PowerFlex® 700H Adjustable Frequency AC Drive

When reading this document, look for this symbol " Step x " to guide you through the **8 BASIC STEPS needed to install, start-up and program the PowerFlex 700H**. **The information provided Does Not replace the Installation or Programming Manuals and is intended for qualified drive service personnel only.** For detailed PowerFlex 700H information including application considerations and related precautions refer to the following:

Title	Publication	Available . . .
PowerFlex 700H/S Installation Manual	PFLEX-IN006	on the CD supplied with the drive or **www.rockwellautomation.com/literature**
PowerFlex Reference Manual	PFLEX-RM001	
PowerFlex 700H/S Hardware Service Manual	PFLEX-TG001	

For Allen-Bradley Drives Technical Support:

Title	Online at . . .
Allen-Bradley Drives Technical Support	**www.ab.com/support/abdrives**

Step 1 Read the General Precautions

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

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

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

ATTENTION: To avoid an electric shock hazard, verify that the voltage on the bus capacitors has discharged before performing any work on the drive. Measure the DC bus voltage at the +DC & –DC terminals (refer to the Installation Manual for location). The voltage must be zero.

ATTENTION: Risk of injury or equipment damage exists. DPI 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: Inputs must be configured with software and jumpers (see page 33). In addition, configuring an analog input for 0-20mA operation and driving it from a voltage source could cause component damage. Verify proper configuration prior to applying input signals.

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: The "adjust freq" portion of the bus regulator function is extremely useful for preventing nuisance overvoltage faults resulting from aggressive decelerations, overhauling loads, and eccentric loads. It forces the output frequency to be greater than commanded frequency while the drive's bus voltage is increasing towards levels that would otherwise cause a fault. However, it can also cause either of the following two conditions to occur.

1. Fast positive changes in input voltage (more than a 10% increase within 6 minutes) can cause uncommanded positive speed changes. However an "OverSpeed Limit" fault will occur if the speed reaches [Max Speed] + [Overspeed Limit]. If this condition is unacceptable, action should be taken to 1) limit supply voltages within the specification of the drive and, 2) limit fast positive input voltage changes to less than 10%. Without taking such actions, if this operation is unacceptable, the "adjust freq" portion of the bus regulator function must be disabled (see parameters 161 and 162).
2. Actual deceleration times can be longer than commanded deceleration times. However, a "Decel Inhibit" fault is generated if the drive stops decelerating altogether. If this condition is unacceptable, the "adjust freq" portion of the bus regulator must be disabled (see parameters 161 and 162). In addition, installing a properly sized dynamic brake resistor will provide equal or better performance in most cases.

Important: These faults are not instantaneous. They can take between 2-12 seconds to occur.

EMC Instructions

CE Conformity

Conformity with the Low Voltage (LV) Directive and Electromagnetic Compatibility (EMC) Directive has been demonstrated using harmonized European Norm (EN) standards published in the Official Journal of the European Communities. PowerFlex Drives comply with the EN standards listed below when installed according to the Installation and Reference Manuals.

CE Declarations of Conformity are available online at:
http://www.ab.com/certification/ce/docs.

Low Voltage Directive (73/23/EEC)

- EN50178 Electronic equipment for use in power installations.

EMC Directive (89/336/EEC)

- EN61800-3 Adjustable speed electrical power drive systems Part 3: EMC product standard including specific test methods.

General Notes

- The motor cable should be kept as short as possible in order to avoid electromagnetic emission as well as capacitive currents.
- Use of line filters in ungrounded systems is not recommended.
- PowerFlex drives may cause radio frequency interference if used in a residential or domestic environment. The user is required to take measures to prevent interference, in addition to the essential requirements for CE compliance listed below, if necessary.
- Conformity of the drive with CE EMC requirements does not guarantee an entire machine or installation complies with CE EMC requirements. Many factors can influence total machine/installation compliance.
- PowerFlex drives can generate conducted low frequency disturbances (harmonic emissions) on the AC supply system. More information regarding harmonic emissions can be found in the *PowerFlex Reference Manual*.

Essential Requirements for CE Compliance

Conditions 1-6 listed below **must be** satisfied for PowerFlex drives to meet the requirements of **EN61800-3**.

1. Standard PowerFlex High Power CE compatible Drive. For Frames 10 and up, the drive must also be installed in a suitable Rittal TS 8 (or equivalent) enclosure.
2. Review important precautions/attention statements throughout this manual before installing the drive.
3. Grounding as described in the *PowerFlex High Power Installation Manual*.
4. Output power, control (I/O) and signal wiring must be braided, shielded cable with a coverage of 75% or better, metal conduit or equivalent attenuation.
5. All shielded cables should terminate with the proper shielded connector.
6. Conditions in the table below.

PowerFlex High Power EN61800-3 EMC Compatibility

Frame	**Second Environment** *Restrict Motor Cable to 30 m (98 ft.)* *Any Drive and Option*	**First Environment** **Restricted Distribution**
9	✔	*See PowerFlex Reference Manual*
10	✔	
11	✔	
12	✔	

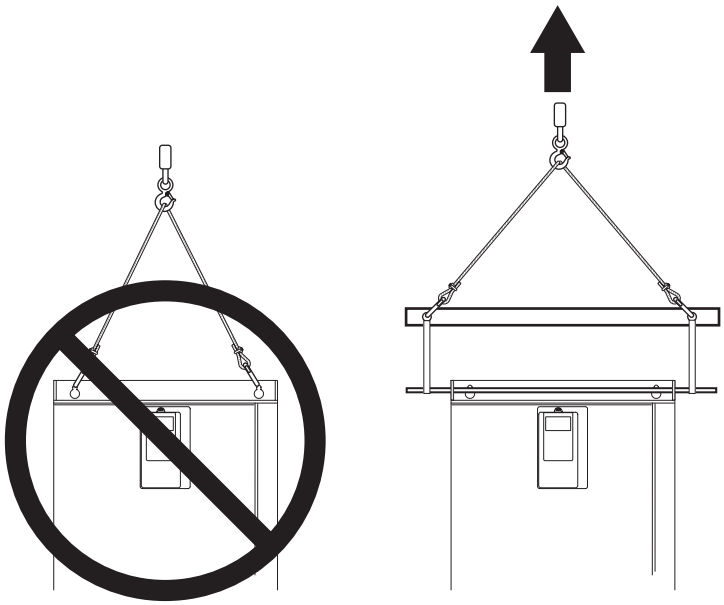
Step 2 Lift the Drive

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

- Remove any wiring access covers at the top of the drive (Frame 9).
- Do Not allow any part of the drive or lifting mechanism to make contact with electrically charged conductors or components.
- At no time should a person or their limbs be directly underneath the items being lifted.
- Do not subject the load to high rates of acceleration or deceleration.
- Inspect all lifting hardware for proper attachment before lifting drive unit.

Frame 9

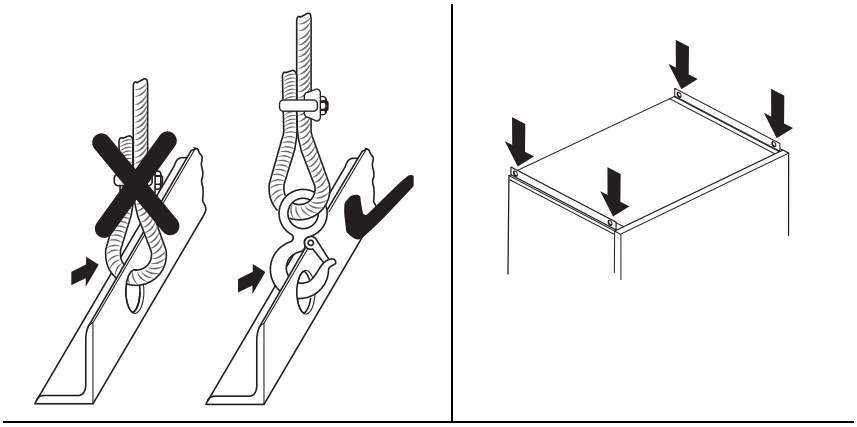
Important: When lifting the drive, a rod must be placed between the lifting holes as shown below.

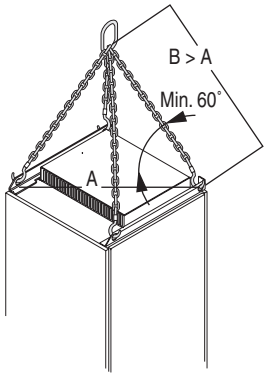


Frame 9 Weight

Weight *kg (lbs.)*	
Drive	**Drive & Packaging**
143 (315)	177 (390)

Frames 10 and Up – Standard Enclosed Drives



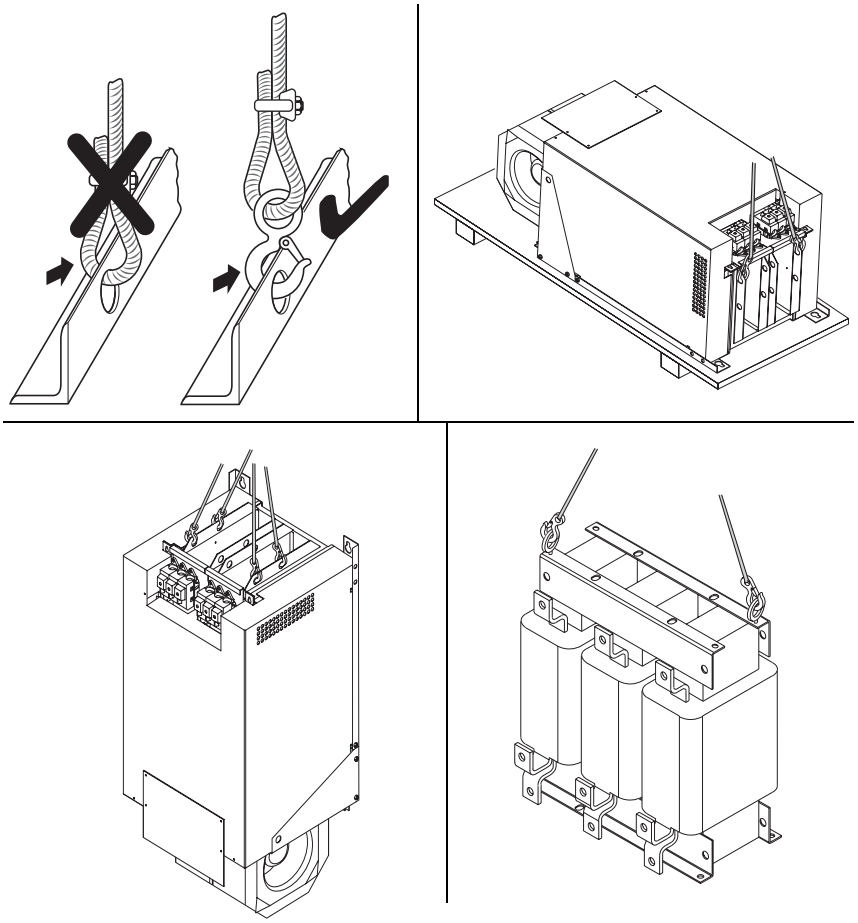


To ensure that this angle is greater than 60°, make the length of chain or cable between the center and the corners (B) longer than the distance between the opposite corners (A).

Drive Weights

Frame Size	Type	Weight kg (lbs.)
Frame 10	Drive & Enclosure (AC Input)	432 (952)
	Drive & Enclosure (DC Input)	317 (699)
Frame 11	Drive & Enclosure (AC Input)	614 (1350)
	Drive & Enclosure (DC Input)	446 (980)
Frame 12	Drive & Enclosure (AC Input)	802 (1765)
	Drive & Enclosure (DC Input)	634 (1398)

Frames 10 and Up – Open Type Drives



Drive Weights

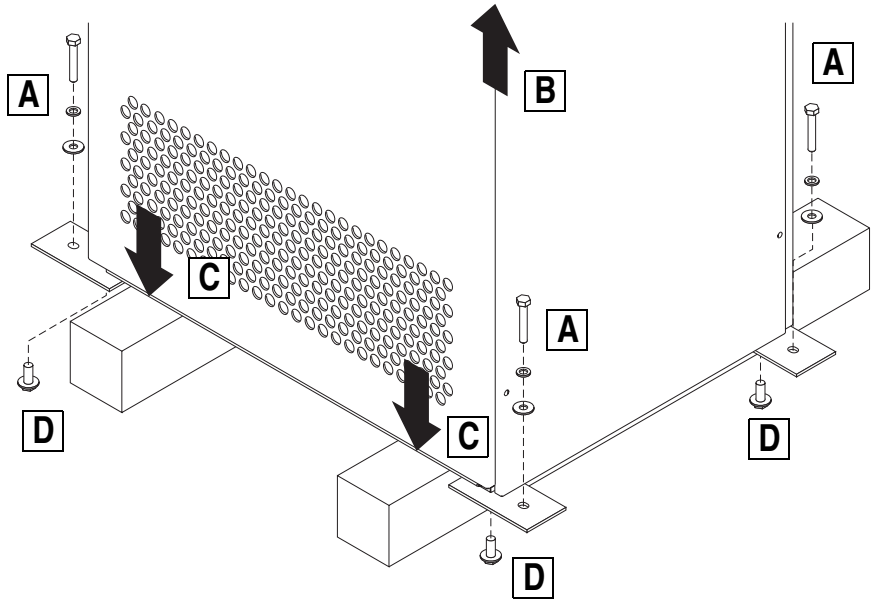
Frame Size	Type	Weight kg (lbs.)
Frame 10	Power Structure	120 (265)
	AC Choke CHK0520	115 (254)
Frame 11	Power Structure	210 (463)
	AC Choke CHK0400 (1)	84 (185)
Frame 12	Power Structure (2)	120 (265)
	AC Choke (3)	84 (185)

(1) Two reactors are required per Frame 11 AC Drive
(2) Two power structures are required per Frame 12 Drive
(3) Two reactors are required per Frame 12 AC Drive

Removing the Skid and Shipping Feet

ATTENTION: To guard against personal injury and equipment damage, do not work under the drive unless the drive is securely mounted on appropriate blocks.

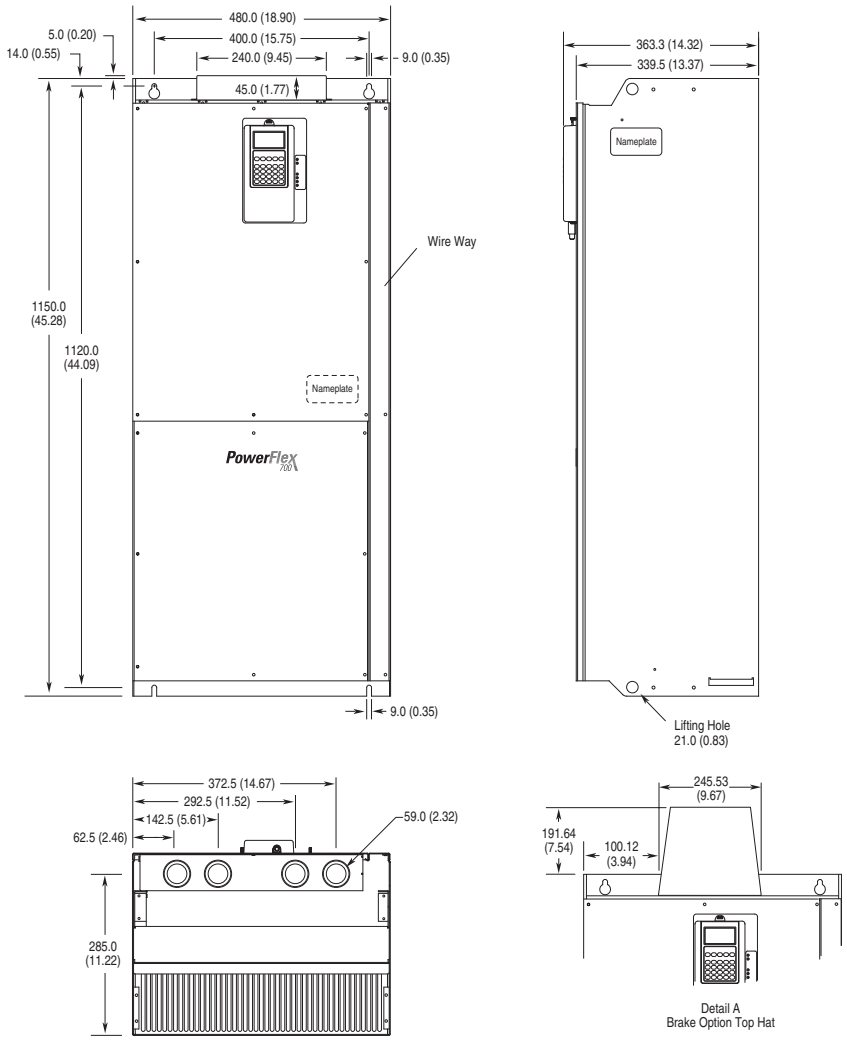
Task	Description
A	Using a 15 mm wrench, remove the hardware which secures the drive to the skid.
B	Lift the drive off the skid.
C	Place the drive on proper blocks on a hard level surface. The blocks should be approximately 10 cm (4 inches) high.
D	Using a 17 mm wrench, remove the hardware which secures the feet to the drive and remove the feet.



