Installation Instructions

Original Instructions

Allen-Bradley

PowerFlex® 750-Series AC Drives

Introduction

This document explains the 5 BASIC STEPS for mechanical installation and for connecting incoming power, the motor, and basic I/O to the PowerFlex® 750-Series Adjustable Frequency AC drive.

The information provided is intended for qualified installers only.

The Additional Resources section is a directory of Rockwell Automation publications that provide detailed drive information from wiring and grounding recommendations to troubleshooting and repair.

Instructions in Other Languages

English	This instruction sheet is available in multiple languages at http://rockwellautomation.com/literature. Select publication language and type "750-IN001" in the search field.
German	Diese Anleitung steht in mehreren Sprachen unter http://rockwellautomation.com/literature zur Verfügung. Wählen Sie Ihre Sprache aus, und geben Sie „750-IN001" in das Suchfeld ein.
French	Ces instructions sont disponibles dans différentes langues à l'adresse suivante: http://rockwellautomation.com/literature. Sélectionner la langue puis taper « 750-IN001 » dans le champ de recherche.
Italian	La presente scheda d'istruzione è disponibile in varie lingue sul sito http://rockwellautomation.com/literature. Selezionare la lingua desiderata e digitare "750-IN001" nel campo di ricerca.
Spanish	Puede encontrar esta hoja de instrucciones en varios idiomas en http://rockwellautomation.com/literature. Selecione el idioma de publicación y escriba "750-IN001" en el campo de búsqueda.
Portuguese	Esta folha de instruções está disponível em várias línguas em http://rockwellautomation.com/literature. Seleccione a língua de publicação e entre com "750-IN001" no espaço de busca.
Chinese (Simplified)	从以下网页可以获得本说明书的多种语言的版本：http://rockwellautomation.com/literature 。请选择出版物的语言，并在搜索栏输入 "750-IN001" 即。
Japanese	本説明書シートの多言語版は Web サイト http://rockwellautomation.com/literature にて入手できます。出版言語を選択し、検索フィールドに 「750-IN001」 とタイプしてください。
Korean	이 명령 부 http://rockwellautomation.com/literature에서 여러 언어로 사용할 수있습니다. 출판 언어와 유형을 선택하십시오 "750 - IN001"검색 필드에있다.
Russian	Данное руководство на других языках можно найти по адресу http://rockwellautomation.com/literature. Выберите язык и введите в окно поиска «750-IN001».
Chinese (Complex)	以下網頁提供本說明書的多國語言版本：http://rockwellautomation.com/literature. 請選擇出版語言，並於搜尋欄鍵入 "750-IN001" 即可。
Czech	Tato stránka s pokyny je k dispozici ve více jazykových verzích na adrese http://rockwellautomation.com/literature. Zvolte jazyk publikace a do vstupního pole pro vyhledávání zadejte „750-IN001".
Polish	Niniejsza instrukcja dostępna jest w wielu językach na stronie http://rockwellautomation.com/literature. Wybrać język publikacji, w polu wyszukiwania wpisać "750-IN001".

PowerFlex 750-Series AC Drives

Table of Contents

Step 5: I/O Wiring

PowerFlex 755 Drives with Cabinet Options

Integrated Motion Drives

Additional Resources

The following table lists publications that provide general drive related information.

Resource	Description
PowerFlex 750-Series AC Drives Programming Manual, publication 750-PM001	Provides detailed information on: • I/O, control, and feedback options • Parameters and programming • Faults, alarms, and troubleshooting
PowerFlex 750-Series AC Drives Technical Data, publication 750-TD001	Provides detailed information on: • Drive specifications • Option specifications • Fuse and circuit breaker ratings
PowerFlex 20-HIM-A6 / -C6S HIM (Human Interface Module) User Manual, publication 20HIM-UM001	Provides detailed information on HIM components, operation, features.
PowerFlex 750-Series AC Drives Hardware Service Manual - Frame 8 and Larger, publication 750-TG001	Provides detailed information on: • Preventive maintenance • Component testing • Hardware replacement procedures
PowerFlex 755 Drive Embedded EtherNet/IP Adapter User Manual, publication 750COM-UM001	These publications provide detailed information on configuring, using, and troubleshooting PowerFlex 750-Series communication option modules and adapters.
PowerFlex 750-Series Drive DeviceNet Option Module User Manual, publication 750COM-UM002	
PowerFlex 7-Class Network Communication Adapter User Manuals, publications 750COM-UMxxx	
PowerFlex 750-Series Safe Torque Off User Manual, publication 750-UM002	These publications provide detailed information on installation, set up, and operation of the 750-Series safety option modules.
Safe Speed Monitor Option Module for PowerFlex 750-Series AC Drives Safety Reference Manual, publication 750-RM001	
Wiring and Grounding Guidelines for Pulse Width Modulated (PWM) AC Drives, publication DRIVES-IN001	Provides basic information needed to properly wire and ground PWM AC drives.
PowerFlex AC Drives in Common Bus Configurations, publication DRIVES-AT002	Provides basic information needed to properly wire and ground PWM AC drives using a common bus.
Safety Guidelines for the Application, Installation and Maintenance of Solid State Control, publication SGI-1.1	Provides general guidelines for the application, installation, and maintenance of solid-state control.
A Global Reference Guide for Reading Schematic Diagrams, publication 100-2.10	Provides a simple cross-reference of common schematic/ wiring diagram symbols used throughout various parts of the world.
Guarding Against Electrostatic Damage, publication 8000-4.5.2	Provides practices for guarding against Electrostatic damage (ESD)
Product Certifications website, http://ab.com	Provides declarations of conformity, certificates, and other certification details.

Commonly Used Tools

Installation and Service Tools

IMPORTANT Care must be taken to ensure that tools and/or hardware components do not fall into open drive assemblies. Do not energize the drive unless all loose tools and/or hardware components have been removed from the drive assemblies and enclosure.

This list covers the tools needed for drive installation.

Tool Description	Details
ESD-protected place of work	Working surface, Floor covering, seat and ground connections
ESD-protective clothing	Wrist wrap, shoes, overall clothing (coat)
Multi meter	Digital multi meter, capable of ac and dc voltage, continuity, resistance, capacitance measurements, and forward diode bias tests. Fluke model 87 III or equivalent.
Allen socket wrench	4 mm, 5 mm
Allen socket wrench extension	254 mm (10 in.)
Flat nose screw driver	5 mm (0.19 in.), 6.4 mm (0.25 in.), 9.5 mm (0.375 in.), #1, #2
Hexalobular screw driver/bit	#15, #20, #25, #40, #45
Hexagonal socket wrench	7 mm, 8 mm, 10 mm, 12 mm, 13 mm, 17 mm, 18 mm
Combination wrench	10 mm, 17 mm
Phillips® screw driver/bit (1)	#2, 492-C
Pozidriv® (1)	#2
Torque wrench	1...12 N•m (8.8…106 lb•in)
Torque wrench	6...50 N•m (53…443 lb•in)
Roll-out cart	20-750-CART1-F8 Note: The roll-out cart is required to remove the drive assembly from the enclosure.

(1) Phillips and Pozidriv are registered trademarks of the Phillips Screw Company.

Step 1: Read the General Precautions

Qualified Personnel

ATTENTION: Only qualified personnel familiar with adjustable frequency AC drives and associated machinery should plan or implement the installation, start-up and subsequent maintenance of the system. Failure to comply may result in personal injury and/or equipment damage.

Personal Safety

ATTENTION: To avoid an electric shock hazard, verify that the voltage on the bus capacitors has discharged completely before servicing.

Frames 1...7: Measure the DC bus voltage at the Power Terminal Block by measuring between the +DC and -DC terminals (see Figure 50 and Figure 51 for location), between the +DC terminal and the chassis, and between the -DC terminal and the chassis. The voltage must be zero for all three measurements.

Frame 8...10: Measure the DC bus voltage at the DC+ and DC- TESTPOINT sockets on the front of the power module (see Figure 54 for location).

ATTENTION: Hazard of personal injury or equipment damage exists when using bipolar input sources. Noise and drift in sensitive input circuits can cause unpredictable changes in motor speed and direction. Use speed command parameters to help reduce input source sensitivity.

ATTENTION: Risk of injury or equipment damage exists. DPI or SCANport host products must not be directly connected together via 1202 cables. Unpredictable behavior can result if two or more devices are connected in this manner.

ATTENTION: The drive start/stop/enable control circuitry includes solid state components. If hazards due to accidental contact with moving machinery or unintentional flow of liquid, gas or solids exists, an additional hardwired stop circuit may be required to remove the AC line to the drive. An auxiliary braking method may be required.

ATTENTION: Hazard of personal injury or equipment damage due to unexpected machine operation exists if the drive is configured to automatically issue a Start or Run command. Do not use these functions without considering applicable local, national and international codes, standards, regulations or industry guidelines.

Product Safety

ATTENTION: An incorrectly applied or installed drive can result in component damage or a reduction in product life. Wiring or application errors such as under sizing the motor, incorrect or inadequate AC supply, or excessive surrounding air temperatures may result in malfunction of the system.

ATTENTION: This drive contains ESD (Electrostatic Discharge) sensitive parts and assemblies. Static control precautions are required when installing, testing, servicing or repairing this assembly. Component damage may result if ESD control procedures are not followed. If you are not familiar with static control procedures, reference Guarding Against Electrostatic Damage, publication 8000-4.5.2 or any other applicable ESD protection handbook.

ATTENTION: Configuring an analog input for 0-20 mA operation and driving it from a voltage source could cause component damage. Verify proper configuration prior to applying input signals.

Class 1 LED Product

ATTENTION: Hazard of permanent eye damage exists when using optical transmission equipment. This product emits intense light and invisible radiation. Do not look into module ports or fiber optic cable connectors.

Step 2: Prepare for Installation

Catalog Number Explanation

1…3	4	5	6	7	8…10	11	12	13	14	15	16	17	18	
20G	1	A	N	D	248	A	A	0	N	N	N	N	N	- LD - P3 - P11…
a	*b*	*c*	*d*	*e*	*f1…f4*	*g*	*h*							*Cabinet Options (21G)*

a

Drive	
Code	Type
20F	PowerFlex 753
20G	PowerFlex 755
21G	PowerFlex 755 Drive with Options

b

Future Use

c

Input Type ★		
Code	Description	Frames
1	AC & DC Input w/Precharge	1…5, 8…10
4	DC Input w/Precharge	5…10
A	AC Input w/Precharge, no DC Terminals	6…8

★ Frames 1…4, Code 1 also provides the functionality of DC input with Precharge. Frames 5 & larger, Code 4 is required for DC input with Precharge. The optional DC Bus Bar kit (20-750-DCBB1-Fx) is available for Frames 6…7 AC input drives requiring DC bus terminals.

d

Enclosure		
Code	Description	Frames
R	IP20, NEMA/UL Type Open, Frame 1	1
F §	Flange (NEMA/UL Type 4X/12 back)	2…5
G	IP54, NEMA/UL Type 12	2…7
N ‡	IP20/IP00, NEMA/UL Type Open	2…7
B	IP20, NEMA/UL Type 1, 600 mm (23.6 in.) Deep, Standard Cabinet Color (RAL 7032)	8…10
J	IP54, NEMA Type 12, 800 mm (31.5 in.) Deep, Standard Cabinet Color (RAL 7032)	8…10
K Δ	IP54, NEMA Type 12, 2500 MCC Style Cabinet & Options w/MCC Power Bus, 800 mm (31.5 in.) Deep, Standard Cabinet Color (RAL 7032)	8…10
L	IP20, NEMA/UL Type 1, 800 mm (31.5 in.) Deep, Standard Cabinet Color (RAL 7032)	8…10
P Δ	IP20, NEMA/UL Type 1, 2500 MCC Style Cabinet & Options w/MCC Power Bus, 800 mm (31.5 in.) Deep, Standard Cabinet Color (RAL 7032)	8…10
W Δ	IP20, NEMA/UL Type 1, 2500 MCC Style Cabinet & Options w/MCC Power Bus, 800 mm (31.5 in.) Deep, CenterLine 2100 Gray (ASA49)	8…10
Y Δ	IP54, NEMA Type 12, 2500 MCC Style Cabinet & Options w/MCC Power Bus, 800 mm (31.5 in.) Deep, CenterLine 2100 Gray (ASA49)	8…10

§ For Frames 6…7 a User Installed Flange Kit is available to convert a Code N drive that provides a NEMA/UL Type 4X/12 back.

‡ Frames 2…5 are IP20, Frames 6…7 are IP00.

Δ Available as a drive with options (21G).

e

Voltage Rating	
Code	Voltage
C	400V AC/540V DC
D	480V AC/650V DC
E	600V AC/725V DC
F	690V AC/932V DC (not UL listed)

f1

ND Rating									
400V, 50 Hz Input									
Code	Amps	kW	Frame						
			Enclosure Code						
			B, J, L	F	G	N	K, P, W, Y	R	
2P1	2.1	0.75	–	2	2	2	–	1	
3P5	3.5	1.5							
5P0	5.0	2.2							
8P7	8.7	4							
011	11.5	5.5							
015	15.4	7.5							
022	22	11		3	3	3		–	
030	30	15							
037	37	18.5							
043	43	22							
060	60	30		4	4	4			
072	72	37			5				
085	85	45		5		5			
104	104	55			6				
140	140	75		§		6			
170	170	90							
205	205	110							
260	260	132			7				
302	302	160				7			
367	367	200							
456	456	250						–	
460	460	250	8	–	–	–	8 Δ		
540	540	315							
567	567	315							
650	650	355							
750	750	400							
770	770	400							
910	910	500	9				9 Δ		
1K0	1040	560							
1K1	1090	630							
1K2	1175	710							
1K4	1465	800							
1K5	1480	850							
1K6	1590	900	10				10 Δ		
2K1	2150	1250							

§ For Frames 6…7 a User Installed Flange Kit is available to convert a Code N drive that provides a NEMA/UL Type 4X/12 back.

Δ Available as a drive with options (21G).

f2

ND Rating									
480V, 60 Hz Input									
Code	Amps	Hp	Frame						
			Enclosure Code						
			B, J, L	F	G	N	K, P, W, Y	R	
2P1	2.1	1	–	2	2	2	–	1	
3P4	3.4	2							
5P0	5.0	3							
8P0	8.0	5							
011	11	7.5							
014	14	10							
022	22	15		3	3	3		–	
027	27	20							
034	34	25							
040	40	30							
052	52	40		4	4	4			
065	65	50			5				
077	77	60		5		5			
096	96	75			6				
125	125	100		§		6			
156	156	125							
186	186	150							
248	248	200			7				
302	302	250				7			
361	361	300							
415	415	350						–	
430	430	350	8	–	–	–	8 Δ		
485	485	400							
545	545	450							
617	617	500							
710	710	600							
740	740	650							
800	800	700	9				9 Δ		
960	960	800							
1K0	1045	900							
1K2	1135	1000							
1K3	1365	1100							
1K4	1420	1250							
1K5	1525	1350	10				10 Δ		
2K0	2070	1750							

§ For Frames 6…7 a User Installed Flange Kit is available to convert a Code N drive that provides a NEMA/UL Type 4X/12 back.

Δ Available as a drive with options (21G).

Catalog Number Explanation *(continued)*

f3

ND Rating								
600V, 60 Hz Input								
Code	Amps	Hp	Frame					
			Enclosure Code					
			B, J, L	F	G	N	K, P, W, Y	R
295	295	300	8	–	–	–	8 △	–
355	355	350						
395	395	400						
435	435	450						
460	460	500						
510	510	500						
595	595	600	9	–	–	–	9 △	–
630	630	700						
760	760	800						
825	825	900						
900	900	950						
980	980	1000						
1K1	1110	1100	10				10 △	
1K4	1430	1400						

△ Available as a drive with options (21G).

f4

ND Rating								
690V, 60 Hz Input (not UL listed)								
Code	Amps	kW	Frame					
			Enclosure Code					
			B, J, L	F	G	N	K, P, W, Y	R
265	265	250	8	–	–	–	8 △	–
330	330	315						
370	370	355						
415	415	400						
460	460	450						
500	500	500						
590	590	560	9	–	–	–	9 △	–
650	650	630						
710	710	710						
765	765	750						
795	795	800						
960	960	900						
1K0	1040	1000	10				10 △	
1K4	1400	1400						

△ Available as a drive with options (21G).

g

Filtering and CM Cap Configuration ♦		
Code	Filtering	Default CM Cap Connection
A	Yes	Jumper Removed
J	Yes	Jumper Installed

♦ 480V drives must select code "A." Jumpers are included for field reconfiguration as desired.

h

Dynamic Braking &		
Code	Internal Resistor ♠	Internal Transistor ▽
A	No	Yes
N	No	No

♠ Frames 1…2 only.

▽ Standard on Frames 1…5, optional on 6…7.

& Not available on Frames 8…10, specify Code "N."

PowerFlex 755 w/Options (21G) - Required Selections

Code	Option	Type	Frames
LD	Light Duty	System Overload Duty Cycle ★	8…10
ND	Normal Duty		
HD	Heavy Duty		
P3	Input Thermal Magnetic Circuit Breaker	Power Disconnect or Wiring Only Bay ★	8…10
P5	Input Non-Fused Molded Case Disconnect Switch		
P14	Wiring Only Bay		

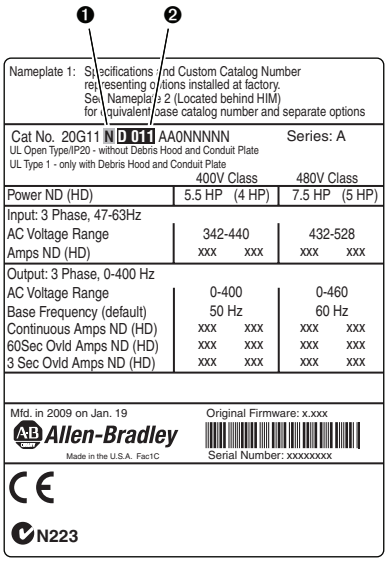
★ Only one option of this type may be selected.

PowerFlex 755 w/Options (21G) - Additional Selections

Code	Option	Type	Frames
P11	Input Contactor	Contactors ★ §	8
P12	Output Contactor		
L1	3% Input Reactor	Reactors ★	8…10
L2	3% Output Reactor		
L3	5% Input Reactor		8
L4	5% Output Reactor		
P20	1200 Amp Bus	MCC Power Bus Capacity ★	8…10
P22	2000 Amp Bus		
P24	3000 Amp Bus		
P30	UPS Control Bus, DC Input w/Precharge only	UPS Control Bus	8…10

★ Only one option of this type may be selected.

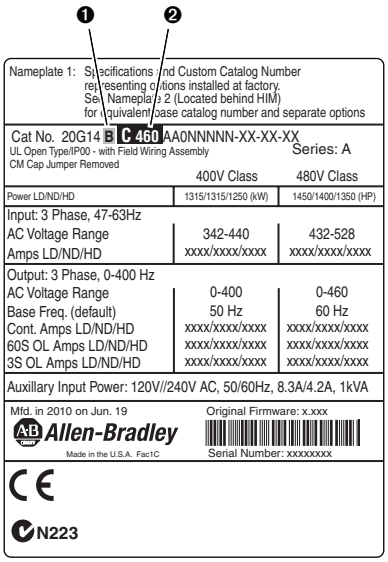
§ Contactor options are not available for systems with MCC power bus.



Drive Nameplate 1, Frames 1…7

Drive Frame 1…7 Rating Cross-References

Drive Code	❷		❶				
	Input Voltage & ND Amp Rating		Enclosure Code				
	400V AC	480V AC	F	G	N	R	
20F or 20G	C2P1	D2P1	2	2	2	1	Drive Frame
20F or 20G	C3P5	D3P4					
20F or 20G	C5P0	D5P0					
20F or 20G	C8P7	D8P0					
20F or 20G	C011	D011					
20F or 20G	C015	D014					
20F or 20G	C022	D022				–	
20F or 20G	C030	D027	3	3	3		
20F or 20G	C037	D034					
20F or 20G	C043	D040					
20F or 20G	C060	D052	4	4	4		
20F or 20G	C072	D065		5			
20F or 20G	C085	D077	5		5		
20F or 20G	C104	D096		6			
20F or 20G	C140	D125	N/A		6		
20F or 20G	C170	D156					
20F or 20G	C205	D186					
20F or 20G	C260	D248		7			
20F or 20G	C302	D302			7		
20F or 20G	C367	D361					
20F or 20G	C456	D415					



Drive Nameplate 1, Frames 8…10

Drive Frame 8…10 Rating Cross-References

Drive Code	❷				❶				
	Input Voltage & ND Amp Rating				Enclosure Code				
	400V AC	480V AC	600V AC	690V AC	B	L, J	P, K	W, Y	
20G or 21G	C460	D430	E295	F265	8	8	8	8	Drive Frame
20G or 21G	C540	D485	E355	F330					
20G or 21G	C567	D545	E395	F370					
20G or 21G	C650	D617	E435	F415					
20G or 21G	C750	D710	E460	F460					
20G or 21G	C770	D740	E510	F500					
20G or 21G	C910	D800	E595	F590	9	9	9	9	
20G or 21G	C1K0	D960	E630	F650					
20G or 21G	C1K1	D1K0	E760	F710					
20G or 21G	C1K2	D1K2	E825	F765					
20G or 21G	C1K4	D1K3	E900	F795					
20G or 21G	C1K5	D1K4	E980	F960					
20G or 21G	C1K6	D1K5	E1K1	F1K0	10	10	10	10	
20G or 21G	C2K1	D2K0	E1K4	F1K4					

CE Conformity

Compliance with the Low Voltage Directive and Electromagnetic Compatibility Directive has been demonstrated using harmonized European Norm (EN) standards published in the Official Journal of the European Communities. PowerFlex 750-Series drives comply with the EN standards listed below when installed according to this PowerFlex 750-Series AC Drive Installation Instructions.

CE Declarations of Conformity are available online at:
www.rockwellautomation.com/products/certification/

Low Voltage Directive (2006/95/EC)

- EN 61800-5-1 Adjustable speed electrical power drive systems – Part 5-1: Safety requirements – Electrical, thermal and energy.

EMC Directive (2004/108/EC)

- EN 61800-3 Adjustable speed electrical power drive systems – Part 3: EMC product standard including specific test methods.

General Considerations

- For CE compliance, drives must satisfy installation requirements related to both EN 61800-5-1 and EN 61800-3 provided in this document.
- PowerFlex 750-Series AC Drives comply with the EMC requirements of EN 61800-3 when installed according to good EMC practices and the instructions provided in this document. However, many factors can influence the EMC compliance of an entire machine or installation, and compliance of the drive itself does not ensure compliance of all applications.
- PowerFlex 750-Series drives are not intended to be used on public low-voltage networks which supply domestic premises. Without additional mitigation, radio frequency interference is expected if used on such a network. The installer is responsible to take measures such as supplementary line filters and enclosures to prevent interference, in addition to the installation requirements of this document.

ATTENTION: NEMA/UL Open Type and Flange Mount drives must either be installed in a supplementary enclosure or equipped with a "NEMA Type 1 Kit" to be CE compliant with respect to protection against electrical shock.

- Requirements for supplementary mitigation related to specific high frequency emission limits are provided in Table 1

- PowerFlex 750-Series drives generate harmonic current emissions on the AC supply system. When operated on a public low-voltage network it is the responsibility of the installer or user to ensure that applicable requirements of the distribution network operator have been met. Consultation with the network operator and Rockwell Automation may be necessary.

ATTENTION: PowerFlex 750-Series drives produce DC current in the protective earthing conductor which may reduce the ability of RCD's (residual current-operated protective devices) or RCM's (residual current-operated monitoring devices) of type A or AC to provide protection for other equipment in the installation. Where an RCD or RCM is used for protection in case of direct or indirect contact, only an RCD or RCM of Type B is allowed on the supply side of this product.

Installation Requirements Related to EN 61800-5-1 and the Low Voltage Directive

Frame 1 Drives:

- Voltage classes up to 480V PowerFlex 750-Series Frame 1 drives can only be used on a "center grounded" supply system for altitudes up to and including 2000 m (6562 ft).

Frame 2 and Larger Drives:

- Voltage classes up to 690V PowerFlex 750-Series Frame 2 and Larger drives are compliant with the CE LV Directive when used on a "corner-earthed" supply system as well as all other common supply systems for altitudes up to and including 2000 m (6562 ft).
- When used at altitudes above 2000 m (6562 ft) up to a maximum of 4800 m (15,748 ft), PowerFlex 750-Series drives of voltage classes up to 480V may not be powered from a "corner-earthed" supply system in order to maintain compliance with the CE LV Directive. Altitude derating curves are provided in the PowerFlex 750-Series AC Drives Technical Data, publication 750-TD001.

All Drive Frames:

- Drives provided in the IP54, NEMA/UL Type 12 enclosure are compliant with the CE LV Directive when installed in pollution degree 1...4 environments. All other enclosure types must be installed in a pollution degree 1 or 2 environment to be compliant with the CE LV Directive. Characteristics of the different pollution degree ratings are provided in the PowerFlex 750-Series AC Drives Technical Data, publication 750-TD001.
- PowerFlex 750-Series drives produce leakage current in the protective earthing conductor which exceeds 3.5 mA AC and/or 10 mA DC. The minimum size of the protective earthing (grounding) conductor used in the application must comply with local safety regulations for high protective earthing conductor current equipment.

ATTENTION: PowerFlex 750-Series drives produce DC current in the protective earthing conductor which may reduce the ability of RCD's (residual current-operated protective devices) or RCM's (residual current-operated monitoring devices) of type A or AC to provide protection for other equipment in the installation. Where an RCD or RCM is used for protection in case of direct or indirect contact, only an RCD or RCM of Type B is allowed on the supply side of this product.

Installation Requirements Related to EN 61800-3 and the EMC Directive

- The drive must be earthed (grounded) as described in Step 4: Power Wiring on page 89.
- Output power wiring to the motor must employ cable with a braided shield providing 75% or greater coverage, or the cables must be housed in metal conduit, or equivalent shielding must be provided. Continuous shielding must be provided from the drive enclosure to the motor enclosure. Both ends of the motor cable shield (or conduit) must terminate with a low-impedance connection to earth.

  Drive Frames 1...7: At the drive end of the motor cable, either

  a. The cable shield must be clamped to a properly-installed "EMC plate" for the drive. Kit number 20-750-EMC1-F*x*.

  or

  b. The cable shield or conduit must terminate in a shielded connector installed in a conduit plate or conduit box provided in the "NEMA Type 1 Kit" for the drive (kit number 20-750-NEMA1-F*x*).

  Drive Frames 8 and larger: At the drive end of the motor cable, terminate the shield at the PE Grounding Bar (See page 99).
- At the motor end, the motor cable shield or conduit must terminate in a shielded connector which must be properly installed in an earthed motor wiring box attached to the motor. The motor wiring box cover must be installed and earthed.
- All control (I/O) and signal wiring to the drive must use cable with a braided shield providing 75% or greater coverage, or the cables must be housed in metal conduit, or equivalent shielding must be provided. When shielded cable is used, the cable shield should be terminated with a low-impedance connection to earth at only one end of the cable, preferably the end where the receiver is located. When the cable shield is terminated at the drive end, it may be terminated either by using a shielded connector in conjunction with a conduit plate or conduit box, or the shield may be clamped to an "EMC plate."
- Motor cabling must be separated from control and signal wiring wherever possible.
- Maximum motor cable length must not exceed the maximum length indicated in Table 1 for compliance with radio frequency emission limits for the specific standard and installation environment.
- EMC cores must be applied to input power and motor cabling for some models of the PowerFlex 750-Series drives as indicated in Table 1.
- The drive must be powered from an earthed supply system such as a TN or TT system and the PE-A and PE-B jumpers in the drive must be installed (see Drive Power Jumper Configuration starting on page 119).
- IP00 and NEMA/UL Open Type Frame 8 and higher frames must be installed in suitable supplementary EMC enclosures to achieve compliance with EN 61800-3.

Table 1 - PowerFlex 750-Series RF Emission Compliance and Installation Requirements

	Standard / Limits			
Drive Frame Catalog Number	**EN61800-3 Category C1 EN61000-6-3 CISPR11 Group 1 Class B**	**EN61800-3 Category C2 EN61000-6-4 CISPR11 Group 1 Class A (input power ≤ 20 kVA)**	**EN61800-3 Category C3 (I ≤ 100 A) CISPR11 Group 1 Class A (Input power > 20 kVA)**	**EN61800-3 Category C3 I > 100 A**
Frame 1 20F11xx2P1…20F11xx015 20G11xx2P1…20G11xx015	N/A	30 m motor cable limit with one turn of each wire around an input core. (1) (2)	30 m motor cable limit with one turn of each wire around an input core. (1)	N/A
Frame 2 20F11xx2P1…20F11xx022 20G11xx2P1…20G11xx022	150 m cable limit with Schaffner FN3258-30-33 filter. Supplementary EMC enclosure required to provide attenuation of radiated emissions.	30 m motor cable limit with input core. (1) 150 m motor cable limit with Schaffner FN3258-30-33 filter.	30 m motor cable limit with input core. (1) 150 m motor cable limit with Schaffner FN3258-30-33 filter.	N/A
Frame 3 20F11xx030…20F11xx043 20G11xx030…20G11xx043	150 m cable limit with Schaffner FN3258-55-34 filter. Supplementary EMC enclosure required to provide attenuation of radiated emissions.	30 m motor cable limit with input core. (1) 150 m motor cable limit with Schaffner FN3258-55-34 filter.	30 m motor cable limit with input core. (1) 150 m motor cable limit with Schaffner FN3258-55-34 filter.	N/A
Frame 4 20F11xx060…20F11xx072 20G11xx060…20G11xx072	150 m cable limit with Schaffner FN3258-75-34 filter. Supplementary EMC enclosure required to provide attenuation of radiated emissions.	30 m motor cable limit with input and output cores. (1) 150 m motor cable limit with Schaffner FN3258-75-34 filter.	30 m motor cable limit with input and output cores. (1) 150 m motor cable limit with Schaffner FN3258-75-34 filter.	N/A
Frame 5 20F11xx085…20F11xx104 20G11xx085…20G11xx104	150 m cable limit with Schaffner FN3258-130-35 filter. Supplementary EMC enclosure required to provide attenuation of radiated emissions.	30 m motor cable limit with input and output cores. (1) 150 m motor cable limit with Schaffner FN3258-130-35 filter.	30 m motor cable limit with input and output cores. (1) 150 m motor cable limit with Schaffner FN3258-130-35 filter.	30 m motor cable limit with input and output cores. (1) 150 m motor cable limit with Schaffner FN3258-130-35 filter.
Frame 6 20F11xx140…20F11xx260 20G11xx140…20G11xx260	150 m cable limit with Schaffner FS21808-323-99 filter. Supplementary EMC enclosure required to provide attenuation of radiated emissions.	100 m motor cable limit with Schaffner FN3359-320-99 filter. 150 m motor cable limit with Schaffner FS21808-323-99 filter. Supplementary EMC enclosure required to provide attenuation of radiated emissions.	30 m motor cable limit with no filter. (3) 100 m motor cable limit with Schaffner FN3359-320-99 filter. 150 m motor cable limit with Schaffner FS21808-323-99 filter.	30 m motor cable limit with no filter. (3) 100 m motor cable limit with Schaffner FN3359-320-99 filter. 150 m motor cable limit with Schaffner FS21808-323-99 filter.
Frame 7 20F11xx302…20F11xx456 20G11xx302…20G11xx456	150 m cable limit with Schaffner FS21808-480-99 filter. Supplementary EMC enclosure required to provide attenuation of radiated emissions.	150 m motor cable limit with Schaffner FN3359-600-99 filter. 150 m motor cable limit with Schaffner FS21808-480-99 filter. Supplementary EMC enclosure required to provide attenuation of radiated emissions.	30 m motor cable limit with no filter. (3) 150 m motor cable limit with Schaffner FN3359-600-99 filter. 150 m motor cable limit with Schaffner FS21808-480-99 filter.	30 m motor cable limit with no filter. (3) 150 m motor cable limit with Schaffner FN3359-600-99 filter. 150 m motor cable limit with Schaffner FS21808-480-99 filter.
Frame 8 - AC Input 20G1Axx460…20G1Axx770 21G1Axx460…21G1Axx770	Compliance possible with supplementary mitigation (Consult factory)	Compliance possible with supplementary mitigation (Consult factory)	30 m motor cable limit (3) with output core. (4)	30 m motor cable limit (3) with output core. (4)
Frame 9 - AC Input 20G11xx910…20G11xx1K5 21G11xx910…21G11xx1K5	Compliance possible with supplementary mitigation (Consult factory)	Compliance possible with supplementary mitigation (Consult factory)	30 m motor cable limit (3) with output core(4) and input core.(5)	30 m motor cable limit (3) with output core(4) and input core.(5)
Frame 10 - AC Input 20G11xx1K6…20G11xx2K1 21G11xx1K6…21G11xx2K1	Compliance possible with supplementary mitigation (Consult factory)	Compliance possible with supplementary mitigation (Consult factory)	30 m motor cable limit (3) with output core(4) and input core.(5) Door shielding kit installed.(6)	30 m motor cable limit (3) with output core(4) and input core.(5) Door shielding kit installed.(6)
Frames 8…9 - Common DC Input 20G14xx460…20G14xx1K5 21G14xx460…21G14xx1K5	Compliance possible with supplementary mitigation (Consult factory)	Compliance possible with supplementary mitigation (Consult factory)	30 m motor cable limit (3) with output core(4) and input core.(7)	30 m motor cable limit (3) with output core(4) and input core.(7)
Frame 10 - Common DC Input 20G14xx1K6…20G14xx2K1 21G14xx1K6…21G14xx2K1	Compliance possible with supplementary mitigation (Consult factory)	Compliance possible with supplementary mitigation (Consult factory)	30 m motor cable limit (3) with output core(4) and input core.(7) Door shielding kit installed.(6)	30 m motor cable limit (3) with output core(4) and input core.(5) Door shielding kit installed.(6)
	More Stringent Limits ←		→	Less Stringent Limits

(1) Rating-specific EMC cores are part of EMC kit numbers 20-750-EMC1-xx and 20-750-EMC2-xx.

(2) To meet the C2 rating with a Dual Encoder module installed, Frame 1 drives must be installed in a supplementary EMC enclosure to attenuate radiated emissions.

(3) Intended to be powered from an industrial power network supplied by a dedicated power transformer or generator and not from LV power lines supplying other customers.

(4) EMC kit number 20-750-EMCCM1-F8. Kit contains one core. Each drive assembly requires one EMC kit. Order one kit for a Frame 8 drive, two kits for a Frame 9 drive, three kits for a Frame 10 drive.

(5) EMC kit number 20-750-EMCCM1-F9. Kit contains one core. Each drive assembly requires one EMC kit. Order two kits for a Frame 9 drive, three kits for a Frame 10 drive.

(6) Door shielding kit number 20-750-EMCDK1-F10. Kit contains shielding brackets for three doors.

(7) EMC kit number 20-750-CBPEMCCM1-F8. Kit contains one core. Each drive assembly requires one EMC kit. Order one kit for a Frame 8 drive, two kits for a Frame 9 drive, three kits for a Frame 10 drive.

Access Panels, Covers, and Doors

Figure 1 - Enclosure Code R (IP20, NEMA/UL Open Type) Frame 1

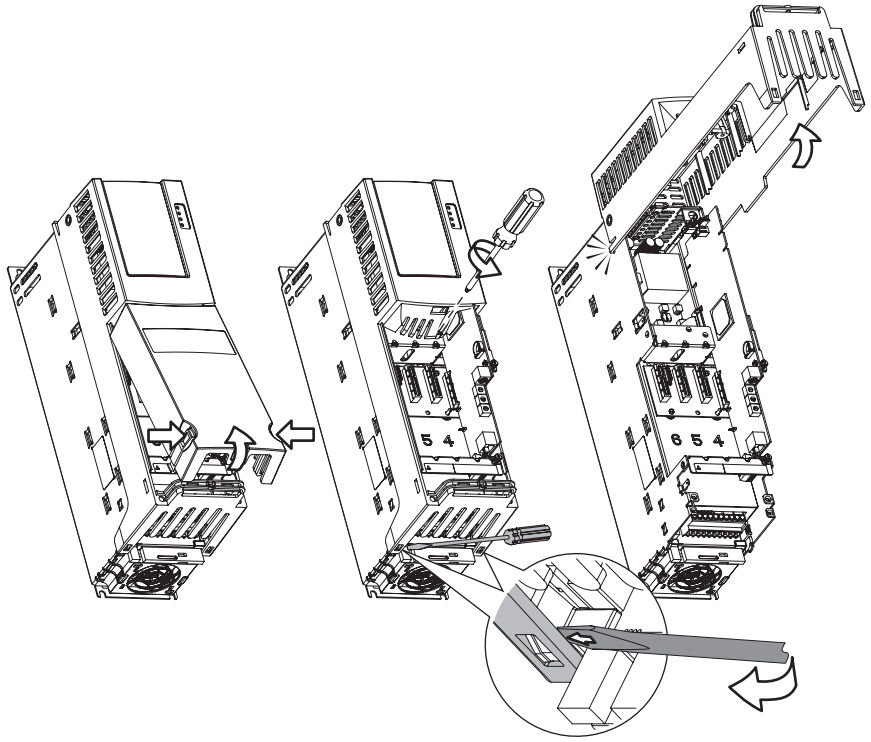


Figure 2 - Enclosure Code N (IP20, NEMA/UL Open Type) Frames 2…5

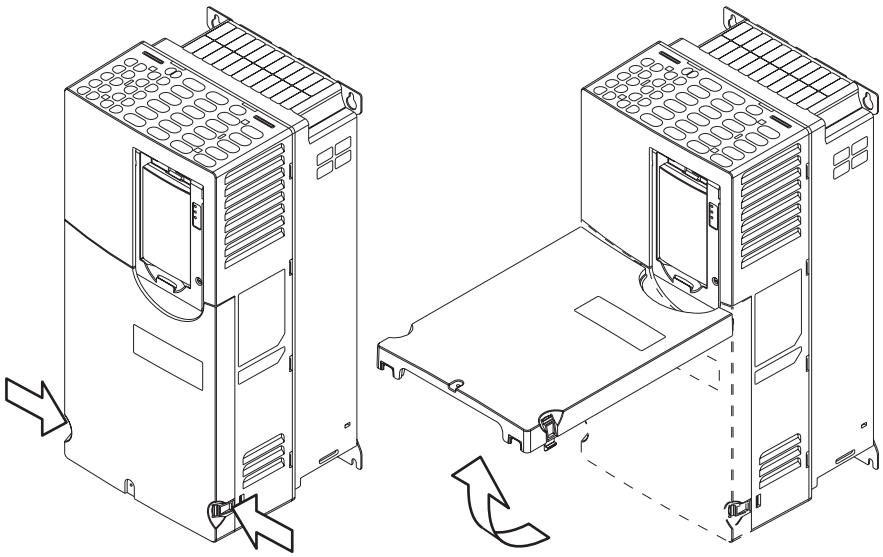
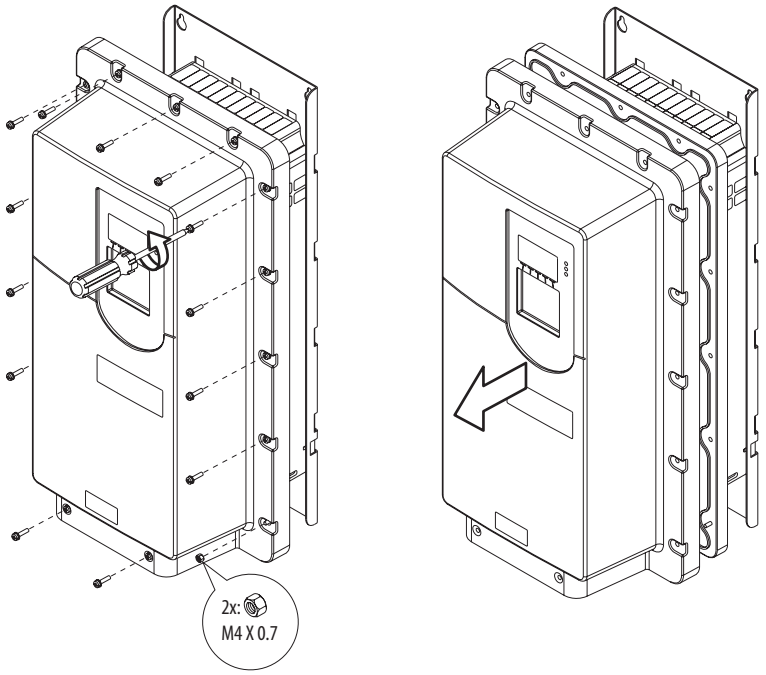


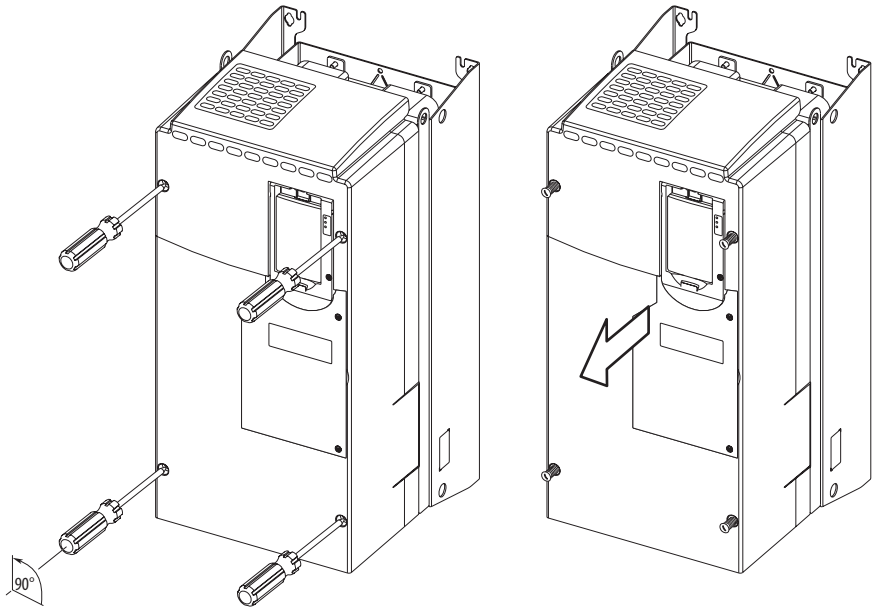
Figure 3 - Enclosure Code G (IP54, NEMA/UL Type 12) Frames 2…5



When cover is replaced:

- Recommended torque (screws and nuts) = 0.68 N•m (6.0 lb•in)
- Recommended screwdriver = 6.4 mm (0.25 in.) flat or T20 Hexalobular
- Recommended hex socket = 7 mm

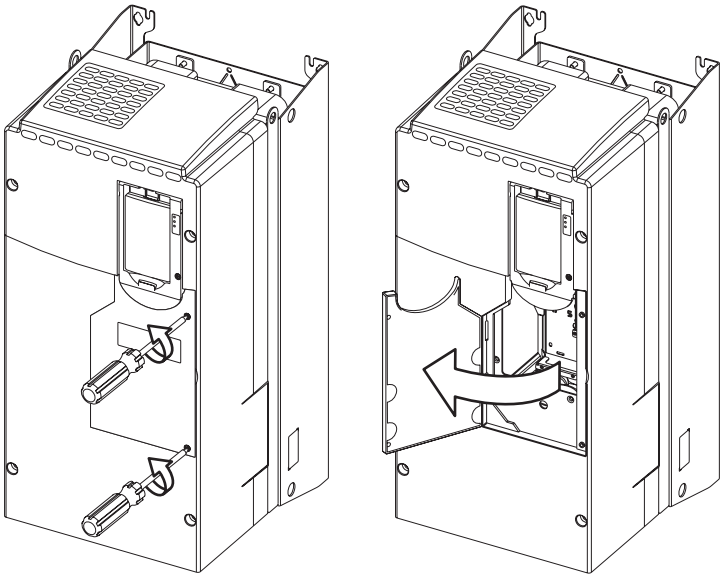
Figure 4 - Enclosure Code N (IP00, NEMA/UL Open Type) Frames 6 & 7



When cover is replaced:

- Recommended screwdriver = 9.5 mm (0.375 in.) flat

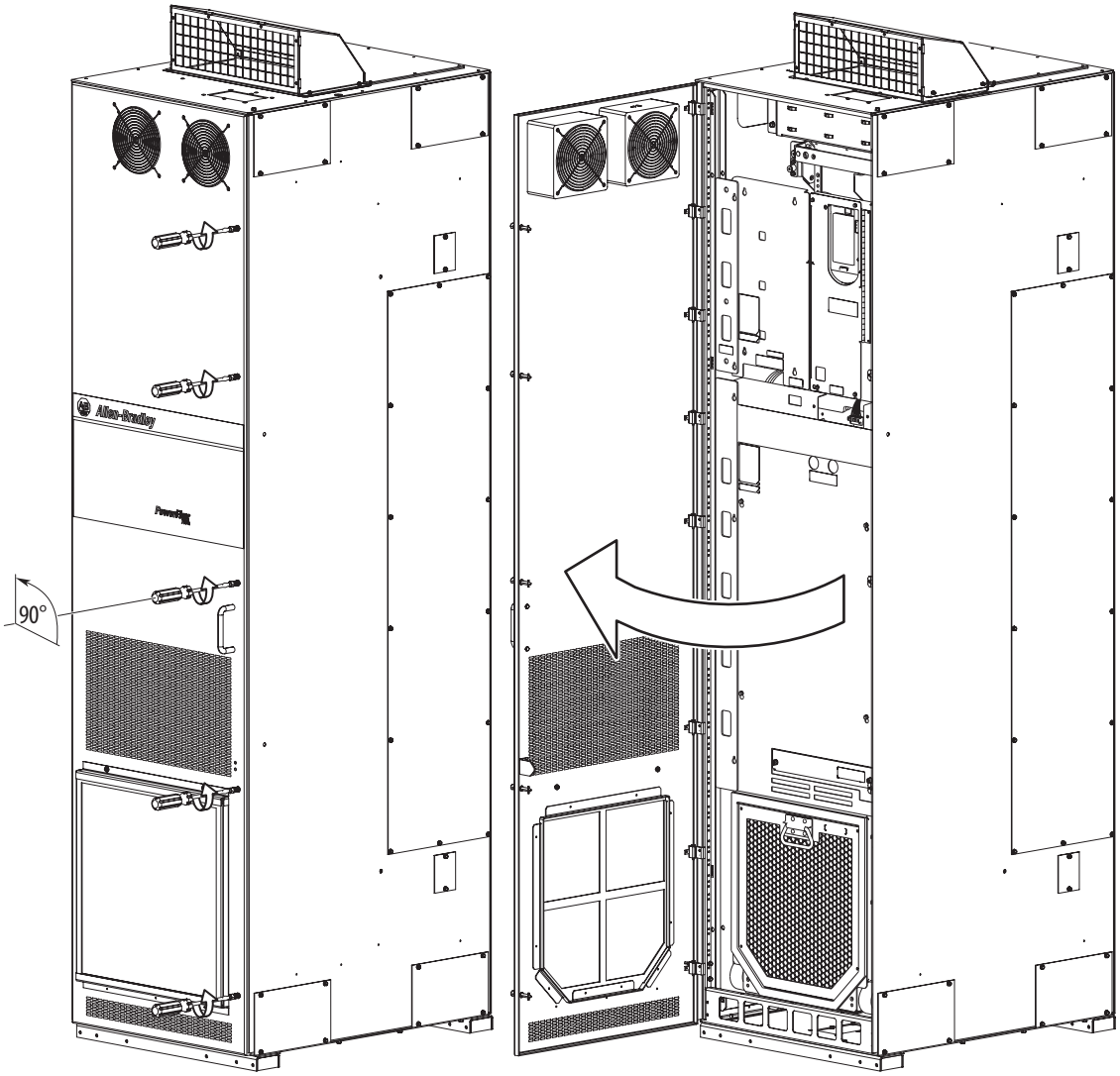
Figure 5 - Enclosure Code N (IP00, NEMA/UL Open Type) Frames 6 & 7 Access Door



When door is replaced:

- Recommended screwdriver = 6.4 mm (0.25 in.) flat or T20 Hexalobular

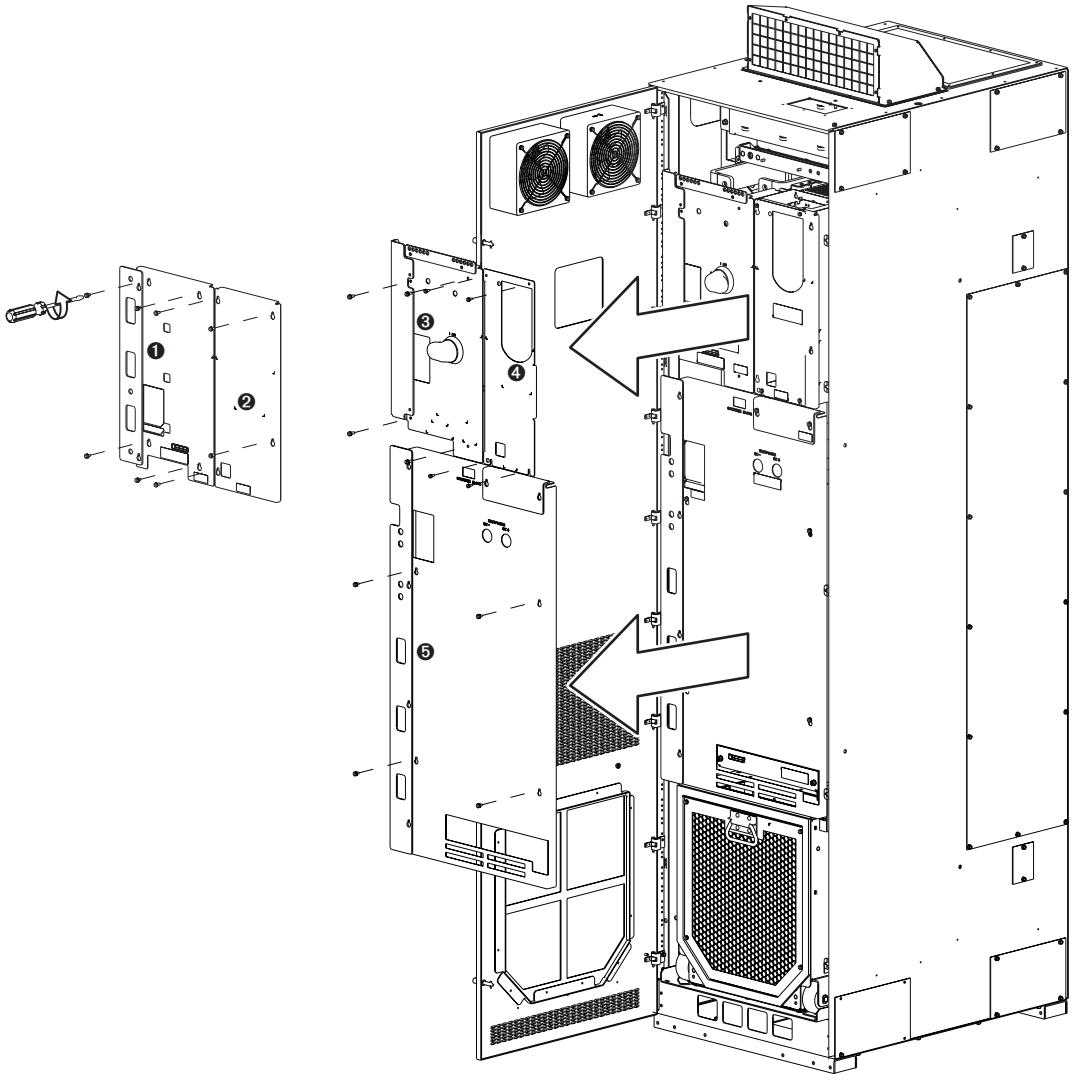
Figure 6 - Enclosure Codes B, L, P, W (IP20, NEMA/UL Type 1) Drive Cabinet Access Door



To release or secure door:

- Recommended screwdriver = 9.5 mm (0.375 in.) flat

Figure 7 - Enclosure Codes B, L, P, W (IP20, NEMA/UL Type 1) Drive Assembly Access Panels



No.	Description
❶	Converter Left Front Cover with Side Shield (AC Input Drives)
❷	Converter Right Front Cover (No Control Pod)
❸	Converter Left Front Cover with Side Shield (Common DC Input Drives)
❹	Converter Right Front Cover (With Control Pod)
❺	Inverter Front Cover with Side Shield (Common DC Input Drives)

When covers are replaced:

- Recommended torque = 2.8 N•m (25.0 lb•in)
- Recommended screwdriver = 6.4 mm (0.25 in.) flat or T25 Hexalobular

Minimum Clearances

Specified vertical clearance requirements (indicated in Figure 8) are intended to be from drive to drive. Other objects can occupy this space; however, reduced airflow may cause protection circuits to fault the drive. The drive must be mounted in a vertical orientation as shown and must make full contact with the mounting surface. Do not use standoffs or spacers. In addition, inlet air temperature must not exceed the product specification.

Figure 8 - Minimum Mounting Clearances Frames 1...7

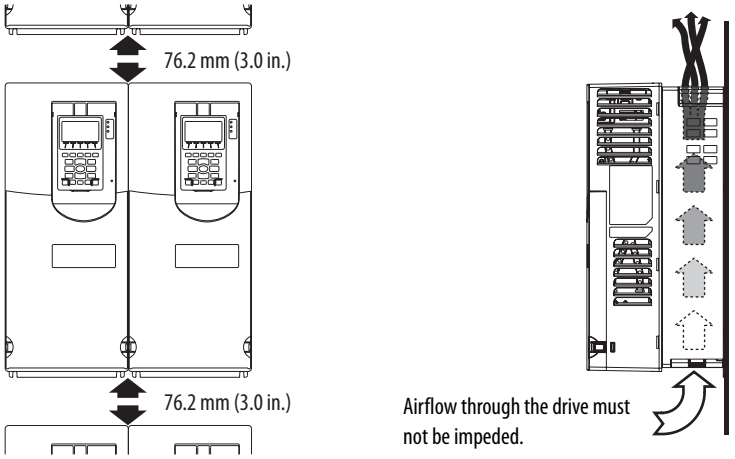
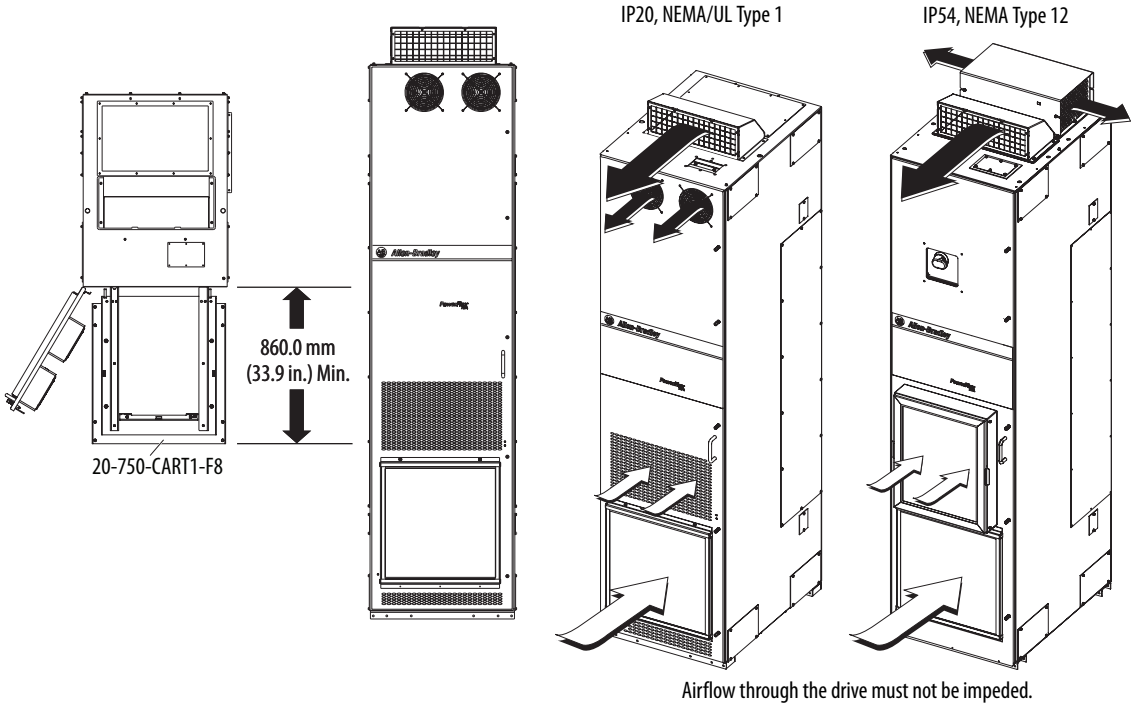


Figure 9 - Minimum Mounting Clearances Drive Cabinets



Mounting Considerations

Frames 1…7

- Mount the drive upright on a flat, vertical and level surface.
- Ensure the drive makes full contact with the mounting surface as depicted in Figure 8.

Frames 8…10

- Install the drive upright on a flat and level surface.
- Ensure the drive cabinet is square, vertical, and stable.
- Ensure the filter and debris screens are installed.

All Frames

- Protect the cooling fan by avoiding dust or metallic particles.
- Do not expose to a corrosive atmosphere.
- Protect from moisture and direct sunlight (unless rated for outdoor use).

Environmental Specifications

Maximum Surrounding Air Temperature		
IP20, NEMA/UL Open Type:	0…50 °C (32…122 °F)	Frame 1…5, All Ratings
IP00, NEMA/UL Open Type:	0…50 °C (32…122 °F)	Frame 6…7, All Ratings
IP20, NEMA/UL Type 1 (w/Hood):	0…40 °C (32…104 °F)	Frame 1…5, All Ratings
IP20, NEMA/UL Type 1 (w/Label):	0…40 °C (32…104 °F)	Frame 6…7, All Ratings
IP20, NEMA/UL Type 1 (MCC Cabinet):	0…40 °C (32…104 °F)	Frame 8…10, All Ratings
IP54, NEMA Type 12 (MCC Cabinet):	0…40 °C (32…104 °F)	Frame 8…10, All Ratings
Flange Mount – Front:		
IP20, NEMA/UL Open Type:	0…50 °C (32…122 °F)	Frame 2…5, All Ratings
IP00, NEMA/UL Open Type:	0…50 °C (32…122 °F)	Frame 6…7, All Ratings
Back/Heat Sink:		
IP66, NEMA/UL Type 4X	0…40 °C (32…104 °F)	Frame 2…7, All Ratings
Stand-alone/Wall Mount –		
IP54, NEMA/UL Type 12	0…40 °C (32…104 °F)	Frame 2…7, All Ratings
Storage Temperature (all const.):	-40…70 °C (-40…158 °F)	
Atmosphere:		

ATTENTION: Drive **must not** be installed in an area where the ambient atmosphere contains volatile or corrosive gas, vapors or dust. If the drive is not going to be installed for a period of time, it must be stored in an area where it will not be exposed to a corrosive atmosphere.

Motor Overload Protection

Electronic Motor Overload Protection:	Class 10 protection with speed sensitive response. Complies with N.E.C. Article 430. U.L. File E59272, volume 12.

Short Circuit Current Rating

Maximum Short Circuit Rating:	200,000 Amps RMS symmetrical (20F & 20G drives only)
Actual Short Circuit Rating:	Determined by AIC rating of installed fuse/circuit breaker. See page 194 for 21G drives

Step 3: Lift and Mount the Drive

Drive Weights

All lifting equipment and lifting components (hooks, bolts, lifts, slings, chains, etc.) must be properly sized and rated to safely lift and hold the weight of the drive while mounting.

ATTENTION: To guard against possible personal injury and/or equipment damage…

- Inspect all lifting hardware for proper attachment before lifting drive.
- Do not allow any part of the drive or lifting mechanism to make contact with electrically charged conductors or components.
- Do not subject the drive to high rates of acceleration or deceleration while transporting to the mounting location or when lifting.
- Do not allow personnel or their limbs directly underneath the drive when it is being lifted and mounted.

Table 2 - Approximate Drive Weights - Frames 1…10

Drive		Frame Size	Drive Rating		Enclosure Code/Weight *kg (lb)*			
			kW	Hp	F	G	N	R
Standard (20F, 20G)	AC Input and Common DC Input	1	0.75…7.5	1…10				6 (13)
		2	0.75…11	1…15	8 (17)	8 (17)	8 (17)	
		3	15…22	20…30	12 (26)	12 (26)	12 (26)	
		4	30…37	40…50	14 (30)	14 (30)	14 (30)	
		5	45…55	60…70	20 (45)	20 (45)	20 (45)	
		6	75	100	37 (82)	89 (197)	37 (82)	
			90…132	125…200	38 (84)	91 (200)	39 (85)	
		7	160…200	250…300	69 (152)	135 (297)	79 (174)	
			250	350	96 (212)	162 (357)	106 (234)	
					B, L	P, W	J	K, Y
Standard (20G)	AC Input	8	250…400	350…650	623 (1374)	1145 (2525)	644 (1419)	1166 (2570)
		9	500…850	700…1250	1246 (2748)	2290 (5051)	1287 (2838)	2332 (5141)
		10	900…1250	1350…1750	1869 (4122)	3435 (7576)	1931 (4257)	3498 (7711)
	Common DC Input	8	250…400	350…650	566 (1248)	1088 (2400)	586 (1293)	1109 (2445)
		9	500…850	700…1250	1132 (2497)	2176 (4799)	1173 (2587)	2218 (4889)
		10	900…1250	1350…1750	1698 (3745)	3264 (7199)	1760 (3880)	3327 (7334)
with Options (21G)	AC Input	8	250…400	350…650	1145 (2525)	1675 (3694)	1166 (2570)	1696 (3739)
		9	500…850	700…1250	1730 (3815)	2820 (6219)	1771 (3905)	2862 (6309)
		10	900…1250	1350…1750	2315 (5106)	3965 (8745)	2377 (5241)	4028 (8880)

Table 3 - Maximum Component Weights - Frame 8…10

	Weight *kg (lb)*	
Component	AC Input	Common DC Input
Converter/DC Input w/Precharge	64 (140)	64 (140)
Inverter	222 (490)	165 (363)
Drive Assembly (Open, IP00)	286 (630)	229 (504)

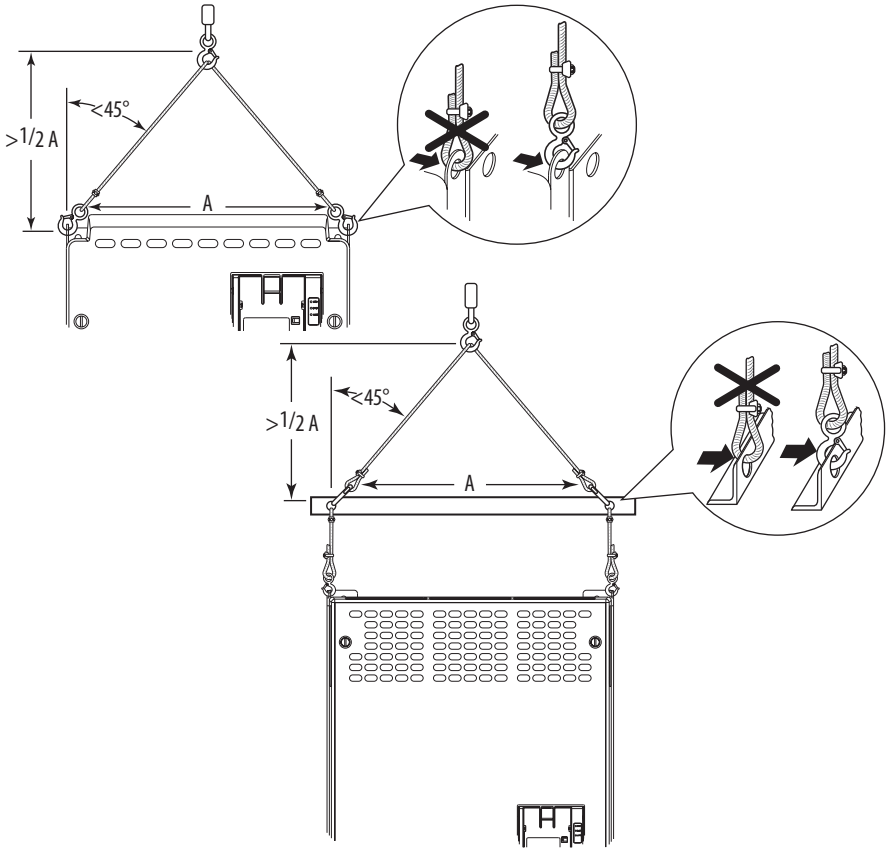
Recommended Mounting Hardware

Frame Size	Fastener Size	Notes
1	M6 (1/4 in.)	
2		
3		
4		
5		
6		
7	M8 (5/16 in.)	
8	M12 (1/2 in.)	Property Class 8.8 (Minimum)
9		
10		

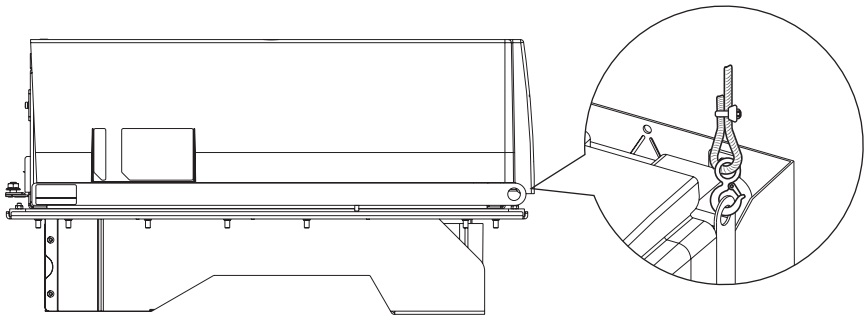
IMPORTANT Mounting hardware is provided with enclosure type F (Flange mount) drives. The hardware supplied must be used to meet the enclosure rating.

Attach Lifting Hardware

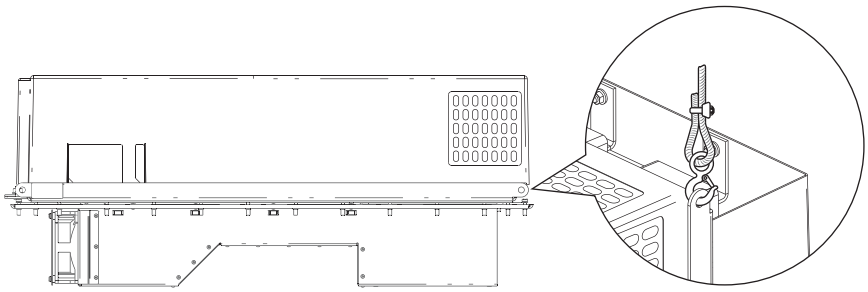
Figure 10 - Rigging Geometry



Enclosure Code F
Frame 6 Lifting Points – 2 Places

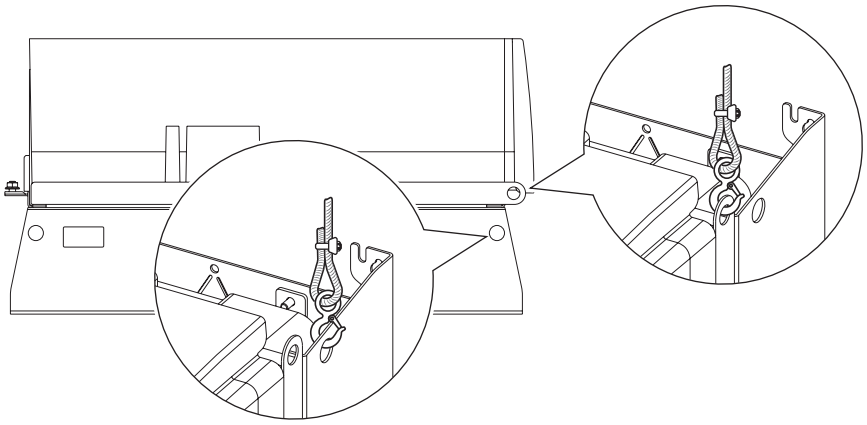


Frame 7 Lifting Points – 4 Places

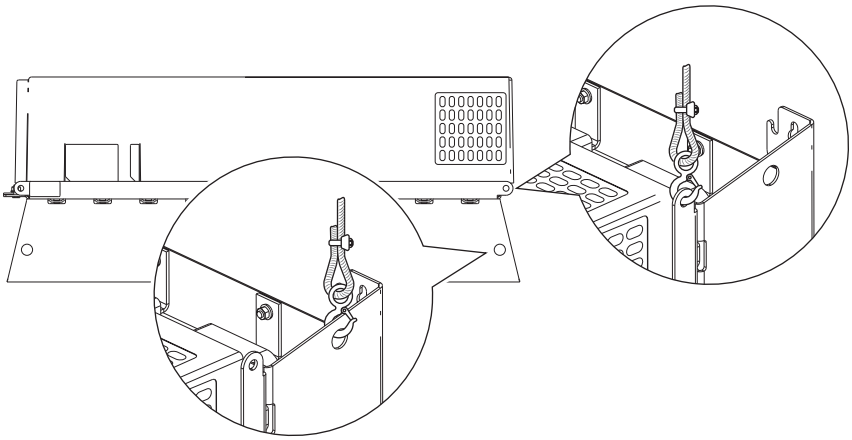


Enclosure Code N

Frame 6 Lifting Points – 6 Places

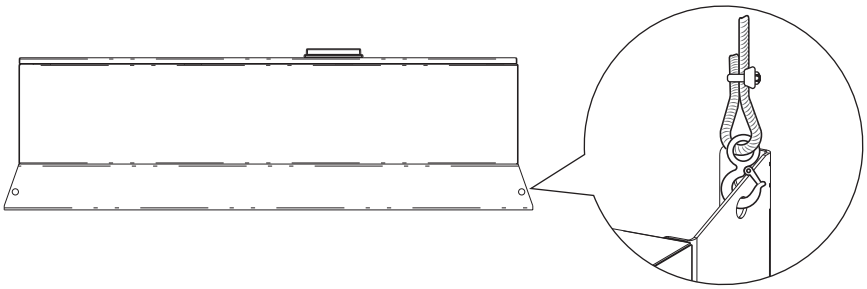


Frame 7 Lifting Points – 8 Places



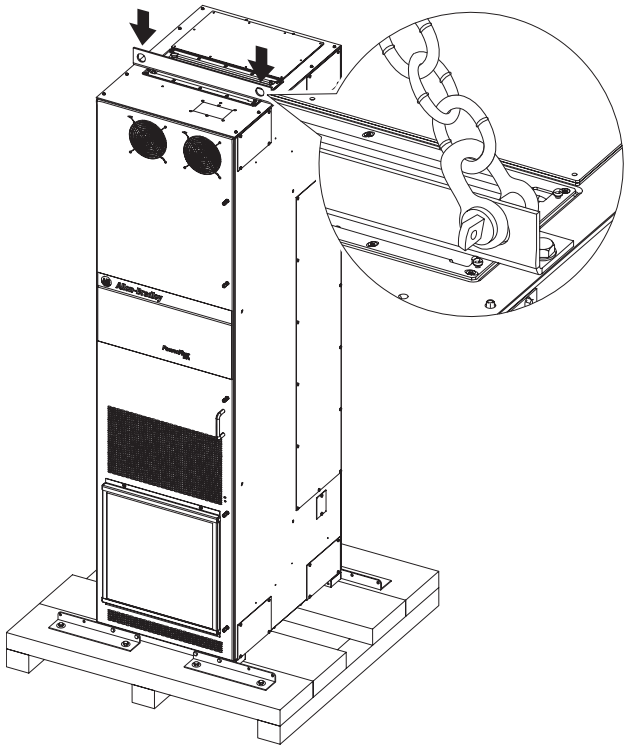
Enclosure Code G

Frame 6 and 7 Lifting Points – 4 Places

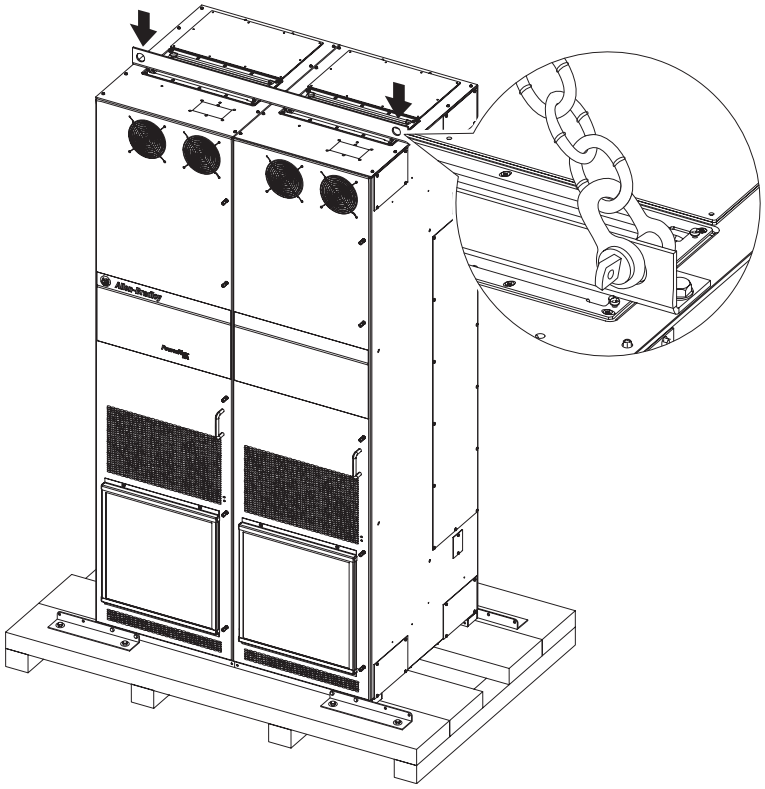


Enclosure Codes B and L

Frame 8 Lifting Points – 2 Places

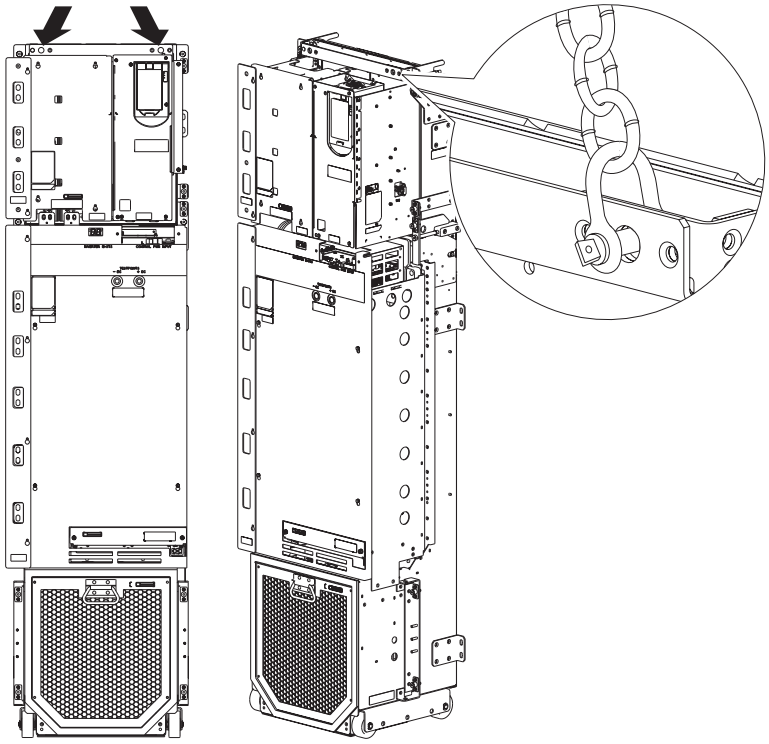


Frame 9 and 10 Lifting Points – 2 Places



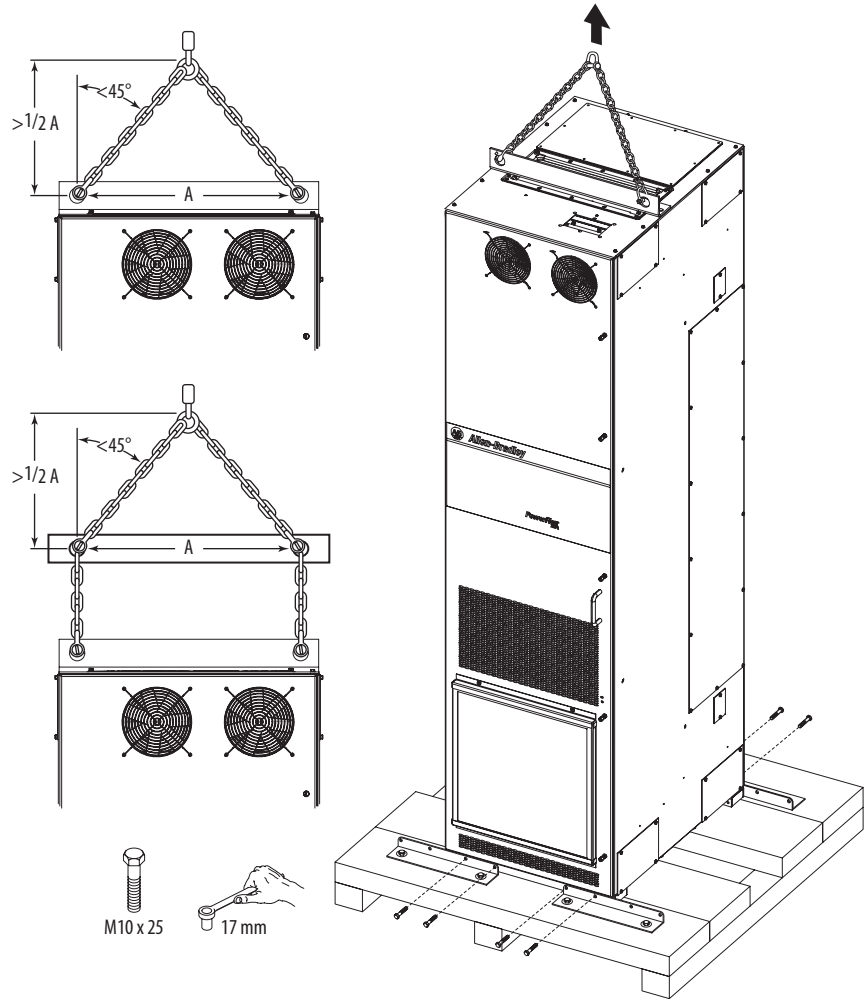
Open Type Drive (Removed From Cabinet)

Drive Assembly – IP00, NEMA/UL Type Open Drive Lifting Points – 2 Places

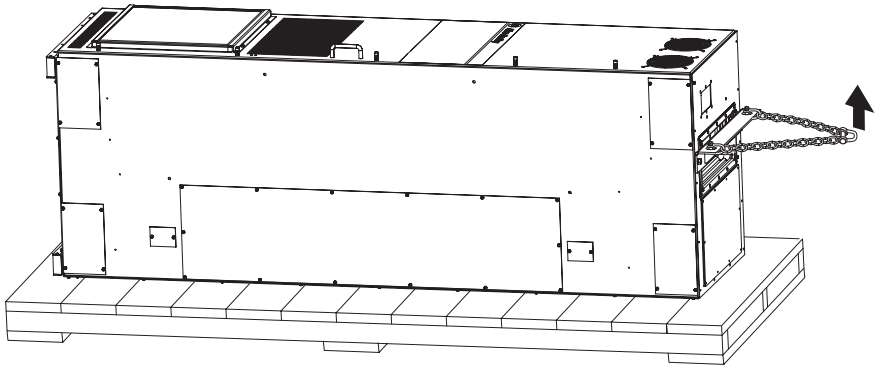


Release Drive Cabinet Frame 8 and Larger Shipping Skid

Remove the bolts fastening a vertically oriented drive cabinet to the shipping skid and lift.

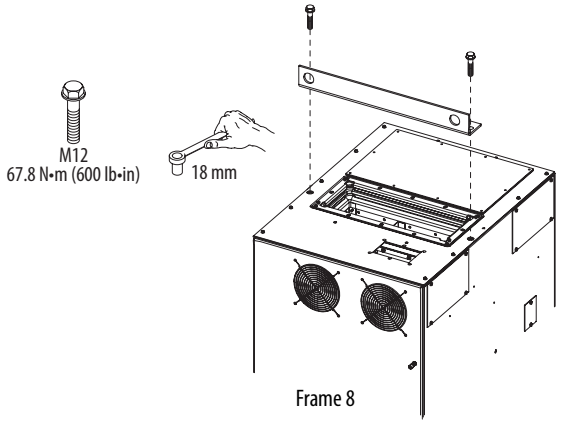


Remove the shipping crate that encloses a horizontally oriented drive cabinet on the shipping skid and lift.

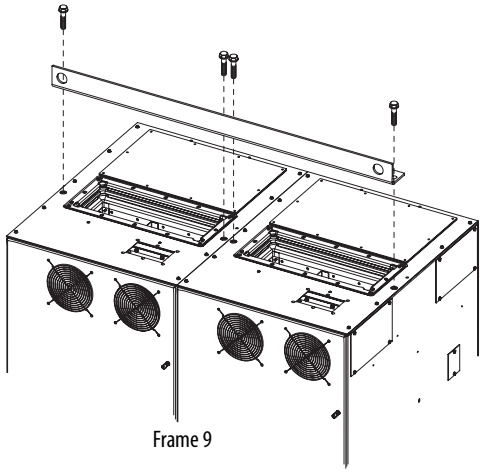


Remove Drive Cabinet Lifting Angle

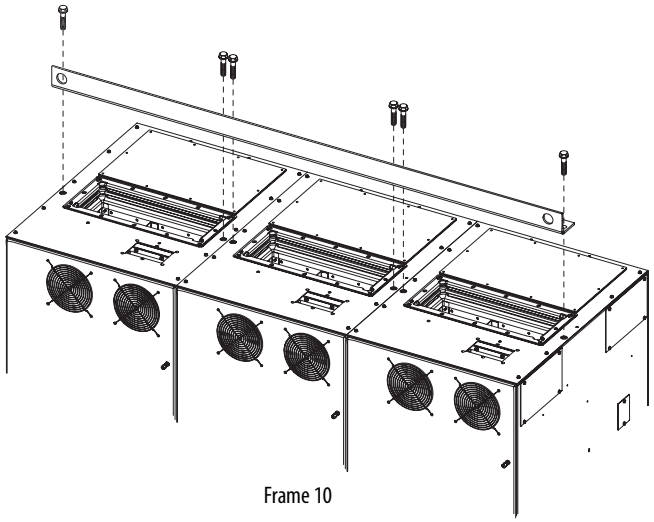
After the drive cabinet is in its final position, remove the lifting angle.



Frame 8



Frame 9

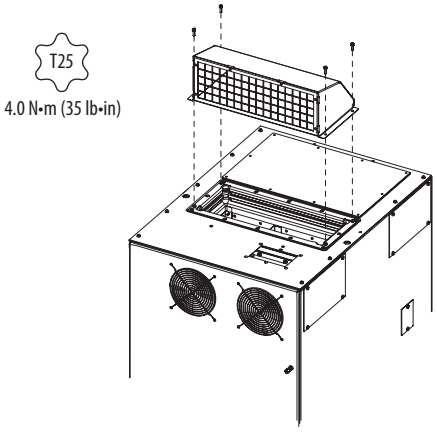


Frame 10

Install Exhaust Hood

IP20, NEMA/UL Type 1 drives are equiped with a top mounted exhaust hood.

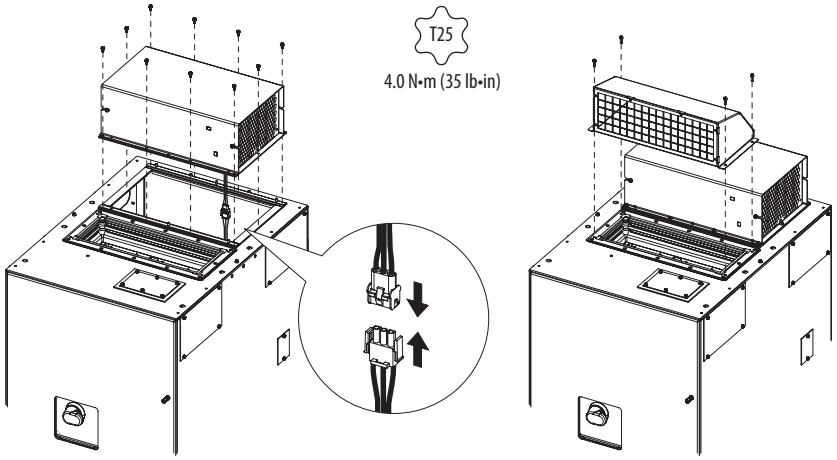
1. Install the exhaust hood with the grill facing the front of the drive.
2. Secure with the four screws provided.



Install Cabinet Blower Assembly and Exhaust Hood

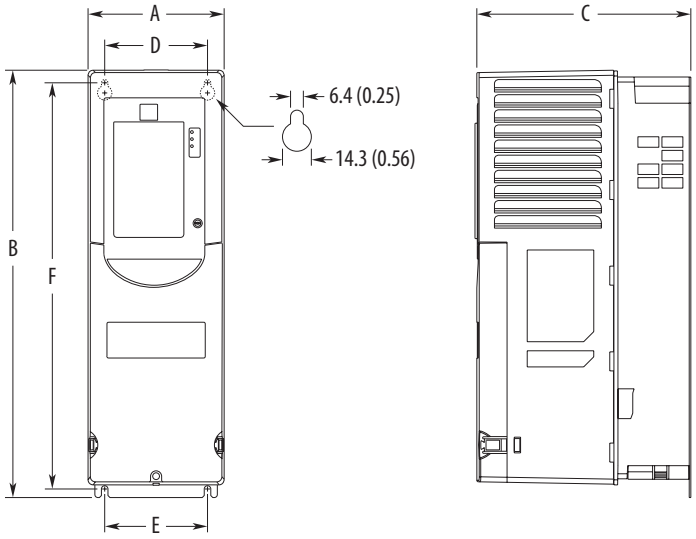
IP54, NEMA Type 12 drives are equiped with top a mounted blower assembly and exhaust hood.

1. Install the cabinet blower assembly. Note the required power connection.
2. Secure with the ten screws provided.
3. Install the exhaust hood with the grill facing the front of the drive.
4. Secure with the four screws provided.



Approximate Dimensions

Figure 11 - IP20, NEMA/UL Open Type Frames 1…5 *(Frame 2 Shown)*

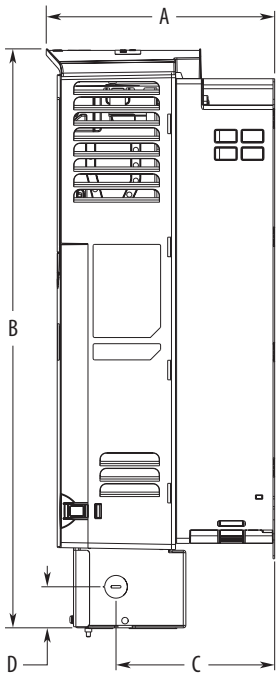


Dimensions are in millimeters and (inches).
Weights are in kilograms and (pounds).

