User Manual

Allen-Bradley

# PowerFlex 520-Series Adjustable Frequency AC Drive

PowerFlex 523 Catalog Number 25A, Series B
PowerFlex 525 Catalog Number 25B

Original Instructions

Allen-Bradley • Rockwell Software

Rockwell Automation

## Important User Information

Solid-state equipment has operational characteristics differing from those of electromechanical equipment. Safety Guidelines for the Application, Installation and Maintenance of Solid State Controls (publication SGI-1.1 available from your local Rockwell Automation® sales office or online at http://www.rockwellautomation.com/literature/) describes some important differences between solid-state equipment and hard-wired electromechanical devices. Because of this difference, and also because of the wide variety of uses for solid-state equipment, all persons responsible for applying this equipment must satisfy themselves that each intended application of this equipment is acceptable.

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

## Appendix D

**Velocity StepLogic, Basic Logic and Timer/Counter Functions**



## Appendix E

**Encoder/Pulse Train Usage and Position StepLogic Application**



## Appendix F

**PID Set Up**



## Appendix G

**Safe-Torque-Off Function**



## Appendix H

**EtherNet/IP**

This manual contains new and updated information.

## New and Updated Information

This table contains the changes made to this revision.

| Topic | Page |
|---|---|
| Added footnote to indicate that circuit breaker selection is not available for certain drive ratings. | 24...27 |
| Added PowerFlex 523 series B to Control I/O Wiring Block Diagram. | 38 |
| Added PowerFlex 523 series B to Control I/O Terminal Designations. | 40 |
| Added PowerFlex 523 series B I/O wiring examples for analog input and analog output. | 45 |
| Added note to PowerFlex 525 I/O wiring example for pulse train input. | 46 |
| Added footnote to enum "4" for P053 [Reset to Defalts] under Smart Start-Up with Basic Program Group Parameters. | 67 |
| Added new sub topic for 32-bit parameters. | 72 |
| Added footnotes to parameters that are available in PowerFlex 523 FRN 3.xxx and later. | Chapter 3 |
| Updated descriptions for parameters that are available in PowerFlex 523 FRN 3.xxx and later. | |
| Added formula for calculating scaled process value to parameter b010 [Process Display]. | 79 |
| Added recommendation to perform rotate tune when using VVC mode to parameter P040 [Autotune]. | 85 |
| Added footnote to indicate which settings are PowerFlex 525 only for parameter d394 [Dig Out Status]. | 114 |
| Updated descriptions for parameters A465 [PID 1 Deadband] and A477 [PID 2 Deadband]. | 123 |
| Added corrective action to fault F114 (uC Failure). | 162 |
| Added analog output to PowerFlex 523 drives. | 171 |
| Added new topic "Determine Encoder Pulse Per Revolution (PPR) Specification Based on Speed Resolution" to Appendix E. | 217 |
| Updated information to verify operation of the safety inputs in Appendix G. | 240 |
| General maintenance updates. | Throughout manual |

## Notes:

# Overview

The purpose of this manual is to provide you with the basic information needed to install, start-up and troubleshoot the PowerFlex® 520-Series Adjustable Frequency AC Drive.



## Who Should Use this Manual

This manual is intended for qualified personnel. You must be able to program and operate Adjustable Frequency AC Drive devices. In addition, you must have an understanding of the parameter settings and functions.

## Recommended Documentation

All the recommended documentation listed in this section is available online at http://www.rockwellautomation.com/literature/.

The following publications provide general drive information:

| Title | Publication |
|---|---|
| Wiring and Grounding Guidelines for Pulse Width Modulated (PWM) AC Drives | DRIVES-IN001 |
| Preventive Maintenance of Industrial Control and Drive System Equipment | DRIVES-TD001 |
| Safety Guidelines for the Application, Installation and Maintenance of Solid State Control | SGI-1.1 |
| A Global Reference Guide for Reading Schematic Diagrams | 100-2.10 |
| Guarding Against Electrostatic Damage | 8000-4.5.2 |

The following publications provide specific PowerFlex 520-Series information on drive installation, features, specifications, and service:

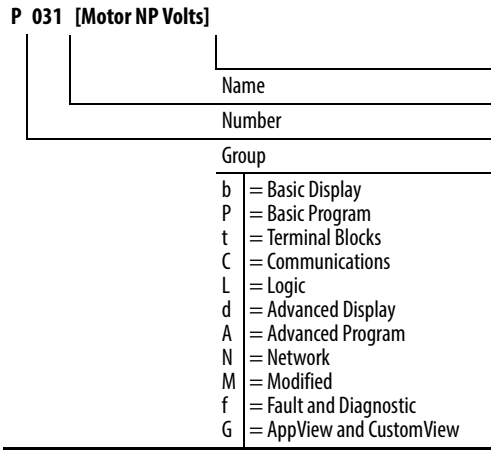
| Title | Publication |
|---|---|
| PowerFlex 520-Series AC Drive Specifications | 520-TD001 |
| PowerFlex Dynamic Braking Resistor Calculator | PFLEX-AT001 |
| PowerFlex AC Drives in Common Bus Configurations | DRIVES-AT002 |

The following publications provide specific Network Communications information:

| Title | Publication |
|---|---|
| PowerFlex 525 Embedded EtherNet/IP Adapter | 520COM-UM001 |
| PowerFlex 25-COMM-D DeviceNet Adapter | 520COM-UM002 |
| PowerFlex 25-COMM-E2P Dual-Port EtherNet/IP Adapter | 520COM-UM003 |
| PowerFlex 25-COMM-P PROFIBUS DPV1 Adapter | 520COM-UM004 |

## Manual Conventions

- In this manual we refer to PowerFlex 520-Series Adjustable Frequency AC Drive as; drive, PowerFlex 520-series, PowerFlex 520-series drive or PowerFlex 520-series AC drive.
- Specific drives within the PowerFlex 520-series may be referred to as:
  – PowerFlex 523, PowerFlex 523 drive or PowerFlex 523 AC drive.
  – PowerFlex 525, PowerFlex 525 drive or PowerFlex 525 AC drive.
- Parameter numbers and names are shown in this format:




- The following words are used throughout the manual to describe an action:

| Words | Meaning |
|---|---|
| Can | Possible, able to do something |
| Cannot | Not possible, not able to do something |
| May | Permitted, allowed |
| Must | Unavoidable, you must do this |
| Shall | Required and necessary |
| Should | Recommended |
| Should Not | Not Recommended |

- The Studio 5000® Engineering and Design Environment combines engineering and design elements into a common environment. The first element in the Studio 5000 environment is the Logix Designer application. The Studio 5000 Logix Designer™ application is the rebranding of RSLogix™ 5000 software and will continue to be the product to program Logix 5000 controllers for discrete, process, batch, motion, safety, and drive-based solutions. The Studio 5000 environment is the foundation for the future of Rockwell Automation engineering design tools and capabilities. It is the one place for design engineers to develop all the elements of their control system.

## Drive Frame Sizes

Similar PowerFlex 520-series drive sizes are grouped into frame sizes to simplify spare parts ordering, dimensioning, etc. A cross reference of drive catalog numbers and their respective frame sizes is provided in Appendix B.

## General Precautions

**ATTENTION:** The drive contains high voltage capacitors which take time to discharge after removal of mains supply. After power has been removed from the drive, wait three minutes to make sure DC bus capacitors are discharged. After three minutes, verify AC voltage L1, L2, L3 (Line to Line and Line to Ground) to ensure mains power has been disconnected. Measure DC voltage across DC- and DC+ bus terminals to verify DC Bus has discharged to zero volts. Measure DC voltage from L1, L2, L3, T1, T2, T3 DC – and DC+ terminals to ground and keep the meter on the terminals until the voltage discharges to zero volts. The discharge process may take several minutes to reach zero volts. Darkened display LEDs is not an indication that capacitors have discharged to safe voltage levels.

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

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

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

**ATTENTION:** The bus regulator function is extremely useful for preventing nuisance overvoltage faults resulting from aggressive decelerations, overhauling loads, and eccentric loads. However, it can also cause either of the following two conditions to occur.
1. Fast positive changes in input voltage or imbalanced input voltages can cause uncommanded positive speed changes;
2. Actual deceleration times can be longer than commanded deceleration times However, a "Stall Fault" is generated if the drive remains in this state for 1 minute. If this condition is unacceptable, the bus regulator must be disabled (see parameter A550 [Bus Reg Enable]). In addition, installing a properly sized dynamic brake resistor will provide proper stopping requirements based on braking resistor sizing.

**ATTENTION:** Risk of injury or equipment damage exists. Drive does not contain user-serviceable components. Do not disassemble drive chassis.

# Catalog Number Explanation

| 1-3 | 4 | 5 | 6-8 | 9 | 10 | 11 | 12 | 13 | 14 |
|---|---|---|---|---|---|---|---|---|---|
| **25B** | **–** | **B** | **2P3** | **N** | **1** | **1** | **4** | **–** | **–** |
| Drive | Dash | Voltage Rating | Rating | Enclosure | Reserved | Emission Class | Reserved | Dash | Dash |

| Code | Type |
|---|---|
| 25A | PowerFlex 523 |
| 25B | PowerFlex 525 |

| Code | Voltage | Phase |
|---|---|---|
| V | 120V AC | 1 |
| A | 240V AC | 1 |
| B | 240V AC | 3 |
| D | 480V AC | 3 |
| E | 600V AC | 3 |

| Code | Enclosure |
|---|---|
| N | IP20 NEMA / Open |

| Code | Interface Module |
|---|---|
| 1 | Standard |

| Code | EMC Filter |
|---|---|
| 0 | No Filter |
| 1 | Filter |

| Code | Braking |
|---|---|
| 4 | Standard |

| Output Current @ 1 Phase, 100...120V Input | | | | | | |
|---|---|---|---|---|---|---|
| Code | Amps | Frame | ND | | HD | |
| | | | HP | kW | HP | kW |
| 1P6[1] | 1.6 | A | 0.25 | 0.2 | 0.25 | 0.2 |
| 2P5 | 2.5 | A | 0.5 | 0.4 | 0.5 | 0.4 |
| 4P8 | 4.8 | B | 1.0 | 0.75 | 1.0 | 0.75 |
| 6P0 | 6.0 | B | 1.5 | 1.1 | 1.5 | 1.1 |

| Output Current @ 1 Phase, 200...240V Input | | | | | | |
|---|---|---|---|---|---|---|
| Code | Amps | Frame | ND | | HD | |
| | | | HP | kW | HP | kW |
| 1P6[1] | 1.6 | A | 0.25 | 0.2 | 0.25 | 0.2 |
| 2P5 | 2.5 | A | 0.5 | 0.4 | 0.5 | 0.4 |
| 4P8 | 4.8 | A | 1.0 | 0.75 | 1.0 | 0.75 |
| 8P0 | 8.0 | B | 2.0 | 1.5 | 2.0 | 1.5 |
| 011 | 11.0 | B | 3.0 | 2.2 | 3.0 | 2.2 |

| Output Current @ 3Phase, 200...240V Input | | | | | | |
|---|---|---|---|---|---|---|
| Code | Amps | Frame | ND | | HD | |
| | | | HP | kW | HP | kW |
| 1P6[1] | 1.6 | A | 0.25 | 0.2 | 0.25 | 0.2 |
| 2P5 | 2.5 | A | 0.5 | 0.4 | 0.5 | 0.4 |
| 5P0 | 5.0 | A | 1.0 | 0.75 | 1.0 | 0.75 |
| 8P0 | 8.0 | A | 2.0 | 1.5 | 2.0 | 1.5 |
| 011 | 11.0 | A | 3.0 | 2.2 | 3.0 | 2.2 |
| 017 | 17.5 | B | 5.0 | 4.0 | 5.0 | 4.0 |
| 024 | 24.0 | C | 7.5 | 5.5 | 7.5 | 5.5 |
| 032 | 32.2 | D | 10.0 | 7.5 | 10.0 | 7.5 |
| 048[2] | 48.3 | E | 15.0 | 11.0 | 10.0 | 7.5 |
| 062[2] | 62.1 | E | 20.0 | 15.0 | 15.0 | 11.0 |

| Output Current @ 3 Phase, 380...480V Input | | | | | | |
|---|---|---|---|---|---|---|
| Code | Amps | Frame | ND | | HD | |
| | | | HP | kW | HP | kW |
| 1P4 | 1.4 | A | 0.5 | 0.4 | 0.5 | 0.4 |
| 2P3 | 2.3 | A | 1.0 | 0.75 | 1.0 | 0.75 |
| 4P0 | 4.0 | A | 2.0 | 1.5 | 2.0 | 1.5 |
| 6P0 | 6.0 | A | 3.0 | 2.2 | 3.0 | 2.2 |
| 010 | 10.5 | B | 5.0 | 4.0 | 5.0 | 4.0 |
| 013 | 13.0 | C | 7.5 | 5.5 | 7.5 | 5.5 |
| 017 | 17.0 | C | 10.0 | 7.5 | 10.0 | 7.5 |
| 024 | 24.0 | D | 15.0 | 11.0 | 15.0 | 11.0 |
| 030[2] | 30.0 | D | 20.0 | 15.0 | 15.0 | 11.0 |
| 037[2] | 37.0 | E | 25.0 | 18.5 | 20.0 | 15.0 |
| 043[2] | 43.0 | E | 30.0 | 22.0 | 25.0 | 18.5 |

| Output Current @ 3 Phase, 525...600V Input | | | | | | |
|---|---|---|---|---|---|---|
| Code | Amps | Frame | ND | | HD | |
| | | | HP | kW | HP | kW |
| 0P9 | 0.9 | A | 0.5 | 0.4 | 0.5 | 0.4 |
| 1P7 | 1.7 | A | 1.0 | 0.75 | 1.0 | 0.75 |
| 3P0 | 3.0 | A | 2.0 | 1.5 | 2.0 | 1.5 |
| 4P2 | 4.2 | A | 3.0 | 2.2 | 3.0 | 2.2 |
| 6P6 | 6.6 | B | 5.0 | 4.0 | 5.0 | 4.0 |
| 9P9 | 9.9 | C | 7.5 | 5.5 | 7.5 | 5.5 |
| 012 | 12.0 | C | 10.0 | 7.5 | 10.0 | 7.5 |
| 019 | 19.0 | D | 15.0 | 11.0 | 15.0 | 11.0 |
| 022[2] | 22.0 | D | 20.0 | 15.0 | 15.0 | 11.0 |
| 027[2] | 27.0 | E | 25.0 | 18.5 | 20.0 | 15.0 |
| 032[2] | 32.0 | E | 30.0 | 22.0 | 25.0 | 18.5 |

(1) This rating is only available for PowerFlex 523 drives.

(2) Normal and Heavy Duty ratings are available for this drive.

## Notes:

# Installation/Wiring

This chapter provides information on mounting and wiring the PowerFlex 520-series drives.



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

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

## Mounting Considerations

- Mount the drive upright on a flat, vertical and level surface.

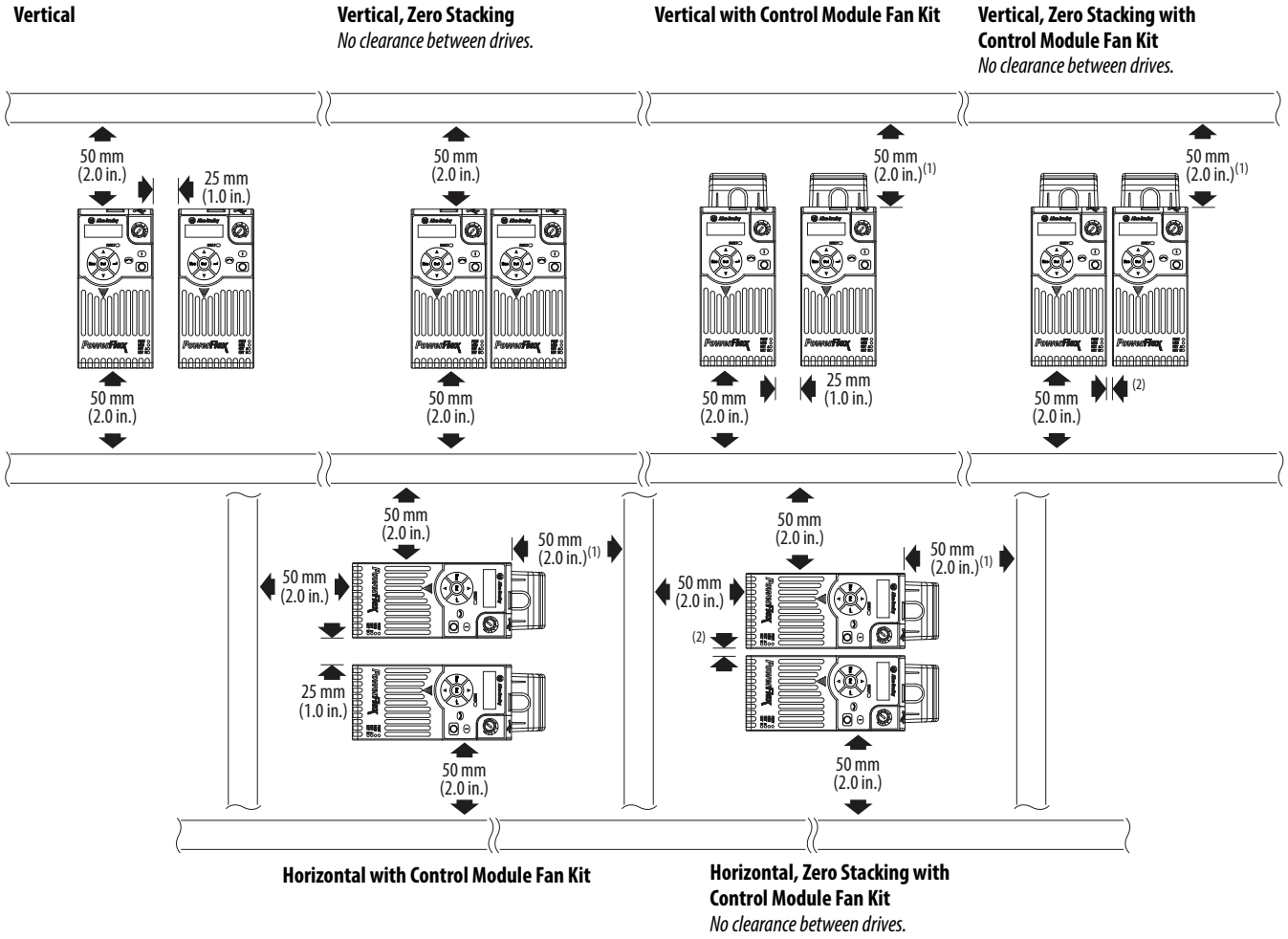
| Frame | Screw Size | Screw Torque |
|---|---|---|
| A | M5 (#10...24) | 1.56...1.96 Nm (14...17 lb-in.) |
| B | M5 (#10...24) | 1.56...1.96 Nm (14...17 lb-in.) |
| C | M5 (#10...24) | 1.56...1.96 Nm (14...17 lb-in.) |
| D | M5 (#10...24) | 2.45...2.94 Nm (22...26 lb-in.) |
| E | M8 (5/16 in.) | 6.0...7.4 Nm (53...65 lb-in.) |

- Protect the cooling fan by avoiding dust or metallic particles.

- Do not expose to a corrosive atmosphere.
- Protect from moisture and direct sunlight.

## Minimum Mounting Clearances

See Appendix B for mounting dimensions.




(1) For Frame E with Control Module Fan Kit only, clearance of 95 mm (3.7 in.) is required.
(2) For Frame E with Control Module Fan Kit only, clearance of 12 mm (0.5 in.) is required.

## Ambient Operating Temperatures

See Appendix B for option kits.

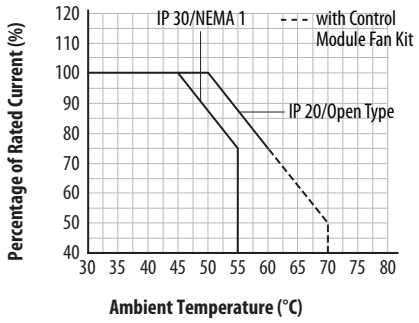
| Mounting | Enclosure Rating[1] | Ambient Temperature | | | |
|---|---|---|---|---|---|
| | | Minimum | Maximum (No Derate) | Maximum (Derate)[2] | Maximum with Control Module Fan Kit (Derate)[3][5] |
| Vertical | IP 20/Open Type | -20 °C (-4 °F) | 50 °C (122 °F) | 60 °C (140 °F) | 70 °C (158 °F) |
| | IP 30/NEMA 1/UL Type 1 | | 45 °C (113 °F) | 55 °C (131 °F) | – |
| Vertical, Zero Stacking | IP 20/Open Type | | 45 °C (113 °F) | 55 °C (131 °F) | 65 °C (149 °F) |
| | IP 30/NEMA 1/UL Type 1 | | 40 °C (104 °F) | 50 °C (122 °F) | – |
| Horizontal with Control Module Fan Kit[4][5] | IP 20/Open Type | | 50 °C (122 °F) | – | 70 °C (158 °F) |
| Horizontal, Zero Stacking with Control Module Fan Kit[4][5] | IP 20/Open Type | | 45 °C (113 °F) | – | 65 °C (149 °F) |

(1) IP 30/NEMA 1/UL Type 1 rating requires installation of the PowerFlex 520-Series IP 30/NEMA 1/UL Type 1 option kit, catalog number 25-JBAx.
(2) For catalogs 25x-D1P4N104 and 25x-E0P9N104, the temperature listed under the Maximum (Derate) column is reduced by 5 °C (9 °F) for all mounting methods.
(3) For catalogs 25x-D1P4N104 and 25x-E0P9N104, the temperature listed under the Maximum with Control Module Fan Kit (Derate) column is reduced by 10 °C (18 °F) for vertical and vertical with zero stacking mounting methods only.
(4) Catalogs 25x-D1P4N104 and 25x-E0P9N104 cannot be mounted using either of the horizontal mounting methods.
(5) Requires installation of the PowerFlex 520-Series Control Module Fan Kit, catalog number 25-FANx-70C.

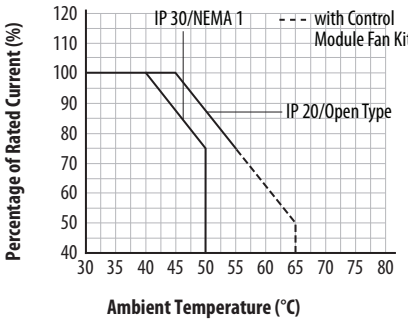
## Current Derating Curves

### Vertical Mounting

**Single Drive**

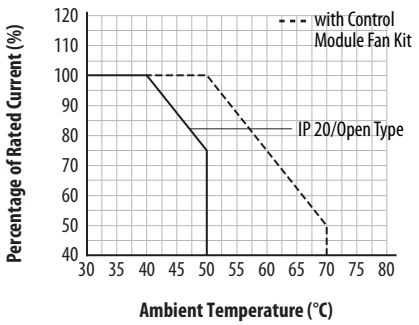



**Zero Stacking**

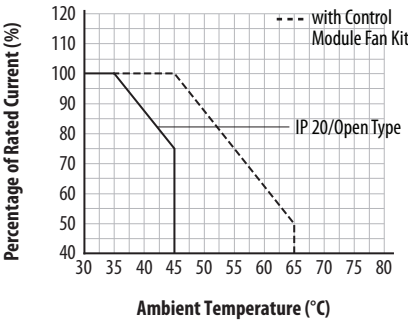



### Horizontal/Floor Mounting

**Single Drive**




**Zero Stacking**



*Derating Guidelines for High Altitude*

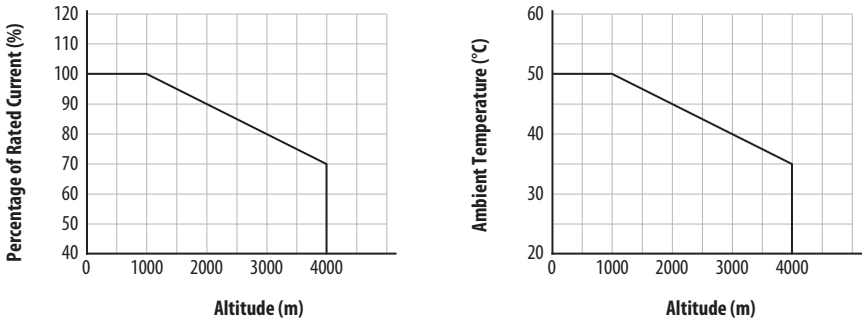
The drive can be used without derating at a maximum altitude of 1000 m (3300 ft). If the drive is used above 1000 m (3300 ft):

- Derate the maximum ambient temperature by 5 °C (9 °F) for every additional 1000 m (3300 ft), subject to limits listed in the Altitude Limit (Based on Voltage) table below.
  Or
- Derate the output current by 10% for every additional 1000 m (3300 ft), up to 3000 m (9900 ft), subject to limits listed in the Altitude Limit (Based on Voltage) table below.

**Altitude Limit (Based on Voltage)**

| Drive Rating | Center Ground (Wye Neutral) | Corner Ground, Impedance Ground, or Ungrounded |
|---|---|---|
| 100...120V 1-Phase | 6000 m | 6000 m |
| 200...240V 1-Phase | 2000 m | 2000 m |
| 200...240V 3-Phase | 6000 m | 2000 m |
| 380...480V 3-Phase | 4000 m | 2000 m |
| 525...600V 3-Phase | 2000 m | 2000 m |

**High Altitude**




## Debris Protection

Take precautions to prevent debris from falling through the vents of the drive housing during installation.

## Storage

- Store within an ambient temperature range of -40...85°C(1).
- Store within a relative humidity range of 0...95%, noncondensing.
- Do not expose to a corrosive atmosphere.

(1) The maximum ambient temperature for storing a Frame E drive is 70 °C.

# AC Supply Source Considerations

## Ungrounded Distribution Systems

**ATTENTION:** PowerFlex 520-series drives contain protective MOVs that are referenced to ground. These devices must be disconnected if the drive is installed on an ungrounded or resistive grounded distribution system.

**ATTENTION:** Removing MOVs in drives with an embedded filter will also disconnect the filter capacitor from earth ground.

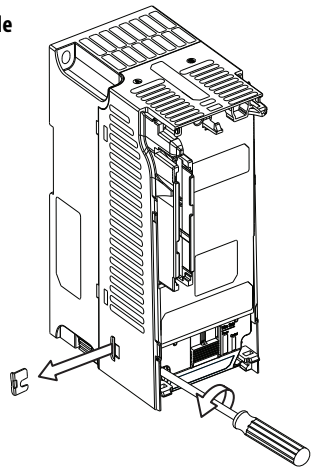
*Disconnecting MOVs*

To prevent drive damage, the MOVs connected to ground shall be disconnected if the drive is installed on an ungrounded distribution system (IT mains) where the line-to-ground voltages on any phase could exceed 125% of the nominal line-to-line voltage. To disconnect these devices, remove the jumper shown in the diagrams below.

1. Turn the screw counterclockwise to loosen.
2. Pull the jumper completely out of the drive chassis.
3. Tighten the screw to keep it in place.

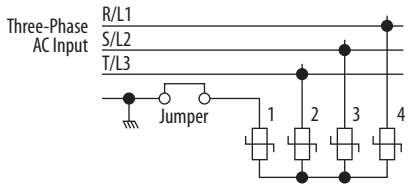
**Jumper Location (Typical)**

**Power Module**



**IMPORTANT** Tighten screw after jumper removal.

**Phase to Ground MOV Removal**



## Input Power Conditioning

The drive is suitable for direct connection to input power within the rated voltage of the drive (see page 169). Listed in the Input Power Conditions table below are certain input power conditions which may cause component damage or reduction in product life. If any of these conditions exist, install one of the devices listed under the heading Corrective Action on the line side of the drive.

**IMPORTANT** Only one device per branch circuit is required. It should be mounted closest to the branch and sized to handle the total current of the branch circuit.

**Input Power Conditions**

| Input Power Condition | Corrective Action |
|---|---|
| Low Line Impedance (less than 1% line reactance) | • Install Line Reactor(2)<br>• or Isolation Transformer |
| Greater than 120 kVA supply transformer | |
| Line has power factor correction capacitors | • Install Line Reactor(2)<br>• or Isolation Transformer |
| Line has frequent power interruptions | |
| Line has intermittent noise spikes in excess of 6000V (lightning) | |
| Phase to ground voltage exceeds 125% of normal line to line voltage | • Remove MOV jumper to ground.<br>• or Install Isolation Transformer with grounded secondary if necessary. |
| Ungrounded distribution system | |
| B-phase grounded distribution system | |
| 240V open delta configuration (stinger leg)(1) | • Install Line Reactor(2) |

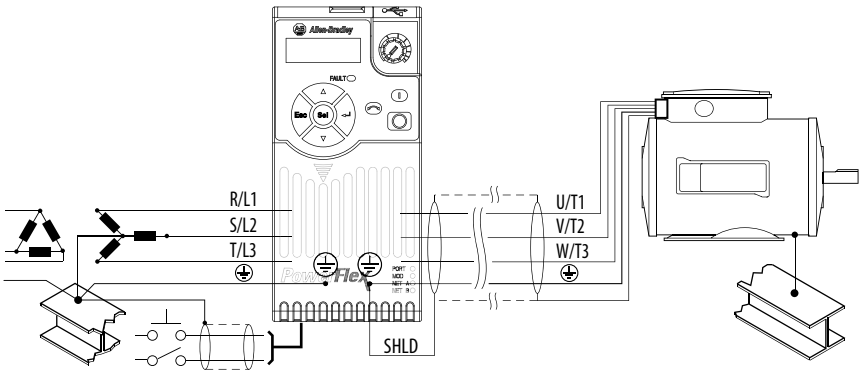
(1) For drives applied on an open delta with a middle phase grounded neutral system, the phase opposite the phase that is tapped in the middle to the neutral or earth is referred to as the "stinger leg," "high leg," "red leg," etc. This leg should be identified throughout the system with red or orange tape on the wire at each connection point. The stinger leg should be connected to the center Phase B on the reactor. See Bulletin 1321-3R Series Line Reactors on page 183 for specific line reactor part numbers.

(2) See Appendix B for accessory ordering information.

## General Grounding Requirements

The drive Safety Ground - ⏚ (PE) must be connected to system ground. Ground impedance must conform to the requirements of national and local industrial safety regulations and/or electrical codes. The integrity of all ground connections should be periodically checked.