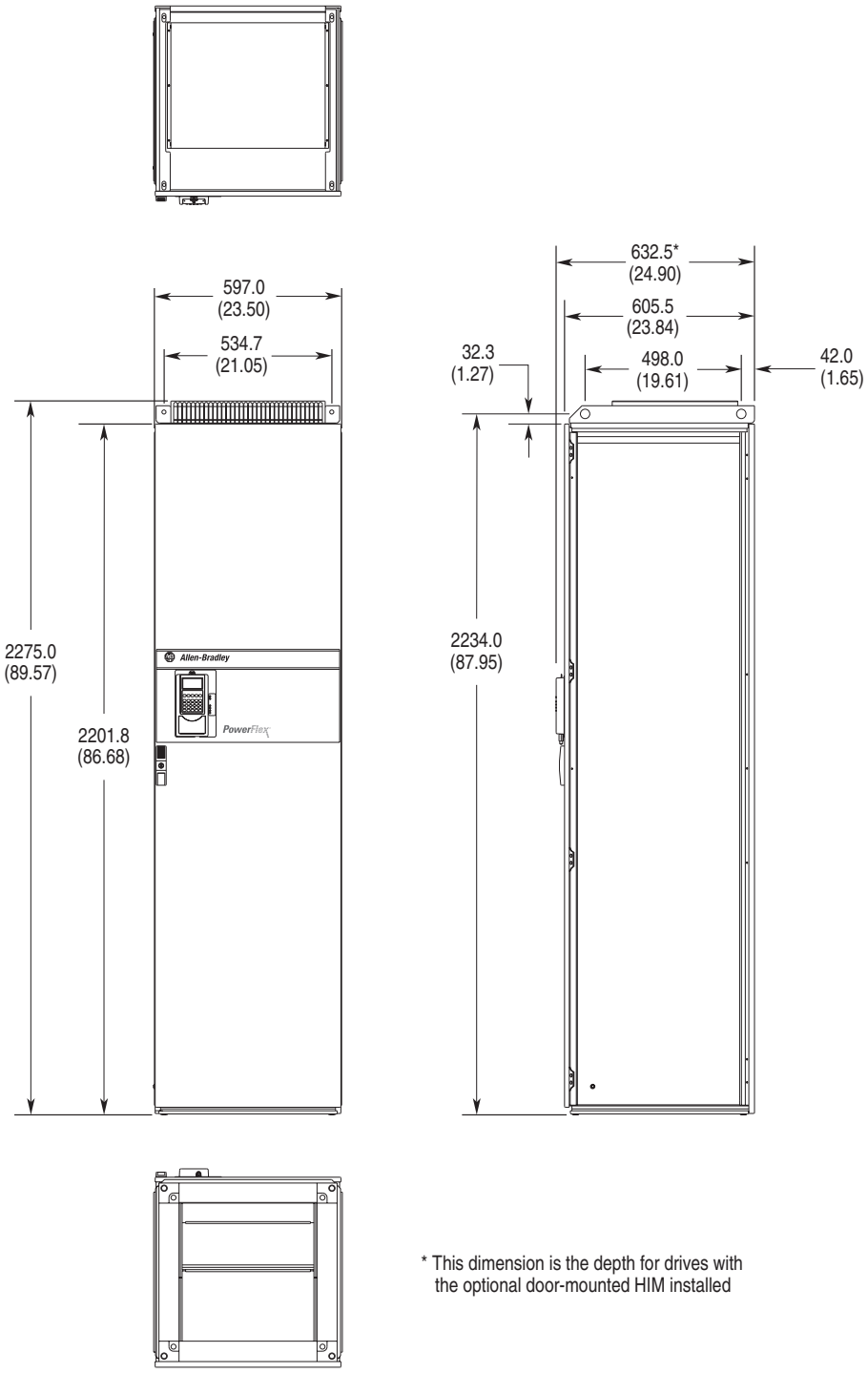
Step 3 Mount the Drive

Dimensions

Frame 9

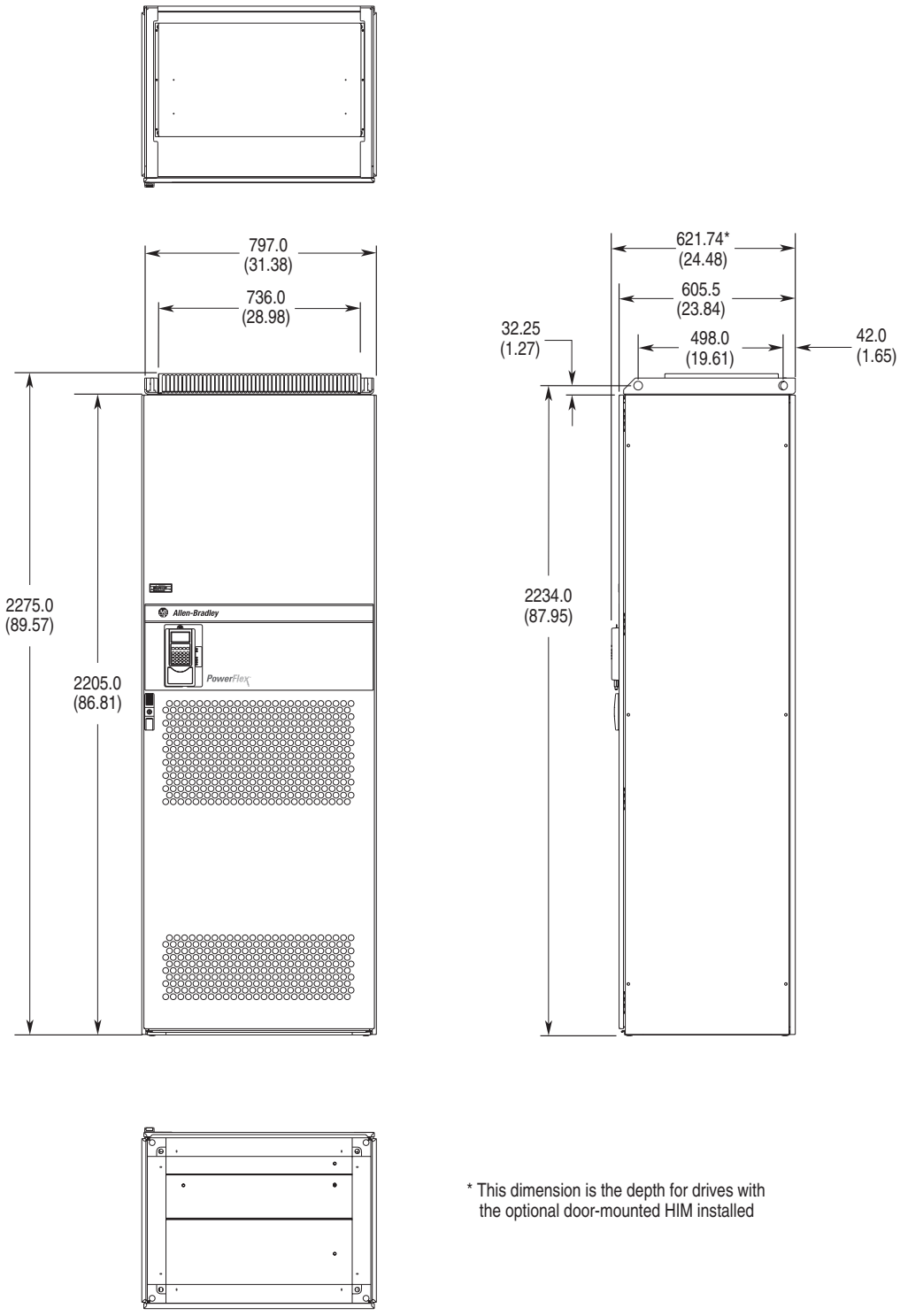


Frame 10



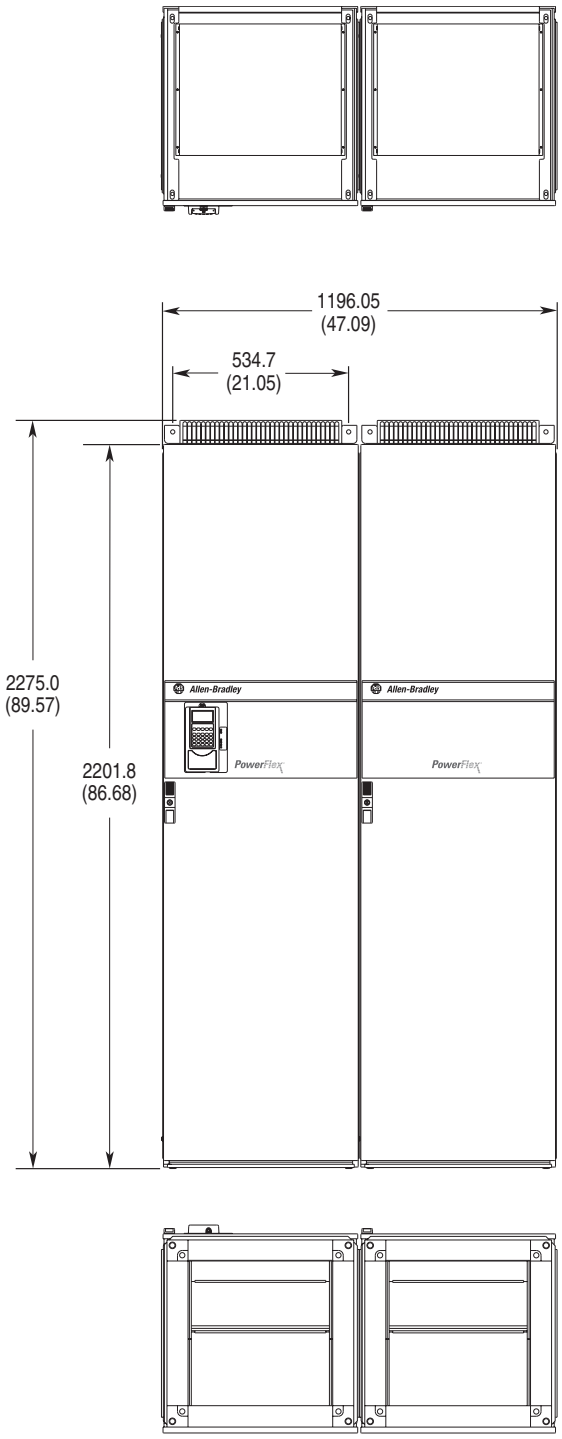
* This dimension is the depth for drives with the optional door-mounted HIM installed

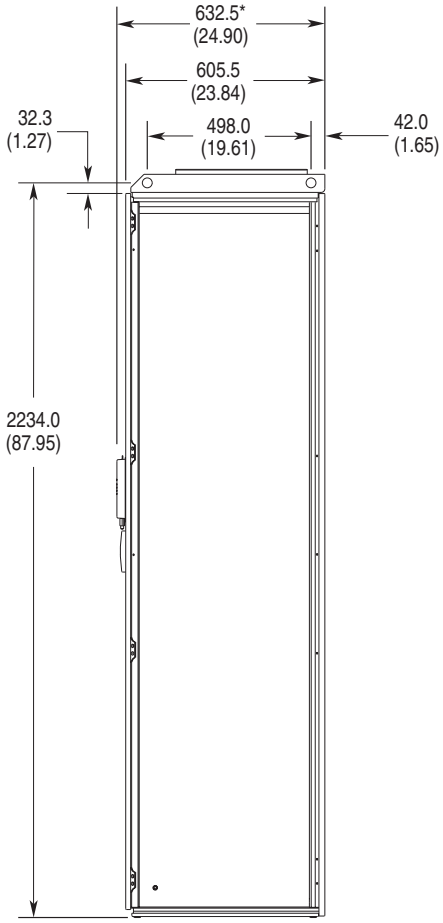
Frame 11



* This dimension is the depth for drives with the optional door-mounted HIM installed

Frame 12

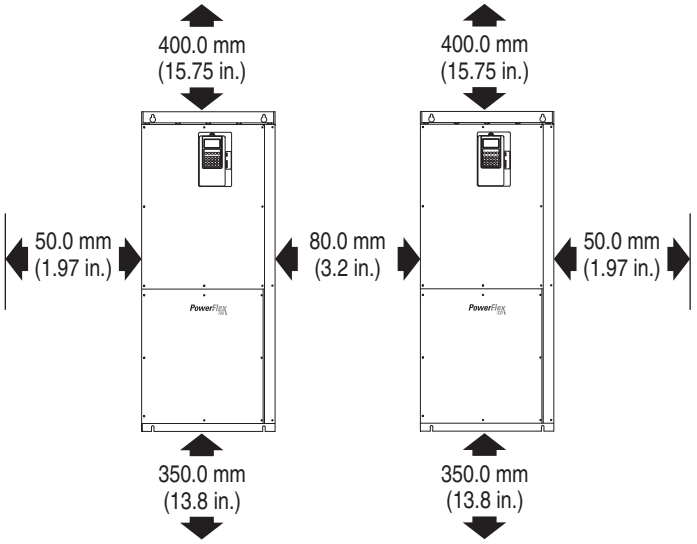




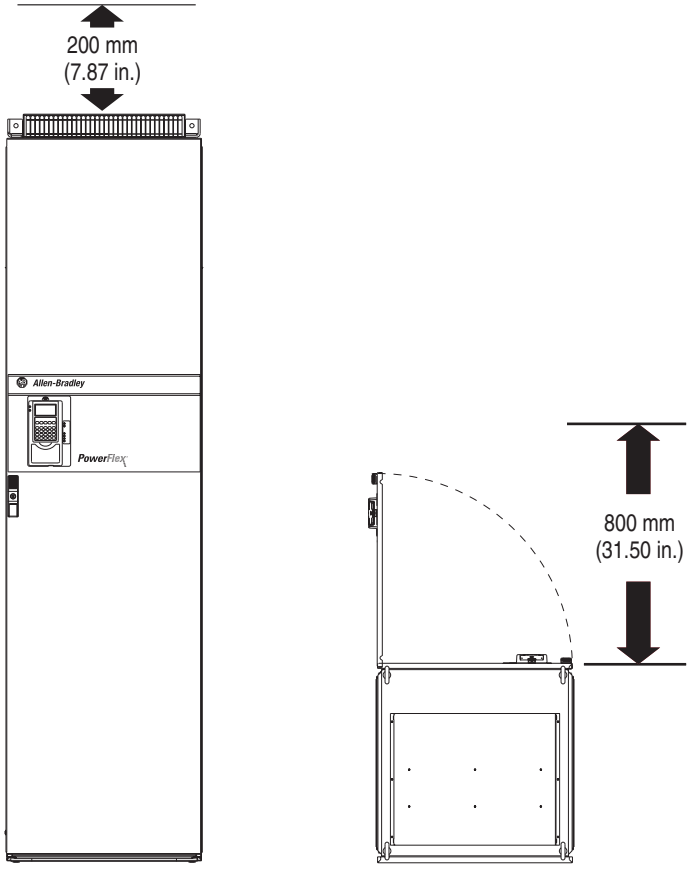
* This dimension is the depth for drives with the optional door-mounted HIM installed

