Enclosed Altistart™ 22
Solid State Reduced Voltage Combination Motor Controller
Altistart™ 22 en gabinete
Controlador de motor combinado a tensión reducida de estado sólido
Altistart™ 22 sous coffret
Contrôleur de moteur combiné transistorisé à tension réduite

Instruction Bulletin
Boletín de instrucciones
Directives d'utilisation

30072-453-26
Rev. 03, 12/2012

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Solid State Reduced Voltage Combination Motor Controller

ESPAÑOL

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Controlador de motor combinado a tensión reducida de estado sólido

FRANÇAIS

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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 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 personal injury hazards. Obey all safety messages that follow this symbol to avoid possible injury or death.

⚠ DANGER

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

⚠ WARNING

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

⚠ CAUTION

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

NOTICE

NOTICE is used to address practices not related to physical injury. The safety alert symbol is not used with this signal word.

NOTE: Provides additional information to clarify or simplify a procedure.

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.

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Section 1—Introduction and Technical Characteristics

Product Overview

Enclosed Altistart™ 22 (ATS22) solid-state combination motor controllers are a pre-engineered, integrated solution for reduced voltage starting and soft stopping of standard three-phase asynchronous induction (squirrel cage) motors. The Enclosed 22 controllers consist of a disconnect means, optional power circuit contactors for isolation, bypass, and reversing operations, and an ATS22 soft starter in a stand-alone enclosure. Enclosed 22 controllers integrate the ATS22 soft start technology into a combination package for application requirements up to 500 hp at 575 V.

The Enclosed 22 controller provides the benefits of reduced current inrush (and resulting voltage sag) and reduced mechanical shocks that can result from starting a motor across the line. A six thyristor (SCR) solid-state power configuration provides smooth acceleration and deceleration control of three-phase squirrel cage motors. Control algorithms are integrated to help ensure smooth rotation throughout the starting ramp without mechanical instability at the end of starting. The ATS22 soft starter also features an integral shorting contactor to reduce steady state motor operational losses.

Standard Features

Features standard on the Enclosed 22 controllers are:

- Mid-range enclosed soft starter
- Low cost, space-saving design with integrated shorting contactor
- Easy start-up
- Full starter and motor protection
- Versatile power circuit configurations
- Coordinated short circuit current rating of 100 kA at 208 V, 240 V, and 480 V and 50 kA at 600 V with circuit breakers, and 100 kA at 208 V and 600 V with Class J fuses
- UL Type 1, Type 12/12K, and Type 3R enclosure ratings and UL Listed combination motor controller (UL 508)
- Service entrance option
- Automatic remote starting

About this Document

This document contains installation, start-up, and maintenance instructions for the Enclosed 22 controller. The following documentation is also available from the technical library at www.schneider-electric.us:

- *ATS22 User Manual*, BBV51330
- *ATS22 Quick Start Guide,* S1A10388 and *Annex for UL508 Markets*, S1A14738
- *ATS22 CD-ROM*, VW3A8200
- *Handling, Installation, Operation, and Maintenance of Electrical Control Equipment*, Instruction Bulletin 30072-200-50

To replace documents, contact your local Schneider Electric field office or download them from the Technical Library at www.schneider-electric.us.

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Terminology

The following terminology is used in this instruction bulletin to distinguish between the Enclosed 22 controller and the ATS22 soft starter component:

- Enclosed 22 controller, or controller, refers to the combination of the ATS22 soft starter, enclosure, and the power and control circuits that comprise the Enclosed 22 combination motor controller.
- ATS22 soft starter, or soft starter, refers to the ATS22 solid-state reduced voltage motor controllers used as a component in the Enclosed 22 controller. The ATS22 soft starter is described in the *ATS22 User Manual,* BBV51330.
- Shorting contactor refers to the internal contactor(s) in the ATS22 soft starter. The shorting contactor closes during full speed operation to reduce losses under steady state operation.
- Bypass, or integral bypass starter, refers to the optional, integrated full voltage combination starter in the enclosed ATS22 controller (power circuit option Y05). When provided, the integral bypass starter may be used to start and run the motor in the unlikely event that the ATS22 soft starter becomes inoperable.

Before You Begin

Read and follow these precautions before performing any procedure with this controller.

⚠ DANGER

HAZARD OF ELECTRIC SHOCK, EXPLOSION, OR ARC FLASH

- Read and understand this manual before installing or operating the Enclosed 22 controller. Installation, adjustment, repair, and maintenance must be performed by qualified personnel.
- The user is responsible for compliance with all national and local electrical code requirements with respect to grounding of all equipment.
- Many parts of this controller, including the printed circuit boards, operate at the line voltage. DO NOT TOUCH. Use only electrically insulated tools.
- Some terminals may have voltage when the disconnect is open.
- Before servicing the controller:
  - — Disconnect all power, including external control power that may be present.
  - — Place a “DO NOT TURN ON” label on all power disconnects.
  - — Lock disconnects in the open position.
- Install and close all covers before applying power or starting and stopping the controller.

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

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⚠ 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 that 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.

⚠ 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[1].
- Each implementation of an Enclosed 22 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.

[1] For additional information, refer to NEMA ICS 1.1 (latest edition), “Safety Guidelines for the Application, Installation, and Maintenance of Solid State Control.”

⚠ CAUTION

INCOMPATIBLE LINE VOLTAGE

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

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

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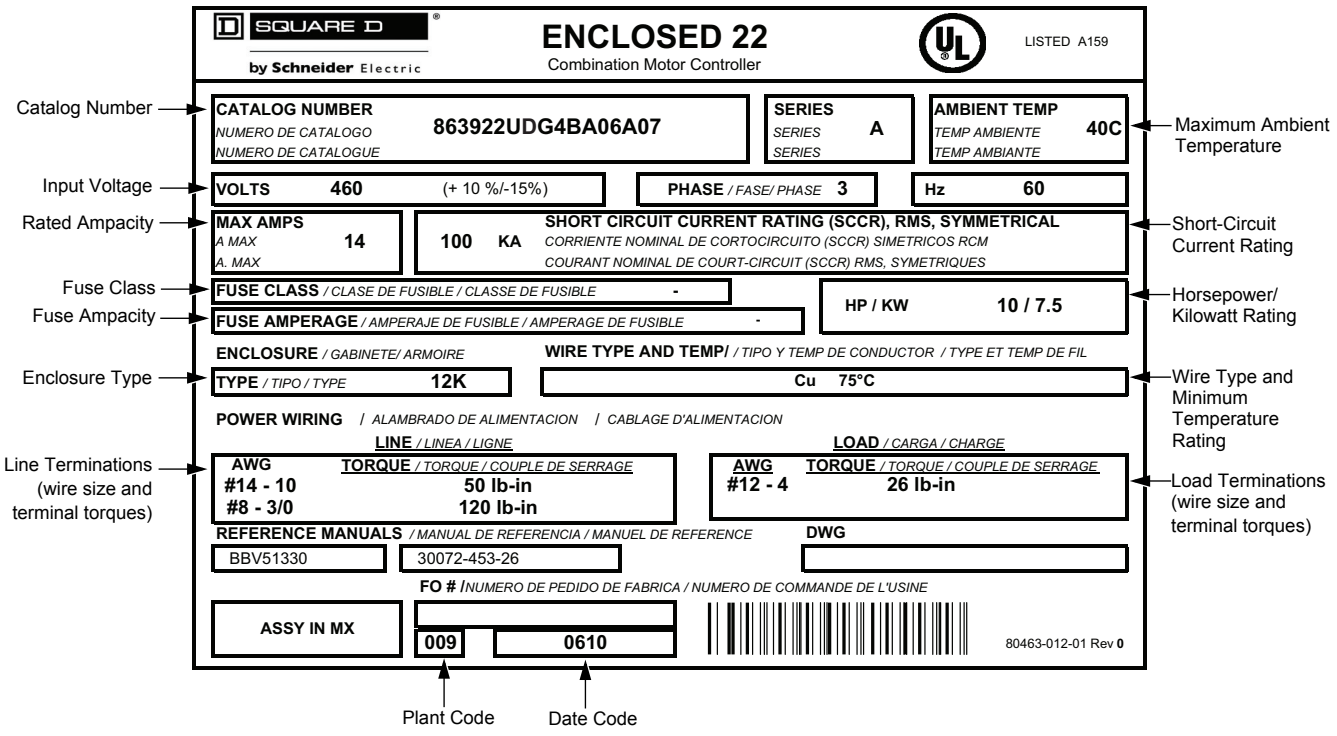
Nameplate Identification

The nameplate for the Enclosed 22 controller is on the inside of the enclosure door. See Figure 1. The nameplate identifies the controller type and modification options. When identifying or describing the Enclosed 22 controller, use the data from this nameplate.

Figure 1: Nameplate Example



Catalog Number Description

The catalog number is on the nameplate attached to the inside of the Enclosed 22 controller door (see Figure 1). The catalog number is coded to describe the configuration of the controller.

Use Table 2 on page 11 to translate the catalog number into a description of the controller. The example in Table 1 translates the catalog number shown on the nameplate.

For descriptions of the options listed in Table 2, refer to Section 4 beginning on page 85.

Table 1: Catalog Number Example: 863922UDG4BA06A07

	Field						
—	1	2	3	4	5	6	7
8639	22U	D	G	4	B	A06	A07
Controller Class	PowerPact™ Thermal-Magnetic Circuit Breaker	10 hp	UL Type 1 General Purpose	460 Vac	Basic Shunt Trip	Start-Stop Pushbutton	Run Light (Red), Off Light (Green)

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Table 2: Catalog Number Description

Field	Digit	Characteristic	Description
—	—	Controller Class	8638 = Fused Disconnect[1] 8639 = Circuit Breaker Disconnect
01	1–3	Controller Style	22F = Altistart 22 with Class J fuse clips and molded case switch[1] 22T = Altistart 22 with PowerPact Motor Circuit Protector 22U = Altistart 22 with PowerPact Thermal-Magnetic Circuit Breaker
02	4	Horsepower	A = 3 hp B = 5 hp C = 7.5 hp D = 10 hp E = 15 hp F = 20 hp G = 25 hp H = 30 hp J = 40 hp K = 50 hp L = 60 hp M = 75 hp N = 100 hp P = 125 hp Q = 150 hp R = 200 hp S = 250 hp T = 300 hp U = 350 hp W = 400 hp X = 500 hp
03	5	Enclosure Type	G = UL Type 1 General Purpose A = UL Type 12/12K Industrial Use, Dust-Tight/Drip-Tight[2] H = UL Type 3R Outdoor Use
04	6	Voltage	2 = 208 Vac 3 = 230 Vac 4 = 460 Vac 5 = 575 Vac
05	7	Power Circuit	B = Basic Shunt Trip S = Full-Featured Shunt Trip N = Non-reversing Isolation R = Reversing Isolation Y = Integral Full-Voltage Bypass
06	8–10	Control Options [3,4]	A06 = Start-Stop Pushbuttons B06 = Forward-Off-Reverse[5] C06 = Hand-Off-Auto (HOA) Selector Switch D06 = Stop-Run Selector Switch E06 = Hand-Auto Selector Switch / Start-Stop Pushbuttons
07	11–13	Pilot Device Options [3,4]	A07 = Run Light (Red), Off Light (Green) B07 = Push-to-Test Run Light (Red), Push-to-Test Off Light (Green) C07 = Run Light (Red), Off Light (Green), Tripped Light/Reset (Yellow)[6] D07 = PTT Run Light (Red), PTT Off Light (Green), Tripped Light/Reset (Yellow)[6]
08	14–16	Metering Options [3]	B08 = Elapsed Run Time Meter

Continued on next page

Table 2: Catalog Number Description *(continued)*

Field	Digit	Characteristic	Description
09	17–19	Miscellaneous Options [3]	A10 = Floor Mounting Kit[7] B10 = Additional 150 VA[1] C10 = Power-Up On Delay Relay[1,10] D10 = Emergency Stop Pushbutton[1] E10 = cUL Label[8] F10 = Auxiliary Run Mode Contacts G10 = Auxiliary FV Bypass Contacts[1,9] H10 = Auxiliary Auto Mode Contacts[10,11] J10 = Auxiliary Trip Indication Contacts L10 = ID Engraved Nameplate[1] M10 = 10 Spare Terminal Blocks[1] P10 = Permanent Wire Markers[1] R10 = MOV/Surge Arrestor[1] U10 = Omit Door-Mounted Keypad Display[12] X10 = 50 °C (122 °C) Operation Y10 = Seismic Qualified Z10 = Service Entrance Rating[8] 610 = High Interrupting Rating[13] 910 = American Recovery and Reinvestment Act (ARRA) Option

1 This option is not selectable with power circuit option B05.

2 Wall-mounted enclosures include knockouts for conduit connection. Refer to Figures 17–21 beginning on page 40 for knockout location and details.

3 Select only one option.

4 To omit, do not include a selection in the catalog number.

5 Control circuit B06 is required when reversing isolation power circuit (R05) is selected and is not available with other power circuit options.

6 This option is not valid with shunt trip power circuits (B05 or S05).

7 This option is available only for enclosure size D. Refer to Table 12 on page 35 for ratings.

8 Options E10 and Z10 cannot be ordered together.

9 The contacts are available only when power circuit option Y05 is selected.

10 The contacts are not available when power circuit option R05 is selected.

11 This option is valid only with the following control options: C06, D06, or E06.

12 If you select option U10, you must separately order the remote keypad (VW3G22101) and cable (VW3A1104R30) to commission the soft starter. Refer to the *ATS22 User Manual*, BBV51330, for serial communication programming and control capabilities.

13 Enclosed ATS22 controllers sizes E and G with circuit breaker disconnection (22U) are provided as standard with short circuit ratings of 65 kA @ 460 V and 25 kA @ 575 V. Selection of option 610 increases the rating to 100 kA @ 460 V or 50 kA @ 575 V. The option is not valid with controller styles 22T or 22F.

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Technical Characteristics

Table 3: Standard Duty Ratings, UL Type 1 and Type 12/12K

Enclosed 22 Catalog No. [1,2,3]	Input Voltage 60 Hz	Horsepower Rating	Full Load Current	Maximum Total Dissipated Power at Rated Load [4,5]	Altistart 22 Catalog No.
	Vac	hp	A	W	
22◆A●2✖	208	3	10.6	65.7	ATS22D17S6U
22◆B●2✖		5	16.7	71.8	ATS22D32S6U
22◆C●2✖		7.5	24.2	75.0	ATS22D32S6U
22◆D●2✖		10	30.8	81.8	ATS22D47S6U
22◆E●2✖		15	46.2	95.4	ATS22D62S6U
22◆F●2✖		20	59.4	106.7	ATS22D75S6U
22◆G●2✖		25	74.8	112.0	ATS22D88S6U
22◆H●2✖		30	88	149.0	ATS22C11S6U
22◆J●2✖		40	114	182.8	ATS22C14S6U
22◆K●2✖		50	143	221.3	ATS22C17S6U
22◆L●2✖		60	169	252.6	ATS22C21S6U
22◆M●2✖		75	211	307.1	ATS22C25S6U
22◆N●2✖		100	273	418.3	ATS22C32S6U
22◆P●2✖		125	343	533.0	ATS22C41S6U
22◆Q●2✖		150	395	563.0	ATS22C48S6U
22◆B●3✖	230	5	15.2	66.5	ATS22D17S6U
22◆C●3✖		7.5	22	74.2	ATS22D32S6U
22◆D●3✖		10	28	76.5	ATS22D32S6U
22◆E●3✖		15	42	94.0	ATS22D47S6U
22◆F●3✖		20	54	101.4	ATS22D62S6U
22◆G●3✖		25	68	112.8	ATS22D75S6U
22◆H●3✖		30	80	115.6	ATS22D88S6U
22◆J●3✖		40	104	163.7	ATS22C11S6U
22◆K●3✖		50	130	199.9	ATS22C14S6U
22◆L●3✖		60	154	232.9	ATS22C17S6U
22◆M●3✖		75	192	273.1	ATS22C21S6U
22◆N●3✖		100	248	354.4	ATS22C25S6U
22◆P●3✖		125	312	481.6	ATS22C32S6U
22◆Q●3✖		150	360	562.3	ATS22C41S6U
22◆R●3✖		200	480	691.3	ATS22C59S6U

Continued on next page

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Table 3: Standard Duty Ratings, UL Type 1 and Type 12/12K *(continued)*

Enclosed 22 Catalog No. [1,2,3]	Input Voltage 60 Hz Vac	Horsepower Rating hp	Full Load Current A	Maximum Total Dissipated Power at Rated Load [4,5] W	Altistart 22 Catalog No.
22◆D●4✖	460	10	14	81.2	ATS22D17S6U
22◆E●4✖		15	21	88.5	ATS22D32S6U
22◆F●4✖		20	27	91.6	ATS22D32S6U
22◆G●4✖		25	34	98.7	ATS22D47S6U
22◆H●4✖		30	40	107.2	ATS22D47S6U
22◆J●4✖		40	52	121.1	ATS22D62S6U
22◆K●4✖		50	65	132.0	ATS22D75S6U
22◆L●4✖		60	77	134.9	ATS22D88S6U
22◆M●4✖		75	96	176.8	ATS22C11S6U
22◆N●4✖		100	124	214.6	ATS22C14S6U
22◆P●4✖		125	156	256.1	ATS22C17S6U
22◆Q●4✖		150	180	263.6	ATS22C21S6U
22◆R●4✖		200	240	343.5	ATS22C25S6U
22◆S●4✖		250	302	464.5	ATS22C32S6U
22◆T●4✖		300	361	564.1	ATS22C41S6U
22◆U●4✖		350	414	589.6	ATS22C48S6U
22◆V●4✖		400	477	686.6	ATS22C59S6U
22◆E●5✖	575	15	17	82.0	ATS22D17S6U
22◆F●5✖		20	22	88.6	ATS22D32S6U
22◆G●5✖		25	27	90.7	ATS22D32S6U
22◆H●5✖		30	32	96.8	ATS22D47S6U
22◆J●5✖		40	41	106.7	ATS22D47S6U
22◆K●5✖		50	52	119.3	ATS22D62S6U
22◆L●5✖		60	62	127.4	ATS22D75S6U
22◆M●5✖		75	77	134.9	ATS22D88S6U
22◆N●5✖		100	99	179.4	ATS22C11S6U
22◆P●5✖		125	125	215.7	ATS22C14S6U
22◆Q●5✖		150	144	243.3	ATS22C17S6U
22◆R●5✖		200	192	273.1	ATS22C21S6U
22◆S●5✖		250	242	346.2	ATS22C25S6U
22◆T●5✖		300	289	443.2	ATS22C32S6U
22◆W●5✖		400	382	543.1	ATS22C48S6U
22◆X●5✖		500	472	678.8	ATS22C59S6U

1 ◆ may be F, T or U, describing the controller style. See Table 2 on page 11.

2 ● may be G or A, describing the enclosure type. See Table 2 on page 11.

3 ✖ may be B, S, N, R, or Y describing the power circuit configuration. See Table 2 on page 11.

4 Dissipated power does not include losses of the customer-supplied power fuses.

5 For btu/hr, multiply the values by 3.413.

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Table 4: Standard Duty Ratings, UL Type 3R and 50 °C (122 °F) Rated

Enclosed 22 Catalog No. [1,2,3]	Input Voltage 60 Hz Vac	Horsepower Rating hp	Full Load Current A	Maximum Total Dissipated Power at Rated Load [4,5] W	Altistart 22 Catalog No.
22◆A●2✖	208	3	10.6	50.4	ATS22D17S6U
22◆B●2✖		5	16.7	53.3	ATS22D32S6U
22◆C●2✖		7.5	24.2	60.1	ATS22D47S6U
22◆D●2✖		10	30.8	70.2	ATS22D47S6U
22◆E●2✖		15	46.2	74.0	ATS22D75S6U
22◆F●2✖		20	59.4	83.2	ATS22D88S6U
22◆G●2✖		25	74.8	118.5	ATS22C11S6U
22◆H●2✖		30	88	140.3	ATS22C14S6U
22◆J●2✖		40	114	164.1	ATS22C17S6U
22◆K●2✖		50	143	197.8	ATS22C21S6U
22◆L●2✖		60	169	236.3	ATS22C25S6U
22◆M●2✖		75	211	297.8	ATS22C32S6U
22◆N●2✖		100	273	376.1	ATS22C41S6U
22◆P●2✖		125	343	434.8	ATS22C48S6U
22◆B●3✖	230	5	15.2	55.1	ATS22D32S6U
22◆C●3✖		7.5	22	57.5	ATS22D32S6U
22◆D●3✖		10	28	68.8	ATS22D47S6U
22◆E●3✖		15	42	69.7	ATS22D62S6U
22◆F●3✖		20	54	85.3	ATS22D75S6U
22◆G●3✖		25	68	89.1	ATS22D88S6U
22◆H●3✖		30	80	127.4	ATS22C11S6U
22◆J●3✖		40	104	145.5	ATS22C14S6U
22◆K●3✖		50	130	181.2	ATS22C17S6U
22◆L●3✖		60	154	213.4	ATS22C21S6U
22◆M●3✖		75	192	250.7	ATS22C25S6U
22◆N●3✖		100	248	338.9	ATS22C32S6U
22◆P●3✖		125	312	438.1	ATS22C41S6U
22◆Q●3✖		150	360	506.6	ATS22C59S6U

Continued on next page

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Table 4: Standard Duty Ratings, UL Type 3R and 50 °C (122 °F) Rated *(continued)*

Enclosed 22 Catalog No. [1,2,3]	Input Voltage 60 Hz Vac	Horsepower Rating hp	Full Load Current A	Maximum Total Dissipated Power at Rated Load [4,5] W	Altistart 22 Catalog No.
22◆D●4✖	460	10	14	60.4	ATS22D32S6U
22◆E●4✖		15	21	63.5	ATS22D32S6U
22◆F●4✖		20	27	75.3	ATS22D47S6U
22◆G●4✖		25	34	83.3	ATS22D47S6U
22◆H●4✖		30	40	95.1	ATS22D62S6U
22◆J●4✖		40	52	96.6	ATS22D75S6U
22◆K●4✖		50	65	101.9	ATS22D88S6U
22◆L●4✖		60	77	139.9	ATS22C11S6U
22◆M●4✖		75	96	155.9	ATS22C14S6U
22◆N●4✖		100	124	170.4	ATS22C17S6U
22◆P●4✖		125	156	208.6	ATS22C21S6U
22◆Q●4✖		150	180	251.3	ATS22C25S6U
22◆R●4✖		200	240	322.8	ATS22C32S6U
22◆S●4✖		250	302	422.9	ATS22C41S6U
22◆T●4✖		300	361	471.4	ATS22C48S6U
22◆U●4✖		350	414	557.3	ATS22C59S6U
22◆E●5✖	575	15	17	68.3	ATS22D32S6U
22◆F●5✖		20	22	70.2	ATS22D32S6U
22◆G●5✖		25	27	77.7	ATS22D47S6U
22◆H●5✖		30	32	84.9	ATS22D47S6U
22◆J●5✖		40	41	89.4	ATS22D62S6U
22◆K●5✖		50	52	96.8	ATS22D75S6U
22◆L●5✖		60	62	104.5	ATS22D88S6U
22◆M●5✖		75	77	135.1	ATS22C11S6U
22◆N●5✖		100	99	155.2	ATS22C14S6U
22◆P●5✖		125	125	173.4	ATS22C17S6U
22◆Q●5✖		150	144	209.5	ATS22C21S6U
22◆R●5✖		200	192	240.9	ATS22C25S6U
22◆S●5✖		250	242	335.0	ATS22C32S6U
22◆T●5✖		300	289	447.7	ATS22C48S6U
22◆W●5✖		400	382	541.8	ATS22C59S6U

1 ◆ may be F, T, or U, describing the controller style. See Table 2 on page 11.

2 ● may be G, A, or H describing the enclosure type. See Table 2 on page 11.

3 ✖ may be B, S, N, R, or Y describing the power circuit configuration. See Table 2 on page 11.

4 Dissipated power does not include losses of the customer-supplied power fuses.

5 For btu/hr, multiply the values by 3.413.

Short-Circuit Ratings

Enclosed 22 controllers featuring PowerPact H, J, D, L, and P frame circuit breakers as the disconnect device have a short-circuit rating of 100 kA @ 208 V, 240 V, and 480 V and 50 kA @ 600 V (RMS symmetrical).[1]

Enclosed 22 controllers featuring PowerPact M frame circuit breakers as the disconnect device have a short-circuit rating of 65 kA @ 208 V, 240 V, and 480 V and 25 kA @ 600 V (RMS symmetrical). This circuit breaker comes standard when ordering thermal-magnetic type disconnect (22U) at the following horsepower and voltage ranges:

- For Type 1/12 rating (40 °C / 104 °F): 150 hp @ 208 V; 200 hp @ 230 V; 350–400 hp @ 460 V; 400–500 hp @ 575 V.
- For Type 3R rating or 50 °C (122 °F) ambient rated Type 1/12: 125 hp @ 208 V; 150 hp @ 230 V; 300–350 hp @ 460 V; 350–400 hp @ 575 V.

Option 610 (22U only) provides a PowerPact P circuit breaker for thermal-magnetic disconnect to increase the rating as described above.

All enclosed 22 controllers with a fusible switch as the disconnect device have a short-circuit rating of 100,000 A (RMS symmetrical) when equipped with UL Class J time-delay fuses. To include fuses with the equipment when shipped, contact the factory.

⚠ WARNING

HEAT OR FIRE DAMAGE

- Protective devices must be properly coordinated.
- Do not connect the controller to a power feeder whose short-circuit capacity exceeds the short-circuit rating listed on the controller nameplate.

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

[1] Short-circuit rating for power circuits N05, R05, and Y05 with an IEC contactor is 35,000 A @ 600 V for the following horsepower ratings:
350 hp: Type 1 and 12
300 hp: Type 3R or Mod X10

ENGLISH

Technical Specifications

Table 5: Electrical Specifications

Supply Voltage	208 Vac +10%/-15%; 230 Vac +10%/-15%; 460 Vac +10%/-15%; 575 Vac +10%/-15%
Control Voltage	115 Vac +10%/-15% (control power transformer included)
Frequency	50/60 Hz +/- 5%
Rated Current	Full load current (FLA) per NFPA 70 / NEC Table 430-250
Motor Power	Type 1 and Type 12/12K: 3–150 hp @ 208 V 5–200 hp @ 230 V 10–400 hp @ 460 V 15–500 hp @ 575 V
	Type 3R or 50 °C (122 °F) Rated: 3–125 hp @ 208 V 5–150 hp @ 230 V 10–350 hp @ 460 V 15–400 hp @ 575 V
Motor Voltage	208, 230, 460, 575 V
Starting Duty (Standard Duty)	S1: Starting at 350% of In[1] for 40 s from a cold state
	S3: Starting at 300% of In[1] for 20 s, or 200% of In for 40 s, with a load factor of 95% and 3 starts per hour, or an equivalent thermal cycling

[1] In is the controller full load current listed on the nameplate.

Table 6: Environmental Specifications

Storage Temperature	-13 to +158 ºF (-25 to +70 ºC)
Operating Temperature	UL Type 1 and Type 12/12K: +14 to 104 ºF (-10 to 40 ºC)
	UL Type 3R and Mod X10: +14 to 122 ºF (-10 to 50 ºC)
Humidity	95% with no condensation or dripping water, conforming to IEC 60068-2-3
Altitude	1000 m (3280 ft.), derated by 2.2% for each additional 100 m (328 ft.) up to 2000 m (6560 ft.) maximum
Enclosure	UL Type 1: General Purpose
	UL Type 12/12K: Industrial Use, dust-tight/drip-tight
	UL Type 3R: Outdoor Use
Pollution Degree	Pollution degree 2 (UL Type 1 and Type 3R) and pollution degree 3 (UL Type 12/12K) per NEMA ICS-1 and IEC 60664-1
Resistance to Vibration (Soft Starter Only)	According to IEC 60068-2-6: 1.5 mm peak to peak from 3 to 13 Hz 1 gn from 13 to 150 Hz
Resistance to Shocks	According to IEC 60068-2
Codes and Standards	UL Listed per UL 508 under category NKJH
	Conforms to applicable NEMA ICS, NFPA, and IEC standards
	Manufactured under ISO 9001 standards
	Factory modification E10 provides Canadian cUL certification per C22.2 No.14.
	Seismic Certification: • 2003 IBC, NFPA 5000, and ASCE7 • ICC ES AC 156[1]

[1] Acceptance criteria test protocol with an importance factor of 1.5.

Table 7: Operation

Methods of Starting:	
Torque Ramp	Adjustable from 1 to 60 s by keypad
Current Limitation	Adjustable from 150% to 350% of controller rated current (In) as indicated on nameplate
Booster Start-up Pulse	Pulse start at 80% of full voltage for 0.1 to 1 s (**bSt**) for breaking free high-friction loads or starting 2-pole motors
Methods of Stopping:	
Freewheel	Coast to stop on stop command
Torque Deceleration Ramp	Adjustable from 1 to 60 s by keypad
Status and Diagnostics:	Digital display of motor and controller status, including: Ready/Run Motor Current

Table 8: Protection

Motor:	
Thermal Overload	Solid-state thermal overload relay, integral to the ATS22 soft starter. Overload class is selectable as 10, 20, or 30 by keypad. Range is 40% to 100% of ATS22 soft starter rated current.[1]
Shunt-Trip Disconnect	Removes all power from the controller cabinet when the ATS22 soft starter detects a fault condition.
Controller:	
Short-Circuit Current Ratings	• PowerPact H, J, D, L, or P Circuit Breaker: 100 kA @ 480 V and 50 kA @ 600 V[2] • PowerPact M Circuit Breaker: 65 kA @ 480 V and 25 kA @ 600 V • Fusible Disconnect: 100 kA @ 600 V (requires UL Class J time-delay fuses, not included).
Overcurrent Protection	An overcurrent protection device (OCPD) provides Type 1 coordination to the short-circuit current ratings.
Overtemperature Protection	Protection if heatsink temperature exceeds 85 ºC (185 ºF)
Shorting Contactor	A shorting contactor is integral to the ATS22 soft starter and reduces temperature rise in the enclosure by eliminating the watts loss of the SCRs.
Unbalanced Threshold Current	Programmable, 10% to 100% of soft starter rated current (In)
Ground Fault	Programmable, 10% to 100% of soft starter rated current (In)
Undervoltage/Overvoltage	Programmable, undervoltage trip at 50% to 90% of line voltage (**ULn**), and overvoltage trip at 110% to 125% of line voltage

1 Refer to the *ATS22 User Manual*, BBV51330, for ATS22 soft starter maximum rated current. It may differ from the ratings of the Enclosed ATS22 controller.

2 Short-circuit rating for power circuits N05, R05, and Y05 with an IEC contactor is 35,000 A @ 600 V for the following horsepower ratings:
350 hp: Type 1 and 12
300 hp: Type 3R or Mod X10

Section 2—Receiving, Handling, and Storing

⚠ WARNING

DAMAGED ENCLOSED 22 CONTROLLER

Do not operate or install any Enclosed 22 controller that appears damaged.

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

Receiving and Preliminary Inspection

Before shipment from the factory, each Enclosed 22 controller is inspected visually, electrically, and mechanically by professional quality control analysts. Certification of quality control testing is available upon request.

Thoroughly inspect the Enclosed 22 controller before storing or installing it. Upon receipt:

1. Remove the Enclosed 22 controller from its packaging and visually inspect the exterior for shipping damage.
2. Ensure that the catalog number on the Enclosed 22 controller nameplate (see Figure 1 on page 10) matches the catalog number on the packing slip and corresponding purchase order.
3. If you find any shipping damage, notify the carrier and your Schneider Electric sales representative.

Storing the Equipment

NOTICE

STACKING DURING STORAGE OR SHIPPING

- Do not stack Enclosed 22 controllers on top of each other unless they are packed in a wooden crate. Do not stack controllers packed in a wooded crate more than three high.
- Do not place any material on top of the Enclosed 22 controller.
- Store or ship the Enclosed 22 controller in the original packaging.

Failure to follow these instructions can result in equipment damage.

Storing the Enclosed 22 controller in its original packaging until it reaches its final installation site helps protect the equipment and helps prevent damage to its exterior.

- If you plan to store the Enclosed 22 controller after receipt, replace it in its original packaging and store it in a clean, dry area where the ambient temperature is between -13 to +158 °F (-25 to +70 °C).
- If the controller must be shipped to another location, use the original shipping material and carton to help protect it.

ENGLISH

Unpacking the Controller

Wall-Mounted Units

⚠ WARNING

HEAVY EQUIPMENT

- Lifting the Enclosed 22 controller requires the use of a lifting apparatus or two people.
- Always use safe lifting practices.

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

- Handle the Enclosed 22 controller carefully to avoid damage to the internal components, frame, and exterior.
- Lift the Enclosed 22 controller out of its shipping carton with two people or a suitable lifting apparatus, and place it on a flat surface.

Floor-Mounted Units

Controllers shipped standing up have a high center of gravity, which may cause them to tilt and fall. Fork trucks provide a convenient method of moving floor-mounted equipment.

⚠ WARNING

UNSTABLE LOAD

- Use extreme care when moving heavy equipment.
- Verify that the moving equipment is rated to handle the weight.
- When removing equipment from a shipping pallet, carefully balance and secure it using a safety strap.

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

Lifting the Controller

⚠ WARNING

HANDLING AND LIFTING HAZARD

- Keep the area below any equipment being lifted clear of all personnel and property.
- Lifting the Enclosed 22 controller requires the use of a lifting apparatus. Use the lifting method shown in Figures 2 and 3 on page 24.
- Before lifting the controller:
  - — Inspect the lifting plates, holes, slots, and eyebolts for any damage.
  - — Attach a spreader bar.
  - — Keep the lifting force vertical.
  - — Limit the sling angle to less than 45°.

