

1336 FORCE™ to PowerFlex® 700S Phase II Drive



CONVERSION GUIDE



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Table of Contents

Description	Page
1336 FORCE™ AC Drive Availability Schedule revision	4
Product Description	4
Operation	5
Application Solutions	6
Start Up and Programming	7
Communications	9
PowerFlex 700S Phase II AC Drive Support	11
PowerFlex 700S Phase II Drive Selection	12
Frame to AC Drive Rating Cross Reference	14
Power Terminal Block Specifications	16
Control Terminals	31
Cable Recommendations - Power	32
Cable Recommendations - Control	34
Cable Length Restrictions	35
Packaging and Mounting	39
Minimum Mounting Clearances	40
Approximate Dimensions	42
Specifications	53
Reference Materials	60

1336 FORCE™ AC Drive Availability Schedule revision

The 1336 FORCE (1336T) was moved to an inactive stage on October 1, 2007 - Rockwell Automation, Inc. will no longer accept orders for new drive units. Rockwell Automation has been an industry leader in its commitment to long term customer support of drive products. This demonstrated commitment is unmatched in today's global drives market. This commitment is carried out in a variety of ways, including:

- Ongoing product migration to newer products - such as the PowerFlex 700S Phase II AC drive
- Extended product life cycles
- Parts and service support that extends well beyond new product availability
- "Custom Classics" production of discontinued products

The availability schedule for the 1336 FORCE AC drive is as follows:

- Date Inactive - October 1, 2007 - No new orders accepted
- Date Discontinued - October 2009*
- Date Obsoleted - October 2012*

* Date is forecasted based on spare parts on hand and includes repair and field services. This date could change without notice.

Product Description

1336 FORCE AC Drive

The 1336 FORCE AC Drive is the high performance member of the 1336 family. Its precise speed and torque control, flexible architecture, and communication capability make it ideal for controlling the most demanding applications.

Combining patented FORCE™ Technology, current regulated pulse width modulation (CRPWM), and microprocessors permits motor speed regulation within 0.001% and precise control of torque at all speeds.

The 1336 FORCE AC Drive shares many features with the 1336 PLUS and 1336 IMPACT AC drives including human interface, space-saving packaging, and communications capabilities. The IGBT power structure technology provides smooth current output to the motor, reducing motor heating.

PowerFlex 700S Phase II AC Drive

The PowerFlex® 700S Phase II AC drive, a version of PowerFlex 700 power platform, offers high performance drive control, advanced features and more built-in diagnostics for handling the most demanding drive applications.

The PowerFlex 700S with DriveLogix™ combines the powerful performance and flexible control of PowerFlex AC drives with the high-performance Logix engine to produce a highly functional, cost-effective drive and control solution.

Operation

1336 FORCE

- FORCE Technology, a patented technique of Field-Oriented Control, to achieve the high performance speed and torque control of an AC motor. FORCE Technology is the first AC motor control technology that can truly achieve dynamic “DC-like” performance.
- Speed and torque regulation capability without the need for an encoder. With the 1336 FORCE drive, switching from encoder-feedback to Encoderless Control is as simple as changing a parameter value. The FORCE Technology Encoderless Control expands the operating speed range from 40:1 up to 120:1 for standard AC motors. This improved speed/torque performance makes the drive suitable for a wide range of applications.
- An internal process trim regulator provides control of dancer, load cell, or other tension transducer devices, without the need for an external controller.
- Internal Logic Supply from DC Bus does not require separate control power wiring, and improves ride-through capability.

PowerFlex 700S

- Multiple high performance motor control algorithms: Flux Vector Control utilizes patented FORCE™ Technology for sensor and sensorless induction motor control and brushless permanent magnet motor operation, provide maximum application flexibility.
- An array of feedback options, including a standard incremental encoder, an optional incremental encoder, resolver, and high resolution encoder feedback interface cards optimize the accuracy of speed and position regulators. A Temposonics® and Stalh SSI interface for linear feedback devices are also available.
- An integrated position loop for applications from simple indexing to electronic line shaft.
- SynchLink™, a high performance, high speed, drive-to-drive link for transmitting synchronized drive and application data. The SynchLink fiber optic link provides the highest level of multiple drive coordination, with a 50µSec maximum transfer rate and multiple data configuration.
- Standard chopper transistor and separately mounted or drive mounted resistors provide cost effective dynamic braking solutions.

Application Solutions

1336 FORCE

The 1336 FORCE drive can be applied to specialized applications with cyclic or high inertia loads, impact loads that require fast response, or other demanding requirements. With available drive configurations that include Standalone, Common AC or Common DC Bus lineups, line regeneration, or dynamic braking or high performance systems – the 1336 FORCE drive handles many specialized applications with ease.

PowerFlex 700S

The PowerFlex 700S AC drive is ideally suited for high performance applications in a wide variety of industries including converting, paper, print, metals, material handling, automotive, etc. For consultation on high performance drive applications, Rockwell Automation's SupportPlus program uses expert level Rockwell Automation system engineers to support your engineering team.

- Selectable high performance motor control algorithms for maximum application flexibility within one drive
- Standard transistor and available drive-mounted (or separately mounted) braking resistor provide cost-effective dynamic brake options
- Multiple feedback options optimize the accuracy of speed and position regulators
- High speed 24V dc and 120V ac I/O and high resolution analog I/O provides application I/O flexibility
- Integrated position loop for positioning applications from indexing to electronic line shaft configurations
- SynchLink™ fiber optic link for the highest level of drive coordination and data transfer
- AC or DC common bus configurations for stand alone or multiple drive solutions
- Seven preset speeds with programmable control through digital inputs or communications
- User Function Library provides logic functions without a PLC

Drive Application Software

- Drive Application Software brings together an outstanding range of application experience and performance drive products to provide the user with pre-engineered and the most effective drive application solutions. For more information, refer to our web site: www.ab.com/drives/drvappsw

Start Up and Programming

1336 FORCE

- A Human Interface Module (HIM) provides programming, auto-tuning features, diagnostics and other information in full, easy to understand text. The standard display is a 2 line by 16 character backlit LCD screen. A Graphic Programming Terminal (GPT) is also available and provides a full numeric keypad, advanced parameter programming operations, and parameter upload/ download capabilities. The GPT HIM provides an 8 line by 40 character backlit supertwist LCD display.
- Auto-tuning eliminates the need for detailed motor parameter information by using information from the motor to tune both the speed and torque loops. Auto-tuning tests include: Motor Inertia, System Inertia, Motor Electrical Parameter, and separate regulator tuning.
- Integration with DriveExecutive™ software, for online/offline configuration and management of drives and drive peripherals and DriveObserver™ software, for real time trending of drive information.

PowerFlex 700S

- The PowerFlex 700S has optimized global voltage settings for quick configuration anywhere in the world. Multiple reset defaults make setup for your voltage/frequency fast and easy.
- An optional LCD Human Interface Module (HIM) provides programming, start up information, diagnostics and other information in full, easy to understand text. The display is a 7 line by 21 character backlit LCD screen. Four styles are available; full numeric keypad, operating and programming keys only and programming only.
- Flash upgrades for both the drive control and programmable DriveLogix, equip the designer with the ability to upgrade to the latest control features available.
- For simplified AC drive start-up and reduced development time, we've integrated the PowerFlex 700S Phase II drive configuration with RSLogix™ 5000 software. This single software approach simplifies parameter and tag programming while still allowing stand-alone drive software tool use on the factory floor.

Integrated Software

DriveTools™ SP Software

A powerful new PC based software suite, for programming, configuration and troubleshooting.

- DriveExecutive™ - for online/offline configuration and management of drives and drive peripherals.
- DriveObserver™ - for real time trending of drive information.

DriveExplorer™ Software

DriveExplorer software is an entry-level package providing basic functionality for programming and maintaining Rockwell Automation drives. DriveExplorer features Windows® Explorer-style navigation to make drive set-up easy and faster than using a Human Interface Module (HIM).

Product Highlights:

- Intuitive online editor with dialog-based parameter editing
- Upload and save information from individual devices for later downloads
- Upload and download all information in a drive and its peripherals for quick commissioning replacement or to duplicate drives
- Ability to flash update device firmware
- Control Bar tools for starting and stopping drives
- Print online or use the 'Print to a Text File' feature to print offline later
- Integrated HTML Help™ architecture
- Startup wizards simplify configuration process
- Custom views with desktop shortcuts
- Status view display shows drive status and process display items

DriveLogix

DriveLogix offers embedded Logix control for application programmability and control of auxiliary functions in one package, the PowerFlex 700S with DriveLogix.

- Common programming environment and multiple programming languages supported by all Logix platforms.
- Ladder Diagram, Function Block Diagram, Sequential Function Chart and Structured Text.
- Eight (8) separate tasks including one (1) continuous and seven (7) periodic. Each task can support up to 32 programs and an unlimited number of routines for program organization.
- 1.5 Mbytes of standard user memory.
- CompactFLASH™ for non-volatile storage.
- Local connections for up to sixteen (16) Compact I/O modules.
- Communication options include the RS-232 port and the same optional communication daughter cards used by the FlexLogix™ controller.
- Virtual backplane concept for program portability to other Logix platforms, seamless integration into the NetLinx architecture and direct drive communication.

RSLogix™ 5000

The PowerFlex 700S with DriveLogix utilizes RSLogix 5000, v13.0 or greater, with embedded DriveExecutive Lite for programming, configuration and troubleshooting the drive and embedded Logix controller.

- Single programming software package for the entire family of Logix 5000 products.
- Reduces learning curve between controllers.
- Multiple IEC1131-3 programming languages.
- Symbolic tag and structure data model.
- Integrated sequential and motion control.
- Power programming tools to increase productivity.

Communications

1336 FORCE

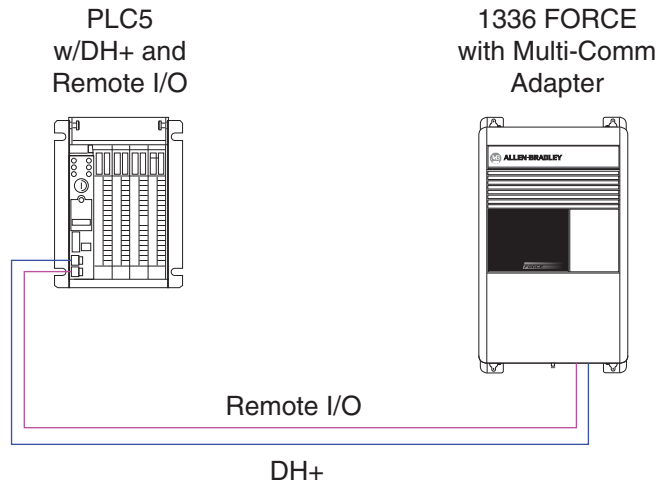
- Direct connection to Remote I/O provides a seamless digital interface to a PLC Controller.
- Direct connection to Data Highway Plus (DH+™) makes it possible to program and monitor the drive using DriveTools32™ programming software.
- Direct connection to ControlNet™ provides powerful function block programming capabilities and 4 real-time trend buffers.
- Digital Drive-to-Drive (D2D) Interface – A high speed interface that allows drives to share time-critical information.

PowerFlex 700S

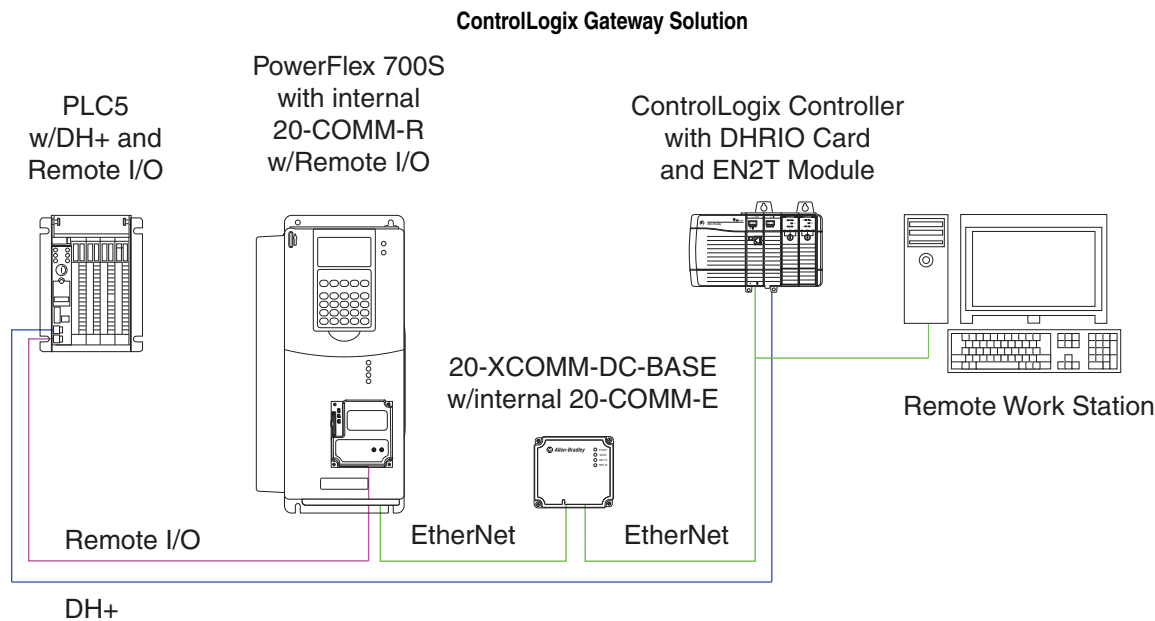
The Allen-Bradley PowerFlex family of drives utilizes Rockwell Automation's NetLinx Open Network Architecture. This provides the common set of features and services for DeviceNet™, ControlNet™, and EtherNet/IP™ networks resulting in lower total cost of ownership. Users can easily manage information from shop floor to top floor and seamlessly integrate their complete system as they control, configure, and collect data.

- PowerFlex drives offer internal communication options helping the user to cost-effectively assemble highly integrated applications. Options include: DeviceNet, ControlNet, Universal Remote I/O™, and other open communications including PROFIBUS™ DP and Interbus™.
- Status indicators for all internal communications options are visible on the cover for easy set-up and monitoring of drive communications.

Typical 1336 FORCE Network Configuration



Recommended Network Configuration Migration with PowerFlex 700S Phase II Drive



1336T FORCE to PowerFlex 700S Network Migration Solutions

Option Type:	Hardware Required:	Benefits:	Trade-Offs:
ControlLogix Gateway	- ControlLogix Chassis 20-COMM-R (in drive) 20-COMM-E (in box) 1756-EN2T or -ENBT 1756-DHRIO Card 20-XCOMM-DC-BASE - Ext. 24V DC supply - DIN rail to support - BASE & supply	- Fastest data throughput - Positions the system for future use with high-end communication networks - Can now use DriveTools SP to go online with the drive and connected peripheral(s) - Additional network flexibility	- Expensive - Requires more mounting space - Must install new wiring - Need to convert PLC-5 program to work with ControlLogix - Need to train personal on how to use the new hardware

Option Type:	Hardware Required:	Benefits:	Trade-Offs:
Add EtherNet to PLC-5®	- Ethernet Side-card 20-COMM-R (in drive) 20-COMM-E (in box) 20-XCOMM-DC-BASE - Ext. 24V DC supply - DIN rail to support 20-XCOMM-DC-BASE & Ext. 24V DC supply - Ethernet cables	- Positions the system for future use with high-end communication networks - Faster data throughput - Additional network flexibility - Can now use DriveTools SP to go online with the drive and connected peripheral(s)	- Expensive - Requires more mounting space - Must install new wiring - Need to modify existing PLC-5 program
Datalink Gateway	- Datalink module w/ DH+ upgrade 20-COMM-S (in box) 20-COMM-R (in drive) 20-XCOMM-DC-BASE - Ext. 24V DC supply - DIN rail to support 20-XCOMM-DC-BASE & Ext. 24V DC supply	Can use existing DH+ cabling for connection to 20-COMM-S	- Expensive - Requires more mounting space - Need to modify existing PLC-5 program - Slow data throughput (38.4Kbps max) - Need to rely on 3rd-Party (Datalink) to update firmware in future - Still using old comm. technology - Need 3rd-Party (Datalink) to update firmware to support PCCC messaging for DriveTools SP - Need a separate power source for Datalink gateway (range is 9 to 24V DC only)

PowerFlex 700S Phase II AC Drive Support

Rockwell Automation is committed to maintaining and supporting Allen-Bradley drives and installations. Included in this commitment is start-up support and consultation for drive applications.

ProtectionPlus Drive Start-Up

With ProtectionPlus Drive Start-Up Services from Rockwell Automation, users can leverage the extensive product and industry experience of Rockwell Automation technicians to quickly commission drives and reduce the time between integration and actual start-up.

ProtectionPlus Drive Start-Up Services verify drive installation to ensure proper electrical, mechanical and environmental criteria are met. This includes verification of power and I/O wiring to the drive, custom drive configuration/tuning to meet application specific requirements, and diagnosing/troubleshooting problems that occur during a standalone drive start-up. ProtectionPlus can also extend an eligible product parts warranty and add a labor warranty. For more information about ProtectionPlus Drive Services, contact your local Rockwell Automation sales office or authorized distributor, or visit: <http://support.rockwellautomation.com/SupportPrograms/>.

SupportPlus

For consultation on high performance drive applications, the SupportPlus program is offered. SupportPlus uses expert level Rockwell Automation system engineers to support the user's engineering team. SupportPlus engineers will work with the end user to layout the appropriate architecture, configure drives, recommend programming techniques and provide application assistance on the most effective ways to implement the control solution.

For more information, please call 262-512-8176 or refer to www.ab.com/support/abdrives.

PowerFlex 700S Phase II Drive Selection

Position												
1-3	4	5-7	8	9	10	11	12	13	14	15	16	17
20D	D	2P1	A	0	E	Y	N	A	N	A	N	E
<i>a</i>	<i>b</i>	<i>c</i>	<i>d</i>	<i>e</i>	<i>f</i>	<i>g</i>	<i>h</i>	<i>i</i>	<i>j</i>	<i>k</i>	<i>l</i>	<i>m</i>

<i>a</i>			
Drive			
Code	Type		
20D	PowerFlex 700S		

<i>b</i>			
Voltage Rating			
Code	Voltage	Ph.	Prechg.
B §	240V ac	3	—
C §	400V ac	3	—
D §	480V ac	3	—
E ¶ §	600V ac	3	—
F ¶	690V ac	3	—
H ¶	540V dc	—	N
J ¶	650V dc	—	N
K ¶	810V dc	—	N
M ¶	932V dc	—	N
N >	325V dc	—	Y
P >	540V dc	—	Y
R >	650V dc	—	Y
T >	810V dc	—	Y
W >	932V dc	—	Y

¶ Note: CE Certification testing has not been performed on 600V class drives, Frames 1...4.

> Frames 5 & 6 Only.

¶ Frames 5 & up.

§ For DC input on Frames 1...4, use the corresponding AC input code B, C, D, or E.

<i>c1</i>			
ND Rating			
208/240V, 60Hz Input			
Code	208V Amps	240V Amps	Hp
4P2	4.8	4.2	1.0
6P8	7.8	6.8	2.0
9P6	11	9.6	3.0
015	17.5	15.3	5.0
022	25.3	22	7.5
028	32.2	28	10
042	48.3	42	15
052	56	52	20
070	78.2	70	25
080	92	80	30
104	120	104	40
130	130	130	50
154	177	154	60
192	221	192	75
260	260	260	100

<i>c2</i>		
ND Rating		
400V, 50 Hz Input		
Code	Amps	kW
2P1	2.1	0.75
3P5	3.5	1.5
5P0	5.0	2.2
8P7	8.7	4.0
011	11.5	5.5
015	15.4	7.5
022	22	11
030	30	15
037	37	18.5
043	43	22
056	56	30
072	72	37
085	85	45
105	105	55
125	125	55
170	170	90
205	205	110
260	260	132
261	261	132
300	300	160
385	385	200
460	460	250
500	500	250
590	590	315
650	650	355
730	730	400
820	820	450
920	920	500
1K0	1030	560
1K1	1150	630
1K3	1300	710
1K4	1450	800

<i>c3</i>		
ND Rating		
480V, 60 Hz Input		
Code	Amps	Hp
2P1	2.1	1.0
3P4	3.4	2.0
5P0	5	3.0
8P0	8	5.0
011	11	7.5
014	14	10
022	22	15
027	27	20
034	34	25
040	40	30
052	52	40
065	65	50
077	77	60
096	96	75
125	125	100
156	156	125
180	180	150
248	248	200
261	261	200
300	300	250
385	385	300
460	460	350
500	500	450
590	590	500
650	650	500
730	730	600
820	820	700
920	920	800
1K0	1030	900
1K1	1150	1000
1K3	1300	1200
1K4	1450	1250

c4

ND Rating		
600V, 60Hz Input *		
Code	Amps	Hp
1P7	1.7	1
2P7	2.7	2
3P9	3.9	3
6P1	6.1	5
9P0	9	7.5
011	11	10
017	17	15
022	22	20
027	27	25
032	32	30
041	41	40
052	52	50
062	62	60
077	77	75
099	99	100
125	125	125
144	144	150
170	170	150
208	208	200
261	261	250
325	325	350
385	385	400
416	416	450
460	460	450
502	502	500
590	590	600
650	650	700
750	750	800
820	820	900
920	920	1000
1K0	1030	1100
1K1	1180	1300

* Note: CE Certification testing has not been performed on 600V class drives Frames 1...4.

d

Enclosure	
Code	Enclosure
A	IP20, NEMA Type 1
B §	IP21, NEMA Type 1, MCC
N +	Open/IP00

+ Frames 9 & up Only.

§ Frames 10-12 Only.

e

HIM	
Code	Operator Interface
0	Blank Cover
2	Digital LCD
3	Full Numeric LCD
5	Prog. Only LCD
C	Full Numeric LCD, Door Mount *

* Frames 10 & up only.

c5

ND Rating		
690V, 50 Hz Input *		
Code	Amps	kW
052	52	45
060	60	55
082	82	75
098	98	90
119	119	110
142	142	132
170	170	160
208	208	200
261	261	250
325	325	315
385	385	355
416	416	400
460	460	450
502	502	500
590	590	560
650	650	630
750	750	710
820	820	800
920	920	900
1K0	1030	1000
1K1	1180	1100

* Note: CE Certification testing has not been performed on 600V class drives Frames 1...4.

f

Documentation	
Code	Documents
E	Quick Start Guide
N	No Documentation

g

Brake	
Code	w/Brake IGBT ‡
Y	Yes
N	No

‡ Brake IGBT is standard on Frames 1-3 and optional on Frames 4-9 ONLY.

h

Brake Resistor	
Code	w/Resistor
Y	Yes *
N	No

* Not available for Frame 3 drives or larger.

i

Emission		
Code	CE Filter *	CM Choke
A ✧	Yes	Yes
B >	Yes	No
N §	No	No

✧ Frames 1-6 Only.

> Frames 9 & up Only.

§ For use on a high resistive ground or ungrounded distribution system (Frame 9 only).

* Note: CE Certification testing has not been performed on 600V class drives Frames 1...4.

j

Comm Slot	
Code	Version
N	None
C	DPI ControlNet (Coax)
D	DPI DeviceNet
E	DPI EtherNet/IP
R	DPI RIO
S	DPI RS-485 DF1
1	DriveLogix ControlNet (Coax)
2	DriveLogix ControlNet Redundant (Coax)
3	DriveLogix ControlNet (Fiber)
4	DriveLogix ControlNet Redundant (Fiber)
5	DriveLogix DeviceNet (Open Conn.)
6	DriveLogix EtherNet/IP

k

Control Options				
Code	Control Option	Logic Expansion	Synch -Link	Cassette
A	Phase II	No	No	Expanded
B	Phase II	No	Yes	Expanded
C	Phase II	Yes	No	Expanded
D	Phase II	Yes	Yes	Expanded
G	Phase II	N/A	No	Slim
H	Phase II	N/A	Yes	Slim

l

Feedback	
Code	Option
N %	No Option
A ✧	Resolver
B ✧	Stegmann Hi-Resolution Encoder
C ✧	Multi-Device Interface
E ✧	2nd Encoder
S ✧	Safe-Off (w/2nd Encoder)

✧ Expanded cassette required.

% One encoder interface is included with the base drive.

m

Additional Config.	
Code	Description
E	Phase II Control
K	Phase II DriveLogix5730
L +	Phase II DriveLogix5730 w/EtherNet/IP

+ This is an embedded EtherNet option that is only available with DriveLogix5730.