Frame	A	B	C	D	E	F	Weight *kg (lb)*
1	110.0 (4.33)	400.5 (15.77)	211.0 (8.31)	68.0 (2.68)	82.0 (3.23)	390.4 (15.37)	6.0 (12.75)
2	134.5 (5.30)	424.2 (16.70)	212.0 (8.35)	100.0 (3.94)	100.0 (3.94)	404.2 (15.91)	7.8 (17.2)
3	190.0 (7.48)	454.0 (17.87)	212.0 (8.35)	158.0 (6.22)	158.0 (6.22)	435.0 (17.13)	11.8 (26.1)
4	222.0 (8.74)	474.0 (18.66)	212.0 (8.35)	194.0 (7.64)	202.0 (7.95)	455.0 (17.91)	13.6 (30.0)
5	270.0 (10.63)	550.0 (21.65)	212.0 (8.35)	238.0 (9.37)	238.0 (9.37)	531.0 (20.91)	20.4 (45.0)


M6 (#10 or #12) mounting hardware recommended.

Figure 12 - NEMA/UL Type 1 Kit Frames 1…5 *(Frame 4 Shown)*

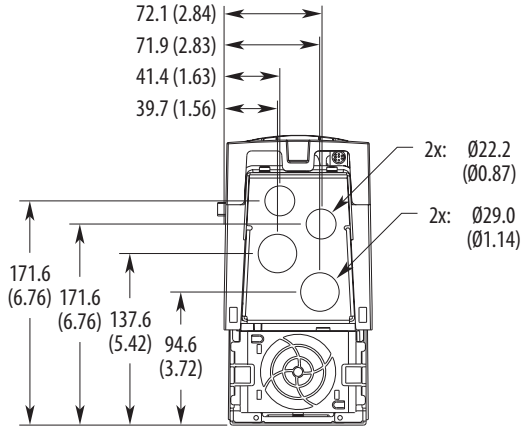


Dimensions are in millimeters and (inches).

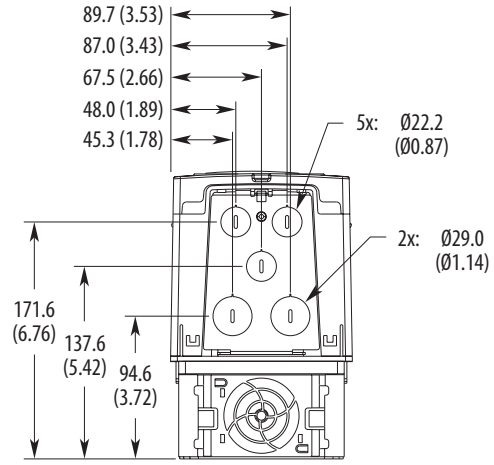
Frame	A	B	C	D
1	215.4 (8.48)	458.8 (18.06)	–	–
2	222.2 (8.75)	497.1 (19.57)	117.7 (4.63)	38.0 (1.50)
3	223.1 (8.78)	530.1 (20.87)	154.7 (6.09)	38.0 (1.50)
4	222.7 (8.77)	564.4 (22.22)	154.7 (6.09)	40.0 (1.57)
5	222.7 (8.77)	665.4 (26.20)	155.0 (6.10)	55.0 (2.17)

IMPORTANT NEMA Type 1 Kits (20-750-NEMA-F*x*) do not change the mounting dimensions in Figure 11.

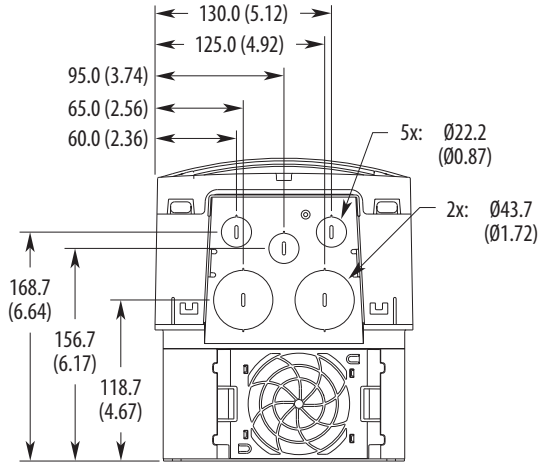
Figure 13 - NEMA/UL Type 1 Frames 1…5 Bottom View Dimensions



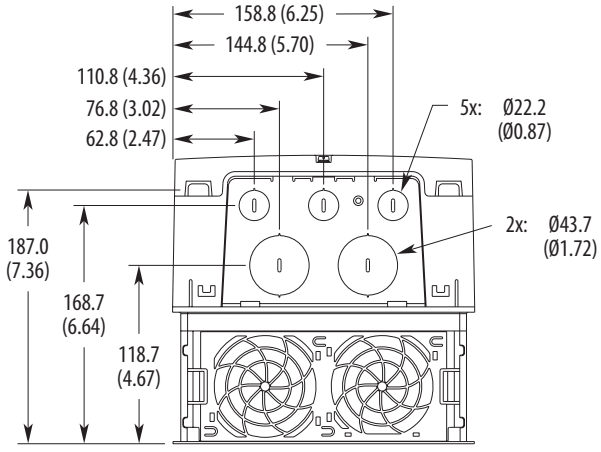
Frame 1



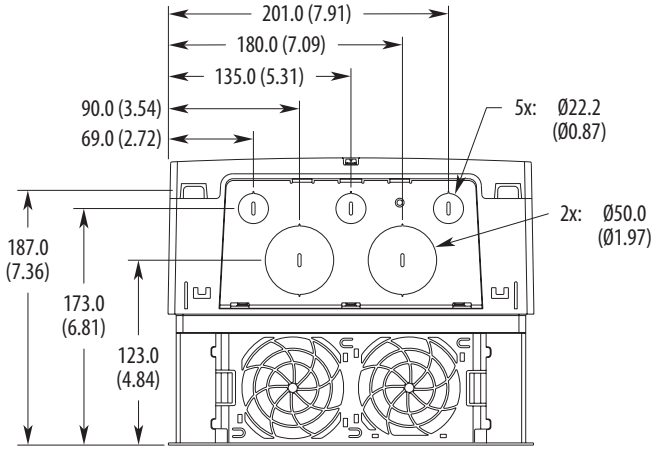
Frame 2



Frame 3



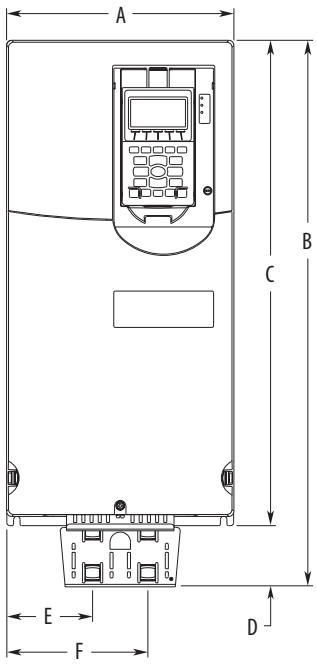
Frame 4



Frame 5

Dimensions are in millimeters and (inches).

Figure 14 - EMC Plate Kit Frames 1…5 *(Frame 4 Shown)*

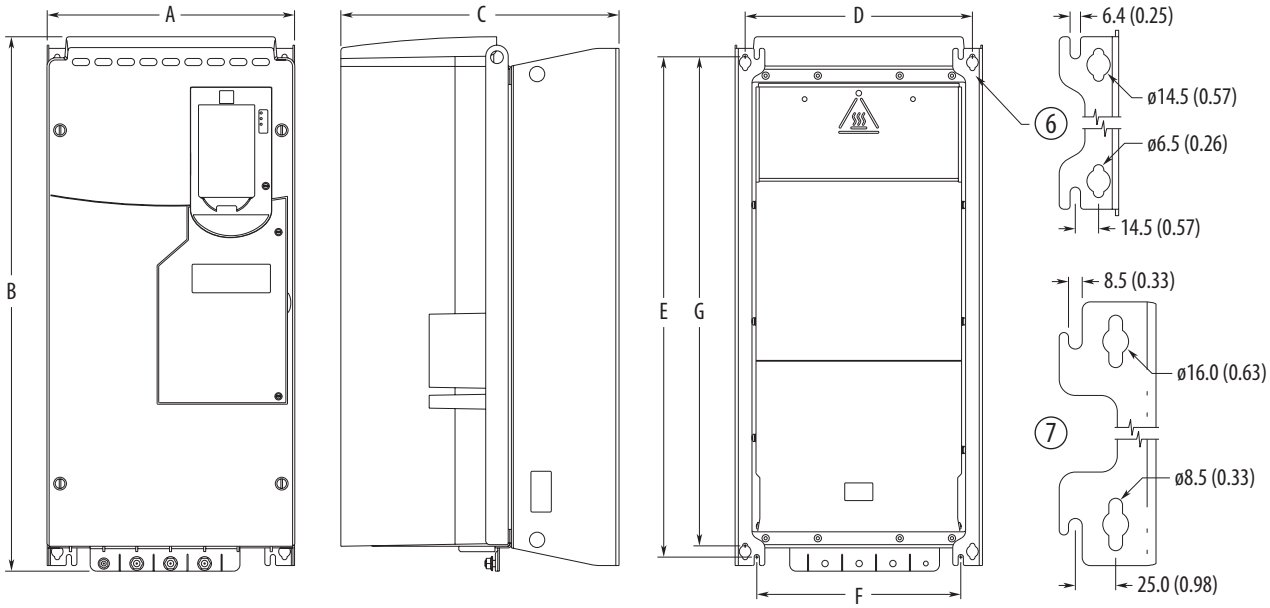


Dimensions are in millimeters and (inches).

Frame	A	B	C	D	E	F
1	110.0 (4.33)	478.8 (18.85)	400.5 (15.77)	78.3 (3.08)	37.4 (1.47)	73.4 (2.89)
2	134.5 (5.30)	485.9 (19.13)	424.2 (16.70)	61.7 (2.43)	43.5 (1.71)	79.5 (3.13)
3	190.0 (7.48)	514.0 (20.24)	454.0 (17.87)	60.0 (2.36)	74.0 (2.91)	116.0 (4.57)
4	222.0 (8.74)	533.7 (21.01)	474.0 (18.66)	59.7 (2.35)	84.0 (3.31)	138.0 (5.43)
5	270.0 (10.63)	609.7 (24.00)	550.0 (21.65)	59.7 (2.35)	77.8 (3.06)	191.8 (7.55)

IMPORTANT EMC Kits (20-750-EMC-F*x*) do not change the mounting dimensions in Figure 11. Refer to the PowerFlex 750-Series EMC Plate and Core(s) Installation Instructions, publication 750-IN006, for detailed information on kit installation.

Figure 15 - IP00, NEMA/UL Open Type Frames 6 & 7 *(Frame 6 Shown)*

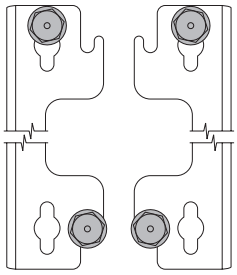


Dimensions are in millimeters and (inches).

Frame	A	B	C	D	E	F	G	Weight *kg (lb)*
6	308.0 (12.13)	665.5 (26.20)	346.4 (13.64)	283.0 (11.14)	623.0 (24.53)	254.0 (10.00)	609.0 (23.98)	38.6 (85.0)
7	430.0 (16.93)	881.5 (34.70)	349.6 (13.76)	380.0 (14.96)	838.0 (32.99)	330.0 (12.99)	825.0 (32.48)	72.6…108.9 (160.0…240.0)

Frame 6: M6 (#12) mounting hardware recommended.
Frame 7: M8 (5/16 in.) mounting hardware recommended.

IMPORTANT

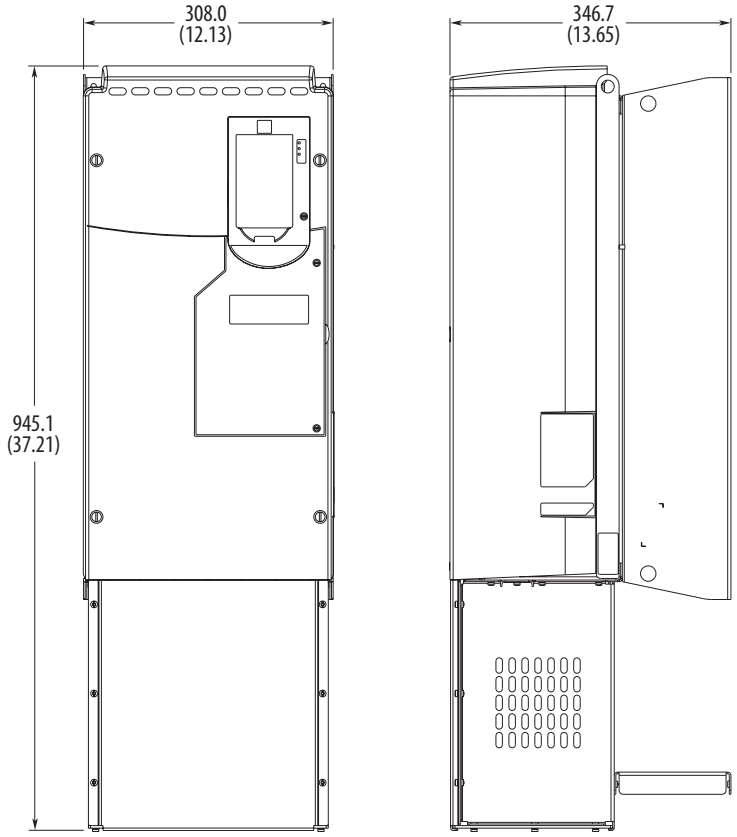


Always install mounting hardware in all four corners of the mounting legs for stability.

Only install mounting hardware through the top key holes to help insure the drive is securely fastened to the mounting surface.

At the bottom of the mounting legs, either the key holes or optional open mounting slots may be used.

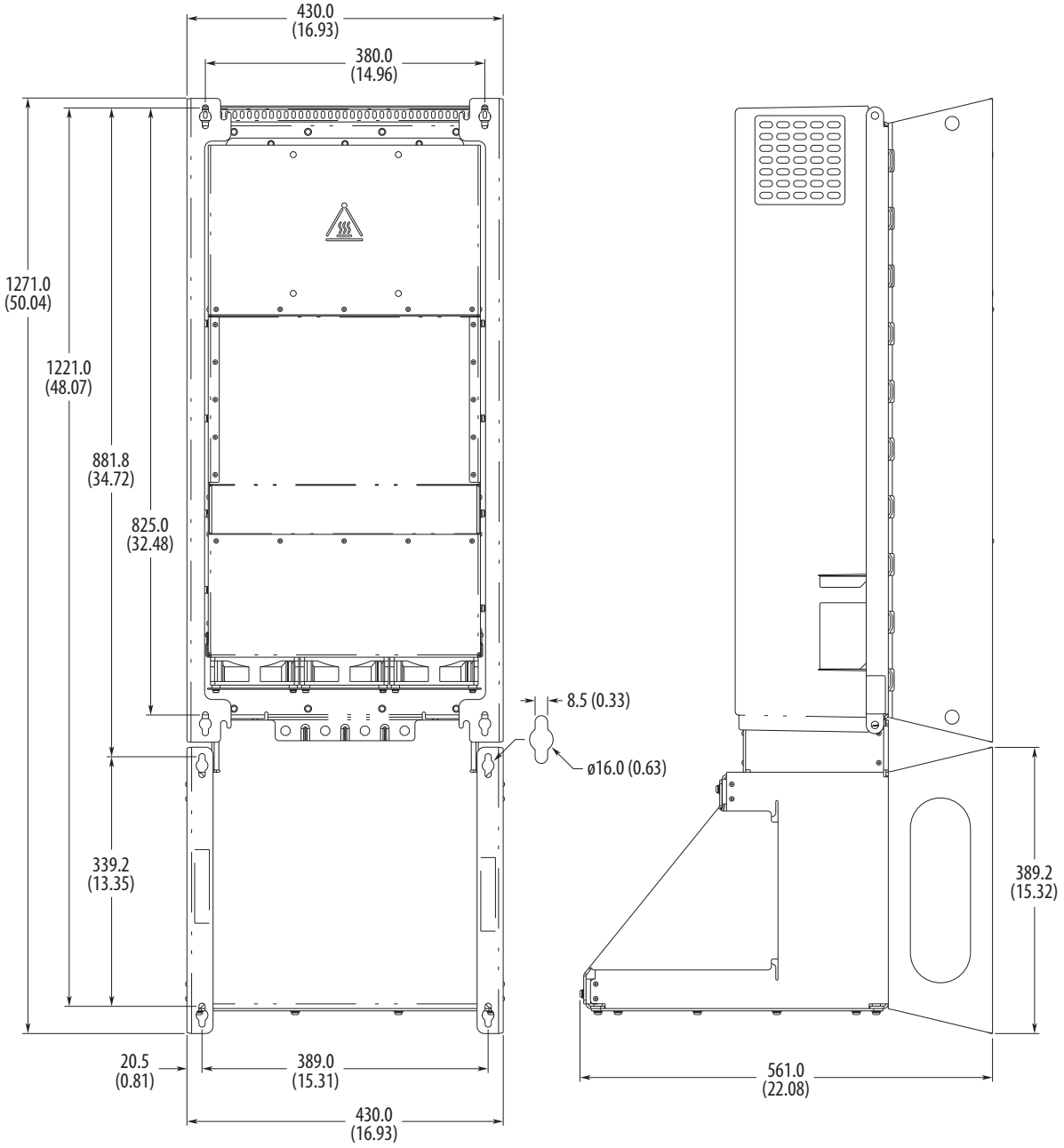
Figure 16 - NEMA/UL Type 1 Kit Frame 6



Dimensions are in millimeters and (inches).

IMPORTANT NEMA Type 1 Kit (20-750-NEMA-F6) does not change the mounting dimensions in Figure 15.

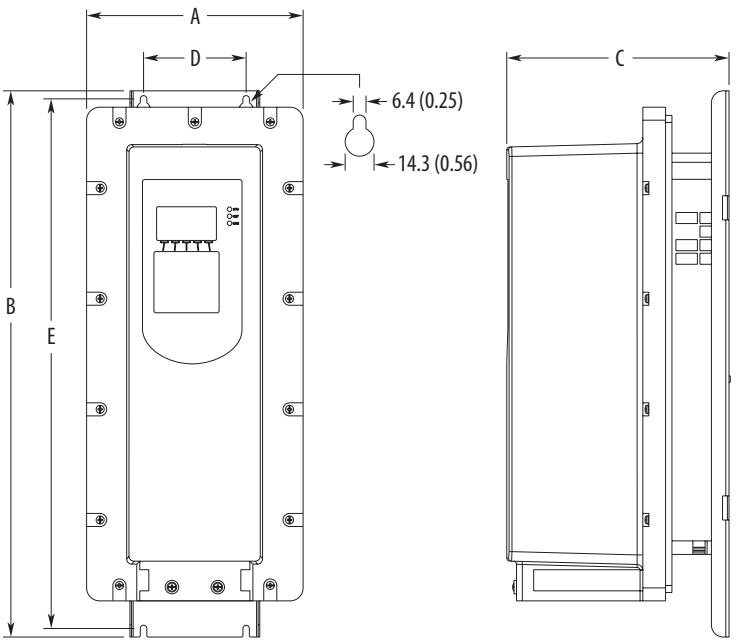
Figure 17 - NEMA/UL Type 1 Frame 7



Dimensions are in millimeters and (inches).

M8 (5/16 in.) mounting hardware recommended.

Figure 18 - IP54, NEMA/UL Type 12 Frames 2…5 *(Frame 2 Shown)*

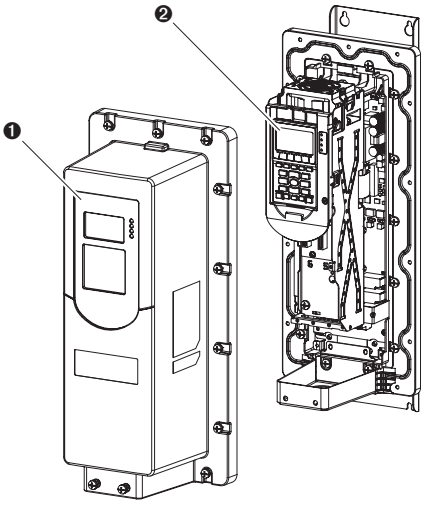


Dimensions are in millimeters and (inches).
Weights are in kilograms and (pounds).

Frame	A	B	C	D	E	Weight *kg (lb)*
2	215.3 (8.48)	543.2 (21.39)	222.2 (8.75)	100.0 (3.94)	528.2 (20.80)	7.8 (17.2)
3	268.0 (10.55)	551.0 (21.69)	220.1 (8.67)	158.0 (6.22)	533.0 (20.98)	11.8 (26.1)
4	300.0 (11.81)	571.0 (22.48)	220.1 (8.67)	194.0 (7.64)	553.0 (21.77)	13.6 (30.0)
5	348.0 (13.70)	647.0 (25.47)	220.1 (8.67)	238.0 (9.37)	629.0 (24.76)	20.4 (45.0)

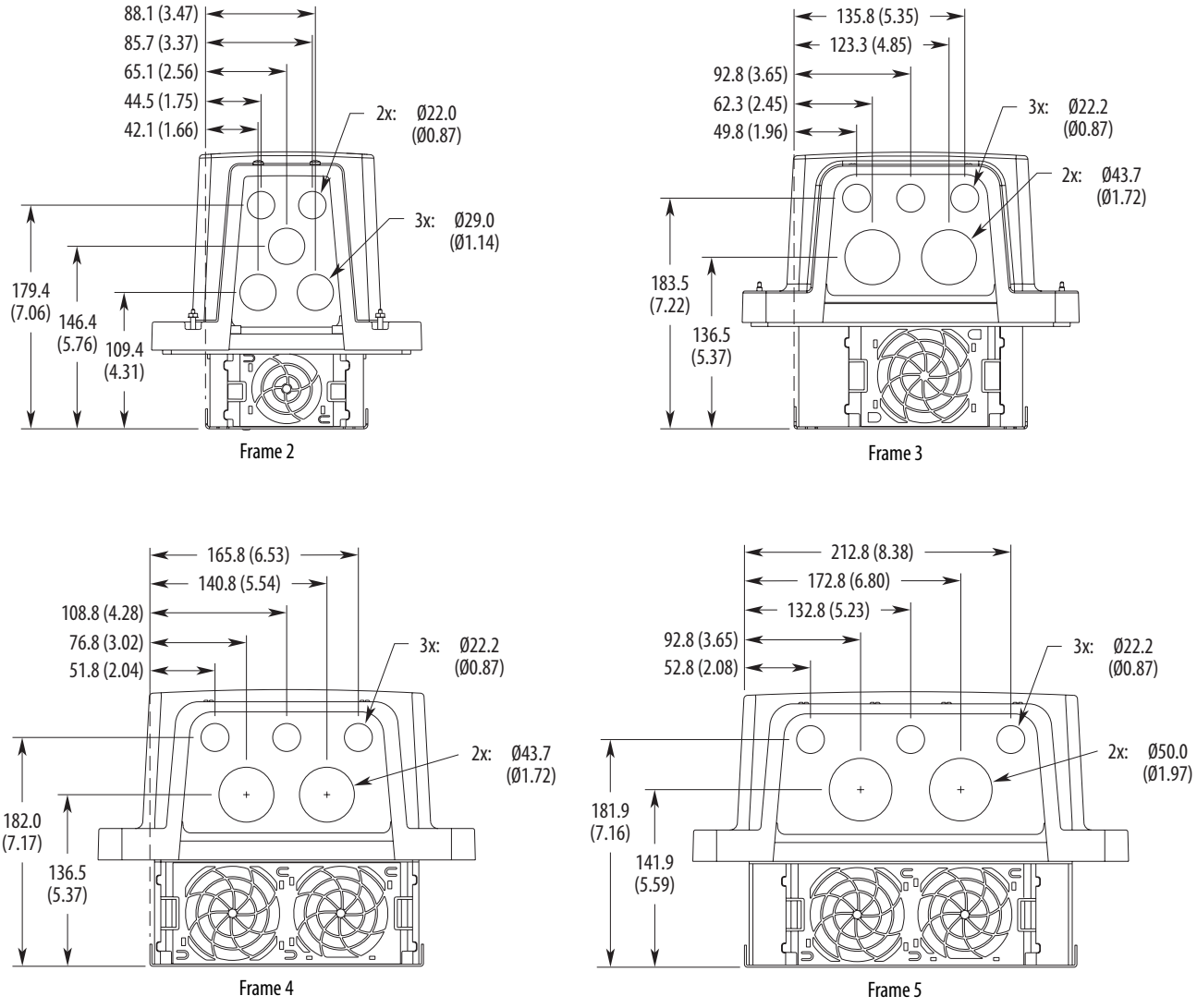

M6 (1/4 in.) mounting hardware recommended.

Figure 19 - P54, NEMA/UL Type 12 Frames 2…5 Human Interface Module Access



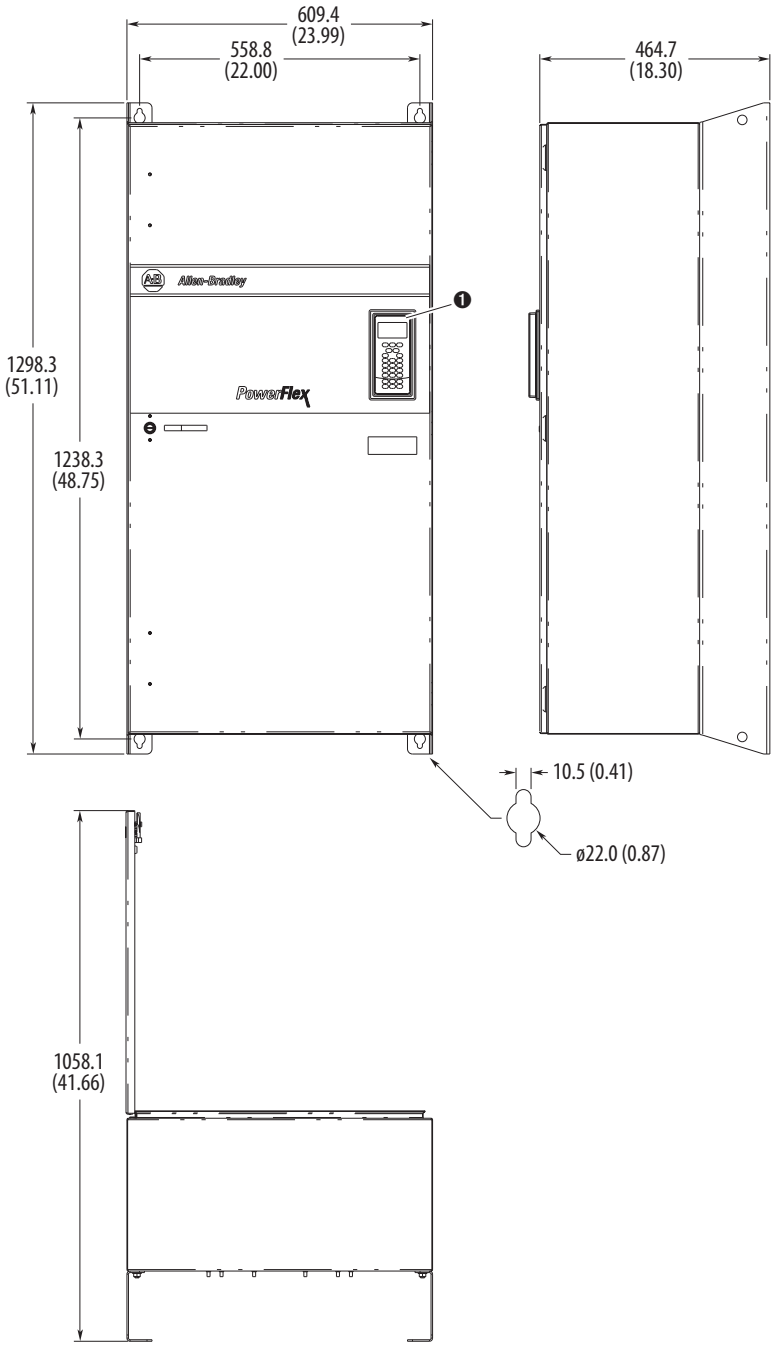
No.	Description
❶	Flexible panel molded into the IP54, NEMA/UL Type 12 cover.
❷	Human Interface Module, Catalog Number 20-HIM-A6, under cover in control pod cradle.

Figure 20 - IP54, NEMA/UL Type 12 Frames 2…5 Bottom View Dimensions



Dimensions are in millimeters and (inches).

Figure 21 - IP54, NEMA/UL Type 12, Frame 6

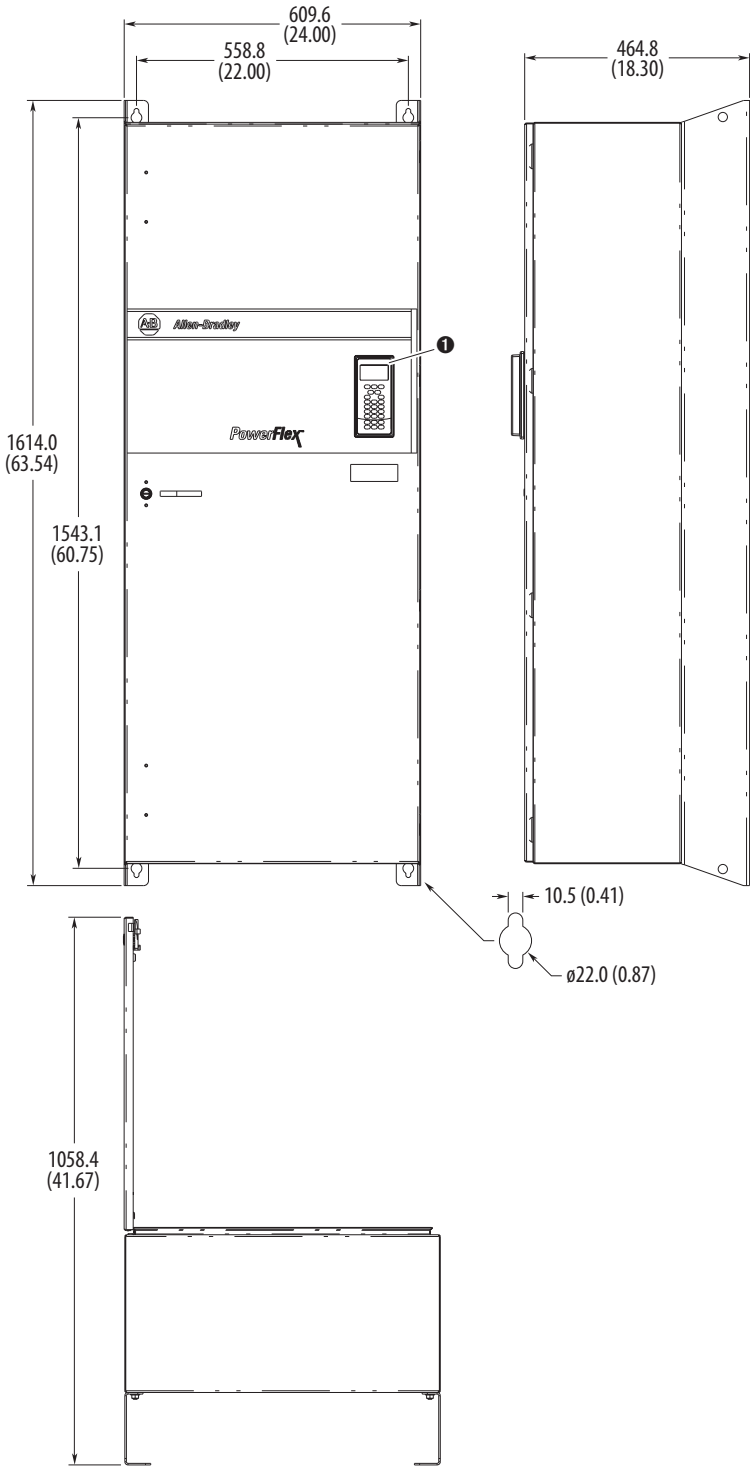


❶ Human Interface Module, Catalog Number 20-HIM-C6S, required to meet enclosure rating.

Dimensions are in millimeters and (inches).

M10 (7/16 in.) mounting hardware recommended.

Figure 22 - IP54, NEMA/UL Type 12, Frame 7

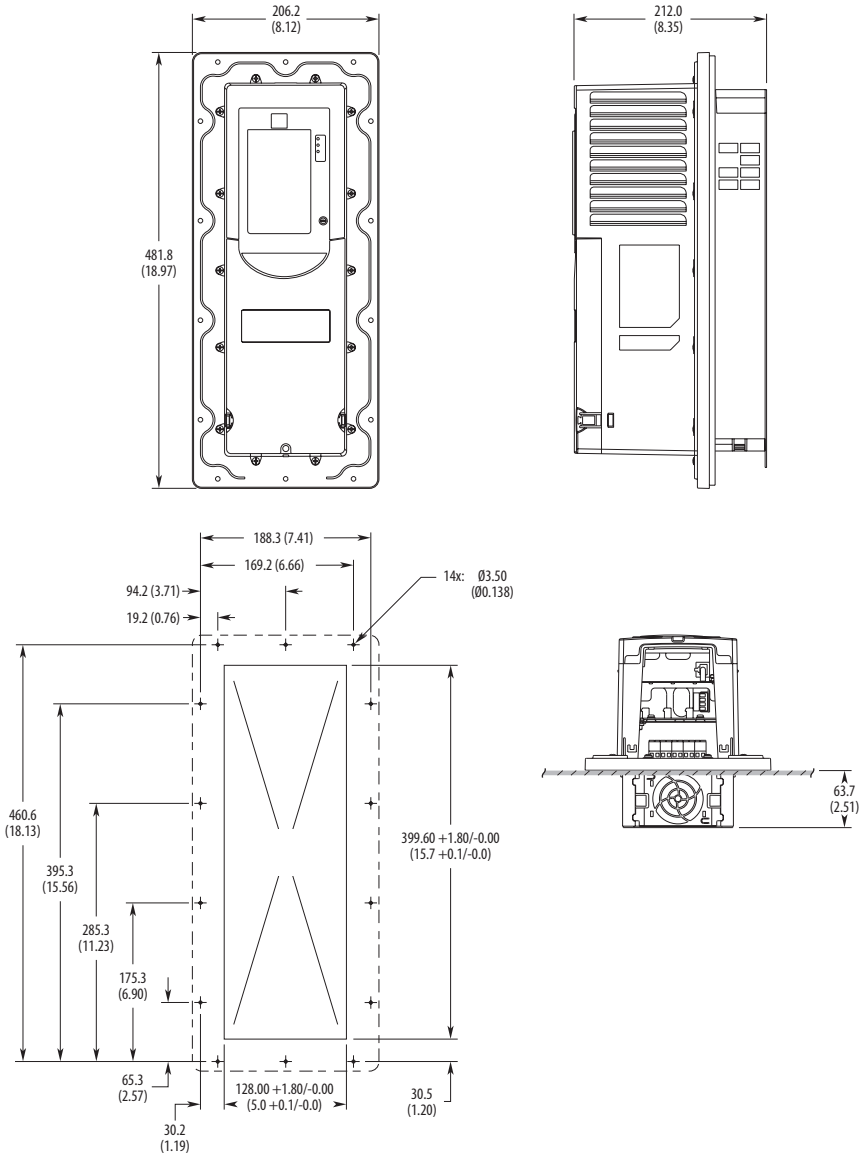


❶ Human Interface Module, Catalog Number 20-HIM-C6S, required to meet enclosure rating.

Dimensions are in millimeters and (inches).

M10 (7/16 in.) mounting hardware recommended.

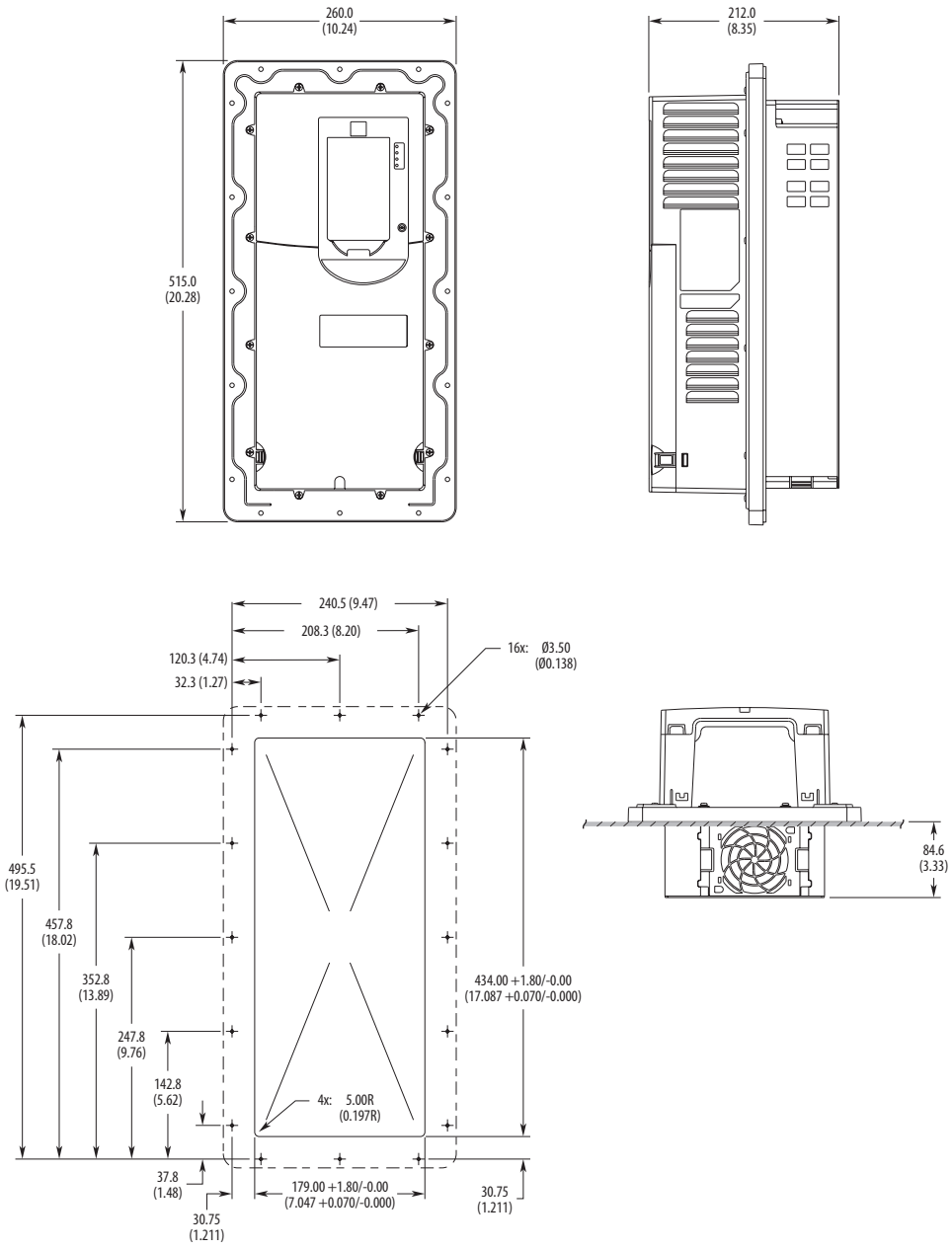
Figure 23 - Flange Mount Frame 2



Dimensions are in millimeters and (inches).

IMPORTANT Must use mounting hardware supplied to meet enclosure rating.

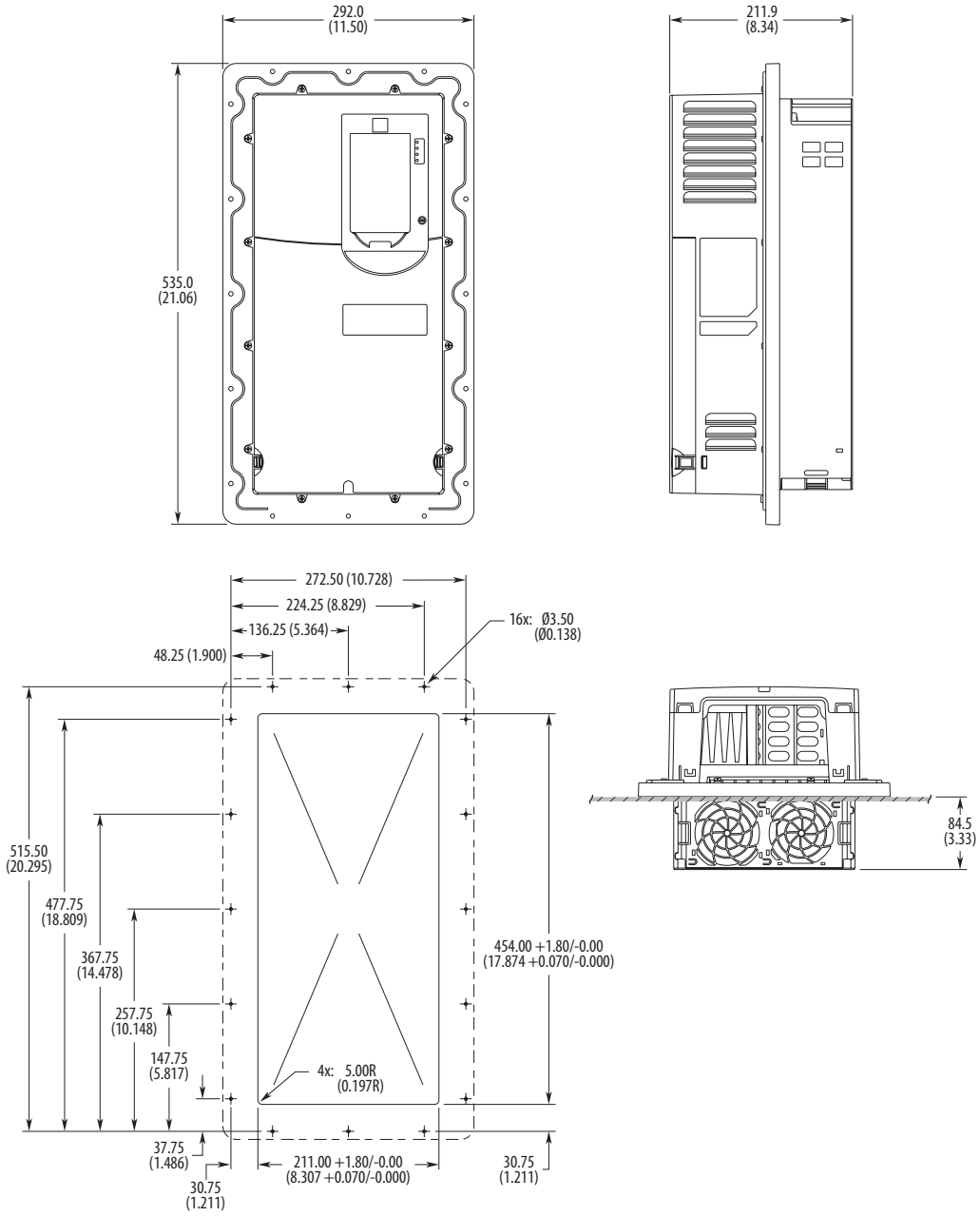
Figure 24 - Flange Mount Frame 3



Dimensions are in millimeters and (inches).

IMPORTANT Must use mounting hardware supplied to meet enclosure rating.

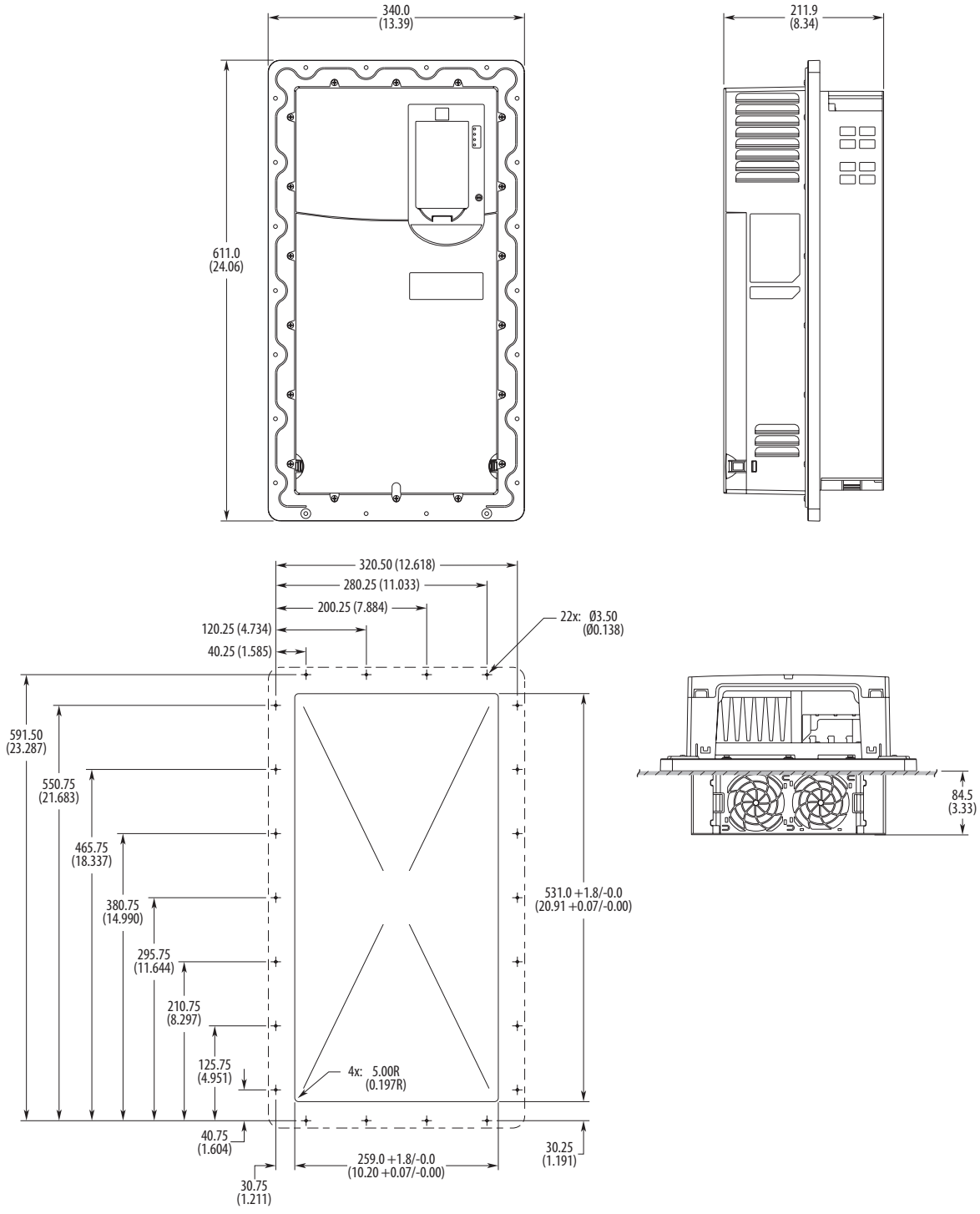
Figure 25 - Flange Mount Frame 4



Dimensions are in millimeters and (inches).

IMPORTANT Must use mounting hardware supplied to meet enclosure rating.

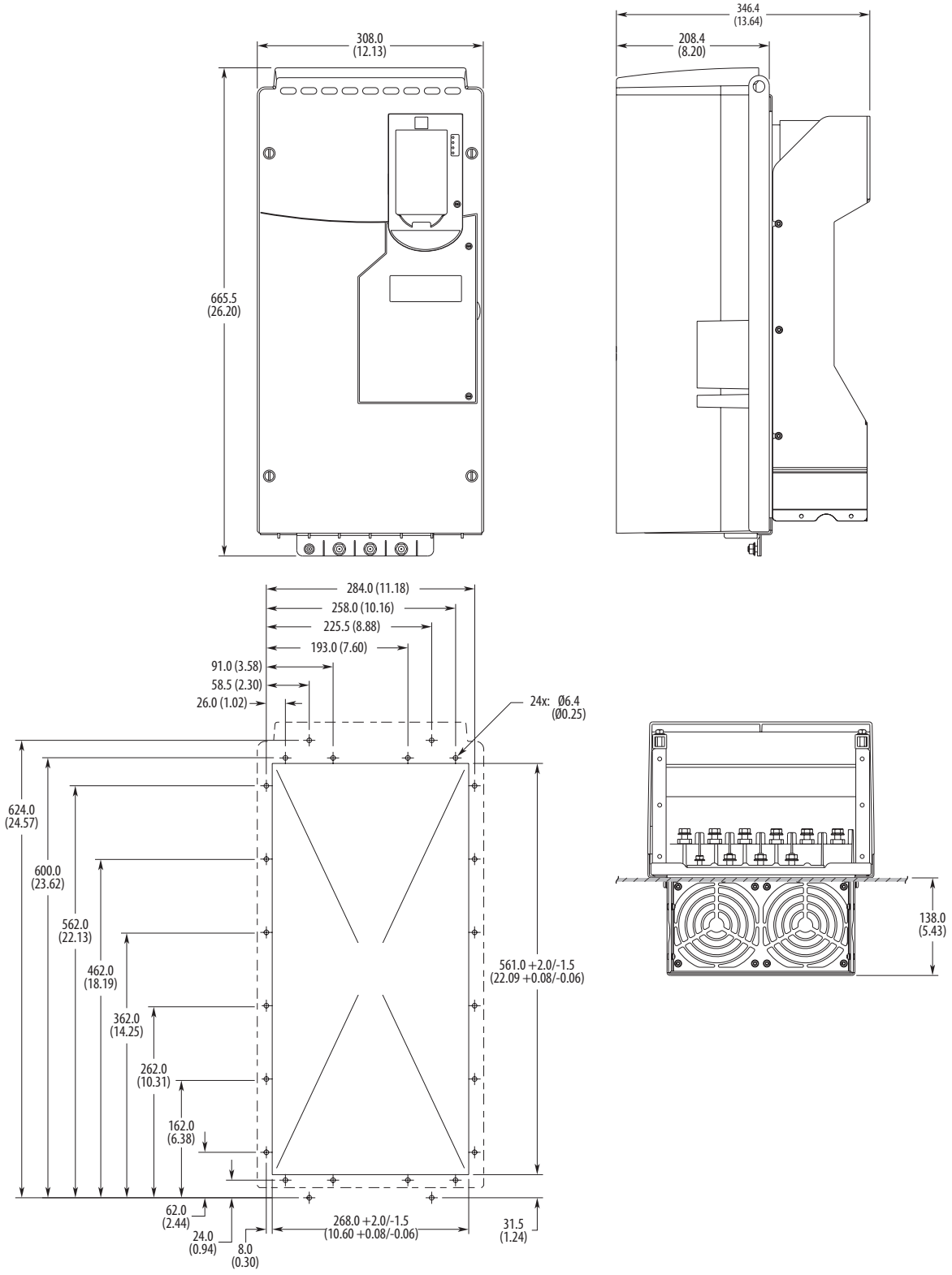
Figure 26 - Flange Mount Frame 5



Dimensions are in millimeters and (inches).

IMPORTANT Must use mounting hardware supplied to meet enclosure rating.

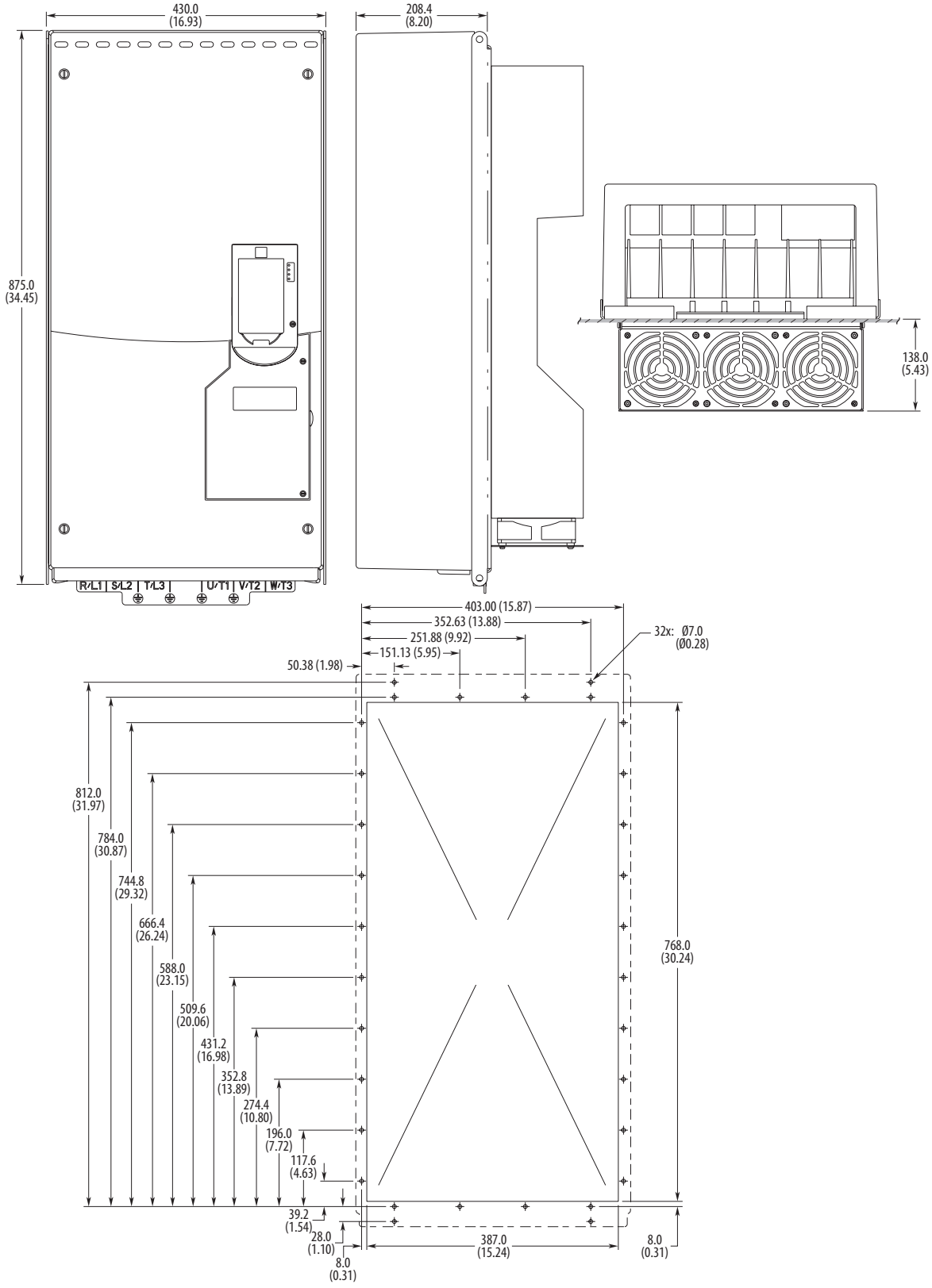
Figure 27 - Flange Mount Frame 6



Dimensions are in millimeters and (inches).

IMPORTANT Must use Flange Adapter kit (20-750-FLNG4-F6) to meet enclosure rating.

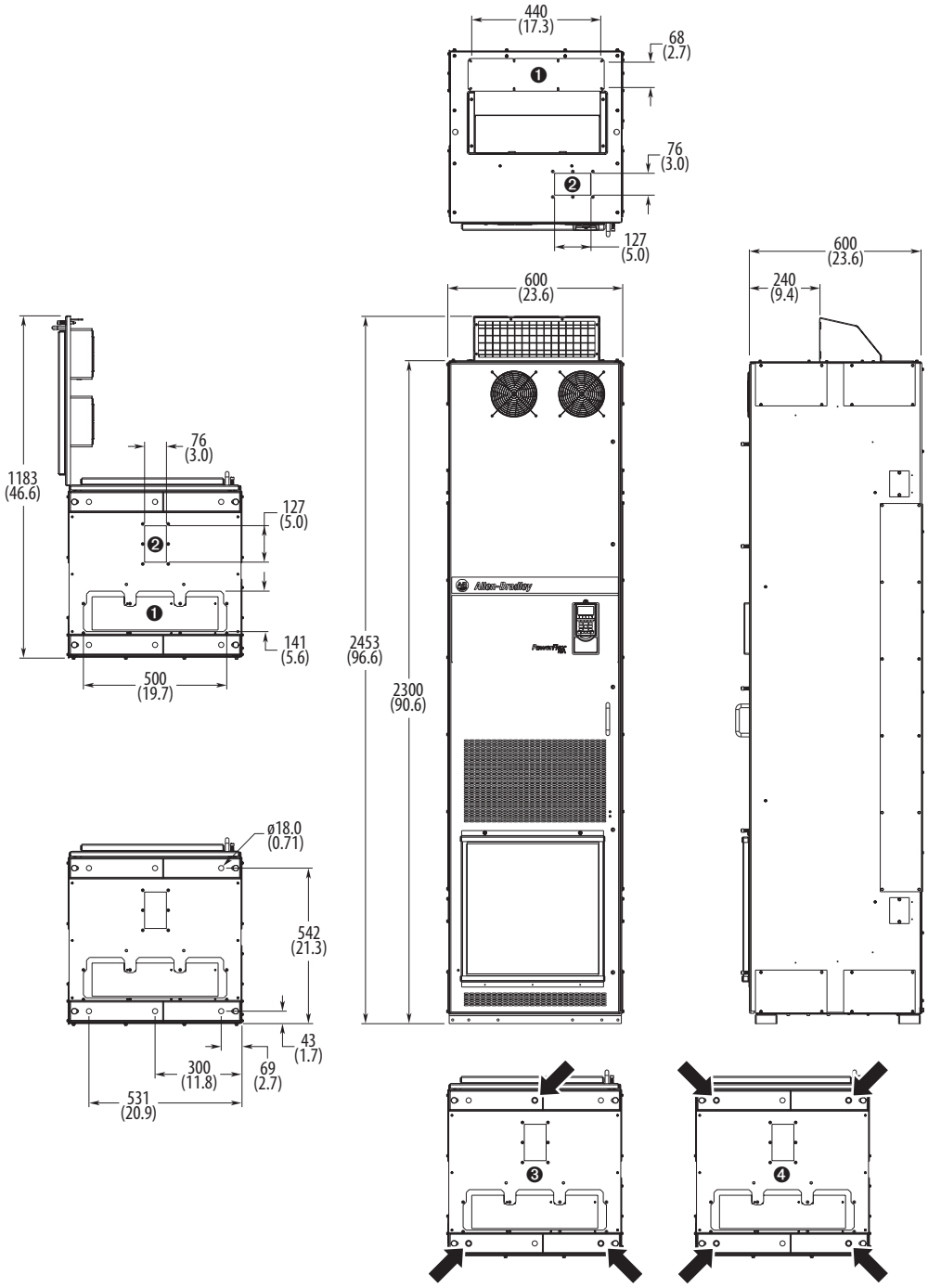
Figure 28 - Flange Mount Frame 7



Dimensions are in millimeters and (inches).

IMPORTANT Must use Flange Adapter kit (20-750-FLNG4-F7) to meet enclosure rating.

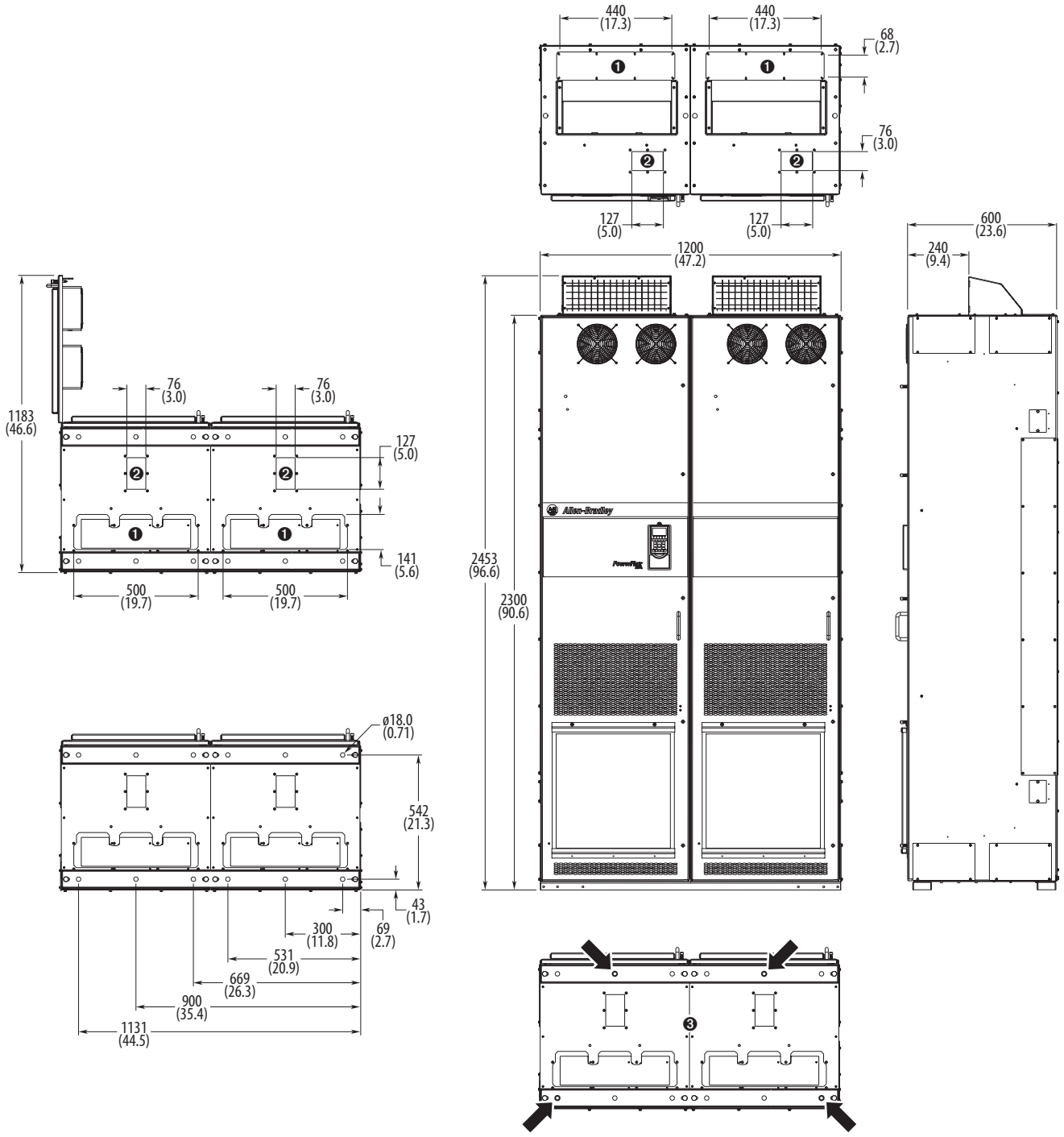
Figure 29 - IP20, NEMA/UL Type 1 Drive with 2500 MCC Style Cabinet, Frame 8 *(Enclosure Code B)*



No.	Description
❶	Power wiring conduit plates.
❷	Control wiring conduit plates.
❸	Three-hole anchoring option.
❹	Optional four-hole anchoring option. Requires removal of cabinet floor to access front holes.

M12 (1/2 in.) Property Class 8.8 anchoring hardware recommended to fasten the drive cabinet through its internal mounting angle to the foundation. Anchor bolts may be pre-located and embedded in the foundation prior to instillation.

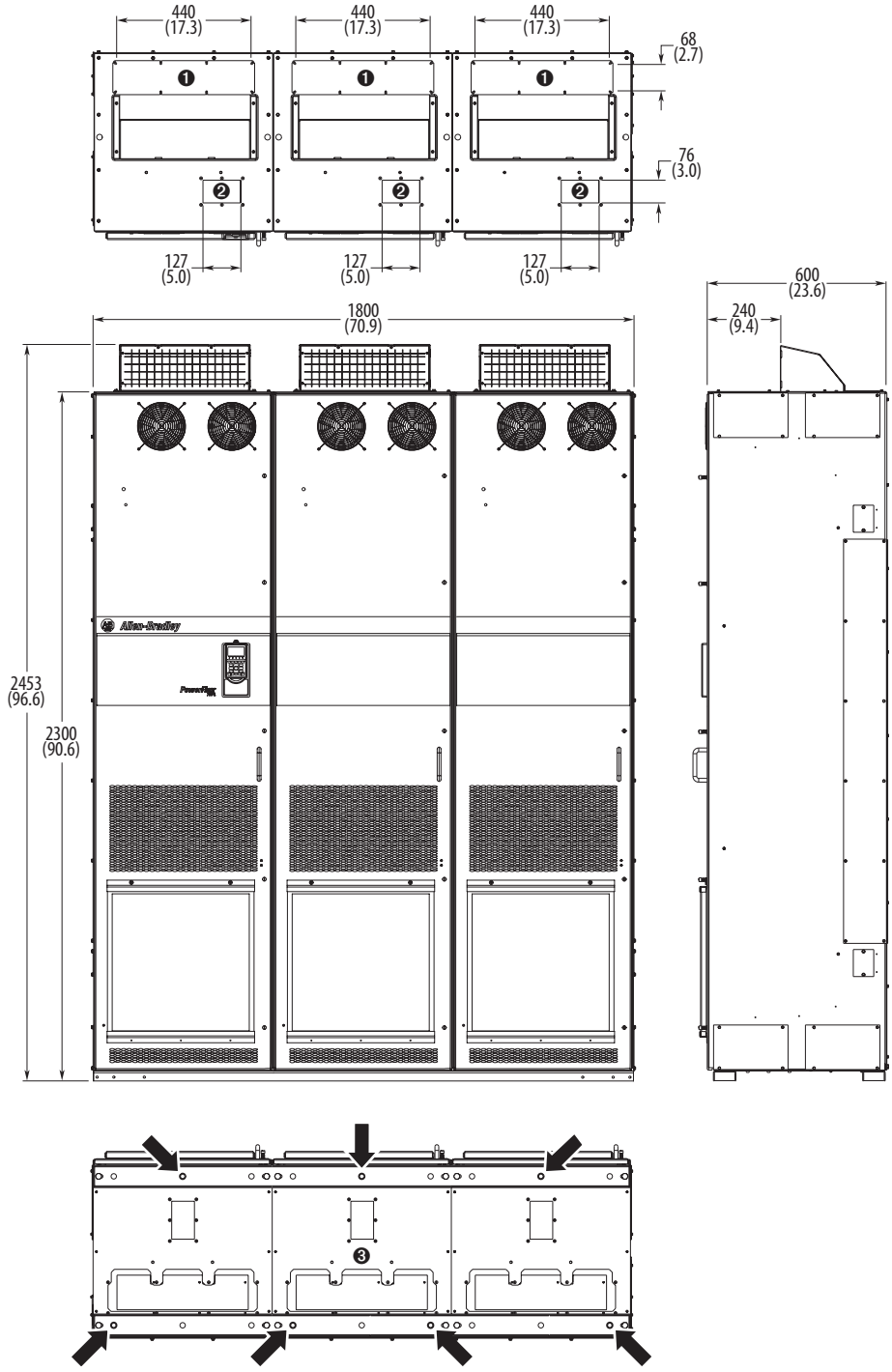
Figure 30 - IP20, NEMA/UL Type 1 Drive with 2500 MCC Style Cabinet, Frame 9 *(Enclosure Code B)*



No.	Description
❶	Power wiring conduit plates.
❷	Control wiring conduit plates.
❸	Four-hole anchoring recommendation.

M12 (1/2 in.) Property Class 8.8 anchoring hardware recommended to fasten the drive cabinet through its internal mounting angle to the foundation. Anchor bolts may be pre-located and embedded in the foundation prior to instillation.

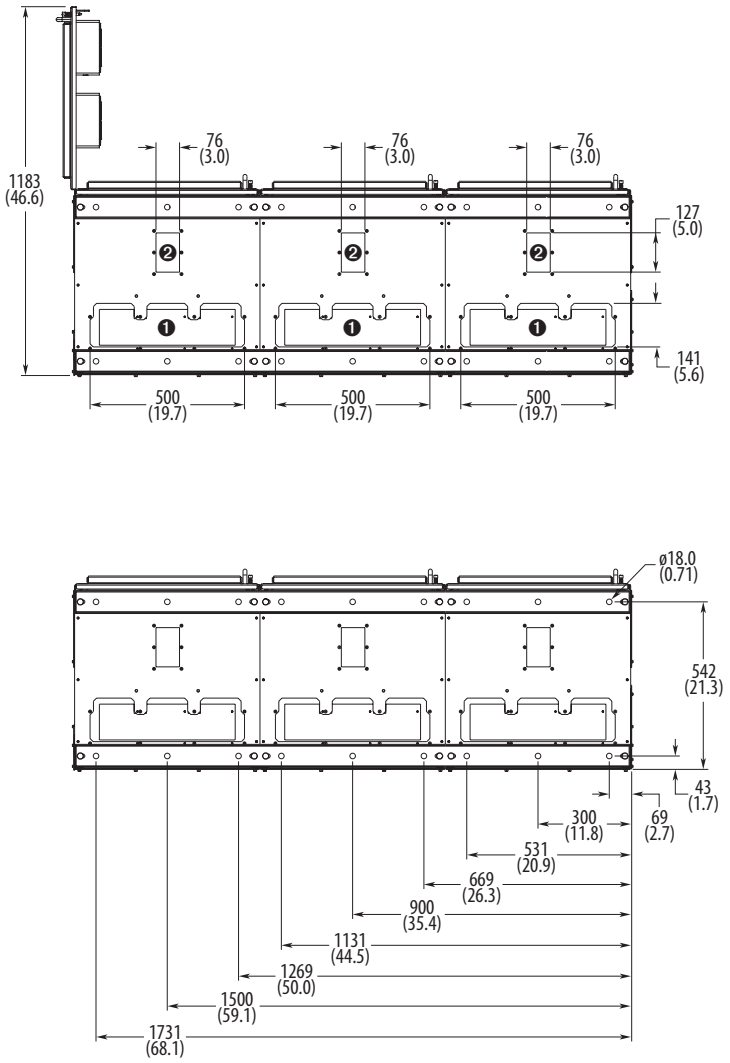
Figure 31 - IP20, NEMA/UL Type 1 Drive with 2500 MCC Style Cabinet, Frame 10 *(Enclosure Code B)*



No.	Description
❶	Power wiring conduit plates.
❷	Control wiring conduit plates.
❸	Seven-hole anchoring recommendation.

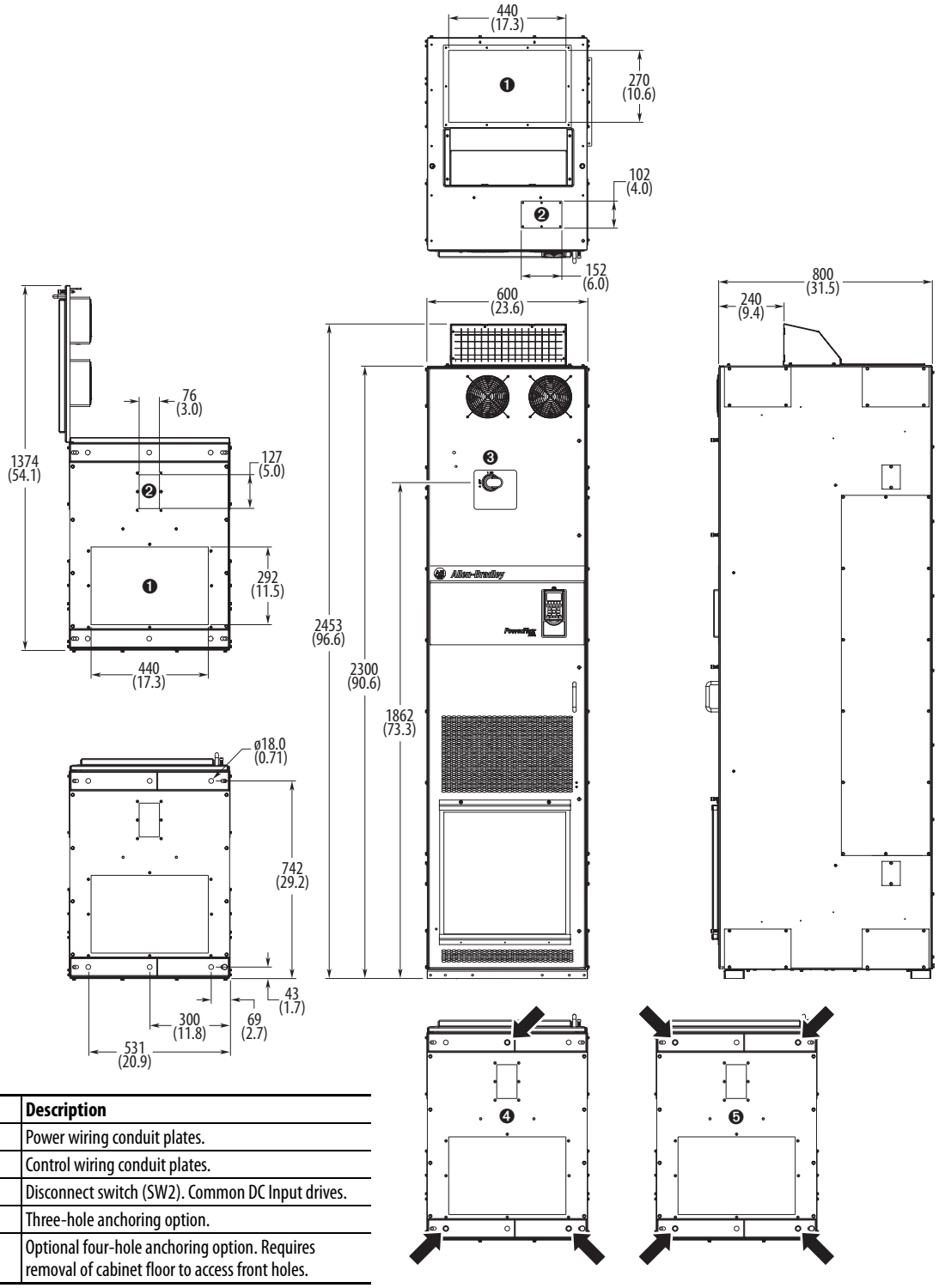
M12 (1/2 in.) Property Class 8.8 anchoring hardware recommended to fasten the drive cabinet through its internal mounting angle to the foundation. Anchor bolts may be pre-located and embedded in the foundation prior to instillation.

Figure 32 - IP20, NEMA/UL Type 1 Drive with 2500 MCC Style Cabinet, Frame 10 Bottom Access
(Enclosure Code B)



No.	Description
❶	Power wiring conduit plates.
❷	Control wiring conduit plates.

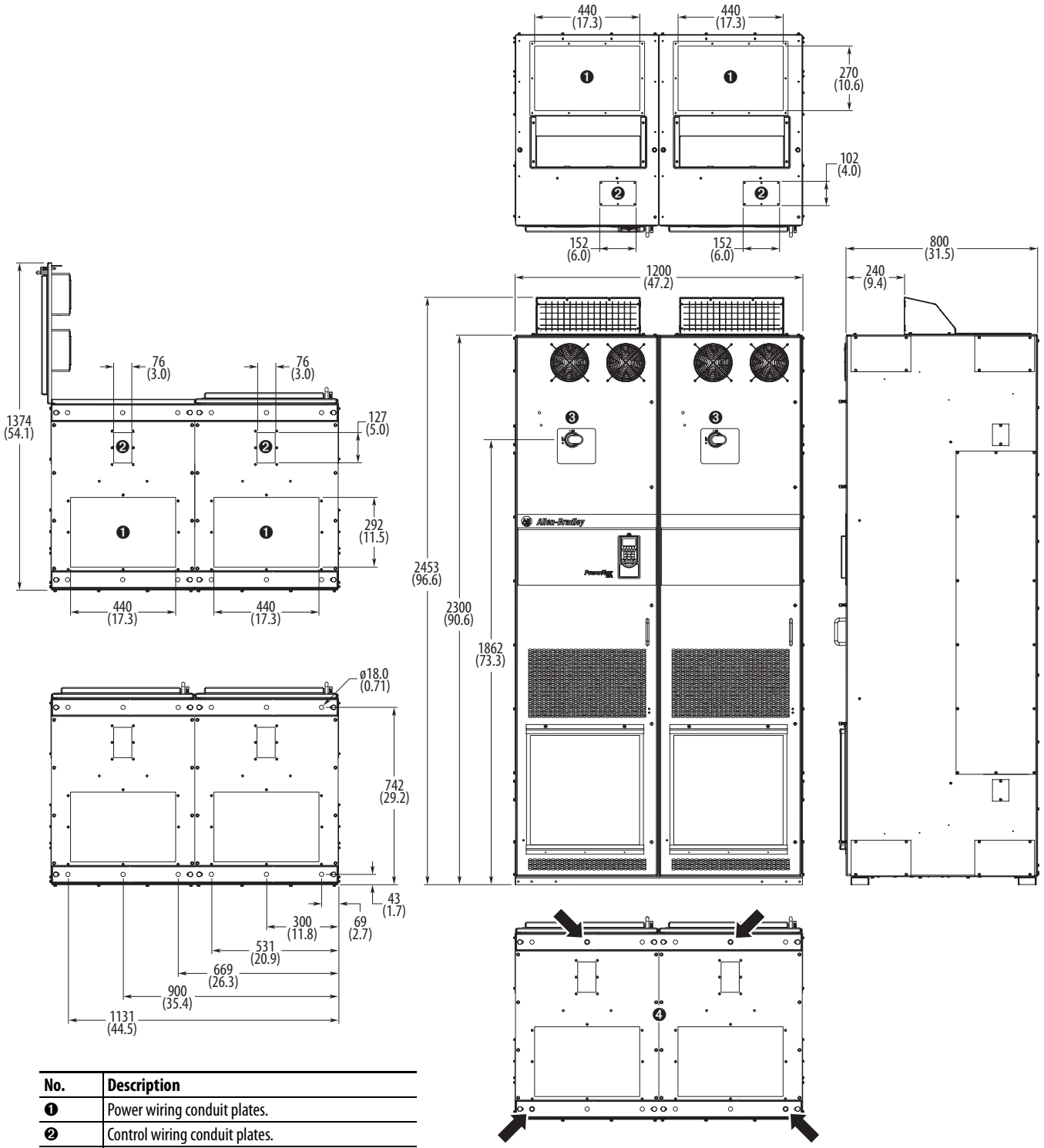
Figure 33 - IP20, NEMA/UL Type 1 Drive with 2500 MCC Style Cabinet, Frame 8
(Enclosure Codes L, P, W)



No.	Description
❶	Power wiring conduit plates.
❷	Control wiring conduit plates.
❸	Disconnect switch (SW2). Common DC Input drives.
❹	Three-hole anchoring option.
❺	Optional four-hole anchoring option. Requires removal of cabinet floor to access front holes.

M12 (1/2 in.) Property Class 8.8 anchoring hardware recommended to fasten the drive cabinet through its internal mounting angle to the foundation. Anchor bolts may be pre-located and embedded in the foundation prior to instillation.

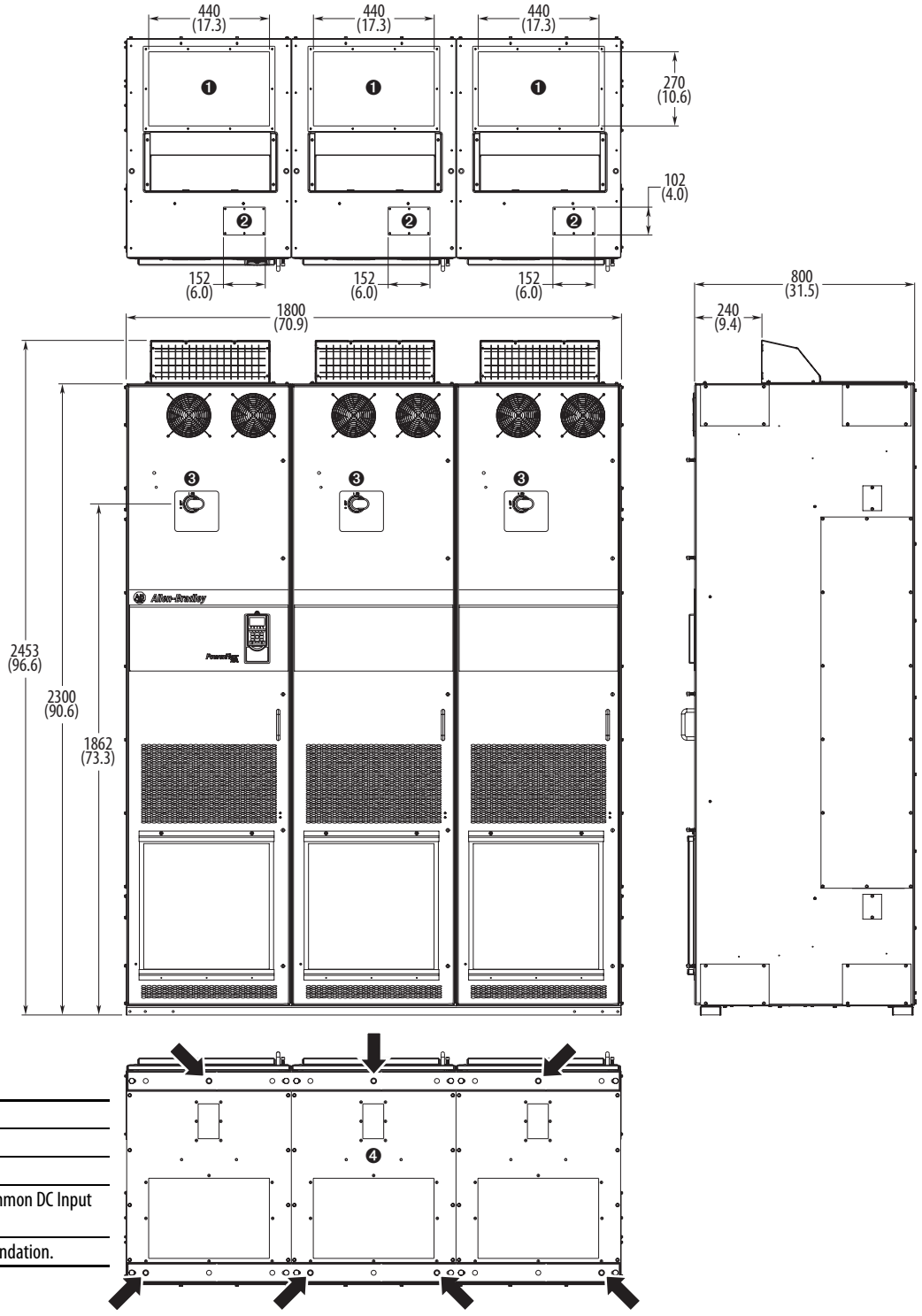
Figure 34 - IP20, NEMA/UL Type 1 Drive with 2500 MCC Style Cabinet, Frame 9
(Enclosure Codes L, P, W)



No.	Description
❶	Power wiring conduit plates.
❷	Control wiring conduit plates.
❸	Disconnect switches (SW2). Common DC Input drives.
❹	Four-hole anchoring recommendation.

M12 (1/2 in.) Property Class 8.8 anchoring hardware recommended to fasten the drive cabinet through its internal mounting angle to the foundation. Anchor bolts may be pre-located and embedded in the foundation prior to instillation.

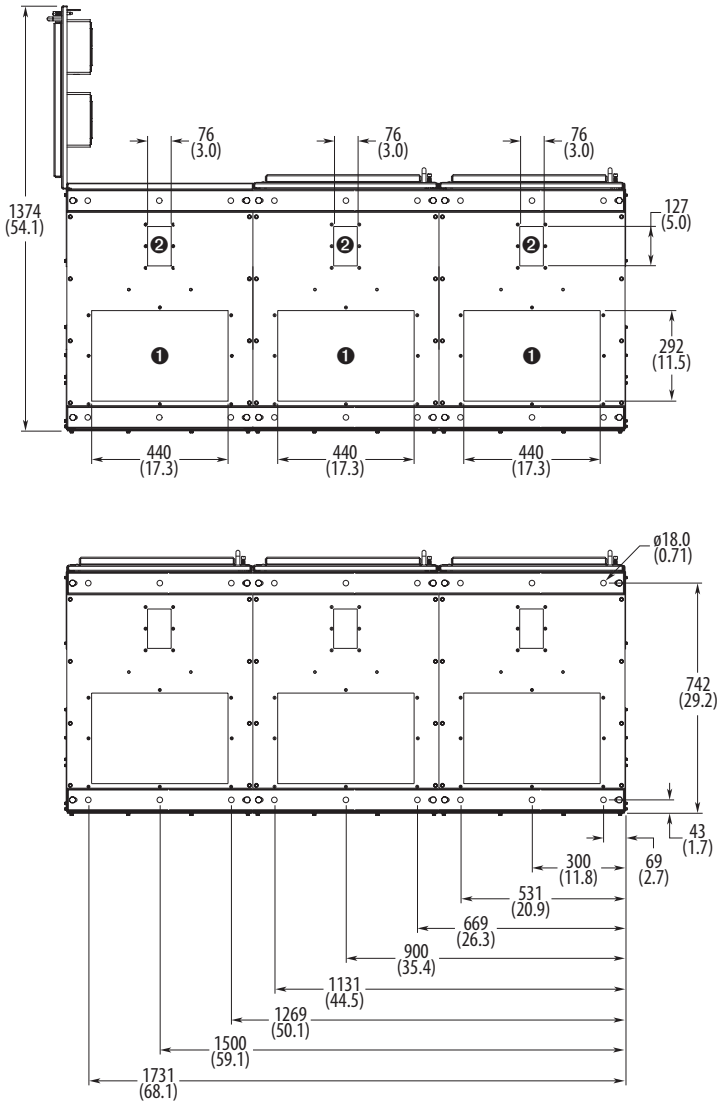
Figure 35 - IP20, NEMA/UL Type 1 Drive with 2500 MCC Style Cabinet, Frame 10
(Enclosure Codes L, P, W)



No.	Description
❶	Power wiring conduit plates.
❷	Control wiring conduit plates.
❸	Disconnect switches (SW2). Common DC Input drives.
❹	Seven-hole anchoring recommendation.

