-55.4	F719B	100	2	5
55.5-63.3	F772B	100	3	5
63.4-66.1	F848B	100	3	5
66.2-73.5	F914B	100	3	6
73.6-82.2	F104C	150	2	4
82.3-86.9	F114C	150	2	5

Size 4 (Standard)

Motor Full-Load Amps 3-Ph, 3 Heater	Heater Number CR 123	SE Rating	Mag-Break Trip Setting	
			Rec.	Max.
28.8-32.0	F357B	50	3	5
32.1-34.2	F395B	50	3	5
34.3-36.7	F430B	70	2	5
36.8-43.9	F487B	70	3	5
44.0-46.6	F567B	70	3	5
46.7-52.6	F614B	100	2	4
52.7-55.6	F658B	100	2	5
55.7-58.7	F719B	100	2	5
58.8-67.1	F772B	100	3	5
67.2-70.6	F848B	100	3	6
70.7-76.3	F914B	150	2	4
76.4-88.7	F104C	150	2	5
88.8-93.4	F114C	150	3	5
93.5-102	F118C	150	3	5
103-110	F133C	150	3	5
111-122	F149C	150	4	6
123-131	F161C	150	4	6

Size 4 (Standard)

Motor Full-Load Amps 3-Ph, 3 Heater	Heater Number CR 123	SF Rating Plug	Mag-Break Trip Setting	
			Rec.	Max.
28.8-32.0	F357B	70	2	4
32.1-34.2	F395B	70	3	4
34.3-36.7	F430B	70	3	5
36.8-43.9	F487B	70	3	5
44.0-46.6	F567B	70	3	5
46.7-52.6	F614B	100	2	4
52.7-55.6	F658B	100	2	4
55.7-58.7	F719B	100	2	5
58.8-67.1	F772B	150	MIN	4
67.2-70.6	F848B	150	MIN	4
70.7-76.3	F914B	150	2	4
76.4-88.7	F104C	200	MIN	4
88.8-93.4	F114C	200	MIN	4
93.5-102	F118C	200	MIN	5
103-110	F133C	200	2	6
111-122	F149C	200	2	6
123-131	F161C	200	2	6

**Overload Heater Tables
Heaters for Mag-Break® Controllers**

Size 4 (Ambient Comp.)

Motor Full-Load Amps 3-Ph, 3 Heater	Heater Number CR 123	SE Rating	Mag-Break Trip Setting	
			Rec.	Max.
28.8-32.0	F357B	50	3	5
32.1-34.2	F395B	50	3	5
34.3-36.7	F430B	70	2	5
36.8-43.9	F487B	70	3	5
44.0-46.6	F567B	70	3	5
46.7-52.6	F614B	100	2	4
52.7-55.6	F658B	100	2	5
55.7-58.7	F719B	100	2	5
58.8-67.1	F772B	100	3	5
67.2-70.6	F848B	100	3	6
70.7-76.3	F914B	150	2	4
76.4-88.7	F104C	150	2	5
88.8-93.4	F114C	150	3	5
93.5-102	F118C	150	3	5
103-110	F133C	150	3	5
111-122	F149C	150	4	6
123-131	F161C	150	4	6

Size 6 (Standard and Ambient Comp.)

Motor Full-Load Amps 3-Ph, 3 Heater	Heater Number CR 123	SK Rating Plug	Instantaneous Trip Setting	
			Rec.	Max.
181-197	C220A	400	MIN	4
198-214	C239A	400	2	4
215-238	C268A	400	3	5
239-258	C301A	500	MIN	4
259-290	C326A	500	2	5
291-346	C356A	800	MIN	4
347-387	C379A	800	MIN	5
388-423	C419A	800	2	5
424-467	C466A	1000	MIN	4
468-516	C526A	1000	2	4
517-540	C592A	1000	2	5

Size 4 (Ambient Comp.)

