PowerFlex 755TS Products with TotalFORCE Control

Catalog Numbers 20G2, 20GE

Allen-Bradley
by ROCKWELL AUTOMATION

Installation Instructions

Original Instructions

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.

No patent liability is assumed by Rockwell Automation, Inc. with respect to use of information, circuits, equipment, or software described in this manual.

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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).

Chapter 6

Service and Maintenance

This manual provides procedures for the mechanical and electrical installation of PowerFlex® 755TS products with TotalFORCE® control.

This manual provides instructions for an initial product installation. Assembly procedures in chapters 1...4 assume that supply power is not connected. Once the product is connected to a power supply, always verify that system power is not present before performing any work on the product. See safety-related practices that are contained in publication NFPA 70E, Standard for Electrical Safety in the Work Place.

This manual is intended for two types of personnel:

- Qualified personnel familiar with handling mechanical electrical equipment.
- Qualified electricians or other personnel who have experience with electrical terminology, equipment, methods, and safety precautions.

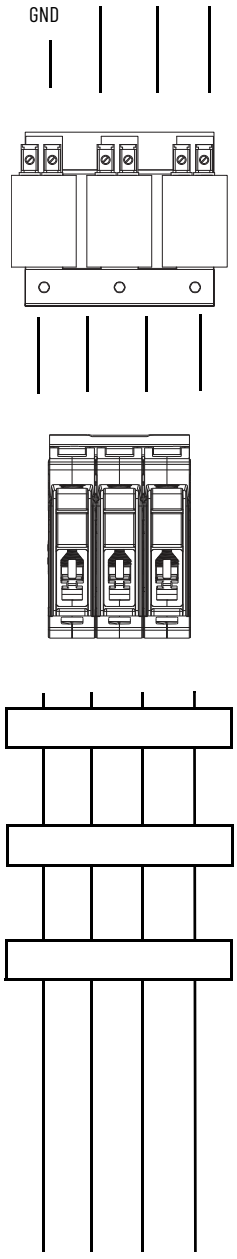
The Additional Resources section is a directory of Rockwell Automation publications that provide detailed drive information from wiring and grounding recommendations to troubleshooting and repair.

Commonly Used Installation Tools

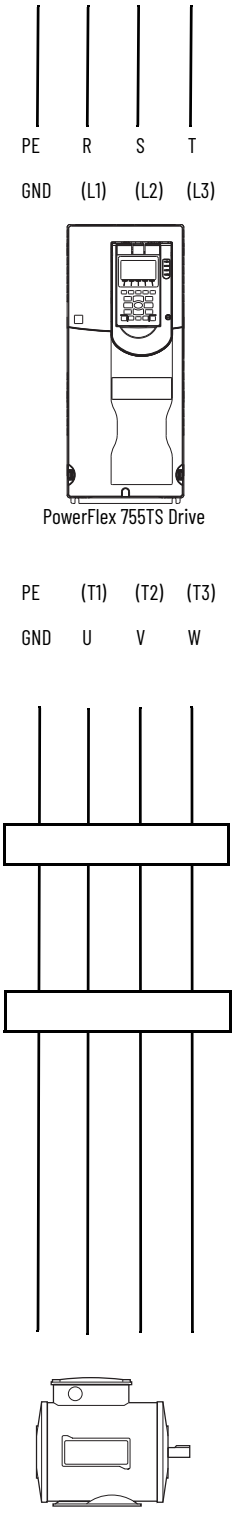
See Chapter 6 on page 85 for a list of common tools used for installing PowerFlex 755TS products.

Line to Load Installation Guidelines

This section provides direction for how and where to find information from line to load on the successful installation and implementation of PowerFlex 755TS drives.



Topic	PowerFlex 750-Series Drives
AC supply source	Wiring and Grounding Guidelines for Pulse-width Modulated (PWM) AC Drives Installation Instructions, publication DRIVES-IN001 See Chapter 2 – System Configurations.
Input power conditioning	Wiring and Grounding Guidelines for Pulse-width Modulated (PWM) AC Drives Installation Instructions, publication DRIVES-IN001 See Chapter 2 – AC Line Impedance.
	1321 Power Conditioning Products Technical Data, publication 1321-TD001 See this publication for line reactors and isolation transformers.
Input fusing and circuit breakers	See Fuse and Circuit Breaker Ratings on page 71.
Input power wire and cable	Wiring and Grounding Guidelines for Pulse-width Modulated (PWM) AC Drives Installation Instructions, publication DRIVES-IN001 See Chapter 1 – Input Power Cables.
EMC filters	See Installation Requirements Related to EN 61800-3 and the EMC Directive on page 27.
Electrical interference	Wiring and Grounding Guidelines for Pulse-width Modulated (PWM) AC Drives Installation Instructions, publication DRIVES-IN001 See Chapter 6 – How Electromechanical Switches Cause Transient Interference.
Grounding	Wiring and Grounding Guidelines for Pulse-width Modulated (PWM) AC Drives Installation Instructions, publication DRIVES-IN001 See Chapter 3 – Grounding.
	See Grounding Requirements on page 60.



PowerFlex 755TS Drive

Topic	PowerFlex 750-Series Drives
Jumpers	See Drive Power Jumper Configuration on page 77.
Mounting considerations	See Mounting Surface on page 29 and Minimum Clearances on page 30.
Environment	Industry Installation Guidelines for Pulse-width Modulated (PWM) AC Drives Application Technique, publication DRIVES-AT003 See this publication for information for different enclosure systems and environmental/location considerations (to help protect against environmental contaminants), and power and grounding considerations.
	See Environment on page 29.
Control and signal cabling	Wiring and Grounding Guidelines for Pulse-width Modulated (PWM) AC Drives Installation Instructions, publication DRIVES-IN001 See Chapter 4 – Wire Routing.
	PowerFlex 750-Series I/O, Feedback, and Power Option Modules Installation Instructions, publication 750-IN111
Output power cabling	Wiring and Grounding Guidelines for Pulse-width Modulated (PWM) AC Drives Installation Instructions, publication DRIVES-IN001 See Chapter 1 – Motor Cables.
Output devices	Wiring and Grounding Guidelines for Pulse-width Modulated (PWM) AC Drives Installation Instructions, publication DRIVES-IN001 See Chapter 6 – Shielded or Armored Power Cable.
	1321 Power Conditioning Products Technical Data, publication 1321-TD001 See this publication for load reactors, RWRs, and common mode chokes/cores.
	1204 Terminator Instructions, publication 1204-IN002 See this publication for motor terminators.
	See Output Contactor Precaution on page 77.
Cable length	Wiring and Grounding Guidelines for Pulse-width Modulated (PWM) AC Drives Installation Instructions, publication DRIVES-IN001 See Chapter 5 – Length Restrictions for Motor Protection.
Encoder	Wiring and Grounding Guidelines for Pulse-width Modulated (PWM) AC Drives Installation Instructions, publication DRIVES-IN001 See Chapter 1 – Analog Signal and Encoder Cable.
Motor	Wiring and Grounding Guidelines for Pulse-width Modulated (PWM) AC Drives Installation Instructions, publication DRIVES-IN001 See Appendix A – Overview.

Additional Resources

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

Resource	Description
PowerFlex 750-Series Products with TotalFORCE Control Reference Manual, publication 750-RM100	Provides detailed setup and programming instructions for common applications.
PowerFlex TotalFORCE Firmware Documentation Set: • PowerFlex Drives with TotalFORCE Control Programming Manual, publication 750-PM101 • PowerFlex Drives with TotalFORCE Control Parameters Reference Data, publication 750-RD101 • PowerFlex Drives with TotalFORCE Control Conditions Reference Data, publication 750-RD102	Provides detailed information on: • Startup, control algorithms, and status indicators • Parameters and programming • Faults, alarms, events, and troubleshooting
PowerFlex 755TS Products with TotalFORCE Control Technical Data, publication 750-TD104	Provides detailed information on: • Drive specifications • Option specifications • Fuse and circuit breaker ratings
PowerFlex 755T Products with TotalFORCE Control Hardware Service Manual, publication 750-TG101	Provides detailed information on: • Preventive maintenance • Component testing • Hardware replacement procedures
Drives in Common Bus Configurations with PowerFlex 755TM Bus Supplies Application Techniques, publication DRIVES-AT005	Provides basic information to properly wire and ground the following products in common bus applications: • PowerFlex 755TM drive system for common bus solutions • PowerFlex 750-Series AC and DC input drives • Kinetix® 5700 servo drives
PowerFlex 755T Flux Vector Tuning, publication 750-AT006	Provides guidance on how to tune Flux Vector position and velocity loops, filters, and other features to achieve the level of performance that is required for a given application. This publication is intended for novice drives users and users with advanced skills.
PowerFlex 750-Series I/O, Feedback, and Power Option Modules Installation, publication 750-IN111	Provides instructions to install and wire 750-Series option modules.
PowerFlex Drives with TotalFORCE Control Built-in EtherNet/IP Adapter User Manual, publication 750COM-UM009	Provides information on how to install, configure, and troubleshoot applications for the PowerFlex drives with the built-in EtherNet/IP™ adapter.
PowerFlex 750-Series Safe Speed Monitor Option Module Safety Reference Manual, publication 750-RM001	These publications provide detailed information on installation, set-up, and operation of the 750-Series safety option modules.
PowerFlex 750-Series Safe Torque Off Option Module User Manual, publication 750-UM002	
PowerFlex 750-Series ATEX Option Module User Manual, publication 750-UM003	
PowerFlex 755 Integrated Safety - Safe Torque Off Option Module User Manual, publication 750-UM004	
PowerFlex 20-HIM-A6 / -C6S HIM (Human Interface Module) User Manual, 20HIM-UM001	Provides detailed information on HIM components, operation, and features.
Industry Installation Guidelines for Pulse Width Modulated (PWM) AC Drives, publication DRIVES-AT003	Provides basic information on enclosure systems, considerations to help protect against environmental contaminants, and power and grounding considerations for installing Pulse Width Modulated (PWM) AC drives.
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.
Product Certifications website, rok.auto/certifications	Provides declarations of conformity, certificates, and other certification details.
Rockwell Automation Knowledge Base	The Rockwell Automation Support Forum

You can view or download publications at rok.auto/literature.

Product Overview

PowerFlex® 755TS Products with TotalFORCE® control are Architecture Class AC drives. These products provide a broad set of features and application-specific parameters, and they are ideal for high-performance applications.

Product Advisories

Read the following precautions before you begin installation of the product.

Qualified Personnel

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

Personal Safety

ATTENTION: Measure the DC bus voltage at the power terminal block by measuring between the +DC and -DC terminals (see Figure 41 and Figure 42 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.

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.

ATTENTION: A possible hazard of personal injury due to prolonged exposure to high sound levels. Follow applicable local, national, and international codes, standards, regulations, or industry guidelines for hearing protection when exposed to potentially damaging noise hazards.

Product Safety

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

ATTENTION: This product contains Electrostatic Discharge (ESD) sensitive parts and assemblies. Static control precautions are required when you install these assemblies. Component damage can result if ESD control procedures are not followed. If you are not familiar with static control procedures, reference any applicable ESD protection handbook.

ATTENTION: If you configure 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.

Waste Electrical and Electronic Equipment

At the end of its life, this equipment should be collected separately from any unsorted municipal waste.

Catalog Number Explanation

Catalog number positions 1...7 identify the product type and voltage rating.

1...3	4	5	6	7	8...10	11	12	13	14	15	16	17	18
20G	E	A	N	D	248	J	N	0	N	N	N	N	N
	A	B	C	D	E								

A

Drive		
Code	**Type**	**Frames**
20G	PowerFlex 755TS Drives	1...7

B

Corrosive Gas Protection (XT) and Cooling Type		
Code	**Description**	**Frames**
2	Standard Protection, Forced Air	1...7
E	Corrosive Gas Protection (XT), Forced Air	1...7

C

Input Type		
Code	**Description**	**Frames**
1	AC Input with Precharge, includes DC terminals	1...5
4	DC Input with Precharge	5...7
A	AC Input with Precharge, no DC terminals	6 and 7 (1)

(1) The DC Bus Bar kit (20-750-DCBB3-F*n*) is available for Frames 6 and 7 AC input drives that require DC bus terminals.

D

Enclosure		
Code	**Description**	**Frames**
R	IP20, NEMA/UL Open Type, Frame 1	1
F	Flange, NEMA/UL Type 4X/12 back	2...5
G	IP54, NEMA/UL Type 12	2...7
N	IP20/IP00, NEMA/UL Open Type	2...7

E

Voltage Rating	
Code	**Voltage**
C	400V AC; 3 PH/540V DC
D	480V AC; 3 PH/650V DC

Catalog number positions 8...10 identify the product normal duty rating.

1...3	4	5	6	7	8...10	11	12	13	14	15	16	17	18
20G	E	A	N	D	248	J	N	O	N	N	N	N	N
					F1...F2								

F1

PowerFlex 755TS ND Drive Ratings

400V, 50 Hz Input

Code	Amps	kW	Frame			
			Enclosure Code			
			F	G	N	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				–
030	30	15	3	3	3	
037	37	18.5				
043	43	22				
060	60	30	4	4	4	
061	61	30	–	–	3	
072	72	37	4	5	4	
073	73	37	–	4	–	
085	85	45	5	5	5	
086	86	45	4	–	4	
104	104	55	5	6	5	
140	140	75	6(1)		6	
170	170	90				
205	205	110				
260	260	132		7		
302	302	160	7(1)		7	
367	367	200				
456	456	250				
477	477	270		–		

F2

PowerFlex 755TS ND Drive Ratings

480V, 60 Hz Input

Code	Amps	Hp	Frame			
			Enclosure Code			
			F	G	N	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				–
027	27	20	3	3	3	
034	34	25				
040	40	30				
052	52	40	4	4	4	
053	53	40	–	–	3	
065	65	50	4	5	4	
066	66	50	–	4	–	
077	77	60	5	5	5	
078	78	60	4	–	4	
096	96	75	5	6	5	
125	125	100	6(1)		6	
156	156	125				
186	186	150				
248	248	200		7		
302	302	250	7(1)		7	
361	361	300				
415	415	350				
477	477	400		–		

(1) For Frames 6 and 7, a field-installed flange kit (20-750-TFLNG1-F*n*) is available to convert a Code N drive to provide a UL Type 4X/12 back.

Catalog number positions 11...13 identify additional product configuration.

1...3	4	5	6	7	8...10	11	12	13	14	15	16	17	18
20G	E	A	N	D	248	J	N	0	N	N	N	N	N
						G	H	I					

G

Filtering and CM Cap Configuration		
Code	**Filtering**	**Default CM Cap Connection**
J	Yes	Jumper Installed

H

Dynamic Braking			
Code	**Internal Resistor (1)**	**Internal Transistor (2)**	**Frames**
A	No	Yes	1...7
N	No	No	6 and 7

(1) Frames 1...2 only. Internal Resistor kits (20-750-DB1-D*n*) sold separately.
(2) Standard on Frames 1...5, optional on 6 and 7.

I

Human Interface Module (HIM) (1)		
Code	**Operator Interface**	**Frames**
0	No HIM	1...7

(1) Order a HIM option separately for PowerFlex 755TS products.

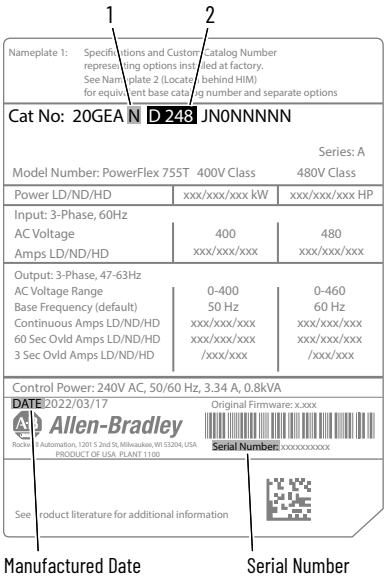
Catalog number positions 14...18 are not used.

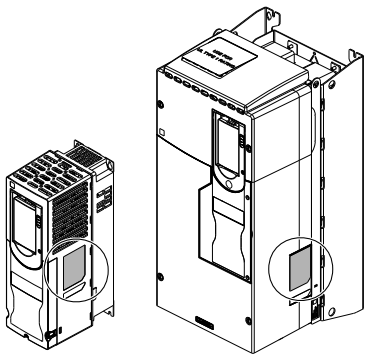
1...3	4	5	6	7	8...10	11	12	13	14	15	16	17	18
20G	E	A	N	D	248	J	N	0	N	N	N	N	N

Product Rating Cross-reference

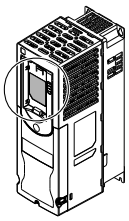
The nameplate 1 and nameplate 2 catalog number provides information about the product enclosure rating, input voltage rating, normal duty output amp rating, product manufactured date, and product serial number.

Nameplate 1 - Drives





Typical Nameplate 1 Location



Typical Nameplate 2 Location

PowerFlex 755TS Drive Ratings to Frame Size Cross-references

Drive Code	1 – Cat. No. Position 6				2 – Cat. No. Positions 7...10	
	Frame Size				Input Voltage and ND Amp Rating	
	Enclosure Code				400V AC	480V AC
	R	F	G	N		
20G	1	2	2	2	C2P1	D2P1
					C3P5	D3P4
					C5P0	D5P0
					C8P7	D8P0
					C011	D011
					C015	D014
	–				C022	D022
		3	3	3	C030	D027
					C037	D034
					C043	D040
		4	4	4	C060	D052
		–	–	3	C061	D053
		4	5	4	C072	D065
		–	4	–	C073	D066
		5	5	5	C085	D077
		4	–	4	C086	D078
		5	6	5	C104	D096
		6(1)		6	C140	D125
					C170	D156
					C205	D186
			7		C260	D248
		7(1)		7	C302	D302
					C367	D361
					C456	D415
			–		C477	D477

(1) For Frames 6 and 7, a field-installed flange kit (20-750-TFLNG1-F*n*) is available to convert a Code N drive to provide a UL Type 4X/12 back.

Fastener Torque Sequences

ATTENTION: Components can be damaged if initial tightening procedure is not performed to specification.

The following illustrates initial and final torque sequences for components that are fastened to a heat sink by using two, four, and six screws. Initial torque is 1/3 (33%) of final torque, except six-point mountings, which require 0.7 N•m (6 lb•in) initial torque. The numeric illustration labels are for your assistance. Drive components do not contain these labels.

Figure 1 - Two-point Mounting

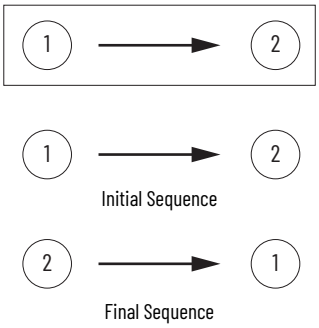


Figure 2 - Four-point Mounting

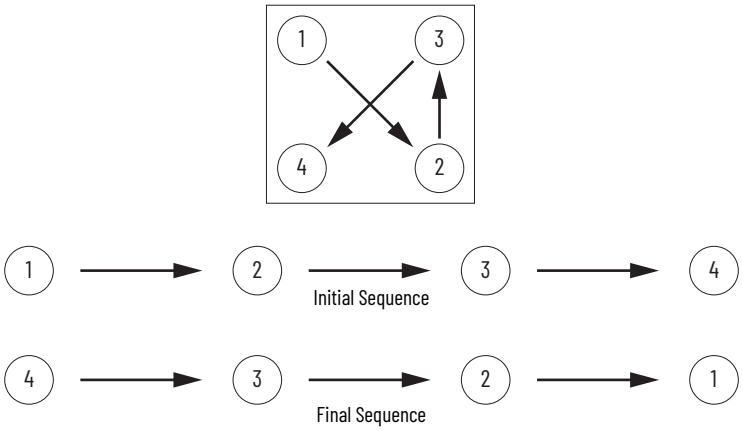
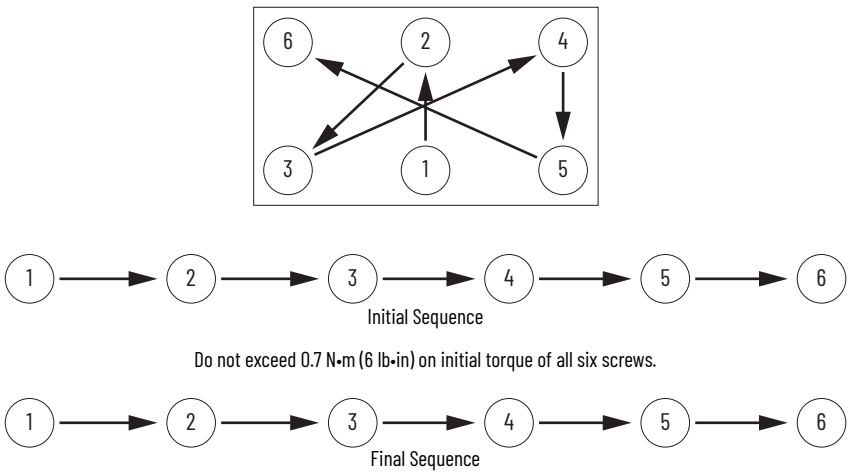
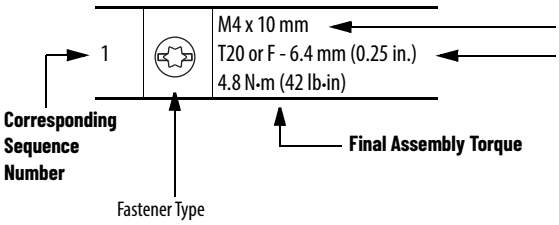


Figure 3 - Six-point Mounting



Hardware Installation Diagrams

The assembly illustrations throughout this manual contain diagrams as shown here. These diagrams identify the corresponding sequence number when required, type of fastener, fastener size, tool type and size, and final assembly torque.



F	Flat-nose screwdriver
Px	Phillips screwdriver/bit and size
PZx	Pozidriv screwdriver/bit and size
Txx	Torx screwdriver/bit and size
xx mm	Hexagonal socket wrench

	Flat-head screw
	Hexagonal bolt
	Hexagonal nut or standoff
	Hexagonal screw
	Hexalobular (star or Torx) screw
	Phillips screw
	Pozidriv screw
	Slotted hexalobular (star or Torx) screw

Configuration Tool Options

Any of the following configuration tools can be used with PowerFlex 755TS products.

- PowerFlex 20-HIM-A6 or 20-HIM-C6S HIM
  See the PowerFlex 20-HIM-A6 or 20-HIM-C6S HIM (Human Interface Module) User Manual, publication 20HIM-UM001.
- Connected Components Workbench™ (CCW) software R13.00 or later
- Connected Components Workbench is the standalone software tool for use with PowerFlex drives. You can obtain a free copy by Internet download at the Product Compatibility and Download Center rok.auto/pcdc
- Controller configuration software, such as RSLogix 5000® software, version 20.00 or later, or Studio 5000™ Logix Designer application, version 21.00 and later.
- Automatic Device Configuration (ADC), an RSLogix 5000 software feature, which supports the automatic download of configuration data. The download occurs after the Logix controller establishes an EtherNet/IP network connection to a PowerFlex 755TS product and its associated peripherals.
- A computer connection to the EtherNet/IP network.

Receiving, Handling, and Storage

PowerFlex® 755TS frame 6 and frame 7 drives are bolted to wooden skids for shipment. For ease of handling, Rockwell Automation recommends leaving the products bolted to the skids until moved to the final installation area.

ATTENTION: To avoid personal injury or structural damage, never attempt to lift or move products that weigh more than 18 kg (40 lbs.) by any means other than the handling methods outlined in this publication.
ATTENTION: Exercise caution when moving the product to ensure the equipment is not scratched, dented, or damaged in any manner.

Receiving

Standard packaged PowerFlex 755TS wall mount products are boxed and shipped as a whole unit. Each unit is boxed or bolted to a shipping skid and is covered with plastic wrap. Protection is not waterproof or watertight.

Heavy duty/export packaging is similar to standard packaging, but uses a plastic wrap suitable for occasional light water-spray. In addition, wood framing and sheeting surround the unit. Heavy duty/export packaging is not waterproof, watertight, or intended for long-term storage.

Upon delivery of the PowerFlex 755TS product, refer to the packing slip for sizes and exact shipping weights. The packing slip also lists the items that are included in the shipment.

Inspect the shipment for damaged or lost items. If the packaging appears to be damaged, unpack the equipment for further inspection. Remove covers and inspect the major components for signs of damage. If there is evidence of damage or loss, follow this procedure:

- Note on the delivery receipt that the equipment being received is damaged.
- Contact the carrier that made the delivery and schedule an inspection.
- Inform your local Rockwell Automation representative that the equipment is damaged.
- Retain all product packaging for review by the carrier.

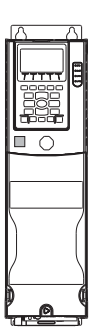
For further assistance, contact your Rockwell Automation representative.

Approximate Weights

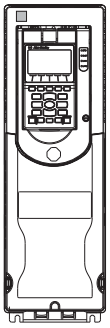
The approximate total weight of the product is listed in the following table.

When lifting and handling these products, follow all applicable local, national, and international codes, standards, regulations or industry guidelines for safe practices.

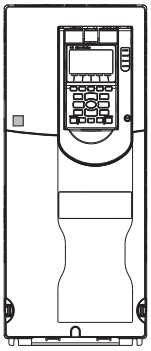
Product frames 1...7 ship as complete units.



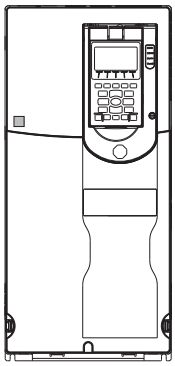
Frame 1



Frame 2

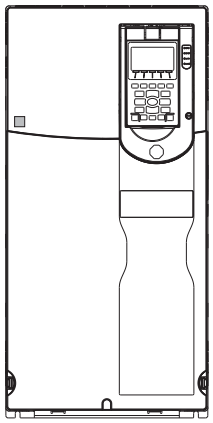


Frame 3

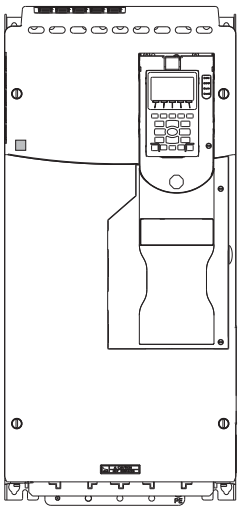


Frame 4

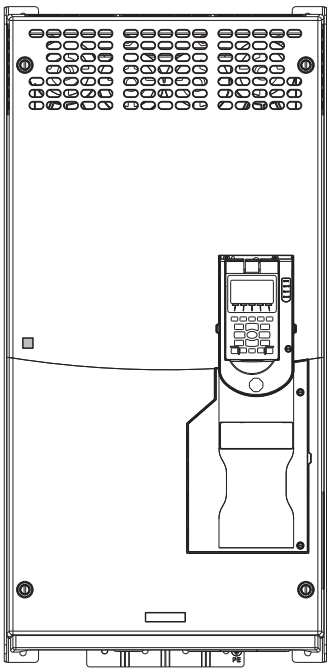
Drives are shown with the optional human interface module (HIM) installed.
Order this device separately. Choose catalog number 20-HIM-A6.



Frame 5



Frame 6



Frame 7

Table 1 - Approximate Maximum Unit Weights

Drive	Frame Size	Drive Rating		Enclosure Code/Weight [kg (lb)]			
		kW (400V)	Hp (480V)	F	G	N	R
Standard 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...30	20...40	12 (26)	12 (26)	12 (26)	–
	4	30...45	40...60	14 (31)	14 (31)	14 (31)	–
	5	37...55	50...75	21 (47)	21 (47)	21 (47)	–
	6	55...132	75...200	48 (105)	100 (221)	48 (105)	–
	7	132...270	200...400	72 (158)	132 (290)	82 (180)	–

Handling

Two methods of handling larger and heavier PowerFlex 755TS products within the receiving facility are acceptable.

- Transport by lift truck
- Overhead lifting (crane or hoist)

ATTENTION: Follow local codes and guidelines and your company safety procedures when you handle PowerFlex 755TS products.
To avoid personal injury and structural damage to the PowerFlex 755TS product, do not lift or move the equipment by any means other than what is described in this publication.

The following guidelines are provided to help avoid personal injury and equipment damage during handling and to help stabilize the product during transport to the installation site.

- Keep large product frame sizes bolted to the shipping skid to minimize possibility of shifting during transport.
- Handle the PowerFlex 755TS product carefully to avoid damage to the enclosure.
- Before moving the product, verify that the route is clear of obstructions.

Transport by Lift Truck

PowerFlex 755TS frames 6 and 7 are bolted to shipping skids that facilitate transport by a lift truck. If you are using a lift truck, refer to the following procedure.

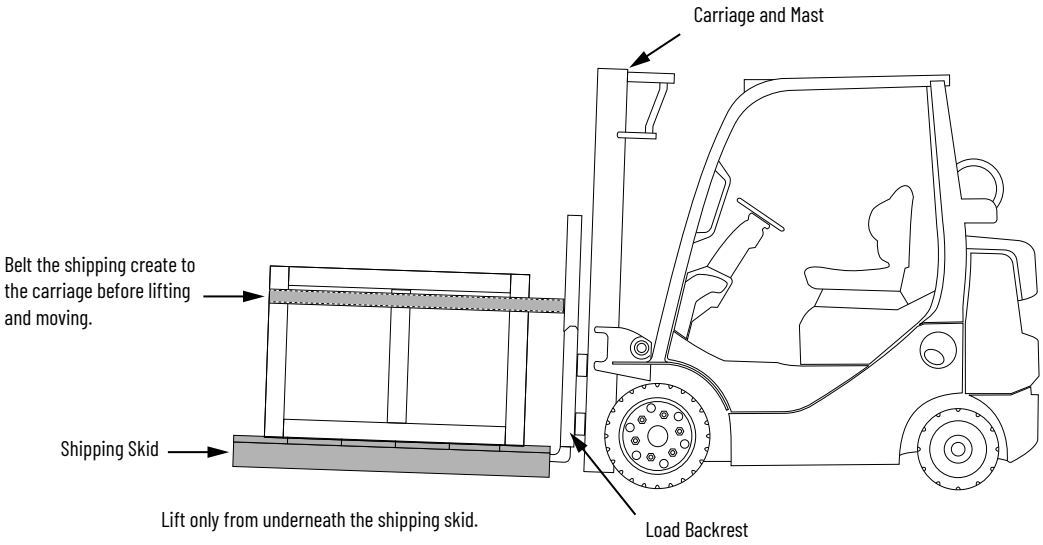
ATTENTION: Verify that the lift truck can handle the weight and size of the PowerFlex 755TS product safely. Shipment weights can be found on the packing slip that is included with each shipment. Approximate weights are listed on page 18.

1. Lift only from underneath the shipping skid. Position the PowerFlex 755TS product on the forks so that the load is balanced.
2. Keep the load against the load backrest of the lift truck. Use a belt to secure the PowerFlex 755TS product to the lift truck. Tilt the load a few degrees backward toward the lift truck mast.

   IMPORTANT The use of a belt is to help prevent the load from slipping forward during a sudden stop. Do not excessively tighten the belt.

3. Start and stop the lift truck gradually and slowly to avoid jerky movements. When traveling with the load, drive slowly with the forks carried as low as possible, consistent with safe operation.

Figure 4 - Use a Lift Truck to Transport a PowerFlex 755TS Shipping Crate



Overhead Lifting (Crane or Hoist)

All lifting equipment and components (hooks, bolts, lifts, slings, chains, and so forth) must be properly sized and rated to lift and hold the weight of the equipment safely. Shipment weights can be found on the packing slip that is included with each shipment. Approximate weights are listed on page 18.

