PowerFlex 700S Drive Frames 1...6 to PowerFlex 755TS Drive Frames 1...6

700S Catalog Number 20D
755TS Catalog Number 20G2, 20GE

Allen-Bradley
by ROCKWELL AUTOMATION

Migration Guide

Original Instructions

Important User Information

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

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

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

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

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

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

Reproduction of the contents of this manual, in whole or in part, without written permission of Rockwell Automation, Inc., is prohibited.

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

WARNING: Identifies information about practices or circumstances that can cause an explosion in a hazardous environment, which may lead to personal injury or death, property damage, or economic loss.

ATTENTION: Identifies information about practices or circumstances that can lead to personal injury or death, property damage, or economic loss. Attentions help you identify a hazard, avoid a hazard, and recognize the consequence.

IMPORTANT Identifies information that is critical for successful application and understanding of the product.

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

SHOCK HAZARD: Labels may be on or inside the equipment, for example, a drive or motor, to alert people that dangerous voltage may be present.

BURN HAZARD: Labels may be on or inside the equipment, for example, a drive or motor, to alert people that surfaces may reach dangerous temperatures.

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

The following icon may appear in the text of this document.

Identifies information that is useful and can help to make a process easier to do or easier to understand.

Chapter 3

Communication Configuration

Chapter 4

Drive Configuration and Parameter Comparison

About This Publication

The purpose of this migration guide is to assist you in migrating a PowerFlex®700S Phase II, frame 1...6 drive to an equivalent PowerFlex 755TS drive. Use this migration guide to help you understand some basic migration requirements.

To help you determine the proper migration solution, review additional product literature to understand the technical similarities and differences between the PowerFlex 700S Phase II and the PowerFlex 755TS drive.

Download the installation instructions, technical data, programming, and other associated publications listed in Additional Resources on page 7. Many sections of this migration guide direct you to additional details and information available in these publications.

IMPORTANT Throughout this publication, the term PowerFlex 700S is used to describe the PowerFlex 700S with Phase II Control.

Download Firmware, AOP, EDS, and Other Files

Download firmware, associated files (such as AOP, EDS, and DTM), and access product release notes from the Product Compatibility and Download Center at rok.auto/pcdc.

Parameter References

PowerFlex 700S parameters are referenced in the format P*xxx* [*name*], where:

- *xxx* is the parameter number
- [*name*] is the parameter display name

In this document, PowerFlex 755TS ports, parameters, and bits are referenced in the format #:x.y [name], where:

- • # is the port number
- • x is the parameter number
- • [name] is the parameter display name
- • y is the bit number (if applicable).

EXAMPLE For example, referencing an I/O module that is installed in port 4, parameter 6 [Dig Out Invert], bit 1 (TransOut0) can be shown as 04:0006.01 [Dig Out Invert].

The leading zeroes and [name] can be omitted unless required to clarify the context.

This parameter can also be shown as 4:6.1, 4:6.01 [Dig Out Invert] or any other combination that shows the minimum port:parameter information.

Abbreviations

This table contains abbreviations that are used throughout this document.

Abbreviation	Description
(o)	Optional equipment
(s)	Standard, or included in base catalog number
AFE	Active Front End
AOP	Add On Profile
EMC	Electromagnetic Compatibility
EMC C2	Electromagnetic Compatibility Category 2 according to EMC Directive (2014/30/EU)
EMC C3	Electromagnetic Compatibility Category 3 according to EMC Directive (2014/30/EU)
EMI	Electromagnetic Interference
ESD	Electrostatic Discharge
HD	Heavy Duty Overload Rating
HIM	Human Interface Module
I/O	Input/Output
LSC	Line Side Converter
MCC	Motor Control Center
MOV	Metal Oxide Varistor
ND	Normal Duty Overload Rating
PWM	Pulse-width Modulated
RWR	Reflective Wave Reduction
SCCR	Short Circuit Current Rating
TAM	Torque Accuracy Module
TVSS	Transient Voltage Surge Suppressor
XLPE	Cross-linked Polyethylene

Integrated Architecture Tools

The Control Systems Configuration Tools can help you plan and configure a system, as well as migrate system architectures. For more information, go to: https://www.rockwellautomation.com/en-us/support/product/product-selection-configuration/control-systems-configuration-tools.html

Migration Services

Throughout the product lifecycle, as products mature, Rockwell Automation will be there as your partner to help you get the most out of your current equipment, to help you determine your next steps, and to help you lay out a plan for the transition to newer technology.

Whether you choose to migrate all at once or use our unique, phased approach to help minimize the costs, risks, and complexities involved with managing legacy products and systems, Rockwell Automation has the tools and the experience to guide you through the transition.

For more information, see Migration Solutions Brochure, publication MIGRAT-BR002.

Additional Resources

These documents contain additional information concerning related products from Rockwell Automation.

Resource	Description
PowerFlex 700S Drives with Phase II Control Technical Data, publication 20D-TD002	Provides detailed drive and option specifications, drive, fuse, and circuit breaker ratings, watts loss information, and derating guidelines.
PowerFlex 700S High Performance AC Drive - Phase II Control Programming Manual, publication 20D-PM001	Provides detailed PowerFlex 700S Phase II parameter descriptions, configuration settings, startup, and fault/alarm troubleshooting.
PowerFlex 700S AC Drives Phase II Control Reference Manual, publication PFLEX-RM003	This manual provides detailed PowerFlex 700S drive with Phase II control functions and application programming examples.
DriveLogix 5730 Controller for PowerFlex 700S Drives with Phase II Control User Manual, publication 20D-UM003	This publication provides guidance on the development of projects for DriveLogix controllers.
DriveGuard® Safe Torque Off Option for PowerFlex 700S Phase II AC Drives and PowerFlex 700L Liquid-Cooled AC Drives User Manual, publication 20D-UM007	Provides information that is needed to plan, install, and configure the DriveGuard Safe Torque Off option for PowerFlex 700S and 700L AC drives.
PowerFlex 700S Phase II, Frame 1...6, AC Drives Installation Instructions, publication 20D-IN024	This document provides information that is needed to install and wire a frame 1...6 PowerFlex 700S Phase II drive.
Drives in Common Bus Configurations with PowerFlex 755TM Bus Supplies Application Techniques, publication DRIVES-AT005	Provides basic information to properly wire and ground the following products in common bus applications: • PowerFlex 755TM common bus solutions • PowerFlex 750-Series AC and DC input drives • Kinetix 5700 servo drives
PowerFlex 755TS Products with TotalFORCE® Control Installation Instructions, publication 750-IN119	Provides the basic steps to install PowerFlex 755TS drives.
PowerFlex TotalFORCE Firmware Documentation Set: PowerFlex Drives with TotalFORCE Control Programming Manual, publication 750-PM101 PowerFlex Drives with TotalFORCE Control Parameters Reference Data, publication 750-RD101 PowerFlex Drives with TotalFORCE Control Conditions Reference Data, publication 750-RD102	Provides detailed information on: Startup, control algorithms, and status indicators Parameters and programming Faults, alarms, events, and troubleshooting
PowerFlex 755TS Products with TotalFORCE Control Technical Data, publication 750-TD104	Provides detailed information on: Drive and bus supply specifications Option specifications Fuse and circuit breaker ratings
PowerFlex 750-Series AC Drives with TotalFORCE Control Quick Start, publication 750-QS100	Provides the basic steps that are required to start up the following products for the first time, for simple applications: • PowerFlex 755TL low harmonic standalone AC drive • PowerFlex 755TR regenerative standalone AC drive • PowerFlex 755TS six-pulse rectifier standalone AC drive • PowerFlex 755TS wall-mount DC common bus inverter
PowerFlex 750-Series Drive DeviceNet Option Module User Manual, publication 750COM-UM002	These publications provide detailed information on how to configure, use, and troubleshoot PowerFlex 750-Series communication option modules and adapters.
PowerFlex 20-750-CNETC Coaxial ControlNet Option Module, publication 750COM-UM003	
PowerFlex 20-750-PBUS Profibus DPV1 Option Module, publication 750COM-UM004	
PowerFlex 20-750-BNETIP BACnet/IP Option Module, publication 750COM-UM005	
PowerFlex 20-750-PNET2P Profinet Dual-port Option Module, publication 750COM-UM007	
PowerFlex 20-750-ENETR Dual-port EtherNet/IP Option Module User Manual, publication 750COM-UM008	
PowerFlex 750-Series Drives with TotalFORCE Control Built-in EtherNet/IP Adapter User Manual, publication 750COM-UM009	
ControlNet to EtherNet/IP Migration Reference Manual, publication CNET-RM001	Provides information to migrate from an existing ControlNet network to an EtherNet/IP network.
PowerFlex 750-Series I/O, Feedback, and Power Option Modules Installation Instructions, publication 750-IN111-EN-P	Provides detailed information on PowerFlex 750-Series I/O, feedback, and power option modules.
PowerFlex 20-HIM-A6 and 20-HIM-C6S HIM (Human Interface Module) User Manual, publication 20HIM-UM001	Provides detailed information on the Human Interface Module (HIM).
PowerFlex 750-Series ATEX Option Module User Manual, publication 750-UM003	Provides information on using the 20-750-ATEX option module.
PowerFlex 755T Flux Vector Tuning Application Technique, publication 750-AT006	Provides information about adaptive features and optimizing regulator tuning.
Drives in Common Bus Configurations Application Technique, publication DRIVES-AT002	Provides detailed application techniques for the design and installation of common bus drive systems.
Wiring and Grounding for Pulse Width Modulated (PWM) AC Drives Installation Instructions, publication DRIVES-IN001	Provides detailed installation guidelines and recommendations for PWM AC drive equipment.
Industry Installation Guidelines for Pulse Width Modulated (PWM) AC Drives Application Technique, publication DRIVES-AT003	Provides basic information on enclosure systems, considerations to help protect against environmental contaminants, and power and grounding considerations for installing Pulse Width Modulated (PWM) AC drives.
Industrial Automation Wiring and Grounding Guidelines, publication 1770-4.1	Provides general guidelines for installing a Rockwell Automation industrial system.

Resource (Continued)	Description (Continued)
Safety Guidelines for the Application, Installation, and Maintenance of Solid-State Control, publication SGI-1.1	Provides general guidelines for the application, installation, and maintenance of solid-state control.
Guarding Against Electrostatic Damage, publication 8000-4.5.2	Provides practices for guarding against Electrostatic damage (ESD)
EtherNet/IP Network Devices User Manual, ENET-UM006	Describes how to configure and use EtherNet/IP devices to communicate on the EtherNet/IP network.
Ethernet Reference Manual, ENET-RM002	Describes basic Ethernet concepts, infrastructure components, and infrastructure features.
System Security Design Guidelines Reference Manual, SECURE-RM001	Provides guidance on how to conduct security assessments, implement Rockwell Automation products in a secure system, harden the control system, manage user access, and dispose of equipment.
UL Standards Listing for Industrial Control Products, publication CMPNTS-SR002	Assists original equipment manufacturers (OEMs) with construction of panels, to help ensure that they conform to the requirements of Underwriters Laboratories.
American Standards, Configurations, and Ratings: Introduction to Motor Circuit Design, publication IC-AT001	Provides an overview of American motor circuit design based on methods that are outlined in the NEC.
Industrial Components Preventive Maintenance, Enclosures, and Contact Ratings Specifications, publication IC-TD002	Provides a quick reference tool for Allen-Bradley® industrial automation controls and assemblies.
Product Certifications website, rok.auto/certifications	Provides declarations of conformity, certificates, and other certification details.

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

Replacement Considerations

Before proceeding with detailed migration guidelines, see Compatibility Quick Check on page 16 to verify that you can migrate your PowerFlex® 700S drive. You must consider the hardware and control differences between the drives. This chapter describes some of the primary differences.

Benefits of Migration

PowerFlex 755TS drives deliver TotalFORCE® Technology to standard and premium six-pulse drive applications. TotalFORCE Technology combines high-performance motor control, advanced self-monitoring capabilities, and a contemporary digital platform to deliver more precise and responsive AC drives. In addition to TotalFORCE Technology, PowerFlex 755TS drives enhance reliability, power density, environmental protection, and application flexibility.

The following are benefits of migrating to the 755TS drive:

- High-performance motor control with precise velocity, torque, and positioning
- Adaptive Tuning technology that simplifies commissioning and continually optimizes over the machine life
- Predictive diagnostics and maintenance settings to monitor drive and motor operating conditions to help analyze system health
- Lower total cost of ownership through improved efficiency and reliability
- Improved power density with higher output current
- Reduced downtime through improved reliability and predictive maintenance capabilities
- Support for extended ambient temperatures up to 60 °C (140 °F)
- Corrosive gas protection (XT) which improves reliability in environments with corrosive gases
- More secure authentication, improved communication integrity, and data confidentiality through CIP™ Security protocol
- Certification to leading UL61800-5-1 standards, which provide higher standards for verifying VFD equipment safety

Before You Begin

Complete the following worksheet with information about your PowerFlex 700S drive. See PowerFlex 700S Catalog Number Explanation on page 11 for an explanation of the catalog number.

PowerFlex 700S Drive Category	Your Drive...
Volts	
Amps	
Enclosure	
Dynamic brake	
Emissions	
Communications	
Control voltage - I/O	
Encoder feedback	
PLC control	
Safety	

Follow these steps to be sure that your migration is successful.

- Upload and save the PowerFlex 700S parameters via Connected Components Workbench™ or Studio 5000 Logix Designer® software. If you cannot connect to the drive online, manually record the parameter values.
- Record and label all power, digital, and analog I/O control wiring.
- Upload and save any network files and programmable controller programs.

Be aware of the following general precautions when working with this type of equipment. See the installation instructions for each drive for additional product-specific precautions. Applicable publication information can be found in Additional Resources on page 7.

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

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

PowerFlex 700S Catalog Number Explanation

The catalog number explanation for the PowerFlex 700S drive:

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
a	b	c	d	e	f	g	h	i	j	k	l	m

a

Drive	
Code	Type
20D	PowerFlex 700S

b

Voltage Rating			
Code	Amps	Ph.	Prechg.
B §	240V AC	3 (6 pulse)	–
C §	400V AC	3 (6 pulse)	–
D §	480V AC	3 (6 pulse)	–
E♣ §	600V AC	3 (6 pulse)	–
F ⌘	690V AC	3 (6 pulse)	–
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.

c1

ND Rating				
208/240V, 60Hz Input				
Code	208V Amps	240V Amps	Hp	Frame
4P2	4.8	4.2	1.0	1
6P8	7.8	6.8	2.0	1
9P6	11	9.6	3.0	1
015	17.5	15.3	5.0	1
022	25.3	22	7.5	1
028	32.2	28	10	2
042	48.3	42	15	3
052	56	52	20	3
070	78.2	70	25	4
080	92	80	30	4
104	120	104	40	5
130	130	130	50	5
154	177	154	60	6
192	221	192	75	6
260	260	260	100	6

c2

ND Rating			
400V, 50 Hz Input			
Code	Amps	kW	Frame
2P1	2.1	0.75	1
3P5	3.5	1.5	1
5P0	5.0	2.2	1
8P7	8.7	4.0	1
011	11.5	5.5	1
015	15.4	7.5	1
022	22	11	1
030	30	15	2
037	37	18.5	2
043	43	22	3
056	56	30	3
072	72	37	3
085	85	45	4
105	105	55	5
125	125	55	5
170	170	90	6
205	205	110	6
260	260	132	6
261	261	132	9
300	300	160	9
385	385	200	10
460	460	250	10
500	500	250	10
590	590	315	11
650	650	355	11
730	730	400	11
820	820	450	12
920	920	500	12
1K0	1030	560	12
1K1	1150	630	13
1K3	1300	710	13
1K4	1450	800	13

c3

ND Rating			
480V, 60 Hz Input			
Code	Amps	Hp	Frame
2P1	2.1	1.0	1
3P4	3.4	2.0	1
5P0	5	3.0	1
8P0	8	5.0	1
011	11	7.5	1
014	14	10	1
022	22	15	1
027	27	20	2
034	34	25	2
040	40	30	3
052	52	40	3
065	65	50	3
077	77	60	4
096	96	75	5
125	125	100	5
156	156	125	6
180	180	150	6
248	248	200	6
261	261	200	9
300	300	250	9
385	385	300	10
460	460	350	10
500	500	450	10
590	590	500	11
650	650	500	11
730	730	600	11
820	820	700	12
920	920	800	12
1K0	1030	900	12
1K1	1150	1000	13
1K3	1300	1200	13
1K4	1450	1250	13

c4

ND Rating			
600V, 60 Hz Input ♣			
Code	Amps	Hp	Frame
1P7	1.7	0	1
2P7	2.7	2	1
3P9	3.9	3	1
6P1	6.1	5	1
9P0	9	7.5	1
011	11	10	1
017	17	15	1
022	22	20	2
027	27	25	2
032	32	30	3
041	41	40	3
052	52	50	3
062	62	60	4
077	77	75	5
099	99	100	5
125	125	125	6
144	144	150	6
170	170	150	9
208	208	200	9
261	261	250	10
325	325	350	10
385	385	400	10
416	416	450	10
460	460	450	11
502	502	500	11
590	590	600	11
650	650	700	12
750	750	800	12
820	820	900	12
920	920	1000	13
1K0	1030	1100	13
1K1	1180	1300	13
1K5	1500	1600	14

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

d

Enclosure	
Code	Description
A ✳	IP20/IP21, NEMA Type 1, with Conformal Coat
B §	IP20, NEMA Type 1, MCC, with Conformal Coat
H §	IP54, NEMA Type 12, Rittal, with Conformal Coat
N ✦	Open/IP00, with Conformal Coat

✳ IP20 for Frames 1...6, IP21 for Frames 9 & up.
§ Frames 10 & up only.
✦ Frames 9 & up only.

e

HIM	
Code	Operator Interface
0	Blank Cover
3	Full Numeric LCD
C	Full Numeric LCD, Door Mount ❁

❁ Frames 10 & up only.

c5

ND Rating			
690V, 50 Hz Input ♣			
Code	Amps	kW	Frame
052	52	45	5
060	60	55	5
082	82	75	5
098	98	90	5
119	119	110	6
142	142	132	6
170	170	160	9
208	208	200	9
261	261	250	10
325	325	315	10
385	385	355	10
416	416	400	10
460	460	450	11
502	502	500	11
590	590	560	11
650	650	630	12
750	750	710	12
820	820	800	12
920	920	900	13
1K0	1030	1000	13
1K1	1180	1100	13
1K5	1500	1500	14

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

f

Documentation	
Code	Documents
E	English Manual
N	No Documentation

g

Brake	
Code	with 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	with Resistor
Y	Yes ✳
N	No

✳ Not available for Frame 3 drives or larger.

i

Emission			
Code	CE Filter ♣	CM Choke	du/dt Filter
A ❖	Yes	Yes	No
B ➢	Yes	No	No
E ✦	Yes	No	Yes
N §	No	No	No

❖ Frames 1...6 only.
➢ Frames 9 & up only.
§ For use on a high resistive ground, an ungrounded distribution system, or a B phase grounded distribution system (Frame 9 only).
♣ Note: CE Certification testing has not been performed on 600V class drives Frames 1...4.
✦ Frame 14 only.

j

Comm Slot	
Code	Version
N	None
C	DPI ControlNet (Coax)
D	DPI DeviceNet
E	DPI EtherNet/IP
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	Logix Expansion	Synchlink	Cassette
A	No	No	Expanded
B	No	Yes	Expanded
C	Yes	No	Expanded
D	Yes	Yes	Expanded
G ✦	N/A	No	Slim
H ✦	N/A	Yes	Slim

✳ Phase II Contol available only.
✦ Frames 1...9 only.

l

Feedback	
Code	Option
N ⌘	Standard (Incremental Encoder)
A ❖	Resolver
B ❖	Stegmann Hi-Resolution Encoder
C ❖	Multi-Device Interface
E ❖	2nd Encoder
S ❖	Safe-Off (w/2nd Encoder)
T ❖	Stegmann Hi-Res Enc. (w/2nd Encoder)
U ❖	Stegmann Hi-Res Enc. (w/Safe-Off)

⌘ One encoder interface included with base drive.
❖ Expanded cassette required.

m

Additional Config.	
Code	Description
E	Phase II Control
K	Phase II DriveLogix5730
L ✦	Phase II DriveLogix5730 with EtherNet/IP

✦ This is an embedded EtherNet/IP option that is only available with DriveLogix5730.

PowerFlex 755TS Drive Catalog Number Explanation

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

1...3	4	5	6	7	8...10	11	12	13	14	15	16	17	18
20G	2	A	N	D	248	J	N	0	N	N	N	N	N
A	B	C	D	E									

A

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

B

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

C

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

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

D

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

(1) For Frames 6...7, a user installed flange kit (20-750-FLNG4-Fx) is available to convert a Code N drive that provides a NEMA/UL Type 4X/12 back.
(2) Frames 2...5 are IP20, Frames 6...7 are IP00.

E

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

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

1…3	4	5	6	7	8…10	11	12	13	14	15	16	17	18
20G	2	A	N	D	248	J	N	0	N	N	N	N	N
					F1…F2								

F1

PowerFlex 755TS ND Drive Ratings

400V, 50 Hz Input

Code	Amps	kW	Frame			
			Enclosure Code			
			F	G	N	R
2P1	2.1	0.75	2	2	2	1
3P5	3.5	1.5				
5P0	5.0	2.2				
8P7	8.7	4				
011	11.5	5.5				
015	15.4	7.5				
022	22	11				–
030	30	15	3	3	3	
037	37	18.5				
043	43	22				
060	60	30	4	4	4	
061	61	30	–	–	3	
072	72	37	4	5	4	
073	73	37	–	4	–	
085	85	45	5	5	5	
086	86	45	4	–	4	
104	104	55	5	6	5	
140	140	75	6(1)		6	
170	170	90				
205	205	110				
260	260	132		7		
302	302	160	7(1)		7	
367	367	200				
456	456	250				
477	477	270		–		

F2

PowerFlex 755TS ND Drive Ratings

480V, 60 Hz Input

Code	Amps	Hp	Frame			
			Enclosure Code			
			F	G	N	R
2P1	2.1	1	2	2	2	1
3P4	3.4	2				
5P0	5.0	3				
8P0	8.0	5				
011	11	7.5				
014	14	10				
022	22	15				–
027	27	20	3	3	3	
034	34	25				
040	40	30				
052	52	40	4	4	4	
053	53	40	–	–	3	
065	65	50	4	5	4	
066	66	50	–	4	–	
077	77	60	5	5	5	
078	78	60	4	–	4	
096	96	75	5	6	5	
125	125	100	6(1)		6	
156	156	125				
186	186	150				
248	248	200		7		
302	302	250	7(1)		7	
361	361	300				
415	415	350				
477	477	400		–		

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

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

1...3	4	5	6	7	8...10	11	12	13	14	15	16	17	18
20G	2	A	N	D	248	J	N	0	N	N	N	N	N
						G	H	I					

G

Filtering and CM Cap Configuration			
Code	**Filtering**	**Default CM Cap Connection**	**Frames**
J	Yes	Jumper Installed	1...7

H

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

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

I

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

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

1...3	4	5	6	7	8...10	11	12	13	14	15	16	17	18
20G	2	A	N	D	248	J	N	0	N	N	N	N	N

Compatibility Quick Check

Use the following comparison table to determine if there are compatible PowerFlex 755TS products available to migrate your existing PowerFlex 700S drive. If your existing PowerFlex 700S installation does not have any configuration exceptions, proceed to use the guidelines in this migration guide. Contact an Authorized Rockwell Automation Distributor specialist, Solution Partner, Recognized System Integrator, or Rockwell Automation account manager for custom migration solutions.

Table 1 - Comparison Quick Check Considerations

Consideration	If You Have These Existing PowerFlex 700S Drive Configuration Exceptions	Then Follow These Recommendations for the PowerFlex 755TS Drive Migration
AC Line Voltage	200...240V AC, 3 PH, AC nput 600...690V AC, 3 PH, AC input	Not available at initial product release.
If internal braking is not sufficient	Brake IGBT is standard on frames 0...3 and optional on frames 4...6. See the catalog number for frames 4...6.	Braking transistor, DC+/DC- terminals, and BR1/BR2 terminals are standard on frames 1...5 but optional on frames 6 and 7. For frame 6 and 7 drives, order a bus bar kit to connect an external braking module: • 20-750-DCBB1-F6: bus bar kit for frame 6 • 20-750-DCBB1-F7: bus bar kit for frame 7 See Dynamic Brake Considerations on page 31 for more information.
Resolver feedback device	Optional resolver feedback module	Requires third-party option module (AMCI RD750).
SynchLink™	SynchLink fiber-optic high-speed dedicated communication protocol, which is used for drive-to-drive or drive-to-controller communication links	See Transferring Data on page 62 for more information.
DriveLogix™ and Compact I/O™	Use of the DriveLogix controller or Compact I/O expansion capability	The PowerFlex 755TS drive does not have an option for an embedded Logix controller. If DriveLogix was used in the PowerFlex 700S drive that is being converted, then CompactLogix™ or ControlLogix® will be required to implement the functionality. See PowerFlex 700S DriveLogix 5730 Configurations on page 70 for more information on DriveLogix™.
Custom Packaging	IP00 open type units that are installed in non-standard enclosures.	This may require a custom migration solution. Custom migration solutions are not covered in this migration guide.
Communication Protocol	ControlNet® DeviceNet® EtherNet/IP™	The PowerFlex 755TS drive has embedded EtherNet/IP communications. Other communication protocols may be available through an optional communication option module. See Table 39 on page 62 for more information on the compatible communication option modules available.
	BACnet MS/IP ControlNet Fiber Optic HVAC Modbus RTU CANopen Interbus Modbus/TCP Remote I/O RS485 DF1	A custom migration solution or external communication protocol converter may be required.
PowerFlex 700S Phase I	Phase I Control	This migration guide only pertains to PowerFlex 700S Phase II migrations.
Branch Circuit Protection	Designed to meet UL 508C.	Not designed to meet UL 508C. Is designed to meet UL 61800-5-1. Reconfiguration of branch circuit protection is needed. See PowerFlex 750TS Products with TotalFORCE Control Technical Data, publication 750-TD104, for more information.

Drive Overviews

The following are descriptions of each drive.

PowerFlex 700S

The PowerFlex 700S, catalog code 20D..., is a high-performance AC drive available in 14 frame sizes (frames 1...14). This migration guide provides information on frames 1...6. See PowerFlex 700S Phase II Drives to PowerFlex 755TL/TR Common Bus Inverters Migration guide, publication 750-RM004, for information on frames 9...14.

Two different input configurations:

- PowerFlex 700S standalone, 3-phase, AC input, 6-pulse drive
- PowerFlex 700S DC input drive (frames 5 and 6 are available with or without precharge; other frames only available without precharge)

Ten different input voltages:

- 240V AC/325V DC (frames 1...6 only)
- 400V AC/540V DC
- 480V AC/650V DC
- 600V AC/810V DC
- 690V AC/932V DC

And one packaging method:

- IP20 NEMA type 1, frames 1...6

The PowerFlex 700S drive supports several communication and feedback options. See Table 39 on page 62. Note that Safe Torque Off is supported as an option.

PowerFlex 755TS

The PowerFlex 755TS, catalog code 20G..., is a high-performance AC drive available in seven frame sizes (frames 1...7).

Two different input configurations:

- PowerFlex 755TS standalone, 3-phase, AC input, 6-pulse drive
- PowerFlex 755TS DC input drive (with precharge)

Four different input voltages (see Table 2 on page 18 for details):

- 400V AC/540V DC
- 480V AC/650V DC

And four packaging methods:

- IP20, UL open type, frame 1
- flange, UL type 4x/12 back, frames 2...5
- IP54, UL type 12, frames 2...7
- IP20/IP00, UL open type, frames 2...7

The PowerFlex 755TS supports several communication and feedback options. See Table 39 on page 62. PowerFLex 755TS drives support multiple functional safety options.

The following table aligns the voltage rating codes required for converting from the PowerFlex 700S drive to the PowerFlex 755TS drive. For example, because the PowerFlex 755TS drive is only available in 400/480V ratings, you

will need to select a PowerFlex 755TS drive voltage rating code C for a PowerFlex 700S voltage code H.