Minimum Mounting Clearances

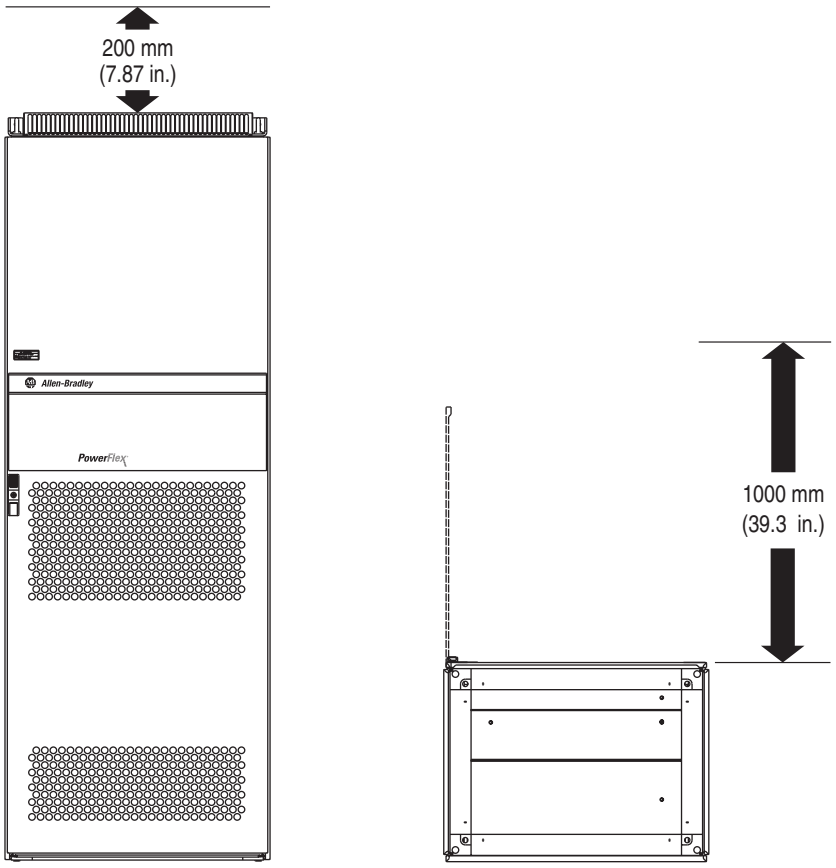
Frame 9



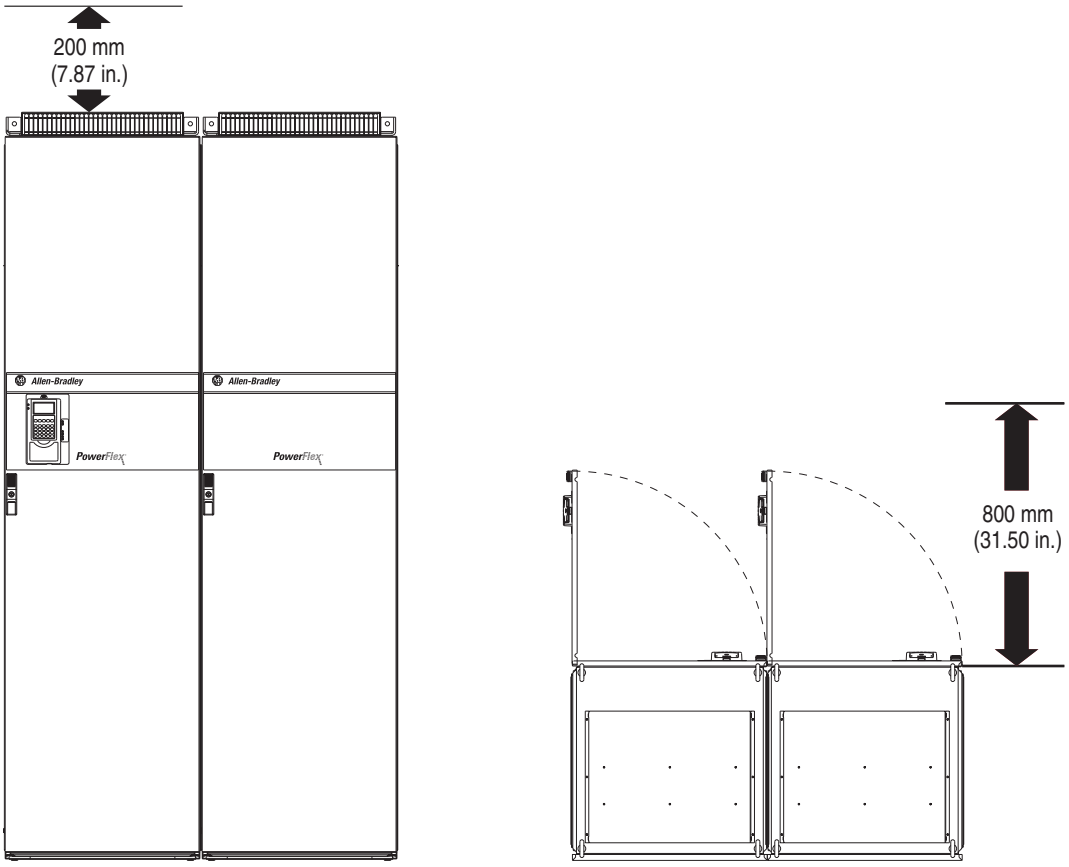
Frame 10



Frame 11



Frame 12



Operating Temperatures

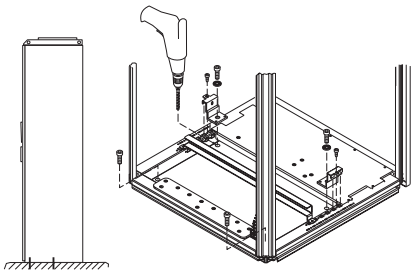
Surrounding Air Temperature

Frame	Normal Duty	Heavy Duty		Notes
9	0 to 40 degrees C (32 to 104 degrees F)	0 to 50 degrees C (32 to 122 degrees F)		Drive requires a minimum of 1300 m^3/h (765 cfm) of cooling air.
10	0 to 40 degrees C (32 to 104 degrees F)	0 to 40 degrees C (32 to 104 degrees F)		Drive requires a minimum of 2600 m^3/h (1530 cfm) of cooling air.
11	0 to 40 degrees C (32 to 104 degrees F)	0 to 40 degrees C (32 to 104 degrees F)		Drive requires a minimum of 3900 m^3/h (2295 cfm) of cooling air.
12	0 to 40 degrees C (32 to 104 degrees F)	820A & 920A Drives	0 to 40 degrees C (32 to 104 degrees F)	Drive requires a minimum of 5200 m^3/h (3060 cfm) of cooling air.
		1030A Drives	0 to 35 degrees C (32 to 95 degrees F)	Drive requires a minimum of 5200 m^3/h (3060 cfm) of cooling air.

Mounting

Floor Only Mounting

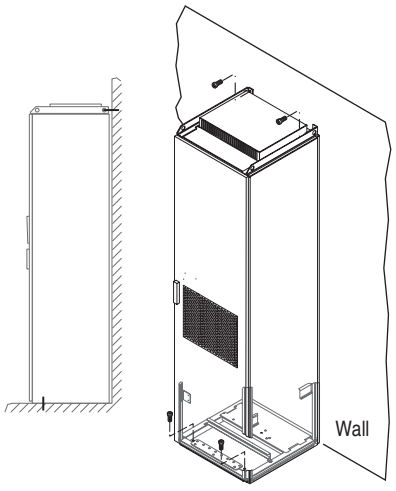
Secure drive to the floor with anchor bolts in the front corner holes of the enclosure base plate. Additionally secure the drive using the mounting plates as needed (Rittal part no. 8800-210 or equivalent). Do this as far back as possible to the choke assembly plate. With this method the holes through base plate must be drilled on-site.



Important: If it is important to align the drive cabinet vertically with adjacent Rittal cabinets, you may need to place shims under the drive cabinet or use leveling feet throughout the cabinet line-up. The Allen-Bradley factory may have removed the standard plastic plugs from the bottom of the cabinet when installing the shipping feet. This reduces the height of the cabinet by 2.0 mm (0.08 in.).

Wall Mounting

Secure drive to the floor with anchor bolts in the front corner holes of the enclosure base plate. Secure the drive by bolting the adjustable lifting rails to the rear wall or supporting structure.



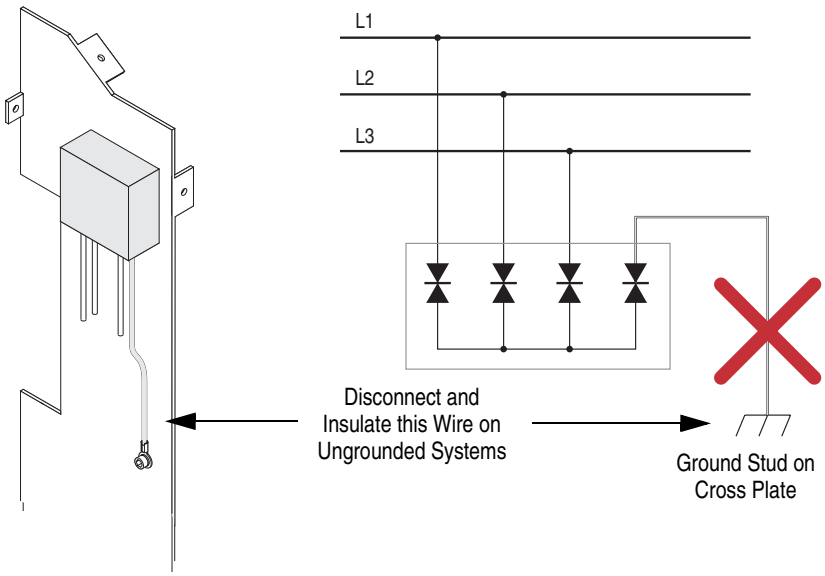
Step 4 Check the Ground System

Frame 9

CE Frame 9 drives are equipped with common mode capacitors that are referenced to ground. Operating a CE frame 9 drive on an ungrounded distribution system could result in drive damage.

ATTENTION: If you intend to operate a Frame 9 drive on an ungrounded distribution system, you must order a non-CE PowerFlex High Power drive.

All Frame 9 drives (CE and non-CE) are equipped with a Metal Oxide Varistor assembly (MOV) to provide voltage surge protection. The MOV is designed for transient surge suppression only (not continuous operation). With an ungrounded distribution system the phase-to-ground MOV connection could become a continuous current path. Therefore, you should disconnect the MOV ground connection when installing a Frame 9 drive on an ungrounded distribution system. Refer to publication PFLEX-RM001, *PowerFlex Reference Manual*, for information on ungrounded system installation.



ATTENTION: Risk of equipment damage exists if this wire contacts other circuits in the drive while the drive is energized. Insulate the lug on this wire with several turns of electrical tape and anchor the wire so it does not contact other circuits.

Frames 10 and Up

Frames 10 and up are equipped with common mode capacitors that are referenced to ground. To guard against drive damage, these capacitors should be disconnected if the drive is installed on an ungrounded distribution system. To disconnect the capacitors, move the jumper shown below. Refer to publication PFLEX-RM001, *PowerFlex Reference Manual*, for information on ungrounded system installation.

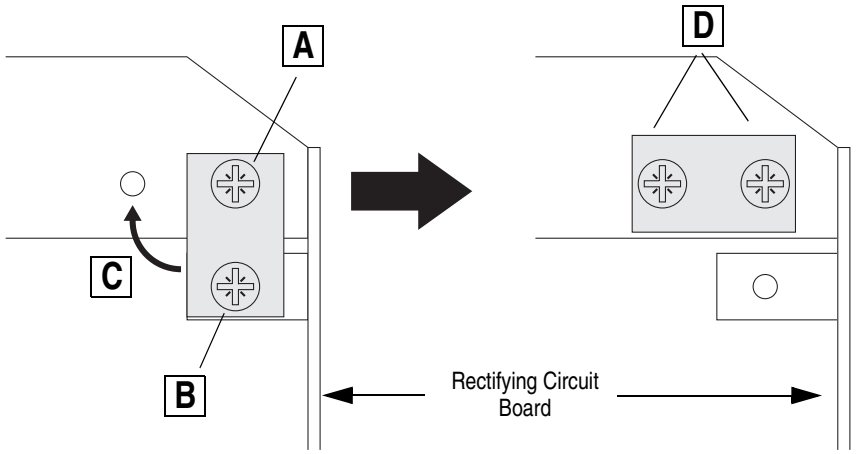
There is one jumper on each Rectifying Module.

Frame Size	Number of Rectifying Modules (Number of Jumpers)	Location of Rectifying Module(s)
10	1	Upper-right side of drive power structure.
11	2(1)	Center and right hand power stacks of drive power structure.
12	2(1)	Upper-right side of each power structure.

(1) Jumpers on both rectifying modules must be in the same position.

Figure 1.1 Moving Common Mode Capacitor Jumper

Task	Description
A	Loosen upper screw.
B	Remove lower screw.
C	Move jumper to horizontal position.
D	Install and tighten screws.



