Installation Instructions

Allen-Bradley

PowerFlex 750-Series AC Drives

Catalog Numbers 20F, 20G, 21G

Important User Information

Read this document and the documents listed in the additional resources section about installation, configuration, and operation of this equipment before you install, configure, operate, or maintain this product. Users are required to familiarize themselves with installation and wiring instructions in addition to requirements of all applicable codes, laws, and standards.

Activities including installation, adjustments, putting into service, use, assembly, disassembly, and maintenance are required to be carried out by suitably trained personnel in accordance with applicable code of practice.

If this equipment is used in a manner not specified by the manufacturer, the protection provided by the equipment may be impaired.

In no event will Rockwell Automation, Inc. be responsible or liable for indirect or consequential damages resulting from the use or application of this equipment.

The examples and diagrams in this manual are included solely for illustrative purposes. Because of the many variables and requirements associated with any particular installation, Rockwell Automation, Inc. cannot assume responsibility or liability for actual use based on the examples and diagrams.

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Throughout this manual, when necessary, we use notes to make you aware of safety considerations.

	**WARNING:** Identifies information about practices or circumstances that can cause an explosion in a hazardous environment, which may lead to personal injury or death, property damage, or economic loss.
	**ATTENTION:** Identifies information about practices or circumstances that can lead to personal injury or death, property damage, or economic loss. Attentions help you identify a hazard, avoid a hazard, and recognize the consequence.
IMPORTANT	Identifies information that is critical for successful application and understanding of the product.

Labels may also be on or inside the equipment to provide specific precautions.

	**SHOCK HAZARD:** Labels may be on or inside the equipment, for example, a drive or motor, to alert people that dangerous voltage may be present.
	**BURN HAZARD:** Labels may be on or inside the equipment, for example, a drive or motor, to alert people that surfaces may reach dangerous temperatures.
	**ARC FLASH HAZARD:** Labels may be on or inside the equipment, for example, a motor control center, to alert people to potential Arc Flash. Arc Flash will cause severe injury or death. Wear proper Personal Protective Equipment (PPE). Follow ALL Regulatory requirements for safe work practices and for Personal Protective Equipment (PPE).

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Chapter 4

Power Wiring

Chapter 5

I/O Wiring

Integrated Motion Drives

Notes:

Introduction

This document explains the 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 that is 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" 印。
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".

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 to configure, use, and troubleshoot 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 to install, configure, and operate 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 to properly wire and ground PWM AC drives.
PowerFlex AC Drives in Common Bus Configurations, publication DRIVES-AT002	Provides basic information to properly wire and ground PWM AC drives with 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.
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 be sure 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 that are needed for drive installation.

Tool Description	Details
ESD-protected place of work	Work surface, Floor cover, seat, and ground connections
ESD-protective clothing	Wrist wrap, shoes, overall clothing (coat)
Multimeter	Digital multimeter, 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, M3 x 7
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 Frame 8 and larger drive assembly from the enclosure.

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

Notes:

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 88 and Figure 89 for location) or between the +DC and -DC test point sockets if equipped. Also measure between the +DC terminal or test point and the chassis, and between the -DC terminal or testpoint 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 92 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, a corrosive environment, 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.

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*	*i*						*Cabinet Options (21G)*

a

Drive		
Code	Type	Frames
20F	PowerFlex 753	1…7
20G	PowerFlex 755	1…10
21G	PowerFlex 755 Drive with Options	8…10

b

Future Use

c

Input Type		
Code	Description	Frames
1	AC Input with Precharge, includes DC Terminals	1…5 8…10
4	DC Input with Precharge	5…10
A	AC Input with Precharge, no DC Terminals	6…8 (1)

(1) The DC Bus Bar kit (20-750-DCBB1-Fx) is available for Frames 6…7 AC input drives that require DC bus terminals.

d

Enclosure		
Code	Description	Frames
R	IP20, NEMA/UL Type Open, Frame 1	1
F (1)	Flange (NEMA/UL Type 4X/12 back)	2…5
G	IP54, NEMA/UL Type 12	2…7
N (2)	IP20/IP00, NEMA/UL Type Open	2…7
B (3)	IP20, NEMA/UL Type 1, 600 mm (23.6 in.) Deep, Standard Cabinet Color (RAL 7032)	8…10
J (3)	IP54, UL Type 12, 800 mm (31.5 in.) Deep, Standard Cabinet Color (RAL 7032)	8…10
K (3)	IP54, NEMA 12, 2500 MCC Style Cabinet and Options w/MCC Power Bus, 800 mm (31.5 in.) Deep, Standard Cabinet Color (RAL 7032)	8…10
L (3)	IP20, NEMA/UL Type 1, 800 mm (31.5 in.) Deep, Standard Cabinet Color (RAL 7032)	8…10
P (3)	IP20, NEMA/UL Type 1, 2500 MCC Style Cabinet and Options w/MCC Power Bus, 800 mm (31.5 in.) Deep, Standard Cabinet Color (RAL 7032)	8…10
W (3)	IP20, NEMA/UL Type 1, 2500 MCC Style Cabinet and Options w/MCC Power Bus, 800 mm (31.5 in.) Deep, CenterLine 2100 Gray (ASA49)	8…10
Y (3)	IP54, NEMA 12, 2500 MCC Style Cabinet and Options w/MCC Power Bus, 800 mm (31.5 in.) Deep, CenterLine 2100 Gray (ASA49)	8…10
T	IP00, UL Open Type without Control POD	8…10

(1) For Frames 6…7 a user installed Flange kit (20-750-FLNG4-Fx) is available to convert a Code N drive that provides a NEMA/UL Type 4X/12 back.
(2) Frames 2…5 are IP20, Frames 6…7 are IP00.
(3) 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/810V 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, T	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		(1)		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 (2)		
540	540	315							
567	567	315							
650	650	355							
750	750	400							
770	770	400							
910	910	500	9				9 (2)		
1K0	1040	560							
1K1	1090	630							
1K2	1175	710							
1K4	1465	800							
1K5	1480	850							
1K6	1590	900	10				10 (2)		
2K1	2150	1250							

(1) For Frames 6…7 a user installed Flange kit (20-750-FLNG4-Fx) is available to convert a Code N drive that provides a NEMA/UL Type 4X/12 back.
(2) Available as a drive with options (21G).

f2

ND Rating									
480V, 60 Hz Input									
Code	Amps	Hp	Frame						
			Enclosure Code						
			B, J, L, T	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		(1)		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 (2)		
485	485	400							
545	545	450							
617	617	500							
710	710	600							
740	740	650							
800	800	700	9				9 (2)		
960	960	800							
1K0	1045	900							
1K2	1135	1000							
1K3	1365	1100							
1K4	1420	1250							
1K5	1525	1350	10				10 (2)		
2K0	2070	1750							

(1) For Frames 6…7 a user installed Flange kit (20-750-FLNG4-Fx) is available to convert a Code N drive that provides a NEMA/UL Type 4X/12 back.
(2) Available as a drive with options (21G).

Catalog Number Explanation *(continued)*

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*	*i*						*Cabinet Options (21G)*

f3

ND Rating									
600V, 60 Hz Input									
Code	Amps	Hp	Frame						
			Enclosure Code						
			B, J, L, T	F	G	N	K, P, W, Y	R	
1P7	1.7	1	–	3	3	3	–	–	
2P7	2.7	2							
3P9	3.9	3							
6P1	6.1	5							
9P0	9	7.5							
011	11	10							
012(1)	12	10		–	6	6			
017	17	15		3	3	3			
018(1)	18	15		–	6	6			
022	22	20		3	3	3			
023(1)	23	20		–	6	6			
024(1)	24	20							
027	27	25		4	4	4			
028(1)	28	25		–	6	6			
032	32	30		4	4	4			
033(1)	33	30		–	6	6			
041	41	40		5	5	5			
042(1)	42	40		–	6	6			
052	52	50		5	–	5			
053(1)	53	50		(2)	6	6			
063	63	60							
077	77	75							
099	99	100							
125	125	125							
144	144	150							
192	192	200			7	7			
242	242	250							
289	289	300							
295	295	300	8	–	–	–	8(3)		
355	355	350							
395	395	400							
435	435	450							
460	460	500							
510	510	500							
595	595	600	9				9(3)		
630	630	700							
760	760	800							
825	825	900							
900	900	950							
980	980	1000							
1K1	1110	1100	10				10(3)		
1K4	1430	1400							

(1) Required for uncontrolled common DC bus applications. Optional for all AC applications.
(2) For Frames 6…7 a user installed Flange kit (20-750-FLNG4-Fx) is available to convert a Code N drive that provides a NEMA/UL Type 4X/12 back.
(3) Available as a drive with options (21G).

f4

ND Rating									
690V, 50 Hz Input (not UL listed)									
Code	Amps	kW	Frame						
			Enclosure Code						
			B, J, L, T	F	G	N	K, P, W, Y	R	
012	12	7.5	–	(1)	6	6	–	–	
015	15	11							
020	20	15							
023	23	18.5							
030	30	22							
034	34	30							
046	46	37							
050	50	45							
061	61	55							
082	82	75							
098	98	90							
119	119	110							
142	142	132							
171	171	160			7	7			
212	212	200							
263	263	250							
265	265	250	8		–	–	8(2)		
330	330	315							
370	370	355							
415	415	400							
460	460	450							
500	500	500							
590	590	560	9	–			9(2)		
650	650	630							
710	710	710							
765	765	750							
795	795	800							
960	960	900							
1K0	1040	1000	10				10(2)		
1K4	1400	1400							

(1) For Frames 6…7 a user installed Flange kit (20-750-FLNG4-Fx) is available to convert a Code N drive that provides a NEMA/UL Type 4X/12 back.
(2) Available as a drive with options (21G).

g

Filtering and CM Cap Configuration (1)		
Code	Filtering	Default CM Cap Connection
A	Yes	Jumper Removed
J	Yes	Jumper Installed

(1) 480V drives must select code "A." Jumpers are included for field reconfiguration as desired.

h

Dynamic Braking (1)		
Code	Internal Resistor (2)	Internal Transistor (3)
A	No	Yes
N	No	No

(1) Not available on Frames 8…10, specify Code "N."
(2) Frames 1…2 only. Internal Resistor kits (20-750-DB1-Dx) sold separately.
(3) Standard on Frames 1…5, optional on 6…7.

i

Door Mounted HIM (Frames 8…10)	
Code	Operator Interface
0	No Door Mounted HIM
2	Enhanced LCD, Full Numeric, IP20
4	Enhanced LCD, Full Numeric, IP66 NEMA Type 4X/12

PowerFlex 755 w/Options (21G) Required Selections

Code	Option	Frames	Type
LD	Light Duty	8…10	System Overload Duty Cycle (1)
ND	Normal Duty		
HD	Heavy Duty		
P3	Input Thermal Magnetic Circuit Breaker	8…10	Power Disconnect (1)
P5	Input Non-Fused Molded Case Disconnect Switch	8 Only	
P14	Wiring Only Bay	8…10	Wiring Only Bay

(1) Only one option of this type ma y be selected.

PowerFlex 755 w/Options (21G) Additional Selections

Code	Option	Frames	Type
P11	Input Contactor	8 Only	Contactors (1)(2)
P12	Output Contactor		
L1	3% Input Reactor	8…9	Reactors (1)
L2	3% Output Reactor		
L3	5% Input Reactor	8 Only	
L4	5% Output Reactor		
P20	1200 Amp Bus	8…10	MCC Power Bus Capacity (1)
P22	2000 Amp Bus		
P24	3000 Amp Bus		
P30	UPS Control Bus, DC Input w/Precharge only	8…10	UPS Control Bus
X1	Auxiliary Transformer (500VA available), IP20 Cabinet Only	8 Only(3)	Auxiliary Power

(1) Only one option of this type ma y be selected.
(2) Contactor options are not available for systems with MCC power bus.
(3) Standard on all other cabinet configurations.

Wall Mount Frames 1…7
Drive Rating Cross-references

Drive Nameplate 1, Wall Mount Frames 1…7

Drive Code	❷		❶				
	Input Voltage and ND Amp Rating		Enclosure Code				
	400V AC	480V AC	F	G	N	R	
20F or 20G	C2P1	D2P1	**2**	**2**	**2**	1	**Wall Mount 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, Wall Mount Frames 1…7

Drive Code	❷ Input Voltage and ND Amp Rating		❶ Enclosure Code				
	600V AC	690V AC	F	G	N	R	
20F or 20G	E1P7	–	3	3	3	–	Wall Mount Frame
20F or 20G	E2P7						
20F or 20G	E3P9						
20F or 20G	E6P1						
20F or 20G	E9P0						
20F or 20G	E011						
20F or 20G	E012	F012	–	6	6		
20F or 20G	E017	–	3	3	3		
20F or 20G	E018	F015	–	6	6		
20F or 20G	E022	–	3	3	3		
20F or 20G	E023	F020	–	6	6		
20F or 20G	E024	F023					
20F or 20G	E027	–	4	4	4		
20F or 20G	E028	F030	–	6	6		
20F or 20G	E032	–	4	4	4		
20F or 20G	E033	F034	–	6	6		
20F or 20G	E041	–	5	5	5		
20F or 20G	E042	F046	–	6	6		
20F or 20G	E052	–	5	–	5		
20F or 20G	E053	F050		6	6		
20F or 20G	E063	F061					
20F or 20G	E077	F082					
20F or 20G	E099	F098					
20F or 20G	E125	F119					
20F or 20G	E144	F142					
20F or 20G	E192	F171		7	7		
20F or 20G	E242	F212					
20F or 20G	E289	F263					

Floor Mount Frames 8…10 Drive Rating Cross-references

Drive Nameplate 1, Floor Mount Frames 8…10

Drive Code	❷ Input Voltage and ND Amp Rating				❶ 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**	Floor Mount 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, referenced by the Official Journal of the European Union. PowerFlex 750-Series drives comply with the EN standards listed in this section when installed according to these installation instructions.

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

Low Voltage Directive

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

EMC Directive

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

General Considerations

- For EU compliance, drives must satisfy installation requirements that are 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 that are 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 that 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 that is 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 can be necessary.

ATTENTION: PowerFlex 750-Series drives produce DC current in the protective earthing conductor which can reduce the ability of RCDs (residual current-operated protective devices) or RCMs (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 and 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 cannot be powered from a “corner-earthed” supply system 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 that are 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 that exceeds 3.5 mA AC and/or 10 mA DC. The minimum size of the protective earthing (grounding) conductor that is 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 can reduce the ability of RCDs (residual current-operated protective devices) or RCMs (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 Power Wiring on page 145.
- 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.

  Wall Mount 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 that is installed in a conduit plate or conduit box that is provided in the "NEMA Type 1 Kit" for the drive (kit number 20-750-NEMA1-F*x*).

  Floor Mount Drive Frames 8 and larger: At the drive end of the motor cable, terminate the shield at the PE Grounding Bar (See page 156).
- 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 that is 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 is 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 can be terminated either by using a shielded connector with a conduit plate or conduit box, or the shield can be clamped to an "EMC plate."
- Motor cables must be separated from control and signal wiring wherever possible.
- Maximum motor-cable length must not exceed the maximum length that is 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 cables 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 on page 209).
- 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 400/480V Input Drives 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**
Wall Mount Frame 1 20F11xx2P1…20F11xx015 20G11xx2P1…20G11xx015	N/A	30 m motor cable limit with each wire looped once around an input core. (1) (2)	30 m motor cable limit with each wire looped once around an input core. (1)	N/A
Wall Mount Frame 2 20F11xx2P1…20F11xx022 20G11xx2P1…20G11xx022	150 m cable limit with Schaffner FN3258-30-*nn* filter. Supplementary EMC enclosure is 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-*nn* filter.	30 m motor cable limit with input core. (1) 150 m motor cable limit with Schaffner FN3258-30-*nn* filter.	N/A
Wall Mount Frame 3 20F11xx030…20F11xx043 20G11xx030…20G11xx043	150 m cable limit with Schaffner FN3258-55-*nn* filter. Supplementary EMC enclosure is 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-*nn* filter.	30 m motor cable limit with input core. (1) 150 m motor cable limit with Schaffner FN3258-55-*nn* filter.	N/A
Wall Mount Frame 4 20F11xx060…20F11xx072 20G11xx060…20G11xx072	150 m cable limit with Schaffner FN3258-75-*nn* filter. Supplementary EMC enclosure is 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-*nn* filter.	30 m motor cable limit with input and output cores. (1) 150 m motor cable limit with Schaffner FN3258-75-*nn* filter.	N/A
Wall Mount Frame 5 20F11xx085…20F11xx104 20G11xx085…20G11xx104	150 m cable limit with Schaffner FN3258-130-*nn* filter. Supplementary EMC enclosure is 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-*nn* filter.	30 m motor cable limit with input and output cores. (1) 150 m motor cable limit with Schaffner FN3258-130-*nn* filter.	30 m motor cable limit with input and output cores. (1) 150 m motor cable limit with Schaffner FN3258-130-*nn* filter.
Wall Mount Frame 6 20F11xx140…20F11xx260 20G11xx140…20G11xx260	150 m cable limit with 22-RFD323 filter. Supplementary EMC enclosure is required to provide attenuation of radiated emissions.	100 m motor cable limit with Schaffner FN3359-320-*nn* filter. 150 m motor cable limit with 22-RFD323 filter. Supplementary EMC enclosure is 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-*nn* filter. 150 m motor cable limit with 22-RFD323 filter.	30 m motor cable limit with no filter. (3) 100 m motor cable limit with Schaffner FN3359-320-*nn* filter. 150 m motor cable limit with 22-RFD323 filter.
Wall Mount Frame 7 20F11xx302…20F11xx456 20G11xx302…20G11xx456	150 m cable limit with 22-RFD480 filter. Supplementary EMC enclosure is required to provide attenuation of radiated emissions.	150 m motor cable limit with Schaffner FN3359-600-*nn* filter. 150 m motor cable limit with 22-RFD480 filter. Supplementary EMC enclosure is 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-*nn* filter. 150 m motor cable limit with 22-RFD480 filter.	30 m motor cable limit with no filter. (3) 150 m motor cable limit with Schaffner FN3359-600-*nn* filter. 150 m motor cable limit with 22-RFD480 filter.
Floor Mount 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)
Floor Mount 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.	30 m motor cable limit (3) with output core(4) and input core.
Floor Mount 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. With door shielding kit installed.(5)	30 m motor cable limit (3) with output core(4) and input core. With door shielding kit installed.(5)
Floor Mount 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.(6)	30 m motor cable limit (3) with output core(4) and input core.(6)
Floor Mount 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.(6) With door shielding kit installed.(5)	30 m motor cable limit (3) with output core(4) and input core. With door shielding kit installed.(5)
	More Stringent Limits ←		→	Less Stringent Limits

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

(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 that is supplied by a dedicated power transformer or generator and not from LV power lines that supply 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) Door-shielding kit number 20-750-EMCDK1-F10. Kit contains shield brackets for three doors.

(6) 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.

Table 2 - PowerFlex 750-Series 600/690V Input Drives 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**
Wall Mount Frame 3: 600V (3 Hp and higher.) 20F11xE3P9…20F11xE022 20G11xE3P9…20G11xE022	50 m cable limit with Schaffner FN258HV-42-33 filter. Supplementary EMC enclosure is required to provide attenuation of radiated emissions.	30 m motor cable limit with one input and one output core.(1)	30 m motor cable limit with one input and one output core.(1)	N/A
Wall Mount Frame 4: 600V 20F11xE027…20F11xE032 20G11xE027…20G11xE032	50 m cable limit with Schaffner FN258HV-55-34 filter. Supplementary EMC enclosure is required to provide attenuation of radiated emissions.	30 m motor cable limit with one input and one output core.(1)	30 m motor cable limit with one input and one output core.(1)	N/A
Wall Mount Frame 5: 600V 20F11xE041…20F11xE052 20G11xE041…20G11xE052	50 m cable limit with Schaffner FN258HV-100-35 filter. Supplementary EMC enclosure is required to provide attenuation of radiated emissions.	30 m motor cable limit with one input and one output core.(1)	30 m motor cable limit with one input and one output core.(1)	N/A
Wall Mount Frame 6: 600/690V 20F11xx012…20F11xx144 20G11xx012…20G11xx144	50 m cable limit with Schaffner FN258HV-100-35 filter (up to 90 kW drives) or FN3359HV-250-28 filter (110 kW and larger drives). Supplementary EMC enclosure is required to provide attenuation of radiated emissions.	50 m cable limit with Schaffner FN258HV-100-35 filter (up to 90 kW drives) or FN3359HV-250-28 filter (110 kW and larger drives). Supplementary EMC enclosure is required to provide attenuation of radiated emissions.	30 m motor cable limit with one input and one output core.(1)	30 m motor cable limit with one input and one output core.(1)
Frame 7: 600/690 20F11xx192…20F11xx289 20G11xx192…20G11xx289	50 m cable limit with Schaffner FN3359HV-400-99 filter. Supplementary EMC enclosure is required to provide attenuation of radiated emissions.	50 m cable limit with Schaffner FN3359HV-400-99 filter. Supplementary EMC enclosure is required to provide attenuation of radiated emissions.	30 m motor cable limit with one input and one output core.(1)	30 m motor cable limit with one input and one output core.(1)
	More Stringent Limits ⟷			Less Stringent Limits

(1) Rating-specific EMC cores are part of EMC kit numbers 20-750-EMC3-*nn* and 20-750-EMC4-*nn*.

Access Panels, Covers, and Doors

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

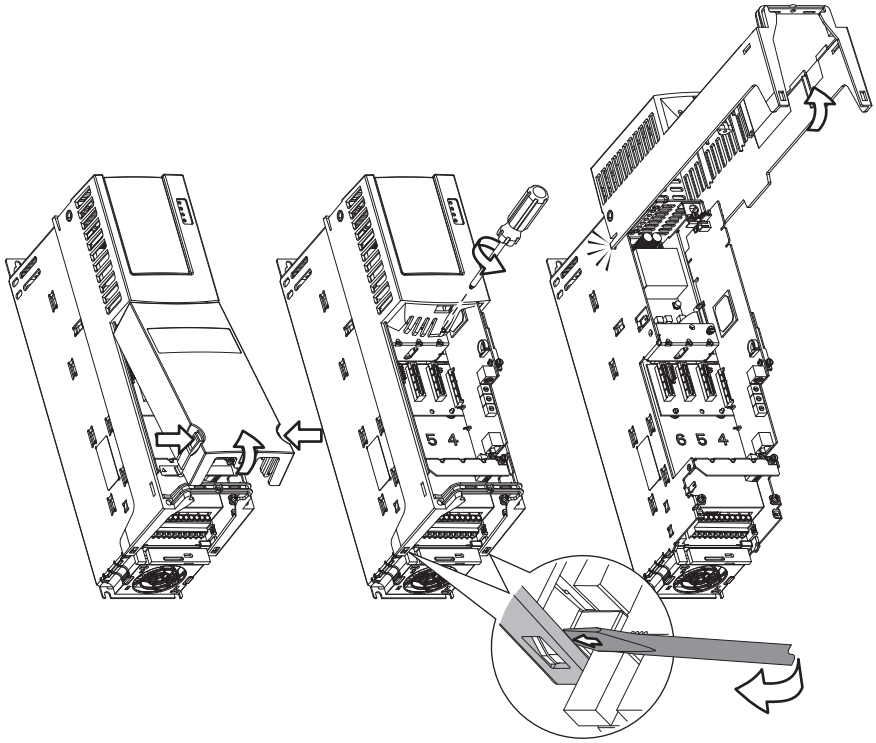


Figure 2 - Enclosure Code N (IP20, NEMA/UL Open Type) Wall Mount Frames 2…5

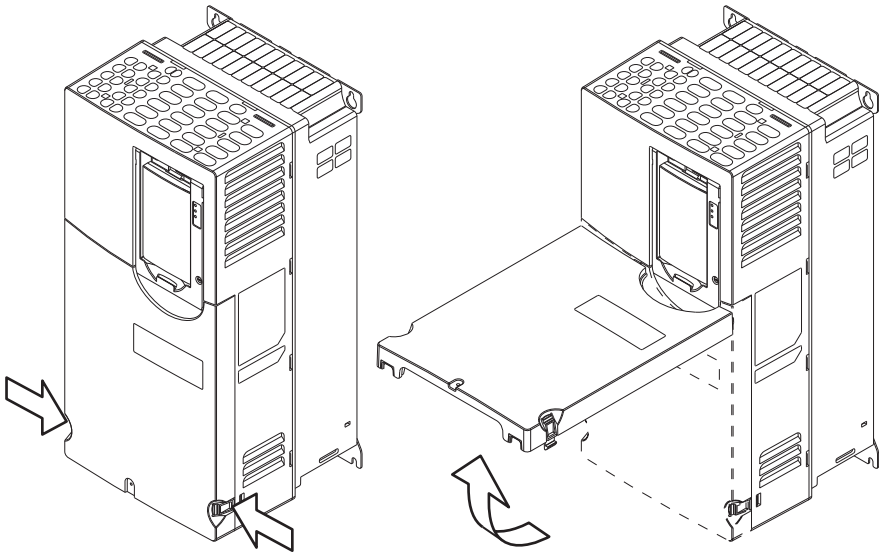
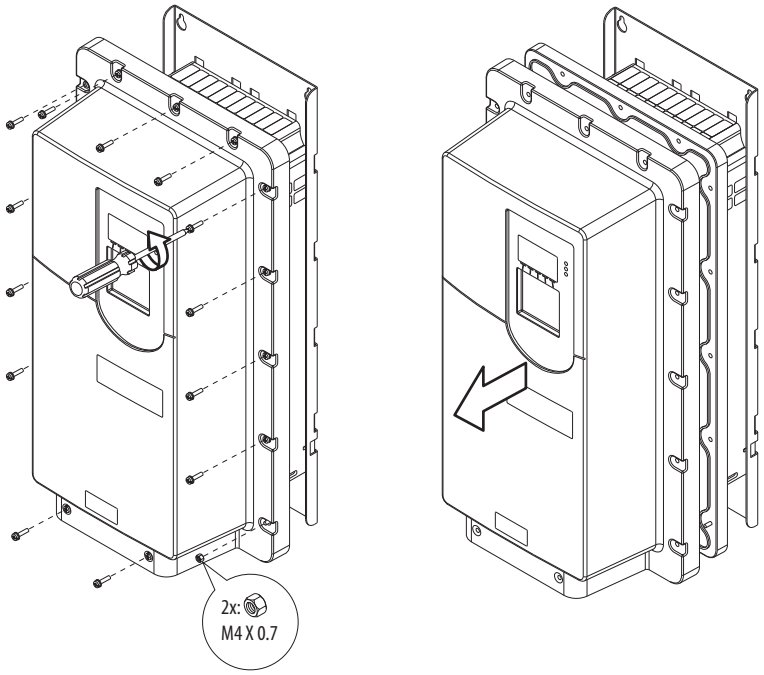


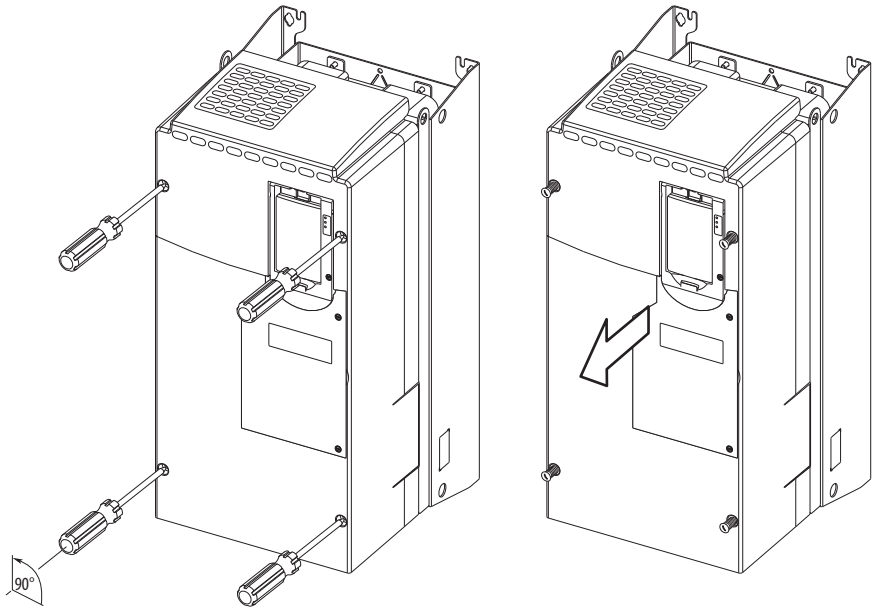
Figure 3 - Enclosure Code G (IP54, NEMA/UL Type 12) Wall Mount Frames 2…5



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

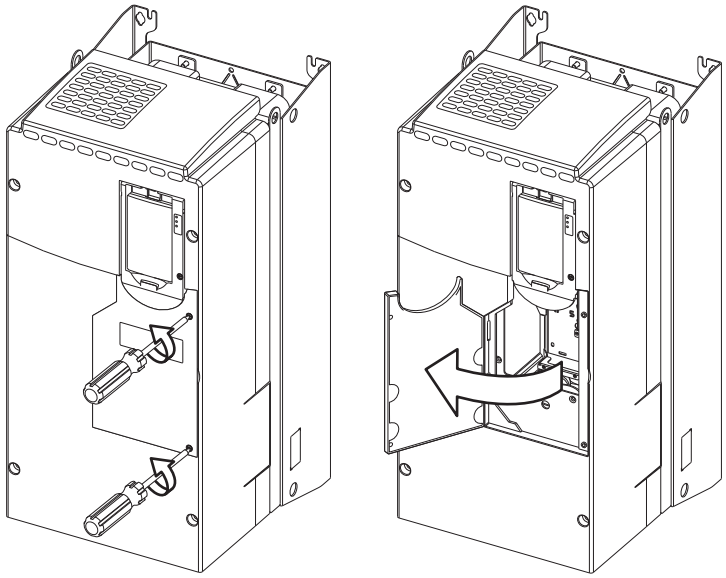
Figure 4 - Enclosure Code N (IP00, NEMA/UL Open Type) Wall Mount Frames 6 and 7



When cover is replaced:

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

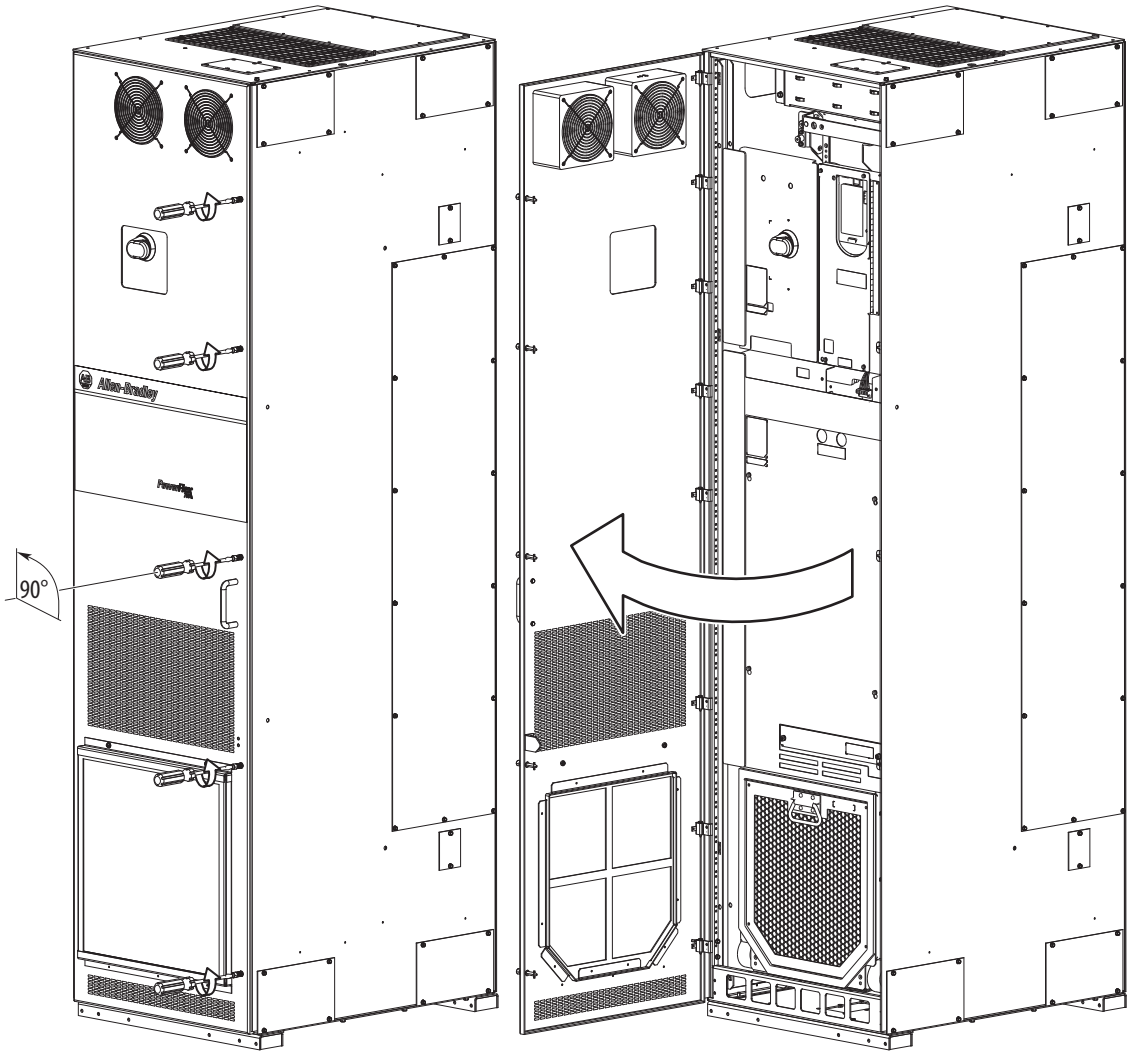
Figure 5 - Enclosure Code N (IP00, NEMA/UL Open Type) Wall Mount Frames 6 and 7 Access Door



When door is replaced:

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

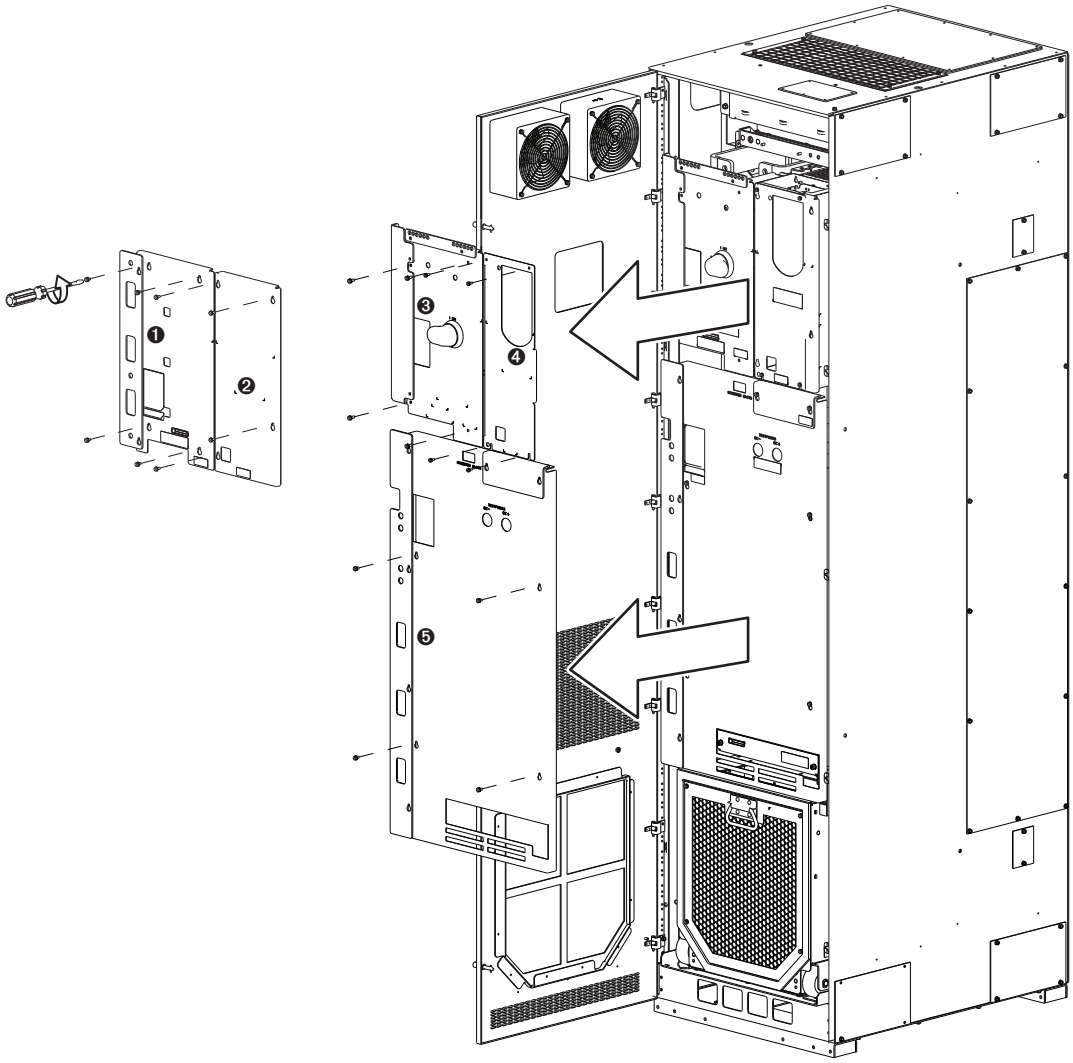
Figure 6 - Floor Mount Frames 8 and Larger Cabinet Access Door (All Enclosure Types)



To release or secure door:

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

Figure 7 - Floor Mount Drive-assembly Access Panels - All Enclosure Types (IP20, NEMA/UL Type 1 Shown)

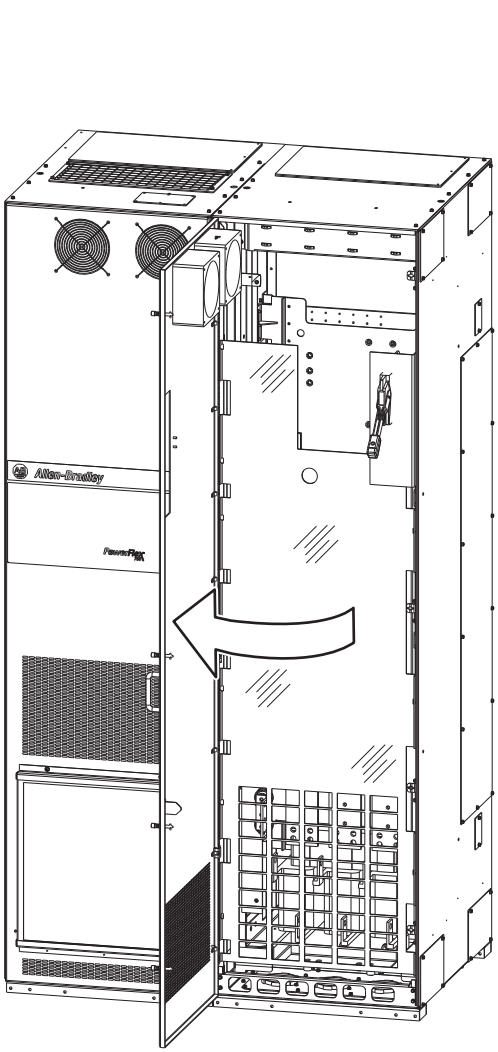


No.	Description
❶	Left Front Converter Cover with Side Shield (AC Input Drives)
❷	Right Front Converter Cover (No Control Pod)
❸	Left Front Converter Cover with Side Shield (Common DC Input Drives)
❹	Right Front Converter Cover (With Control Pod)
❺	Inverter Front Cover with Side Shield (Common DC Input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

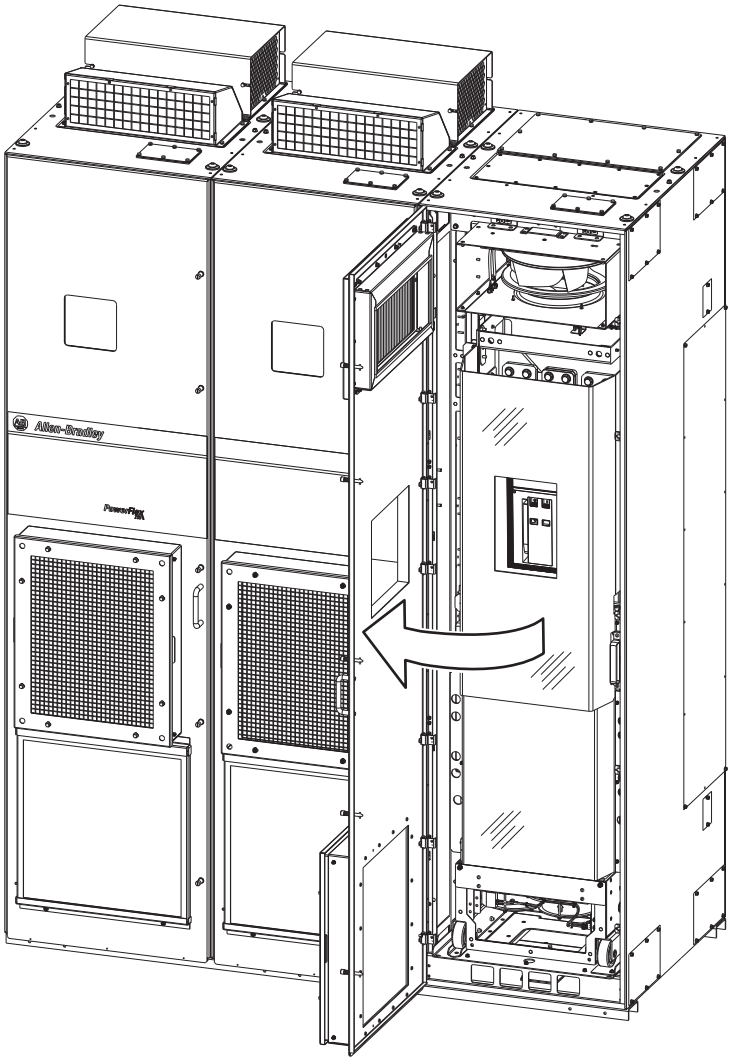
When covers are replaced:

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

Figure 8 - Floor Mount Cabinet Options Bay Access Door



Floor Mount Frame 8 - IP20, NEMA/UL Type 1

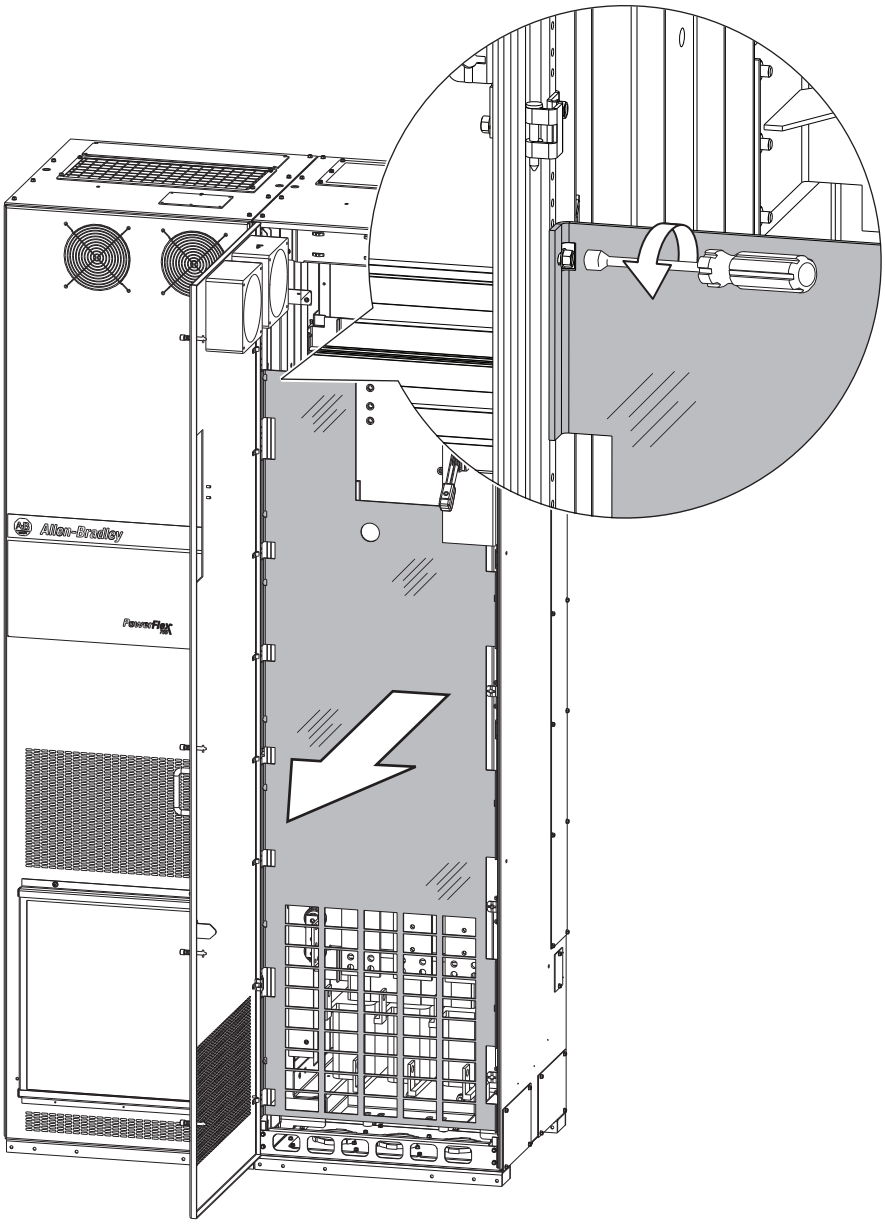


Floor Mount Frame 9 - IP54, NEMA 12

To release or secure door:

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

Figure 9 - Full Cabinet Options Bay Guard - Floor Mount Frame 8

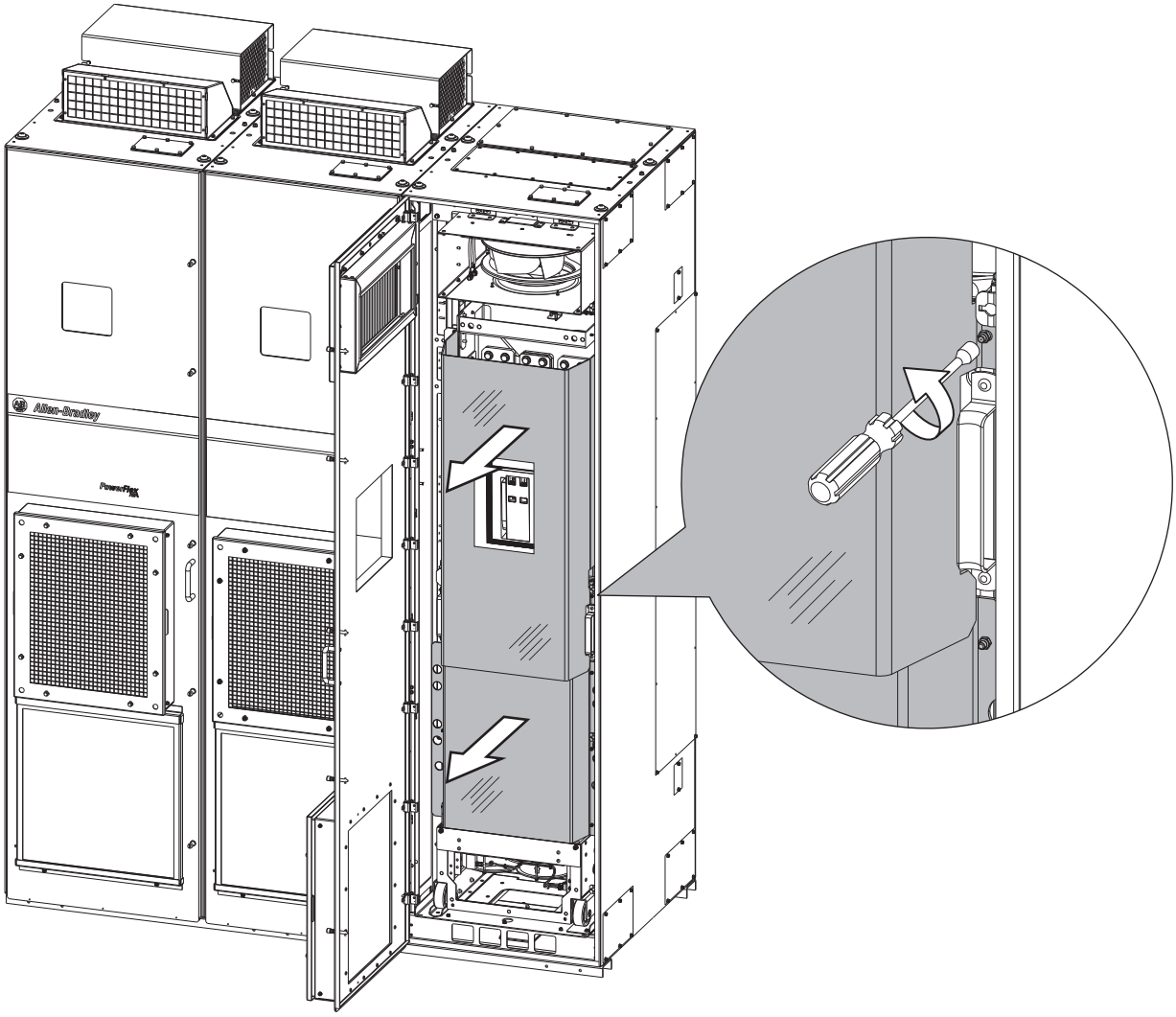


To remove the full bay guard, loosen the ten M5 screws. It is not necessary to remove these screws.

When the full bay guard is replaced:

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

Figure 10 - Full Cabinet Options Bay Guard Floor Mount Frame 9



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

Specified vertical clearance requirements (indicated in Figure 11) are intended to be from the drive to the closest object that can restrict airflow through the drive heat sink and chassis. 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 11 - Minimum Mounting Clearances – Wall Mount Frames 1…7

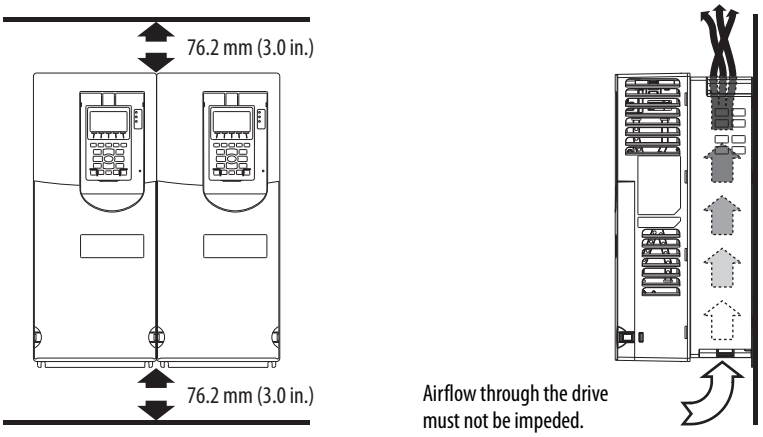
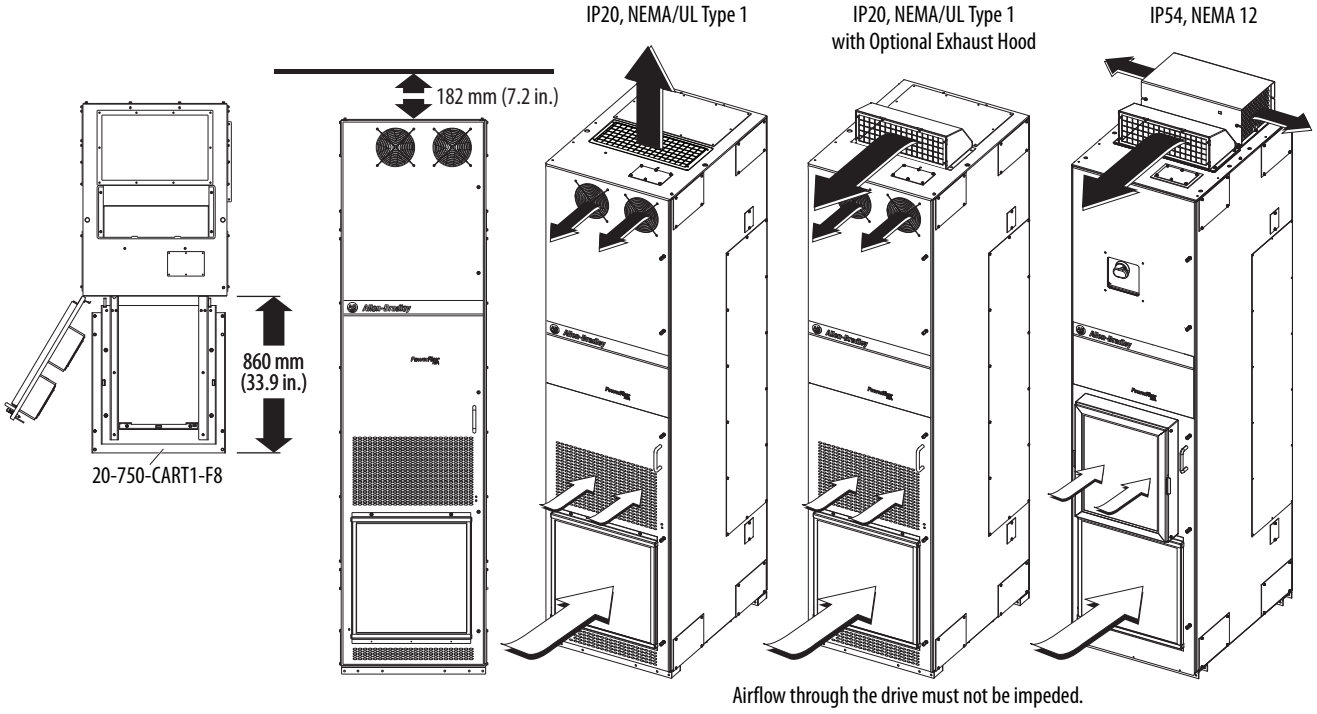


Figure 12 - Minimum Mounting Clearances – Floor Mount Drive Cabinets



Mounting Considerations

Wall Mount Frames 1…7

- Mount the drive upright on a flat, vertical, and level surface.
- Verify that the drive is in full contact with the mounting surface as depicted in Figure 11.

Floor Mount Frames 8…10

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

All Mounting Styles and 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)	Wall Mount Frames 1…5, All Ratings
IP00, NEMA/UL Open Type:	0…50 °C (32…122 °F)	Wall Mount Frames 6…7, All Ratings
IP20, NEMA/UL Type 1 (w/Hood):	0…40 °C (32…104 °F)	Wall Mount Frames 1…5, All Ratings
IP20, NEMA/UL Type 1 (w/Label):	0…40 °C (32…104 °F)	Wall Mount Frames 6…7, All Ratings
IP20, NEMA/UL Type 1 (MCC Cabinet):	0…40 °C (32…104 °F)	Floor Mount Frames 8…10, All Ratings
IP54, NEMA 12 (MCC Cabinet):	0…40 °C (32…104 °F)	Floor Mount Frames 8…10, All Ratings
Flange Mount – Front:		
IP20, NEMA/UL Open Type:	0…50 °C (32…122 °F)	Wall Mount Frames 2…5, All Ratings
IP00, NEMA/UL Open Type:	0…50 °C (32…122 °F)	Wall Mount Frames 6…7, All Ratings
Back/Heat Sink:		
IP66, NEMA/UL Type 4X	0…40 °C (32…104 °F)	Wall Mount Frames 2…7, All Ratings
Stand-alone/Wall Mount –		
IP54, NEMA/UL Type 12	0…40 °C (32…104 °F)	Wall Mount Frames 2…7, All Ratings
Storage Temperature (all const.):	-40…70 °C (-40…158 °F)	
Atmosphere:	**Important**: 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 immediately installed, it must be stored in an area where it is not exposed to a corrosive atmosphere.	

Notes:

Lift and Mount the Drive

Drive Weights

All lifting equipment and lifting components (hooks, bolts, lifts, slings, chains, and so forth) 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 3 - Approximate Drive Weights - Wall Mount Frames 1…7 and Floor Mount Frames 8…10

Drive		Frame Size	Drive Rating		Enclosure Code/Weight *kg (lb)*			
			kW (400V, 690V)	Hp (480V, 600V)	**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	0.5…30	12 (26)	12 (26)	12 (26)	
		4	30…37	20…50	14 (30)	14 (30)	14 (30)	
		5	45…55	30…70	20 (45)	20 (45)	20 (45)	
		6	5.5…75	75…100	37 (82)	89 (197)	37 (82)	
			45…132	50…200	38 (84)	91 (200)	39 (85)	
		7	132…200	150…300	69 (152)	135 (297)	79 (174)	
			200…250	300…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 4 - Maximum Component Weights - Floor Mount Frames 8…10

Component	Weight *kg (lb)*	
	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)
Cabinet Options Assembly with Circuit Breaker and Reactor	296 (653)	–

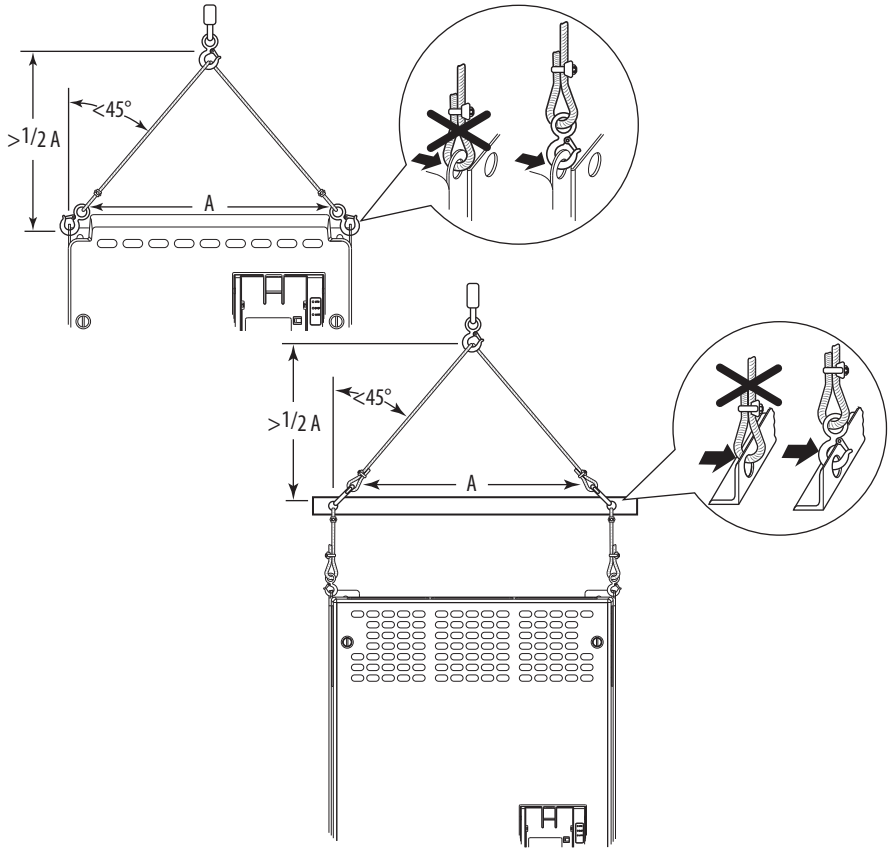
Recommended Mounting Hardware

Frame Size		Fastener Size	Notes
Wall Mount	1	M6 (#10 or #12)	
	2		
	3		
	4		
	5		
	6	M6 (#12)	
	7	M8 (5/16 in.)	
Floor Mount	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.

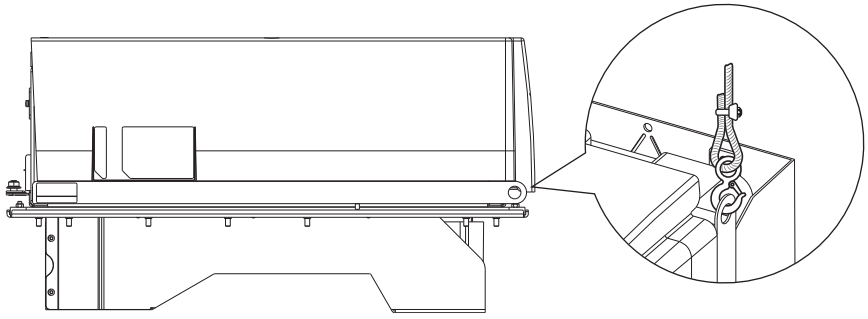
Attach Lifting Hardware

Figure 13 - Rigging Geometry

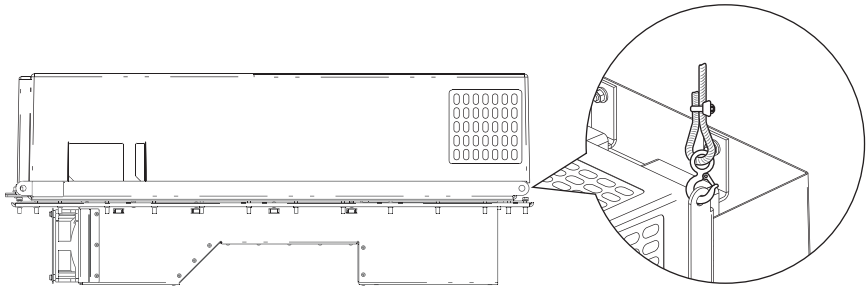


Enclosure Code F

Wall Mount Frame 6 Lifting Points – 2 Places

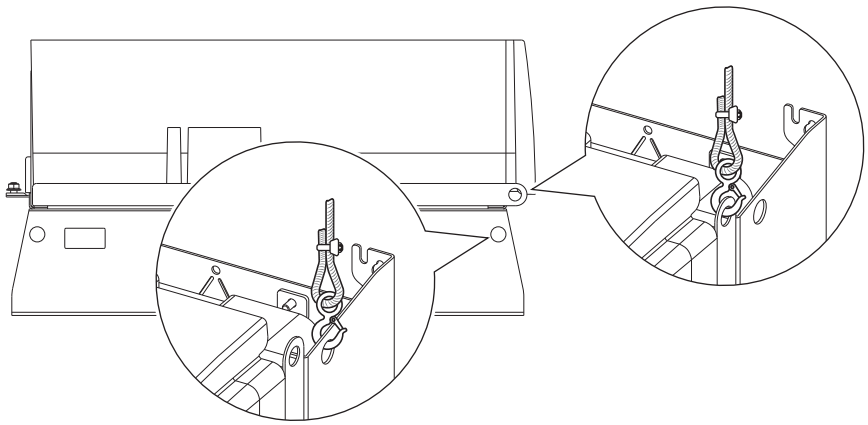


Wall Mount Frame 7 Lifting Points – 4 Places

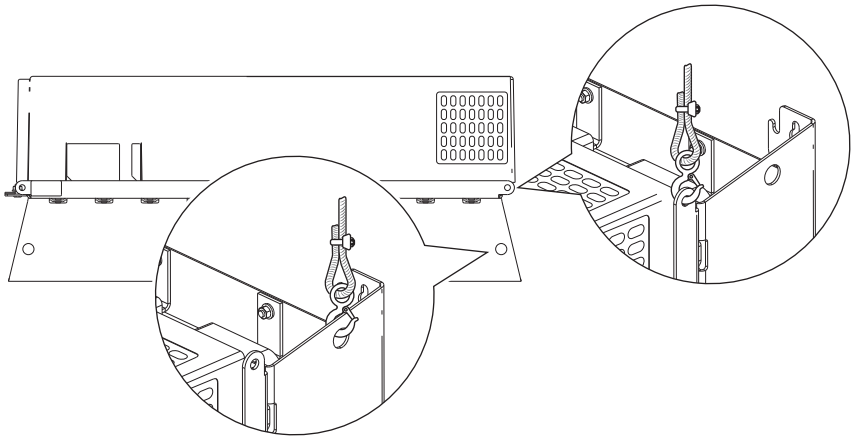


Enclosure Code N

Wall Mount Frame 6 Lifting Points – 6 Places

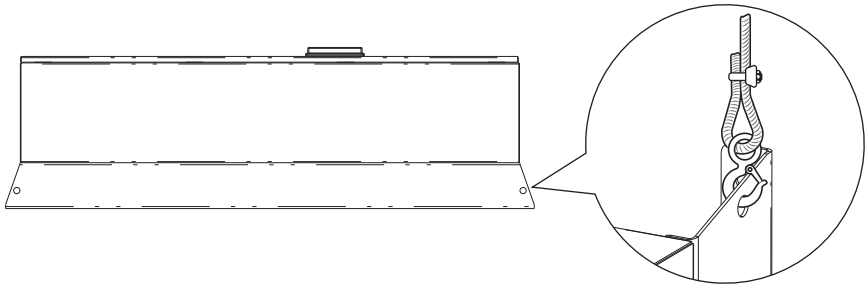


Wall Mount Frame 7 Lifting Points – 8 Places



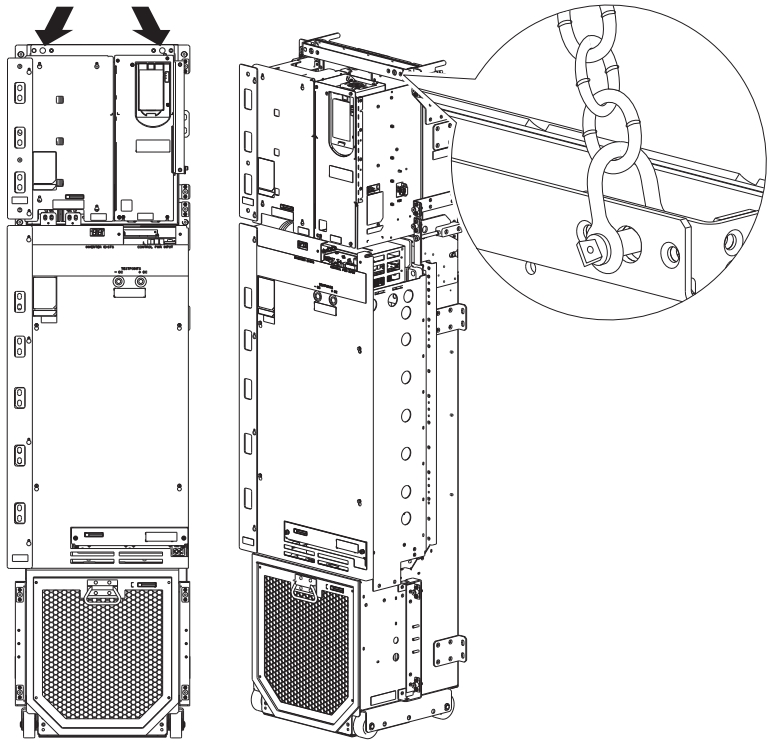
Enclosure Code G

Wall Mount Frames 6 and 7 Lifting Points – 4 Places



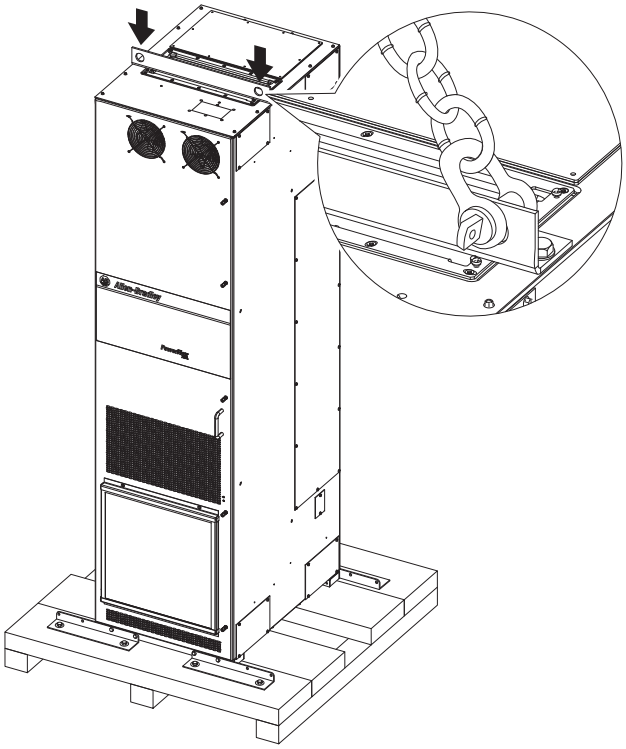
Open Type Drive (Removed From Cabinet)

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

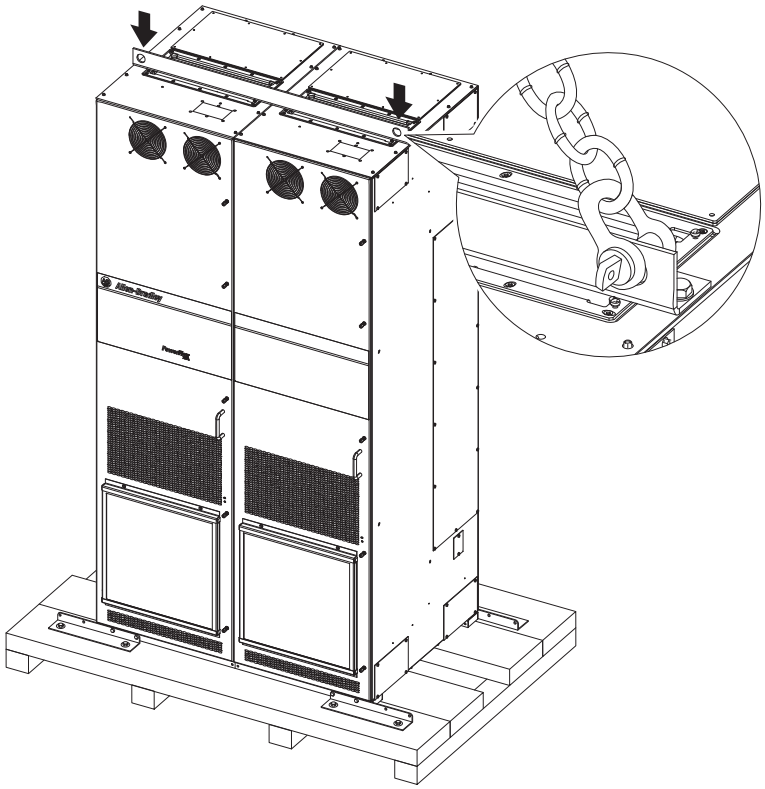


Enclosure Codes B and L

Floor Mount Frame 8 Lifting Points – 2 Places

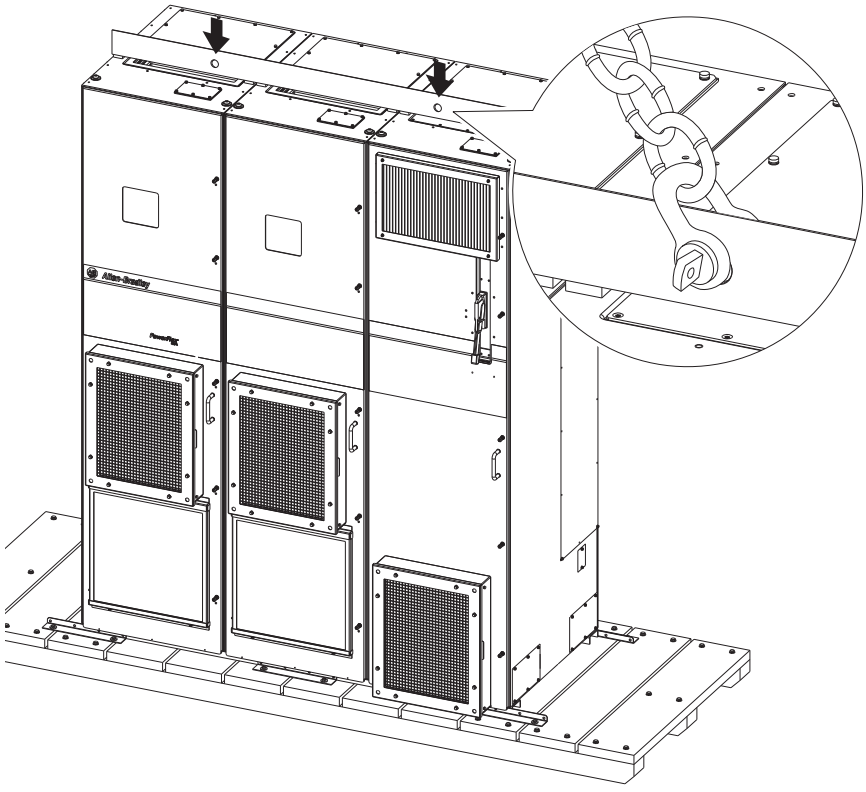


Floor Mount Frames 9 and 10 Lifting Points – 2 Places



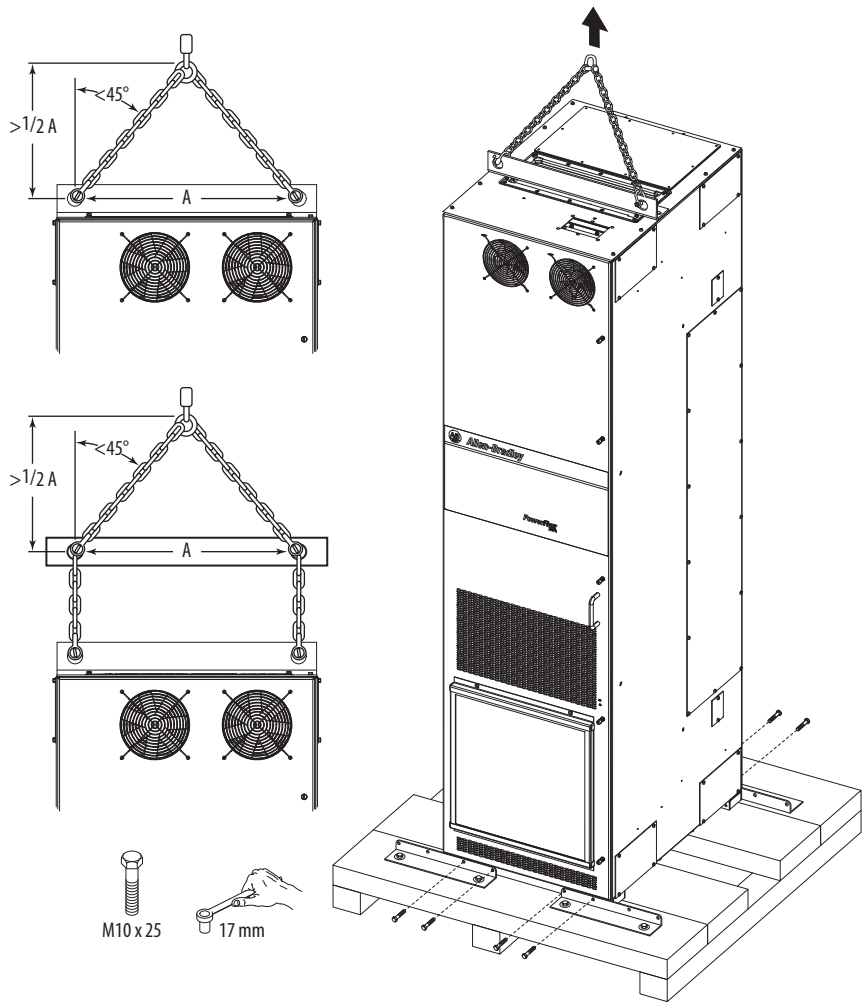
Enclosure Codes J, K, and Y

Floor Mount Frame 9 with Cabinet Options Bay Lifting Points – 2 Places

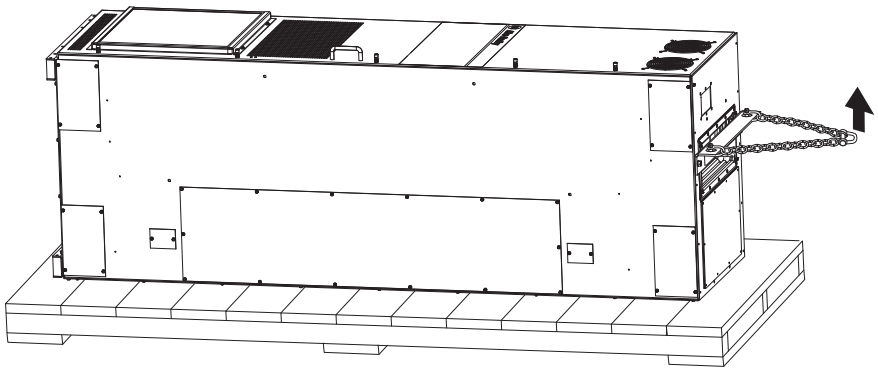


Release Floor Mount Drive Cabinet From Shipping Skid

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



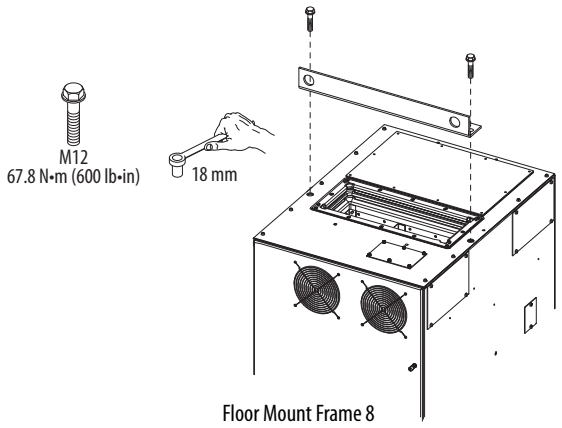
Remove the shipping crate that encloses a horizontally oriented drive cabinet on the shipping skid and lift.



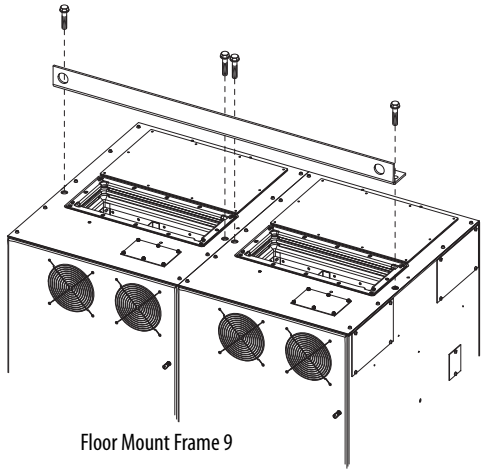
IMPORTANT Drives equipped with the MCC bus option, with codes P20, P22, and P24 in the catalog string, are not to be shipped horizontally.

Remove Drive Cabinet Lifting Angle

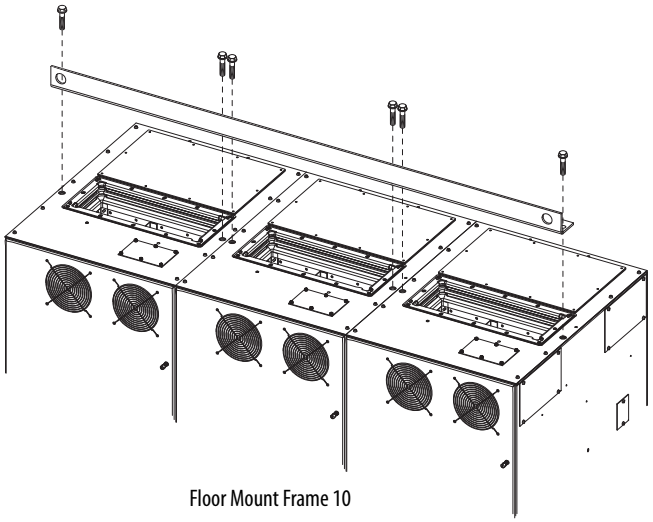
After the drive cabinet is in its final position, remove the lifting angle.



Floor Mount Frame 8



Floor Mount Frame 9

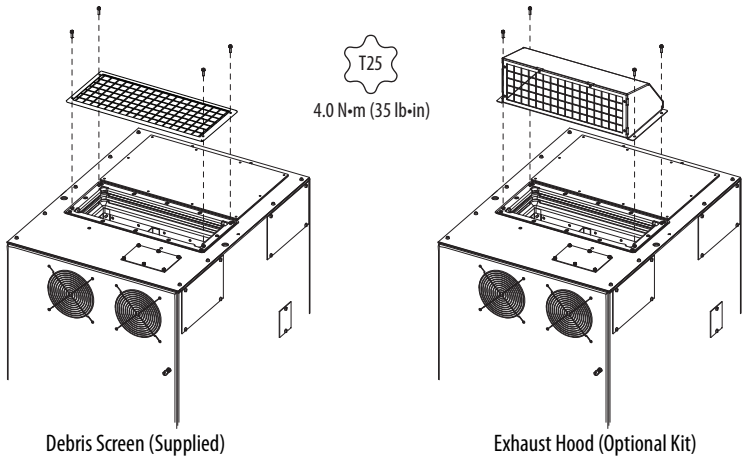


Floor Mount Frame 10

Install IP20, NEMA/UL Type 1 Debris Screen or Optional Exhaust Hood

IP20, NEMA/UL Type 1 drives are equipped with a top mounted debris screen. An optional exhaust hood is also available as a kit (20-750-HOOD1-F8).

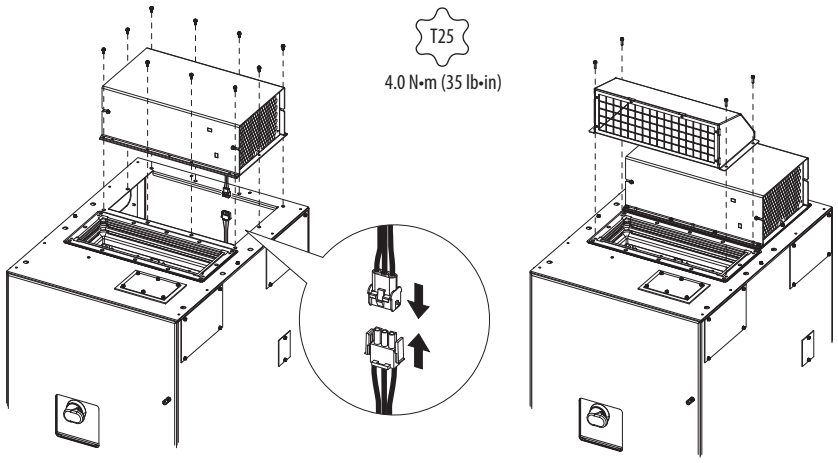
1. Install the supplied debris screen over the exhaust vent.
   or
   Install the optional exhaust hood with the grill facing the front of the drive.
2. Secure with the four screws provided.



Install IP54, NEMA 12 Cabinet Blower Assembly and Exhaust Hood

IP54, NEMA 12 drives are equipped 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.



Install Floor Mount Drive with Cabinet Options Bay and Wiring Bay

Frame 9 drives configured with both the cabinet options bay and wiring bay ship in two sections. The following procedure describes how to join the wiring bay to the cabinet options bay.

1. Remove external wrapping, bus bar cover, and locate joining hardware.

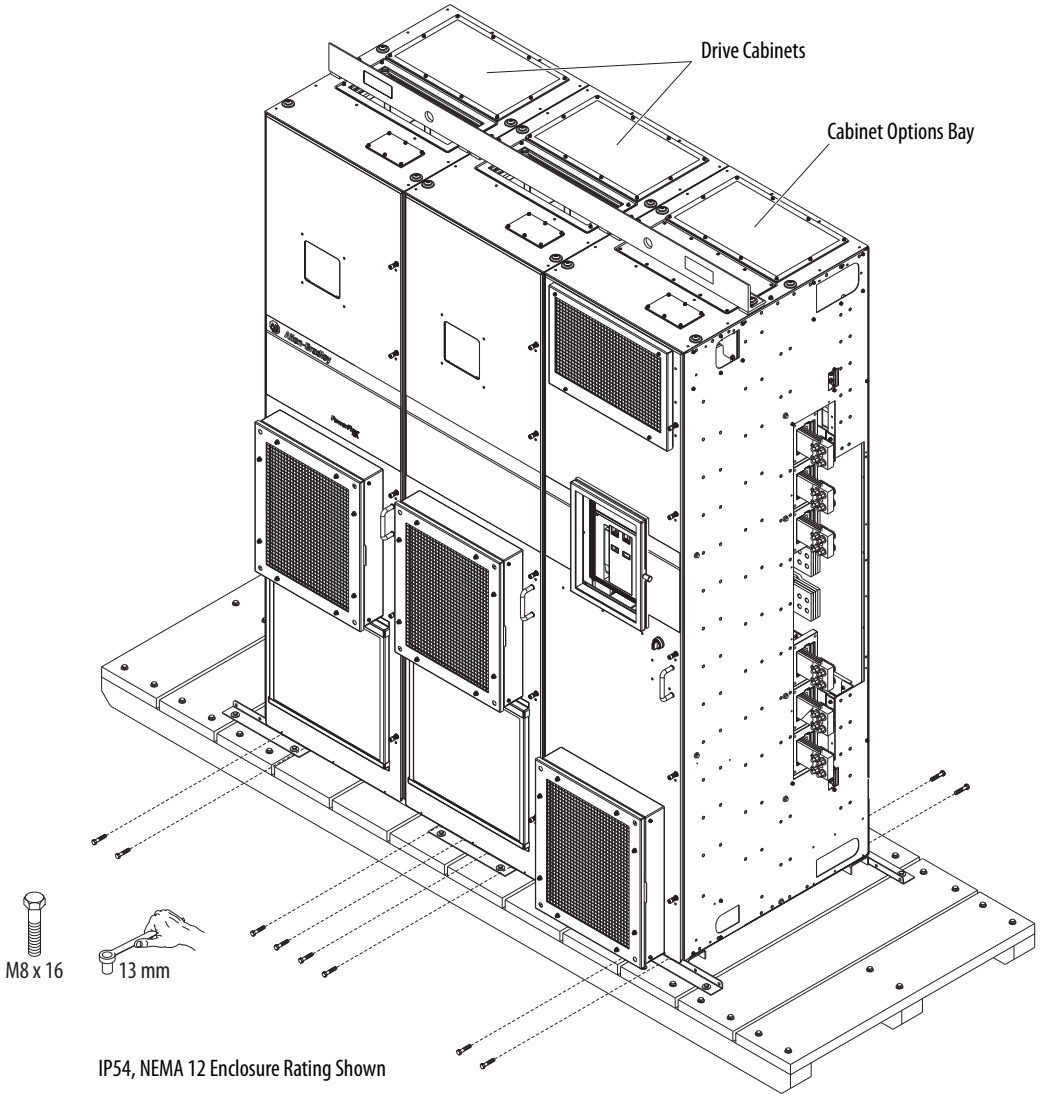
   Joining hardware is shipped with the wiring bay.

Description	Quantity
M8 x 16 mm Cabinet Joining Screw	20
M10 x 45 mm Carriage Bolt	12
Bus Bar Clamp Plate	12

Description	Quantity
M10 Nut with Washer	12
M6 x 40 mm bolts	4
M6 Flange Nuts	4

Position the Drive Cabinets and Cabinet Options Bay

2. Release the factory-assembled drive cabinets and cabinet options bay from the shipping skid.



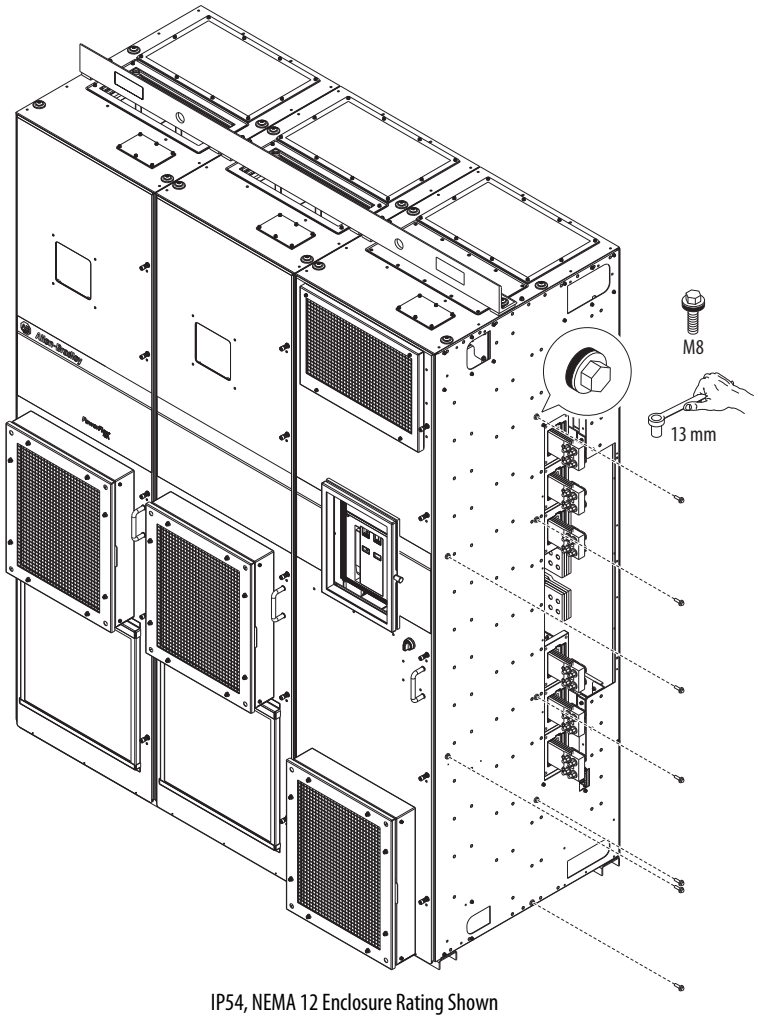
IP54, NEMA 12 Enclosure Rating Shown

3. Attach lifting hardware to the drive assembly.

   Follow lifting instructions and precautions beginning on page 35.

4. Locate the factory-assembled drive cabinets and cabinet options bay in its final position.

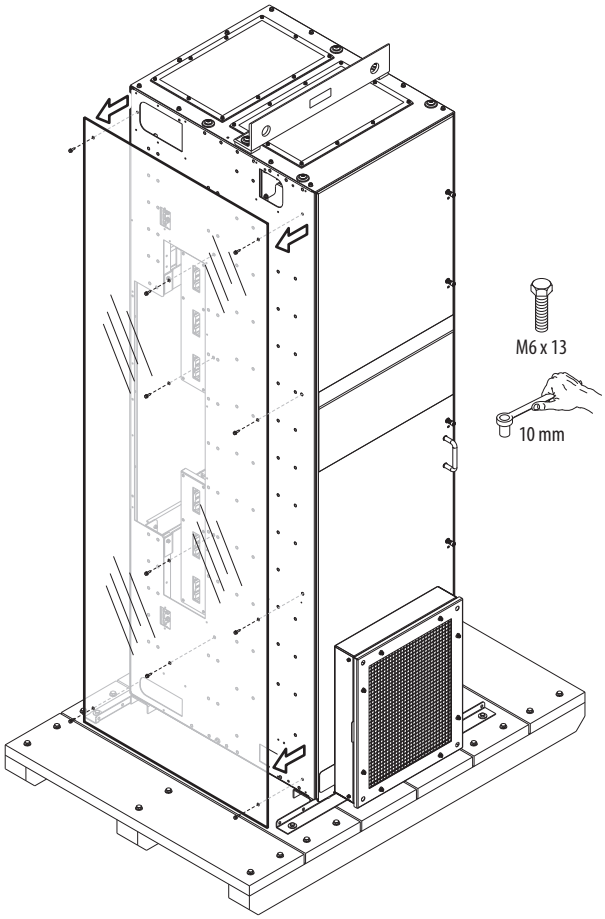
5. Remove and discard the seven M8 sealing screws from the right side of the cabinet options bay.



IP54, NEMA 12 Enclosure Rating Shown

Position the Wiring Bay

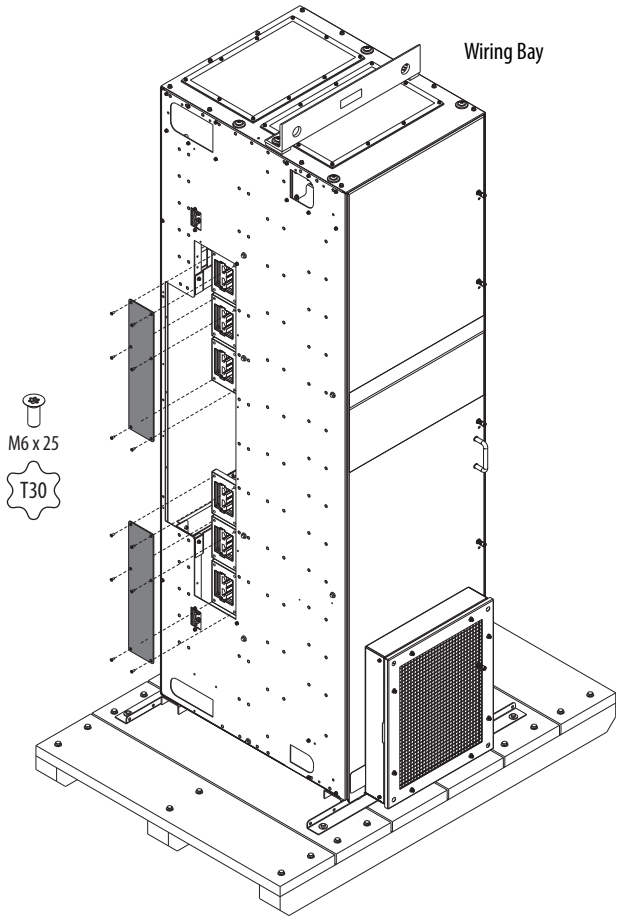
6. Remove and discard the screws holding the protective panel against the left side of the wiring bay.



IP54, NEMA 12 Enclosure Rating Shown

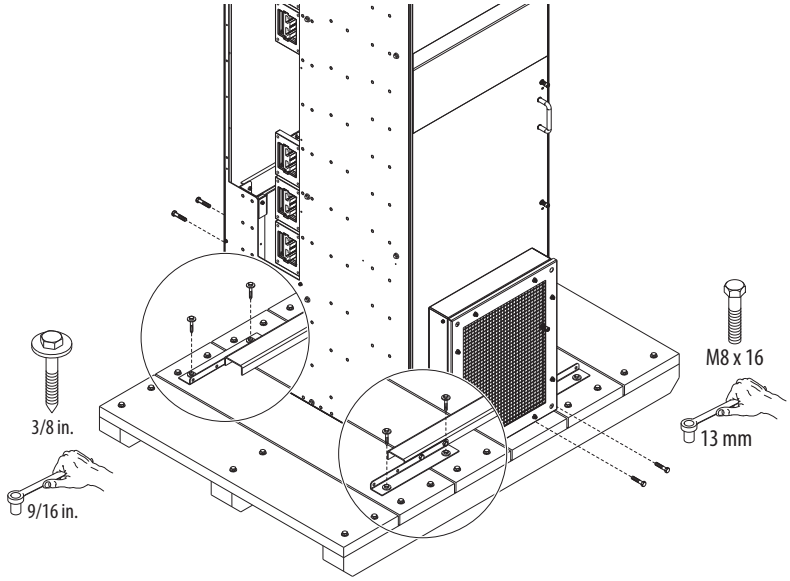
7. Remove and discard the protective panel.

