PowerFlex 750-Series AC Drives with TotalFORCE Control

Catalog Number 20G

Allen-Bradley
by ROCKWELL AUTOMATION

Quick Start

Original Instructions

Important User Information

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

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

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

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

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

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

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

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

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

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

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

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

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

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

Introduction

This Quick Start is designed to guide you through 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

The procedure in this Quick Start uses the Human Interface Module (HIM) to configure parameters. However, you can use Connected Components Workbench™ (CCW) (version 11 or later) software and the associated PowerFlex 755T Wizards to configure parameters, instead of using the HIM.

Who Should Use This Manual

This manual is intended for qualified personnel.

- You must understand the hazards that are associated with electromechanical equipment installations.
- You must understand and follow all applicable local, national, and/or international electrical codes.
- You must be able to program and operate Adjustable Frequency AC Drive devices.
- You must have an understanding of the parameter settings and functions.

Equipment

The following equipment requirements apply to the use of this publication:

- The drive is a PowerFlex 755TL, PowerFlex 755TR, or PowerFlex 755TS standalone installation. All content in this document applies to all of these drive types unless otherwise noted. All uses of the term “drives” refers to all of these drive types unless otherwise noted.
- The motor is either an induction motor, a synchronous reluctance motor, or a permanent magnet motor.
- No load sharing or multiple motors on a single drive.
- The drive has all required circuit protection installed.
- The drive and motor are connected and ready to have AC power applied.
- The drive is equipped with either a PowerFlex 20-HIM-A6 or a 20-HIM-C6S Human Interface Module (HIM).
- If used, the motor feedback device is a quadrature (AqB) incremental encoder.

Supported Applications

This publication is intended for use on simple velocity control applications with fans, pumps, compressors, and conveyors. For more advanced applications, see the publications that are listed in Advanced Configuration on page 57.

Installation

The content of this manual assumes that the drive is installed according to the guidelines in the following publications:

- Wiring and Grounding for Pulse Width Modulated (PWM) AC Drives, publication DRIVES-IN001
- PowerFlex 750-Series Products with TotalFORCE Control Installation Instructions, publication 750-IN100 for PowerFlex 755TR and 755TL drives
- PowerFlex 755TS Products with TotalFORCE Control Installation Instructions, publication 750-IN119 for PowerFlex 755TS drives

The following is assumed:

- The drive installation meets mechanical requirements for drive orientation, cooling airflow, and mounting hardware.
- The drive installation meets environmental requirements for surrounding air temperature, ambient atmosphere, and the enclosure rating.
- The drive installation meets electrical requirements for AC supply, motor sizing, wiring and grounding, and overload and short circuit protection.
- The drive installation is compliant with all applicable local, national, and international codes, standards, and requirements.

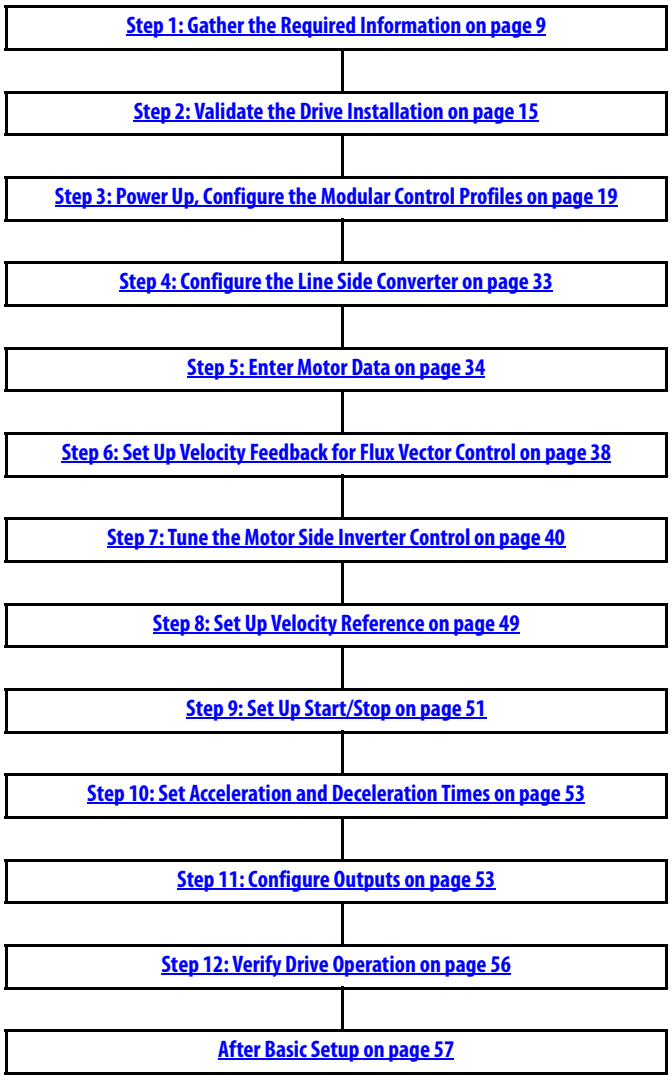
Summary of Changes

This publication contains the following new or updated information. This list includes substantive updates only and is not intended to reflect all changes. Translated versions are not always available for each revision.

Topic	Page
Added PowerFlex 755TS to footnote 1 of the System Data table.	10
Added 208V and 240V to footnote 1 of the Configurations and Preferences table.	20
Added 208V and 240V to the Enter the Voltage Class section.	25

Procedure Flowchart

Basic setup includes the following steps. We recommend that you proceed to the After Basic Setup section once basic setup is complete.



Notes:

Step 1: Gather the Required Information

When you apply power to your drive for the first time, you must enter specific information about your application. This step helps you to verify that you have the needed information before drive power-up.

Table 1 on page 10 provides a place to record the data you need for the rest of the steps in this document.

Record System Data

Record the data that is required to configure system parameters. This data includes motor nameplate data, AC power data, and other motor data. Use Table 1 on page 10 to record a descriptive name, and parameter values for each drive/motor combination. You can record data for up to five drive/motor combinations.

Table 1 - System Data

Drive/Motor Identifier (example, Main Exhaust Fan)			Drive/Motor 1:	Drive/Motor 2:	Drive/Motor 3:	Drive/Motor 4:	Drive/Motor 5:
Drive Type			❑ 755TL ❑755TR ❑755TS	❑ 755TL ❑755TR ❑755TS	❑ 755TL ❑755TR ❑755TS	❑ 755TL ❑755TR ❑755TS	❑ 755TL ❑755TR ❑755TS
Drive Catalog Number			20G	20G	20G	20G	20G
Transformer Identifier							
Port No.	**Parameter No.**	**Description(2)**	**Drive/Motor 1:**	**Drive/Motor 2:**	**Drive/Motor 3:**	**Drive/Motor 4:**	**Drive/Motor 5:**
10	400	Motor Nameplate Volts					
10	401	Motor Nameplate Amps					
10	402	Motor Nameplate Hertz					
10	403	Motor Nameplate RPM					
10	405	Motor Nameplate Power Units	❑ kW ❑ Hp	❑ kW ❑ Hp	❑ kW ❑ Hp	❑ kW ❑ Hp	❑ kW ❑ Hp
10	406	Motor Nameplate Power					
10	407	Motor Poles(3)					
10	204	Motor Overload Hertz(4)					
10	209	Motor Protection Class(5)					
10	210	Motor Hot Start Coefficient(6)					
10	211	Motor Cooling Time(7)					
10	900	Motor Inertia(8) (kg•m2)					
0	33(1)	Voltage Class Configure					
13	30(1)	Nominal Line Frequency (50 Hz or 60 Hz)	❑ 50 Hz ❑ 60 Hz	❑ 50 Hz ❑ 60 Hz	❑ 50 Hz ❑ 60 Hz	❑ 50 Hz ❑ 60 Hz	❑ 50 Hz ❑ 60 Hz
13	32(1)	Apparent Power Rating AC Line Source A					
13	34(1)	Impedance AC Line Source A (%)(9)					
Power Jumpers Configuration		AC Power Source Grounding Method(10)					
Braking Chopper (if used)		External Brake Chopper and DB Resistor Data	❑ —	❑ —	❑ —	❑ —	❑ —
Motor Encoder, also called Feedback Device (if used)		Motor Encoder Data(11)	❑ — PPR: _____	❑ — PPR: _____	❑ — PPR: _____	❑ — PPR: _____	❑ — PPR: _____

(1) These parameters only apply to PowerFlex 755TL, PowerFlex 755 TR, and PowerFlex 755TS drives.
(2) Motor parameters with descriptions that do not include "Motor Nameplate" are typically not present on the motor nameplate.
(3) See Step 5: Enter Motor Data > Enter Motor Poles on page 35.
(4) See Step 5: Enter Motor Data > Enter Motor Overload Hertz on page 36.
(5) See Step 5: Enter Motor Data > Enter Motor Protection Class on page 36.
(6) See Step 5: Enter Motor Data > Enter Motor Hot Start Coefficient on page 37.
(7) See Step 5: Enter Motor Data > Enter Motor Cooling Time on page 37.
(8) Only needed for Flux Vector motor control mode. Methods to determine motor inertia are covered in Step 7: Tune the Motor Side Inverter Control > Enter Motor Inertia on page 44.
(9) If your system uses a line reactor, see Calculating AC Line Impedance on page 66.
(10) For example, solid (low res), non-solid (high res).
(11) Only needed if a motor encoder is used. For more information, see Step 6: Set Up Velocity Feedback for Flux Vector Control on page 38.

Record Velocity Reference and Start/Stop Sources

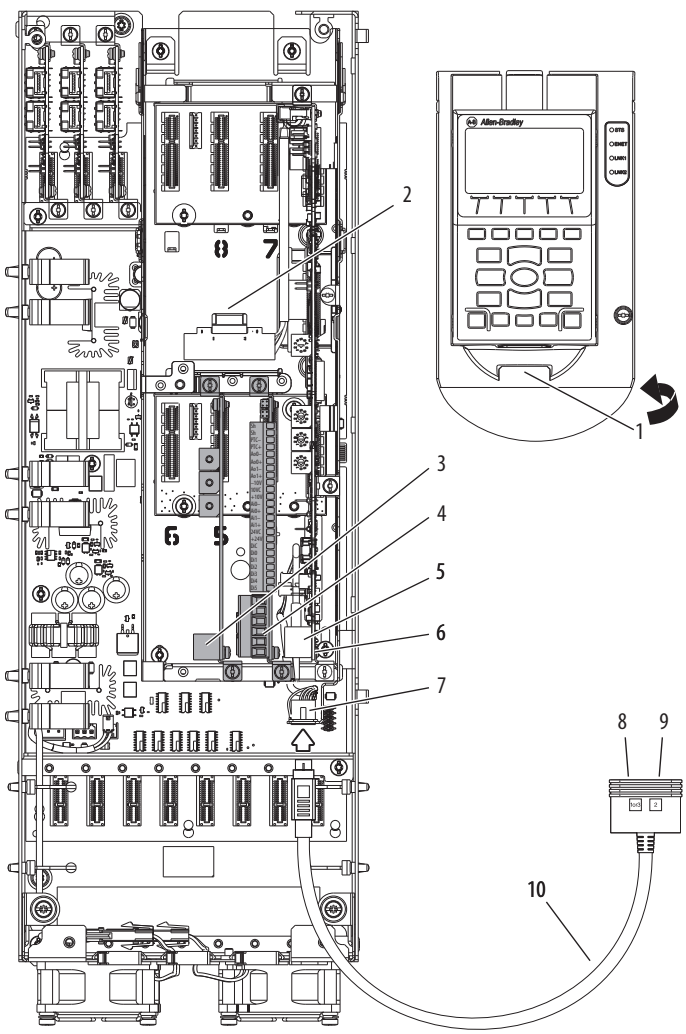
Use one of the following figures to help determine where signal and control sources are connected in each of your drives:

- Figure 1: PowerFlex 755TL Standard and PowerFlex 755TR Standard: Basic Subset of Signal Source and Port Locations in the Control Pod Assembly on page 11
- Figure 2: PowerFlex 755TL XT and PowerFlex 755TR XT: Basic Subset of Signal Source and Port Locations in the Control Pod Assembly on page 12
- Figure 3: PowerFlex 755TS Standard and XT: Basic Subset of Signal Source and Port Locations in the Control Pod on page 13

You need this information for Step 8: Set Up Velocity Reference on page 49 and Step 9: Set Up Start/Stop on page 51.

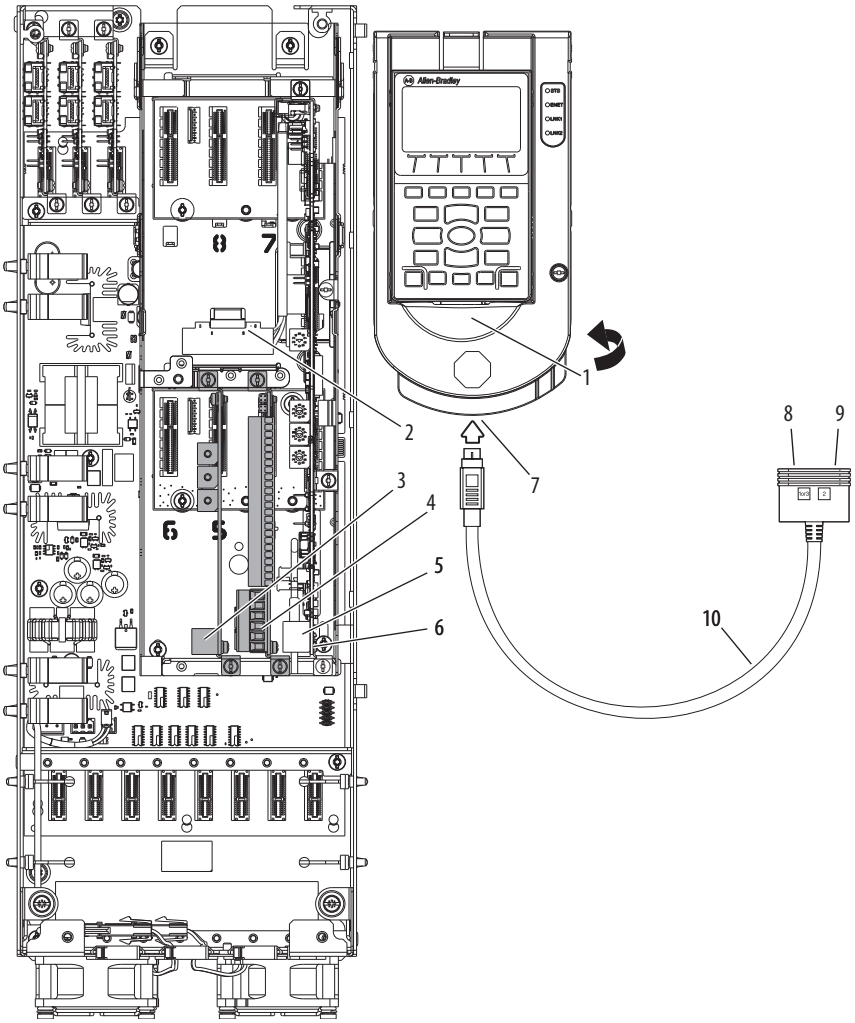
IMPORTANT PowerFlex® 755T products use the term 'port' to designate (in firmware and software) the physical location where hardware is located to make it easier to select hardware or functions to program.

Figure 1 - PowerFlex 755TL Standard and PowerFlex 755TR Standard: Basic Subset of Signal Source and Port Locations in the Control Pod Assembly



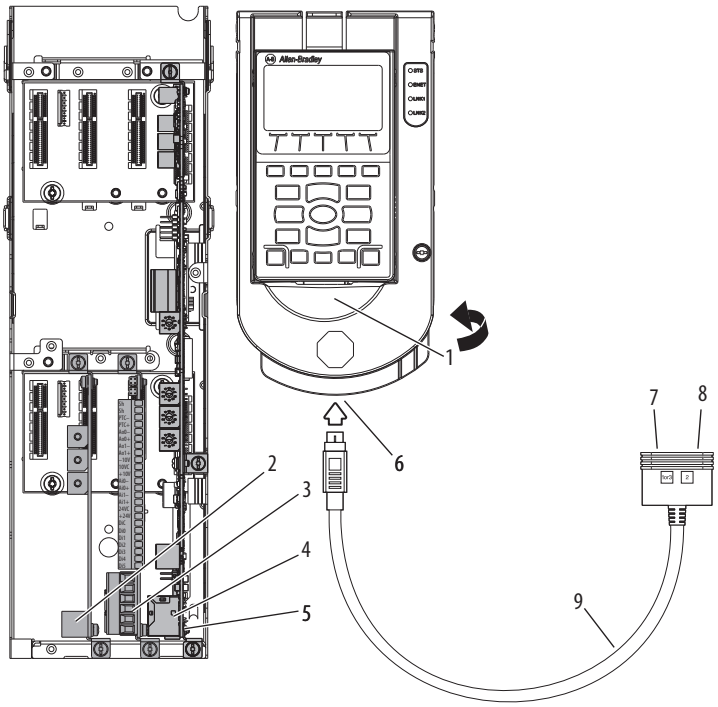
Items	Descriptions
1	DPI Port 1 connection on the control-pod-mounted Human Interface Module (HIM). The connection is on the back of the assembly that includes the control-pod-mounted HIM and HIM cradle. This assembly is shown not installed. When this assembly is installed, the DPI Port 1 connection on the HIM connects to the Control Pod at item 2.
2	DPI Port 1 connection on the control pod. The connector that is shown here is part of the DPI Port 1 connection on the HIM and HIM cradle assembly (item 1). The connector is shown in the control pod to show where it connects.
3	Communication option module (shown installed at Port 5)
4	Expansion I/O module (shown installed at Port 4)
5	Embedded EtherNet/IP™ connectors
6	Terminal block TB1 behind Port 0 (the EtherNet/IP port) on the main control board
7	DPI Port 2 for handheld HIM connection, remote HIM connection, or a splitter cable (item 10)
8	Splitter cable connection that provides the following: • When the DPI Port 1 connection on the control pod (item 2) is unused, this splitter cable connection provides a DPI Port 1 connection. • When the DPI Port 1 connection on the control pod (item 2) is used, this splitter cable connection provides a Port 3 connection.
9	Splitter cable connection that provides a handheld HIM connection, or a remote HIM connection to DPI Port 2.
10	Splitter cable that connects to DPI Port 2 (item 7) and provides the connections that are listed in items 8 and 9.

