

Altistart[®] 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



Read these instructions carefully and look at the equipment to become familiar with the device before trying to install, operate, service or maintain it. The following special messages may appear throughout this bulletin or on the equipment to warn of potential hazards or to call attention to information that clarifies or simplifies a procedure.

The addition of either symbol to a “Danger” or “Warning” safety label indicates that an electrical hazard exists, which will result in personal injury if the instructions are not followed.

This is the safety alert symbol. It is used to alert you to potential personal injury hazards. Obey all safety messages that follow this symbol to avoid possible injury or death.

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.

PLEASE NOTE

Electrical equipment should be installed, operated, serviced, and maintained only by qualified personnel. No responsibility is assumed by Schneider Electric for any consequences arising out of the use of this material.

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 29 of this bulletin replaces the “Quick Start Procedures” section on page 5 of instruction bulletin 30072-450-61_.
- “Receiving, Handling, and Storage” on page 9 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 11 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 31) and “Replacement Parts” (page 37) 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 31 and “Replacement Parts” on page 37 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

TERMINOLOGY

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

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_.

TECHNICAL SPECIFICATIONS

Table 1 on page 5 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_.

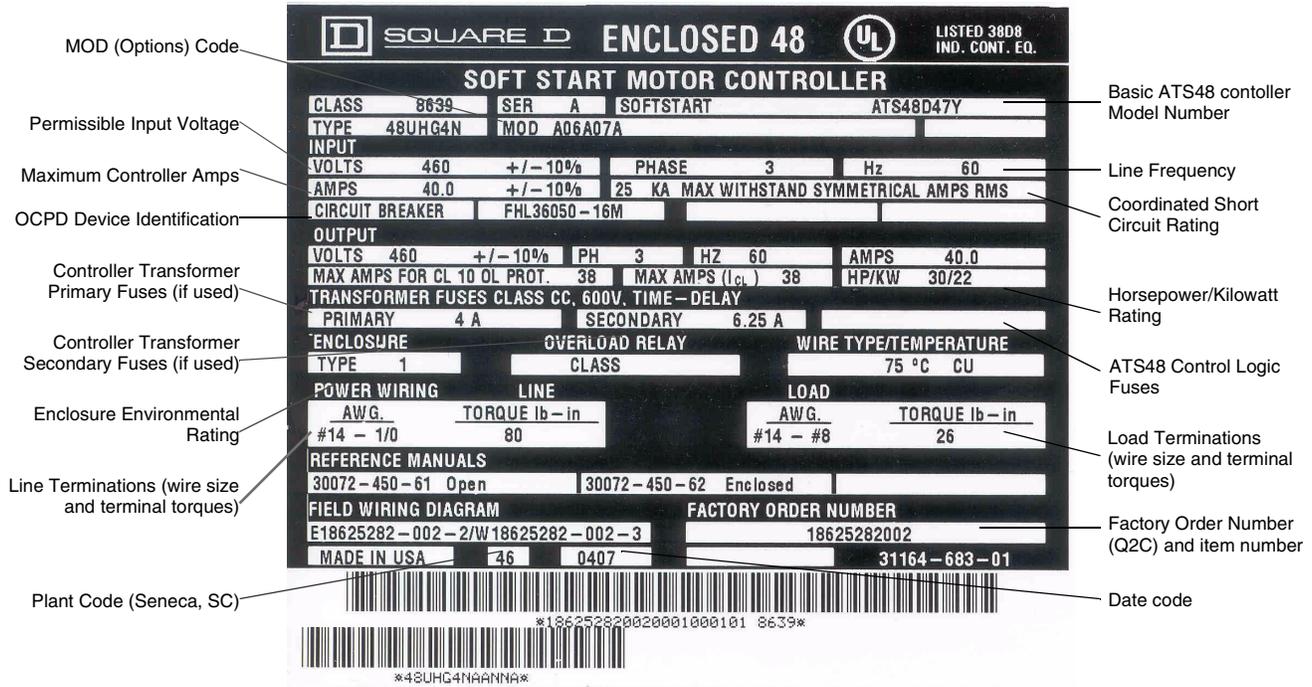
Table 1: Technical Specifications

Environment	Degree of protection	<ul style="list-style-type: none"> Type 1: Indoor use primarily to provide a degree of protection against limited amounts of falling dirt. Type 12: Indoor use primarily to provide a degree of protection against circulating dust, falling dirt, and dripping noncorrosive liquids. Type 3R: Outdoor use primarily to provide a degree of protection against rain, sleet, and damage from ice formation. Enclosures are painted ANSI #49.
	Conformity to standards	UL listed per UL508; CSA Certified per CSA 22.2 No. 14. Immunity to radioelectrical interference: conforms to IEC 60801-3.
	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 AC156 harmonized with NFPA 5000 and IBC2000 standards. Applicable to floor mount enclosures Size D and E only.
	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"> 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) Storage: -25 to +70 °C, -13 to 158 °F.
	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.
Characteristics	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 29.
	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"> Starting at 400% of I_n for 23 s, or 300% of I_n for 46 s, from a cold state Starting at 400% of I_n for 12 s, or 300% of I_n for 23 s, with a load factor of 50% and 10 starts per hour or an equivalent thermal cycling <p>For additional information, refer to "Application and Protection" in bulletin 30072-450-61_.</p>
Operation	Methods of Starting:	
	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.
Methods of Stopping:		
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.	
Status and Diagnostics:	Digital display of motor and controller status, including: <ul style="list-style-type: none"> Ready/Run/Fault Status Motor Current Motor Torque Motor Thermal State Power Factor 	
Protection	Motor:	
	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.
	Controller:	
	Short circuit current ratings	See Table 3 on page 7.
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 31.	
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 protect against overheating. Controllers rated 72 A and greater have 2 thermal switches; one controls the fan, the other protects 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.

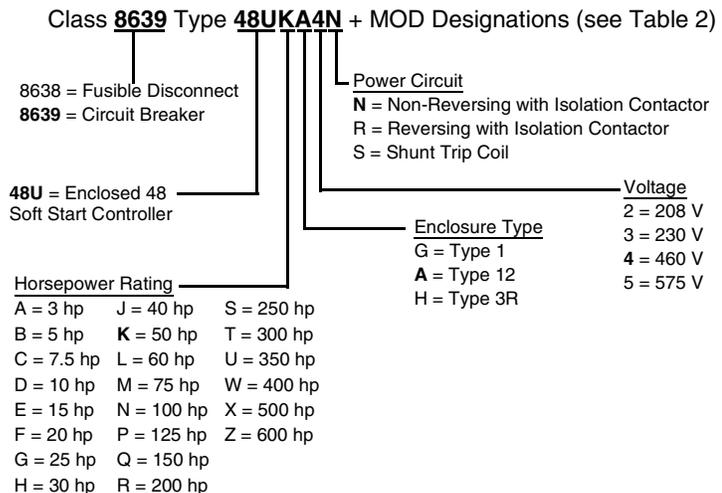
Figure 1: Enclosed 48 Controller Nameplate



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
Control		Miscellaneous Options	
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
Pilot Light Clusters		J10	Auxiliary contacts for 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 Fault (yellow)	M10	Spare terminal blocks
D07	Push-To-Test Run (red), Off (green), and Push-To-Reset Fault (yellow)	P10	Permanent wire markers
Meters		Q10	ANSI #61 enclosure paint
A08	Ammeter	R10	MOV/Surge arrester
B08	Elapsed time meter	S10	Dual motor overloads and branch circuits
Communications Cards		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, floor mounted units)
Miscellaneous Options		Z10	Reserved for future
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

▲ CAUTION

DAMAGED EQUIPMENT

Do not operate any Enclosed 48 controller that appears damaged.

Failure to follow this instruction 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 6) 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 5.
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 this instruction can result in equipment damage.

HANDLING THE CONTROLLER

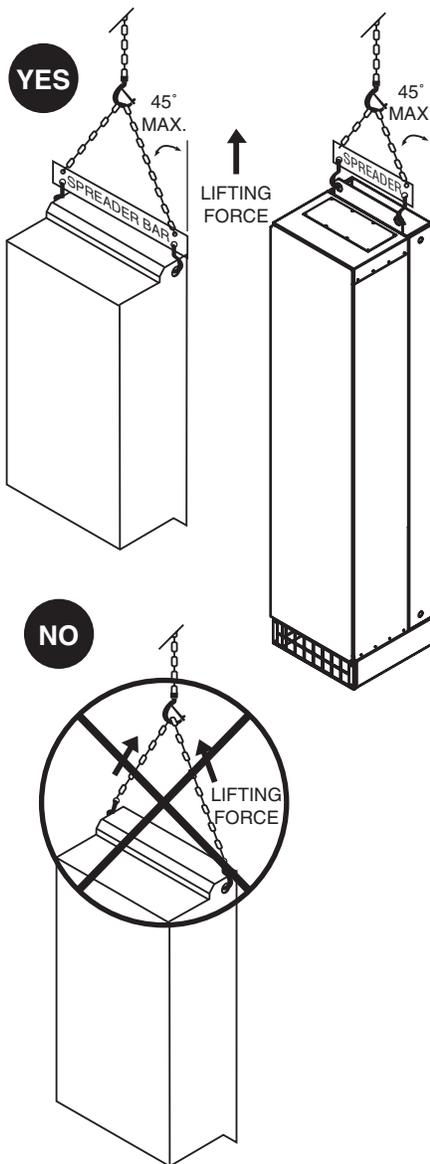
⚠ WARNING

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 this instruction 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 this instruction can result in death, serious injury, or equipment damage.