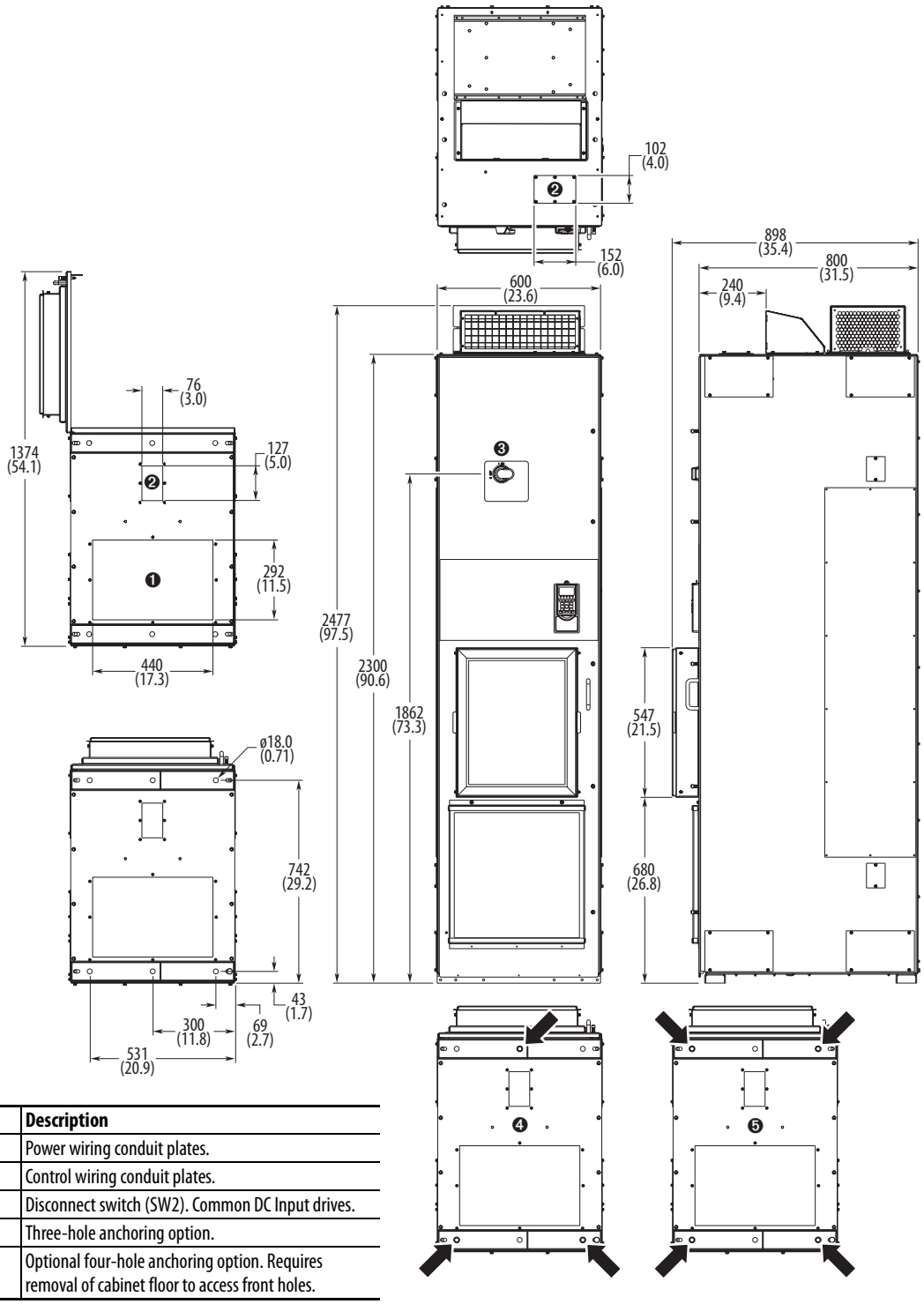
M12 (1/2 in.) Property Class 8.8 anchoring hardware recommended to fasten the drive cabinet through its internal mounting angle to the foundation. Anchor bolts may be pre-located and embedded in the foundation prior to instillation.

Figure 36 - IP20, NEMA/UL Type 1 Drive with 2500 MCC Style Cabinet, Frame 10 Bottom Access
(Enclosure Code L, P, W)



No.	Description
❶	Power wiring conduit plates.
❷	Control wiring conduit plates.

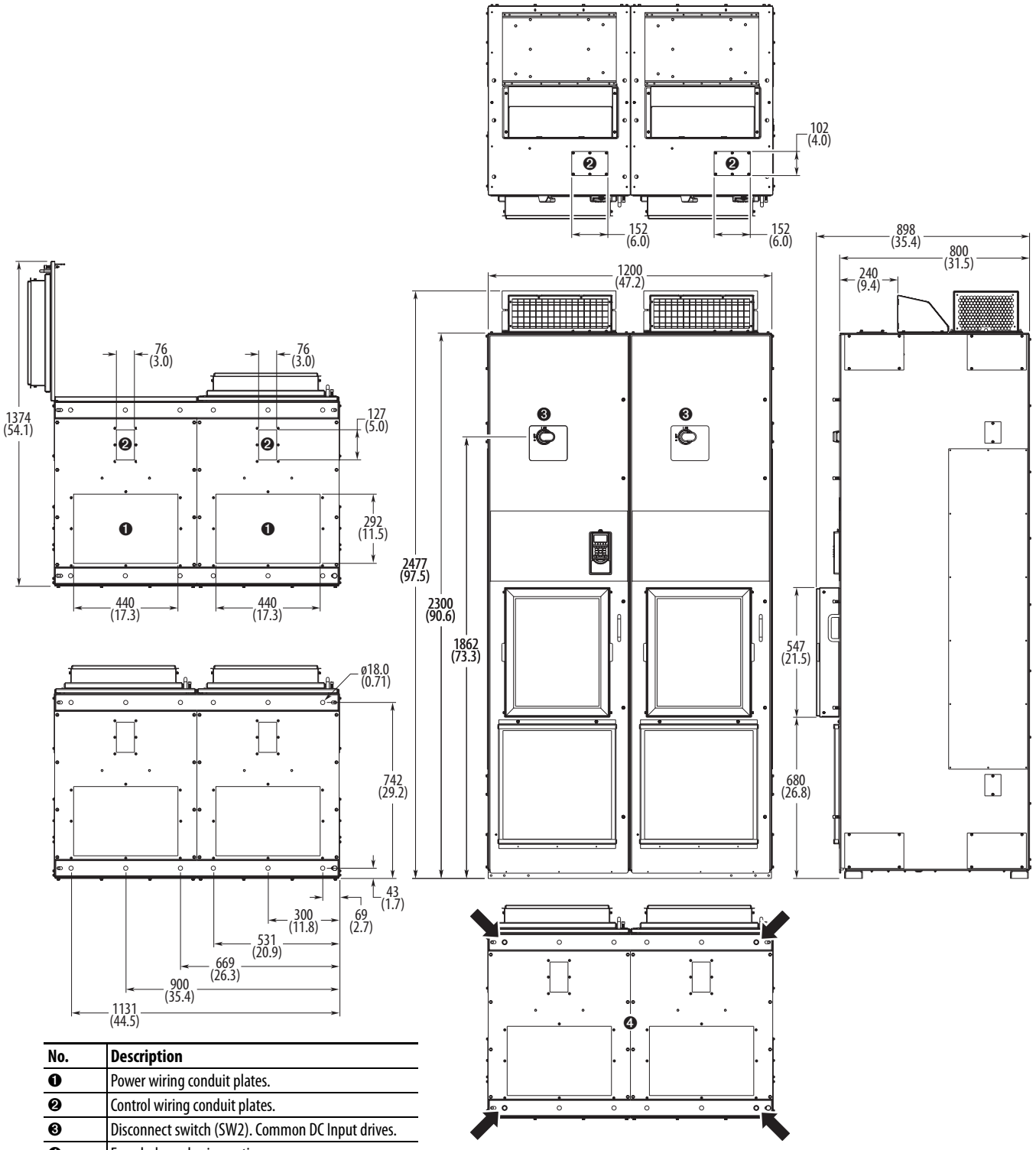
Figure 37 - IP54, NEMA Type 12 Drive with 2500 MCC Style Cabinet, Frame 8
(Enclosure Codes J, K, Y)



No.	Description
❶	Power wiring conduit plates.
❷	Control wiring conduit plates.
❸	Disconnect switch (SW2). Common DC Input drives.
❹	Three-hole anchoring option.
❺	Optional four-hole anchoring option. Requires removal of cabinet floor to access front holes.

M12 (1/2 in.) Property Class 8.8 anchoring hardware recommended to fasten the drive cabinet through its internal mounting angle to the foundation. Anchor bolts may be pre-located and embedded in the foundation prior to instillation.

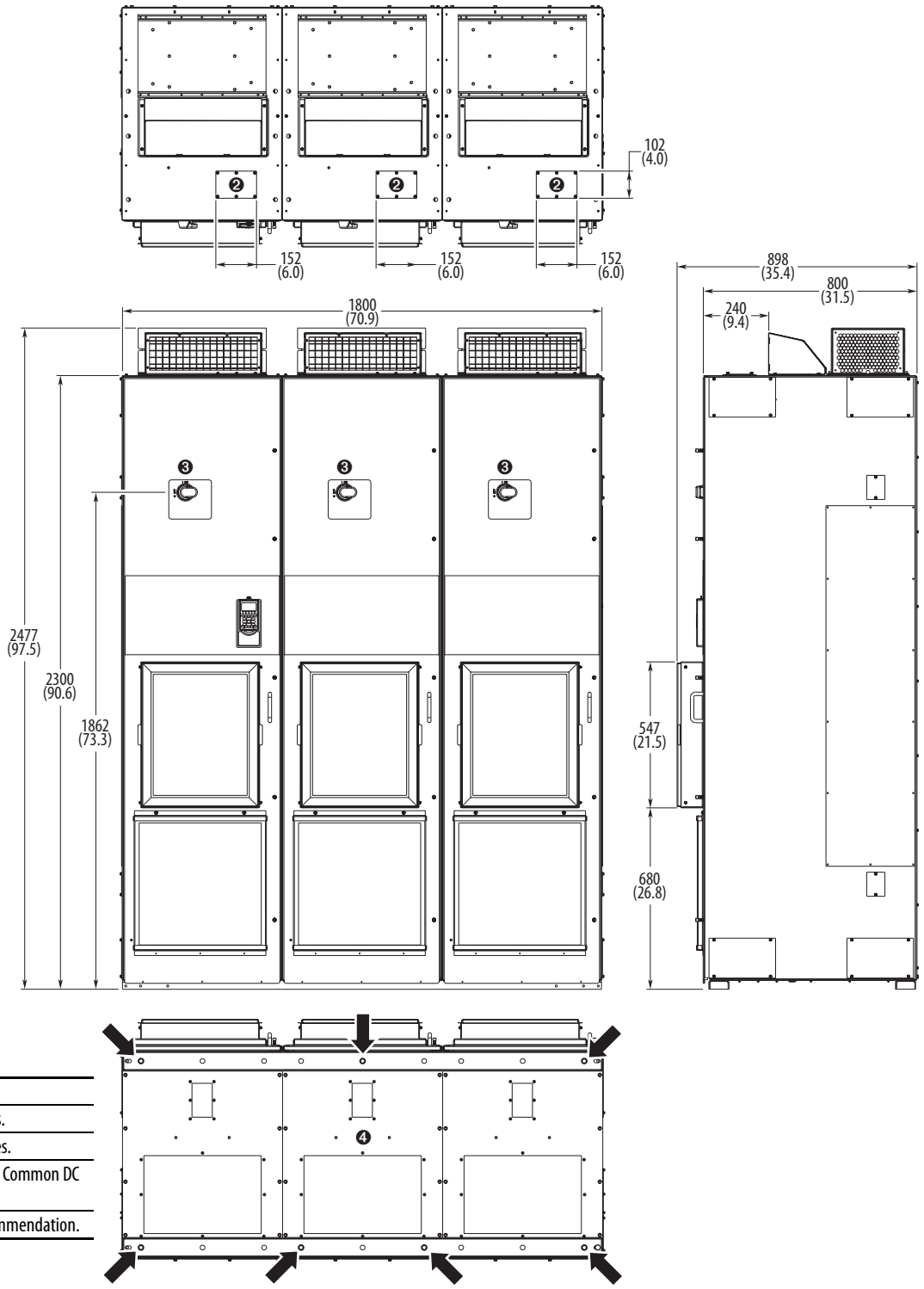
Figure 38 - IP54, NEMA Type 12 Drive with 2500 MCC Style Cabinet, Frame 9
(Enclosure Codes J, K, Y)



No.	Description
❶	Power wiring conduit plates.
❷	Control wiring conduit plates.
❸	Disconnect switch (SW2). Common DC Input drives.
❹	Four-hole anchoring option.

M12 (1/2 in.) Property Class 8.8 anchoring hardware recommended to fasten the drive cabinet through its internal mounting angle to the foundation. Anchor bolts may be pre-located and embedded in the foundation prior to instillation.

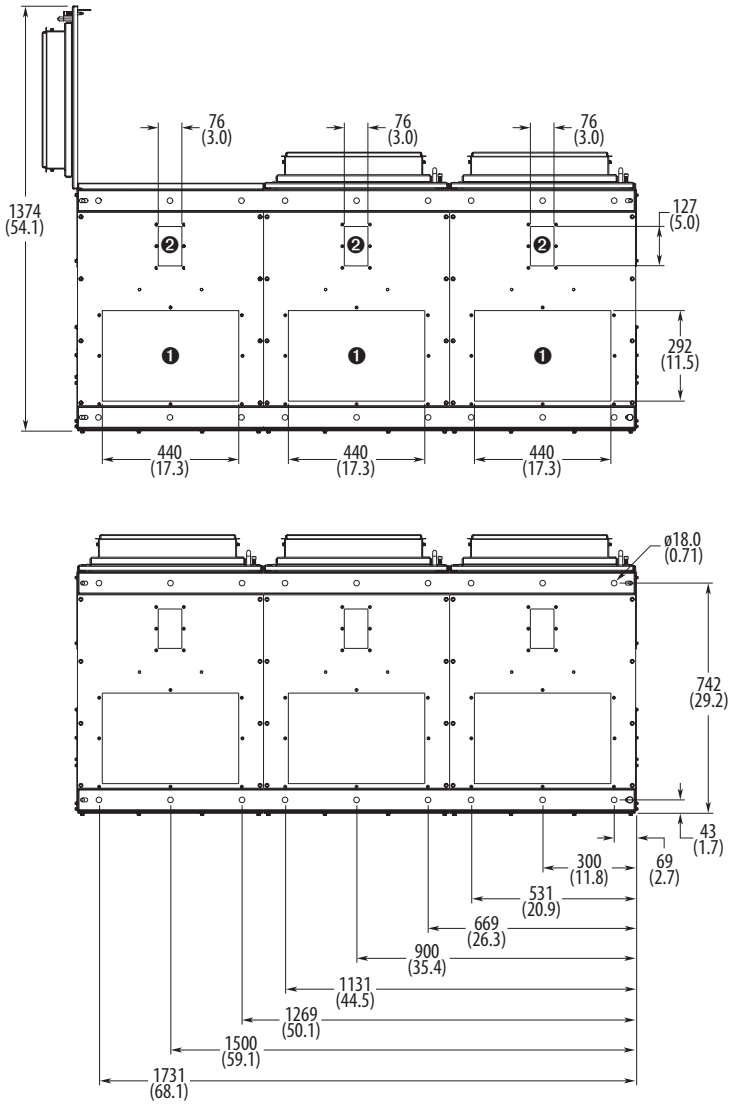
Figure 39 - IP54, NEMA Type 12 Drive with 2500 MCC Style Cabinet, Frame 10
(Enclosure Codes J, K, Y)



No.	Description
❶	Power wiring conduit plates.
❷	Control wiring conduit plates.
❸	Disconnect switches (SW2). Common DC Input drives.
❹	Seven-hole anchoring recommendation.

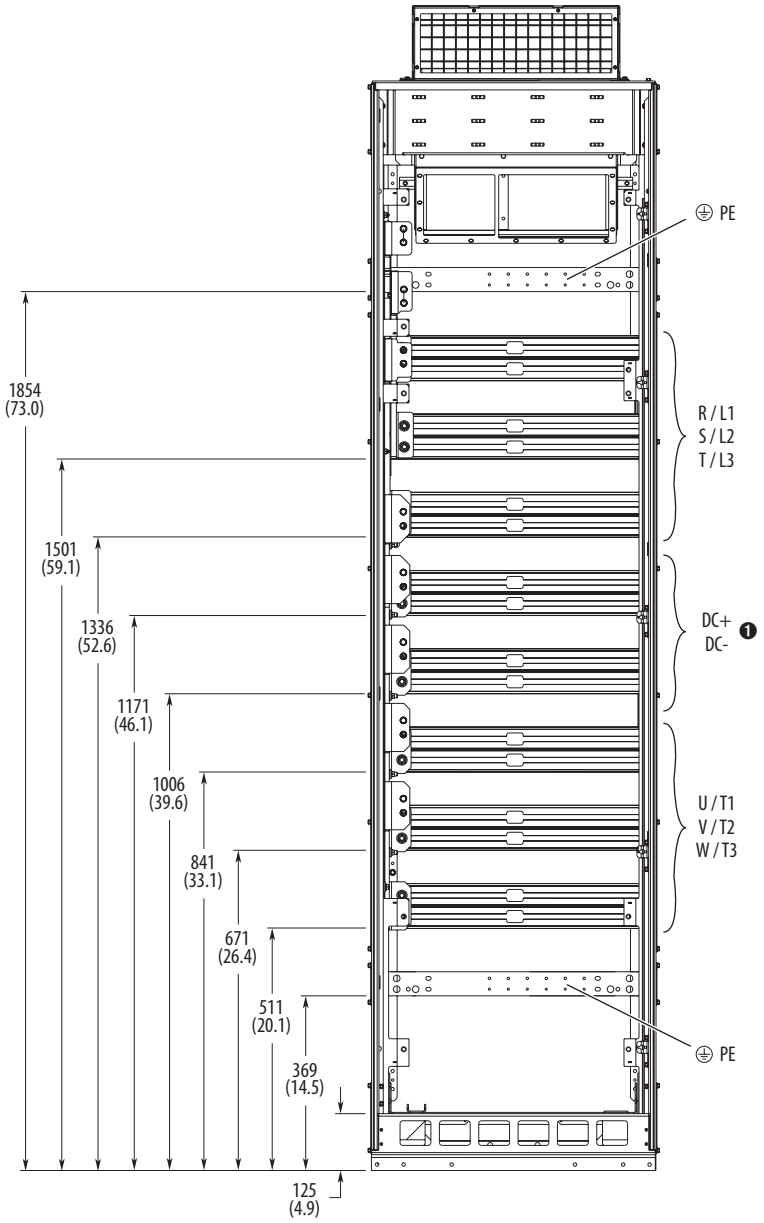
M12 (1/2 in.) Property Class 8.8 anchoring hardware recommended to fasten the drive cabinet through its internal mounting angle to the foundation. Anchor bolts may be pre-located and embedded in the foundation prior to instillation.

Figure 40 - IP20, NEMA/UL Type 1 Drive with 2500 MCC Style Cabinet, Frame 10 Bottom Access
(Enclosure Code J, K, Y)



No.	Description
❶	Power wiring conduit plates.
❷	Control wiring conduit plates.

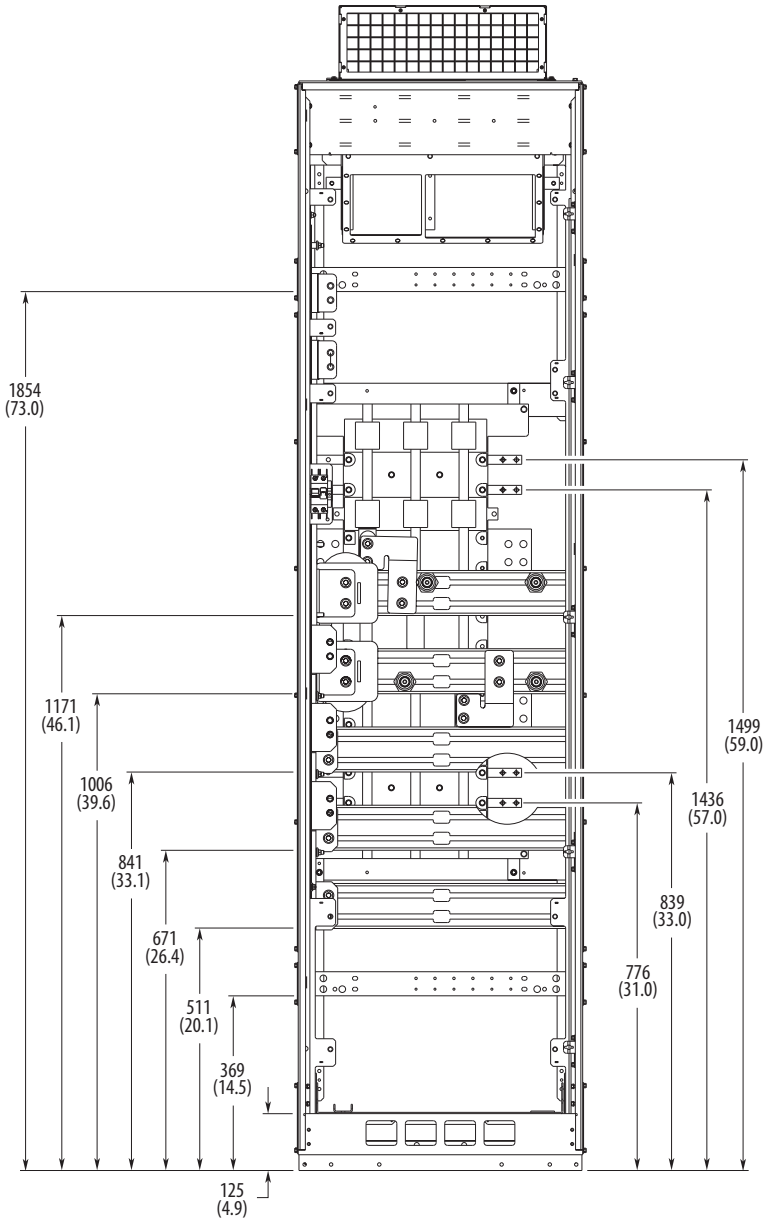
Figure 41 - Bus Bar Dimensions (AC Input)



Dimensions are in millimeters and (inches).

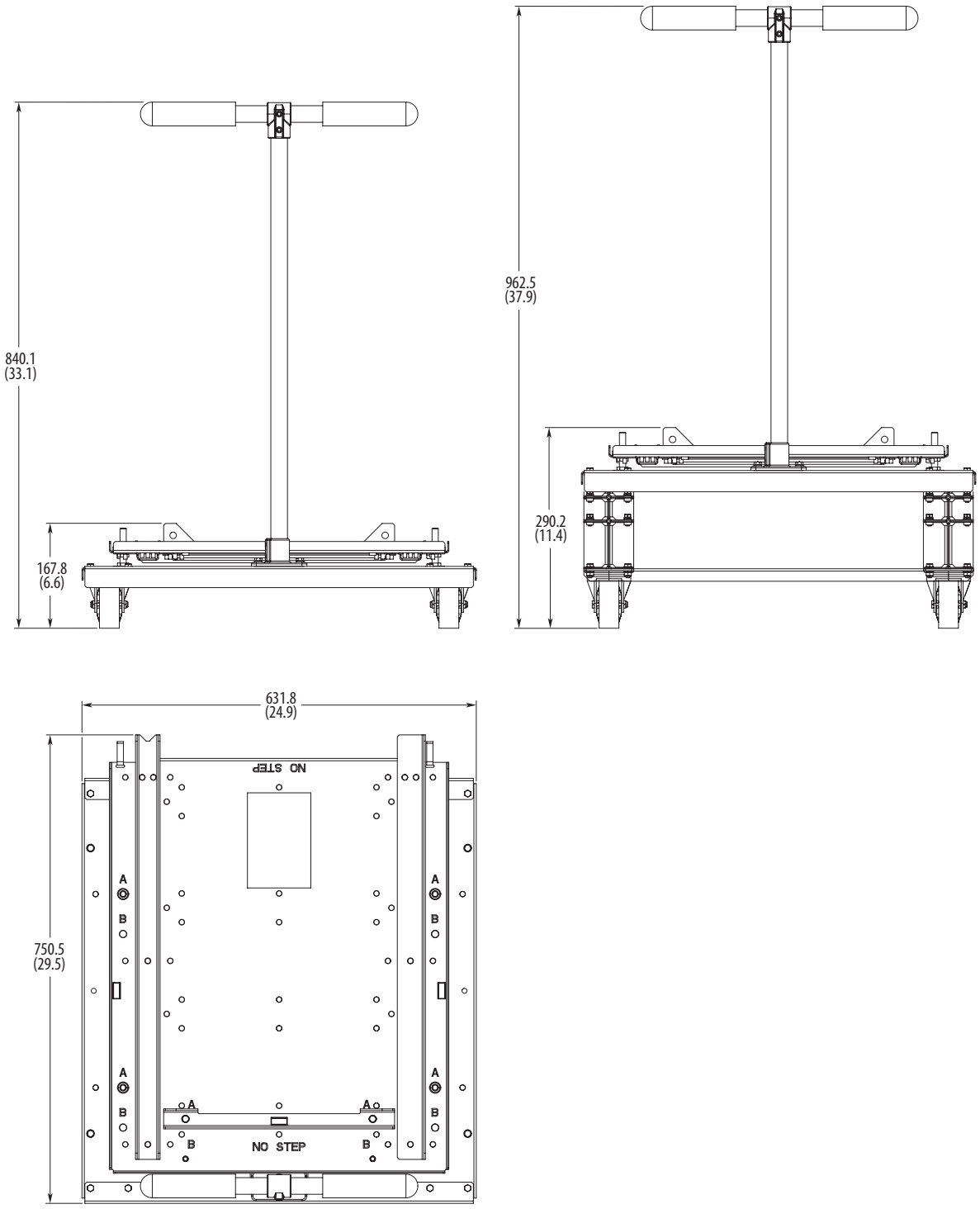
❶ To connect to the DC bus bars, a PowerFlex 750-Series Side DC Bus Bar Option Kit (20-750-BUS1-F8) is required.

Figure 42 - Bus Bar Dimensions (Common DC Input)



Dimensions are in millimeters and (inches).

Figure 43 - Roll-out Cart Dimensions



Dimensions are in millimeters and (inches).

Approximate weight: 27.2 kg (60 lb)

See page 77 for spacer height combinations.

Release Drive Assembly From Cabinet

To access the interior of the drive cabinet to complete installation and power wiring connections, remove the drive assembly from the cabinet.

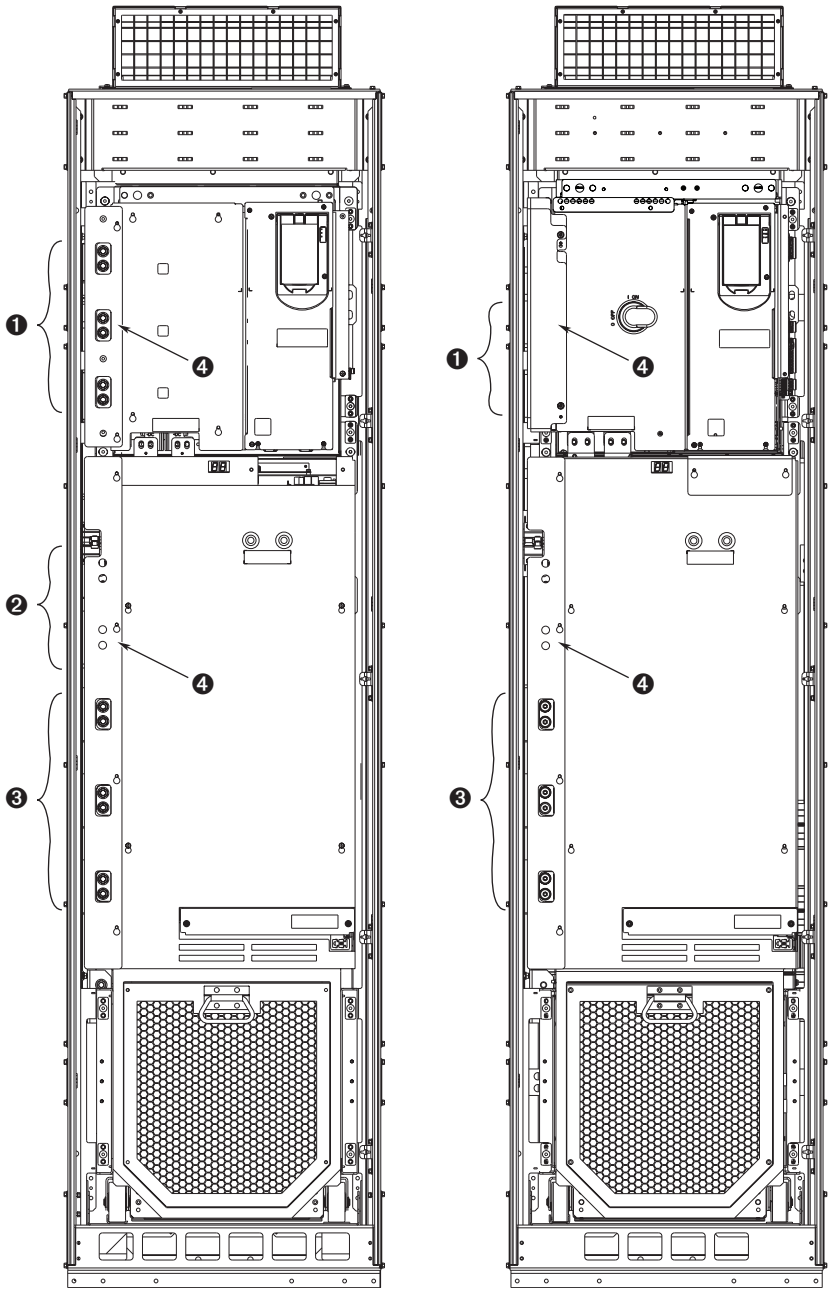
IMPORTANT Before removing the drive assembly, ensure the cabinet is in its intended installed position. Height adjustments to the roll-out cart can not be made while carrying a drive.

1. Open the cabinet door.
2. Remove the side shields (No. ❹ Figure 44).
3. Remove the bus bar connector bolts. Numbers ❶, ❷, and ❸ in Figure 44.
4. Disconnect the two captive bolts connecting the converter chassis to the exhaust vent (No. ❺ Figure 45).
5. Disconnect the four captive bolts connecting the converter chassis to the cabinet frame (No. ❻ Figure 45).

   IMPORTANT When removing both the inverter and converter drive sections from the cabinet, do not disconnect the captive bolts holding the two sections together. The inverter-to-converter connector bolts are labeled ❽ in Figure 45.

6. Disconnect the six captive bolts connecting the inverter chassis to the cabinet frame (No. ❼ Figure 45).

Figure 44 - Side Shield and Bus Bar Connections

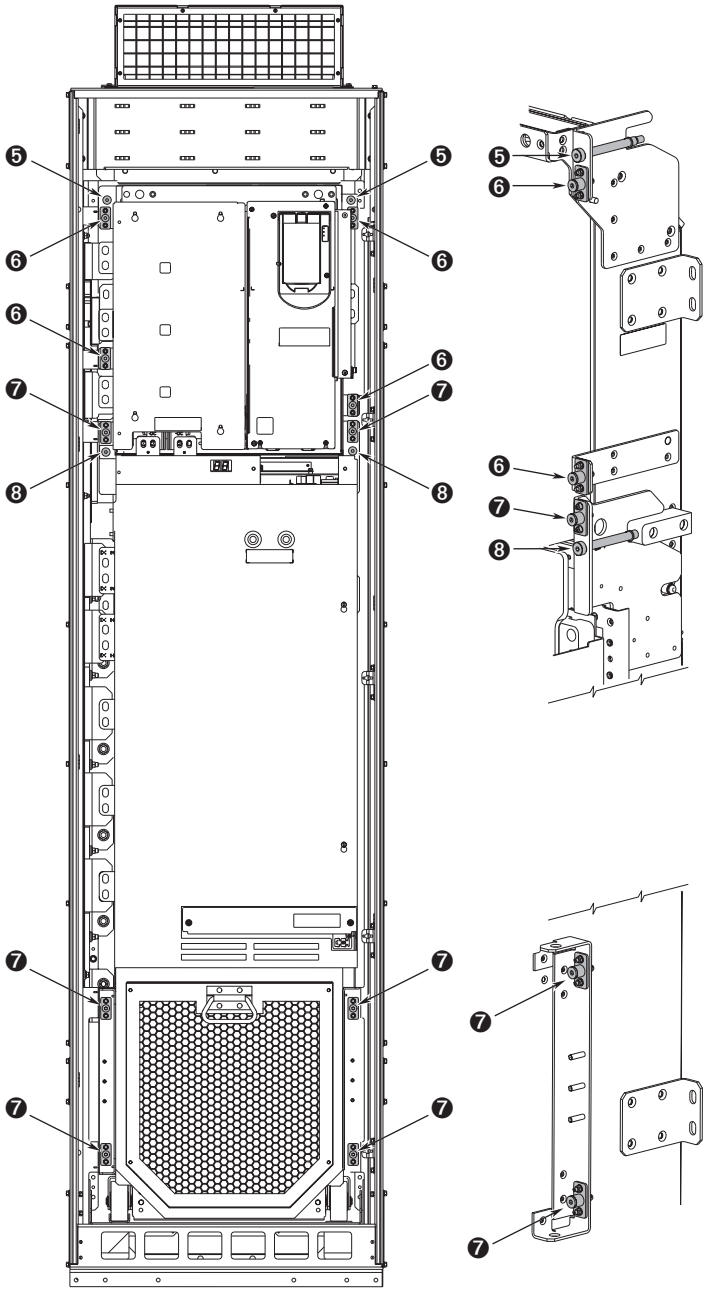


AC Input Drive

Common DC Input Drive

No.	Description	Torque	Recommended Tool
❶	Converter input power connections.	22.6 N•m (200 lb•in)	T45 hexalobular (Torx)
❷	DC bus connections (if equipped).	22.6 N•m (200 lb•in)	T45 hexalobular (Torx)
❸	Inverter output power connections.	22.6 N•m (200 lb•in)	T45 hexalobular (Torx)
❹	Side shields	2.8 N•m (25 lb•in)	T25 hexalobular (Torx)

Figure 45 - Drive-To-Cabinet Connections



AC Input Drive Shown

No.	Description	Torque	Recommended Tool
❺	Converter-to-vent hood anchor bolts (2 places).	11.3 N•m (100 lb•in)	5 mm hex key (Allen)
❻	Converter-to-cabinet anchor bolts (4 places).	11.3 N•m (100 lb•in)	5 mm hex key (Allen)
❼	Inverter-to-cabinet anchor bolts (6 places).	11.3 N•m (100 lb•in)	5 mm hex key (Allen)
❽	Inverter-to-converter connector bolts (2 places).	11.3 N•m (100 lb•in)	5 mm hex key (Allen)

Fiber-Optic Cables

IMPORTANT	Fiber-optic cables have a minimum bend radius of 50 mm (2 in.). If cables are over bent, damage will occur.

IMPORTANT	For Frame 8 drives, the fiber-optic cables used to connect the fiber interface board to both the converter (AC Input) / DC precharge (DC Input) control board and the inverter power layer interface board must be the same length. The cables provided are 560 mm (22 in.) in length.

IMPORTANT	For Frame 9 and larger drives, the fiber-optic cables used to connect the fiber interface board to the power layer interface board must be the same length. The cables provided are 2.8 m (110 in.) in length.

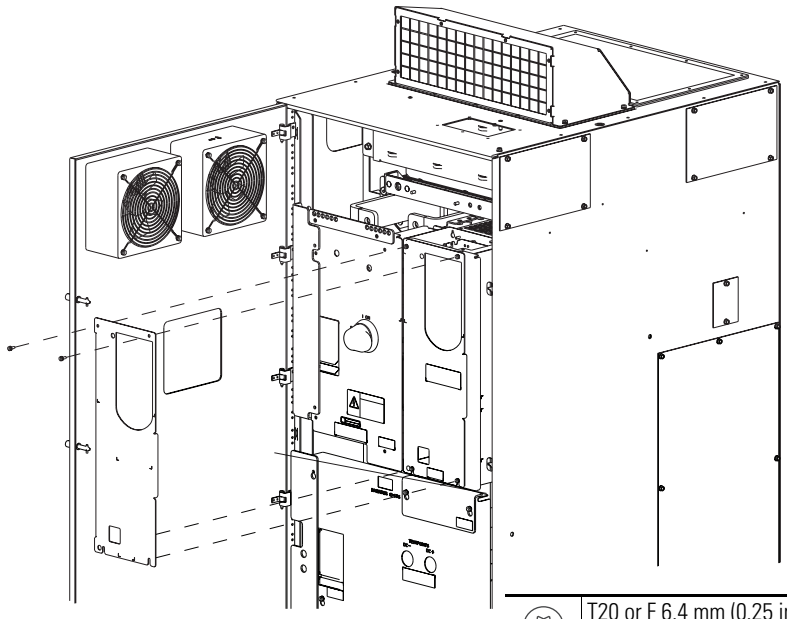
Disconnect Drive Control Pod Wiring Connections

Frame 8 drives, with drive control pod installed, complete steps 1 and 2 of this procedure.

Frame 9 and larger drives, with drive control pod installed, complete steps 1 through 7 of this section.

If the drive control pod is mounted remotely, skip this section.

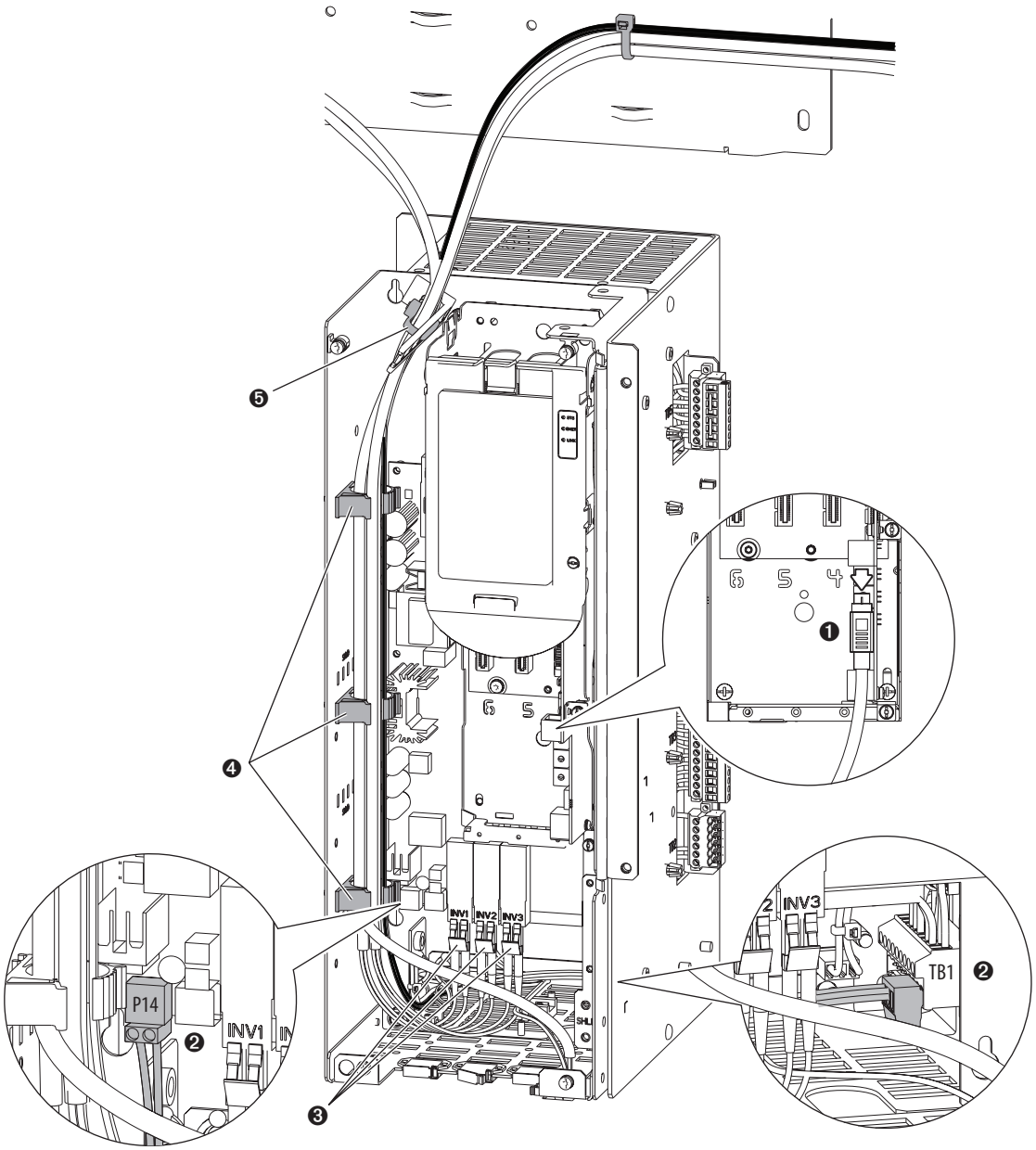
1. Remove the right front cover.



	T20 or F 6.4 mm (0.25 in.) 1.8 N•m (16.0 lb•in)

Frame 8 Shown

2. Disconnect the HIM cable ❶.
3. Disconnect the 24V wire harness ❷ fromTB1 and P14 on the fiber interface board.
4. Disconnect any fiber-optic cables ❸ from the fiber interface board. This step is not necessary on Frame 8 drives.
5. Unlock the three cable supports ❹ along the left inside wall of the drive control pod.
6. Open the releasable cable tie ❺ at the top of the drive control pod.

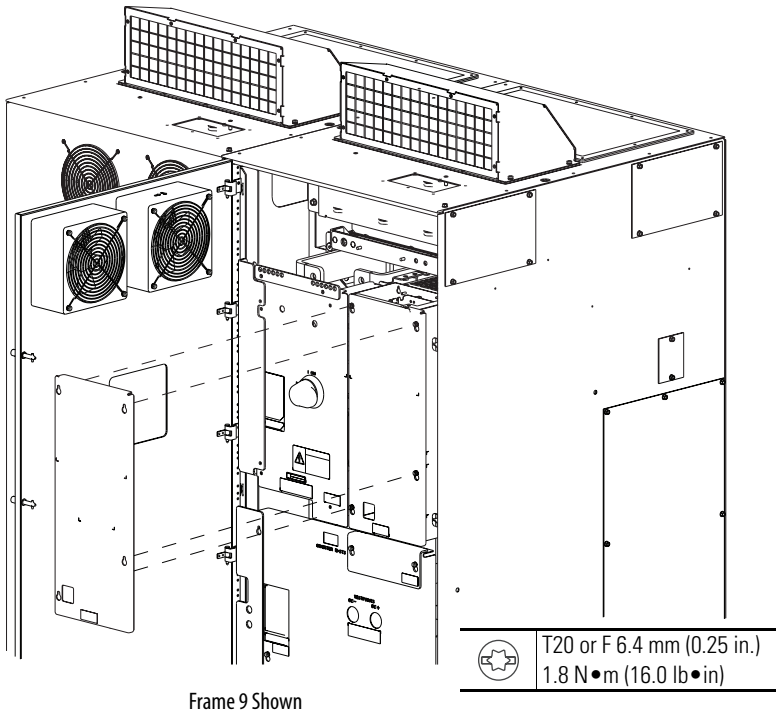


7. Without bending the cables to a radius less than 50 mm (2 in.), lift the 24V wire harness and fiber-optic cables out of the drive control pod. Support the cable bundle so it is out of the way of the drive assembly when it is rolled out of the cabinet.

Disconnect Wire Connections - No Drive Control Pod

This procedure applies to Frame 8 drives with a remotely mounted drive control pod and to the right hand cabinets of Frame 9 and larger drives.

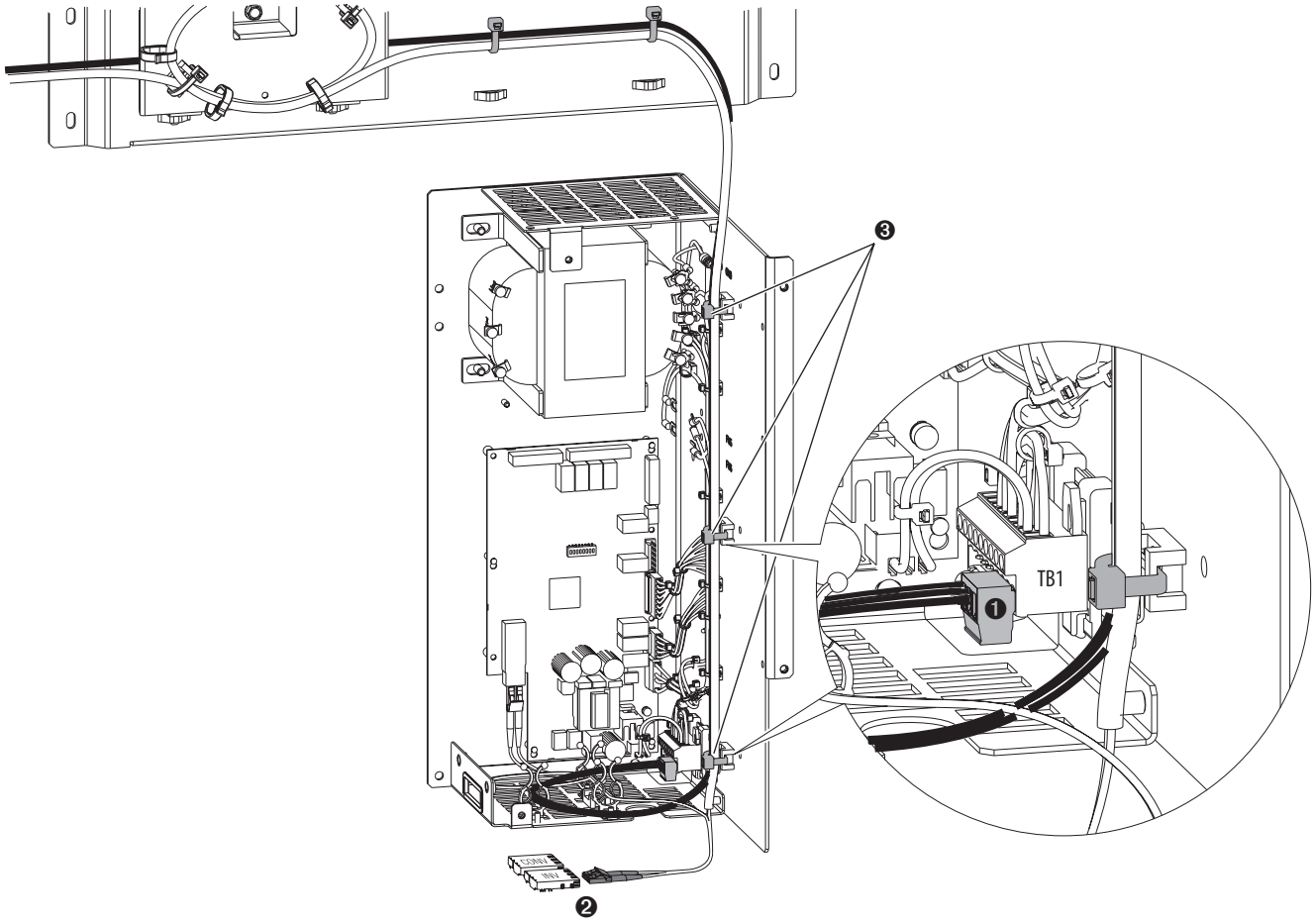
1. Remove the right front cover.



Frame 9 Shown

2. Disconnect the 24V wire harness ❶ from TB1.
3. Disconnect the fiber-optic cable ❷ from INV on the power layer interface board.

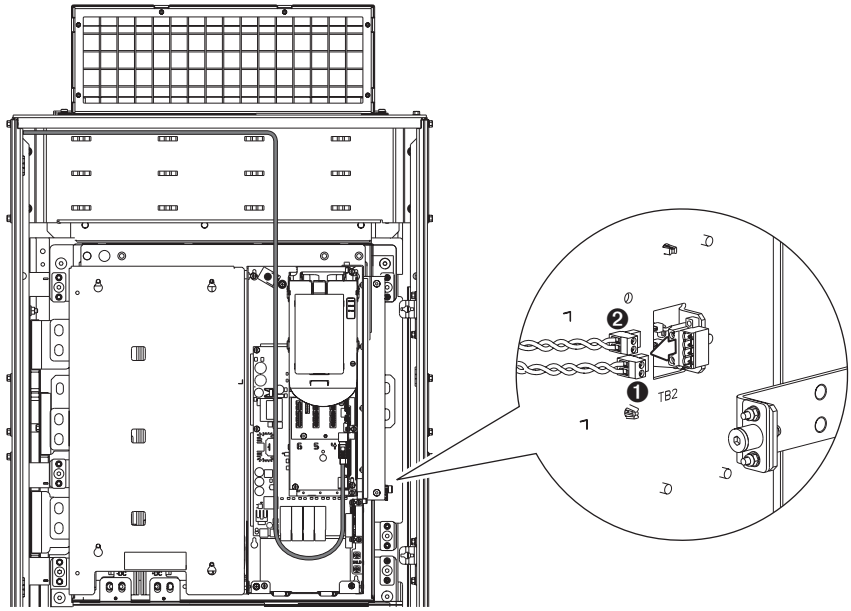
4. Open the three releasable cable ties ❸ along the right inside wall of the drive control pod.



5. Without bending the cables to a radius less than 50 mm (2 in.), lift the 24V wire harness and fiber-optic cable out of the drive control pod. Support the cable bundle so it is out of the way of the drive assembly when it is rolled out of the cabinet.

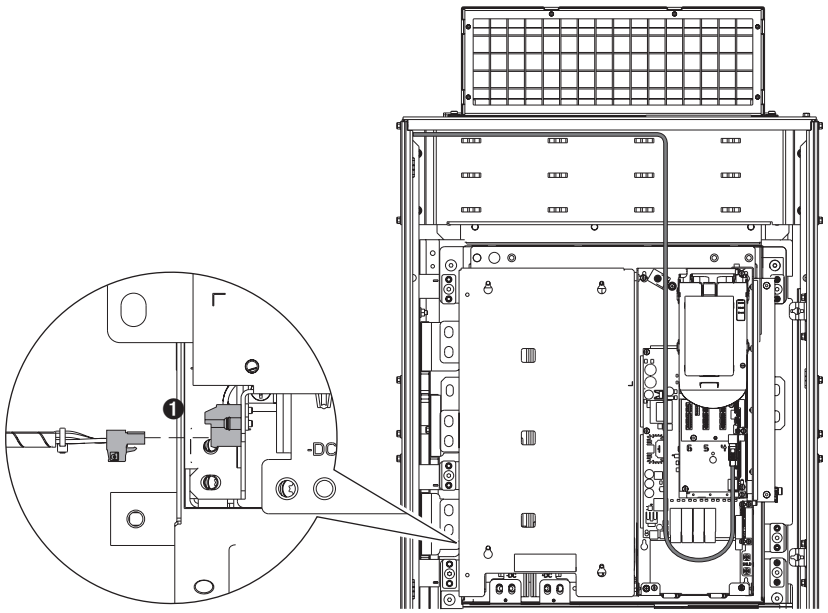
Disconnect Control and Power Wire Harnesses - AC Input Drives

1. Disconnect the cabinet fan /cabinet blower assembly wiring harness ❶ from TB2-3 and TB2-4.
2. Disconnect the cabinet shunt trip harness ❷ (if used) from TB2-1 and TB2-2.



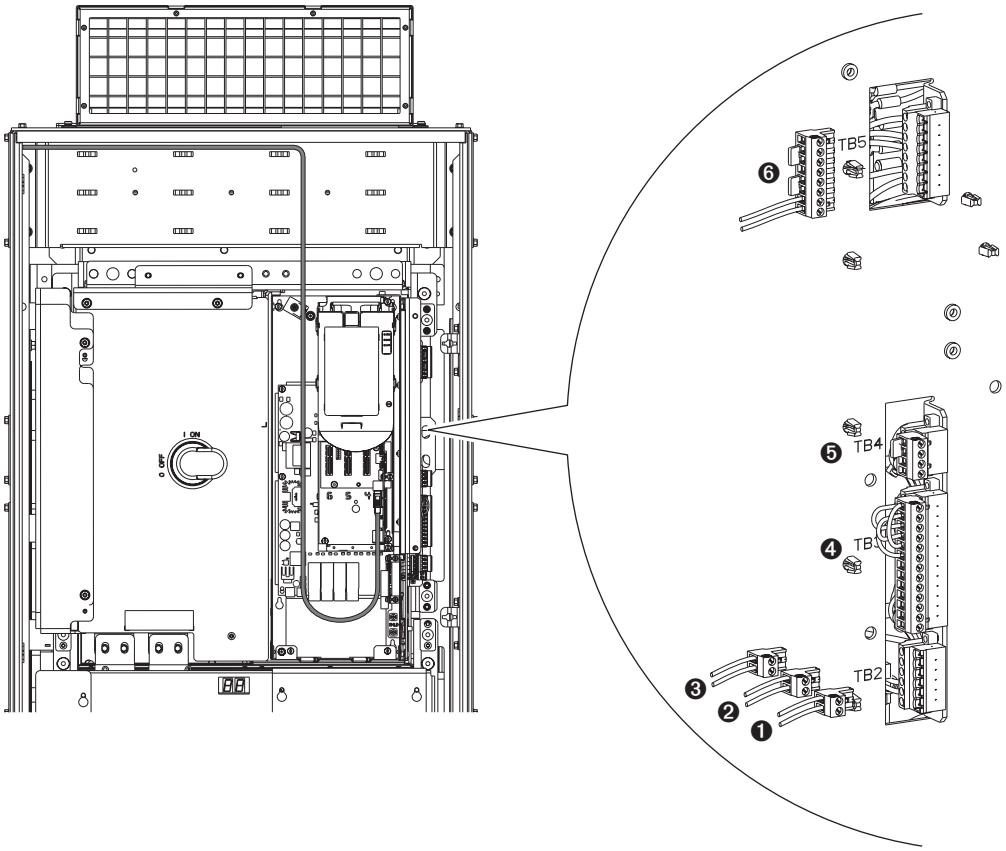
Disconnect DC Bus Fuse Wire Harness - AC Input Drives - Frame 9 and Larger

Disconnect the DC Bus wiring harness ❶ from TB6.



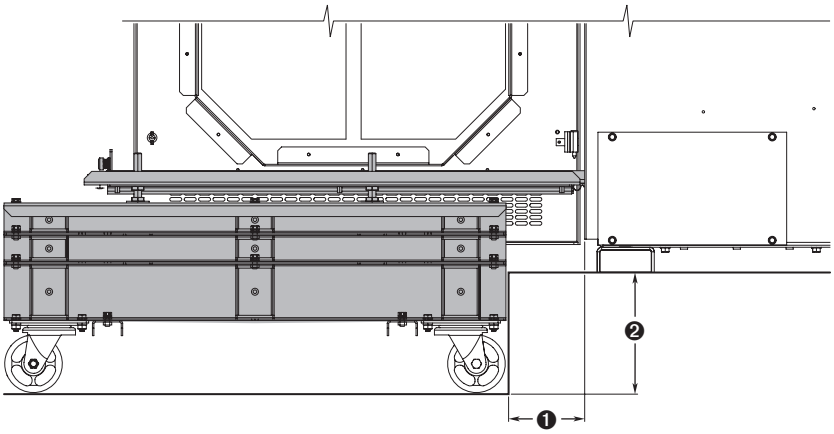
Disconnect Control and Power Wire Harnesses - Common DC Input Drives

1. Disconnect the cabinet fan /cabinet blower assembly harnesses ❶ from TB2-5 and TB2-6.
2. Disconnect the 120/240V control power input harness ❷ from TB2-3 and TB2-4.
3. Disconnect 120V UPS control power input ❸ (if used) from TB2-1 and TB2-2.
4. Disconnect the digital I/O wiring ❹ (if used) from TB3
5. Disconnect the door interlock wiring ❺ (if used) from TB4
6. Disconnect the 120V UPS control power output wiring ❻ (if used) from TB5.



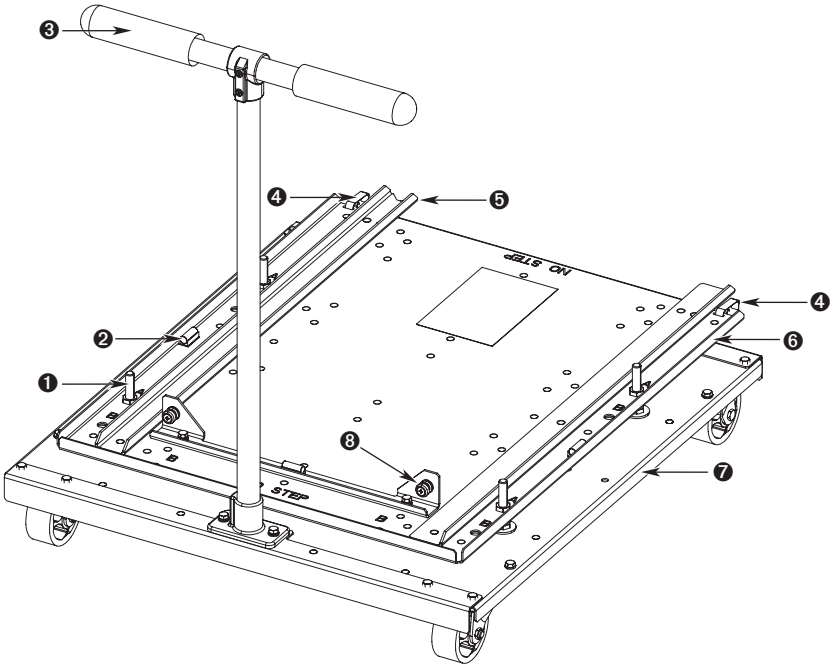
Prepare the Roll-Out Cart

The 20-750-CART1-F8 Roll-out Cart is required to remove the Frame 8 drive from the cabinet. It can be adjusted for reach and height.



No.	Description
❶	Adjustment for Curb Offset/Reach: 0…114 mm (0…4.5 in.)
❷	Adjustable Curb Height: 0…182 mm (0…7.2 in.)

Figure 46 - Roll-out Cart Features



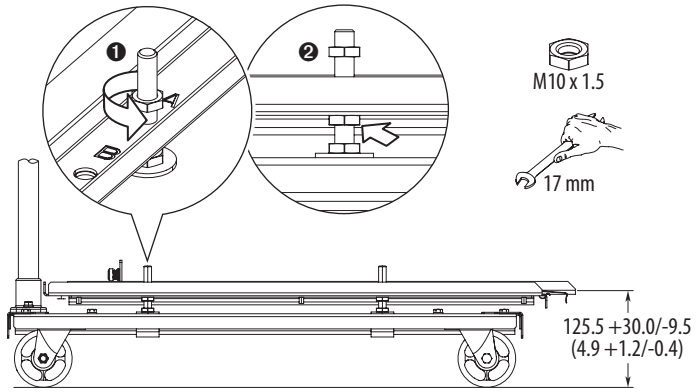
No.	Description
❶	Threaded studs and nuts allow precision height and leveling adjustments (four positions)
❷	Bubble levels help with fine adjustment of the cart deck (three positions)
❸	Handle
❹	Retaining clips positively engage the cart with the drive cabinet (two positions)
❺	Alignment track keeps the drive in the correct position
❻	Cart deck
❼	Cart chassis
❽	Drive stop and capture screws

Adjust Roll-Out Cart Height Using Threaded Studs and Nuts

The height of the Roll-out Cart deck can be adjusted using the threaded leveling studs and nuts.

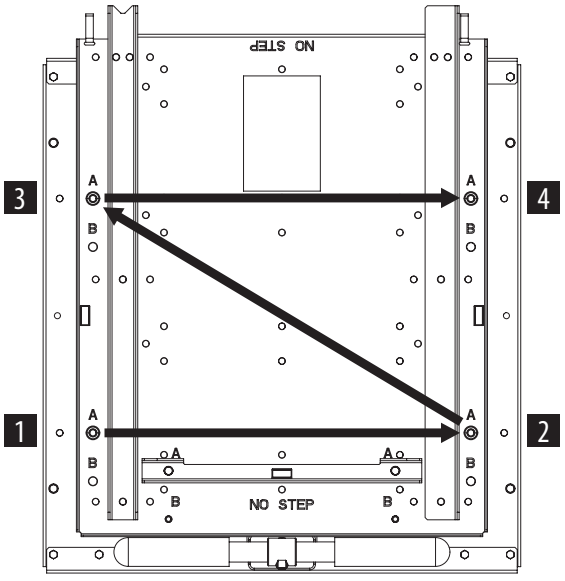
- Maximum height = 155.5 mm (6.1 in.)
- Minimum height = 116 mm (4.6 in.)
- Adjustment range = 30 mm (1.2 in.) up, 9.5 mm (0.4 in.) down from the factory setting of 125.5 mm (4.9 in.)

1. Loosen and back off the top nuts on the four threaded leveling studs ❶.



2. Turn the bottom supporting nuts to raise or lower the cart deck ❷. Right hand nut rotation lowers the deck. Left hand rotation raises the deck.

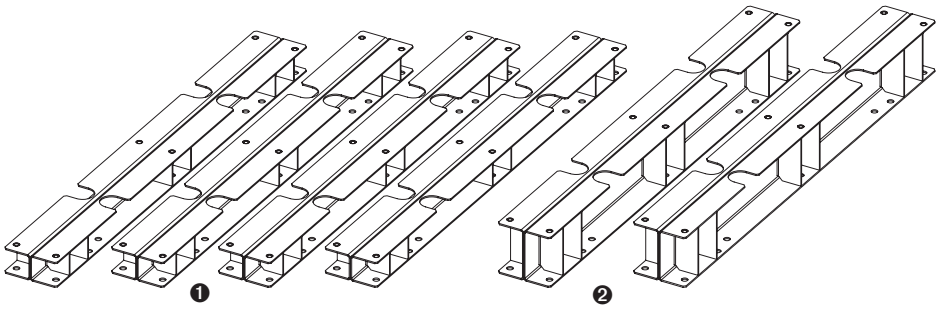
   Make uniform half-turn adjustments to each of the four threaded studs in an alternating pattern to help prevent binding and maintain a level orientation.



3. At the desired height, ensure the deck is level using the three bubble levels.
4. Tighten the top nuts.

Adjust Roll-Out Cart Height Using Spacers

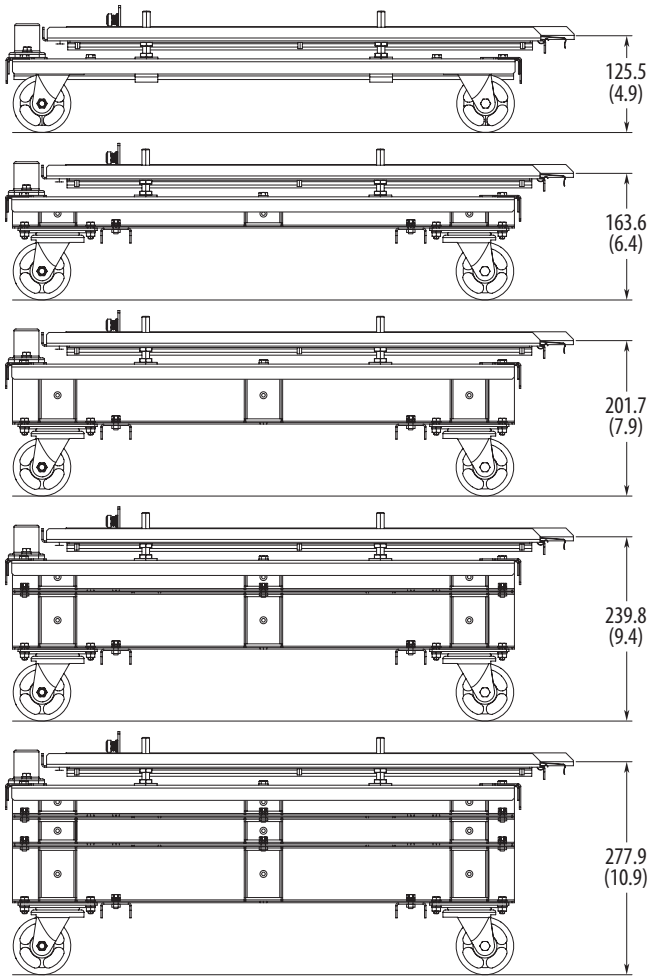
The height of the Roll-out Cart deck can be adjusted using the I-beam spacers provided.



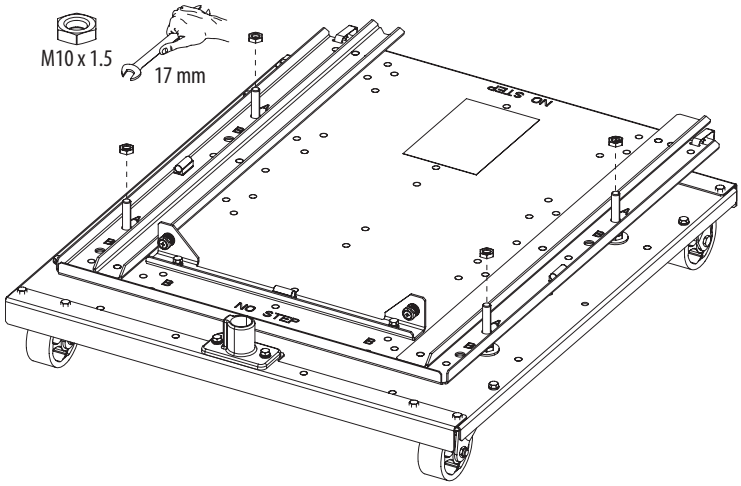
No.	Description
❶	Four 38.1 mm (1.5 in.) spacers
❷	Two 76.2 mm (3.0 in.) spacers

Spacer Height Combinations

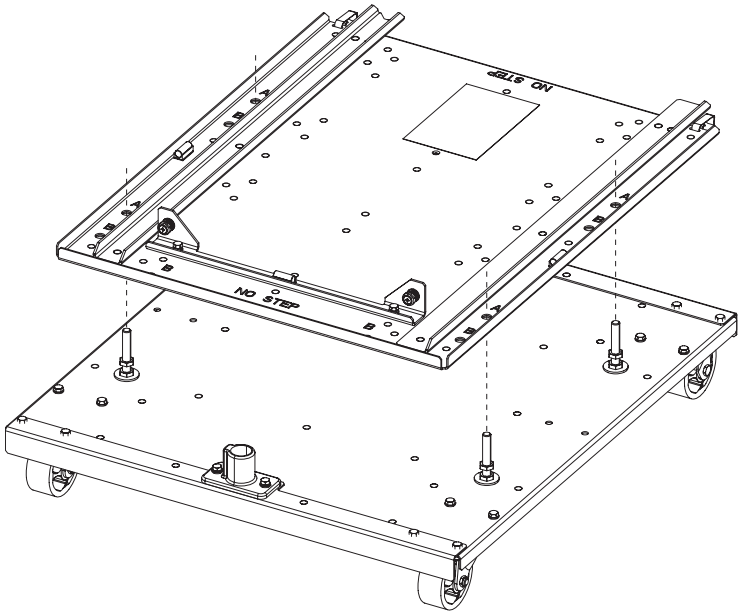
Each of the base heights below have adjustment range of +30.0 mm (1.2 in.) and -9.5 mm (0.4 in.).



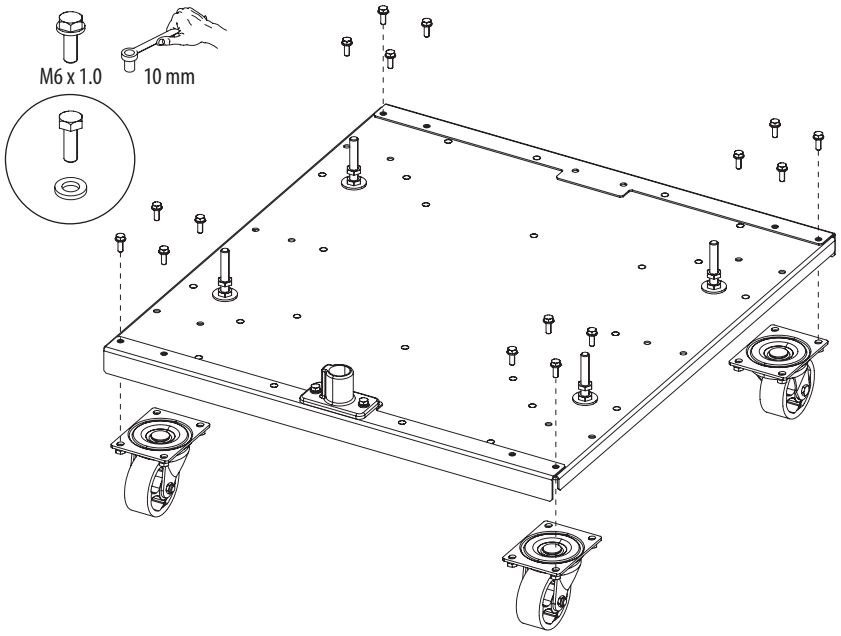
1. Remove the Roll-out Cart deck by removing the top nuts of the four threaded leveling studs.



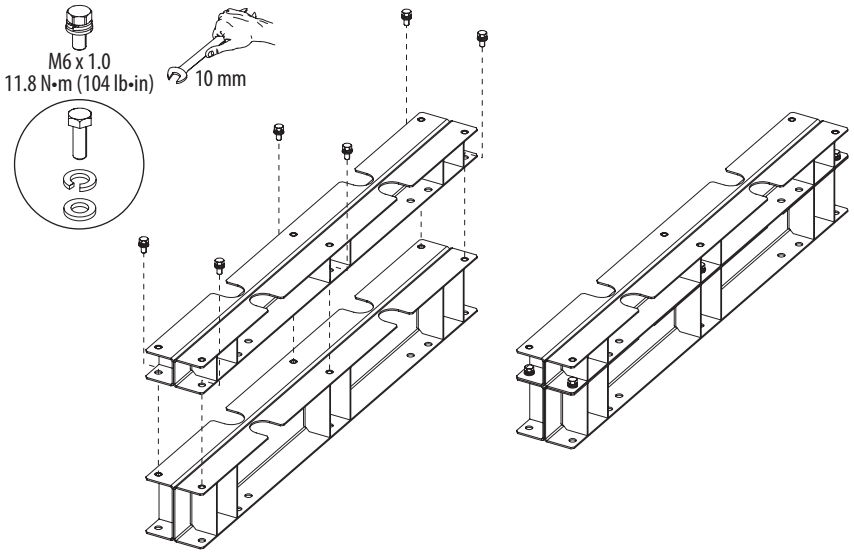
2. Lift the deck off of the four threaded leveling studs.



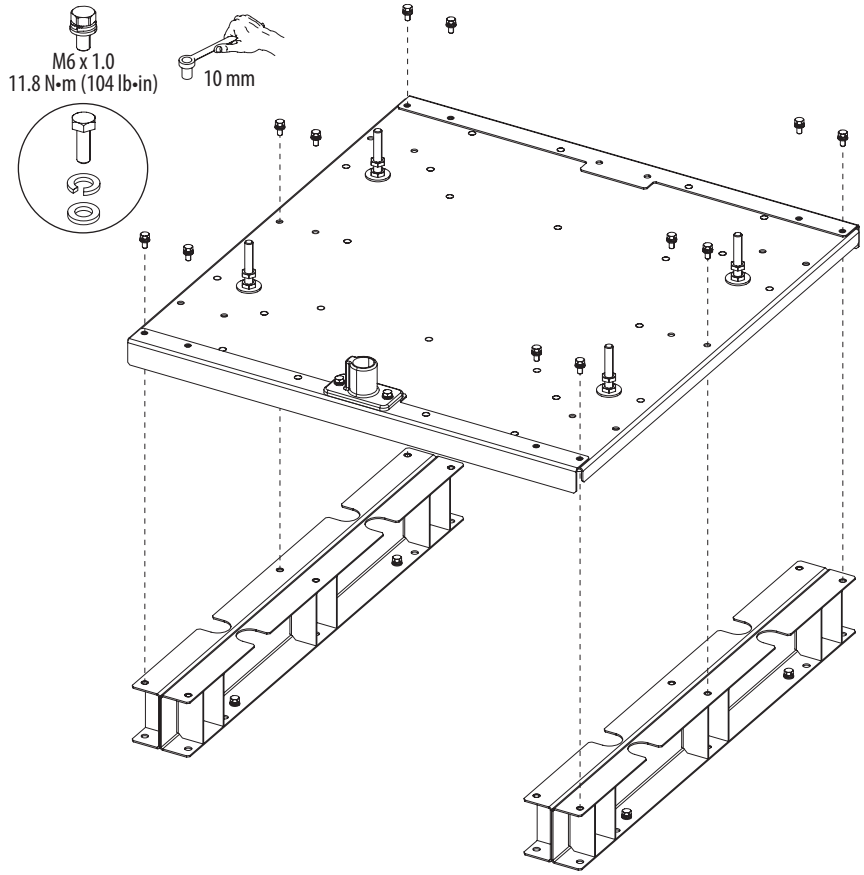
3. Remove the bolts securing the casters to chassis.



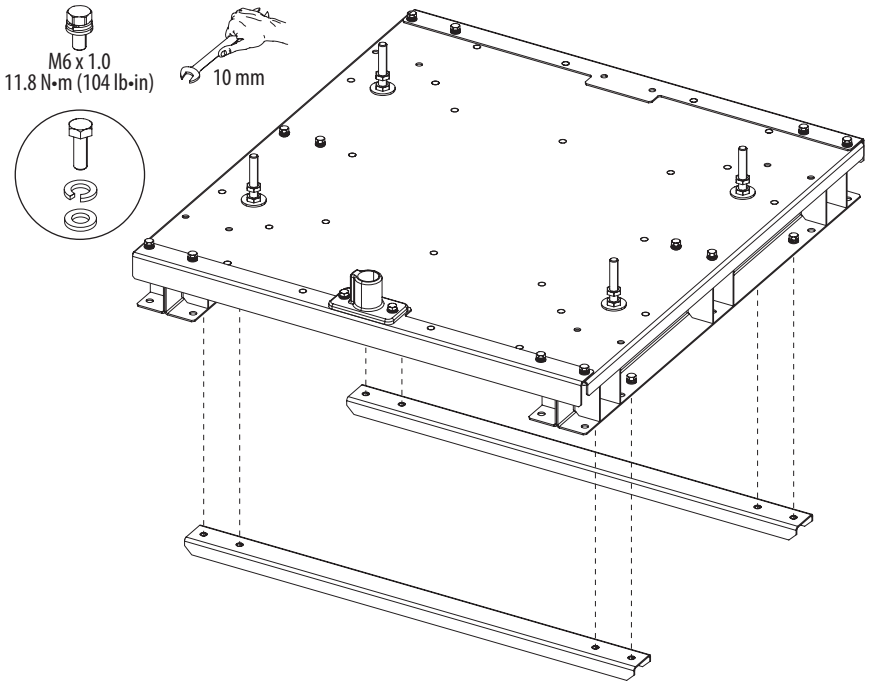
4. Select the spacer or spacers required. Combine spacers using bolts provided as needed.



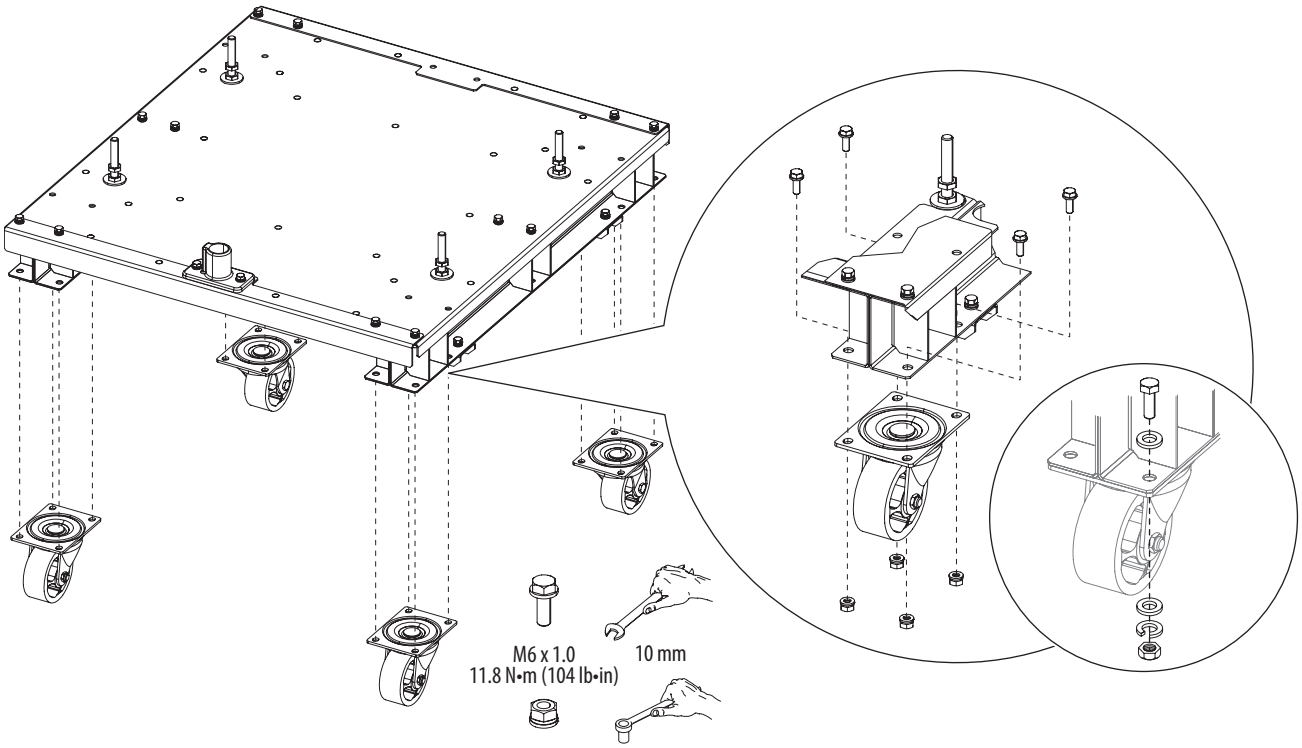
5. Bolt the spacer or spacer assembly to the bottom of the cart chassis.



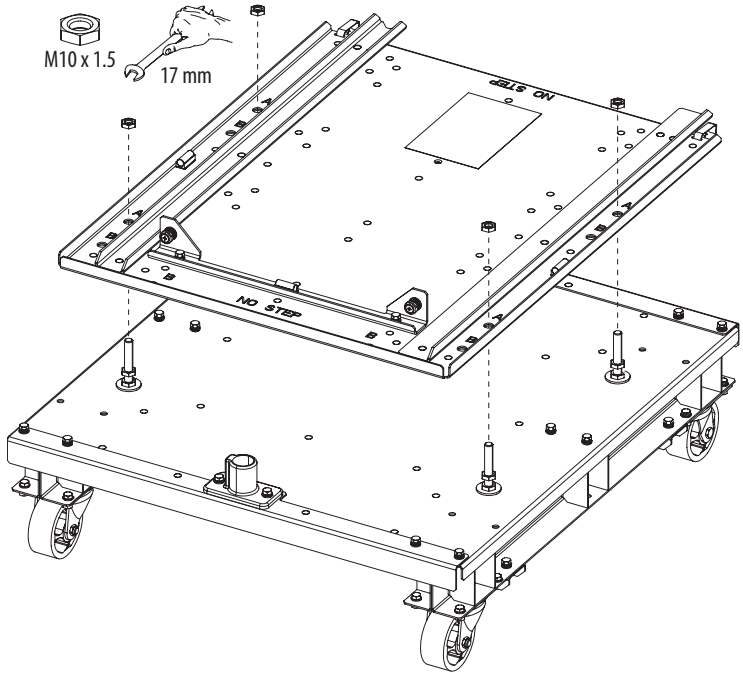
6. Bolt the cross beams to the bottom of the spacers.



7. Bolt the casters to the bottom spacer.



8. Determine reach required and install the deck in Position A or Position B See next section for details.



Adjust Roll-Out Cart Reach

Figure 47 - Reach Position A

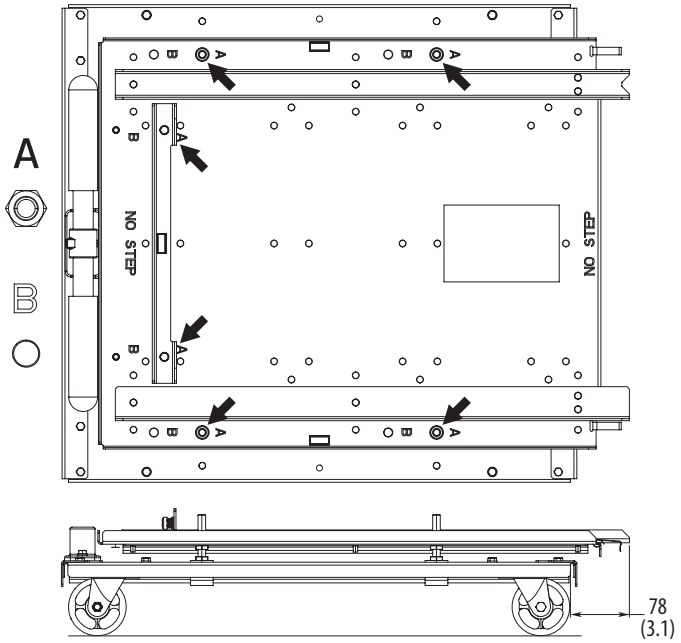
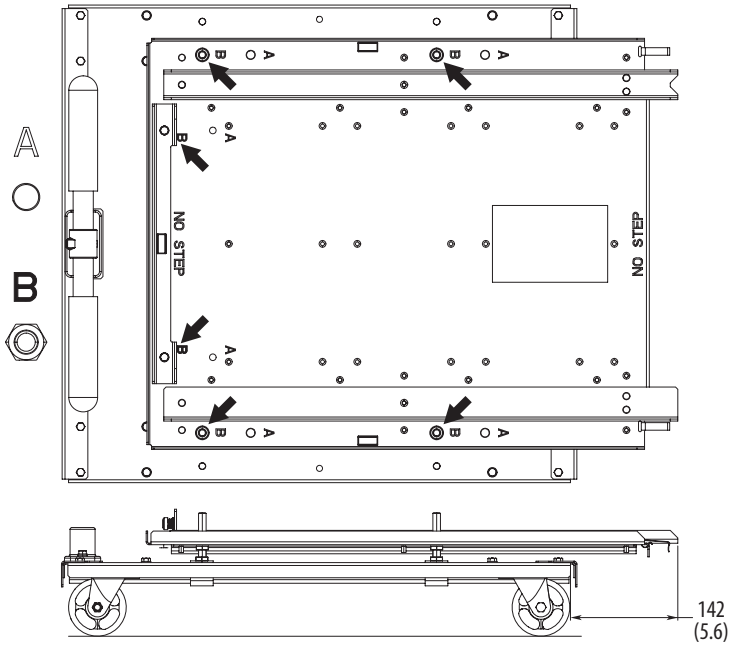


Figure 48 - Reach Position B

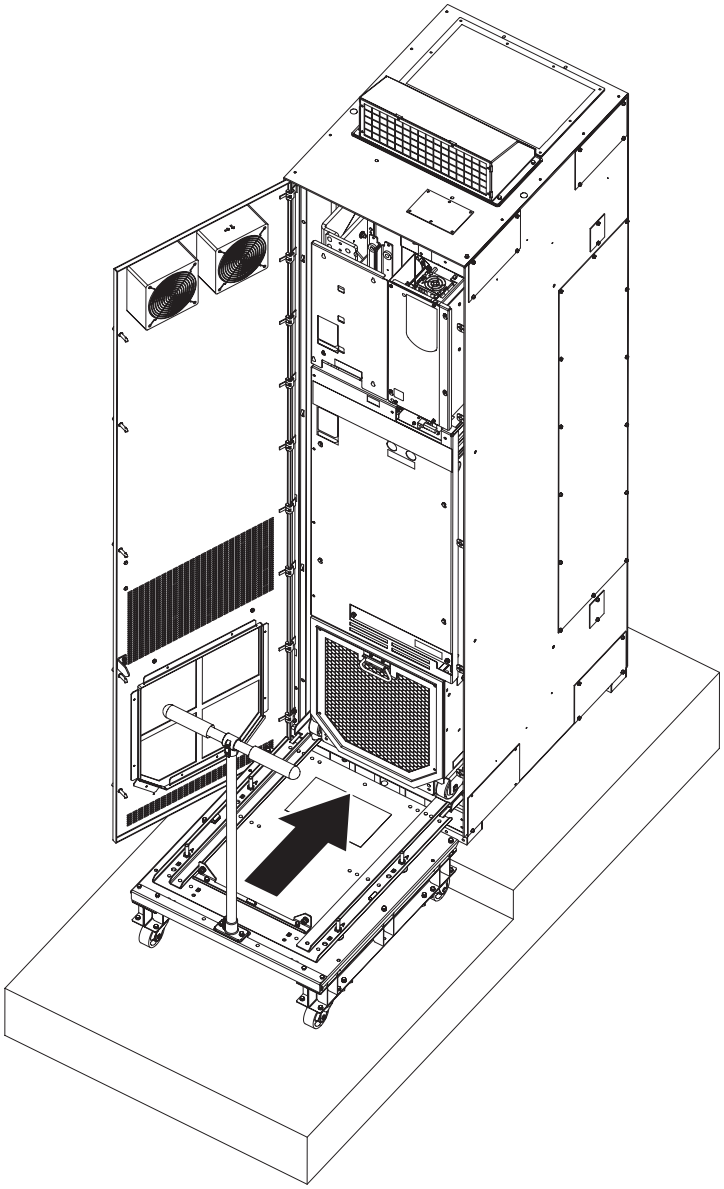


ATTENTION: A tip over hazard exists. To guard against death, serious personal injury, and/or equipment damage, ensure the Drive Stop (see Figure 46) is in the same position as the corresponding threaded leveling studs. The weight of the drive must be evenly distributed over the cart wheels.