**Typical Grounding**



## Ground Fault Monitoring

If a system ground fault monitor (RCD) is to be used, only Type B (adjustable) devices should be used to avoid nuisance tripping.

## Safety Ground - ⏚ (PE)

This is the safety ground for the drive that is required by code. One of these points must be connected to adjacent building steel (girder, joist), a floor ground rod or bus bar. Grounding points must comply with national and local industrial safety regulations and/or electrical codes.

## Network Ground

Connect terminal C1 to a clean earth ground when using a network with a star topology (EtherNet/IP) or daisy-chain (RS485). It is acceptable to ground both C1 and C2 terminals.

Connect terminal CS1 or CS2 to a clean ground when using a network with a ring topology (EtherNet/IP).

For more information on EtherNet/IP networks, see Ground Connections for EtherNet/IP Networks on page 248.

For more information on RS485 networks, see Network Wiring on page 201.

## Motor Ground

The motor ground must be connected to one of the ground terminals on the drive.

## Shield Termination - SHLD

Either of the safety ground terminals located on the power terminal block provides a grounding point for the motor cable shield. The **motor cable** shield connected to one of these terminals (drive end) should also be connected to the motor frame (motor end). Use a shield terminating or EMI clamp to connect the shield to the safety ground terminal. The earthing plate or conduit box option may be used with a cable clamp for a grounding point for the cable shield.

When shielded cable is used for **control and signal wiring**, the shield should be grounded at the source end only, not at the drive end.

## RFI Filter Grounding

Using a drive with filter may result in relatively high ground leakage currents. Therefore, the **filter must only be used in installations with grounded AC supply systems and be permanently installed and solidly grounded** (bonded) to the building power distribution ground. Ensure that the incoming supply neutral is solidly connected (bonded) to the same building power distribution ground. Grounding must not rely on flexible cables and should not include any form of plug or socket that would permit inadvertent disconnection. Some local codes may require redundant ground connections. The integrity of all connections should be periodically checked.

## Fuses and Circuit Breakers

The PowerFlex 520-series drive does not provide branch short circuit protection. This product should be installed with either input fuses or an input circuit breaker. National and local industrial safety regulations and/or electrical codes may determine additional requirements for these installations.

The tables found on pages 24...27 provide recommended AC line input fuse and circuit breaker information. See Fusing and Circuit Breakers below for UL and IEC requirements. Sizes listed are the recommended sizes based on 40 °C (104 °F) and the U.S. N.E.C. Other country, state or local codes may require different ratings.

### Fusing

The recommended fuse types are listed in the tables found on pages 24...27. If available current ratings do not match those listed in the tables provided, choose the next higher fuse rating.

- IEC – BS88 (British Standard) Parts 1 & 2(1), EN60269-1, Parts 1 & 2, type GG or equivalent should be used.
- UL – UL Class CC, T, RK1, or J should be used.

### Circuit Breakers

The "non-fuse" listings in the tables found on pages 24...27 include inverse time circuit breakers, instantaneous trip circuit breakers (motor circuit protectors) and 140M self-protected combination motor controllers. If one of these is chosen as the desired protection method, the following requirements apply:

- IEC – Both types of circuit breakers and 140M self-protected combination motor controllers are acceptable for IEC installations.
- UL – Only inverse time circuit breakers and the specified 140M self-protected combination motor controllers are acceptable for UL installations.

#### *Bulletin 140M (Self-Protected Combination Controller)/UL489 Circuit Breakers*

When using Bulletin 140M or UL489 rated circuit breakers, the guidelines listed below must be followed in order to meet the NEC requirements for branch circuit protection.

- Bulletin 140M can be used in single motor applications.
- Bulletin 140M can be used up stream from the drive **without** the need for fuses.

(1) Typical designations include, but may not be limited to the following; Parts 1 & 2: AC, AD, BC, BD, CD, DD, ED, EFS, EF, FF, FG, GF, GG, GH.

# Fuses and Circuit Breakers for PowerFlex 520-Series Drives

*100...120V 1-Phase Input Protection Devices – Frames A...B*

| Catalog No. | | Output Ratings | | | | | Input Ratings | | Frame Size | Contactor Catalog No. | IEC Applications (Non-UL) | | | | UL Applications | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| PF 523 | PF 525 | ND | | HD | | Amps | kVA | Max Amps(1) | | | Fuses (Rating) | | Circuit Breakers | | Fuses (Max. Rating) | Circuit Breakers | | Min. Enclosure Vol. (in.3) |
| | | HP | kW | HP | kW | | | | | | Min. | Max. | 140U/140G | 140M | Class / Catalog No. | 140U/140G | 140M(2)(3)(4) | |
| 25A-V1P6N104 | – | 0.25 | 0.2 | 0.25 | 0.2 | 1.6 | 0.8 | 6.4 | A | 100-C09 | 10 | 16 | 140U-D6D2-B80 | 140M-C2E-B63 | CLASS RK5, CC, J, or T / DLS-R-15 | 140U-D6D2-B80 | 140M-C2E-B63 | – |
| 25A-V2P5N104 | 25B-V2P5N104 | 0.5 | 0.4 | 0.5 | 0.4 | 2.5 | 1.3 | 9.6 | A | 100-C12 | 16 | 20 | 140U-D6D2-C12 | 140M-C2E-C10 | CLASS RK5, CC, J, or T / DLS-R-20 | 140U-D6C2-C12 | 140M-C2E-C10 | – |
| 25A-V4P8N104 | 25B-V4P8N104 | 1.0 | 0.75 | 1.0 | 0.75 | 4.8 | 2.5 | 19.2 | B | 100-C23 | 25 | 40 | 140U-D6D2-C25 | 140M-D8E-C20 | CLASS RK5, CC, J, or T / DLS-R-40 | 140U-D6D2-C25 | 140M-D8E-C20 | – |
| 25A-V6P0N104 | 25B-V6P0N104 | 1.5 | 1.1 | 1.5 | 1.1 | 6.0 | 3.2 | 24.0 | B | 100-C23 | 32 | 50 | 140U-D6D2-C30 | 140M-F8E-C25 | CLASS RK5, CC, J, or T / DLS-R-50 | 140U-D6D2-C30 | 140M-F8E-C25 | – |

*200...240V 1-Phase Input Protection Devices – Frames A...B*

| Catalog No. | | Output Ratings | | | | | Input Ratings | | Frame Size | Contactor Catalog No. | IEC Applications (Non-UL) | | | | UL Applications | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| PF 523 | PF 525 | ND | | HD | | Amps | kVA | Max Amps(1) | | | Fuses (Rating) | | Circuit Breakers | | Fuses (Max. Rating) | Circuit Breakers | | Min. Enclosure Vol. (in.3) |
| | | HP | kW | HP | kW | | | | | | Min. | Max. | 140U/140G | 140M | Class / Catalog No. | 140U/140G | 140M(2)(3)(4) | |
| 25A-A1P6N104 | – | 0.25 | 0.2 | 0.25 | 0.2 | 1.6 | 1.4 | 5.3 | A | 100-C09 | 6 | 10 | 140U-D6D2-C10 | 140M-C2E-B63 | CLASS RK5, CC, J, or T / DLS-R-15 | 140U-D6D2-C10 | 140M-C2E-B63 | – |
| 25A-A1P6N114 | – | 0.25 | 0.2 | 0.25 | 0.2 | 1.6 | 1.4 | 5.3 | A | 100-C09 | 6 | 10 | 140U-D6D2-C10 | 140M-C2E-B63 | CLASS RK5, CC, J, or T / DLS-R-15 | 140U-D6D2-C10 | 140M-C2E-B63 | – |
| 25A-A2P5N104 | 25B-A2P5N104 | 0.5 | 0.4 | 0.5 | 0.4 | 2.5 | 1.7 | 6.5 | A | 100-C09 | 10 | 16 | 140U-D6D2-C10 | 140M-C2E-C10 | CLASS RK5, CC, J, or T / DLS-R-15 | 140U-D6D2-C10 | 140M-C2E-C10 | – |
| 25A-A2P5N114 | 25B-A2P5N114 | 0.5 | 0.4 | 0.5 | 0.4 | 2.5 | 1.7 | 6.5 | A | 100-C09 | 10 | 16 | 140U-D6D2-C10 | 140M-C2E-C10 | CLASS RK5, CC, J, or T / DLS-R-15 | 140U-D6D2-C10 | 140M-C2E-C10 | – |
| 25A-A4P8N104 | 25B-A4P8N104 | 1.0 | 0.75 | 1.0 | 0.75 | 4.8 | 2.8 | 10.7 | A | 100-C12 | 16 | 25 | 140U-D6D2-C15 | 140M-C2E-C16 | CLASS RK5, CC, J, or T / DLS-R-25 | 140U-D6D2-C15 | 140M-C2E-C16 | – |
| 25A-A4P8N114 | 25B-A4P8N114 | 1.0 | 0.75 | 1.0 | 0.75 | 4.8 | 2.8 | 10.7 | A | 100-C12 | 16 | 25 | 140U-D6D2-C15 | 140M-C2E-C16 | CLASS RK5, CC, J, or T / DLS-R-25 | 140U-D6D2-C15 | 140M-C2E-C16 | – |
| 25A-A8P0N104 | 25B-A8P0N104 | 2.0 | 1.5 | 2.0 | 1.5 | 8.0 | 4.8 | 18.0 | B | 100-C23 | 25 | 40 | 140U-D6D2-C25 | 140M-F8E-C25 | CLASS CC, J, or T / 40 | 140U-D6D2-C25 | 140M-F8E-C25 | – |
| 25A-A8P0N114 | 25B-A8P0N114 | 2.0 | 1.5 | 2.0 | 1.5 | 8.0 | 4.8 | 18.0 | B | 100-C23 | 25 | 40 | 140U-D6D2-C25 | 140M-F8E-C25 | CLASS CC, J, or T / 40 | 140U-D6D2-C25 | 140M-F8E-C25 | – |
| 25A-A011N104 | 25B-A011N104 | 3.0 | 2.2 | 3.0 | 2.2 | 11.0 | 6.0 | 22.9 | B | 100-C37 | 32 | 50 | 140G-G6C3-C35 | 140M-F8E-C25 | CLASS CC, J, or T / 50 | –(5) | 140M-F8E-C25 | – |
| 25A-A011N114 | 25B-A011N114 | 3.0 | 2.2 | 3.0 | 2.2 | 11.0 | 6.0 | 22.9 | B | 100-C37 | 32 | 50 | 140G-G6C3-C35 | 140M-F8E-C25 | CLASS CC, J, or T / 50 | –(5) | 140M-F8E-C25 | – |

(1) When the drive is controlling motors with lower amp ratings, refer to the drive nameplate for drive input current rating.

(2) The AIC ratings of the Bulletin 140M Motor Protector Circuit Breakers may vary. See Bulletin 140M Motor Protection Circuit Breakers Application Ratings.

(3) Bulletin 140M with adjustable current range should have the current trip set to the minimum range that the device will not trip.

(4) Manual Self-Protected (Type E) Combination Motor Controller, UL listed for 480Y/277 and 600Y/347 AC input. Not UL listed for use on 480V or 600V Delta/Delta, corner ground, or high-resistance ground systems.

(5) Circuit breaker selection is not available for this drive rating.

## Fuses and Circuit Breakers for PowerFlex 520-Series Drives *(continued)*

*200...240V 3-Phase Input Protection Devices – Frames A...E*

| Catalog No.[1] | | Output Ratings | | | | | Input Ratings | | Frame Size | Contactor Catalog No. | IEC Applications (Non-UL) | | | | UL Applications | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| PF 523 | PF 525 | ND | | HD | | Amps | kVA | Max Amps[2] | | | Fuses (Rating) | | Circuit Breakers | | Fuses (Max. Rating) | Circuit Breakers | | Min. Enclosure Vol. (in.$^3$) |
| | | HP | kW | HP | kW | | | | | | Min. | Max. | 140U/140G | 140M | Class / Catalog No. | 140U/140G | 140M[3][4][5] | |
| 25A-B1P6N104 | – | 0.25 | 0.2 | 0.25 | 0.2 | 1.6 | 0.9 | 1.9 | A | 100-C09 | 3 | 6 | 140U-D6D3-B30 | 140M-C2E-B25 | CLASS RK5, CC, J, or T / DLS-R-15 | 140U-D6D3-B30 | 140M-C2E-B25 | – |
| 25A-B2P5N104 | 25B-B2P5N104 | 0.5 | 0.4 | 0.5 | 0.4 | 2.5 | 1.2 | 2.7 | A | 100-C09 | 6 | 6 | 140U-D6D3-B40 | 140M-C2E-B40 | CLASS RK5, CC, J, or T / DLS-R-6 | 140U-D6D3-B40 | 140M-C2E-B40 | – |
| 25A-B5P0N104 | 25B-B5P0N104 | 1.0 | 0.75 | 1.0 | 0.75 | 5.0 | 2.7 | 5.8 | A | 100-C09 | 10 | 16 | 140U-D6D3-B80 | 140M-C2E-B63 | CLASS RK5, CC, J, or T / DLS-R-15 | 140U-D6D3-B80 | 140M-C2E-B63 | – |
| 25A-B8P0N104 | 25B-B8P0N104 | 2.0 | 1.5 | 2.0 | 1.5 | 8.0 | 4.3 | 9.5 | A | 100-C12 | 16 | 20 | 140U-D6D3-C10 | 140M-C2E-C10 | CLASS RK5, CC, J, or T / DLS-R-20 | 140U-D6D3-C10 | 140M-C2E-C10 | – |
| 25A-B011N104 | 25B-B011N104 | 3.0 | 2.2 | 3.0 | 2.2 | 11.0 | 6.3 | 13.8 | A | 100-C23 | 20 | 32 | 140U-D6D3-C15 | 140M-C2E-C16 | CLASS RK5, CC, J, or T / DLS-R-30 | 140U-D6D3-C15 | 140M-C2E-C16 | – |
| 25A-B017N104 | 25B-B017N104 | 5.0 | 4.0 | 5.0 | 4.0 | 17.5 | 9.6 | 21.1 | B | 100-C23 | 32 | 45 | 140U-D6D3-C25 | 140M-F8E-C25 | CLASS CC, J, or T / 45 | 140U-D6D3-C25 | 140M-F8E-C25 | – |
| 25A-B024N104 | 25B-B024N104 | 7.5 | 5.5 | 7.5 | 5.5 | 24.0 | 12.2 | 26.6 | C | 100-C37 | 35 | 63 | 140G-G6C3-C35 | 140M-F8E-C32 | CLASS CC, J, or T / 60 | –[7] | 140M-F8E-C32 | – |
| 25A-B032N104 | 25B-B032N104 | 10.0 | 7.5 | 10.0 | 7.5 | 32.2 | 15.9 | 34.8 | D | 100-C43 | 45 | 70 | 140G-G6C3-C60 | 140M-F8E-C45 | CLASS RK5, CC, J, or T / DLS-R-70 | –[7] | 140M-F8E-C45 | – |
| 25A-B048N104 | 25B-B048N104 | 15.0 | 11.0 | 10.0 | 7.5 | 48.3 | 20.1 | 44.0 | E | 100-C60 | 63 | 90 | 140G-G6C3-C70 | 140M-F8E-C45 | CLASS CC, J, or T / 90 | –[7] | 140M-F8E-C45 | 1416.0[6] |
| 25A-B062N104 | 25B-B062N104 | 20.0 | 15.0 | 15.0 | 11.0 | 62.1 | 25.6 | 56.0 | E | 100-C72 | 70 | 125 | 140G-G6C3-C90 | –[7] | CLASS CC, J, or T / 125 | –[7] | –[7] | – |

(1) Normal Duty (ND) and Heavy Duty (HD) ratings are available for this drive.

(2) When the drive is controlling motors with lower amp ratings, refer to the drive nameplate for drive input current rating.

(3) The AIC ratings of the Bulletin 140M Motor Protector Circuit Breakers may vary. See Bulletin 140M Motor Protection Circuit Breakers Application Ratings.

(4) Bulletin 140M with adjustable current range should have the current trip set to the minimum range that the device will not trip.

(5) Manual Self-Protected (Type E) Combination Motor Controller, UL listed for 480Y/277 and 600Y/347 AC input. Not UL listed for use on 480V or 600V Delta/Delta, corner ground, or high-resistance ground systems.

(6) When using a Manual Self-Protected (Type E) Combination Motor Controller with this drive power rating, the drive must be installed in a ventilated or non-ventilated enclosure with the minimum volume specified in this column. Application specific thermal considerations may require a larger enclosure.

(7) Circuit breaker selection is not available for this drive rating.

## Fuses and Circuit Breakers for PowerFlex 520-Series Drives *(continued)*

*380...480V 3-Phase Input Protection Devices – Frames A...E*

| Catalog No.[1] | | Output Ratings | | | | | Input Ratings | | Frame Size | Contactor Catalog No. | IEC Applications (Non-UL) | | | | UL Applications | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| PF 523 | PF 525 | ND | | HD | | Amps | kVA | Max Amps[2] | | | Fuses (Rating) | | Circuit Breakers | | Fuses (Max. Rating) | Circuit Breakers | | Min. Enclosure Vol. (in.$^3$) |
| | | HP | kW | HP | kW | | | | | | Min. | Max. | 140U/140G | 140M | Class / Catalog No. | 140U/140G | 140M[3][4][5] | |
| 25A-D1P4N104 | 25B-D1P4N104 | 0.5 | 0.4 | 0.5 | 0.4 | 1.4 | 1.7 | 1.9 | A | 100-C09 | 3 | 6 | 140U-D6D3-B30 | 140M-C2E-B25 | CLASS RK5, CC, J, or T / DLS-R-6 | –[7] | 140M-C2E-B25 | – |
| 25A-D1P4N114 | 25B-D1P4N114 | 0.5 | 0.4 | 0.5 | 0.4 | 1.4 | 1.7 | 1.9 | A | 100-C09 | 3 | 6 | 140U-D6D3-B30 | 140M-C2E-B25 | CLASS RK5, CC, J, or T / DLS-R-6 | –[7] | 140M-C2E-B25 | – |
| 25A-D2P3N104 | 25B-D2P3N104 | 1.0 | 0.75 | 1.0 | 0.75 | 2.3 | 2.9 | 3.2 | A | 100-C09 | 6 | 10 | 140U-D6D3-B60 | 140M-C2E-B40 | CLASS RK5, CC, J, or T / DLS-R-10 | –[7] | 140M-C2E-B40 | – |
| 25A-D2P3N114 | 25B-D2P3N114 | 1.0 | 0.75 | 1.0 | 0.75 | 2.3 | 2.9 | 3.2 | A | 100-C09 | 6 | 10 | 140U-D6D3-B60 | 140M-C2E-B40 | CLASS RK5, CC, J, or T / DLS-R-10 | –[7] | 140M-C2E-B40 | – |
| 25A-D4P0N104 | 25B-D4P0N104 | 2.0 | 1.5 | 2.0 | 1.5 | 4.0 | 5.2 | 5.7 | A | 100-C09 | 10 | 16 | 140U-D6D3-B60 | 140M-C2E-B63 | CLASS RK5, CC, J, or T / DLS-R-15 | –[7] | 140M-C2E-B63 | – |
| 25A-D4P0N114 | 25B-D4P0N114 | 2.0 | 1.5 | 2.0 | 1.5 | 4.0 | 5.2 | 5.7 | A | 100-C09 | 10 | 16 | 140U-D6D3-B60 | 140M-C2E-B63 | CLASS RK5, CC, J, or T / DLS-R-15 | –[7] | 140M-C2E-B63 | – |
| 25A-D6P0N104 | 25B-D6P0N104 | 3.0 | 2.2 | 3.0 | 2.2 | 6.0 | 6.9 | 7.5 | A | 100-C09 | 10 | 16 | 140U-D6D3-C10 | 140M-C2E-C10 | CLASS RK5, CC, J, or T / DLS-R-15 | –[7] | 140M-C2E-C10 | – |
| 25A-D6P0N114 | 25B-D6P0N114 | 3.0 | 2.2 | 3.0 | 2.2 | 6.0 | 6.9 | 7.5 | A | 100-C09 | 10 | 16 | 140U-D6D3-C10 | 140M-C2E-C10 | CLASS RK5, CC, J, or T / DLS-R-15 | –[7] | 140M-C2E-C10 | – |
| 25A-D010N104 | 25B-D010N104 | 5.0 | 4.0 | 5.0 | 4.0 | 10.5 | 12.6 | 13.8 | B | 100-C23 | 20 | 32 | 140U-D6D3-C15 | 140M-C2E-C16 | CLASS RK5, CC, J, or T / DLS-R-30 | –[7] | 140M-C2E-C16 | – |
| 25A-D010N114 | 25B-D010N114 | 5.0 | 4.0 | 5.0 | 4.0 | 10.5 | 12.6 | 13.8 | B | 100-C23 | 20 | 32 | 140U-D6D3-C15 | 140M-C2E-C16 | CLASS RK5, CC, J, or T / DLS-R-30 | –[7] | 140M-C2E-C16 | – |
| 25A-D013N104 | 25B-D013N104 | 7.5 | 5.5 | 7.5 | 5.5 | 13.0 | 14.1 | 15.4 | C | 100-C23 | 20 | 35 | 140U-D6D3-C25 | 140M-D8E-C20 | CLASS CC, J, or T / 35 | –[7] | 140M-D8E-C20 | – |
| 25A-D013N114 | 25B-D013N114 | 7.5 | 5.5 | 7.5 | 5.5 | 13.0 | 14.1 | 15.4 | C | 100-C23 | 20 | 35 | 140U-D6D3-C25 | 140M-D8E-C20 | CLASS CC, J, or T / 35 | –[7] | 140M-D8E-C20 | – |
| 25A-D017N104 | 25B-D017N104 | 10.0 | 7.5 | 10.0 | 7.5 | 17.0 | 16.8 | 18.4 | C | 100-C23 | 25 | 40 | 140U-D6D3-C25 | 140M-D8E-C20 | CLASS CC, J, or T / 40 | –[7] | 140M-D8E-C20 | – |
| 25A-D017N114 | 25B-D017N114 | 10.0 | 7.5 | 10.0 | 7.5 | 17.0 | 16.8 | 18.4 | C | 100-C23 | 25 | 40 | 140U-D6D3-C25 | 140M-D8E-C20 | CLASS CC, J, or T / 40 | –[7] | 140M-D8E-C20 | – |
| 25A-D024N104 | 25B-D024N104 | 15.0 | 11.0 | 15.0 | 11.0 | 24.0 | 24.1 | 26.4 | D | 100-C37 | 35 | 63 | 140G-G6C3-C40 | 140M-F8E-C32 | CLASS CC, J, or T / 60 | –[7] | 140M-F8E-C32 | 656.7[6] |
| 25A-D024N114 | 25B-D024N114 | 15.0 | 11.0 | 15.0 | 11.0 | 24.0 | 24.1 | 26.4 | D | 100-C37 | 35 | 63 | 140G-G6C3-C40 | 140M-F8E-C32 | CLASS CC, J, or T / 60 | –[7] | 140M-F8E-C32 | 656.7[6] |
| 25A-D030N104 | 25B-D030N104 | 20.0 | 15.0 | 15.0 | 11.0 | 30.0 | 30.2 | 33.0 | D | 100-C43 | 45 | 70 | 140G-G6C3-C50 | 140M-F8E-C45 | CLASS CC, J, or T / 70 | –[7] | 140M-F8E-C45 | 656.7[6] |
| 25A-D030N114 | 25B-D030N114 | 20.0 | 15.0 | 15.0 | 11.0 | 30.0 | 30.2 | 33.0 | D | 100-C43 | 45 | 70 | 140G-G6C3-C50 | 140M-F8E-C45 | CLASS CC, J, or T / 70 | –[7] | 140M-F8E-C45 | 656.7[6] |
| 25A-D037N114 | 25B-D037N114 | 25.0 | 18.5 | 20.0 | 15.0 | 37.0 | 30.8 | 33.7 | E | 100-C43 | 45 | 70 | 140G-G6C3-C50 | 140M-F8E-C45 | CLASS CC, J, or T / 70 | –[7] | 140M-F8E-C45 | – |
| 25A-D043N114 | 25B-D043N114 | 30.0 | 22.0 | 25.0 | 18.5 | 43.0 | 35.6 | 38.9 | E | 100-C60 | 50 | 80 | 140G-G6C3-C60 | 140M-F8E-C45 | CLASS CC, J, or T / 80 | –[7] | 140M-F8E-C45 | – |

(1) Normal Duty (ND) and Heavy Duty (HD) ratings are available for this drive.

(2) When the drive is controlling motors with lower amp ratings, refer to the drive nameplate for drive input current rating.

(3) The AIC ratings of the Bulletin 140M Motor Protector Circuit Breakers may vary. See Bulletin 140M Motor Protection Circuit Breakers Application Ratings.

(4) Bulletin 140M with adjustable current range should have the current trip set to the minimum range that the device will not trip.

(5) Manual Self-Protected (Type E) Combination Motor Controller, UL listed for 480Y/277 and 600Y/347 AC input. Not UL listed for use on 480V or 600V Delta/Delta, corner ground, or high-resistance ground systems.

(6) When using a Manual Self-Protected (Type E) Combination Motor Controller with this drive power rating, the drive must be installed in a ventilated or non-ventilated enclosure with the minimum volume specified in this column. Application specific thermal considerations may require a larger enclosure.

(7) Circuit breaker selection is not available for this drive rating.

## Fuses and Circuit Breakers for PowerFlex 520-Series Drives *(continued)*

*525...600V 3-Phase Input Protection Devices – Frames A...E*

| Catalog No.[1] | | Output Ratings | | | | | Input Ratings | | Frame Size | Contactor Catalog No. | IEC Applications (Non-UL) | | | | UL Applications | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| PF 523 | PF 525 | ND | | HD | | Amps | kVA | Max Amps[2] | | | Fuses (Rating) | | Circuit Breakers | | Fuses (Max. Rating) | Circuit Breakers | | Min. Enclosure Vol. (in.$^3$) |
| | | HP | kW | HP | kW | | | | | | Min. | Max. | 140U/140G | 140M | Class / Catalog No. | 140U/140G | 140M[3][4][5] | |
| 25A-E0P9N104 | 25B-E0P9N104 | 0.5 | 0.4 | 0.5 | 0.4 | 0.9 | 1.4 | 1.2 | A | 100-C09 | 3 | 6 | 140U-D6D3-B20 | 140M-C2E-B25 | CLASS RK5, CC, J, or T / DLS-R-6 | –[8] | 140M-C2E-B25 | – |
| 25A-E1P7N104 | 25B-E1P7N104 | 1.0 | 0.75 | 1.0 | 0.75 | 1.7 | 2.6 | 2.3 | A | 100-C09 | 3 | 6 | 140U-D6D3-B30 | 140M-C2E-B25 | CLASS RK5, CC, J, or T / DLS-R-6 | –[8] | 140M-C2E-B25 | – |
| 25A-E3P0N104 | 25B-E3P0N104 | 2.0 | 1.5 | 2.0 | 1.5 | 3.0 | 4.3 | 3.8 | A | 100-C09 | 6 | 10 | 140U-D6D3-B50 | 140M-C2E-B40 | CLASS RK5, CC, J, or T / DLS-R-10 | –[8] | 140M-C2E-B40 | – |
| 25A-E4P2N104 | 25B-E4P2N104 | 3.0 | 2.2 | 3.0 | 2.2 | 4.2 | 6.1 | 5.3 | A | 100-C09 | 10 | 16 | 140U-D6D3-B80 | 140M-C2E-B63 | CLASS RK5, CC, J, or T / DLS-R-15 | –[8] | 140M-D8E-B63 | – |
| 25A-E6P6N104 | 25B-E6P6N104 | 5.0 | 4.0 | 5.0 | 4.0 | 6.6 | 9.1 | 8.0 | B | 100-C09 | 10 | 20 | 140U-D6D3-C10 | 140M-C2E-C10 | CLASS RK5, CC, J, or T / DLS-R-20 | –[8] | 140M-D8E-C10 | – |
| 25A-E9P9N104 | 25B-E9P9N104 | 7.5 | 5.5 | 7.5 | 5.5 | 9.9 | 12.8 | 11.2 | C | 100-C16 | 16 | 25 | 140U-D6D3-C15 | 140M-C2E-C16 | CLASS RK5, CC, J, or T / DLS-R-25 | –[8] | 140M-D8E-C16[6] | – |
| 25A-E012N104 | 25B-E012N104 | 10.0 | 7.5 | 10.0 | 7.5 | 12.0 | 15.4 | 13.5 | C | 100-C23 | 20 | 32 | 140U-D6D3-C20 | 140M-C2E-C16 | CLASS RK5, CC, J, or T / DLS-R-30 | –[8] | 140M-D8E-C16 | – |
| 25A-E019N104 | 25B-E019N104 | 15.0 | 11.0 | 15.0 | 11.0 | 19.0 | 27.4 | 24.0 | D | 100-C30 | 32 | 50 | 140G-G6C3-C30 | 140M-F8E-C25 | CLASS CC, J, or T / 50 | –[8] | 140M-F8E-C25 | 656.7[7] |
| 25A-E022N104 | 25B-E022N104 | 20.0 | 15.0 | 15.0 | 11.0 | 22.0 | 31.2 | 27.3 | D | 100-C30 | 35 | 63 | 140G-G6C3-C35 | 140M-F8E-C32 | CLASS CC, J, or T / 60 | –[8] | 140M-F8E-C32 | 656.7[7] |
| 25A-E027N104 | 25B-E027N104 | 25.0 | 18.5 | 20.0 | 15.0 | 27.0 | 28.2 | 24.7 | E | 100-C30 | 35 | 50 | 140G-G6C3-C35 | 140M-F8E-C32 | CLASS CC, J, or T / 50 | –[8] | 140M-F8E-C32 | 1416.0[7] |
| 25A-E032N104 | 25B-E032N104 | 30.0 | 22.0 | 25.0 | 18.5 | 32.0 | 33.4 | 29.2 | E | 100-C37 | 40 | 63 | 140G-G6C3-C50 | 140M-F8E-C32 | CLASS CC, J, or T / 60 | –[8] | 140M-F8E-C32 | 1416.0[7] |

(1) Normal Duty (ND) and Heavy Duty (HD) ratings are available for this drive.
(2) When the drive is controlling motors with lower amp ratings, refer to the drive nameplate for drive input current rating.
(3) The AIC ratings of the Bulletin 140M Motor Protector Circuit Breakers may vary. See Bulletin 140M Motor Protection Circuit Breakers Application Ratings.
(4) Bulletin 140M with adjustable current range should have the current trip set to the minimum range that the device will not trip.
(5) Manual Self-Protected (Type E) Combination Motor Controller, UL listed for 480Y/277 and 600Y/347 AC input. Not UL listed for use on 480V or 600V Delta/Delta, corner ground, or high-resistance ground systems.
(6) When used with the 140M circuit breaker, the 25A-E9P9104 must be installed in a ventilated or non-ventilated enclosure with the minimum size of 457.2 x 457.2 x 269.8 mm (18 x 18 x 10.62 in.).
(7) When using a Manual Self-Protected (Type E) Combination Motor Controller with this drive power rating, the drive must be installed in a ventilated or non-ventilated enclosure with the minimum volume specified in this column. Application specific thermal considerations may require a larger enclosure.
(8) Circuit breaker selection is not available for this drive rating.