SECTION 3— INSTALLATION

⚠ 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 be installed and serviced only by qualified electrical personnel.
- Turn OFF all power supplying this equipment before working on or inside the equipment.
- Always use a properly rated voltage sensing device to confirm that all power is off.
- Replace all devices, doors, and covers before turning on the power to this equipment.

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.

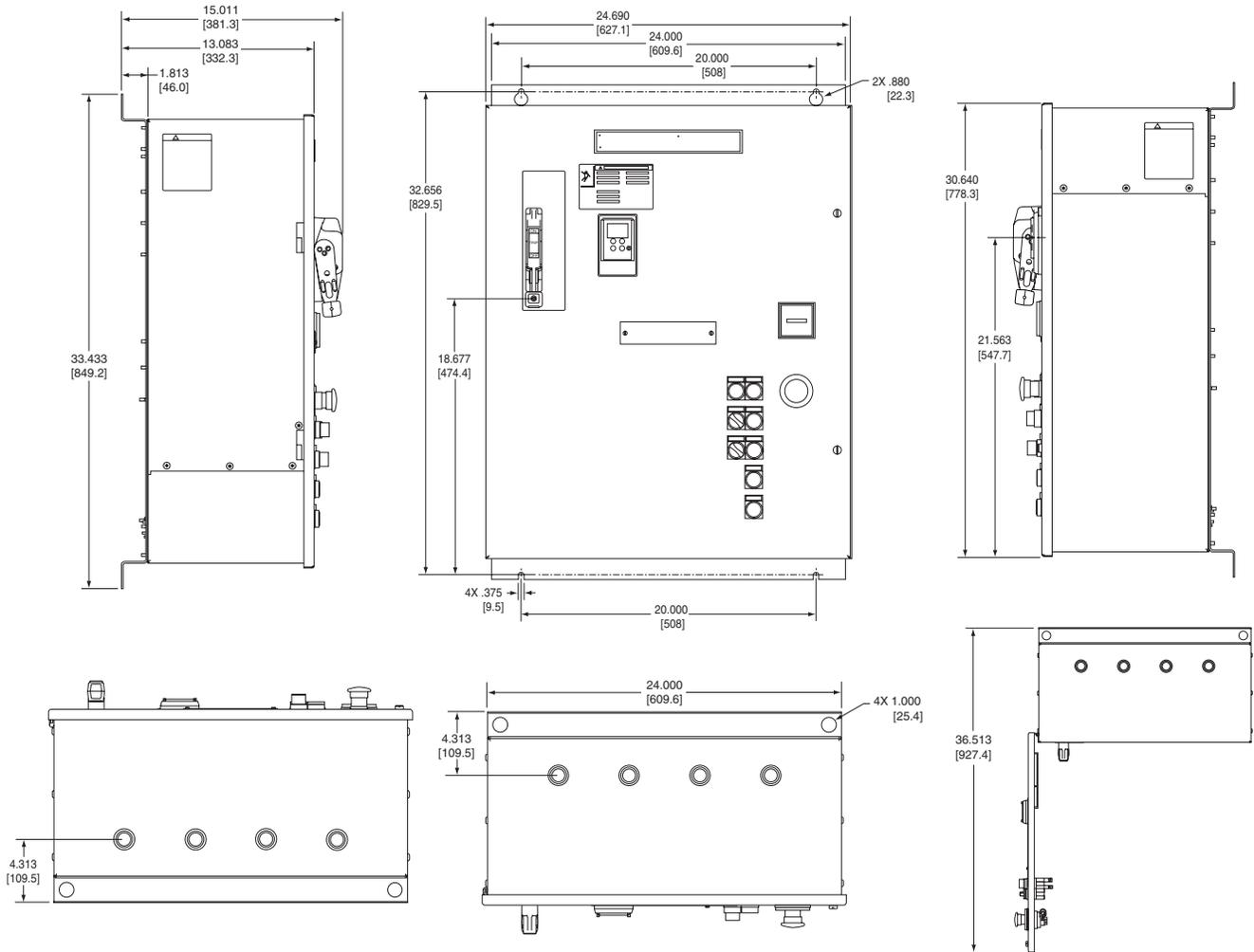
Follow these precautions when installing Enclosed 48 controllers:

- 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 4–14. 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.*

MOUNTING DIMENSIONS AND WEIGHTS

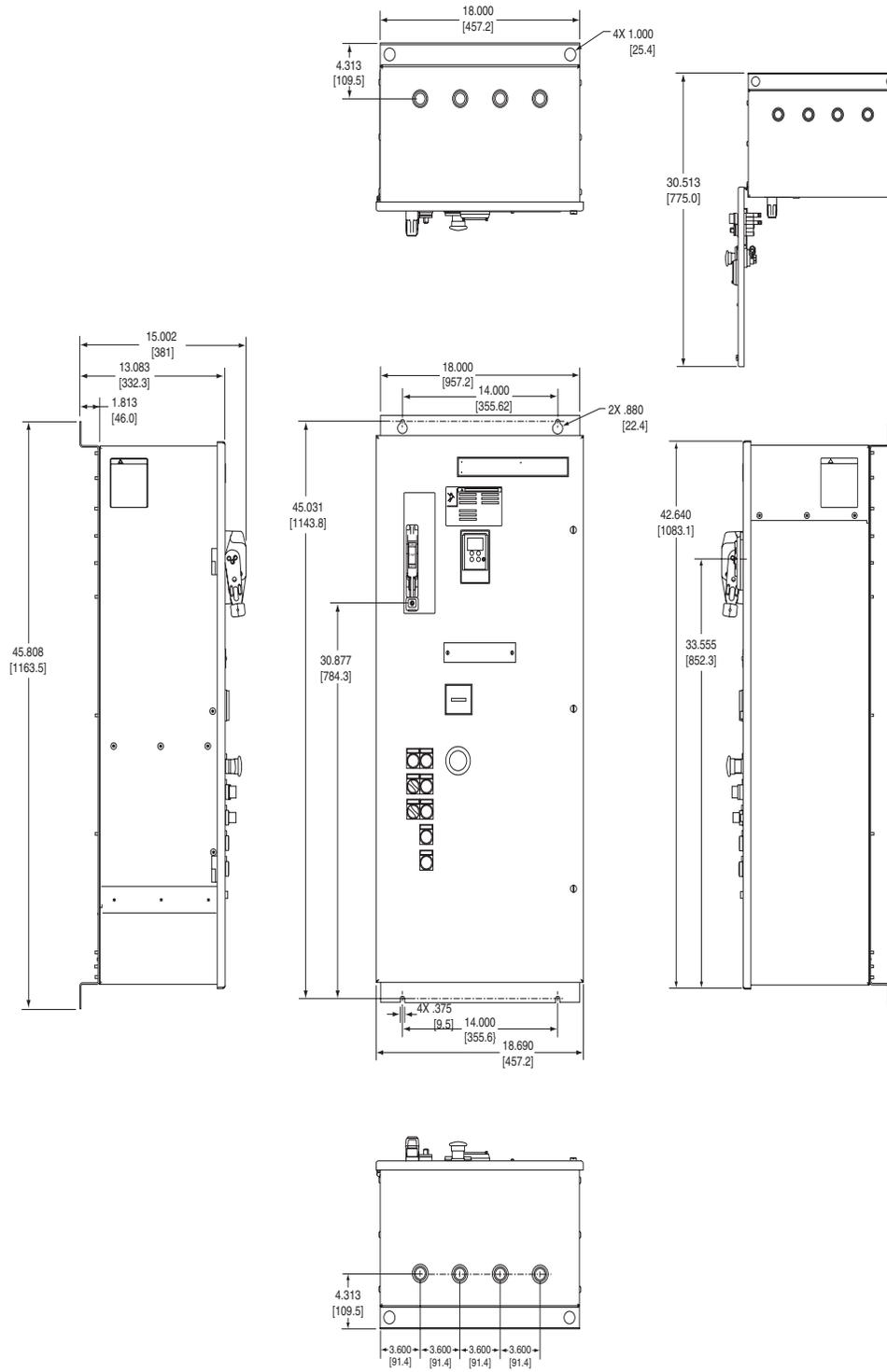
Figures 4–14 show dimensions of the various wall mount and floor mount enclosure types. Table 4 on page 25 lists the weights and estimated watts loss for the various enclosure types.