Table 2 - PowerFlex 700S Drive to 755TS Drive Voltage and Input Type Code Conversion

700S Voltage Code	755TS Voltage Code	755TS Input Type Code
C (400V AC Input)	C (400V AC Input)	Frames 1...5: 1 (AC input with precharge and DC terminals) Frames 6, 7: A (AC input type with precharge, no DC terminals)(1)
D (480V AC Input)	D (480V AC Input)	
H (540V DC Input, no precharge)	C (400V AC Input)	Frames 1...4:1 (AC input with precharge and DC terminals) Frames 5...7: 4 (DC Input with precharge)
J (650V DC input, no precharge)	D (480V AC Input)	
P (540V DC input with precharge)	C (400V AC Input)	
R (650V DC input with precharge)	D (480V AC Input)	

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

Drive Conversion Guide

Use the following tables to compare output power, output current, overload capacity, and dimensions when migrating your PowerFlex 700S drive to a PowerFlex 755TS drive. Because of the wide variety of possible migration options, we provide these tables as an example of how you can cross-reference your PowerFlex 700S drive rating to an equivalent PowerFlex 755TS drive. The shaded cells indicate different current ratings as a replacement for a previous sizing application.

Follow this procedure when using the tables.

1. Find the existing PowerFlex 700S input voltage (AC or DC), voltage class, and catalog number.
2. Use the row in the electrical rating cross-reference table with your PowerFlex 700S to see the catalog number and ratings of a suitable migration solution to PowerFlex 755TS drive.
3. Note the catalog number of the PowerFlex 755TS drive.
4. See the Drive Dimension Comparison Dimensions to see if the new drive is dimensionally compatible.

Reference all applicable footnotes at the end of each section.

Table 3 - PowerFlex 700S Drive to PowerFlex 755TS Drive Conversions – 400V AC

PowerFlex 700S Drive (1)							PowerFlex 755TS Drive Conversion (2)						
20D	Amps	HP (ND)	Frame	Height mm, (in.)	Width mm, (in.) (3)	Depth mm, (in.)	20G	Amps	HP (ND)	Frame	Height mm, (in.)	Width mm, (in.)	Depth mm, (in.)
2P1	2.1	0.75	1	336 (13.22)	100 (3.94)	200 (7.87)	2P1	2.1	0.75	2	424.4 (16.7)	134.5 (5.29)	212 (8.34)
3P5	3.5	1.5	1				3P5	3.5	1.5	2			
5P0	5.0	2.2	1				5P0	5.0	2.2	2			
8P7	8.7	4.0	1				8P7	8.7	4.0	2			
011	11.5	5.5	1				011	11.5	5.5	2			
015	15.4	7.5	1		135 (5.31)		015	15.4	7.5	2			
022	22	11	1				022	22	11	2			
030	30	15	2	342.5 (13.48)	222 (8.74)		030	30	15	3	454 (17.87)	190 (7.48)	
037	37	18.5	2				037	37	18.5	3			
043	43	22	3	517.5 (20.37)			043	43	22	3			
056	56	30	3				060	60	30	4	474 (18.66)	222 (8.74)	
–	–	–	–	–	–	–	061	61	30	3	454 (17.87)	190 (7.48)	
072	72	37	3	517.5 (20.37)	222 (8.74)	200 (7.87)	072	72	37	4	474 (18.66)	222 (8.74)	
085	85	45	4	759 (29.88)	220 (8.66)	202 (7.95)	085	85	45	5	550 (21.65)	270 (10.62)	
–	–	–	–	–	–	–	086	86	45	4	474 (18.66)	222 (8.74)	
105	105	55	5	644.5 (25.37)	308 (12.13)	275.4 (10.84)	105	105	55	5	550 (21.65)	270 (10.62)	
125	125	55	5				140	140	75	6	665.5 (26.2)	308 (12.12)	346.5 (13.64)
							140	140	75	6			
170	170	90	6	850 (33.46)(4)	404 (15.9)		170	170	90	6			
205	205	110	6				205	205	110	6			
260	260	132	6				260	260	132	6			

(1) All dimensions are IP20, NEMA/UL Type 1 unless specified otherwise.
(2) All dimensions are IP20, NEMA/UL Open type unless specified otherwise. For other frame sizes, including frame 1 and frame 7, and other enclosure types, see PowerFlex 755TS Products with TotalFORCE Control Technical Data, publication 750-TD104.
(3) Width listed is for slim cassette; expanded cassette is wider. See page 34...page 37 for dimensions with expanded cassette.
(4) Height dimension shown for a drive mounted in a cabinet; height dimension is 976.5 mm with required junction box if not cabinet mounted.

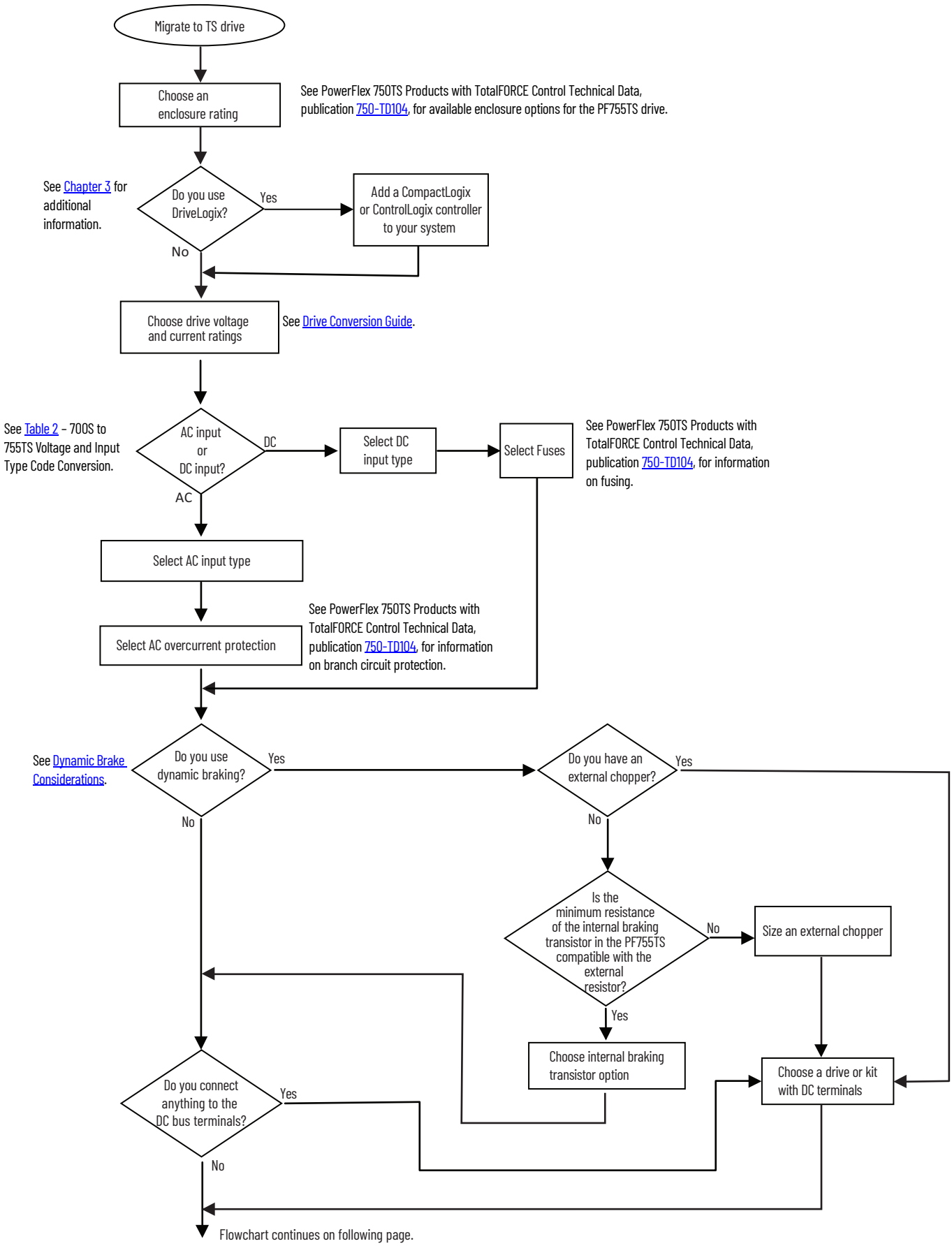
Table 4 - PowerFlex 700S Drive to PowerFlex 755TS Drive Conversions – 480V AC

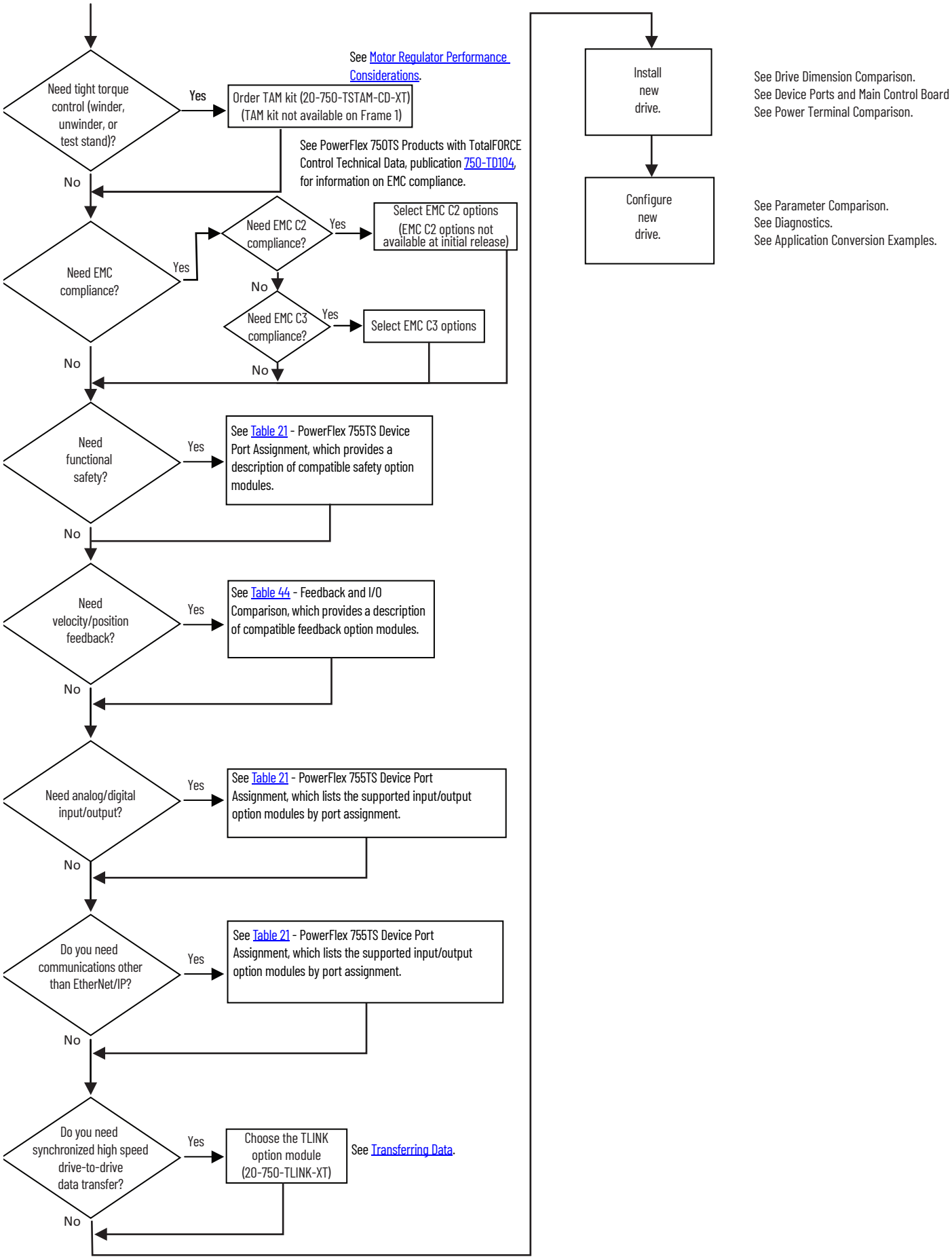
PowerFlex 700S Drive [1]							PowerFlex 755TS Drive Conversion[2]						
20D	Amps	HP (ND)	Frame	Height mm, (in.)	Width mm, (in.) [3]	Depth mm, (in.)	20G	Amps	HP (ND)	Frame	Height mm, (in.)	Width mm, (in.)	Depth mm, (in.)
1P1	1.1	0.5	1	336 (13.22)	135 (5.31)	200 (7.87)	–	–	–	–	–	–	–
2P1	2.1	1.0	1				2P1	2.1	1	2	424.4 (16.71)	134.5 (5.29)	212 (8.34)
3P4	3.4	2.0	1				3P4	3.4	2	2			
5P0	5.0	3	1				5P0	5.0	3	2			
8P0	8.0	5	1				8P0	8.0	5	2			
011	11	7.5	1				011	11	7.5	2			
014	14	10	1				014	14	10	2			
022	22	15	1				022	22	15	2			
027	27	20	2	342.5 (13.48)	222 (8.74)	200 (7.87)	027	27	20	3	454 (17.87)	190 (7.48)	
034	34	25	2				034	34	25	3			
040	40	30	3	517.5 (20.37)	222 (8.74)	200 (7.87)	040	40	30	3			
052	52	40	3				052	52	40	4	474 (18.66)	222 (8.74)	
–	–	–	–	–	–	–	053	53	40	3	454 (17.87)	190 (7.48)	
065	65	50	3	517.5 (20.37)	222 (8.74)	200 (7.87)	065	65	50	4	474 (18.66)	222 (8.74)	
077	77	60	4	759 (29.88)	220 (8.66)	202 (7.95)	077	77	60	5	555 (21.85)	270 (10.63)	
–	–	–	–	–	–	–	078	78	60	4	474 (18.66)	222 (8.74)	
096	96	75	5	689.6 (27.1)	309 (12.16)	275.5 (10.84)	096	96	75	5	555 (21.85)	270 (10.62)	
125	125	100	5				125	125	100	6	665.5 (26.2)	308 (12.12)	346.5 (13.64)
156	156	125	6	850 (33.46) [4]	404 (15.9)	275.5 (10.84)	156	156	125	6			
180	180	150	6				186	186	150	6			
248	248	200	6				248	248	200	6			

(1) All dimensions are IP20, NEMA/UL Type 1 unless specified otherwise.
(2) All dimensions are IP20/IP00, NEMA/UL Open type unless specified otherwise. For other frame sizes, including frame 1, and other enclosure types, see PowerFlex 750TS Products with TotalFORCE Control Technical Data, publication 750-TD104.
(3) Width listed is for SLIM cassette; expanded cassette is wider.
(4) Height dimension shown for a drive mounted in a cabinet; height dimension is 976.5 mm (38.4 in.) with required junction box if not cabinet-mounted.

Planning for Migration

Use the following flowchart to assist in your migration.




Need tight torque control (winder, unwinder, or test stand)?
Yes
Order TAM kit (20-750-TSTAM-CD-XT) (TAM kit not available on Frame 1)
See Motor Regulator Performance Considerations.
See PowerFlex 750TS Products with TotalFORCE Control Technical Data, publication 750-TD104, for information on EMC compliance.
No
Need EMC compliance?
Yes
Need EMC C2 compliance?
Yes
Select EMC C2 options (EMC C2 options not available at initial release)
No
Need EMC C3 compliance?
Yes
Select EMC C3 options
No
No
Need functional safety?
Yes
See Table 21 - PowerFlex 755TS Device Port Assignment, which provides a description of compatible safety option modules.
No
Need velocity/position feedback?
Yes
See Table 44 - Feedback and I/O Comparison, which provides a description of compatible feedback option modules.
No
Need analog/digital input/output?
Yes
See Table 21 - PowerFlex 755TS Device Port Assignment, which lists the supported input/output option modules by port assignment.
No
Do you need communications other than EtherNet/IP?
Yes
See Table 21 - PowerFlex 755TS Device Port Assignment, which lists the supported input/output option modules by port assignment.
No
Do you need synchronized high speed drive-to-drive data transfer?
Yes
Choose the TLINK option module (20-750-TLINK-XT)
See Transferring Data.
No
Install new drive.
See Drive Dimension Comparison.
See Device Ports and Main Control Board
See Power Terminal Comparison.
Configure new drive.
See Parameter Comparison.
See Diagnostics.
See Application Conversion Examples.

Specification Comparison

The following tables compare input power functionality, output power, environmental ratings, and certifications.

Table 5 - Input Power Comparison

Input I	700S	755TS
Single phase	Yes, 50% derate	Yes, 50% derate
Logic ride-through	0.5 s minimum, 2 s typical	0.5 s minimum,2 s typical
Power ride-through	15 ms	15 ms
Transient protection	MOV	MOV
DC input terminals	Frames 1...4: No Frames 5,6: Standard	Frames 1...4: Standard Frames 5...6: Optional

Table 6 - Output Power Comparison

Output Power	700S	755TS
Carrier frequency	All frames: 2, 4, 6, 8, and 10 kHz, derating may apply, see publication 20D-TD002	Frames 1...6: 2, 4, 8, and 12 kHz, derating may apply, see publication 750-TD104
Output frequency range	0...400 Hz	0...325 Hz at 2 kHz carrier 0...590 Hz at 4 kHz carrier
Efficiency	97.5% typical	97.5% typical
Power factor	0.98	0.98
Overload capability:		
Normal duty	110%-60 s, 150%-3 s	110%-60 s, 150%-3 s
Heavy duty	150%-60 s, 200%-3 s	150%-60 s, 180%-3 s

Consider the carrier frequency you need for your motor and application. Typically, it is recommended to set the PWM frequency at least 20 times the intended maximum frequency of the motor. See the derating tables for higher carrier frequencies and size your drive accordingly.

Table 7 - Environmental Ratings Comparison

Enclosure Type	Ambient Temperature Range	
	700S	755TS
Enclosure types and ambient temperature range:		
IP20, NEMA/UL Type Open	0...50 °C (32...122 °F) (1)	-20...+50 °C (-4...+122 °F) (2)
IP20, NEMA/UL Type 1 (with hood)	–	-20...+40 °C (-4...+104 °F) (2)
Flange enclosure types and ambient temperature range:		
Front		
IP20, NEMA/UL, Type Open	–	-20...+50 °C (-4...+122 °F) (2)
Back/heatsink		
IP20, NEMA/UL, Type Open	0...40 °C (32...104 °F) (2)	–
Stand-alone/wall mount		
IP54, NEMA/UL Type 12	–	-20...+40 °C (-4...+104 °F) (3)
Storage temperature range	-40...+70 °C (-40...+158 °F)	-40...+70 °C (-40...+158 °F)

(1) Frames 0...6 only.
(2) Frame 6.
(3) Frames 2...6 only.

Certifications

Certification[1]	PowerFlex 700S Frames 1...6[2]	PowerFlex 755TS Drives 1...6
Product certifications	Rockwell Automation maintains current product certification information on its website at: rok.auto/certifications	
CE	In conformity with these European Directives: EMC Directive (2014/30/EU) EN 61800-3 Low Voltage Directive (2014/35/EU) EN 61800-5-1 ATEX Directive (2014/34/EU) EC-Type-Examination Certificate Number TÜV 15 ATEX 7727 X EN 50495 Machinery Directive (2006/42/EC) EN 61800-5-2	In conformity with these European Directives EMC Directive (2014/30/EU) EN 61800-3 Low Voltage Directive (2014/35/EU) EN 61800-5-1 ATEX Directive (2014/34/EU) EC-Type-Examination Certificate Number TÜV 17 ATEX 7990 X EN 50495 Machinery Directive (2006/42/EC) EN 61800-5-2
cULus	Listed to UL508C and C22.2 No. 14 up to 600V AC	Listed to UL61800-5-1 and CSA C22.2 No. 274 up to 600V AC
EAC	Low Voltage TP TC 004/2011 EMC TP TC 020/2011	Low Voltage TP TC 004/2011 EMC TP TC 020/2011
Ecodesign	Ecodesign Directive (2009/125/EC) as implemented by EU 2019/1781. UK Ecodesign Regulation 2021 No. 745	Ecodesign Directive (2009/125/EC) as implemented by EU 2019/1781. UK Ecodesign Regulation 2021 No. 7457uuu
EMC	In conformity with EMC Directive (2014/30/EU) EN 61800-3 In conformity with UK EMC Regulation 2016 No. 1091 EN 61800-3	In conformity with EMC Directive (2014/30/EU) EN 61800-3 In conformity with UK EMC Regulation 2016 No. 1091 EN 61800-3
Functional Safety	Applies to 20D-P2-DG01 Safety Option Module when installed in a frame 1...6, 208/240V and 400/480V, and frame 5 and 6, 600/690V drives. Standards applied: EN 61800-5-2, EN60204-1 EN ISO 13849-1, EN 62061 IEC 61508 Parts 1-7	TÜV Rheinland — Certification applies to 20-750-S, 20-750-S1, 20-750-S3, and 20-750-S4 Safety Options when installed in drive, all voltage classes. Standards applied: EN 61508 PARTS 1-7 EN 62061 EN 61800-5-2, EN 60204-1 EN ISO 13849-1
KCC	R-R-RAA-Drive See the certificate of registration for specific drive catalog numbers that have this certification.	R-R-RAA-Drive, R-R-RAA-750-M See the certificate of registration for specific drive catalog numbers that have this certification.[1]
Morocco	Arrêté ministériel n° 6404-15 du 1 er muharram 1437 (15 octobre 2015) NM EN 61800-5-1 Arrêté ministériel n° 6404-15 du 29 ramadan 1436 (16 juillet 2015) NM EN 61800-3	Arrêté ministériel n° 6404-15 du 1 er muharram 1437 (15 octobre 2015) NM EN 61800-5-1 Arrêté ministériel n° 6404-15 du 29 ramadan 1436 (16 juillet 2015) NM EN 61800-3
RCM	(Does not include 600V AC Input frames 1...4 drives) Australian Communications and Media Authority In conformity with the following items: Radiocommunications Act:1992 (including Amendments up to 2018) Radiocommunications (Electromagnetic Compatibility) Standard 2017 Radiocommunications Labeling (Electromagnetic Compatibility) Notice 2017 Standards applied: EN 61800-3	Australian Communications and Media Authority In conformity with the following items: Radiocommunications Act: 1992 (including Amendments up to 2018) Radiocommunications (Electromagnetic Compatibility) Standard 2017 Radiocommunications Labeling (Electromagnetic Compatibility) Notice 2017 Standards applied: EN 61800-3
SEMI F47		Certified compliant with the following standards SEMI F47 IEC 61000-4-34
UKCA	In conformity with the following UK Regulations: UK EMC Regulation 2016 No. 1091 EN 61800-3 UK Low Voltage Regulation 2016 No. 1101 EN 61800-5-1 UK Ex Regulation 2016 No. 1107 UKEX Type-Examination Certificate Number TUV 21 UKEX 7035 X EN 50495 UK MD Regulation 2008 No. 1597 EN 61800-5-2	In conformity with the following UK Regulations: UK EMC Regulation 2016 No. 1091 EN 61800-3 UK Low Voltage Regulation 2016 No. 1101 EN 61800-5-1 UK Ex Regulation 2016 No. 1107 UKEX Type-Examination Certificate Number TÜV 21 UKEX 7036 X EN 50495 UK MD Regulation 2008 No. 1597 EN 61800-5-2

(1) See the product certifications website, rok.auto/certifications, for declarations of conformity, certificates, and other certification details.
(2) Certifications on the PowerFlex 700S drive may depend on the manufacture date of the drive.

Feature and Function Comparison

This section compares protection, safety, drive control, control features, and supported feedback devices.

Table 8 - Protection

Type of Protection	700S	755TS
Motor overload	Standard	Standard
Output short circuit	Standard	Standard
Output ground fault	Standard	Standard
Under and over voltage	Standard	Standard
Dynamic braking	Internal chopper	Internal chopper
Common mode choke	Internal (standard)	External (optional)(1)
Common mode capacitors	Standard	Standard
Hardware enable	Standard	Standard
EMC filters (internal)	Standard (frames 1...6 only)	Standard (frames 1...5) Optional (frame 6)(2)

(1) Not required for EMC C3 compliance.
(2) On frames 1...5, EMC filters are not needed for EMC C3 and the hardware needed to meet this compliance is provided. An EMC Option kit, 20-750-EMC6-F6, is available for frame 6.

Table 9 - Drive Control

Drive Control Type / Specification	700S	755TS(1)
Motor control type		
Induction V/Hz	Standard	Standard
Induction sensorless vector (SVC)	–	Standard
Induction flux vector (FVC)	Standard with FORCE technology	Standard with TotalFORCE technology
Synchronous reluctance V/Hz	–	Standard
Synchronous reluctance SV	–	Standard
Permanent magnet motors	SPM (Surface Permanent Magnet)	SPM (Surface Permanent Magnet) IPM (Interior Permanent Magnet)
Frequency control	–	Speed regulation — with slip compensation (V/Hz and Sensorless Vector modes) 0.5 % of base speed across 40:1 speed range, 40:1 operating range
Speed control	Speed Regulation - without feedback 0.1 % of base speed across 120:1 speed range 120:1 operating range	Speed Regulation - without feedback (Flux vector mode) 0.1 % of base speed across 120:1 speed range 120:1 operating range
	Speed Regulation - with feedback 0.001 % of base speed across 120:1 speed range 1000:1 operating range	Speed Regulation - with feedback 0.001 % of base speed across 120:1 speed range 1000:1 operating range
Slip compensation	Standard	Standard
Droop	Standard	Standard
Inertia adaption	Standard	Standard
Phase lock loop	Standard	Standard
Torque accuracy	2 % Motor Rated Torque with Encoder Feedback	1.2% Motor Rated Torque with Encoder Feedback and optional Torque Accuracy Module (Cat# 20-750-TSTAM-CD-XT)

(1) See PowerFlex 755TS Products with TotalFORCE Control Technical Data, publication 750-TD104, for more information.

Table 10 - Control Features

Feature	700S	755TS
Flying start	Standard	Standard (1)
Bus regulator	Standard	Standard (2)
S-curve	Standard	Standard
Drive overload protection	Standard	Standard (2)
Input phase loss	Standard	Standard
Preset speeds	7	7
Process control loop	Standard (2)	Standard (2)
Fast flux up	Standard	Standard
Fast brake to stop	–	Standard
Flux braking	–	Standard
Feedback loss switchover	Standard	Standard
Real-time clock	–	Standard
Auxiliary power back-up	Optional	Optional
Multi-motor parameters	–	Standard
Start on power-up	–	Standard
Integral position loop	Standard	Standard
PCAM planner	–	Standard
Electronic gearing	Standard	Standard
Speed/position profiler	–	Standard
Position indexer	Standard	Standard
Predictive diagnostics	–	Standard
Torque proving	–	Standard
Conformal coating	Standard	Standard
Corrosive gas protection (XT)	-	Optional
Timer/counter functions	Optional with DriveLogix	Standard (3)
Embedded control	Optional with DriveLogix	Standard (3)

(1) Advanced and non-advanced.
(2) Advanced.
(3) DeviceLogix.

Digital I/O and Feedback Support

The PowerFlex 700S drive features integrated standard I/O and has six digital inputs and three digital outputs. The PowerFlex 755TS drive features the ability to add optional I/O via 24V DC and 115V AC option modules. See Table 11 and Table 39 on page 62 for more information.

Table 11 - Digital Input and Digital Output Information

	PowerFlex 700S	PowerFlex 755TS
Digital Inputs	(standard) 6, 24V DC, inputs 4...6 are 24V DC or 115V AC	(optional) 20-750 series 24V DC and 115V AC I/O modules; 3...6 per module, depending on the option module chosen
Digital Output	(standard) 2, 24V DC open collector sinking (standard) 1, form C relay. Relay 115V AC/24V DC, 2 A resistive or inductive.	(optional) 20-750 series 24V DC and 115V AC I/O modules; 2...3 per module, relay or transistor depending on option module chosen. Relay Normally Open, 240V AC/24V DC, 2 A resistive/general purpose inductive. Relay Normally Closed, 240V AC/24V DC, 2 A resistive. Transistor, 24V DC, 1 A max resistive.

The PowerFlex 700S drive has a built-in incremental encoder; the PowerFlex 755TS drive offers optional feedback modules with single encoder, dual encoder, and universal encoder support. For details on I/O and feedback support options see Table 39 on page 62.

Both the PowerFlex 700S and PowerFlex 755TS drives have jumpers on their main control boards (see Figure 7 on page 41, Figure 10 on page 46, and the associated tables for locations of the jumpers). When the jumper is removed, the drive assigns a digital input for HW Enable. The following inputs are set by default to 'HW Enable' when this jumper is removed:

	PowerFlex 700S Drive	PowerFlex 755TS Drive
Input that is set to 'Hardware Enable' when jumper removed	Digital input 6	Digital input 0 (main control board)

Optional PowerFlex 750-Series I/O modules must be added to the PowerFlex 755TS drive if additional digital and analog I/O is required.