8. Remove and discard the wiring bay inner panels covering the ends of the bus bars.



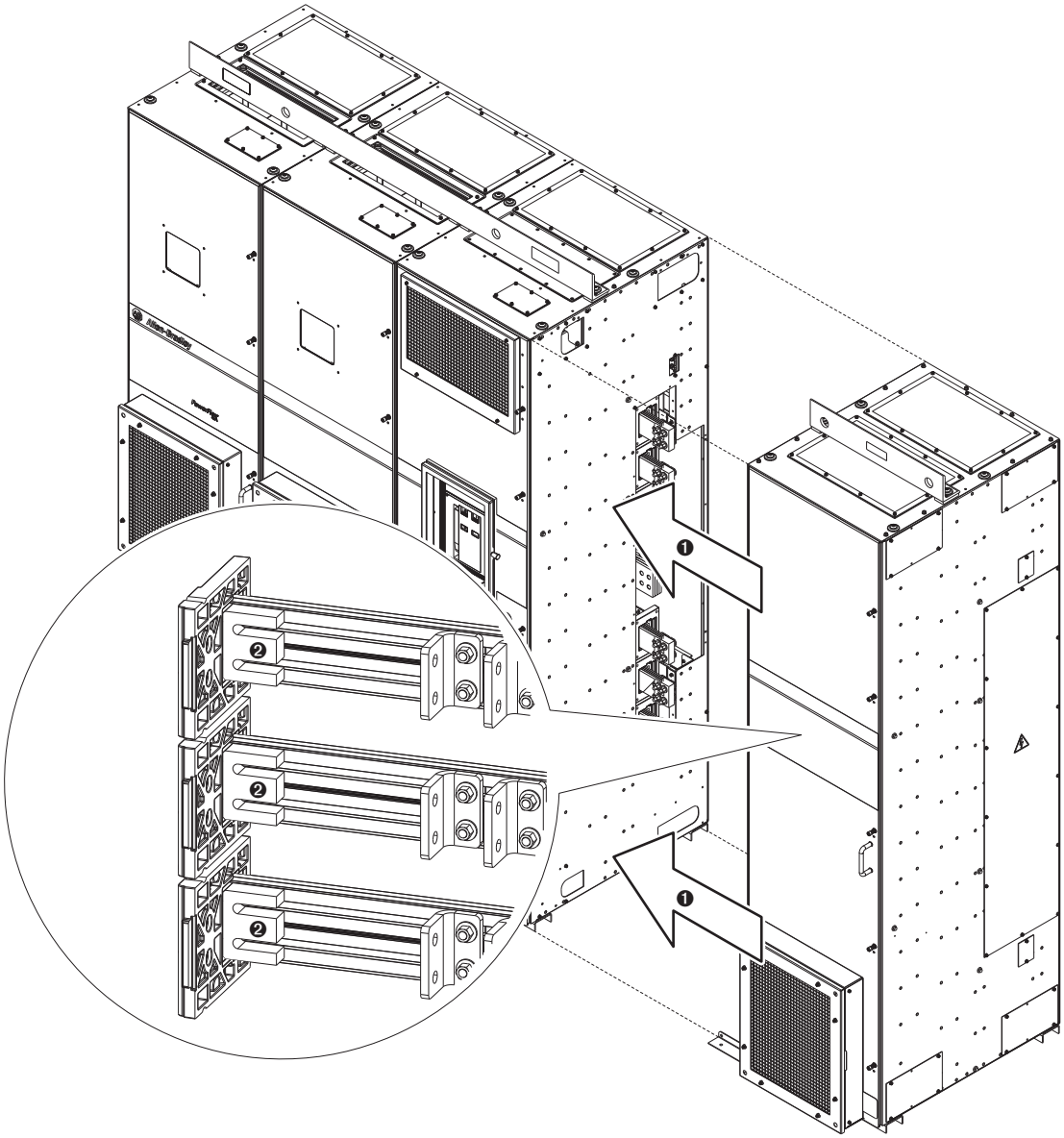
9. Release the wiring bay from the shipping skid.

   The shipping angles on the left side of the cabinet can be left in place to assist with alignment in step 11. Remove the shipping angles after cabinets are aligned and joined.



10. Align the wiring bay with cabinet options bay.
11. Bring the cabinets together ❶.

    The bus bar couplers extend from the cabinet options cabinet ❷ and align with the bus bars in the wiring bay.



Join the Cabinets

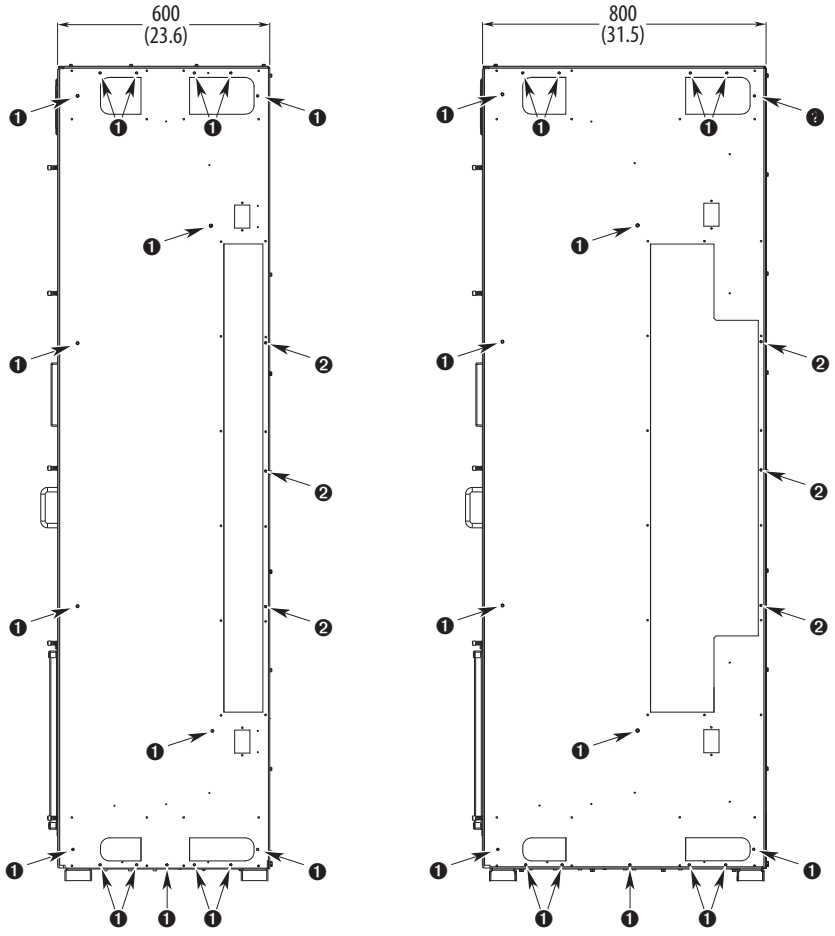
12. Pass the M8 x 16 mm hex-head thread-forming screws from inside the wiring bay through the clearance holes and start to engage the screws with the holes in the cabinet options bay.

Make sure the cabinets are level and aligned and pushed tightly together.

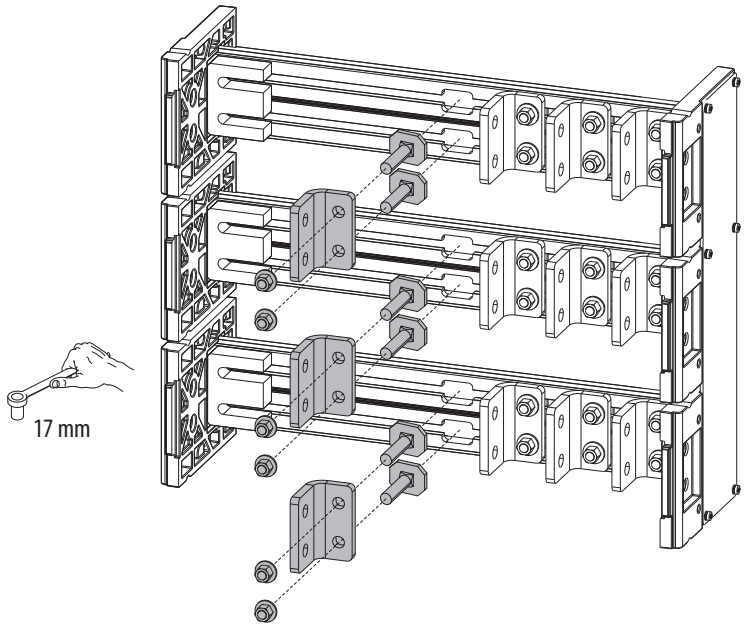
13. Lightly tighten the screws in a uniform pattern.

IMPORTANT Do not use hardware to draw cabinets together.

Torque screws labeled ❶ to 11.3 N•m (100 lb•in).
Torque screws labeled ❷ to 9.0 N•m (80 lb•in).

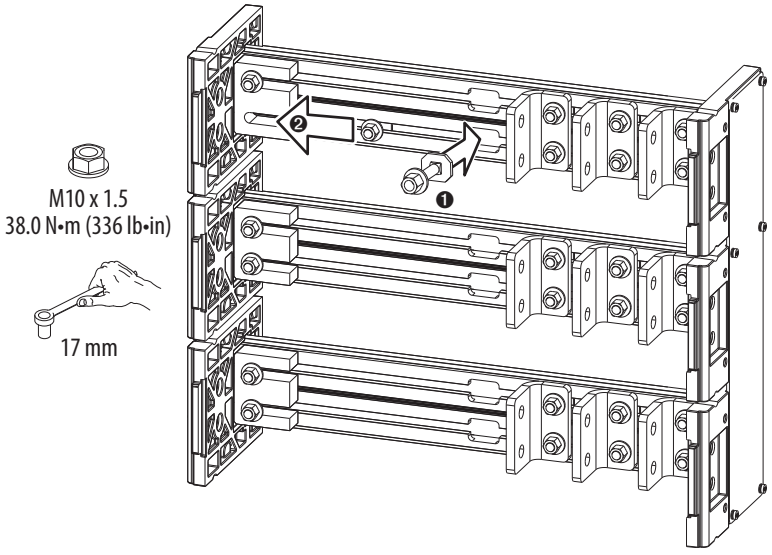


14. Remove the left most L-bracket from each of the six wiring bay bus bars to access the channel notches.

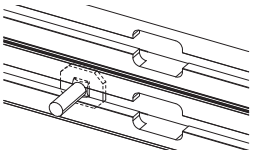


15. Insert the 12 carriage bolt assemblies ❶ into the 12 wiring bay bus bar channels.

16. Slide the carriage bolt assemblies ❷ into the bus bar couplers on the left and tighten.

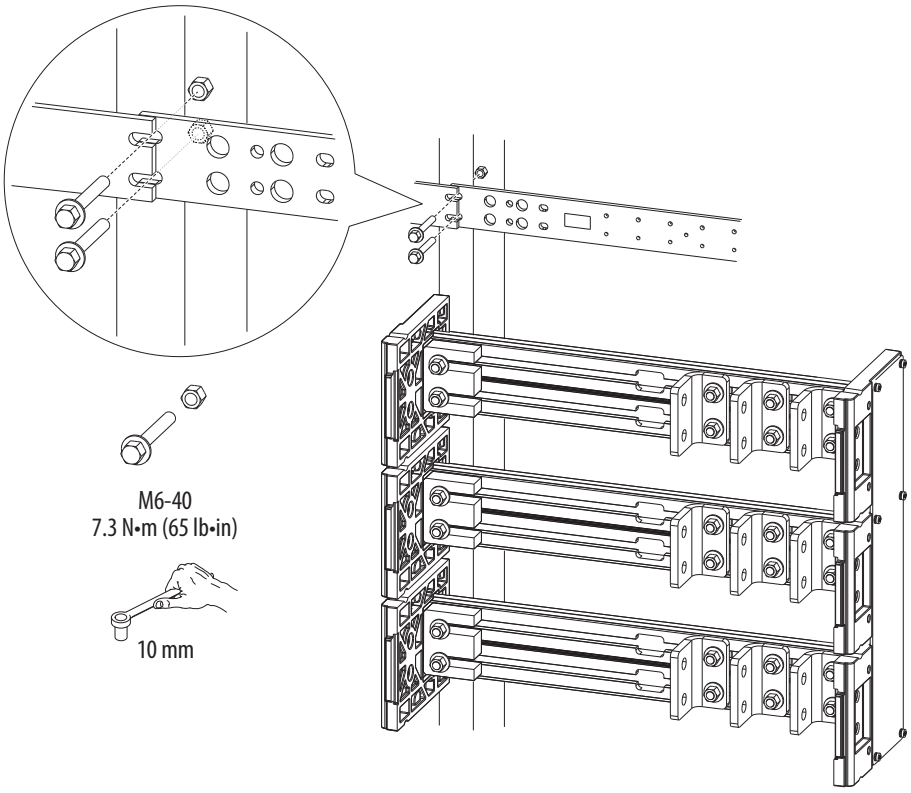


IMPORTANT



Verify that clamp fits squarely in the bus bar channel.

17. Use the M6 x 40 bolts and flange nuts to secure the upper and lower PE bus bars to the cabinet bracket.



18. Reinstall the L-brackets removed in step 14.

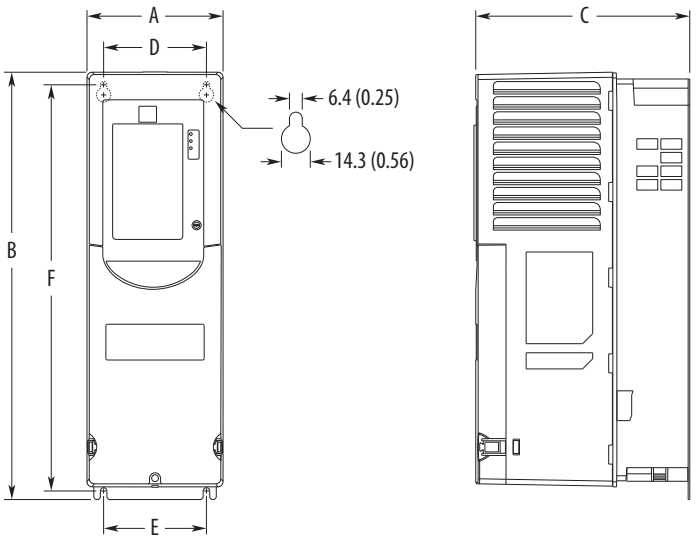
Refer to pages 162...166 for torque requirements and addition L-bracket and wiring details.

Approximate Dimensions - Wall Mount Frames 1…7 and Floor Mount Frames 8…10

Table 5 - Dimension Drawing Index

See page 82 for dimensions of drives with cabinet options.

Figure 14 - IP20, NEMA/UL Open Type, Wall Mount Frames 1…5 *(Frame 2 Shown)*

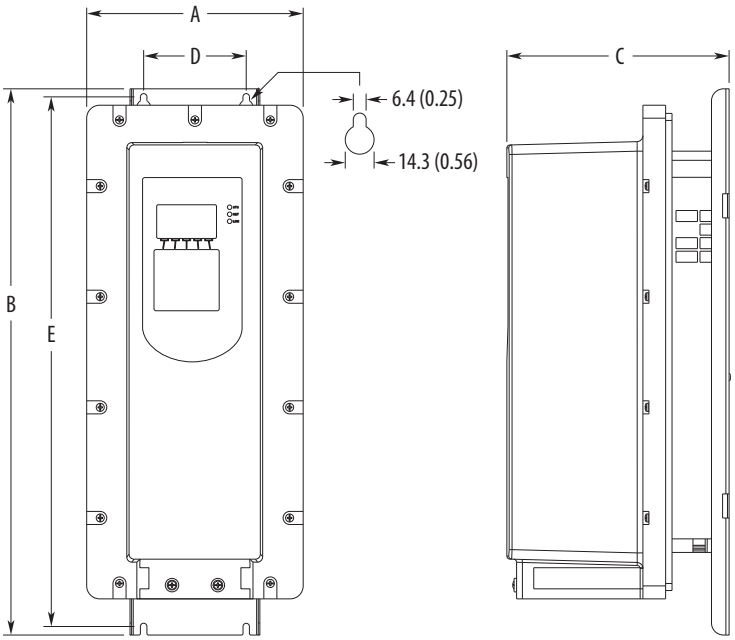


Dimensions are in millimeters and (inches).
Weights are in kilograms and (pounds).

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 15 - IP54, NEMA/UL Type 12, Wall Mount Frames 2…5 *(Frame 2 Shown)*

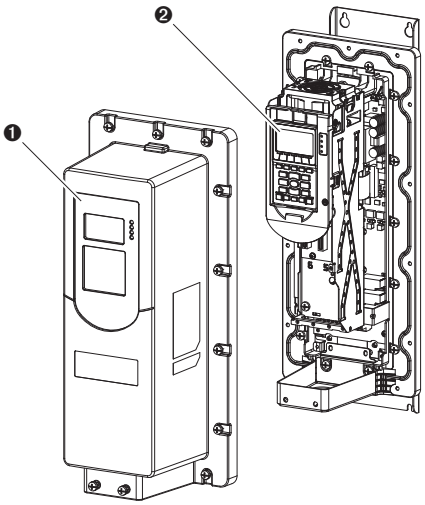


Dimensions are in millimeters and (inches).
Weights are in kilograms and (pounds).

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)

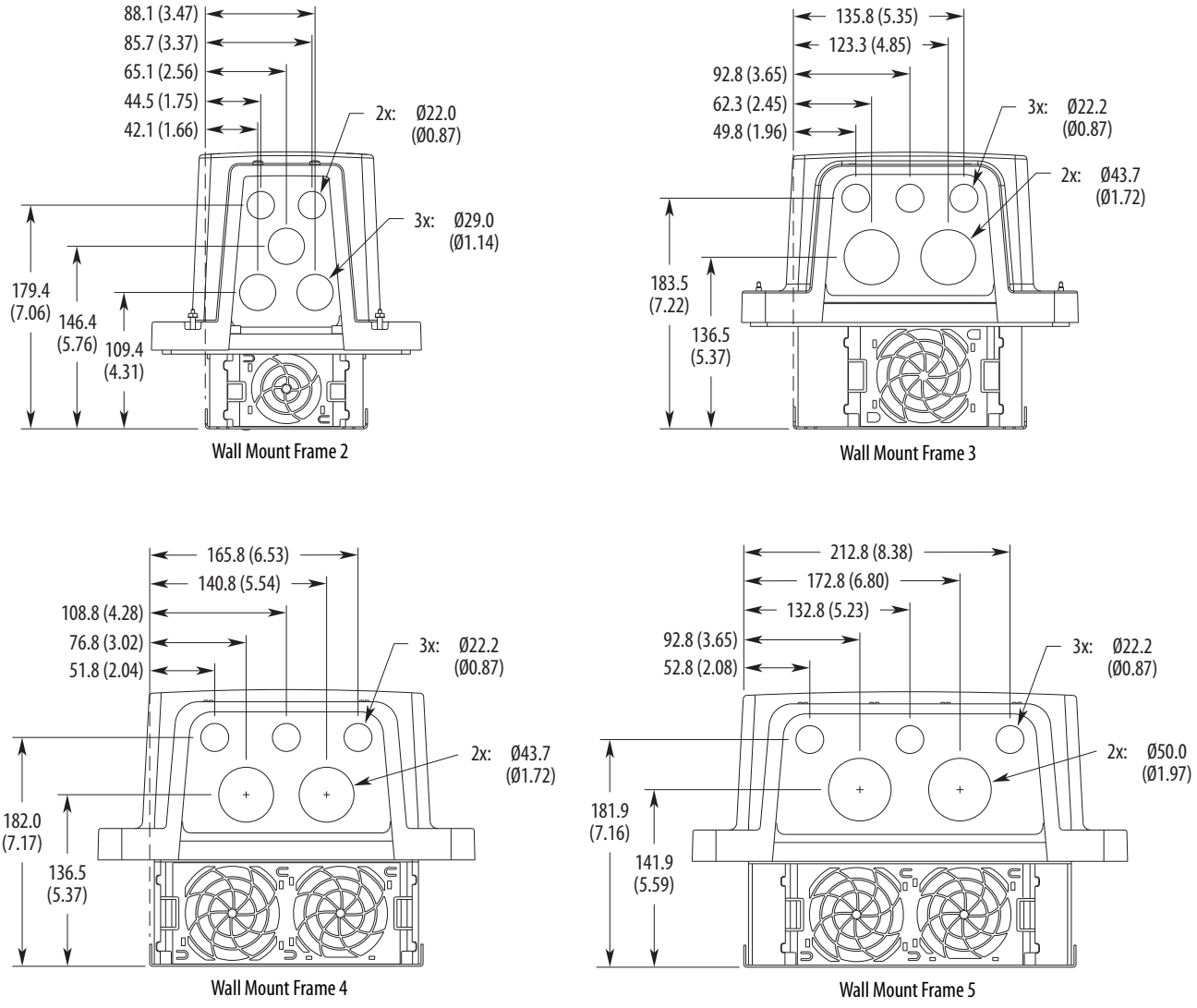
M6 (#10 or #12) mounting hardware recommended.

Figure 16 - P54, NEMA/UL Type 12, Wall Mount Frames 2…5 Human Interface Module Access



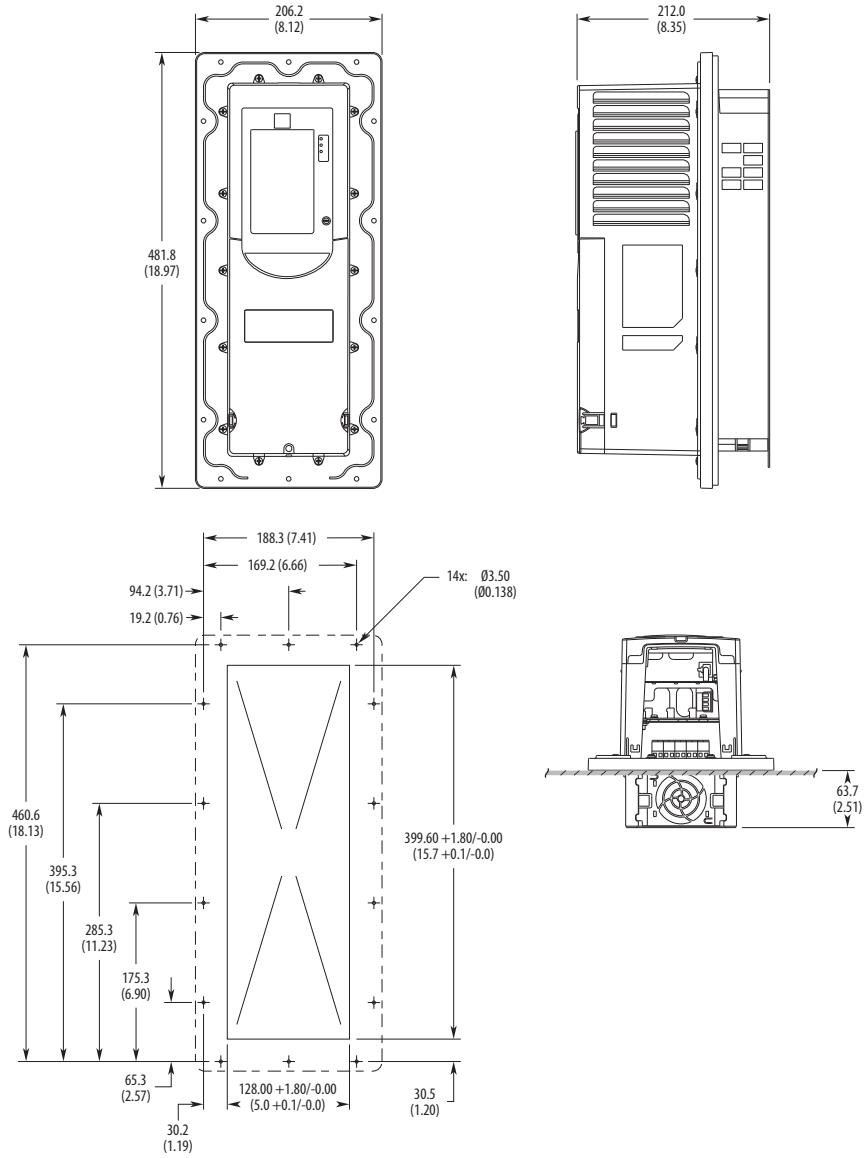
No.	Description
❶	Flexible panel molded into the IP54, NEMA/UL Type 12 cover.
❷	Human Interface Module, Catalog Number 20-HIM-A6, under cover in control pod cradle.

Figure 17 - IP54, NEMA/UL Type 12, Wall Mount Frames 2…5, Bottom Access



Dimensions are in millimeters and (inches).

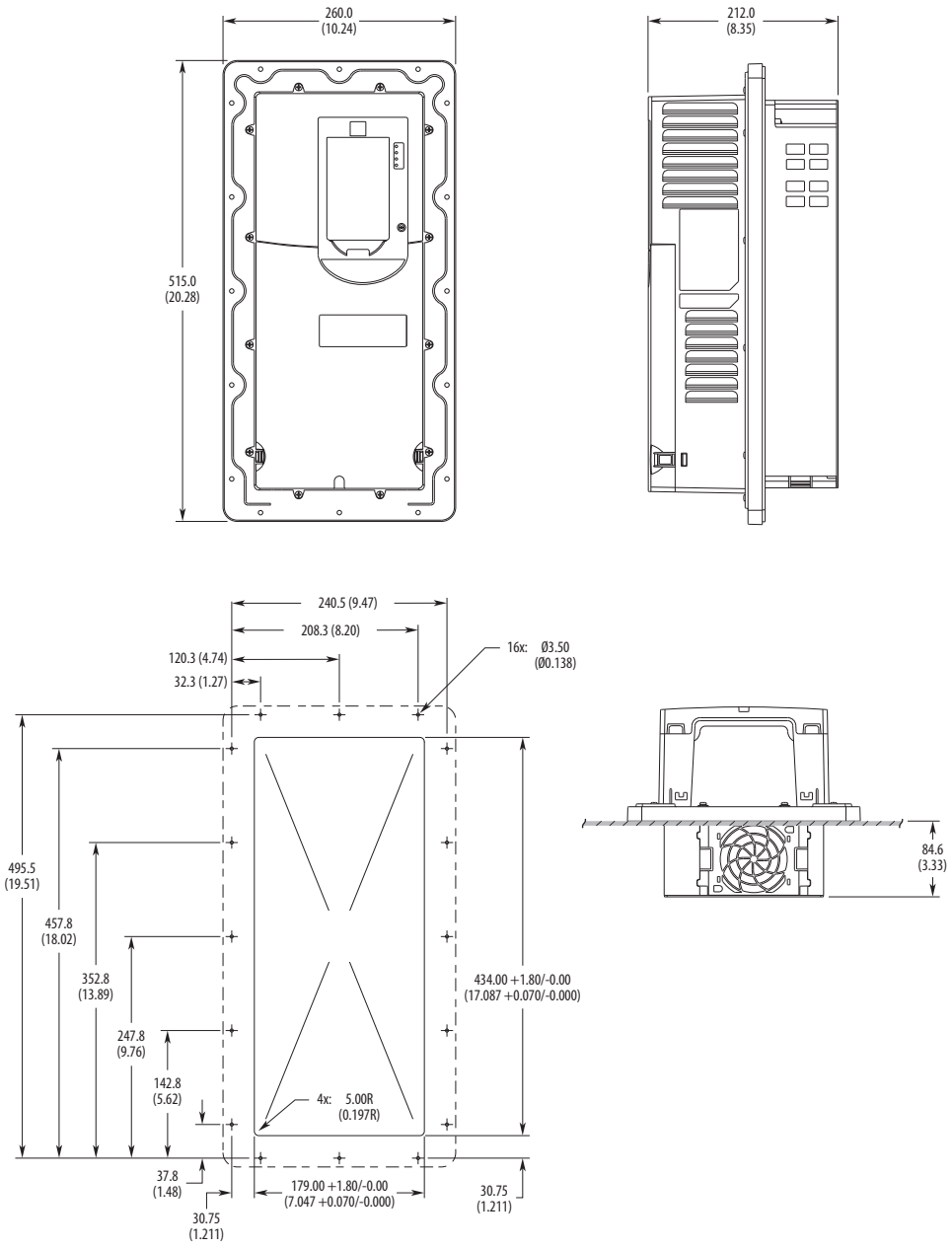
Figure 18 - Flange Mount, Frame 2



Dimensions are in millimeters and (inches).

IMPORTANT Must use mounting hardware supplied to meet enclosure rating.

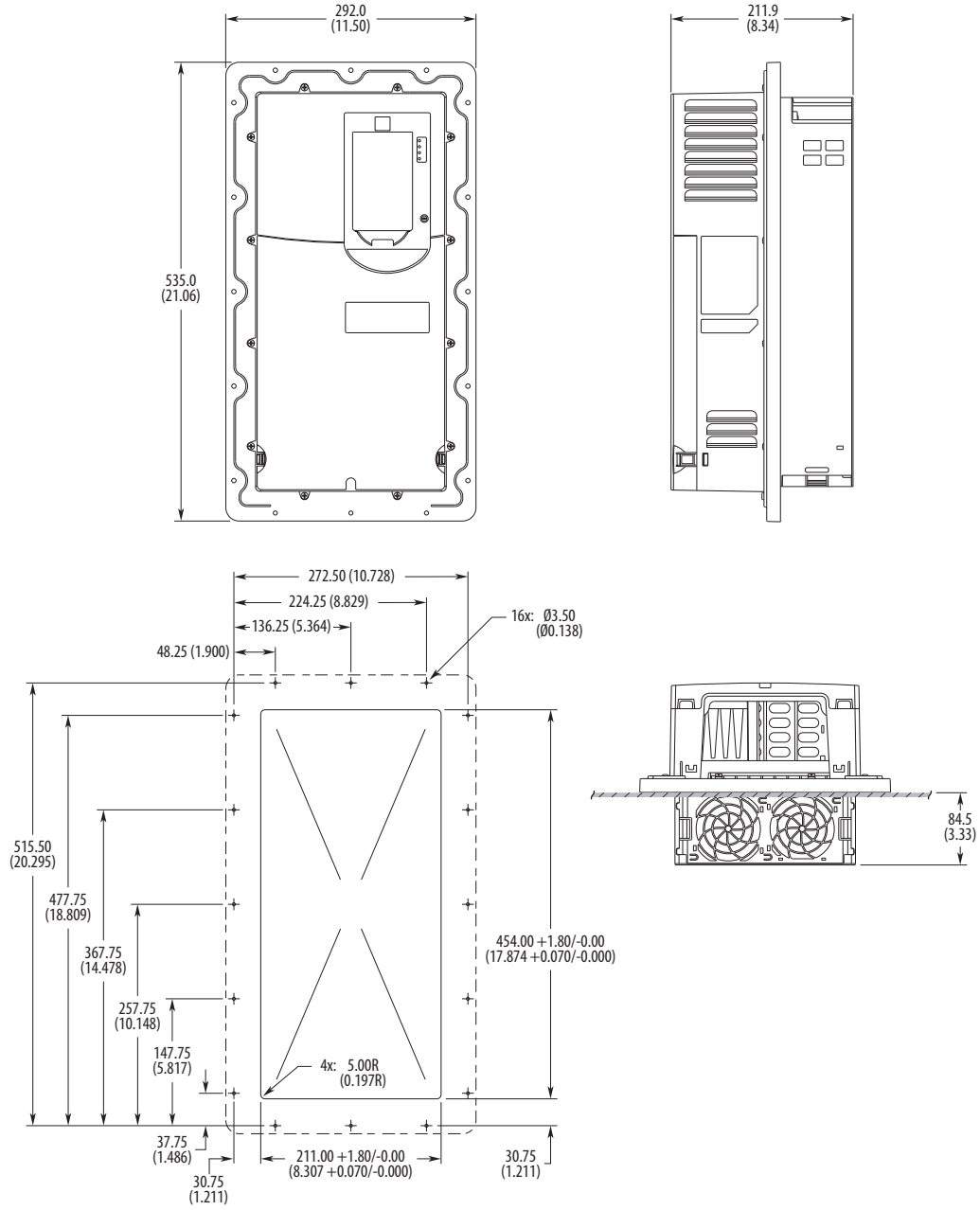
Figure 19 - Flange Mount, Frame 3



Dimensions are in millimeters and (inches).

IMPORTANT Must use mounting hardware supplied to meet enclosure rating.

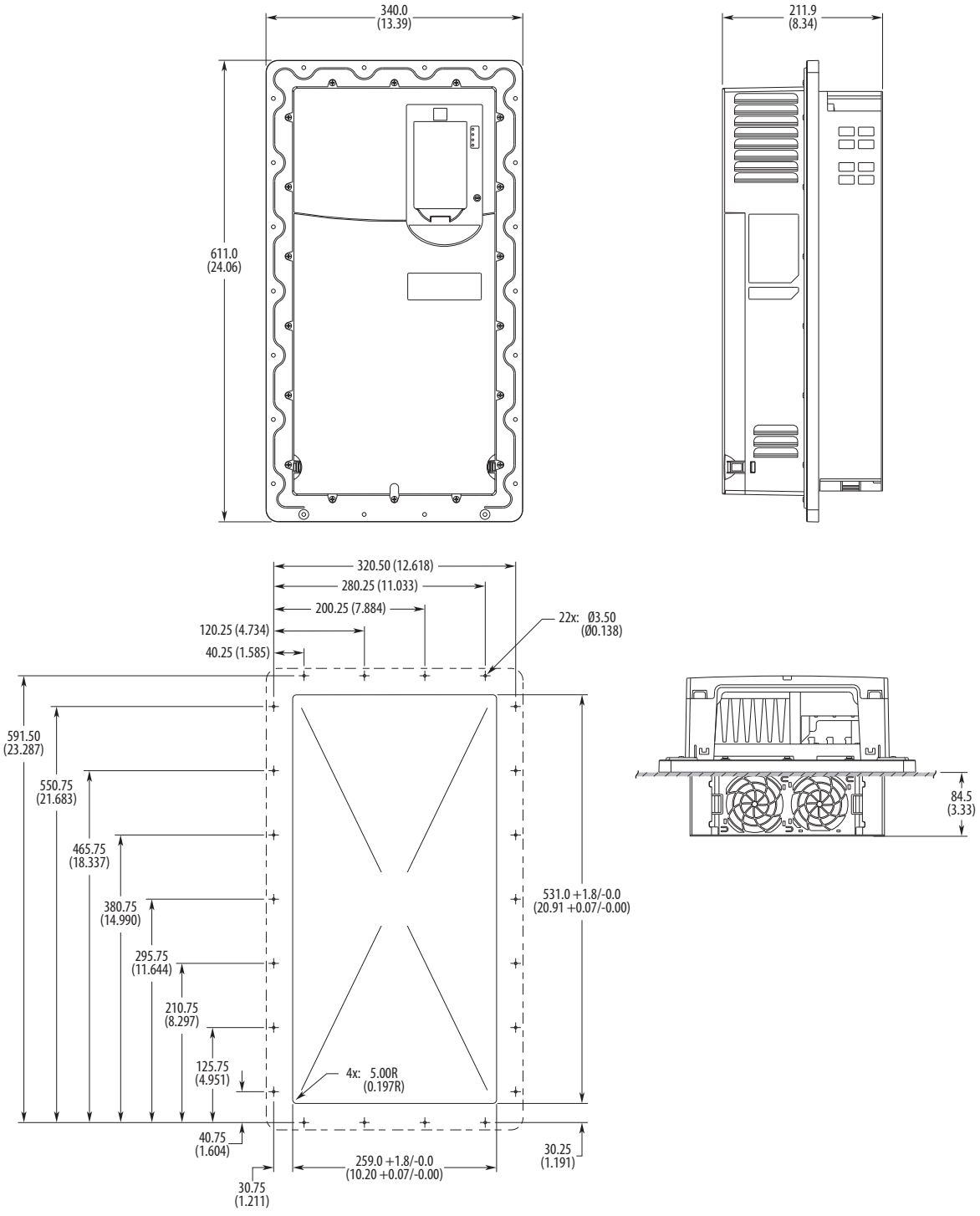
Figure 20 - Flange Mount, Frame 4



Dimensions are in millimeters and (inches).

IMPORTANT Must use mounting hardware supplied to meet enclosure rating.

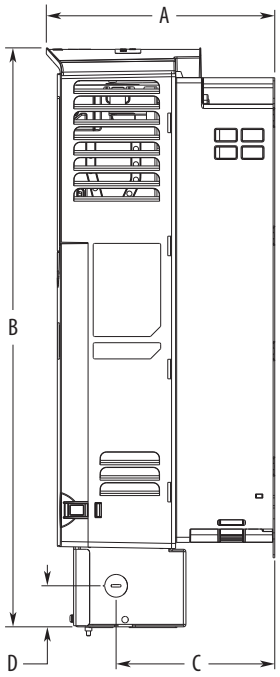
Figure 21 - Flange Mount, Frame 5



Dimensions are in millimeters and (inches).

IMPORTANT Must use mounting hardware supplied to meet enclosure rating.

Figure 22 - NEMA/UL Type 1 Kit, Wall Mount Frames 1…5 *(Frame 4 Shown)*

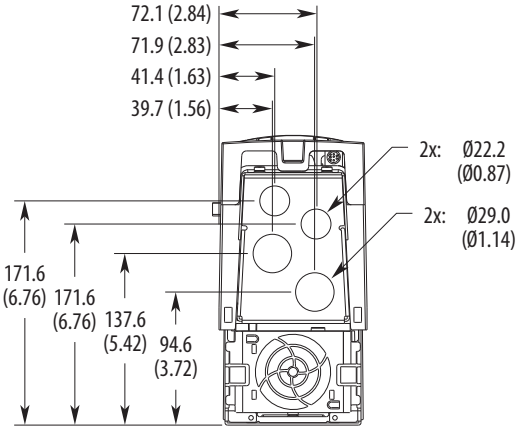


Dimensions are in millimeters and (inches).

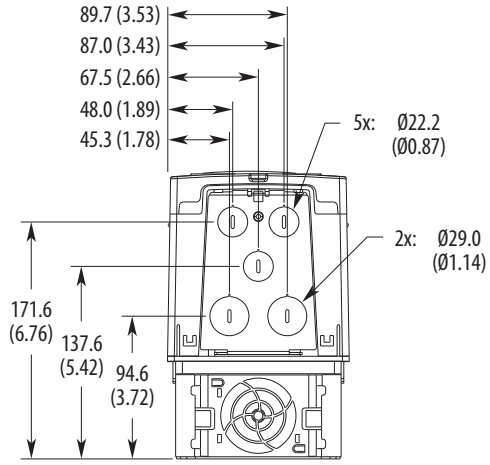
Frame	A	B	C	D
1	215.4 (8.48)	458.8 (18.06)	–	–
2	222.2 (8.75)	497.1 (19.57)	117.7 (4.63)	38.0 (1.50)
3	223.1 (8.78)	530.1 (20.87)	154.7 (6.09)	38.0 (1.50)
4	222.7 (8.77)	564.4 (22.22)	154.7 (6.09)	40.0 (1.57)
5	222.7 (8.77)	665.4 (26.20)	155.0 (6.10)	55.0 (2.17)

IMPORTANT NEMA Type 1 Kits (20-750-NEMA-F*x*) do not change the mounting dimensions in Figure 14.

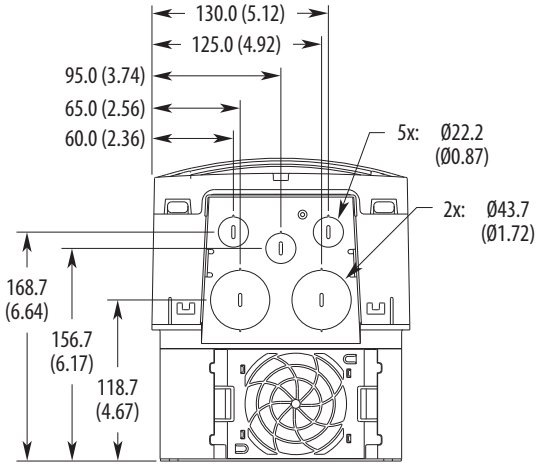
Figure 23 - NEMA/UL Type 1, Wall Mount Frames 1…5, Bottom Access



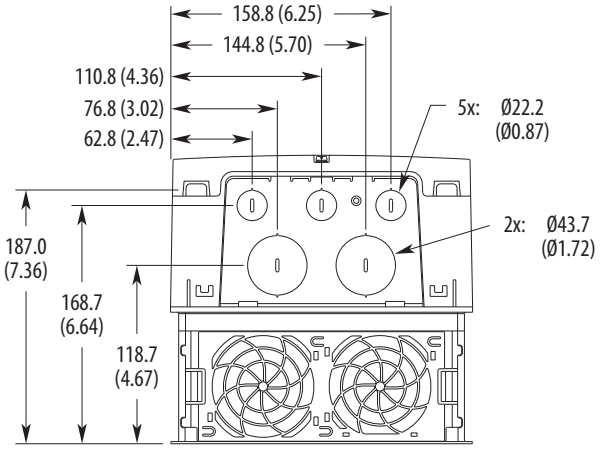
Wall Mount Frame 1



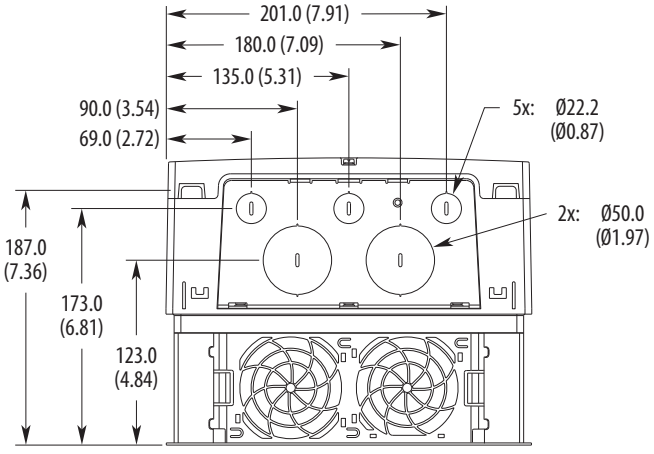
Wall Mount Frame 2



Wall Mount Frame 3



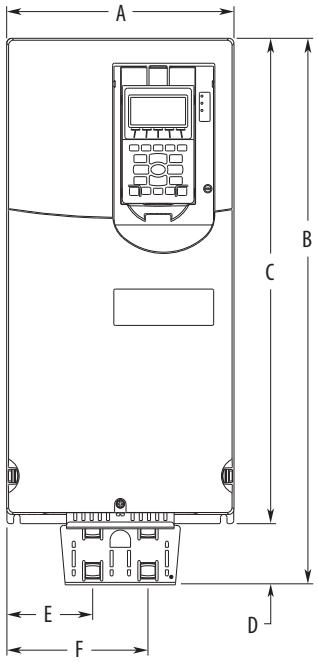
Wall Mount Frame 4



Wall Mount Frame 5

Dimensions are in millimeters and (inches).

Figure 24 - EMC Plate Kit, Wall Mount Frames 1…5 *(Frame 4 Shown)*

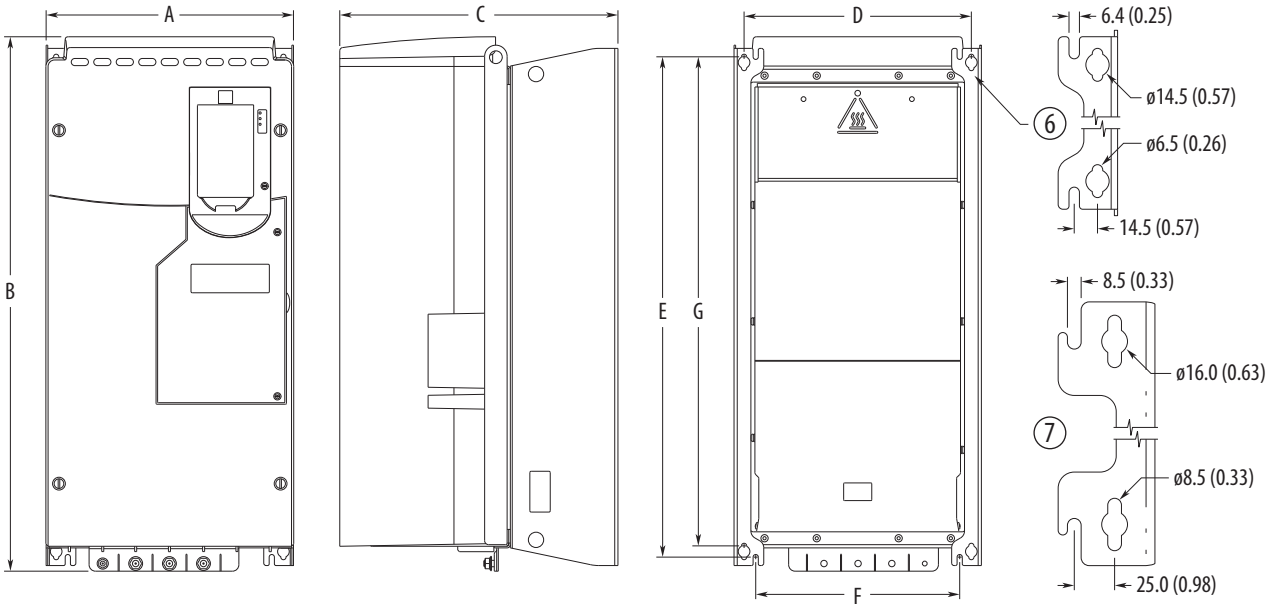


Dimensions are in millimeters and (inches).

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 14. Refer to the PowerFlex 750-Series EMC Plate and Core(s) Installation Instructions, publication 750-IN006, for detailed information on kit installation.

Figure 25 - IP00, NEMA/UL Open Type, Wall Mount Frames 6 and 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.

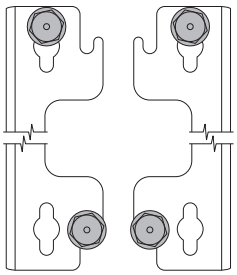
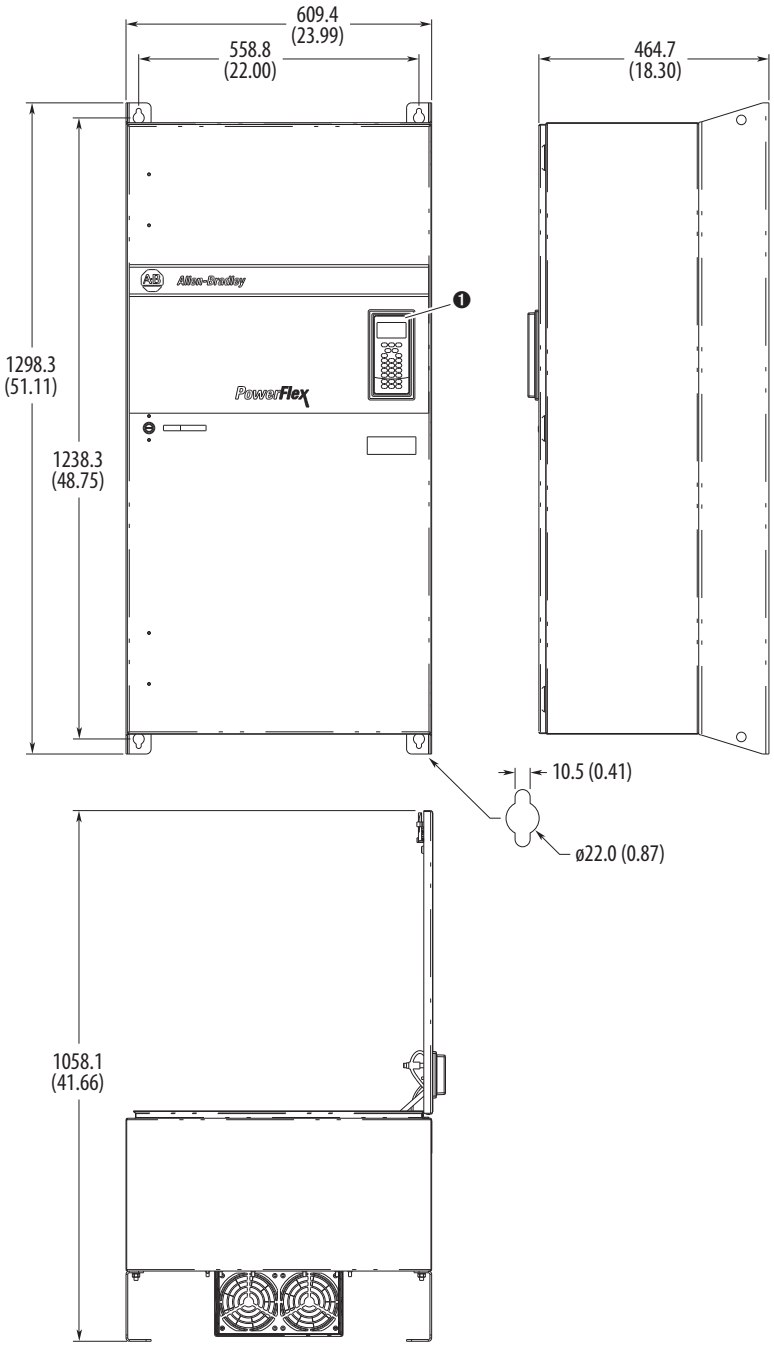


Figure 26 - IP54, NEMA/UL Type 12, Wall Mount Frame 6

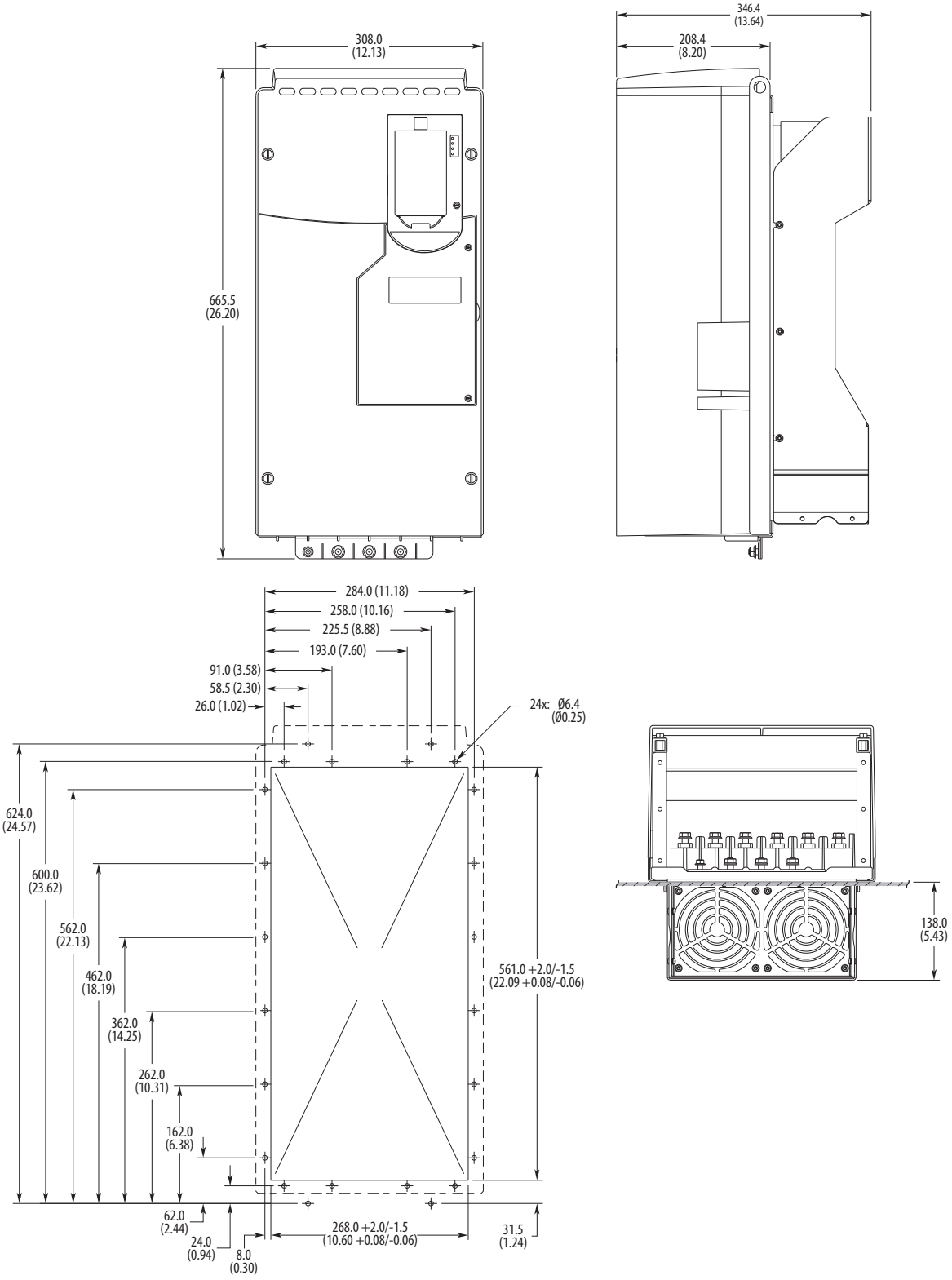


❶ Human Interface Module, Catalog Number 20-HIM-C6S, required to meet enclosure rating.

Dimensions are in millimeters and (inches).

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

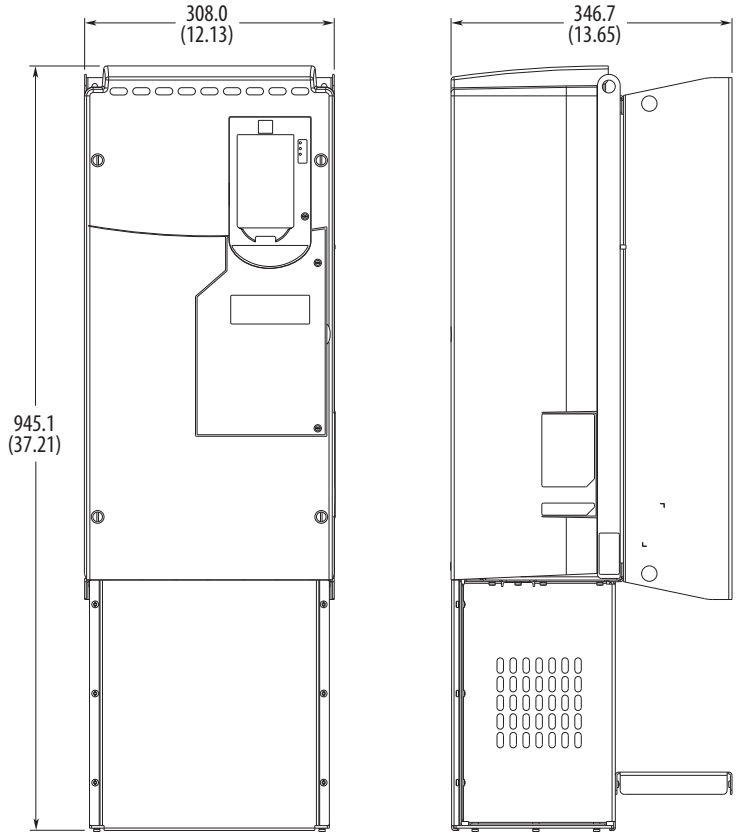
Figure 27 - Flange Mount, Frame 6



Dimensions are in millimeters and (inches).

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

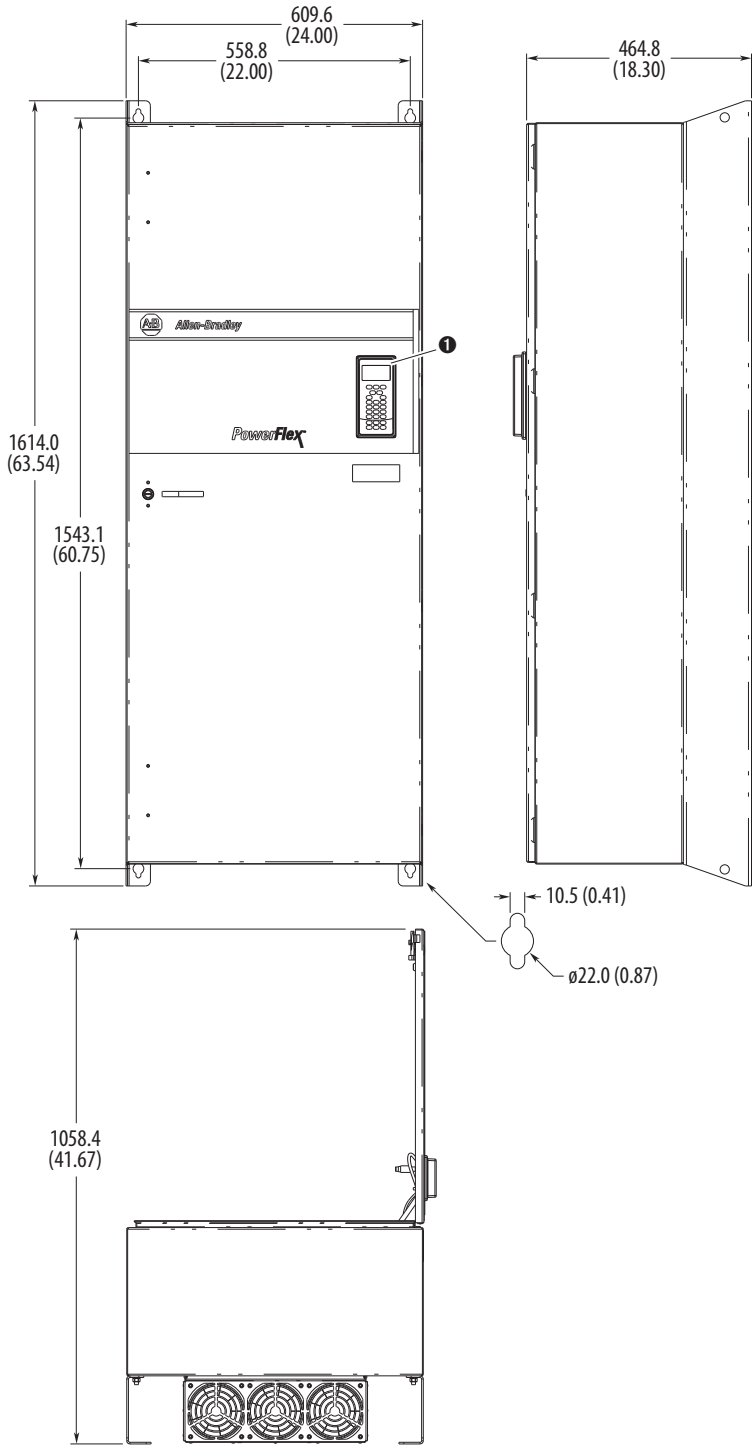
Figure 28 - NEMA/UL Type 1 Kit, Wall Mount Frame 6



Dimensions are in millimeters and (inches).

IMPORTANT NEMA Type 1 Kit (20-750-NEMA-F6) does not change the mounting dimensions in Figure 25.

Figure 29 - IP54, NEMA/UL Type 12, Wall Mount Frame 7

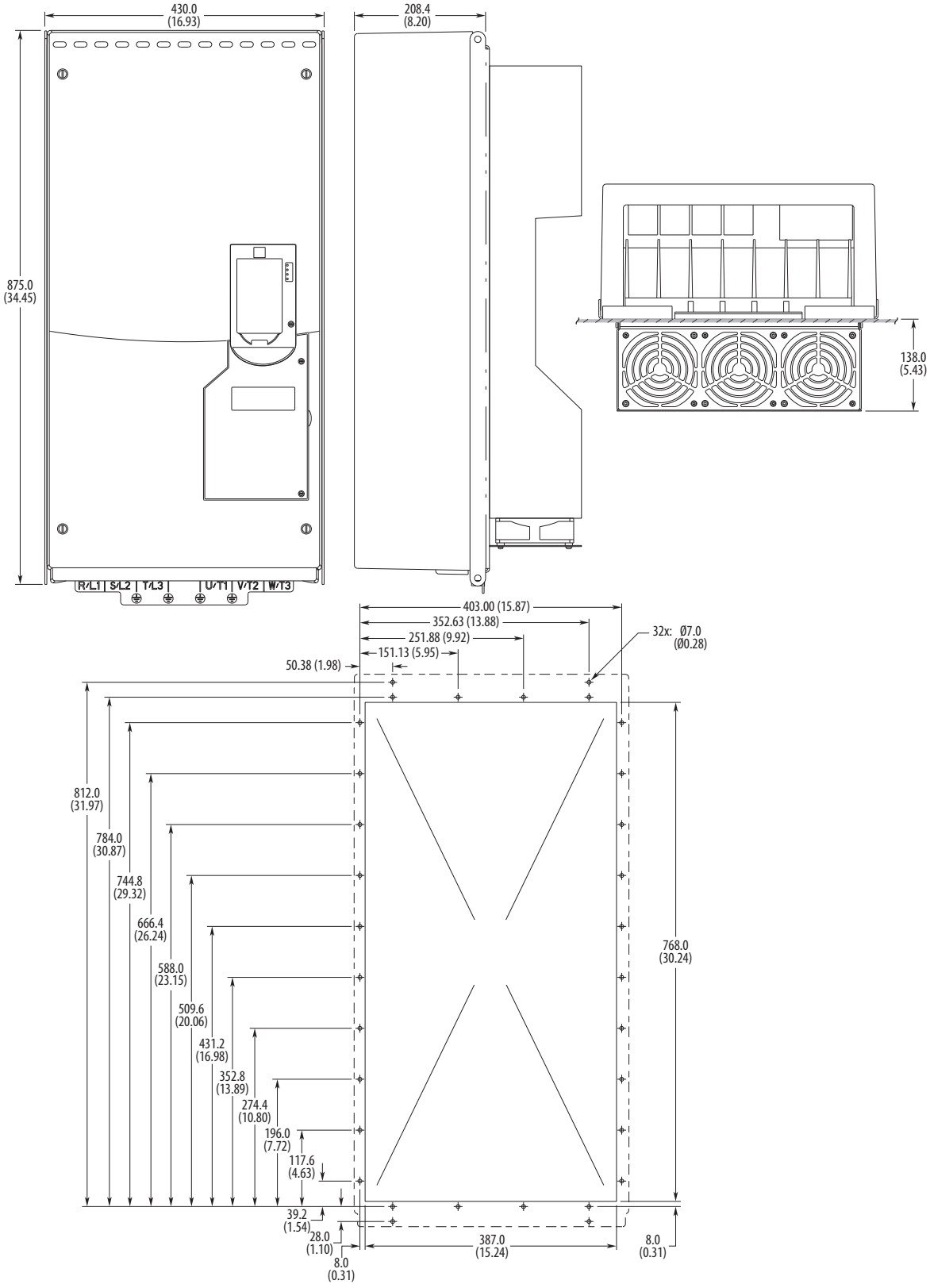


❶ Human Interface Module, Catalog Number 20-HIM-C6S, required to meet enclosure rating.

Dimensions are in millimeters and (inches).

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

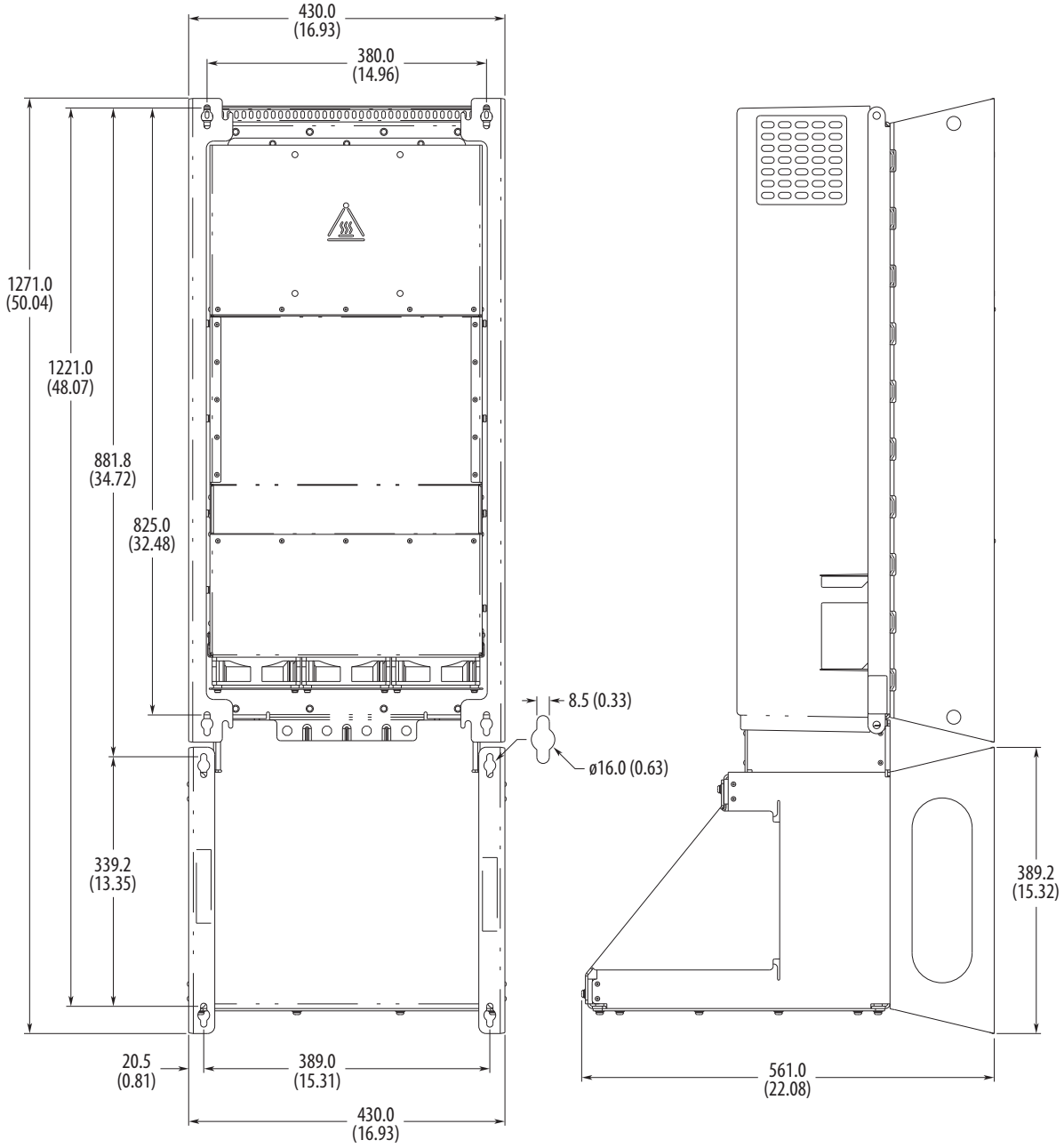
Figure 30 - Flange Mount, Frame 7



Dimensions are in millimeters and (inches).

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

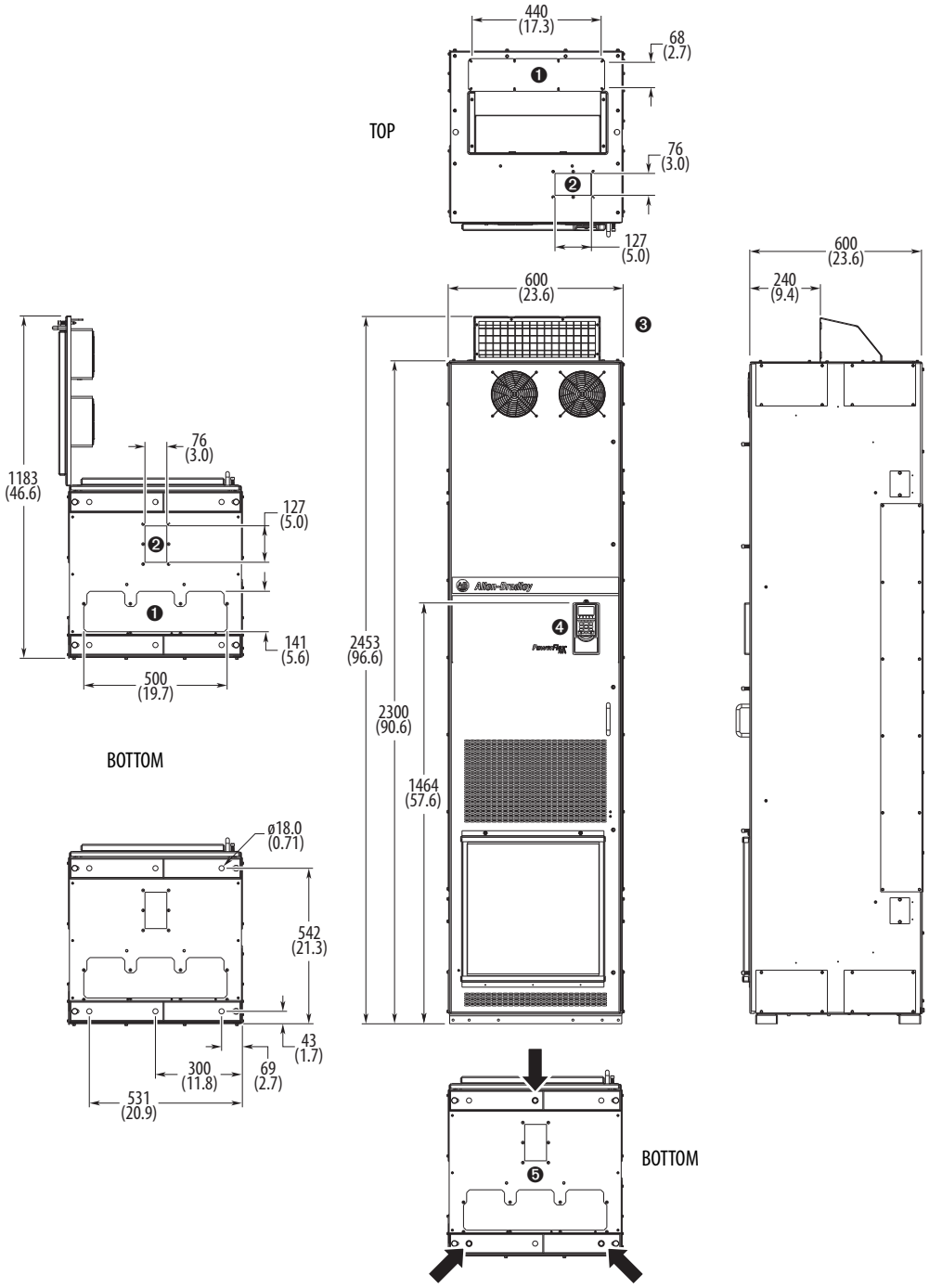
Figure 31 - NEMA/UL Type 1, Wall Mount Frame 7



Dimensions are in millimeters and (inches).

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

Figure 32 - IP20, NEMA/UL Type 1, MCC Style Cabinet, Floor Mount Frame 8 *(Enclosure Code B)*

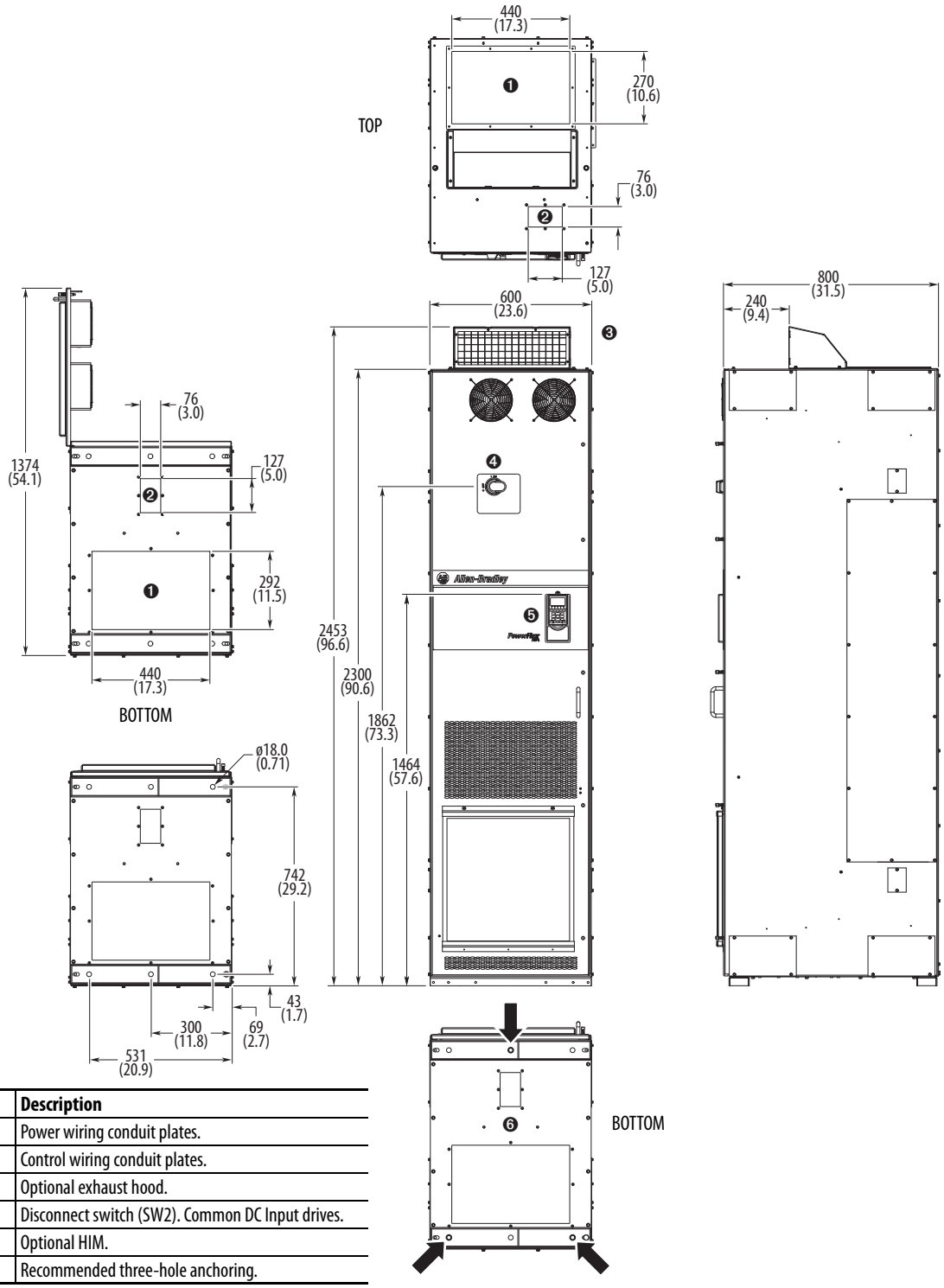


No.	Description
❶	Power wiring conduit plates.
❷	Control wiring conduit plates.
❸	Optional exhaust hood.

No.	Description
❹	Optional HIM.
❺	Recommended three-hole anchoring.

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.

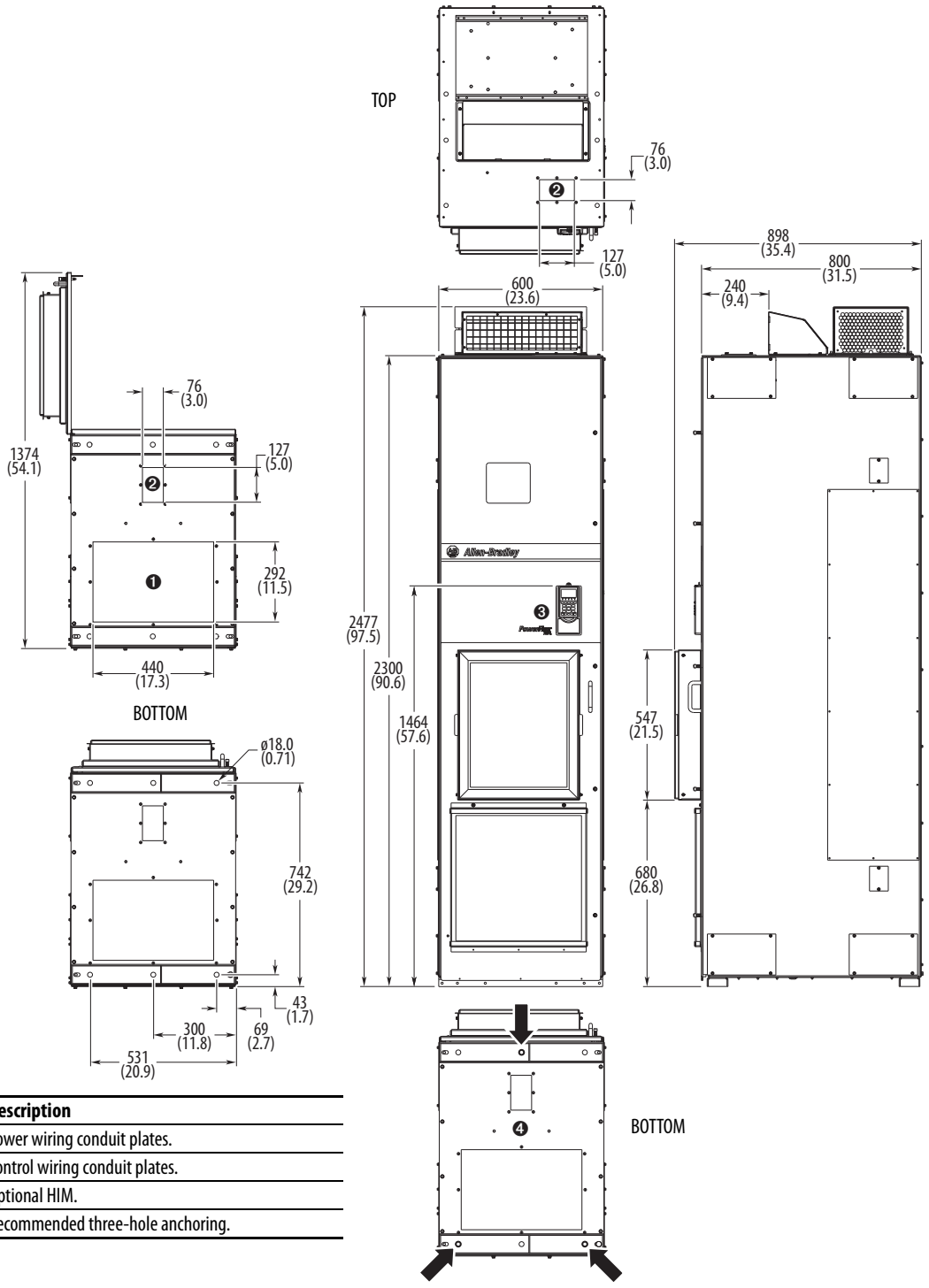
Figure 33 - IP20, NEMA/UL Type 1, MCC Style Cabinet, Floor Mount Frame 8
(Enclosure Codes L, P, W)



No.	Description
❶	Power wiring conduit plates.
❷	Control wiring conduit plates.
❸	Optional exhaust hood.
❹	Disconnect switch (SW2). Common DC Input drives.
❺	Optional HIM.
❻	Recommended three-hole anchoring.

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.

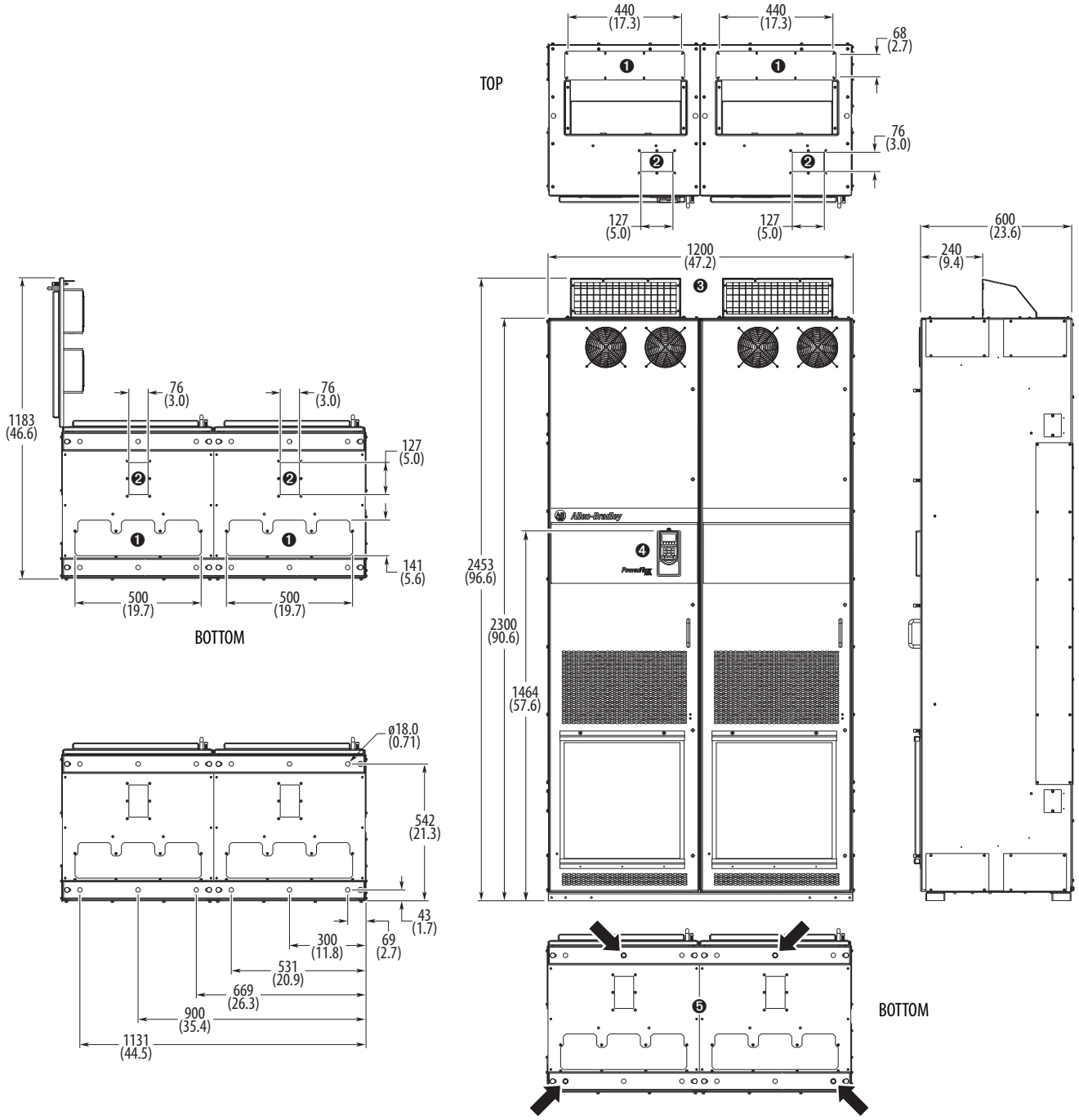
Figure 34 - IP54, NEMA 12, MCC Style Cabinet, Floor Mount Frame 8 *(Enclosure Codes K and Y)*
IP54, UL Type 12, MCC Style Cabinet, Floor Mount Frame 8 *(Enclosure Code J)*



No.	Description
❶	Power wiring conduit plates.
❷	Control wiring conduit plates.
❸	Optional HIM.
❹	Recommended three-hole anchoring.

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, MCC Style Cabinet, Floor Mount Frame 9 *(Enclosure Code B)*

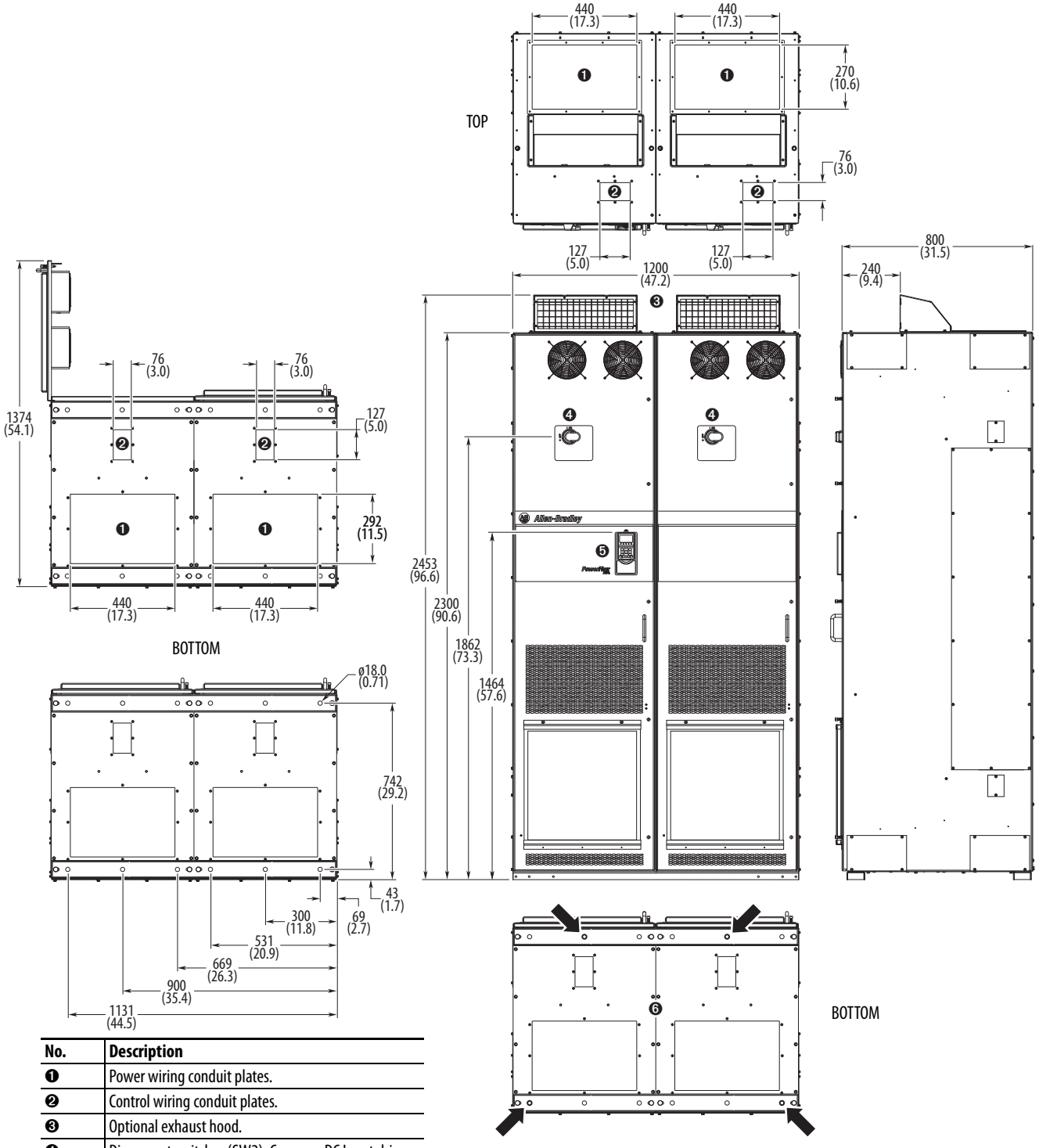


No.	Description
❶	Power wiring conduit plates.
❷	Control wiring conduit plates.
❸	Optional exhaust hood.

No.	Description
❹	Optional HIM.
❺	Recommended four-hole anchoring.

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.

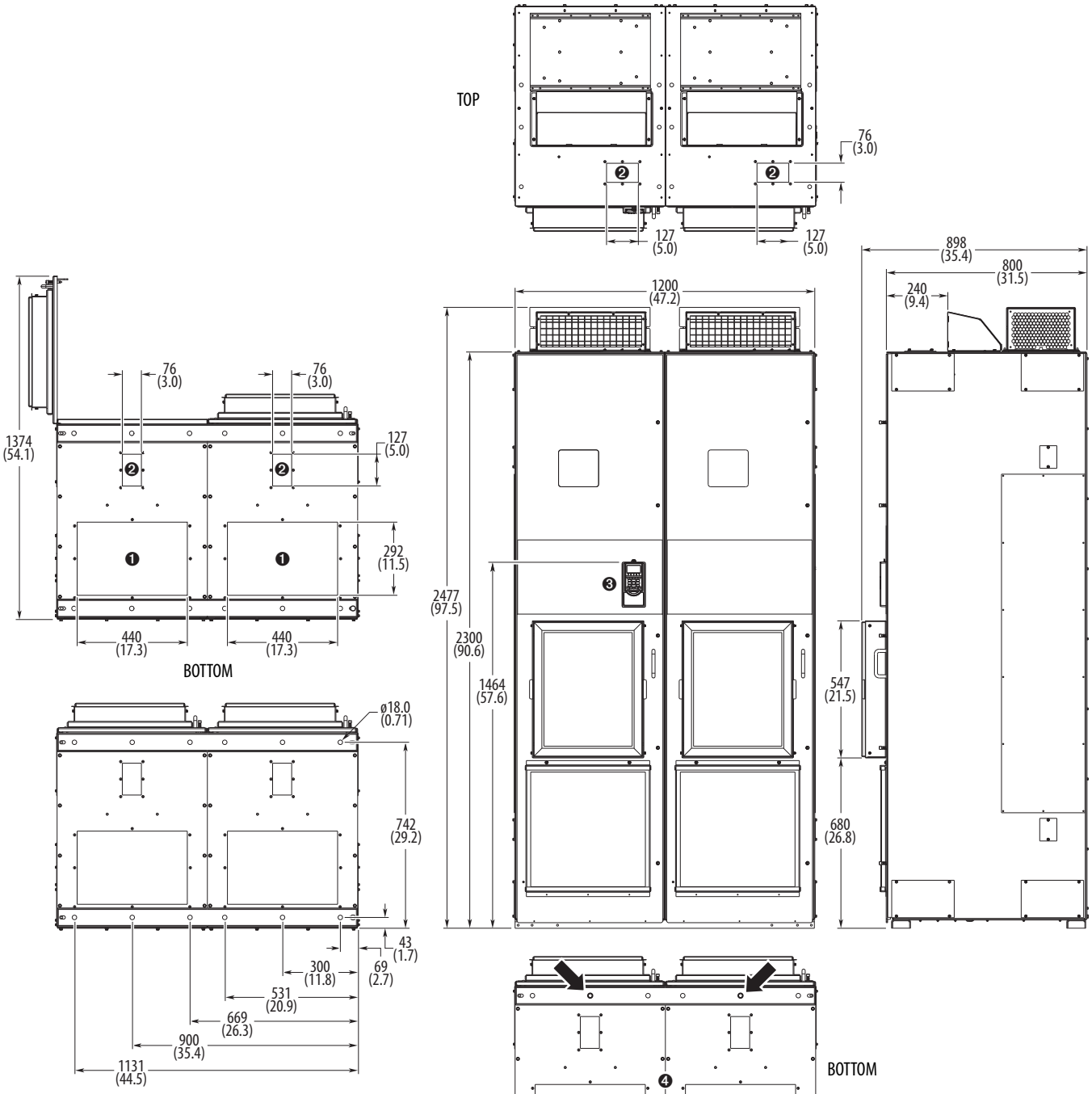
Figure 36 - IP20, NEMA/UL Type 1, MCC Style Cabinet, Floor Mount Frame 9
(Enclosure Codes L, P, W)



No.	Description
❶	Power wiring conduit plates.
❷	Control wiring conduit plates.
❸	Optional exhaust hood.
❹	Disconnect switches (SW2). Common DC Input drives.
❺	Optional HIM.
❻	Recommended four-hole anchoring.

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.

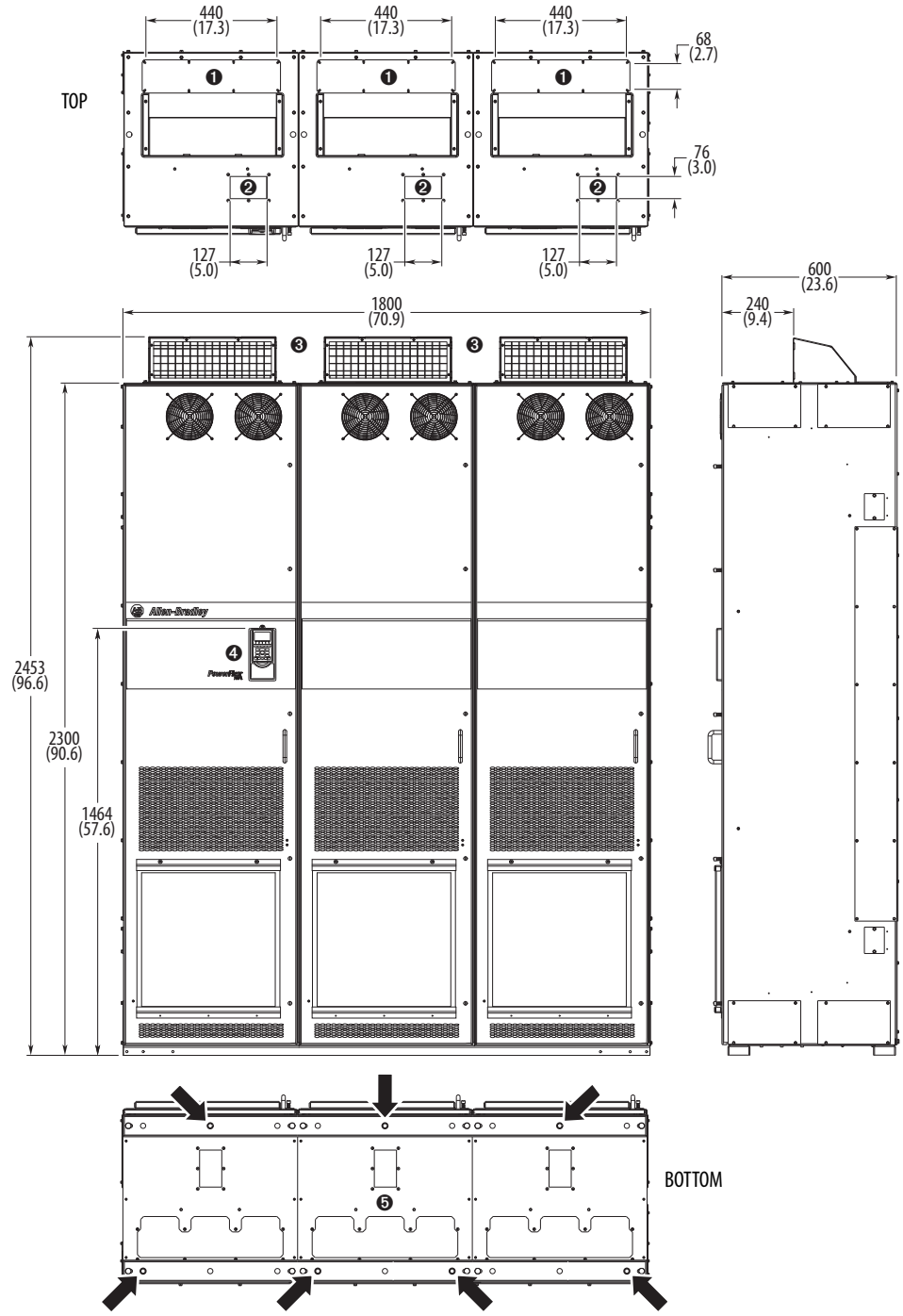
Figure 37 - IP54, NEMA 12, MCC Style Cabinet, Floor Mount Frame 9 *(Enclosure Codes K and Y)*
IP54, UL Type 12, MCC Style Cabinet, Floor Mount Frame 9 *(Enclosure Code J)*



No.	Description
❶	Power wiring conduit plates.
❷	Control wiring conduit plates.
❸	Optional HIM.
❹	Recommended four-hole anchoring.

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 - IP20, NEMA/UL Type 1, MCC Style Cabinet, Floor Mount Frame 10 *(Enclosure Code B)*

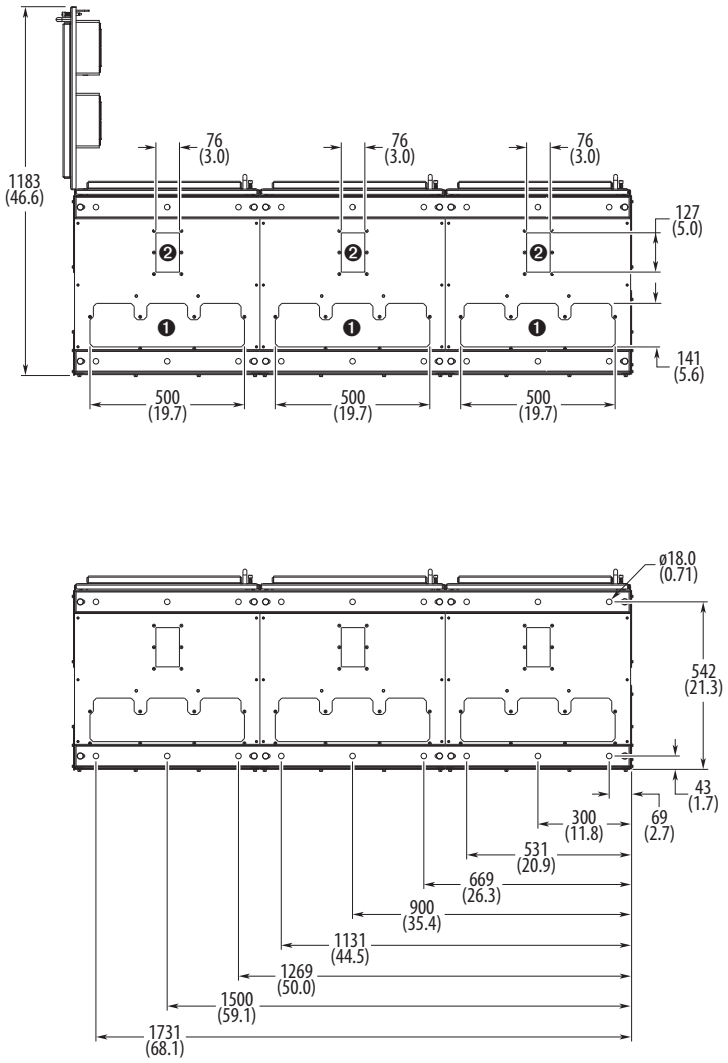


No.	Description
❶	Power wiring conduit plates.
❷	Control wiring conduit plates.
❸	Optional exhaust hood.