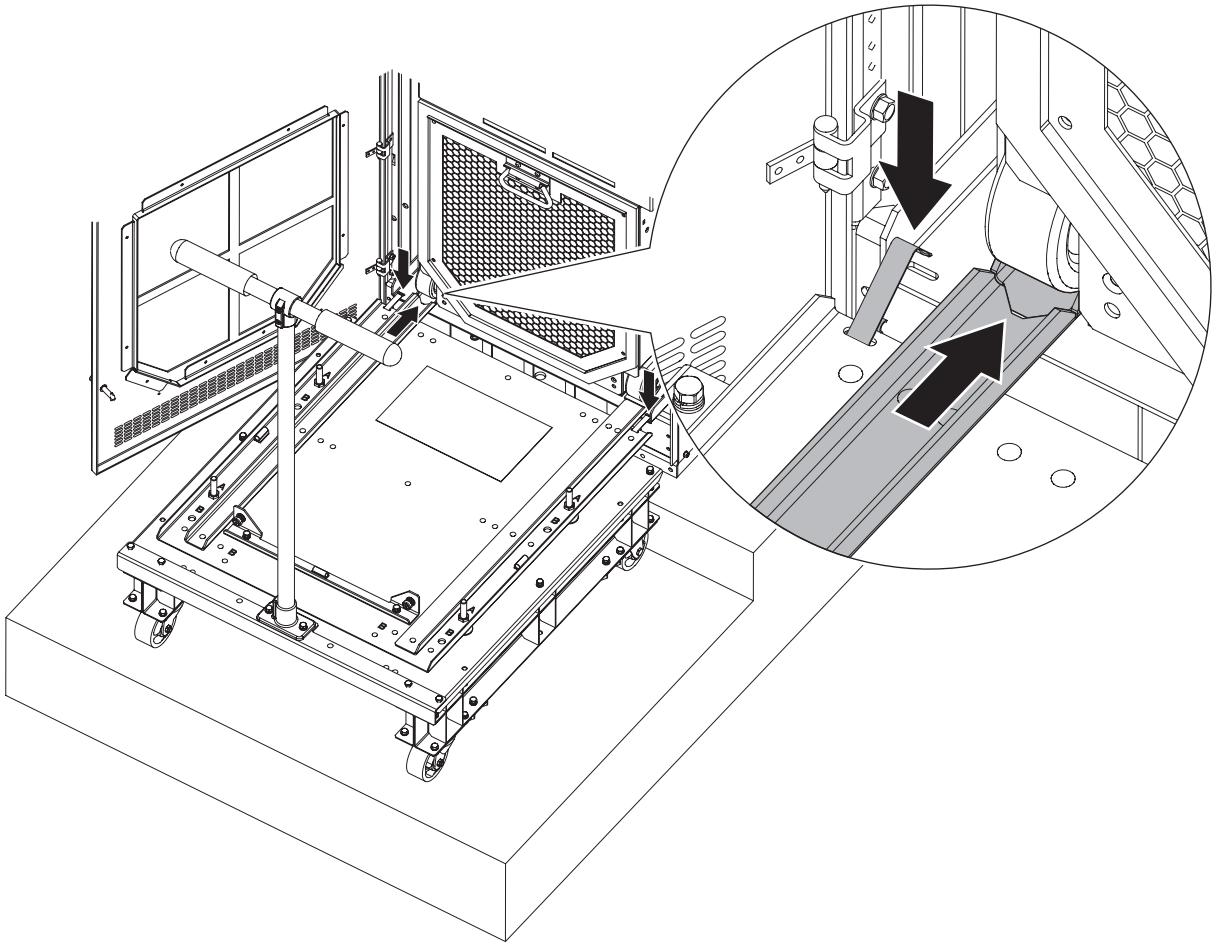
Remove Drive Assembly

This section assumes that the steps in Release Drive Assembly From Cabinet and Prepare the Roll-Out Cart have been completed.

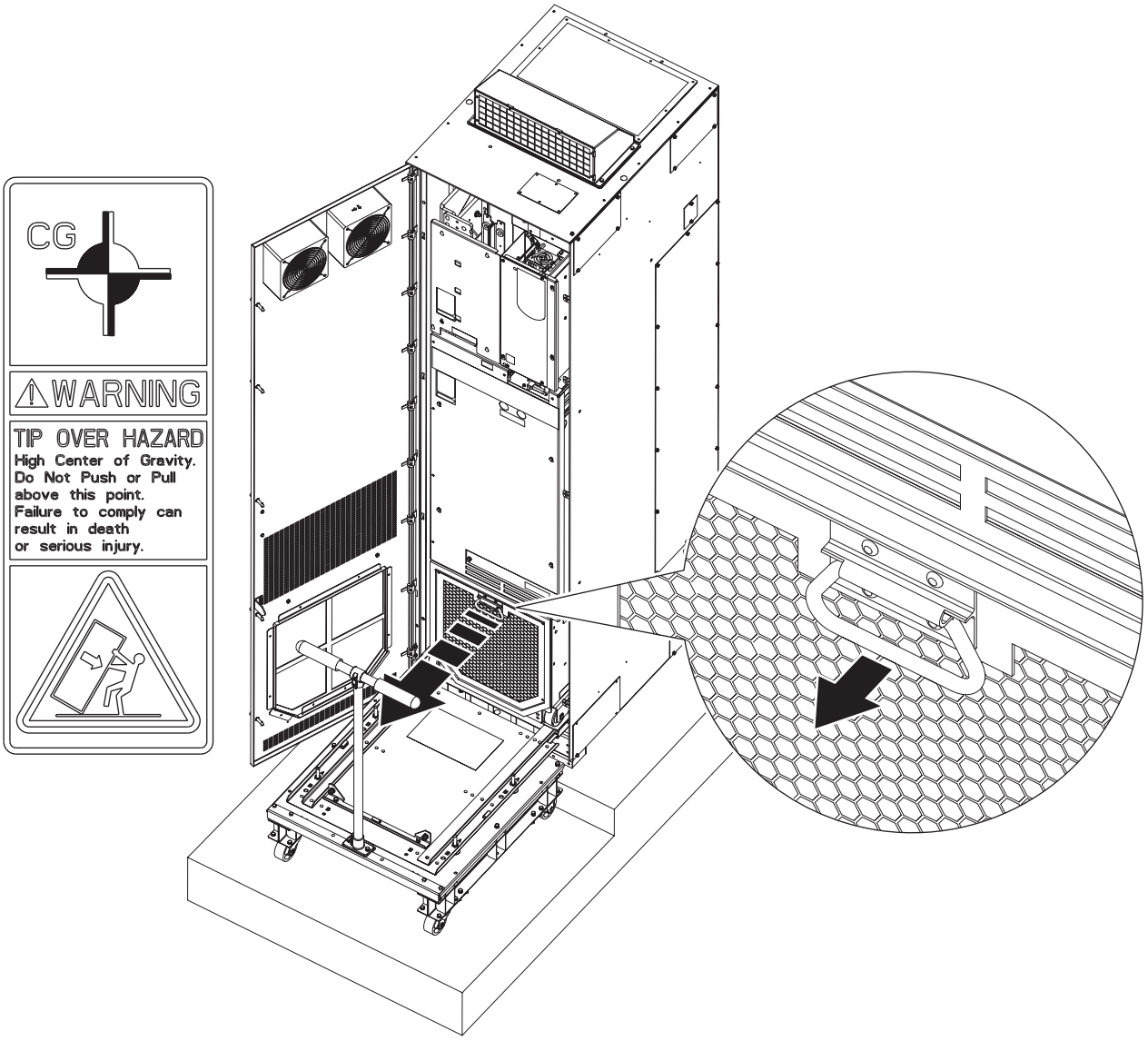
1. Carefully push the prepared Roll-out Cart to the front of the drive cabinet.



2. Use the alignment track to center the Roll-out Cart and engage the two retaining clips.

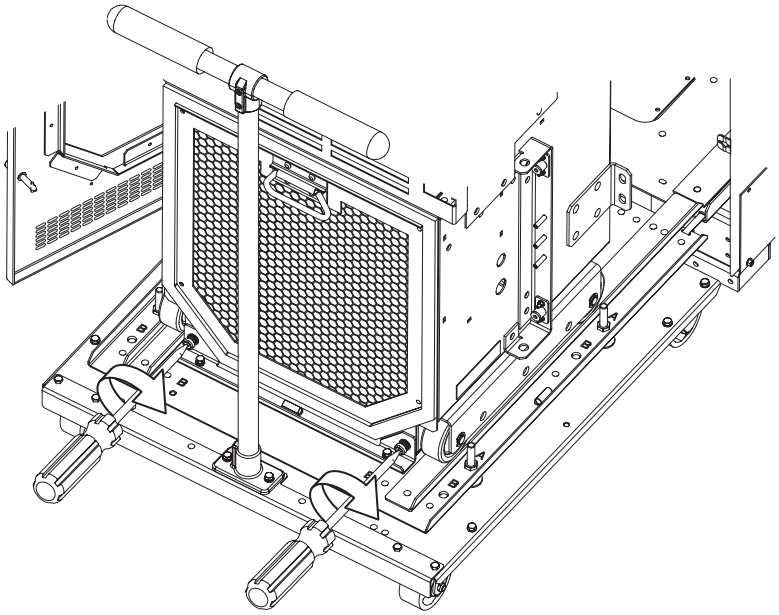


3. Using the handle above the fan intake, slowly and smoothly pull the drive on to the Roll-out Cart.



ATTENTION: This drive has a high center of gravity and a tip over hazard exists. To guard against death, serious personal injury, and/or equipment damage, do not subject the drive to high rates of acceleration or deceleration while transporting. Do not push or pull above the points indicated on the drive.

4. Engage and tighten the capture screws to lock the drive to the Stop.



5. Release the retaining clips to roll the drive away from the cabinet.

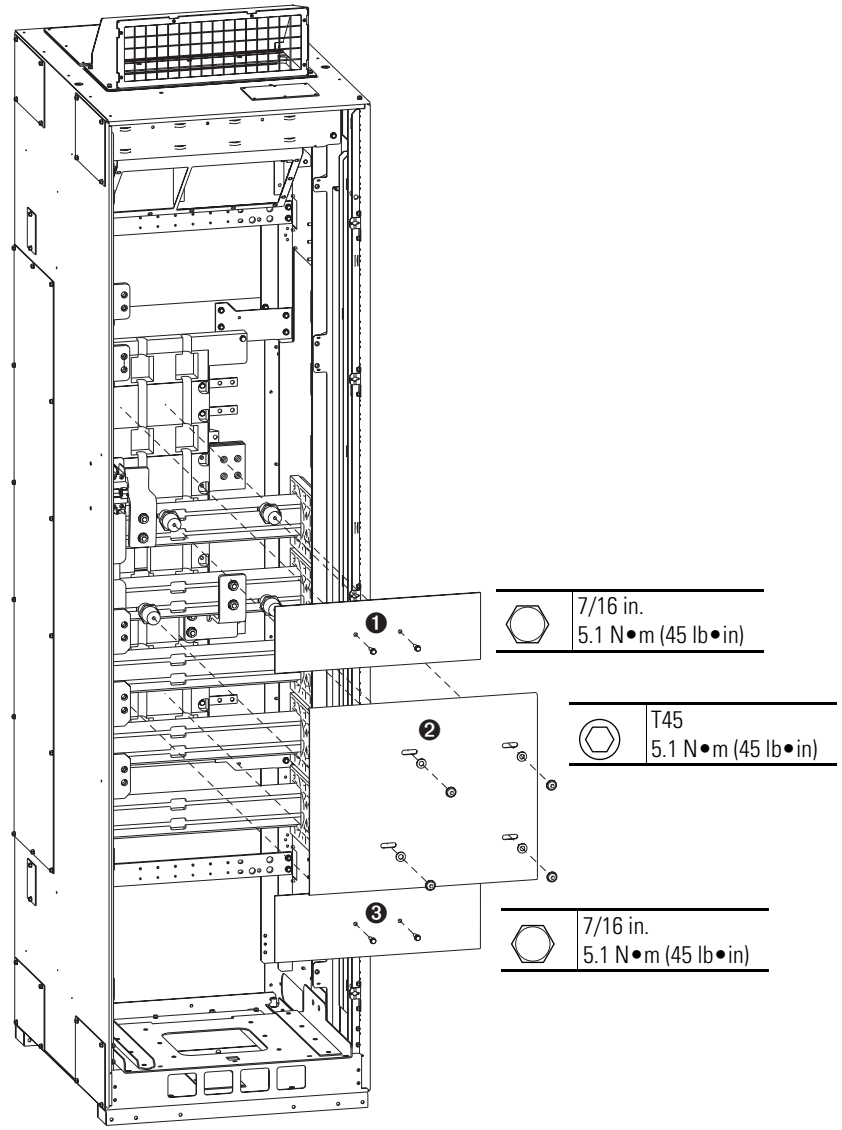
ATTENTION: This drive has a high center of gravity and a tip over hazard exists. To guard against death, serious personal injury, and/or equipment damage, do not subject the drive to high rates of acceleration or deceleration while transporting. Do not push or pull above the points indicated on the drive.

IMPORTANT Take precautions when using the Roll-out Cart to move the drive.

- Only use the Roll-out Cart to move the drive a short distance in order to gain access to the cabinet interior.
- Do not attempt to move the drive on the Roll-out Cart with the handle alone. The Roll-out Cart handle is designed for positioning the empty cart.
- Only use the cart on a smooth and level surface.
- Ensure the path for the cart is clear of debris and obstacles.
- Avoid sloped and rough surfaces.
- Always move the drive slowly.

Remove DC Back Bus Guard - Common DC Input Drives

To complete the power wiring connections in the Common DC Input drive cabinet, remove the DC Back Bus Guard ❷ to access the power terminals.



No.	Description
❶	120/240V Control Rail Guard
❷	DC Back Bus Guard
❸	120V Interruptible Power Supply (UPS) Rail Guard

Reinstall Drive Assembly

After cabinet installation and power wiring is complete, reinstall the drive in the cabinet.

1. Align the Roll-out Cart and drive with the cabinet and lock into position according to the procedures described in Remove Drive Assembly on page 83.
2. Disengage the capture screws and slowly push the drive into the cabinet.
3. Secure the drive-to-cabinet connections then the bus connections. Refer to Side Shield and Bus Bar Connections on page 67 for torque values.

Step 4: Power Wiring

Most start-up difficulties are the result of incorrect wiring. Every precaution must be taken to assure that the wiring is done as instructed. All items must be read and understood before the actual installation begins.

ATTENTION: The following information is merely a guide for proper installation. Rockwell Automation, Inc. cannot assume responsibility for the compliance or the noncompliance to any code, national, local or otherwise for the proper installation of this drive or associated equipment. A hazard of personal injury and/or equipment damage exists if codes are ignored during installation.

Grounding Requirements

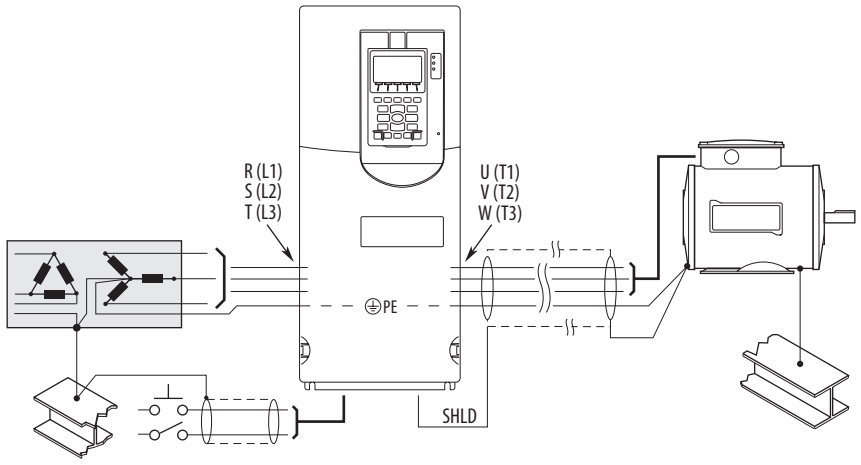
The drive Safety Ground-PE must be connected to system ground. Ground impedance must conform to the requirements of national and local industrial safety regulations and/or electrical codes. The integrity of all ground connections should be periodically checked.

Recommended Grounding Scheme

A single point (PE only) grounding scheme should be used. Some applications may require alternate grounding schemes, refer to Wiring and Grounding Guidelines for Pulse Width Modulated (PWM) AC Drives, publication DRIVES-IN001, for more information. These applications include installations with long distances between drives or drive line-ups, which could cause large potential differences between the drive or line-up grounds.

For installations within a cabinet, a single safety ground point or ground bus bar connected directly to building steel should be used. All circuits including the AC input ground conductor should be grounded independently and directly to this point/bar.

Figure 49 - Typical Grounding



Shield Termination - SHLD

The Shield terminal (see page 92) provides a grounding point for the motor cable shield. It must be connected to an earth ground by a separate continuous lead. The **motor cable** shield should be connected to this terminal on the drive (drive end) and the motor frame (motor end). Use a shield terminating or EMI clamp to connect shield to this terminal.

RFI Filter Grounding

Using an optional RFI filter may result in relatively high ground leakage currents. Therefore, the **filter must only be used in installations with grounded AC supply systems and be permanently installed and solidly grounded** (bonded) to the building power distribution ground. Ensure that the incoming supply neutral is solidly connected (bonded) to the same building power distribution ground. Grounding must not rely on flexible cables and should not include any form of plug or socket that would permit inadvertent disconnection. Some local codes may require redundant ground connections. The integrity of all connections should be periodically checked. Refer to the instructions supplied with the filter.

Power Cable Types Acceptable for 200…600 Volt Installations

ATTENTION: National Codes and standards (NEC, BSI etc.) and local codes outline provisions for safely installing electrical equipment. Installation must comply with specifications regarding wire types, conductor sizes, branch circuit protection and disconnect devices. Failure to do so may result in personal injury and/or equipment damage.

For detailed information on a variety of cable types that are acceptable for drive installations, refer to Wiring and Grounding Guidelines for Pulse Width Modulated (PWM) AC Drive, publication DRIVES-IN001.

Wire Recommendations

Type		Description	Min. Insulation Rating
Power (1)(2)	Standard	• Four tinned copper conductors with XLPE insulation. • Copper braid/aluminum foil combination shield and tinned copper drain wire. • PVC jacket.	600V, 75 °C (167 °F)

(1) Control and signal wires should be separated from power wires by at least 0.3 meters (1 foot).
(2) The use of shielded wire for AC input power may not be necessary but is always recommended.

Motor Considerations

Due to the operational characteristics of AC variable frequency drives, motors with inverter grade insulation systems designed to meet or exceed NEMA MG1 Part 31.40.4.2 standards for resistance to spikes of 1600 volts are recommended.

Guidelines must be followed when using non-inverter grade motors to avoid premature motor failures. Refer to Wiring and Grounding Guidelines for Pulse Width Modulated (PWM) AC Drives, publication DRIVES-IN001 for recommendations.

Terminal Block Specifications

Table 4 - Frames 1…5 Power Terminal Block

Frame	Wire Size Range[1] [2]		Strip Length	Recommended Torque	Recommended Tool(s)
	Maximum	Minimum			
1	4.0 mm^2 (10 AWG)	0.2 mm^2 (24 AWG)	8.0 mm (0.31 in.)	0.57 N•m (5 lb•in)	#1 Flat Screwdriver
2	4.0 mm^2 (10 AWG)	0.2 mm^2 (24 AWG)	8.0 mm (0.31 in.)	0.57 N•m (5 lb•in)	#1 Flat Screwdriver
3	16.0 mm^2 (6 AWG)	0.5 mm^2 (20 AWG)	10.0 mm (0.39 in.)	1.2 N•m (10.6 lb•in)	#2 Flat Screwdriver
4	25.0 mm^2 (3 AWG)	2.5 mm^2 (14 AWG)	10.0 mm (0.39 in.)	2.7 N•m (24 lb•in)	#2 Pozidrive® 492-C Phillips® 0.25 in. Flat Screwdriver
5	35.0 mm^2 (1 AWG)	10.0 mm^2 (8 AWG)	12.0 mm (0.5 in.)	4.0 N•m (35 lb•in)	#2 Pozidrive® 492-C Phillips® 0.25 in. Flat Screwdriver

(1) Maximum/minimum wire sizes that the terminal block will accept - these are not recommendations.

(2) Terminal blocks are designed to accept a single wire.

Table 5 - Frames 6 & 7 Power Terminal Block

Frame	Maximum Lug Width[1]	Recommended Torque	Terminal Bolt Size	Recommended Tool
6	34.6 mm (1.36 in.)	11.3 N•m (100 lb•in)	M8 x 1.25	13 mm Hex Socket
7	43.5 mm (1.71 in.)	11.3 N•m (100 lb•in)	M8 x 1.25	13 mm Hex Socket

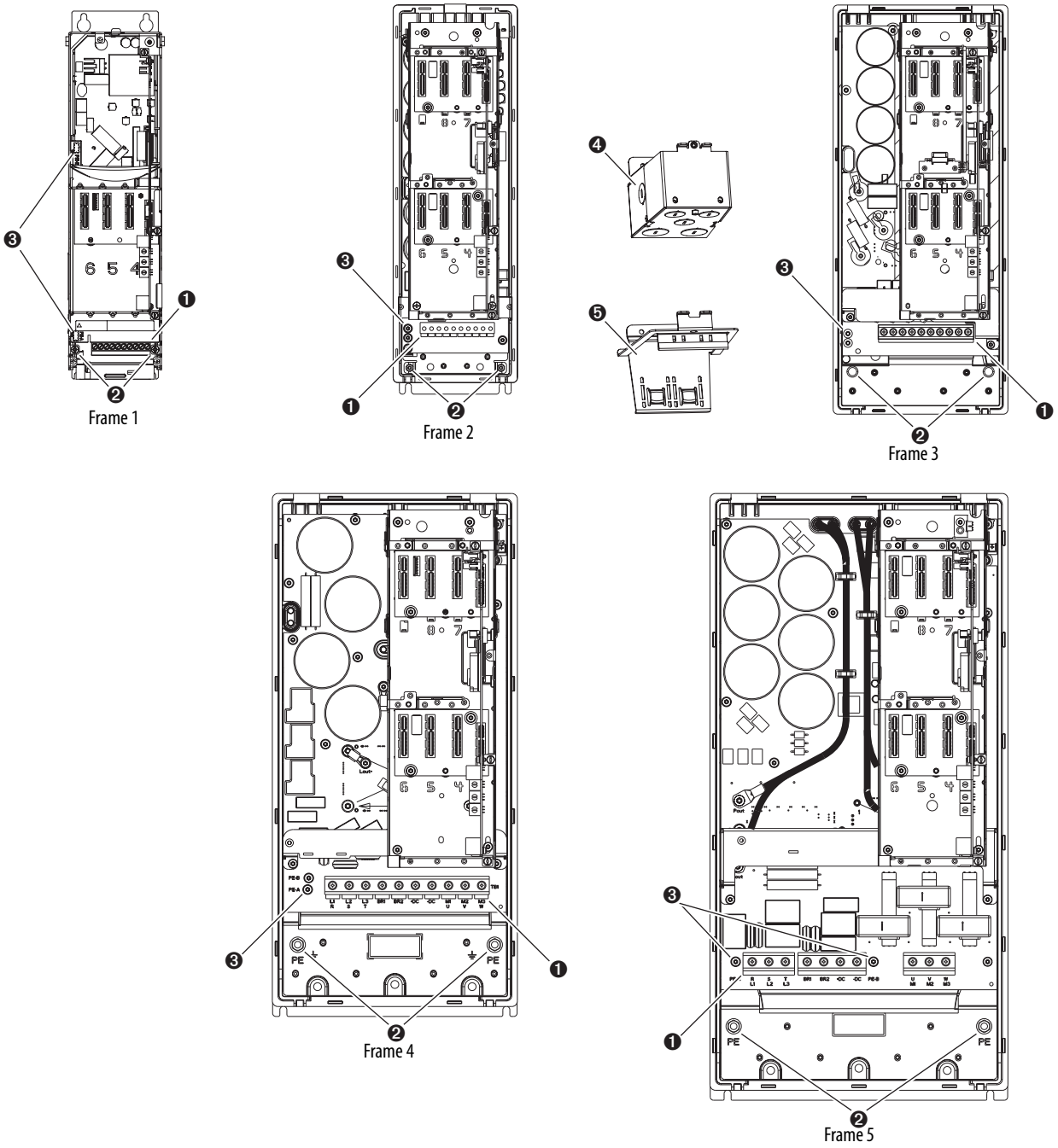
(1) Lugs are supplied by the user.

Table 6 - Frames 1…7 PE Grounding Stud

Frame	Recommended Torque	Terminal Bolt/Screw Size	Recommended Tool
1	1.36 N•m (12 lb•in)	M4	T20 hexalobular (Torx) #1 Flat Screwdriver
2	1.36 N•m (12 lb•in)	M4	7 mm Hex Deep Socket
3	3.4 N•m (30 lb•in)	M6	10 mm Hex Deep Socket
4	3.4 N•m (30 lb•in)	M6	10 mm Hex Deep Socket
5	3.4 N•m (30 lb•in)	M6	10 mm Hex Deep Socket
6	11.3 N•m (100 lb•in)	M8	13 mm Hex Socket
7	11.3 N•m (100 lb•in)	M8	13 mm Hex Socket

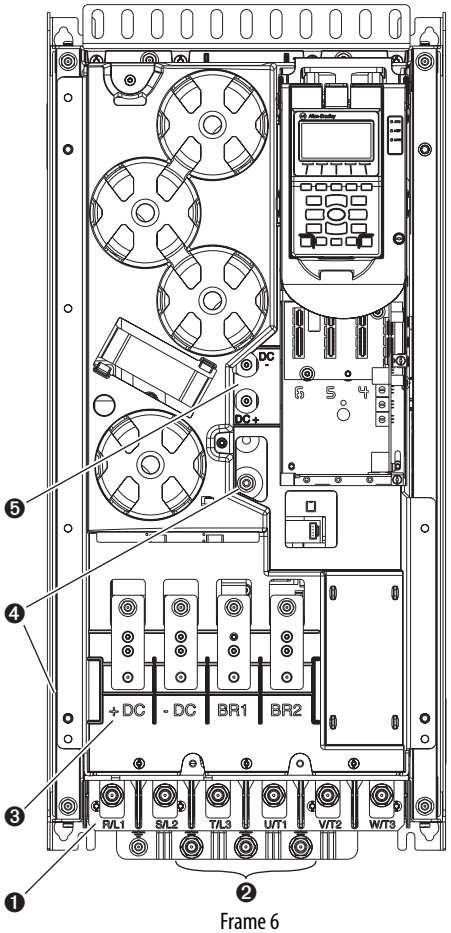
Three-Phase Terminal Locations

Figure 50 - Frame 1…5 Power Terminal Block and Termination Point Locations

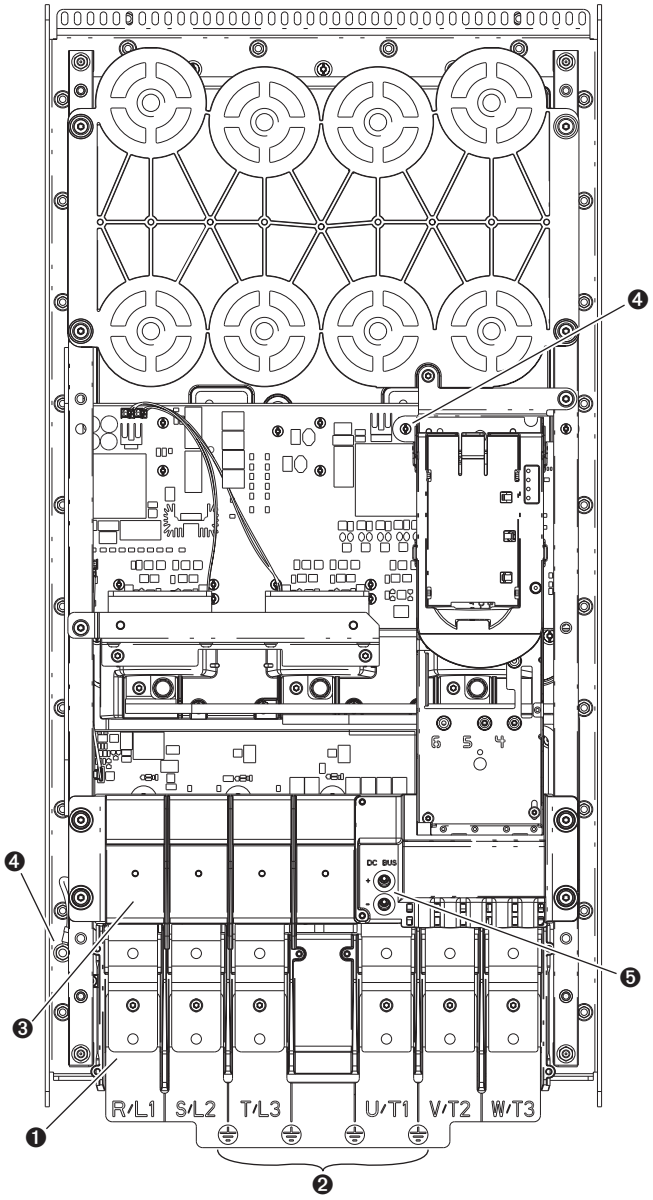


No.	Name	Description
❶	Power Terminal Block	R/L1, S/L2, T/L3, BR1, BR2, +DC, -DC, U/T1, V/T2, W/T3
❷	PE Grounding Studs	Terminating point to chassis ground for incoming AC line and motor shields.
❸	PE-A and PE-B	MOV and CMC Jumpers
❹	Optional NEMA/UL Type 1 Conduit Box	Terminating point to chassis ground for incoming AC line, motor shields, and control wire shields.
❺	Optional EMC Plate	Terminating point to chassis ground for incoming AC line, motor shields, and control wire shields.

Figure 51 - Frame 6 and 7 Power Terminal and Termination Point Locations



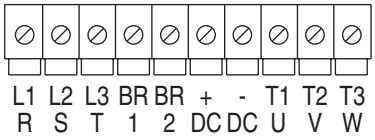
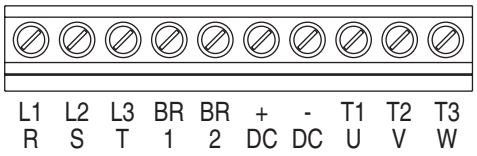
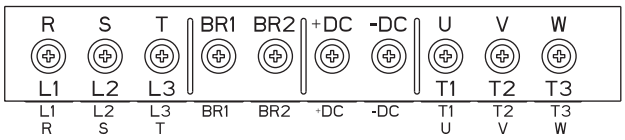
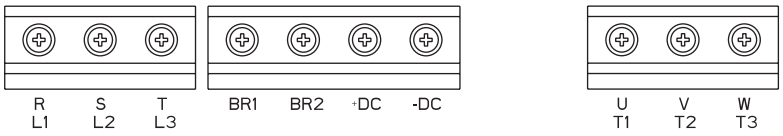
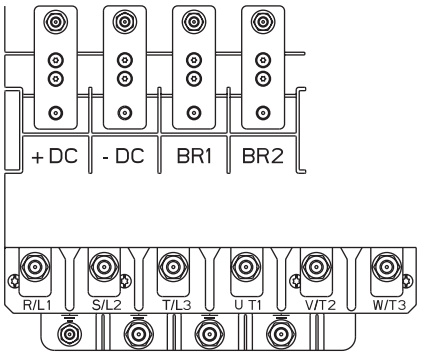
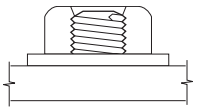
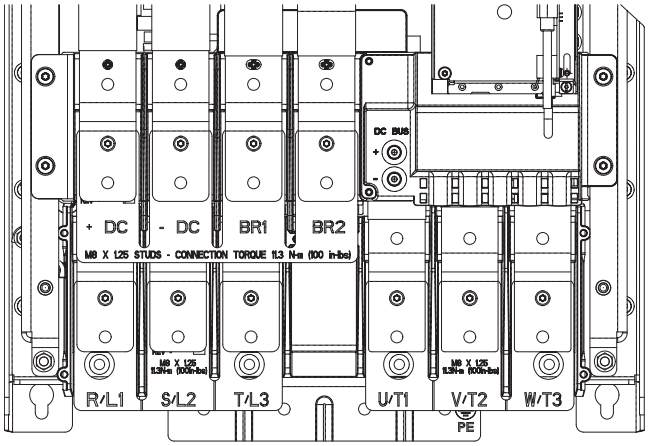
Frame 6



Frame 7

No.	Name	Description
❶	Power Terminals	R/L1, S/L2, T/L3, U/T1, V/T2, W/T3
❷	PE Grounding Studs	Terminating point to chassis ground for incoming AC line and motor shield.
❸	DC Bus and Brake Terminals	+DC, -DC, BR1, BR2 (Optional)
❹	PE-A and PE-B	MOV and CMC Jumpers
❺	DC+ and DC-	Bus Voltage Test Points

Frame 1…7 AC Input Power Terminals

Frame	Power Terminal Blocks
1 2	
3	
4	
5	
6 (1) (2)	 When nuts are fully seated on the Frame 6 power terminals, the stud will not extend beyond the top edge of the nut. Thread engagement is sufficient for a secure connection. 
7 (1)	

(1) DC Bus Terminals are optional on Frame 6 and 7 drives: catalog number position 5 or install kit number 20-750-DCBB1-F6 (Frame 6) or 20-750-DCBB1-F7 (Frame 7).
Dynamic Brake Resistor Terminals are optional on Frame 6 and 7 drives: catalog number position 12.
Refer to Catalog Number Explanation on page 9.

(2) If the use of two conductors is desired, an AC Terminal Extension Kit (20-750-ACTE-F6) is available for Frame 6 drives.

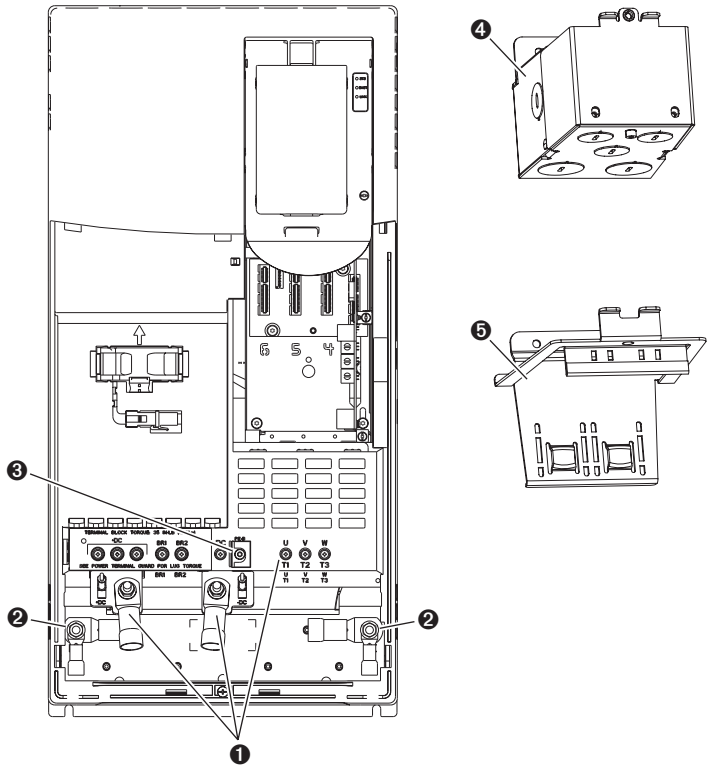
Table 7 - Terminal Designations

Terminal	Description	Notes
+DC	DC Bus (+)	DC Input Power or Dynamic Brake Chopper
-DC	DC Bus (–)	DC Input Power or Dynamic Brake Chopper
BR1	DC Brake (+)	Dynamic Brake Resistor Connection (+)
BR2	DC Brake (–)	Dynamic Brake Resistor Connection (–)
U	U (T1)	Motor Connections (1)
V	V (T2)	
W	W (T3)	
R	R (L1)	AC Line Input Power
S	S (L2)	
T	T (L3)	
PE / ⏚	PE Ground	Terminating point to chassis ground for incoming AC line and motor shield.

(1) **Important:** Motors with NEMA MG1 Part 31.40.4.2 inverter grade insulation systems are recommended. If you intend to connect a motor that is not rated inverter grade, refer to Wiring and Grounding Guidelines for Pulse Width Modulated (PWM) AC Drives, publication DRIVES-IN001 for recommendations.

Frame 5…7 Common DC Input Terminal Locations

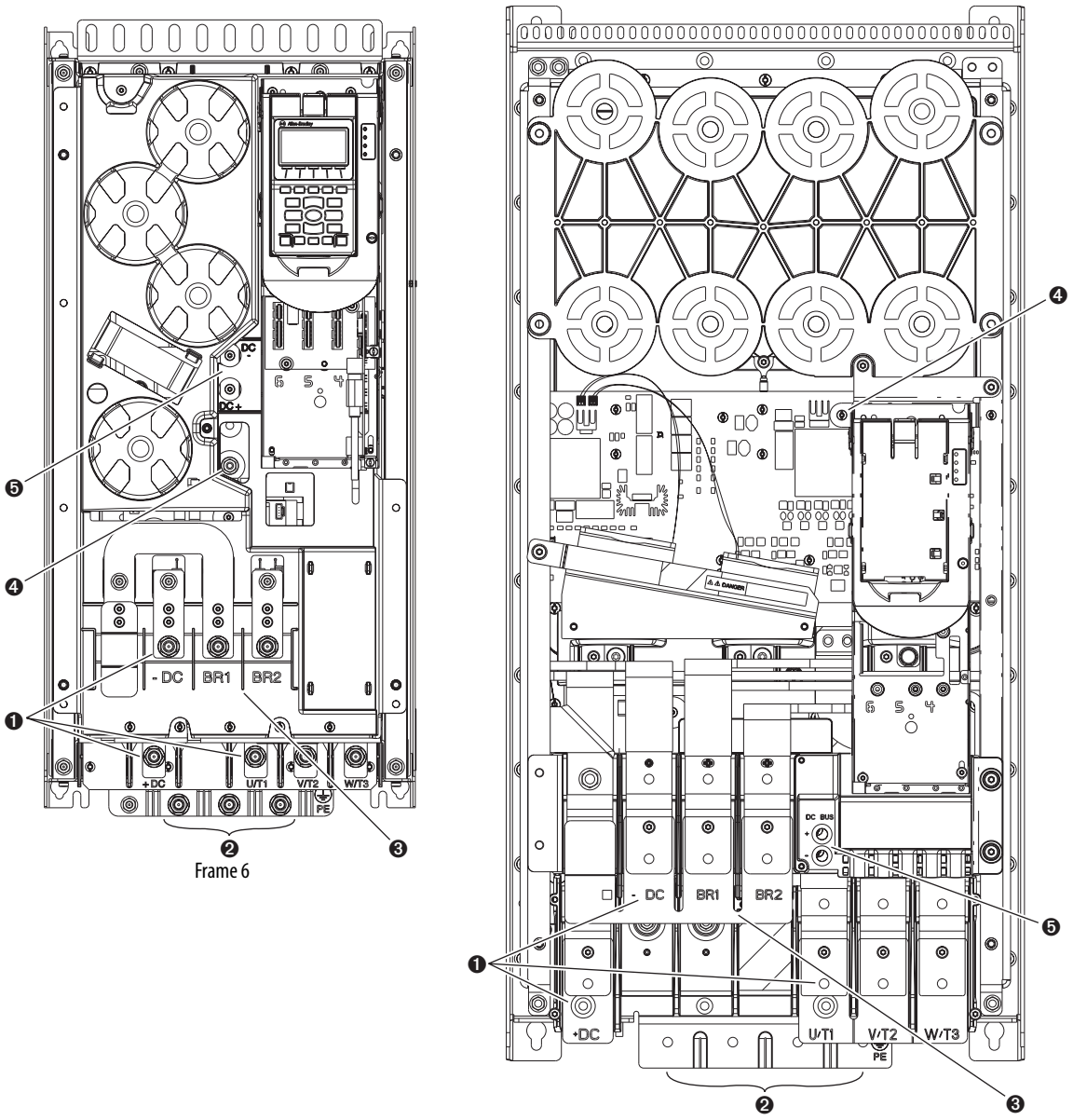
Figure 52 - Frame 5 Common DC Input Power Terminal and Termination Point Locations



Frame 5

No.	Name	Description
❶	Power Terminal Connections	+DC, -DC, U/T1, V/T2, W/T3
❷	PE Grounding Studs	Terminating point to chassis ground for incoming DC line and motor shields.
❸	PE-B	CMC Jumper Screw
❹	Optional NEMA/UL Type 1 Conduit Box	Terminating point to chassis ground for incoming AC line, motor shields, and control wire shields.
❺	Optional EMC Plate	Terminating point to chassis ground for incoming AC line, motor shields, and control wire shields.

Figure 53 - Frame 6 and 7 Common DC Input Power Terminal and Termination Point Locations

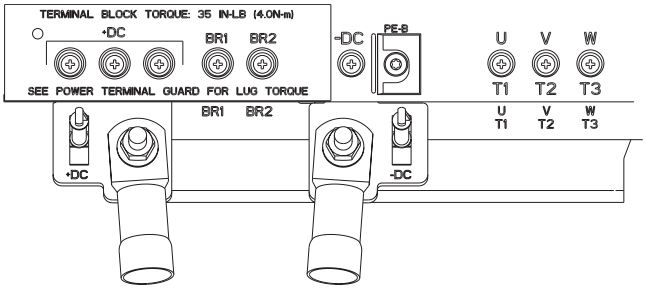
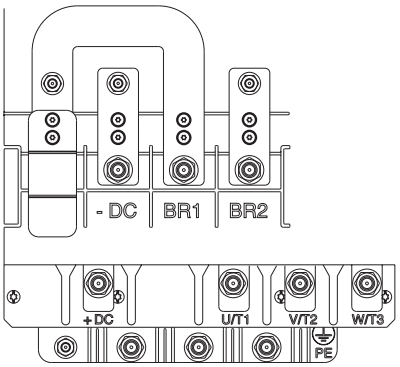
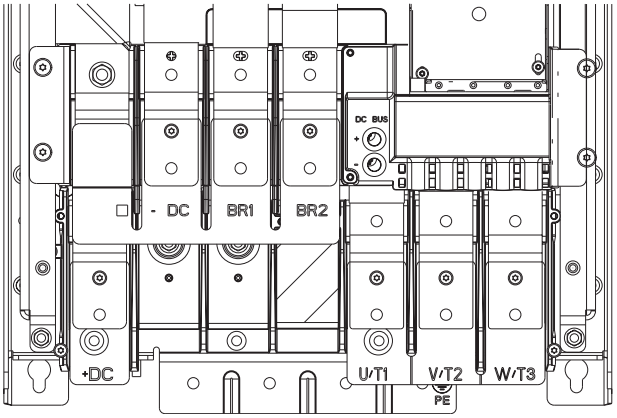


Frame 6

Frame 7

No.	Name	Description
❶	Power Terminals	+DC, -DC, U/T1, V/T2, W/T3
❷	PE Grounding Studs	Terminating point to chassis ground for incoming DC line and motor shield.
❸	DC Bus and Brake Terminals	+DC, -DC, BR1, BR2
❹	PE-B	CMC Jumper Wire
❺	DC+ and DC-	Bus Voltage Test Points

Frame 5…7 Common DC Input Power Terminals

Frame	Power Terminal Blocks
5	
6 (1)	
7 (1)	

(1) Dynamic Brake Resistor Terminals are optional on Frame 6 and 7 drives: catalog number position 12. Refer to Catalog Number Explanation on page 9.

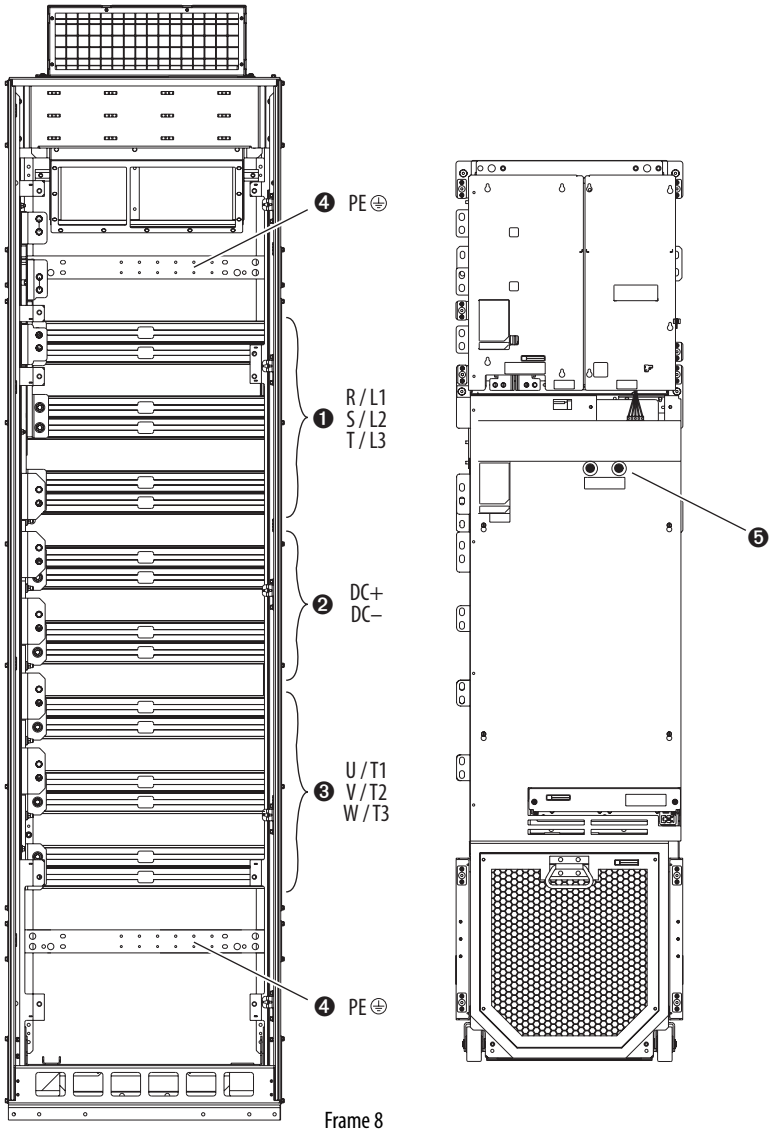
Table 8 - Common DC Input Terminal Designations

Terminal	Description	Notes
+DC	DC Bus (+)	DC Input Power
-DC	DC Bus (–)	DC Input Power
BR1	DC Brake (+)	Dynamic Brake Resistor Connection (+)
BR2	DC Brake (–)	Dynamic Brake Resistor Connection (–)
U	U (T1)	Motor Connections (1)
V	V (T2)	
W	W (T3)	
PE / ⏚	PE Ground	Terminating point to chassis ground for incoming DC line and motor shield.

(1) **Important:** Motors with NEMA MG1 Part 31.40.4.2 inverter grade insulation systems are recommended. If you intend to connect a motor that is not rated inverter grade, refer to Wiring and Grounding Guidelines for Pulse Width Modulated (PWM) AC Drives, publication DRIVES-IN001 for recommendations.

Frame 8…10 Bus Bar Locations

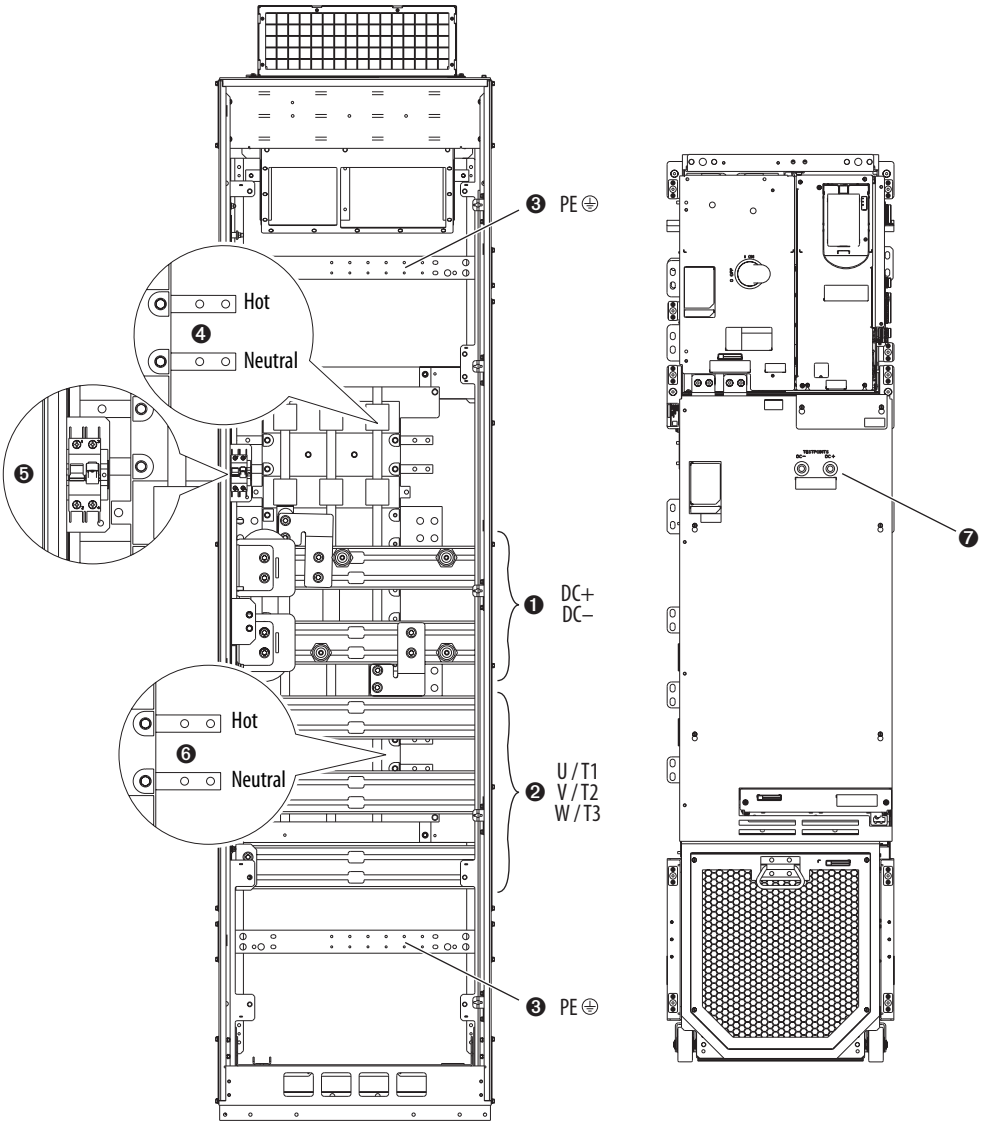
Figure 54 - Bus Bar Locations, AC Input Drives



Frame 8

No.	Name	Description
❶	Power Bus	R/L1, S/L2, T/L3
❷	DC Bus	DC+, DC- (Requires field installed kit 20-750-BUS1-F8.)
❸	Power Bus	U/T1, V/T2, W/T3
❹	PE Grounding Bar	Terminating point to chassis ground for incoming AC line and motor shield.
❺	DC+ and DC-	Bus Voltage Test Points

Figure 55 - Bus Bar and AC Power Rail Locations, Common DC Input Drives



Frame 8

Table 9 - Frame 8 Common DC Input

No.	Name	Description
❶	DC Power Bus	DC+, DC-
❷	Power Bus	U/T1, V/T2, W/T3
❸	PE Grounding Bar	Terminating point to chassis ground for incoming AC line and motor shield.
❹	Control Rail	120V AC control power supply connections. Top rail is hot.
❺	Control Power Circuit Breaker	120V AC control power supply circuit breaker.
❻	UPS Rail	120V AC Uninterruptible Power Supply (UPS) connections. Top rail is hot.
❼	DC+ and DC-	Bus Voltage Test Points

Frame 8…10 Power Wiring Options

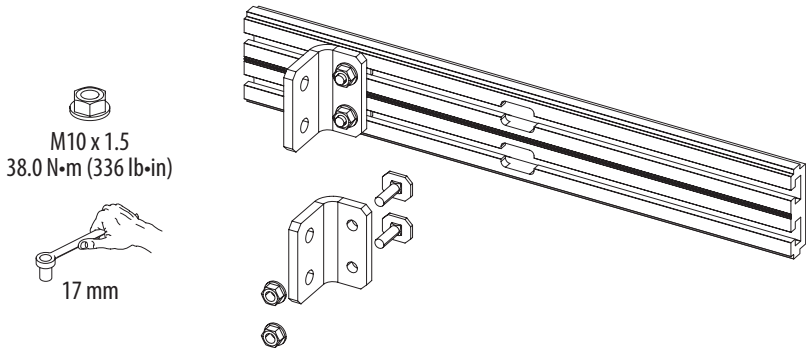
Cable Option	Wire Entry/Exit Location	IP20, NEMA/UL Type 1 Drive (2500 MCC Style Cabinet)		IP20, NEMA/UL Type 1 Drive and Cabinet Options (2500 MCC Style Cabinet)	
		600 mm (23.6 in.) Deep Drive Bay	800 mm (31.5 in.) Deep Drive Bay	600 or 800 mm Deep Drive Bay w/ 600 mm Wide Wiring Only Bay	600 or 800 mm Deep Drive Bay w/ 600 mm Cabinet Options Bay
Armored Cable with Conduit Hubs	Top Entry, Bottom Exit		✓	✓	✓
	Bottom Entry, Bottom Exit		✓	✓	
	Top Entry,Top Exit		✓	✓	
Shielded Cable with Conduit Hubs	Top Entry, Bottom Exit	✓	✓	✓	✓
	Bottom Entry, Bottom Exit		✓	✓	
	Top Entry,Top Exit		✓	✓	✓(2)
Shielded Cable without Conduit Hubs(1)	Bottom Entry, Bottom Exit	✓	✓	✓	

(1) Other configurations with shielded cable are possible, however the use of conduit hubs is recommended.

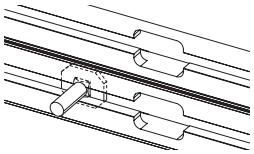
(2) This wiring configuration is possible when there are no ouput options in the option bay and the motor connections are wired from the drive bay.

Frame 8…10 Power Terminal L-Brackets

Frame 8 drives and larger utilize movable L-bracket assemblies to connect AC line input power, output to motor, and DC power to the extruded bus bars at the back of the cabinet. Wiring must be connected to the L-brackets using customer-supplied lugs (either crimp or mechanical type) and customer-supplied hardware. See Figure 57.



IMPORTANT

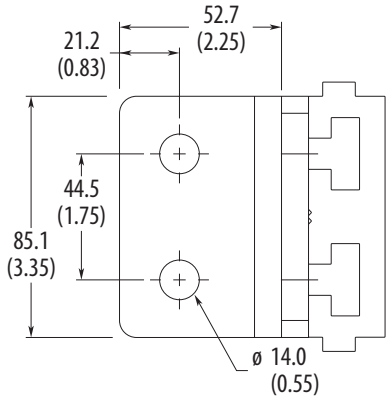


Verify that clamp fits squarely in the bus bar slot.

Additional Power Terminal L-Brackets

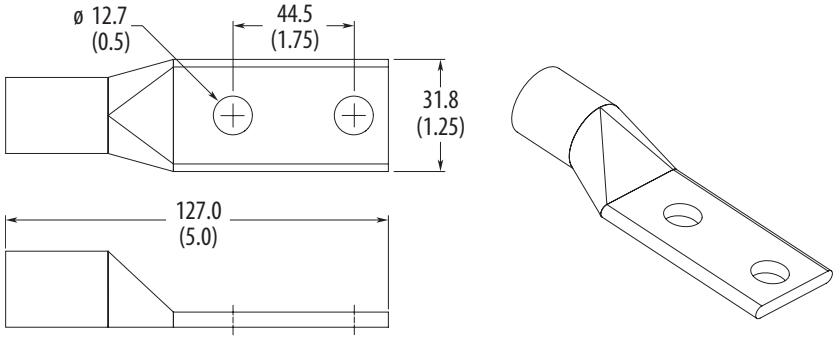
Frame 8 and larger drives come equipped with two L-brackets per AC phase. If an application requires additional L-brackets, kit number 20-750-LBRKT1 is available. Each kit contains three L-brackets and mounting hardware.

Figure 56 - L-Bracket Approximate Dimensions



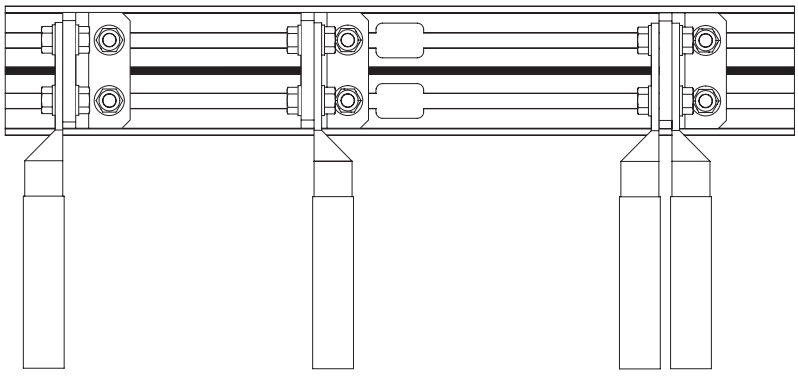
Crimp terminals should be applied to cabling using the vendor-recommended tooling. Mechanical terminals should be torqued per vendor instructions. When using mechanical terminals, which may be large, be sure to maintain adequate spacing to adjacent wires, terminals, and other parts.

Figure 57 - Standard Barrel Lugs: Approximate Maximum Dimensions



Wires with appropriate terminals can be bolted to both sides of the L-brackets if required. Frame 8 drives include two L-brackets per phase, allowing up to four conductors per phase. Terminals should be attached to the L-brackets using M12 or 0.5 in. diameter bolts, nuts and washers. Bellville spring washers, or equivalent, are recommended.

Figure 58 - Typical Lug Connection Options



Left side of L-bracket. Right side of L-bracket. Both sides of L-bracket.

Recommended Motor Cable Spacing - Frame 8 and Larger

Frame 8 and larger drives typically require multiple conductors in parallel. Wire size and number of conductors must be determined by the customer based on drive rated current, local codes, operating conditions, and specific application needs. When using multiple conductors per phase, symmetrical spacing of the input and output power cabling over the span of the bus bar for each phase is recommended.

When using multiple conductors per phase, wires must be arranged so that each conduit, bundle, or cable contains equal numbers of conductors from all three phases.

Figure 59 - Recommended Cable Spacing Example - Frame 9 Shown

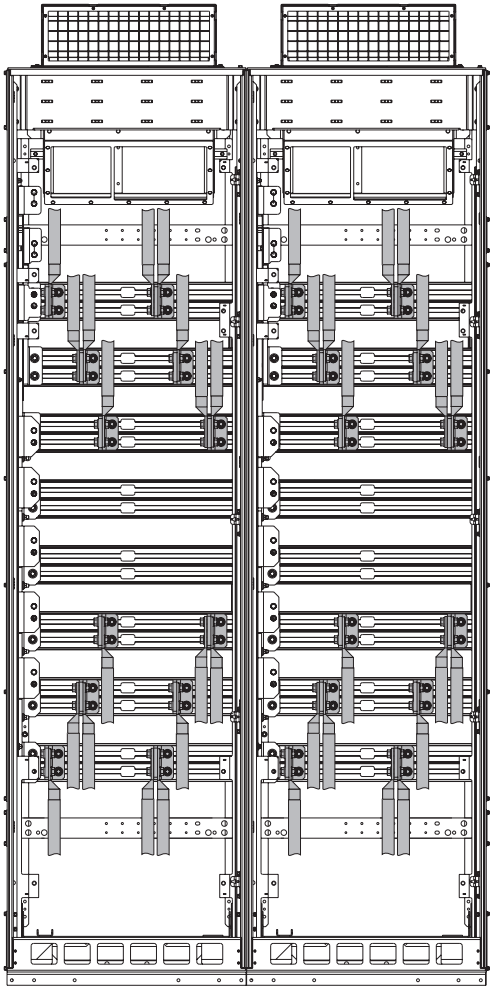
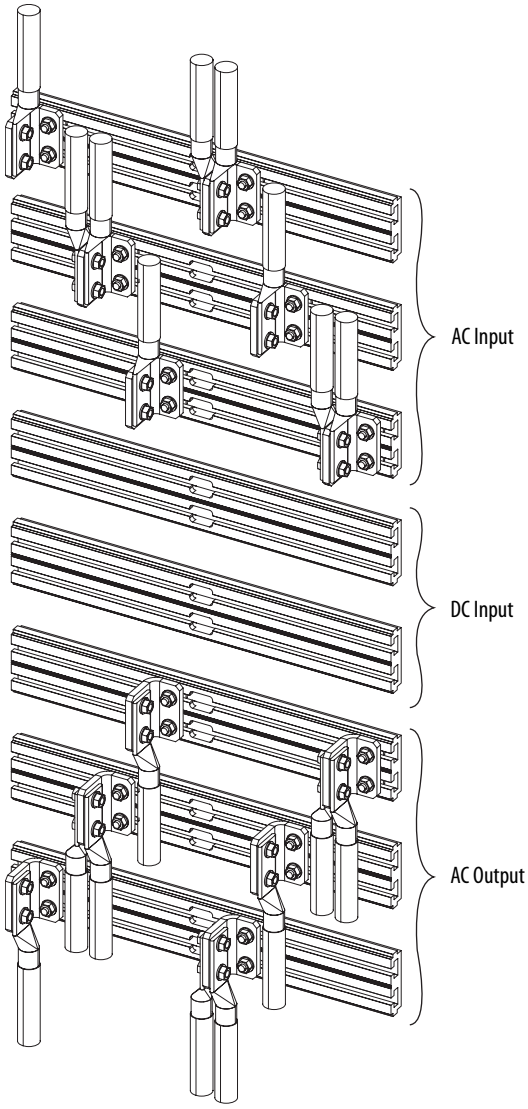
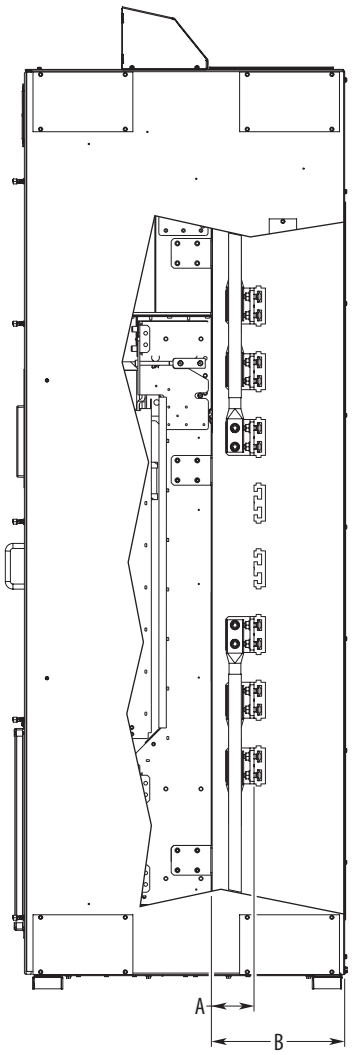


Figure 60 - Top And Bottom Entry Power Connection Example



IMPORTANT Verify that all lug fasteners and L-brackets are properly torqued to 38.0 N•m (336 lb•in). Torque down or remove any unused L-brackets.

Figure 61 - Cabinet Clearances



Dimensions are in millimeters and (inches).

Cabinet Depth	A	B
600 mm	102 (4.0)	69 (2.7)
800 mm	102 (4.0)	269 (10.6)

Drive, Fuse & Circuit Breaker Ratings

The tables on pages 108...112 provide drive ratings (including continuous, 1 minute and 3 second) and recommended AC line input fuse and circuit breaker information. Sizes listed are the recommended sizes based on 40 degree C and the U.S. N.E.C. Other country, state or local codes may require different ratings. In addition, Frame 8 and Frame 9 drives include AC line fuses (with blown fuse indicators) to provide drive short circuit protection.

ATTENTION: PowerFlex 750-Series drives do not provide branch short circuit protection. Specifications for the recommended fuse or circuit breaker to provide protection against short circuits are provided in this section.

IMPORTANT For maximum protection of the drive and its internal components, Rockwell Automation prefers the use of fast acting semiconductor fuses to other methods of circuit protection. This reduces risk of drive damage from power quality events, and improves machine and process utilization, thus maximizing productivity.

Input Device Requirements

Frames	Enclosure Catalog Code	Enclosure Type	Installation Type	UL Certification Required	UL Certification Not Required
1	R	IP20 NEMA/UL Open Type	Installed in a non-ventilated cabinet.	All devices listed on pages 108 and 111 are acceptable.	All devices listed on pages 108 through 112 are acceptable.
			Installed outside of cabinet using NEMA Type 1 kit or in a ventilated cabinet.	Devices listed on pages 108 and 111 are acceptable, excluding time delay fuses and maximum value for non-time delay fuses.	
2...5	N	IP20 NEMA/UL Open Type	Installed in a non-ventilated cabinet. Heat sink is inside or outside of cabinet.	All devices listed on pages 108 and 111 are acceptable.	
	F	Flange			
	N	IP20 NEMA/UL Open Type	Installed outside of cabinet using NEMA Type 1 kit or in a ventilated cabinet.	Devices listed on pages 108 and 111 are acceptable, excluding time delay fuses and maximum value for non-time delay fuses.	
	F	Flange			
	G	IP54 NEMA/UL Type 12	Installed inside or outside of any cabinet.	All devices listed on pages 108 and 111 are acceptable.	
6...7	N	IP00 NEMA/UL Open Type	Installed in any cabinet. Heat sink is inside or outside of cabinet.		
			Installed outside of cabinet using NEMA Type 1 kit.		
	G	IP54 NEMA/UL Type 12	Installed inside or outside of any cabinet.		
8...10	B, L, P, W	IP20 NEMA/UL Type 1	Installed inside of any cabinet.	All devices listed on pages 109 and 112 are acceptable.	
	J, K, Y	IP54 NEMA/UL Type 12	Installed inside or outside of any cabinet.	All devices listed on pages 108 and 111 are acceptable.	

Fusing

If fuses are chosen as the desired protection method, refer to the recommended types listed below. If available amp ratings do not match the tables provided, the closest fuse rating that exceeds the drive rating should be chosen.

- IEC – BS88 (British Standard) Parts 1 & 2 [(1)], EN60269-1, Parts 1 & 2, type gG or equivalent should be used.
- UL – UL Class T, J or L should be used.

Circuit Breakers

The "non-fuse" listings in the following tables include both circuit breakers (inverse time or instantaneous trip). **If one of these is chosen as the desired protection method**, the following requirements apply.

- IEC and UL – Both types of devices are acceptable for IEC and UL installations.

(1) Typical designations include, but may not be limited to the following; Parts 1 & 2: AC, AD, BC, BD, CD, DD, ED, EFS, EF, FF, FG, GF, GG, GH.

400 Volt AC and 540 Volt DC Input Protection Devices - Frames 1…7

Applied Rating (1)	Frame (2)	Cont. Output Amps	Drive Sized For Normal Duty			Drive Sized For Heavy Duty			Input Quantities		AC Input Protection Devices										Input Quantities		DC Input Protection (9)
			Catalog Number	Output Overload Amps		Catalog Number	Output Overload Amps		Continuous AC Input		Dual Element Time Delay Fuse		Non-Time Delay Fuse		Circuit Breaker Max Size (5)	Motor Circuit Protector (6)	140M Motor Starter with Adjustable Current Range (7) (8)				Continuous DC Input		
			(x = F or G)	1 min	3 sec	(x = F or G)	1 min	3 sec	kVA	Amps	Min (3)	Max (4)	Min (3)	Max (4)							kW	Amps	Non-Time Delay Fuse
400 Volt AC Input																					**540 Volt DC Input**		
0.75 kW	1	2.1	20x…C2P1	2.3	3.2	20x…C2P1	2.3	3.2	1.2	1.7	2	3	2	3	15	3					1.1	2.1	JKS-6
1.5 kW	1	3.5	20x…C3P5	3.9	5.3	20x…C3P5	3.9	5.3	1.9	2.8	6	6	6	6	15	7					2.0	3.7	JKS-8
2.2 kW	1	5	20x…C5P0	5.5	7.5	20x…C5P0	5.5	7.5	3.1	4.5	6	6	6	6	20	7					2.9	5.3	JKS-10
4.0 kW	1	8.7	20x…C8P7	9.6	13.1	20x…C8P7	9.6	13.1	5.4	7.8	10	15	10	15	30	15					5.0	9.3	HSJ15
5.5 kW	1	11.5	20x…C011	12.7	17.3	20x…C011	13.1	17.3	7.4	10.7	15	20	15	20	45	15					6.8	12.6	HSJ20
7.5 kW	1	15.4	20x…C015	16.9	23.1	20x…C022	17.3	23.1	10.1	14.6	20	25	20	25	60	20					9.2	17.0	HSJ25
0.75 kW	2	2.1	20x…C2P1	3.1	3.7	20x…C2P1	3.1	3.7	1.2	1.7	3	6	3	8	15	3	M-C2E-B25	M-D8E-B25			1.1	2.1	JKS-6
1.5 kW	2	3.5	20x…C3P5	5.2	6.3	20x…C3P5	5.2	6.3	1.9	2.8	6	7	6	12	15	7	M-C2E-B40	M-D8E-B40			2.0	3.7	JKS-8
2.2 kW	2	5	20x…C5P0	7.5	9.0	20x…C5P0	7.5	9.0	3.1	4.5	6	10	6	20	20	7	M-C2E-B63	M-D8E-B63			2.9	5.3	JKS-10
4.0 kW	2	8.7	20x…C8P7	13.0	15.6	20x…C8P7	13.0	15.6	5.4	7.8	10	17.5	10	30	30	15	M-C2E-C10	M-D8E-C10	M-F8E-C10		5.0	9.3	HSJ15
5.5 kW	2	11.5	20x…C011	17.2	20.7	20x…C011	17.2	20.7	7.4	10.7	15	25	15	45	45	15	M-C2E-C16	M-D8E-C16	M-F8E-C16		6.8	12.6	HSJ20
7.5 kW	2	15.4	20x…C015	16.9	23.1	20x…C022	24.2	33.0	10.1	14.6	20	30	20	60	60	20	M-C2E-C20	M-D8E-C20	M-F8E-C20		9.2	17.0	HSJ25
11 kW	2	22	20x…C022	24.2	33.0	20x…C030	33.0	45.0	14.6	21.1	30	45	30	80	80	30	M-C2E-C25	M-D8E-C25	M-F8E-C25		13.3	24.6	HSJ40
15 kW	3	30	20x…C030	33.0	45.0	20x…C037	45.0	55.5	19.9	28.7	40	60	40	120	100	50			M-F8E-C32		18.1	33.6	HSJ50
18.5 kW	3	37	20x…C037	40.7	55.5	20x…C043	55.5	66.6	24.5	35.4	45	80	45	125	110	50			M-F8E-C45		22.3	41.4	HSJ70
22 kW	3	43	20x…C043	47.3	64.5	20x…C060	66.0	90.0	28.5	41.2	55	90	55	150	120	60					26.0	48.1	HSJ90
30 kW	4	60	20x…C060	66.0	90.0	20x…C072	90.0	108.0	39.8	57.4	75	125	75	225	180	100					36.2	67.1	HSJ100
37 kW	4	72	20x…C072	79.2	108.0	20x…C085	108.0	129.6	48.9	70.5	90	150	90	275	200	100					44.5	82.4	HSJ125
45 kW	5	85	20x…C085	93.5	127.5	20x…C104	127.5	156.0	57.7	83.3	110	175	110	325	250	150					52.5	97.3	HSJ150
55 kW	5	104	20x…C104	114.4	156.0	20x…C140	156.0	210.0	71.3	102.9	130	225	130	400	300	150					64.9	120.2	HSJ175
75 kW	6	140	20x…C140	154.0	210.0	20x…C170	210.0	255.0	95.0	137.2	175	300	175	550	400	250					86.5	160.3	HSJ250
90 kW	6	170	20x…C170	187.0	255.0	20x…C205	255.0	307.5	115.4	166.5	225	375	225	600	500	250					105.1	194.6	HSJ350
110 kW	6	205	20x…C205	225.5	307.5	20x…C260	307.5	390.0	139.1	200.8	275	450	275	600	600	400					126.7	234.7	HSJ350
132 kW	6	260	20x…C260	286.0	390.0	20x…C302	390.0	468.0	176.5	254.7	325	575	325	750	700	400					160.7	297.7	HSJ400
160 kW	7	302	20x…C302	332.2	453.0	20x…C367	453.0	550.5	205.0	295.9	400	675	400	900	900	600					186.7	345.7	Bussman 170M6608
200 kW	7	367	20x…C367	403.7	550.5	20x…C456	550.5	684.0	249.1	359.5	475	800	475	1000	1100	600					226.9	420.2	Bussman 170M6612
250 kW	7	456	20x…C456	501.6	684.0				309.5	446.7	600	1000	600	1800	1300	600					281.9	522.0	Bussman 170M6613

(1) "Applied Rating" refers to the motor that will be connected to the drive. For example, a "C022" drive can be used in Normal Duty mode on a 11 kW motor, or in Heavy Duty mode on a 7.5 kW motor. A "C015" drive can be used in Heavy Duty mode on a 5.5 kW motor with the same ratings as a "C011." The drive can be programmed for either mode. Wiring and fuses can be sized based on the programmed mode. For any given drive catalog number, Normal Duty mode provides higher continuous current but smaller overload current with respect to Heavy Duty mode. See parameter 306 [Duty Rating].

(2) Enclosure codes F, N, and R only. See Frame/Rating Cross-Reference in PowerFlex 750-Series AC Drives Technical Data, publication 750-TD001, for frame sizes of other enclosure types.

(3) Minimum protection device size is the lowest rated device that supplies maximum protection without nuisance tripping.

(4) Maximum protection device size is the highest rated device that supplies drive protection. For US NEC, minimum size is 125% of motor FLA. Ratings shown are maximum.

(5) Circuit Breaker - inverse time breaker. For US NEC, minimum size is 125% of motor FLA. Ratings shown are maximum.

(6) Recommended Motor circuit protector - Instantaneous trip circuit breaker. The trip setting should be set to the input current of the drive and should be sized for the continuous current of the system.

(7) Bulletin 140M with adjustable current range should have the current trip set to the minimum range that the device will not trip.

(8) Manual Self-Protected (Type E) Combination Motor Controller. 480Y/277V and 600Y/347V AC Input.

(9) See Fuse Certification and Test Data in PowerFlex AC Drives in Common Bus Configurations Application Guidelines, publication DRIVES-AT002, for fuse self-certification and test data for Bussmann 170M and JKS fuses recommended for the DC bus fusing.

400 Volt AC and 540 Volt DC Input Protection Devices - Frames 8...10

Applied Rating [1]	Frame	Cont. Output Amps	Duty	Catalog Number	Output Overload Amps		Continuous AC Input	AC Input Integral Semiconductor Fuse Size (170M) [2]	DC Bay to Bay Integral Semiconductor Fuse Size (170M)	AC Input Protection Devices Recommended for Branch Circuit Protection (Does not apply to 21G Drives with Options)								DC Input Integral Semiconductor Fuse Size (170M) [8]
										Dual Element Time Delay Fuse			Non-Time Delay Fuse			Circuit Breaker Max Size [6]	Motor Circuit Protector [7]	
					1 min	3 sec				1/Phase Min [4]	2/Phase Min [4]	Max [5]	1/Phase Min [4]	2/Phase Min [4]	Max [5]			
400 Volt AC Input																		**540V DC Input**
200 kW	8	385	Heavy	20G...C460	578	693	380	1100	–	500	–	850	500	–	1100	1100	500	1600
250 kW	8	460	Normal	20G...C460	506	693	455	1100	–	600	–	1000	600	–	1300	1300	600	1600
		456	Heavy	20G...C540	684	821	450	1100	–	600	–	1000	600	–	1300	1300	600	1600
		472	Heavy	20G...C567	708	851	466	1100	–	600	–	1000	600	–	1400	1400	600	1600
315 kW	8	540	Light	20G...C460	594	–	534	1100	–	700	350	1200	700	350	1600	1600	700	1600
		540	Normal	20G...C540	594	821	533	1100	–	700	350	1200	700	350	1600	1600	700	1600
		540	Heavy	20G...C650	810	975	533	1100	–	700	–	1200	700	–	1600	1600	700	1600
315 kW	8	585	Light	20G...C540	644	–	578	1100	–	750	375	1300	750	375	1700	1700	800	1600
		567	Normal	20G...C567	624	851	560	1100	–	750	375	1200	750	375	1700	1700	700	1600
		585	Heavy	20G...C750	878	1125	577	1100	–	750	375	1300	750	375	1700	1700	800	1600
355 kW	8	612	Light	20G...C567	673	–	604	1100	–	800	400	1300	800	400	1800	1800	800	1600
		650	Normal	20G...C650	715	975	640	1100	–	850	425	1400	850	425	1900	1900	800	1600
		642	Heavy	20G...C770	963	1155	634	1100	–	800	400	1400	800	400	1900	1900	800	1600
400 kW	8	750	Light	20G...C650	825	–	739	1100	–	1000	500	1600	1000	500	2200	2200	1000	1600
		750	Normal	20G...C750	825	1125	739	1100	–	1000	500	1600	1000	500	2200	2200	1000	1600
		770	Normal	20G...C770	847	1155	758	1100	–	1000	500	1700	1000	500	2300	2300	1000	1600
450 kW	8	796	Light	20G...C750	876	–	784	1100	–	1000	500	1700	1000	500	2300	2300	1000	1600
		832	Light	20G...C770	915	–	819	1100	–	1100	550	1800	1100	550	2400	2400	1200	1600
		832	Light	20G...C770	915	–	819	1100	–	1100	550	1800	1100	550	2400	2400	1200	1600
400 kW	9	750	Heavy	20G...C910	1125	1365	739	1100	1400 [3]	900	450	1700	900	450	2200	2200	900	1600 [3]
500 kW	9	880	Heavy	20G...C1K0	1320	1584	867	1100	1400 [3]	1100	550	2000	1100	550	2600	2600	1100	1600 [3]
		910	Heavy	20G...C1K1	1365	1638	896	1100	1400 [3]	1100	550	2000	1100	550	2700	2700	1100	1600 [3]
		910	Normal	20G...C910	1001	1365	896	1100	1400 [3]	1100	550	2000	1100	550	2700	2700	1100	1600 [3]
560 kW	9	1040	Light	20G...C910	1144	–	1024	1100	1400 [3]	1300	650	2300	1300	650	3100	3100	1300	1600 [3]
		1040	Normal	20G...C1K0	1144	1584	1024	1100	1400 [3]	1300	650	2300	1300	650	3100	3100	1300	1600 [3]
		1040	Heavy	20G...C1K2	1560	1872	1024	1100	1400 [3]	1300	650	2300	1300	650	3100	3100	1300	1600 [3]
630 kW	9	1090	Light	20G...C1K0	1199	–	1073	1100	1400 [3]	1350	675	2400	1350	675	3200	3200	1350	1600 [3]
		1090	Normal	20G...C1K1	1199	1638	1073	1100	1400 [3]	1350	675	2400	1350	675	3200	3200	1350	1600 [3]
		1090	Heavy	20G...C1K4	1635	2198	1073	1100	1400 [3]	1350	675	2400	1350	675	3200	3200	1350	1600 [3]
710 kW	9	1175	Light	20G...C1K1	1293	–	1157	1100	1400 [3]	1450	725	2600	1450	725	3500	3500	1450	1600 [3]
		1175	Normal	20G...C1K2	1293	1872	1157	1100	1400 [3]	1450	725	2600	1450	725	3500	3500	1450	1600 [3]
		1175	Heavy	20G...C1K5	1763	2220	1157	1100	1400 [3]	1450	725	2600	1450	725	3500	3500	1450	1600 [3]
	10	1325	Heavy	20G...C1K6	1988	2385	1305	1100	1400 [3]	1650	825	2900	1650	825	3900	3900	1650	1600 [3]
800 kW	9	1465	Light	20G...C1K2	1612	–	1443	1100	1400 [3]	1800	900	3200	1800	900	4300	4300	1800	1600 [3]
		1465	Normal	20G...C1K4	1612	2198	1443	1100	1400 [3]	1800	900	3200	1800	900	4300	4300	1800	1600 [3]
850 kW	9	1480	Light	20G...C1K4	1628	–	1457	1100	1400 [3]	1800	900	3300	1800	900	4400	4400	1800	1600 [3]
		1480	Normal	20G...C1K5	1628	2220	1457	1100	1400 [3]	1800	900	3300	1800	900	4400	4400	1800	1600 [3]

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Applied Rating [1]	Frame	Cont. Output Amps	Duty	Catalog Number	Output Overload Amps		Continuous AC Input	AC Input Integral Semiconductor Fuse Size (170M) [2]	DC Bay to Bay Integral Semiconductor Fuse Size (170M)	AC Input Protection Devices Recommended for Branch Circuit Protection (Does not apply to 21G Drives with Options)								DC Input Integral Semiconductor Fuse Size (170M) [8]
										Dual Element Time Delay Fuse			Non-Time Delay Fuse			Circuit Breaker Max Size [6]	Motor Circuit Protector [7]	
					1 min	3 sec	Amps	Amps	Amps	1/Phase Min [4]	2/Phase Min [4]	Max [5]	1/Phase Min [4]	2/Phase Min [4]	Max [5]			Amps
400 Volt AC Input (continued)																		**540V DC Input**
900 kW	9	1600	Light	20G…C1K5	1760	–	1576	1100	1400 [3]	1950	975	3500	1950	975	4700	4700	1950	1600 [3]
	10	1590	Normal	20G…C1K6	1749	2385	1566	1100	1400 [3]	1950	975	3500	1950	975	4700	4700	1950	1600 [3]
1000 kW	10	1715	Light	20G…C1K6	1887	2058	1689	1100	1400 [3]	2100	1050	3800	2100	1050	5100	5100	2100	1600 [3]
		1800	Heavy	20G…C2K1	2700	3240	1773	1100	1400 [3]	2200	1100	4000	2200	1100	5300	5300	2200	1600 [3]
1250 kW	10	2150	Normal	20G…C2K1	2365	3240	2117	1100	1400 [3]	2650	1325	4800	2650	1325	6400	6400	2650	1600 [3]
1400 kW	10	2330	Light	20G…C2K1	2563	2796	2294	1100	1400 [3]	2850	1425	5200	2850	1425	6900	6900	2850	1600 [3]

(1) "Applied Rating" refers to the motor that will be connected to the drive. For example, a "C460" drive can be used in Normal Duty mode on a 250 kW motor, in Heavy Duty mode on a 200 kW motor or in Light Duty mode on a 315 kW motor. The drive can be programmed for each mode. Wiring and fuses can be sized based on the programmed mode. For any given drive catalog number, Normal Duty mode provides higher continuous current but smaller overload current with respect to Heavy Duty mode. See parameter 306 [Duty Rating]. Refer to Specifications for an explanation of Duty Ratings.

(2) These AC line fuses (with blown fuse indicators) are included in the drive to provide drive short circuit protection. AC input protection devices for branch circuit protection based on US NEC are listed in the table. Each drive bay has one fuse per phase.

(3) Each drive bay has one fuse per DC line.

(4) Minimum protection device size is the lowest rated device that supplies maximum protection without nuisance tripping.

(5) Maximum protection device size is the highest rated device that supplies drive protection. For US NEC, minimum size is 125% of motor FLA. Ratings shown are maximum.

(6) Circuit Breaker - inverse time breaker. For US NEC, minimum size is 125% of motor FLA. Ratings shown are maximum.

(7) Recommended Motor circuit protector - Instantaneous trip circuit breaker. The trip setting should be set to the input current of the drive and should be sized for the continuous current of the system.

(8) These DC line fuses (with blown fuse indicators) are included in the drive to provide drive short circuit protection.

480 Volt AC and 650 Volt DC Input Protection Devices - Frames 1...7

Applied Rating [1]	Frame [2]	Cont. Output Amps	Drive Sized For Normal Duty			Drive Sized For Heavy Duty			Input Quantities		AC Input Protection Devices										Input Quantities		DC Input Protection [9]
			Catalog Number	Output Overload Amps		Catalog Number	Output Overload Amps		Continuous AC Input		Dual Element Time Delay Fuse		Non-Time Delay Fuse		Circuit Breaker Max Size [5]	Motor Circuit Protector [6]	140M Motor Starter with Adjustable Current Range [7] [8]				Continuous DC Input		
			(x = F or G)	1 min	3 sec	(x = F or G)	1 min	3 sec	kVA	Amps	Min [3]	Max [4]	Min [3]	Max [4]							kW	Amps	Non-Time Delay Fuse
480 Volt AC Input																					**650 Volt DC Input**		
1.0 Hp	1	2.1	20x...D2P1	2.3	3.2	20x...D2P1	2.3	3.2	1.3	1.6	2	3	2	3	15	3					1.2	1.9	JKS-6
2.0 Hp	1	3.4	20x...D3P4	3.7	5.1	20x...D3P4	3.7	5.1	2.2	2.6	6	6	6	6	15	7					1.9	3.0	JKS-6
3.0 Hp	1	5	20x...D5P0	5.5	7.5	20x...D5P0	5.5	7.5	3.2	3.9	6	6	6	6	20	7					2.9	4.5	JKS-10
5.0 Hp	1	8	20x...D8P0	8.8	12.0	20x...D8P0	8.8	12.0	5.7	6.9	10	15	10	15	30	15					5.2	8.1	HSJ15
7.5 Hp	1	11	20x...D011	12.1	16.5	20x...D011	12.1	16.5	7.9	9.5	15	20	15	20	40	15					7.2	11.1	HSJ20
10 Hp	1	14	20x...D014	15.4	21.0	20x...D022	16.5	21.0	10.4	12.5	20	25	20	25	50	20					9.5	14.7	HSJ30
1.0 Hp	2	2.1	20x...D2P1	3.1	3.7	20x...D2P1	3.1	3.7	1.3	1.6	2	6	2	8	15	3	M-C2E-B25	M-D8E-B25			1.2	1.9	JKS-6
2.0 Hp	2	3.4	20x...D3P4	5.1	6.1	20x...D3P4	5.1	6.1	2.2	2.6	4	7	4	12	15	7	M-C2E-B40	M-D8E-B40			1.9	3.0	JKS-6
3.0 Hp	2	5	20x...D5P0	7.5	9.0	20x...D5P0	7.5	9.0	3.2	3.9	6	10	6	20	20	7	M-C2E-B63	M-D8E-B63			2.9	4.5	JKS-10
5.0 Hp	2	8	20x...D8P0	12.0	14.4	20x...D8P0	12.0	14.4	5.7	6.9	10	17.5	10	30	30	15	M-C2E-C10	M-D8E-C10	M-F8E-C10		5.2	8.1	HSJ15
7.5 Hp	2	11	20x...D011	16.5	19.8	20x...D011	16.5	19.8	7.9	9.5	12	20	12	40	40	15	M-C2E-C16	M-D8E-C16	M-F8E-C16	CMN-2500	7.2	11.1	HSJ20
10 Hp	2	14	20x...D014	15.4	21.0	20x...D022	24.2	33.0	10.4	12.5	20	30	20	55	50	20	M-C2E-C16	M-D8E-C16	M-F8E-C16	CMN-4000	9.5	14.7	HSJ30
15 Hp	2	22	20x...D022	24.2	33.0	20x...D027	33.0	40.5	16.6	19.9	30	50	30	80	80	30	M-C2E-C25	M-D8E-C25	M-F8E-C25	CMN-4000	15.1	23.3	HSJ40
20 Hp	3	27	20x...D027	29.7	40.5	20x...D034	40.5	51.0	20.6	24.8	35	60	35	100	100	50			M-F8E-C32	CMN-4000	18.8	28.9	HSJ50
25 Hp	3	34	20x...D034	37.4	51.0	20x...D040	51.0	61.2	25.9	31.2	45	75	45	125	100	50			M-F8E-C45	CMN-6300	23.6	36.4	HSJ60
30 Hp	3	40	20x...D040	44.0	60.0	20x...D052	60.0	78.0	30.5	36.7	50	90	50	150	120	50			M-F8E-C45	CMN-9000	27.8	42.9	HSJ80
40 Hp	4	52	20x...D052	57.2	78.0	20x...D065	78.0	97.5	39.7	47.7	65	110	65	200	150	70				CMN-9000	36.1	55.7	HSJ90
50 Hp	4	65	20x...D065	71.5	97.5	20x...D077	97.5	117.0	49.6	59.6	90	125	90	250	175	100				CMN-9000	45.1	69.7	HSJ100
60 Hp	5	77	20x...D077	84.7	115.5	20x...D096	115.5	144.0	60.1	72.3	100	170	100	300	225	100					54.7	84.5	HSJ150
75 Hp	5	96	20x...D096	105.6	144.0	20x...D125	144.0	187.5	74.9	90.1	125	200	125	375	275	125					68.3	105.3	HSJ175
100 Hp	6	125	20x...D125	137.5	187.5	20x...D156	187.5	234.0	97.6	117.4	175	275	175	500	375	250					88.9	137.1	HSJ200
125 Hp	6	156	20x...D156	171.6	234.0	20x...D186	234.0	280.8	121.8	146.5	200	350	200	600	450	250					110.9	171.2	HSJ300
150 Hp	6	186	20x...D186	204.6	279.0	20x...D248	279.0	372.0	145.2	174.6	250	400	250	600	550	250					132.2	204.1	HSJ400
200 Hp	6	248	20x...D248	272.8	372.0	20x...D302	372.0	453.0	193.6	232.8	325	550	325	700	700	400					176.3	272.1	HSJ400
250 Hp	7	302	20x...D302	332.2	453.0	20x...D361	453.0	543.6	235.7	283.5	400	675	400	900	900	600					214.7	331.3	Bussman 170M6608
300 Hp	7	361	20x...D361	397.1	541.5	20x...D415	541.5	649.8	281.8	338.9	475	800	475	1000	1000	600					256.6	396.1	Bussman 170M6612
350 Hp	7	415	20x...D415	456.5	622.5				323.9	389.6	525	900	525	1200	1200	600					295.0	455.3	Bussman 170M6612

(1) "Applied Rating" refers to the motor that will be connected to the drive. For example, a "D022" drive can be used in Normal Duty mode on a 15 Hp motor, or in Heavy Duty mode on a 10 Hp motor. A "D014" drive can be used in Heavy Duty mode on a 7.5 Hp motor with the same ratings as a "D011." The drive can be programmed for either mode. Wiring and fuses can be sized based on the programmed mode. For any given drive catalog number, Normal Duty mode provides higher continuous current but smaller overload current with respect to Heavy Duty mode. See parameter 306 [Duty Rating].