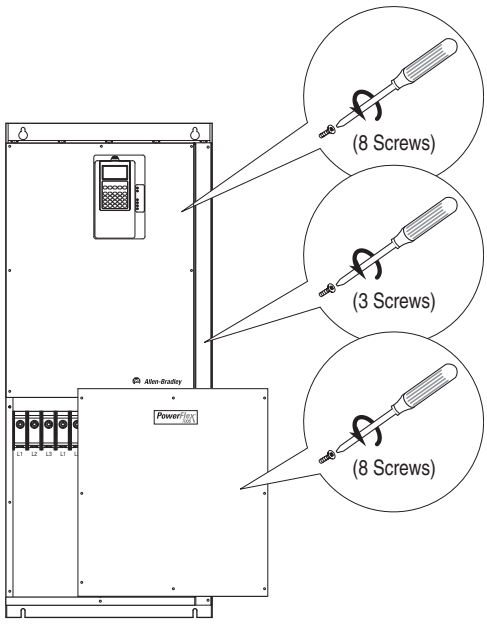
Step 5 Power Wiring

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

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

Frame 9

Cover Removal



Frame 9 Terminal Locations

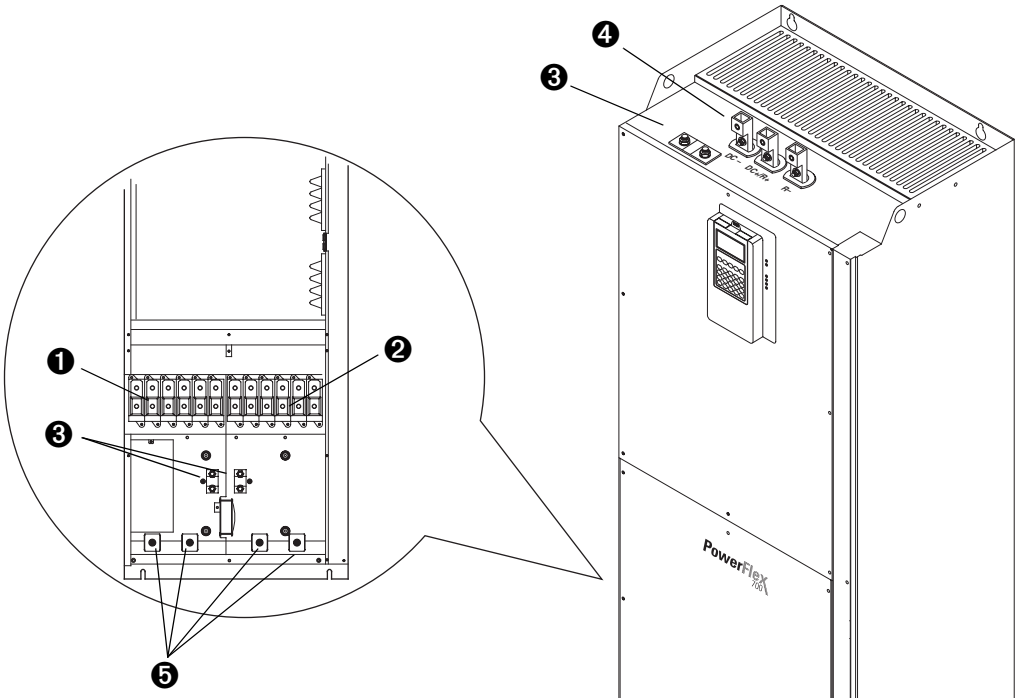
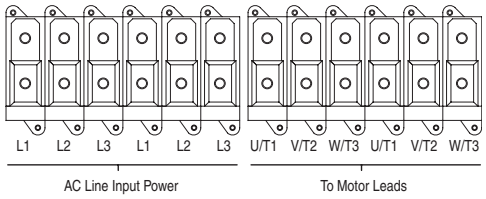


Figure 1 Power Terminal Block(1)



Frame 9 Power Terminal Specifications

No.	Name	Description	Wire Size Range(3) Maximum	Wire Size Range(3) Minimum	Torque Recommended
❶	Input Power Terminal Block(1) L1, L2, L3	Input power	185.0 mm^2 (350 MCM)	95.0 mm^2 (4/0 AWG)	40 N-m (354 lb.-in.)
❷	Output Power Terminal Block(1) U/T1, V/T2, W/T3	Motor connections	185.0 mm^2 (350 MCM)	95.0 mm^2 (4/0 AWG)	40 N-m (354 lb.-in.)
❸	SHLD Terminal, PE, Motor Ground	Terminating point for wiring shields	95.0 mm^2 (4/0 AWG)	5.0 mm2 (10 AWG)	22 N-m (195 lb.-in.)
❹	DC Bus(2) (2 Terminals; DC–, DC+)	DC input or external brake *(Internal Brake option not ordered)*	185.0 mm^2 (350 MCM)	95.0 mm^2 (4/0 AWG)	40 N-m (354 lb.-in.)
	DC Bus w/Brake(2) (3 Terminals; DC–, DC+/R+, R–)	DC input/internal brake *(Internal Brake option is ordered)*	185.0 mm^2 (350 MCM)	95.0 mm^2 (4/0 AWG)	40 N-m (354 lb.-in.)
❺	Cable Clamp for Strain Relief				

(1) Do Not exceed maximum wire size. Parallel connections may be required.

(2) DC terminal and brake lugs can be removed.

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

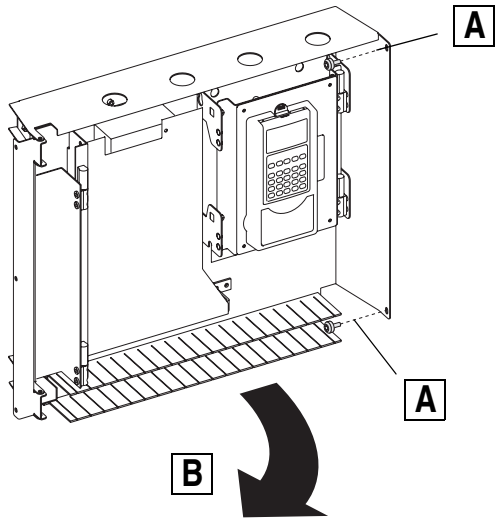
Frame 10

Cover Removal

Moving Control Frame

To gain access to the airflow plate and protective covers you must move the Control Frame out of the way.

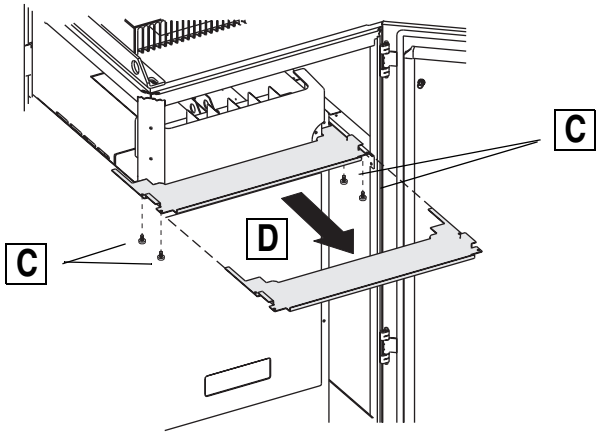
Task	Description
A	Remove the T8 Torx-head screws which secure the Control Frame to the drive enclosure.
B	Swing the Control Frame out and away from the power structure.



Removing the Airflow Plate

The drive is equipped with a plate, just above the Control Frame, that manages airflow through the drive. You must remove this plate in order to access the protective covers.

Task	Description
C	Remove the T8 Torx-head screws which secure the airflow plate to the drive.
D	Slide airflow plate off of drive.



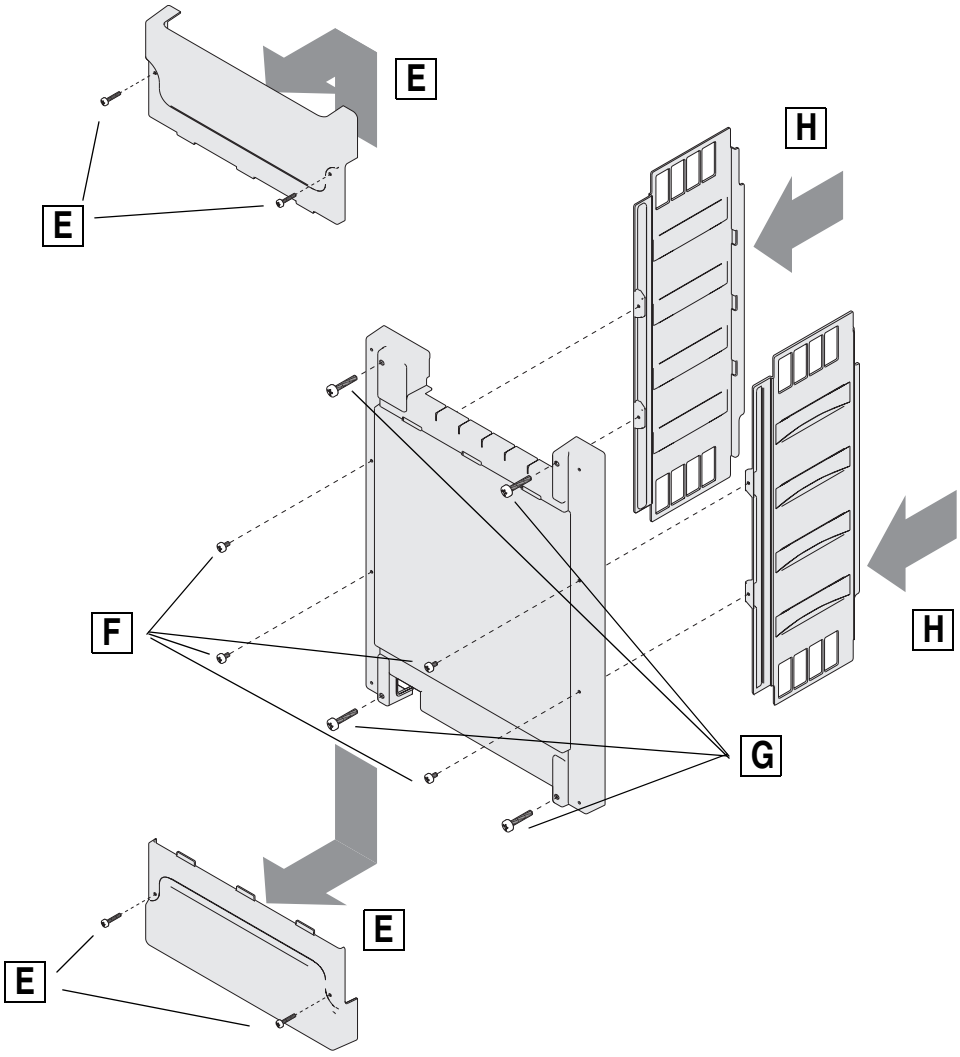
Removing Protective Covers

You must remove the protective covers to gain access to the power structure.

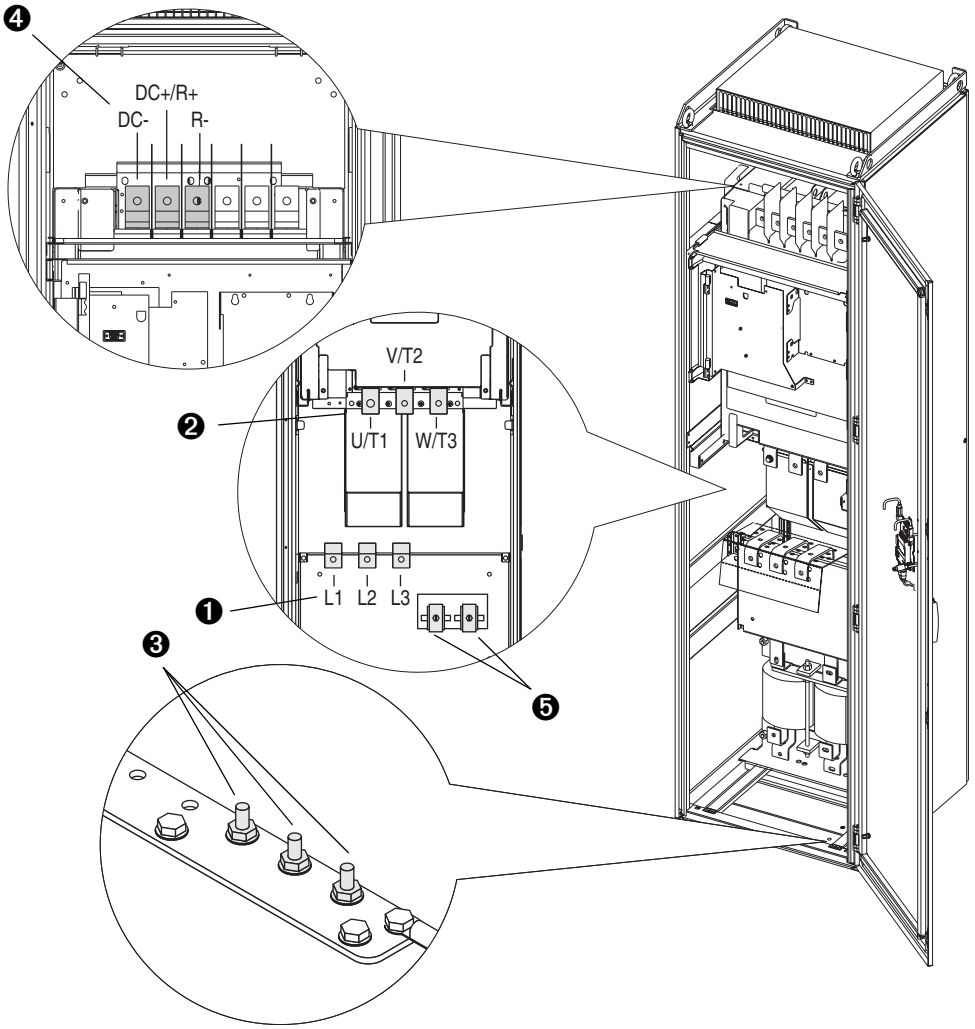
Task	Description
E	Remove the four M5 Pozi-drive screws which secure the top and bottom protective covers to the main front protective cover, then remove the top and bottom protective covers.
F	Remove the four M4 Pozi-drive screws which secure the side protective covers to the main front protective cover(1).
G	Remove the four M5 Pozi-drive screws which secure the main front protective cover to the drive, then remove the protective cover.
H	Remove side protective covers.

(1) In some configurations these screws will not be present

Important: The side protective covers are not reversible, make note of which is left and which right.



Frame 10 Terminal Locations



Frame 10 Power Terminal Specifications

No.	Name	Description	Wire Size Range[1][2]		Torque	Terminal Bolt Size[3] [4]
			Maximum	Minimum	Recommended	
1	Input Power Terminal Block L1, L2, L3[3]	Input power	300 mm^2 (600 MCM)	2.1 mm^2 (14 AWG)	40 N-m (354 lb.-in.)	M12
2	Output Power Terminal Block[3] U/T1, V/T2, W/T3	Motor connections	300 mm^2 (600 MCM)	2.1 mm^2 (14 AWG)	40 N-m (354 lb.-in.)	M12
3	SHLD Terminal, PE, Motor Ground[3]	Terminating point for wiring shields	300 mm^2 (600 MCM)	2.1 mm^2 (14 AWG)	40 N-m (354 lb.-in.)	M10
4	DC Bus[3] (2 Terminals; DC–, DC+)	DC input or external brake *(Internal Brake option not ordered)*	300 mm^2 (600 MCM)	2.1 mm^2 (14 AWG)	40 N-m (354 lb.-in.)	M12
	DC Bus w/Brake[3] (3 Terminals; DC–, DC+/R+, R–)	DC input/internal brake *(Internal Brake option is ordered)*	300 mm^2 (600 MCM)	2.1 mm^2 (14 AWG)	40 N-m (354 lb.-in.)	M12
5	Cable Clamp for Strain Relief					

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

(2) Do Not exceed maximum wire size. Parallel connections may be required.

(3) These connections are bus bar type terminations and require the use of lug type connectors.

(4) Apply counter torque to the nut on the other side of terminations when tightening or loosening the terminal bolt in order to avoid damage to the terminal.

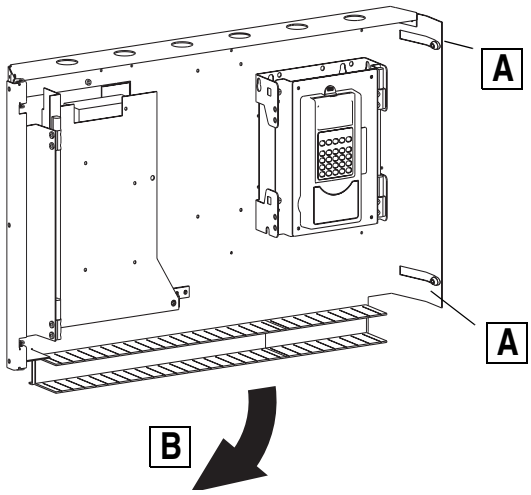
Frame 11

Cover Removal

Moving Control Frame

To gain access to the airflow plate and protective covers you must move the Control Frame out of the way.