Figure 2 - PowerFlex 755TL XT and PowerFlex 755TR XT: Basic Subset of Signal Source and Port Locations in the Control Pod Assembly



Items	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 at item 2.
2	DPI Port 1 connection on the control pod. The connector that is shown here is part of the DPI Port 1 connection on the HIM and HIM cradle assembly (item 1). The connector is shown in the control pod to show where it connects.
3	Communication option module (shown installed at Port 5)
4	Expansion I/O module (shown installed at Port 4)
5	Embedded EtherNet/IP™ connectors
6	Terminal block TB1 behind Port 0 (the EtherNet/IP port) on the main control board
7	DPI Port 2 for handheld HIM connection, remote HIM connection, or a splitter cable (item 10)
8	Splitter cable connection that provides the following: • When the DPI Port 1 connection on the control pod (item 2) is unused, this splitter cable connection provides a DPI Port 1 connection. • When the DPI Port 1 connection on the control pod (item 2) is used, this splitter cable connection provides a Port 3 connection.
9	Splitter cable connection that provides a handheld HIM connection, or a remote HIM connection to DPI Port 2.
10	Splitter cable that connects to DPI Port 2 (item 7) and provides the connections that are listed in items 8 and 9.

Figure 3 - PowerFlex 755TS Standard and XT: Basic Subset of Signal Source and Port Locations in the Control Pod



Items	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.

Table 2 - Velocity Reference and Start/Stop Control Sources

Item(1)					
03	Are signal sources connected to a communication option module installed in your drive? If yes, note the catalog number and port number for the module.(2)				
	Drive 1: ☐ Yes: Port No. ______ ☐ No Cat. No.: 20-750-______	Drive 2: ☐ Yes: Port No.______ ☐ No Cat. No.: 20-750-______	Drive 3: ☐ Yes: Port No.______ ☐ No Cat. No.: 20-750-______	Drive 4: ☐ Yes: Port No.______ ☐ No Cat. No.: 20-750-______	Drive 5: ☐ Yes: Port No. ______ ☐ No Cat. No.: 20-750-______
	Address Information:	Address Information:	Address Information:	Address Information:	Address Information:
04	Are signal sources connected to the digital and analog inputs of an I/O option module that is installed in your drive? If yes, note the catalog number, port number, and wiring terminal information for the module.(3)				
	Drive 1: ☐ Yes: Port No.______ ☐ No Cat. No.: 20-750-______	Drive 2: ☐ Yes: Port No.______ ☐ No Cat. No.: 20-750-______	Drive 3: ☐ Yes: Port No.______ ☐ No Cat. No.: 20-750-______	Drive 4: ☐ Yes: Port No.______ ☐ No Cat. No.: 20-750-______	Drive 5: ☐ Yes: Port No.______ ☐ No Cat. No.: 20-750-______
	Vel Ref Term: Ai ____ DI 0 Term: ______ DI 1 Term: ______ DI 2 Term: ______ DI 3 Term: ______ DI 4 Term: ______ DI 5 Term: ______ Ao0 Term: ______ Ao1 Term: ______ R0 Term: ______ R1 Term: ______ T0 Term: ______ T1 Term: ______	Vel Ref Term: Ai ____ DI 0 Term: ______ DI 1 Term: ______ DI 2 Term: ______ DI 3 Term: ______ DI 4 Term: ______ DI 5 Term: ______ Ao0 Term: ______ Ao1 Term: ______ R0 Term: ______ R1 Term: ______ T0 Term: ______ T1 Term: ______	Vel Ref Term: Ai ____ DI 0 Term: ______ DI 1 Term: ______ DI 2 Term: ______ DI 3 Term: ______ DI 4 Term: ______ DI 5 Term: ______ Ao0 Term: ______ Ao1 Term: ______ R0 Term: ______ R1 Term: ______ T0 Term: ______ T1 Term: ______	Vel Ref Term: Ai ____ DI 0 Term: ______ DI 1 Term: ______ DI 2 Term: ______ DI 3 Term: ______ DI 4 Term: ______ DI 5 Term: ______ Ao0 Term: ______ Ao1 Term: ______ R0 Term: ______ R1 Term: ______ T0 Term: ______ T1 Term: ______	Vel Ref Term: Ai ____ DI 0 Term: ______ DI 1 Term: ______ DI 2 Term: ______ DI 3 Term: ______ DI 4 Term: ______ DI 5 Term: ______ Ao0 Term: ______ Ao1 Term: ______ R0 Term: ______ R1 Term: ______ T0 Term: ______ T1 Term: ______
05	Is there a connection to the Embedded EtherNet/IP Adapter? If yes, note the IP address and other applicable information.(4)				
	Drive 1: ☐ Yes ☐ No	Drive 2: ☐ Yes ☐ No	Drive 3: ☐ Yes ☐ No	Drive 4: ☐ Yes ☐ No	Drive 5: ☐ Yes ☐ No
	Port No. 0 IP Address: ____:____:____:____ Subnet Mask: ____:____:____:____ Gateway Address (if used): ____:____:____:____	Port No. 0 IP Address: ____:____:____:____ Subnet Mask: ____:____:____:____ Gateway Address (if used): ____:____:____:____	Port No. 0 IP Address: ____:____:____:____ Subnet Mask: ____:____:____:____ Gateway Address (if used): ____:____:____:____	Port No. 0 IP Address: ____:____:____:____ Subnet Mask: ____:____:____:____ Gateway Address (if used): ____:____:____:____	Port No. 0 IP Address: ____:____:____:____ Subnet Mask: ____:____:____:____ Gateway Address (if used): ____:____:____:____
01, 02	Are you using the drive HIM to set the speed reference or for Start/Stop control? If yes, note the HIM port number.				
	Drive 1: ☐ Yes: Port No.______ ☐ No	Drive 2: ☐ Yes: Port No.______ ☐ No	Drive 3: ☐ Yes: Port No.______ ☐ No	Drive 4: ☐ Yes: Port No.______ ☐ No	Drive 5: ☐ Yes: Port No.______ ☐ No

(1) Item numbers are referenced to the control pod diagram, Figure 1 on page 11.

(2) See the user manual for the communication option module installed in the drive.

(3) See Connections on 11-Series and 22-Series I/O Modules on page 49 for information regarding analog I/O parameter assignments. Leave unused digital and analog assignments blank. See application wiring diagrams to determine the functions of digital and analog I/O that are wired to various I/O option module terminals. Possible motor side control functions that can be assigned to the digital inputs include; Stop, Start, and Run. See the PowerFlex Drives with TotalFORCE Control Programming Manual, publication 750-PM100, for all motor side control functions available for assignment to digital inputs.

(4) See Configure Embedded EtherNet/IP Communication Adapter on page 31 for information regarding methods to set the embedded EtherNet adapter IP address.

Step 2: Validate the Drive Installation

It is important that you thoroughly inspect each of your drive installations before applying power for the first time. This inspection is especially important if you did not personally perform the installation tasks. Verify that each drive is ready to be energized when you get to Step 3: Power Up, Configure the Modular Control Profiles on page 19.

ATTENTION: To avoid an electric shock hazard, the drive must be locked and tagged before you start Step 2: Validate the Drive Installation. Failure to comply can result in personal injury and/or equipment damage.

Verify the Setting of the ENABLE and SAFETY Jumpers

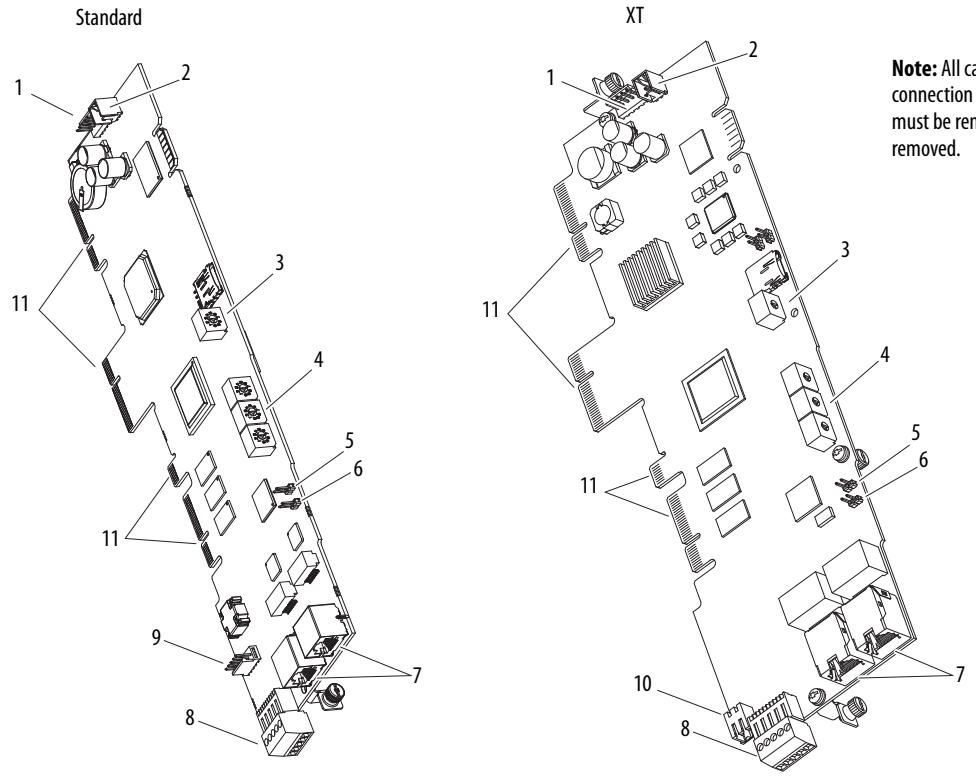
For locations of the ENABLE and SAFETY jumpers, see the following:

- For PowerFlex 755TL and PowerFlex 755TR, see Figure 4 on page 16.
- For PowerFlex 755TS, see Figure 5 on page 17.

Make jumpers are set correctly using the following information:

- If the ENABLE jumper is removed, then to enable the product to operate, you must apply control power to the main control board, port 0 TB1 terminal <Di0> and <DiC>. No modification of drive parameters is required. Port 0 TB1 terminal <Di0> becomes the dedicated product enable input. For more information, see the PowerFlex 750-Series Products with TotalFORCE Control Installation Instructions, publication 750-IN100.
- If the SAFETY jumper is removed, install the ENABLE jumper and install a safety option module in a valid control pod port. Configuring a safety option module is beyond the scope of this document. See the manual for the safety option that is installed:
  - Catalog number 20-750-S: PowerFlex 750-Series Safe Torque Off User Manual, publication 750-UM002.
  - Catalog number 20-750-S1: Safe Speed Monitor Option Module for PowerFlex 750-Series AC Drives Safety Reference Manual, publication 750-RM001.
  - Catalog number 20-750-ATEX: PowerFlex 750-Series ATEX Option Module User Manual, publication 750-UM003.
  - Catalog number 20-750-S3: PowerFlex 755 Integrated Safety - Safe Torque Off User Manual, publication 750-UM004.
  - Catalog number 20-750-S4: PowerFlex 755/755T Integrated Safety Functions Option Module, publication 750-UM005.

Figure 4 - PowerFlex 755TL and PowerFlex 755TR Main Control Board

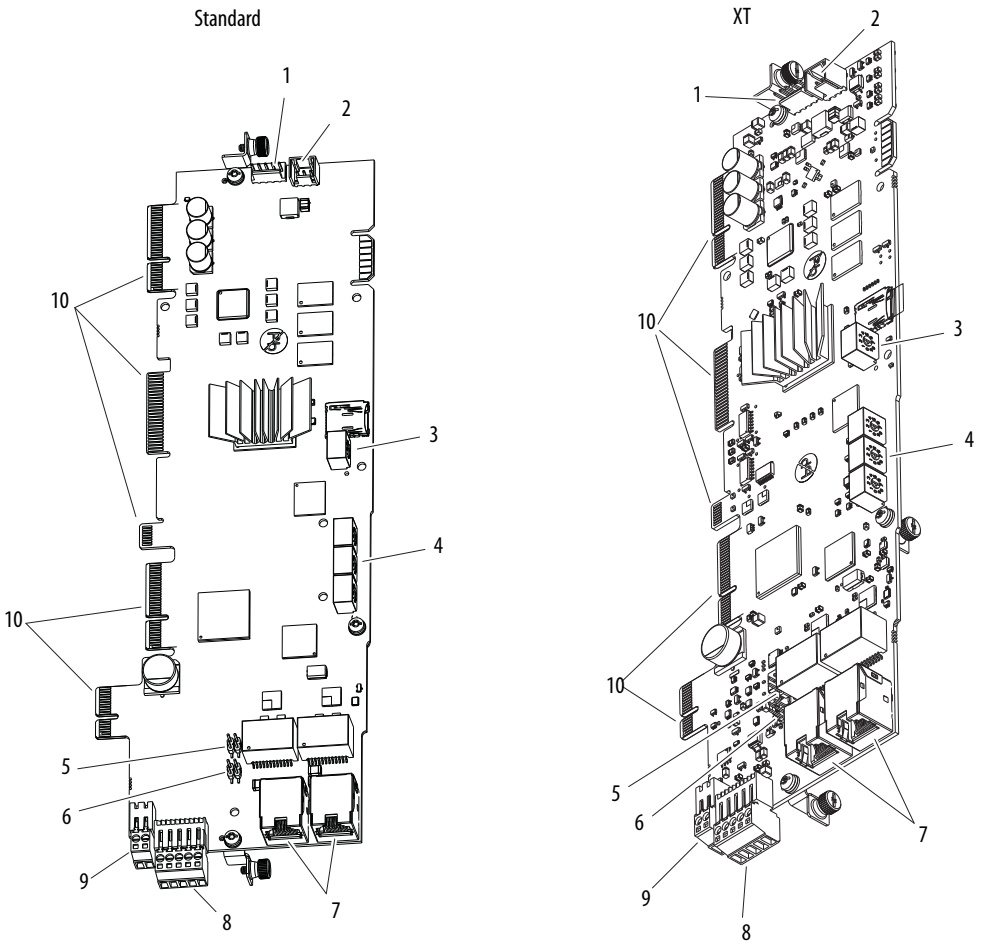


Note: All caps and plugs are shown removed to show connection components. Only the caps and plugs that must be removed to make connections should be removed.

Item	Name	Description
1	HIM Connector	Terminal block connector for the DPI™ Port 1 (HIM Cradle) cable connection.
2	Fan Connector	Power supply for internal cooling fan.
3	Control Selector	Rotary switch for setting the programming mode.
4	Embedded EtherNet/IP[(1)] Address Selectors	Rotary switches for setting lowest octet of EtherNet address (forces address to 192.168.1.xxx). See Configure Embedded EtherNet/IP Communication Adapter on page 31 for instructions on setting the IP address.
5	SAFETY Jumper	Safety enable jumper. Removed when safety option is installed.
6	ENABLE Jumper	Hardware enable jumper. TB1 becomes an Enable when this jumper is removed.
7	Built-in EtherNet/IP Adapter	A single adapter with dual EtherNet/IP network cable connections.
8	TB1	I/O terminal block.
9	DPI Port 2/3	Terminal block connector for the mini-DIN cable that is used for handheld and remote HIM options.
10	Door Switch Connector	Power supply for the door switch.
11	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 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.

Figure 5 - PowerFlex 755TS Main Control Board



Note: All caps and plugs are shown removed to show connection components. Only the caps and plugs that must be removed to make connections should be removed.

Item	Name	Description
1	HIM Connector	Terminal block connector for the DPI Port 1 (HIM Cradle) cable connection.
2	Fan Connector	Power supply for internal cooling fan.
3	Control Selector	Rotary switch for setting the programming mode.
4	Built-in EtherNet/IP[(1)] Address Selectors	Rotary switches for setting lowest octet of EtherNet address (forces address to 192.168.1.xxx). See Configure Embedded EtherNet/IP Communication Adapter on page 31 for instructions on setting the IP address.
5	ENABLE Jumper	Hardware enable jumper (P7). TB1 becomes an Enable when this jumper is removed.
6	SAFETY Jumper	Safety enable jumper (P8). Removed when safety option is installed.
7	Built-in EtherNet/IP Adapter	A single adapter with dual EtherNet/IP network cable connections.
8	TB1	I/O terminal block.
9	Terminal Block Connector	Reserved for future use.
10	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 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.