(2) Enclosure codes F, N, and R only. See Frame/Rating Cross-Reference in PowerFlex 750-Series AC Drives Technical Data, publication 750-TD001, for frame sizes of other enclosure types.

(3) Minimum protection device size is the lowest rated device that supplies maximum protection without nuisance tripping.

(4) Maximum protection device size is the highest rated device that supplies drive protection. For US NEC, minimum size is 125% of motor FLA. Ratings shown are maximum.

(5) Circuit Breaker - inverse time breaker. For US NEC, minimum size is 125% of motor FLA. Ratings shown are maximum.

(6) Recommended Motor circuit protector - Instantaneous trip circuit breaker. The trip setting should be set to the input current of the drive and should be sized for the continuous current of the system.

(7) Bulletin 140M with adjustable current range should have the current trip set to the minimum range that the device will not trip.

(8) Manual Self-Protected (Type E) Combination Motor Controller. 480Y/277V and 600Y/347V AC Input.

(9) See Fuse Certification and Test Data in PowerFlex AC Drives in Common Bus Configurations Application Guidelines, publication DRIVES-AT002, for fuse self-certification and test data for Bussmann 170M and JKS fuses recommended for the DC bus fusing.

480 Volt AC and 650 Volt DC Input Protection Devices - Frames 8...10

Applied Rating[1]	Frame	Cont. Output Amps	Duty	Catalog Number	Output Overload Amps		Continuous AC Input	AC Input Integral Semiconductor Fuse Size (170M)[2]	DC Bay to Bay Integral Semiconductor Fuse Size (170M)	AC Input Protection Devices Recommended for Branch Circuit Protection (Does not apply to 21G Drives with Options)								DC Input Integral Semiconductor Fuse Size (170M)[8]
										Dual Element Time Delay Fuse			Non-Time Delay Fuse			Circuit Breaker Max Size[6]	Motor Circuit Protector[7]	
					1 min	3 sec	Amps	Amps	Amps	1/Phase Min[4]	2/Phase Min[4]	Max[5]	1/Phase Min[4]	2/Phase Min[4]	Max[5]			Amps
480 Volt AC Input																		**650 Volt DC Input**
300 Hp	8	370	Heavy	20G...D430	555	666	349	1100	–	450	–	800	450	–	1100	1100	450	1600
350 Hp	8	430	Normal	20G...D430	473	666	406	1100	–	550	–	900	550	–	1200	1200	550	1600
		414	Heavy	20G...D485	621	745	391	1100	–	500	–	900	500	–	1200	1200	500	1600
		454	Heavy	20G...D545	681	818	428	1100	–	550	–	1000	550	–	1300	1300	550	1600
400 Hp	8	485	Light	20G...D430	534	–	458	1100	–	600	–	1000	600	–	1400	1400	600	1600
		485	Normal	20G...D485	534	745	458	1100	–	600	–	1000	600	–	1400	1400	600	1600
		485	Heavy	20G...D617	728	926	458	1100	–	600	–	1000	600	–	1400	1400	600	1600
450 Hp	8	545	Light	20G...D485	600	–	514	1100	–	650	–	1200	650	–	1600	1600	650	1600
		545	Normal	20G...D545	600	818	514	1100	–	650	–	1200	650	–	1600	1600	650	1600
		545	Heavy	20G...D710	818	1065	514	1100	–	650	325	1200	650	325	1600	1600	650	1600
500 Hp	8	590	Light	20G...D545	649	–	557	1100	–	700	–	1300	700	–	1700	1700	700	1600
		617	Normal	20G...D617	679	926	582	1100	–	750	325	1300	750	325	1800	1800	800	1600
		617	Heavy	20G...D740	926	1110	582	1100	–	750	375	1300	750	375	2400	1800	800	1600
600 Hp	8	710	Light	20G...D617	781	–	670	1100	–	850	425	1500	850	425	2100	2100	900	1600
		710	Normal	20G...D710	781	1065	670	1100	–	850	425	1500	850	425	2100	2100	900	1600
650 Hp	8	765	Light	20G...D710	842	–	722	1100	–	1000	500	1700	1000	500	2200	2200	1000	1600
		740	Normal	20G...D740	814	1110	698	1100	–	900	450	1600	900	450	2200	2200	900	1600
700 Hp	8	800	Light	20G...D740	880	–	755	1100	–	1000	500	1800	1000	500	1800	2400	1000	1600
600 Hp	9	710	Heavy	20G...D800	1065	1278	670	1100	1400[3]	850	425	1500	850	425	2000	2000	850	1600[3]
700 Hp	9	795	Heavy	20G...D960	1193	1440	750	1100	1400[3]	950	475	1700	950	475	2300	2300	950	1600[3]
		800	Normal	20G...D800	880	1278	755	1100	1400[3]	950	475	1700	950	475	2300	2300	950	1600[3]
750 Hp	9	800	Heavy	20G...D1K0	1200	1568	755	1100	1400[3]	950	475	1700	950	475	2300	2300	950	1600[3]
800 Hp	9	960	Light	20G...D800	1056	–	906	1100	1400[3]	1150	575	2000	1150	575	2700	2700	1150	1600[3]
		960	Normal	20G...D960	1056	1440	906	1100	1400[3]	1150	575	2000	1150	575	2700	2700	1150	1600[3]
		960	Heavy	20G...D1K2	1440	1728	906	1100	1400[3]	1150	575	2000	1150	575	2700	2700	1150	1600[3]
900 Hp	9	1045	Light	20G...D960	1150	–	986	1100	1400[3]	1250	625	2200	1250	625	3000	3000	1250	1600[3]
		1045	Normal	20G...D1K0	1150	1568	986	1100	1400[3]	1250	625	2200	1250	625	3000	3000	1250	1600[3]
		1045	Heavy	20G...D1K3	1568	2048	986	1100	1400[3]	1250	625	2200	1250	625	3000	3000	1250	1600[3]
1000 Hp	9	1135	Light	20G...D1K0	1249	–	1071	1100	1400[3]	1350	675	2400	1350	675	3200	3200	1350	1600[3]
		1135	Normal	20G...D1K2	1249	1728	1071	1100	1400[3]	1350	675	2400	1350	675	3200	3200	1350	1600[3]
		1135	Heavy	20G...D1K4	1703	2130	1071	1100	1400[3]	1350	675	2400	1350	675	3200	3200	1350	1600[3]
1100 Hp	9	1365	Light	20G...D1K2	1502	–	1288	1100	1400[3]	1600	800	2900	1600	800	3900	3900	1600	1600[3]
		1365	Normal	20G...D1K3	1502	2048	1288	1100	1400[3]	1600	800	2900	1600	800	3900	3900	1600	1600[3]
	10	1270	Heavy	20G...D1K5	1905	2288	1199	1100	1400[3]	1500	750	2700	1500	750	3600	3600	1500	1600[3]
1250 Hp	9	1420	Light	20G...D1K3	1562	–	1340	1100	1400[3]	1700	850	3000	1700	850	4000	4000	1700	1600[3]
		1420	Normal	20G...D1K4	1562	2130	1340	1100	1400[3]	1700	850	3000	1700	850	4000	4000	1700	1600[3]

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Applied Rating[1]	Frame	Cont. Output Amps	Duty	Catalog Number	Output Overload Amps		Continuous AC Input	AC Input Integral Semiconductor Fuse Size (170M)[2]	DC Bay to Bay Integral Semiconductor Fuse Size (170M)	AC Input Protection Devices Recommended for Branch Circuit Protection (Does not apply to 21G Drives with Options)								DC Input Integral Semiconductor Fuse Size (170M)[8]
										Dual Element Time Delay Fuse			Non-Time Delay Fuse			Circuit Breaker Max Size[6]	Motor Circuit Protector[7]	
					1 min	3 sec	Amps	Amps	Amps	1/Phase Min[4]	2/Phase Min[4]	Max[5]	1/Phase Min[4]	2/Phase Min[4]	Max[5]			Amps
480 Volt AC Input (continued)																		**650 Volt DC Input**
1350 Hp	9	1540	Light	20G…D1K4	1694	–	1453	1100	1400[3]	1800	900	3300	1800	900	4400	4400	1800	1600[3]
	10	1525	Normal	20G…D1K5	1678	2288	1439	1100	1400[3]	1800	900	3200	1800	900	4300	4300	1800	1600[3]
1500 Hp	10	1655	Light	20G…D1K5	1821	1986	1562	1100	1400[3]	1950	975	3500	1950	975	4700	4700	1950	1600[3]
1650 Hp	10	1730	Heavy	20G…D2K0	2595	3114	1633	1100	1400[3]	2050	1025	3700	2050	1025	4900	4900	2050	1600[3]
1750 Hp	10	2070	Normal	20G…D2K0	2277	3114	1953	1100	1400[3]	2450	1225	4400	2450	1225	5900	5900	2450	1600[3]
2000 Hp	10	2240	Light	20G…D2K0	2464	2688	2114	1100	1400[3]	2650	1325	4800	2650	1325	6300	6300	2650	1600[3]

(1) "Applied Rating" refers to the motor that will be connected to the drive. For example, a "D430" drive can be used in Normal Duty mode on a 350 Hp motor, in Heavy Duty mode on a 300 Hp motor or in Light Duty mode on a 400 Hp motor. The drive can be programmed for each mode. Wiring and fuses can be sized based on the programmed mode. For any given drive catalog number, Normal Duty mode provides higher continuous current but smaller overload current with respect to Heavy Duty mode. See parameter 306 [Duty Rating]. Refer to Specifications for an explanation of Duty Ratings.

(2) These AC line fuses (with blown fuse indicators) are included in the drive to provide drive short circuit protection. AC input protection devices for branch circuit protection based on US NEC are listed in the table. Each drive bay has one fuse per phase.

(3) Each drive bay has one fuse per DC line.

(4) Minimum protection device size is the lowest rated device that supplies maximum protection without nuisance tripping.

(5) Maximum protection device size is the highest rated device that supplies drive protection. For US NEC, minimum size is 125% of motor FLA. Ratings shown are maximum.

(6) Circuit Breaker - inverse time breaker. For US NEC, minimum size is 125% of motor FLA. Ratings shown are maximum.

(7) Recommended Motor circuit protector - Instantaneous trip circuit breaker. The trip setting should be set to the input current of the drive and should be sized for the continuous current of the system.

(8) These DC line fuses (with blown fuse indicators) are included in the drive to provide drive short circuit protection.

600 Volt AC and 725 Volt DC Input Protection Devices - Frames 8...10

Applied Rating[1]	Frame	Cont. Output Amps	Duty	Catalog Number	Output Overload Amps		Continuous AC Input	AC Input Integral Semiconductor Fuse Size (170M)[2]	DC Bay to Bay Integral Semiconductor Fuse Size (170M6648)	AC Input Protection Devices Recommended for Branch Circuit Protection (Does not apply to 21G Drives with Options)								DC Input Integral Semiconductor Fuse Size (170M6253)[7]
										Dual Element Time Delay Fuse			Non-Time Delay Fuse			Circuit Breaker Max Size[5]	Motor Circuit Protector[6]	
					1 min	3 sec	Amps	Amps	Amps	1/Phase Min[3]	2/Phase Min[3]	Max[4]	1/Phase Min[3]	2/Phase Min[3]	Max[4]			Amps
600 Volt AC Input																		**725V DC Input**
250 Hp	8	272	Heavy	20G...E295	408	490	257	900	–	350	175	600	350	175	800	800	350	1000
300 Hp	8	295	Heavy	20G...E355	443	533	278	900	–	350	175	700	350	175	900	900	350	1000
		295	Normal	20G...E295	325	490	302	900	–	400	200	700	400	200	1000	1000	400	1000
350 Hp	8	355	Light	20G...E295	391	–	335	900	–	450	225	800	450	225	1100	1100	450	1000
		355	Normal	20G...E355	391	533	335	900	–	450	225	800	450	225	1100	1100	450	1000
		329	Heavy	20G...E395	494	593	310	900	–	400	200	700	400	200	1000	1000	400	1000
		355	Heavy	20G...E435	533	639	335	900	–	450	225	800	450	225	1100	1100	450	1000
400 Hp	8	395	Light	20G...E355	435	–	373	900	–	500	250	900	500	250	1200	1200	500	1000
		395	Normal	20G...E395	435	593	373	900	–	500	250	900	500	250	1200	1200	500	1000
		395	Heavy	20G...E460	593	711	373	900	–	500	250	900	500	250	1200	1200	500	1000
450 Hp	8	435	Light	20G...E395	479	–	411	900	–	550	275	1000	550	275	1300	1300	550	1000
		435	Normal	20G...E435	479	639	396	900	–	500	250	900	500	250	1200	1200	500	1000
		425	Heavy	20G...E510	638	765	401	900	–	550	275	1000	550	275	1300	1300	550	1000
500 Hp	8	460	Light	20G...E435	506	–	429	900	–	550	275	1000	550	275	1300	1300	550	1000
		510	Light	20G...E460	561	–	481	900	–	650	325	1100	650	325	1500	1500	650	1000
		460	Normal	20G...E460	506	711	429	900	–	550	275	1000	550	275	1300	1300	550	1000
		510	Normal	20G...E510	561	765	481	900	–	650	325	1100	650	325	1500	1500	650	1000
550 Hp	8	545	Light	20G...E510	600	–	514	900	–	650	325	1200	650	325	1600	1600	650	1000
500 Hp	9	510	Heavy	20G...E595	765	918	481	900	1000	600	300	1100	600	300	1400	1400	600	1000
600 Hp	9	595	Heavy	20G...E630	893	1071	562	900	1000	700	350	1300	700	350	1700	1700	700	1000
		595	Normal	20G...E595	655	918	562	900	1000	700	350	1300	700	350	1700	1700	700	1000
700 Hp	9	630	Heavy	20G...E760	945	1149	595	900	1000	750	375	1300	750	375	1800	1800	750	1000
		630	Normal	20G...E630	693	1071	595	900	1000	750	375	1300	750	375	1800	1800	750	1000
		595	Light	20G...E595	693	–	651	900	1000	800	400	1500	800	400	2000	2000	800	1000
750 Hp	9	700	Heavy	20G...E825	1050	1260	661	900	1000	850	425	1500	850	425	2000	2000	850	1000
800 Hp	9	760	Heavy	20G...E900	1140	1368	717	900	1000	900	450	1600	900	450	2200	2200	900	1000
		760	Normal	20G...E760	836	1140	717	900	1000	900	450	1600	900	450	2200	2200	900	1000
		760	Light	20G...E630	836	–	717	900	1000	900	450	1600	900	450	2200	2200	900	1000

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Applied Rating[1]	Frame	Cont. Output Amps	Duty	Catalog Number	Output Overload Amps		Continuous AC Input	AC Input Integral Semiconductor Fuse Size (170M)[2]	DC Bay to Bay Integral Semiconductor Fuse Size (170M6648)	AC Input Protection Devices Recommended for Branch Circuit Protection (Does not apply to 21G Drives with Options)								DC Input Integral Semiconductor Fuse Size (170M6253)[7]
										Dual Element Time Delay Fuse			Non-Time Delay Fuse					
					1 min	3 sec	Amps	Amps	Amps	1/Phase Min[3]	2/Phase Min[3]	Max[4]	1/Phase Min[3]	2/Phase Min[3]	Max[4]	Circuit Breaker Max Size[5]	Motor Circuit Protector[6]	Amps
600 Volt AC Input (continued)																		**725V DC Input**
900 Hp	9	815	Heavy	20G…E980	1223	1470	769	900	1000	950	475	1700	950	475	2300	2300	950	1000
		825	Normal	20G…E825	908	1260	779	900	1000	950	475	1800	950	475	2300	2300	950	1000
		835	Light	20G…E760	919	–	788	900	1000	1000	500	1800	1000	500	2400	2400	1000	1000
950 Hp	9	900	Normal	20G…E900	990	1368	849	900	1000	1050	525	1900	1050	525	2500	2500	1050	1000
		900	Light	20G…E825	990	–	849	900	1000	1050	525	1900	1050	525	2500	2500	1050	1000
1000 Hp	9	980	Normal	20G…E980	1078	1470	925	900	1000	1150	575	2100	1150	575	2800	2800	1150	1000
		980	Light	20G…E900	1078	–	925	900	1000	1150	575	2100	1150	575	2800	2800	1150	1000
	10	920	Heavy	20G…E1K1	1380	1665	868	900	1000	1100	550	2000	1100	550	2600	2600	1100	1000
1100 Hp	9	1045	Light	20G…E980	1150	–	986	900	1000	1250	625	2200	1250	625	3000	3000	1250	1000
	10	1110	Normal	20G…E1K1	1221	1665	1048	900	1000	1300	650	2400	1300	650	3100	3100	3100	1000
1200 Hp	10	1220	Light	20G…E1K1	1342	1464	1151	900	1000	1450	725	2600	1450	725	3500	3500	3500	1000
1250 Hp	10	1190	Heavy	20G…E1K4	1785	2145	1123	900	1000	1400	700	2500	1400	700	3400	3400	3400	1000
1400 Hp	10	1430	Normal	20G…E1K4	1573	2145	1350	900	1000	1700	850	3000	1700	850	4100	4100	4100	1000
1500 Hp	10	1530	Light	20G…E1K4	1683	1836	1444	900	1000	1800	900	3200	1800	900	4300	4300	4300	1000

(1) "Applied Rating" refers to the motor that will be connected to the drive. For example, a "E420" drive can be used in Normal Duty mode on a 450 Hp motor, in Heavy Duty mode on a 350 Hp motor or in Light Duty mode on a 500 Hp motor. The drive can be programmed for each mode. Wiring and fuses can be sized based on the programmed mode. For any given drive catalog number, Normal Duty mode provides higher continuous current but smaller overload current with respect to Heavy Duty mode. See parameter 306 [Duty Rating]. Refer to Specifications for an explanation of Duty Ratings.

(2) These AC line fuses (with blown fuse indicators) are included in the drive to provide drive short circuit protection. AC input protection devices for branch circuit protection based on US NEC are listed in the table. Each drive bay has one fuse per phase.

(3) Minimum protection device size is the lowest rated device that supplies maximum protection without nuisance tripping.

(4) Maximum protection device size is the highest rated device that supplies drive protection. For US NEC, minimum size is 125% of motor FLA. Ratings shown are maximum.

(5) Circuit Breaker - inverse time breaker. For US NEC, minimum size is 125% of motor FLA. Ratings shown are maximum.

(6) Recommended Motor circuit protector - Instantaneous trip circuit breaker. The trip setting should be set to the input current of the drive and should be sized for the continuous current of the system.

(7) These DC line fuses (with blown fuse indicators) are included in the drive to provide drive short circuit protection.

690 Volt AC and 932 Volt DC Input Protection Devices - Frames 8...10

Applied Rating[1]	Frame	Cont. Output Amps	Duty	Catalog Number	Output Overload Amps		Continuous AC Input	AC Input Integral Semiconductor Fuse Size (170M)[2]	DC Bay to Bay Integral Semiconductor Fuse Size (170M6648)	AC Input Protection Devices Recommended for Branch Circuit Protection (Does not apply to 21G Drives with Options)								DC Input Integral Semiconductor Fuse Size (170M6253)[7]
										Dual Element Time Delay Fuse			Non-Time Delay Fuse			Circuit Breaker Max Size[5]	Motor Circuit Protector[6]	
					1 min	3 sec	Amps	Amps	Amps	1/Phase Min[3]	2/Phase Min[3]	Max[4]	1/Phase Min[3]	2/Phase Min[3]	Max[4]			Amps
690 Volt AC Input																		**932V DC Input**
200 kW	8	215	Heavy	20G...F265	323	375	188	900	–	250	125	500	250	125	600	600	250	1000
250 kW	8	265	Normal	20G...F265	292	375	235	900	–	300	150	600	300	150	800	800	300	1000
		265	Heavy	20G...F330	398	473	235	900	–	300	150	600	300	150	800	800	300	1000
300 kW	8	308	Heavy	20G...F370	462	555	290	900	–	400	200	700	400	200	900	900	400	1000
315 kW	8	330	Light	20G...F265	363	–	297	900	–	400	200	700	400	200	900	900	400	1000
		330	Normal	20G...F330	363	473	297	900	–	400	200	700	400	200	900	900	400	1000
355 kW	8	370	Light	20G...F330	407	–	349	900	–	450	225	800	450	225	1100	1100	450	1000
		370	Normal	20G...F370	407	555	349	900	–	450	225	800	450	225	1100	1100	450	1000
		370	Heavy	20G...F415	555	639	334	900	–	450	225	800	450	225	1100	1100	450	1000
375 kW	8	375	Heavy	20G...F460	563	675	353	900	–	450	225	800	450	225	1100	1100	450	1000
400 kW	8	410	Light	20G...F370	451	–	386	900	–	500	250	900	500	250	1200	1200	500	1000
		415	Normal	20G...F415	457	639	377	900	–	500	250	900	500	250	1200	1200	500	1000
		413	Heavy	20G...F500	620	750	389	900	–	500	250	900	500	250	1200	1200	500	1000
450 kW	8	460	Light	20G...F415	506	–	424	900	–	550	275	1000	550	275	1300	1300	550	1000
		460	Normal	20G...F460	506	675	424	900	–	550	275	1000	550	275	1300	1300	550	1000
500 kW	8	500	Light	20G...F460	550	–	471	900	–	600	300	1100	600	300	1500	1500	600	1000
		500	Normal	20G...F500	550	750	471	900	–	600	300	1100	600	300	1500	1500	600	1000
530 kW	8	530	Light	20G...F500	583	–	499	900	–	650	325	1200	650	325	1500	1500	650	1000
450 kW	9	460	Heavy	20G...F590	690	885	433	900	1000	550	275	1000	550	275	1300	1300	550	1000
500 kW	9	500	Heavy	20G...F650	750	975	471	900	1000	600	300	1100	600	300	1400	1400	600	1000
560 kW	9	590	Heavy	20G...F710	885	1065	556	900	1000	700	350	1300	700	350	1700	1700	700	1000
		590	Normal	20G...F590	649	885	556	900	1000	700	350	1300	700	350	1700	1700	700	1000
630 kW	9	650	Heavy	20G...F765	975	1170	612	900	1000	750	375	1400	750	375	1800	1800	750	1000
		650	Normal	20G...F650	715	975	612	900	1000	750	375	1400	750	375	1800	1800	750	1000
		650	Light	20G...F590	715	–	612	900	1000	750	375	1400	750	375	1800	1800	750	1000
710 kW	9	750	Heavy	20G...F795	1125	1350	706	900	1000	900	450	1600	900	450	2100	2100	900	1000
		710	Normal	20G...F710	781	1065	706	900	1000	900	450	1600	900	450	2100	2100	900	1000
		710	Light	20G...F650	781	–	706	900	1000	900	450	1600	900	450	2100	2100	900	1000
750 kW	9	765	Normal	20G...F765	842	1170	721	900	1000	900	450	1600	900	450	2200	2200	900	1000

continued on page 117

Applied Rating[1]	Frame	Cont. Output Amps	Duty	Catalog Number	Output Overload Amps		Continuous AC Input	AC Input Integral Semiconductor Fuse Size (170M)[2]	DC Bay to Bay Integral Semiconductor Fuse Size (170M6648)	AC Input Protection Devices Recommended for Branch Circuit Protection (Does not apply to 21G Drives with Options)								DC Input Integral Semiconductor Fuse Size (170M6253)[7]
										Dual Element Time Delay Fuse			Non-Time Delay Fuse			Circuit Breaker Max Size[5]	Motor Circuit Protector[6]	
					1 min	3 sec	Amps	Amps	Amps	1/Phase Min[3]	2/Phase Min[3]	Max[4]	1/Phase Min[3]	2/Phase Min[3]	Max[4]			Amps
690 Volt AC Input (continued)																		**932V DC Input**
800 kW	9	795	Heavy	20G…F960	1193	1440	749	900	1000	950	475	1700	950	475	2200	2200	950	1000
		795	Normal	20G…F795	875	1350	749	900	1000	950	475	1700	950	475	2200	2200	950	1000
		790	Light	20G…F710	869	–	744	900	1000	950	475	1700	950	475	2200	2200	950	1000
850 kW	9	860	Light	20G…F765	946	–	810	900	1000	1000	500	1800	1000	500	2400	2400	1000	1000
900 kW	9	960	Normal	20G…F960	1056	1440	904	900	1000	1150	575	2000	1150	575	2700	2700	1150	1000
		960	Light	20G…F795	1056	–	904	900	1000	1150	575	2000	1150	575	2700	2700	1150	1000
	10	865	Heavy	20G…F1K0	1298	1560	815	900	1000	1000	500	1800	1000	500	2400	2400	1000	1000
1000 kW	9	1020	Light	20G…F795	1122	–	961	900	1000	1200	600	2200	1200	600	2900	2900	1200	1000
	10	1040	Normal	20G…F1K0	1144	1560	980	900	1000	1250	625	2200	1250	625	2900	2900	1250	1000
1100 kW	10	1150	Light	20G…F1K0	1265	1380	1083	900	1000	1350	675	2400	1350	675	3200	3200	1350	1000
1120 kW	10	1160	Heavy	20G…F1K4	1740	2100	1093	900	1000	1350	675	2500	1350	675	3300	3300	1350	1000
1400 kW	10	1400	Normal	20G…F1K4	1540	2100	1319	900	1000	1650	825	3000	1650	825	4000	4000	1650	1000
1500 kW	10	1485	Light	20G…F1K4	1634	1782	1399	900	1000	1750	875	3100	1750	875	4200	4200	1750	1000

(1) "Applied Rating" refers to the motor that will be connected to the drive. For example, a "F400" drive can be used in Normal Duty mode on a 400 kW motor, in Heavy Duty mode on a 355 kW motor or in Light Duty mode on a 450 kW motor. The drive can be programmed for each mode. Wiring and fuses can be sized based on the programmed mode. For any given drive catalog number, Normal Duty mode provides higher continuous current but smaller overload current with respect to Heavy Duty mode. See parameter 306 [Duty Rating]. Refer to Specifications for an explanation of Duty Ratings.

(2) These AC line fuses (with blown fuse indicators) are included in the drive to provide drive short circuit protection. AC input protection devices for branch circuit protection based on US NEC are listed in the table. Each drive bay has one fuse per phase.

(3) Minimum protection device size is the lowest rated device that supplies maximum protection without nuisance tripping.

(4) Maximum protection device size is the highest rated device that supplies drive protection. For US NEC, minimum size is 125% of motor FLA. Ratings shown are maximum.

(5) Circuit Breaker - inverse time breaker. For US NEC, minimum size is 125% of motor FLA. Ratings shown are maximum.

(6) Recommended Motor circuit protector - Instantaneous trip circuit breaker. The trip setting should be set to the input current of the drive and should be sized for the continuous current of the system.

(7) These DC line fuses (with blown fuse indicators) are included in the drive to provide drive short circuit protection.

Input Contactor Precautions

ATTENTION: A contactor or other device that routinely disconnects and reapplies the AC line to the drive to start and stop the motor can cause drive hardware damage. The drive is designed to use control input signals that will start and stop the motor. If an input device is used, operation must not exceed one cycle per minute or drive damage will occur.

ATTENTION: The drive start/stop/enable control circuitry includes solid state components. If hazards due to accidental contact with moving machinery or unintentional flow of liquid, gas or solids exist, an additional hardwired stop circuit may be required to remove the AC line to the drive. An auxiliary braking method may be required.

Output Contactor Precaution

ATTENTION: To guard against drive damage when using output contactors, the following information must be read and understood. One or more output contactors may be installed between the drive and motor(s) for the purpose of disconnecting or isolating certain motors/loads. If a contactor is opened while the drive is operating, power will be removed from the respective motor, but the drive will continue to produce voltage at the output terminals. In addition, reconnecting a motor to an active drive (by closing the contactor) could produce excessive current that may cause the drive to fault. If any of these conditions are determined to be undesirable or unsafe, an auxiliary contact on the output contactor should be wired to a drive digital input that is programmed as "Enable." This will cause the drive to execute a coast-to-stop (cease output) whenever an output contactor is opened.

Bypass Contactor Precaution

ATTENTION: An incorrectly applied or installed bypass system can result in component damage or reduction in product life. The most common causes are:

- Wiring AC line to drive output or control terminals.
- Improper bypass or output circuits not approved by Allen-Bradley.
- Output circuits which do not connect directly to the motor.

Contact Allen-Bradley for assistance with application or wiring.

Applying and Removing Power

IMPORTANT Wait one minute before cycling power disconnect switches. This requirement applies to both Off-to-On and On-to-Off transitions. Rapid switch cycling may result in equipment damage.

Drive Power Jumper Configuration

PowerFlex 750-Series drives contain protective MOVs and common mode capacitors that are referenced to ground. To guard against drive damage and/or operation problems, these devices must be properly configured according to Table 12.

MOV, AC EMI Capacitor, and Common Mode Capacitor Circuits

Figure 62 - MOV and AC EMI Capacitor Phase to Ground (Frames 1…7)

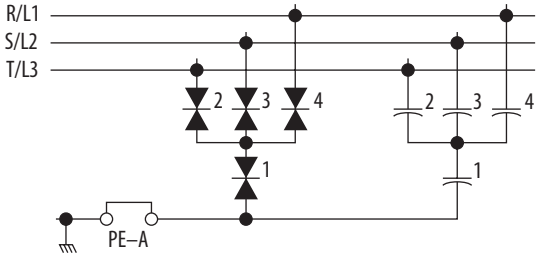


Figure 63 - MOV and AC EMI Capacitor Phase to Ground (Frames 8…10) AC Input Only

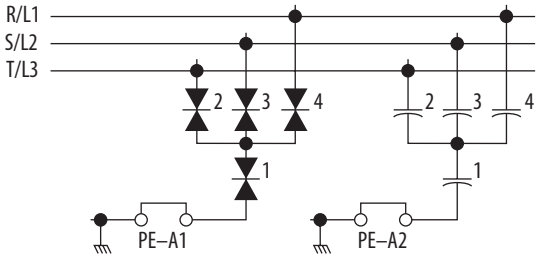
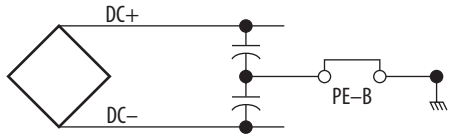


Figure 64 - Common Mode Capacitors to Ground (All Frames)



ATTENTION: To avoid an electric shock hazard, verify that the voltage on the bus capacitors has discharged completely before removing/installing jumpers.

Frames 1…7: Measure the DC bus voltage at the Power Terminal Block by measuring between the +DC and -DC terminals (see Figure 50 and Figure 51 for location), between the +DC terminal and the chassis, and between the -DC terminal and the chassis. The voltage must be zero for all three measurements.

Frames 8…10: Measure the DC bus voltage at the DC+ and DC- TESTPOINT sockets on the front of the power module (see Figure 54 for location). The voltage must be zero.

Frames 1…7

IMPORTANT PowerFlex 750-Series drives, Frames 1…7, leave the factory with Jumpers PE-A and PE-B in one of two possible configurations. Reconfigure these jumpers based on the power source type available.

Table 10 - Power Jumper Default Configurations

Cat. No. Position 11	Jumper PE-A (MOV / Input Filter Caps)	Jumper PE-B (DC Bus Common Mode Caps)
A	Connected	Disconnected
J	Connected	Connected

Frames 8…10

IMPORTANT PowerFlex 750-Series drives, Frames 8…10, leave the factory with Jumpers PE-A1, PE-A2 and PE-B in one of two possible configurations. Reconfigure these jumpers based on the power source type available.

Table 11 - Power Jumper Default Configurations

Cat. No. Position 11	Jumper PE-A1 (MOV)	Jumper PE-A2 (Input Filter Caps)	Jumper PE-B (DC Bus Common Mode Caps)
A	Connected	Connected	Disconnected
J	Connected	Connected	Connected

ATTENTION: Risk of equipment damage exists. The drive power source type must be accurately determined. Jumpers PE-A, PE-A1, PE-A2 and PE-B must be configured for the power source type according to the recommendations in Table 12.

Table 12 - Recommended Power Jumper Configurations Frames 1…7

Power Source Type	Jumper PE-A (1) (MOV / Input Filter Caps)	Jumper PE-B (DC Bus Common mode Caps)	Benefits Of Correct Configuration on Power Source Type
Non-Solid Ground • AC fed ungrounded • Impedance grounded • B phase ground • DC fed from an active converter	Disconnected	Disconnected	Helps avoid severe equipment damage when ground fault occurs
Solid Ground • AC fed solidly grounded • DC fed from passive rectifier which has a solidly grounded AC source	Connected	Connected	UL compliance, Reduced electrical noise, Most stable operation, EMC compliance, Reduced voltage stress on components and motor bearings

(1) When MOVs are disconnected, the power system must have its own transient protection to insure known and controlled voltages.

Table 13 - Recommended Power Jumper Configurations Frames 8…10

Power Source Type	Jumper PE-A1 (1) (MOV)	Jumper PE-A2 (Input Filter Caps)	Jumper PE-B (DC Bus Common mode Caps)	Benefits Of Correct Configuration on Power Source Type
Non-Solid Ground • AC fed ungrounded • Impedance grounded • B phase ground • DC fed from an active converter	Disconnected	Disconnected	Disconnected	Helps avoid severe equipment damage when ground fault occurs
Solid Ground • AC fed solidly grounded • DC fed from passive rectifier which has a solidly grounded AC source	Connected	Connected	Connected	UL compliance, Reduced electrical noise, Most stable operation, EMC compliance, Reduced voltage stress on components and motor bearings

(1) When MOVs are disconnected, the power system must have its own transient protection to ensure known and controlled voltages.

To connect or disconnect these devices, refer to the jumper locations shown in the figures on pages 122 through 127.

In addition, on an ungrounded distribution system where the line-to-ground voltages on any phase could exceed 125% of the nominal line-to-line voltage, an isolation transformer should be installed. See Wiring and Grounding Guidelines for Pulse Width Modulated (PWM) AC Drives, publication DRIVES-IN001 at www.rockwellautomation.com/literature for more information on impedance grounded and ungrounded systems.

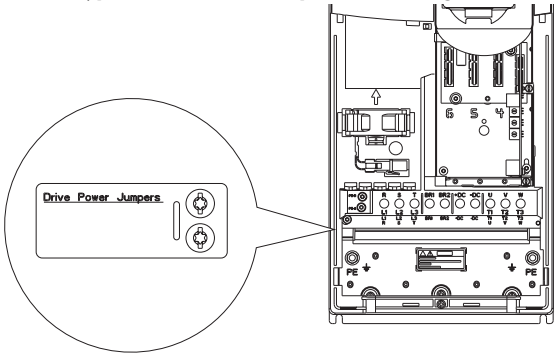
Frame 2…5 Power Jumper Screw Removal and Storage

Frames 2...5 use jumper screws to complete an electrical connection when installed. Install or remove jumper screws according to the recommendations in Table 12.

ATTENTION: Hazard of equipment damage exists if jumpers are not properly disconnected. For Frames 2…5, completely remove the jumper screw from the circuit board.

When power jumper screws are not used, they are stored on the left interior chassis wall as shown.

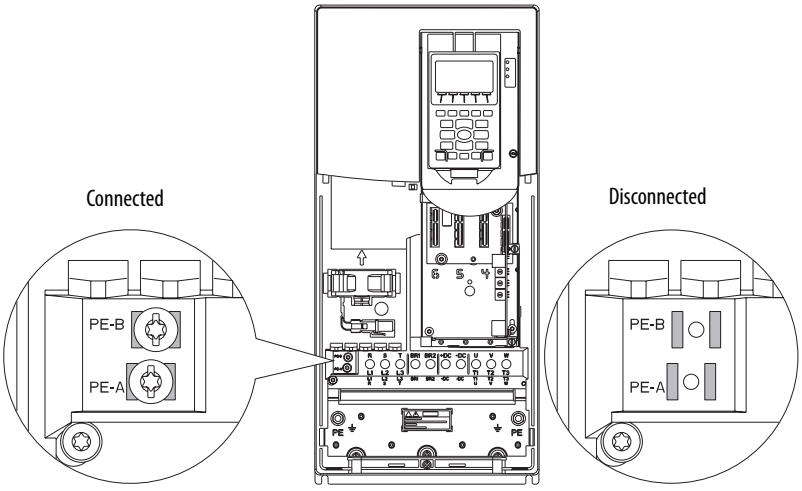
Figure 65 - Typical Frame 2…5 Jumper Screw Storage Location (Frame 4 shown)



When screws are installed:

- Recommended torque = 1.36 N•m (12.0 lb•in) +/- 0.14 N•m (1.2 lb•in)
- Recommended screwdriver = 6.4 mm (0.25 in.) flat or T15 Hexalobular

Figure 66 - Typical Frame 2…5 Jumper Screw Installation Locations (Frame 4 shown)

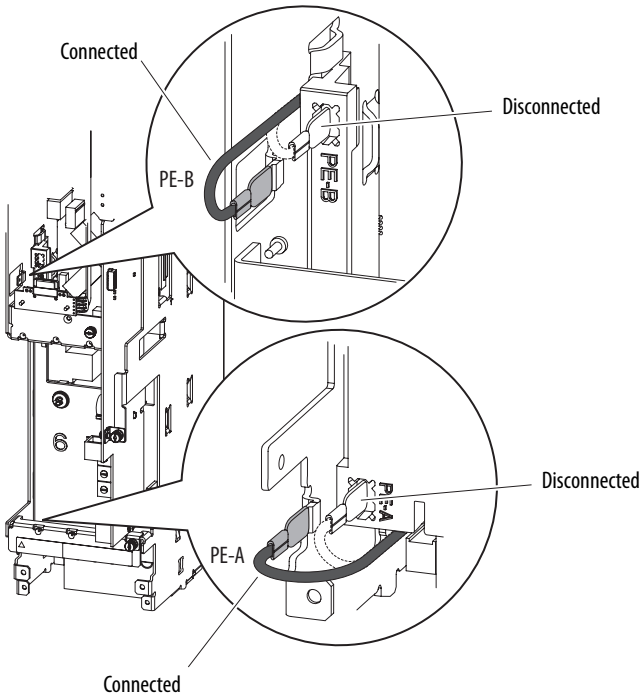


Frame 1, 6, and 7 Power Jumper Wire Removal and Storage

Frames 1, 6, and 7 use jumper wires to complete an electrical connection when installed. Install or remove jumper wires according to the recommendations in Table 12.

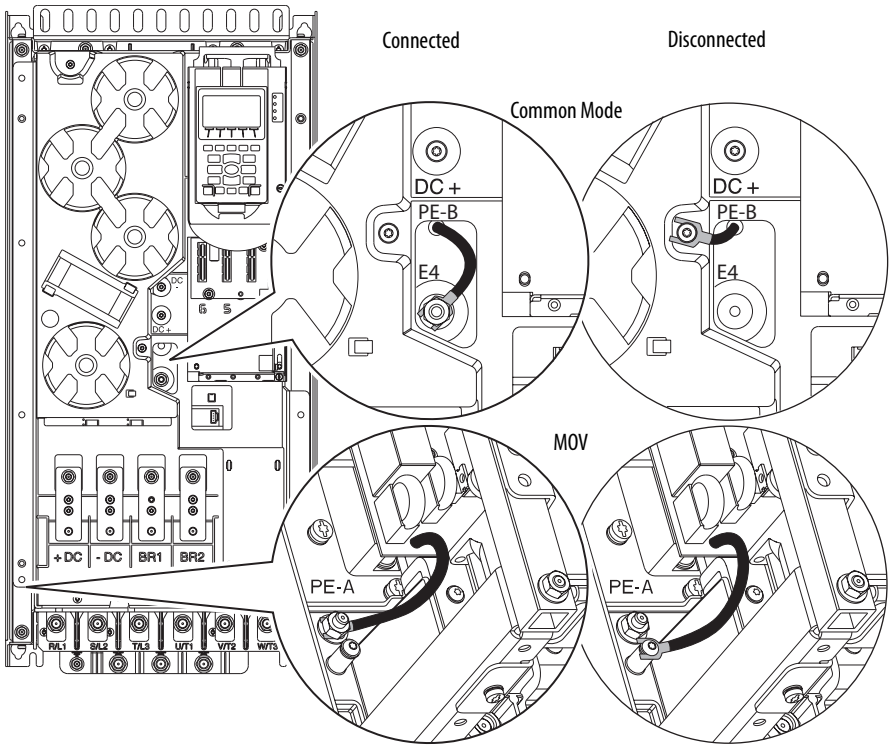
ATTENTION: Hazard of equipment damage exists if jumpers are not properly disconnected. For Frames 1, 6, and 7, secure the disconnected jumper wire to the insulated position provided.

Figure 67 - Frame 1 Jumper Wire Locations



When jumper wires are connected, the spade connector should be pressed firmly onto the sheet metal tab.

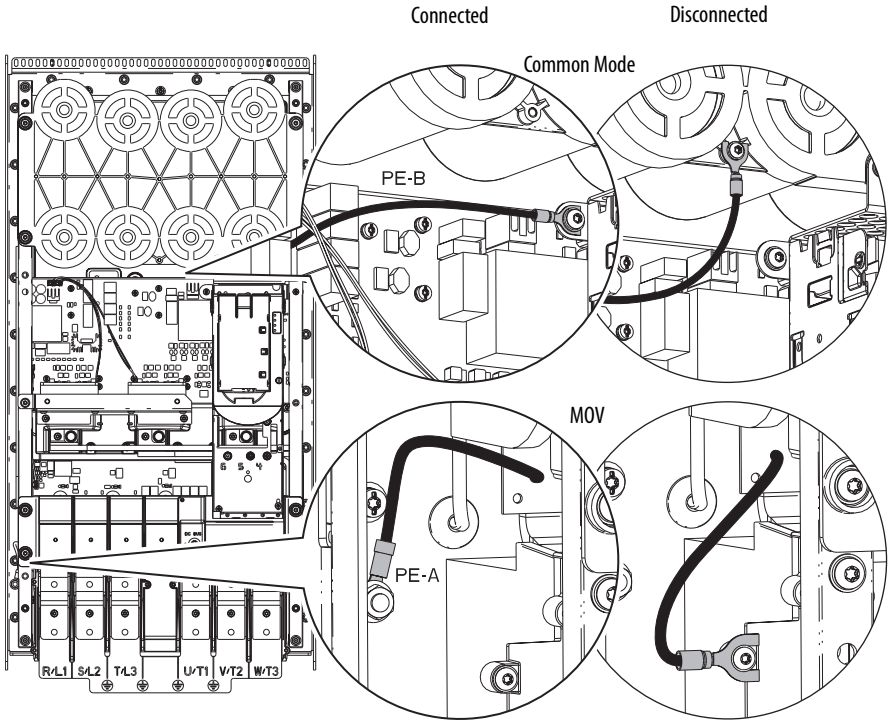
Figure 68 - Frame 6 Jumper Wire Locations



When jumper wires are connected:

- Recommended torque (screws and nuts) = 1.36 N•m (12.0 lb•in)
- Recommended hex socket = 7 mm
- Recommended screwdriver = T20 Hexalobular

Figure 69 - Frame 7 Jumper Wire Locations



When jumper wires are connected:

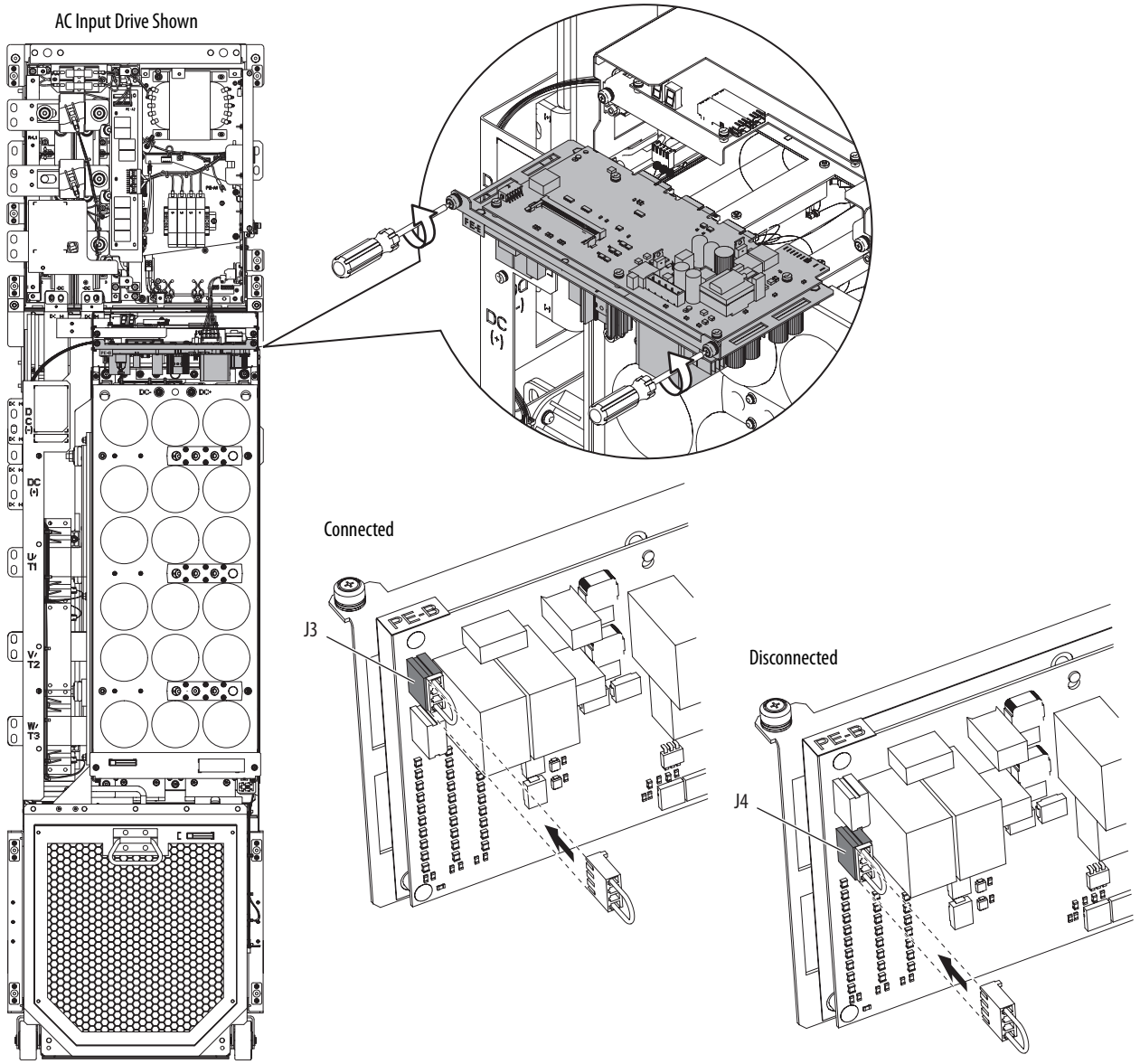
- Recommended torque (screws and nuts) = 1.36 N•m (12.0 lb•in)
- Recommended hex socket = 7 mm
- Recommended screwdriver = T20 Hexalobular

Frame 8…10 Drive Assembly Jumper Removal and Storage

Frame 8...10 drive assemblies use jumper plugs to complete an electrical connection when installed. Install or remove jumper plugs according to the recommendations in Table 12.

ATTENTION: Hazard of equipment damage exists if jumpers are not properly disconnected or are set differently between drive assemblies. For Frame 8…10 drive assemblies, secure the disconnected jumper plug in the socket provided and ensure that all drive assemblies are identically configured.

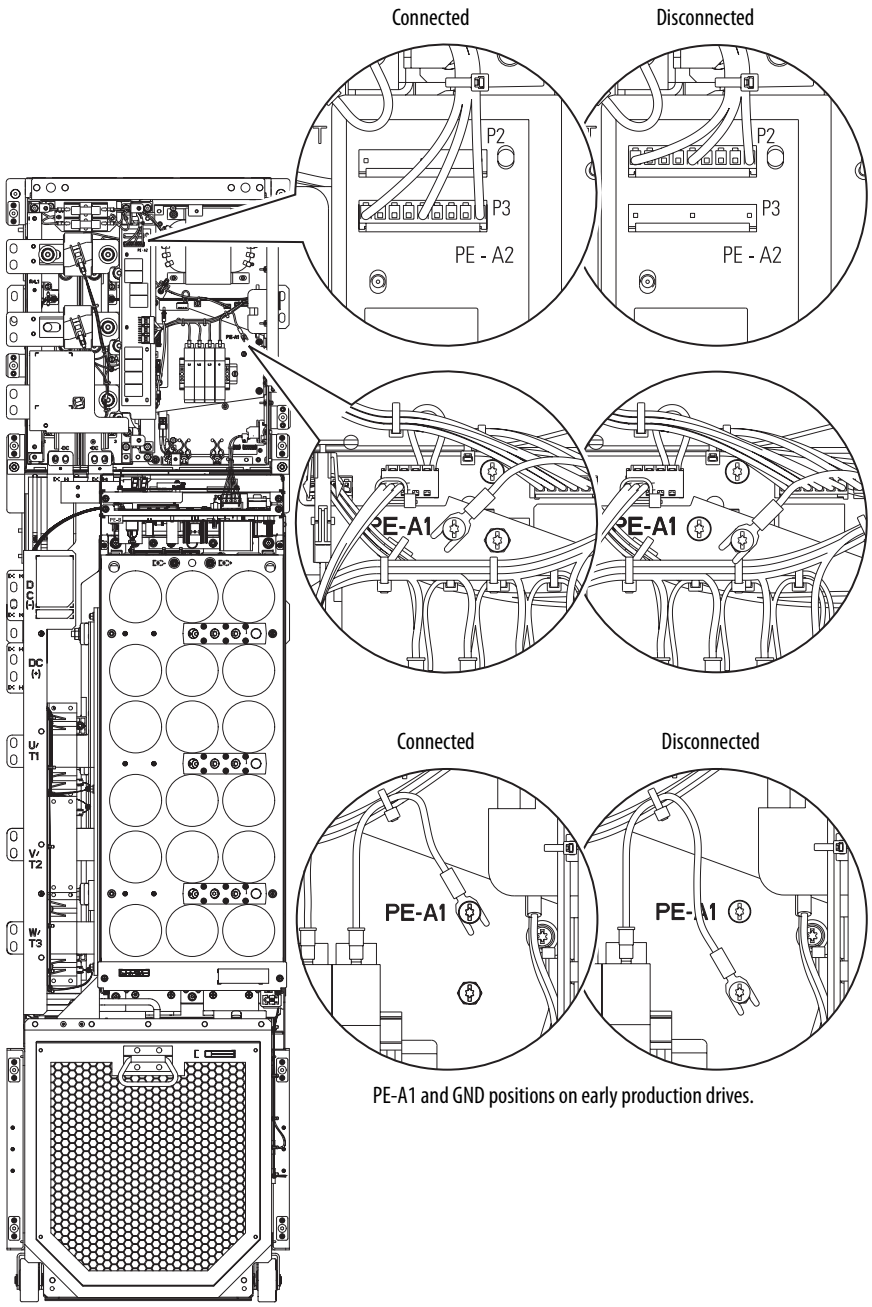
Figure 70 - Frame 8…10 Drive Assembly PE-B Common Mode Jumper Location



Removal and installation the Inverter Power Control Board tray:

- Recommended torque = 1.86 N•m (16.0 lb•in)
- Recommended screwdriver = T20 Hexalobular

Figure 71 - Drive Assembly PE-A1 MOV and PE-A2 Input Filter Caps Jumper Location



PE-A1 and GND positions on early production drives.

When the PE-A1 jumper wire is connected:

- Recommended torque = 1.8 N•m (16.0 lb•in)
- Recommended screwdriver = T20 Hexalobular

IMPORTANT PE-A1 and PE-A2 jumper are only used by three-phase input drive assemblies and are not applicable to Common DC Input drives assemblies.

Step 5: I/O Wiring

Important points to remember about I/O wiring:

- Always use copper wire.
- Wire with an insulation rating of 600V or greater is recommended.
- Control and signal wires should be separated from power wires by at least 0.3 meters (1 foot).
- For CE compliance, 115 volt digital input wiring must be shielded or must not exceed 30 meters (98 feet) in length.
- In order to maintain electrical safety for all user-accessible low voltage circuits (SELV and PELV circuits), I/O terminals designated for 24V or lower voltage must not be connected to a circuit of higher voltage or a circuit which is not adequately insulated from dangerous voltages with double or reinforced insulation within other connected equipment or wiring.
- In order to provide electrical safety for user-accessible low voltage I/O circuits which are referenced to earth (PELV circuits) and which may be touched simultaneously, care should be taken to provide a common earth reference for all equipment connected to the drive.

IMPORTANT I/O terminals labeled "(–)" or "Common" are not referenced to earth ground and are designed to greatly reduce common mode interference. Grounding these terminals can cause signal noise.

ATTENTION: Hazard of personal injury or equipment damage exists when using bipolar input sources. Noise and drift in sensitive input circuits can cause unpredictable changes in motor speed and direction. Use speed command parameters to help reduce input source sensitivity.

I/O Terminal Blocks

Table 14 - Main Control Board I/O Terminal Block Specifications

Name	Wire Size Range		Torque		Strip Length
	Maximum	Minimum	Maximum	Recommended	
753 Control Module TB1, TB2, and TB3	2.5 mm^2 (14 AWG)	0.3 mm^2 (28 AWG)	0.25 N•m (2.2 lb•in)	0.2 N•m (1.8 lb•in)	6 mm (0.24 in.)
755 Control Module TB1	2.5 mm^2 (14 AWG)	0.3 mm^2 (28 AWG)	0.25 N•m (2.2 lb•in)	0.2 N•m (1.8 lb•in)	6 mm (0.24 in.)

Table 15 - Option Module I/O Terminal Block Specifications

Name	Wire Size Range		Torque		Strip Length
	Maximum	Minimum	Maximum	Recommended	
I/O Module TB1	2.5 mm^2 (14 AWG)	0.3 mm^2 (28 AWG)	0.25 N•m (2.2 lb•in)	0.2 N•m (1.8 lb•in)	6 mm (0.24 in.)
I/O Module TB2	4.0 mm^2 (12 AWG)	0.25 mm^2 (24 AWG)	0.5 N•m (4.4 lb•in)	0.4 N•m 3.5 lb•in)	7 mm (0.28 in.)
Safe Torque Off (1)	0.8 mm^2 (18 AWG)	0.3 mm^2 (28 AWG)	N/A		10 mm (0.39 in.)
Single Incremental Encoder	0.8 mm^2 (18 AWG)	0.3 mm^2 (28 AWG)	N/A		10 mm (0.39 in.)
Safe Speed Monitor TB1 and TB2 (1)	2.5 mm^2 (14 AWG)	0.25 mm^2 (24 AWG)	0.25 N•m (2.2 lb•in)	0.2 N•m (1.8 lb•in)	6 mm (0.24 in.)
Dual Incremental Encoder	0.8 mm^2 (18 AWG)	0.3 mm^2 (28 AWG)	N/A		10 mm (0.39 in.)
755 Universal Feedback Module	0.8 mm^2 (18 AWG)	0.3 mm^2 (28 AWG)	N/A		10 mm (0.39 in.)
Auxiliary Power Supply TB1	2.5 mm^2 (14 AWG)	0.3 mm^2 (28 AWG)	0.25 N•m (2.2 lb•in)	0.2 N•m (1.8 lb•in)	6 mm (0.24 in.)

(1) Shielded cable required.

Table 16 - Three-Phase Drive Assembly I/O Terminal Block and Connector Specifications

Name	Wire Size Range		Torque		Strip Length
	Maximum	Minimum	Maximum	Recommended	
Converter TB1 and TB2	4.0 mm^2 (12 AWG)	0.25 mm^2 (24 AWG)	0.5 N•m (4.4 lb•in)	0.4 N•m (3.5 lb•in)	7 mm (0.28 in.)
Fiber Interface PCB Connector P13	4.0 mm^2 (12 AWG)	0.25 mm^2 (24 AWG)	0.5 N•m (4.4 lb•in)	0.4 N•m (3.5 lb•in)	7 mm (0.28 in.)
Fiber Interface PCB Connector P14	2.5 mm^2 (14 AWG)	0.3 mm^2 (28 AWG)	0.25 N•m (2.2 lb•in)	0.2 N•m (1.8 lb•in)	6 mm (0.24 in.)

Table 17 - Common DC Input Drive Assembly I/O Terminal Block and Connector Specifications

Name	Wire Size Range		Torque		Strip Length
	Maximum	Minimum	Maximum	Recommended	
Common DC Input TB1…TB5	4.0 mm^2 (12 AWG)	0.25 mm^2 (24 AWG)	0.5 N•m (4.4 lb•in)	0.4 N•m (3.5 lb•in)	7 mm (0.28 in.)
Fiber Interface PCB Connector P13	4.0 mm^2 (12 AWG)	0.25 mm^2 (24 AWG)	0.5 N•m (4.4 lb•in)	0.4 N•m (3.5 lb•in)	7 mm (0.28 in.)
Fiber Interface PCB Connector P14	2.5 mm^2 (14 AWG)	0.3 mm^2 (28 AWG)	0.25 N•m (2.2 lb•in)	0.2 N•m (1.8 lb•in)	6 mm (0.24 in.)

Table 18 - I/O Wire Recommendations

Type		Wire Type(s)	Description	Min. Insulation Rating
Signal (1)(2)(3)	Standard Analog I/O	–	0.750 mm^2 (18 AWG), twisted pair, 100% shield with drain.	300V, 75…90 °C (167…194 °F)
	Remote Pot	–	0.750 mm^2 (18 AWG), 3 conductor, shielded.	
	Encoder/ Pulse I/O < 30 m (100 ft)	Combined	0.196 mm^2 (24 AWG) individually shielded pairs.	
	Encoder/ Pulse I/O 30 to 152 m (100 to 500 ft)	Signal	0.196 mm^2 (24 AWG) individually shielded pairs.	
		Power	0.750 mm^2 (18 AWG) in.dividually shielded pairs	
		Combined	0.330 mm^2 (18 AWG), power is 0.500 mm^2 (20 AWG) individually shielded pairs.	
	Encoder/ Pulse I/O 152 to 259 m (500 to 850 ft.)	Signal	0.196 mm^2 (24 AWG) individually shielded pairs.	
		Power	0.750 mm^2 (18 AWG) individually shielded pairs.	
		Combined	0.750 mm^2 (18 AWG) individually shielded pairs.	
Digital I/O Homing Inputs Safety Inputs (4) (1)(2)(3)	Shielded	Multi-conductor shielded cable	0.750 mm^2 (18 AWG), 3 conductor, shielded.	300V, 60 °C (140 °F)
Digital I/O Homing Inputs (1)(2)(3)	Un-shielded	–	Per US NEC or applicable national or local code.	

(1) Control and signal wires should be separated from power wires by at least 0.3 meters (1 foot).

(2) If the wires are short and contained within a cabinet which has no sensitive circuits, the use of shielded wire may not be necessary, but is always recommended.

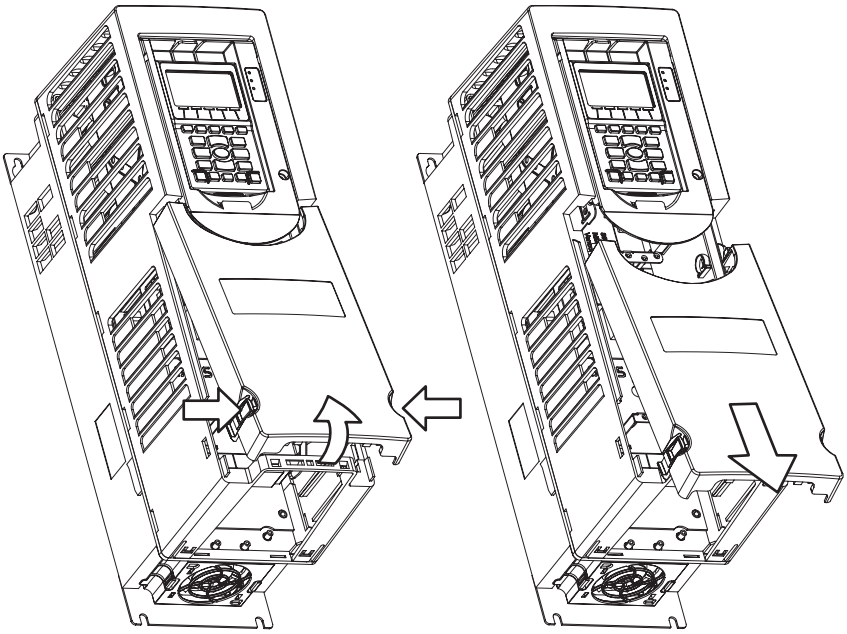
(3) I/O terminals labeled "(–)" or "Common" are not referenced to earth ground and are designed to greatly reduce common mode interference. Grounding these terminals can cause signal noise.

(4) Safety option modules 20-750-S and 20-750-S1 require shielded cable.

Access Drive Control Pod

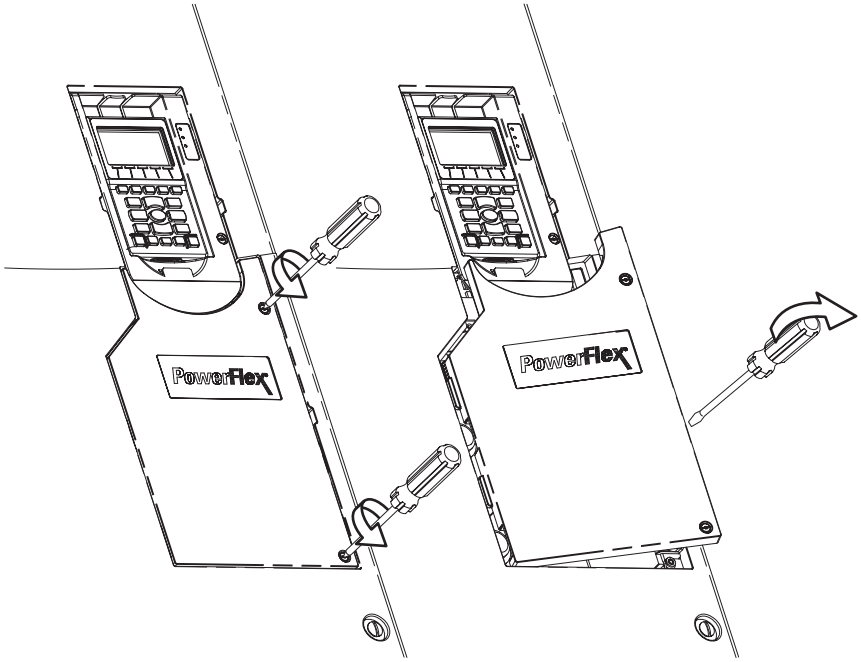
1. Remove drive cover

   Frames 1...5



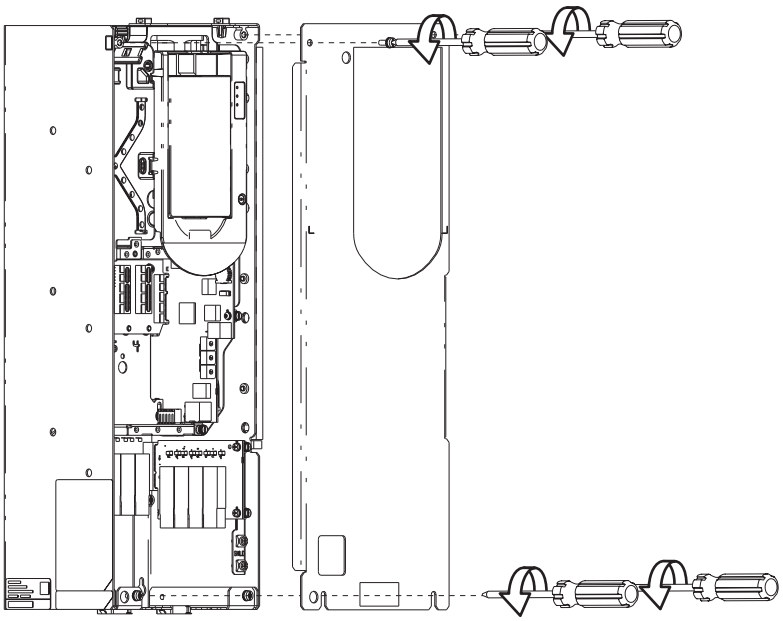
   – Squeeze locking tabs and pull out bottom of cover.
   – Pull cover down and away from the chassis.

   Frames 6...7



   – Loosen door screws.
   – Gently pry the door open to remove.

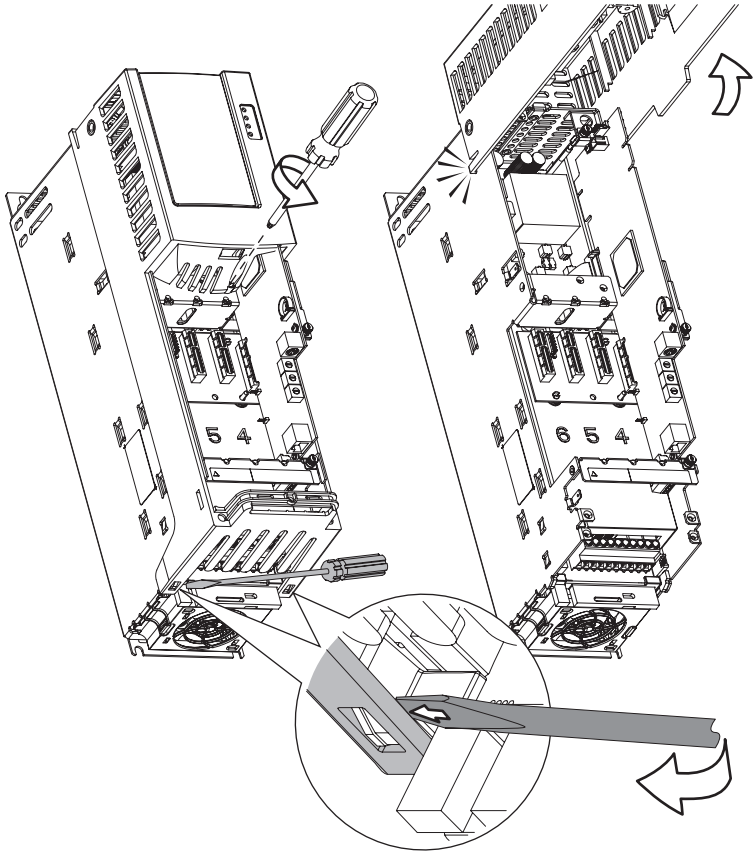
Frames 8...10



- Remove top screws.
- Loosen bottom screws.
- Remove the right front cover.

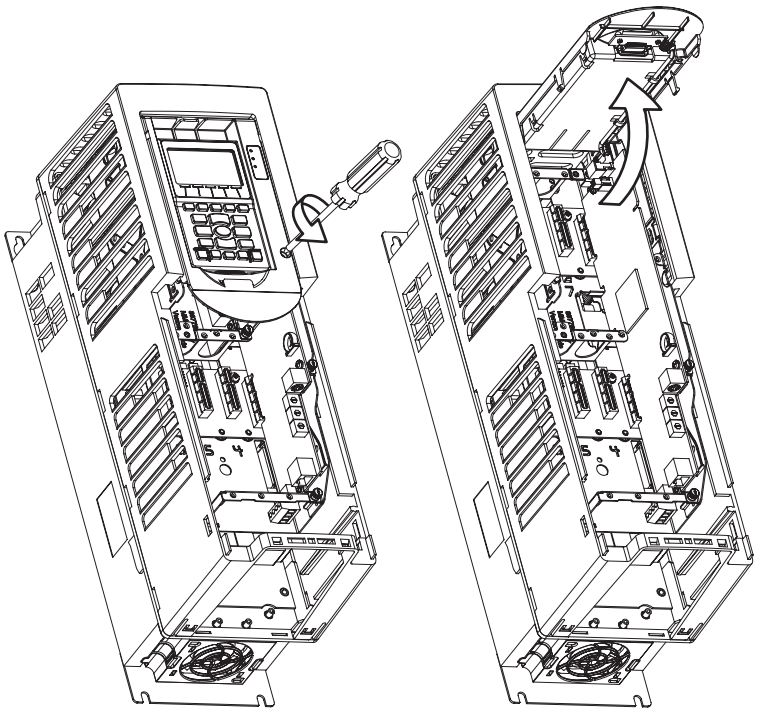
2. Frame 1 – Lift the chassis cover.
Frames 2...7 – Lift the Human Interface Module (HIM) cradle.

Frame 1



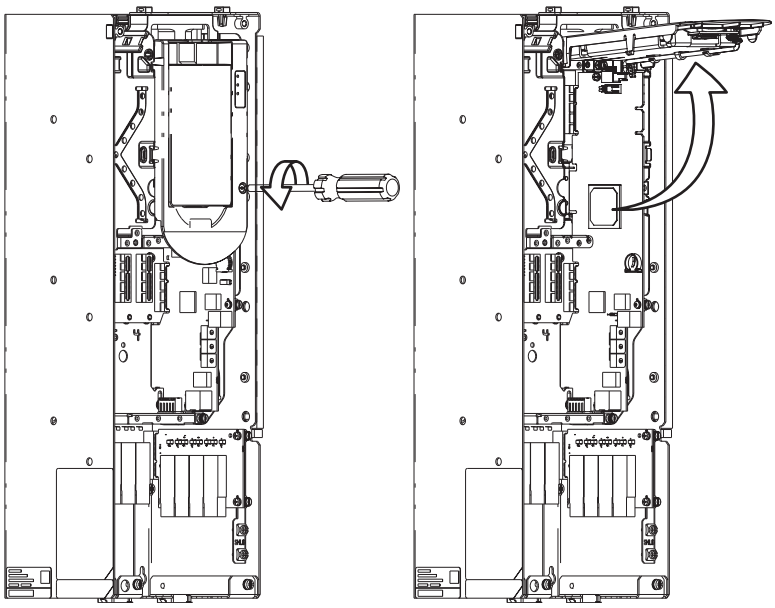
- Loosen the retention screw.
- Use a screwdriver to release the chassis cover locking tabs.
- Lift the chassis cover until the latch engages.

Frames 2...7



– Loosen the retention screw.
– Lift the cradle until the latch engages.

Frames 8...10



– Loosen the retention screw.
– Lift the cradle until the latch engages.

PowerFlex 753 Main Control Board

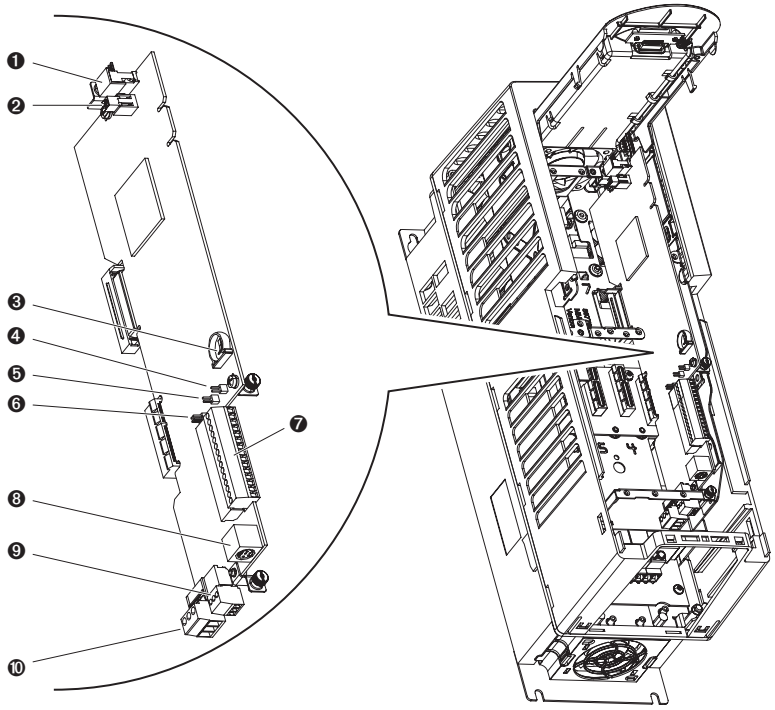


Table 19 - 753 Main Control Board Details

No.	Name	Description
❶	HIM Connector	DPI Port 1 (HIM Cradle) connection.
❷	Fan Connector	Power supply for internal cooling fan (Frames 2 & 3).
❸	 Battery Receptacle	User installed CR1220 lithium coin cell battery provides power to the Real Time Clock (Optional, not supplied). Preserves the Real Time Clock setting in the event power to the drive is lost or cycled.
❹	ENABLE Jumper	Hardware enable jumper. TB3 becomes an Enable when this jumper is removed.
❺	SAFETY Jumper	Safety enable jumper. Removed when safety option is installed.
❻	Jumper J4 Input Mode	Analog input mode jumper. Selects voltage mode or current mode.
❼	TB1	I/O terminal block.
❽	DPI Port 2	Cable connection for handheld and remote HIM options.
❾	TB3	Digital input terminal block. See Important at Table 23.
❿	TB2	Relay terminal block.

Table 20 - J4 Input Mode Jumper

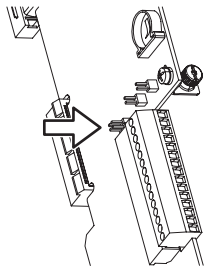
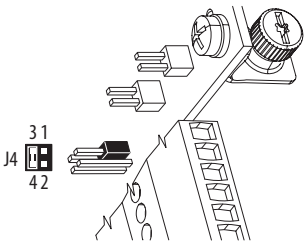
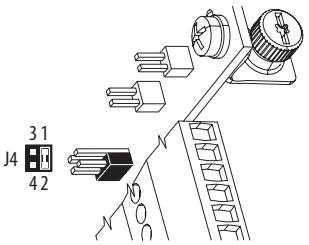
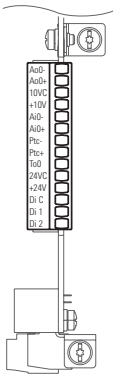
Jumper Position	Voltage Mode	Current Mode
		

Table 21 - TB1 Terminal Designations

	Terminal	Name	Description	Related Param
	Ao0–	Analog Out 0 (–)	Bipolar, ±10V (1), 11 bit & sign, 2 k ohm minimum load. 4-20 mA (1), 11 bit & sign, 400 ohm maximum load.	270
	Ao0+	Analog Out 0 (+)		
	10VC	10 Volt Common	For (+) 10 Volt references. 2k ohm minimum.	
	+10V	+10 Volt Reference		
	Ai0–	Analog Input 0 (–)	Isolated (2), bipolar, differential, 11 bit & sign. Voltage Mode:(3) ±10V @ 88k ohm input impedance. Current Mode:(3) 0-20 mA @ 93 ohm input impedance	255
	Ai0+	Analog Input 0 (+)		
	Ptc–	Motor PTC (–)	Motor protection device (Positive Temperature Coefficient).	250
	Ptc+	Motor PTC (+)		
	T0	Transistor Output 0	Open drain output, 48V DC, 250 mA maximum load.	
	24VC	24 Volt Common	Drive supplied logic input power. 150 mA maximum	
	+24V	+24 Volt DC		
	Di C	Digital Input Common	24V DC - Opto isolated Low State: less than 5V DC High State: greater than 20V DC	150
	Di 1	Digital Input 1		
	Di 2	Digital Input 2		

(1) Mode is selected by parameter only.

(2) Differential Isolation - External source must be maintained at less than 160V with respect to PE. Input provides high common mode immunity.

(3) Mode is selected by jumper J4.

Note: 753 Main Control Board I/O TB1 wiring examples begin on page 154.

Table 22 - TB2 Terminal Designations

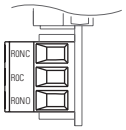
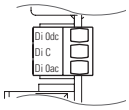
Fixed I/O	Terminal	Name	Description	Rating	Related Param
	R0NC	Relay 0 N.C.	Output Relay 0 normally closed contact.	240V AC, 24V DC, 2 A max. Resistive Only	285 286
	R0C	Relay 0 Common	Output Relay 0 common		291
	R0NO	Relay 0 N.O.	Output Relay 0 normally open contact.	240V AC, 24V DC, 2 A max. General Purpose (Inductive) / Resistive	292

Table 23 - TB3 Terminal Designations

Power Block	Terminal	Name	Description	Related Param
	Di 0dc	Digital Input 0 (24V DC)	Connections for DC power supply.	150
	Di C	Digital Input Common	Digital input common	
	Di 0ac	Digital Input 0 (120V AC)	Connections for AC power supply.	

IMPORTANT This terminal becomes a hardware enable when the ENABLE jumper is removed.

PowerFlex 755 Main Control Board

Frames 1…7

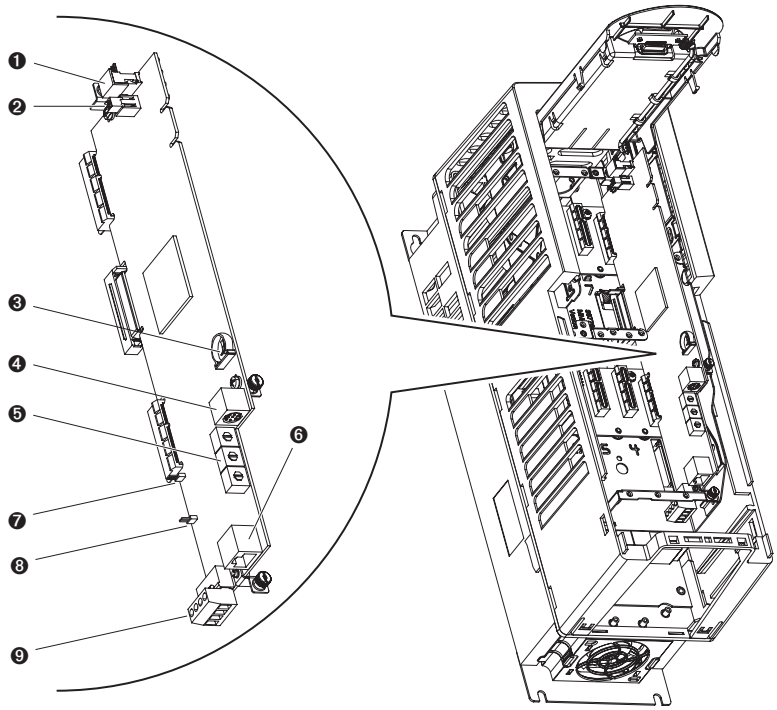


Table 24 - Control Board Details

No.	Name	Description
❶	HIM Connector	DPI Port 1 (HIM Cradle) connection.
❷	Fan Connector	Power supply for internal cooling fan (Frames 2 & 3).
❸	 Battery Receptacle	User installed CR1220 lithium coin cell battery provides power to the Real Time Clock (Optional, not supplied). Preserves the Real Time Clock setting in the event power to the drive is lost or cycled.
❹	DPI Port 2	Cable connection for handheld and remote HIM options.
❺	Embedded EtherNet/IP(1) Address Selectors	Rotary switches for setting lowest octet of EtherNet address (forces address to 192.168.1.xxx). Refer to the Programming Manual, publication 750-PM001 for instructions on setting the IP address.
❻	Embedded EtherNet/IP(1) Connector	Network cable connection.
❼	SAFETY Jumper	Safety enable jumper. Removed when safety option is installed.
❽	ENABLE Jumper	Hardware enable jumper. TB1 becomes an Enable when this jumper is removed.
❾	TB1	I/O terminal block.

(1) Refer to the PowerFlex 755 Drive Embedded EtherNet/IP Adapter User Manual, publication 750COM-UM001.

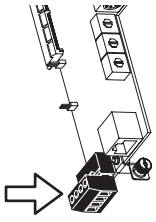
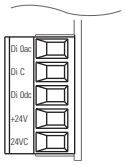


Table 25 - TB1 I/O Terminal Designations

Fixed I/O	Terminal	Name	Description
	Di 0ac	Digital Input 0 (120V AC)	Connections for AC power supply.
	Di C	Digital Input Common	Digital input common
	Di 0dc	Digital Input 0 (24V DC)	Connections for DC power supply.
	+24V	+24 Volt Power	Connections for drive supplied 24V power. 150 mA maximum
	24VC	24 Volt Common	

Frames 8…10

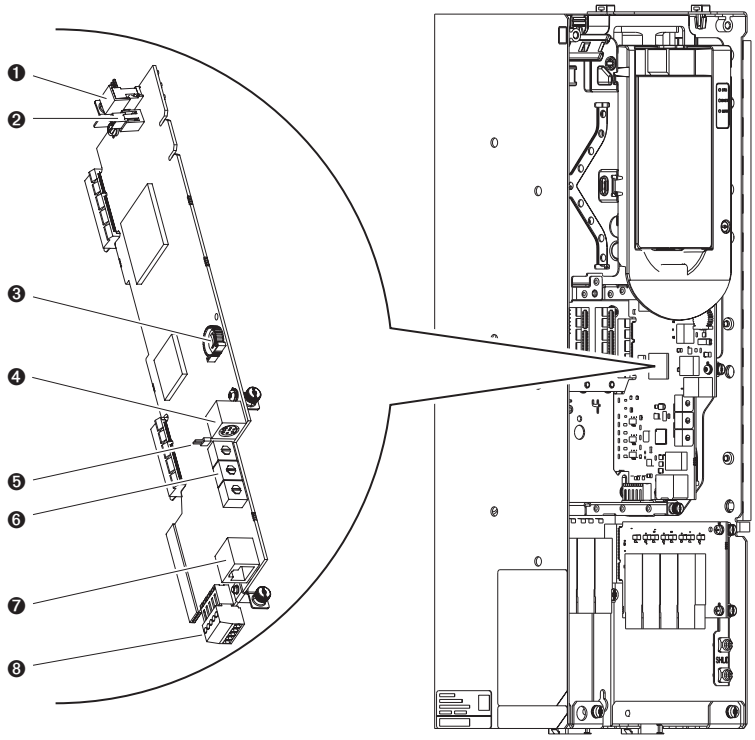


Table 26 - Control Board Details

No.	Name	Description
❶	HIM Connector	DPI Port 1 (HIM Cradle) connection.
❷	Fan Connector	Power supply for internal cooling fan.
❸	Battery Receptacle 	User installed CR1220 lithium coin cell battery provides power to the Real Time Clock (Optional, not supplied). Preserves the Real Time Clock setting in the event power to the drive is lost or cycled.
❹	DPI Port 2	Cable connection for handheld and remote HIM options.
❺	ENABLE Jumper	Hardware enable jumper. Removed when a hardware enable configuration is utilized.
❻	Embedded EtherNet/IP(1) Address Selectors	Rotary switches for setting lowest octet of EtherNet address (forces address to 192.168.1.xxx). Refer to the Programming Manual, publication 750-PM001 for instructions on setting the IP address.
❼	Embedded EtherNet/IP(1) Connector	Network cable connection.
❽	TB1	I/O terminal block.

(1) Refer to the PowerFlex 755 Drive Embedded EtherNet/IP Adapter User Manual, publication 750COM-UM001.

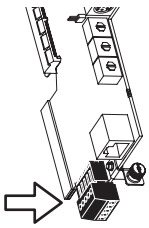
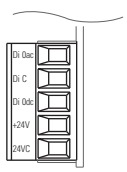
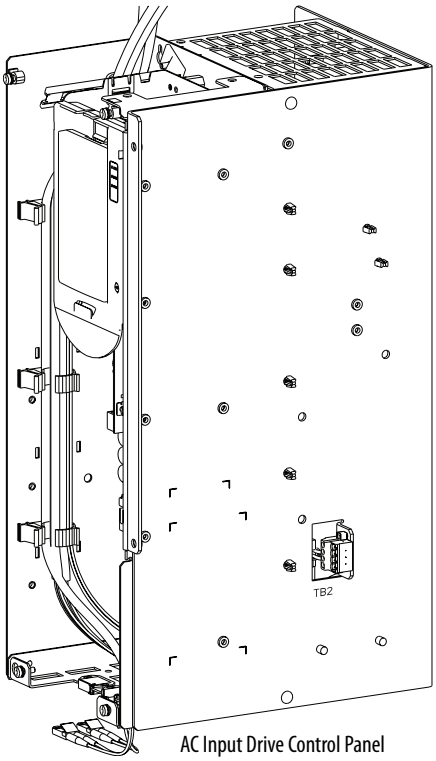


Table 27 - TB1 I/O Terminal Designations

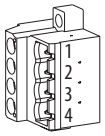
Fixed I/O	Terminal	Name	Description
	Di 0ac	Digital Input 0 (120V AC)	Connections for AC power supply.
	Di C	Digital Input Common	Digital input common
	Di 0dc	Digital Input 0 (24V DC)	Connections for DC power supply.
	+24V	+24 Volt Power	Connections for drive supplied 24V power. 150 mA maximum
	24VC	24 Volt Common	

AC Input Drive Control and Power Terminal Block



AC Input Drive Control Panel

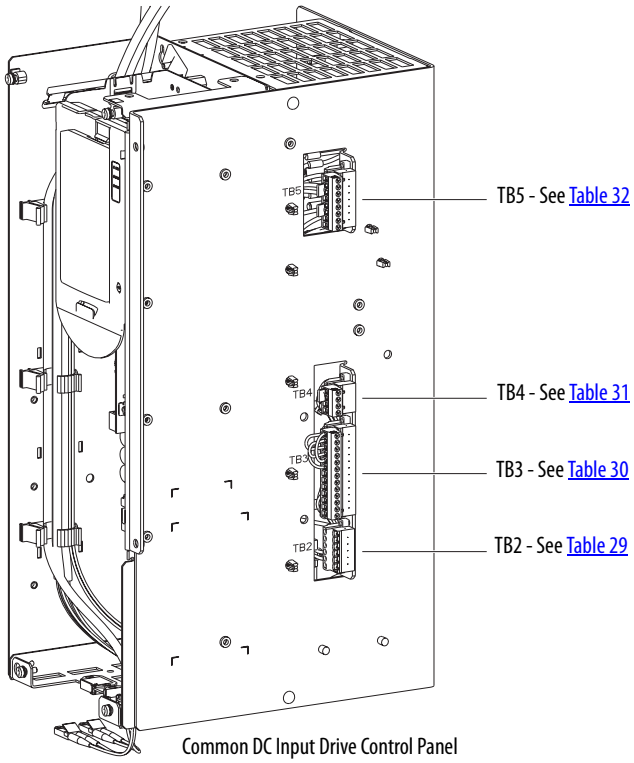
Table 28 - TB2 Terminal Designations

Fixed I/O	Terminal	Name	Description	Rating	Related Param
	1	SHUNT TRIP COMMON	Output Relay common	125V AC, 10 A max., 1250 VA Resistive Only	16 on Port 11
	2	SHUNT TRIP NO	Output Relay normally open contact.		
	3	FAN 240VAC OUT NEUTRAL	Connections for cooling fans.	240V AC, 50/60 Hz, 1.4 A, 336 VA	
	4	FAN 240VAC OUT HOT			

Shunt Trip Contact Operation

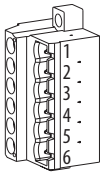
A ground fault occurs when the input ground current exceeds the threshold set in P16 [Gnd Cur Flt Lvl] on port 11 for five line cycles.