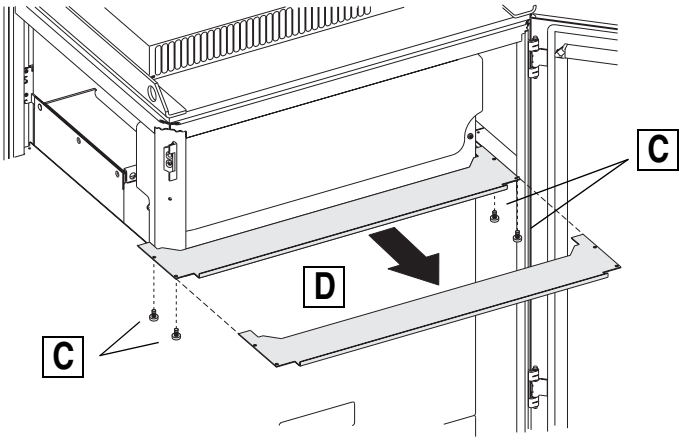
Task	Description
A	Loosen the T8 Torx-head screws which secure the Control Frame to the drive enclosure.
B	Swing the Control Frame out and away from the power structure.



Removing the Airflow Plate

The drive is equipped with a plate, just above the Control Frame, that manages airflow through the drive. You must remove this plate in order to access the protective covers.

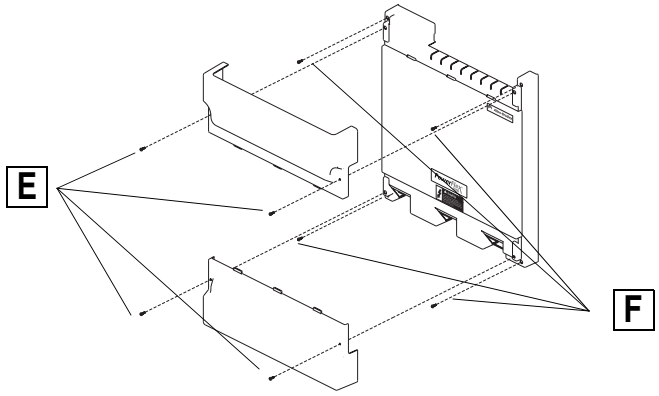
Task	Description
C	Remove the T8 Torx-head screws which secure the airflow plate to the drive.
D	Slide airflow plate off of drive.



Removing Protective Covers

You must remove the protective covers to gain access to the power structure.

Task	Description
E	Remove the four M5 Pozi-drive screws which secure the top and bottom protective covers to the main front protective cover, then remove the top and bottom protective covers.
F	Remove the four M5 Pozi-drive screws which secure the main front protective cover to the drive, then remove the protective cover.

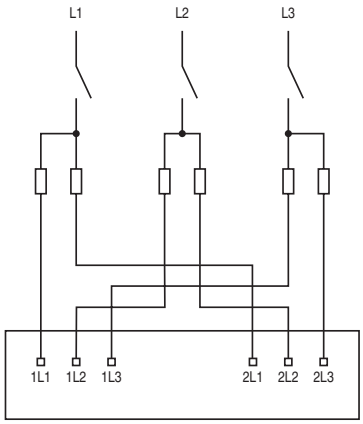
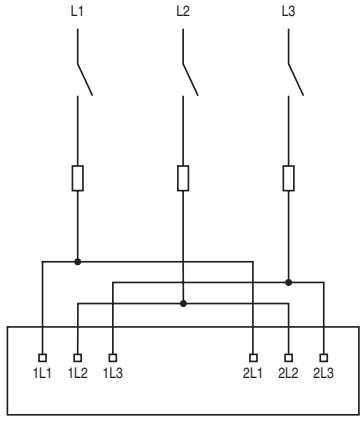


400 and 480 Volt AC Input Wiring for Frame 11 Drives

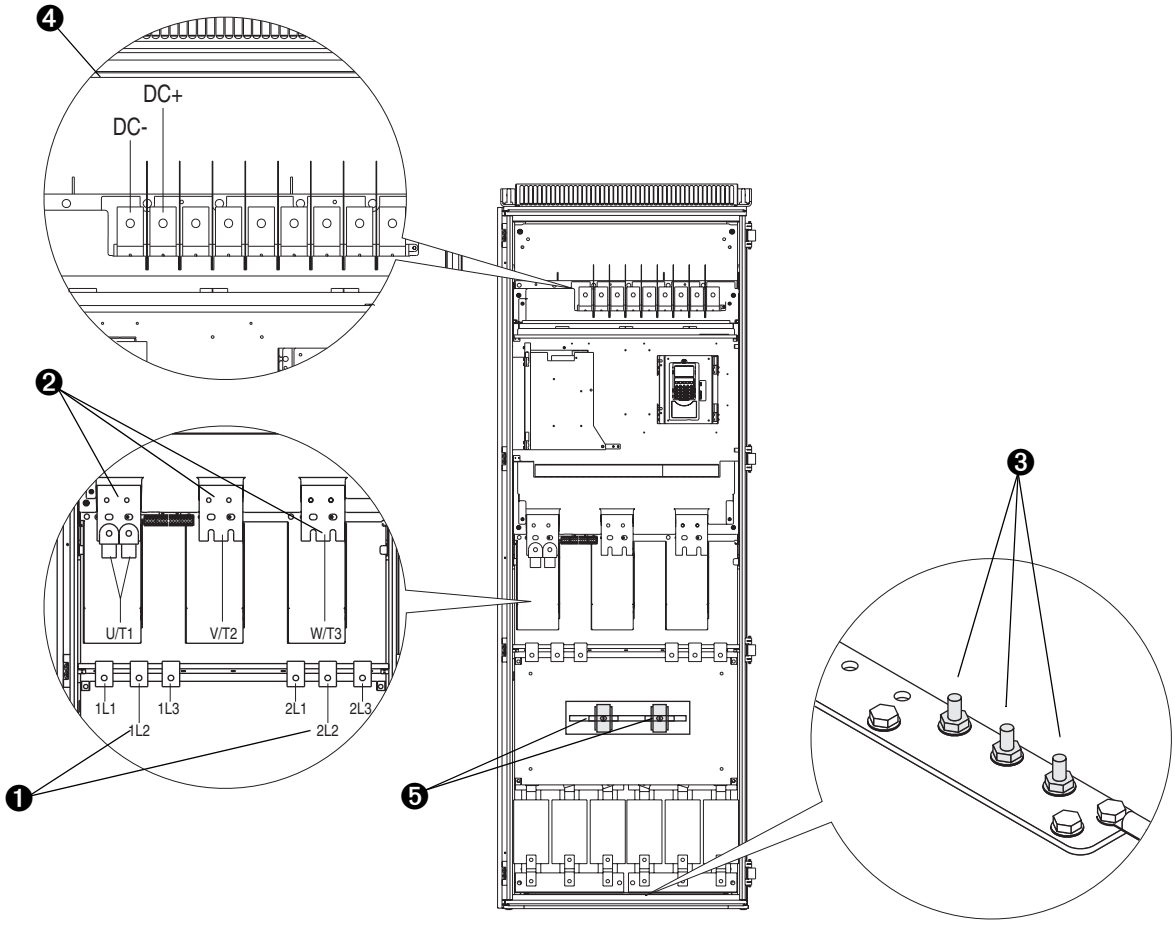
Frame 11 drives with 400V and 480V ac input power utilize two parallel input rectifying modules, and therefore have two sets of AC input power terminals. You must supply power to both sets of input terminals. There are several methods for accomplishing this.

Important: Parallel wiring must have the same cable dimensions, type and routing. Non-symmetrical wiring may cause unequal loading between the converters and reduce the drive's ability to deliver current to the motor.

Frame 11 AC Wiring Examples

2 Fuses per Phase	1 Fuse per Phase
	

Frame 11 Terminal Locations



Frame 11 Power Terminal Block Specifications

No.	Name	Description	Wire Size Range[1][2]		Torque	Terminal Bolt Size[3] [4]
			Maximum	Minimum	Recommended	
❶	Input Power Terminal Block 1L1, 1L2, 1L3, 2L1, 2L2, 2L3[3]	AC Input power	300 mm^2 (600 MCM)	2.1 mm^2 (14 AWG)	40 N-m (354 lb.-in.)	M12
❷	Output Power Terminal Block[(3)] U/T1, V/T2, W/T3	Motor connections	300 mm^2 (600 MCM)	2.1 mm^2 (14 AWG)	40 N-m (354 lb.-in.)	M12
❸	SHLD Terminal, PE, Motor Ground[3]	Terminating point for wiring shields	300 mm^2 (600 MCM)	2.1 mm^2 (14 AWG)	40 N-m (354 lb.-in.)	M10
❹	DC Bus[3] (2 Terminals; DC–, DC+)	DC input or external brake *(Internal Brake option not ordered)*	300 mm^2 (600 MCM)	2.1 mm^2 (14 AWG)	40 N-m (354 lb.-in.)	M12
❺	Cable Clamp for Strain Relief					

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

(2) Do Not exceed maximum wire size. Parallel connections may be required.

(3) These connections are bus bar type terminations and require the use of lug type connectors.

(4) Apply counter torque to the nut on the other side of terminations when tightening or loosening the terminal bolt in order to avoid damage to the terminal.

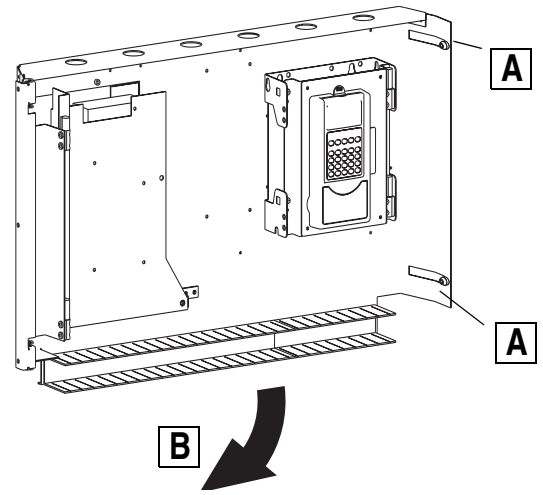
Frame 12

Cover Removal

Moving Control Frame

To gain access to the airflow plate and protective covers you must move the Control Frame out of the way.

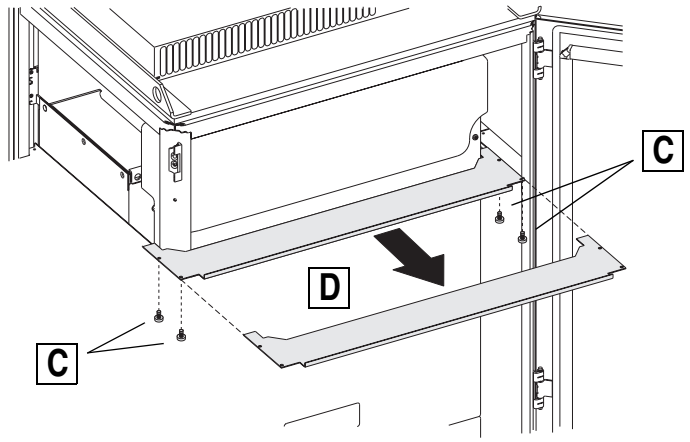
Task	Description
A	Loosen the T8 Torx-head screws which secure the Control Frame to the drive enclosure.
B	Swing the Control Frame out and away from the power structure.



Removing the Airflow Plate

The drive is equipped with a plate, just above the Control Frame, that manages airflow through the drive. You must remove this plate in order to access the protective covers.

Task	Description
C	Remove the T8 Torx-head screws which secure the airflow plate to the drive.
D	Slide airflow plate off of drive.

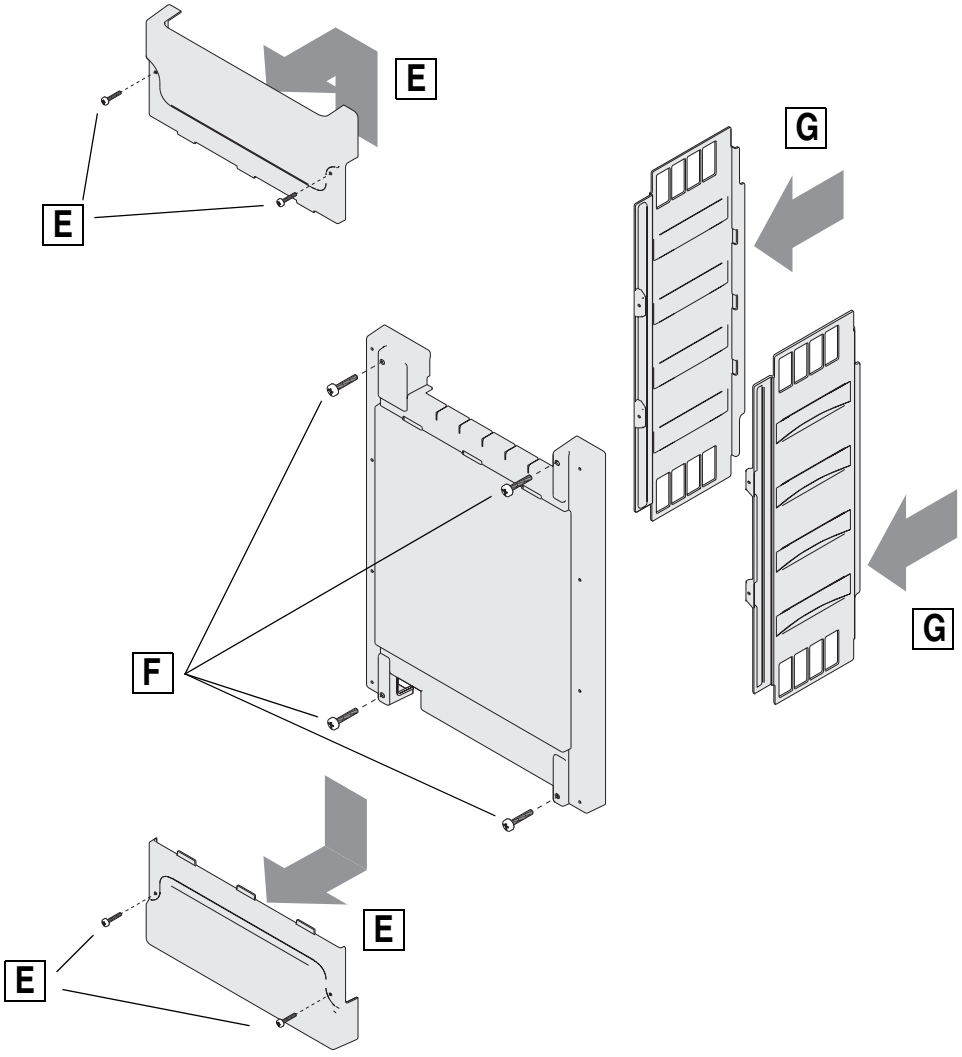


Removing Protective Covers

You must remove the protective covers to gain access to the power structure.

Task	Description
E	Remove the four M5 Pozi-drive screws which secure the top and bottom protective covers to the main front protective cover, then remove the top and bottom protective covers. Note: Power terminal access is gained by removing the top and bottom covers only.
F	Remove the four M5 Pozi-drive screws which secure the main front protective cover to the drive, then remove the protective cover.
G	Remove side protective covers.

Important: The side protective covers are not reversible, make note of which is left and which right.

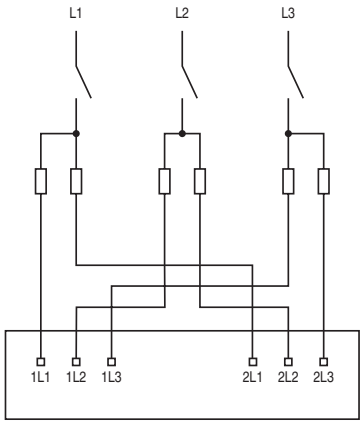
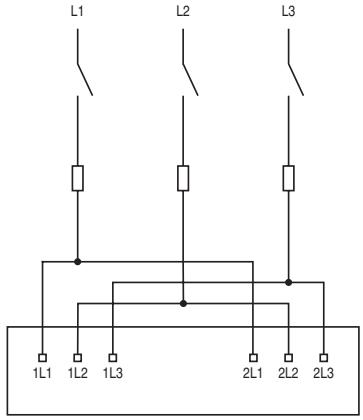


Input Power Wiring

Frame 12 drives utilize two parallel power structures, and therefore have two sets of input power terminals. You must supply power to both sets of input terminals.