No.	Description
❹	Optional HIM.
❺	Recommended seven-hole anchoring.

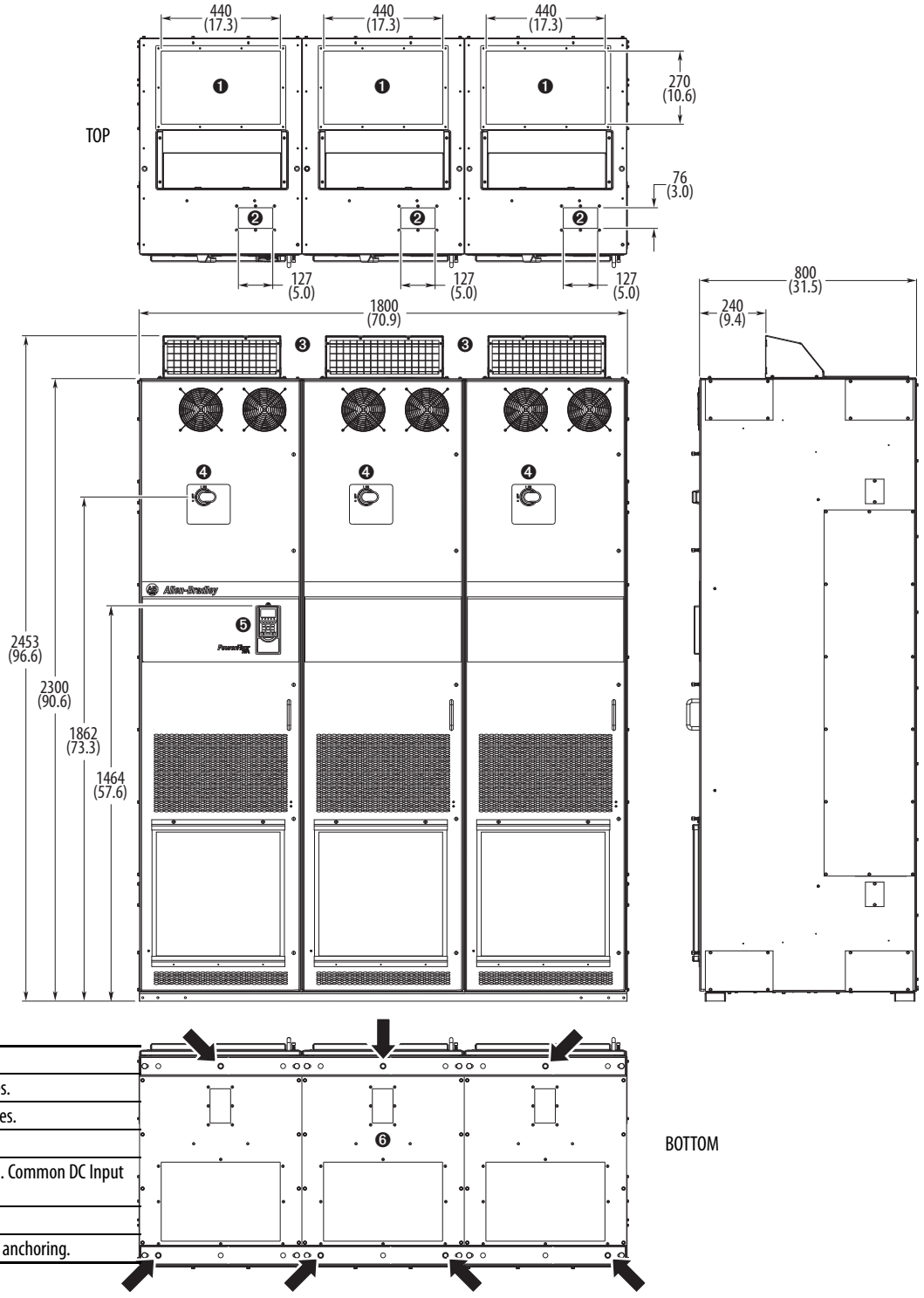
M12 (1/2 in.) Property Class 8.8 anchoring hardware recommended to fasten the drive cabinet through its internal mounting angle to the foundation. Anchor bolts may be pre-located and embedded in the foundation prior to instillation.

Figure 39 - IP20, NEMA/UL Type 1, MCC Style Cabinet, Floor Mount Frame 10 Bottom Access
(Enclosure Code B)



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

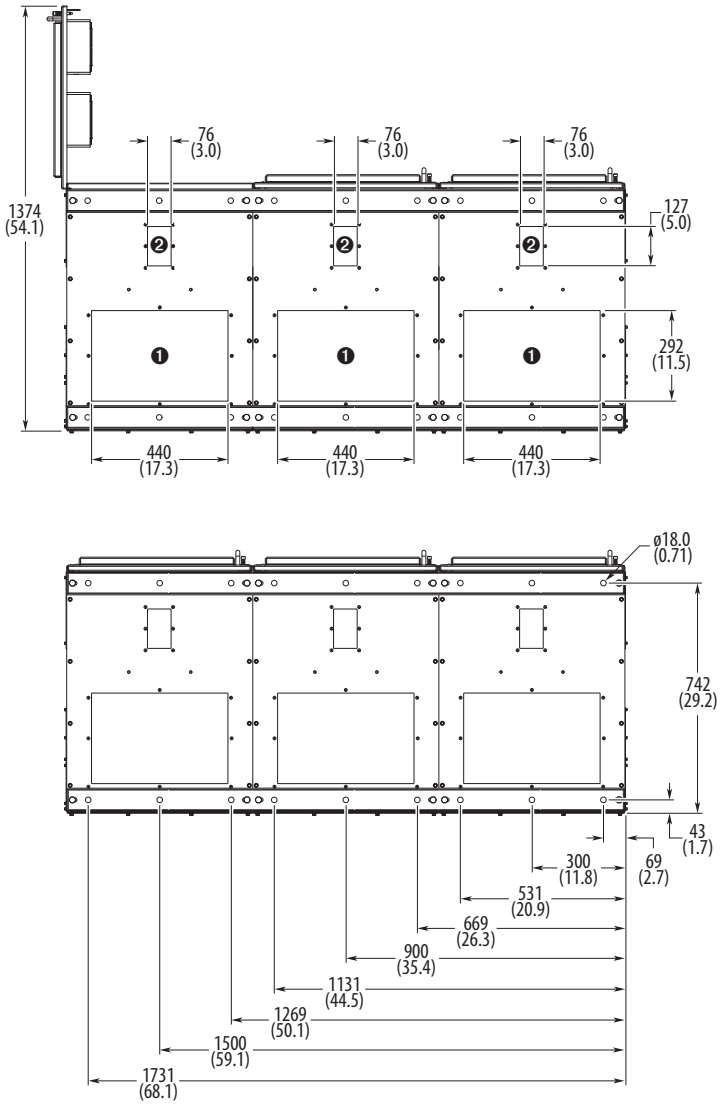
Figure 40 - IP20, NEMA/UL Type 1, MCC Style Cabinet, Floor Mount Frame 10
(Enclosure Codes L, P, W)



No.	Description
❶	Power wiring conduit plates.
❷	Control wiring conduit plates.
❸	Optional exhaust hood.
❹	Disconnect switches (SW2). Common DC Input drives.
❺	Optional HIM.
❻	Recommended seven-hole anchoring.

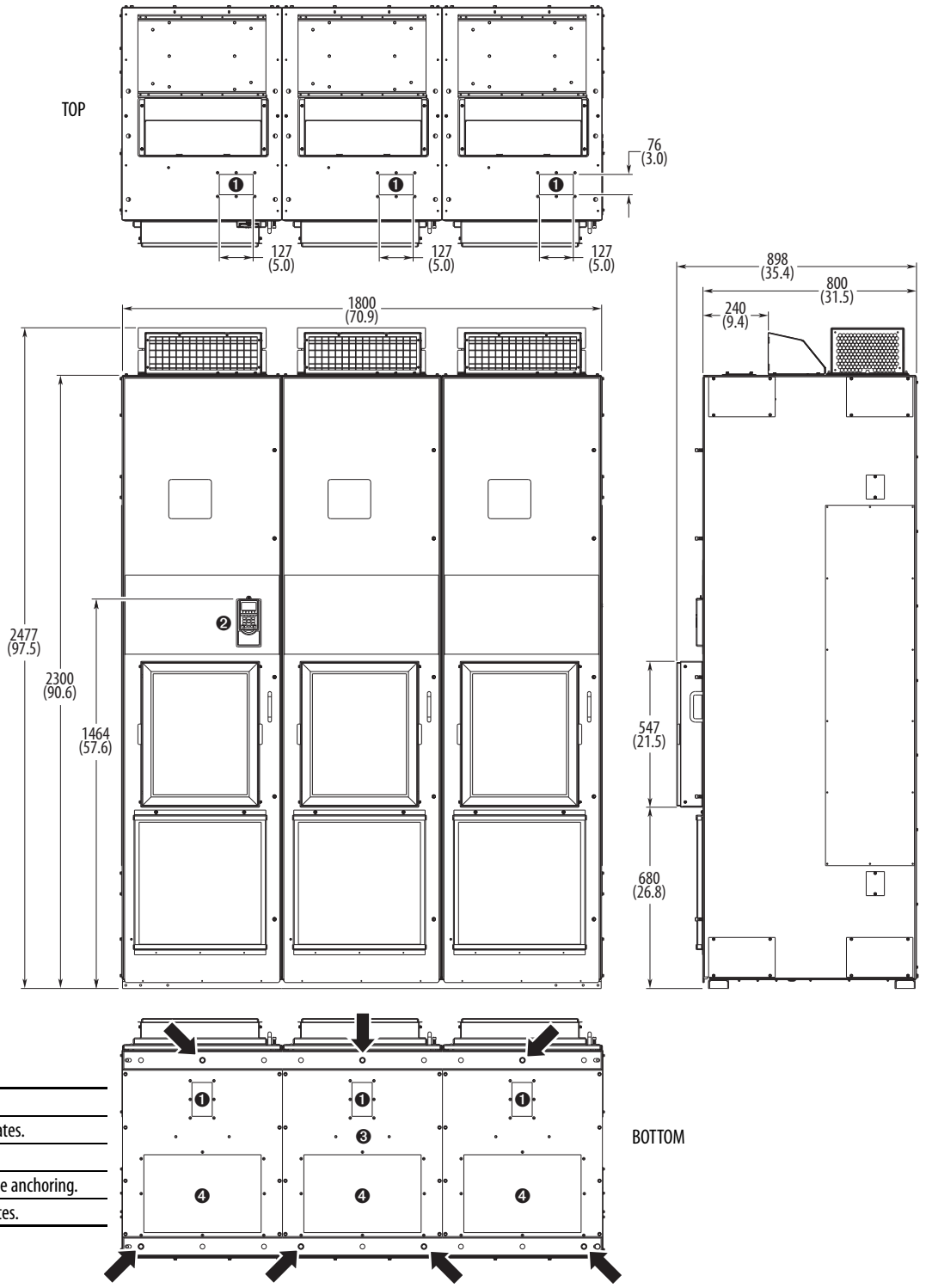
M12 (1/2 in.) Property Class 8.8 anchoring hardware recommended to fasten the drive cabinet through its internal mounting angle to the foundation. Anchor bolts may be pre-located and embedded in the foundation prior to instillation.

Figure 41 - IP20, NEMA/UL Type 1, MCC Style Cabinet, Floor Mount Frame 10 Bottom Access
(Enclosure Codes L, P, W)



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

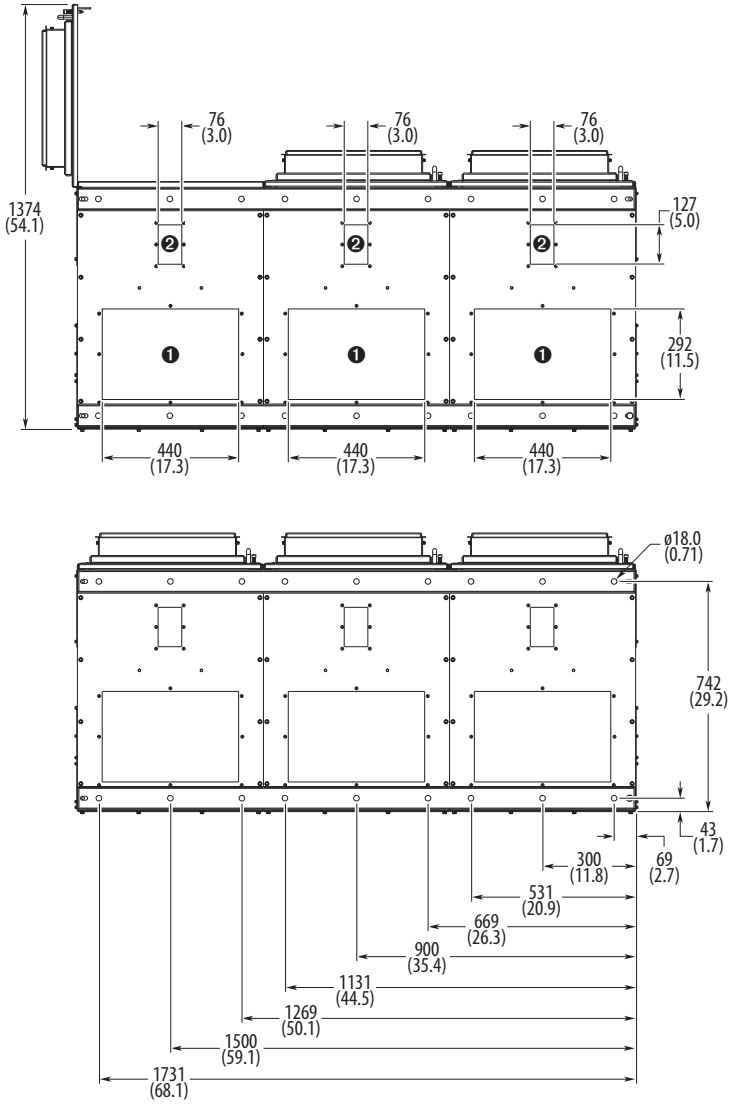
Figure 42 - IP54, NEMA 12, MCC Style Cabinet, Floor Mount Frame 10 *(Enclosure Codes K and Y)*
IP54, UL Type 12, MCC Style Cabinet, Floor Mount Frame 10 *(Enclosure Code J)*



No.	Description
❶	Control wiring conduit plates.
❷	Optional HIM.
❸	Recommended seven-hole anchoring.
❹	Power 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.

Figure 43 - IP54, NEMA 12, MCC Style Cabinet, Floor Mount Frame 10 Bottom Access
(Enclosure Codes K and Y)
IP54, UL Type 12, MCC Style Cabinet, Floor Mount Frame 10 Bottom Access
(Enclosure Code J)

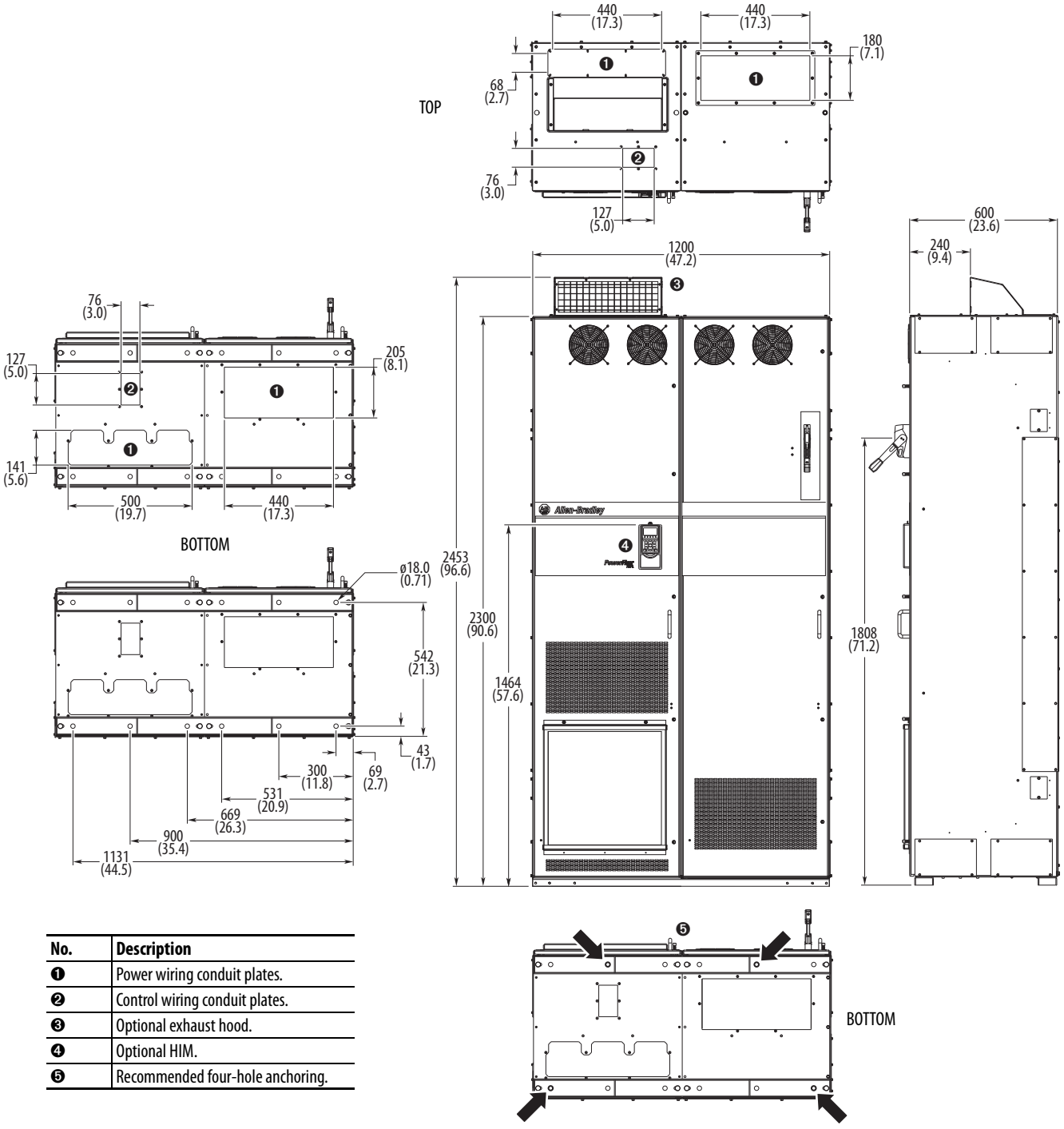


No.	Description
❶	Power wiring conduit plates.
❷	Control wiring conduit plates.

Approximate Dimensions - Floor Mount Drives with Cabinet Options

Table 6 - Dimension Drawing Index

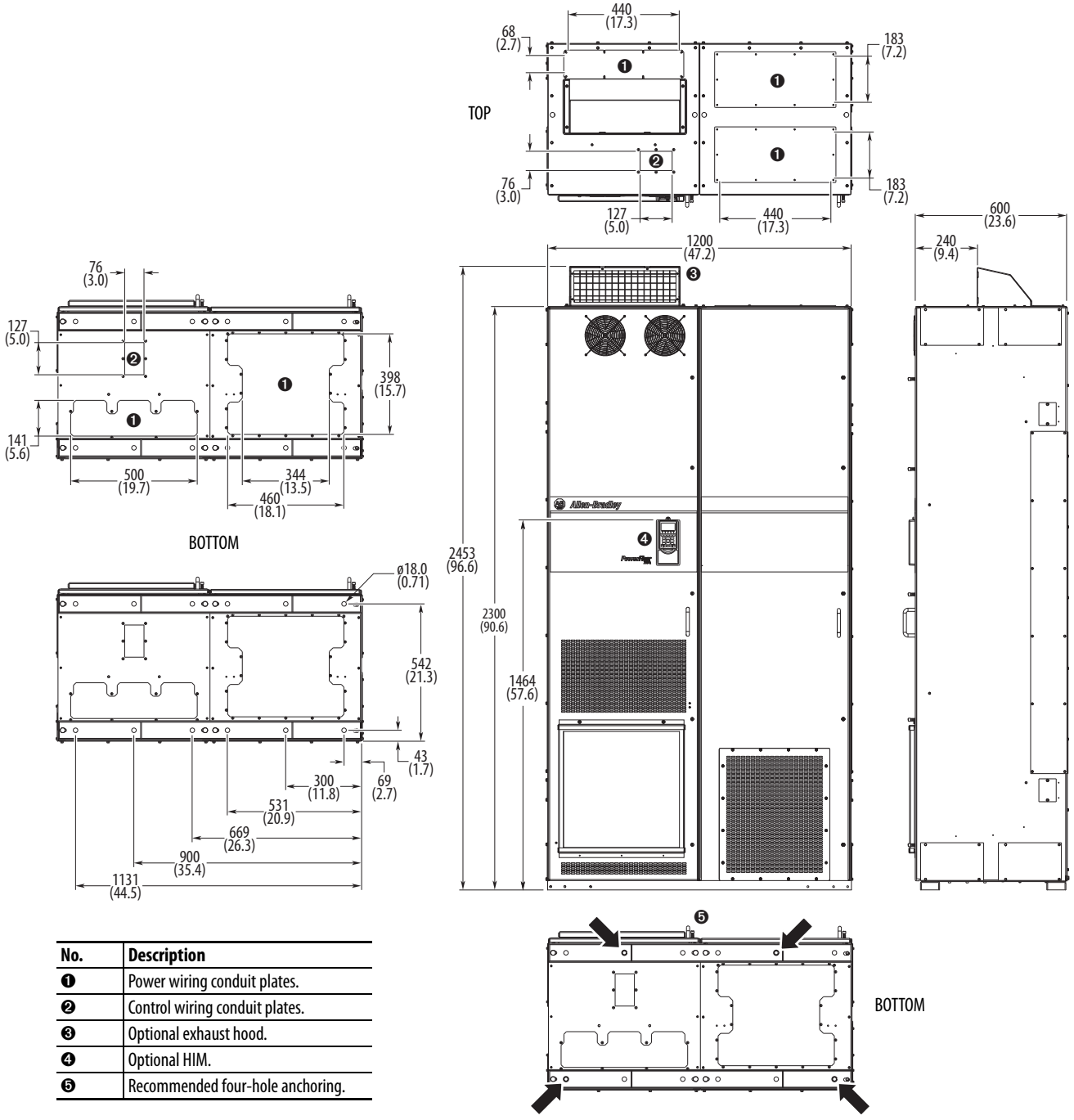
Figure 44 - IP20, NEMA/UL Type 1, MCC Style Cabinet, Floor Mount Frame 8
Enclosure Code B - 600 mm Deep Drive with Cabinet Options Bay.



No.	Description
❶	Power wiring conduit plates.
❷	Control wiring conduit plates.
❸	Optional exhaust hood.
❹	Optional HIM.
❺	Recommended four-hole anchoring.

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.

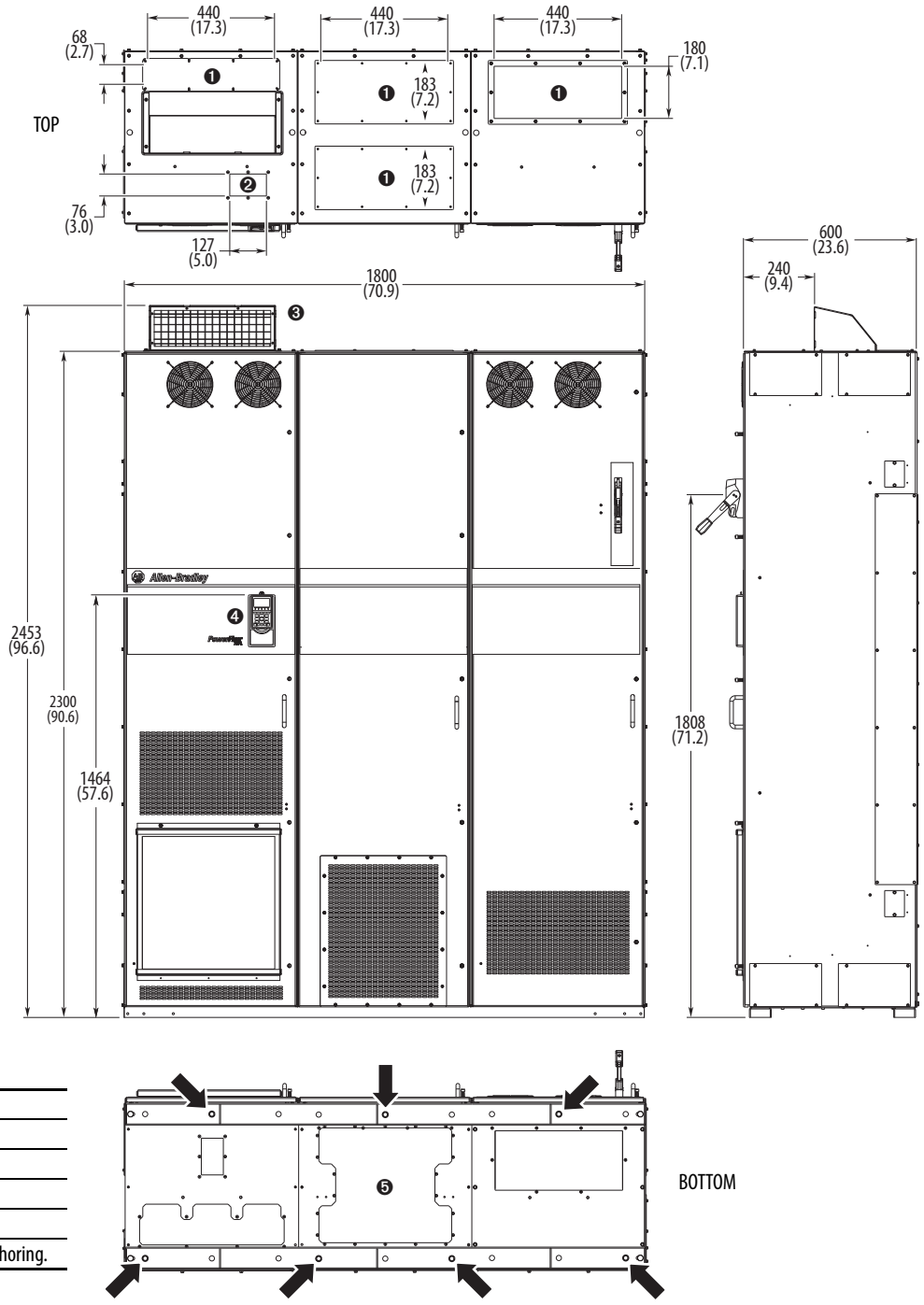
Figure 45 - IP20, NEMA/UL Type 1, MCC Style Cabinet, Floor Mount Frame 8
Enclosure Code B with P14 - 600 mm Deep Drive with Wiring Bay.



No.	Description
❶	Power wiring conduit plates.
❷	Control wiring conduit plates.
❸	Optional exhaust hood.
❹	Optional HIM.
❺	Recommended four-hole anchoring.

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.

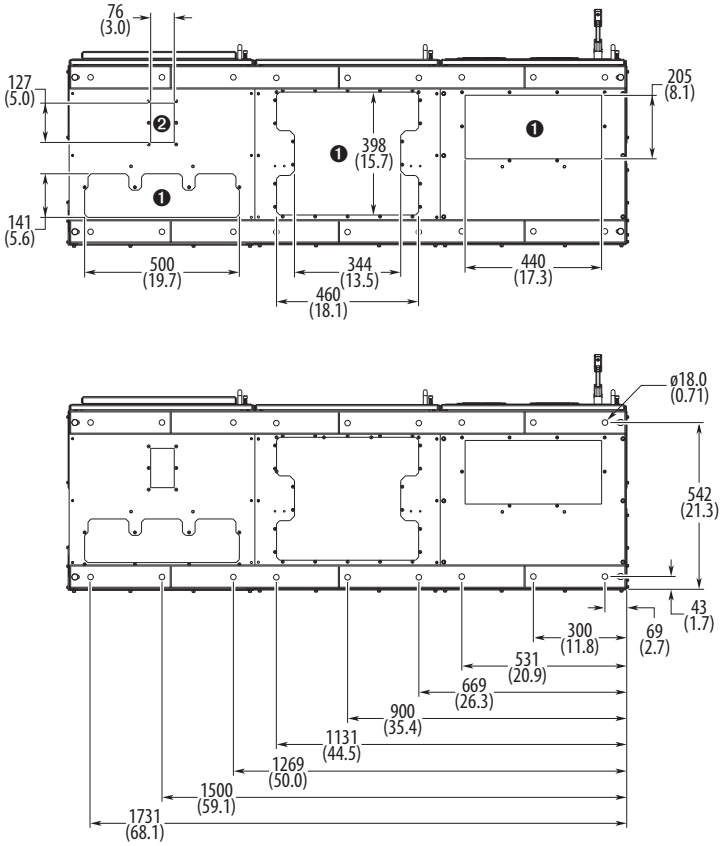
Figure 46 - IP20, NEMA/UL Type 1, MCC Style Cabinet, Floor Mount Frame 8
Enclosure Code B - 600 mm Deep Drive with Wiring Bay and Cabinet Options Bay.



No.	Description
❶	Power wiring conduit plates.
❷	Control wiring conduit plates.
❸	Optional exhaust hood.
❹	Optional HIM.
❺	Recommended seven-hole anchoring.

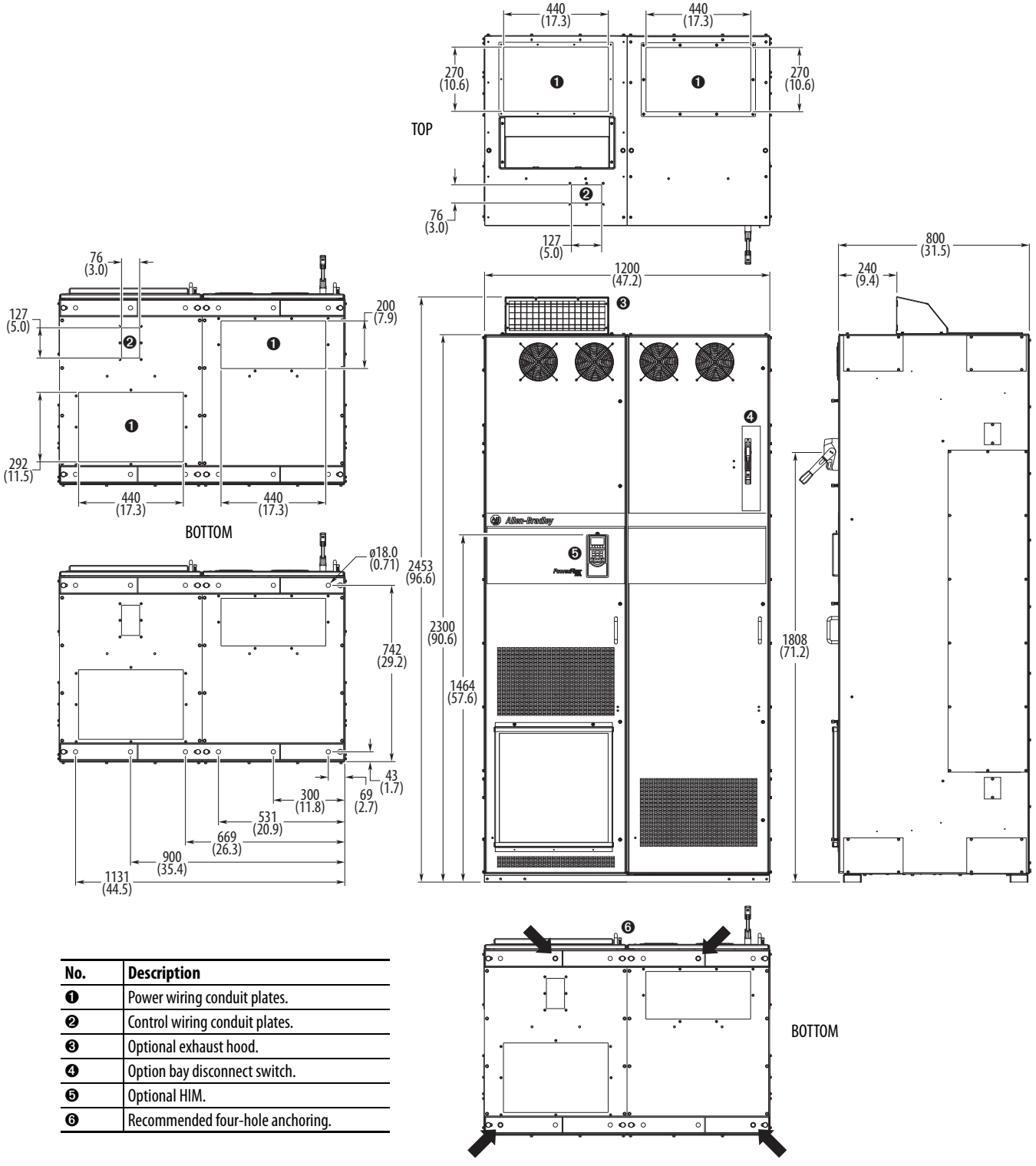
M12 (1/2 in.) Property Class 8.8 anchoring hardware recommended to fasten the drive cabinet through its internal mounting angle to the foundation. Anchor bolts may be pre-located and embedded in the foundation prior to instillation.

Figure 47 - IP20, NEMA/UL Type 1, MCC Style Cabinet, Floor Mount Frame 8 Bottom Access
Enclosure Code B - 600 mm Deep Drive with Wiring Bay and Cabinet Options Bay.



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

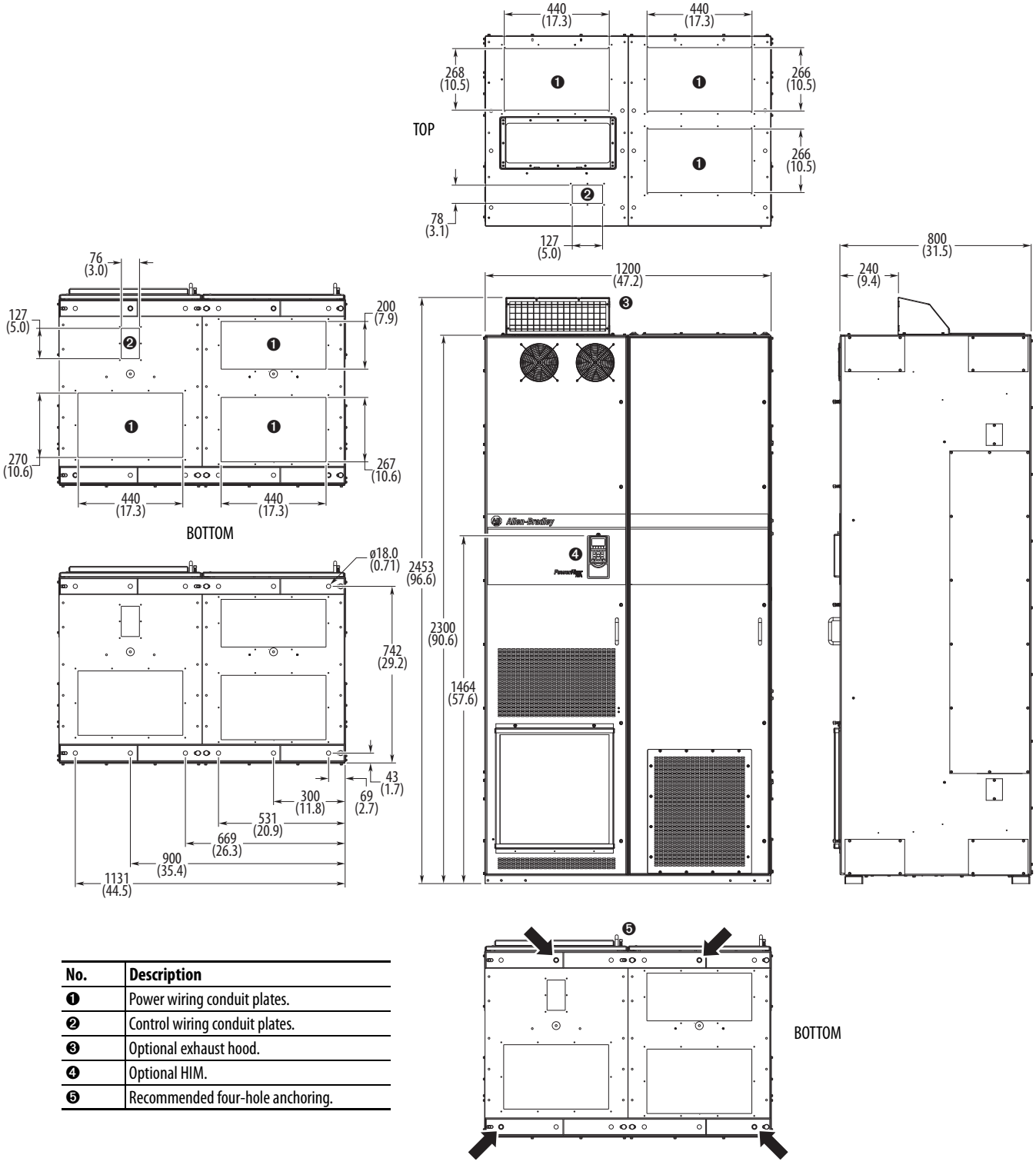
Figure 48 - IP20, NEMA/UL Type 1, MCC Style Cabinet, Floor Mount Frame 8
Enclosure Code L, P, W - 800 mm Deep Drive with Cabinet Options Bay.



No.	Description
❶	Power wiring conduit plates.
❷	Control wiring conduit plates.
❸	Optional exhaust hood.
❹	Option bay disconnect switch.
❺	Optional HIM.
❻	Recommended four-hole anchoring.

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.

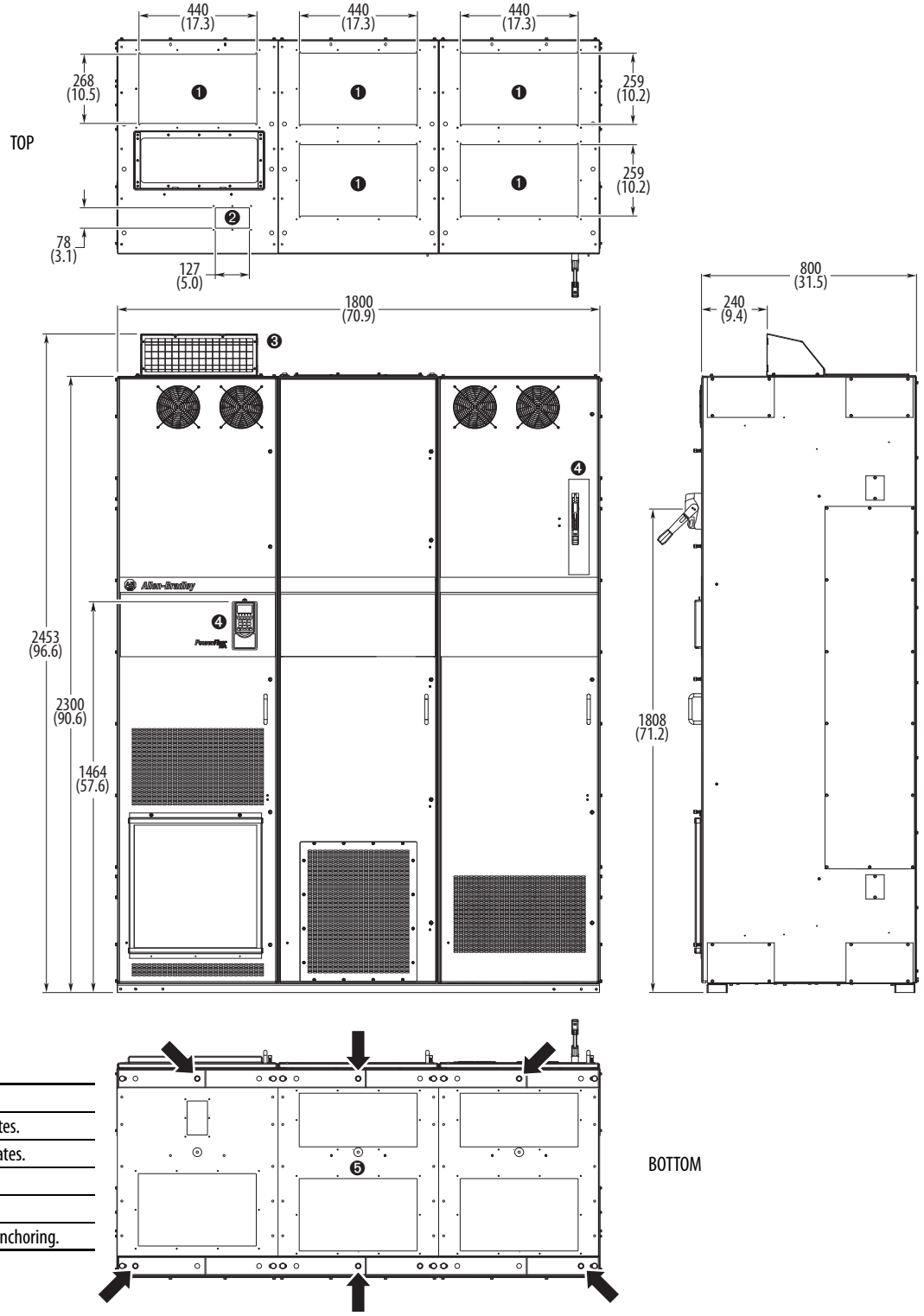
Figure 49 - IP20, NEMA/UL Type 1, MCC Style Cabinet, Floor Mount Frame 8
Enclosure Code L, P, W - 800 mm Deep Drive with Wiring Bay.



No.	Description
❶	Power wiring conduit plates.
❷	Control wiring conduit plates.
❸	Optional exhaust hood.
❹	Optional HIM.
❺	Recommended four-hole anchoring.

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.

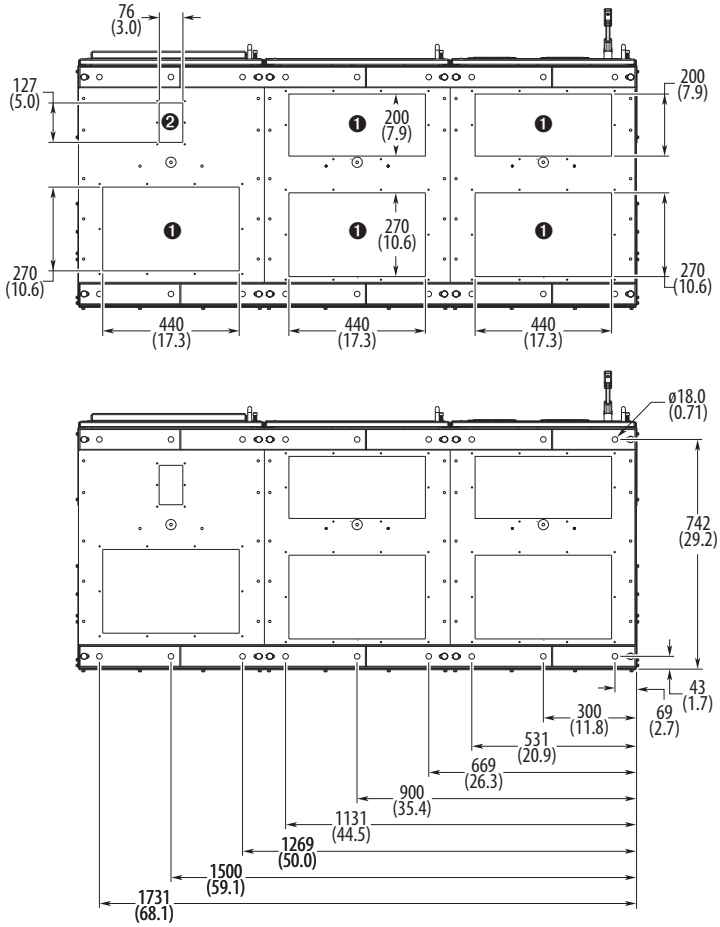
Figure 50 - IP20, NEMA/UL Type 1, MCC Style Cabinet, Floor Mount Frame 8
Enclosure Code L, P, W - 800 mm Deep Drive with Wiring Bay and Cabinet Options Bay.



No.	Description
❶	Power wiring conduit plates.
❷	Control wiring conduit plates.
❸	Optional exhaust hood.
❹	Optional HIM.
❺	Recommended six-hole anchoring.

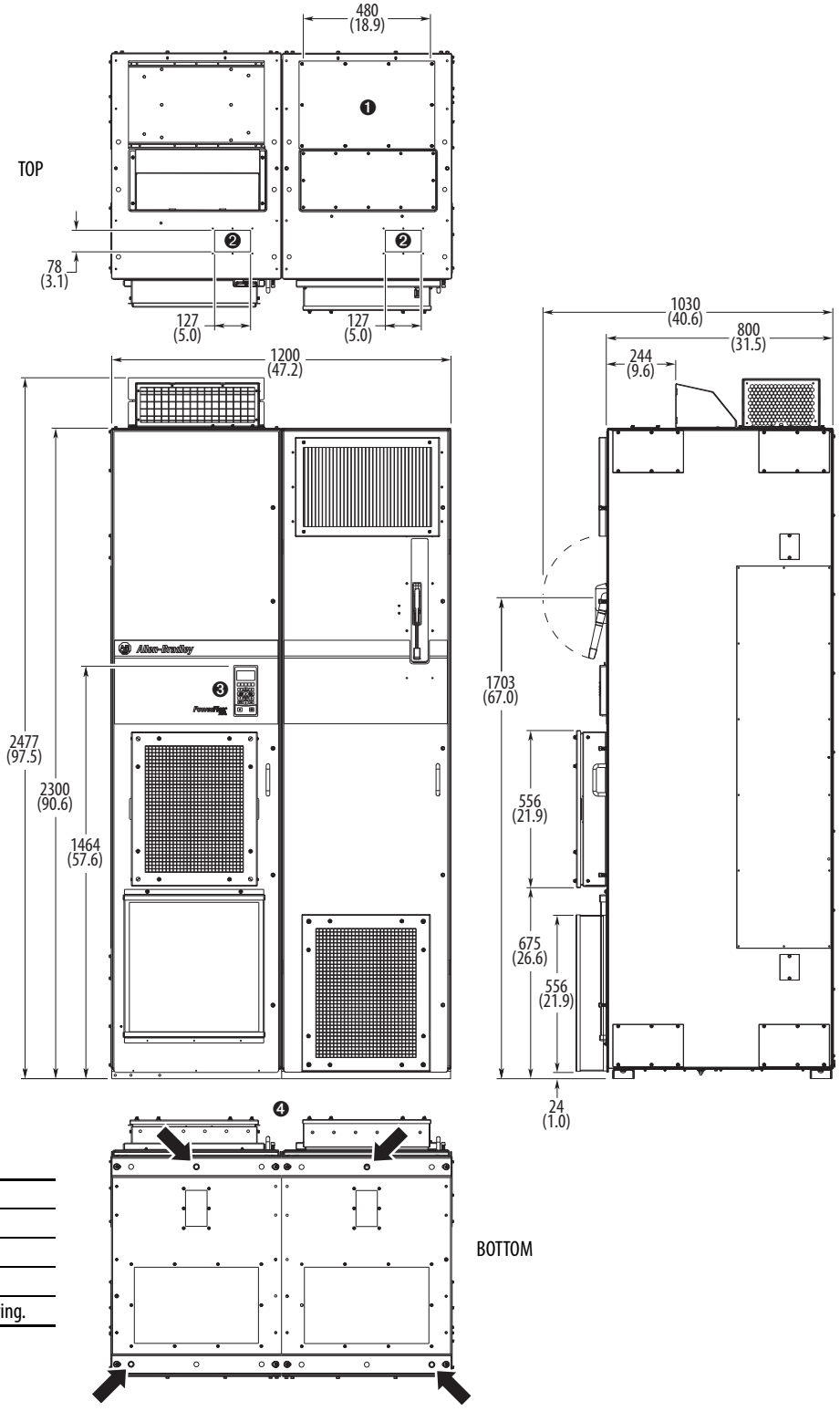
M12 (1/2 in.) Property Class 8.8 anchoring hardware recommended to fasten the drive cabinet through its internal mounting angle to the foundation. Anchor bolts may be pre-located and embedded in the foundation prior to instillation.

Figure 51 - IP20, NEMA/UL Type 1, MCC Style Cabinet, Floor Mount Frame 8 Bottom Access
Enclosure Code L, P, W - 800 mm Deep Drive with Wiring Bay and Cabinet Options Bay.



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

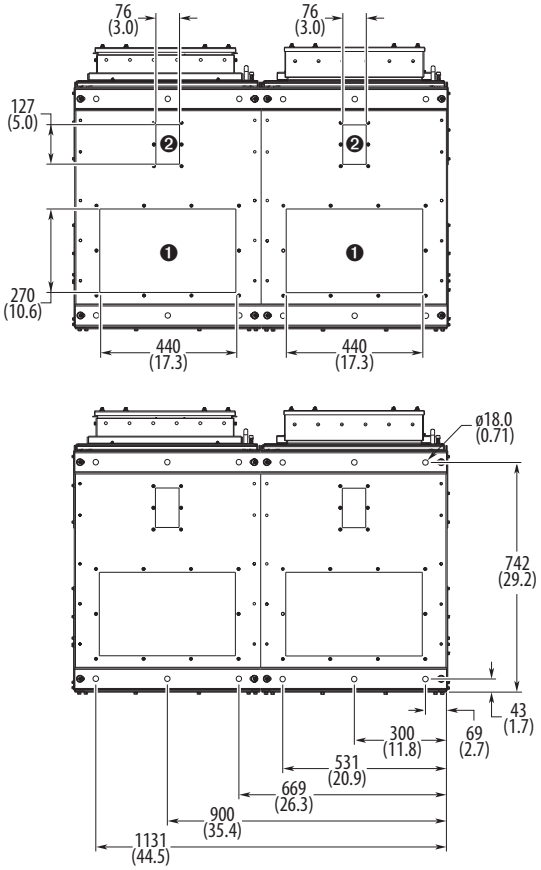
Figure 52 - IP54, NEMA 12, MCC Style Cabinet, Floor Mount Frame 8 *(Enclosure Codes K and Y)*
IP54, UL Type 12, MCC Style Cabinet, Floor Mount Frame 8 *(Enclosure Code J)*
800 mm Deep Drive with Cabinet Options Bay.



No.	Description
❶	Power wiring conduit plates.
❷	Control wiring conduit plates.
❸	Optional HIM.
❹	Recommended four-hole anchoring.

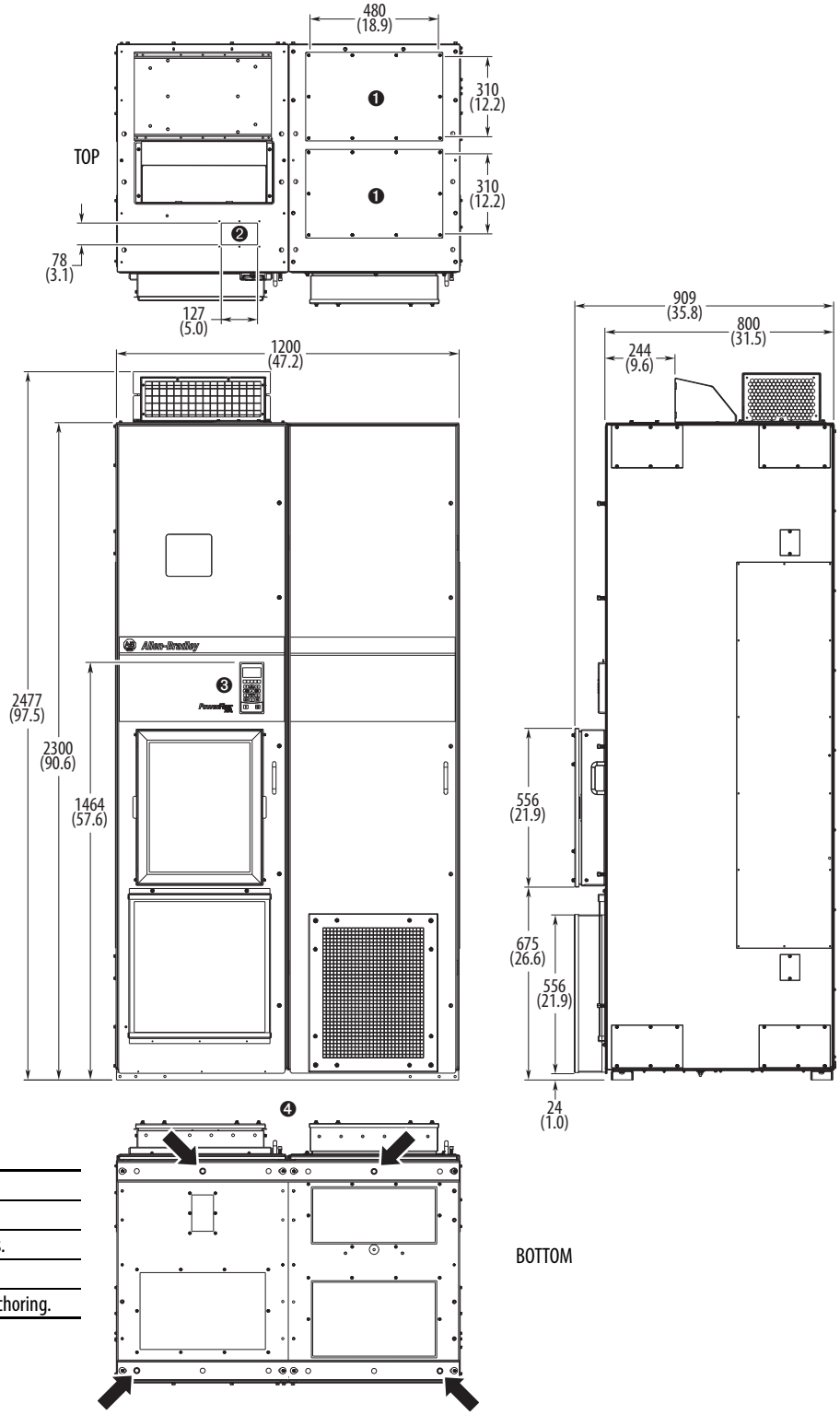
M12 (1/2 in.) Property Class 8.8 anchoring hardware recommended to fasten the drive cabinet through its internal mounting angle to the foundation. Anchor bolts may be pre-located and embedded in the foundation prior to instillation.

Figure 53 - IP54, NEMA 12, MCC Style Cabinet, Floor Mount Frame 8 Bottom Access
(Enclosure Codes K and Y)
IP54, UL Type 12, MCC Style Cabinet, Floor Mount Frame 8 Bottom Access
(Enclosure Code J)
800 mm Deep Drive with Cabinet Options Bay.



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

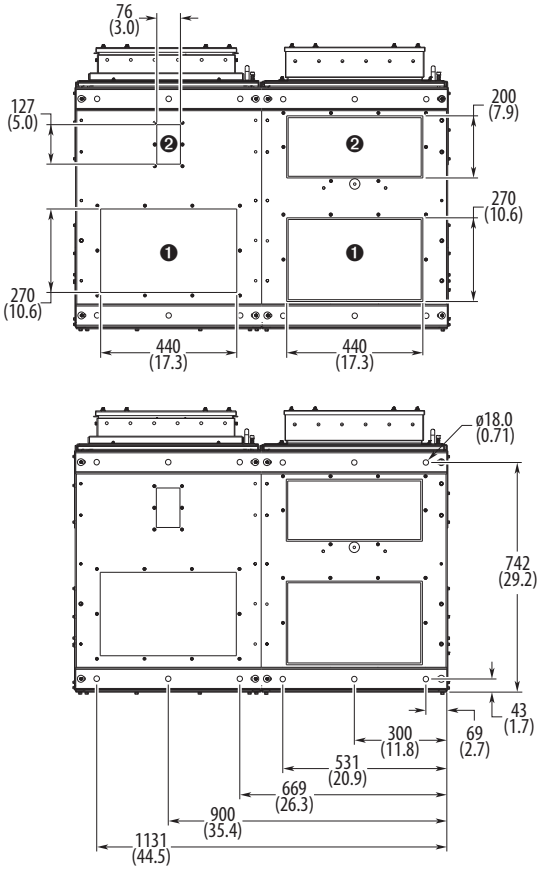
Figure 54 - IP54, NEMA 12, MCC Style Cabinet, Floor Mount Frame 8 *(Enclosure Codes K and Y)*
IP54, UL Type 12, MCC Style Cabinet, Floor Mount Frame 8 *(Enclosure Code J)*
With P14 - 800 mm Deep Drive with Wiring Bay.



No.	Description
❶	Power wiring conduit plates.
❷	Control wiring conduit plates.
❸	Optional HIM.
❹	Recommended four-hole anchoring.

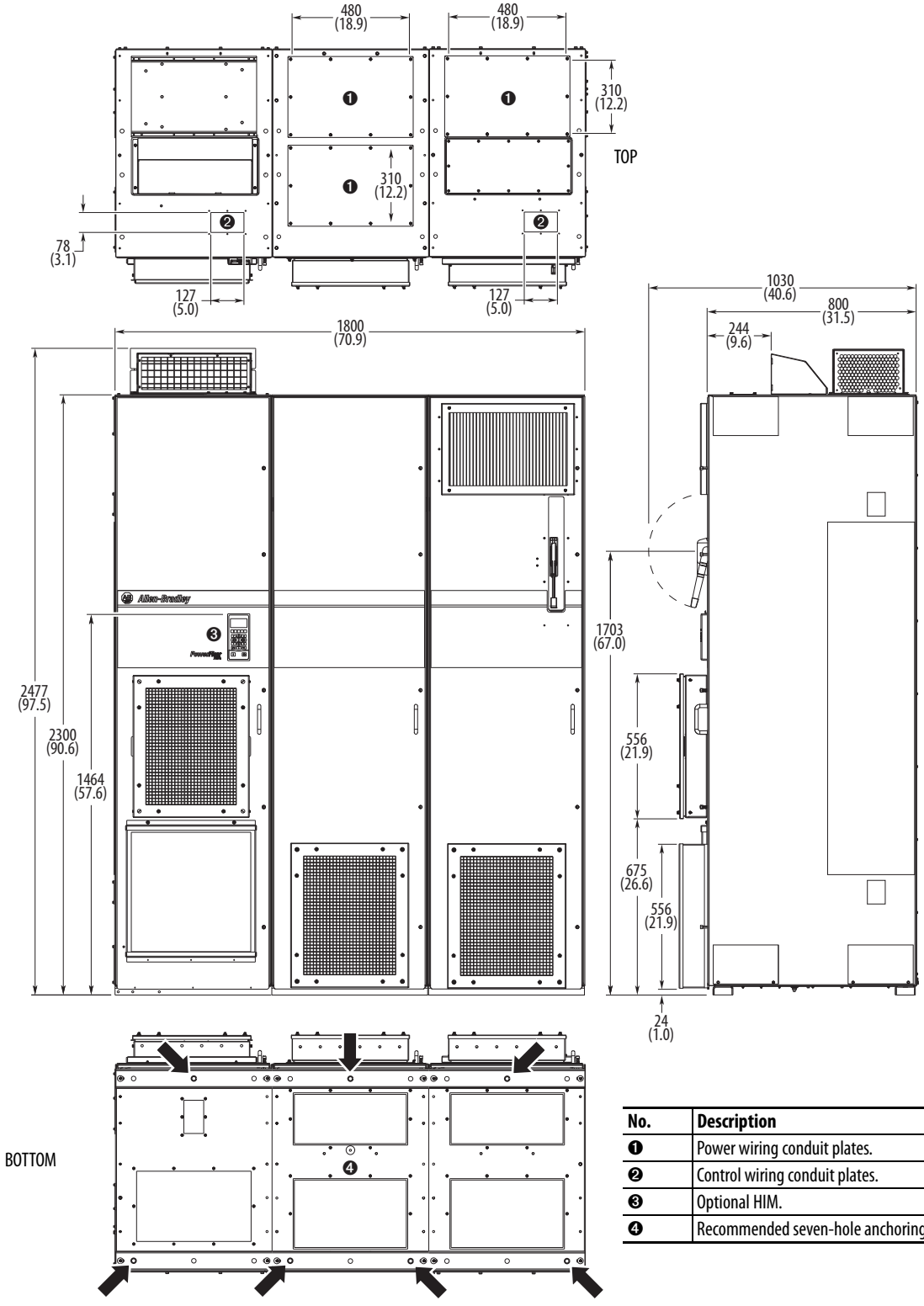
M12 (1/2 in.) Property Class 8.8 anchoring hardware recommended to fasten the drive cabinet through its internal mounting angle to the foundation. Anchor bolts may be pre-located and embedded in the foundation prior to instillation.

Figure 55 - IP54, NEMA 12, MCC Style Cabinet, Floor Mount Frame 8 Bottom Access
(Enclosure Codes K and Y)
IP54, UL Type 12, MCC Style Cabinet, Floor Mount Frame 8 Bottom Access
(Enclosure Code J)
With P14 - 800 mm Deep Drive with Wiring Bay.



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

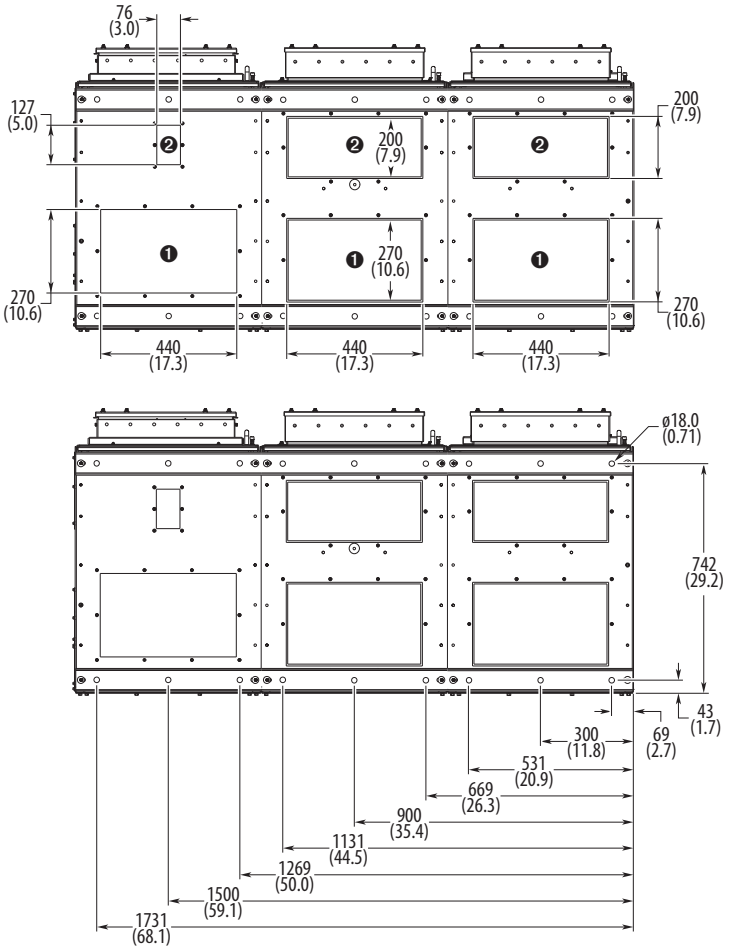
Figure 56 - IP54, NEMA 12, MCC Style Cabinet, Floor Mount Frame 8 *(Enclosure Codes K and Y)*
IP54, UL Type 12, MCC Style Cabinet, Floor Mount Frame 8 *(Enclosure Code J)*
800 mm Deep Drive with Wiring Bay and Cabinet Options Bay.



No.	Description
❶	Power wiring conduit plates.
❷	Control wiring conduit plates.
❸	Optional HIM.
❹	Recommended seven-hole anchoring.

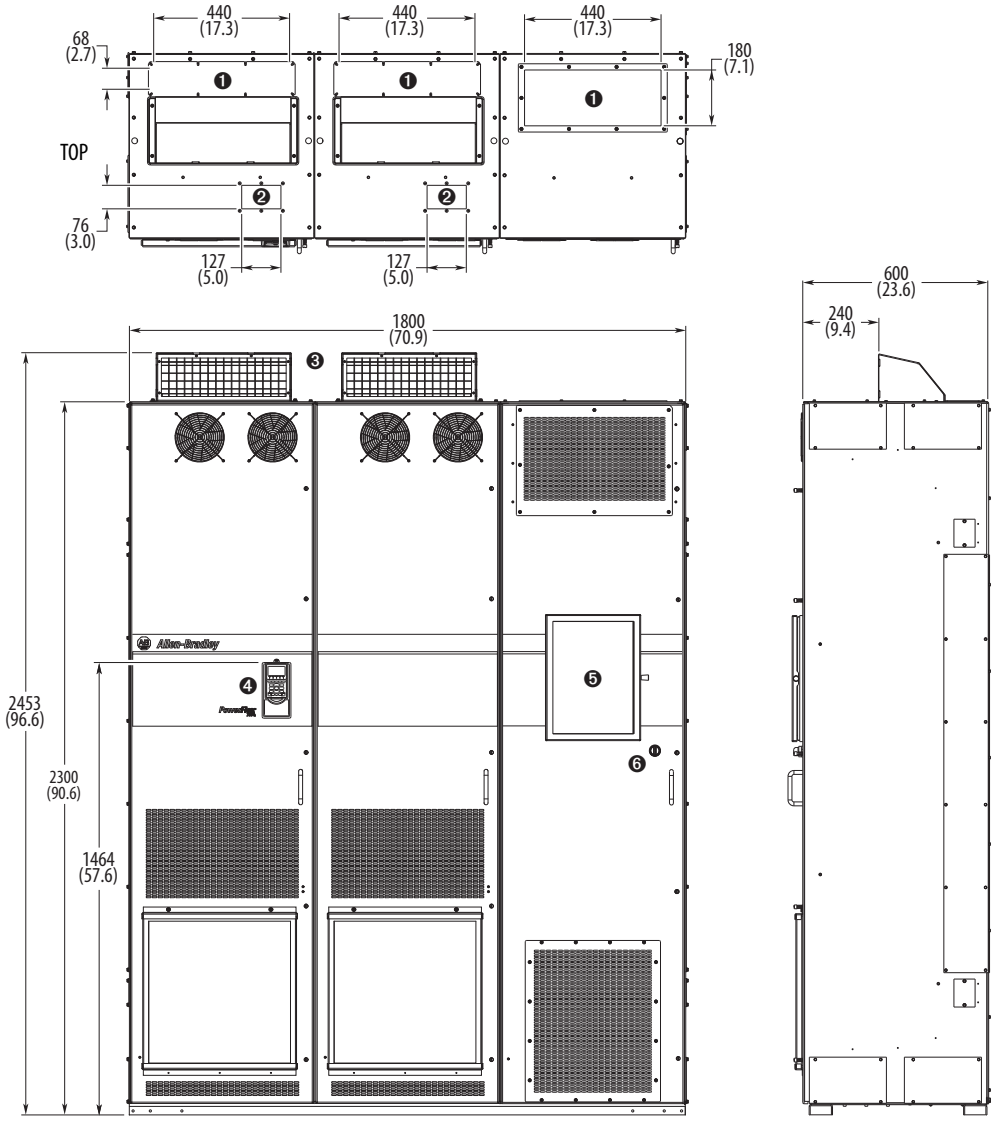
M12 (1/2 in.) Property Class 8.8 anchoring hardware recommended to fasten the drive cabinet through its internal mounting angle to the foundation. Anchor bolts may be pre-located and embedded in the foundation prior to instillation.

Figure 57 - IP54, NEMA 12, MCC Style Cabinet, Floor Mount Frame 8 Bottom Access
(Enclosure Codes K and Y)
IP54, UL Type 12, MCC Style Cabinet, Floor mount Frame 8 Bottom Access
(Enclosure Code J)
800 mm Deep Drive with Wiring Bay and Cabinet Options Bay.

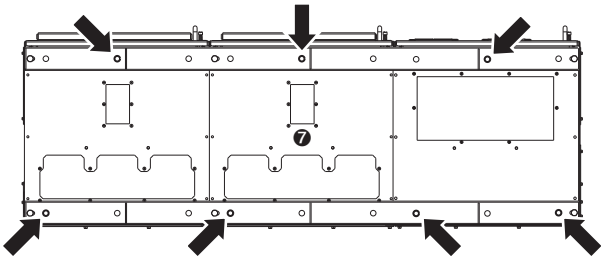


No.	Description
❶	Power wiring conduit plates.
❷	Control wiring conduit plates.

Figure 58 - IP20, NEMA/UL Type 1, MCC Style Cabinet, Floor Mount Frame 9
Enclosure Code B with P14 - 600 mm Deep Drive with Cabinet Options Bay.

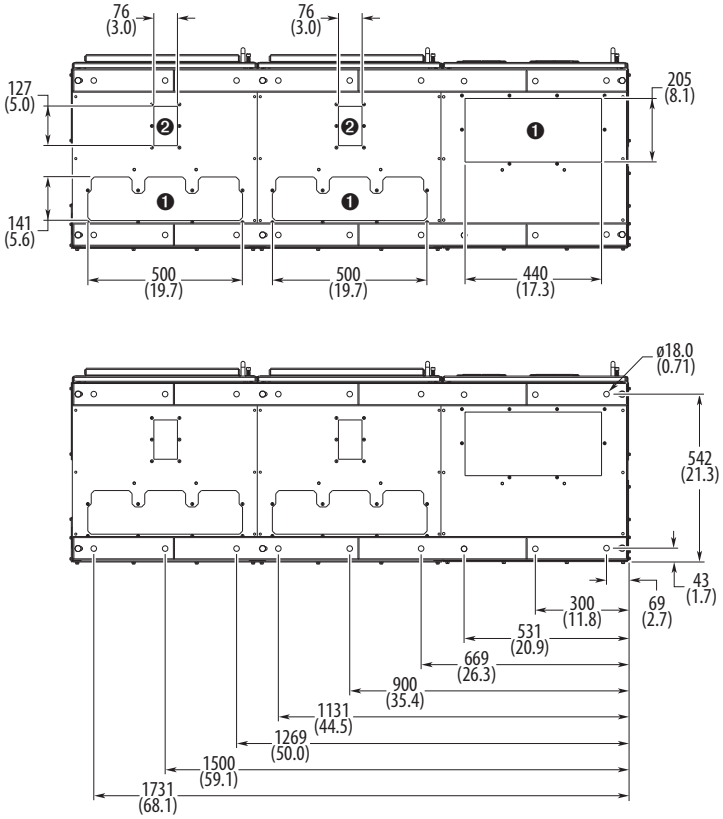


No.	Description
❶	Power wiring conduit plates.
❷	Control wiring conduit plates.
❸	Optional exhaust hood.
❹	Optional HIM.
❺	Option bay disconnect switch access door..
❻	Interlock override switch. For instructions and precautions refer to the Hardware Service Manual, 750-TG001.
❼	Recommended seven-hole anchoring.



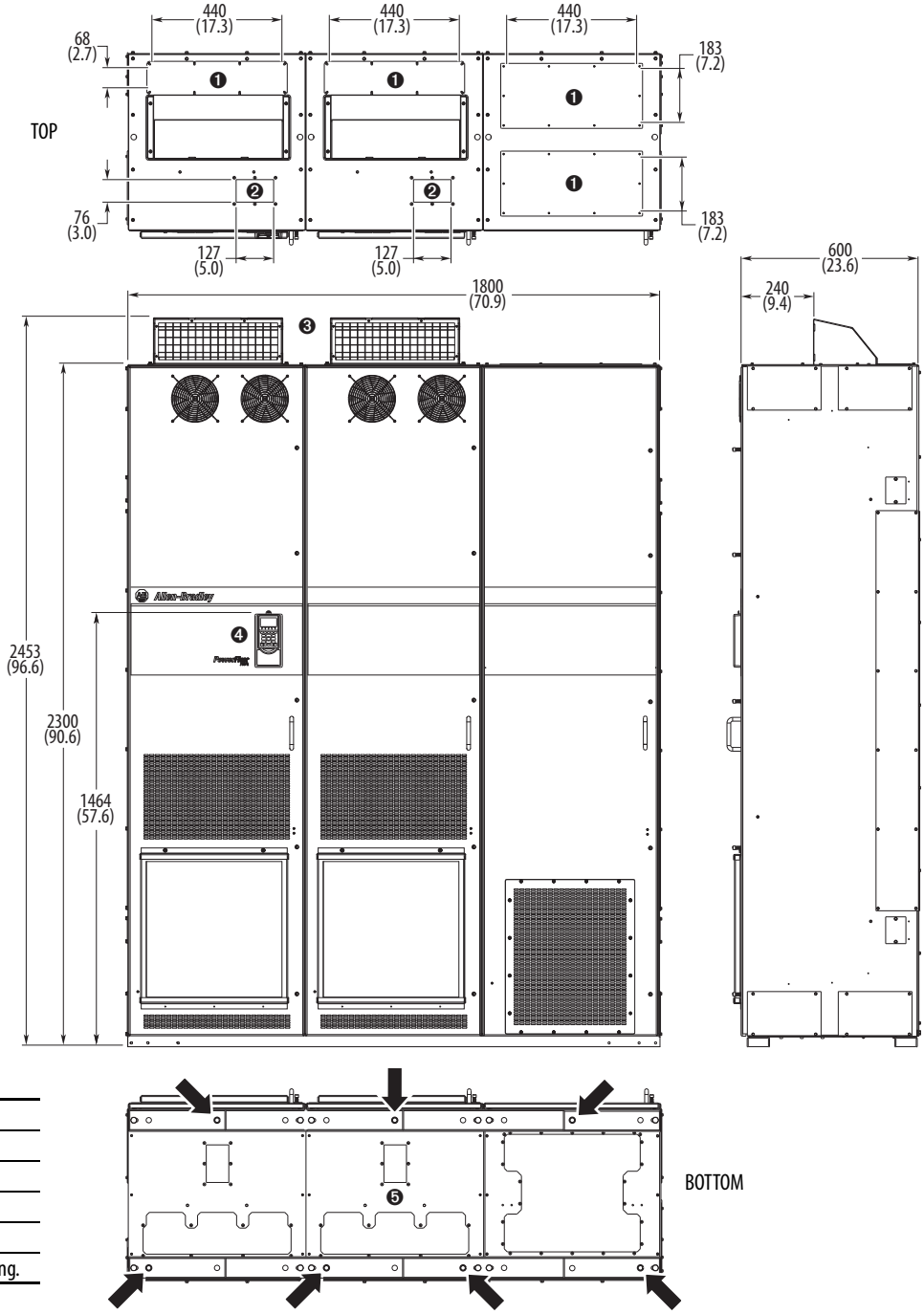
M12 (1/2 in.) Property Class 8.8 anchoring hardware recommended to fasten the drive cabinet through its internal mounting angle to the foundation. Anchor bolts may be pre-located and embedded in the foundation prior to instillation.

Figure 59 - IP20, NEMA/UL Type 1, MCC Style Cabinet, Floor Mount Frame 9 Bottom Access
Enclosure Code B with P14 - 600 mm Deep Drive with Cabinet Options Bay.



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

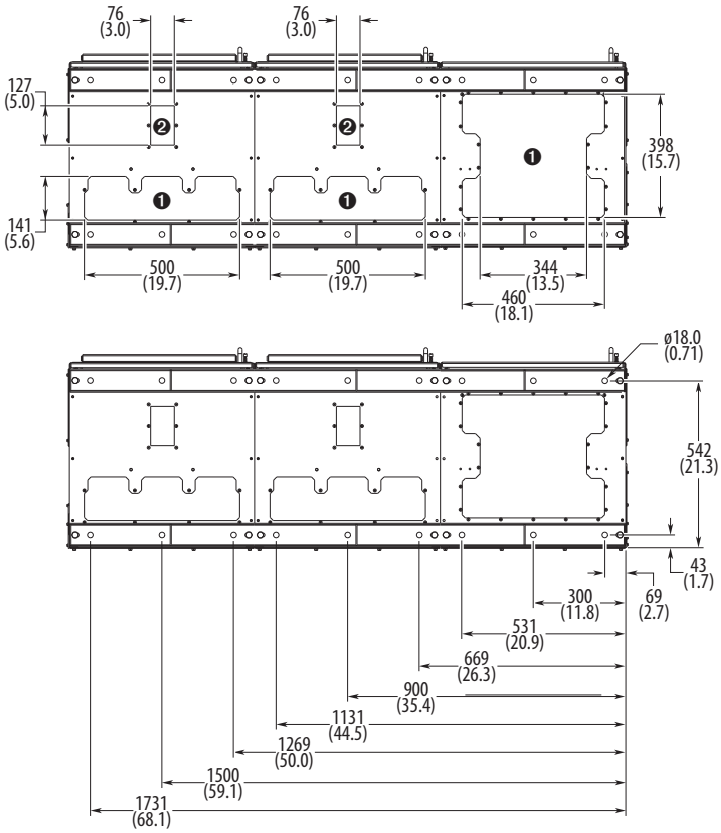
Figure 60 - IP20, NEMA/UL Type 1, MCC Style Cabinet, Floor Mount Frame 9
Enclosure Code B with P14 - 600 mm Deep Drive with Wiring Bay.



No.	Description
❶	Power wiring conduit plates.
❷	Control wiring conduit plates.
❸	Optional exhaust hood.
❹	Optional HIM.
❺	Recommended seven-hole anchoring.

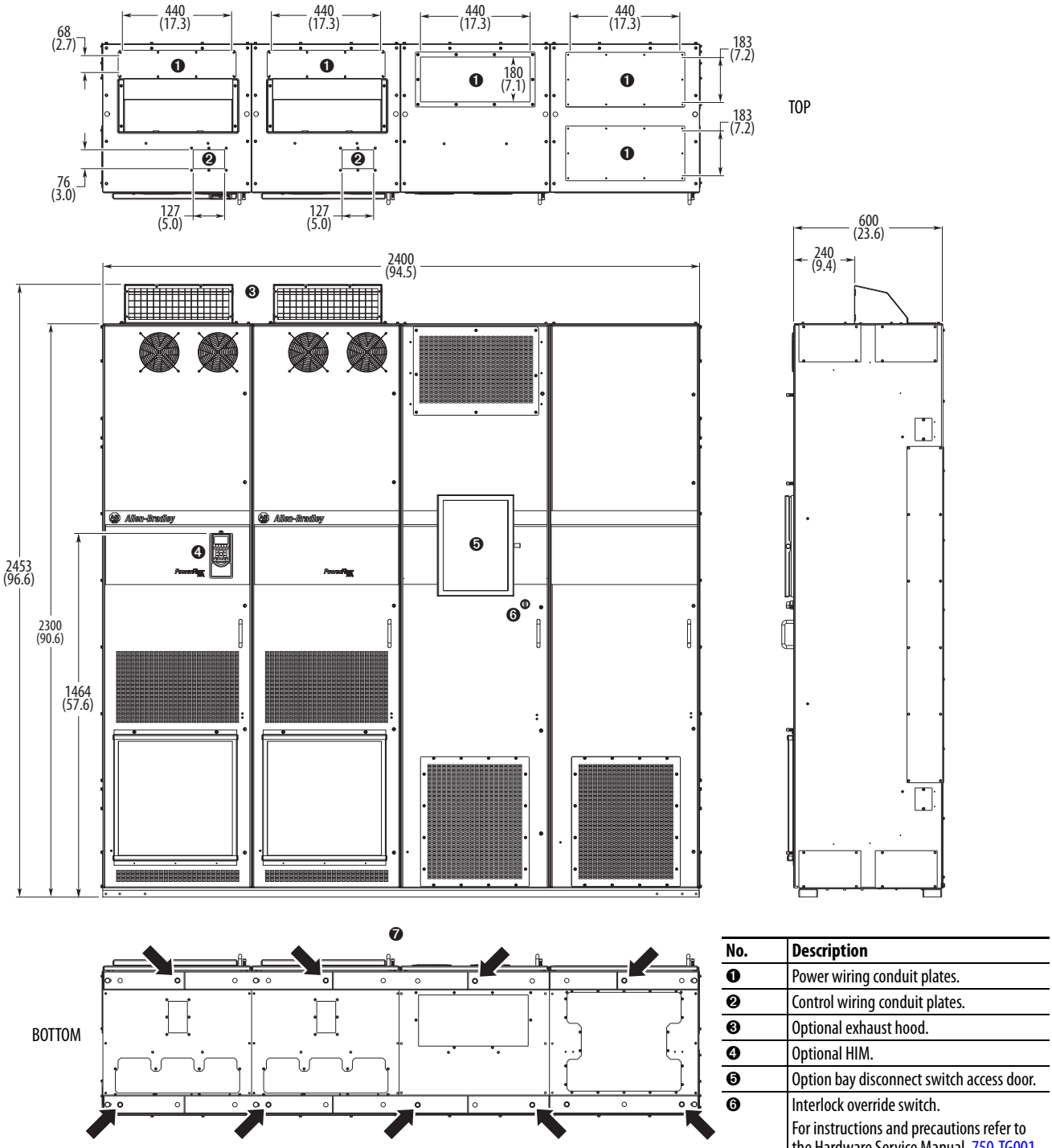
M12 (1/2 in.) Property Class 8.8 anchoring hardware recommended to fasten the drive cabinet through its internal mounting angle to the foundation. Anchor bolts may be pre-located and embedded in the foundation prior to instillation.

Figure 61 - IP20, NEMA/UL Type 1, MCC Style Cabinet, Floor Mount Frame 9 Bottom Access
Enclosure Code B with P14 - 600 mm Deep Drive with Wiring Bay.



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

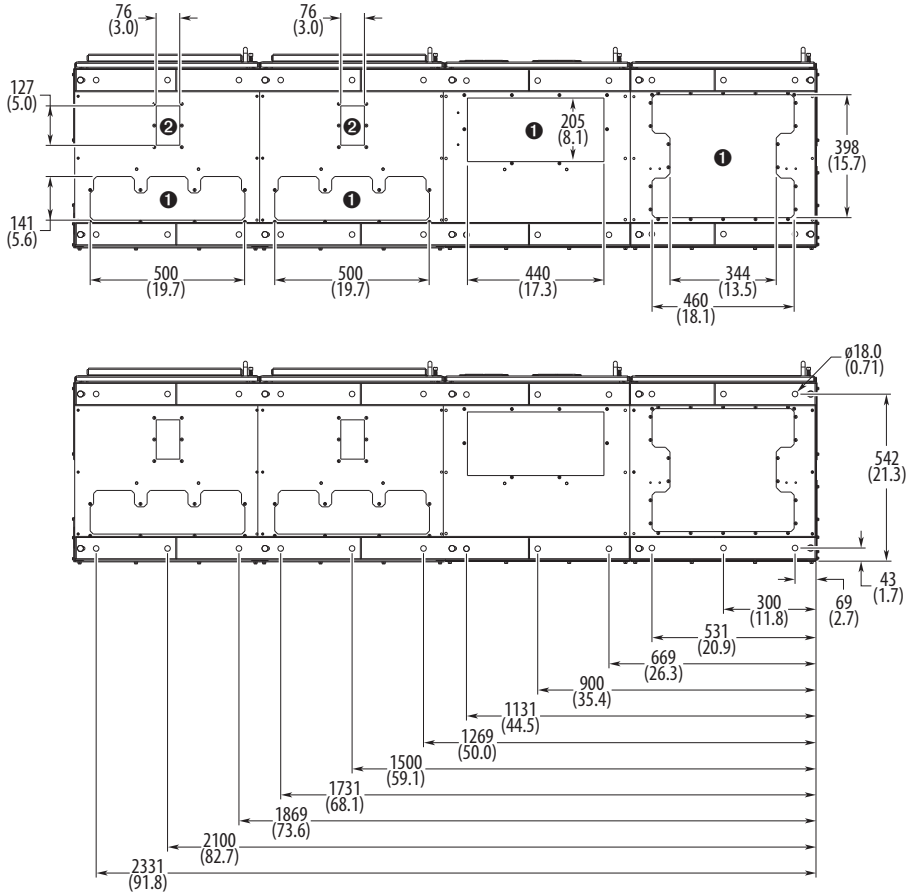
Figure 62 - IP20, NEMA/UL Type 1, MCC Style Cabinet, Floor Mount Frame 9
Enclosure Code B - 600 mm Deep Drive with Cabinet Options Bay and Wiring Bay.



No.	Description
❶	Power wiring conduit plates.
❷	Control wiring conduit plates.
❸	Optional exhaust hood.
❹	Optional HIM.
❺	Option bay disconnect switch access door.
❻	Interlock override switch. For instructions and precautions refer to the Hardware Service Manual, 750-TG001.
❼	Recommended nine-hole anchoring.

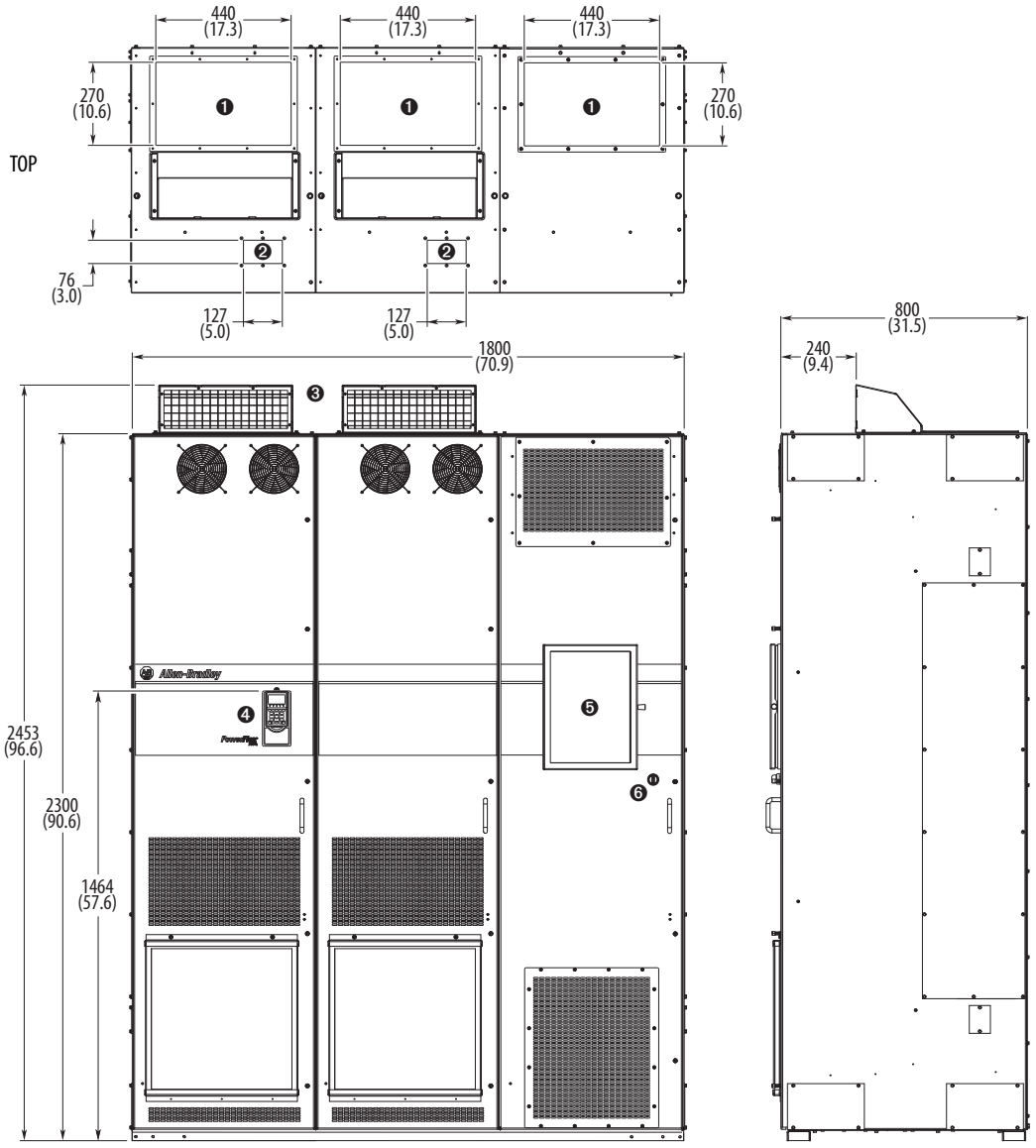
M12 (1/2 in.) Property Class 8.8 anchoring hardware recommended to fasten the drive cabinet through its internal mounting angle to the foundation. Anchor bolts may be pre-located and embedded in the foundation prior to instillation.

Figure 63 - IP20, NEMA/UL Type 1, MCC Style Cabinet, Floor Mount Frame 9 Bottom Access
Enclosure Code B - 600 mm Deep Drive with Cabinet Options Bay and Wiring Bay.



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

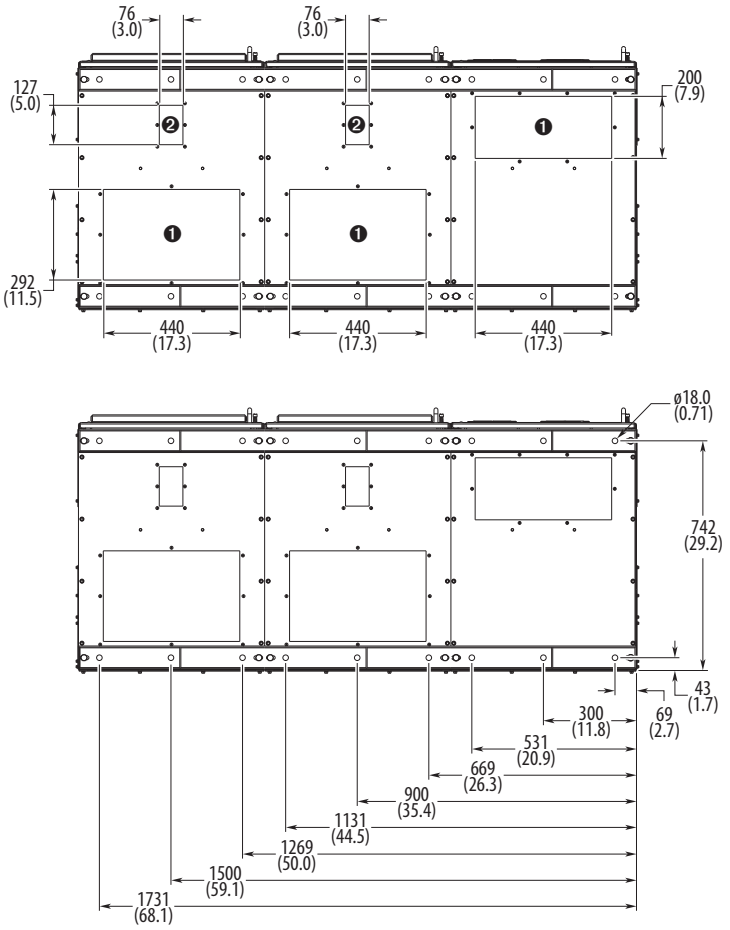
Figure 64 - IP20, NEMA/UL Type 1, MCC Style Cabinet, Floor Mount Frame 9
Enclosure Code L, P, W - 800 mm Deep Drive with Cabinet Options Bay.



No.	Description
❶	Power wiring conduit plates.
❷	Control wiring conduit plates.
❸	Optional exhaust hood.
❹	Optional HIM.
❺	Option bay disconnect switch access door.
❻	Interlock override switch. For instructions and precautions refer to the Hardware Service Manual, 750-TG001.
❼	Recommended seven-hole anchoring.

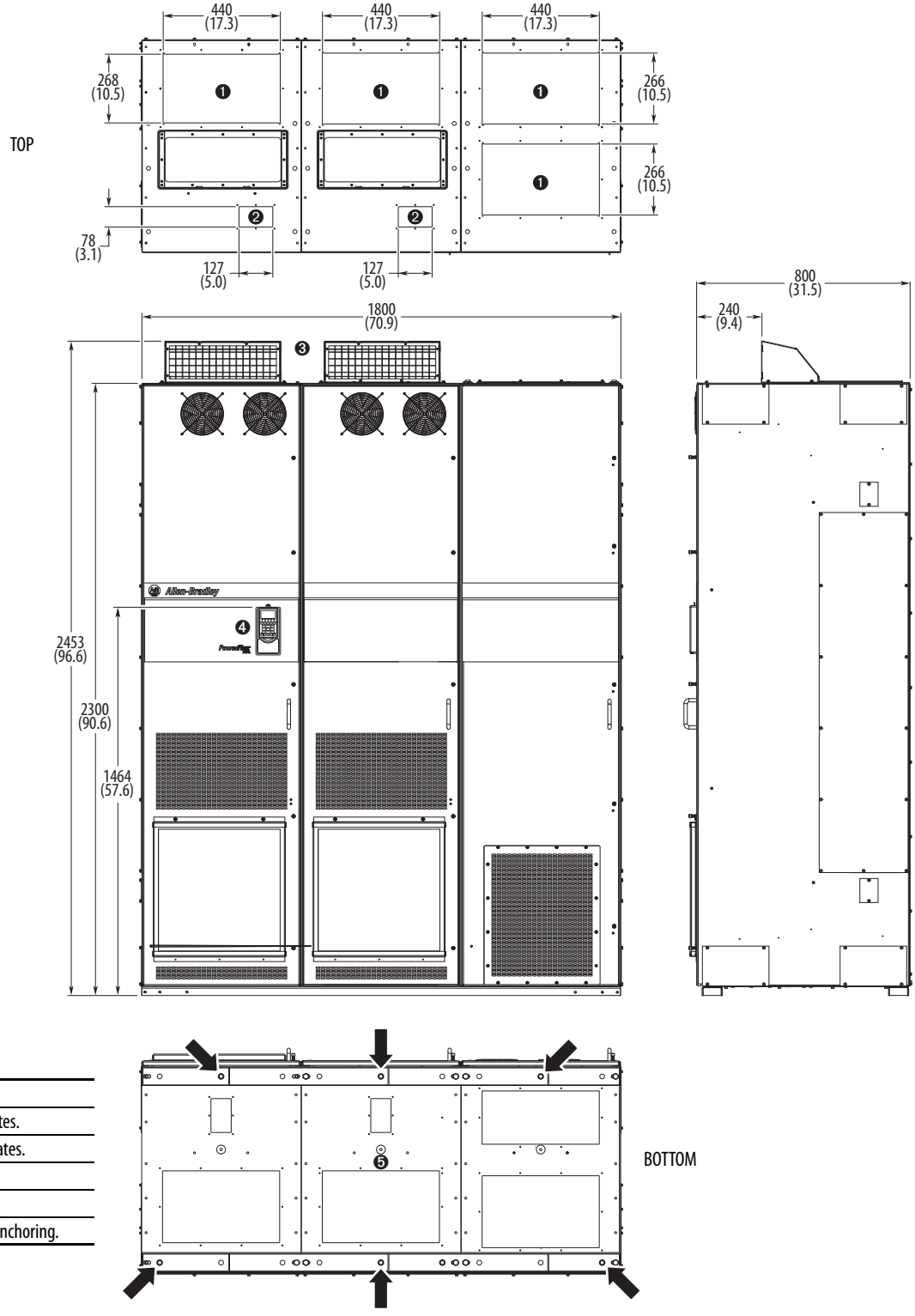
M12 (1/2 in.) Property Class 8.8 anchoring hardware recommended to fasten the drive cabinet through its internal mounting angle to the foundation. Anchor bolts may be pre-located and embedded in the foundation prior to instillation.