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

When lifting the controllers:

- Always work with another person. The weight, size, and shape of the controller is such that two people are required to handle it.
- Use cut-resistant gloves.

Wall-Mounted Controllers

When lifting wall-mounted controllers:

- Attach a spreader bar to the two top lifting holes on the controller top plate and hoist the controller with chains or straps. See Figure 2 on page 24 for the proper hoisting method. See Figure 4 on page 24 for the location of the lifting holes.
- Raise the controller from a horizontal position (the back of the controller resting on the pallet) to the vertical, upright position.

NOTE: The bottom of all wall-mounted controllers has a mounting flange which prevents the controller from standing in a vertical position. If the controller is rested on the mounting flange, it may tip over.

Floor-Mounted Controllers

When lifting floor-mounted controllers:

- Handle the controller in the upright position only.
- Select rigging lengths to compensate for any unequal weight distribution.
- Do not exceed the 45° maximum angle between the vertical lifting cables (see Figure 3 on page 24).
- Use only slings with safety hooks or shackles. Do not pass cables through the holes in the lifting angle.

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Figure 2: Proper Use of a Spreader Bar to Lift Wall-Mounted Controllers

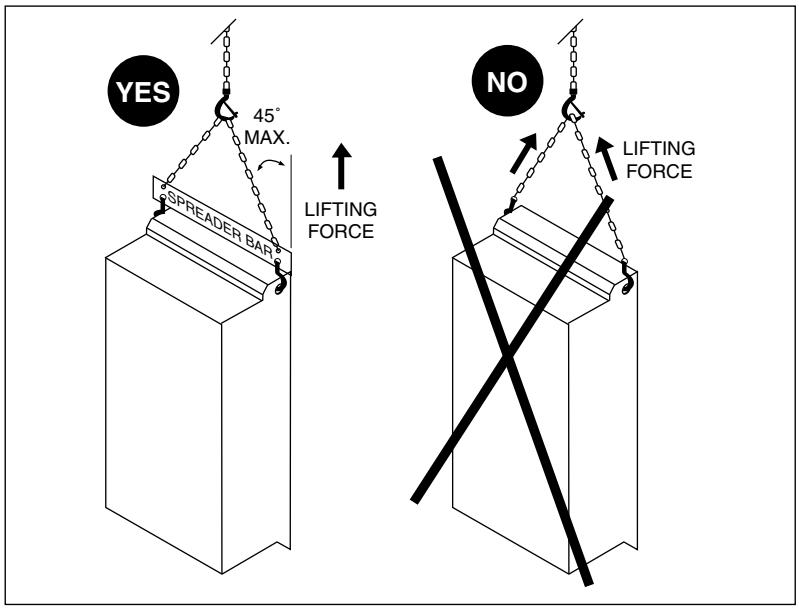


Figure 3: Proper Use of a Sling to Lift Floor-Mounted Controllers

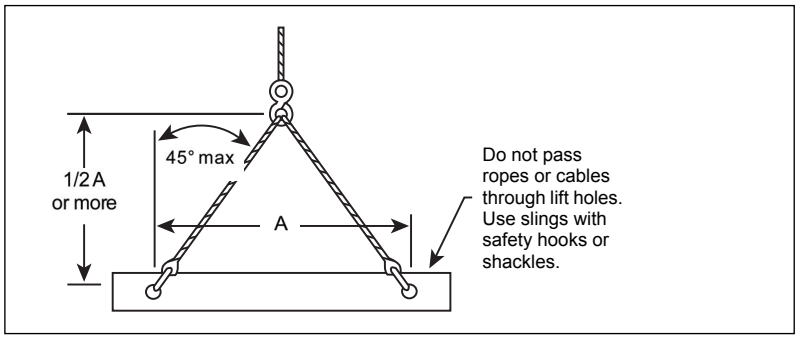
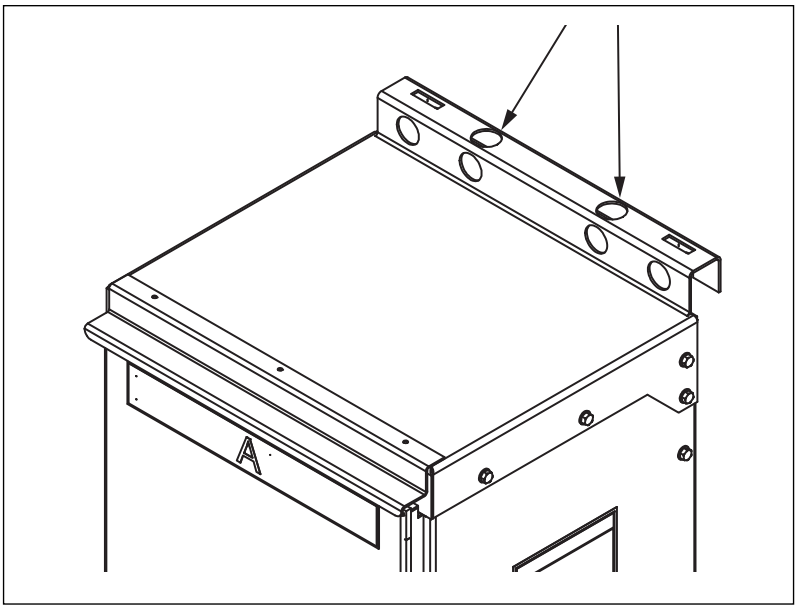


Figure 4: Lifting Holes on Enclosed 22 Controllers

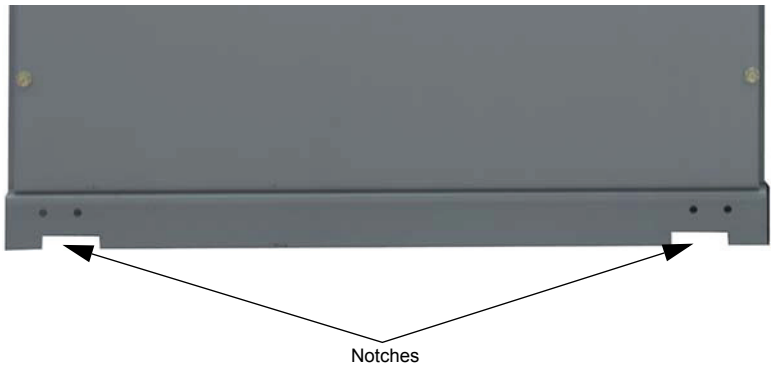


Positioning the Controller

Using the notches in the base channels, carefully move the controller into position with a crowbar.

NOTE: Use extreme care when moving floor-mounted controllers, as they may be unstable. See “Unpacking the Controller” on page 22 before moving any floor-mounted equipment.

Figure 5: Base Channel Notches



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Section 3—Installation and Start-Up

Physical Installation

⚠ DANGER

HAZARD OF ELECTRIC SHOCK, EXPLOSION, OR ARC FLASH

Read and understand the precautions in “Before You Begin” starting on page 8 before performing the procedures in this section.

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

Mounting Requirements

Size A, B, C, and D Enclosures

Observe these requirements when mounting the Enclosed 22 controller:

- Install the controller in a pollution degree 2 (UL Type 1 or Type 3R) or pollution degree 3 (UL Type 12/12K) environment, as defined in NEMA ICS1 and IEC 60664-1.
- Mount the wall-mounted controller on a flat, rigid, noncombustible vertical surface, capable of supporting the controller weight.
- Mount the floor-mounted controller on a flat, solid surface capable of supporting the controller weight.
- If drilling for conduit entry, take care to prevent metal chips from falling on parts and electronic printed wiring boards.
- When cleaning the interior and exterior of the controller, use a vacuum. Do not use compressed air, as it may blow contaminants into other parts of the controller.
- Check the enclosure for damage that might reduce electrical clearances.
- Do not mount the controller in direct sunlight or on hot surfaces.
- When attaching wall-mounted controllers to their mounting surfaces, use fasteners rated for the weight of the controller, the expected shock and vibration of the installation, and the expected environment. See Tables 11 and 12 beginning on page 34 for controller weights.
- Secure all four corners of the controller.
- Use water-tight rated conduit hubs to make connections between the conduit and the UL Type 3R enclosures. Conduit connections through the top of the enclosure are not recommended.
- Provide sufficient cooling for the expected heat load. See Tables 3 and 4 on pages 13 and 15 for dissipated power at rated load.
- Refer to page 30 for EZM mounting instructions.

⚠ 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.

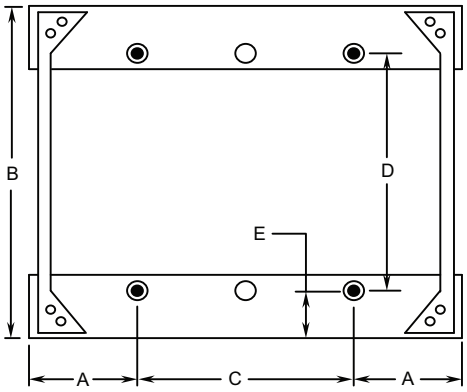
Failure to follow these instructions can result in death, serious injury, or equipment damage.

Size E, F, and G Enclosures

Fasten the controller to the floor using 1/2 in. or 3/4 in. grade 5 or higher bolts and flat washers (customer furnished). The base channel mounting holes [0.88 in. (22 mm) diameter] provide clearance for expansion anchors for 1/2 in. bolts.

NOTE: Although the enclosure is free-standing, fastening it to the floor prevents movement and reduces the chance of conduit connection damage.

Figure 6: Type 1 and Type 12 Base Channel Mounting Dimensions



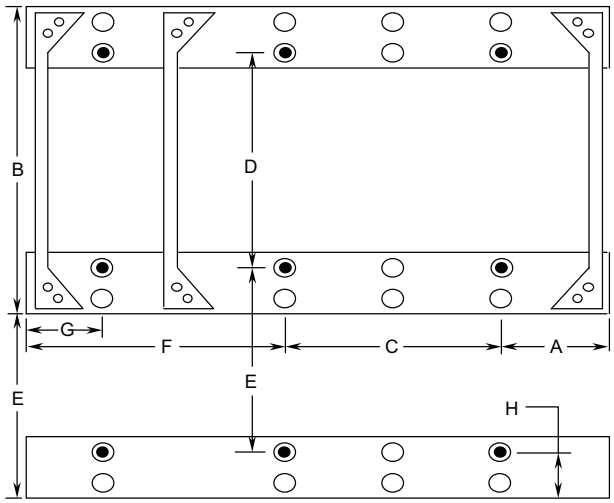
● = Seismic Tie-Down Locations

Table 9: Type 1 and Type 12 Dimensions (See Figure 6 for Letters)

Letter	Section Width in. (mm)	Dimension in. (mm)
A	N/A	5.00 (127)
B	N/A	20.00 (508)
C	20.00 (508)	10.00 (254)
	25.00 (635)	15.00 (381)
	30.00 (762)	20.00 (508)
D	N/A	14.98 (380)
E	N/A	2.50 (64)

N/A = Not applicable

Figure 7: Type 3R Section Dimensions



● = Seismic Tie-Down Locations

Table 10: Type 3R Dimensions (See Figure 7 for Letters)

Letter	Section Width in. (mm)	Dimension in. (mm)
A	N/A	5.00 (127)
B	N/A	20.00 (508)
C	20.00 (508)	10.00 (254)
	25.00 (635)	15.00 (381)
	30.00 (762)	20.00 (508)
D	N/A	14.98 (380)
E	N/A	11.60 (295)
F	N/A	12.50 (318)
G	N/A	5.00 (127)
H	N/A	3.60 (91)

N/A = Not applicable

Spacing Requirements

Observe the following spacing requirements when mounting Enclosed 22 controllers:

- Mount each controller so that the door can be opened at least 90°.
- Wall-mounted equipment:
  - — Allow a minimum of 2.0 in. (50 mm) of clear space at the top and bottom of each controller.
  - — Allow a minimum of 1.0 in. (25 mm) of clear space to the left and right of each controller.
  - — Provide a minimum of 3 ft (914 mm) of free space in front of the controller.
- Floor-mounted equipment:
  - — Provide a minimum of 3 ft (914 mm) of free space in front of the controller.
  - — Provide a minimum of 0.5 in. (13 mm) of space between the back of the controller and the wall. For damp locations, allow a minimum of 6 in. (152 mm).

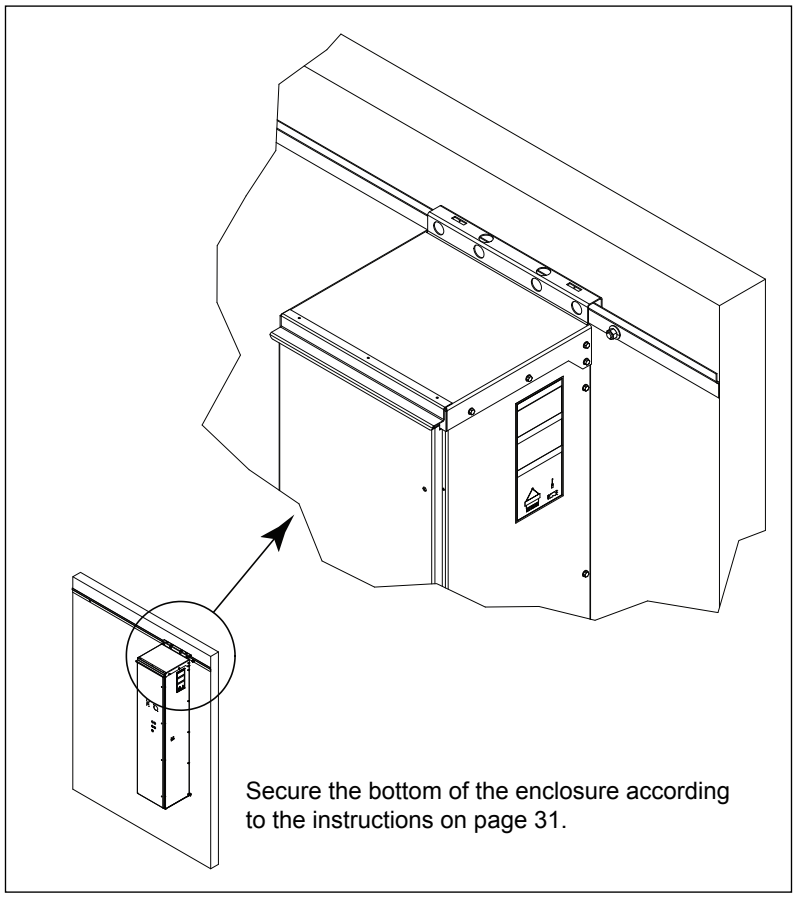
ENGLISH

EZM Mounting Channel

An EZM mounting channel can be used to mount a single wall-mounted enclosure or to assist in the alignment of multiple wall-mounted enclosures.

NOTE: EZM mounting cannot meet seismic requirements. Normal mounting methods must be used to meet seismic requirements.

Figure 8: EZM Mounting Channel



Observe the following requirements for EZM mounting:

- Securely fasten the EZM mounting channel to a wall that is rated to support the total weight of the controllers.
- Add additional wall anchor points to the EZM mounting channel as follows, with consideration given to wall construction:

  Shunt Trip (B05)

  — Refer to Table 11 on page 34 for applicable enclosure type, horsepower, and voltage range.

  — **Size A enclosures**: For a 72 in. (1829 mm) long rail with a maximum of eight size A controllers, do not locate the rail anchor points more than 9 in. (229 mm) from each end, and do not allow more than 25 in. (635 mm) between each additional anchor point.

  — **Size B enclosures:** For a 72 in. (1829 mm) long rail with a maximum of six size B controllers, do not locate rail anchor points more than 4 in. (102 mm) from each end, and do not allow more than 15 in. (381 mm) between each additional anchor point.

  — **Size D enclosures**: For a 72 in. (1829 mm) long rail with a maximum of five size D controllers, do not locate rail anchor points more than

4 in. (102 mm) from each end, and do not allow more than 15 in. (381 mm) between each additional anchor point.

Power Options (S05, N05, R05, or Y05)

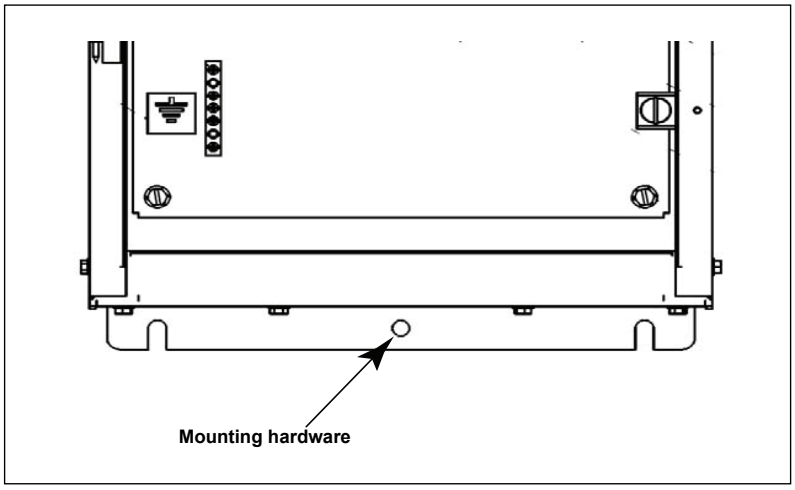
— Refer to Table 12 on page 35 for applicable enclosure type, horsepower, and voltage range.

— **Size B enclosures**: For a 72 in. (1829 mm) long rail with a maximum of six size B controllers, do not locate rail anchor points more than 9 in. (229 mm) from each end, and do not allow more than 25 in. (635 mm) between each additional anchor point.

— **Size C and D enclosures**: For a 72 in. (1829 mm) long rail with a maximum of five size C or D controllers, do not locate rail anchor points more than 4 in. (102 mm) from each end, and do not allow more than 15 in. (381 mm) between each additional anchor point.

- Use grade 5 5/16 in. or better hardware to secure the rail to the wall. Use additional anchor hardware if needed for the material used in the wall construction.
- Add additional 5/16 in. hardware to the bottom flange of the enclosure. See Figure 9.

Figure 9: EZM Mounting Hardware



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Seismic Qualification Mounting Criteria

Seismic qualification (MOD S07) harmonizes the following standards in compliance with ICC ES AC156 acceptance criteria test protocol with an importance factor of 1.5:

- 2003 IBC (International Building Code)
- NFPA 5000 (Building Code–National Fire Protection Agency)
- 2001 CBC (Canadian Building Code)
- 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 anchorage and mounting guidelines on the seismic qualification labels attached to the controller (see Figures 10–12 on pages 33–34).
- Use SAE grade 5 bolts and washers.
- Torque all bolts to applicable SAE standards for grade 5 hardware, considering all plating and lubricant factors.

⚠ WARNING

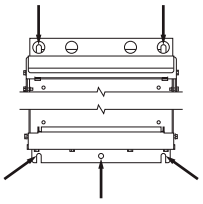
TOPPLING AND CRUSHING HAZARD

- Follow all recommended practices when anchoring and securing seismically rated equipment.
- Replace all covers and secure doors before placing equipment into service.

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

ENGLISH

Figure 10: Seismic Anchorage Requirements for Wall-Mounted Enclosures, Label 80463-017-01



Seismic Anchorage Location
Ubicación de los sujetadores antisísmicos
Emplacement d'ancrage anti-séisme

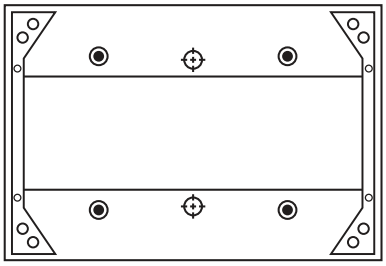
Seismic Anchorage Requirements
Requisitos de los sujetadores antisísmicos
Exigences d'ancrage anti-séisme

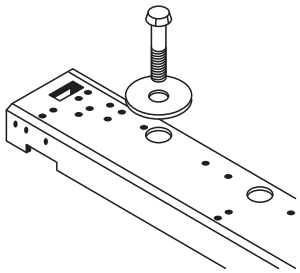
80463-017-01

ENGLISH	SPANISH	FRENCH
• To maintain Seismic Qualification each individual enclosure must be anchored to wall at all five mounting locations shown above. • Refer to the current International Building Code, ASCE/SEI 7, or the National Building Code of Canada for the location-specific values of the 0.2 second spectral value of acceleration (Ss for the U.S. or Sa(0.2) for Canada). • Use 3/8 in. Grade 5 bolts and 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 for seismic installation instructions.	• Para mantener la calificación sísmica, cada gabinete individual deberá ser sujetado a la pared en las cinco ubicaciones de montaje mostradas en la figura de arriba. • Consulte el código de construcción internacional actual, ASCE/SEI 7, o bien, el código de construcción nacional de Canadá para obtener los valores de la ubicación especifica para la aceleración espectral de 0,2 segundo (Ss para los EUA o Sa(0,2) para Canadá). • Utilice tornillos de 10 mm (3/8 pulg) y rondanas. • Para obtener la máxima resistencia de los herrajes de sujeción, apriételos en los valores especificados por el fabricante. • Consulte el boletín para obtener las instrucciones de instalación antisísmica.	• Pour maintenir la qualification sismique, chaque armoire individuelle doit être ancrée au mur aux cinq emplacements de fixation indiqués ci-dessus. • Se reporter au code de construction international (International Building Code), ASCE/SEI 7 ou au Code national du bâtiment du Canada en vigueur pour la valeur d'accélération spectrale de réponse à 0,2 seconde (Ss aux É-U. ou Sa(0,2) au Canada) applicable à votre site. • Utiliser des boulons grade 5 de 3/8 po et des rondelles appropriées. • Pour développer la résistance totale des ancres, serrer les boulons au couple spécifié par leur fabricant. • Se reporter aux directives d'utilisation pour obtenir les directives d'installation anti-séisme.

Figure 11: Seismic Anchorage Requirements for Floor-Mounted Enclosures, Label 80463-018-01

◉ Seismic Anchorage Location
Ubicación de los sujetadores antisísmicos
Emplacements d'ancrage anti-séisme





Seismic Anchorage Requirements

- To maintain Seismic Qualification each individual section must be anchored at the floor locations shown above.
- For seismic hazard areas with an Ss acceleration value in excess of 2.67g (New Madrid Seismic Hazard Area) each individual section must be laterally braced at the top. Refer to the current International Building Code, ASCE/SEI 7, or the National Building Code of Canada for the location-specific values of the 0.2 second spectral value of acceleration (Ss for the U.S. or Sa(0.2) for Canada).
- Use ½" or ¾" SAE Grade 5 bolts (supplied by others) and the appropriate Belleville Spring washers (supplied with the equipment). In order to develop full strength of the anchor, torque bolts to the value specified by the anchor manufacturer.
- Refer to instruction manual for installation instructions.

Requisitos de los sujetadores antisísmicos

- Para mantener la calificación sísmica, cada sección individuak debe ser sujetada al piso en las ubicaciones que muestra la figura anterior.
- En zonas de riesgo sísmico con un valor de aceleración Ss mayor que 2,67g (zona de riesgo sísmico de Nuevo Madrid), cada sección individual debe ser reforzada por los lados en la parte superior. Consulte el código de construcción internacional actual, ASCE/SEI 7, o bien, el código de construcción nacional de Canadá para obtener los valores de la ubicación específica para la aceleración espectral de 0,2 segundo (Ss para los EUA o Sa(0,2) para Canadá).
- Emplee tornillos de 12 mm (0,5 pulg) o 19 mm (0,75 pulg) SAE grado 5 (provistos por terceros) y roldanas de resorte Belleville apropiadas incluidas con el equipo. Para obtener la máxima resistencia de los herrajes de sujeción, apriételos en los valores especificados por el fabricante.
- Consulte el boletín para obtener las instrucciones de instalación.

Exigences d'ancrage anti-séisme

- Pour maintenir laqualification anti-séisme, chaque section doit être ancrée aux emplacements du sol indiqués ci-dessus.
- Une valeur d'accélération Ss supérieure à 2,67 g (zone sismique de New Madrid), chaque section individuelle doit être ancrée latéralement au haut. Se reporter au code de construction international (International Building Code), ASCE/SEI 7 ou au Code national du bâtiment du Canada en vigueur pour la valeur d'accélération spectrale de réponse à 0,2 seconde (Ss aux É-U. ou Sa(0,2) au Canada), applicable à votre site.
- Utiliser des boulons SAE grade 5 de 12 mm (½ po) ou 19 mm (3/4 po) (fournis par des tiers) et les rondelles de sûreté Belleville appropriées fournies avec l'appareil. Pour exploiter la résistance totale des ancres, serrer les boulons au couple spécifié par leur fabricant.
- Se reporter aux directives d'utilisation pour obtenir les directives d'installation

80463-018-01 REV -

ENGLISH

Figure 12: Lateral Bracing Requirements for Floor-Mounted Enclosures, Label 80463-019-01

◉ Seismic Anchorage Location
Ubicación de los sujetadores antisísmicos
Emplacements d'ancrage anti-séisme

Seismic Anchorage Requirements

- For seismic hazard areas with an Ss acceleration value in excess of 2.67g (New Madrid Seismic Hazard Area) each individual section must be laterally braced at the top and connected to the building load bearing structural system. Refer to the current International Building Code, ASCE/SEI 7, or the National Building Code of Canada for the location-specific values of the 0.2 second spectral value of acceleration (Ss for the U.S. or Sa(0.2) for Canada).
- Remove lifting bracket, after the section enclosure has been installed, and attach lateral brace (supplied by others), re-using bolt and lock washer or user supplied hardware.
- Each section must also be anchored at the base (as shown on the instruction label located on the inside of the bottom located horizontal wire-way cover plate).
- Refer to instruction manual for installation instructions.

Requisitos de los sujetadores antisísmicos

- En zonas de riesgo sísmico con un valor de aceleración Ss mayor que 2,67g (zona de riesgo sísmico de Nuevo Madrid), cada sección individual debe ser reforzada por los lados en la parte superior y conectada al sistema estructural de soporte de carga del edificio. Consulte el código de construcción internacional actual, ASCE/SEI 7, o bien, el código de construcción nacional de Canadá para obtener los valores de la ubicación específica para la aceleración espectral de 0,2 segundo (Ss para los EUA o Sa(0,2) para Canadá).
- Retire el soporte de levantamiento después de haber instalado el gabinete de la sección y conecte el soporte lateral (provisto por terceros); vuelva a usar el tornillo y la roldana de sujeción, o bien, los herrajes provistos por el usuario.
- Cada sección debe también ser sujetada a la base como se ilustra en la etiqueta de instrucciones, situada en el interior, en la placa protectora de la canalización de cables horizontal inferior.
- Consulte el boletín para obtener las instrucciones de instalación.

Exigences d'ancrage anti-séisme

- Pour les régions avec risque de séisme ayant une valeur d'accélération Ss supérieure à 2,67 g (zone sismique de New Madrid), chaque section individuelle doit être ancrée latéralement au haut et raccordée au système structural portant la charge de l'immeuble. Se reporter au code de construction international (International Building Code), ASCE/SEI 7 ou au Code national du bâtiment du Canada en vigueur pour la valeur d'accélération spectrale de réponse à 0,2 seconde (Ss aux É-U. ou Sa(0,2) au Canada), applicable à votre site.
- Enlever le support de levage après avoir installé l'armoire de la section et attacher l'ancre latérale (fournie par des tiers) réutilisant le boulon et la rondelle de sûreté ou à l'aide de la quincaillerie fournie par l'utilisateur.
- Chaque section doit être également ancrée à la base (comme indiqué sur l'étiquette de directives placée à l'intérieur de la plaque de recouvrement de la goulotte guide-fils verticale inférieure).
- Se reporter aux directives d'utilisation pour obtenir les directives d'installation

80463-019-01 REV -

Weights

Table 11: Enclosed 22 Controller Ratings and Weights (B05)

Controller Rating			Weight	Enclosure Size Reference
40 °C (104 °F) hp	UL Type 3R or 50 °C (122 °F) hp	V	lb (kg)	
3–10	3–10	208	63 (28)	A
5–15	5–10	230		
10–30	10–25	460		
15–40	15–30	575		
15–25	10–20	208	68 (30)	
20–30	15–25	230		
40–60	30–50	460		
50–75	40–60	575		
30–50	25–40	208	98 (44)	B
40–60	30–50	230		
75–125	60–100	460		
100–150	75–125	575		

Table 11: Enclosed 22 Controller Ratings and Weights (B05)

Controller Rating			Weight	Enclosure Size Reference
40 °C (104 °F) hp	UL Type 3R or 50 °C (122 °F) hp	V	lb (kg)	
60–125	50–100	208	200 (91)	D
75–150	60–125	230		
150–300	125–250	460		
200–300	150–300	575		
150	125	208	492 (223)	E
200	150	230		
350–400	300–350	460		
400–500	350–400	575		

Table 12: Enclosed 22 Controller Ratings and Weights[1] (S05, N05, R05, Y05)

Controller Rating			Weight	Enclosure Size Reference
40 °C (104 °F) hp	UL Type 3R or 50 °C (122 °F) hp	V	lb (kg)	
3–10	3–10	208	125 (57)	B
5–15	5–10	230		
10–30	10–25	460		
15–40	15–30	575		
15–25	15–20	208	160 (73)	C
20–30	15–25	230		
40–60	30–50	460		
50–75	40–60	575		
30–50	25–40	208	205 (93)	D
40–60	30–50	230		
75–125	60–100	460		
100–150	75–125	575		
60–125	50–100	208	830 (376)	F
75–150	60–125	230		
150–300	125–250	460		
200–300	150–300	575		
150	125	208	976 (443)	G
200	150	230		
350–400	300–350	460		
400–500	350–400	575		

[1] The weight is supplied for power circuit Y05 (integral bypass) and may differ for different power options and miscellaneous options selected.

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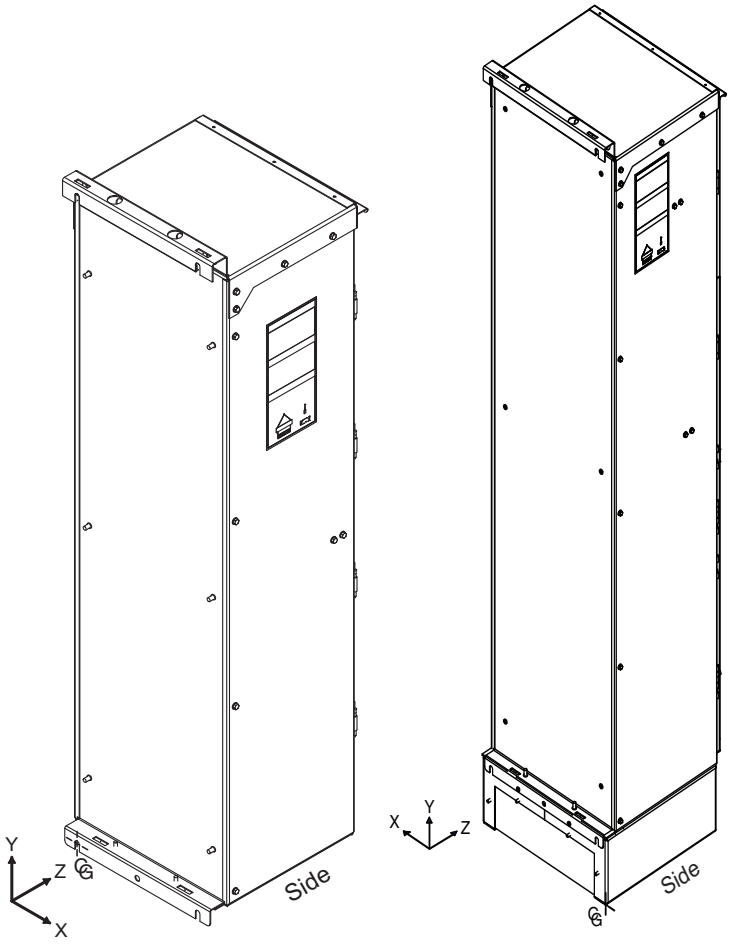
Center of Gravity

Center of gravity information is provided for reference in mounting and for consideration in structural analysis. The information is provided with reference to the lower left-hand (wall-mounted) or right-hand (floor-mounted) corner of the controllers. See Figure 13.