Verify Power Source Ratings and Wiring Configurations

The installation must conform with the guidelines that are given in the PowerFlex 750-Series Products with TotalFORCE Control Installation Instructions, publication 750-IN100.

If any of the following conditions exist, confirm that these items have been addressed and that the power source and cabling is suitable for operation of PowerFlex 755TL, 755TR, or 755TS products.

- The power-source-short-circuit-current capacity must not exceed 100,000 A rms symmetrical amperes at 400/480/600V systems, and 65,000 A rms symmetrical amperes for 690V systems.
- The PowerFlex 755TL/TR drives must not be used on undersized or high impedance supply systems. The supply system kVA must be equal to or greater than the drive kW, and the system impedance must be less than 10%.
- Other drives share the AC input source transformer with the PowerFlex 755TL/TR drive, certain measures may be required for proper operation of the PowerFlex 755TL/TR drive.
- The power source grounding method is not the recommended wye secondary with solid (low resistance) X0 ground with cable that is connected to the drive PE terminal. DC bus conditioning filters and other devices may be required.
- The motor output cable length is greater than the recommendations in Appendix A of the Wiring and Grounding for Pulse Width Modulated (PWM) AC Drives, publication DRIVES-IN001. When assessing the motor output cable length in comparison to the recommendations, consider the following:
  - Motor insulation rating
  - PWM switching frequency
  - Any reflected wave protection devices, such as an RWR filter, if any such devices have been installed

See the Wiring and Grounding for Pulse Width Modulated (PWM) AC Drives, publication DRIVES-IN001, for important information regarding installation of AC drives.

Verify Power Wiring

Visually inspect the power wiring connections to each drive. Be sure that you are satisfied that the correct wires are connected to the input terminals and to the output terminals and are tightened with the correct torque.

See the PowerFlex 750-Series Products with TotalFORCE Control Installation Instructions, publication 750-IN100 for more information on where these connections are made and torque requirements.

See the Wiring and Grounding for Pulse Width Modulated (PWM) AC Drives, publication DRIVES-IN001, for important information regarding installation of AC drives.

Verify Wiring	Drive 1 Wiring is Correct	Drive 2 Wiring is Correct	Drive 3 Wiring is Correct	Drive 4 Wiring is Correct	Drive 5 Wiring is Correct
AC input power is on L1, L2, L3 / R, S, T.	❑	❑	❑	❑	❑
Output motor connection is on T1, T2, T3 / U, V, W.	❑	❑	❑	❑	❑
Proper ground wire terminations at PE ground studs.	❑	❑	❑	❑	❑
The motor output cable length does not exceed the max recommended length.	❑	❑	❑	❑	❑

Verify Power Jumper Configuration

PowerFlex 755T drives contain protective MOVs and common mode capacitors that are referenced to ground. To guard against drive damage and/or operation problems, these devices must be configured based on the AC power source grounding method that is recorded in Table 1 on page 10.

IMPORTANT The drive-power-source-grounding method must be accurately determined and the jumpers must be configured for the power source. See the PowerFlex 750-Series Products with TotalFORCE Control Installation Instructions, publication 750-IN100 for more information on common power source types. See the Power Jumper Configuration sections for the proper jumper configuration for your power source and the locations of power jumpers in the drives.

Drive 1 Power jumpers are configured correctly.	Drive 2 Power jumpers are configured correctly.	Drive 3 Power jumpers are configured correctly.	Drive 4 Power jumpers are configured correctly.	Drive 5 Power jumpers are configured correctly.
❑	❑	❑	❑	❑

Verify I/O Wiring

To configure a drive correctly, you must know the source of the velocity reference and the start/stop commands. There are four places where signal sources (such as push buttons, potentiometers, communication network cabling, or HIM) are connected to the drive:

1. The main control board.
   - Embedded EtherNet/IP port
   - Terminal block TB1 (Di0)
2. An I/O option module. This module is where an analog input or preset speed would connect.
3. A communication option module.
4. A HIM.

Step 3: Power Up, Configure the Modular Control Profiles

In this step, you power up the drive and configure the drive modular control profiles and system properties. Modular Control Profiles are parts of the drive that change to match your application needs. A power cycle or drive reset is required for the new configuration to be applied. Modular Control Profiles improve the user interface and performance.

Preparation

Use the following table to record your configurations and preferences. See the detailed description below the table for more information about what to record in this table.

Table 3 - Configurations and Preferences

Drive/Motor Name (example, Main Exhaust Fan)							
Port No.	Related Parameter No.	Description	**Drive/Motor 1:**	**Drive/Motor 2:**	**Drive/Motor 3:**	**Drive/Motor 4:**	**Drive/Motor 5:**
0	33	Voltage Class(1) (Low, High)					
0	35	Duty Rating Class(2) (Light Duty [LD], Normal Duty [ND], Heavy Duty [HD])					
0	46	Velocity Units (Hertz, RPM)					
0	65	Primary Motor Control Mode(3)					
0	70	Application Select(4) (None, PID, Torque Prove, OilWell Pump)					
0	72	Embedded Logic Select(5) (None, DeviceLogix™)					
10	110	Stop Mode(6) (Coast, Ramp, Current Lmt, DecelToHold, Ramp to Hold, DC Brake, Fast Brake)					
10	116	Motor Side DC Bus Regulation Mode(7) (Disabled, Adjust Freq, Dyn Brake, Both DB 1st, Both Frq 1st)					

(1) Set Voltage Class to 'Low' for 208V, 400V and 600V drives. Set Voltage Class to 'High' for 240V, 480V and 690V drives. See Enter the Voltage Class on page 25 for more information about this setting.

(2) Depends on the application overload requirements. LD = 110% for 60 s, ND = 110%/150% for 60 s/3 s, HD = 150%/180% for 60 s/3 s. See Enter the Duty Rating on page 26 for more information about this setting. Light Duty is not available on all drive sizes.

(3) Motor control mode options include: Induction Volts Per Hertz, Induction Sensorless Vector, Induction Economizer, Induction Flux Vector, Interior Permanent Magnet Flux Vector, Surface Permanent Magnet Flux Vector, Permanent Magnet Volts Per Hertz, Permanent Magnet Sensorless Vector, Synchronous Reluctance Volts Per Hertz, and Synchronous Reluctance Sensorless Vector. For most applications, select an SV (Sensorless Vector) or Econ (Econ SV) motor control mode. If your application requires closed loop velocity control with encoder feedback, select an FV (Flux Vector) motor control mode.
See Enter the Motor Control Mode on page 27 for more information about this setting.

(4) For most applications, select 'None'. See Enter the Application Selection on page 28 for more information about this setting.

(5) For most applications, select 'None'. See Enter the Embedded Logic Selection on page 28 for more information about this setting.

(6) For most applications, select 'Ramp'. See Enter the Motor Stop Mode on page 29 for more information about this setting. If parameter 0:65 (port 0, parameter 65) is changed, then performing a Reset Device procedure changes parameters that are associated with port 10.

(7) For PowerFlex 755TL and PowerFlex 755TS drives, select 'Adjust Frequency'. For PowerFlex 755TR drives, select 'Disabled'. See Enter the Motor Side Bus Regulation Mode on page 30 for more information about this setting. If parameter 0:65 is changed, then performing a Reset Device procedure changes parameters that are associated with port 10.

Some of the parameters that are listed in Table 3 require you to reset the device to change the value of the parameter. See Appendix A > Reset Device on page 59. The parameters that require reset are listed in Reset Device and Verify the Configurations on page 30.

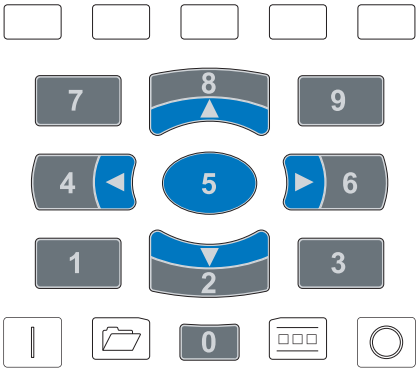
How to Use the HIM

The PowerFlex 20-HIM-A6 / -C6S HIM User Manual, publication 20HIM-UM001, provides detailed instructions on how to use the Human Interface Module (HIM) capabilities for configuring PowerFlex 750-Series drive settings.

The PowerFlex 755T product does not support Assisted Startup using the HIM. You must manually select parameters as directed in the following procedure.

HIM Navigation Keys

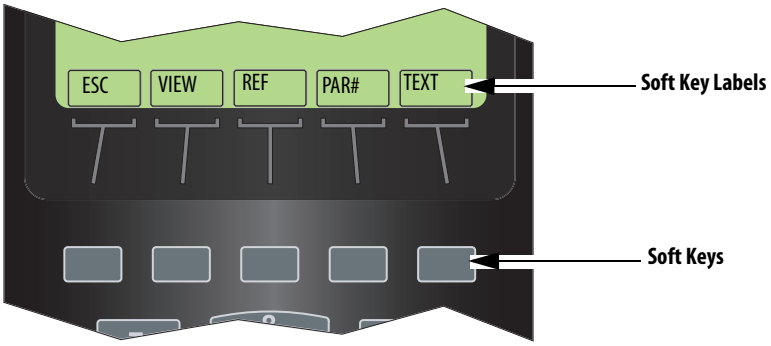
The navigation keys are the blue keys (2, 4, 5, 6, 8). The navigation keys are also used for entering numeric values.



- Use the  or  to scroll up or down through selection lists shown on the LCD display.
- Use the  or  keys to scroll left or right through selection options that are shown on the LCD display.
- Use the  key to accept selections.

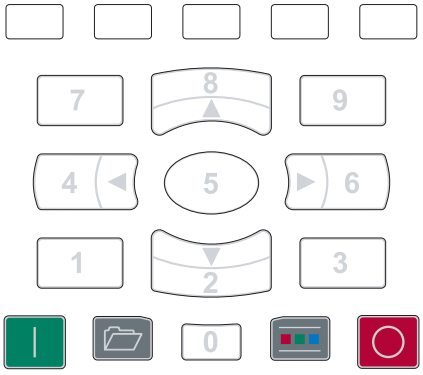
HIM Soft Keys

The HIM soft keys are the top row of gray unmarked keys. Soft key function depends on context. The function that a key currently has is shown by the corresponding soft key label at the bottom of the LCD display. When prompted to use a soft key function, use the key label to determine which soft key button to press.



HIM Single Function Keys

There are four single-function keys, which are highlighted. Each single-function key always performs only its dedicated function.



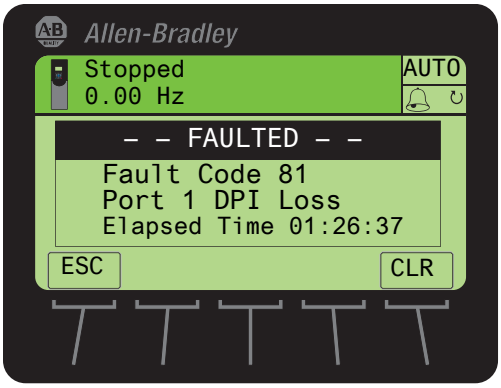
- The key is the drive Start push button.
- The key is the drive Stop push button and can be used to clear alarms and faults.
- The key accesses folder for parameters, diagnostics, memory functions, preferences, and other tasks.
- The key accesses drive control such as jog, direction, auto/manual and other functions.

HIM Alarms and Faults

The HIM displays various alarm and fault codes. When alarm and fault codes display, you have the following options:

- Correct the cause of the fault and then clear the fault code by pressing the drive Stop push button or the CLR soft key. Once the fault is corrected and cleared, the fault no longer exists, and normal drive operation can resume.
- Do not correct the cause of the fault. Press the drive Stop push button or the CLR soft key. If the fault is cleared, but not corrected, whatever condition is causing the fault still exists, but the fault is removed from the HIM display.
- Do not clear faults. Exit the fault screen by pressing the ESC soft key.

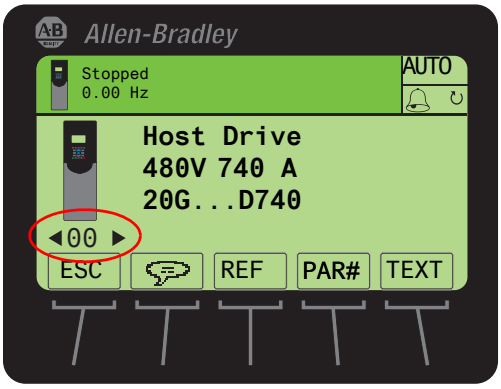
Normal drive operation cannot be resumed until any faults that exist are both corrected and cleared. See the PowerFlex Drives with TotalFORCE Control Programming Manual, publication 750-PM100 for Fault/Alarm code information.



Navigating to a Port and Parameter

Throughout this document you are prompted to 'Navigate to parameter nn:xxxx [name]'. 'Parameter nn:xxxx' means port nn, parameter xxxx. When prompted to access a parameter, use the following procedure.

1. From the Status screen, use the  or  navigation keys to scroll to the indicated port number.



2. Press the PAR# soft key.
3. Use the numeric keys to enter the indicated parameter number. Entry of leading zeroes is not required.
4. Press the ENTER soft key.

Edit a value

When prompted to Edit a value, use the following procedures.

1. When the parameter display screen appears, press the EDIT soft key.
2. Depending on the parameter properties, you can enter the parameter value directly with the numeric keys or there may be a list of available selections.

   If there is a list of available selection use the HIM navigation keys  or  , to scroll up or down through selection list that is shown on the LCD display.

   Other settings such as bit selections use the HIM navigation keys  or  to scroll left or right to the indicated value or bit number.
3. To accept the entered data or selection, press the ENTER soft key.

   Depending on the parameter properties, there may be multiple selection lists that appear each time you press the ENTER soft key.
4. If you do not want to accept a value or selection, press the ESC soft key.
5. To return to the Status screen, press the ESC soft key. Multiple presses may be required.

Power the Drive

Use one of the following procedures to energize your drive.

ATTENTION: Power must be applied to the drive to perform the following start-up procedure. Some of the voltages present are at incoming line potential. To avoid electric shock hazard or damage to equipment, allow only qualified service personnel to perform the following procedure. Thoroughly read and understand the procedure before beginning.

For Drives Without 24V Auxiliary Power

1. Energize the 3-phase power source to the drive.
2. If your product is a PowerFlex 755TL, PowerFlex 755TM, or PowerFlex 755TR, and it is Frame 7...15, then turn the Fused Disconnect handle on the drive input bay to the ON position.
3. After the drive boots up, if there are any faults, correct and clear them.

TIP The drive should remain energized for the next procedure, but if you ever want to de-energize the drive, do so as follows:

1. For Frames 7…15, turn the Fused Disconnect handle on the drive input bay to the OFF position.
2. De-energize the 3-phase power source to the drive.

For Drives With 24V Auxiliary Power

1. Energize the three-phase power source to the drive.
2. For Frames 7...15, turn the Fused Disconnect handle on the drive input bay to the ON position.
3. After the drive boots up, if there are any faults, correct and clear them.
4. Energize the 24V Auxiliary Power supply source.
5. Keep the 24V Auxiliary Power source energized even if the AC power is de-energized. This maintains operation of the control pod port devices and communication adapters.

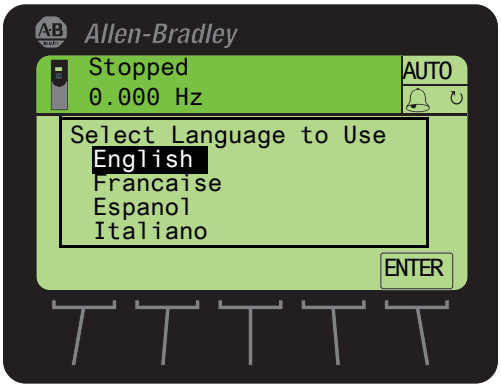
TIP The drive should remain energized for the next procedure, but if you ever want to de-energize the drive, do so as follows:

1. For Frames 7…15, turn the Fused Disconnect handle on the drive input bay to the OFF position.
2. De-energize the 3-phase power source to the drive.

Select the Language

If you are prompted to select the language, use the following procedure.

1. Use the HIM navigation keys to scroll through the list of selections to highlight the desired display language.
2. To accept the setting, press the ENTER soft key.



Configure the Motor Side Inverter

IMPORTANT If the drive was previously configured for a different application, and is being repurposed for this application, you must reset the parameters to factory defaults before configuring the motor side inverter. See Appendix A > Setting Factory Defaults on page 61.

Enter the following data, which was gathered in Table 3 on page 20.

IMPORTANT Some parameter settings and related control mode changes only take effect after you perform a Reset Device procedure. You only need to perform the Reset Device procedure once, after entering all settings to configure the motor side inverter.

Enter the Voltage Class

A change to this parameter is needed only when you are applying a drive on a voltage other than what the catalog number specifies.