Figure 65 - IP20, NEMA/UL Type 1, MCC Style Cabinet, Floor Mount Frame 9 Bottom Access
Enclosure Code L, P, W - 800 mm Deep Drive with Cabinet Options Bay.



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

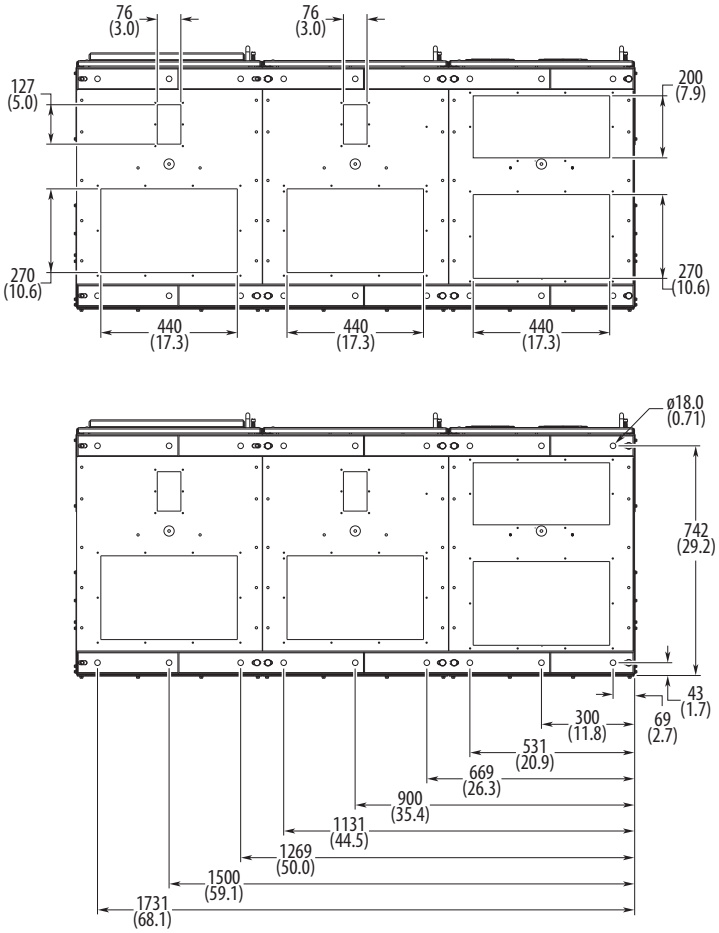
Figure 66 - NEMA/UL Type 1, MCC Style Cabinet, Floor Mount Frame 9
Enclosure Code L, P, W - 800 mm Deep Drive with Wiring Bay.



No.	Description
❶	Power wiring conduit plates.
❷	Control wiring conduit plates.
❸	Optional exhaust hood.
❹	Optional HIM.
❺	Recommended six-hole anchoring.

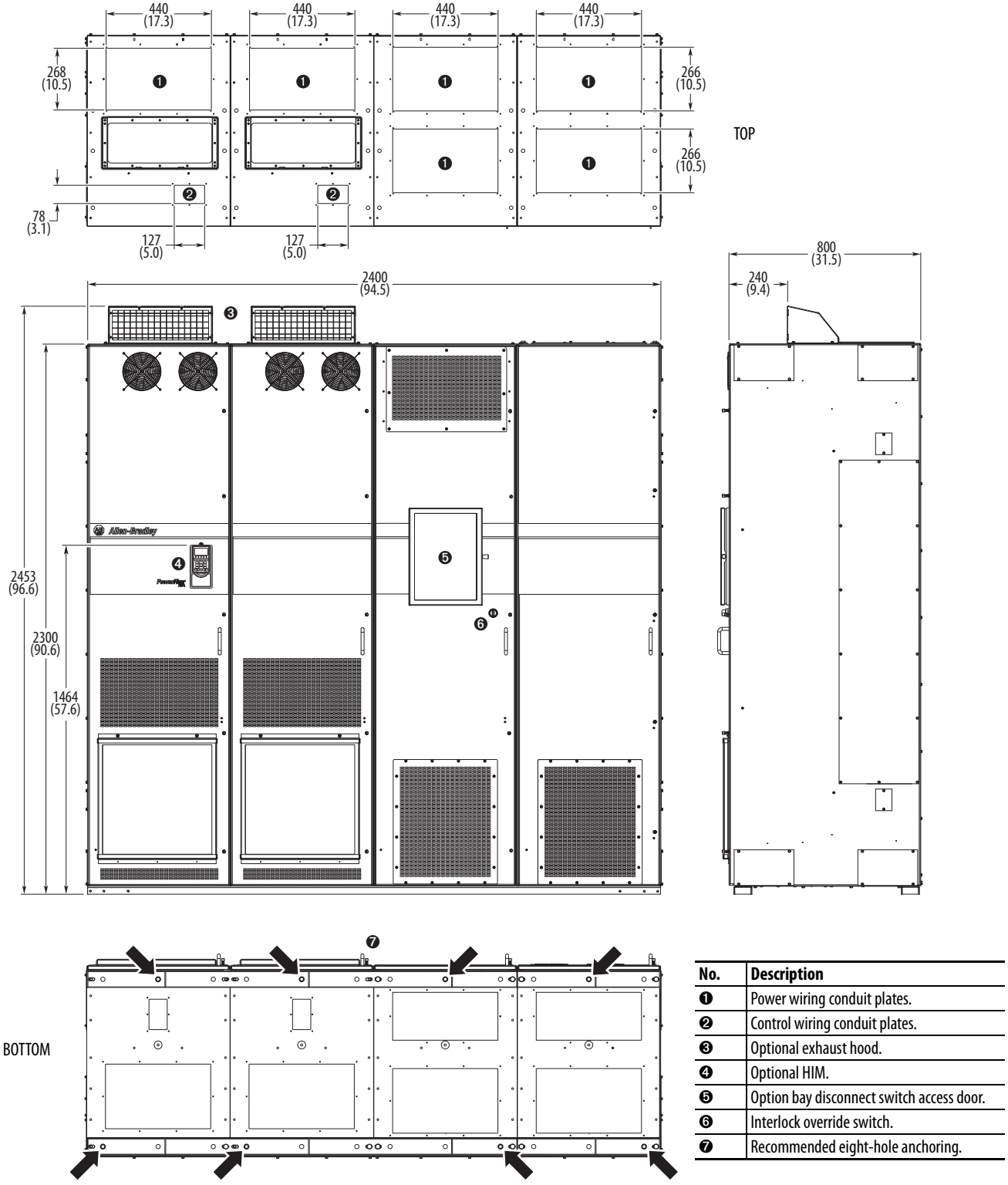
M12 (1/2 in.) Property Class 8.8 anchoring hardware recommended to fasten the drive cabinet through its internal mounting angle to the foundation. Anchor bolts may be pre-located and embedded in the foundation prior to instillation.

Figure 67 - IP20, NEMA/UL Type 1, MCC Style Cabinet, Floor Mount Frame 9 Bottom Access
Enclosure Code L, P, W - 800 mm Deep Drive with Wiring Bay.



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

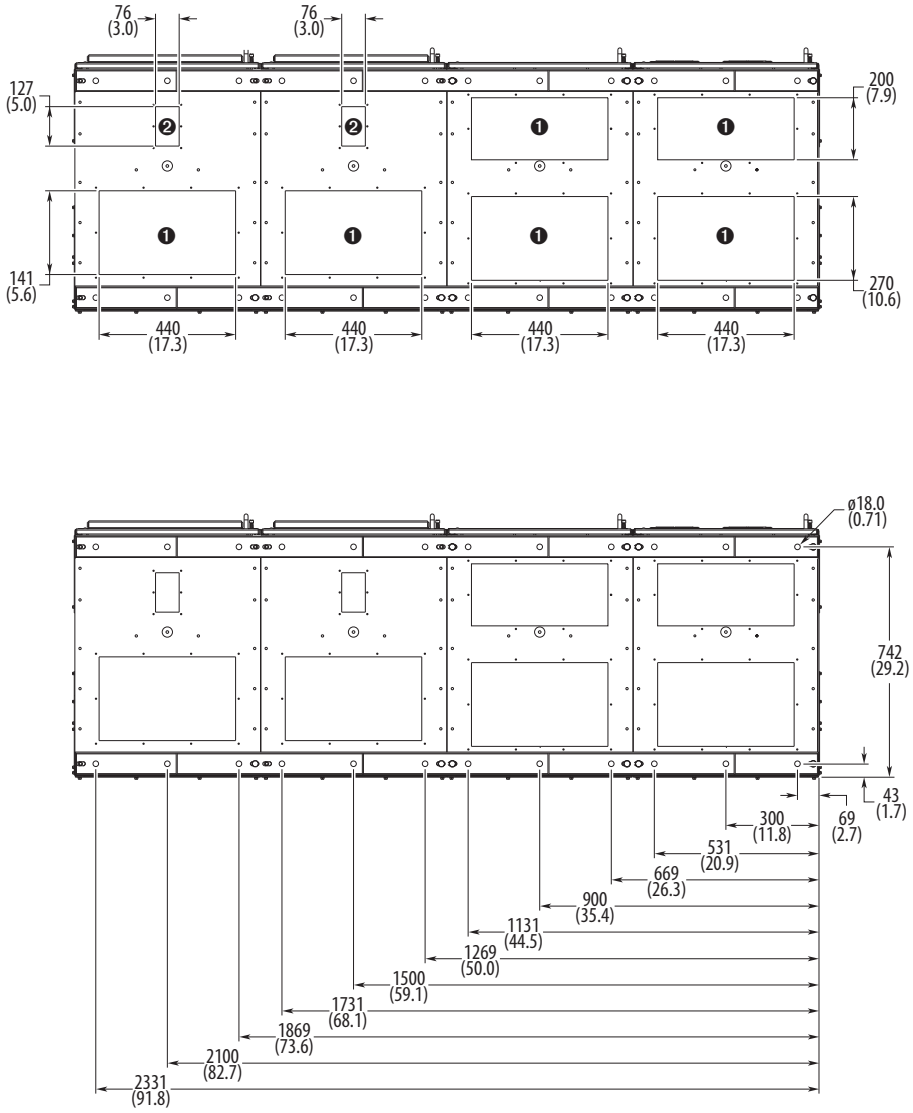
Figure 68 - IP20, NEMA/UL Type 1, MCC Style Cabinet, Floor Mount Frame 9
Enclosure Code L, P, W - 800 mm Deep Drive with Cabinet Options Bay and Wiring Bay.



No.	Description
❶	Power wiring conduit plates.
❷	Control wiring conduit plates.
❸	Optional exhaust hood.
❹	Optional HIM.
❺	Option bay disconnect switch access door.
❻	Interlock override switch.
❼	Recommended eight-hole anchoring.

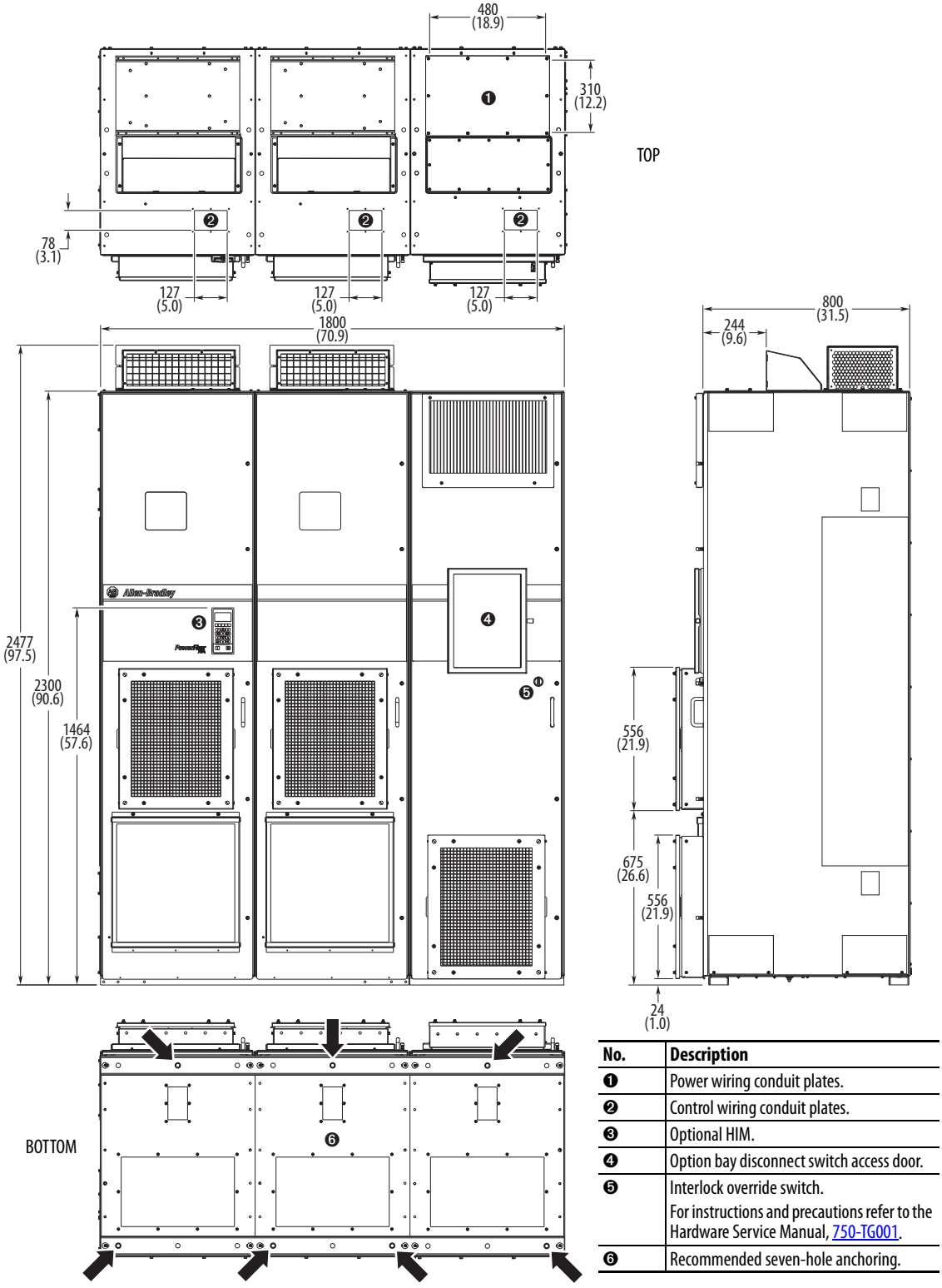
M12 (1/2 in.) Property Class 8.8 anchoring hardware recommended to fasten the drive cabinet through its internal mounting angle to the foundation. Anchor bolts may be pre-located and embedded in the foundation prior to instillation.

Figure 69 - IP20, NEMA/UL Type 1, MCC Style Cabinet, Floor Mount Frame 9 Bottom Access
Enclosure Code L, P, W - 800 mm Deep Drive with Cabinet Options Bay and Wiring Bay.



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

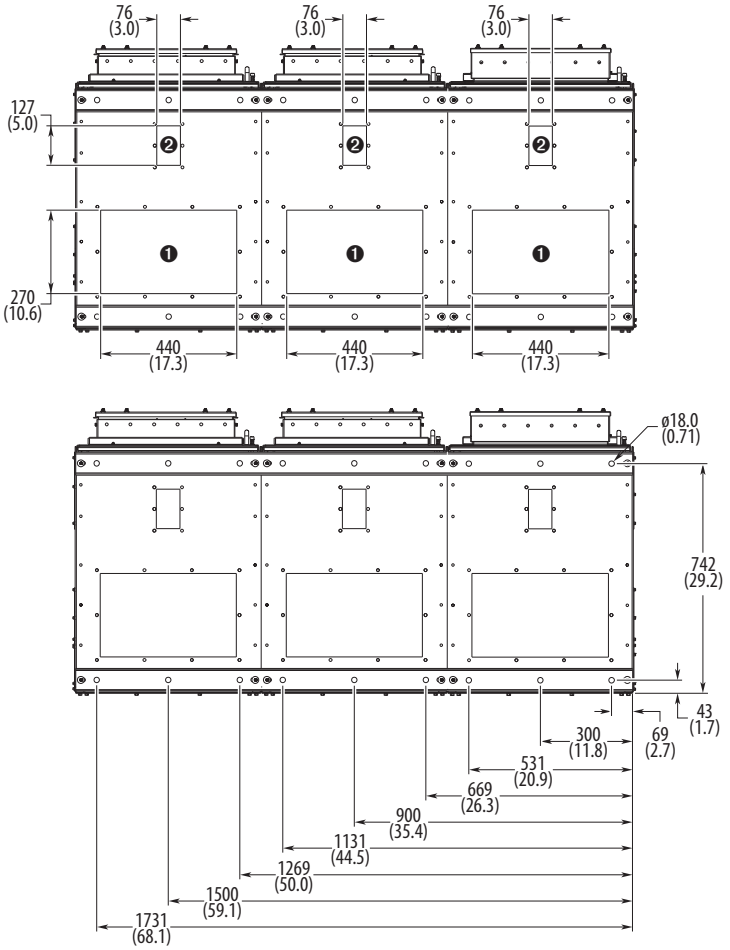
Figure 70 - IP54, NEMA 12, MCC Style Cabinet, Floor Mount Frame 9 *(Enclosure Codes K and Y)*
IP54, UL Type 12, MCC Style Cabinet, Floor Mount Frame 9 *(Enclosure Code J)*
800 mm Deep Drive with Cabinet Options Bay.



No.	Description
❶	Power wiring conduit plates.
❷	Control wiring conduit plates.
❸	Optional HIM.
❹	Option bay disconnect switch access door.
❺	Interlock override switch. For instructions and precautions refer to the Hardware Service Manual, 750-TG001.
❻	Recommended seven-hole anchoring.

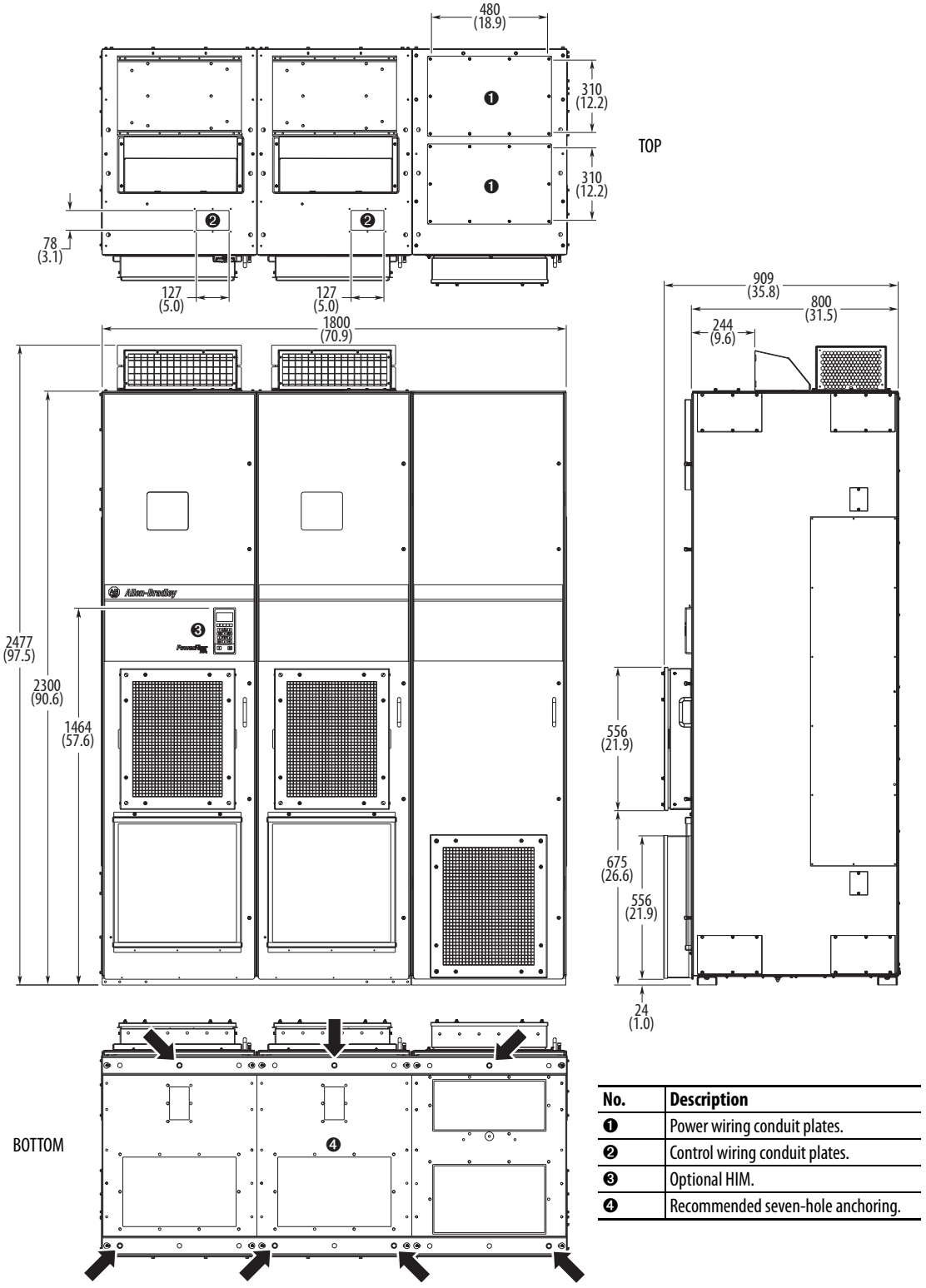
M12 (1/2 in.) Property Class 8.8 anchoring hardware recommended to fasten the drive cabinet through its internal mounting angle to the foundation. Anchor bolts may be pre-located and embedded in the foundation prior to instillation.

Figure 71 - IP54, NEMA 12, MCC Style Cabinet, Floor Mount Frame 9 Bottom Access
(Enclosure Codes K and Y)
IP54, UL Type 12, MCC Style Cabinet, Floor Mount Frame 9 Bottom Access
(Enclosure Code J)
800 mm Deep Drive with Cabinet Options Bay.



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

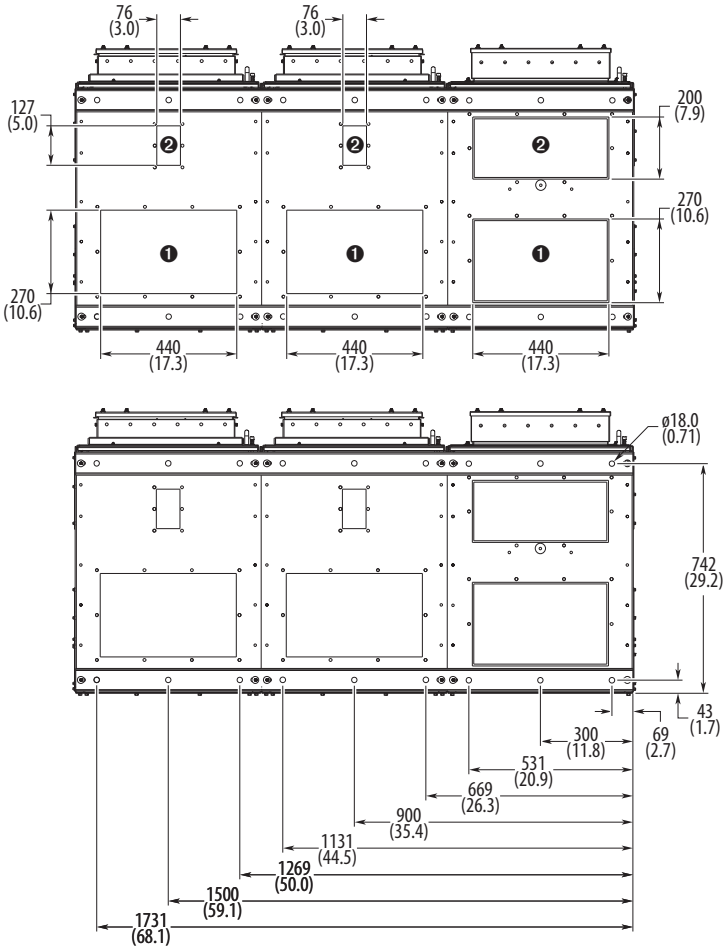
Figure 72 - IP54, NEMA 12, MCC Style Cabinet, Floor Mount Frame 9 *(Enclosure Codes K and Y)*
IP54, UL Type 12, MCC Style Cabinet, Floor Mount Frame 9 *(Enclosure Code J)*
With P14 - 800 mm Deep Drive with Wiring Bay.



No.	Description
❶	Power wiring conduit plates.
❷	Control wiring conduit plates.
❸	Optional HIM.
❹	Recommended seven-hole anchoring.

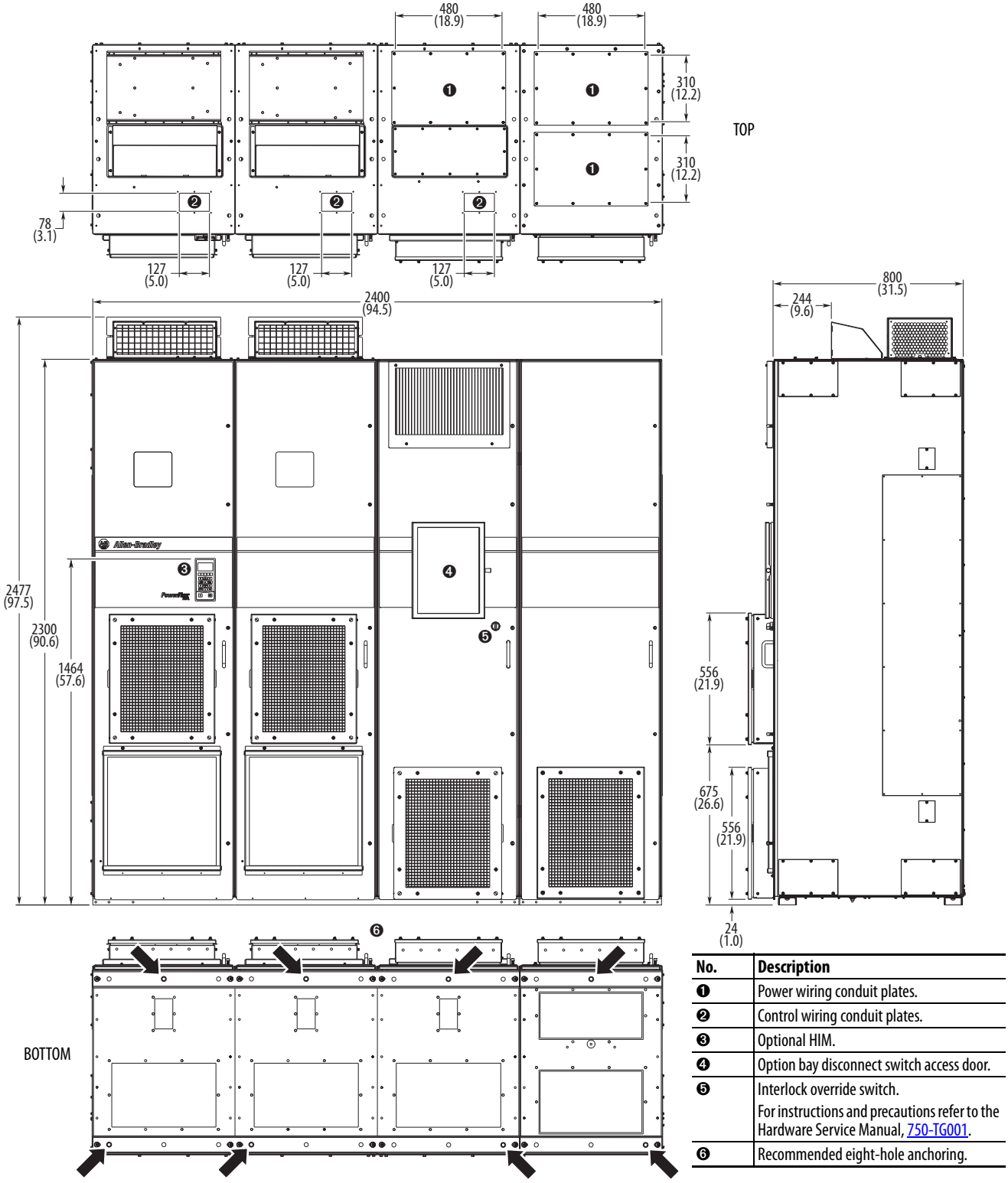
M12 (1/2 in.) Property Class 8.8 anchoring hardware recommended to fasten the drive cabinet through its internal mounting angle to the foundation. Anchor bolts may be pre-located and embedded in the foundation prior to instillation.

Figure 73 - IP54, NEMA 12, MCC Style Cabinet, Floor Mount Frame 9 Bottom Access
(Enclosure Codes K and Y)
IP54, UL Type 12, MCC Style Cabinet, Floor Mount Frame 9 Bottom Access
(Enclosure Code J)
800 mm Deep Drive with Wiring Bay.



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

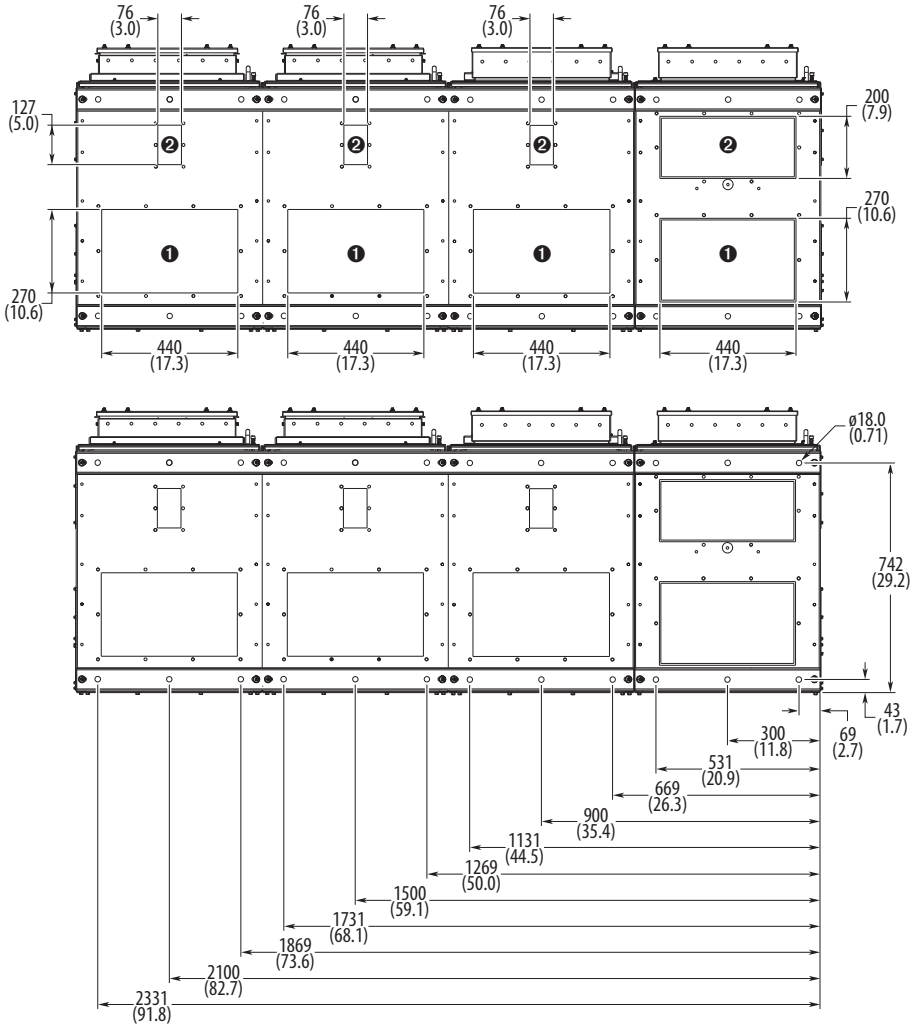
Figure 74 - IP54, NEMA 12, MCC Style Cabinet, Floor Mount Frame 9 *(Enclosure Codes K and Y)*
IP54, UL Type 12, MCC Style Cabinet, Floor Mount Frame 9 *(Enclosure Code J)*
800 mm Deep Drive with Cabinet Options Bay and Wiring Bay.



No.	Description
❶	Power wiring conduit plates.
❷	Control wiring conduit plates.
❸	Optional HIM.
❹	Option bay disconnect switch access door.
❺	Interlock override switch. For instructions and precautions refer to the Hardware Service Manual, 750-TG001.
❻	Recommended eight-hole anchoring.

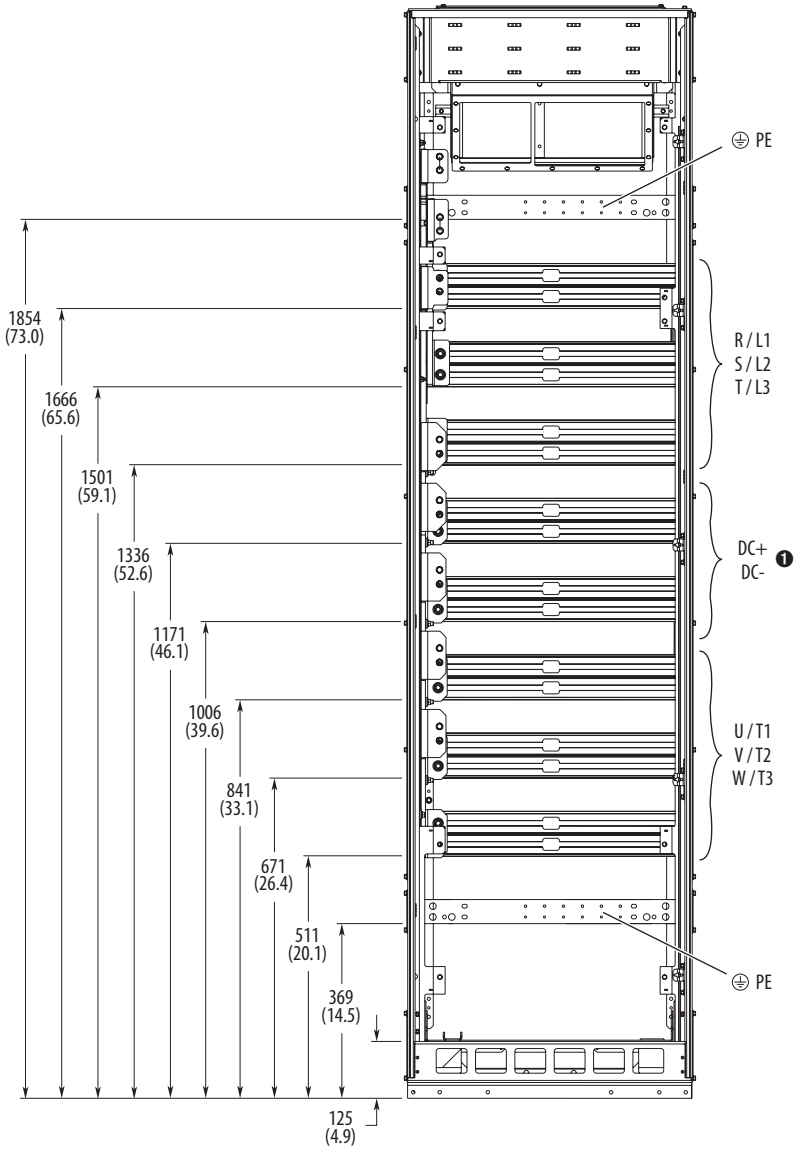
M12 (1/2 in.) Property Class 8.8 anchoring hardware recommended to fasten the drive cabinet through its internal mounting angle to the foundation. Anchor bolts may be pre-located and embedded in the foundation prior to instillation.

Figure 75 - IP54, NEMA 12, MCC Style Cabinet, Floor Mount Frame 9 Bottom Access
(Enclosure Codes K and Y)
IP54, UL Type 12, MCC Style Cabinet, Floor Mount Frame 9 Bottom Access
(Enclosure Code J)
800 mm Deep Drive with Cabinet Options Bay and Wiring Bay.



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

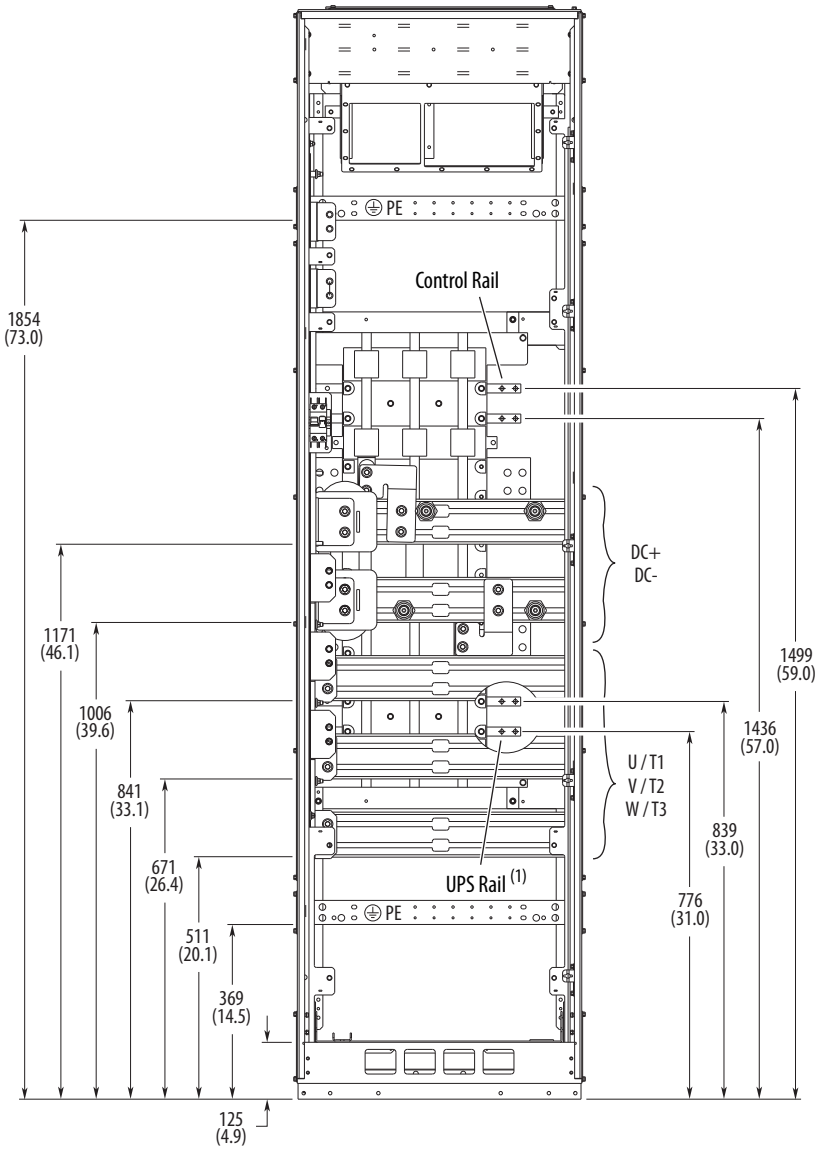
Figure 76 - Bus Bar Dimensions (AC Input)



Dimensions are in millimeters and (inches).

❶ To connect to the DC bus bars, a PowerFlex 750-Series DC Bus Connection Kit (20-750-BUS1A-F8) is required.

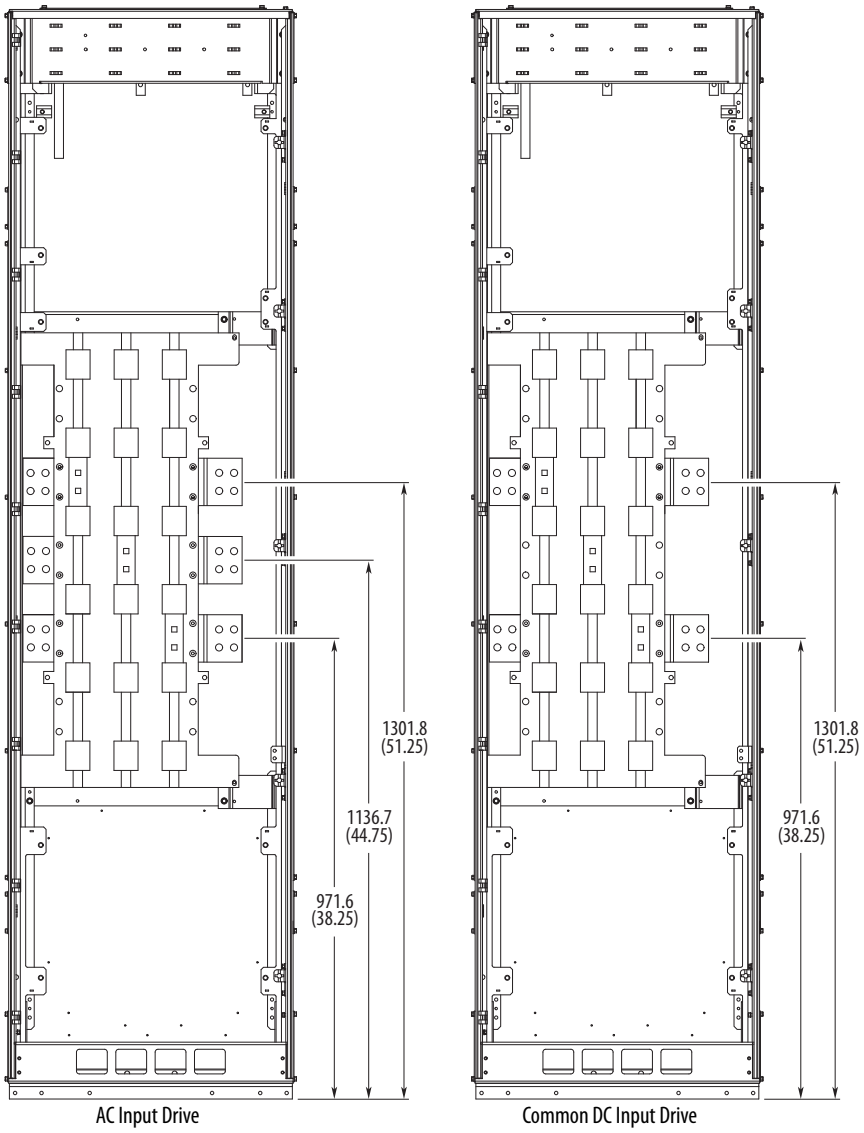
Figure 77 - Bus Bar Dimensions (Common DC Input)



(1) The UPS rail is only installed when the P30 UPS Control Bus option is selected.

Dimensions are in millimeters and (inches).

Figure 78 - Bus Bar Dimensions (MCC Bus)



Dimensions are in millimeters and (inches).

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.

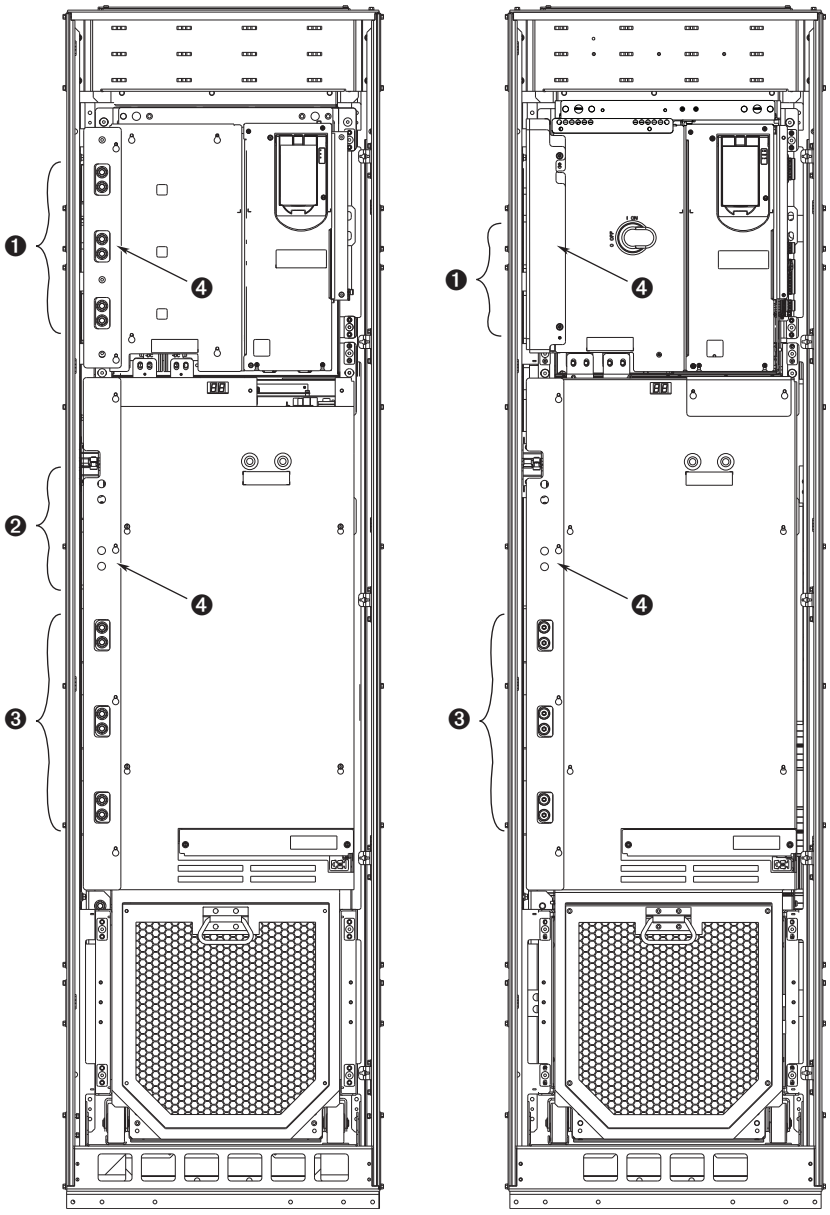
IMPORTANT Before removing the drive assembly, be sure the cabinet is in its intended installed position. Height adjustments to the roll-out cart can not be made while carrying a drive.

1. Open the cabinet door.
2. Remove the side shields (No. ❹ Figure 79).
3. Remove the bus bar connector bolts. Numbers ❶, ❷, and ❸ in Figure 79.
4. Disconnect the two captive bolts connecting the converter chassis to the exhaust vent (No. ❺ Figure 80).
5. Disconnect the four captive bolts connecting the converter chassis to the cabinet frame (No. ❻ Figure 80).

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 80.

6. Disconnect the six captive bolts connecting the inverter chassis to the cabinet frame (No. ❼ Figure 80).

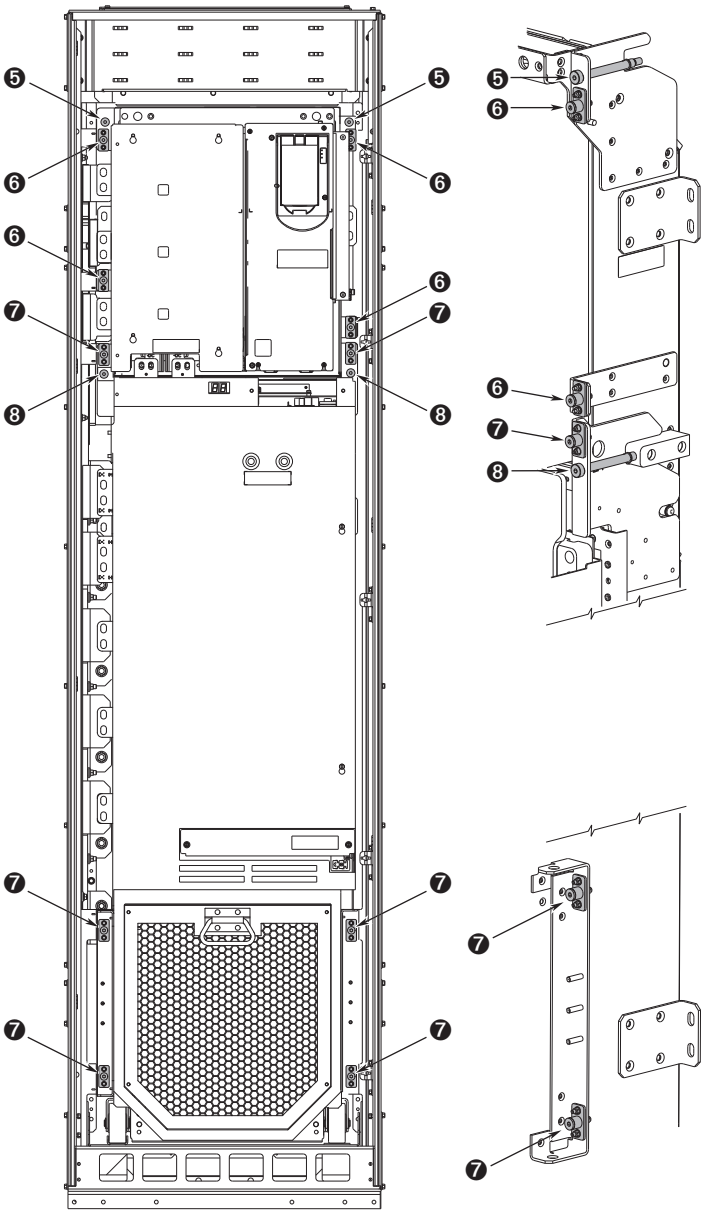
Figure 79 - Side Shield and Bus Bar Connections



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 80 - 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.

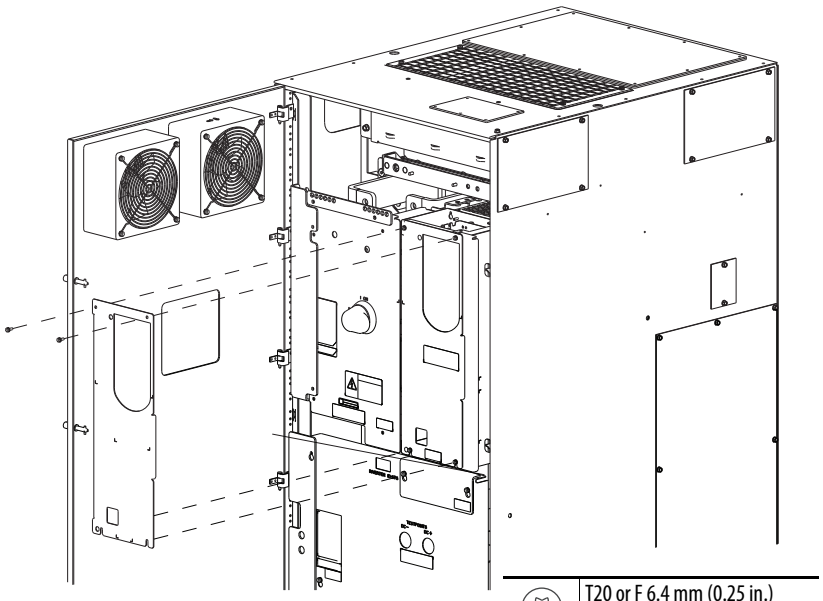
Disconnect Drive Control Pod Wiring Connections

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.

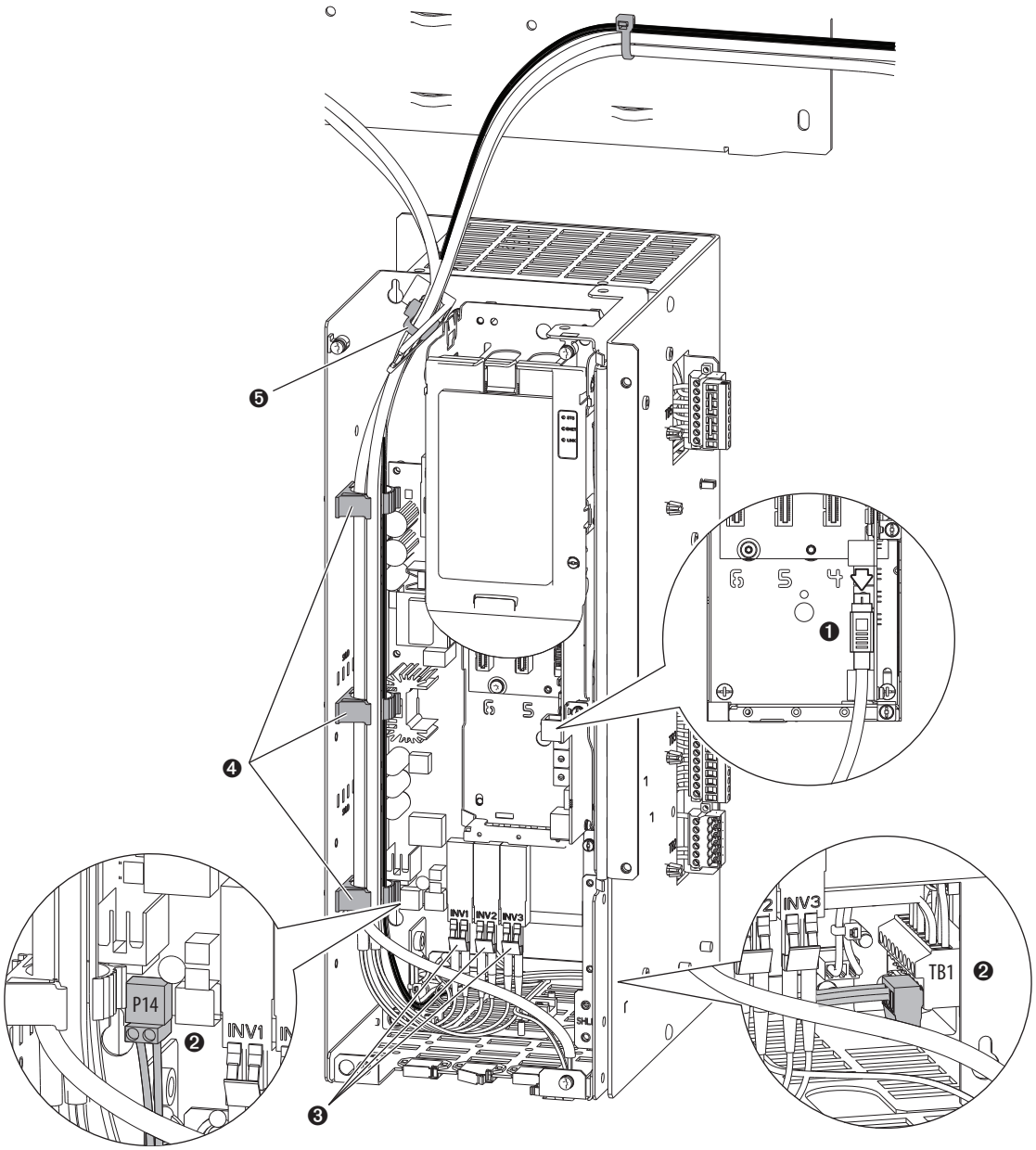
If the drive control pod is mounted remotely, skip this section.

1. Remove the right front cover.



Floor Mount Frame 8 Shown

2. Disconnect the HIM cable ❶.
3. Disconnect the 24V wire harness ❷ from TB1 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.

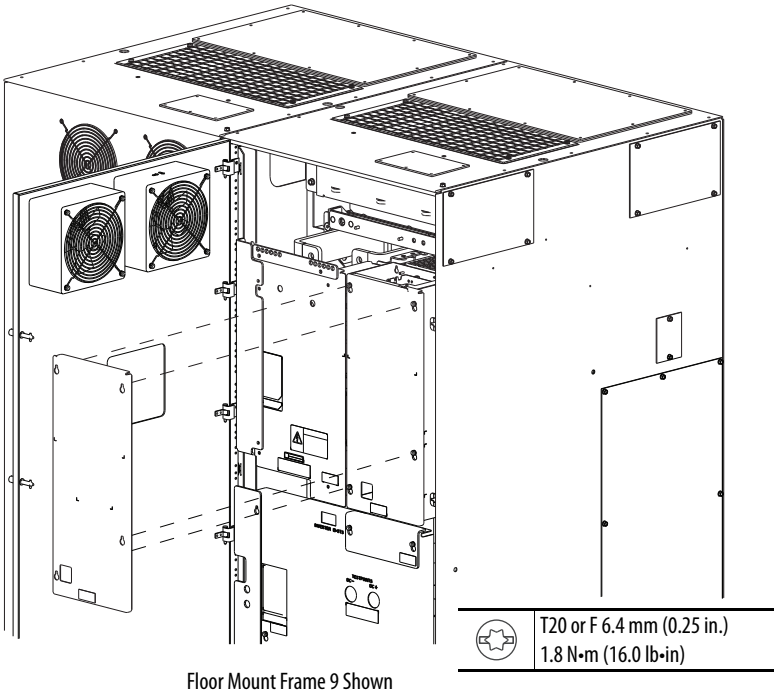


7. Without bending the cables to a radius less than 50 mm (2 in.), lift the 24V wire harness and fiber-optic cables out of the drive control pod. Support the cable bundle so it is out of the way of the drive assembly when it is rolled out of the cabinet.

Disconnect Wire Connections - No Drive Control Pod

This procedure applies to Frame 8 drives with a remotely mounted drive control pod (up to 23 m or 75 ft away) and to the right hand cabinets of Frame 9 and larger drives.

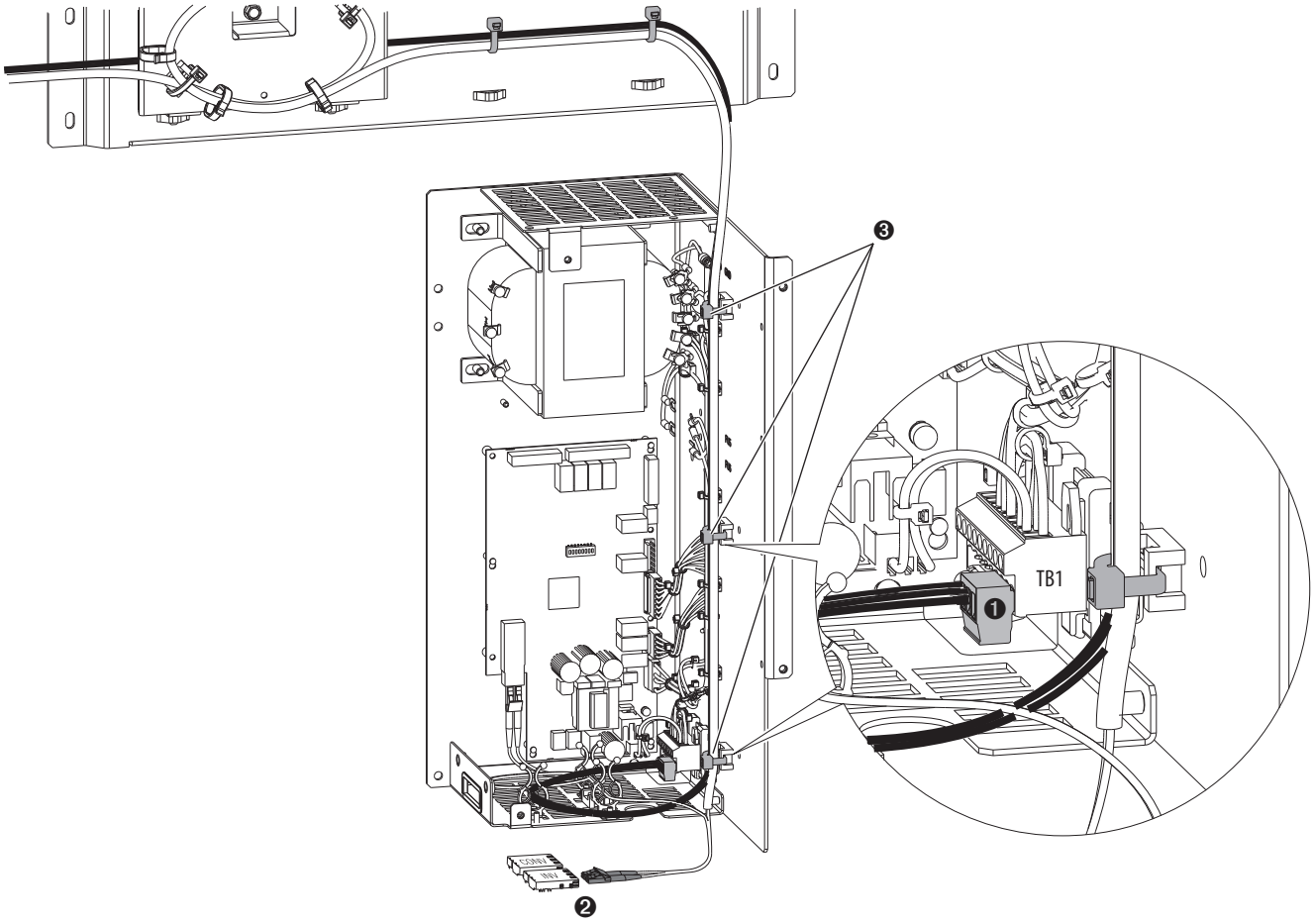
1. Remove the right front cover.



Floor Mount 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.

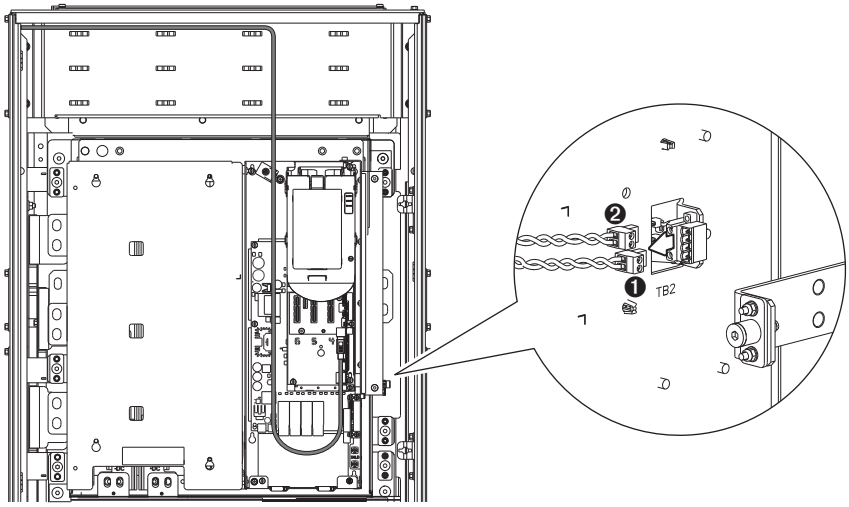


5. Without bending the cables to a radius less than 50 mm (2 in.), lift the 24V wire harness and fiber-optic cable out of the drive control pod. Support the cable bundle so it is out of the way of the drive assembly when it is rolled out of the cabinet.

Disconnect Control and Power Wire Harnesses

AC Input Drives

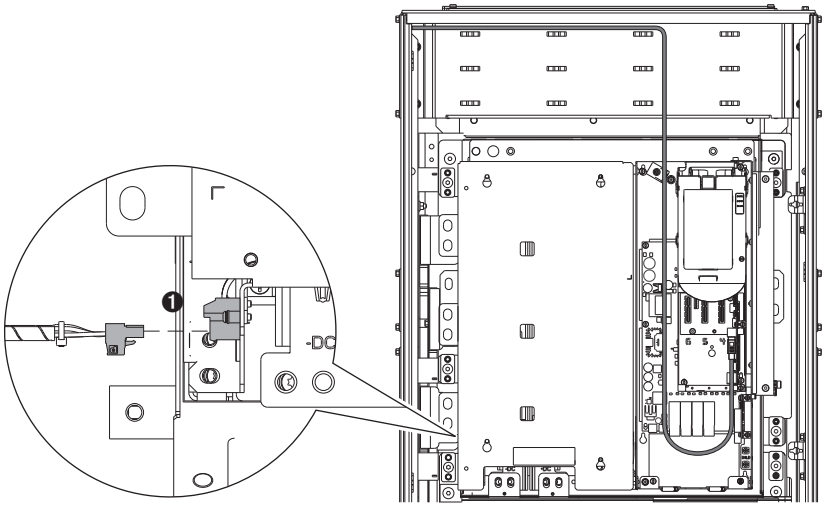
1. Disconnect the cabinet fan /cabinet blower assembly wiring harness ❶ from TB2-3 and TB2-4.
2. Disconnect the cabinet shunt trip harness ❷ (if used) from TB2-1 and TB2-2.



Disconnect DC Bus Fuse Wire Harness

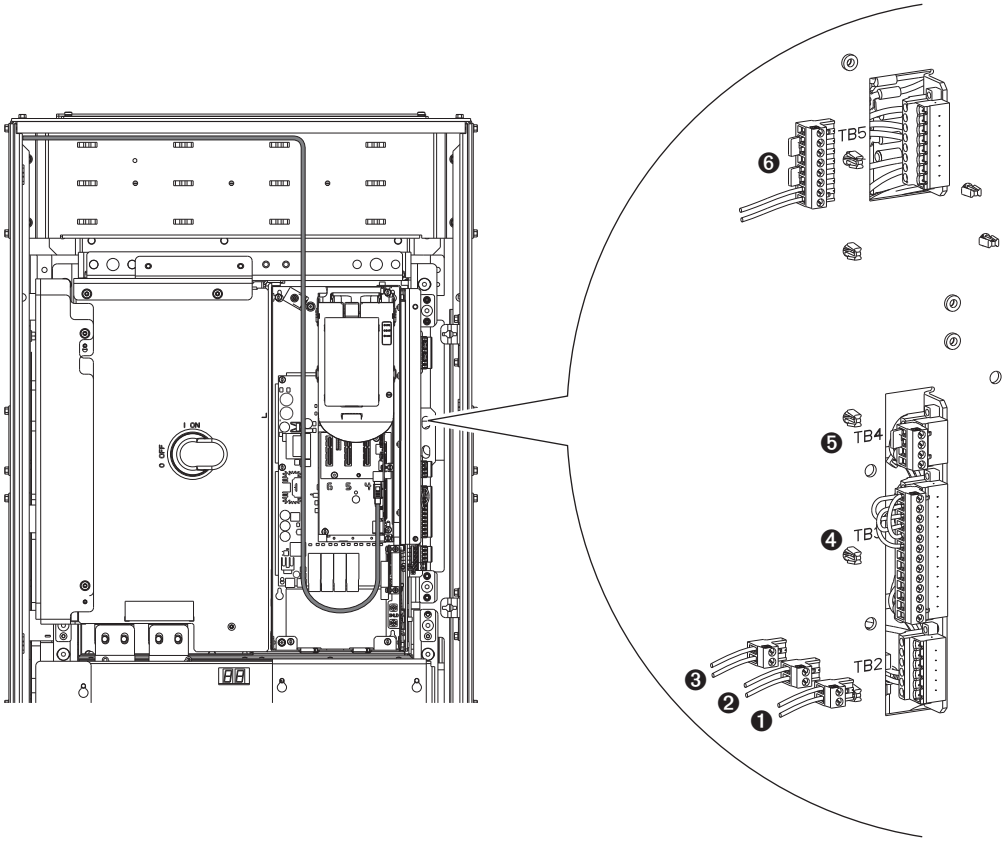
AC Input Drives Floor Mount Frames 9 and Larger

Disconnect the DC Bus wiring harness ❶ from TB6.



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.



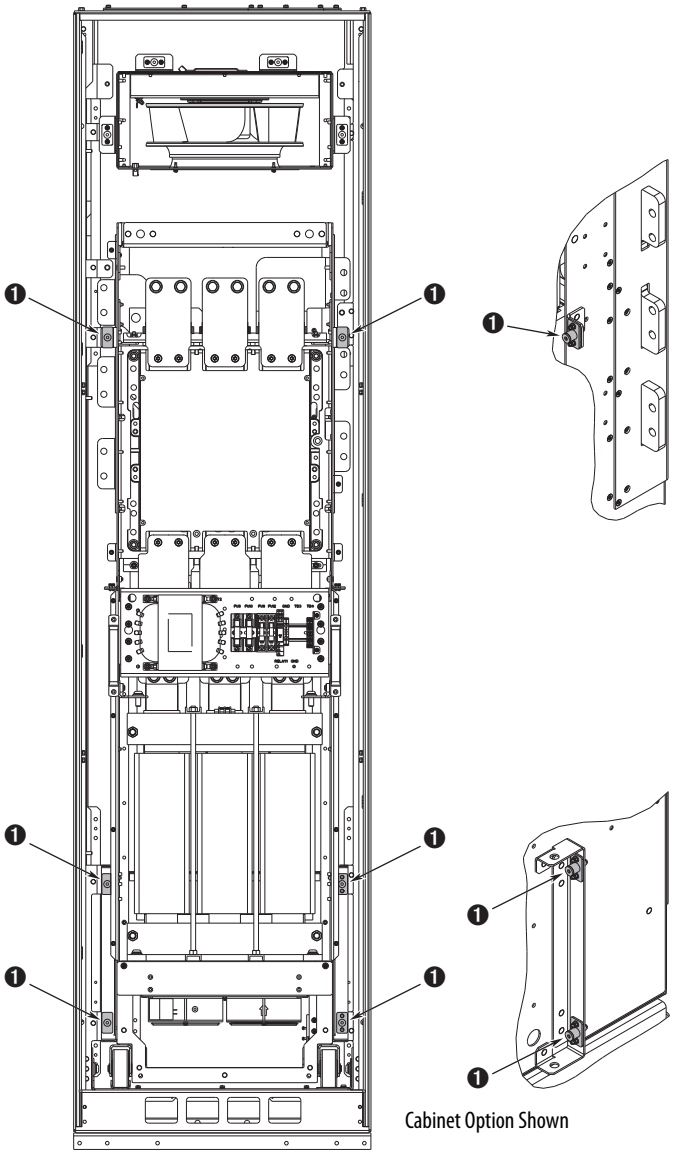
Release Cabinet Options Assembly From Cabinet

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

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

1. Open the cabinet door.
2. Disconnect the six captive bolts connecting the cabinet options assembly to the cabinet frame (No. ❶ Figure 81).
3. Disconnect the wiring harnesses and bus connections shown in Figure 82.

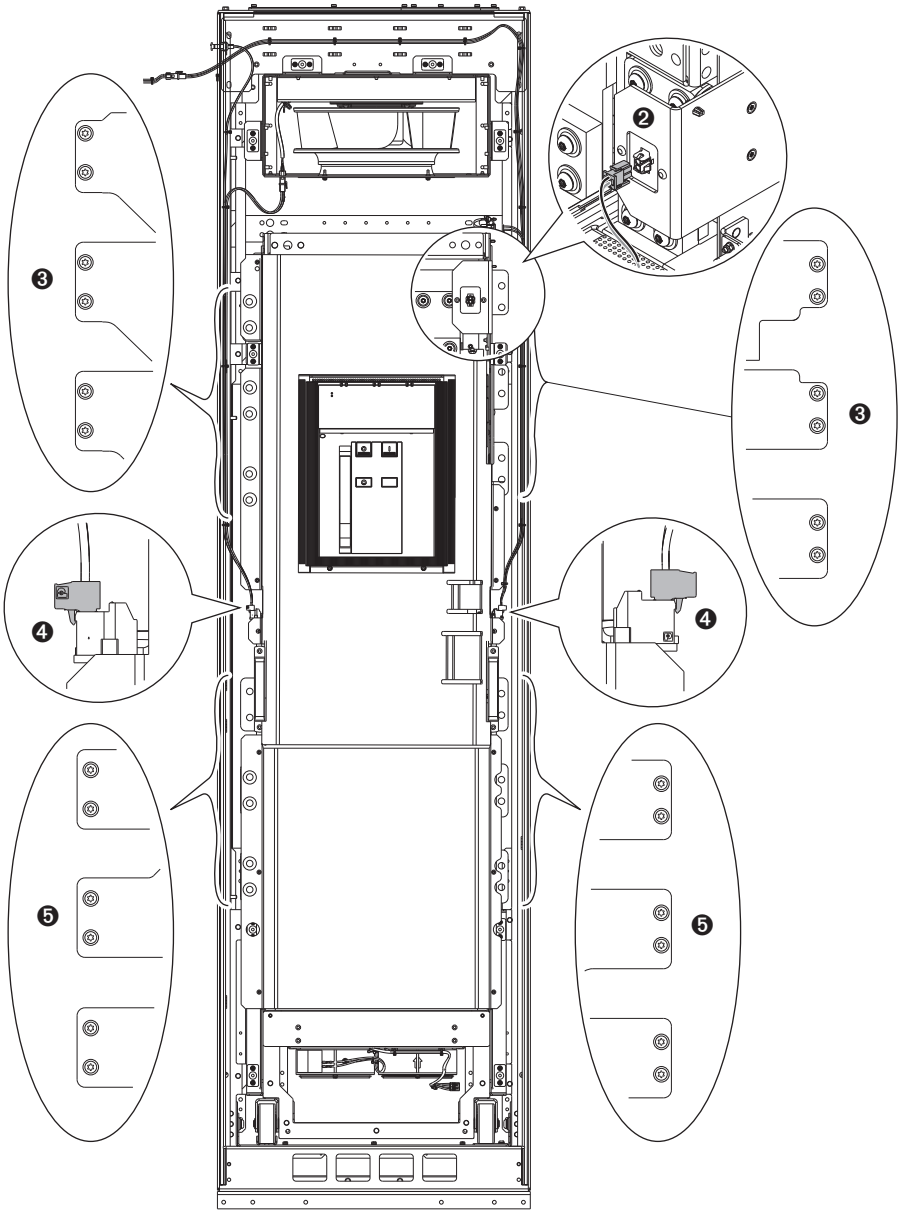
Figure 81 - Cabinet Options-To-Cabinet Connections



No.	Description	Torque	Recommended Tool
❶	Cabinet options assembly-to-cabinet anchor bolts (6 places).	11.3 N•m (100 lb•in)	5 mm hex key (Allen)

Disconnect Cabinet Options Wiring and Electrical Connections

Figure 82 - Cabinet Options Wire Harness and Electrical Connections

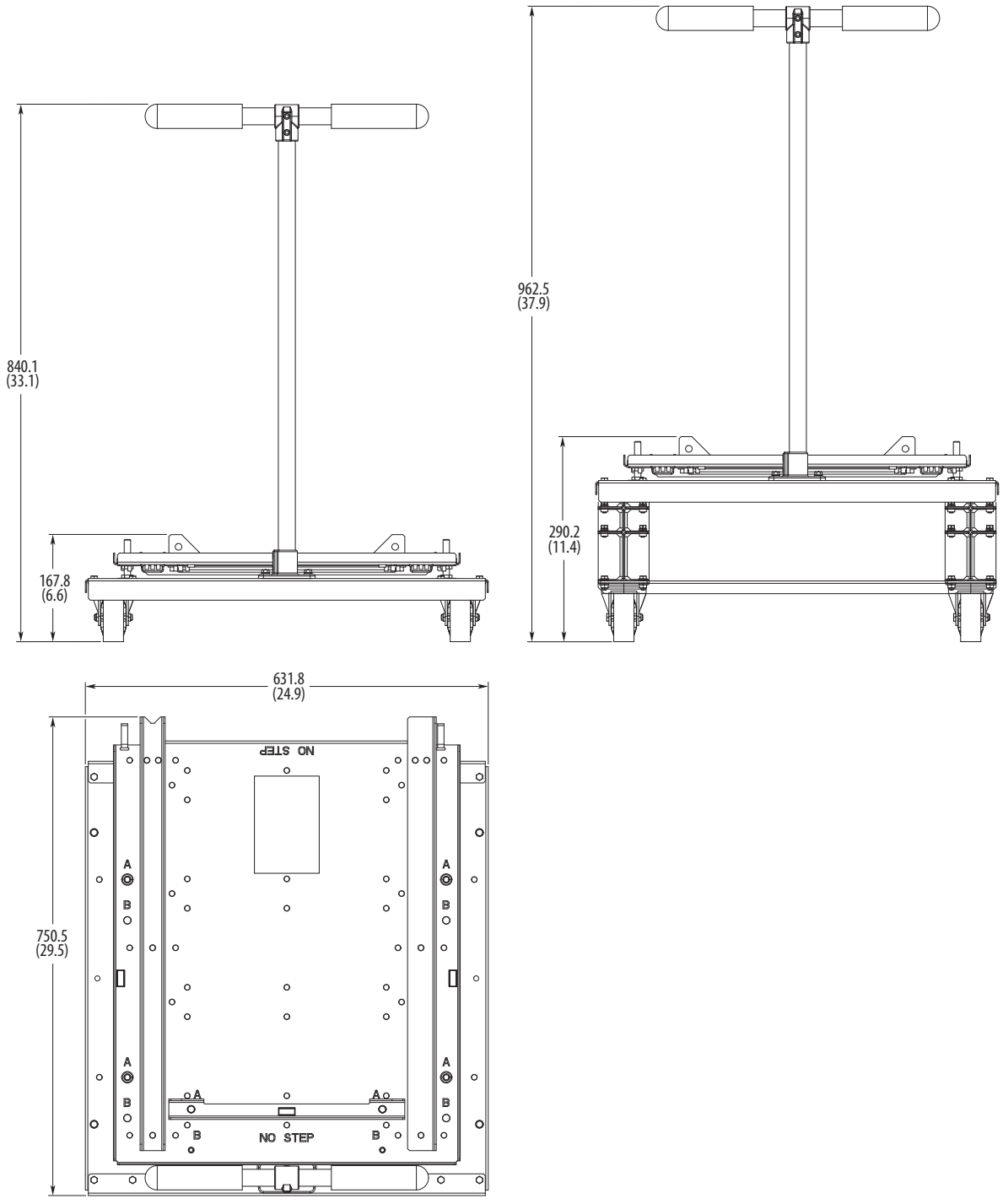


No.	Description	Torque	Recommended Tool
❷	Thermostat connection (plug).	N/A	N/A
❸	AC Input connections (12 places)	22.4 N•m (200 lb•in)	T45 Hexalobular driver with ~457 mm (18 in) extension
❹	Terminal block connections (plugs).	N/A	N/A
❺	Output Reactor connections (12 places)	22.4 N•m (200 lb•in)	T45 Hexalobular driver with ~457 mm (18 in) extension

Prepare the Roll-Out Cart

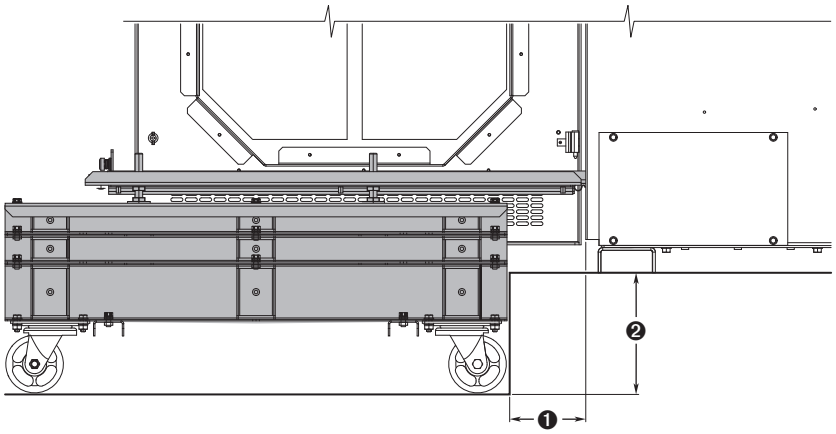
The 20-750-CART1-F8 Roll-out Cart is required to remove the drive assembly from Floor Mount Frame 8...10 drive cabinets.

Figure 83 - Roll-out Cart Dimensions



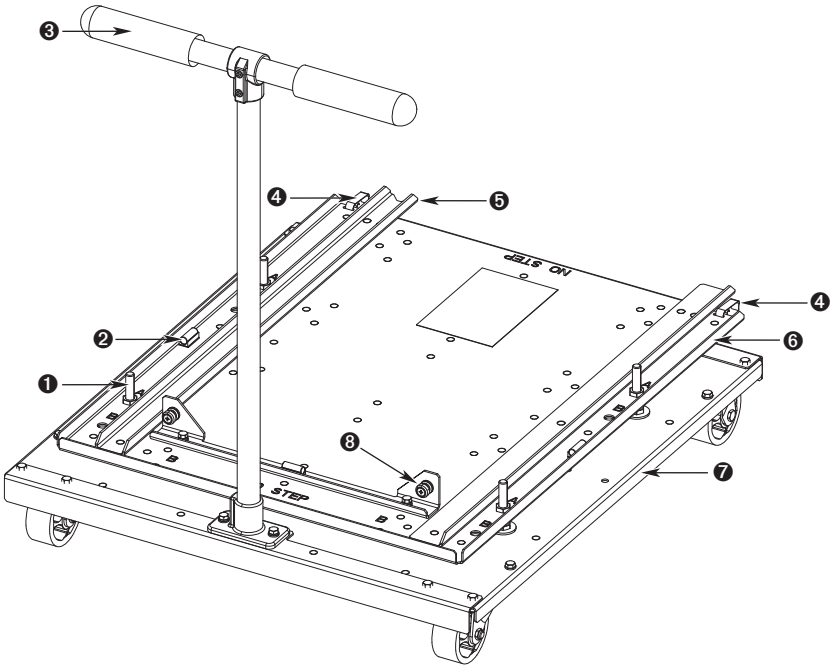
Dimensions are in millimeters and (inches).
Approximate weight: 27.2 kg (60 lb)
See page 132 for spacer height combinations.

The Roll-out Cart can be adjusted for both 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 84 - Roll-out Cart Features



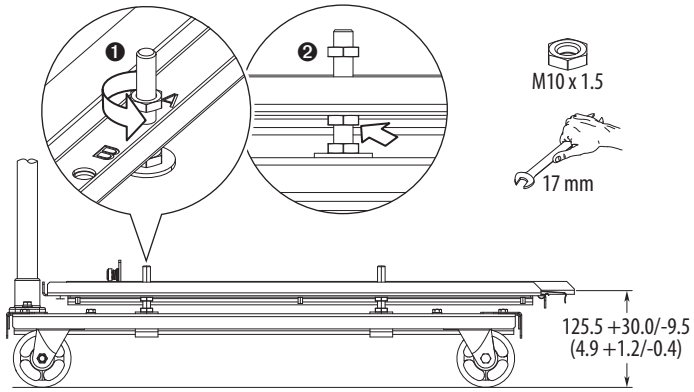
No.	Description
❶	Threaded studs and nuts allow precision height and leveling adjustments (four positions)
❷	Bubble levels help with fine adjustment of the cart deck (three positions)
❸	Handle
❹	Retaining clips positively engage the cart with the drive cabinet (two positions)
❺	Alignment track keeps 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.

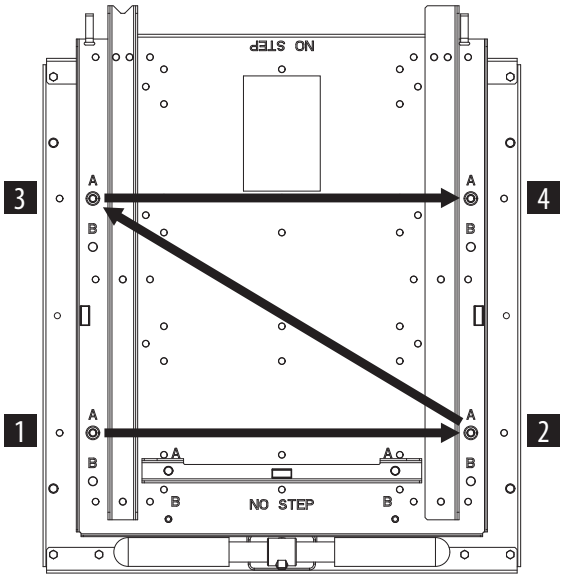
- Maximum height = 155.5 mm (6.1 in.)
- Minimum height = 116 mm (4.6 in.)
- Adjustment range = 30 mm (1.2 in.) up, 9.5 mm (0.4 in.) down from the factory setting of 125.5 mm (4.9 in.)

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.

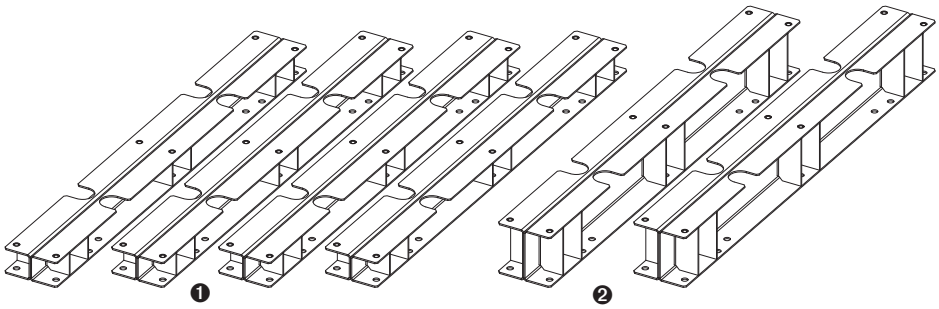
   Make uniform half-turn adjustments to each of the four threaded studs in an alternating pattern to help prevent binding and maintain a level orientation.



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

Adjust Roll-Out Cart Height Using Spacers

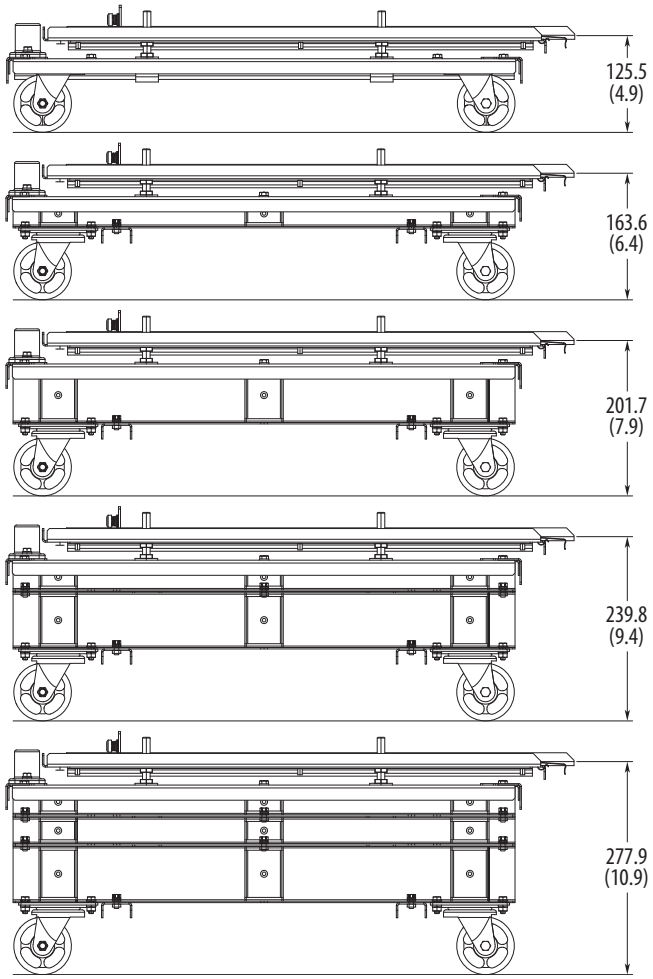
The height of the Roll-out Cart deck can be adjusted using the I-beam spacers provided.



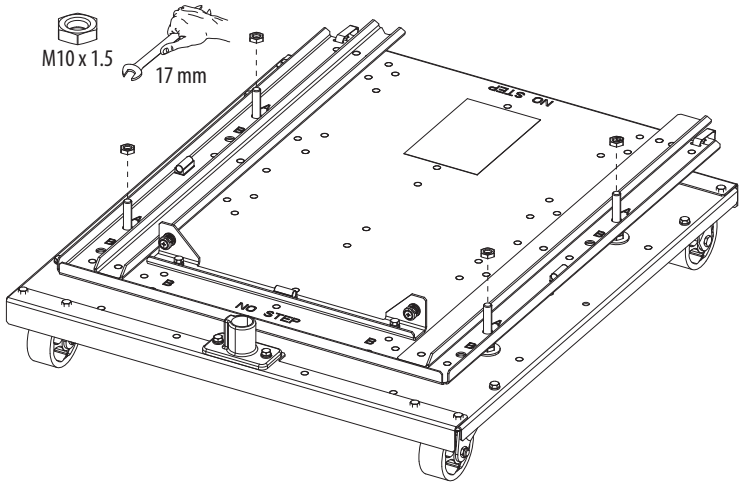
No.	Description
❶	Four 38.1 mm (1.5 in.) spacers
❷	Two 76.2 mm (3.0 in.) spacers

Spacer Height Combinations

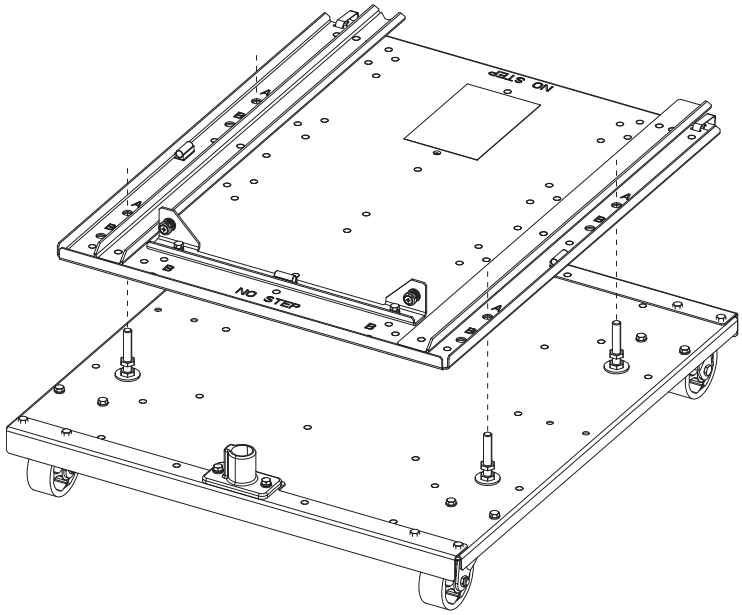
Each of the base heights below have adjustment range of +30.0 mm (+1.2 in.) and -9.5 mm (-0.4 in.).



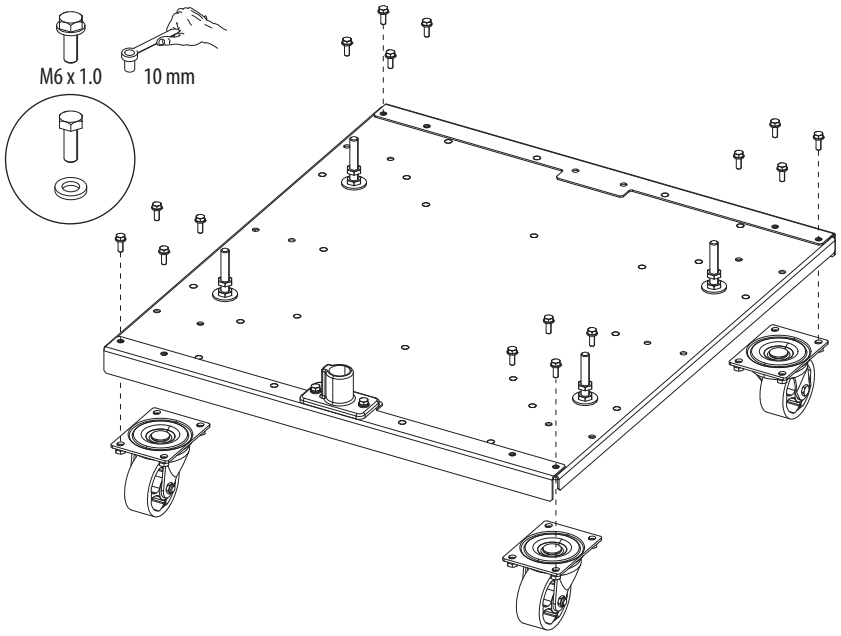
1. Remove the Roll-out Cart deck by removing the top nuts of the four threaded leveling studs.



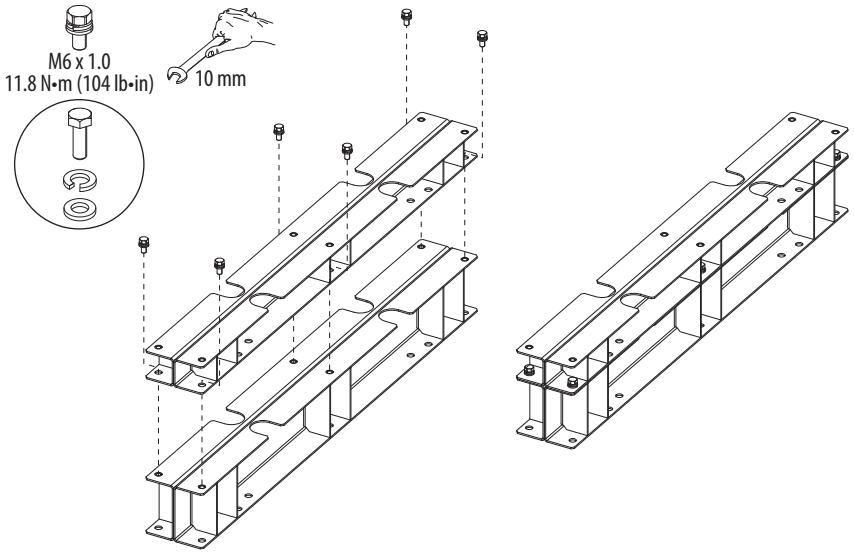
2. Lift the deck off of the four threaded leveling studs.



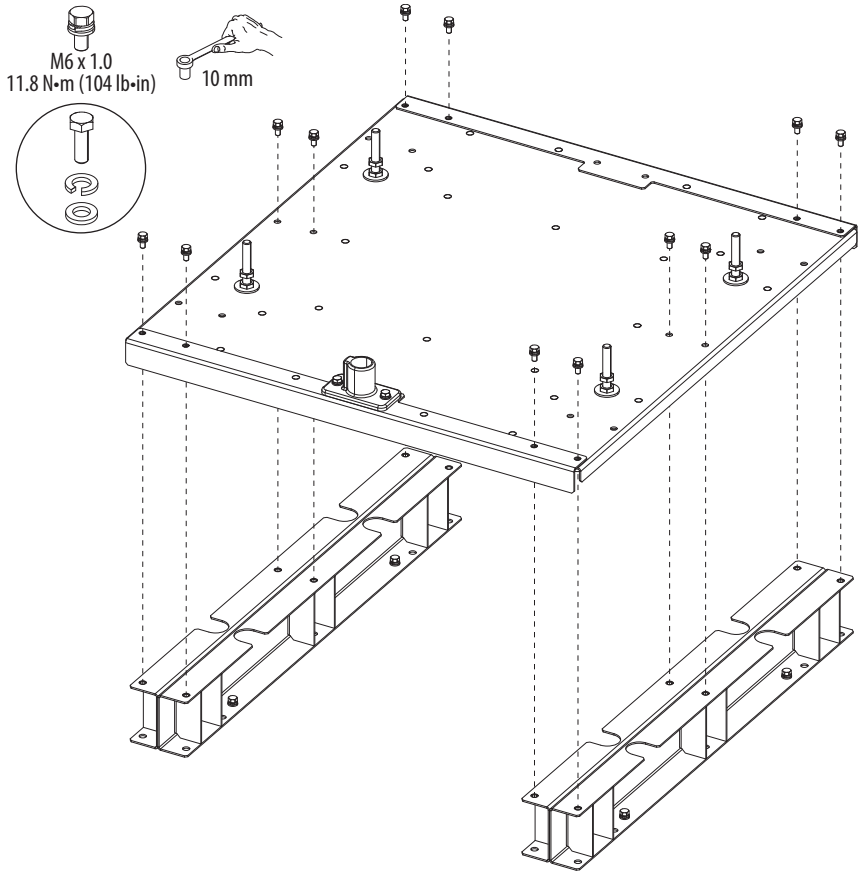
3. Remove the bolts securing the casters to chassis.