Important: Parallel wiring must have the same cable dimensions, type and routing. Non-symmetrical wiring may cause unequal loading between the converters and reduce the drive's ability to deliver current to the motor.

Frame 12 Input Wiring Examples

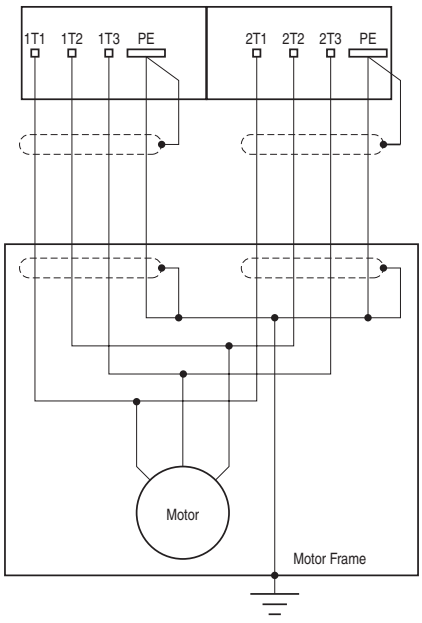
2 Fuses per Phase	1 Fuse per Phase
	

Output Power Wiring

Frame 12 drives utilize two parallel power structures, and therefore have two sets of output power terminals. You must connect the motor to both sets of input terminals. Refer to the "Important" statement above.

Important: The minimum cable length for parallel motor cables from the drive to the point where the cables connect is 5m (16.4 ft). Join the parallel cables at the motor end (not the drive end).

Frame 12 Output Wiring Example



Frame 12 Power Terminal Specifications

No.	Name	Description	Wire Size Range[1][2]		Torque	Terminal Bolt Size[3] [4]
			Maximum	Minimum	Recommended	
❶	Input Power Terminal Block 1L1, 1L2, 1L3, 2L1, 2L2, 2L3[3]	Input power	300 mm^2 (600 MCM)	2.1 mm^2 (14 AWG)	40 N-m (354 lb.-in.)	M12
❷	Output Power Terminal Block[3] 1U/1T1, 1V/1T2, 1W/1T3, 2U/2T1, 2V/2T2, 2W/2T3	Motor connections	300 mm^2 (600 MCM)	2.1 mm^2 (14 AWG)	40 N-m (354 lb.-in.)	M12
❸	SHLD Terminal, PE, Motor Ground[3]	Terminating point for wiring shields	300 mm^2 (600 MCM)	2.1 mm^2 (14 AWG)	40 N-m (354 lb.-in.)	M10
❹	DC Bus[3] (2 Terminals; DC–, DC+)	DC input or external brake *(Internal Brake option not ordered)*	300 mm^2 (600 MCM)	2.1 mm^2 (14 AWG)	40 N-m (354 lb.-in.)	M12
	DC Bus w/Brake[3] (3 Terminals; DC–, DC+/R+, R–)	DC input/internal brake *(Internal Brake option is ordered)*	300 mm^2 (600 MCM)	2.1 mm^2 (14 AWG)	40 N-m (354 lb.-in.)	M12
❺	Cable Clamp for Strain Relief					

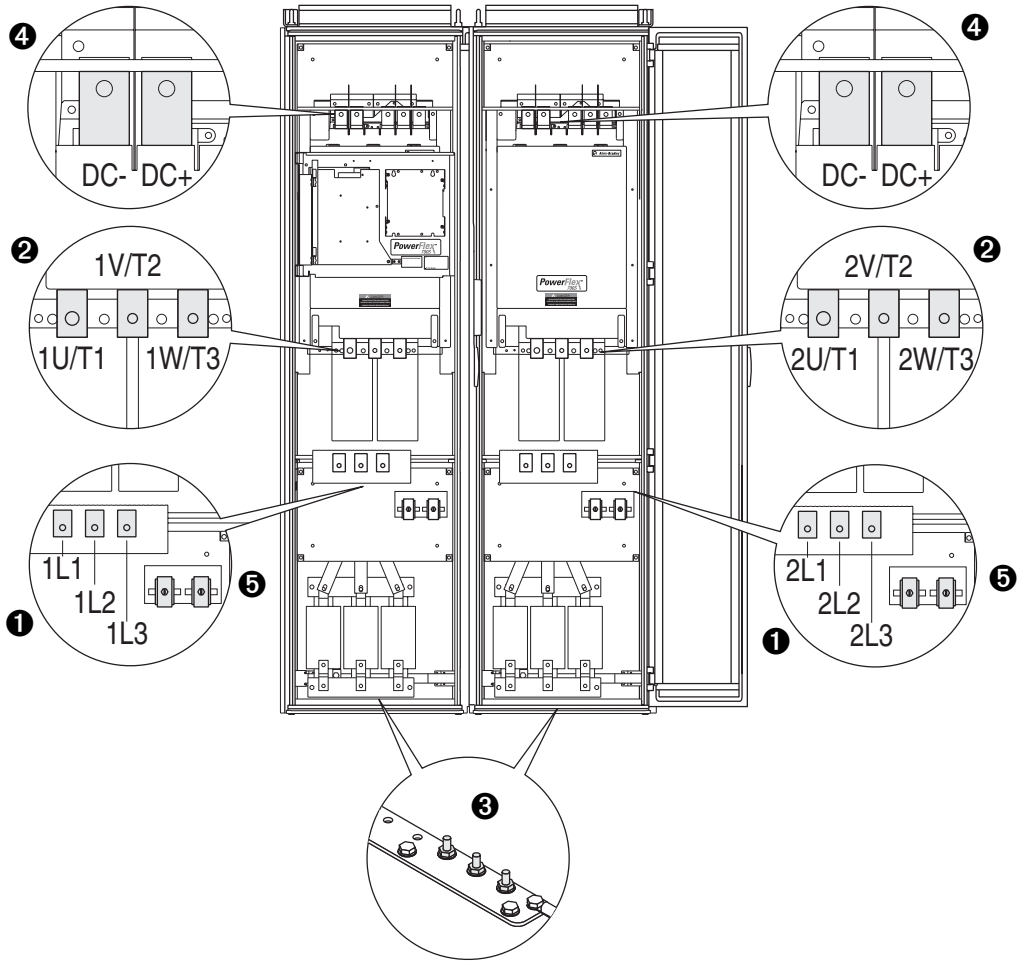
(1) Maximum/minimum sizes that the terminal block will accept - these are not recommendations.

(2) Do Not exceed maximum wire size. Parallel connections may be required.

(3) These connections are bus bar type terminations and require the use of lug type connectors.

(4) Apply counter torque to the nut on the other side of terminations when tightening or loosening the terminal bolt in order to avoid damage to the terminal.

Frame 12 Terminal Locations



Step 6 Signal and Control Wiring

Important points to remember about I/O wiring:

- Always use copper wire.
- Wire with an insulation rating of 600V or greater is recommended.
- Control and signal wires should be separated from power wires by at least 0.3 meters (1 foot).

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

ATTENTION: Inputs must be configured with software and jumpers (see page 33). In addition, configuring an analog input for 0-20mA operation and driving it from a voltage source could cause component damage. Verify proper configuration prior to applying input signals.

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.

Wire Types

Recommended Signal Wire

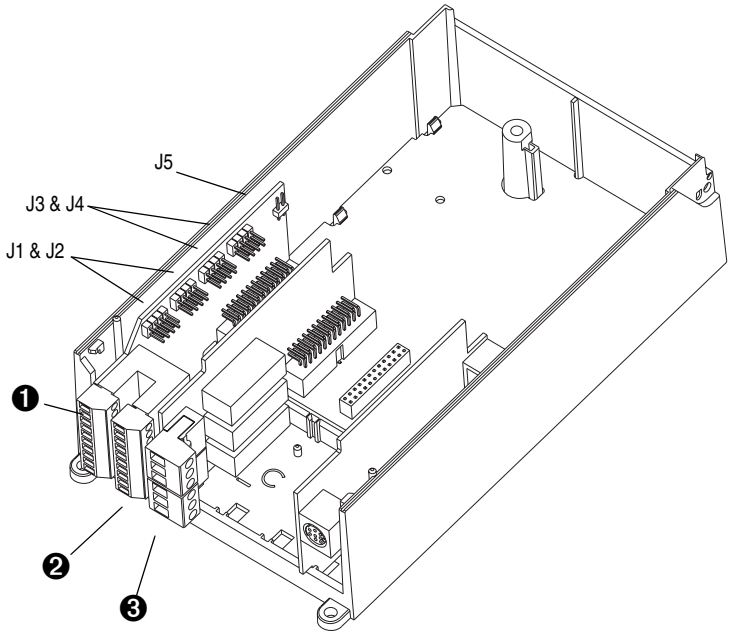
Signal Type	Wire Type(s)	Description	Minimum Insulation Rating
Analog I/O	Belden 8760/9460 (or equiv.)	0.750 mm^2 (18 AWG), twisted pair, 100% shield with drain (1).	300V, 75-90 degrees C (167-194 degrees F)
	Belden 8770 (or equiv.)	0.750 mm^2 (18 AWG), 3 cond., shielded for remote pot only.	
EMC Compliance	Refer to "EMC Instructions" on page 2 for details.		

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

Recommended Control Wire for Digital I/O

Type	Wire Type(s)	Description	Minimum Insulation Rating
Unshielded	Per US NEC or applicable national or local code	–	300V, 60 degrees C (140 degrees F)
Shielded	Multi-conductor shielded cable such as Belden 8770 (or equiv.)	0.750 mm^2 (18 AWG), 3 conductor, shielded.	

I/O Terminal Blocks and Jumpers

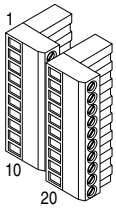
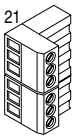


I/O Terminal Block Specifications

No.	Name	Description	Wire Size Range[1]		Torque	
			Maximum	Minimum	Maximum	Recommended
1	Analog I/O	Analog I/O Signals	2.5 mm^2 (14 AWG)	0.5 mm^2 (22 AWG)	0.2 N-m 1.8 lb.-in.	0.2 N-m 1.8 lb.-in.
2	Digital Inputs	Digital Input Signals	2.5 mm^2 (14 AWG)	0.5 mm^2 (22 AWG)	0.2 N-m 1.8 lb.-in.	0.2 N-m 1.8 lb.-in.
3	Digital Outputs	Digital Out Relays	2.5 mm^2 (14 AWG)	0.5 mm^2 (22 AWG)	0.5 N-m 4.5 lb.-in.	0.5 N-m 4.5 lb.-in.

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

I/O Terminal Designations

	No.	Signal	Factory Default	Description	Related Parameter(s)
	1	Analog In 1 (–)(1)	(4)	Isolated(5), bipolar, differential, 9 bit & sign, 88k ohm input impedance. A jumper (page 33) selects: 0-10V, ±10V, 4-20mA. Default: 0-10V (Ri =200k), 4-20mA (Ri=100 ohm).	320 - 327
	2	Analog In 1 (+)(1)			
	3	Analog In 2 (–)(1)			
	4	Analog In 2 (+)(1)			
	5	–10V Pot Reference	–	2k ohm minimum, 10 mA maximum load, 1% accuracy.	
	6	Pot Common (GND)		For (+) and (–) 10V pot references.	
	7	+10V Pot Reference	–	2k ohm minimum, 10mA maximum load, 1% accuracy.	
	8	Analog Out 1 (+)	(4)	Bipolar (current out is not bipolar), 9 bit & sign, 2k ohm minimum load. A jumper (see page 33) selects: 0-10V, ±10V, 4-20mA.	340 - 347
	9	Analog Out Common			
	10	Analog Out 2 (+)			
	11	Digital In 1	Stop - CF	115V ac, 50/60 Hz - Opto isolated Low State: less than 30V ac High State: greater than 40V ac 24V dc - Opto isolated (250V) Low State: less than 5V dc High State: greater than 20V dc 11.2 mA DC Enable: Digital Input 6 is jumper selectable for HW Enable. On-Time: < 16.7ms, Off-Time < 1ms	361 - 366
	12	Digital In 2	Start		
	13	Digital In 3	Auto/Man		
	14	Digital In 4	Speed Sel 1		
	15	Digital In 5	Speed Sel 2		
	16	Digital In 6/Hardware Enable, see pg. 33	Speed Sel 3		
	17 18	Digital In Common		Allows source or sink operation. Terminals 17/18 & 19 can also be used to provide backup power to DPI and control devices.	
	19	+24VDC (2)	–	Drive supplied logic input power.	
	20	24V Common(2)	–	Common for internal power supply.	
	21	Digital Out 1 – N.C.(3)	Fault	Max. Resistive Load: 240V ac/30V dc – 1200VA, 150W Max. Current: 5A, Min. Load: 10mA Max. Inductive Load: 240V ac/30V dc – 840VA, 105W Max. Current: 3.5A, Min. Load: 10mA	380 - 391
	22	Digital Out 1 Common			
	23	Digital Out 1 – N.O.(3)	NOT Fault		
	24	Digital Out 2 – N.C.(3)	NOT Run		
	25	Digital Out 2/3 Com.			
	26	Digital Out 3 – N.O.(3)	Run		

(1) **Important:** Input must be configured with a jumper. Drive damage may occur if jumper is not installed properly. Refer to page 33.

(2) 150mA maximum Load. Not present on 115V versions. Can be used to provide control power from an external 24V source when main power is not applied. Refer to page 33

(3) Contacts in un-powered state. Any relay programmed as Fault or Alarm will energize (pick up) when power is applied to drive and de-energize (drop out) when a fault or alarm exists. Relays selected for other functions will energize only when that condition exists and will de-energize when condition is removed.

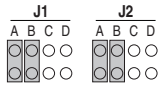
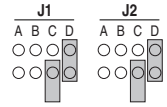
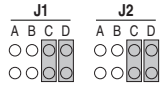
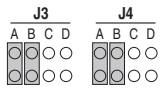
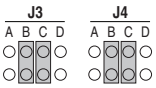
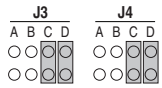
(4) These inputs/outputs are dependant on a number of parameters (see “Related Parameters”).

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

Analog I/O Configuration

Important: Analog I/O must be configured through programming, as well as the jumpers shown below.

I/O Configuration

Signal	Jumper	Setting		
Analog Inputs	J1 (Analog In 1) J2 (Analog In 2)	0-20 mA	0-10V	±10V
				
Analog Outputs	J3 (Analog Out 1) J4 (Analog Out 2)	0-20 mA	0-10V	±10V
				

Hardware Enable Circuitry

By default, the user can program a digital input as an Enable input. The status of this input is *interpreted by drive software*. If the application requires the drive to be disabled *without* software interpretation, a "dedicated" hardware enable configuration can be utilized. This is done by removing jumper J5 and wiring the enable input to "Digital In 6" (see below). Verify that [Digital In6 Sel], parameter 366 is set to "1, Enable."

Hardware Enable Configuration

Signal	Jumper	Setting	
Hardware Enable	J5	Hardware Enable	Input Programmable (No Hardware Enable)
			

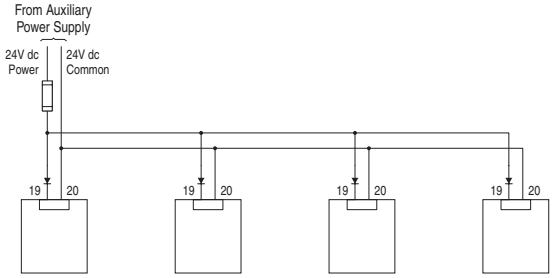
Auxiliary Power Supply

You may use an auxiliary power supply to keep the 700H Control Unit energized, when input power is de-energized. This provides back-up power for the Control Unit and is sufficient for setting parameters. Connect 24V dc power to pin 19 and 24V dc common to pin 20 of the 24V dc version of the I/O card.