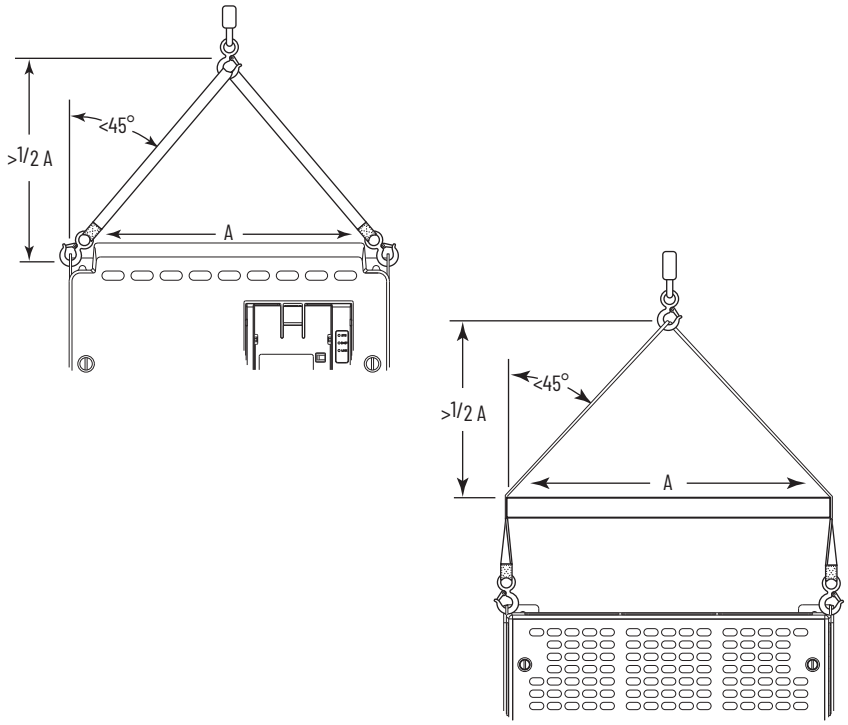
ATTENTION: To guard against possible personal injury and/or equipment damage:

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

Attach Lifting Hardware to Frames 6 and 7

Rig the lifting hardware according to the following diagrams.

Figure 5 - Rigging Geometry



Enclosure Code F

Follow these guidelines for drives with enclosure code F.

Figure 6 - Wall Mount Frame 6 Lifting Points – Two Places

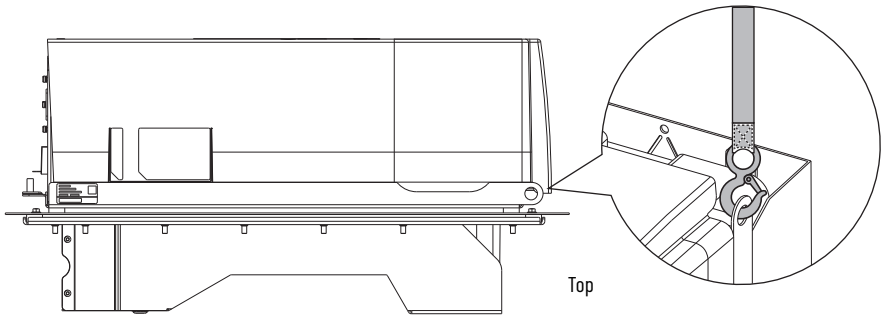
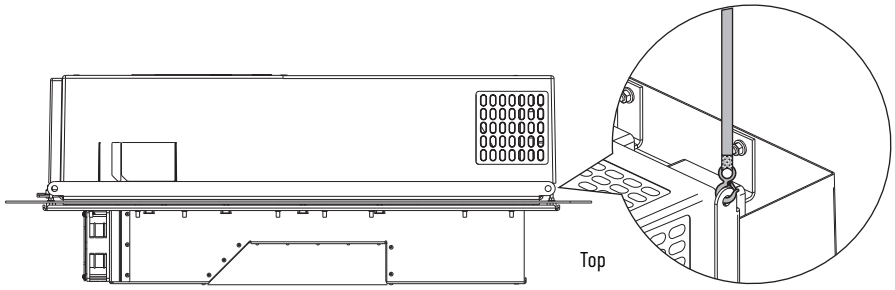


Figure 7 - Wall Mount Frame 7 Lifting Points – Four Places



Enclosure Code N

Follow these guidelines for drives with enclosure code N.

Figure 8 - Wall Mount Frame 6 Lifting Points – Six Places

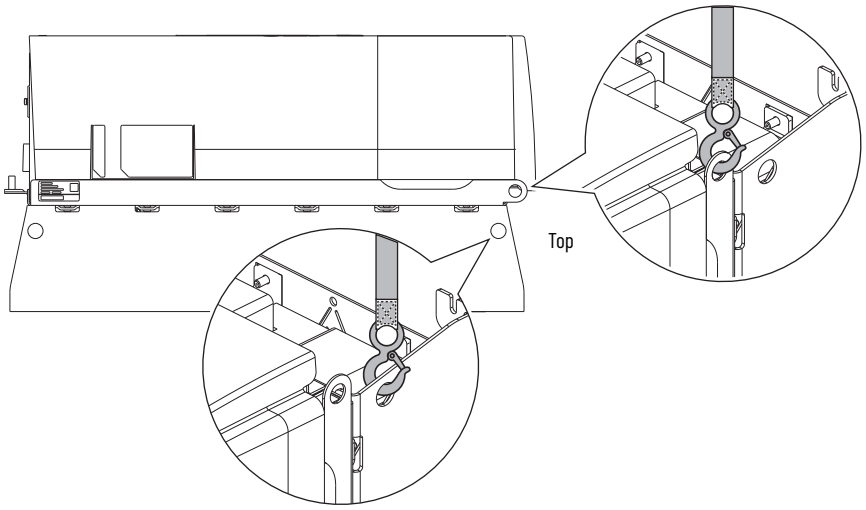
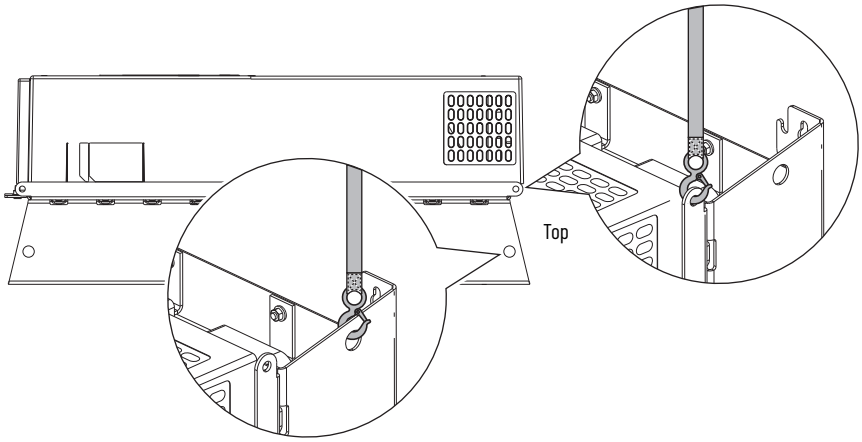


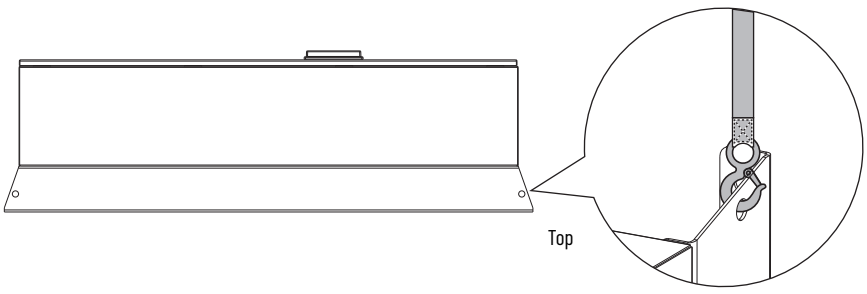
Figure 9 - Wall Mount Frame 7 Lifting Points – Eight Places



Enclosure Code G

Follow these guidelines for drives with enclosure code G.

Figure 10 - Wall Mount Frames 6 and 7 Lifting Points – Four Places



Storage

PowerFlex 755TS products are boxed to help prevent dirt and dust from entering the enclosure during shipment. If you must store the equipment after you receive it, take the following precautions.

ATTENTION: PowerFlex 755TS products are designed for indoor applications and do not have sufficient packaging for outdoor storage. Store PowerFlex 755TS products in a heated building that offers adequate air circulation and protection from dirt and moisture.

- Do not remove from packaging.
- Do not store the product outdoors.
- Do not store the product in an area where it is exposed to a corrosive atmosphere.
- Store the product in an area that is clean and dry.
- Store the product in a conditioned building with adequate air circulation.
- Maintain a storage temperature of -40…+70 °C (-40…+158 °F).
- Maintain a relative humidity of 5…95% non-condensing.
- Heating and moisture protection devices must be used if the rate of change in relative humidity and/or ambient temperature can lead to condensation on the stored equipment.
- If the product is stored for a long time, reform the bus capacitors before use. For instructions on how to reform the bus capacitors, visit rok.auto/support and search on Capacitor Reforming Guidelines.

Notes:

Prepare for Installation

CE Conformity

Compliance with the Low Voltage Directive and Electromagnetic Compatibility Directive has been demonstrated using harmonized European Norm (EN) standards, which are referenced by the Official Journal of the European Union. PowerFlex® 755TS products comply with the EN standards that are listed in this section when installed according to these installation instructions.

EU Declarations of Conformity are available online at: rok.auto/certifications.

Low Voltage Directive (LVD)

- 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 755TS products 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 end user applications.
- PowerFlex 755TS products 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, and the installation requirements of this document.
- Requirements for supplementary mitigation that is related to specific high-frequency emission limits are provided in Table 2.
- PowerFlex 755TS products 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 755TS products 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

This section lists installation requirements that are related to EN 61800-5-1 and the Low Voltage Directive.

Frame 1 Drives

- PowerFlex 755TS 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

- PowerFlex 755TS products are compliant with the CE LVD when used on a 'corner-earthed' supply system and all other common grounded 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 755TS products cannot be powered from a 'corner-earthed' supply system to maintain compliance with the CE LVD. Altitude derating curves are provided in the PowerFlex 755TS Products with TotalFORCE Control Technical Data, publication 750-TD104.
- Drives that are provided in the IP54, NEMA/UL Type 12 enclosure are compliant with the CE LVD when installed in pollution degree 1...4 environments where no gaseous contaminants are present. All other enclosure types must be installed in a pollution degree 1 or 2 environment to be compliant with the CE LVD. Characteristics of the different pollution degree ratings are provided in the PowerFlex 755TS Products with TotalFORCE Control Technical Data, publication 750-TD104.
- PowerFlex 755TS products produce leakage current in the protective earthing conductor that exceeds 3.5 mA AC and/or 10 mA DC. The minimum size protective earthing conductor must be at least 2.5 mm^2 Cu as part of a multi-conductor power cable, or fixed connection with at least 10 mm^2 Cu or 16 mm^2 Al. The conductor must also comply with local regulations as already stated.

ATTENTION: PowerFlex 755TS products 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 Chapter 5.
- Output power wiring to the motor 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. Continuous shielding must be provided from the drive enclosure to the motor enclosure. Both ends of the motor cable shield (or conduit) must terminate with a low-impedance connection to earth.

  Drive Frames 1...7: At the drive end of the motor cable, the cable shield must be terminated in one of the following ways.

  - For IP00/IP20 and NEMA/UL Open Type drives, the cable shield must be clamped to a properly installed 'EMC plate' for the drive. For Frames 1...5, the EMC plate ships with the drive. For Frames 6...7, use kit catalog number 20-750-EMC6-F*n* (where *n* is the frame size of the drive). See PowerFlex 750-Series EMC Plate and Core(s) – Frames 1...7, publication 750-IN124, for details. Alternatively, for Frames 6...7, the cable shield must either terminate in a shielded connector installed in the enclosure or be clamped to the enclosure containing the drive.
  - For IP21 and NEMA/UL Type 1 drives, 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 catalog number 20-750-NEMA1-F*n* (where *n* is the frame size of the drive). See PowerFlex 750-Series NEMA/UL Type 1 Kits – Frames 1...7, publication 750-IN008, for details.
  - For IP54 or NEMA/UL Type 12 drives, the cable shield must terminate in a shielded connector that is installed in the conduit box provided with the drive (Frames 2...5) or in the enclosure that is provided with the drive (Frames 6...7).
- 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.
- 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 2 for compliance with radio-frequency emission limits for the specific standard and installation environment. See Wiring and Grounding for Pulse Width Modulated (PWM) AC Drives, publication DRIVES-IN001 for detailed cable length recommendations.
- 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 correctly configured (see Drive Power Jumper Configuration on page 77).

Table 2 - PowerFlex 755TS 400V/480V Input Drives RF Emission Compliance and Installation Requirements

Drive Frame Catalog Number	EN 61800-3 Category C3 (1) (I ≤ 100 A) CISPR11 Group 1 Class A (Input Power > 20 kVA)	EN 61800-3 Category C3 (1) I > 100 A
Frame 1 20G...C2P1 thru 20G...C015 20G...D2P1 thru 20G...D014	150m (492.1 ft) motor cable limit with no filter. Requires installation of the supplied C3 bracket to ground the motor cable shield. See page 61 for instructions.	N/A
Frame 2 20G...C2P1 thru 20G...C022 20G...D2P1 thru 20G...D022	150m (492.1 ft) motor cable limit with no filter. Requires using the factory installed C3 bracket to ground the motor cable shield. See page 61 for instructions.	N/A
Frame 3 20G...C030 thru 20G...C061 20G...D027 thru 20G...D053	150m (492.1 ft) motor cable limit with no filter. Requires using the factory installed C3 bracket to ground the motor cable shield. See page 61 for instructions.	N/A
Frame 4 20G...C060 thru 20G...C086 20G...D052 thru 20G...D078	150m (492.1 ft) motor cable limit with no filter. Requires using the factory installed C3 bracket to ground the motor cable shield. See page 61 for instructions.	N/A
Frame 5 20G...C085 thru 20G...C104 20G...D077 thru 20G...D096	150m (492.1 ft) motor cable limit with no filter. Requires using the factory installed C3 bracket to ground the motor cable shield. See page 61 for instructions.	150m (492.1 ft) motor cable limit with no filter. Requires using the factory installed C3 bracket to ground the motor cable shield. See page 61 for instructions.
Frame 6 20G...C104 thru 20G...C260 20G...D125 thru 20G...D248	150m (492.1 ft) motor cable limit with no filter. Requires a 20-750-EMC6-F6 EMC C3 option kit or other means of shield termination within the installation. (2)	150m (492.1 ft) motor cable limit with no filter. Requires a 20-750-EMC6-F6 EMC C3 option kit or other means of shield termination within the installation. (2)
Frame 7 20G...C302 thru 20G...C477 20G...D302 thru 20G...D477	N/A	150m (492.1 ft) motor cable limt with no filter. Requires a 20-750-EMC6-F7 EMC C3 option kit or other means of shield termination within the installation. (2)

(1) 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.
(2) Review the shield termination requirements for EN 61800-5-1 on page 26 and for EN 61800-3 on page 27.

Location Planning

Consider the following when planning the location for your PowerFlex 755TS product.

- Environment - temperature, humidity, and vibration or shock
- Ventilation and air conditioning
- Input power cable entry points
- Motor cable exit points
- Product dimensions (See page 31 for Approximate Dimensions.)
- Overall height of installation area
- Alignment with other equipment
- Future needs

Mounting Surface

Install wall mount products on a flat vertical surface.

- Install the product on a clean metal surface that is free of paint and other coatings.
- Install the product in a vertical orientation.
- Verify that the product makes full contact with the mounting surface.
- Do not use standoffs or spacers.

Environment

The installation site must be compatible with the degree of protection that is provided by the enclosure.

- PowerFlex 755TS products are only intended for indoor use.
- Protect the equipment from moisture and direct sunlight.
- Do not expose to a corrosive atmosphere.
- Protect fans and electronics by avoiding dust or metallic particles.

Temperatures

Enclosure Rating	Operating Temperature Range without Derating	Maximum Operating Temperature with Derating (1)	Frames
Stand-alone/Wall-mount			
IP20, NEMA/UL Open Type	-20...+50 °C (-4...+122 °F)	60 °C (140 °F)	1...5, All ratings
IP00, NEMA/UL Open Type	-20...+50 °C (-4...+122 °F)	60 °C (140 °F)	6 and 7, All ratings
IP20, NEMA/UL Type 1 (with hood)	-20...+40 °C (-4...+104 °F)	50 °C (104 °F)	1...5, All ratings
IP20, NEMA/UL Type 1 (with option kit)	-20...+40 °C (-4...+104 °F)	50 °C (104 °F)	6 and 7, All ratings
IP54, NEMA/UL Type 12	-20...+40 °C (-4...+104 °F)	50 °C (104 °F)	2...7, All ratings
Flange mount – front			
IP20, NEMA/UL Open Type	-20...+50 °C (-4...+122 °F)	60 °C (140 °F)	2...5, All ratings
IP00, NEMA/UL Open Type	-20...+50 °C (-4...+122 °F)	60 °C (140 °F)	6 and 7, All ratings
Flange mount – back/heatsink			
IP66, NEMA/UL Type 4X	-20...+40 °C (-4...+104 °F)	50 °C (104 °F)	2...7, All ratings (2)

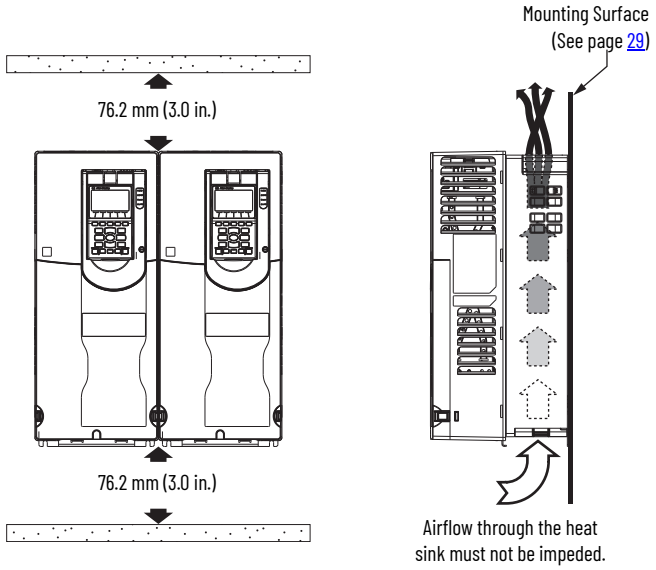
(1) See the PowerFlex 755TS Products with TotalFORCE Control Technical Data, publication 750-TD104 for derating guidelines.
(2) Not applicable to 40 Hp/30 kW ND frame 3 drives.

Storage temperature	-40...+70 °C (-40...+158 °F)
Relative humidity	5...95% non-condensing
Atmospheric protection	Harsh environment is defined as a copper or silver reactivity level greater than 1000 angstroms per 30 days exposure. No condensation allowed. Maximum allowable humidity is 60% in the presence of corrosive gases. See ISA-71.04-2013 for details on how to measure reactivity levels on copper and silver test coupons.

Minimum Clearances

Specified vertical clearance requirements that are 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.

Figure 11 - Minimum Mounting Clearances – Wall Mount Frames 1...7



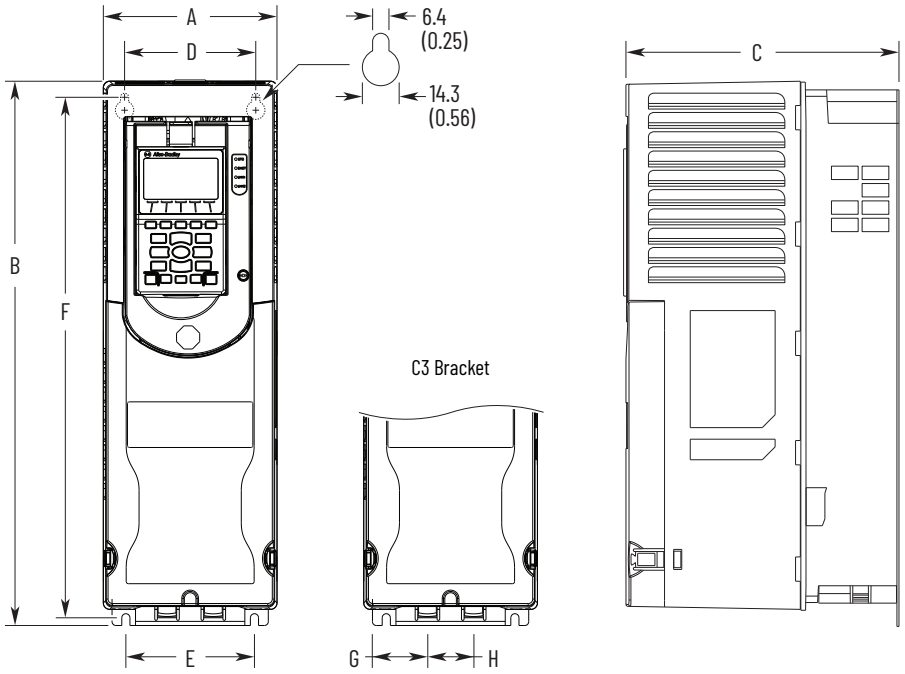
Drives are shown with the optional human interface module (HIM) installed.
Order this device separately. Choose catalog number 20-HIM-A6.

Approximate Dimensions

The following table lists the dimensional drawings that are provided in this section.

Table 3 - Dimensional Drawing Index

Figure 12 - IP20, NEMA/UL Open Type, Wall Mount Frames 1...5 (Frame 2 Shown)



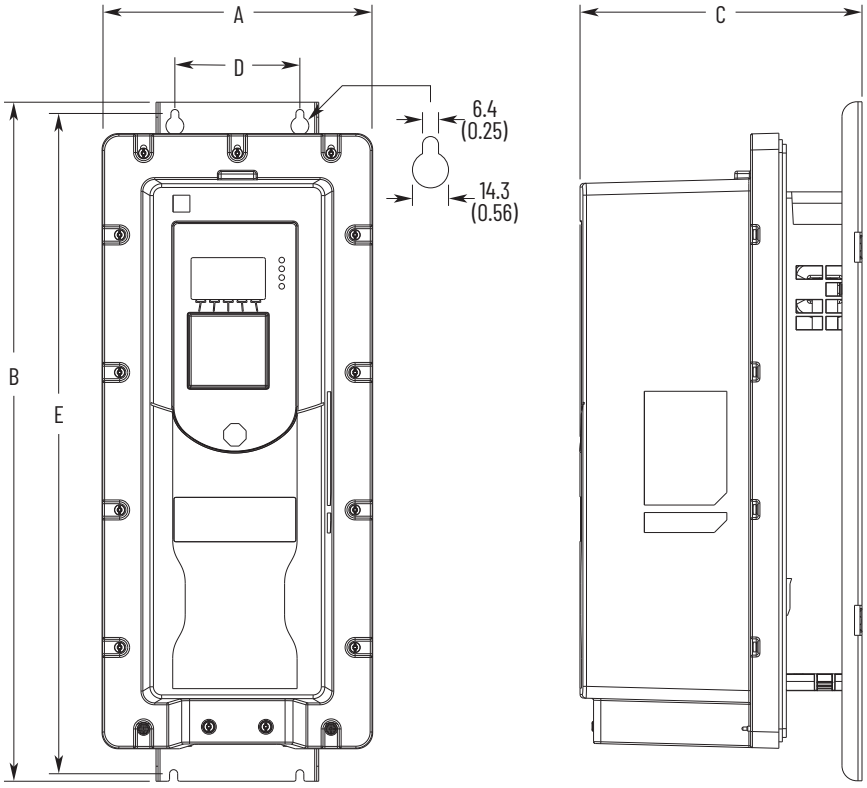
Dimensions are in millimeters and (inches).
Weights are in kilograms and (pounds).

Frame	A	B	C	D	E	F	G	H	Weight [kg (lb)]
1 (1)	109.0 (4.3)	400.0 (15.7)	211.1 (8.3)	68.0 (2.7)	82.0 (3.2)	390.3 (15.4)	28.8 (1.1)	36.0 (1.4)	6.0 (13.2)
2	135.0 (5.3)	424.2 (16.7)	212.0 (8.3)	100.0 (3.9)	100.0 (3.9)	404.2 (15.9)	42.8 (1.7)	36.0 (1.4)	8.0 (17.6)
3	190.0 (7.5)	454.0 (17.9)	212.0 (8.3)	158.0 (6.2)	158.0 (6.2)	435.0 (17.1)	58.8 (2.3)	68.0 (2.7)	12.0 (26.5)
4	222.0 (8.7)	474.0 (18.7)	212.0 (8.3)	194.0 (7.6)	202.0 (8.0)	455.0 (17.9)	69.3 (2.7)	96.0 (3.8)	13.6 (30.8)
5	270.0 (10.6)	550.0 (21.7)	212.0 (8.3)	238.0 (9.4)	238.0 (9.4)	531.0 (21.0)	69.8 (2.7)	129.0 (5.1)	21.0 (46.3)

(1) With the supplied C3 bracket installed on the frame 1 drive, dimension B changes to 431.4 mm (16.9 in.).

M6 (#10...#12 or 3/16...7/32 in.) mounting hardware recommended.

Figure 13 - IP54, NEMA/UL Type 12, Wall Mount Frames 2...5 (Frame 2 Shown)

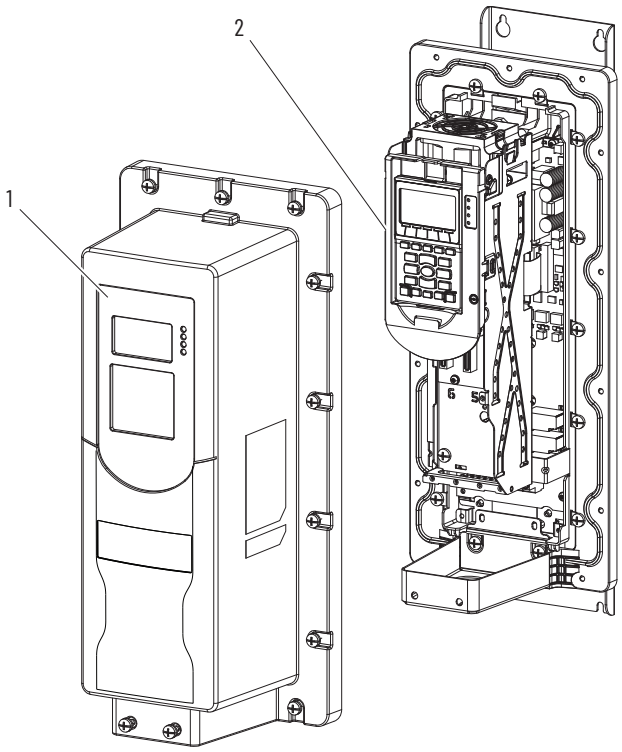


Dimensions are in millimeters and (inches).
Weights are in kilograms and (pounds).

Frame	A	B	C	D	E	Weight, kg (lb)
2	216.5 (8.5)	543.2 (21.4)	225.6 (8.9)	100.0 (3.9)	528.2 (20.8)	8.0 (17.6)
3	268.0 (10.6)	551.0 (21.7)	220.1 (8.7)	158.0 (6.2)	533.0 (21.0)	12.0 (26.5)
4	300.0 (11.8)	571.0 (22.5)	220.1 (8.7)	194.0 (7.6)	553.0 (21.8)	14.0 (30.9
5	348.0 (13.7)	647.0 (25.5)	220.1 (8.7)	238.0 (9.4)	629.0 (24.8)	21.0 (46.3)

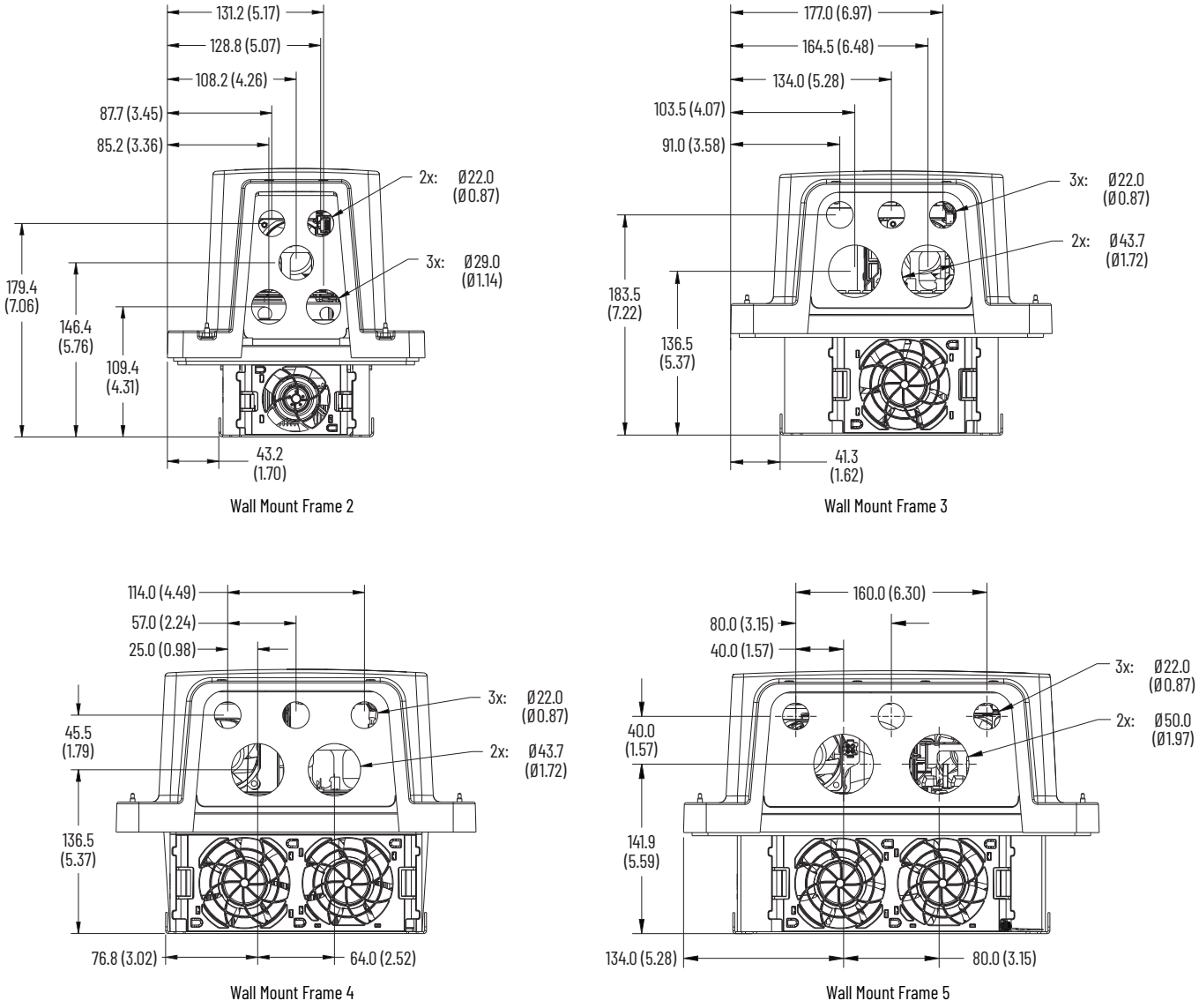
M6 (#10...#12 or 3/16...7/32 in.) mounting hardware recommended.