Functional Safety Features

The PowerFlex 700S drive supports an option module (catalog number 20D-P2-DG01) for hardwired safe torque off only. The PowerFlex 755TS drive provides four options for functional safety:

Four safety options are available for the PowerFlex 755TS drive:

- Safe Torque Off (20-750-S)
- Safe Speed Monitor (20-750-S1)
- Integrated Safety - Safe Torque Off (20-750-S3)
- Integrated Safety Functions (20-750-S4)

Safe Torque Off is ideal for safety-related applications that require the removal of rotational power to the motor without shutting down the drive. Safe Torque Off functionality offers the benefit of quick start-up after a demand on the safety system. Safe Torque Off helps reduce wear from repetitive start-up, and provides safety ratings up to and including SIL CL3, PLe, and category 3.

Safe Speed Monitor is ideal for applications where the speed is controlled and monitored. The Safe Speed Monitor option combines Safe Torque Off capability with integrated safety relay functionality and the Safe Speed control technology in one hardware option. The Safe Speed Monitor option provides safety ratings up to and including SIL CL3, PLe, and category 4.

With the Safe Speed Monitor option module (20-750-S1), you can safely monitor and control the speed of your application, which allows operators to perform process or maintenance work without stopping the machine.

The Integrated Safety - Safe Torque Off (STO) option module (20-750-S3) provides either a hardwired or a networked STO function via an Ethernet/IP network.

With Networked Safe Torque Off, a GuardLogix safety controller issues the Safe Torque Off command over the Ethernet /IP network, and the PowerFlex drive executes the command.

The Integrated Safety Functions option module (20-750-S4) provides a networked STO (Safe Torque Off) function though an Ethernet/IP network. It is also equipped for Integrated (drive-based) Timed SS1, Monitored SS1, and Safe Brake Control, which operate in the drive and are activated through the network safety connection.

The Integrated Safety Functions option module also supports select controller-based IEC 61800-5-2 safety functions operating in GuardLogix 5580 or Compact GuardLogix 5380 controllers that use the Ethernet/IP network to communicate withe the safety I/O. This support includes the new safety function instructions that are provided on the Drive Safety tab in the Logix

Designer application. See Functional Safety Configurations on page 78 and Table 54 on page 79 for more information.

Power Considerations

To determine whether the PowerFlex 755TS drives will operate reliably with the existing power source and what changes you might need to make, review these DC input, power source sizing, grounding, and cable considerations.

DC Input Inverter Considerations

If using a PowerFlex 7000S frame 5 or frame 6 drive in a DC input application, use the PowerFlex 755TS DC fed drive, frames 5 and 6. See PowerFlex 700S Drive to 755TS Drive Voltage and Input Type Code Conversion on page 18 for the voltage codes to use and additional hardware required.

See Drives in Common Bus Configurations with PowerFlex 755TM Bus Supplies Application Technique, publication DRIVES-AT005, and Drives in Common Bus Configurations Application Technique, publication DRIVES-AT002 for additional information on common bus configurations.

WARNING: Failure to properly apply this equipment may cause dangerous over current, possible explosion, and arc flash conditions that can lead to personal injury or death.

Power Source Sizing

PowerFlex 755TS drives are suitable for use on a power source having a short circuit current rating of 100,000 Arms symmetrical amperes at 400/480. The actual short circuit rating may be further limited by an interrupting capacity rating of user-supplied branch circuit fuses and circuit breaker.

You must take into account the kVA of all PowerFlex 755TS drives on the distribution system and the system impedance of upstream transformers. See Wiring and Grounding Guidelines for Pulse-width Modulated (PWM) AC Drives Installation Instructions, publication DRIVES-IN001, for more information.

Power Source Grounding

The PowerFlex 755TS drive safety ground (PE terminal) must be connected to the power system ground. Ground impedance must conform to the requirements of national and local industrial safety regulations and/or electrical codes. Check the integrity of all ground connections periodically.

Like PowerFlex 700S AC input drives, PowerFlex 755TS drives can be used with various grounding methods. A single point (PE only) grounding scheme should be used. However, some applications may require alternate grounding schemes. These applications include installations with long distances between drives or drive line-ups, which could cause large potential differences between the drive or line-up grounds. See Wiring and Grounding Guidelines for Pulse-width Modulated (PWM) AC Drives Installation Instructions, publication DRIVES-IN001, for more information.

Control Power Considerations

24V DC auxiliary control power is not required for basic operation of the PowerFlex 755TS drives. The 24V DC auxiliary control power can be used to

maintain logic and communication power if line power is shut down. If 24V DC auxiliary power is required, then order a 20-750-TAPSX option module. The 20-750-TAPSX option module provides 24V DC aux power. See PowerFlex 750-Series I/O, Feedback, and Power Option Modules Installation Instructions, publication 750-IN111, for more information.

IMPORTANT The PowerFlex 700S Aux power supply cannot be used with the PowerFlex 755TS drive. The PowerFlex 700S Aux power supply has a 300V output.

Power Cables

The PowerFlex 700S IP20/IP21/IP54 enclosed drives used various AC and DC power connection methods. If you intend to reuse any of the existing AC power cables, review the installation and verify that the cables, lugs, and other cable ratings meet the requirements of the new PowerFlex 755TS drives.

Table 12 - Power Cable Recommendations for PowerFlex 755TS Drive

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

(1) Signal wires should be separated from power wires by at least 0.3 meters (1 foot).
(2) The use of shielded wire for AC input power may not be necessary but is always recommended.
(3) The minimum insulation rating for input power wire must be at least equal to the nominal system voltage rating.

Table 13 - PowerFlex 755TS Drive, Frames 1...5 Power Terminal Block

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

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

Table 14 - PowerFlex 755TS Drive, Frames 6 and 7 Power Terminal Block

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

(1) Customers supply the lugs.

Table 15 - PowerFlex 755TS Drive, Frames 1...7 PE Grounding Stud

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

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

IMPORTANT See Wiring and Grounding Guidelines for Pulse-width Modulated (PWM) AC Drives Installation Instructions, publication DRIVES-IN001, for detailed installation planning guidelines.

Electrical Considerations

EMI Filtering and Power Filter Jumpers

The PowerFlex 755TS drive standard EMI filtering is obtained by selecting catalog code (-J) in catalog position 11.

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

PowerFlex 755TS drives leave the factory with jumpers PE-A and PE-B connected. Reconfigure these jumpers based on the power source type available. If additional EMI filtering is needed, see PowerFlex 755TS Products with TotalFORCE Control Installation Instructions, publication 750-IN119.

ATTENTION: Risk of equipment damage exists. The drive power source type must be accurately determined. Jumpers PE-A and PE-B must be configured for the power source type according to the recommendations in Table 17.

It is important to consider the EMC requirements and grounding configuration of the power source. Certain power source grounding configurations may require removal of the PE-B power jumpers. Contact an Authorized Rockwell Automation Distributor specialist, Solution Partner, Recognized System Integrator or Rockwell Automation account manager to discuss EMC, grounding, and power jumper settings if your system does not match Rockwell Automation recommendations.

Table 16 - Power Jumper Default Configuration

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

Table 17 - Recommended Power Jumper Configurations

Power Source Type	Jumper PE-A (1) (2) (MOV/Input filter caps)	Jumper PE-B (DC bus common mode caps)	Benefits Of Correct Configuration on Power Source Type
Non-Solid Ground or Corner Ground • AC fed ungrounded • Impedance grounded • B phase ground • DC fed from a passive rectifier	Disconnected	Disconnected	Helps avoid severe equipment damage when ground fault occurs
DC fed from an active converter	Disconnected	Disconnected	Helps avoid damage to filter capacitors
Solid Ground • AC fed solidly grounded • DC fed from passive rectifier that has a solidly grounded AC source	Connected	Connected	• Reduced electrical noise • Most stable operation • EMC compliance • Reduced voltage stress on components and motor bearings

(1) When MOVs are disconnected, the power system must have its own transient protection to confirm known and controlled voltages.
(2) Frame 5...7 common DC input drives do not have the PE-A jumper.

Circuit Protection

Fuses from your PowerFlex 700S drive can't be reused. The PowerFlex 755TS drive requires fast acting fuses that aren't required by the PowerFlex 700S drive. See the PowerFlex 755TS Products with TotalFORCE Control Technical Data, publication 750-TD104, for information on selecting fuses for the PowerFlex 755TS drive.

Other Power Circuit Considerations

If your application requires the use of AC input contactors, motor output contactors, bypass contactors, or other power circuit devices, see the appropriate sections of the PowerFlex 755TS Products with TotalFORCE Control Installation Instructions, publication 750-IN119. It is important to ensure that interruption of the AC input and/or motor output circuits of the PowerFlex 755TS drive is handled correctly to prevent malfunctions, damage, and operational issues with the equipment.

Dynamic Brake Considerations

If you were using an internal or external brake resistor, or using an internal or external brake transistor, see the PowerFlex 755TS Products with TotalFORCE Control Technical Data, publication 750-TD104, and PowerFlex Dynamic Braking Resistor Calculator, publication PFLEX-AT001, for more information on sizing.

Regenerative or AFE Application Considerations

If your PowerFlex 700S drive implementation used a separate regen unit, bus supply, or active front end converter, consider using a 755T product. If the PowerFlex 700S drive implementation was an individual drive on a larger common bus system, consider the method of pre-charge as well as any

difference in product capacitance. See Drives in Common Bus Configurations Application Technique, publication DRIVES-AT002, and Drives in Common Bus Configurations with PowerFlex 755T Bus Supplies Application Technique, DRIVES-AT005, for more information.

Motor Regulator Performance Considerations

To achieve PowerFlex 755TS torque accuracy equal to or greater than the PowerFlex 700S drive, install the Torque Accuracy Module (TAM). The catalog number is 20-750-TSTAM-CD-XT for use with 400/480V drives. See PowerFlex 750TS Products with TotalFORCE Control Technical Data, publication 750-TD104, and PowerFlex 755TS Torque Accuracy Module (TAM) Installation Instructions, publication 750-IN120, for more information.

Chapter 2

Dimensions, Connection, and Installation Considerations

This chapter describes the differences in dimensions, connection information, and installation information that needs to be considered when migrating from a PowerFlex® 700S drive to a PowerFlex 755TS drive.

Drive Dimension Comparison Dimensions

For alternate frame sizes and enclosure types, see PowerFlex 750TS Products with TotalFORCE® Control Technical Data, publication 750-TD104.

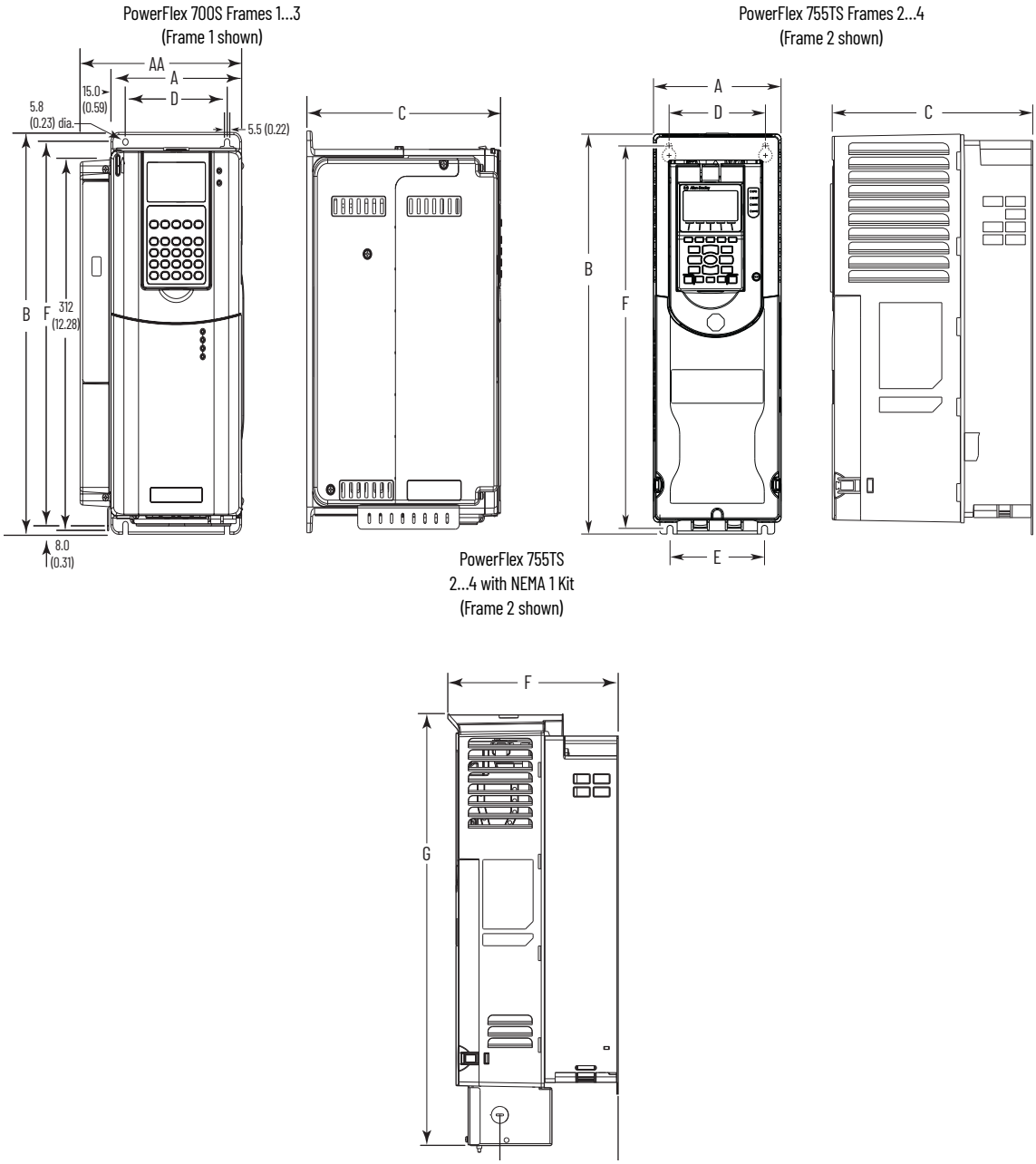


Figure 1 - PowerFlex 700S Frames 1...3 to PowerFlex 755TS Frames 2...4

Drive	Frame	Dimensions mm (in.)								
		A	Expanded AA	B	C	D	E	F	G	H
700S	1	135.0 (5.32)	166.9 (6.57)	336.0 (13.23)	200.0 (7.87)	105.0 (4.13)	–	320.0 (12.60)	–	–
	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)		
	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)		
755TS	2	135.0 (5.3)	--	424.2 (16.7)	212.0 (8.3)	100.0 (3.9)	100.0 (3.94)	222.2 (8.7)	497.1 (19.6)	117.7 (4.6)
	3	190.0 (7.48)		454.0 (17.87)	212.0 (8.3)	158.0 (6.22)	158 (6.22)	223.1 (8.8)	530.1 (20.9)	154.7 (8.1)
	4	222.0 (8.7)		474.0 (18.7)	212.0 (8.3)	194.0 (7.6)	202.0 (8.0)	222.7 (8.8)	564.4 (22.2)	154.7 (8.1)

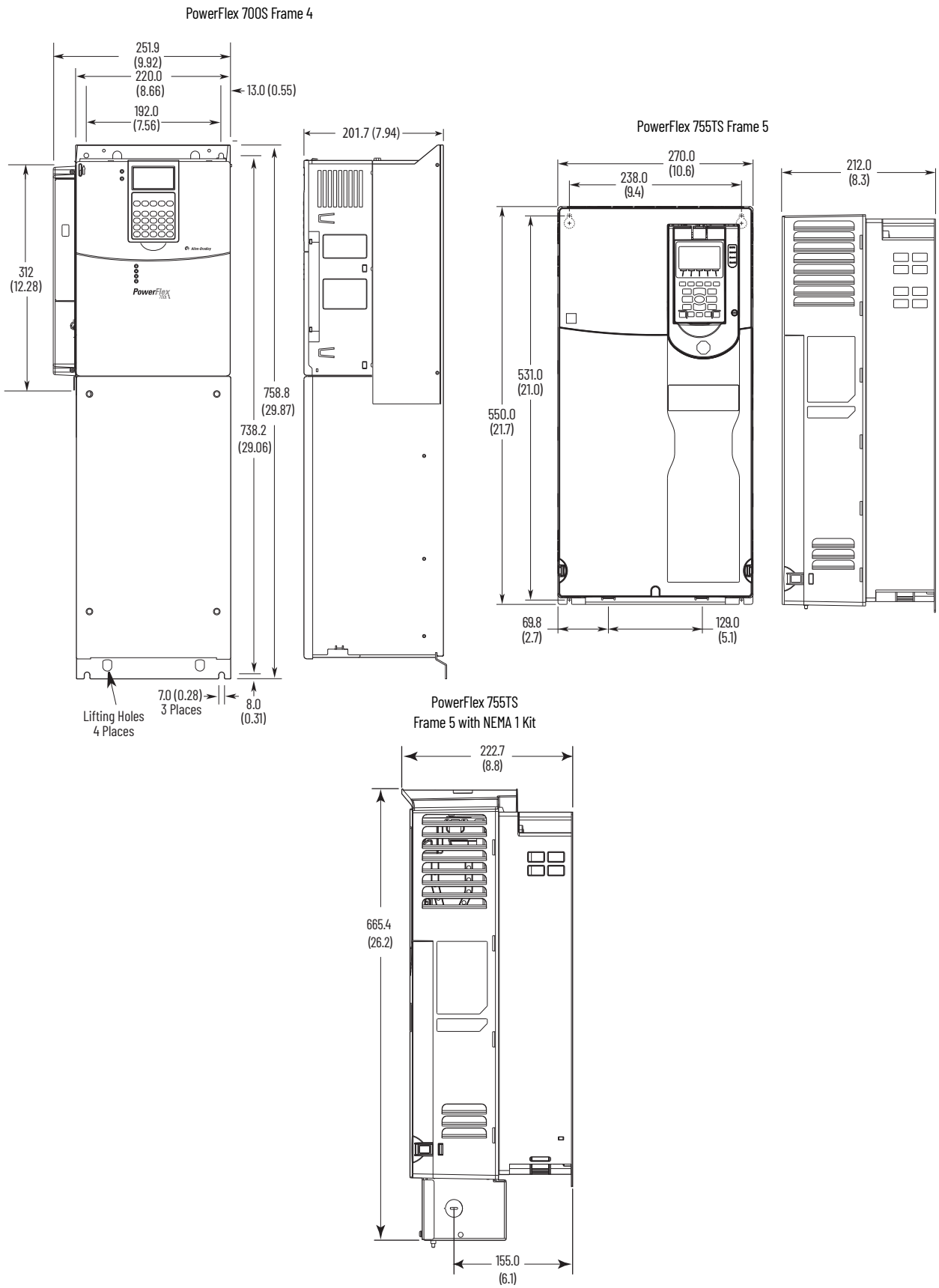


Figure 2 - PowerFlex 700S Frame 4 to PowerFlex 755TS Frame 5

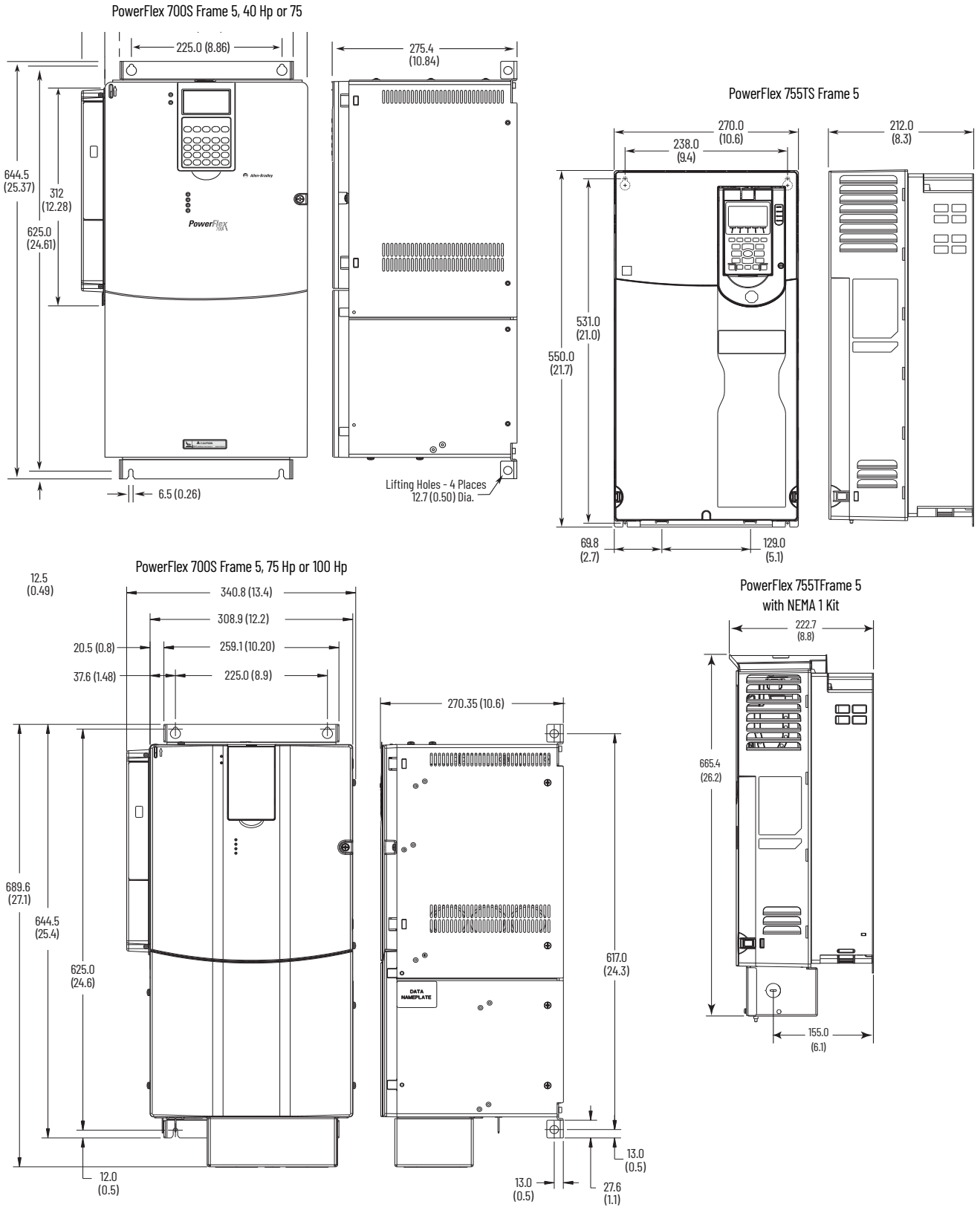
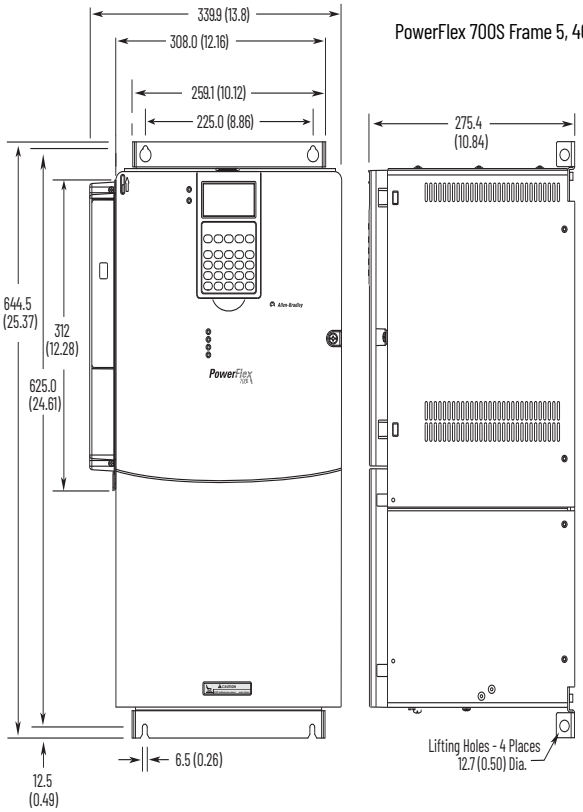
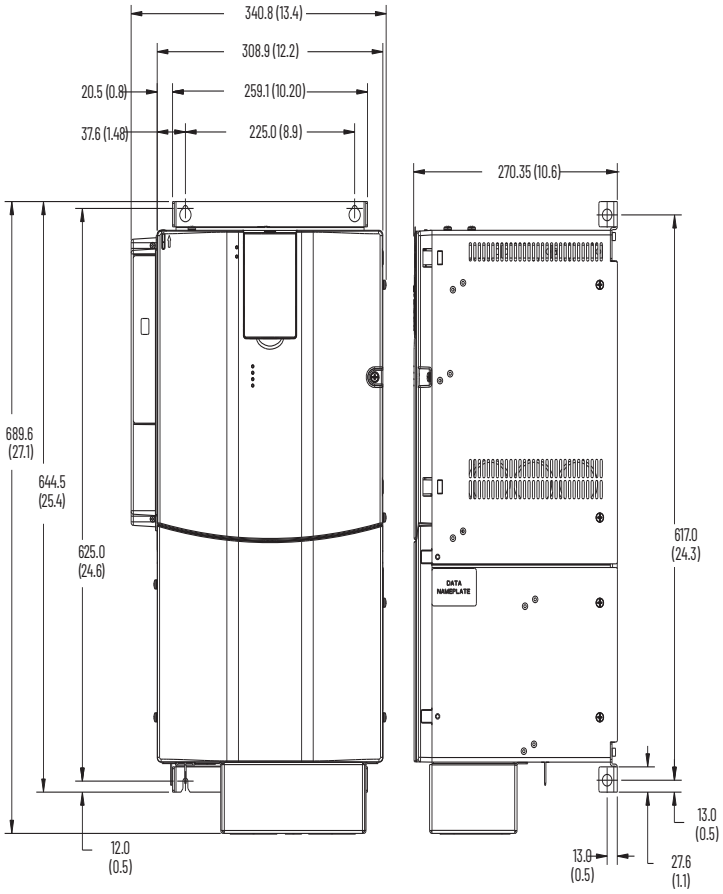


