

# Altistart<sup>®</sup> 48

Enclosed Soft Start Controllers

1-600 hp, 600 V; 1-500 hp, 480 V;

1-250 hp, 240 V or 1-200 hp, 208 V

Class 8638 and 8639

Instruction Bulletin

Retain for future use.





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## HAZARD CATEGORIES AND SPECIAL SYMBOLS

The following symbols and special messages may appear in this manual or on the equipment to warn of potential hazards.

A lightning bolt or ANSI man symbol in a “Danger” or “Warning” safety label on the equipment indicates an electrical hazard which, as indicated below, can or will result in personal injury if the instructions are not followed.

An exclamation point symbol in a safety message in the manual indicates potential personal injury hazards. Obey all safety messages introduced by this symbol to avoid possible injury or death.

| Symbol  | Name              |
|---|-------------------|
|  | Lightning Bolt    |
|  | ANSI Man          |
|  | Exclamation Point |

### **DANGER**

**DANGER** indicates an imminently hazardous situation which, if not avoided, **will result in** death or serious injury.

### **WARNING**

**WARNING** indicates a potentially hazardous situation which, if not avoided, **can result in** death or serious injury.

### **CAUTION**

**CAUTION** indicates a potentially hazardous situation which, if not avoided, **can result in** minor or moderate injury.

### **CAUTION**

**CAUTION**, used without the safety alert symbol, indicates a potentially hazardous situation which, if not avoided, **can result in** property damage.

## PRODUCT SUPPORT

For support and assistance, contact the Product Support Group. The Product Support Group is staffed from 8:00 am until 6:00 pm Eastern time to assist with product selection, start-up, and diagnosis of product or application problems. Emergency phone support is available 24 hours a day, 365 days a year.

Toll Free      888-Square D (888-778-2733)  
E-mail         drive.products.support@us.schneider-electric.com  
Fax              919-217-6508

## SECTION 1— INTRODUCTION AND TECHNICAL CHARACTERISTICS

This instruction bulletin is a supplement to the *Altistart® 48 Y-Range Soft Start Controller Installation Guide, 30072-450-61\_*. This bulletin provides installation and maintenance information for the Altistart 48 (ATS48) Enclosed Soft Start Controllers. ATS48 Enclosed soft start controllers are combination devices available with a fusible disconnect (Class 8638) or with a circuit breaker (Class 8639).

### RELATED DOCUMENTATION

In addition to this bulletin, refer to the following documentation which ships with the ATS48 Enclosed controllers:

- Elementary diagrams that illustrate power, control, and optional circuits of the controller.
- Outline dimension drawings that identify the physical characteristics of the controller and contain installation information.
- Instruction bulletin 30072-450-61\_, *Altistart 48 Y-Range Soft Start Controller Installation Guide*, describes the installation, operation, and characteristics of the ATS48 soft start when used as a component of the Class 8638 or Class 8639 ATS48 Enclosed controllers.
- Instruction bulletin 30072-200-50\_, *Safe Handling, Installation, Operation, and Maintenance of Electrical Equipment*.

*NOTE: To replace missing documents, contact your local Schneider Electric field office.*

### EXCEPTIONS TO BULLETIN 30072-450-61

Certain information in the related documentation replaces information provided in the bulletin 30072-450-61\_. When referencing this instruction bulletin, note the following exceptions:

- “Minimum Start-Up Procedure” on page 35 of this bulletin replaces the “Quick Start Procedures” section on page 5 of instruction bulletin 30072-450-61\_.
- “Receiving, Handling, and Storage” on page 11 of this bulletin replaces the “Receiving and Handling” section of instruction bulletin 30072-450-61\_.
- “Mounting” in bulletin number 30072-450-61\_, is not applicable to the ATS48 Enclosed controller. For information about installing the controller, refer to the “Installation” section on page 13 of this bulletin.
- “Recommended Component Lists” in bulletin number 30072-450-61\_, apply to open Altistart 48 soft starts only. For a list of actual components used with the ATS48 Enclosed controller, refer to the “Power Fuse Recommendation” (page 39) and “Replacement Parts” (page 45) sections of this bulletin.
- “Recommended OCPD Rating” in bulletin number 30072-450-61\_, applies to open ATS48 soft starts only. For actual components used with ATS48 Enclosed controllers, refer to “Power Fuse Recommendation” on page 39 and “Replacement Parts” on page 45 of this bulletin.
- “Dimensions and Weights” in bulletin number 30072-450-61\_, applies to open ATS48 soft starts only. For overall enclosure weights, refer to the front elevation drawings supplied with the ATS48 Enclosed controller order.
- “Recommended Wiring Diagrams” in bulletin number 30072-450-61\_, applies to open Altistart 48 soft starts, and do not necessarily apply to

ATS48 Enclosed controllers. For the exact wiring, refer to the wiring diagram shipped with the enclosed unit.

## TERMINOLOGY

The following terms and abbreviations are used in this bulletin:

- Class 8638 and Class 8639 Altistart 48 Enclosed Soft Start Controllers are called Enclosed 48 controllers.
- MOD for factory modifications
- Altistart 48 Soft Start Controllers are called ATS48 soft starts.

## STANDARD FEATURES

The Enclosed 48 controller provides a pre-engineered enclosure package with a disconnect means and a starter for soft starting and stopping of standard, three-phase, asynchronous induction motors.

Each Enclosed 48 controller contains:

- Current limiting provisions to achieve short circuit ratings for the unit
- Customer terminal blocks for 120 V control connections
- A disconnect (circuit breaker or fused switch) with an external handle
- A door mounted keypad display for diagnostics and set up
- A shorting contactor which bypasses the soft start when full voltage level is reached upon starting.
- Various control and power contactor options may be included in the Enclosed 48 controller. Factory order-specific drawings will list all included options.
- Load terminals (T1/T2/T3) for motor connections to the ATS48 soft start.
- Solid state overload protection built in to the ATS48 soft starts.

For information about how to apply and adjust the ATS48 soft start for a particular installation, refer to instruction bulletin 30072-450-61\_.

## BEFORE YOU BEGIN

### **⚠ DANGER**

#### **HAZARD OF ELECTRIC SHOCK, EXPLOSION, OR ARC FLASH**

- Read and understand this instruction bulletin before installing or operating the Enclosed 48 controller. Installation, adjustment, repair, and maintenance must be performed by qualified personnel.
- The user is responsible for compliance with all international and national electrical code requirements with respect to grounding of all equipment.
- Many parts of this drive controller, including the printed circuit boards, operate at the line voltage. **DO NOT TOUCH.** Use only electrically insulated tools.
- Some terminals have voltage on them when the disconnect is open.
- Install and close all covers and doors before applying power or starting and stopping the drive controller.

**Failure to follow these instructions will result in death or serious injury.**

**Class 8638<sup>1</sup>**

**⚠ DANGER**

**HAZARD OF ELECTRIC SHOCK, EXPLOSION, OR ARC FLASH**

- Apply appropriate personal protective equipment (PPE) and follow safe electrical work practices. See NFPA 70E.
- This equipment must only be installed and serviced by qualified electrical personnel.
- Never operate energized switch with door open.
- Turn off switch before removing or installing fuses or making load side connections.
- Always use a properly rated voltage sensing device at all line and load fuse clips to confirm switch is off.
- Turn off power supplying switch before doing any other work on or inside switch.
- Do not use renewable link fuses in fused switches.

**Failure to follow these instructions will result in death or serious injury.**

**Class 8639<sup>2</sup>**

**⚠ DANGER**

**HAZARD OF ELECTRIC SHOCK, EXPLOSION, OR ARC FLASH**

- Apply appropriate personal protective equipment (PPE) and follow safe electrical work practices. See NFPA 70E.
- This equipment must only be installed and serviced by qualified electrical personnel.
- Turn off all power supplying this equipment before working on or inside equipment.
- Always use a properly rated voltage sensing device to confirm power is off.
- Replace all devices, doors and covers before turning on power to this equipment.

**Failure to follow these instructions will result in death or serious injury.**

<sup>1</sup> This safety message refers to the Enclosed 48 controllers with a fusible disconnect (Class 8638). Unless otherwise specified, all other safety messages in this document refer to all Enclosed 48 controllers.

<sup>2</sup> This safety message refers to the Enclosed 48 controllers with a circuit breaker (Class 8639). Unless otherwise specified, all other safety messages in this document refer to all Enclosed 48 controllers.

## **⚠ DANGER**

### **UNINTENDED EQUIPMENT OPERATION**

Before turning on the Enclosed 48 controller or upon exiting the configuration menus, ensure that the inputs assigned to the Run command are in a state that will not cause the drive controller to run. Otherwise, the motor can start immediately.

**Failure to follow these instructions will result in death or serious injury.**

## **⚠ WARNING**

### **LOSS OF CONTROL**

- The designer of any control scheme must consider the potential failure modes of control paths and, for certain critical control functions, provide a means to achieve a safe state during and after a path failure. Examples of critical control functions are emergency stop and overtravel stop.
- Separate or redundant control paths must be provided for critical control functions.
- System control paths may include communication links. Consideration must be given to the implications of anticipated transmission delays or failures of the link<sup>1</sup>.
- Each implementation of an Enclosed 48 controller must be individually and thoroughly tested for proper operation before being placed into service.

**Failure to follow these instructions can result in death, serious injury, or equipment damage.**

<sup>1</sup> For additional information, refer to NEMA ICS 1.1 (latest edition), "Safety Guidelines for the Application, Installation, and Maintenance of Solid State Control" and to NEMA ICS 7.1 (latest edition), "Safety Standards for Construction and Guide for Selection, Installation and Operation of Adjustable-Speed Drive Systems."

## **⚠ CAUTION**

### **INCOMPATIBLE LINE VOLTAGE**

Before turning on and configuring the Enclosed 48 controller, ensure that the line voltage is compatible with the line voltage range specified on the drive controller nameplate. The drive controller can be damaged if the line voltage is not compatible.

**Failure to follow these instructions can result in injury or equipment damage.**

## **TECHNICAL SPECIFICATIONS**

Table 1 on page 7 describes the technical specifications for the Enclosed 48 controllers. For additional specifications of the open style ATS48 soft start, refer to the instruction bulletin 30072-450-61\_.

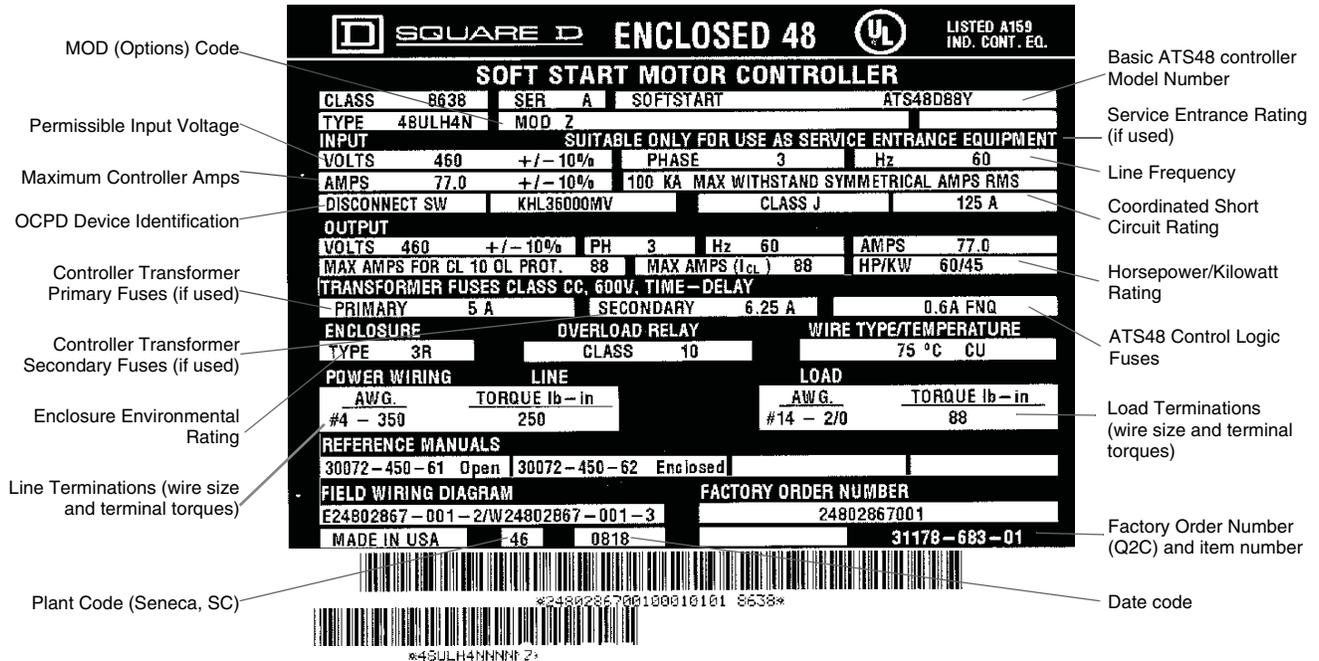
**Table 1: Technical Specifications**

|                                |   |  |
|--------------------------------|---|--|
| <b>Environment</b>             | Degree of protection  | <ul style="list-style-type: none"> <li>NEMA Type 1: Indoor use primarily to provide a degree of protection against limited amounts of falling dirt.</li> <li>Type 12: Indoor use primarily to provide a degree of protection against circulating dust, falling dirt, and dripping noncorrosive liquids.</li> <li>Type 3R: Outdoor use primarily to provide a degree of protection against rain, sleet, and damage from ice formation.</li> <li>Enclosures are painted ANSI #49.</li> </ul> |
|                                | Conformity to standards   | UL listed per UL508; CSA Certified per CSA 22.2 No. 14.<br>Immunity to radioelectrical interference: conforms to IEC 61000-4-3 Level 3.  |
|                                | Operational test vibration  | Conforms to IEC 60068-2-6, 1.5 mm peak from 2 to 13 Hz, 1 gn from 13 to 200 Hz (ATS48 soft starts).  |
|                                | Seismic qualification   | Available as an optional feature (MOD Y10). Provides a qualification label and hardware qualified to seismic rating per ICC ES AC156 for compliance to the seismic provisions of the International Building Code and ASCE 7.   |
|                                | Transit test to shock   | Conforms to the National Safe Transit Association and International Safe Transit Association test for packages weighing 100 lbs and over.  |
|                                | Ambient air temperature   | <ul style="list-style-type: none"> <li>Operation: Ambient conditions in installed area from 0 to 40 °C, 32 to 104 °F (Type 1 and 12); 0 to 50 °C, 32 to 122 °F (Type 3R)</li> <li>Storage: -25 to +70 °C, -13 to 158 °F.</li> </ul>  |
|                                | Maximum ambient pollution   | Conforms to IEC 60664-1, Pollution Degree 3  |
|                                | Maximum relative humidity   | 95% without condensation or dripping water conforming to IEC 60068-2-3   |
|                                | Maximum operating altitude  | 1000 m (3280 ft.), derate by 2.2% for each additional 100 m (328 ft) up to 3000 m (9842 ft) maximum.   |
| <b>Characteristics</b>         | 3-phase supply voltage  | 208 Vac ± 10%; 230 Vac ± 15%; 460 Vac ± 15%; 575 Vac ± 10%   |
|                                | Control voltage   | 115 Vac [Control Power Transformer (CPT) included as standard]   |
|                                | Frequency   | 50/60 Hz   |
|                                | Rated current   | See Table 7 on page 35.  |
|                                | Motor power   | 3 to 600 hp  |
|                                | Motor voltage   | 208, 220, 230, 240, 460, 480, 575, 600 V   |
|                                | Duty cycle  | <ul style="list-style-type: none"> <li>Starting at 400% of <math>I_n</math> for 23 s, or 300% of <math>I_n</math> for 46 s, from a cold state</li> <li>Starting at 400% of <math>I_n</math> for 12 s, or 300% of <math>I_n</math> for 23 s, with a load factor of 50% and 10 starts per hour or an equivalent thermal cycling</li> </ul> <p>For additional information, refer to "Application and Protection" in bulletin 30072-450-61_.</p>   |
| <b>Operation</b>               | <b>Methods of Starting:</b>   |  |
|                                | Torque ramp   | Adjustable from 1 to 60 s by keypad  |
|                                | Current limitation  | Adjustable from 150% to 500% of controller-rated current by keypad   |
|                                | Booster start-up pulse  | Full voltage starting for 5 cycles of 50 to 100% mains voltage, selectable by keypad.  |
| <b>Methods of Stopping:</b>    |   |  |
| Freewheel                      | Coast to stop on stop command   |  |
| Torque deceleration ramp       | Adjustable from 1 to 60 s by keypad   |  |
| InTele Braking                 | Selectable by keypad. Contact Schneider Electric Technical Support for application assistance.  |  |
| <b>Status and Diagnostics:</b> | Digital display of motor and controller status, including: <ul style="list-style-type: none"> <li>Ready/Run/Detected Fault</li> <li>Motor Current</li> <li>Motor Torque</li> <li>Motor Thermal State</li> <li>Power Factor</li> </ul> |  |
| <b>Protection</b>              | <b>Motor:</b>   |  |
|                                | Thermal overload  | With Full Voltage Bypass: A bimetallic or solid state Class 20 (MOD A10) overload relay is integral to the ATS48 soft starts. Without Full Voltage Bypass: A solid state thermal overload is integral to the ATS48 soft start. Overload class is selectable as 10, 20, or 30 via keypad. Range is 50% to 100% of ATS48 soft start rated current.   |
|                                | Shunt-trip disconnect   | Removes all power from the controller cabinet when the ATS48 soft start detects a fault condition.   |
|                                | Isolation contactor   | Removes supply power from the Silicon Control Rectifier (SCR) power circuit and motor when the motor is not running or when the ATS48 soft starts detects a fault condition.   |
|                                | <b>Controller:</b>  |  |
|                                | Short circuit current ratings   | See Table 3 on page 9.   |
| Overcurrent protection device  | An overcurrent protection device (OCPD) provides Type 1 coordination to the short-circuit current withstand ratings. Select fuses for motor protection from Table 9 on page 39.   |  |
| Shorting contactor             | A standard shorting contactor reduces temperature rise within the enclosure by eliminating the watts loss of the SCRs. Control of the contactor allows all forms of stopping.   |  |
| Thermal switch                 | Controllers rated for 17–62 A have one thermal switch to help protect against overheating. Controllers rated 72 A and greater have 2 thermal switches; one controls the fan, the other helps protect against overheating.             |  |

## CONTROLLER NAMEPLATE

The nameplate for the Enclosed 48 controller is located on the inside door. This nameplate, shown in Figure 1, identifies the controller Class, Type, and MODs (options) listing. When identifying or describing the Enclosed 48 controllers, use the data from this nameplate.