Figure 14 - P54, NEMA/UL Type 12, Wall Mount Frames 2...5 Human Interface Module Access



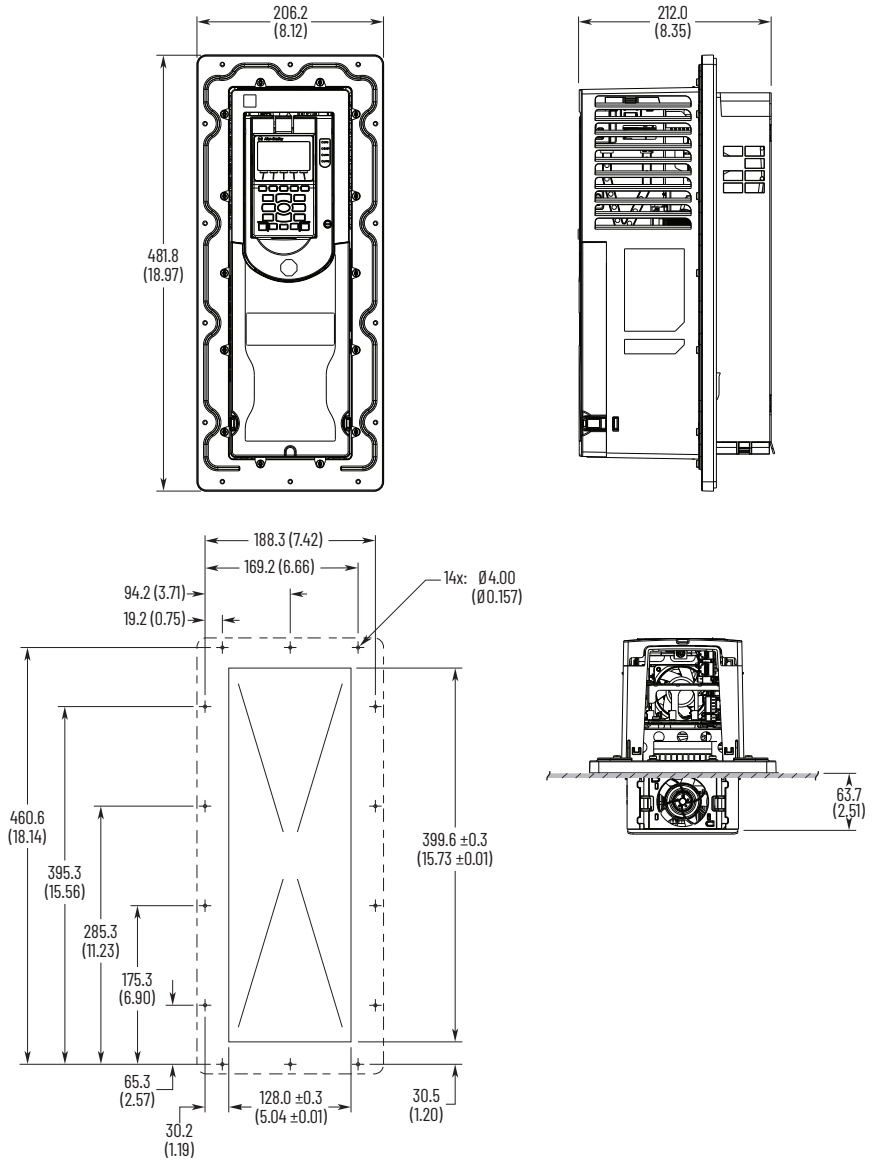
No.	Description
1	Flexible panel that is molded into the IP54, NEMA/UL Type 12 cover.
2	Human interface module, catalog number 20-HIM-A6, under cover in control pod cradle.

Figure 15 - IP54, NEMA/UL Type 12, Wall Mount Frames 2...5, Bottom Access



Dimensions are in millimeters and (inches).

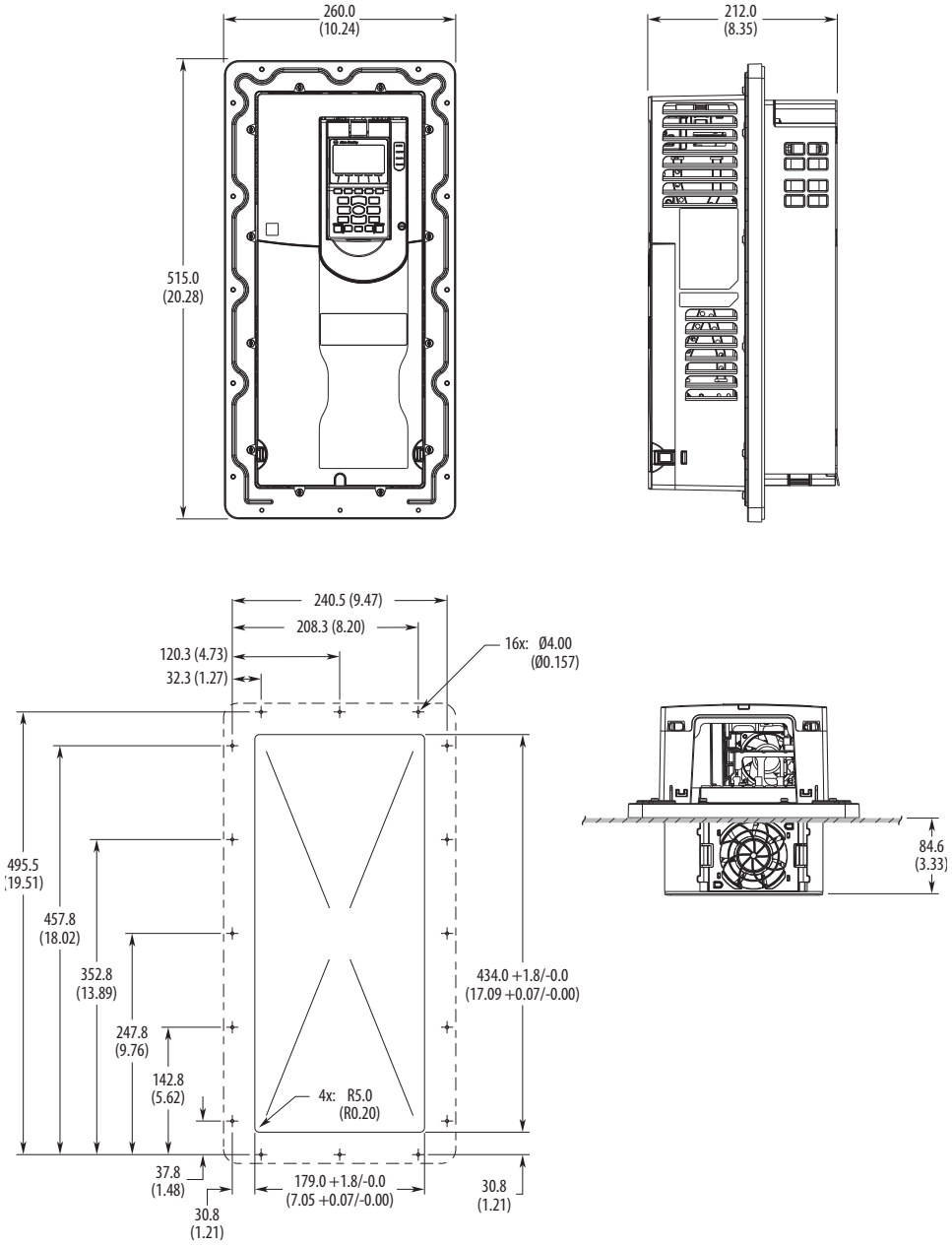
Figure 16 - Flange Mount, Frame 2



Dimensions are in millimeters and (inches).

IMPORTANT Must use mounting hardware that is supplied to meet enclosure rating.

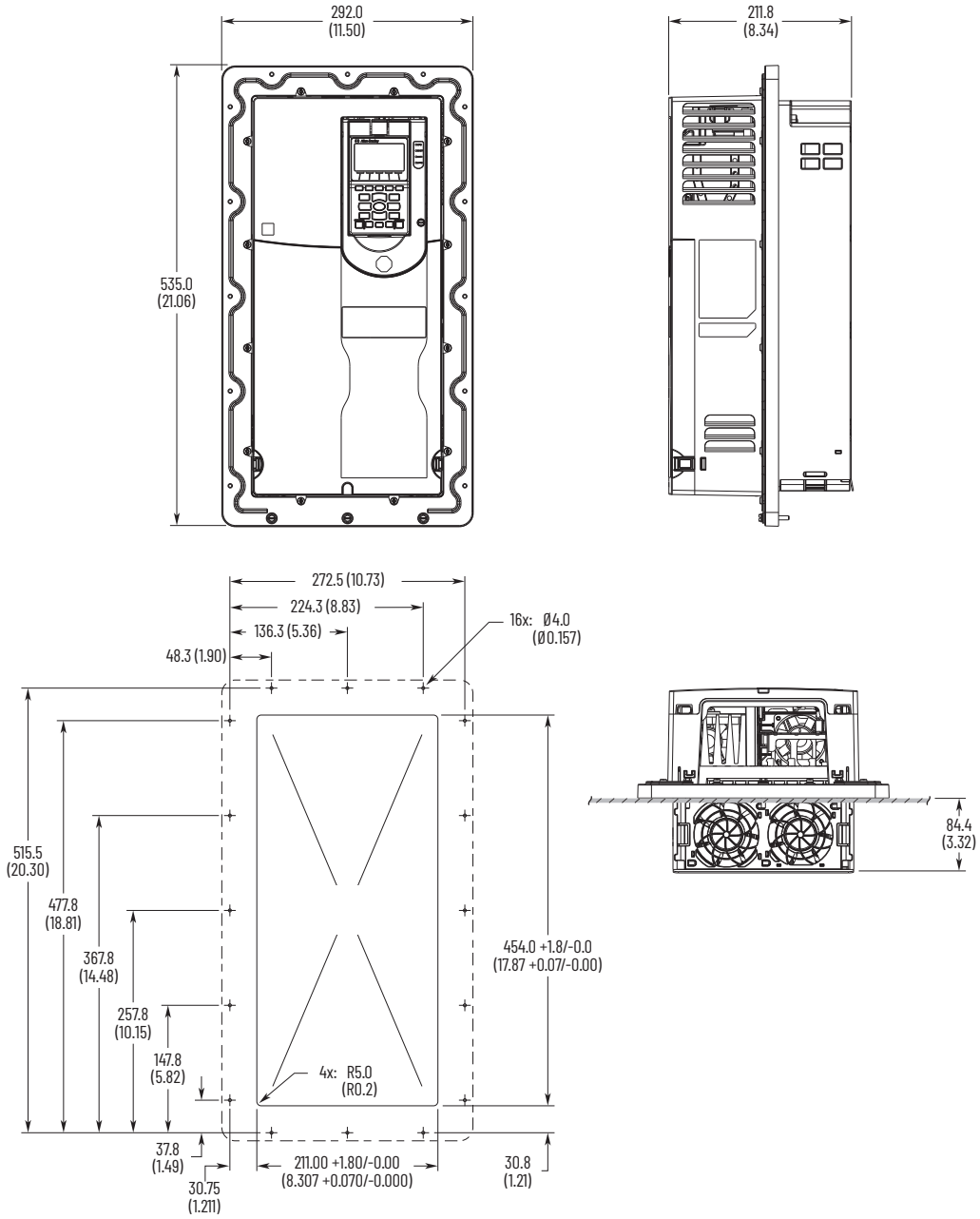
Figure 17 - Flange Mount, Frame 3



Dimensions are in millimeters and (inches).

IMPORTANT Must use mounting hardware that is supplied to meet enclosure rating.

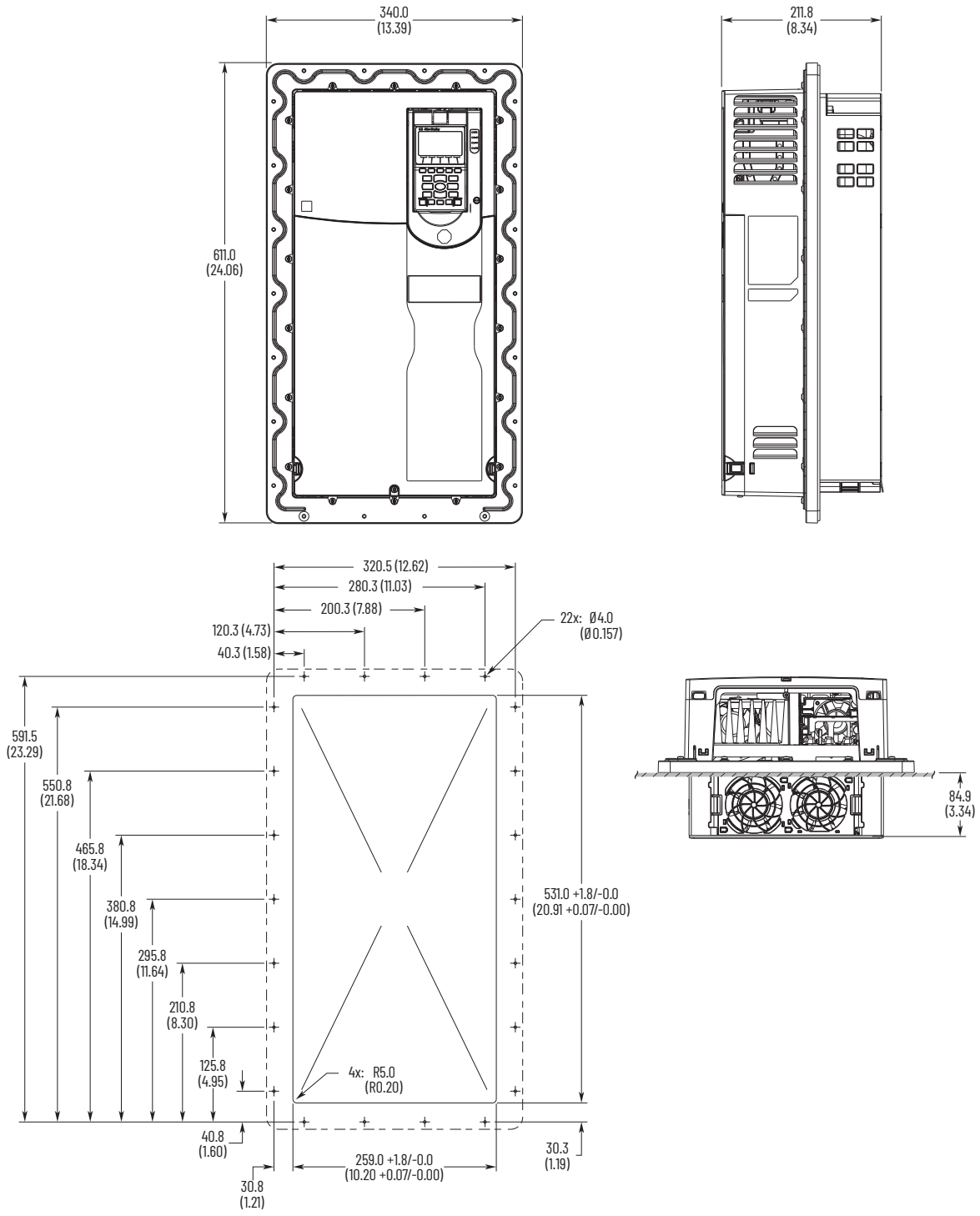
Figure 18 - Flange Mount, Frame 4



Dimensions are in millimeters and (inches).

IMPORTANT Must use mounting hardware that is supplied to meet enclosure rating.

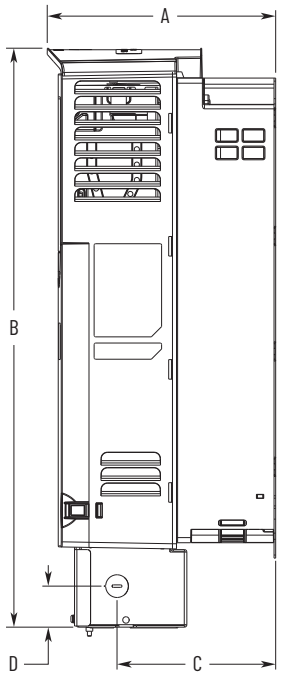
Figure 19 - Flange Mount, Frame 5



Dimensions are in millimeters and (inches).

IMPORTANT Must use mounting hardware that is supplied to meet enclosure rating.

Figure 20 - NEMA/UL Type 1 Kit, Wall Mount Frames 1...5 (Frame 4 Shown)

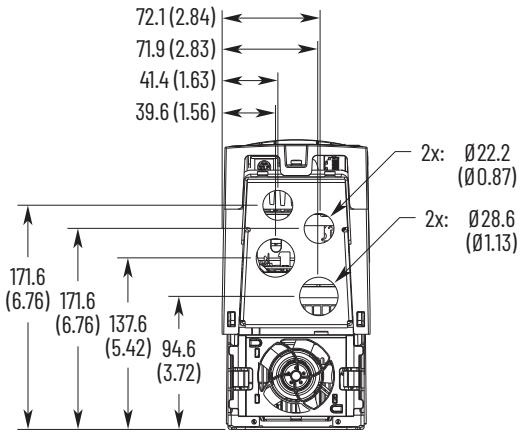


Dimensions are in millimeters and (inches).

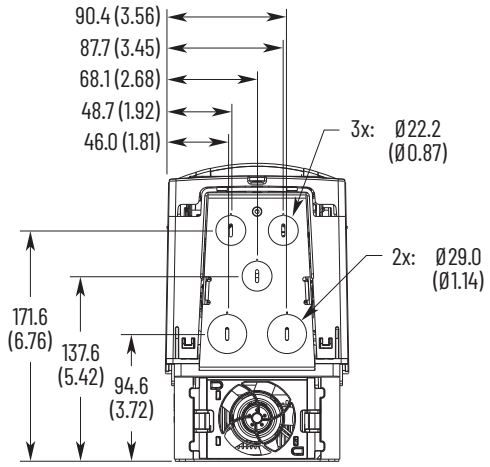
Frame	A	B	C	D
1	215.4 (8.48)	458.8 (18.06)	–	–
2	221.5 (8.72)	503.7 (19.83)	117.7 (4.63)	38.7 (1.53)
3	223.1 (8.78)	534.2 (21.03)	154.7 (6.09)	38.7 (1.53)
4	222.0 (8.74)	568.4 (22.38)	154.7 (6.09)	40.8 (1.61)
5	223.0 (8.78)	672.3 (26.47)	155.4 (6.12)	55.8 (2.19)

IMPORTANT NEMA Type 1 kits (catalog number 20-750-NEMA1-F*n*) do not change the mounting dimensions in Figure 12 (where *n* is the frame size of the drive).

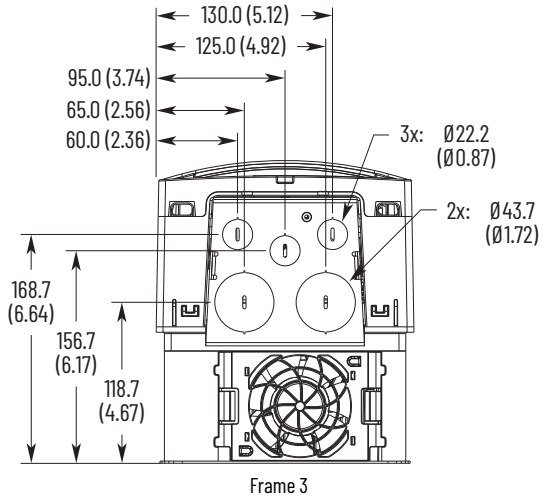
Figure 21 - NEMA/UL Type 1, Wall Mount Frames 1...5, Bottom Access



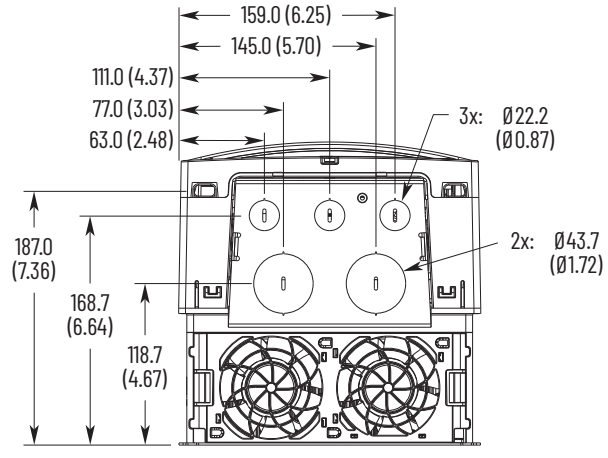
Frame 1



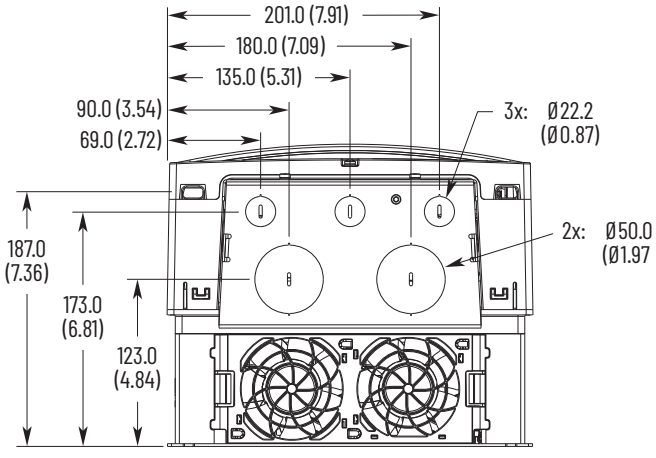
Frame 2



Frame 3



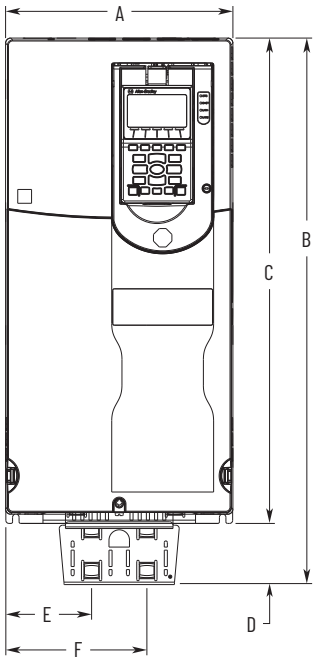
Frame 4



Frame 5

Dimensions are in millimeters and (inches).

Figure 22 - EMC Plate Kit, Wall Mount Frames 1...5 (Frame 4 Shown)



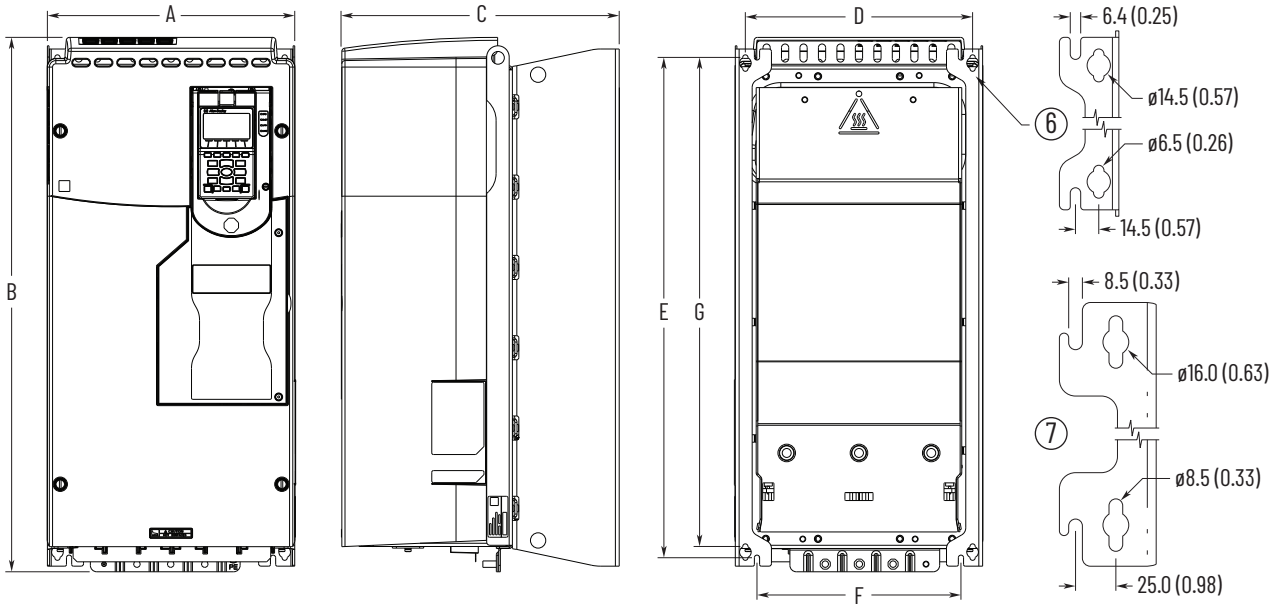
Dimensions are in millimeters and (inches).

Frame	A	B	C	D	E	F
1 (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)

(1) The EMC plate shown here is not the same as the C3 plate that is provided with frame 1 drives. The C3 plate is shorter than this EMC plate kit.

IMPORTANT EMC Kits (20-750-EMC*n*-F*n*) do not change the mounting dimensions in Figure 12. See the PowerFlex® 750-Series EMC Plate and Cores Installation Instructions, publication 750-IN006, for detailed information on kit installation.

Figure 23 - 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)	48.0 (105.0)
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)	82.0 (180.0)

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 make sure that 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 can be used.

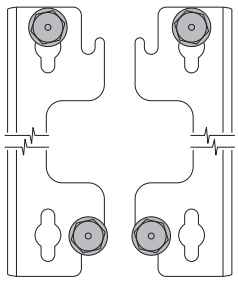
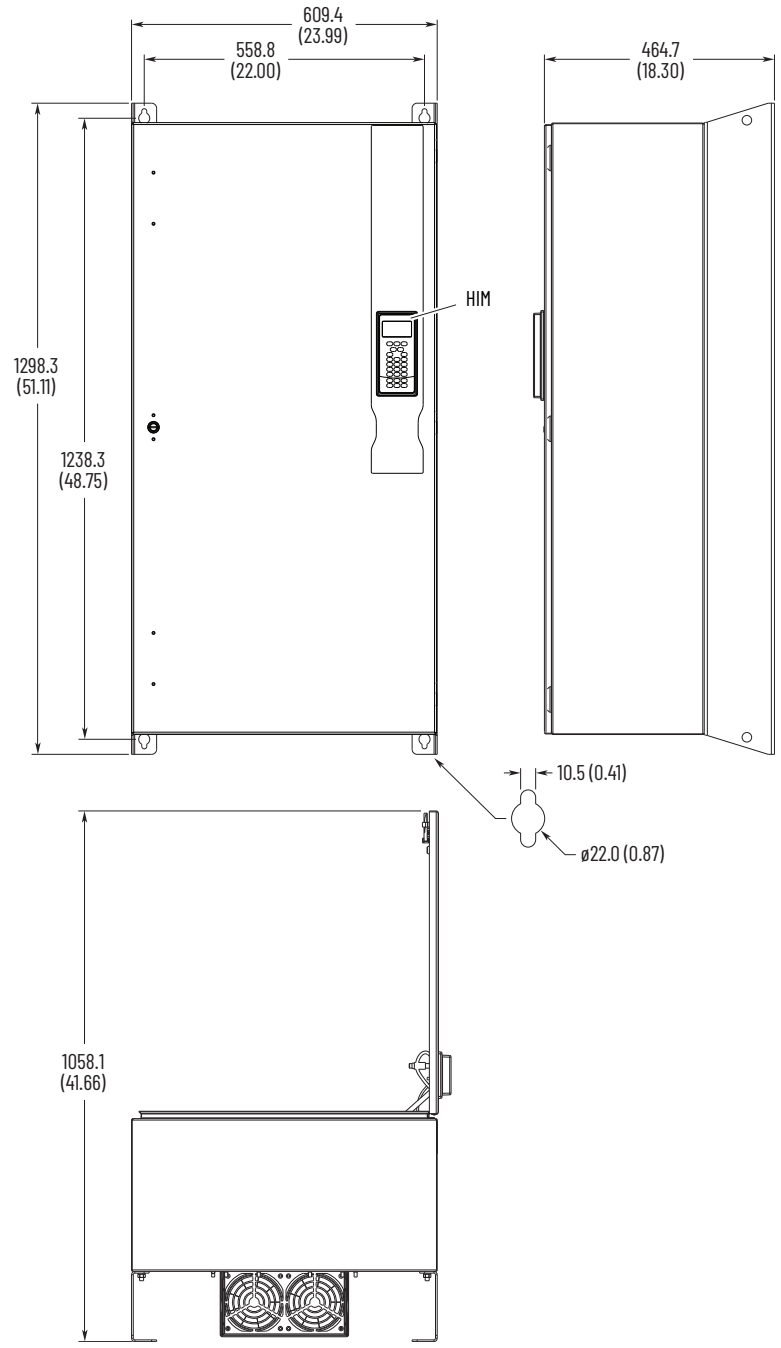


Figure 24 - IP54, NEMA/UL Type 12, Wall Mount Frame 6

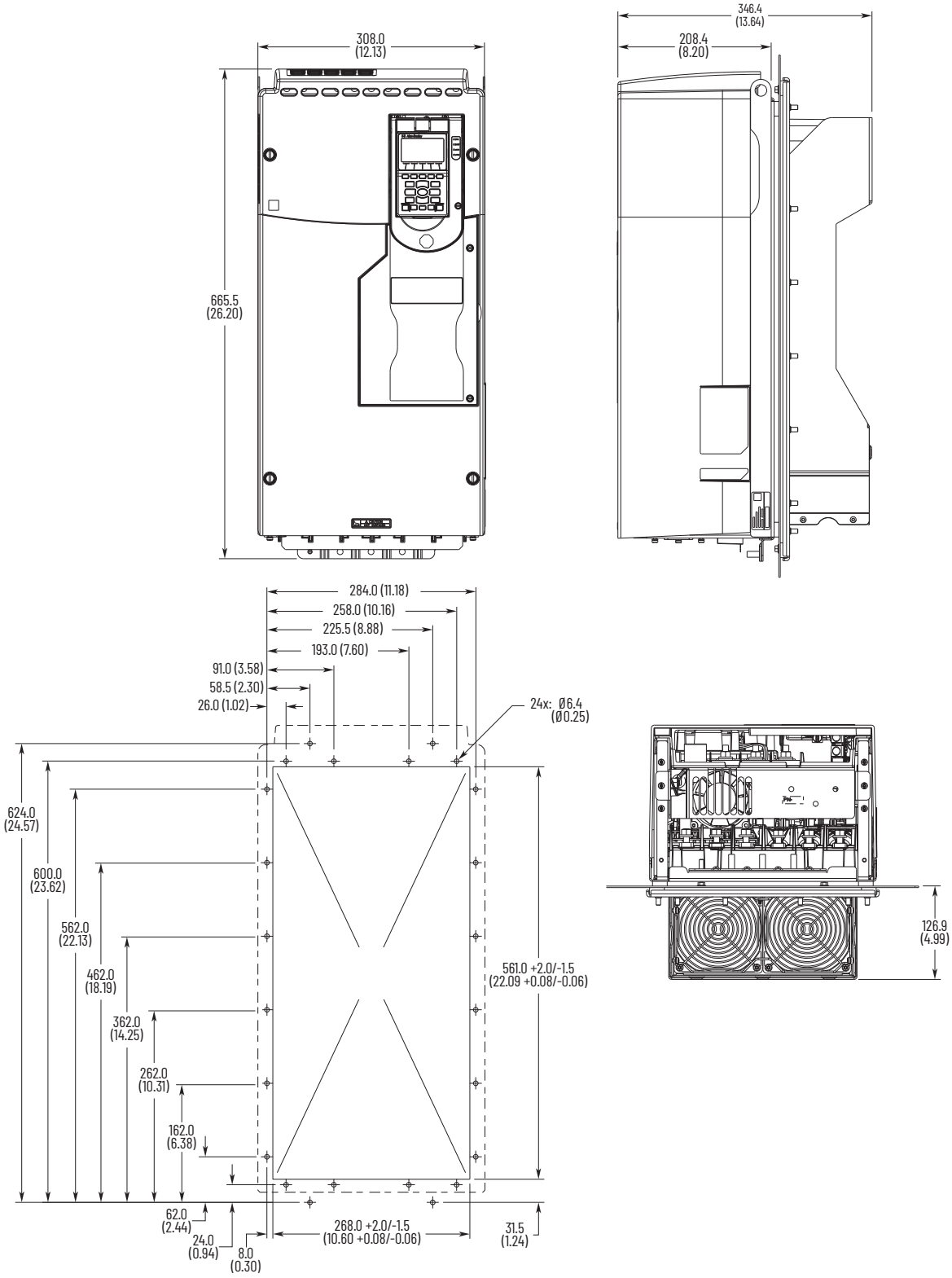


IMPORTANT Must use human interface module (HIM), catalog number 20-HIM-C6S, to meet enclosure rating. Order this device separately.