Motor Full-Load Amps 3-Ph, 3 Heater	Heater Number CR 123	SF Rating	Mag-Break Trip Setting	
			Rec.	Max.
28.8-32.0	F357B	70	2	4
32.1-34.2	F395B	70	3	4
34.3-36.7	F430B	70	3	5
36.8-43.9	F487B	70	3	5
44.0-46.6	F567B	70	3	5
46.7-52.6	F614B	100	2	4
52.7-55.6	F658B	100	2	4
55.7-58.7	F719B	100	2	5
58.8-67.1	F772B	150	MIN	4
67.2-70.6	F848B	150	MIN	4
70.7-76.3	F914B	150	2	4
76.4-88.7	F104C	200	MIN	4
88.8-93.4	F114C	200	MIN	4
93.5-102	F118C	200	MIN	5
103-110	F133C	200	2	6
111-122	F149C	200	2	6
123-131	F161C	200	2	6

Size 5 (Standard and Ambient Comp.) 300:5 CT

Motor Full-Load Amps 3-Ph, 3 Heater	Heater Number CR 123	SG Rating Plug	Instantaneous Trip Setting	
			Rec.	Max.
107-119	C268A	250	MIN	3
120-129	C301A	250	MIN	4
130-145	C326A	250	2	5
146-173	C356A	300	2	5
174-193	C379A	350	2	5
194-212	C419A	350	2	5
213-233	C466A	400	2	4
234-258	C526A	400	2	5
259-270	C592A	400	3	5

Size 6 (Standard and Ambient Comp.)

Motor Full-Load Amps 3-Ph, 3 Heater	Heater Number CR 123	SG Rating Plug	Instantaneous Trip Setting	
			Rec.	Max.
181-197	C220A	400	MIN	4
198-214	C239A	400	2	5
215-238	C268A	500	MIN	4
239-258	C301A	500	MIN	4
259-290	C326A	500	2	5
291-346	C356A	600	MIN	5
347-387	C379A	600	2	5
388-424	C419A	600	3	MAX

Size 5 (Standard and Ambient Comp.)

Motor Full-Load Amps 3-Ph, 3 Heater	Heater Number CR 123	SG Rating Plug	Instantaneous Trip Setting	
			Rec.	Max.
106-115	C592A	250	MIN	3
116-125	C630A	250	MIN	4
126-135	C695A	250	2	4
136-151	C778A	250	2	5
152-164	C867A	300	2	4
165-179	C955A	300	2	5
180-195	C104B	350	2	4
196-215	C113B	350	2	5
216-231	C125B	400	2	4
232-255	C137B	400	2	5
256-270	C151B	400	3	5

**Overload Heater Tables
Heaters for Fused Controllers**

For continuous rated motors with a service factor of 1.15 to 1.25, select heaters from the heater table. For continuous rated motors with a service factor of 1.0, multiply the motor full-load current by 0.9 and use this value to select heaters.

Overload relay tripping current in 40°C ambient is the minimum value of full-load current multiplied by 1.25.

Warning: Overload relays with automatic reset may automatically start a motor connected to a 2-wire control circuit. When automatic restarting is not desired, use a 3-wire control circuit.

Provide short-circuit protection in accordance with the

Table 2 – Maximum Fuse and Short-circuit Rating

NEMA Size	Class RK Fuse		Class J Fuse	
	Max. Clip	Max. RMS Sym. Amps	Max. Clip	Max. RMS Sym. Amps
1	30A	100,000	60A	100,000
2	60	100,000	100	100,000
3	100	100,000	200	100,000
4	200	100,000	400	100,000
5	400	100,000	600	100,000

NEMA Size	Class K1, K5 Fuse		Class H Fuse	
	Max. Clip	Max. RMS Sym. Amps	Max. Clip	Max. RMS Sym. Amps
1	Fuse per Overload Heater Table	5,000	Fuse per Overload Heater Table	5,000
2		5,000		5,000
3		5,000		5,000
4		10,000		10,000
5		10,000		10,000

Note: Data subject to change without notice.

National Electrical Code, except fuses are not to exceed the value shown in the table.