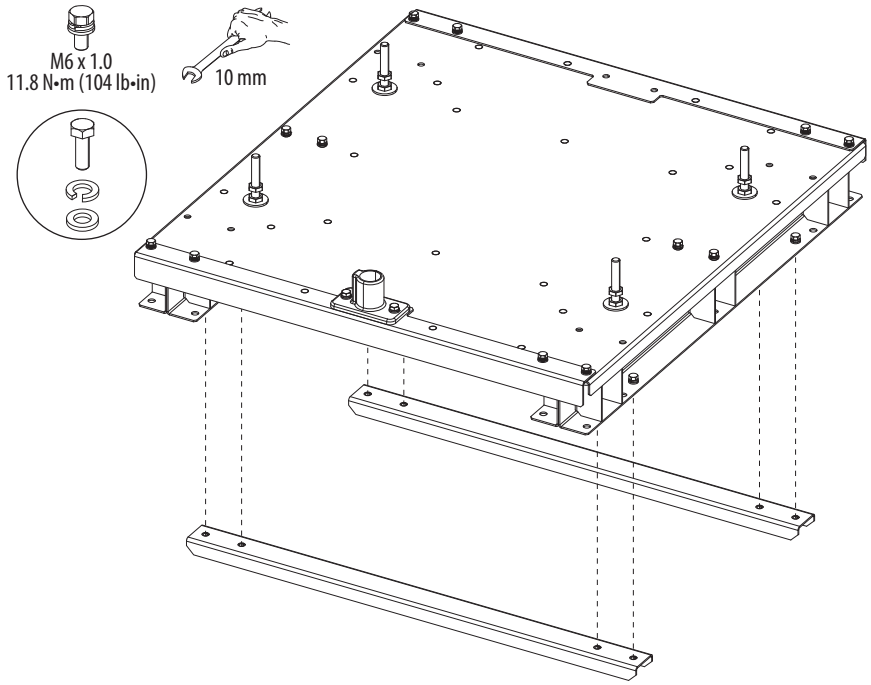
4. Select the spacer or spacers required. Combine spacers using bolts provided as needed.



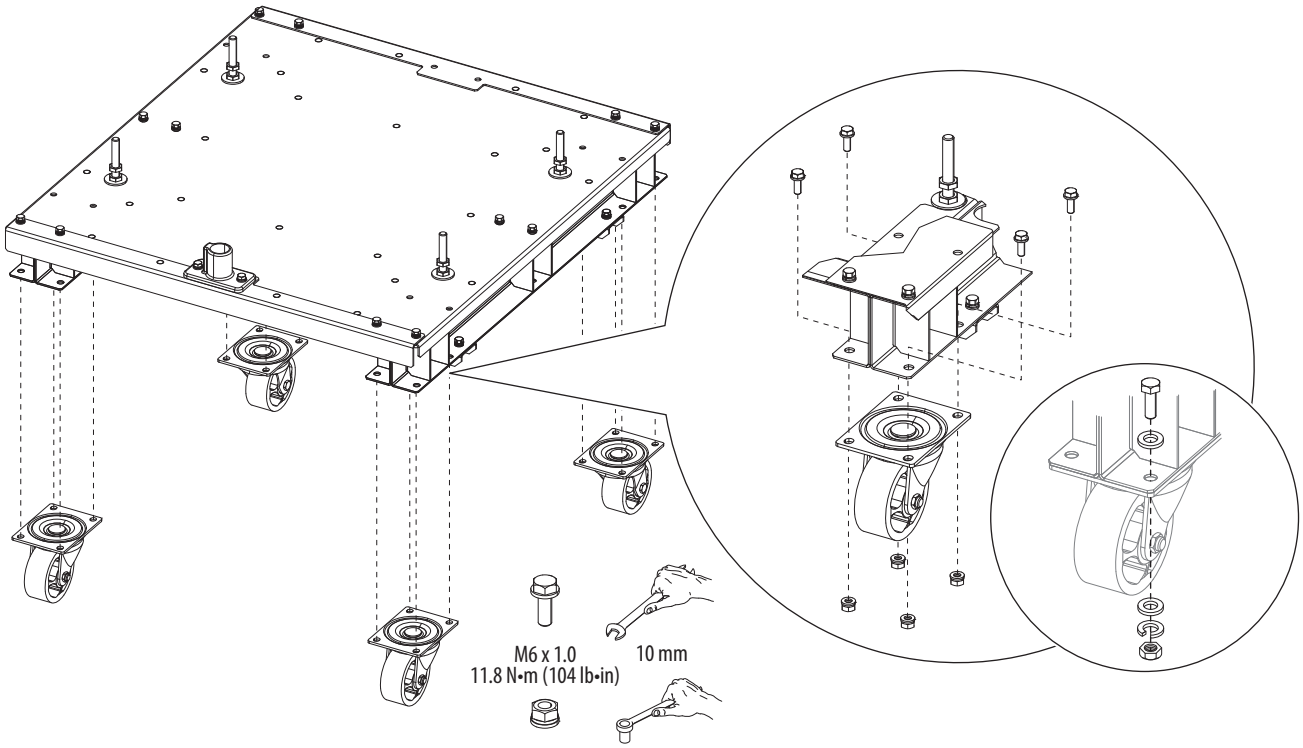
5. Bolt the spacer or spacer assembly to the bottom of the cart chassis.



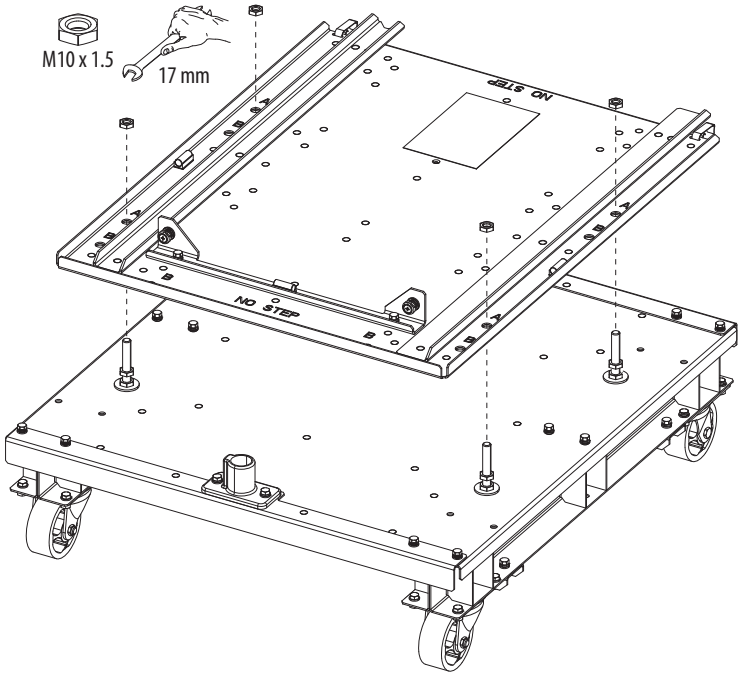
6. Bolt the cross beams to the bottom of the spacers.



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 85 - Reach Position A

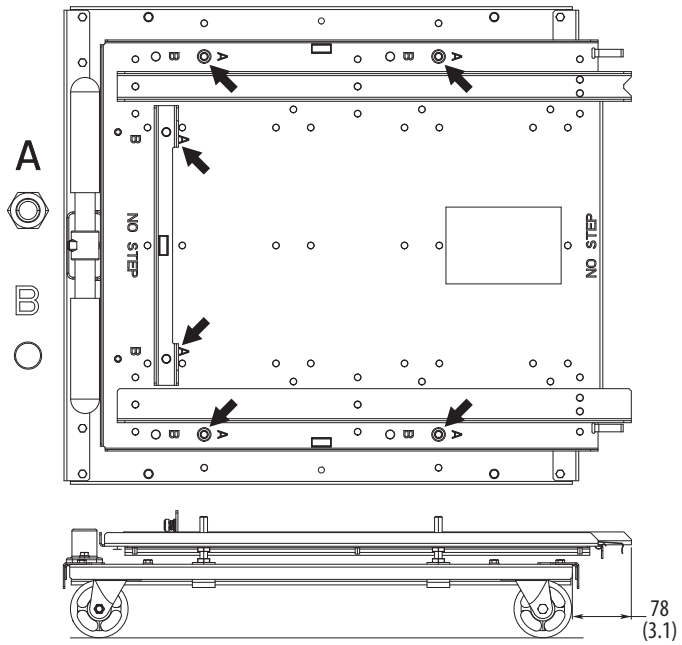
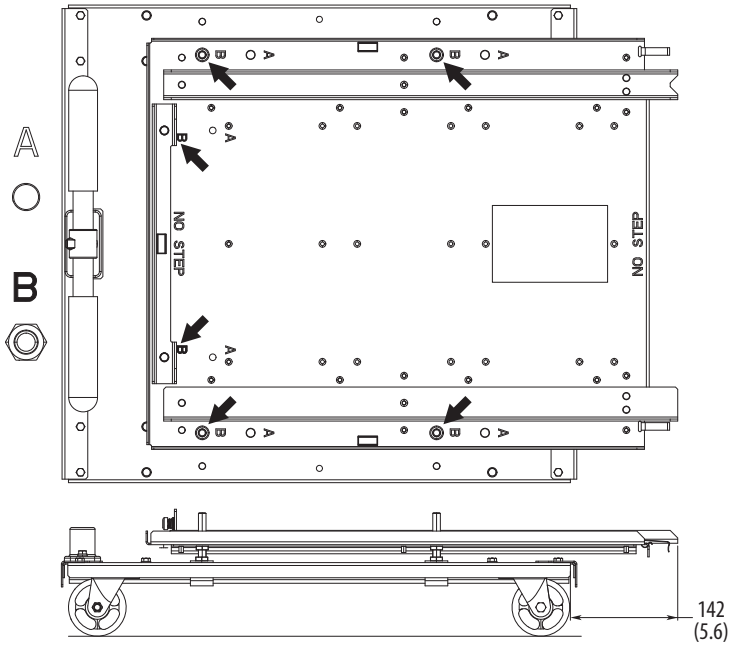


Figure 86 - Reach Position B

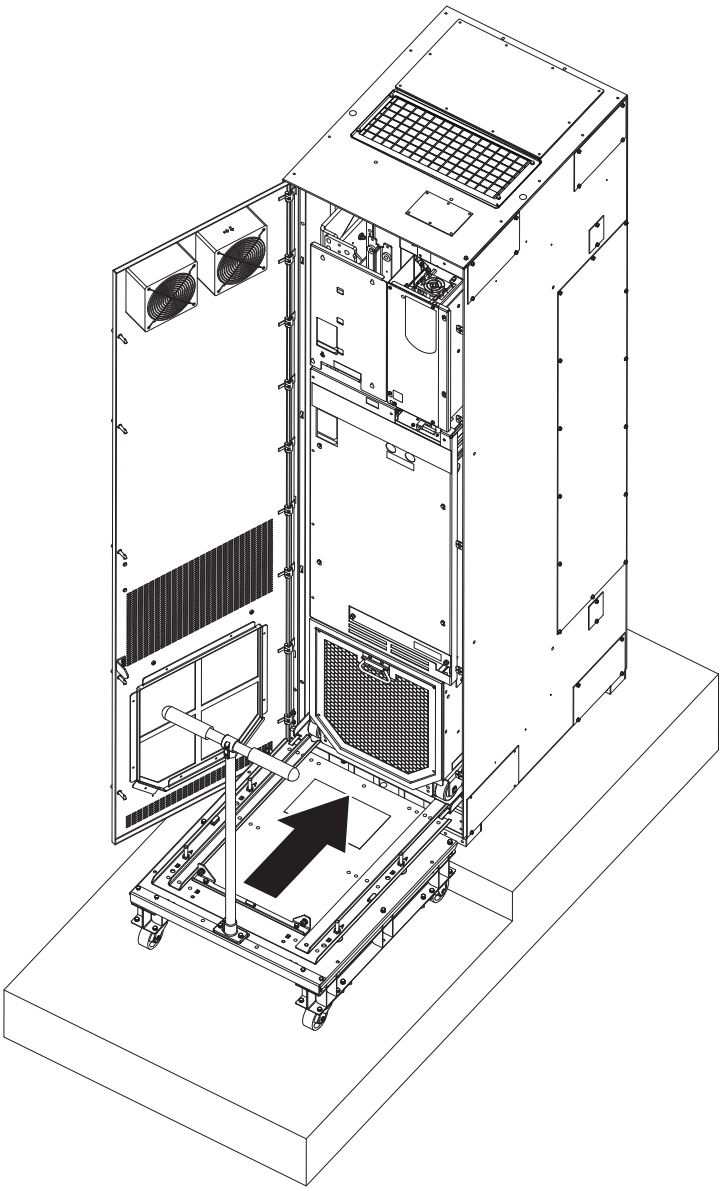


ATTENTION: A tip over hazard exists. To guard against death, serious personal injury, and/or equipment damage, verify the Drive Stop (see Figure 84) is in the same position as the corresponding threaded leveling studs. The weight of the drive must be evenly distributed over the cart wheels.

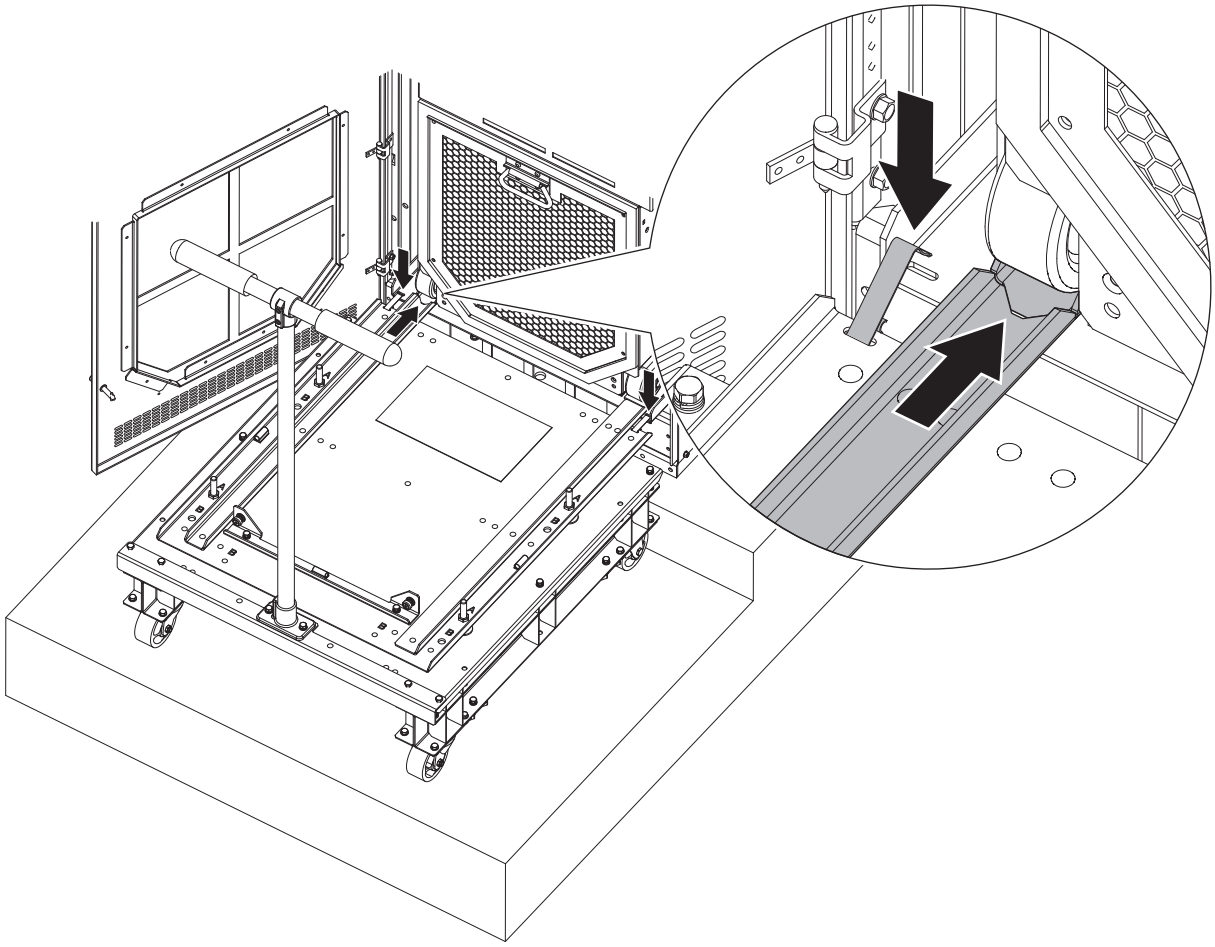
Remove Drive Assembly or Cabinet Options Assembly

This section assumes that the steps in Release Drive Assembly From Cabinet or Release Cabinet Options 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.

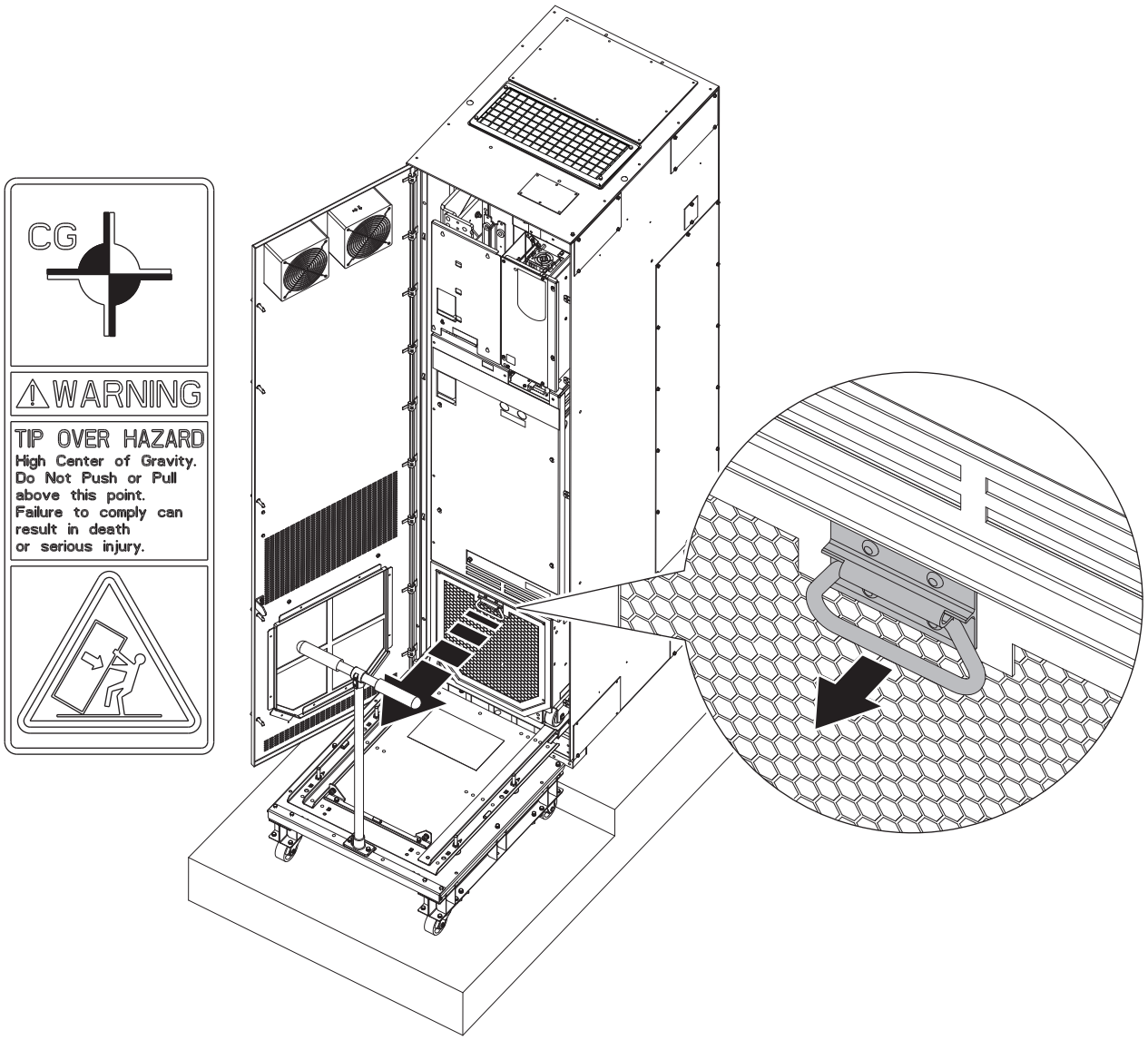


2. Use the alignment track to center the Roll-out Cart and engage the two retaining clips.



Drive Assembly – Floor Mount Frames 8…10

Use the handle above the fan intake to slowly and smoothly pull the drive assembly on to the Roll-out Cart.

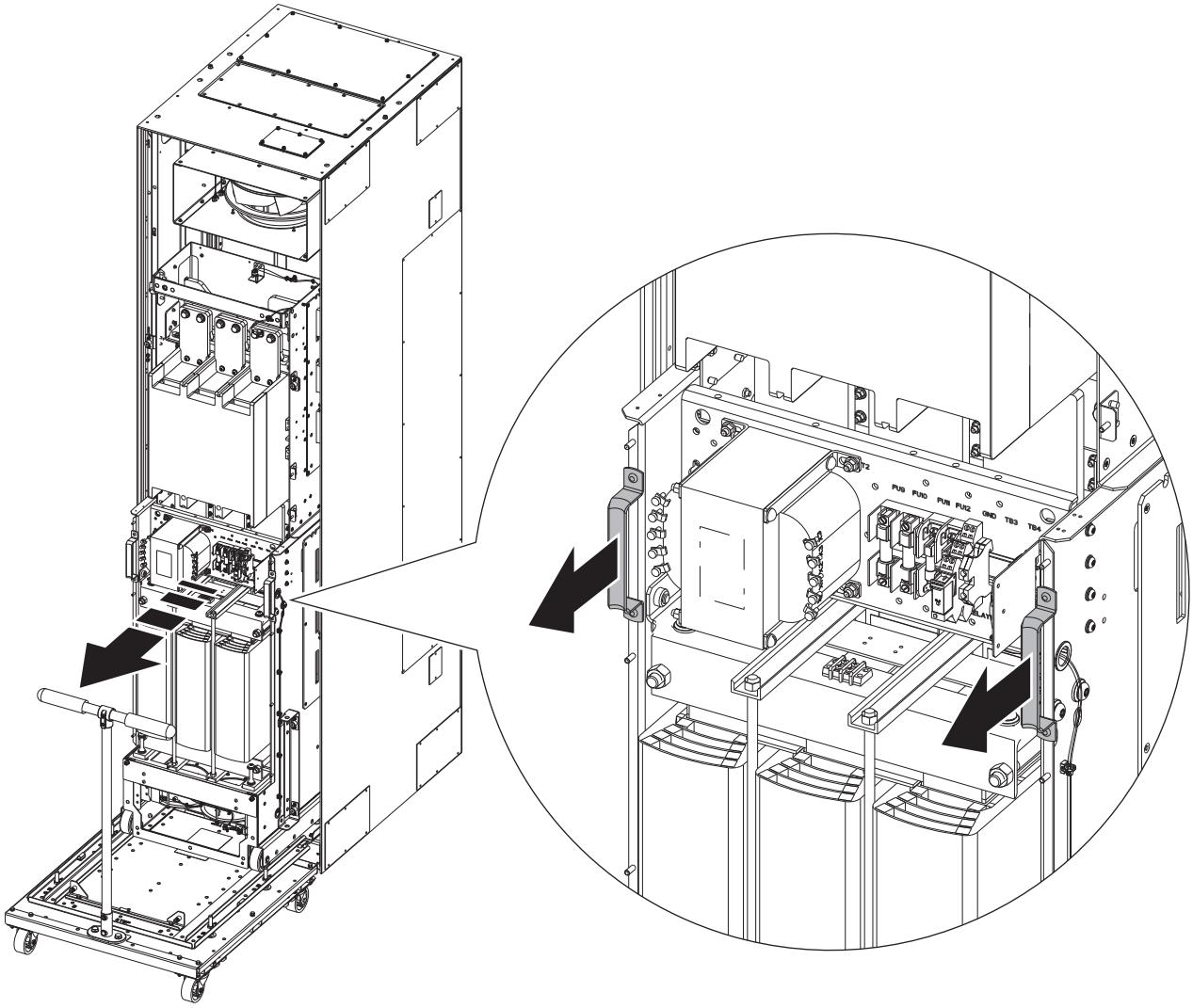


ATTENTION: This drive has a high center of gravity and a tip-over hazard exists. To guard against death, serious personal injury, and/or equipment damage, do not subject the drive to high rates of acceleration or deceleration while transporting. Do not push or pull above the points indicated on the drive.

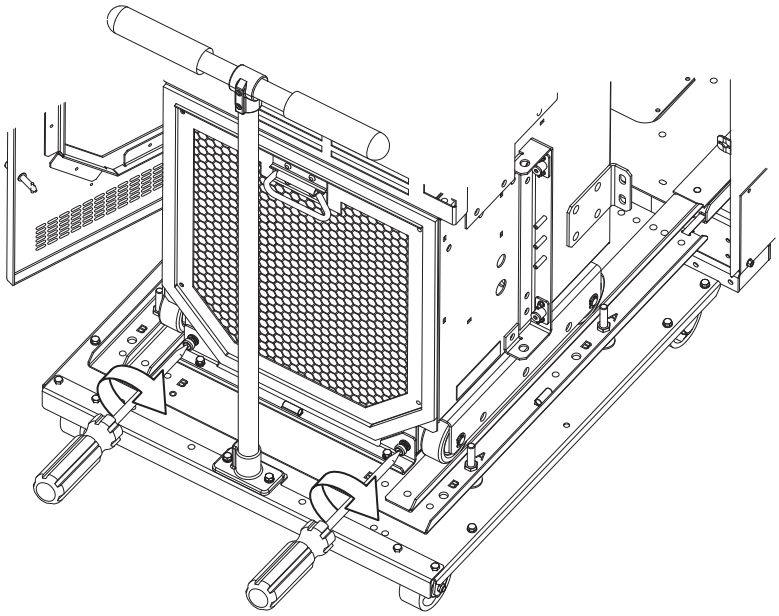
Cabinet Options Assembly – Floor Mount Frames 9 and 10

Use the two handles on each side of cabinet options assembly to slowly and smoothly pull the assembly on to the Roll-out Cart.

Refer to page 128 for information on related electrical connections.



3. Engage and tighten the capture screws to lock the drive assembly or cabinet options assembly to the Stop.



4. Release the retaining clips to roll the drive assembly or cabinet options assembly away from the cabinet.

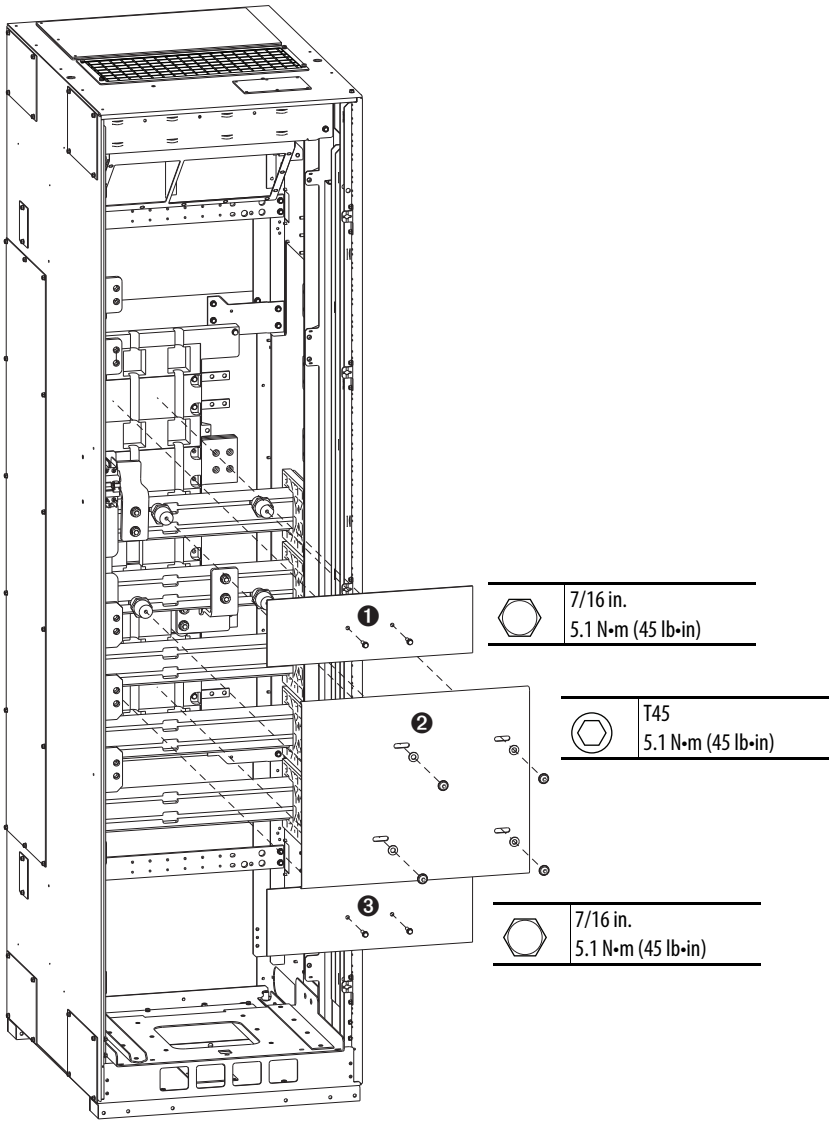
ATTENTION: The drive assembly and cabinet options assembly have a high center of gravity and a tip over hazard exists. To guard against death, serious personal injury, and/or equipment damage, do not subject the drive assembly or cabinet options assembly to high rates of acceleration or deceleration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

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

- Only use the Roll-out Cart to move the drive or cabinet options a short distance in order to gain access to the cabinet interior.
- Do not attempt to move the drive or cabinet options 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.
- Verify the path for the cart is clear of debris and obstacles.
- Avoid sloped and rough surfaces.
- Always move the drive or cabinet options 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 or Cabinet Options Assembly

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

1. Align the Roll-out Cart and drive assembly or cabinet options with the cabinet and lock into position according to the procedures described in Remove Drive Assembly or Cabinet Options Assembly on page 138.
2. Disengage the capture screws and slowly push the drive assembly or cabinet options assembly into the cabinet.
3. Secure the assembly-to-cabinet connections then the bus connections. Refer to Side Shield and Bus Bar Connections on page 119 for torque values.

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

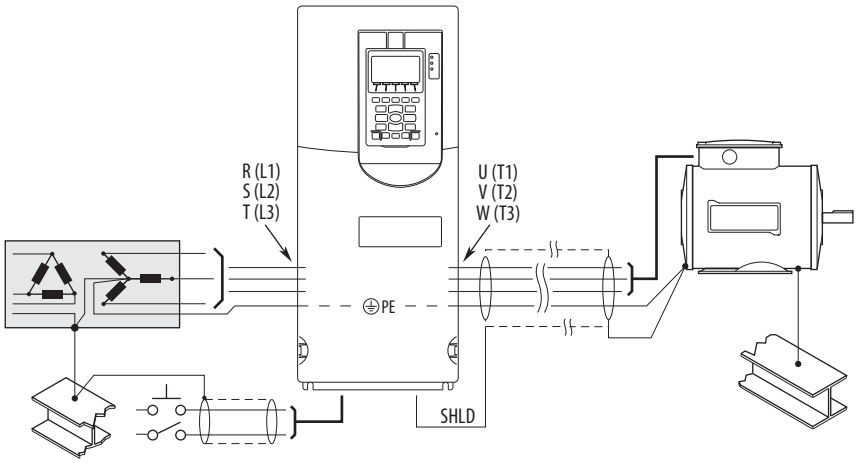
The drive Safety Ground-PE must be connected to system ground. Ground impedance must conform to the requirements of national and local industrial safety regulations and/or electrical codes. The integrity of all ground connections should be periodically checked.

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 87 - Typical Grounding



Shield Termination - SHLD

The Shield terminal (see page 149) 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. Be sure 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

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.

ATTENTION: National Codes and standards (NEC, BSI and so forth) 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.

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 7 - Wall Mount 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)	#2 Pozidrive®, M3 x 7
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)	#2 Pozidrive®, M3 x 7
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 8 - Wall Mount Frames 6 and 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

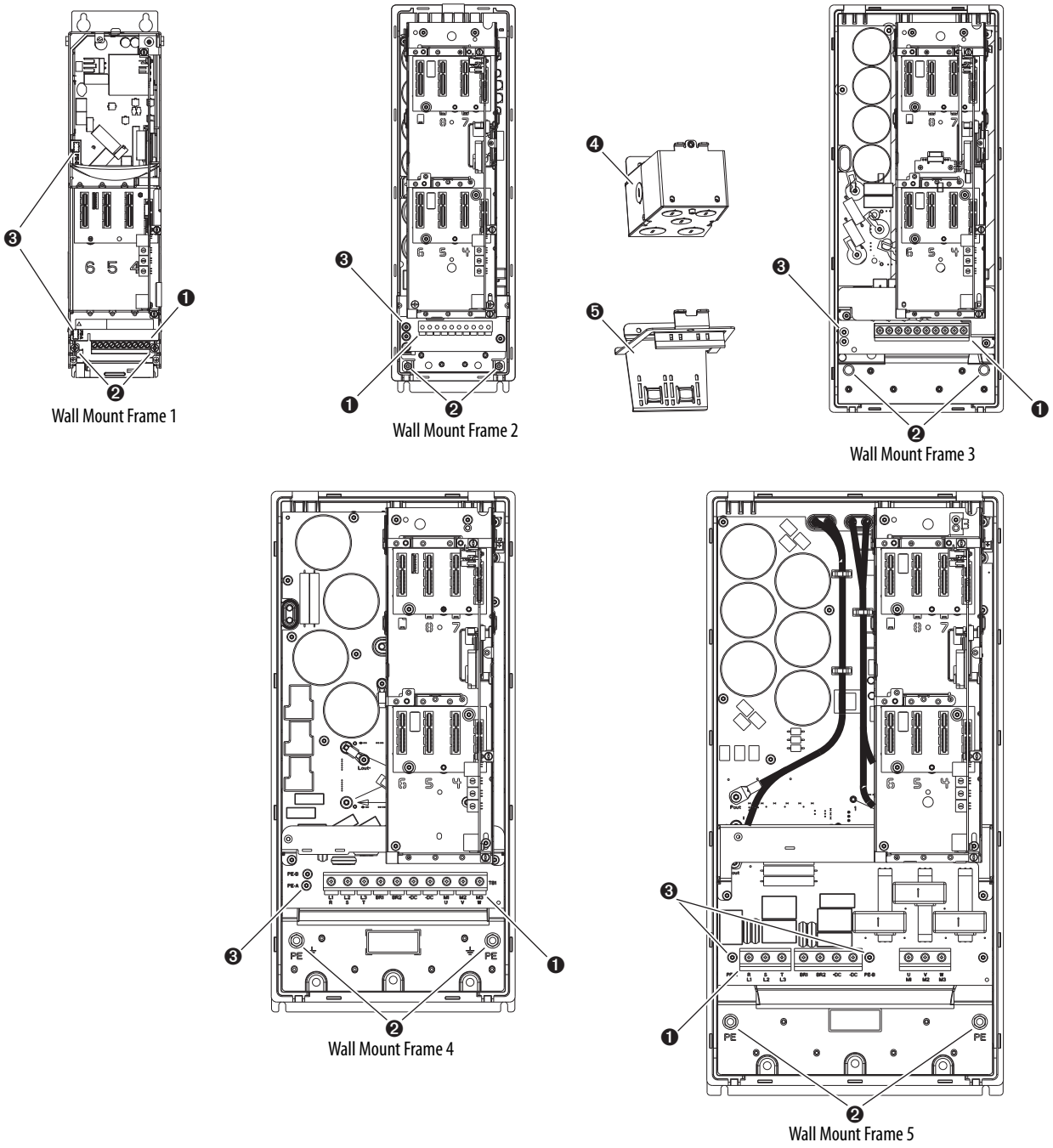
(1) Lugs are supplied by the user.

Table 9 - Wall Mount 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

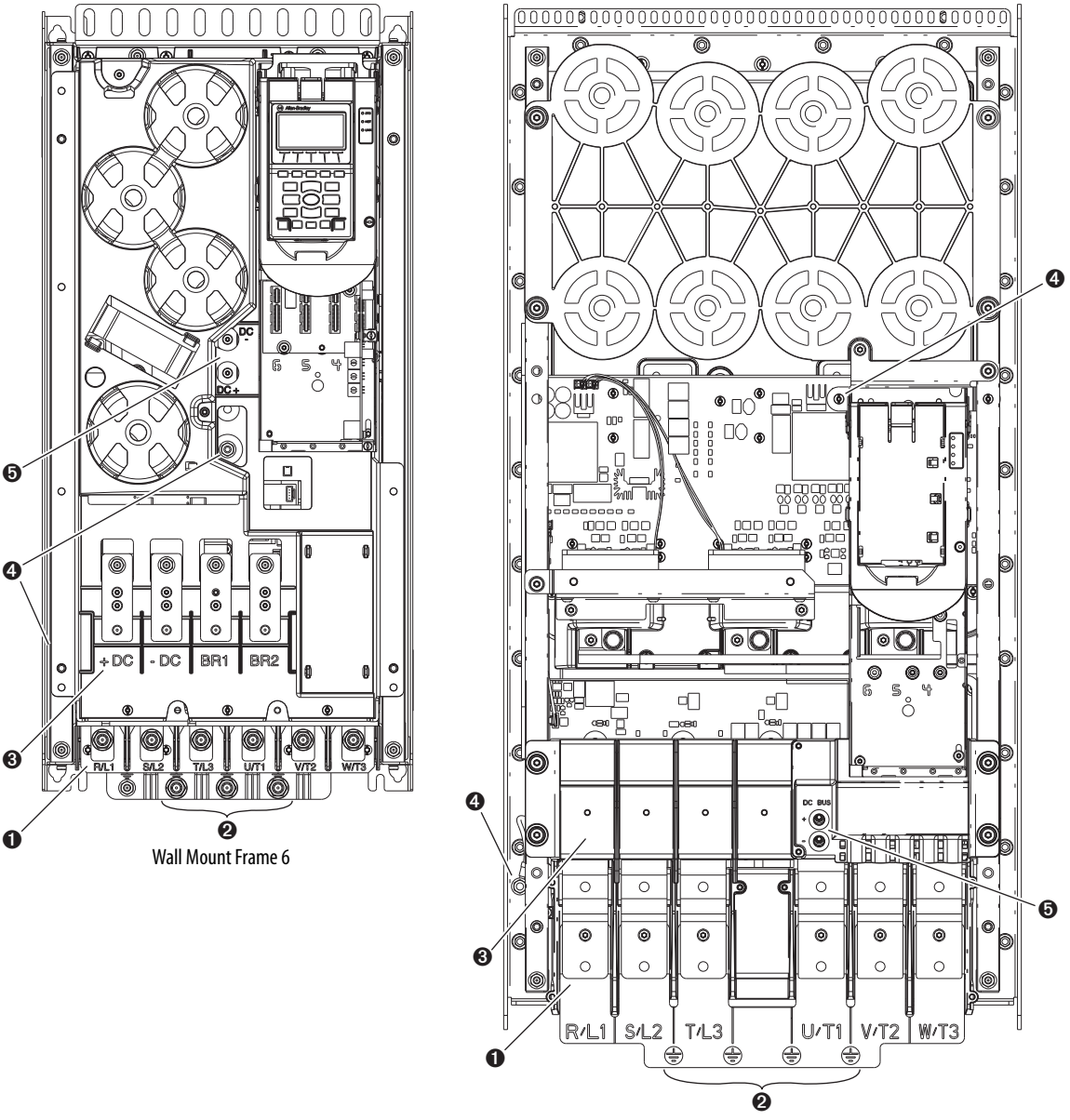
Three-Phase Terminal Locations

Figure 88 - Wall Mount Frames 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 89 - Wall Mount Frames 6 and 7 Power Terminal and Termination Point Locations



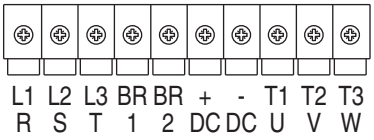
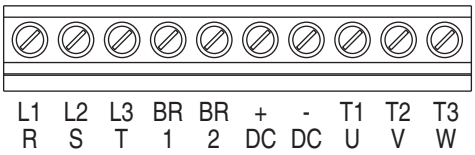
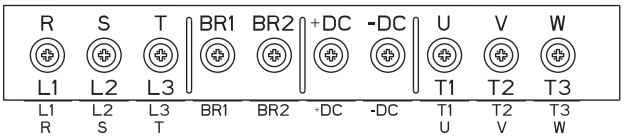
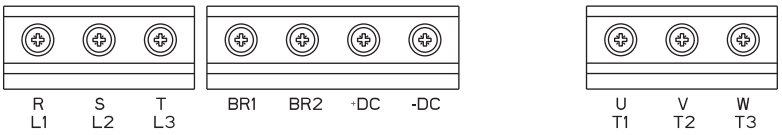
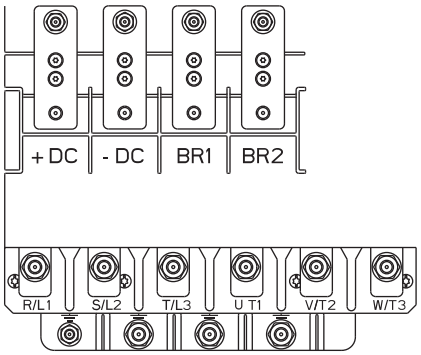
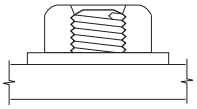
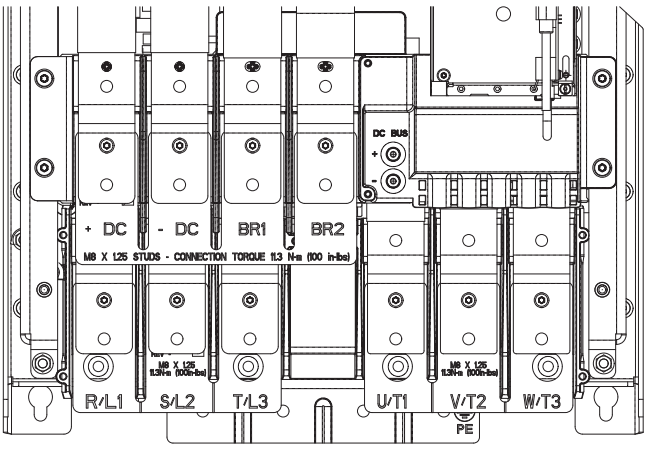
Wall Mount Frame 6

400/480V drives shown.

Wall Mount 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

Wall Mount Frames 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 13.

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

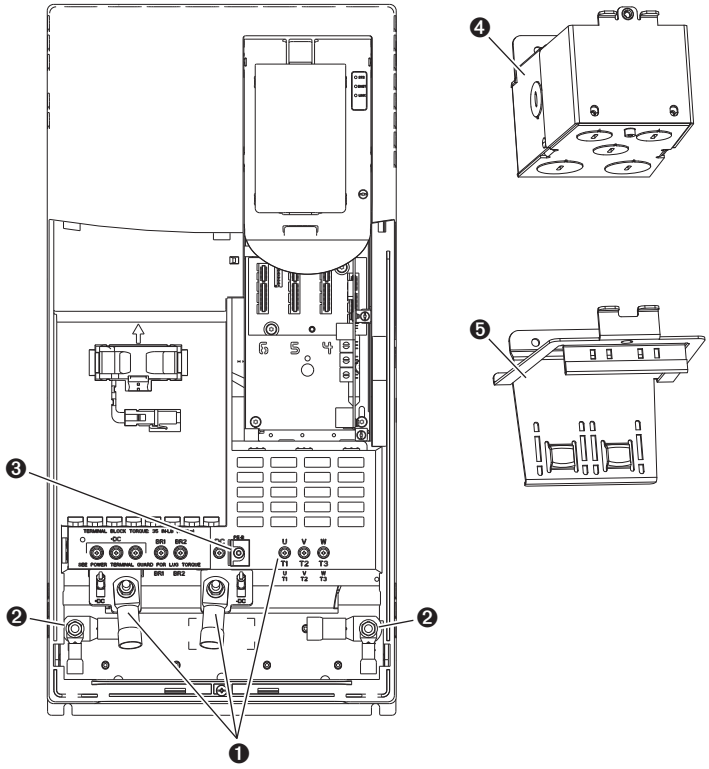
Table 10 - Terminal Designations

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.

Wall Mount Frames 5…7 Common DC Input Terminal Locations

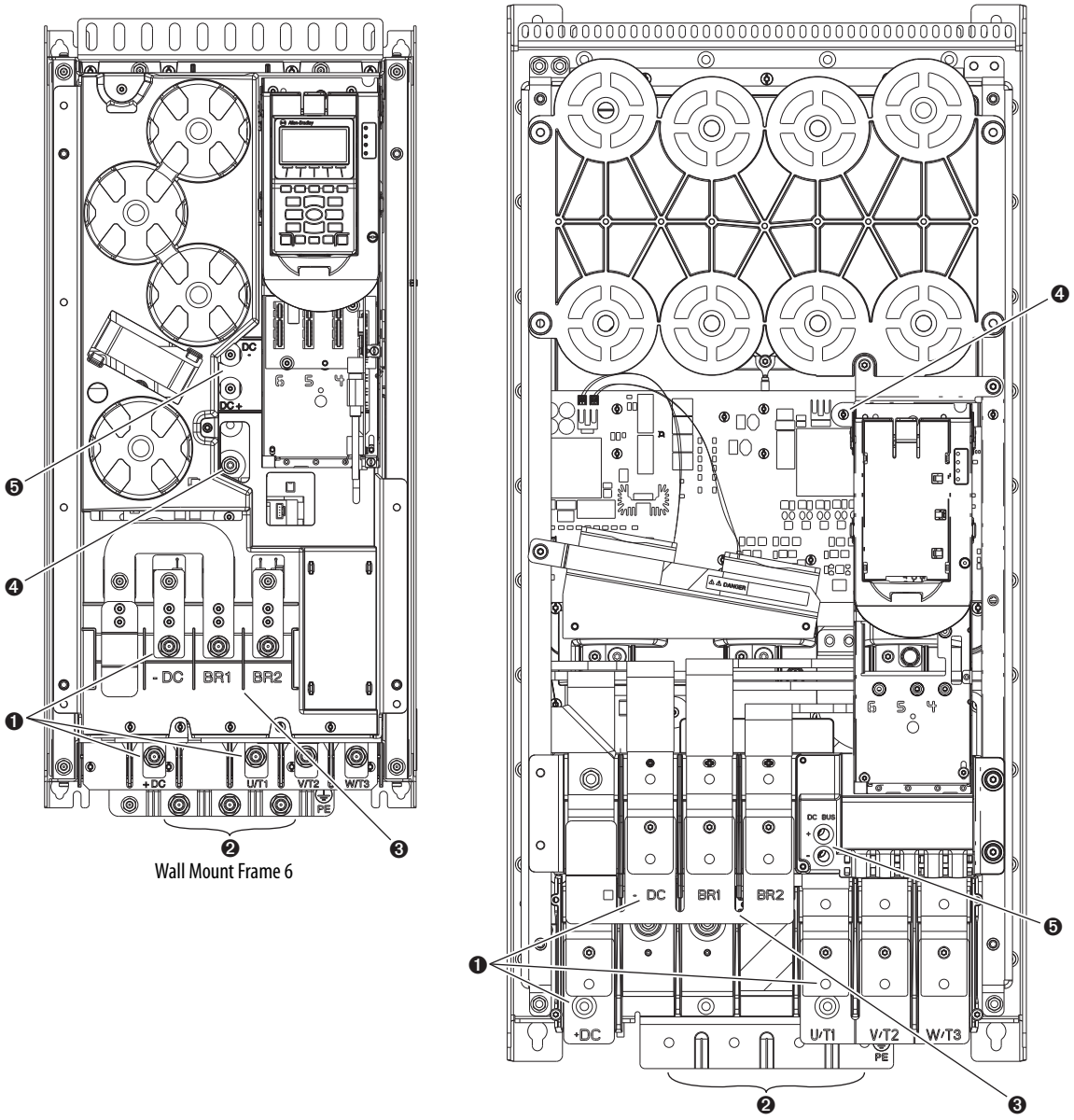
Figure 90 - Wall Mount Frame 5 Common DC Input Power Terminal and Termination Point Locations



Wall Mount 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 91 - Wall Mount Frames 6 and 7 Common DC Input Power Terminal and Termination Point Locations

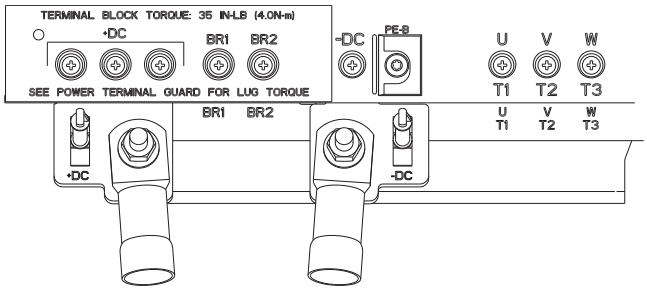
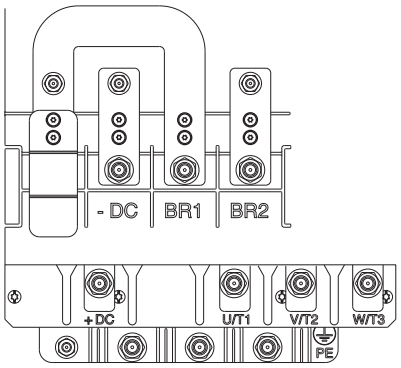
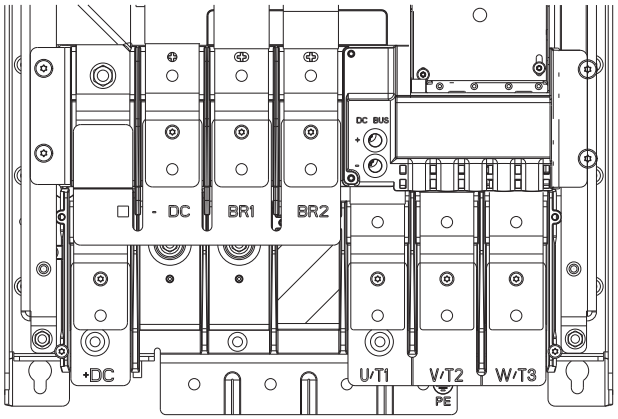


Wall Mount Frame 6

Wall Mount 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

Wall Mount Frames 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 13.

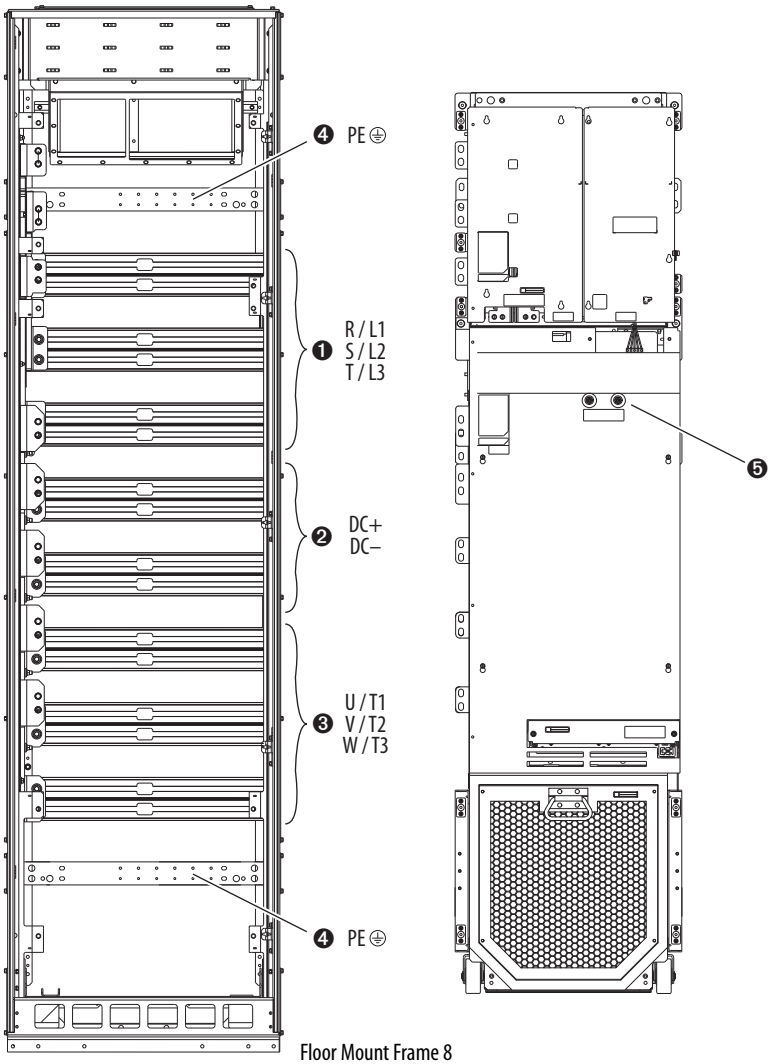
Table 11 - Common DC Input Terminal Designations

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.

Floor Mount Frames 8…10 Bus Bar Locations

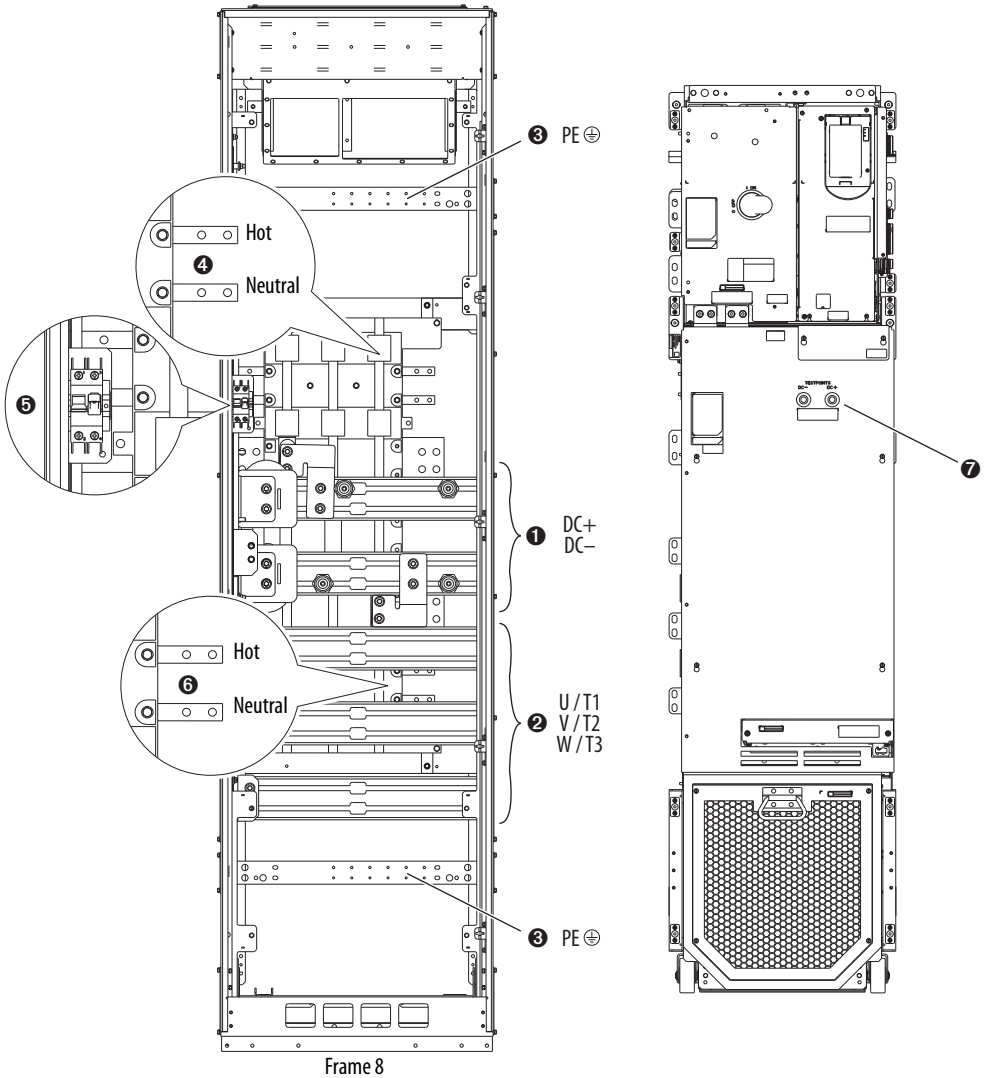
Figure 92 - Bus Bar Locations, AC Input Drives



Floor Mount Frame 8

No.	Name	Description
❶	Power Bus	R/L1, S/L2, T/L3 (Drive only.)
❷	DC Bus	DC+, DC- (The DC Bus is included with frame 9 and 10 drives. Frame 8 drives require the field installed kit 20-750-BUS1A-F8.)
❸	Power Bus	U/T1, V/T2, W/T3 (Drive only or Cabinet Options Bay without power output options.)
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 93 - Bus Bar and AC Power Rail Locations, Common DC Input Floor Mount Drives



Frame 8

Table 12 - Floor Mount 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. The UPS rail is only installed when the P30 UPS Control Bus option is selected.
❼	DC+ and DC-	Bus Voltage Test Points

Figure 94 - Bus Bar Locations, Floor Mount Frame 8 Option P14 Wiring Bay

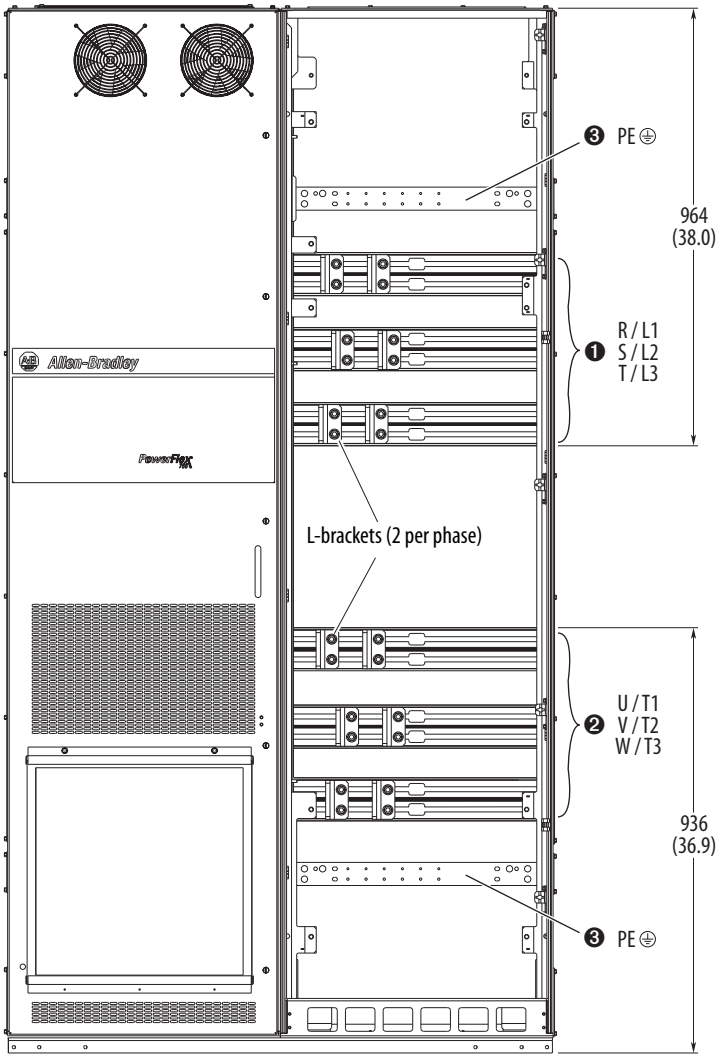


Table 13 - Floor Mount Frame 8 Wiring Bay

No.	Name	Description
❶	Power Bus	R/L1, S/L2, T/L3
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.

See Floor Mount Frames 8...10 Power Terminal L-Brackets on page 162 for information on making cable connections on extruded bus bars.

Floor Mount Cabinet Options Bay

Figure 95 - Bus Bar Locations, Floor Mount Frame 9 Cabinet Options Bay (Cabinet Options Assembly Removed)

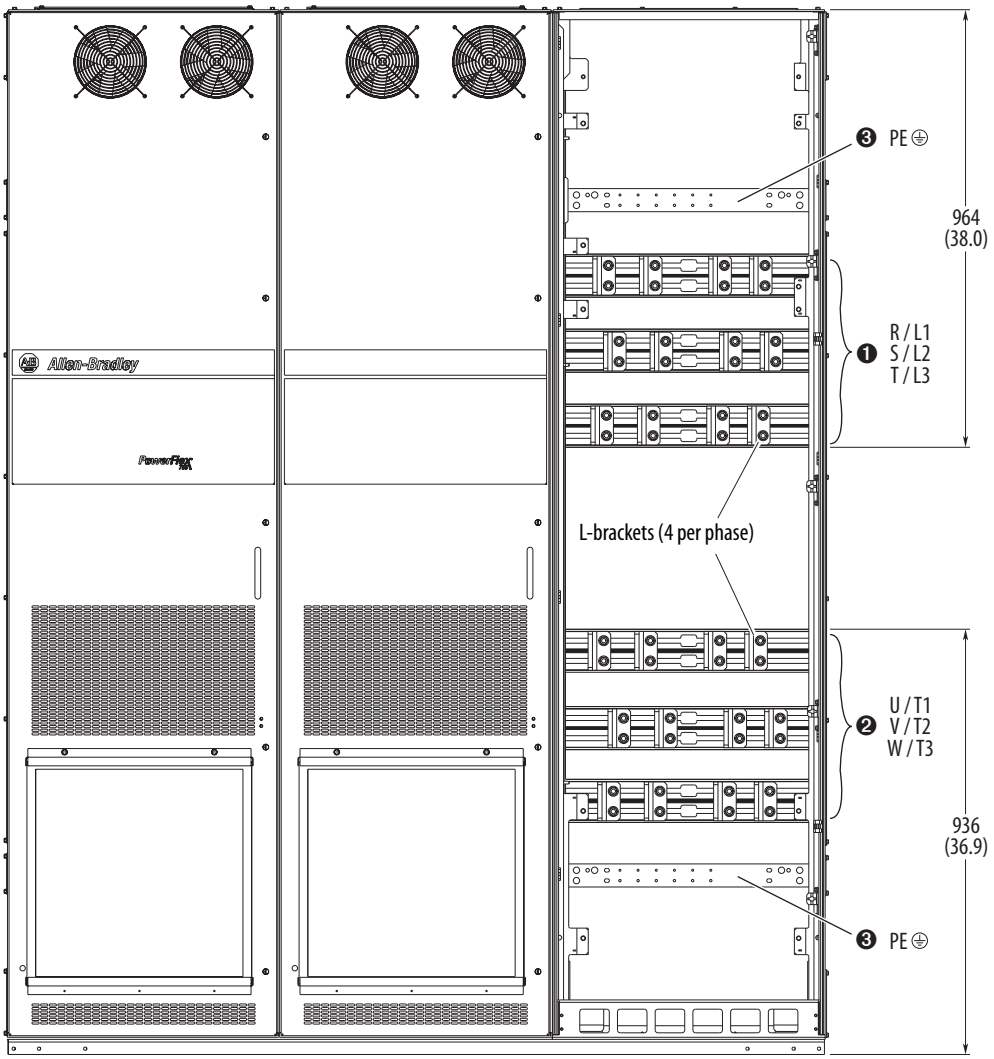
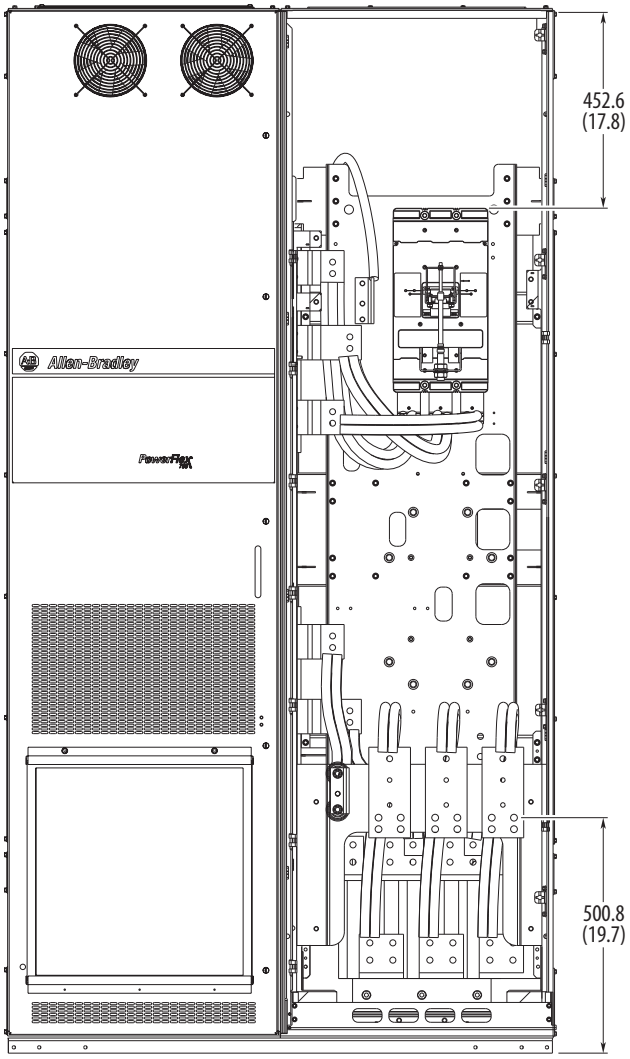


Table 14 - Floor Mount Frame 9 Cabinet Options Bay Bus Bars

No.	Name	Description
❶	Power Bus	R/L1, S/L2, T/L3
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.

See Floor Mount Frames 8...10 Power Terminal L-Brackets on page 162 for information on making cable connections on extruded bus bars.

Option P3 or P5 Disconnect Switch Wiring Clearance



Floor Mount Frames 8…10 Power Wiring Options

The following table describes the cabling options available for each Floor Mount Frames 8...10 drive enclosure. Refer to pages 70...114 for conduit plate dimensions.

Adequate Spacing
Available conduit plates provide adequate spacing for typical cabling.

0

Possible – Evaluation is Required
Available conduit plates must be evaluated to determine if cabling will fit.

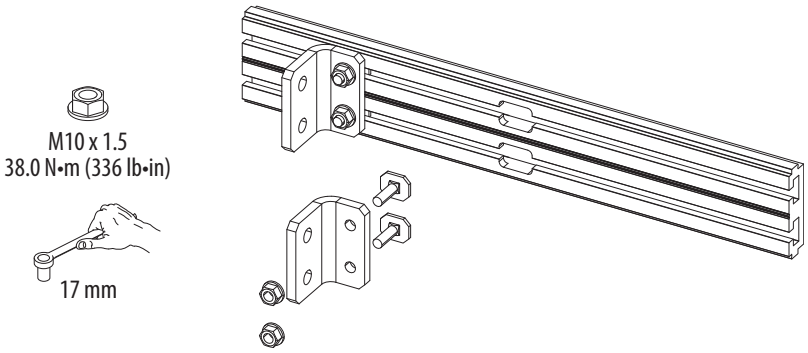
X

Not Possible – Insufficient Spacing
Conduit plates are not available for the specified configuration.

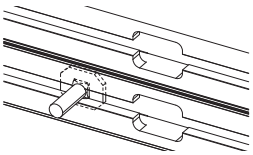
Frame	Enclosure Rating	Enclosure Code	Cabinet Layout	Top Entry/ Top Exit	Top Entry/ Bottom Exit	Bottom Entry/ Top Exit	Bottom Entry/ Bottom Exit
8	IP20, NEMA/UL Type 1	B	600 mm Drive Cabinet	X		X	0
		L, P, W	800 mm Drive Cabinet	0		0	
		B	600 mm Drive with Cabinet Options Bay			X	0
		L, P, W	800 mm Drive with Cabinet Options Bay			0	
		B	600 mm Drive with Wiring Bay				
		L, P, W	800 mm Drive with Wiring Bay				
		B	600 mm Drive with Cabinet Options and Wiring Bays				
		L, P, W	800 mm Drive with Cabinet Options Bay and Wiring Bays				
	IP54, NEMA Type 12	J, K, Y	800 mm Drive Cabinet	X	X	X	
		J, K, Y	800 mm Drive with Cabinet Options Bay	X		0	0
		J, K, Y	800 mm Drive with Wiring Bay				
		J, K, Y	800 mm Drive with Cabinet Options Bay and Wiring Bays				
9	IP20, NEMA/UL Type 1	B	600 mm Drive Cabinet	0		0	0
		L, P, W	800 mm Drive Cabinet				
		B	600 mm Drive with Cabinet Options Bay			X	
		L, P, W	800 mm Drive with Cabinet Options Bay				
		B	600 mm Drive with Wiring Bay				
		L, P, W	800 mm Drive with Wiring Bay				
		B	600 mm Drive with Cabinet Options and Wiring Bays				
		L, P, W	800 mm Drive with Cabinet Options Bay and Wiring Bays				
	IP54, NEMA Type 12	J, K, Y	800 mm Drive Cabinet	X	X	X	
		J, K, Y	800 mm Drive with Cabinet Options Bay	0		0	
		J, K, Y	800 mm Drive with Wiring Bay				
		J, K, Y	800 mm Drive with Cabinet Options Bay and Wiring Bays				
10	IP20, NEMA/UL Type 1	B	600 mm Drive Cabinet	0		0	0
		L, P, W	800 mm Drive Cabinet			0	
	IP54, NEMA Type 12	J, K, Y	800 mm Drive Cabinet	X	X	X	

Floor Mount Frames 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 97.



IMPORTANT

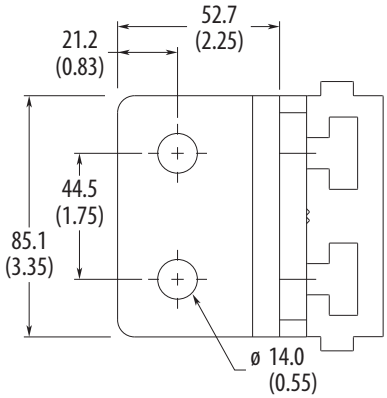


Verify that clamp fits squarely in the bus bar channel

Additional Power Terminal L-Brackets

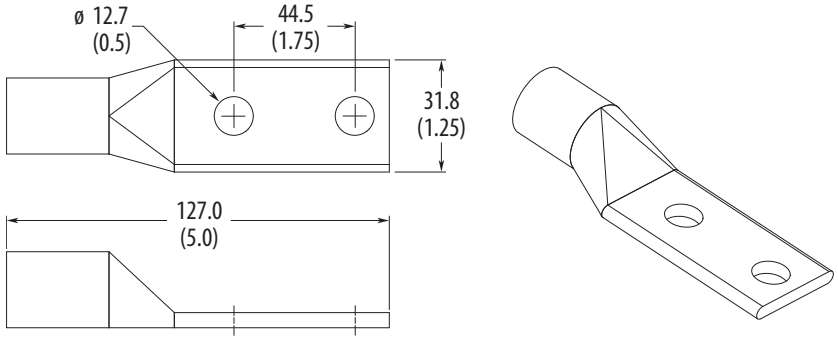
Frame 8 and larger drives come equipped with two L-brackets per AC phase. If an application requires additional L-brackets, kit number 20-750-LBRKT1 is available. Each kit contains three L-brackets and mounting hardware.

Figure 96 - L-Bracket Approximate Dimensions



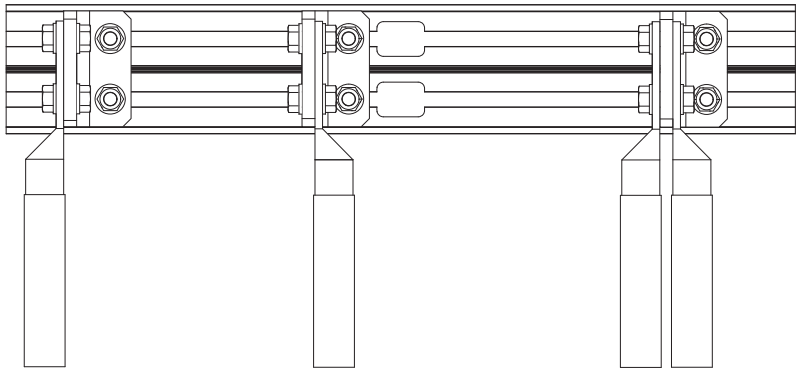
Crimp terminals should be applied to cabling using the vendor-recommended tooling. Mechanical terminals should be torqued per vendor instructions. When using mechanical terminals, which may be large, be sure to maintain adequate spacing to adjacent wires, terminals, and other parts.

Figure 97 - 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 98 - Typical Lug Connection Options



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

Recommended Motor Cable Spacing - Floor Mount Frames 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 99 - Recommended Cable Spacing Example - Floor Mount Frame 9 without Cabinet Options Bay

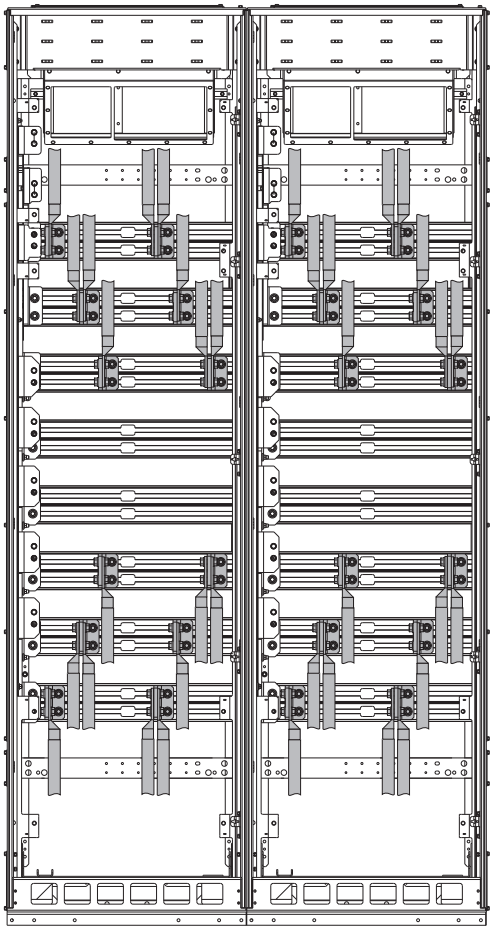
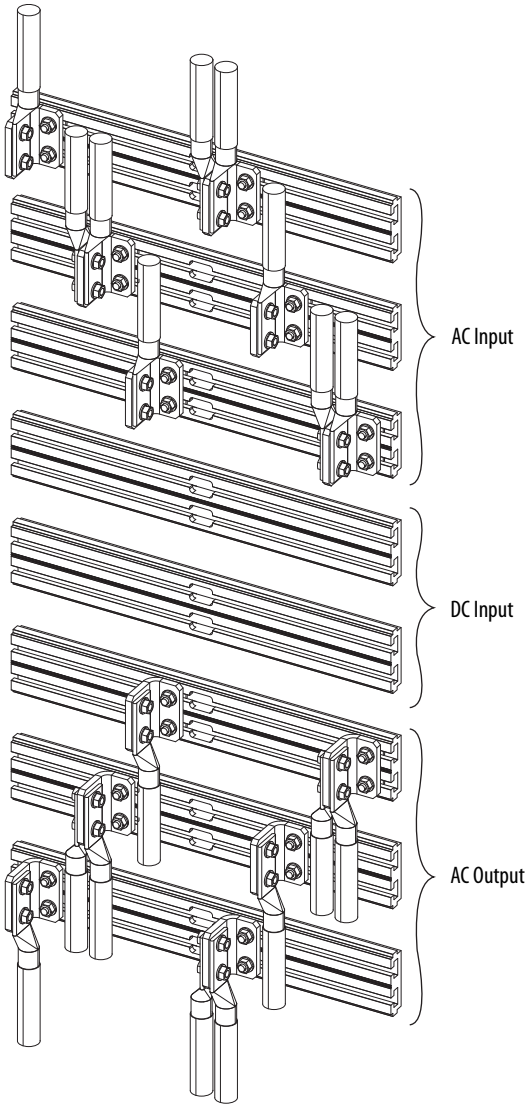
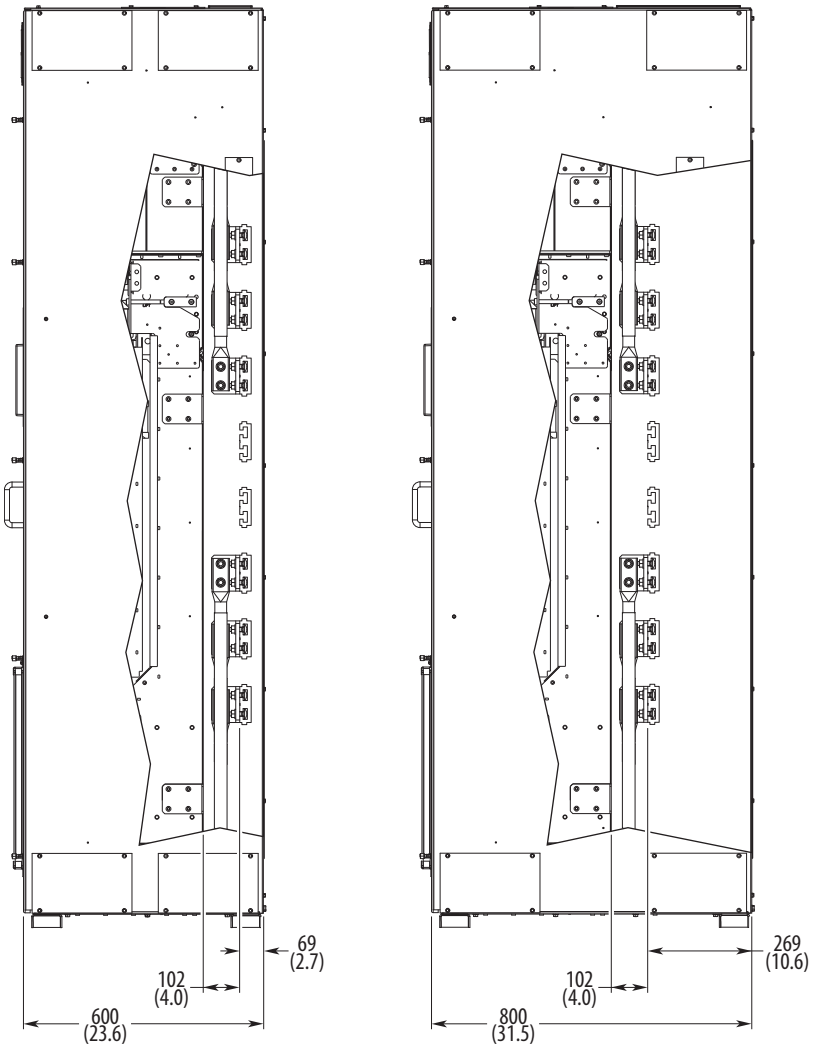


Figure 100 - Top And Bottom Entry Power Connection Example



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 101 - Floor Mount Drives Cabinet Clearances



Dimensions are in millimeters and (inches).

Fuse and Circuit Breaker Ratings

The tables on the following pages provide recommended AC line input fuse and circuit breaker information. See Fusing and Circuit Breakers on the next page for UL and IEC requirements. Sizes listed are the recommended sizes based on 40 °C (104 °F) and the U.S. NEC. Other country, state, or local codes can require different ratings. DC link fuse recommendations for DC input drives are also provided. In addition, Frame 8 and larger drives include AC line fuses (with blown fuse indicators) to provide drive short circuit protection.

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 169 and 173 are acceptable.	All devices listed on pages 169 through 182 are acceptable.
			Installed outside of cabinet using NEMA Type 1 kit or in a ventilated cabinet.	Only non-time delay fuses listed on pages 169 and 173, excluding maximum value, are acceptable.	
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 169, 173, 177, and 181 are acceptable.	
	F	Flange			
	N	IP20 NEMA/UL Open Type	Installed outside of cabinet using NEMA Type 1 kit or in a ventilated cabinet.	400V AC/540V DC or 480V AC/650V DC drives: Only non-time delay fuses listed on pages 169 and 173, excluding maximum value, are acceptable. 600V AC/810V DC drives: Only non-time delay fuses listed on page 177 are acceptable, with maximum value of 40A (Frame 3), 60A (Frame 4) and 100A (Frame 5).	
	F	Flange			
	G	IP54 NEMA/UL Type 12	Installed inside or outside of any cabinet.	All devices listed on pages 169, 173, 177, and 181 are acceptable.	
6…7	N	IP00 NEMA/UL Open Type	Installed in any cabinet. Heat sink is inside or outside of cabinet.	400V AC/540V DC or 480V AC/650V DC drives: All devices listed on pages 169, 173, 177, and 181 are acceptable. 600V AC/810V DC or 690V AC/932V DC drives: Only time delay and non-time delay fuses listed on pages 177 and 181 are acceptable.	
			Installed outside of cabinet using NEMA Type 1 kit.		
	G	IP54 NEMA/UL Type 12	Installed inside or outside of any cabinet.	All devices listed on pages 169, 173, 177, and 181 are acceptable.	
8…10	B, L, P, W	IP20 NEMA/UL Type 1	Installed inside of any cabinet.	All devices listed on pages 171, 175, 179 and 182 are acceptable.	
	J, K, Y	IP54 NEMA 12	Installed inside of any cabinet.	All devices listed on pages 171, 175, 179 and 182 are acceptable.	

Fusing

The recommended fuse types are listed below. If available current ratings do not match those listed in the tables provided, choose the next higher fuse rating.

- IEC – BS88 (British Standard) Parts 1 & 2, EN60269-1, Parts 1 & 2 [(1)], type gG or equivalent should be used.
- UL – UL Class CC, T, RK1, J, or L should be used.

Circuit Breakers

The "non-fuse" listings in the following tables include inverse time circuit breakers, instantaneous trip circuit breakers (motor circuit protectors) and 140M self-protected combination motor controllers. If one of these is chosen as the desired protection method, the following requirements apply:

- IEC – Both types of circuit breakers and 140M self-protected combination motor controllers are acceptable for IEC installations.
- UL – Only inverse time circuit breakers and the specified 140M self-protected combination motor controllers are acceptable for UL installations.
- Drives without a 140M recommendation have not been tested in combination with the drive.

140G circuit breakers, used in frame 8 and larger drives, are set by the factory for the duty rating of the drive. The default switch settings for each drive rating are listed in the PowerFlex 750-Series AC Drives Frames 8 and Larger Hardware Service Manual, Appendix C, publication 750-TG001.

(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 - Wall Mount 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 (11)
			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 (6)	Motor Circuit Protector (7)	140M Type E Combination Motor Controller with Adjustable Current Range (8) (9)				Continuous DC Input	Non-Time Delay Fuse
			(x = F or G)	1 min	3 sec	(x = F or G)	1 min	3 sec	kVA	Amps	Min (4)	Max (5)	Min (4)	Max (5)			Cat. No.			Min Enclosure Volume (in.^{3}) (10)	Amps	
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	M-C2E-B25	M-D8E-B25		7269	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	M-C2E-B40	M-D8E-B40		7269	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	M-C2E-B63	M-D8E-B63		7269	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	M-C2E-C10	M-D8E-C10	M-F8E-C10	7269	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	M-C2E-C16	M-D8E-C16	M-F8E-C16	7269	12.6	HSJ20
7.5 kW	1	15.4	20x...C015	16.9	23.1	20x...C022 (3)	17.3	23.1	10.1	14.6	20	25	20	25	60	20	M-C2E-C20	M-D8E-C20	M-F8E-C20	7269	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		9086	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		9086	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		9086	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	9086	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	9086	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	9086	17.0	HSJ25
11 kW	2	22	20x...C022	24.2	33.0	20x...C030 (3)	33.0	45.0	14.6	21.1	30	45	30	80	80	30		M-D8E-C25	M-F8E-C25	9086	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	9086	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	9086	41.4	HSJ70
22 kW	3	43	20x...C043	47.3	64.5	20x...C060 (3)	66.0	90.0	28.5	41.2	55	90	55	150	120	60					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					67.1	HSJ100
37 kW	4	72	20x...C072	79.2	108.0	20x...C085 (3)	108.0	129.6	48.9	70.5	90	150	90	275	200	100					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					97.3	HSJ150
55 kW	5	104	20x...C104	114.4	156.0	20x...C140 (3)	156.0	210.0	71.3	102.9	130	225	130	400	300	150					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					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					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					234.7	HSJ350
132 kW	6	260	20x...C260	286.0	390.0	20x...C302 (3)	390.0	468.0	176.5	254.7	325	575	325	750	700	400					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					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					420.2	Bussman 170M6612
250 kW	7	456	20x...C456	501.6	684.0				309.5	446.7	600	1000	600	1800	1300	600					522.0	Bussman 170M6613

See page 170 for notes.

(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) This drive is the next larger frame size.
(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) Bulletin 140M with adjustable current range should have the current trip set to the minimum range that the device will not trip.
(9) Manual Self-Protected (Type E) Combination Motor Controller, UL listed for 480Y/277V and 600Y/347V AC Input. Not UL listed for use on 480V or 600V Delta/Delta, corner ground, or high-resistance ground systems.
(10) When using a Manual Self-Protected (Type E) Combination Motor Controller, the drive must be installed in a ventilated or non-ventilated enclosure with the minimum volume specified in this column. Application specific thermal considerations may require a larger enclosure.
(11) 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 - Floor Mount 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)								Input Quantities	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]	Continuous DC Input	
					1 min	3 sec				1/Phase Min [4]	2/Phase Min [4]	Max [5]	1/Phase Min [4]	2/Phase Min [4]	Max [5]				
400V AC Input																		**540V DC Input**	
200 kW	8	385	Heavy	20G...C460	578	693	380	1100	–	500	–	850	500	–	1100	1100	500	443	1600
250 kW	8	460	Normal	20G...C460	506	693	455	1100	–	600	–	1000	600	–	1300	1300	600	529	1600
		456	Heavy	20G...C540	684	821	450	1100	–	600	–	1000	600	–	1300	1300	600	525	1600
		472	Heavy	20G...C567	708	851	466	1100	–	600	–	1000	600	–	1400	1400	600	543	1600
315 kW	8	540	Light	20G...C460	594	–	534	1100	–	700	350	1200	700	350	1600	1600	700	621	1600
		540	Normal	20G...C540	594	821	533	1100	–	700	350	1200	700	350	1600	1600	700	621	1600
		540	Heavy	20G...C650	810	975	533	1100	–	700	–	1200	700	–	1600	1600	700	621	1600
315 kW	8	585	Light	20G...C540	644	–	578	1100	–	750	375	1300	750	375	1700	1700	800	673	1600
		567	Normal	20G...C567	624	851	560	1100	–	750	375	1200	750	375	1700	1700	700	652	1600
		585	Heavy	20G...C750	878	1125	577	1100	–	750	375	1300	750	375	1700	1700	800	673	1600
355 kW	8	612	Light	20G...C567	673	–	604	1100	–	800	400	1300	800	400	1800	1800	800	704	1600
		650	Normal	20G...C650	715	975	640	1100	–	850	425	1400	850	425	1900	1900	800	748	1600
		642	Heavy	20G...C770	963	1155	634	1100	–	800	400	1400	800	400	1900	1900	800	739	1600
400 kW	8	750	Light	20G...C650	825	–	739	1100	–	1000	500	1600	1000	500	2200	2200	1000	863	1600
		750	Normal	20G...C750	825	1125	739	1100	–	1000	500	1600	1000	500	2200	2200	1000	863	1600
		770	Normal	20G...C770	847	1155	758	1100	–	1000	500	1700	1000	500	2300	2300	1000	886	1600
450 kW	8	796	Light	20G...C750	876	–	784	1100	–	1000	500	1700	1000	500	2300	2300	1000	916	1600
		832	Light	20G...C770	915	–	819	1100	–	1100	550	1800	1100	550	2400	2400	1200	957	1600
400 kW	9	750	Heavy	20G...C910	1125	1365	739	1100	1400 [3]	900	450	1700	900	450	2200	2200	900	863	1600 [3]
500 kW	9	880	Heavy	20G...C1K0	1320	1584	867	1100	1400 [3]	1100	550	2000	1100	550	2600	2600	1100	1013	1600 [3]
		910	Heavy	20G...C1K1	1365	1638	896	1100	1400 [3]	1100	550	2000	1100	550	2700	2700	1100	1047	1600 [3]
		910	Normal	20G...C910	1001	1365	896	1100	1400 [3]	1100	550	2000	1100	550	2700	2700	1100	1047	1600 [3]
560 kW	9	1040	Light	20G...C910	1144	–	1024	1100	1400 [3]	1300	650	2300	1300	650	3100	3100	1300	1197	1600 [3]
		1040	Normal	20G...C1K0	1144	1584	1024	1100	1400 [3]	1300	650	2300	1300	650	3100	3100	1300	1197	1600 [3]
		1040	Heavy	20G...C1K2	1560	1872	1024	1100	1400 [3]	1300	650	2300	1300	650	3100	3100	1300	1197	1600 [3]
630 kW	9	1090	Light	20G...C1K0	1199	–	1073	1100	1400 [3]	1350	675	2400	1350	675	3200	3200	1350	1254	1600 [3]
		1090	Normal	20G...C1K1	1199	1638	1073	1100	1400 [3]	1350	675	2400	1350	675	3200	3200	1350	1254	1600 [3]
		1090	Heavy	20G...C1K4	1635	2198	1073	1100	1400 [3]	1350	675	2400	1350	675	3200	3200	1350	1254	1600 [3]

continued on page 172

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)								Input Quantities	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]	Continuous DC Input	
					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	Amps
400V AC Input (continued)																		**540V DC Input (continued)**	
710 kW	9	1175	Light	20G…C1K1	1293	–	1157	1100	1400 [3]	1450	725	2600	1450	725	3500	3500	1450	1352	1600 [3]
		1175	Normal	20G…C1K2	1293	1872	1157	1100	1400 [3]	1450	725	2600	1450	725	3500	3500	1450	1352	1600 [3]
		1175	Heavy	20G…C1K5	1763	2220	1157	1100	1400 [3]	1450	725	2600	1450	725	3500	3500	1450	1352	1600 [3]
	10	1325	Heavy	20G…C1K6	1988	2385	1305	1100	1400 [3]	1650	825	2900	1650	825	3900	3900	1650	1525	1600 [3]
800 kW	9	1465	Light	20G…C1K2	1612	–	1443	1100	1400 [3]	1800	900	3200	1800	900	4300	4300	1800	1686	1600 [3]
		1465	Normal	20G…C1K4	1612	2198	1443	1100	1400 [3]	1800	900	3200	1800	900	4300	4300	1800	1686	1600 [3]
850 kW	9	1480	Light	20G…C1K4	1628	–	1457	1100	1400 [3]	1800	900	3300	1800	900	4400	4400	1800	1703	1600 [3]
		1480	Normal	20G…C1K5	1628	2220	1457	1100	1400 [3]	1800	900	3300	1800	900	4400	4400	1800	1703	1600 [3]
900 kW	9	1600	Light	20G…C1K5	1760	–	1576	1100	1400 [3]	1950	975	3500	1950	975	4700	4700	1950	1841	1600 [3]
	10	1590	Normal	20G…C1K6	1749	2385	1566	1100	1400 [3]	1950	975	3500	1950	975	4700	4700	1950	1830	1600 [3]
1000 kW	10	1715	Light	20G…C1K6	1887	2058	1689	1100	1400 [3]	2100	1050	3800	2100	1050	5100	5100	2100	1974	1600 [3]
		1800	Heavy	20G…C2K1	2700	3240	1773	1100	1400 [3]	2200	1100	4000	2200	1100	5300	5300	2200	2071	1600 [3]
1250 kW	10	2150	Normal	20G…C2K1	2365	3240	2117	1100	1400 [3]	2650	1325	4800	2650	1325	6400	6400	2650	2474	1600 [3]
1400 kW	10	2330	Light	20G…C2K1	2563	2796	2294	1100	1400 [3]	2850	1425	5200	2850	1425	6900	6900	2850	2681	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 - Wall Mount 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 (11)
			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 (6)	Motor Circuit Protector (7)	140M Type E Combination Motor Controller with Adjustable Current Range (8) (9)				Continuous DC Input	
			(x = F or G)	1 min	3 sec	(x = F or G)	1 min	3 sec	kVA	Amps	Min (4)	Max (5)	Min (4)	Max (5)			Cat. No.			Min Enclosure Volume (in.^{3}) (10)	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	M-C2E-B25	M-D8E-B25		7269	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	M-C2E-B40	M-D8E-B40		7269	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	M-C2E-B63	M-D8E-B63		7269	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	M-C2E-C10	M-D8E-C10	M-F8E-C10	7269	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	M-C2E-C16	M-D8E-C16	M-F8E-C16	7269	11.1	HSJ20
10 Hp	1	14	20x…D014	15.4	21.0	20x…D022(3)	16.5	21.0	10.4	12.5	20	25	20	25	50	20	M-C2E-C16	M-D8E-C16	M-F8E-C16	7269	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		9086	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		9086	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		9086	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	9086	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	9086	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	9086	14.7	HSJ30
15 Hp	2	22	20x…D022	24.2	33.0	20x…D027(3)	33.0	40.5	16.6	19.9	30	50	30	80	80	30		M-D8E-C25	M-F8E-C25	9086	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	9086	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	9086	36.4	HSJ60
30 Hp	3	40	20x…D040	44.0	60.0	20x…D052(3)	60.0	78.0	30.5	36.7	50	90	50	150	120	50			M-F8E-C45	9086	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					55.7	HSJ90
50 Hp	4	65	20x…D065	71.5	97.5	20x…D077(3)	97.5	117.0	49.6	59.6	90	125	90	250	175	100					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					84.5	HSJ150
75 Hp	5	96	20x…D096	105.6	144.0	20x…D125(3)	144.0	187.5	74.9	90.1	125	200	125	375	275	125					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					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					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					204.1	HSJ400
200 Hp	6	248	20x…D248	272.8	372.0	20x…D302(3)	372.0	453.0	193.6	232.8	325	550	325	700	700	400					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					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					396.1	Bussman 170M6612
350 Hp	7	415	20x…D415	456.5	622.5				323.9	389.6	525	900	525	1200	1200	600					455.3	Bussman 170M6612

See page 174 for notes.