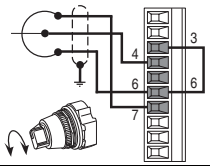
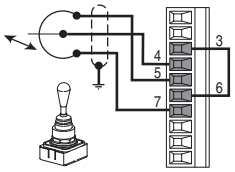
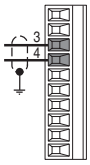
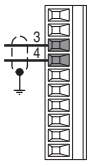
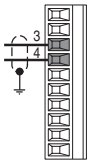
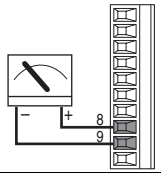
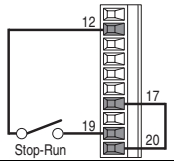
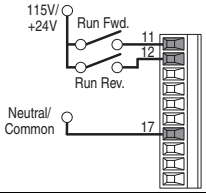
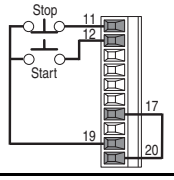
Auxiliary Power Supply Specifications

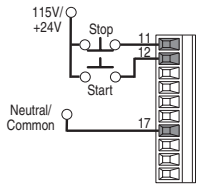
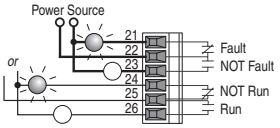
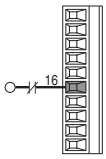
Voltage	Current (Min)	Current (Max)
24V dc ± 15%	150 mA	250 mA

If 24V terminals of several drives are connected in parallel, we recommend using a diode circuit to block current flow in the opposite direction. Reverse current flow could damage the Control Board.



I/O Wiring Examples

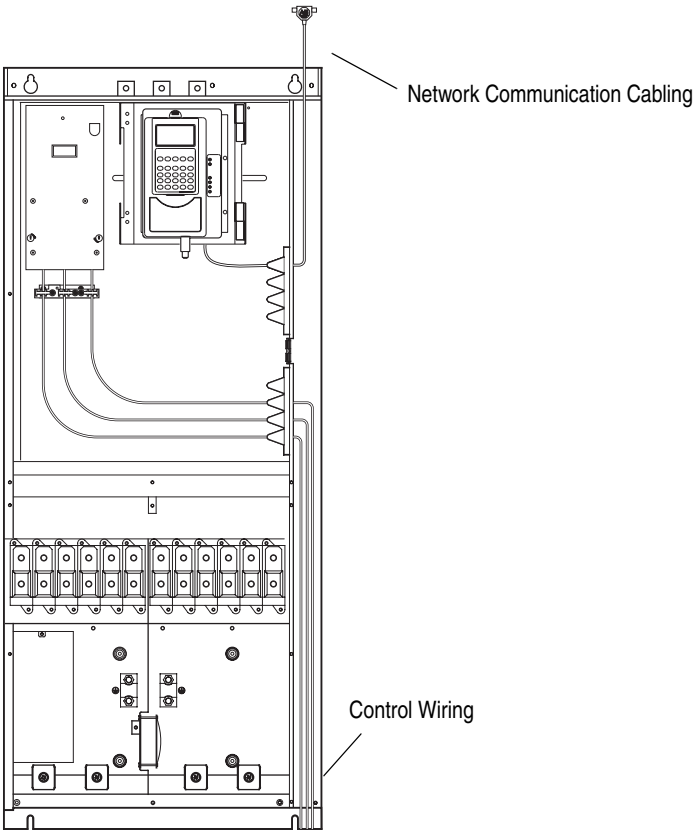
Input/Output	Connection Example	Required Parameter Changes
Potentiometer Unipolar Speed Reference(1) 10k Ohm Pot. Recommended (2k Ohm Minimum)		• Set I/O configuration (see page 33). • Adjust Scaling: Parameters 91/92 and 325/326 • View Results: Parameter 002
Joystick Bipolar Speed Reference(1) ±10V Input		• Set I/O configuration (see page 33). • Set Direction Mode: Parameter 190 = "1, Bipolar" • Adjust Scaling: Parameters 91/92 and 325/326 • View Results: Parameter 002
Analog Input Bipolar Speed Reference ±10V Input		• Set I/O configuration (see page 33). • Set Direction Mode: Parameter 190 = "1, Bipolar" • Adjust Scaling: Parameters 91/92 and 325/326 • View Results: Parameter 002
Analog Voltage Input Unipolar Speed Reference 0 to +10V Input		• Set I/O configuration (see page 33). • Configure Input with parameter 320 • Adjust Scaling: Parameters 91/92 and 325/326 • View results: Parameter 002
Analog Current Input Unipolar Speed Reference 4-20 mA Input		• Set I/O configuration (see page 33). • Configure Input for Current: Parameter 320 and add jumper at appropriate terminals • Adjust Scaling: Parameters 91/92 and 325/326 • View results: Parameter 002
Analog Output ±10V, 4-20 mA Bipolar +10V Unipolar *(shown)*		• Set I/O configuration (see page 33). • Configure with Parameter 340 • Select Source Value: Parameter 384, [Digital Out1 Sel] • Adjust Scaling: Parameters 343/344
2-Wire Control Non-Reversing(2) 24V dc internal supply		• Disable Digital Input #1: Parameter 361 = "0, Unused" • Set Digital Input #2: Parameter 362 = "7, Run" • Set Direction Mode: Parameter 190 = "0, Unipolar"
2-Wire Control Reversing(2) External supply (I/O Board dependent)		• Set Digital Input #1: Parameter 361 = "8, Run Forward" • Set Digital Input #2: Parameter 362 = "9, Run Reverse"
3-Wire Control Internal supply		• No Changes Required

Input/Output	Connection Example	Required Parameter Changes
3-Wire Control External supply (I/O Board dependent). Requires 3-wire functions only ([Digital In1 Sel]). Using 2-wire selections will cause a type 2 alarm.		• No Changes Required
Digital Output Relays shown in powered state with drive faulted. See page 32. 2 relays at terminals 24-26.		• Select Source to Activate: Parameters 380/384
Enable Input		• Configure with parameter 366 For dedicated hardware Enable: Remove Jumper J5 (see page 33)

(1) Refer to the Attention statement on page 30 for important bipolar wiring information.

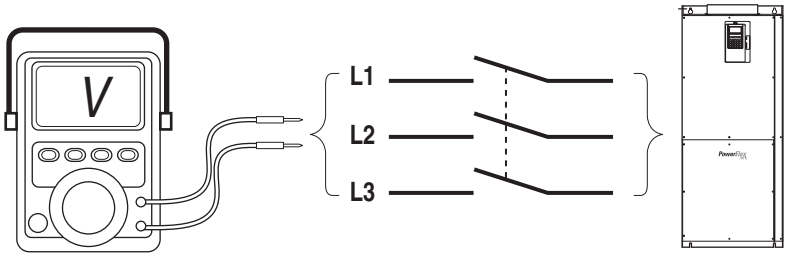
(2) **Important:** Programming inputs for 2 wire control deactivates all HIM Start buttons.

I/O and Communication Wire Routing

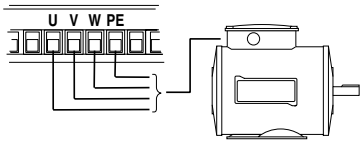


Step 7 Start-Up Check List

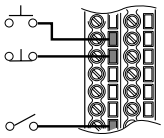
❑ **1.** Verify supply voltage.



❑ **2.** Check power wiring.



❑ **3.** Check control wiring.

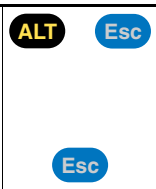


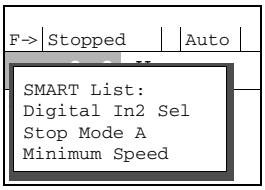
❑ **4.** Apply AC power and control voltages to the drive.

If any of the six digital inputs are configured to "Stop – CF" (CF = Clear Fault) or "Enable," verify that signals are present or reconfigure [Digital Inx Sel]. If an I/O option is not installed (i.e. no I/O terminal block), verify that [Digital Inx Sel] is not configured to "Stop – CF" or "Enable." If this is not done, the drive will not start. Refer to Troubleshooting – Abbreviated Fault & Alarm Listing on page 44 for a list of potential digital input conflicts. If the STS LED is not flashing green at this point, see page 37.

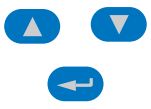
❑ **5.** Select Start-Up method: SMART Start . . .

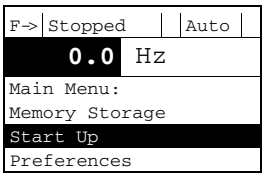
1. Press ALT and then Esc (S.M.A.R.T). The S.M.A.R.T. start screen appears.
2. View and change parameter values as desired. For HIM information, refer to the Programming Manual.
3. Press Esc to exit the S.M.A.R.T. start.





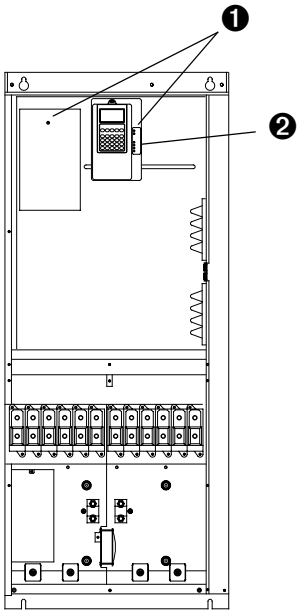
or any of the other start-up routines . . .





Status Indicators

Drive Status Indicators *(Frame 9 Shown)*

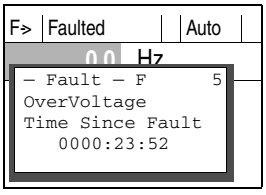
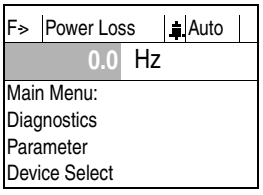


#	Name	Color	State	Description
❶	PWR (Power)	Green	Steady	Illuminates when power is applied to the drive.
❷	PORT(1)	Green	–	Status of DPI port internal communications (if present).
	MOD(1)	Yellow	–	Status of communications module (when installed).
	NET A(1)	Red	–	Status of network (if connected).
	NET B(1)	Red	–	Status of secondary network (if connected).

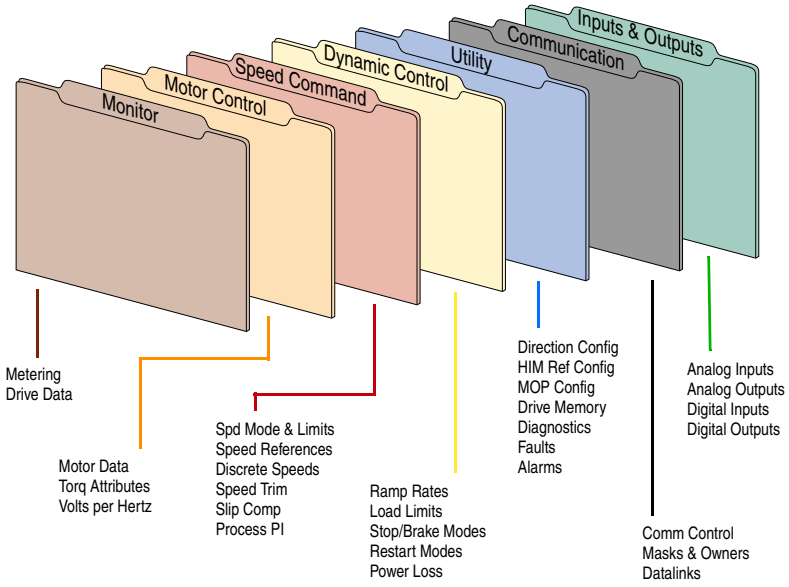
(1) Refer to the Communication Option User Manual for details.

HIM Indication

The LCD HIM also provides visual notification of a fault or alarm condition.

Drive is indicating a fault. The LCD HIM immediately reports the fault condition by displaying the following. • "Faulted" appears in the status line • Fault number • Fault name • Time that has passed since fault occurred Press Esc to regain HIM control.	
Drive is indicating an alarm. The LCD HIM immediately reports the alarm condition by displaying the following. • Alarm name (Type 2 alarms only) • Alarm bell graphic	

Step 8 Program the Drive



Important Notes about Parameters

= Stop drive before changing this parameter.

indicates that additional information is available in *Appendix B* of the *Programming Manual*.

Important: Some parameters will have two unit values:
- Analog inputs can be set for current or voltage with [Anlg In Config], param. 320.
- Setting [Speed Units], parameter 79 selects Hz or RPM.

Important: When sending values through DPI ports, simply remove the decimal point to arrive at the correct value (i.e. to send “5.00 Hz,” use “500”).

Frequently Used Parameters

File	Group	No.	Parameter Name & Description	Values		Related
MOTOR CONTROL	Motor Data	041	**[Motor NP Volts]**	Default:	Based on Drive Rating	
			Set to the motor nameplate rated volts.	Min/Max:	0.0/[Rated Volts]	
				Units:	0.1 VAC	
		042	**[Motor NP FLA]**	Default:	Based on Drive Rating	047
			Set to the motor nameplate rated full load amps.	Min/Max:	0.0/[Rated Amps] × 2	048
				Units:	0.1 Amps	
		045	**[Motor NP Power]**	Default:	Based on Drive Rating	046
			Set to the motor nameplate rated power.	Min/Max:	0.00/5000.00	
				Units:	0.01 kW/HP See [Mtr NP Pwr Units]	

File	Group	No.	Parameter Name & Description	Values	Related
MOTOR CONTROL	Motor Data	046	**[Mtr NP Pwr Units]** Selects the motor power units to be used. "Convert HP" = converts all power units to Horsepower. "Convert kW" = converts all power units to kilowatts.	Default: Drive Rating Based Options: 0 "Horsepower" 1 "kiloWatts" 2 "Convert HP" 3 "Convert kW"	
		047	**[Motor OL Hertz]** Selects the output frequency below which the motor operating current is derated. The motor thermal overload will generate a fault at lower levels of current below this output frequency.	Default: Motor NP Hz/3 Min/Max: 0.0/Motor NP Hz Units: 0.1 Hz	042 220
	Torq Attributes	053	**[Motor Cntl Sel]** Sets the method of motor control used in the drive.	Default: 0 "Sensrls Vect" Options: 0 "Sensrls Vect" 1 "SV Economize" 2 "Custom V/Hz" 3 "Fan/Pmp V/Hz"	
		061	**[Autotune]** Provides a manual or automatic method for setting [IR Voltage Drop], [Flux Current Ref] and [Ixo Voltage Drop]. "Ready" (0) = Parameter returns to this setting following a "Static Tune" or "Rotate Tune." It also permits manually setting [IR Voltage Drop], [Ixo Voltage Drop] and [Flux Current Ref]. "Static Tune" (1) = A temporary command that initiates a non-rotational motor stator resistance test for the best possible automatic setting of [IR Voltage Drop], [Break Voltage] and [Break Frequency] in all modes. A start command is required within 20 seconds following initiation of this setting. The parameter returns to "Ready" (0) following the test, at which time another start transition is required to operate the drive in normal mode. Used when motor cannot be rotated. "Rotate Tune" (2) = A temporary command that initiates a "Static Tune" followed by a rotational test for the best possible automatic setting of [Flux Current Ref] and [Start Boost]. A start command is required following initiation of this setting. The parameter returns to "Ready" (0) following the test, at which time another start transition is required to operate the drive in normal mode. **Important:** Used when motor is uncoupled from the load. Results may not be valid if a load is coupled to the motor during this procedure. ⚠ Rotation of the motor in an undesired direction can occur during this procedure. To guard against possible injury and/or equipment damage, it is recommended that the motor be disconnected from the load before proceeding. "Calculate" (3) = This setting uses motor nameplate data to automatically set [IR Voltage Drop], [Flux Current Ref] and [Slip RPM @ FLA].	Default: 3 "Calculate" Options: 0 "Ready" 1 "Static Tune" 2 "Rotate Tune" 3 "Calculate"	053 062