Figure 13: Center of Gravity



Wall-Mounted Floor-Mounted

Table 13: Center of Gravity (B05)

Controller Rating			X in. (mm)	Y in. (mm)	Z in. (mm)	Enclosure Size Reference
40 °C (104 °F) hp	UL Type 3R or 50 °C (122 °F) hp	V				
3–25	15–20	208	4.6 (116.8)	15.4 (391.2)	6.7 (170.2)	A
5–30	15–25	230				
10–60	30–50	460				
15–75	40–60	575				
30–50	25–40	208	4.9 (124.5)	26.6 (675.6).	7.8 (177.8)	B
40–60	30–50	230				
75–125	60–100	460				
100–150	75–125	575				
60–125	50–100	208	5.9 (149.9)	35.0 (889.0)	8.1 (205.7)	D
75–150	60–125	230				
150–300	125–250	460				
200–300	150–300	575				
150	125	208	10.8 (274.3)	54.8 (1391.9)	9.8 (228.6)	E
200	150	230				
350–400	300–350	460				
400–500	350–400	575				

Table 14: Center of Gravity[1] (S05, N05, R05, Y05)

Controller Rating			X in. (mm)	Y in. (mm)	Z in. (mm)	Enclosure Size Reference
40 °C (104 °F) hp	UL Type 3R or 50 °C (122 °F) hp	V				
3–10	3–10	208	5.6 (142.2)	24.6 (624.8)	7.6 (193.0)	B
5–15	5–10	230				
10–30	10–25	460				
15–40	15–30	575				
15–25	15–20	208	5.8 (147.3)	26.7 (678.2)	7.2 (182.9)	C
20–30	15–25	230				
40–60	30–50	460				
50–75	40–60	575				
30–50	25–40	208	6.5 (165.1)	33.3 (845.8)	8.0 (203.2)	D
40–60	30–50	230				
75–125	60–100	460				
100–150	75–125	575				
60–125	50–100	208	13.4 (340.4)	53.8 (1366.5)	8.9 (226.1)	F
75–150	60–125	230				
150–300	125–250	460				
200–300	150–300	575				
150	125	208	15.9 (403.9)	52.7 (1338.6)	10.2 (259.1)	G
200	150	230				
350–400	300–350	460				
400–500	350–400	575				

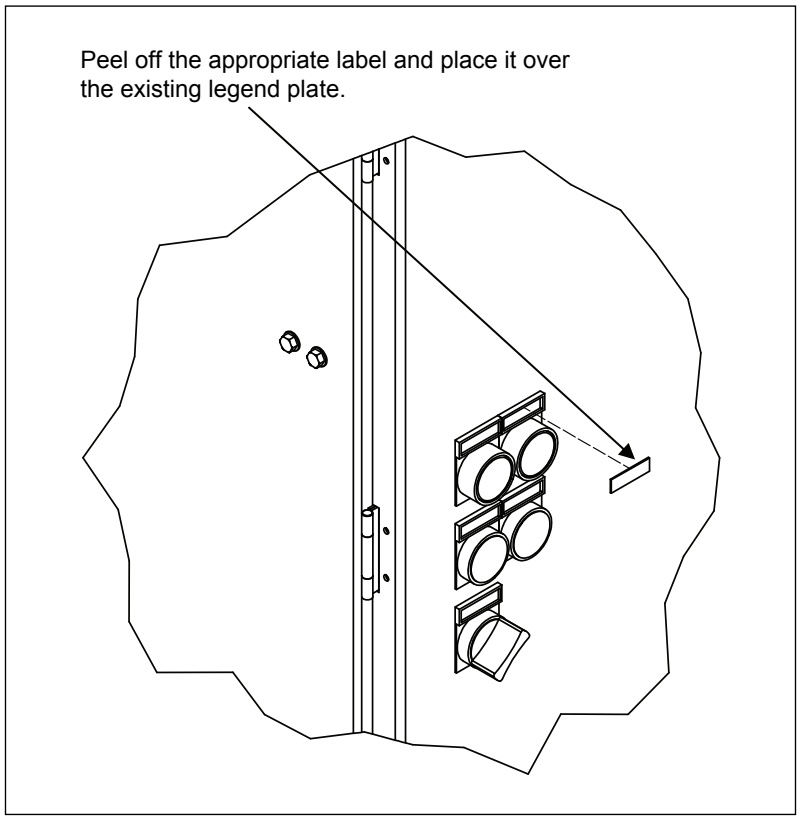
[1] The center of gravity measurements are provided for power circuit Y05 (integral bypass) and may differ for different power options and miscellaneous options selected.

Trilingual Legend Plate Kit

A trilingual legend plate kit is included in the Enclosed 22 instruction package. The kit is for applications that require operator and light legend plates displayed in Spanish or French.

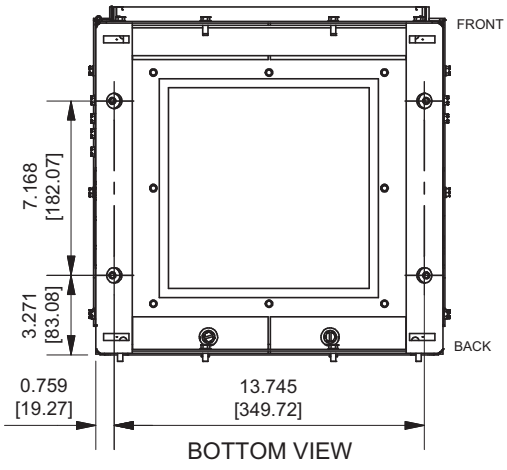
Select the appropriate label from the kit and place it over the existing legend plate as illustrated in Figure 14.

Figure 14: Label Installation



Installing the Optional Floor-Mounting Kit (MOD A10)

Figure 15: Anchor Mounting Holes for Floor-Mounting Kit (in. [mm])



The optional floor-mounting kit is available for all power options in size D enclosures. Refer to Tables 11 and 12 on pages 34 and 35 for applicable power circuit, enclosure type, and horsepower range.

⚠ WARNING

TOPPLING AND CRUSHING HAZARD

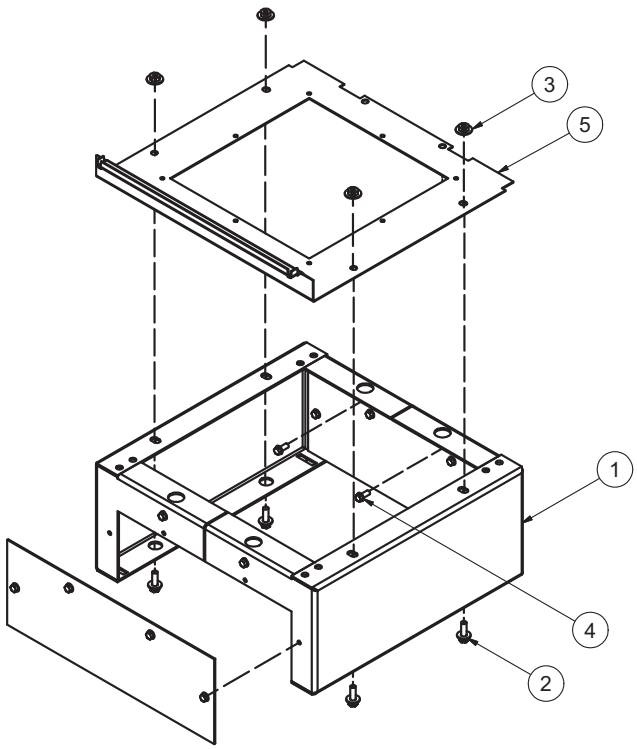
- Follow all recommended practices when anchoring and securing seismically rated equipment.
- Replace all covers and secure doors before placing equipment into service.

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

The kit comes with the Enclosed 22 controller in a separate package and includes the hardware required for mounting the assembly. To install the kit (refer to Figure 16 for numbered items):

1. Remove the lag screws securing the enclosure to the shipping pallet before attaching the floor-mounting kit.
2. Remove the four screws (**2**) attached to the enclosure bottom plate (**5**).
3. Using the supplied nuts (**3**), attach the floor kit (**1**) to the enclosure bottom plate (**5**). Open the enclosure door and tighten the bolted assembly to 60–72 lb-in (6.8–8.1 N•m).
4. Attach two screws (**4**) to the bottom flange of the enclosure. Tighten the screws to 40–48 lb-in (4.5–5.4 N•m).
5. Close the enclosure door. The floor-mounting kit is installed and the Enclosed 22 controller is ready for installation.

Figure 16: Floor-Mounting Kit



ENGLISH

Dimensions

Figure 17: Size A Enclosure

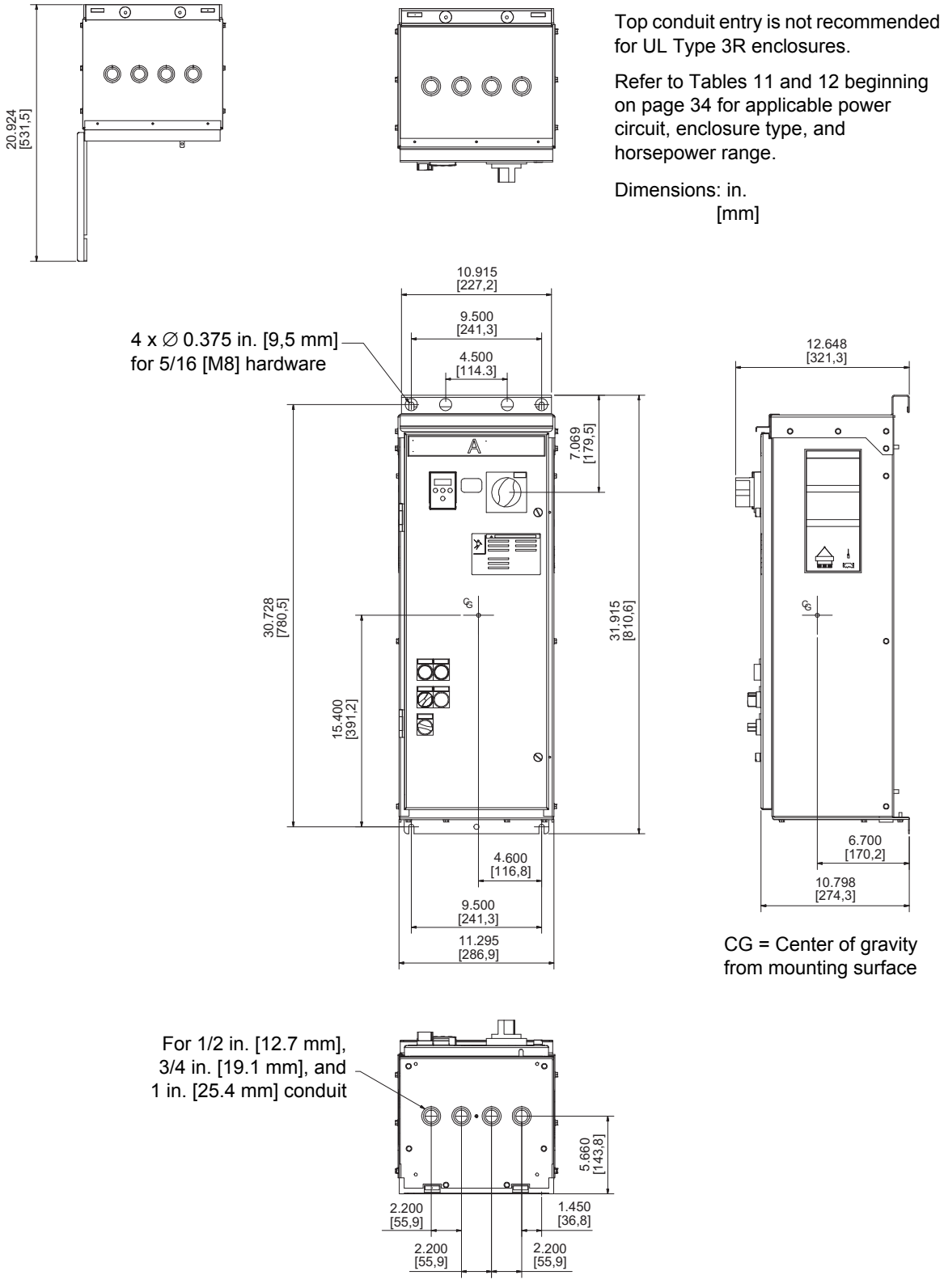


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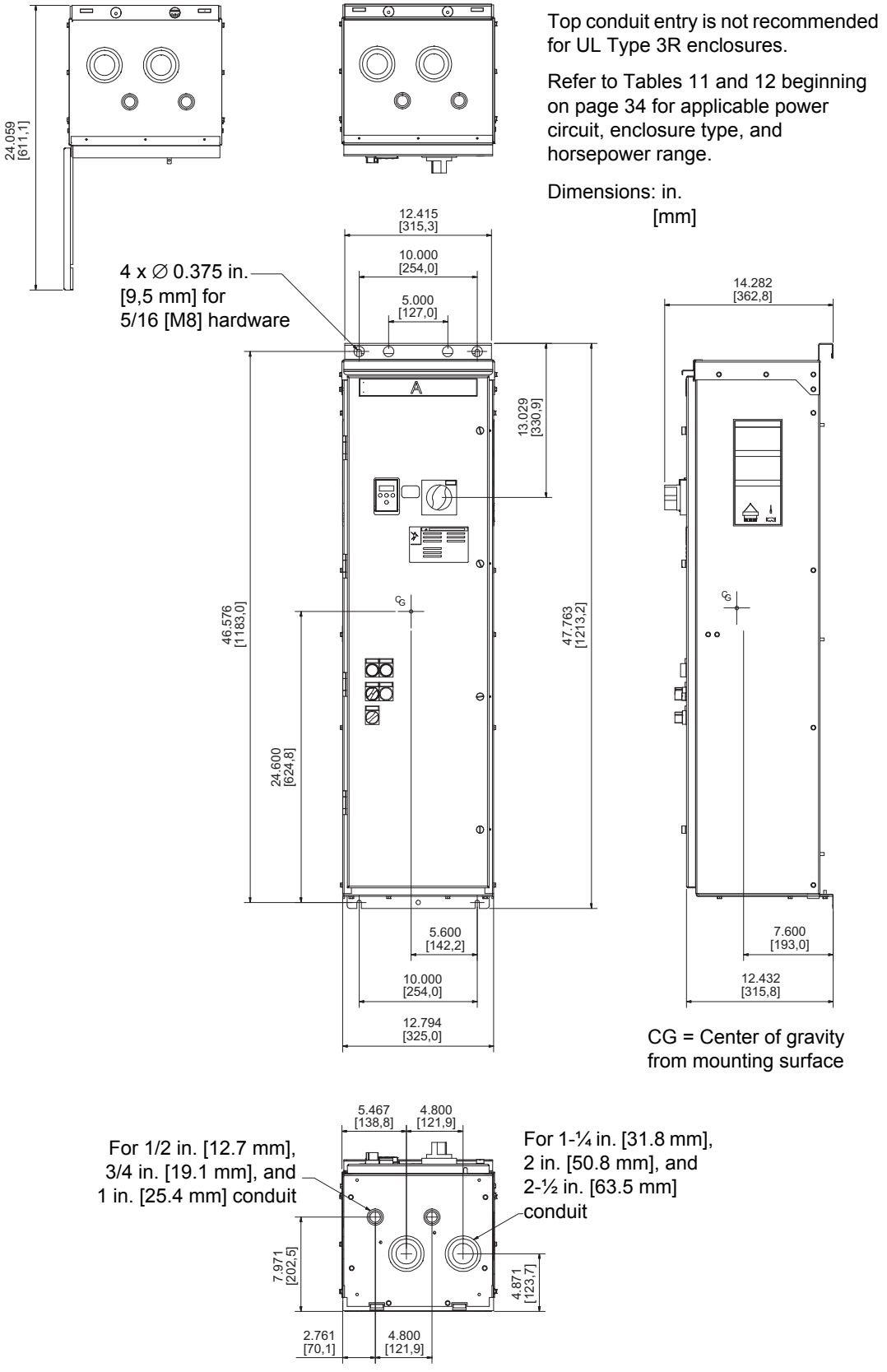
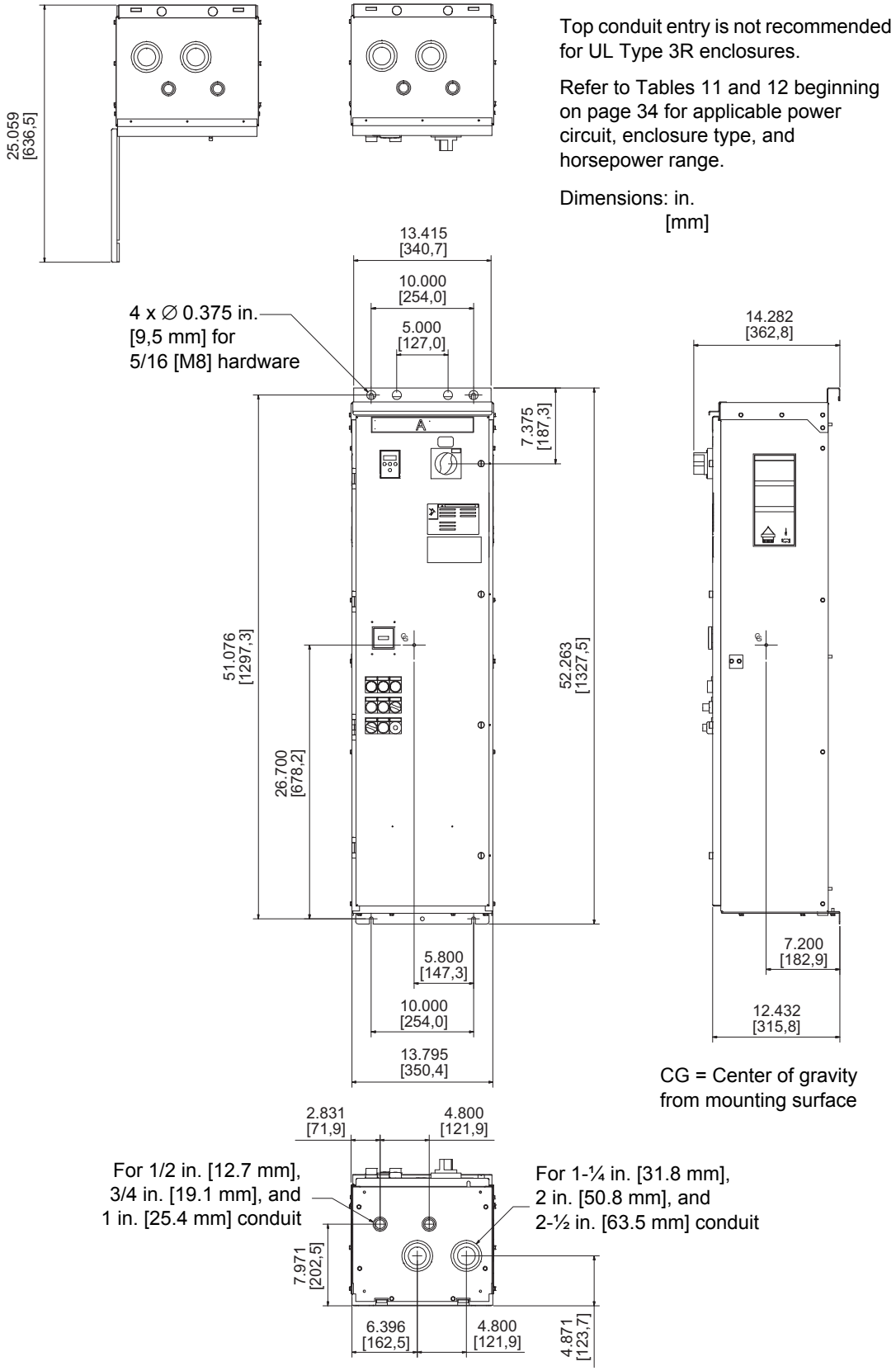
Figure 18: Size B Enclosure



ENGLISH

Figure 19: Size C Enclosure



ENGLISH

Figure 20: Size D Enclosure

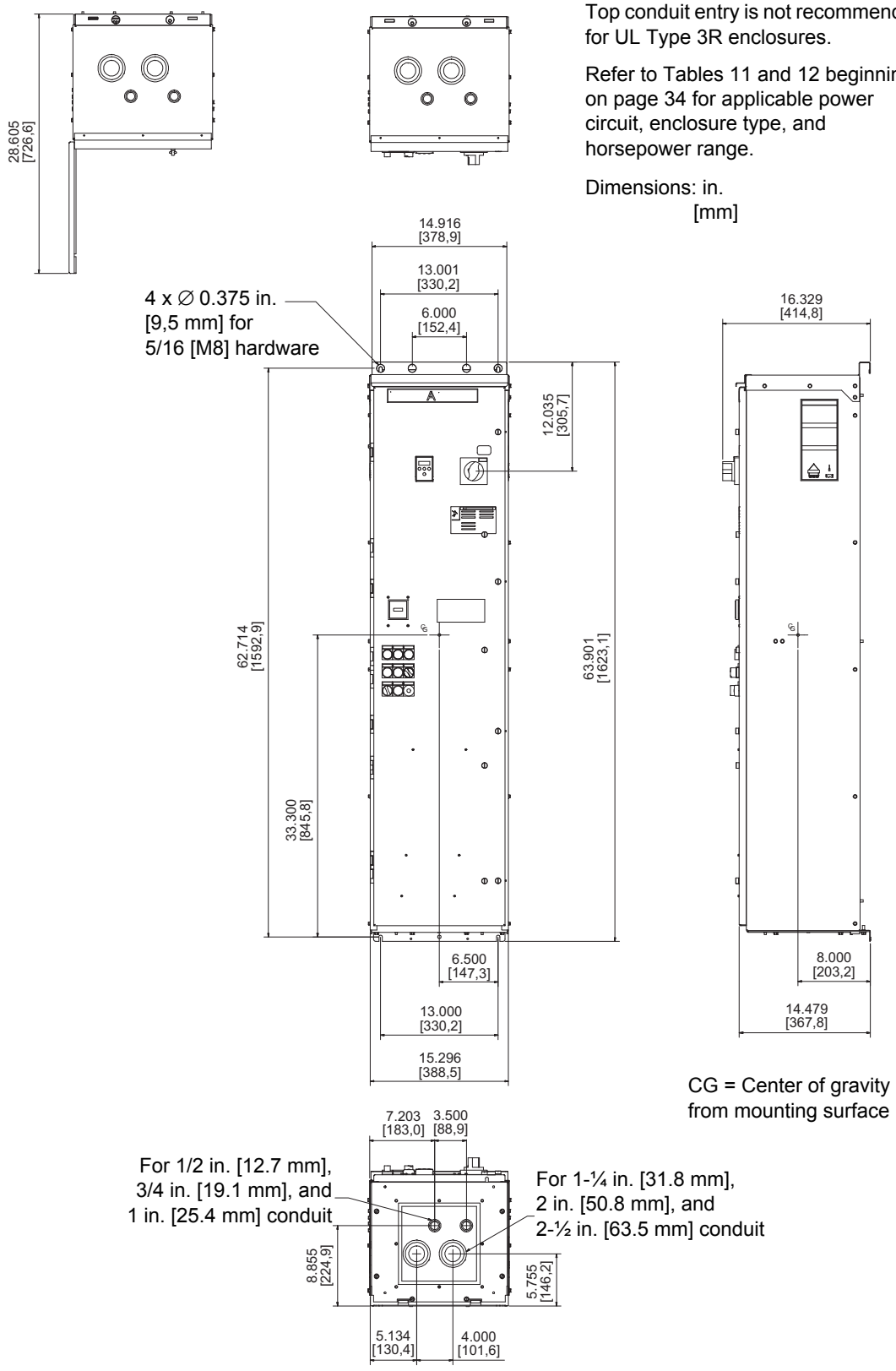


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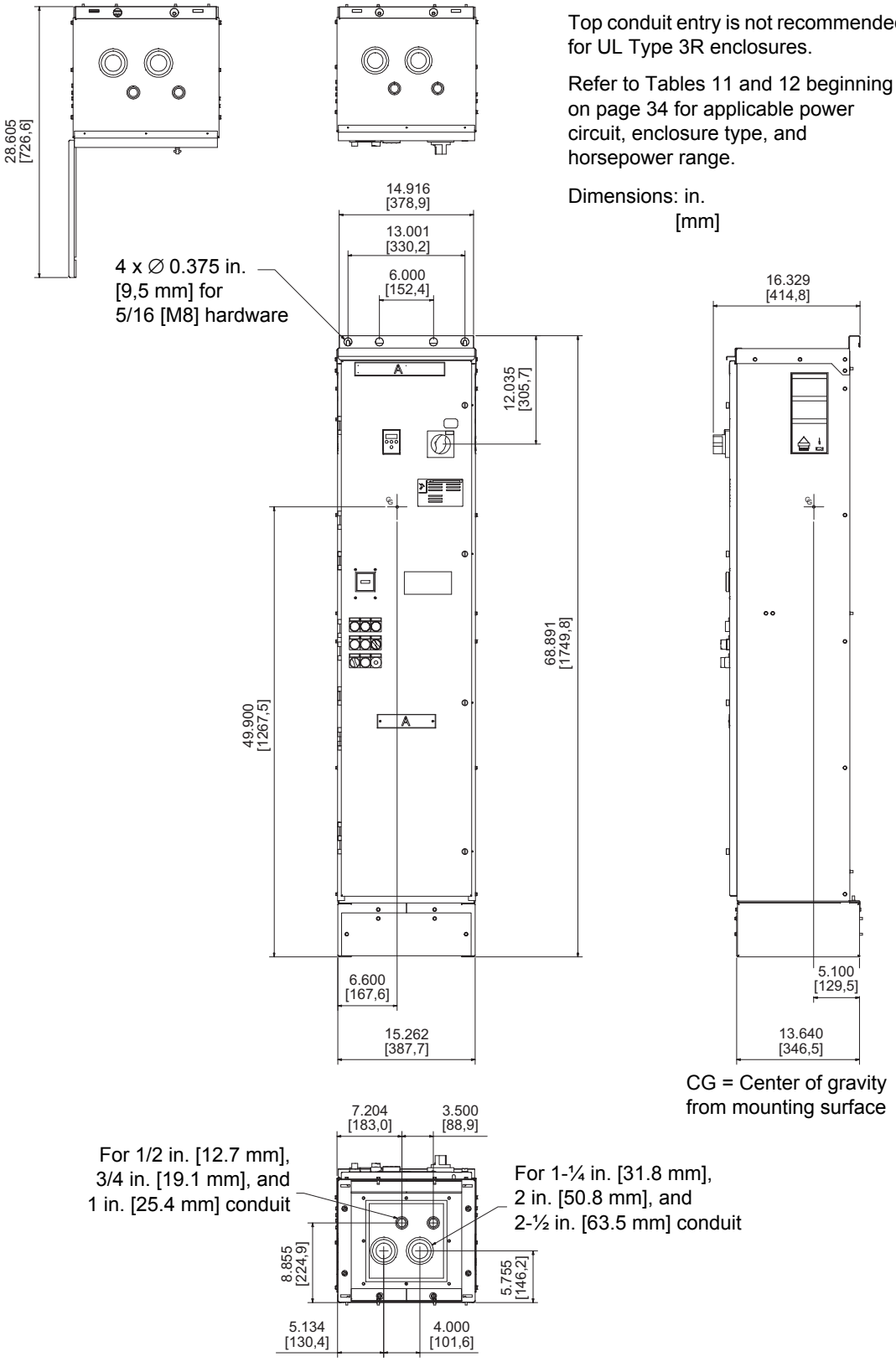
Figure 21: Size D Enclosure with Floor-Mounting Kit



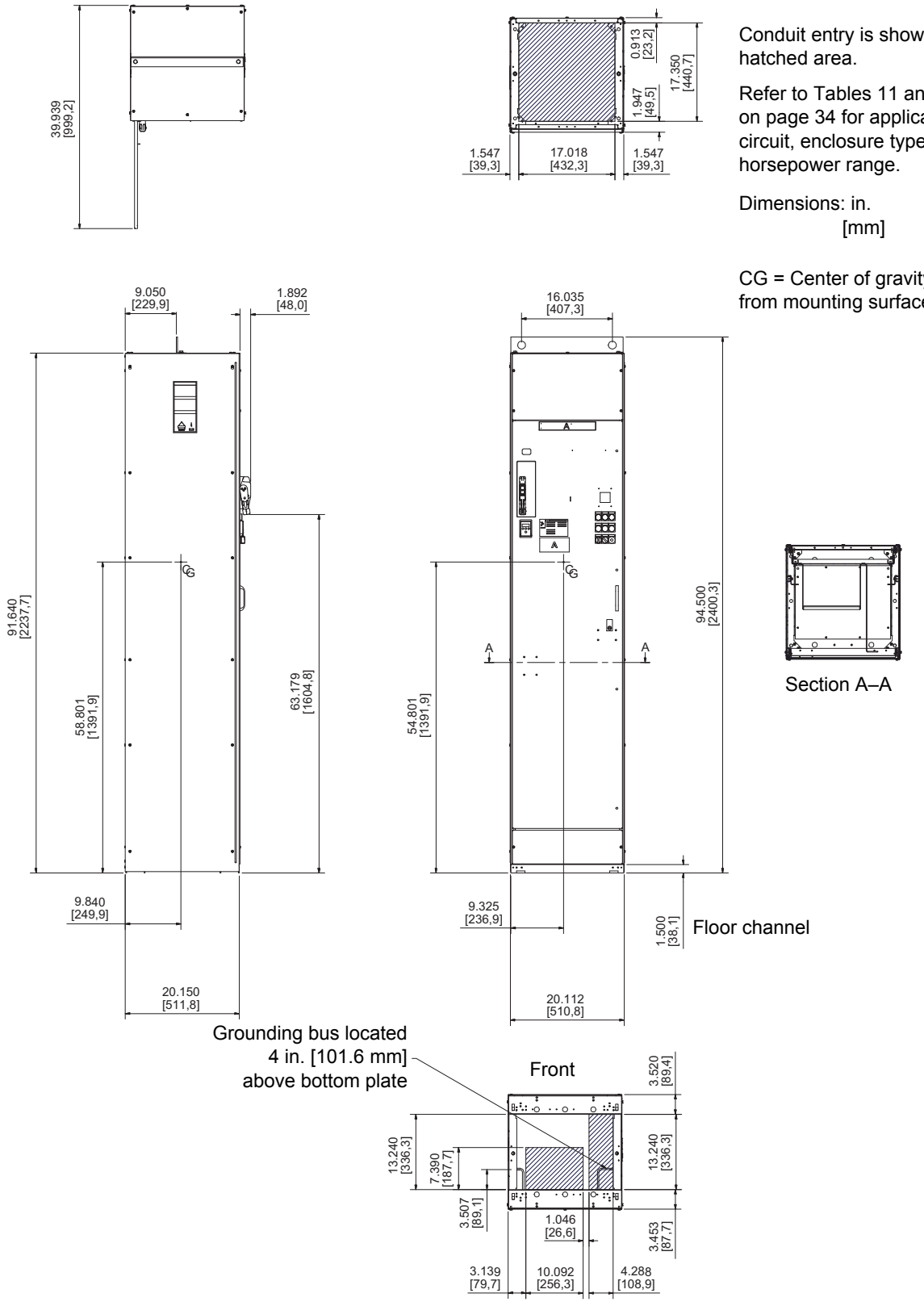
Top conduit entry is not recommended for UL Type 3R enclosures.

Refer to Tables 11 and 12 beginning on page 34 for applicable power circuit, enclosure type, and horsepower range.

Dimensions: in.
[mm]

ENGLISH

Figure 22: Size E Enclosure, Type 1 and 12



Conduit entry is shown as cross-hatched area.

Refer to Tables 11 and 12 beginning on page 34 for applicable power circuit, enclosure type, and horsepower range.

Dimensions: in.
[mm]

CG = Center of gravity from mounting surface

Section A–A

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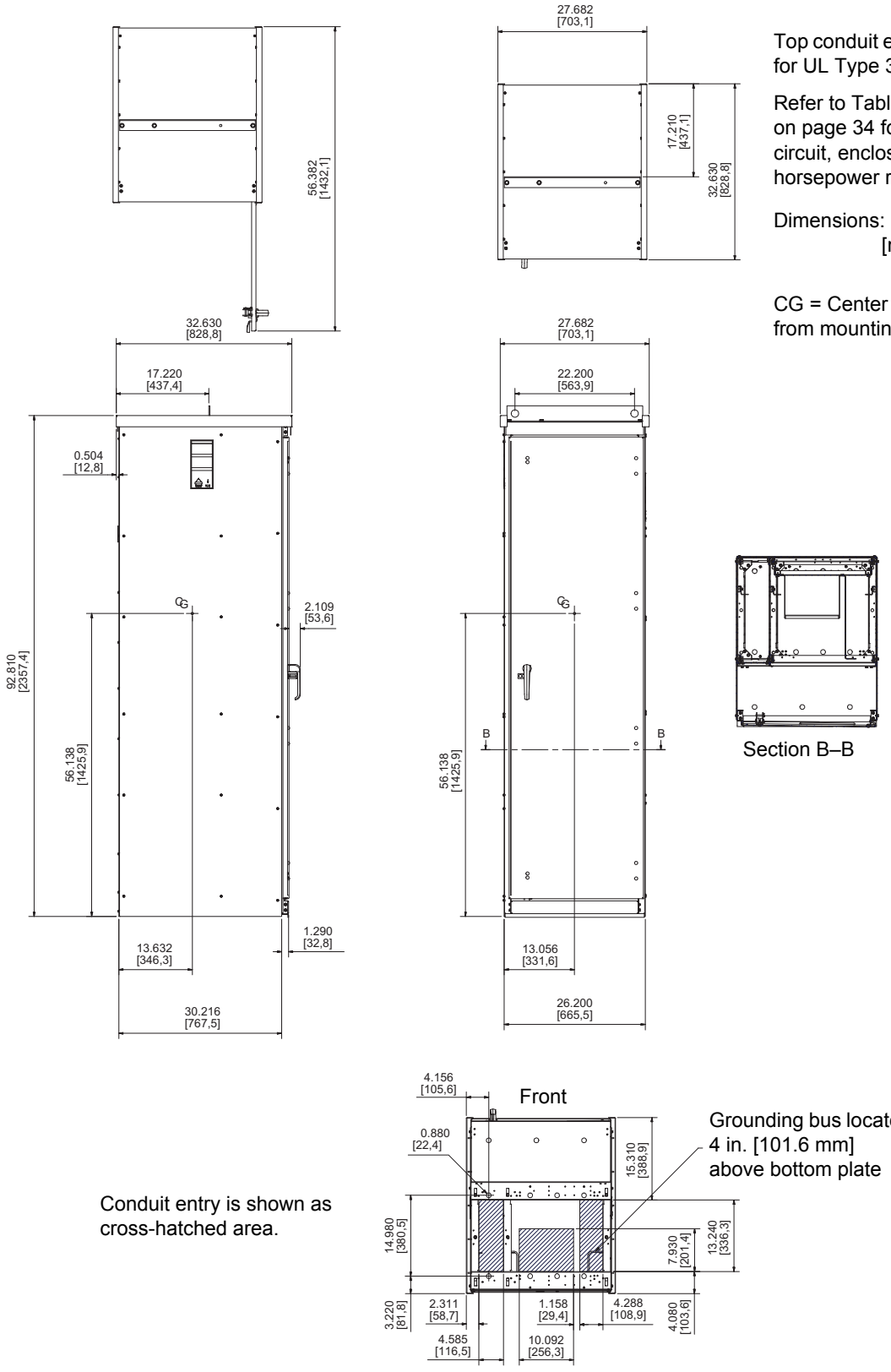
Figure 23: Size E Enclosure, Type 3R



Top conduit entry is not recommended for UL Type 3R enclosures.