Figure 3 - PowerFlex 700S Frame 5 to PowerFlex 755TS Frame 5

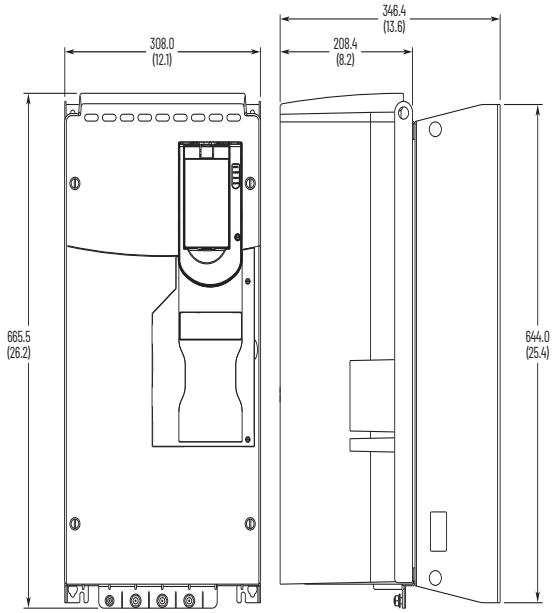
PowerFlex 700S Frame 5, 40 Hp or 75 Hp



PowerFlex 700S Frame 5, 75 Hp or 100 Hp



PowerFlex 755TS Frame 6



PowerFlex 755TS Frame 6

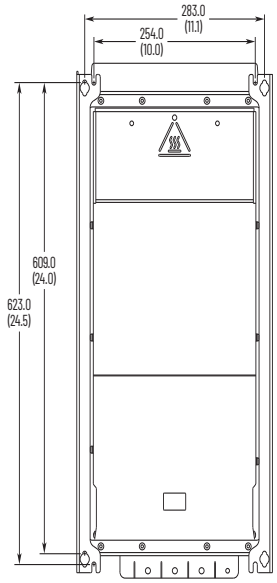


Figure 4 - PowerFlex 700S Frame 5 to PowerFlex 755TS Frame 6

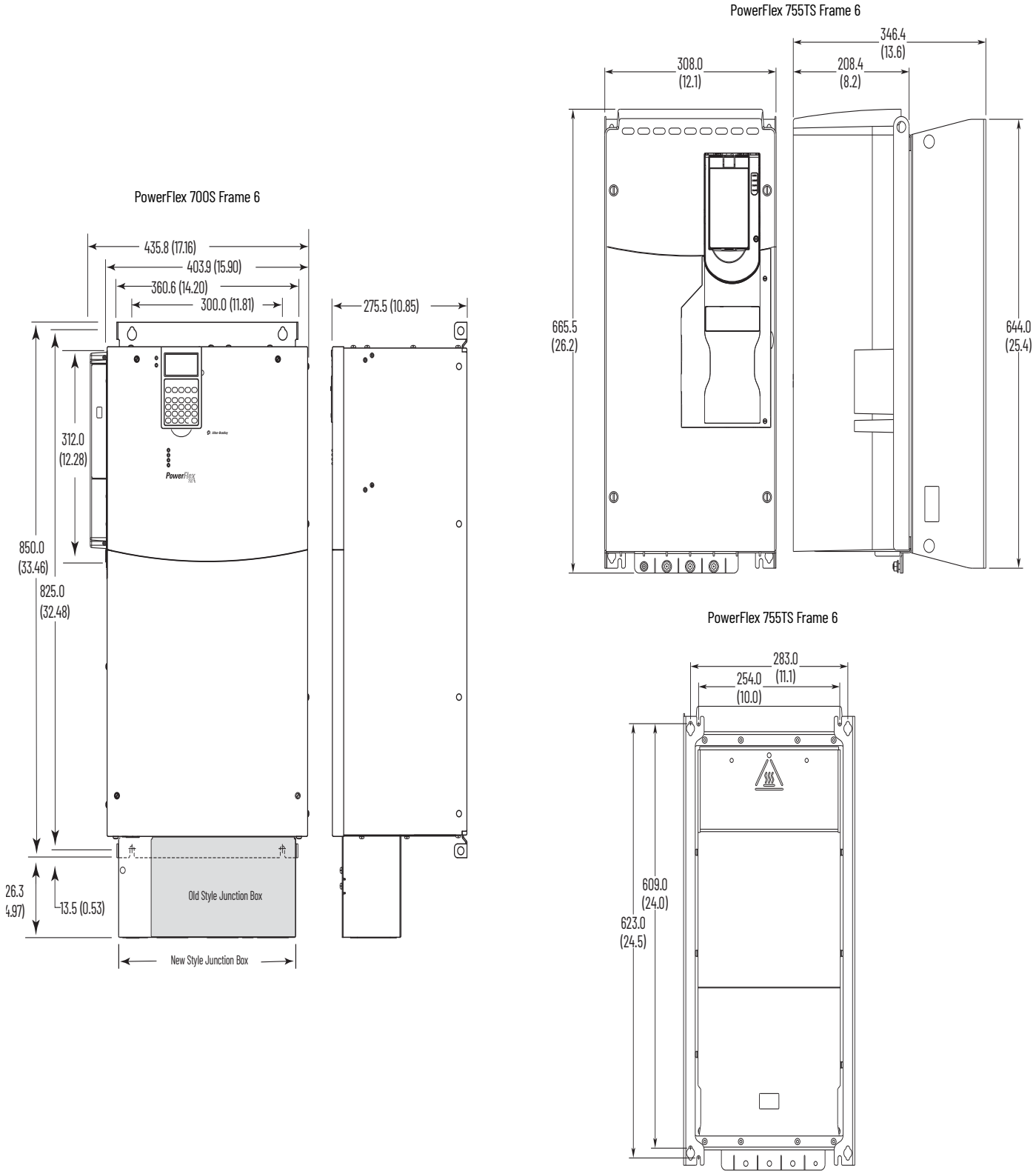


Figure 5 - PowerFlex 700S Frame 6 to PowerFlex 755TS Frame 6

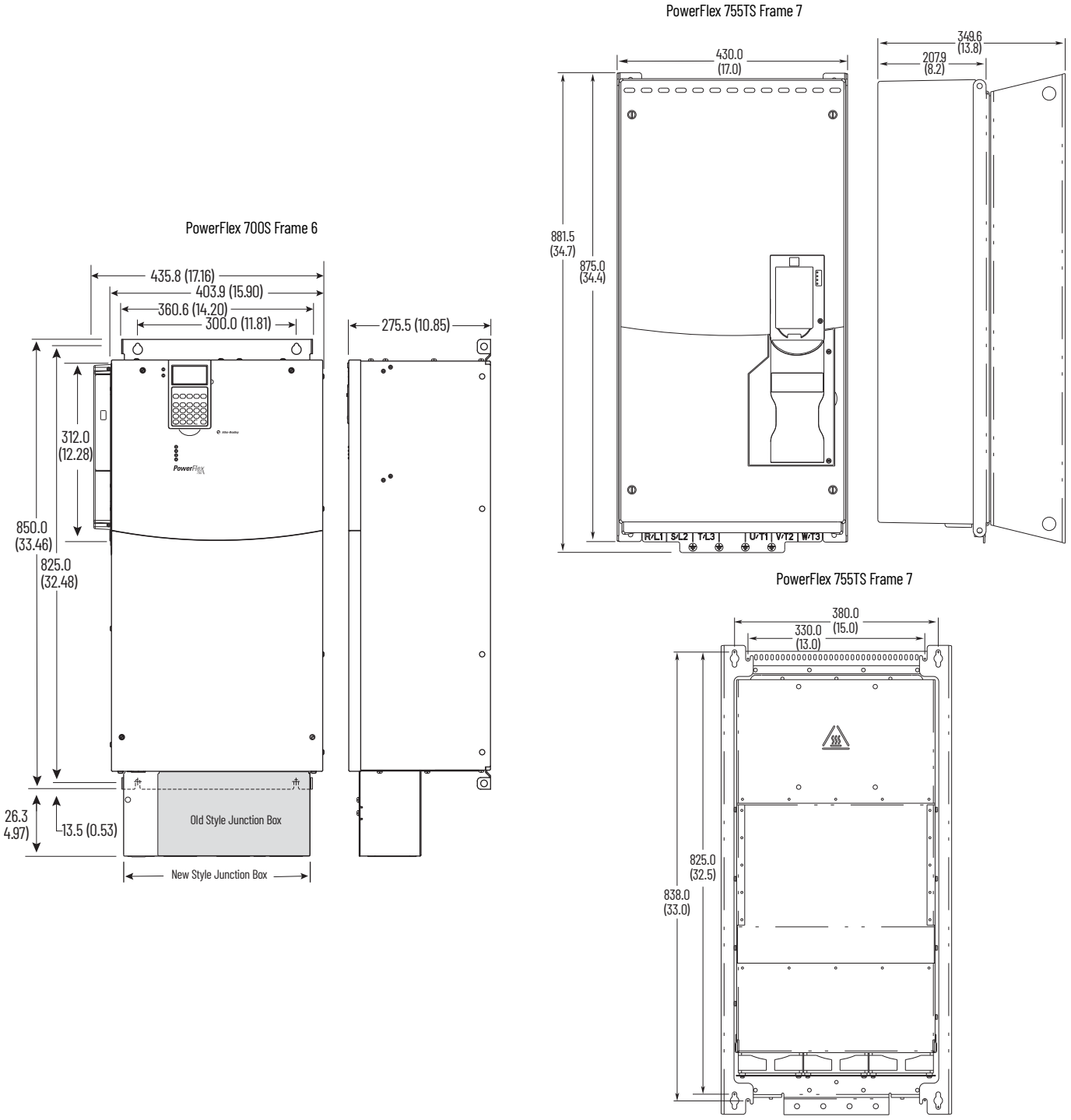


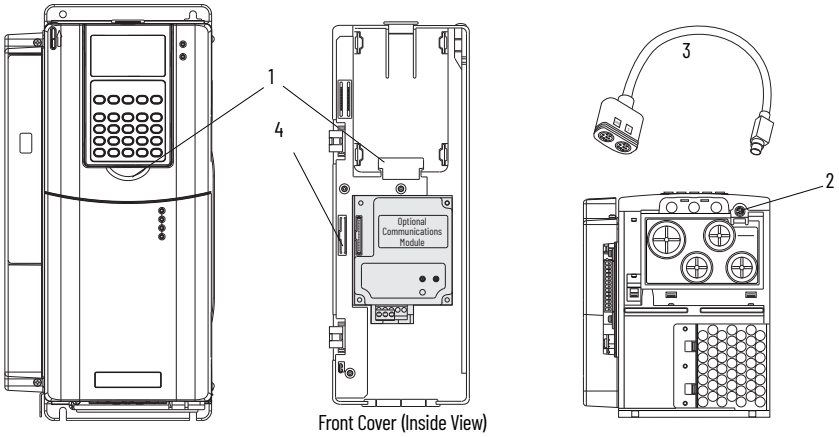
Figure 6 - PowerFlex 700S Frame 6 to PowerFlex 755TS Frame 7

Device Ports and Main Control Board

The PowerFlex 700S drive had some provision to add communication option modules. The PowerFlex 755TS drive has many optional I/O and communication modules.

PowerFlex 700S Drives

The PowerFlex 700S main control board has fixed I/O module configurations that you cannot modify. There are a number of cable connection points that allow various HIM and communication DPI™ connections.



No.	Connector	Description
0	Host main control board	Fixed port for main control board and feedback options.
1	DPI Port 1	HIM connection when installed in the drive cover.
2	DPI Port 2	Cable connection for handheld and remote options.
3	DPI Port 3[(1)] or 2	Splitter cable that is connected to DPI Port 2 provides additional port.
4	DPI Port 5	Cable connection for communications adapter.

(1) DPI port 3 can also be obtained using a HIM bezel.

DPI Port 4 is not available.

Figure 7 - PowerFlex 700S Main Control Board Switch and Jumper Locations

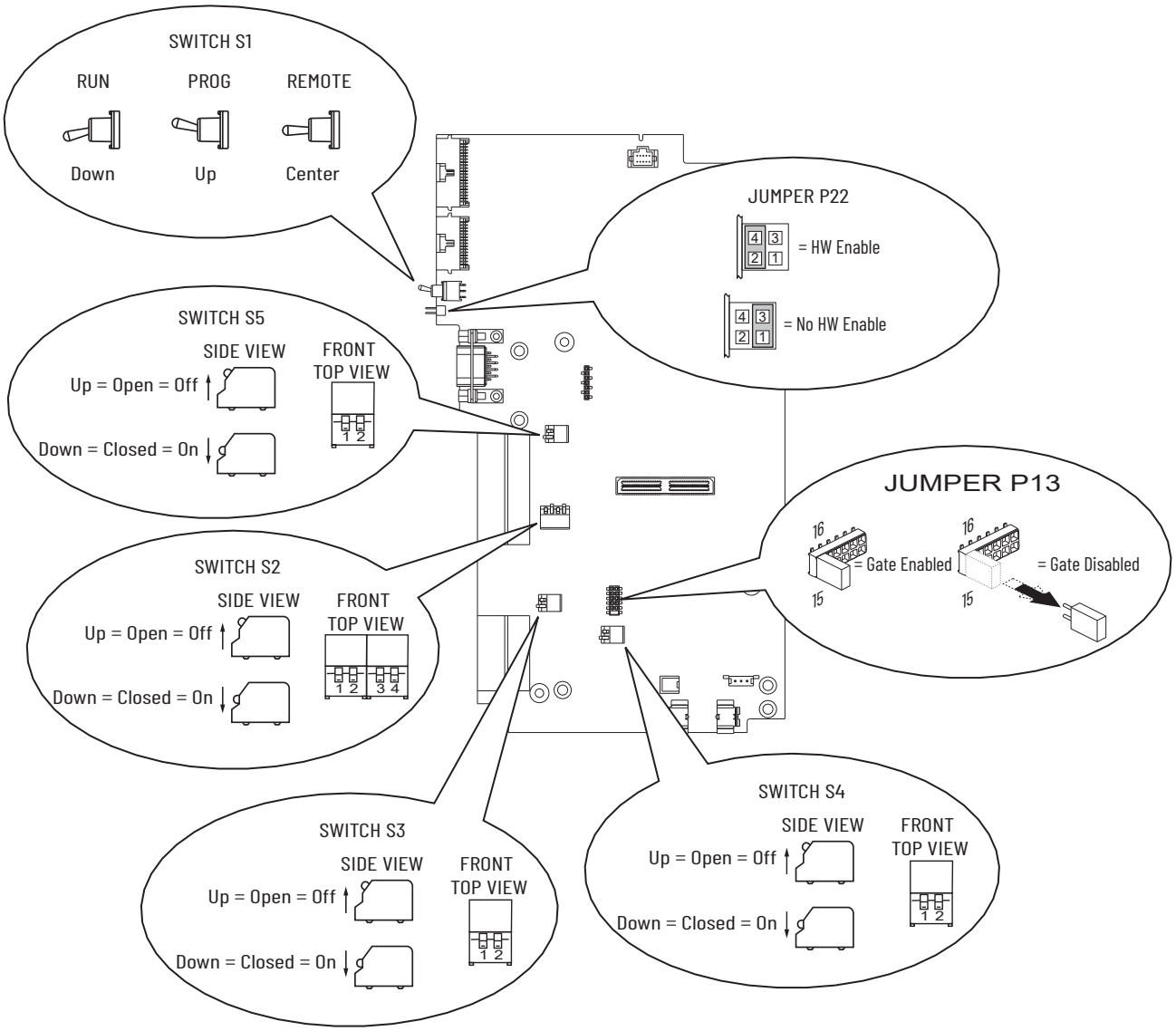


Table 18 - PowerFlex 700S Main Control Board Switch and Jumper Assignment

Function	Default	Switch	Open	Closed	Notes
HW Enable Jumper (P22)	pins 2...4 HW Enbl	SHUNT Jumper	pins 2...4 HW Enbl	pins 1...3 No Enbl	No Jmpr = HW Enbl.
Gate Enable Jumper (P13)	Jumper on pins 15 and 16	SHUNT Jumper	No Jmpr	Jumper on pins 15 and 16	No Jmpr = Gate disable or Safe-Off/ Second Encoder board is present[1]
Analog Input 1	Voltage	S5-2	Voltage	Current	Change with Power Off
Analog Input 2	Voltage	S5-1	Voltage	Current	Change with Power Off
Digital Inputs 4...6 Voltage	24V DC	S4-1, S4-2	115V AC	24V DC	Change with Power Off
Digital Input 1 Voltage	24V DC	S3-1	24V DC	12V DC	Change with Power Off
Digital Input 2 Voltage	24V DC	S3-2	24V DC	12V DC	Change with Power Off

Table 18 - PowerFlex 700S Main Control Board Switch and Jumper Assignment (Continued)

Function	Default	Switch	Open	Closed	Notes
Encoder Supply Voltage	12V DC	S2-4	12V DC	5V DC	Change with Power Off Typically, set all switches the same
Encoder Signal A Voltage	12V DC	S2-1	12V DC	5V DC	
Encoder Signal B Voltage	12V DC	S2-2	12V DC	5V DC	
Encoder Signal Z Voltage	12V DC	S2-3	12V DC	5V DC	
DriveLogix™ Processor	S1	RUN	PROG	REMOTE	Processor Mode

(1) See publication 20D-UM007, DriveGuard® Safe Torque Off Option for PowerFlex 700S Phase II AC Drives and PowerFlex 700L Liquid-Cooled AC Drives, for more information on the Safe Torque Off Option board, or publication, 20D-IN009 Installation Instructions - Second Encoder Option Card for PowerFlex 700S Drives with Phase II Control, for more information on the Second Encoder Option board.

Figure 8 - Main Control Board I/O Terminal Locations

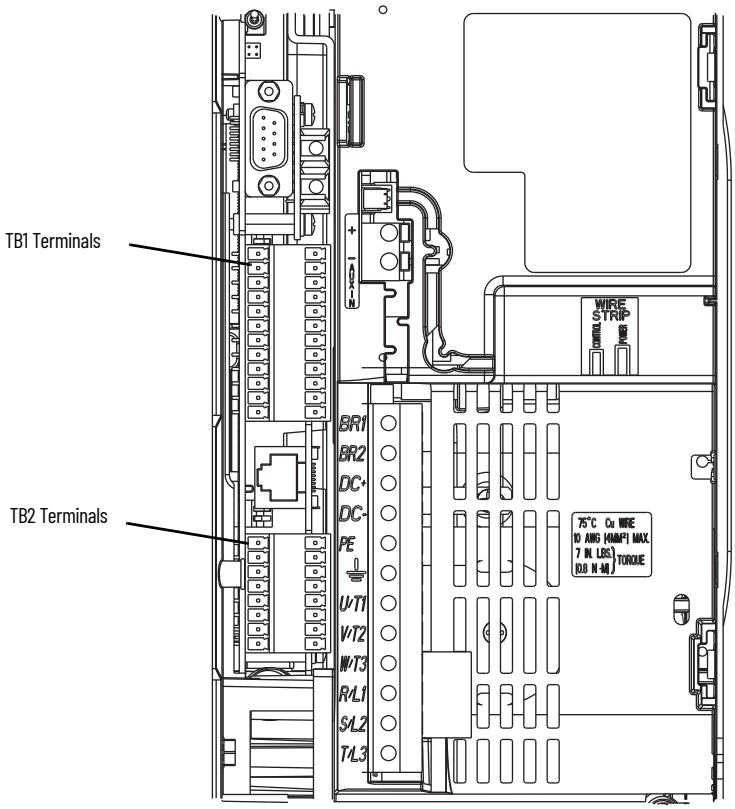


Table 19 - PowerFlex 700S Main Control Board I/O Connections

Connector	Description
TB1	Analog I/O and Encoder Signals
TB2	Digital I/O

See PowerFlex 700S Adjustable Frequency Drive - Phase II Control Installation Instructions, publication 20D-IN024, for I/O connector wiring and analog configuration jumpers. Also see Chapter 4 for wiring examples. See Hardware Enable Circuits on page 47 for information on using Hardware Enable.

The PowerFlex 700S could be equipped with several communication and feedback options. Not all devices that are shown in Table 20 have equivalent PowerFlex 755T devices. See Table 21 on page 44 and Table 39 on page 62 for more information about compatible PowerFlex 755TS devices.

Table 20 - PowerFlex 700S Drive Option Port Assignments

Port	Device	Description
DPI Port 1	20-HIM-A3, 20-HIM-A5, 20-HIM-A6	HIM connection when installed in drive
DPI Port 2	DPI Port	Connection for handheld/remote HIM, 1203-USB, or splitter cable connections
DPI Port 3	Splitter cable	Splitter cable connects to DPI Port 2 to provide an additional port
DPI Port 5	20-COMM-E, 20-COMM-ER 1788-ENBT (1)(3), 20D-DL2-ENET0 (2)	EtherNet/IP™
	20-COMM-C 1788-CNC/CNCR (1)(3)	ControlNet®
	20-COMM-Q 1788-CNF/CNFR (1)(3)	ControlNet Fiber
	20-COMM-D 1788-DNB0(2)(3)	DeviceNet®
	20-COMM-H	HVAC
	20-COMM-K	CANopen
	20-COMM-M	Modbus/TCP
	20-COMM-P	PROFIBUS DP
	20-COMM-R	Remote I/O
	20-COMM-S	RS-485 DF1
Port 0	20D-P2-SLB0	SynchLink™
	20D-DL2-LEB0(3)	Logix Expansion DriveLogix™ 5730
	20D-MDI-C2(3)	Multi-Device Interface
	20D-P2-DG01(3)	DriveGuard Safe Torque Off with 2nd Encoder
	20D-P2-ENC0(3))	2nd Encoder
	20D-RES-A1(3)	Resolver
	20D-STEG-B1(3)	Stegmann High Resolution Hiperface Encoder
	16th position of catalog number =T (3)	Stegmann High Res Enc with 2nd Encoder
	16th position of catalog number =U (3)	Stegmann High Res Enc with DriveGuard Safe Torque Off
—	20-24V-AUX1	Auxiliary Control Power Supply

(1) Requires DriveLogix option.
(2) Requires DriveLogix 5730 option.
(3) Requires Expanded Cassette.

IMPORTANT If the existing PowerFlex 700S system uses any of the available analog I/O, encoder input, safety modules, or Logix digital I/O, you need to supply and configure appropriate PowerFlex 750 I/O option modules for the replacement PowerFlex 755TS drive. See Chapter 3 for more details.

PowerFlex 755TS Drives

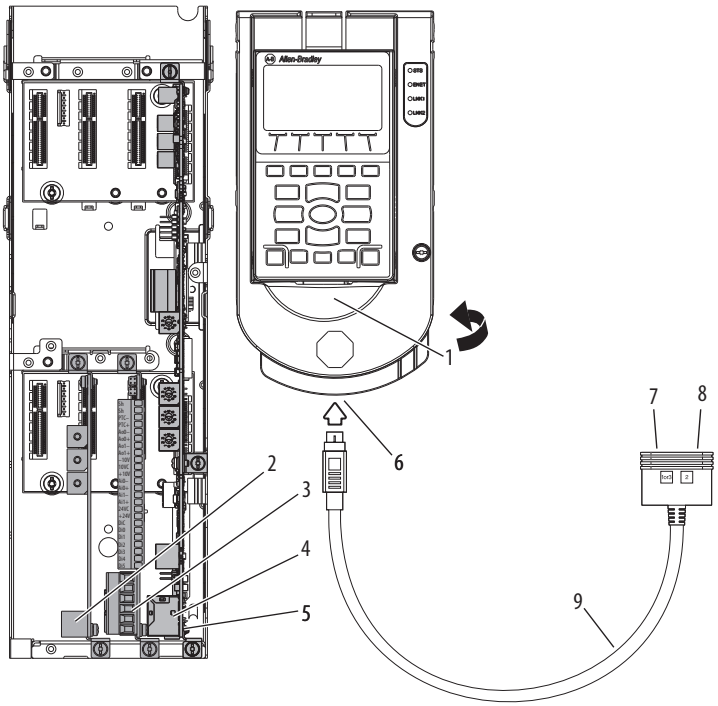
This section describes the option modules that are compatible with PowerFlex 755TS drives and provides information on which slots can be used with which modules. Connectors, embedded devices, and installed option modules such as I/O and communication adapters have unique port number assignments. Connectors and embedded devices have fixed port numbers that cannot be changed. Option modules are assigned a port number when installed.

Table 21 - PowerFlex 755TS Drive Device Port Assignments

Port	Device	Description
00	Host main control board	Fixed port for the main control board and embedded dual port EtherNet.
01	20-HIM-A6, 20-HIM-C6S	Fixed port at HIM cradle connector. Splitter cable connector provides Port 01 when HIM cradle connect is not used.
02	DPI port	8-pin round mini-DIN connector for handheld/remote HIM, 1203-USB, or splitter cable connections.
03	Splitter cable	Connects to DPI port 02. Provides port 02 and port 03.
04...08	I/O option modules:(1)	Valid ports:
	20-750-1132C-2R (24V DC)	04...08
	20-750-1133C-1R2T (24V DC)	
	20-750-1132D-2R (120V AC)	
	20-750-2262C-2R (24V DC)	
	20-750-2263C-1R2T (24V DC)	
	20-750-2262D-2R (120V AC)	
	20-750-ATEX(2)	04...05 (bottom row only)
	Communication option modules:	Valid ports:
	20-750-DNET(3)	04...06 (bottom row only)
	20-750-CNETC(3)	
	20-750-ENETR(3)	
	20-750-PBUS	
	20-750-PNET	
	20-750-PNET2P	
	Safety option modules:	Valid ports:
	20-750-S(4)	04...08
	20-750-S1(4)	05...06 (bottom row only)
	20-750-S3(4)	04...06 (bottom row only)
	20-750-S4(4)	
	Feedback option modules	Valid ports:
	20-750-ENC-1	04...08
	20-750-DENC-1	04...08, 04...06 (bottom row only), when used with 20-750-S1
	20-750-UFB-1	04...06 (bottom row only)
	AMCI RD750	04...05 (only)
	Aux Power Supply	Valid ports:
	20-750-TAPS-XT(1)	8 and external connection
	Peer to Peer	Valid ports:
	20-750-TLINK-XT	04...06 (bottom row only)
09	Application parameters	Built-in applications; TorqProve™, PID, and so on.
10	Motor side inverter primary control parameters	Fixed ports for Motor Side Inverter Control Parameters
11	Motor side inverter secondary control parameters(5)	
12	Motor Side Inverter Power Parameters	Fixed port for Motor Side Inverter Power Parameters

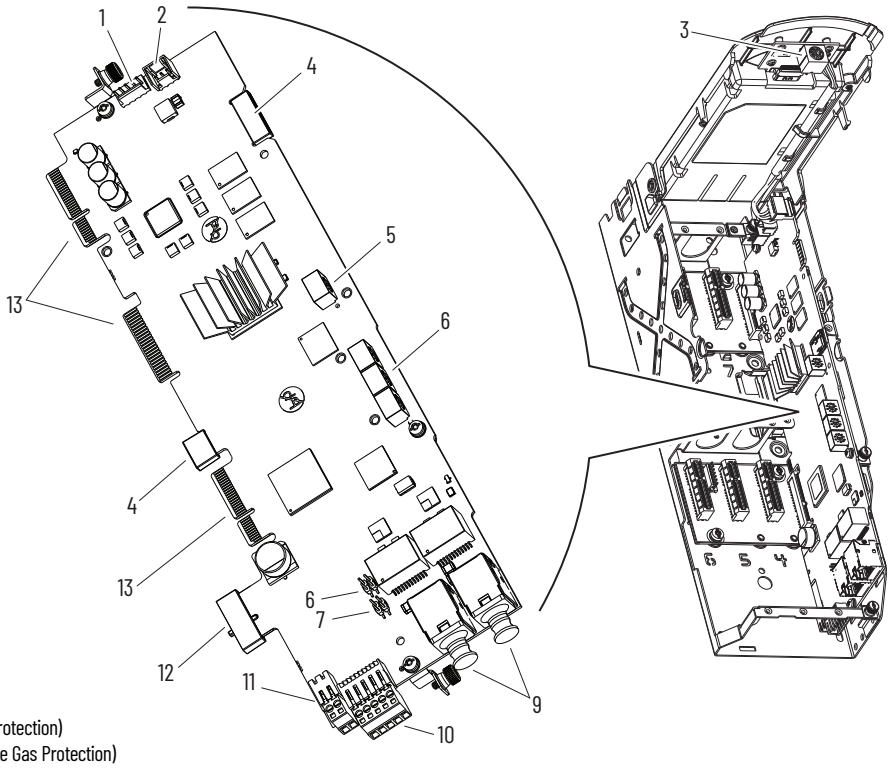
(1) For detailed information, see PowerFlex 750-Series Option Modules Installation Instructions, publication 750-IN002.
(2) Requires compatible 20-750-113x I/O module. See the PowerFlex 750-Series ATEX Option Module user manual, publication 750-UM003.
(3) See Knowledgebase Technote *Explicit (CIP) Messaging PowerFlex 755T* for detailed information about using explicit messaging with option modules 20-750-CNETC, 20-750-DNET, or 20-750-ENETR.
(4) Only one safety option module can be installed.
(5) Only present if secondary motor control enabled.

Figure 9 - PowerFlex 755TS: Control Pod and Port Locations



Item	Descriptions
1	DPI Port 1 connection on the control-pod-mounted Human Interface Module (HIM). The connection is on the back of the assembly that includes the control-pod-mounted HIM and HIM cradle. This assembly is shown not installed. When this assembly is installed, the DPI Port 1 connection on the HIM connects to the Control Pod.
2	Communication option module (shown installed at Port 5)
3	Expansion I/O module (shown installed at Port 4)
4	Embedded EtherNet/IP™ connectors
5	Terminal block TB1 behind Port 0 (the EtherNet/IP port) on the main control board
6	DPI Port 2 for handheld HIM connection, remote HIM connection, or a splitter cable (item 9)
7	Splitter cable connection that provides the following: When the DPI Port 1 connection (item 1) is not used, this splitter cable connection provides a DPI Port 1 connection. When the DPI Port 1 connection (item 1) is used, this splitter cable connection provides a Port 3 connection.
8	Splitter cable connection that provides a handheld HIM connection, or a remote HIM connection to DPI Port 2.
9	Splitter cable that connects to DPI Port 2 (item 6) and provides the connections that are listed in items 7 and 8.