(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) This drive is the next larger frame size.
(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) Bulletin 140M with adjustable current range should have the current trip set to the minimum range that the device will not trip.
(9) Manual Self-Protected (Type E) Combination Motor Controller, UL listed for 480Y/277V and 600Y/347V AC Input. Not UL listed for use on 480V or 600V Delta/Delta, corner ground, or high-resistance ground systems.
(10) When using a Manual Self-Protected (Type E) Combination Motor Controller, the drive must be installed in a ventilated or non-ventilated enclosure with the minimum volume specified in this column. Application specific thermal considerations may require a larger enclosure.
(11) 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 - Floor Mount 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)								Input Quantities	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]	Continuous DC Input	
					1 min	3 sec				1/Phase Min[4]	2/Phase Min[4]	Max[5]	1/Phase Min[4]	2/Phase Min[4]	Max[5]				
480V AC Input																		**650V DC Input**	
							Amps	Amps	Amps									Amps	Amps
300 Hp	8	370	Heavy	20G...D430	555	666	349	1100	–	450	–	800	450	–	1100	1100	450	407	1600
350 Hp	8	430	Normal	20G...D430	473	666	406	1100	–	550	–	900	550	–	1200	1200	550	473	1600
		414	Heavy	20G...D485	621	745	391	1100	–	500	–	900	500	–	1200	1200	500	455	1600
		454	Heavy	20G...D545	681	818	428	1100	–	550	–	1000	550	–	1300	1300	550	499	1600
400 Hp	8	485	Light	20G...D430	534	–	458	1100	–	600	–	1000	600	–	1400	1400	600	533	1600
		485	Normal	20G...D485	534	745	458	1100	–	600	–	1000	600	–	1400	1400	600	533	1600
		485	Heavy	20G...D617	728	926	458	1100	–	600	–	1000	600	–	1400	1400	600	533	1600
450 Hp	8	545	Light	20G...D485	600	–	514	1100	–	650	–	1200	650	–	1600	1600	650	599	1600
		545	Normal	20G...D545	600	818	514	1100	–	650	–	1200	650	–	1600	1600	650	599	1600
		545	Heavy	20G...D710	818	1065	514	1100	–	650	325	1200	650	325	1600	1600	650	599	1600
500 Hp	8	590	Light	20G...D545	649	–	557	1100	–	700	–	1300	700	–	1700	1700	700	649	1600
		617	Normal	20G...D617	679	926	582	1100	–	750	325	1300	750	325	1800	1800	800	678	1600
		617	Heavy	20G...D740	926	1110	582	1100	–	750	375	1300	750	375	2400	1800	800	678	1600
600 Hp	8	710	Light	20G...D617	781	–	670	1100	–	850	425	1500	850	425	2100	2100	900	781	1600
		710	Normal	20G...D710	781	1065	670	1100	–	850	425	1500	850	425	2100	2100	900	781	1600
650 Hp	8	765	Light	20G...D710	842	–	722	1100	–	1000	500	1700	1000	500	2200	2200	1000	841	1600
		740	Normal	20G...D740	814	1110	698	1100	–	900	450	1600	900	450	2200	2200	900	814	1600
700 Hp	8	800	Light	20G...D740	880	–	755	1100	–	1000	500	1800	1000	500	1800	2400	1000	880	1600
600 Hp	9	710	Heavy	20G...D800	1065	1278	670	1100	1400[3]	850	425	1500	850	425	2000	2000	850	781	1600[3]
700 Hp	9	795	Heavy	20G...D960	1193	1440	750	1100	1400[3]	950	475	1700	950	475	2300	2300	950	874	1600[3]
		800	Normal	20G...D800	880	1278	755	1100	1400[3]	950	475	1700	950	475	2300	2300	950	880	1600[3]
750 Hp	9	800	Heavy	20G...D1K0	1200	1568	755	1100	1400[3]	950	475	1700	950	475	2300	2300	950	880	1600[3]
800 Hp	9	960	Light	20G...D800	1056	–	906	1100	1400[3]	1150	575	2000	1150	575	2700	2700	1150	1055	1600[3]
		960	Normal	20G...D960	1056	1440	906	1100	1400[3]	1150	575	2000	1150	575	2700	2700	1150	1055	1600[3]
		960	Heavy	20G...D1K2	1440	1728	906	1100	1400[3]	1150	575	2000	1150	575	2700	2700	1150	1055	1600[3]
900 Hp	9	1045	Light	20G...D960	1150	–	986	1100	1400[3]	1250	625	2200	1250	625	3000	3000	1250	1149	1600[3]
		1045	Normal	20G...D1K0	1150	1568	986	1100	1400[3]	1250	625	2200	1250	625	3000	3000	1250	1149	1600[3]
		1045	Heavy	20G...D1K3	1568	2048	986	1100	1400[3]	1250	625	2200	1250	625	3000	3000	1250	1149	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)								Input Quantities	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]	Continuous DC Input	
					1 min	3 sec				1/Phase Min[4]	2/Phase Min[4]	Max[5]	1/Phase Min[4]	2/Phase Min[4]	Max[5]			Amps	Amps
480V AC Input (continued)																		**650V DC Input (continued)**	
1000 Hp	9	1135	Light	20G…D1K0	1249	–	1071	1100	1400[3]	1350	675	2400	1350	675	3200	3200	1350	1248	1600[3]
		1135	Normal	20G…D1K2	1249	1728	1071	1100	1400[3]	1350	675	2400	1350	675	3200	3200	1350	1248	1600[3]
		1135	Heavy	20G…D1K4	1703	2130	1071	1100	1400[3]	1350	675	2400	1350	675	3200	3200	1350	1248	1600[3]
1100 Hp	9	1365	Light	20G…D1K2	1502	–	1288	1100	1400[3]	1600	800	2900	1600	800	3900	3900	1600	1501	1600[3]
		1365	Normal	20G…D1K3	1502	2048	1288	1100	1400[3]	1600	800	2900	1600	800	3900	3900	1600	1501	1600[3]
	10	1270	Heavy	20G…D1K5	1905	2288	1199	1100	1400[3]	1500	750	2700	1500	750	3600	3600	1500	1396	1600[3]
1250 Hp	9	1420	Light	20G…D1K3	1562	–	1340	1100	1400[3]	1700	850	3000	1700	850	4000	4000	1700	1561	1600[3]
		1420	Normal	20G…D1K4	1562	2130	1340	1100	1400[3]	1700	850	3000	1700	850	4000	4000	1700	1561	1600[3]
1350 Hp	9	1540	Light	20G…D1K4	1694	–	1453	1100	1400[3]	1800	900	3300	1800	900	4400	4400	1800	1693	1600[3]
	10	1525	Normal	20G…D1K5	1678	2288	1439	1100	1400[3]	1800	900	3200	1800	900	4300	4300	1800	1677	1600[3]
1500 Hp	10	1655	Light	20G…D1K5	1821	1986	1562	1100	1400[3]	1950	975	3500	1950	975	4700	4700	1950	1819	1600[3]
1650 Hp	10	1730	Heavy	20G…D2K0	2595	3114	1633	1100	1400[3]	2050	1025	3700	2050	1025	4900	4900	2050	1902	1600[3]
1750 Hp	10	2070	Normal	20G…D2K0	2277	3114	1953	1100	1400[3]	2450	1225	4400	2450	1225	5900	5900	2450	2276	1600[3]
2000 Hp	10	2240	Light	20G…D2K0	2464	2688	2114	1100	1400[3]	2650	1325	4800	2650	1325	6300	6300	2650	2463	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 810V DC Input Protection Devices - Wall Mount Frames 3…7

Applied Rating [1]	Frame	Cont. Output Amps	Drive Sized For Normal Duty			Drive Sized For Heavy Duty			Continuous AC Input	AC Input Protection Devices									Input Quantities	DC Input Protection [11]
			Catalog Number	Output Overload Amps		Catalog Number	Output Overload Amps			Dual Element Time Delay Fuse		Non-Time Delay Fuse		Circuit Breaker Max Size [6]	Motor Circuit Protector [7]	140M Type E Combination Motor Controller with Adjustable Current Range [8] [9]			Continuous DC Input	
			(x = F or G)	1 min	3 sec	(x = F or G)	1 min	3 sec	Amps	Min [2]	Max [3]	Min [2]	Max [3]			Cat. No.		Min Enclosure Volume (in.^{3}) [10]	Amps	Non-Time Delay Fuse
600 Volt AC Input																			**810 Volt DC Input**	
0.5 Hp	3	0.9				20x…E1P7	1.4	2.6	0.8	1	2	1	3	3	1	M-C2E-B16	M-D8E-B16		9086	1.0	JKS-2
1 Hp	3	1.7	20x…E1P7	1.9	2.6	20x…E2P7	2.6	4.1	1.6	2	4	2	5	5	2	M-C2E-B25	M-D8E-B25		9086	1.9	JKS-4
2 Hp	3	2.7	20x…E2P7	3.0	4.1	20x…E3P9	4.1	5.9	2.5	3	6	3	8	8	3	M-C2E-B40	M-D8E-B40		9086	3.0	JKS-5
3 Hp	3	3.9	20x…E3P9	4.3	5.9	20x…E6P1	5.9	9.2	3.7	5	8	5	11 [4], 10 [5]	11 [4], 20 [5]	5		M-D8E-B63		9086	4.3	JKS-8
5 Hp	3	6.1	20x…E6P1	6.7	9.2	20x…E9P0	9.2	13.5	5.7	7	13	7	15	20	10		M-D8E-B63		9086	6.7	HSJ10
7.5 Hp	3	9	20x…E9P0	9.9	13.5	20x…E011	13.5	16.5	8.4	11	19	11	25	30	15		M-D8E-C10	M-F8E-C10	9086	9.9	HSJ15
10 Hp	3	11	20x…E011	12.1	16.5	20x…E017	16.5	25.5	10.3	13	23	13	30	40	15		M-D8E-C16	M-F8E-C16	9086	12.0	HSJ20
15 Hp	3	17	20x…E017	18.7	25.5	20x…E022	25.5	33.0	16.0	20	36	20	50	50	20			M-F8E-C20	9086	18.6	HSJ30
20 Hp	3	22	20x…E022	24.2	33.0				20.7	26	46	26	60	70	30			M-F8E-C25	9086	24.1	HSJ40
	4	22				20x…E027	33.0	40.5	20.7	26	46	26	60	70	30			M-F8E-C25	9086	24.1	HSJ40
25 Hp	4	27	20x…E027	29.7	40.5	20x…E032	40.5	48.6	25.3	32	57	32	75	80	35			M-F8E-C32	9086	29.6	HSJ50
30 Hp	4	32	20x…E032	35.2	48.0				30.0	38	68	38	90	100	40			M-F8E-C32	9086	35.0	HSJ60
	5	32				20x…E041	48.0	61.5	30.0	38	68	38	90	100	40			M-F8E-C32	13630	35.0	HSJ60
40 Hp	5	41	20x…E041	45.1	61.5	20x…E052	61.5	78.0	38.5	48	87	48	115	120	50					44.9	HSJ70
50 Hp	5	52	20x…E052	57.2	78.0				48.8	61	110	61	145	150	65					56.9	HSJ90
7.5 Hp	6	9.1				20x…E012	13.7	18.0	8.5	11	19	11	25	30	15		M-D8E-C10	M-D8E-C10	14400	10.0	HSJ15
10 Hp	6	12	20x…E012	13.2	18.0	20x…E018	18.0	27.0	11.3	14	25	14	35	40	15		M-D8E-C16	M-D8E-C16	14400	13.1	HSJ20
15 Hp	6	18	20x…E018	19.8	27.0	20x…E023	27.0	34.5	16.9	21	38	21	50	60	25			M-F8E-C20	14400	19.7	HSJ30
20 Hp	6	23	20x…E023	25.3	34.5	20x…E028	34.5	42.0	21.6	27 [4], 25 [5]	49 [4], 50 [5]	27 [4], 25 [5]	65	70	30			M-F8E-C25	14400	25.2	HSJ40
	6	24	20x…E024	26.4	36.0				22.5	28	51	28	70	70	30			M-F8E-C25	14400	26.3	HSJ40
	6	22				20x…E024	33.0	39.6	20.7	26	46	26	60	70	30			M-F8E-C25	14400	24.1	HSJ40
25 Hp	6	28	20x…E028	30.8	42.0	20x…E033	42.0	50.4	26.3	35	60	35	80	80	35			M-F8E-C32	14400	30.7	HSJ50
30 Hp	6	33	20x…E033	36.3	49.5	20x…E042	49.5	63.0	31.0	40	70	40	95	100	40			M-F8E-C32	14400	36.1	HSJ60
40 Hp	6	42	20x…E042	46.2	63.0	20x…E053	63.0	79.5	39.4	50	90	50	120	120	50					46.0	HSJ70
50 Hp	6	53 [4], 52 [5]	20x…E053	58.3	79.5	20x…E063	78.0	94.5	49.8 [4], 48.8 [5]	60	110	60	150 [4], 145 [5]	150	65					58.0 [4], 56.9 [5]	HSJ90

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Applied Rating (1)	Frame	Cont. Output Amps	Drive Sized For Normal Duty			Drive Sized For Heavy Duty			Continuous AC Input	AC Input Protection Devices									Input Quantities	DC Input Protection (11)
			Catalog Number	Output Overload Amps		Catalog Number	Output Overload Amps			Dual Element Time Delay Fuse		Non-Time Delay Fuse		Circuit Breaker Max Size (6)	Motor Circuit Protector (7)	140M Type E Combination Motor Controller with Adjustable Current Range (8) (9)				
			(x = F or G)	1 min	3 sec	(x = F or G)	1 min	3 sec	Amps	Min (2)	Max (3)	Min (2)	Max (3)			Cat. No.			Min Enclosure Volume (in.^{3}) (10)	Continuous DC Input Amps	Non-Time Delay Fuse
60 Hp	6	63	20x…E063	69.3	94.5	20x…E077	94.5	115.5	59.1	75	135	75	175	180	75					69.0	HSJ110
75 Hp	6	77	20x…E077	84.7	115.5	20x…E099	115.5	148.5	72.3	90	165	90	215	220	95					84.3	HSJ150
100 Hp	6	99	20x…E099	108.9	148.5	20x…E125	148.5	187.5	92.9	115	210	115	280	280	120					108.4	HSJ175
125 Hp	6	125	20x…E125	137.5	187.5	20x…E144	187.5	225.0	117.4	145	265	145	350	360	150					136.8	HSJ225
150 Hp	6	144	20x…E144	158.4	216.0				135.2	170	300	170	400	400	170					157.6	HSJ250
	7	144				20x…E192	216.0	288.0	135.2	170	305	170	405	410	170					157.6	HSJ250
200 Hp	7	192	20x…E192	211.2	288.0	20x…E242	288.0	363.0	180.3	225	405	225	540	550	230					210.2	HSJ350
250 Hp	7	242	20x…E242	266.2	363.0	20x…E289	363.0	435.6	227.2	285	510	285	680	690	285					264.9	HSJ400
300 Hp	7	289	20x…E289	317.9	433.5				271.3	340	600	340	800	800	340					316.4	HSJ500

(1) "Applied Rating" refers to the motor that will be connected to the drive. For example, a "E063" drive can be used in Normal Duty mode on a 60 Hp motor, in Heavy Duty mode on a 50 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) Minimum protection device size is the lowest rated device that supplies maximum protection without nuisance tripping.

(3) 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.

(4) Normal duty.

(5) Heavy duty.

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

(9) Manual Self-Protected (Type E) Combination Motor Controller, UL listed for 480Y/277V and 600Y/347V AC Input. Not UL listed for use on 480V or 600V Delta/Delta, corner ground, or high-resistance ground systems.

(10) When using a Manual Self-Protected (Type E) Combination Motor Controller, the drive must be installed in a ventilated or non-ventilated enclosure with the minimum volume specified in this column. Application specific thermal considerations may require a larger enclosure.

(11) 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.

600 Volt AC and 810V DC Input Protection Devices - Floor Mount 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)								Input Quantities	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]	Continuous DC Input	
					1 min	3 sec				1/Phase Min[3]	2/Phase Min[3]	Max[4]	1/Phase Min[3]	2/Phase Min[3]	Max[4]				
																		Amps	Amps
600V AC Input																		**810V DC Input**	
250 Hp	8	272	Heavy	20G...E295	408	490	257	900	–	350	175	600	350	175	800	800	350	300	1000
300 Hp	8	295	Heavy	20G...E355	443	533	278	900	–	350	175	700	350	175	900	900	350	325	1000
		295	Normal	20G...E295	325	490	278	900	–	400	200	700	400	200	1000	1000	400	325	1000
350 Hp	8	355	Light	20G...E295	391	–	335	900	–	450	225	800	450	225	1100	1100	450	391	1000
		355	Normal	20G...E355	391	533	335	900	–	450	225	800	450	225	1100	1100	450	391	1000
		329	Heavy	20G...E395	494	593	310	900	–	400	200	700	400	200	1000	1000	400	363	1000
		355	Heavy	20G...E435	533	639	335	900	–	450	225	800	450	225	1100	1100	450	391	1000
400 Hp	8	395	Light	20G...E355	435	–	373	900	–	500	250	900	500	250	1200	1200	500	436	1000
		395	Normal	20G...E395	435	593	373	900	–	500	250	900	500	250	1200	1200	500	436	1000
		395	Heavy	20G...E460	593	711	373	900	–	500	250	900	500	250	1200	1200	500	436	1000
450 Hp	8	435	Light	20G...E395	479	–	411	900	–	550	275	1000	550	275	1300	1300	550	480	1000
		435	Normal	20G...E435	479	639	411	900	–	500	250	900	500	250	1200	1200	500	480	1000
		425	Heavy	20G...E510	638	765	401	900	–	550	275	1000	550	275	1300	1300	550	469	1000
500 Hp	8	460	Light	20G...E435	506	–	434	900	–	550	275	1000	550	275	1300	1300	550	507	1000
		510	Light	20G...E460	561	–	481	900	–	650	325	1100	650	325	1500	1500	650	562	1000
		460	Normal	20G...E460	506	711	434	900	–	550	275	1000	550	275	1300	1300	550	507	1000
		510	Normal	20G...E510	561	765	481	900	–	650	325	1100	650	325	1500	1500	650	562	1000
550 Hp	8	545	Light	20G...E510	600	–	514	900	–	650	325	1200	650	325	1600	1600	650	601	1000
500 Hp	9	510	Heavy	20G...E595	765	918	481	900	1000	600	300	1100	600	300	1400	1400	600	562	1000
600 Hp	9	595	Heavy	20G...E630	893	1071	562	900	1000	700	350	1300	700	350	1700	1700	700	656	1000
		595	Normal	20G...E595	655	918	562	900	1000	700	350	1300	700	350	1700	1700	700	656	1000
700 Hp	9	630	Heavy	20G...E760	945	1149	595	900	1000	750	375	1300	750	375	1800	1800	750	695	1000
		630	Normal	20G...E630	693	1071	595	900	1000	750	375	1300	750	375	1800	1800	750	695	1000
		595	Light	20G...E595	693	–	651	900	1000	800	400	1500	800	400	2000	2000	800	761	1000
750 Hp	9	700	Heavy	20G...E825	1050	1260	661	900	1000	850	425	1500	850	425	2000	2000	850	772	1000
800 Hp	9	760	Heavy	20G...E900	1140	1368	717	900	1000	900	450	1600	900	450	2200	2200	900	838	1000
		760	Normal	20G...E760	836	1140	717	900	1000	900	450	1600	900	450	2200	2200	900	838	1000
		760	Light	20G...E630	836	–	717	900	1000	900	450	1600	900	450	2200	2200	900	838	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)								Input Quantities	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]	Continuous DC Input	
					1 min	3 sec				1/Phase Min[3]	2/Phase Min[3]	Max[4]	1/Phase Min[3]	2/Phase Min[3]	Max[4]				
							Amps	Amps	Amps									Amps	Amps
600V AC Input (continued)																		**810V DC Input (continued)**	
900 Hp	9	815	Heavy	20G…E980	1223	1470	769	900	1000	950	475	1700	950	475	2300	2300	950	899	1000
		825	Normal	20G…E825	908	1260	779	900	1000	950	475	1800	950	475	2300	2300	950	910	1000
		835	Light	20G…E760	919	–	788	900	1000	1000	500	1800	1000	500	2400	2400	1000	921	1000
950 Hp	9	900	Normal	20G…E900	990	1368	849	900	1000	1050	525	1900	1050	525	2500	2500	1050	993	1000
		900	Light	20G…E825	990	–	849	900	1000	1050	525	1900	1050	525	2500	2500	1050	993	1000
1000 Hp	9	980	Normal	20G…E980	1078	1470	925	900	1000	1150	575	2100	1150	575	2800	2800	1150	1081	1000
		980	Light	20G…E900	1078	–	925	900	1000	1150	575	2100	1150	575	2800	2800	1150	1081	1000
	10	920	Heavy	20G…E1K1	1380	1665	868	900	1000	1100	550	2000	1100	550	2600	2600	1100	1015	1000
1100 Hp	9	1045	Light	20G…E980	1150	–	986	900	1000	1250	625	2200	1250	625	3000	3000	1250	1152	1000
	10	1110	Normal	20G…E1K1	1221	1665	1048	900	1000	1300	650	2400	1300	650	3100	3100	3100	1224	1000
1200 Hp	10	1220	Light	20G…E1K1	1342	1464	1151	900	1000	1450	725	2600	1450	725	3500	3500	3500	1345	1000
1250 Hp	10	1190	Heavy	20G…E1K4	1785	2145	1123	900	1000	1400	700	2500	1400	700	3400	3400	3400	1312	1000
1400 Hp	10	1430	Normal	20G…E1K4	1573	2145	1350	900	1000	1700	850	3000	1700	850	4100	4100	4100	1577	1000
1500 Hp	10	1530	Light	20G…E1K4	1683	1836	1444	900	1000	1800	900	3200	1800	900	4300	4300	4300	1687	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 932V DC Input Protection Devices - Wall Mount Frames 6...7

Applied Rating[1]	Frame	Cont. Output Amps	Drive Sized For Normal Duty			Drive Sized For Heavy Duty			Continuous AC Input	AC Input Protection Devices						Input Quantities	DC Input Protection
			Catalog Number	Output Overload Amps		Catalog Number	Output Overload Amps			Dual Element Time Delay Fuse		Non-Time Delay Fuse		Circuit Breaker Max Size[6]	Motor Circuit Protector[7]	Continuous DC Input	Non-Time Delay Fuse
			(x = F or G)	1 min	3 sec	(x = F or G)	1 min	3 sec	Amps	Min[2]	Max[5]	Min[2]	Max[5]			Amps	
690 Volt AC Input																**932 Volt DC Input**	
5.5 kW	6	9				20x...F011	13.5	18.0	8.4	11	19	11	25	30	15	9.9	HSJ15
7.5 kW	6	12	20x...F011	13.2	18.0	20x...F015	18.0	22.5	11.2	14	25	14	35	40	15	13.2	HSJ20
11 kW	6	15	20x...F015	16.5	22.5	20x...F020	22.5	30.0	14.1	18	32	18	40	50	20	16.5	HSJ25
15 kW	6	20	20x...F020	22.0	30.0	20x...F023	30.0	36.0	18.7	23	42	23	55	60	25	21.9	HSJ35
18.5 kW	6	23	20x...F023	25.3	34.5	20x...F030	34.5	45.0	21.6	27[3], 25[4]	48[3], 50[4]	27[3], 25[4]	65	70	30	25.2	HSJ40
22 kW	6	30	20x...F030	33.0	45.0	20x...F034	45.0	54.0	28.1	35	65	35	85	90	40	32.9	HSJ50
30 kW	6	34	20x...F034	37.4	51.0	20x...F046	51.0	69.0	31.9	40	70	40	95	100	40	37.3	HSJ60
37 kW	6	46	20x...F046	50.6	69.0	20x...F050	69.0	82.8	43.1	55	95	55	130	130	55	50.5	HSJ80
45 kW	6	50	20x...F050	55.0	75.0	20x...F061	75.0	91.5	46.9	60	105	60	140	150	60	54.8	HSJ90
55 kW	6	61	20x...F061	67.1	91.5	20x...F082	91.5	123.0	57.2	70	130	70	170	180	75	66.9	HSJ100
75 kW	6	82	20x...F082	90.2	123.0	20x...F098	123.0	147.6	76.8	95	175	95	230	240	100	89.9	HSJ150
90 kW	6	98	20x...F098	107.8	147.0	20x...F119	147.0	178.5	91.8	115	205	115	275	280	115	107.5	HSJ175
110 kW	6	119	20x...F119	130.9	178.5	20x...F142	178.5	214.2	111.5	140	250	140	335	340	140	130.5	HSJ200
132 kW	6	142	20x...F142	156.2	213.0				133.1	165	300	165	400	400	170	155.7	HSJ250
	7	142				20x...F171	213.0	256.5	133.1	165	300	165	400	400	170	155.7	HSJ250
160 kW	7	171	20x...F171	188.1	256.5	20x...F212	256.5	318.0	160.2	200	360	200	480	490	205	187.5	HSJ300
200 kW	7	212	20x...F212	233.2	318.0	20x...F263	318.0	394.5	198.7	250	445	250	595	600	250	232.5	HSJ350
250 kW	7	263	20x...F263	289.3	394.5				246.5	310	555	310	740	740	310	288.4	HSJ500

(1) "Applied Rating" refers to the motor that will be connected to the drive. For example, a "F061" drive can be used in Normal Duty mode on a55 kW motor, in Heavy Duty mode on a 45 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) Minimum protection device size is the lowest rated device that supplies maximum protection without nuisance tripping.

(3) Normal duty.

(4) Heavy duty.

(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.

690 Volt AC and 932V DC Input Protection Devices - Floor Mount 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)							
										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]		
690V AC Input																	
200 kW	8	215	Heavy	20G...F265	323	375	203	900	–	250	125	500	250	125	600	600	250
250 kW	8	265	Normal	20G...F265	292	375	250	900	–	300	150	600	300	150	800	800	300
		265	Heavy	20G...F330	398	473	250	900	–	300	150	600	300	150	800	800	300
300 kW	8	308	Heavy	20G...F370	462	555	290	900	–	400	200	700	400	200	900	900	400
315 kW	8	330	Light	20G...F265	363	–	311	900	–	400	200	700	400	200	900	900	400
		330	Normal	20G...F330	363	473	311	900	–	400	200	700	400	200	900	900	400
355 kW	8	370	Light	20G...F330	407	–	349	900	–	450	225	800	450	225	1100	1100	450
		370	Normal	20G...F370	407	555	349	900	–	450	225	800	450	225	1100	1100	450
		370	Heavy	20G...F415	555	639	349	900	–	450	225	800	450	225	1100	1100	450
375 kW	8	375	Heavy	20G...F460	563	675	353	900	–	450	225	800	450	225	1100	1100	450
400 kW	8	410	Light	20G...F370	451	–	386	900	–	500	250	900	500	250	1200	1200	500
		415	Normal	20G...F415	457	639	391	900	–	500	250	900	500	250	1200	1200	500
		413	Heavy	20G...F500	620	750	389	900	–	500	250	900	500	250	1200	1200	500
450 kW	8	460	Light	20G...F415	506	–	433	900	–	550	275	1000	550	275	1300	1300	550
		460	Normal	20G...F460	506	675	433	900	–	550	275	1000	550	275	1300	1300	550
500 kW	8	500	Light	20G...F460	550	–	471	900	–	600	300	1100	600	300	1500	1500	600
		500	Normal	20G...F500	550	750	471	900	–	600	300	1100	600	300	1500	1500	600
530 kW	8	530	Light	20G...F500	583	–	499	900	–	650	325	1200	650	325	1500	1500	650
450 kW	9	460	Heavy	20G...F590	690	885	433	900	1000	550	275	1000	550	275	1300	1300	550
500 kW	9	500	Heavy	20G...F650	750	975	471	900	1000	600	300	1100	600	300	1400	1400	600
560 kW	9	590	Heavy	20G...F710	885	1065	556	900	1000	700	350	1300	700	350	1700	1700	700
		590	Normal	20G...F590	649	885	556	900	1000	700	350	1300	700	350	1700	1700	700
630 kW	9	650	Heavy	20G...F765	975	1170	612	900	1000	750	375	1400	750	375	1800	1800	750
		650	Normal	20G...F650	715	975	612	900	1000	750	375	1400	750	375	1800	1800	750
		650	Light	20G...F590	715	–	612	900	1000	750	375	1400	750	375	1800	1800	750
710 kW	9	750	Heavy	20G...F795	1125	1350	706	900	1000	900	450	1600	900	450	2100	2100	900
		710	Normal	20G...F710	781	1065	669	900	1000	900	450	1600	900	450	2100	2100	900
		710	Light	20G...F650	781	–	669	900	1000	900	450	1600	900	450	2100	2100	900
750 kW	9	765	Normal	20G...F765	842	1170	721	900	1000	900	450	1600	900	450	2200	2200	900

Input Quantities	DC Input Integral Semiconductor Fuse Size (170M6253)[7]
Continuous DC Input	
Amps	Amps
932V DC Input	
237	1000
292	1000
292	1000
339	1000
363	1000
363	1000
407	1000
407	1000
407	1000
413	1000
451	1000
457	1000
454	1000
506	1000
506	1000
550	1000
550	1000
583	1000
506	1000
550	1000
649	1000
649	1000
715	1000
715	1000
715	1000
825	1000
781	1000
781	1000
842	1000

continued on page 183

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)								Input Quantities	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]	Continuous DC Input	
					1 min	3 sec				1/Phase Min[3]	2/Phase Min[3]	Max[4]	1/Phase Min[3]	2/Phase Min[3]	Max[4]				
							Amps	Amps	Amps									Amps	Amps
690V AC Input (continued)																		**932V DC Input (continued)**	
800 kW	9	795	Heavy	20G…F960	1193	1440	749	900	1000	950	475	1700	950	475	2200	2200	950	875	1000
		795	Normal	20G…F795	875	1350	749	900	1000	950	475	1700	950	475	2200	2200	950	875	1000
		790	Light	20G…F710	869	–	744	900	1000	950	475	1700	950	475	2200	2200	950	869	1000
850 kW	9	860	Light	20G…F765	946	–	810	900	1000	1000	500	1800	1000	500	2400	2400	1000	946	1000
900 kW	9	960	Normal	20G…F960	1056	1440	904	900	1000	1150	575	2000	1150	575	2700	2700	1150	1056	1000
		960	Light	20G…F795	1056	–	904	900	1000	1150	575	2000	1150	575	2700	2700	1150	1056	1000
	10	865	Heavy	20G…F1K0	1298	1560	815	900	1000	1000	500	1800	1000	500	2400	2400	1000	952	1000
1000 kW	9	1020	Light	20G…F795	1122	–	904	900	1000	1200	600	2200	1200	600	2900	2900	1200	1056	1000
	10	1040	Normal	20G…F1K0	1144	1560	980	900	1000	1250	625	2200	1250	625	2900	2900	1250	1144	1000
1100 kW	10	1150	Light	20G…F1K0	1265	1380	1083	900	1000	1350	675	2400	1350	675	3200	3200	1350	1265	1000
1120 kW	10	1160	Heavy	20G…F1K4	1740	2100	1093	900	1000	1350	675	2500	1350	675	3300	3300	1350	1276	1000
1400 kW	10	1400	Normal	20G…F1K4	1540	2100	1319	900	1000	1650	825	3000	1650	825	4000	4000	1650	1540	1000
1500 kW	10	1485	Light	20G…F1K4	1634	1782	1399	900	1000	1750	875	3100	1750	875	4200	4200	1750	1634	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.

Motor Overload Protection

Electronic Motor Overload Protection:	Class 10 motor overload protection according to NEC article 430 and motor over-temperature protection according to NEC article 430.126 (A)(2). UL 508C File E59272.

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 185 for 21G drives

Short Circuit Current Ratings - Floor Mount 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

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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…C910	LD	560	100	These options are not used with these drive ratings.		
	ND	500	100			
	HD	400	100			
21G…C1K0	LD	630	100			
	ND	560	100			
	HD	500	100			
21G…C1K1	LD	710	100			
	ND	630	100			
	HD	500	100			
21G…C1K2	LD	800	100			
	ND	710	100			
	HD	560	100			
21G…C1K4	LD	850	100			
	ND	800	100			
	HD	630	100			
21G…C1K5	LD	900	100			
	ND	850	100			
	HD	710	100			

(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

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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…D800	LD	800	100	These options are not used with these drive ratings.		
	ND	700	100			
	HD	600	100			
21G…D960	LD	900	100			
	ND	800	100			
	HD	700	100			
21G…D1K0	LD	1000	100			
	ND	900	100			
	HD	750	100			
21G…D1K2	LD	1100	100			
	ND	1000	100			
	HD	800	100			
21G…D1K3	LD	1250	100			
	ND	1100	100			
	HD	900	100			
21G…D1K4	LD	1350	100			
	ND	1250	100			
	HD	1000	100			

(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]
600 Volt AC Input						
21G…E295	LD	350	50	• 18 w/601…700 A Class L fuse • 18 w/500 A CB • 100 w/600 A Class J fuse	25	• 25 w/600 A Class J fuse
	ND	300	50	• 18 w/600 A Class L fuse • 18 w/500 A CB • 100 w/600 A Class J fuse	25	• 25 w/600 A Class J fuse
	HD	250	50	• 18 w/600 A Class L fuse • 18 w/500 A CB • 100 w/600 A Class J fuse	25	• 25 w/600 A Class J fuse
21G…E355	LD	400	50	• 18 w/601…800 A Class L fuse • 18 w/500 A CB • 100 w/600 A Class J fuse	25	• 25 w/600 A Class J fuse
	ND	350	50	• 18 w/601…700 A Class L fuse • 18 w/500 A CB • 100 w/600 A Class J fuse	25	• 25 w/600 A Class J fuse
	HD	300	50	• 18 w/600 A Class L fuse • 18 w/500 A CB • 100 w/600 A Class J fuse	25	• 25 w/600 A Class J fuse
21G…E395	LD	450	50	• 30 w/601…900 A Class L fuse • 30 w/1000 A CB	• 100 w/800 A max Class L fuse	• 30 w/800 A Class L fuse
	ND	400	50	• 18 w/601…800 A Class L fuse • 18 w/500 A CB • 100 w/600 A Class J fuse	25	• 25 w/600 A Class J fuse
	HD	350	50	• 18 w/601…700 A Class L fuse • 18 w/500 A CB • 100 w/600 A Class J fuse	25	• 25 w/600 A Class J fuse
21G…E435	LD	500	50	• 30 w/601…1000 A Class L fuse • 30 w/1000 A CB	• 100 w/800 A max Class L fuse	• 30 w/800 A Class L fuse
	ND	450	50	• 30 w/601…900 A Class L fuse • 30 w/1000 A CB	• 100 w/800 A max Class L fuse	• 30 w/800 A Class L fuse
	HD	350	50	• 18 w/601…700 A Class L fuse • 18 w/500 A CB • 100 w/600 A Class J fuse	25	• 25 w/600 A Class J fuse
21G…E460	LD	500	35	• 30 w/601…1000 A Class L fuse • 30 w/1000 A CB	• 100 w/800 A max Class L fuse	• 30 w/800 A Class L fuse
	ND	500	50	• 30 w/601…1000 A Class L fuse • 30 w/1000 A CB	• 100 w/800 A max Class L fuse	• 30 w/800 A Class L fuse
	HD	400	50	• 18 w/601…800 A Class L fuse • 18 w/500 A CB • 100 w/600 A Class J fuse	25	• 25 w/600 A Class J fuse
21G…E510	LD	550	35	• 30 w/601…1100 A Class L fuse • 30 w/1100 A CB	• 100 w/800 A max Class L fuse	• 30 w/800 A Class L fuse
	ND	500	35	• 30 w/601…1000 A Class L fuse • 30 w/1000 A CB	• 100 w/800 A max Class L fuse	• 30 w/800 A Class L fuse
	HD	450	50	• 30 w/601…900 A Class L fuse • 30 w/1000 A CB	• 100 w/800 A max Class L fuse	• 30 w/800 A Class L fuse
21G…E595	LD	700	50	These options are not used with these drive ratings.		
	ND	600	50			
	HD	500	50			
21G…E630	LD	800	50			
	ND	700	50			
	HD	600	50			
21G…E760	LD	900	50			
	ND	800	50			
	HD	700	50			

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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]
600 Volt AC Input						
21G…E825	LD	950	50	These options are not used with these drive ratings.		
	ND	900	50			
	HD	750	50			
21G…E900	LD	1000	65			
	ND	950	50			
	HD	800	50			
21G…E980	LD	1100	65			
	ND	1000	65			
	HD	900	50			

(1) These circuit breakers are considered Branch Circuit Protection for the unit if the tap is within 10 ft. of the breaker input.

(2) These are 21G, SCCR ratings with no additional protection provided. Branch circuit protection (fuse) is required based on NEC guidelines for options with P5.

Drive Catalog Number	Duty Cycle	kW	Short Circuit Current Rating (kA)			
			Circuit Breaker Only (P3)	Circuit Breaker with Input Contactor (P3 with P11)	Molded Case Switch Only (P5)	Molded Case Switch with Input Contactor (P5 with P11)
690 Volt AC Input						
21G…F265	LD	315	30	SCCR rating for 690V input contactor not available at time of publication.	25	SCCR rating for 690V input contactor not available at time of publication.
	ND	250	30		25	
	HD	200	30		25	
21G…F330	LD	355	30		25	
	ND	315	30		25	
	HD	250	30		25	
21G…F370	LD	400	30		25	
	ND	355	30		25	
	HD	300	30		25	
21G…F415	LD	450	30		25	
	ND	400	30		25	
	HD	355	30		25	
21G…F460	LD	500	25		25	
	ND	450	30		25	
	HD	375	30		25	
21G…F500	LD	530	25		25	
	ND	500	25		25	
	HD	400	30		25	
21G…F590	LD	630	35	These options are not used with these drive ratings.		
	ND	560	35			
	HD	450	35			
21G…F650	LD	710	35			
	ND	630	35			
	HD	500	35			
21G…F710	LD	800	35			
	ND	710	35			
	HD	560	35			
21G…F765	LD	850	35			
	ND	750	35			
	HD	630	35			
21G…F795	LD	900	35			
	ND	800	35			
	HD	710	35			
21G…F960	LD	1000	35			
	ND	900	35			
	HD	800	35			

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.

Drives with Cabinet Options

Power Disconnects

Option	Code	Applicable Frame	Description
Input Thermal Magnetic Circuit Breaker	P3	8…10	This option is for disconnecting drive power. All breakers include flange style handle operators that are door interlocking and padlockable.
Input Non-Fused Molded Case Disconnect Switch	P5	8 Only	This option is for disconnecting drive power. All switches include flange style handle operators that are door interlocking and padlockable.

Contactors

Option	Code	Applicable Frame	Description
Input Contactor	P11	8 Only	An input contactor is provided. The contactor is controlled by customer supplied 120V AC (480V and 600V input drives) or 230V AC (400V and 690V input drives) remote contact closure logic or by the X1 option if present. 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	P12	8 Only	A contactor is provided between the drive output and the motor. The contactor is controlled by customer supplied 120V AC (480V and 600V input drives) or 230V AC (400V and 690V input drives) remote contact closure logic or by the X1 option if present. 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.

Reactors

Option	Code	Applicable Frame	Description
3% Input Reactor	L1	8…9	Provides a 3% open core drive input line reactor that mounts inside the Cabinet Options Bay.
3% Output Reactor	L2	8…9	Provides a 3% open core drive output load reactor that mounts inside the Cabinet Options Bay.
5% Input Reactor	L3	8 Only	Provides a 5% open core drive input line reactor that mounts inside the Cabinet Options Bay.
5% Output Reactor	L4	8 Only	Provides a 5% open core drive output load reactor that mounts inside the Cabinet Options Bay.

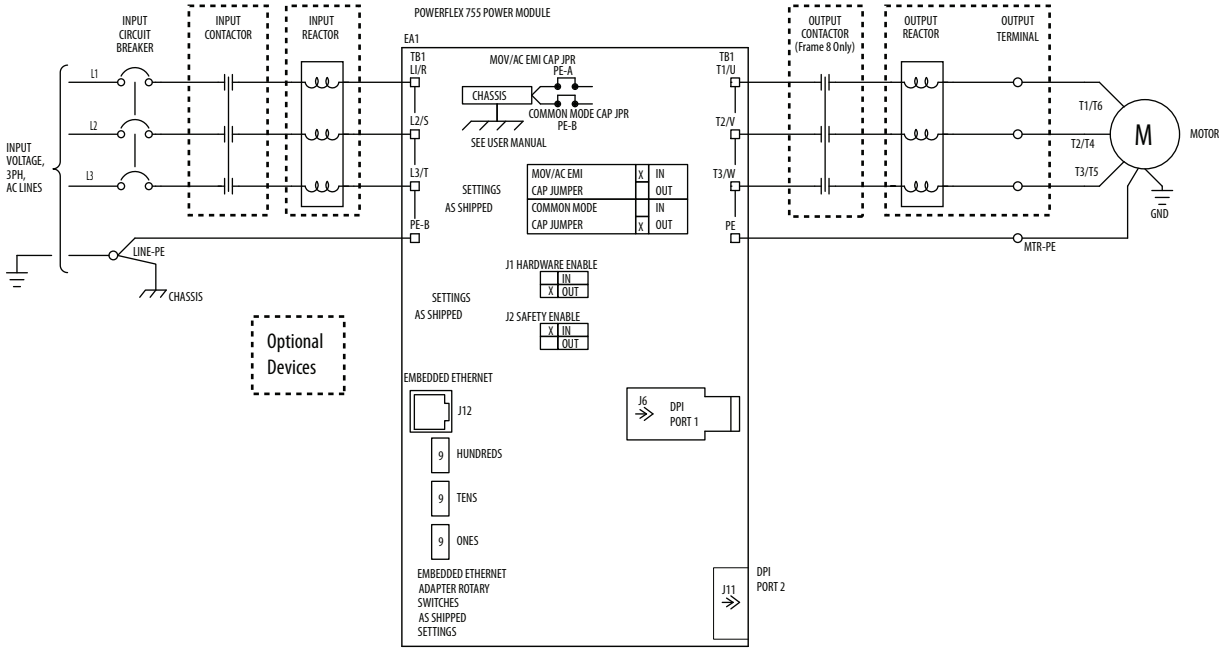
Terminal Blocks and Other Cabinet Parts

Option	Code	Applicable Frame	Description
Control Terminal Block	–	8…9	Provides contact for field wired hardware enable circuit (See page 295 for more detail) and contactor control if ordered without the X1 option. Frame 8 drives with cabinet options ship with a hardware enable jumper on TB4. This may be removed and replaced with field wiring for hardware enable.
Thermostat	–	8…9	Monitors cabinet options 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 options bay will not disable the drive unless an over temperature is detected by the thermostat.

Transformer Panel

Option	Code	Applicable Frame	Description	
Fuses	–	8 (IP54 enclosures only.) 9 (All enclosures.)	FU9,FU10 (690VAC) FU9,FU10 (400,480,600VAC) FU11 FU12 (120VAC) FU12 (230VAC) FU13 (Frame 8 with P11 or P12 Only)	690 VAC, 6A, IEC gI-gG 600 VAC, 6A, Class CC 600 VAC, 5A, Class CC 600 VAC, 6A, Class CC 600 VAC, 3A, Class CC 600 VAC, 5A, Class CC
Thermostat	–	8…9	Thermostat is used in all option bays and enclosure types.	

Power Wiring Schematic



Input Power Circuit Breakers and Disconnect Switches

Refer to page 17 for an explanation of where to locate drive ratings on the nameplate.

Table 15 - 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	140G-M-TLA23	(2) 250…500 MCM kit of 3	31 N•m (274 lb•in)
250	460	Normal	140G-M-TLA23	(2) 250…500 MCM kit of 3	31 N•m (274 lb•in)
	456	Heavy	140G-M-TLA23	(2) 250…500 MCM kit of 3	31 N•m (274 lb•in)
	472	Heavy	140G-M-TLA23	(2) 250…500 MCM kit of 3	31 N•m (274 lb•in)
315	540	Light	140G-N-TLA43	(4) 4/0…500 MCM	43 N•m (381 lb•in)
	540	Normal	140G-N-TLA43	(4) 4/0…500 MCM	43 N•m (381 lb•in)
	540	Heavy	140G-N-TLA43	(4) 4/0…500 MCM	43 N•m (381 lb•in)
315	585	Light	140G-N-TLA43	(4) 4/0…500 MCM	43 N•m (381 lb•in)
	567	Normal	140G-N-TLA43	(4) 4/0…500 MCM	43 N•m (381 lb•in)
	585	Heavy	140G-N-TLA43	(4) 4/0…500 MCM	43 N•m (381 lb•in)
355	612	Light	140G-N-TLA43	(4) 4/0…500 MCM	43 N•m (381 lb•in)
	650	Normal	140G-N-TLA43	(4) 4/0…500 MCM	43 N•m (381 lb•in)
	642	Heavy	140G-N-TLA43	(4) 4/0…500 MCM	43 N•m (381 lb•in)
400	750	Light	140G-N-TLA43	(4) 4/0…500 MCM	43 N•m (381 lb•in)
	750	Normal	140G-N-TLA43	(4) 4/0…500 MCM	43 N•m (381 lb•in)
	770	Normal	140G-N-TLA43	(4) 4/0…500 MCM	43 N•m (381 lb•in)
450	796	Light	140G-N-TLA43	(4) 4/0…500 MCM	43 N•m (381 lb•in)
	832	Light	140G-N-TLA43	(4) 4/0…500 MCM	43 N•m (381 lb•in)

Table 16 - 400V, 50 Hz Input - Code P5 Molded Case Disconnect Switch Options (Floor Mount Frame 8 Only)

kW	Amps	Duty	Line Side Terminal Lugs	Terminal Size	Recommended Torque
200	385	Heavy	140G-M-TLA23	(2) 250…500 MCM kit of 3	31 N•m (274 lb•in)
250	460	Normal	140G-M-TLA23	(2) 250…500 MCM kit of 3	31 N•m (274 lb•in)
	456	Heavy	140G-M-TLA23	(2) 250…500 MCM kit of 3	31 N•m (274 lb•in)
	472	Heavy	140G-M-TLA23	(2) 250…500 MCM kit of 3	31 N•m (274 lb•in)
315	540	Light	140G-M-TLA23	(2) 250…500 MCM kit of 3	31 N•m (274 lb•in)
	540	Normal	140G-M-TLA23	(2) 250…500 MCM kit of 3	31 N•m (274 lb•in)
	540	Heavy	140G-M-TLA23	(2) 250…500 MCM kit of 3	31 N•m (274 lb•in)
315	585	Light	140G-M-TLA23	(2) 250…500 MCM kit of 3	31 N•m (274 lb•in)
	567	Normal	140G-M-TLA23	(2) 250…500 MCM kit of 3	31 N•m (274 lb•in)
	585	Heavy	140G-M-TLA23	(2) 250…500 MCM kit of 3	31 N•m (274 lb•in)
355	612	Light	140G-M-TLA23	(2) 250…500 MCM kit of 3	31 N•m (274 lb•in)
	650	Normal	140G-M-TLA23	(2) 250…500 MCM kit of 3	31 N•m (274 lb•in)
	642	Heavy	140G-M-TLA23	(2) 250…500 MCM kit of 3	31 N•m (274 lb•in)
400	750	Light	140G-N-TLA43	(4) 4/0…500 MCM	43 N•m (381 lb•in)
	750	Normal	140G-N-TLA43	(4) 4/0…500 MCM	43 N•m (381 lb•in)
	770	Normal	140G-N-TLA43	(4) 4/0…500 MCM	43 N•m (381 lb•in)
450	796	Light	140G-N-TLA43	(4) 4/0…500 MCM	43 N•m (381 lb•in)
	832	Light	140G-N-TLA43	(4) 4/0…500 MCM	43 N•m (381 lb•in)

Table 17 - 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	140G-M-TLA23	(2) 250…500 MCM kit of 3	31 N•m (274 lb•in)
350	430	Normal	140G-M-TLA23	(2) 250…500 MCM kit of 3	31 N•m (274 lb•in)
	414	Heavy	140G-M-TLA23	(2) 250…500 MCM kit of 3	31 N•m (274 lb•in)
	454	Heavy	140G-M-TLA23	(2) 250…500 MCM kit of 3	31 N•m (274 lb•in)
400	485	Light	140G-N-TLA43	(4) 4/0…500 MCM	43 N•m (381 lb•in)
	485	Normal	140G-N-TLA43	(4) 4/0…500 MCM	43 N•m (381 lb•in)
	485	Heavy	140G-N-TLA43	(4) 4/0…500 MCM	43 N•m (381 lb•in)
450	545	Light	140G-N-TLA43	(4) 4/0…500 MCM	43 N•m (381 lb•in)
	545	Normal	140G-N-TLA43	(4) 4/0…500 MCM	43 N•m (381 lb•in)
	545	Heavy	140G-N-TLA43	(4) 4/0…500 MCM	43 N•m (381 lb•in)
500	590	Light	140G-N-TLA43	(4) 4/0…500 MCM	43 N•m (381 lb•in)
	617	Normal	140G-N-TLA43	(4) 4/0…500 MCM	43 N•m (381 lb•in)
	617	Heavy	140G-N-TLA43	(4) 4/0…500 MCM	43 N•m (381 lb•in)
600	710	Light	140G-N-TLA43	(4) 4/0…500 MCM	43 N•m (381 lb•in)
	710	Normal	140G-N-TLA43	(4) 4/0…500 MCM	43 N•m (381 lb•in)
650	765	Light	140G-N-TLA43	(4) 4/0…500 MCM	43 N•m (381 lb•in)
	740	Normal	140G-N-TLA43	(4) 4/0…500 MCM	43 N•m (381 lb•in)
700	800	Light	140G-N-TLA43	(4) 4/0…500 MCM	43 N•m (381 lb•in)

Table 18 - 480V, 60 Hz Input - Code P5 Molded Case Disconnect Switch Options (Floor Mount Frame 8 Only)

Hp	Amps	Duty	Line Side Terminal Lugs	Terminal Size	Recommended Torque
300	370	Heavy	140G-M-TLA23	(2) 250…500 MCM kit of 3	31 N•m (274 lb•in)
350	430	Normal	140G-M-TLA23	(2) 250…500 MCM kit of 3	31 N•m (274 lb•in)
	414	Heavy	140G-M-TLA23	(2) 250…500 MCM kit of 3	31 N•m (274 lb•in)
	454	Heavy	140G-M-TLA23	(2) 250…500 MCM kit of 3	31 N•m (274 lb•in)
400	485	Light	140G-M-TLA23	(2) 250…500 MCM kit of 3	31 N•m (274 lb•in)
	485	Normal	140G-M-TLA23	(2) 250…500 MCM kit of 3	31 N•m (274 lb•in)
	485	Heavy	140G-M-TLA23	(2) 250…500 MCM kit of 3	31 N•m (274 lb•in)
450	545	Light	140G-M-TLA23	(2) 250…500 MCM kit of 3	31 N•m (274 lb•in)
	545	Normal	140G-M-TLA23	(2) 250…500 MCM kit of 3	31 N•m (274 lb•in)
	545	Heavy	140G-M-TLA23	(2) 250…500 MCM kit of 3	31 N•m (274 lb•in)
500	590	Light	140G-M-TLA23	(2) 250…500 MCM kit of 3	31 N•m (274 lb•in)
	617	Normal	140G-M-TLA23	(2) 250…500 MCM kit of 3	31 N•m (274 lb•in)
	617	Heavy	140G-M-TLA23	(2) 250…500 MCM kit of 3	31 N•m (274 lb•in)
600	710	Light	140G-N-TLA43	(4) 4/0…500 MCM	43 N•m (381 lb•in)
	710	Normal	140G-N-TLA43	(4) 4/0…500 MCM	43 N•m (381 lb•in)
650	765	Light	140G-N-TLA43	(4) 4/0…500 MCM	43 N•m (381 lb•in)
	740	Normal	140G-N-TLA43	(4) 4/0…500 MCM	43 N•m (381 lb•in)
700	800	Light	140G-N-TLA43	(4) 4/0…500 MCM	43 N•m (381 lb•in)

Table 19 - 600V, 50 Hz Input - Code P3 Thermal Magnetic Circuit Breaker Options

Hp	Amps	Duty	Line Side Terminal Lugs	Terminal Size	Recommended Torque
250	272	Heavy	140G-M-TLA23	(2) 250…500 MCM kit of 3	31 N•m (274 lb•in)
300	295	Heavy	140G-M-TLA23	(2) 250…500 MCM kit of 3	31 N•m (274 lb•in)
	295	Normal	140G-M-TLA23	(2) 250…500 MCM kit of 3	31 N•m (274 lb•in)
350	329	Heavy	140G-M-TLA23	(2) 250…500 MCM kit of 3	31 N•m (274 lb•in)
	355	Heavy	140G-M-TLA23	(2) 250…500 MCM kit of 3	31 N•m (274 lb•in)
	355	Light	140G-M-TLA23	(2) 250…500 MCM kit of 3	31 N•m (274 lb•in)
	355	Normal	140G-M-TLA23	(2) 250…500 MCM kit of 3	31 N•m (274 lb•in)
400	395	Heavy	140G-M-TLA23	(2) 250…500 MCM kit of 3	31 N•m (274 lb•in)
	395	Light	140G-M-TLA23	(2) 250…500 MCM kit of 3	31 N•m (274 lb•in)
	395	Normal	140G-M-TLA23	(2) 250…500 MCM kit of 3	31 N•m (274 lb•in)
450	425	Heavy	140G-M-TLA23	(2) 250…500 MCM kit of 3	31 N•m (274 lb•in)
	435	Light	140G-M-TLA23	(2) 250…500 MCM kit of 3	31 N•m (274 lb•in)
	435	Normal	140G-M-TLA23	(2) 250…500 MCM kit of 3	31 N•m (274 lb•in)
500	460	Light	140G-M-TLA23	(2) 250…500 MCM kit of 3	31 N•m (274 lb•in)
	460	Normal	140G-M-TLA23	(2) 250…500 MCM kit of 3	31 N•m (274 lb•in)
	510	Light	140G-M-TLA23	(2) 250…500 MCM kit of 3	31 N•m (274 lb•in)
	510	Normal	140G-M-TLA23	(2) 250…500 MCM kit of 3	31 N•m (274 lb•in)
550	545	Light	140G-M-TLA23	(2) 250…500 MCM kit of 3	31 N•m (274 lb•in)

Table 20 - 600V, 50 Hz Input - Code P5 Molded Case Disconnect Switch Options (Floor Mount Frame 8 Only)

Hp	Amps	Duty	Line Side Terminal Lugs	Terminal Size	Recommended Torque
250	272	Heavy	140G-M-TLA23	(2) 250…500 MCM kit of 3	31 N•m (274 lb•in)
300	295	Heavy	140G-M-TLA23	(2) 250…500 MCM kit of 3	31 N•m (274 lb•in)
	295	Normal	140G-M-TLA23	(2) 250…500 MCM kit of 3	31 N•m (274 lb•in)
350	329	Heavy	140G-M-TLA23	(2) 250…500 MCM kit of 3	31 N•m (274 lb•in)
	355	Heavy	140G-M-TLA23	(2) 250…500 MCM kit of 3	31 N•m (274 lb•in)
	355	Light	140G-M-TLA23	(2) 250…500 MCM kit of 3	31 N•m (274 lb•in)
	355	Normal	140G-M-TLA23	(2) 250…500 MCM kit of 3	31 N•m (274 lb•in)
400	395	Heavy	140G-M-TLA23	(2) 250…500 MCM kit of 3	31 N•m (274 lb•in)
	395	Light	140G-M-TLA23	(2) 250…500 MCM kit of 3	31 N•m (274 lb•in)
	395	Normal	140G-M-TLA23	(2) 250…500 MCM kit of 3	31 N•m (274 lb•in)
450	425	Heavy	140G-M-TLA23	(2) 250…500 MCM kit of 3	31 N•m (274 lb•in)
	435	Light	140G-M-TLA23	(2) 250…500 MCM kit of 3	31 N•m (274 lb•in)
	435	Normal	140G-M-TLA23	(2) 250…500 MCM kit of 3	31 N•m (274 lb•in)
500	460	Light	140G-M-TLA23	(2) 250…500 MCM kit of 3	31 N•m (274 lb•in)
	460	Normal	140G-M-TLA23	(2) 250…500 MCM kit of 3	31 N•m (274 lb•in)
	510	Light	140G-M-TLA23	(2) 250…500 MCM kit of 3	31 N•m (274 lb•in)
	510	Normal	140G-M-TLA23	(2) 250…500 MCM kit of 3	31 N•m (274 lb•in)
550	545	Light	140G-M-TLA23	(2) 250…500 MCM kit of 3	31 N•m (274 lb•in)

Table 21 - 690V, 60 Hz Input - Code P3 Thermal Magnetic Circuit Breaker Options

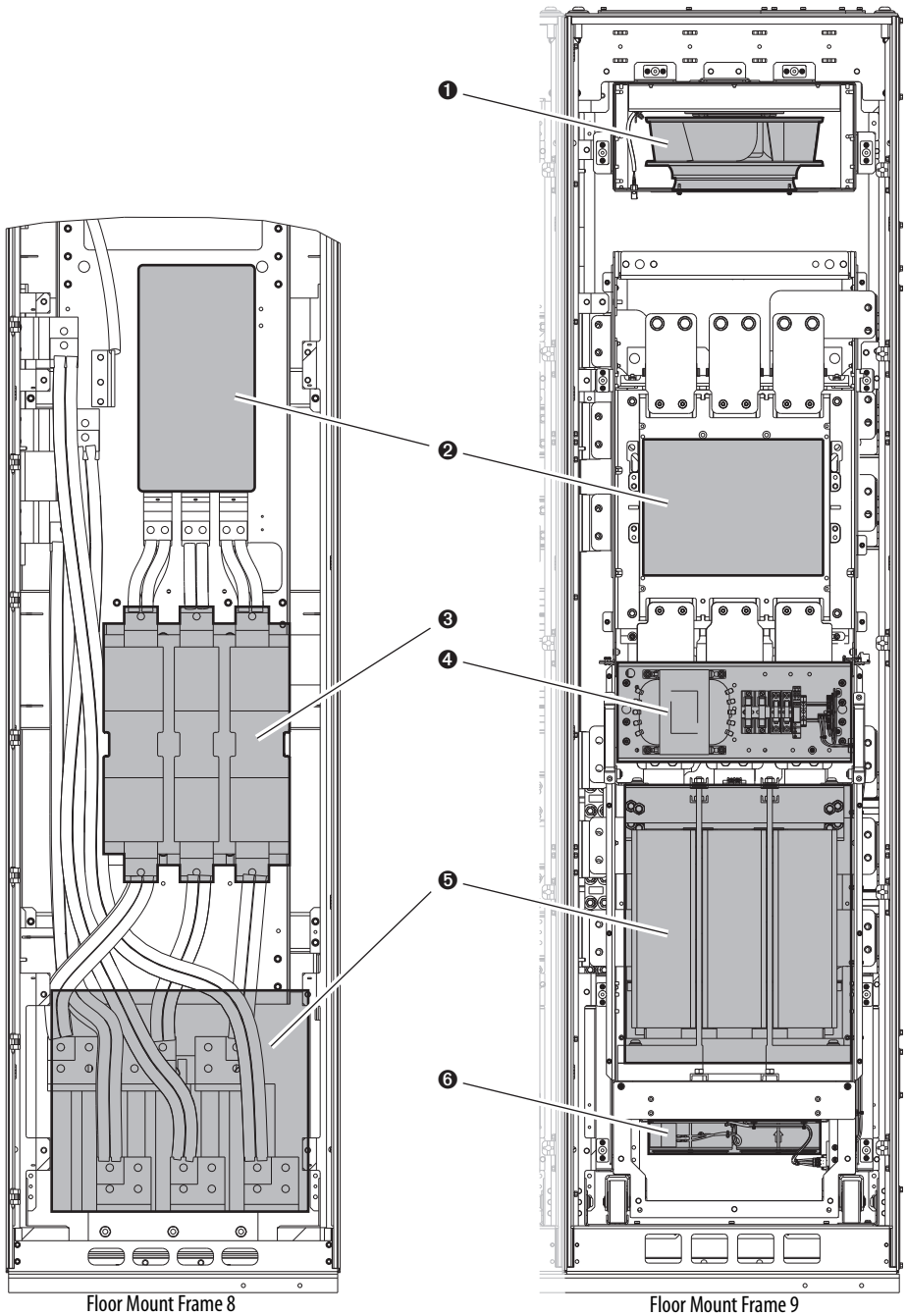
kW	Amps	Duty	Line Side Terminal Lugs	Terminal Size	Recommended Torque
200	215	Heavy	140G-M-TLA23	(2) 250…500 MCM kit of 3	31 N•m (274 lb•in)
250	265	Heavy	140G-M-TLA23	(2) 250…500 MCM kit of 3	31 N•m (274 lb•in)
	265	Normal	140G-M-TLA23	(2) 250…500 MCM kit of 3	31 N•m (274 lb•in)
300	308	Heavy	140G-M-TLA23	(2) 250…500 MCM kit of 3	31 N•m (274 lb•in)
315	330	Light	140G-M-TLA23	(2) 250…500 MCM kit of 3	31 N•m (274 lb•in)
	330	Normal	140G-M-TLA23	(2) 250…500 MCM kit of 3	31 N•m (274 lb•in)
355	370	Heavy	140G-M-TLA23	(2) 250…500 MCM kit of 3	31 N•m (274 lb•in)
	370	Light	140G-M-TLA23	(2) 250…500 MCM kit of 3	31 N•m (274 lb•in)
	370	Normal	140G-M-TLA23	(2) 250…500 MCM kit of 3	31 N•m (274 lb•in)
375	375	Heavy	140G-M-TLA23	(2) 250…500 MCM kit of 3	31 N•m (274 lb•in)
400	410	Light	140G-M-TLA23	(2) 250…500 MCM kit of 3	31 N•m (274 lb•in)
	413	Heavy	140G-M-TLA23	(2) 250…500 MCM kit of 3	31 N•m (274 lb•in)
	415	Normal	140G-M-TLA23	(2) 250…500 MCM kit of 3	31 N•m (274 lb•in)
450	460	Light	140G-M-TLA23	(2) 250…500 MCM kit of 3	31 N•m (274 lb•in)
	460	Normal	140G-M-TLA23	(2) 250…500 MCM kit of 3	31 N•m (274 lb•in)
500	500	Light	140G-M-TLA23	(2) 250…500 MCM kit of 3	31 N•m (274 lb•in)
	500	Normal	140G-M-TLA23	(2) 250…500 MCM kit of 3	31 N•m (274 lb•in)
530	530	Light	140G-M-TLA23	(2) 250…500 MCM kit of 3	31 N•m (274 lb•in)

Table 22 - 690V, 60 Hz Input - Code P5 Molded Case Disconnect Switch Options (Floor Mount Frame 8 Only)

kW	Amps	Duty	Line Side Terminal Lugs	Terminal Size	Recommended Torque
200	215	Heavy	140G-M-TLA23	(2) 250…500 MCM kit of 3	31 N•m (274 lb•in)
250	265	Heavy	140G-M-TLA23	(2) 250…500 MCM kit of 3	31 N•m (274 lb•in)
	265	Normal	140G-M-TLA23	(2) 250…500 MCM kit of 3	31 N•m (274 lb•in)
300	308	Heavy	140G-M-TLA23	(2) 250…500 MCM kit of 3	31 N•m (274 lb•in)
315	330	Light	140G-M-TLA23	(2) 250…500 MCM kit of 3	31 N•m (274 lb•in)
	330	Light	140G-M-TLA23	(2) 250…500 MCM kit of 3	31 N•m (274 lb•in)
355	370	Heavy	140G-M-TLA23	(2) 250…500 MCM kit of 3	31 N•m (274 lb•in)
	370	Light	140G-M-TLA23	(2) 250…500 MCM kit of 3	31 N•m (274 lb•in)
	370	Normal	140G-M-TLA23	(2) 250…500 MCM kit of 3	31 N•m (274 lb•in)
375	375	Heavy	140G-M-TLA23	(2) 250…500 MCM kit of 3	31 N•m (274 lb•in)
400	410	Light	140G-M-TLA23	(2) 250…500 MCM kit of 3	31 N•m (274 lb•in)
	413	Heavy	140G-M-TLA23	(2) 250…500 MCM kit of 3	31 N•m (274 lb•in)
	415	Normal	140G-M-TLA23	(2) 250…500 MCM kit of 3	31 N•m (274 lb•in)
450	460	Light	140G-M-TLA23	(2) 250…500 MCM kit of 3	31 N•m (274 lb•in)
	460	Normal	140G-M-TLA23	(2) 250…500 MCM kit of 3	31 N•m (274 lb•in)
500	500	Light	140G-M-TLA23	(2) 250…500 MCM kit of 3	31 N•m (274 lb•in)
	500	Normal	140G-M-TLA23	(2) 250…500 MCM kit of 3	31 N•m (274 lb•in)
530	530	Light	140G-M-TLA23	(2) 250…500 MCM kit of 3	31 N•m (274 lb•in)

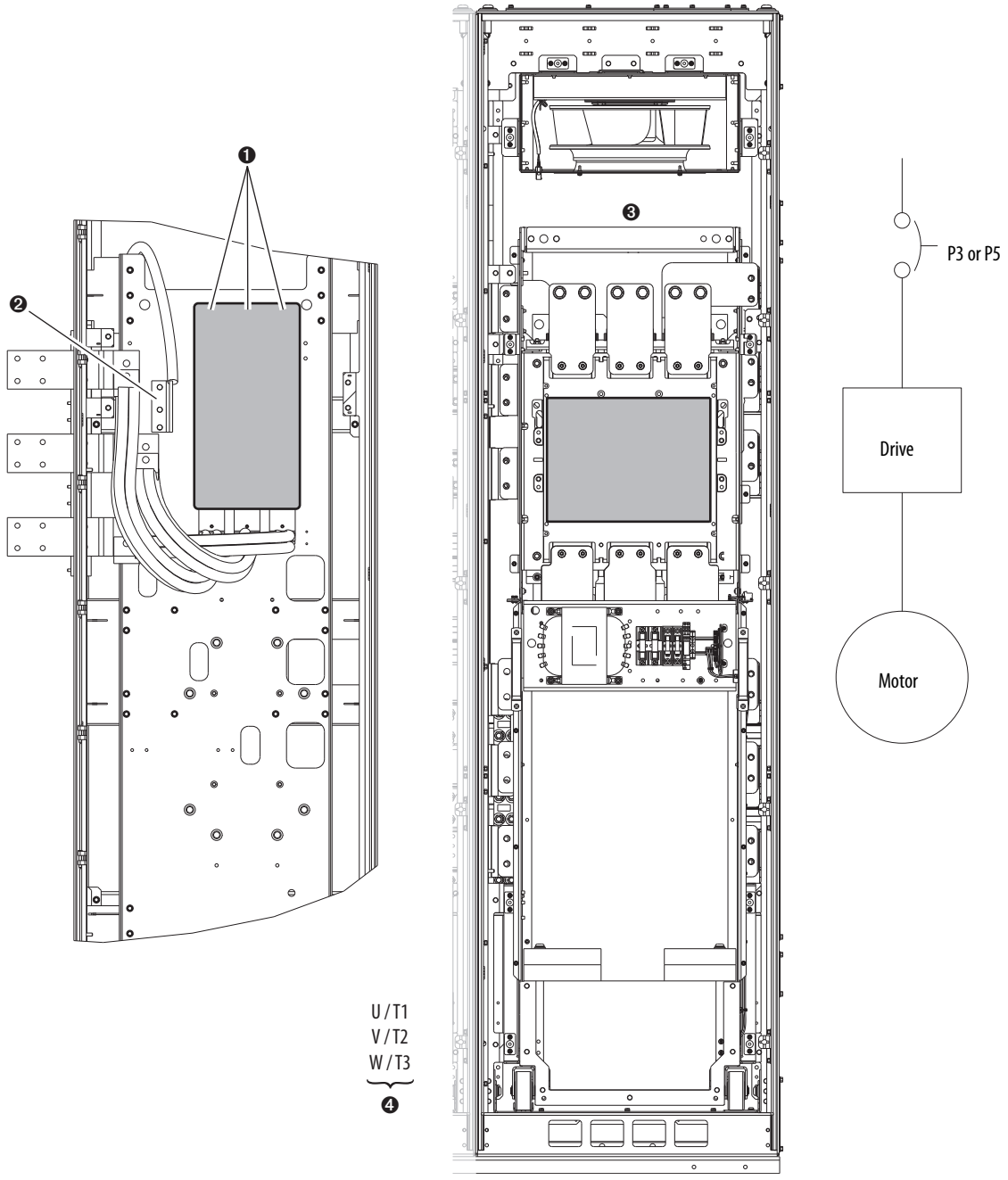
Cabinet Options Bay Accessories

Figure 102 - Accessory Overview



No.	Description	Floor Mount Drive Frame(s)
❶	Outlet Blower (Frame 9)	9
❷	Circuit Breaker / Molded Case Switch	8, 9
❸	Input or Output Contactor (Optional)	8
❹	Transformer Panel	9
❺	Input or Output Reactor (Optional)	8, 9
❻	Reactor Fan Tray (Included with Reactor)	9

Figure 103 - Option P3 or P5 Disconnect

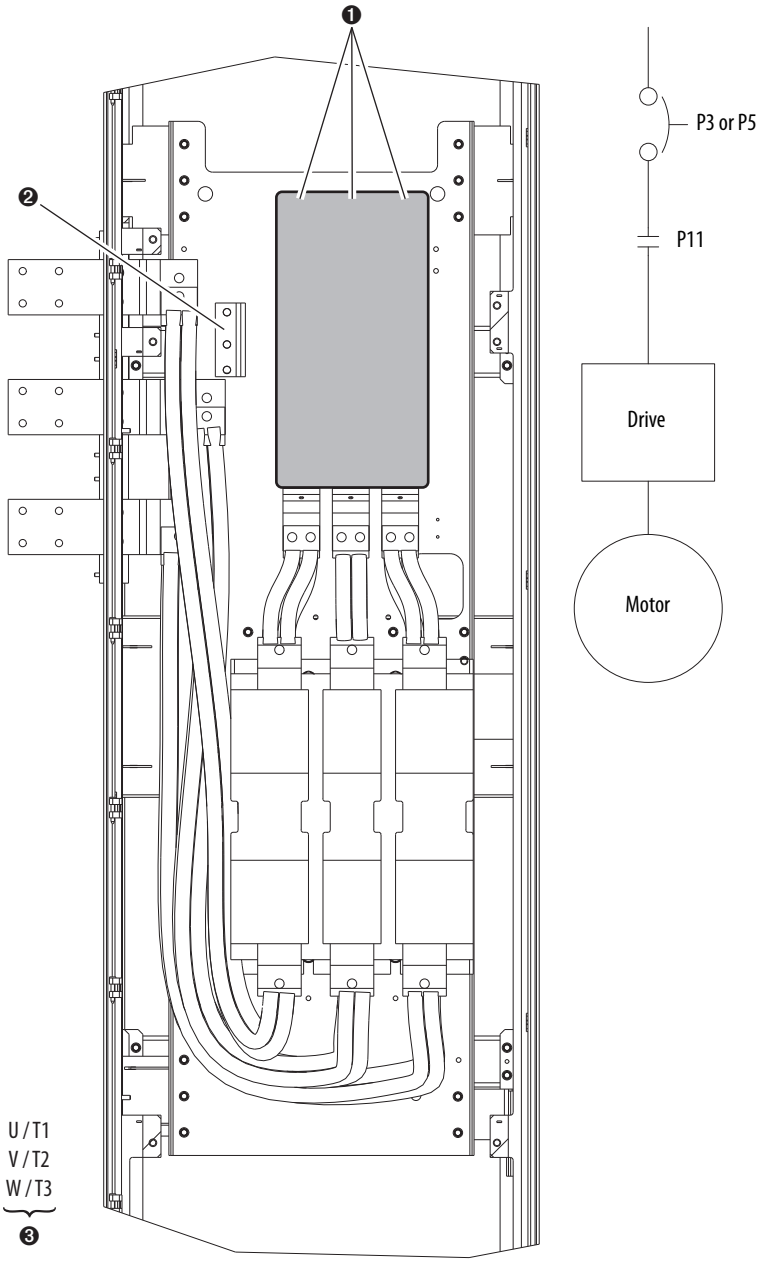


Floor Mount Frame 8

Floor Mount Frame 9

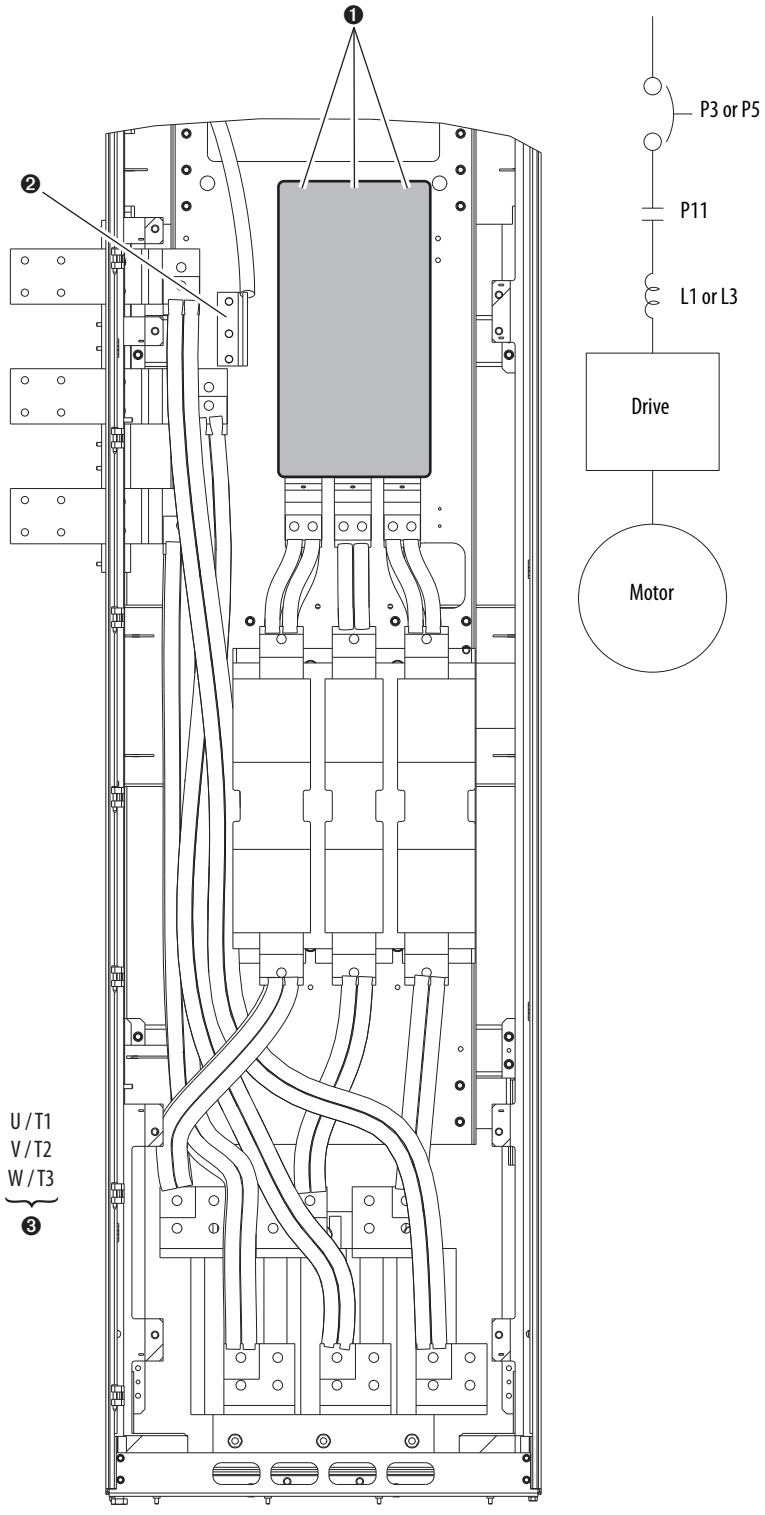
No.	Name	Description
❶	R/L1, S/L2, T/L3	Three-phase input power connection.
❷	PE	Three-phase input ground.
❸	R/L1, S/L2, T/L3	Three-phase input power for frame 9 drives lands on the horizontal bus bars behind the cabinet options rollout assembly. See page 164 and page 165.
❹	U/T1, V/T2, W/T3	Motor connection made at drive power bus. See page 156.

Figure 104 - Option P3 or P5 Disconnect and Option P11 Input Contactor (Floor Mount Frame 8 Only)



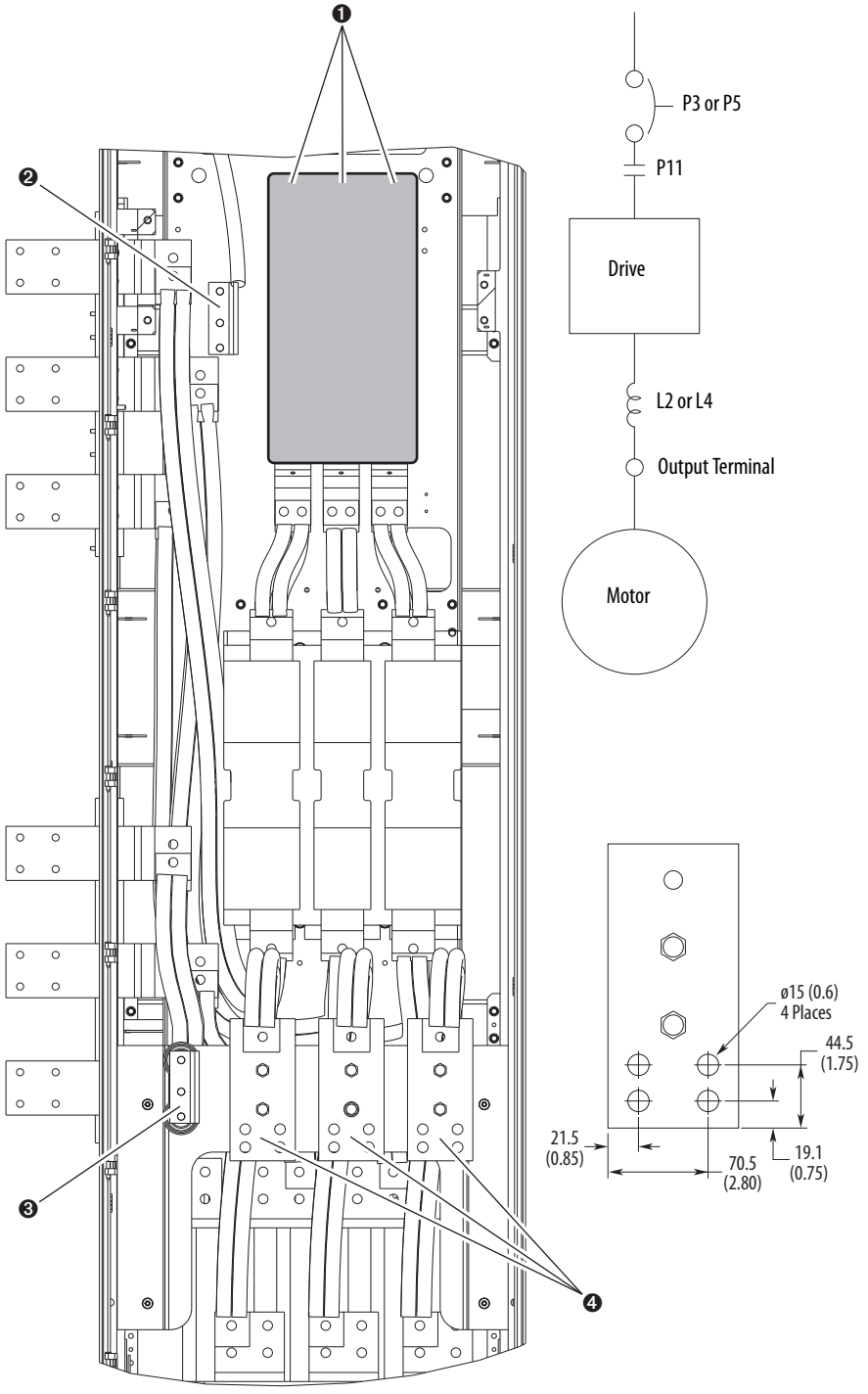
No.	Name	Description
❶	R/L1, S/L2, T/L3	Three-phase input power connection.
❷	PE	Three-phase input ground.
❸	U/T1, V/T2, W/T3	Motor connection made at drive power bus. See page 156.

Figure 105 - Option P3 or P5 Disconnect, Option P11 Input Contactor, and Option L1 or L3 Input Reactor (Floor Mount Frame 8 Only)



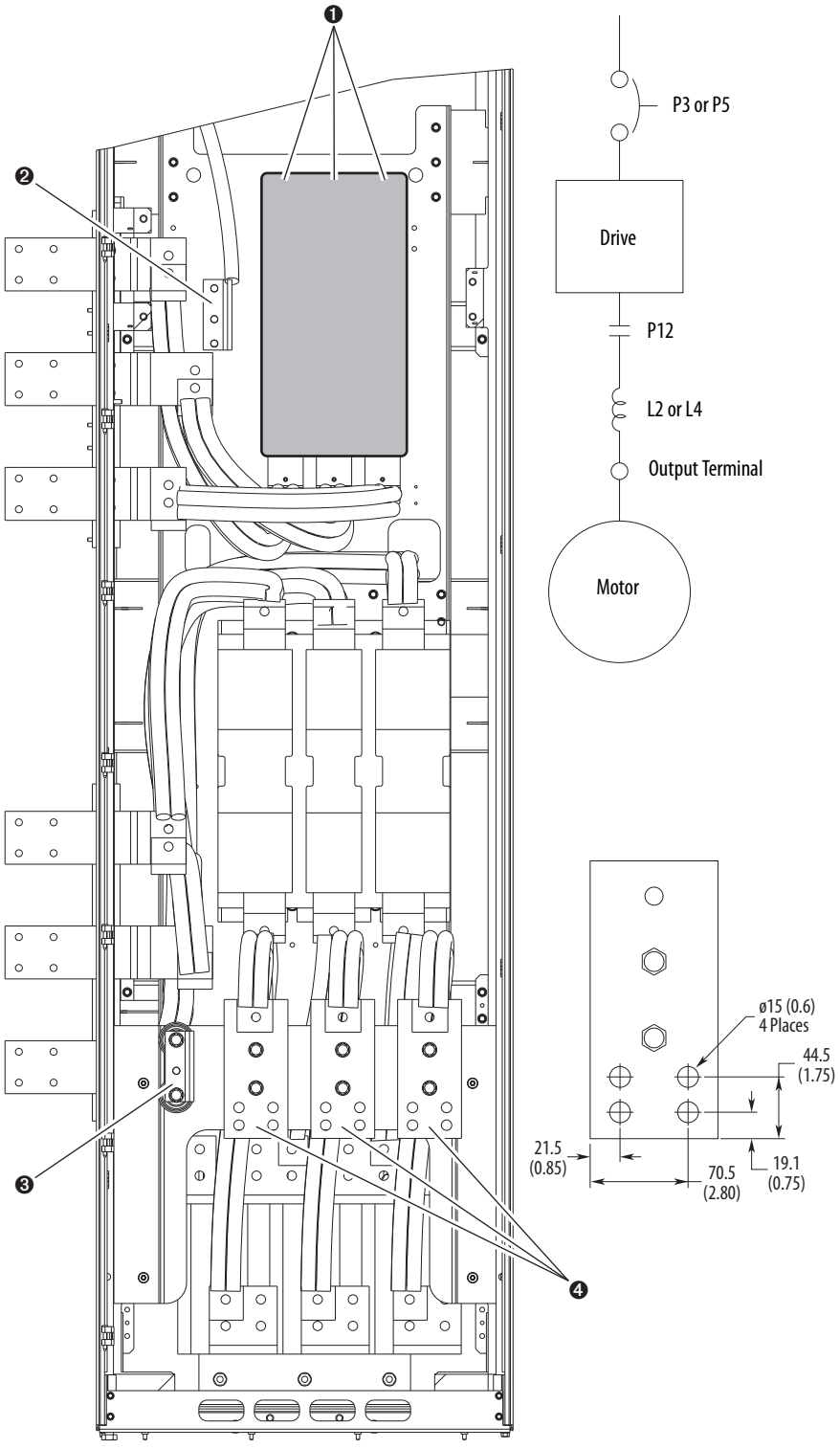
No.	Name	Description
❶	R/L1, S/L2, T/L3	Three-phase input power connection.
❷	PE	Three-phase input ground.
❸	U/T1, V/T2, W/T3	Motor connection made at drive power bus. See page 156.

Figure 106 - Option P3 or P5 Disconnect, Option P11 Input Contactor, and Option L2 or L4 Output Reactor (Floor Mount Frame 8 Only)



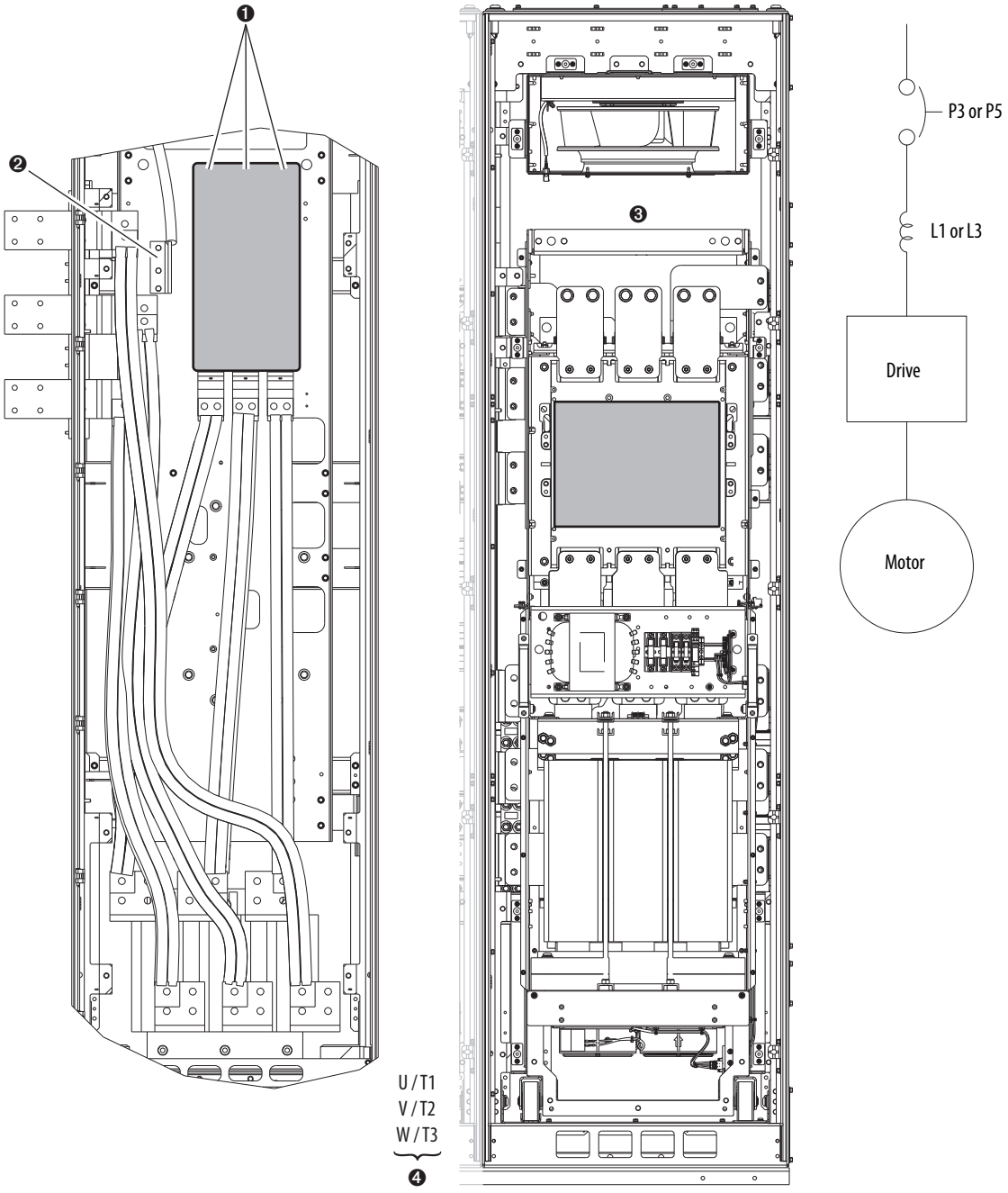
No.	Name	Description	Recommended Torque
❶	R/L1, S/L2, T/L3	Three-phase input power connection.	Factory Installed
❷	PE	Three-phase input ground.	38.0 N•m (336 lb•in)
❸	PE	Three-phase motor ground.	38.0 N•m (336 lb•in)
❹	U/T1, V/T2, W/T3	Motor connection.	38.0 N•m (336 lb•in)

Figure 107 - Option P3 or P5 Disconnect, Option P12 Output Contactor, and Option L2 or L4 Output Reactor (Floor Mount Frame 8 Only)



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 108 - Option P3 or P5 Disconnect and Option L1 or L3 Input Reactor

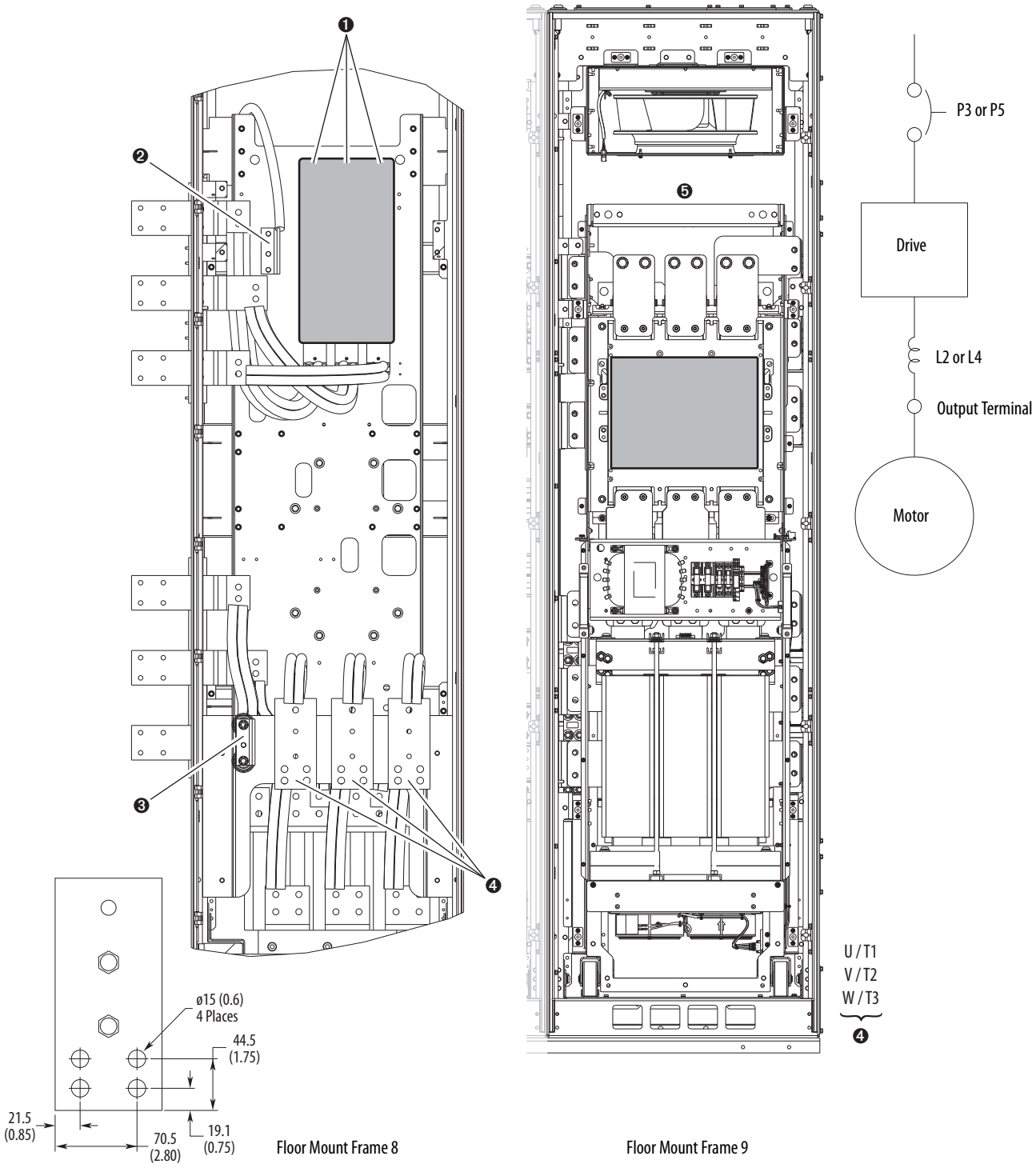


Floor Mount Frame 8

Floor Mount Frame 9

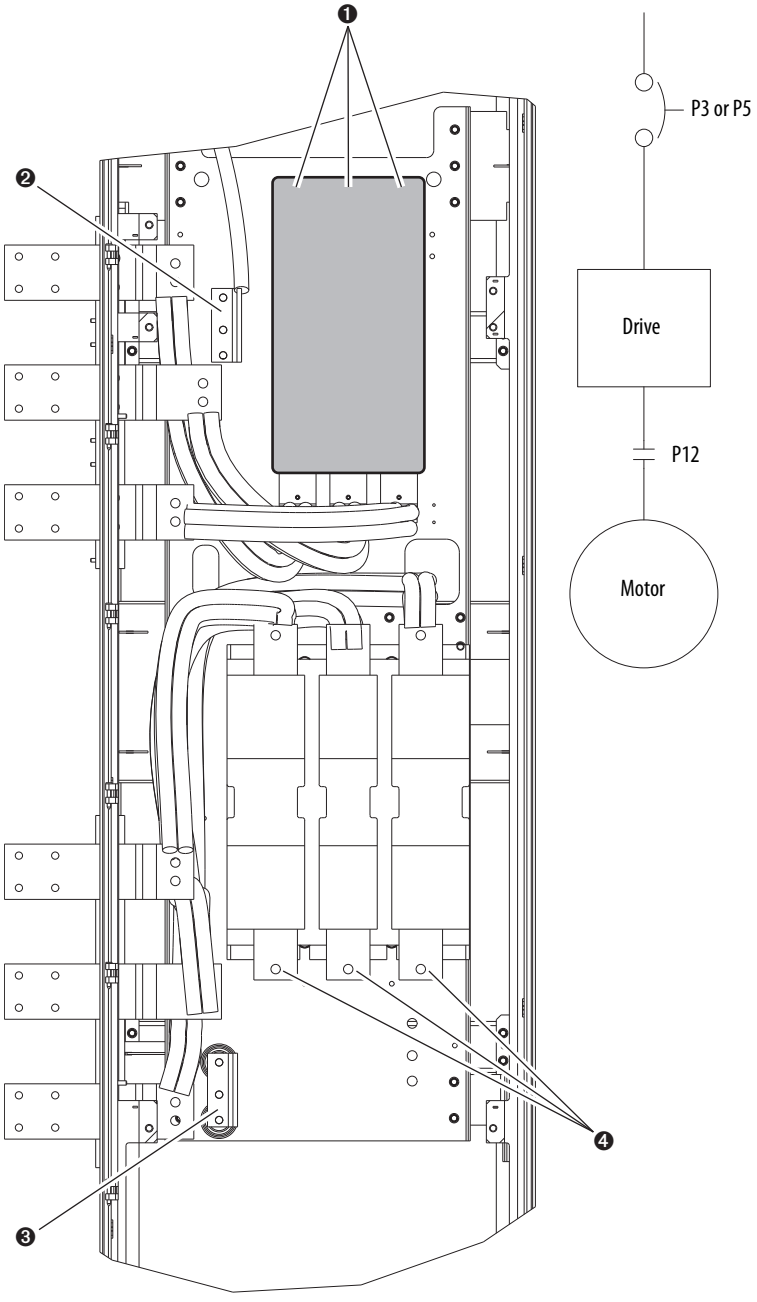
No.	Name	Description
❶	R/L1, S/L2, T/L3	Three-phase input power connection.
❷	PE	Three-phase input ground.
❸	R/L1, S/L2, T/L3	Three-phase input power for frame 9 drives lands on the horizontal bus bars behind the cabinet options rollout assembly. See page 164 and page 165.
❹	U/T1, V/T2, W/T3	Motor connection made at drive power bus. See page 156.

Figure 109 - 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)
❺	R/L1, S/L2, T/L3	Three-phase input power for frame 9 drives lands on the horizontal bus bars behind the cabinet options rollout assembly. See page 164 and page 165.	