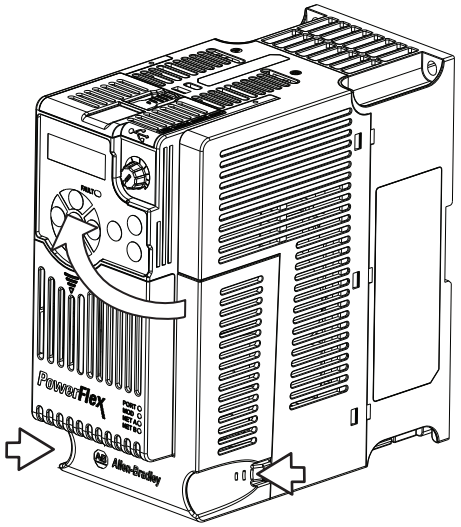
## Power and Control Module

PowerFlex 520-series drives consist of a Power Module and Control Module.

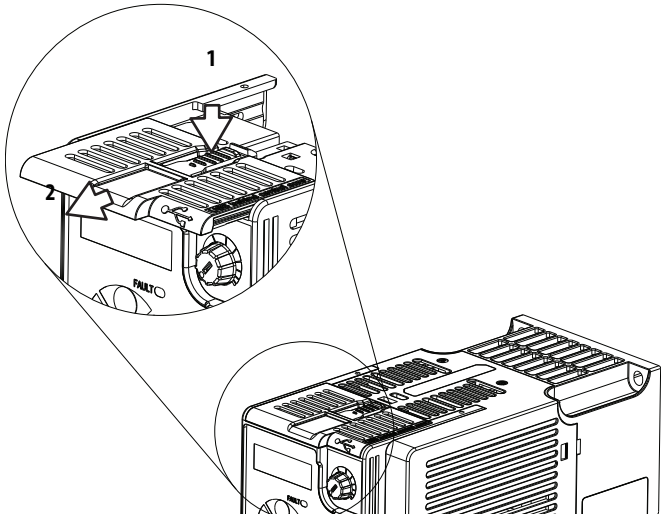
*Separating the Power and Control Module*

**ATTENTION:** Perform this action only when drive is NOT powered.

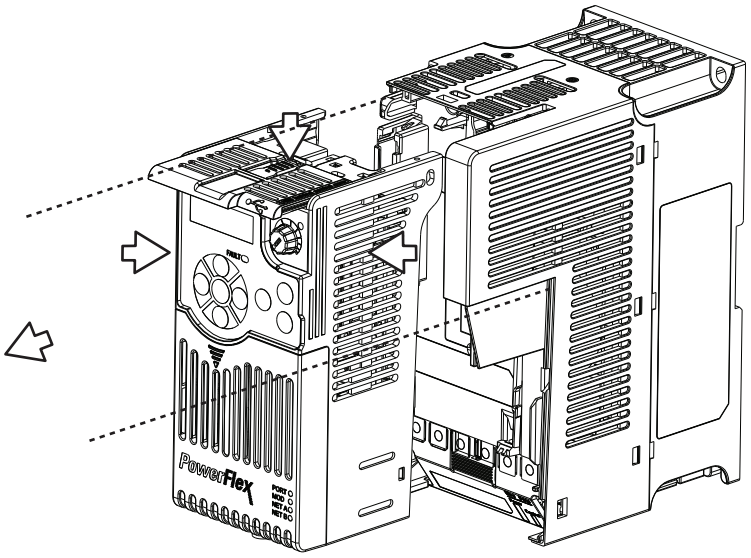
1. Press and hold down the catch on both sides of the frame cover, then pull out and swing upwards to remove (Frames B...E only).




2. Press down and slide out the top cover of the Control Module to unlock it from the Power Module.

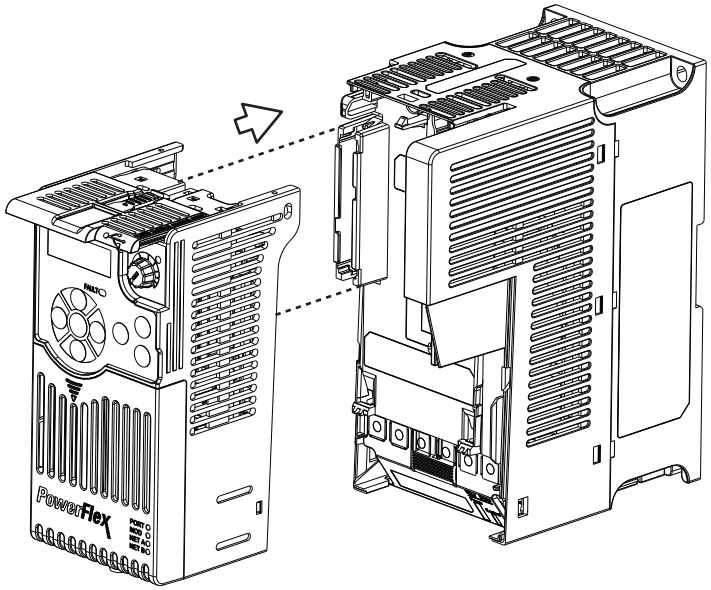


3. Hold the sides and top of the Control Module firmly, then pull out to separate it from the Power Module.

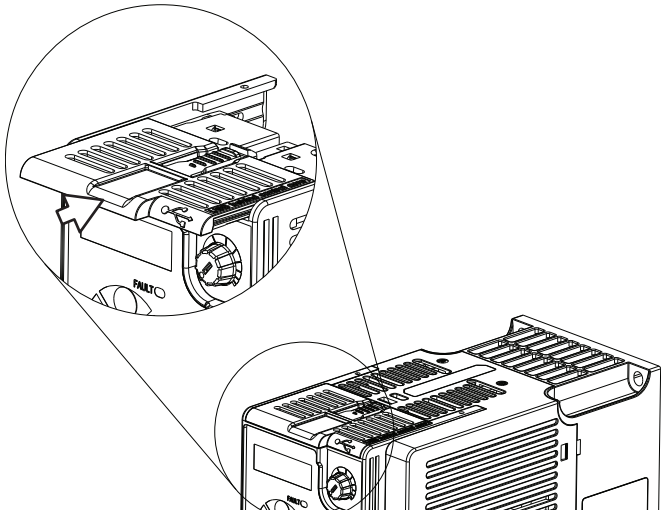


*Connecting the Power and Control Module*

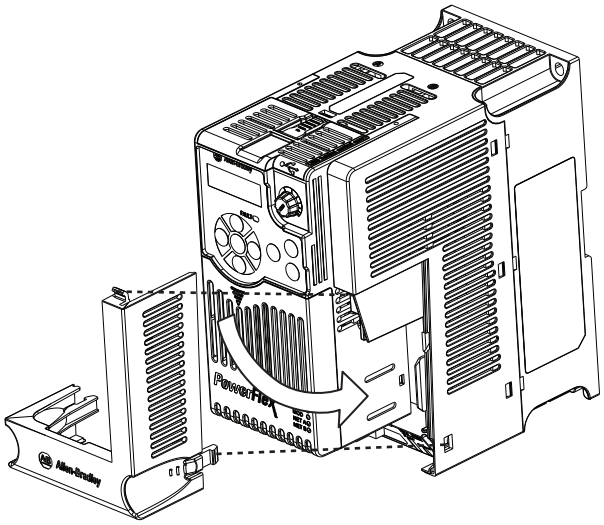
1. Align the connectors on the Power Module and Control Module, then push the Control Module firmly onto the Power Module.



2. Push the top cover of the Control Module towards the Power Module to lock it.



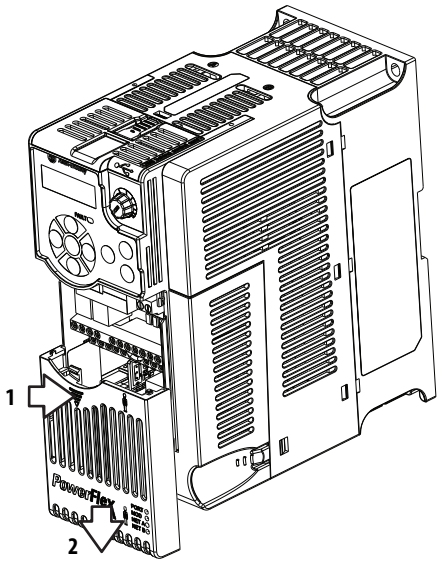

3. Insert the catch at the top of the frame cover into the Power Module, then swing the frame cover to snap the side catches onto the Power Module (Frames B...E only).



## Control Module Cover

To access the control terminals, DSI port, and Ethernet port, the front cover must be removed. To remove:

1. Press and hold down the arrow on the front of the cover.
2. Slide the front cover down to remove from the Control Module.

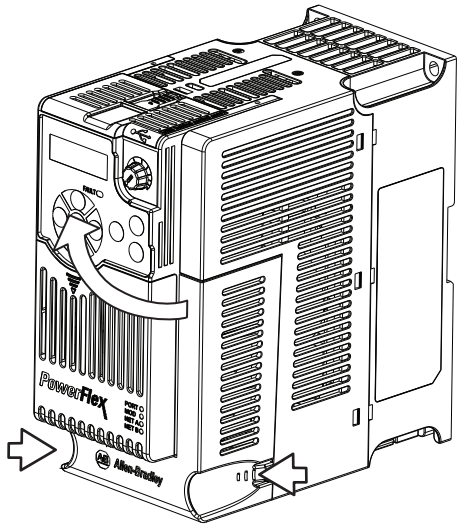



Re-attach the front cover when wiring is complete.

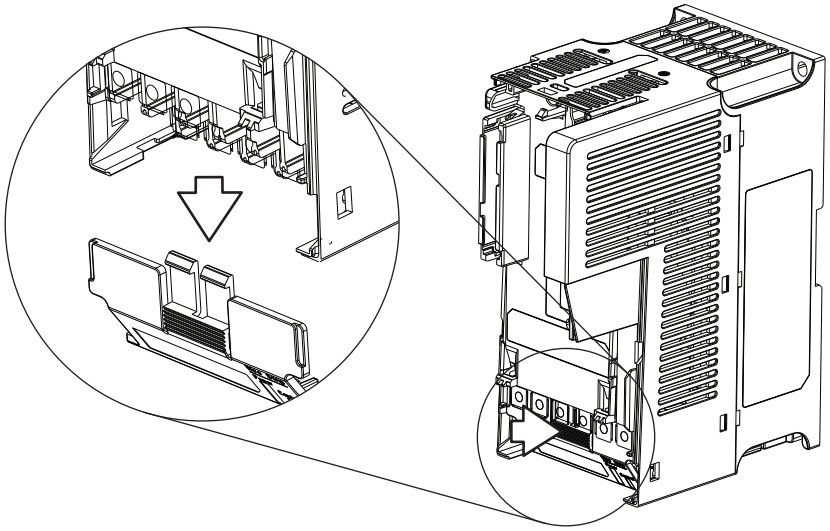
## Power Module Terminal Guard

To access the power terminals, the terminal guard must be removed. To remove:

1. Press and hold down the catch on both sides of the frame cover, then pull out and swing upwards to remove (Frames B...E only).



2. Press and hold down the locking tab on the terminal guard.
3. Slide the terminal guard down to remove from the Power Module.



Re-attach the terminal guard when wiring is complete.

To access the power terminals for Frame A, you need to separate the Power and Control Modules. See Separating the Power and Control Module on page 28 for instructions.

## Power Wiring

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

**ATTENTION:** To avoid a possible shock hazard caused by induced voltages, unused wires in the conduit must be grounded at both ends. For the same reason, if a drive sharing a conduit is being serviced or installed, all drives using this conduit should be disabled. This will help minimize the possible shock hazard from "cross coupled" power leads.

### Motor Cable Types Acceptable for 100...600 Volt Installations

A variety of cable types are acceptable for drive installations. For many installations, unshielded cable is adequate, provided it can be separated from sensitive circuits. As an approximate guide, allow a spacing of 0.3 m (1 ft) for every 10 m (32.8 ft) of length. In all cases, long parallel runs must be avoided. Do not use cable with an insulation thickness less than 15 mils (0.4 mm/0.015 in.). Do not route more than three sets of motor leads in a single conduit to minimize "cross talk". If more than three drive/motor connections per conduit are required, shielded cable must be used.

UL installations above 50 °C ambient must use 600V, 90 °C wire.
UL installations in 50 °C ambient must use 600V, 75 °C or 90 °C wire.
UL installations in 40 °C ambient should use 600V, 75 °C or 90 °C wire.
Use copper wire only. Wire gauge requirements and recommendations are based on 75 °C. Do not reduce wire gauge when using higher temperature wire.

**WARNING:** The distance between the drive and motor must not exceed the maximum cable length stated in the Motor Cable Length Restrictions Tables in "Wiring and Grounding Guide, (PWM) AC Drives," publication DRIVES-IN001.

*Unshielded*

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

**ATTENTION:** Do not use THHN or similarly coated wire in wet areas.

*Shielded/Armored Cable*

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

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

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

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

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

**Recommended Shielded Wire**

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

## Reflected Wave Protection

The drive should be installed as close to the motor as possible. Installations with long motor cables may require the addition of external devices to limit voltage reflections at the motor (reflected wave phenomena). Refer to Reflected Wave in "Wiring and Grounding Guide, (PWM) AC Drives," publication DRIVES-IN001.

The reflected wave data applies to all carrier frequencies 2...16 kHz.

For 240V ratings and lower, reflected wave effects do not need to be considered.

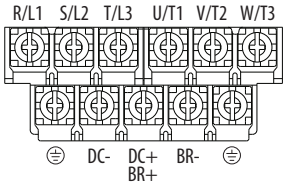
## Output Disconnect

The drive is intended to be commanded by control input signals that will start and stop the motor. A device that routinely disconnects then reapplies output power to the motor for the purpose of starting and stopping the motor should not be used. If it is necessary to disconnect power to the motor with the drive outputting power, an auxiliary contact should be used to simultaneously disable drive (Aux Fault or Coast to Stop).

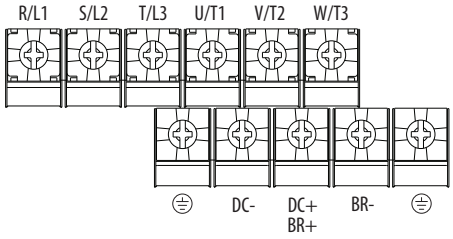
# Power Terminal Block

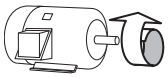
### Power Terminal Block

**Frame A, B, C & D**




**Frame E**




| Terminal | Description |
|---|---|
| R/L1, S/L2 | 1-Phase Input Line Voltage Connection |
| R/L1, S/L2, T/L3 | 3-Phase Input Line Voltage Connection |
| U/T1, V/T2, W/T3 | Motor Phase Connection =  Switch any two motor leads to change forward direction. |
| DC+, DC- | DC Bus Connection (except for 110V 1-Phase) |
| BR+, BR- | Dynamic Brake Resistor Connection |
| ⏚ | Safety Ground - PE |

**IMPORTANT** Terminal screws may become loose during shipment. Ensure that all terminal screws are tightened to the recommended torque before applying power to the drive.

### Power Terminal Block Wire Specifications

| Frame | Maximum Wire Size(1) | Minimum Wire Size(1) | Torque |
|---|---|---|---|
| A | 5.3 $mm^2$ (10 AWG) | 0.8 $mm^2$ (18 AWG) | 1.76...2.16 Nm (15.6...19.1 lb-in.) |
| B | 8.4 $mm^2$ (8 AWG) | 2.1 $mm^2$ (14 AWG) | 1.76...2.16 Nm (15.6...19.1 lb-in.) |
| C | 8.4 $mm^2$ (8 AWG) | 2.1 $mm^2$ (14 AWG) | 1.76...2.16 Nm (15.6...19.1 lb-in.) |
| D | 13.3 $mm^2$ (6 AWG) | 5.3 $mm^2$ (10 AWG) | 1.76...2.16 Nm (15.6...19.1 lb-in.) |
| E | 26.7 $mm^2$ (3 AWG) | 8.4 $mm^2$ (8 AWG) | 3.09...3.77 Nm (27.3...33.4 lb-in.) |

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

## Common Bus/Precharge Notes

If drives are used with a disconnect switch to the common DC bus, then an auxiliary contact on the disconnect must be connected to a digital input of the drive. The corresponding input (parameter t062, t063, t065...t068 [DigIn TermBlk xx]) must be set to 30, "Precharge En" This provides the proper precharge interlock, guarding against possible damage to the drive when connected to a common DC bus. For more information, see Drives in Common Bus Configurations, publication DRIVES-AT002.

## I/O Wiring

### Motor Start/Stop Precautions

**ATTENTION:** A contactor or other device that routinely disconnects and reapplies the AC line to the drive to start and stop the motor can cause drive hardware damage. The drive is designed to use control input signals that will start and stop the motor. If used, the input device must not exceed one operation per minute or drive damage can occur.

**ATTENTION:** The drive start/stop control circuitry includes solid-state components. If hazards due to accidental contact with moving machinery or unintentional flow of liquid, gas or solids exist, an additional hardwired stop circuit may be required to remove the AC line to the drive. When the AC line is removed, there will be a loss of any inherent regenerative braking effect that might be present - the motor will coast to a stop. An auxiliary braking method may be required. Alternatively, use the drive's safety input function.

Important points to remember about I/O wiring:

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

**IMPORTANT** I/O terminals labeled "Common" are not referenced to the safety ground (PE) terminal and are designed to greatly reduce common mode interference.

**ATTENTION:** Driving the 4-20 mA analog input from a voltage source could cause component damage. Verify proper configuration prior to applying input signals.

### Signal and Control Wire Types

Recommendations are for 50 °C ambient temperature.
75 °C wire must be used for 60 °C ambient temperature.
90 °C wire must be used for 70 °C ambient temperature.

**Recommended Signal Wire**

| Signal Type/ Where Used | Belden Wire Type(s)[1] *(or equivalent)* | Description | Min. Insulation Rating |
|---|---|---|---|
| Analog I/O & PTC | 8760/9460 | 0.750 $mm^2$ (18 AWG), twisted pair, 100% shield with drain[2] | 300V, 60 °C (140 °F) |
| Remote Pot | 8770 | 0.750 $mm^2$ (18 AWG), 3 conductor, shielded | |
| Encoder/Pulse I/O | 9728/9730 | 0.196 $mm^2$ (24 AWG), individually shielded pairs | |

(1) Stranded or solid wire.

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

**Recommended Control Wire for Digital I/O**

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

## Maximum Control Wire Recommendations

Do not exceed control wiring length of 30 m (100 ft). Control signal cable length is highly dependent on electrical environment and installation practices. To improve noise immunity, the I/O terminal block Common may be connected to ground terminal/protective earth.

# Control I/O Terminal Block

**Control I/O Terminal Block Wire Specifications**

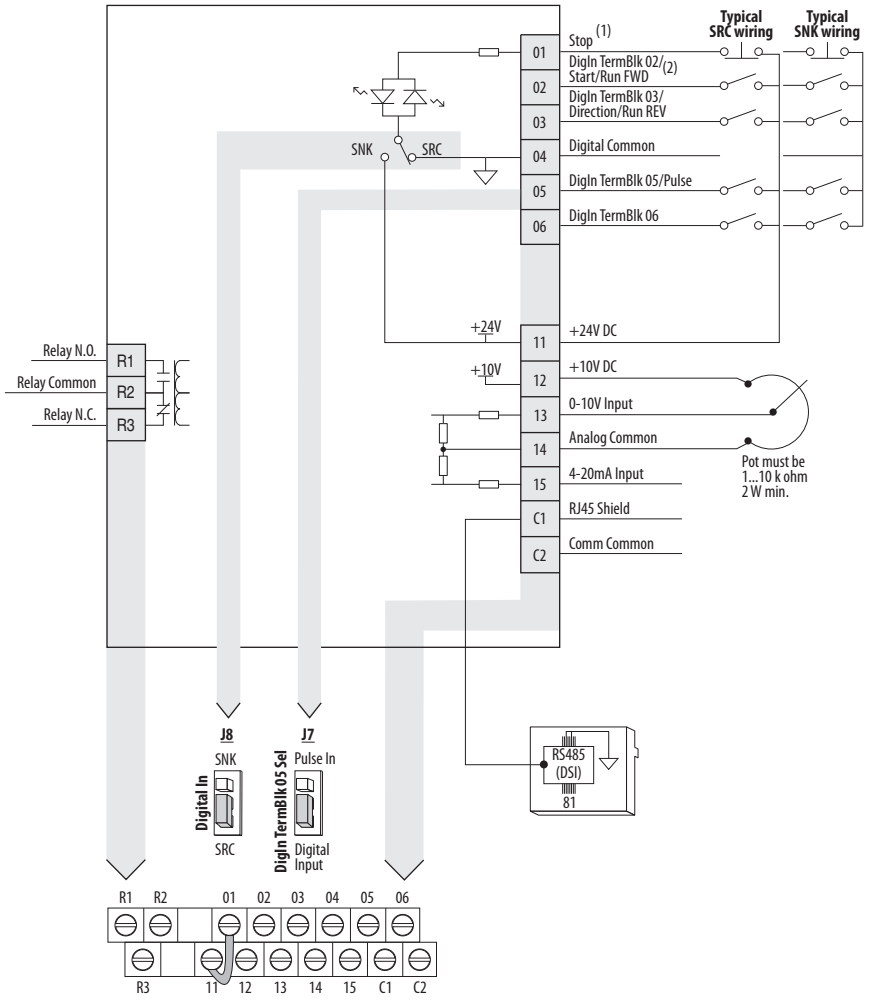
| Frame | Maximum Wire Size[1] | Minimum Wire Size[1] | Torque |
|---|---|---|---|
| A...E | 1.3 $mm^2$ (16 AWG) | 0.13 $mm^2$ (26 AWG) | 0.71...0.86 Nm (6.2...7.6 lb-in.) |

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

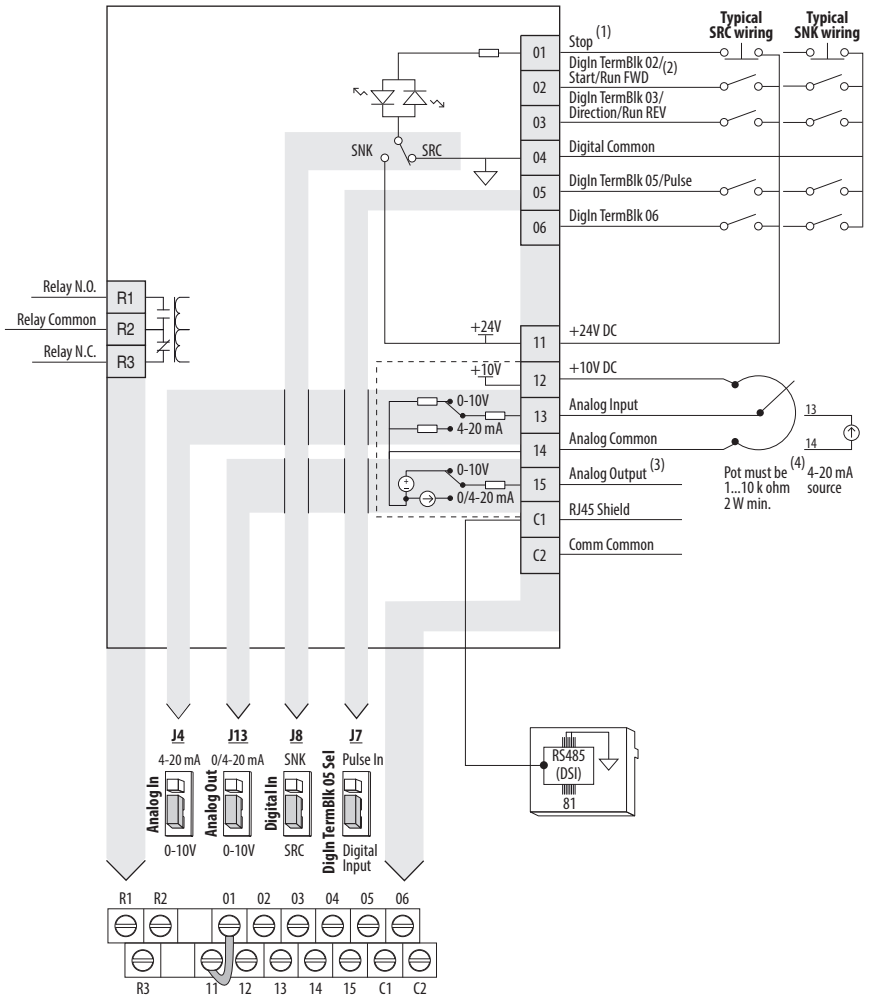
# PowerFlex 523 Control I/O Terminal Block

## PowerFlex 523 Control I/O Wiring Block Diagram

### Series A



**Series B**




## *Control I/O Wiring Block Diagram Notes*

(1) See Digital Input Selection for Start Source on page 50 for more information on configuring the digital inputs.

**IMPORTANT** I/O Terminal 01 is always a stop input. The stopping mode is determined by the drive setting. See the tables below for more information.

| Start Method | Stop Method | |
|---|---|---|
| **P046, P048, P050 [Start Source x]** | **I/O Terminal 01 Stop** | **Normal Stop** |
| 1 "Keypad" | Coast | Per P045 [Stop Mode] |
| 2 "DigIn TrmBlk" | See t062, t063 [DigIn TermBlk xx] below | |
| 3 "Serial/DSI" | Coast | |
| 4 "Network Opt" | Coast | |
| 5 "Ethernet/IP" (1) | Coast | |

(1) Setting is specific to PowerFlex 525 drives only.

| Start Method | Stop Method | |
|---|---|---|
| **t062, t063 [DigIn TermBlk xx]** | **I/O Terminal 01 Stop** | **Normal Stop** |
| 48 "2-Wire FWD" | t064 [2-Wire Mode] is set to:<br>• 0, 1, or 2 = Coast<br>• 3 = per P045 [Stop Mode] | Per P045 [Stop Mode] |
| 49 "3-Wire Start" | Per P045 [Stop Mode] | |
| 50 "2-Wire REV" | t064 [2-Wire Mode] is set to:<br>• 0, 1, or 2 = Coast<br>• 3 = per P045 [Stop Mode] | |
| 51 "3-Wire Dir" | Per P045 [Stop Mode] | |

**IMPORTANT** The drive is shipped with a jumper installed between I/O Terminals 01 and 11. Remove this jumper when using I/O Terminal 01 as a stop or enable input.

(2) Two wire control shown. For three wire control use a momentary input on I/O Terminal 02 to command a start. Use a maintained input for I/O Terminal 03 to change direction.

(3) Analog output (terminal 15) is only available on PowerFlex 523 series B drive, and requires firmware 3.001 and later to configure the analog output parameters (t088, t089, and t090).

(4) Potentiometer connection is only applicable when the 0-10V setting (default) is selected for jumper J4.

(5) Only one analog frequency source may be connected at a time. If more than one reference is connected at the same time, an undetermined frequency reference will result.