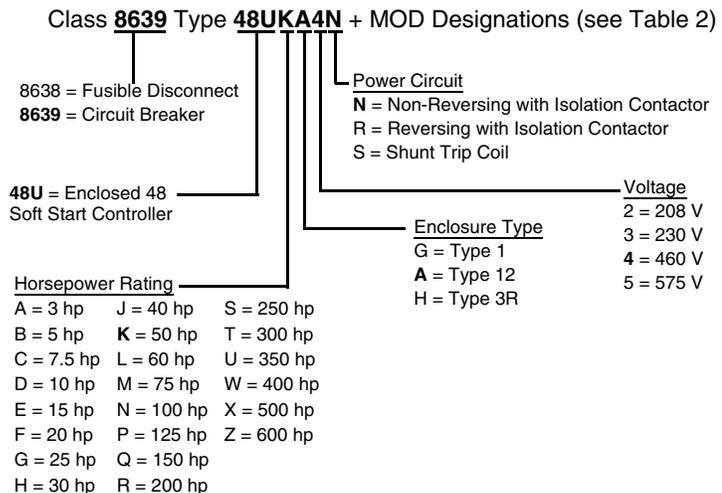
Figure 1: Enclosed 48 Controller Nameplate



## CATALOG NUMBER IDENTIFICATION

Figure 2 identifies each part of the catalog number for Enclosed 48 controllers.

Figure 2: Catalog Number Identification



## FORM DESIGNATIONS

Table 2 describes the MOD designations for Enclosed 48 controllers.

**Table 2: Factory Modifications (MOD)**

| Options                      | Description   | Options                      | Description                                    |
|------------------------------|---|------------------------------|--|
| <b>Control</b>               |   | <b>Miscellaneous Options</b> |  |
| A06                          | Start/Stop pushbuttons  | D10                          | Emergency Stop pushbutton                      |
| B06                          | Forward, Stop, and Reverse pushbuttons                                | E10                          | CSA / cUL label(s)                             |
| C06                          | Hand-Off-Auto selector switch   | F10                          | Auxiliary contacts for run                     |
| D06                          | Stop-Run selector switch  | G10                          | Auxiliary contacts for full voltage bypass run |
| E06                          | Hand-Auto, Start/Stop pushbuttons                                     | H10                          | Auxiliary contacts for auto mode               |
| <b>Pilot Light Clusters</b>  |   | J10                          | Auxiliary contacts for detected fault mode     |
| A07                          | Run (Red) and Off (green)   | K10                          | Motor space heater provisions                  |
| B07                          | Push-To-Test Run (red) and Off (green)                                | L10                          | ID engraved nameplates                         |
| C07                          | Run (Red), Off (green), and Detected Fault (yellow)                   | M10                          | Spare terminal blocks                          |
| D07                          | Push-To-Test Run (red), Off (green), and Push-To-Reset Fault (yellow) | P10                          | Permanent wire markers                         |
| <b>Meters</b>                |   | Q10                          | ANSI #61 enclosure paint                       |
| A08                          | Ammeter   | R10                          | MOV/Surge arrester                             |
| B08                          | Elapsed time meter  | S10                          | Dual motor overloads and branch circuits       |
| <b>Communications Cards</b>  |   | T10                          | Reserved for future                            |
| A09                          | Modbus®   | U10                          | Omit door mounted keypad                       |
| B09                          | Modbus Plus   | W10                          | NEMA style contactors                          |
| C09                          | Ethernet  | X10                          | 50 °C, 122 °F operation                        |
| D09                          | Devicenet™  | Y10                          | Seismic qualification (AC156)                  |
| <b>Miscellaneous Options</b> |   | Z10                          | Service entrance rating                        |
| A10                          | Full voltage bypass (AC3)   | 710                          | UL qualified modifications                     |
| B10                          | 150 VA additional control capacity                                    | 810                          | SPL special features                           |
| C10                          | Power-Up ON delay (start relay)                                       |                              |  |

Table 3 describes the coordinated short circuit current ratings for the Enclosed 48 controller.

**Table 3: Short Circuit Current Ratings**

| Enclosure Size | Horsepower Rating |         |         |         | 8638 Fusible Disconnect AIC | 8639 Circuit Breaker AIC |
|----------------|-------------------|---------|---------|---------|-----------------------------|--------------------------|
|                | @ 208 V           | @ 230 V | @ 460 V | @ 575 V |                             |                          |
| A-C            | 3-50              | 5-60    | 10-125  | 15-150  | 100K                        | 25K                      |
| D              | 60-100            | 75-125  | 150-250 | 200-300 | 100K                        | 30K                      |
| E              | 125-200           | 150-250 | 300-500 | 350-600 | 65K                         | 30K                      |



## SECTION 2— RECEIVING, HANDLING, AND STORAGE

### **▲ WARNING**

#### **DAMAGED CONTROLLER EQUIPMENT**

Do not operate any Enclosed 48 controller that appears damaged.

**Failure to follow these instructions can result in injury or equipment damage.**

### **RECEIVING AND PRELIMINARY INSPECTION**

The Enclosed 48 controller must be thoroughly inspected before it is stored or installed. Upon receipt:

1. Remove the controller from its packaging and visually inspect the exterior for shipping damage.
2. Ensure that the Class, Type, and MOD specified on the controller nameplate (see page 8) agree with the packaging slip and corresponding purchase order.
3. If you find any shipping damage, notify the carrier and your sales representative.
4. Enclosed 48 controllers are shipped on a pallet on their back or in an upright position. To avoid damage, do not stack units on top of each other. If you plan to store the controller after receipt, replace it in its original packaging material and store it in an environment whose ambient air temperature is within the range specified in Table 1 on page 7.
5. Store the controller in its original packaging until it is at the final installation site.

### **BEFORE INSTALLATION**

Before installing the Enclosed 48 controller:

1. Move the operating handle assembly to the Off position and open the Enclosed 48 controller door.
2. Visually verify that all internal mounting and terminal connection hardware is properly seated, securely fastened, and undamaged.
3. Visually verify that the internal plugs and wiring connections are tight. Inspect all connections for damage.
4. Verify that all relays and fuses are installed and fully seated.
5. Close and secure the Enclosed 48 controller door by fully tightening the thumbscrews.

### **CAUTION**

#### **STACKING DURING STORAGE OR SHIPPING**

- Do not stack Enclosed 48 controllers on top of each other.
- Do not place any material on the top of the Enclosed 48 controller.

**Failure to follow these instructions can result in equipment damage.**

## HANDLING THE CONTROLLER

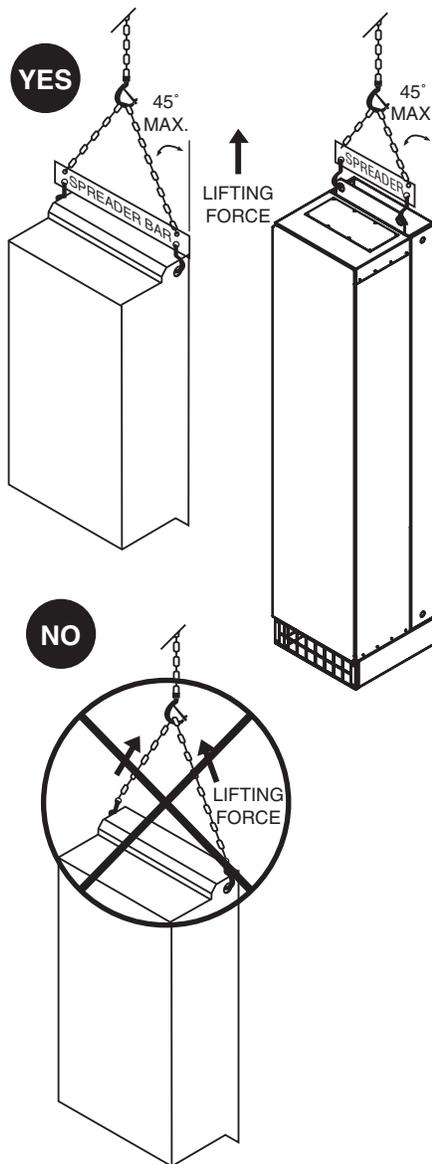
### ⚠ WARNING

#### LIFTING HEAVY EQUIPMENT

Keep the area below any equipment being lifted clear of all personnel and property. Use the lifting method shown in Figure 3.

**Failure to follow these instructions can result in death, serious injury, or equipment damage.**

**Figure 3: Hoisting Enclosed 48 Controllers**



Handle the Enclosed 48 carefully to avoid damage to the internal components, frame, or exterior. When handling the controller, balance it carefully to keep it from tipping. After removing the packaging materials, the controller requires some type of mechanical lifting.

When handling the Enclosed 48 controllers:

- Always work with another person. The weight, size, and shape of the controller are such that two people are required to handle it.
- Use gloves.
- Attach a spreader bar to the two top lifting holes on the controller back panel or lifting bracket (see Figures 4–14 for location of lifting holes) and hoist the controller with chains or straps. See Figure 3 for the proper hoisting method.
- Raise the controller from a horizontal position (i.e., the back of the controller resting on a pallet).
- Before removing banding or lag bolts (if used), attach the spreader bar with chains or straps (hoisting mechanism) to maintain control or tipping.
- Place the controller in an upright position.

*NOTE: Wall mounted enclosures will not sit upright without support. The bottom of the wall mounting Enclosed 48 controller is on an angle.*

### ⚠ WARNING

#### IMPROPER MOUNTING

Before removing the lifting mechanism:

- Ensure that all hardware is of sufficient size and type for the controller weight.
- Secure and tighten all hardware.

**Failure to follow these instructions can result in death, serious injury, or equipment damage.**

## SECTION 3— INSTALLATION

### **⚠ DANGER**

#### **HAZARD OF ELECTRIC SHOCK, EXPLOSION, OR ARC FLASH**

Read and understand the precautions in “Before You Begin” starting on page 4 before performing the procedures in this section.

**Failure to follow these instructions will result in death or serious injury.**

### PRECAUTIONS

Read, understand, and follow all precautions described in this instruction bulletin and in the reference documents listed on page 3 before attempting to install, service, or maintain the Enclosed 48 controller.

Follow these precautions when installing Enclosed 48 controllers:

- The Enclosed 48 controller can be installed in a Pollution Degree 3 environment, as defined in NEMA ICS1-111A and IEC 60664-1. Ensure that the expected environment is compatible with this rating.
- When attaching wall mounted and free standing controllers, use fasteners rated for the weight of the apparatus, the expected shock and vibration of the installation, and the expected environment.
- During installation and operation, maintain the ventilation clearances specified on the factory supplied outline dimension drawing(s) or in Figures 8–18. Provide sufficient cooling for the heat load.
- Do not mount the controller in direct sunlight or on hot surfaces (Type 1 and 12 only). Mount it on a solid, flat surface only. *When drilling for conduit entry, take care to prevent metal chips from falling on parts and electronic printed wiring boards.*

### SEISMIC QUALIFICATION MOUNTING CRITERIA

Seismic qualification (MOD Y10) harmonizes the following standards in compliance to ICC ES AC156 acceptance criteria test protocol with an importance factor of 1.5:

- IBC (International Building Code)
- NFPA 5000 (Building Code – National Fire Protection Agency)
- NBCC (National Building Code of Canada)
- 1997 UBC (Uniform Building Code)
- 1999 NBC (BOCA National Building Code)
- 1999 SBC (Standard Building Code)
- ASCE 7 (American Society of Civil Engineers)

For seismic rating installation compliance, follow the specific labels attached to the drive controller (see Figures 4–7 on page 14) for anchorage, lateral, and mounting guidelines using **SAE Grade 5 hardware bolts and washers**. These guidelines apply for both floor and wall mounted Type 1, 12K, and 3R construction.

Figure 4: Certification Label



Figure 5: Floor Mounting

**SEISMIC ANCHORAGE REQUIREMENTS**

To maintain Seismic Qualification each individual section must be anchored to floor at all mounting locations shown in Instruction Manual.

For seismic hazard areas with an  $S_s$  acceleration value in excess of 2.67 g (New Madrid Seismic Hazard Area) or displacement at the top of the enclosure cannot be tolerated, the enclosure must be laterally braced at the top of the section and connected to the building load bearing structural system. Refer to the current IBC or NFPA 5000 for location specific values of  $S_s$ .

Use 1/2" grade 5 bolts and the appropriate washers. In order to develop full strength of the anchor, torque bolts to the value specified by the anchor manufacturer.

Refer to Instruction Manual 30072-450-62 for installation instructions.

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Figure 6: Floor Mounting (Type 1 an 12 only)

● Seismic Anchorage Location

**Seismic Anchorage Requirements**

For seismic hazard areas with an  $S_s$  acceleration value in excess of 2.67 g (New Madrid Seismic Hazard Area) or displacement at the top of the enclosure cannot be tolerated, the enclosure must be laterally braced at the top of the section and connected to the building load bearing structural system. Refer to the current IBC or NFPA 5000 for location specific values of  $S_s$ .

Remove lifting bracket after equipment has been installed, and attach lateral brace (supplied by others), re-using bolt and lock washer or user supplied hardware.

Equipment must also be anchored at the base (as shown on the instruction label located on the inside of the door).

Refer to Bulletin number 30072-450-62 for installation instructions.

80438-880-14 REV -

Figure 7: Wall Mounting

**SEISMIC ANCHORAGE REQUIREMENTS**

■ Seismic Anchorage Location

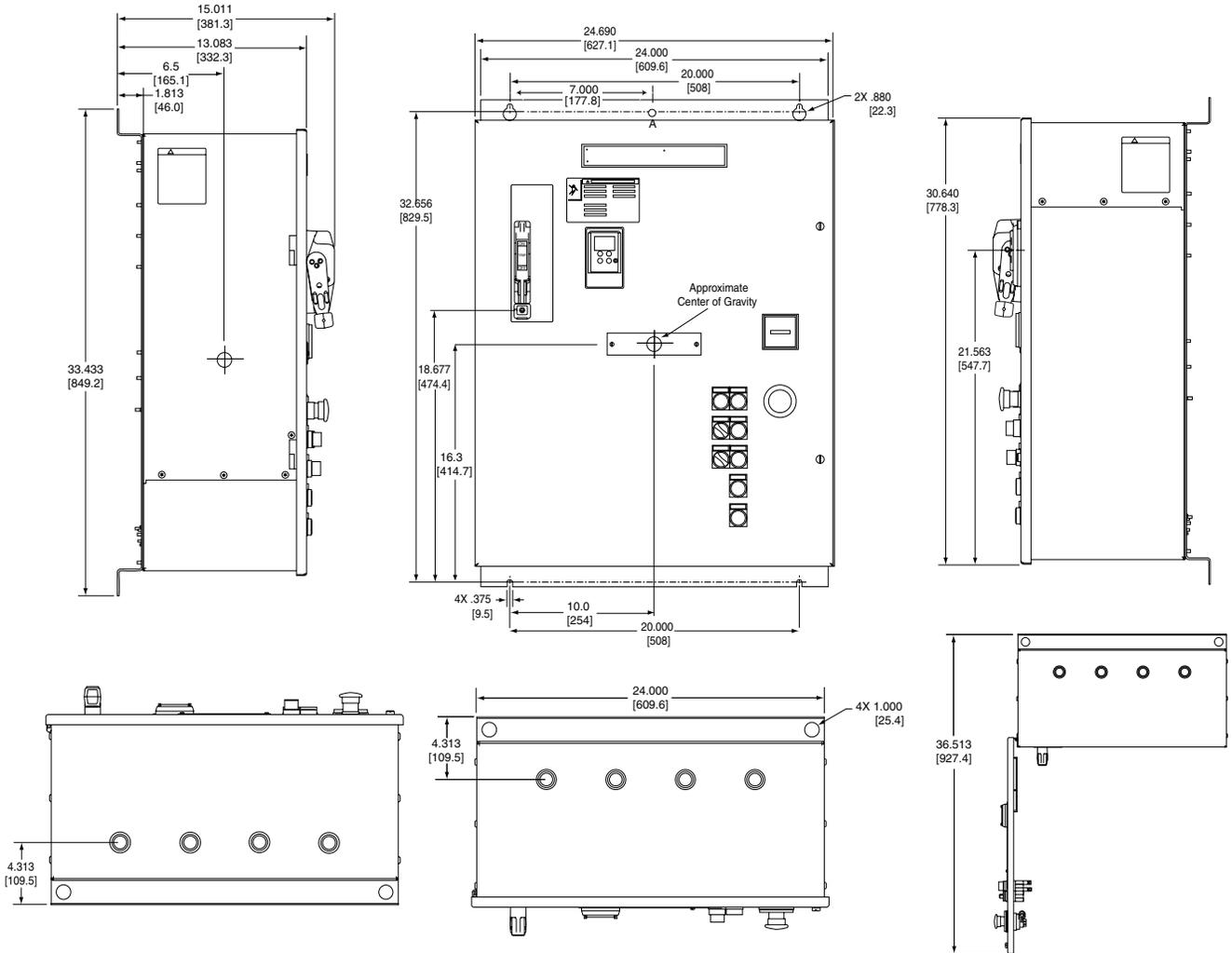
To maintain Seismic Qualification each individual enclosure must be anchored to wall at all five mounting locations shown to the left. Use 3/8" grade 5 bolts and the appropriate flat washers. In order to develop full strength of the anchor, torque bolts to the value specified by the anchor manufacturer. Refer to Instruction Manual 30072-450-62 for installation instructions.

REV B  
80038-908-01box

## MOUNTING DIMENSIONS AND WEIGHTS

Figures 8–18 show dimensions of the various wall mount and floor mount enclosure types. Table 4 on page 28 lists the weights and estimated watts loss for the various enclosure types.