- For 208/240V products, 'Low Voltage' selects 208V and 'High Voltage' selects 240V.
- For 400/480V products, ‘Low Voltage’ selects 400V and ‘High Voltage’ selects 480V.
- For 600/690V products, ‘Low Voltage’ selects 600V and ‘High Voltage’ selects 690V.

1. Navigate to parameter 0:33 [VoltageClass Cfg].
2. Press the EDIT soft key.
3. Edit the value to either 0 ‘Low Voltage’ or 1 ‘High Voltage’, choosing the option corresponding to the data collected in Table 3 on page 20.
4. Press the ENTER soft key.

Enter the Duty Rating

The duty class parameter allows you to select the continuous and overload modes of operation. The value of this parameter affects the continuous current rating of the drive.

- Normal Duty (ND) - Selects the normal continuous rating, with overload ratings of 110% for 60 seconds and 150% for 3 seconds.
- Heavy Duty (HD) - Provides a lower continuous rating, with overload ratings of 150% for 60 seconds and 180% for 3 seconds.
- Light Duty (LD) - provides the highest continuous rating, with an overload rating of 110% for 60 seconds. Not available on all drive ratings. Not available for PowerFlex 755TS.

1. Navigate to parameter 0:35 [Duty Rating Cfg].
2. Press the EDIT soft key.
3. Edit the value to 0 'Normal Duty', 1 'Heavy Duty', or 2 'Light Duty', choosing the option corresponding to the data collected in Table 3 on page 20.
4. Press the ENTER soft key.

Enter the Velocity Units

This parameter allows you to select either Hertz (Hz) or Revolutions per Minute (RPM) as the units for velocity (speed).

1. Navigate to parameter 0:46 [Velocity Units].
2. Press the EDIT soft key.
3. Edit the value to 0 'Hz' or 1 'RPM', choosing the option corresponding to the data collected in Table 3.
4. Press the ENTER soft key.

Enter the Motor Control Mode

Setting the motor control mode determines how the drive controls the motor. There are four basic control modes. Some of them have different variations for different motor types. The four basic modes are as follows:

- Volts per Hertz (VHz) - The most basic form of motor control. Useful for variable torque applications such as pumps, fans, and multiple motors in parallel.
- Sensorless Vector (SV) - An enhanced form of VHz control with better low speed operation and better torque control at low frequencies. Useful for variable torque and simple constant torque applications. If you choose an SV control mode, we recommend that you run a Motor ID test.
- Economize (Econ) - An enhanced form of Sensorless Vector control designed to reduce energy consumption when the drive is not accelerating. If you choose Econ, we recommend that you run a Motor ID test.
- Flux Vector (FV) - The highest performance control mode. A control mode that is designed for precise Torque, Velocity, and/or Position regulation. Usually uses a motor feedback device. Useful for variable torque, constant torque, and constant power applications. Provides precise position and velocity tracking. Provides excellent disturbance rejection. This mode is required for position and load sharing applications. If you choose an FV control mode, it is required that you run a Motor ID test. You may also have to run a Motor Inertia test. We recommend that you use a Flux Vector control mode for both encoder and encoderless control of permanent magnet motors.

For the control modes where a Motor ID test or Motor Inertia is recommended or required, these tests are performed during Step 7: Tune the Motor Side Inverter Control on page 40.

The motor-type-specific motor control modes are as follows. Choose from these options based on your type of motor and application:

- Induction Volts Per Hertz (InductionVHz)
- Induction Sensorless Vector (Induction SV)
- Induction Economize (Induct Econ)
- Induction Flux Vector (Induction FV)
- Interior Permanent Magnet Flux Vector (IPM FV)
- Surface Permanent Magnet Flux Vector (SPM FV)
- Permanent Magnet Volts Per Hertz (PM VHz)
- Permanent Magnet Sensorless Vector (PM SV)
- Synchronous Reluctance Volts Per Hertz (SynR VHz)
- Synchronous Reluctance Sensorless Vector (SynR SV)

1. Navigate to parameter 0:65 [Pri MtrCtrl Mode].
2. Press the EDIT soft key.
3. Edit the value to one of the following, choosing the option corresponding to the data collected in Table 3 on page 20: 1 'InductionVHz', 2 'Induction SV', 3 'Induct Econ', 4 'Induction FV', 5 'IPM FV', 6 'SPM FV', 7 'PM VHz', 8 'PM SV', 9 'SynR VHz', or 10 'SynR SV'.
4. Press the ENTER soft key.

Enter the Application Selection

You can add Process PID, Torque Prove, or Oil Well Pump application functionality to determine which application parameters are present in virtual port 9. Application selection is only needed when you are using Process PID, Torque Prove, or Oil Well Pump. The following options are available:

- None - leaves port 9 empty. This is the default setting
- Process PID only - provides a PID regulator for process applications in port 9. Use Process PID for pressure or flow transducers on fan or pump applications; you can also use it for tension transducers on winding applications.
- Torque Prove - provides a mechanism for coordinating the motor and mechanical brake on lifting applications. This selection loads these parameters and the Process PID parameters into port 9.
- Oil Well Pump - provides a mechanism for pump jack and progressive cavity pump applications

1. Navigate to parameter 0:70 [Application Sel].
2. Press the EDIT soft key.
3. Edit the value to 0 'None', 1 'ProcPID Only', 2 'Torque Prove', or 3 `OilWell Pump', choosing the option corresponding to the data collected in Table 3 on page 20.
4. Press the ENTER soft key.

Enter the Embedded Logic Selection

Selecting DeviceLogix as the embedded logic source loads embedded logic parameters into port 9 following a reset or power cycle. These parameters contain the default values.

1. Navigate to parameter 0:72 [Emb Logic Select].
2. Press the EDIT soft key.
3. Edit the value to 0 'None' or 1 'DeviceLogix', choosing the option corresponding to the data collected in Table 3.
4. Press the ENTER soft key.

Enter the Motor Stop Mode

Select how the drive executes a stop command. For operation with a controller, Stop Mode A (parameter 10:110 [Mtr Stop Mode A]) defines the method that is used for a Normal Stop. The default motor stop mode is 'Ramp'. Not all options are available for all motor control modes.

IMPORTANT To use Stop Mode A, the Bus Regulation Mode must be set to Adjust Frequency.

- Coast - the motor side inverter immediately stops modulating (stops gating its power devices), and stops the motor side inverter from powering the motor. In most applications, Coast causes the motor to coast to a standstill.
- Ramp - the motor side inverter decelerates the motor from the Base speed to the Zero Speed threshold, 10:146 [Zero Speed Limit]. Active Decel Time (10:1917 [VRef Decel Time1] or 10:1918 [VRef Decel Time2]) controls the rate of deceleration. Active Decel Time sets the amount of time that it takes for the motor to decelerate from Base speed to the Zero Speed threshold. Once the motor reaches the Zero Speed threshold, modulation is stopped (stops gating its power devices). Decel rate is defined as motor Base speed/Decel time.
- Current Limit - the motor side inverter decelerates the motor at a rate where the Decel Time is 0.1 seconds. Deceleration does not exceed the Current Limit to stop at this rate.
- Decel To Hold - the motor side inverter decelerates the motor from the Base speed to the Zero Speed threshold, 10:146 [Zero Speed Limit]. Active Decel Time (10:1917 [VRef Decel Time1] or 10:1918 [VRef Decel Time2]) controls the rate of deceleration. Active Decel Time sets the amount of time that it takes for the motor to decelerate from Base speed to the Zero Speed threshold. Once the motor reaches the Zero Speed threshold, the motor side inverter holds by continuing to modulate with a zero speed (zero frequency) output. Hold continues until there is a new start command, new run command, or another kind of stop command. Decel rate is defined as motor Base speed/Decel time.
- Ramp to Hold - the motor side inverter decelerates the motor, at a rate that is defined by the active Decel Time, until it reaches the Zero Speed threshold. It holds by DC braking until the next start sequence. Only available with induction motor control modes.
- DC Brake - the motor side inverter halts output phase rotation and injects DC current on the last used output phase. Only available with induction motor control modes.
- Fast Brake - the motor side inverter decreases the output frequency so it is lower than the motor speed, but not low enough for regeneration to occur. The motor side inverter forces the frequency to zero when the frequency is too low to allow regeneration to cause the DC bus to rise. Only available with induction motor control modes.

1. Navigate to parameter 10:110 [Mtr Stop Mode A].
2. Press the EDIT soft key.
3. Edit the value so that it matches the data recorded in Table 3 on page 20, choosing from 0 'Coast', 1 'Ramp', 2 'Current Lmt', 3 'DecelToHold', 4 'Ramp to Hold', 5 'DC Brake', and 6 'Fast Brake'.
4. Press the ENTER soft key.

Enter the Motor Side Bus Regulation Mode

Selects how the motor side inverter attempts to mitigate rising DC bus voltage during motor regeneration.

- Disabled - the motor side inverter does nothing to regulate the DC bus voltage. In this mode, the regenerative line side converter or an external DC bus voltage control (brake resistor, regen module) is required to regulate the DC bus voltage during motor regeneration.
  - Disabled is the typical setting for a PowerFlex 755TR.
  - Disabled is the required setting if you have installed an external brake chopper and dynamic brake resistor.
- Adjust Output Frequency - the motor side inverter adjusts its fundamental output frequency or torque, depending on the motor control mode, to reduce the amount of motor regeneration. The use of this option may result in extended deceleration times.
  - Adjust Output Frequency is the typical setting for a PowerFlex 755TL or PowerFlex 755TS.
  - Adjust Output Frequency is the default motor side bus regulation mode.

1. Navigate to parameter 10:116 [Bus Reg Mode A].
2. Press the EDIT soft key.
3. Edit the value to 0 'Disabled' or 1 'Adjust Freq', choosing the option corresponding to the data collected in Table 3 on page 20.
4. Press the ENTER soft key.

Reset Device and Verify the Configurations

For the setting changes you entered earlier to be accepted, you must perform a Reset Device procedure. You can cycle power to the drive and control pod or use the HIM. See Appendix A > Reset Device on page 59, for more information.

IMPORTANT You must perform a Reset Device procedure to load the modified values of these parameters.

To verify the configurations, verify the values of the following parameters:

0:34 [VoltageClass Act]	0:47 [Vel Units Act]	0:71 [Application Act]
0:36 [Duty Rating Act]	0:66 [Pri MtrCtrl Act]	0:73 [Emb Logic Act]

Configure Embedded EtherNet/IP Communication Adapter

If you are using a communication adapter, configure the address so that it corresponds to the data collected in Table 2 on page 14.

If you are using a communication option module (20-750 series), refer to the appropriate 750COM-UM user manual for more information about setting communication addresses.

See PowerFlex Drives with TotalFORCE Control Built-in EtherNet/IP Adapter User Manual, publication 750COM-UM009, for more information about configuring the embedded EtherNet/IP adapter.

Active IP addresses are shown in the diagnostic items, parameters 0:49...60.

There are three methods for configuring the embedded EtherNet/IP IP address in the adapter:

1. **Adapter Rotary Switches** - Use the switches when working on a simple, isolated network (for example, 192.168.1.xxx). The three adapter switches are read when the drive powers up, and represent three decimal digits from top to bottom (see Figure 6 on page 32).
   a. Set the rotary switches to a valid address (001-254) corresponding to the data collected in Table 2. The adapter uses that value as the lower octet of its IP address (192.168.1.xxx, where xxx = rotary switch settings), along with a subnet mask of 255.255.255.0. No gateway is configured. Also, the setting for adapter parameter 0:300 [Net Addr Sel] is automatically ignored.
   b. To accept the changes to IP address switches, perform a Reset Device procedure. See Appendix A > Reset Device on page 59 for more information.
2. **BOOTP or DHCP Server** - If you prefer to control the IP addresses of devices using a server, use BOOTP/DHCP. The IP address, subnet mask, and gateway addresses are then provided by the BOOTP/DHCP server. If the address is invalid, DHCP is used.
3. **Adapter Parameters** - Use adapter parameters when you want more flexibility in configuring the IP address, or when you must communicate outside the control network using a gateway. When adapter parameters are used, the IP address, subnet mask, and gateway addresses come from the adapter parameters you set.
   a. Set the adapter rotary switches to 999. See Figure 6 and its accompanying table for all possible switch settings and their related descriptions.
   b. Navigate to parameter 0:300 [Net Addr Sel]. Press the EDIT soft key. Edit to a value of 1 'Parameters'. Press the ENTER soft key.
   c. Navigate to parameters 0:302...305 [IP Addr Cfg 1...4]. Press the EDIT soft key. Edit the value of each IP address octet corresponding to the data collected in Table 2. Press the ENTER soft key. For example, to set the IP address to 10.20.3.123, you would set the parameters as follows:
      – 0:302 [IP Addr Cfg 1] = 10
      – 0:303 [IP Addr Cfg 2] = 20
      – 0:304 [IP Addr Cfg 3] = 3
      – 0:305 [IP Addr Cfg 4] = 123

d. Navigate to parameters 0:306...309 [Subnet Cfg 1...4] corresponding the data collected in Table 2 on page 14. Press the EDIT soft key. Edit the value of each subnet mask octet. Press the ENTER soft key. The subnet mask cannot be set to 0.0.0.0. If you set the subnet incorrectly, the drive uses DHCP.

e. Navigate to parameters 0:310...313 [Gateway Cfg 1...4] corresponding to the data collected in Table 2. Press the EDIT soft key. Edit the value of each gateway address octet. Press the ENTER soft key.
If the gateway address is set to 0.0.0.0, the drive can only communicate with devices on the same subnet as the drive. It is not able to communicate with devices on other subnets. If the gateway address is not set to 0.0.0.0, then it must be set to an address that is on the same subnet as the IP address of the drive. If you set the gateway incorrectly, the drive uses DHCP.

f. To accept the changes to the switch and parameter settings, perform a Reset Device procedure. See Appendix A > Reset Device on page 59 for more information.

g. Verify the entered values of parameters 0:301...313. Active IP addresses are shown in the diagnostic items, parameters 0:49...60.

IMPORTANT Regardless of the method used to set the IP address on the adapter, each node on the EtherNet/IP network must have a unique IP address. To accept IP address changes, you must perform a Reset Device procedure.

Set the Embedded Ethernet Adapter IP Address Switches

Set the embedded Ethernet adapter IP address switches using Figure 6 and the information in Table 4.

Figure 6 - Location of Ethernet Adapter IP Address Switches

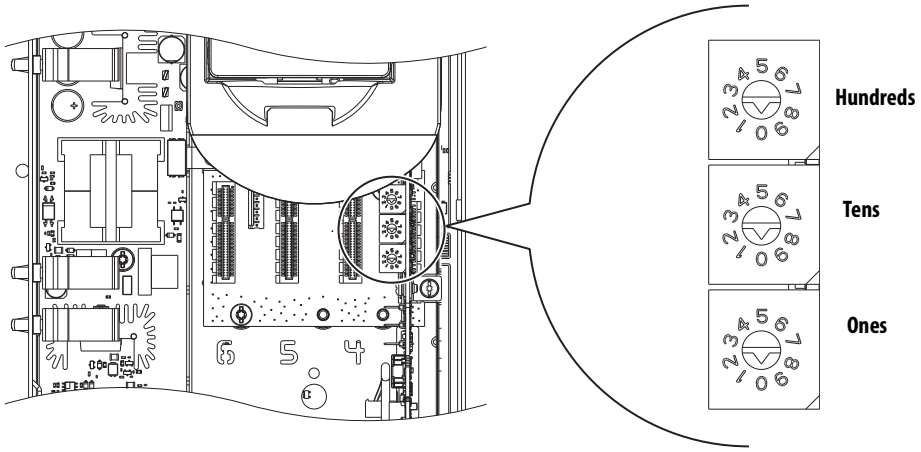


Table 4 - Ethernet Adapter IP Address Switches

Possible Settings	Description
000, 255...887, 889...998	The adapter is non-functional with these settings.
001...254	Adapter uses the rotary switch settings for the IP address (192.168.1.xxx, where xxx = rotary switch settings).
888	Resets the adapter IP address function to factory defaults. This setting also resets most parameters to factory defaults (see Setting Factory Defaults on page 61). After you reset the adapter, power down the drive. Set the switches to a setting other than 888. Power up the drive to accept the new address.
999	Enables the address to be set with DHCP, BOOTP, or parameters.

Step 4: Configure the Line Side Converter

This step applies to only PowerFlex 755TL and PowerFlex 755TR drives. In this step, you configure the line side converter. The line-side-converter-regulation parameters can usually be left at the default values. If the drive displays alarm conditions, fault conditions, or other issues, refer to Appendix A > Line Side Converter Settings on page 63.