Frame to AC Drive Rating Cross Reference

400V AC Input (using 700S kW ratings values)

ND kW	HD kW	ND Cont. Output Amps	1336 Frame	PF 700S Frame
0.75	0.55	2.1	B	1
1.5	1.1	3.5	B	1
2.2	1.5	5.0	B	1
4.0	3.0	8.7	B	1
5.5	4.0	11.5	B	1
7.5	5.5	15.4	B	1
11	7.5	22	B	1
15	11	30	B	2
18.5	15	37	B	2
22	18.5	43	B	3
30	22	56	B, C	3
37	30	72	C	3
45	37	85	C	4
55	45	105	C, D	5
55	45	125	D	5
75	55	140	D	6
90	75	170	D, E	6
110	90	205	E	6
132	110	260	E	6
132	110	261	E	9
160	132	300	E	9
200	160	385	E	10
250	200	460	E, F, G	10
250	250	500	F, G	10
315	250	590	F, G	11
355	315	650	F, G	11
400	355	730	G	11

480V AC Input (using 700S HP ratings values)

ND HP	HD HP	ND Cont. Output Amps	1336 Frame	PF 700S Frame
1	0.75	2.1	B	1
2	1.5	3.4	B	1
3	2	5.0	B	1
5	3	8.0	B	1
7.5	5	11	B	1
10	7.5	14	B	1
15	10	22	B	1
20	15	27	B	2
25	20	34	B	2
30	25	40	B, C	3
40	30	52	B, C	3
50	40	65	C	3
60	50	77	C	4
75	60	96	C, D	5
100	75	125	D	5
125	100	156	D	6
150	125	180	D, E	6
200	150	248	E	6
200	150	261	E	9
250	200	300	E	9
300	250	385	E	10
350	300	460	E, F, G	10
450	350	500	F, G	10
500	450	590	F, G	11
500	500	650	G	11
600	500	730	G	11
700	600	820	H	12
800	700	920	H	12

600V AC Input (using 700S HP ratings values)

ND HP	HD HP	ND Cont. Output Amps	1336 Frame	PF 700S Frame
1	0.75	1.7	B	1
2	1.5	2.7	B	1
3	2	3.9	B	1
5	3	6.1	B	1
7.5	5	9	B	1
10	7.5	11	B	1
15	10	17	B	1
20	15	22	B	2
25	20	27	C	2
30	25	32	C	3
40	30	41	C	3
50	40	52	C	3
60	50	62	C	4
75	60	77	C, D	5
100	75	99	D	5
125	100	125	D	6
150	125	144	D, E	6
150	150	170	E	9
200	150	208	E	9
250	200	261	E	10
350	250	325	E, F, G	10
400	350	385	F, G	10
450	350	416	F, G	10
500	400	460	F, G	11
500	500	502	G	11
600	500	590	G	11
700	650	650	H	12
800	700	750	H	12

Power Terminal Block Specifications

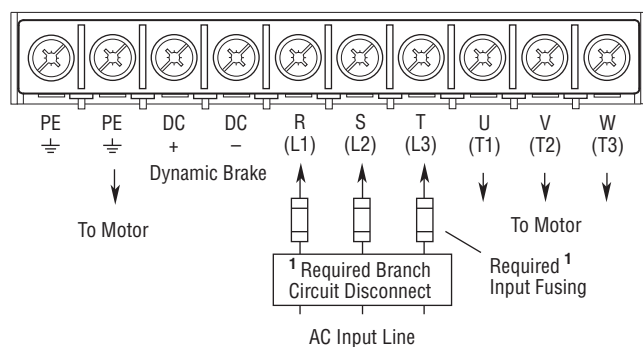
1336 FORCE

Table A Power Terminal Designations

Terminal	Description
PE 	Potential Earth Ground
TE 	True Earth Ground
R (L1), S (L2), T (L3)	AC Line Input Terminals
+DC, -DC	DC Bus Terminals
U (T1), V (T2), W (T3)	Motor Connection

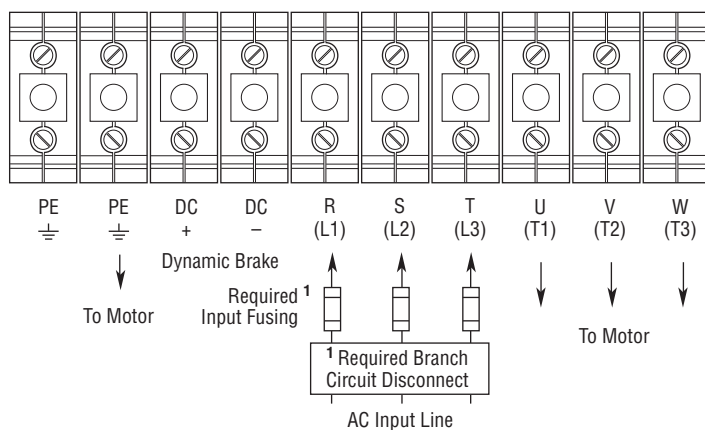
Frame B1 Power Terminal Block

200-240V, 0.75-5.5 kW (1-7.5 HP)
380-480/500-600V, 0.75-11 kW (1-15 HP)



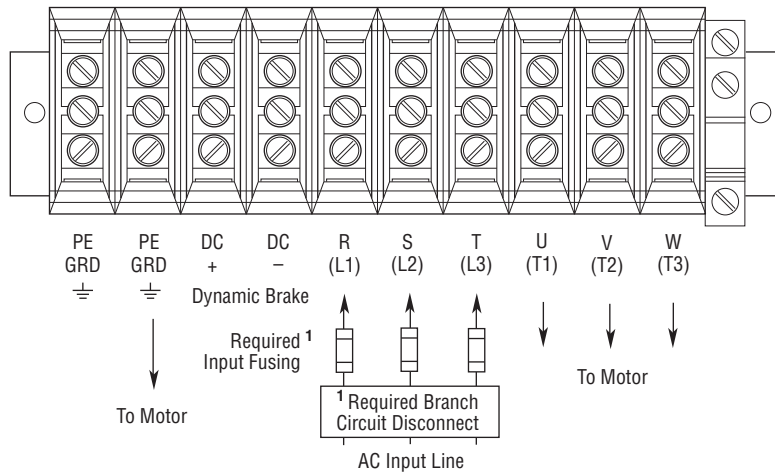
Frame B2 Power Terminal Block

200-240V, 7.5-11 kW (10-15 HP)
380-480V, 15-22 kW (20-30 HP)
500-600V, 15 kW (20 HP)



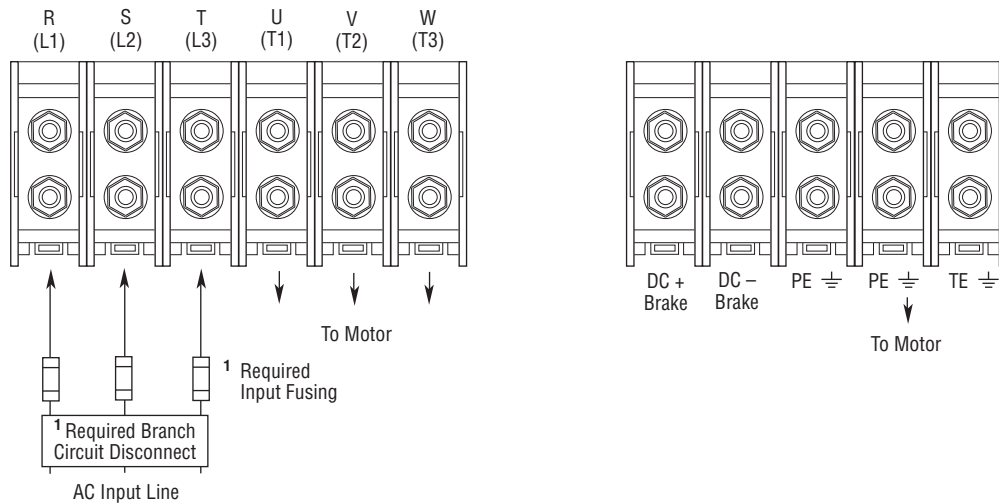
Frame C Power Terminal Block

200-240V, 15-22 kW (20-30 HP)
 380-480V, 30-45 kW (40-60 HP)
 500-600V, 18.5-45 kW (25-60 HP)



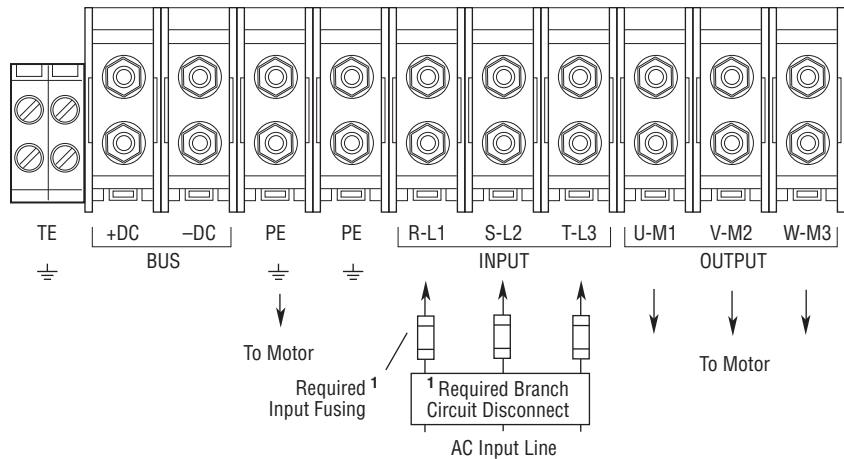
Frame D Power Terminal Block

200-240V, 30-45 kW (40-60 HP)
 380-480V, 45-112 kW (60-150 HP)
 500-600V, 56-112 kW (75-150 HP)



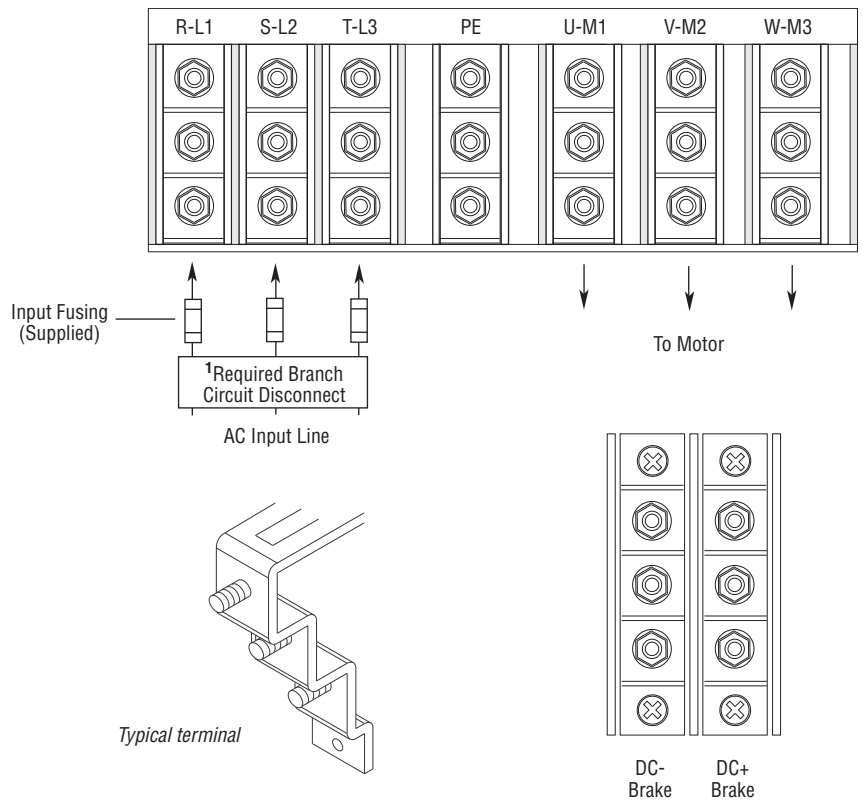
Frame E Power Terminal Block

200-240V, 56-75 kW (75-100 HP)
380-480V, 112-187 kW (150-250 HP)
500-600V, 112-149 kW (150-200 HP)



Frame F Power Terminal Block

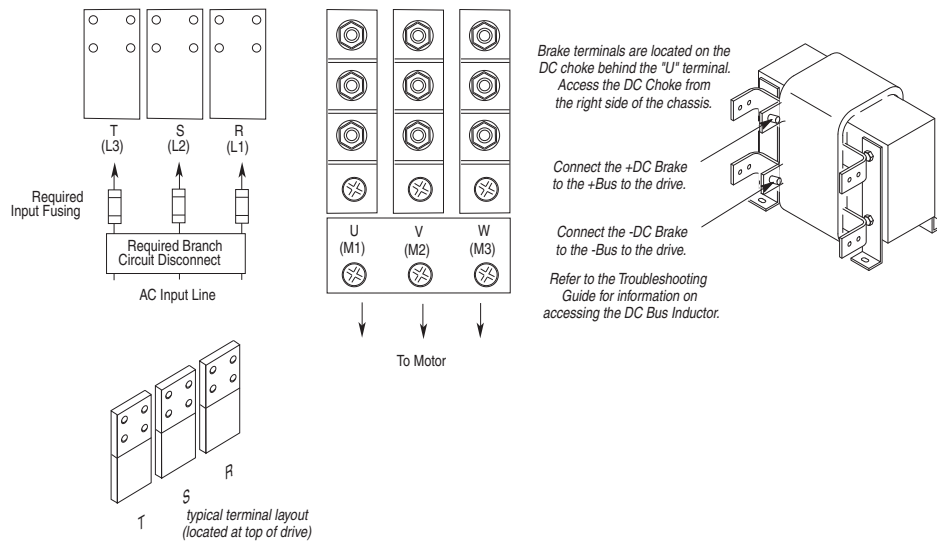
380-480V, 187-336 kW (250-450 HP)



Frame G Power Terminal Block

380-480V, 224-448 kW (300-600 HP)

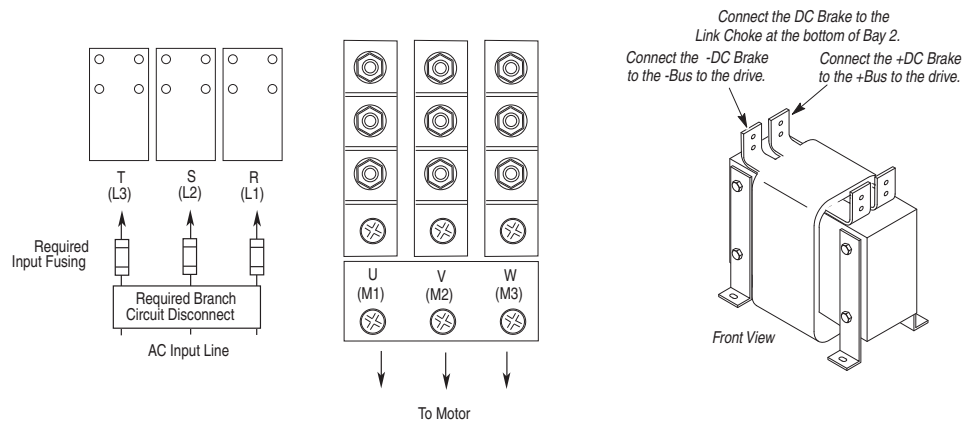
500-600V, 187-485 kW (250-650 HP)



Frame H Power Terminal Block

380-480V, 522-597 kW (700-800 HP)

500-600V, 522-597 kW (700-800 HP)



Power Terminal Block Locations

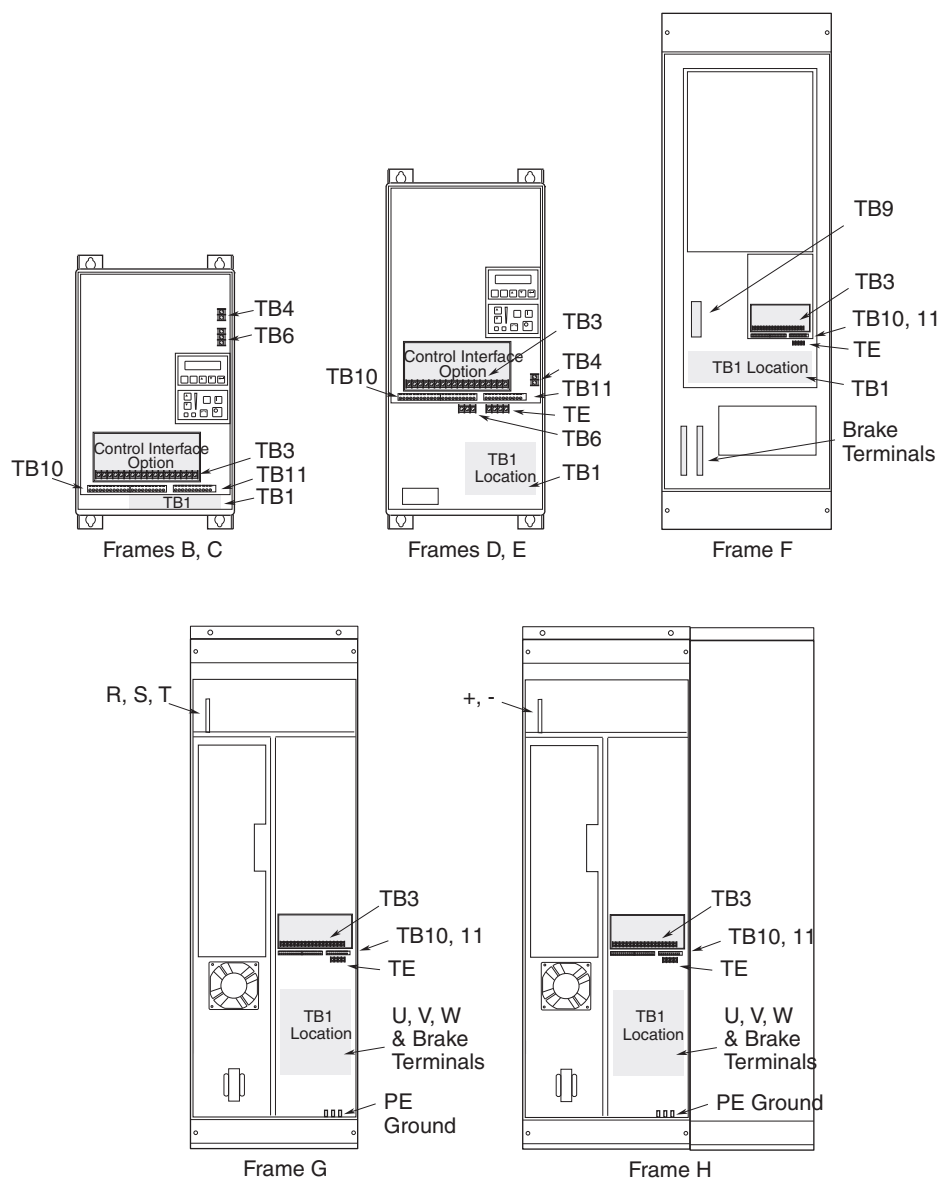


Table B Terminal Block Designations

Terminal Block	Description
TB1	Power Terminal Block
TB2	Control & Signal Wiring
TB3	Control Interface Option
TB4	24V DC Auxiliary Input
TB6	High Voltage DC Auxiliary Input
TB9	480 or 600V Auxiliary Output (F Frame Only)
TE	Control & Signal Shield Terminals

Table C Power Terminal Block (TB1) Specifications

Drive Frame Size	Max./Min. Wire Size ⁽⁴⁾ mm ² (AWG)	Maximum Torque N-m (lb.-in.)
B1	8.4/0.8 (8/18)	1.81 (16)
B2	13.3/0.5 (6/20)	1.70 (15)
C	26.7/0.8 (3/18)	5.65 (50)
D ^{(1), (2)}	120.0/2.1 (4/0 /14) 67.4/2.1 (00/14) ⁽⁵⁾	6.00 (52) 6.00 (52)
E ^{(1), (3)}	253.0/2.1 (500 MCM/14)	10.00 (87)
F ⁽¹⁾	303.6/2.1 (600 MCM/14)	23.00 (200)
G ⁽¹⁾	303.6/2.1 (600 MCM/14)	23.00 (200)

(1) These configurations of TB1 are stud type terminations and require the use of lug type connectors to terminate field installed conductors. Lug kits are available for use with these configurations. Wire size used is determined by selecting the proper lug based on the drive catalog number.

(2) One TE terminal is present – Max./Min. Wire Size is the same as other terminals.

(3) Two TE terminals are present – Max./Min. Wire Size is the same as the D Frame terminal block.

(4) Wire sizes given are maximum/minimum sizes that TB1 will accept - these are not recommendations. Use Copper wire only. Wire gauge requirements and recommendations are based on 75 degree C. Do not reduce wire gauge when using higher temperature wire.

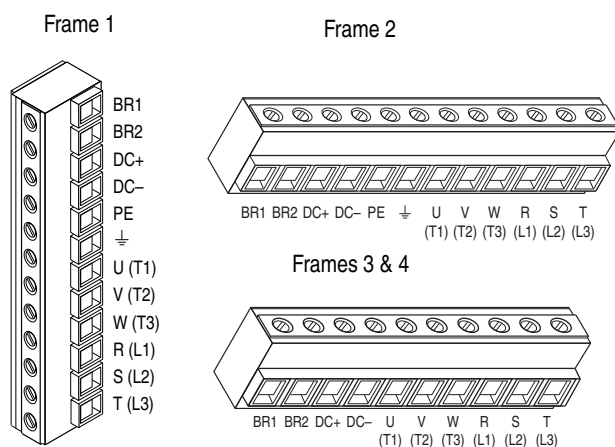
(5) Applies to 30 kW (40 HP) 200-240V, 45 & 56 kW (60 & 75 HP) 380-480V, 56 kW (75 HP) 500-600V drives only.

PowerFlex 700S

Terminal	Description	Notes
BR1	DC Brake (+)	Dynamic Brake Resistor Connection (+)
BR2	DC Brake (-)	Dynamic Brake Resistor Connection (-)
DC+	DC Bus (+)	DC Input Power or Dynamic Brake Chopper
DC-	DC Bus (-)	DC Input Power or Dynamic Brake Chopper
PE	PE Ground	Not present on 3 Frame drives
	Motor Ground	Not present on 3 Frame drives
PS+	Aux +	(1)
PS-	Aux -	(1)
U	U (T1)	To motor
V	V (T2)	To motor
W	W (T3)	To motor
R	R (L1)	AC Line Input Power
S	S (L2)	AC Line Input Power
T	T (L3)	AC Line Input Power

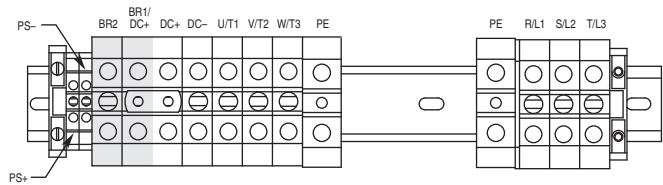
(1) External control power: UL Installation - 300V DC, $\pm 10\%$, Non UL Installation - 270-600V DC, $\pm 10\%$. Frames 1-3; 40 W, 165 mA, Frame 5; 80 W, 90 mA

Frames 1 - 4 Power Terminal Blocks

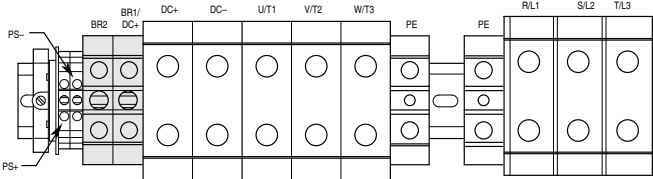


Frame 5 Power Terminal Blocks

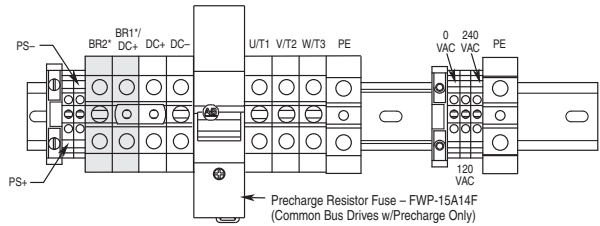
75 HP Normal Duty - 480V AC Input



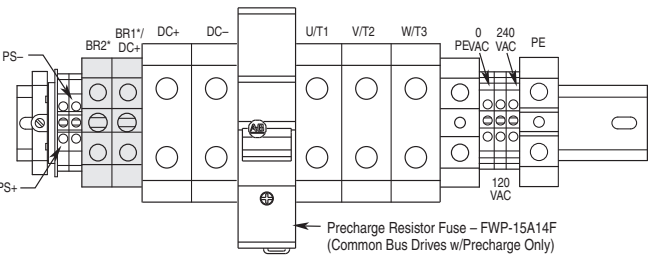
100 HP Normal Duty - 480V AC Input



75 HP Normal Duty - 650V DC Input



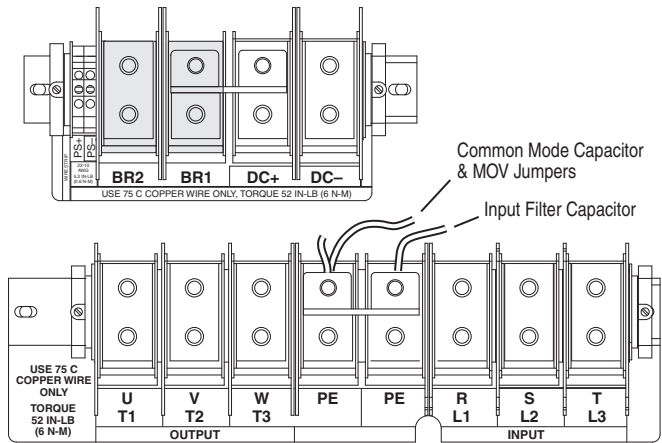
100 HP Normal Duty - 650V DC Input



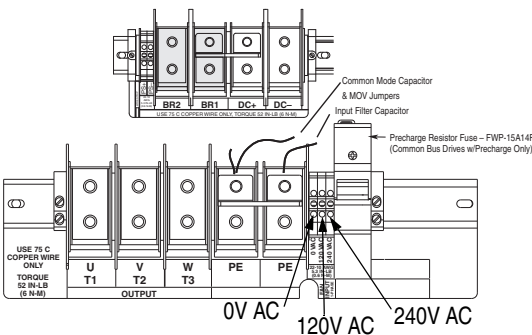
Shaded terminals (BR1 & BR2) will only be present on drives ordered with the Brake Option.

Frame 6 Power Terminal Blocks

150 HP Normal Duty 480V AC Input

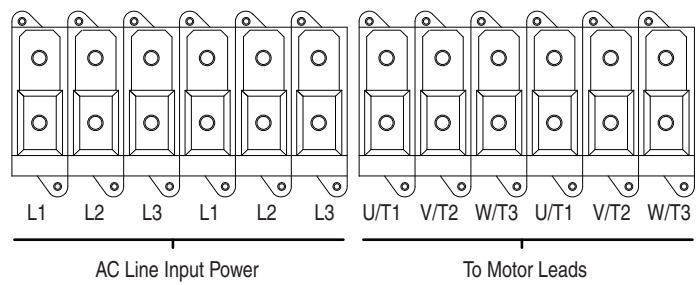


150 HP Normal Duty 650V DC Input

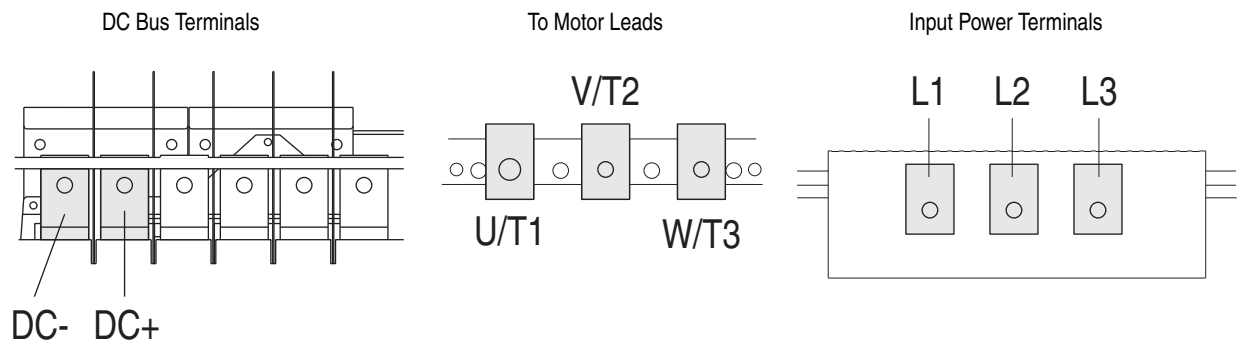


Shaded terminals (BR1 & BR2) will only be present on drives ordered with the Brake Option.