Figure 4: 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]

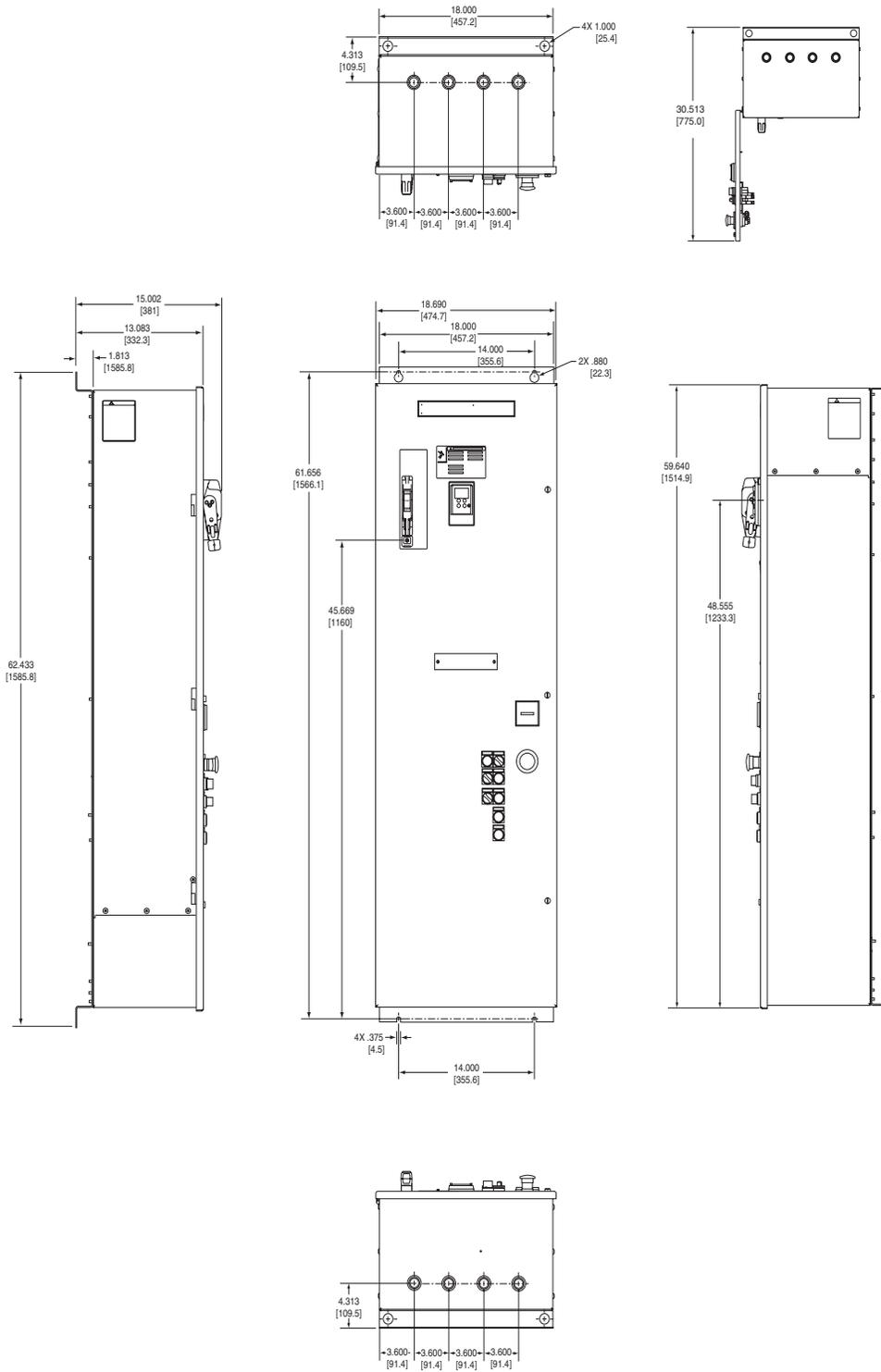
Figure 5: Size B Enclosure, Wall Mount, Type 1, 12, and 3R: 15–30 hp @ 208 V, 20–40 hp @ 230 V, 40–75 hp @ 480 V, and 50–100 hp @ 575 V



Dimensions: in. / [mm]

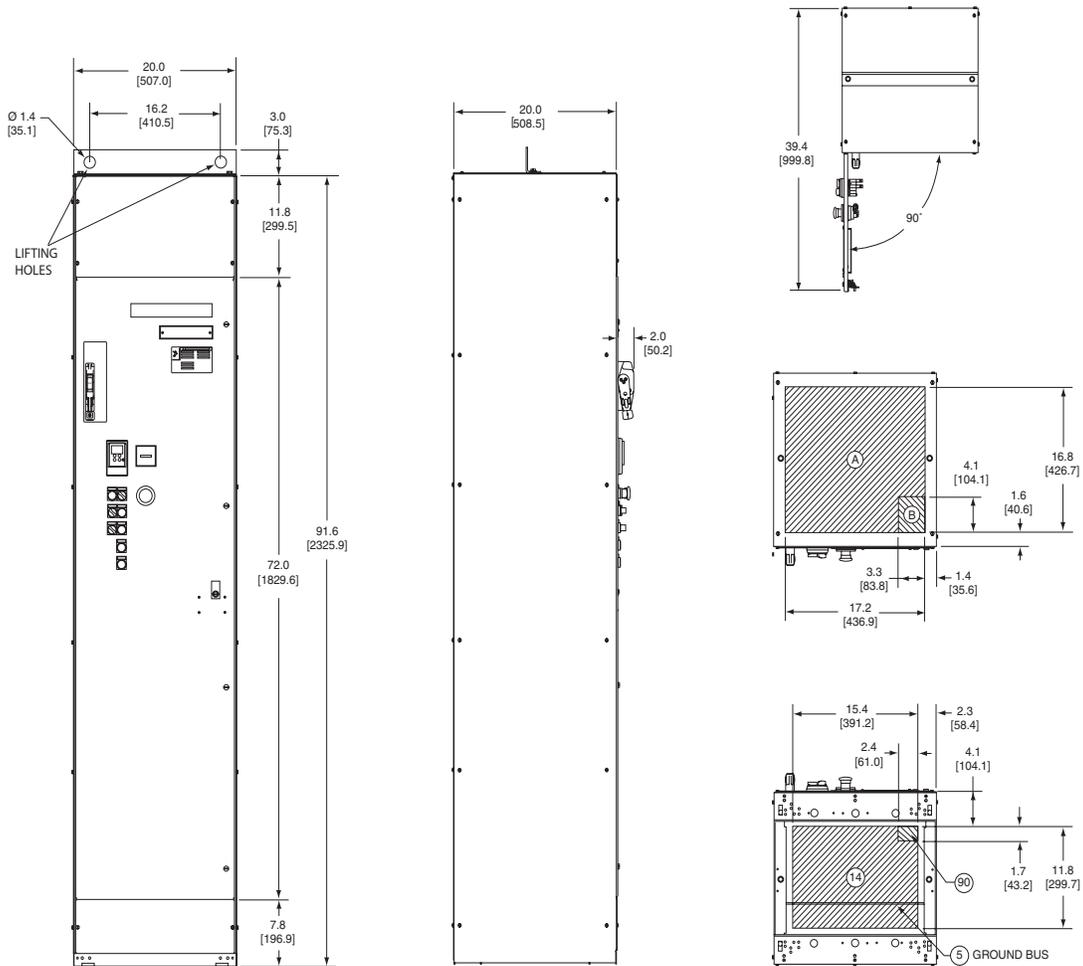
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Figure 6: Size C Enclosure, Wall Mount, Type 1, 12, and 3R: 40–50 hp @ 208 V, 50–60 hp @ 230 V, 100–125 hp @ 480 V, and 125–150 hp @ 575 V



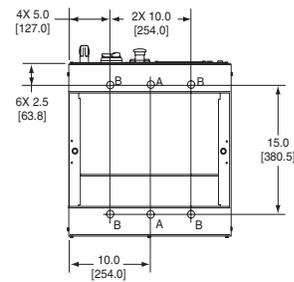
Dimensions: in. / [mm]

Figure 7: 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:

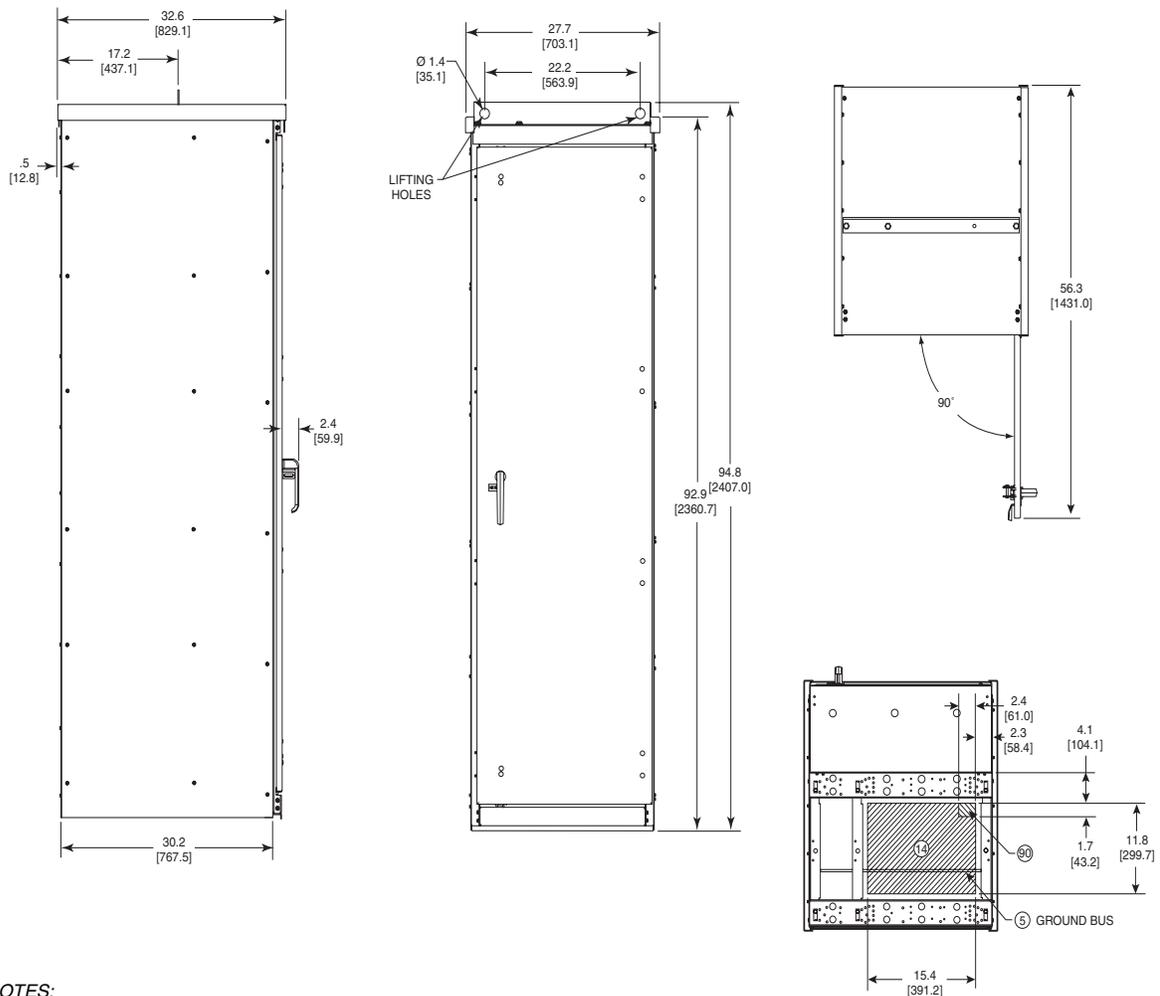
1. Circled numbers indicate depth in inches.
2. A = Standard Anchors, B = Seismic Anchors



Dimensions: in. / [mm]

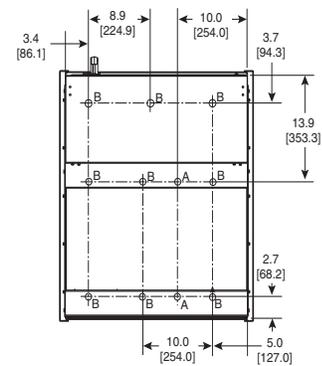
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Figure 8: Size D Enclosure, Floor Mount, Type 3R, 20 inches wide, 8639 Power Circuit S (Shunt Trip) only: 60–100 hp @ 208 V, 75–125 hp @ 230 V, 150–250 hp @ 480 V, and 200–300 hp @ 575 V



NOTES:

1. Circled numbers indicate depth in inches.
2. A = Standard Anchors, B = Seismic Anchors

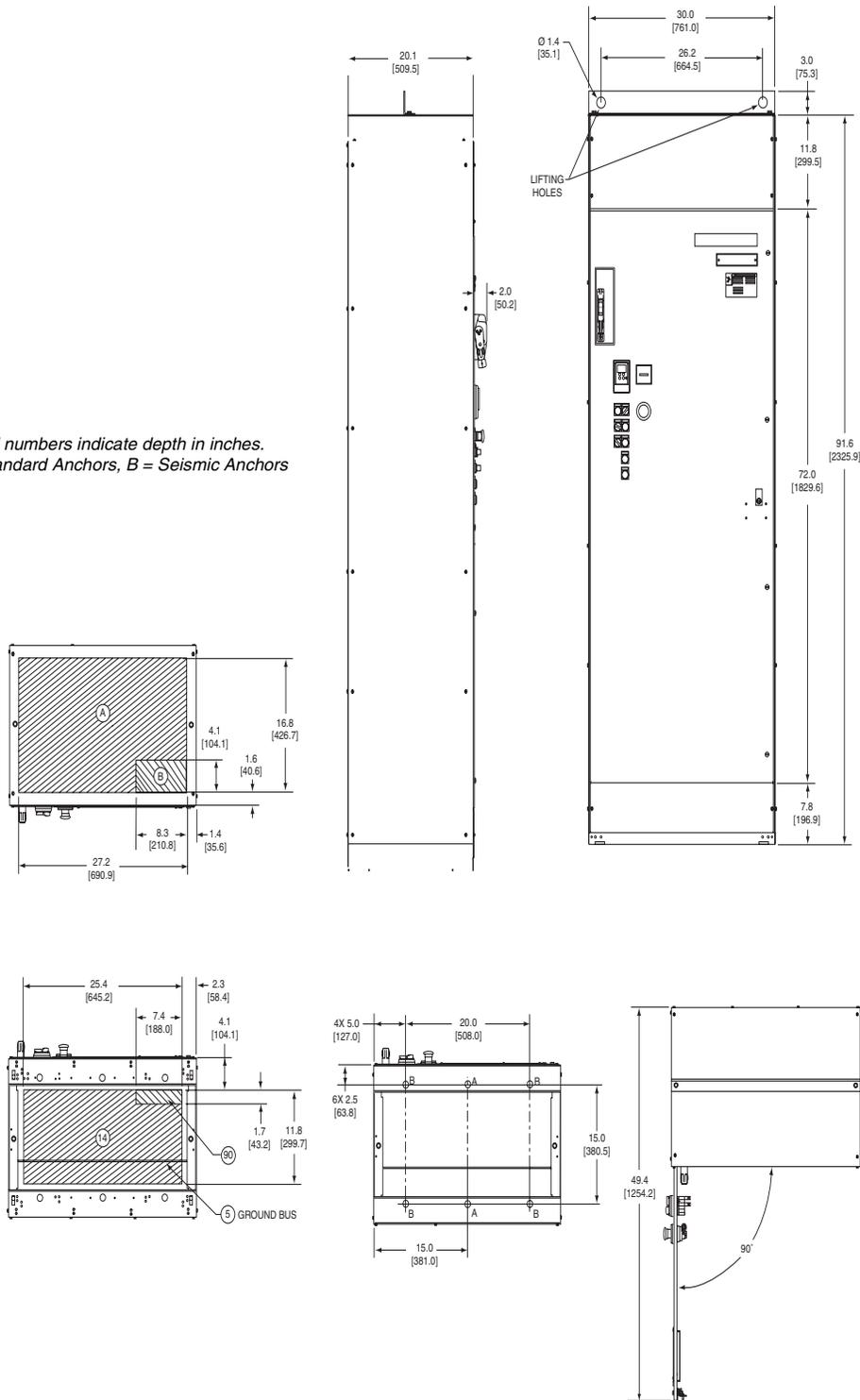


Dimensions: in. / [mm]