Figure 110 - Option P3 or P5 Disconnect and Option P12 Output Contactor (Floor Mount Frame 8 Only)



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 23 - 400V, 50 Hz Input - Code P12 Output Contactor Options (Floor Mount Frame 8 Only)

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 24 - 480V, 60 Hz Input - Code P12 Output Contactor Options (Floor Mount Frame 8 Only)

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)

Table 25 - 600V, 50 Hz Input - Code P12 Output Contactor Options (Floor Mount Frame 8 Only)

Hp	Amps	Duty	Contactor Cat. No.	Recommended Torque
250	272	Heavy	100-D420ED11	17 N•m (150 lb•in)
300	295	Heavy	100-D420ED11	17 N•m (150 lb•in)
	295	Normal	100-D420ED11	17 N•m (150 lb•in)
350	329	Heavy	100-D420ED11	17 N•m (150 lb•in)
	355	Heavy	100-D420ED11	17 N•m (150 lb•in)
	355	Light	100-D420ED11	17 N•m (150 lb•in)
	355	Normal	100-D420ED11	17 N•m (150 lb•in)
400	395	Heavy	100-D420ED11	17 N•m (150 lb•in)
	395	Light	100-D420ED11	17 N•m (150 lb•in)
	395	Normal	100-D420ED11	17 N•m (150 lb•in)
450	425	Heavy	100-D630ED11	68 N•m (600 lb•in)
	435	Light	100-D630ED11	68 N•m (600 lb•in)
	435	Normal	100-D630ED11	68 N•m (600 lb•in)
500	460	Light	100-D630ED11	68 N•m (600 lb•in)
	460	Normal	100-D630ED11	68 N•m (600 lb•in)
	510	Light	100-D630ED11	68 N•m (600 lb•in)
	510	Normal	100-D630ED11	68 N•m (600 lb•in)
550	545	Light	100-D630ED11	68 N•m (600 lb•in)

Table 26 - 690V, 60 Hz Input - Code P12 Output Contactor Options (Floor Mount Frame 8 Only)

kW	Amps	Duty	Contactor Cat. No.	Recommended Torque
200	215	Heavy	100-D420EA11	17 N•m (150 lb•in)
250	265	Heavy	100-D420EA11	17 N•m (150 lb•in)
	265	Normal	100-D420EA11	17 N•m (150 lb•in)
300	308	Heavy	100-D420EA11	17 N•m (150 lb•in)
315	330	Light	100-D420EA11	17 N•m (150 lb•in)
	330	Normal	100-D420EA11	17 N•m (150 lb•in)
355	370	Heavy	100-D420EA11	17 N•m (150 lb•in)
	370	Light	100-D420EA11	17 N•m (150 lb•in)
	370	Normal	100-D420EA11	17 N•m (150 lb•in)
375	375	Heavy	100-D420EA11	17 N•m (150 lb•in)
400	410	Light	100-D420EA11	17 N•m (150 lb•in)
	413	Heavy	100-D420EA11	17 N•m (150 lb•in)
	415	Normal	100-D420EA11	17 N•m (150 lb•in)
450	460	Light	100-D630EA11	68 N•m (600 lb•in)
	460	Normal	100-D630EA11	68 N•m (600 lb•in)
500	500	Light	100-D630EA11	68 N•m (600 lb•in)
	500	Normal	100-D630EA11	68 N•m (600 lb•in)
530	530	Light	100-D860EA11	68 N•m (600 lb•in)

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 29.

MOV, AC EMI Capacitor, and Common Mode Capacitor Circuits

Figure 111 - MOV and AC EMI Capacitor Phase to Ground (Wall Mount Frames 1…7)

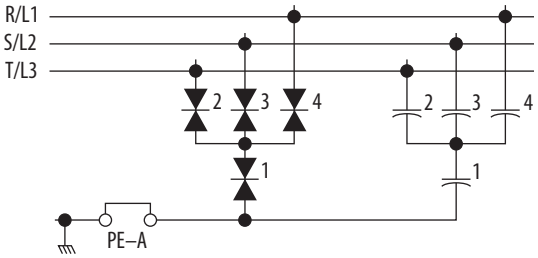


Figure 112 - MOV and AC EMI Capacitor Phase to Ground (Floor Mount Frames 8…10) AC Input Only

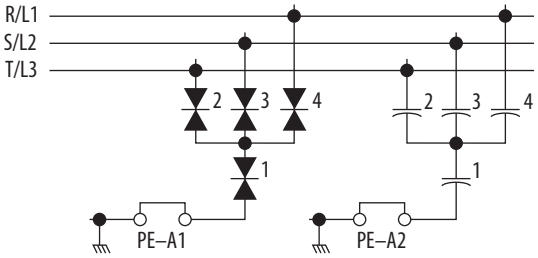
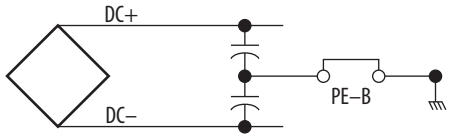


Figure 113 - Common Mode Capacitors to Ground (All Frames)



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

Frames 1…7: Measure the DC bus voltage at the power terminal block by measuring between the +DC and -DC terminals (see Figure 88 and Figure 89 for location) or between the +DC and -DC test point sockets if equipped. Also measure between the +DC terminal or test point and the chassis, and between the -DC terminal or testpoint 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 92 for location).

Wall Mount 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 27 - 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

Floor Mount 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 28 - 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 29.

Table 29 - Recommended Power Jumper Configurations Wall Mount Frames 1…7

Power Source Type	Jumper PE-A (1) (2) (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.
(2) Frame 5…7 Common DC Input drives do not have the PE-A jumper.

Table 30 - Recommended Power Jumper Configurations Floor Mount 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 212 through 217.

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.

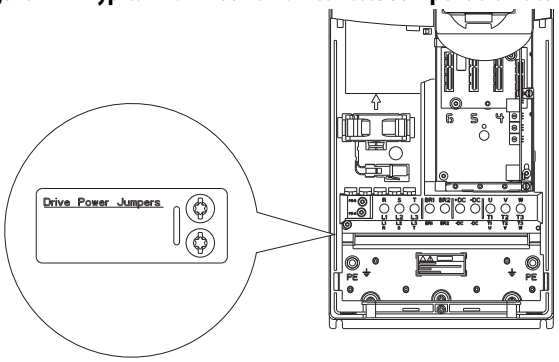
Wall Mount Frames 2…5 Power Jumper Screw Removal and Storage

Wall/Flange Mount Frames 2...5 use jumper screws to complete an electrical connection when installed. Install or remove jumper screws according to the recommendations in Table 29.

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.

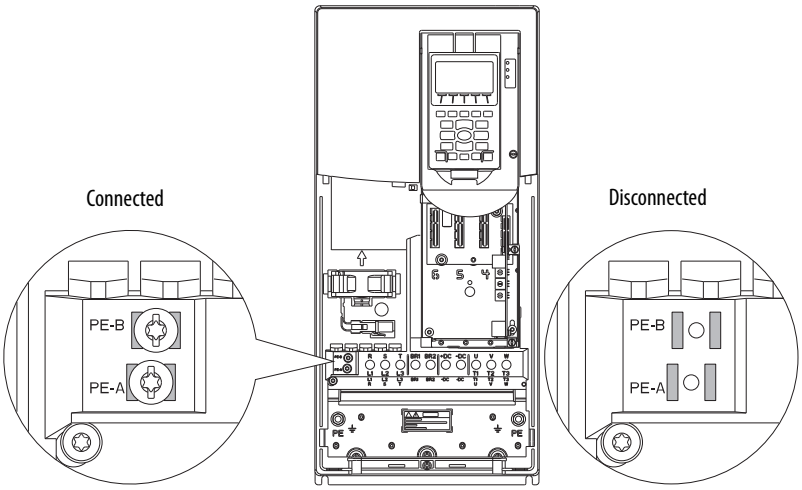
Figure 114 - Typical Wall Mount Frames 2…5 Jumper Screw Storage Location (Frame 4 shown)



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 115 - Typical Wall Mount Frames 2…5 Jumper Screw Installation Locations (Frame 4 shown)

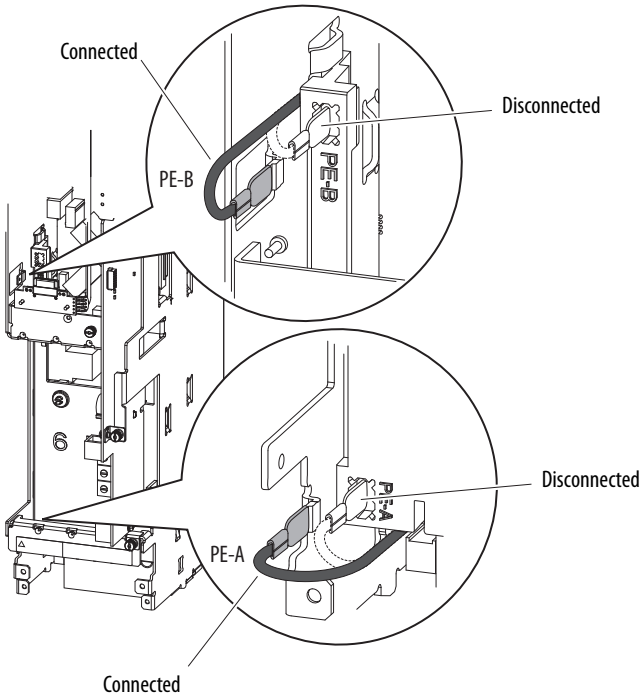


Wall Mount Frames 1, 6, and 7 Power Jumper Wire Removal and Storage

Wall/Flange Mount 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 29.

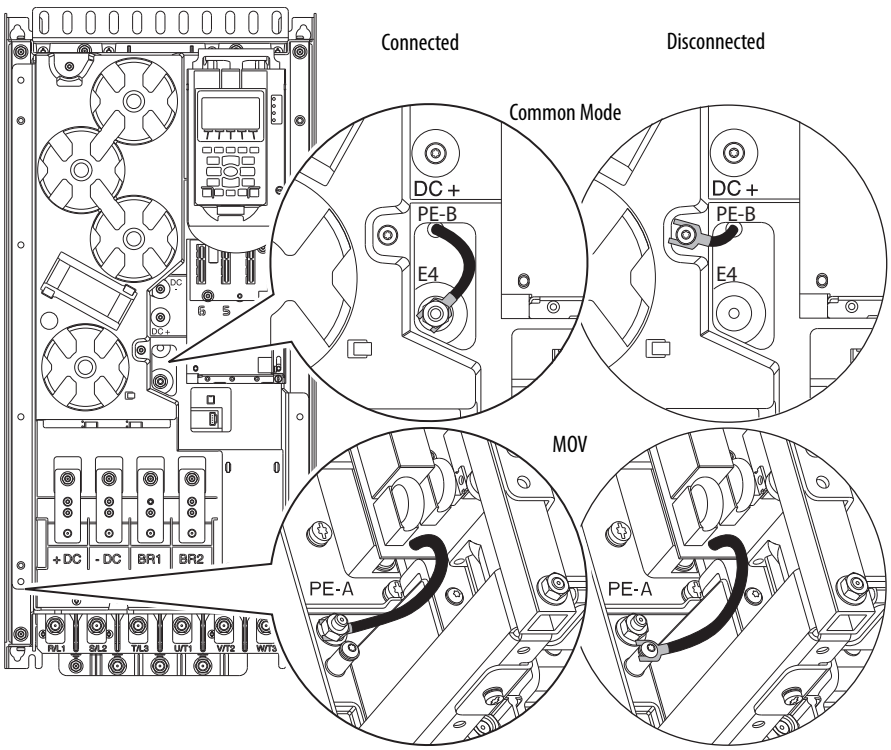
ATTENTION: Hazard of equipment damage exists if jumpers are not properly disconnected. For Frames 1, 6, and 7, secure the disconnected jumper wire to the insulated position provided.

Figure 116 - Wall Mount Frame 1 Jumper Wire Locations



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

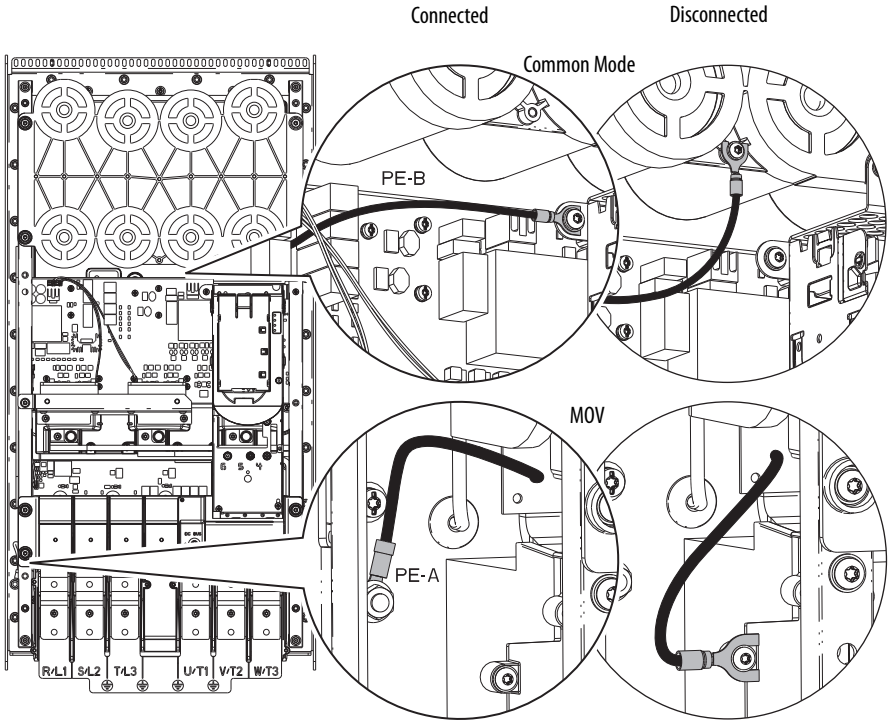
Figure 117 - Wall Mount Frame 6 Jumper Wire Locations



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 118 - Wall Mount Frame 7 Jumper Wire Locations



When jumper wires are connected:

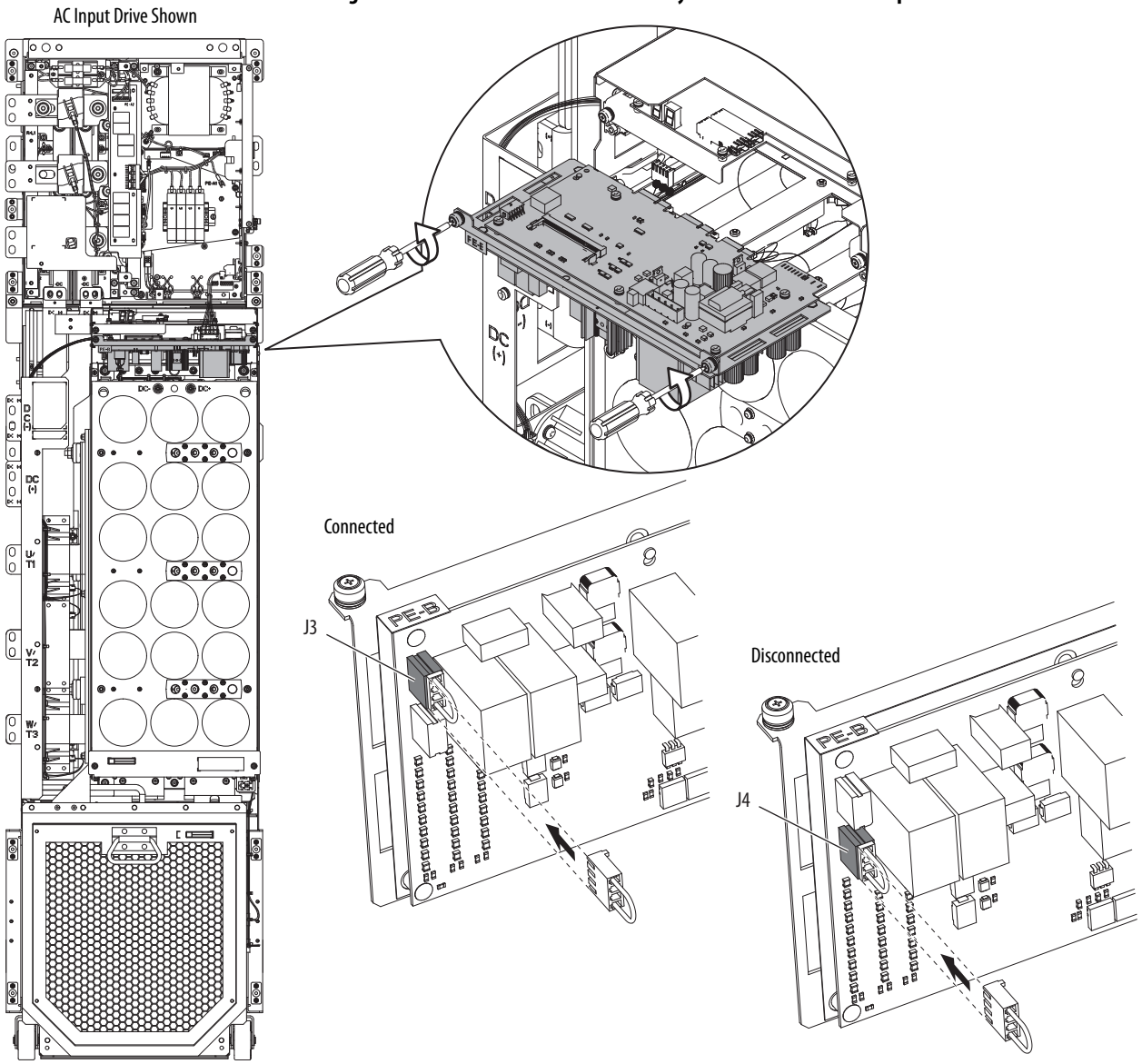
- Recommended torque (screws and nuts) = 1.36 N•m (12.0 lb•in)
- Recommended hex socket = 7 mm
- Recommended screwdriver = T20 Hexalobular

Floor Mount Frames 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 30.

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.

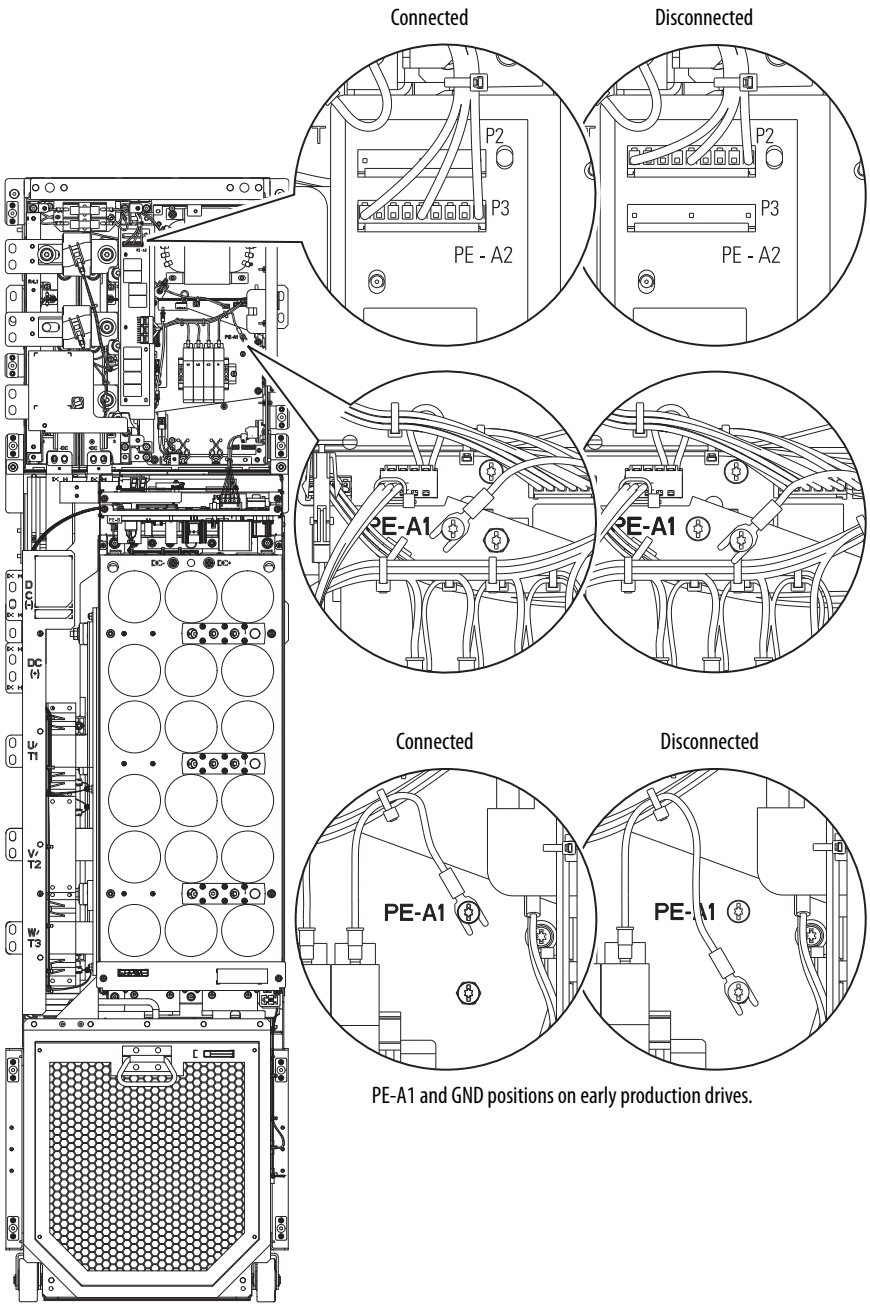
Figure 119 - Frames 8…10 Drive Assembly PE-B Common Mode Jumper Location



Removal and installation the Inverter Power Control Board tray:

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

Figure 120 - 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.

Notes:

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 31 - 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 32 - Option Module I/O Terminal Block Specifications

Name	Wire Size Range		Torque		Strip Length
	Maximum	Minimum	Maximum	Recommended	
22-Series I/O Modules TB1 with Screw Terminals	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.)
22-Series I/O Modules TB2 with Screw Terminals	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.)
11-Series I/O Module TB1 with Tension Clamp Terminals	2.5 mm^2 (14 AWG)	0.13 mm^2 (26 AWG)	N/A		10 mm (0.39 in.)
11-Series I/O Module TB2 with Tension Clamp Terminals	4.0 mm^2 (12 AWG)	0.25 mm^2 (24 AWG)	N/A		10 mm (0.39 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 33 - 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 34 - 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 35 - 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 (22 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 Safety Inputs Homing Inputs (1)(2)(3)(4)	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.

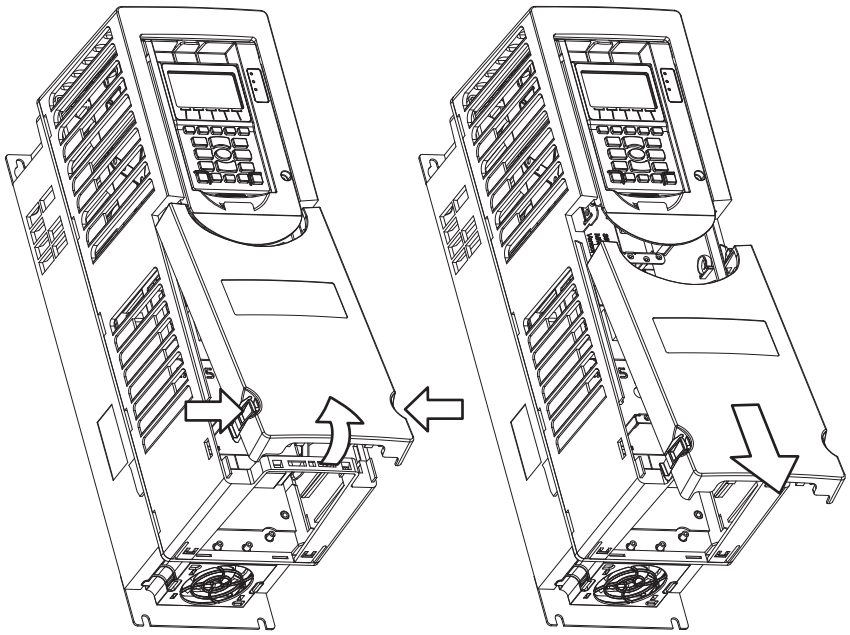
(3) I/O terminals labeled "(–)" or "Common" are not referenced to earth ground and are designed to greatly reduce common mode interference. Grounding these terminals can cause signal noise.

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

Access Drive Control Pod

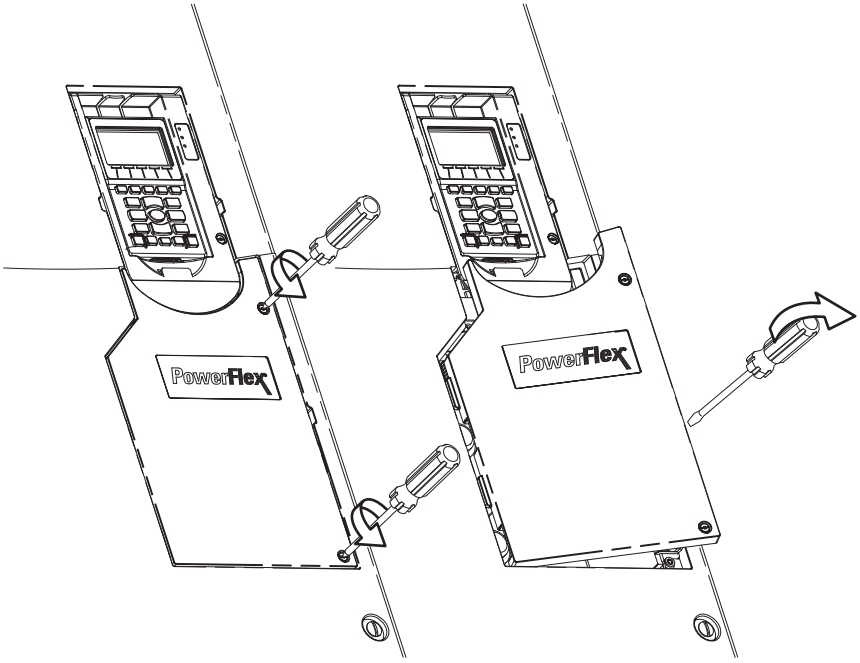
1. Remove drive cover

Wall Mount Frames 1...5



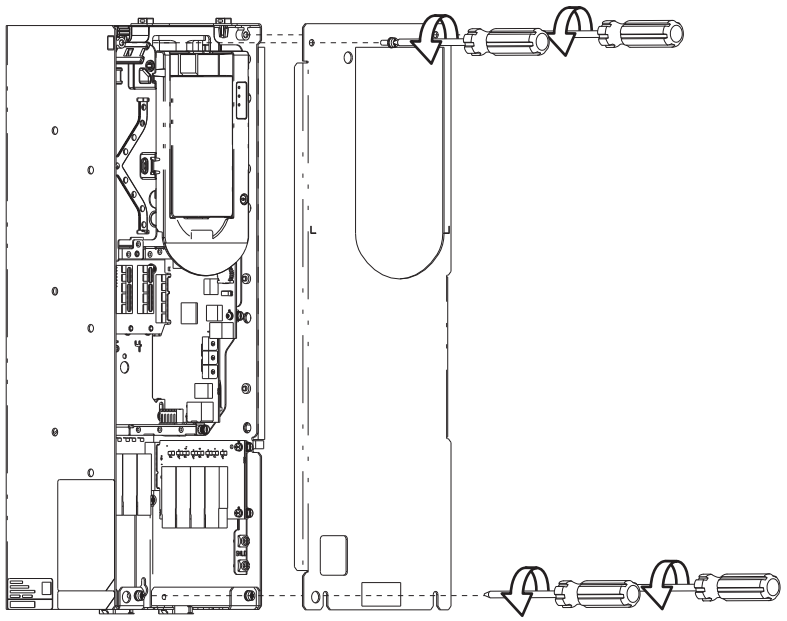
– Squeeze locking tabs and pull out bottom of cover.
– Pull cover down and away from the chassis.

Wall Mount Frames 6...7



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

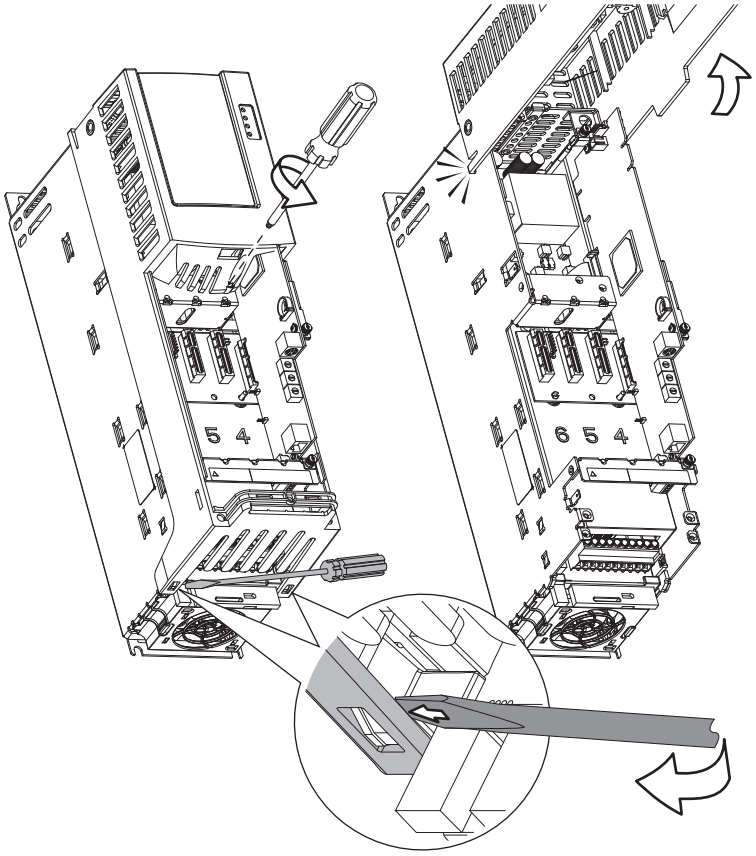
Floor Mount Frames 8...10



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

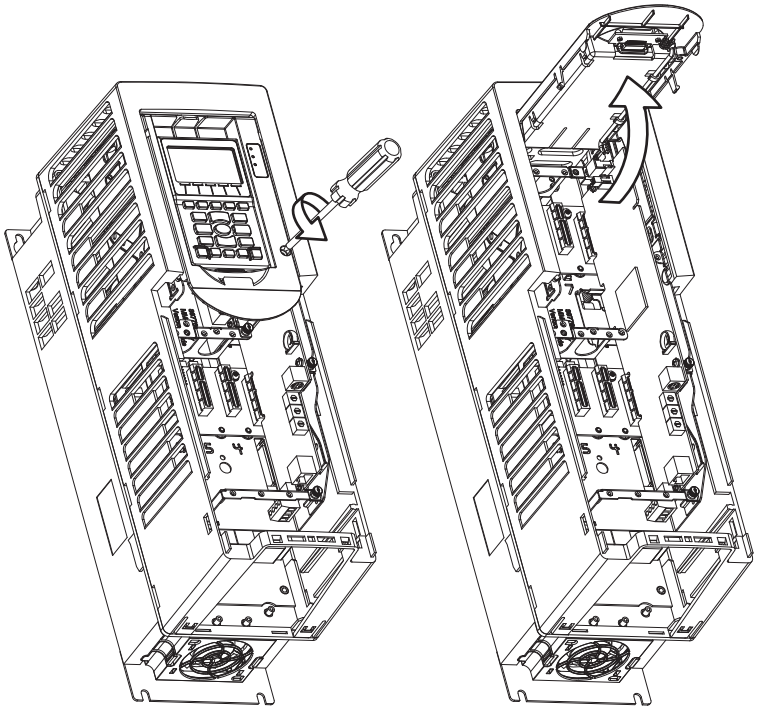
2. Frame 1 – Lift the chassis cover.
Frames 2...7 – Lift the Human Interface Module (HIM) cradle.

Wall Mount Frame 1



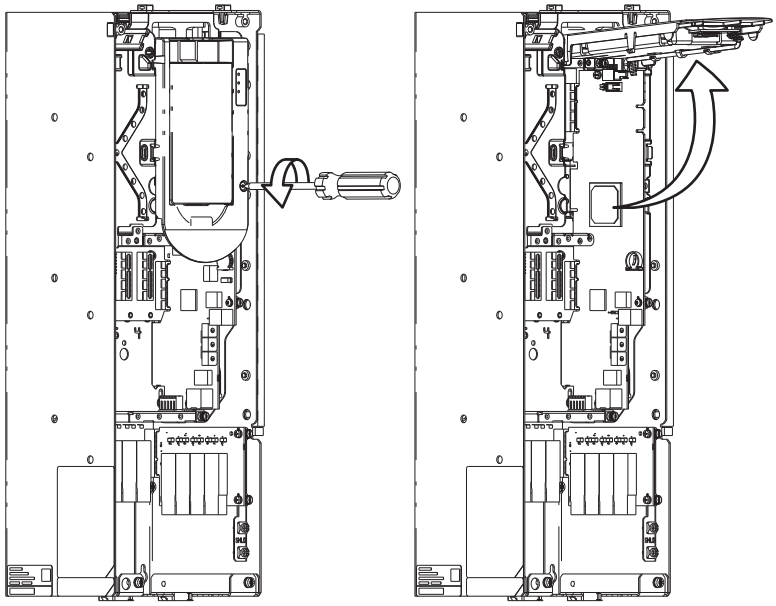
– Loosen the retention screw.
– Use a screwdriver to release the chassis cover locking tabs.
– Lift the chassis cover until the latch engages.

Wall Mount Frames 2...7



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

Floor Mount Frames 8...10



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

PowerFlex 753 Main Control Board

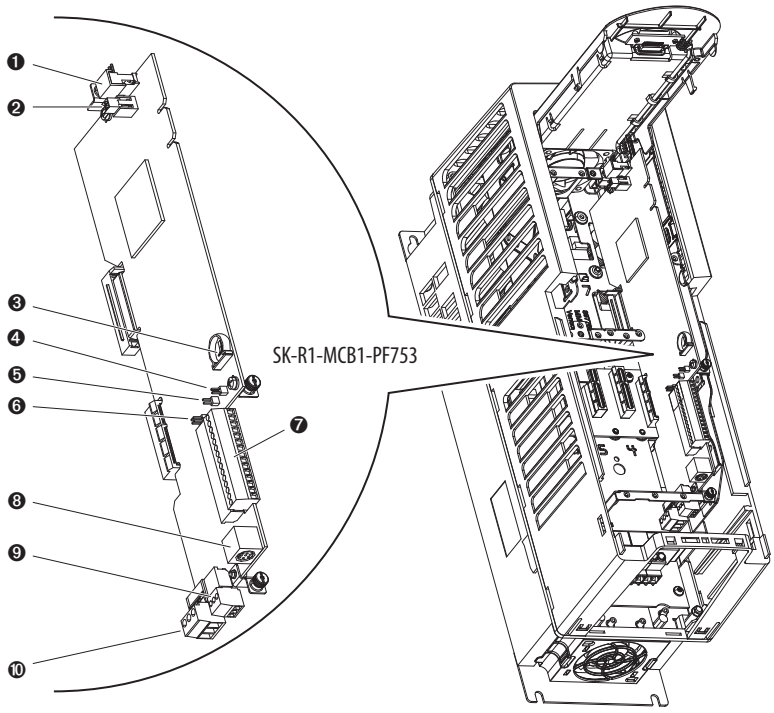


Table 36 - 753 Main Control Board Details

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 40.
❿	TB2	Relay terminal block.

Table 37 - J4 Input Mode Jumper

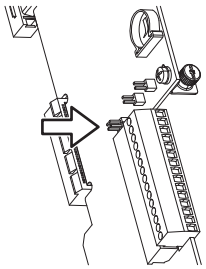
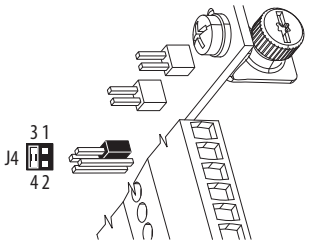
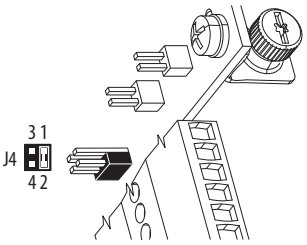
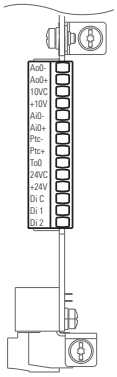
Jumper Position	Voltage Mode	Current Mode
		

Table 38 - 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). (4)	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 (30V DC Max.) - Opto isolated High State: 20…24V DC Low State: 0…5V DC	220
	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.
(4) See HW Input PTC on page 242 for PTC data.

Note: 753 Main Control Board I/O TB1 wiring examples begin on page 241.

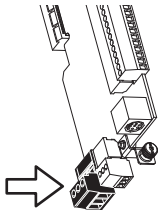
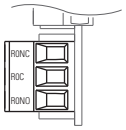


Table 39 - TB2 Terminal Designations

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	285 286 291 292
	R0C	Relay 0 Common	Output Relay 0 common		
	R0NO	Relay 0 N.O.	Output Relay 0 normally open contact.	240V AC, 24V DC, 2 A max. General Purpose (Inductive) / Resistive	

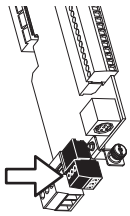
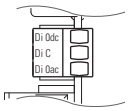


Table 40 - TB3 Terminal Designations

Power Block	Terminal	Name	Description	Related Param
	Di 0dc	Digital Input 0 24V DC (30V DC Max.)	Connections for Digital Input 0 when signal is DC power. High State: 20…24V DC Low State: 0…5V DC	220
	Di C	Digital Input Common	Digital input common	
	Di 0ac	Digital Input 0 120V AC (132V AC Max.)	Connections for Digital Input 0 when signal is AC power. High State: 100…132V AC Low State: 0…30V AC	

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

PowerFlex 755 Main Control Board

Wall Mount Frames 1…7

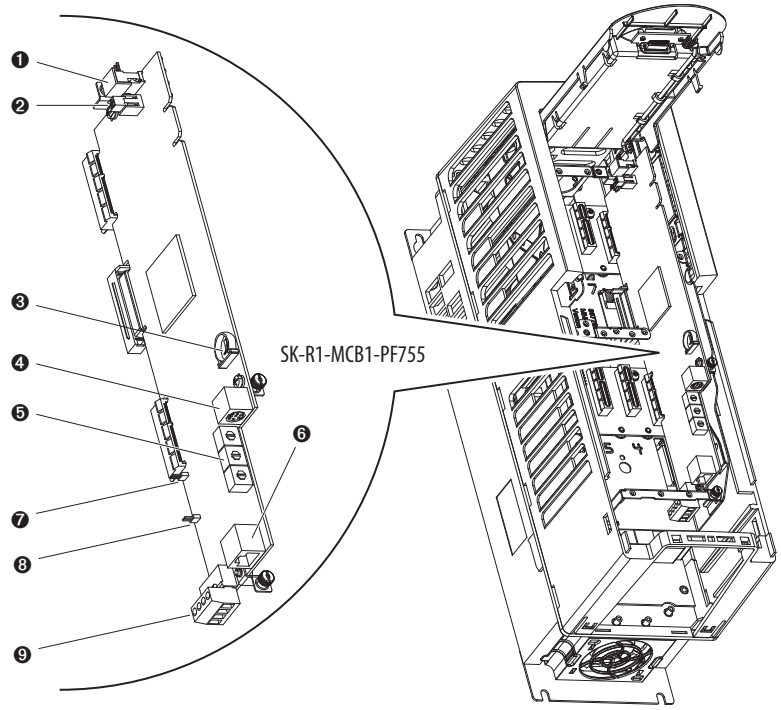


Table 41 - Control Board Details

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.

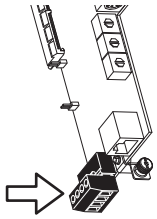
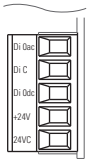


Table 42 - TB1 I/O Terminal Designations

Fixed I/O	Terminal	Name	Description
	Di 0ac	Digital Input 0 120V AC (132V AC Max.)	Connections for AC power supply. High State: 100…132V AC Low State: 0…30V AC
	Di C	Digital Input Common	Digital input common
	Di 0dc	Digital Input 0 24V DC (30V DC Max.)	Connections for DC power supply. High State: 20…24V DC Low State: 0…5V DC
	+24V	+24 Volt Power (50 mA Max.)	Connections for drive supplied 24V power.
	24VC	24 Volt Common	

Floor Mount Frames 8…10

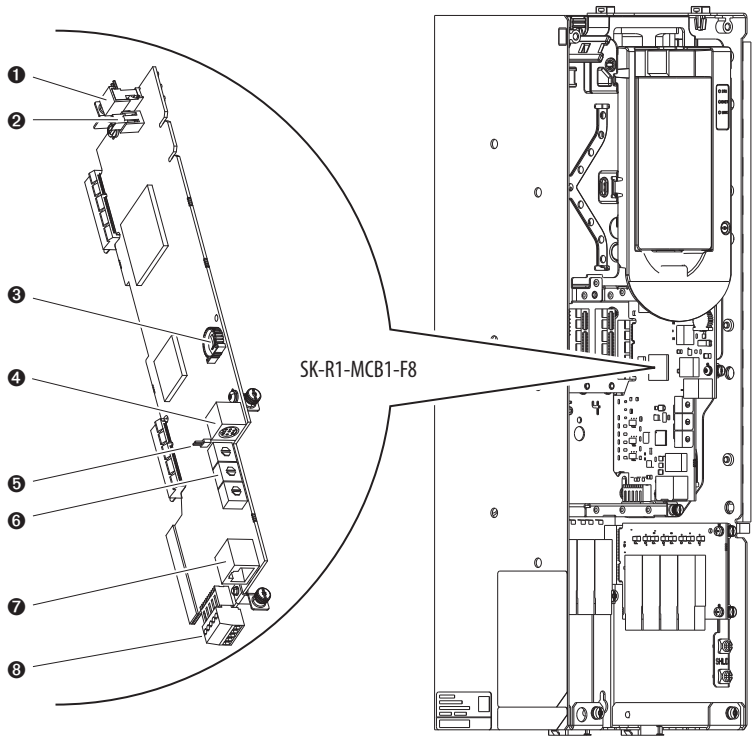


Table 43 - Control Board Details

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.

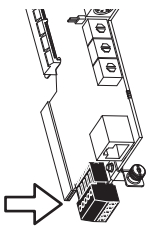
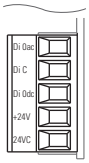


Table 44 - TB1 I/O Terminal Designations

Fixed I/O	Terminal	Name	Description
	Di 0ac	Digital Input 0 120V AC (132V AC Max.)	Connections for AC power supply. High State: 100…132V AC Low State: 0…30V AC
	Di C	Digital Input Common	Digital input common
	Di 0dc	Digital Input 0 24V DC (30V DC Max.)	Connections for DC power supply. High State: 20…24V DC Low State: 0…5V DC
	+24V	+24 Volt Power	Connections for drive supplied 24V power. 150 mA maximum
	24VC	24 Volt Common	

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 222.
2. Locate and remove ENABLE Jumper on the Main Control Board (see diagram).

Figure 121 - PowerFlex 753 - ENABLE Jumper Location

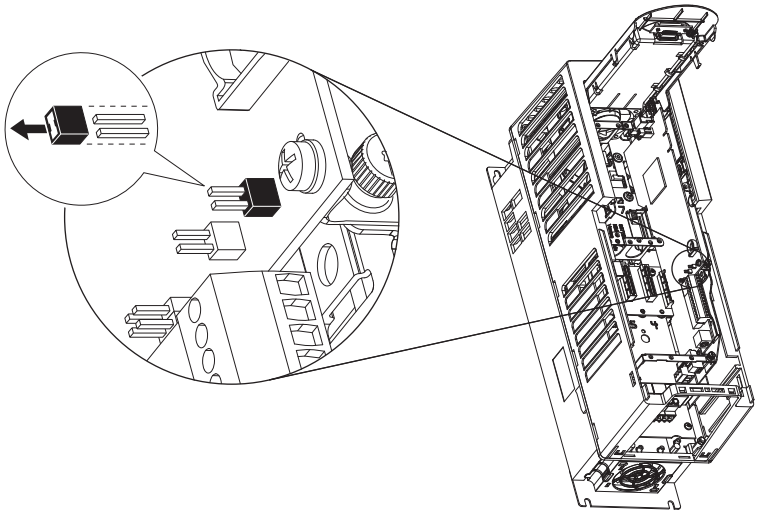


Figure 122 - PowerFlex 755 - ENABLE Jumper Location (Wall Mount Frames 1…7)

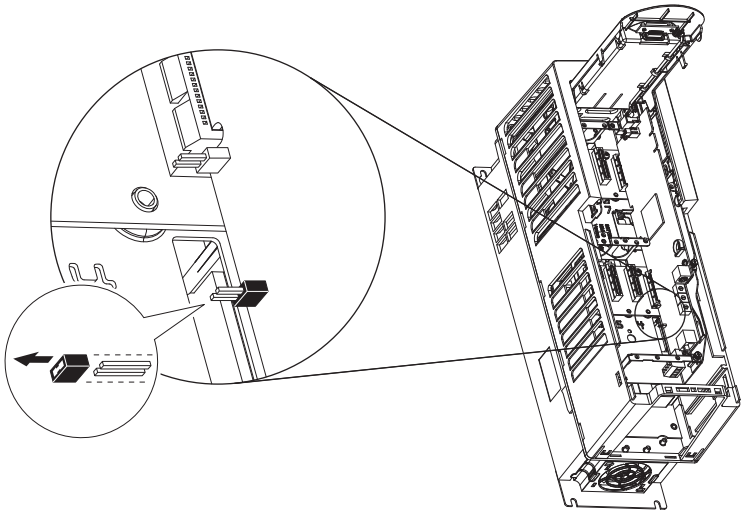
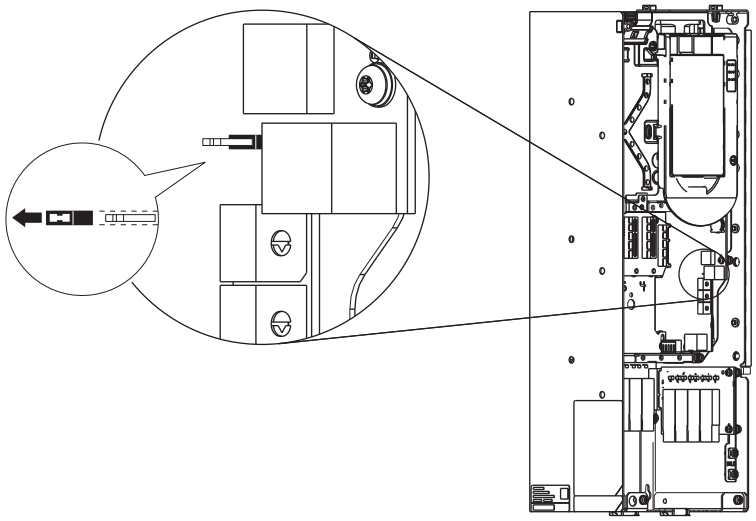


Figure 123 - PowerFlex 755 - ENABLE Jumper Location (Floor Mount Frames 8…10)



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.

Figure 124 - PowerFlex 753 - SAFETY Jumper Location

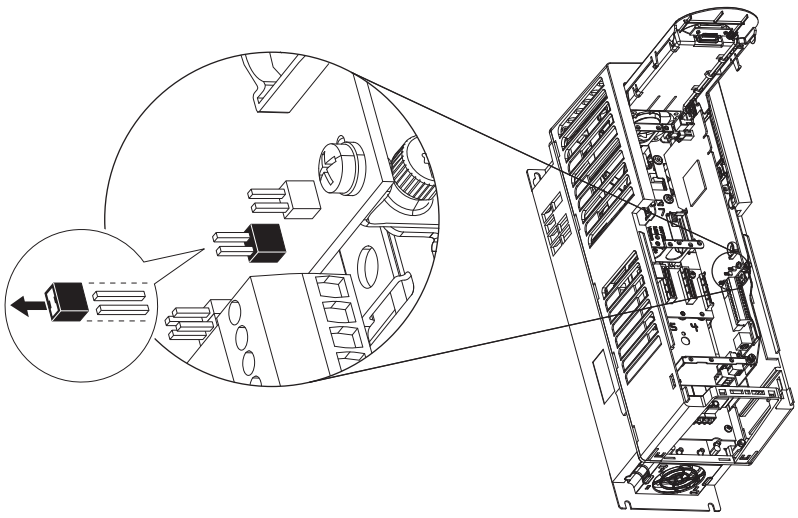
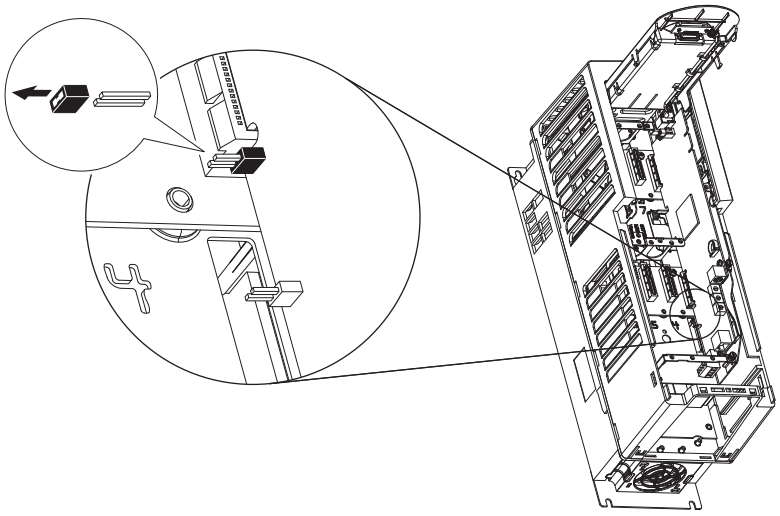


Figure 125 - PowerFlex 755 - SAFETY Jumper Location (Wall Mount Frames 1…7 Only)



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

PowerFlex 755 Fiber Optic Interface Board

Figure 126 - Floor Mount Frames 8…10

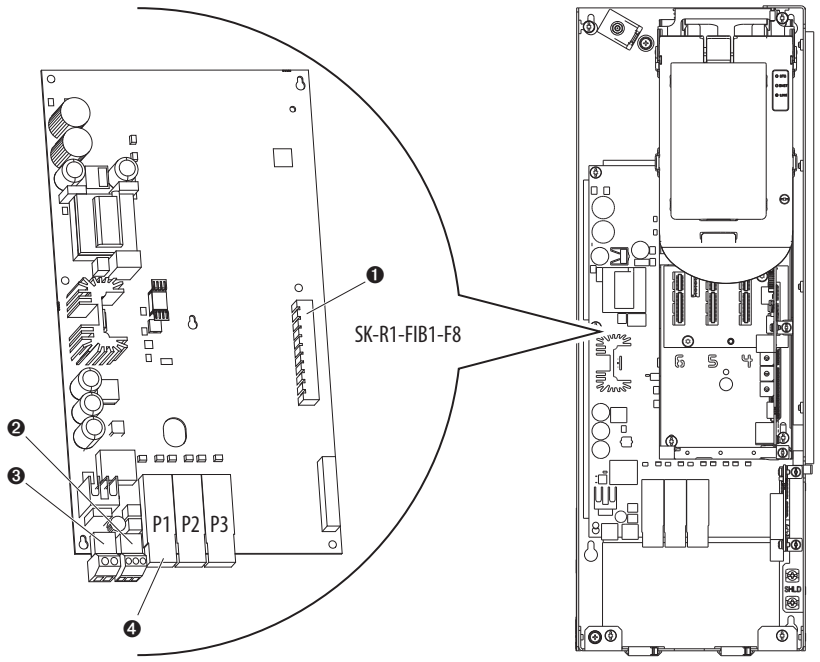


Table 45 - Fiber Interface Board Details

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 46 - P13 Terminal Designations

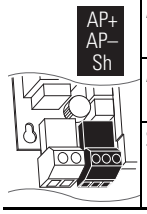
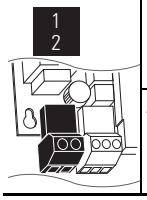
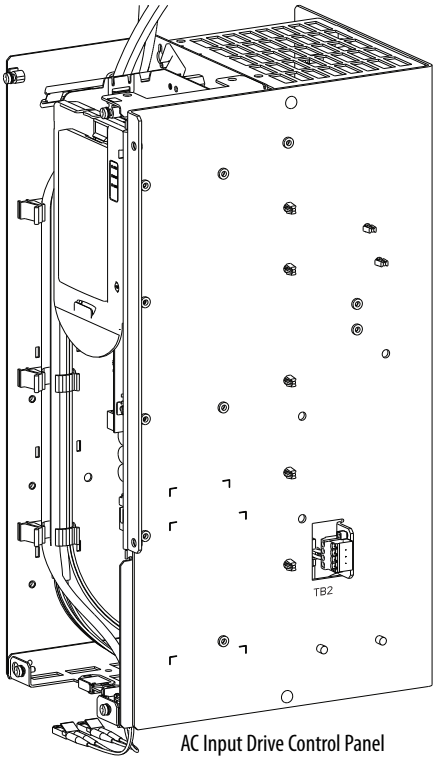
Power Block	Terminal	Name	Description
	AP+	+24 Volt Auxiliary Power	Connections for customer supplied power supply: 24V DC ±10%, 5 A, PELV (Protective Extra Low Voltage) or SELV (Safety Extra Low Voltage)
	AP–	Auxiliary Power Common	
	Sh	Shield	Terminating point for wire shields.

Table 47 - P14 Terminal Designations

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

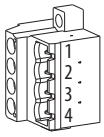
AC Input Drive Control and Power Terminal Block

Figure 127 - Floor Mount Frames 8…10



AC Input Drive Control Panel

Table 48 - TB2 Terminal Designations

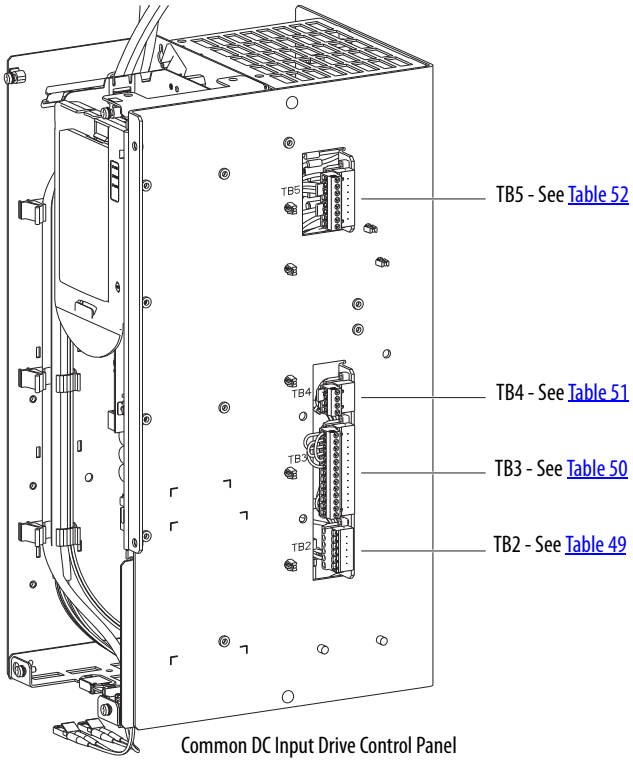
Fixed I/O	Terminal	Name	Description	Rating	Related Param
	1	SHUNT TRIP COMMON	Output Relay common	125V AC, 10 A max., 1250 VA Resistive Only	16 on Port 11
	2	SHUNT TRIP NO	Output Relay normally open contact.		
	3	FAN 240VAC OUT NEUTRAL	Connections for cooling fans.	240V AC, 50/60 Hz, 1.4 A, 336 VA	
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

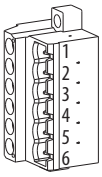
Common DC Input Drive Control and Power Terminal Blocks

Figure 128 - Floor Mount Frames 8…10



Common DC Input Drive Control Panel

Table 49 - 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		

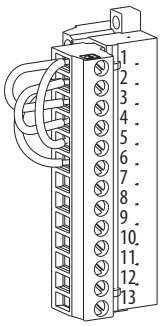
(1) See Uninterruptible Power Supply Connections - Common DC Input Drives on page 239.

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

DC Precharge Board

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

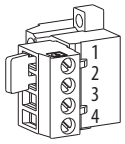
Table 50 - TB3 Terminal Designations

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. Normally open contact output.
	12	FAULT OUT NO	
	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.	

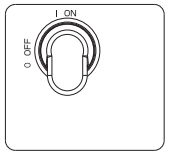
Cabinet Door Interlock and Door Switch

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

Table 51 - 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 71 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 34 - on page 220.

Table 52 - TB5 Terminal Designations

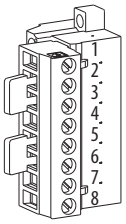
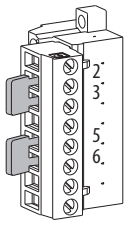
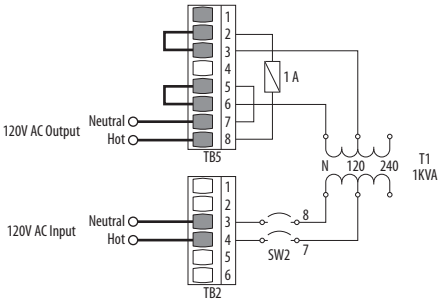
Fixed I/O	Terminal	Name	Description	Rating
	1	UPS 120VAC OUT HOT	Jumper combinations select the source of the 120V AC output for drive control. See Table 53.	120V AC, 50/60 Hz, 0.4 A, 48 VA Fusing: 1A, 600V, Class CC, Time Delay
	2	120VAC HOT		
	3	CONTROL 120VAC OUT HOT		
	4	UPS 120VAC OUT NEUTRAL		
	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 53 - TB5 Jumper Settings

120V AC from Control Transformer

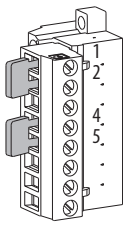
Factory Jumper Settings:
- TB5-2 and TB5-3
- TB5-5 and TB5-6

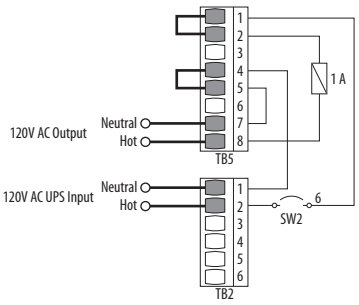




120V AC from User Supplied UPS

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



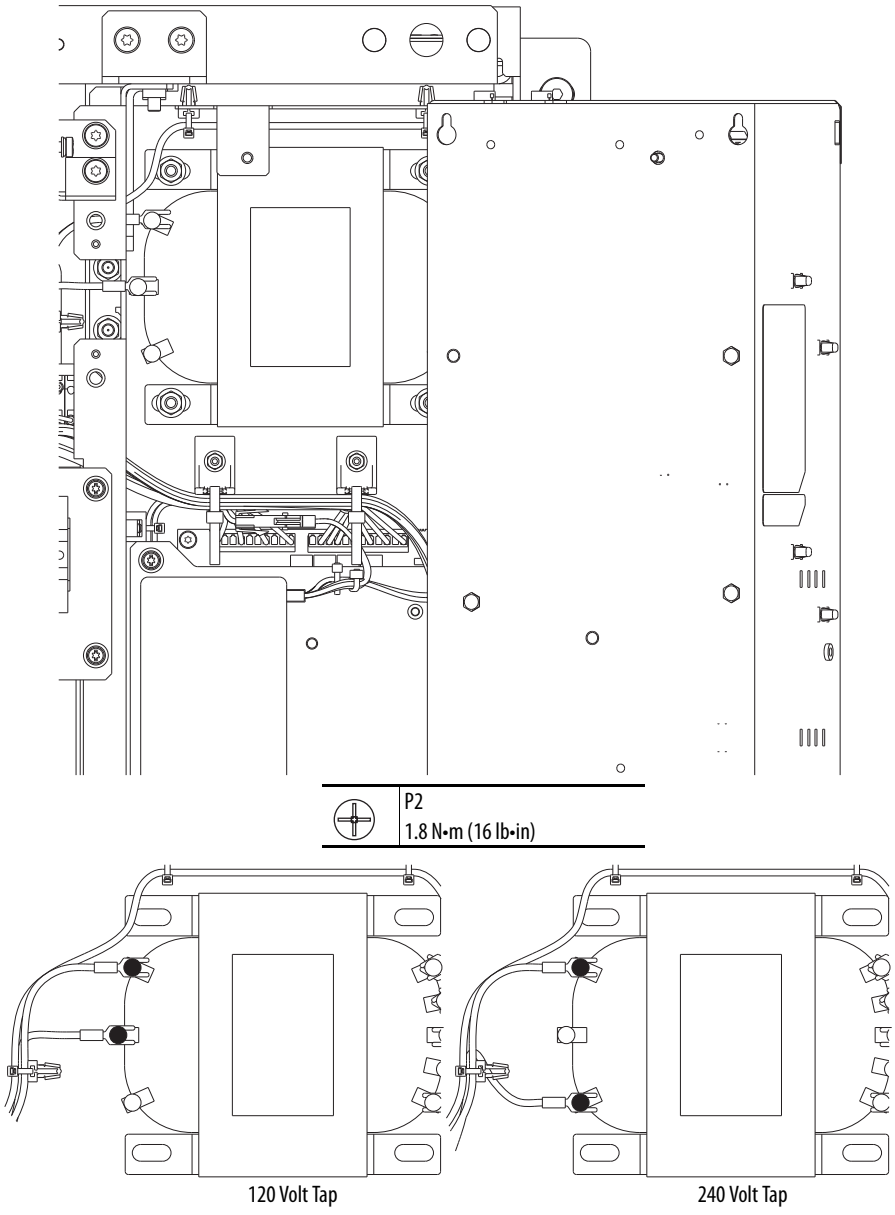


ATTENTION: Hazard of personal injury or equipment damage exists if jumpers are incorrectly set. Verify jumpers are set for control scheme used before energizing the circuit.

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 129 - Control Transformer Voltage Settings - Floor Mount Frames 8…10

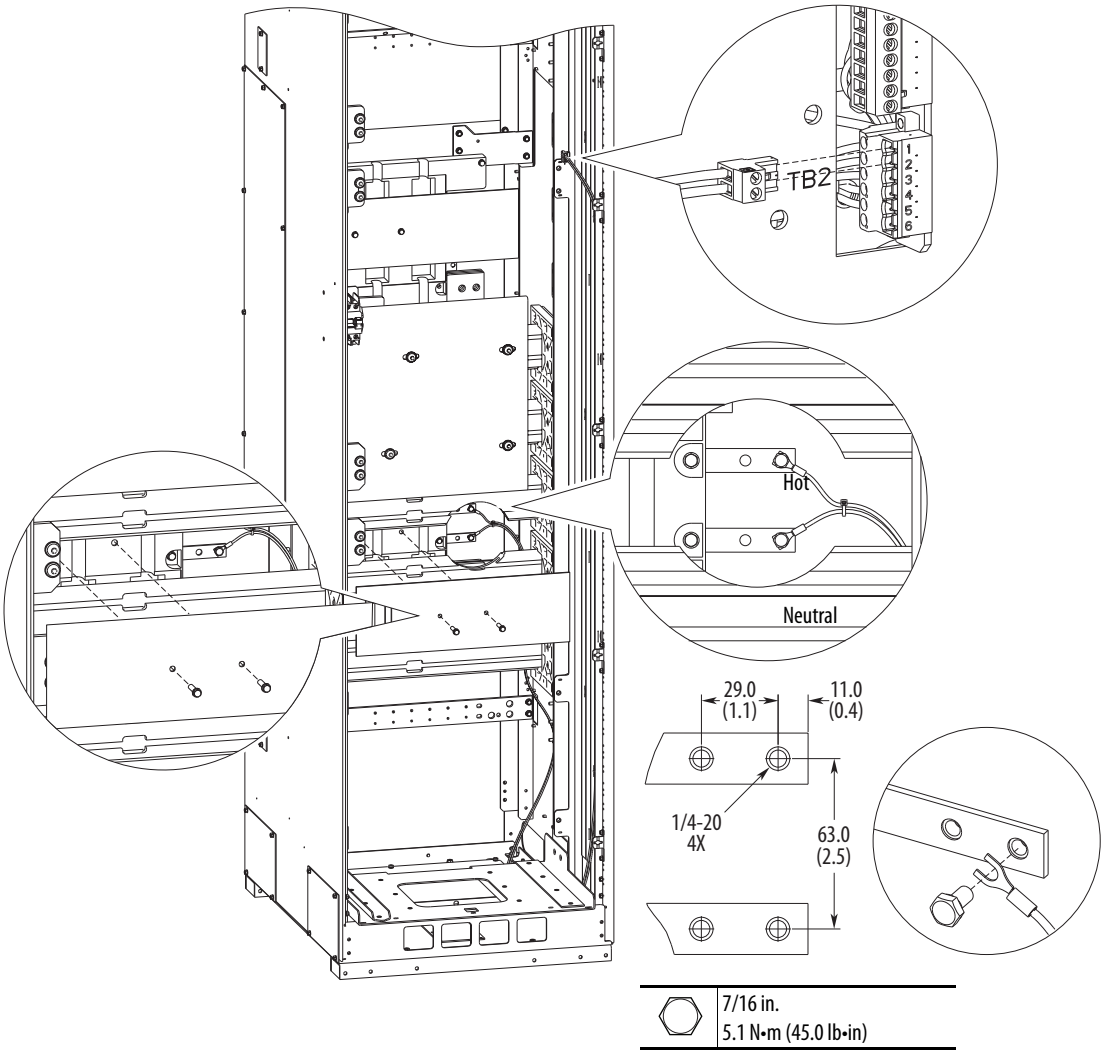


Uninterruptible Power Supply Connections - Common DC Input Drives

The user-supplied 120V AC UPS is connected to the lower 120V rail in the back of the Common DC Input drive cabinet. The UPS rail is only installed when the P30 UPS Control Bus option is selected. 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 53 - on page 237.

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.

Figure 130 - UPS Connection Terminals - Floor Mount Frames 8…10



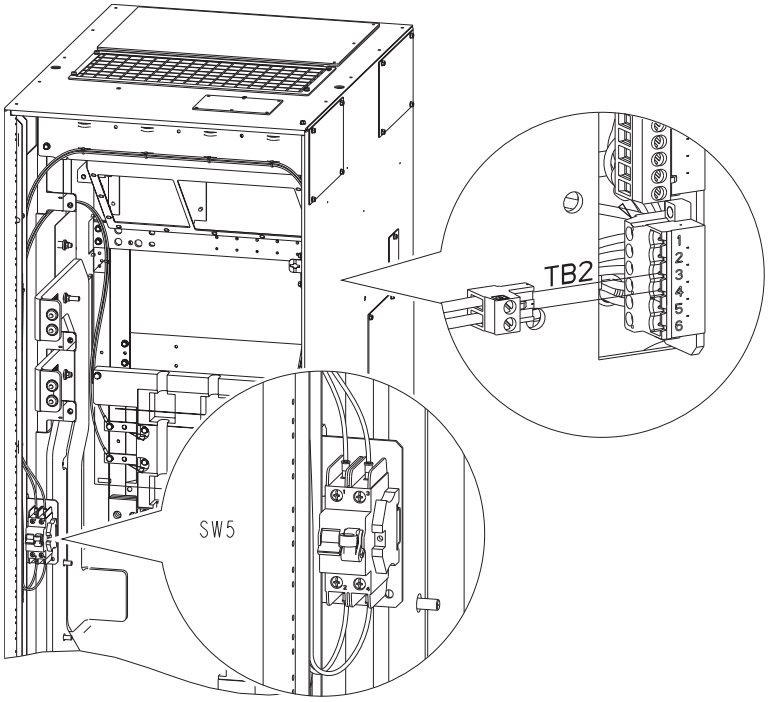
IMPORTANT The UPS wiring is internally wired through the DC input drive disconnect switch SW2 ahead of the UPS terminal connections.

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.

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.

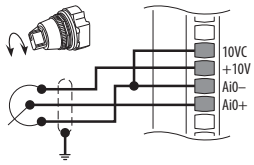
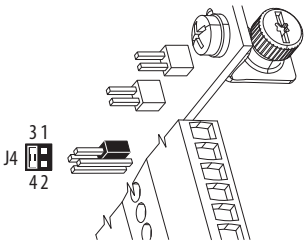
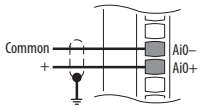
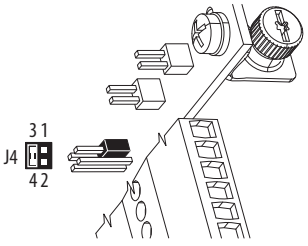
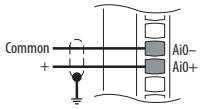
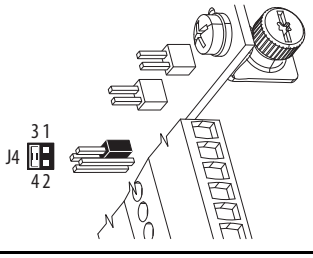
Figure 131 - 120V Connection Terminals - Floor Mount Frames 8…10

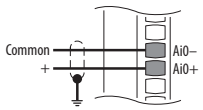
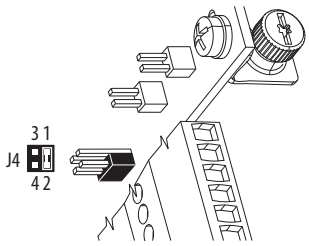
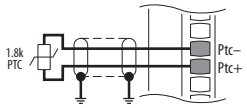


This 13 A circuit breaker provides branch-circuit short-circuit and overcurrent protection for the wiring on the primary side of the control transformer, and protection of the transformer primary. Transformer secondary protection (240V output) is provided through a 5 A, 600V, Class CC, time delay fuse.

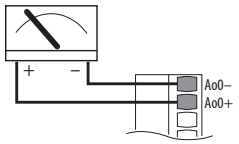
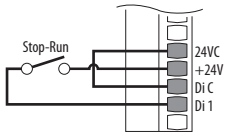
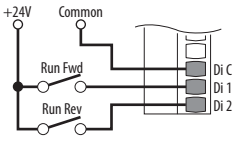
IMPORTANT The transformer primary wiring is internally wired through the DC input drive disconnect switch SW2 ahead of the control transformer primary terminal connections.

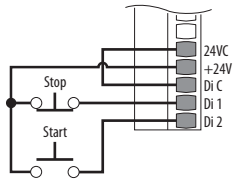
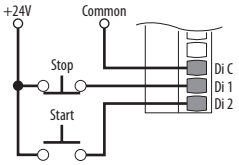
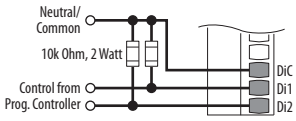
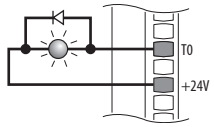
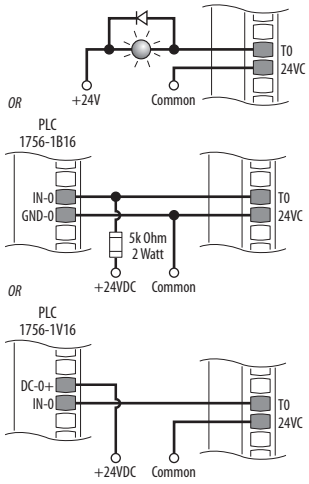
753 Main Control Board I/O Wiring Examples

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]

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 Standard = No design standard PTC Nominal = 1.8 k Ohm PTC Trip = 3.1 k Ohm PTC Reset = 2.2 k Ohm Short Circuit Trip - No fault	 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.

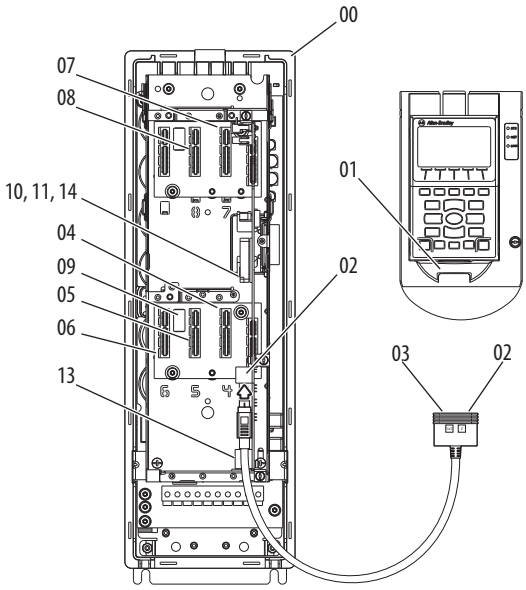
Analog Voltage Output ±10V, 0…20 mA Bipolar +10V Unipolar	 753 Main Control Board TB1	• Configuration Port 0: P270 [Anlg Out Type], bit 0 = 0 • Set Selection Port 0: P275 [Anlg Out0 Sel] = Port 0: P3 [Mtr Vel Fdbk] • Adjust Scaling Port 0: P278 [Anlg Out0 DataHi] = 60 Hz Port 0: P279 [Anlg Out0 DataLo] = 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]

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.

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.

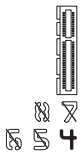
Figure 132 - Drive Device Ports



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 245, 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 266.)
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.

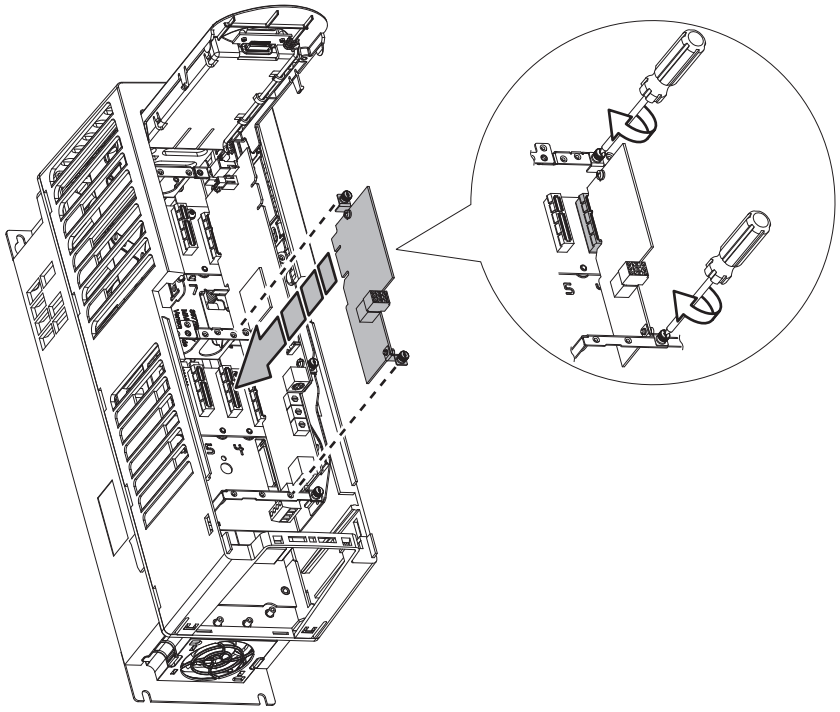
Frames 1…7: Measure the DC bus voltage at the Power Terminal Block by measuring between the +DC and -DC terminals (refer to Figure 88 and Figure 89 for location), between the +DC terminal and chassis, and between the -DC terminal and the chassis. The voltage must be zero for all three measurements.

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 92). 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.



11-Series I/O Module

20-750-1132C-2R *(24 Volts DC)*
20-750-1133C-1R2T *(24 Volts DC)*
20-750-1132D-2R *(120 Volts AC)*

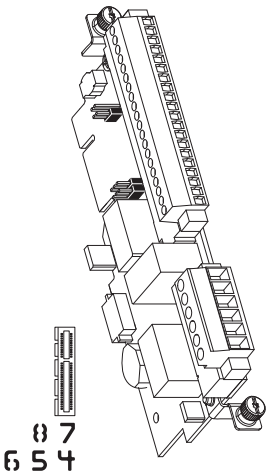


Table 54 - Analog Input Mode Jumpers

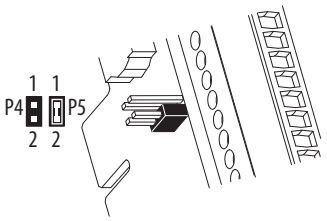
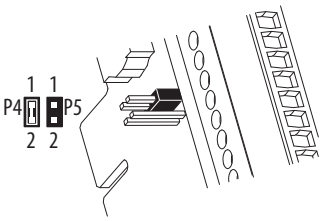
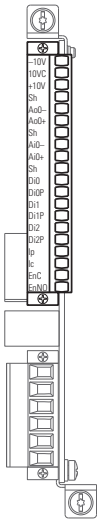
Voltage Mode	Current Mode
	

Table 55 - TB1 Terminal Designations



Terminal	Name	Description	Related Param [4]
–10V	–10 Volt Reference	Negative 10V DC for analog inputs. 2k ohm minimum.	
10VC	10 Volt Common	For (–) and (+) 10 Volt references.	
+10V	+10 Volt Reference	Positive 10V DC for analog inputs. 2k ohm minimum.	
Sh	Shield	Terminating point for wire shields when an EMC plate or conduit box is not installed.	
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 (+)		
Sh	Shield	Terminating point for wire shields when an EMC plate or conduit box is not installed.	
Ai0–	Analog Input 0 (–)	Differential [2], bipolar, 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 (+)		
Sh	Shield	Terminating point for wire shields when an EMC plate or conduit box is not installed.	
Di0	Digital Input 0	24V DC (30V DC Max.) - Opto isolated High State: 20…24V DC 11.2 mA DC Low State: 0…5V DC 120V AC (132V AC Max.) 50/60 Hz [3] - Opto isolated High State: 100…132V AC Low State: 0…30V AC	1 on Port X
Di0P	Digital Input 0 Power[1]		
Di1	Digital Input 1		
Di1P	Digital Input 1Power[1]		
Di2	Digital Input 2		
Di2P	Digital Input 2 Power[1]		
Ip	Input Power	External 24V DC or 115V AC power supply input connections. Does not power the main control board.	
Ic	Input Common		
EnC	Enable Output	ATEX fault enable output. Used only when an ATEX option module is installed.	
EnNO			

(1) Digital Inputs are either 24 Volts DC (1132C) or 115 Volts AC (1132D) based on module catalog number. Ensure applied voltage is correct for I/O module.
(2) Differential - External source must be maintained at less than 160V with respect to PE. Input provides high common mode immunity.
(3) For CE compliance use shielded cable. Cable length should not exceed 30 m (98 ft).
(4) 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.

- 20-750-1132**C**-2R is rated 24 Volts DC
- 20-750-1133**C**-1R2T is rated 24 Volts DC
- 20-750-1132**D**-2R is rated 120 Volts AC

Table 56 - TB2 Terminal Designations (2 Relay Outputs: 2R)

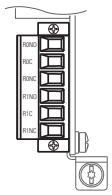
Relay Out	Terminal	Name	Description	Related Param
	R0NO	Relay 0 N.O.	Relay Normally Open contact output: 240V AC, 30V DC, 3.5 A max. General Purpose (Inductive) / Resistive	10, 100, 101, 105, 106 on Port X
	R0C	Relay 0 Common		
	R0NC	Relay 0 N.C.		
	R1NO	Relay 1 N.O.	Relay Normally Closed contact output: 240V AC, 30V DC, 5 A max. Resistive Only	20, 110, 111, 115, 116 on Port X
	R1C	Relay 1 Common		
	R1NC	Relay 1 N.C.		

Table 57 - TB2 Terminal Designations (1 Relay and 2 Transistor Outputs: 1R2T)

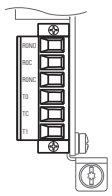
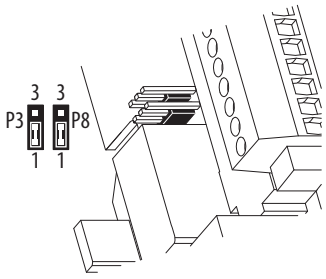
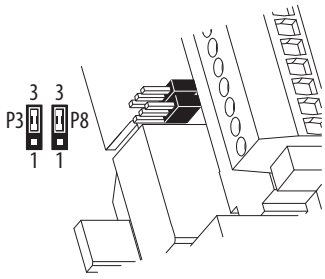
Relay Out	Terminal	Name	Description	Related Param
	R0NO	Relay 0 N.O.	Relay Normally Open contact output: 240V AC, 24V DC, 3.5 A max. General Purpose (Inductive) / Resistive Relay Normally Closed contact output: 240V AC, 24V DC, 5 A max. Resistive Only	10, 100, 101, 105, 106 on Port X
	R0C	Relay 0 Common		
	R0NC	Relay 0 N.C.		
	T0	Transistor Output 0	Transistor output Rating: 24V DC = 1 A max. including U.L. applications Resistive	20 on Port X
	TC	Transistor Output Common		
	T1	Transistor Output 1		30 on Port X

Table 58 - 24 Volt DC Power Supply Source for Digital Inputs Jumpers

Internal	External
	

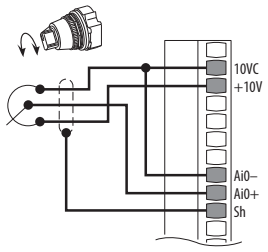
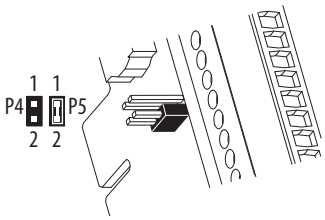
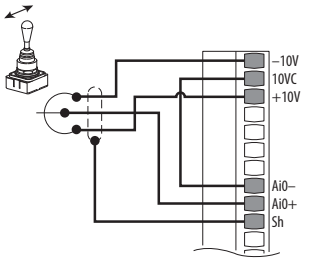
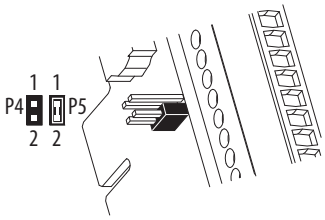
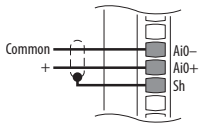
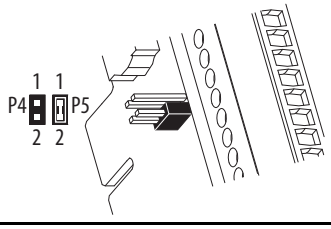
Important: 24 Volt DC supply is only used with modules 20-750-1132C-2R and 20-750-1133C-1R2T.

11-Series I/O with ATEX Module

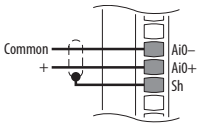
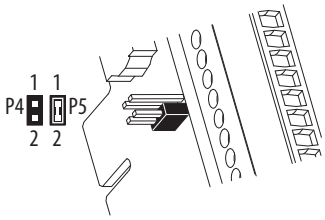
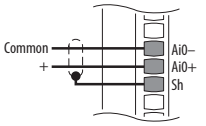
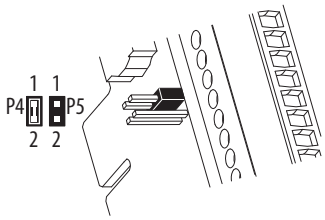
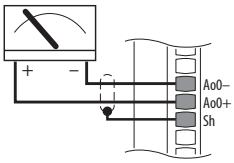
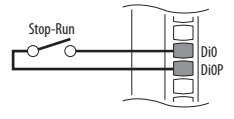
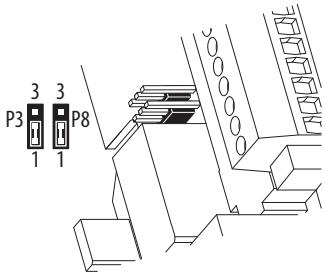
The 11-Series I/O option module can be used with the ATEX option module, catalog number 20-750-ATEX. For detailed information on installation of 11-Series I/O with the ATEX option module, refer to the PowerFlex 750-Series ATEX User Manual, publication 750-UM003.

11-Series I/O Wiring Examples

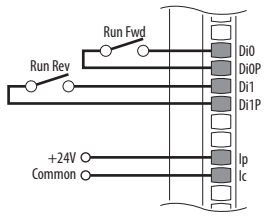
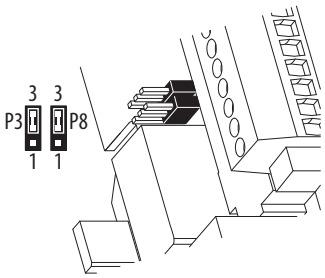
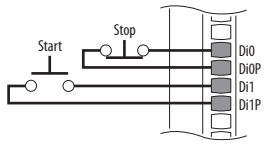
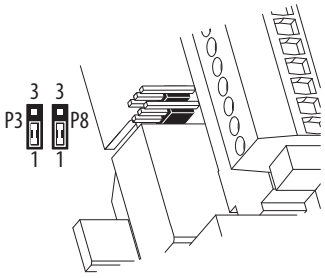
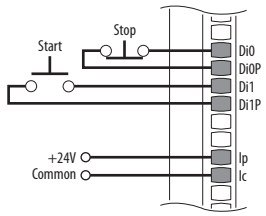
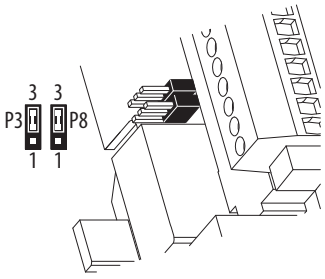
11-Series I/O Module TB1 Wiring Examples

Input/Output	Connection Example	Required Parameter Changes
Potentiometer Unipolar Speed Reference 10k Ohm Pot. Recommended (2k Ohm Minimum)	 11-Series 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 (11-Series I/O Module): P50 [Anlg In0 Value] • Adjust Scaling Port X (11-Series I/O Module): P51 [Anlg In0 Hi] = 10 Volt Port X (11-Series 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 (11-Series I/O Module): P50 [Anlg In0 Value] Port 0: P592 [Selected Spd Ref]
Joystick Bipolar Speed Reference ±10V Input	 11-Series 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 (11-Series I/O Module): P50 [Anlg In0 Value] • Adjust Scaling Port X (11-Series I/O Module): P51 [Anlg In0 Hi] = +10 Volt Port X (11-Series 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 (11-Series I/O Module): P50 [Anlg In0 Value] Port 0: P592 [Selected Spd Ref]
Analog Input Bipolar Speed Reference ±10V Input	 11-Series 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 (11-Series I/O Module): P50 [Anlg In0 Value] • Adjust Scaling Port X (11-Series I/O Module): P51 [Anlg In0 Hi] = +10 Volt Port X (11-Series 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 (11-Series I/O Module): P50 [Anlg In0 Value] Port 0: P592 [Selected Spd Ref]

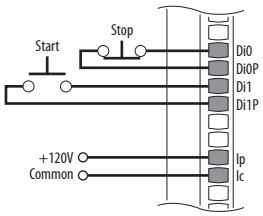
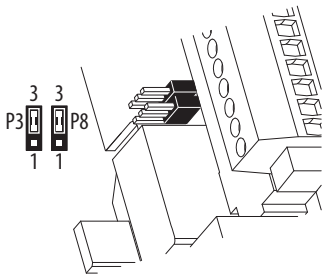
11-Series I/O Module TB1 Wiring Examples (Continued)

Input/Output	Connection Example	Required Parameter Changes
Analog Voltage Input Unipolar Speed Reference 0 to +10V Input	 11-Series 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 (11-Series I/O Module): P50 [Anlg In0 Value] • Adjust Scaling Port X (11-Series I/O Module): P51 [Anlg In1 Hi] = 10 Volt Port X (11-Series 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 (11-Series I/O Module): P50 [Anlg In0 Value] Port 0: P592 [Selected Spd Ref]
Analog Current Input Unipolar Speed Reference 0-20 mA Input	 11-Series 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 (11-Series I/O Module): P50 [Anlg In0 Value] • Adjust Scaling Port X (11-Series I/O Module): P51 [Anlg In0 Hi] = 20 mA Port X (11-Series I/O Module): P52 [Anlg In0 Lo] = 0 mA or 4 mA Port 0: P547 [Spd Ref A AnlgHi] = 60 Hz Port 0: P548 [Spd Ref A AnlgLo] = 0 Hz • View Results Port X (11-Series I/O Module): P50 [Anlg In0 Value] Port 0: P592 [Selected Spd Ref]
Analog Voltage Output ±10V, 0…20 mA Bipolar +10V Unipolar	 11-Series I/O Module TB1	• Configuration Port X (11-Series I/O Module): P70 [Anlg Out Type], bit 0 = 0 • Set Selection Port X (11-Series I/O Module): P75 [Anlg Out0 Sel] = Port 0: P3 [Mtr Vel Fdbk] • Adjust Scaling Port X (11-Series I/O Module): P78 [Anlg Out0 DataHi] = 60 Hz Port X (11-Series I/O Module): P79 [Anlg Out0 DataLo] = 0 Hz Port X (11-Series I/O Module): P80 [Anlg Out0 Hi] =10V/20 mA Port X (11-Series I/O Module): P81 [Anlg Out0 Lo] = 0V/0 mA • View Results Port X (11-Series I/O Module): P77 [Anlg Out0 Data] Port X (11-Series I/O Module): P82 [Anlg Out0 Val]
2-Wire Control Non-Reversing 24V DC internal supply	 11-Series I/O Module TB1 	• Set Direction Mode Port 0: P308 [Direction Mode] = 2 "Rev Disable" • Set Selection Port 0: P163 [DI Run] = Port X (11-Series I/O Module): P1 [Dig In Sts], bit 0 = Input 0 • View Results Port X (11-Series I/O Module): P1 [Dig In Sts] Port 0: P935 [Drive Status 1]

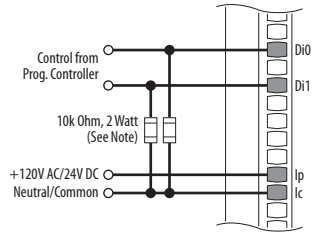
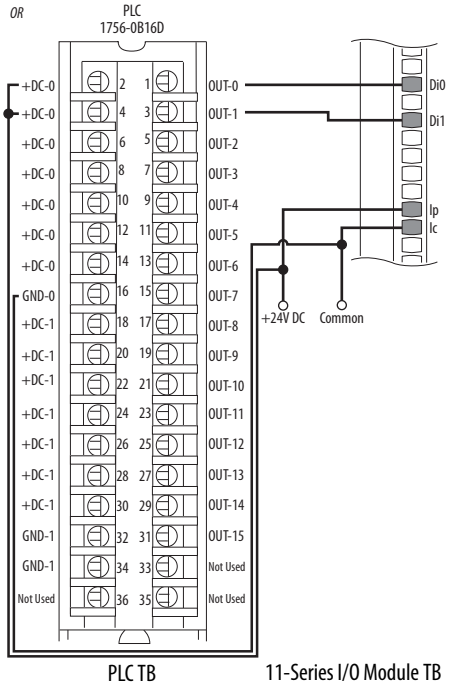
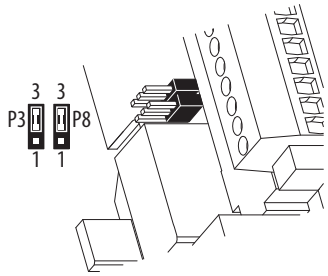
11-Series I/O Module TB1 Wiring Examples (Continued)

Input/Output	Connection Example	Required Parameter Changes
2-Wire Control Reversing External 24 volt supply 20-750-1132C-2R 20-750-1133C-1R2T	 11-Series I/O Module TB1 	• Set Direction Mode Port 0: P308 [Direction Mode] = 0 "Unipolar" • Set Selection Port 0: P164 [DI Run Forward] = Port X (11-Series I/O Module): P1 [Dig In Sts], bit 0 = Input 0 Port 0: P165 [DI Run Reverse] = Port X (11-Series I/O Module): P1 [Dig In Sts], bit 1 = Input 1 • View Results Port X (11-Series I/O Module): P1 [Dig In Sts] Port 0: P935 [Drive Status 1]
3-Wire Control Internal supply	 11-Series I/O Module TB1 	• Set Selection Port 0: P158 [DI Stop] = Port X (11-Series I/O Module): P1 [Dig In Sts], bit 0 = Input 0 Port 0: P161 [DI Start] = Port X (11-Series I/O Module): P1 [Dig In Sts], bit 1 = Input 1 • View Results Port X (11-Series I/O Module): P1 [Dig In Sts] Port 0: P935 [Drive Status 1]
3-Wire Control External 24 volt supply 20-750-1132C-2R 20-750-1133C-1R2T	 11-Series I/O Module TB1 	• Set Selection Port 0: P158 [DI Stop] = Port X (11-Series I/O Module): P1 [Dig In Sts], bit 0 = Input 0 Port 0: P161 [DI Start] = Port X (11-Series I/O Module): P1 [Dig In Sts], bit 1 = Input 1 • View Results Port X (11-Series I/O Module): P1 [Dig In Sts] Port 0: P935 [Drive Status 1]

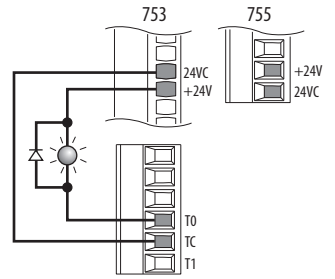
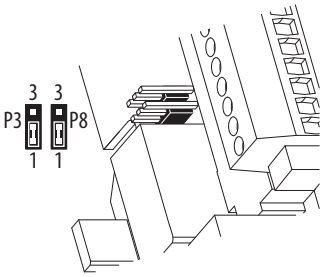
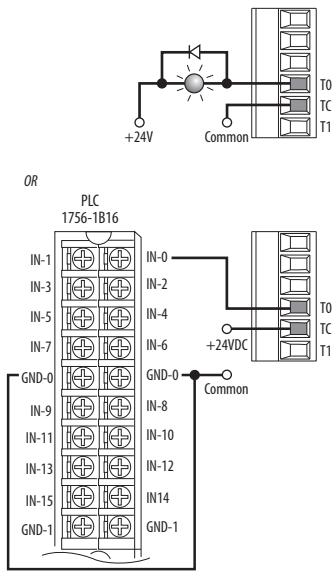
11-Series I/O Module TB1 Wiring Examples (Continued)

Input/Output	Connection Example	Required Parameter Changes
3-Wire Control External 120 volt supply 20-750-1132D-2R	 11-Series I/O Module TB1 	• Set Selection Port 0: P158 [DI Stop] = Port X (11-Series I/O Module): P1 [Dig In Sts], bit 0 = Input 0 Port 0: P161 [DI Start] = Port X (11-Series I/O Module): P1 [Dig In Sts], bit 1 = Input 1 • View Results Port X (11-Series I/O Module): P1 [Dig In Sts] Port 0: P935 [Drive Status 1]

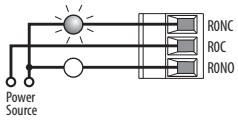
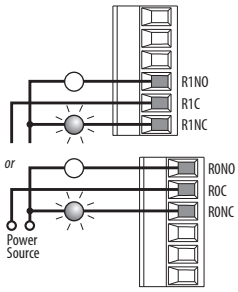
11-Series I/O Module TB1 Wiring Examples (Continued)

Input/Output	Connection Example	Required Parameter Changes
Digital Input PLC Output Module External supply	 11-Series I/O Module TB1 *OR*  PLC TB 11-Series I/O Module TB 	• Set Selection Port 0: P158 [DI Stop] = Port X (11-Series I/O Module): P1 [Dig In Sts], bit 0 = Input 0 Port 0: P161 [DI Start] = Port X (11-Series I/O Module): P1 [Dig In Sts], bit 1 = Input 1 • View Results Port X (11-Series I/O Module): P1 [Dig In Sts] Port 0: P935 [Drive Status 1] Note: Pull down resistors may be required by some PLC interfaces.