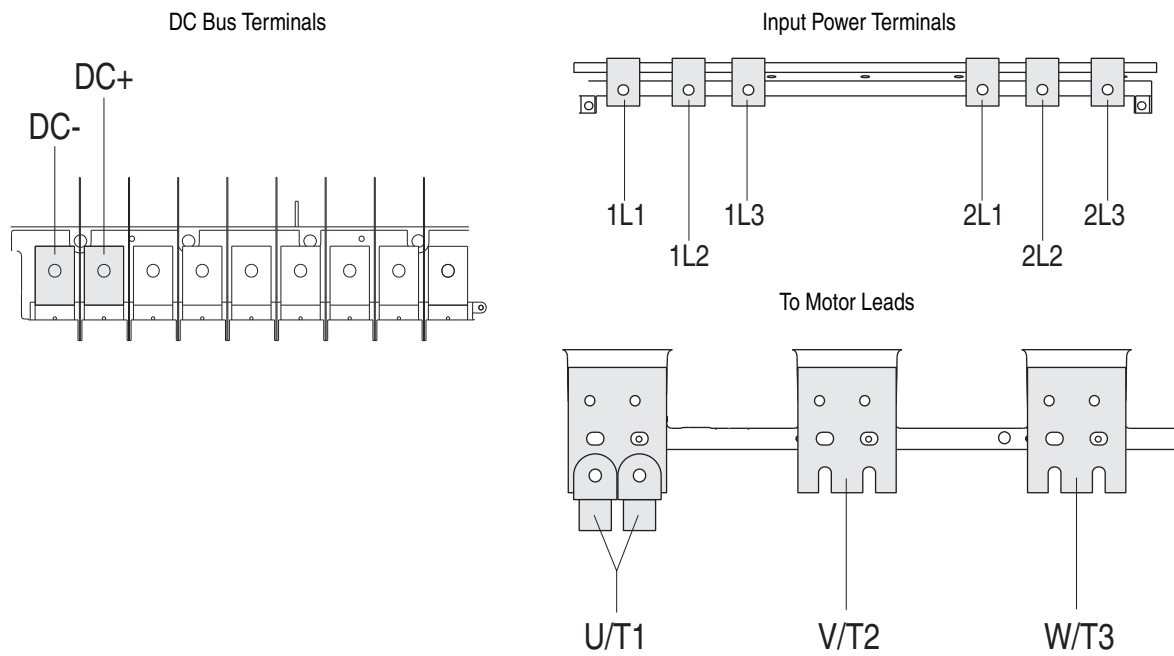
Frame 9 Power Terminal Blocks



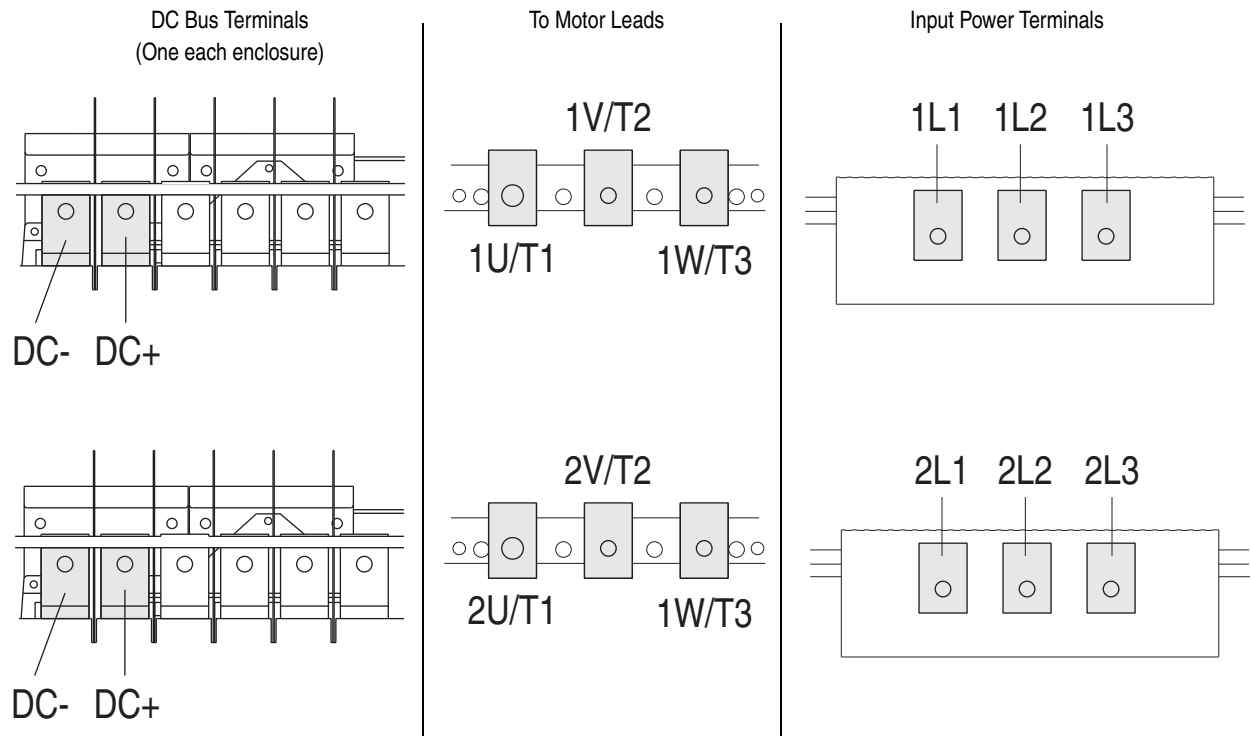
Frame 10 Power Terminal Blocks



Frame 11 Power Terminal Blocks

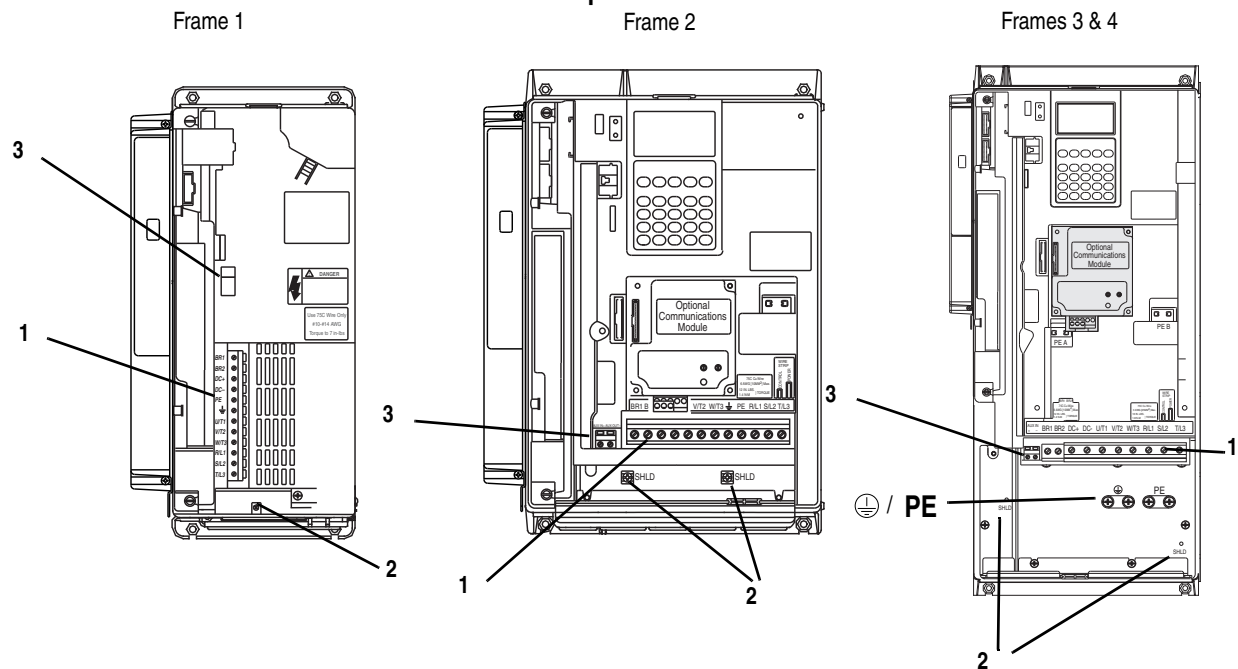


Frame 12 Power Terminal Blocks



Power Terminal Block Locations

Frames 1 - 4 Power Terminal Block Locations and Specifications



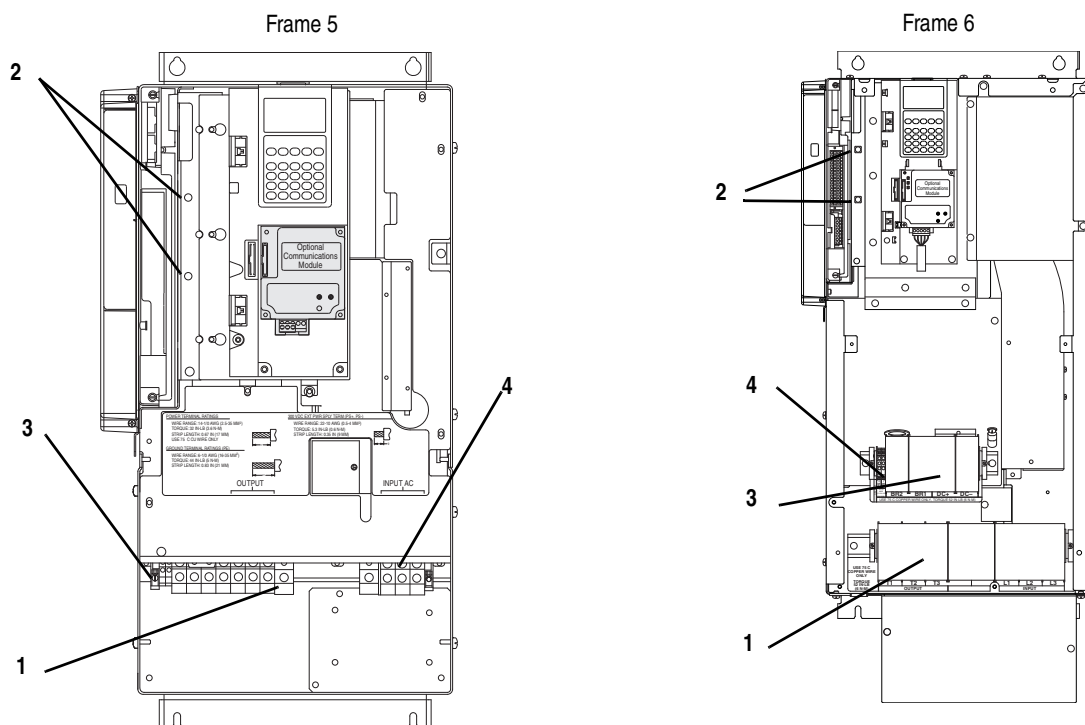
No.	Name	Frame	Description	Wire Size Range ⁽¹⁾		Torque		Terminal Bolt Size ⁽²⁾
				Maximum	Minimum	Maximum	Recommended	
1	Power Terminal Block	1	Input power and motor connections	4.0 mm ² (10 AWG)	0.5 mm ² (22 AWG)	1.7 N-m (15 lb.-in.)	0.8 N-m (7 lb.-in.)	—
		2	Input power and motor connections	10.0 mm ² (6 AWG)	0.8 mm ² (18 AWG)	1.7 N-m (15 lb.-in.)	1.4 N-m (12 lb.-in.)	—
		3	Input power and motor connections	25.0 mm ² (3 AWG)	2.5 mm ² (14 AWG)	3.6 N-m (32 lb.-in.)	1.8 N-m (16 lb.-in.)	—
			BR1, BR2	10.0 mm ² (6 AWG)	0.8 mm ² (18 AWG)	1.7 N-m (15 lb.-in.)	1.4 N-m (12 lb.-in.)	—
		4	Input power and motor connections	35.0 mm ² (1/0 AWG)	10 mm ² (8 AWG)	4.0 N-m (24 lb.-in.)	4.0 N-m (24 lb.-in.)	—
2	SHLD Terminal	1-4	Terminating point for wiring shields	—	—	1.6 N-m (14 lb.-in.)	1.6 N-m (14 lb.-in.)	—
3	AUX Terminal Block	1-4	Auxiliary Control Voltage ⁽³⁾ PS+, PS-	1.5 mm ² (16 AWG)	0.2 mm ² (24 AWG)	—	—	—

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

(2) 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.

(3) External control power: UL Installation - 300V DC, ±10%, Non UL Installation - 270-600V DC, ±10%. Frame 1-6, 100 W

PowerFlex 700S - Frames 5 & 6



No.	Name	Frame	Description	Wire Size Range ⁽¹⁾		Torque		Terminal Bolt Size ⁽²⁾
				Maximum	Minimum	Maximum	Recommended	
1	Power Terminal Block	5 (75 HP) ⁽³⁾	R, S, T, BR1, 2, DC+, DC-, U, V and W	50.0 mm ² (1/0 AWG)	2.5 mm ² (14 AWG)	See Note (4)	See Note (4)	—
			PE	50.0 mm ² (1/0 AWG)	4.0 mm ² (12 AWG)			
		5 (100 HP) ⁽³⁾	R, S, T, DC+, DC-, U, V and W	70.0 mm ² (2/0 AWG)	16.0 mm ² (6 AWG)			
			BR1, BR2	50.0 mm ² (1/0 AWG)	2.5 mm ² (14 AWG)			
			PE	50.0 mm ² (1/0 AWG)	4.0 mm ² (12 AWG)			
		6	Input power and motor connections	120.0 mm ² (4/0 AWG) ⁽⁵⁾	2.5 mm ² (14 AWG)	6 N-m (52 lb.-in.)	6 N-m (52 lb.-in.)	—
2	SHLD Terminal	5 & 6	Terminating point for wiring shields	—	—	1.6 N-m (14 lb.-in.)	1.6 N-m (14 lb.-in.)	—
3	AUX Terminal Block	5 & 6	Auxiliary Control Voltage ⁽⁶⁾ PS+, PS-	4.0 mm ² (10 AWG)	0.5 mm ² (22 AWG)	0.6 N-m (5.3 lb.-in.)	0.6 N-m (5.3 lb.-in.)	—
4	Fan Terminal Block (Common Bus Only)	5 & 6	User Supplied Fan Voltage 0V AC, 120V AC, 240V AC	4.0 mm ² (10 AWG)	0.5 mm ² (22 AWG)	0.6 N-m (5.3 lb.-in.)	0.6 N-m (5.3 lb.-in.)	—

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

(2) 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.

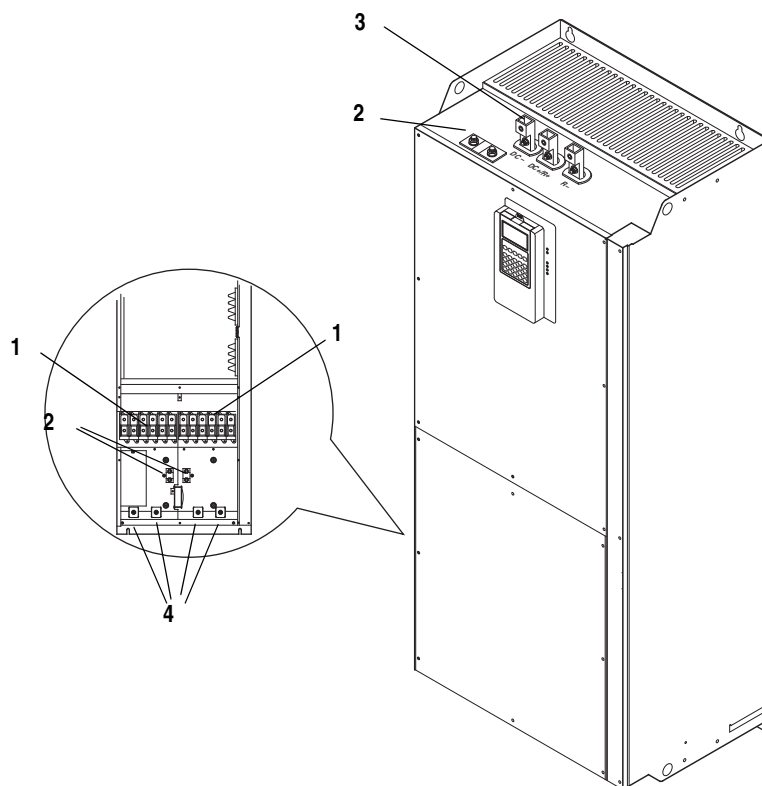
(3) Not all terminals present on all drives.

(4) Refer to the terminal block label inside the drive.

(5) If necessary, two wires can be used in parallel to any of these terminals using two lugs.

(6) External control power: UL Installation - 300V DC, $\pm 10\%$, Non UL Installation - 270-600V DC, $\pm 10\%$. Frame 1-6, 100 W

PowerFlex 700S - Frame 9



No.	Name	Frame	Description	Wire Size Range ⁽¹⁾		Torque		Terminal Bolt Size ⁽²⁾
				Maximum	Minimum	Maximum	Recommended	
1	Power Terminal Block	9 ⁽³⁾	Input Power — L1, L2, L3 Motor Connections — U/T1, V/T2, W/T3	185.0 mm ² 350 MCM	95.0 mm ² 4/0 AWG	40 N-m (340 lb.-in.)	40 N-m (340 lb.-in.)	—
2	SHLD Terminal	9	Terminating point for wiring shields	95.0 mm ² 4/0 AWG	5.0 mm ² 10 AWG	22 N-m (187 lb.-in.)	22 N-m (187 lb.-in.)	—
3	DC Bus (2 Terminals)	9 ⁽⁴⁾	DC input or external brake (Internal Brake option <u>not</u> ordered)	185.0 mm ² 350 MCM	95.0 mm ² 4/0 AWG	40 N-m (340 lb.-in.)	40 N-m (340 lb.-in.)	—
	DC Bus w/Brake (3 Terminals)	9 ⁽⁴⁾	DC input/internal brake (Internal Brake option <u>is</u> ordered)	185.0 mm ² 350 MCM	95.0 mm ² 4/0 AWG	40 N-m (340 lb.-in.)	40 N-m (340 lb.-in.)	—
4	Cable Clamp	9	Cable Clamp for Strain Relief					—

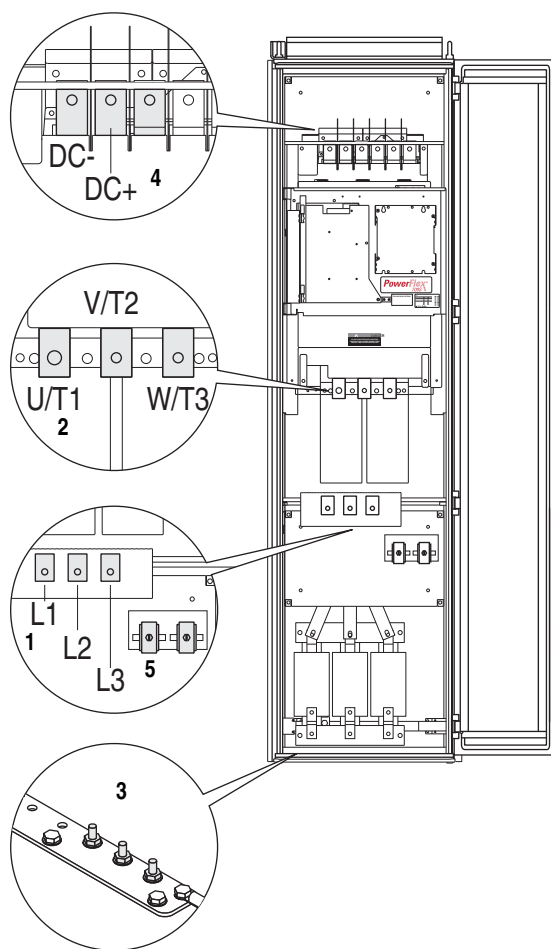
⁽¹⁾ Maximum/minimum sizes that the terminal block will accept - these are not recommendations.

⁽²⁾ 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.

⁽³⁾ Do Not exceed maximum wire size. Parallel connections may be required.

⁽⁴⁾ DC terminal and brake lugs can be removed.

PowerFlex 700S - Frame 10



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	300 mm ² (600 MCM)	2.1 mm ² (14 AWG)	40 N-m (354 lb.-in.)	M12
5	Cable Clamp for Shield					

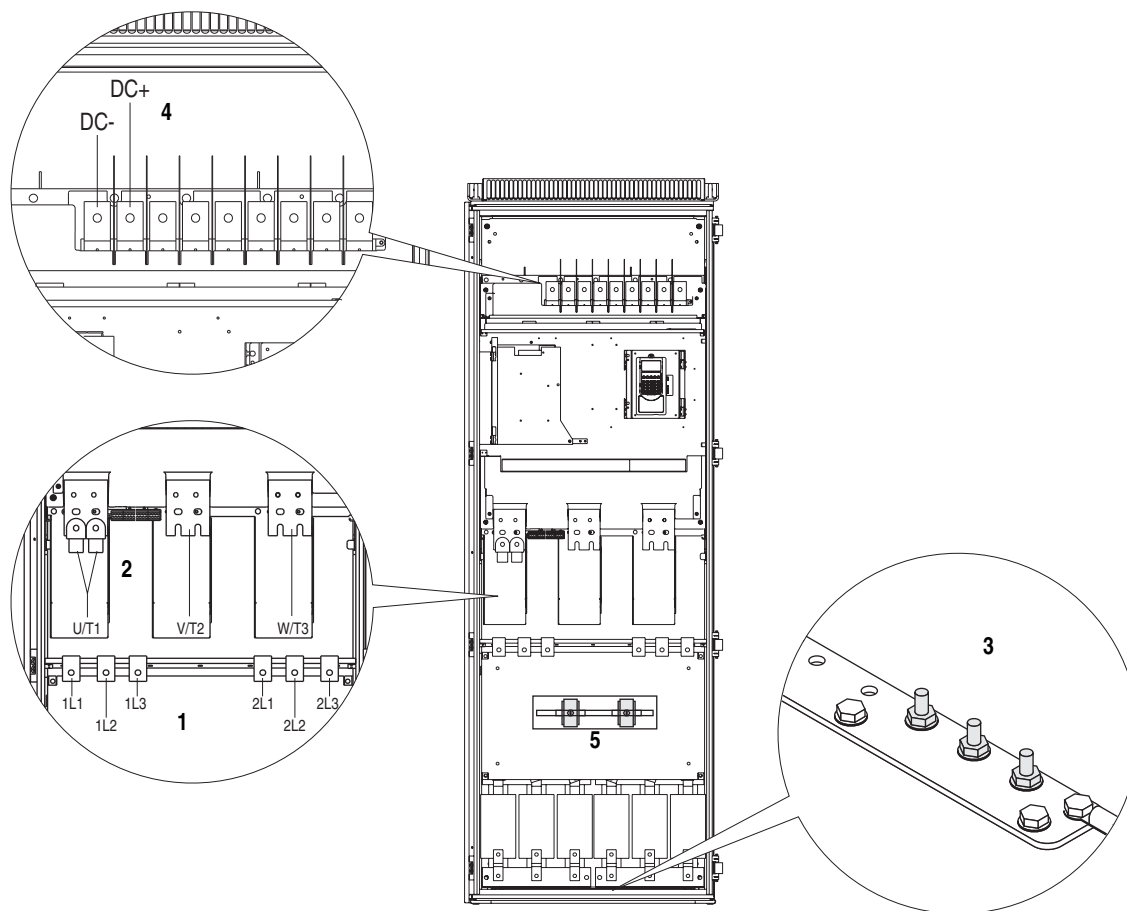
⁽¹⁾ Maximum/minimum sizes that the terminal block will accept - these are not recommendations.

⁽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.

PowerFlex 700S - Frame 11



No.	Name	Description	Wire Size Range ⁽¹⁾ (2)		Torque	Terminal Bolt Size (3) (4)
			Maximum	Minimum	Recommended	
1	Input Power Terminal Block ⁽⁴⁾ 1L1, 1L2, 1L3, 2L1, 2L2, 2L3	AC 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 ⁽⁴⁾ 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 ⁽⁴⁾	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 ⁽⁴⁾ (2 Terminals; DC-, DC+)	DC input	300 mm ² (600 MCM)	2.1 mm ² (14 AWG)	40 N-m (354 lb.-in.)	M12
5	Cable Clamp for Strain Relief					

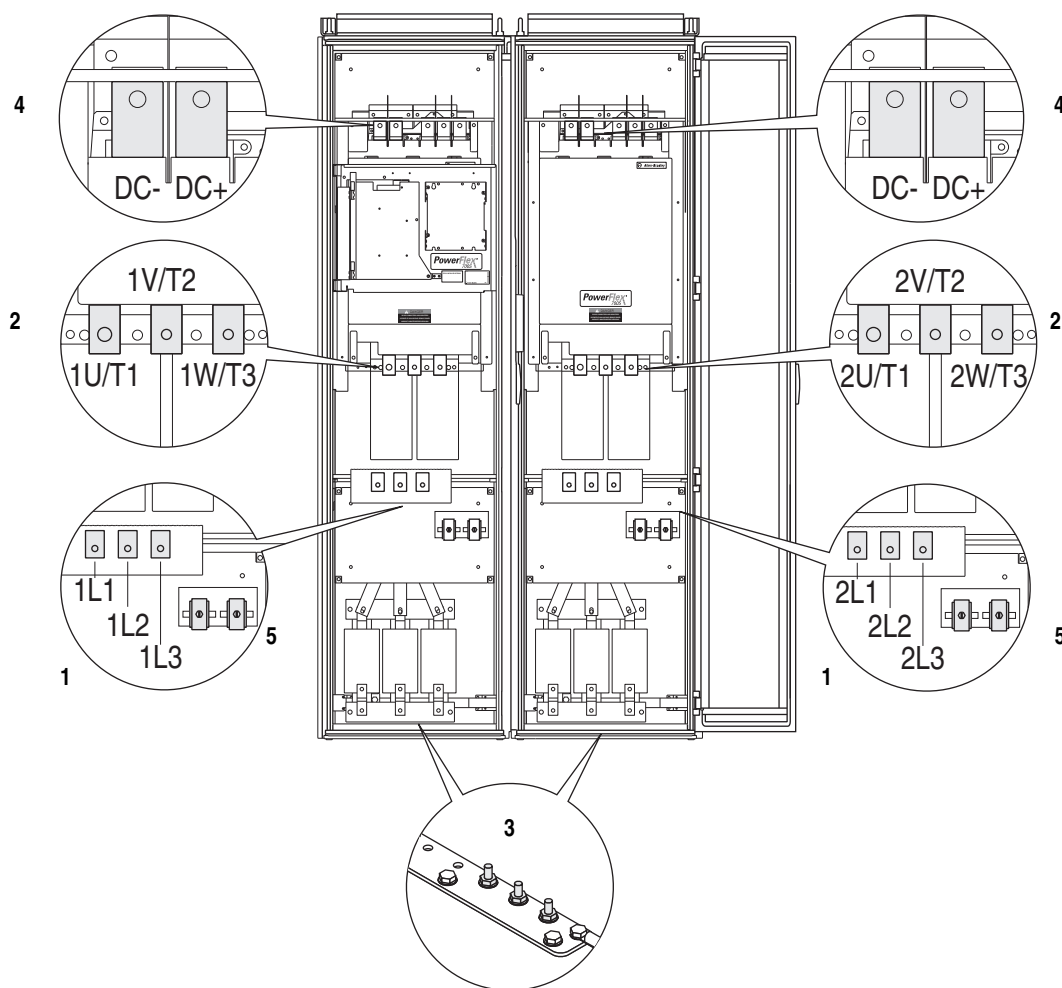
(1) Maximum/minimum sizes that the terminal block will accept - these are not recommendations.