Figure 9: 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

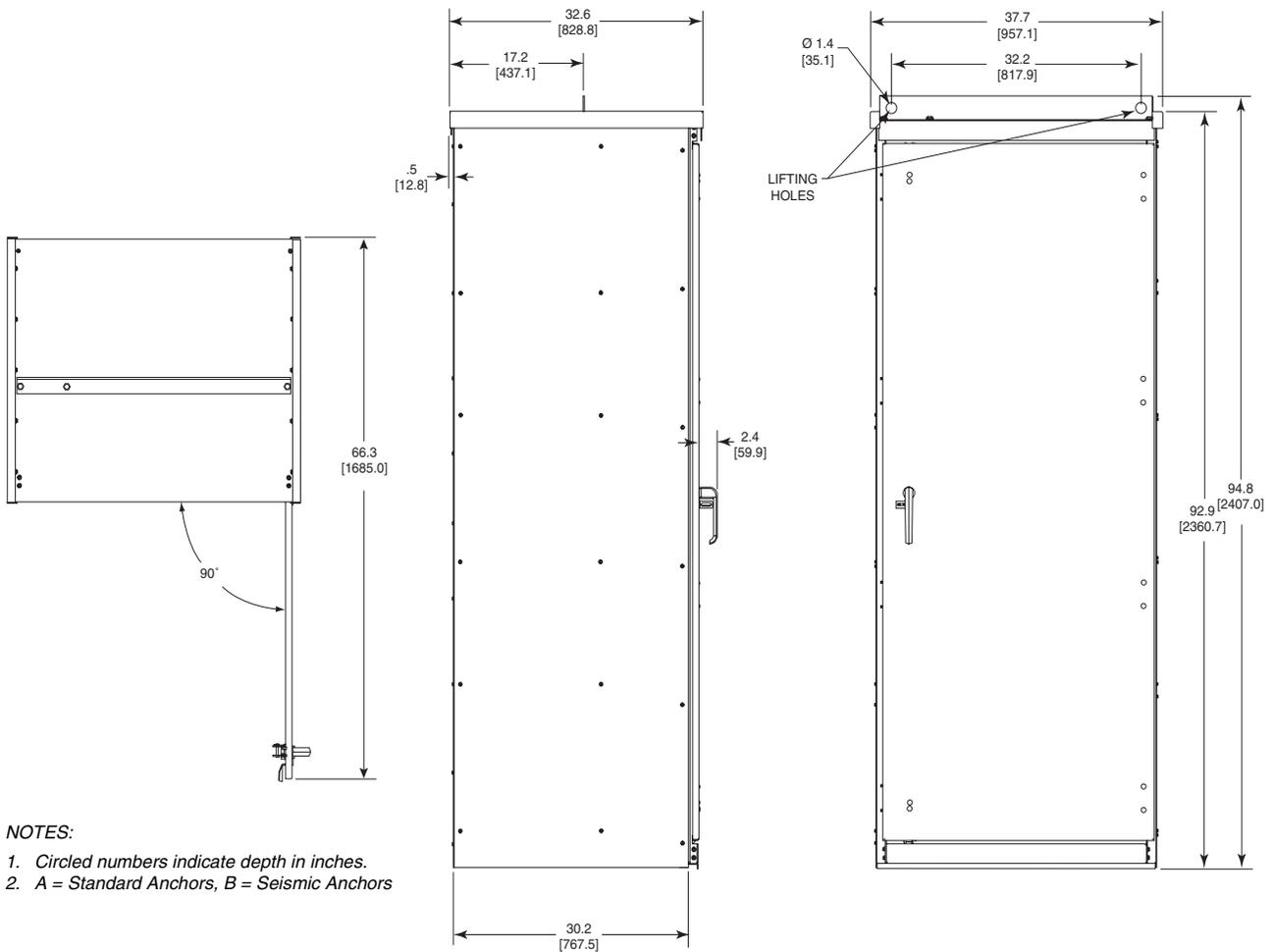
NOTES:

1. Circled numbers indicate depth in inches.
2. A = Standard Anchors, B = Seismic Anchors



Dimensions: in. / [mm]

Figure 10: 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

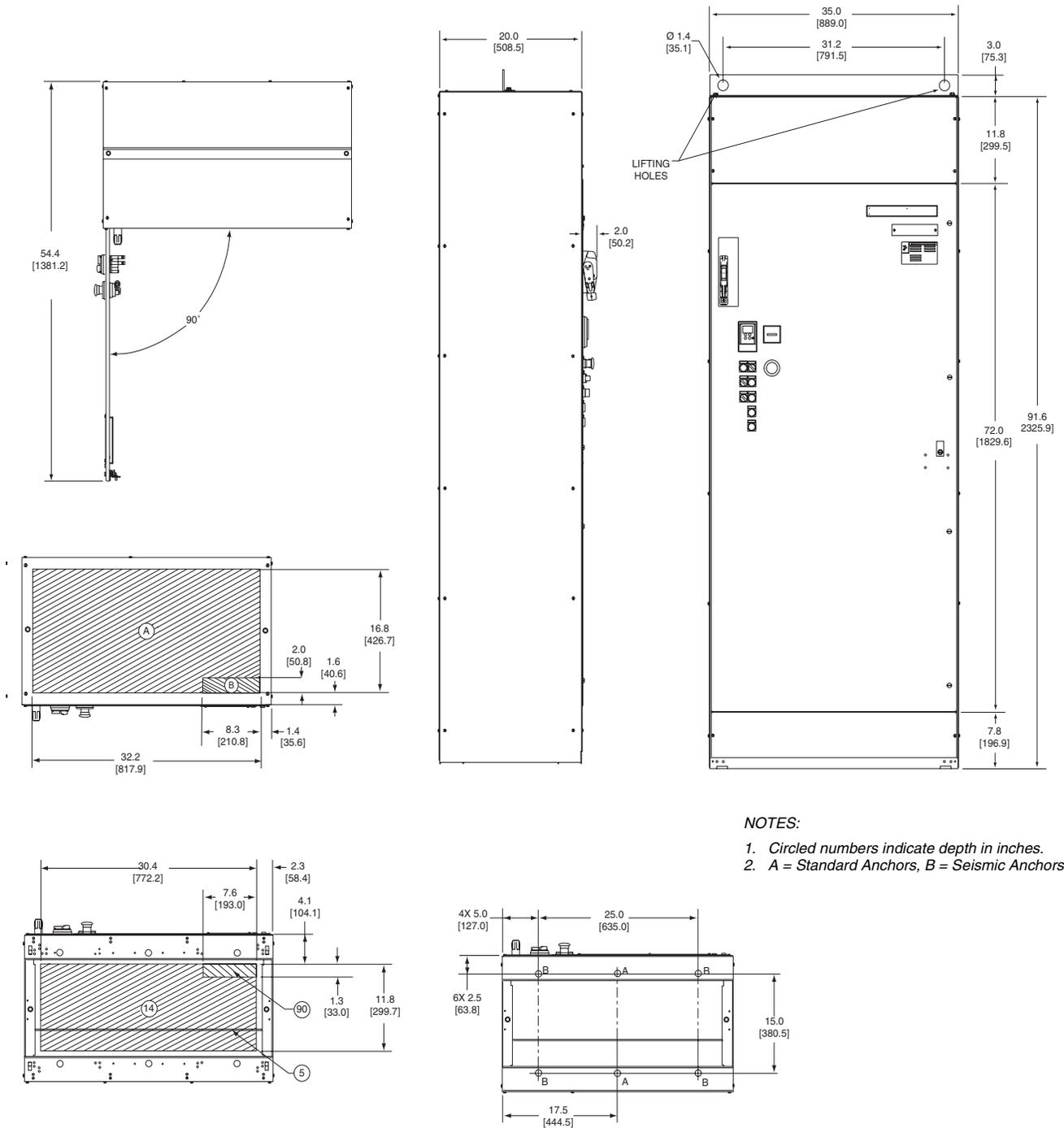


NOTES:

1. Circled numbers indicate depth in inches.
2. A = Standard Anchors, B = Seismic Anchors

Dimensions: in. / [mm]