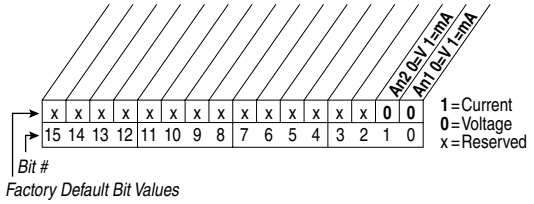
File	Group	No.	Parameter Name & Description	Values			Related
SPEED COMMAND	Spd Mode/Limits	079	**[Speed Units]** Selects the units to be used for all speed related parameters. Options 0 & 1 indicate status only. Options 2 & 3 will convert/configure the drive for that selection. "Convert Hz" (2) - converts all speed based parameters to Hz, and changes the value proportionately (i.e. 1800 RPM = 60 Hz). "Convert RPM" (3) - converts all speed based parameters to RPM, and changes the value proportionately.	Default: Options:	0 0 1 2 3	"Hz" "Hz" "RPM" "Convert Hz" "Convert RPM"	
		080	**[Feedback Select]** Selects the source for motor speed feedback. "Open Loop" (0) - no encoder is present, and slip compensation is not needed. "Slip Comp" (1) - tight speed control is needed, and encoder is not present.	Default: Options:	0 0 1	"Open Loop" "Open Loop" "Slip Comp"	152
		081	**[Minimum Speed]** Sets the low limit for speed reference after scaling is applied. Refer to parameter 083 [Overspeed Limit].	Default: Min/Max: Units:	0.0 0.0/[Maximum Speed] 0.1 Hz 0.1 RPM		079 083 092 095
		082	**[Maximum Speed]** Sets the high limit for speed reference after scaling is applied. Refer to parameter 083 [Overspeed Limit].	Default: Min/Max: Units:	50.0 or 60.0 Hz (volt class) [Motor NP RPM] 5.0/320.0 Hz 75.0/19200.0 RPM 0.1 Hz 0.1 RPM		055 079 083 091 094
	Speed References	090	**[Speed Ref A Sel]** Selects the source of the speed reference to the drive unless [Speed Ref B Sel] or [Preset Speed 1-7] is selected. (1) See Installation Manual for DPI port locations.	Default: Options:	2 1 2 3-8 9 10 11 12 13 14 15 16 17 18 19 20 21 22	"Analog In 2" "Analog In 1" "Analog In 2" "Reserved" "MOP Level" "Reserved" "Preset Spd1" "Preset Spd2" "Preset Spd3" "Preset Spd4" "Preset Spd5" "Preset Spd6" "Preset Spd7" "DPI Port 1"(1) "DPI Port 2"(1) "DPI Port 3"(1) "DPI Port 4"(1) "DPI Port 5"(1)	002 091 thru 093 101 thru 107 117 thru 120 192 thru 194 213 272 273 320 361 thru 366
		091	**[Speed Ref A Hi]** Scales the upper value of the [Speed Ref A Sel] selection when the source is an analog input.	Default: Min/Max: Units:	[Maximum Speed] –/+[Maximum Speed] 0.1 Hz 0.01 RPM		079 082
		092	**[Speed Ref A Lo]** Scales the lower value of the [Speed Ref A Sel] selection when the source is an analog input.	Default: Min/Max: Units:	0.0 –/+[Maximum Speed] 0.1 Hz 0.01 RPM		079 081

File	Group	No.	Parameter Name & Description	Values	Related
SPEED COMMAND	Discrete Speeds	101 102 103 104 105 106 107	**[Preset Speed 1]** **[Preset Speed 2]** **[Preset Speed 3]** **[Preset Speed 4]** **[Preset Speed 5]** **[Preset Speed 6]** **[Preset Speed 7]** Provides an internal fixed speed command value. In bipolar mode direction is commanded by the sign of the reference.	Default: 5.0 Hz/150 RPM 10.0 Hz/300 RPM 20.0 Hz/600 RPM 30.0 Hz/900 RPM 40.0 Hz/1200 RPM 50.0 Hz/1500 RPM 60.0 Hz/1800 RPM Min/Max: –/+[Maximum Speed] Units: 0.1 Hz 1 RPM	079 090 093

File	Group	No.	Parameter Name & Description	Values	Related
DYNAMIC CONTROL	Ramp Rates	140 141	**[Accel Time 1]** **[Accel Time 2]** Sets rate of accel for all speed increases. $\frac{\text{Max Speed}}{\text{Accel Time}} = \text{Accel Rate}$	Default: 10.0 Secs 10.0 Secs Min/Max: 0.1/3276.7 Secs Units: 0.1 Secs	142 143 146 361 thru 366
		142 143	**[Decel Time 1]** **[Decel Time 2]** Sets rate of decel for all speed decreases. $\frac{\text{Max Speed}}{\text{Decel Time}} = \text{Decel Rate}$	Default: 10.0 Secs 10.0 Secs Min/Max: 0.1/3276.7 Secs Units: 0.1 Secs	140 141 146 361 thru 366
	Load Limits	148	**[Current Lmt Val]** Defines the current limit value when [Current Lmt Sel] = "Cur Lim Val."	Default: [Rated Amps] × 1.5 (Equation yields approximate default value.) Min/Max: Based on Drive Rating Units: 0.1 Amps	147 149
		151	**[PWM Frequency]** Sets the carrier frequency for the PWM output. Drive derating may occur at higher carrier frequencies.	Default: 2 kHz Min/Max: 1/Based on Drive Rating Units: 1 kHz	
	Stop/Brake Modes	155 156	**[Stop/Brk Mode A]** **[Stop/Brk Mode B]** Active stop mode. [Stop Mode A] is active unless [Stop Mode B] is selected by inputs. (1) When using options 1 or 2, refer to the Attention statements at [DC Brake Level].	Default: 1 "Ramp" Default: 0 "Coast" Options: 0 "Coast" 1 "Ramp"(1) 2 "Ramp to Hold"(1) 3 "DC Brake"	157 158 159 ℹ

File	Group	No.	Parameter Name & Description	Values	Related
DYNAMIC CONTROL	Stop/Brake Modes	158	**[DC Brake Level]** Defines the DC brake current level injected into the motor when "DC Brake" is selected as a stop mode. The DC braking voltage used in this function is created by a PWM algorithm and may not generate the smooth holding force needed for some applications. **ATTENTION:** If a hazard of injury due to movement of equipment or material exists, an auxiliary mechanical braking device must be used. **ATTENTION:** This feature should not be used with synchronous or permanent magnet motors. Motors may be demagnetized during braking.	Default: [Rated Amps] Min/Max: 0/[Rated Amps] Units: 0.1 Amps	
		163	**[DB Resistor Type]** Selects whether an external DB resistor will be used.	Default: 0 "None" Options: 0 "None" 1 "External Res"	161 162
	Restart Modes	169	**[Flying Start En]** Enables/disables the function which reconnects to a spinning motor at actual RPM when a start command is issued.	Default: 0 "Disabled" Options: 0 "Disabled" 1 "Enabled"	

File	Group	No.	Parameter Name & Description	Values	Related
UTILITY	Drive Memory	201	**[Language]** Selects the display language when using an LCD HIM. This parameter is not functional with an LED HIM. Options 6, 8 and 9 are "Reserved."	Default: 0 "Not Selected" Options: 0 "Not Selected" 1 "English" 2 "Francais" 3 "Español" 4 "Italiano" 5 "Deutsch" 7 "Português" 10 "Nederlands"	
	Faults	240	**[Fault Clear]** Resets a fault and clears the fault queue.	Default: 0 "Ready" Options: 0 "Ready" 1 "Clear Faults" 2 "Clr Flt Que"	

File	Group	No.	Parameter Name & Description	Values	Related
INPUTS/OUTPUTS	Analog Inputs	320	**[Anlg In Config]** Selects the mode for the analog inputs.  *Factory Default Bit Values*	322 325 323 326

File	Group	No.	Parameter Name & Description	Values	Related
INPUTS/OUTPUTS	Analog Inputs	322	**[Analog In 1 Hi]**	Default: 10.000 Volt	091
		325	**[Analog In 2 Hi]**	Default: 10.000 Volt	092
			Sets the highest input value to the analog input x scaling block. [Anlg In Config], parameter 320 defines if this input will be –/+10V or 4-20 mA.	Min/Max: 4.000/20.000mA –/+10.000V 0.000/10.000V Units: 0.001 mA 0.001 Volt	
		323	**[Analog In 1 Lo]**	Default: 0.000 Volt	091
		326	**[Analog In 2 Lo]**	Default: 0.000 Volt	092
			Sets the lowest input value to the analog input x scaling block. [Anlg In Config], parameter 320 defines if this input will be –/+10V or 4-20 mA.	Min/Max: 4.000/20.000mA –/+10.000V 0.000/10.000V Units: 0.001 mA 0.001 Volt	
	Digital Inputs	361	**[Digital In1 Sel]**	Default: 4 "Stop – CF"	
		362	**[Digital In2 Sel]**	Default: 5 "Start"	
		363	**[Digital In3 Sel]**	Default: 18 "Auto/ Manual"	
		364	**[Digital In4 Sel]**	Default: 15 "Speed Sel 1"	
		365	**[Digital In5 Sel]**	Default: 16 "Speed Sel 2"	
		366	**[Digital In6 Sel]**(9)	Default: 17 "Speed Sel 3"	
			Selects the function for the digital inputs. (1) Speed Select Inputs.	Options: 0 "Not Used" 1 "Enable"(6)(8) 2 "Clear Faults"(CF)(2) 3 "Aux Fault" 4 "Stop – CF"(8) 5 "Start"(3)(7) 6 "Fwd/ Reverse"(3) 7 "Run"(4)(8) 8 "Run Forward"(4) 9 "Run Reverse"(4) 10 "Jog1"(3)	100
			To access Preset Speed 1, set [Speed Ref x Sel] to "Preset Speed 1".	11 "Jog Forward"(4) 12 "Jog Reverse"(4)	
			Type 2 Alarms - Some digital input programming may cause conflicts that will result in a Type 2 alarm. Example: [Digital In1 Sel] set to "5, Start" in 3-wire control and [Digital In2 Sel] set to 7 "Run" in2-wire.	13 "Stop Mode B" 14 "Bus Reg Md B"	156 162
			Refer to Fault/Alarm Listing on page 44 for information on resolving this type of conflict.	15-17 "Speed Sel 1-3"(1) 18 "Auto/ Manual"(5) 19 "Local" 20 "Acc2 & Dec2"	096
			(2) When [Digital Inx Sel] is set to option 2 "Clear Faults" the Stop button cannot be used to clear a fault condition.	21 "Accel 2" 22 "Decel 2" 23 "MOP Inc" 24 "MOP Dec" 25 "Excl Link"	141 143 195
			(3) Typical 3-Wire Inputs - Requires that only 3-wire functions are chosen. Including 2-wire selections will cause a type 2 alarm.	26 "PI Enable" 27 "PI Hold" 28 "PI Reset"	194
			(4) Typical 2-Wire Inputs - Requires that only 2-wire functions are chosen. Including 3-wire selections will cause a type 2 alarm. See Fault/Alarm Listing on page 44 for conflicts.	29 "Pwr Loss Lvl" 30-33 Reserved 34 "Jog 2" 35 "PI Invert"	124
			(5) Auto/Manual - Refer to the Installation Manual for details.		
			(6) Opening an "Enable" input will cause the motor to coast-to-stop, ignoring any programmed Stop modes.		
			(7) A "Dig In ConflictB" alarm will occur if a "Start" input is programmed without a "Stop" input.		
			(8) If using the Sleep-Wake function, refer to [Sleep-Wake Mode], parameter 178 in the Programming Manual.		
			(9) A dedicated hardware enable input is available via a jumper selection. Refer to Installation Manual for further information.		

3	2	1	Auto Reference Source
0	0	0	Reference A
0	0	1	Reference B
0	1	0	Preset Speed 2
0	1	1	Preset Speed 3
1	0	0	Preset Speed 4
1	0	1	Preset Speed 5
1	1	0	Preset Speed 6
1	1	1	Preset Speed 7

Troubleshooting – Abbreviated Fault & Alarm Listing

For a complete listing of Faults and Alarms, refer to the Programming Manual.

A fault is a condition that stops the drive. There are three fault types.

Type	Fault Description	
①	Auto-Reset Run	When this type of fault occurs, and [Auto Rstrt Tries] is set to a value greater than "0," a user-configurable timer, [Auto Rstrt Delay] begins. When the timer reaches zero, the drive attempts to automatically reset the fault. If the condition that caused the fault is no longer present, the fault will be reset and the drive will be restarted.
②	Non-Resettable	This type of fault normally requires drive or motor repair. The cause of the fault must be corrected before the fault can be cleared. The fault will be reset on power up after repair.
③	User Configurable	These faults can be enabled/disabled to annunciate or ignore a fault condition.

An alarm is a condition that, if left untreated, may stop the drive. There are two alarm types.

Type	Alarm Description	
❶	User Configurable	These alarms can be enabled or disabled through [Alarm Config 1].
❷	Non-Configurable	These alarms are always enabled.

Fault/Alarm Listing

No.	Name	Fault	Alarm	Description
133	DigIn CnflctA		❷	Digital input functions are in conflict. Combinations marked with a "▲" will cause an alarm. * Jog 1 and Jog 2

	Acc2/ Dec2	Accel 2	Decel 2	Jog*	Jog Fwd	Jog Rev	Fwd/ Rev
Acc2 / Dec2		▲	▲				
Accel 2	▲						
Decel 2	▲						
Jog*					▲	▲	
Jog Fwd				▲			▲
Jog Rev				▲			▲
Fwd/Rev					▲	▲	

No.	Name	Fault	Alarm	Description
134	DigIn CnflctB		❷	A digital Start input has been configured without a Stop input or other functions are in conflict. Combinations that conflict are marked with a "▲" and will cause an alarm. * Jog 1 and Jog 2

	Start	Stop-CF	Run	Run Fwd	Run Rev	Jog*	Jog Fwd	Jog Rev	Fwd/ Rev
Start			▲	▲	▲		▲	▲	
Stop-CF									
Run	▲			▲	▲		▲	▲	
Run Fwd	▲		▲			▲			▲
Run Rev	▲		▲			▲			▲
Jog*				▲	▲				
Jog Fwd	▲		▲						
Jog Rev	▲		▲						
Fwd/Rev				▲	▲				

No.	Name	Fault	Alarm	Description
135	DigIn CnflctC		❷	More than one physical input has been configured to the same input function. Multiple configurations are not allowed for the following input functions. Forward/Reverse, Speed Select 1, Speed Select 2, Speed Select 3, Run Forward, Run Reverse, Jog Forward, Jog Reverse, Run, Stop Mode B, Bus Regulation Mode B, Acc2 / Dec2, Accel 2, Decel 2

Manually Clearing Faults

1. Press Esc to acknowledge the fault. The fault information will be removed so that you can use the HIM.	Esc
2. Address the condition that caused the fault. The cause must be corrected before the fault can be cleared.	
3. After corrective action has been taken, clear the fault by **one** of these methods. • Press Stop • Cycle drive power • Set parameter 240 [Fault Clear] to “1.” • “Clear Faults” on the HIM Diagnostic menu.	

Notes

Notes

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