Dimensions are in millimeters and (inches).

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

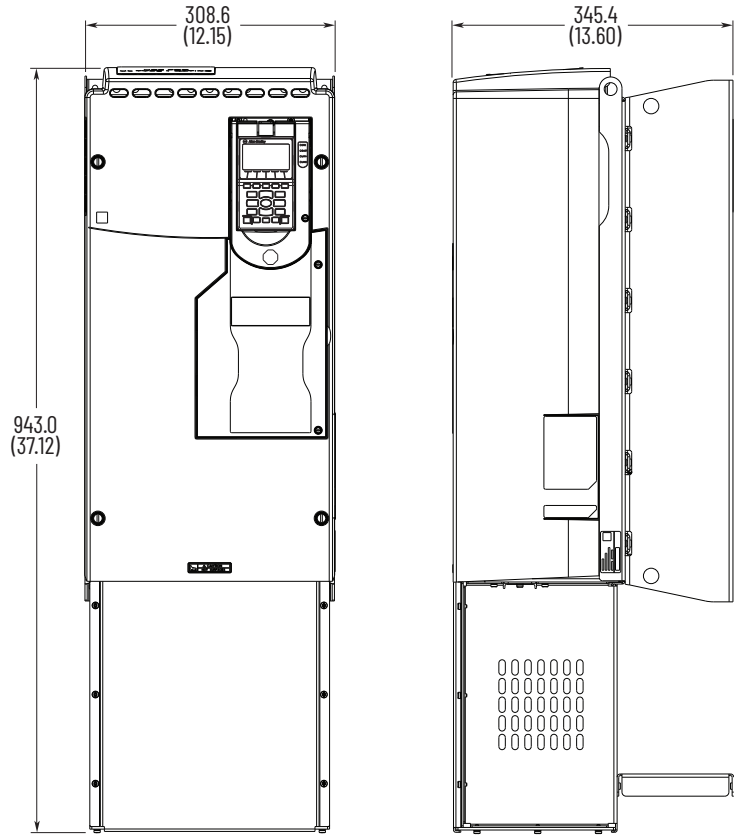
Figure 25 - Flange Mount, Frame 6



Dimensions are in millimeters and (inches).

IMPORTANT Must use flange adapter kit (catalog number 20-750-TFLNG1-F6) to meet enclosure rating.

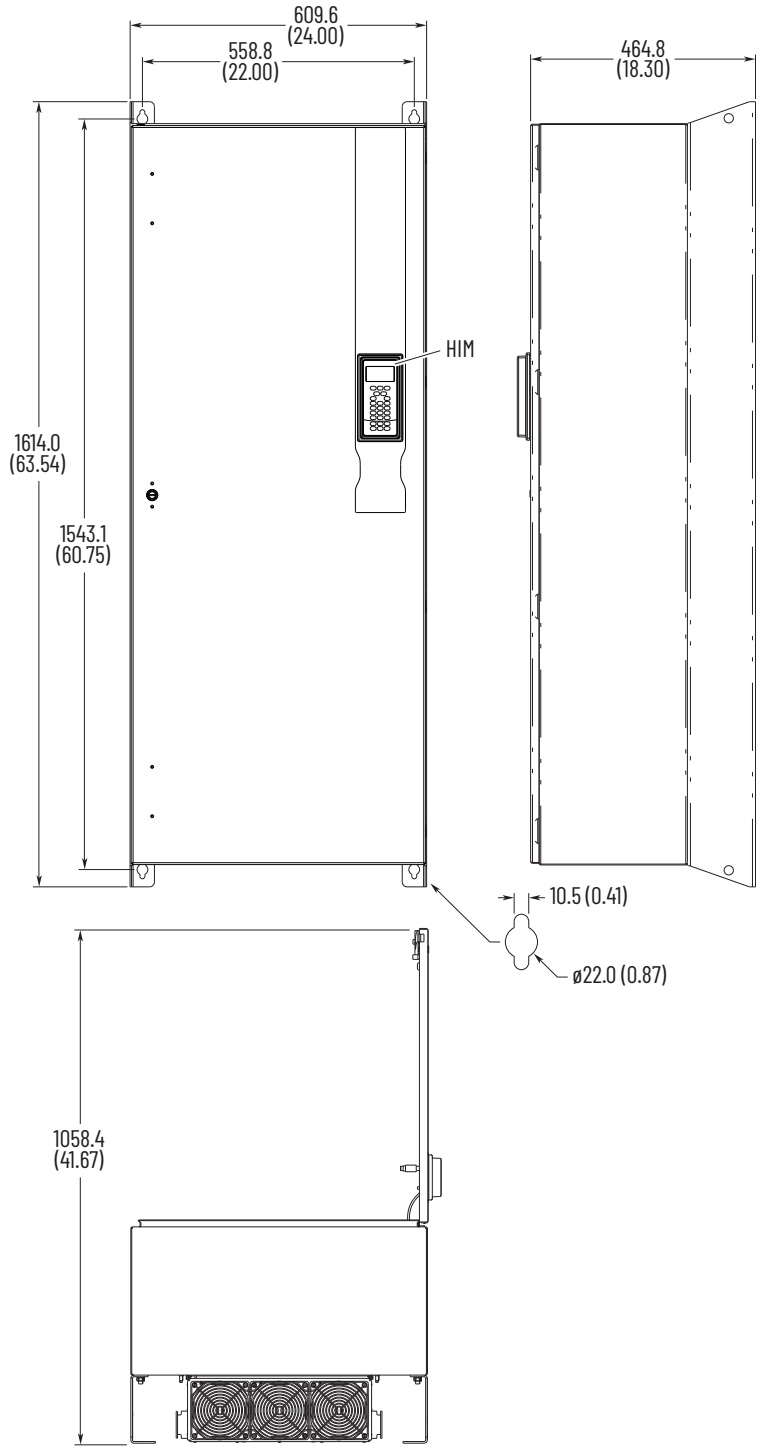
Figure 26 - IP21, NEMA/UL Type 1, Wall Mount Frame 6



Dimensions are in millimeters and (inches).

IMPORTANT NEMA Type 1 kit (catalog number 20-750-NEMA1-F6) does not change the mounting dimensions in Figure 23.

Figure 27 - IP54, NEMA/UL Type 12, Wall Mount Frame 7

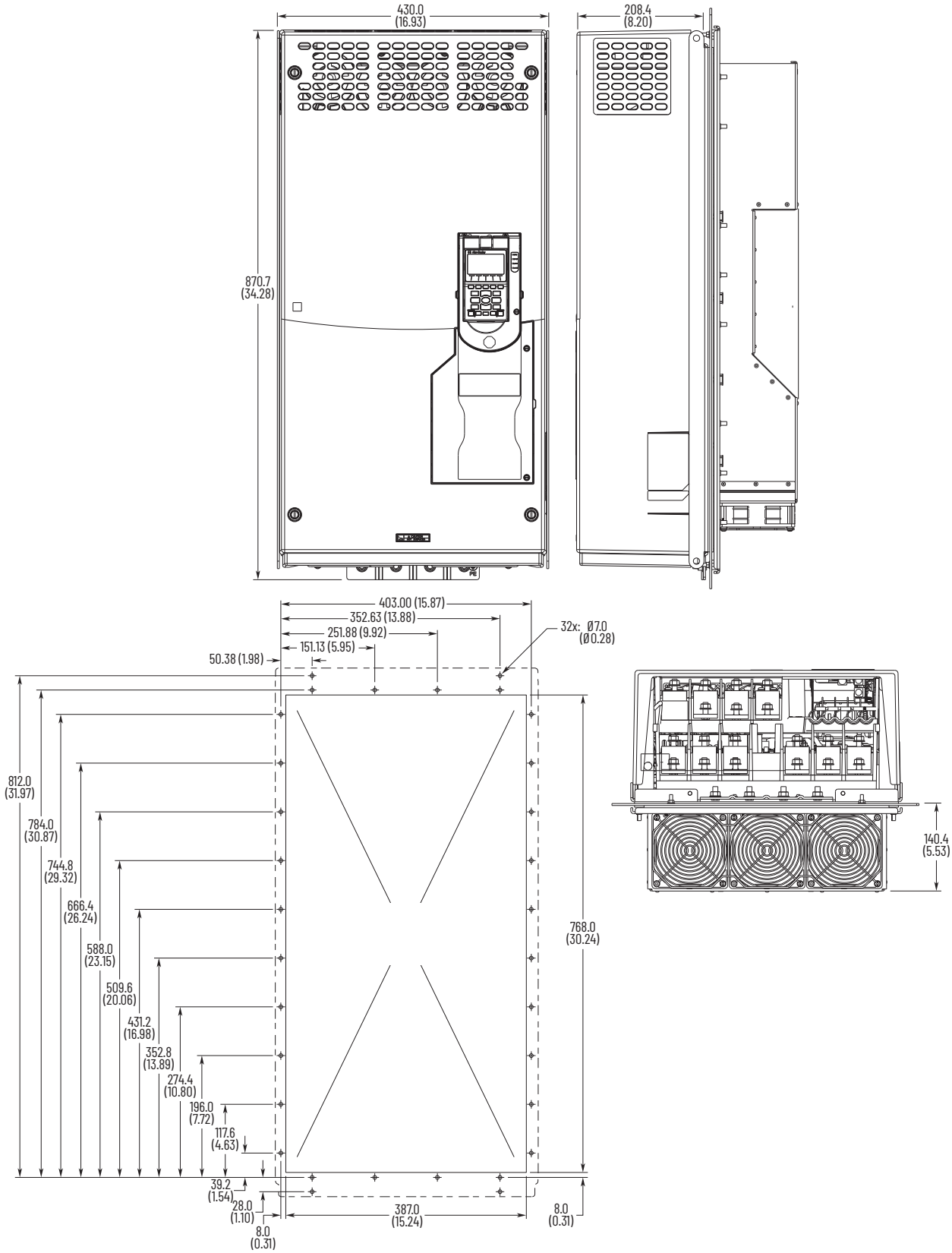


IMPORTANT Must use human interface module (HIM), catalog number 20-HIM-C6S, to meet enclosure rating. Order this device seperatly.

Dimensions are in millimeters and (inches).

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

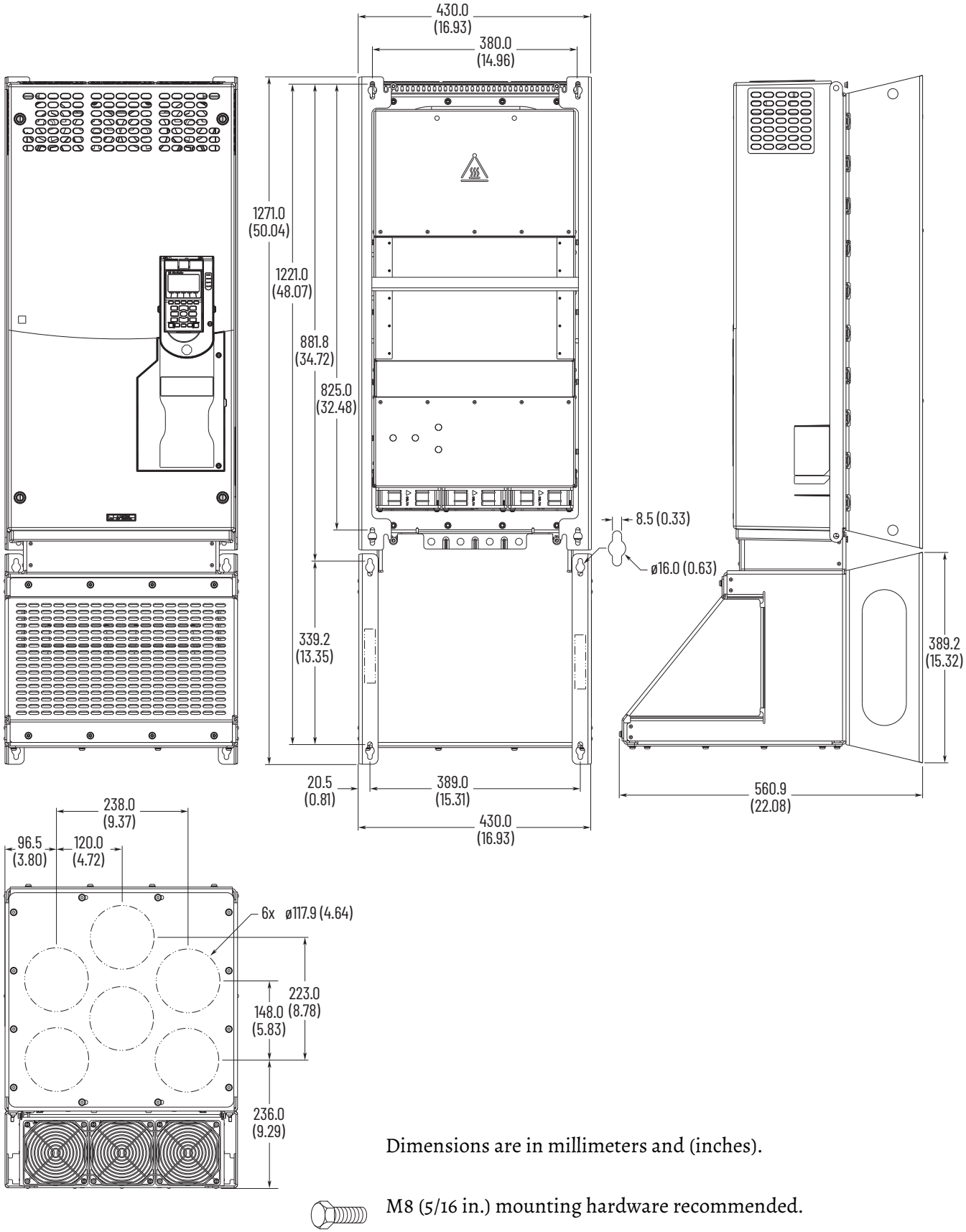
Figure 28 - Flange Mount, Frame 7



Dimensions are in millimeters and (inches).

IMPORTANT Must use flange adapter kit (catalog number 20-750-TFLNG1-F7) to meet enclosure rating.

Figure 29 - IP21, NEMA/UL Type 1, Wall Mount Frame 7



Dimensions are in millimeters and (inches).

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

IMPORTANT NEMA Type 1 kit (catalog number 20-750-NEMA1-F7) does change the mounting dimensions in Figure 23.

Notes:

Mechanical and Electrical Installation

The PowerFlex® 755TS installation process is divided into two principal tasks:

- Mechanically mount the enclosures
- Make power supply and motor connections (Chapter 5)

Installation of Products with Corrosive Gas Protection (XT)

PowerFlex 755TS products manufactured with XT use protective covers to help seal connectors against environments with corrosive gases. To help provide improved performance in these environments, only remove protective covers to make a required connection. Do not remove protective covers from unused connectors.

Access Panels, Covers, and Doors

This section provides descriptions for how to remove and replace access panels, covers, and doors on different drive sizes and enclosures.

Figure 30 - Enclosure Code R (IP20, NEMA/UL Open Type) Wall Mount, Frame 1

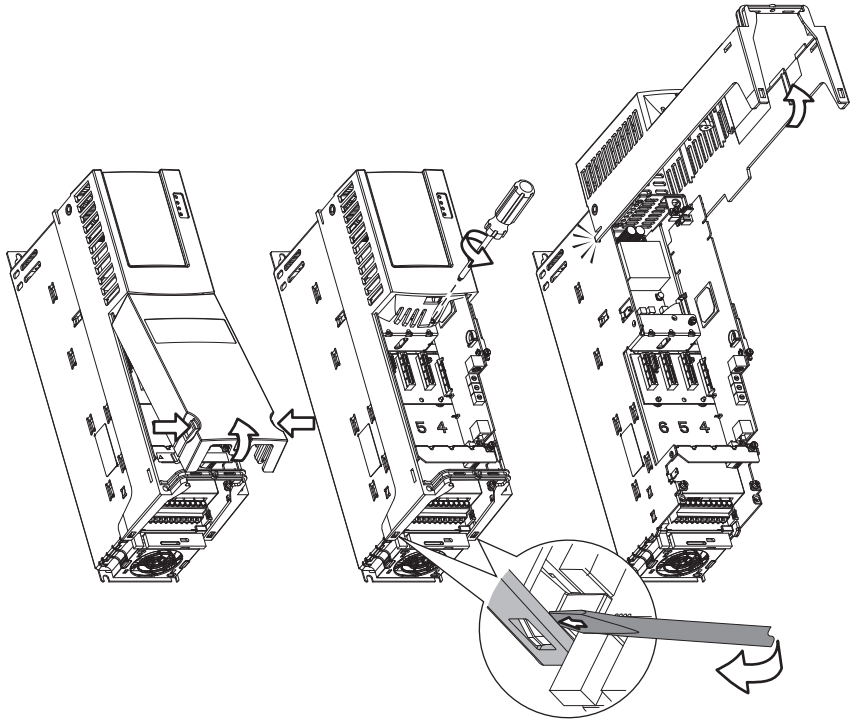


Figure 31 - Enclosure Code N (IP20, NEMA/UL Open Type) Wall Mount, Frames 2...5

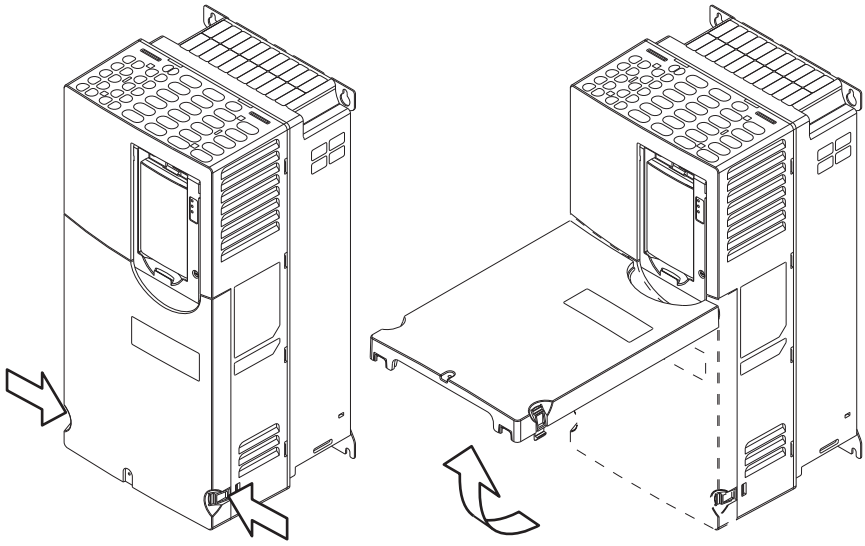
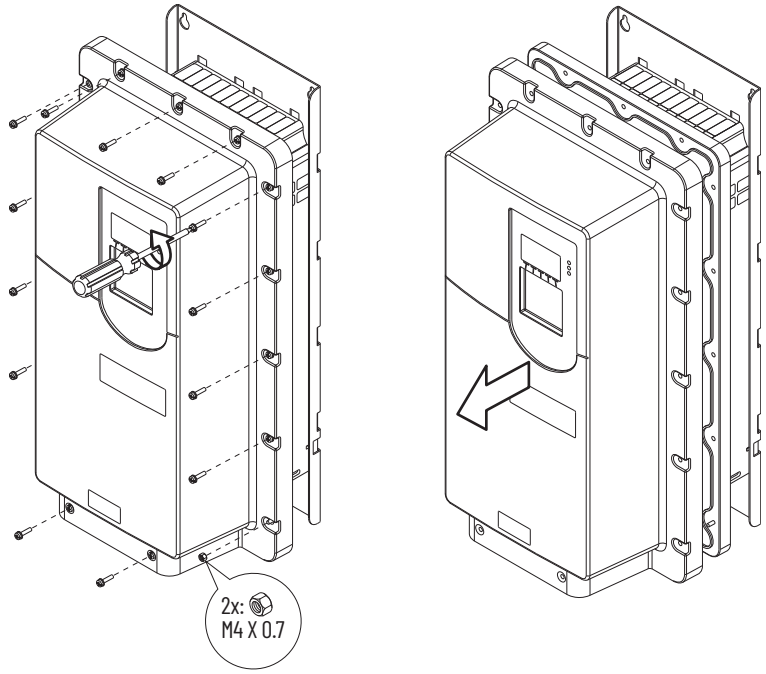


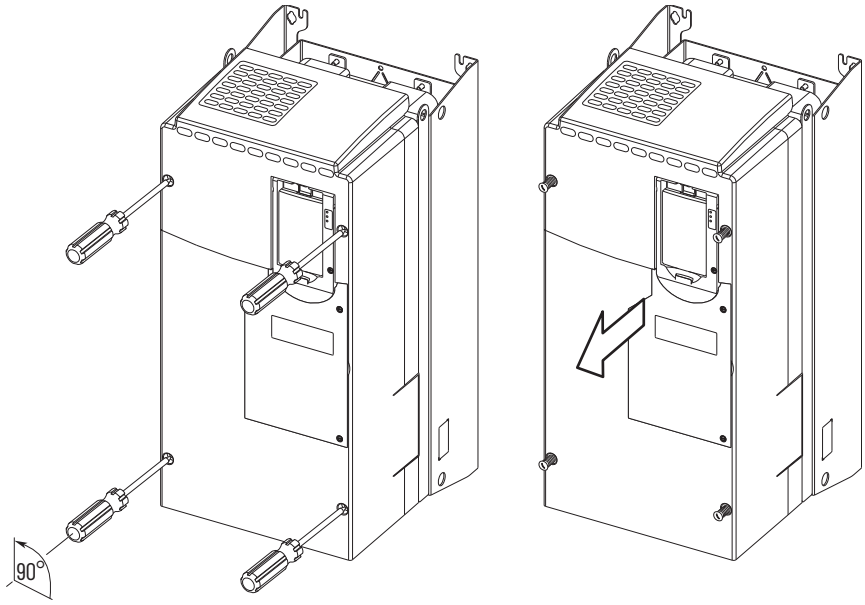
Figure 32 - Enclosure Code G (IP54, NEMA/UL Type 12) Wall Mount, Frames 2...5



To remove or replace the cover, use these tools and torque:

- 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

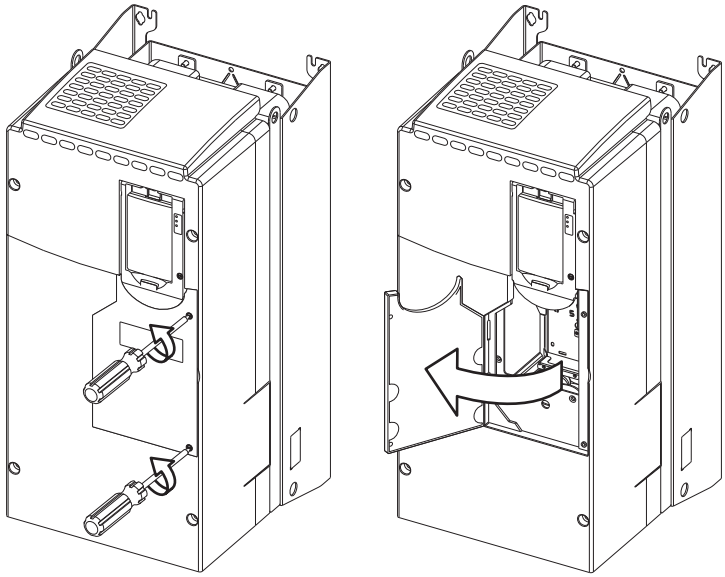
Figure 33 - Enclosure Code N (IP00, NEMA/UL Open Type) Wall Mount, Frames 6 and 7



To remove or replace the cover, use this tool:

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

Figure 34 - Enclosure Code N (IP00, NEMA/UL Open Type) Wall Mount, Frames 6 and 7 Access Door



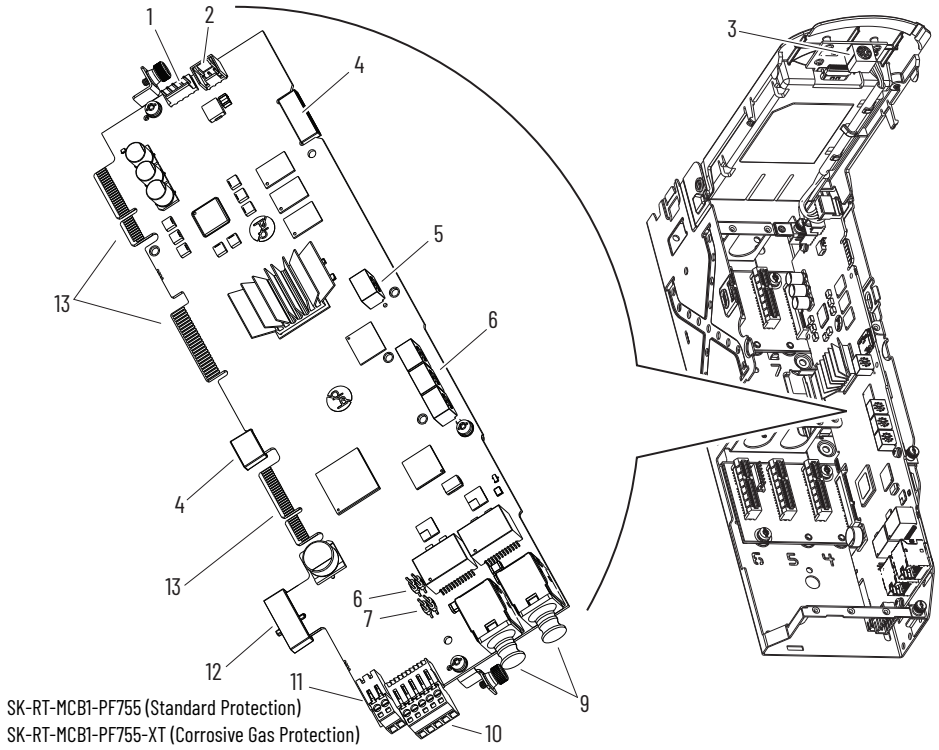
To open or secure the access door, use this tool:

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

Hardware Connections

The human interface module, internal power devices, and option module hardware connections are made in the control pod. The host drive and embedded functions are assigned fixed port numbers that cannot be changed. Option modules are assigned a port number that is based on where they are installed.

Main Control Circuit Board



SK-RT-MCB1-PF755 (Standard Protection)
SK-RT-MCB1-PF755-XT (Corrosive Gas Protection)

Table 4 - Main Control Circuit Board Details

Item	Name	Description
1	HIM Connector	Terminal block connector for the HIM Cradle and DPI Port 1 cable connection.
2	Fan Connector	Power supply for internal cooling fan.
3	DPI Port 1 Connector	If a cable is not connected to the PDI port on the HIM cradle, be sure to leave the protective cover installed.
4	Protective Cap	Protective caps that are present on XT main control boards. Do not remove these caps.
5	Control Selector	Rotary switch for setting the programming mode.
6	Built-in EtherNet/IP(1) Address Selectors	Rotary switches for setting lowest octet of EtherNet address (forces address to 192.168.1.xxx). See the PowerFlex Drives with TotalFORCE Control Programming Manual (firmware revision 10.xxx and later), publication 750-PM101 for instructions on setting the IP address.
7	ENABLE Jumper	Hardware enable jumper (P7). TB1 becomes an Enable when this jumper is removed.
8	SAFETY Jumper	Safety enable jumper (P8). Removed when safety option is installed.
9	Built-in EtherNet/IP(1) Connectors	EtherNet/IP network cable connections. If cables are not connected to the EtherNet/IP connectors, be sure to leave the protective covers installed.
10	TB1	I/O terminal block.
11	Terminal Block Connector	Reserved for future use.
12	TAM Connector	Used to connect the torque accuracy module (TAM). Remove cap only when the module, catalog number 20-750-TSTAM-*xx*-XT, is installed.
13	Edge Connectors	Provide signal and power interconnections between the main control board, the backplane interface boards, and the power layer interface board. The XT main control circuit board has PolySi PST-576 dielectric grease applied to the edge connectors. **Important:** When handling circuit boards with grease: Do not touch or remove the grease Do not allow the grease to become contaminated If necessary, an edge connector grease applicator kit, catalog number SK-RM-GRAPP1, is available to apply new grease to edge connectors on circuit boards.

(1) See the PowerFlex Drives with TotalFORCE Control Built-in EtherNet/IP Adapter User Manual, publication 750COM-UM009.

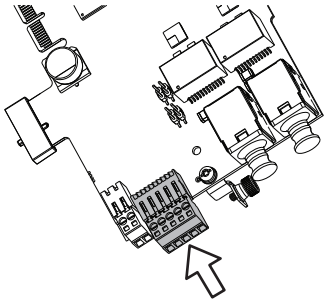
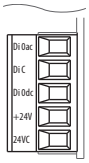


Table 5 - TB1 I/O Terminal Designations

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	

Main Control Board I/O Terminal Block Specifications

Name	Wire Size Range		Torque		Strip Length
	Maximum	Minimum	Maximum	Recommended	
755TS 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.)

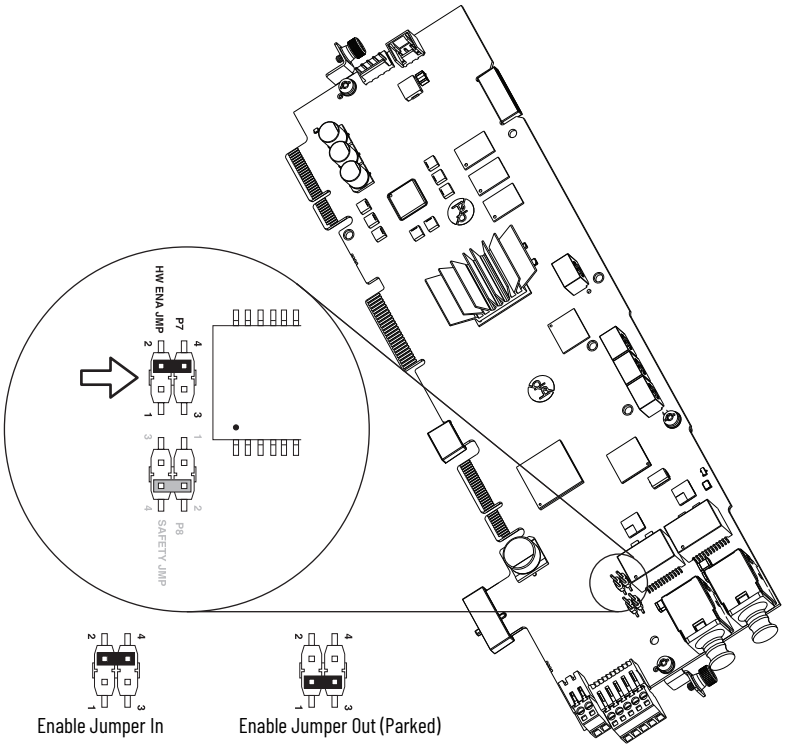
Hardware Enable Circuitry

The main control board has one digital input. Digital Input 0 is found on TB1 and can be used as a general-purpose programmable input, or by removal of a jumper, it can be configured as a dedicated hardware enable, which is unaffected by parameter settings.