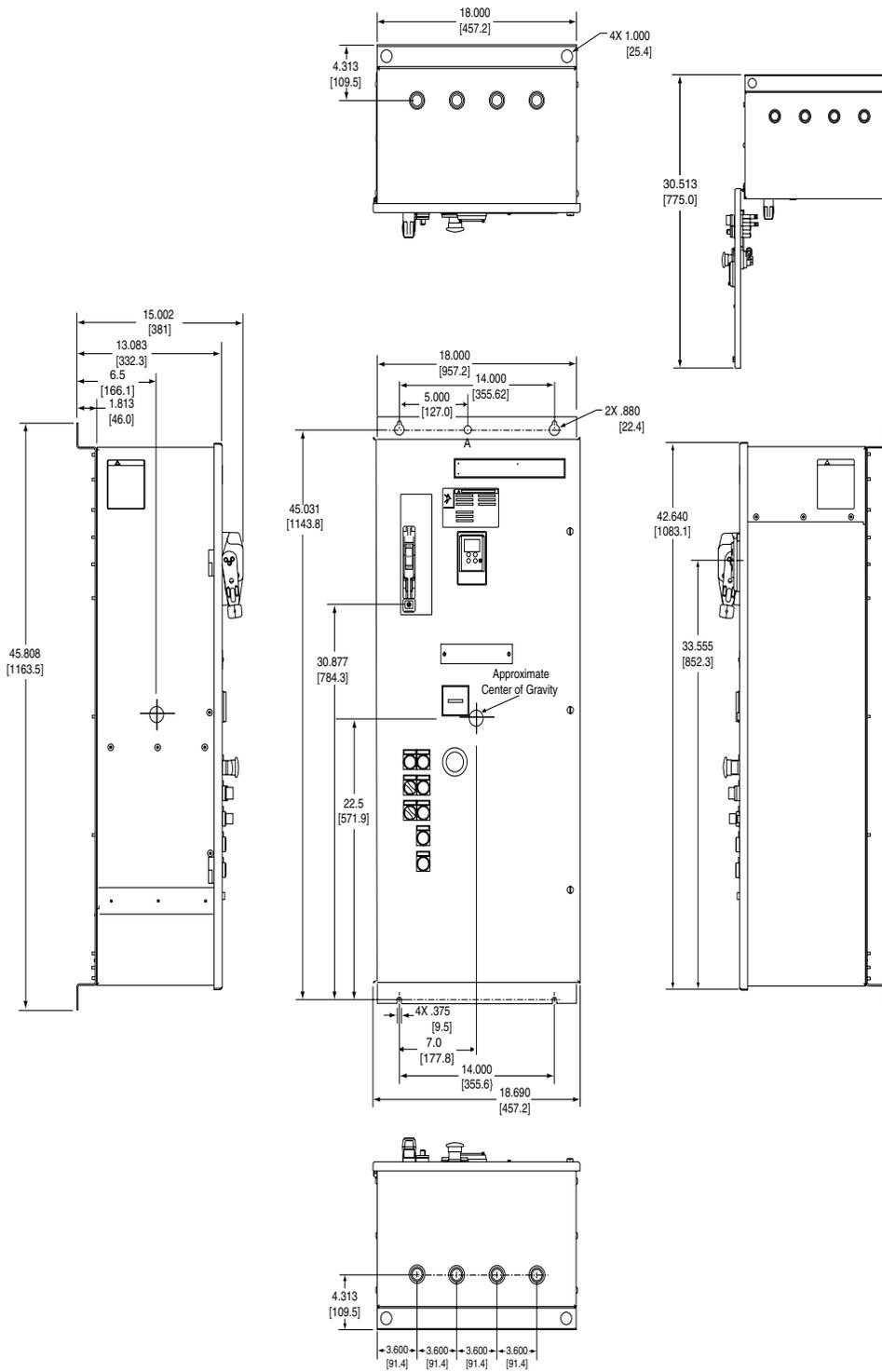
**Figure 8: Size A Enclosure, Wall Mount, Type 1, 12, and 3R: 3–5 hp @ 208 V, 5–15 hp @ 230 V, 10–30 hp @ 480 V, and 15–40 hp @ 575 V**



Dimensions: in. / [mm]

NOTE: A=Seismic Anchor .437/[11.1]

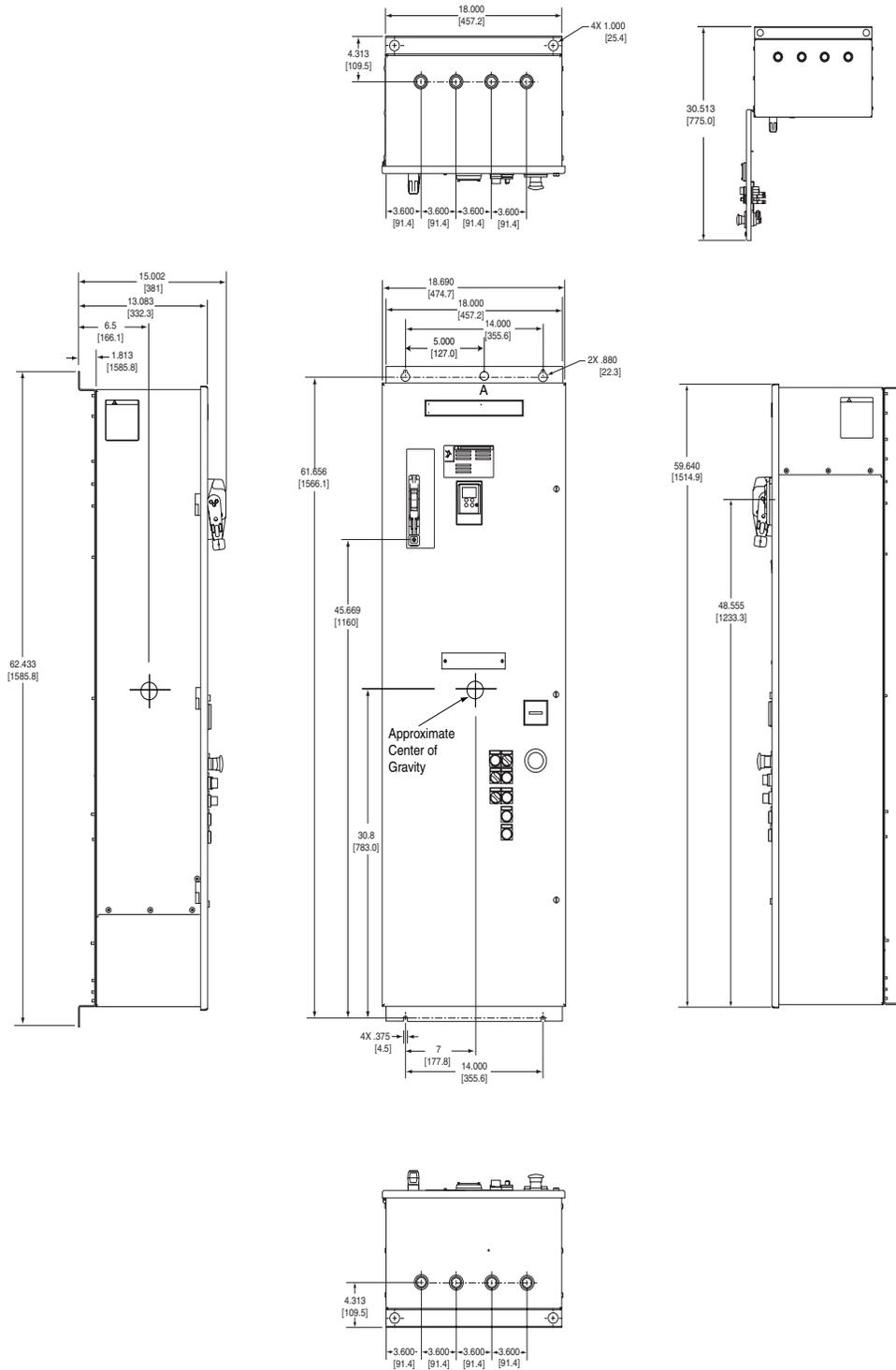
**Figure 9: Size B Enclosure, Wall Mount, Type 1, 12, and 3R: 15–30 hp @ 208 V, 20–40 hp @ 230 V, 40–75 hp @ 480 V, and 50–100 hp @ 575 V**



Dimensions: in. / [mm]

NOTE: A=Seismic Anchor .437/ [11.1]

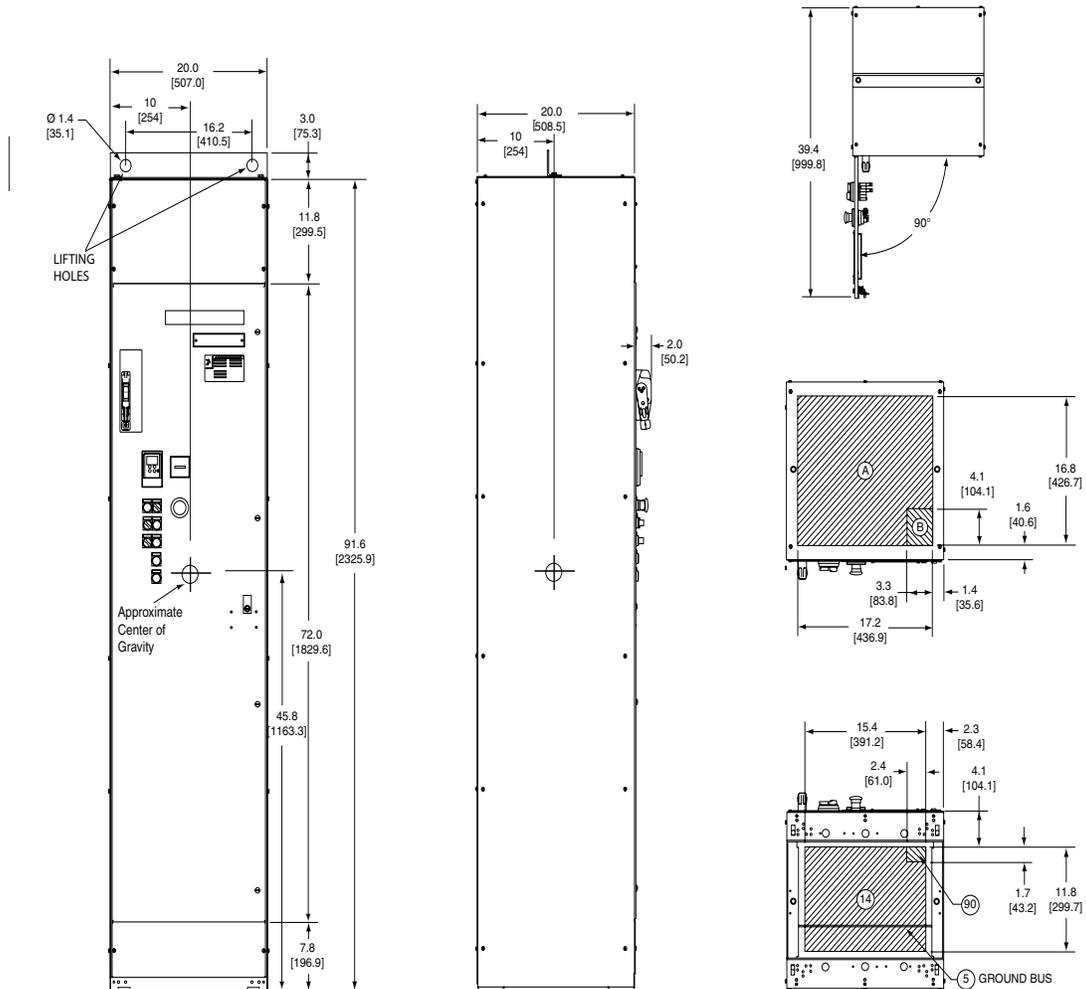
**Figure 10: Size C Enclosure, Wall Mount, Type 1, 12, and 3R: 40–50 hp @ 208 V, 50–60 hp @ 230 V, 100–125 hp @ 480 V, and 125–150 hp @ 575 V**



Dimensions: in. / [mm]

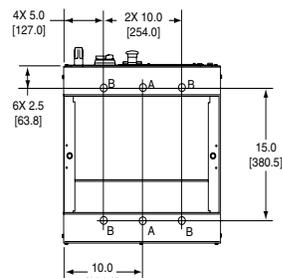
NOTE: A=Seismic Anchor .437/ [11.1]

**Figure 11: Size D Enclosure, Floor Mount, Type 1 and 12, 20 inches wide, 8639 Power Circuit S (Shunt Trip) only: 60–100 hp @ 208 V, 75–125 hp @ 230 V, 150–250 hp @ 480 V, and 200–300 hp @ 575 V**



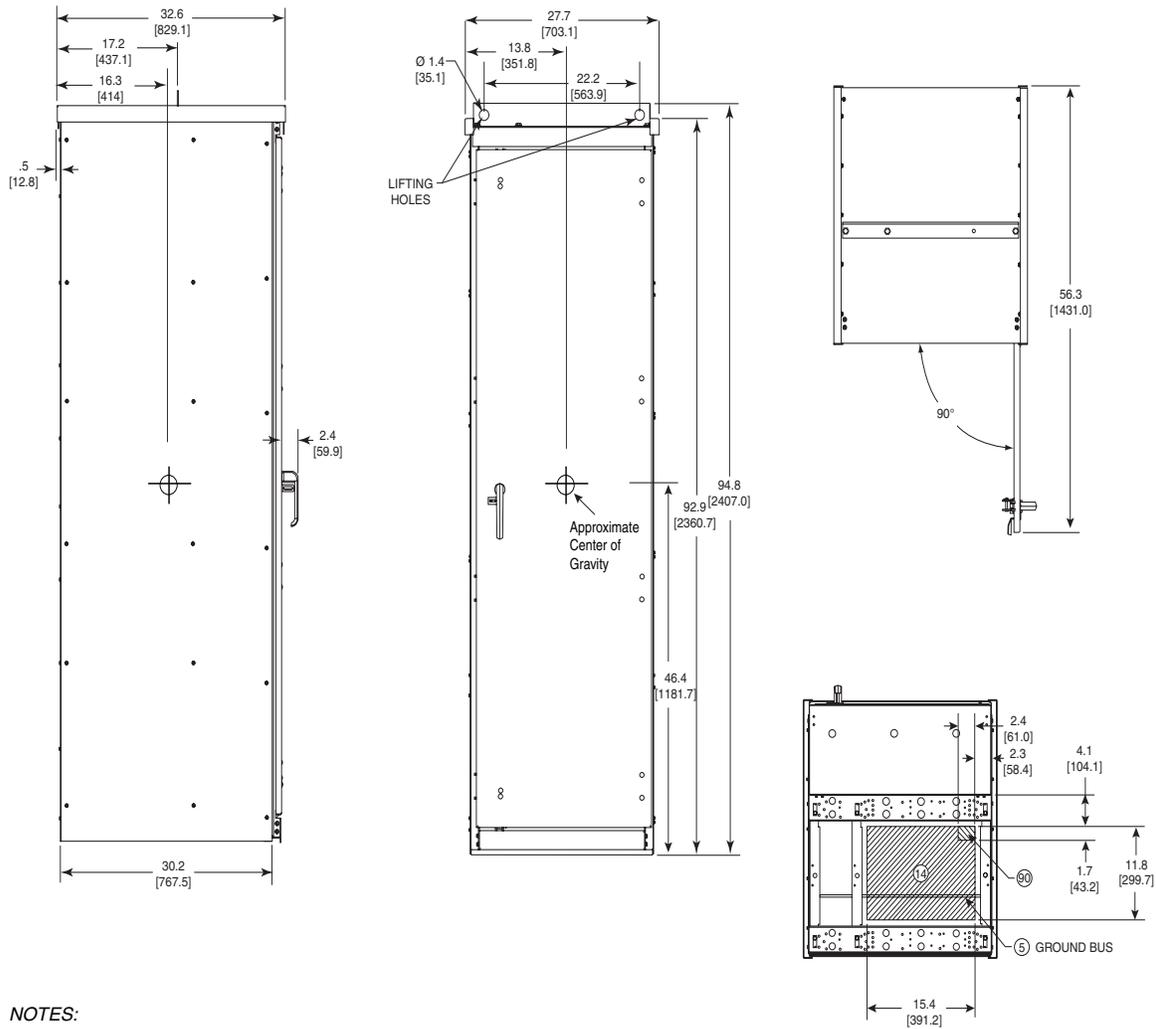
**NOTES:**

1. Circled numbers indicate depth in inches.
2. A = Standard Anchors, B = Seismic Anchors .88' [22.4]



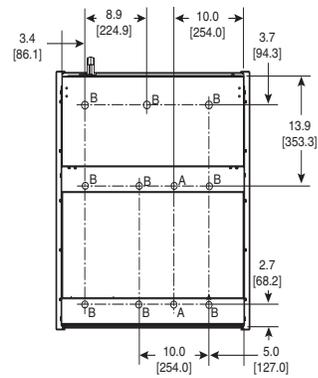
Dimensions: in. / [mm]

**Figure 12: Size D Enclosure, Floor Mount, Type 3R, 20 inches wide, 8639 Power Circuit S (Shunt Trip) only: 60–100 hp @ 208 V, 75–125 hp @ 230 V, 150–250 hp @ 480 V, and 200–300 hp @ 575 V**