Figure 10 - PowerFlex 755TS Main Control Board



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

Table 22 - PowerFlex 755TS Main Control Board Connector and Jumper Assignments

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

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

Hardware Enable Circuits

The PowerFlex 700S drive digital input Di 6 can be programmed for any available digital input functions, including hardware enable. The PowerFlex 700S drive has a hardware enable jumper (P22) on the main control board. See Figure 7 to identify jumper (P22).

By default, hardware enable is not used, jumper (P22) is closed (connected to pins 1…3), and Di 6 can be configured for other uses. If hardware enable is used, jumper (P22) is open (connected to pins 2…4), requiring a hardware enable contact wired to Di 6. Parameter P830 [Dig In6 Sel] is available but not functional when HW Enable is enabled (jumper (P22) is open, on pins 2…4).

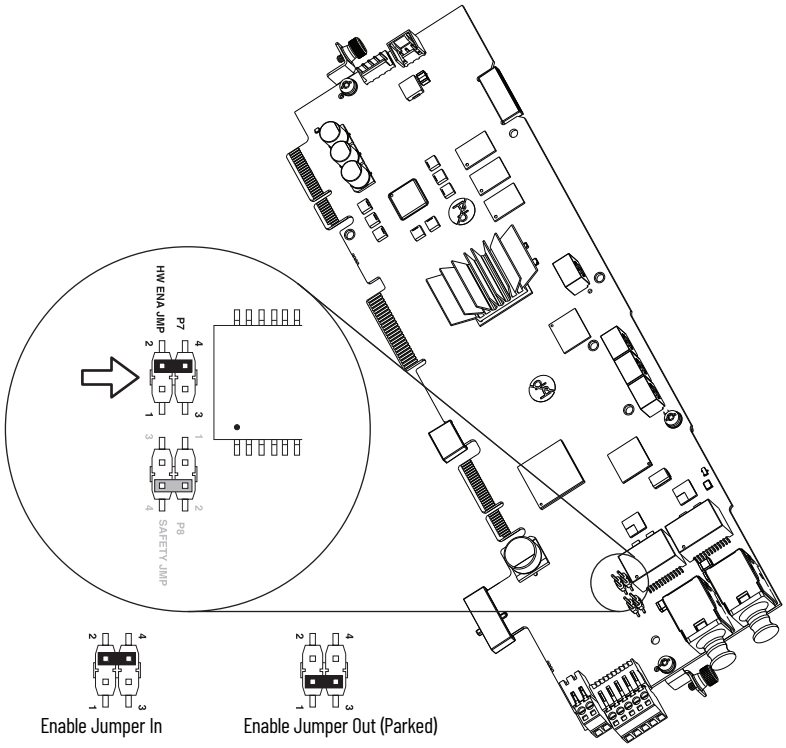
Table 23 - P22 Switch and Jumper Settings

Function	Default	Open	Closed
HW Enable Jumper (P22)	Pins 2…4 HW Enbl	pins 2…4 HW Enbl	pins 1…3 No Enbl

The PowerFlex 755TS Main Control Board Port 0, Digital input Di 0 can be configured for any available digital input functions, including DI ENABLE. See Figure 11 to identify the ENABLE jumper (J7). By default, hardware enable is not used and jumper (ENABLE) is installed. If hardware enable is used, ENABLE jumper (J7) is removed.

If desired, a digital input on an installed I/O option module can be assigned to the ENABLE input by setting 0:103 [DI M Enable] to the Port and digital input status parameter and bit on the I/O option module that will be used as the hardware ENABLE.

Figure 11 - ENABLE Jumper Location



Power Terminal Comparison

This section compares the input power terminals of the PowerFlex 700S drive with the PowerFlex 755TS drive.

PowerFlex 700S Drive

See Table 24 and Table 25 on page 49 for descriptions.

Figure 12 - PowerFlex 700S Drive, Typical Power Terminal Block Locations

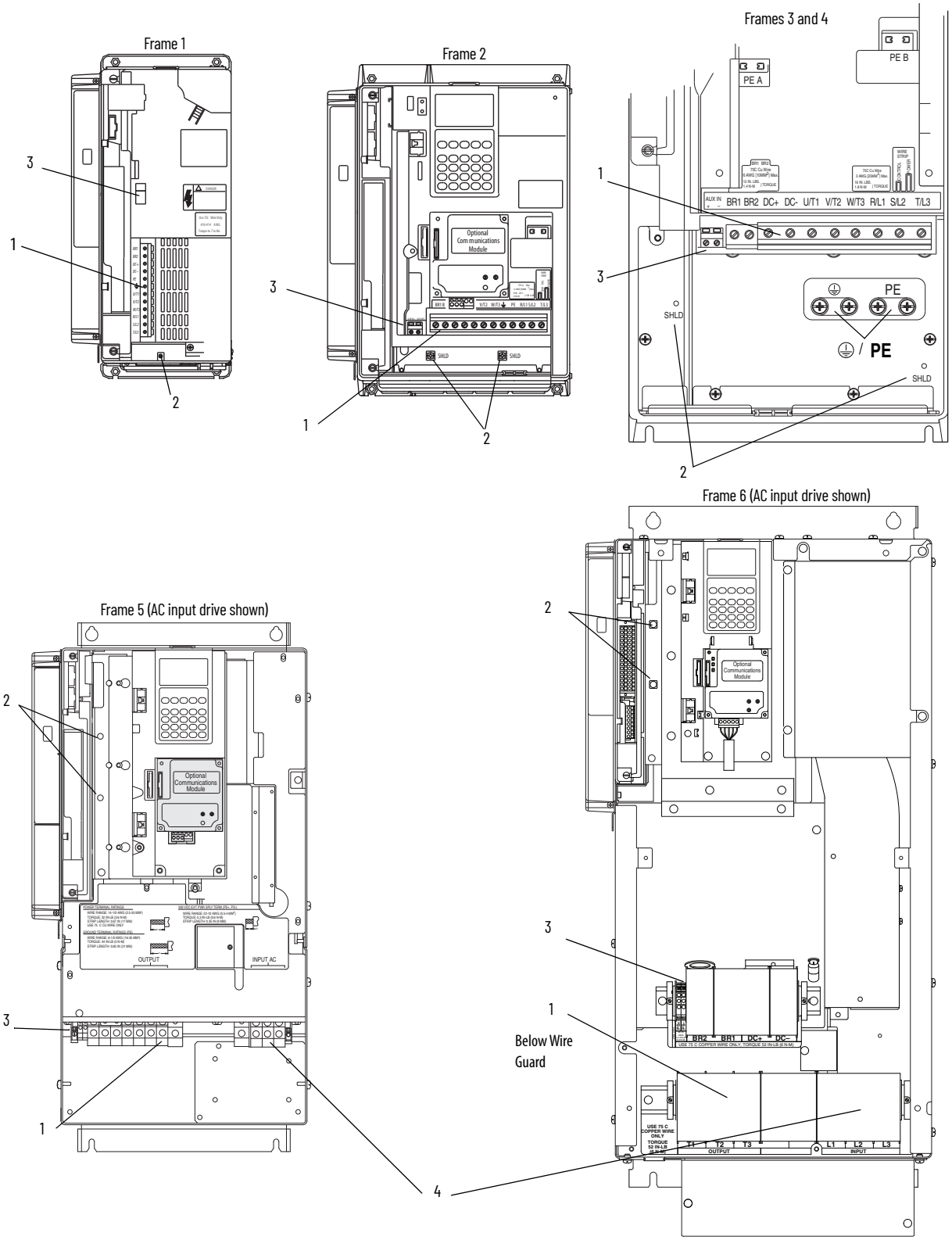


Table 24 - PowerFlex 700S Drive, Frames 1...6 Power Terminal Block Descriptions

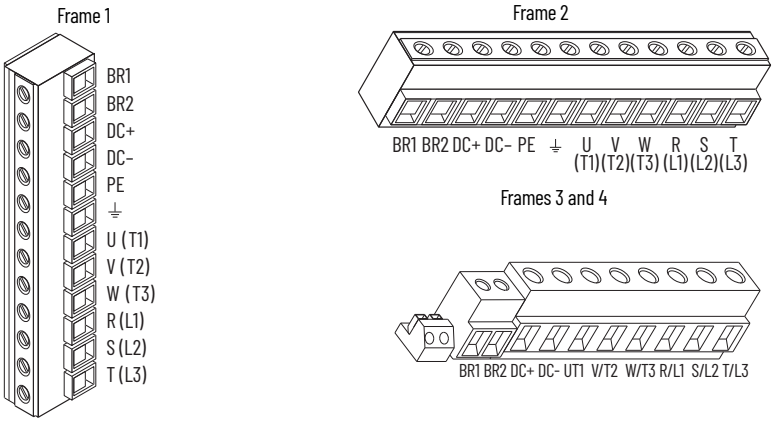
No.	Name	Frame	Description
1	Power Terminal Block	1	Input power and motor connections
		2	Input power and motor connections
		3	Input power and motor connections, BR1, BR2
		4	Input power and motor connections
		5 (1)	BR1, BR2, DC+, DC-, PE, U, V, W, R, S, and T
		6	L1, L2, L3, T1, T2, T3, BR1, BR2, DC+, and DC-
2	SHLD Terminal	1...6	Terminating point for wiring shields
3	AUX Terminal Block	1...6	Auxiliary Control Voltage (2) PS+, PS-
4	Fan Terminal Block	5 and 6	User Supplied Fan Voltage 0V AC, 120V AC, 240V AC

(1) Not all terminals present on all drives.
(2) External control power: UL Installation - 300V DC, ±10%, Non UL Installation - 270...600V DC, ±10%. Frame 1...6, 100 W

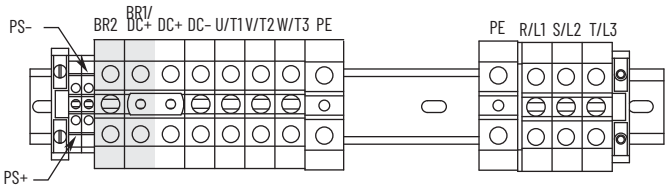
Table 25 - PowerFlex 700S Drive, Power Terminal Descriptions

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 (–)	
PE	PE Ground	Not present on frame 3 and 4 power terminal block
⏚	Motor Ground	Not present on frame 3 and 4 power terminal block
PS+	Aux +	
PS-	Aux -	
U	U (T1)	To motor
V	V (T2)	
W	W (T3)	
R	R (L1)	AC Line Input Power
S	S (L2)	
T	T (L3)	

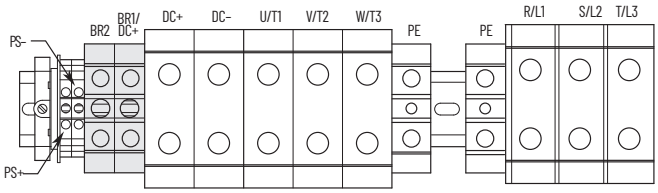
Figure 13 - PowerFlex 700S Drive, Power Terminal Blocks



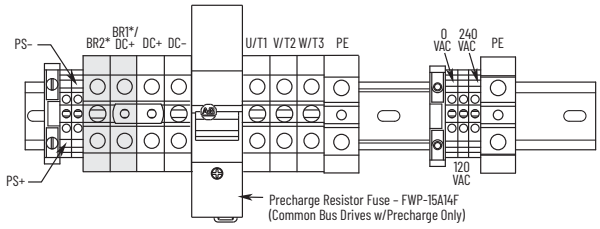
Frame 5 - 75 HP Normal Duty
480V AC Input



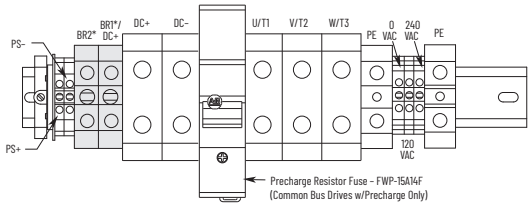
Frame 5 - 100 HP Normal Duty
480V AC Input



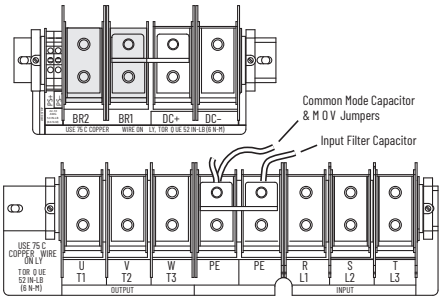
Frame 5 - 75 HP Normal Duty
650V DC Input



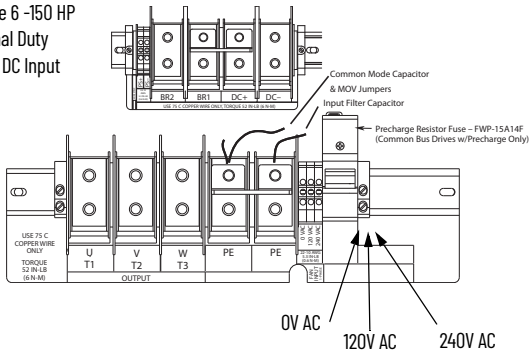
Frame 5 - 100 HP Normal Duty
650V DC Input



Frame 6 - 150 HP
Normal Duty
480V AC Input



Frame 6 -150 HP
Normal Duty
650V DC Input



Shaded terminals (BR1 & BR2) are only present on drives that are ordered with the Brake option.

PowerFlex 755TS Drives

Figure 14 - PowerFlex 755TS Drive, Frames 2...5 Power Terminal Block and Termination Point Locations

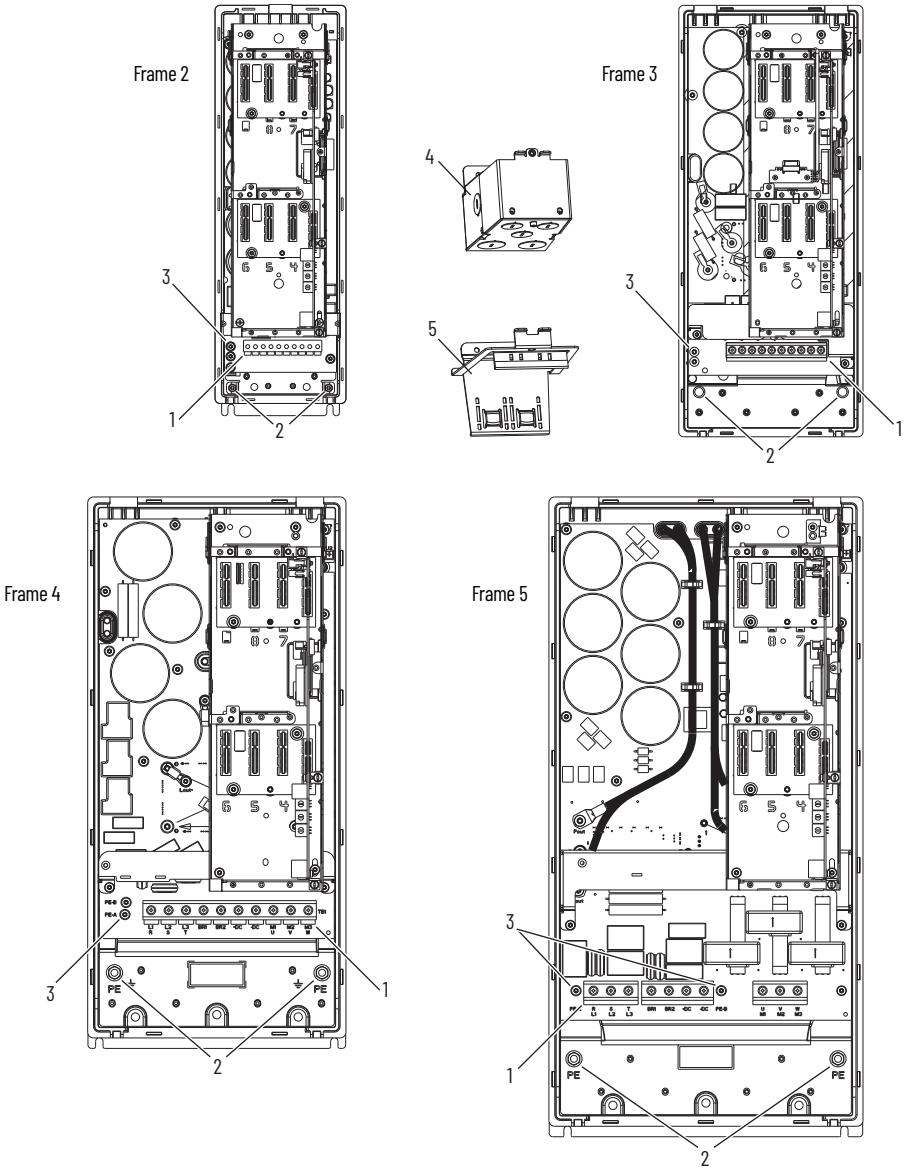


Table 26 - PowerFlex 755TS Drive, Frames 2...5 Power Terminal Block Descriptions

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

Figure 15 - PowerFlex 755TS Drive, Frame 6 Power Terminal Block and Termination Point Locations

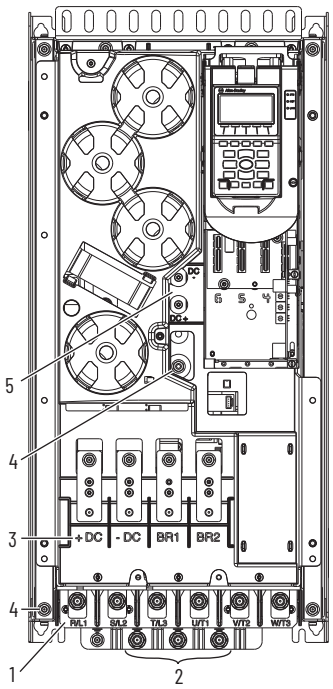
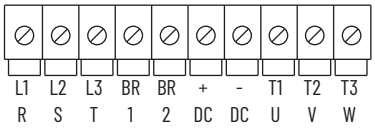
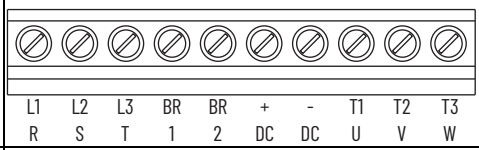
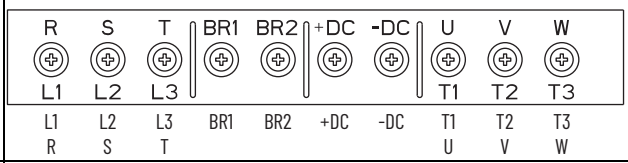
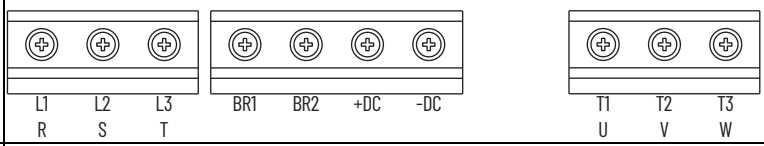
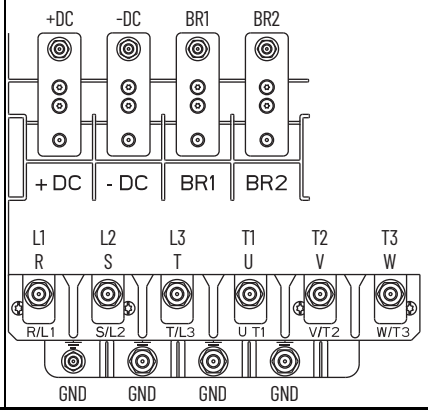


Table 27 - PowerFlex 755TS Drive, Frame 6 Power Terminal Block Descriptions

No.	Name	Description
1	Power Terminals	R/L1, S/L2, T/L3, U/T1, V/T2, W/T3
2	PE Grounding Studs	Terminating point to chassis ground for incoming AC line and motor shield
3	DC Bus and Brake Terminals	+DC, -DC, BR1, BR2
4	PE-A and PE-B	MOV and CMC jumper wires
5	DC+ and DC-	Bus voltage test points

Table 28 - PowerFlex 755TS AC Input Power Terminal Blocks Frames 2...6

Frame	Power Terminal Blocks
2	
3	
4	
5	
6 (1)	

(1) DC Bus Terminals are optional on Frame 6 drives: catalog number position 5.

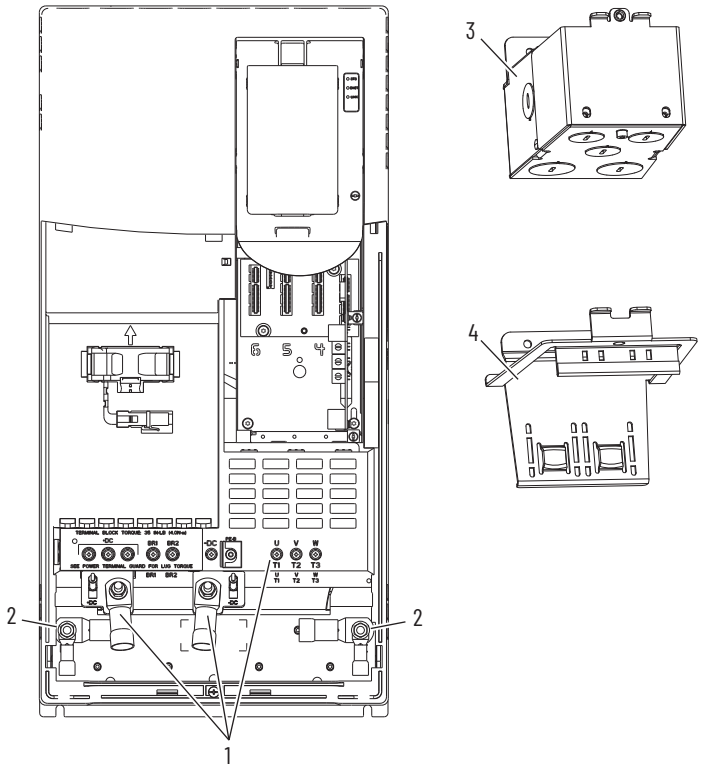
Table 29 - PowerFlex 750-Series Frames 2...6 Power Terminal Block Designations

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

(1) **Important:** Motors with NEMA MG1 Part 31.40.4.2 inverter grade insulation systems are recommended. See Wiring and Grounding Guidelines for Pulse Width Modulated (PWM) AC Drives, publication DRIVES-IN001, for recommendations.

PowerFlex 755TS Drive Frames 5 and 6 Common DC Input Terminal Locations

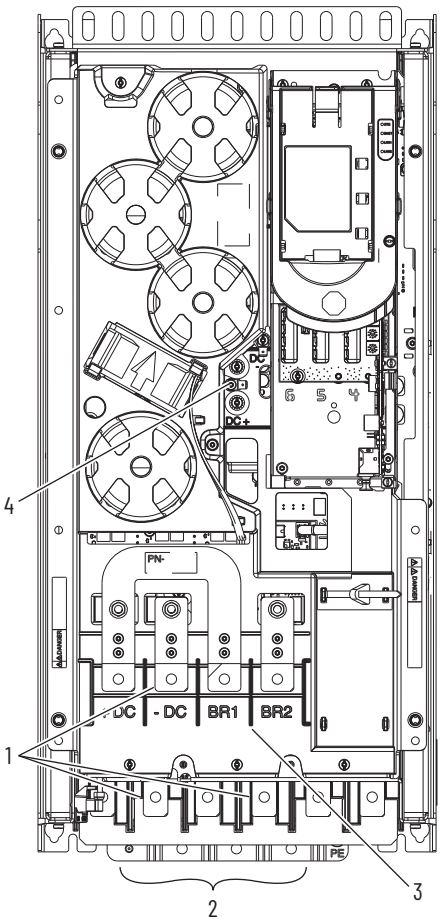
Figure 16 - PowerFlex 755TS Drive Frame 5 Common DC Input Power Terminal and Termination Point Locations



Frame 5

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

Figure 17 - PowerFlex 755TS Drive Frame 6 DC Input Power Terminal and Termination Point Locations

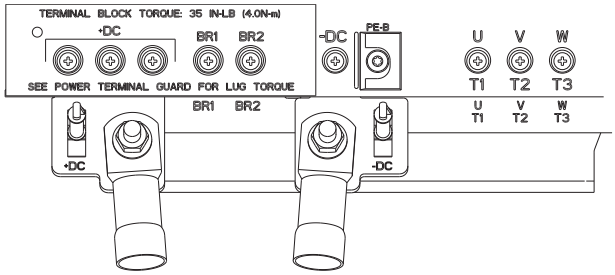
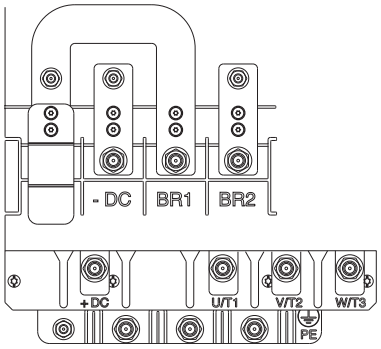
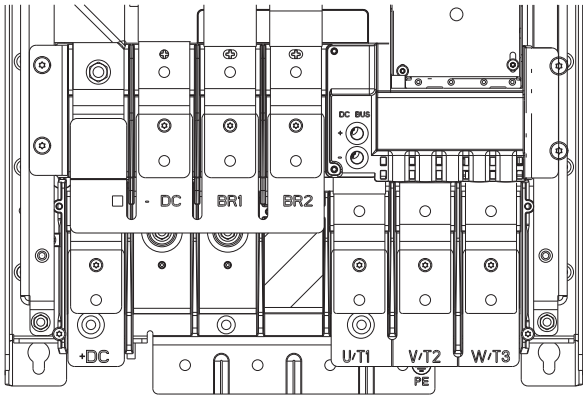


Frame 6

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

PowerFlex 755TS Drive Frames 5...7 Common DC Input Power Terminals

Table 30 - PowerFlex 755TS Drive AC Input Power Terminal Blocks Frames 5...7

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

(1) Dynamic Brake Resistor Terminals are optional on Frame 6 and 7 drives: catalog number position 12. See Catalog Number Explanation on page 11.

Table 31 - PowerFlex 755TS Drive Common DC Input Terminal Designations

Terminal	Description	Notes
+DC	DC bus (+)	DC input power
-DC	DC bus (–)	DC input power
BR1	DC brake (+)	Dynamic brake resistor connection (+)
BR2	DC brake (–)	Dynamic brake resistor connection (–)
U	U (T1)	Motor connections (1)
V	V (T2)	
W	W (T3)	
PE / ⏚	PE ground	Terminating point to chassis ground for incoming DC line and motor shield.

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

Table 32 - PowerFlex 755TS Drive, Frames 2...5 Power Terminal Block Specifications

Frame	Wire Size Range (1) (2)		Strip Length mm (in.)	Recommended Torque N•m (lb•in)	Recommended Tool(s)
	Max mm^2 (AWG)	Min mm^2 (AWG)			
2	4.0 (10)	0.2 (24)	8.0 (0.31)	0.57 (5.0)	#2 Pozidriv, M# x 7
3	16.0 (6)	0.5 (20)	10.0 (0.39)	1.2 (10.6)	#2 flat screwdriver
4	45.0 (1)	2.5 (14)	10.0 (0.39)	2.7 (24.0)	#2 Pozidriv 492-C Phillips 0.25 in. flat screwdriver
5	35.0 (1)	10.0 (8)	12.0 (0.5)	4.0 (35.0)	#2 Pozidriv 492-C Phillips 0.25 in. flat screwdriver

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

Table 33 - PowerFlex 755TS Drive, Frame 6 Terminal Block Specifications

Frame	Maximum Lug Width mm (in.)	Recommended Torque N•m (lb•in)]	Terminal Bolt Size	Recommended Tool
6	34.6 (1.36 in.)	11.3 (100)	M8 x 1.25	13 mm hex socket

Table 34 - PowerFlex 755TS Drive, Frames 2...6 PE Grounding Stud

Frame	Recommended Torque	Terminal Bolt Size	Recommended Tool
2	1.36 N•m (12 lb•in)	M4	7 mm hex deep-socket
3	3.4 N•m (30 lb•in)	M6	10 mm hex deep-socket
4	3.4 N•m (30 lb•in)	M6	10 mm hex deep-socket
5	3.4 N•m (30 lb•in)	M6	10 mm hex deep-socket
6	11.3 N•m (100 lb•in)	M8	13 mm hex socket

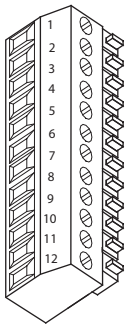
Control Terminal Block Specifications

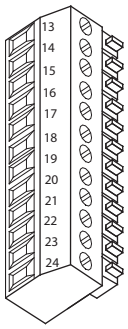
Use this section to compare the control terminal blocks of the PowerFlex 700S drives to the PowerFlex 755TS drives.