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

1. Access the control pod as described beginning on page 51.
2. Locate and move the ENABLE Jumper on the Main Control Board to the out (parked) position (see Figure 35).

Figure 35 - ENABLE Jumper Location

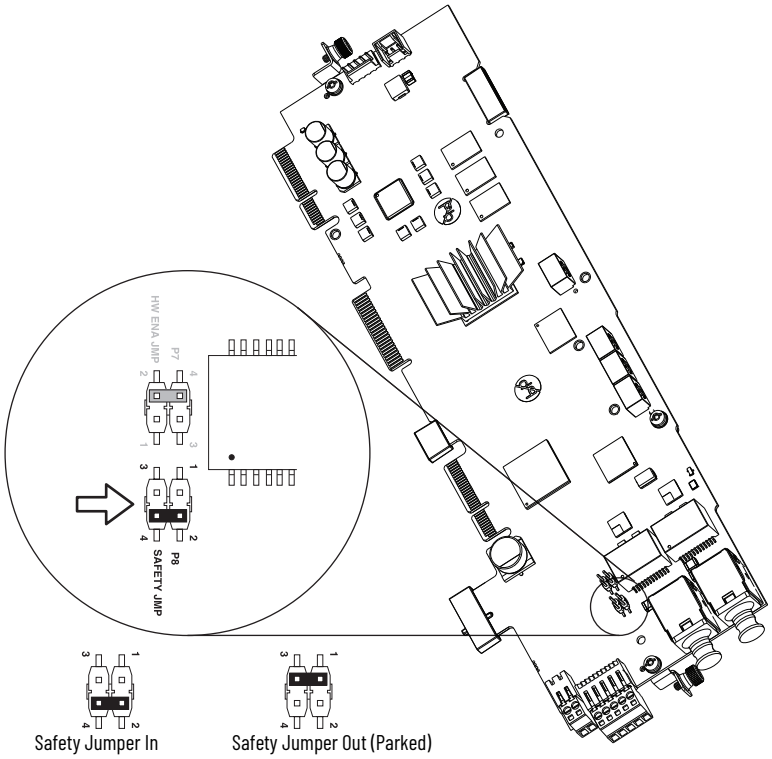


Safety Enable Circuitry

The drive ships with the SAFETY enable jumper installed (In). This jumper must be removed or placed in the out (parked) position when using a safety option.

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

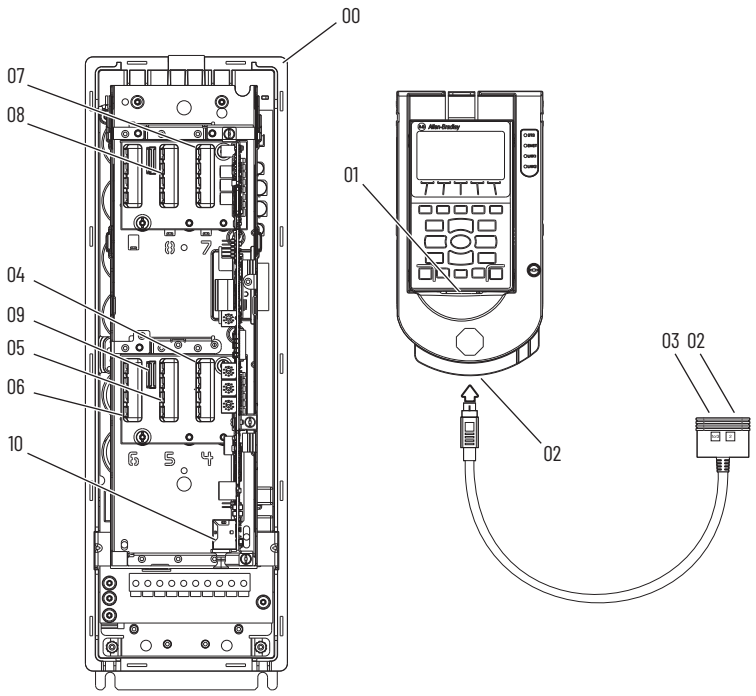
Figure 36 - SAFETY Jumper Location



Drive Device Ports

Connectors, embedded devices, and installed option modules such as I/O, communication adapters, and DeviceLogix™ options, 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 37 - Drive Device Ports



Port	Device	Description
00	Host drive	Fixed port for the drive.
01	DPI port 1	DPI Port 1 connection on the control-pod-mounted Human Interface Module (HIM). Splitter cable connector provides DPI Port 1 when HIM cradle connector is unused.
02	DPI port 2	DPI Port 2 for handheld HIM connection, remote HIM connection, or a splitter cable.
03	DPI port 1 or 3	Splitter cable connection that provides the following: • When the DPI port 1 connection is not used, this splitter cable connection provides a DPI port 1 connection. • When the DPI port 1 connection is used, this splitter cable connection provides a DPI port 3 connection.
04...08	Option modules	Available ports for option modules. **IMPORTANT:** Ports 07 and 08 are available on PowerFlex 755TS Frame 2...7 drives only. PowerFlex 755TS Frame 1 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 755TS Frame 1 drives only.)
10	EtherNet/IP ports	Fixed built-in dual EtherNet/IP ports.

IMPORTANT PowerFlex 755TS drives with XT use protective covers to seal wire harness connectors, circuit board connectors, terminal bocks, and ports. The covers protect against contamination and corrosion in corrosive gas environments. For the product to meet the corrosive atmosphere rating, protective covers must remain installed in unused connectors during storage and operation.

Notes:

Power Wiring

Most startup difficulties are the result of incorrect wiring. Every precaution must be taken to help ensure 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. can't 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.

AC Supply Source Considerations

PowerFlex® 755TS drives are suitable for use on a circuit capable of delivering up to a maximum of 100,000 rms symmetrical amperes at 400/480V.

You must account for the kVA of all PowerFlex 755TS drives on the distribution system and the system impedance of upstream transformers.

ATTENTION: To guard against personal injury and/or equipment damage that is caused by improper fusing or circuit breaker selection, use only the recommended line fuses/circuit breakers that are specified in the Fuses and Circuit Breakers section on page 71.

If a Residual Current Detector (RCD) is used as a ground fault monitor, use only Type B (adjustable) devices to avoid nuisance tripping.

Motor Considerations

Due to the operational characteristics of AC variable frequency drives, motors with inverter grade insulation systems that are 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. See Wiring and Grounding Guidelines for Pulse Width Modulated (PWM) AC Drives, publication DRIVES-IN001 for recommendations.

Grounding Requirements

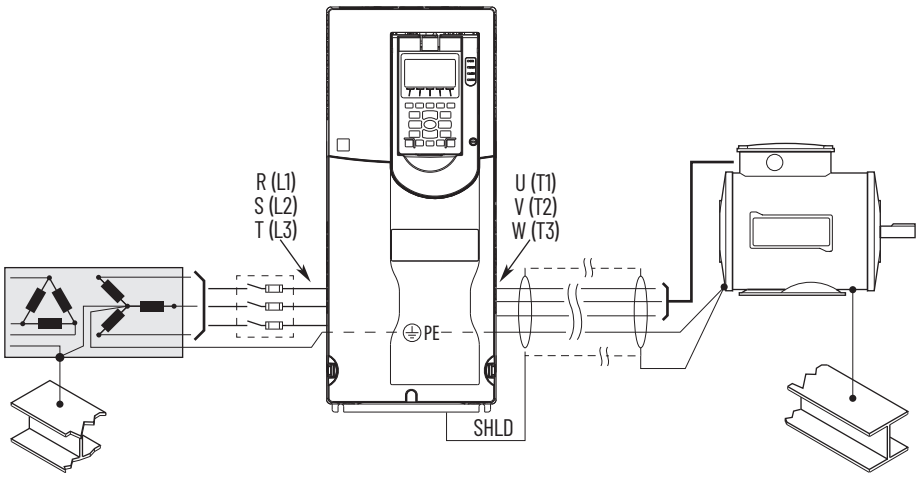
The safety ground-PE must be connected to the system ground. Ground impedance must conform to the requirements of national and local industrial safety regulations and/or electrical codes. Periodically check the integrity of all ground connections.

Recommended Grounding Scheme

These diagrams show products that are connected to a solid ground single point (PE only) power source. Some applications can 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, use one safety ground point or ground bus bar connected directly to building steel. Independently ground all circuits including the AC input ground conductor directly to this point/bar.

Figure 38 - Typical Grounding



Shield Termination—SHLD

The motor cable shield must be connected to earth ground through a shield terminating or EMI clamp at the drive end and to the motor frame at the motor end. See installation requirements on page 26 and page 27 for termination of the motor cable shield at the drive end.

Radio Frequency Interference (RFI) Filter Grounding

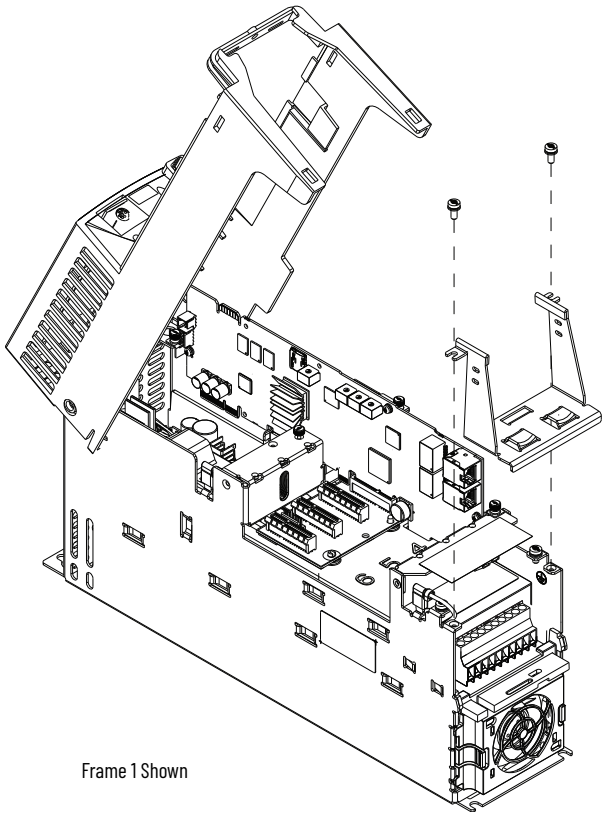
An optional RFI filter can result in relatively high ground leakage currents. Therefore, the **filter must only be used in installations with grounded AC supply systems and be permanently installed and solidly grounded** (bonded) to the building power distribution ground. Be sure that the incoming supply neutral is solidly connected (bonded) to the same building power distribution ground. Grounding must not rely on flexible cables and must exclude any form of plug or socket that would permit inadvertent disconnection. Some local codes can require redundant ground connections. Periodically check the integrity of all connections. See the instructions that are supplied with the filter.

RF Emission Category C3 Compliant Wiring

To help meet the EN 61800-3 Category C3 standard for RF emissions, PowerFlex 755TS drives, frames 1...5, are equipped with a shield termination bracket. You need to install the bracket on frame 1 drives.

An EMC C3 kit is available for frames 6 drives (20-750-EMC6-F6) and frame 7 drive (20-750-EMC6-F7).

Figure 39 - Install the EMC C3 Shield Termination Bracket

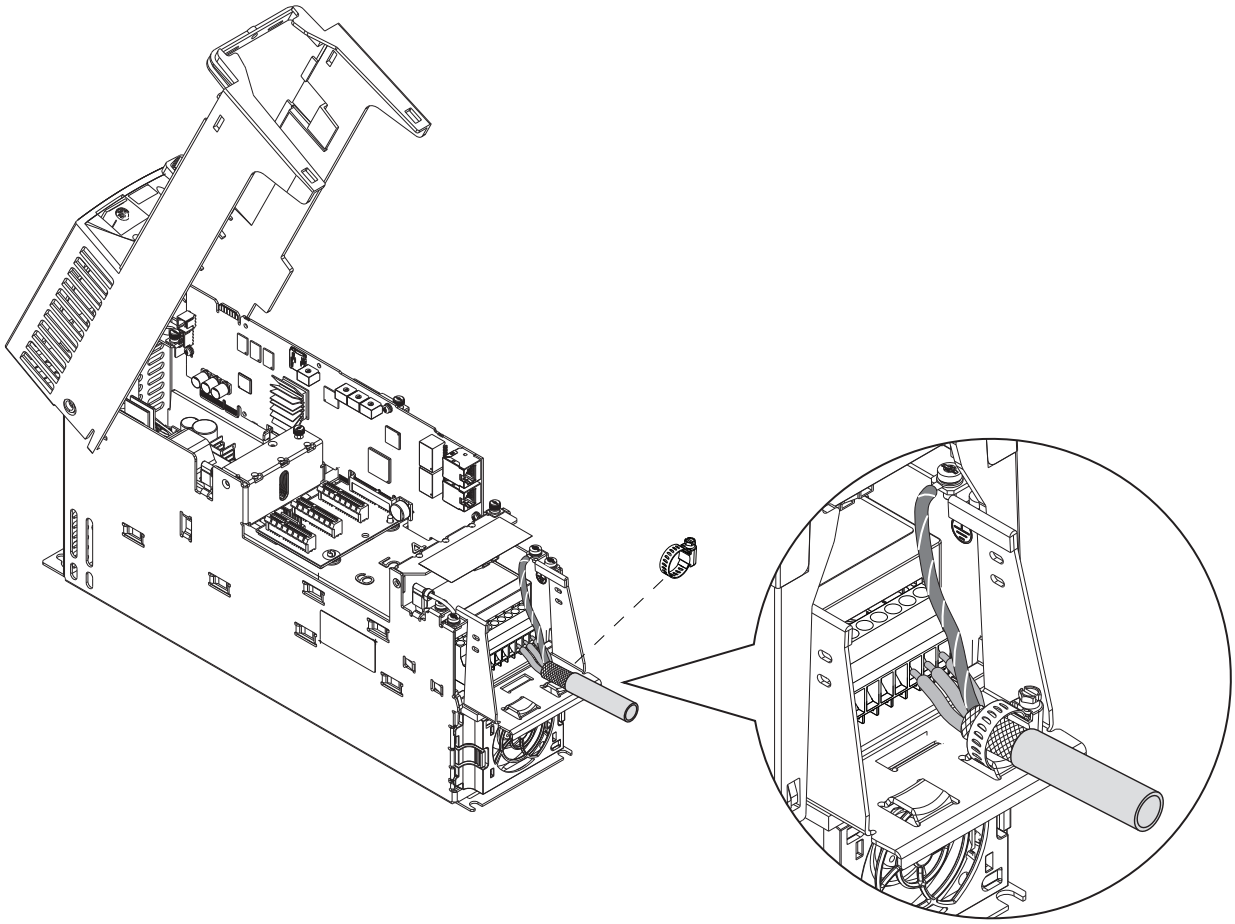


Frame 1 Shown

Frame	Fastener	Torque	Tool	Replacement Kit Cat. No.
1	M4 x 10 mm (Polycarbonate)	0.34 N•m (3 lb•in)	T20 or F - 6.4 mm (0.25 in.)	SK-RT-EMC3-F*n* (*n* = frame number)
2...5	M4 x 10 mm (Steel)	1.8 N•m (16 lb•in)		

For frames 1...5, expose the braided shielding of the motor cable assembly. Use the clamp provided to secure the cable assembly so that the shield makes contact with the C3 bracket as shown here.

Figure 40 - Category C3 Wiring with Shield Termination—Frames 1...5



Power Cable Specifications

Various cable types are acceptable for drive installations. For an in-depth discussion of cable types, including a table of maximum motor cable lengths, refer to the Wiring and Grounding Guidelines for Pulse Width Modulated (PWM) AC Drives, publication DRIVES-IN001.

Power Cable Types Acceptable for 400...480 Volt Installations

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 can result in personal injury and/or equipment damage.

Table 6 - Power Cable Recommendations

Type		Cable Description	Minimum Insulation Rating
Input Power (1)(2)	Standard	All frame sizes: • Three tinned copper conductors with XLPE insulation. • Copper braid/aluminum foil combination shield and tinned copper drain wire, three drain wires per cable assembly. • PVC jacket.	600V, 75 °C (167 °F) (3)
Motor	Standard		

(1) 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.
(3) The minimum insulation rating for input power wire must be at least equal to the nominal system voltage rating.

Terminal Block Specifications

Table 7 - Frames 1...5 Power Terminal Block

Frame	Wire Size Range[1] [2]		Strip Length [mm (in.)]	Recommended Torque [N•m (lb•in)]	Recommended Tools
	Max [mm^2 (AWG)]	Min [mm^2 (AWG)]			
1	4.0 (10)	0.2 (24)	8.0 (0.31)	0.57 (5.0)	#2 Pozidriv, M3 x 7
2					
3	16.0 (6)	0.5 (20)	10.0 (0.39)	1.2 (10.6)	#2 flat screwdriver
4	35.0 (1)	2.5 (14)	10.0 (0.39)	2.7 (24.0)	#2 Pozidriv 492-C Phillips 0.25 in. flat screwdriver
5	35.0 (1)	10.0 (8)	12.0 (0.5)	4.0 (35.0)	#2 Pozidriv 492-C Phillips 0.25 in. flat screwdriver

(1) Maximum/minimum wire sizes that the terminal block can accept. These sizes are not recommendations.
(2) Terminal blocks are designed to accept one wire.

Table 8 - Frames 6 and 7 Power Terminal Block

Frame	Maximum Lug Width[1] [mm (in.)]	Recommended Torque [N•m (lb•in)]	Terminal Bolt Size	Recommended Tool
6	32.0 (1.26)	11.3 (100)	M8 x 1.25	13 mm hex socket
7	43.5 (1.71)			

(1) Customers supply the lugs.

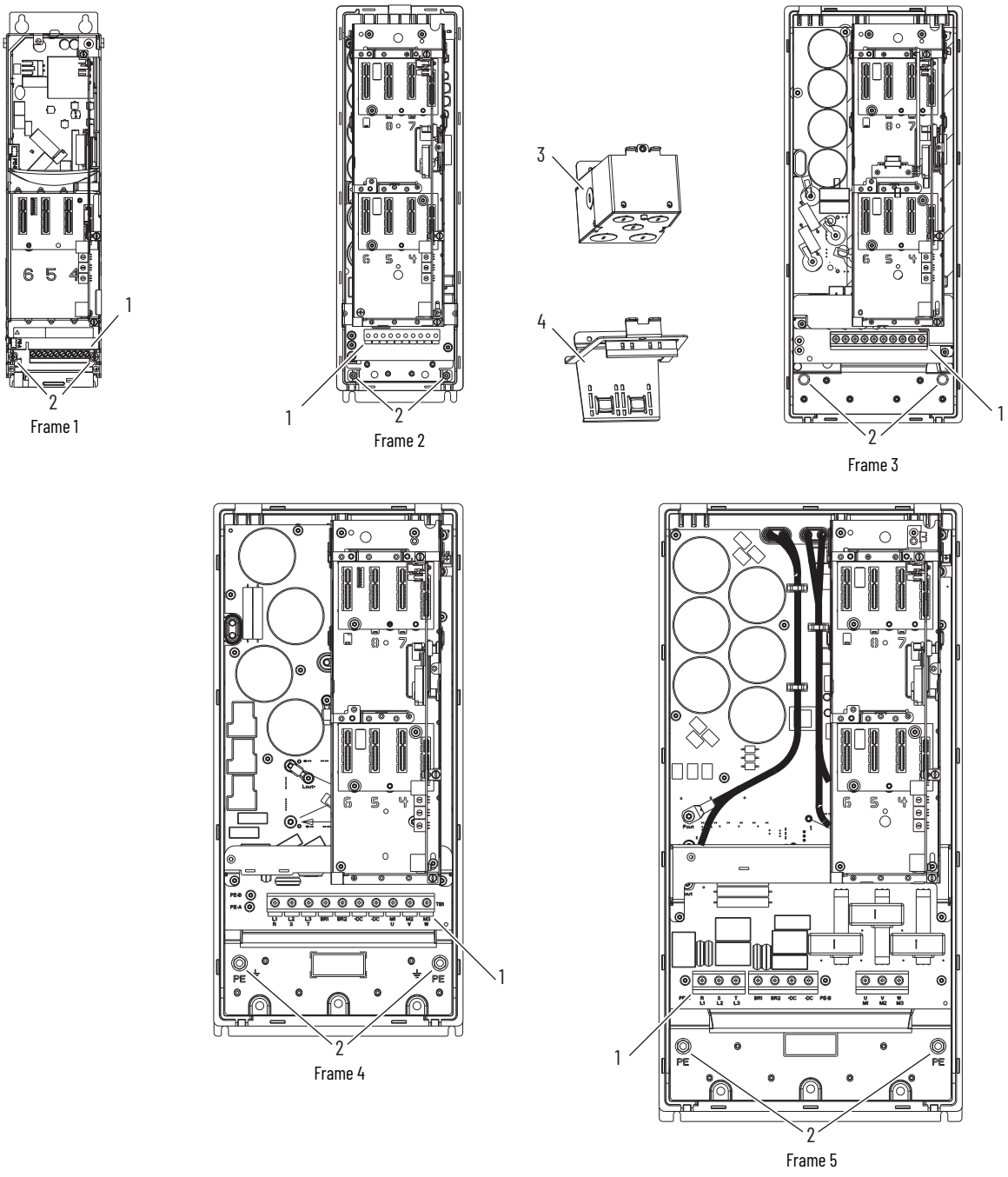
Table 9 - Frames 1...7 PE Grounding Stud

Frame	Recommended Torque N•m (lb•in)	Terminal Bolt/Screw Size	Recommended Tool
1	1.36 (12)	M4	T20 hexalobular (Torx) #1 flat screwdriver
2	1.36 (12)	M4	7 mm hex deep socket
3	3.4 (30)	M6	10 mm hex deep socket
4			
5			
6	11.3 (100)	M8	13 mm hex socket
7			

Three-phase Power Terminal Locations

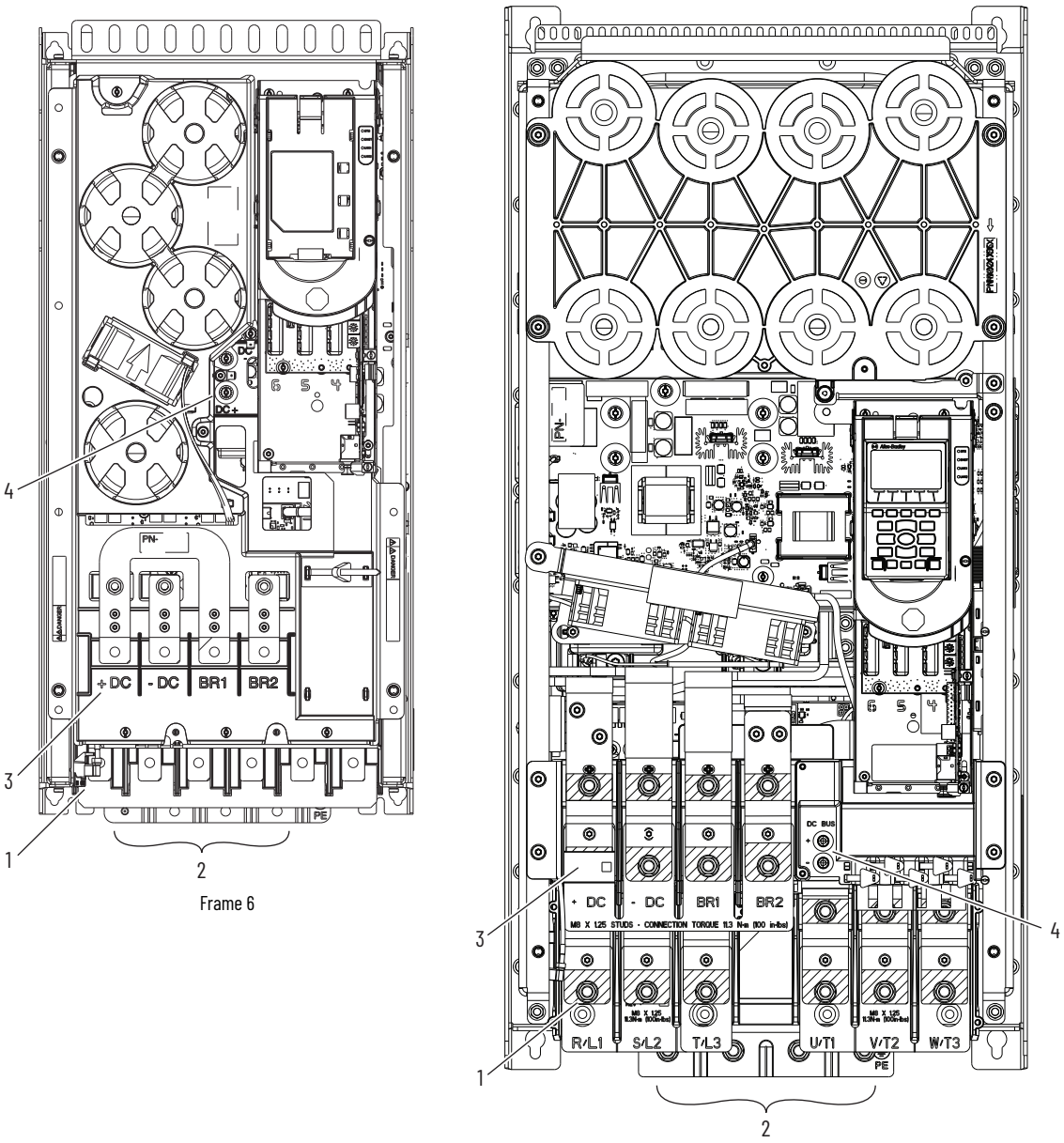
This section shows the locations of the power block and termination points.

Figure 41 - Frames 1...5 Power Terminal Block and Termination Point Locations



No.	Name	Description
1	Power terminal block	R/L1, S/L2, T/L3, BR1, BR2, +DC, -DC, U/T1, V/T2, W/T3
2	PE grounding studs	Terminating point to chassis ground for incoming AC line and motor shields.
3	Optional NEMA/UL Type 1 conduit box	Terminating point to chassis ground for incoming AC line, motor shields, and control wire shields.
4	Optional EMC plate	Terminating point to chassis ground for incoming AC line, motor shields, and control wire shields.

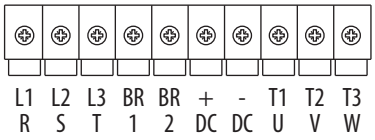
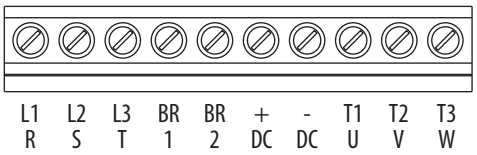
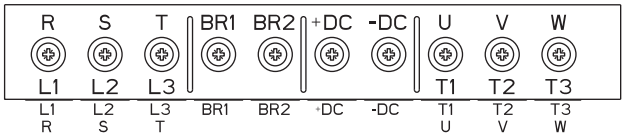
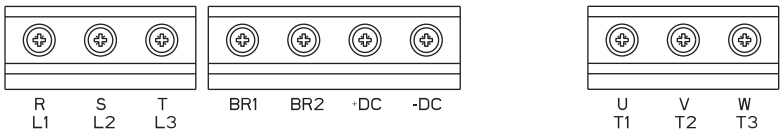
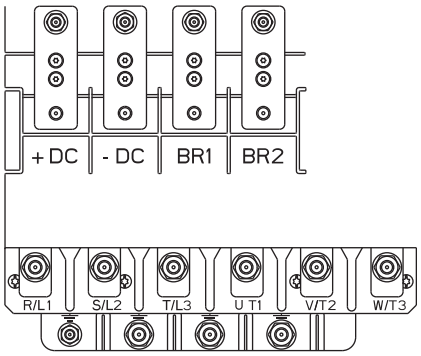
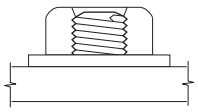
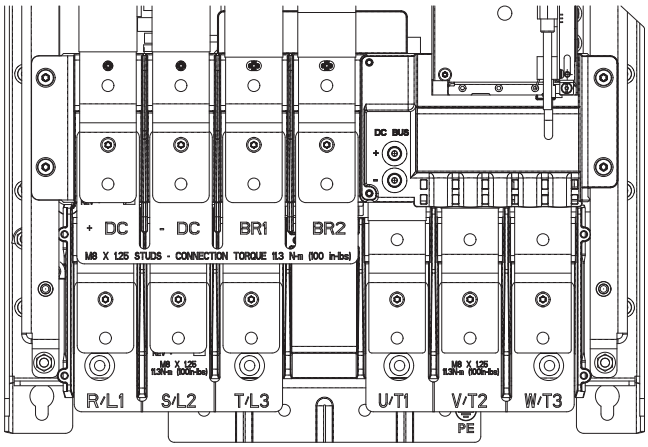
Figure 42 - Frames 6 and 7 Power Terminal and Termination Point Locations



400/480V drives shown.

No.	Name	Description
1	Power terminals	R/L1, S/L2, T/L3, U/T1, V/T2, W/T3
2	PE grounding studs	Terminating point to chassis ground for incoming AC line and motor shield.
3	DC Bus and brake terminals	+DC, -DC, BR1, BR2 (optional)
4	DC+ and DC-	Bus voltage test points (Touch guard removed)

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 does 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-DCBB3-F6 (Frame 6) or 20-750-DCBB3-F7 (Frame 7).
Dynamic Brake Resistor Terminals are optional on Frame 6 and 7 drives: catalog number position 12.
See Catalog Number Explanation on page 11.

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

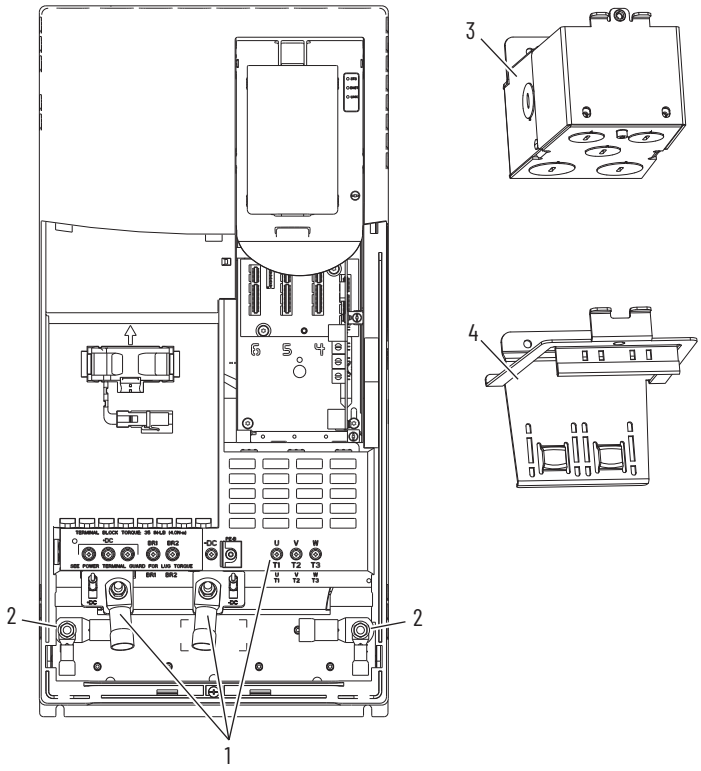
Table 10 - Terminal Designations

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, see Wiring and Grounding Guidelines for Pulse-width Modulated (PWM) AC Drives, publication DRIVES-IN001 for recommendations.