Enter Line Side Converter Settings

1. Navigate to parameter 13:30 [Nom Line Freq]. Press the EDIT soft key.
2. Edit the nominal line frequency in Hertz, corresponding to the data collected in Table 1 on page 10.
3. Press the ENTER soft key.
4. Navigate to parameter 13:32 [AC Line kVA A]. Press the EDIT soft key.
5. Edit the supply transformer power rating in kVA, corresponding to the data collected in Table 1.
6. Press the ENTER soft key.
7. Navigate to parameter 13:34 [AC Line Imped% A]. Press the EDIT soft key.
8. Edit the power source line impedance in percent, corresponding to the data collected in Table 1.
9. Press the ENTER soft key.
10. At this point, the basic line side converter settings that are required for most applications are configured. You may configure additional parameters such as:
    - Current Rate Limit, parameter 10:227 [Current Rate Lim].
    - Regen Power Limit, parameter 10:229 [Regen Power Lim]. Only for Flux Vector motor control modes.
    - Motor Power Limit, parameter 10:230 [Motor Power Lim]. Only for Flux Vector motor control modes.

    To determine the settings for these parameters, refer to either of the following:
    - Connected Components Workbench™ (version 11 or later) software and the associated PowerFlex 755T Startup Wizard.
    - The PowerFlex Drives with TotalFORCE Control Programming Manual, publication 750-PM100.

Step 5: Enter Motor Data

In this step, you configure the Motor Side Inverter Control using the motor data that are recorded in Table 1 on page 10.

Enter Motor Nameplate Data

1. Navigate to parameter 10:400 [Motor NP Volts]. Press the EDIT soft key.
2. Edit the motor nameplate voltage to match the data recorded in Table 1.
3. Press the ENTER soft key.
4. Navigate to parameter 10:401 [Motor NP Amps]. Press the EDIT soft key.
5. Edit the motor nameplate full-load current in amps, to match the data collected Table 1. Press the ENTER soft key.
6. Navigate to parameter 10:402 [Motor NP Hertz]. Press the EDIT soft key.
7. Edit the motor nameplate fundamental frequency in Hertz, to match the data collected Table 1.
8. Press the ENTER soft key.
9. Navigate to parameter 10:403 [Motor NP RPM]. Press the EDIT soft key.
10. Edit the motor nameplate base speed in RPM, to match the data collected Table 1.
11. Press the ENTER soft key.
12. Navigate to parameter 10:405 [Mtr NP Pwr Units]. Press the EDIT soft key.
13. Edit the value to 0 'HP' or 1 'kW', to match the motor nameplate power units collected Table 1.
14. Press the ENTER soft key.
15. Navigate to parameter 10:406 [Motor NP Power]. Press the EDIT soft key.
16. Edit the motor nameplate power, to match the data collected Table 1.
17. Press the ENTER soft key.

Enter Motor Poles

If the number of motor poles is not on the motor nameplate, contact the motor manufacturer and confirm the number of motor poles. The number of motor poles is ALWAYS an even integer multiple of 2.

Use this table to help determine the number of poles. The motor NP RPM is always less than the Sync RPM by the amount of motor slip RPM. If the motor NP Hertz is not 50 Hz or 60 Hz, or if the motor has a low NP RPM, contact the motor manufacturer and confirm the number of poles.

No. Poles	Sync RPM NP Hertz = 60 Hz	Sync RPM NP Hertz = 50 Hz
2	3600	3000
4	1800	1500
6	1200	1000
8	900	750
10	720	600
12	600	500

1. Navigate to parameter 10:407 [Motor Poles]. Press the EDIT soft key.
2. Edit the number of motor poles to match the data collected Table 1 on page 10.
3. Press the ENTER soft key.

Enter Motor Overload Hertz

The motor OL Hertz is typically not on the motor nameplate. This information is available from the motor manufacturer data sheets. Motor OL Hertz is the fundamental frequency below which the motor cannot deliver rated torque continuously without the possibility of overheating. This is sometimes referred to as the 'speed turn-down ratio'. Self-cooled motors with Totally Enclosed Non-Ventilated (TENV) enclosures, Drip Proof Guarded (DPG) enclosures, and Totally Enclosed Fan Cooled (TEFC) enclosures, have shaft-driven cooling fans. These fans cannot produce the volume and pressure of cooling air that is required to produce rated motor torque continuously, without the motor overheating when operated below the minimum speed turn-down frequency. Motors with separately powered cooling fans, such as those with Totally Enclosed Blower Cooled (TEBC) enclosures, and Drip Proof Guarded Force Ventilated (DPG-FV) enclosures, can typically be operated to zero speed without overload Hertz derating.

For example, a 60 Hz base speed TEFC motor with 4:1 speed turndown ratio can only produce rated torque continuously down to 60 Hz / 4 = 15 Hz. In this example, parameter 10:204 [Mtr OL Hertz] would be set to 15 Hz.

Another example is a 60 Hz base speed TEBC blower cooled motor with a 1000:1 speed turndown ratio. In this case, parameter 10:204 [Mtr OL Hertz] would be set to 60 Hz / 1000 = 0.06 Hz or 0 Hz.

Setting parameter 10:204 [Mtr OL Hertz] does not affect the drives capability to deliver motor current or limit output current in any way. Parameter 10:204 only sets the threshold where the motor overload counter begins to increment.

1. Navigate to parameter 10:204 [Mtr OL Hertz]. Press the EDIT soft key.
2. Edit the overload threshold frequency in Hertz, based on the data collected in Table 1 on page 10 and the previous calculations. Press the ENTER soft key.

Enter Motor Protection Class

This parameter is available in firmware revision 10 and higher. The motor protection class, or trip class, defines the length of time it takes to trip the system in an overload condition. The Motor Protection Class parameter can have a value of 1...60. This value is the maximum number of seconds until the motor trips off when it is in an overload condition. An overload condition is defined as the current being over 600% of the maximum thermal current rating (or 600% of the actual dial setting on adjustable overloads). So if the motor current is over 600% of the maximum thermal current rating, and the motor protection class is 60, the motor trips in 60 seconds or less.

The default value for Motor Protection Class is 11. Many industrial loads, particularly high inertia loads, require Class 30. Use a protection class appropriate for your application, considering motor thermal curves, operating conditions, and inertia of the load. For more information on motor protection class, refer to the Low Voltage Motor Protection White Paper, publication 193-WP008. To set Motor Protection Class, use the following procedure.

1. Navigate to parameter 10:209 [Mtr Protn Class]. Press the EDIT soft key.
2. Enter the Motor Protection Class that is recorded in Table 1 on page 10. Press the ENTER soft key.

Enter Motor Hot Start Coefficient

This parameter is available in firmware revision 10 and higher. The Motor Hot Start Coefficient parameter allows you to set the hot state overload curve to some percent of the cold curve representing the motor protection class. This functionality accommodates requirements for both cold start and hot start. Running from a cold state, the cold curve is used. The motor is considered to be in a hot state if it has been running above the rated current for at least 20 minutes. Once the motor is considered to be in a hot state, the hot curve is used for any overload condition. The parameter can have a value in the range of 0.1...1. A value of 1 makes the hot state overload curve equivalent to the cold curve. A value of 0.1 makes the hot state overload curve equivalent to 10% of the cold curve.

The default value for Motor Hot Start Coefficient is 0.33. To set Motor Hot Start Coefficient, use the following procedure.

1. Navigate to parameter 10:210 [Mtr HotStrtCoeff]. Press the EDIT soft key.
2. Enter the Motor Hot Start Coefficient that is recorded in Table 1 on page 10. Press the ENTER soft key.

Enter Motor Cooling Time

This parameter is available in firmware revision 10 and higher. The Motor Cooling Time parameter allows you to set the decay time for the motor to go from a hot state to a cool state. The parameter value is the time in minutes. The motor is considered to be in a hot state if it has been running above the rated current for at least 20 minutes. A hot state occurs when a motor overload condition appears and the overload count reaches 100%. If the motor was just in a hot state, and is no longer running above the rated Amps, the motor cooling time begins. This could be because the motor was tripped off due to an overload, was turned off by a user, or it could still be running, but below the rated Amps. Once the full length of the motor cooling time has passed, the motor overload count reaches 0%, and the motor is considered to be in a cool state.

The default value for Motor Cooling Time is 20 minutes. To set Motor Cooling Time, use the following procedure.

1. Navigate to parameter 10:211 [Mtr Cooling Time]. Press the EDIT soft key.
2. Enter the Motor Cooling Time in minutes, as recorded in Table 1 on page 10. Press the ENTER soft key.

Step 6: Set Up Velocity Feedback for Flux Vector Control

Perform this step only if your application uses Flux Vector motor control and closed loop (encoder) feedback. If your application uses open loop (encoderless) feedback, skip this section. Default velocity feedback values are for open loop feedback, so no setup is required for open loop feedback.

Record Encoder Information

If your application uses Flux Vector motor control and closed loop (encoder) feedback, record the system information for the encoder feedback option modules and wiring terminals in Table 5.

Additional information is available in PowerFlex 755T Flux Vector Tuning, publication 750-AT006.

Examples of wiring encoder feedback devices to option modules can be found in the PowerFlex 750-Series I/O, Feedback, and Power Option Modules Installation Instructions, publication 750-IN111.

Table 5 - Encoder Information

Enter the encoder feedback module catalog number, port number, and wiring terminals.				
Drive 1: _____ Port No. _____ Cat. No.: 20-750- _____ Encoder Term: _____ A…Z	Drive 2:_____ Port No. _____ Cat. No.: 20-750-_____ Encoder Term:_____ A…Z	Drive 3:_____ Port No. _____ Cat. No.: 20-750- _____ Encoder Term:_____ A…Z	Drive 4:_____ Port No. _____ Cat. No.: 20-750- _____ Encoder Term: _____ A…Z	Drive 5:_____ Port No. _____ Cat. No.: 20-750-_____ Encoder Term: _____ A…Z

Configure Motor Encoder Velocity Feedback

This procedure is needed only if you are using closed loop Flux Vector motor control with a motor-incremental-encoder-feedback device. In this procedure, you configure the motor incremental encoder feedback.

1. Navigate to parameter 10:1000 [Pri Vel Fb Sel] and press the EDIT soft key.
2. Edit the value to assign the encoder module port and feedback parameter number for the velocity feedback, corresponding to the encoder terminal connections you recorded in Table 1 on page 10. Press the ENTER soft key.

   Example: Suppose that the encoder is wired to terminals <1A...1Z> of the dual encoder feedback module (20-750-DENC-1) in port 5. In this case, you would do the following:

   Navigate to parameter 10:1000 [Pri Vel Fb Sel]. Press the EDIT soft key. Edit the value using the HIM navigation keys to select the encoder module in port 5. Press the ENTER soft key. Use the HIM navigation keys to select parameter 5:14 [Enc 1 FB]. Press the ENTER soft key.
3. Navigate to the port and parameters for the encoder feedback option module. Press the EDIT soft key.
4. Edit the parameter values to the value required for the application and corresponding to data recorded in Table 1. Press the ENTER soft key. For more information about setting these parameters, see the PowerFlex Drives with TotalFORCE Control Programming Manual, publication 750-PM100.

   Example: Continuing the example in step 2, you would navigate to port 5 and edit values for these parameters: 5:11 [Enc1 Cfg], 5:12 [Enc1 PPR], and 5:13 [Enc 1 FB Lss Cfg].

Examples of wiring encoder feedback option modules can be found in the PowerFlex 750-Series I/O, Feedback, and Power Option Modules Installation Instructions, publication 750-IN111.

Step 7: Tune the Motor Side Inverter Control

In this step, you tune the motor side inverter control by using HIM Autotune routines and entering some values that are derived from the motor nameplate or motor data sheet.

These tests require use of the HIM Start key . Verify that parameter 0:41 [Logic Mask] bits 01...03 are enabled (set to '1') to allow operation with the HIM port you are using. See Appendix A > Disable the HIM Start Function on page 65 for more information.

IMPORTANT	During this test, the drive uses an internal reference that is positive (forward). During operation and other tests, the drive uses an external reference that you select. An external reference can include the HIM, analog input, or communicated reference. The direction of rotation depends on the polarity (direction) of that external reference. Make sure the external reference moves the motor in the intended direction.

IMPORTANT	If you are using a motor feedback device and you are using automatic tach switch over, parameter 10: 1019 [FB Loss Action] is set for 'Auto Tach SW', and the autotune must be performed twice. Once with the motor feedback device and once without.

Enable the HIM Start Key

Some autotune tests require use of the HIM Start key . To enable Start key operation with the HIM port you are using, make sure that parameter 0:41 [Logic Mask] bits 01...03 are enabled (set to '1'). See Appendix A > Disable the HIM Start Function for more information.

Set Maximum Velocity for Permanent Magnet Motor

If you have a permanent magnet motor application using firmware revision 6 or lower, perform the following procedure before you run autotune tests.

IMPORTANT	If you have a permanent magnet motor application using firmware revision 10 or higher, do not perform this procedure. In revision 10 and higher, parameter 10:691 [PM Bus Prot] and parameter 10:699 [PM Vel Max] are set as a percentage of motor nameplate RPM or a percentage of motor nameplate Hertz. These parameters are defaulted to 100%, so they are set correctly for a permanent magnet motor application by default.

1. Navigate to parameter 10:691 [PM Bus Prot]. Press the EDIT soft key.
2. Enter either the Motor Nameplate RPM or Hertz, depending on the velocity unit selection in parameter 0:46 [Velocity Units]. If unit conversion is necessary, see the formula in Step 5: Enter Motor Data on page 34. Press the Enter soft key.

3. Navigate to parameter 10:699 [PM Vel Max]. Press the EDIT soft key.
4. Enter the same value that you entered for parameter 10:691. Press the Enter soft key.

Perform the Direction Test

This procedure is for use with Flux Vector motor control mode.

1. Navigate to parameter 10:910 [Autotune]. Press the EDIT soft key.
2. Edit the value to 1 'Direction Test'. Press the Enter soft key.
3. To start motor rotation, press the Start key . The maximum motor speed during the test is 5 Hz.

   You can stop motor rotation at any time during this test by pressing the Stop key .
4. To determine whether the current forward direction is the forward direction that the application requires, observe the motor direction.

   If the direction is as required, proceed to step 7. If the direction is opposite from required, proceed to step 5.
5. Change the motor forward rotation direction.

   If the motor direction is opposite from application requirements, you have two alternatives:
   - Stop the drive, shutdown, and safely lockout drive power sources. Exchange any two motor output leads on the drive output.
   - Navigate to parameter 10:420 [Mtr Cfg Options]. Press the EDIT soft key. Use the HIM navigation keys to select bit 4. Enter a value of 1. Press the ENTER soft key. This electronically reverses the phase rotation of the applied voltage, effectively reversing the direction of rotation.

   IMPORTANT If you reset parameters to defaults, this parameter is reset to 0 and the motor may rotate in the incorrect direction.

6. Perform step 1 through step 4 again to verify that the motor direction is now the direction that the application requires.

7. Perform this step only if Flux Vector motor control is used. Address the motor velocity feedback polarity as follows:

IMPORTANT If you are using another type of motor velocity feedback device, and/or the universal feedback option module, the parameter numbers may be different than described here. See the PowerFlex 750-Series I/O, Feedback, and Power Option Modules Installation Instructions, publication 750-IN111, for more information about feedback option modules.

a. Ascertain by observation whether parameter 10:1044 [Motor Vel Fb] is positive (+) or negative (-) for the application forward rotation direction.

b. Do one of the following:
   - If the motor velocity feedback polarity is positive (+) for the application forward rotation direction, this test is complete.
   - If the motor velocity feedback polarity is negative (-) when the motor is rotating in the forward application direction, proceed to the next substep.

c. Change the feedback polarity using one of the following two options:
   - Stop the drive, shutdown, and safely lockout drive power sources. Exchange the encoder A and Anot wires on the encoder module terminal board.
   - Set the encoder configuration parameter to electronically invert the feedback polarity:
     – If you are using a single encoder feedback module (20-750-ENC-1), navigate to parameter *nn:*1 [Encoder Cfg], where *nn* is the port where the motor encoder feedback module is installed. Press the EDIT soft key. Edit the value using the HIM navigation keys to select bit 5 'Direction'. Enter a value of 1 to invert the polarity. Press the ENTER soft key.
     – If you are using a dual encoder feedback module (20-750-DENC-1), navigate to parameter *nn*:1 [Enc0 Cfg] or parameter *nn*:11 [Enc1 Cfg], where *nn* is the port where the motor encoder feedback module is installed. Press the EDIT soft key. Edit the value using the HIM navigation keys to select bit 5 'Direction'. Enter a value of 1 to invert the polarity. Press the ENTER soft key.

IMPORTANT If you reset parameters to defaults, this parameter is reset to (0) and the motor feedback may be negative, which may cause loss of speed regulation and potential motor overspeed.

Select the Source of Motor Control Parameter Values

In this procedure, you select the source of motor control parameter settings. These parameters include stator resistance, leakage inductance, flux current reference, encoderless electrical angle compensation, stator resistance compensation factor, and slip speed at full load.

1. Navigate to parameter 10:510 [MtrParam C/U Sel].
2. Press the EDIT soft key.
3. Set the value for this parameter to 2 'LoadCalcData'.

TIP The options for this parameter include the following:

0 'Calculated' – The parameters are set to values that have been calculated from previously entered information. These values are not based on the results of a Motor ID test.

1 'User Entered' – The parameters are set to values entered by the user. User entered values can be values that were copied from the Calculated values, if LoadCalcData was selected and no Motor ID test was run. User entered values can also be the measured test results from a Motor ID test, if LoadCalcData was selected and then a Motor ID test was run.