Figure 11: 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

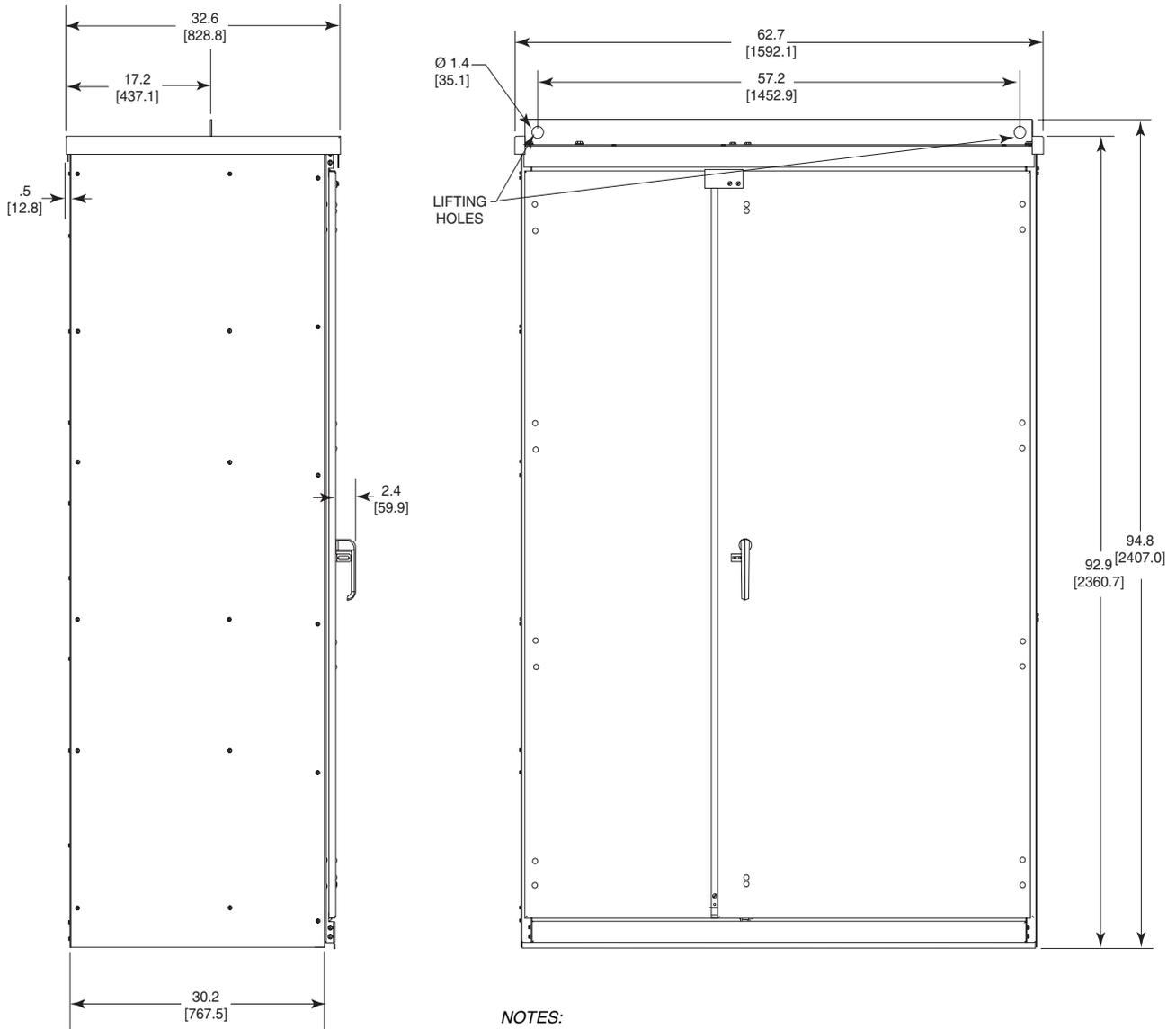


NOTES:

1. Circled numbers indicate depth in inches.
2. A = Standard Anchors, B = Seismic Anchors

Dimensions: in. / [mm]

**Figure 12: 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:

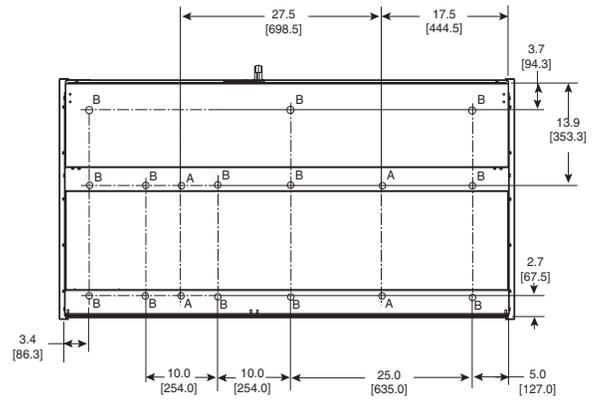
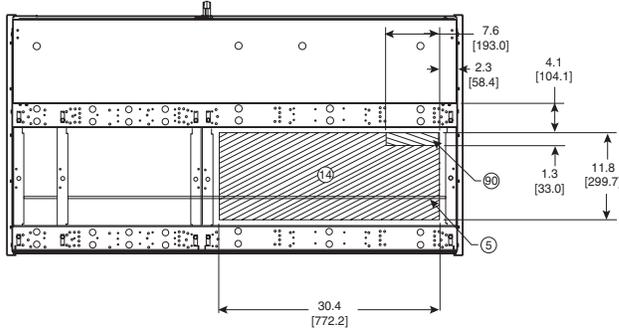
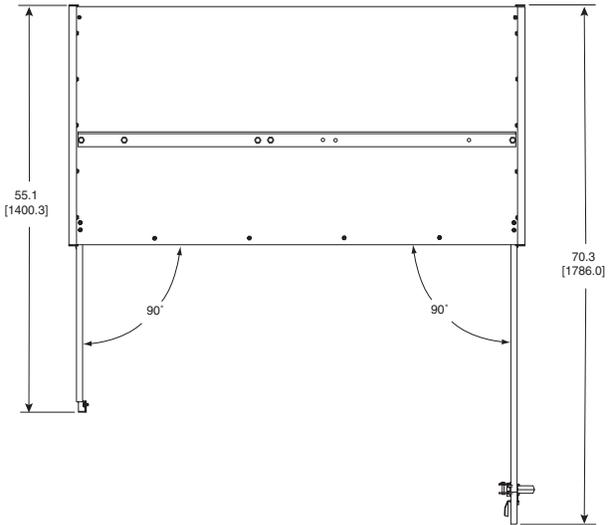
1. Circled numbers indicate depth in inches.
2. A = Standard Anchors, B = Seismic Anchors

Dimensions: in. / [mm]

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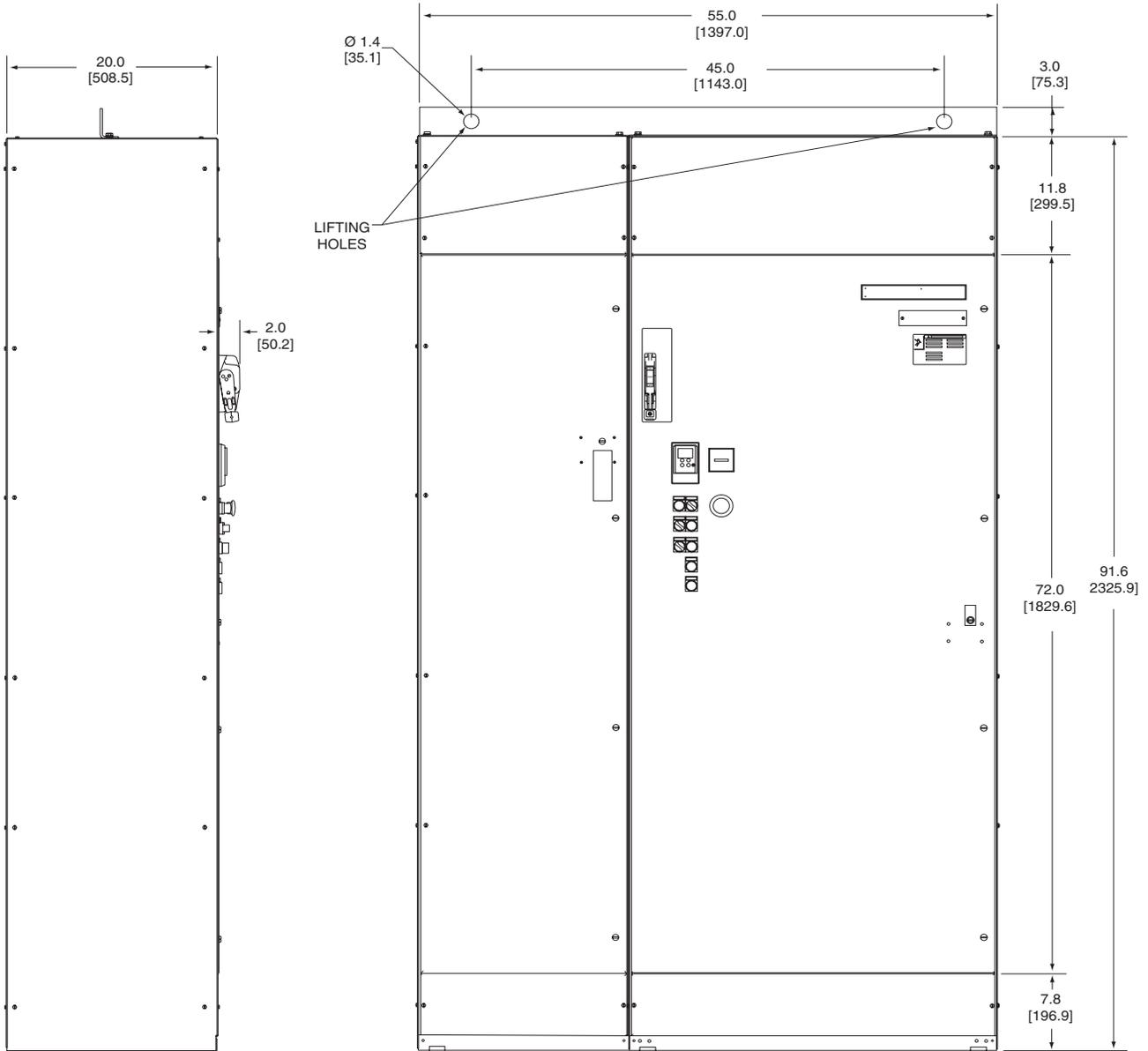
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Dimensions: in. / [mm]