(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.

Power Terminal Specifications, Frame 12



No.	Name	Description	Wire Size Range ⁽¹⁾⁽²⁾		Torque Recommended	Terminal Bolt Size ^{(3) (4)}
			Maximum	Minimum		
1	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
2	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
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⁾ (4 Terminals 2 DC-, 2 DC+)	DC input	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.

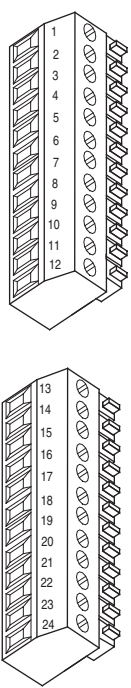
⁽³⁾ These connections are bus bar type terminations and require the use of lug type connectors.

⁽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.

Control Terminals

PowerFlex 700S

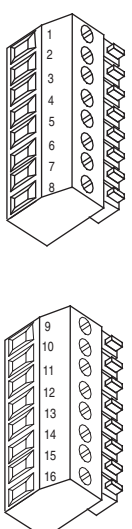
Table D TB1 Terminals



Terminal	Signal	Factory Default	Description	Related Params
1	Analog Input 1 Comm.	(Volt)	Bipolar, differential input, +/-10V, 0-20 mA, 13 bit + sign	800
2	Analog Input 1 (+/-)		20k Ohm impedance at Volt; 500 Ohm impedance at mA ⁽¹⁾	
3	Shield	NA	Analog Input Shield	
4	Analog Input 2 Comm.	(Volt)	Bipolar, differential input, +/-10V, 0-20 mA, 13 bit + sign	806
5	Analog Input 2 (+/-)		20k Ohm impedance at Volt; 500 Ohm impedance at mA ⁽¹⁾	
6	Analog Input 3 [NTC-] Comm.	(Volt)	Differential input, 0-10V, 10 bit (for motor control mode FOC2, this is the temperature adaptation input). ⁽¹⁾	812
7	Analog Input 3 [NTC+] Comm.			
8	Shield	NA	Analog Output Shield	
9	Analog Output 1 (-)	(Volt)	Bipolar, differential output, +/-10V, 0-20 mA, 11 bit + sign	832, 833
10	Analog Output 1 (+)		2k Ohm minimum load	
11	Analog Output 2 (-)	(Volt)		839, 840
12	Analog Output 2 (+)			
13	+10V Reference	NA	Rating: 20 mA maximum load (Recommend 5k Ohm pot)	
14	Reference Common	NA		
15	-10V Reference	NA		
16	Encoder A	NA	Normal current draw per channel: 20 mA	230 - 234
17	Encoder A (Not)	NA		
18	Encoder B	NA		
19	Encoder B (Not)	NA		
20	Encoder Z	NA		
21	Encoder Z (Not)	NA		
22	Encoder Reference (+)	NA	12 or 5V DC power supply for primary encoder interface	
23	Encoder Reference (-)	NA	Rating: 300 mA maximum	
24	Encoder Shield	NA	Connection point for encoder shield	

⁽¹⁾ The Analog inputs are not isolated. However, the analog inputs can be connected in series when using current mode. Note that at 20mA the voltage source must be capable of providing 10V dc at the drive terminals for one drive - - 20V dc is required for two drives and 30V dc is required for three drives, etc.

Table E TB2 Terminals



Terminal	Signal	Factory Default	Description	Related Params
1	24V DC Common (-)	NA	Drive supplied 24V DC logic input power	
2	24V DC Source (+)	NA	Rating: 300 mA maximum load	
3	Digital Output 1		24V DC Open Collector (sinking logic) Rating: Internal Source = 150 mA max. External Source = 750 mA	846, 847
4	Digital Output 1/2 Com	NA	Common for Digital Output 1 & 2	
5	Digital Output 2		24V DC Open Collector (sinking logic) Rating: Internal Source = 150 mA max. External Source = 750 mA	851, 852
6	Relay Output 3 (NC)		Relay contact output	856, 857
7	Relay Output 3 Com	NA	Rating: 115V AC or 24V DC = 2 A max.	
8	Relay Output 3 (NO)		Inductive/Resistive	
9	Digital Input 1-3 Com	NA	Common for Digital Inputs 1-3	
10	Digital Input 1		High speed 12-24V DC sourcing Digital Input	825
11	Digital Input 2		Load: 15 mA at 24V DC	826
12	Digital Input 3		Load: 15 mA at 24V DC sourcing	827
13	Digital Input 4-6 Com	NA	Common for Digital Inputs 4-6	
14	Digital Input 4		Load: 10 mA at 24V DC sinking/sourcing	828
15	Digital Input 5		Load: 7.5 mA at 115V AC	829
16	Digital Input 6	HW Enable	Note: The 115 VAC Digital Inputs can withstand 2 milliamps of leakage current without turning on. If an output device has a leakage current greater than 2 milliamps a burden resistor is required. A 68.1K ohm resistor with a 0.5 watt rating should be used to keep the 115 VAC output below 2 milliamps.	830

Cable Recommendations - Power

Unshielded Cable

THHN, THWN or similar wire is acceptable for drive installation in dry environments provided adequate free air space and/or conduit fill rates limits are provided. **Do not use THHN or similarly coated wire in wet areas.** Any wire chosen must have a minimum insulation thickness of 15 Mils and should not have large variations in insulation concentricity.

Shielded Cable

Shielded cable contains all of the general benefits of multi-conductor cable with the added benefit of a copper braided shield that can contain much of the noise generated by a typical AC Drive. Strong consideration for shielded cable should be given in installations with sensitive equipment such as weigh scales, capacitive proximity switches and other devices that may be affected by electrical noise in the distribution system. Applications with large numbers of drives in a similar location, imposed EMC regulations or a high degree of communications/ networking are also good candidates for shielded cable.

Shielded cable may also help reduce shaft voltage and induced bearing currents for some applications. In addition, the increased impedance of shielded cable may help extend the distance that the motor can be located from the drive without the addition of motor protective devices such as terminator networks. Refer to “Reflected Wave” in publication DRIVES-IN001..., *Wiring and Grounding Guidelines for Pulse Width Modulated (PWM) AC Drives*.

Consideration should be given to all of the general specifications dictated by the environment of the installation, including temperature, flexibility, moisture characteristics and chemical resistance. In addition, a braided shield should be included and be specified by the cable manufacturer as having coverage of at least 75%. An additional foil shield can greatly improve noise containment.

A good example of recommended cable is Belden® 295xx (xx determines gauge). This cable has four (4) XLPE insulated conductors with a 100% coverage foil and an 85% coverage copper braided shield (with drain wire) surrounded by a PVC jacket.

Other types of shielded cable are available, but the selection of these types may limit the allowable cable length. Particularly, some of the newer cables twist 4 conductors of THHN wire and wrap them tightly with a foil shield. This construction can greatly increase the cable charging current required and reduce the overall drive performance. Unless specified in the individual distance tables as tested with the drive, these cables are not recommended and their performance against the lead length limits supplied is not known.

Armored Cable

Cable with continuous aluminum armor is often recommended in drive system applications or specific industries. It offers most of the advantages of standard shielded cable and also combines considerable mechanical strength and resistance to moisture. It can be installed in concealed and exposed manners and removes the requirement for conduit (EMT) in the installation. It can also be directly buried or embedded in concrete.

Because noise containment can be affected by incidental grounding of the armor to building steel (see Chapter 2, “Wire Types,” of publication DRIVES-IN001..., *Wiring and Grounding Guidelines for Pulse Width Modulated (PWM) AC Drives*) when the cable is mounted, it is recommended the armored cable have an overall PVC jacket.

Interlocked armor is acceptable for shorter cable runs, but continuous welded armor is preferred.

Best performance is achieved with 3 spaced ground conductors, but acceptable performance below 200 HP is provided via a single ground conductor.

Table F Recommended Shielded/Armored Cable

Location	Rating/Type	Description
Standard (Option 1)	600V, 90° C (194° F) XHHW2/RHW-2 Anixter B209500-B209507, Belden 29501-29507, or equivalent	Four tinned copper conductors with XLPE insulation. Copper braid/aluminum foil combination shield and tinned copper drain wire. PVC jacket.
Standard (Option 2)	Tray rated 600V, 90° C (194° F) RHH/RHW-2 Anixter OLF-7xxxxx or equivalent	Three tinned copper conductors with XLPE insulation. 5 mil single helical copper tape (25% overlap min.) with three bare copper grounds in contact with shield. PVC jacket.
Class I & II; Division I & II	Tray rated 600V, 90° C (194° F) RHH/RHW-2 Anixter 7V-7xxxx-3G or equivalent	Three bare copper conductors with XLPE insulation and impervious corrugated continuously welded aluminum armor. Black sunlight resistant PVC jacket overall. Three copper grounds on #10 AWG and smaller.

Cable Recommendations - Control

Table G Recommended Control Wire

Type		Wire Type(s)	Description	Insulation Rating
Digital I/O	Un-shielded	Per US NEC or applicable national or local code	–	300V, 60° C (140° F), Minimum
	Shielded	Multi-conductor shielded cable such as Belden 8770 (or equiv.)	0.750 mm ² (18 AWG), 3 conductor, shielded.	
Standard Analog I/O	Belden 8760/9460 (or equiv.)		0.750 mm ² (18 AWG), twisted pair, 100% shield with drain ⁽⁵⁾ .	300V, 75-90 °C
Remote Pot	Belden 8770 (or equiv.)		0.750 mm ² (18 AWG), 3 cond., shielded	(167-194 °F)
Encoder/Pulse I/O Less 30.5 m (100 ft.)	Combined:	Belden 9730 (or equivalent) ⁽¹⁾	0.196 mm ² (24 AWG), individually shielded.	
Encoder/Pulse I/O 30.5 m (100 ft.) to 152.4 m (500 ft.)	Signal:	Belden 9730/9728 (or equivalent) ⁽¹⁾	0.196 mm ² (24 AWG), individually shielded.	
	Power:	Belden 8790 ⁽²⁾	0.750 mm ² (18 AWG)	
	Combined:	Belden 9892 ⁽³⁾	0.330 mm ² or 0.500 mm ² ⁽³⁾	
Encoder/Pulse I/O 152.4 m (500 ft.) to 259.1 m (850 ft.)	Signal:	Belden 9730/9728 (or equivalent) ⁽¹⁾	0.196 mm ² (24 AWG), individually shielded.	
	Power:	Belden 8790 ⁽²⁾	0.750 mm ² (18 AWG)	
	Combined:	Belden 9773/9774 (or equivalent) ⁽⁴⁾	0.750 mm ² (18 AWG), individually shielded pair.	
Stegmann Encoder	Stegmann 6-411682-xx cables with C12 FUR connections			
Resolver	Paige 412081 (or equiv.) Twist, capacitance, inductance and resistance specifications equal to or greater than cable specified		0.750 =mm ² (18 AWG), twisted pair	300V, 80° C (176° F) minimum
SynchLink	Versalink V-System, Lucent Technologies, Specialty Fibers Technology Division 1403-CF BLK		200/230 micron HCS (Hard Clad Silica) 650 nm (Red) Data Rate 5 Mbps	
EMC Compliance	Refer to position “I” - Emission of the Catalog Number Explanation on Page 11 for details.			

⁽¹⁾Belden 9730 is 3 individually shielded pairs (2 channel plus power). If 3 channel is required, use Belden 9728 (or equivalent).

⁽²⁾Belden 8790 is 1 shielded pair.

⁽³⁾Belden 9892 is 3 individually shielded pairs (3 channel), 0.33 mm² (22 AWG) plus 1 shielded pair 0.5 mm² (20 AWG) for power.

⁽⁴⁾Belden 9773 is 3 individually shielded pairs (2 channel plus power). If 3 channel is required, use Belden 9774 (or equivalent).

⁽⁵⁾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.

Cable Length Restrictions

Important: In the following tables, A “●” in any of the latter columns will indicate that this drive rating can be used with an Allen-Bradley Terminator (1204-TFA1/1204-TFB2) and/or Reflected Wave Reduction Device with Common Mode Choke (1204-RWC-17) or without choke (1204-RWR2).

For the Terminator, the maximum cable length is 182.9 meters (600 feet) for 400/480/600V drives (not 690V). The PWM frequency must be 2 kHz. The 1204-TFA1 can be used only on low HP (below 5 HP), while the 1204-TFB2 can be used from 2-800 HP.

1204 Reflected Wave Reduction Device (all motor insulation classes):

- 1204-RWR2-09
2kHz: 182.9m (600 ft.) at 400/480V and 121.9m (400 ft.) at 600V. 4 kHz: 91.4m (300 ft.) at 400/480V and 61.0m (200 ft.) at 600V.
- 1204-RWC-17
2 kHz: 365.8m (1200 ft.) at 400/480/600V. 4 kHz: 243.8m (800 ft.) at 400/480V and 121.9m (400 ft.) at 600V.

For both devices, power dissipation in the damping resistor limits maximum cable length.

The 1321-RWR is a complete reflected wave reduction solution available for many of the PowerFlex drives. If available, a 1321-RWR catalog number will be indicated in the “Reactor/RWR” column. When not available, use the reactor and resistor information provided to build a solution. For more information, refer to the following:

For Further Information on ...	see Publication ...
1321-RWR	1321-TD001..., DRIVES-IN001... (for installation information)
1204-RWR2	1204-5.1
1204-RWC	1204-IN001...
1204-TFxx	1204-IN002...

Table H PowerFlex 700S, 400V Shielded/Unshielded Cable - Meters (Feet)

Drive			No Solution				Reactor Only				Reactor + Damping Resistor or 1321-RWR				Reactor/RWR	Resistor		Available Options			
Frame	kW	kHz	1000V	1200V	1488V	1600V	1000V	1200V	1488V	1600V	1000V	1200V	1488V	1600V	Cat. No.	Ohms	Watts	TFA1	TFB2	RWR2	RWC
1	0.75	2/4	7.6 (25)	83.8 (275)	83.8 (275)	83.8 (275)	91.4 (300)	152.4 (500)	152.4 (500)	152.4 (500)	152.4 (500)	152.4 (500)	152.4 (500)	152.4 (500)				●		●	●
	1.5	2/4	7.6 (25)	106.9 (350)	182.9 (600)	182.9 (600)	91.4 (300)	182.9 (600)	182.9 (600)	182.9 (600)	182.9 (600)	182.9 (600)	182.9 (600)	182.9 (600)				●	●	●	●
	2.2	2/4	7.6 (25)	106.9 (350)	182.9 (600)	182.9 (600)	91.4 (300)	182.9 (600)	182.9 (600)	182.9 (600)	182.9 (600)	182.9 (600)	182.9 (600)	182.9 (600)				●	●	●	●
	4	2/4	7.6 (25)	106.9 (350)	243.8 (800)	243.8 (800)	91.4 (300)	243.8 (800)	243.8 (800)	243.8 (800)	243.8 (800)	243.8 (800)	243.8 (800)	243.8 (800)	1321-RWR8-DP				●		●
	5.5	2/4	7.6 (25)	106.9 (350)	274.3 (900)	304.8 (1000)	91.4 (300)	274.3 (900)	304.8 (1000)	304.8 (1000)	304.8 (1000)	304.8 (1000)	304.8 (1000)	304.8 (1000)	1321-RWR12-DP				●		●
	7.5	2/4	7.6 (25)	106.9 (350)	274.3 (900)	365.8 (1200)	91.4 (300)	274.3 (900)	365.8 (1200)	365.8 (1200)	365.8 (1200)	365.8 (1200)	365.8 (1200)	365.8 (1200)	1321-RWR18-DP				●		●
	11	2/4	7.6 (25)	106.9 (350)	274.3 (900)	365.8 (1200)	91.4 (300)	274.3 (900)	365.8 (1200)	365.8 (1200)	365.8 (1200)	365.8 (1200)	365.8 (1200)	365.8 (1200)	1321-RWR25-DP				●		
2	15	2/4	7.6 (25)	106.9 (350)	274.3 (900)	365.8 (1200)	91.4 (300)	274.3 (900)	365.8 (1200)	365.8 (1200)	365.8 (1200)	365.8 (1200)	365.8 (1200)	365.8 (1200)	1321-RWR25-DP				●		
	18.5	2/4	7.6 (25)	106.9 (350)	274.3 (900)	365.8 (1200)	91.4 (300)	274.3 (900)	365.8 (1200)	365.8 (1200)	365.8 (1200)	365.8 (1200)	365.8 (1200)	365.8 (1200)	1321-RWR35-DP				●		
3	22	2/4	7.6 (25)	106.9 (350)	274.3 (900)	365.8 (1200)	91.4 (300)	274.3 (900)	365.8 (1200)	365.8 (1200)	365.8 (1200)	365.8 (1200)	365.8 (1200)	365.8 (1200)	1321-RWR45-DP				●		
	30	2/4	7.6 (25)	106.9 (350)	274.3 (900)	365.8 (1200)	91.4 (300)	274.3 (900)	365.8 (1200)	365.8 (1200)	365.8 (1200)	365.8 (1200)	365.8 (1200)	365.8 (1200)	1321-RWR55-DP				●		
	37	2/4	12.2 (40)	91.4 (300)	274.3 (900)	365.8 (1200)	76.2 (250)	243.8 (800)	365.8 (1200)	365.8 (1200)	365.8 (1200)	365.8 (1200)	365.8 (1200)	365.8 (1200)	1321-RWR80-DP				●		

1336 FORCE™ To PowerFlex® 700S Phase II AC Drive Conversion Guide

Drive			No Solution				Reactor Only				Reactor + Damping Resistor or 1321-RWR				Reactor/RWR	Resistor		Available Options			
Frame	kW	kHz	1000V	1200V	1488V	1600V	1000V	1200V	1488V	1600V	1000V	1200V	1488V	1600V	Cat. No.	Ohms	Watts	TFA1	TFB2	RWR2	RWC
4	45	2/4	12.2 (40)	106.9 (350)	274.3 (900)	365.8 (1200)	76.2 (250)	304.8 (1000)	365.8 (1200)	365.8 (1200)	365.8 (1200)	365.8 (1200)	365.8 (1200)	365.8 (1200)	1321-RWR80-DP				●		
5	55	2/4	12.2 (40)	106.9 (350)	274.3 (900)	365.8 (1200)	61.0 (200)	274.3 (900)	365.8 (1200)	365.8 (1200)	365.8 (1200)	365.8 (1200)	365.8 (1200)	365.8 (1200)	1321-RWR100-DP				●		
	75	2/4	18.3 (60)	91.4 (300)	213.4 (700)	304.8 (1000)	45.7 (150)	243.8 (800)	365.8 (1200)	365.8 (1200)	304.8 (1000)	365.8 (1200)	365.8 (1200)	365.8 (1200)	1321-RWR130-DP				●		
6	90	2/4	18.3 (60)	91.4 (300)	213.4 (700)	304.8 (1000)	45.7 (150)	213.4 (700)	365.8 (1200)	365.8 (1200)	304.8 (1000)	365.8 (1200)	365.8 (1200)	365.8 (1200)	1321-RWR160-DP				●		
	110	2/4	24.4 (80)	91.4 (300)	213.4 (700)	274.3 (900)	45.7 (150)	182.9 (600)	365.8 (1200)	365.8 (1200)	274.3 (900)	365.8 (1200)	365.8 (1200)	365.8 (1200)	1321-RWR200-DP				●		
	132	2/4	24.4 (80)	91.4 (300)	182.9 (600)	243.8 (800)	45.7 (150)	152.4 (500)	365.8 (1200)	365.8 (1200)	243.8 (800)	365.8 (1200)	365.8 (1200)	365.8 (1200)	1321-RWR250-DP				●		
9	132	2	24.4 (80)	91.4 (300)	182.9 (600)	243.8 (800)	45.7 (150)	152.4 (500)	365.8 (1200)	365.8 (1200)	243.8 (800)	365.8 (1200)	365.8 (1200)	365.8 (1200)	1321-RWR320-DP				●		
	160	2	24.4 (80)	91.4 (300)	152.4 (500)	213.4 (700)	45.7 (150)	121.9 (400)	365.8 (1200)	365.8 (1200)	243.8 (800)	365.8 (1200)	365.8 (1200)	365.8 (1200)	1321-RWR320-DP				●		
10	200	2	24.4 (80)	76.2 (250)	121.9 (400)	182.9 (600)	36.6 (120)	91.4 (300)	304.8 (1000)	365.8 (1200)	243.8 (800)	365.8 (1200)	365.8 (1200)	365.8 (1200)	1321-3R500-B	20	495 ⁽³⁾		●		
	250	2	24.4 (80)	76.2 (250)	99.1 (325)	167.6 (550)	36.6 (120)	76.2 (250)	304.8 (1000)	365.8 (1200)	228.6 (750)	335.3 (1100)	365.8 (1200)	365.8 (1200)	1321-3R500-B	20	495 ⁽³⁾		●		
11	315	2	18.3 (60)	68.6 (225)	99.1 (325)	167.6 (550)	36.6 (120)	68.6 (225)	304.8 (1000)	365.8 (1200)	228.6 (750)	335.3 (1100)	365.8 (1200)	365.8 (1200)	1321-3R600-B	20	495 ⁽³⁾		●		
	355	2	18.3 (60)	68.6 (225)	99.1 (325)	167.6 (550)	36.6 (120)	68.6 (225)	304.8 (1000)	365.8 (1200)	228.6 (750)	274.3 (900)	365.8 (1200)	365.8 (1200)	1321-3R750-B	20	495 ⁽³⁾		●		
	400	2	18.3 (60)	68.6 (225)	99.1 (325)	167.6 (550)	36.6 (120)	68.6 (225)	304.8 (1000)	365.8 (1200)	228.6 (750)	274.3 (900)	365.8 (1200)	365.8 (1200)	1321-3R750-B	20	735 ⁽⁴⁾		●		
12 ⁽¹⁾	450	2	18.3 (60)	68.6 (225)	99.1 (325)	167.6 (550)	36.6 (120)	68.6 (225)	304.8 (1000)	365.8 (1200)	228.6 (750)	274.3 (900)	365.8 (1200)	365.8 (1200)	2 x 1321-3RB400-B	40	375 ⁽⁴⁾		●		
	500	2	12.2 (40)	68.6 (225)	99.1 (325)	167.6 (550)	36.6 (120)	68.6 (225)	304.8 (1000)	365.8 (1200)	198.1 (650)	274.3 (900)	365.8 (1200)	365.8 (1200)	2 x 1321-3R500-B	40	375 ⁽⁴⁾		●		
	560	2	12.2 (40)	68.6 (225)	99.1 (325)	167.6 (550)	36.6 (120)	68.6 (225)	304.8 (1000)	365.8 (1200)	198.1 (650)	274.3 (900)	365.8 (1200)	365.8 (1200)	2 x 1321-3R500-B	20	525 ⁽⁵⁾				
13	630 ⁽²⁾	2	12.2 (40)	61.0 (200)	99.1 (325)	167.6 (550)	36.6 (120)	61.0 (200)	304.8 (1000)	365.8 (1200)	198.1 (650)	274.3 (900)	365.8 (1200)	365.8 (1200)	2 x 1321-3R600-B	20	525 ⁽⁵⁾				
	710 ⁽²⁾	2	12.2 (40)	61.0 (200)	99.1 (325)	167.6 (550)	36.6 (120)	61.0 (200)	304.8 (1000)	365.8 (1200)	198.1 (650)	274.3 (900)	365.8 (1200)	365.8 (1200)	2 x 1321-3R750-B	20	525 ⁽⁵⁾				
	800 ⁽²⁾	2	12.2 (40)	61.0 (200)	99.1 (325)	167.6 (550)	36.6 (120)	61.0 (200)	304.8 (1000)	365.8 (1200)	198.1 (650)	274.3 (900)	365.8 (1200)	365.8 (1200)	2 x 1321-3R750-B	20	525 ⁽⁵⁾				

- (1) Frame 12 drives have dual inverters and require two output reactors. The resistor ratings are per phase values for each reactor.
(2) Some Frame 13 drives require two output reactors to match drive amp rating. The resistor ratings are per phase values for each reactor.
(3) Resistor specification is based on two cables per phase.
(4) Resistor specification is based on three cables per phase.
(5) Resistor specification is based on four cables per phase.