2 'LoadCalcData' – When this option gets set, it copies the default Calculated values into the parameter as User Entered values, providing default values to start with before any test has been run. It then sets the value of 10:510 [MtrParam C/U Sel] to 1 'User Entered', allowing you to adjust the Calculated values. Additionally, when LoadCalcData has been set, whenever a Motor ID test is run, the motor control parameter values are updated using the results of the test. After the values are updated using the test results, the value of [MtrParam C/U Sel] is set to 1 'User Entered'. This allows User Entered changes to the test result values.

4. Press the ENTER soft key.

Enter Motor Inertia

This procedure is only needed for applications that use Flux Vector motor control mode.

1. Determine what value to use for the Motor Inertia parameter. The Motor Inertia parameter is set in units of kg•m^2. There are four ways to determine the Motor Inertia value. These four ways are listed from most effective to least effective:
   - If a motor inertia value is provided on the motor nameplate or data sheet, make sure that it is in units of kg•m^2 and use that value. If the motor inertia value is given in lb•ft^2 or WK^2, divide the value by 23.73 to convert to kg•m^2.
   - Perform the Motor Inertia Test on page 45. This test dynamically measure motor inertia. The test can only be performed if the load is uncoupled from the motor.
   - Use the following equation to roughly approximate the Motor Inertia value based on the motor nameplate horsepower (HP):

     Jm = HP/250 x (HP/500 + 1)

     If the motor nameplate provides a value in kW, multiply the kW value by 1.341 to convert to HP for this equation.
   - Let the Motor Inertia parameter stay set to the default value, which is based on a motor power rating that is equal to the drive power rating.
2. If you used the nameplate/data sheet, or the equation method to find the motor inertia, continue on to step 3. If you used the Motor Inertia Test, or chose to leave the Motor Inertia parameter at the default value, then the Motor Inertia parameter is already set, and you have finished the Enter Motor Inertia procedure.
3. Navigate to parameter 10:900 [Motor Inertia]. Press the EDIT soft key.
4. Edit the value to the motor inertia that you found in step 1, in units of kg•m^2. Press the ENTER soft key.

Motor Inertia Test

Use this test to measure the motor inertia only when the following are all true:

- The application uses Flux Vector motor control mode.
- The motor inertia value cannot be obtained from the manufacturer.
- It is possible to operate the motor while it is uncoupled from the load.

See the Auto Tuning section in the PowerFlex 755T Flux Vector Tuning application technique, publication 750-AT006, for more information about the autotuning features of the drive.

1. Navigate to parameter 10:910 [Autotune]. Press the EDIT soft key.
2. Edit the value to 4 'InertiaMotor'. Press the ENTER soft key.
3. Make sure that the motor is uncoupled from the load. Make sure that the area around the motor is safely secured and the motor shaft can freely rotate up to a speed of 75% of the motor nameplate base speed.

IMPORTANT The motor rotates during this test.

4. Press the Start key  .

   You can stop motor rotation at any time during this test by pressing the Stop key  .
5. Wait for the test to complete. When complete, the drive stops and the HIM status display shows 'Stopped'. Parameter 10:900 [Motor Inertia] is updated and parameter 10:901 [Load Ratio] is set to 0.

   TIP You can leave the load uncoupled from the motor because it needs to be uncoupled to perform the Rotate Motor ID Test.

Perform the Motor ID Test

A Motor ID test is recommended when using Sensorless Vector, or Economize motor control modes. A Motor ID test is required when using Flux Vector motor control mode. There are two methods of conducting a Motor ID Test. It is only necessary to conduct the test using one of these methods:

- Rotate Motor ID Test on page 46: This is the preferred method. This method requires that the motor be uncoupled from the load and can safely be rotated up to Base speed. Applications that use a permanent magnet motor require the Rotate Motor ID test.
- Static Motor ID Test on page 47: If the motor is coupled to the load or cannot be rotated, use this method. The Static Motor ID Test cannot be used for applications that use a permanent magnet motor. This test can only be used for applications that use an induction motor.

See the Auto Tuning section in the PowerFlex 755T Flux Vector Tuning application technique, publication 750-AT006, for more information about the autotuning features of the drive.

Rotate Motor ID Test

1. Navigate to parameter 10:910 [Autotune].
2. Press the EDIT soft key.
3. Set the value of the parameter to 3 'Rotate MtrID'.
4. Press the ENTER soft key.

   Rotate Tune measures the following motor parameters;
   - Stator Resistance. This is one of the following depending on which control mode is used:
     - Induction Motor Stator Resistance, parameter 10:512 [u IM Stator Res].
     - Permanent Magnet Stator Resistance, parameter 10:620 [u PM Stator Res].
     - Synchronous Reluctance Stator Resistance, parameter 10:731 [u SynR StatorRes].
   - Flux Current, parameter 10:518 [u Flux Cur Ref].
   - Levels of inductances. Only in Flux Vector motor control mode. For permanent magnet motor only.
     - PM D Axis Inductance at 0 Cur, parameter 10:627 [u PM Ld at 0].
     - PM D Axis Inductance at 100 Cur, parameter 10:629 [u PM Ld at 100].
     - PM Q Axis Inductance at 25 Cur, parameter 10:637 [u PM Lq at 25].
     - PM Q Axis Inductance at 50 Cur, parameter 10:639 [u PM Lq at 50].
     - PM Q Axis Inductance at 75 Cur, parameter 10:641 [u PM Lq at 75].
     - PM Q Axis Inductance at 100 Cur, parameter 10:643 [u PM Lq at 100].
     - PM Q Axis Inductance at 125 Cur, parameter 10:645 [u PM Lq at 125].
     - PM Q Axis Inductance at 150 Cur, parameter 10:647 [u PM Lq at 150].
     - PM Q Axis Inductance at 175 Cur, parameter 10:649 [u PM Lq at 175].
     - PM Q Axis Inductance at 200 Cur, parameter 10:651 [u PM Lq at 200].
   - Stator Leakage Inductance, parameter 10:515 [u IM Leakage L]. Only in Flux Vector motor control mode. For induction motor only.
   - Slip RPM, parameter 10:490 [u Slip RPM atFLA]. Only in Flux Vector motor control mode when motor feedback is used. For induction motor only.
   - Stator Resistance Compensation, parameter 10:524 [u IM StatResComp]. Only in Flux Vector motor control mode when motor feedback is not used. For induction motor only.
   - EncoderLess Angle Compensation, parameter 10:521 [u EncLs AngCmp]. Only in Flux Vector motor control mode when motor feedback is not used. For induction motor only.

5. Make sure that the motor is uncoupled from the load. Make sure that the area around the motor is safely secured and the motor shaft can freely rotate up to a speed of 75% of the motor nameplate base speed.

IMPORTANT The motor rotates during this test.

6. To begin the test, press the Start key. The maximum motor speed during the test is 75% of base speed.

   Autotuning begins, indicated when the top line of the HIM shows 'Autotuning'.

   If you want to stop the motor rotation anytime during the Autotuning test, you can press the Stop key. The HIM then shows a code 10032 'AutoTune Aborted' fault and the motor coasts to a stop.
7. Wait for the test to complete. When complete, the drive stops and the HIM shows 'Stopped'.
8. Once the motor has stopped and is in a safe state, couple the load to the motor.

Static Motor ID Test

1. Navigate to parameter 10:910 [Autotune].
2. Press the EDIT soft key.
3. Set the value for this parameter to 2 'Static MtrID'.
4. Press the ENTER soft key.

   Static Tune measures the following motor parameters:
   - Stator Resistance, parameter 10:512 [u IM Stator Res]
   - Stator Leakage Inductance, parameter 10:515 [u IM Leakage L]. Only in Flux Vector motor control mode.
   - Stator Resistance Compensation, parameter 10:524 [u IM StatResComp]. Only in Flux Vector motor control mode when motor feedback is not used.
5. To begin the test, press the Start key.

   Autotuning begins, indicated when the top line of the HIM shows 'Autotuning'.

   If you want to stop the motor rotation anytime during the Autotuning test, you can press the Stop key. The HIM then shows a code 10032 'AutoTune Aborted' fault and the motor coasts to a stop.
6. Wait for the test to complete. When complete, the drive stops and the HIM shows 'Stopped'.

Autotune Bandwidth Calculations

Perform this procedure only if your application uses Flux Vector motor control. For more information on Autotune Bandwidth Calculations, refer to the PowerFlex 755T Flux Vector Tuning Application Technique, publication 750-AT006. This procedure does not initiate motion.

1. Navigate to parameter 10:902 [Load Coupling].
2. Make sure that the value of the parameter is 1 'Compliant'. This indicates that the load is a non-rigid load where position misalignment, backlash, and flexing of couplings, gearboxes, belts, and shafts can occur which creates an indirect connection of the load to the motor shaft. This setting is common for most machines. It is the recommended default setting when parameter 10:901 [Load Ratio] is set to 0.
3. Navigate to parameter 10:907 [System Damping].
4. Make sure that the value of the parameter is 1. This is the recommended default value.
5. Navigate to parameter 10:2020 [LdObs Mode]. This parameter configures the load observer feature. Press the EDIT soft key.
6. Set the value of the parameter to one of the following options based on which type of Flux Vector control mode your application uses (Torque, Velocity, or Position):
   - 0 'Disabled' - For applications using Torque mode
   - 1 'LdObs Only' - For applications using Velocity mode
   - 2 'LdObs VelEst' - For applications using Position mode
7. Press the ENTER soft key.
8. Navigate to parameter 10:910 [Autotune]. Press the EDIT soft key.
9. Set the value of the parameter to 6 'BW Calc'. Press the ENTER soft key.

   The following parameters are calculated based on motor inertia, load ratio, load coupling, system damping, load observer mode, and motor parameters that were entered in previous steps:
   - 10:906 [System BW]
   - 10:1010 [Alt Fb GnScale]
   - 10:1392 [Max Speed Fwd]
   - 10:1393 [Max Speed Rev]
   - 10:1898 [Vel Limit Pos]
   - 10:1899 [Vel Limit Neg]
   - 10:1965 [Accel Limit Pos]
   - 10:1966 [Accel Limit Neg]
   - 10:2083 [Torque Limit Pos]
   - 10:2084 [Torque Limit Neg]

Step 8: Set Up Velocity Reference

Select the configuration according to the wiring that you recorded in Table 2 on page 14.

Default Reference Source

The default velocity reference source is the drive-mounted HIM, port 1 (the HIM cradle - see Figure 1 on page 11). To verify the reference source, navigate to parameter 10:1800 [VRef A Sel]. Verify that the source is parameter 0:214 'Port 1 Reference'.

Door Mounted or Remote Mounted HIM

To use a door-mounted or remote-mounted HIM reference source:

IMPORTANT The drive must be stopped.

1. Navigate to parameter 10:1800 [VRef A Sel]. Press the EDIT soft key.
2. Use the HIM navigation keys to choose port 0. Press the ENTER soft key.
3. Do one of the following:
   - For a HIM installed in port 2, select parameter 215 'Port 2 Reference'.
   - For a HIM installed in port 3, select parameter 216 'Port 3 Reference'.
4. Press the ENTER soft key.

Connections on 11-Series and 22-Series I/O Modules

The 11-Series I/O Module is Catalog Number 20-750-11xxx-xxxx. The 22-Series I/O Module is Catalog Number 20-750-22xxx-xxxx.

Examples of wiring option module analog I/O can be found in the PowerFlex 750-Series I/O, Feedback, and Power Option Modules Installation Instructions, publication 750-IN111.

Use this table to determine the parameters that are associated with I/O option module port location, and analog input that is used for the velocity reference. The port where the I/O module is installed is designated by *nn*.

Terminal	Name	Option Module	Related Parameters
Ai0+, Ai0-	Analog Input 0	11-Series 22-Series	*nn*:45 [Anlg In Type], Bit 0 *nn*:50 [Anlg In0 Value] *nn*:51 [Anlg In0 Hi] *nn*:52 [Anlg In0 Lo] *nn*:53 [Anlg In0 LssActn]
Ai1+, Ai1-	Analog Input 1	22-Series	*nn*:45 [Anlg In Type], Bit 1 *nn*:60 [Anlg In1 Value] *nn*:61 [Anlg In1 Hi] *nn*:62 [Anlg In1 Lo] *nn*:63 [Anlg In1 LssActn]

IMPORTANT The drive must be stopped.

1. Navigate to parameter 10:1800 [VRef A Sel]. Press the EDIT soft key.
2. Edit the value using the HIM navigation keys to select the I/O module port and velocity-reference-analog-input parameter corresponding to the analog input terminals you recorded in Table 2 on page 14.

   For example, when using a 22-Series (20-750-22xxx-xxxx) in port 4 with the velocity reference wired to terminals <Ai1+> and <Ai1->. Navigate to parameter 10:1800 [VRef A Sel]. Press the EDIT soft key. Edit the value using the HIM navigation keys to select the I/O module in port 4. Press the ENTER soft key. Use the HIM navigation keys to select parameter 4:60 [Anlg In1 Value]. Press the ENTER soft key.
3. Navigate to the port and parameters containing the I/O option card. Edit each of the parameter values so that they match the application requirements. See the PowerFlex Drives with TotalFORCE Control Programming Manual, publication 750-PM100, for more information about setting these parameters.

   In the preceding example, you would edit values for these parameters: 4:61 [Anlg In1 Hi], 4:62 [Anlg In1 Lo], and 4:63 [Anlg In1 LssActn].

Embedded EtherNet/IP Interface

IMPORTANT The drive must be Stopped.

1. Navigate to parameter 10:1800 [VRef A Sel]. Press the EDIT soft key.
2. Edit the value using the HIM navigation keys to select port 0. Press the ENTER soft key.
3. Use the HIM navigation keys to select parameter 211 'Emb Enet Ref'. Press the ENTER soft key.

   See Configure Embedded EtherNet/IP Communication Adapter on page 31 and Set the Embedded Ethernet Adapter IP Address Switches on page 32 for more information about setting the Embedded EtherNet IP address.

Step 9: Set Up Start/Stop

Human Interface Module

By default, the drive-mounted HIM (port1) or remote mounted HIM (ports 2/3) provide three-wire control. This allows you to start the drive with the Start key  , and stop the drive with the Stop key  .

If you want to use the HIM for Start/Stop control, verify that parameter 0:41 [Logic Mask] bits 01...03 are enabled (set to '1') to allow operation with the HIM port you are using. See Appendix A > Disable the HIM Start Function on page 65 for more information.

IMPORTANT If you are not using the HIM for Start/Stop control, disable the HIM Start key to help prevent inadvertent drive operation if the HIM Start key is pressed. See Appendix A > Disable the HIM Start Function for more information.

Control on 11-Series and 22-Series I/O Modules

The 11-Series I/O Module is Catalog Number 20-750-11xxx-xxxx.
The 22-Series I/O Module is Catalog Number 20-750-22xxx-xxxx.

IMPORTANT Two-Wire and Three-Wire control discrete wired inputs are not compatible. Select one mode or the other. Configuring a Start and a Run on the same drive causes a Digital Input Configuration fault.

Three-Wire Control

Examples of wiring option module digital I/O can be found in the PowerFlex 750-Series I/O, Feedback, and Power Option Modules Installation Instructions, publication 750-IN111.

IMPORTANT The drive must be Stopped.

1. Navigate to parameter 0:108 [DI M Stop]. Press the EDIT soft key.

2. Edit the value using the HIM navigation keys to assign the I/O module port, and digital input status bit, parameter *nn*:1 [Dig In Sts], corresponding to the Stop digital input terminal you recorded in Table 2 on page 14.

   For example, the Stop push button is wired to terminal DI 0 of a 22-Series (20-750-22xxx-xxxx) I/O module in port 4. Navigate to parameter 0:108 [DI M Stop]. Press the EDIT soft key. Edit the value using the HIM navigation keys to select the I/O module in port 4. Press the ENTER soft key. Use the HIM navigation keys to select parameter 4:1 [Dig In Sts]. Press the ENTER soft key. Use the HIM navigation keys to select bit 0. Press the ENTER soft key.

3. Navigate to parameter 0:117 [DI M Start]. Press the EDIT soft key.

4. Edit the value using the HIM navigation keys to assign the I/O module port and digital input status bit, and the parameter *nn*:1 [Dig In Sts], corresponding to the motor side Start digital input terminal you recorded in Table 2.

   For example, the Start push button is wired to terminal DI 1 of a 22-Series (20-750-22xxx-xxxx) I/O module in port 4. Navigate to parameter 0:117 [DI M Start]. Press the EDIT soft key. Edit the value using the HIM navigation keys to select the I/O module in port 4. Press the ENTER soft key. Use the HIM navigation keys to select parameter 4:1 [Dig In Sts]. Press the ENTER soft key. Use the HIM navigation keys to select bit 1. Press the ENTER soft key.

Two-Wire Control

Examples of wiring option module digital I/O can be found in the PowerFlex 750-Series I/O, Feedback, and Power Option Modules Installation Instructions, publication 750-IN111.

IMPORTANT The drive must be stopped.

1. Navigate to parameter 0:120 [DI M Run]. Press the EDIT soft key.

2. Edit the value using the HIM navigation keys to assign the I/O module port and digital input status bit, and parameter 0:1 [Dig In Sts], corresponding to the motor side Run digital input terminal you recorded in Table 2.