PowerFlex 700S Drives Main Control Board Input/Output

Digital and Analog I/O and a single Encoder input on the PowerFlex 700S are provided as standard on the main control board.

Table 35 - PowerFlex 700S TB1 Control Terminals

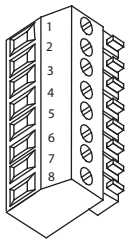


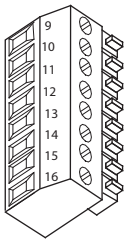


Terminal	Signal	Factory Default	Description	Related Parameter
1	Analog Input 1 Comm.	(Volt)	Bipolar, differential input, +/-10V, 0...20 mA, 13 bit + sign 20k Ohm impedance at Volt; 500 Ohm impedance at mA (1)	
2	Analog Input 1 (+/-)			800
3	Shield	—	Analog Input Shield	
4	Analog Input 2 Comm.	(Volt)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

Table 36 - PowerFlex 700S TB2 Control Terminals





Terminal	Signal	Factory Default	Description	Related Parameter
1	24V DC Common (-)	—	Drive supplied 24V DC logic input power Rating: 300 mA maximum load	
2	24V DC Source (+)	—		
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	—	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 Rating: 115V AC or 24V DC = 2 A Max Inductive/Resistive	856, 857
7	Relay Output 3 Com	—		
8	Relay Output 3 (NO)			
9	Digital Input 1...3 Com	—	Common for Digital Inputs 1...3	
10	Digital Input 1		High speed 12V or 24V DC(1) sinking Load:15 mA at 24V DC	825
11	Digital Input 2			826
12	Digital Input 3		Load:15 mA at 24V DC sourcing	827
13	Digital Input 4...6 Com	—	Common for Digital Inputs 4...6	
14	Digital Input 4		Load: 10 mA at 24V DC sinking/sourcing Load: 7.5 mA at 115V AC Note: The 115V AC 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 115V AC output below 2 milliamps.	828
15	Digital Input 5			829
16	Digital Input 6	HW Enable		830

(1) Digital Inputs 1 and 2 are configured for 12V or 24V DC via DIP switches S3-1 and S3-2, respectively. 24V DC is the default setting.

PowerFlex 755TS Drives Main Control Board Input/Output

The PowerFlex 755TS product main control board has one digital input that is typically used for hardware ENABLE. Optional 750-Series I/O modules must be added if additional digital and analog I/O is required. See PowerFlex 750TS AC Drives Installation Instructions, publication 750-IN119A, for more information about option modules.

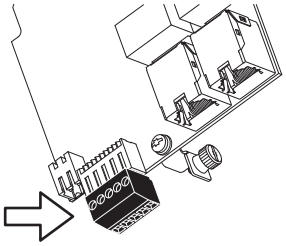


Table 37 - TB1 I/O Terminal Block Designations

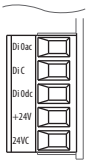
Fixed I/O	Terminal	Name	Description
	Di 0ac	Digital Input 0 120V AC (132V AC Max.)	Connections for AC power supply. High State: 100…132V AC Low State: 0…30V AC 10 mA maximum
	Di C	Digital Input Common	Digital input common
	Di 0dc	Digital Input 0 24V DC (30V DC Max.)	Connections for DC power supply. High State: 20…24V DC Low State: 0…5V DC 9 mA maximum
	+24V	+24 Volt Power	Connections for drive supplied 24V power. 150 mA maximum
	24VC	24 Volt Common	

Table 38 - TB1 I/O Terminal Block Specifications

Name	Wire Size Range		Torque		Strip Length
	Maximum	Minimum	Maximum	Recommended	
PowerFlex 755TS control module TB1	2.5 mm^2 (14 AWG)	0.3 mm^2 (28 AWG)	0.25 N•m (2.2 lb•in)	0.2 N•m (1.8 lb•in)	6 mm (0.24 in.)

Chapter 4 shows an example of using a 20-750-2263C-1R2T, 24V DC I/O module to emulate a typical hardware control function used with a PowerFlex 700S drive.

Communication Configuration

A PowerFlex® 700S drive with a communication option module can usually be migrated to a PowerFlex 755TS drive with embedded EtherNet/IP™ or compatible communication module. The process to migrate can vary significantly depending on the communication option in the PowerFlex 700S drive and the controller type communicating with the drive.

IMPORTANT See the appropriate communication option module user manuals. The manuals provide important configuration, installation, wiring, and programming processes required for proper operation.

This section describes the PowerFlex 700S network options that are compatible with PowerFlex 755TS drives. Because of the wide variety of networks, processors, and drive options available, use this section to understand the types of network communication that are available for PowerFlex 755TS drives, and determine the correct communication option for your drive migration.

In some cases, it is necessary to remap and translate reference, status, control, and DataLink registers if 16-bit based processors such as PLC-5®, SLC™, or certain MicroLogix™ controllers are communicating with the drive.

Use Table 39 to cross-reference the existing PowerFlex 700S communication module to a compatible PowerFlex 750-series communication module. If your existing communication protocol does not have a compatible PowerFlex 750-Series communication module, contact an authorized Rockwell Automation Distributor specialist, Solution Partner, Recognized System Integrator or Rockwell Automation account manager to discuss engineered solutions for custom migrations.

ControlNet® is an Active Mature communication network. New installations should consider modernizing to EtherNet/IP to optimize asset utilization. For information on how to migrate ControlNet to EtherNet/IP, see the ControlNet to EtherNet/IP Migration Reference Manual, publication CNET-RM001.

Table 39 - Communication Module Cross-reference Guide

Protocol	PowerFlex 700S	PowerFlex 755TS
EtherNet/IP	20-COMM-E	Embedded dual-portEtherNet/IP and 20-750-ENETR. (1)
	20-COMM- ER	
	1788-ENBT	–
	20D-DL2-ENET0	
ControlNet Coax	20-COMM-C	20-750-CNETC (1)
	1788-CNC/CNCR	
ControlNet Fiber	20-COMM-Q	–
	1788-CNF/CNFR	
DeviceNet®	20-COMM-D 1788-DNB0	20-750-DNET(1)
HVAC Modbus RTU	20-COMM-H	–
CANopen	20-COMM-K	–
Modbus/TCP	20-COMM-M	–
PROFIBUS DPV1	20-COMM-P	20-750-PBUS (series B only)
ProfiNet	–	20-750-PNET (series B only)
		20-750-PNET2P (series B only)
Remote I/O	20-COMM-R	–
RS485 DF1	20-COMM-S	–
USB	1203-USB	1203-USB

(1) See Knowledgebase Technote *Explicit (CIP) Messaging PowerFlex 755T* for detailed information about using explicit messaging with option modules 20-750-CNETC, 20-750-DNET, or 20-750-ENETR.

Transferring Data

There are differences in the way the PowerFlex 700S drive and the PowerFlex 755TS drive transfer data.

Transferring Data With the PowerFlex 700S Drives

The PowerFlex 700S drives transfer two types of data between drives, including:

- Direct - Data delivered in a single message. A SynchLink™ message can contain a maximum of four direct data words; each word is 32 bits in length. Direct data can be automatically forwarded to the next SynchLink node in the daisy chain or ring configurations.
- Buffered - Data that exceeds the four word limit of a direct data transfer. Buffered data is appropriately segmented at the transmitting device and reassembled at the receiving device. Buffered data cannot be automatically forwarded to the next SynchLink node in the daisy chain and ring configurations.

Transferring Data With the PowerFlex 755TS Drives

PowerFlex 755TS drives can use TLink option modules. TLink option modules allow high-speed communication between drives. A TLink-based system consists of at least two TLink option modules that are installed in two or more drives that are connected by a fiber-optic cable. One drive is considered the leader and all others are considered followers. TheTLink option module is intended to provide synchronization of the drives in a system and to share data from leader to followers.

SyncLink Versus TLink

There are differences in the way SyncLink and TLink work.

PowerFlex 700S Drive

SynchLink offers the ability to send any parameter from a PowerFlex 700S drive to any parameter linkable in the receiving drive. SynchLink can be set up in 3 different configurations:

- Star with up to 256 followers
- Linear with 9 followers
- Ring with 9 followers looped back to the leader.

Table 40 - SyncLink Information

SyncLink Connection Modes
Linear mode 10 drive Ring mode 10 drives Star mode up to 256
SyncLink Data Type Output
Any parameter in the drive Encoder / optional feedback Any direct or buffered input of SyncLink Synclink multiply data Event data Event status
SyncLink Data Types Input
Any linkable parameter Direct or buffered outputs
SynchLink Timing
Direct 50 µsec Buffered 500 µsec Axis 500 µsec Master time keeper All drives synchronized to with 1 µsec

PowerFlex 755TS With TLink

TLink offers the ability to send two selections from the leader to multiple follower drives. The following selections are available to be transmitted to the followers.

- Torque Ref Out
- Torque Ref Selected
- Torque Ref Filtered In
- Ramped Velocity Reference

The follower drives can use either the Ramped Velocity Reference, Torque Reference, or both. See the TLink Option Module User Manual, publication 750COM-UM100, for more information.

Table 41 - TLink Information

TLink Connection Modes
Linear mode 4 nodes
TLink Data Output Parameters
Linear mode 4 nodes
TLink Data Input Parameters
Trq Ref A Sel 10:2000 Vref A Sel 10:1800
TLink Timing
4 nodes 125 µsec All drives synchronized within 6.25 µsec

Complex Conversions

If you are migrating from a PowerFlex 700S drive and using position follower or line draw multiplication applications, contact an authorized Rockwell Automation Distributor specialist, Solution Partner, Recognized System Integrator, or Rockwell Automation account manager to discuss engineered solutions for custom migrations.

Using Datalinks

Scaling of Reference and Feedback

The PowerFlex 700S drive parameters for network 'SpeedReference' and 'SpeedFeedback' data using a 20-COMM-E communication adapter are scaled for 32767 = 1.0 PU. A Logix value of 32767 written to network DPI Port 5 'SpeedReference' 32-bit integer pre-defined output DataLink will equate to a parameter P40 [Selected Spd Ref] internal value of 1.0 PU, which is displayed in RPM where 1.0 PU = P4 [Motor NP RPM].

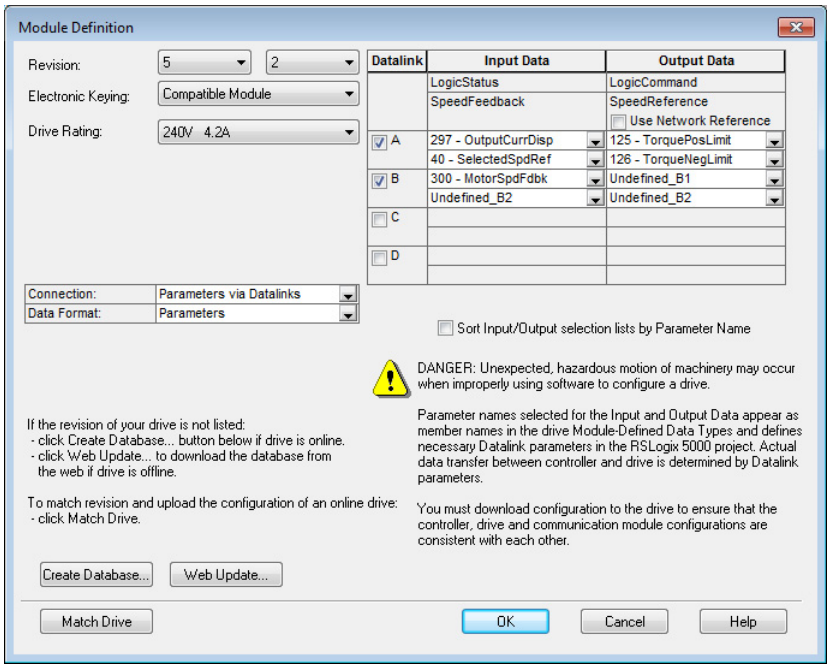
The PowerFlex 755TS network speed 'Reference' and 'Feedback' data using the Embedded Ethernet or 20-750-ENTR option module are in engineering units and are dependent on 0:46 [Velocity Units]. A Logix value of 60.2 written to the network 'Reference' 32-bit real pre-defined output DataLink will equate to a parameter 0:1892 [VRef Selected] value of 60.2 Hz or 60.2 rpm depending on the setting of parameter 0:46 [Velocity Units]. It is highly recommended that 0:46 be set to 1='RPM' to match the velocity units used by the PowerFlex 700S.

PowerFlex 700S Drive DPI Communications

The PowerFlex 700S drive supports 16/32-bit integer [INT/DINT] and floating point [REAL] DataLinks, which can be selected on the Logix module definition screen (for details, see the communication adapter documentation). The PowerFlex 700S with 20-COMM-x communication option module supports 8 Input and 8 Output 32-bit DataLinks. When using Logix Version 16 and later PowerFlex 700S internal/communication parameter values and Logix DataLink tags automatically have the same data type and scaling factor as the PowerFlex 700S internal values.

Figure 18 shows the Module Definition dialog box for a PowerFlex 700S with 20-COMM-E Ethernet/IP adapter using one 32-bit DINT parameter (A1) and two 32-bit REAL parameters (A2 and B1) on the Input, as well as two 32-bit REAL parameters (A1 and A2) on the Output.

Figure 18 - Module Definition



PowerFlex 755TS Drive Communications

The PowerFlex 755TS drive supports 16 input and 16 output 16/32-bit integer [INT/DINT] and floating point [REAL] DataLinks when using Embedded EtherNet or 20-750-ENETR communication option module. When using Logix Version 20 and later, PowerFlex 755TS parameters and Logix DataLink tags automatically have the same data type and scaling factor. Figure 19 and Figure 20 show similar 32-bit DataLinks when using a PowerFlex 755TS drive with Embedded EtherNet communication.

See PowerFlex Drives with TotalFORCE Control Built-in EtherNet/IP Adapter User Manual, publication 750COM-UM009, and PowerFlex 20-750-ENETR Dual-port EtherNet/IP Option Module User Manual, publication 750COM-UM008, for more information.

Figure 19 - Connection Formats - Inputs

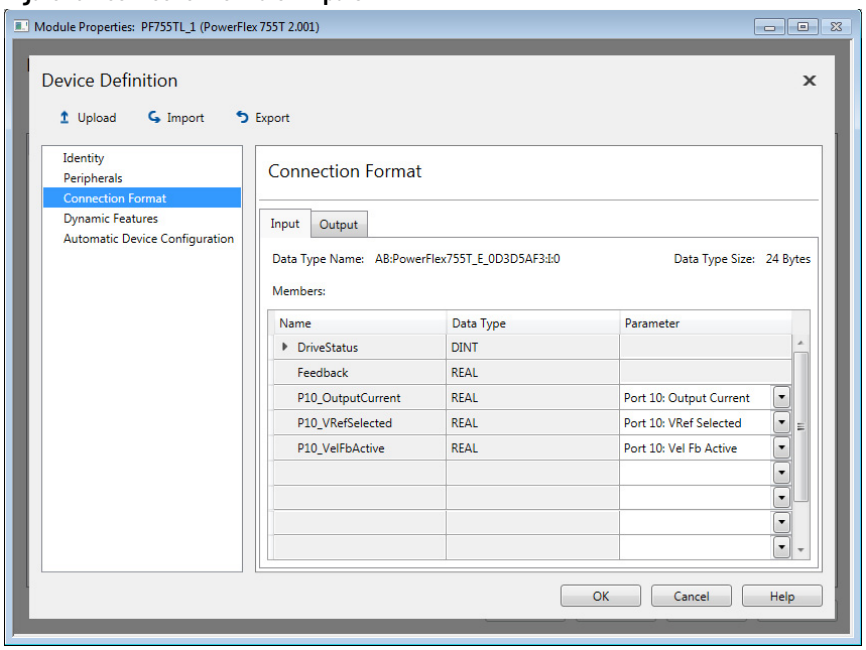
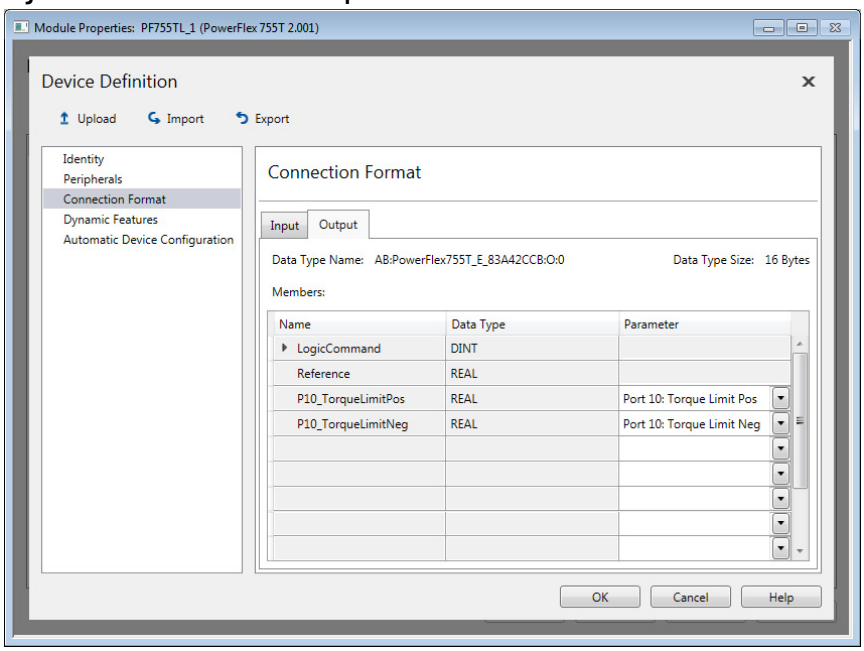


Figure 20 - Connection Formats - Outputs



Logic Command Word

Table 42 shows the motor side inverter communication Logic Command Word comparison that applies to the Logix Add-On-Profile (AOP). The Logic Command Word functions are pre-defined by the AOP and associated tags are automatically assigned in the Logix project.

- "Start" is a momentary command, that is, a transition from '0' to '1' performs the start function. A '1' to '0' transition of the "Start" command has no effect on operation and does NOT perform a stop function.
- The "Run" command is a maintained function. A '0' to '1' transition of the "Run" command performs the run function. A '1' to '0' transition of the "Run" command performs a stop function.
- The "NormalStop" or "Stop" command must transition from '0' to '1' to perform a stop function. The "Start" and "Run" commands are inhibited if the "NormalStop" or "Stop" command is '1'. The "Start" or "Run" commands must transition from '0' to '1' after a stop command in order to perform the start or run functions.

Table 42 - Motor Side Inverter Logic Command Word Comparison

PowerFlex 700S Drive :O.LogicCommand_ "TagName"	Command Description	PowerFlex 755TS Common Bus Inverter :O.LogicCommand_ "TagName"	Command Description
Bit 0 "NormalStop"	0 = Not Normal Stop 1 = Normal Stop	Bit 0 "Stop"	0 = Not Stop 1 = Stop
Bit 1 "Start"	0 = Not Start 1= Start	Bit 1 "Start"	0 = Not Start 1= Start
Bit 2 "Jog1"	0 = Not Jog 1 1 = Jog using P29 [Jog Speed 1]	Bit 2 "Jog1"	0 = Not Jog 1 1 = Jog using 10:1894 [Jog Speed 1]
Bit 3 "ClearFault"	0 = Not Clear Fault 1 = Clear Fault	Bit 3 "ClearFaults"	0 = Not Clear Fault 1 = Clear Fault
Bit 4 "UniPolFwd" Bit 5 "UniPolRev"	00 = No Command 01 = Forward command 10 = Reverse command 11 = Hold Direction	Bit 4 "Forward" Bit 5 "Reverse"	00 = No Command 01 = Forward command 10 = Reverse command 11 = Hold Direction
Bit 6 Reserved	Not used	Bit 6 "Manual"	0 = Not Manual 1 = Manual
		Bit 7 Reserved	Not used
Bit 7 "Jog2"	0 = Not Jog 2 1 = Jog using P39 [Jog Speed 2]	Bit 19 "Jog2"	0 = Not Jog 2 1 = Jog using 10:1895 [Jog Speed 2]
Bit 8 "CurLimStop"	0 = Not Current Limit Stop 1 = Current Limit Stop	Bit 17 "CLimitStop"	0 = Not Current Limit Stop 1 = Current Limit Stop
Bit 9 "CoastStop"	0 = Not Coast Stop 1 = Coast Stop	Bit 16 "CoastStop"	0 = Not Coast Stop 1 = Coast Stop
		Bit 8 "AccelTime1" Bit 9 "AccelTime2"	00 = No Command 01 = Use 10:1915 [VRef Accel Time1] 10 = Use 10:1916 [VRef Accel Time2] 11 = Use Present Time
Bit 10 Reserved	Not used	Bit 10 "DecelTime1" Bit 11 "DecelTime2"	00 = No Command 01 = Use 10:1917 [VRef Decel Time1] 10 = Use 10:1918 [VRef Decel Time2] 11 = Use Present Time
Bit 11 Reserved	Not used		
Bit 12 "SpdRefSel1" Bit 13 "SpdRefSel2" Bit 14 "SpdRefSel3"	000 = Use P27 [Speed Ref A Sel] 001 = Use P28 [Speed Ref B Sel] 010 = Use P15 [Preset Speed 2] 011 = Use P16 [Preset Speed 3] 100 = Use P17 [Preset Speed 4] 101 = Use P18 [Preset Speed 5] 110 = Use P19 [Preset Speed 6] 111 = Use P20 [Preset Speed 7]	Bit 12 "SpdRefSel0" Bit 13 "SpdRefSel1" Bit 14 "SpdRefSel2"	000 = No Command 001 = Use 10:1800 [VRef A Sel] 010 = Use 10:1807 [VRef B Sel] 011 = Use 10:1816 [Preset Speed 3] 100 = Use 10:1817 [Preset Speed 4] 101 = Use 10:1818 [Preset Speed 5] 110 = Use 10:1819 [Preset Speed 6] 111 = Use 10:1820 [Preset Speed 7]
Bit 15 Reserved	Not used	Bit 15 Reserved	Not used
		Bit 18 "Run"	0 = Not Run 1 = Run
		Bit 20...31 Reserved	Not used

DataLink Handling Comparison

DataLink examples using a Logix controller with Logix V16 and later firmware. Sample numerical data is interpreted as shown in Table 43.

Table 43 - DataLink Handling Comparison

Example Data	Drive Type and Comm Option	DataLink; Parameter Information	Parameter Value in PowerFlex	Tag Value in Logix(1) (2)
Output Amps	PowerFlex 700S; 20-COMM-E/ER	Input DataLink A1; P308 [Output Current], type 'REAL', units 'Amps'	458.9	458.9
	PowerFlex 755TS; Embedded Ethernet	Input DataLink 01; 10:3 [Output Current], type 'REAL', units 'Amps'	458.9	458.9
Motoring Torque Limit	PowerFlex 700S; 20-COMM-E/ER	Output DataLink A1; P125 [Torque Pos Limit], type 'REAL', units 'PU'	2.0	2.0
	PowerFlex 755TS; Embedded Ethernet	Output DataLink 01; 10:2083 [Torque Limit Pos], type 'REAL', units '%'	200.0	200.0
Regen Torque Limit	PowerFlex 700S; 20-COMM-E/ER	Output DataLink A2; P126 [Torque Neg Limit], type 'REAL', units 'PU'	-2.0	-2.0
	PowerFlex 755TS; Embedded Ethernet	Output DataLink 02; 10:2084 [Torque Limit Neg], type 'REAL', units '%'	-200.0	-200.0
Network Speed Reference	PowerFlex 700S; 20-COMM-E/ER	Pre-defined Output Tag; DPI Port 5, Tag 'SpeedReference', Type 'DINT'	Internal value; 21554 Comm value; =(21554 / 32767) x [Motor NP RPM] =(21554 / 32767) x 1750 = 1151 RPM	11151
	PowerFlex 755TS; Embedded Ethernet	Pre-defined Output DataLink; 0:211 [Emb Enet Ref], Tag 'Reference', Type 'REAL'	1460.2	1460.2
Selected Speed Reference	PowerFlex 700S; 20-COMM-E/ER	Input DataLink A2; P40 [Selected Spd Ref], Type 'REAL', units 'RPM'	Internal value; 0.513 P40 displayed as; = 0.513 * P4 [Motor NP RPM]	0.513
	PowerFlex 755TS; Embedded Ethernet	Input DataLink 02; 0:1892 [VRef Selected], Type 'REAL', units(3) 'RPM'	1460.2	1460.2
Network Speed Feedback	PowerFlex 700S; 20-COMM-E/ER	Pre-defined Input Tag; DPI Port 5, Tag 'SpeedFeedback', Type 'DINT'	Internal value; 21554 Comm value; =(21554 / 32767) x [Motor NP RPM] =(21554 / 32767) x 1750 =1151 RPM	1151
	PowerFlex 755TS; Embedded Ethernet	Pre-defined Input DataLink; Tag 'Feedback', Type 'REAL'	935.7	935.7

(1) When using Logix Version 16 and later, DataLink scaling is automatically applied such that Logix values match PowerFlex internal values.
(2) When using Logix V1ersion 5 and earlier or 16-bit processors, DataLink scaling may need to be done in application programs. See the 16 Bit-based Processor section in this document for more information.
(3) PowerFlex 755T velocity units depend on the setting of parameter 0:46 [Velocity Units]. It is highly recommended that parameter 0:46 be to 1='RPM' to match the PowerFlex 700S velocity units of 'RPM'. The above examples assume P46 = 1 'RPM'.

16-bit Processors

The PowerFlex 755T products are 32-bit, whereas the PLC-5, SLC 500, and MicroLogix 1100/1400 processor modules are 16-bit. Any application that uses a 16-bit based processor with a PowerFlex 755Ts drive Embedded EtherNet/IP or communication option module must include a review to determine the types of data that are passed, and if the 16-bit based processor can process the data.

For information on how to use a PLC-5, SLC 500, or MicroLogix 1100/1400 controller, see Controller Examples for EtherNet/IP Network

Communications with PowerFlex 750-Series Drives, publication 750COM-AT001.

For 16-bit processors, the data requires manipulation to set a speed reference above 32767 or below -32767. See PowerFlex 700S AC Drives Phase II Control reference manual, publication PFLEX-RM003.

PowerFlex 700S DriveLogix 5730 Configurations

The PowerFlex 700S control board includes a DriveLogix 5730 processor. The drive could also be equipped with an optional logix expansion board 20D-DL2-LEB0, to expand the capabilities of the DriveLogix 5730 controller.

DriveLogix offers embedded Logix control for application programmability and control of auxiliary functions in the PowerFlex 700S. DriveLogix is programmed using Studio/RSLogix 5000. It is a fully functional CompactLogix™ controller. It can be programmed using a Ladder Diagram, Function Block Diagram, Sequential Function Chart, or Structured Text. It is only an option for the PowerFlex 700S and is not available in any other current drive product. More information on DriveLogix can be found in the DriveLogix 5730 Controller for PowerFlex 700S Drives with Phase II Control User Manual, publication 20D-UM003.

DeviceLogix is an embedded control technology in some Rockwell Automation products that can control outputs and manage status information onboard a device. In the PowerFlex 755TS drive, DeviceLogix is used to provide additional control capability at the drive level based on application needs. A Function Block Diagram or Ladder Logic program can be configured to control drive functions and physical and networked I/O. DeviceLogix is programmed using Connected Components Workbench (CCW). More information on DeviceLogix is found in the DeviceLogix System User Manual, publication RA-UM003.

Migration Solutions

If you are using DriveLogix with the PowerFlex 700S, you will need to use an external automation controller, such as a CompactLogix or ControlLogix®, and translate your PowerFlex 700S DriveLogix application software to operate within the automation controller. A communication network is required to communicate between the PowerFlex 755TS drive and the automation controller.

For simple programming needs use DeviceLogix — Embedded control technology that supports the manipulation of discrete outputs and drive control functions, while using discrete inputs and drive status information onboard the drive.

Drive Configuration and Parameter Comparison

This chapter examines drive configurations and parameter comparisons.