Table I PowerFlex 700S, 480V Shielded/Unshielded Cable - Meters (Feet)

Drive			No Solution				Reactor Only				Reactor + Damping Resistor or 1321-RWR				Reactor/RWR	Resistor		Available Options			
Frame	HP	kHz	1000V	1200V	1488V	1600V	1000V	1200V	1488V	1600V	1000V	1200V	1488V	1600V	Cat. No.	Ohms	Watts	TFA1	TFB2	RWR2	RWC
1	1	2/4	7.6 (25)	12.2 (40)	83.8 (275)	83.8 (275)	7.6 (25)	91.4 (300)	152.4 (500)	152.4 (500)	152.4 (500)	152.4 (500)	152.4 (500)	152.4 (500)				●		●	●
	2	2/4	7.6 (25)	12.2 (40)	83.8 (275)	83.8 (275)	7.6 (25)	91.4 (300)	182.9 (600)	182.9 (600)	152.4 (500)	182.9 (600)	182.9 (600)	182.9 (600)				●	●	●	●
	3	2/4	7.6 (25)	12.2 (40)	106.9 (350)	152.4 (500)	7.6 (25)	91.4 (300)	182.9 (600)	182.9 (600)	152.4 (500)	182.9 (600)	182.9 (600)	182.9 (600)				●	●	●	●
	5	2/4	7.6 (25)	12.2 (40)	106.9 (350)	152.4 (500)	7.6 (25)	91.4 (300)	243.8 (800)	243.8 (800)	152.4 (500)	243.8 (800)	243.8 (800)	243.8 (800)	1321-RWR8-DP			●	●	●	●
	7.5	2/4	7.6 (25)	12.2 (40)	106.9 (350)	152.4 (500)	7.6 (25)	91.4 (300)	304.8 (1000)	304.8 (1000)	152.4 (500)	304.8 (1000)	304.8 (1000)	304.8 (1000)	1321-RWR12-DP				●		●
	10	2/4	7.6 (25)	12.2 (40)	106.9 (350)	152.4 (500)	7.6 (25)	91.4 (300)	365.8 (1200)	365.8 (1200)	152.4 (500)	365.8 (1200)	365.8 (1200)	365.8 (1200)	1321-RWR18-DP				●		●
	15	2/4	7.6 (25)	12.2 (40)	106.9 (350)	152.4 (500)	7.6 (25)	91.4 (300)	365.8 (1200)	365.8 (1200)	152.4 (500)	365.8 (1200)	365.8 (1200)	365.8 (1200)	1321-RWR25-DP				●		

1336 FORCE™ To PowerFlex® 700S Phase II AC Drive Conversion Guide

Drive			No Solution				Reactor Only				Reactor + Damping Resistor or 1321-RWR				Reactor/RWR	Resistor		Available Options			
Frame	HP	kHz	1000V	1200V	1488V	1600V	1000V	1200V	1488V	1600V	1000V	1200V	1488V	1600V	Cat. No.	Ohms	Watts	TFA1	TFB2	RWR2	RWC
2	20	2/4	7.6 (25)	12.2 (40)	106.9 (350)	152.4 (500)	7.6 (25)	91.4 (300)	365.8 (1200)	365.8 (1200)	182.9 (600)	365.8 (1200)	365.8 (1200)	365.8 (1200)	1321-RWR25-DP				●		
	25	2/4	7.6 (25)	12.2 (40)	106.9 (350)	152.4 (500)	7.6 (25)	76.2 (250)	365.8 (1200)	365.8 (1200)	152.4 (500)	365.8 (1200)	365.8 (1200)	365.8 (1200)	1321-RWR35-DP				●		
3	30	2/4	7.6 (25)	12.2 (40)	106.9 (350)	152.4 (500)	7.6 (25)	76.2 (250)	365.8 (1200)	365.8 (1200)	152.4 (500)	365.8 (1200)	365.8 (1200)	365.8 (1200)	1321-RWR45-DP				●		
	40	2/4	7.6 (25)	12.2 (40)	106.9 (350)	152.4 (500)	7.6 (25)	76.2 (250)	365.8 (1200)	365.8 (1200)	121.9 (400)	365.8 (1200)	365.8 (1200)	365.8 (1200)	1321-RWR55-DP				●		
	50	2/4	12.2 (40)	18.3 (60)	106.9 (350)	152.4 (500)	12.2 (40)	61.0 (200)	304.8 (1000)	365.8 (1200)	121.9 (400)	365.8 (1200)	365.8 (1200)	365.8 (1200)	1321-RWR80-DP				●		
4	60	2/4	12.2 (40)	18.3 (60)	91.4 (300)	152.4 (500)	12.2 (40)	61.0 (200)	304.8 (1000)	365.8 (1200)	91.4 (300)	365.8 (1200)	365.8 (1200)	365.8 (1200)	1321-RWR80-DP				●		
5	75	2/4	12.2 (40)	18.3 (60)	91.4 (300)	152.4 (500)	12.2 (40)	61.0 (200)	274.3 (900)	365.8 (1200)	91.4 (300)	365.8 (1200)	365.8 (1200)	365.8 (1200)	1321-RWR100-DP				●		
	100	2/4	12.2 (40)	24.4 (80)	91.4 (300)	137.2 (450)	12.2 (40)	61.0 (200)	243.8 (800)	365.8 (1200)	91.4 (300)	365.8 (1200)	365.8 (1200)	365.8 (1200)	1321-RWR130-DP				●		
6	125	2/4	12.2 (40)	24.4 (80)	91.4 (300)	137.2 (450)	12.2 (40)	61.0 (200)	243.8 (800)	365.8 (1200)	76.2 (250)	304.8 (1000)	365.8 (1200)	365.8 (1200)	1321-RWR160-DP				●		
	150	2/4	12.2 (40)	24.4 (80)	91.4 (300)	137.2 (450)	12.2 (40)	61.0 (200)	243.8 (800)	304.8 (1000)	76.2 (250)	274.3 (900)	365.8 (1200)	365.8 (1200)	1321-RWR200-DP				●		
	200	2/4	12.2 (40)	30.5 (100)	91.4 (300)	137.2 (450)	12.2 (40)	61.0 (200)	243.8 (800)	304.8 (1000)	61.0 (200)	274.3 (900)	365.8 (1200)	365.8 (1200)	1321-RWR250-DP				●		
9	200	2	12.2 (40)	30.5 (100)	91.4 (300)	152.4 (500)	12.2 (40)	45.7 (150)	152.4 (500)	228.6 (750)	61.0 (200)	274.3 (900)	365.8 (1200)	365.8 (1200)	1321-RWR320-DP				●		
	250	2	12.2 (40)	30.5 (100)	91.4 (300)	152.4 (500)	12.2 (40)	45.7 (150)	121.9 (400)	182.9 (600)	61.0 (200)	243.8 (800)	365.8 (1200)	365.8 (1200)	1321-RWR320-DP				●		
10	300	2	12.2 (40)	30.5 (100)	61.0 (200)	121.9 (400)	12.2 (40)	45.7 (150)	61.0 (200)	121.9 (400)	61.0 (200)	243.8 (800)	304.8 (1000)	365.8 (1200)	1321-3RB400-B	20	495 ⁽³⁾		●		
	350	2	12.2 (40)	30.5 (100)	61.0 (200)	121.9 (400)	12.2 (40)	45.7 (150)	61.0 (200)	121.9 (400)	61.0 (200)	243.8 (800)	304.8 (1000)	365.8 (1200)	1321-3R500-B	20	495 ⁽³⁾		●		
	450	2	12.2 (40)	30.5 (100)	61.0 (200)	121.9 (400)	12.2 (40)	45.7 (150)	61.0 (200)	121.9 (400)	61.0 (200)	213.4 (700)	304.8 (1000)	365.8 (1200)	1321-3R500-B	20	495 ⁽³⁾		●		
11	500	2	12.2 (40)	30.5 (100)	61.0 (200)	121.9 (400)	12.2 (40)	45.7 (150)	61.0 (200)	121.9 (400)	61.0 (200)	213.4 (700)	304.8 (1000)	365.8 (1200)	1321-3R750-B	20	495 ⁽³⁾		●		
	600	2	12.2 (40)	30.5 (100)	61.0 (200)	121.9 (400)	12.2 (40)	45.7 (150)	61.0 (200)	121.9 (400)	61.0 (200)	213.4 (700)	304.8 (1000)	365.8 (1200)	1321-3R750-B	20	735 ⁽⁴⁾		●		
12 ⁽¹⁾	700	2	12.2 (40)	30.5 (100)	61.0 (200)	121.9 (400)	12.2 (40)	45.7 (150)	61.0 (200)	121.9 (400)	45.7 (150)	182.9 (600)	304.8 (1000)	365.8 (1200)	2 x 1321-3RB400-B	40	375 ⁽⁴⁾		●		
	800	2	12.2 (40)	30.5 (100)	61.0 (200)	121.9 (400)	12.2 (40)	45.7 (150)	61.0 (200)	121.9 (400)	45.7 (150)	182.9 (600)	304.8 (1000)	365.8 (1200)	2 x 1321-3R500-B	40	375 ⁽⁴⁾		●		
	900	2	12.2 (40)	30.5 (100)	61.0 (200)	121.9 (400)	12.2 (40)	45.7 (150)	61.0 (200)	121.9 (400)	45.7 (150)	182.9 (600)	304.8 (1000)	365.8 (1200)	2 x 1321-3R500-B	20	525 ⁽⁵⁾				
13	1000 ⁽²⁾	2	12.2 (40)	30.5 (100)	61.0 (200)	121.9 (400)	12.2 (40)	45.7 (150)	61.0 (200)	121.9 (400)	45.7 (150)	152.4 (500)	304.8 (1000)	365.8 (1200)	2 x 1321-3R600-B	20	525 ⁽⁵⁾				
	1200 ⁽²⁾	2	12.2 (40)	30.5 (100)	61.0 (200)	121.9 (400)	12.2 (40)	45.7 (150)	61.0 (200)	121.9 (400)	45.7 (150)	152.4 (500)	304.8 (1000)	365.8 (1200)	2 x 1321-3R750-B	20	525 ⁽⁵⁾				
	1250 ⁽²⁾	2	12.2 (40)	30.5 (100)	61.0 (200)	121.9 (400)	12.2 (40)	45.7 (150)	61.0 (200)	121.9 (400)	45.7 (150)	152.4 (500)	304.8 (1000)	365.8 (1200)	2 x 1321-3R750-B	20	525 ⁽⁵⁾				

- (1) Frame 12 drives have dual inverters and require two output reactors. The resistor ratings are per phase values for each reactor.
- (2) Some Frame 13 drives require two output reactors to match drive amp rating. The resistor ratings are per phase values for each reactor.
- (3) Resistor specification is based on two cables per phase.
- (4) Resistor specification is based on three cables per phase.
- (5) Resistor specification is based on four cables per phase.

Table J PowerFlex 700S, 600V Shielded/Unshielded Cable - Meters (Feet)

Drive			No Solution		Reactor Only		Reactor + Damping Resistor or 1321-RWR		Reactor/RWR	Resistor		Available Options			
Frame	HP	kHz	1488V	1850V	1488V	1850V	1488V	1850V	Cat. No.	Ohms	Watts	TFA1	TFB2	RWR2	RWC
1	1	2/4	30.5 (100)	121.9 (400)	121.9 (400)	121.9 (400)	121.9 (400)	121.9 (400)				●	●	●	●
	2	2/4	30.5 (100)	152.4 (500)	121.9 (400)	152.4 (500)	152.4 (500)	152.4 (500)				●	●	●	●
	3	2/4	30.5 (100)	152.4 (500)	121.9 (400)	182.9 (600)	182.9 (600)	182.9 (600)				●	●	●	●
	5	2/4	30.5 (100)	152.4 (500)	121.9 (400)	243.8 (800)	243.8 (800)	243.8 (800)	1321-RWR8-EP			●	●	●	●
	7.5	2/4	30.5 (100)	152.4 (500)	121.9 (400)	304.8 (1000)	304.8 (1000)	304.8 (1000)	1321-RWR8-EP				●		●
	10	2/4	30.5 (100)	152.4 (500)	121.9 (400)	365.8 (1200)	365.8 (1200)	365.8 (1200)	1321-RWR12-EP				●		●
	15	2/4	30.5 (100)	152.4 (500)	121.9 (400)	365.8 (1200)	365.8 (1200)	365.8 (1200)	1321-RWR18-EP				●		
2	20	2/4	30.5 (100)	152.4 (500)	121.9 (400)	365.8 (1200)	365.8 (1200)	365.8 (1200)	1321-RWR25-EP				●		
	25	2/4	30.5 (100)	152.4 (500)	121.9 (400)	365.8 (1200)	365.8 (1200)	365.8 (1200)	1321-RWR25-EP				●		
3	30	2/4	30.5 (100)	152.4 (500)	121.9 (400)	365.8 (1200)	365.8 (1200)	365.8 (1200)	1321-RWR35-EP				●		
	40	2/4	30.5 (100)	152.4 (500)	121.9 (400)	365.8 (1200)	365.8 (1200)	365.8 (1200)	1321-RWR45-EP				●		
	50	2/4	36.6 (120)	152.4 (500)	121.9 (400)	365.8 (1200)	365.8 (1200)	365.8 (1200)	1321-RWR55-EP				●		
4	60	2/4	36.6 (120)	152.4 (500)	121.9 (400)	365.8 (1200)	365.8 (1200)	365.8 (1200)	1321-RWR80-EP				●		
5	75	2/4	36.6 (120)	152.4 (500)	121.9 (400)	365.8 (1200)	365.8 (1200)	365.8 (1200)	1321-RWR80-EP				●		
	100	2/4	42.7 (140)	152.4 (500)	121.9 (400)	304.8 (1000)	365.8 (1200)	365.8 (1200)	1321-RWR100-EP				●		
6	125	2/4	42.7 (140)	152.4 (500)	121.9 (400)	304.8 (1000)	365.8 (1200)	365.8 (1200)	1321-RWR130-EP				●		
	150	2/4	42.7 (140)	152.4 (500)	121.9 (400)	304.8 (1000)	365.8 (1200)	365.8 (1200)	1321-RWR160-EP				●		
9	150	2	42.7 (140)	152.4 (500)	61.0 (200)	304.8 (1000)	365.8 (1200)	365.8 (1200)	1321-RWR200-EP				●		
	200	2	42.7 (140)	152.4 (500)	61.0 (200)	304.8 (1000)	365.8 (1200)	365.8 (1200)	1321-RWR250-EP				●		
10	250	2	42.7 (140)	152.4 (500)	61.0 (200)	304.8 (1000)	365.8 (1200)	365.8 (1200)	1321-3RB250-B	50	315		●		
	350	2	42.7 (140)	152.4 (500)	61.0 (200)	304.8 (1000)	365.8 (1200)	365.8 (1200)	1321-3RB350-B	20	585 ⁽³⁾		●		
	400	2	42.7 (140)	152.4 (500)	61.0 (200)	304.8 (1000)	365.8 (1200)	365.8 (1200)	1321-3RB400-B	20	585 ⁽³⁾		●		
	450	2	42.7 (140)	152.4 (500)	61.0 (200)	304.8 (1000)	365.8 (1200)	365.8 (1200)	1321-3R500-B	20	585 ⁽³⁾		●		
11	500	2	42.7 (140)	152.4 (500)	61.0 (200)	304.8 (1000)	365.8 (1200)	365.8 (1200)	1321-3R500-B	20	585 ⁽³⁾		●		
	600	2	42.7 (140)	152.4 (500)	61.0 (200)	304.8 (1000)	365.8 (1200)	365.8 (1200)	1321-3R600-B	20	585 ⁽³⁾		●		
12 ⁽¹⁾	700	2	42.7 (140)	152.4 (500)	61.0 (200)	304.8 (1000)	365.8 (1200)	365.8 (1200)	2 X 1321-3RB320-B	40	300 ⁽³⁾		●		
	800	2	42.7 (140)	152.4 (500)	61.0 (200)	304.8 (1000)	365.8 (1200)	365.8 (1200)	2 X 1321-3RB400-C	40	480 ⁽⁴⁾		●		
	900	2	42.7 (140)	152.4 (500)	61.0 (200)	304.8 (1000)	365.8 (1200)	365.8 (1200)	2 X 1321-3R400-B	40	480 ⁽⁴⁾				
13	1000	2	42.7 (140)	152.4 (500)	61.0 (200)	304.8 (1000)	365.8 (1200)	365.8 (1200)	1321-3R1000-C	20	960 ⁽⁴⁾				
	1100	2	42.7 (140)	152.4 (500)	61.0 (200)	304.8 (1000)	365.8 (1200)	365.8 (1200)	1321-3R1000-B	10	1440 ⁽⁵⁾				
	1300 ⁽²⁾	2	42.7 (140)	152.4 (500)	61.0 (200)	304.8 (1000)	365.8 (1200)	365.8 (1200)	2 X 1321-3R600-B	20	720 ⁽⁵⁾				

(1) Frame 12 drives have dual inverters and require two output reactors. The resistor ratings are per phase values for each reactor.

(2) Some Frame 13 drives require two output reactors to match drive amp rating. The resistor ratings are per phase values for each reactor.

(3) Resistor specification is based on two cables per phase.

(4) Resistor specification is based on three cables per phase.

(5) Resistor specification is based on four cables per phase.

Table K PowerFlex 700S, 690V Shielded/Unshielded Cable - Meters (Feet)

Drive			No Solution		Reactor Only		Reactor + Damping Resistor		Reactor	Resistor		Available Options			
Frame	kW	kHz	1850V	2000V	1850V	2000V	1850V	2000V	Cat. No.	Ohms	Watts	TFA1	TFB2	RWR2	RWC
5	45	2/4	30.5 (100)	76.2 (250)	91.4 (300)	152.4 (500)	365.8 (1200)	365.8 (1200)	1321-3R80-C	50	345/690				
	55	2/4	30.5 (100)	76.2 (250)	91.4 (300)	152.4 (500)	365.8 (1200)	365.8 (1200)	1321-3R80-C	50	345/690				
	75	2/4	30.5 (100)	76.2 (250)	91.4 (300)	152.4 (500)	365.8 (1200)	365.8 (1200)	1321-3R100-C	50	345/690				
	90	2/4	30.5 (100)	76.2 (250)	91.4 (300)	152.4 (500)	365.8 (1200)	365.8 (1200)	1321-3R130-C	50	375/750				
6	110	2/4	30.5 (100)	76.2 (250)	91.4 (300)	152.4 (500)	365.8 (1200)	365.8 (1200)	1321-3R160-C	50	375/750				
	132	2/4	30.5 (100)	76.2 (250)	91.4 (300)	152.4 (500)	365.8 (1200)	365.8 (1200)	1321-3R200-C	50	375/750				
9	160	2	30.5 (100)	68.6 (225)	91.4 (300)	152.4 (500)	274.3 (900)	365.8 (1200)	1321-3RB250-C	50	480				
	200	2	30.5 (100)	68.6 (225)	91.4 (300)	152.4 (500)	274.3 (900)	365.8 (1200)	1321-3RB250-C	50	480				
10	250	2	30.5 (100)	68.6 (225)	76.2 (250)	121.9 (400)	274.3 (900)	365.8 (1200)	1321-3RB320-C	50	480				
	315	2	30.5 (100)	68.6 (225)	76.2 (250)	121.9 (400)	274.3 (900)	365.8 (1200)	1321-3RB400-C	20	945 ⁽³⁾				
	355	2	30.5 (100)	68.6 (225)	76.2 (250)	121.9 (400)	274.3 (900)	365.8 (1200)	1321-3R500-C	20	945 ⁽³⁾				
	400	2	30.5 (100)	68.6 (225)	76.2 (250)	121.9 (400)	243.8 (800)	304.8 (1000)	1321-3R500-C	20	945 ⁽³⁾				

Drive			No Solution		Reactor Only		Reactor + Damping Resistor		Reactor	Resistor		Available Options			
Frame	kW	kHz	1850V	2000V	1850V	2000V	1850V	2000V	Cat. No.	Ohms	Watts	TFA1	TFB2	RWR2	RWC
11	450	2	30.5 (100)	68.6 (225)	76.2 (250)	121.9 (400)	243.8 (800)	304.8 (1000)	1321-3R600-C	20	945 ⁽³⁾				
	500	2	30.5 (100)	68.6 (225)	76.2 (250)	121.9 (400)	243.8 (800)	304.8 (1000)	1321-3R600-C	20	945 ⁽³⁾				
	560	2	30.5 (100)	68.6 (225)	61.0 (200)	91.4 (300)	243.8 (800)	304.8 (1000)	1321-3R750-C	20	945 ⁽³⁾				
12 ⁽¹⁾	630	2	30.5 (100)	68.6 (225)	61.0 (200)	91.4 (300)	243.8 (800)	304.8 (1000)	2 X 1321-3RB400-C	40	480 ⁽³⁾				
	710	2	30.5 (100)	68.6 (225)	61.0 (200)	91.4 (300)	243.8 (800)	304.8 (1000)	2 X 1321-3R500-C	40	645 ⁽⁴⁾				
	800	2	30.5 (100)	68.6 (225)	61.0 (200)	91.4 (300)	243.8 (800)	304.8 (1000)	2 X 1321-3R500-C	40	645 ⁽⁴⁾				
13	900 ⁽²⁾	2	30.5 (100)	68.6 (225)	61.0 (200)	91.4 (300)	243.8 (800)	304.8 (1000)	2 X 1321-3R600-C	40	645 ⁽⁴⁾				
	1000 ⁽²⁾	2	30.5 (100)	68.6 (225)	48.8 (160)	91.4 (300)	243.8 (800)	304.8 (1000)	2 X 1321-3R600-C	20	840 ⁽⁵⁾				
	1100 ⁽²⁾	2	30.5 (100)	68.6 (225)	48.8 (160)	91.4 (300)	243.8 (800)	304.8 (1000)	2 X 1321-3R750-C	20	840 ⁽⁵⁾				

(1) Frame 12 drives have dual inverters and require two output reactors. The resistor ratings are per phase values for each reactor.

(2) Some Frame 13 drives require two output reactors to match drive amp rating. The resistor ratings are per phase values for each reactor.

(3) Resistor specification is based on two cables per phase.

(4) Resistor specification is based on three cables per phase.

(5) Resistor specification is based on four cables per phase.

Packaging and Mounting

1336 FORCE

- Small size conserves expensive panel space.
- “Planar Construction” eliminates most internal cables and connectors. Increases reliability.
- Laminar Bus Design reduces internal inductance, thereby reducing snubber losses and improving IGBT performance.
- Common Human Interface Module provides simplicity of programming and flexibility of operation.
- Thermal Dissipation Management design and extensive infra-red testing minimizes hot spots to maximize reliability.
- NEMA and International standards designed for global acceptability.
- Common AC/DC Bus accommodates both stand alone and common bus using standard Bulletin 2362 Motor Control Center (MCC) vertical sections.
- Adapter Board Interface allows you to change the personality of the drive based on application.

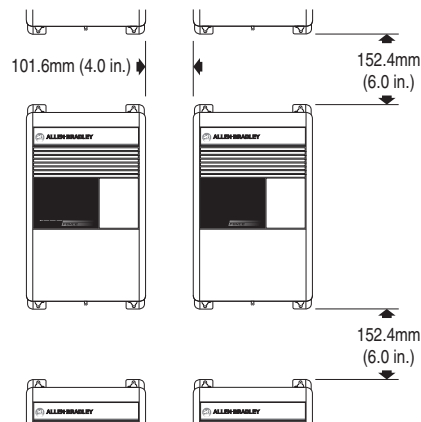
PowerFlex 700S

- The innovative bookshelf design allows Zero Stacking™ or side-by-side mounting of the drives. With no minimum spacing required between drives, valuable panel space is conserved and installation cost is reduced.
- The design of the PowerFlex® family of drives incorporates proven noise reduction components on both the input and output of the drive. Many of the global EMC standards can be met and many noise related application concerns can be reduced or eliminated using a standard “out-of-the-box” PowerFlex drive with no additional hardware or cost. By also incorporating higher rated components and significant voltage suppression devices for both phase-to-phase and phase-to-ground protection, power conditioning concerns and the need for additional hardware are significantly reduced.
- Pull-apart control terminal blocks for easy wiring and quick disconnect.
- Scalable hardware options include feedback and communications.

Minimum Mounting Clearances

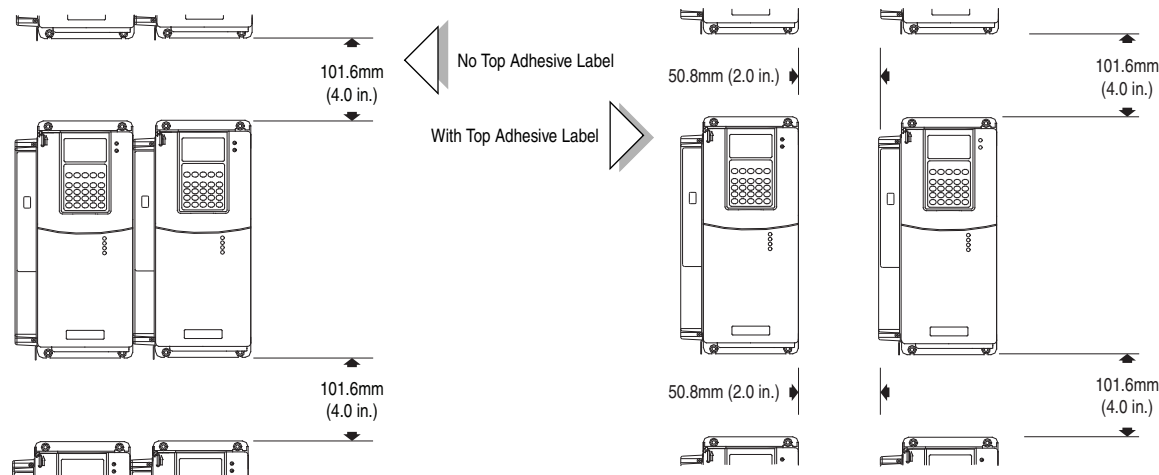
1336 FORCE All Frames

Important: F & G Frame drives require a minimum of 152.4 mm (6.0 in.) between the drive back and mounting wall, if drives are mounted with sides touching another device or wall. A minimum of 76.2 mm (3.0 in.) is required on the sides if the back of the drive is mounted against a wall or other device.