### Control I/O Terminal Designations

| No. | Signal | Default | Description | Parameter |
|---|---|---|---|---|
| R1 | Relay N.O. | Fault | Normally open contact for output relay. | t076 |
| R2 | Relay Common | Fault | Common for output relay. | |
| R3 | Relay N.C. | Motor Running | Normally closed contact for output relay. | t081 |
| 01 | Stop | Coast | Three wire stop. However, it functions as a stop under all input modes and cannot be disabled. | P045(2) |
| 02 | DigIn TermBlk 02/ Start/Run FWD | Run FWD | Used to initiate motion and also can be used as a programmable digital input. It can be programmed with t062 [DigIn TermBlk 02] as three wire (Start/Dir with Stop) or two wire (Run FWD/ Run REV) control. Current consumption is 6 mA. | P045, P046, P048, P050, A544, t062 |
| 03 | DigIn TermBlk 03/ Dir/Run REV | Run REV | Used to initiate motion and also can be used as a programmable digital input. It can be programmed with t063 [DigIn TermBlk 03] as three wire (Start/Dir with Stop) or two wire (Run FWD/ Run REV) control. Current consumption is 6 mA. | t063 |
| 04 | Digital Common | – | Return for digital I/O. Electrically isolated (along with the digital I/O) from the rest of the drive. | – |
| 05 | DigIn TermBlk 05/ Pulse In | Preset Freq | Program with t065 [DigIn TermBlk 05].<br>Also functions as a Pulse Train input for reference or speed feedback. Requires an NPN pulse input. The maximum frequency is 100 kHz. Current consumption is 6 mA. | t065 |
| 06 | DigIn TermBlk 06 | Preset Freq | Program with t066 [DigIn TermBlk 06].<br>Current consumption is 6 mA. | t066 |
| 11 | +24V DC | – | Referenced to Digital Common.<br>Drive supplied power for digital inputs.<br>Maximum output current is 100 mA. | – |
| 12 | +10V DC | – | Referenced to Analog Common.<br>Drive supplied power for 0...10V external potentiometer.<br>Maximum output current is 15 mA. | P047, P049 |

### Control I/O Terminal Designations

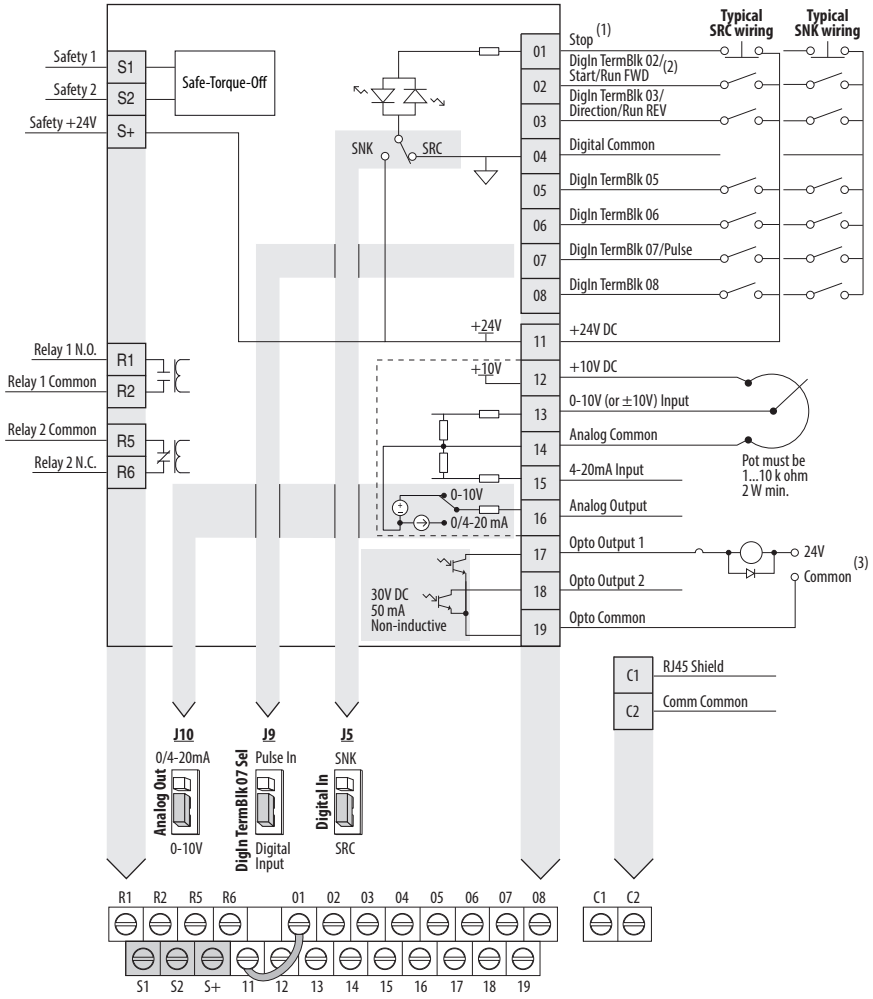
| No. | Signal | Default | Description | Parameter |
|---|---|---|---|---|
| 13 | **For Series A**<br>0-10V In(1) | Not Active | For external 0-10V (unipolar) input supply or potentiometer wiper.<br>Input impedance:<br>Voltage source = 100 kΩ<br>Allowable potentiometer resistance range = 1...10 kΩ | P047, P049, t062, t063, t065, t066, t093, A459, A471 |
| | **For Series B**<br>Analog Input | Not Active | External analog input supply, selectable by Analog Input jumper. Default is 0-10V (unipolar) input supply or potentiometer wiper.<br>Input impedance:<br>Voltage source = 100 kΩ<br>Allowable potentiometer resistance range = 1...10 kΩ<br>Change Analog Input jumper to 4-20 mA for external 4-20 mA input supply. Input impedance = 250 Ω | P047, P049, t062, t063, t065, t066, t093, A459, A471 |
| 14 | Analog Common | – | Return for the analog I/O. Electrically isolated (along with the analog I/O) from the rest of the drive. | – |
| 15 | **For Series A**<br>4-20mA In(1) | Not Active | For external 4-20 mA input supply.<br>Input impedance = 250 Ω | P047, P049, t062, t063, t065, t066, A459, A471 |
| | **For Series B**<br>Analog Output | OutFreq 0-10 | The default analog output is 0-10V. To convert a current value, change the Analog Output jumper to 0-20 mA. Program with t088 [Analog Out Sel]. Maximum analog value can be scaled with t089 [Analog Out High].<br>Maximum Load: 4-20 mA = 525 Ω (10.5V)<br>0-10V = 1 kΩ (10 mA) | t088, t089 |
| C1 | C1 | – | This terminal is tied to the RJ-45 port shield. Tie this terminal to a clean ground in order to improve noise immunity when using external communication peripherals. | – |
| C2 | C2 | – | This is the signal common for the communication signals. | – |

(1) Only one analog frequency source may be connected at a time. If more than one reference is connected at the same time, an undetermined frequency reference will result.

(2) See Footnote (1) on page 39.

# PowerFlex 525 Control I/O Terminal Block

### PowerFlex 525 Control I/O Wiring Block Diagram




## *Control I/O Wiring Block Diagram Notes*

(1) See Digital Input Selection for Start Source on page 50 for more information on configuring the digital inputs.

**IMPORTANT** I/O Terminal 01 is always a stop input. The stopping mode is determined by the drive setting. See the tables below for more information.

| Start Method | Stop Method | |
|---|---|---|
| **P046, P048, P050 [Start Source x]** | **I/O Terminal 01 Stop** | **Normal Stop** |
| 1 "Keypad" | Coast | Per P045 [Stop Mode] |
| 2 "DigIn TrmBlk" | See t062, t063 [DigIn TermBlk xx] below | |
| 3 "Serial/DSI" | Coast | |
| 4 "Network Opt" | Coast | |
| 5 "EtherNet/IP" | Coast | |

| Start Method | Stop Method | |
|---|---|---|
| **t062, t063 [DigIn TermBlk xx]** | **I/O Terminal 01 Stop** | **Normal Stop** |
| 48 "2-Wire FWD" | t064 [2-Wire Mode] is set to:<br>• 0, 1, or 2 = Coast<br>• 3 = per P045 [Stop Mode] | Per P045 [Stop Mode] |
| 49 "3-Wire Start" | Per P045 [Stop Mode] | |
| 50 "2-Wire REV" | t064 [2-Wire Mode] is set to:<br>• 0, 1, or 2 = Coast<br>• 3 = per P045 [Stop Mode] | |
| 51 "3-Wire Dir" | Per P045 [Stop Mode] | |

**IMPORTANT** The drive is shipped with a jumper installed between I/O Terminals 01 and 11. Remove this jumper when using I/O Terminal 01 as a stop or enable input.

(2) Two wire control shown. For three wire control use a momentary input on I/O Terminal 02 to command a start. Use a maintained input for I/O Terminal 03 to change direction.

(3) When using an opto output with an inductive load such as a relay, install a recovery diode parallel to the relay as shown, to prevent damage to the output.

### Control I/O Terminal Designations

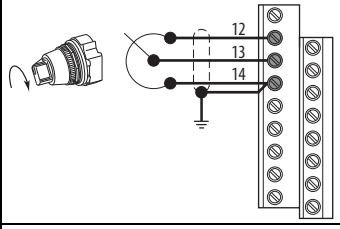
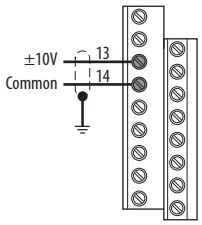
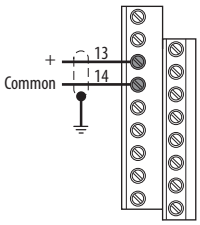
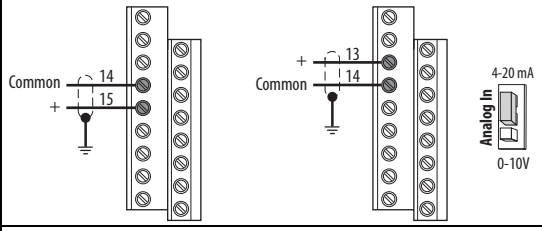
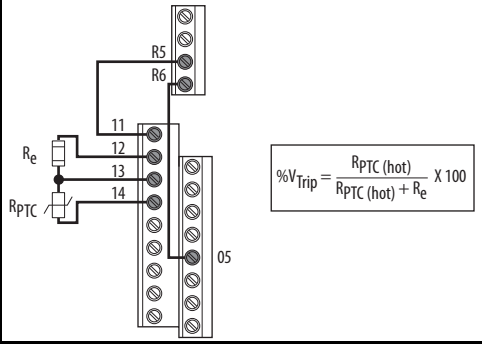
| No. | Signal | Default | Description | Parameter |
|---|---|---|---|---|
| R1 | Relay 1 N.O. | Fault | Normally open contact for output relay. | t076 |
| R2 | Relay 1 Common | Fault | Common for output relay. | |
| R5 | Relay 2 Common | Motor Running | Common for output relay. | t081 |
| R6 | Relay 2 N.C. | Motor Running | Normally closed contact for output relay. | |
| 01 | Stop | Coast | Three wire stop. However, it functions as a stop under all input modes and cannot be disabled. | P045(1) |
| 02 | DigIn TermBlk 02/ Start/Run FWD | Run FWD | Used to initiate motion and also can be used as a programmable digital input. It can be programmed with t062 [DigIn TermBlk 02] as three wire (Start/Dir with Stop) or two wire (Run FWD/ Run REV) control. Current consumption is 6 mA. | P045, P046, P048, P050, A544, t062 |
| 03 | DigIn TermBlk 03/ Dir/Run REV | Run REV | Used to initiate motion and also can be used as a programmable digital input. It can be programmed with t063 [DigIn TermBlk 03] as three wire (Start/Dir with Stop) or two wire (Run FWD/ Run REV) control. Current consumption is 6 mA. | t063 |
| 04 | Digital Common | – | Return for digital I/O. Electrically isolated (along with the digital I/O) from the rest of the drive. | – |
| 05 | DigIn TermBlk 05 | Preset Freq | Program with t065 [DigIn TermBlk 05].<br>Current consumption is 6 mA. | t065 |
| 06 | DigIn TermBlk 06 | Preset Freq | Program with t066 [DigIn TermBlk 06].<br>Current consumption is 6 mA. | t066 |
| 07 | DigIn TermBlk 07/ Pulse In | Start Source 2 + Speed Reference2 | Program with t067 [DigIn TermBlk 07].<br>Also functions as a Pulse Train input for reference or speed feedback. Requires an NPN pulse input. Maximum frequency is 100 kHz. Current consumption is 6 mA. | t067 |
| 08 | DigIn TermBlk 08 | Jog Forward | Program with t068 [DigIn TermBlk 08].<br>Current consumption is 6 mA. | t068 |
| C1 | C1 | – | This terminal is tied to the RJ-45 port shield. Tie this terminal to a clean ground in order to improve noise immunity when using external communication peripherals. | – |
| C2 | C2 | – | This is the signal common for the communication signals. | – |
| S1 | Safety 1 | – | Safety input 1. Current consumption is 6 mA. | – |
| S2 | Safety 2 | – | Safety input 2. Current consumption is 6 mA. | – |
| S+ | Safety +24V | – | +24V supply for safety circuit. Internally tied to the +24V DC source (Pin 11). | – |
| 11 | +24V DC | – | Referenced to Digital Common.<br>Drive supplied power for digital inputs.<br>Maximum output current is 100 mA. | – |

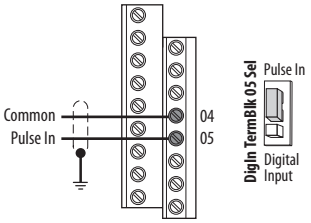
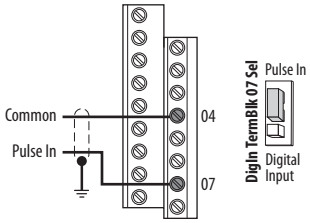
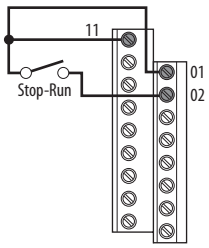
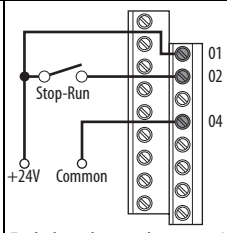
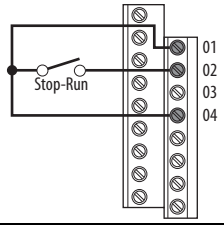
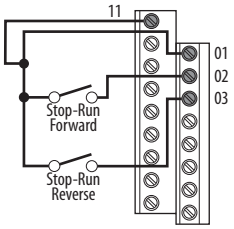
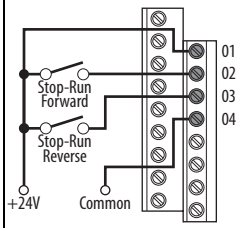
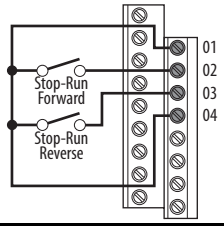
### Control I/O Terminal Designations

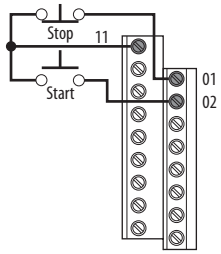
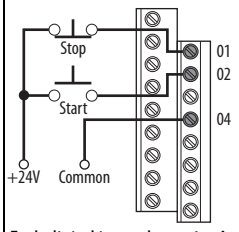
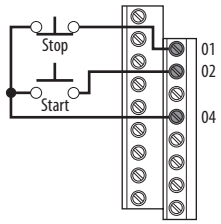
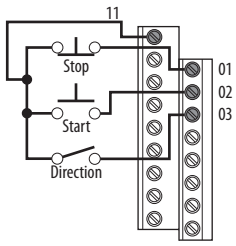
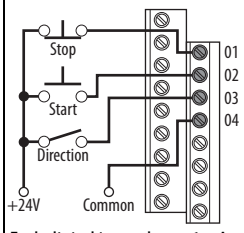
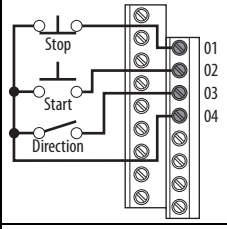
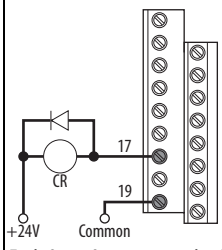
| No. | Signal | Default | Description | Parameter |
|---|---|---|---|---|
| 12 | +10V DC | – | Referenced to Analog Common.<br>Drive supplied power for 0...10V external potentiometer.<br>Maximum output current is 15 mA. | P047, P049 |
| 13 | ±10V In | Not Active | For external 0-10V (unipolar) or ±10V (bipolar) input supply or potentiometer wiper.<br>Input impedance:<br>Voltage source = 100 kΩ<br>Allowable potentiometer resistance range = 1...10 kΩ | P047, P049, t062, t063, t065, t066, t093, A459, A471 |
| 14 | Analog Common | – | Return for the analog I/O. Electrically isolated (along with the analog I/O) from the rest of the drive. | – |
| 15 | 4-20mA In | Not Active | For external 4-20 mA input supply.<br>Input impedance = 250 Ω | P047, P049, t062, t063, t065, t066, A459, A471 |
| 16 | Analog Output | OutFreq 0-10 | The default analog output is 0-10V. To convert a current value, change the Analog Output jumper to 0-20 mA. Program with t088 [Analog Out Sel]. Maximum analog value can be scaled with t089 [Analog Out High].<br>Maximum Load: 4-20 mA = 525 Ω (10.5V)<br>0-10V = 1 kΩ (10 mA) | t088, t089 |
| 17 | Opto Output 1 | Motor Running | Program with t069 [Opto Out1 Sel].<br>Each Opto-Output is rated 30V DC 50 mA (Non-inductive). | t069, t070, t075 |
| 18 | Opto Output 2 | At Frequency | Program with t072 [Opto Out1 Sel].<br>Each Opto-Output is rated 30V DC 50 mA (Non-inductive). | t072, t073, t075 |
| 19 | Opto Common | – | The emitters of the Optocoupler Outputs (1 and 2) are tied together at Optocoupler Common. Electrically isolated from the rest of the drive. | – |

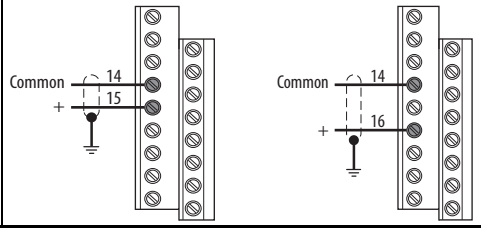
(1) See Footnote (1) on page 39.

# I/O Wiring Examples

<table>
<tr><th>I/O</th><th>Connection Example</th></tr>
<tr><td rowspan="2">Potentiometer<br>1...10k Ω Pot.<br>Recommended<br>(2 W minimum)</td><td>P047 [Speed Reference1] = 5 “0-10V Input”</td></tr>
<tr><td> 
</td></tr>
<tr><td rowspan="4">Analog Input<br>0-10V, 100k Ω impedance<br>4-20 mA, 250 Ω impedance</td><td>Bipolar<br>P047 [Speed Reference1] = 5 “0-10V Input” and t093 [10V Bipolar Enbl] = 1 “Bi-Polar In”</td><td>Unipolar (Voltage)<br>P047 [Speed Reference1] = 5 “0-10V Input”</td></tr>
<tr><td> 
</td><td> 
</td></tr>
<tr><td colspan="2">Unipolar (Current)<br>P047 [Speed Reference1] = 6 “4-20mA Input”</td></tr>
<tr><td colspan="2">PowerFlex 523 Series A, PowerFlex 525 PowerFlex 523 Series B<br> 
</td></tr>
<tr><td>Analog Input, PTC<br>For Drive Fault</td><td colspan="2">Wire the PTC and External Resistor (typically matched to the PTC Hot Resistance) to I/O Terminals 12, 13, 14.<br>Wire R2/R3 Relay Output (SRC) to I/O Terminals 5 & 11.<br>t065 [DigIn TermBlk 05] = 12 “Aux Fault”<br>t081 [Relay Out 2 Sel] = 10 “Above AnIg V”<br>t082 [Relay Out 2 Level] = % Voltage Trip</td></tr>
<tr><td colspan="2"> 
</td></tr>
</table>

| I/O | Connection Example | |
|---|---|---|
| **Pulse Train Input**<br>PowerFlex 523<br>t065 [DigIn TermBlk 05] = 52<br>PowerFlex 525<br>t067 [DigIn TermBlk 07] = 52<br><br>Use P047, P049 and P051 [Speed Referencex] to select pulse input.<br>Jumper for DigIn TermBlk 05 or 07 Sel must be moved to Pulse In. | **PowerFlex 523**<br>  <br>**PowerFlex 525**<br>  <br>The device connected to terminal 5 (for PowerFlex 523) or terminal 7 (for PowerFlex 525) needs to be NPN or push-pull output driver. | |
| **2 Wire SRC Control - Non-Reversing**<br>P046 [Start Source 1] = 2 and t062 [DigIn TermBlk 02] = 48<br>Input must be active for the drive to run. When input is opened, the drive will stop as specified by P045 [Stop Mode].<br>If desired, a User Supplied 24V DC power source can be used. Refer to the "External Supply (SRC)" example. | Internal Supply (SRC)<br>  | External Supply (SRC)<br>  <br>Each digital input draws 6 mA. |
| **2 Wire SNK Control - Non-Reversing** | Internal Supply (SNK)<br>  | |
| **2 Wire SRC Control - Run FWD/Run REV**<br>P046 [Start Source 1] = 2, t062 [DigIn TermBlk 02] = 48 and t063 [DigIn TermBlk 03] = 50<br>Input must be active for the drive to run. When input is opened, the drive will stop as specified by P045 [Stop Mode].<br>If both Run Forward and Run Reverse inputs are closed at the same time, an undetermined state could occur. | Internal Supply (SRC)<br>  | External Supply (SRC)<br>  <br>Each digital input draws 6 mA. |
| **2 Wire SNK Control - Run FWD/Run REV** | Internal Supply (SNK)<br>  | |

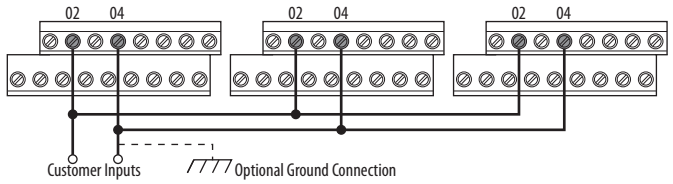
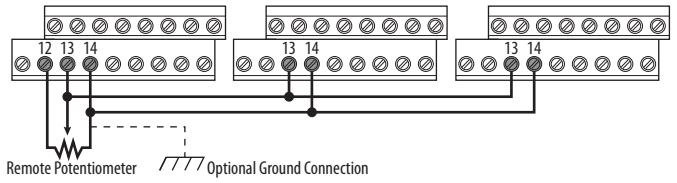
<table>
<tr><th>I/O</th><th colspan="2">Connection Example</th></tr>
<tr><td rowspan="2">3 Wire SRC Control - Non-Reversing<br>P046 [Start Source 1] = 2, t062 [DigIn TermBlk 02] = 49 and t063 [DigIn TermBlk 03] = 51<br>A momentary input will start the drive. A stop input to I/O Terminal 01 will stop the drive as specified by P045 [Stop Mode].</td><td>Internal Supply (SRC)<br> 
</td><td>External Supply (SRC)<br> 
<br>Each digital input draws 6 mA.</td></tr>
<tr><td colspan="2">Internal Supply (SNK)<br> 
</td></tr>
<tr><td rowspan="2">3 Wire SRC Control - Reversing<br>P046 [Start Source 1] = 2, t062 [DigIn TermBlk 02] = 49 and t063 [DigIn TermBlk 03] = 51<br>A momentary input will start the drive. A stop input to I/O Terminal 01 will stop the drive as specified by P045 [Stop Mode]. I/O Terminal 03 determines direction.</td><td>Internal Supply (SRC)<br> 
</td><td>External Supply (SRC)<br> 
<br>Each digital input draws 6 mA.</td></tr>
<tr><td colspan="2">Internal Supply (SNK)<br> 
</td></tr>
<tr><td>Opto Output (1 & 2)[1]<br>t069 [Opto Out1 Sel] determines Opto-Output 1 (I/O Terminal 17) operation.<br>t072 [Opto Out2 Sel] determines Opto-Output 2 (I/O Terminal 18) operation.<br>When using Opto-Output with an inductive load such as a relay, install a recovery diode parallel to the relay as shown, to prevent damage to the output.</td><td colspan="2">Opto-Output 1<br> 
<br>Each Opto-Output is rated 30V DC 50 mA (Non-inductive).</td></tr>
</table>

| I/O | Connection Example |
|---|---|
| **Analog Output**[2]<br>t088 [Analog Out Sel] determines analog output type and drive conditions.<br>0-10V,<br>1k Ω minimum<br>0-20 mA/4-20 mA,<br>525 Ω maximum | t088 [Analog Out Sel] = 0 through 23<br>The Analog Output Select jumper must be set to match the analog output signal mode set in t088 [Analog Out Sel].<br>**PowerFlex 523 Series B** **PowerFlex 525**<br>  |

(1) Feature is specific to PowerFlex 525 drives only

(2) Feature is not applicable to PowerFlex 523 series A drives.

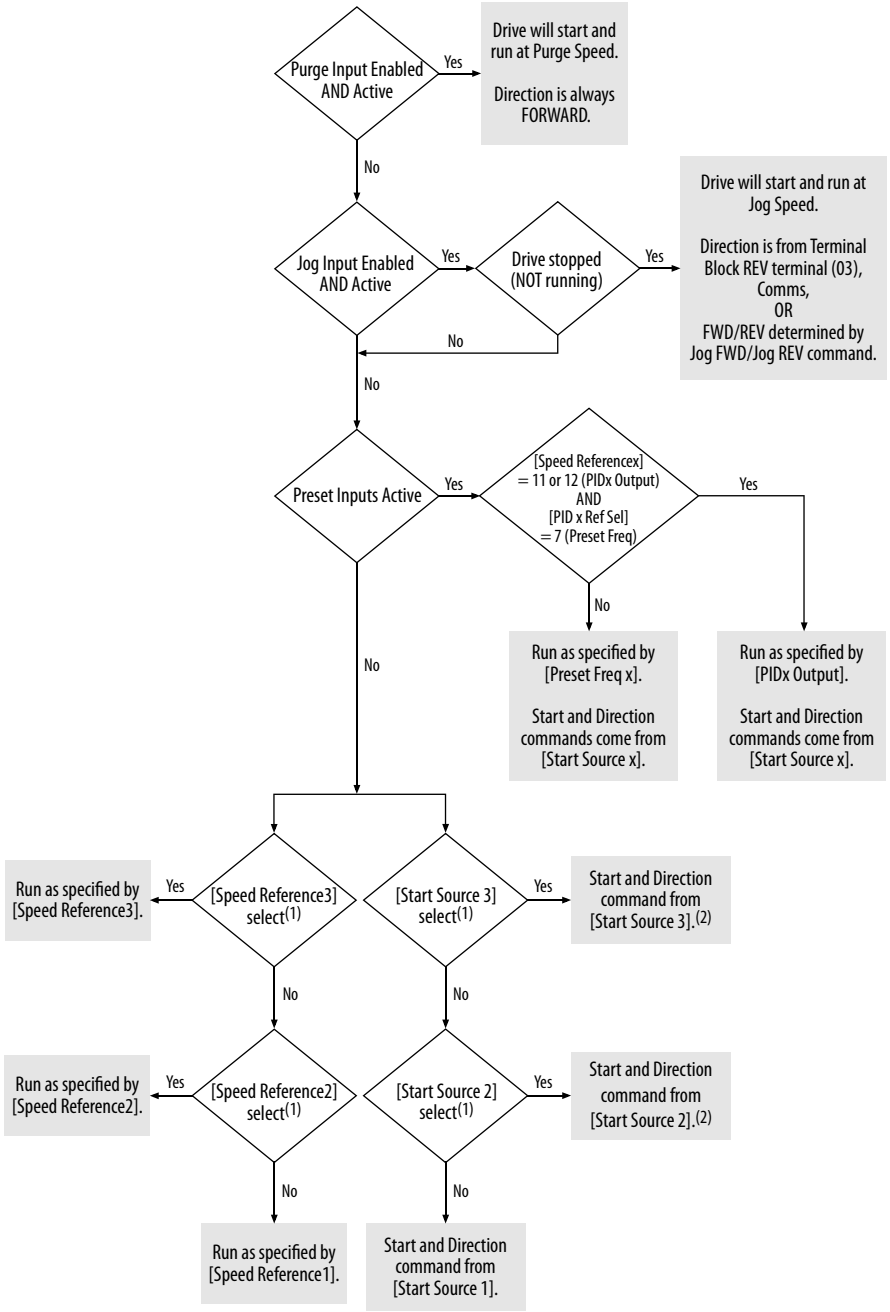
## Typical Multiple Drive Connection Examples

| Input/Output | Connection Example |
|---|---|
| **Multiple Digital Input Connections**<br>Customer Inputs can be wired per External Supply (SRC). |  <br>When connecting a single input such as Run, Stop, Reverse or Preset Speeds to multiple drives, it is important to connect I/O Terminal 04 common together for all drives. If they are to be tied into another common (such as earth ground or separate apparatus ground) only one point of the daisy chain of I/O Terminal 04 should be connected.<br>**ATTENTION:** I/O Common terminals should **not** be tied together when using SNK (Internal Supply) mode. In SNK mode, if power is removed from one drive, inadvertent operation of other drives that share the same I/O Common connection may occur. |
| **Multiple Analog Connections** |  <br>When connecting a single potentiometer to multiple drives it is important to connect I/O Terminal 14 common together for all drives. I/O Terminal 14 common and I/O Terminal 13 (potentiometer wiper) should be daisy-chained to each drive. All drives must be powered up for the analog signal to be read correctly. |

# Start and Speed Reference Control

## Start Source and Speed Reference Selection

The start and drive speed command can be obtained from a number of different sources. By default, start source is determined by P046 [Start Source 1] and drive speed source is determined by P047 [Speed Reference1]. However, various inputs can override this selection, See below for the override priority.

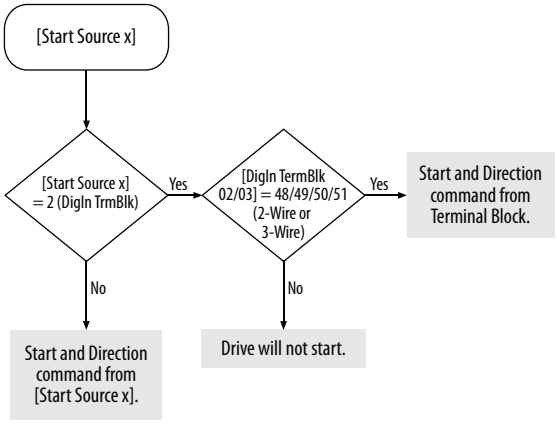



(1) [Start Source 2/3] and [Speed Reference2/3] can be selected by the control terminal block or communication commands.

(2) See Digital Input Selection for Start Source on page 50 for information on selecting the correct digital input.