**NOTES:**

1. Circled numbers indicate depth in inches.
2. A = Standard Anchors, B = Seismic Anchors .88/ [22.4]

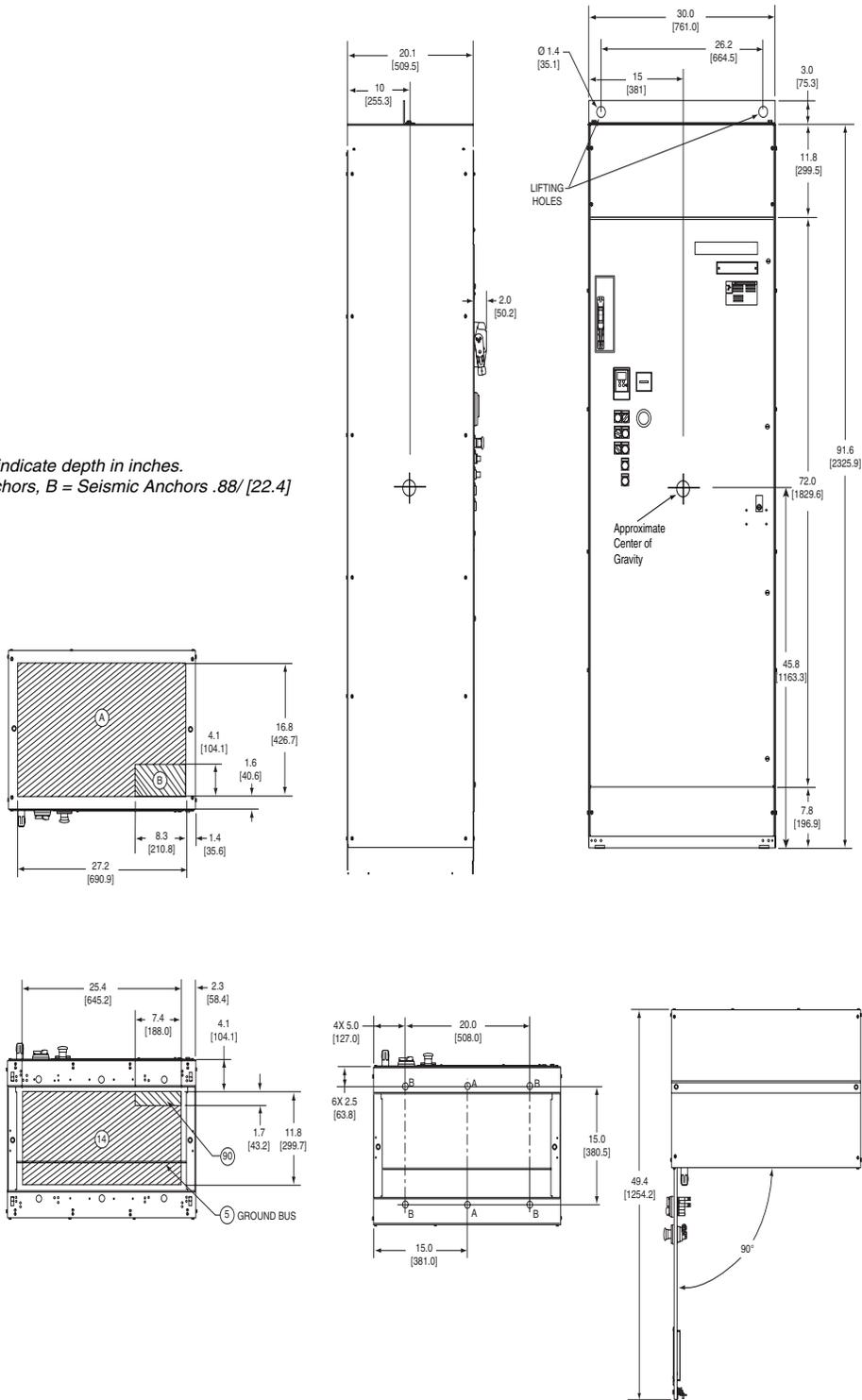


Dimensions: in. / [mm]

Figure 13: Size D Enclosure, Floor Mount, Type 1 and 12, 30 inches wide, 8639 Power Circuit N (Isolation Contactor) or R (Reversing): 60–100 hp @ 208 V, 75–125 hp @ 230 V, 150–250 hp @ 480 V, and 200–300 hp @ 575 V

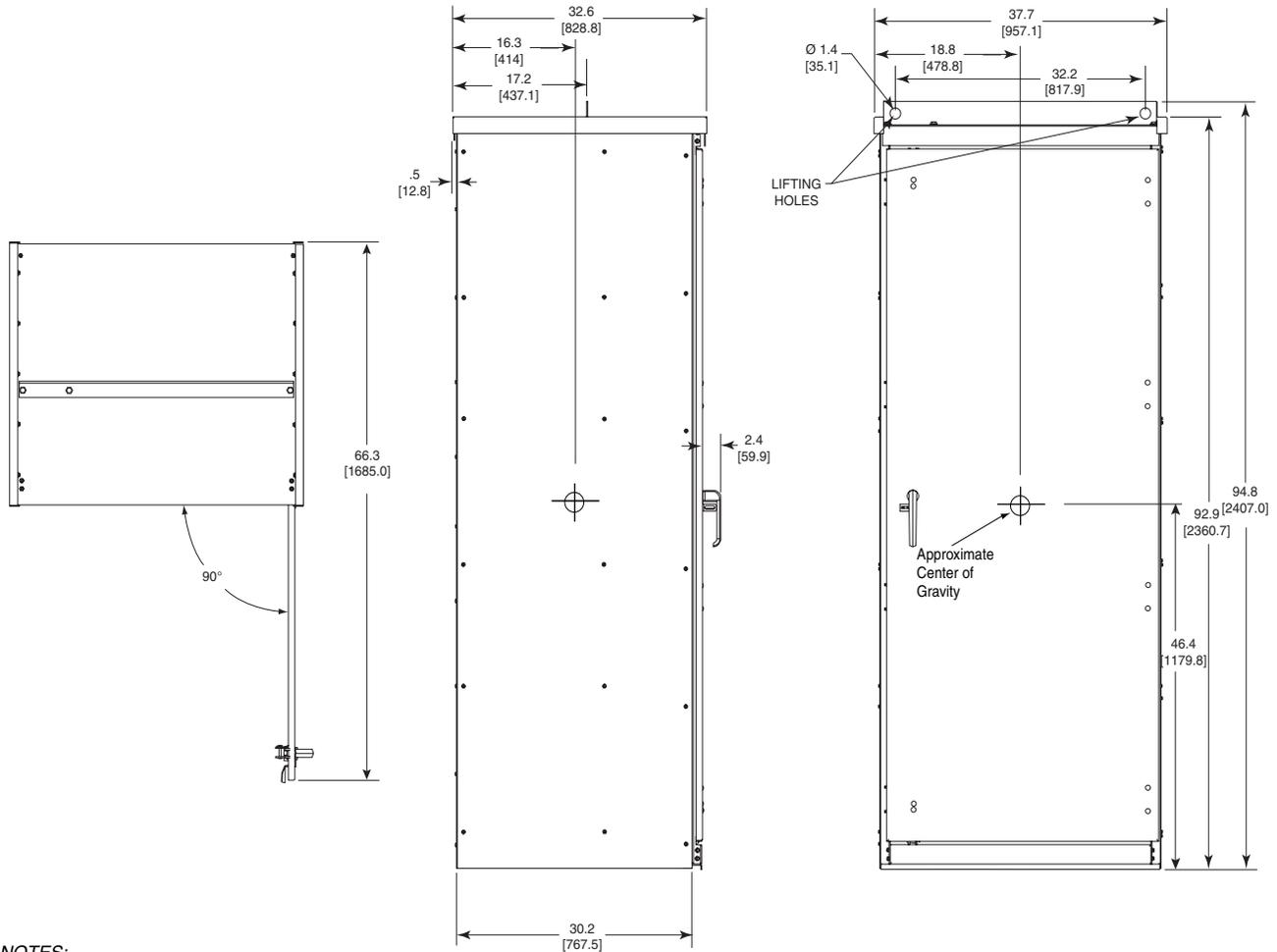
NOTES:

1. Circled numbers indicate depth in inches.
2. A = Standard Anchors, B = Seismic Anchors .88/ [22.4]



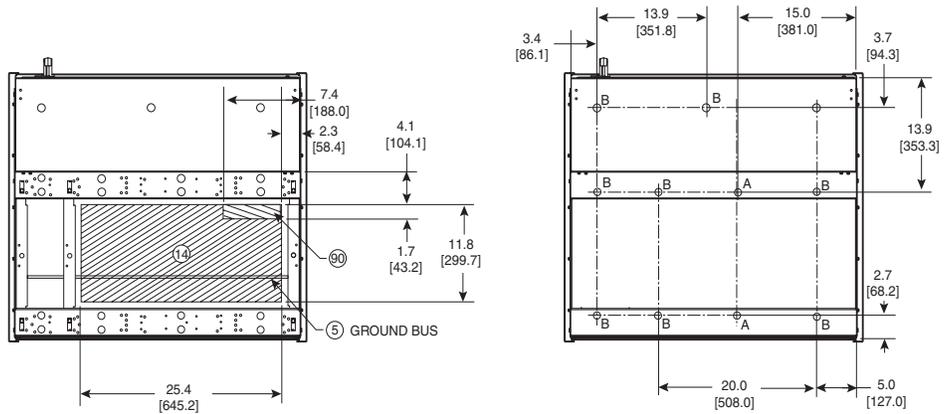
Dimensions: in. / [mm]

**Figure 14: Size D Enclosure, Floor Mount, Type 3R, 30 inches wide, 8639 Power Circuit N (Isolation Contactor) or R (Reversing): 60–100 hp @ 208 V, 75–125 hp @ 230 V, 150–250 hp @ 480 V, and 200–300 hp @ 575 V**



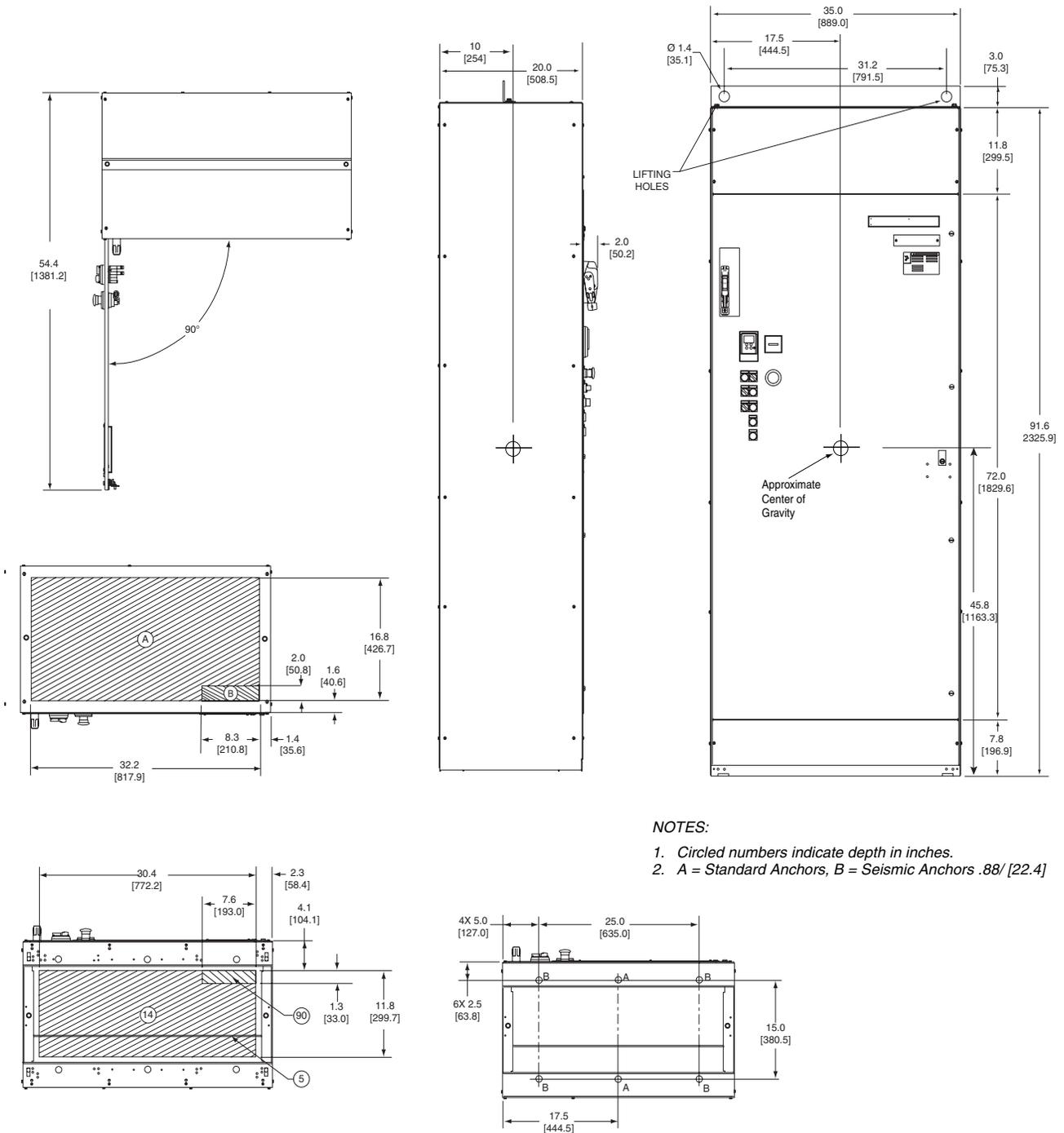
**NOTES:**

1. Circled numbers indicate depth in inches.
2. A = Standard Anchors, B = Seismic Anchors .88/ [22.4]



Dimensions: in. / [mm]

**Figure 15: Size E Enclosure, Floor Mount, Type 1 and 12, 35 inches wide, 8638 and 8639 Power Circuit N (Isolation Contactor) or S (Shunt Trip): 125–200 hp @ 208 V, 150–250 hp @ 230 V, 300–500 hp @ 480 V, and 350–600 hp @ 575 V**

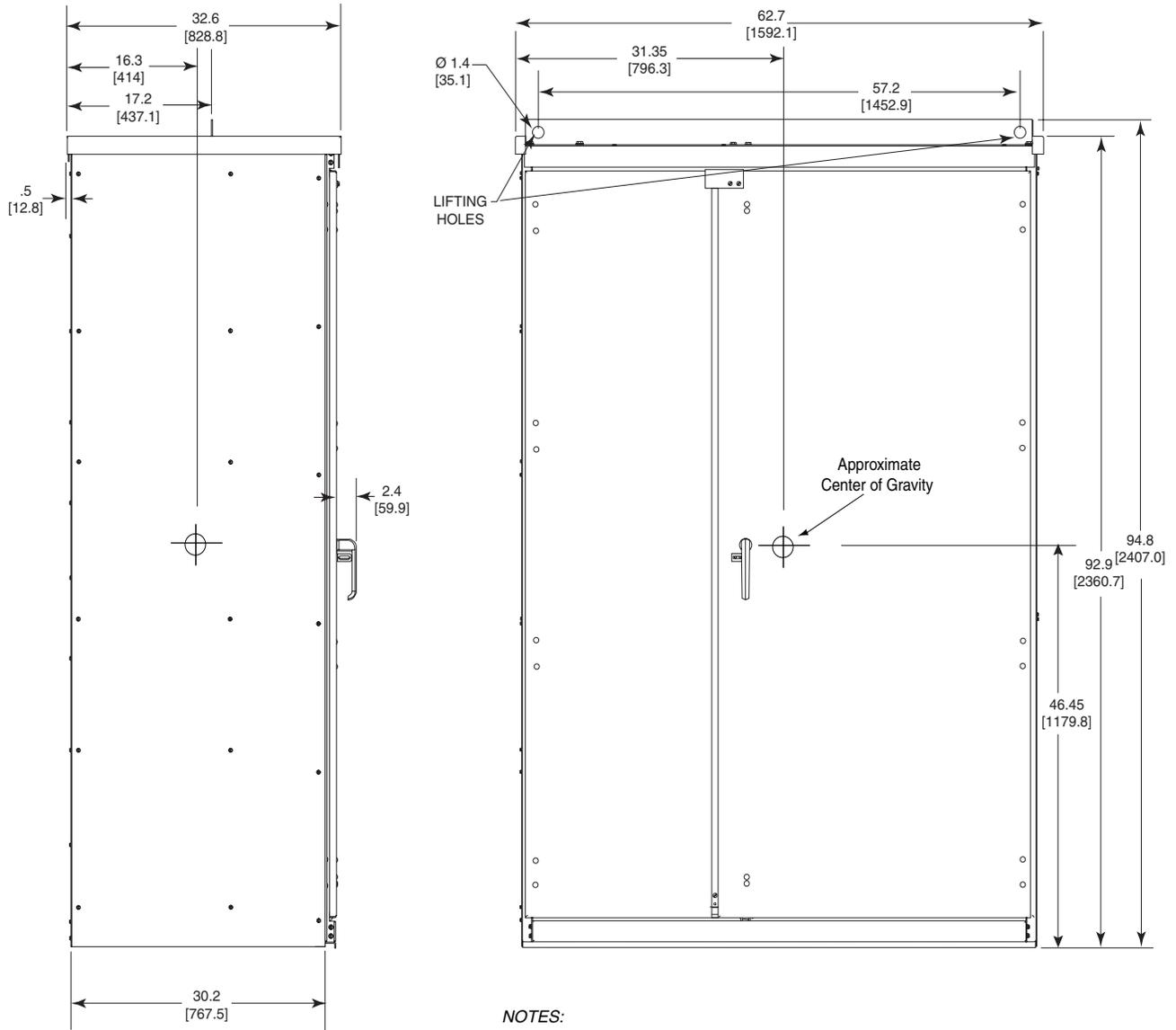


**NOTES:**

1. Circled numbers indicate depth in inches.
2. A = Standard Anchors, B = Seismic Anchors .88/ [22.4]

Dimensions: in. / [mm]

**Figure 16: Size E Enclosure Outline, Floor Mount, Type 3R, 55 in. wide, 8638 and 8339 Power Circuit R (Reversing):  
125–200 hp @ 208 V, 150–250 hp @ 230 V, 300–500 hp @ 480 V, and 350–600 hp @ 575 V**



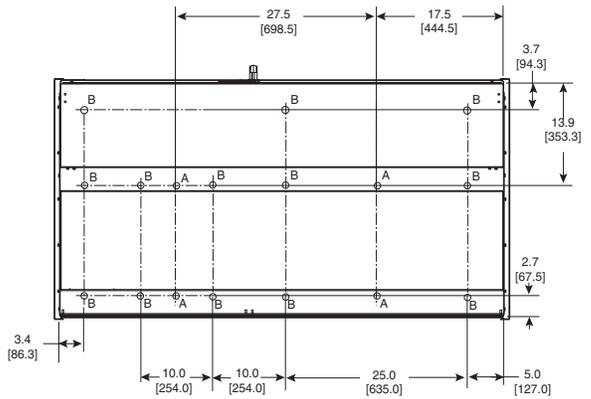
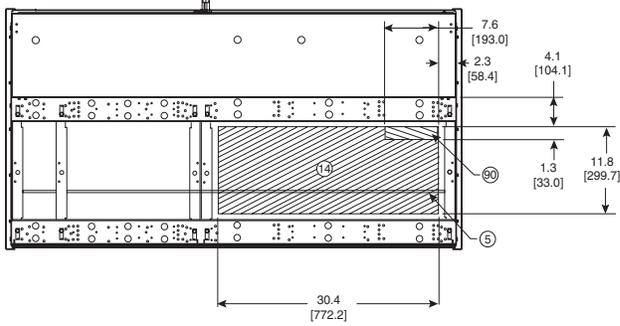
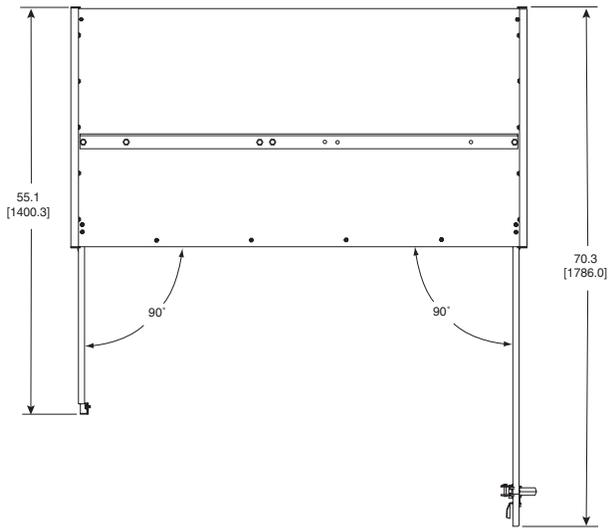
**NOTES:**