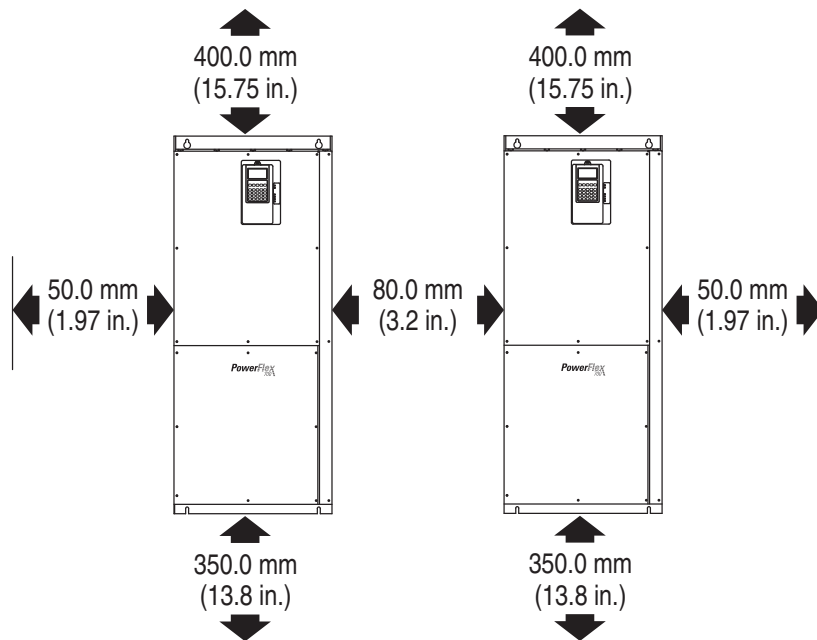


PowerFlex 700S

Frames 1-6

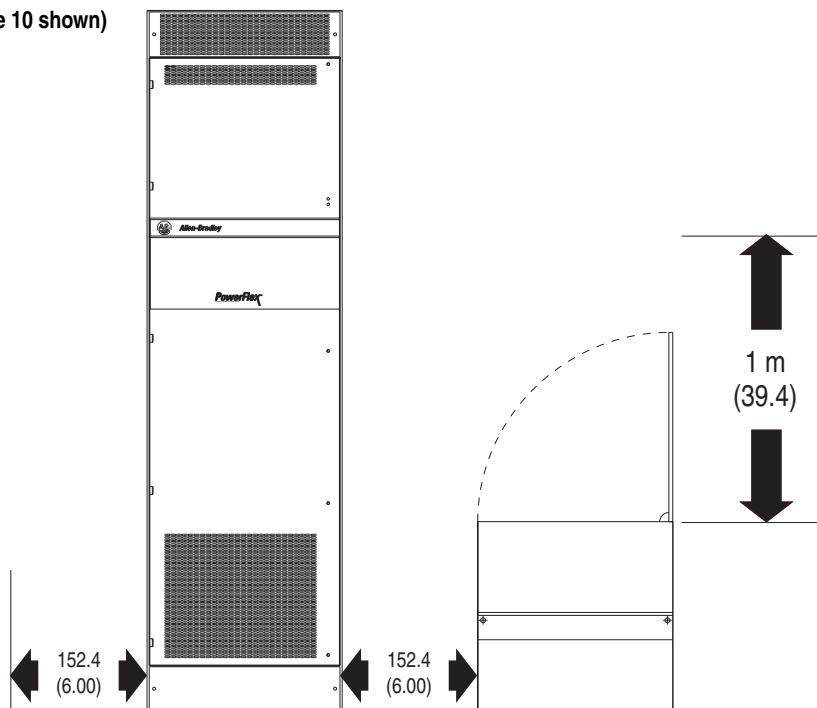


Frame 9



Frames 10 - 13

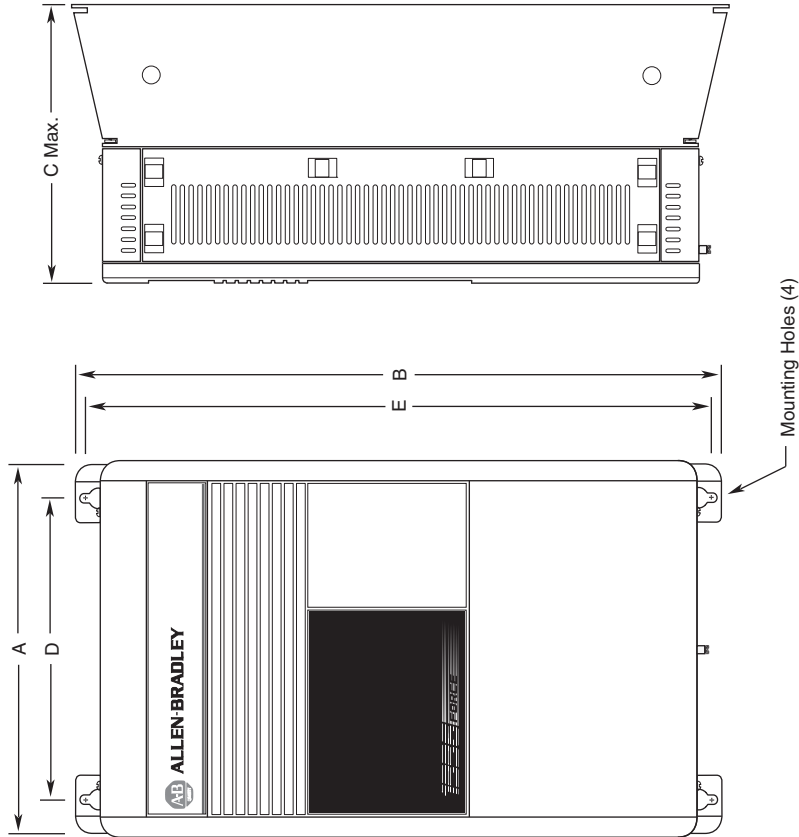
(Frame 10 shown)



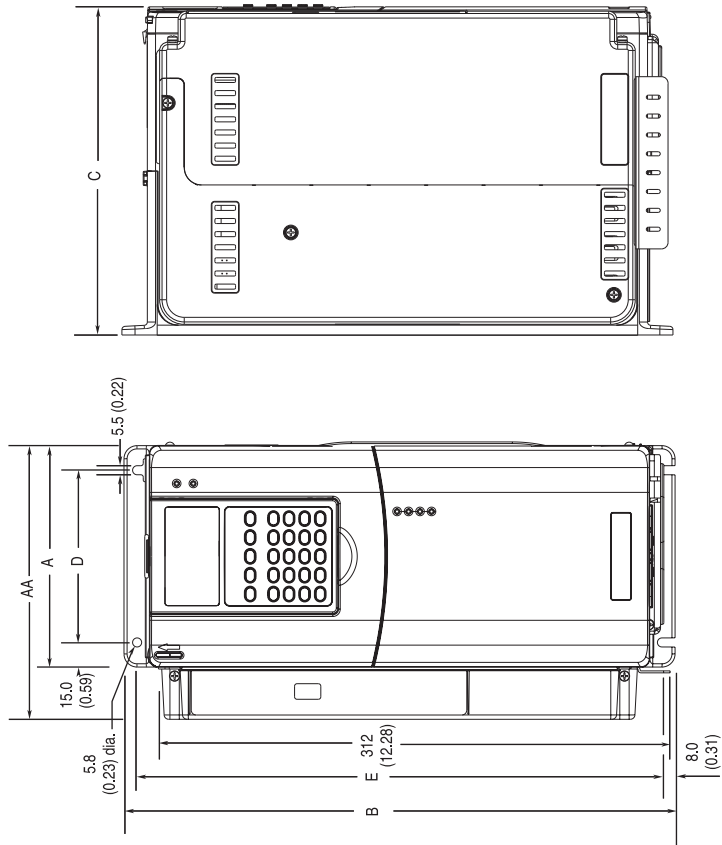
Approximate Dimensions

1336 FORCE Frames B1, B2 & C to PowerFlex 700S Frames 1, 2, & 3 Dimensions

1336 FORCE



PowerFlex 700S (Frame 1 w/Expanded Cassette shown)



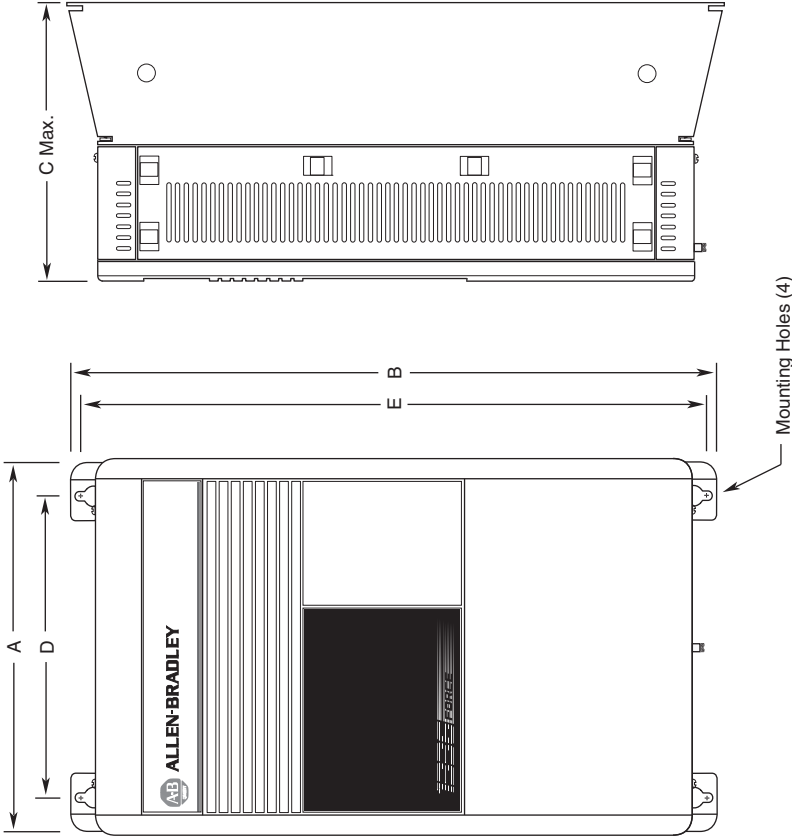
Drive	Frame	Dimensions ⁽¹⁾ mm (in.)					Weight ⁽²⁾ kg (lbs.)	
		A (700S Slim)	AA (700S Expanded)	B	C (Max.)	D	E	Drive
1336T	B1, B2	276.4 (10.88)	na	476.3 (18.75)	225.0 (8.86)	212.6 (8.37)	461.0 (18.15)	na
	C	301.8 (11.88)	na	701.0 (27.60)	225.0 (8.86)	238.0 (9.37)	685.8 (27.00)	na
								22.7 (50)
700S	1	135.0 (5.31)	166.9 (6.57)	336.0 (13.23)	200.0 (7.87)	105.0 (4.13)	320.0 (12.60)	7.03 (15.5)
	2	222.0 (8.74)	253.9 (9.99)	342.5 (13.48)	200.0 (7.87)	192.0 (7.56)	320.0 (12.60)	12.52 (27.6)
	3	222.0 (8.74)	253.9 (9.99)	517.5 (20.37)	200.0 (7.87)	192.0 (7.56)	500.0 (19.69)	15.20 (33.5)
								22.68 (50)

(1) Refer to drive User Manuals for location and size of motor lead knockouts.

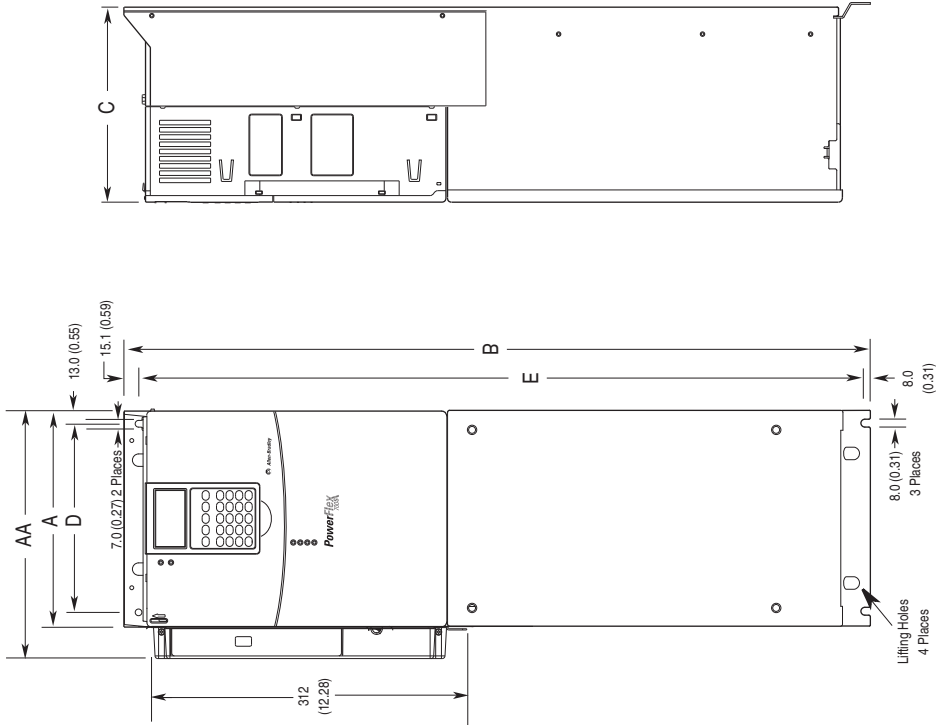
(2) PowerFlex 700S weights include HIM, DriveLogix controller with ControlNet daughtercard, Hi-Resolution Encoder Option, and 20-COMM-C ControlNet adapter.

1336 FORCE Frame C to PowerFlex 700S Frame 4 Dimensions

1336 FORCE



PowerFlex 700S



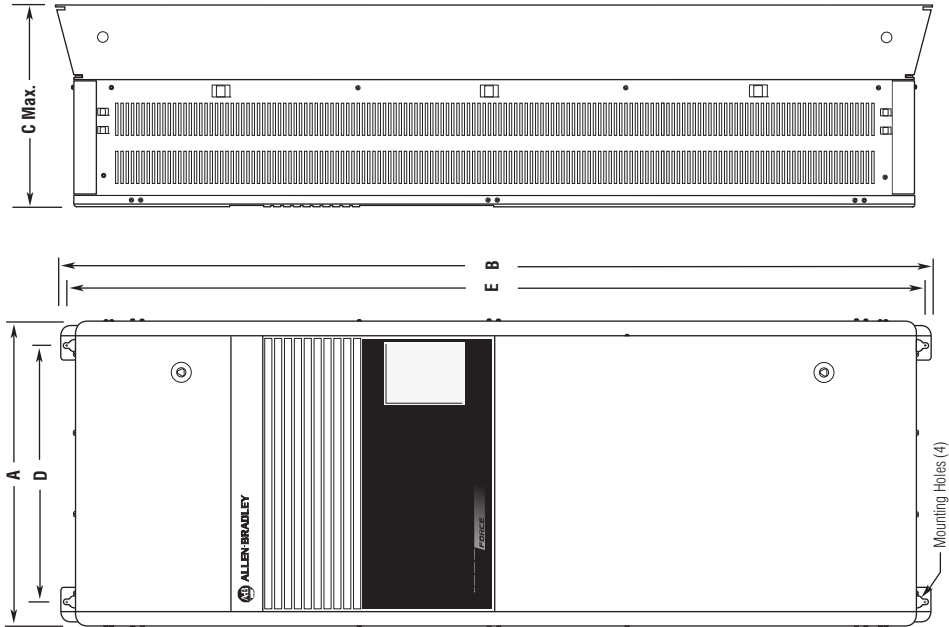
		Dimensions ⁽¹⁾ mm (in.)				Weight ⁽²⁾ kg (lbs.)				
	Drive	Frame	A (700S Slim)	AA (700S Expanded)	B	C (Max.)	D	E	Drive	Drive & Packaging
	1336T	C	301.8 (11.88)	na	701.0 (27.60)	225.0 (8.86)	238.0 (9.37)	685.8 (27.00)	na	38.6 (85)
	700S	4	220.0 (8.66)	251.9 (9.92)	758.8 (29.87)	201.7 (7.94)	192.0 (7.56)	738.2 (29.06)	24.49 (54.0)	29.03 (64.0)

(1) Refer to drive User Manuals for location and size of motor lead knockouts.

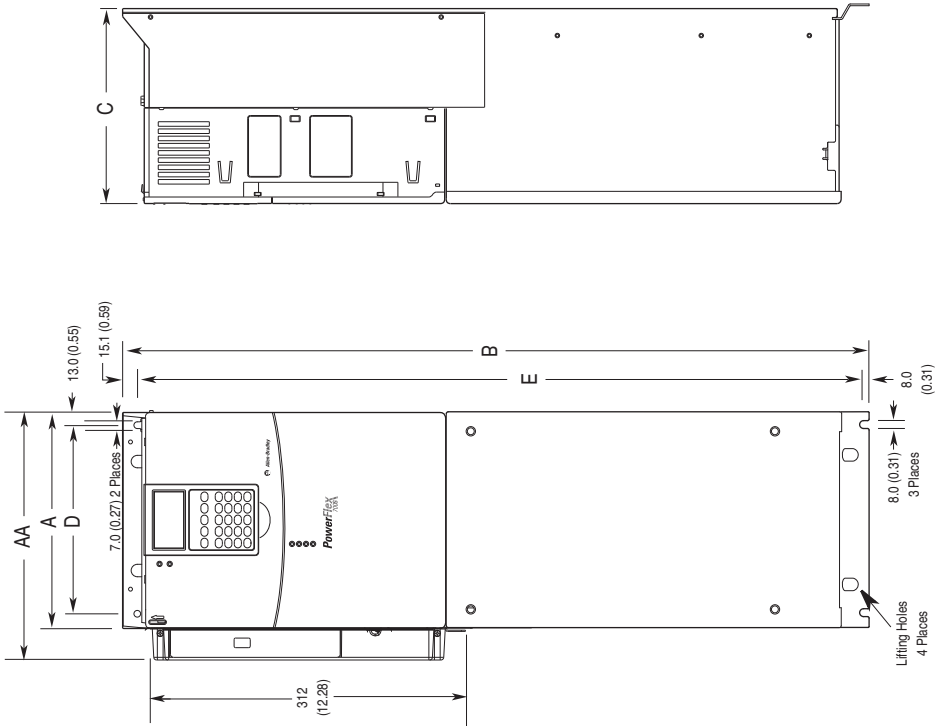
(2) PowerFlex 700S weights include HIM, DriveLogix controller with ControlNet daughtercard, Hi-Resolution Encoder Option, and 20-COMM-C ControlNet adapter.

1336 FORCE Frame D to PowerFlex 700S Frame 4 Dimensions

1336 FORCE



PowerFlex 700S



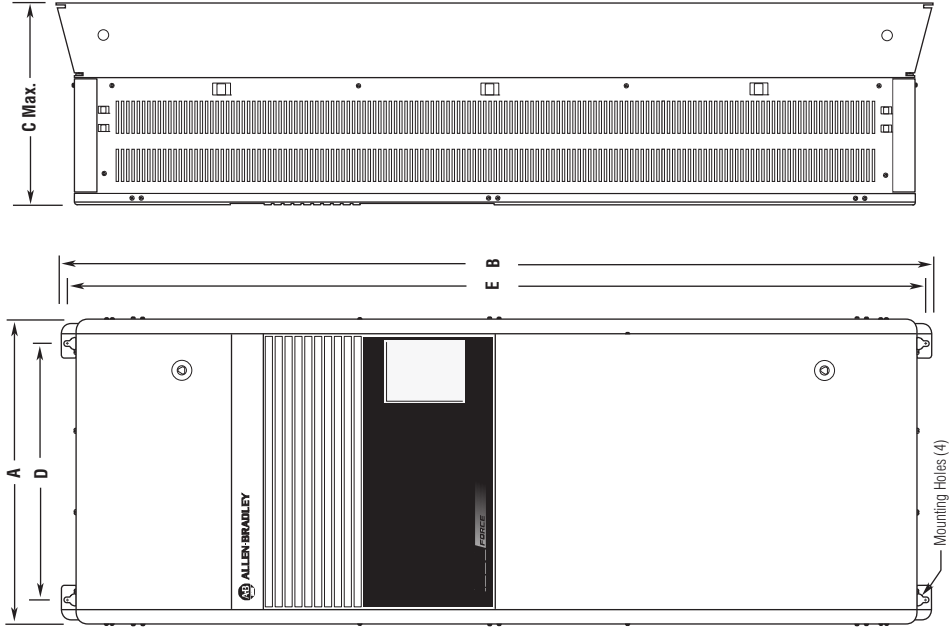
Drive	Frame	Dimensions ⁽¹⁾ mm (in.)					Weight ⁽²⁾ kg (lbs.)		
		A (700S Slim)	AA (700S Expanded)	B	C (Max.)	D	E	Drive	Drive & Packaging
1336T	D	381.5 (15.02)	na	1240.0 (48.82)	270.8 (10.66)	325.9 (12.83)	1216.2 (47.88)	na	108.9 (240)
700S	4	220.0 (8.66)	251.9 (9.92)	758.8 (29.87)	201.7 (7.94)	192.0 (7.56)	738.2 (29.06)	24.49 (54.0)	29.03 (64.0)

⁽¹⁾ Refer to drive User Manuals for location and size of motor lead knockouts.

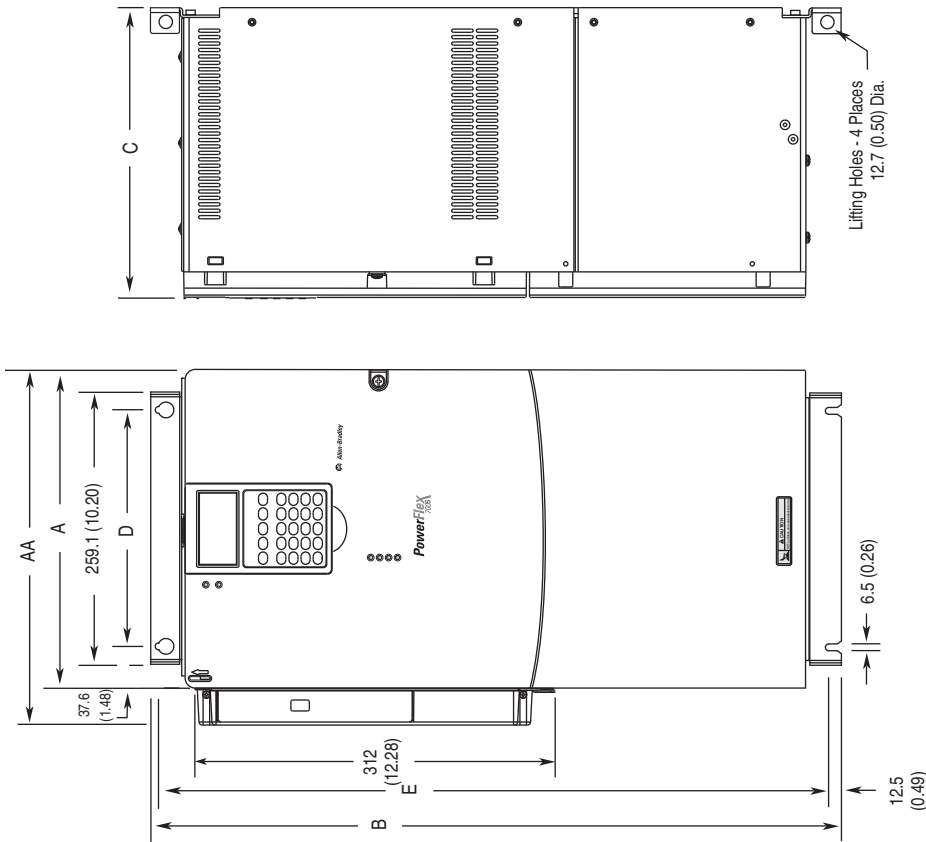
⁽²⁾ PowerFlex 700S weights include HIM, DriveLogix controller with ControlNet daughtercard, Hi-Resolution Encoder Option, and 20-COMM-C ControlNet adapter.

1336 FORCE Frame D to PowerFlex 700S Frame 5 Dimensions

1336 FORCE



PowerFlex 700S



Drive	Frame	Dimensions ⁽¹⁾ mm (in.)					Weight ⁽³⁾ kg (lbs.)	
		A (700S Slim)	AA (700S Expanded)	B	C (Max.)	D	Drive	Drive & Packaging
1336T	D	381.5 (15.02)	na	1240.0 (48.82)	270.8 (10.66)	325.9 (12.83)	na	108.9 (240)
700S	5	308.0 (12.16)	339.9 (13.38)	644.5 (25.37) ⁽²⁾	275.4 (10.84)	225.0 (8.86)	37.19 (82.0)	42.18 (93.0)

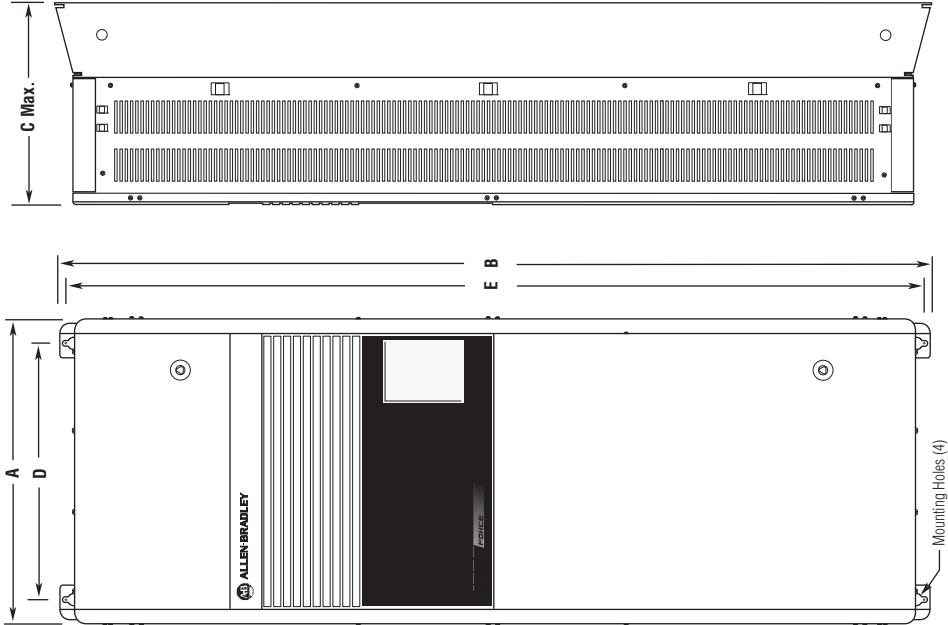
(1) Refer to drive User Manuals for location and size of motor lead knockouts.

(2) When using the supplied junction box (Frame 5, 100 HP PowerFlex 700S drives only), add an additional 45.1 mm (1.78 in.) to this dimension.

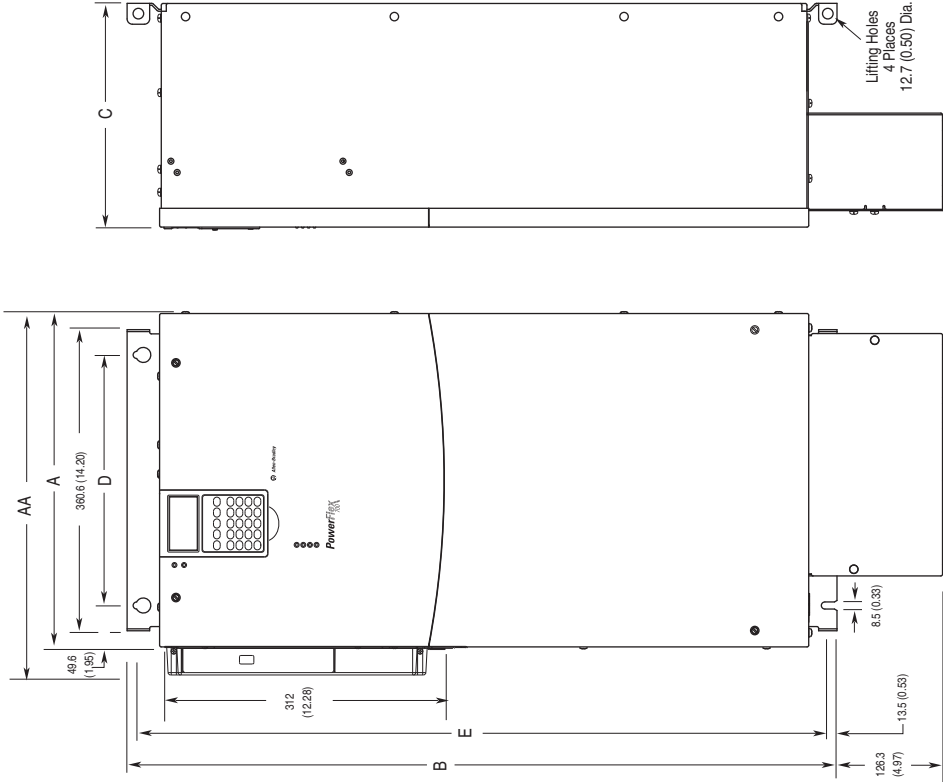
(3) PowerFlex 700S weights include HIM, DriveLogix controller with ControlNet daughtercard, Hi-Resolution Encoder Option, and 20-COMM-C ControlNet adapter.