Common DC Input Drive Control and Power Terminal Blocks



Common DC Input Drive Control Panel

Table 29 - TB2 Terminal Designations

Fixed I/O	Terminal	Name	Description	Rating
	1	UPS 120VAC IN NEUTRAL	Connections for Uninterruptible Power Supply (UPS).(1)	N/A
	2	UPS 120VAC IN HOT		
	3	CONTROL 120/240VAC IN NEUTRAL	Connections for control power supply.(2)	N/A
	4	CONTROL 120/240VAC IN HOT		
	5	FAN 240VAC OUT NEUTRAL	Connections for cooling fans.	240V AC, 50/60 Hz, 1.4 A, 336 VA
	6	FAN 240VAC OUT HOT		

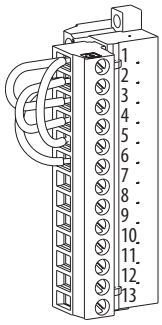
(1) See Uninterruptible Power Supply Connections - Common DC Input Drives on page 144.

(2) See 120/240V AC Power Supply Connections - Common DC Input Drives on page 145.

DC Precharge Board

The DC precharge board provides sensing of bus voltage, monitoring of bus fuses and control over all precharge hardware.

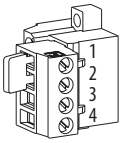
Table 30 - TB3 Terminal Designations

Fixed I/O	Terminal	Name	Description
	1	I/O 24V	Drive supplied 24V DC I/O power.
	2	I/O 24V COMMON	
	3	EXT. PRCHRG CLOSE/$\overline{\text{OPEN}}$ INPUT+	External precharge close/$\overline{\text{open}}$ input.
	4	EXT. PRCHRG CLOSE/$\overline{\text{OPEN}}$ INPUT-	
	5	EXT. PRCHRG INHIBIT INPUT+	External precharge inhibit input.
	6	EXT. PRCHRG INHIBIT INPUT-	
	7	RESET FAULTS INPUT +	Reset faults input.
	8	RESET FAULTS INPUT -	
	9	PRECHARGE COMPLETE NO	Precharge complete normally open input
	10	PRECHARGE COMPLETE COM	
	11	FAULT OUT NC	Normally closed contact output.
	12	FAULT OUT NO	Normally open contact output.
	13	FAULT OUT COM	
Factory Jumper Settings: • TB3-1 and TB3-3 • TB3-1 and TB3-5 • TB3-2 and TB3-4 • TB3-2 and TB3-6		**IMPORTANT** Do not remove the factory installed jumpers.	

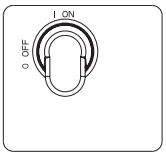
Cabinet Door Interlock and Door Switch

The Common DC Input drive supports the installation of a door interlock solenoid and door switch.

Table 31 - TB4 Terminal Designations

Fixed I/O	Terminal	Name	Description
	1	DOOR SWITCH CLOSED	Normally open door switch. Door switch input connection. Remove TB4-1 to TB4-2 jumper to wire switch.
	2	I/O 24V	Drive supplied 24V DC power. Door switch supply or power connection.
	3	240 VAC NEUTRAL	Solenoid neutral connection.
	4	240 VAC HOT DOOR INTERLOCK SOLENOID	Drive supplied 240V AC power. Solenoid hot connection.

Disconnect Switch (SW2) Operation

SW2 is On	Door Closed	Door Open
 See Figure 33 - on page 55 for location.	Solenoid and door switch circuits are energized.	Alarm is indicated.

120V Output Wiring for Drive Control

The Common DC Input drive provides limited 120V control power for use with the drive control pod option modules. For terminal block wiring specifications see Table 17 - on page 129.

Table 32 - TB5 Terminal Designations

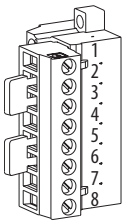
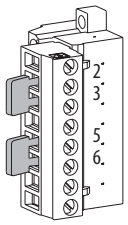
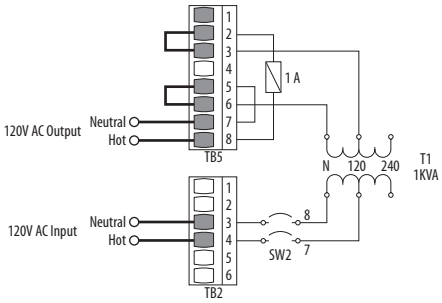
Fixed I/O	Terminal	Name	Description	Rating
	1	UPS 120VAC OUT HOT	Jumper combinations select the source of the 120V AC output for drive control. See Table 33.	120V AC, 50/60 Hz, 0.4 A, 48 VA Fusing: 1A, 600V, Class CC, Time Delay
	2	120VAC HOT		
	3	CONTROL 120VAC OUT HOT		
	4	UPS 120VAC OUT NEUTRAL		
	5	120VAC NEUTRAL		
	6	CONTROL 120VAC OUT NEUTRAL		
	7	120VAC OUT NEUTRAL	Drive supplied 120V AC output for drive control.	
	8	120VAC OUT HOT		

Table 33 - TB5 Jumper Settings

120V AC from Control Transformer

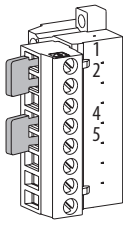
Factory Jumper Settings:
- TB5-2 and TB5-3
- TB5-5 and TB5-6

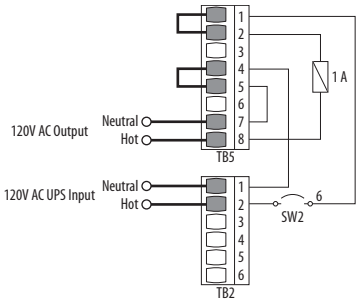




120V AC from User Supplied UPS

User Jumper Settings:
- TB5-1 and TB5-2
- TB5-4 and TB5-5



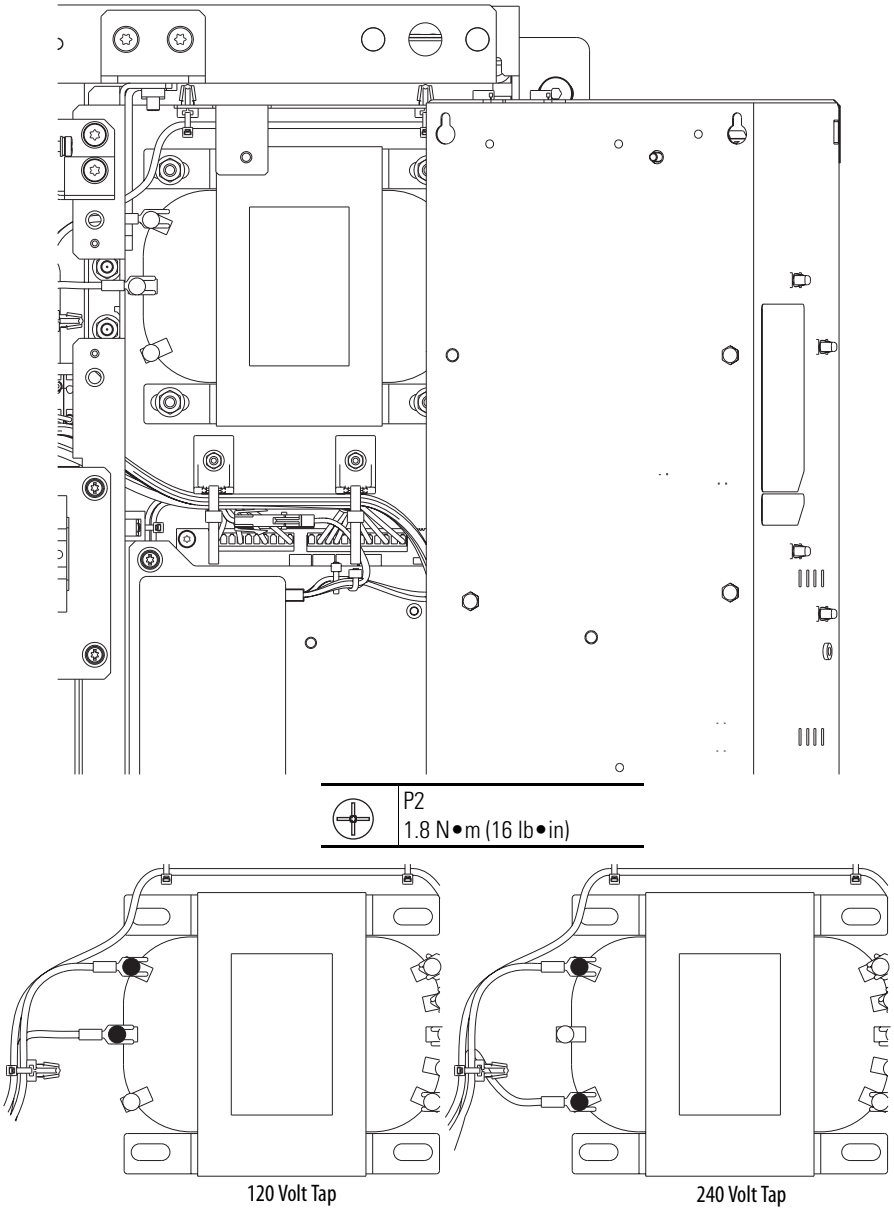


ATTENTION: Hazard of personal injury or equipment damage exists if jumpers are incorrectly set. Verify jumpers are set for control scheme used before energizing the circuit.

Control Transformer Connections - Common DC Input Drives

The Common DC Input drive control transformer is factory set to 120V AC input. A 240V AC input setting is also available by changing primary wire connections.

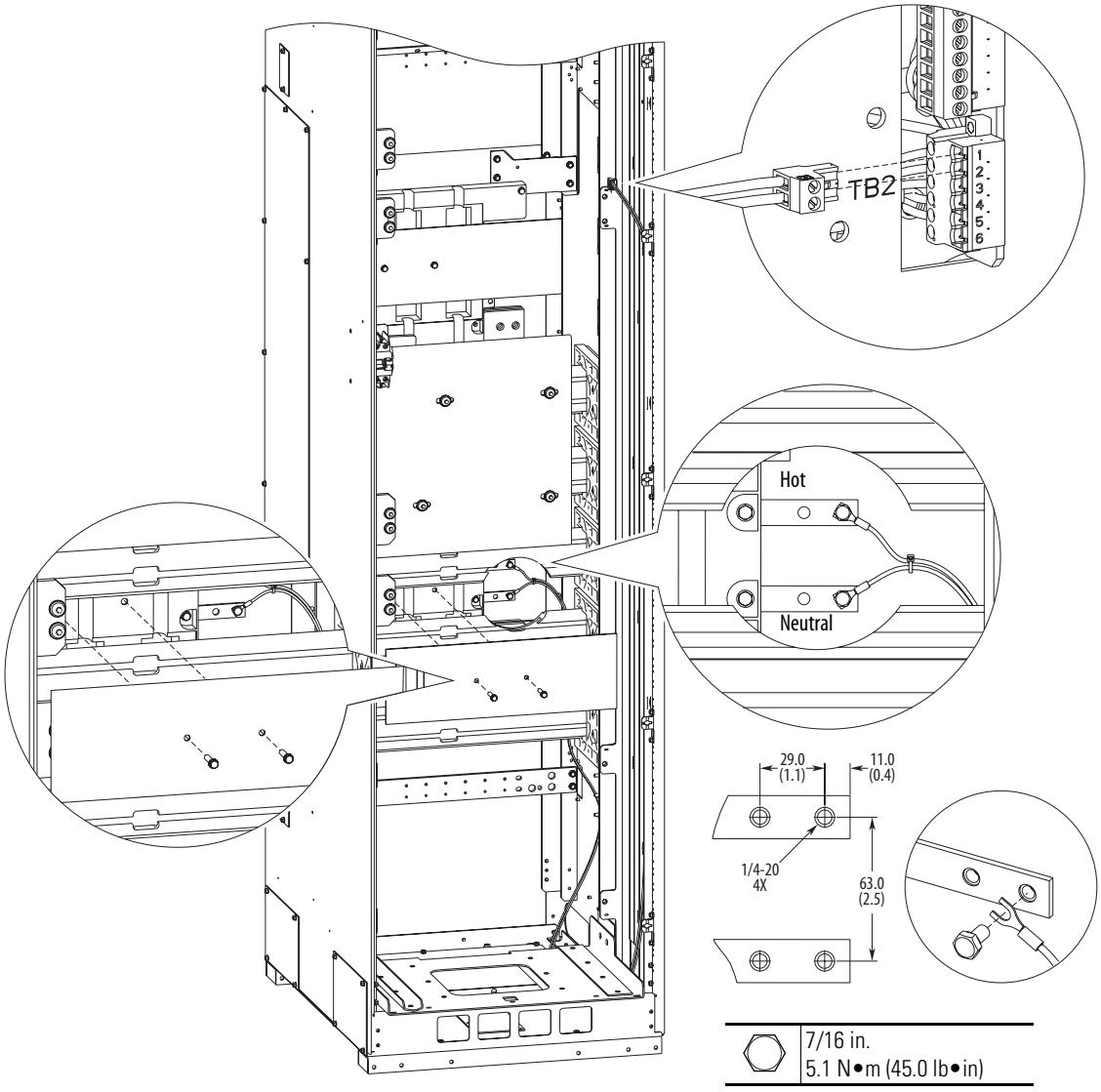
Figure 72 - Control Transformer Voltage Settings



Uninterruptible Power Supply Connections - Common DC Input Drives

The user-supplied 120V AC UPS is connected to the lower 120V rail in the back of the Common DC Input drive cabinet. The rail is connected to TB2-1 and TB2-2 on the Common DC Input drive control panel. To use 120V AC UPS power, configure the TB5 jumpers as shown in Table 33 - on page 142.

Figure 73 - UPS Connection Terminals



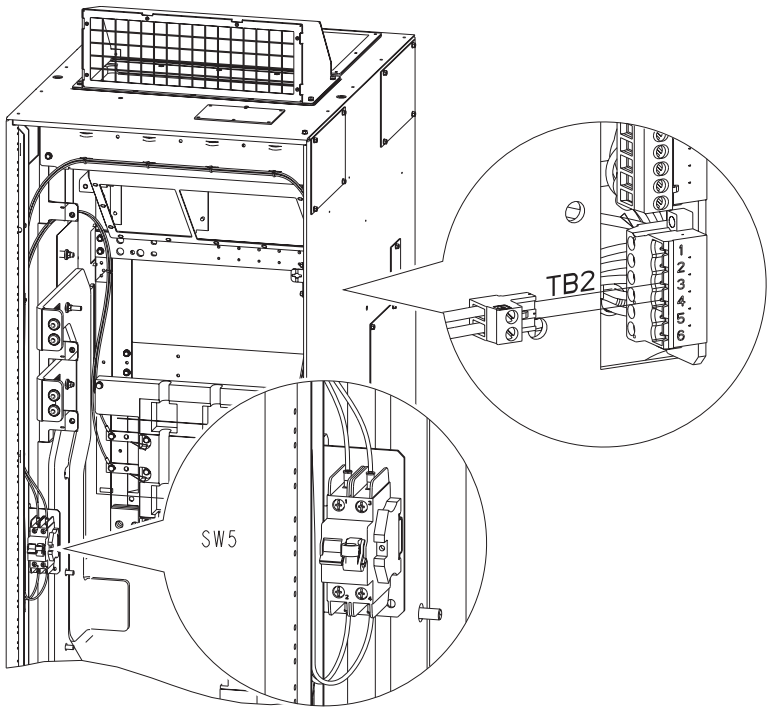
IMPORTANT The UPS wiring is internally wired through the DC input drive disconnect switch SW2 ahead of the UPS terminal connections.

ATTENTION: To avoid an electric shock hazard when servicing the drive, a means for Lockout/Tagout of an external 120V uninterruptible power supply must be provided. Or the circuit breaker SW5 must be locked and tagged. Locking and tagging the common bus precharge disconnect switch SW2 alone does not provide sufficient protection when servicing the drive.

120/240V AC Power Supply Connections - Common DC Input Drives

The drive-supplied 120/240V AC is wired through a circuit breaker mounted in the Common DC Input drive cabinet. The circuit breaker is connected to TB2-3 and TB2-4 on the Common DC Input drive control panel.

Figure 74 - 120V Connection Terminals



This 13 A circuit breaker provides branch-circuit short-circuit and overcurrent protection for the wiring on the primary side of the control transformer, and protection of the transformer primary. Transformer secondary protection (240V output) is provided through a 5 A, 600V, Class CC, time delay fuse.

IMPORTANT The transformer primary wiring is internally wired through the DC input drive disconnect switch SW2 ahead of the control transformer primary terminal connections.

ATTENTION: To avoid an electric shock hazard when servicing the drive, a means for Lockout/Tagout of an external 120/240V power source must be provided. Or the circuit breaker SW5 must be locked and tagged. Locking and tagging the common bus precharge disconnect switch SW2 alone does not provide sufficient protection when servicing the drive.

Hardware Enable Circuitry

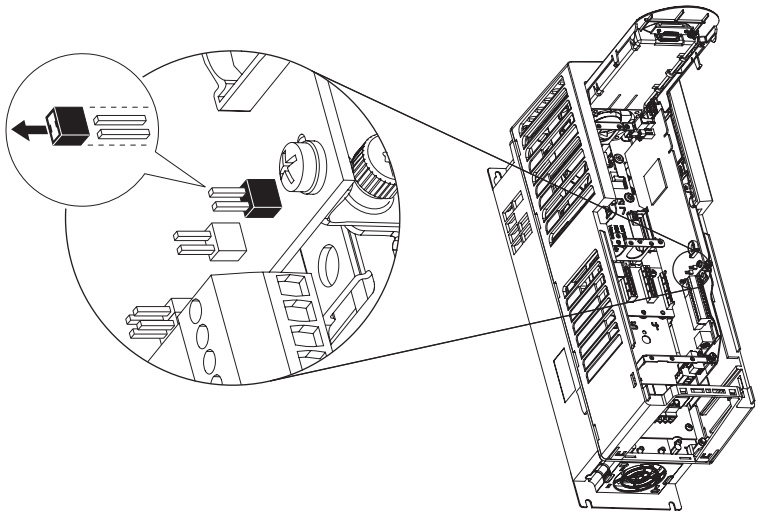
Each main control board has one digital input, Digital Input 0, that can be used as a general purpose programmable input, or by removal of a jumper, configured as a dedicated hardware enable, which is unaffected by parameter settings.

- PowerFlex 753 - Digital Input 0 is found on TB3
- PowerFlex 755 - Digital Input 0 is found on TB1

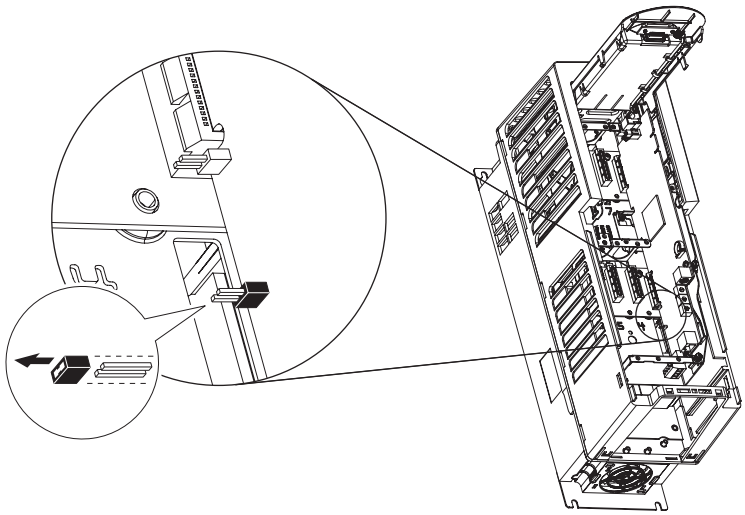
To configure Digital Input 0 as a dedicated hardware enable, complete the following steps.

1. Access the control pod as described beginning on page 131.
2. Locate and remove ENABLE Jumper on the Main Control Board (see diagram).

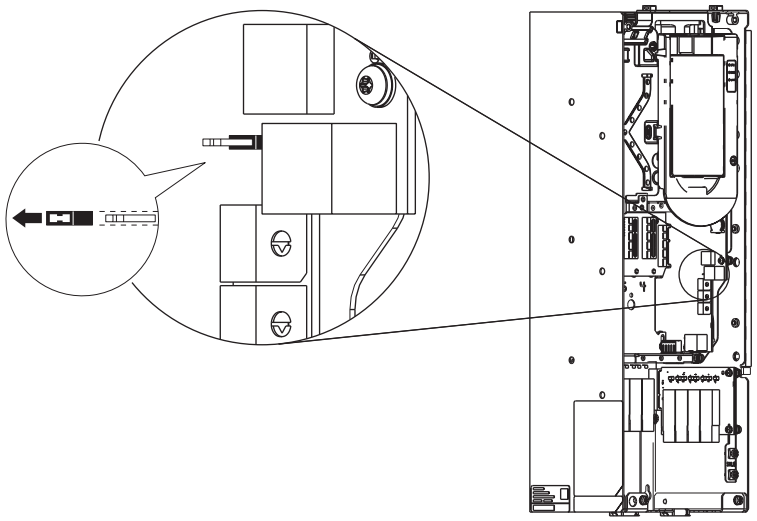
PowerFlex 753 - ENABLE Jumper Location



PowerFlex 755 - ENABLE Jumper Location (Frames 1…7)



PowerFlex 755 - ENABLE Jumper Location (Frames 8…10)

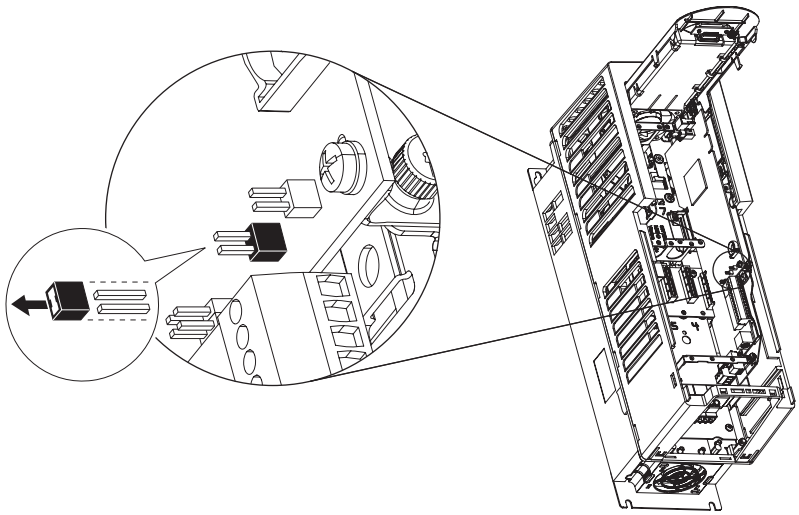


Safety Enable Circuitry

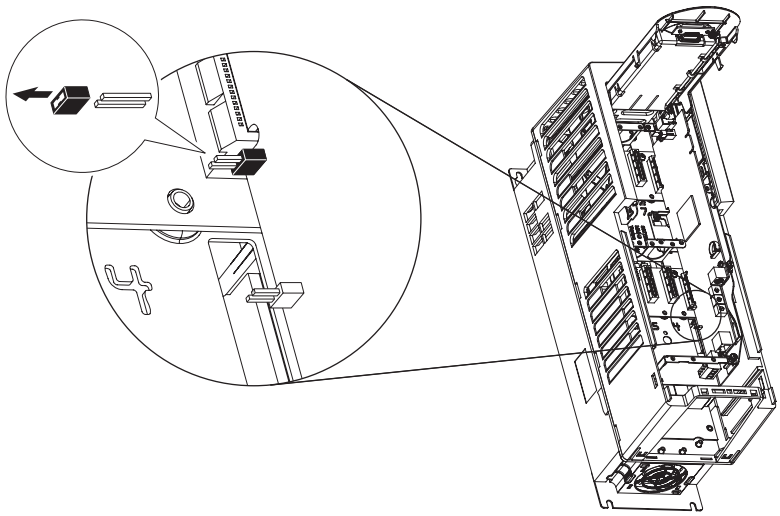
The drive ships with the safety enable jumper (SAFETY) installed. This jumper must be removed when using the safe torque off or speed monitoring safety options.

IMPORTANT Failure to remove the jumper when using either safety option will cause the drive to fault when a start command is issued.

PowerFlex 753 - SAFETY Jumper Location



PowerFlex 755 - SAFETY Jumper Location (Frames 1…7 Only)



Note: Frame 8 drives and larger do not have a safety enable jumper.

PowerFlex 755 Fiber Optic Interface Board

Frames 8…10

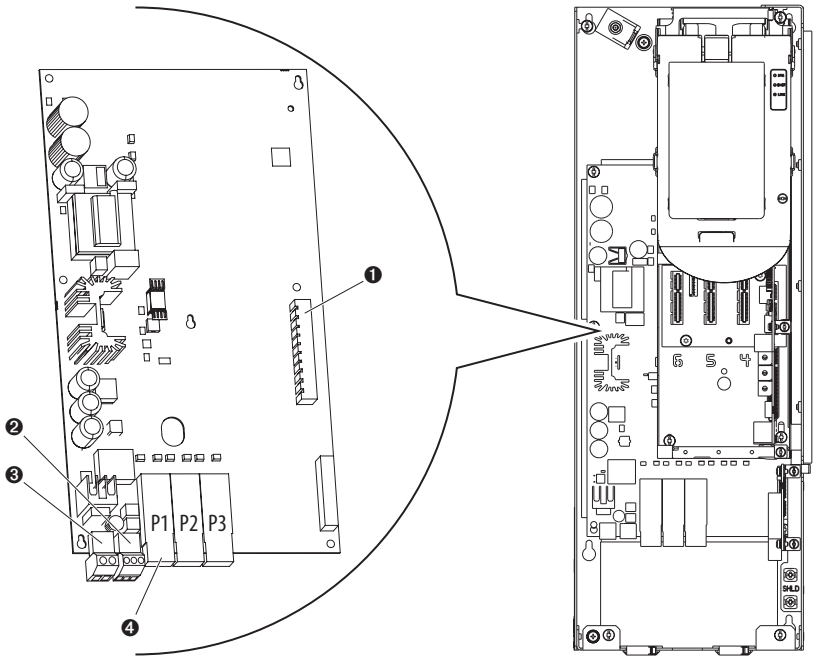


Table 34 - Fiber Interface Board Details

No.	Name	Description
❶	Main Control Board Connector	98 pin main control board interface connection.
❷	P13	Connections for user-supplied 24 volt power. Powers control circuits when main power is removed.
❸	P14	Connections for internal drive-supplied 24 volt power. Connection is factory wired and must not be modified by the user. Powers control circuits when main power is connected.
❹	Inverter Connections	Fiber optic ports: P1 = INV1, P2 = INV2, P3 = INV3, P4 = INV4, P5 = INV5

Table 35 - P13 Terminal Designations

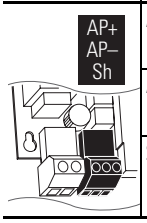
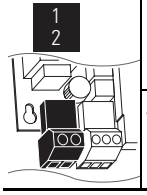
Power Block	Terminal	Name	Description
	AP+	+24 Volt Auxiliary Power	Connections for customer supplied power supply: 24V DC ±10%, 5 A, PELV (Protective Extra Low Voltage) or SELV (Safety Extra Low Voltage)
	AP–	Auxiliary Power Common	
	Sh	Shield	Terminating point for wire shields.

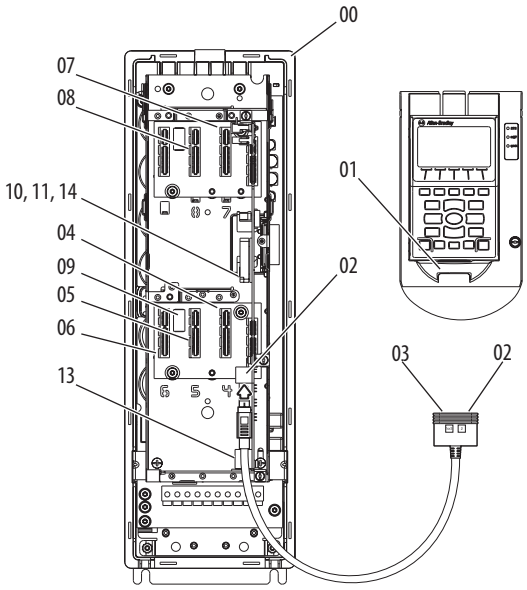
Table 36 - P14 Terminal Designations

Power Block	Terminal	Name	Description
	1	+24 Volt Power	Connections for drive supplied power.
	2	Power Common	

Drive Device Ports

Connectors, embedded devices, and installed option modules such as I/O, communication adapters, and DeviceLogix, have unique port number assignments. Connectors and embedded devices have fixed port numbers that cannot be changed. Option modules are assigned a port number when installed.

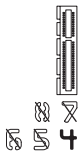
Figure 75 - Drive Device Ports



Port	Device	Description
00	Host Drive	Fixed port for the drive.
01	HIM	Fixed port at HIM cradle connector. Splitter cable connector provides Port 01 when HIM cradle connector is unused.
02	DPI Port	Handheld or Remote HIM connection. Splitter cable connection.
03	Splitter Cable	Connects to DPI Port 02. Provides Port 02 and Port 03.
04…08	Option Modules	Available ports for option modules. Refer to the Option Module Installation section, beginning on page 151, for each option's port recommendations. **Important:** Ports 07 and 08 are available on PowerFlex 755 Frame 2 drives and larger only. PowerFlex 755 Frame 1 drives and 753 drives do not support Ports 07 and 08.
09	Auxiliary Power Supply Option Module	Designated port for the Auxiliary Power Supply when connected via cable. (PowerFlex 755 Frame 1 and 753 drives only. See page 164.)
10	Inverter	Fixed port for Inverter (PowerFlex 755 Frame 8 drives and larger only).
11	Converter	Fixed port for Converter (PowerFlex 755 Frame 8 drives and larger only).
12	Reserved for future use.	
13	EtherNet/IP	Fixed port for embedded EtherNet/IP (PowerFlex 755 drives only).
14	DeviceLogix	Fixed port for embedded DeviceLogix.

Option Module Installation

Compatible port locations may be restricted for each module. An icon with position number(s) is provided to indicate which option module ports are compatible. For example, the icon to the right indicates that the option module is only compatible with port 4.



ATTENTION: Hazard of equipment damage exists if an option module is installed or removed while the drive is powered. To avoid damaging the drive, verify that the voltage on the bus capacitors has discharged completely and all control power is removed before performing any work on the drive.

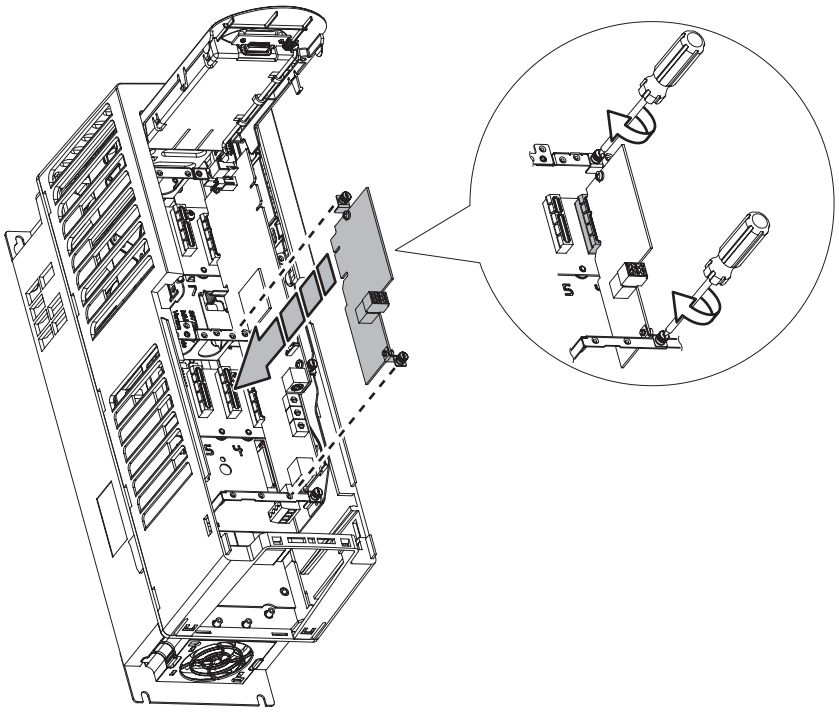
Frames 1…7: Measure the DC bus voltage at the Power Terminal Block by measuring between the +DC and -DC terminals (refer to Figure 50 and Figure 51 for location), between the +DC terminal and chassis, and between the -DC terminal and the chassis. The voltage must be zero for all three measurements.

Frames 8…10: Measure the DC bus voltage at the DC+ and DC- TESTPOINT sockets on the front of the power module (refer to Figure 54). The voltage must be zero

To install an option module:

1. Firmly press the module edge connector into the desired port.
2. Tighten the top and bottom retaining screws.
   - Recommended torque = 0.45 N•m (4.0 lb•in)
   - Recommended screwdriver = T15 Hexalobular

IMPORTANT Do not over-tighten retaining screws.



I/O Module

20-750-2262C-2R *(24 Volts DC)*
20-750-2263C-1R2T *(24 Volts DC)*
20-750-2262D-2R *(120 Volts AC)*

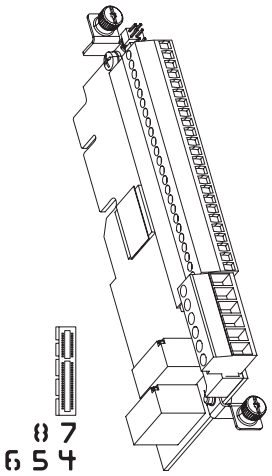


Table 37 - Input Mode Jumpers

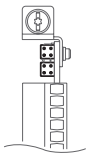
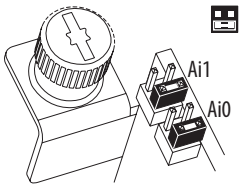
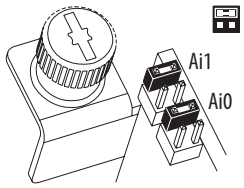
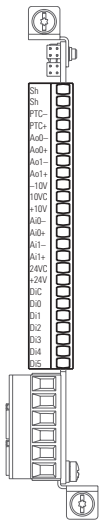
Jumper Position	Voltage Mode	Current Mode
		

Table 38 - TB1 Terminal Designations



Terminal	Name	Description	Related Param (5)
Sh	Shield	Terminating point for wire shields when an EMC plate or conduit box is not installed.	
Sh			
Ptc–	Motor PTC (–)	Motor protection device (Positive Temperature Coefficient).	40 on Port X
Ptc+	Motor PTC (+)		
Ao0–	Analog Out 0 (–)	Bipolar, ±10V, 11 bit & sign, 2 k ohm minimum load. 4-20 mA, 11 bit & sign, 400 ohm maximum load.	75 on Port X
Ao0+	Analog Out 0 (+)		
Ao1–	Analog Out 1 (–)		85 on Port X
Ao1+	Analog Out 1 (+)		
–10V	–10 Volt Reference	2k ohm minimum.	
10VC	10 Volt Common	For (–) and (+) 10 Volt references.	
+10V	+10 Volt Reference	2k ohm minimum.	
Ai0–	Analog Input 0 (–)	Isolated (3), bipolar, differential, 11 bit & sign. Voltage Mode: ±10V @ 88k ohm input impedance. Current Mode: 0-20 mA @ 93 ohm input impedance.	50, 70 on Port X
Ai0+	Analog Input 0 (+)		
Ai1–	Analog Input 1 (–)		60, 70 on Port X
Ai1+	Analog Input 1 (+)		
24VC	24 Volt Common (1)	Drive supplied logic input power. 200 mA max. per I/O module 600 mA max per drive	
+24V	+24 Volt DC (1)		
Di C	Digital Input Common	Common for Digital Inputs 0…5	
Di 0	Digital Input 0 (2)	24V DC - Opto isolated Low State: less than 5V DC High State: greater than 20V DC 11.2 mA DC 115V AC, 50/60 Hz (4) - Opto isolated Low State: less than 30V AC High State: greater than 100V AC	1 on Port X
Di 1	Digital Input 1 (2)		
Di 2	Digital Input 2 (2)		
Di 3	Digital Input 3 (2)		
Di 4	Digital Input 4 (2)		
Di 5	Digital Input 5 (2)		

(1) Not present on 120V versions.
(2) Digital Inputs are either 24 Volts DC (2262C) or 115 Volts AC (2262D) based on module catalog number. Ensure applied voltage is correct for I/O module.
(3) Differential Isolation - External source must be maintained at less than 160V with respect to PE. Input provides high common mode immunity.
(4) For CE compliance use shielded cable. Cable length should not exceed 30 m (98 ft).
(5) I/O Module parameters will also have a Port designation.

ATTENTION: Risk of equipment damage exists. Ensure that the correct voltage is applied to the I/O Module digital inputs. Refer to the I/O Module catalog number to determine the voltage rating.

- 20-750-2262**C**-2R is rated 24 Volts DC
- 20-750-2262**C**-1R2T is rated 24 Volts DC
- 20-750-2262**D**-2R is rated 120 Volts AC

Table 39 - TB2 Terminal Designations (2 Relay Outputs: 2R)

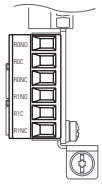
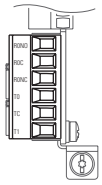
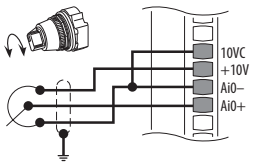
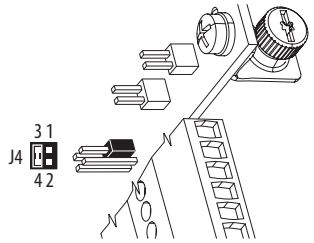
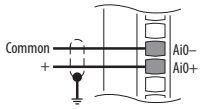
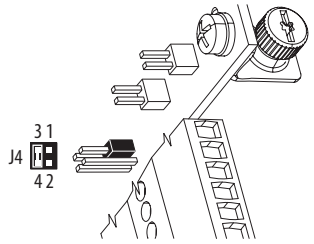
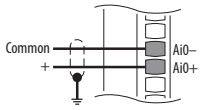
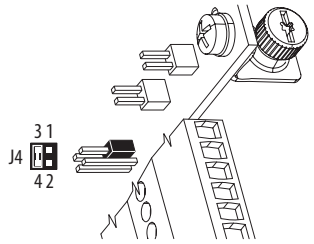
Relay Out	Terminal	Name	Description	Related Param
	R0NO	Relay 0 N.O.	Relay Normally Open contact output: 240V AC, 24V DC, 2 A max. General Purpose (Inductive) / Resistive	10, 100, 101, 105, 106 on Port X
	R0C	Relay 0 Common		
	R0NC	Relay 0 N.C.		
	R1NO	Relay 1 N.O.	Relay Normally Closed contact output: 240V AC, 24V DC, 2 A max. Resistive Only	20, 110, 111, 115, 116 on Port X
	R1C	Relay 1 Common		
	R1NC	Relay 1 N.C.		

Table 40 - TB2 Terminal Designations (1 Relay and 2 Transistor Outputs: IR2T)

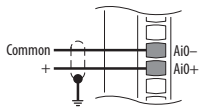
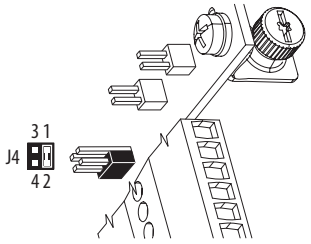
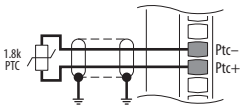
Relay Out	Terminal	Name	Description	Related Param
	R0NO	Relay 0 N.O.	Relay Normally Open contact output: 240V AC, 24V DC, 2 A max. General Purpose (Inductive) / Resistive	10, 100, 101, 105, 106 on Port X
	R0C	Relay 0 Common		
	R0NC	Relay 0 N.C.	Relay Normally Closed contact output: 240V AC, 24V DC, 2 A max. Resistive Only	
	T0	Transistor Output 0	Transistor output Rating: 24V DC = 1 A max. 24V DC = 0.4 A Max for U.L. applications Resistive	20 on Port X
	TC	Transistor Output Common		
	T1	Transistor Output 1		30 on Port X

I/O Wiring Examples

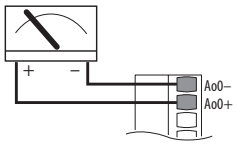
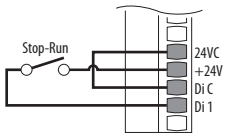
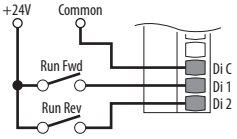
753 Main Control Board TB1 Wiring Examples

Input/Output	Connection Example	Required Parameter Changes
Potentiometer Unipolar Speed Reference 10k Ohm Pot. Recommended (2k Ohm Minimum)	 753 Main Control Board TB1 	• Set Direction Mode Port 0: P308 [Direction Mode] = 0 “Unipolar” • Set Selection Port 0: P545 [Spd Ref A Sel] = Port 0: P260 [Anlg In0 Value] • Adjust Scaling Port 0: P261 [Anlg In0 Hi] = 10 Volt Port 0: P262 [Anlg In0 Lo] = 0 Volt Port 0: P547 [Spd Ref A AnlgHi] = 60 Hz Port 0: P548 [Spd Ref A AnlgLo] = 0 Hz • View Results Port 0: P260 [Anlg In0 Value] Port 0: P592 [Selected Spd Ref]
Analog Input Bipolar Speed Reference ±10V Input	 753 Main Control Board TB1 	• Set Direction Mode Port 0: P308 [Direction Mode] = 1 “Bipolar” • Set Selection Port 0: P545 [Spd Ref A Sel] = Port 0: P260 [Anlg In0 Value] • Adjust Scaling Port 0: P261 [Anlg In0 Hi] = +10 Volt Port 0: P262 [Anlg In0 Lo] = -10 Volt Port 0: P547 [Spd Ref A AnlgHi] = +60 Hz Port 0: P548 [Spd Ref A AnlgLo] = -60 Hz • View Results Port 0: P260 [Anlg In0 Value] Port 0: P592 [Selected Spd Ref]
Analog Voltage Input Unipolar Speed Reference 0 to +10V Input	 753 Main Control Board TB1 	• Set Direction Mode Port 0: P308 [Direction Mode] = 0 “Unipolar” • Set Selection Port 0: P545 [Spd Ref A Sel] = Port 0: P260 [Anlg In0 Value] • Adjust Scaling Port 0: P261 [Anlg In0 Hi] = 10 Volt Port 0: P262 [Anlg In0 Lo] = 0 Volt Port 0: P547 [Spd Ref A AnlgHi] = 60 Hz Port 0: P548 [Spd Ref A AnlgLo] = 0 Hz • View Results Port 0: P260 [Anlg In0 Value] Port 0: P592 [Selected Spd Ref]

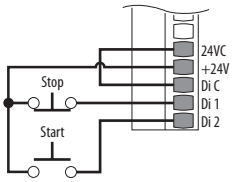
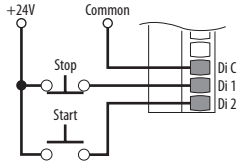
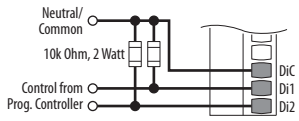
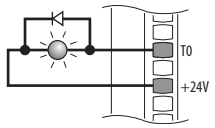
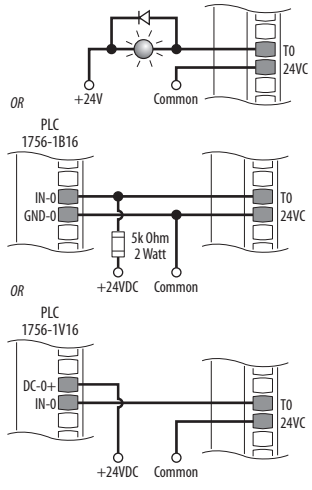
753 Main Control Board TB1 Wiring Examples (Continued)

Input/Output	Connection Example	Required Parameter Changes
Analog Current Input Unipolar Speed Reference 0-20 mA Input	 753 Main Control Board TB1 	• Set Direction Mode Port 0: P308 [Direction Mode] = 0 "Unipolar" • Set Selection Port 0: P545 [Spd Ref A Sel] = Port 0: P260 [Anlg In0 Value] • Adjust Scaling Port 0: P261 [Anlg In0 Hi] = 20 mA Port 0: P262 [Anlg In0 Lo] = 0 mA Port 0: P547 [Spd Ref A AnlgHi] = 60 Hz Port 0: P548 [Spd Ref A AnlgLo] = 0 Hz • View Results Port 0: P260 [Anlg In0 Value] Port 0: P592 [Selected Spd Ref]
HW Input PTC PTC Nominal = 1.8 k Ohm PTC Trip = 3.1k Ohm PTC Reset = 2.2 k Ohm	 753 Main Control Board TB1	• Configuration Port 0: P250 [PTC Cfg] = 0 "Ignore," 1 "Alarm," 2 "Flt Minor," 3 "FltCoastStop," 4 "Flt RampStop," or 5 "Flt CL Stop" • View Results Port 0: P251 [PTC Status]

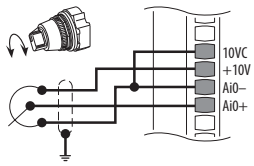
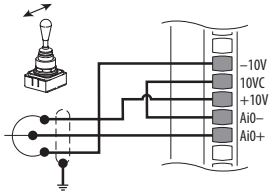
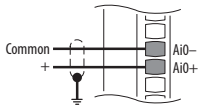
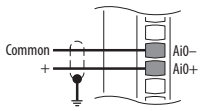
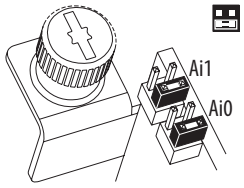
ATTENTION: To avoid an electric shock hazard, the connection of the motor temperature sensor requires double or reinforced insulation between motor live parts and the PTC.

Analog Voltage Output ±10V, 0…20 mA Bipolar +10V Unipolar	 753 Main Control Board TB1	• Configuration Port 0: P270 [Anlg Out Type], bit 0 = 0 • Set Selection Port 0: P275 [Anlg Out0 Sel] = Port 0: P3 [Mtr Vel Fdbk] • Adjust Scaling Port 0: P278 [Anlg Out0 DataHi] = 60 Hz Port 0: P279 [Anlg Out0 DataLo] = 0 Hz Port 0: P280 [Anlg Out0 Hi] =10V/20 mA Port 0: P281 [Anlg Out0 Lo] = 0V/0 mA • View Results Port 0: P277 [Anlg Out0 Data] Port 0: P282 [Anlg Out0 Val]
2-Wire Control Non-Reversing 24V DC internal supply	 753 Main Control Board TB1	• Set Direction Mode Port 0: P308 [Direction Mode] = 2 "Rev Disable" • Set Selection Port 0: P163 [DI Run] = Port 0: P220 [Digital In Sts], bit 1 = Digital In 1 • View Results Port 0: P220 [Digital In Sts] Port 0: P935 [Drive Status 1]
2-Wire Control Reversing External 24 volt supply	 753 Main Control Board TB1	• Set Direction Mode Port 0: P308 [Direction Mode] = 0 "Unipolar" • Set Selection Port 0: P164 [DI Run Forward] = Port 0: P220 [Digital In Sts], bit 1 = Digital In 1 Port 0: P165 [DI Run Reverse] = Port 0: P220 [Digital In Sts], bit 2 = Digital In 2 • View Results Port 0: P220 [Digital In Sts] Port 0: P935 [Drive Status 1]

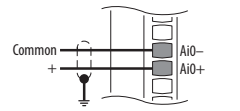
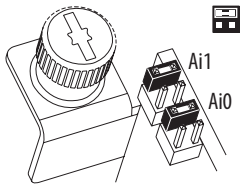
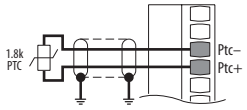
753 Main Control Board TB1 Wiring Examples (Continued)

Input/Output	Connection Example	Required Parameter Changes
3-Wire Control Internal supply	 753 Main Control Board TB1	• Set Selection Port 0: P158 [DI Stop] = Port 0: P220 [Digital In Sts], bit 1 = Digital In 1 Port 0: P161 [DI Start] = Port 0: P220 [Digital In Sts], bit 2 = Digital In 2 • View Results Port 0: P220 [Digital In Sts] Port 0: P935 [Drive Status 1]
3-Wire Control External 24 volt supply	 753 Main Control Board TB1	• Set Selection Port 0: P158 [DI Stop] = Port 0: P220 [Digital In Sts], bit 1 = Digital In 1 Port 0: P161 [DI Start] = Port 0: P220 [Digital In Sts], bit 2 = Digital In 2 • View Results Port 0: P220 [Digital In Sts] Port 0: P935 [Drive Status 1]
Digital Input PLC Output Module	 753 Main Control Board TB1	• Set Selection Port 0: P158 [DI Stop] = Port 0: P220 [Digital In Sts], bit 1 = Digital In 1 Port 0: P161 [DI Start] = Port 0: P220 [Digital In Sts], bit 2 = Digital In 2 • View Results Port 0: P220 [Digital In Sts] Port 0: P935 [Drive Status 1]
Digital Output Internal supply	 753 Main Control Board TB1	• Set Selection Port 0: P240 [T00 Sel] = Port 0: P935 [Drive Status 1], bit 7 = Faulted • View Results Port 0: P225 [Dig Out Sts]
Digital Output External supply	 PLC TB 753 TB1	When T0 is On, IN-0 is Off.

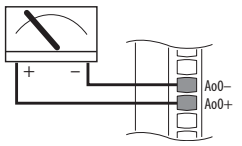
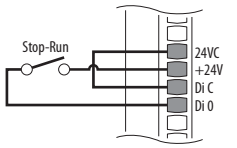
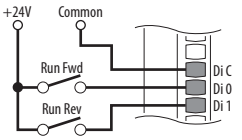
750-Series I/O Module TB1 Wiring Examples

Input/Output	Connection Example	Required Parameter Changes
Potentiometer Unipolar Speed Reference 10k Ohm Pot. Recommended (2k Ohm Minimum)	 I/O Module TB1	• Set Direction Mode Port 0: P308 [Direction Mode] = 0 “Unipolar” • Set Selection Port 0: P545 [Spd Ref A Sel] = Port X (I/O Module): P50 [Anlg In0 Value] • Adjust Scaling Port X (I/O Module): P51 [Anlg In0 Hi] = 10 Volt Port X (I/O Module): P52 [Anlg In0 Lo] = 0 Volt Port 0: P547 [Spd Ref A AnlgHi] = 60 Hz Port 0: P548 [Spd Ref A AnlgLo] = 0 Hz • View Results Port X (I/O Module): P50 [Anlg In0 Value] Port 0: P592 [Selected Spd Ref]
Joystick Bipolar Speed Reference ±10V Input	 I/O Module TB1	• Set Direction Mode Port 0: P308 [Direction Mode] = 1 “Bipolar” • Set Selection Port 0: P545 [Spd Ref A Sel] = Port X (I/O Module): P50 [Anlg In0 Value] • Adjust Scaling Port X (I/O Module): P51 [Anlg In0 Hi] = +10 Volt Port X (I/O Module): P52 [Anlg In0 Lo] = -10 Volt Port 0: P547 [Spd Ref A AnlgHi] = +60 Hz Port 0: P548 [Spd Ref A AnlgLo] = -60 Hz • View Results Port X (I/O Module): P50 [Anlg In0 Value] Port 0: P592 [Selected Spd Ref]
Analog Input Bipolar Speed Reference ±10V Input	 I/O Module TB1	• Set Direction Mode Port 0: P308 [Direction Mode] = 1 “Bipolar” • Set Selection Port 0: P545 [Spd Ref A Sel] = Port X (I/O Module): P50 [Anlg In0 Value] • Adjust Scaling Port X (I/O Module): P51 [Anlg In0 Hi] = +10 Volt Port X (I/O Module): P52 [Anlg In0 Lo] = -10 Volt Port 0: P547 [Spd Ref A AnlgHi] = +60 Hz Port 0: P548 [Spd Ref A AnlgLo] = -60 Hz • View Results Port X (I/O Module): P50 [Anlg In0 Value] Port 0: P592 [Selected Spd Ref]
Analog Voltage Input Unipolar Speed Reference 0 to +10V Input	 I/O Module TB1 	• Set Direction Mode Port 0: P308 [Direction Mode] = 0 “Unipolar” • Set Selection Port 0: P545 [Spd Ref A Sel] = Port X (I/O Module): P50 [Anlg In0 Value] • Adjust Scaling Port X (I/O Module): P51 [Anlg In1 Hi] = 10 Volt Port X (I/O Module): P52 [Anlg In1 Lo] = 0 Volt Port 0: P547 [Spd Ref A AnlgHi] = 60 Hz Port 0: P548 [Spd Ref A AnlgLo] = 0 Hz • View Results Port X (I/O Module): P50 [Anlg In0 Value] Port 0: P592 [Selected Spd Ref]

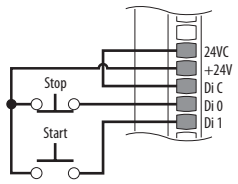
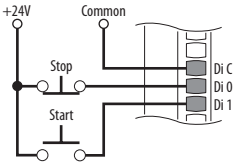
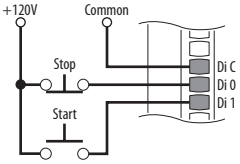
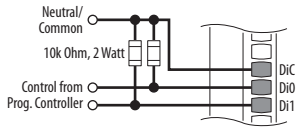
750-Series I/O Module TB1 Wiring Examples (Continued)

Input/Output	Connection Example	Required Parameter Changes
Analog Current Input Unipolar Speed Reference 0-20 mA Input	 I/O Module TB1 	• Set Direction Mode Port 0: P308 [Direction Mode] = 0 “Unipolar” • Set Selection Port 0: P545 [Spd Ref A Sel] = Port X (I/O Module): P50 [Anlg In0 Value] • Adjust Scaling Port X (I/O Module): P51 [Anlg In0 Hi] = 20 mA Port X (I/O Module): P52 [Anlg In0 Lo] = 0 mA Port 0: P547 [Spd Ref A AnlgHi] = 60 Hz Port 0: P548 [Spd Ref A AnlgLo] = 0 Hz • View Results Port X (I/O Module): P50 [Anlg In0 Value] Port 0: P592 [Selected Spd Ref]
HW Input PTC PTC Nominal = 1.8 k Ohm PTC Trip = 3.1 k Ohm PTC Reset = 2.2 k Ohm	 I/O Module TB1	• Configuration Port X (I/O Module): P40 [PTC Cfg] = 0 “Ignore,” 1 “Alarm,” 2 “Flt Minor,” 3 “Flt CoastStop,” 4 “Flt RampStop,” or 5 “Flt CL Stop” • View Results Port X (I/O Module): P41 [PTC Sts] Port X (I/O Module): P42 [PTC Raw Value]

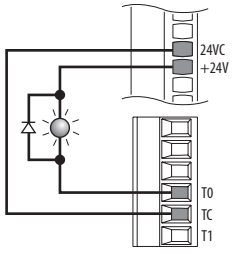
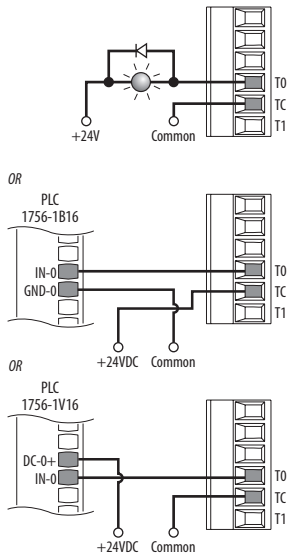
ATTENTION: To avoid an electric shock hazard, the connection of the motor temperature sensor requires double or reinforced insulation between motor live parts and the PTC.

Analog Voltage Output ±10V, 0…20 mA Bipolar +10V Unipolar	 I/O Module TB1	• Configuration Port X (I/O Module): P70 [Anlg Out Type], bit 0 = 0 • Set Selection Port X (I/O Module): P75 [Anlg Out0 Sel] = Port 0: P3 [Mtr Vel Fdbk] • Adjust Scaling Port X (I/O Module): P78 [Anlg Out0 DataHi] = 60 Hz Port X (I/O Module): P79 [Anlg Out0 DataLo] = 0 Hz Port X (I/O Module): P80 [Anlg Out0 Hi] =10V/20 mA Port X (I/O Module): P81 [Anlg Out0 Lo] = 0V/0 mA • View Results Port X (I/O Module): P77 [Anlg Out0 Data] Port X (I/O Module): P82 [Anlg Out0 Val]
2-Wire Control Non-Reversing 24V DC internal supply	 I/O Module TB1	• Set Direction Mode Port 0: P308 [Direction Mode] = 2 “Rev Disable” • Configuration Port 0: P150 [Digital In Cfg] = 1 “Run Level” • Set Selection Port 0: P163 [DI Run] = Port X (I/O Module): P1 [Dig In Sts], bit 0 = Input 0 • View Results Port X (I/O Module): P1 [Dig In Sts] Port 0: P935 [Drive Status 1]
2-Wire Control Reversing External 24 volt supply 20-750-2262C-2R 20-750-2263C-1R2T	 I/O Module TB1	• Set Direction Mode Port 0: P308 [Direction Mode] = 0 “Unipolar” • Configuration Port 0: P150 [Digital In Cfg] = 1 “Run Level” • Set Selection Port 0: P164 [DI Run Forward] = Port X (I/O Module): P1 [Dig In Sts], bit 0 = Input 0 Port 0: P165 [DI Run Reverse] = Port X (I/O Module): P1 [Dig In Sts], bit 1 = Input 1 • View Results Port X (I/O Module): P1 [Dig In Sts] Port 0: P935 [Drive Status 1]

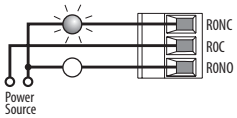
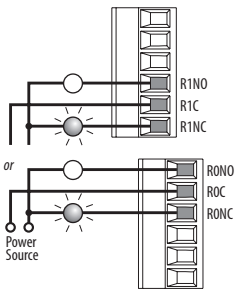
750-Series I/O Module TB1 Wiring Examples (Continued)

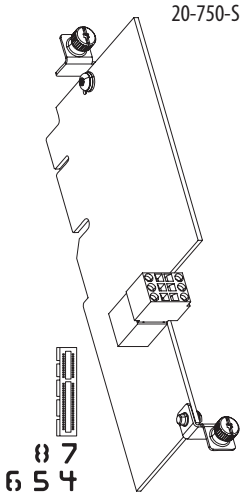
Input/Output	Connection Example	Required Parameter Changes
3-Wire Control Internal supply	 I/O Module TB1	• Set Selection Port 0: P158 [DI Stop] = Port X (I/O Module): P1 [Dig In Sts], bit 0 = Input 0 Port 0: P161 [DI Start] = Port X (I/O Module): P1 [Dig In Sts], bit 1 = Input 1 • View Results Port X (I/O Module): P1 [Dig In Sts] Port 0: P935 [Drive Status 1]
3-Wire Control External 24 volt supply 20-750-2262C-2R 20-750-2263C-1R2T	 I/O Module TB1	• Set Selection Port 0: P158 [DI Stop] = Port X (I/O Module): P1 [Dig In Sts], bit 0 = Input 0 Port 0: P161 [DI Start] = Port X (I/O Module): P1 [Dig In Sts], bit 1 = Input 1 • View Results Port X (I/O Module): P1 [Dig In Sts] Port 0: P935 [Drive Status 1]
3-Wire Control External 120 volt supply 20-750-2262D-2R	 I/O Module TB1	• Set Selection Port 0: P158 [DI Stop] = Port 0: P220 [Digital In Sts], bit 1 = Digital In 1 Port 0: P161 [DI Start] = Port 0: P220 [Digital In Sts], bit 2 = Digital In 2 • View Results Port 0: P220 [Digital In Sts] Port 0: P935 [Drive Status 1]
Digital Input PLC Output Module	 I/O Module TB1	• Set Selection Port 0: P158 [DI Stop] = Port X (I/O Module): P1 [Dig In Sts], bit 0 = Input 0 Port 0: P161 [DI Start] = Port X (I/O Module): P1 [Dig In Sts], bit 1 = Input 1 • View Results Port X (I/O Module): P1 [Dig In Sts] Port 0: P935 [Drive Status 1]

750-Series I/O Module TB1 Wiring Examples (Continued)

Input/Output	Connection Example	Required Parameter Changes
Digital Output Internal supply 20-750-2263C-1R2T	 I/O Module TB1 I/O Module TB2	• Set Selection Port X (I/O Module): P20 [T00 Sel] = Port 0: P935 [Drive Status 1], bit 7 = Faulted • View Results Port X (I/O Module): P5 [Dig Out Sts]
Digital Output External supply 20-750-2263C-1R2T	 PLC TB I/O Module TB2	

Relay Wiring Examples

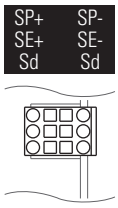
Input/Output	Connection Example	Required Parameter Changes
Relay Output External supply	753 Main Control Board 	• Set Selection Port 0: P230 [R00 Sel] = Port 0: P935 [Drive Status 1], bit 7 = Faulted • View Results Port 0: P225 [Dig Out Sts]
	750-Series I/O Module 	• Set Selection Port X (I/O Module): P10 [R00 Sel] = Port 0: P935 [Drive Status 1], bit 7 = Faulted • View Results Port X (I/O Module): P5 [Dig Out Sts]



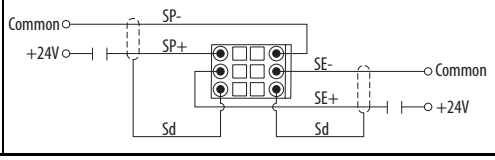
Safe Torque Off Option Module

The safe torque off option is just one component in a safety control system. Components in the system must be chosen and applied appropriately to achieve the desired level of operational safety. For detailed information on applying this option, refer to the PowerFlex 750-Series Safe Torque Off User Manual, publication 750-UM002.

Table 41 - TB2 Terminal Designations



Terminal	Name	Description
SP+	+24 Volt Safety Power	User-supplied power: 24 volt ±10% 45 mA typical
SP-	Safety Power Common	
SE+	+24 Volt Safety Enable	User-supplied power: 24 volt ±10% 25 mA typical
SE-	Safety Enable Common	
Sd	Shield	Terminating point for wire shields when an EMC plate or conduit box is not installed.
Sd	Shield	

Safety Input	Connection Example
Power Supply	

Important Safe Torque Off Option Module Installation Notes

Cabling

- Safety input wiring must be protected against external damage by cable ducting, conduit, aramored cable or other means.
- Shielded cable is required.

Port Assignment

- When used in an Integrated Motion application, the Safe Torque Off option must be installed in port 6.
- Only one safety option module can be installed at a time. Multiple safety options or duplicate safety option installations are not supported.

Jumper Settings

- Ensure the hardware enable jumper (ENABLE) on the main control board is installed. Refer to page 146 for location. If not installed, the drive will fault when powered up.
- Ensure the safety enable jumper (SAFETY) on the main control board is removed (Frames 1...7 only). Refer to page 148 for location.

Safe Speed Monitor Option Module

The Safe Speed Monitor option is just one component in a safety control system. Components in the system must be chosen and applied appropriately to achieve the desired level of operational safety. For detailed information on applying this option, refer to the Safe Speed Monitor Option Module for PowerFlex 750-Series AC Drives Safety Reference Manual, publication 750-RM001.

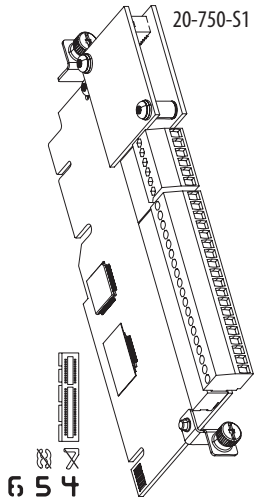


Table 42 - TB1 Terminal Designations

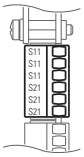
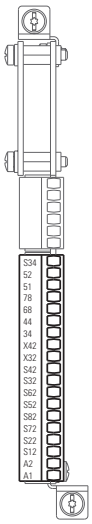
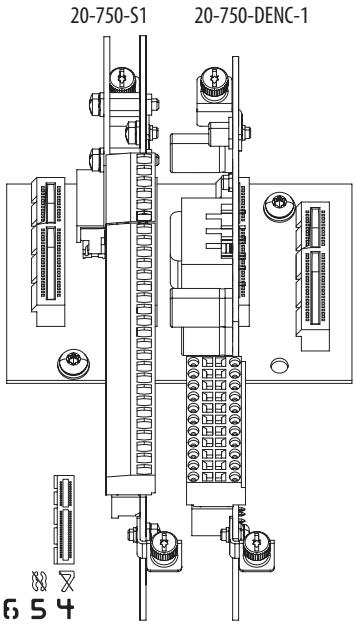
	Terminal	Name	Signal Name	Description
	S11	Pto0	TEST_OUT_0	Pulse test source for safety inputs.
	S11			
	S11			
	S21	Pto1	TEST_OUT_1	Pulse test source for safety inputs.
	S21			
	S21			

Table 43 - TB2 Terminal Designations

	Terminal	Name	Description	Related Param
	S34	Res0	Reset	
	52	Dco1	Door Control Output. Enables pulse testing.	74
	51	Dco0		
	78	Slo1	Safe Limited Speed Output. Enables pulse testing.	73
	68	Slo0		
	44	Sso1	Safe Stop Output. Enables pulse testing.	72
	34	Sso0		
	X42	Lmi1	Lock Monitoring Input	60
	X32	Lmi0		
	S42	Dmi1	Door Monitoring Input	58
	S32	Dmi0		
	S62	Sli1	Safe Limited Speed Input	52
	S52	Sli0		
	S82	Esm1	Enabling Switch Monitoring Input	54
	S72	Esm0		
	S22	Ssi1	Safe Stop Input	44
	S12	Ssi0		
	A2	24VC	Customer supplied 24V DC. Module is not functional without these connections.	
	A1	+24V		



Important Safe Speed Monitor Option Module Installation Notes

Cabling

- Safety input wiring must be protected against external damage by cable ducting, conduit, aramored cable or other means.
- Shielded cable is required.
- When installed in a Frame 8 or larger drive, an EMC Core Kit, catalog number 20-750-EMCSSM1-F8, is required.

Feedback Devices

The Safe Speed Monitor option must be used with one of the following feedback devices.

- Dual Incremental Encoder module, catalog number 20-750-DENC-1
- Universal Feedback module catalog number 20-750-UFB-1

Port Assignment

- The Safe Speed Monitor option and the feedback device must be installed on the same backplane using ports 4, 5, or 6.
- When used in an Integrated Motion application, the Safe Speed Monitor option must be installed in port 6.
- Only one safety option module can be installed at a time. Multiple safety options or duplicate safety option installations are not supported.

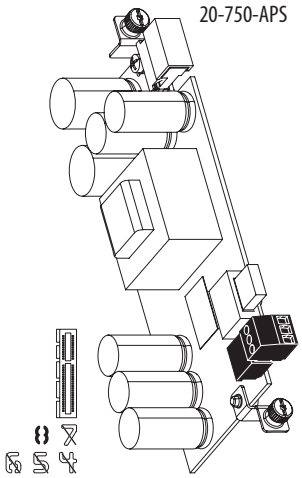
Jumper Settings

- Ensure the hardware enable jumper (ENABLE) on the main control board is installed. Refer to page 146 for location. If not installed, the drive will fault when powered up.
- Ensure the safety enable jumper (SAFETY) on the main control board is removed (Frames 1...7 only). Refer to page 148 for location.

Parameter Settings

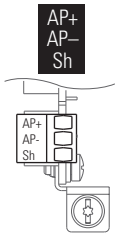
There are required parameter settings when used with the Universal Feedback module.

- Set Safe Speed Monitor parameter P28 [Fbk 1 Type] to option 0 “Sine/Cosine.”
- Set Universal Feedback parameter P6 [FB0 Device Sel] and/or P36 [FB1 Device Sel] to a Sine/Cosine type device.



Auxiliary Power Supply Option Module

Table 44 - TB1 Terminal Designations



Terminal	Name	Description
AP+	+24 Volt Auxiliary Power	Connections for customer supplied power supply: 24V DC ±10%, 3 A, PELV (Protective Extra Low Voltage) or SELV (Safety Extra Low Voltage)
AP–	Auxiliary Power Common	
Sh	Shield	Terminating point for wire shields when an EMC plate or conduit box is not installed.

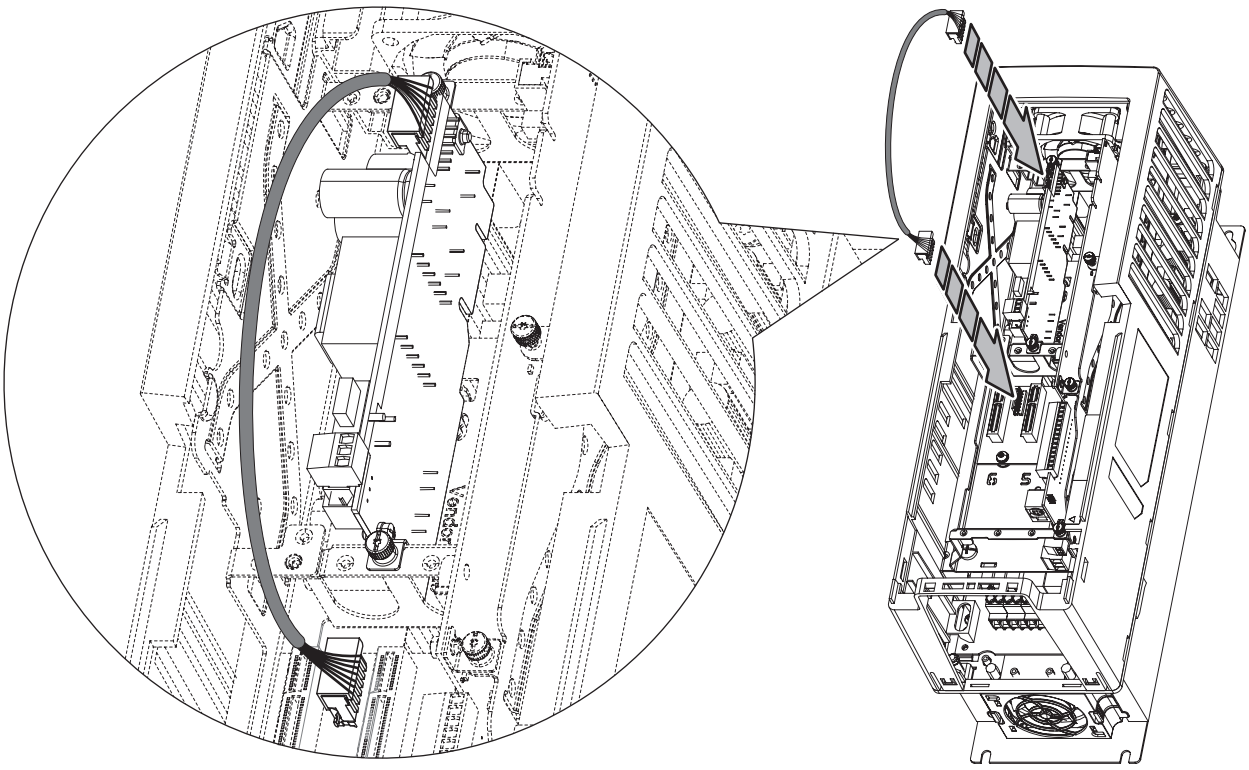
IMPORTANT The Auxiliary Power Supply option module may be installed in any option port. Due to its size, the module will extend over and block an adjacent port. Therefore, installation in Port 8 is recommended.

Do not use the Auxiliary Power Supply option module with Frame 8 and larger drives. Refer to page 149 fir information on connecting an external power supply to Frame 8 and larger drives.

A connector cable is provided with Auxiliary Power Supply option modules for use in PowerFlex 753 drives. The cable is used to connect the module to the backplane when installed on the upper control pod brackets.

IMPORTANT The connector cable is used with PowerFlex 755 Frame 1 drives. The cable is not used with PowerFlex 755 Frame 2 and larger drives.

Figure 76 - Auxiliary Power Supply Installation in PowerFlex 753 Drive (All Frames) and PowerFlex 755 (Frame 1 Drives Only)



DeviceNet Option Module

For complete information on the DeviceNet Option Module, refer to the PowerFlex 750-Series Drive DeviceNet Option Module User Manual, publication 750COM-UM002.

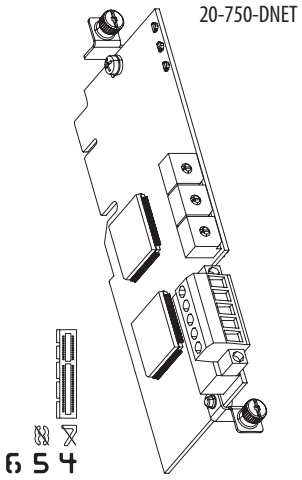


Table 45 - DeviceNet Option Module LED Indication

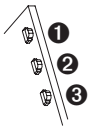
	LED	Name	Description
	❶	Port	DPI Connection Status
	❷	MOD	Option Module Status
	❸	NET A	DeviceNet Status

Table 46 - DeviceNet Option Module Rotary Switches

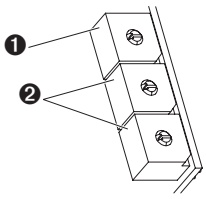
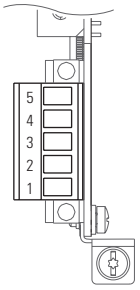
	Switch	Name	Description
	❶	Data Rate Switch	Sets the DeviceNet data rate at which the option module communicates.
	❷	Node Address Switches	Sets the node address of the option module.

Table 47 - TB1 Terminal Designations

	Terminal	Color	Signal	Function
	5	Red	V+	Power Supply
	4	White	CAN_H	Signal High
	3	Bare	SHIELD	Shield
	2	Blue	CAN_L	Signal Low
	1	Black	V-	Common

ControlNet Option Module

For complete information on the ControlNet Option Module, refer to the PowerFlex 20-750-CNETC Coaxial ControlNet Option Module User Manual, publication 750COM-UM003.

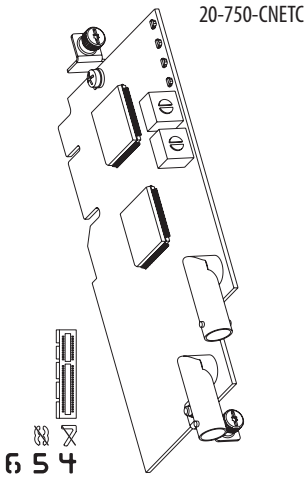


Table 48 - ControlNet Option Module LED Indication

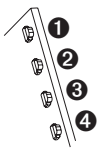
	LED	Name	Description
	❶	Port	DPI Connection Status
	❷	MOD	Option Module Status
	❸	NET A	ControlNet Channel A Status
	❹	NET B	ControlNet Channel B Status

Table 49 - ControlNet Option Module Rotary Switches

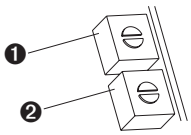
	Switch	Name	Description
	❶	TENS Switch	Sets the node address of the option module.
	❷	ONES Switch	

Table 50 - Coax Receptacles

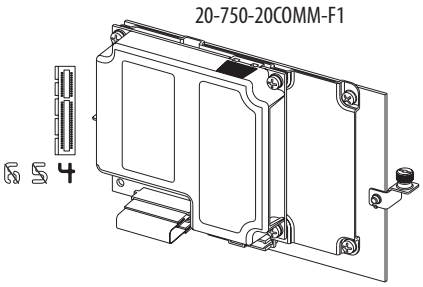
	Receptacle	Name	Description
	❶	Channel A	Channel A BNC connection to the network.
	❷	Channel B	Channel B (redundant) BNC connection to the network.

20-COMM Carrier

Enables use of some 20-COMM adapters with PowerFlex 750-Series drives. See Table 51.

Refer to publication 750COM-IN001 for instructions on installing a 20-COMM adapter on the 20-COMM Carrier.

Frame 1



Frames 2 and Larger

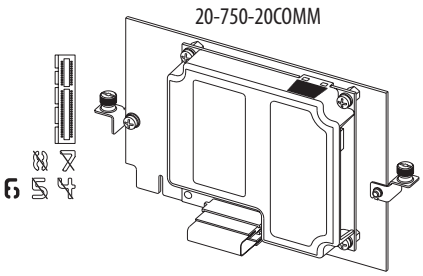


Table 51 - 20-COMM-* Network Adapter Compatibility with 750-Series Drives

Adapter Type	Accesses Ports 2, 3, and 6 for I/O Connections (Implicit and Explicit Messaging)	Accesses Port 7 through 14 Devices	Supports Drive Add On Profiles	Supports Asian-Languages (5)
20-COMM-B BACnet MS/TP	No			
20-COMM-C ControlNet (Coax)	✓ (1)	✓ v3.001 (3)	✓ (4)	✓ v3.001 (3)
20-COMM-D DeviceNet		No		
20-COMM-E EtherNet/IP		✓ v4.001 (3)	✓ (4)	✓ v4.001 (3)
20-COMM-H RS-485 HVAC	✓ v2.009 (2)	No		
20-COMM-K CANopen	✓ v1.001 (3)			
20-COMM-L LonWorks	✓ v1.007 (3)			
20-COMM-M Modbus/TCP	✓ (1)	✓ v2.001 (3)	No	✓ v2.001 (3)
20-COMM-Q ControlNet (Fiber)	✓ (1)	✓ v3.001 (3)	✓ (4)	✓ v3.001 (3)
20-COMM-R Remote I/O		No		
20-COMM-S RS-485 DF1				

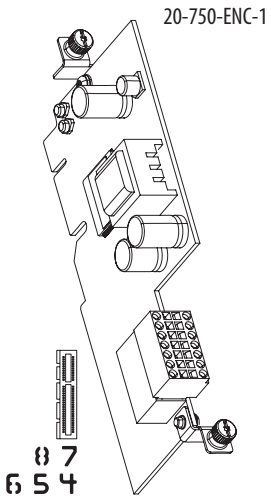
(1) Controller must be capable of reading/writing 32-bit floating point (REAL) values.
(2) Supports all three modes of operation (RTU, P1, N2).
(3) Requires this adapter firmware version or higher.
(4) Requires firmware version v1.05 or higher of the drive Add On Profiles for RSLogix 5000 version v16 or higher.
(5) Chinese, Japanese, and Korean languages are supported at the time of publication.

Frame 1 Drives Installation Recommendations

- PowerFlex Frame 1 drives require the use of the 20-750-20COMM-F1 Communication Carrier kit. This kit contains the required adapter plate.
- Only install the 20-750-20COMM-F1 Communication Carrier in Port 4. See page 150 for port locations. Port 5 will not be accessible when this module is installed.

Frame 2 and Larger Drives Installation Recommendations

- Installing the 20-750-20COMM Communication Carrier in Port 6 is recommended. Installing in Port 4 or Port 5 will make the adjacent left port inaccessible to other option modules, and may interfere with network cable connections.

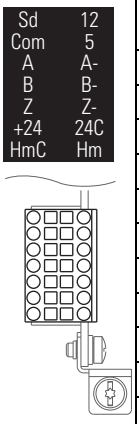


Single Incremental Encoder Option Module

Table 52 - Single Incremental Encoder Specifications

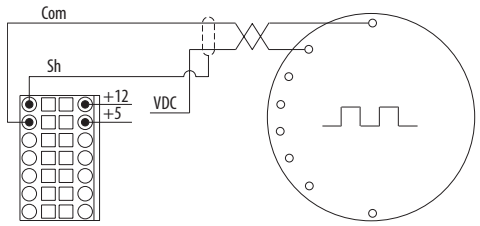
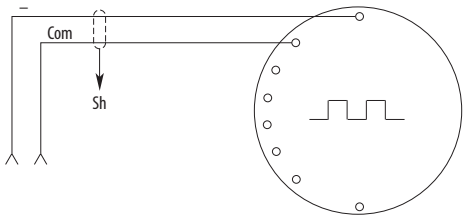
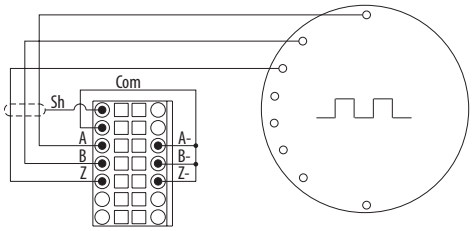
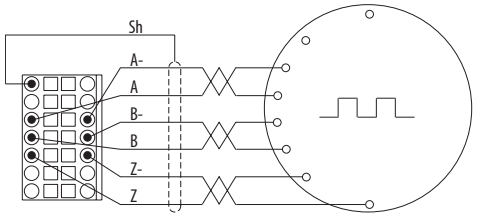
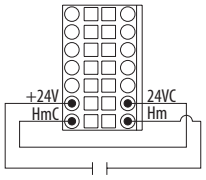
Consideration	Description
Input	Differential or Single Ended operation, Constant Current Sink operation ~10 mA,
	5V DC minimum to 15V DC maximum sourcing 10 mA minimum high state voltage of 3.5V DC maximum low state voltage of 0.4V DC
Maximum Cable Length	30 m (100 ft) @ 5V, 183 m (600 ft) @ 12V
Maximum Input Frequency	250 kHz

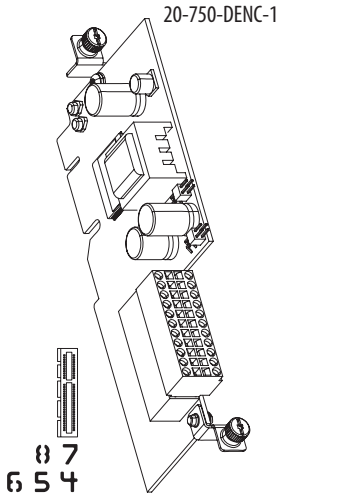
Table 53 - TB1 Terminal Designations

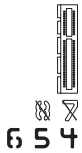


Terminal	Name	Description
Sd	Shield	Terminating point for wire shields when an EMC plate or conduit box is not installed.
12	+12 Volt DC Power	Power supply for encoder 250 mA.
Com	Common	+12V and +5V Common
5	+5 Volt DC Power	Power supply for encoder 250 mA.
A	Encoder A	Single channel or quadrature A input.
A-	Encoder A (NOT)	
B	Encoder B	Quadrature B input.
B-	Encoder B (NOT)	
Z	Encoder Z	Pulse or marker input.
Z-	Encoder Z (NOT)	
+24	+24 Volt	Power source for homing input.
24C	Common	
HmC	Homing Input Common	Captures the AB edge counter.
Hm	Homing Input	

Table 54 - Single Incremental Encoder Sample Wiring

I/O	Connection Example
Encoder Power by Drive 12V DC, 250 mA OR 5V DC, 250 mA	
Separately Powered Encoder	
Encoder Signal – **Single-Ended, Dual Channel**	
Encoder Signal – **Differential, Dual Channel**	
Homing Signal – **Internal Drive Power**	





See **Important** statement on page 148.

Dual Incremental Encoder Option Module

Table 55 - Dual Incremental Encoder Jumper Settings

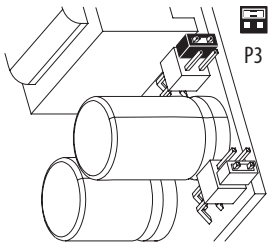
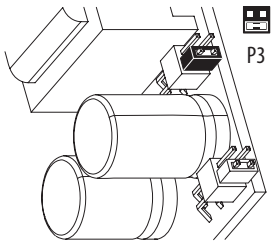
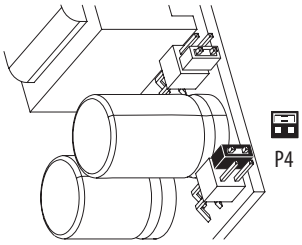
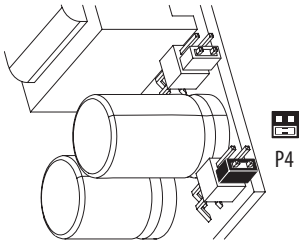
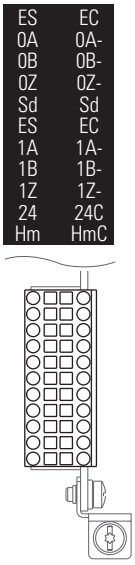
Jumper	Enabled Position	Storage Position
P3 - Safety Jumper Enables use with speed monitoring safety option (20-750-S1).		
P4 - 12V Jumper Enables use with 12 volt supply in “Enabled” position and 5 volt supply in “Storage” position.		