Refer to Tables 11 and 12 beginning on page 34 for applicable power circuit, enclosure type, and horsepower range.

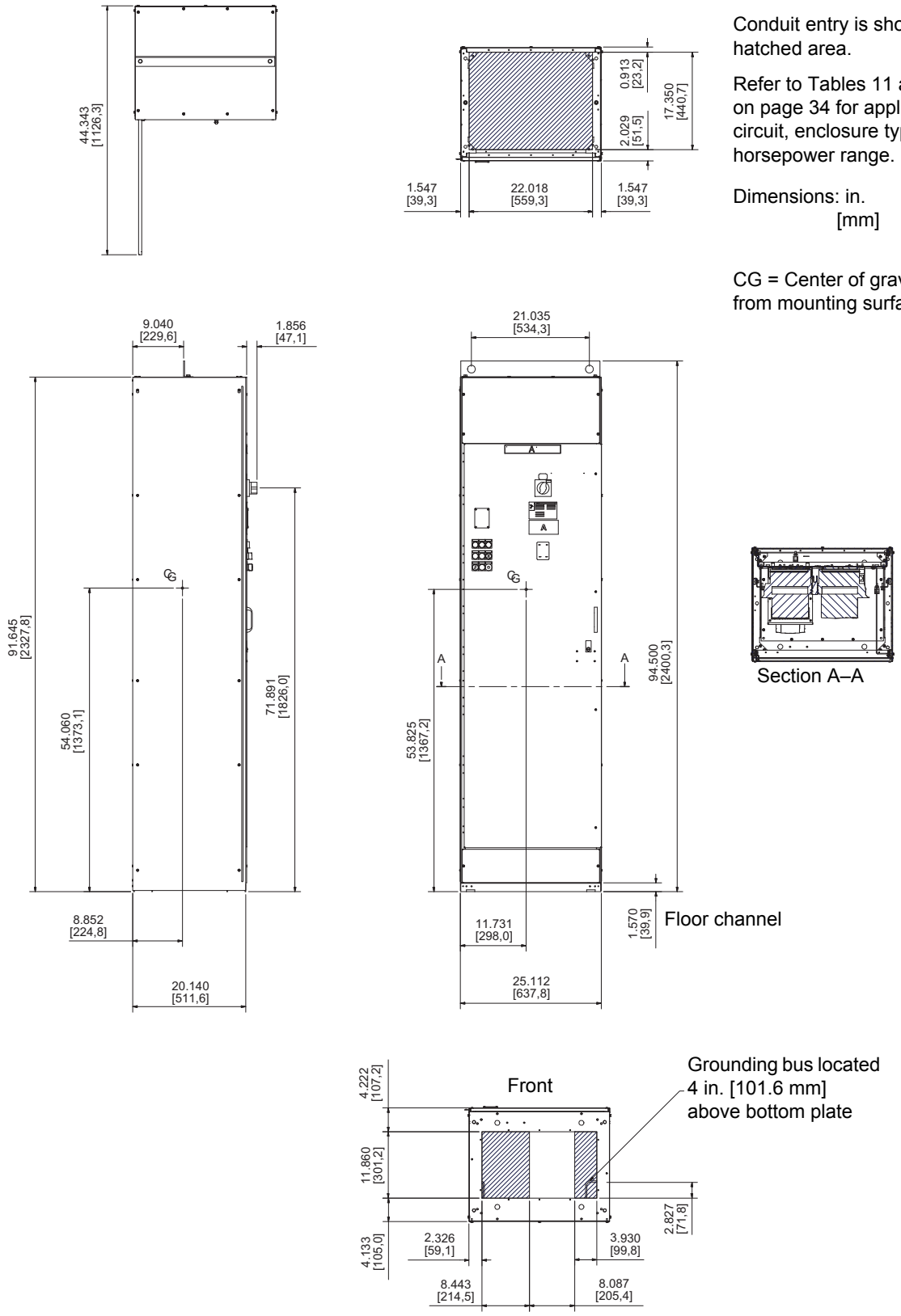
Dimensions: in.
[mm]

CG = Center of gravity from mounting surface

Grounding bus located 4 in. [101.6 mm] above bottom plate

Conduit entry is shown as cross-hatched area.

Figure 24: Size F Enclosure, Type 1 and 12



Conduit entry is shown as cross-hatched area.

Refer to Tables 11 and 12 beginning on page 34 for applicable power circuit, enclosure type, and horsepower range.

Dimensions: in.
[mm]

CG = Center of gravity from mounting surface

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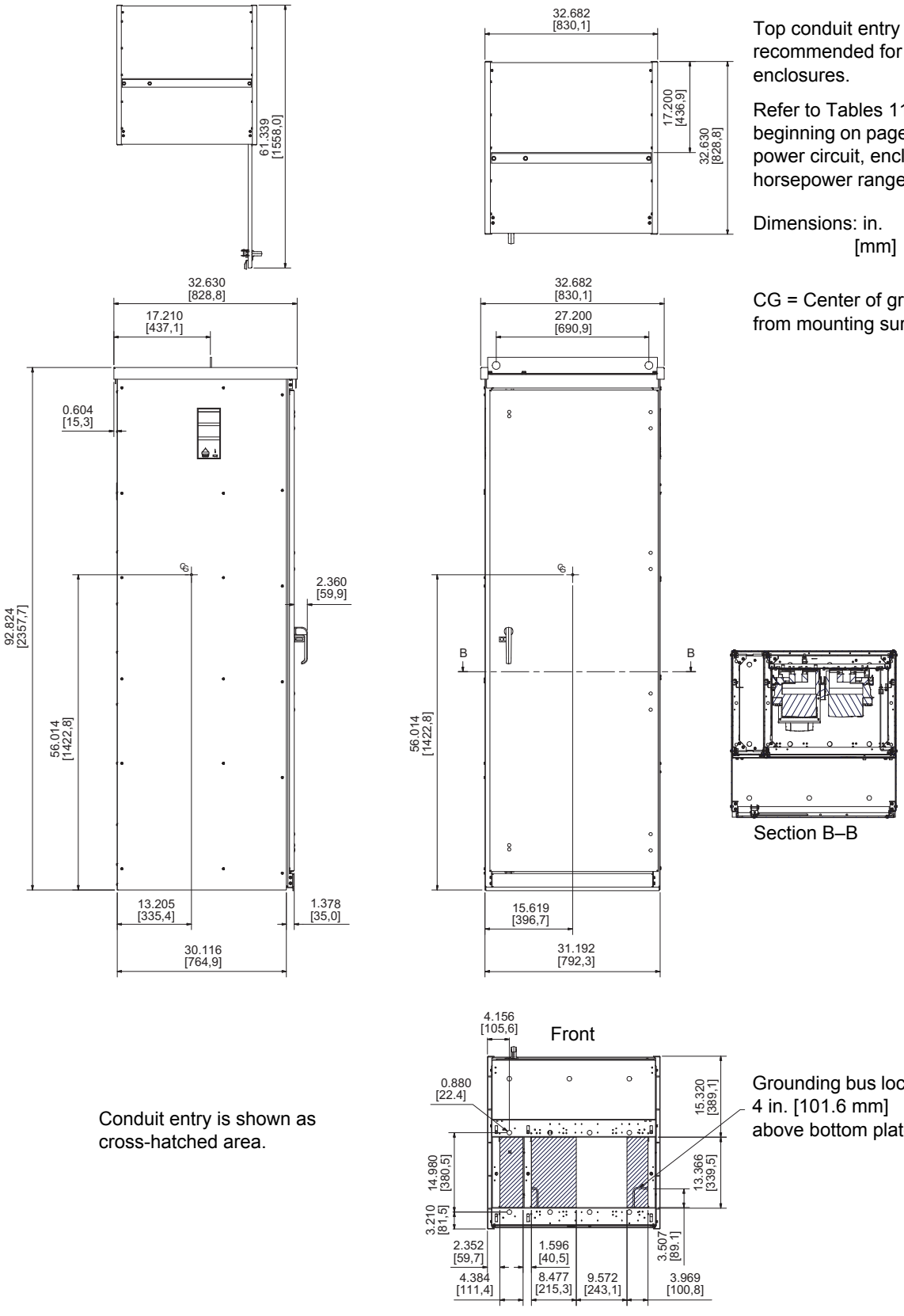
Figure 25: Size F Enclosure, Type 3R



Top conduit entry is not recommended for UL Type 3R enclosures.

Refer to Tables 11 and 12 beginning on page 34 for applicable power circuit, enclosure type, and horsepower range.

Dimensions: in.
[mm]

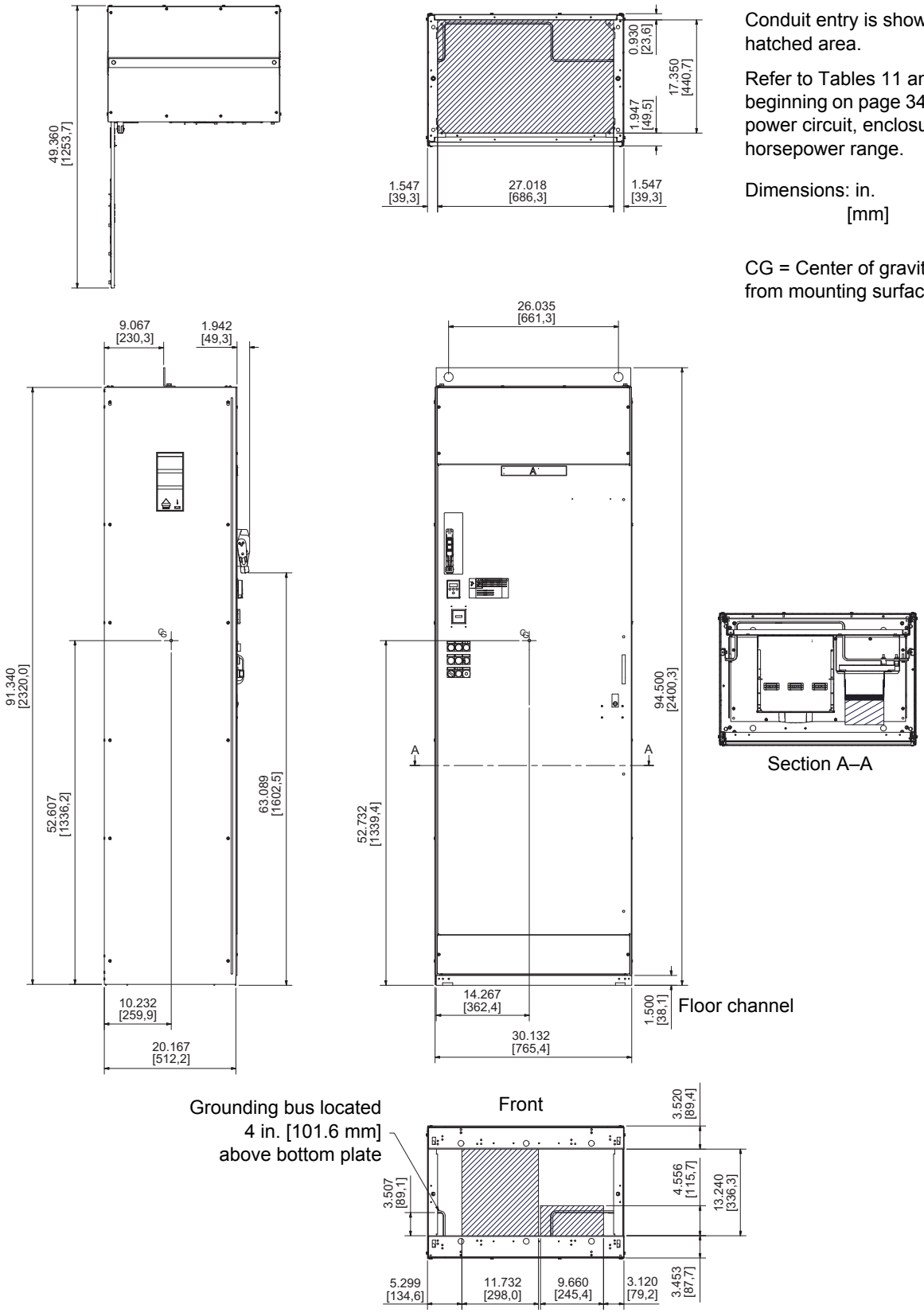
CG = Center of gravity from mounting surface

Conduit entry is shown as cross-hatched area.

Grounding bus located 4 in. [101.6 mm] above bottom plate

ENGLISH

Figure 26: Size G Enclosure, Type 1 and 12



Conduit entry is shown as cross-hatched area.

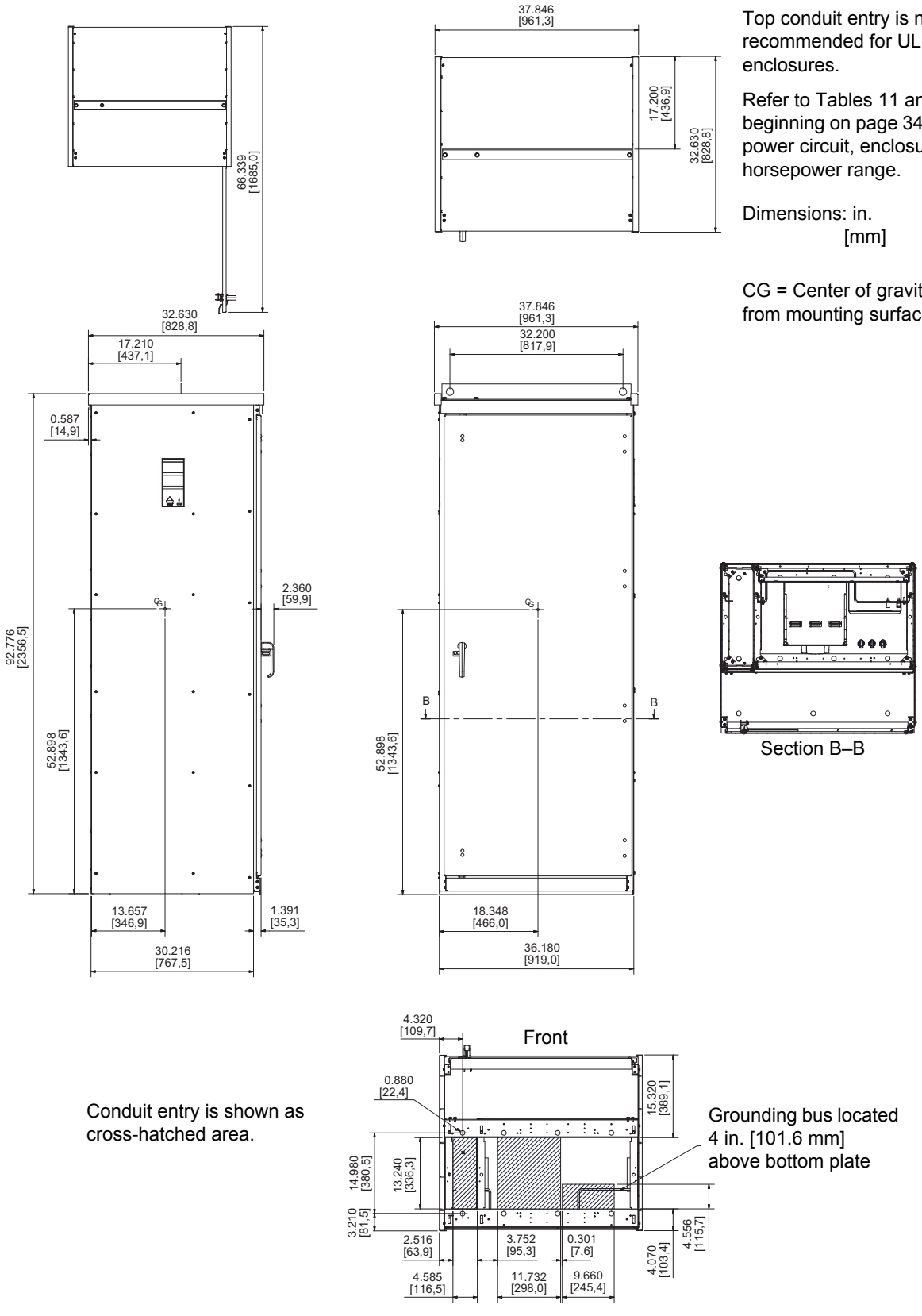
Refer to Tables 11 and 12 beginning on page 34 for applicable power circuit, enclosure type, and horsepower range.

Dimensions: in.
[mm]

CG = Center of gravity from mounting surface

ENGLISH

Figure 27: Size G Enclosure, Type 3R



Top conduit entry is not recommended for UL Type 3R enclosures.

Refer to Tables 11 and 12 beginning on page 34 for applicable power circuit, enclosure type, and horsepower range.

Dimensions: in.
[mm]

CG = Center of gravity from mounting surface

Conduit entry is shown as cross-hatched area.

Grounding bus located 4 in. [101.6 mm] above bottom plate

Electrical Installation

⚠ DANGER

HAZARD OF ELECTRIC SHOCK, EXPLOSION, OR ARC FLASH

- Turn off all power (main and remote) before installing the equipment.
- Read and understand the precautions in "Before You Begin" on page 8 before performing the procedures in this section.

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

General Wiring Practices

Good wiring practice requires the separation of control circuit wiring from all power wiring. **Do not run power and/or control or multiple power wiring in the same conduit**. This separation reduces the possibility of coupling electrical transients from power circuits into control circuits or from motor power wiring into other power circuits.

⚠ CAUTION

IMPROPER WIRING HAZARD

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.

When wiring the Enclosed 22 controller:

- Use the knockouts identified in Figures 17–21, or punch conduit holes in the locations specified in Figures 22–27 for control and power wiring.
- Use metallic conduit for all controller wiring. Do not run control and power wiring in the same conduit.
- Separate metallic conduits carrying power wiring or low-level control wiring by at least 3 inches (76 mm).
- Separate existing, non-metallic conduits or cable trays used to carry power wiring from metallic conduit carrying low-level control wiring by at least 12 inches (305 mm).
- Whenever power and control wiring cross, the metallic conduits and non-metallic conduits or trays must cross at right angles.
- Use water-tight rated conduit hubs to make connections between the conduit and the UL Type 3R enclosures. Conduit connections through the top of the enclosure are not recommended.

Input Wiring

Size the ampacity of the input power conductors according to the National Electrical Code (U.S. and Mexico) or the Canadian Electrical Code (Canada) and applicable local codes based on the motor full load current.

Connect the mains power conductors to terminals L1, L2, and L3 at the top of the circuit breaker.

Grounding

Ground the Enclosed 22 controller according to the National Electrical Code (NEC) or Canadian Electrical Code (CEC) and all local codes. To ground the controller:

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

⚠ DANGER

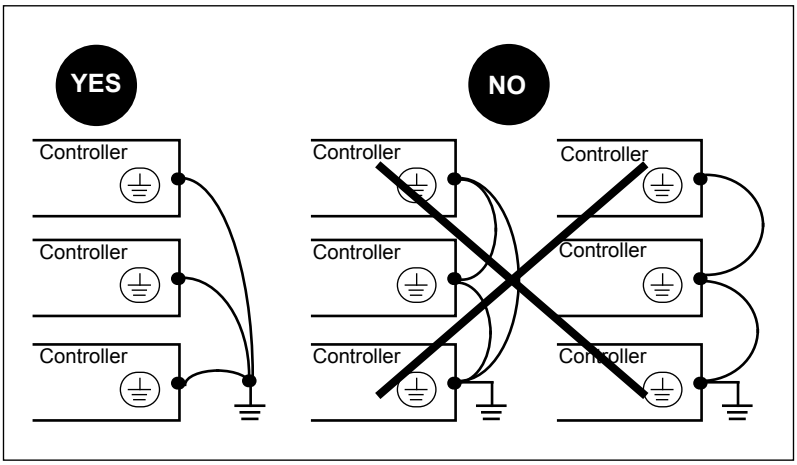
HAZARD OF ELECTRIC SHOCK, EXPLOSION, OR ARC FLASH

- Ground equipment using the provided grounding connection point as shown in Figures 33 to 37 (pages 59 to 63). The controller panel must be properly grounded before power is applied.
- Do not use metallic conduit as a grounding conductor.

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

Ground multiple controllers as shown in Figure 28. Use one grounding conductor per device. Do not loop grounding conductors or install them in series.

Figure 28: Grounding Multiple Controllers



Output Wiring

Size the ampacity of motor power conductors according to the motor full load current, NEC or CEC, and applicable local codes.

- Depending on the control circuit selected, connect the motor conductors to terminals T1, T2, and T3 at the bottom of the soft starter, overload relay, or distribution block.
- Connect the motor ground to the grounding bar provided. See Figures 33 to 37 (pages 59 to 63).
- Do not use the Enclosed 22 controller in applications where extremely long output cables are required. Maximum output cable length for standard duty motors is 1300 ft. (400 m). For applications exceeding this cable length, consult the your local Schneider Electric field sales representative.

Wire Routing and Interconnection

Wire Class

The Wire Class describes the compatibility of the field wiring terminal with the conductor material and insulation system. When used in conjunction with the required conductor current rating and the controller ambient temperature rating, the Wire Class forms the basis for selecting a conductor size that limits the temperature on the conductor insulation at the field wiring terminal to acceptable limits. Conductors with operating temperatures exceeding those given by the Wire Class can be used, but the conductor size must be selected based on the Wire Class limits.

EMI Class

The EMI (electromagnetic interference) Class categorizes the electromagnetic properties of the voltages and currents present. The six EMI Class categories determine proper wiring methods and physical segregation. See Figures 29–32 on pages 54–57 and Table 15 on page 58.

Quiet Wiring 1 (QW1)

High-susceptibility analog and digital control signals. Signals falling under the classification of QW1 include digital communication/network circuits, controller analog I/O and analog process signals.

Quiet Wiring 2 (QW2)

Medium-susceptibility analog and digital control signals. Signals falling under the classification of QW2 include 24 Vdc and 24 Vac control circuits.

Standard Wiring 1 (SW1)

Low-Susceptibility control or power circuits rated less than 600 Vac (250 Vdc) and less than 15 A (voltage and current spectra are generally contained within 0.05–9 kHz). Signals falling under the classification of SW1 include 120 Vac control circuits.

Standard Wiring 2 (SW2)

Power circuits rated greater than 15 A (voltage and current spectra are generally contained with 0.05–9 kHz). Signals falling under the classification of SW2 include line power to controllers.

Standard Wiring 3 (SW3)

Reserved.

Pulse Wiring 1 (PW1)

Control or power circuits whose voltage or current spectra significantly exceed 9 kHz. Signals falling under the classification of PW1 include motor and dynamic braking circuits fed from PWM (pulse width modulation) power converters.

Voltage Class

The Voltage Class groups the voltages present into recognized conductor insulation categories (30,150, 300, and 600 V) for selection of conductor insulation voltage rating and physical segregation.

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Figure 29: Power Circuit B05 Wire Routing: EMI Class Groups

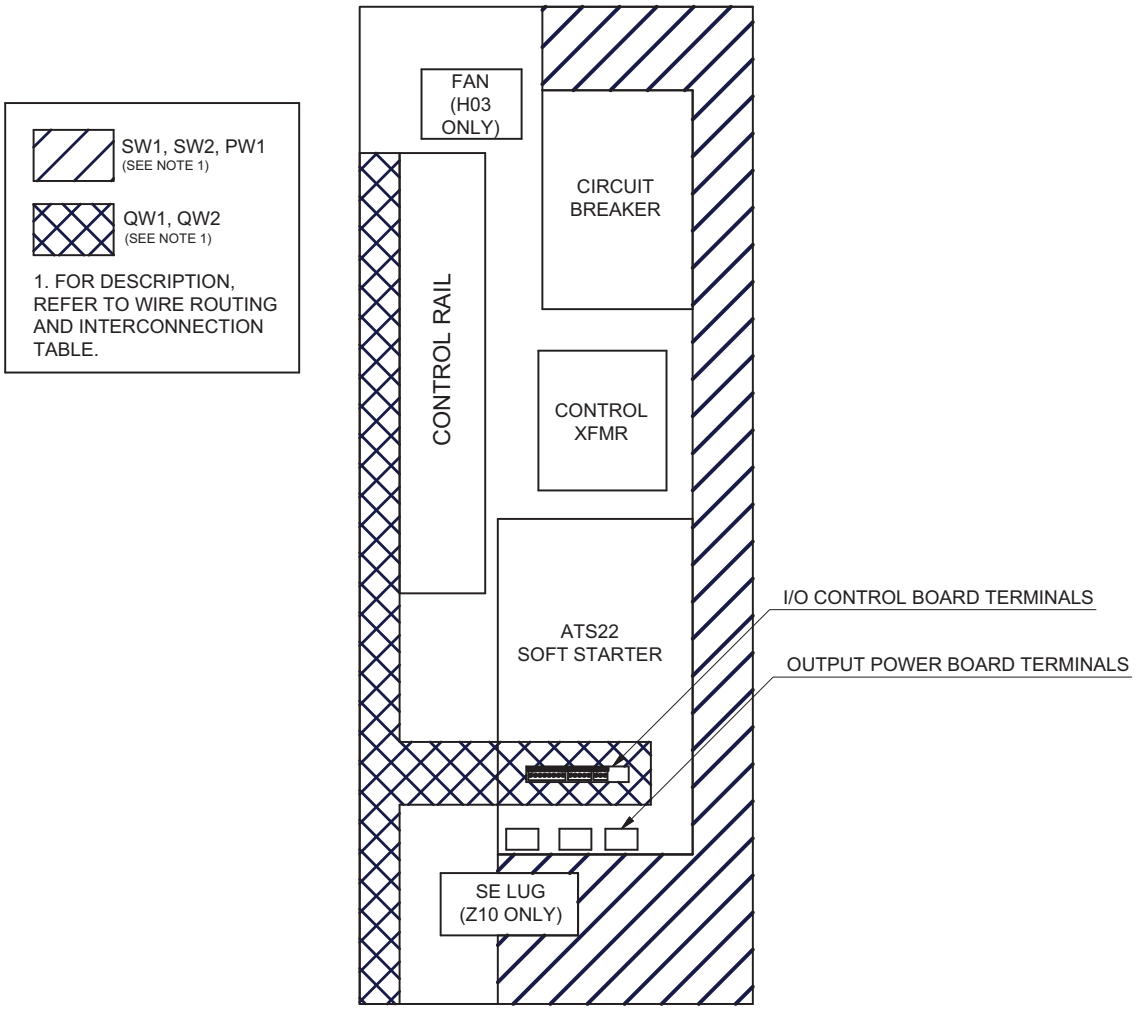

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Figure 30: Power Circuit B05 Wire Routing: EMI Class Groups

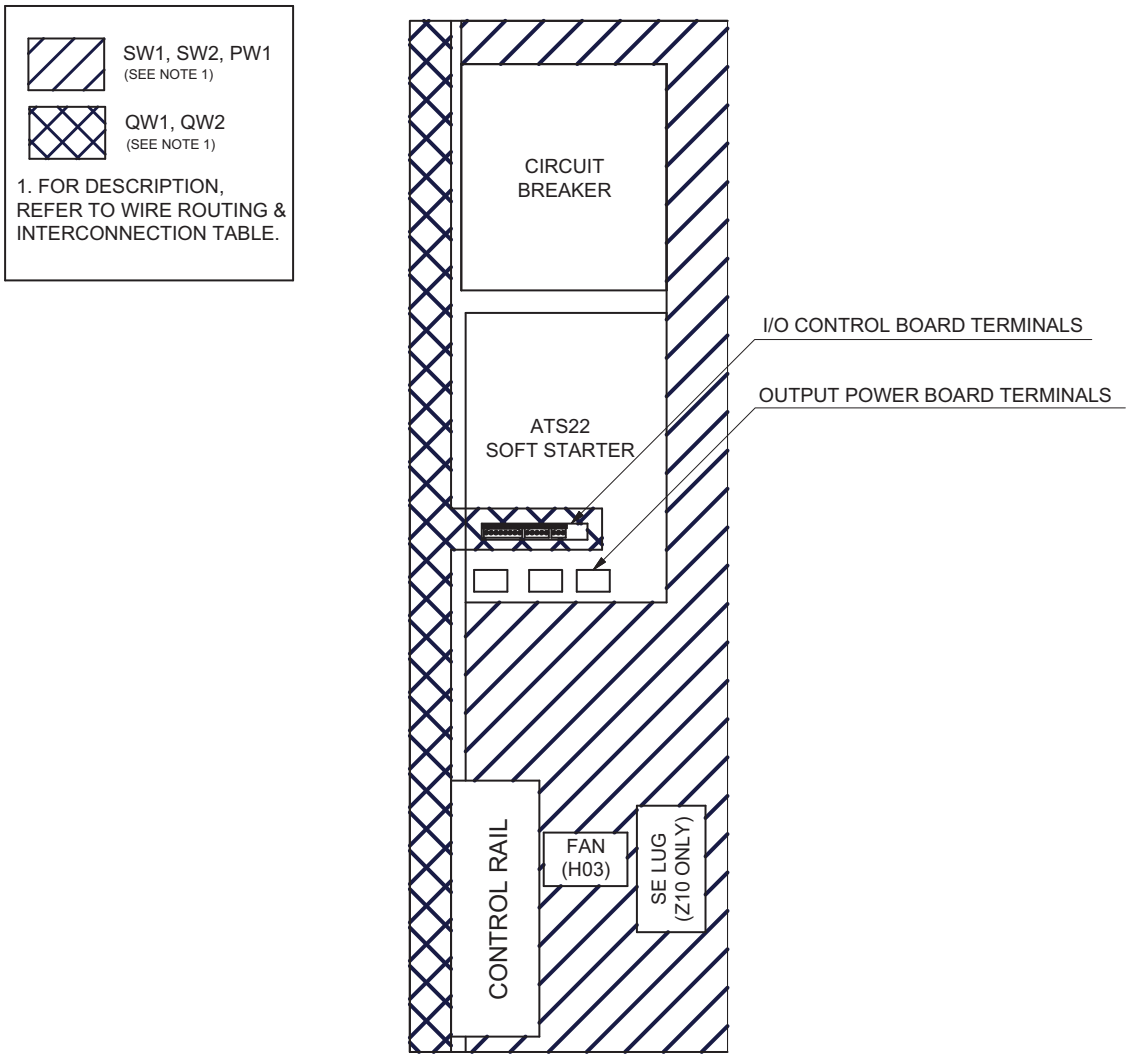

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Figure 31: Power Circuit S05, N05, R05 and Y05 Wire Routing: EMI Class Groups

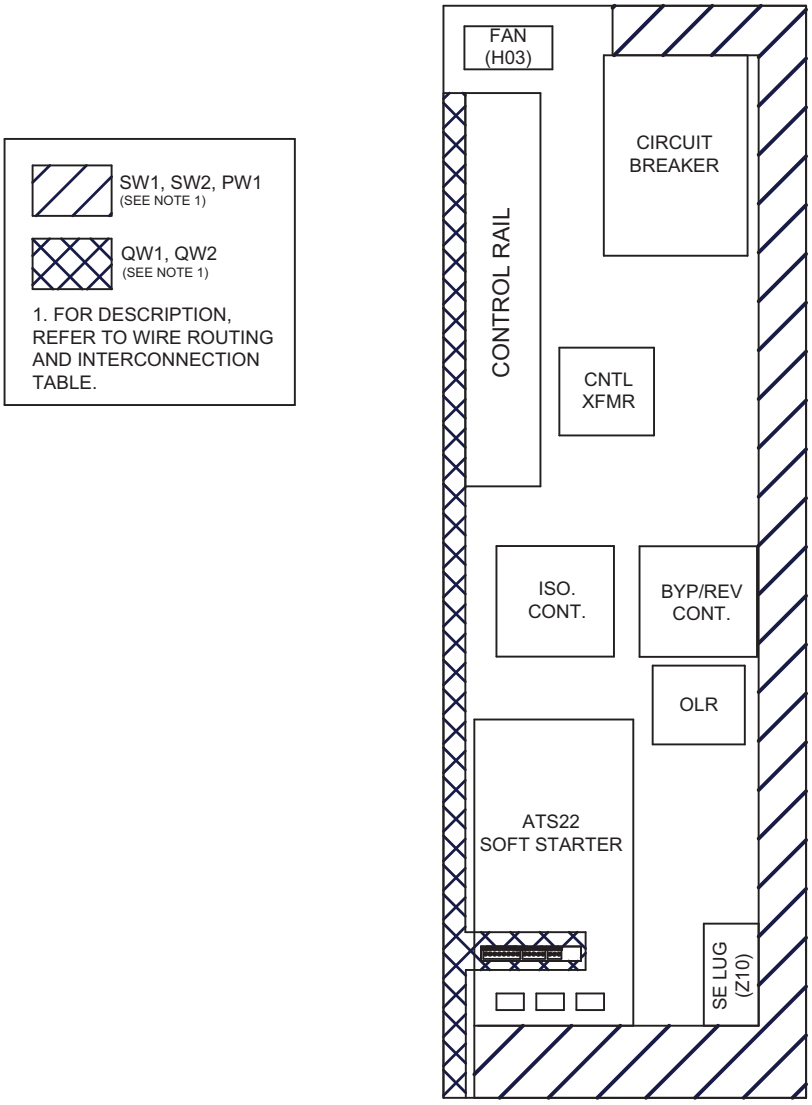

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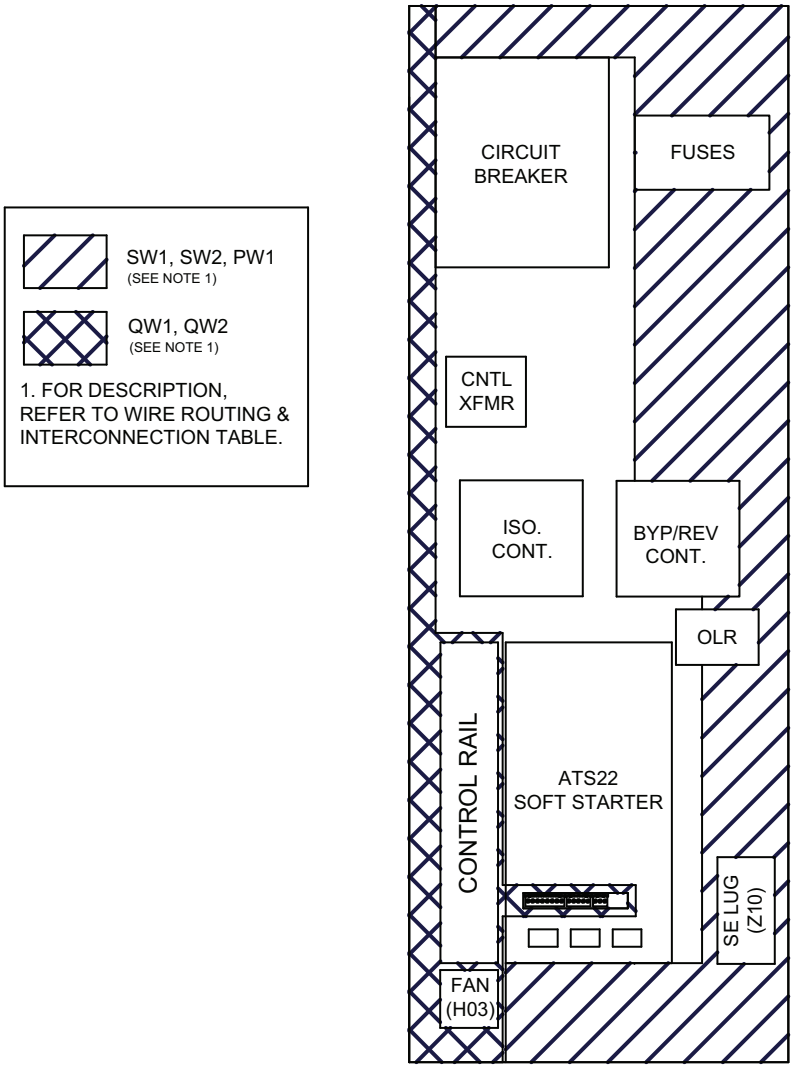
Figure 32: Power Circuit S05, N05, R05 and Y05 Wire Routing: EMI Class Groups



Wiring Methods

⚠ DANGER

HAZARD OF ELECTRIC SHOCK, EXPLOSION, OR ARC FLASH

- Route and secure all conductors to prevent damage to insulation when installing them under or near sharp edges.
- When possible, use jacketed conductors.