1. Circled numbers indicate depth in inches.
2. A = Standard Anchors, B = Seismic Anchors .88/ [22.4]

Dimensions: in. / [mm]

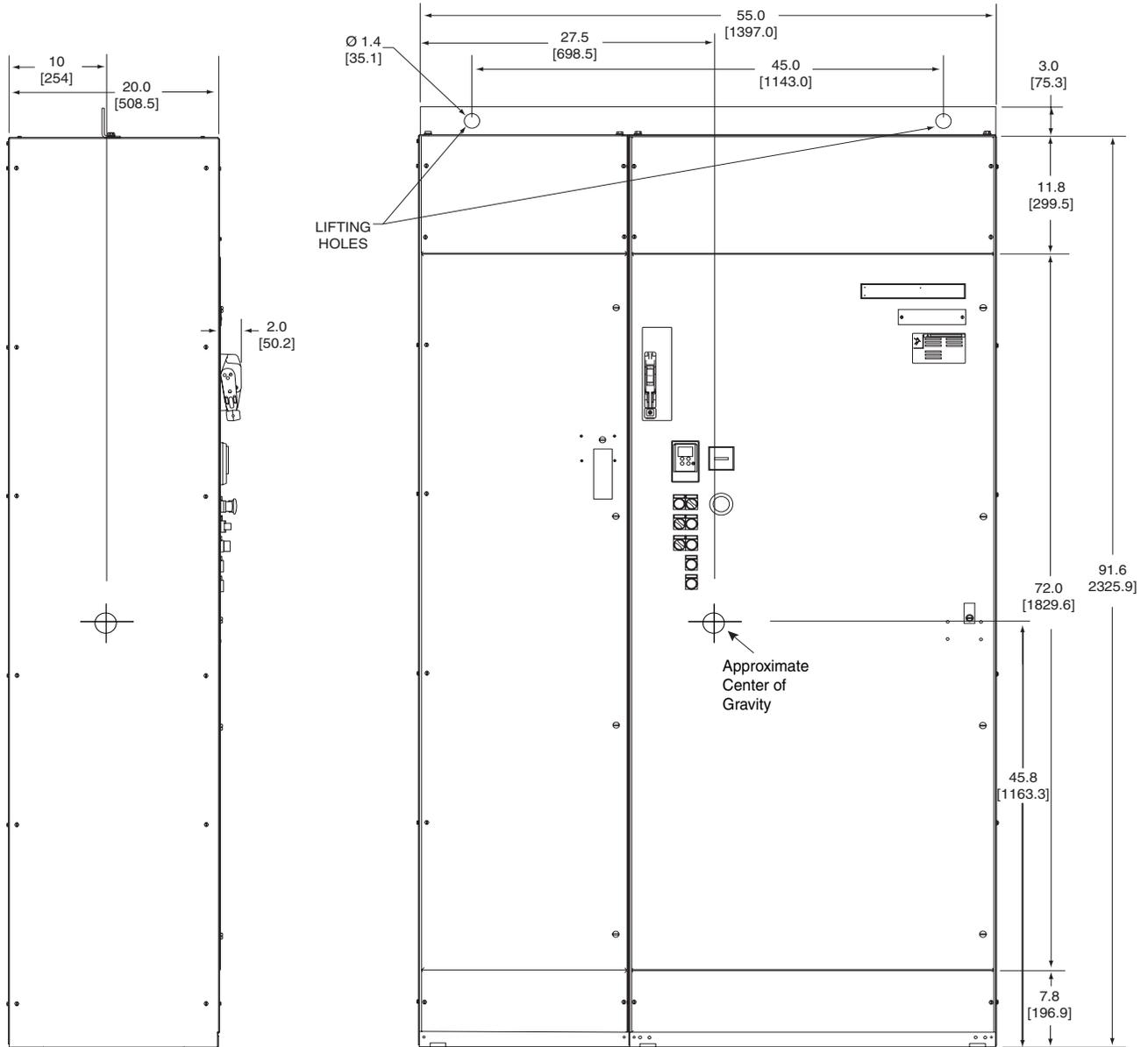
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Dimensions: in. / [mm]

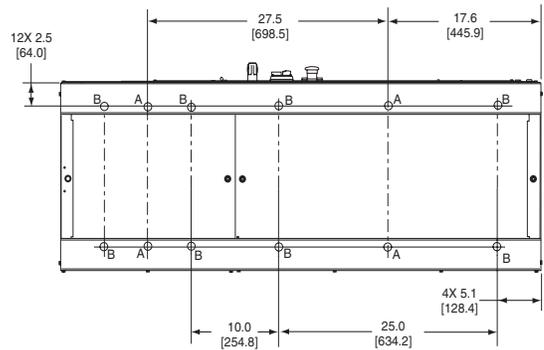
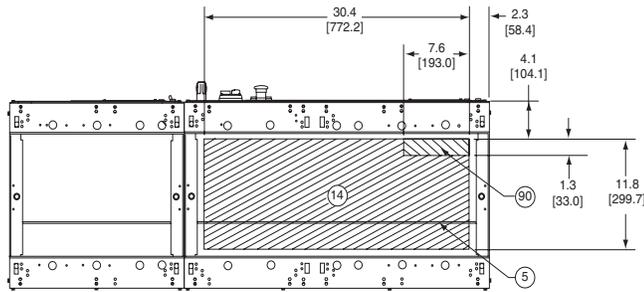
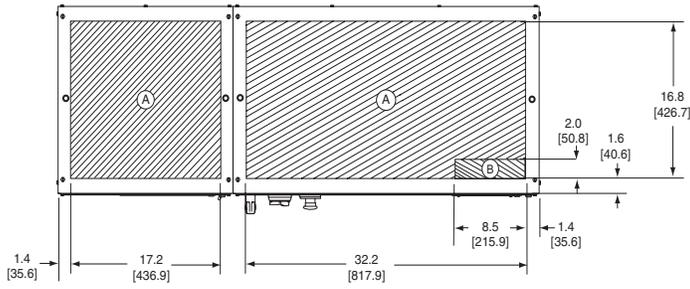
**Figure 17: Size E Enclosure, Floor Mount, Type 1 and 12, 55 inches wide, 8638 and 8339 Power Circuit R (Reversing):  
125–200 hp @ 208 V, 150–250 hp @ 230 V, 300–500 hp @ 480 V, and 350–600 hp @ 575 V**



Dimensions: in. / [mm]

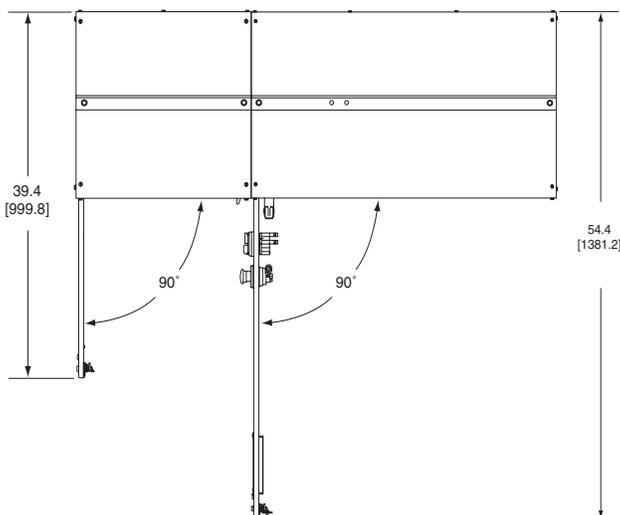
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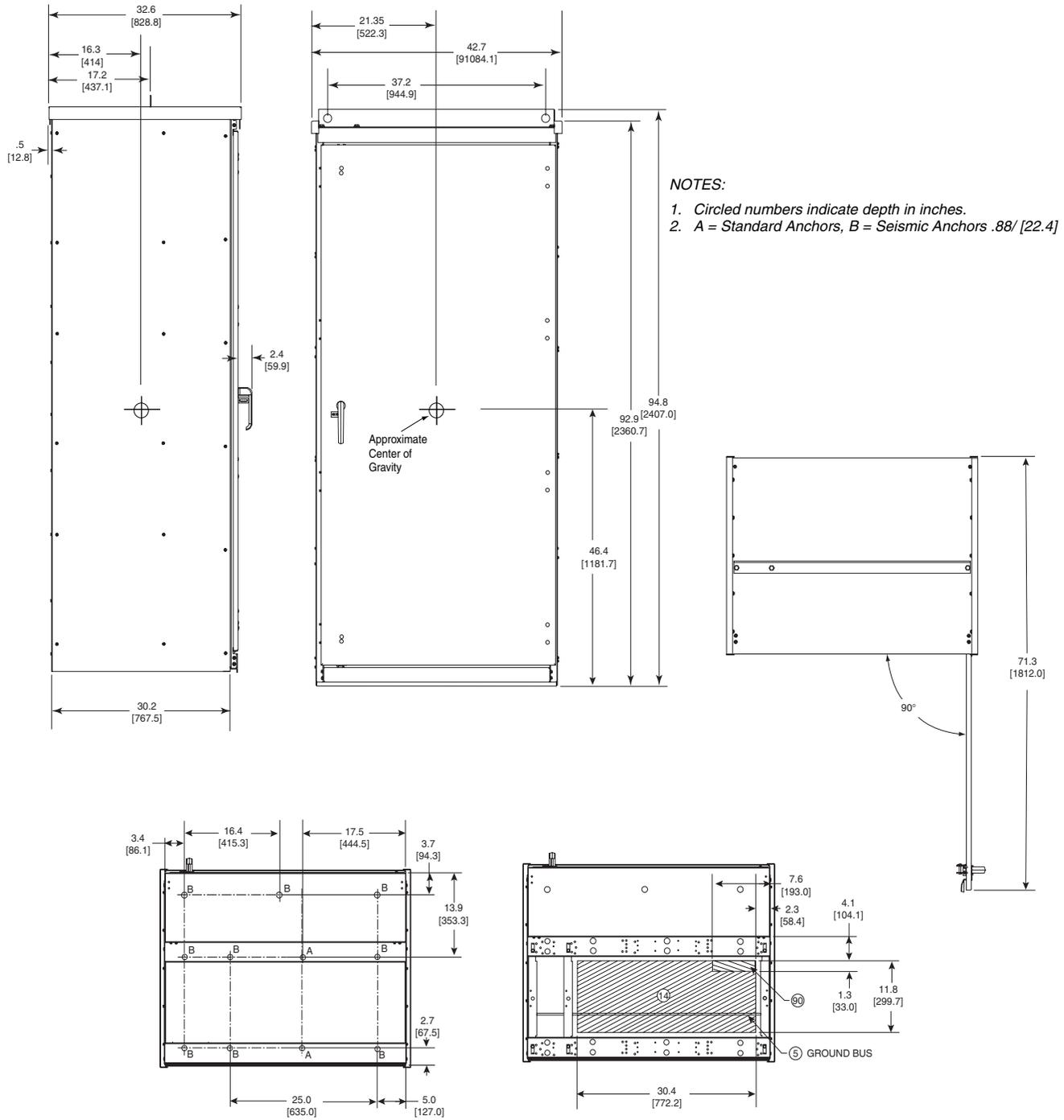
**NOTES:**

1. Circled numbers indicate depth in inches.
2. A = Standard Anchors, B = Seismic Anchors .88/ [22.4]



**Dimensions: in. / [mm]**

**Figure 18: Size E Enclosure, Floor Mount, Type 3R, 35 inches wide, 8638 and 8639 Power Circuit N (Isolation Contactor) or S (Shunt Trip): 125–200 hp @ 208 V, 150–250 hp @ 230 V, 300–500 hp @ 480 V, and 350–600 hp @ 575 V**



Dimensions: in. / [mm]

Table 4 lists the weights for the devices illustrated in Figures 8 through 18. It also provides the estimated watts loss for the Enclosed 48 controllers.

**Table 4: Weights and Estimated Watts Loss**

| Class 8638 & 8639<br>Enclosed 48 Controllers<br>Horsepower Ratings |                                 |       |       |       |       | Estimated<br>Watts Loss <sup>1</sup> | Weights (lb) <sup>2</sup> |      |     |         |      |     |         |      |     |
|--|---------------------------------|-------|-------|-------|-------|--------------------------------------|---------------------------|------|-----|---------|------|-----|---------|------|-----|
| Size<br>SI   | ATS48_YU <sup>3</sup><br>Device | 208 V | 230 V | 460 V | 575 V |                                      | Power Circuits            |      |     |         |      |     |         |      |     |
|  |                                 |       |       |       |       |                                      | Type 1                    |      |     | Type 12 |      |     | Type 3R |      |     |
|  |                                 |       |       |       |       | N                                    | R                         | S    | N   | R       | S    | N   | R       | S    |     |
| A  | D17                             | 3     | 5     | 10    | 15    | 285 W Start<br>158 W Run             | 110                       |      |     | 110     |      |     | 110     |      |     |
| A  | D22                             | 5     | 7.5   | 15    | 20    |                                      |                           |      |     |         |      |     |         |      |     |
| A  | D32                             | 7.5   | 10    | 20    | 25    |                                      |                           |      |     |         |      |     |         |      |     |
| A  | D38                             | 10    | –     | 25    | 30    |                                      |                           |      |     |         |      |     |         |      |     |
| A  | D47                             | –     | 15    | 30    | 40    |                                      |                           |      |     |         |      |     |         |      |     |
| B  | D62                             | 15    | 20    | 40    | 50    | 529 W Start<br>258 W Run             | 125                       |      |     | 125     |      |     | 125     |      |     |
| B  | D75                             | 20    | 25    | 50    | 60    |                                      |                           |      |     |         |      |     |         |      |     |
| B  | D88                             | 25    | 30    | 60    | 75    |                                      |                           |      |     |         |      |     |         |      |     |
| B  | C11                             | 30    | 40    | 75    | 100   |                                      |                           |      |     |         |      |     |         |      |     |
| C  | C14                             | 40    | 50    | 100   | 125   | 529 W Start<br>258 W Run             | 200                       |      |     | 200     |      |     | 200     |      |     |
| C  | C17                             | 50    | 60    | 125   | 150   |                                      |                           |      |     |         |      |     |         |      |     |
| D  | C21                             | 60    | 75    | 150   | 200   | 1264 W Start<br>538 W Run            | 500                       | 500  | 400 | 500     | 500  | 400 | 525     | 525  | 425 |
| D  | C25                             | 75    | 100   | 200   | 250   |                                      |                           |      |     |         |      |     |         |      |     |
| D  | C32                             | 100   | 125   | 250   | 300   |                                      |                           |      |     |         |      |     |         |      |     |
| E  | C41                             | 125   | 150   | 300   | 350   | 2482 W Start<br>1004 W Run           | 750                       | 1000 | 750 | 750     | 1000 | 750 | 800     | 1050 | 800 |
| E  | C48                             | 150   | –     | 350   | 400   |                                      |                           |      |     |         |      |     |         |      |     |
| E  | C59                             | –     | 200   | 400   | 500   |                                      |                           |      |     |         |      |     |         |      |     |
| E  | C66                             | 200   | 250   | 500   | 600   |                                      |                           |      |     |         |      |     |         |      |     |

<sup>1</sup> Watts loss conditions identified in Start (ATS48 soft start mode) during installation /deceleration ramp. Run (shorting contactor mode) during operating conditions.  
<sup>2</sup> Power Circuit **N** is non-reversing with an isolation contactor. Power Circuit **R** is reversing with an isolation contactor. Power Circuit **S** is a Shunt Trip Coil with a molded case.  
<sup>3</sup> The underscore ( \_ ) represents the variable part of the catalog number.

## WIRING

### **⚠ DANGER**

#### **HAZARD OF ELECTRIC SHOCK, EXPLOSION, OR ARC FLASH**

Turn off all power (main and remote) before installing the equipment. Refer to “Before You Begin” starting on page 4 before performing the procedures in this section.

**Failure to follow these instructions will result in death or serious injury.**

### **⚠ CAUTION**

#### **IMPROPER WIRING HAZARDS**

Follow the wiring practices described in this document in addition to those already required by the National Electrical Code and local codes.

**Failure to follow these instructions can result in injury or equipment damage.**

## Grounding

Ground the Enclosed 48 controller according to the National Electrical Code and all local codes. To ground the drive controller:

- Connect a copper wire from the ground bar terminal to the power system ground.
- Verify that the resistance to ground is 1  $\Omega$  or less. Improper grounding causes intermittent and unreliable operation.

### **⚠ DANGER**

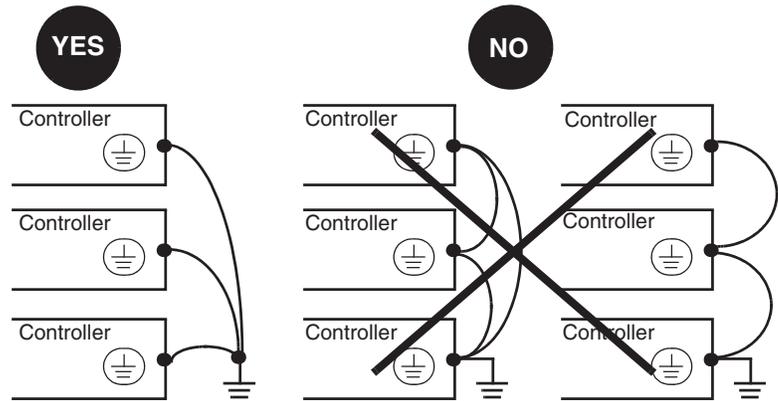
#### **HAZARD OF ELECTRIC SHOCK**

- Ground equipment using the provided ground connection point. The Enclosed 48 controller panel must be properly grounded before power is applied.
- Do not use metallic conduit as a ground conductor.