Suitable for use in a circuit capable of delivering not more than the maximum RMS symmetrical amperes indicated in the table below, 600-volts maximum, when protected by an appropriate fuse having an interrupting rating not less than the available short-circuit current.

Warning: Opening of the fuse(s) may be an indication that a fault current has been interrupted. To provide continued protection against fire or shock hazard, all current-carrying parts and other components of the motor controller should be examined and replaced if damaged. If heater burnout occurs, the complete overload relay must be replaced.

Size 0 and 1 (Standard and Ambient Comp.)

Motor Full-Load Amps 3-Ph, 3 Heater	Heater Number CR 123	Maximum Fuse Rating
.41-.45	C054A	3
.46-.49	C060A	3
.50-.53	C066A	3
.54-.59	C071A	3
.60-.65	C078A	3
.66-.76	C087A	3
.77-.84	C097A	3
.85-.93	C109A	3
.94-1.04	C118A	3
1.05-1.15	C131A	3
1.16-1.27	C148A	3
1.28-1.39	C163A	3
1.40-1.55	C184A	6
1.56-1.73	C196A	6
1.74-1.89	C220A	6
1.90-2.05	C239A	6
2.06-2.28	C268A	6
2.29-2.47	C301A	6
2.48-2.79	C326A	10
2.80-3.31	C356A	10
3.32-3.70	C379A	12
3.71-4.06	C419A	15
4.07-4.47	C466A	15
4.48-4.95	C526A	15
4.96-5.49	C592A	20
5.50-5.91	C630A	20
5.92-6.47	C695A	25
6.48-7.20	C778A	25
7.21-8.22	C867A	30
8.23-8.72	C955A	30
8.73-9.67	C104B	35 ①
9.68-10.4	C113B	35 ①
10.5-11.0	C125B	40 ①
11.1-12.4	C137B	45 ①
12.5-13.2	C151B	50 ①
13.3-15.4	C163B	60 ①
15.5-17.1	C180B	60 ①
17.2-18.0	C198B	60 ①
Size 1		
17.2-18.1	C198B	60 ①
18.2-20.0	C214B	60 ①
20.1-21.5	C228B	60 ①
21.6-22.5	C250B	60 ①
22.6-23.9	C273B	60 ①
24.0-26.3	C303B	60 ①
26.4-27.0	C330B	60 ①

① See Table 2 for maximum fuse and short-circuit rating.

Spectra Series™/8000-Line Motor Control Centers

Size 2 (Standard and Ambient Comp.)

Motor Full-Load Amps 3-Ph, 3 Heater	Heater Number CR 123	Maximum Fuse Rating
5.48-5.85	C630A	20
5.86-6.47	C695A	20
6.48-7.35	C778A	25
7.36-8.06	C867A	30
8.07-9.03	C955A	30
9.04-9.61	C104B	35
9.62-10.5	C113B	35
10.6-11.6	C125B	40
11.7-12.5	C137B	45
12.6-13.6	C151B	50
13.7-16.7	C163B	60
16.8-17.9	C180B	60
18.0-18.7	C198B	70 ①
18.8-20.4	C214B	80 ①
20.5-22.7	C228B	80 ①
22.8-24.7	C250B	90 ①
24.8-26.3	C273B	90 ①
26.4-29.5	C303B	100 ①
29.6-32.5	C330B	100 ①
32.6-36.7	C366B	100 ①
36.8-41.9	C400B	100 ①
42.0-43.2	C440B	100 ①
43.3-45.0	C460B	100 ①

Size 3 (Standard)

Motor Full-Load Amps 3-Ph, 3 Heater	Heater Number CR 123	Maximum Fuse Rating
19.0-19.3	F233B	70
19.4-22.1	F243B	80
22.2-23.4	F270B	80
23.5-27.0	F300B	90
27.1-29.1	F327B	100
29.2-31.8	F357B	110 ①
31.9-33.9	F395B	125 ①
34.0-37.6	F430B	125 ①
37.7-41.9	F487B	150 ①
42.0-47.7	F567B	175 ①
47.8-52.1	F614B	175 ①
52.2-55.8	F658B	200 ①
55.9-59.7	F719B	200 ①
59.8-68.1	F772B	200 ①
68.2-71.5	F848B	200 ①
71.6-78.2	F914B	200 ①
78.3-87.5	F104C	200 ①
87.6-90.0	F114C	200 ①