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

Based on the EMI Class and Voltage Class of the conductors, apply the wiring methods described in Table 15 on page 58.

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Table 15: Wire Routing and Interconnection

Wiring Methods and Considerations	EMI Class of Conductors[1]				
	QW1	QW2	SW1	SW2	PW1
Conductor Grouping in Wireways and Conduits					
1. Bundle all conductors of 1- or 3-phase AC power circuits to minimize stray magnetic fields.			X	X	X
2. Bundle all conductors of a DC power circuit to minimize stray magnetic fields.			X	X	X
3. When parallel conductors must be run in separate wireways or conduit, bundle the conductors into groups to minimize stray magnetic fields.				X	X
4. Maintain conductor runs that are as short and direct as possible.	X	X	X	X	X
Separation of Circuits					
1. Do not run different EMI Class conductors in the same conduit.	X	X	X	X	X
2. Do not run different Voltage Class conductors in the same conduit unless all conductors are insulated for the maximum Voltage Class present.	X	X	X	X	X
3. Separate all conductors by EMI Class. Use the following circuit separation when conductors run parallel for more than 12 in. (305 mm).					
• Metallic conduit: 3 in. (76 mm) from QW to SW or PW	X	X	X	X	X
• Metallic tray: 3 in. (76 mm) from SW to PW			X	X	X
• Metallic tray: 6 in. (152 mm) from QW to SW or PW	X	X	X	X	X
• Against continuous metal surface: 3 in. (76 mm) from SW to PW			X	X	X
• Against continuous metal surface: 6 in. (152 mm) from QW to SW or PW	X	X	X	X	X
• Metallic conduit housing QW: 12 in. (305 mm) to non-metallic conduit SW or PW	X	X	X	X	X
• Non-metallic conduit: 3 in. (76 mm) from SW to PW			X	X	X
• Non-metallic conduit: 23 in. (584 mm) from QW to SW or PW	X	X	X	X	X
4. All PW conductor groups must be individually separated using metallic conduit.					X
5. If QW and SW1 wiring must cross SW2 or PW1 wiring, cross the bundles at right angles.	X	X	X	X	X
Common Mode Noise Issues					
1. Provide adjacent signal returns using twisted pair cable.	X	X			
2. Galvanically isolate the signal and the associated signal return path when possible.	X	X			
Shielding					
1. Use metallic conduit for all power and control circuits external to the controller enclosure.	X	X	X	X	X
2. Use shields that are continuous and equipped with a drain wire.	X	X	X		
3. Do not group different EMI Class conductors within the same shield.	X	X	X	X	X
4. Minimize the non-shielded portion of the conductor at the end of the shielded cable.	X	X	X	X	X
5. When shielding AC or DC power conductors, group the conductors to minimize the magnetic field in the shield.			X	X	X
Grounding					
1. Ground shields only at the controller end.	X	X	X	X	X
2. Use a separate grounding wire for each shield ground.	X	X	X	X	X
3. Provide a grounding wire with all conductor groups, whether in tray or conduit.			X	X	X
4. When multiple grounds must be made to a shielded power cable, the shield must have the same short-circuit withstand capability as the grounding conductor in the power cable.			X	X	X
5. Terminate all power grounds and power shield grounds to the controller grounding point or bar.			X	X	X
6. Terminate all signal shield grounds to the terminals provided.	X	X			
7. Always supply a separate equipment grounding conductor with the controller power feed. Do not depend on metallic conduit for the grounding connection.			X	X	X

[1] "X" indicates applicability to the specified EMI Class.

Component Locations

See Figures 33–37 for Enclosed 22 component identification and terminal block locations for the power circuit configuration specified.

See Tables 19–23 on pages 67–71 for wire sizes and terminal torque requirements.

Figure 33: Power Circuit B05

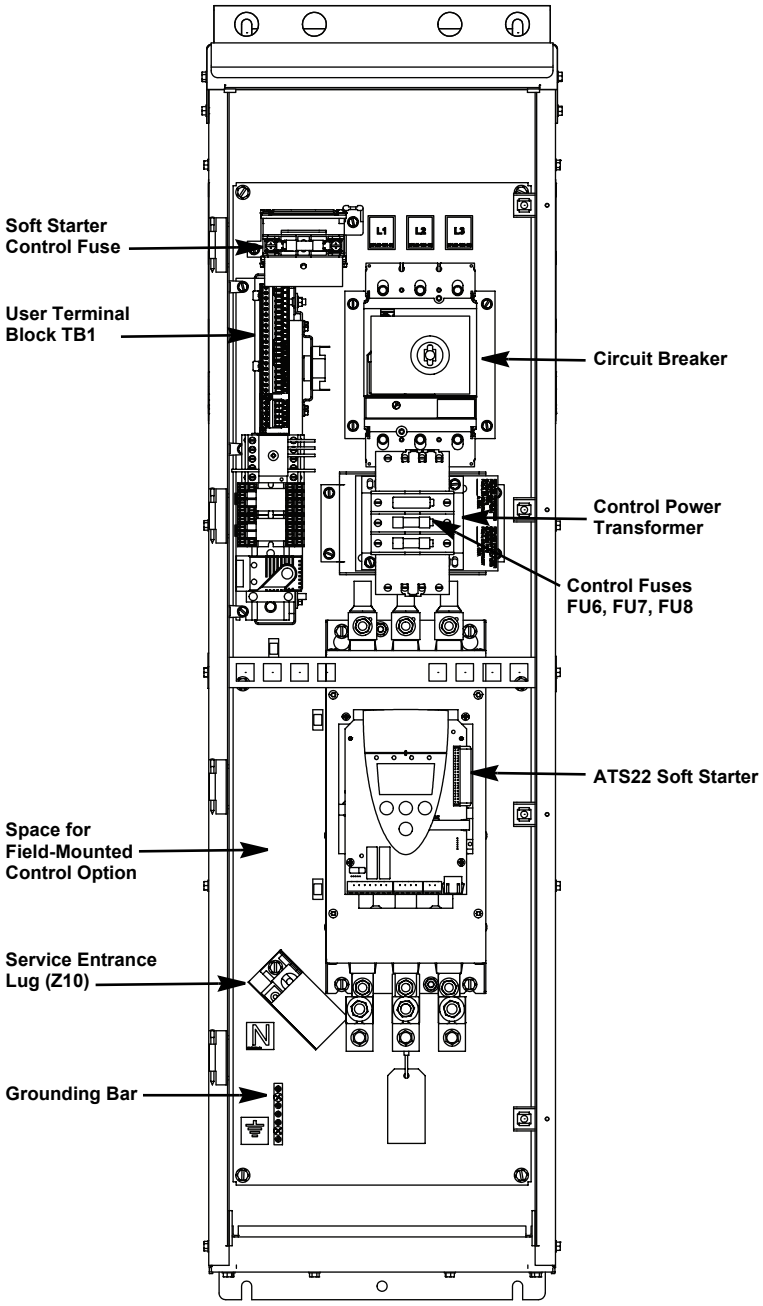

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Figure 34: Power Circuit S05

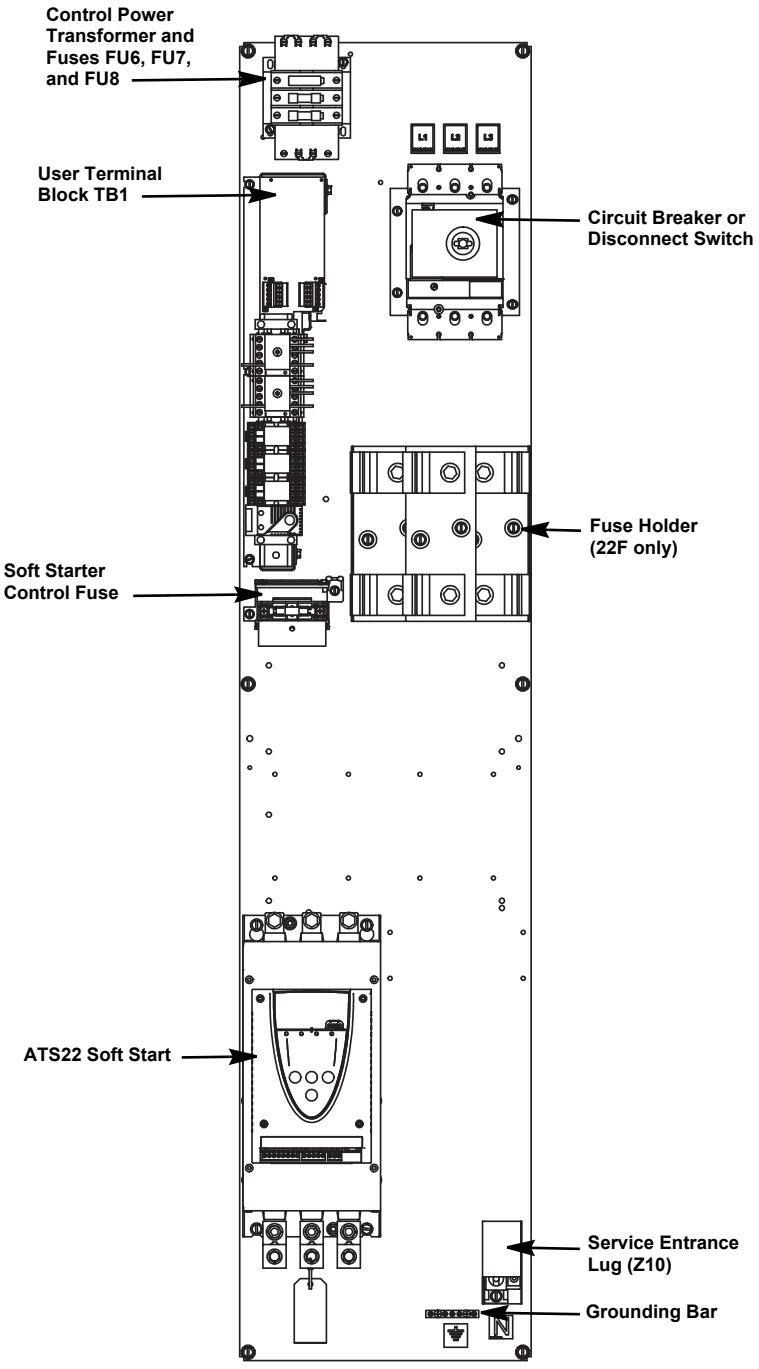

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Figure 35: Power Circuit N05

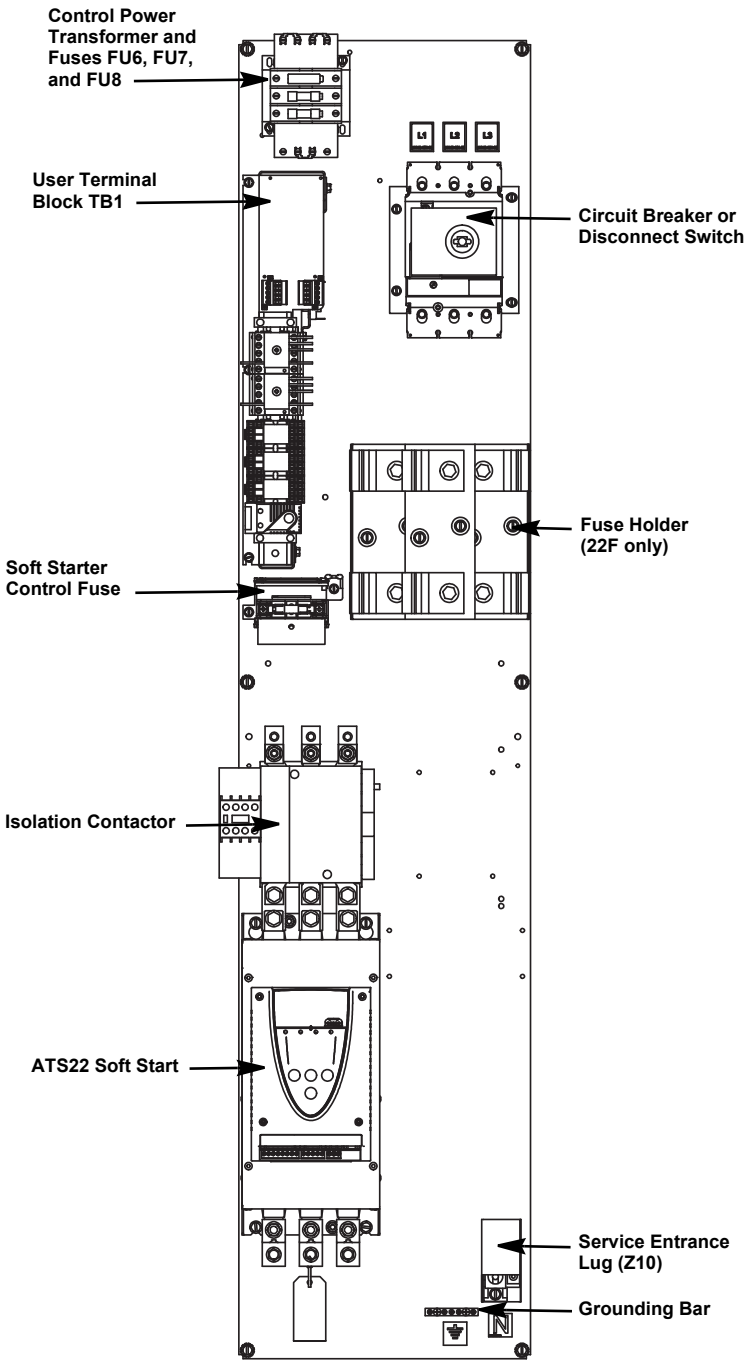

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Figure 36: Power Circuit R05

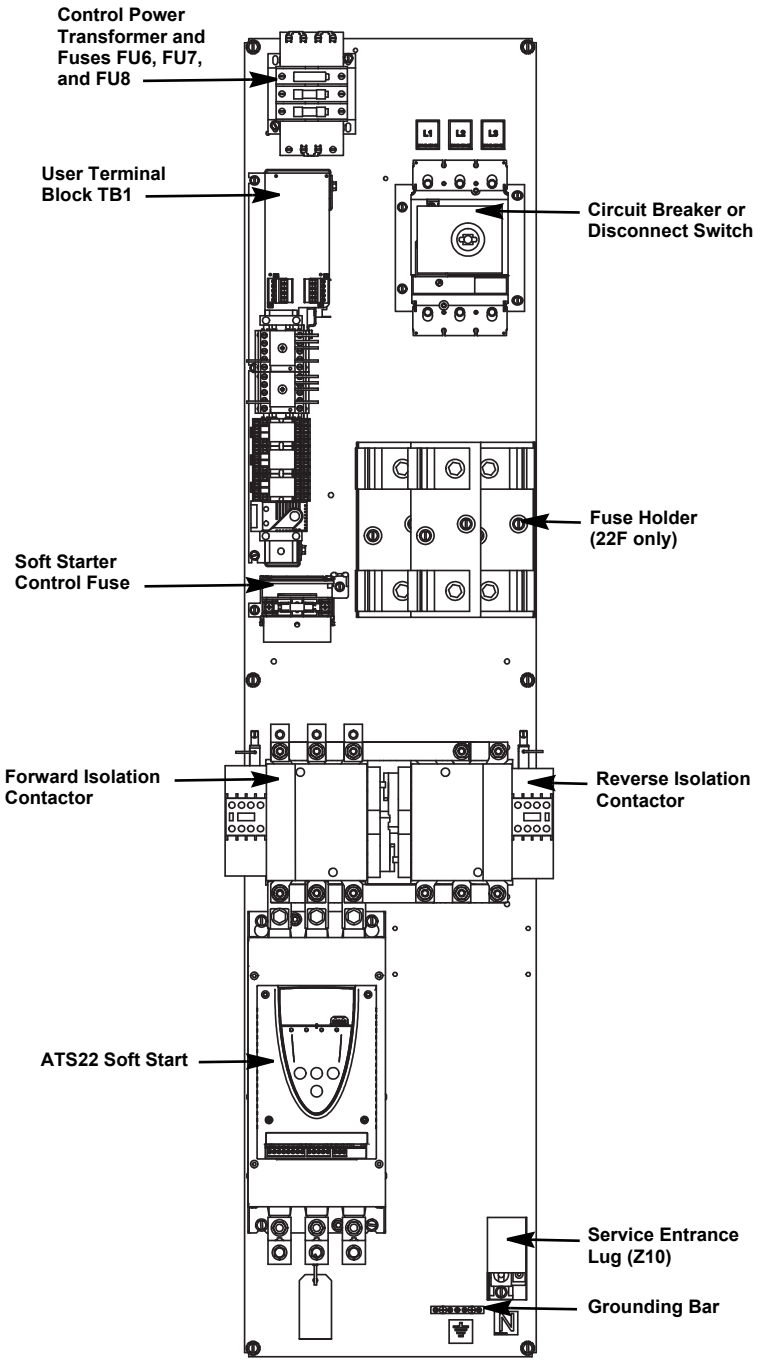

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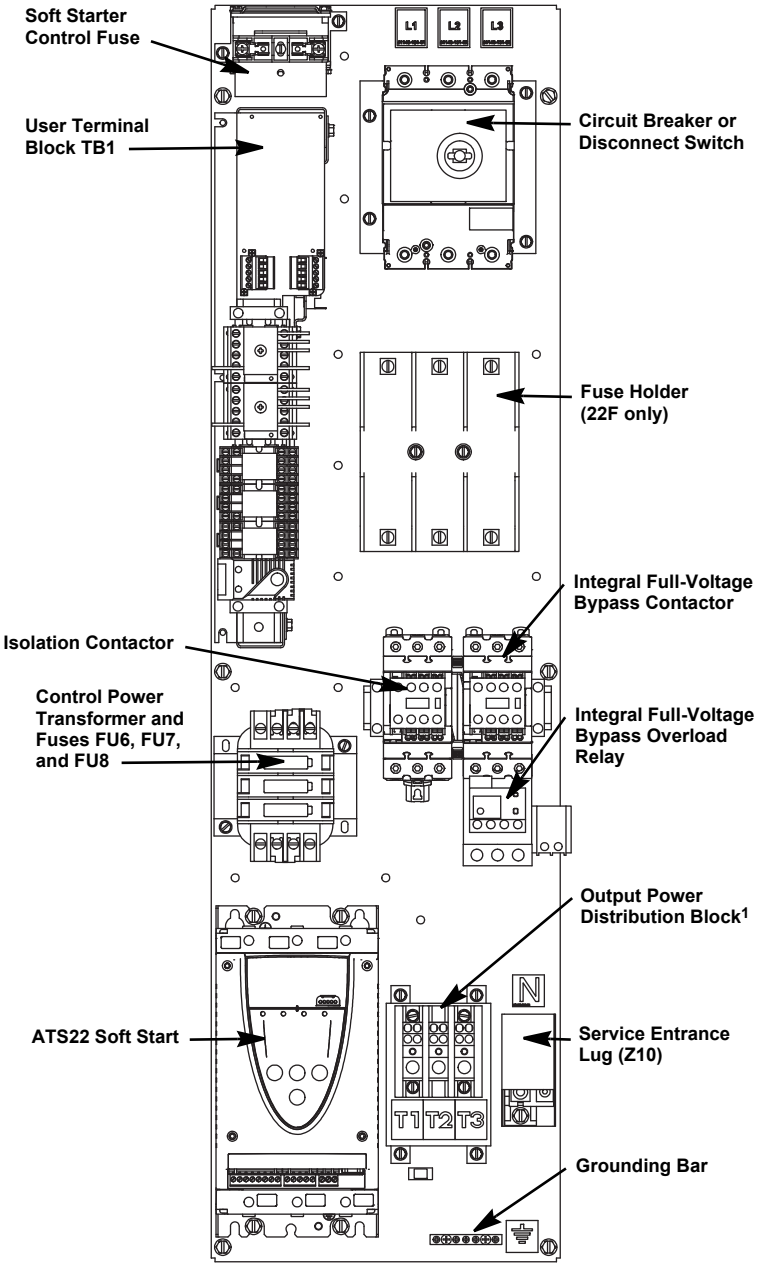
Figure 37: Power Circuit Y05



1 Power distribution block supplied for UL Type 1 and Type 12K enclosures in the following hp/voltages: 3–20 hp @ 208 V; 5–25 hp @ 230 V; 10–50 hp @ 460 V; 15–60 hp @ 575 V. Power Distribution Block supplied for UL Type 3R enclosures in the following hp/voltages: 3–20 hp @ 208 V; 5–20 hp @ 230 V; 10–40 hp @ 460 V; 15–60 hp @ 575 V.

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Power 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.
- Some terminals have voltage on them when the disconnect is open.
- Turn off all power supplying this equipment before working on or inside equipment.
- Always use a properly rated voltage sensing device to confirm that power is off.
- Replace covers before turning on power to equipment.
- Read and understand the precautions in “Before You Begin” on page 8 before performing the procedures in this section.

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

⚠ CAUTION

IMPROPER WIRING

- Do not connect input power leads to the controller output terminals (T1, T2, T3 or U, V, W). This damages the controller and voids the warranty.
- Check the power connections before energizing the controller.

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

⚠ CAUTION

HEAT AND FIRE DAMAGE

Follow the torque requirements specified on the Enclosed 22 controller nameplate.

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

Table 16: Power Terminal Characteristics

Terminal	Function	Voltage (+10%/-15%)
GND	Ground (to grounding bar on panel)	—
L1, L2, and L3	Three-phase power supply (top of circuit breaker)	208
		230
		460
		575
T1, T2, and T3	Output connections to motor (bottom of soft starter, overload relay, or power distribution block)	208
		230
		460
		575

Table 17: Available Wire Bending Space, Power Circuit B05

Controller Rating			Wire Bending Space in. (mm)	Maximum Field Termination Wire Size[1]	Enclosure Size Reference
40 °C (104 °F) hp	UL Type 3R or 50 °C (122 °F) hp	V			
3–25	3–20	208	2.5 (63.5)	AWG 2 (66.4 mm^2)	A
5–30	5–25	230			
10–60	10–50	460			
15-75	15-60	575			
30–50	25–40	208	8 (203.2)	250 kcmil (127 mm^2)	B
40–60	30–50	230			
75–125	60–100	460			
60–125	50–100	208	11 (279.4)	(2) 350 kcmil (177 mm^2)	D
75–150	60–125	230			
150–300	125–250	460			
200–300	150–300	575			
150	125	208	17 (431.8)	(2) 500 kcmil (253 mm^2)	E
200	150	230			
350–400	300–350	460			
400–500	350–400	575			

[1] Maximum wire size according to NEC 2009 Table 312.6(B), based on provided wire bend.

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Table 18: Available Wire Bending Space, Power Circuits S05, N05, R05 and Y05

Controller Rating			Wire Bending Space in. (mm)	Maximum Field Termination Wire Size[1]	Enclosure Size Reference
40 °C (104 °F) hp	UL Type 3R or 50 °C (122 °F) hp	V			
3–10	3–10	208	3.0 (76.2)	AWG 3 (26.7 mm^2)	B
5–15	5–10	230			
10–30	10–25	460			
15–40	15–30	575			
15–25	10–20	208	8.0 (203.2)	AWG 1/0 (53.5 mm^2)	C
20–30	15–25	230			
40–60	30–50	460			
50–75	40–60	575			
30–50	25–40	208	7.0 (177.8)	AWG 4/0 (107 mm^2)	D
40–60	30–50	230			
75–125	60–100	460			
100–150	75–125	575			
60–125	50–100	208	12 (304.8)	(2) 350 kcmil (177 mm^2)	F
75–150	60–125	230			
150–300	125–250	460			
200–300	150–300	575			
150	125	208	13 (330.2)	(2) 500 kcmil (253 mm^2)	G
200	150	230			
350–400	300–350	460			
400–500	350–400	575			

[1] Maximum wire size according to NEC 2009 Table 312.6(B), based on provided wire bend.

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Table 19: Line Power Terminal Wire Range and Torque Requirements[1]

L1, L2, L3 (Line)			Controller Style 22T or 22F			Controller Style 22U		
hp		V	Wire Range AWG (mm²)	Torque lb-in (N•m)	Strip Length in. (mm)	Wire Range AWG (mm²)	Torque lb-in (N•m)	Strip Length in. (mm)
3–25		208	14–10 (2.1–5.3) 8–3/0 (8.4–85)	50 (5.6) 120 (13.5)	0.65 (16)	14–10 (2.1–5.3) 8–3/0 (8.4–85)	50 (5.6) 120 (13.5)	0.65 (16)
5–30		230						
10–60		460						
15–75		575						
30–40		208	14–10 (2.1–5.3) 8–3/0 (8.4–85)	50 (5.6) 120 (13.5)	0.65 (16)	4–4/0 (21–107)	225 (25.4)	1 (25)
40		230						
75		460						
100		575						
50		230	4–4/0 (21–107)	225 (25.4)	1 (25)	4–4/0 (21–107)	225 (25.4)	1 (25)
100		460						
125		575						
50		208	3/0–350 (85–177)	225 (25.4)	1 (25)	3/0–350 (85–177)	225 (25.4)	1 (25)
60		230						
125		460						
150		575						
60		208	3/0–350 (85–177)	225 (25.4)	1 (25)	2–500 (33.6–253)	275[2] (31) 442[3] (50)	1.2 (31)
75		230						
150		460						
200		575						
75		208	2–500 (33.6–253)	275[2] (31) 442[3] (50)	1.2 (31)	2–500 (33.6–253)	275[2] (31) 442[3] (50)	1.2 (31)
100		230						
200		460						
250		575						
100		208	2–500 (33.6–253)	275[2] (31) 442[3] (50)	1.2 (31)	(2)[2] 2/0–350 (67.4–177) (2)[3] 2/0–500 (67.4–253)	275[2] (31) 442[3] (50)	(1) 1.2 (31) (2) 2.4 (61)
125		230						
250		460						
40 °C (104 °F) Rated	50 °C (122°F) Rated							
300	—	575	2–500 (33.6–253)	275[2] (31) 442[3] (50)	1.2 (31)	(2)[2] 2/0–350 (67.4–177) (2)[3] 2/0–500 (67.4–253)	275[2] (31) 442[3] (50)	(1) 1.2 (31) (2) 2.4 (61)
125	—	208	(2)[2] 2/0–350 (67.4–177) (2)[3] 2/0–500 (67.4–253)	275[2] (31) 442[3] (50)	(1) 1.2 (31) (2) 2.4 (61)	(2)[2] 2/0–350 (67.4–177) (2)[3] 2/0–500 (67.4–253)	275[2] (31) 442[3] (50)	(1) 1.2 (31) (2) 2.4 (61)
150	—	230						
300	—	460						
150	125	208	(3) 3/0–500 (85–253)	442 (50)	1 (25)	(3) 3/0–500 (85–253)	442 (50)	1 (25)
200	150	230						
350–400	300–350	460						
400–500	340–400	575						

1 Refer to the product nameplate to confirm torque requirements. The information provided in this table is for reference only.

2 Power terminal wire range and torque requirements for PowerPact D circuit breaker.

3 Power terminal wire range and torque requirements for PowerPact L circuit breaker.

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Table 20: Load Power Terminal Wire Range and Torque Requirements[1]

T1, T2, T3 (Load)			Power Circuit B05, S05, N05, R05			Power Circuit Y05		
40 °C (104 °F) hp	UL Type 3R or 50 °C (122 °F) hp	V	Wire Range AWG (mm²)	Torque lb-in (N•m)	Strip Length in. (mm)	Wire Range AWG (mm²)	Torque lb-in (N•m)	Strip Length in. (mm)
3–10	3–10	208	12–4 (2.5–16)	26 (3)	0.3 (7)	14–10 (2.1–5.3)	35 (3.9)	0.65 (16)
5–15	5–10	230				8 (8.4)	40 (4.5)	
10–30	10–25	460				6–2/0 (13–67)	120 (13.5)	
15–40	15–30	575						
15–20	15–20	208	10–1/0 (4–50)	88 (10)	0.6 (15)	8 (8.4)	40 (4.5)	0.65 (16)
20–25	15–20	230				6–2/0 (13–67)	120 (13.5)	
40–50	30–40	460						
50–60	40–60	575						
25	—	208	10–1/0 (4–50)	88 (10)	0.6 (15)	6–300 (13–151)	275 (31)	1 (25)
30	25	230						
60	50	460						
75	—	575						
30–50	25–40	208	6–300 (13–151)	275 (31)	1 (25)	6–300 (13–151)	275 (31)	1 (25)
40–60	30–50	230						
75–125	60–100	460						
100–150	75–125	575						
60–150	50–125	208	(2) 2–500 (33.6–253)	500 (56)	Lug 1: 1.0 (25) Lug 2: 2.0 (50)	(2) 2–500 (33.6–253)	500 (56)	Lug 1: 1.0 (25) Lug 2: 2.0 (50)
75–200	60–150	230						
150–400	125–350	460						
200–500	150–400	575						

[1] Refer to the product nameplate to confirm torque requirements. The information provided in this table is for reference only.

Table 21: Grounding Bar Wire Range and Torque Requirements

Controller Rating		Grounding Bar		
hp	V	AWG (mm^2)	lb-in (N•m)	Strip Length in. (mm)
Enclosure Sizes A, B, or C				
3–50	208	14–4 (2–21)	35 (4.0)	0.35 (9)
5–60	230			
10–125	460			
15–150	575			
Enclosure Size D, Power Circuits S05, N05, R05 or Y05				
3–50	208	14–4 (2–21)	35 (4.0)	0.35 (9)
40–60	230			
75–125	460			
100–150	575			
Enclosure Size D, Power Circuit B05				
60–125	208	14–8 (2.1–8.4) 6–1/0 (13.3–53.5)	36 (4.1) 45 (5.1)	0.6 (15.2) 0.6 (15.2)
75–150	230			
150–300	460			
200–300	575			
Enclosure Sizes E, F, or G				
60–150	208	6–300 (13.3–151)	275 (31.1)	1 (25.4)
75–200	230			
150–400	460			
200–500	575			

Table 22: Service Entrance (Mod Z10) Wire Range and Torque Requirements

Controller Rating			Main Neutral		Ground	
40 °C (104 °F) hp	UL Type 3R or 50 °C (122 °F) hp	V	AWG (mm^2)	lb-in (N•m)	AWG (mm^2)	lb-in (N•m)
3–25	3–20	208	12–1/0 AL (3.3–53.3 AL) 14–1/0 CU (2.1–53.3 CU)	75 (8.5)	12–1/0 AL (3.3–53.3 AL) 14–1/0 CU (2.1–53.3 CU)	50 (5.6)
5–30	5–25	230				
10–60	10–50	460				
15–75	15–60	575				
30–50	25–40	208	4–300 (21.1–151)	250 (28.2)	6–4 (13.3–21.1) 8 (8.4)	45 (5.1) 40 (4.5)
40–60	30–50	230				
75–125	60–100	460				
100–150	75–125	575				

Continued on next page

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Table 22: Service Entrance (Mod Z10) Wire Range and Torque Requirements *(continued)*

Controller Rating			Main Neutral		Ground	
40 °C (104 °F) hp	UL Type 3R or 50 °C (122 °F) hp	V	AWG (mm^2)	lb-in (N•m)	AWG (mm^2)	lb-in (N•m)
75–125	60–100	208	1–500 (42.4–253)	300 (33.9)	4–300 (21.1–151)	250 (28.2)
100–150	75–125	230				
200–300	150–250	460				
250–300	200–250	575				
150	125	208	3/0–500 (85–253)	300 (33.9)	6–250 (13.3–127)	275 (31.1)
200	150	230				
350–400	300–350	460				
400–500	350–400	575				

Control Wiring

Connect the control wiring to the upper portion of the pull-apart terminal block TB1. See Figure 38 or 39 (pages 70 and 71).