**Failure to follow these instructions will result in death or serious injury.**

Ground multiple Enclosed 48 controllers as shown in Figure 19. Use one grounding conductor per device. Do not loop ground conductors or install them in series.

Figure 19: Grounding Multiple Enclosed 48 Controllers



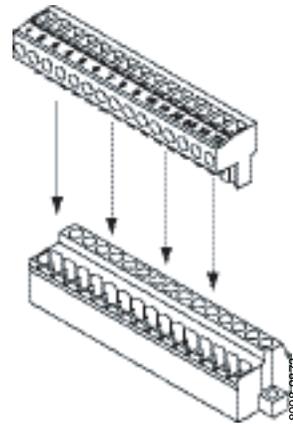
## Control Wiring

The customer terminal block pulls apart to facilitate control wiring. To access the control terminals, remove the top portion of the terminal block from the base by grasping it and pulling up. See Figure 20. Connect the control wiring to the top portion of the terminal block.

Each terminal is rated for one 16-12 AWG (1.3 to 3.3 mm<sup>2</sup>) wire or two 16 AWG (1.3 mm<sup>2</sup>) wires. Torque the terminal screws to 5 lb-in (0.6 N•m). The customer terminal block is designated TB1 on the wiring diagrams shipped with the Enclosed 48 controller.

*NOTE: Depending on the power and control options ordered, several analog or digital inputs and outputs will be available at the control terminal blocks on the Altistart 48 soft start. For I/O availability, refer to the elementary diagram supplied with the Enclosed 48 controller. For I/O specifications and adjustments, refer to bulletin number 30072-450-61\_.*

**Figure 20: Pull-Apart Customer Terminal Block**



## Load Wiring

The motor load connections to the Enclosed 48 controller terminate on the ATS48 soft start controller. The load terminals are designated T1, T2, and T3. Refer to the Enclosed 48 controller wiring diagrams, nameplate, and bulletin number 30072-450-61\_, for load terminal wire and torque requirements.

## Adaptation to Line Input

This paragraph replaces the information described in the “Adaptation To Line Input” section of bulletin number 30072-450-61\_.

Each ATS48 soft start controller is factory configured for a particular line voltage as specified in the equipment order. The available ratings are: 208 Vac, 240 Vac, 480 Vac, and 600 Vac @ 60 Hz. The factory configured voltage rating is listed on the controller nameplate. Consult your Schneider Electric representative if the equipment requires modification from these voltage ratings.

The ATS48 soft start control transformer and overcurrent protective device (OCPD) may require change or reconfiguration.



## SECTION 4— OPERATION

### **⚠ DANGER**

#### **HAZARD OF ELECTRIC SHOCK, EXPLOSION, OR ARC FLASH**

Read and understand the precautions in “Before You Begin” starting on page 4 before performing the procedures in this section.

**Failure to follow these instructions will result in death or serious injury.**

### **⚠ WARNING**

#### **UNINTENDED EQUIPMENT OPERATION**

- Read and understand the *Altistart 48 Y-Range Soft Start Controllers Installation Guide* (30072-450-61\_) before using the keypad display. Parameter changes affect drive controller operation. Most parameter changes require pressing ENT.
- Lock the keypad after making parameter adjustments.
- Do not reset soft start parameters to configurations other than those specified on the wiring diagrams supplied with the Enclosed 48 controller. Some factory-set drive parameters are critical for the Enclosed 48 controller power and control configurations.
- Do not alter the programming of factory-installed control devices or power contactors.

**Failure to follow these instructions can result in death or serious injury.**

For complete information about the operation of the ATS48 soft start, refer to bulletin number 30072-450-61\_, and to the drawings supplied with the unit.

## CIRCUIT DIAGRAMS

The Enclosed 48 controller is an integrated package that can have different components and control schemes than those listed in bulletin number 30072-450-61\_. Replace the “Recommended Wiring Diagrams” and “Recommended Components Lists” sections of bulletin number 30072-450-61\_ with the documentation shipped with the Enclosed 48 units. Wiring diagrams specific to Enclosed 48 controllers are shipped with each unit. For component information, refer to the replacement parts list beginning on page 45 of this document, or consult your Schneider Electric representative.

## INTEGRATED FULL VOLTAGE BYPASS STARTER (MOD A10)

Enclosed 48 controllers can include an optional full-voltage bypass starter which provides the ability to bypass the ATS48 soft start and run the motor using across-the-line, full-voltage starting. This mode of operation can be used when the ATS48 soft start is out of service due to a protective trip condition but the process needs to continue until a convenient shutdown is possible. Ensure that the electrical and mechanical systems are compatible with full-voltage starting before using the bypass starter.

The bypass circuit includes a “Bypass-Norm” (Bypass/Normal) selector switch mounted on the controller, control logic, and a separate ambient-temperature compensated bimetallic or solid state overload relay (SSOLR). When the selector switch is in the Normal position, the ATS48 soft start controls the motor and the bypass contactor functions as a shorting contactor. The bypass contactor closes when the starting cycle is complete and opens when a stop command is given.

When the selector switch is in the Bypass position, the ATS48 soft start does not control the motor. The input contactor and the bypass contactor are directly opened and closed using a customer-supplied control.

## FACTORY SETTINGS

The Enclosed 48 controller software is factory configured to match the power and control options purchased with the enclosed controller.

*NOTE: Use caution when making changes to factory configured parameters. The factory settings are critical for the power and control options to function properly.*

For more information about the Enclosed 48 controller factory settings, refer to Table 5. A wiring diagram is a part of the “Installation/Maintenance” packet included with your shipment.

**Before powering up the controller for the first time, compare the motor nameplate current rating with the output current (based on the horsepower and voltage rating) in Table 7 on page 35.** If the motor nameplate current rating is not within 40 to 100% of the value in the table, a different ATS48 soft start must be used.

**Table 5: Factory Configuration**

|   |  |
|---|--|
| <b>Nominal motor current (<math>I_N</math>)</b>       | Preset to correspond to 460 V rated motor current based on NFPA 70/NEC Table 430.150 ratings   |
| <b>Current Limit (ILt)</b>                            | 400% of the motor current $I_N$  |
| <b>Acceleration ramp (ACC)</b>                        | 15 seconds   |
| <b>Initial torque on starting (<math>tq_0</math>)</b> | 20% of the nominal torque  |
| <b>Stop (StY)</b>                                     | Freewheel stop (-F-)   |
| <b>Motor thermal protection (tHP)</b>                 | Class 10 thermal overload protection curve (ATS48 soft start)<br>Class 20 set to minimum threshold (MOD A10)   |
| <b>Display</b>  | rdY (ATS48 soft start ready) when power and control voltage are present and the motor is operating.  |
| <b>Logic inputs</b>                                   | <ul style="list-style-type: none"> <li>• LI1</li> <li>• LI2</li> <li>• LI3</li> <li>• LI4</li> </ul> <ul style="list-style-type: none"> <li>• STOP</li> <li>• RUN</li> <li>• Forced freewheel stop (LIA)</li> <li>• Forced local mode (LIL)</li> </ul> |
| <b>Logic outputs</b>                                  | <ul style="list-style-type: none"> <li>• LO1</li> <li>• LO2</li> </ul> <ul style="list-style-type: none"> <li>• Motor thermal alarm (tA1)</li> <li>• Motor powered (rnI)</li> </ul>  |
| <b>Relay outputs</b>                                  | <ul style="list-style-type: none"> <li>• R1</li> <li>• R2</li> <li>• R3</li> </ul> <ul style="list-style-type: none"> <li>• Detected fault relay (r1F)</li> <li>• Bypass relay at the end of starting</li> <li>• Motor powered (rnI)</li> </ul>        |

**Table 5: Factory Configuration (continued)**

|                                 |   |
|---------------------------------|---|
| <b>Analog output (AO)</b>       | Motor current (OCr, 0–20 mA)  |
| <b>Communication parameters</b> | <ul style="list-style-type: none"> <li>When connected via the serial link, the soft starter has a logic address (Add) of 0</li> <li>Transmission speed (tbr): 19200 bits per second</li> <li>Communication format (FOr): 8 bits, no parity, 1 stop bit (8n1)</li> </ul> |

## MINIMUM START-UP PROCEDURE

Before operating the motor, check and adjust the following:

- The nominal motor current parameter
- The bimetallic motor overload relay or SSOLR (if a full voltage bypass starter, MOD A10, is provided)

Refer to the following sections for more information.

The nominal motor current parameter and all programmable Altistart 48 parameters can be adjusted via the keypad. An access switch on the back of the keypad provides three levels of access to the parameters: locked, partial unlocked, and unlocked. The switch is factory set to the locked position to help prevent accidental modification of the parameters. To access the parameters, open the Enclosed 48 controller door, locate the access switch, and set the switch to the unlocked position.

For more information, refer to the “Remote Keypad Display” section of instruction bulletin 30072-450-61\_.

## Nominal Motor Current (I<sub>N</sub>)

The factory settings for the nominal motor current, I<sub>N</sub>, are listed in Table 7. If the factory setting is not within 95–105% of the motor nameplate current, or if using a 1.0 service factor motor, the I<sub>N</sub> parameter should be adjusted to obtain optimal performance and thermal protection as specified in Table 6.

**Table 6: Service Factor Settings**

| Service Factor | Setting                                   |
|----------------|---|
| 1.0            | I <sub>N</sub> = 0.96 x Nameplate Current |
| 1.15 or 1.25   | I <sub>N</sub> = 1.00 x Nameplate Current |

For 1.15 or 1.25 service factor motors, the nominal current may be set as high as 104% of the nameplate current if required to help prevent nuisance tripping.

**Table 7: Horsepower Ratings and Nominal Motor Current Factory Settings**

| Altistart Soft Start Model | Horsepower Rating |       |       |       | Nominal Motor Current (I <sub>N</sub> ) Factory Setting |
|----------------------------|-------------------|-------|-------|-------|---|
|                            | 208 V             | 230 V | 460 V | 575 V |   |
| ATS48D17Y                  | 3                 | 5     | 10    | 15    | 14  |
| ATS48D22Y                  | 5                 | 7.5   | 15    | 20    | 21  |
| ATS48D32Y                  | 7.5               | 10    | 20    | 25    | 27  |
| ATS48D38Y                  | 10                | –     | 25    | 30    | 34  |
| ATS48D47Y                  | –                 | 15    | 30    | 40    | 40  |
| ATS48D62Y                  | 15                | 20    | 40    | 50    | 52  |
| ATS48D75Y                  | 20                | 25    | 50    | 60    | 65  |
| ATS48D88Y                  | 25                | 30    | 60    | 75    | 77  |
| ATS48C11Y                  | 30                | 40    | 75    | 100   | 96  |
| ATS48C14Y                  | 40                | 50    | 100   | 125   | 124   |
| ATS48C17Y                  | 50                | 60    | 125   | 150   | 156   |

**Table 7: Horsepower Ratings and Nominal Motor Current Factory Settings** *(continued)*

| Altistart Soft Start Model | Horsepower Rating |       |       |       | Nominal Motor Current (I <sub>N</sub> ) Factory Setting |
|----------------------------|-------------------|-------|-------|-------|---|
|                            | 208 V             | 230 V | 460 V | 575 V |   |
| ATS48C21Y                  | 60                | 75    | 150   | 200   | 180   |
| ATS48C25Y                  | 75                | 100   | 200   | 250   | 240   |
| ATS48C32Y                  | 100               | 125   | 250   | 300   | 302   |
| ATS48C41Y                  | 125               | 150   | 300   | 350   | 361   |
| ATS48C48Y                  | 150               | –     | 350   | 400   | 414   |
| ATS48C59Y                  | –                 | 200   | 400   | 500   | 477   |
| ATS48C66Y                  | 200               | 250   | 500   | 600   | 660   |

**Motor Overload Relay (MOD A10 only)**

All Enclosed 48 controllers use the solid state thermal overload protection provided with the Altistart soft start. The bypass starter option provides an additional ambient-temperature compensated bimetallic or SSOLR for supplementary motor overload protection. Check the overload relay to verify that the current setting matches the actual motor full load amperes. All adjustable overload relays are factory set for the minimum trip setting.

Table 8 lists the catalog numbers of the motor overload relays provided with the MOD A10 option.

**Table 8: Enclosed 48 Controller Overload Relays**

| Overload Relay Full Load Current in Amperes | Overload Relay Catalog Number <sup>1</sup> |
|---|--|
| 9–13  | LRD1516                                    |
| 12–18                                       | LRD1521                                    |
| 17–25                                       | LRD1522                                    |
| 23–28                                       | LRD1532                                    |
| 30–40                                       | LR2D3555                                   |
| 37–50                                       | LR2D3557                                   |
| 48–65                                       | LR2D3559                                   |
| 55–70                                       | LR2D3561                                   |
| 63–80                                       | LR2D3563                                   |
| 60–100                                      | LR9F5567                                   |
| 90–150                                      | LR9F5569                                   |
| 132–220                                     | LR9F5571                                   |
| 200–330                                     | LR9F7575                                   |
| 300–500                                     | LR9F7579                                   |
| 380–630                                     | LR9F7581                                   |

<sup>1</sup> Catalog numbers beginning with LR9 are SSOLR Type overload relays.

## SECTION 5— MAINTENANCE

Before replacing any parts in the Enclosed 48 controller, read and understand the following safety message and all other safety messages provided in this bulletin.

### BEFORE YOU BEGIN

| <b>⚠ DANGER</b>   |
|---|
| <b>HAZARD OF ELECTRIC SHOCK, EXPLOSION, OR ARC FLASH</b>  |
| <ul style="list-style-type: none"><li>• Read and understand this instruction bulletin before installing or operating the Enclosed 48 controller. Installation, adjustment, repair, and maintenance must be performed by qualified personnel.</li><li>• The user is responsible for compliance with all international and national electrical code requirements with respect to grounding of all equipment.</li><li>• Many parts of this drive controller, including the printed circuit boards, operate at the line voltage. <b>DO NOT TOUCH.</b> Use only electrically insulated tools.</li><li>• Some terminals have voltage on them when the disconnect is open.</li><li>• Install and close all covers and doors before applying power or starting and stopping the drive controller.</li></ul> |
| <b>Failure to follow these instructions will result in death or serious injury.</b>   |

#### Class 8638<sup>1</sup>

| <b>⚠ DANGER</b>   |
|---|
| <b>HAZARD OF ELECTRIC SHOCK, EXPLOSION, OR ARC FLASH</b>  |
| <ul style="list-style-type: none"><li>• Apply appropriate personal protective equipment (PPE) and follow safe electrical work practices. See NFPA 70E.</li><li>• This equipment must only be installed and serviced by qualified electrical personnel.</li><li>• Never operate energized switch with door open.</li><li>• Turn off switch before removing or installing fuses or making load side connections.</li><li>• Always use a properly rated voltage sensing device at all line and load fuse clips to confirm switch is off.</li><li>• Turn off power supplying switch before doing any other work on or inside switch.</li><li>• Do not use renewable link fuses in fused switches.</li></ul> |
| <b>Failure to follow these instructions will result in death or serious injury.</b>   |

<sup>1</sup> This safety message refers to the Enclosed 48 controllers with a fusible disconnect (Class 8638). Unless otherwise specified, all other safety messages in this document refer to all Enclosed 48 controllers.

Class 8639

**⚠ DANGER**

**HAZARD OF ELECTRIC SHOCK, EXPLOSION, OR ARC FLASH**

- Apply appropriate personal protective equipment (PPE) and follow safe electrical work practices. See NFPA 70E.
- This equipment must only be installed and serviced by qualified electrical personnel.
- Turn off all power supplying this equipment before working on or inside equipment.
- Always use a properly rated voltage sensing device to confirm power is off.
- Replace all devices, doors and covers before turning on power to this equipment.

**Failure to follow these instructions will result in death or serious injury.**

**⚠ DANGER**

**UNINTENDED EQUIPMENT OPERATION**

Before turning on the Enclosed 48 controller or upon exiting the configuration menus, ensure that the inputs assigned to the Run command are in a state that will not cause the drive controller to run. Otherwise, the motor can start immediately.

**Failure to follow these instructions will result in death or serious injury.**

**⚠ WARNING**

**LOSS OF CONTROL**

- The designer of any control scheme must consider the potential failure modes of control paths and, for certain critical control functions, provide a means to achieve a safe state during and after a path failure. Examples of critical control functions are emergency stop and overtravel stop.
- Separate or redundant control paths must be provided for critical control functions.
- System control paths may include communication links. Consideration must be given to the implications of anticipated transmission delays or failures of the link<sup>1</sup>.
- Each implementation of an Enclosed 48 controller must be individually and thoroughly tested for proper operation before being placed into service.

**Failure to follow these instructions can result in death, serious injury, or equipment damage.**

<sup>1</sup> For additional information, refer to NEMA ICS 1.1 (latest edition), "Safety Guidelines for the Application, Installation, and Maintenance of Solid State Control" and to NEMA ICS 7.1 (latest edition), "Safety Standards for Construction and Guide for Selection, Installation and Operation of Adjustable-Speed Drive Systems."

|  |
|--|
| <b>⚠ CAUTION</b>   |
| <p><b>INCOMPATIBLE LINE VOLTAGE</b></p> <p>Before turning on and configuring the Enclosed 48 controller, ensure that the line voltage is compatible with the line voltage range specified on the drive controller nameplate. The drive controller can be damaged if the line voltage is not compatible.</p> <p><b>Failure to follow these instructions can result in injury or equipment damage.</b></p> |

**POWER FUSE  
RECOMMENDATION**

The Enclosed 48 controllers are provided with a circuit breaker or with a fusible switch disconnect.

Units supplied with fusible switch disconnects require the user to supply and install the power fuses. Select the fuses from Table 9. All of the Enclosed 48 controllers accept UL Class J or L fuses, depending on the full load current rating.