Frames 5...7 Common DC Input Terminal Locations

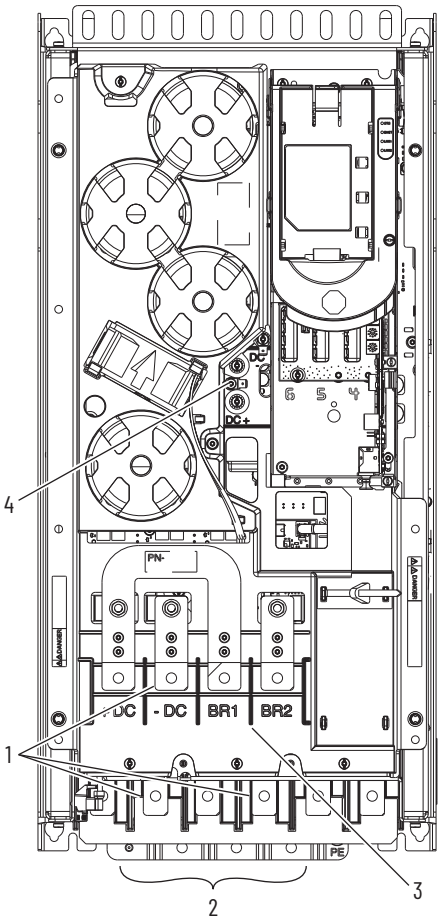
Figure 43 - Frame 5 Common DC Input Power Terminal and Termination Point Locations



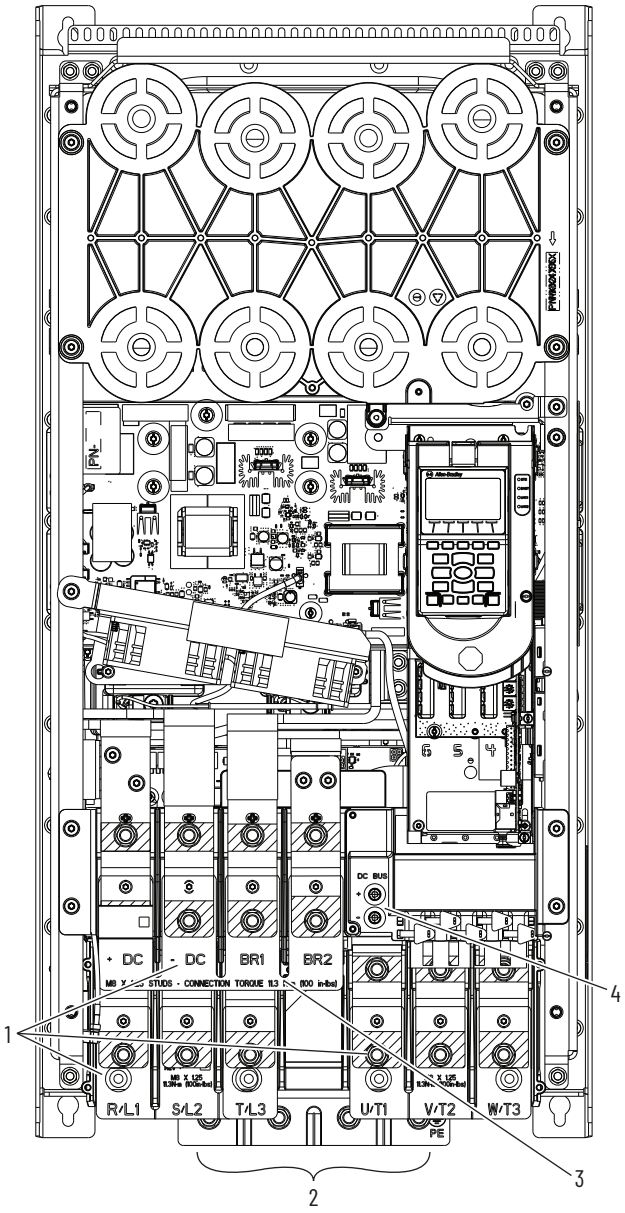
Frame 5

No.	Name	Description
1	Power terminal connections	+DC, -DC, U/T1, V/T2, W/T3
2	PE grounding studs	Terminating point to chassis ground for incoming DC line and motor shields.
3	Optional NEMA/UL Type 1 conduit box	Terminating point to chassis ground for incoming AC line, motor shields, and control wire shields.
4	Optional EMC plate	Terminating point to chassis ground for incoming AC line, motor shields, and control wire shields.

Figure 44 - Frames 6 and 7 Common DC Input Power Terminal and Termination Point Locations



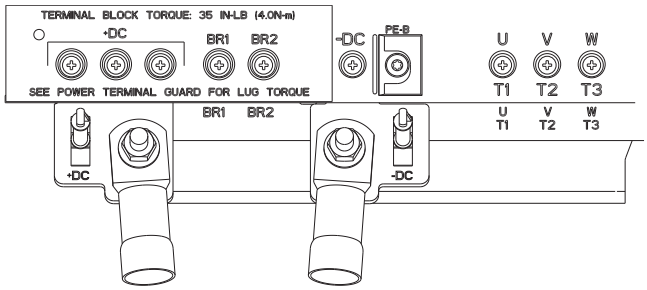
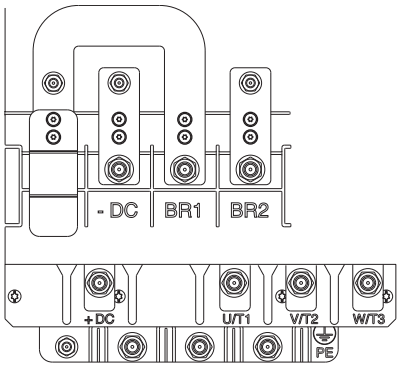
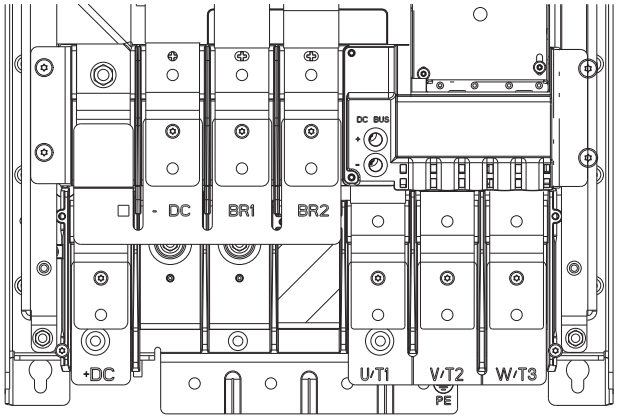
Frame 6



Frame 7

No.	Name	Description
1	Power terminals	+DC, -DC, U/T1, V/T2, W/T3
2	PE grounding studs	Terminating point to chassis ground for incoming DC line and motor shield.
3	DC Bus and brake terminals	+DC, -DC, BR1, BR2
4	DC+ and DC-	Bus voltage test points

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. See Catalog Number Explanation on page 11.

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, see Wiring and Grounding Guidelines for Pulse-width Modulated (PWM) AC Drives, publication DRIVES-IN001 for recommendations.

Fuse and Circuit Breaker Ratings

The tables in this section provide recommended AC line input fuse and circuit breaker information. See the following Fuses and Circuit Breakers sections for CE and UL requirements. The size recommendations are 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.

Fuses

The recommended fuse types are listed here. Select a fuse rating within the range that is specified in the tables starting on page 72.

- CE — Type gG fuses
- UL — Fast-acting Class J, T

IMPORTANT For maximum protection of the drive and its internal components, we recommend the use of fuses over other methods of circuit protection. Fuses reduce the risk of drive damage from power quality events and improve machine and process utilization.

Circuit Breakers

The non-fuse listings in the following tables include inverse time circuit breakers, and 140M/140MT self-protected combination motor controllers. If one of these methods is chosen for protection, the following requirements apply, for both UL and CE installations:

- 140M/140MT self-protected combination motor controllers are acceptable if the installation conforms with the requirements that are specified in the tables.
- Inverse time circuit breakers can only be used with a fuse that is specified in the tables.

400-Volt AC and 540-Volt DC Input Protection Devices—Drive Frames 1...7

Applied Rating [1]	Frame [2]	Cont. Output Amps	Sized For Normal Duty			Sized For Heavy Duty			Input Quantities		AC Input Protection Devices						Input Quantities	DC Input Protection [12]	
			Cat. No.	Output Overload Amps		Cat. No.	Output Overload Amps		Cont. AC Input		Fuse		Circuit Breaker [6]		140M/140MT Type E Combination Motor Controller with Adjustable Current Range [7] [8]		Cont. DC Input	Fuse Cat. No. 20-750-...	Fuse Holder Cat. No. 20-750-...
kW				1 Min	3 s		1 Min	3 s	kVA	Amps	Min [A] [4]	Max [A] [5]	Max [A]	Min. Encl. Vol. [in.^{3}]	Cat. No.	Min Enclosure Volume [in.^{3}] [11]	Amps		
400 Volt AC Input																	**540 Volt DC Input**		
0.37	1	1.3				20G...C2P1	2.3	3.2	0.8	1.2	2	4	15	–	M-xxx-B25 [9]	3242	1.4	DCFUSE1-10A	DCFH-51
0.75	1	2.1	20G...C2P1	2.3	3.2	20G...C3P5	3.9	5.3	1.3	1.9	3	6	15	–	M-xxx-B25 [9]	3242	2.2	DCFUSE1-10A	DCFH-51
1.5	1	3.5	20G...C3P5	3.9	5.3	20G...C5P0	5.5	7.5	2.1	3.1	4	10	15	–	M-xxx-B40 [9]	3242	3.7	DCFUSE1-10A	DCFH-51
2.2	1	5.0	20G...C5P0	5.5	7.5				3.1	4.5	6	10	20	–	M-xxx-B63 [9]	3242	5.3	DCFUSE1-10A	DCFH-51
						20G...C8P7	9.6	13.1	3.1	4.5	6	15	20	–	M-xxx-B63 [9]	3242	5.3	DCFUSE1-10A	DCFH-51
4.0	1	8.7	20G...C8P7	9.6	13.1	20G...C011	13.1	17.3	5.4	7.8	10	20	30	–	M-xxx-C10 [9]	3242	9.2	DCFUSE1-16A	DCFH-51
5.5	1	11.5	20G...C011	12.7	17.3	20G...C015	17.3	23.1	7.1	10.3	15	25	45	–	M-xxx-C16 [10]	3242	12.2	DCFUSE1-20A	DCFH-51
7.5	1	15.4	20G...C015	16.9	23.1				9.6	13.8	20	30	60	–	M-xxx-C20 [10]	3242	16.3	DCFUSE1-25A	DCFH-51
0.75	2	2.1	20G...C2P1	3.1	3.7	20G...C2P1	3.1	3.7	1.3	1.9	3	4	15	–	M-xxx-B25 [9]	3242	2.2	DCFUSE1-10A	DCFH-51
1.5	2	3.5	20G...C3P5	5.2	6.3	20G...C3P5	5.2	6.3	2.1	3.1	4	7	15	–	M-xxx-B40 [9]	3242	3.7	DCFUSE1-10A	DCFH-51
2.2	2	5.0	20G...C5P0	7.5	9.0	20G...C5P0	7.5	9.0	3.1	4.5	6	10	20	–	M-xxx-B63 [9]	3242	5.3	DCFUSE1-10A	DCFH-51
4.0	2	8.7	20G...C8P7	13.0	15.6	20G...C8P7	13.0	15.6	5.4	7.8	10	15	30	–	M-xxx-C10 [10]	3242	9.2	DCFUSE1-16A	DCFH-51
5.5	2	11.5	20G...C011	17.2	20.7	20G...C011	17.2	20.7	7.1	10.3	15	20	45	–	M-xxx-C16 [10]	3242	12.2	DCFUSE1-20A	DCFH-51
						20G...C015	17.3	23.1	7.1	10.3	15	20	45	–	M-xxx-C16 [10]	3242	12.2	DCFUSE1-20A	DCFH-51
7.5	2	15.4	20G...C015	16.9	23.1	20G...C022	24.3	33.0	9.6	13.8	20	30	60	–	M-xxx-C20 [10]	3242	16.3	DCFUSE1-25A	DCFH-51
11	2	22	20G...C022	24.2	33.0				13.6	19.7	25	45	80	–	M-F8E-C25	3242	23.2	DCFUSE1-40A	DCFH-NH1
	3					20G...C030	33.0	45.0	13.6	19.7	25	45	80	–	M-F8E-C25	4052	23.2	DCFUSE1-40A	DCFH-NH1
15	3	30	20G...C030	33.0	45.0	20G...C037	45.0	55.5	18.6	26.9	35	60	100	–	M-F8E-C32	4052	31.7	DCFUSE3-63A	DCFH-NH1
18.5	3	37	20G...C037	40.7	55.5	20G...C043	55.5	66.6	22.9	33.1	45	70	110	–	M-F8E-C45	4052	39.1	DCFUSE3-63A	DCFH-NH1
22	3	43	20G...C043	47.3	64.5	20G...C060 [3]	66.0	90.0	26.7	38.5	50	90	120	–	–	–	45.4	DCFUSE3-80A	DCFH-NH1
						20G...C061	66.0	90.0	26.7	38.5	50	90	120	–	–	–	45.4	DCFUSE3-125A	DCFH-NH1
30	4	60	20G...C060	66.0	90.0	20G...C072	90.0	108.0	37.2	53.7	70	100	180	–	–	–	63.4	DCFUSE3-125A	DCFH-NH1
						20G...C073	90.0	108.0	37.2	53.7	70	100	180	–	–	–	63.4	DCFUSE3-125A	DCFH-NH1
	3	61	20G...C061	67.1	91.5				37.8	54.6	70	100	180	–	–	–	64.5	DCFUSE3-125A	DCFH-NH1
37	4	72	20G...C072	79.2	108.0	20G...C086	108.0	129.6	44.6	64.4	80	125	200	–	–	–	76.1	DCFUSE3-125A	DCFH-NH1
	5					20G...C085	108.0	129.6	44.6	64.4	80	125	200	–	–	–	76.1	DCFUSE3S-160A	DCFH-NH1
	4	73	20G...C073	80.3	109.5				45.2	65.3	80	125	200	–	–	–	77.1	DCFUSE3-125A	DCFH-NH1
45	5	85	20G...C085	93.5	127.5	20G...C104	127.5	156.0	52.7	76.1	100	150	250	–	–	–	89.8	DCFUSE3S-160A	DCFH-NH1
	4	86	20G...C086	94.6	129.0				53.3	77.0	100	150	250	–	–	–	90.9	DCFUSE3-160A	DCFH-NH1
55	5	104	20G...C104	114.4	156.0	20G...C140 [3]	156.0	210.0	64.5	93.1	125	200	300	–	–	–	109.9	DCFUSE3S-200A	DCFH-NH1

400-Volt AC and 540-Volt DC Input Protection Devices—Drive Frames 1...7 (continued)

Applied Rating (1)	Frame (2)	Cont. Output Amps	Sized For Normal Duty			Sized For Heavy Duty			Input Quantities		AC Input Protection Devices						Input Quantities	DC Input Protection (12)	
			Cat. No.	Output Overload Amps		Cat. No.	Output Overload Amps		Cont. AC Input		Fuse		Circuit Breaker (6)		140M/140MT Type E Combination Motor Controller with Adjustable Current Range (7) (8)		Cont. DC Input	Fuse Cat. No. 20-750-...	Fuse Holder Cat. No. 20-750-...
kW				1 Min	3 s		1 Min	3 s	kVA	Amps	Min [A] (4)	Max [A] (5)	Max [A]	Min. Encl. Vol. [in.^{3}]	Cat. No.	Min Enclosure Volume [in.^{3}] (11)	Amps		
400 Volt AC Input																	**540 Volt DC Input**		
75	6	140	20G...C140	154.0	210.0	20G...C170	210.0	255.0	88.9	128.3	175	300	400	–	–	–	151.4	DCFUSE3S-315A	DCFH-NH1
90	6	170	20G...C170	187.0	255.0	20G...C205	255.0	307.5	107.9	155.8	200	300	500	–	–	–	183.9	DCFUSE3S-315A	DCFH-NH1
110	6	205	20G...C205	225.0	307.5	20G...C260	307.5	390.0	130.1	187.8	250	400	600	–	–	–	221.7	DCFUSE3S-400A	DCFH-NH1
132	6	260	20G...C260	286.0	390.0				165.0	238.2	300	500	700	–	–	–	281.2	DCFUSE5S-500A	DCFH-NH2
	7					20G...C302	390.0	468.0	165.0	238.2	300	500	700	–	–	–	281.2	DCFUSE6S-500A	DCFH-NH3
160	7	302	20G...C302	332.2	453.0	20G...C367	453.0	550.5	191.7	276.7	350	600	900	–	–	–	326.7	DCFUSE6S-550A	DCFH-NH3
200	7	367	20G...C367	403.5	550.5	20G...C456	550.5	684.0	232.9	336.2	450	700	1100	–	–	–	397.0	DCFUSE6S-700A	DCFH-NH3
						20G...C477	550.5	684.0	232.9	336.2	450	700	1100	–	–	–	397.0	DCFUSE6S-700A	DCFH-NH3
250	7	456	20G...C456	501.6	684.0				289.5	417.8	600	800	1300	–	–	–	493.2	DCFUSE6S-900A	DCFH-NH3
270	7	477	20G...C477	524.7	715.5				302.8	437.0	600	800	1300	–	–	–	516.0	DCFUSE6S-900A	DCFH-NH3

(1) Applied rating refers to the motor that is connected to the drive. For example, a C022 drive can be used in Normal Duty mode on an 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 drive. The drive can be programmed for either mode. For any given drive catalog number, Normal Duty mode provides higher continuous current but smaller overload current when compared to Heavy Duty mode. See parameter 0:36 [Duty Rating Cfg].

(2) Only enclosure codes F, N, and R. See Product Rating Cross-reference on page 14, for frame sizes of other enclosure types.

(3) This drive is the next larger frame size.

(4) For UL compliance - fast-acting class J (Bussmann DFJ) or fast-acting class T (Bussmann JJS) fuses only. Equivalent fuses of class J, T may be used if they have lower I_{peak} and I^2t ratings than the Bussmann JJS fuse. For CE compliance - type gR fuses (Bussmann 170M - size 00 to 3, IEC 60269 or DIN 43620, or FWP-_G10F, _G14F, _G22F) only. Minimum protection device size is the lowest rated device that supplies maximum protection without nuisance tripping. Max. source SCCR = 100 kA.

(5) For UL compliance - fast-acting class J (Bussmann DFJ) or fast-acting class T (Bussmann JJS) fuses only. Equivalent fuses of class J, T may be used if they have lower I_{peak} and I^2t ratings than the Bussmann JJS fuse. For CE compliance - type gR fuses (Bussmann 170M - size 00 to 3, IEC 60269 or DIN 43620, or FWP-_G10F, _G14F, _G22F) only. Maximum protection device size is the highest rated device that supplies drive protection. Max. source SCCR = 100 kA.

(6) Circuit breaker - inverse time breaker - must be used with a fuse specified in the table. For US NEC, minimum circuit breaker size is 125% of motor FLA. Ratings that are shown are maximum values.

(7) Bulletin 140M/140MT with adjustable current range must have the current trip set to the minimum range so that the device does not trip.

(8) Bulletin 140M/140MT is UL Listed for 480Y/277V. Not UL Listed for use on 400V or 480V Delta/Delta, corner ground, or high-resistance ground systems.

(9) Bulletin 140M/140MT must be Frame C (140M-C2E-xxx or 140MT-C3E-xxx) or Frame D (140M-D8E-xxx or 140MT-D9E-xxx). Max. source SCCR = 65 kA.

(10) Bulletin 140M/140MT must be Frame D (140M-D8E-xxx or 140MT-D9E-xxx) or Frame F (140M-F8E-xxx). Max. source SCCR = 65 kA.

(11) When using the Bulletin 140M/140MT, the drive must be installed in a ventilated or non-ventilated enclosure with the minimum volume that is specified in this column. Application-specific thermal considerations can require a larger enclosure.

(12) DC fuses specified are UL recognized and CE compliant.

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

Applied Rating [1]	Frame [2]	Cont. Output Amps	Sized For Normal Duty			Sized For Heavy Duty			Input Quantities		AC Input Protection Devices						Input Quantities	DC Input Protection [12]	
			Cat. No.	Output Overload Amps		Cat. No.	Output Overload Amps		Cont. AC Input		Fuse		Circuit Breaker [6]		140M/140MT Type E Combination Motor Controller with Adjustable Current Range [7] [8]		Cont. DC Input	Fuse Cat. No. 20-750-...	Fuse Holder Cat. No. 20-750-...
Hp				1 Min	3 s		1 Min	3 s	kVA	Amps	Min [A] [4]	Max [A] [5]	Max [A]	Min. Encl. Vol. [in.^{3}]	Cat. No.	Min Enclosure Volume [in.^{3}] [11]	Amps		
480-Volt AC Input																	**650-Volt DC Input**		
0.5	1	1.1				20G...D2P1	2.3	3.2	0.8	1.0	2	2	15	–	M-xxx-B25 [9]	3242	1.2	DCFUSE1-10A	DCFH-51
1.0	1	2.1	20G...D2P1	2.3	3.2	20G...D3P4	3.7	5.1	1.6	1.9	3	4	15	–	M-xxx-B25 [9]	3242	2.2	DCFUSE1-10A	DCFH-51
2.0	1	3.4	20G...D3P4	3.7	5.1	20G...D5P0	5.5	7.5	2.6	3.1	4	7	15	–	M-xxx-B40 [9]	3242	3.6	DCFUSE1-10A	DCFH-51
3.0	1	5.0	20G...D5P0	5.5	7.5	20G...D8P0	8.8	12.0	3.7	4.5	6	15	20	–	M-xxx-B63 [9]	3242	5.3	DCFUSE1-10A	DCFH-51
5.0	1	8.0	20G...D8P0	8.8	12.0	20G...D011	12.1	16.5	6.0	7.2	9	15	30	–	M-xxx-C10 [9]	3242	8.5	DCFUSE1-16A	DCFH-51
7.5	1	11	20G...D011	12.1	16.5	20G...D014	16.5	21.0	8.2	9.9	12	20	40	–	M-xxx-C16 [10]	3242	11.7	DCFUSE1-20A	DCFH-51
10	1	14	20G...D014	15.4	21.0				10.5	12.6	15	30	50	–	M-xxx-C16 [10]	3242	14.9	DCFUSE1-25A	DCFH-51
1.0	2	2.1	20G...D2P1	3.1	3.7	20G...D2P1	3.1	3.7	1.6	1.9	3	4	15	–	M-xxx-B25 [9]	3242	2.2	DCFUSE1-10A	DCFH-51
2.0	2	3.4	20G...D3P4	5.1	6.1	20G...D3P4	5.1	6.1	2.6	3.1	4	7	15	–	M-xxx-B40 [9]	3242	3.6	DCFUSE1-10A	DCFH-51
3.0	2	5.0	20G...D5P0	7.5	9.0	20G...D5P0	7.5	9.0	3.7	4.5	6	10	20	–	M-xxx-B63 [9]	3242	5.3	DCFUSE1-10A	DCFH-51
5.0	2	8.0	20G...D8P0	12.0	14.4	20G...D8P0	12.0	14.4	6.0	7.2	9	15	30	–	M-xxx-C10 [10]	3242	8.5	DCFUSE1-16A	DCFH-51
7.5	2	11	20G...D011	16.5	19.8	20G...D011	16.5	19.8	8.2	9.9	12	20	40	–	M-xxx-C16 [10]	3242	11.7	DCFUSE1-20A	DCFH-51
						20G...D014	16.5	21.0	8.2	9.9	12	20	40	–	M-xxx-C16 [10]	3242	11.7	DCFUSE1-20A	DCFH-51
10	2	14	20G...D014	15.4	21.0	20G...D022	21.0	33.0	10.5	12.6	15	30	50	–	M-xxx-C16 [10]	3242	14.9	DCFUSE1-25A	DCFH-51
15	2	22	20G...D022	24.2	33.0				16.5	19.9	25	45	80	–	M-F8E-C25	3242	23.5	DCFUSE3-40A	DCFH-NH1
	3					20G...D027	33.0	40.5	16.5	19.9	25	45	80	–	M-F8E-C25	4052	23.5	DCFUSE3-40A	DCFH-NH1
20	3	27	20G...D027	29.7	40.5	20G...D034	40.5	51.0	20.3	24.4	30	50	100	–	M-F8E-C32	4052	28.8	DCFUSE3-50A	DCFH-NH1
25	3	34	20G...D034	37.4	51.0	20G...D040	51.0	61.2	25.5	30.7	40	60	100	–	M-F8E-C45	4052	36.2	DCFUSE3-63A	DCFH-NH1
30	3	40	20G...D040	44.0	60.0	20G...D053	60.0	78.0	30.0	36.1	45	80	120	–	M-F8E-C45	4052	42.6	DCFUSE3-70A	DCFH-NH1
	4					20G...D052	60.0	78.0	30.0	36.1	45	80	120	–	M-F8E-C45	4863	42.6	DCFUSE3-70A	DCFH-NH1
40	4	52	20G...D052	57.2	78.0	20G...D065	78.0	97.5	39.1	47.0	60	100	150	–	–	–	55.4	DCFUSE3-100A	DCFH-NH1
						20G...D066	78.0	97.5	39.1	47.0	60	100	150	–	–	–	55.4	DCFUSE3-100A	DCFH-NH1
	3	53	20G...D053	58.3	79.5				39.8	47.9	60	100	150	–	–	–	56.5	DCFUSE3-100A	DCFH-NH1
50	4	65	20G...D065	71.5	97.5	20G...D078	97.5	117.0	48.8	58.7	80	125	175	–	–	–	69.3	DCFUSE3-125A	DCFH-NH1
	5					20G...D077	97.5	117.0	48.8	58.7	80	125	175	–	–	–	69.3	DCFUSE3S-160A	DCFH-NH1
	4	66	20G...D066	72.5	99.0				49.6	59.6	80	125	175	–	–	–	70.4	DCFUSE3-125A	DCFH-NH1
60	5	77	20G...D077	84.7	115.5	20G...D096	115.5	144.0	57.8	69.5	90	150	225	–	–	–	82.1	DCFUSE3S-160A	DCFH-NH1
	4	78	20G...D078	85.8	117.0				58.5	70.4	90	150	225	–	–	–	83.2	DCFUSE3-125A	DCFH-NH1
75	5	96	20G...D096	105.6	144.0	20G...D125 [3]	144.0	187.5	72.1	86.7	110	200	275	–	–	–	102.3	DCFUSE3S-200A	DCFH-NH1
100	6	125	20G...D125	137.5	187.5	20G...D156	187.5	234.0	96.0	115.5	150	250	375	–	–	–	136.4	DCFUSE3S-315A	DCFH-NH1
125	6	156	20G...D156	171.6	234.0	20G...D186	234.0	280.8	119.9	144.2	200	300	450	–	–	–	170.2	DCFUSE3S-315A	DCFH-NH1

480 Volt AC and 650 Volt DC Input Protection Devices—Drive Frames 1...7 (continued)

Applied Rating (1)	Frame (2)	Cont. Output Amps	Sized For Normal Duty			Sized For Heavy Duty			Input Quantities		AC Input Protection Devices						Input Quantities	DC Input Protection (12)	
			Cat. No.	Output Overload Amps		Cat. No.	Output Overload Amps		Cont. AC Input		Fuse		Circuit Breaker (6)		140M/140MT Type E Combination Motor Controller with Adjustable Current Range (7) (8)		Cont. DC Input	Fuse Cat. No. 20-750-...	Fuse Holder Cat. No. 20-750-...
Hp				1 Min	3 s		1 Min	3 s	kVA	Amps	Min [A](4)	Max [A](5)	Max [A]	Min. Encl. Vol. [in.3]	Cat. No.	Min Enclosure Volume [in.3] (11)	Amps		
480-Volt AC Input																	**650-Volt DC Input**		
150	6	186	20G...D186	204.6	279.0	20G...D248	279.0	372.0	142.9	171.9	225	400	550	–	–	–	203.0	DCFUSE3S-400A	DCFH-NH1
200	6	248	20G...D248	272.8	372.0				190.6	229.2	300	450	700	–	–	–	270.6	DCFUSE5S-500A	DCFH-NH2
	7					20G...D302	372.0	453.0	190.6	229.2	300	450	700	–	–	–	270.6	DCFUSE6S-500A	DCFH-NH3
250	7	302	20G...D302	332.2	453.0	20G...D361	453.0	543.6	232.0	279.1	350	600	900	–	–	–	329.5	DCFUSE6S-550A	DCFH-NH3
300	7	361	20G...D361	397.1	541.5	20G...D415	541.5	649.8	277.3	333.6	450	700	1000	–	–	–	393.9	DCFUSE6S-700A	DCFH-NH3
						20G...D477	541.5	649.8	277.3	333.6	450	700	1000	–	–	–	393.9	DCFUSE6S-700A	DCFH-NH3
350	7	415	20G...D415	456.5	622.5				318.9	383.6	500	800	1200	–	–	–	452.8	DCFUSE6S-900A	DCFH-NH3
400	7	477	20G...D477	524.7	715.5				366.6	440.9	600	800	1400	–	–	–	520.5	DCFUSE6S-900A	DCFH-NH3

(1) Applied rating refers to the motor that is 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 10HP motor. A D014 drive can be used in Heavy Duty mode on a 7.5 Hp motor with the same ratings as a D011 drive. The drive can be programmed for either mode. For any given catalog number, Normal Duty mode provides higher continuous current but smaller overload current compared to Heavy Duty mode. See parameter 0:36 [Duty Rating Cfg].

(2) Only enclosure codes F, N, and R. See Product Rating Cross-reference on page 14 for frame sizes of other enclosure types.

(3) This drive is the next larger frame size.

(4) For UL compliance - fast-acting class J (Bussmann DFJ) or fast-acting class T (Bussmann JJS) fuses only. Equivalent fuses of class J, T may be used if they have lower I_{peak} and I^2t ratings than the Bussmann JJS fuse. For CE compliance - type gR fuses (Bussmann 170M - size 00 to 3, IEC 60269 or DIN 43620, or FWP-_G10F, _G14F, _G22F) only. Minimum protection device size is the lowest rated device that supplies maximum protection without nuisance tripping. Max. source SCCR = 100 kA.

(5) For UL compliance - fast-acting class J (Bussmann DFJ) or fast-acting class T (Bussmann JJS) fuses only. Equivalent fuses of class J, T may be used if they have lower I_{peak} and I^2t ratings than the Bussmann JJS fuse. For CE compliance - type gR fuses (Bussmann 170M - size 00 to 3, IEC 60269 or DIN 43620, or FWP-_G10F, _G14F, _G22F) only. Maximum protection device size is the highest rated device that supplies drive protection. Max. source SCCR = 100 kA.

(6) Circuit breaker - inverse time breaker - must be used with a fuse specified in the table. For US NEC, minimum circuit breaker size is 125% of motor FLA. Ratings that are shown are maximum values.

(7) Bulletin 140M/140MT with adjustable current range must have the current trip set to the minimum range so that the device does not trip.

(8) Bulletin 140M/140MT is UL Listed for 480Y/277V. Not UL Listed for use on 400V or 480V Delta/Delta, corner ground, or high-resistance ground systems.

(9) Bulletin 140M/140MT must be Frame C (140M-C2E-xxx or 140MT-C3E-xxx) or Frame D (140M-D8E-xxx or 140MT-D9E-xxx). Max. source SCCR = 65 kA.