- The control terminals are rated 250 V, 12 A. Maximum wire size for the control terminals:
  - — 12 AWG (2.5 mm^2), 1 wire
  - — 16 AWG (1.5 mm^2), 2 wire
- Minimum tightening torque: 4.5 lb-in (0.5 N•m)
- The user terminals for power circuit B05 are designated on the wiring diagrams. See Figures 43–52 on pages 92–101.

  For other power circuit options (S05, N05, R05 or Y05), refer to the documentation that ships with the controller.

Shunt Trip (B05)

Figure 38: TB1 and TB2 User Terminal Blocks

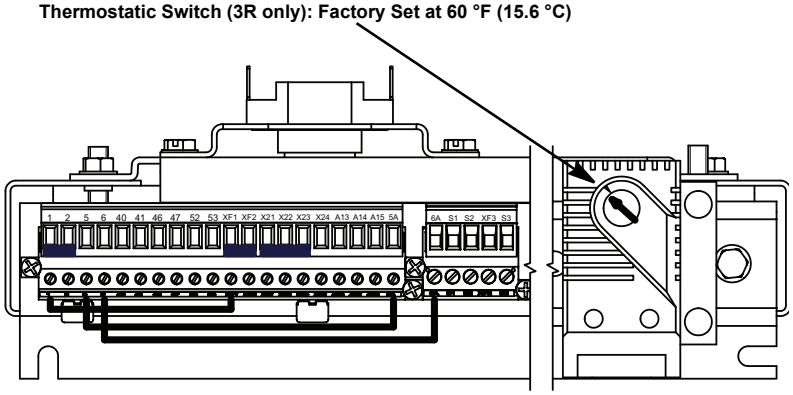

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Table 23: TB1 User Terminal Connections

Function	Description	User Terminals (See Figure 38)	
User Interlock	Remove the jumper between terminals 1 and 2 to add interlock.	1	2
Auto Start Contact[1]	Auto mode run input	5	6
Normally-Open (N.O.) Trip Contact[2]	Closes when the controller trips.	40	41
N.O. Auto Mode Contact[3]	Closes when auto mode is selected.	46	47
N.O. Run Contact[4]	Closes when a run command is provided.	52	53

1 Auto start contact valid only for control options C06 and E06.

2 Requires selecting miscellaneous option J10, N.O. auxiliary trip annunciation contact.

3 Requires selecting miscellaneous option H10, N.O. auxiliary auto mode contact. Valid only with control options C06 and E06.

4 Requires selecting miscellaneous option F10, N.O. auxiliary run mode contact.

Shunt Trip (S05) and Other Power Options (N05, R05, Y05)

Figure 39: TB1 User Terminal Block

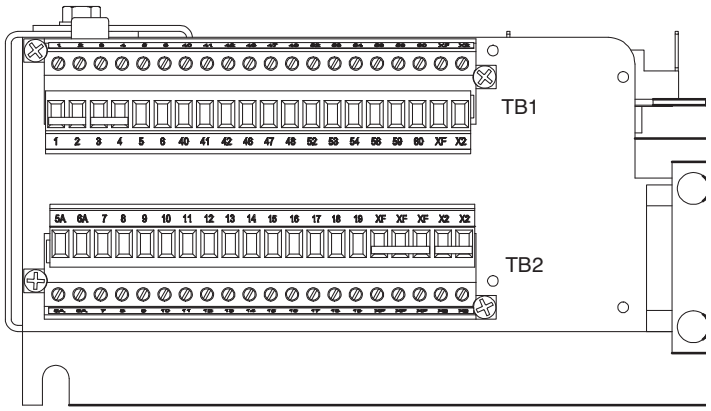

Table 24: TB1 User Terminal Connections

Function	Description	User Terminals (See Figure 39)	
User Interlock 1	Remove the jumper between terminals 1 and 2 to add the interlock.	1	2
User Interlock 2	Remove the jumper between terminals 3 and 4 to add the interlock.	3	4
Auto Start Contact[1]	Auto mode run input.	5	6
Normally-Open (N.O.) Trip Contact[2]	Closes when a fault is detected.	40	41
Normally-Closed (N.C.) Trip Contact[2]	Opens when a fault is detected.	41	42
N.O. Auto Mode Contact[3]	Closes when Auto mode is selected.	46	47
N.C. Auto Mode Contact[3]	Opens when Auto mode is selected.	47	48
N.O. Run Contact[4]	Closes when a run command is provided.	52	53
N.C. Run Contact[4]	Opens when a run command is provided.	53	54

Continued on next page

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Table 24: TB1 User Terminal Connections *(continued)*

Function	Description	User Terminals (See Figure 39)	
N.O. Bypass Contact[5]	Closes when the controller is placed in Bypass mode.	58	59
N.C. Bypass Contact[5]	Opens when the controller is placed in Bypass mode.	59	60
Control Power (120 Vac)	Provides access to control power when option B10 is selected.	XF	X2

1 Auto start contacts valid only for control options C06 and E06.

2 Requires selecting miscellaneous option J10, auxiliary trip annunciation contacts.

3 Requires selecting miscellaneous option H10, auxiliary Auto mode contacts. Valid only with control options C06 and E06.

4 Requires selecting miscellaneous option F10, auxiliary Run mode contacts.

5 Requires selecting miscellaneous option Y06 and miscellaneous option G10.

Initial Start-Up Procedure

⚠ DANGER

HAZARD OF ELECTRIC SHOCK, EXPLOSION, OR ARC FLASH

Read and understand the precautions in “Before You Begin” starting on page 8 before performing the procedures in this section.

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

⚠ 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.

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⚠ DANGER

UNQUALIFIED PERSONNEL

- This equipment must be installed and serviced only by qualified personnel.
- Qualified personnel performing diagnostics or troubleshooting requiring electrical conductors to be energized must comply with NFPA 70 E - Standard for Electrical Safety Requirements for Employee Workplaces and OSHA Standards – 29 CFR Part 1910 Subpart S Electrical.

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

The Enclosed 22 controller is configured for the installed options and tested at the factory. Depending on the application requirements, minor adjustments may be required to complete the field installation. Follow this initial start-up procedure step by step.

With all incoming power removed, make the following equipment checks:

1. Verify that all equipment disconnects are open.
2. If provided, set the selector switch[1] to Off or Stop.
3. Turn off all power supplying this equipment before working on or inside the equipment, and follow lockout/tagout procedures. Always use a properly rated voltage sensing device to confirm that the power is off.
4. Place the unit handle in the Off position and open the door.
5. Check the wiring of the input power ground and the motor ground.
6. Ensure that the motor conductors are wired to the load terminals in the enclosure marked T1, T2, and T3. Load terminals are either at the softstarter, bypass overload relay or power distribution block, depending on the power circuit, horsepower, and voltage selected.

⚠ DANGER

HAZARD OF ELECTRIC SHOCK, EXPLOSION, OR ARC FLASH

- Properly ground the controller panel before applying power.
- Close and secure the enclosure door before applying power.
- Certain adjustments and test procedures require that power be applied to this controller. Exercise extreme caution as hazardous voltages exist. The enclosure door must be closed and secured while turning on power or starting and stopping this controller. Always follow practices and procedures from NFPA 70E, “Standard for Electrical Safety in the Workplace®.”

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

7. Close and secure the enclosure door. Close the controller disconnect. Close the supplying equipment disconnect.
8. Open the controller disconnect by moving the handle to the Off position. Open the enclosure door.

[1] The selector switch is provided with control options A06, B06, D06, or E06.

9. Using a properly rated voltage sensing device set to the appropriate scale, verify that the incoming line voltage at the line side of the disconnecting means is within +10%/-15% of the input voltage rating on the controller nameplate.
10. Close and secure the enclosure door. Close the equipment disconnect means. The Off pilot light[1], if provided, illuminates.

    This controller provides direct thermal protection for the motor when a motor thermal sensor is connected to terminals PTC1 and PTC2 on the ATS22 soft starter terminal block. Refer to the *ATS22 User Manual*, BBV51330, for additional details.

⚠ CAUTION

MOTOR OVERHEATING HAZARD

Use a thermal sensor in the motor as required by the motor manufacturer to facilitate overheating protection at all speeds and load conditions.

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

11. Adjust the full load current setting as follows:
    - — Press the down arrow key on the keypad terminal until the display shows **COnF**. Press the ENT key once, then press the down arrow key until **In** is displayed.
    - — Press the ENT key, then use the up and down arrow keys to adjust the setting to match the full load current listed on the motor nameplate.
    - — Press the ENT key to save the setting, and press the ESC key twice to return to the status menu.

    NOTE: The settings listed in this procedure are suitable for most applications. If your application requires different operating characteristics, refer to the *ATS22 User Manual*, BBV51330.

⚠ WARNING

HAZARDOUS MOVING PARTS

Before starting the Enclosed 22 controller, ensure that the motor and its connected load are clear of personnel and are ready to run.

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

12. Check the direction of motor rotation as follows:
    - — Set the selector switch[2], if provided, to Hand or Run. Press the Start button[3], if provided. Check the direction of motor rotation. If correct, proceed to Step 13. If incorrect, press the Stop button and/or turn the selector switch back to Off or Stop.

[1] Pilot lights are provided with pilot options A07, B07, C07, or D07.

[2] The selector switch is provided with control options B06, C06, D06, and E06.

[3] The Start and Stop pushbuttons are provided with control options A06 and E06.

⚠ 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.

  - — Turn off all power supplying this equipment before working on or inside the equipment, and follow lockout/tagout procedures. Always use a properly rated voltage sensing device to confirm that the power is off.
  - — Place the unit handle in the Off position and open the door.
  - — Correct the direction of motor rotation by reversing any two motor leads connected to the controller output.
  - — Close and secure the enclosure door. Close the equipment disconnect means. The Off pilot light, if provided, illuminates.
  - — Set the selector switch, if provided, to Hand or Run. Press the Start button, if provided. Check the direction of motor rotation. If correct, this completes the motor rotation check.

13. If required for the application, adjust the setting of acceleration time (**ACC**), deceleration time (**dEC**), current limit (**ILt**), max starting time (**tLs**), and other parameters.

ATS22 Soft Starter Factory Settings

If the ATS22 soft starter has been replaced or reset to the factory settings, you may need to adjust some parameter values. The soft starter is factory configured as shown in Table 25. Refer to the *ATS22 User Manual*, BBV51330, for other settings and options.

Table 25: ATS22 Soft Starter Factory Settings

Menu	Parameter	Name	Unit	Description	Factory Setting
COnF	**UIn**	Line Voltage	V	Mains Voltage	According to nameplate
COnF	**In**	Motor Rated Current	A	Motor Rated Current	100% of the controller's nameplate rating
AdJ	**Snb**	# of Starts	—	Number of Starts	3
AdJ	**SLG**	Starts Period	min	Starts Period	60
IO	**LI2**	Logic Input LI2	(B05) Basic Shunt Trip Power Circuit	(A06) Start-Stop Pushbuttons	**Strt** (3-Wire)
				(C06) Hand-Off-Auto Selector Switch	**rUn** (2-Wire)
				(D06) Run-Stop Selector Switch	**rUn** (2-Wire)
				(E06) Hand-Auto Selector Switch and Start-Stop Pushbuttons	**Strt** (3-Wire)
			(S05, N05, R05, Y05) All Control Options		**rUn** (2-Wire)

Programming Access with Omit Keypad Option (U10) or UL Type 3R Enclosure (H03)

⚠ DANGER

HAZARD OF ELECTRIC SHOCK, EXPLOSION, OR ARC FLASH

- Properly ground the controller panel before applying power.
- Close and secure the enclosure door before applying power.
- Certain adjustments and test procedures require that power be applied to this controller. Exercise extreme caution as hazardous voltages exist. The enclosure door must be closed and secured while turning on power or starting and stopping this controller. Always follow practices and procedures from NFPA 70E, “Standard for Electrical Safety in the Workplace.”

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

When option U10, Omit Door-Mounted Keypad, is selected, the remote keypad (VW3G22101) and cable (WV3A1104R30) must be ordered to make programming changes to the soft starter. Option H03, UL Type 3R enclosure, includes a remote keypad and cable inside the enclosure.

To program the controller when options U10 or H03 are selected:

1. Remove all power from the controller, then test for the absence of voltage.

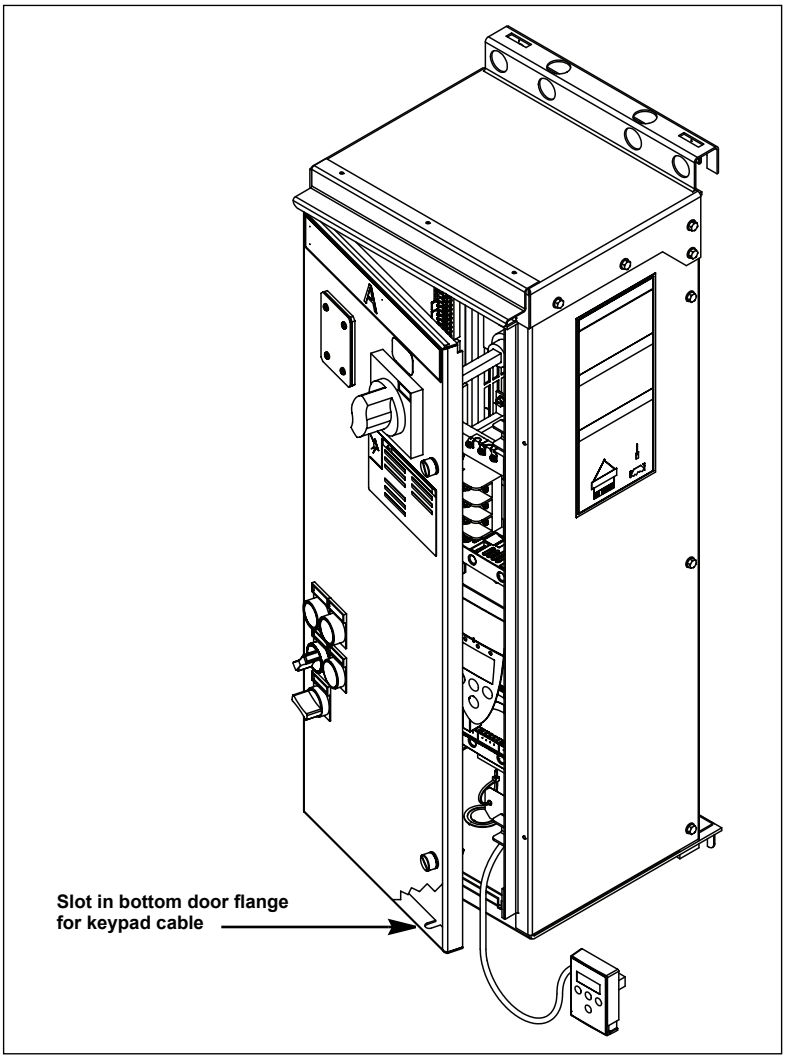
   NOTE: Verify that the voltage tester is functioning properly before and after testing for the absences of voltage.

2. Turn the circuit breaker and handle assembly to the Off position and open the enclosure door.
3. Remove the remote keypad and cable from the enclosure.

4. Connect the remote keypad and cable to the soft starter.
5. Route the keypad cable between the bottom enclosure flange and the notch in the bottom of the door flange. See Figure 40.
6. Close and secure the enclosure door. Ensure that the keypad cable is not pinched by the door.
7. Close the disconnect means.
8. Program the controller with the keypad.
9. When programming is complete, remove all power then test for the absence of voltage.
10. Open the enclosure door and remove the remote keypad cable from the soft starter.
11. Place the remote keypad and cable inside the enclosure. Do not leave the remote keypad in the bottom of the enclosure.
12. Close and secure the enclosure door.

To program or control the ATS22 soft starter through the Modbus™ communication port, refer to the *ATS22 User Manual*, BBV51330.

Figure 40: Remote Keypad Access on Wall-Mounted Enclosures



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Adjusting the PowerPact Motor Circuit Protector Trip Setting

Style 22T

If controller style 22T (Powerpact motor circuit protector disconnect) is provided, the adjustable magnetic-trip circuit breaker setting is factory-set to the minimum current. You may have to adjust these settings for proper motor start-up. Refer to the magnetic trip setpoint limits outlined in the applicable national standards.

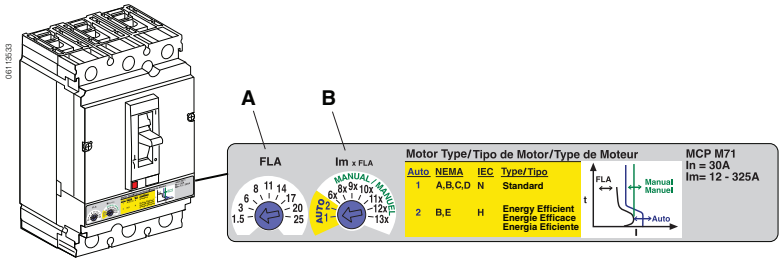
⚠ DANGER

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.

Figure 41: PowerPact H/J FLA and Im Dials



To access the PowerPact H or J full load amps (FLA) and instantaneous trip setting (Im) dials:

1. Turn off all power supplying this equipment before working on or inside the equipment, and follow lockout/tagout procedures. Always use a properly rated voltage sensing device to confirm that the power is off.
2. Place the unit handle in the Off position and open the door.
3. To set the motor circuit protector, refer to the instruction bulletin supplied with the equipment, or download it from the Technical Library at www.schneider-electric.us.

NOTE: Motor circuit protectors are suitable for motors with locked-rotor indicating code letters based on applicable national codes and standards. For other motors, consult your local Schneider Electric field sales representative.

Table 26: Style 22T Motor Circuit Protector Selection

hp	208 V	230 V	460 V	575 V
3	HLL36030M71	—	—	—
5	HLL36030M71	HLL36030M71	—	—
7.5	HLL36050M72	HLL36050M72	—	—
10	HLL36050M72	HLL36050M72	HLL36030M71	—
15	HLL36100M73	HLL36100M73	HLL36050M72	HLL36030M71
20	HLL36150M74	HLL36100M73	HLL36050M72	HLL36030M71
25	HLL36150M74	HLL36150M74	HLL36050M72	HLL36050M72
30	HLL36150M74	HLL36150M74	HLL36100M73	HLL36050M72
40	HLL36150M74	HLL36150M74	HLL36100M73	HLL36100M73
50	JLL36250M75	JLL36250M75	HLL36150M74	HLL36100M73
60	JLL36250M75	JLL36250M75	HLL36150M74	HLL36100M73
75	DJL36400M36 LLL36400M37XLY	JLL36250M75	HLL36150M74	HLL36150M74
100	DJL36400M36 LLL36400M37XLY	DJL36400M36 LLL36400M37XLY	JLL36250M75	HLL36150M74
125	DJL36600M42[1] LLL36600M37X[1]	DJL36400M36 LLL36400M37XLY	JLL36250M75	JLL36250M75
150	PLL34060M68[2]	DJL36600M42[1] LLL36600M37X[1]	JLL36250M75	JLL36250M75
200	—	PLL34060M68[2]	DJL36400M36 LLL36400M37XLY	JLL36250M75
250	—	—	DJL36400M36 LLL36400M37XLY	DJL36400M36 LLL36400M37XLY
300	—	—	DJL36600M42[1] LLL36600M37X[1]	DJL36400M36 LLL36400M37XLY
350	—	—	PLL34060M68	—
400	—	—	PLL34060M68[2]	PKL36060M68
500	—	—	—	PKL36060M68[2]

1 600 A PowerPact P motor circuit protector is supplied for UL Type 3R or 50 °C (122 °F) rated enclosures.

2 Selection valid for UL Type 1 and Type 12 enclosures only. Not valid for 50 °C (122 °F) rated enclosures.

Style 22U

Some circuit breakers have trip settings that may need adjustment according to the application and motor type. For more information on trip setting adjustment, refer to the circuit breaker instruction bulletin provided with the equipment, or available for download from the Technical Library at www.schneider-electric.us.

Figure 42: PowerPact J FLA and Im Dial

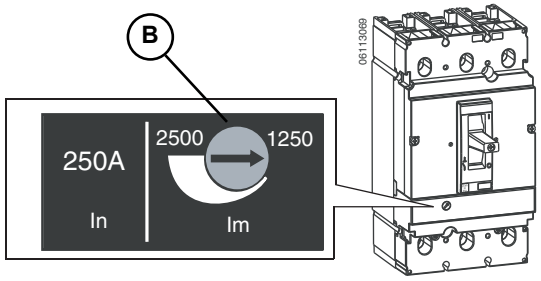


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Table 27: Style 22U Thermal-Magnetic Circuit Breaker Selection

hp	208 V	230 V	460 V	575 V
3	HLL36025	—	—	—
5	HLL36040	HLL36035	—	—
7.5	HLL36060	HLL36050	—	—
10	HLL36070	HLL36070	HLL36035	—
15	HLL36110	HLL36090	HLL36050	HLL36040
20	HLL36125	HLL36110	HLL36060	HLL36050
25	HLL36150	HLL36125	HLL36070	HLL36060
30	JLL36175	HLL36150	HLL36090	HLL36080
40	JLL36250	JLL36175	HLL36110	HLL36100
50	JLL36250	JLL36250	HLL36125	HLL36125
60	DLL36400E20 LLL36400U31XLY	JLL36250	HLL36150	HLL36150
75	DLL36400E20 LLL36400U31XLY	DLL36400E20 LLL36400U31XLY	JLL36175	HLL36150
100	DLL36600E20 LLL36600U31X	DLL36400E20 LLL36400U31XLY	JLL36250	JLL36175[1]
125	DLL36600E20[2] LLL36600U31X[2]	DLL36600E20 LLL36600U31X	JLL36250	JLL36250
150	MJL36600[3]	DLL36600E20[2] LLL36600U31X[2]	DLL36400E20 LLL36400U31XLY	JLL36250
200	—	MJL36800[3]	DLL36400E20 LLL36400U31XLY	DLL36400E20 LLL36400U31XLY
250	—	—	DLL36600E20 LLL36600U31X	DLL36400E20 LLL36400U31XLY
300	—	—	DLL36600E20[2] LLL36600U31X[2]	DLL36600E20 LLL36600U31X
350	—	—	MJL36800	—
400	—	—	MJL36800[3]	MJL36600
500	—	—	—	MJL36800[3]
Circuit Breaker Supplied with Option 610				
150	PLL34060[3]	—	—	—
200	—	PLL34080[3]	—	—
250	—	—	—	—
300	—	—	—	—
350	—	—	PLL34080	—
400	—	—	PLL34080[3]	PKL36060
500	—	—	—	PKL36080[3]

1 JLL36200 circuit breaker is supplied for UL Type 3R or 50 °C (122 °F) rated enclosures.

2 600 A PowerPact M or P circuit breaker is supplied for UL Type 3R or 50 °C (122 °F) rated enclosures.

3 Selection valid for UL Type 1 and Type 12 enclosures only. Not valid for 50 °C (122 °F) rated enclosures.

Power Fuse Recommendations Style 22F

You must supply and install the power fuses in controllers supplied with fusible switch disconnects. Select the fuses from Tables 28 and 29 (page 81). All Enclosed 22 controllers accept UL Class J time-delay fuses, depending on the full load current rating.

Select fuses according to the recommendations in this section and make sure they conform with all local and national codes regarding selection of fuse protection and the actual full load current of the motor. The selections provided in Tables 28 and 29 comply with the requirements of NFPA 70 (NEC) and with the Canadian Electric Code (CEC) based on the rated current of the Enclosed 22 controller.

To order power fuses from Schneider Electric, refer to Section 5 Maintenance beginning on page 103. Consult the factory for the ampacity of other fuses.

Table 28: Maximum Power Fuse Ampacity for Controllers with Fusible Switch Disconnect (22F)

hp	208 V	230 V	460 V	575 V
3	15	—	—	—
5	25	30	—	—
7.5	40	35	—	—
10	50	45	20	—
15	80	70	35	25
20	100	90	45	35
25	125	110	60	45
30	150	125	70	50
40	200	175	90	70
50	250	225	110	90
60	250	250	125	100
75	350	300	150	125
100	450	400	200	150
125	600	500	250	200
150	600[1]	600	300	250
200	—	600[1]	400	300
250	—	—	500	400
300	—	—	600	500
350	—	—	600	500
400	—	—	600[1]	600
500	—	—	—	600[1]

[1] Selection valid for UL Type 1 and Type 12 enclosures only. Not valid for 50 °C (122 °F) rated enclosures.

Table 29: Supplied UL Class J Fuse Base Current Rating for Controllers with Fusible Switch Disconnect (22F)

hp	208 V	230 V	460 V	575 V
3	30	—	—	—
5	30	30	—	—
7.5	60	60	—	—
10	60	60	30	—
15	100	100	60	30
20	100	100	60	60
25	200	200	60	60
30	200	200	100	60
40	200	200	100	100
50	400	400	200	100
60	400	400	200	100
75	400	400	200	200
100	600	400	200	200
125	600	600	400	200
150	600[1]	600	400	400
250	—	600[1]	400	400
250	—	—	600	400
300	—	—	600	600
350	—	—	600	600
400	—	—	600[1]	600
500	—	—	—	600[1]

[1] Selection valid for UL Type 1 and Type 12 enclosures only. Not valid for 50° C (122 °F) rated enclosures.

Overload Relay Adjustment

Always verify that the overload relay setting does not exceed the motor full load current or rated controller current found on the Enclosed 22 nameplate, whichever is less.

Tables 30 and 31 provide the adjustment ranges for overload relays according to horsepower rating and voltage. Contact the factory if the adjustment ranges do not meet the intended application.

Table 30: Overload Relay Adjustment Ranges for Full-Voltage Bypass Operation, UL Type 1 and Type 12

hp	208 V	230 V	460 V	575 V
3	9–13	—	—	—
5	12–18	12–18	—	—
7.5	23–28	16–24	—	—
10	23–32	25–32	12–18	—
15	37–50	37–50	16–24	12–18
20	48–65	48–65	23–28	17–25
25	60–100	55–70	30–40	23–32
30	60–100	60–100	30–40	30–40
40	90–150	90–150	48–65	37–50
50	90–150	90–150	55–70	48–65

Continued on next page

Table 30: Overload Relay Adjustment Ranges for Full-Voltage Bypass Operation, UL Type 1 and Type 12 *(continued)*

hp	208 V	230 V	460 V	575 V
60	132–220	132–220	60–100	48–65
75	200–330	132–220	60–100	60–100
100	200–330	200–330	90–150	90–150
125	300–500	200–330	132–220	90–150
150	300–500	300–500	132–220	132–220
200	—	380–630	200–330	132–220
250	—	—	200–330	200–330
300	—	—	300–500	200–330
350	—	—	300–500	—
400	—	—	380–630	300–500
500	—	—	—	380–630

Table 31: Overload Relay Adjustment Ranges for Full-Voltage Bypass Operation, UL Type 3R and 50 °C (122 °F)

hp	208 V	230 V	460 V	575 V
3	9–13	—	—	—
5	12–18	12–18	—	—
7.5	17–25	16–24	—	—
10	23–32	23–32	12–18	—
15	37–50	37–50	16–24	12–18
20	48–65	48–65	23–28	17–25
25	60–100	60–100	30–40	23–32
30	60–100	60–100	30–40	30–40
40	90–150	90–150	48–65	37–50
50	132–220	90–150	60–100	48–65
60	132–220	132–220	60–100	48–65
75	200–330	132–220	60–100	60–100
100	200–330	200–330	90–150	90–150
125	300–500	200–330	132–220	90–150
150	—	300–500	132–220	132–220
200	—	—	200–330	132–220
250	—	—	200–330	200–330
300	—	—	200–330	200–330
350	—	—	300–500	300–500
400	—	—	—	300–500

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Section 4—Circuit Descriptions

Precautions

⚠ DANGER

HAZARD OF ELECTRIC SHOCK, EXPLOSION, OR ARC FLASH

Read and understand the precautions in “Before You Begin” starting on page 8 before performing the procedures in this section.

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

⚠ DANGER

UNINTENDED EQUIPMENT OPERATION

Before operating the Enclosed 22 controller:

- Read and understand the *ATS22 User Manual*, BBV51330, before changing any parameters from the factory defaults. Refer to Table 25 on page 76 for parameter settings.
- If the ATS22 soft starter is re-initialized using the total or partial factory setting function, the soft starter must be reprogrammed to the values listed in Table 25 on page 76.
- If the soft starter or the main control board of the soft starter is replaced, the soft starter must be reprogrammed to the values listed in Table 25 on page 76.

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

Power Circuit B: Basic Shunt Trip

The basic shunt trip power circuit is a space optimized version of the Enclosed 22 controller. Limited space is provided for field mountable control equipment.

If a fault is detected, a shunt trip coil in the circuit breaker trips the breaker, removing all power on the load side of the disconnect. After all detected fault conditions are cleared, the disconnect must be reset before restarting is permitted. The shunt trip function is coordinated by a time delay relay (time set for 2 seconds) signaled from the trip annunciation relay.

Power Circuit S: Full-Featured Shunt Trip

The full-featured shunt trip power circuit is a fully customizable version of the Enclosed 22 controller. Additional space is provided for engineered to order options and field installable equipment.

If a fault is detected, a shunt trip coil in the circuit breaker trips the breaker, removing all power on the load side of the disconnect. After all detected fault conditions are cleared, the disconnect must be reset before restarting is permitted. The shunt trip function is coordinated by a time delay relay (time set for 2 seconds) signaled from the trip annunciation relay.

Power Circuit N: Non-Reversing Isolation

The non-reversing power circuit provides a line isolation contactor ahead of the ATS22 softstarter when the starter is not in operation, protecting the starter from potentially hazardous power system transients induced by lightning or capacitor switching. Additional space is provided for engineered-to-order options and field-installable equipment.

On application of power, the softstarter is supplied control power. Mains power remains isolated from the softstarter until a run command is applied, at which time the isolation contactor closes and motor starting begins. In the event of a detected fault, or if the run command is removed, the isolation contactor opens.

NOTE: If a soft stop is programmed, the isolation contactor will remain closed until the end of the soft stop ramp time.

Power Circuit R: Reversing Operation

The reversing power circuit provides a line isolation contactor ahead of the ATS22 softstarter when the starter is not in operation, protecting the starter from potentially hazardous power system transients induced by lightning or capacitor switching. Additionally, integral reversing contactors allow for selection of motor operation in either forward or reverse direction.

On application of power, the softstarter is supplied control power. Mains power remains isolated from the softstarter until the directional selector switch is turned to forward or reverse, at which time the line side contactor closes and motor starting begins. In the event of a detected fault, or if the switch is turned to off, the line side contactor opens.

An intentional start delay of 15 seconds is factory set. When reversing motor direction, place the switch in the off position until the motor comes to a complete stop, then to the desired direction.

NOTE: Soft-stop functionality is not recommended in the reversing power circuit. Line isolation is provided when the run command is removed. Auto mode operation is not recommended.

Power Circuit Y: Isolation with Integral Full-Voltage Bypass

The Isolation with integral full-voltage bypass power circuit provides the same functionality as power circuit N described above. In addition, an integral full voltage bypass starter is provided in the unlikely condition that the starter becomes inoperable.

The integral full-voltage bypass starter includes a Class 20 bi-metallic or solid-state overload relay and door-mounted overload relay reset button.

NOTE: Switching between *Normal* mode and *Bypass* mode without allowing the motor to come to a complete stop is not recommended.

UL Type 3R Operation

To prevent condensation on the inside of the cabinet, leave the mains power energized even when the motor is not running.

Control Options

Mod A06: Start-Stop Pushbuttons

Mod A06 provides a door-mounted, black Start pushbutton and a door-mounted, red Stop pushbutton for operating the controller locally (3-wire control scheme).

- The Start pushbutton commands the controller to start the motor.
- The Stop pushbutton commands the controller to stop the motor by freewheel stop (factory setting) or by deceleration ramp.

Mod B06: Forward-Off-Reverse Selector Switch

Mod B06 provides a door-mounted Forward-Off-Reverse selector switch for operating the controller (2-wire control scheme).

- Forward and Reverse modes are for directional control of the motors attached to applications requiring rotation in both directions. When the switch is moved to either position, the controller starts the motor in the selected direction.
- Off mode commands the controller to stop the motor by freewheel stop. Programming the soft-stop function is not recommended as the attempt to softstop will trip the controller.

Always allow the motor to come to a complete stop before changing rotational direction.

Mod C06: Hand-Off-Auto Selector Switch

Mod C06 provides a door-mounted Hand-Off-Auto selector switch for operating the controller (2-wire control scheme).

- Hand mode is for local control. When Hand mode is selected, the controller starts the motor.
- Off mode commands the controller to stop the motor by freewheel stop (factory setting) or by deceleration ramp.
- Auto mode is for remote control. In Auto mode, the controller starts the motor when the user-supplied Start contact is closed between controller terminals 5 and 6. The controller stops the motor when the user-supplied Start contact is opened. See Table 23 on page 70.

Mod D06: Stop-Run Selector Switch

Mod D06 provides a door-mounted Stop-Run selector switch for operating the controller (2-wire control scheme).

- Run mode commands the controller to start the motor.
- Stop mode commands the controller to stop the motor by freewheel stop (factory setting) or by deceleration ramp.

Mod E06: Hand-Auto Selector Switch and Start-Stop Pushbuttons

Mod E06 provides a door-mounted, black Hand-Auto selector switch, a Start pushbutton, and a Stop pushbutton (mixed mode control scheme).