Size 3 (Ambient Comp.) (Red Reset Arm)

Motor Full-Load Amps 3-Ph, 3 Heater	Heater Number CR 123	Maximum Fuse Rating
17.8-18.4	F233B	70
18.5-21.1	F243B	80
21.2-22.1	F270B	80
22.2-26.1	F300B	90
26.2-28.0	F327B	100
28.1-31.3	F357B	110 ①
31.4-33.3	F395B	125 ①
33.4-34.3	F430B	125 ①
34.4-40.9	F487B	150 ①
41.0-44.7	F567B	150 ①
44.8-51.0	F614B	175 ①
51.1-52.0	F658B	200 ①
52.1-55.4	F719B	200 ①
55.5-63.3	F772B	200 ①
63.4-66.1	F848B	200 ①
66.2-73.5	F914B	200 ①
73.6-82.2	F104C	200 ①
82.3-90.0	F114C	200 ①

Size 4 (Standard)

Motor Full-Load Amps 3-Ph, 3 Heater	Heater Number CR 123	Maximum Fuse Rating
27.1-32.2	F357B	110
32.3-34.0	F395B	125
34.1-36.8	F430B	125
36.9-44.6	F487B	150
44.7-48.4	F567B	175
48.5-53.9	F614B	175
54.0-57.4	F658B	200
57.5-60.0	F719B	225 ①
60.1-69.5	F772B	225 ①
69.6-71.7	F848B	250 ①
71.8-79.9	F914B	275 ①
80.0-92.3	F104C	300 ①
92.4-97.0	F114C	350 ①
97.1-108	F118C	400 ①
109-118	F133C	400 ①
119-131	F149C	400 ①
132-135	F161C	400 ①

① See Table 2 for maximum fuse and short-circuit rating.

Size 4 (Ambient Comp.) (Red Reset Arm)

Motor Full-Load Amps 3-Ph, 3 Heater	Heater Number CR 123	Maximum Fuse Rating
28.8-32.0	F357B	110
32.1-34.2	F395B	125
34.3-36.7	F430B	125
36.8-43.9	F487B	150
44.0-46.6	F567B	175
46.7-52.6	F614B	175
52.7-55.6	F658B	200
55.7-58.7	F719B	225 ①
58.8-67.1	F772B	225 ①
67.2-70.6	F848B	250 ①
70.7-76.3	F914B	275 ①
76.4-88.7	F104C	300 ①
88.8-93.4	F114C	350 ①
93.5-105	F118C	350 ①
106-114	F133C	400 ①
115-128	F149C	400 ①
129-131	F161C	400 ①
132-135	F174C	400 ①

Size 5 (Standard and Ambient Comp.)

Motor Full-Load Amps 3-Ph, 3 Heater	Heater Number CR 123	Maximum Fuse Rating ①
109-118	C592A	600
119-128	C630A	600
129-138	C695A	600
139-155	C778A	600
156-168	C867A	600
169-184	C955A	600
185-200	C104B	600
201-221	C113B	600
222-237	C125B	600
238-262	C137B	600
263-270	C151B	600

Note: Data subject to change without notice.

**Overload Heater Tables
Heaters for Size 6 and Size 7 Controllers**

For continuous rated motors with a service factor of 1.15 to 1.25, select heaters from the heater table. For continuous rated motors with a service factor of 1.0, multiply the motor full-load current by 0.9 and use this value to select heaters.

Overload relay tripping current in 40°C ambient is the minimum value of full-load current multiplied by 1.25.

Warning: *Overload relays with automatic reset may automatically start a motor connected to a 2-wire control circuit. When automatic restarting is not desired, use a 3-wire control circuit.*

Provide short-circuit protection in accordance with the National Electrical Code.