Table 56 - Dual Incremental Encoder Specifications

Consideration	Description
Input	Differential or Single Ended operation, Constant Current Sink operation ~10 mA
	5V DC minimum to 15V DC maximum sourcing 10 mA minimum high state voltage of 3.5V DC maximum low state voltage of 0.4V DC
Maximum Cable Length	30 m (100 ft) @ 5V, 183 m (600 ft) @ 12V
Maximum Input Frequency	250 kHz

Table 57 - Dual Incremental Encoder Terminal Designations



Terminal	Name	Description
ES	+12 or +5 Volt DC Power	Power supply for Encoder 0, 250 mA.
EC	Common	+12V and +5V Encoder 0, common
0A	Encoder 0: A	Single channel or quadrature A input.
0A-	Encoder 0: A (NOT)	
0B	Encoder 0: B	Quadrature B input.
0B-	Encoder 0: B (NOT)	
0Z	Encoder 0: Z	Pulse or marker input.
0Z-	Encoder 0: Z (NOT)	
Sd	Encoder Shield	Terminating point for wire shields when an EMC plate or conduit box is not installed.
Sd	Encoder Shield	
ES	+12 or +5 Volt DC Power	Power supply for Encoder 1, 250 mA.
EC	Common	+12V and +5V Encoder 1, common
1A	Encoder 1: A	Single channel or quadrature A input.
1A-	Encoder 1: A (NOT)	
1B	Encoder 1: B	Quadrature B input.
1B-	Encoder 1: B (NOT)	
1Z	Encoder 1: Z	Pulse or marker input.
1Z-	Encoder 1: Z (NOT)	
24	+24 Volt	Power source for homing input.
24C	Common	
Hm	Homing Input	Captures the AB edge counter.
HmC	Homing Input Common	

Wiring Examples - Single Incremental Encoder Option Module Connections

Figure 77 - Differential Dual Channel with Z Channel

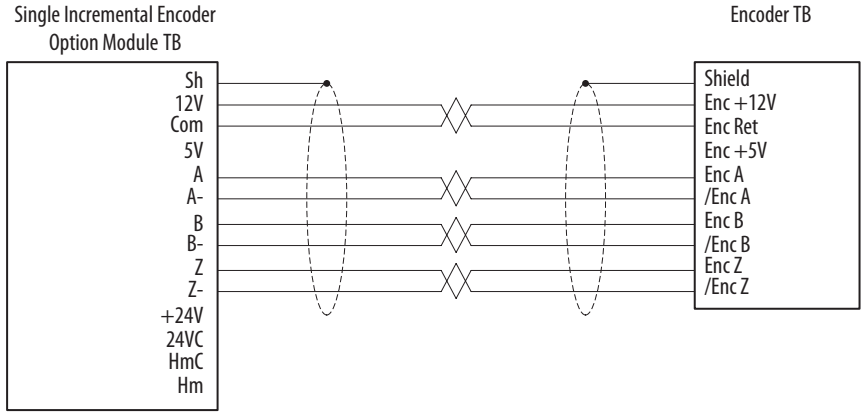


Figure 78 - Differential Dual Channel without Z Channel

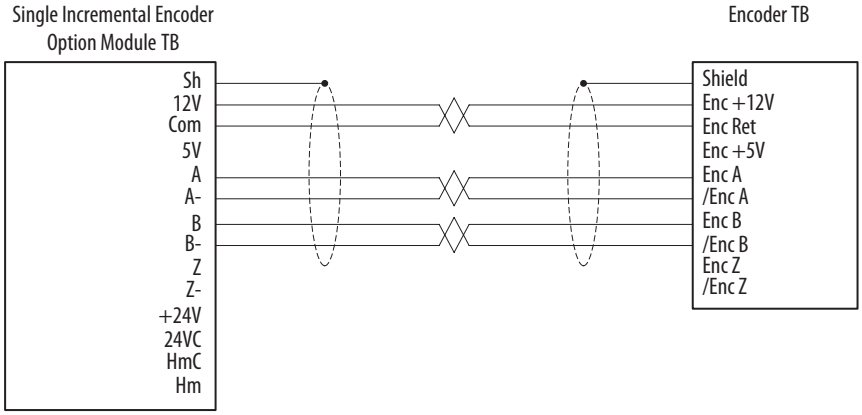


Figure 79 - Differential Dual Channel with Z Channel with External Power Supply

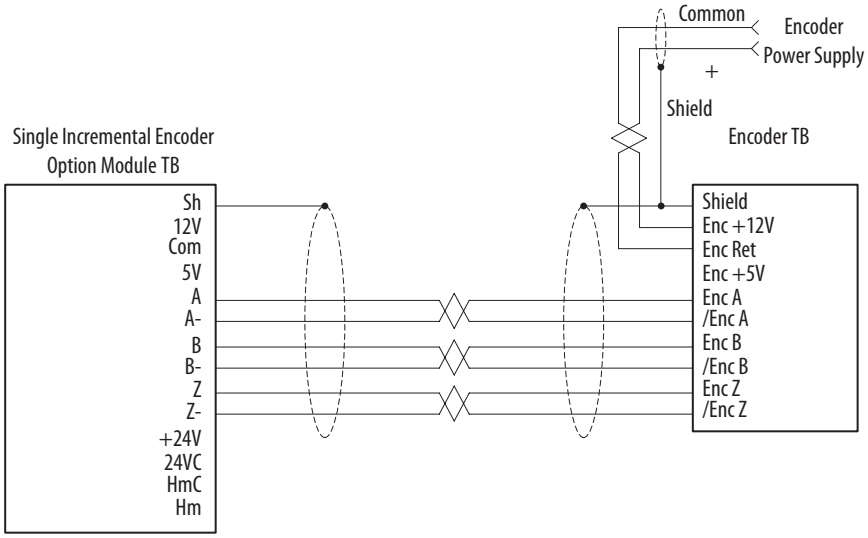
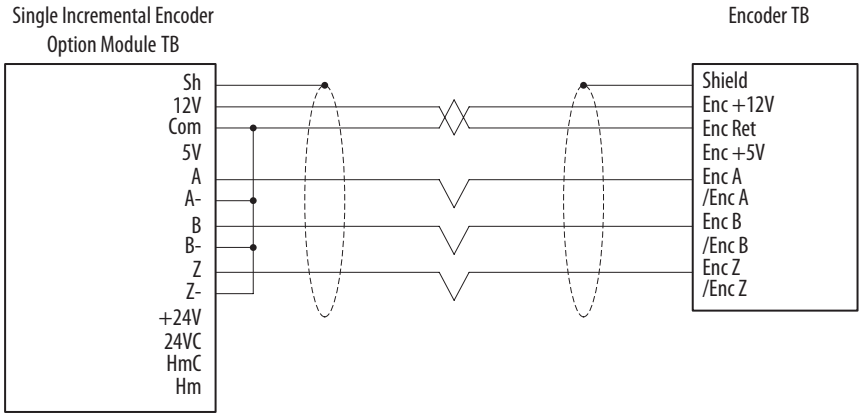
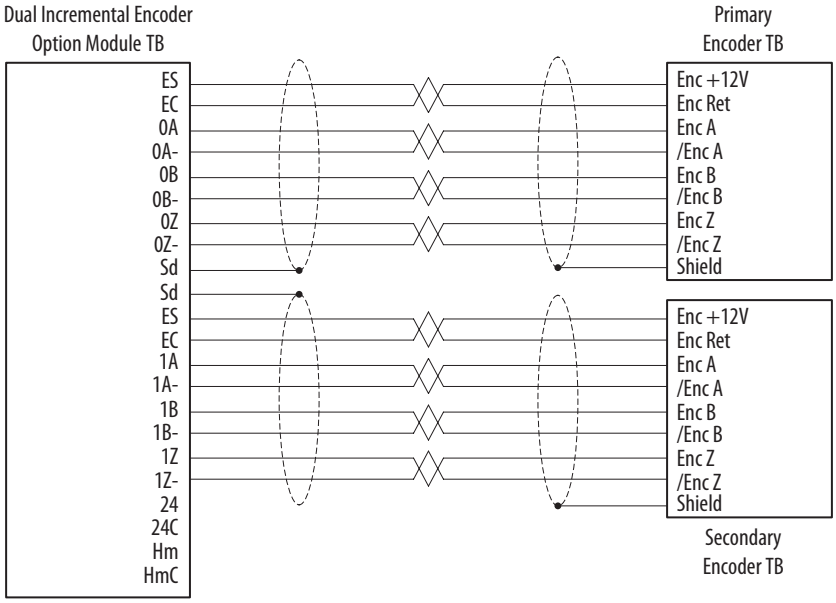


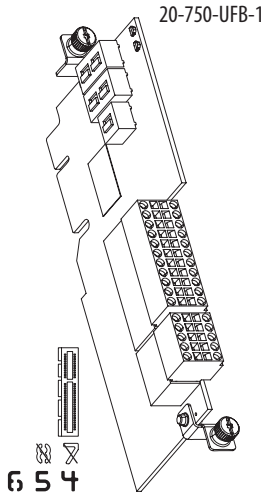
Figure 80 - Single-Ended, Dual Channel



Wiring Examples - Dual Incremental Encoder Option Module Connections

Figure 81 - Differential Dual Channel with Z Channel



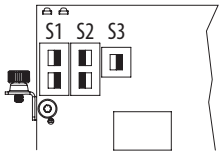
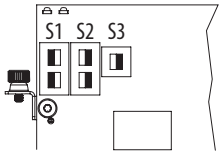
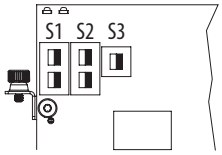


Universal Feedback Option Module - 755 Drives Only

Table 58 - Universal Feedback Option Module LED Indication

LED	Name	Color	State	Description
❶	Board	Unlit	Off	Not powered.
		Green	Flashing	Initializing, not active. Communication lost, attempting to reconnect.
			Steady	Operational, no faults are present.
		Red	Flashing	Module error. • Check P1 [Module Sts]
			Steady	Normal operation.
				Module is booting.
				Fatal module error. • Cycle power • Flash update module firmware • Replace module
		Yellow	Flashing	A type 2 alarm condition exists. • Check P1 [Module Sts]
			Steady	A type 1 alarm condition exists. • Check P1 [Module Sts]
		Yellow / Green	Flashing Alternately	Module is flash updating.
❷	DPI	Unlit	Off	Not powered. Not communicating.
		Green	Flashing	Module is attempting to communicate with the DPI host.
			Steady	• Properly connected and communicating. • Module is flash updating.
		Red	Flashing	Module is not communicating with the DPI host.
			Steady	DPI communication failure such as invalid port.
		Yellow	Flashing	Normal operation.
			Steady	Peripheral is connected to a SCANport product and does not support a SCANport compatibility mode.

Table 59 - Universal Feedback Option Module DIP Switch Settings - Safety Application

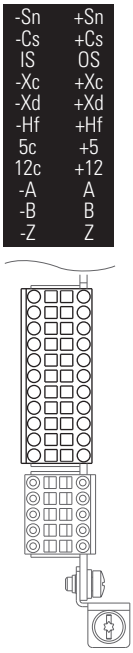
Safety Channel Selection	DIP Switch Settings (1)
Primary Safety Channel To connect feedback signals to the Primary Safety Channel, set: S1 sliders to ON S2 sliders to OFF S3 slider to ON	
Secondary Safety Channel To connect feedback signals to the Secondary Safety Channel, set: S1 sliders to OFF S2 sliders to ON S3 slider to ON	
Primary and Secondary Safety Channels To connect feedback signals to both the Primary and Secondary Safety Channels, set: S1 sliders to ON S2 sliders to ON S3 slider to ON	

(1) DIP switches only function when safety channels are used.

Table 60 - Universal Feedback Incremental AquadB Encoder

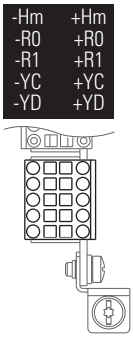
Consideration	Description
Input	Differential or Single Ended operation, Constant Current Sink operation ~10 mA
	3.5V DC minimum to 7.5V DC maximum sourcing 10 mA minimum high state voltage of 3.5V DC maximum low state voltage of 0.4V DC
Maximum Cable Length	30 m (100 ft) @ 5V, 183 m (600 ft) @ 12V
Maximum Input Frequency	250 kHz

Table 61 - TB1 Terminal Designations



Terminal	Name	Description
-Sn	Sine (–)	Negative Sine signal
+Sn	Sine (+)	Positive Sine signal
-Cs	Cosine (–)	Negative Cosine signal
+Cs	Cosine (+)	Positive Cosine signal
Is	Inner Shield	Heidenhain inner shield terminal
Os	Outer Shield	Cable shield terminal
-Xc	Channel X Clock (–)	Negative clock terminal (Channel X)
+Xc	Channel X Clock (+)	Positive clock terminal (Channel X)
-Xd	Channel X Data (–)	Negative data terminal (Channel X)
+Xd	Channel X Data (+)	Positive data terminal (Channel X)
-Hf	Heidenhain Supply Feedback (–)	For incremental feedback applications, tie terminal -Hf to 5c and terminal +Hf to +5 for proper voltage regulation.
+Hf	Heidenhain Supply Feedback (+)	
5c	Common	+5V Common
+5	+5 Volt DC Power	Power supply for encoder 250 mA
12c	Common	+12V Common
+12	+12 Volt DC Power	Power supply for encoder (10.5V @ 250 mA)
-A	Encoder A (NOT)	Single channel or quadrature A input or encoder output.
A	Encoder A	
-B	Encoder B (NOT)	Quadrature B input or encoder output.
B	Encoder B	
-Z	Encoder Z (NOT)	Pulse or marker input or encoder output.
Z	Encoder Z	

Table 62 - TB2 Terminal Designations



Terminal	Name	Description
-Hm	Home Input (–)	12V DC @ 9 mA to 24V DC @ 40 mA
+Hm	Home Input (+)	
-R0	Registration Input 0 (–)	Positive and negative encoder registration terminals. 12V DC @ 9 mA to 24V DC @ 40 mA
+R0	Registration Input 0 (+)	
-R1	Registration Input 1 (–)	
+R1	Registration Input 1 (+)	
-Yc	Channel Y Clock (–)	Negative clock terminal (Channel Y)
+Yc	Channel Y Clock (+)	Positive clock terminal (Channel Y)
-Yd	Channel Y Data (–)	Negative data terminal (Channel Y)
+Yd	Channel Y Data (+)	Positive data terminal (Channel Y)

IMPORTANT Only one linear feedback device can be connected to the option module. Wire the device to either Channel X on TB1 or Channel Y on TB2.

Motor Power Cables

The following table lists 460V rated Allen-Bradley servo motors and flying-lead motor cables that are compatible with PowerFlex 750- Series drives.

Motor Catalog Number	Power Cable Catalog Number
MPL-B4530K MPL-B4560K MPL-B520K	2090-XXNPMF-16SXX (standard) 2090-CPXM7DF-16AFXX (continuous-flex)
MPL-B540K MPL-B560F	2090-XXNPMF-14SXX (standard) 2090-CPXM7DF-14AFXX (continuous-flex)
MPL-B580F, MPL-B580J MPL-B640F	2090-XXNPMF-10SXX (standard) 2090-CPXM7DF-10AFXX (continuous-flex)
MPL-B660F MPL-B680D MPL-B960B MPL-B980B	2090-CPBM7DF-08AAXX (standard)
MPL-B680F MPL-B860D MPL-B880C MPL-B960C	2090-CPBM7DF-06AAXX
MPL-B880D MPL-B960D MPL-B980C, MPL-B980D	2090-CPBM7DF-04AAXX
MPM-B1151F, MPM-B1151T MPM-B1152C, MPM-B1152F, MPM-B1152T MPM-B1153E, MPM-B1153F MPM-B1302F, MPM-B1302M MPM-B1304C, MPM-B1304E MPM-B1651C MPM-B1652	2090-XXNPMF-16SXX (standard) 2090-CPXM7DF-16AFXX (continuous-flex)
MPM-B1153T MPM-B1304M MPM-B1651F MPM-B1653C	2090-XXNPMF-14SXX (standard) 2090-CPXM7DF-14AFXX (continuous-flex)
MPM-B1652E	2090-CPBM7DF-12AAXX (standard)
MPM-B1651M MPM-B1652F MPM-B1653E MPM-B2152C MPM-B2153B	2090-XXNPMF-10SXX (standard) 2090-CPXM7DF-10AFXX (continuous-flex)
MPM-B1653F MPM-B2152F, MPM-B2152M MPM-B2153E, MPM-B2153F MPM-B2154B, MPM-B2154E, MPM-B2154F	2090-CPBM7DF-08AAXX (standard)

Feedback Device Resolution

When using a PowerFlex 755 drive to control a permanent magnet motor, the motor feedback device must have a resolution so that the number of pulses per revolution (PPR) is an exponent of two.

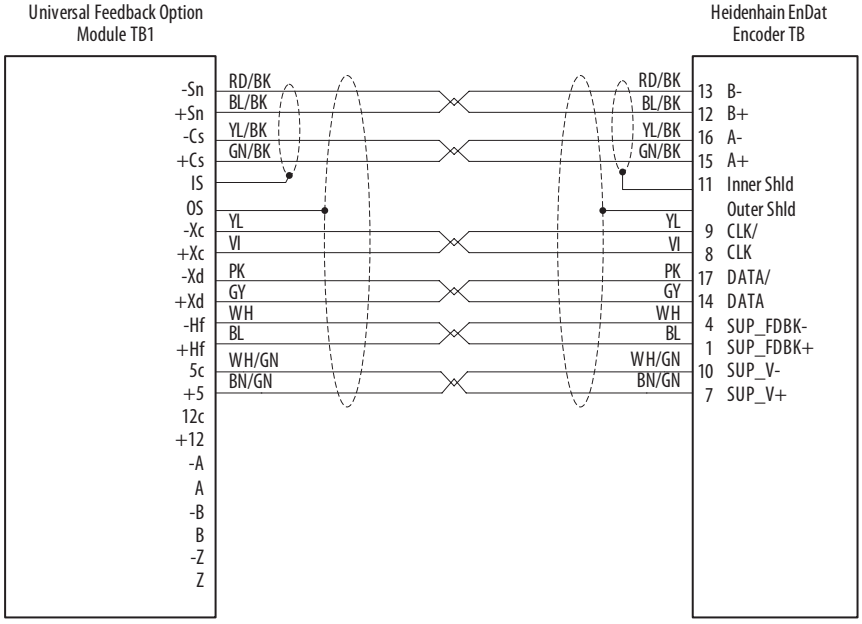
For example: 512, 1024, 2048, 4096, 8192...524288, 1048576...

Motor Feedback Wiring Examples

The following table includes a list of motor, feedback device and cable wiring examples.

If you are using this motor and/or feedback device…	and this cable…	See this wiring example…
Heidenhain EnDat angle encoder (e.g., RCN729/829) with internal power supply	supplied with encoder	Figure 82 - on page 178
Heidenhain EnDat angle encoder with external power supply	supplied with encoder	Figure 83 - on page 178
Heidenhain Non-EnDat rotary encoder with internal power supply	PUR cable supplied with encoder	Figure 84 - on page 179
Heidenhain EnDat rotary encoder (ECN 412 EnDat01) with internal power supply	supplied with encoder	Figure 85 - on page 179
Heidenhain EnDat rotary encoder (ECN 412 EnDat01) with internal power supply	PUR cable supplied with encoder	Figure 86 - on page 180
MP-Series (460V) motor and Stegmann rotary or Rotary encoder HPK series motor and Stegmann rotary or Rotary encoder Allen-Bradley 1326AB-Series motor and Stegmann rotary or Rotary encoder	2090-CFBM4DF-CEAAXX	Figure 87 - on page 181
Stegmann rotary encoder	1326-CECU-XXL-XXX	Figure 88 - on page 182
	Pre-attached, shielded, twisted pair	Figure 89 - on page 182
	Shielded, twisted pair cable with an 8-pin Berg style connector	Figure 90 - on page 183
	Shielded, twisted pair cable with a 10-pin MS style connector	Figure 91 - on page 183
	Shielded, twisted pair cable with a 12-pin DIN style connector	Figure 92 - on page 184
Linear sensor	MDI RG Connector	Figure 93 - on page 184
	P Integral Cable	Figure 93 - on page 184
Registration sensor	supplied with sensor	Figure 94 - on page 185
Simulated Incremental encoder output	customer supplied	Figure 95 - on page 185
Incremental encoder with 5V internal power supply	customer supplied	Figure 96 - on page 186
Incremental encoder with external power supply	customer supplied	Figure 97 - on page 186

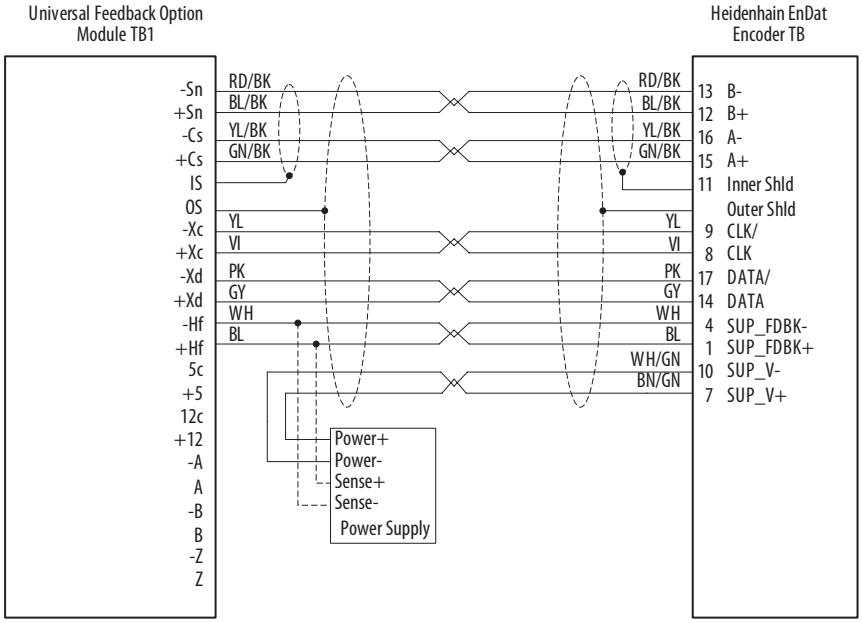
Figure 82 - Heidenhain EnDat Angle Encoder with Internal Power Supply



Set Universal Feedback parameter P6 [FB0 Device Sel] or P36 [FB1 Device Sel] to 1 "EnDat SC."

Note: Refer to Installation Instructions supplied with encoder for additional information.

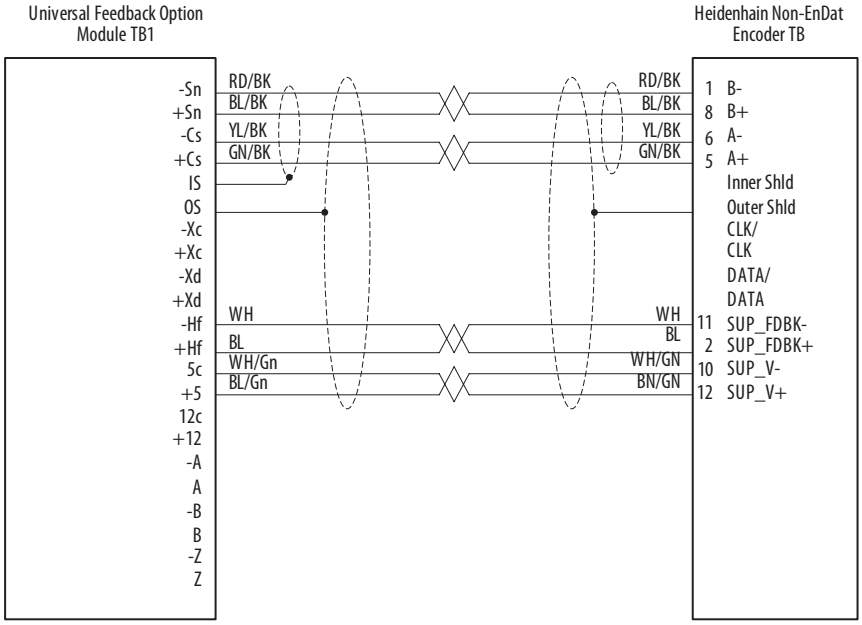
Figure 83 - Heidenhain EnDat Angle Encoder with External Power Supply



Set Universal Feedback parameter P6 [FB0 Device Sel] or P36 [FB1 Device Sel] to 1 "EnDat SC."

Notes: Refer to Installation Instructions supplied with encoder for additional information. The external power supply must be 3.6V to 5.25V, max. 350mA.
TB1-14 (Power+) and TB1-13 (Power-) must not be connected to the encoder. The brown/green and white/green conductors must be connected to the external power supply. If the external power supply does not have sense connections, the supply feedback (sense) connections should still be made from the encoder to the universal board (TB1-11,12).

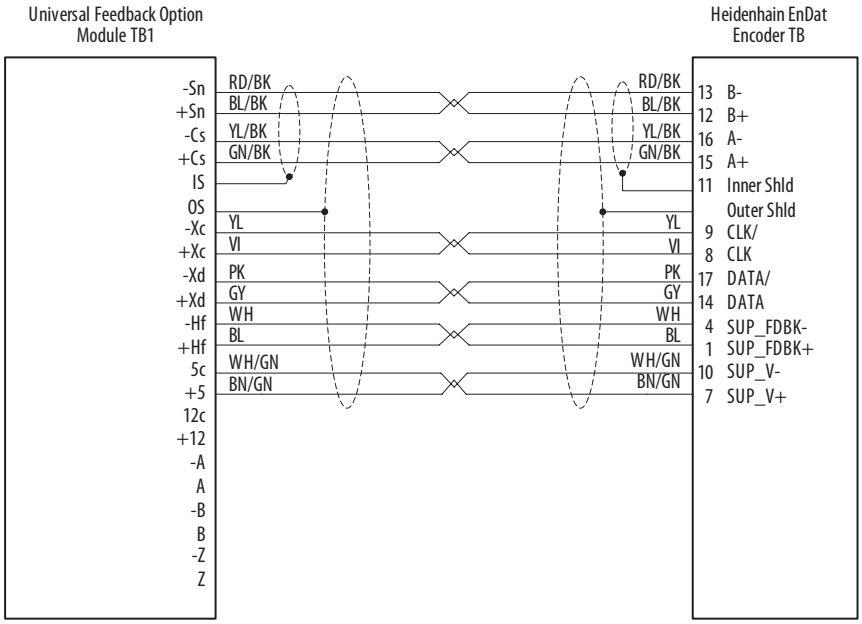
Figure 84 - Heidenhain Non-EnDat Rotary Encoder with Internal Power Supply



Set Universal Feedback parameter P6 [FB0 Device Sel] or P36 [FB1 Device Sel] to 11 "SinCos Only."

Note: Refer to Installation Instructions supplied with encoder for additional information.

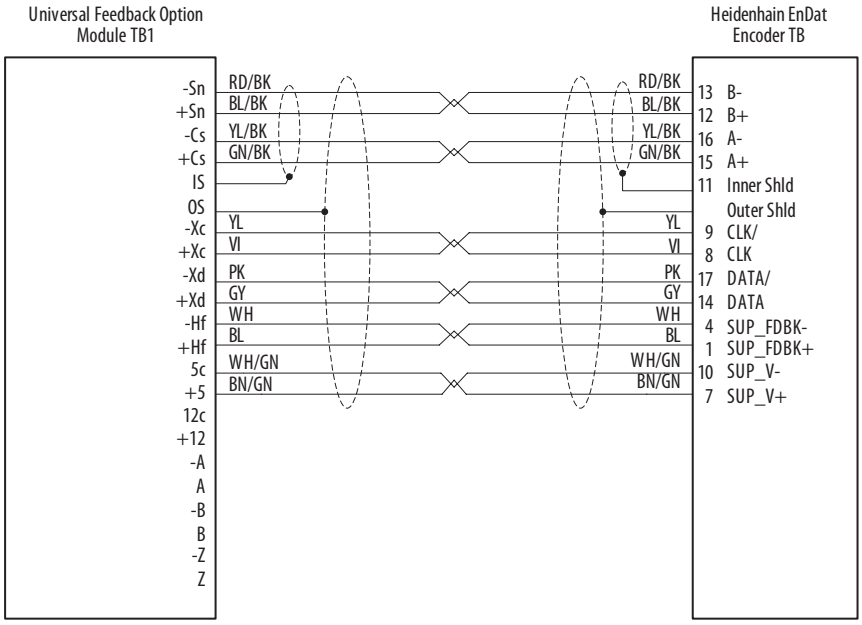
Figure 85 - Heidenhain EnDat Rotary Encoder (ECN 412 EnDat01) with Internal Power Supply



Set Universal Feedback parameter P6 [FB0 Device Sel] or P36 [FB1 Device Sel] to 1 "EnDat SC."

Note: Refer to Installation Instructions supplied with encoder for additional information.

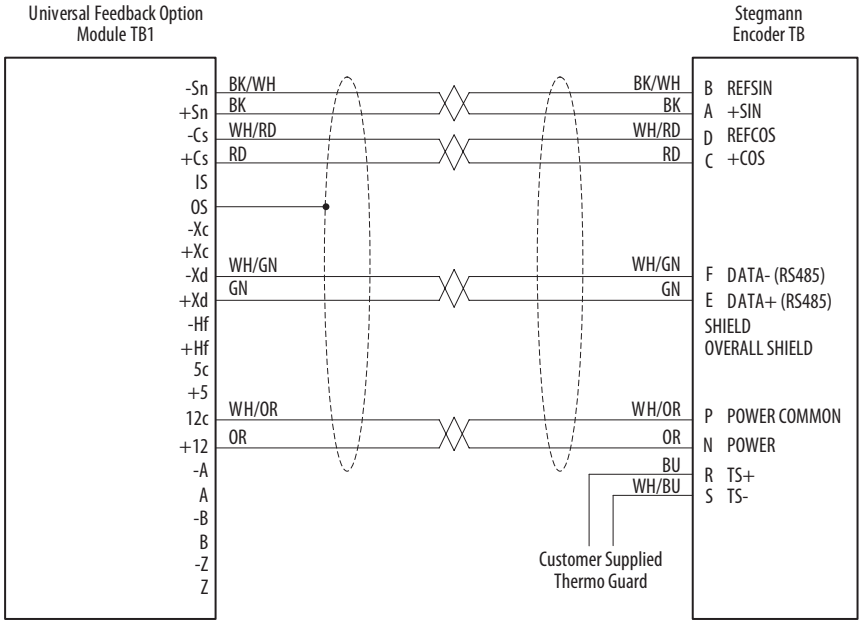
Figure 86 - Heidenhain EnDat Rotary Encoder (ECN 412 EnDat01) with Internal Power Supply



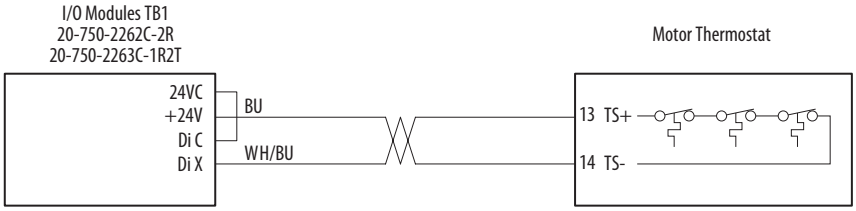
Set Universal Feedback parameter P6 [FB0 Device Sel] or P36 [FB1 Device Sel] to 1 “EnDat SC.”

Note: Refer to Installation Instructions supplied with encoder for additional information.

Figure 87 - 460V MP-Series, HPK-Series, or Allen-Bradley 1326AB-Series Motor and a Stegmann Rotary or Rotary Encoder connected via a 2090-CFBM4DF-CEAAXX



Motor Thermostat Connection



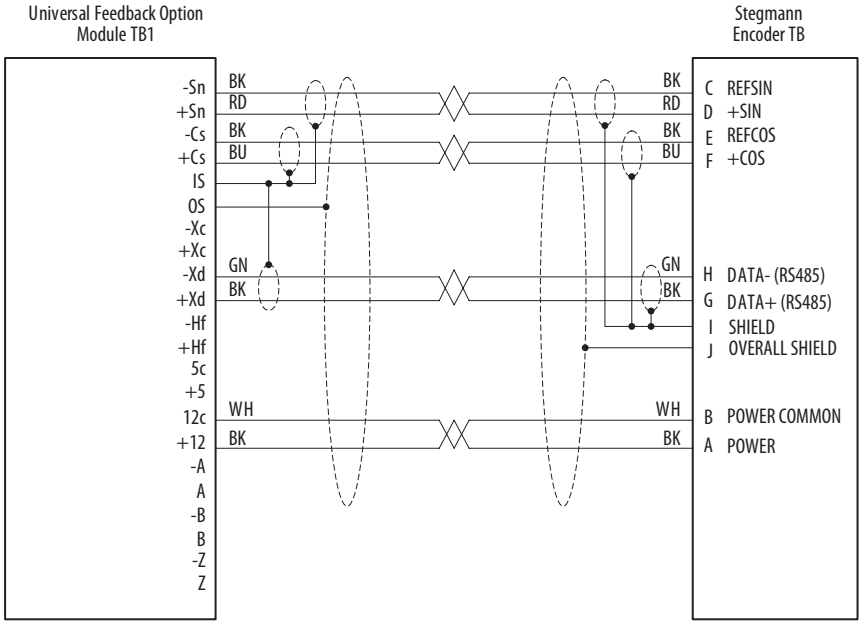
IMPORTANT Do not use 120 Volts with the motor thermostat.

Set Universal Feedback parameter P6 [FB0 Device Sel] or P36 [FB1 Device Sel] to 2 “Hiperface SC.”

Note: The Thermal Switch cannot be accessed using the 2090-XXNFMP-SXX cable.

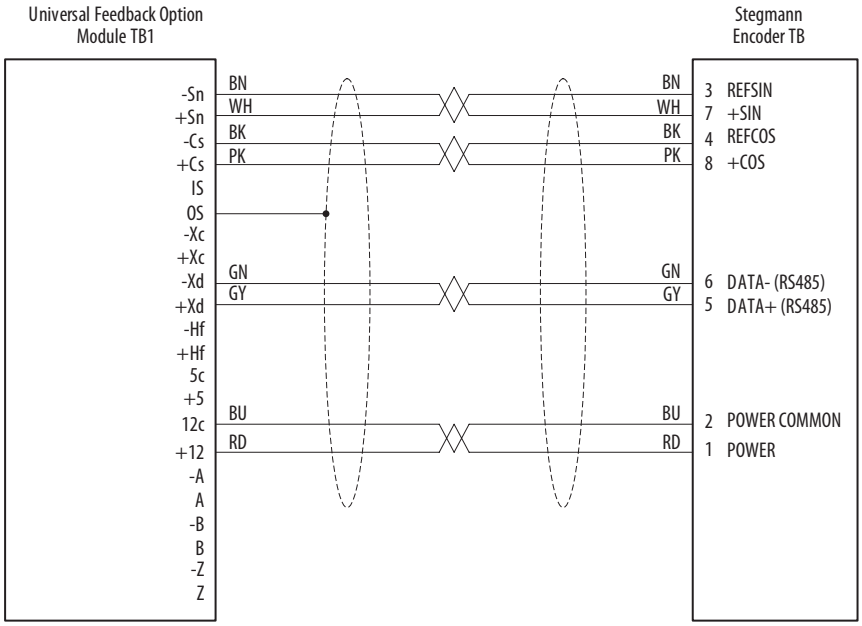
Note: I/O modules 20-750-2262C-2R and 20-750-2263C-1R2T cannot be used in CIP motion mode. Use controller I/O to consume the status of the motor thermostat in CIP motion mode.

Figure 88 - Stegmann Rotary Encoder connected via a 1326-CECU-XXL-XXX Cable



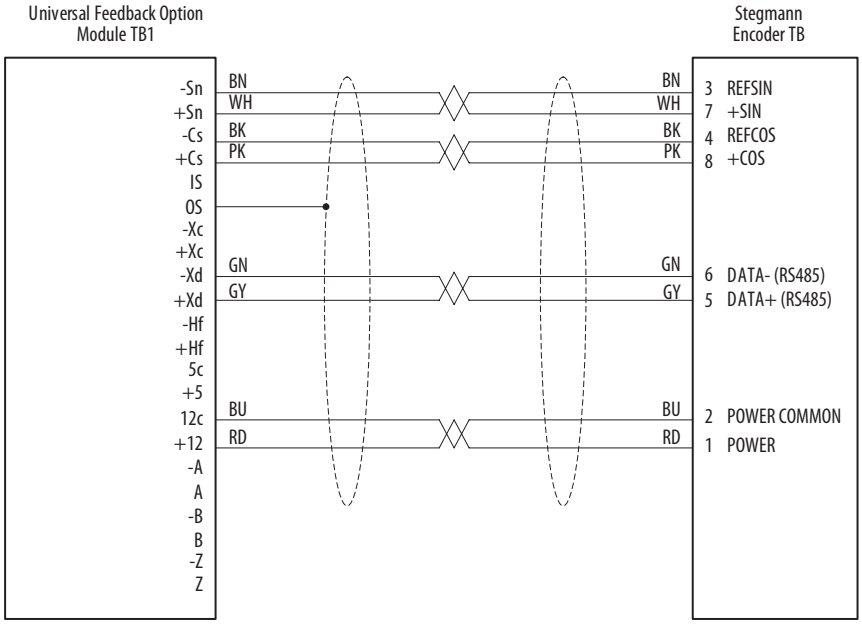
Set Universal Feedback parameter P6 [FB0 Device Sel] or P36 [FB1 Device Sel] to 2 "Hiperface SC."

Figure 89 - Stegmann Rotary Encoder connected via a Pre-Attached, Shielded, Twisted Pair Cable



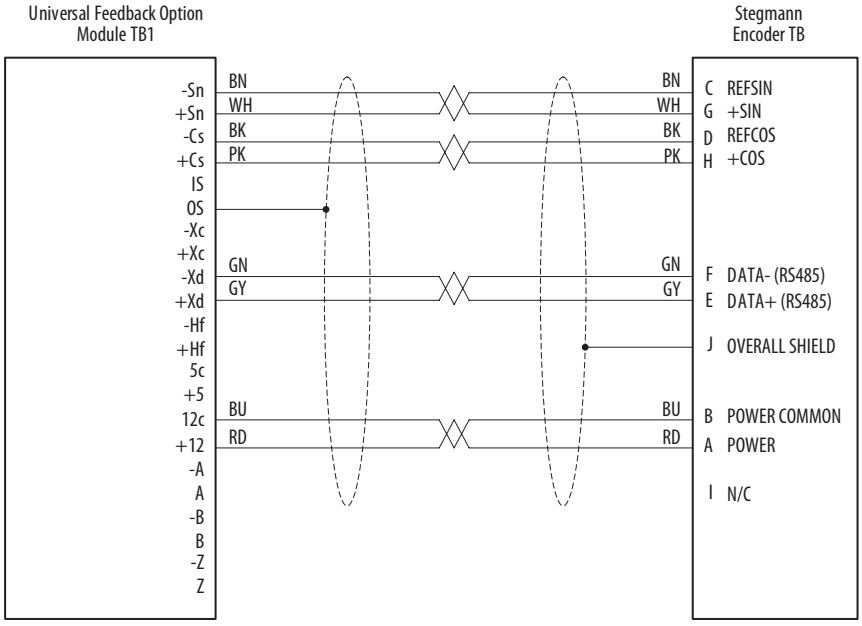
Set Universal Feedback parameter P6 [FB0 Device Sel] or P36 [FB1 Device Sel] to 2 "Hiperface SC."

Figure 90 - Stegmann Rotary Encoder Connected via a Shielded, Twisted Pair Cable with an 8-pin Berg Style Connector



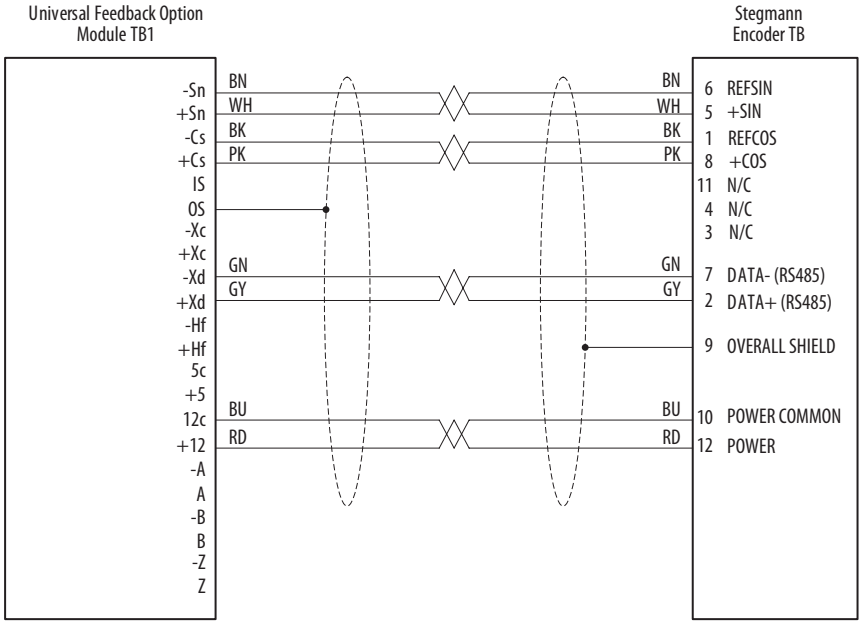
Set Universal Feedback parameter P6 [FB0 Device Sel] or P36 [FB1 Device Sel] to 2 "Hiperface SC."

Figure 91 - Stegmann Rotary Encoder Connected via a Shielded, Twisted Pair Cable with a 10-pin MS Style Connector



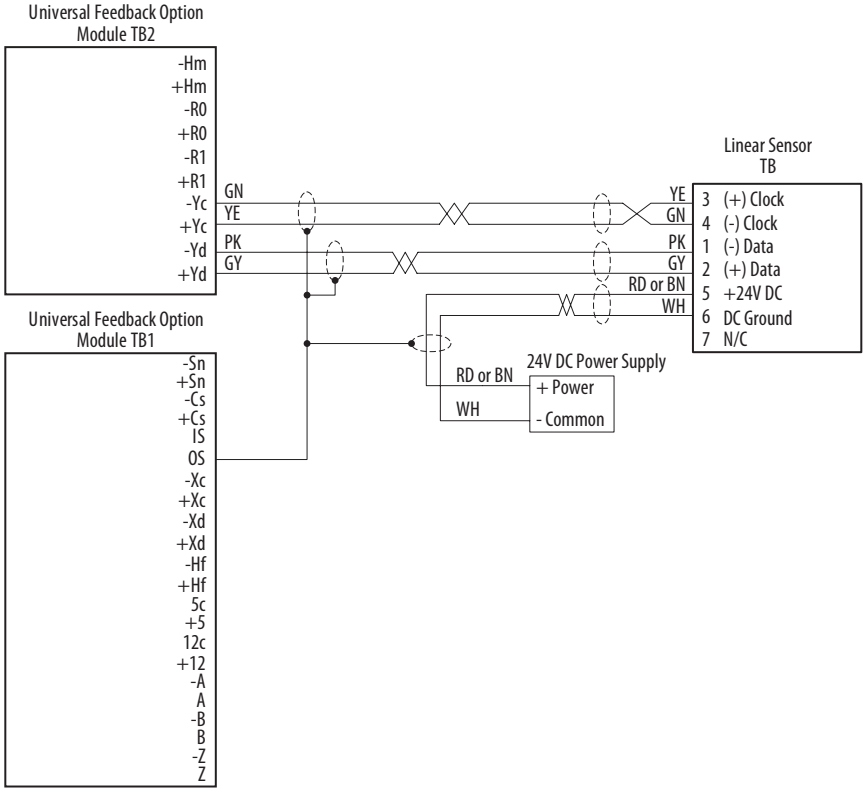
Set Universal Feedback parameter P6 [FB0 Device Sel] or P36 [FB1 Device Sel] to 2 "Hiperface SC."

Figure 92 - Stegmann Rotary Encoder Connected via a Shielded, Twisted Pair Cable with a 12-pin DIN Style Connector



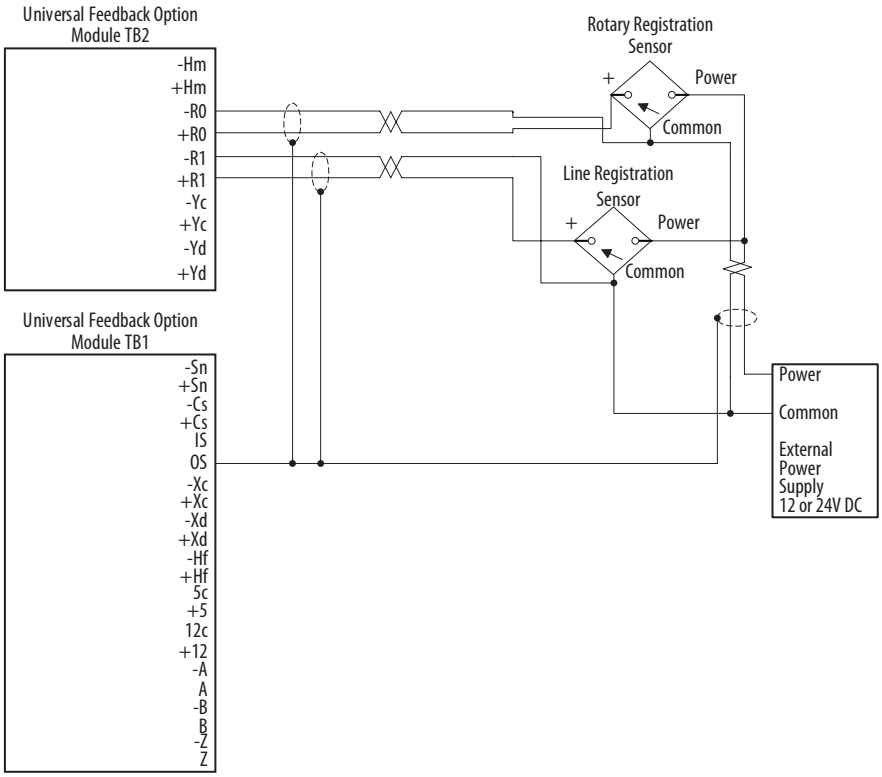
Set Universal Feedback parameter P6 [FB0 Device Sel] or P36 [FB1 Device Sel] to 2 “Hiperface SC.”

Figure 93 - Linear Sensor with MDI RG Connector or P Integral Cable



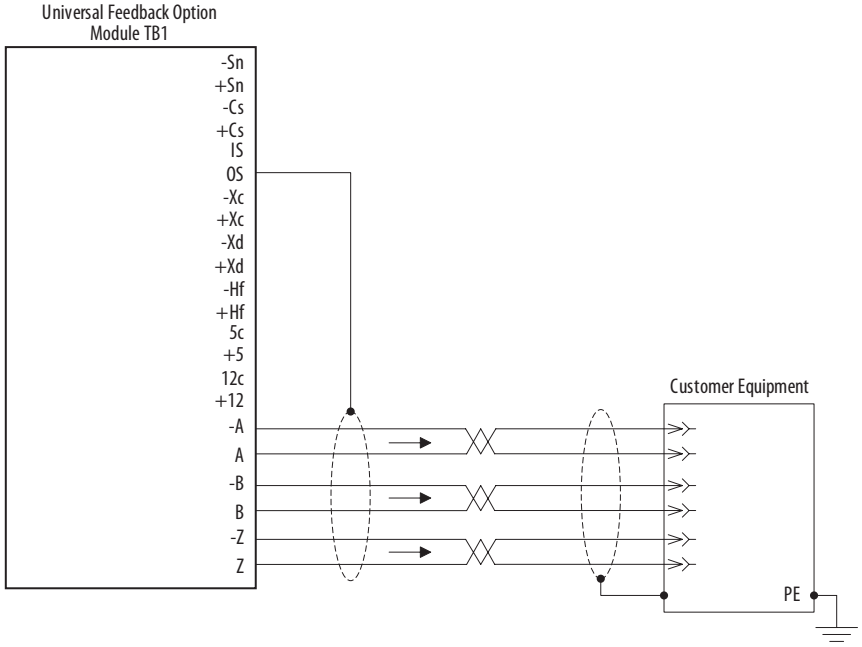
Set Universal Feedback parameter P6 [FB0 Device Sel] or P36 [FB1 Device Sel] to 17 “LinStahl ChY” or 19 “LinSSI ChY.”

Figure 94 - Registration Sensor



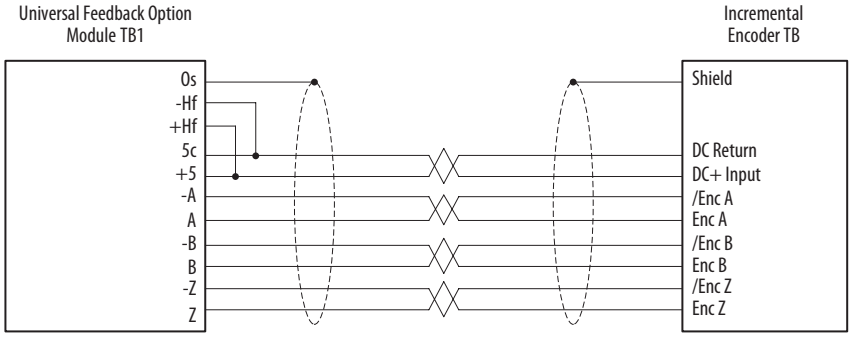
See Universal Feedback parameters P90 through P129.

Figure 95 - Simulated Incremental Encoder Output



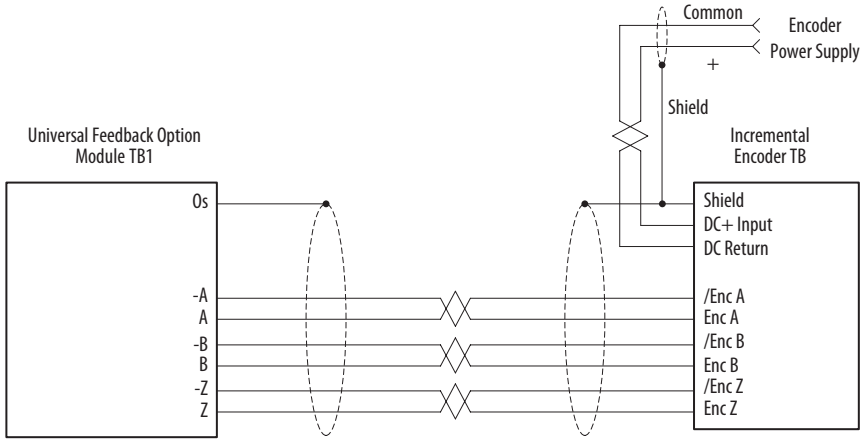
Set Universal Feedback parameter P80 [Enc Out Sel] to 2 “Sine Cosine,” 3 “Channel X,” or 4 “Channel Y” as needed.

Figure 96 - Differential Dual Channel with Z Channel with 5V Internal Supply



Set Universal Feedback parameter P6 [FB0 Device Sel] or P36 [FB1 Device Sel] to 12 “Inc A B Z.”

Figure 97 - Differential Dual Channel with Z Channel with External Power Supply



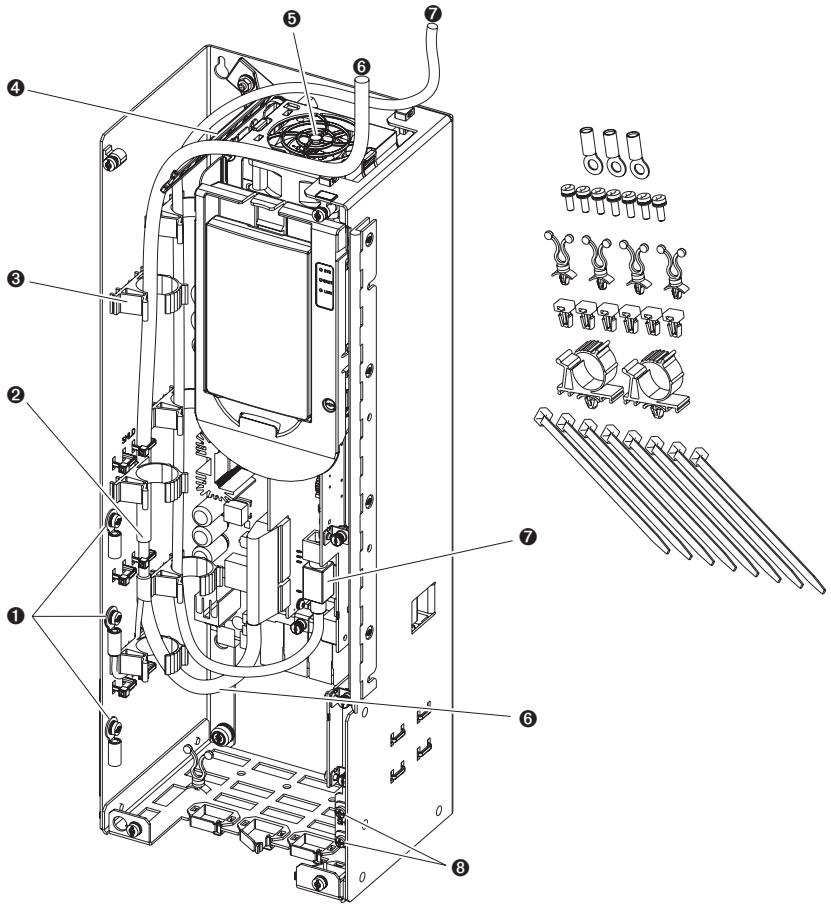
Set Universal Feedback parameter P6 [FB0 Device Sel] or P36 [FB1 Device Sel] to 12 “Inc A B Z.”

Control Pod Cable Routing - Frames 8…10

Supports, clips, and cable ties are provided to help route cabling inside the control pod.

IMPORTANT
- When routing cabling into the control POD, do not block the cooling fan outlet.
- Do not ground shield wires to inner sheet metal bucket supporting option modules.

Figure 98 - Control POD Detail



No.	Description
❶	I/O Signal shield termination points. Use M4 screws and ring terminals provided to tie together and terminate drain wires and shields.
❷	Ground shield wires to outer sheet metal bucket. Strip cable insulation 25 mm (1 in.) to expose braid. Attach cable ties around shield and through slots. Pull tight.
❸	Attachment points for cable management devices provided (6 places).
❹	Cable support ladder.
❺	Fan outlet. Keep clear to help ensure proper cooling.
❻	Control cable entry and routing.
❼	Human Interface Module (HIM) cable entry and routing.
❽	Shield termination points.

PowerFlex 755 Drives with Cabinet Options

Hardware Overview

Power Disconnect

- Input Thermal Magnetic Circuit Breaker (Component CB1, Catalog Option Code -P3)

  This option is for disconnecting drive power. An Allen-Bradley 140U Molded Case Circuit Breaker is provided. All switches include flange style handle operators that are door interlocking and padlockable.
- Input Non-Fused Molded Case Disconnect Switch (Component MCS1, Catalog Option Code -P5)

  This option is for disconnecting drive power. An Allen-Bradley 140U Molded Case Switch is provided. All switches include flange style handle operators that are door interlocking and padlockable.

Contactor

- Input Contactor (Component M4, Catalog Option Code -P11)

  A contactor is provided between the AC line and the drive. The contactor is controlled by customer supplied 120V AC (480V input) or 230V AC (400V input) remote contact closure logic. A terminal block for control is provided for customer use, and is wired to 1 N.O. and 1 N.C. auxiliary contact on the contactor. Important: The P11 option “Alternate Contact Circuit” is not intended to be used as a Start/Stop circuit.
- Output Contactor (Component M2, Catalog Option Code -P12)

  A contactor is provided between the drive output and the motor. The contactor is controlled by customer supplied 120V AC (480V input) or 230V AC (400V input) remote contact closure logic. A terminal block for control is provided for customer use and is wired to 1 N.O. and 1 N.C. auxiliary contact on the contactor.

Reactor

- 3% Input Reactor (Component LR1, Catalog Option Code -L1)

  Provides an open core drive input line reactor that mounts inside the drive enclosure. Typical impedance is 3%.
- 3% Output Reactor (Component LR2, Catalog Option Code -L2)

  Provides an open core drive output load reactor, which mounts inside the drive enclosure. Typical impedance is 3%.
- 5% Input Reactor (Component LR3, Catalog Option Code -L3)

  Provides an open core drive input line reactor that mounts inside the drive enclosure. Typical impedance is 5%.
- 5% Output Reactor (Component LR4, Catalog Option Code -L4)

  Provides an open core drive output load reactor, which mounts inside the drive enclosure. Typical impedance is 5%.

Terminal Blocks and Other Cabinet Parts

- Control Terminal Block (Component TB2)

  Provides contact for field wired hardware enable circuit (See page 221 for more detail) and contactor control if ordered. Frame 8 drives with cabinet options ship with a hardware enable jumper on TB2. This may be removed and replaced with field wiring for hardware enable.
- Thermostat (Component TS1)

  Monitors cabinet option bay for temperature and wired to drive hardware enable input. Will disable system when over temperature is detected in order to protect cabinet option components. Note: A ventilation fan failure in the cabinet option bay will not disable the drive unless an over temperature is detected by the thermostat.

Enclosure Options

NEMA/UL Type 1 Enclosure - 2500 MCC Style Cabinet

The enclosure provided is a NEMA/UL Type 1 - 2500 MCC style cabinet that is 600 or 800 mm deep (Position 6, Code B or L). Type 1 enclosures are intended for indoor use primarily to provide a degree of protection against limited amounts of falling dirt. Doors and openings will be gasket sealed.

- Position 6, Code B = 600 mm deep enclosure
- Position 6, Code L = 800 mm deep enclosure
- Position 6, Code P = 800 mm deep enclosure with MCC bus installed; standard cabinet color (RAL 7032)
- Position 6, Code W = 800 mm deep enclosure with MCC bus installed; Centerline 2100 gray color (ASA49)

Step 1: Read the General Precautions

Before performing any work on the drive, read the General Precautions starting on page 7.

Step 2: Prepare for Installation

Catalog Number Explanation

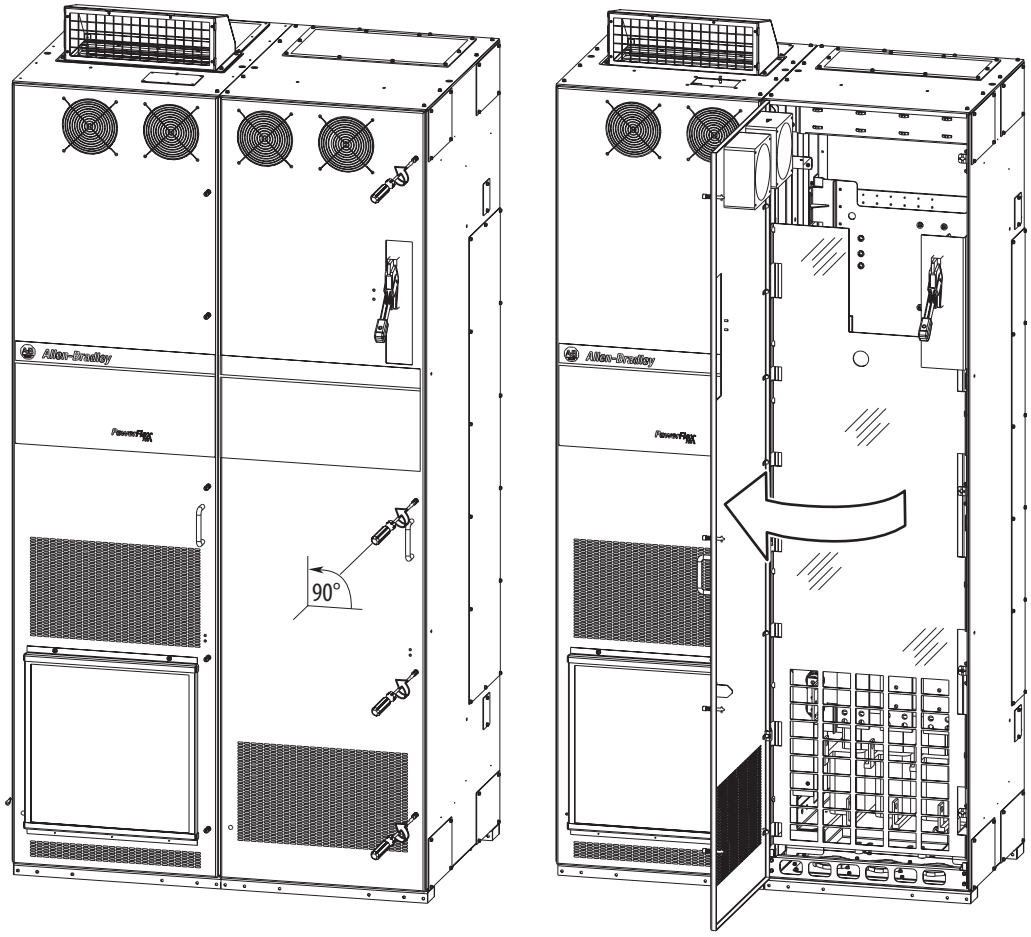
See page 9.

CE Conformity

See page 12.

Access Panels, Covers, and Doors

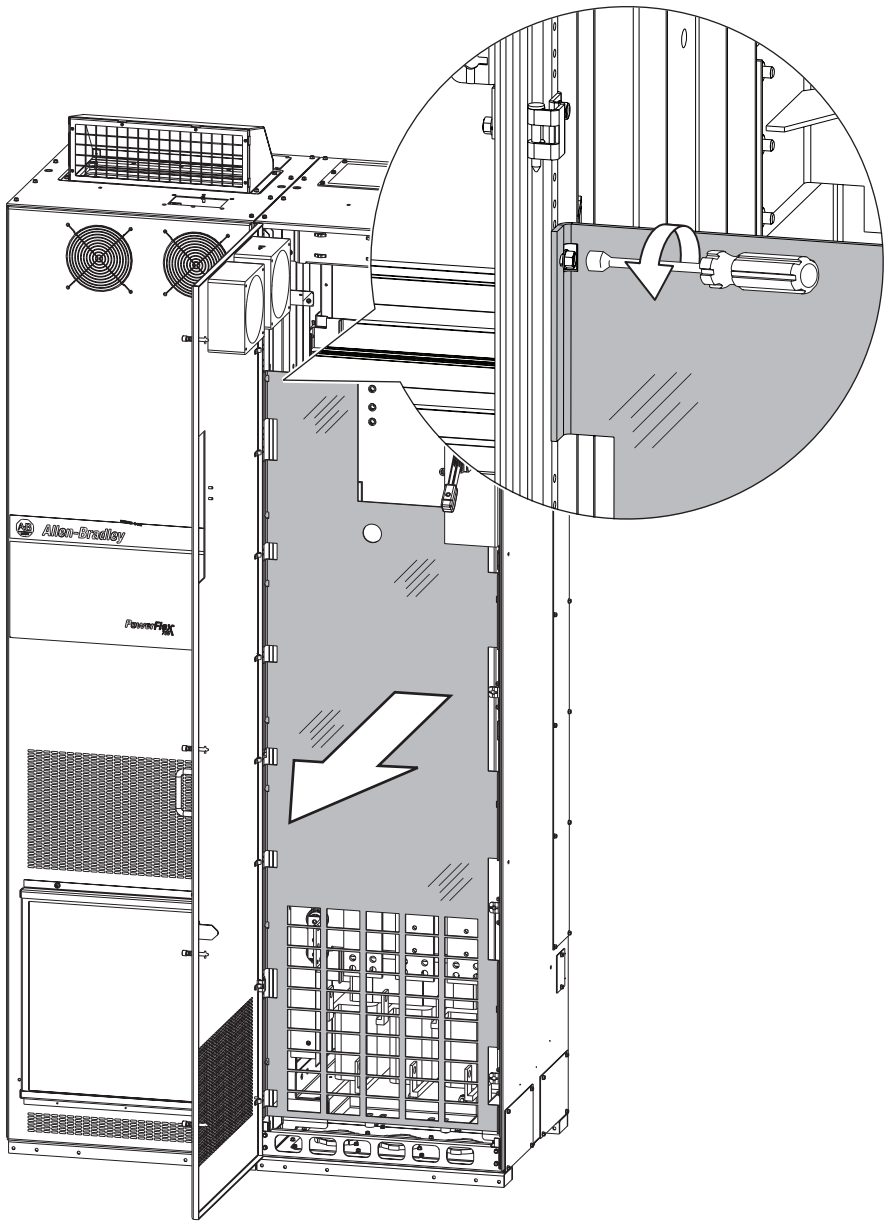
Figure 99 - Enclosure Codes B, L, P, W (IP20, NEMA/UL Type 1) Cabinet Options Bay Access Door



To release or secure door:

- Recommended screwdriver = 9.5 mm (0.375 in.) flat

Figure 100 - Full Cabinet Options Bay Guard



To remove the full bay guard, loosen the ten M5 screws. It is not necessary to remove these screws.

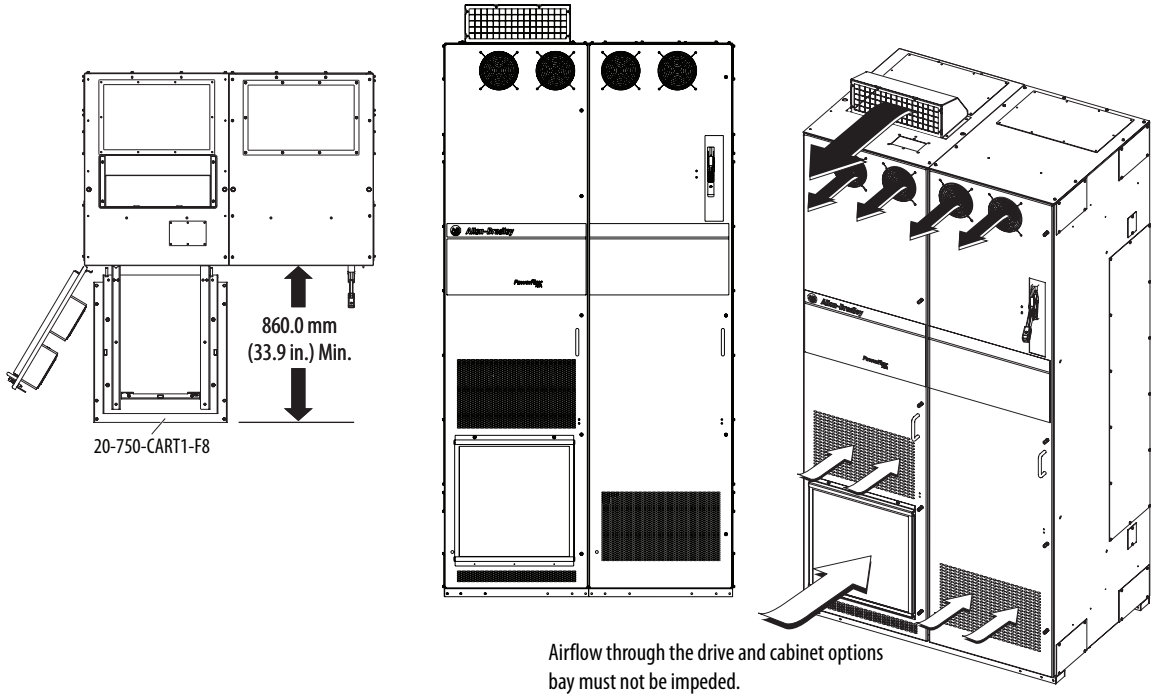
When the full bay guard is replaced:

- Recommended torque = 2.8 N•m (25.0 lb•in)
- Recommended driver = 8 mm Hexagonal socket

Minimum Clearances

The drive must be mounted in a vertical orientation as shown and must make full contact with the mounting surface. Do not use standoffs or spacers. In addition, inlet air temperature must not exceed the product specification.

Figure 101 - Minimum Mounting Clearances Frames 8…9



Mounting Considerations

- Install the drive upright on a flat and level surface.
- Ensure the drive cabinet is square, vertical, and stable.
- Ensure filters and debris screens are installed.
- Protect cooling fans by avoiding dust or metallic particles.
- Do not expose to a corrosive atmosphere.
- Protect from moisture and direct sunlight (unless rated for outdoor use).

Short Circuit Current Ratings for Drives with Cabinet Options

Default ratings (no added protection) shown. A"•" indicates ratings that can be achieved with additional protection.

Drive Catalog Number	Duty Cycle	kW	Short Circuit Current Rating (kA)			
			Circuit Breaker Only (P3) [1]	Circuit Breaker with Input Contactor (P3 with P11) [1]	Molded Case Switch Only (P5) [2]	Molded Case Switch with Input Contactor (P5 with P11) [2]
400 Volt AC Input						
21G…C460	LD	315	100	30	65 or • 100 w/700…800 A Class L fuse	5 or • 30 w/700…1200 A Class L fuse • 30 w/700…1200 A CB
	ND	250	100	30 or • 65 w/600 A Class J fuse	65	5 or • 65 w/600 A Class J fuse • 30 w/600…1000 A Class L fuse • 30 w/600…1200 A CB
	HD	200	100	5 or • 100 w/500…600 A Class J fuse • 18 w/600…800 A Class L fuse • 18 w/500 A CB	65	5 or • 100 w/500…600 A Class J fuse • 18 w/600…800 A Class L fuse • 18 w/500 A CB
21G…C540	LD	315	100	30	65 or • 100 w/750…800 A Class L fuse	5 or • 30 w/750…1300 A Class L fuse • 30 w/800…1200 A CB
	ND	315	100	30	65 or • 100 w/700…800 A Class L fuse	5 or • 30 w/700…1200 A Class L fuse • 30 w/700…1200 A CB
	HD	250	100	30 or • 65 w/600 A Class J fuse	65	5 or • 65 w/600 A Class J fuse • 30 w/600…1000 A Class L fuse • 30 w/600…1200 A CB
21G…C567	LD	355	100	30	65 or • 100 w/800 A Class L fuse	5 or • 30 w/800…1300 A Class L fuse • 30 w/800…1200 A CB
	ND	315	100	30	65 or • 100 w/750…800 A Class L fuse	5 or • 30 w/750…1200 A Class L fuse • 30 w/800…1200 A CB
	HD	250	100	30 or • 65 w/600 A Class J fuse	65	5 or • 65 w/600 A Class J fuse • 30 w/600…1000 A Class L fuse • 30 w/600…1200 A CB
21G…C650	LD	400	100	42	65 or • 100 w/1000…1200 A Class L fuse	5 or • 42 w/1000…1600 A Class L fuse • 42 w/1000…1200 A CB
	ND	355	100	42	65 or • 100 w/850…1200 A Class L fuse	5 or • 42 w/850…1400 A Class L fuse • 42w/900…1200 A CB
	HD	315	100	30	65 or • 100 w/700…800 A Class L fuse	5 or • 30 w/700…1200 A Class L fuse • 30 w/700…1200 A CB
21G…C750	LD	450	100	42	65 or • 100 w/1000…1200 A Class L fuse	5 or • 42 w/1000…1700 A Class L fuse • 42 w/1000…1200 A CB
	ND	400	100	42	65 or • 100 w/1000…1200 A Class L fuse	5 or • 42 w/1000…1600 A Class L fuse • 42 w/1000…1200 A CB
	HD	315	100	30	65 or • 100 w/700…800 A Class L fuse	5 or • 30 w/750…1300 A Class L fuse • 30 w/800…1200 A CB
21G…C770	LD	450	100	42	65 or • 100 w/1000…1200 A Class L fuse	5 or • 42 w/1100…1800 A Class L fuse • 42 w/1100…1200 A CB
	ND	400	100	42	65 or • 100 w/1000…1200 A Class L fuse	5 or • 42 w/1000…1700 A Class L fuse • 42 w/1000…1200 A CB
	HD	355	100	42	65 or • 100 w/700…800 A Class L fuse	5 or • 42 w/800…1400 A Class L fuse • 42 w/800…1200 A CB

(1) These circuit breakers are considered Branch Circuit Protection for the unit.

(2) No additional protection is provided with the P5 Molded Case Switch option. Branch circuit protection is required based on NEC guidelines.

Drive Catalog Number	Duty Cycle	Hp	Short Circuit Current Rating (kA)			
			Circuit Breaker Only (P3) [1]	Circuit Breaker with Input Contactor (P3 with P11) [1]	Molded Case Switch Only (P5) [2]	Molded Case Switch with Input Contactor (P5 with P11) [2]
480 Volt AC Input						
21G…D430	LD	400	100	30 or • 65 w/600 A Class J fuse	65	5 or • 65 w/600 A Class J fuse • 30 w/600…1000 A Class L fuse • 30 w/600…1200 A CB
	ND	350	100	30 or • 65 w/550…600 A Class J fuse	65	30 or • 65 w/550…600 A Class J fuse
	HD	300	100	5 or • 100 w/450…600 A Class J fuse • 18 w/600…800 A Class L fuse • 18 w/500 A CB	65	5 or • 100 w/500…600 A Class J fuse • 18 w/600…800 A Class L fuse • 18 w/500 A CB
21G…D485	LD	450	100	30	65 or • 100 w/800 A Class L fuse	5 or • 30 w/650…1200 A Class L fuse • 30 w/700…1200 A CB
	ND	400	100	30 or • 65 w/600 A Class J fuse	65	5 or • 65 w/600 A Class J fuse • 30 w/600…1000 A Class L fuse • 30 w/600…1200 A CB
	HD	350	100	5 or • 100 w/500…600 A Class J fuse • 18 w/600…900 A Class L fuse	65	5 or • 100 w/500…600 A Class J fuse • 18 w/600…900 A Class L fuse
21G…D545	LD	500	100	30	65 or • 100 w/800 A Class L fuse	5 or • 30 w/700…1300 A Class L fuse • 30 w/700…1200 A CB
	ND	450	100	30	65 or • 100 w/650…800 A Class L fuse	5 or • 30 w/650…1200 A Class L fuse • 30 w/700…1200 A CB
	HD	350	100	30 or • 65 w/550…600 A Class J fuse	65	5 or • 65 w/550…600 A Class J fuse • 30 w/600…1000 A Class L fuse • 30 w/600…1200 A CB
21G…D617	LD	600	100	42	65 or • 100 w/850…1200 A Class L fuse	5 or • 42 w/850…1500 A Class L fuse • 42 w/900…1200 A CB
	ND	500	100	30	65 or • 100 w/750…800 A Class L fuse	5 or • 30 w/750…1300 A Class L fuse • 30 w/800…1200 A CB
	HD	400	100	30 or • 65 w/600 A Class J fuse	65	5 or • 65 w/600 A Class J fuse • 30 w/600…1000 A Class L fuse • 30 w/600…1200 A CB
21G…D710	LD	650	100	42	65 or • 100 w/1000…1200 A Class L fuse	5 or • 42 w/1000…1700 A Class L fuse • 42 w/1000…2000 A CB
	ND	600	100	42	65 or • 100 w/850…1200 A Class L fuse	5 or • 42 w/850…1500 A Class L fuse • 42 w/900…1200 A CB
	HD	450	100	30	65 or • 100 w/650…800 A Class L fuse	5 or • 30 w/650…1200 A Class L fuse • 30 w/700…1200 A CB
21G…D740	LD	700	100	42	65 or • 100 w/1000…1200 A Class L fuse	5 or • 42 w/1000…1700 A Class L fuse • 42 w/1000…2000 A CB
	ND	650	100	42	65 or • 100 w/900…1200 A Class L fuse	5 or • 42 w/900…1600 A Class L fuse • 42 w/900…2000 A CB
	HD	500	100	30	65 or • 100 w/750…800 A Class L fuse	5 or • 30 w/750…1300 A Class L fuse • 30 w/800…1200 A CB

(1) These circuit breakers are considered Branch Circuit Protection for the unit.

(2) No additional protection is provided with the P5 Molded Case Switch option. Branch circuit protection is required based on NEC guidelines.

Step 3: Lift and Mount the Drive

Drive Weights

All lifting equipment and lifting components (hooks, bolts, lifts, slings, chains, etc.) must be properly sized and rated to safely lift and hold the weight of the drive while mounting.

ATTENTION: To guard against possible personal injury and/or equipment damage…

- Inspect all lifting hardware for proper attachment before lifting drive.
- Do not allow any part of the drive or lifting mechanism to make contact with electrically charged conductors or components.
- Do not subject the drive to high rates of acceleration or deceleration while transporting to the mounting location or when lifting.
- Do not allow personnel or their limbs directly underneath the drive when it is being lifted and mounted.

Table 63 - Maximum Drive Weights - Frames 8…9

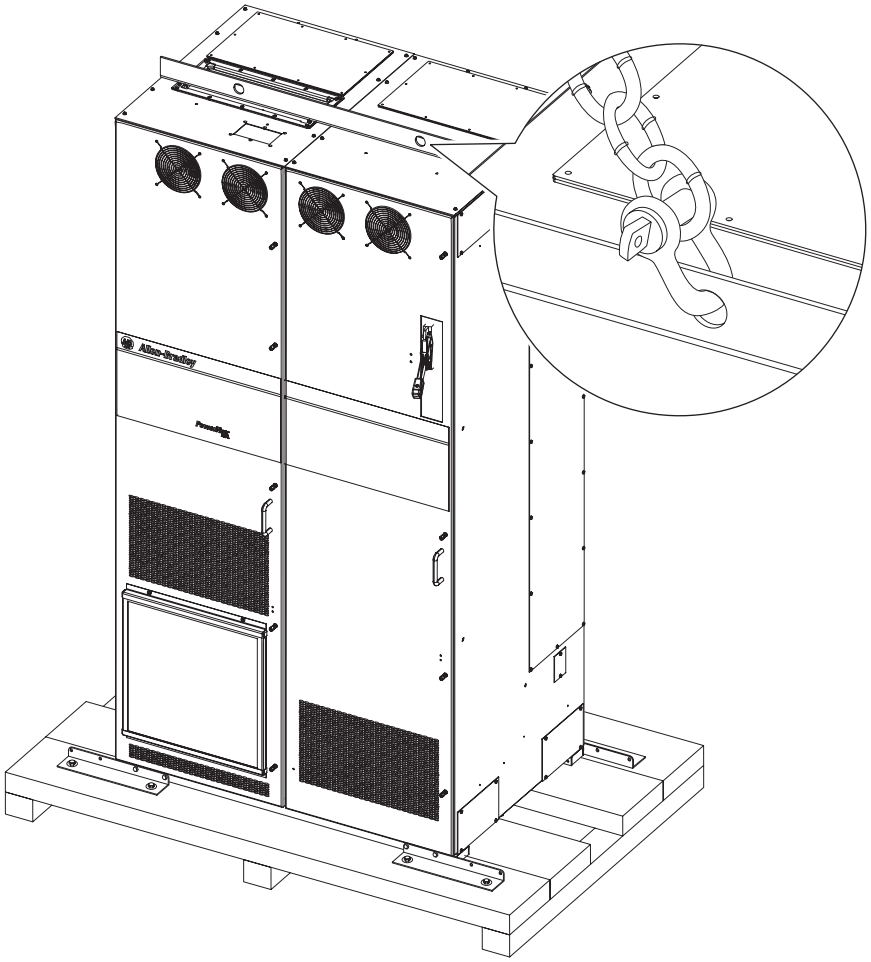
Frame Size	Drive Rating		Weight *kg (lb)*	
	kW	Hp	Enclosure Codes B and L	Enclosure Codes P and W
8	250…400	350…650	1145 (2525)	1675 (3693)
9	500…850	700…1250	1730 (3814)	2820 (6217)

Recommended Mounting Hardware

Frame Sizes	Fastener Size	Notes
8…9	M12 (1/2 in.)	Property Class 8.8 (Minimum)

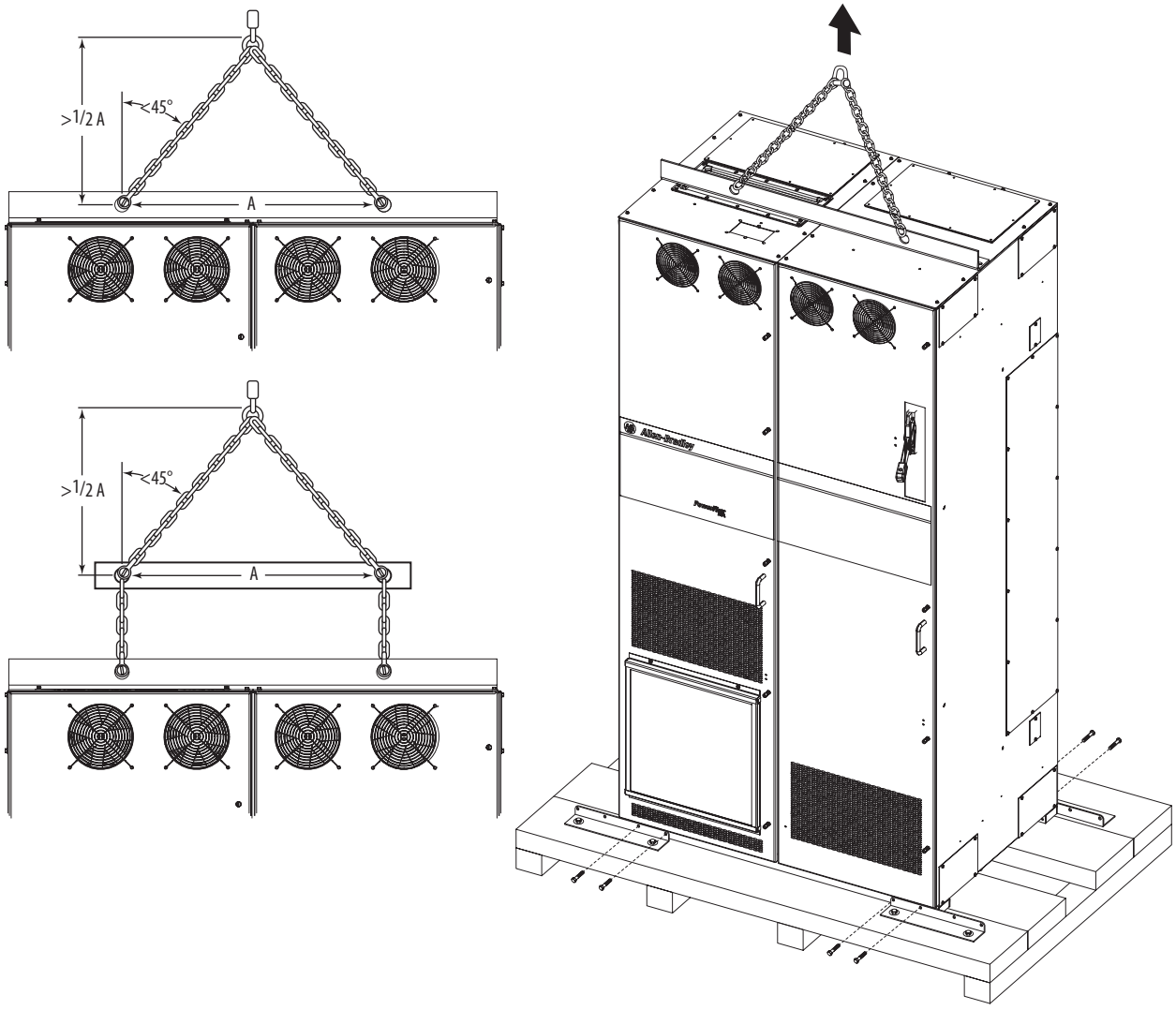
Attach Lifting Hardware

Figure 102 - Frame 8…9 Lifting Points



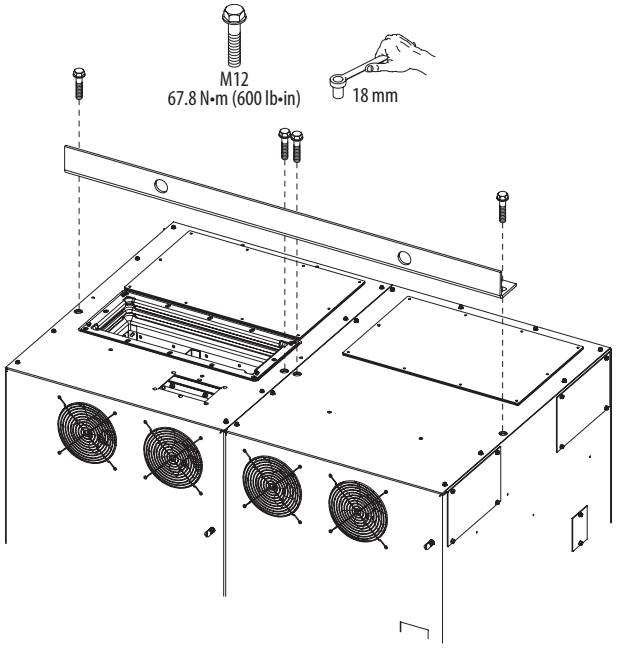
Release Frame 8…9 Shipping Skid

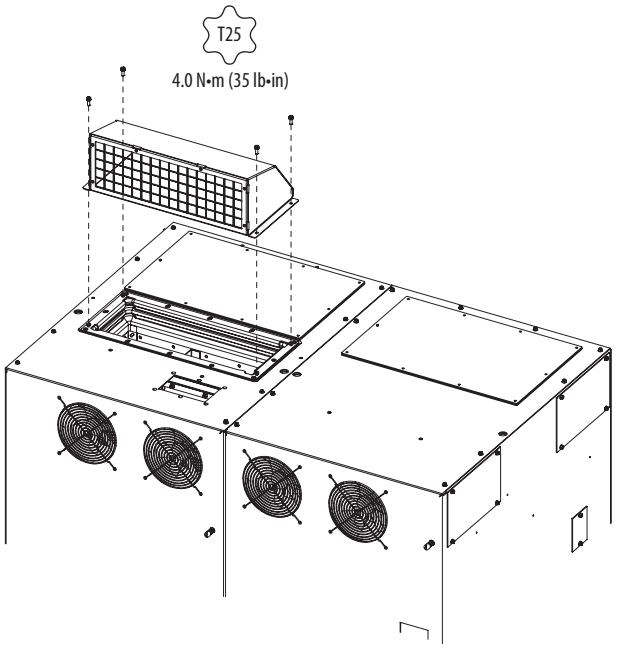
Remove the bolts fastening a vertically oriented drive cabinet to the shipping skid and lift.