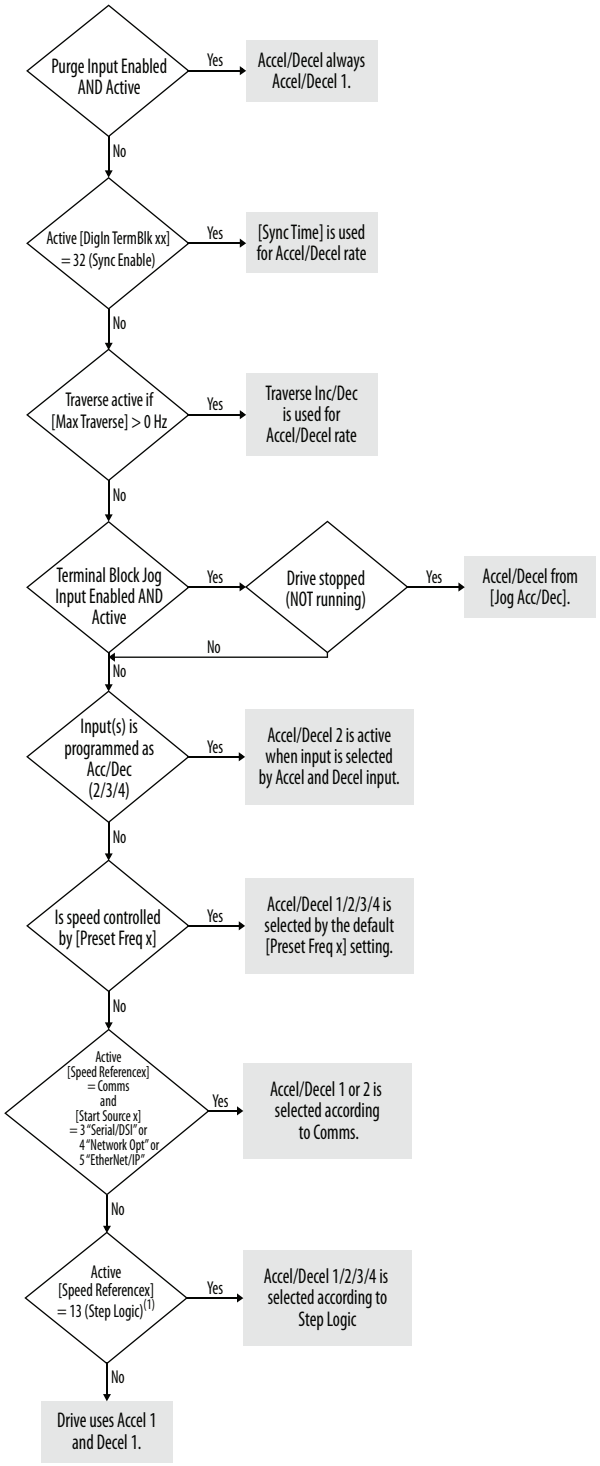
### *Digital Input Selection for Start Source*

If P046, P048 or P050 [Start Source x] has been set to 2, "DigIn TermBlk", then t062 and t063 [DigIn TermBlk xx] must be configured for 2-Wire or 3-Wire control for the drive to function properly.



## Accel/Decel Selection

The Accel/Decel rate can be obtained by a variety of methods. The default rate is determined by P041 [Accel Time 1] and P042 [Decel Time 1]. Alternative Accel/Decel rates can be made through digital inputs, communications and/or parameters. See below for the override priority.




(1) Setting is specific to PowerFlex 525 drives only.

# CE Conformity

Compliance with the Low Voltage Directive and Electromagnetic Compatibility Directive has been demonstrated using harmonized European Norm (EN) standards published in the Official Journal of the European Communities. PowerFlex 520-series drives comply with the EN standards listed below when installed according to the installation instructions in this manual.

CE Declarations of Conformity are available online at: http://www.rockwellautomation.com/products/certification/.

## Low Voltage Directive (2006/95/EC and 2014/35/EU)

- EN 61800-5-1 Adjustable speed electrical power drive systems – Part 5-1: Safety requirements – Electrical, thermal and energy.

**Pollution Degree Ratings According to EN 61800-5-1**

| Pollution Degree | Description |
|---|---|
| 1 | No pollution or only dry, non-conductive pollution occurs. The pollution has no influence. |
| 2 | Normally, only non-conductive pollution occurs. Occasionally, however, a temporary conductivity caused by condensation is to be expected, when the drive is out of operation. |

## EMC Directive (2004/108/EC and 2014/30/EU)

- EN 61800-3 – Adjustable speed electrical power drive systems - Part 3: EMC requirements and specific test methods

## Machinery Directive (2006/42/EC)

- EN ISO 13849-1 – Safety of machinery – Safety related parts of control systems -Part 1: General principles for design
- EN 62061 – Safety of machinery – Functional safety of safety-related electrical, electronic and programmable electronic control systems
- EN 60204-1 – Safety of machinery – Electrical equipment of machines - Part 1: General requirements
- EN 61800-5-2 – Adjustable speed electrical power drive systems - Part 5-2: Safety requirement – Functional

Refer to Appendix G for installation consideration related to Machinery Directive.

## ATEX Directive (94/9/EC and 2014/34/EU)

- EN 50495 – Safety devices required for the safe functioning of equipment with respect to explosion risks.

## General Considerations

- For CE compliance, drives must satisfy installation requirements related to both EN 61800-5-1 and EN 61800-3 provided in this document.
- PowerFlex 520-series drives must be installed in a pollution degree 1 or 2 environment to be compliant with the CE LV Directive. See Pollution Degree Ratings According to EN 61800-5-1 on page 52 for descriptions of each pollution degree rating.
- PowerFlex 520-series drives comply with the EMC requirements of EN 61800-3 when installed according to good EMC practices and the instructions provided in this document. However, many factors can influence the EMC compliance of an entire machine or installation, and compliance of the drive itself does not ensure compliance of all applications.
- PowerFlex 520-series drives are not intended to be used on public low-voltage networks which supply domestic premises. Without additional mitigation, radio frequency interference is expected if used on such a network. The installer is responsible for taking measures such as a supplementary line filter and enclosure (see Connections and Grounding on page 55) to prevent interference, in addition to the installation requirements of this document.

**ATTENTION:** NEMA/UL Open Type drives must either be installed in a supplementary enclosure or equipped with a "NEMA Type 1 Kit" to be CE compliant with respect to protection against electrical shock.

- PowerFlex 520-series drives generate harmonic current emissions on the AC supply system. When operated on a public low-voltage network it is the responsibility of the installer or user to ensure that applicable requirements of the distribution network operator have been met. Consultation with the network operator and Rockwell Automation may be necessary.
- If the optional NEMA 1 kit is not installed, the drive must be installed in an enclosure with side openings less than 12.5 mm (0.5 in.) and top openings less than 1.0 mm (0.04 in.) to maintain compliance with the LV Directive.
- The motor cable should be kept as short as possible in order to avoid electromagnetic emission as well as capacitive currents.
- Use of line filters in ungrounded systems is not recommended.
- In CE installations, input power must be a Balanced Wye with Center Ground configuration for EMC compliance.

### *Installation Requirements Related to EN 61800-5-1 and the Low Voltage Directive*

- 600V PowerFlex 520-series drives can only be used on a "center grounded" supply system for altitudes up to and including 2000 m (6562 ft).

- When used at altitudes above 2000 m (6562 ft) up to a maximum of 4800 m (15,748 ft), PowerFlex 520-series drives of voltage classes up to 480V may not be powered from a "corner-earthed" supply system in order to maintain compliance with the CE LV Directive. See Derating Guidelines for High Altitude on page 18.
- PowerFlex 520-series drives produce leakage current in the protective earthing conductor which exceeds 3.5 mA AC and/or 10 mA DC. The minimum size of the protective earthing (grounding) conductor used in the application must comply with local safety regulations for high protective earthing conductor current equipment.

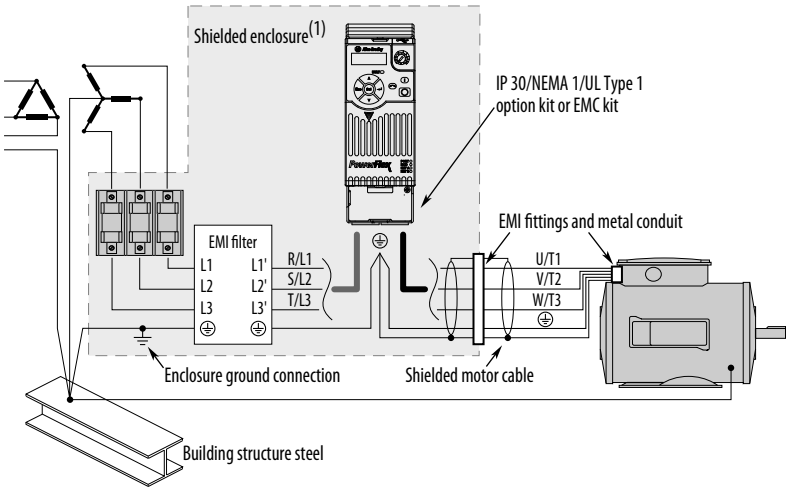
**ATTENTION:** PowerFlex 520-series drives produce DC current in the protective earthing conductor which may reduce the ability of RCD's (residual current-operated protective devices) or RCM's (residual current-operated monitoring devices) of type A or AC to provide protection for other equipment in the installation. Where an RCD or RCM is used for protection in case of direct or indirect contact, only an RCD or RCM of Type B is allowed on the supply side of this product.

*Installation Requirements Related to EN 61800-3 and the EMC Directive*

- The drive must be earthed (grounded) as described in Connections and Grounding on page 55. See General Grounding Requirements on page 20 for additional grounding recommendations.
- Output power wiring to the motor must employ cables with a braided shield providing 75% or greater coverage, or the cables must be housed in metal conduit, or equivalent shield must be provided. Continuous shielding must be provided from the drive enclosure to the motor enclosure. Both ends of the motor cable shield (or conduit) must terminate with a low-impedance connection to earth.
  Drive Frames A...E: At the drive end of the motor, either
  a. The cable shield must be clamped to a properly installed "EMC Plate" for the drive. Kit number 25-EMC1-Fx.
     or
  b. The cable shield or conduit must terminate in a shielded connector installed in an EMC plate, conduit box, or similar.
- At the motor end, the motor cable shield or conduit must terminate in a shielded connector which must be properly installed in an earthed motor wiring box attached to the motor. The motor wiring box cover must be installed and earthed.
- All control (I/O) and signal wiring to the drive must use cable with a braided shield providing 75% or greater coverage, or the cables must be housed in metal conduit, or equivalent shielding must be provided. When shielded cable is used, the cable shield should be terminated with a low impedance connection to earth at only one end of the cable, preferably the end where the receiver is located. When the cable shield is terminated at the drive end, it may be terminated either by using a shielded connector in conjunction with a conduit plate or conduit box, or the shield may be clamped to an "EMC plate."

- Motor cabling must be separated from control and signal wiring wherever possible.
- Maximum motor cable length must not exceed the maximum length indicated in PowerFlex 520-Series RF Emission Compliance and Installation Requirements on page 55 for compliance with radio frequency emission limits for the specific standard and installation environment.

**Connections and Grounding**




(1) Some installations require a shielded enclosure. Keep wire length as short as possible between the enclosure entry point and the EMI filter.

**PowerFlex 520-Series RF Emission Compliance and Installation Requirements**

| Filter Type | Standard/Limits | | |
|---|---|---|---|
| | **EN61800-3 Category C1<br>EN61000-6-3<br>CISPR11 Group 1 Class B** | **EN61800-3 Category C2<br>EN61000-6-4<br>CISPR11 Group 1 Class A<br>(Input power ≤ 20 kVA)** | **EN61800-3 Category C3<br>(I ≤ 100 A)<br>CISPR11 Group 1 Class A<br>(Input power > 20 kVA)** |
| Internal | – | 10 m (33 ft) | 20 m (66 ft) |
| External(1) | 30 m (16 ft) | 100 m (328 ft) | 100 m (328 ft) |

(1) See Appendix B for more information on optional external filters.

### *Additional Installation Requirements*

This section provides information on additional requirements for category C1 and C2 installation, such as enclosures and EMC cores.

**IMPORTANT** EMC cores are included with:

- drives that have an internal EMC filter (25x-xxxxN114)
- external EMC filter accessory kit (25-RFxxx)

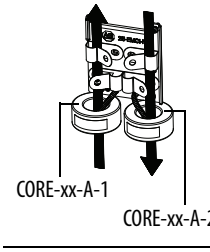
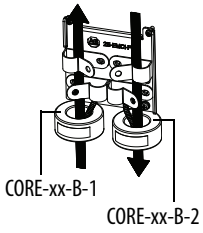
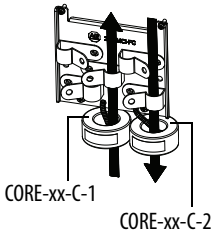
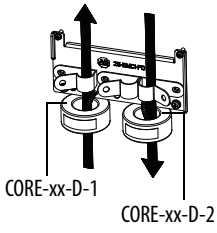
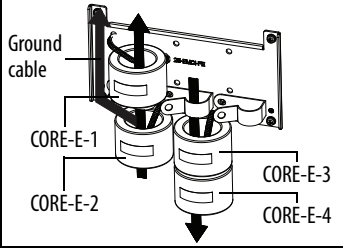
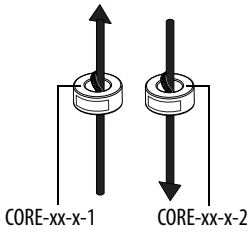
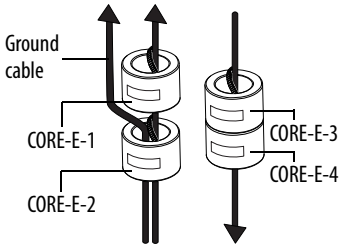
**IMPORTANT** An enclosure, shielded input cable, and EMC cores are not required to meet category C3 requirements.

### Additional Installation Requirements

| Frame Size | Category C1 | | | Category C2 | | |
|---|---|---|---|---|---|---|
| | Enclosure | Conduit or Shielded Cable @ Input | EMC Cores Required (Included with product) | Enclosure | Conduit or Shielded Cable @ Input | EMC Cores Required (Included with product) |
| **100...120V AC (-15%, +10%) – 1-Phase Input with External EMC Filter, 0...120V 1-Phase Output** | | | | | | |
| A | No | No | No | No | No | No |
| B | No | No | No | No | No | No |
| **200...240V AC (-15%, +10%) – 1-Phase Input with External EMC Filter, 0...230V 3-Phase Output** | | | | | | |
| A | Yes | Yes | No | No | No | Input/Output |
| B | Yes | Yes | Output only | No | No | Input/Output |
| **200...240V AC (-15%, +10%) – 1-Phase Input with Internal EMC Filter, 0...230V 3-Phase Output(1)** | | | | | | |
| A | * | * | * | Yes | No | No |
| B | * | * | * | Yes | No | No |
| **200...240V AC (-15%, +10%) – 3-Phase Input with External EMC Filter, 0...230V 3-Phase Output** | | | | | | |
| A | Yes | Yes | Output only | No | No | Input/Output |
| B | Yes | Yes | Output only | No | No | Input/Output |
| C | Yes | Yes | Output only | No | No | Input/Output |
| D | Yes | Yes | No | No | No | Input only |
| E | Yes | Yes | Output only | No | No | Input only |
| **380...480V AC (-15%, +10%) – 3-Phase Input with External EMC Filter, 0...460V 3-Phase Output** | | | | | | |
| A | Yes | Yes | No | No | No | Input/Output |
| B | Yes | Yes | No | No | No | Input/Output |
| C | Yes | Yes | No | No | No | Input only |
| D | Yes | Yes | Output only | No | No | Input/Output |
| E | Yes | Yes | No | Yes | No | Input/Output |
| **380...480V AC (-15%, +10%) – 3-Phase Input with Internal EMC Filter, 0...460V 3-Phase Output(1)** | | | | | | |
| A | * | * | * | No | No | Input/Output |
| B | * | * | * | No | No | Input/Output |
| C | * | * | * | No | No | Input/Output |
| D | * | * | * | No | No | Input/Output |
| E | * | * | * | No | No | Input/Output |
| **525...600V AC (-15%, +10%) – 3-Phase Input with External EMC Filter, 0...575V 3-Phase Output** | | | | | | |
| A | Yes | Yes | No | No | No | Input/Output |
| B | Yes | Yes | No | No | No | Input/Output |
| C | Yes | Yes | No | No | No | Input/Output |
| D | Yes | Yes | No | No | No | Input/Output |
| E | Yes | Yes | No | Yes | No | No |

(1) An (*) indicates that EMC requirements are not met.

### Recommended Placement of EMC Cores

| Frame A | Frame B | Frame C | Frame D | Frame E |
|---|---|---|---|---|
| **With optional EMC plate (25-EMC-Fx)** | | | | |
|  |  |  |  |  |
| **Without EMC plate** | | | | |
|  | | | |  |

Input cable to drive (Shielded or Unshielded) Output cable from drive (Shielded)

 Shows contact to shielded layer

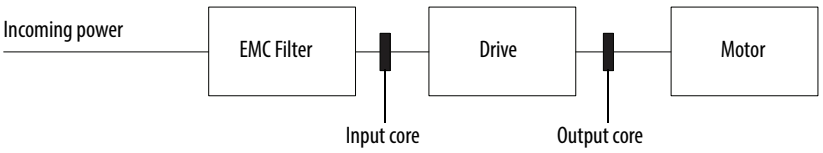
 Secure EMC core by using cable/zip ties

**IMPORTANT** The ground cable/shield for both input and output must pass through the EMC core(s), except for the following:

- Frame E drives with internal filters where the grounded input cable must not pass through EMC CORE-E-1.
- 600V drives with external filters where the grounded output cable must not pass through the EMC core(s).

### Recommended Placement of EMC Cores Relative to External Filter

**All Frame sizes**



## Notes:

# Start Up

This chapter describes how to start up the PowerFlex 520-series drive. To simplify drive setup, the most commonly programmed parameters are organized in a single Basic Program Group.



**IMPORTANT** Read the *General Precautions* section before proceeding.

**ATTENTION:** Power must be applied to the drive to perform the following start-up procedures. Some of the voltages present are at incoming line potential. To avoid electric shock hazard or damage to equipment, only qualified service personnel should perform the following procedure. Thoroughly read and understand the procedure before beginning. If an event does not occur while performing this procedure, **Do Not Proceed. Remove All Power** including user supplied control voltages. User supplied voltages may exist even when main AC power is not applied to the drive. Correct the malfunction before continuing.

## Prepare for Drive Start-Up

### Drive Startup Task List

1. Disconnect and lock out power to the machine.
2. Verify that AC line power at the disconnect device is within the rated value of the drive.
3. If replacing a drive, verify the current drive's catalog number. Verify all options installed on the drive.
4. Verify that any digital control power is 24 volts.
5. Inspect grounding, wiring, connections, and environmental compatibility.

6. Verify that the Sink (SNK)/Source (SRC) jumper is set to match your control wiring scheme. See the PowerFlex 523 Control I/O Wiring Block Diagram on page 38 and PowerFlex 525 Control I/O Wiring Block Diagram on page 42 for location.

**IMPORTANT** The default control scheme is Source (SRC). The Stop terminal is jumpered to allow starting from the keypad or comms. If the control scheme is changed to Sink (SNK), the jumper must be removed from I/O Terminals 01 and 11 and installed between I/O Terminals 01 and 04.

7. Wire I/O as required for the application.
8. Wire the power input and output terminals.
9. Confirm that all inputs are connected to the correct terminals and are secure.
10. Collect and record motor nameplate and encoder or feedback device information. Verify motor connections.
    - Is the motor uncoupled?
    - What direction will the motor need to turn for the application?
11. Verify the input voltage to the drive. Verify if the drive is on a grounded system. Ensure the MOV jumpers are in the correct position. See AC Supply Source Considerations on page 19 for more information.
12. Apply power and reset the drive and communication adapters to factory default settings. To reset the drive, see parameter P053 [Reset to Defalts]. To reset the communication adapters, see the user manual of the adapter for more information.
13. Configure the basic program parameters related to the motor. See Smart Start-Up with Basic Program Group Parameters on page 65.
14. Complete the autotune procedure for the drive. See parameter P040 [Autotune] for more information.
15. If you are replacing a drive and have a backup of the parameter settings obtained using the USB utility application, use the USB utility application to apply the backup to the new drive. See Using the USB Port on page 67 for more information.

    Otherwise, set the necessary parameters for your application using the LCD keypad interface, Connected Components Workbench, or RSLogix or Logix Designer if using an Add-on Profile through EtherNet/IP.
    - Configure the communication parameters needed for the application (node number, IP address, Datalinks in and out, communication rate, speed reference, start source, and so on). Record these settings for your reference.
    - Configure the other drive parameters needed for the drive analog and digital I/O to work correctly. Verify the operation. Record these settings for your reference.

16. Verify the drive and motor perform as specified.
    - Verify that the Stop input is present or the drive will not start.

    **IMPORTANT** If I/O Terminal 01 is used as a stop input, the jumper between I/O Terminals 01 and 11 must be removed.

    - Verify the drive is receiving the speed reference from the correct place and that the reference is scaled correctly.
    - Verify the drive is receiving start and stop commands correctly.
    - Verify input currents are balanced.
    - Verify motor currents are balanced.
17. Save a backup of the drive settings using the USB utility application. See Using the USB Port on page 67 for more information.

## Start, Stop, Direction and Speed Control

Factory default parameter values allow the drive to be controlled from the keypad. No programming is required to start, stop, change direction and control speed directly from the keypad.

**IMPORTANT** To disable reverse operation, see A544 [Reverse Disable].

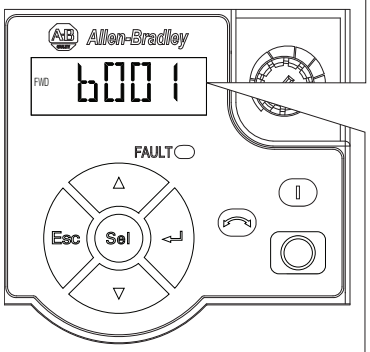
If a fault appears on power up, see Fault Descriptions on page 159 for an explanation of the fault code.

## Variable Torque Fan/Pump Applications

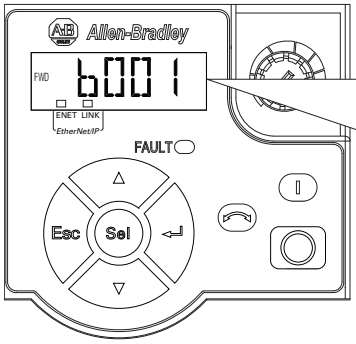
For improved motor and drive performance, tune the motor in SVC mode using parameter P040 [Autotune]. If V/Hz mode is selected, use parameter A530 [Boost Select] to adjust the boost.

# Display and Control Keys

**PowerFlex 523**




**PowerFlex 525**



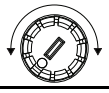

| Menu | Parameter Group and Description |
|---|---|
| b | **Basic Display**<br>Commonly viewed drive operating conditions. |
| P | **Basic Program**<br>Commonly used programmable functions. |
| t | **Terminal Blocks**<br>Programmable terminal functions. |
| C | **Communications**<br>Programmable communication functions. |
| L | **Logic (PowerFlex 525 only)**<br>Programmable logic functions. |
| d | **Advanced Display**<br>Advanced drive operating conditions. |
| A | **Advanced Program**<br>Remaining programmable functions. |
| N | **Network**<br>Network functions that are shown only when a comm card is used. |
| M | **Modified**<br>Functions from the other groups with values changed from default. |
| F | **Fault and Diagnostic**<br>Consists of list of codes for specific fault conditions. |
| G | **AppView and CustomView**<br>Functions from the other groups organized for specific applications. |

## Control and Navigation Keys

| Display | Display State | Description |
|---|---|---|
| ENET (PowerFlex 525 only) | Off | Adapter is not connected to the network. |
| | Steady | Adapter is connected to the network and drive is controlled through Ethernet. |
| | Flashing | Adapter is connected to the network but drive is not controlled through Ethernet. |
| LINK (PowerFlex 525 only) | Off | Adapter is not connected to the network. |
| | Steady | Adapter is connected to the network but not transmitting data. |
| | Flashing | Adapter is connected to the network and transmitting data. |

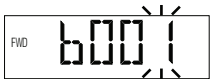
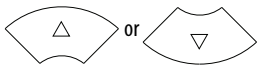
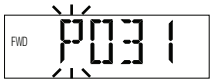
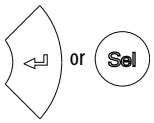
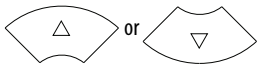
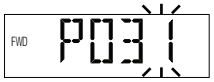
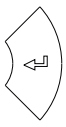
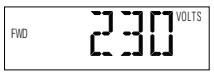
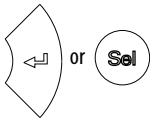
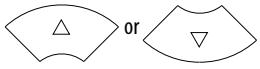
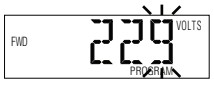
| LED | LED State | Description |
|---|---|---|
| FAULT | Flashing Red | Indicates drive is faulted. |

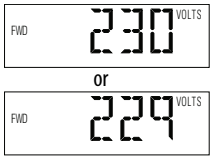
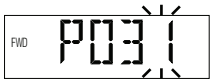
| Key | Name | Description |
|---|---|---|
|  | Up Arrow<br>Down Arrow | Scroll through user-selectable display parameters or groups.<br>Increment values. |
|  | Escape | Back one step in programming menu.<br>Cancel a change to a parameter value and exit Program Mode. |
|  | Select | Advance one step in programming menu.<br>Select a digit when viewing parameter value. |
|  | Enter | Advance one step in programming menu.<br>Save a change to a parameter value. |

| Key | Name | Description |
|---|---|---|
|  | Reverse | Used to reverse direction of the drive. Default is active.<br>Controlled by parameters P046, P048 and P050 [Start Source x] and A544 [Reverse Disable]. |
|  | Start | Used to start the drive. Default is active.<br>Controlled by parameters P046, P048 and P050 [Start Source x]. |
|  | Stop | Used to stop the drive or clear a fault.<br>This key is always active.<br>Controlled by parameter P045 [Stop Mode]. |
|  | Potentiometer | Used to control speed of drive. Default is active.<br>Controlled by parameters P047, P049 and P051 [Speed Referencex]. |

## Viewing and Editing Parameters

The following is an example of basic integral keypad and display functions. This example provides basic navigation instructions and illustrates how to program a parameter.

| Step | Key(s) | Example Display |
|---|---|---|
| 1. When power is applied, the last user-selected Basic Display Group parameter number is briefly displayed with flashing characters. The display then defaults to that parameter's current value. (Example shows the value of b001 [Output Freq] with the drive stopped.) | |  |
| 2. Press Esc to display the Basic Display Group parameter number shown on power-up. The parameter number will flash. |  |  |
| 3. Press Esc to enter the parameter group list. The parameter group letter will flash. |  |  |
| 4. Press the Up Arrow or Down Arrow to scroll through the group list (b, P, t, C, L, d, A, f and Gx). |  |  |
| 5. Press Enter or Sel to enter a group. The right digit of the last viewed parameter in that group will flash. |  |  |
| 6. Press the Up Arrow or Down Arrow to scroll through the parameter list. |  |  |
| 7. Press Enter to view the value of the parameter.<br>Or<br>Press Esc to return to the parameter list. |  |  |
| 8. Press Enter or Sel to enter Program Mode and edit the value. The right digit will flash and the word Program on the LCD display will light up. |  |  |
| 9. Press the Up Arrow or Down Arrow to change the parameter value. |  |  |

| Step | Key(s) | Example Display |
|---|---|---|
| 10. If desired, press Sel to move from digit to digit or bit to bit. The digit or bit that you can change will flash. | Sel |   |
| 11. Press Esc to cancel a change and exit Program Mode.<br>Or<br>Press Enter to save a change and exit Program Mode.<br>The digit will stop flashing and the word Program on the LCD display will turn off. | Esc or ⏎ |   |
| 12. Press Esc to return to the parameter list. Continue to press Esc to back out of the programming menu.<br>If pressing Esc does not change the display, then b001 [Output Freq] is displayed. Press Enter or Sel to enter the group list again. | Esc |   |

## Drive Programming Tools

Some features in the PowerFlex 520-series drive are not supported by older configuration software tools. It is strongly recommended that customers using such tools migrate to RSLogix 5000 (version 17.0 or greater) or Logix Designer (version 21.0 or greater) with Add-On-Profile (AOP), or Connected Components Workbench (version 5.0 or greater) to enjoy a richer, full-featured configuration experience. For Automatic Device Configuration (ADC) support, RSLogix 5000 version 20.0 or greater is required.

| Description | Catalog Number/Release Version |
|---|---|
| Connected Components Workbench(1) | Version 5.0 or greater |
| Logix Designer | Version 21.0 or greater |
| RSLogix 5000 | Version 17.0 or greater |
| Built-in USB software tool | – |
| Serial Converter Module(2) | 22-SCM-232 |
| USB Converter Module(2) | 1203-USB |
| Remote Panel Mount, LCD Display(2) | 22-HIM-C2S |
| Remote Handheld, LCD Display(2) | 22-HIM-A3 |

(1) Available as a free download at http://ab.rockwellautomation.com/programmable-controllers/connected-components-workbench-software.

(2) Does not support the new dynamic parameter groups (AppView, CustomView), and CopyCat functionality is limited to the linear parameter list.

## Language Support

| Language | Keypad/LCD Display | RSLogix 5000/ Logix Designer | Connected Components Workbench |
|---|---|---|---|
| English | Y | Y | Y |
| French | Y | Y | Y |
| Spanish | Y | Y | Y |
| Italian | Y | Y | Y |
| German | Y | Y | Y |
| Japanese | – | Y | – |
| Portuguese | Y | Y | – |
| Chinese Simplified | – | Y | Y |
| Korean | – | Y | – |

| Language | Keypad/LCD Display | RSLogix 5000/ Logix Designer | Connected Components Workbench |
|---|---|---|---|
| Polish(1) | Y | – | – |
| Turkish(1) | Y | – | – |
| Czech(1) | Y | – | – |

(1) Due to a limitation of the LCD Display, some of the characters for Polish, Turkish, and Czech will be modified.

## Smart Start-Up with Basic Program Group Parameters

The PowerFlex 520-series drive is designed so that start up is simple and efficient. The Basic Program Group contains the most commonly used parameters. See Programming and Parameters on page 71 for detailed descriptions of the parameters listed here, as well as the full list of available parameters.