(10) Bulletin 140M/140MT must be Frame D (140M-D8E-xxx or 140MT-D9E-xxx) or Frame F (140M-F8E-xxx). Max. source SCCR = 65 kA.

(11) When using the Bulletin 140M/140MT, the drive must be installed in a ventilated or non-ventilated enclosure with the minimum volume that is specified in this column. Application-specific thermal considerations can require a larger enclosure.

(12) DC fuses specified are UL recognized and CE compliant.

Intermittent Overload

Normal Duty	110% Overload capability for up to 1 minute out of 10 minutes
	150% Overload capability for up to 3 seconds out of 60 seconds
Heavy Duty	150% Overload capability for up to 1 minute out of 10 minutes
	180% Overload capability for up to 3 seconds out of 60 seconds

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). UL61800-5-1 File E59272.

Short-circuit Current Rating

Maximum Short Circuit Rating	The maximum short circuit rating is 100,000 A RMS symmetrical.
Actual Short Circuit Rating	Can be further limited by AIC rating of customer supplied branch circuit fuse/ circuit breaker. The lowest rated device in the circuit determines the branch short circuit rating. If the fuses providing power to the drive are lower than 100 kA rms, the maximum short circuit rating is the short circuit rating of the fuses. If the fuses have rating higher than 100 kA rms, the maximum short circuit rating is 100 kA rms.

Apply and Remove Power

IMPORTANT It's recommend that you wait 5 minutes before cycling the power disconnect switches. This recommendation applies to both Off-to-On and On-to-Off transitions. Rapid power cycling can result in equipment damage.

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 every 5 minutes 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 can be required to remove the AC line to the drive. An auxiliary braking method can 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 can be installed between the drive and motor, or motors, to disconnect or isolate certain motors/loads. If a contactor is opened while the drive is operating, power is removed from the respective motor, but the drive continues 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 can cause the drive to fault. If any of these conditions are determined to be undesirable or unsafe, wire an auxiliary contact on the output contactor to a drive digital input that is programmed as "Enable." This causes 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 that aren't approved by Rockwell Automation.
- Output circuits that do not connect directly to the motor.

Contact Rockwell Automation for assistance with application or wiring.

Drive Power Jumper Configuration

PowerFlex 755TS 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 13.

MOV, AC EMI Capacitor, and Common Mode Capacitor Circuits

Figure 45 - MOV and AC EMI Capacitor Phase to Ground

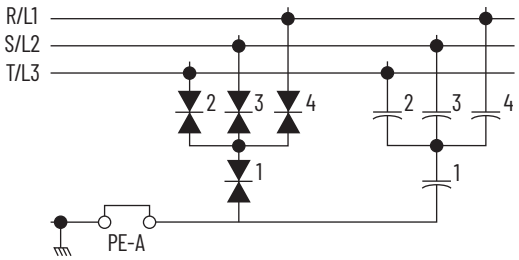
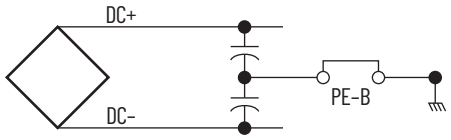


Figure 46 - Common Mode Capacitors to Ground



ATTENTION: To avoid an electric shock hazard, verify that the voltage on the bus capacitors has discharged completely before servicing.
Measure the DC bus voltage at the power terminal block by measuring between the +DC and -DC terminals (see page 67 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.

IMPORTANT PowerFlex 755TS drives leave the factory with jumpers PE-A and PE-B connected. Reconfigure these jumpers based on the power source type available.

Table 12 - Power Jumper Default Configuration

Cat. No. Position 11	Jumper PE-A (MOV/Input filter caps)	Jumper PE-B (DC bus common mode caps)
J	Connected	Connected

ATTENTION: Risk of equipment damage exists. The drive power source type must be accurately determined. Jumpers PE-A and PE-B must be configured for the power source type according to the recommendations in Table 49.

Table 13 - Recommended Power Jumper Configurations

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 or Corner Ground • AC fed ungrounded • Impedance grounded • B phase ground • DC fed from a passive rectifier	Disconnected	Disconnected	Helps avoid severe equipment damage when ground fault occurs
DC fed from an active converter	Disconnected	Disconnected	Helps avoid damage to filter capacitors
Solid Ground • AC fed solidly grounded • DC fed from passive rectifier that has a solidly grounded AC source	Connected	Connected	• 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 confirm known and controlled voltages.
(2) Frame 5...7 common DC input drives do not have the PE-A jumper.

To connect or disconnect these devices, see the jumper locations that are shown in Figure 47 on page 79 through Figure 53 on page 83.

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, install an isolation transformer. See Wiring and Grounding Guidelines for Pulse-width Modulated (PWM) AC Drives, publication DRIVES-IN001, for more information on impedance grounded and ungrounded systems.

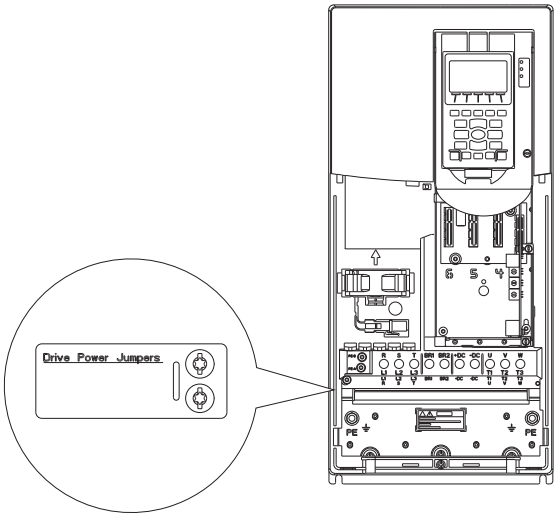
Power Jumper Screw Location, Removal, and Storage—Frames 2...5

Frames 2...5 use jumper screws to complete an electrical connection when installed. Install or remove jumper screws according to the recommendations in Table 13.

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 aren't used, store them on the left interior chassis wall as shown.

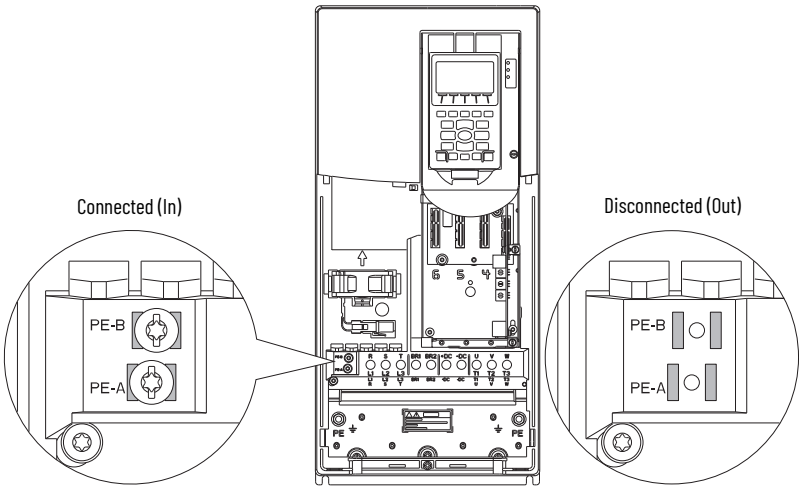
Figure 47 - Typical Frames 2...5 Jumper Screw Storage Location (Frame 4 shown)



When screws are installed, use this torque and tool:

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

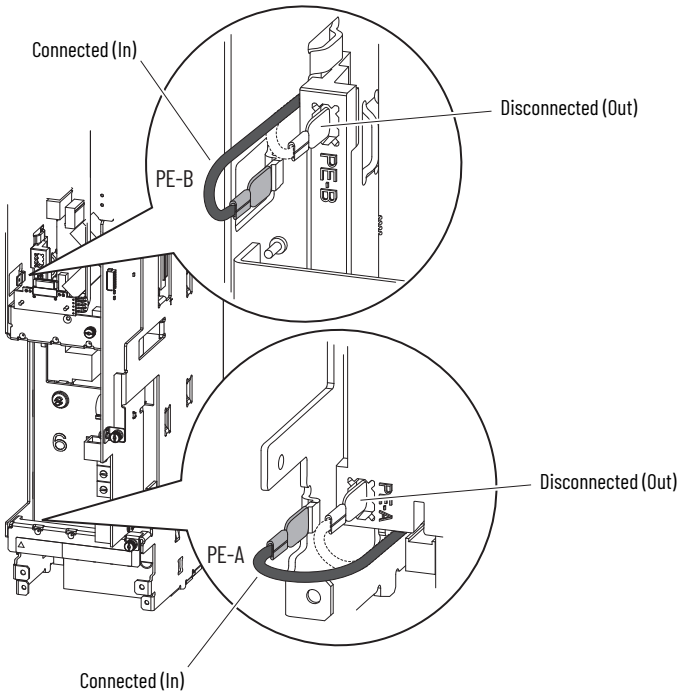


Power Jumper Wire Location and Connection Options—Frame 1

Frame 1 products use jumper wires to complete an electrical connection when installed. Install or remove jumper wires according to the recommendations in Table 13.

ATTENTION: Hazard of equipment damage exists if jumpers aren't properly disconnected. For Frame 1, secure the disconnected jumper wire to the insulated position provided.

Figure 49 - Jumper Wire Positions—Frame 1



When jumper wires are Connected (In), press the spade connector firmly onto the sheet metal tab.

Power Jumper Wire Location and Connection Options—Frame 6

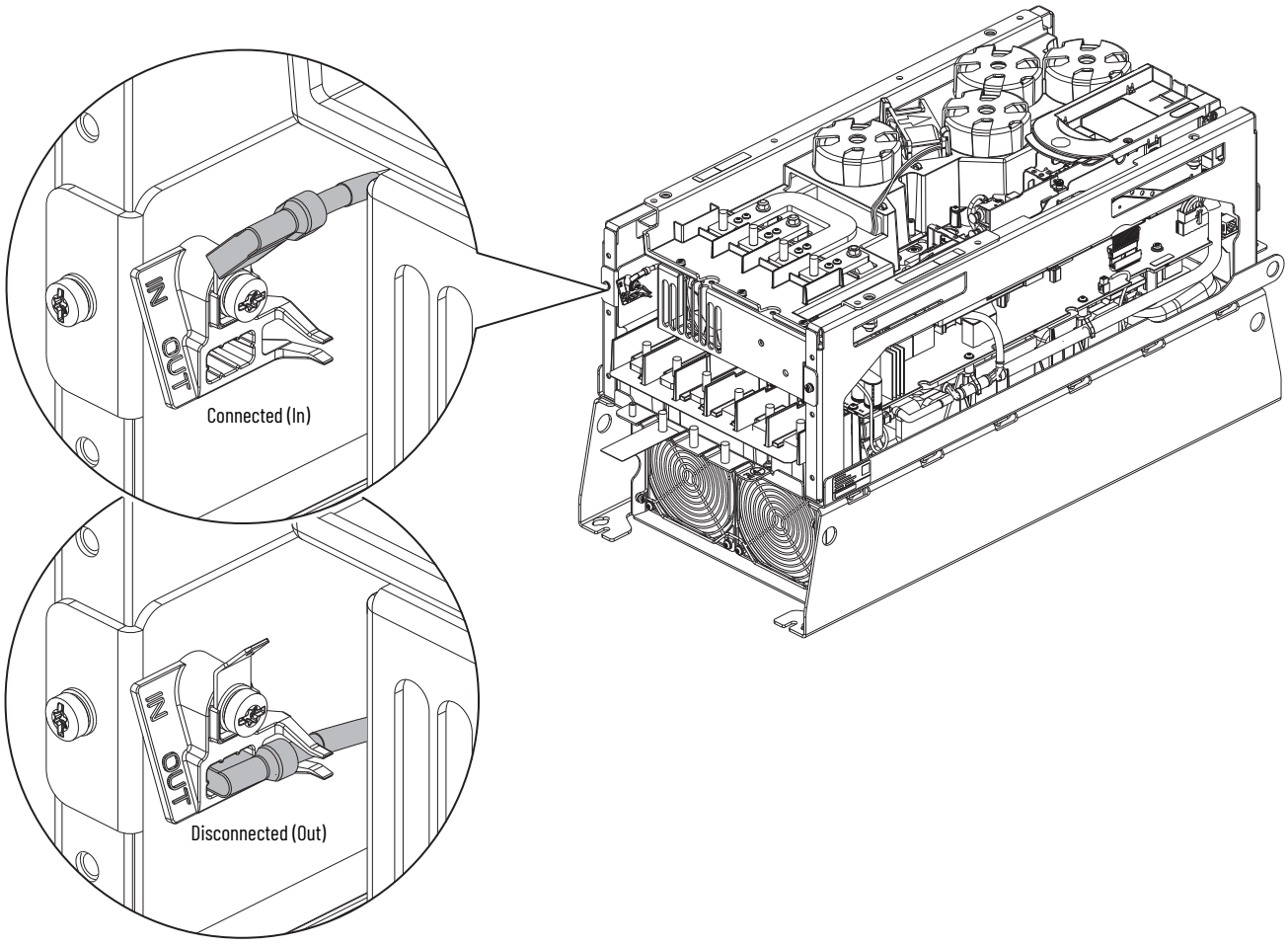
Frame 6 products use jumper wires to complete an electrical connection when installed. Install or remove jumper wires according to the recommendations in Table 13.

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

MOV and AC EMI Capacitor PE-A Jumper—Frame 6

The PE-A jumper is located to the left of the AC input terminals.

Figure 50 - PE-A Jumper Positions—Frame 6



When the jumper wire is Connected (In), press the spade connector firmly onto the sheet metal tab.

Common Mode Capacitor PE-B Jumper—Frame 6

Remove the touch guard to access the PE-B jumper wire.

Figure 51 - PE-B Jumper Wire Access—Frame 6

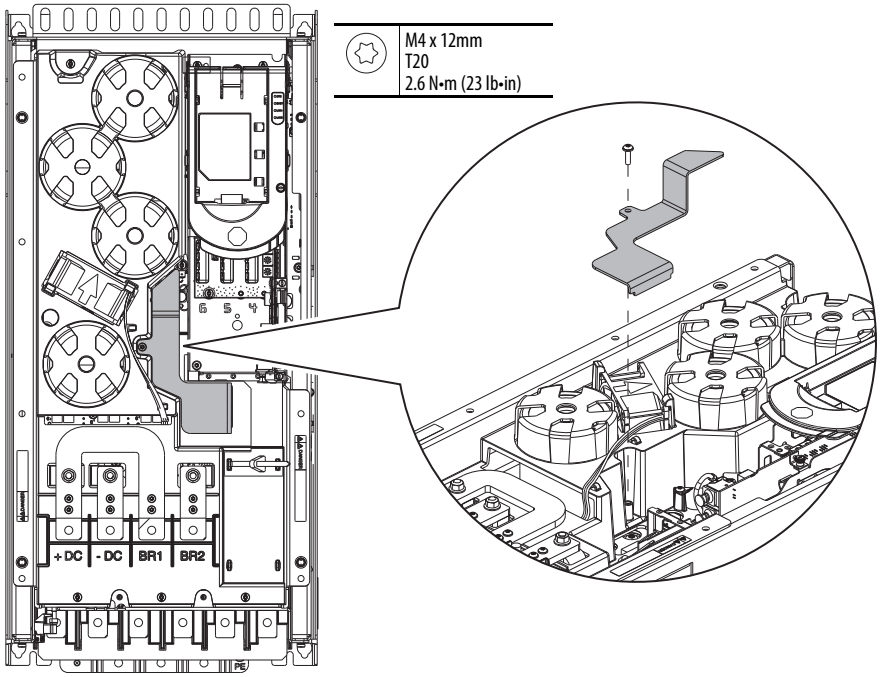
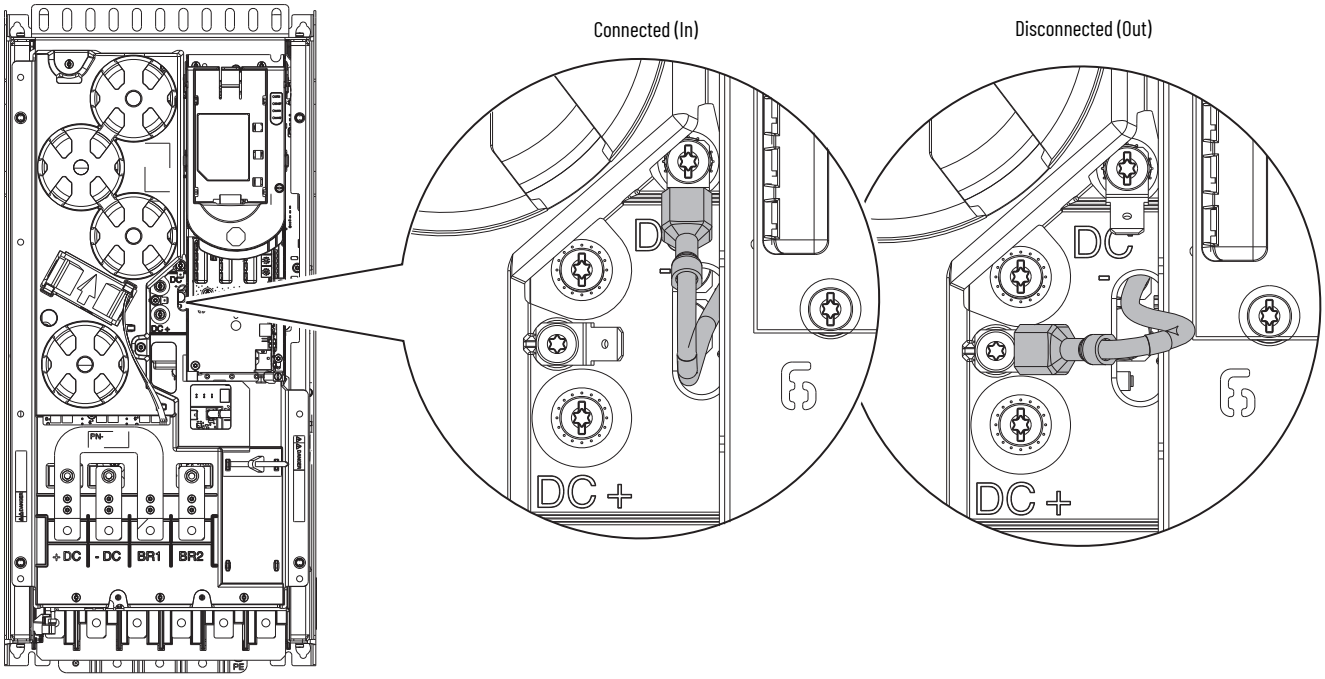


Figure 52 - PE-B Jumper Positions—Frame 6



When the jumper wire is Connected (In), press the spade connector firmly onto the sheet metal tab.

Power Jumper Wire Location and Connection Options—Frame 7

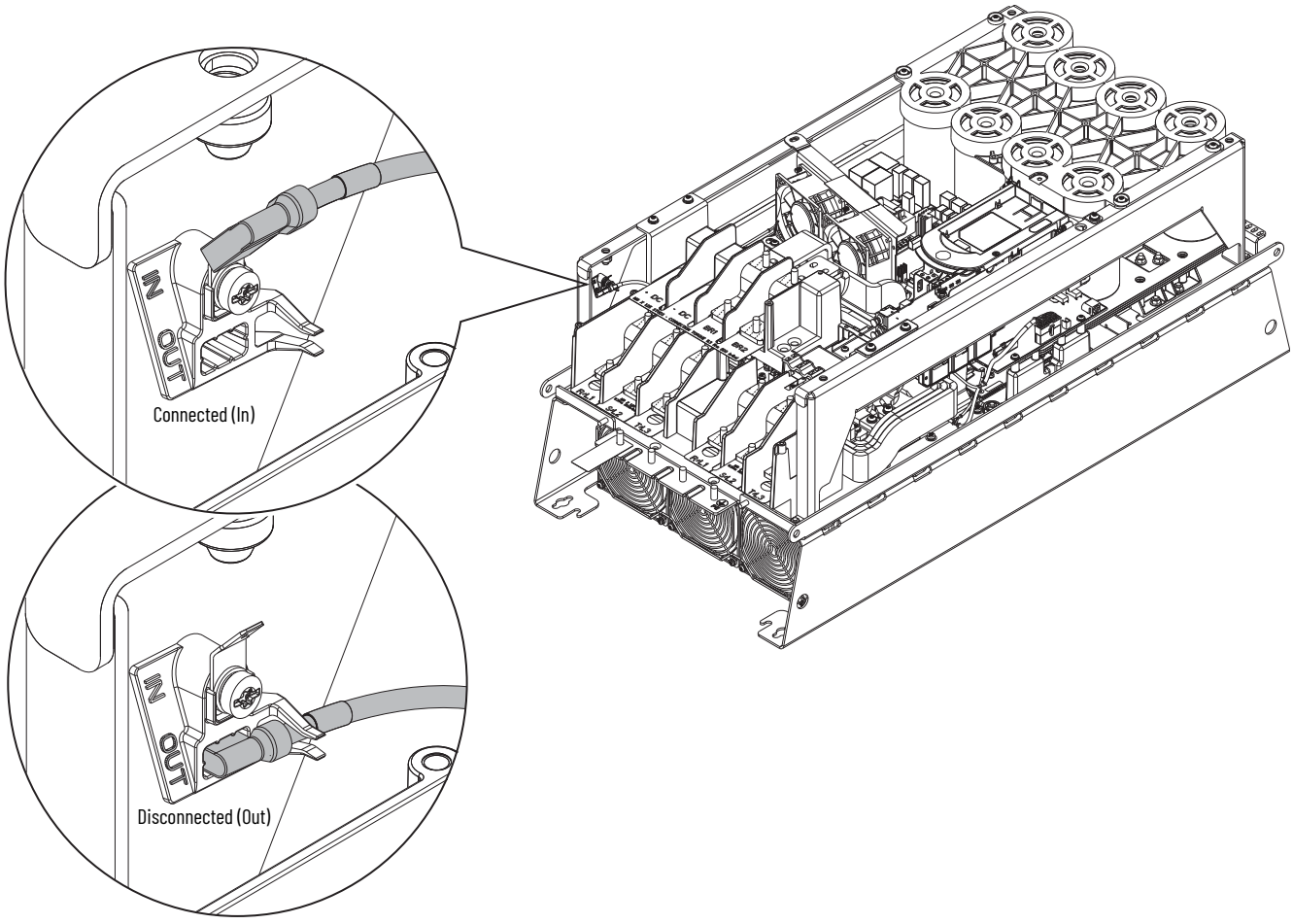
Frame 7 products use jumper wires to complete an electrical connection when installed. Install or remove jumper wires according to the recommendations in Table 13.

ATTENTION: Hazard of equipment damage exists if jumpers aren't properly disconnected. For Frame 7, secure the disconnected jumper wire to the insulated position provided.

MOV and AC EMI Capacitor PE-A Jumper—Frame 7

The PE-A jumper is located to the left of the AC input terminals.

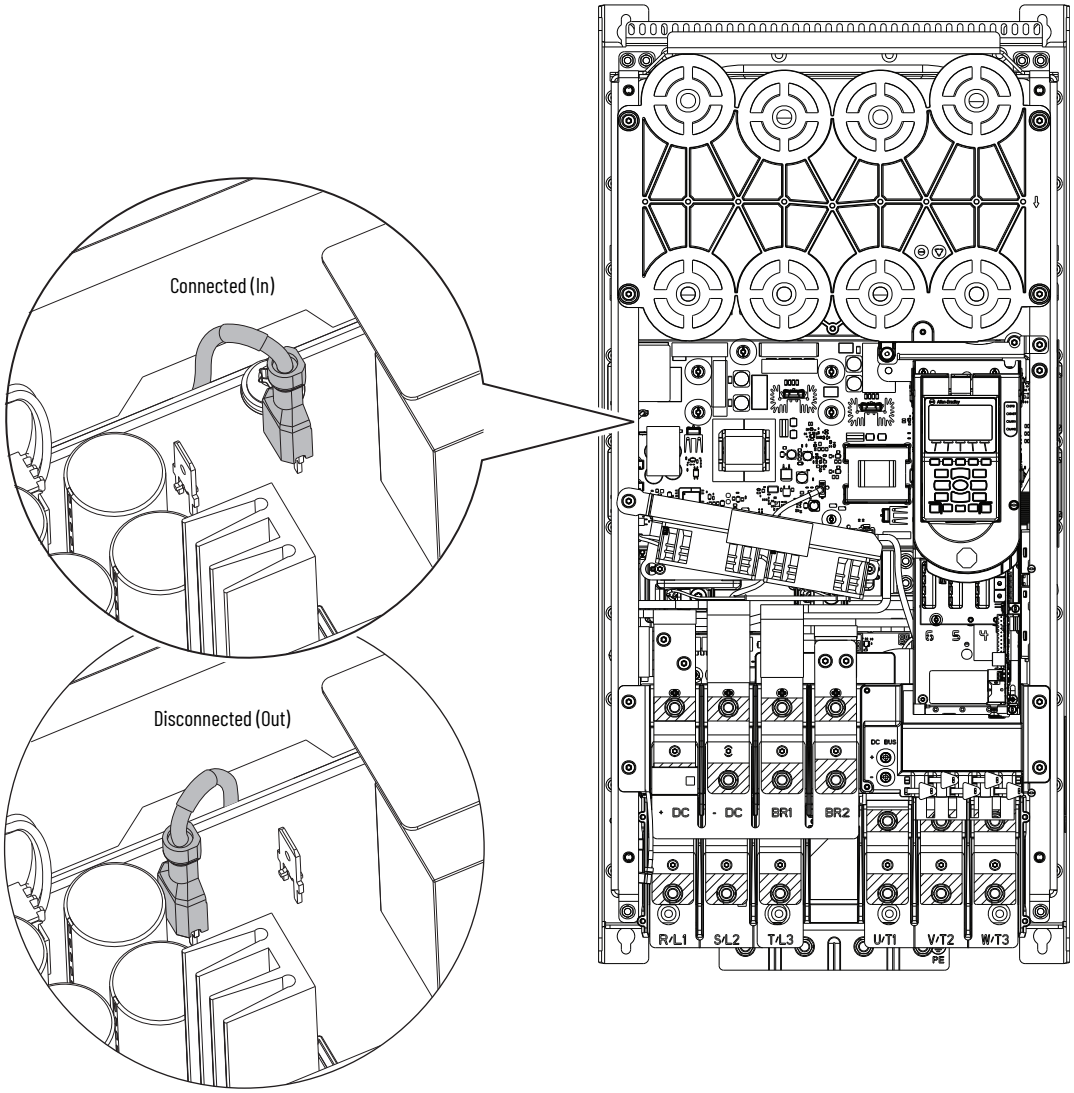
Figure 53 - PE-A Jumper Positions—Frame 7



When the jumper wire is Connected (In), press the spade connector firmly onto the sheet metal tab.

Common Mode Capacitor PE-B Jumper—Frame 7

Figure 54 - PE-B Jumper Wire Access—Frame 7



When the jumper wire is Connected (In), press the spade connector firmly onto the sheet metal tab.

Service and Maintenance

Read the information in this chapter and Product Advisories on page 9 before you begin tests, maintenance, or repairs on product components. This chapter covers service and maintenance for the PowerFlex® 755TS products.

ATTENTION: Once the product is connected to a power supply, always verify that system power is not present before performing any work on the product. See safety-related practices that are contained in publication NFPA 70E, Standard for Electrical Safety in the Work Place.

Recommended Preventative Maintenance

To help achieve the highest level of uptime, Rockwell Automation recommends that you follow the maintenance schedule that is provided for your operating environment. For environments with a corrosive atmosphere, use PowerFlex 755TS products with enhanced protection only. A maintenance schedule is provided for these environments:

- Table 14 Recommended Maintenance Schedule for Operating Conditions Below 40°C (104 °F) on page 87.
- Table 15 Recommended Maintenance Schedule for Operating Conditions Above 40°C (104 °F) on page 88.

IMPORTANT Duty cycle and load profile can greatly affect the reliability of PowerFlex 755TS Products with TotalFORCE Control.

An annual preventive maintenance program includes the following primary tasks:

- A visual inspection of all components accessible from the front of the drive
- Resistance checks on the power components
- Power-supply voltage level checks
- General cleaning and maintenance
- Tightness checks on all power connections

For for additional information on how to perform inspections and tests of PowerFlex 755TS drives, see the PowerFlex 755TS Products with TotalFORCE Control Hardware Service Manual, publication 750-TG101.

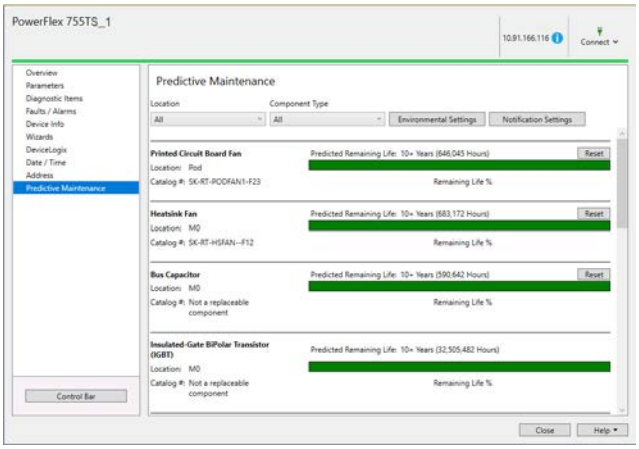
Predictive Maintenance

PowerFlex 755TS Products with TotalFORCE® Control contain algorithms for predictive maintenance that are used to improve the uptime of machines, processes, and facilities. These algorithms monitor the lifespan of certain components and display the percentage of remaining life and the number of hours or counts of remaining life in specific parameters or a software interface. These algorithms can be used to alert personnel when the components are nearing the end of their lifespan so the components can be replaced before they fail. For an overview of predictive maintenance, see the Predictive Maintenance section in the PowerFlex 750-Series Products with TotalFORCE Control Reference Manual, publication 750-RM100.

IMPORTANT Failure to address predictive maintenance alarms can cause unexpected downtime or premature product failure.

For PowerFlex 755TS drives, the remaining life of components with predictive maintenance appear on the Predictive Maintenance page in the Device Details window in Connected Components Workbench® software and the Drive Details window in Studio 5000 Logix Designer® application. See Figure 55 for an example.

Figure 55 - Connected Components Workbench - Predictive Maintenance Page



The shaded rows in Table 14 and Table 15, identify the components with predictive maintenance parameters or objects. Use the predictive maintenance parameters or objects to determine a replacement schedule for the applicable components. For more information on how to configure predictive maintenance parameters, see Predictive Maintenance in the PowerFlex 750-Series Products with TotalFORCE Control Reference Manual, publication 750-RM100. For more information on predictive maintenance objects, see Predictive Maintenance in the online help for PowerFlex 755TS products in the Connected Components Workbench software and Studio 5000 Logix Designer application.

Schedule Codes Explanation

The codes that are listed in this table are used to identify the task that is associated with the components that are identified in the tables on page 87 and page 88.

Code	Task	Description
I	Inspect	Inspect the component for signs of excessive accumulation of dust, dirt, or external damage. For example, inspect the fan inlets for debris that can block the airflow path.
C	Clean	Clean the components that can be reused, specifically fan inlets and heatsinks.
M	Maintain	This type of maintenance task can include tightening loose terminal and cable connectors.
R	Replace	This component has reached its mean operational life. Replace the component to decrease the chance of failure. It is likely that components can exceed their designed life, but component life is dependent on many factors such as usage and heat. Use the predictive maintenance objects to determine a replacement schedule for components in shaded table rows.
Rv	Review	A discussion with Rockwell Automation personnel is recommended to help determine whether any enhancements that have been made to the hardware could benefit the application.