Feedback and I/O Comparison

The PowerFlex™ 700S drive could be equipped with various I/O, feedback, and control options. Most of the available I/O and feedback options have equivalent PowerFlex 755TS devices as indicated in the following table.

Table 44 - Feedback and I/O Comparison

Device or Function	PowerFlex 700S	PowerFlex 755TS
Digital and Analog I/O	Standard: 6 x digital input 3 x digital output 2 x analog input 2 x analog output	Standard: 1 x digital input Optional: 20-750-11/22 series I/O See Table 39 on page 62 for more information.
Encoder	Standard: single channel incremental encoder	Optional: 20-750-ENC-1(1), 20-750-DENC-1(1), or 20-750-UFB(2)
SynchLink™	Optional: 20D-P2-SLB0	20-750-TLINK-XT
Logix Expansion DriveLogix™ 5730	Optional: 20D-DL2-LEB0	—
DriveLogix™ with 1769 Compact I/O™ module	Optional: additional config option codes (-K or -L), with 1769 Compact I/O modules and cables 20D-DL2-CL3 / 20D-DL2-CR3	Optional: 20-750-11/22 series I/O See Table 39 on page 62 for more information.
Multi-Device Interface (for use with Stegman Rotary Encoder and Linear Feedback devices)	Optional: 20D-MDI-C2	Optional: 20-750-UFB-1(2)
DriveGuard® Safe Torque Off	Optional: 20D-P2-DG01 (includes 2nd encoder)	Optional: 20-750-S or 20-750-S3 and 20-750-DENC-1(1)
2nd Encoder	Optional: 20D-P2-ENC0	Optional: 20-750-ENC-1(1) or 20-750-DENC-1(1)
Resolver	Optional: 20D-RES-A1	Optional: Third-party, AMCI RD750
Stegmann High Res Hiperface Encoder	Optional: 20D-STEG-B1	Optional: 20-750-UFB-1(2)
Auxiliary Control Power Supply	Optional: 20-24V-AUX1	Optional: 20-750-750-TAPS-XT
Motor Voltage Feedback	Standard:	Optional: Torque Accuracy Module (TAM) 20-750-TSTAM-CD-XT

(1) See Table 45 on page 72 to see if your existing incremental encoder can be used with the 20-750-ENC-1 and 20-750-DENC-1 modules.
(2) See PowerFlex 755TS Products with TotalFORCE Control Technical Data, publication 750-TD104, to see if your existing encoder can be used with the 20-750-UFB module.

Table 45 - PowerFlex 755TS Incremental Encoder Compatibility

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

Table 46 - PowerFlex 755 Universal Feedback Encoder Option Module - Supported Feedback Devices

Consideration	Heidenhain (EnDat)	SSI	Stegmann (Hiperface)	BiSS	Stahl (Linear)	Temposonics (Linear)
Encoder Voltage Supply	5V @ 250 mA	10.5V @ 250 mA	10.5V @ 250 mA	10.5V @ 250 mA	External Supplied 24V	External Supplied 24V
High-Resolution Signal	Sine/Cosine 1V P-P	Sine/Cosine 1V P-P	Sine/Cosine 1V P-P	Sine/Cosine 1V P-P	—	—
Maximum Cable Length	100 m (328 ft)	100 m (328 ft)	90 m (328 ft)	100 m (328 ft)	100 m (328 ft)	100 m (328 ft)
Update Rate(1)	102.4 µs	102.4 µs	102.4 µs	102.4 µs	0.5/1.0/1.5/2.0 ms	0.5/1.0/1.5/2.0 ms
Maximum Input Frequency	163.8 kHz	163.8 kHz	163.8 kHz	163.8 kHz	—	—

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

Configuration Software and HIM Versions

There are several tools available for configuring PowerFlex 755TS parameters. You must use a compatible human interface module (HIM) or configuration software package to migrate to the new PowerFlex 755TS products.

The PowerFlex 755TS drive uses similar HIM and configuration software packages as the PowerFlex 700S, but you must know the software version of each drive to know if the available software packages are compatible with the new PowerFlex 755TS drive.

Older configuration software tools do not support the PowerFlex 755TS drive. You must use the latest available versions of software configuration tools such as Studio 5000 Logix Designer application, RSLogix 5000® software, or Connected Components Workbench™ (CCW) software for full featured configuration capabilities.

- CCW can be used to configure PowerFlex 755TS drive parameters directly via EtherNet/IP™ connection from your computer to the PowerFlex 755TS drive Embedded or option module Ethernet communication port.
- If your computer is connected to Logix controller EtherNet/IP architecture that supports drive Add-On-Profiles (AOP), you can use RSLogix™ or Studio 5000® to configure PowerFlex 755TS parameters via Embedded or option module Ethernet communication port.
- If you wish to make a direct connection from your computer USB port to the PowerFlex 755TS drive DPI™ port, you will require an external 1203-USB communication protocol converter and appropriate connection cables to configure PowerFlex 755TS product parameters.

Table 47 - PowerFlex 755TS Configuration Tools

Configuration Tool	Minimum Software and Firmware Requirements (1)
DriveExplorer™ software	Not supported
DriveTools™ SP/DriveExecutive software	Not supported
CCW (Connected Components Workbench)(2) software	Version 11.000 and later
RSLogix 5000® (3)	Version 20.001 and later
Studio 5000® (3)	Version 21.003 and later
HIM (4) 20-HIM-A6/-C6S	Revision 2.008 and later

(1) The latest available versions are recommended.
(2) CCW Profile update (version 15.01 or later) is required.
(3) AOP update (version 15.01 or later) is required.
(4) Assisted Startup using the HIM not available.

Parameter Comparison

Use Table 48 ...Table 53 to cross-reference commonly used and modified PowerFlex 700S parameters with equivalent parameters in the PowerFlex 755TS drive. See PowerFlex Drives with TotalFORCE Control Programming Manual, Firmware Rev. 10...11, publication 750-PM101B, for more information.

Parameter Scaling

The PowerFlex 700S uses per unit (PU) values for most internal parameter values and some parameters that are accessed by the user. Most parameters are presented to the user in scaled engineering units (rpm, amps, and so on). However, others like P10 [Speed Ref 1] and P111 [Torque Ref 1] are presented in PU values.

The PowerFlex 755TS drive uses floating point engineering units for all parameter values. Confirm that Logix tags that reference PowerFlex 700S PU parameters are properly scaled for use with the PowerFlex 755TS drive.

PowerFlex 700S Parameter Assignment

The PowerFlex 700S uses linear parameter numbering and direct or 'linkable' parameter assignments for most user parameters, so the port number is not specified or is internally referenced to fixed port locations, like the HIM (ports 1, 2) and DPI communication (port 5).

PowerFlex 755TS Parameter Assignment

The PowerFlex 755TS drive uses indirect parameter numbers to create parameter assignments or to select data sources and destinations. The maximum value for indirect parameter assignments is 159999.15.

The left most one or two digits are the port number, the right most four digits are the parameter number and, if applicable, the two digits after the decimal point are the bit number. This port, parameter, bit format is how internal values of assignable parameter values are handled. Parameter selections or assignments can be calculated using this formula:

$$\text{Parameter Value} = (10{,}000 \times \text{Port Number} + \text{Parameter Number}).\text{bit}$$

For example, parameter 0:120 [DI M Run] will be assigned to an I/O option module in port 4 using a run contact that is wired to digital input 1 (port 4,

parameter 1 [Dig In Sts], bit-1). In this example, parameter 0:120 [DI M Run] would be set = (10000*4 + 1).01 = 40001.01.

IMPORTANT The parameters in Table 48...Table 53 do not represent an exhaustive list. Many applications may require modification of other parameters that are not shown in the following table. See PowerFlex Drives with TotalFORCE Control Programming Manual, Firmware Rev. 10...11, publication 750-PM101B, for more information.

IMPORTANT The parameter comparisons in Table 53...Table 59 relate similar parameter functions. However, data type, units, and scaling may be different between the old and new parameters. This is especially true for DataLink parameters that are produced/consumed by a Logix controller or PLC. Most parameters within the PowerFlex 755TS drive, including DataLinks, are real type. However, PowerFlex 700S parameters are integer type with scaling factors applied.

The PowerFlex 700S drive uses only RPM as velocity units, the PowerFlex 755TS drive can use either Hz or RPM depending on parameter 0:P46 [Velocity Units]. It is HIGHLY recommended that PowerFlex 755TS parameter 0:46 be set to 1='RPM' to match the velocity units that are used by the PowerFlex 700S drive. Ensure that the applicable parameter units scaling are considered when designing the PowerFlex 755TS drive migration solution.

Table 48 - Motor Side Inverter Control Parameters

PowerFlex 700S			PowerFlex 755TS		
Parameter, Bit	**Display Name**	**Read/Write**	**Port:Parameter.Bit**	**Display Name**	**Read/Write**
P1	Motor NP Volts	RW	10:400	Motor NP Volts	RW
P2	Motor NP FLA	RW	10:401	Motor NP Amps	RW
P3	Motor NP Hertz	RW	10:402	Motor NP Hertz	RW
P4	Motor NP RPM	RW	10:403	Motor NP RPM	RW
P5	Motor NP Power	RW	10:406	Motor NP Power	RW
P6	Mtr NP Pwr Units	RW	10:405	Mtr NP Pwr Units	RW
P7	Motor Poles	RW	10:407	Motor Poles	RW
P9	Total Inertia	RW	10:900	Motor Inertia (only for Flux Vector control)	RW
			10:901(1)(2)	Load Ratio = Load Inertia / Motor Inertia (Total Inertia = Motor Inertia * (1 + Load Ratio)	RW
P10	Speed Ref 1	RW	10:1801	VRef A Stpt	RW
P14...20	Preset Speed 1...7	RW	10:1814...1820	Preset Speed 1...7	RW
P27	Speed Ref A Sel	RW	10:1800	VRef A Sel	RW
P29	Jog Speed 1	RW	10:1894	Jog Speed 1	RW
P30	Min Spd Ref Lim	RW	10:1900 10:1901	Vel Low Lim Pos Vel Low Lim Neg	RW
P31	Max Spd Ref Lim	RW	10:1898 10:1899	Vel Limit Pos Vel Limit Neg	RW
P32	Accel Time 1	RW	10:1915	VRef Accel Time1	RW
P33	Decel Time 1	RW	10:1917	VRef Decel Time1	RW
P34	S Curve Time	RW	10:1919 10:1920	VRef Accel Jerk VRef Decel Jerk	RW
P40	Selected Spd Ref	RO	10:1892	VRef Selected	RO
P72	Scaled Spd Fdbk (filtered for display)	RO	10:1044	Motor Vel Fb (filtered for display)	RO

Table 48 - Motor Side Inverter Control Parameters (Continued)

PowerFlex 700S			PowerFlex 755TS		
Parameter, Bit	**Display Name**	**Read/Write**	**Port:Parameter.Bit**	**Display Name**	**Read/Write**
P81	Spd Reg P Gain	RW	10:1956[1]	u VReg Kp	RW
P82	Spd Ref I Gain	RW	10:1958[1]	u VReg Ki	RW
P86	Spd Reg Droop	RW	10:1961	Droop RPM at FLA	RW
P90	Spd Reg BW	RW	10:906[1][2]	System BW	RW
P91	Spd Reg Damping	RW	10:907[1]	System Damping	RW
P102	Spd Reg Pos Lim	RW	10:1965	Accel Lim Pos	RW
P103	Spd Reg Neg Lim	RW	10:1966	Accel Limit Neg	RW
P110	Speed/Torque Mode	RW	10:30	PsnVelTrq Mode A	RW
P111	Torque Ref 1	RW	10:2000	Trq Ref A Sel	RW
			10:2001	Trq Ref A Stpt	RW
P118	Notch Filt Freq	RW	10:2159[1][2]	Trq NF 1 Freq	RW
P125	Torque Pos Limit	RW	10:2083	Torque Limit Pos	RW
P126	Torque Neg Limit	RW	10:2084	Torque Limit Neg	RW
P153, B0	Control Options	RW	10:930	Direction Mode	RW
P155	Logic Status	RO	10:354 10:355 13:225	Motor Side Sts 1 (motor side) Motor Side Sts 2 (motor side) Line Side Sts 1 (Line side)	RO
P156	Start Inhibits	RO	10:351	M Start Inhibits	RO
P168	Normal Stop Mode	RW	10:110	Mtr Stop Mode A	RW
P196	Param Access Level	RW	0:30	Access Level	RW
P222	Mtr Fdbk Sel Pri	RW	10:1000	Pri Vel Fb Sel	RW
P223	Mtr Fdbk Sel Alt	RW	10:1006	Alt Vel Fb Sel	RW

(1) Tuning Parameter, do not use previous values, perform autotune. In the PowerFlex 700S drive, Total Inertia is shown in seconds; in the PowerFlex 755TS drive, the Load Ratio is unitless. See PowerFlex 755T Flux Vector Tuning Application Technique, publication 750-AT006 (Chapter 1 Inertia, Chapter 2 Torque Scaler and Chapter 4 Inertia Tune) for more information about how the Load Ratio is calculated. Kj, inertia in seconds, is available in the PowerFlex 755TS drive, as a testpoint; see PowerFlex Drives with TotalFORCE Control Parameter Reference Data, publication RD101 for more information about test points.

(2) The PowerFlex 700S drive bandwidth units are in R/s while the PowerFlex F755TS drive bandwidth units are in Hz. Convert R/S to Hz. 1 rad/s = 2π Hz.

Table 49 - Encoder Feedback

PowerFlex 700S			PowerFlex 755TS (With 20-750-ENC-1 or 20-750-DENC-2 Encoder Module)		
Parameter, Bit	**Display Name**	**Read/Write**	**Port:Parameter.Bit[1]**	**Display Name**	**Read/Write**
P232	Encoder0 PPR	RW	x:2	Encoder PPR (Enc 0 PPR)	RW
P230	Encdr0 Position	RO	x:4	Encoder Feedback (Enc 0 FB)	RO
P233	Encdr 0/1 Config	RW	x:1	Encoder Cfg (Enc 0 Cfg)	RW
			x:11	Enc 1 Cfg	
P240	Encdr1 Position	RO	x:14	Enc 1 FB	RW
P242	Encoder1 PPR	RW	x:12	Enc 1 PPR	RW
P231	Encdr0 Spd Fdbk	RO	10:1040	Pri Vel Feedback	RO
P233 B10, B11, B12 B26, B27, B28	Encdr 0/1 Config Encoder 0 FIR Filter Encoder 1 FIR Filter	RW	10:1001	Vel Fb Taps	RW
P233, B0, B1, B2, B3 B16, B17, B18, B19	Encdr 0/1 Config Encoder 0 Input Filter Encoder 1 Input Filter	RW	10:1002 10:1003	cVel Fb LPF BW uVel Fb LPF BW	RW

Table 49 - Encoder Feedback (Continued)

PowerFlex 700S			PowerFlex 755TS (With 20-750-ENC-1 or 20-750-DENC-2 Encoder Module)		
Parameter, Bit	**Display Name**	**Read/Write**	**Port:Parameter.Bit(1)**	**Display Name**	**Read/Write**
P241	Encdr1 Spd Fdbk	RO	10:1041	Alt Vel Feedback	RO

(1) 'x' in the Port:Parameter.Bit column is the physical port where the I/O module is installed.

Table 50 - Display, Status, Fault/Alarm, and Setup

PowerFlex 700S			PowerFlex 755TS		
Parameter	**Display Name**	**Read/Write**	**Port:Parameter.Bit**	**Display Name**	**Read/Write**
P297	Output Curr Disp	RO	10:3	Output Current	RO
P300	Motor Spd Fdbk	RO	10:1042	Vel Fb Active	RO
P301	Motor Speed Ref	RO	10:1933	VRef Final	RO
P303	Motor Torque Ref	RO	10:2087	Trq Ref Limited	RO
P306	DC Bus Volt	RO	0:3	DC Bus Volts	RO
P307	Output Voltage	RO	10:2	Output Voltage	RO
P308	Output Current	RO	10:3	Output Current	RO
P310	Output Freq	RO	10:1	Output Frequency	RO
P323	Fault Status 1	RO	10:461	Fault Status A (motor side)	RO
P324	Fault Status 2	RO	10:462	Fault Status B (motor side)	RO
P325	Fault Status 3	RO			
P326	Alarm Status 1	RO	10:465	Alarm Status A (motor side)	RO
P327	Alarm Status 2	RO	10:466	Alarm Status B (motor side)	RO
P328	Alarm Status 3	RO	10:467	Type 2 Alarms (line side)	RO
P403	Voltage Class	RW	0:33	Voltage Class Cfg	RW
—			0:35	Duty Rating Cfg	RW
—	Default units are RPM only		0:46	Velocity Units	RW
P414	Brake/Bus Cnfg	RW	10:116	Bus Reg Mode A	RW
P485	Motor Ctrl Mode	RW	0:65	Pri MtrCtrl Mode (applies to Port 10)	RW
P670	Logic Mask	RW	0:41	Logic Mask Cfg	RW
P671	Start Mask	RW	0:42	Auto Mask	RW
P672	Jog Mask	RW	0:43	Manual Cmd Mask	RW
P673	Direction Mask	RW	—		
P674	Fault Clr Mask	RW	—		
P677	Stop Owner	RO	0:260	Stop Owner	RO
P678	Start Owner	RO	0:261	Start Owner	RO
P679	Jog Owner	RO	0:262	Jog Owner	RO
P680	Direction Owner	RO	0:263	Dir Owner	RO
P681	Fault Clr Owner	RO	0:264	Clear Flt Owner	RO

Table 51 - Analog I/O

PowerFlex 700S			PowerFlex 755TS (With 2263C-1R2T I/O Module)		
Parameter	**Display Name**	**Read/Write**	**Port:Parameter.Bit[1]**	**Display Name**	**Read/Write**
P821	Analog I/O Units (See also, Main Control Board, HW switch S5)	RW	x:45	Anlg In Type (See also, module jumpers)	RO
			x:70	Anlg Out Type	RW
P800	Anlg In1 Data	RO	x:50	Anlg In0 Value	RO
P801	Anlg In1 Value	RO	x:54	Anlg In0 Raw Val	RO
P802	Anlg In1 Scale	RW	x:51 x:52 10:1802/1809 10:1803/1810 10:1804/1811 10:2002/2009 10:2003/2010 10:2004/2011	Anlg In0 Hi Anlg In0 Lo Examples, analog scaling is applied to reference source; VRefA/B AnlgHi VRefA/B AnlgLo VRefA/B Mult Trq RefA/B AnlgHi Trq RefA/B AnlgLo Trq RefA/B Mult	RW RW
P803	Anlg In1 Offset	RW	—		
P1093	Anlg In1 Loss Cnfg	RW	x:53	Anlg In0 LssActn	RW
P806	Anlg In2 Data	RO	x:60	Anlg In1 Value	RO
P807	Anlg In2 Value	RO	x:64	Anlg In1 Raw Val	RO
P808	Anlg In2 Scale	RW	x:61 x:62 10:1802/1809 10:1803/1810 10:1804/1811 10:2002/2009 10:2003/2010 10:2004/2011	Anlg In1 Hi Anlg In1 Lo Examples, analog scaling is applied to reference source; VRefA/B AnlgHi VRefA/B AnlgLo VRefA/B Mult Trq RefA/B AnlgHi Trq RefA/B AnlgLo Trq RefA/B Mult	RW RW
P809	Anlg In2 Offset	RW	—		
P1094	Anlg In2 Loss Cnfg	RW	x:63	Anlg In1 LssActn	RW
P812	Anlg In3 Data	RO	y:50	Anlg In0 Value	RO
P813	Anlg In3 Value	RO	y:54	Anlg In0 Raw Val	RO
P814	Anlg In3 Scale	RW	y:51 y:52 10:1802/1809 10:1803/1810 10:1804/1811 10:2002/2009 10:2003/2010 10:2004/2011	Anlg In0Hi Anlg In0Lo Examples, analog scaling is applied to reference source; VRefA/B AnlgHi VRefA/B AnlgLo VRefA/B Mult Trq RefA/B AnlgHi Trq RefA/B AnlgLo Trq RefA/B Mult	RW RW
P815	Anlg In3 Offset	RW	—		
P1095	Anlg In3 Loss Cnfg	RW	y:53	Anlg In0 LssActn	RW
P831	Anlg Out1 Sel	RW	x:75	Anlg Out0 Sel	RW
P838	Analog Out 2 Sel		x:85	Anlg Out1 Sel	RW
P835	Anlg Out1 Scale		x:78 x:79 x:80 x:81	Anlg Out0 DataHi Anlg Out0 DataLo Anlg Out0 Hi Anlg Out0 Lo	RW
P842	Anlg Out2 Scale		x:88 x:89 x:90 x:91	Anlg Out1 DataHi Anlg Out1 DataLo Anlg Out1 Hi Anlg Out1 Lo	RW

Table 51 - Analog I/O (Continued)

PowerFlex 700S			PowerFlex 755TS (With 2263C-1R2T I/O Module)		
Parameter	**Display Name**	**Read/Write**	**Port:Parameter.Bit(1)**	**Display Name**	**Read/Write**
P837	Anlg Out1 Value	RO	x:82	Anlg Out0 Val	RO
P844	Anlg Out2 Value	RO	x:92	Anlg Out1 Val	RO

(1) x = physical port location of I/O module
y = physical port location of I/O module

Table 52 - Digital I/O

PowerFlex 700S			PowerFlex 755TS (With 2263C-1R2T I/O Module)		
Parameter	**Display Name**	**Read/Write**	**Port:Parameter.Bit(1)**	**Display Name**	**Read/Write**
P825...P830	Digital Inx Sel	RW	0:103...191	Digital Input parameter assignment	RW
P845, P846	Digital Out1 Sel, Dig Out1 Data	RW	x:20	T00 Sel	RW
P850, P851	Digital Out2 Sel, Dig Out2 Data	RW	x:30	T01 Sel	RW
P855, P856	Rly Out3 Sel, Rly Out3 Data	RW	x:10	R00 Sel	RW

(1) x = physical port location of I/O module

Table 53 - Communication

PowerFlex 700S 20-COMM-E EtherNet			PowerFlex 755TS Embedded Ethernet		
Parameter	**Description**	**Read/Write**	**Parameter**	**Description**	**Read/Write**
Port 5, P4...P7	IP Addr Cfg 1, 2, 3, 4	RW	0:302...305	IP Addr Cfg 1, 2, 3, 4	RW
Port 5, P8...P11	Subnet Cfg 1, 2, 3, 4	RW	0:306...309	Subnet Cfg 1, 2, 3, 4	RW
P650	DPI In DataType	RW	—		
P651...P658	DPI Data In	RO	0:321...336	DL From Net 01...16 (Embedded EtherNet)	RW
P659	DPI Out DataType	RW	—		
P660...P667	DPI Data Out	RW	0:340...355	DL To Net 01...16 (Embedded EtherNet)	RW

Predictive Maintenance Feature

PowerFlex 755TS drives contain algorithms for predictive maintenance that are used to improve the uptime of machines, processes, and facilities. These algorithms monitor the lifespan of certain components and display the percentage of remaining life and the number of hours or counts of remaining life in specific parameters or a software interface.

These algorithms can be used to alert personnel when the components are nearing the end of their lifespan so the components can be replaced before they fail. For details on predictive maintenance, see the Predictive Maintenance section in the PowerFlex Drives with TotalFORCE Control Programming Manual, publication 750-PM101.

Functional Safety Configurations

The PowerFlex 700S drive was available with an optional hardware Safe Torque Off / 2nd Encoder module. The functionality of this option can easily be obtained with the PowerFlex 755TS drive by using one of the available Safe Torque Off option modules.

PowerFlex 700S Functional Safety Options

The PowerFlex 700S DriveGuard® Safe Torque Off with 2nd Encoder option module, catalog 20D-P2-DG01, provides hardware Safe Torque Off functionality and the facility to connect a second encoder. The DriveGuard option requires an Expanded Cassette.

The DriveGuard® Safe Torque Off option is just one component in a safety control system. Components in the system must be chosen and applied appropriately to achieve the desired level of functional safety.

Details of installation, wiring, and safety performance levels are found in the DriveGuard Safe Torque Off Option for PowerFlex 700S Phase II AC Drives and PowerFlex 700L Liquid-Cooled AC Drives User Manual, publication 20D-UM007.

PowerFlex 755TS Functional Safety Options

Like the PowerFlex 750-series AC drives, the PowerFlex 755TS drive can be equipped with one safety option module. The safety option module is just one component in a safety control system. Components in the migration solution must be chosen and applied appropriately to achieve the same or higher level of functional safety that was available with the existing PowerFlex 700S with DriveGuard Safe Torque Off.

Details of installation, wiring, and safety performance levels for each of the PowerFlex 750-series safety options can be found in Table 54.

Table 54 - PowerFlex 750-Series Safety Option Modules

Description	Cat. No.	Publication
Hardware Safe Torque Off	20-750-S	PowerFlex 750-Series Safe Torque Off Option Module User Manual, publication 750-UM002
Hardware Safe Speed Monitor	20-750-S1	PowerFlex 750-Series Safe Speed Monitor Option Module Safety Reference Manual, publication 750-RM001
Integrated Safe Torque Off	20-750-S3	PowerFlex 755 Integrated Safety - Safe Torque Off Option Module User Manual, publication 750-UM004
Integrated Safety Functions	20-750-S4	PowerFlex 755/755T Integrated Safety Functions Option Module User Manual, publication 750-UM005

IMPORTANT When installing a safety option module in your new drive, review all of the safety data, including system reaction time to make sure you understand any impacts to your application.

See the user manuals for information on installation, configuration and operation of the modules, as well as safety data and safety application requirements.

Migration Solutions for Safe Torque Off

Either the hardware Safe Torque Off (20-750-S) or integrated Safe Torque Off (20-750-S3) PowerFlex 750-series safety options can be used to migrate the functionality of the PowerFlex 700S DriveGuard® Safe Torque Off module.

The PowerFlex 750-series Safe Torque Off option modules exclude encoder inputs. If the second encoder part of the PowerFlex 700S DriveGuard Safe Torque Off module is used, it will be necessary to supply a PowerFlex 750-series encoder option module to interface with the second encoder.

The PowerFlex 700S DriveGuard Safe Torque Off requires using the DriveGuard safety module feedback monitoring contact to achieve the published safety level and category. The PowerFlex 750-series safety modules do not use or require safety module feedback monitoring to achieve the published safety level and category.

The integrated Safe Torque Off option module (20-750-S3) uses integrated safety over EtherNet/IP or a hardware interface for Safe Torque Off functionality.

See Actuator Subsystems – Stop Cat. 0 or 1 via a PowerFlex Drive with Integrated Safe Torque Off Safety Function Application Technique, publication SAFETY-AT141, that describes using the PowerFlex 750-Series integrated Safe Torque Off option module.

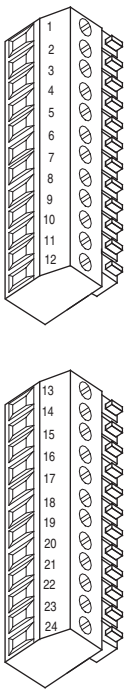
Application Conversion Example

This section provides a common example of the PowerFlex 700S drive using a potentiometer analog speed reference along with hard-wired start/stop/direction control, and the equivalent PowerFlex 755TS product configuration.

Powerflex 700S Drive I/O Terminals

Terminal blocks TB1 and TB2 contain connection points for all inputs, outputs, and standard encoder connections. When installed, both terminal blocks reside on the main control board. These components are provided with the drive but are not factory installed.