*NOTE: Table 9 replaces the fuse recommendations and references to fuse type and size listed in instruction bulletin 30072-450-61\_. Consult the fuse manufacturer derating curves before selecting fuses for ambient temperatures above 40 °C (104 °F). Consider that internal ambient temperatures are higher than external ambient temperatures. For typical wattage values, refer to Table 4 on page 28.*

**Table 9: Power Fuse Selection for Enclosed 48 Controller with Fusible Switch Disconnect**

| Motor Horsepower at |       |       |       | Recommended Square D Fuses |                        | Altistart 48 Controller           |                           |
|---------------------|-------|-------|-------|----------------------------|------------------------|-----------------------------------|---------------------------|
| 200 V               | 230 V | 460 V | 575 V | Power Fuse Class/Rating    | Power Fuse Part Number | Fuse Manufacturer and Part Number | Soft Start Catalog Number |
| 3                   | -     | -     | -     | J/20A                      | 25423-30200            | Bussmann LPJ-20                   | ATS48D17Y                 |
|                     |       |       |       | J/20A                      | 25423-20200            | Littelfuse JTD-20                 |                           |
|                     |       |       |       | J/20A                      |                        | Shawmut AJT-20                    |                           |
| -                   | 5     | 10    | -     | J/25A                      | 25423-30250            | Bussmann LPJ-25                   |                           |
|                     |       |       |       | J/25A                      | 25423-20250            | Littelfuse JTD-25                 |                           |
|                     |       |       |       | J/25A                      |                        | Shawmut AJT-25                    |                           |
| -                   | -     | -     | 15    | J/30A                      | 25423-30300            | Bussmann LPJ-30                   |                           |
|                     |       |       |       | J/30A                      | 25423-20300            | Littelfuse JTD-30                 |                           |
|                     |       |       |       | J/30A                      |                        | Shawmut AJT-30                    |                           |
| 5                   | -     | -     | -     | J/30A                      | 25423-30300            | Bussmann LPJ-30                   |                           |
|                     |       |       |       | J/30A                      | 25423-20300            | Littelfuse JTD-30                 |                           |
|                     |       |       |       | J/30A                      |                        | Shawmut AJT-30                    |                           |
| -                   | -     | 15    | -     | J/35A                      | 25423-30350            | Bussmann LPJ-35                   |                           |
|                     |       |       |       | J/35A                      |                        | Littelfuse JTD-35                 |                           |
|                     |       |       |       | J/35A                      |                        | Shawmut AJT-35                    |                           |
| -                   | 7.5   | -     | 20    | J/40A                      | 25423-30400            | Bussmann LPJ-40                   |                           |
|                     |       |       |       | J/40A                      | 25423-20400            | Littelfuse JTD-40                 |                           |
|                     |       |       |       | J/40A                      |                        | Shawmut AJT-40                    |                           |

**Table 9: Power Fuse Selection for Enclosed 48 Controller with Fusible Switch Disconnect** (continued)

| Motor Horsepower at |       |       |       | Recommended Square D Fuses |                        | Altistart 48 Controller           |                           |           |           |
|---------------------|-------|-------|-------|----------------------------|------------------------|-----------------------------------|---------------------------|-----------|-----------|
| 200 V               | 230 V | 460 V | 575 V | Power Fuse Class/Rating    | Power Fuse Part Number | Fuse Manufacturer and Part Number | Soft Start Catalog Number |           |           |
| 7.5                 | -     | 20    | 25    | J/45A                      | 25423-30450            | Bussmann LPJ-45                   | ATS48D32Y                 |           |           |
|                     |       |       |       | J/45A                      |                        | Littelfuse JTD-45                 |                           |           |           |
|                     |       |       |       | J/45A                      |                        | Shawmut AJT-45                    |                           |           |           |
| -                   | 10    | -     | -     | J/50A                      | 25423-30500            | Bussmann LPJ-50                   |                           |           |           |
|                     |       |       |       | J/50A                      | 25423-20500            | Littelfuse JTD-50                 |                           |           |           |
|                     |       |       |       | J/50A                      |                        | Shawmut AJT-50                    |                           |           |           |
| 10                  | -     | -     | -     | J/50A                      | 25423-30500            | Bussmann LPJ-50                   |                           | ATS48D38Y |           |
|                     |       |       |       | J/50A                      | 25423-20500            | Littelfuse JTD-50                 |                           |           |           |
|                     |       |       |       | J/50A                      |                        | Shawmut AJT-50                    |                           |           |           |
| -                   | -     | 25    | 30    | J/60A                      | 25423-30600            | Bussmann LPJ-60                   | ATS48D38Y                 |           |           |
|                     |       |       |       | J/60A                      | 25423-20600            | Littelfuse JTD-60                 |                           |           |           |
|                     |       |       |       | J/60A                      |                        | Shawmut AJT-60                    |                           |           |           |
| -                   | 15    | 30    | 40    | J/70A                      | 25423-30700            | Bussmann LPJ-70                   |                           |           | ATS48D47Y |
|                     |       |       |       | J/70A                      | 25423-20700            | Littelfuse JTD-70                 |                           |           |           |
|                     |       |       |       | J/70A                      |                        | Shawmut AJT-70                    |                           |           |           |
| 15                  | -     | -     | -     | J/80A                      | 25423-30800            | Bussmann LPJ-80                   |                           | ATS48D62Y |           |
|                     |       |       |       | J/80A                      | 25423-20800            | Littelfuse JTD-80                 |                           |           |           |
|                     |       |       |       | J/80A                      |                        | Shawmut AJT-80                    |                           |           |           |
| -                   | 20    | 40    | 50    | J/90A                      | 25423-30900            | Bussmann LPJ-80                   | ATS48D62Y                 |           |           |
|                     |       |       |       | J/90A                      | 25423-20900            | Littelfuse JTD-80                 |                           |           |           |
|                     |       |       |       | J/90A                      |                        | Shawmut AJT-80                    |                           |           |           |
| 20                  | -     | -     | -     | J/100A                     | 25423-31000            | Bussmann LPJ-100                  |                           |           | ATS48D75Y |
|                     |       |       |       | J/100A                     | 25423-21000            | Littelfuse JTD-100                |                           |           |           |
|                     |       |       |       | J/100A                     |                        | Shawmut AJT-100                   |                           |           |           |
| -                   | -     | 50    | 60    | J/110A                     | 25423-31100            | Bussmann LPJ-110                  |                           | ATS48D75Y |           |
|                     |       |       |       | J/110A                     | 25423-21100            | Littelfuse JTD-110                |                           |           |           |
|                     |       |       |       | J/110A                     |                        | Shawmut AJT-110                   |                           |           |           |
| -                   | 25    | -     | -     | J/125A                     | 25423-31250            | Bussmann LPJ-125                  | ATS48D88Y                 |           |           |
|                     |       |       |       | J/125A                     | 25423-21250            | Littelfuse JTD-125                |                           |           |           |
|                     |       |       |       | J/125A                     |                        | Shawmut AJT-125                   |                           |           |           |
| 25                  | -     | 60    | 75    | J/125A                     | 25423-31250            | Bussmann LPJ-125                  |                           |           | ATS48D88Y |
|                     |       |       |       | J/125A                     | 25423-21250            | Littelfuse JTD-125                |                           |           |           |
|                     |       |       |       | J/125A                     |                        | Shawmut AJT-125                   |                           |           |           |
| -                   | 30    | -     | -     | J/150A                     | 25423-31500            | Bussmann LPJ-150                  |                           | ATS48D88Y |           |
|                     |       |       |       | J/150A                     | 25423-21500            | Littelfuse JTD-150                |                           |           |           |
|                     |       |       |       | J/150A                     |                        | Shawmut AJT-150                   |                           |           |           |
| 30                  | -     | -     | -     | J/150A                     | 25423-31500            | Bussmann LPJ-150                  | ATS48C11Y                 |           |           |
|                     |       |       |       | J/150A                     | 25423-21500            | Littelfuse JTD-150                |                           |           |           |
|                     |       |       |       | J/150A                     |                        | Shawmut AJT-150                   |                           |           |           |
| -                   | 40    | 75    | 100   | J/175A                     | 25423-31750            | Bussmann LPJ-175                  |                           |           | ATS48C11Y |
|                     |       |       |       | J/175A                     | 25423-21750            | Littelfuse JTD-175                |                           |           |           |
|                     |       |       |       | J/175A                     |                        | Shawmut AJT-175                   |                           |           |           |
| 40                  | -     | -     | -     | J/200A                     | 25423-32000            | Bussmann LPJ-200                  |                           | ATS48C14Y |           |
|                     |       |       |       | J/200A                     | 25423-22000            | Littelfuse JTD-200                |                           |           |           |
|                     |       |       |       | J/200A                     |                        | Shawmut AJT-200                   |                           |           |           |
| -                   | 50    | 100   | 125   | J/225A                     | 25423-32250            | Bussmann LPJ-225                  | ATS48C14Y                 |           |           |
|                     |       |       |       | J/225A                     | 25423-22250            | Littelfuse JTD-225                |                           |           |           |
|                     |       |       |       | J/225A                     |                        | Shawmut AJT-225                   |                           |           |           |

**Table 9: Power Fuse Selection for Enclosed 48 Controller with Fusible Switch Disconnect** (continued)

| Motor Horsepower at |       |       |       | Recommended Square D Fuses |                        | Altistart 48 Controller           |                           |
|---------------------|-------|-------|-------|----------------------------|------------------------|-----------------------------------|---------------------------|
| 200 V               | 230 V | 460 V | 575 V | Power Fuse Class/Rating    | Power Fuse Part Number | Fuse Manufacturer and Part Number | Soft Start Catalog Number |
| 50                  | 60    | 125   | 150   | J/250A                     | 25423-32500            | Bussmann LPJ-250                  | ATS48C17Y                 |
|                     |       |       |       | J/250A                     | 25423-22500            | Littelfuse JTD-250                |                           |
|                     |       |       |       | J/250A                     |                        | Shawmut AJT-250                   |                           |
| 60                  | -     | 150   | -     | J/300A                     | 25423-33000            | Bussmann LPJ-300                  | ATS48C21Y                 |
|                     |       |       |       | J/300A                     | 25423-23000            | Littelfuse JTD-300                |                           |
|                     |       |       |       | J/300A                     |                        | Shawmut AJT-300                   |                           |
| -                   | 75    | -     | 200   | J/350A                     | 25423-33500            | Bussmann LPJ-350                  | ATS48C25Y                 |
|                     |       |       |       | J/350A                     | 25423-23500            | Littelfuse JTD-350                |                           |
|                     |       |       |       | J/350A                     |                        | Shawmut AJT-350                   |                           |
| 75                  | -     | -     | -     | J/350A                     | 25423-33500            | Bussmann LPJ-350                  | ATS48C25Y                 |
|                     |       |       |       | J/350A                     | 25423-23500            | Littelfuse JTD-350                |                           |
|                     |       |       |       | J/350A                     |                        | Shawmut AJT-350                   |                           |
| -                   | 100   | 200   | 250   | J/400A                     | 25423-34000            | Bussmann LPJ-400                  | ATS48C32Y                 |
|                     |       |       |       | J/400A                     | 25423-24000            | Littelfuse JTD-400                |                           |
|                     |       |       |       | J/400A                     |                        | Shawmut AJT-400                   |                           |
| 100                 | -     | -     | -     | J/450A                     | 25423-34500            | Bussmann LPJ-450                  | ATS48C32Y                 |
|                     |       |       |       | J/450A                     | 25423-24500            | Littelfuse JTD-450                |                           |
|                     |       |       |       | J/450A                     |                        | Shawmut AJT-450                   |                           |
| -                   | 125   | 250   | 300   | J/500A                     | 25423-35000            | Bussmann LPJ-500                  | ATS48C41Y                 |
|                     |       |       |       | J/500A                     | 25423-25000            | Littelfuse JTD-500                |                           |
|                     |       |       |       | J/500A                     |                        | Shawmut AJT-500                   |                           |
| 125                 | 150   | 300   | 350   | J/600A                     | 25423-36000            | Bussmann LPJ-600                  | ATS48C48Y                 |
|                     |       |       |       | J/600A                     | 25423-26000            | Littelfuse JTD-600                |                           |
|                     |       |       |       | J/600A                     |                        | Shawmut AJT-600                   |                           |
| 150                 | -     | 350   | 400   | L/700A                     | 25432-10700            | Bussmann KRP-C-700                | ATS48C59Y                 |
|                     |       |       |       | L/700A                     |                        | Littelfuse KLP-C-700              |                           |
|                     |       |       |       | L/700A                     |                        | Shawmut A4BQ-700                  |                           |
| -                   | 200   | 400   | 500   | L/800A                     | 25432-10800            | Bussmann KRP-C-800                | ATS48C66Y                 |
|                     |       |       |       | L/800A                     |                        | Littelfuse KLP-C-800              |                           |
|                     |       |       |       | L/800A                     |                        | Shawmut A4BQ-800                  |                           |
| 200                 | -     | -     | -     | L/900A                     | 25432-10900            | Bussmann KRP-C-900                | ATS48C66Y                 |
|                     |       |       |       | L/900A                     |                        | Littelfuse KLP-C-900              |                           |
|                     |       |       |       | L/900A                     |                        | Shawmut A4BQ-900                  |                           |
| -                   | 250   | 500   | 600   | L/1000A                    | 25432-11000            | Bussmann KRP-C-1000               | ATS48C66Y                 |
|                     |       |       |       | L/1000A                    |                        | Littelfuse KLP-C-1000             |                           |
|                     |       |       |       | L/1000A                    |                        | Shawmut A4BQ-1000                 |                           |

## TECHNICAL SUPPORT

When troubleshooting the Class 8638 or Class 8639 Enclosed 48 controller, discuss with the operating personnel the symptoms of the reported problem. Ask them to describe the problem, when they first observed the problem, and where the problem was seen. Observe directly the controller and process. Record the controller, motor, and peripheral equipment nameplate data on the “Altistart 48 Class 8638/8639 Enclosed Controllers Troubleshooting Sheet” on page 43. (You may copy this form as needed.)

For more information, call, fax or write:

Schneider Electric Technical Support  
8001 Knightdale Blvd  
Knightdale, NC 27545-9023

Telephone: 1-888-SQUARED (1-888-778-2733)

Fax Line: 919-217-6508

e-Mail: [drive.products.support@us.Schneider-Electric.com](mailto:drive.products.support@us.Schneider-Electric.com)

**Figure 21: Altistart 48 Class 8638/8639 Enclosed Controllers Troubleshooting Sheet**

When requesting after-sales service, it is important to disclose all conditions under which the Square D / Schneider Electric equipment currently operates. This will help in diagnosing the system quickly.

FAX to: **TECHNICAL SUPPORT at 919-217-6508**

|               |
|---------------|
| DATE:         |
| CONTACT NAME: |
| COMPANY:      |
| ADDRESS:      |
| CITY:         |
| STATE:        |
| PHONE:        |
| FAX:          |

**ENCLOSED 48 CONTROLLER CONFIGURATION**

Class: \_\_\_\_\_ Type: \_\_\_\_\_ Forms: \_\_\_\_\_  
 Factory Order Number / Q2C Number: \_\_\_\_\_  
 Application/Equipment Designation: \_\_\_\_\_

**MOTOR NAMEPLATE DATA**

Horsepower: \_\_\_\_\_ Voltage (3 Phase): \_\_\_\_\_ Frequency: \_\_\_\_\_ Poles: \_\_\_\_\_ FLA: \_\_\_\_\_  
 Service Factor: \_\_\_\_\_ Motor Type/Design: \_\_\_\_\_  NEMA A  NEMA B  NEMA C  NEMA D  
 Motor Cable Type: \_\_\_\_\_ Approximate Cable Length (in Feet): \_\_\_\_\_

**POWER SOURCE AND ENVIRONMENT**

Voltage Between L1 and L2: \_\_\_\_\_ Voltage Between L2 and L3: \_\_\_\_\_ Voltage Between L3 and L1: \_\_\_\_\_  
 Service Transformer Rating: \_\_\_\_\_ kVA, \_\_\_\_\_ % Z Frequency:  60 Hz or  50 Hz  
 Ambient Temperatures: \_\_\_\_\_ Min. °C (°F) \_\_\_\_\_ Max. °C (°F) Humidity: \_\_\_\_\_  
 Altitude if greater than 3300 feet above sea level, specify: \_\_\_\_\_ ft

**ATS48 SOFT START CONTROLLER DETECTED FAULT AND EVENT CODES**

Refer to instruction bulletin 30072-450-61\_, Tables 28 to 33 for possible causes and corrective action

| Requires a Power Reset                                 | Auto-Reset Conditions (Customer Configurable)                      | Requires a RUN Command Reset                               |   |
|--|--|--|---|
| <input type="checkbox"/> InF, Internal Analysis Needed | <input type="checkbox"/> PHF, Loss of Phase or Loss of Motor Phase | <input type="checkbox"/> SLF, Serial Link Interruption     | <input type="checkbox"/> OHF, Starter Thermal Trip              |
| <input type="checkbox"/> OCF, Overcurrent              |  | <input type="checkbox"/> ETF, External Event               | <input type="checkbox"/> OTF, Motor Thermal Trip Via PTC Probes |
| <input type="checkbox"/> PIF, Phase Inversion          | <input type="checkbox"/> FRF, Line Frequency (out of tolerance)    | <input type="checkbox"/> STF, Excessive Starting Time      |   |
| <input type="checkbox"/> EEF, Internal Memory          | <input type="checkbox"/> USF, Power Supply                         | <input type="checkbox"/> OLC, Current Overload             | <input type="checkbox"/> LRF, Locked Rotor (in steady state)    |
|  | <input type="checkbox"/> CLF, Control Line Interruption (CL1/CL2)  | <input type="checkbox"/> OLF, Motor Thermal Trip           |   |
| <b>Auto-Reset Conditions When Causes Disappear</b>     | <input type="checkbox"/> CFF, Invalid Configuration (power up)     | <input type="checkbox"/> CFI, Invalid Configuration (COMM) |   |

Detailed description of problem (attach wiring diagram/schematics if applicable):

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## SECTION 6— REPLACEMENT PARTS

**⚠ DANGER**

**HAZARD OF ELECTRIC SHOCK, EXPLOSION, OR ARC FLASH**

- Refer to “Before You Begin” starting on page 4 before performing the procedures in this section.
- For controllers with fusible switch disconnects, use only the Class J or Class L fuses listed in Table 9 on page 39 to provide correct short-circuit protection.

**Failure to follow these instructions will result in death or serious injury.**

For the ATS48 soft start replacement parts, refer to instruction bulletin 30072-450-61\_. Refer to the Table 10 for additional replacement parts used in the Enclosed 48 controllers. Order all parts from your local supplier of Square D brand parts.