Warning: *Opening of the circuit breaker or power fuse may be an indication that a fault current has been interrupted. To provide continued protection against fire or shock hazard, all current-carrying parts and other components of the motor controller should be examined and replaced if damaged. If heater burnout occurs, the complete overload relay must be replaced.*

Size 6 – Standard and Ambient-compensated Overload Relays CT Ratio 600/5

Maximum Motor Full-Load Current	Current Transformer Secondary Amps	Heater Number CR 123
181-197	1.51-1.64	C220A
198-214	1.65-1.78	C239A
215-238	1.79-1.98	C268A
239-258	1.99-2.15	C301A
259-290	2.16-2.42	C326A
291-346	2.43-2.88	C356A
347-387	2.89-3.22	C379A
388-423	3.23-3.53	C419A
424-467	3.54-3.89	C466A
468-516	3.90-4.30	C526A
517-540	4.31-4.50	C592A

Size 7 – Standard and Ambient-compensated Overload Relays CT Ratio 800/5

Maximum Motor Full-Load Current	Current Transformer Secondary Amps	Heater Number CR 123
346-387	2.16-2.42	C326A
388-461	2.43-2.88	C356A
462-515	3.89-3.22	C379A
516-565	3.23-3.53	C419A
566-622	3.54-3.89	C466A
623-688	3.90-4.30	C526A
689-763	4.31-4.77	C592A
764-810	4.78-5.06	C630A

Note: *Data subject to change without notice.*

Spectra Series™/8000-Line Motor Control Centers

ELECTRONIC OVERLOAD TABLES

Tripping current is 120% of dial setting. Motors with 1.15-1.25 service factor, set dial to motor FLA. Motors with 1.0 service factor, set dial to 0.9 motor FLA. Read GEH-6430/6431 before energizing.

NEMA SIZE	CURRENT RANGE (A)	CATALOG NUMBER	Max Fuse (A)	
			Class R 30	Class J 60
1	.4-.85	CR324CXCS	Class R 30	Class J 60
1	.8-1.7	CR324CXDS	30	60
1	1.6-3.4	CR324CXES	30	60
1	3.2-6.8	CR324CXFS	30	60
1	6.5-13.5	CR324CXGS	30	60
1	13-27	CR324CXHS	30	60
2	6.5-13.5	CR324DXGS	60	100
2	13-27	CR324DXHS	60	100
2	25-50	CR324DXJS	60	100
3	17-35	CR324FXKS	100	200
3	35-70	CR324FXLS	100	200
3	65-90	CR324FXMS	100	200
4	17-35	CR324FXKS	200	400
4	35-70	CR324FXLS	200	400
4	65-135	CR324FXMS	200	400

WARNING- Opening of the branch circuit protective device may be an indication that a fault current has been interrupted. To reduce the risk of fire or electric shock, current-carrying parts and other components of the controller should be examined and replaced if damaged.

Provide short circuit protection in accordance with NEC Article 430/CE Code Part 1. See GEH-4961 overload heater tables on pages 21-30 for circuit breaker setting vs. FLA. for each circuit breaker type.

Tripping current is 120% of dial setting. Motors with 1.15-1.25 service factor, set to motor FLA. Motors with 1.0 service factor, set dial to 0.9 motor FLA. Read GEH-6432 before energizing.

NEMA SIZE	CURRENT RANGE (A)	CATALOG NUMBER	Max Fuse (A)	
			Class R 400	Class J 600
5	65-135	CR324GXP5	Class R 400	Class J 600
5	130-270	CR324GXQ5	400	600
6*	130-270	CR324HXSS	600	Class L 1200
6*	260-540	CR324HXTS	600	1200

WARNING- Opening of the branch circuit protective device may be an indication that a fault current has been interrupted. To reduce the risk of fire or electric shock, current-carrying parts and other components of the controller should be examined and replaced if damaged.

Provide short circuit protection in accordance with NEC Article 430/CE Code Part 1. See GEH-4961 overload heater tables for circuit breaker setting vs. FLA. for each circuit breaker type.

*WITH 800:5 C/T

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