= Stop drive before changing this parameter.
PF 525 = Parameter is specific to PowerFlex 525 drives only.

| No. | Parameter | Min/Max | Display/Options | Default |
|---|---|---|---|---|
| P030 | [Language] | 1/15 | 1 = English<br>2 = Français<br>3 = Español<br>4 = Italiano<br>5 = Deutsch<br>6 = Reserved<br>7 = Português<br>8 = Reserved<br>9 = Reserved<br>10 = Reserved<br>11 = Reserved<br>12 = Polish<br>13 = Reserved<br>14 = Turkish<br>15 = Czech | 1 |
| | Selects the language displayed.<br>**Important:** The setting takes effect after the drive is power cycled. | | | |
| P031 | [Motor NP Volts] | 10V (for 200V Drives), 20V (for 400V Drives), 25V (for 600V Drives)/Drive Rated Volts | 1V | Based on Drive Rating |
| | Sets the motor nameplate rated volts. | | | |
| P032 | [Motor NP Hertz] | 15/500 Hz | 1 Hz | 60 Hz |
| | Sets the motor nameplate rated frequency. | | | |
| P033 | [Motor OL Current] | 0.0/(Drive Rated Amps x 2) | 0.1 A | Based on Drive Rating |
| | Sets the motor nameplate overload current. | | | |
| P034 | [Motor NP FLA] | 0.0/(Drive Rated Amps x 2) | 0.1 A | Drive Rated Amps |
| | Sets the motor nameplate FLA. | | | |
| P035 | [Motor NP Poles] | 2/40 | 1 | 4 |
| | Sets the number of poles in the motor. | | | |
| P036 | [Motor NP RPM] | 0/24000 rpm | 1 rpm | 1750 rpm |
| | Sets the rated nameplate rpm of motor. | | | |
| P037 PF 525 | [Motor NP Power] | 0.00/Drive Rated Power | 0.01 kW | Drive Rated Power |
| | Sets the motor nameplate power. Used in PM regulator. | | | |
| P038 | [Voltage Class] | 2/3 | 2 = “480V”<br>3 = “600V” | 3 |
| | Sets the voltage class of 600V drives. Only applicable to 600V drives. | | | |

= Stop drive before changing this parameter.
PF 525 = Parameter is specific to PowerFlex 525 drives only.

| No. | Parameter | Min/Max | Display/Options | Default |
|---|---|---|---|---|
| P039 | [Torque Perf Mode] | 0/4 | 0 = "V/Hz"<br>1 = "SVC"<br>2 = "Economize"<br>3 = "Vector"(1)<br>4 = "PM Control"(1)(2)(3) | 1 |
| | Selects the motor control mode.<br>(1) Setting is specific to PowerFlex 525 drives only.<br>(2) Setting is available in PowerFlex 525 FRN 5.xxx and later.<br>(3) When P039 [Torque Perf Mode] is set to 4 and A535 [Motor Fdbk Type] is set to 0, 1, 2 or 3, the drive is in open loop PM motor control mode. When P039 [Torque Perf Mode] is set to 4 and A535 [Motor Fdbk Type] is set to 4 or 5, the drive is in closed loop PM motor control mode. | | | |
| P040 | [Autotune] | 0/2 | 0 = "Ready/Idle"<br>1 = "Static Tune"<br>2 = "Rotate Tune" | 0 |
| | Enables a static (not spinning) or dynamic (motor spinning) autotune. | | | |
| P041 | [Accel Time 1] | 0.00/600.00 s | 0.01 s | 10.00 s |
| | Sets the time for the drive to accel from 0 Hz to [Maximum Freq]. | | | |
| P042 | [Decel Time 1] | 0.00/600.00 s | 0.01 s | 10.00 s |
| | Sets the time for the drive to decel from [Maximum Freq] to 0 Hz. | | | |
| P043 | [Minimum Freq] | 0.00/500.00 Hz | 0.01 Hz | 0.00 Hz |
| | Sets the lowest frequency the drive outputs. | | | |
| P044 | [Maximum Freq] | 0.00/500.00 Hz | 0.01 Hz | 60.00 Hz |
| | Sets the highest frequency the drive outputs. | | | |
| P045 | [Stop Mode] | 0/11 | 0 = "Ramp, CF"(1)<br>1 = "Coast, CF"(1)<br>2 = "DC Brake, CF"(1)<br>3 = "DCBrkAuto,CF"(1)<br>4 = "Ramp"<br>5 = "Coast"<br>6 = "DC Brake"<br>7 = "DC BrakeAuto"<br>8 = "Ramp+EM B,CF"(1)<br>9 = "Ramp+EM Brk"<br>10 = "PointStp,CF"(1)<br>11 = "PointStop" | 0 |
| | Stop command for normal stop.<br>**Important:** I/O Terminal 01 is always a stop input. The stopping mode is determined by the drive setting.<br>**Important:** The drive is shipped with a jumper installed between I/O Terminals 01 and 11. Remove this jumper when using I/O Terminal 01 as a stop or enable input.<br>(1) Stop input also clears active fault. | | | |
| P046, P048, P050 | [Start Source 1] | 1/5 | 1 = "Keypad"(1)<br>2 = "DigIn TrmBlk"(2)<br>3 = "Serial/DSI"<br>4 = "Network Opt"<br>5 = "Ethernet/IP"(3) | P046 = 1<br>P048 = 2<br>P050 = 3 (PowerFlex 523)<br>5 (PowerFlex 525) |
| | Sets the default control scheme used to start the drive unless overriden by P048 [Start Source 2] or P050 [Start Source 3].<br>(1) When active, the Reverse key is also active unless disabled by A544 [Reverse Disable].<br>(2) If "DigIn TrmBlk" is selected, ensure that the digital inputs are properly configured.<br>(3) Setting is specific to PowerFlex 525 drives only. | | | |

= Stop drive before changing this parameter.
PF 525 = Parameter is specific to PowerFlex 525 drives only.

| No. | Parameter | Min/Max | Display/Options | Default |
|---|---|---|---|---|
| P047, P049, P051 | [Speed Reference1] | 1/16 | 1 = "Drive Pot"<br>2 = "Keypad Freq"<br>3 = "Serial/DSI"<br>4 = "Network Opt"<br>5 = "0-10V Input"<br>6 = "4-20mA Input"<br>7 = "Preset Freq"<br>8 = "Anlg In Mult"(1)<br>9 = "MOP"<br>10 = "Pulse Input"<br>11 = "PID1 Output"<br>12 = "PID2 Output"(1)<br>13 = "Step Logic"(1)<br>14 = "Encoder"(1)<br>15 = "Ethernet/IP"(1)<br>16 = "Positioning"(1) | P047 = 1<br>P049 = 5<br>P051 = 3 (PowerFlex 523)<br>15 (PowerFlex 525) |
| | Sets the default speed command of the drive unless overridden by P049 [Speed Reference2] or P051 [Speed Reference3].<br>(1) Setting is specific to PowerFlex 525 drives only. | | | |
| P052 | [Average kWh Cost] | 0.00/655.35 | 0.01 | 0.00 |
| | Sets the average cost per kWh. | | | |
| P053 | [Reset To Defalts] | 0/4 | 0 = "Ready/Idle"<br>1 = "Param Reset"<br>2 = "Factory Rset"<br>3 = "Power Reset"<br>4 = "Module Reset"(1)(2)(3) | 0 |
| | Resets parameters to their factory defaults values. After a Reset command, the value of this parameter returns to zero.<br>(1) Power cycle of the drive, **NO** parameters are reset.<br>(2) Setting is available in PowerFlex 525 FRN 5.xxx and later.<br>(3) Setting is available in PowerFlex 523 FRN 3.xxx and later. | | | |

## LCD Display with QuickView Technology

QuickView™ technology enables text to scroll across the LCD display of the PowerFlex 520-series drive. This allows you to easily configure parameters, troubleshoot faults and view diagnostic items without using a separate device.

Use parameter A556 [Text Scroll] to set the speed at which the text scrolls across the display. Select 0 "Off" to turn off text scrolling. See Language Support on page 64 for the languages supported by the PowerFlex 520-series drive.

## Using the USB Port

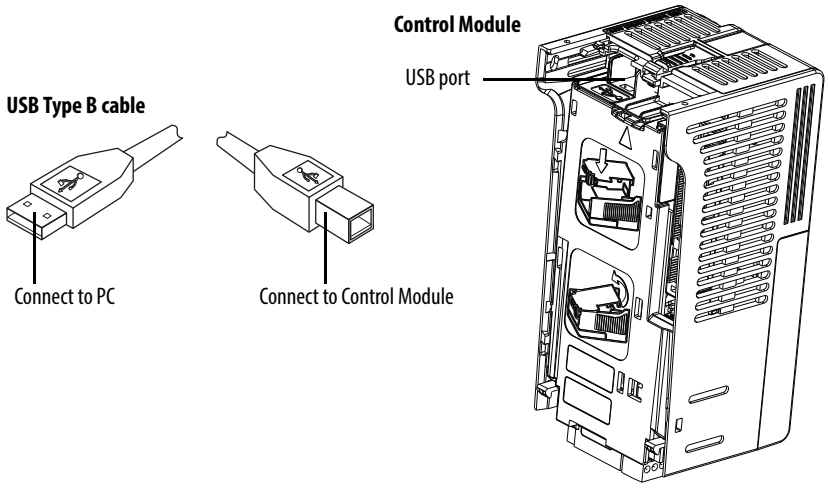
The PowerFlex 520-series drive has a USB port that connects to a PC for the purpose of upgrading drive firmware or uploading/downloading a parameter configuration.

**IMPORTANT** To use the USB feature of the PowerFlex 520-series drive, Microsoft .Net Framework 2.0 and Windows XP or later is required.

### MainsFree Programming

The MainsFree™ programming feature allows you to quickly configure your PowerFlex 520-series drive without having to power up the control module or install additional software. Simply connect the control module to your PC with a USB Type B cable and you can download a parameter configuration to your drive. You can also easily upgrade your drive with the latest firmware.

**Connecting a PowerFlex 520-series drive to a PC**

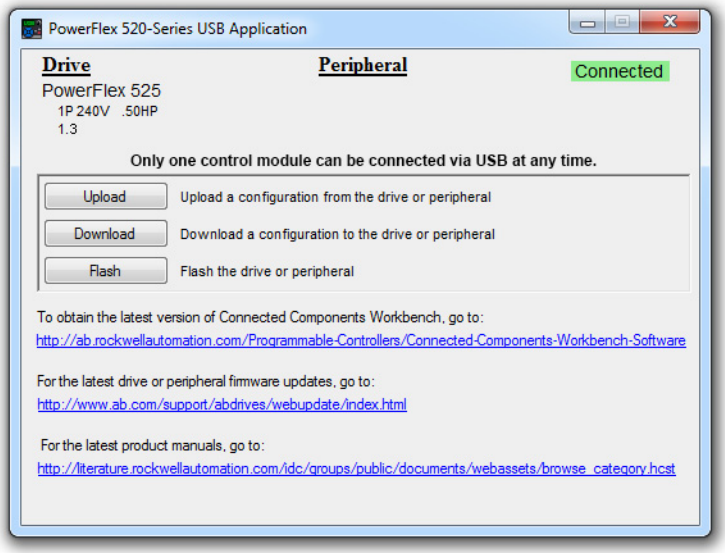



When connected, the drive appears on the PC and contains two files:

- GUIDE.PDF
  This file contains links to relevant product documentation and software downloads.
- PF52XUSB.EXE
  This file is an application to flash upgrade firmware or upload/download a parameter configuration.

  It is not possible to delete these files or add more to the drive.

Double-click on the PF52XUSB.EXE file to launch the USB utility application. The main menu is displayed. Follow the program instructions to upgrade the firmware or upload/download configuration data.




**IMPORTANT** Make sure your PC is powered by an AC power outlet or has a fully charged battery before starting any operation. This prevents the operation from terminating before completion due to insufficient power.

## Limitation in Downloading .pf5 Configuration Files with the USB Utility Application

Before downloading a .pf5 configuration file using the USB utility application, parameter C169 [MultiDrv Sel] in the destination drive must match the incoming configuration file. If it does not, set the parameter manually to match and then cycle drive power. Also, the drive type of the .pf5 file must match the drive.

This means you cannot apply a multi-drive configuration using the USB utility application to a drive in single mode (parameter C169 [MultiDrv Sel] set to 0 “Disabled”), or apply a single mode configuration to a drive in multi-drive mode.

## Notes:

# Programming and Parameters

This chapter provides a complete listing and description of the PowerFlex 520-series drive parameters. Parameters are programmed (viewed/edited) using either the drive's built-in keypad, RSLogix 5000 version 17.0 or greater, Logix Designer version 21.0 or greater, o r Connected Components Workbench version 5.0 or greater software. The Connected Components Workbench software can be used offline (through USB) to upload parameter configurations to the drive or online (through Ethernet connection).

Limited functionality is also available when using the Connected Components Workbench software online (through DSI and serial converter module), a legacy external HIM, or legacy software online (DriveTools SP™). When using these methods, the parameter list can only be displayed linearly, and there is no access to communications option card programming.



## About Parameters

To configure a drive to operate in a specific way, drive parameters may have to be set. Three types of parameters exist:

- **ENUM**
  ENUM parameters allow a selection from 2 or more items. Each item is represented by a number.
- **Numeric Parameters**
  These parameters have a single numerical value (0.1V).

- **Bit Parameters**
  Bit parameters have five individual digits associated with features or conditions. If the digit is 0, the feature is off or the condition is false. If the digit is 1, the feature is on or the condition is true.

Some parameters are marked as follows.

= Stop drive before changing this parameter.

= 32 bit parameter.

= Parameter is specific to PowerFlex 525 drives only.

### *32-bit Parameters*

Parameters marked 32-bit will have two parameter numbers when using RS485 communications and programming software. For example, parameters b010 [Process Display] and b011 [Process Fract] are scaled and displayed as follows.

- P043 [Minimum Freq] = 0 Hz
- P044 [Maximum Freq] = 60 Hz
- A481 [Process Display Lo] = 0
- A482 [Process Display Hi] = 10

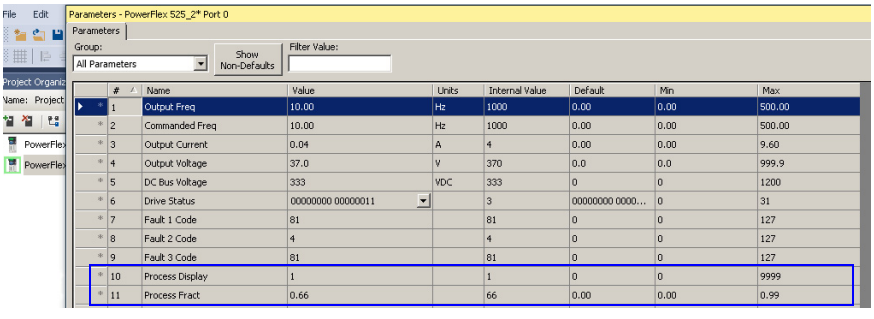
Using the forumla,

$$\text{Scaled Process Value (PV)} = \frac{([\text{Process Disp Hi}] - [\text{Process Disp Lo}]) \times ([\text{Output Freq}] - [\text{Minimum Freqp}])}{[\text{Maximum Freq}] - [\text{Minimum Freq}]}$$

when the drive is running at 10 Hz, the Process Value will be 1.66.

On the drive LCD display, only parameter b010 [Process Display] is shown.


In Connected Components Workbench software, parameter b010 [Process Display] and b011 [Process Fract] are shown separately.



# Parameter Groups

For an alphabetical listing of parameters, see Parameter Cross Reference by Name on page 152.

| **Basic Display** | | Output Voltage | b004 | Control Source | b012 | Elapsed Run Time | b019 | Accum CO2 Sav | b026 |
|---|---|---|---|---|---|---|---|---|---|
|  | | DC Bus Voltage | b005 | Contrl In Status | b013 | Average Power | b020 | Drive Temp | b027 |
| | | Drive Status | b006 | Dig In Status | b014 | Elapsed kWh | b021 | Control Temp | b028 |
| | | Fault 1 Code | b007 | Output RPM | b015 | Elapsed MWh | b022 | Control SW Ver | b029 |
| Output Freq | b001 | Fault 2 Code | b008 | Output Speed | b016 | Energy Saved | b023 | | |
| Commanded Freq | b002 | Fault 3 Code | b009 | Output Power | b017 | Accum kWh Sav | b024 | | |
| Output Current | b003 | Process Display | b010 | Power Saved | b018 | Accum Cost Sav | b025 | | |
| **Basic Program** | | Motor NP Hertz | P032 | Voltage Class | P038 | Maximum Freq | P044 | Start Source 3 | P050 |
|  | | Motor OL Current | P033 | Torque Perf Mode | P039 | Stop Mode | P045 | Speed Reference3 | P051 |
| | | Motor NP FLA | P034 | Autotune | P040 | Start Source 1 | P046 | Average kWh Cost | P052 |
| | | Motor NP Poles | P035 | Accel Time 1 | P041 | Speed Reference1 | P047 | Reset To Defalts | P053 |
| Language | P030 | Motor NP RPM | P036 | Decel Time 1 | P042 | Start Source 2 | P048 | | |
| Motor NP Volts | P031 | Motor NP Power[1] | P037 | Minimum Freq | P043 | Speed Reference2 | P049 | | |
| **Terminal Blocks** | | DigIn TermBlk 07[1] | t067 | Relay 1 On Time | t079 | Analog Out High[2] | t089 | Anlg Loss Delay | t098 |
|  | | DigIn TermBlk 08[1] | t068 | Relay 1 Off Time | t080 | Anlg Out Setpt[2] | t090 | Analog In Filter | t099 |
| | | Opto Out1 Sel[1] | t069 | Relay Out2 Sel[1] | t081 | Anlg In 0-10V Lo | t091 | Sleep-Wake Sel | t100 |
| | | Opto Out1 Level[1] | t070 | Relay Out2 Level[1] | t082 | Anlg In 0-10V Hi | t092 | Sleep Level | t101 |
| DigIn TermBlk 02 | t062 | Opto Out2 Sel[1] | t072 | Relay 2 On Time[1] | t084 | 10V Bipolar Enbl[1] | t093 | Sleep Time | t102 |
| DigIn TermBlk 03 | t063 | Opto Out2 Level[1] | t073 | Relay 2 Off Time[1] | t085 | Anlg In V Loss | t094 | Wake Level | t103 |
| 2-Wire Mode | t064 | Opto Out Logic[1] | t075 | EM Brk Off Delay | t086 | Anlg In4-20mA Lo | t095 | Wake Time | t104 |
| DigIn TermBlk 05 | t065 | Relay Out1 Sel | t076 | EM Brk On Delay | t087 | Anlg In4-20mA Hi | t096 | Safety Open En[1] | t105 |
| DigIn TermBlk 06 | t066 | Relay Out1 Level | t077 | Analog Out Sel[2] | t088 | Anlg In mA Loss | t097 | SafetyFlt RstCfg[1][3] | t106 |
| **Communications** | | EN Addr Sel[1] | C128 | EN Gateway Cfg 3[1] | C139 | EN Data In 1[1] | C153 | Opt Data In 4 | C164 |
|  | | EN IP Addr Cfg 1[1] | C129 | EN Gateway Cfg 4[1] | C140 | EN Data In 2[1] | C154 | Opt Data Out 1 | C165 |
| | | EN IP Addr Cfg 2[1] | C130 | EN Rate Cfg[1] | C141 | EN Data In 3[1] | C155 | Opt Data Out 2 | C166 |
| | | EN IP Addr Cfg 3[1] | C131 | EN Comm Flt Actn[1] | C143 | EN Data In 4[1] | C156 | Opt Data Out 3 | C167 |
| Comm Write Mode | C121 | EN IP Addr Cfg 4[1] | C132 | EN Idle Flt Actn[1] | C144 | EN Data Out 1[1] | C157 | Opt Data Out 4 | C168 |
| Cmd Stat Select[1] | C122 | EN Subnet Cfg 1[1] | C133 | EN Flt Cfg Logic[1] | C145 | EN Data Out 2[1] | C158 | MultiDrv Sel | C169 |
| RS485 Data Rate | C123 | EN Subnet Cfg 2[1] | C134 | EN Flt Cfg Ref[1] | C146 | EN Data Out 3[1] | C159 | Drv 1 Addr | C171 |
| RS485 Node Addr | C124 | EN Subnet Cfg 3[1] | C135 | EN Flt Cfg DL 1[1] | C147 | EN Data Out 4[1] | C160 | Drv 2 Addr | C172 |
| Comm Loss Action | C125 | EN Subnet Cfg 4[1] | C136 | EN Flt Cfg DL 2[1] | C148 | Opt Data In 1 | C161 | Drv 3 Addr | C173 |
| Comm Loss Time | C126 | EN Gateway Cfg 1[1] | C137 | EN Flt Cfg DL 3[1] | C149 | Opt Data In 2 | C162 | Drv 4 Addr | C174 |
| RS485 Format | C127 | EN Gateway Cfg 2[1] | C138 | EN Flt Cfg DL 4[1] | C150 | Opt Data In 3 | C163 | DSI I/O Cfg | C175 |
| **Logic**[1] | | Stp Logic 2 | L182 | Stp Logic Time 0 | L190 | Stp Logic Time 6 | L196 | Step Units 4 | L208 |
|  | | Stp Logic 3 | L183 | Stp Logic Time 1 | L191 | Stp Logic Time 7 | L197 | Step Units 5 | L210 |
| | | Stp Logic 4 | L184 | Stp Logic Time 2 | L192 | Step Units 0 | L200 | Step Units 6 | L212 |
| | | Stp Logic 5 | L185 | Stp Logic Time 3 | L193 | Step Units 1 | L202 | Step Units 7 | L214 |
| Stp Logic 0 | L180 | Stp Logic 6 | L186 | Stp Logic Time 4 | L194 | Step Units 2 | L204 | | |
| Stp Logic 1 | L181 | Stp Logic 7 | L187 | Stp Logic Time 5 | L195 | Step Units 3 | L206 | | |
| **Advanced Display** | | Elapsed Time-min | d363 | Speed Feedback | d376 | PID2 Fdbk Displ[1] | d385 | RdyBit Mode Act[2][4] | d392 |
|  | | Counter Status | d364 | Encoder Speed[2] | d378 | PID2 Setpnt Disp[1] | d386 | Drive Status 2[2][3] | d393 |
| | | Timer Status | d365 | DC Bus Ripple | d380 | Position Status[1] | d387 | Dig Out Status[2][3] | d394 |
| | | Drive Type | d367 | Output Powr Fctr | d381 | Units Traveled H[1] | d388 | | |
| Analog In 0-10V | d360 | Testpoint Data | d368 | Torque Current | d382 | Units Traveled L[1] | d389 | | |
| Analog In 4-20mA | d361 | Motor OL Level | d369 | PID1 Fdbk Displ | d383 | Fiber Status | d390 | | |
| Elapsed Time-hr | d362 | Slip Hz Meter | d375 | PID1 Setpnt Disp | d384 | Stp Logic Status[1] | d391 | | |

| **Advanced Program** | | Accel Time 2 | A442 | PID 2 Preload[1] | A478 | PM HIFI NS Cur[1][3] | A519 | Reset Meters | A555 |
|---|---|---|---|---|---|---|---|---|---|
|  | | Decel Time 2 | A443 | PID 2 Invert Err[1] | A479 | PM Bus Reg Kd[1][3] | A520 | Text Scroll | A556 |
| | | Accel Time 3 | A444 | Process Disp Lo | A481 | Freq 1 Kp[1] | A521 | Out Phas Loss En | A557 |
| | | Decel Time 3 | A445 | Process Disp Hi | A482 | Freq 1 Ki[1] | A522 | Positioning Mode[1] | A558 |
| Preset Freq 0 | A410 | Accel Time 4 | A446 | Testpoint Sel | A483 | Freq 2 Kp[1] | A523 | Counts Per Unit[1] | A559 |
| Preset Freq 1 | A411 | Decel Time 4 | A447 | Current Limit 1 | A484 | Freq 2 Ki[1] | A524 | Enh Control Word[1] | A560 |
| Preset Freq 2 | A412 | Skip Frequency 1 | A448 | Current Limit 2[1] | A485 | Freq 3 Kp[1] | A525 | Home Save[1] | A561 |
| Preset Freq 3 | A413 | Skip Freq Band 1 | A449 | Shear Pin1 Level | A486 | Freq 3 Ki[1] | A526 | Find Home Freq[1] | A562 |
| Preset Freq 4 | A414 | Skip Frequency 2 | A450 | Shear Pin 1 Time | A487 | PM FWKn 1 Kp[1][3] | A527 | Find Home Dir[1] | A563 |
| Preset Freq 5 | A415 | Skip Freq Band 2 | A451 | Shear Pin2 Level[1] | A488 | PM FWKn 2 Kp[1][3] | A528 | Encoder Pos Tol[1] | A564 |
| Preset Freq 6 | A416 | Skip Frequency 3[1] | A452 | Shear Pin 2 Time[1] | A489 | PM Control Cfg[1][3] | A529 | Pos Reg Filter[1] | A565 |
| Preset Freq 7 | A417 | Skip Freq Band 3[1] | A453 | Load Loss Level[1] | A490 | Boost Select | A530 | Pos Reg Gain[1] | A566 |
| Preset Freq 8[1] | A418 | Skip Frequency 4[1] | A454 | Load Loss Time[1] | A491 | Start Boost | A531 | Max Traverse | A567 |
| Preset Freq 9[1] | A419 | Skip Freq Band 4[1] | A455 | Stall Fault Time | A492 | Break Voltage | A532 | Traverse Inc | A568 |
| Preset Freq 10[1] | A420 | PID 1 Trim Hi | A456 | Motor OL Select | A493 | Break Frequency | A533 | Traverse Dec | A569 |
| Preset Freq 11[1] | A421 | PID 1 Trim Lo | A457 | Motor OL Ret | A494 | Maximum Voltage | A534 | P Jump | A570 |
| Preset Freq 12[1] | A422 | PID 1 Trim Sel | A458 | Drive OL Mode | A495 | Motor Fdbk Type[2] | A535 | Sync Time | A571 |
| Preset Freq 13[1] | A423 | PID 1 Ref Sel | A459 | IR Voltage Drop | A496 | Encoder PPR[1] | A536 | Speed Ratio | A572 |
| Preset Freq 14[1] | A424 | PID 1 Fdback Sel | A460 | Flux Current Ref | A497 | Pulse In Scale | A537 | Mtr Options Cfg[2][5] | A573 |
| Preset Freq 15[1] | A425 | PID 1 Prop Gain | A461 | Motor Rr[1] | A498 | Ki Speed Loop[2] | A538 | RdyBit Mode Cfg[2][4] | A574 |
| Keypad Freq | A426 | PID 1 Integ Time | A462 | Motor Lm[1] | A499 | Kp Speed Loop[2] | A539 | Flux Braking En[2][3] | A575 |
| MOP Freq | A427 | PID 1 Diff Rate | A463 | Motor Lx[1] | A500 | Var PWM Disable | A540 | Phase Loss Level[2][3] | A576 |
| MOP Reset Sel | A428 | PID 1 Setpoint | A464 | PM IR Voltage[1][3] | A501 | Auto Rstrt Tries | A541 | Current Loop BW[1][3] | A580 |
| MOP Preload | A429 | PID 1 Deadband | A465 | PM IXd Voltage[1][3] | A502 | Auto Rstrt Delay | A542 | PM Stable 1 Freq[1][3] | A581 |
| MOP Time | A430 | PID 1 Preload | A466 | PM IXq Voltage[1][3] | A503 | Start At PowerUp | A543 | PM Stable 2 Freq[1][3] | A582 |
| Jog Frequency | A431 | PID 1 Invert Err | A467 | PM BEMF Voltage[1][3] | A504 | Reverse Disable | A544 | PM Stable 1 Kp[1][3] | A583 |
| Jog Accel/Decel | A432 | PID 2 Trim Hi[1] | A468 | Speed Reg Sel[1] | A509 | Flying Start En | A545 | PM Stable 2 Kp[1][3] | A584 |
| Purge Frequency | A433 | PID 2 Trim Lo[1] | A469 | Freq 1[1] | A510 | FlyStrt CurLimit | A546 | PM Stable Brk Pt[1][3] | A585 |
| DC Brake Time | A434 | PID 2 Trim Sel[1] | A470 | Freq 1 BW[1] | A511 | Compensation | A547 | PM Stepload Kp[1][3] | A586 |
| DC Brake Level | A435 | PID 2 Ref Sel[1] | A471 | Freq 2[1] | A512 | Power Loss Mode | A548 | PM 1 Efficiency[1][3] | A587 |
| DC Brk Time@Strt | A436 | PID 2 Fdback Sel[1] | A472 | Freq 2 BW[1] | A513 | Half Bus Enable | A549 | PM 2 Efficiency[1][3] | A588 |
| DB Resistor Sel | A437 | PID 2 Prop Gain[1] | A473 | Freq 3[1] | A514 | Bus Reg Enable | A550 | PM Algor Sel[1][3] | A589 |
| DB Threshold | A438 | PID 2 Integ Time[1] | A474 | Freq 3 BW[1] | A515 | Fault Clear | A551 | | |
| S Curve % | A439 | PID 2 Diff Rate[1] | A475 | PM Initial Sel[1][3] | A516 | Program Lock | A552 | | |
| PWM Frequency | A440 | PID 2 Setpoint[1] | A476 | PM DC Inject Cur[1][3] | A517 | Program Lock Mod | A553 | | |
| Droop Hertz@ FLA[1] | A441 | PID 2 Deadband[1] | A477 | PM Align Time[1][3] | A518 | Drv Ambient Sel | A554 | | |

| | |
|---|---|
| **Network**  | This group contains parameters for the network option card that is installed.<br>See the network option card's user manual for more information on the available parameters. |
| **Modified**  | This group contains parameters that have their values changed from the factory default.<br>When a parameter has its default value changed, it is automatically added to this group. When a parameter has its value changed back to the factory default, it is automatically removed from this group. |

| **Fault and Diagnostic** | |
|---|---|
|  | |
| Fault 4 Code | F604 |
| Fault 5 Code | F605 |
| Fault 6 Code | F606 |
| Fault 7 Code | F607 |
| Fault 8 Code | F608 |
| Fault 9 Code | F609 |
| Fault10 Code | F610 |
| Fault 1 Time-hr | F611 |
| Fault 2 Time-hr | F612 |
| Fault 3 Time-hr | F613 |
| Fault 4 Time-hr | F614 |
| Fault 5 Time-hr | F615 |
| Fault 6 Time-hr(1) | F616 |
| Fault 7 Time-hr(1) | F617 |
| Fault 8 Time-hr(1) | F618 |
| Fault 9 Time-hr(1) | F619 |
| Fault10 Time-hr(1) | F620 |
| Fault 1 Time-min | F621 |
| Fault 2 Time-min | F622 |
| Fault 3 Time-min | F623 |
| Fault 4 Time-min | F624 |
| Fault 5 Time-min | F625 |
| Fault 6 Time-min(1) | F626 |
| Fault 7 Time-min(1) | F627 |
| Fault 8 Time-min(1) | F628 |
| Fault 9 Time-min(1) | F629 |
| Fault10 Time-min(1) | F630 |
| Fault 1 Freq | F631 |
| Fault 2 Freq | F632 |
| Fault 3 Freq | F633 |
| Fault 4 Freq | F634 |
| Fault 5 Freq | F635 |
| Fault 6 Freq(1) | F636 |
| Fault 7 Freq(1) | F637 |
| Fault 8 Freq(1) | F638 |
| Fault 9 Freq(1) | F639 |
| Fault10 Freq(1) | F640 |
| Fault 1 Current | F641 |
| Fault 2 Current | F642 |
| Fault 3 Current | F643 |
| Fault 4 Current | F644 |
| Fault 5 Current | F645 |
| Fault 6 Current(1) | F646 |
| Fault 7 Current(1) | F647 |
| Fault 8 Current(1) | F648 |
| Fault 9 Current(1) | F649 |
| Fault10 Current(1) | F650 |
| Fault 1 BusVolts | F651 |
| Fault 2 BusVolts | F652 |
| Fault 3 BusVolts | F653 |
| Fault 4 BusVolts | F654 |
| Fault 5 BusVolts | F655 |
| Fault 6 BusVolts(1) | F656 |
| Fault 7 BusVolts(1) | F657 |
| Fault 8 BusVolts(1) | F658 |
| Fault 9 BusVolts(1) | F659 |
| Fault10 BusVolts(1) | F660 |
| Status @ Fault 1 | F661 |
| Status @ Fault 2 | F662 |
| Status @ Fault 3 | F663 |
| Status @ Fault 4 | F664 |
| Status @ Fault 5 | F665 |
| Status @ Fault 6(1) | F666 |
| Status @ Fault 7(1) | F667 |
| Status @ Fault 8(1) | F668 |
| Status @ Fault 9(1) | F669 |
| Status @ Fault10(1) | F670 |
| Comm Sts - DSI | F681 |
| Comm Sts - Opt | F682 |
| Com Sts-Emb Enet(1) | F683 |
| EN Addr Src(1) | F684 |
| EN Rate Act(1) | F685 |
| DSI I/O Act | F686 |
| HW Addr 1(1) | F687 |
| HW Addr 2(1) | F688 |
| HW Addr 3(1) | F689 |
| HW Addr 4(1) | F690 |
| HW Addr 5(1) | F691 |
| HW Addr 6(1) | F692 |
| EN IP Addr Act 1(1) | F693 |
| EN IP Addr Act 2(1) | F694 |
| EN IP Addr Act 3(1) | F695 |
| EN IP Addr Act 4(1) | F696 |
| EN Subnet Act 1(1) | F697 |
| EN Subnet Act 2(1) | F698 |
| EN Subnet Act 3(1) | F699 |
| EN Subnet Act 4(1) | F700 |
| EN Gateway Act 1(1) | F701 |
| EN Gateway Act 2(1) | F702 |
| EN Gateway Act 3(1) | F703 |
| EN Gateway Act 4(1) | F704 |
| Drv 0 Logic Cmd | F705 |
| Drv 0 Reference | F706 |
| Drv 0 Logic Sts | F707 |
| Drv 0 Feedback | F708 |
| Drv 1 Logic Cmd | F709 |
| Drv 1 Reference | F710 |
| Drv 1 Logic Sts | F711 |
| Drv 1 Feedback | F712 |
| Drv 2 Logic Cmd | F713 |
| Drv 2 Reference | F714 |
| Drv 2 Logic Sts | F715 |
| Drv 2 Feedback | F716 |
| Drv 3 Logic Cmd | F717 |
| Drv 3 Reference | F718 |
| Drv 3 Logic Sts | F719 |
| Drv 3 Feedback | F720 |
| Drv 4 Logic Cmd | F721 |
| Drv 4 Reference | F722 |
| Drv 4 Logic Sts | F723 |
| Drv 4 Feedback | F724 |
| EN Rx Overruns(1) | F725 |
| EN Rx Packets(1) | F726 |
| EN Rx Errors(1) | F727 |
| EN Tx Packets(1) | F728 |
| EN Tx Errors(1) | F729 |
| EN Missed IO Pkt(1) | F730 |
| DSI Errors | F731 |

(1) Parameter is specific to PowerFlex 525 drives only.
(2) Parameter is also available in PowerFlex 523 FRN 3.xxx and later.
(3) Parameter is available in PowerFlex 525 FRN 5.xxx and later.
(4) Parameter is available in PowerFlex 525 FRN 3.xxx and later.
(5) Parameter is available in PowerFlex 525 FRN 2.xxx and later.