**Table 10: Replacement Parts for Enclosed 48 Controllers**

| Part Description  | Motor Horsepower at |         |         |         | Rating         | Catalog Number  |
|---|---------------------|---------|---------|---------|----------------|-----------------|
|   | 208 V               | 230 V   | 460 V   | 575 V   |                |                 |
| Automatic Molded Case Switch with Visible Blades            | 3–20                | 5–25    | 10–50   | 15–60   | 100 A          | FHP36000MV      |
|   | 25–60               | 30–75   | 60–150  | 75–150  | 250 A          | KHP36000MV      |
|   | 75–100              | 10–125  | 200–250 | 200–300 | 400 A          | LHL36000MV      |
|   | 125–150             | 150–200 | 300–400 | 350–500 | 600 A          | MHL360006MV     |
|   | 200                 | 250     | 500     | 600     | 800 A          | MHL360008MV     |
| Shunt Trip Automatic Molded Case Switch with Visible Blades | 3–20                | 5–25    | 10–50   | 15–60   | 100 A          | FHP36000MV1021  |
|   | 25–60               | 30–75   | 60–150  | 75–150  | 250 A          | KHP36000MV1021  |
|   | 75–100              | 100–125 | 200–250 | 200–300 | 400 A          | LHL36000MV1021  |
|   | 125–150             | 150–200 | 300–400 | 350–500 | 600 A          | MHL360006MV1021 |
|   | 200                 | 250     | 500     | 600     | 800 A          | MHL360008MV1021 |
| Operator Mechanisms   | 3–20                | 5–25    | 10–50   | 15–60   | FA Mech – ENCL | 80439-898-51    |
|   | 25–60               | 30–75   | 60–150  | 75–150  | KA Mech – ENCL | 80439-929-52    |
|   | 75–100              | 100–125 | 200–250 | 200–300 | LA mech – ENCL | 80439-945-50    |
|   | 125–200             | 150–250 | 300–500 | 350–600 | MA Mech        | 80439-939-50    |

**Table 10: Replacement Parts for Enclosed 48 Controllers** *(continued)*

| Part Description                | Motor Horsepower at |         |         |                   | Rating                  | Catalog Number |
|---------------------------------|---------------------|---------|---------|-------------------|-------------------------|----------------|
|                                 | 208 V               | 230 V   | 460 V   | 575 V             |                         |                |
| IEC Shorting Contactors (AC-1)  | 3–7.5               | 5–10    | 10–20   | 15–25             | 25 A Contactor          | LC1D25G7       |
|                                 | 10–15               | 15      | 25–30   | 30–40             | 32 A Contactor          | LC1D32G7       |
|                                 | –                   | 20      | 40      | 50                | 40 A Contactor          | LC1D40G7       |
|                                 | 20–25               | 25      | 50      | 60                | 50 A Contactor          | LC1D50G7       |
|                                 | 30–40               | 30–40   | 60–75   | 75–100            | 80 A Contactor          | LC1D80G7       |
|                                 | 50                  | 50–60   | 100–125 | 125–150           | 115 A Contactor         | LC1D115G7      |
|                                 | 60                  | 75      | 150     | 200               | 150 A Contactor         | LC1D150G7      |
|                                 | 75                  | 100     | 200     | 250               | 185 A Contactor         | LC1F185        |
|                                 | 75                  | 100     | 200     | 250               | 120V/60Hz Coil (F185)   | LX1FG095       |
|                                 | 100                 | –       | –       | –                 | 265 A Contactor         | LC1F265        |
|                                 | 100                 | –       | –       | –                 | 120 V Coil (F265)       | LX1FH1272      |
|                                 | 125                 | 125     | 250     | 300–350           | 330 A Contactor         | LC1F330        |
|                                 | 125                 | 125     | 250     | 300–350           | 120 V Coil (F330)       | LX1FH1272      |
|                                 | 150                 | 150     | 300–350 | 400               | 400 A Contactor         | LC1F400        |
|                                 | 150                 | 150     | 300–350 | 400               | 120 V Coil (F400)       | LX1FJ110       |
|                                 | 200                 | 200     | 400     | 500–600           | 500 A Contactor         | LC1F500        |
|                                 | 200                 | 200     | 400     | 500–600           | 120 V Coil (F500)       | LX1FK110       |
| –                               | 250                 | 500     | –       | 630 A Contactor   | LC1F630                 |                |
| –                               | 250                 | 500     | –       | 120 V Coil (F630) | LX1FL110                |                |
| IEC Isolation Contactors (AC-3) | 3–5                 | 5       | 10–15   | 15–20             | 25 A Contactor          | LC1D25G7       |
|                                 | 7.5                 | 7.5–10  | 20      | 25                | 32 A Contactor          | LC1D32G7       |
|                                 | 10                  | –       | 25      | 30                | 40 A Contactor          | LC1D40G7       |
|                                 | 15                  | 15      | 30      | 40                | 50 A Contactor          | LC1D50G7       |
|                                 | 20                  | 20      | 40      | 50                | 65 A Contactor          | LC1D65G7       |
|                                 | –                   | 25      | 50      | 60                | 80 A Contactor          | LC1D80G7       |
|                                 | 25–30               | 30–40   | 60–75   | 75–100            | 115 A Contactor         | LC1D115G7      |
|                                 | 40                  | 50      | 100     | 125               | 150 A Contactor         | LC1D150G7      |
|                                 | 50–60               | 60      | 125     | 150               | 185 A Contactor         | LC1F185        |
|                                 | 50–60               | 60      | 125     | 150               | 120 V/60 Hz Coil (F185) | LX1FG095       |
|                                 | 75                  | 75      | 150     | 200               | 225 A Contactor         | LC1F225        |
|                                 | 75                  | 75      | 150     | 200               | 120 V/60 Hz Coil (F225) | LX1FG095       |
|                                 | –                   | 100     | 200     | 250               | 265 A Contactor         | LC1F265        |
|                                 | –                   | 100     | 200     | 250               | 120 V Coil (F265)       | LX1FG095       |
|                                 | 100                 | 125     | 250     | 300               | 330 A Contactor         | LC1F330        |
|                                 | 100                 | 125     | 250     | 300               | 120 V Coil (F330)       | LX1FH1272      |
|                                 | 125                 | 150     | 300     | 250               | 400 A Contactor         | LC1F400        |
|                                 | 125                 | 150     | 300     | 250               | 120 V Coil (F400)       | LX1FJ110       |
|                                 | 150                 | –       | 350     | 400–500           | 500 A Contactor         | LC1F500        |
| 150                             | –                   | 350     | 400–500 | 120 V Coil (F500) | LX1FK110                |                |
| 200                             | 200–250             | 400–500 | 600     | 630 A Contactor   | LC1F630                 |                |
| 200                             | 200–250             | 400–500 | 600     | 120 V Coil (F630) | LX1FI10                 |                |

**Table 10: Replacement Parts for Enclosed 48 Controllers (continued)**

| Part Description                   | Motor Horsepower at |       |       |       | Rating            | Catalog Number    |
|------------------------------------|---------------------|-------|-------|-------|-------------------|-------------------|
|                                    | 208 V               | 230 V | 460 V | 575 V |                   |                   |
| <b>Circuit Breakers</b>            | 3                   | –     | –     | –     | 15 A              | FHL36015-13M      |
|                                    | 5                   | 5–7.5 | 10–15 | –     | 30 A              | FHL36030-15M      |
|                                    | 7.5–10              | 10–15 | 20–30 | –     | 50 A              | FHL36050-16M      |
|                                    | 15                  | 20    | 40    | –     | 90 A              | FHL36090*         |
|                                    | 20                  | 25    | 50    | –     | 100 A             | FHL36100*         |
|                                    | 25                  | 30    | 60    | –     | 110 A             | KCL34110*         |
|                                    | 30                  | –     | 75    | –     | 125 A             | KCL34125*         |
|                                    | –                   | 40    | –     | –     | 150 A             | KCL34150*         |
|                                    | 40                  | –     | –     | –     | 250 A             | KHL36250-26M      |
|                                    | –                   | 50    | 100   | –     | 250 A             | KHL36250-29M      |
|                                    | 50                  | –     | –     | –     | 250 A             | KHL36250-30M      |
|                                    | 60                  | 60    | 125   | –     | 250 A             | KHL36250-31M      |
|                                    | –                   | 75    | 150   | –     | 250 A             | KHL36250-32M      |
|                                    | 75                  | –     | –     | –     | 400 A             | LHL36400-33M      |
|                                    | 100                 | 100   | 200   | –     | 400 A             | LHL36400-35M      |
|                                    | –                   | 125   | 250   | –     | 400 A             | LHL36400-36M      |
|                                    | 125                 | 150   | 300   | –     | 600 A             | MHL36600-40M      |
|                                    | 150                 | –     | 350   | –     | 600 A             | MHL36600-42M      |
| 200                                | 200                 | 400   | –     | 600 A | MHL36600-44M      |                   |
| –                                  | 250                 | 500   | –     | 800 A | MHL36600-44M      |                   |
| <b>Shunt Trip Circuit Breakers</b> | 3                   | –     | –     | –     | 15 A              | FHL36015-13M-1021 |
|                                    | 5                   | 5–7.5 | 10–15 | –     | 30 A              | FHL36030-15M-1021 |
|                                    | 7.5–10              | 10–15 | 20–30 | –     | 50 A              | FHL36050-16M-1021 |
|                                    | 15                  | 20    | 40    | –     | 90 A              | FHL36090-1021*    |
|                                    | 20                  | 25    | 50    | –     | 100 A             | FHL36100-1021*    |
|                                    | 25                  | 30    | 60    | –     | 110 A             | KHL34110-1021*    |
|                                    | 30                  | –     | 75    | –     | 125 A             | KHL34125-1021*    |
|                                    | –                   | 40    | –     | –     | 150 A             | KHL34150-1021*    |
|                                    | 40                  | –     | –     | –     | 250 A             | KHL36250-26M-1021 |
|                                    | –                   | 50    | 100   | –     | 250 A             | KHL36250-29M-1021 |
|                                    | 50                  | –     | –     | –     | 250 A             | KHL36250-30M-1021 |
|                                    | 60                  | 60    | 125   | –     | 250 A             | KHL36250-31M-1021 |
|                                    | –                   | 75    | 150   | –     | 250 A             | KHL36250-32M-1021 |
|                                    | 75                  | –     | –     | –     | 400 A             | LHL36400-33M-1021 |
|                                    | 100                 | 100   | 200   | –     | 400 A             | LHL36400-35M-1021 |
|                                    | –                   | 125   | 250   | –     | 400 A             | LHL36400-36M-1021 |
|                                    | 125                 | 150   | 300   | –     | 600 A             | MHL36600-40M-1021 |
|                                    | 150                 | –     | 350   | –     | 600 A             | MHL36600-42M-1021 |
| –                                  | 200                 | 400   | –     | 600 A | MHL36600-44M-1021 |                   |
| 200                                | –                   | –     | –     | 600 A | MHL36800-44M-1021 |                   |
| –                                  | 250                 | 500   | –     | 800 A | MHL36800-45M-1021 |                   |

**Table 10: Replacement Parts for Enclosed 48 Controllers** *(continued)*

| Part Description                     | Motor Horsepower at |         |         |           | Rating   | Catalog Number |
|--------------------------------------|---------------------|---------|---------|-----------|--|----------------|
|                                      | 208 V               | 230 V   | 460 V   | 575 V     |  |                |
| Mechanical Interlocks for Contactors | 3–7.5               | 5–10    | 10–20   | 15–25     | D09–D32 Contactors                             | LAD9R1V        |
|                                      | 10–20               | 15–25   | 25–50   | 30–60     | D40–D65 Contactors                             | LA9D4002       |
|                                      | 25–50               | 30–50   | 60–100  | 75–150    | D115–D150 Contactors                           | LA9D11502      |
|                                      | –                   | 60      | 125     | –         | F185–F225 Contactors<br>(horizontally mounted) | LA9FG970       |
|                                      | 60–75               | 75      | 150     | 200       | F185–F225 Contactors<br>(vertically mounted)   | LA9FG4G        |
|                                      | 100                 | 100–125 | 200–250 | 250–300   | F265–F330 Contactors<br>(vertically mounted)   | LA9FH4H        |
|                                      | 125                 | –       | 300     | 350       | F400 Contactors<br>(vertically mounted)        | LA9FJ4J        |
|                                      | 150                 | 150     | 350     | 400–500   | F500 Contactors<br>(vertically mounted)        | LA9FK4K        |
|                                      | 200                 | 200–250 | 400–500 | 600       | F630 Contactors<br>(vertically mounted)        | LA9FL4L        |
| Overload Relays                      | 3                   | –       | –       | –         | 9–13 A   | LRD1516        |
|                                      | 5                   | 5       | 10      | 15        | 12–18 A  | LRD1521        |
|                                      | 7.5                 | 7.5     | 15      | 20        | 17–25 A  | LRD1522        |
|                                      | –                   | 10      | 20      | 25        | 25–32 A  | LRD1532        |
|                                      | 10                  | –       | 25      | 30        | 30–40 A  | LR2D3555       |
|                                      | 15                  | 15      | 30      | 40        | 37–50 A  | LR2D3557       |
|                                      | 20                  | 20      | 40      | 50        | 48–65 A  | LR2D3559       |
|                                      | –                   | –       | 50      | 60        | 55–70 A  | LR2D3561       |
|                                      | –                   | 25      | –       | –         | 63–80 A  | LR2D3563       |
|                                      | 25–30               | 30      | 60      | 75        | 60–100 A                                       | LR9D5567       |
|                                      | 40                  | 40–50   | 75–100  | 100–125   | 90–150 A                                       | LR9D5569       |
|                                      | 50–75               | 60–75   | 125–150 | 150–200   | 132–220 A                                      | LR9F5571       |
|                                      | 100                 | 100–125 | 200–250 | 250–300   | 200–330 A                                      | LR9F7575       |
|                                      | 125–150             | 150     | 300–350 | 350–400   | 300–500 A                                      | LR9F7579       |
| 200                                  | 200–250             | 400–500 | 500–600 | 380–630 A | LR9F7581                                       |                |

**Table 10: Replacement Parts for Enclosed 48 Controllers** (continued)

| Part Description                          | Motor Horsepower at |         |       |                  | Rating                | Catalog Number |
|---|---------------------|---------|-------|------------------|-----------------------|----------------|
|   | 208 V               | 230 V   | 460 V | 575 V            |                       |                |
| IEC Reversing Isolation Contactors (AC-3) | 3–5                 | 5       | 10–15 | 15–20            | 25A Contactor         | LC2D25G7       |
|   | 7.5                 | 7.5–10  | 20    | 25               | 32A Contactor         | LC2D32G7       |
|   | 10                  | –       | 25    | 30               | 40A Contactor         | LC2D40G7       |
|   | 15                  | 15      | 30    | 40               | 50A Contactor         | LC2D50G7       |
|   | 20                  | 20      | 40    | 50               | 65A Contactor         | LC2D65G7       |
|   | 25                  | 25      | 50    | 60               | 80A Contactor         | LC2D80G7       |
|   | 30                  | 30–40   | 60–75 | 75–100           | 115A Contactor        | LC2D115G7      |
|   | 40                  | 50      | 100   | 125              | 150A Contactor        | LC2D150G7      |
|   | 50–60               | 60      | 125   | 150              | 185A Contactor        | LC2F185        |
|   | 50–60               | 60      | 125   | 150              | 120V/60Hz Coil (F185) | LX1FG095       |
|   | 75                  | 75      | 150   | 200              | 225A Contactor        | LC2F225        |
|   | 75                  | 75      | 150   | 200              | 120V/60Hz Coil (F225) | LX1FG095       |
|   | –                   | 100     | 200   | 250              | 265A Contactor        | LC2F265        |
|   | –                   | 100     | 200   | 250              | 120V Coil (F265)      | LX1FG095       |
|   | 100                 | 125     | 250   | 300              | 330A Contactor        | LC2F330        |
|   | 100                 | 125     | 250   | 300              | 120V Coil (F330)      | LX1FH1272      |
|   | 125                 |         | 300   | 350              | 400A Contactor        | LC2F400        |
|   | 125                 | 150     | 300   | 350              | 120V Coil (F400)      | LX1FJ110       |
|   | 150                 | 150     | 350   | 400–500          | 500A Contactor        | LC2F500        |
|   | 150                 | –       | 350   | 400–500          | 120V Coil (F500)      | LX1FK110       |
| 200                                       | –                   | 400–500 | 600   | 630A Contactor   | LC2F630               |                |
| 200                                       | 200–250             | 400–500 | 600   | 120V Coil (F630) | LX1FL110              |                |
| IEC FV Bypass Contactors (AC-3)           | 3–5                 | –       | 10–15 | 15–20            | 25A Contactor         | LC1D2G7        |
|   | 7.5                 | 5       | 20    | 25               | 32A Contactor         | LC1D32G7       |
|   | 10                  | 7.5–10  | 25    | 30               | 40A Contactor         | LC1D40G7       |
|   | 15                  | –       | 30    | 40               | 50A Contactor         | LC1D50G7       |
|   | 20                  | 15      | 40    | 50               | 65A Contactor         | LC1D65G7       |
|   | –                   | 20      | 50    | 60               | 80A Contactor         | LC1D80G7       |
|   | 25–30               | 25      | 60–75 | 75–100           | 115A Contactor        | LC1D115G7      |
|   | 40                  | 30–40   | 100   | 125              | 150A Contactor        | LC1D150G7      |
|   | 50–60               | 50      | 125   | 150              | 185A Contactor        | LC1F185        |
|   | 50–60               | 60      | 125   | 150              | 120V/60Hz Coil (F185) | LX1FG095       |
|   | 75                  | 75      | 150   | 200              | 225A Contactor        | LC1F225        |
|   | 75                  | 75      | 150   | 200              | 120V/60Hz Coil (F225) | LX1FG095       |
|   | –                   | 100     | 200   | 250              | 265A Contactor        | LC1F265        |
|   | –                   | 100     | 200   | 250              | 120V Coil (F265)      | LX1FG095       |
|   | 100                 | 125     | 250   | 300              | 330A Contactor        | LC1F330        |
|   | 100                 | 125     | 250   | 300              | 120V Coil (F330)      | LX1FH1272      |
|   | 125                 | 150     | 300   | 350              | 400A Contactor        | LC1F400        |
|   | 125                 | 150     | 300   | 350              | 120V Coil (F400)      | LX1FJ110       |
|   | 150                 | –       | 350   | 400–500          | 500A Contactor        | LC1F500        |
|   | 150                 | –       | 350   | 400–500          | 120V Coil (F500)      | LX1FK110       |
| 200                                       | 200–250             | 400–500 | 600   | 630A Contactor   | LC1F630               |                |
| 200                                       | 200–250             | 400–500 | 600   | 120V Coil (F630) | LX1FL110              |                |



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