- Hand mode is for local control. In Hand mode:
  - The Start pushbutton commands the controller to start the motor.
  - The Stop pushbutton commands the controller to stop the motor by freewheel stop (factory setting) or by deceleration ramp.
- Auto mode is for remote control. In Auto mode, the controller starts the motor when the user-supplied Start contact is closed between controller

terminals 5 and 6. The controller stops the motor when the user-supplied Start contact is opened. See Table 23 on page 70. In auto mode:

— The Start pushbutton **does not** command the controller to start the motor locally.

— The Stop pushbutton does not command the controller to stop. To stop the controller, remove the auto-mode start command or turn off the mains disconnect switch.

No Control Operators

No door-mounted control operators provided. Omit a control option selection when ordering to receive no operators.

Pilot Light Cluster Options

Mod A07: Pilot Light Cluster #1

Mod A07 provides red Run (On) and green Off pilot lights for status annunciation.

Mod B07: Pilot Light Cluster #2

Mod B07 provides red Run (Push-to-Test) and green Off (Push-to-Test) pilot lights for status annunciation.

Mod C07: Pilot Light Cluster #3

Mod C07 provides red Run (On), green Off, and yellow Trip pilot lights for status annunciation.

Mod D07: Pilot Light Cluster #4

Mod D07 provides red Run (Push-to-Test), green Off (Push-to-Test), and yellow Trip pilot lights for status annunciation. The yellow Trip pilot light includes pushbutton functionality and also serves as a trip reset for the ATS22 soft starter.

No Pilot Lights

No door-mounted lights are provided. Omit a pilot light option selection when ordering to receive no lights.

Metering Options

Mod B08: Elapsed Run Time Meter

Mod B08 provides a door-mounted elapsed time meter, indicating the number of hours the controller has been running.

Miscellaneous Options

Mod A10: Floor Mounting Kit

Mod A10 Is provided for Enclosure D and includes a kit for mounting the equipment to the floor or ground.

Mod B10: 150 VA Control Power

Mod B10 provides additional control power transformer VA capacity to power field-installable equipment and control circuits.

Mod C10: Power Up On Delay

Mod C10 provides a delayed starting feature. The delay is programmable between one and thirty seconds by adjusting timer ODRT. The factory setting is fifteen seconds.

Mod D10: Emergency Stop Pushbutton

Mod D10 provides a door-mounted emergency stop pushbutton. When the option is selected, the disconnect is provided with a shunt trip function. Pressing the emergency stop pushbutton will trip the disconnect switch, removing all electrical power from the controller.

NOTE: To restore operation, the pushbutton must be pulled out and the disconnect switch must be reset to the Off position and then turned on.

Mod E10: cUL Label

Mod E10 provides a Canadian Underwriters Laboratories label when required by local code requirements.

ENGLISH

Mod F10: Auxiliary Contact for Run Mode Annunciation

Power Circuit B05

Mod F10 provides one Form A normally open (N.O.) contact, rated 5 A at 120 Vac, wired to the terminal blocks. The contact(s) change state when the controller is applying power to the motor.

Power Circuits S05, N05, R05, and Y05

Mod F10 provides one Form C set of contacts, rated 5 A at 120 Vac, wired to the terminal blocks. The contact(s) change state when the controller is applying power to the motor.

Mod G10: Auxiliary Contact for Bypass Run Indication

Mod G10 provides one Form C contact, rated 5 A at 120 Vac, to the terminal blocks. The contact closes when the controller is applying power to the motor.

Mod H10: Auxiliary Contact for Auto Mode Annunciation

NOTE: MOD C06 (Hand-Off-Auto Selector Switch) or E06 (Hand-Auto Selector Switch) must be specified with Mod H10.

Power Circuit B05

Mod H10 provides one Form A, normally open (N.O.) contact, rated 5 A at 120 Vac, wired to the terminal blocks. The contact(s) change state when the controller is placed in Auto (remote) mode.

Power Circuits S05, N05, and Y05

Mod H10 provides one Form C set of contacts, rated 5 A at 120 Vac, wired to the terminal blocks. The contact(s) change state when the controller is placed in Auto (remote) mode. Auto mode operation is not recommended for reversing applications so this option is not provided for power circuit R05.

Mod J10: Auxiliary Contact for Trip Condition Annunciation

Power Circuit B05

Mod J10 provides one Form A, normally open (N.O.) contact, rated 5 A at 120 Vac, wired to the terminal blocks. The contact(s) change state when the controller detects a fault or trips.

Power Circuits S05, N05, R05, and Y05

Mod J10 provides one Form C set of contacts, rated 5 A at 120 Vac, wired to the terminal blocks. The contact(s) change state when the controller detects a fault or trips.

Mod L10: Customer Engraved Nameplates

Mod L10 provides custom engraved nameplates for the controller, identifying the equipment or the equipment that it controls. Engraving information must be provided when the order is placed.

Mod M10: Ten Additional Unwired Terminal Points

Mod M10 provides an additional ten unwired control terminals for wiring and interfacing field-installable equipment. The terminals are rated 5 A at 250 Vac.

Mod P10: Permanent Wire Markers

Mod P10 provides shrink-wrapped control wire markers for identifying and troubleshooting control circuits.

Mod R10: Transient Voltage Surge Protection

Mod R10 provides an integrated supplementary voltage surge protective device to protect equipment from transient voltage surges associated with some electrical power distribution systems.

Mod U10: Omit Door-Mounted Keypad Display

Mod U10 omits the door-mounted keypad display. A keypad closing plate and gasket are provided on the door. See “Programming Access with Omit Keypad Option (U10) or UL Type 3R Enclosure (H03)” on page 76. To program or control the ATS22 soft starter with Modbus communication, refer to the *ATS22 User Manual*, BBV51330.

Mod X10: 50 °C Operation

Mod X10 provides a high ambient equipment rating above 40 °C (104 °F) to a maximum of 50 °C (122 °F) without derating.

NOTE: The 50 °C rating is standard on all UL Type 3R (H03) enclosures.

Mod Z10: Service Entrance Rating

Mod Z10 provides a UL869A approved insulated ground neutral lug assembly and mounting bracket with a bonded enclosure ground wire suitable for use as service entrance rated equipment. Service Entrance Rating is not available with Mod E10 (cUL Label).

Mod Y10: Seismic Qualified

Mod Y10 provides a certification label indicating that the enclosure is qualified with seismic rating AC156 acceptance criteria test protocol with an importance factor of 1.5. Refer to “Seismic Qualification Mounting Criteria” on page 32.

Mod 610: High Interrupting Rating

Mod 610 provides a high interrupting rating for size E and G Enclosed 22 controllers with circuit breaker disconnection (22U). Standard short circuit ratings are 65 kA @ 460 V and 25 kA @ 575 V. Selecting these ratings increases the short circuit current rating to 100 kA @ 460 V or 50 kA @ 575 V. The option is not valid with magnetic only (22T) or fusible (22F) disconnect types. These disconnect types are provided with high interrupting rating by default.

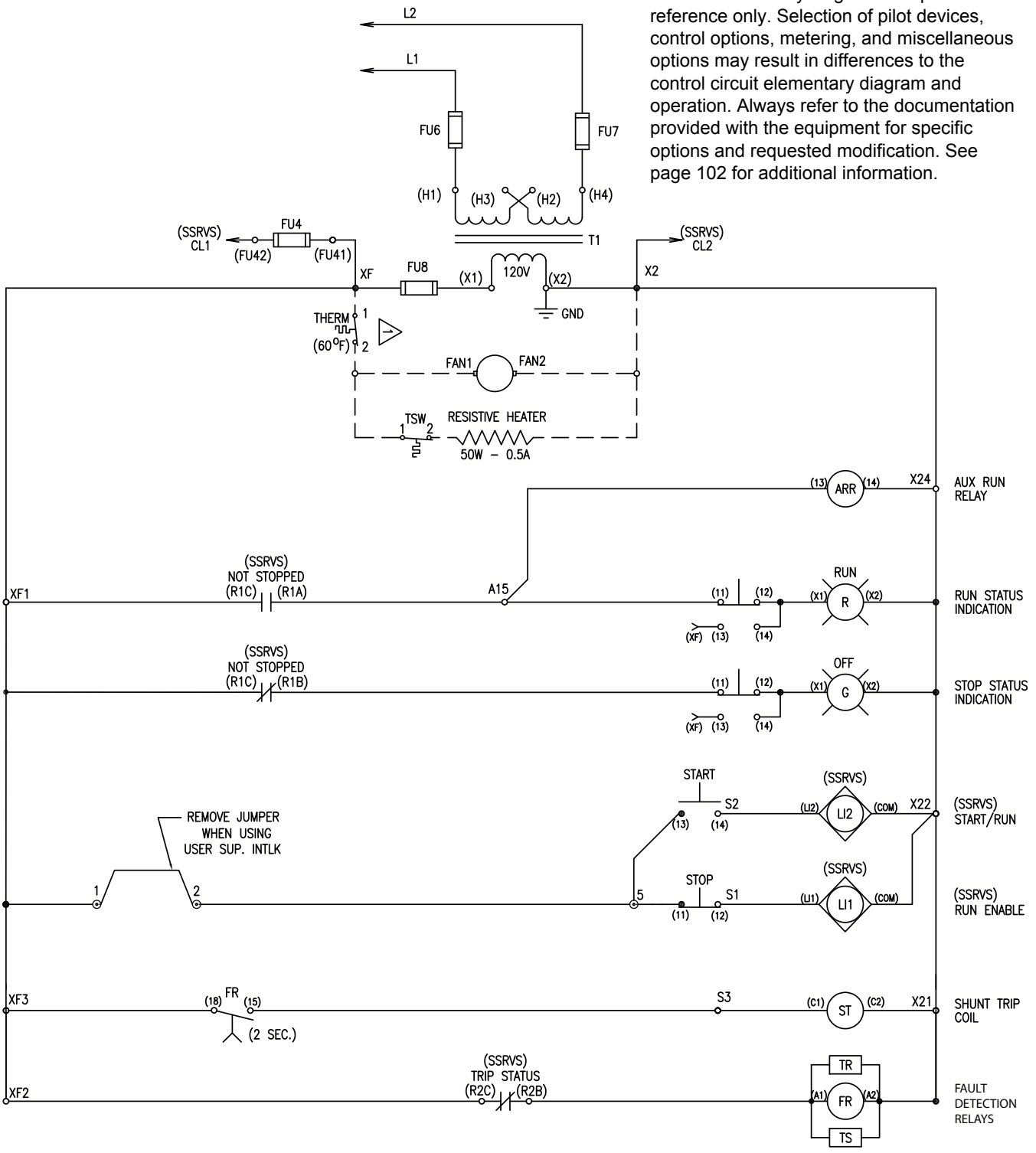
Mod 910: ARRA Option

Select Mod 910 to comply with requirements of the American Recovery and Reinvestment Act (ARRA) of 2009 (Pub.L. 111-5). Equipment will be assembled in the U.S.

ENGLISH

Figure 43: Power Circuit B05 Control Elementary Diagram, Mod A06, Start-Stop Pushbuttons

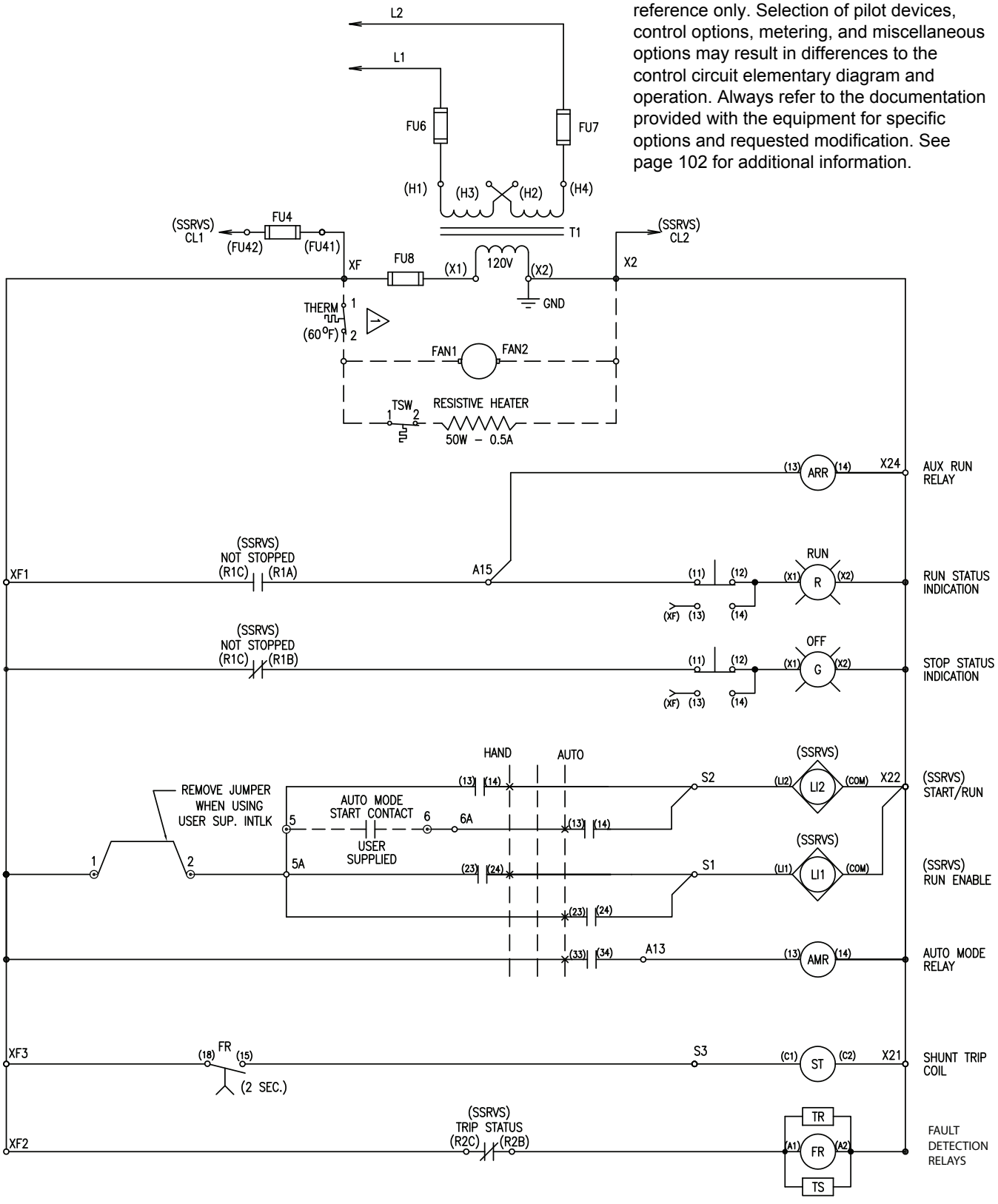
NOTE: Elementary diagrams are provided for reference only. Selection of pilot devices, control options, metering, and miscellaneous options may result in differences to the control circuit elementary diagram and operation. Always refer to the documentation provided with the equipment for specific options and requested modification. See page 102 for additional information.



ENGLISH

Figure 44: Power Circuit B05 Control Elementary Diagram, Mod C06, Hand-Off-Auto Selector Switch

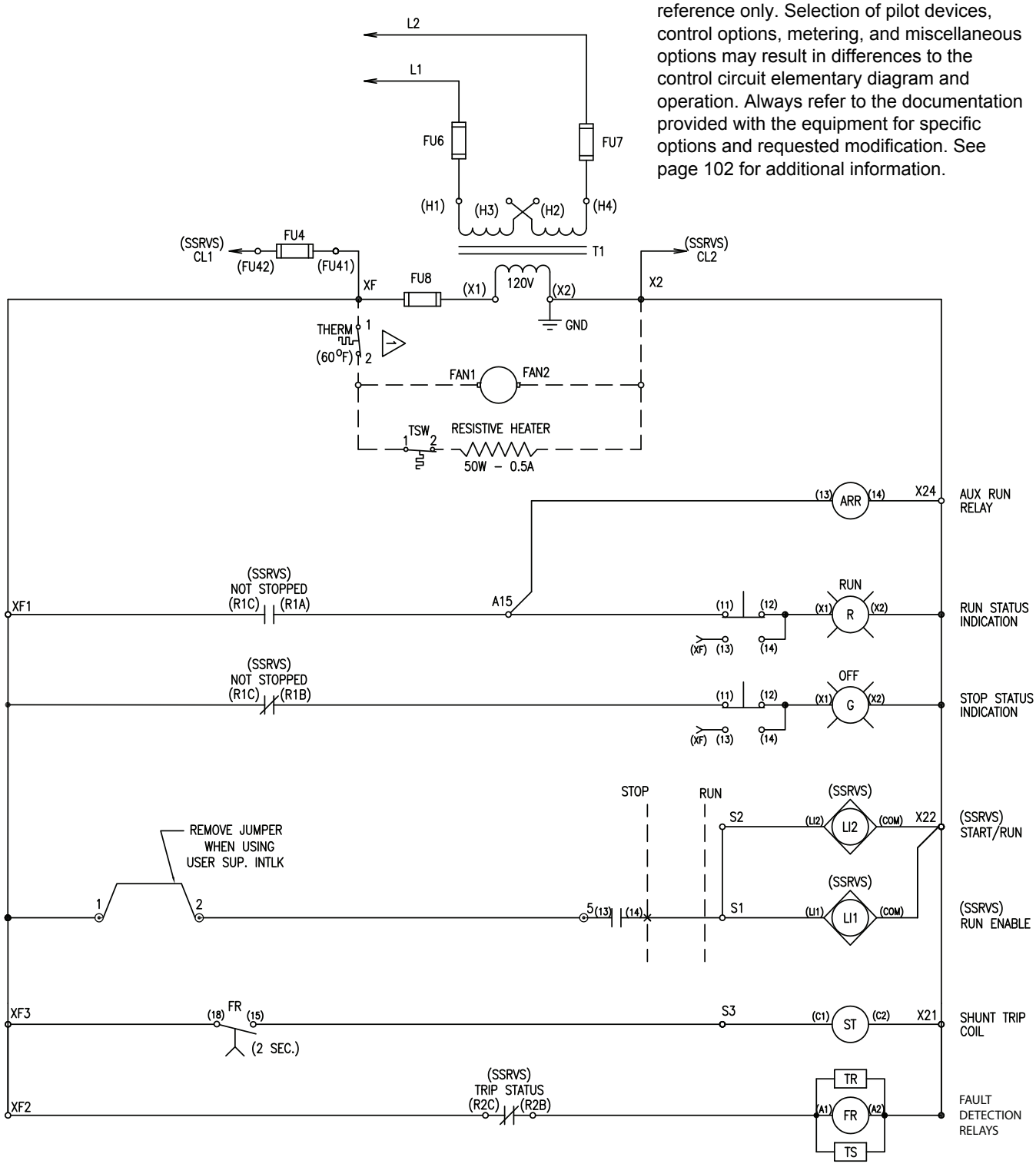
NOTE: Elementary diagrams are provided for reference only. Selection of pilot devices, control options, metering, and miscellaneous options may result in differences to the control circuit elementary diagram and operation. Always refer to the documentation provided with the equipment for specific options and requested modification. See page 102 for additional information.



ENGLISH

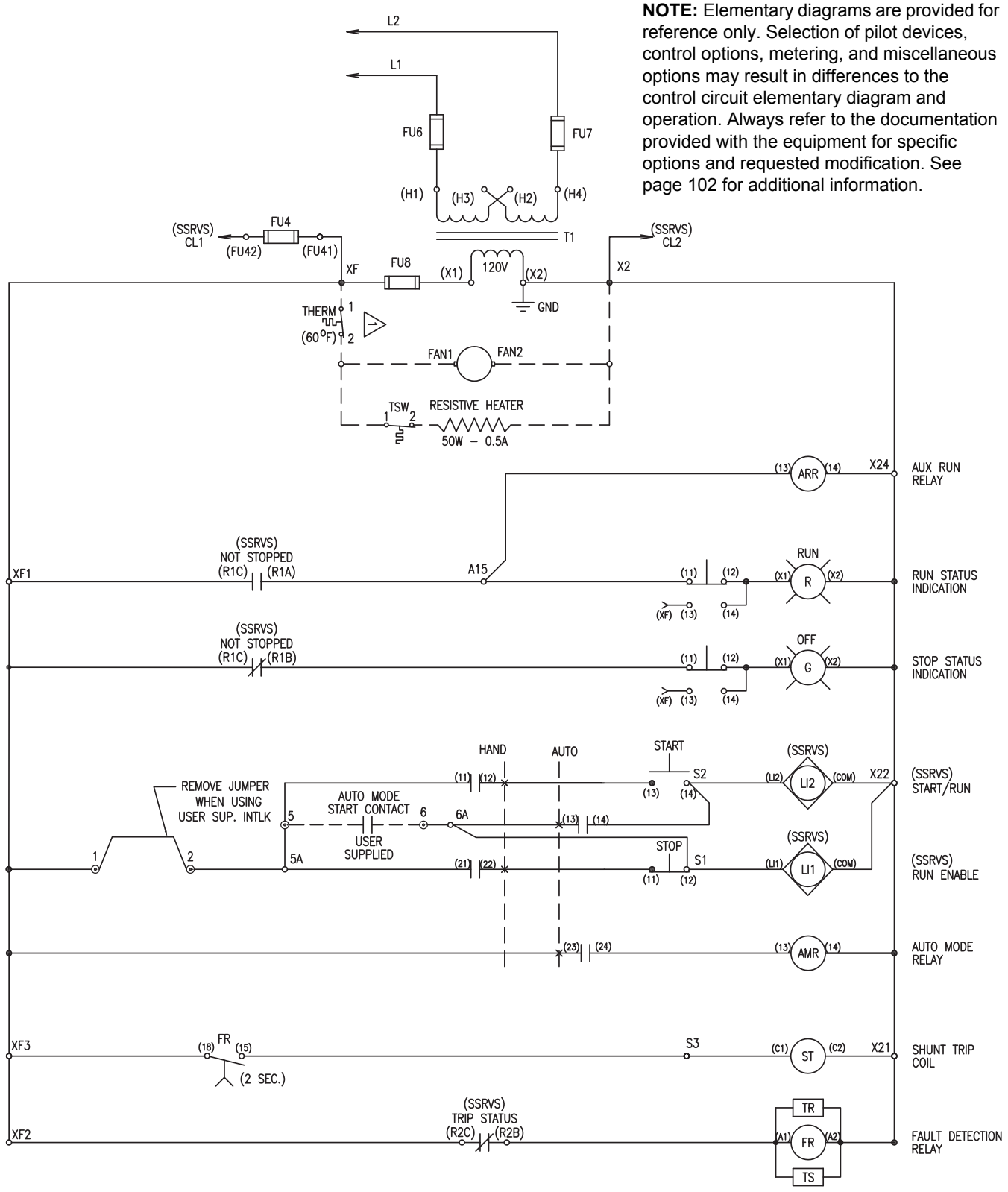
Figure 45: Power Circuit B05 Control Elementary Diagram, Mod D06, Stop-Run Selector Switch

NOTE: Elementary diagrams are provided for reference only. Selection of pilot devices, control options, metering, and miscellaneous options may result in differences to the control circuit elementary diagram and operation. Always refer to the documentation provided with the equipment for specific options and requested modification. See page 102 for additional information.



ENGLISH

Figure 46: Power Circuit B05 Control Elementary Diagram, Mod E06, Hand-Auto Selector Switch and Start-Stop Pushbuttons



NOTE: Elementary diagrams are provided for reference only. Selection of pilot devices, control options, metering, and miscellaneous options may result in differences to the control circuit elementary diagram and operation. Always refer to the documentation provided with the equipment for specific options and requested modification. See page 102 for additional information.

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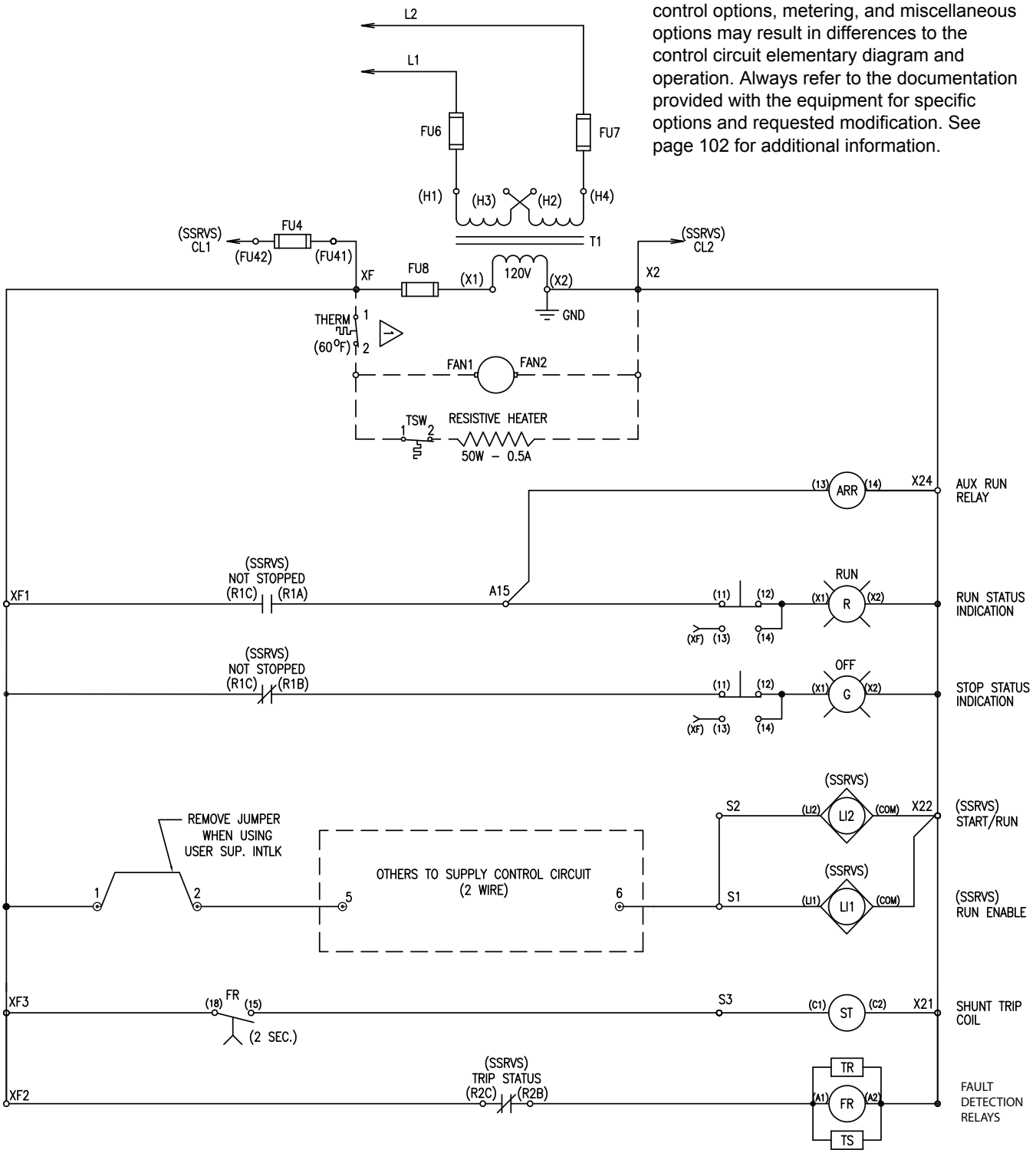
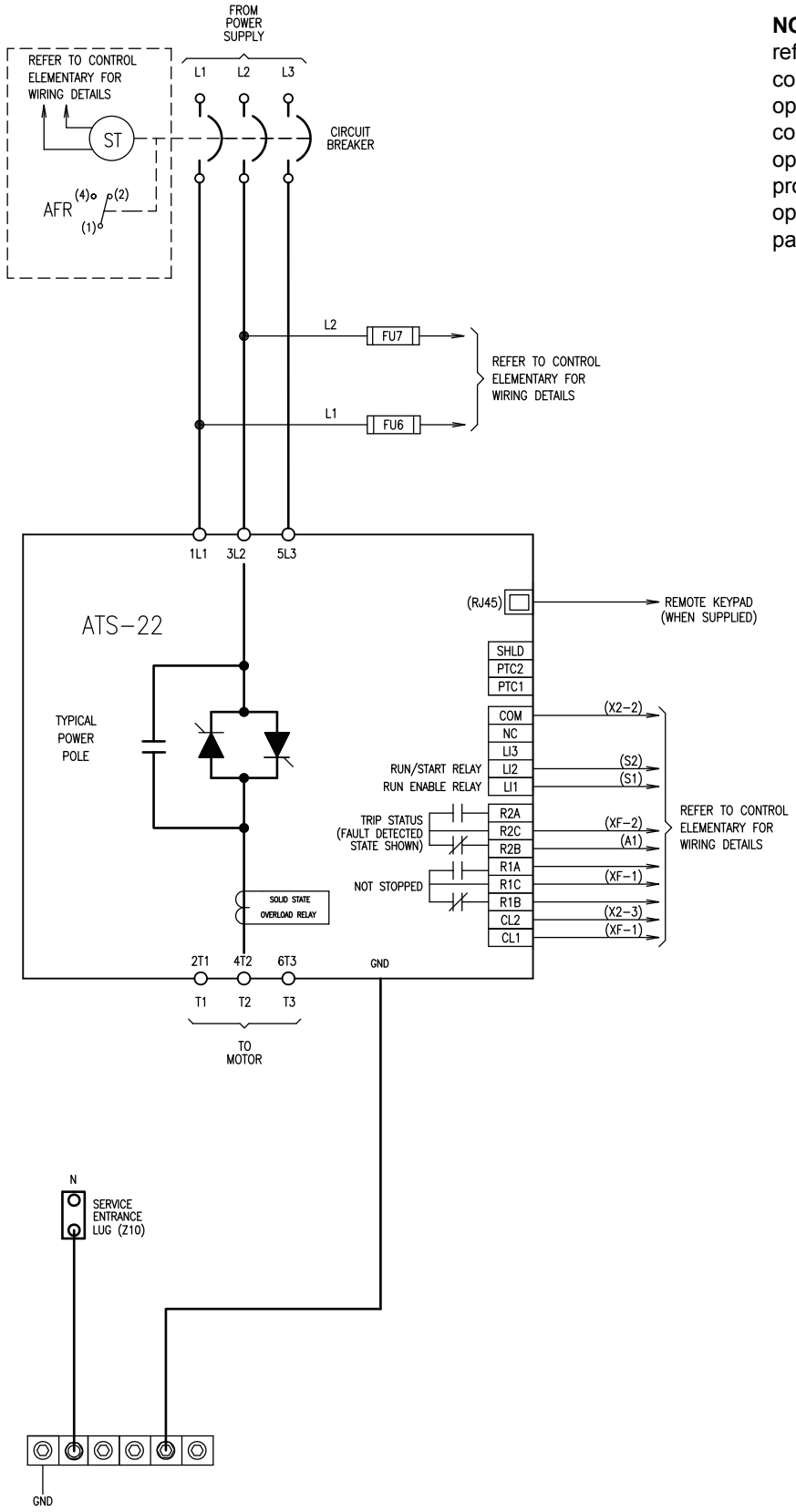
Figure 47: Power Circuit B05 Control Elementary Diagram without Operator Controls

NOTE: Elementary diagrams are provided for reference only. Selection of pilot devices, control options, metering, and miscellaneous options may result in differences to the control circuit elementary diagram and operation. Always refer to the documentation provided with the equipment for specific options and requested modification. See page 102 for additional information.



ENGLISH

Figure 48: Power Circuit B05 Power Elementary Diagram



NOTE: Elementary diagrams are provided for reference only. Selection of pilot devices, control options, metering, and miscellaneous options may result in differences to the control circuit elementary diagram and operation. Always refer to the documentation provided with the equipment for specific options and requested modification. See page 102 for additional information.

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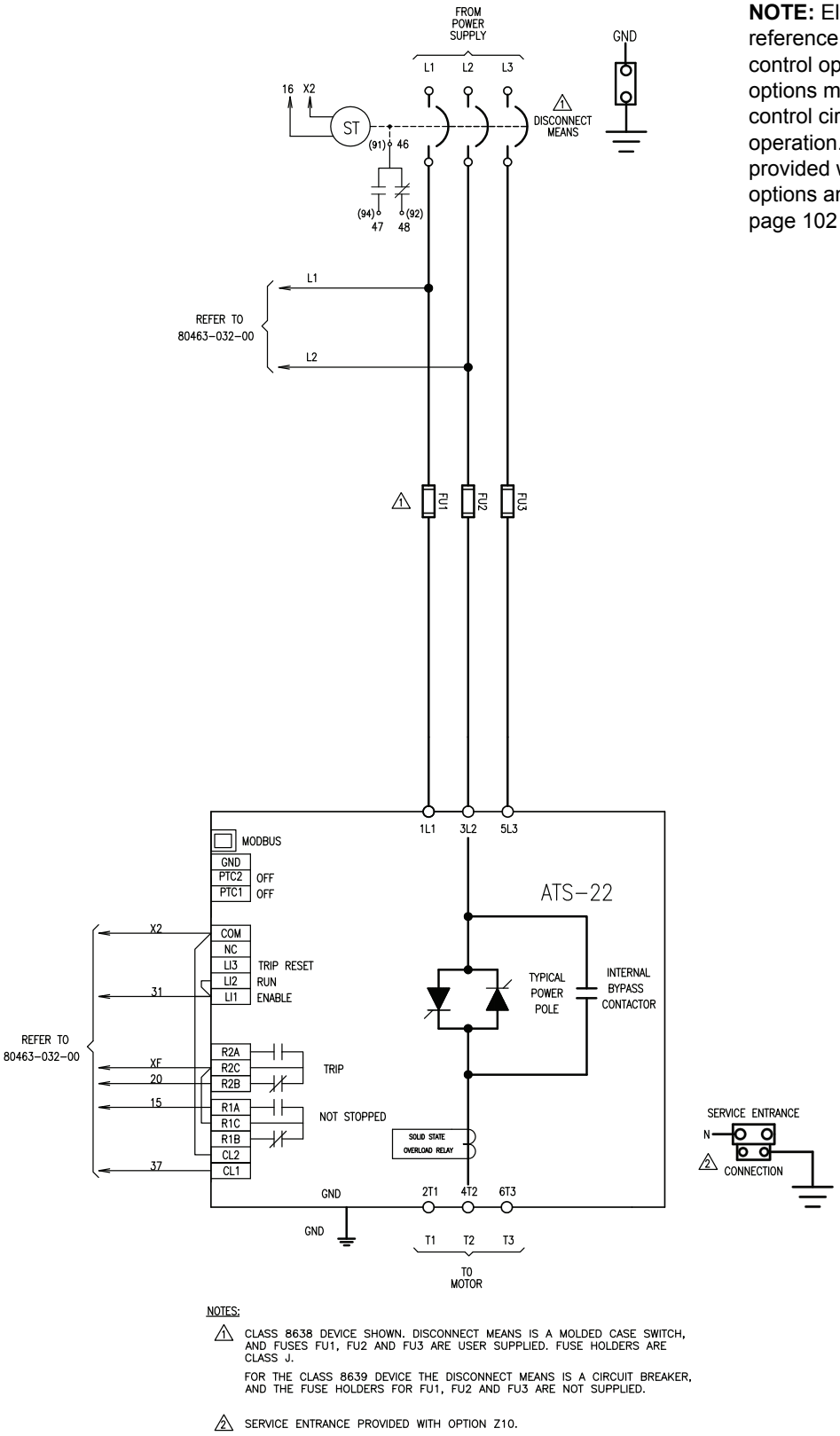
Figure 49: Power Circuit S05 Power Elementary Diagram



NOTES:

1. CLASS 8638 DEVICE SHOWN. DISCONNECT MEANS IS A MOLDED CASE SWITCH, AND FUSES FU1, FU2 AND FU3 ARE USER SUPPLIED. FUSE HOLDERS ARE CLASS J.