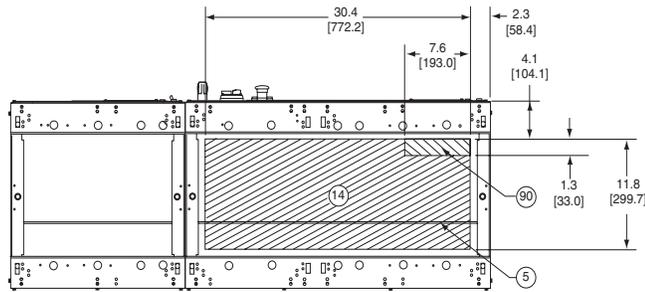
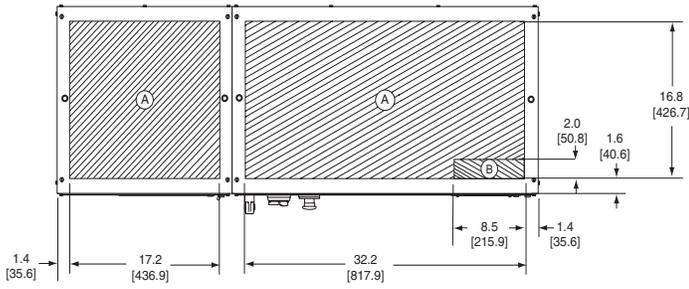
**Figure 13: Size E Enclosure, Floor Mount, Type 1 and 12, 55 inches wide, 8638 and 8339 Power Circuit R (Reversing):
 125–200 hp @ 208 V, 150–250 hp @ 230 V, 300–500 hp @ 480 V, and 350–600 hp @ 575 V**



Dimensions: in. / [mm]

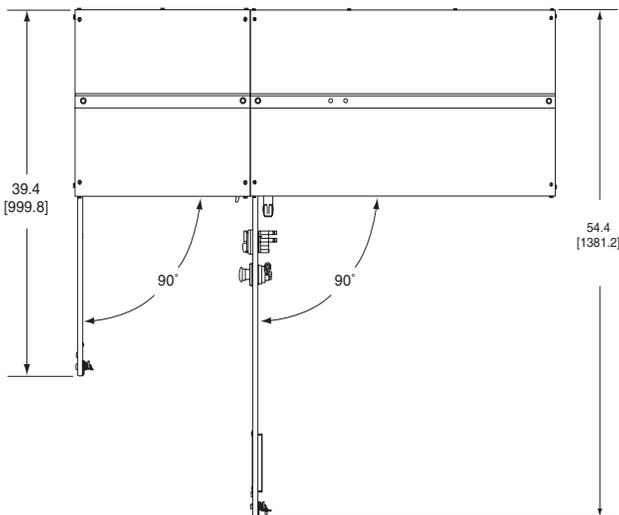
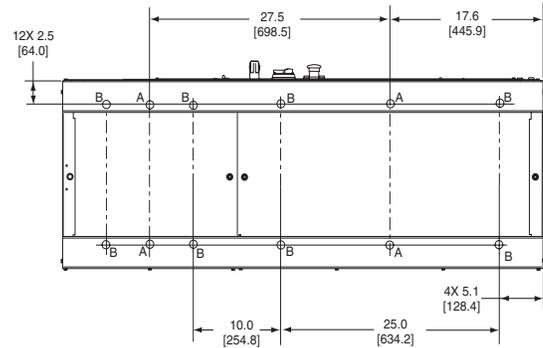
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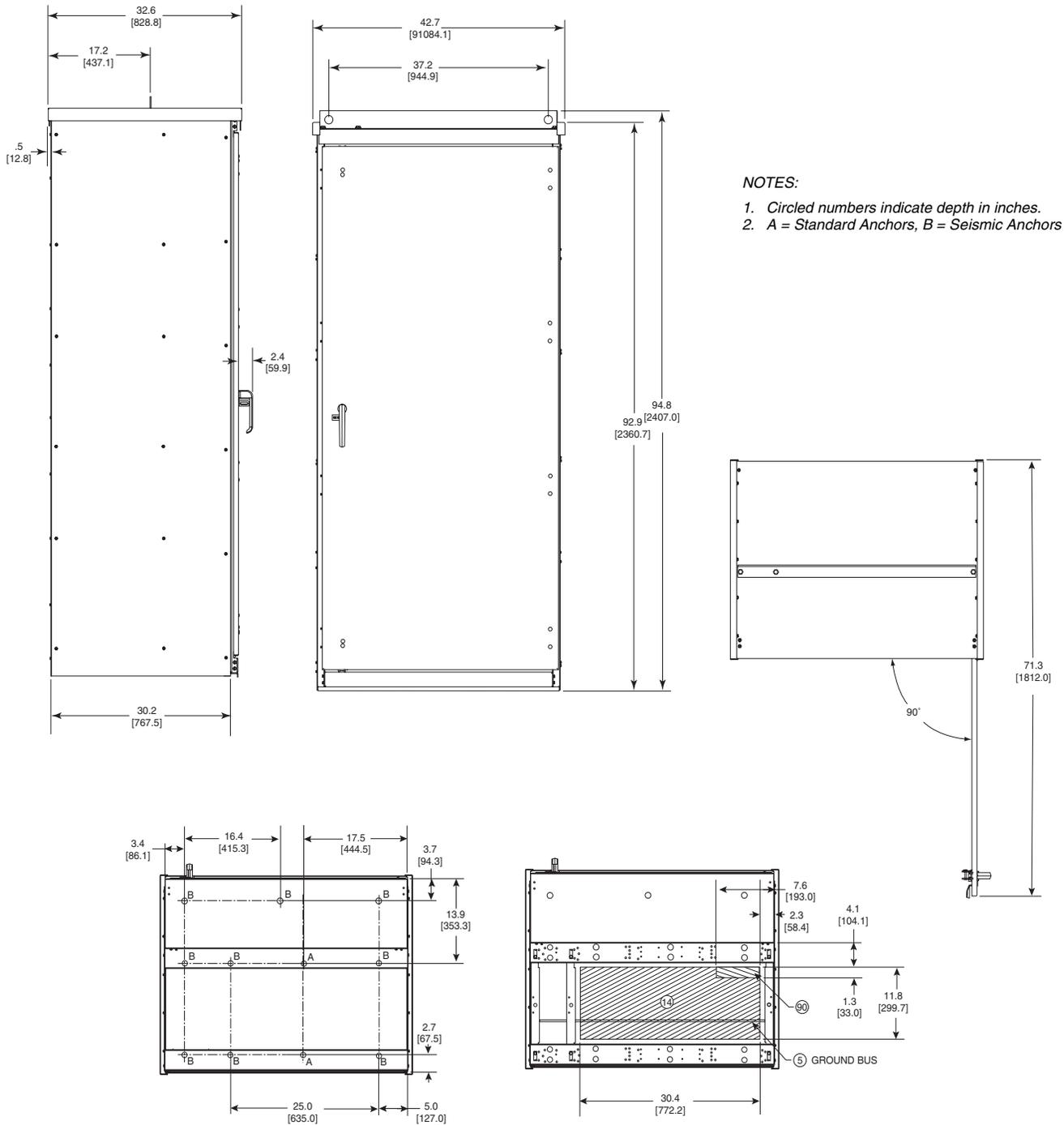
NOTES:

1. Circled numbers indicate depth in inches.
2. A = Standard Anchors, B = Seismic Anchors



Dimensions: in. / [mm]

Figure 14: 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



NOTES:

1. Circled numbers indicate depth in inches.
2. A = Standard Anchors, B = Seismic Anchors

Dimensions: in. / [mm]

Table 4 lists the weights for the devices illustrated in Figures 4–14. It also provides the estimated watts loss for the Enclosed 48 controllers.