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

Input/Output	Connection Example	Required Parameter Changes
Digital Output Internal supply 20-750-1133C-1R2T	 Main Control Board TB1 11-Series I/O Module TB2 	• Set Selection Port X (11-Series I/O Module): P20 [T00 Sel] = Port 0: P935 [Drive Status 1], bit 7 = Faulted • View Results Port X (11-Series I/O Module): P5 [Dig Out Sts]
Digital Output External supply 20-750-1133C-1R2T	 PLC TB 11-Series I/O Module TB2	• Set Selection Port X (11-Series I/O Module): P20 [T00 Sel] = Port 0: P935 [Drive Status 1], bit 7 = Faulted • View Results Port X (11-Series I/O Module): P5 [Dig Out Sts]

11-Series I/O Relay Wiring Examples

Input/Output	Connection Example	Required Parameter Changes
Relay Output External supply	753 Main Control Board 	• Set Selection Port 0: P230 [RO0 Sel] = Port 0: P935 [Drive Status 1], bit 7 = Faulted • View Results Port 0: P225 [Dig Out Sts]
	11-Series I/O Module 	• Set Selection Port X (11-Series I/O Module): P10 [RO0 Sel] = Port 0: P935 [Drive Status 1], bit 7 = Faulted • View Results Port X (11-Series I/O Module): P5 [Dig Out Sts]

22-Series I/O Module

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

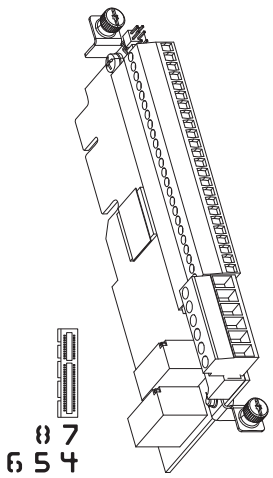


Table 59 - Input Mode Jumpers

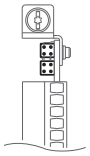
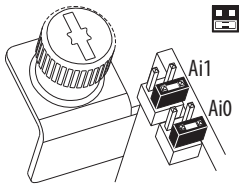
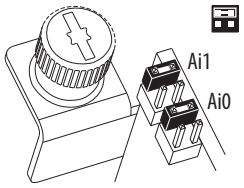
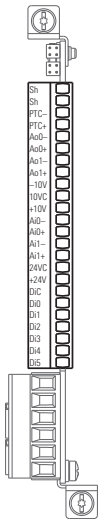
Jumper Position	Voltage Mode	Current Mode
		

Table 60 - 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). (2)	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	Drive supplied logic input power. 200 mA max. per I/O module 600 mA max per drive	
+24V	+24 Volt DC		
Di C	Digital Input Common	Common for Digital Inputs 0…5	
Di 0	Digital Input 0 (1)	24V DC (30V DC Max.) - Opto isolated High State: 20…24V DC 11.2 mA DC Low State: 0…5V DC 120V AC (132V AC Max.) 50/60 Hz (4) - Opto isolated High State: 100…132V AC Low State: 0…30V AC	1 on Port X
Di 1	Digital Input 1 (1)		
Di 2	Digital Input 2 (1)		
Di 3	Digital Input 3 (1)		
Di 4	Digital Input 4 (1)		
Di 5	Digital Input 5 (1)		

(1) 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.
(2) See HW Input PTC on page 258 for PTC data.
(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
- 20-750-2263**C**-1R2T is rated 24 Volts DC
- 20-750-2262**D**-2R is rated 120 Volts AC

Table 61 - TB2 Terminal Designations (2 Relay Outputs: 2R)

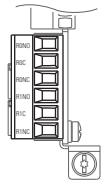
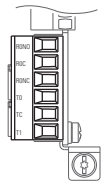
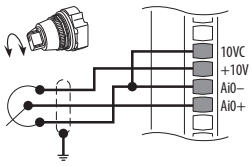
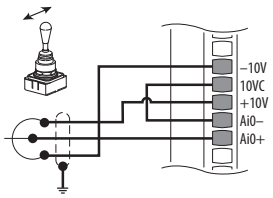
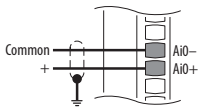
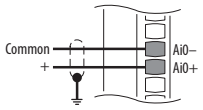
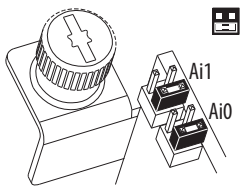
Relay Out	Terminal	Name	Description	Related Param
	R0NO	Relay 0 N.O.	Relay Normally Open contact output: 240V AC, 24V DC, 2 A max. General Purpose (Inductive) / Resistive	10, 100, 101, 105, 106 on Port X
	R0C	Relay 0 Common		
	R0NC	Relay 0 N.C.		
	R1NO	Relay 1 N.O.	Relay Normally Closed contact output: 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 62 - TB2 Terminal Designations (1 Relay and 2 Transistor Outputs: 1R2T)

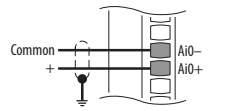
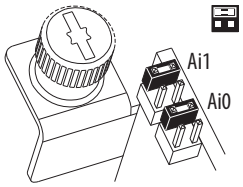
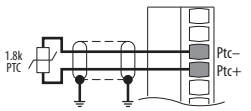
Relay Out	Terminal	Name	Description	Related Param
	R0NO	Relay 0 N.O.	Relay Normally Open contact output: 240V AC, 24V DC, 2 A max. General Purpose (Inductive) / Resistive	10, 100, 101, 105, 106 on Port X
	R0C	Relay 0 Common		
	R0NC	Relay 0 N.C.	Relay Normally Closed contact output: 240V AC, 24V DC, 2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

22-Series I/O Wiring Examples

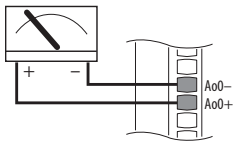
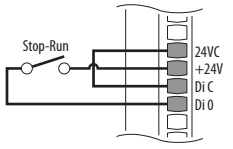
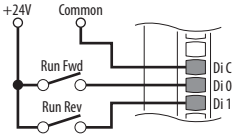
22-Series I/O Module TB1 Wiring Examples

Input/Output	Connection Example	Required Parameter Changes
Potentiometer Unipolar Speed Reference 10k Ohm Pot. Recommended (2k Ohm Minimum)	 22-Series 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 (22-Series I/O Module): P50 [Anlg In0 Value] • Adjust Scaling Port X (22-Series I/O Module): P51 [Anlg In0 Hi] = 10 Volt Port X (22-Series 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 (22-Series I/O Module): P50 [Anlg In0 Value] Port 0: P592 [Selected Spd Ref]
Joystick Bipolar Speed Reference ±10V Input	 22-Series 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 (22-Series I/O Module): P50 [Anlg In0 Value] • Adjust Scaling Port X (22-Series I/O Module): P51 [Anlg In0 Hi] = +10 Volt Port X (22-Series 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 (22-Series I/O Module): P50 [Anlg In0 Value] Port 0: P592 [Selected Spd Ref]
Analog Input Bipolar Speed Reference ±10V Input	 22-Series 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 (22-Series I/O Module): P50 [Anlg In0 Value] • Adjust Scaling Port X (22-Series I/O Module): P51 [Anlg In0 Hi] = +10 Volt Port X (22-Series 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 (22-Series I/O Module): P50 [Anlg In0 Value] Port 0: P592 [Selected Spd Ref]
Analog Voltage Input Unipolar Speed Reference 0 to +10V Input	 22-Series 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 (22-Series I/O Module): P50 [Anlg In0 Value] • Adjust Scaling Port X (22-Series I/O Module): P51 [Anlg In1 Hi] = 10 Volt Port X (22-Series 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 (22-Series I/O Module): P50 [Anlg In0 Value] Port 0: P592 [Selected Spd Ref]

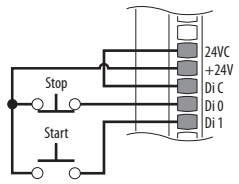
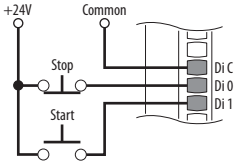
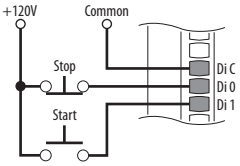
22-Series I/O Module TB1 Wiring Examples (Continued)

Input/Output	Connection Example	Required Parameter Changes
Analog Current Input Unipolar Speed Reference 0-20 mA Input	 22-Series 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 (22-Series I/O Module): P50 [Anlg In0 Value] • Adjust Scaling Port X (22-Series I/O Module): P51 [Anlg In0 Hi] = 20 mA Port X (22-Series I/O Module): P52 [Anlg In0 Lo] = 0 mA Port 0: P547 [Spd Ref A AnIgHi] = 60 Hz Port 0: P548 [Spd Ref A AnIgLo] = 0 Hz • View Results Port X (22-Series I/O Module): P50 [Anlg In0 Value] Port 0: P592 [Selected Spd Ref]
HW Input PTC Standard = DIN 44082 PTC Nominal = 1.8 k Ohm PTC Trip = 3.1 k Ohm PTC Reset = 2.2 k Ohm Short Circuit Trip = 300 Ohm	 22-Series I/O Module TB1	• Configuration Port X (22-Series 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 (22-Series I/O Module): P41 [PTC Sts] Port X (22-Series I/O Module): P42 [PTC Raw Value]

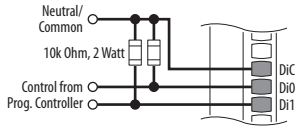
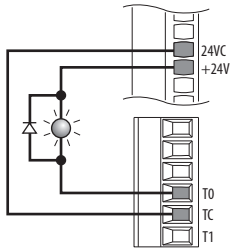
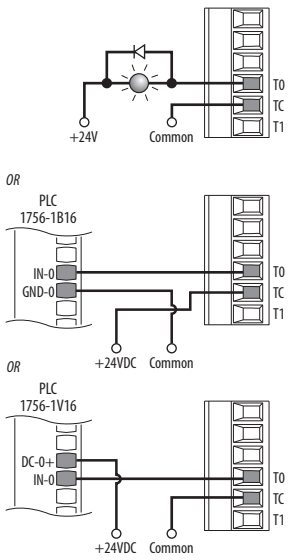
ATTENTION: To avoid an electric shock hazard, the connection of the motor temperature sensor requires double or reinforced insulation between motor live parts and the PTC.

Analog Voltage Output ±10V, 0…20 mA Bipolar +10V Unipolar	 22-Series I/O Module TB1	• Configuration Port X (22-Series I/O Module): P70 [Anlg Out Type], bit 0 = 0 • Set Selection Port X (22-Series I/O Module): P75 [Anlg Out0 Sel] = Port 0: P3 [Mtr Vel Fdbk] • Adjust Scaling Port X (22-Series I/O Module): P78 [Anlg Out0 DataHi] = 60 Hz Port X (22-Series I/O Module): P79 [Anlg Out0 DataLo] = 0 Hz Port X (22-Series I/O Module): P80 [Anlg Out0 Hi] =10V/20 mA Port X (22-Series I/O Module): P81 [Anlg Out0 Lo] = 0V/0 mA • View Results Port X (22-Series I/O Module): P77 [Anlg Out0 Data] Port X (22-Series I/O Module): P82 [Anlg Out0 Val]
2-Wire Control Non-Reversing 24V DC internal supply	 22-Series I/O Module TB1	• Set Direction Mode Port 0: P308 [Direction Mode] = 2 "Rev Disable" • Set Selection Port 0: P163 [DI Run] = Port X (22-Series I/O Module): P1 [Dig In Sts], bit 0 = Input 0 • View Results Port X (22-Series 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	 22-Series I/O Module TB1	• Set Direction Mode Port 0: P308 [Direction Mode] = 0 "Unipolar" • Set Selection Port 0: P164 [DI Run Forward] = Port X (22-Series I/O Module): P1 [Dig In Sts], bit 0 = Input 0 Port 0: P165 [DI Run Reverse] = Port X (22-Series I/O Module): P1 [Dig In Sts], bit 1 = Input 1 • View Results Port X (22-Series I/O Module): P1 [Dig In Sts] Port 0: P935 [Drive Status 1]

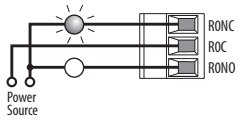
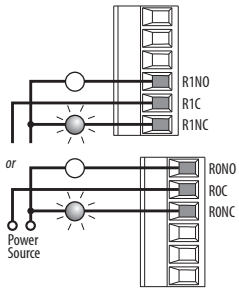
22-Series I/O Module TB1 Wiring Examples (Continued)

Input/Output	Connection Example	Required Parameter Changes
3-Wire Control Internal supply	 22-Series I/O Module TB1	• Set Selection Port 0: P158 [DI Stop] = Port X (22-Series I/O Module): P1 [Dig In Sts], bit 0 = Input 0 Port 0: P161 [DI Start] = Port X (22-Series I/O Module): P1 [Dig In Sts], bit 1 = Input 1 • View Results Port X (22-Series 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	 22-Series I/O Module TB1	• Set Selection Port 0: P158 [DI Stop] = Port X (22-Series I/O Module): P1 [Dig In Sts], bit 0 = Input 0 Port 0: P161 [DI Start] = Port X (22-Series I/O Module): P1 [Dig In Sts], bit 1 = Input 1 • View Results Port X (22-Series I/O Module): P1 [Dig In Sts] Port 0: P935 [Drive Status 1]
3-Wire Control External 120 volt supply 20-750-2262D-2R	 22-Series I/O Module TB1	• Set Selection Port 0: P158 [DI Stop] = Port X (22-Series I/O Module): P1 [Dig In Sts], bit 0 = Input 0 Port 0: P161 [DI Start] = Port X (22-Series I/O Module): P1 [Dig In Sts], bit 1 = Input 1 • View Results Port X (22-Series I/O Module): P1 [Dig In Sts] Port 0: P935 [Drive Status 1]

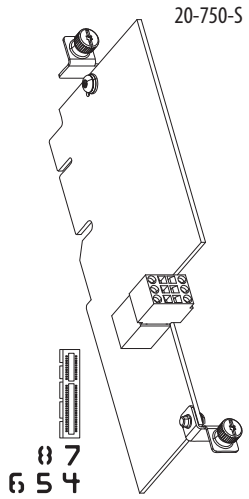
22-Series I/O Module TB1 Wiring Examples (Continued)

Input/Output	Connection Example	Required Parameter Changes
Digital Input PLC Output Module	 22-Series I/O Module TB1	• Set Selection Port 0: P158 [DI Stop] = Port X (22-Series I/O Module): P1 [Dig In Sts], bit 0 = Input 0 Port 0: P161 [DI Start] = Port X (22-Series I/O Module): P1 [Dig In Sts], bit 1 = Input 1 • View Results Port X (22-Series I/O Module): P1 [Dig In Sts] Port 0: P935 [Drive Status 1]
Digital Output Internal supply 20-750-2263C-1R2T	 22-Series I/O Module TB1 22-Series I/O Module TB2	• Set Selection Port X (22-Series I/O Module): P20 [T00 Sel] = Port 0: P935 [Drive Status 1], bit 7 = Faulted • View Results Port X (22-Series I/O Module): P5 [Dig Out Sts]
Digital Output External supply 20-750-2263C-1R2T	 PLC TB 22-Series I/O Module TB2	

22-Series I/O Relay Wiring Examples

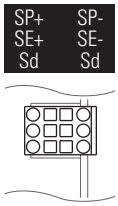
Input/Output	Connection Example	Required Parameter Changes
Relay Output External supply	753 Main Control Board 	• Set Selection Port 0: P230 [RO0 Sel] = Port 0: P935 [Drive Status 1], bit 7 = Faulted • View Results Port 0: P225 [Dig Out Sts]
	22-Series I/O Module 	• Set Selection Port X (22-Series I/O Module): P10 [RO0 Sel] = Port 0: P935 [Drive Status 1], bit 7 = Faulted • View Results Port X (22-Series I/O Module): P5 [Dig Out Sts]

Safe Torque Off Option Module

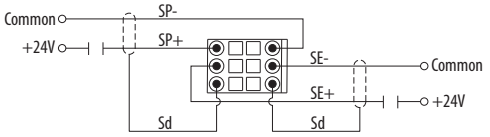


The safe torque off option is just one component in a safety control system. Components in the system must be chosen and applied appropriately to achieve the desired level of operational safety. For detailed information on applying this option, refer to the PowerFlex 750-Series Safe Torque Off User Manual,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

Table 63 - 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**: Only break the 24V DC user-supplied power feeding the option module. Do not remove the line voltage from the 24V DC power supply.

Important Safe Torque Off Option Module Installation Notes

Cabling

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

Power Supply Requirements

- The external power supply must conform to the Directive 2006/95/EC Low Voltage, by applying the requirements of EN61131-2 Programmable Controllers, Part 2 - Equipment Requirements and Tests and one of the following:
  - EN60950 - SELV (Safety Extra Low Voltage)
  - EN60204 - PELV (Protective Extra Low Voltage)
  - IEC 60536 Safety Class III (SELV or PELV)
  - UL 508 Limited Voltage Circuit
  - 24V DC ±10% must be supplied by a power supply that complies with
  - IEC/EN60204 and IEC/EN 61558-1.
- For planning information, refer to the guidelines in Industrial Automation Wiring and Grounding Guidelines, publication 1770-4.1.

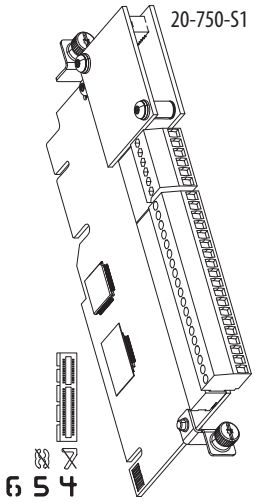
Port Assignment

- 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

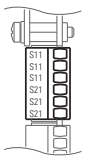
- Ensure the hardware enable jumper (ENABLE) on the main control board is installed. Refer to page 230 for location. If not installed, the drive will fault when powered up.
- Ensure the safety enable jumper (SAFETY) on the main control board is removed (Frames 1...7 only). Refer to page 232 for location.

Safe Speed Monitor Option Module



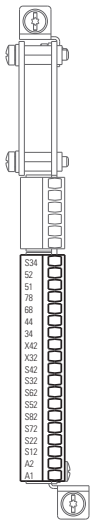
The Safe Speed Monitor option is just one component in a safety control system. Components in the system must be chosen and applied appropriately to achieve the desired level of operational safety. For detailed information on applying this option, refer to the Safe Speed Monitor Option Module for PowerFlex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

Table 64 - TB1 Terminal Designations

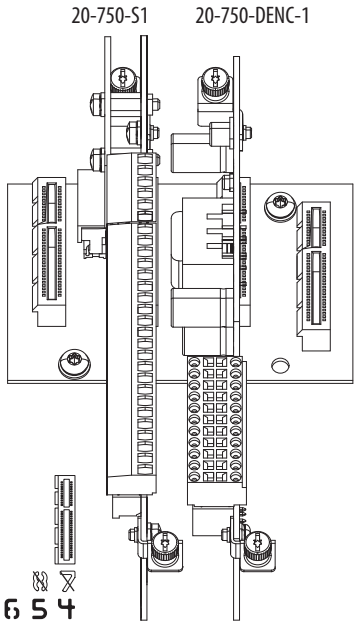


Terminal	Name	Signal Name	Description
S11	Pto0	TEST_OUT_0	Pulse test source for safety inputs.
S11			
S11			
S21	Pto1	TEST_OUT_1	Pulse test source for safety inputs.
S21			
S21			

Table 65 - 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, armored 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 230 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 232 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

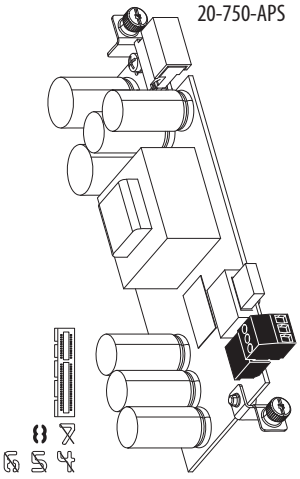
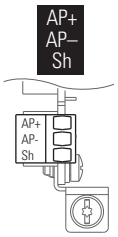


Table 66 - TB1 Terminal Designations



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.

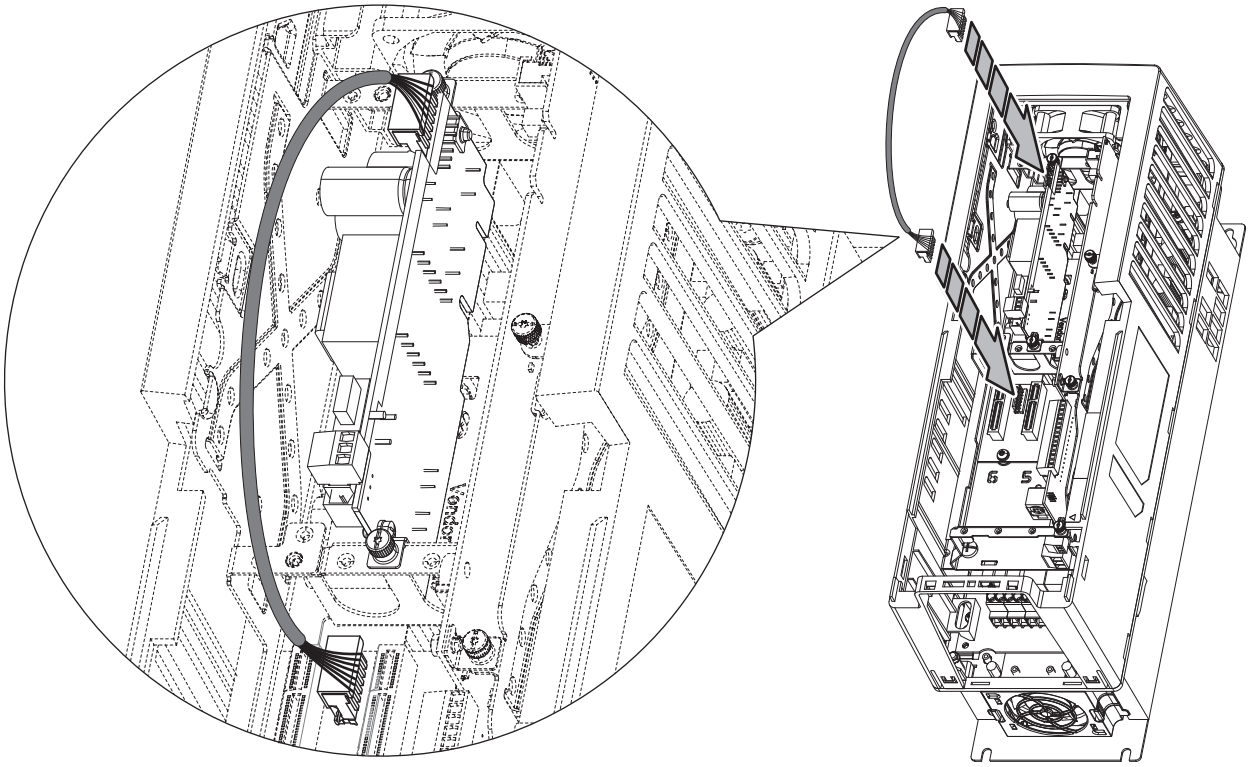
IMPORTANT The Auxiliary Power Supply option module may be installed in any option port. Due to its size, the module will extend over and block an adjacent port. Therefore, installation in Port 8 is recommended.

Do not use the Auxiliary Power Supply option module with Frame 8 and larger drives. Refer to page 233 for 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 133 - 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.

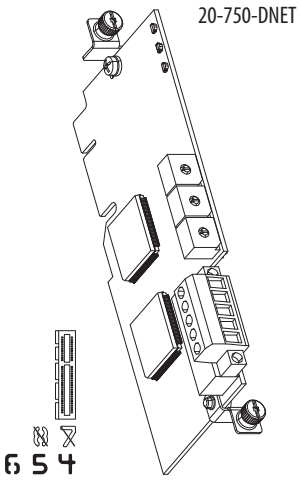


Table 67 - DeviceNet Option Module LED Indication

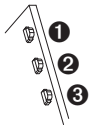
	LED	Name	Description
	❶	PORT	DPI Connection Status
	❷	MOD	Option Module Status
	❸	NET A	DeviceNet Status

Table 68 - DeviceNet Option Module Rotary Switches

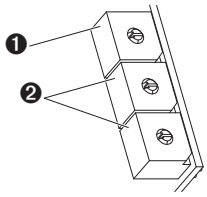
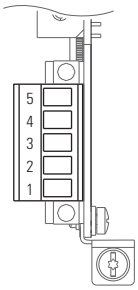
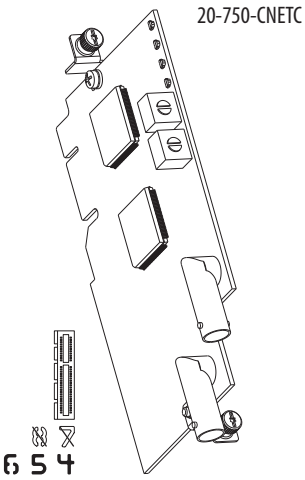
	Switch	Name	Description
	❶	Data Rate Switch	Sets the DeviceNet data rate at which the option module communicates.
	❷	Node Address Switches	Sets the node address of the option module.

Table 69 - 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 70 - ControlNet Option Module LED Indication

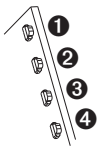
	LED	Name	Description
	❶	PORT	DPI Connection Status
	❷	MOD	Option Module Status
	❸	NET A	ControlNet Channel A Status
	❹	NET B	ControlNet Channel B Status

Table 71 - ControlNet Option Module Rotary Switches

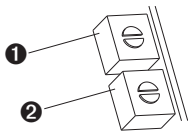
	Switch	Name	Description
	❶	TENS Switch	Sets the node address of the option module.
	❷	ONES Switch	

Table 72 - 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.

Dual-Port EtherNet/IP Option Module

For complete information on the Dual-Port EtherNet/IP Option Module, refer to the PowerFlex 20-750-ENETR Dual-Port EtherNet/IP Option Module User Manual, publication 750COM-UM008.

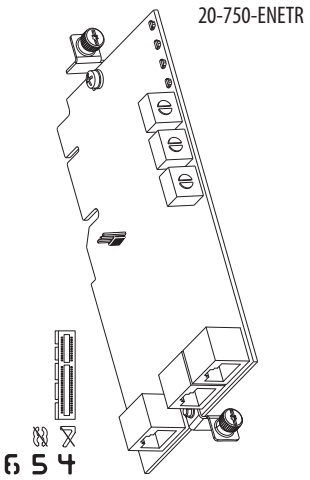


Table 73 - EtherNet Option Module LED Indication

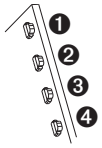
	LED	Name	Description
	❶	PORT	DPI Connection Status
	❷	MOD	Option Module Status
	❸	NET A	Network Port 1 Status
	❹	NET B	Network Port 2 Status

Table 74 - EtherNet Option Module Rotary Switches

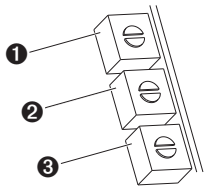
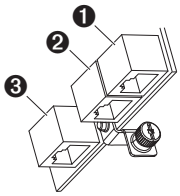
	Switch	Name	Description
	❶	HUNDREDS Switch	Sets the node address of the option module.
	❷	TENS Switch	
	❸	ONES Switch	

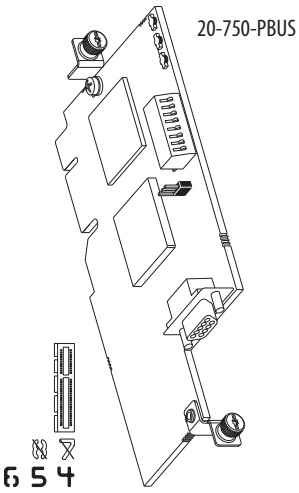
Table 75 - J4 Jumper

Adapter Mode	Tap Mode
	

Table 76 - Ethernet Connectors

	Connector	Name	Description
	❶	ENET1	Ethernet RJ45 connection to the network.
	❷	ENET2	
	❸	ENET3 (DEVICE)	Connection for the short Ethernet cable (provided with option module) to the Ethernet port on the PowerFlex 755 drive embedded EtherNet/IP adapter. This is used only for CIP Motion data transfer.

Profibus Option Module



For complete information on the Profibus Option Module, refer to the PowerFlex 20-750-PBUS Profibus DPV1 Option Module User Manual, publication 750COM-UM004.

Table 77 - Profibus Option Module LED Indication

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

Table 78 - Profibus Option Module Node Address Switches

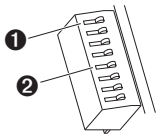
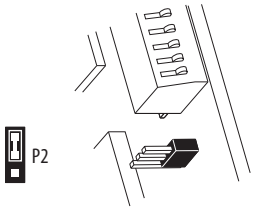
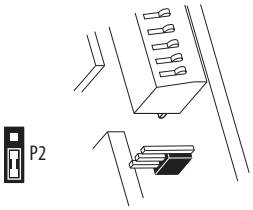
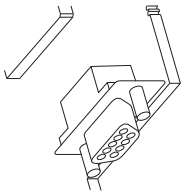
	Switch	Name	Description
	❶	Endianness Selection Switch (Switch 8)	Sets endianness of data transmitted over network.
	❷	Node Address Switches (Switches 1…7)	Sets the node address of the option module.

Table 79 - Profibus Option Module Selection Jumper

Profibus Mode	Profidrive Mode (1)
	

(1) Profidrive Mode is not yet supported. Changing the jumper position has no effect. Profibus is selected in both positions.

Table 80 - Network Connector

	Name	Description
	Profibus DB9 Female Connector	Profibus connection to the network.

BACnet/IP Option Module

For complete information on the BACnet/IP Option Module, refer to the PowerFlex 20-750-BNETIP BACnet/IP Option Module User Manual, publication 750COM-UM005.

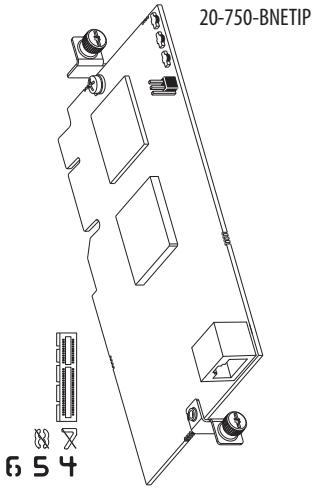


Table 81 - BACnet/IP Option Module LED Indication

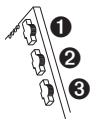
	LED	Name	Description
	❶	PORT	DPI Connection Status
	❷	MOD	Option Module Status
	❸	NET A	BACnet Status

Table 82 - P4 Address Selection Jumper

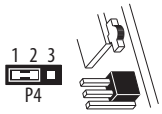
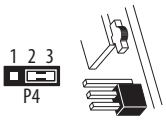
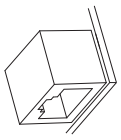
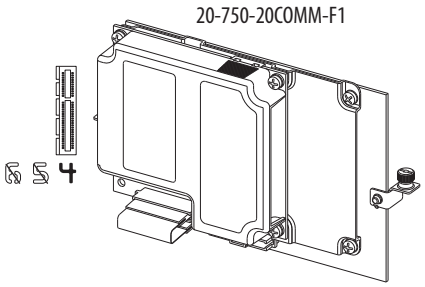
Jumper Position	Description
	Default network address.
	Configured network address.

Table 83 - Ethernet Connector

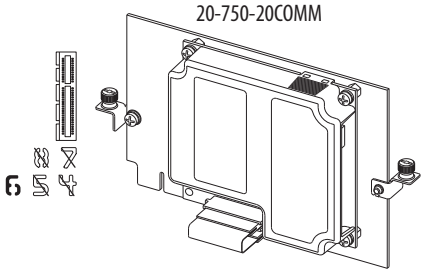
	Name	Description
	Ethernet RJ45 Connector	BACnet/IP connection to the Ethernet network.

20-COMM Carrier

Frame 1



Frames 2 and Larger



Enables use of some 20-COMM adapters with PowerFlex 750-Series drives. See Table 84.

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

Table 84 - 20-COMM-* Network Adapter Compatibility with 750-Series Drives

Adapter		Accesses Ports 0…6 for I/O Connections (Implicit and Explicit Messaging)	Accesses Ports 7 and Higher (I/O, Explicit Messaging)	Supports Drive Add-on Profiles	Supports Asian-Languages (6)
Cat. No.	Type				
20-COMM-B	BACnet MS/TP	Not Compatible			
20-COMM-C	ControlNet (Coax)	✓ v3.001 (4)	✓ v3.001 (4)	✓ (5)	✓ v3.001 (4)
20-COMM-D	DeviceNet	✓ (2)	Not Compatible		
20-COMM-E	EtherNet/IP	✓ v4.001 (4)	✓ v4.001 (4)	✓ (5)	✓ v4.001 (4)
20-COMM-H	RS-485 HVAC	✓ v2.009 (3) (4)	Not Compatible		
20-COMM-K	CANopen	✓ v1.001 (4)			
20-COMM-L	LonWorks	✓ v1.007 (4)			
20-COMM-M	Modbus/TCP	✓ v2.001 (4)	✓ v2.001 (4)	Not Compatible	✓ v2.001 (4)
20-COMM-P	ControlNet (Fiber)	✓ v1.006 (4)	✓ v1.006 (4)		Not Compatible
20-COMM-Q	PROFIBUS DP	✓ v3.001 (4)	✓ v3.001 (4)	✓ (5)	✓ v3.001 (4)
20-COMM-R (1)	Remote I/O	✓ (2)	Not Compatible		
20-COMM-S	RS-485 DF1	✓ (2)			

(1) This item has Silver Series status.
(2) Controller must be capable of reading/writing 32-bit floating point (REAL) values.
(3) Supports all three modes of operation (RTU, P1, N2).
(4) Requires this adapter firmware version or higher.
(5) Requires firmware version v1.05 or higher of the drive Add-on Profiles for RSLogix 5000 version v16 or higher.
(6) 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 244 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

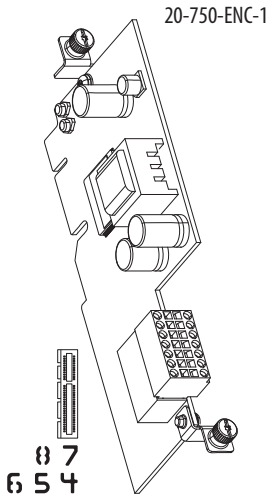
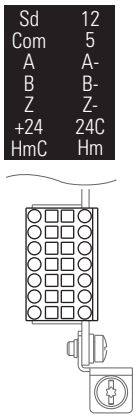


Table 85 - Single Incremental Encoder Specifications

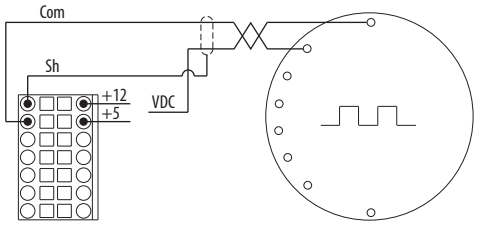
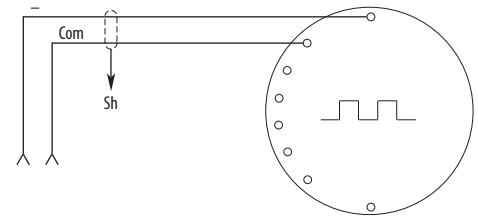
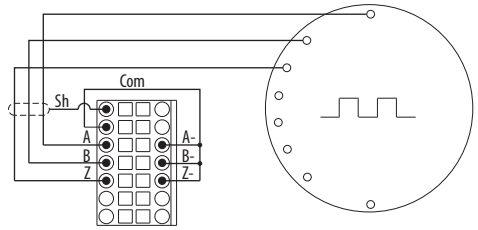
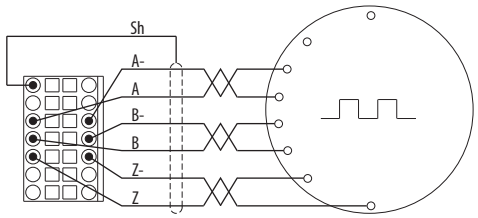
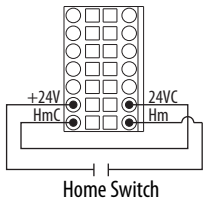
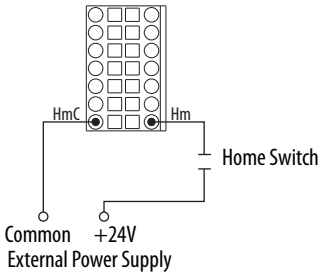
Consideration	Description
Input	Differential or Single Ended operation, Constant Current Sink operation ~10 mA,
	5V DC minimum to 15V DC maximum sourcing 10 mA minimum high state voltage of 3.5V DC maximum low state voltage of 0.4V DC
Maximum Cable Length	30 m (100 ft) @ 5V, 183 m (600 ft) @ 12V
Maximum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

Table 86 - TB1 Terminal Designations

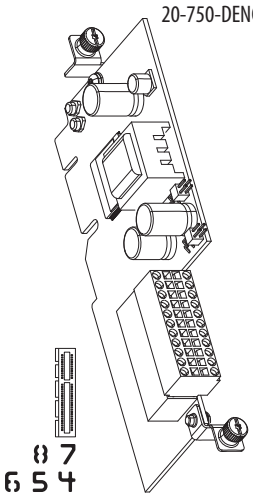


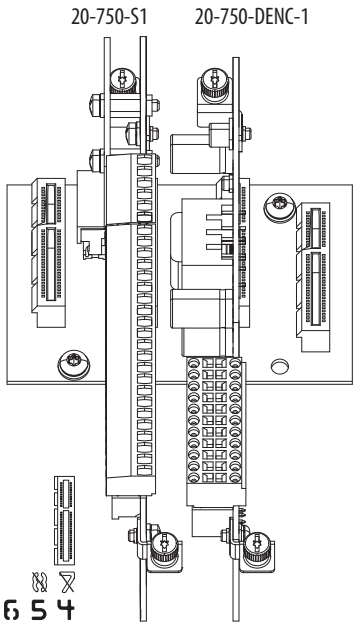
Terminal	Name	Description
Sd	Shield	Terminating point for wire shields when an EMC plate or conduit box is not installed.
12	+12 Volt DC Power	Power supply for encoder 250 mA.
Com	Common	+12V and +5V Common
5	+5 Volt DC Power	Power supply for encoder 250 mA.
A	Encoder A	Single channel or quadrature A 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 87 - 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	
Homing Signal – External Power	

Dual Incremental Encoder Option Module





See **Important** statement on this page.

Table 88 - Dual Incremental Encoder Jumper Settings

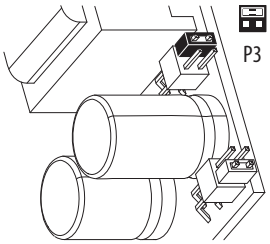
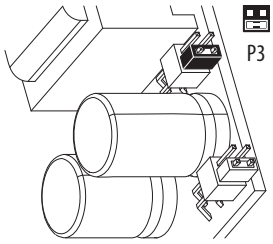
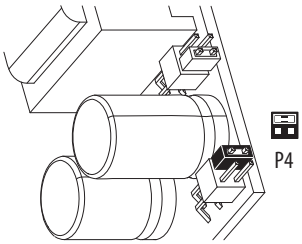
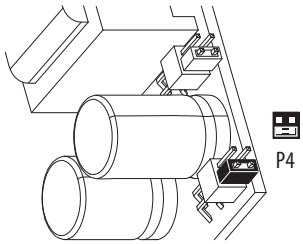
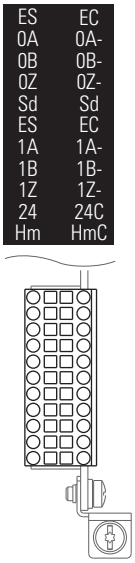
Jumper	Enabled Position	Storage Position
P3 - Safety Jumper Enables use with speed monitoring safety option (20-750-S1).		
P4 - 12V Jumper Enables use with 12 volt supply in "Enabled" position and 5 volt supply in "Storage" position.		

Table 89 - 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

IMPORTANT When used with the Safe Speed Monitor option, both modules must be installed on the same backplane using ports 4, 5, or 6.

Table 90 - 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 134 - Homing Signal – External Power

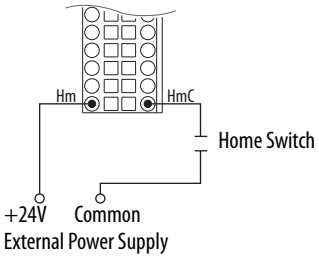


Figure 135 - Differential Dual Channel with Z Channel

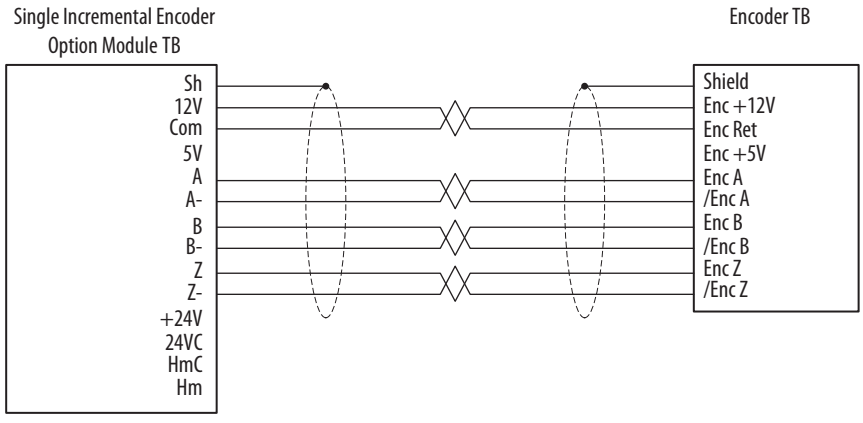


Figure 136 - Differential Dual Channel without Z Channel

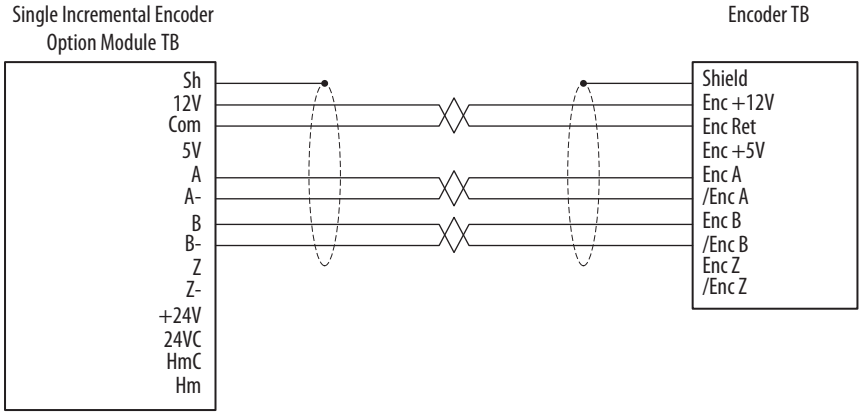


Figure 137 - Differential Dual Channel with Z Channel with External Power Supply

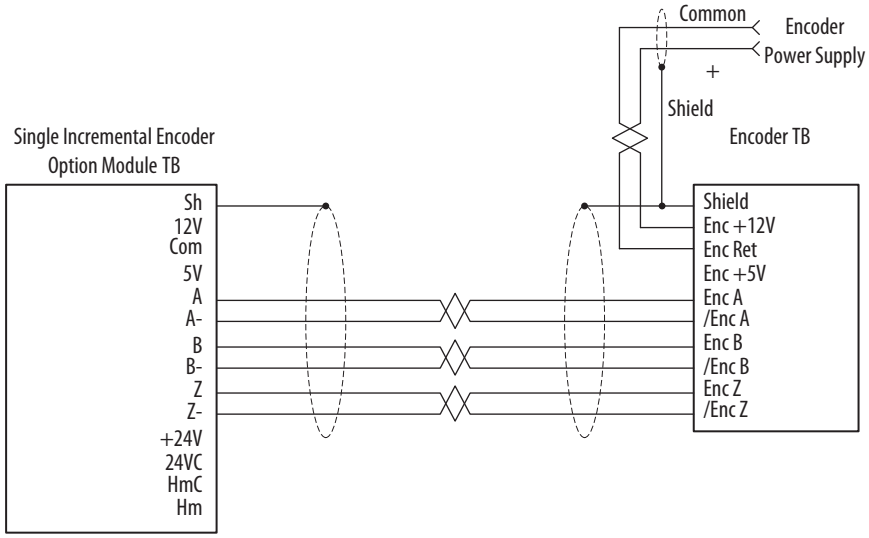
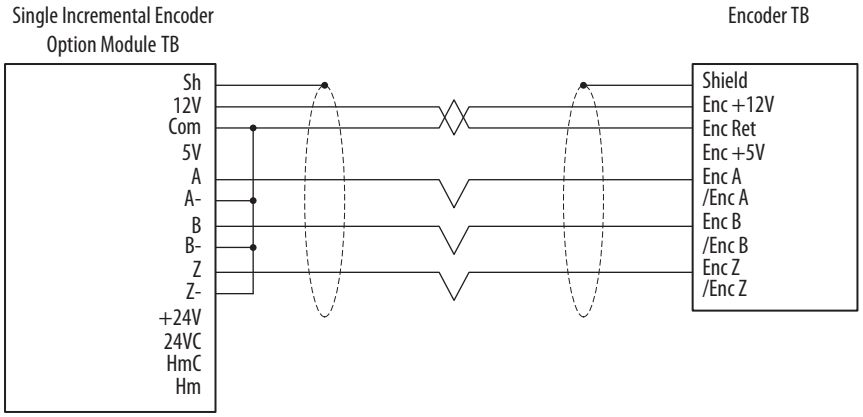
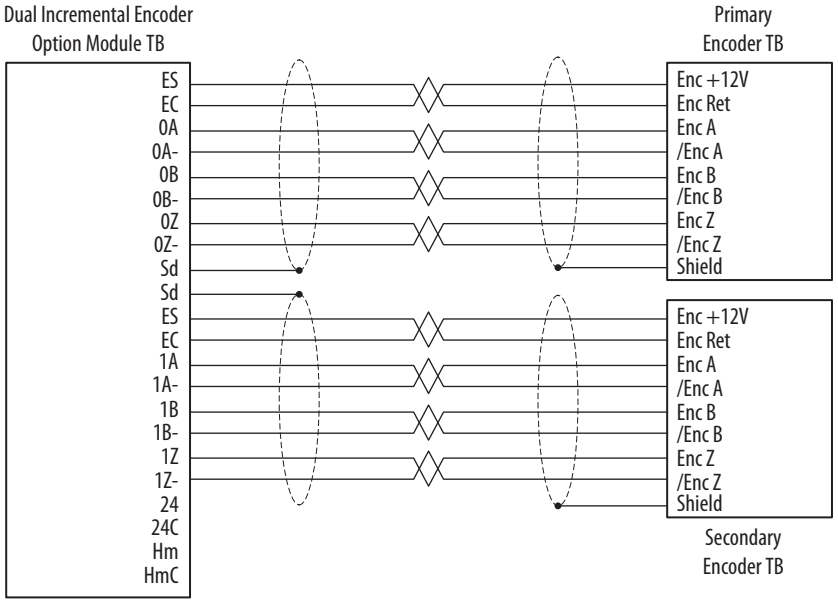


Figure 138 - Single-Ended, Dual Channel



Wiring Examples - Dual Incremental Encoder Option Module Connections

Figure 139 - Differential Dual Channel with Z Channel



Universal Feedback Option Module - 755 Drives Only

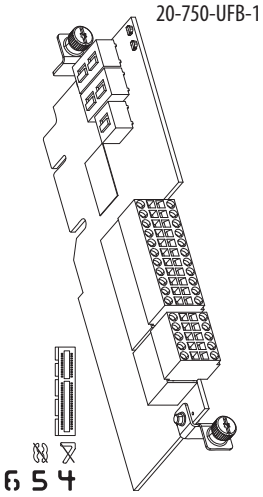
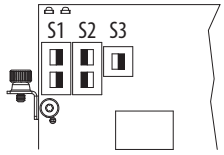
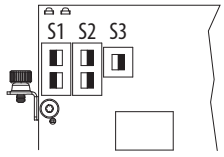
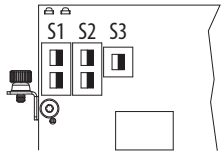


Table 91 - Universal Feedback Option Module LED Indication

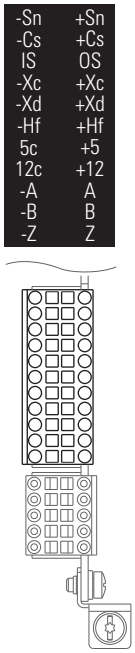
LED	Name	Color	State	Description
❶	Board	Unlit	Off	Not powered.
		Green	Flashing	Initializing, not active. Communication lost, attempting to reconnect.
			Steady	Operational, no faults are present.
		Red	Flashing	Module error. • Check P1 [Module Sts]
			Steady	Normal operation.
				Module is booting.
				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 92 - 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.

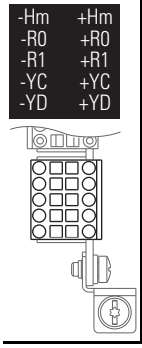
Table 93 - TB1 Terminal Designations



Terminal	Name	Description
-Sn	Sine (–)	Positive and negative terminals for Sine and Cosine signals. For use with 5V incremental encoders only.
+Sn	Sine (+)	
-Cs	Cosine (–)	
+Cs	Cosine (+)	
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.(1)
A	Encoder A	
-B	Encoder B (NOT)	Quadrature B input or encoder output.(1)
B	Encoder B	
-Z	Encoder Z (NOT)	Pulse or marker input or encoder output.(1)
Z	Encoder Z	

(1) Inputs support 5V incremental encoders only. The encoder outputs differential voltage is 3.3V.

Table 94 - 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.

Table 95 - 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
Maximum Input Frequency	250 kHz

Table 96 - Supported Encoders

Consideration	Heidenhain (EnDat)	SSI	Stegmann (Hiperface)	BiSS	Stahl (linear)	Temposonics (linear)
Encoder Voltage Supply	5V @ 250 mA	10.5V @ 250 mA	10.5V @ 250 mA	10.5V @ 250 mA	External Supplied 24V	External Supplied 24V
High-Resolution Signal	Sine/Cosine 1V P-P	Sine/Cosine 1V P-P	Sine/Cosine 1V P-P	Sine/Cosine 1V P-P	n/a	n/a
Maximum Cable Length	100 m	100 m	90 m	100 m	100 m	100 m
Update Rate(1)	102.4 µs	102.4 µs	102.4 µs	102.4 µs	0.5/1.0/1.5/2.0 ms	0.5/1.0/1.5/2.0 ms
Maximum Input Frequency	163.8 kHz	163.8 kHz	163.8 kHz	163.8 kHz	n/a	n/a

(1) The Universal Feedback Encoder Option Module will acquire the position with the update rates displayed.

Motor Power Cables

For detailed information on 2090-Series flying-lead motor cables, refer to the Kinetix Motion Accessories Specifications Technical Data, publication GMC-TD004.

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.

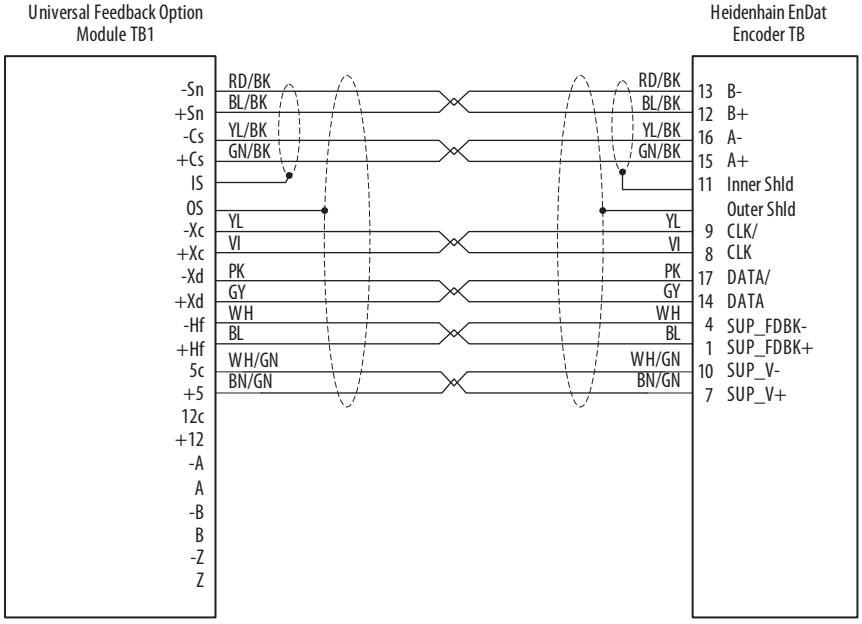
For example: 512, 1024, 2048, 4096, 8192...524288, 1048576...

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 140 - on page 283
Heidenhain EnDat angle encoder with external power supply	supplied with encoder	Figure 141 - on page 283
Heidenhain Non-EnDat rotary encoder with internal power supply	PUR cable supplied with encoder	Figure 142 - on page 284
Heidenhain EnDat rotary encoder (ECN 412 EnDat01) with internal power supply	supplied with encoder	Figure 143 - on page 284
Heidenhain EnDat rotary encoder (ECN 412 EnDat01) with internal power supply	PUR cable supplied with encoder	Figure 144 - on page 285
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-CFBM7DF-CEAAXX	Figure 145 - on page 286
Stegmann rotary encoder	1326-CECU-XXL-XXX	Figure 146 - on page 287
	Pre-attached, shielded, twisted pair	Figure 147 - on page 287
	Shielded, twisted pair cable with an 8-pin Berg style connector	Figure 148 - on page 288
	Shielded, twisted pair cable with a 10-pin MS style connector	Figure 149 - on page 288
	Shielded, twisted pair cable with a 12-pin DIN style connector	Figure 150 - on page 289
Linear sensor	MDI RG Connector	Figure 151 - on page 289
	P Integral Cable	Figure 151 - on page 289
Registration sensor	supplied with sensor	Figure 152 - on page 290
Simulated Incremental encoder output	customer supplied	Figure 153 - on page 290
Incremental encoder with 5V internal power supply	customer supplied	Figure 154 - on page 291
Incremental encoder with external power supply	customer supplied	Figure 155 - on page 291

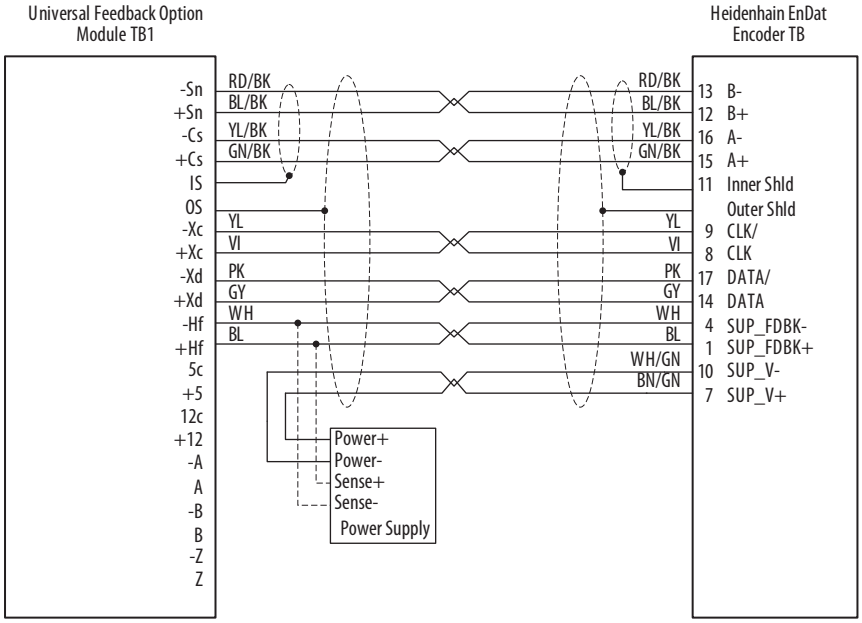
Figure 140 - Heidenhain EnDat Angle Encoder with Internal Power Supply



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 141 - Heidenhain EnDat Angle Encoder with External Power Supply

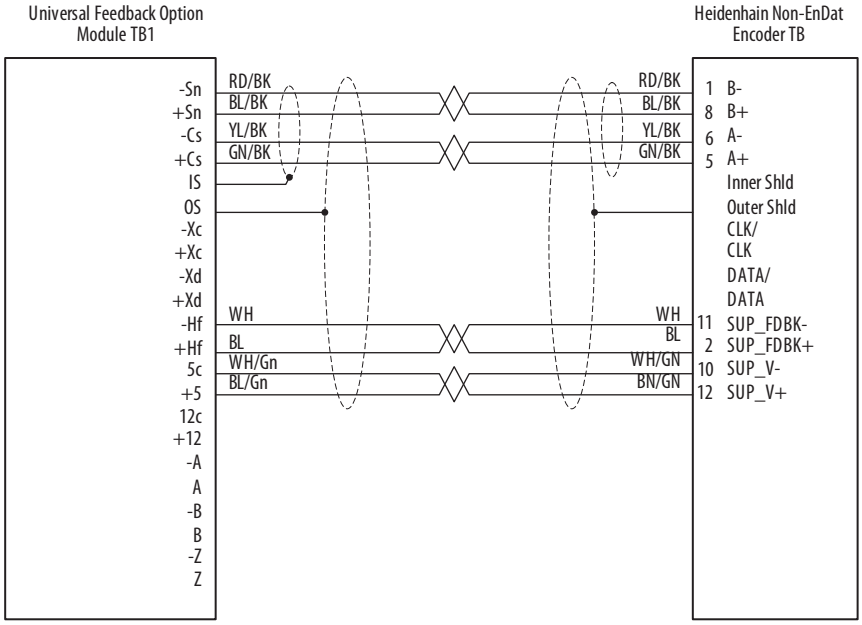


Set Universal Feedback parameter P6 [FB0 Device Sel] or P36 [FB1 Device Sel] to 1 "EnDat SC."

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).

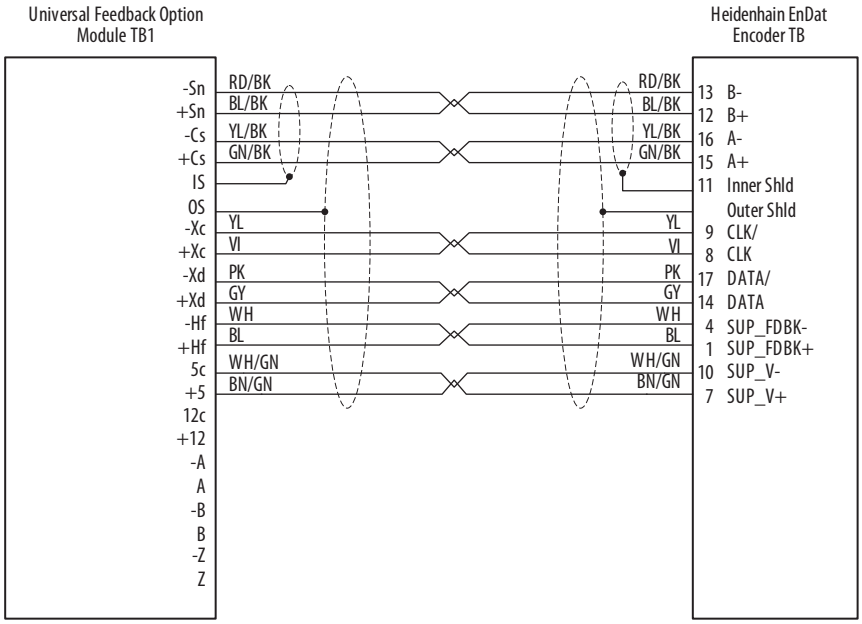
Figure 142 - Heidenhain Non-EnDat Rotary Encoder with Internal Power Supply



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.

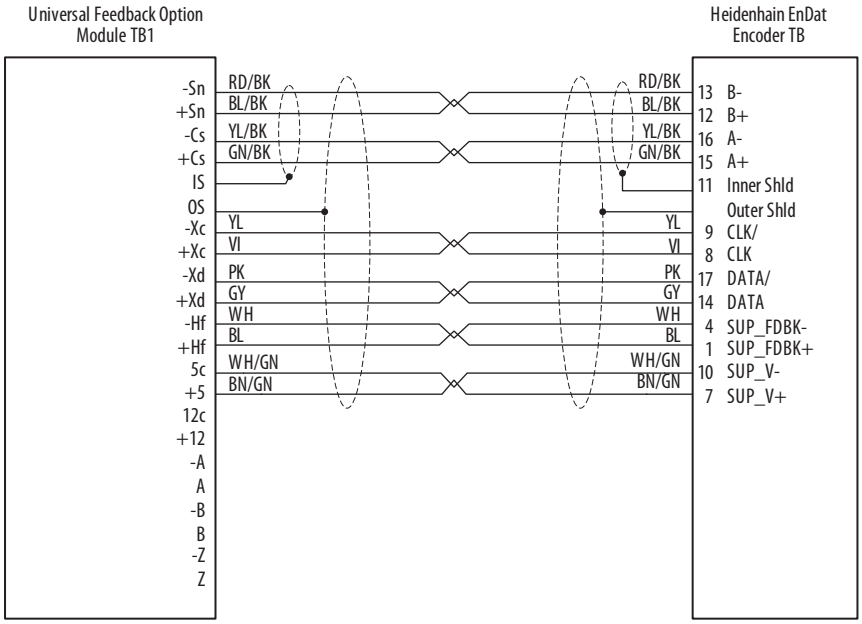
Figure 143 - Heidenhain EnDat Rotary Encoder (ECN 412 EnDat01) with Internal Power Supply



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.

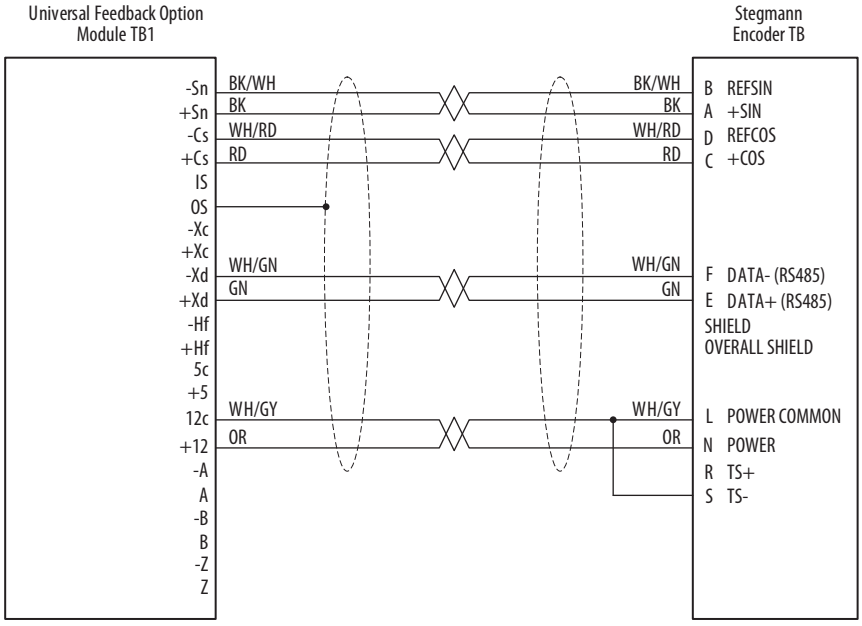
Figure 144 - Heidenhain EnDat Rotary Encoder (ECN 412 EnDat01) with Internal Power Supply



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 145 - 460V MP-Series, HPK-Series, or Allen-Bradley 1326AB-Series Motor and a Stegmann Rotary or Rotary Encoder connected via a 2090-CFBM7DF-CEAAXX (Non-Flex) or -CEAFXX (Flex)

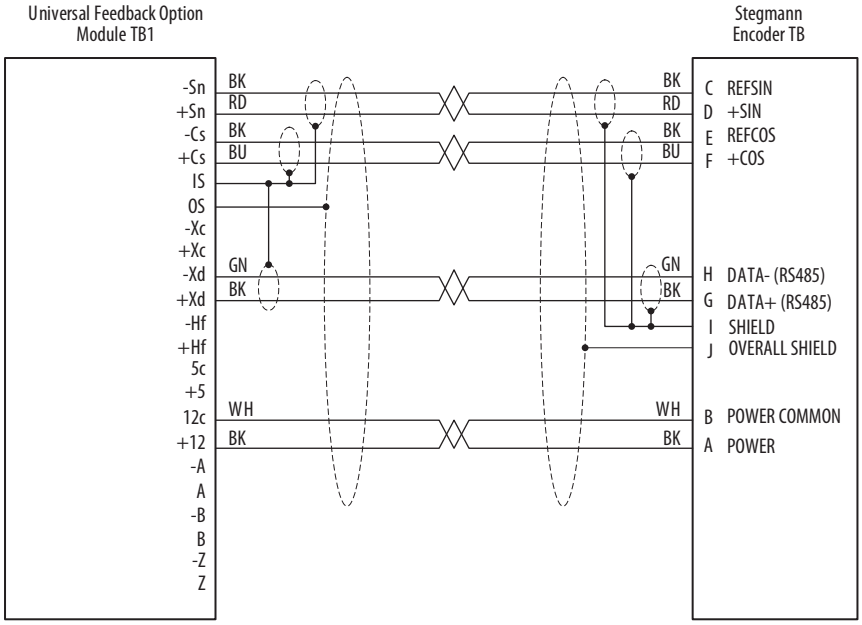


Set Universal Feedback parameter P6 [FB0 Device Sel] or P36 [FB1 Device Sel] to 2 “Hiperface SC.”

IMPORTANT Do not use 120 Volts with the motor thermostat.

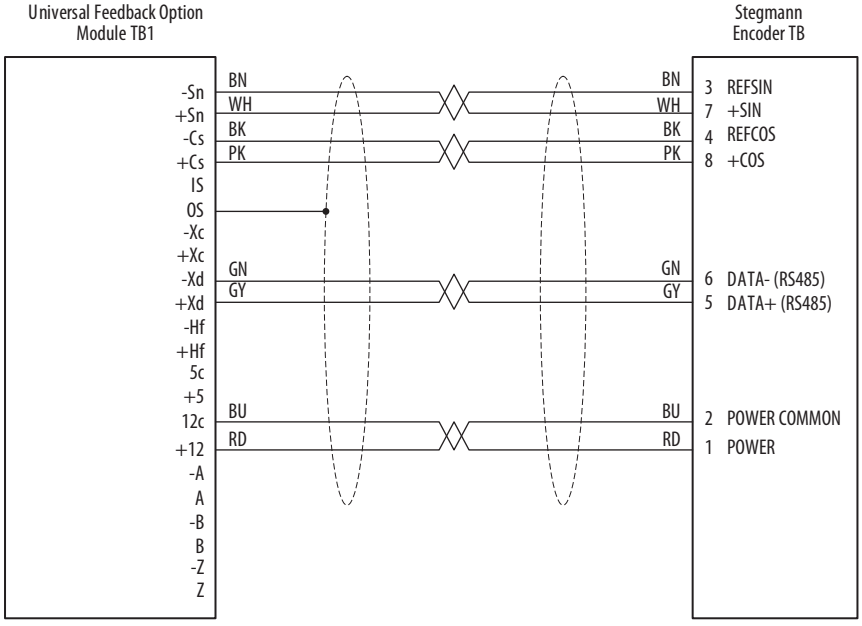
IMPORTANT The Thermal Switch cannot be accessed using 2090-XXNFMP-SXX or 2090-CFBM7XX series cables.

Figure 146 - Stegmann Rotary Encoder connected via a 1326-CECU-XXL-XXX Cable



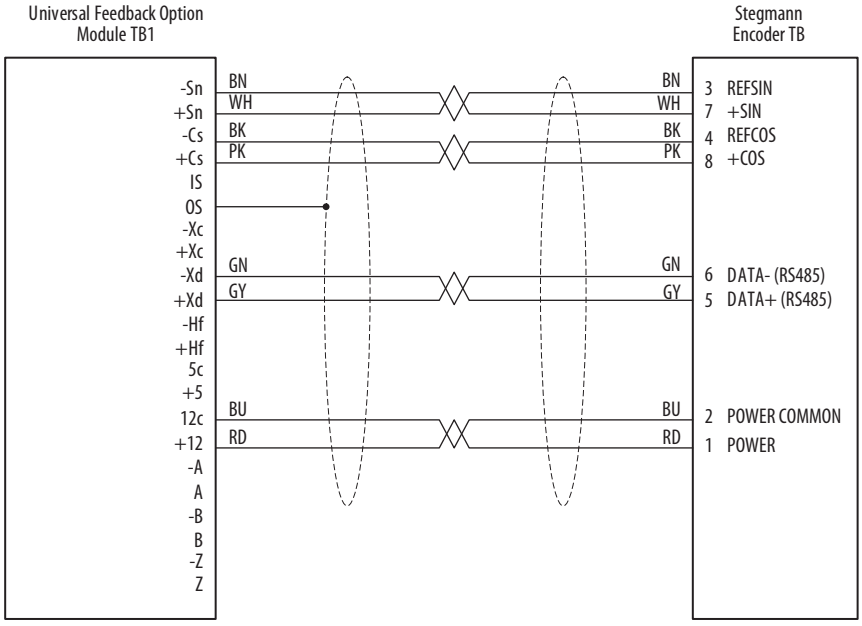
Set Universal Feedback parameter P6 [FB0 Device Sel] or P36 [FB1 Device Sel] to 2 “Hiperface SC.”

Figure 147 - Stegmann Rotary Encoder connected via a Pre-Attached, Shielded, Twisted Pair Cable



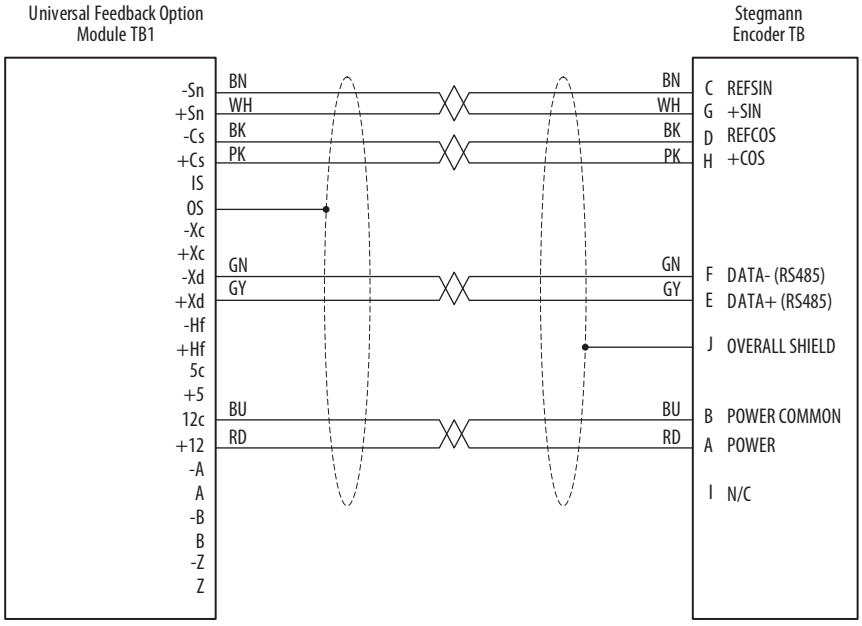
Set Universal Feedback parameter P6 [FB0 Device Sel] or P36 [FB1 Device Sel] to 2 “Hiperface SC.”

Figure 148 - Stegmann Rotary Encoder Connected via a Shielded, Twisted Pair Cable with an 8-pin Berg Style Connector



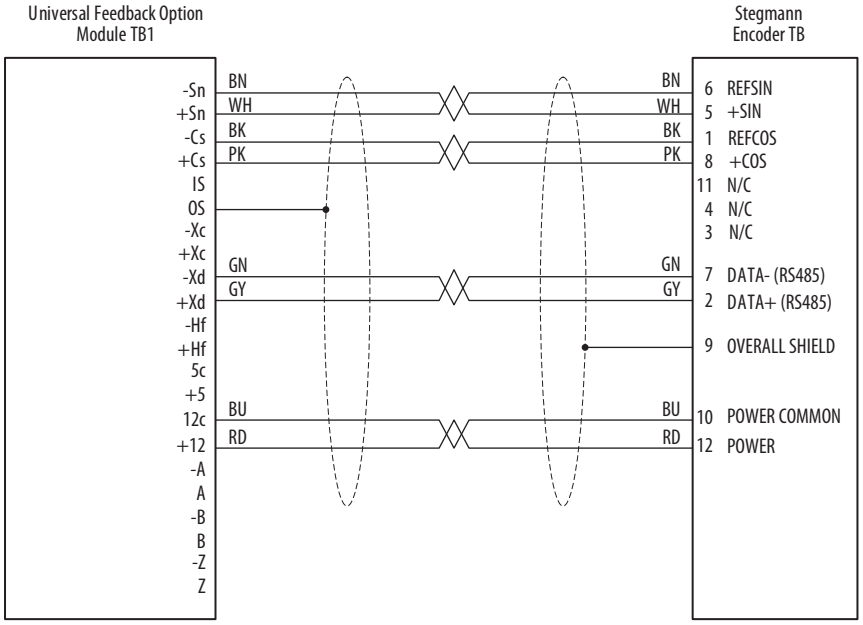
Set Universal Feedback parameter P6 [FB0 Device Sel] or P36 [FB1 Device Sel] to 2 “Hiperface SC.”

Figure 149 - Stegmann Rotary Encoder Connected via a Shielded, Twisted Pair Cable with a 10-pin MS Style Connector



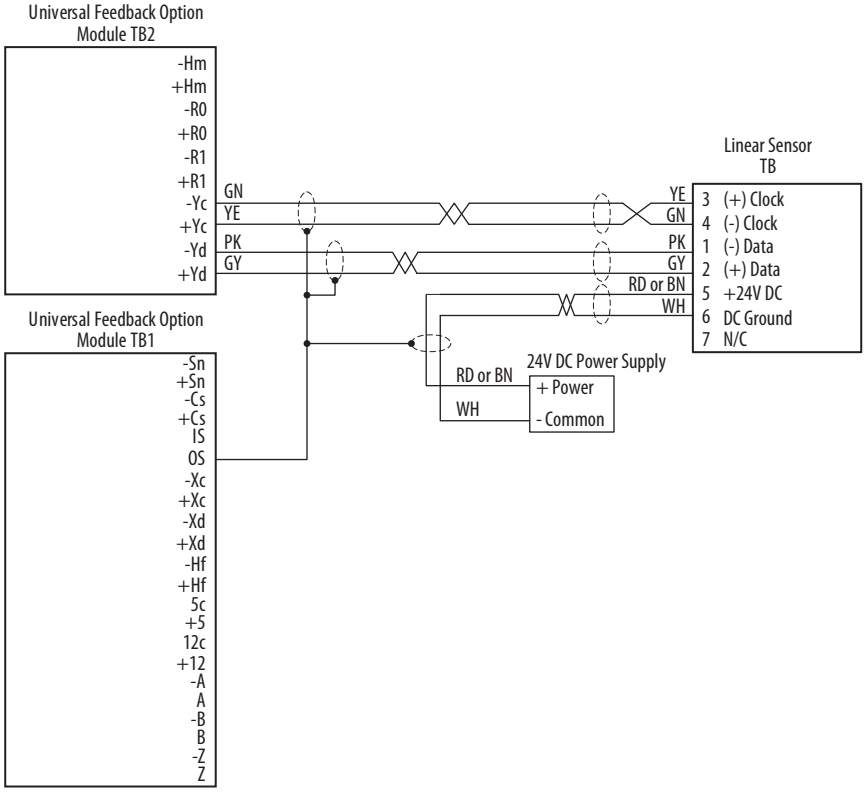
Set Universal Feedback parameter P6 [FB0 Device Sel] or P36 [FB1 Device Sel] to 2 “Hiperface SC.”

Figure 150 - Stegmann Rotary Encoder Connected via a Shielded, Twisted Pair Cable with a 12-pin DIN Style Connector



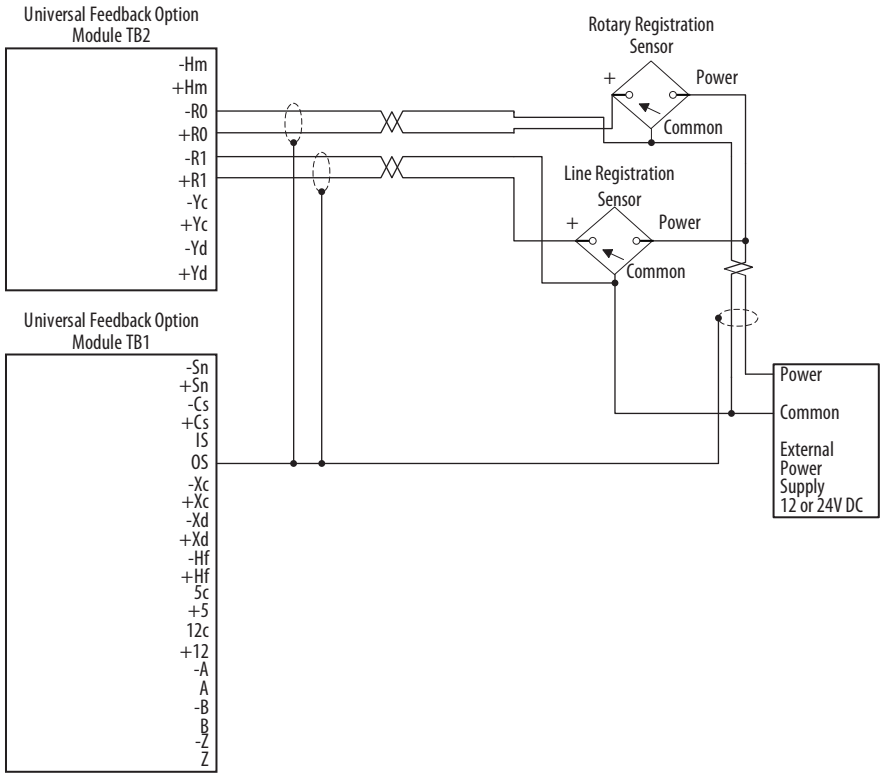
Set Universal Feedback parameter P6 [FB0 Device Sel] or P36 [FB1 Device Sel] to 2 “Hiperface SC.”

Figure 151 - Linear Sensor with MDI RG Connector or P Integral Cable



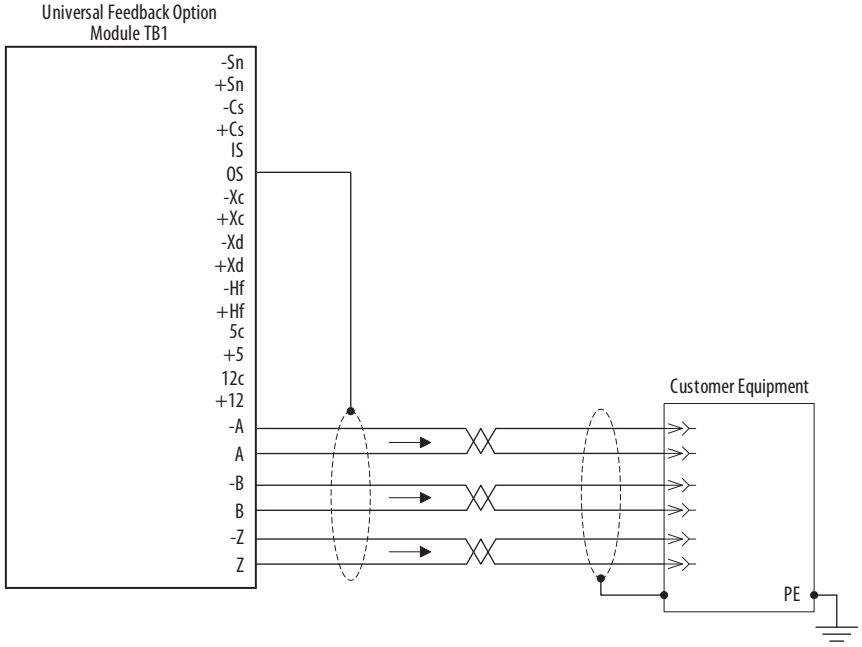
Set Universal Feedback parameter P6 [FB0 Device Sel] or P36 [FB1 Device Sel] to 17 “LinStahl ChY” or 19 “LinSSI ChY.”

Figure 152 - Registration Sensor



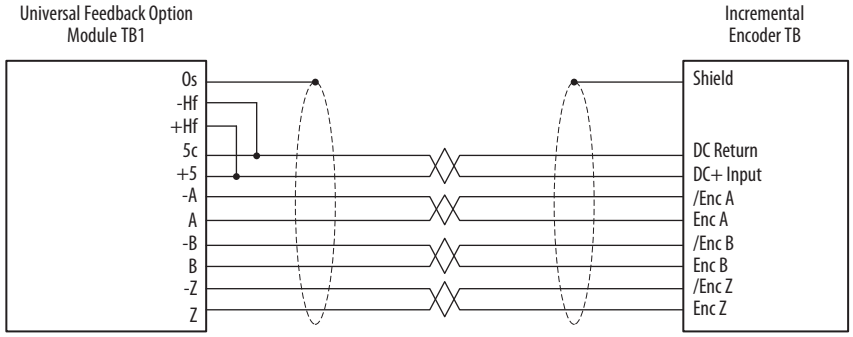
See Universal Feedback parameters P90 through P129.

Figure 153 - Simulated Incremental Encoder Output



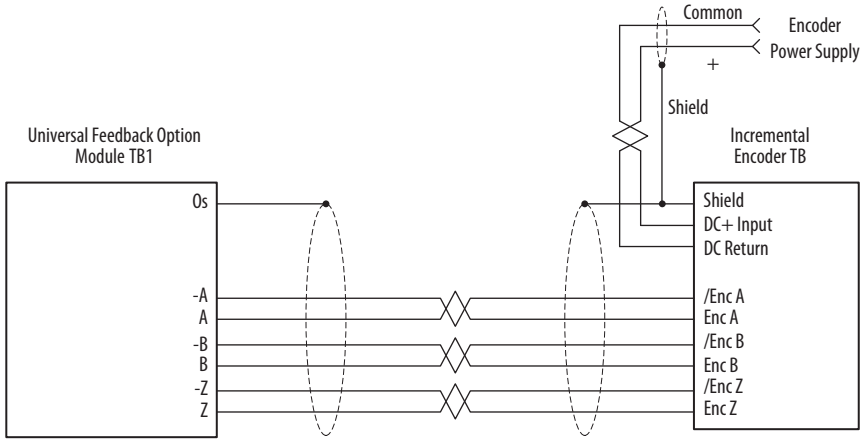
Set Universal Feedback parameter P80 [Enc Out Sel] to 2 “Sine Cosine,” 3 “Channel X,” or 4 “Channel Y” as needed.

Figure 154 - 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 155 - 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

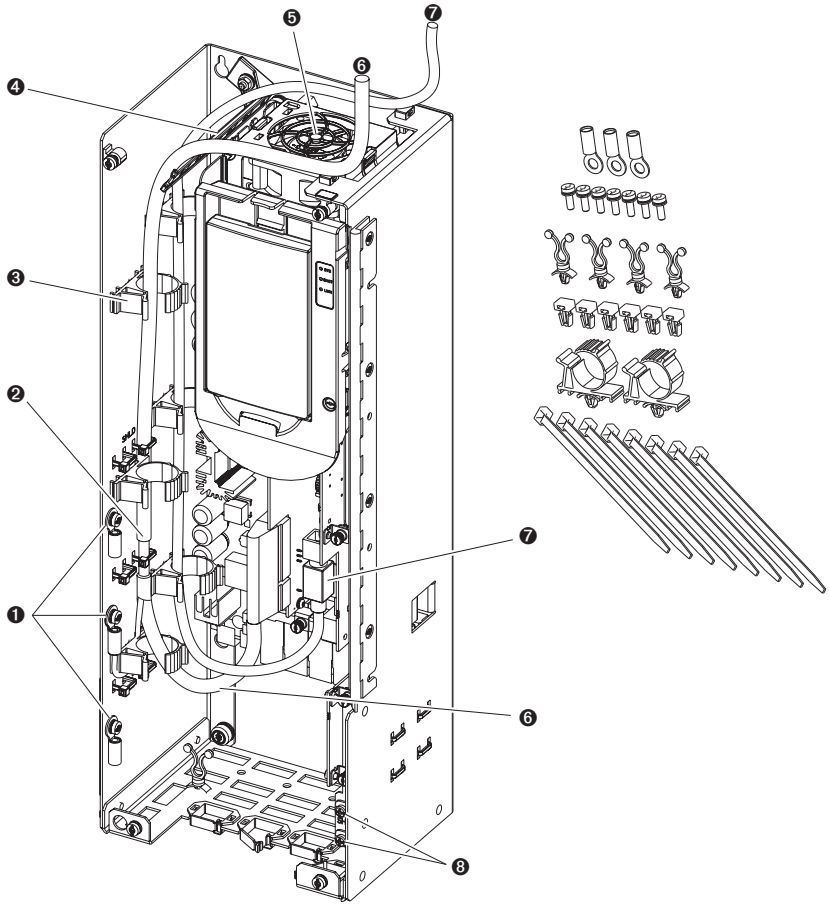
Floor Mount Frames 8…10

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 156 - 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.

Control Wiring - Early Frame 8 Drives with Cabinet Options

Control terminal block TB2 is mounted on the inside right panel of the cabinet options bay on early production frame 8 drives. TB1 referenced in the illustrations below resides on the main control board. See page 229.

Table 97 - TB2 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 157 - Control Terminal Block TB2 - Floor Mount Frame 8 Drives

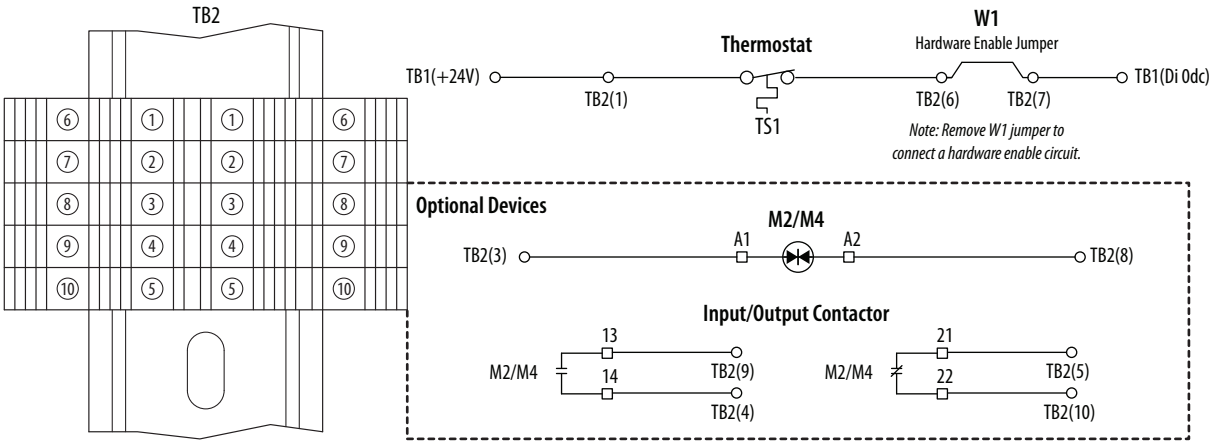
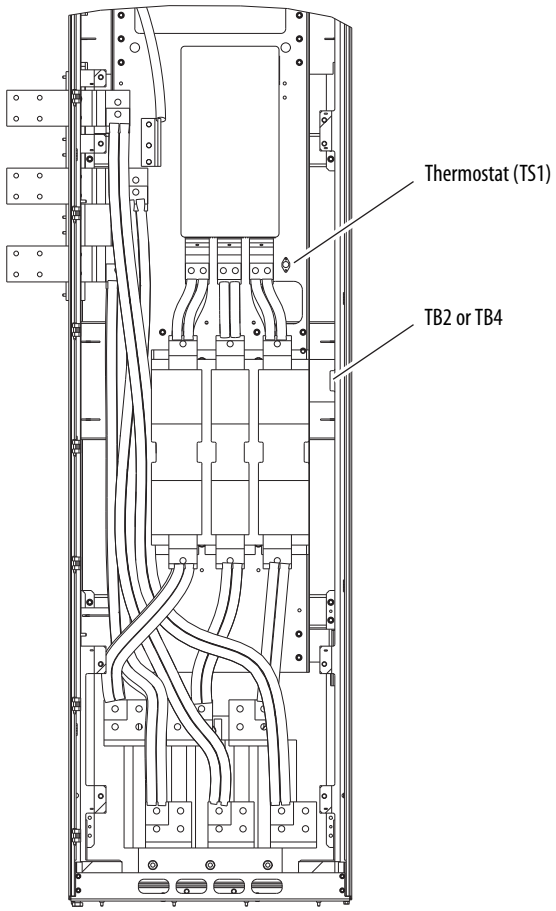


Table 98 - Input/Output Contactor Data

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 158 - Frame 8 Cabinet Options Bay Component Location



Control Wiring - Current Frame 8 Drives with Cabinet Options

Frame 8 drives are shipped from the factory with control power set to 120V AC. To change control voltage to 230V AC, move the jumper as shown.

Table 99 - Control Power for Customer Use Voltage Selection - Floor Mount Frame 8 Drives

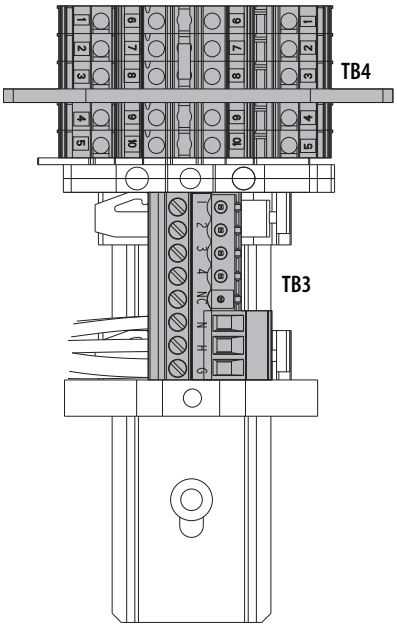
120V AC, 60Hz, 4.2A (Factory Setting)	230V AC, 50Hz, 2.2A
TB4(7) ○—[FU12]—□ TB3(H) 600V AC, 3A, Class CC	TB4(6) ○—[FU12]—□ TB3(H) 600V AC, 6A, Class CC

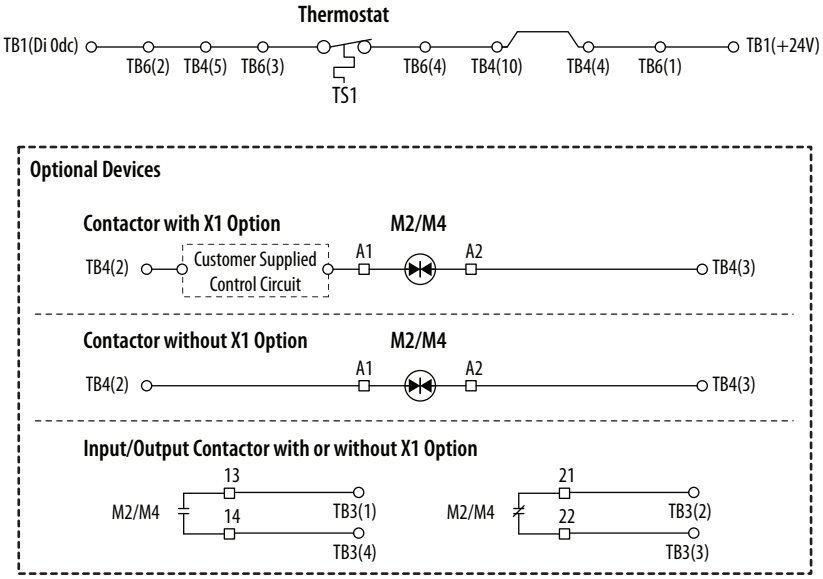
Control terminal block TB4 is mounted on the inside right panel of the cabinet options bay in current production drives. TB1 referenced in the illustrations below resides on the main control board. See page 229.

Table 100 - TB4 Terminal Block Specifications

Name	Wire Size Range		Torque		Strip Length
	Maximum	Minimum	Maximum	Recommended	
Control Terminal Block TB3	4.0 mm^2 (12 AWG)	0.2 mm^2 (24 AWG)	0.5 N•m (4.5 lb•in)	0.4 N•m (3.5 lb•in)	7 mm (0.28 in.)
Control Terminal Block TB4	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 159 - Control Terminal Blocks TB3 and TB4 - Floor Mount Frame 8 Drives





Control Wiring - Frame 9 and 10 Drives with Cabinet Options

Frame 9 drives are shipped from the factory with control power set to 120V AC. To change control voltage to 230V AC, move the jumper as shown.

Table 101 - Control Power for Customer Use Voltage Selection - Floor Mount Frames 9 and 10 Drives

120V AC, 60Hz, 4.2A (Factory Setting)	230V AC, 50Hz, 2.2A
T1 (X2) ○—[FU12]—□ TB3(H) 600V AC, 3A, Class CC	TB4(6) ○—[FU12]—□ TB3(H) 600V AC, 6A, Class CC

Control terminal block TB4 is mounted on the power option module. TB1 referenced in the illustrations below resides on the main control board. See page 229.

Figure 160 - Control Terminal Blocks TB3 and TB4 - Floor Mount Frames 9 and 10 Drives

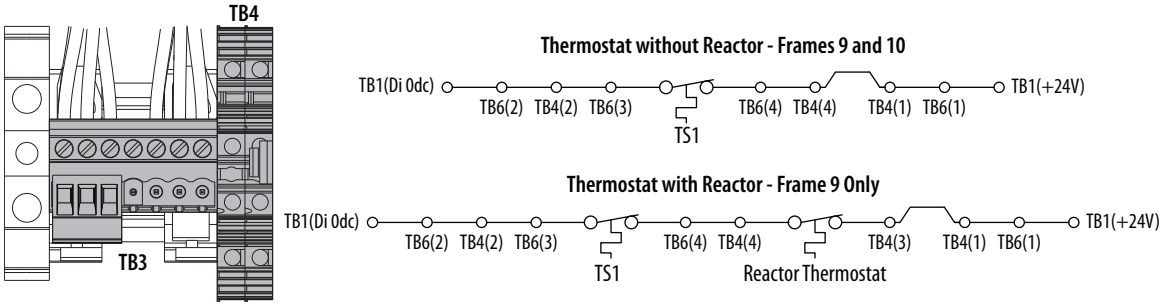
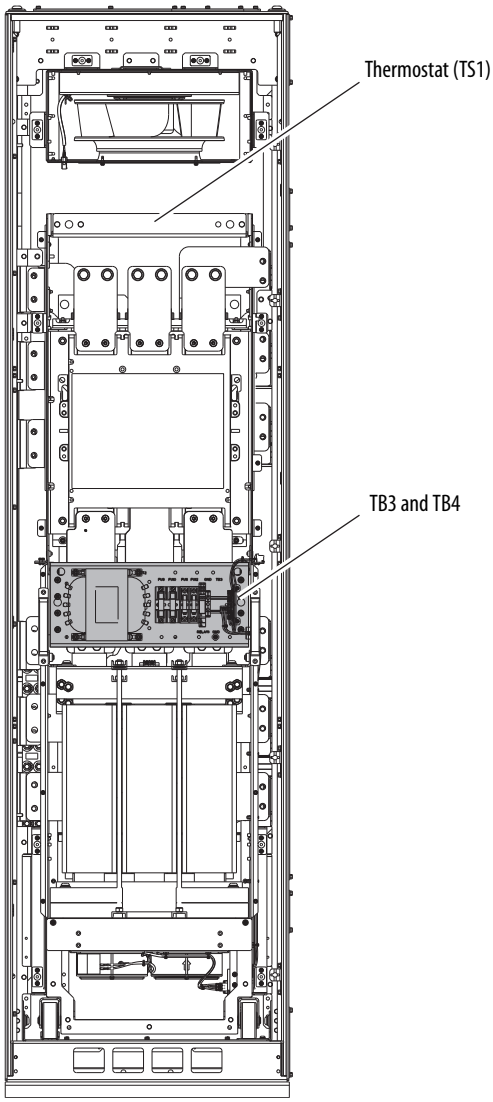


Figure 161 - Floor Mount Frame 9 Cabinet Options Bay Component Location



Enclosure Options - Floor Mount Frames 8…10

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, L, P, or W). 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)

NEMA Type 12 Enclosure - 2500 MCC Style Cabinet

The enclosure provided is a NEMA Type 12 - 2500 MCC style cabinet that is 800 mm deep (Position 6, Code J, K, or Y). Type 12 enclosures are intended for indoor use primarily to provide a degree of protection against dust, falling dirt, and dripping noncorrosive liquids.

- Position 6, Code J = 800 mm deep enclosure
- Position 6, Code K = 800 mm deep enclosure with MCC bus installed; standard cabinet color (RAL 7032)
- Position 6, Code Y = 800 mm deep enclosure with MCC bus installed; Centerline 2100 gray color (ASA49)

Before performing any work on the drive, read the General Precautions starting on page 11.

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 102 - 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 103 - 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 104 - 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

Notes:

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 and application notes, sample code, and links to software service packs. You can also visit our Support Center at https://rockwellautomation.custhelp.com/ for software updates, support chats and forums, technical information, FAQs, and to sign up for product notification updates.

In addition, we offer multiple support programs for installation, configuration, and troubleshooting. For more information, contact your local distributor or Rockwell Automation representative, or visit http://www.rockwellautomation.com/services/online-phone.

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/rockwellautomation/support/overview.page, or contact your local Rockwell Automation representative.

New Product Satisfaction Return

Rockwell Automation tests all of its products to help 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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