   For example, the Run input is wired to terminal DI 2 of a 22-Seriex (20-750-22xxx-xxxx) I/O module in port 4. Navigate to parameter 0:120 [DI M Run]. Press the EDIT soft key. Edit the value using the HIM navigation keys to select the I/O module in port 4. Press the ENTER soft key. Use the HIM navigation keys to select parameter 4:1 [Dig In Sts]. Press the ENTER soft key. Use the HIM navigation keys to select bit 2. Press the ENTER soft key.

Embedded EtherNet/IP Interface

The logic command word from the controller starts and stops the drive without any special parameter settings.

Step 10: Set Acceleration and Deceleration Times

In this step, you set acceleration and deceleration times for the motor to help protect the drive and motor from overload.

Acceleration and Deceleration Times

The default acceleration time is 10 seconds (from 0 to Motor NP RPM). The default deceleration time is 10 seconds (from Motor NP RPM to 0).

Some applications with high inertia loads, such as fans and centrifuges, can cause drive overload and other faults especially during acceleration and deceleration. See Appendix A > High Inertia Loads on page 63 for more information about optimizing drive parameters.

Use the following procedure to modify acceleration and deceleration times if needed.

1. Navigate to parameter 10:1915 [VRef Accel Time1].
2. Press the EDIT soft key.
3. Edit the value to the desired acceleration time in seconds and press the ENTER soft key.
4. Navigate to parameter 10:1917 [VRef Decel Time1].
5. Press the EDIT soft key.
6. Edit the value to the desired deceleration time in seconds and press the ENTER soft key.

Step 11: Configure Outputs

In this step, you configure analog and digital outputs.

Analog Outputs

Select the configuration according to the analog output wiring that you recorded in Table 2 on page 14.

Examples of wiring option module analog I/O can be found in the PowerFlex 750-Series I/O, Feedback, and Power Option Modules Installation Instructions, publication 750-IN111.

Use this table to determine the parameters associated with I/O option module analog output parameters, where *nn* is port where the I/O module is installed.

Terminal	Name	Option Module	Related Parameters
Ao0+, Ao0-	Analog Out 0	11-Series 22-Series	*nn*:70 [Anlg Out Type], bit 0 *nn*:71 [Anlg Out Abs], bit 0 *nn*:75 [Anlg Out0 Sel] *nn*:76 [Anlg Out0 Stpt] *nn*:77 [Anlg Out0 Data] *nn*:78 [Anlg Out0 DataHi] *nn*:79 [Anlg Out0 DataLo] *nn*:80 [Anlg Out0 Hi] *nn*:81 [Anlg Out0 Lo] *nn*:82 [Anlg Out0 Val]
Ao1+, Ao1-	Analog Out 1	22-Series	*nn*:70 [Anlg Out Type], bit 1 *nn*:71 [Anlg Out Abs], bit 1 *nn*:85 [Anlg Out1 Sel] *nn*:86 [Anlg Out1 Stpt] *nn*:87 [Anlg Out1 Data] *nn*:88 [Anlg Out1 DataHi] *nn*:89 [Anlg Out1 DataLo] *nn*:90 [Anlg Out1 Hi] *nn*:91 [Anlg Out1 Lo] *nn*:92 [Anlg Out1 Val]

1. Navigate to port *nn*, parameter 75 [Anlg Out0 Sel] for I/O terminal <Ao0>, or parameter 85 [Anlg Out1 Sel] for I/O terminal <Ao1>. Press the EDIT soft key.
2. Edit the value using the HIM navigation keys to select the port and parameter corresponding with the analog output functions you recorded in Table 2.

   For example, when using a 22-Series (20-750-22xxx-xxxx) in port 4 with a motor current meter wired to analog output terminals <Ao0+> and <Ao0->. Navigate to port 4, parameter 75 [Anlg Out0 Sel]. Press the EDIT soft key. Edit the value using the HIM navigation keys to select port 10. Press the ENTER soft key. Use the HIM navigation keys to select the motor side inverter 'Output Current', parameter 10:3 [Output Current]. Press the ENTER soft key.
3. Navigate to the port and parameters for the I/O option card. Edit each of the parameter values to match the application requirements. See the PowerFlex Drives with TotalFORCE Control Programming Manual, publication 750-PM101, for more information about setting these parameters.

   In the previous example, you would navigate to port 4 and edit values for these parameters: 4:70 [Angl Out Type] bit 0, 4:71 [Anlg Out Abs] bit 0, 4:78 [Anlg Out0 DataHi], 4:79 [Anlg Out0 DataLo], 4:80 [Anlg Out0 Hi], and 4:81 [Anlg Out0 Lo].

Digital Outputs

Select the configuration according to the digital output wiring that you recorded in Table 2 on page 14.

Examples of wiring option module analog I/O can be found in the PowerFlex 750-Series I/O, Feedback, and Power Option Modules Installation Instructions, publication 750-IN111.

Use this table to determine the parameters associated with I/O option module digital output parameters, where *nn* is port where the I/O module is installed.

Terminal	Name	Option Module	Related Parameters
R0NO, R0NC, R0C	Relay Out 0	11-Series 22-Series	*nn*:10 [Ro0 Sel]
R1NO, R1NC, R0C	Relay Out 1	22-Series	*nn*:20 [Ro1 Sel]
T0, TC	Transistor Out 0	11-Series 22-Series	*nn*:20 [To0 Sel]
T1, TC	Transistor Out 1	11-Series 22-Series	*nn*:30 [To1 Sel]

1. Navigate to port *nn*.
2. Navigate to the parameter for the I/O terminals that you want to edit:
   - For I/O terminals R0NO/R0C/R0NC, navigate to parameter 10 [RO0 Sel].
   - For I/O terminals R1NO/R1C/R1NC (T0/TC), navigate to parameter 20 [RO1 Sel] ([TO0 Sel]).
   - For I/O terminals T1/TC, navigate to parameter 30 [TO1 Sel].
3. Press the EDIT soft key.
4. Edit the value using the HIM navigation keys to select the port and parameter corresponding to the digital output function you recorded in Table 2.

   The following is an example illustrating how to edit the value. Suppose the following situation:
   - You are using a 22-Series (20-750-2262C-2R) in port 4.
   - It requires a connection that is wired to digital output terminals <R0NO> and <R0C>.
   - It is required to turn on when the motor side inverter is active.

   In this situation, you would do the following: Navigate to parameter 4:20 [RO0 Sel]. Press the EDIT soft key. Edit the value using the HIM navigation keys to select port 10. Press the ENTER soft key. Use the HIM navigation keys to select the motor side status, parameter 10:354 [Motor Side Sts 1]. Use the HIM navigation keys to select bit 1 'Active'. Press the ENTER soft key.
5. Navigate to the port and parameters for the I/O option card. Edit each of the parameter values to match the application requirements. See the PowerFlex Drives with TotalFORCE Control Programming Manual, publication 750-PM101, for more information about setting these parameters.

   In the preceding example, you would navigate to port 4 and edit values for these parameters: 4:11 [RO0 Level Sel], 4:12 [RO0 Level], 4:14 [RO0 On Time], 4:15 [RO0 Off Time].

Step 12: Verify Drive Operation

At this point, you have completed the steps that are required to start up your drive for the first time. Now, verify and record that each of your drive/motor combinations is operating correctly.

Use the information displayed on the HIM, the drive status indicators to the right of the HIM, and the system operation to assist with verifying drive operation. See Appendix A > Status Indicators on page 60 for more information about interpreting the status indicators.

1. Is each drive/motor combination responding correctly to each of the signal sources?

Signal Command	Drive/Motor 1	Drive/Motor 2	Drive/Motor 3	Drive/Motor 4	Drive/Motor 5
Start/Stop or Run	❑	❑	❑	❑	❑
Direction (if applicable)	❑	❑	❑	❑	❑

2. Is each drive/motor combination responding correctly to the speed reference source? (Check only the boxes that apply.)

Velocity Reference	Drive/Motor 1	Drive/Motor 2	Drive/Motor 3	Drive/Motor 4	Drive/Motor 5
Communications over Other Protocol	❑ Yes ❑ No	❑ Yes ❑ No	❑ Yes ❑ No	❑ Yes ❑ No	❑ Yes ❑ No
I/O Option Module Analog Input	❑ Yes ❑ No	❑ Yes ❑ No	❑ Yes ❑ No	❑ Yes ❑ No	❑ Yes ❑ No
Communications over Embedded EtherNet/IP Adapter	❑ Yes ❑ No	❑ Yes ❑ No	❑ Yes ❑ No	❑ Yes ❑ No	❑ Yes ❑ No
HIM Source	❑ Yes ❑ No	❑ Yes ❑ No	❑ Yes ❑ No	❑ Yes ❑ No	❑ Yes ❑ No

Configuration Troubleshooting

If any of your drive/motor combinations are not functioning properly, review Step 1: Gather the Required Information through Step 11: Configure Outputs to be sure that the correct information was gathered or calculated and that parameters were set correctly.

If your EtherNet/IP communications are not functioning properly, verify that the controller/PLC is communicating the expected commands and/or reference. For more information, see the PowerFlex Drives with TotalFORCE Control Built-in EtherNet/IP Adapter User Manual, publication 750COM-UM009, or see Contact Technical Support on page 57.

To interpret the Status Indicators, refer to Appendix A > Status Indicators on page 60 and the Troubleshooting chapter within the PowerFlex Drives with TotalFORCE Control Programming Manual, publication 750-PM100.

If performance problems persist, see the publications that are listed in Advanced Configuration on page 57 and Additional Resources on page 67.

Contact Technical Support

If you feel you need additional technical support, have the information that is gathered in Table 1 on page 10, Table 2 on page 14, and Table 3 on page 20, before contacting a support representative.

After Basic Setup

Step 1: Gather the Required Information through Step 12: Verify Drive Operation cover the basic steps to start up and operate your drive. This section briefly describes steps that you can take after basic setup.

Configure Predictive Maintenance

When configured, the Predictive Maintenance feature evaluates drive operation and sensor inputs to calculate the remaining life of key components. We highly recommend using Predictive Maintenance. We recommend configuring Predictive Maintenance soon after the initial startup of the drive and monitoring Predictive Maintenance information on a regular schedule. For information on configuring and using Predictive Maintenance, see the Predictive Maintenance section in the PowerFlex 750-Series Products with TotalFORCE Control Reference Manual, publication 750-RM100.

Create a Backup of Drive Parameters

See Using the HIM CopyCat Function on page 65.

Advanced Configuration

After basic setup, if you would like information about further optimizing the performance of your PowerFlex 755T product for the application, refer to the following documents:

- PowerFlex Drives with TotalFORCE Control Programming Manual, publication 750-PM101
- PowerFlex 755T Flux Vector Tuning Application Technique, publication 750-AT006 (only for applications that use Flux Vector motor control mode)
- PowerFlex 750-Series Products with TotalFORCE Control Reference Manual, publication 750-RM100

Notes:

Reference Information

This appendix provides reference information that supplements the start-up and configuration procedure.

Reset Device

There are two Reset Device procedures. You can use either method to reset the device:

- Cycle Power to the Drive and Control Pod
- Use the HIM Reset Device Function

Cycle Power to the Drive and Control Pod

1. De-energize the external 24V DC power source that is connected to the drive 24V Auxiliary Power terminals, if used.
2. De-energize the AC power supply to the drive AC input. To make sure that the drive is adequately de-energized, wait 3 minutes or wait until all lights are off in the drive cabinet.
3. Energize the AC power supply to the drive AC input.
4. Energize the 24V Auxiliary Power supply source, if used.

IMPORTANT If the 24V Auxiliary Power supply source is energized, cycling the AC power does not reset the control pod port devices.

Use the HIM Reset Device Function

1. Make sure that the drive is not communicating to a controller. You cannot use the HIM reset device function while the drive is communicating to a controller.
2. Access the HIM Status screen. The AC power and 24V Auxiliary Power sources can be energized when using the HIM Reset Device function.
3. Use the HIM navigation keys to scroll to the port of the device you want to reset. Typically this is port 0 Host drive.
4. Press the key and use the HIM navigation keys to scroll to the DIAGNOSTIC folder.
5. Use the HIM navigation keys to select 'Reset Device'.
6. Press the 5 key. When the confirmation dialog box opens, press the ENTER soft key to reset the device. The device restarts. To cancel Reset Device, press the ESC soft key.

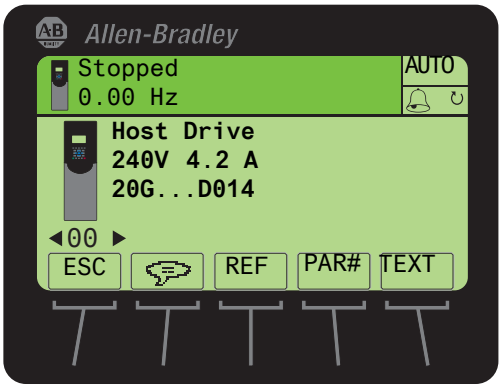
Status Indicators

The status indicators on the drive-mounted HIM cradle indicate the status of the drive.

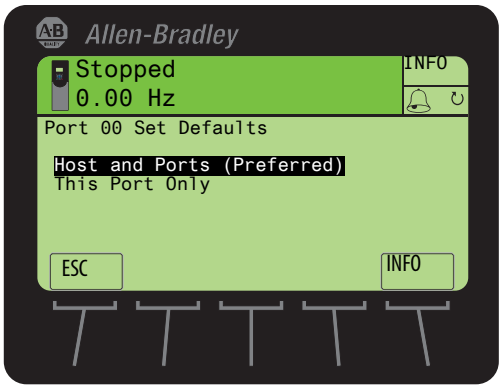
Name	Color	State	Description
STS (Status)	Green	Flashing	The drive is not running and no faults or alarms are present. The drive is ready to run.
		Steady	The drive is running and no faults or alarms are present.
	Yellow	Flashing	The drive is not running. A start inhibit condition is present in the drive. The drive cannot be started until the start inhibit condition is cleared. See parameter 0:603 [Start Inhibits].
		Steady	The drive is not running and a type 1 (user configurable) alarm exists. The drive cannot be started until the alarm condition is cleared. See parameters 10:465 [Alarm Status A] and 10:466 [Alarm Status B].
	Red	Flashing	A major fault has occurred. If the drive is running, it stops. The drive cannot be started until the fault condition is cleared. See parameter 0:610 [Last Fault Code].
		Steady	A non-resettable fault has occurred.
	Red / Yellow	Flashing Alternately	A minor fault has occurred. If the drive is running, it continues to run. The drive cannot be restarted until the fault condition is cleared.
	Yellow/ Green	Flashing Alternately	The drive is running and a type 1 alarm exists. The drive can continue to run. The drive can be restarted without clearing the alarm condition. See parameters 10:465 [Alarm Status A] and 10:466 [Alarm Status B].
	Green/ Red	Flashing Alternately	The drive is updating the flash memory for firmware on the main control board, an option card, or a peripheral device.
	Unlit	Off	The main control board is not powered.
ENET	Unlit	Off	There is no link on port1 or port 2. Embedded EtherNet/IP™ is not properly connected to the network or needs an IP address.
	Red	Flashing	At least one of the following has occurred: • An I/O connection timed out. • Network peer input timed out. • Explicit messaging control timed out. • Network address rotary switches have changed. • The IP address is invalid. If this occurs, communication defaults to DHCP.
		Steady	At least one of the following has occurred: • There is a duplicate IP address. • The network address rotary switches are set to 888. • DHCP lease expired.
	Green	Flashing	There is normal operation with an I/O connection and network peer input, but explicit messaging control is inactive (there is a valid IP address, the network cable is plugged in, and a physical layer connection is established to a remote device, but the drive is not being controlled via Ethernet).
		Steady	I/O connection, network peer input, or explicit messaging control is active (the drive is being controlled via Ethernet).
LNK1 (Link 1) LNK2 (Link 2)	Unlit	Off	There is no link on this port because the adapter is not powered or is not transmitting on the network.
	Green	Flashing	Adapter is properly connected (100 Mbps or 1 Gbps), and transmitting data packets on the network.
		Steady	Adapter is properly connected (100 Mbps or 1 Gbps), but is not transmitting on the network.
	Amber	Flashing	Adapter is properly connected (10 Mbps), and transmitting data packets on the network.
		Steady	Adapter is properly connected (10 Mbps) but is not transmitting on the network.

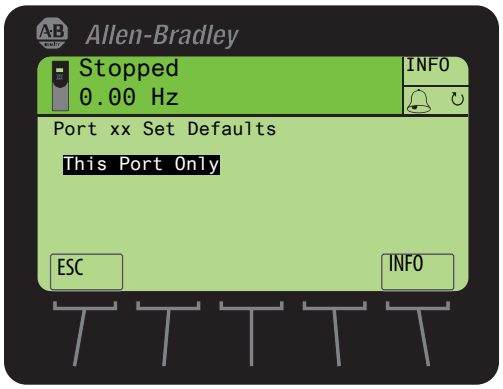
Setting Factory Defaults

1. Make sure that the drive is not communicating to a controller. If the drive is communicating to a controller, you cannot set to factory defaults.
2. Access the Status screen.