Table 4: Weights and Estimated Watts Loss

Class 8638 & 8639 Enclosed 48 Controllers Horsepower Ratings						Estimated Watts Loss ¹	Weights (lb) ²								
Size	ATS48_YU ³ Device	208 V	230 V	460 V	575 V		Type 1			Type 12			Type 3R		
							N	R	S	N	R	S	N	R	S
A	D17	3	5	10	15	285 W Start 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 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 258 W Run	200			200			200		
C	C17	50	60	125	150										
D	C21	60	75	150	200	1264 W Start 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 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										

¹ Watts loss conditions identified in Start (ATS48 soft start mode) during installation /deceleration ramp. Run (shorting contactor mode) during operating conditions.
² 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.
³ The underscore (_) represents the variable part of the catalog number.

WIRING

⚠ 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 be installed and serviced only 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 that all power is off.
- Replace all devices, doors, and covers before turning on the power to this equipment.

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

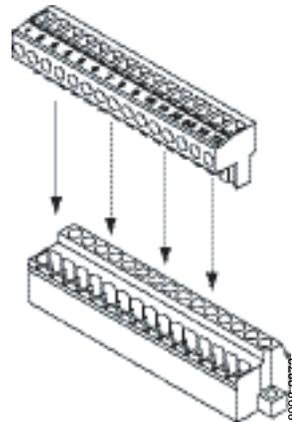
Control Wiring

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 15. 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 mm²) wire or two 16 AWG (1.3 mm²) 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 15: 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 OCPD may require change or reconfiguration.

SECTION 4— OPERATION

▲ 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.

NOTE: Before operating the Enclosed 48 controller, perform the procedures listed in “Factory Settings” on page 28.

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 37 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 fault 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.

FACTORY SETTINGS

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 by customer-supplied control.

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 29. 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

Nominal motor current (I_N)	Preset to correspond to 460 V rated motor current based on NFPA 70/NEC Table 430.150 ratings
Current Limit (ILt)	400% of the motor current I_N
Acceleration ramp (ACC)	15 seconds
Initial torque on starting (tq_0)	20% of the nominal torque
Stop (StY)	Freewheel stop (-F-)
Motor thermal protection (tHP)	Class 10 thermal overload protection curve (ATS48 soft start) Class 20 set to minimum threshold (MOD A10)
Display	rdY (ATS48 soft start ready) when power and control voltage are present and the motor is operating.
Logic inputs	<ul style="list-style-type: none"> • LI1 • LI2 • LI3 • LI4 <ul style="list-style-type: none"> • STOP • RUN • Forced freewheel stop (LIA) • Forced local mode (LIL)
Logic outputs	<ul style="list-style-type: none"> • LO1 • LO2 <ul style="list-style-type: none"> • Motor thermal alarm (tA1) • Motor powered (rnI)
Relay outputs	<ul style="list-style-type: none"> • R1 • R2 • R3 <ul style="list-style-type: none"> • Fault relay (r1F) • Bypass relay at the end of starting • Motor powered (rnI)
Analog output (AO)	Motor current (OCr, 0–20 mA)
Communication parameters	<ul style="list-style-type: none"> • When connected via the serial link, the soft starter has a logic address (Add) of 0 • Transmission speed (tbr): 19200 bits per second • Communication format (FOr): 8 bits, no parity, 1 stop bit (8nl)

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 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_N)

The factory settings for the nominal motor current, I_N, 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_N 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 _N = 0.96 x Nameplate Current
1.15 or 1.25	I _N = 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 prevent nuisance tripping.

Table 7: Horsepower Ratings and Nominal Motor Current Factory Settings

Altistart Soft Start Model	Horsepower Rating				Nominal Motor Current (I _N) 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
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 ¹
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

¹ 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.

⚠ DANGER

HAZARD OF ELECTRIC SHOCK, EXPLOSION, OR ARC FLASH

- Never operate the disconnect switch with the door open.
- Turn OFF the disconnect switch before removing or installing fuses or making load side connections.
- Always use a properly-rated voltage sensing device at all line and load side fuse clips to confirm that the switch is OFF.
- Turn OFF all power supplying the disconnect switch before doing any other work on or inside the disconnect switch.
- Use only the Class J or Class L fuses listed in Table 9 to provide correct short-circuit protection.

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

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 25.

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	

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	
5	-	-	-	J/30A	25423-30300	Bussmann LPJ-30	ATS48D22Y	
				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		
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		
				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		
				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		
				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		
				J/125A	25423-21250	Littelfuse JTD-125		
				J/125A		Shawmut AJT-125		
-	30	-	-	J/150A	25423-31500	Bussmann LPJ-150		
				J/150A	25423-21500	Littelfuse JTD-150		
				J/150A		Shawmut AJT-150		

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	
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		
				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-200		
				J/225A	25423-22250	Littelfuse JTD-200		
				J/225A		Shawmut AJT-200		
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		
				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		
				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		
				J/500A	25423-25000	Littelfuse JTD-500		
				J/500A		Shawmut AJT-500		
125	150	300	350	J/600A	25423-36000	Bussmann LPJ-600	ATS48C41Y	
				J/600A	25423-26000	Littelfuse JTD-600		
				J/600A		Shawmut AJT-600		
150	-	350	400	L/700A	25432-10700	Bussmann KRP-C-700		ATS48C48Y
				L/700A		Littelfuse KLP-C-700		
				L/700A		Shawmut A4BQ-700		
-	200	400	500	L/800A	25432-10800	Bussmann KRP-C-800		
				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		
				L/1000A		Littelfuse KLP-C-1000		
				L/1000A		Shawmut A4BQ-1000		

ENGLISH

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 35. (You may copy this form as needed.)

For more information, call, fax or write:

Schneider Electric Technical Support
8001 Highway 64 East
Knightdale, NC 27545-9023

Telephone: 919-266-8600 or 1-888-SQUARED (1-888-778-2733)
Fax Line: 919-217-6508
e-Mail: drivepsg@squared.com

Figure 16: 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 FAULT CODES

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

Non-Reset Faults	Auto-Reset Faults (Customer Configurable)	Manual Reset Faults	
<input type="checkbox"/> InF, Internal Fault	<input type="checkbox"/> PHF, Loss of Phase or Loss of Motor Phase	<input type="checkbox"/> SLF, Serial Link Fault	<input type="checkbox"/> OHF, Starter Thermal Fault
<input type="checkbox"/> OCF, Overcurrent	<input type="checkbox"/> FRF, Line Frequency (out of tolerance)	<input type="checkbox"/> ETF, External Fault	<input type="checkbox"/> OTF, Motor Thermal Fault Via PTC Probes
<input type="checkbox"/> PIF, Phase Inversion	<input type="checkbox"/> USF, Power Supply	<input type="checkbox"/> STF, Excessive Starting Time	<input type="checkbox"/> ULF, Motor Underload
<input type="checkbox"/> EEF, Internal Memory	<input type="checkbox"/> CLF, Control Line Failure (CL1/CL2)	<input type="checkbox"/> OLC, Current Overload	<input type="checkbox"/> LRF, Locked Rotor (in steady state)
<input type="checkbox"/> OLF, Motor Thermal Fault			
Resettable Faults When Causes Disappear	<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):

SECTION 6— REPLACEMENT PARTS

⚠ DANGER

HAZARD OF ELECTRIC SHOCK, EXPLOSION, OR ARC FLASH

- Never operate the disconnect switch with the door open.
- Turn OFF the disconnect switch before removing or installing fuses or making load side connections.
- Always use a properly-rated voltage sensing device at all line and load side fuse clips to confirm that the switch is OFF.
- Turn OFF all power supplying the disconnect switch before doing any other work on or inside the disconnect switch.
- Use only the Class J or Class L fuses listed in Table 9 on page 31 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		
Circuit Breakers	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	
Shunt Trip Circuit Breakers	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	

NOTE: MAG-Guard circuit breakers are used unless otherwise noted. Devices noted by "" are thermal-magnetic circuit breakers used to achieve short circuit ratings.*

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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 (horizontally mounted)	LA9FG970
	60–75	75	150	200	F185–F225 Contactors (vertically mounted)	LA9FG4G
	100	100–125	200–250	250–300	F265–F330 Contactors (vertically mounted)	LA9FH4H
	125	–	300	350	F400 Contactors (vertically mounted)	LA9FJ4J
	150	150	350	400–500	F500 Contactors (vertically mounted)	LA9FK4K
	200	200–250	400–500	600	F630 Contactors (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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