   FOR THE CLASS 8639 DEVICE THE DISCONNECT MEANS IS A CIRCUIT BREAKER, AND THE FUSE HOLDERS FOR FU1, FU2 AND FU3 ARE NOT SUPPLIED.

2. SERVICE ENTRANCE PROVIDED WITH OPTION Z10.

NOTE: Elementary diagrams are provided for reference only. Selection of pilot devices, control options, metering, and miscellaneous options may result in differences to the control circuit elementary diagram and operation. Always refer to the documentation provided with the equipment for specific options and requested modification. See page 102 for additional information.

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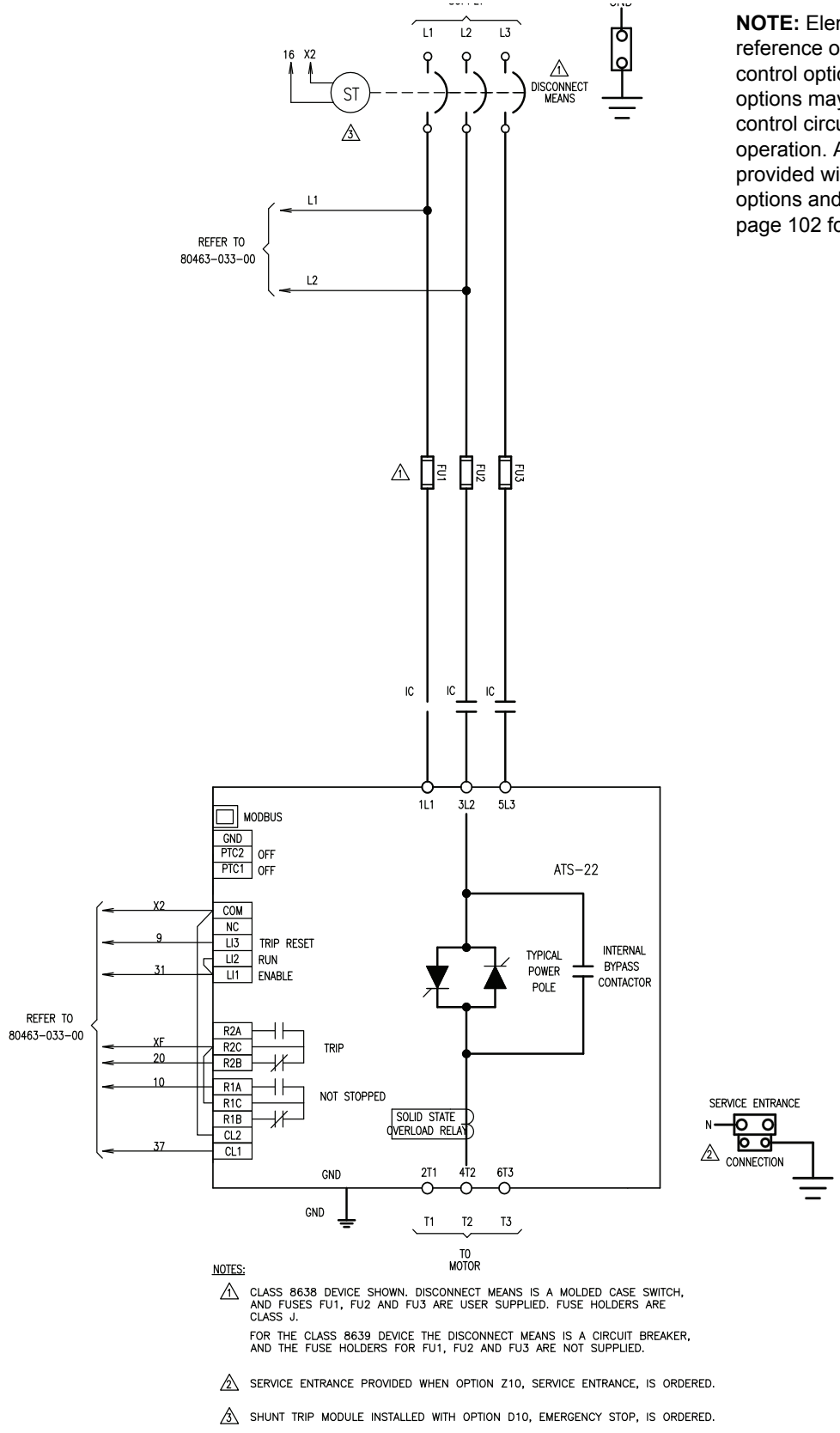
Figure 50: Power Circuit N05 Power Elementary Diagram



NOTE: Elementary diagrams are provided for reference only. Selection of pilot devices, control options, metering, and miscellaneous options may result in differences to the control circuit elementary diagram and operation. Always refer to the documentation provided with the equipment for specific options and requested modification. See page 102 for additional information.

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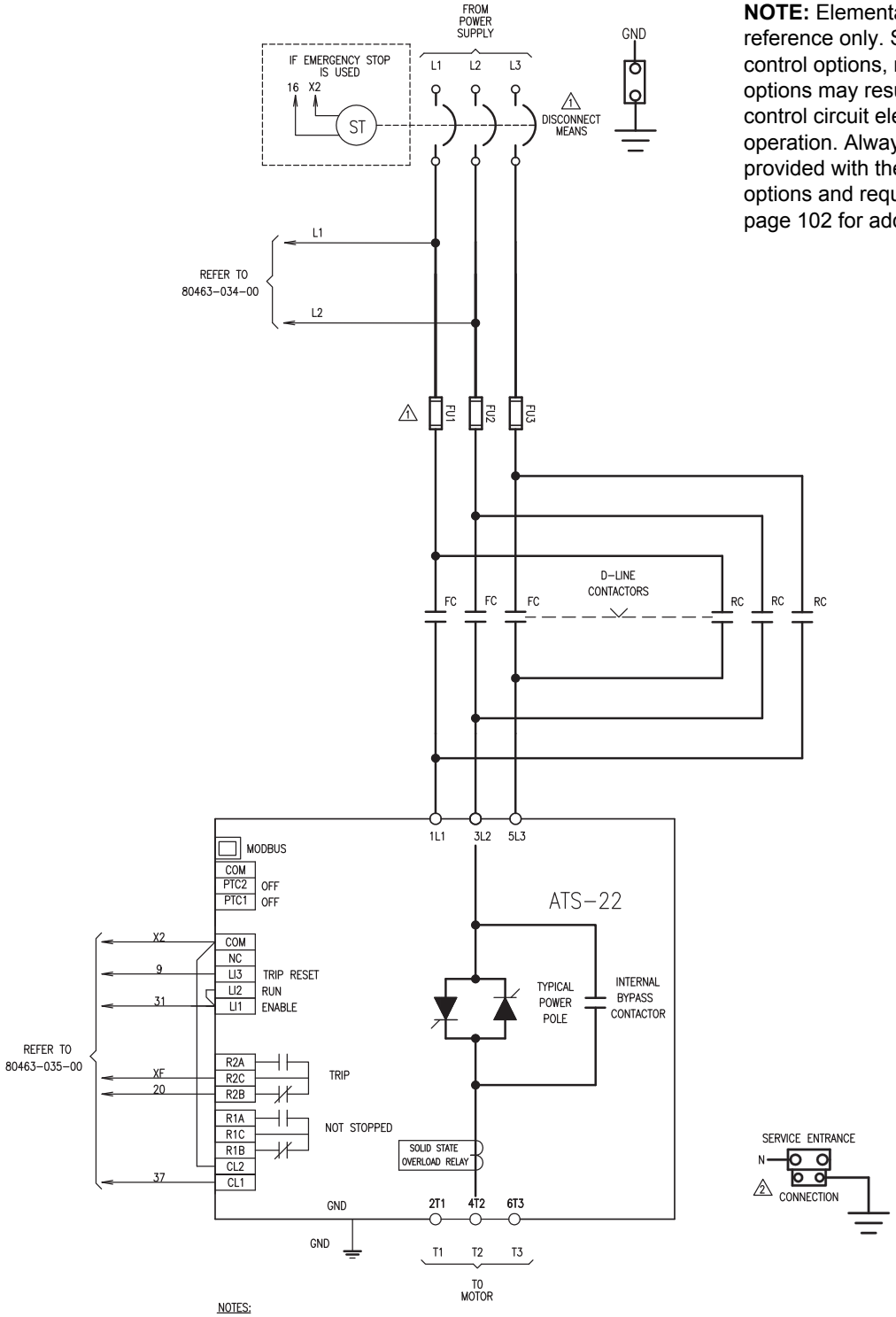
Figure 51: Power Circuit R05 Power Elementary Diagram



NOTE: Elementary diagrams are provided for reference only. Selection of pilot devices, control options, metering, and miscellaneous options may result in differences to the control circuit elementary diagram and operation. Always refer to the documentation provided with the equipment for specific options and requested modification. See page 102 for additional information.

NOTES:

1. CLASS 8638 DEVICE SHOWN. DISCONNECT MEANS IS A MOLDED CASE SWITCH, AND FUSES FU1, FU2 AND FU3 ARE USER SUPPLIED. FUSE HOLDERS ARE CLASS J.

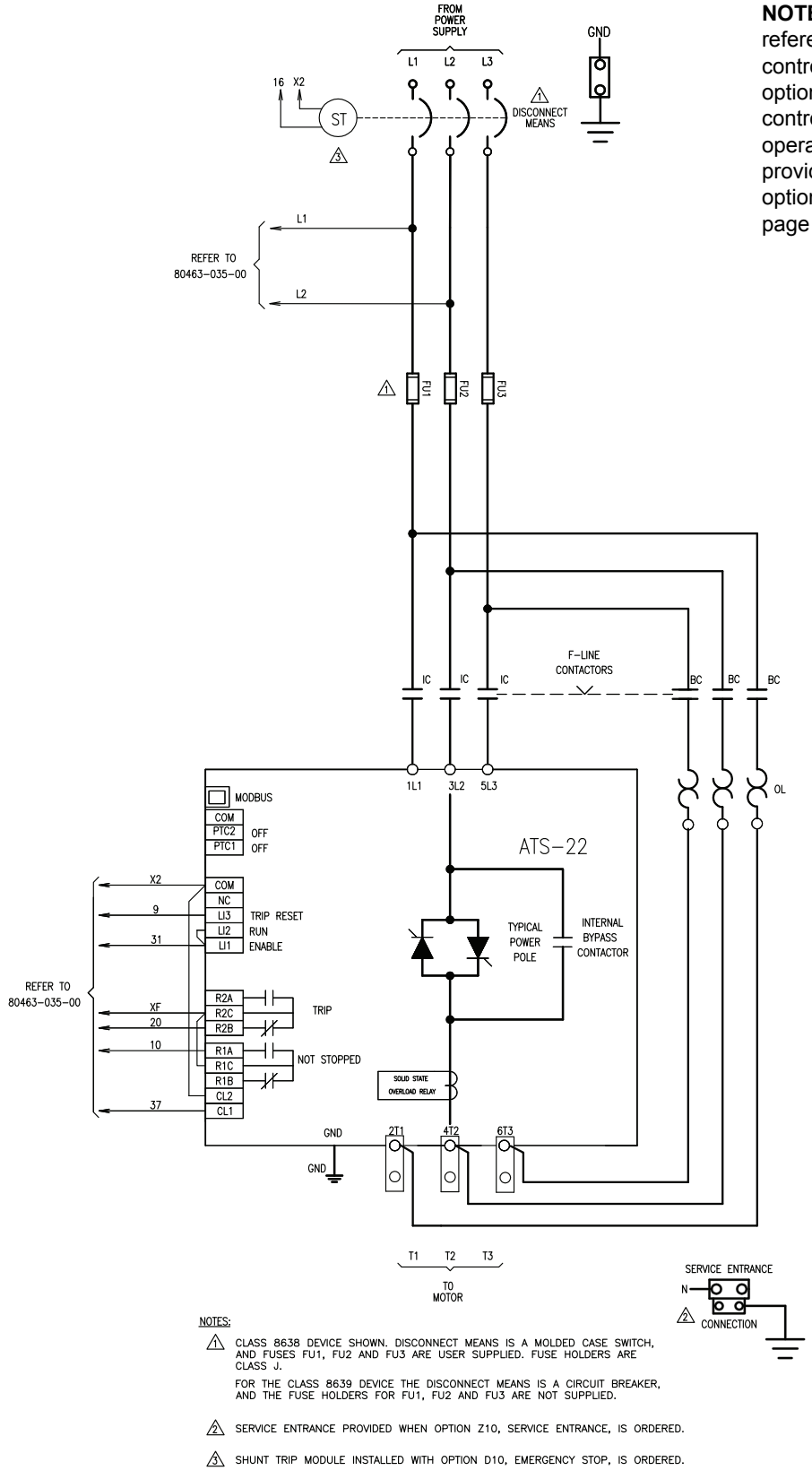
   FOR THE CLASS 8639 DEVICE THE DISCONNECT MEANS IS A CIRCUIT BREAKER, AND THE FUSE HOLDERS FOR FU1, FU2 AND FU3 ARE NOT SUPPLIED.

2. SERVICE ENTRANCE PROVIDED WHEN OPTION Z10, SERVICE ENTRANCE, IS ORDERED.

3. SHUNT TRIP MODULE INSTALLED WITH OPTION D10, EMERGENCY STOP, IS ORDERED.

ENGLISH

Figure 52: Power Circuit Y05 Power Elementary Diagram



NOTE: Elementary diagrams are provided for reference only. Selection of pilot devices, control options, metering, and miscellaneous options may result in differences to the control circuit elementary diagram and operation. Always refer to the documentation provided with the equipment for specific options and requested modification. See page 102 for additional information.

Engineered To Order Electrical Diagrams

For power circuits S05, N05, R05 and Y05, refer to the documentation included with the controller for specific wiring diagrams and the options provided. The power circuit figures provided in this manual are for reference only.

Contact the factory for additional copies of documentation for engineered to order options. Refer to the Technical Support section on page 105.

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Section 5—Maintenance

Precautions

Before replacing any parts in the Enclosed 22 controller, read and observe the following safety messages and all other safety messages provided in this bulletin.

⚠ DANGER

HAZARD OF ELECTRIC SHOCK, EXPLOSION, OR ARC FLASH

- Read and understand this instruction bulletin before installing or operating the Enclosed 22 controller. Installation, adjustment, repair, and maintenance must be performed by qualified personnel.
- The user is responsible for compliance with all national and local electrical code requirements with respect to grounding of all equipment.
- Many parts of this 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.
- Before servicing the controller:
  - — Disconnect all power including external control power that may be present before servicing the controller.
  - — Place a “DO NOT TURN ON” label on the disconnect.
  - — Lock the disconnect in the open position.
- Install and close all covers and doors before applying power or starting and stopping the controller.

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

⚠ 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 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 the 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.

⚠ 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[1].
- Each implementation of an Enclosed 22 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.

[1] For additional information, refer to NEMA ICS 1.1 (latest edition), “Safety Guidelines for the Application, Installation, and Maintenance of Solid State Control.”

⚠ CAUTION

INCOMPATIBLE LINE VOLTAGE

Before turning on and configuring the controller, ensure that the line voltage is compatible with the line voltage range specified on the nameplate. Incompatible line voltage can cause equipment damage.

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

External Signs of Damage

The following are signs of external damage:

- Cracked, charred, or damaged covers or enclosure parts
- Damage to the keypad terminal such as scratches, punctures, burn marks, chemical burns, or moisture in the screen
- Excessive surface temperatures of enclosures and conduits
- Damage to power or control conductors
- Unusual noise or odors from any of the equipment
- Abnormal temperature, humidity, or vibration

If you see any sign of external damage while powering up the equipment, immediately inform operating personnel and assess the risk of leaving the system powered up. Before removing power from the equipment, always consult with the operating personnel responsible for the machinery and process.

Diagnostic Codes

The keypad terminal displays a number of diagnostic and status codes to indicate the controller's operating and protective circuit functions and to assist with maintenance and troubleshooting. See the troubleshooting sheet on page 106.

Technical Support

When troubleshooting the Enclosed 22 controller, discuss the symptoms of the reported problems with operating personnel. Ask them to describe the problem, identify when they first observed the problem, and where the problem was seen.

Observe the system and process. Record the motor and peripheral equipment nameplate data on the Enclosed 22 Troubleshooting sheet provided on page 106. Copy this form as needed.

For support and assistance, contact the Drives Product Support Group. The Product Support Group is staffed from 8:00 am until 6:00 pm, Monday through Friday, 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	1-888-778-2733
E-mail	drive.products.support@us.schneider-electric.com
Fax	919-217-6508

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ENCLOSED 22 TROUBLESHOOTING SHEET

When requesting after-sales service, it is important to disclose all conditions under which the equipment currently operates. This will help in diagnosing the system quickly. **Call the Product Support Group at 1-888-778-2733.**

DATE: _____
CONTACT NAME: _____
COMPANY: _____
ADDRESS: _____
CITY: _____
STATE: _____
PHONE: _____
FAX: _____

CONTROLLER CONFIGURATION

CATALOG NUMBER: _____
APPLICATION/EQUIPMENT DESIGNATION: _____

MOTOR NAMEPLATE DATA

HORSEPOWER:_____ VOLTAGE (3 PHASE):_____ FREQUENCY:_____ POLES:_____ FLA:_____
SERVICE FACTOR:_____ MOTOR INSULATION: ☐ NEW OR ☐ EXISTING
MOTOR CABLE TYPE:_____ LENGTH IN FEET:_____
IS MOTOR DESIGNED TO COMPLY WITH NEMA MG-1 PART 31 GUIDELINES? ☐ YES ☐ NO

POWER SOURCE AND ENVIRONMENT

VOLTAGE BETWEEN: L1 AND L2:_____ L2 AND L3:_____ 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

CONTROLLER DETECTED FAULT CODES

☐ bPF BYPASS CONTACTOR DETECTED FAULT	☐ CFF INVALID CONFIGURATION ON POWER-UP	☐ EtF EXTERNAL DETECTED FAULT	☐ GrdF GROUND LEAKAGE CURRENT DETECTED FAULT
☐ InF INTERNAL DETECTED FAULT	☐ OCF MOTOR OVERCURRENT	☐ OHF OVERHEATING DETECTED FAULT	☐ OLF MOTOR OVERLOAD
☐ OSF OVERVOLTAGE	☐ OtF MOTOR OVERTEMPERATURE	☐ PHbd PHASE UNBALANCE	☐ PHF LOSS OF LINE PHASE
☐ P IF PHASE INVERSION	☐ trAP TRAP CODE	☐ SCF SHORT CIRCUIT	☐ SLF MODBUS TIME OUT
☐ SnbF TOO MANY STARTS	☐ SSCr SHORTED THYRISTOR / WRONG CONNECTION	☐ StF STARTING TIME DETECTED FAULT	☐ tbS TOO MANY STARTS
☐ UCF MOTOR UNDERCURRENT	☐ USF UNDERVOLTAGE OR NO VOLTAGE		

DETAILED DESCRIPTION OF PROBLEM

ATS22 Fan Replacement

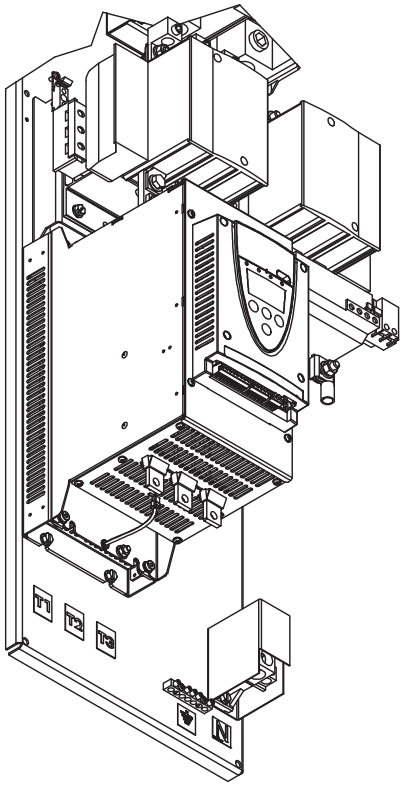
The soft starter heatsink cooling fan, included in some ATS22 models, may require maintenance or replacement after prolonged used. If the cooling fan stops working, order a replacement fan (VW3G22U402) from Schneider Electric.

Table 32: Enclosed 22 Controllers with Replaceable Soft Starter Cooling Fans

Voltage	UL Type 1	UL Type 12	UL Type 3R
208	863822FKG••• (50 hp)	863822FKA2••• (50 hp)	863822FJH2••• (40 hp)
230	863822FLG3••• (60 hp)	863822FLA3••• (60 hp)	863822FKH3••• (50 hp)
460	863822FPG4••• (125 hp)	863822FPA4••• (125 hp)	863822FNH4••• (100 hp)
575	863822FQG5••• (150 hp)	863822FQA5••• (150 hp)	863822FPH5••• (125 hp)

The ATS22 soft starter cooling fan is mounted directly behind the soft starter. Refer to Figure 53 and follow the procedure outlined in this section to replace the cooling fan.

Figure 53: ATS22 Soft Starter



1. Before replacing any parts in the Enclosed 22 controller, read and observe the precautions beginning on page 103.
2. Remove all power from the controller, following lockout/tagout procedures.
3. Open the enclosure door and check for signs of overheating or other damage. If the equipment appears damaged, discontinue equipment use and contact the Schneider Electric product support group. Otherwise continue with Step 4.

4. Remove the control power cable connecting the fan to the soft starter.
5. Loosen and remove the conductors supplying power to the line and load sides of the soft starter.
6. Remove the pull-apart control power terminals from the front the of the soft starter.
7. Loosen and remove the mounting screws attaching the base of the soft starter to the cooling fan. Retain the screws.
8. Remove the soft starter from the enclosure. Take care not to disturb other control power wires.
9. Loosen and remove the 1/4-20 x 0.5 in. mounting screws attaching the base of the cooling fan frame to the mounting pan. Remove the fan and retain the mounting screws.
10. Install the replacement VW3G22402 soft starter cooling fan to the mounting pan, using the mounting screws removed in Step 9. Tighten the screws to 60–72 lb-in (6.8–8.1 N•m).
11. Mount and secure the soft starter, using the mounting screws removed in Step 7. Tighten the screws to 31 lb-in (3.5 N•m).
12. Replace the power conductors on the soft starter and tighten to the torque specifications in ATS22 User Manual, BBV51330.
13. Replace control terminals at the front of the soft starter.
14. Connect the control power cable at the bottom of the soft starter connecting the soft starter to the fan.
15. Close and secure all doors and covers before returning the equipment to service.

Renewable Parts

Schneider Electric provides a limited number of renewable parts for the ATS22 soft starter and the Enclosed 22 controller. Before replacing any parts, consult your local field sales representative. Renewable parts must be installed by qualified personnel.

Table 33: Soft Starters

Type 1 or 12 hp	Type 3R or 50 °C (122 °F) Rated hp	208 V	230 V	460 V	575 V
3	3	ATS22D17S6U	—	—	—
5	—	ATS22D32S6U	ATS22D17S6U	—	—
7.5	5	ATS22D32S6U	ATS22D32S6U	—	—
10	7.5	ATS22D47S6U	ATS22D32S6U	ATS22D17S6U	—
—	10	ATS22D47S6U	ATS22D47S6U	ATS22D32S6U	—
15	—	ATS22D62S6U	ATS22D47S6U	ATS22D32S6U	ATS22D17S6U
20	15	ATS22D75S6U	ATS22D62S6U	ATS22D32S6U	ATS22D32S6U
25	20	ATS22D88S6U	ATS22D75S6U	ATS22D47S6U	ATS22D32S6U
30	25	ATS22C11S6U	ATS22D88S6U	ATS22D47S6U	ATS22D47S6U
40	30	ATS22C14S6U	ATS22C11S6U	ATS22D62S6U	ATS22D47S6U
50	40	ATS22C17S6U	ATS22C14S6U	ATS22D75S6U	ATS22D62S6U
60	50	ATS22C21S6U	ATS22C17S6U	ATS22D88S6U	ATS22D75S6U
75	60	ATS22C25S6U	ATS22C21S6U	ATS22C11S6U	ATS22D88S6U
100	75	ATS22C32S6U	ATS22C25S6U	ATS22C14S6U	ATS22C11S6U

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Table 33: Soft Starters *(continued)*

Type 1 or 12 hp	Type 3R or 50 °C (122 °F) Rated hp	208 V	230 V	460 V	575 V
125	100	ATS22C41S6U	ATS22C32S6U	ATS22C17S6U	ATS22C14S6U
150	125	ATS22C48S6U	ATS22C41S6U	—	ATS22C17S6U
200	150	—	ATS22C59S6U	ATS22C21S6U	ATS22C21S6U
250	200	—	—	ATS22C32S6U	ATS22C25S6U
300	250	—	—	ATS22C41S6U	ATS22C32S6U
350	300	—	—	ATS22C48S6U	ATS22C41S6U
400	350	—	—	ATS22C59S6U	ATS22C48S6U
500	400	—	—	—	ATS22C59S6U

Table 34: Control Transformer Primary Fuses (FU6, FU7): Power Circuit B05

Enclosure Size	208 V	230 V	460 V	575 V
Type 1 or Type 12				
A or B	25430-20113 (1.125 A)	25430-20100 (1.0 A)	25430-20050 (0.5 A)	25430-20040 (0.4 A)
D or E	25430-20225 (2.25 A)	25430-20200 (2.0 A)	25430-20100 (1.0 A)	25430-20080 (0.8 A)
Type 3R				
A or B	25430-20350 (3.5 A)	25430-20321 (3.2 A)	25430-20161 (1.6 A)	25430-20113 (1.125 A)
D or E	25430-20400 (4.0 A)	25430-20400 (4.0 A)	25430-20200 (2.0 A)	25430-20150 (1.5 A)

Table 35: Control Transformer Primary Fuses (FU6, FU7): Power Circuit S05, N05, R05, Y01 without Option B10

Type 1 or Type 12	Type 3R	208 V	230 V	460 V	575 V
B	—	25430-20225 (2.25 A)	25430-20200 (2.0 A)	25430-20100 (1.0 A)	25430-20061 (0.6 A)
C	B or C	25430-20350 (3.5 A)	25430-20300 (3.0 A)	25430-20150 (1.5 A)	25430-20113 (1.125 A)
D or F	D	25430-20600 (6.0 A)	25430-20500 (5.0 A)	25430-20250 (2.5 A)	25430-20200 (2.0 A)
—	F	25430-20600 (6.0 A)	25430-20600 (6.0 A)	25430-20300 (3.0 A)	25430-20250 (2.5 A)
G	G	25430-20800 (8.0 A)	25430-20750 (7.5 A)	25430-20350 (3.5 A)	25430-20250 (2.5 A)

Table 36: Control Transformer Primary Fuses (FU6, FU7): Any Power Circuit with Option B10

Enclosure Size	208 V	230 V	460 V	575 V
B or D	25430-20625 (6.25 A)	25430-20600 (6.0 A)	25430-20321 (3.2 A)	25430-20250 (2.5 A)
D	25430-20800 (8.0 A)	25430-20600 (8.0 A)	25430-20500 (5.0 A)	25430-20321 (3.2 A)
F	25430-20800 (8.0 A)	25430-20600 (8.0 A)	25430-20500 (5.0 A)	25430-20400 (4.0 A)
G	25430-20800 (8.0 A)	25430-20800 (8.0 A)	25430-20500 (5.0 A)	25430-20400 (4.0 A)

Table 37: Control Transformer Secondary Fuse

Enclosure Size	Power Circuit B05 without Option B10	Power Circuit S05, N05, R05, or Y05 without Option B10	Any Power Circuit with Option B10
Type 1 or Type 12			
A or B	25430-20061 (0.6 A)	25430-20130 (1.3 A)	25430-20400 (4.0 A)
C	—	25430-20200 (2.0 A)	25430-20400 (4.0 A)
D	25430-20130 (1.3 A)	25430-20350 (3.5 A)	25430-20625 (6.25 A)
E	25430-20130 (1.3 A)	—	—
F	—	25430-20321 (3.2 A)	25430-20625 (6.25 A)
G	—	25430-20500 (5.0 A)	25430-20625 (6.25 A)
Type 1 or Type 12			
A, B, or C	25430-20200	25430-20200	25430-20400
D	25430-20250	25430-20350	25430-20625 (6.25 A)
E	25430-20250	—	—
F	—	25430-20400	25430-20625 (6.25 A)
G	—	25430-20500	25430-20625 (6.25 A)

Table 38: Soft Starter Control Power Fuse (FU4)

Enclosure Size	Power Circuit B05	Power Circuit S05, N05, R05, or Y05
A, B, or C	25430-20050 (0.5 A)	25430-20050 (0.5 A)
D	25430-20126 (1.2 A)	25430-20050 (0.5 A)
E	25430-20161 (1.6 A)	—
F	—	25430-20126 (1.2 A)
G	—	25430-20161 (1.6 A)

Table 39: Heater Stirring Fan (UL Type 3R Only)

All	26016-31001

Table 40: Heatsink Cooling Fan (when provided[1])

Voltage	UL Type 1 or Type 12 hp	UL Type 3R or 50 °C (122°F) Rated hp	Catalog Number
208	50	40	VW3G22U402
230	60	50	
460	125	100	
575	150	125	

1 A heatsink cooling fan is provided for above power ratings when equipment includes a fusible disconnect (Controller Style 22F).

Table 41: Condensation Heater (UL Type 3R Only)

All	HUA22191

Table 42: SE Supplied Power Fuses for Use with Enclosed 22 Controllers with Fusible Switch Disconnects (22F)[1]

hp	208 V	230 V	460 V	575 V
3	25423-30150	—	—	—
5	25423-30250	25423-30300	—	—
7.5	25423-30400	25423-30350	—	—
10	25423-30500	25423-30450	25423-30200	—
15	25423-30800	25423-30700	25423-30350	25423-30250
20	25423-31000	25423-30900	25423-30450	25423-30350
25	25423-31250	25423-31100	25423-30600	25423-30450
30	25423-31500	25423-31250	25423-30700	25423-30500
40	25423-32000	25423-31750	25423-30900	25423-30700
50	25423-32500	25423-32250	25423-31100	25423-30900
60	25423-32500	25423-32500	25423-31250	25423-31000
75	25423-33500	25423-33000	25423-31500	25423-31250
100	25423-34500	25423-34000	25423-32000	25423-31500
125	25423-36000	25423-35000	25423-32500	25423-32000
150	25423-36000	25423-36000	25423-33000	25423-32500
200	—	25423-36000	25423-34000	25423-33000
250	—	—	25423-35000	25423-34000
300	—	—	25423-36000	25423-35000
350	—	—	25423-36000	25423-35000
400	—	—	25423-36000	25423-36000
500	—	—	—	25423-36000

1 To include fuses with the equipment when shipped, contact the factory.

Table 43: Schneider Electric Supplied Power Fuses for Use with Enclosed 22 Controllers with Fusible Switch Disconnects (22F)[1]

hp	208 V	230 V	460 V	575 V
3	25423-30150	—	—	—
5	25423-30250	25423-30300	—	—
7.5	25423-30400	25423-30350	—	—
10	25423-30500	25423-30450	25423-30200	—
15	25423-30800	25423-30700	25423-30350	25423-30250
20	25423-31000	25423-30900	25423-30450	25423-30350
25	25423-31250	25423-31100	25423-30600	25423-30450
30	25423-31500	25423-31250	25423-30700	25423-30500
40	25423-32000	25423-31750	25423-30900	25423-30700
50	25423-32500	25423-32250	25423-31100	25423-30900
60	—	25423-32500	25423-31250	25423-31000
75	—	—	25423-31500	25423-31250
100	—	—	25423-32000	25423-31500
125	—	—	25423-32500	25423-32000
150	—	—		25423-32500

[1] To include fuses with the equipment when shipped, contact the factory.

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30072-453-26 Rev. 03, 12/2012 Replaces 30072-453-26 Rev. 02, 08/2011