3. Use the left 4 or right 6 key to scroll to the port of the device whose parameters you want to set to factory defaults. For example, port 0 for the Host drive, or the respective port number for one of the connected peripherals on the drive.
4. To display its last-viewed folder, press the key.
5. To scroll to the 'MEMORY' folder, use the left or right keys.
6. To select 'Set Defaults', use the up 8 or down 2 keys.
7. To select the appropriate action, use the up or down key.
8. If you chose the Host device (port 0), these choices appear:
   - **Host and Ports (Preferred)**: Selects the Host device (port 0) and all ports for a factory default action.
   - **This Port Only**: Selects only this port for a factory default action.





Press the INFO soft key to display a description of the selected menu function.

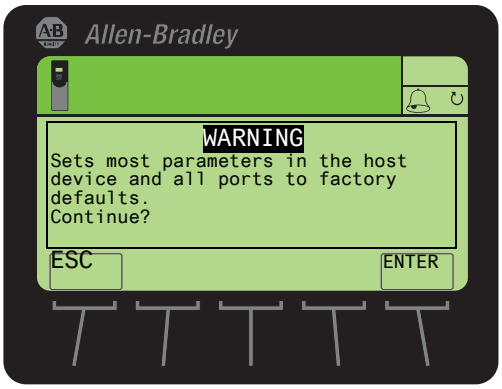
9. To display the Set Defaults popup box, press the 5 key.

10. If you selected either port 0, Host drive and 'Host and Ports (Preferred)', or 'This Port Only' for any other port or peripheral device, select the appropriate action by using a soft key:

- The ENTER soft key sets most parameters for the selected port devices to factory defaults.

  To see the settings that are not restored to factory defaults if you chose the Host device (port 0), see the Setting Factory Defaults section of the PowerFlex Drives with TotalFORCE Control Programming Manual, publication 750-PM101.

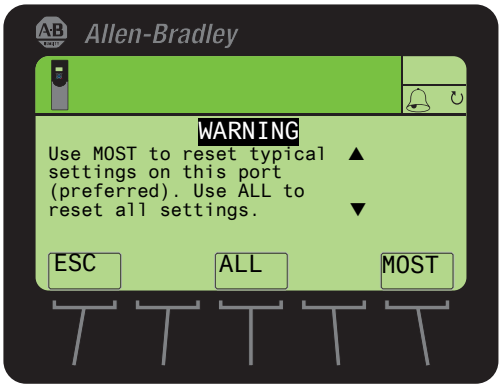
  If you chose any other port device, then all parameters in that port/peripheral are set to factory defaults.
- The ESC soft key cancels the operation; no parameters are set to factory defaults.



11. If you selected port 0 Host drive, and 'This Port Only', select the appropriate action by using a soft key. If you selected another port/peripheral device, then the only selection is as shown in the previous step.

- **MOST** sets most parameters for port 0, Host drive to factory defaults.

  To see the Host device settings that are not restored to factory defaults if you choose MOST, see the Setting Factory Defaults section of the PowerFlex Drives with TotalFORCE Control Programming Manual, publication 750-PM101.
- **ALL** sets all parameters for port 0, Host drive to factory defaults.
- **ESC** cancels the operation; no parameters are set to factory defaults.



IMPORTANT If 'Host and Ports' are set to factory default, port 0 Fault Code 18 'System Defaulted' appears. If 'This Port Only' is set to factory default, port 0 Fault Code 27 'Module Defaulted' appears. This is normal and expected. Press the HIM Stop key to reset the fault.

Line Side Converter Settings

This section applies to PowerFlex® 755TL and PowerFlex 755TR drives only. If necessary, configure the following line side converter settings.

LCL Filter Capacitor Resonance Alarms

If you are experiencing LCL filter capacitor alarms, code 14117 'CapHighResonance' and/or, code 14118 'CapOverResonace', it may be necessary to tune the line side converter regulator and/or replace the LCL filter capacitors.

Review practices for sizing and locating transformers, found in the following publications:

- PowerFlex 750-Series Products with TotalFORCE Control Installation Instructions, publication 750-IN100.
- Drives in Common Bus Configurations with PowerFlex 755TM Bus Supplies Application Techniques, publication DRIVES-AT005.

If this event occurs while the line side converter is modulating, then the configuration and tuning of the Line Side Converter may be causing the resonance.

Consider reducing the bandwidth of current and voltage regulators. When parameter 13:300 [BusDistRej Mode] is set to 2 'FF Power', refer to parameters 13:55 [Volt Reg BW] and 13:75 [Curr Reg BW].

If this event occurs while the line side converter is not modulating, then equipment that shares the source of AC power may be causing the resonance. Consider changing the power distribution scheme. Consider installing a form of magnetic isolation, such as an isolation transformer or line reactor. Also consider using the Energy Pause function, which disconnects the line side converter from the AC source when not needed. For information about configuring the Energy Pause feature, see PowerFlex 750-Series Products with TotalFORCE Control Reference Manual, publication 750-RM100.

High Inertia Loads

This section provides information about configuring a drive that is used in an application with a high inertia load.

Acceleration Time

In applications with high inertia of the load and motor rotating mass, the length of the acceleration time is an important consideration. A typical application where this consideration applies is a centrifugal fan load. High inertia loads can cause overload conditions of the motor, overload conditions of the drive, or overcurrent conditions of the drive. These issues can result in the following:

- A motor overload fault (code 10003)
- A drive overload fault (code 10028)
- A software overcurrent fault (code 10092)
- A hardware overcurrent fault (code 10093)

To help prevent faults that are related to overload and overcurrent conditions, acceleration time must be set to the capabilities of the drive based on the load and application requirements. The normal solution is to set parameter 10:1915 [VRef Accel Time 1] to a longer time period so that an overload or overcurrent condition of the drive does not occur.

To set parameter 10:1915 [VRef Accel Time 1], incrementally increase the acceleration time by a 30 second interval, and after each increase, restart the drive. Repeat this process until the load is able to start without a fault condition. The maximum acceleration time for most applications is up to 5 minutes, however high inertia loads could require higher acceleration times. For example, 30 minutes may be common for a centrifuge. If faster acceleration time is required for the load, contact your local distributor or Rockwell Automation® technical support for further application review or potential drive sizing considerations.

Recommendation

If the load has a large inertia value, and acceleration time is not an application concern, set the current limit of the drive in amps to the continuous current rating of the drive in amps. This current limit setting lets the drive apply its rated current to the motor on a continuous basis until the application reaches full speed. The overload current setting is configured in parameter 10:222 [Current Limit 1]. Default values for this parameter that are time limited equal 110% of the Normal Duty (ND), or 150% of the Heavy Duty (HD) rating of the drive that may have induced a hardware overcurrent fault. To obtain the continuous current rating of the drive, see parameter 10:21 [Rated Amps]. If the application can never reach full speed, it is an indication that the motor and/or the drive may be undersized for the application. Contact your Local distributor or Rockwell Automation technical support for further application review, or potential drive sizing considerations.

Deceleration Time

If the drive faults on either an overload (F10003 or F10028), or an overvoltage (F10107) fault condition during deceleration, it is likely due to the deceleration time being too short for the system, which results in the fault condition. There are two ways to eliminate the fault condition:

- The drive can be set to coast to rest (parameter 10:110 [Mtr Stop Mode A] set = 0 'Coast').
- The deceleration time can be increased (parameter 10:1917 [VRef Decel Time 1] set to a larger value).

Set parameter 10:1917 [VRef Decel Time 1] to the longest necessary deceleration time allowed by the system. If drive faults or DC bus overvoltage conditions continue to exist, dynamic braking can be required.

PowerFlex® 755TR regenerative drives are capable of regeneration to the AC line and should not require dynamic braking.

PowerFlex 755TL and PowerFlex 755TS do not have regeneration capability and may benefit from the addition of a dynamic brake resistor. See PowerFlex Dynamic Braking Resistor Calculator, publication PFLEX-AT001, to understand how to apply a dynamic brake to the application.

Disable the HIM Start Function

There are times when disabling the HIM is necessary, such as the following situations:

- You only need to use the other discrete input.
- You only need to use communications that are controlled by Start/Run, Jog, and Direction commands.

Parameter 0:41 [Logic Mask] is used to disable or 'mask out' the HIM from performing any Start, Jog, and Direction Logic function. Bits 1...3 correspond to a HIM connected to ports 1...3. The default setting is all bits set to '1', ports enabled, or unmasked.

Setting parameter 0:41 [Logic Mask] bits 1...3 equal to '0' disables operation from the HIM that is installed in ports 1...3.

IMPORTANT Setting parameter 0:41 [Logic Mask] bits to '0' to disable the Start, Jog, and Direction commands does not mask the Stop commands. The Stop function cannot be disabled.

Using the HIM CopyCat Function

It is possible to store a set of drive parameters within the HIM. You can upload drive parameters from the drive to the HIM, then use the HIM to download the same set of parameters to a new drive. Detailed information regarding the HIM CopyCat function can be found in the PowerFlex 20-HIM-A6 and 20-HIM-C6S HIM user manual, publication 20HIM-UM001.

The following applies when downloading parameters from the HIM to a drive:

- The drive must be Stopped.
- Do not use the HIM CopyCat function if the port 9, Embedded DeviceLogix application is enabled. To use the HIM CopyCat feature, first disable the embedded DeviceLogix by navigating to parameter 9:1000 [DLX OperationCmd]. Edit the value to 0 'DisableLogic'. Navigate to parameter 9:1001 [DLX OperationSts] and check if the value is 0 'LogicDisabld'.
- If the drive is communicating with Logix™ controller (the controller is 'Online'), the HIM CopyCat function does not operate. To use the HIM CopyCat function, inhibit the IO connection to the Logix controller.

Calculating AC Line Impedance

This section applies to PowerFlex 755TL and PowerFlex 755TR drives only. If your system uses a line reactor, you must adjust the following:

- AC line kVA (parameter 13:32 [AC Line kVA A])
- AC line impedance (parameter 13:34 [AC Line Imped% A])

Use the following equations and information:

$$AC\ Line\ Impedance\ =\ Transformer\ Impedance\ +\ Line\ Reactor\ Impedance\ *\ \frac{Source\ kVA}{Converter\ kVA}$$

$$Source\ kVA\ =\ Transformer\ kVA$$

$$Converter\ kVA\ =\ \sqrt{3}\ *\ \frac{Converter\ Rated\ V\ *\ Converter\ Rated\ Amps}{1000}$$

For Converter Rated Volts, use the value of parameter 13:25 [Line Side Converter Rated Voltage].

For Converter Rated Amps, use the value of parameter 13:26 [Line Side Converter Rated Current].

Example

A drive system has:

- A 2500 kVA transformer with 7% impedance
- A linear reactor with 5% impedance
- Converter Rated Volts of 480
- Converter Rated Amps of 761

In this situation:

- Set parameter 13:32 [AC Line kVA A] to 2500.
- Set parameter 13:34 [AC Line Imped% A] to 27, as found in the following calculations:

$$Converter\ kVA\ =\ \sqrt{3}\ *\ \frac{480\ *\ 761}{1000}\ =\ 632.68$$

$$AC\ Line\ Impedance\ =\ 0.07\ +\ 0.05\ *\ \frac{2500}{632.68}\ =\ 0.2675\ =\ 26.75\%$$

Additional Resources

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

Resource	Description
Industrial Automation Wiring and Grounding Guidelines, publication 1770-4.1	Provides general guidelines for installing a Rockwell Automation industrial system.
PowerFlex® 750-Series Products with TotalFORCE® Control Technical Data, publication 750-TD100	Provides detailed information on: • Drive and bus supply specifications • Option specifications • Fuse and circuit breaker ratings
PowerFlex 750-Series Products with TotalFORCE Control Installation Instructions, publication 750-IN100	Provides the basic steps to install PowerFlex® 755TL low harmonic drives, PowerFlex 755TR regenerative drives, and PowerFlex 755TM drive systems.
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 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 755T Flux Vector Tuning Application Technique, publication 750-AT006	Provides guidance on how to tune Flux Vector position and velocity loops, filters, and other features to achieve the level of performance that is required for a given application. This publication is intended for novice drives users and users with advanced skills.
PowerFlex 20-HIM-A6 / -C6S HIM (Human Interface Module) User Manual, publication 20HIM-UM001	Provides detailed information on HIM components, operation, and features.
Low Voltage Motor Protection White Paper, publication 193-WP008	Provides information about short-circuit protection, and overload protection for low voltage motors.
PowerFlex 755TM IP00 Open Type Kits Installation Instructions, publication 750-IN101	Provides instructions to install IP00 Open Type kits in user-supplied enclosures.
PowerFlex 755TM AC Precharge Modules Unpacking and Lifting Instructions, publication 750-IN102	These publications provide detailed information on: • Component weights • Precautions and recommendations • Hardware attachment points • Lifting the component out of the packaging
PowerFlex 755TM DC Precharge Modules Unpacking and Lifting Instructions, publication 750-IN103	
PowerFlex 755TM Power and Filter Modules Unpacking and Lifting Instructions, publication 750-IN104	
PowerFlex 750-Series Service Cart and DCPC Module Lift Instructions, publication 750-IN105	Provides detailed setup and operating instructions for the module service cart and DC precharge module lift.
PowerFlex 755TM Power and Filter Module Storage Hardware Instructions, publication 750-IN106	Provides detailed installation and usage instructions for this hardware accessory.
PowerFlex 755T Module Service Ramp Instructions, publication 750-IN108	Provides detailed usage instructions for the module service ramp.
PowerFlex 755TM IP00 Open Type Kits Technical Data, publication 750-TD101	Provides detailed information on: • Kit selection • Kit ratings and specifications • Option specifications
PowerFlex 750-Series Products with TotalFORCE Control Hardware Service Manual, publication 750-TG100	Provides detailed information on: • Preventive maintenance • Component testing • Hardware replacement procedures
PowerFlex 755TS Products with TotalFORCE Control Hardware Service Manual, publication 750-TG101	Provides detailed information on: • Preventive maintenance • Component testing • Hardware replacement procedures

Resource	Description
PowerFlex 750-Series Safe Speed Monitor Option Module Safety Reference Manual, publication 750-RM001	These publications provide detailed information on installation, setup, and operation of the 750-Series safety option modules.
PowerFlex 750-Series Safe Torque Off Option Module User Manual, publication 750-UM002	
PowerFlex 750-Series ATEX Option Module User Manual, publication 750-UM003	
PowerFlex 755 Integrated Safety - Safe Torque Off Option Module User Manual, publication 750-UM004	
PowerFlex 755/755T Integrated Safety Functions Option Module User Manual, publication 750-UM005	
PowerFlex Drives with TotalFORCE Control Built-in EtherNet/IP Adapter User Manual, publication 750COM-UM009	Provides information on how to install, configure, and troubleshoot applications for the PowerFlex drives with the built-in EtherNet/IP™ adapter.
Industry Installation Guidelines for Pulse Width Modulated (PWM) AC Drives, publication DRIVES-AT003	Provides basic information on enclosure systems, considerations to help protect against environmental contaminants, and power and grounding considerations for installing Pulse Width Modulated (PWM) AC drives.
Drives in Common Bus Configurations with PowerFlex 755TM Bus Supplies Application Techniques, publication DRIVES-AT005	Provides basic information to properly wire and ground the following products in common bus applications: • PowerFlex 755TM drive system for common bus solutions • PowerFlex 750-Series AC and DC input drives • Kinetix® 5700 servo drives
PowerFlex 750-Series I/O, Feedback, and Power Option Modules Installation Instructions, publication 750-IN111.	Provides drive compatibility, jumper settings, terminal designations, wiring examples for analog and digital I/O, feedback, and auxiliary power option modules.
Wiring and Grounding Guidelines for Pulse Width Modulated (PWM) AC Drives, publication DRIVES-IN001	Provides basic information to properly wire and ground PWM AC drives.
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.
CIP Security Application Technique, SECURE-AT001, SECURE-AT001	Describes how to plan and implement a Rockwell Automation system that supports the CIP Security protocol.
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.
Safety Guidelines for the Application, Installation, and Maintenance of Solid-State Control, publication SGI-1.1	Designed to harmonize with NEMA Standards Publication No. ICS 1.1-1987 and provides general guidelines for the application, installation, and maintenance of solid-state control in the form of individual devices or packaged assemblies incorporating solid-state components.

To view or download publications, go to rok.auto/literature.

To access declarations of conformity, certificates, and other certification details, go to rok.auto/certifications.

Notes:

Rockwell Automation Support

Use these resources to access support information.

Technical Support Center	Find help with how-to videos, FAQs, chat, user forums, and product notification updates.	rok.auto/support
Knowledgebase	Access Knowledgebase articles.	rok.auto/knowledgebase
Local Technical Support Phone Numbers	Locate the telephone number for your country.	rok.auto/phonesupport
Literature Library	Find installation instructions, manuals, brochures, and technical data publications.	rok.auto/literature
Product Compatibility and Download Center (PCDC)	Get help determining how products interact, check features and capabilities, and find associated firmware.	rok.auto/pcdc

Documentation Feedback

Your comments help us serve your documentation needs better. If you have any suggestions on how to improve our content, complete the form at rok.auto/docfeedback.

Waste Electrical and Electronic Equipment (WEEE)

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

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

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