1336 FORCE Frame D to PowerFlex 700S Frame 6 Dimensions

1336 FORCE



PowerFlex 700S



Drive	Frame	Dimensions ⁽¹⁾ mm (in.)					Weight ⁽²⁾ kg (lbs.)		
		A (700S Slim)	AA (700S Expanded)	B	C (Max.)	D	E	Drive	Drive & Packaging
1336T	D	381.5 (15.02)	na	1240.0 (48.82)	270.8 (10.66)	325.9 (12.83)	1216.2 (47.88)	na	108.9 (240)
700S	6	403.9 (15.90)	435.8 (17.16)	850.0 (33.46)	275.5 (10.85)	300.0 (11.81)	825.0 (32.48)	71.44 (157.5) ⁽³⁾	na

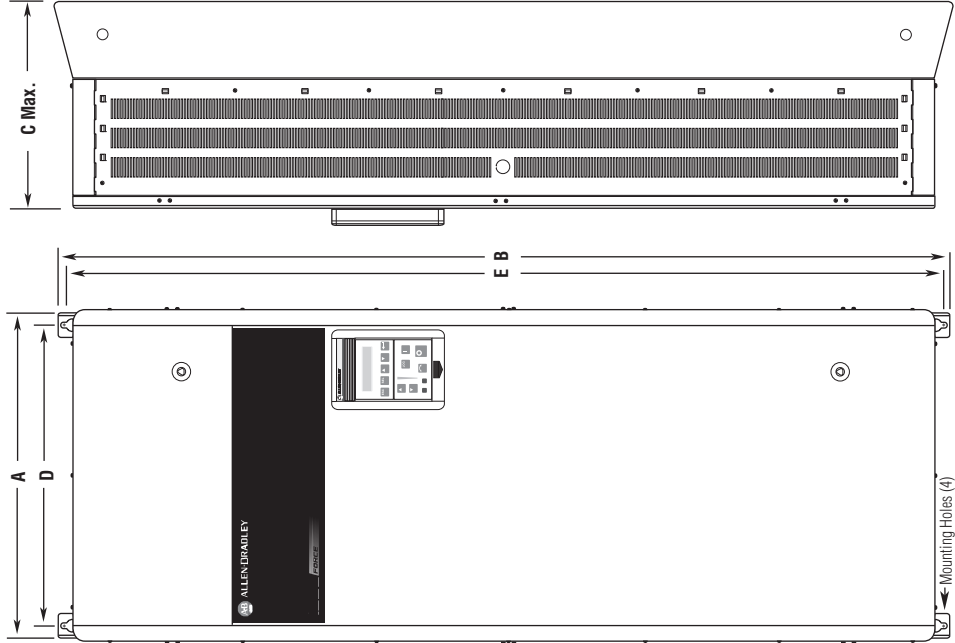
(1) Refer to drive User Manuals for location and size of motor lead knockouts.

(2) PowerFlex 700S weights include HIM, DriveLogix controller with ControlNet daughtercard, Hi-Resolution Encoder Option, and 20-COMM-C ControlNet adapter.

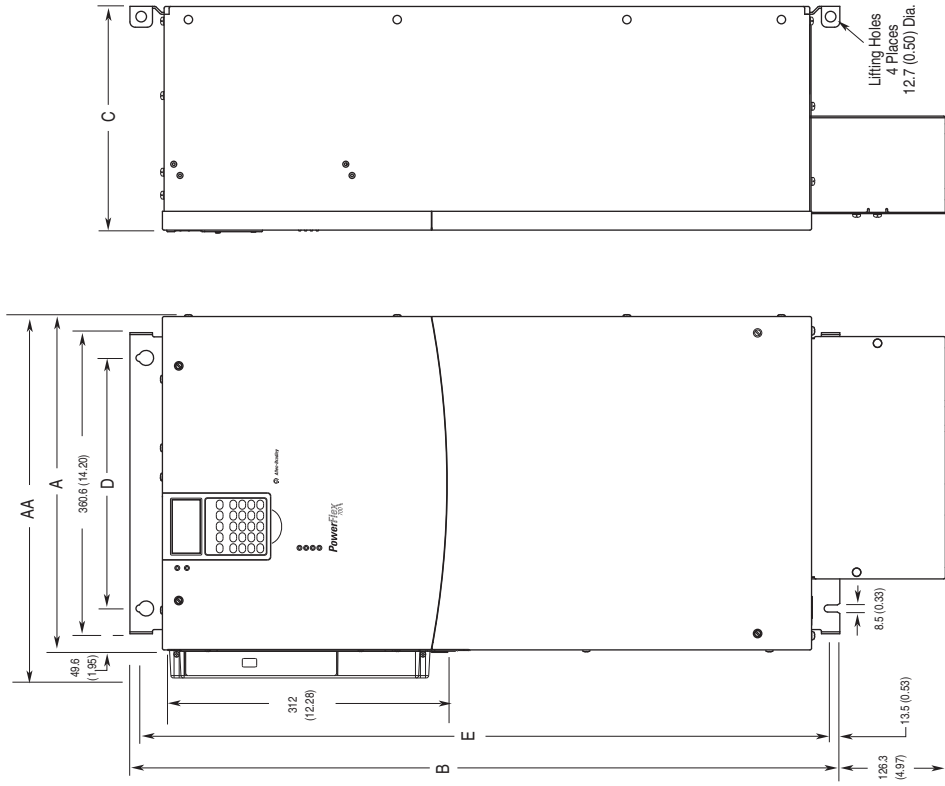
(3) Add an additional 3.6 kg (8.00 lbs.) for Frame 6, 200 HP PowerFlex 700S drives.

1336 FORCE Frame E to PowerFlex 700S Frame 6 Dimensions

1336 FORCE



PowerFlex 700S



Drive	Frame	Dimensions ⁽¹⁾ mm (in.)				Weight ⁽²⁾ kg (lbs.)	
		A (700S Slim)	AA (700S Expanded)	B	C (Max.)	D	E
1336T	E (enclosed)	511.0 (20.1)	na	1498.6 (59.0)	424.4 (16.7)	477.5 (18.8)	1447.8 (57.0)
700S	6	403.9 (15.9)	435.8 (17.2)	850.0 (33.5)	275.5 (10.9)	300.0 (11.8)	825.0 (32.5)

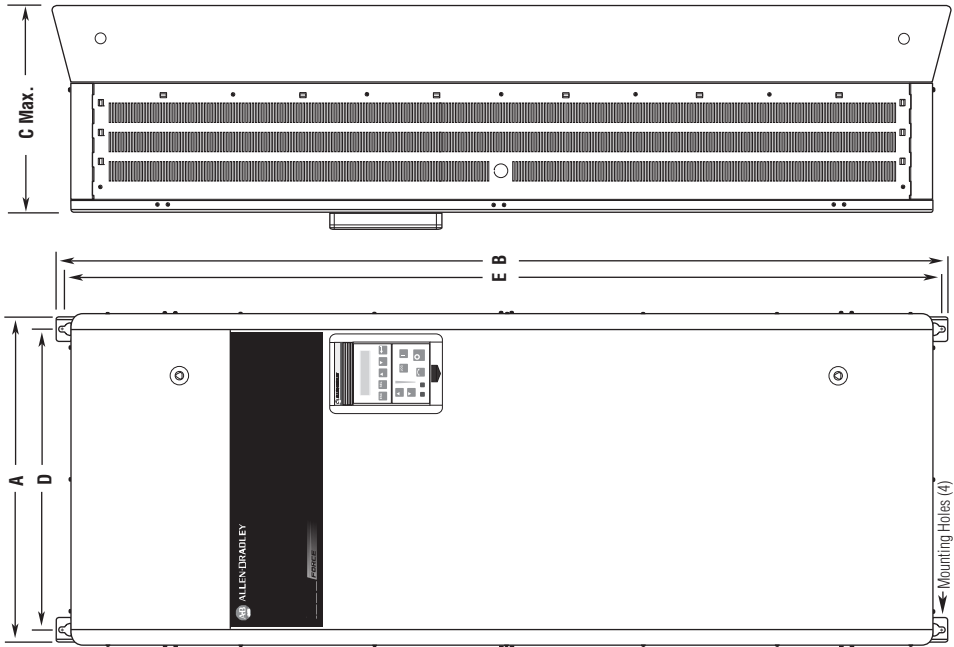
(1) Refer to drive User Manuals for location and size of motor lead knockouts.

(2) PowerFlex 700S weights include HIM, DriveLogix controller with ControlNet daughtercard, Hi-Resolution Encoder Option, and 20-COMM-C ControlNet adapter.

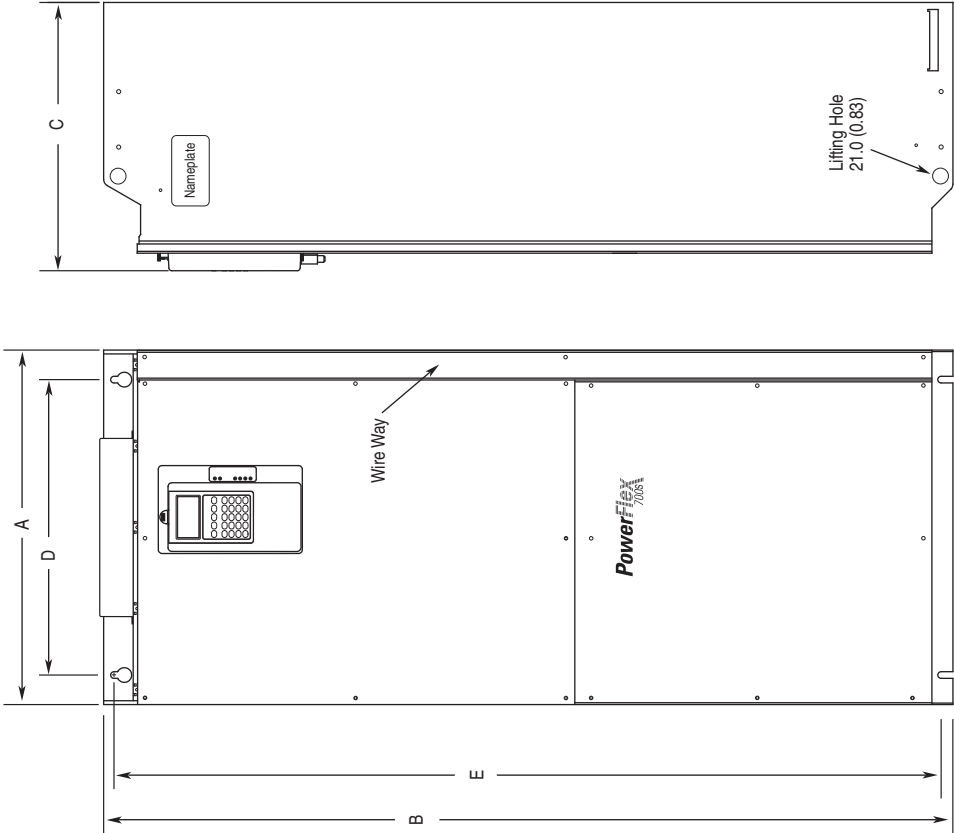
(3) Add an additional 3.6 kg (8.00 lbs.) for Frame 6, 200 HP PowerFlex 700S drives.

1336 FORCE Frame E to PowerFlex 700S Frame 9 Dimensions

1336 FORCE



PowerFlex 700S



Drive	Frame	Dimensions ⁽¹⁾ mm (in.)				Weight ⁽²⁾ kg (lbs.)		
		A	B	C (Max.)	D	E	Drive	Drive & Packaging Drive (400/480V AC - 300A 700S only)
1336T	E (enclosed)	511.0 (20.1)	1498.6 (59.0)	424.4 (16.7)	477.5 (18.8)	1447.8 (57.0)	na	186 (410)
700S	9	480.0 (18.9)	1150.0 (45.28)	363.3 (14.32)	400.0 (15.75)	1120.0 (44.09)	143 (315)	205 (452)

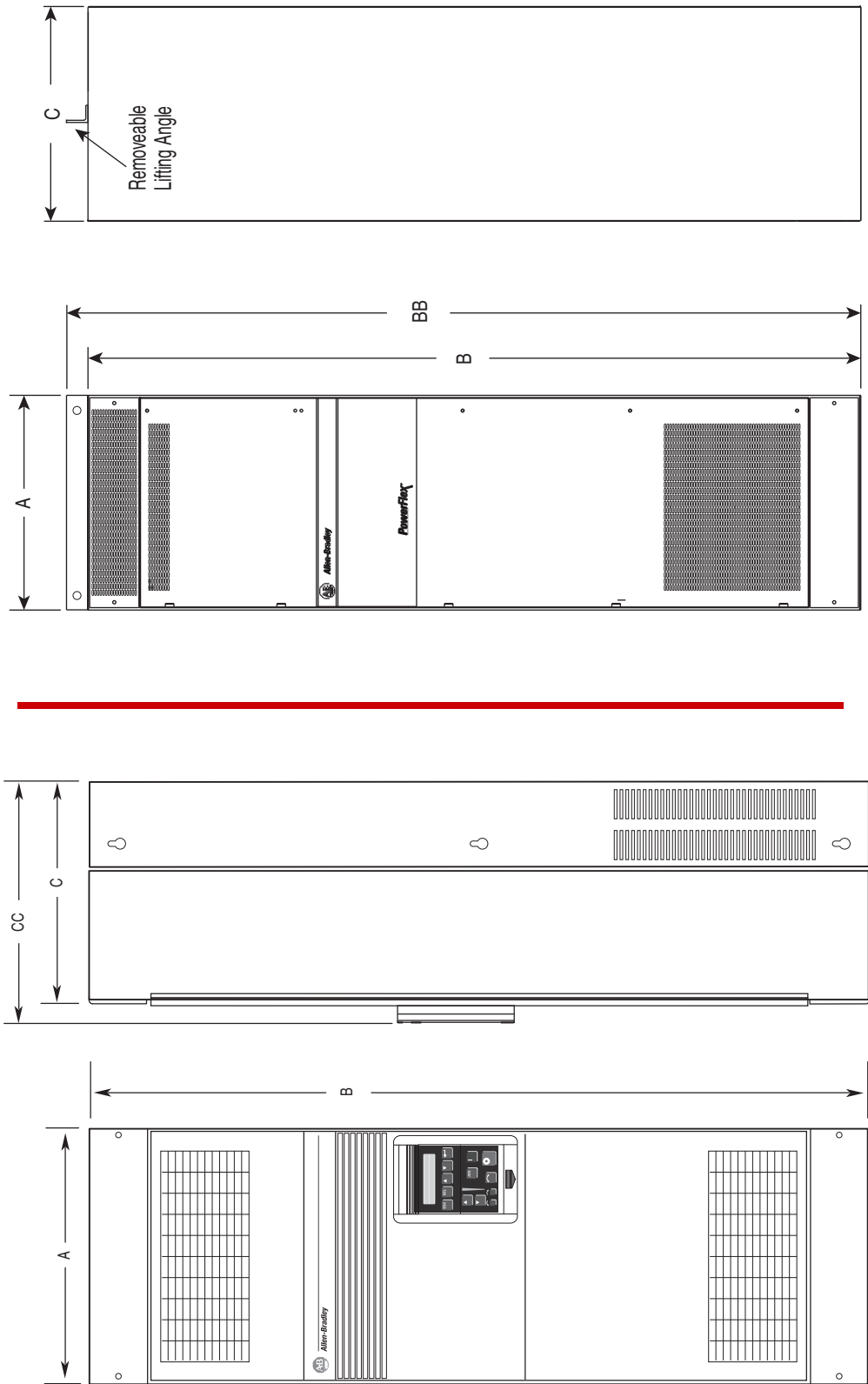
(1) Refer to drive User Manuals for location and size of motor lead knockouts.

(2) PowerFlex 700S weights include HIM, DriveLogix controller with ControlNet daughtercard, Hi-Resolution Encoder Option, and 20-COMM-C ControlNet adapter.

1336 FORCE Frame F (NEMA UL/Type 1, IP20) to PowerFlex 700S Frame 10 MCC Style Enclosure (NEMA UL/Type 1, IP21) Dimensions

1336 FORCE

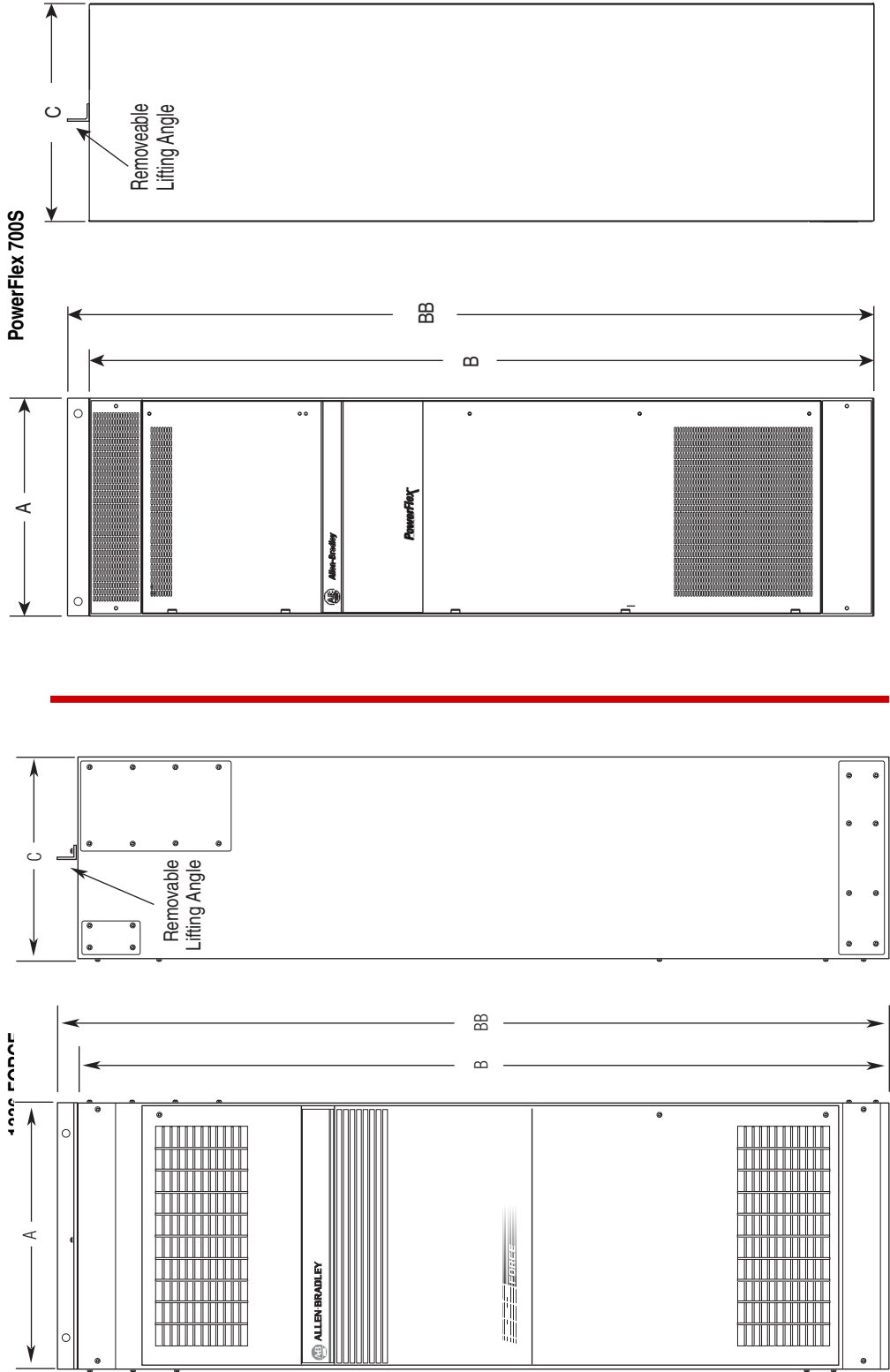
PowerFlex 700S



Drive	Frame	Dimensions ⁽¹⁾ mm (in.)					Weight kg (lbs.)		Drive & Packaging (400V Class)		Drive & Packaging (600V Class)	
		A	B	BB	C	CC	Drive (400V Class)	Drive (600V Class)	Drive & Packaging (400V Class)	Drive & Packaging (600V Class)	Drive & Packaging (400V Class)	Drive & Packaging (600V Class)
1336T	F	762.0 (30.0)	2286.0 (90.0)	na	635.0 (25.0)	672.9 (26.5)	na	na	415 (915)	na	na	na
700S	10	635.0 (25.0)	2286.0 (90.0)	2349.5 (92.5)	635.0 (25.0)	na	454 (1100)	449 (990)	522 (1150)	480 (1058)	na	na

⁽¹⁾ Refer to drive User Manuals for location and size of motor lead knockouts.

1336 FORCE Frame G (NEMA UL/Type 1, IP20) to PowerFlex 700S Frame 10 MCC Style Enclosure (NEMA UL/Type 1, IP21) Dimensions

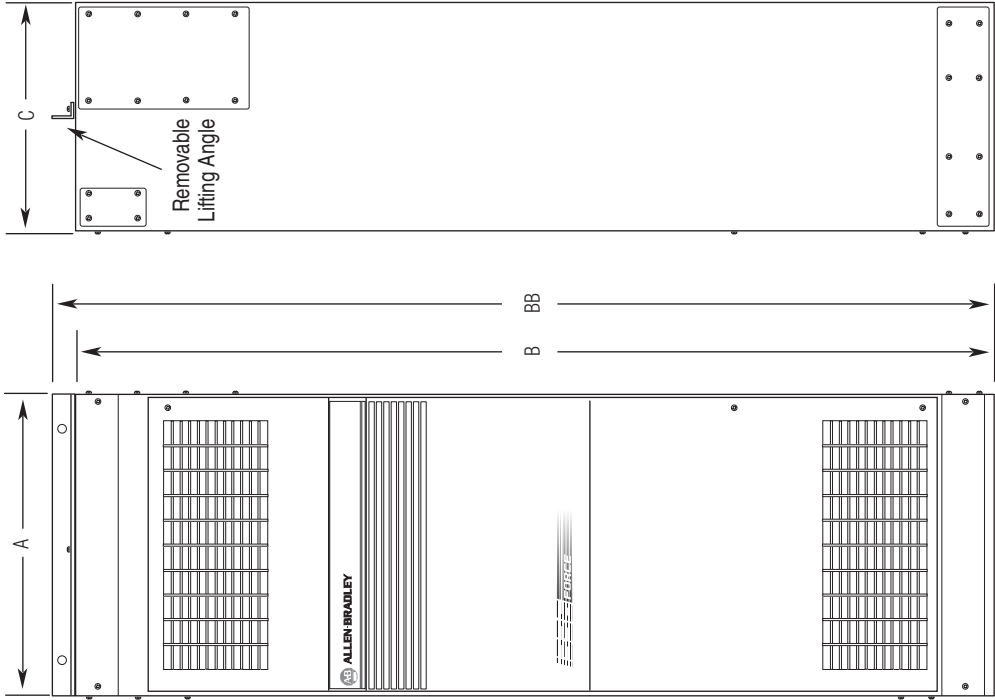


Drive	Frame	Dimensions ⁽¹⁾ mm (in.)				Weight kg (lbs.)		
		A	B	BB	C	Drive (400V Class)	Drive (600V Class)	Drive & Packaging (600V Class)
1336T	G	762.0 (30.0)	2324.1 (91.5)	2387.6 (94.0)	635.0 (25.0)	na	454 (1000)	G
700S	10	635.0 (25.0)	2286.0 (90.0)	2349.5 (92.5)	635.0 (25.0)	454 (1100)	449 (990)	480 (1058)

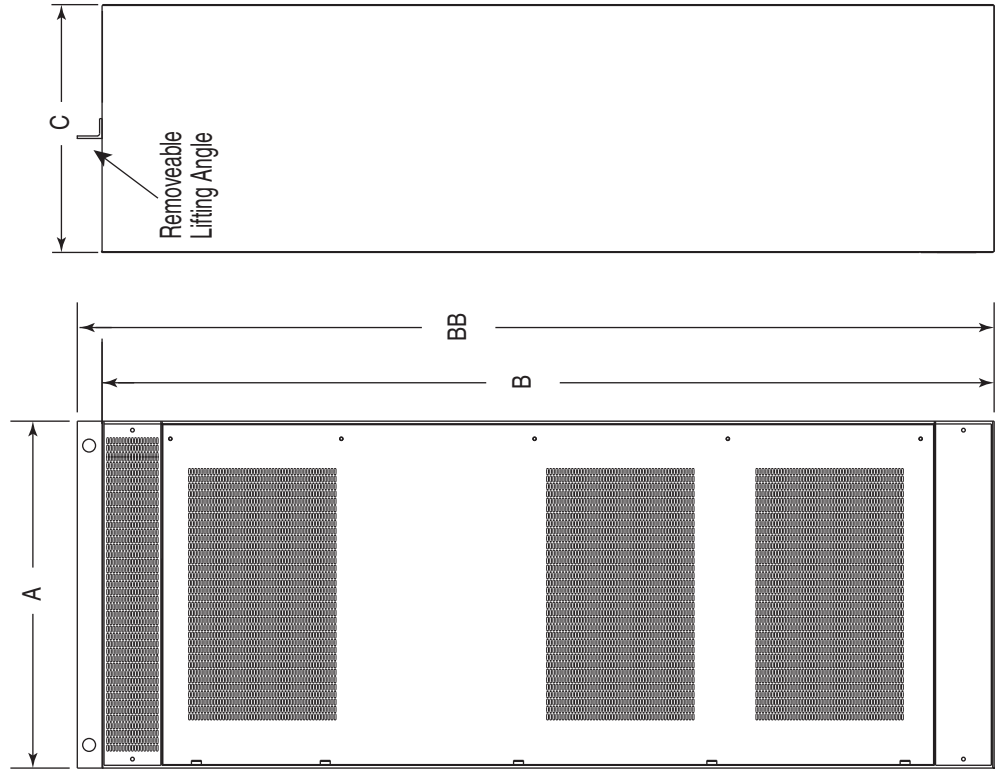
(1) Refer to drive User Manuals for location and size of motor lead knockouts.