Recommended Maintenance Tasks and Schedule

Table 14 - Recommended Maintenance Schedule for Operating Conditions Below 40°C (104 °F)

Components and Activities		Years of Operation																				
		0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
Air-cooling System	Heatsink Fan (cat. no. See Table 18)		I/C	I/C	I/C	I/C	I/C	I/C	I/C	I/C	I/C	I/C	I/C	I/C	I/C	I/C	I/C	I/C	I/C	I/C	I/C	I/C
	Stirring Fan (cat. no. See Table 19)		I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I
	Pod Fan (cat. no. See Table 20)		I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I
Circuit Boards	Main Control Circuit Board (cat. no. See Table 16)													R								
	Backplane Circuit Board (cat. no. See Table 16)													R								
	AC Precharge Circuit Board, Frames 6 and 7 (cat. no. See Table 26)													R								
	DC Precharge Circuit Board, Frames 6 and 7 (cat. no. See Table 26)													R								
Terminal Wiring	Cables and Connectors		I/M	I/M	I/M	I/M	I/M	I/M	I/M	I/M	I/M	I/M	I/M	I/M	I/M	I/M	I/M	I/M	I/M	I/M	I/M	I/M
Internal Components	Electrical Wiring Connections		I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I
	Bus Capacitors																					
	Insulated Gate BiPolar Transistor (IGBT)																					
Ground	PE Grounding Connection		I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I
Enhancements	Firmware				Rv			Rv			Rv			Rv			Rv			Rv		
	Hardware				Rv			Rv			Rv			Rv			Rv			Rv		
Operational Conditions	Parameters		I	I	Rv	I	I	Rv	I	I	Rv	I	I	Rv	I	I	Rv	I	I	Rv	I	I
	Variables		I	I	Rv	I	I	Rv	I	I	Rv	I	I	Rv	I	I	Rv	I	I	Rv	I	I
	Application Concerns		I	I	Rv	I	I	Rv	I	I	Rv	I	I	Rv	I	I	Rv	I	I	Rv	I	I
Spare Parts (1)	Inventory/Needs		I	I	Rv	I	I	Rv	I	I	Rv	I	I	Rv	I	I	Rv	I	I	Rv	I	I

(1) For products that have been in storage for more than one year, see instructions on how to reform the bus capacitors, visit rok.auto/support and search on Capacitor Reforming Guidelines.

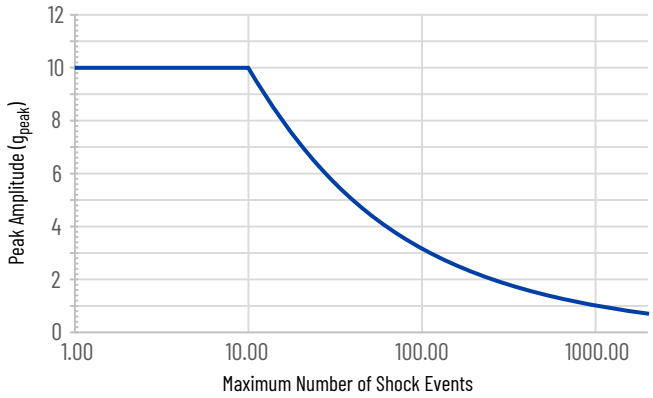
Table 15 - Recommended Maintenance Schedule for Operating Conditions Above 40°C (104 °F)

Components and Activities		Years of Operation																				
		0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
Air-cooling System	Heatsink Fan (cat. no. See Table 18)		I/C	I/C	I/C	I/C	I/C	I/C	I/C	I/C	I/C	I/C	I/C	I/C	I/C	I/C	I/C	I/C	I/C	I/C	I/C	I/C
	Stirring Fan (cat. no. See Table 19)		I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I
	Pod Fan (cat. no. See Table 20)		I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I
Circuit Boards	Main Control Circuit Board (cat. no. See Table 16)									R												
	Backplane Circuit Board (cat. no. See Table 16)									R												
	AC Precharge Circuit Board, Frames 6 and 7 (cat. no. See Table 26)									R												
	DC Precharge Circuit Board, Frames 6 and 7 (cat. no. See Table 26)									R												
Terminal Wiring	Cables and Connectors		I/M	I/M	I/M	I/M	I/M	I/M	I/M	I/M	I/M	I/M	I/M	I/M	I/M	I/M	I/M	I/M	I/M	I/M	I/M	I/M
Internal Components	Electrical Wiring Connections		I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I
	Bus Capacitors																					
	Insulated Gate BiPolar Transistor (IGBT)																					
Ground	PE Grounding Connection		I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I
Enhancements	Firmware				Rv			Rv			Rv			Rv			Rv			Rv		
	Hardware				Rv			Rv			Rv			Rv			Rv			Rv		
Operational Conditions	Parameters		I	I	Rv	I	I	Rv	I	I	Rv	I	I	Rv	I	I	Rv	I	I	Rv	I	I
	Variables		I	I	Rv	I	I	Rv	I	I	Rv	I	I	Rv	I	I	Rv	I	I	Rv	I	I
	Application Concerns		I	I	Rv	I	I	Rv	I	I	Rv	I	I	Rv	I	I	Rv	I	I	Rv	I	I
Spare Parts (1)	Inventory/Needs		I	I	Rv	I	I	Rv	I	I	Rv	I	I	Rv	I	I	Rv	I	I	Rv	I	I

(1) For products that have been in storage for more than one year, see instructions on how to reform the bus capacitors, visit rok.auto/support and search on Capacitor Reforming Guidelines.

Shock Events

PowerFlex 755TS products can withstand a finite number of shock events. The maximum allowable number of shock events increases as the peak amplitude decreases. Below 0.7 g peak, the maximum total shock events should not exceed 2000 cycles.



Maintenance of Industrial Control Equipment

ATTENTION: Performing service on energized Industrial Control Equipment can be hazardous. Severe injury or death can result from electrical shock, bump, or unintended actuation of controlled equipment. Recommended practice is to disconnect and lockout control equipment from power sources, and release stored energy, if present. See National Fire Protection Association Standard No. NFPA 70E, Part II and (as applicable) OSHA rules for Control of Hazardous Energy Sources (lockout/tagout) and OSHA Electrical Safety Related Work Practices for safety-related work practices. These publications include procedural requirements for lockout/tagout, and appropriate work practices, personnel qualifications, and required training where it is not feasible to de-energize and lockout or tagout electric circuits and equipment before working on or near exposed circuit parts.

Periodic Inspection - Periodically inspect industrial control equipment. Base inspection intervals on the environmental and operating conditions and adjust the intervals as necessary. An initial inspection within 3 to 4 months after installation is suggested. See National Electrical Manufacturers Association NEMA) Standard No. ICS 1.3, Preventive Maintenance of Industrial Control and Systems Equipment, for general guidelines for defining a periodic maintenance program. Also see the 'Maintenance of Industrial Control Equipment' section in the PowerFlex 755TS Products with TotalFORCE Control Hardware Service Manual, publication 750-TG101.

Contamination - If inspection reveals that dust, dirt, moisture, or other contamination has reached the control equipment, the cause must be removed. Contamination can indicate an incorrectly selected or ineffective enclosure, unsealed enclosure openings (conduit or other), or incorrect operating procedures. Replace any improperly selected enclosure with one that is suitable for the environmental conditions. See the Industry Installation Guidelines for Pulse Width Modulated (PWM) AC Drives, publication DRIVES-AT003, for guidance on environmental considerations. See NEMA Standard No. 250, Enclosures for Electrical Equipment, or UL 50E Electrical Equipment Enclosures, for enclosure type descriptions and test criteria.

Replace any damaged or cracked elastomer seals and repair or replace any other damaged or malfunctioning parts (for example, hinges and fasteners). Dirty, wet, or contaminated control devices must be replaced. Compressed air is not recommended for cleaning because it can displace dirt, dust, or debris into other parts or equipment, or damage delicate parts.

PowerFlex 755TS products with XT use dielectric grease to protect critical connections from the effects of corrosive gases. When you disconnect or reconnect a greased connection, always inspect for dust, dirt, conductive debris or other contaminants. If contamination is found, see the dielectric grease application section in the PowerFlex 755TS Products with TotalFORCE Control Hardware Service Manual, publication 750-TG101 for detailed instructions on how to thoroughly clean receiving surfaces and re-apply dielectric grease.

Fans - Inspect fans that are used for forced air cooling. Replace any that have bent, chipped, or missing blades, or if the shaft does not turn freely. Apply power momentarily to check operation. If the unit does not operate, replace it. Clean the fins of heatsinks so convection cooling is not impaired.

Operating Mechanisms - Check for proper function and freedom from sticking or binding. Replace any broken, deformed, or badly worn parts or assemblies according to individual product renewal-parts lists. Check for and re-tighten securely any loose fasteners. Lubricate if specified in individual product instructions. Note: Allen-Bradley® magnetic starters, contactors, and relays are designed to operate without lubrication. Do not lubricate these Allen-Bradley devices because oil or grease on the pole faces (mated surfaces) of the operating magnet can cause the device to stick in the "ON" mode. Some parts of other devices are factory lubricated – if lubrication during use or maintenance of these devices is needed, it is specified in their individual instructions. If in doubt, consult your nearest Rockwell Automation sales office for information.

Contacts - Check contacts for excessive wear and dirt accumulation. Wipe contacts with a soft cloth, if necessary, to remove dirt. Discoloration and slight pitting does not harm contacts. Do not file contacts - this action shortens the life of the contact. Do not use contact spray cleaners because residue on magnet pole faces or in operating mechanisms can cause sticking, and on contacts can interfere with electrical continuity. Replace contacts only after the silver has become badly worn. Always replace contacts in complete sets to avoid misalignment and uneven contact pressure.

Terminals - Loose connections in power circuits can cause overheating that can lead to equipment malfunction or failure. Loose connections in control circuits can cause control malfunctions. Loose bond or ground connections can increase hazards of electrical shock and contribute to electromagnetic interference (EMI). Check the tightness of all terminals and bus bar connections and torque any loose connections properly. Infrared technology can be used to check for hot (high resistance/loose) connections during periodic maintenance. Replace any parts or wiring that is damaged by overheating, and any broken wires or bond straps.

Coils - If a coil is overheated (contains cracked, melted, or burned insulation), it must be replaced. In that event, check for and correct overvoltage or undervoltage conditions, which can cause coil failure. Be sure to clean any residues of melted coil insulation from other parts of the device or replace such parts.

Pilot Lights - Replace any burned out lamps or damaged lenses. Photoelectric Switches-The lenses of photoelectric switches require periodic cleaning with a soft dry cloth. Reflective devices that are used with photoelectric switches also require periodic cleaning. Do not use solvents or detergents on the lenses or reflectors. Replace any damaged lenses and reflectors.

Solid-state Devices

ATTENTION: Use of other than factory-recommended test equipment for solidstate controls can result in damage to the control or test equipment or unintended actuation of the controlled equipment. See paragraph titled HIGH VOLTAGE TESTING.
Solid-state devices require little more than a periodic visual inspection. Discolored, charred, or burned components can indicate the need to replace the component or circuit board. Make necessary replacements only at the circuit board or plug-in component level. Inspect printed circuit boards to determine whether they are properly seated in the edge board connectors. Board locking tabs must also be in place. Solid-state devices must also be protected from contamination, and temperature control provisions must be maintained - refer to paragraphs titled CONTAMINATION and COOLING DEVICES. Do not use solvents on printed circuit boards.

High-Voltage Testing - Do not perform high-voltage insulation resistance (IR) and dielectric withstanding voltage (DWV) tests to check solid-state control equipment. When measuring IR or DWV of electrical equipment such as transformers or motors, a solid-state device that is used for control or monitoring must be disconnected before performing the test. Even though no damage is readily apparent after an IR or DWV test, the solid-state devices are degraded and repeated application of high voltage can lead to failure.

Locking and Interlocking Devices - Check these devices for proper working condition and capability of performing their intended functions. Make any necessary replacements only with Allen-Bradley renewal parts or kits. Adjust or repair only in accordance with Allen-Bradley instructions.

Maintenance After a Fault Condition - An open short circuit protective device (such as a fuse or circuit breaker) in a properly coordinated motor branch circuit is an indication of a fault condition in excess of operating overload. Such conditions can damage control equipment. Before power is restored, the fault condition must be corrected and any necessary repairs or replacements must be made to restore the control equipment to good working order. See NEMA Standards Publication No. ICS-2, Part ICS2-302 for procedures. For replacements, use only parts and devices that Rockwell Automation recommends maintaining the integrity of the equipment. Make sure that the parts are properly matched to the model, series, and revision level of the equipment.

Final Check Out - After maintenance or repair of industrial controls, always test the control system for proper function under controlled conditions to avoid a control malfunction hazard. For additional information, see NEMA ICS 1.3, PREVENTIVE MAINTENANCE OF INDUSTRIAL CONTROL AND SYSTEMS EQUIPMENT, published by the National Electrical Manufacturers Association, and NFPA 70B, ELECTRICAL EQUIPMENT MAINTENANCE, published by the National Fire Protection Association.

Replacement Parts

The following tables list the replaceable parts and accessories and a link to the publication to use to perform the part replacement or accessory installation.

Table 16 - Control Pod Components

Part / Kit Description	Catalog Number	Publication
Main Control Board, Standard Protection	SK-RT-MCB1-PF755	750-TG101
Main Control Board, XT Protection	SK-RT-MCB1-PF755-XT	
Backplane Board, Standard Protection	SK-RM-BP1	
Backplane Board, XT Protection	SK-RM-BP1-XT	
Control Pod HIM Bezel, Standard Protection	SK-RT-BZL1	
Control Pod HIM Bezel, XT Protection	SK-RT-BZL1-XT	
Pod Internal Cooling Fan, NEMA/UL Type 4X/12	SK-RT-PODFAN1	
Pod Internal Cooling Fan, NEMA/UL Type 4X/12, XT	SK-RT-PODFAN1-XT	
Remote Mount Control Pod Kit	20-750-RPD1-F8	750-IN015

Table 17 - Conduit Box

Part / Kit Description	Catalog Number	Publication
Frame 1, NEMA/Type 1 Conduit Box	20-750-NEMA1-F1	750-IN008
Frame 2, NEMA/Type 1 Conduit Box	20-750-NEMA1-F2	
Frame 3, NEMA/Type 1 Conduit Box	20-750-NEMA1-F3	
Frame 4, NEMA/Type 1 Conduit Box	20-750-NEMA1-F4	
Frame 5, NEMA/Type 1 Conduit Box	20-750-NEMA1-F5	
Frame 6, NEMA/Type 1 Conduit Box	20-750-NEMA1-F6	
Frame 7, NEMA/Type 1 Conduit Box	20-750-NEMA1-F7	

Table 18 - Heatsink Fans

Part Description	Catalog Number	Publication
Frames 1 and 2, IP21, NEMA/UL Type 1	SK-RT-HSFAN1-F12	750-TG101
Frames 1 and 2, IP21, NEMA/UL Type 1, XT	SK-RT-HSFAN1-F12-XT	
Frame 2, NEMA/UL Type 4X/12, XT	SK-RT-HSFAN2-F2-XT	
Frame 3, IP21, NEMA/UL Type 1	SK-RT-HSFAN1-F3	
Frame 3, IP21, NEMA/UL Type 1	SK-RT-HSFAN1-F3-XT	
Frame 3, IP21, NEMA/UL Type 1	SK-RT-HSFAN1-F3A	
Frame 3, IP21, NEMA/UL Type 1, XT	SK-RT-HSFAN1-F3A-XT	
Frame 3, NEMA/UL Type 4X/12, XT	SK-RT-HSFAN2-F3-XT	
Frame 4, IP21, NEMA/UL Type 1	SK-RT-HSFAN1-F4	
Frame 4, NEMA/UL Type 4X/12, XT	SK-RT-HSFAN1-F4-XT	
Frames 4 and 5, NEMA/UL Type 4X/12, XT	SK-RT-HSFAN2-F45-XT	
Frame 5, IP21, NEMA/UL Type 1	SK-RT-HSFAN1-F5A	
Frame 5, IP21, NEMA/UL Type 1, XT	SK-RT-HSFAN1-F5A-XT	
Frame 5, IP21, NEMA/UL Type 1	SK-RT-HSFAN1-F5	
Frame 5, IP21, NEMA/UL Type 1, XT	SK-RT-HSFAN1-F5-XT	
Frame 6, IP21, NEMA/UL Type 1	SK-RT-HSFAN1-F6	
Frame 6, IP21, NEMA/UL Type 1, XT	SK-RT-HSFAN1-F6-XT	
Frame 6, NEMA/UL Type 4X/12, XT	SK-RT-HSFAN2-F6-XT	
Frame 7, IP21, NEMA/UL Type 1	SK-RT-HSFAN1-F7	
Frame 7, IP21, NEMA/UL Type 1, XT	SK-RT-HSFAN1-F7-XT	
Frame 7, NEMA/UL Type 4X/12, XT	SK-RT-HSFAN2-F7-XT	

Table 19 - Stirring Fans

Part Description	Catalog Number	Publication
Frames 4 and 5, NEMA/UL Type 4X/12	SK-RT-STIRFAN1-F45	750-TG101
Frames 4 and 5, NEMA/UL Type 4X/12, XT	SK-RT-STIRFAN1-F45-XT	
Frame 6, Fan A, NEMA/UL Type 4X/12	SK-RT-STIRFANL1-F6	
Frame 6, Fan A, NEMA/UL Type 4X/12, XT	SK-RT-STIRFAN1L-F6-XT	
Frame 6, Fan B, NEMA/UL Type 4X/12	SK-RT-STIRFAN1R-F6	
Frame 6, Fan B, NEMA/UL Type 4X/12, XT	SK-RT-STIRFAN1R-F6-XT	
Frame 7, Fan B, NEMA/UL Type 4X/12	SK-RT-STIRFAN1-F7	
Frame 7, Fan B, NEMA/UL Type 4X/12, XT	SK-RT-STIRFAN1-F7-XT	

Table 20 - Pod Fans

Part Description	Catalog Number	Publication
NEMA/UL Type 1/4X/12	SK-RT-PODFAN1	750-TG101
NEMA/UL Type 1/4X/12, XT	SK-RT-PODFAN1-XT	

Table 21 - NEMA Type 1 Chassis Kits

Part Description	Catalog Number	Publication
Frame 1, Standard Protection	SK-RT-CHSS1-F1	750-TG101
Frame 1, XT Protection	SK-RT-CHSS1-F1-XT	
Frame 2, Standard Protection	SK-RT-CHSS1-F2	
Frame 2, XT Protection	SK-RT-CHSS1-F2-XT	
Frame 3, Standard Protection	SK-RT-CHSS1-F3	
Frame 3, XT Protection	SK-RT-CHSS1-F3-XT	
Frame 4, Standard Protection	SK-RT-CHSS1-F4	
Frame 4, XT Protection	SK-RT-CHSS1-F4-XT	
Frame 5, Standard Protection	SK-RT-CHSS1-F5	
Frame 5, XT Protection	SK-RT-CHSS1-F5-XT	

Table 22 - Flange Gasket Kits

Part Description	Catalog Number	Publication
Frame 2, Flange Gasket Kit	SK-RT-FG1-F2	750-TG101
Frame 3, Flange Gasket Kit	SK-RT-FG1-F3	
Frame 4, Flange Gasket Kit	SK-RT-FG1-F4	
Frame 5, Flange Gasket Kit	SK-RT-FG1-F5	
Frame 6, Flange Gasket Kit	SK-RT-FG1-F6	
Frame 7, Flange Gasket Kit	SK-RT-FG1-F7	

Table 23 - Flange Mount Kits

Part Description	Catalog Number	Publication
Frame 2, Flange Mount Adapter Kit	20-750-TFLNG1-F2	750-IN122
Frame 3, Flange Mount Adapter Kit	20-750-TFLNG1-F3	
Frame 4, Flange Mount Adapter Kit	20-750-TFLNG1-F4	
Frame 5, Flange Mount Adapter Kit	20-750-TFLNG1-F5	
Frame 6, Flange Mount Adapter Kit	20-750-TFLNG1-F6	750-IN123
Frame 7, Flange Mount Adapter Kit	20-750-TFLNG1-F7	

Table 24 - Renewal Parts—Cover Kits

Part Description	Catalog Number	Publication
Frame 1, NEMA/UL Type 1 Replacement Cover	SK-RT-CVR1-F1	750-TG101
Frame 1, NEMA/UL Type 1 Replacement Cover, XT	SK-RT-CVR1-F1-XT	
Frame 2, NEMA/UL Type 1 Replacement Cover	SK-RT-CVR1-F2	
Frame 2, NEMA/UL Type 1 Replacement Cover, XT	SK-RT-CVR1-F2-XT	
Frame 3, NEMA/UL Type 1 Replacement Cover	SK-RT-CVR1-F3	
Frame 3, NEMA/UL Type 1 Replacement Cover, XT	SK-RT-CVR1-F3-XT	
Frame 4, NEMA/UL Type 1 Replacement Cover	SK-RT-CVR1-F4	
Frame 4, NEMA/UL Type 1 Replacement Cover, XT	SK-RT-CVR1-F4-XT	
Frame 5, NEMA/UL Type 1 Replacement Cover	SK-RT-CVR1-F5	
Frame 5, NEMA/UL Type 1 Replacement Cover, XT	SK-RT-CVR1-F5-XT	
Frame 6, NEMA/UL Type 1 Replacement Cover	SK-RT-CVR1-F6	
Frame 6, NEMA/UL Type 1 Replacement Cover, XT	SK-RT-CVR1-F6-XT	
Frame 7, NEMA/UL Type 1 Replacement Cover	SK-RT-CVR1-F7	
Frame 7, NEMA/UL Type 1 Replacement Cover, XT	SK-RT-CVR1-F7-XT	
Frame 2, NEMA/UL Type 12 Replacement Cover	SK-RT-CVR12-F2	
Frame 2, NEMA/UL Type 12 Replacement Cover, XT	SK-RT-CVR12-F2-XT	
Frame 3, NEMA/UL Type 12 Replacement Cover	SK-RT-CVR12-F3	
Frame 3, NEMA/UL Type 12 Replacement Cover, XT	SK-RT-CVR12-F3-XT	
Frame 4, NEMA/UL Type 12 Replacement Cover	SK-RT-CVR12-F4	
Frame 4, NEMA/UL Type 12 Replacement Cover, XT	SK-RT-CVR12-F4-XT	
Frame 5, NEMA/UL Type 12 Replacement Cover	SK-RT-CVR12-F5	
Frame 5, NEMA/UL Type 12 Replacement Cover, XT	SK-RT-CVR12-F5-XT	

Table 25 - Renewal Parts—Power Interface Circuit Boards

Part Description	Catalog Number	Publication
Frame 6, 400V 104A, 480V 96A, Power Interface Board	SK-RT-PIB1-C104D096	750-TG101
Frame 6, 400V 104A, 480V 96A, Power Interface Board, XT	SK-RT-PIB1-C104D096-XT	
Frame 6, 400V 140A, 480V 125A, Power Interface Board	SK-RT-PIB1-C140D125	
Frame 6, 400V 140A, 480V 125A, Power Interface Board, XT	SK-RT-PIB1-C140D125-XT	
Frame 6, 400V 170A, 480V 156A, Power Interface Board	SK-RT-PIB1-C170D156	
Frame 6, 400V 170A, 480V 156A, Power Interface Board, XT	SK-RT-PIB1-C170D156-XT	
Frame 6, 400V 205A, 480V 186A, Power Interface Board	SK-RT-PIB1-C205D186	
Frame 6, 400V 205A, 480V 186A, Power Interface Board, XT	SK-RT-PIB1-C205D186-XT	
Frame 6, 400V 260A, 480V 248A, Power Interface Board	SK-RT-PIB1-C260D248	
Frame 6, 400V 260A, 480V 248A, Power Interface Board, XT	SK-RT-PIB1-C260D248-XT	
Frame 7, 400V 302A, 480V 302A, Power Interface Board	SK-RT-PIB1-C302D302	
Frame 7, 400V 302A, 480V 302A, Power Interface Board, XT	SK-RT-PIB1-C302D302-XT	
Frame 7, 400V 367A, 480V 361A, Power Interface Board	SK-RT-PIB1-C367D361	
Frame 7, 400V 367A, 480V 361A, Power Interface Board, XT	SK-RT-PIB1-C367D361-XT	
Frame 7, 400V 456A, 480V 415A, Power Interface Board	SK-RT-PIB1-C456D415	
Frame 7, 400V 456A, 480V 415A, Power Interface Board, XT	SK-RT-PIB1-C456D415-XT	
Frame 7, 400V 477A, 480V 477A, Power Interface Board	SK-RT-PIB1-C477D477	
Frame 7, 400V 477A, 480V 477A, Power Interface Board, XT	SK-RT-PIB1-C477D477-XT	

Table 26 - Renewal Parts—Precharge Circuit Boards

Part / Kit Description	Catalog Number	Publication
Frame 6, 400V/480V, AC Precharge Board	SK-RT-ACPC-CDF6	750-TG101S
Frame 6, 400V/480V, AC Precharge Board, XT	SK-RT-ACPC-CDF6-XT	
Frame 7, 400V/480V, DC Precharge Board	SK-RT-ACPC-CDF7	
Frame 7, 400V/480V, DC Precharge Board, XT	SK-RT-ACPC-CDF7-XT	
Frame 6 and 7, DC Precharge Board	SK-RT-DCPC-F67	
Frame 6 and 7, DC Precharge Board, XT	SK-RT-DCPC-F67-XT	

Table 27 - Renewal Parts—Leg Kits

Part / Kit Description	Catalog Number	Publication
Frame 6, Replacement Leg Kit	SK-R9-LEG1-F6	RA-IN026
Frame 7, Replacement Leg Kit	SK-R9-LEG1-F7	

Table 28 - Renewal Parts—EMC C3 Bracket Kits

Part / Kit Description	Catalog Number	Publication
Frame 1, Replacement EMC C3 Bracket Kit	SK-RT-EMC3-F1	This publication, see page 61
Frame 2, Replacement EMC C3 Bracket Kit	SK-RT-EMC3-F2	
Frame 3, Replacement EMC C3 Bracket Kit	SK-RT-EMC3-F3	
Frame 4 Replacement EMC C3 Bracket Kit	SK-RT-EMC3-F4	
Frame 5, Replacement EMC C3 Bracket Kit	SK-RT-EMC3-F5	

Commonly Used Installation and Service Tools

This list includes the tools that are needed for installation, test measurements, basic maintenance, and repairs.

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.

Table 29 - Installation and Service Tools

Tool Description	Details
Allen socket wrench	4 mm, 5 mm
Allen socket wrench extension	254 mm (10 in.)
Box wrench	7 mm, 8 mm, 10 mm, 13 mm, 17mm, 19 mm, 22 mm
Crimping tools	For cable terminals 1.5...240
Current clamp	1000A (AC, rms), signal output
ESD-protected place of work	Work surface, floor cover, seat, and ground connections
ESD-protective clothing	Wrist wrap, shoes, overall clothing (coat)
Flashlight	–
Flat-nose screwdriver	3 mm (0.12 in.), 5 mm (0.19 in.), 6.4 mm (0.25 in.), 9.5 mm (0.375 in.), #1, #2
Fuse puller	–
Hexalobular (star or Torx) screw driver/bit	#15, #20, #25, #30, #40, #45
Hexagonal socket wrench	2.5 mm, 7 mm, 8 mm, 10 mm, 12 mm, 13 mm, 17 mm, 18 mm
Insulation tester	1000V DC

Table 29 - Installation and Service Tools (continued)

Tool Description	Details
Multimeter	Digital multimeter, capable of AC and DC voltage, continuity, resistance, capacitance measurements, and forward diode bias tests. Fluke model 87 III or equivalent.
Nose pliers	–
Oscilloscope	Portable, digitizing, dual channel scope, with isolation
Phillips screwdriver/bit	#1, #2, 492-C
Pozidriv	#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)
Wire cutter	–

Remove Power from the System

The following procedures must be followed before attempting to service any part of a PowerFlex 755TS drive.

WARNING: Remove power before you remove or make cable connections. When you remove or insert a cable connector with power applied, an electric arc can occur. An electric arc can cause personal injury or property damage in theses ways:
- An electric arc can send an erroneous signal to system field devices, which can cause unintended machine motion
- An electric arc can cause an explosion in a hazardous environment

Electric arcs cause excessive wear to contacts on both the module and its mating connector. Worn contacts can create electrical resistance.

1. Turn off and lock out all input power, including any external power sources.
2. Wait 15 minutes.
3. If a conduit box is present, remove the M6 x 12 mm torx screw that secures the conduit box cover to the chassis and remove the cover.
4. Remove the cover. See Chapter 4.
   If the conduit box is present, loosen the four M6 captive torx screws that secure the cover to the conduit box and remove the cover.
5. Measure the AC input voltage to verify that there is no voltage present (See Three-phase Power Terminal Locations on page 65):
   - Measure the AC input terminals R/L1, S/L2, and T/L3, L to L and L to chassis GND (PE).

Start Up After Repairs

IMPORTANT It is recommended that you wait 5 minutes before cycling power disconnect switches. This recommendation applies to both Off-to-On and On-to-Off transitions. Rapid power cycling can result in equipment damage.

Before you place a drive back into operation, complete these instructions.

1. Measure the AC input voltage to verify that there is no voltage present (See Three-phase Power Terminal Locations on page 65):
   - Measure the AC input terminals R/L1, S/L2, and T/L3, L to L and L to chassis GND (PE).
2. Perform phase to ground resistance tests to verify that there are no shorts on terminals R/L1, S/L2, and T/L3 to measure L to chassis GND (PE).
3. If the measured value of any resistance test is less than 1 kOhm, troubleshoot to find the short, correct the problem, and repeat step 2.
4. For any module or component that has been removed and re-installed, complete the following:
   - Verify that all hardware connections have been replaced and are properly torqued.
   - Verify that all interconnection wire harnesses are connected at both ends and properly supported by cable ties along their entire length where applicable.
5. When service has been completed on the control pod, verify that all control power and I/O wires are connected and properly secured.
6. Continue with No-load DC Bus Voltage and Output Current Measurements.

No-load DC Bus Voltage and Output Current Measurements

Follow theses steps to measure the DC bus voltage and output current and diagnose problems without connecting the motor to its mechanical load.

1. Verify that the input power and ground wires are connected.
2. Verify that the AC line power at the disconnect device is within the rated value for the drive or bus supply.
3. Verify that the control power voltage is correct.
4. Verify that the motor cables are connected.
5. Verify that the motor load is disconnected.
6. Energize the system.
7. Measure the DC bus voltage and verify that the measured value is displayed in parameter 0:3 [DC Bus Volts].
8. Start the system and increase the speed from zero to base speed.
9. Measure the system output current and verif y that the measured value is displayed in parameter 10:3 [Output Current].
10. Stop the system.
11. Reconnect the load to the motor before proceeding with drive startup.For startup information see the PowerFlex® Drives with TotalFORCE™ Control Quick Start, publication 750-QS100.

Notes:

Rockwell Automation Support

Use these resources to access support information.

Technical Support Center	Find help with how-to videos, FAQs, chat, user forums, and product notification updates.	rok.auto/support
Knowledgebase	Access Knowledgebase articles.	rok.auto/knowledgebase
Local Technical Support Phone Numbers	Locate the telephone number for your country.	rok.auto/phonesupport
Literature Library	Find installation instructions, manuals, brochures, and technical data publications.	rok.auto/literature
Product Compatibility and Download Center (PCDC)	Download firmware, associated files (such as AOP, EDS, and DTM), and access product release notes.	rok.auto/pcdc

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Waste Electrical and Electronic Equipment (WEEE)

At the end of life, this equipment should be collected separately from any unsorted municipal waste.

Rockwell Automation maintains current product environmental information on its website at rok.auto/pec.

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