## AppView Parameter Groups

PowerFlex 520-series drives include various AppView™ parameter groups that groups certain parameters together for quick and easy access based on different types of applications. See AppView Parameter Groups on page 150 for more information.

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| **Conveyor** | | Motor NP Volts | P031 | Decel Time 1 | P042 | DigIn TermBlk 03 | t063 | Anlg In mA Loss | t097 |
|  | | Motor NP Hertz | P032 | Minimum Freq | P043 | Opto Out1 Sel | t069 | Slip Hz Meter | d375 |
| | | Motor OL Current | P033 | Maximum Freq | P044 | Relay Out1 Sel | t076 | Preset Freq 0 | A410 |
| | | Motor NP FLA | P034 | Stop Mode | P045 | Anlg In 0-10V Lo | t091 | Jog Frequency | A431 |
| Language | P030 | Motor NP Poles | P035 | Start Source 1 | P046 | Anlg In 0-10V Hi | t092 | Jog Accel/Decel | A432 |
| Output Freq | b001 | Autotune | P040 | Speed Reference1 | P047 | Anlg In4-20mA Lo | t095 | S Curve % | A439 |
| Commanded Freq | b002 | Accel Time 1 | P041 | DigIn TermBlk 02 | t062 | Anlg In4-20mA Hi | t096 | Reverse Disable | A544 |
| **Mixer** | | Commanded Freq | b002 | Motor NP Poles | P035 | Stop Mode | P045 | Anlg In4-20mA Lo | t095 |
|  | | Output Current | b003 | Autotune | P040 | Start Source 1 | P046 | Anlg In4-20mA Hi | t096 |
| | | Motor NP Volts | P031 | Accel Time 1 | P041 | Speed Reference1 | P047 | Anlg In mA Loss | t097 |
| | | Motor NP Hertz | P032 | Decel Time 1 | P042 | Relay Out1 Sel | t076 | Preset Freq 0 | A410 |
| Language | P030 | Motor OL Current | P033 | Minimum Freq | P043 | Anlg In 0-10V Lo | t091 | Stall Fault Time | A492 |
| Output Freq | b001 | Motor NP FLA | P034 | Maximum Freq | P044 | Anlg In 0-10V Hi | t092 | | |
| **Compressor** | | Motor NP Hertz | P032 | Maximum Freq | P044 | Anlg In 0-10V Lo | t091 | Start At PowerUp | A543 |
|  | | Motor OL Current | P033 | Stop Mode | P045 | Anlg In 0-10V Hi | t092 | Reverse Disable | A544 |
| | | Motor NP FLA | P034 | Start Source 1 | P046 | Anlg In4-20mA Lo | t095 | Power Loss Mode | A548 |
| | | Motor NP Poles | P035 | Speed Reference1 | P047 | Anlg In4-20mA Hi | t096 | Half Bus Enable | A549 |
| Language | P030 | Autotune | P040 | Relay Out1 Sel | t076 | Anlg In mA Loss | t097 | | |
| Output Freq | b001 | Accel Time 1 | P041 | Analog Out Sel | t088 | Preset Freq 0 | A410 | | |
| Commanded Freq | b002 | Decel Time 1 | P042 | Analog Out High | t089 | Auto Rstrt Tries | A541 | | |
| Motor NP Volts | P031 | Minimum Freq | P043 | Anlg Out Setpt | t090 | Auto Rstrt Delay | A542 | | |
| **Centrifugal Pump** | | Motor OL Current | P033 | Start Source 1 | P046 | Anlg In4-20mA Hi | t096 | PID 1 Diff Rate | A463 |
|  | | Motor NP FLA | P034 | Speed Reference1 | P047 | Anlg In mA Loss | t097 | PID 1 Setpoint | A464 |
| | | Motor NP Poles | P035 | Relay Out1 Sel | t076 | Preset Freq 0 | A410 | PID 1 Deadband | A465 |
| | | Autotune | P040 | Analog Out Sel | t088 | PID 1 Trim Hi | A456 | PID 1 Preload | A466 |
| Language | P030 | Accel Time 1 | P041 | Analog Out High | t089 | PID 1 Trim Lo | A457 | Auto Rstrt Tries | A541 |
| Output Freq | b001 | Decel Time 1 | P042 | Anlg Out Setpt | t090 | PID 1 Ref Sel | A459 | Auto Rstrt Delay | A542 |
| Commanded Freq | b002 | Minimum Freq | P043 | Anlg In 0-10V Lo | t091 | PID 1 Fdback Sel | A460 | Start At PowerUp | A543 |
| Motor NP Volts | P031 | Maximum Freq | P044 | Anlg In 0-10V Hi | t092 | PID 1 Prop Gain | A461 | Reverse Disable | A544 |
| Motor NP Hertz | P032 | Stop Mode | P045 | Anlg In4-20mA Lo | t095 | PID 1 Integ Time | A462 | | |
| **Blower/Fan** | | Motor OL Current | P033 | Start Source 1 | P046 | Anlg In4-20mA Hi | t096 | PID 1 Diff Rate | A463 |
|  | | Motor NP FLA | P034 | Speed Reference1 | P047 | Anlg In mA Loss | t097 | PID 1 Setpoint | A464 |
| | | Motor NP Poles | P035 | Relay Out1 Sel | t076 | Preset Freq 0 | A410 | PID 1 Deadband | A465 |
| | | Autotune | P040 | Analog Out Sel | t088 | PID 1 Trim Hi | A456 | PID 1 Preload | A466 |
| Language | P030 | Accel Time 1 | P041 | Analog Out High | t089 | PID 1 Trim Lo | A457 | Auto Rstrt Tries | A541 |
| Output Freq | b001 | Decel Time 1 | P042 | Anlg Out Setpt | t090 | PID 1 Ref Sel | A459 | Auto Rstrt Delay | A542 |
| Commanded Freq | b002 | Minimum Freq | P043 | Anlg In 0-10V Lo | t091 | PID 1 Fdback Sel | A460 | Start At PowerUp | A543 |
| Motor NP Volts | P031 | Maximum Freq | P044 | Anlg In 0-10V Hi | t092 | PID 1 Prop Gain | A461 | Reverse Disable | A544 |
| Motor NP Hertz | P032 | Stop Mode | P045 | Anlg In4-20mA Lo | t095 | PID 1 Integ Time | A462 | Flying Start En | A545 |

| **Extruder** | | Motor NP Hertz | P032 | Stop Mode | P045 | Anlg In4-20mA Lo | t095 | Encoder PPR | A536 |
|---|---|---|---|---|---|---|---|---|---|
|  | | Motor OL Current | P033 | Start Source 1 | P046 | Anlg In4-20mA Hi | t096 | Pulse In Scale | A537 |
| | | Motor NP FLA | P034 | Speed Reference1 | P047 | Anlg In mA Loss | t097 | Ki Speed Loop | A538 |
| | | Motor NP Poles | P035 | Relay Out1 Sel | t076 | Slip Hz Meter | d375 | Kp Speed Loop | A539 |
| Language | P030 | Autotune | P040 | Analog Out Sel | t088 | Speed Feedback | d376 | Power Loss Mode | A548 |
| Output Freq | b001 | Accel Time 1 | P041 | Analog Out High | t089 | Encoder Speed | d378 | Half Bus Enable | A549 |
| Commanded Freq | b002 | Decel Time 1 | P042 | Anlg Out Setpt | t090 | Preset Freq 0 | A410 | | |
| Output Current | b003 | Minimum Freq | P043 | Anlg In 0-10V Lo | t091 | Stall Fault Time | A492 | | |
| Motor NP Volts | P031 | Maximum Freq | P044 | Anlg In 0-10V Hi | t092 | Motor Fdbk Type | A535 | | |
| **Positioning**(1) | | Stop Mode | P045 | Stp Logic 5 | L185 | Step Units 6 | L212 | Jog Accel/Decel | A432 |
|  | | Start Source 1 | P046 | Stp Logic 6 | L186 | Step Units 7 | L214 | DB Threshold | A438 |
| | | Speed Reference1 | P047 | Stp Logic 7 | L187 | Slip Hz Meter | d375 | S Curve % | A439 |
| | | DigIn TermBlk 02 | t062 | Stp Logic Time 0 | L190 | Speed Feedback | d376 | Motor Fdbk Type | A535 |
| Language | P030 | DigIn TermBlk 03 | t063 | Stp Logic Time 1 | L191 | Encoder Speed | d378 | Encoder PPR | A536 |
| Output Freq | b001 | DigIn TermBlk 05 | t065 | Stp Logic Time 2 | L192 | Units Traveled H | d388 | Pulse In Scale | A537 |
| Commanded Freq | b002 | DigIn TermBlk 06 | t066 | Stp Logic Time 3 | L193 | Units Traveled L | d389 | Ki Speed Loop | A538 |
| Motor NP Volts | P031 | Opto Out1 Sel | t069 | Stp Logic Time 4 | L194 | Preset Freq 0 | A410 | Kp Speed Loop | A539 |
| Motor NP Hertz | P032 | Opto Out2 Sel | t072 | Stp Logic Time 5 | L195 | Preset Freq 1 | A411 | Bus Reg Enable | A550 |
| Motor OL Current | P033 | Relay Out1 Sel | t076 | Stp Logic Time 6 | L196 | Preset Freq 2 | A412 | Positioning Mode | A558 |
| Motor NP FLA | P034 | EM Brk Off Delay | t086 | Stp Logic Time 7 | L197 | Preset Freq 3 | A413 | Counts Per Unit | A559 |
| Motor NP Poles | P035 | EM Brk On Delay | t087 | Step Units 0 | L200 | Preset Freq 4 | A414 | Enh Control Word | A560 |
| Autotune | P040 | Stp Logic 0 | L180 | Step Units 1 | L202 | Preset Freq 5 | A415 | Find Home Freq | A562 |
| Accel Time 1 | P041 | Stp Logic 1 | L181 | Step Units 2 | L204 | Preset Freq 6 | A416 | Find Home Dir | A563 |
| Decel Time 1 | P042 | Stp Logic 2 | L182 | Step Units 3 | L206 | Preset Freq 7 | A417 | Encoder Pos Tol | A564 |
| Minimum Freq | P043 | Stp Logic 3 | L183 | Step Units 4 | L208 | Preset Freq 8 | A418 | Pos Reg Filter | A565 |
| Maximum Freq | P044 | Stp Logic 4 | L184 | Step Units 5 | L210 | Jog Frequency | A431 | Pos Reg Gain | A566 |
| **Textile/Fiber** | | Motor NP FLA | P034 | DigIn TermBlk 02 | t062 | Slip Hz Meter | d375 | Max Traverse | A567 |
|  | | Motor NP Poles | P035 | DigIn TermBlk 03 | t063 | Fiber Status | d390 | Traverse Inc | A568 |
| | | Autotune | P040 | Opto Out1 Sel | t069 | Preset Freq 0 | A410 | Traverse Dec | A569 |
| | | Accel Time 1 | P041 | Opto Out2 Sel | t072 | Jog Frequency | A431 | P Jump | A570 |
| Language | P030 | Decel Time 1 | P042 | Relay Out1 Sel | t076 | Jog Accel/Decel | A432 | Sync Time | A571 |
| Output Freq | b001 | Minimum Freq | P043 | Anlg In 0-10V Lo | t091 | S Curve % | A439 | Speed Ratio | A572 |
| Commanded Freq | b002 | Maximum Freq | P044 | Anlg In 0-10V Hi | t092 | Reverse Disable | A544 | | |
| Motor NP Volts | P031 | Stop Mode | P045 | Anlg In4-20mA Lo | t095 | Power Loss Mode | A548 | | |
| Motor NP Hertz | P032 | Start Source 1 | P046 | Anlg In4-20mA Hi | t096 | Half Bus Enable | A549 | | |
| Motor OL Current | P033 | Speed Reference1 | P047 | Anlg In mA Loss | t097 | Bus Reg Enable | A550 | | |

(1) This AppView parameter group is specific to PowerFlex 525 drives only.

## CustomView Parameter Group

PowerFlex 520-series drives include a CustomView™ parameter group for you to store frequently used parameters for your application. See CustomView Parameter Group on page 151 for more information.

| **Custom Group** | |
|---|---|
|  | This group can store up to 100 parameters. |

# Basic Display Group

**b001 [Output Freq]** Related Parameter(s): b002, b010, P043, P044, P048, P050, P052

Output frequency present at T1, T2 & T3 (U, V & W). Does not include slip frequency.

| | | |
|---|---|---|
| **Values** | Default: | Read Only |
| | Min/Max: | 0.00/[Maximum Freq] |
| | Display: | 0.01 Hz |

**b002 [Commanded Freq]** Related Parameter(s): b001, b013, P043, P044, P048, P050, P052

Value of the active frequency command even if the drive is not running.

**IMPORTANT** The frequency command can come from a number of sources. See Start and Speed Reference Control on page 49 for more information.

| | | |
|---|---|---|
| **Values** | Default: | Read Only |
| | Min/Max: | 0.00/[Maximum Freq] |
| | Display: | 0.01 Hz |

**b003 [Output Current]**

Output current present at T1, T2 & T3 (U, V & W).

| | | |
|---|---|---|
| **Values** | Default: | Read Only |
| | Min/Max: | 0.00/(Drive Rated Amps x 2) |
| | Display: | 0.01 A |

**b004 [Output Voltage]** Related Parameter(s): P031, A530, A534

Output voltage present at T1, T2 & T3 (U, V & W).

| | | |
|---|---|---|
| **Values** | Default: | Read Only |
| | Min/Max: | 0.0/Drive Rated Volts |
| | Display: | 0.1V |

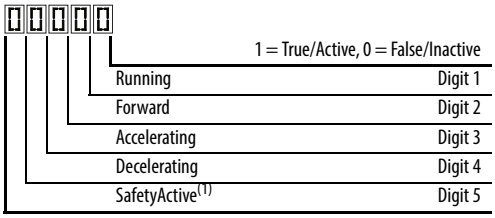
**b005 [DC Bus Voltage]**

Filtered DC bus voltage level of the drive.

| | | |
|---|---|---|
| **Values** | Default: | Read Only |
| | Min/Max: | 0/1200VDC |
| | Display: | 1VDC |

**b006 [Drive Status]** Related Parameter(s): A544

Present operating condition of the drive.




(1) Setting is specific to PowerFlex 525 drives only.

| | | |
|---|---|---|
| **Values** | Default: | Read Only |
| | Min/Max: | 00000/11111 |
| | Display: | 00000 |

## Basic Display Group *(continued)*

**b007 [Fault 1 Code]**
**b008 [Fault 2 Code]**
**b009 [Fault 3 Code]**

Related Parameter(s): F604-F610

A code that represents a drive fault. Codes appear in these parameters in the order they occur (b007 [Fault 1 Code] = the most recent fault). Repetitive faults are only recorded once. See Fault and Diagnostic Group for more information.

| | | |
|---|---|---|
| **Values** | Default: | Read Only |
| | Min/Max: | F0/F127 |
| | Display: | F0 |

**b010 [Process Display]**

Related Parameter(s): b001, A481, A482

32 bit parameter.

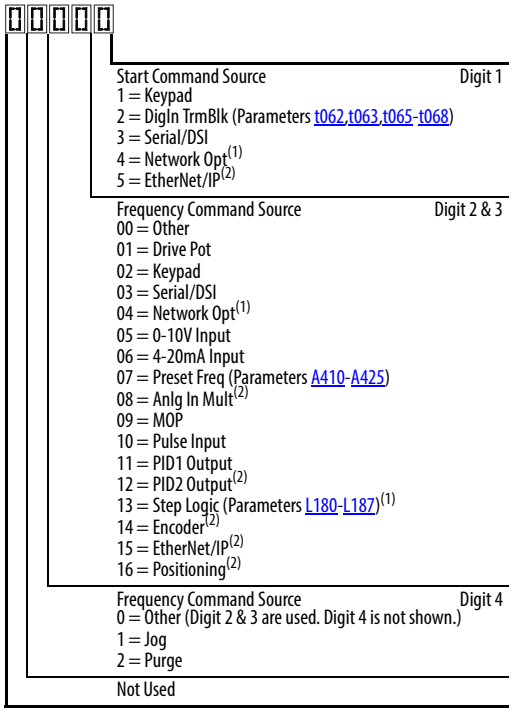
Output frequency scaled by A481[Process Disp Lo] and A482 [Process Disp Hi].
Scaled Process Value (PV) = ((([Process Disp Hi] - [Process Disp Lo]) x ([Output Freq] - [Minimum Freq])) / ([Maximum Freq] - [Minimum Freq])

| | | |
|---|---|---|
| **Values** | Default: | Read Only |
| | Min/Max: | 0.00/9999.00 |
| | Display: | 0.01 |

**b012 [Control Source]**

Related Parameter(s): P046, P047, P048, P049, P050, P051, t062, t063, t065-t068, L180-L187, A410-A425

Active source of the Start Command and Frequency Command. Normally defined by the settings of P046, P048, P050 [Start Source x] and P047, P049, P051 [Speed Referencex]. See Start and Speed Reference Control on page 49 for more information.




**Example**

| Display reads... | Description |
|---|---|
| 2004 | Start source comes from Network Opt and Frequency source is Purge. |
| 113 | Start source comes from Serial/DSI and Frequency source comes from PID1 Output. |
| 155 | Start source and Frequency source comes from EtherNet/IP. |
| 052 | Start source comes from DigIn TrmBlk and Frequency source from 0-10V Input. |
| 011 | Start source comes from Keypad and Frequency source comes from Drive Pot. |

(1) Select this setting if using the optional PowerFlex 25-COMM-E2P, 25-COMM-D, or 25-COMM-P adapters as the Start source and/or Frequency source.
(2) Setting is specific to PowerFlex 525 drives only.

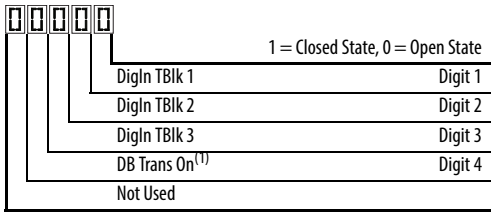
| | | |
|---|---|---|
| **Values** | Default: | Read Only |
| | Min/Max: | 0000/2165 |
| | Display: | 0000 |

## Basic Display Group *(continued)*

**b013 [Contrl In Status]** Related Parameter(s): b002, P044, P045

State of the digital terminal blocks 1...3 and DB transistor.

**IMPORTANT** Actual control commands may come from a source other than the control terminal block.

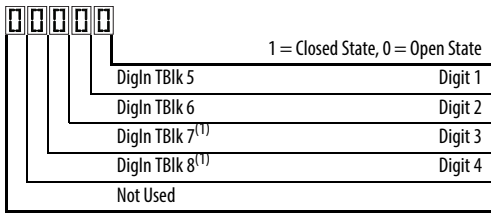



(1) The DB Transistor "on" indication must have a 0.5 s hysteresis. It will turn on and stay on for at least 0.5 s every time the DB transistor is turned on.

| | | |
|---|---|---|
| **Values** | Default: | Read Only |
| | Min/Max: | 0000/1111 |
| | Display: | 0000 |

**b014 [Dig In Status]** Related Parameter(s): t065-t068

State of the programmable digital inputs.




(1) Setting is specific to PowerFlex 525 drives only.

| | | |
|---|---|---|
| **Values** | Default: | Read Only |
| | Min/Max: | 0000/1111 |
| | Display: | 0000 |

**b015 [Output RPM]** Related Parameter(s): P035

Current output frequency in rpm. Scale is based on P035 [Motor NP Poles].

| | | |
|---|---|---|
| **Values** | Default: | Read Only |
| | Min/Max: | 0/24000 rpm |
| | Display: | 1 rpm |

**b016 [Output Speed]** Related Parameter(s): P044

Current output frequency in %. Scale is 0% at 0.00 Hz to 100% at P044 [Maximum Freq].

| | | |
|---|---|---|
| **Values** | Default: | Read Only |
| | Min/Max: | 0.0/100.0% |
| | Display: | 0.1% |

**b017 [Output Power]** Related Parameter(s): b018

Output power present at T1, T2 & T3 (U, V & W).

| | | |
|---|---|---|
| **Values** | Default: | Read Only |
| | Min/Max: | 0.00/(Drive Rated Power x 2) |
| | Display: | 0.01 kW |

## Basic Display Group *(continued)*

**b018 [Power Saved]** Related Parameter(s): b017

Instantaneous power savings of using this drive compared to an across the line starter.

| | | |
|---|---|---|
| **Values** | Default: | Read Only |
| | Min/Max: | 0.00/655.35 kW |
| | Display: | 0.01 kW |

**b019 [Elapsed Run time]** Related Parameter(s): A555

Accumulated time drive is outputting power. Time is displayed in 10 hour increments.

| | | |
|---|---|---|
| **Values** | Default: | Read Only |
| | Min/Max: | 0/65535 x 10 hr |
| | Display: | 1 = 10 hr |

**b020 [Average Power]** Related Parameter(s): A555

Average power used by the motor since the last reset of the meters.

| | | |
|---|---|---|
| **Values** | Default: | Read Only |
| | Min/Max: | 0.00/(Drive Rated Power x 2) |
| | Display: | 0.01 kW |

**b021 [Elapsed kWh]** Related Parameter(s): b022

Accumulated output energy of the drive. When the maximum value of this parameter is reached, it resets to zero and b022 [Elapsed MWh] is incremented.

| | | |
|---|---|---|
| **Values** | Default: | Read Only |
| | Min/Max: | 0.0/100.0 kWh |
| | Display: | 0.1 kWh |

**b022 [Elapsed MWh]** Related Parameter(s): b021

Accumulated output energy of the drive.

| | | |
|---|---|---|
| **Values** | Default: | Read Only |
| | Min/Max: | 0.0/6553.5 MWh |
| | Display: | 0.1 MWh |

**b023 [Energy Saved]** Related Parameter(s): A555

Total energy savings of using this drive compared to an across the line starter since the last reset of the meters.

| | | |
|---|---|---|
| **Values** | Default: | Read Only |
| | Min/Max: | 0.0/6553.5 kWh |
| | Display: | 0.1 kWh |

**b024 [Accum kWh Sav]** Related Parameter(s): b025

Total approximate accumulated energy savings of the drive compared to using an across the line starter.

| | | |
|---|---|---|
| **Values** | Default: | Read Only |
| | Min/Max: | 0.0/6553.5 kWh |
| | Display: | 0.1 = 10 kWh |

## Basic Display Group *(continued)*

**b025 [Accum Cost Sav]** Related Parameter(s): b024, P052, A555

Total approximate accumulated cost savings of the drive compared to using an across the line starter.
[Accum Cost Sav] = [Average kWh cost] x [Accum kWh Sav]

| | | |
|---|---|---|
| **Values** | Default: | Read Only |
| | Min/Max: | 0.0/6553.5 |
| | Display: | 0.1 |

**b026 [Accum CO2 Sav]** Related Parameter(s): A555

Total approximate accumulated CO2 savings of the drive compared to using an across the line starter.

| | | |
|---|---|---|
| **Values** | Default: | Read Only |
| | Min/Max: | 0.0/6553.5 kg |
| | Display: | 0.1 kg |

**b027 [Drive Temp]**

Present operating temperature of the drive heatsink (inside module).

| | | |
|---|---|---|
| **Values** | Default: | Read Only |
| | Min/Max: | 0/120 °C |
| | Display: | 1 °C |

**b028 [Control Temp]**

Present operating temperature of the drive control.

| | | |
|---|---|---|
| **Values** | Default: | Read Only |
| | Min/Max: | 0/120 °C |
| | Display: | 1 °C |

**b029 [Control SW Ver]**

Current drive firmware version.

| | | |
|---|---|---|
| **Values** | Default: | Read Only |
| | Min/Max: | 0.000/65.535 |
| | Display: | 0.001 |

# Basic Program Group

**P030 [Language]**

Selects the language displayed. A reset or power cycle is required after selection is made.

| | | | Language Support | | |
|---|---|---|---|---|---|
| | | | Keypad/ LCD Display | RSLogix 5000/ Logix Designer | Connected Components Workbench |
| **Options** | 1 English (Default) | | Y | Y | Y |
| | 2 Français | | Y | Y | Y |
| | 3 Español | | Y | Y | Y |
| | 4 Italiano | | Y | Y | Y |
| | 5 Deutsch | | Y | Y | Y |
| | 6 Japanese | | – | Y | – |
| | 7 Português | | Y | Y | – |
| | 8 Chinese | Chinese Simplified | – | Y | Y |
| | 9 Reserved | | | | |
| | 10 Reserved | | | | |
| | 11 Korean | | – | Y | – |
| | 12 Polish(1) | | Y | – | – |
| | 13 Reserved | | | | |
| | 14 Turkish(1) | | Y | – | – |
| | 15 Czech(1) | | Y | – | – |

(1) Due to a limitation of the LCD Display, some of the characters for Polish, Turkish, and Czech will be modified.

**P031 [Motor NP Volts]**

Related Parameter(s): b004, A530, A531, A532, A533

Stop drive before changing this parameter.

Sets the motor nameplate rated volts.

| | | |
|---|---|---|
| **Values** | Default: | Drive Rated Volts |
| | Min/Max: | 10V (for 230V Drives), 20V (for 460V Drives), 25V (for 600V Drives)/Drive Rated Volts |
| | Display: | 1V |

**P032 [Motor NP Hertz]**

Related Parameter(s): A493, A530, A531, A532, A533

Stop drive before changing this parameter.

Sets the motor nameplate rated frequency.

| | | |
|---|---|---|
| **Values** | Default: | 60 Hz |
| | Min/Max: | 15/500 Hz |
| | Display: | 1 Hz |

**P033 [Motor OL Current]**

Related Parameter(s): t069, t072, t076, t081, A484, A485, A493

Sets the motor nameplate overload current. Used to determine motor overload conditions and can be set from 0.1 A to 200% of drive rated current.