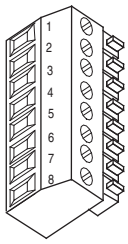
Table 55 - TB1 Terminals – PowerFlex 700S Drive

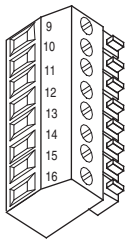


Terminal	Signal	Factory Default	Description	Related Parameters
1	Analog Input 1 Comm.	(Volt)	Bipolar, differential input, ±10V, 0...20 mA, 13 bit + sign 20 kΩ impedance at Volt; 500 Ω impedance at mA[1]	–
2	Analog Input 1 (+/-)			800
3	Shield	–	Analog Input Shield	–
4	Analog Input 2 Comm.	(Volt)	Bipolar, differential input, ±10V, 0...20 mA, 13 bit + sign 20 kΩ impedance at Volt; 500 Ω impedance at mA	–
5	Analog Input 2 (+/-)			806
6	Analog Input 3 [NTC-] Comm.	(Volt)	Differential input, 0...10V, 10 bit (for motor control mode FOC2, this is the temperature adaptation input).	–
7	Analog Input 3 [NTC+]			812
8	Shield	–	Analog Output Shield	–
9	Analog Output 1 (-)	(Volt)	Bipolar, differential output, ±10V, 0...20 mA, 11 bit + sign 2 kΩ minimum load	832, 833
10	Analog Output 1 (+)			
11	Analog Output 2 (-)	(Volt)		839, 840
12	Analog Output 2 (+)			
13	+10V Reference	–	Rating: 20 mA maximum load (Recommend 5 Ω pot)	–
14	Reference Common	–		
15	-10V Reference	–		
16	Encoder A	–	Normal current draw per channel: 20 mA	230...233
17	Encoder A (Not)	–		
18	Encoder B	–		
19	Encoder B (Not)	–		
20	Encoder Z	–		
21	Encoder Z (Not)	–		
22	Encoder Reference (+)	–	12V or 5V DC power supply for primary encoder interface Rating: 300 mA maximum	–
23	Encoder Reference (-)	–		
24	Encoder Shield	–	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 20 mA 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.

Table 56 - TB2 Terminals - PowerFlex 700S Drive





Terminal	Signal	Factory Default	Description	Related Parameters
1	24V DC Common (-)	–	Drive supplied 24V DC logic input power Rating: 300 mA maximum load	–
2	24V DC Source (+)	–		
3	Digital Output 1	–	24V DC Open Collector (sinking logic) Rating: Internal Source = 150 mA max External Source = 750 mA	816, 847
4	Digital Output 1/2 Com	–	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 Rating: 115V AC or 24V DC = 2 A max Inductive/Resistive	856, 857
7	Relay Output 3 Com	–		
8	Relay Output 3 (NO)	–		
9	Digital Input 1...3 Com	–	Common for Digital Inputs 1...3	–
10	Digital Input 1	–	High speed 12V or 24V DC(1), sinking Load:15 mA at 24V DC	825
11	Digital Input 2	–		826
12	Digital Input 3	–	Load:15 mA at 24V DC sourcing	827
13	Digital Input 4...6 Com	–	Common for Digital Inputs 4...6	–
14	Digital Input 4	–	Load: 10 mA at 24V DC sinking/sourcing Load: 7.5 mA at 115V AC **Note**: The 115V AC Digital Inputs can withstand 2 mA of leakage current without turning on. If an output device has a leakage current greater than 2 mA a burden resistor is required. A 68.1 Ω resistor with a 0.5 watt rating should be used to keep the 115V AC output below 2 mA.	828
15	Digital Input 5	–		829
16	Digital Input 6	HW Enable		830

(1) Digital Inputs 1 and 2 are configured for 12V or 24V DC via DIP switches S3-1 and S3-2, respectively. 24V DC is the default setting.

PowerFlex 755TS Drive I/O Terminals

Table 57 - Main Control Board TB1 I/O Terminal Designations

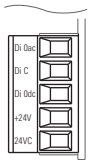
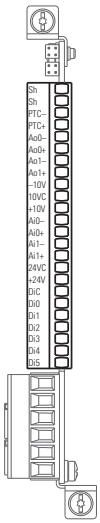
Fixed I/O	Terminal	Name	Description
	Di 0ac	Digital input 0 120V AC (132V AC max)	Connections for AC power supply. High state: 100...132V AC Low state: 0...30V AC
	Di C	Digital input common	Digital input common
	Di 0dc	Digital input 0 24V DC (30V DC max)	Connections for DC power supply. High state: 20...24V DC Low state: 0...5V DC
	+24V	+24 volt power	Connections for product supplied 24V power. 150 mA maximum.
	24VC	24 volt common	

Table 58 - 22-Series I/O Option Module TB1 Terminal Designations

	Terminal	Name	Description	Related Parameters [4]
	Sh	Shield	Terminating point for wire shields when an EMC plate or conduit box is not installed.	
	Sh			
	Ptc–	Motor PTC (–)	Motor protection device (Positive Temperature Coefficient).	40 On port X
	Ptc+	Motor PTC (+)		
	Ao0–	Analog out 0 (–)	Bipolar, ±10V, 11 bit and sign, 2 k Ω minimum load. 4...20 mA, 11 bit and sign, 400 Ω maximum load.	75 On port X
	Ao0+	Analog out 0 (+)		
	Ao1–	Analog Out 1 (–)		85 On port X
	Ao1+	Analog Out 1 (+)		
	–10V	–10V reference	2k Ω minimum.	
	10VC	10V common	For (–) and (+) 10V references.	
	+10V	+10V reference	2k Ω minimum.	
	Ai0–	Analog input 0 (–)	Isolated[2], bipolar, differential, 11 bit and sign. Voltage Mode: ±10V at 88k Ω input impedance. Current Mode: 0...20 mA at 93 Ω input impedance.	50, 70 On port X
	Ai0+	Analog input 0 (+)		
	Ai1–	Analog Input 1 (–)		60, 70 On port X
	Ai1+	Analog Input 1 (+)		
	24VC	24V common	Drive supplied logic input power. 200 mA max per I/O module 600 mA max per drive	
	+24V	+24V DC		
	Di C	Digital input common	Common for Digital inputs 0...5	
	Di 0	Digital input 0 [1]	<u>24V DC (30V DC max)</u> – Opto isolated High state: 20...24V DC 11.2 mA DC Low state: 0...5V DC <u>120V AC (132V AC max) 50/60 Hz</u>[3] – Opto isolated High state: 100...132V AC Low state: 0...30V AC	1 On port X
	Di 1	Digital input 1 [1]		
	Di 2	Digital input 2 [1]		
	Di 3	Digital input 3 [1]		
	Di 4	Digital input 4 [1]		
	Di 5	Digital input 5 [1]		

(1) Digital Inputs are either 24Vs DC (2262C) or 115Vs AC (2262D) based on module catalog number. Verify applied voltage is correct for I/O module.
(2) Differential Isolation – External source must be maintained at less than 160V with respect to PE. Input provides high common mode immunity.
(3) For CE compliance use shielded cable. Do not exceed cable length of 30 m (98.4 ft).
(4) I/O Module parameters also have a port designation.

ATTENTION: Risk of equipment damage exists. Verify that the correct voltage is applied to the I/O Module digital inputs. See the I/O Module catalog number to determine the voltage rating.
- 20-750-2262**C**-2R is rated 24V DC
- 20-750-2263**C**-1R2T is rated 24V DC
- 20-750-2262**D**-2R is rated 120V AC

Table 59 - 22-Series I/O Option Module TB2 Terminal Designations (Two Relay Outputs: 2R)

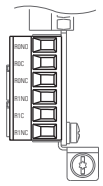
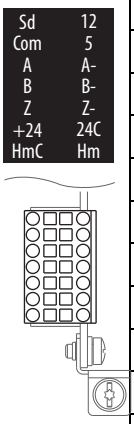
Relay Out	Terminal	Name	Description	Related Parameter
	RONO	Relay 0 N.O.	Relay normally open contact output: 240V AC, 24V DC, 2 A max General-purpose (inductive)/resistive Relay normally closed contact output: 240V AC, 24V DC, 2 A max Only resistive	10, 100, 101, 105, 106 On port X
	ROC	Relay 0 Common		
	RONC	Relay 0 N.C.		
	R1NO	Relay 1 N.O.		20, 110, 111, 115, 116 On port X
	R1C	Relay 1 Common		
	R1NC	Relay 1 N.C.		

Table 60 - Single Incremental Encoder Option Module Designations

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

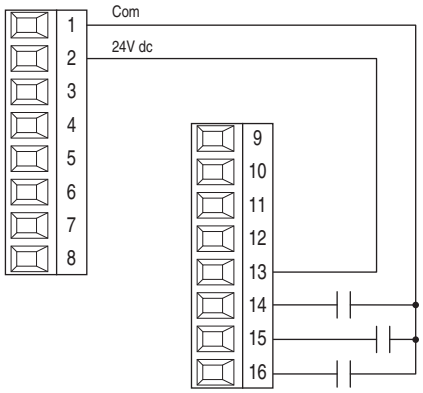
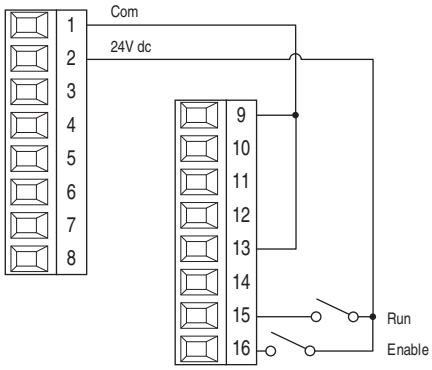
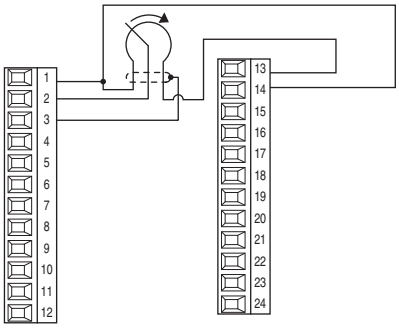
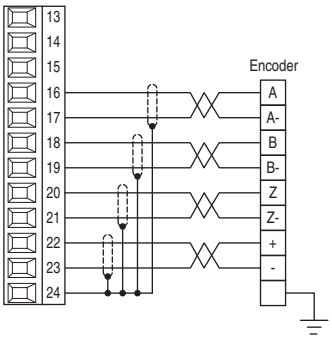
PowerFlex 700S Drive I/O Wiring Examples

This section provides I/O wiring examples. The 3-wire control method is start/stop/direction. The digital control inputs use the internal 24V DC supply of the drive, and the analog speed reference uses a 10,000 Ohm potentiometer that is wired to the internal 10V DC power supply of the drive. The encoder device uses the internal 12V DC supply of the drive.

For this example, the PowerFlex 755TS single encoder option module is shown in port 5 and the I/O option module is shown in port 4. These option modules can be installed in any valid port.

For additional examples, see the PowerFlex 750-Series I/O, Feedback, and Power Option Module Installation Instructions, publication 750-IN111, and PowerFlex 700S Phase II Drive Frames 1...6 Installation Instructions, publication 20D-IN024.

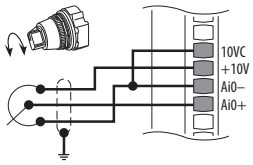
Table 61 - PowerFlex 700S TB1 Analog Input/Output and Encoder Wiring Examples

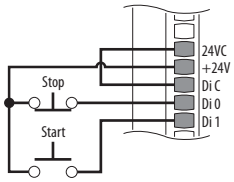
Input/Output	Connection Example	Required Parameter Changes
	Sinking Digital Inputs - Internal Power Supply  	–
Digital Inputs 24V DC	Sourcing Digital Inputs - Internal Power Supply, 2-Wire Control  	Set Par 829 [Dig In5 Sel] to value 7 - "Run". Par 153 [Control Options], bit 8 "3WireControl" is automatically set to "Off" (0) for 2-wire control. Set Par 168 [Normal Stop Mode] for the desired stopping mode: 0 = Ramp Stop 1 = CurLim Stop 2 = Coast Stop
Potentiometer Unipolar Speed Reference 0...10V Analog Input Internal Source	 	–
Primary Encoder Interface Supports 5V DC or 12V DC differential encoders with internal power supply. Used as primary closed loop feedback.	Internal Supply  	Using Encoder 0 as speed feedback: Par 222 [Mtr Fdbk Sel Pri] = 0 "Encoder 0" (default) Par 232 [Encoder0 PPR] = Pulses/Rev for installed encoder

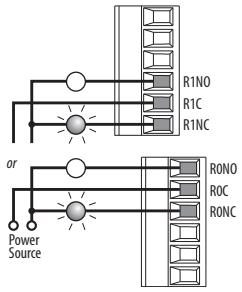
22-Series I/O Option Module Wiring Examples

This section provides examples for wiring the 22-Series I/O option module.

Table 62 - 22-Series I/O Option Module TB1 Wiring Examples

Potentiometer Unipolar Speed Reference 10 kΩ Pot. Recommended (2 kΩ Minimum)	 22-Series I/O Module TB1	• Set direction mode Port 10:930 [Direction Mode] = 0 “Unipolar” • Set selection Port 10:1800 [VRef A Sel] = Port X (22-Series I/O Module): 50 [Anlg In0 Value] • Adjust scaling Port X (22-Series I/O Module): 51 [Anlg In0 Hi] = 10V Port X (22-Series I/O Module): 52 [Anlg In0 Lo] = 0V Port 10:1802 [VRef A AnlgHi = 60 Hz Port 10:1803 [VRef A AnlgLo] = 0 Hz • View results Port X (22-Series I/O Module): 50 [Anlg In0 Value] Port 10:1892 [VRef Selected]

3-Wire Control Internal supply	 22-Series I/O Module TB1	• Set selection Port 0:108 [DI M Stop] = Port X (22-Series I/O Module): 1 [Dig In Sts], bit 0 = Input 0 Port 0:117 [DI M Start] = Port X (22-Series I/O Module): 1 [Dig In Sts], bit 1 = Input 1 • View results Port X (22-Series I/O Module): 1 [Dig In Sts] Port 10:354 [Motor Side Sts 1]

Relay Output External supply	22-Series I/O Module 	• Set selection Port X (22-Series I/O Module): 10 [R00 Sel] = Port 10:P354 [Motor Side Sts 1], bit 7 = Faulted • View results Port X (22-Series I/O Module): 5 [Dig Out Sts]

Encoder Module Wiring Example

This section provides an example for wiring the encoder module.

Table 63 - Encoder Signal – Differential, Dual Channel

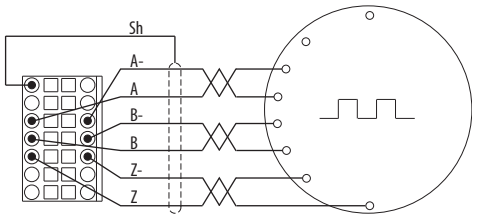
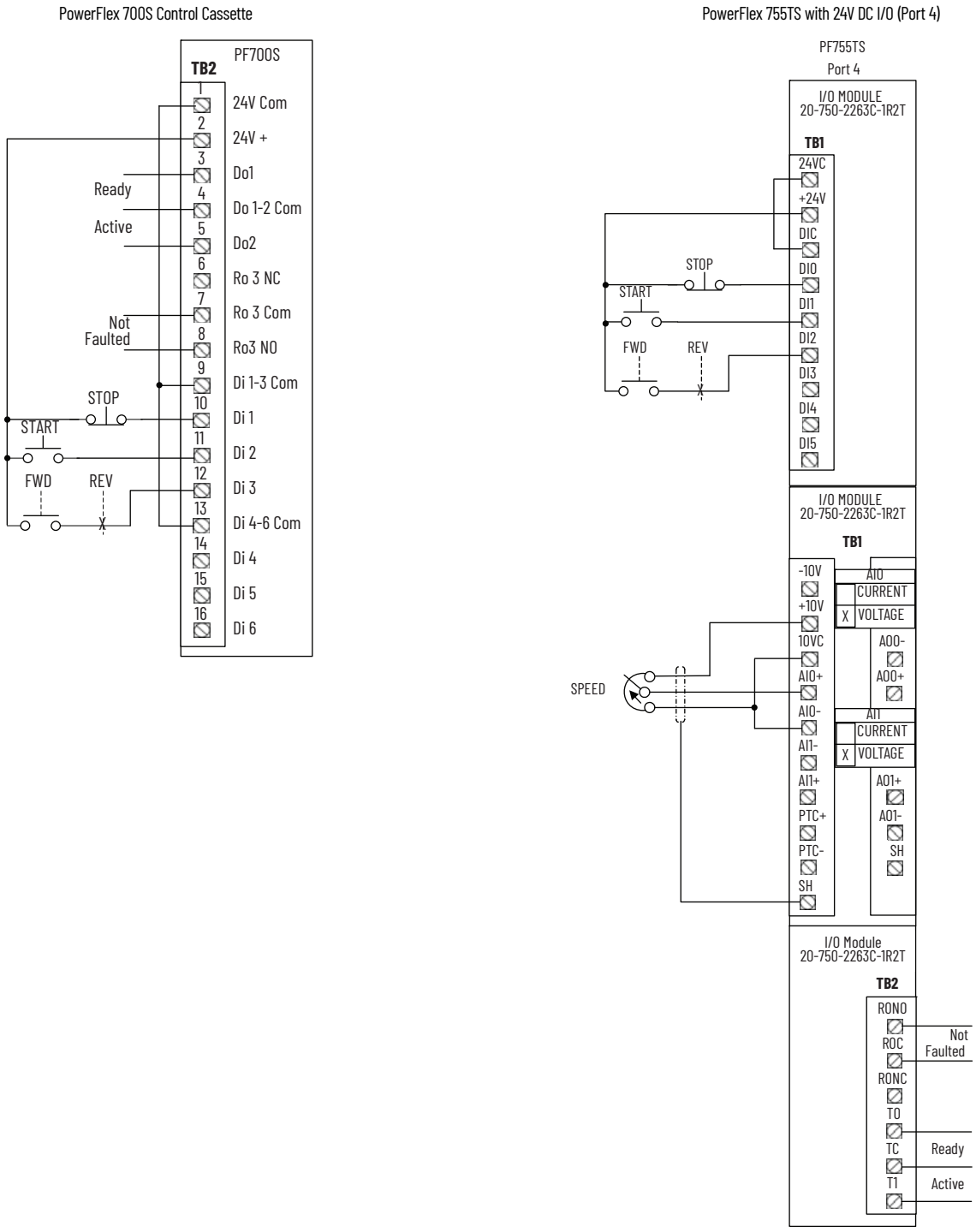
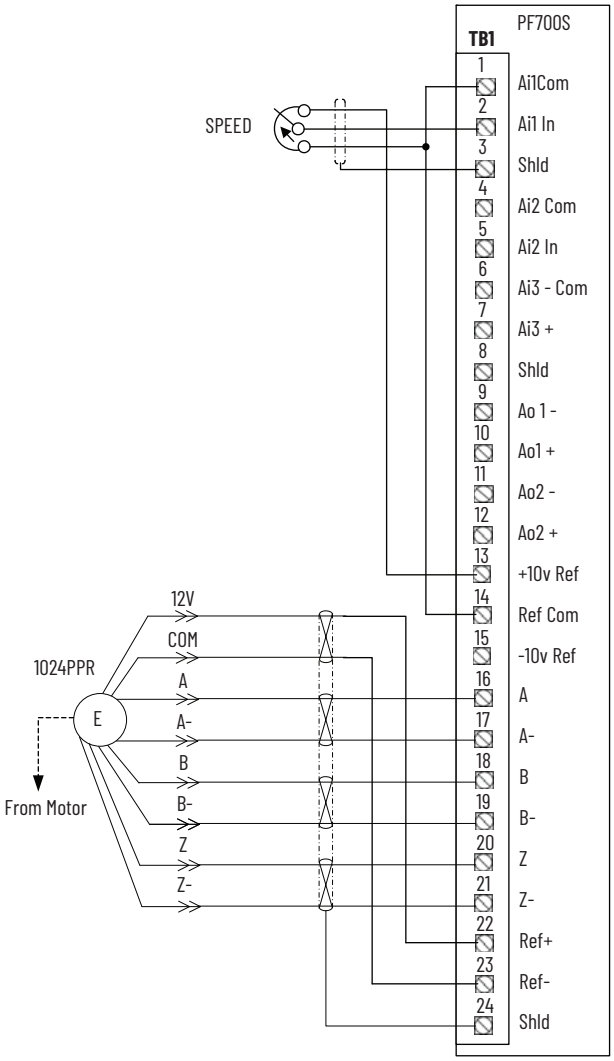
Encoder Signal – Differential, Dual Channel	

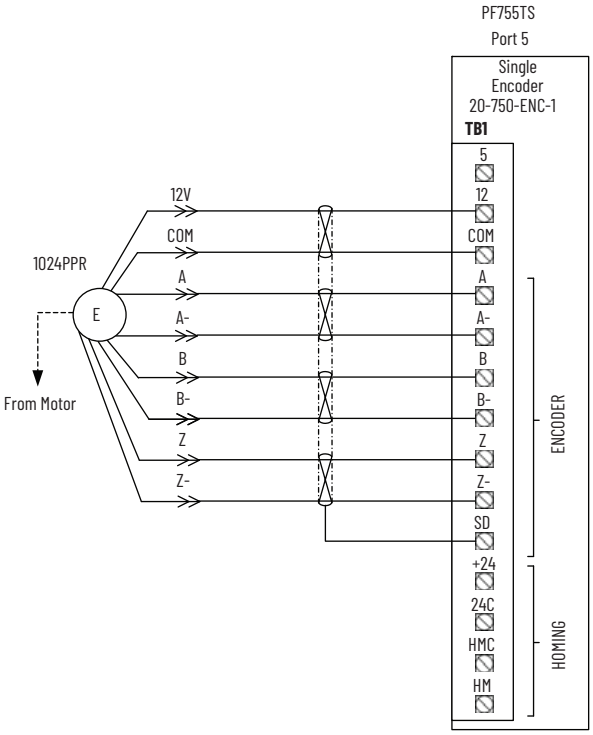
Figure 21 - Typical I/O and Encoder Wiring



PowerFlex 700S Control Cassette



PowerFlex 755TS with Single Encoder (Port 5)



Typical Three-wire Control with Encoder Parameter Comparison

Table 64 - Motor Side Inverter Control Parameters

PowerFlex 700S			PowerFlex 755TS		
Parameter, Bit	**Display Name**	**Value**	**Port:Parameter.Bit**	**Display Name**	**Value**
P1	Motor NP Volts	460V	10:400	Motor NP Volts	460V
P2	Motor NP FLA	10.5 A	10:401	Motor NP Amps	10.5 A
P3	Motor NP Hertz	60 Hz	10:402	Motor NP Hertz	60 Hz
P4	Motor NP RPM	1765 rpm	10:403	Motor NP RPM	1765 rpm
P5	Motor NP Power	7.5 Hp	10:406	Motor NP Power	7.5 Hp
P6	Mtr NP Pwr Units	Hp	10:405	Mtr NP Pwr Units	Hp
P7	Motor Poles	4	10:407	Motor Poles	4
P10	Speed Ref 1	800 ='Anlg In 1 Data'	10:1801	VRef A Stpt	0=Default, not used
P27	Speed Ref A Sel	1='Spd Ref 1'	10:1800	VRef A Sel	40050 ='4:50 [Anlg In0 Value]'
			10:1802	VRef A AnlgHi	Motor NP RPM
			10:1803	VRef A AnlgLo	0
P30	Min Spd Ref Lim	0	10:1900	Vel Low Lim Pos	0
			10:1901	Vel Low Lim Neg	0
P31	Max Spd Ref Lim	Motor NP RPM	10:1898	Vel Limit Pos	Motor NP RPM
			10:1899	Vel Limit Neg	(-) Motor NP RPM
P32	Accel Time 1	10.0	10:1915	VRef Accel Time1	10.0
P33	Decel Time 1	10.0	10:1917	VRef Decel Time1	10.0
P34	S Curve Time	0.5	10:1919	VRef Accel Jerk	5.0
			10:1920	VRef Decel Jerk	5.0
			10:905	System C/U Sel	1 = User Entered
P90	Spd Reg BW	10.00 R/S	10:906(1)(2)	System BW	Autotune recommended
P91	Spd Reg Damping	1.00	10:907(1)	System Damping	Autotune recommended
P81	Spd Reg P Gain	20.00	10:1956(1)(2)	u VReg Kp	Autotune recommended
P82	Spd Ref I Gain	50.00	10:1958(1)(2)	u VReg Ki	Autotune recommended
P86	Spd Reg Droop	0	10:1961	Droop RPM at FLA	Application Specific
P110	Speed/Torque Mode	1 ='Speed Reg'	10:30	PsnVelTrq Mode A	1 ='Speed Reg'
P153, B0	Control Options	0 =NOT 'Bipolar SRef'	10:930	Direction Mode	0 ='Unipolar'
P168	Normal Stop Mode	0 ='Ramp Stop'	10:110	Mtr Stop Mode A	1 ='Ramp'
P222	Mtr Fdbk Sel Pri	0 ='Encoder0'	10:1000	Pri Vel Fb Sel	50005 ='5:4 [Encoder Feedback]'
P403	Voltage Class	High Voltage	0:33	Voltage Class Cfg	High Voltage
—			0:35	Duty Rating Cfg	Normal Duty
—	Default units are RPM only		0:46	Velocity Units	1 ='RPM'
P414	Brake/Bus Cnfg	bit 2 and bit 3 are on	10:116	Bus Reg Mode A	adjust freq.
P485	Motor Ctrl Mode	0 ='FOC'	0:65	Pri MtrCtrl Mode (applies to Port 10)	4 ='Induction FV'

(1) Tuning Parameter, do not use previous values, perform autotune. In the PowerFlex 700S drive, Total Inertia is shown in seconds; in the PowerFlex 755TS drive, the Load Ratio is unitless. See PowerFlex 755T Flux Vector Tuning Application Technique, publication 750-AT006 (Chapter 1 Inertia, Chapter 2 Torque Scaler and Chapter 4 Inertia Tune) for more information about how the Load Ratio is calculated. Kj, inertia in seconds, is available in the PowerFlex 755TS drive, as a testpoint; see PowerFlex Drives with TotalFORCE Control Parameter Reference Data, publication RD101 for more information about test points.

(2) The PowerFlex F700S drive bandwidth units are in R/s while the PowerFlex 755TS drive bandwidth units are in Hz. Convert R/S to Hz. 1 rad/s = 2π Hz.

Table 65 - Encoder Feedback

PowerFlex 700S			PowerFlex 755TS[1]		
Parameter, Bit	**Display Name**	**Value**	**Port:Parameter.Bit**	**Display Name**	**Value**
P232	Encoder0 PPR	1024	5:2	Encoder PPR (Enc 0 PPR)	1024
P233	Encdr 0/1 Config	Application Specific	5:1	Encoder Cfg	Application Specific

(1) With 20-750-ENC-1 Single Encoder Module, Port 5.

Table 66 - Analog I/O

PowerFlex 700S			PowerFlex 755TS[1]		
Parameter, Bit	**Display Name**	**Value**	**Port:Parameter.Bit**	**Display Name**	**Value**
P802	Anlg In1 Scale	0.1	4:51	Anlg In0 Hi	+10.000
P803	Anlg In1 Offset	0.0	4:52	Anlg In0 Lo	0.000
P821, B0	Analog I/O Units (Main Control Board, Switch S5-2 set to 'open')	0 ='Voltage'	4:45	Anlog In Type (Module Ai0 jumper set to 'voltage')	0 ='Voltage Mode'
P1093	Anlg In1 Loss Cnfg	0 ='Disabled'	4:53	Anlg In0 LssActn	0 ='Ignore'

(1) With 2263C-1R2T I/O Module, Port 4.

Table 67 - Digital I/O

PowerFlex 700S			PowerFlex 755TS		
Parameter, Bit	**Display Name**	**Value**	**Port:Parameter.Bit**	**Display Name**	**Value**
P825	Digital In1 Sel	14 ='Normal Stop'	0:108	DI M Stop	40001.00 =4:1, B0 [Dig In Sts, Input0]
P826	Digital In2 Sel	5 ='Start'	0:117	DI M Start	40001.01 =4:1, B1 [Dig In Sts, Input1]
P827	Digital In3 Sel	6 ='Reverse'	0:130	DI M Fwd Reverse	40001.02 =4:1, B2 [Dig In Sts, Input2]
P845	Digital Out1 Sel	3 ='Ready'	4:20	T00 Sel	100354.00 =10:354.00 [Motor Side Sts 1, Ready]
P850	Digital Out2 Sel	8 ='Active'	4:30	T01 Sel	100354.01 =10:354.01 [Motor Side Sts 1, Active]
P855	Rly Out3 Sel	1 ='Not Fault'	4:10	R00 Sel	100354.07 =10:354.07 [Motor Side Sts 1, Faulted]
			4:6.0	Dig Out Invert	1 ='Relay Out0 Output Inverted'

Notes

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Technical Support Center	Find help with how-to videos, FAQs, chat, user forums, and product notification updates.	rok.auto/support
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Literature Library	Find installation instructions, manuals, brochures, and technical data publications.	rok.auto/literature
Product Compatibility and Download Center (PCDC)	Download firmware, associated files (such as AOP, EDS, and DTM), and access product release notes.	rok.auto/pcdc

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