Frame 8…9 Lifting Angle and Exhaust Hood

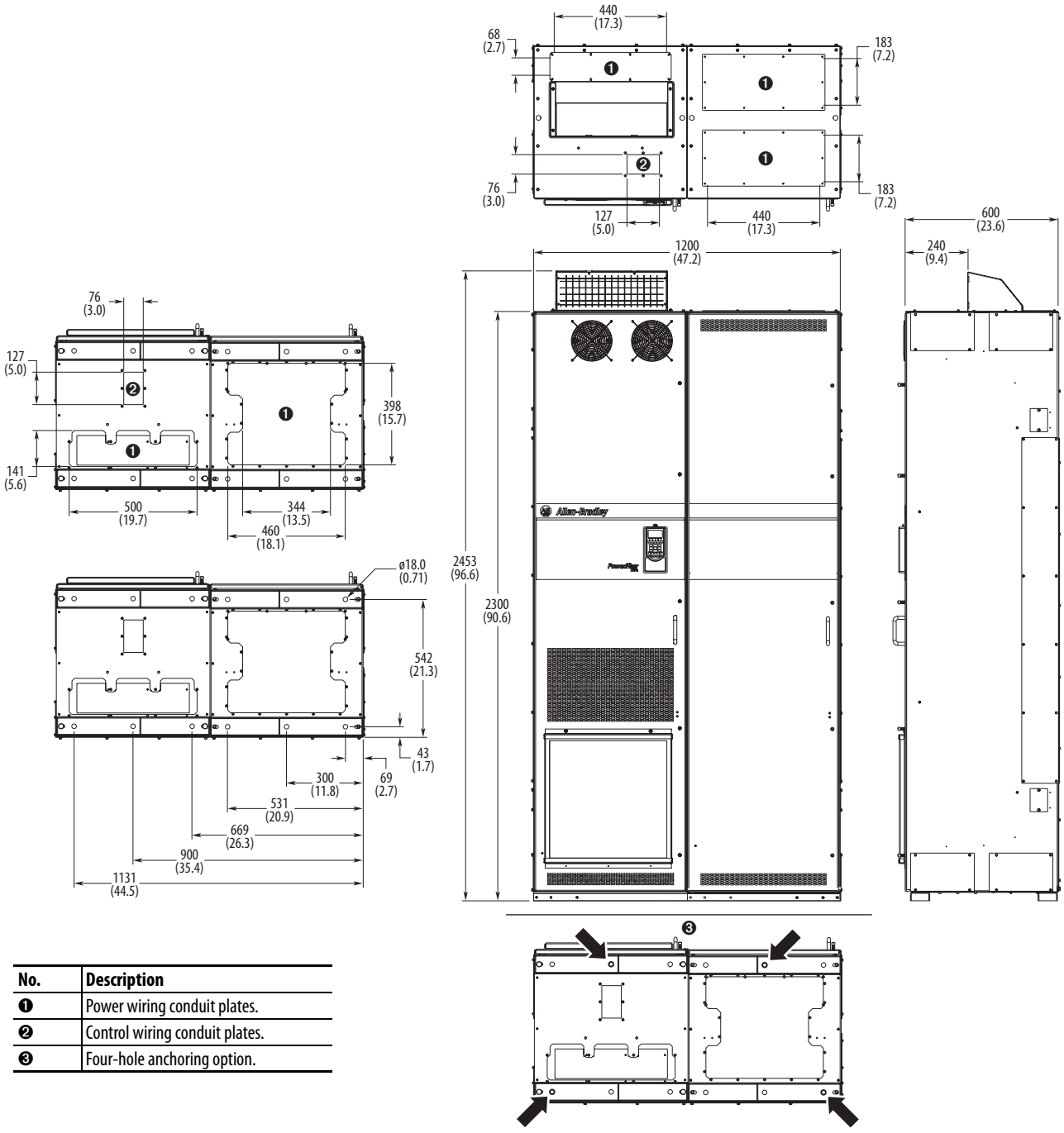
After the drive cabinet is in its final position, remove the lift angle and install the exhaust hood.





Approximate Dimensions

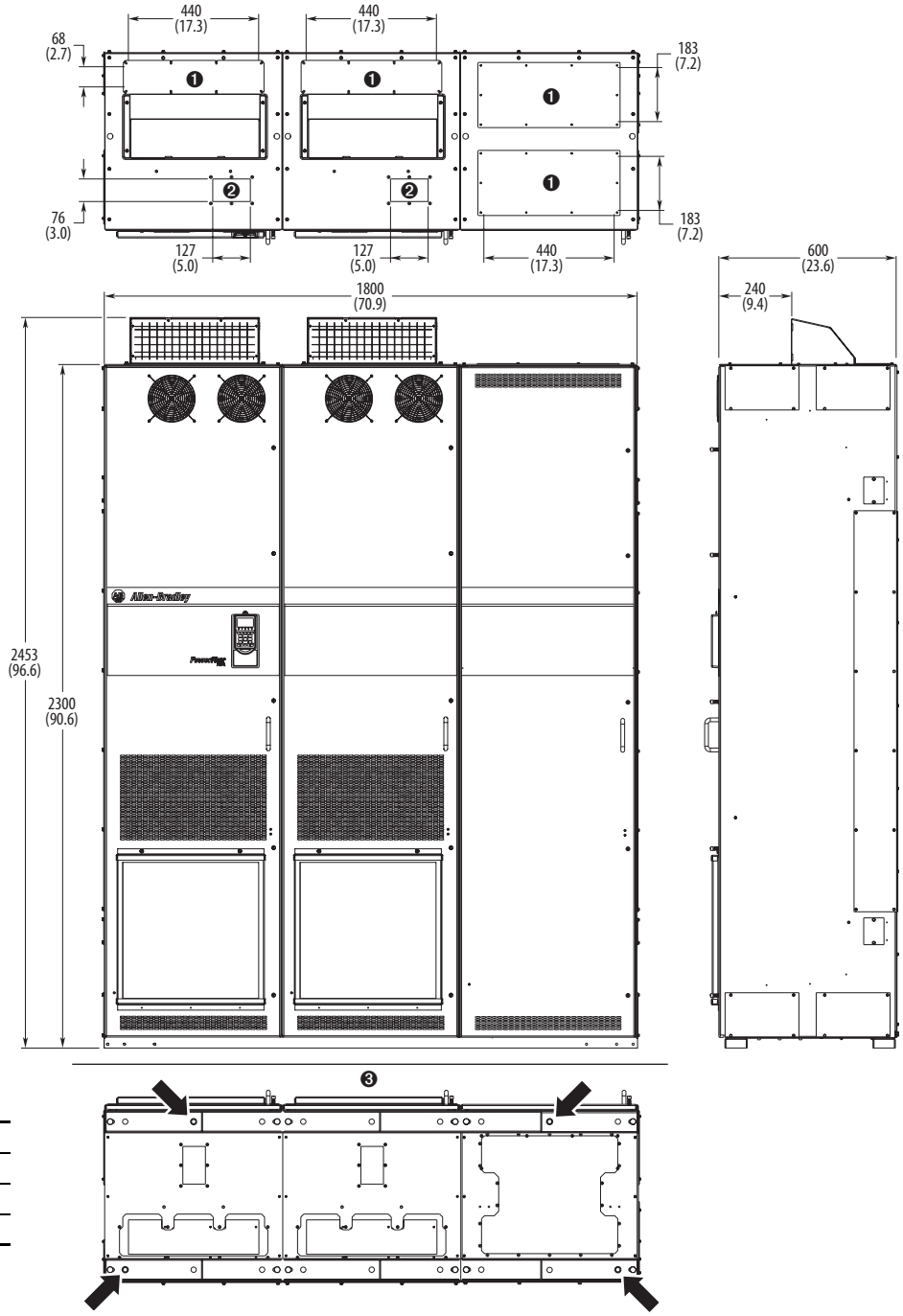
Figure 103 - IP20, NEMA/UL Type 1 Drive with 2500 MCC Style Cabinet, Frame 8
(Enclosure Code B with P14 - Drive and Wiring Only Bay)



No.	Description
❶	Power wiring conduit plates.
❷	Control wiring conduit plates.
❸	Four-hole anchoring option.

M12 (1/2 in.) Property Class 8.8 anchoring hardware recommended to fasten the drive cabinet through its internal mounting angle to the foundation. Anchor bolts may be pre-located and embedded in the foundation prior to instillation.

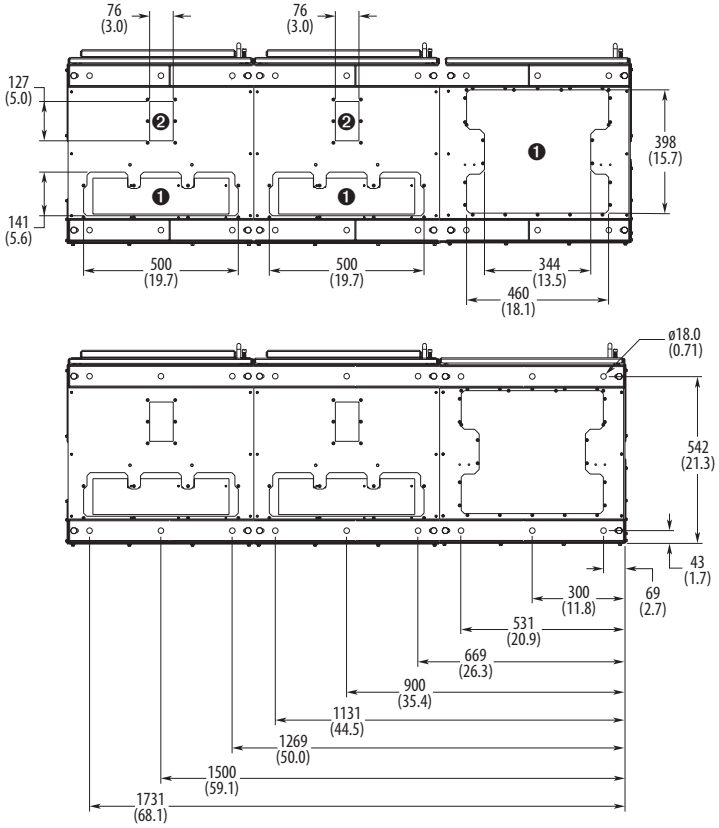
Figure 104 - IP20, NEMA/UL Type 1 Drive with 2500 MCC Style Cabinet, Frame 9
(Enclosure Code B with P14 - Drive and Wiring Only Bay)



No.	Description
❶	Power wiring conduit plates.
❷	Control wiring conduit plates.
❸	Four-hole anchoring option.

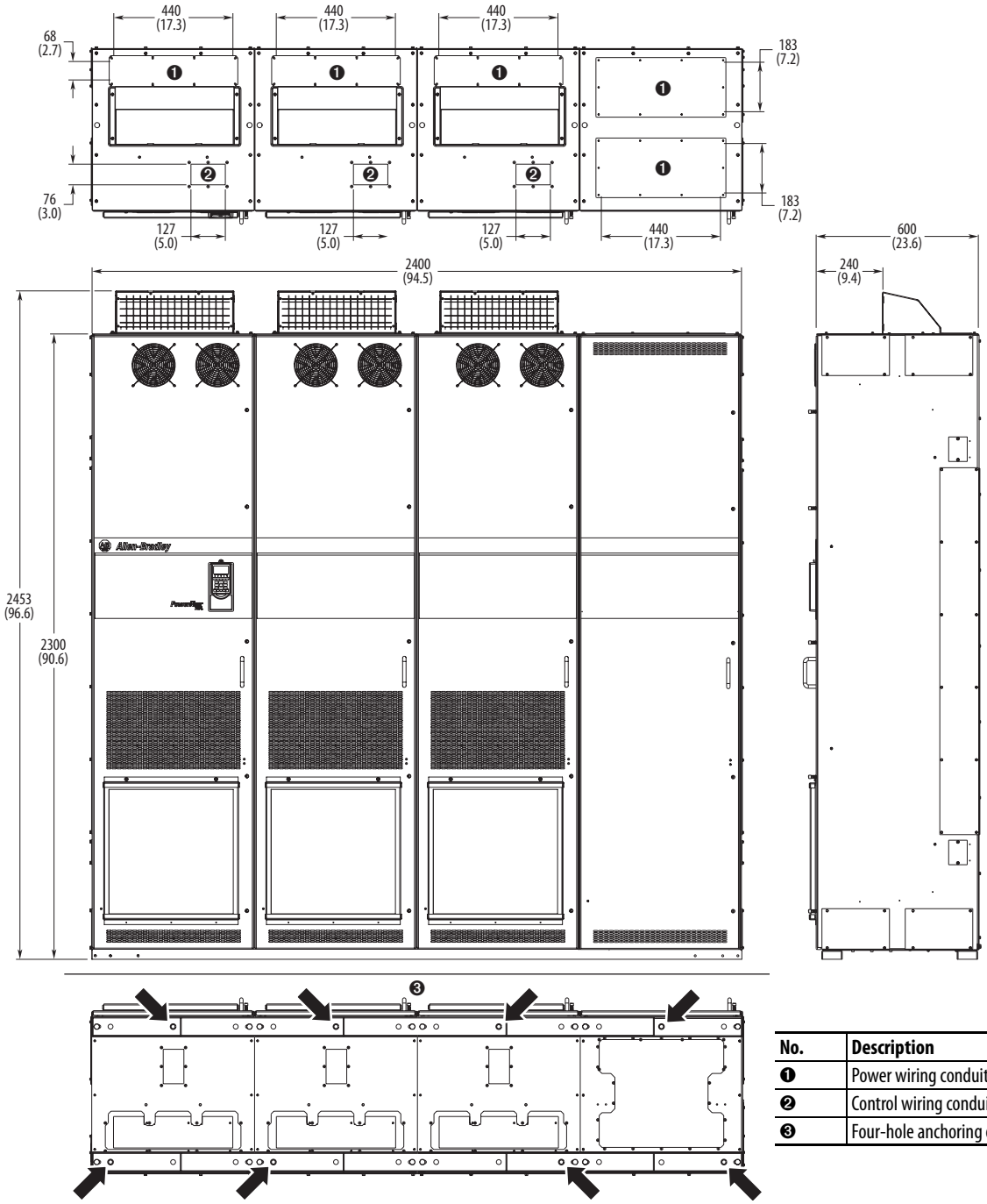
M12 (1/2 in.) Property Class 8.8 anchoring hardware recommended to fasten the drive cabinet through its internal mounting angle to the foundation. Anchor bolts may be pre-located and embedded in the foundation prior to instillation.

Figure 105 - IP20, NEMA/UL Type 1 Drive with 2500 MCC Style Cabinet, Frame 9 Bottom Access
(Enclosure Code B with P14 - Drive and Wiring Only Bay)



No.	Description
❶	Power wiring conduit plates.
❷	Control wiring conduit plates.

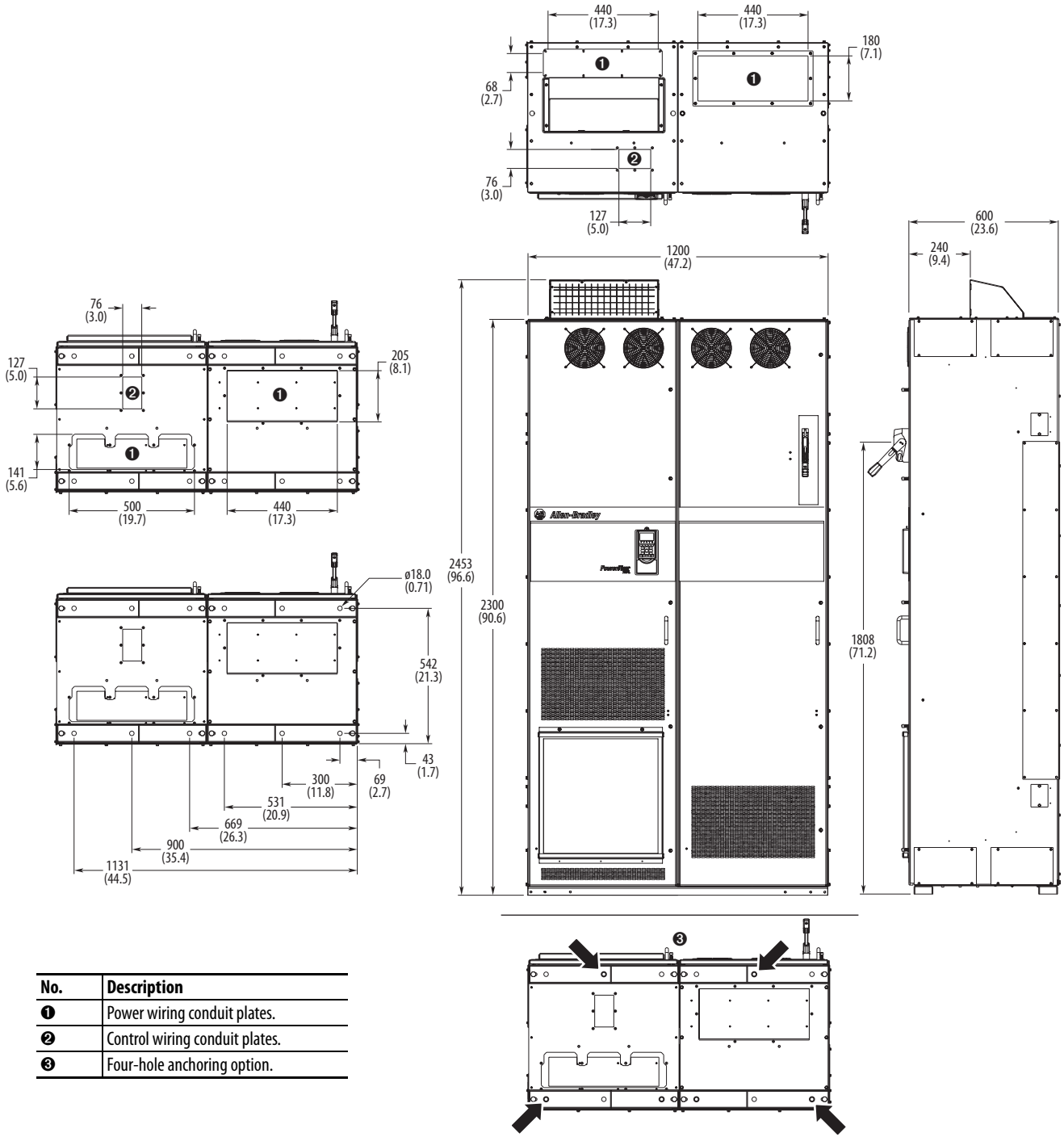
Figure 106 - IP20, NEMA/UL Type 1 Drive with 2500 MCC Style Cabinet, Frame 10
(Enclosure Code B with P14 - Drive and Wiring Only Bay)



No.	Description
❶	Power wiring conduit plates.
❷	Control wiring conduit plates.
❸	Four-hole anchoring option.

M12 (1/2 in.) Property Class 8.8 anchoring hardware recommended to fasten the drive cabinet through its internal mounting angle to the foundation. Anchor bolts may be pre-located and embedded in the foundation prior to instillation.

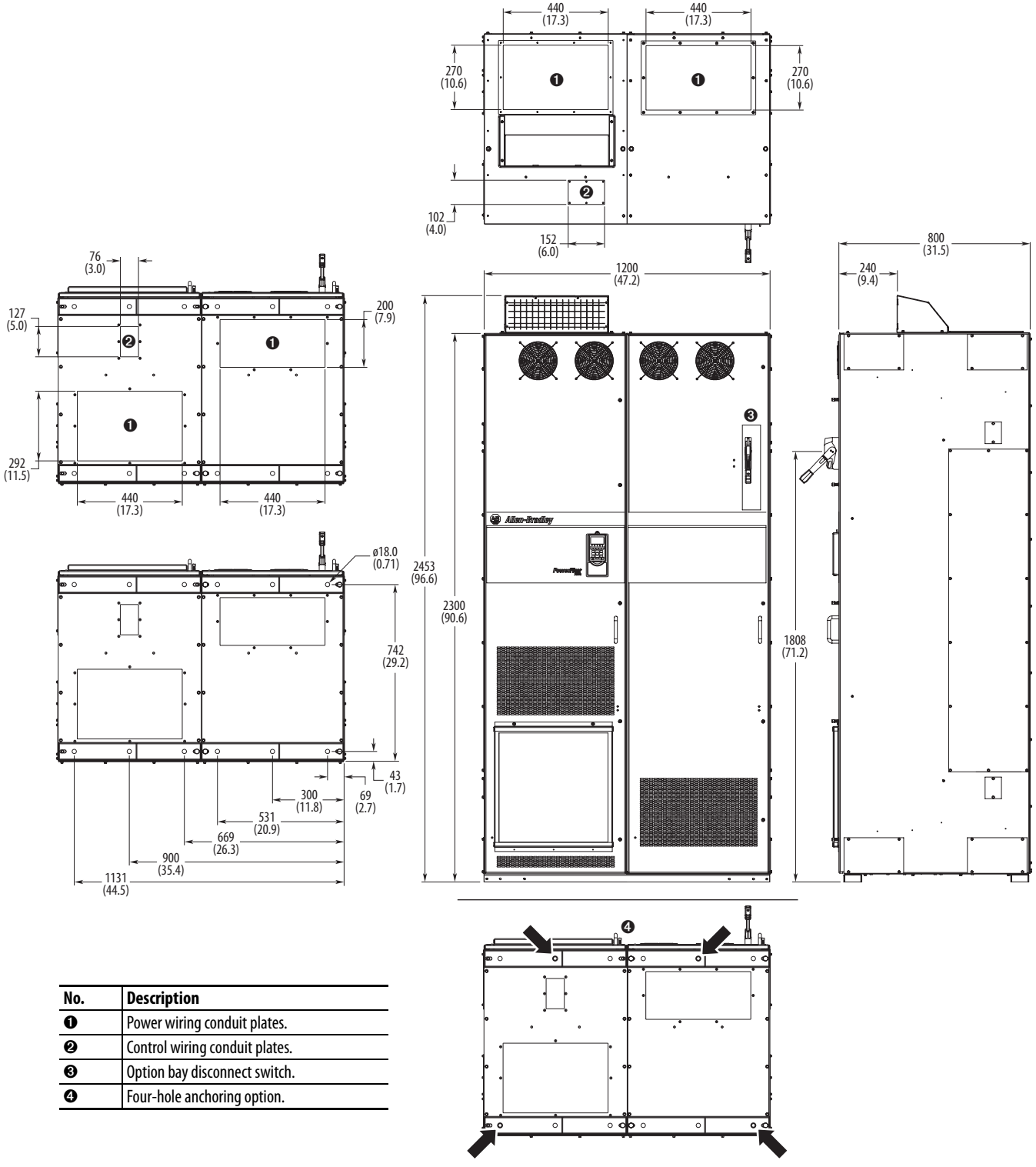
Figure 107 - IP20, NEMA/UL Type 1 Drive with 2500 MCC Style Cabinets, Frame 8
(Enclosure Code B - 600 mm Deep Drive and Cabinet Option Bay)



No.	Description
❶	Power wiring conduit plates.
❷	Control wiring conduit plates.
❸	Four-hole anchoring option.

M12 (1/2 in.) Property Class 8.8 anchoring hardware recommended to fasten the drive cabinet through its internal mounting angle to the foundation. Anchor bolts may be pre-located and embedded in the foundation prior to instillation.

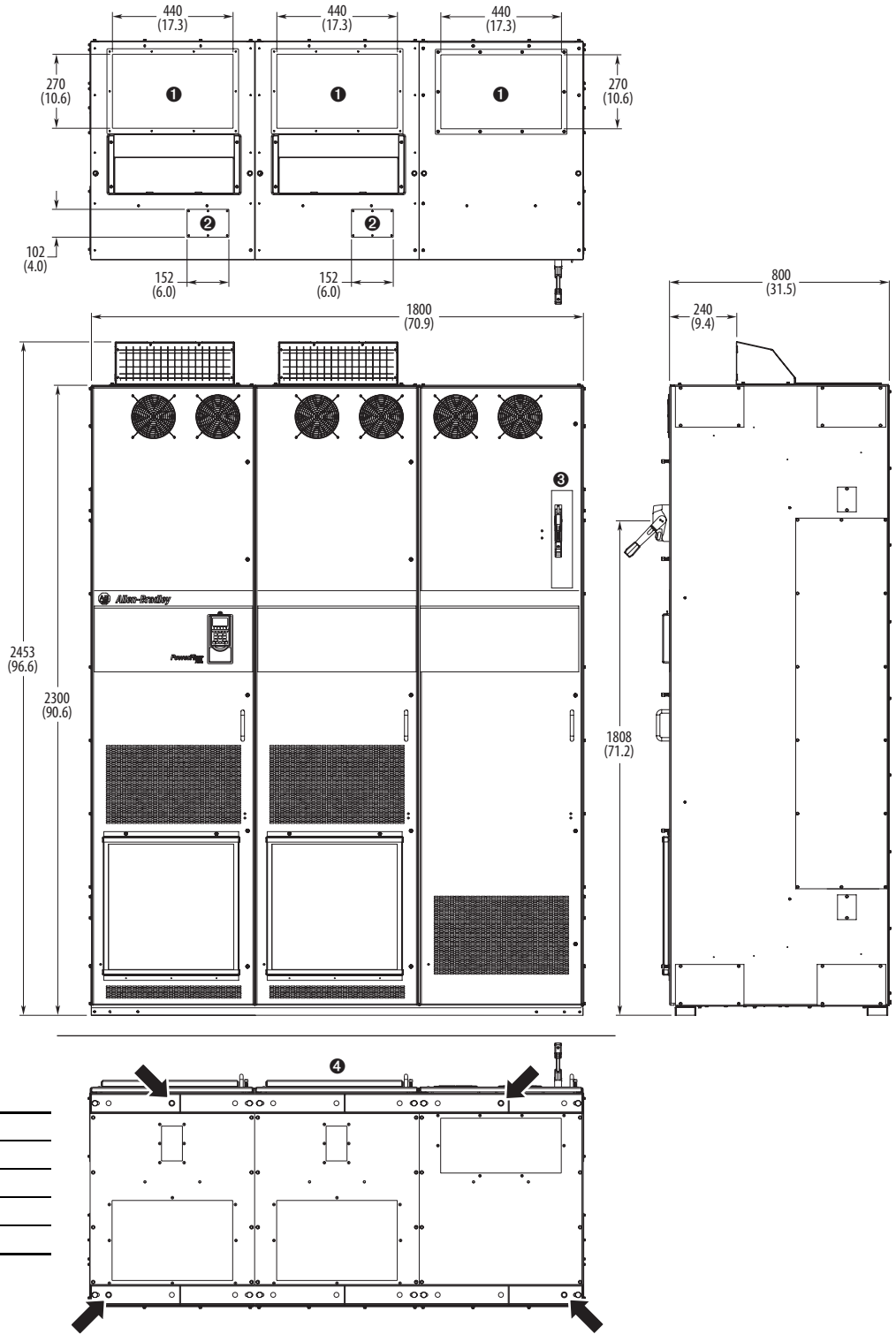
Figure 108 - IP20, NEMA/UL Type 1 Drive with 2500 MCC Style Cabinets, Frame 8
(Enclosure Code P, W, Y - 800 mm Deep Drive and Cabinet Option Bay)



No.	Description
❶	Power wiring conduit plates.
❷	Control wiring conduit plates.
❸	Option bay disconnect switch.
❹	Four-hole anchoring option.

M12 (1/2 in.) Property Class 8.8 anchoring hardware recommended to fasten the drive cabinet through its internal mounting angle to the foundation. Anchor bolts may be pre-located and embedded in the foundation prior to instillation.

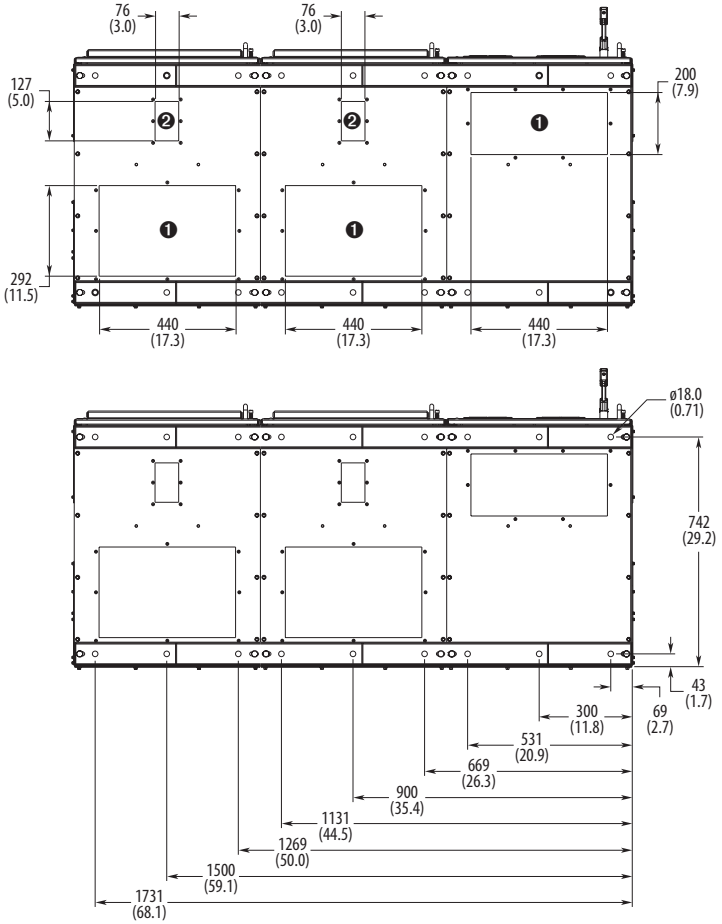
Figure 109 - IP20, NEMA/UL Type 1 Drive with 2500 MCC Style Cabinets, Frame 9
(Enclosure Code P, W, Y - 800 mm Deep Drive and Cabinet Option Bay)



No.	Description
❶	Power wiring conduit plates.
❷	Control wiring conduit plates.
❸	Option bay disconnect switch.
❹	Four-hole anchoring option.

M12 (1/2 in.) Property Class 8.8 anchoring hardware recommended to fasten the drive cabinet through its internal mounting angle to the foundation. Anchor bolts may be pre-located and embedded in the foundation prior to instillation.

Figure 110 - IP20, NEMA/UL Type 1 Drive with 2500 MCC Style Cabinet, Frame 9 Bottom Access
(Enclosure Code P, W, Y - 800 mm Deep Drive and Cabinet Option Bay)



No.	Description
❶	Power wiring conduit plates.
❷	Control wiring conduit plates.

M12 (1/2 in.) Property Class 8.8 anchoring hardware recommended to fasten the drive cabinet through its internal mounting angle to the foundation. Anchor bolts may be pre-located and embedded in the foundation prior to instillation.

Step 4: Power and Control Wiring

Wiring Only Bay Option

Figure 111 - Option P14 Wiring Only Bay

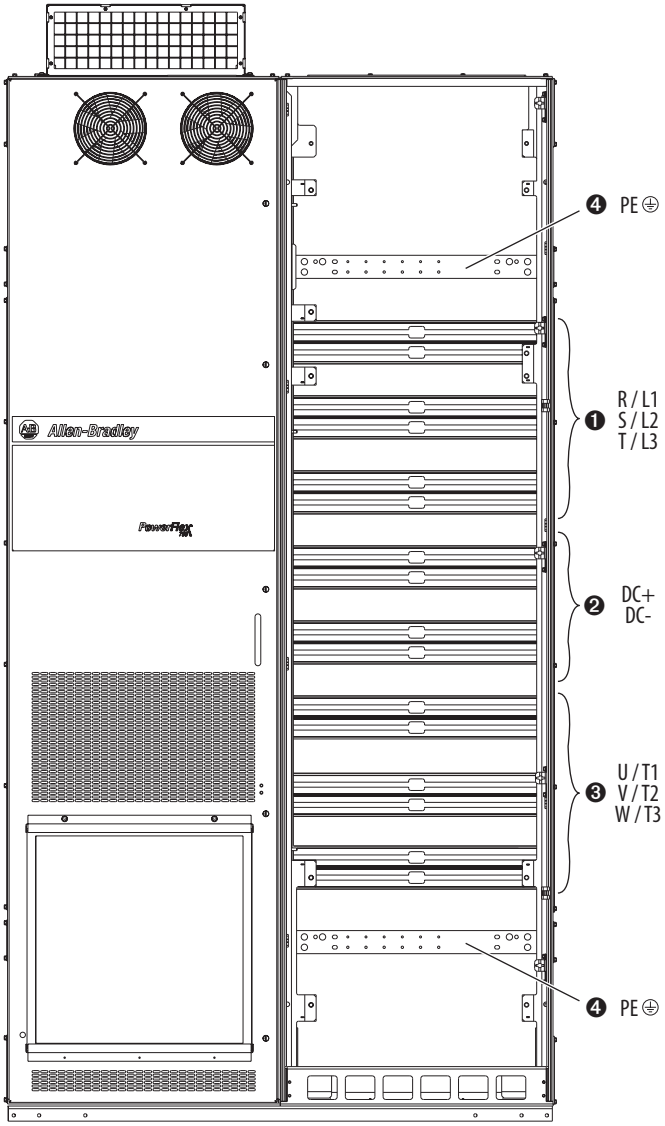


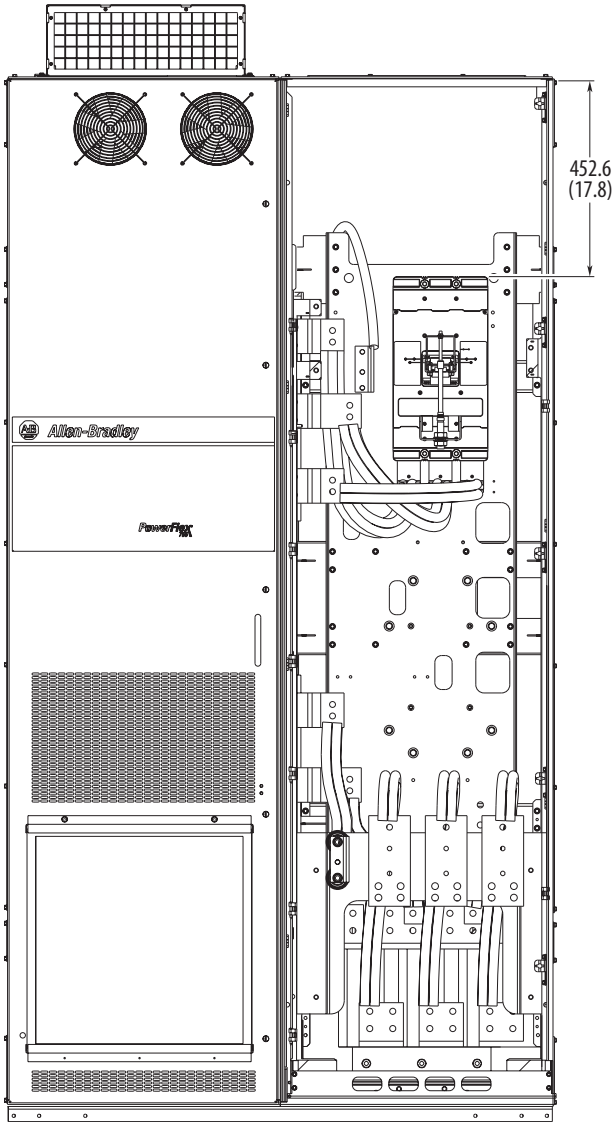
Table 64 - Frame 8

No.	Name	Description
❶	Power Bus	R/L1, S/L2, T/L3
❷	DC Bus	DC+, DC-
❸	Power Bus	U/T1, V/T2, W/T3
❹	PE Grounding Bar	Terminating point to chassis ground for incoming AC line and motor shield.

See Frame 8...10 Power Terminal L-Brackets on page 101 for information on making cable connections on extruded bus bars.

Cabinet Options Bay

Figure 112 - Option P3 and P5 Disconnect Switch Wiring Clearance



Input Power Circuit Breakers and Disconnect Switches

Refer to page 11 for an explanation of where to locate drive ratings on the nameplate.

Table 65 - 400V, 50 Hz Input - Code P3 Thermal Magnetic Circuit Breaker Options

kW	Amps	Duty	Line Side Terminal Lugs	Terminal Size	Recommended Torque
200	385	Heavy	140U-L-TL6A2	(2) 2…500 MCM kit of 3	42 N•m (375 lb•in)
250	460	Normal	140U-L-TL6A2	(2) 2…500 MCM kit of 3	42 N•m (375 lb•in)
	456	Heavy	140U-L-TL6A2	(2) 2…500 MCM kit of 3	42 N•m (375 lb•in)
	472	Heavy	140U-L-TL6A2	(2) 2…500 MCM kit of 3	42 N•m (375 lb•in)
315	540	Light	140U-N-TLA3A	(3) 500…750 MCM	42 N•m (375 lb•in)
	540	Normal	140U-N-TLA3A	(3) 500…750 MCM	42 N•m (375 lb•in)
	540	Heavy	140U-N-TLA3A	(3) 500…750 MCM	42 N•m (375 lb•in)
315	585	Light	140U-N-TLA3A	(3) 500…750 MCM	42 N•m (375 lb•in)
	567	Normal	140U-N-TLA3A	(3) 500…750 MCM	42 N•m (375 lb•in)
	585	Heavy	140U-N-TLA3A	(3) 500…750 MCM	42 N•m (375 lb•in)
355	612	Light	140U-N-TLA3A	(3) 500…750 MCM	42 N•m (375 lb•in)
	650	Normal	140U-N-TLA3A	(3) 500…750 MCM	42 N•m (375 lb•in)
	642	Heavy	140U-N-TLA3A	(3) 500…750 MCM	42 N•m (375 lb•in)
400	750	Light	140U-N-TLA3A	(3) 500…750 MCM	42 N•m (375 lb•in)
	750	Normal	140U-N-TLA3A	(3) 500…750 MCM	42 N•m (375 lb•in)
	770	Normal	140U-N-TLA3A	(3) 500…750 MCM	42 N•m (375 lb•in)
450	796	Light	140U-N-TLA3A	(3) 500…750 MCM	42 N•m (375 lb•in)
	832	Light	140U-N-TLA3A	(3) 500…750 MCM	42 N•m (375 lb•in)

Table 66 - 400V, 50 Hz Input - Code P5 Molded Case Disconnect Switch Options

kW	Amps	Duty	Line Side Terminal Lugs	Terminal Size	Recommended Torque
200	385	Heavy	140U-L-TL6A2	(2) 2…500 MCM kit of 3	42 N•m (375 lb•in)
250	460	Normal	140U-L-TL6A2	(2) 2…500 MCM kit of 3	42 N•m (375 lb•in)
	456	Heavy	140U-L-TL6A2	(2) 2…500 MCM kit of 3	42 N•m (375 lb•in)
	472	Heavy	140U-L-TL6A2	(2) 2…500 MCM kit of 3	42 N•m (375 lb•in)
315	540	Light	140U-M-TLA2A	(2) 500…750 MCM	56 N•m (500 lb•in)
	540	Normal	140U-M-TLA2A	(2) 500…750 MCM	56 N•m (500 lb•in)
	540	Heavy	140U-M-TLA2A	(2) 500…750 MCM	56 N•m (500 lb•in)
315	585	Light	140U-M-TLA2A	(2) 500…750 MCM	56 N•m (500 lb•in)
	567	Normal	140U-M-TLA2A	(2) 500…750 MCM	56 N•m (500 lb•in)
	585	Heavy	140U-M-TLA2A	(2) 500…750 MCM	56 N•m (500 lb•in)
355	612	Light	140U-M-TLA2A	(2) 500…750 MCM	56 N•m (500 lb•in)
	650	Normal	140U-M-TLA2A	(2) 500…750 MCM	56 N•m (500 lb•in)
	642	Heavy	140U-M-TLA2A	(2) 500…750 MCM	56 N•m (500 lb•in)
400	750	Light	140U-N-TLA3A	(3) 500…750 MCM	42 N•m (375 lb•in)
	750	Normal	140U-N-TLA3A	(3) 500…750 MCM	42 N•m (375 lb•in)
	770	Normal	140U-N-TLA3A	(3) 500…750 MCM	42 N•m (375 lb•in)
450	796	Light	140U-N-TLA3A	(3) 500…750 MCM	42 N•m (375 lb•in)
	832	Light	140U-N-TLA3A	(3) 500…750 MCM	42 N•m (375 lb•in)

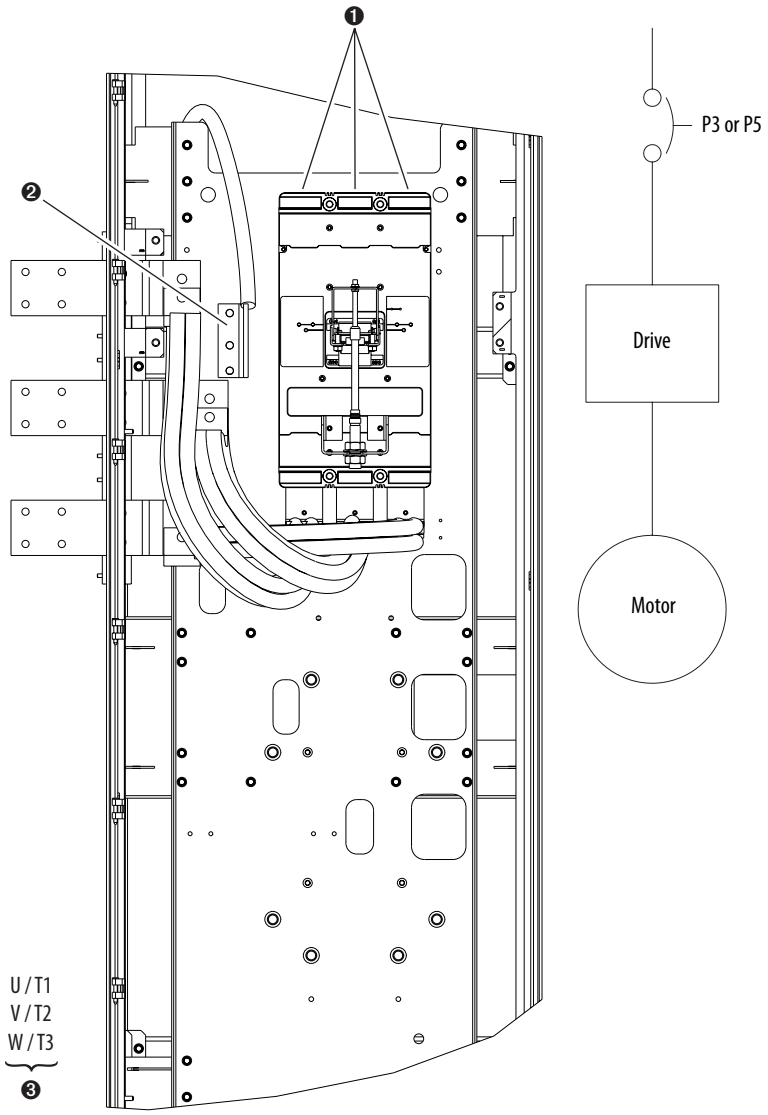
Table 67 - 480V, 60 Hz Input - Code P3 Thermal Magnetic Circuit Breaker Options

HP	Amps	Duty	Line Side Terminal Lugs	Terminal Size	Recommended Torque
300	370	Heavy	140U-L-TL6A2	(2) 2…500 MCM kit of 3	42 N•m (375 lb•in)
350	430	Normal	140U-L-TL6A2	(2) 2…500 MCM kit of 3	42 N•m (375 lb•in)
	414	Heavy	140U-L-TL6A2	(2) 2…500 MCM kit of 3	42 N•m (375 lb•in)
	454	Heavy	140U-L-TL6A2	(2) 2…500 MCM kit of 3	42 N•m (375 lb•in)
400	485	Light	140U-N-TLA3A	(3) 500…750 MCM	42 N•m (375 lb•in)
	485	Normal	140U-N-TLA3A	(3) 500…750 MCM	42 N•m (375 lb•in)
	485	Heavy	140U-N-TLA3A	(3) 500…750 MCM	42 N•m (375 lb•in)
450	545	Light	140U-N-TLA3A	(3) 500…750 MCM	42 N•m (375 lb•in)
	545	Normal	140U-N-TLA3A	(3) 500…750 MCM	42 N•m (375 lb•in)
	545	Heavy	140U-N-TLA3A	(3) 500…750 MCM	42 N•m (375 lb•in)
500	590	Light	140U-N-TLA3A	(3) 500…750 MCM	42 N•m (375 lb•in)
	617	Normal	140U-N-TLA3A	(3) 500…750 MCM	42 N•m (375 lb•in)
	617	Heavy	140U-N-TLA3A	(3) 500…750 MCM	42 N•m (375 lb•in)
600	710	Light	140U-N-TLA3A	(3) 500…750 MCM	42 N•m (375 lb•in)
	710	Normal	140U-N-TLA3A	(3) 500…750 MCM	42 N•m (375 lb•in)
650	765	Light	140U-N-TLA3A	(3) 500…750 MCM	42 N•m (375 lb•in)
	740	Normal	140U-N-TLA3A	(3) 500…750 MCM	42 N•m (375 lb•in)
700	800	Light	140U-N-TLA3A	(3) 500…750 MCM	42 N•m (375 lb•in)

Table 68 - 480V, 60 Hz Input - Code P5 Molded Case Disconnect Switch Options

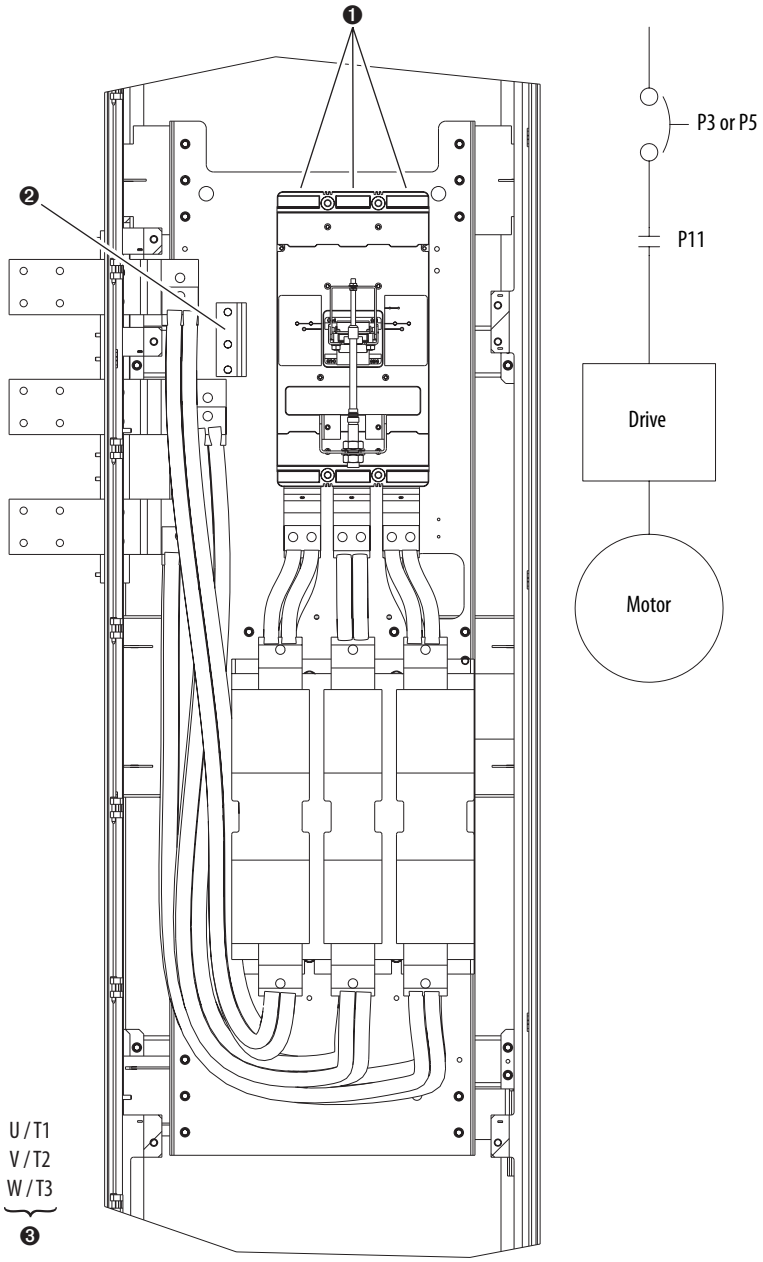
kW	Amps	Duty	Line Side Terminal Lugs	Terminal Size	Recommended Torque
300	370	Heavy	140U-L-TL6A2	(2) 2…500 MCM kit of 3	42 N•m (375 lb•in)
350	430	Normal	140U-L-TL6A2	(2) 2…500 MCM kit of 3	42 N•m (375 lb•in)
	414	Heavy	140U-L-TL6A2	(2) 2…500 MCM kit of 3	42 N•m (375 lb•in)
	454	Heavy	140U-L-TL6A2	(2) 2…500 MCM kit of 3	42 N•m (375 lb•in)
400	485	Light	140U-L-TL6A2	(2) 2…500 MCM kit of 3	42 N•m (375 lb•in)
	485	Normal	140U-L-TL6A2	(2) 2…500 MCM kit of 3	42 N•m (375 lb•in)
	485	Heavy	140U-L-TL6A2	(2) 2…500 MCM kit of 3	42 N•m (375 lb•in)
450	545	Light	140U-M-TLA2A	(2) 500…750 MCM	56 N•m (500 lb•in)
	545	Normal	140U-M-TLA2A	(2) 500…750 MCM	56 N•m (500 lb•in)
	545	Heavy	140U-M-TLA2A	(2) 500…750 MCM	56 N•m (500 lb•in)
500	590	Light	140U-M-TLA2A	(2) 500…750 MCM	56 N•m (500 lb•in)
	617	Normal	140U-M-TLA2A	(2) 500…750 MCM	56 N•m (500 lb•in)
	617	Heavy	140U-M-TLA2A	(2) 500…750 MCM	56 N•m (500 lb•in)
600	710	Light	140U-N-TLA3A	(3) 500…750 MCM	42 N•m (375 lb•in)
	710	Normal	140U-N-TLA3A	(3) 500…750 MCM	42 N•m (375 lb•in)
650	765	Light	140U-N-TLA3A	(3) 500…750 MCM	42 N•m (375 lb•in)
	740	Normal	140U-N-TLA3A	(3) 500…750 MCM	42 N•m (375 lb•in)
700	800	Light	140U-N-TLA3A	(3) 500…750 MCM	42 N•m (375 lb•in)

Figure 113 - Option P3 or P5 Disconnect



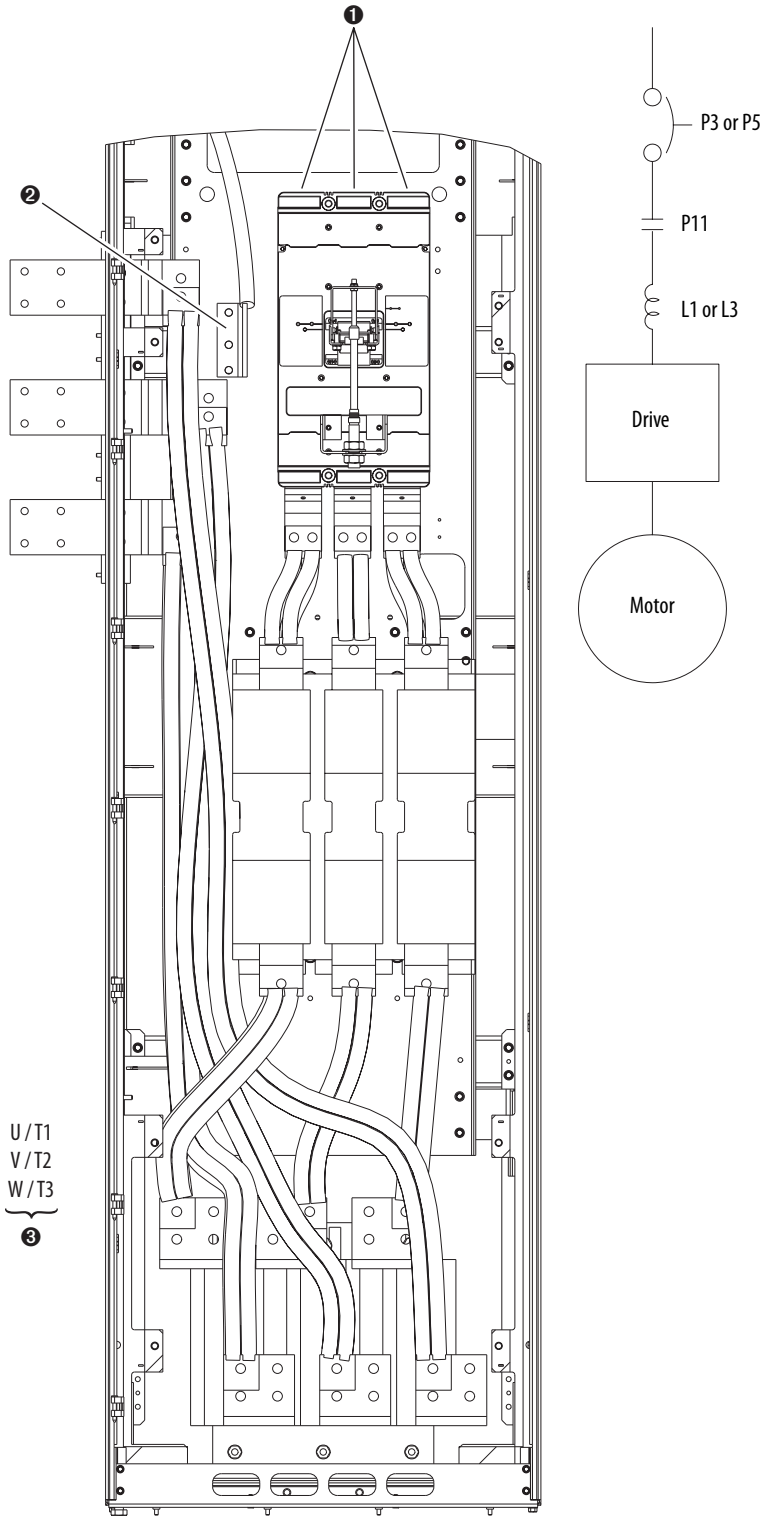
No.	Name	Description
❶	R/L1, S/L2, T/L3	Three-phase input power connection.
❷	PE	Three-phase input ground.
❸	U/T1, V/T2, W/T3	Motor connection made at drive power bus. See page 99.

Figure 114 - Option P3 or P5 Disconnect and Option P11 Input Contactor



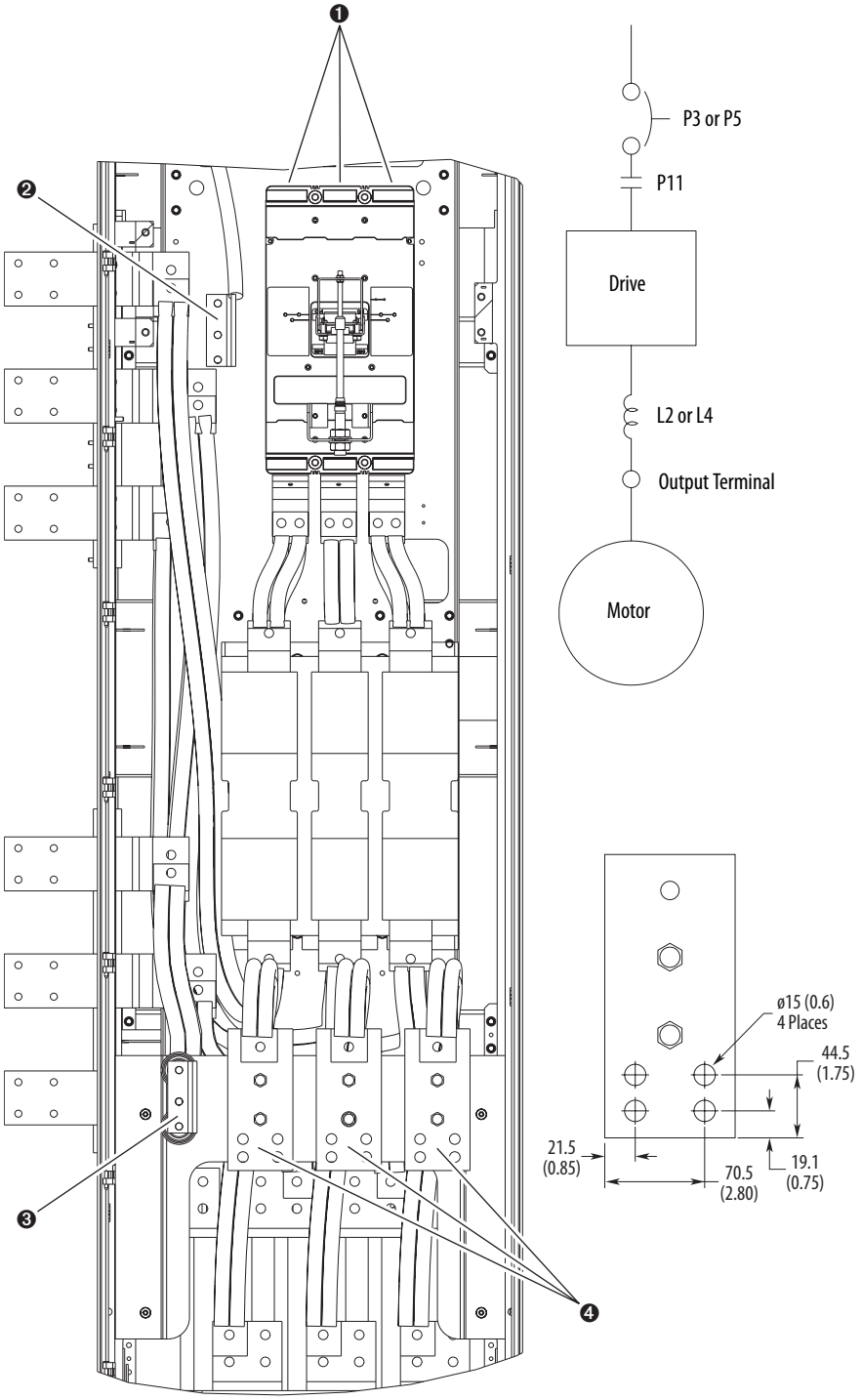
No.	Name	Description
❶	R/L1, S/L2, T/L3	Three-phase input power connection.
❷	PE	Three-phase input ground.
❸	U/T1, V/T2, W/T3	Motor connection made at drive power bus. See page 99.

Figure 115 - Option P3 or P5 Disconnect, Option P11 Input Contactor, and Option L1 or L3 Input Reactor



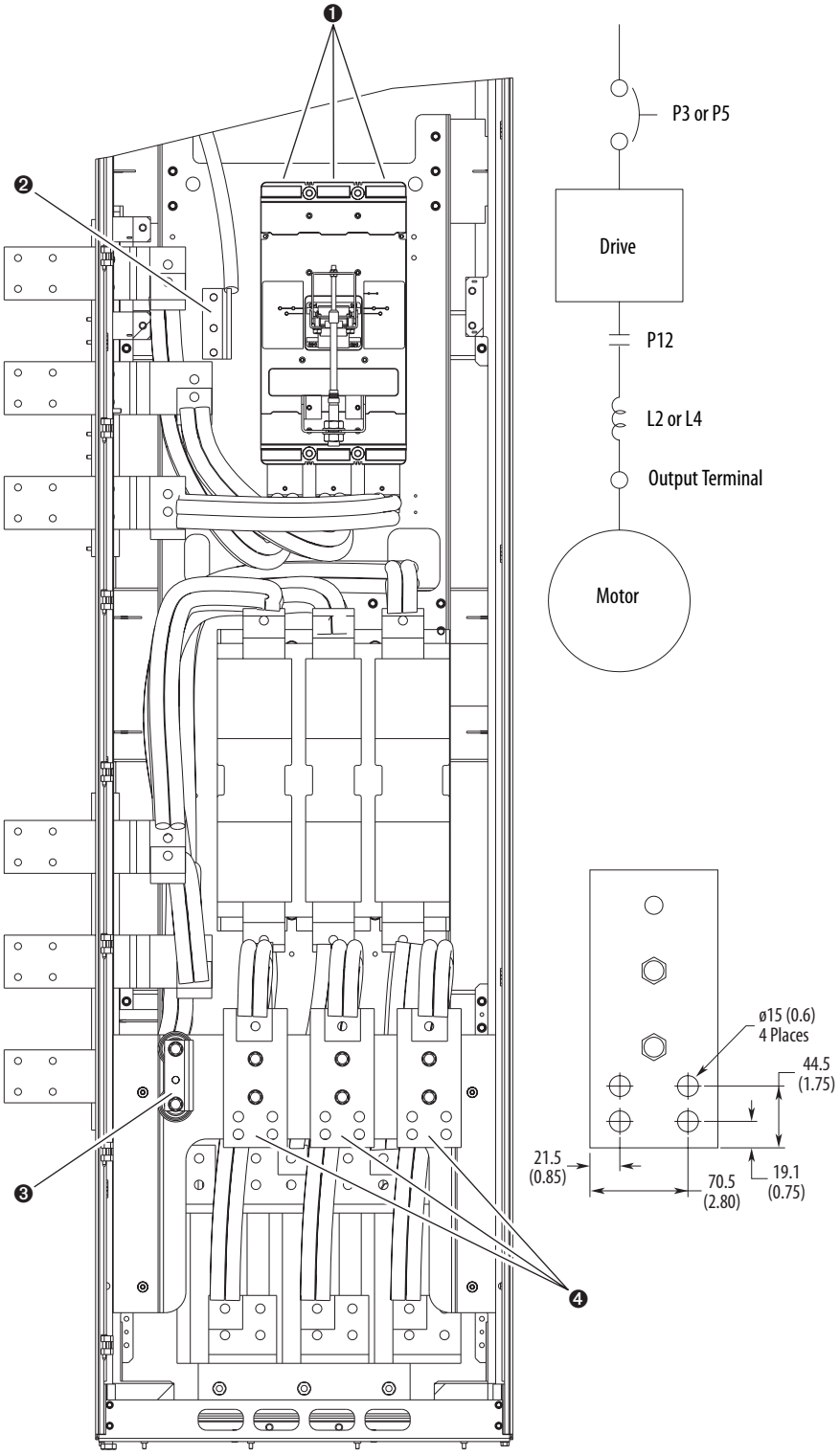
No.	Name	Description
❶	R/L1, S/L2, T/L3	Three-phase input power connection.
❷	PE	Three-phase input ground.
❸	U/T1, V/T2, W/T3	Motor connection made at drive power bus. See page 99.

Figure 116 - Option P3 or P5 Disconnect, Option P11 Input Contactor, and Option L2 or L4 Output Reactor



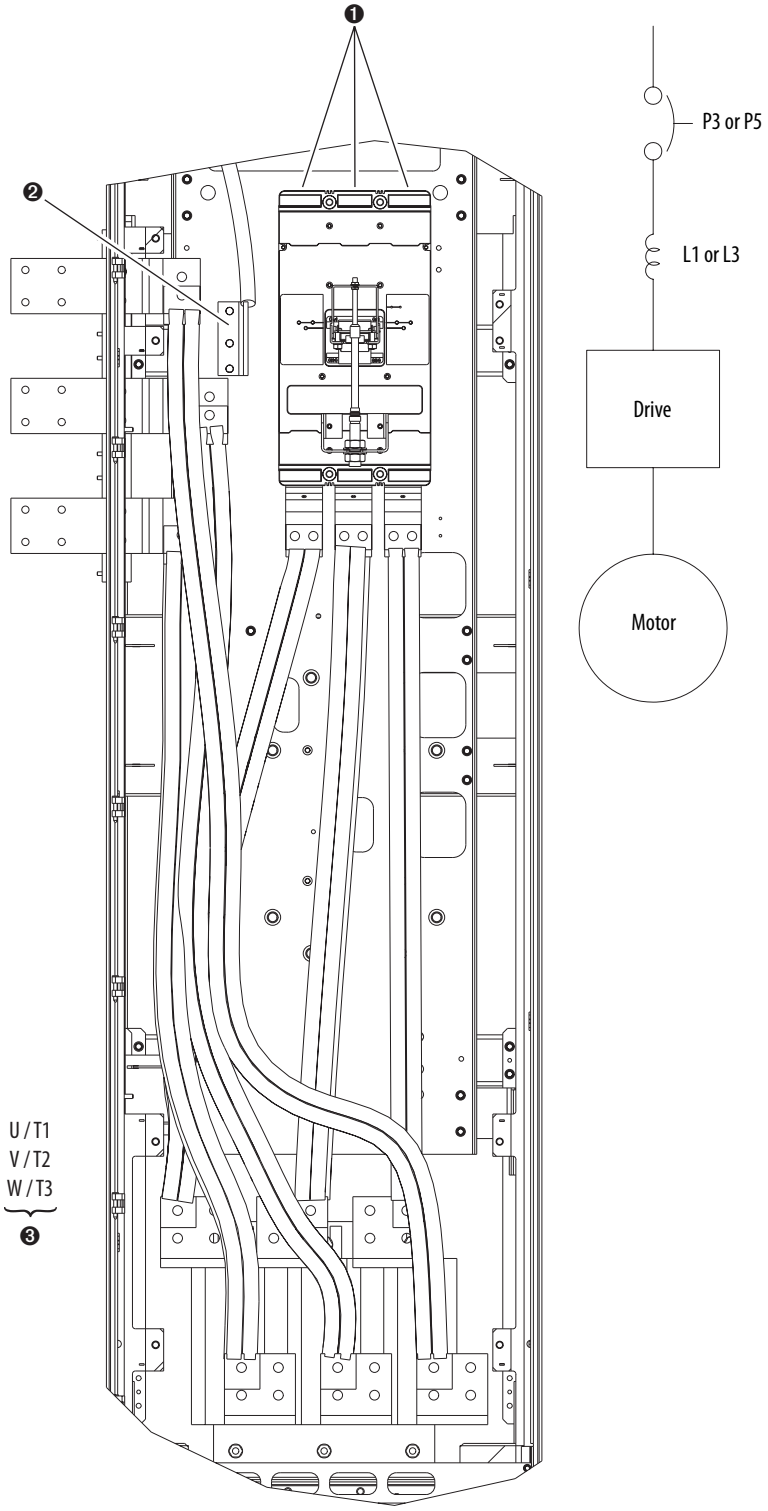
No.	Name	Description	Recommended Torque
❶	R/L1, S/L2, T/L3	Three-phase input power connection.	Factory Installed
❷	PE	Three-phase input ground.	38.0 N•m (336 lb•in)
❸	PE	Three-phase motor ground.	38.0 N•m (336 lb•in)
❹	U/T1, V/T2, W/T3	Motor connection.	38.0 N•m (336 lb•in)

Figure 117 - Option P3 or P5 Disconnect, Option P12 Output Contactor, and Option L2 or L4 Output Reactor



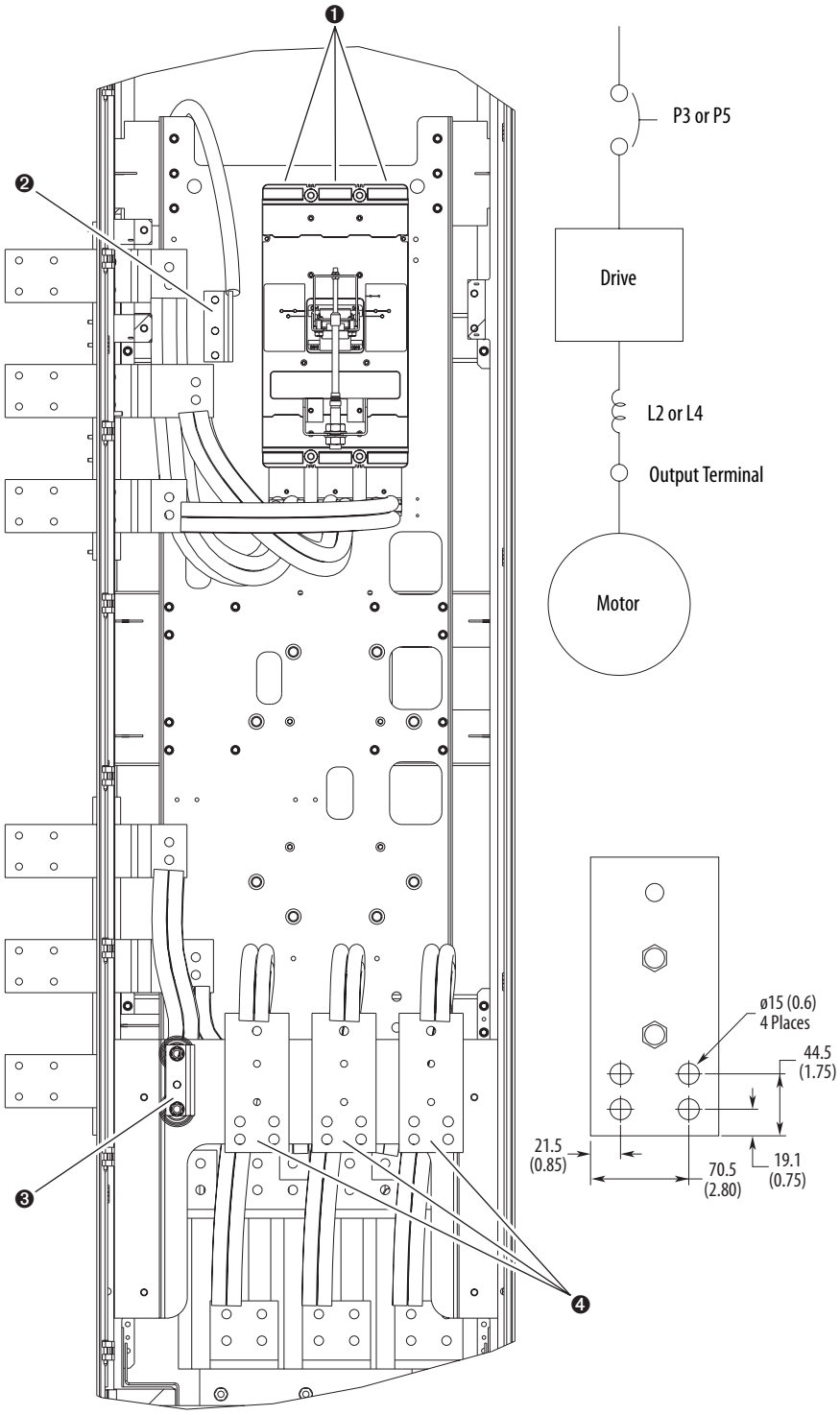
No.	Name	Description	Recommended Torque
❶	R/L1, S/L2, T/L3	Three-phase input power connection.	Factory Installed
❷	PE	Three-phase input ground.	38.0 N•m (336 lb•in)
❸	PE	Three-phase motor ground.	38.0 N•m (336 lb•in)
❹	U/T1, V/T2, W/T3	Motor connection.	38.0 N•m (336 lb•in)

Figure 118 - Option P3 or P5 Disconnect and Option L1 or L3 Input Reactor



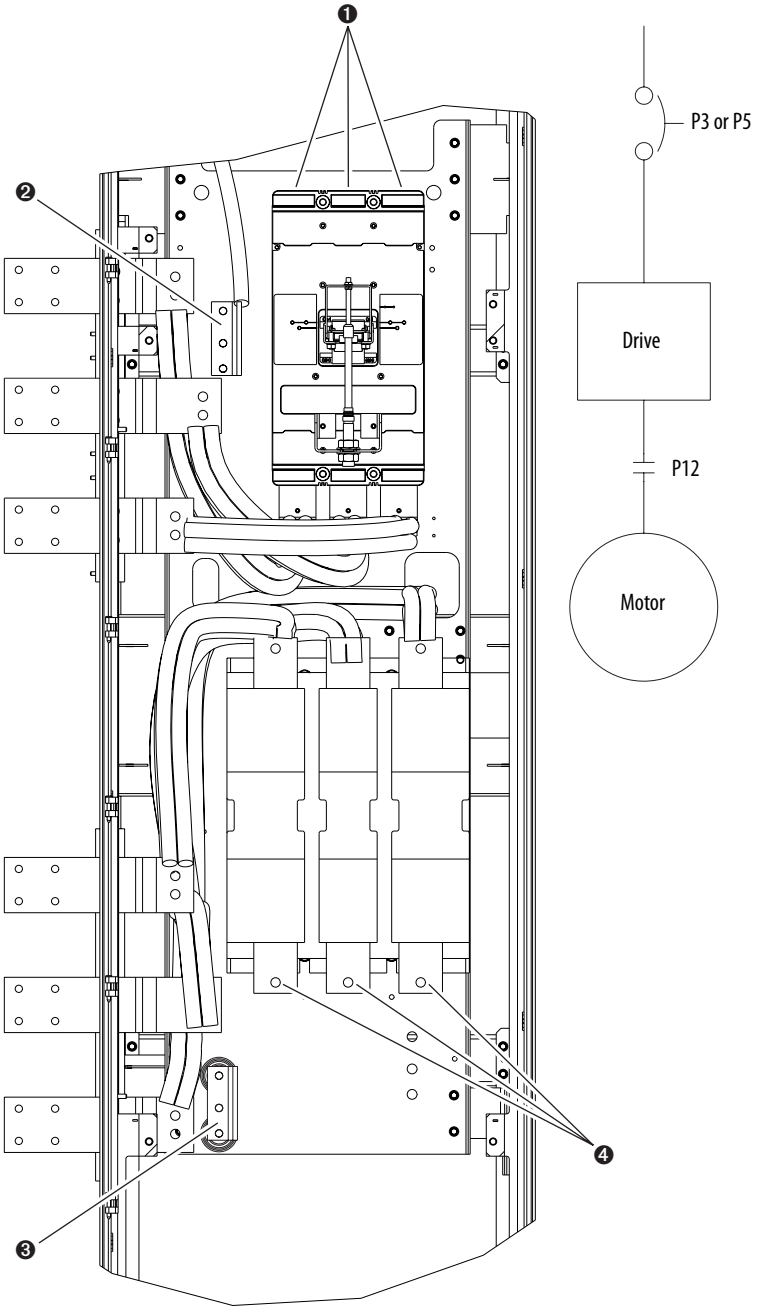
No.	Name	Description
❶	R/L1, S/L2, T/L3	Three-phase input power connection.
❷	PE	Three-phase input ground.
❷	U/T1, V/T2, W/T3	Motor connection made at drive power bus. See page 99.

Figure 119 - Option P3 or P5 Disconnect and Option L2 or L4 Output Reactor



No.	Name	Description	Recommended Torque
❶	R/L1, S/L2, T/L3	Three-phase input power connection.	Factory Installed
❷	PE	Three-phase input ground.	38.0 N•m (336 lb•in)
❸	PE	Three-phase motor ground.	38.0 N•m (336 lb•in)
❹	U/T1, V/T2, W/T3	Motor connection.	38.0 N•m (336 lb•in)

Figure 120 - Option P3 or P5 Disconnect and Option P12 Output Contactor



No.	Name	Description
❶	R/L1, S/L2, T/L3	Three-phase input power connection.
❷	PE	Three-phase input ground.
❸	PE	Three-phase motor ground.
❹	U/T1, V/T2, W/T3	Motor connection.

Table 69 - 400V, 50 Hz Input - Code P12 Output Contactor Options

kW	Amps	Duty	Contactor Cat. No.	Recommended Torque
200	385	Heavy	100-D420EA11	17 N•m (150 lb•in)
250	460	Normal	100-D630EA11	68 N•m (600 lb•in)
	456	Heavy	100-D630EA11	68 N•m (600 lb•in)
	472	Heavy	100-D630EA11	68 N•m (600 lb•in)
315	540	Light	100-D630EA11	68 N•m (600 lb•in)
	540	Normal	100-D860EA11	68 N•m (600 lb•in)
	540	Heavy	100-D630EA11	68 N•m (600 lb•in)
315	585	Light	100-D630EA11	68 N•m (600 lb•in)
	567	Normal	100-D630EA11	68 N•m (600 lb•in)
	585	Heavy	100-D630EA11	68 N•m (600 lb•in)
355	612	Light	100-D630EA11	68 N•m (600 lb•in)
	650	Normal	100-D860EA11	68 N•m (600 lb•in)
	642	Heavy	100-D630EA11	68 N•m (600 lb•in)
400	750	Light	100-D860EA11	68 N•m (600 lb•in)
	750	Normal	100-D860EA11	68 N•m (600 lb•in)
	770	Normal	100-D860EA11	68 N•m (600 lb•in)
450	796	Light	100-D860EA11	68 N•m (600 lb•in)
	832	Light	100-D860EA11	68 N•m (600 lb•in)

Table 70 - 480V, 60 Hz Input - Code P12 Output Contactor Options

kW	Amps	Duty	Contactor Cat. No.	Recommended Torque
300	370	Heavy	100-D420ED11	17 N•m (150 lb•in)
350	430	Normal	100-D630ED11	68 N•m (600 lb•in)
	414	Heavy	100-D420ED11	17 N•m (150 lb•in)
	454	Heavy	100-D630ED11	68 N•m (600 lb•in)
400	485	Light	100-D630ED11	68 N•m (600 lb•in)
	485	Normal	100-D630ED11	68 N•m (600 lb•in)
	485	Heavy	100-D630ED11	68 N•m (600 lb•in)
450	545	Light	100-D630ED11	68 N•m (600 lb•in)
	545	Normal	100-D630ED11	68 N•m (600 lb•in)
	545	Heavy	100-D630ED11	68 N•m (600 lb•in)
500	590	Light	100-D630ED11	68 N•m (600 lb•in)
	617	Normal	100-D630ED11	68 N•m (600 lb•in)
	617	Heavy	100-D630ED11	68 N•m (600 lb•in)
600	710	Light	100-D860ED11	68 N•m (600 lb•in)
	710	Normal	100-D860ED11	68 N•m (600 lb•in)
650	765	Light	100-G1200KD12	60 N•m (528 lb•in)
	740	Normal	100-G1200KD12	60 N•m (528 lb•in)
700	800	Light	100-G1200KD12	60 N•m (528 lb•in)

Control Wiring

Control terminal block TB2 is mounted on the inside right panel of the cabinet option bay. TB1 referenced in the illustrations below resides on the main control board. See page 138.

Table 71 - Option Module I/O Terminal Block Specifications

Name	Wire Size Range		Torque		Strip Length
	Maximum	Minimum	Maximum	Recommended	
Control Terminal Block TB2	4.0 mm^2 (12 AWG)	0.5 mm^2 (20 AWG)	0.5 N•m (4.5 lb•in)	0.4 N•m (3.5 lb•in)	8 mm (0.32 in.)

Figure 121 - Control Terminal Block TB2

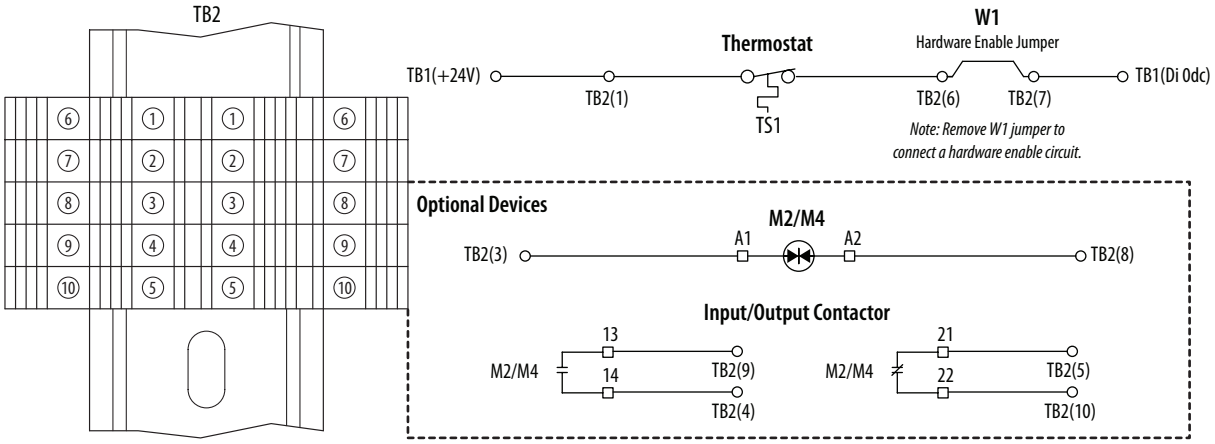
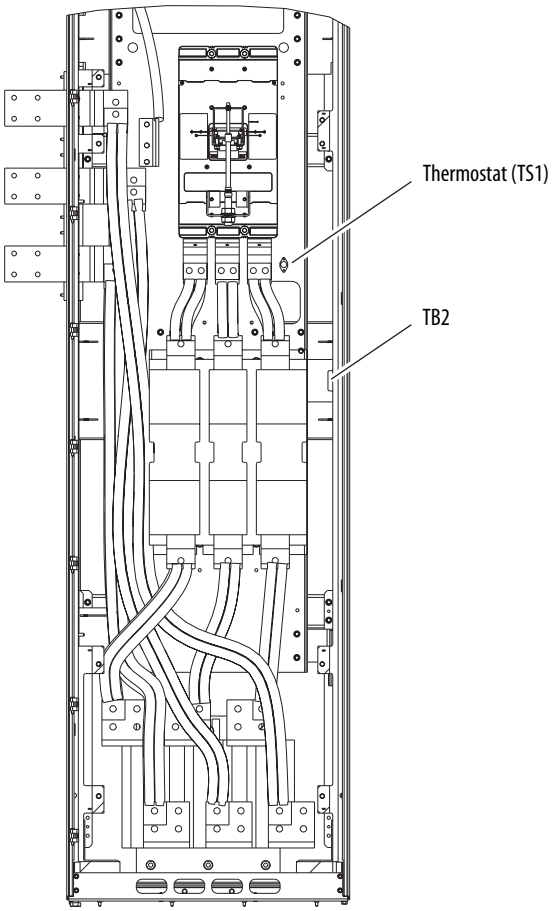


Table 72 - Input/Output Contactor Data

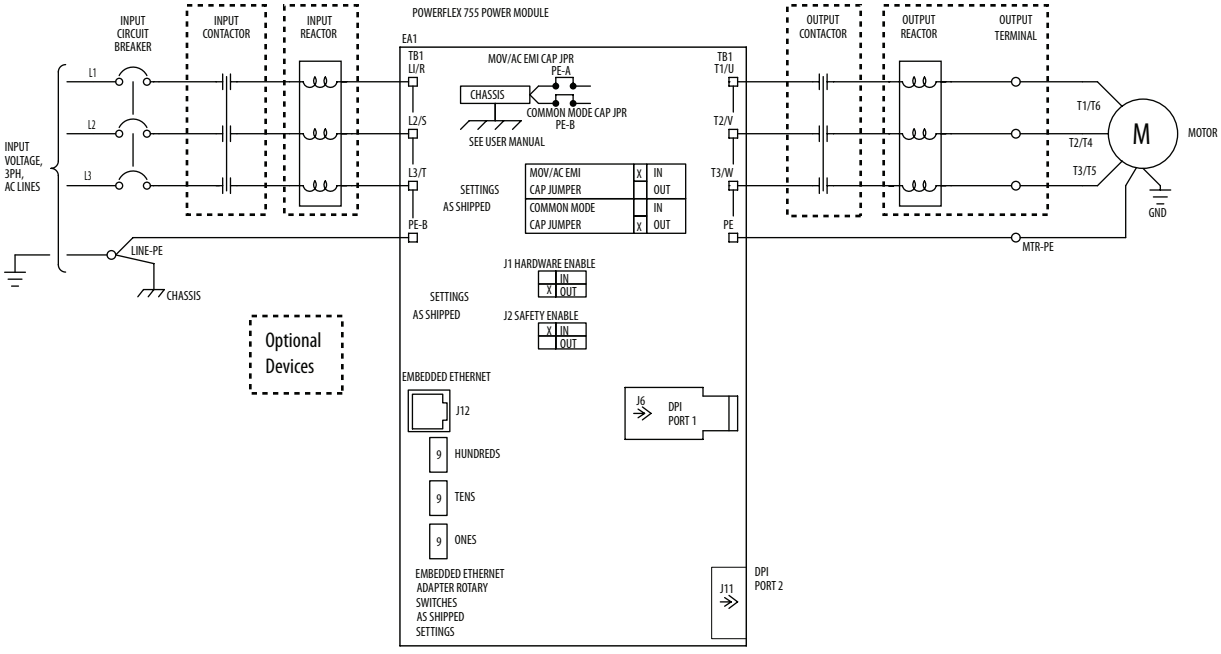
Cat. No. (1)	Input	Pick-Up	Hold-In
100-D420EA11	50 Hz	490VA	18VA
100-D420ED11	60 Hz	490VA	18VA
100-D630EA11	50 Hz	1915VA	33VA
100-D630ED11	60 Hz	1915VA	33VA
100-D860EA11	50 Hz	1915VA	33VA
100-D860ED11	60 Hz	1915VA	33VA
100-G1200KD12	60 Hz	2,400VA	70VA

(1) For full contactor specifications refer to publications 100D-SG001 and 100G-SG001.

Figure 122 - Component Location



Power Wiring Schematic



Integrated Motion Drives

PowerFlex 755 drives can be used as part of a Integrated Motion system.

Configuring Option Modules for Integrated Motion

The following option module combinations are supported by Integrated Motion.

Table 73 - Two Feedback Options

Supported Module	Cat. No.	Valid Port(s)
Single Incremental Encoder	20-750-ENC-1	4…8
Dual Incremental Encoder	20-750-DENC-1	4…8
Universal Feedback	20-750-UFB-1	4…6

Table 74 - Two Feedback Options and One Safe Torque Off Option

Supported Module	Cat. No.	Valid Port(s)
Single Incremental Encoder	20-750-ENC-1	4 and 5
Dual Incremental Encoder	20-750-DENC-1	4 and 5
Universal Feedback	20-750-UFB-1	4 and 5
Safe Torque Off	20-750-S	6

Table 75 - Two Feedback Options and One Safe Speed Monitor Option

Supported Module	Cat. No.	Valid Port(s)
Single Incremental Encoder	20-750-ENC-1	4 and 5
Dual Incremental Encoder	20-750-DENC-1	4 and 5
Universal Feedback	20-750-UFB-1	4 and 5
Safe Speed Monitor	20-750-S1	6

Supporting Documentation

For detailed information about configuring PowerFlex 755 drives for use with a ControlLogix L6x or L7x controller refer to the following publications.

Publication
CIP Motion Configuration and Startup User Manual, publication MOTION-UM003
Logix5000 Motion Controllers Instructions Reference Manual, publication MOTION-RM002
CIP Motion Reference Manual, publication MOTION-RM003

Rockwell Automation Support

Rockwell Automation provides technical information on the Web to assist you in using its products. At http://www.rockwellautomation.com/support/, you can find technical manuals, a knowledge base of FAQs, technical and application notes, sample code and links to software service packs, and a MySupport feature that you can customize to make the best use of these tools.

For an additional level of technical phone support for installation, configuration, and troubleshooting, we offer TechConnect support programs. For more information, contact your local distributor or Rockwell Automation representative, or visit http://www.rockwellautomation.com/support/.

Installation Assistance

If you experience a problem within the first 24 hours of installation, review the information that is contained in this manual. You can contact Customer Support for initial help in getting your product up and running.

United States or Canada	1.440.646.3434
Outside United States or Canada	Use the Worldwide Locator at http://www.rockwellautomation.com/support/americas/phone_en.html, or contact your local Rockwell Automation representative.

New Product Satisfaction Return

Rockwell Automation tests all of its products to ensure that they are fully operational when shipped from the manufacturing facility. However, if your product is not functioning and needs to be returned, follow these procedures.

United States	Contact your distributor. You must provide a Customer Support case number (call the phone number above to obtain one) to your distributor to complete the return process.
Outside United States	Please contact your local Rockwell Automation representative for the return procedure.

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Power, Control and Information Solutions Headquarters

Americas: Rockwell Automation, 1201 South Second Street, Milwaukee, WI 53204-2496 USA, Tel: (1) 414.382.2000, Fax: (1) 414.382.4444
Europe/Middle East/Africa: Rockwell Automation NV, Pegasus Park, De Kleetlaan 12a, 1831 Diegem, Belgium, Tel: (32) 2 663 0600, Fax: (32) 2 663 0640
Asia Pacific: Rockwell Automation, Level 14, Core F, Cyberport 3, 100 Cyberport Road, Hong Kong, Tel: (852) 2887 4788, Fax: (852) 2508 1846

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