1336 FORCE Frame G (NEMA UL/Type 1, IP20) to PowerFlex 700S Frame 11 MCC Style Enclosure (NEMA UL/Type 1, IP21) Dimensions

1336 FORCE



PowerFlex 700S



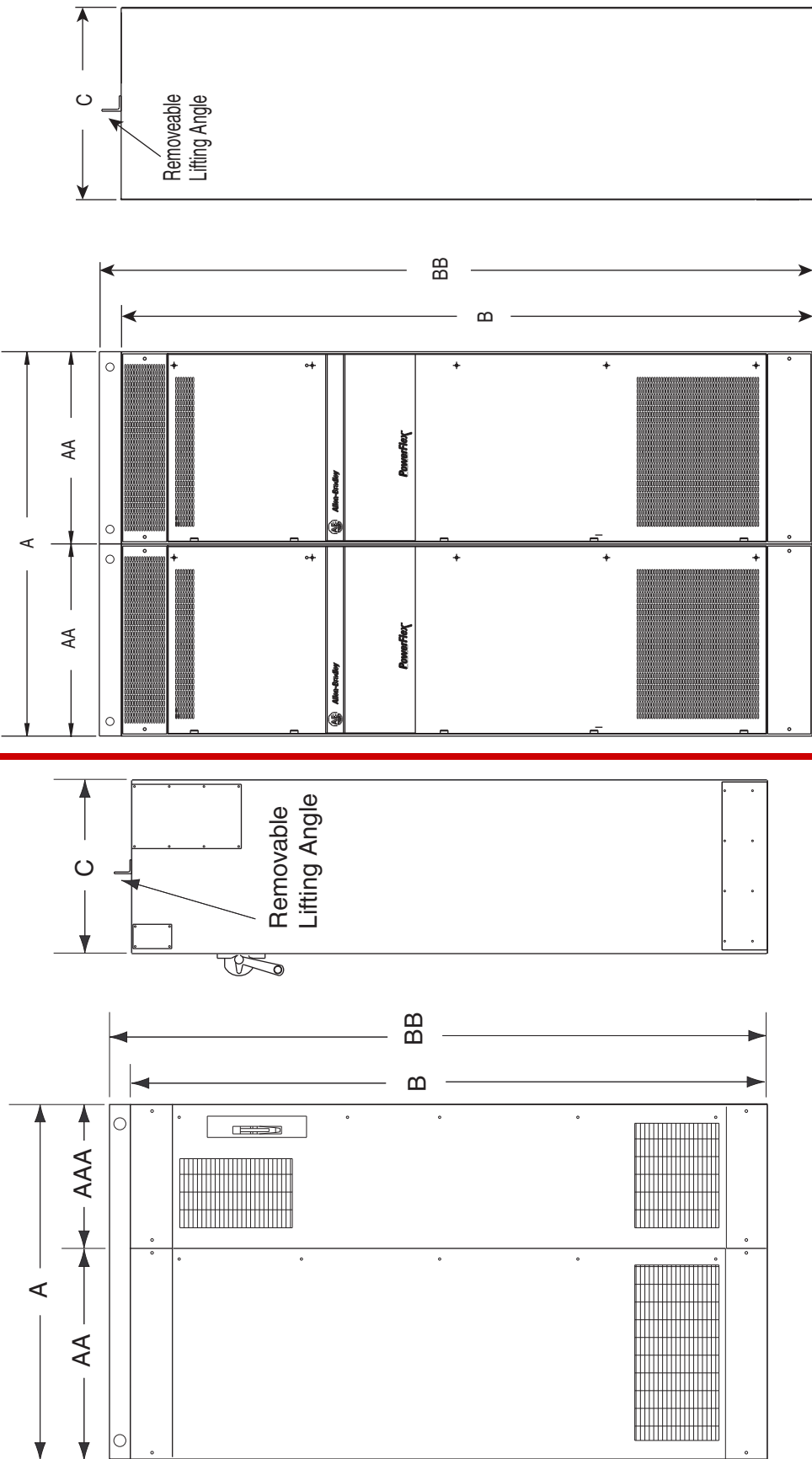
Drive	Frame	Dimensions ⁽¹⁾ mm (in.)				Weight kg (lbs.)		
		A	B	BB	C	Drive (400V Class)	Drive (600V Class)	Drive & Packaging (600V Class)
1336T	G	762.0 (30.0)	2324.1 (91.5)	2387.6 (94.0)	635.0 (25.0)	na	na	na
700S	11	889.0 (35.0)	2286.0 (90.0)	2349.5 (92.5)	635.0 (25.0)	696 (1535)	640 (1411)	661 (1457)

⁽¹⁾ Refer to drive User Manuals for location and size of motor lead knockouts.

1336 FORCE Frame H (NEMA UL/Type 1, IP20) to PowerFlex 700S Frame 12 MCC Style Enclosure (NEMA UL/Type 1, IP21) Dimensions

1336 FORCE

PowerFlex 700S



Drive	Frame	Dimensions ⁽¹⁾ mm (in.)						Weight kg (lbs.)		
		A	AA	AAA	B	BB	C	Drive (400V Class)	Drive (600V Class)	Drive & Packaging (600V Class)
1336T	H	1270 (50.0)	762.0 (30.0)	508.0 (20.0)	2324.1 (91.50)	2387.6 (94.00)	635 (25.0)	na	na	na
700S	12	1270 (50.0)	635 (25.0)	na	2286 (90.0)	2349.5 (92.5)	635 (25.0)	966 (2130)	888 (1958)	989 (2180)

⁽¹⁾ Refer to drive User Manuals for location and size of motor lead knockouts.

Specifications

Category	Specification	1336 FORCE Drive	PowerFlex 700S Phase II Drive Frames 1-6 (690V Drive frames 5 & 6 only)				PowerFlex 700S Phase II Drive Frames 9 & up			
Protection						600V / 690V (frames 5&6)				
	Drive Voltage Class	380-480V	500-600V	200-208V	240V	380/400V	480V	500V	600V	690V
	AC Input Overvoltage Trip:	570VAC	690VAC	300VAC	300VAC	600VAC	600VAC	675VAC	889VAC	889VAC
	AC Input Undervoltage Trip:	280VAC	343VAC	—	—	—	—	—	—	—
	Bus Overvoltage Trip:	810VDC	975VDC	405VDC	405VDC	810VDC	810VDC	911VDC	1200VDC	1200VDC
	Bus Undervoltage Trip:	400VDC	498VDC							
	Nominal Bus Voltage:			281VDC	324VDC	540VDC	648VDC	810VDC	931VDC	Adjustable
								648VDC	810VDC	931VDC
	All Frames	1336 FORCE Drive	PowerFlex 700S Phase II Drive							
	Heat Sink Thermistor:	Monitored by microprocessor overtemp trip	Monitored by microprocessor overtemp trip							
	Drive Overcurrent Trip	—								
	Software Current Limit:	—	Calculated value, 105% of motor rated to 200% of drive rated							
	Hardware Current Limit:	220% of rated output current	105% of 3 sec. rating (158%-210%)							
	Instantaneous Curr. Limit:	—	143% of 3 sec rating (215%-287%)							
	Line Transients:	up to 6000 volts peak per IEEE C62.41-1991	Up to 6000 volts peak per IEEE C62.41-1991							
	Control Logic Noise Immunity:	Showering arc transients up to 1500V peak	Showering arc transients up to 1500V peak							
	Power Ride-Thru:	15 milliseconds at full load	15 milliseconds at full load							
	Logic Control Ride-Thru	0.5 second minimum, 2 seconds typical	0.25 sec., drive not running							
	Ground Fault Trip:	Phase-to-ground on drive output	Phase-to-ground on drive output							
	Short Circuit Trip:	Phase-to-phase on drive output	Phase-to-phase on drive output							

1336 FORCE™ To PowerFlex® 700S Phase II AC Drive Conversion Guide

Category	Specification	1336 FORCE Drive	PowerFlex 700S Phase II Drive Frames 1-6 (690V Drive frames 5 & 6 only)	PowerFlex 700S Phase II Drive Frames 9 & up
Agency Certification		—	The drive is designed to meet applicable requirements of the following codes/standards: IEC 61800-2 Adjustable speed electrical power drive systems - General requirements IEC 61800-5-1 Adjustable speed electrical power drive systems - Safety requirements NFPA 70 – US National Electric Code NEMA 250 – Enclosures for Electrical Equipment UL and cUL Listed to UL508C and CAN/CSA - 22.2 No. 14-95	The drive is designed to meet applicable requirements of the following codes/standards: IEC 61800-2 Adjustable speed electrical power drive systems - General requirements IEC 61800-5-1 Adjustable speed electrical power drive systems - Safety requirements NFPA 70 - US National Electrical Code
c-UL-us	UL and cUL Listed to UL508C and CAN/CSA - 22.2 No. 14-95			
CE	Marked for all applicable European Directives: * Emissions EN 55011 Class B Immunity EN 50082-1 EN 50082-2 IEC 801-2, 3, 4 per EN50082-1, 2 * Installation guidelines detailed in Appendix B of the 1336 FORCE User Manual, publication 1336 FORCE 5.0, must be strictly followed.	Marked for all applicable European Directives: EMC Directive (89/336/EEC) Emissions EN 61800-3 Adjustable Speed electrical power drive systems Part 3 Immunity EN 61800-3 Second Environment, Restricted Distribution Low Voltage Directive (73/23/EEC) EN 50178 Electronic Equipment for use in Power Installations	Marked for all applicable European Directives: EMC Directive (89/336/EEC) Emissions EN 61800-3 Adjustable Speed electrical power drive systems Part 3 Low Voltage Directive (73/23/EEC) EN 50178 Electronic Equipment for use in Power Installations	
C-Tick	—	—	—	Certified to AS/NZS, 1997 Group 1, Class A.
ATEX	—	—	Certified to ATEX directive 94/9/EC. Group II Category (2) GD Applications with ATEX Approved Motors.	
TUV	—	—	TUV Rheinland (applies to frames 1 - 6, 200/400V, and frames 5 & 6, 690V only) TUV Functional Safety Report only for frames 1 - 4, 600V (no FS mark on the label)	TUV functional safety report only (no FS mark on the label)

1336 FORCE™ To PowerFlex® 700S Phase II AC Drive Conversion Guide

Category	Specification	1336 FORCE Drive	PowerFlex 700S Phase II Drive Frames 1-6 (690V Drive frames 5 & 6 only)	PowerFlex 700S Phase II Drive Frames 9 & up																																																								
Environment	Altitude:	1000 m (3300 ft) max. without derating.	1000 m (3300 ft.) max. without derating.																																																									
	Surrounding Air Temp. without Derating:																																																											
	IP00, Open Type:	0 to 50° C (32 to 122° F)	0 to 50° C (32 to 122° F)	Based on drive rating.																																																								
	IP20, NEMA Type 1:	0 to 40° C (32 to 104° F)	0 to 40° C (32 to 104° F)	Based on drive rating.																																																								
	IP56, NEMA Type 4X:	—	0 to 40° C (32 to 104° F)	Frames 9 & 10: 0 to 40° C (32 to 104° F) surrounding air.																																																								
	IP65, NEMA Type 4	0 to 40° C (32 to 104° F)	—	—																																																								
	Storage Temperature (all const.):	–40 to 70° C (–40 to 158° F)	–40 to 70° C (–40 to 158° F)																																																									
	Relative Humidity:	5 to 95% non-condensing	5 to 95% non-condensing																																																									
	Shock:	15G peak for 11ms duration (±1.0 ms)	10G peak for 11 ms duration (± 1.0 ms)																																																									
	Vibration:	0.152 mm (0.006 in.) displacement, 1G peak	0.152 mm (0.006 in.) displacement, 1G peak, 5.5 Hz	2 mm (0.0787 in.) displacement, 1G peak EN50178 / EN60068-2-6																																																								
	Sound	—	<table><tr><th>Frame</th><th>Fan Speed</th><th>Sound Level</th><th>Note: Sound pressure level is measured at 2 meters.</th><th>Frame</th><th>Sound Level</th><th>Background Noise Level</th><th>Notes: Sound pressure level is measured at 1 meter. All devices measured are 400V IP21 and in power up mode.</th></tr><tr><td>1</td><td>30 CFM</td><td>59 dB</td><td></td><td>9</td><td>78</td><td>49</td><td></td></tr><tr><td>2</td><td>50 CFM</td><td>57 dB</td><td></td><td>10</td><td>77</td><td>49</td><td></td></tr><tr><td>3</td><td>120 CFM</td><td>61 dB</td><td></td><td>13</td><td>76</td><td>46</td><td></td></tr><tr><td>4</td><td>190 CFM</td><td>59 dB</td><td></td><td></td><td></td><td></td><td></td></tr><tr><td>5</td><td>200 CFM</td><td>71 dB</td><td></td><td></td><td></td><td></td><td></td></tr><tr><td>6</td><td>300 CFM</td><td>72 dB</td><td></td><td></td><td></td><td></td><td></td></tr></table>	Frame	Fan Speed	Sound Level	Note: Sound pressure level is measured at 2 meters.	Frame	Sound Level	Background Noise Level	Notes: Sound pressure level is measured at 1 meter. All devices measured are 400V IP21 and in power up mode.	1	30 CFM	59 dB		9	78	49		2	50 CFM	57 dB		10	77	49		3	120 CFM	61 dB		13	76	46		4	190 CFM	59 dB						5	200 CFM	71 dB						6	300 CFM	72 dB						
	Frame	Fan Speed	Sound Level	Note: Sound pressure level is measured at 2 meters.	Frame	Sound Level	Background Noise Level	Notes: Sound pressure level is measured at 1 meter. All devices measured are 400V IP21 and in power up mode.																																																				
	1	30 CFM	59 dB		9	78	49																																																					
	2	50 CFM	57 dB		10	77	49																																																					
	3	120 CFM	61 dB		13	76	46																																																					
	4	190 CFM	59 dB																																																									
	5	200 CFM	71 dB																																																									
6	300 CFM	72 dB																																																										
Atmosphere	—	Important: Drive must not be installed in an area where the ambient atmosphere contains volatile or corrosive gas, vapors or dust. If the drive is not going to be installed for a period of time, it must be stored in an area where it will not be exposed to a corrosive atmosphere.																																																										
Electrical	AC Input	See PowerFlex 700S Input Voltage Range/Tolerance on page 59 for Full Power and Operating Range																																																										
	Voltage Tolerance:	±10% of minimum/maximum																																																										
	Frequency Tolerance:	48-62 Hz.	47-63 Hz																																																									
	Input Phases:	Three-phase input provides full rating for all drives. Single-phase operation provides 50% of rated current.	Three-phase input provides full rating for all drives. Single-phase operation provides 50% of rated current.																																																									
	DC Input																																																											
	Voltage Tolerance	—	±10% of Nominal Bus Voltage (above)																																																									
	Displacement Power Factor:	5.5-597 kW (7.5-800 HP): 0.95	0.98 across speed range																																																									
	Efficiency:	97.5% at rated amps, nominal line volts.	97.5% at rated amps, nominal line volts.																																																									
	Max. Short Circuit Current Rating:	≤200,000 Amps, 600V, using recommended fuse or circuit breaker type.	≤200,000 Amps, using recommended fuse or circuit breaker type.																																																									
	Maximum Drive to Motor Power Ratio	—	The drive to motor rating cannot exceed a 2:1 ratio																																																									

1336 FORCE™ To PowerFlex® 700S Phase II AC Drive Conversion Guide

Category	Specification	1336 FORCE Drive	PowerFlex 700S Phase II Drive Frames 1-6 (690V Drive frames 5 & 6 only)	PowerFlex 700S Phase II Drive Frames 9 & up
Control	Method	Indirect Self-Organized, Field-Oriented Control, Current-regulated, sine coded PWM with programmable carrier frequency.	Indirect Self-Organized, Field-Oriented Control, Current-regulated. Ratings apply to all drives. Refer to the <i>PowerFlex® 700S - Phase II Control Reference Manual</i> , publication PFLEX-RM003, for derating guidelines. The drive can be supplied as 6 pulse or 12 pulse in a configured package.	Sine coded PWM with programmable carrier frequency.
	Induction Motor:			
	Brushless Motor:			
	Carrier Frequency	HP Drive RatingCarrier Frequency 1–604 kHz 1–12 kHz 15–2502 kHz1–6 kHz 300–5002 kHz1–4 kHz 600–6501.5 kHz1–4 kHz 700–8001 kHz1–4 kHz	Drive ratings: 4 kHz Settings: 2, 4, 6, 8, 10 kHz (6 kHz is for V/Hz operation only)	Drive ratings: 2 kHz Settings: 2, 4, 6, 8, 10 kHz (6 kHz is for V/Hz operation only)
	Output Voltage Range:	0 to rated motor voltage	0 to rated motor voltage	
	Output Frequency Range:	0 to 250 Hz.	0 – 400 Hz	0 – 400 Hz Note: For output frequencies above 320 - 400 Hz consult the factory.
	Speed Control	Speed Regulation – without encoder feedback 1% of top speed over a 40:1 speed range Speed regulation - with encoder feedback 0.001% of top speed over a 100:1 speed range	Speed regulation - without feedback 0.1% of base speed across 120:1 speed range 120:1 operating range 50 rad/sec bandwidth Speed regulation - with feedback 0.001% of base speed across 120:1 speed range 1000:1 operating range 744 rad/sec bandwidth	Speed regulation - without feedback 0.1% of base speed across 120:1 speed range 120:1 operating range 50 rad/sec bandwidth Speed regulation - with feedback 0.001% of base speed across 120:1 speed range 1000:1 operating range 300 rad/sec bandwidth
	Torque Regulation	Torque Regulation - without feedback +/-5% of rated motor torque —	Torque Regulation - without feedback +/-5%, 600 rad/sec bandwidth Torque Regulation - with feedback +/-2%, 2500 rad/sec bandwidth	Torque Regulation - without feedback +/-10%, 600 rad/sec bandwidth Torque Regulation - with feedback +/-5%, 2500 rad/sec bandwidth
	Selectable Motor Control:	Field Oriented Control with and without a feedback device. Multiple programmable stop modes including – Ramp, Coast and Current Limit	Field Oriented Control with and without a feedback device and permanent magnet motor control Multiple programmable stop modes including – Ramp, Coast and Current Limit	
	Stop Modes:	Multiple programmable stop modes including – Ramp, Coast and Current Limit		
	Accel/Decel	Independently programmable accel and decel times adjustable from 0 to 6553.5 in 0.1 second increments.	Independently programmable accel and decel times adjustable from 0 to 6553.5 in 0.1 second increments.	
	S-Curve Time	—	Adjustable from 0.5 to 4.0 seconds	
	Intermittent Overload:	150% for 1 minute 200% of motor rating for 10 secs - up to inverter limit	110% Overload capability for up to 1 minute 150% Overload capability for up to 3 seconds	
	Current Limit Capability:	Programmable from 200% of rated output current	Independent Motoring and Regenerative Power Limits programmable to 800% of rated output current	
	Electronic Motor Overload Protection	Programmable Motor Overload Protection (I ² T) investigated by UL to comply with NEC Article 430	Provides class 10 motor overload protection according to NEC article 430 and motor over-temperature protection according to NEC article 430.126 (A) (2). UL 508C File E59272.	

1336 FORCE™ To PowerFlex® 700S Phase II AC Drive Conversion Guide

Category	Specification	1336 FORCE Drive	PowerFlex 700S Phase II Drive Frames 1-6 (690V Drive frames 5 & 6 only)	PowerFlex 700S Phase II Drive Frames 9 & up
Feedback	Encoder Inputs:	Incremental, dual channel, isolated with differential transmitter, Quadrature: 90° ±27° @ 25°C, Duty Cycle: 50% + 10%.	Two dual channel plus marker, isolated with differential transmitter output (line drive) incremental, dual channel quadrature type.	
	Encoder PPR Rating:	—	Encoder PPR ratings are limited to the values specified in the table below:	
			PPR Rating Values:	
			$n = \frac{2^n}{x}$	$\frac{2^n}{x}$
			mod 75	mod 125
			1	1
			2	2
			4	4
			8	8
			16	16
			32	32
			64	64
			128	128
			256	256
			512	512
			1024	1024
			2048	2048
			4096	4096
			8192	8192
			16384	16384
	Encoder Voltage Supply:	12V DC, 500 mA 5V or 12V, 10mA Min. Inputs	5V DC or 12 V DC 320 mA/channel 5V DC minimum high state voltage of 3.0V DC, maximum low state voltage at 0.4V DC 12 V DC minimum high state voltage of 7.0V DC, maximum low state voltage of 0.4V DC	5V DC or 12 V DC 320 mA/channel 5V DC minimum high state voltage of 3.0V DC, maximum low state voltage at 0.4V DC 12 V DC minimum high state voltage of 7.0V DC, maximum low state voltage of 0.4V DC
	Maximum Input Frequency:	102.5 kHz	400 kHz	400 kHz
	Stegmann Option:	—	—	—
	Encoder Volt. Supply:	—	11.5V DC @ 130 mA	11.5V DC @ 130 mA
	Hi-Resolution Fdbk.:	—	Sine/Cosine 1V P-P Offset 2.5	Sine/Cosine 1V P-P Offset 2.5
	Max. Cable Length:	—	182 m (600 ft.)	182 m (600 ft.)
	RS-485 Interface:	—	Hi-Resolution Feedback Option card obtains the following information via the Hiperface RS-485 interface shortly after power-up: Address, Command Number, Mode, Number of turns, Number of Sine/Cos cycles, Checksum	Hi-Resolution Feedback Option card obtains the following information via the Hiperface RS-485 interface shortly after power-up: Address, Command Number, Mode, Number of turns, Number of Sine/Cos cycles, Checksum
	Customer-I/O Plug (P1) - HI Res:	—	Allen-Bradley PN: S94262912 Weidmuller PN: BL3.50/90/12BK	Allen-Bradley PN: S94262912 Weidmuller PN: BL3.50/90/12BK
	Resolver Option:	—	—	—
	Excitation Frequency:	—	2400 Hz	2400 Hz
	Excitation Voltage:	—	4.25-26 Vrms	4.25-26 Vrms
	Operating Freq. Range:	—	1 - 10 kHz	1 - 10 kHz
	Resolver Fdbk Voltage:	—	2V ± 300 mV	2V ± 300 mV
	Max. Cable Length:	—	304.8 meters (1000 ft.)	304.8 meters (1000 ft.)

1336 FORCE™ To PowerFlex® 700S Phase II AC Drive Conversion Guide

Category	Specification	1336 FORCE Drive	PowerFlex 700S Phase II Drive Frames 1-6 (690V Drive frames 5 & 6 only)	PowerFlex 700S Phase II Drive Frames 9 & up
DriveLogix	User Available MemoryBase:	—	1.5 megabytes	
	Battery:		1769-BA 0.59g lithium	
	Serial Cable:		1761-CBLPM02 to 1761-NET-AIC	
			1761-CBLPA00 to 1761-NET-AIC	
			1756-CP3 directly to controller	
			1747-CP3 directly to controller	
	Compact I/O Connection: Cable:		category 3 (2)	
Up to (16) modules				
20D-DL2-CL3, 20D-DL2-CR3				

PowerFlex 700S Input Voltage Range/Tolerance

Drive Rating	Nominal Line Voltage	Nominal Motor Voltage	Drive Full Power Range	Drive Operating Range
200-240	200	200†	200-264	180-264
	208	208	208-264	
	240	230	230-264	
380-400	380	380†	380-528	342-528
	400	400	400-528	
	480	460	460-528	
500-600 (Frames 1-4 Only)	600	575†	575-660	432-660
500-690 (Frames 5 & 6 Only)	600	575†	575-660	475-759
	690	690	690-759	475-759

Drive Full Power Range = Nominal Motor Voltage to Drive Rated Voltage + 10%.
Rated current is available across the entire Drive Full Power Range

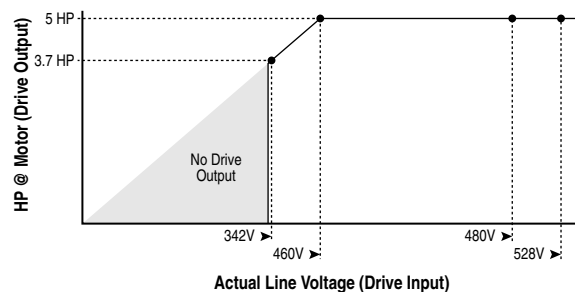
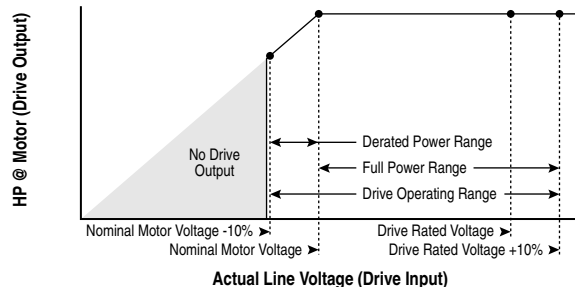
Drive Operating Range = Lowest† Nominal Motor Voltage - 10% to Drive Rated Voltage + 10%.
Drive Output is linearly derated when Actual Line Voltage is less than the Nominal Motor Voltage

Example:

Calculate the maximum power of a 5 HP, 460V motor connected to a 480V rated drive supplied with 342V Actual Line Voltage input.

- Actual Line Voltage / Nominal Motor Voltage = 74.3%
- $74.3\% \times 5 \text{ HP} = 3.7 \text{ HP}$
- $74.3\% \times 60 \text{ Hz} = 44.6 \text{ Hz}$

At 342V Actual Line Voltage, the maximum power the 5 HP, 460V motor can produce is 3.7 HP at 44.6 Hz.



Reference Materials

The following publications provide general drive information.

Title	Publication	Available...
Wiring and Grounding for PWM AC Drives	DRIVES-IN001...	www.rockwellautomation.com/literature
Safety Guidelines for the Application, Installation and Maintenance of Solid State Control	SGI-1.1...	
A Global Reference Guide for Reading Schematic Diagrams	100-2.10...	
Guarding Against Electrostatic Damage	8000-4.5.2...	

The following publications provide detailed PowerFlex® 700S drive information:

Title	Publication	Available...
PowerFlex 700S Reference Manual, Phase II Control	PFLEX-RM003...	www.rockwellautomation.com/literature
PowerFlex 700S User Manual, Phase II Control	20D-UM006...	
PowerFlex 700S Quick Start, Phase II Control (Frames 1 - 6)	20D-QS002...	
PowerFlex 700S and 700H Installation Instructions (Frames 9 - 13)	PFLEX-IN006...	

The following publications provide necessary information when applying the DriveLogix Controller.:

Title	Publication	Available...
DriveLogix5730 Controller User Manual	20D-UM003...	www.rockwellautomation.com/literature
PowerFlex 700S Drive & DriveLogix Controller	20D-RN007...	
Logix5000 Controllers Common Procedures	1756-PM001...	
Logix5000 Controllers General Instructions	1756-RM003...	
Logix5000 Controllers Process Control and Drives Instructions	1756-RM006...	
RSLogix 5000 Getting Results	9399-RLD300GR...	
RSNetworx for ControlNet Getting Results	9398-CNETGR...	
RSLink Getting Results Guide	9399-LINXGR...	

For Allen-Bradley Drives Technical Support:

Title	Online at...
Allen-Bradley Drives Technical Support	www.rockwellautomation.com/literature or call M-F, 7:00a.m. to 7:00p.m. Central STD time: 1.262.512.8176

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