**IMPORTANT** The drive will fault on an F007 "Motor Overload" if the value of this parameter is exceeded based on class 10 motor overload protection according to NEC article 430 and motor over-temperature protection according to NEC article 430.126 (A) (2). UL 508C File 29572

| | | |
|---|---|---|
| **Values** | Default: | Drive Rated Amps |
| | Min/Max: | 0.0/(Drive Rated Amps x 2) |
| | Display: | 0.1 A |

## Basic Program Group *(continued)*

**P034 [Motor NP FLA]** Related Parameter(s): P040

Sets the motor nameplate FLA. Used to assist the Autotune routine and motor control.

| | | |
|---|---|---|
| **Values** | Default: | Based on Drive Rating |
| | Min/Max: | 0.1/(Drive Rated Amps x 2) |
| | Display: | 0.1 A |

**P035 [Motor NP Poles]** Related Parameter(s): b015

Sets the number of poles in the motor.

| | | |
|---|---|---|
| **Values** | Default: | 4 |
| | Min/Max: | 2/40 |
| | Display: | 1 |

**P036 [Motor NP RPM]**

Stop drive before changing this parameter.

Sets the rated nameplate rpm of the motor. Used to calculate the rated slip of the motor. To reduce the slip frequency, set this parameter closer to the motor synchronous speed.

| | | |
|---|---|---|
| **Values** | Default: | 1750 rpm |
| | Min/Max: | 0/24000 rpm |
| | Display: | 1 rpm |

**P037 [Motor NP Power]**

PF 525 PowerFlex 525 only.

Sets the motor nameplate power. Used in PM regulator.

| | | |
|---|---|---|
| **Values** | Default: | Drive Rated Power |
| | Min/Max: | 0.00/Drive Rated Power |
| | Display: | 0.01 kW |

**P038 [Voltage Class]**

Stop drive before changing this parameter.

Sets the voltage class of 600V drives. Only applicable to 600V drives.

| | | |
|---|---|---|
| **Options** | 2 | "480V" |
| | 3 | "600V" (Default) |

**P039 [Torque Perf Mode]** Related Parameter(s): P040, A530, A531, A532, A533, A535

Stop drive before changing this parameter.

Selects the motor control mode.

The PowerFlex 523 and PowerFlex 525 drives are capable of performing with the following motor control modes.

| | | | |
|---|---|---|---|
| **Options** | 0 | "V/Hz" | |
| | 1 | "SVC" (Default) | |
| | 2 | "Economize" | |
| | 3 | "Vector"(1) | |
| | 4 | "PM Control"(1) (2) | When P039 [Torque Perf Mode] is set to 4 and A535 [Motor Fdbk Type] is set to 0, 1, 2 or 3, the drive is in open loop PM motor control mode.<br>When P039 [Torque Perf Mode] is set to 4 and A535 [Motor Fdbk Type] is set to 4 or 5, the drive is in closed loop PM motor control mode. |

(1) Setting is specific to PowerFlex 525 drives only.

(2) Setting is available in PowerFlex 525 FRN 5.xxx and later.

## Basic Program Group *(continued)*

**P040 [Autotune]** Related Parameter(s): P034, P039, A496, A497

Stop drive before changing this parameter.

Enables a static (not spinning) or dynamic (motor spinning) autotune to automatically set the motor parameters. Set the parameter value to a one or two, then issue a valid "Start" command to begin the routine. After the routine is complete the parameter resets to a zero. A failure (such as if a motor is not connected) results in an Autotune Fault.
It is recommended to perform a full rotate tune when using VVC mode.

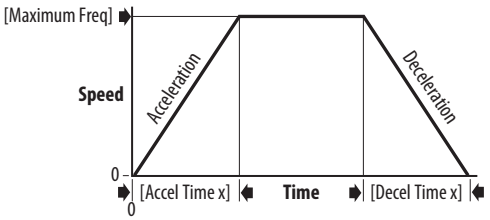
**IMPORTANT** All motor parameters in the Basic Program group must be set before running the routine. If a start command is not given (or a stop command is given) within 30 s, the parameter automatically returns to a zero and an Autotune Fault occurs.

**ATTENTION:** Rotation of the motor in an undesired direction can occur during this procedure. To guard against possible injury and/or equipment damage, it is recommended that the motor be disconnected from the load before proceeding.

| | | | |
|---|---|---|---|
| **Options** | 0 | "Ready/Idle" (Default) | |
| | 1 | "Static Tune" | A temporary command that initiates a non-rotational motor stator resistance test for the best possible automatic setting of A496 [IR Voltage Drop]. A start command is required following initiation of this setting. The parameter returns to 0 "Ready/Idle" following the test, at which time another start transition is required operate the drive in normal mode. Used when motor cannot be uncoupled from the load. |
| | 2 | "Rotate Tune" | A temporary command that initiates a "Static Tune" followed by a rotational test for the best possible automatic setting of A497 [Flux Current Ref]. A start command is required following initiation of this setting. The parameter returns to 0 "Ready/Idle" following the test, at which time another start transition is required to operate the drive in normal mode. Important: Used when motor is uncoupled from the load. Results may not be valid if a load is coupled to the motor during this procedure. |

**P041 [Accel Time 1]** Related Parameter(s): P044, A439

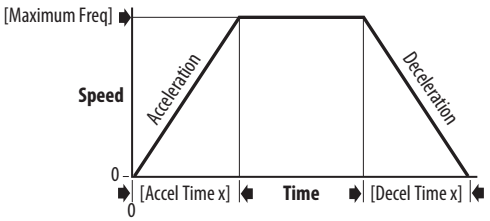
Sets the time for the drive to accelerate from 0 Hz to P044 [Maximum Freq].
Accel Rate = [Maximum Freq] / [Accel Time x]




| | | |
|---|---|---|
| **Values** | Default: | 10.00 s |
| | Min/Max: | 0.00/600.00 s |
| | Display: | 0.01 s |

**P042 [Decel Time 1]** Related Parameter(s): P044, A439

Sets the time for the drive to decelerate from P044 [Maximum Freq] to 0 Hz.
Decel Rate = [Maximum Freq] / Decel Time x]




| | | |
|---|---|---|
| **Values** | Default: | 10.00 s |
| | Min/Max: | 0.00/600.00 s |
| | Display: | 0.01 s |

## Basic Program Group *(continued)*

**P043 [Minimum Freq]** Related Parameter(s): b001, b002, b013, P044, A530, A531

Stop drive before changing this parameter.

Sets the lowest frequency the drive outputs.

| | | |
|---|---|---|
| **Values** | Default: | 0.00 Hz |
| | Min/Max: | 0.00/500.00 Hz |
| | Display: | 0.01 Hz |

**P044 [Maximum Freq]** Related Parameter(s): b001, b002, b013, b016, P043, A530, A531

Stop drive before changing this parameter.

Sets the highest frequency the drive outputs.

**IMPORTANT** This value must be greater than the value set in P043 [Minimum Freq].

| | | |
|---|---|---|
| **Values** | Default: | 60.00 Hz |
| | Min/Max: | 0.00/500.00 Hz |
| | Display: | 0.01 Hz |

**P045 [Stop Mode]** Related Parameter(s): t086, t087, A434, A435, A550

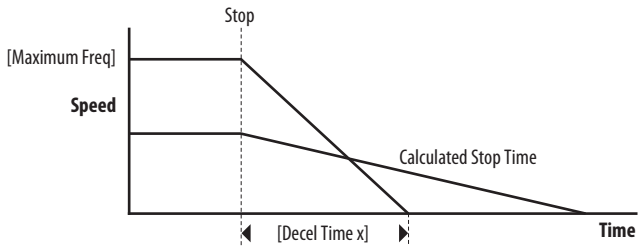
Determines the stopping mode used by the drive when a stop is initiated.

| | | | |
|---|---|---|---|
| **Options** | 0 | "Ramp, CF" (Default) | Ramp to Stop. Stop command clears active fault. |
| | 1 | "Coast, CF" | Coast to Stop. Stop command clears active fault. |
| | 2 | "DC Brake, CF" | DC Injection Braking Stop. Stop command clears active fault. |
| | 3 | "DC BrkAuto,CF" | DC Injection Braking Stop with Auto Shutoff.<br>• Standard DC Injection Braking for value set in A434 [DC Brake Time].<br>OR<br>• Drive shuts off if the drive detects that the motor is stopped.<br>Stop command clears active fault. |
| | 4 | "Ramp" | Ramp to Stop. |
| | 5 | "Coast" | Coast to Stop. |
| | 6 | "DC Brake" | DC Injection Braking Stop. |
| | 7 | "DC BrakeAuto" | DC Injection Braking Stop with Auto Shutoff.<br>• Standard DC Injection Braking for value set in A434 [DC Brake Time].<br>OR<br>• Drive shuts off if the drive detects that the motor is stopped. |
| | 8 | "Ramp+EM B,CF" | Ramp to Stop with EM Brake Control. Stop command clears active fault. |
| | 9 | "Ramp+EM Brk" | Ramp to Stop with EM Brake Control. |
| | 10 | "PointStp,CF" | PointStop. Stop command clears active fault. |
| | 11 | "PointStop" | PointStop. |

Provides a method to stop at a constant distance instead of a fixed rate.

When a Stop command is given, the distance required for the machine to travel to standstill based on the programmed maximum speed and deceleration time is calculated. If the drive is running slower than the maximum speed, the function will apply a calculated deceleration time that allows the machine to travel to standstill in the same distance based on the current speed.

It is recommended to use braking resistors or set A550 [Bus Reg Enable] to 0 "Disabled" for better performance.



## Basic Program Group *(continued)*

**P046 [Start Source 1]**
**P048 [Start Source 2]**
**P050 [Start Source 3]**

Related Parameter(s): b012, t064, C125

Stop drive before changing this parameter.

Configures the start source of the drive. Changes to these inputs take effect as soon as they are entered. P046 [Start Source 1] is the factory default start source unless overridden.
See Start and Speed Reference Control on page 49 for more information.

**IMPORTANT** For all settings except when t064 [2-Wire Mode] is set to 1 "Level Sense", the drive must receive a leading edge from the start input for the drive to start after a stop input, loss of power, or fault condition.

| | | | |
|---|---|---|---|
| **Options** | 1 | "Keypad" | [Start Source 1] default |
| | 2 | "DigIn TrmBlk" | [Start Source 2] default |
| | 3 | "Serial/DSI" | [Start Source 3] default for PowerFlex 523 |
| | 4 | "Network Opt"(1) | |
| | 5 | "EtherNet/IP"(2) | [Start Source 3] default for PowerFlex 525 |

(1) Select this setting if using the optional PowerFlex 25-COMM-E2P, 25-COMM-D, or 25-COMM-P adapters as the start source.
(2) Setting is specific to PowerFlex 525 drives only.

**P047 [Speed Reference1]**
**P049 [Speed Reference2]**
**P051 [Speed Reference3]**

Related Parameter(s): C125

Selects the source of speed command for the drive. Changes to these inputs take effect as soon as they are entered. P047 [Speed Reference1] is the factory default speed reference unless overridden.
See Start and Speed Reference Control on page 49 for more information.

| | | | |
|---|---|---|---|
| **Options** | 1 | "Drive Pot" | [Speed Reference1] default |
| | 2 | "Keypad Freq" | |
| | 3 | "Serial/DSI" | [Speed Reference3] default for PowerFlex 523 |
| | 4 | "Network Opt"(1) | |
| | 5 | "0-10V Input" | [Speed Reference2] default |
| | 6 | "4-20mA Input" | |
| | 7 | "Preset Freq" | |
| | 8 | "Anlg In Mult"(2) | |
| | 9 | "MOP" | |
| | 10 | "Pulse Input" | |
| | 11 | "PID1 Output" | |
| | 12 | "PID2 Output"(2) | |
| | 13 | "Step Logic"(2) | |
| | 14 | "Encoder"(2) | |
| | 15 | "EtherNet/IP"(2) | [Speed Reference3] default for PowerFlex 525 |
| | 16 | "Positioning"(2) | Referencing from A558 [Positioning Mode] |

(1) Select this setting if using the optional PowerFlex 25-COMM-E2P, 25-COMM-D, or 25-COMM-P adapters as the speed reference.
(2) Setting is specific to PowerFlex 525 drives only.

**P052 [Average kWh Cost]**

Related Parameter(s): b025

Sets the average cost per kWh.

| | | |
|---|---|---|
| **Values** | Default: | 0.00 |
| | Min/Max: | 0.00/655.35 |
| | Display: | 0.01 |

## Basic Program Group *(continued)*

**P053 [Reset To Defalts]**

Stop drive before changing this parameter.

Resets all parameters to their factory default values. After a Reset command, the value of this parameter returns to zero.

**Parameters that are NOT Reset when P053 = 1**

| Parameter | Parameter | Parameter |
|---|---|---|
| P030 [Language] | C138 [EN Gateway Cfg 2] | C159 [EN Data Out 3] |
| C121 [Comm Write Mode] | C139 [EN Gateway Cfg 3] | C160 [EN Data Out 4] |
| C122 [Cmd Stat Select] | C140 [EN Gateway Cfg 4] | C161 [Opt Data In 1] |
| C123 [RS485 Data Rate] | C141 [EN Rate Cfg] | C162 [Opt Data In 2] |
| C124 [RS485 Node Addr] | C143 [EN Comm Flt Actn] | C163 [Opt Data In 3] |
| C124 [Comm Loss Action] | C144 [EN Idle Flt Actn] | C164 [Opt Data In 4] |
| C126 [Comm Loss Time] | C145 [EN Flt Cfg Logic] | C165 [Opt Data Out 1] |
| C127 [RS485 Format] | C146 [EN Flt Cfg Ref] | C166 [Opt Data Out 2] |
| C128 [EN Addr Sel] | C147 [EN Flt Cfg DL 1] | C167 [Opt Data Out 3] |
| C129 [EN IP Addr Cfg 1] | C148 [EN Flt Cfg DL 2] | C168 [Opt Data Out 4] |
| C130 [EN IP Addr Cfg 2] | C149 [EN Flt Cfg DL 3] | C169 [MultiDrv Sel] |
| C131 [EN IP Addr Cfg 3] | C150 [EN Flt Cfg DL 4] | C171 [Drv 1 Addr] |
| C132 [EN IP Addr Cfg 4] | C153 [EN Data In 1] | C172 [Drv 2 Addr] |
| C133 [EN Subnet Cfg 1] | C154 [EN Data In 2] | C173 [Drv 3 Addr] |
| C134 [EN Subnet Cfg 2] | C155 [EN Data In 3] | C174 [Drv 4 Addr] |
| C135 [EN Subnet Cfg 3] | C156 [EN Data In 4] | C175 [DSI I/O Cfg] |
| C136 [EN Subnet Cfg 4] | C157 [EN Data Out 1] | GC [Parameters in Custom Group] |
| C137 [EN Gateway Cfg 1] | C158 [EN Data Out 2] | |

**Parameters that are Reset when P053 = 3**

| Parameter Name |
|---|
| P031 [Motor NP Volts] |
| P033 [Motor OL] Current |
| P034 [Motor NP FLA] |
| P035 [Motor NP Poles] |
| P038 [Voltage Class] |
| A435 [DC Brake Level] |
| A484 [Current Limit 1] |
| A485 [Current Limit 2] |
| A486 [Shear Pin1 Level] |
| A488 [Shear Pin2 Level] |
| A490 [Load Loss Level] |
| A496 [IR Voltage Drop] |
| A497 [Flux Current Ref] |
| A530 [Boost Select] |
| A531 [Start Boost] |
| A532 [Break Voltage] |
| A533 [Break Frequency] |
| A534 [Maximum] Voltage |

| **Options** | | | |
|---|---|---|---|
| | 0 | "Ready/Idle" (Default) | |
| | 1 | "Param Reset" | Does not reset custom groups, parameter P030 [Language], and communication parameters. |
| | 2 | "Factory Rset" | Restore drive to factory condition. |
| | 3 | "Power Reset" | Resets only power parameters. Can be used when swapping power modules. |
| | 4 | "Module Reset"(1) (2) | Power cycle of the drive, **NO** parameters are reset. |

(1) Setting is available in PowerFlex 525 FRN 5.xxx and later.

(2) Setting is available in PowerFlex 523 FRN 3.xxx and later.

# Terminal Block Group

| | | | |
|---|---|---|---|
| **t062** | **[DigIn TermBlk 02]** | **t063** | **[DigIn TermBlk 03]** |
| **t065** | **[DigIn TermBlk 05]** | **t066** | **[DigIn TermBlk 06]** |
| **t067** | **[DigIn TermBlk 07]** | **t068** | **[DigIn TermBlk 08]** |

PF 525 PowerFlex 525 only.

Related Parameter(s): b012, b013, b014, P045, P046, P048, P049, P050, P051, t064, t086, A410-A425, A427, A431, A432, A433, A434, A435, A442, A443, A488, A535, A560, A562, A563, A567, A571

Stop drive before changing this parameter.

Programmable digital input. Changes to these inputs takes effect as soon as they are entered. If a digital input is set for a selection that is only usable on one input, no other input can be set for the same selection.

| | | | |
|---|---|---|---|
| **Options** | 0 | "Not Used" | Terminal has no function but can be read over network communications with b013 [Contrl In Status] and b014 [Dig In Status]. |
| | 1 | "Speed Ref 2" | Selects P049 [Speed Reference2] as drive's speed command. |
| | 2 | "Speed Ref 3" | Selects P051 [Speed Reference3] as drive's speed command. |
| | 3 | "Start Src 2" | Selects P048 [Start Source 2] as control source to start the drive. |
| | 4 | "Start Src 3" | Selects P050 [Start Source 3] as control source to start the drive. |
| | 5 | "Spd + Strt 2" | [DigIn TermBlk 07] default.<br>Selects combination of P049 [Speed Reference2] and P048 [Start Source 2] as speed command with control source to start the drive. |
| | 6 | "Spd + Strt 3" | Selects combination of P051 [Speed Reference3] and P050 [Start Source 3] as speed command with control source to start the drive. |
| | 7 | "Preset Freq"<br>(PF523: only for DigIn TermBlk 03, 05, and 06)<br>(PF525: only for DigIn TermBlk 05...08) | [DigIn TermBlk 05] and [DigIn TermBlk 06] default.<br>• Selects a preset frequency in Velocity mode (P047, P049, P051 [Speed Referencex] = 1...15). See A410...A425 [Preset Freq x].<br>• Selects a preset frequency and position in Positioning mode (P047, P049, P051 [Speed Referencex] = 16). See L200...L214 [Step Units x] (only for PowerFlex 525 drives).<br>**IMPORTANT** Digital Inputs have priority for frequency control when programmed as Preset Speed and are active. See Start Source and Speed Reference Selection on page 49 for more information. |
| | 8 | "Jog" | • When input is present, drive accelerates according to the value set in A432 [Jog Accel/Decel] and ramps to the value set in A431 [Jog Frequency].<br>• When input is removed, drive ramps to a stop according to the value set in A432 [Jog Accel/Decel].<br>• A valid Start command will override this input. |
| | 9 | "Jog Forward" | [DigIn TermBlk 08] default.<br>Drive accelerates to A431 [Jog Frequency] according to A432 [Jog Accel/Decel] and ramps to a stop when input becomes inactive. A valid Start command will override this input. |
| | 10 | "Jog Reverse" | Drive accelerates to A431 [Jog Frequency] according to A432 [Jog Accel/Decel] and ramps to a stop when input becomes inactive. A valid Start command will override this input. |
| | 11 | "Acc/Dec Sel2"(1) | If active, determines which Accel/Decel time will be used for all ramp rates except jog.<br>Can be used with option 29 "Acc/Dec Sel3" for additional Accel/Decel times. See A442 [Accel Time 2] for more information. |
| | 12 | "Aux Fault" | When enabled, an F002 "Auxiliary Input" fault will occur when the input is removed. |
| | 13 | "Clear Fault" | When active, clears an active fault. |
| | 14 | "RampStop,CF" | Causes drive to immediately ramp to a stop regardless of how P045 [Stop Mode] is set. |
| | 15 | "CoastStop,CF" | Causes drive to immediately coast to a stop regardless of how P045 [Stop Mode] is set. |
| | 16 | "DCInjStop,CF" | Causes drive to immediately begin a DC Injection stop regardless of how P045 [Stop Mode] is set. |
| | 17 | "MOP Up" | Increases the value of A427 [MOP Freq] at the rate set in A430 [MOP Time]. |
| | 18 | "MOP Down" | Decreases the value of A427 [MOP Freq] at the rate set in A430 [MOP Time]. |
| | 19 | "Timer Start"(1) | Clears and starts the timer function. May be used to control the relay or opto outputs. |
| | 20 | "Counter In"(1) | Starts the counter function. May be used to control the relay or opto outputs. |
| | 21 | "Reset Timer" | Resets the internal active timer, d365 [Timer Status]. For more information, see Timer Function on page 211. |
| | 22 | "Reset Countr" | Resets the count in the accumulated internal active counter, d364 [Counter Status]. For more information, see Counter Function on page 212. |
| | 23 | "Rset Tim&Cnt" | Resets both the internal active timer and accumulated internal active counter. |
| | 24 | "Logic In 1"(1)(2) | Logic function input number 1. May be used to control the relay or opto outputs (t076, t081 [Relay Outx Sel] and t069, t072 [Opto Outx Sel], options 11...14). May be used in conjunction with StepLogic parameters L180...L187 [Stp Logic x]. |
| | 25 | "Logic In 2"(1)(2) | Logic function input number 2. May be used to control the relay or opto outputs (t076, t081 [Relay Outx Sel] and t069, t072 [Opto Outx Sel], options 11...14). May be used in conjunction with StepLogic parameters L180...L187 [Stp Logic x]. |

**Options**

| | |
|---|---|
| 26 "Current Lmt2"[2] | When active, A485 [Current Limit 2] determines the drive current limit level. |
| 27 "Anlg Invert" | Inverts the scaling of the analog input levels set in t091 [Anlg In 0-10V Lo] and t092 [Anlg In 0-10V Hi] or t095 [Anlg In4-20mA Lo] and t096 [Anlg In4-20mA Hi]. |
| 28 "EM Brk Rlse" | If EM brake function is enabled, this input releases the brake. See t086 [EM Brk Off Delay] for more information.<br>  <br>**ATTENTION:** If a hazard of injury due to movement of equipment or material exists, an auxiliary mechanical braking device must be used. |
| 29 "Acc/Dec Sel3"[1] | If active, determines which Accel/Decel time is used for all ramp rates except jog. Used with option 11 "Acc/Dec Sel2" for the Accel/Decel times listed in this table. |
| 30 "Precharge En" | Forces drive into precharge state. Typically controlled by auxiliary contact on the disconnect at the DC input to the drive. If this input is assigned, it must be energized for the pre-charge relay to close and for the drive to run. If it is de-energized, the pre-charge relay opens and the drive coasts to a stop. |
| 31 "Inertia Dcel" | Forces drive into Inertia Ride-Through state. The drive attempts to regulate the DC bus at the current level. |
| 32 "Sync Enable" | Must be used in order to hold the existing frequency when Sync Time is set to enable speed synchronization. When this input is released the drive accelerates to the commanded frequency in A571 [Sync Time]. |
| 33 "Traverse Dis" | When an input is programmed the traverse function is disabled while this input is active. See A567 [Max Traverse]. |
| 34 "Home Limit"[2] | In Positioning mode, indicates the drive is at the home position. See Appendix E for more information on Positioning. |
| 35 "Find Home"[2] | In Positioning mode, causes the drive to return to the Home position when a Start command is issued.<br>Uses A562 [Find Home Freq] and A563 [Find Home Dir] until the "Home Limit" input is activated. If it passes this point, it then runs in the reverse direction at 1/10th the frequency of [Find Home Freq] until the "Home Limit" is activated again. As long as this input is active, any start command causes the drive to enter the homing routine. Only functions if in Positioning mode. Once the Find Home routine has finished, the drive stops. See Appendix E for more information on Positioning. |
| 36 "Hold Step"[2] | In Positioning mode, overrides other inputs and causes the drive to remain at its current step (running at zero speed once it reaches its position) until released.<br>While in "Hold", the drive ignores any input command which would normally result in a move to a new step. Timers continue to run. Therefore, when the Hold is removed, the drive must see any required digital inputs transition (even if they already transitioned during the hold), but it does not reset any timer. See Appendix E for more information on Positioning. |
| 37 "Pos Redefine"[2] | In Positioning mode, resets the home position to the current position of the machine. See Appendix E for more information on Positioning. |
| 38 "Force DC" | If the drive is not running, causes the drive to apply a DC Holding current (A435 [DC Brake Level], ignoring A434 [DC Brake Time]) while the input is applied. |
| 39 "Damper Input" | When active, drive is allowed to run normally.<br>When inactive, drive is forced into sleep mode and is prevented from accelerating to command speed. |
| 40 "Purge"[1] | Starts the drive at A433 [Purge Frequency] regardless of the selected control source. Supersedes the keypad Control function as well as any other control command to take control of the drive. Purge can occur, and is operational, at any time whether the drive is running or stopped regardless of the selected logic source selection. If a valid stop (other than from comms or SW enable) is present, the drive will not start on the purge input transition.<br>  <br>**ATTENTION:** If a hazard of injury due to movement of equipment or material exists, an auxiliary mechanical braking device must be used. |
| 41 "Freeze-Fire" | When inactive, will cause an immediate F094 "Function Loss" fault. Use to safely bypass the drive with an external switching device. |
| 42 "SW Enable" | Works like an interlock that has to be active for the drive to run. |
| 43 "SherPin1 Dis" | Disables shear pin 1 but leaves shear pin 2 active. If A488 [Shear Pin 2 Level] is greater than 0.0 A, shear pin 2 is enabled. |
| 44 Reserved | |
| 45 Reserved | |
| 46 Reserved | |
| 47 Reserved | |

| Option | | Description |
|---|---|---|
| 29 | 11 | |
| 0 | 0 | Acc/Dec 1 |
| 0 | 1 | Acc/Dec 2 |
| 1 | 0 | Acc/Dec 3 |
| 1 | 1 | Acc/Dec 4 |

| Options | | | |
|---|---|---|---|
| | 48 "2-Wire FWD" (only for DigIn TermBlk 02) | [DigIn TermBlk 02] default. Select 2-Wire FWD for this input. Select this option and set P046, P048 or P050 [Start Source x] to 2 "DigIn TrmBlk" to configure [Start Source x] to a 2-wire run forward mode. Also see t064 [2-Wire Mode] for level trigger settings. | |
| | 49 "3-Wire Start" (only for DigIn TermBlk 02) | Select 3-Wire Start for this input. Select this option and set P046, P048 or P050 [Start Source x] to 2 "DigIn TrmBlk" to configure [Start Source x] to a 3-wire start mode. | |
| | 50 "2-Wire REV" (only for DigIn TermBlk 03) | [DigIn TermBlk 03] default. Select 2-Wire REV for this input. Select this option and set P046, P048 or P050 [Start Source x] to 2 "DigIn TrmBlk" to configure [Start Source x] to a 2-wire run reverse mode. Also see t064 [2-Wire Mode] for level trigger settings. For PowerFlex 523 drives, this setting will be disabled If [DigIn TermBlk 03] is set to 7 "Preset Freq". | |
| | 51 "3-Wire Dir" (only for DigIn TermBlk 03) | Select 3-Wire Dir for this input. Select this option and set P046, P048 or P050 [Start Source x] to 2 "DigIn TrmBlk" to change the direction of [Start Source x]. For PowerFlex 523 drives, this setting will be disabled If [DigIn TermBlk 03] is set to 7 "Preset Freq". | |
| | 52 "Pulse Train" (PF523: only for DigIn TermBlk 05) (PF525: only for DigIn TermBlk 07) | Select pulse train for this input. Use P047, P049 and P051 [Speed Referencex] to select pulse input. Jumper for DigIn TermBlk 05 or 07 Sel must be moved to Pulse In. | |

**Drive Start Condition Matrix for t062 and t063**

| | t062 Setting | |
|---|---|---|
| **t063 Setting** | **3-Wire Start** | **2-Wire FWD** |
| **2-Wire REV** | Drive will not start | OK |
| **3-Wire Dir** | OK | Drive will not start |

(1) This function may be tied to one input only.
(2) Setting is specific to PowerFlex 525 drives only.

### t064 [2-Wire Mode]

Related Parameter(s): P045, P046, P048, P050, t062, t063

Stop drive before changing this parameter.

Programs the mode of trigger only for t062 [DigIn TermBlk 02] and t063 [DigIn TermBlk 03] when 2-wire option is being selected as P046, P048 or P050 [Start Source x].

| Options | | |
|---|---|---|
| | 0 "Edge Trigger" (Default) | Standard 2-Wire operation. |
| | 1 "Level Sense" | • I/O Terminal 01 "Stop" = Coast to stop. Drive will restart after a Stop command when:<br>– Stop is removed<br>and<br>– Start is held active<br>• I/O Terminal 03 "Run REV" |

**ATTENTION:** Hazard of injury exists due to unintended operation. When t064 [2-Wire Mode] is set to option 1, and the Run input is maintained, the Run inputs do not need to be toggled after a Stop input for the drive to run again. A Stop function is provided only when the Stop input is active (open).

**ATTENTION:** When operating in 2-Wire Level Sense (Run Level), the PowerFlex 523 and PowerFlex 525 drive should only be controlled from the Digital Input Terminal Blocks. This should NOT be used with any other DSI or Network device.

| | | |
|---|---|---|
| | 2 "Hi-Spd Edge" | **IMPORTANT** There is greater potential voltage on the output terminals when using this option.<br>• Outputs are kept in a ready-to-run state. The drive will respond to a Start command within 10 ms.<br>• I/O Terminal 01 "Stop" = Coast to stop.<br>• I/O Terminal 03 "Run REV" |
| | 3 "Momentary" | • Drive will start after a momentary input from either the Run FWD input (I/O Terminal 02) or the Run REV input (I/O Terminal 03).<br>• I/O Terminal 01 "Stop" = Stop according to the value set in P045 [Stop Mode]. |

**t069 [Opto Out1 Sel]**
**t072 [Opto Out2 Sel]**

Related Parameter(s): P046, P048, P050, t070, t073, t077, t082, t086, t087, t093, t094, t097, A541, A564

PF 525 PowerFlex 525 only.

Determines the operation of the programmable digital outputs.

| Options | Setting Output Changes State When... | Hysteresis |
|---|---|---|
| 0 "Ready/Fault" | Opto outputs are active when power is applied. Indicates that the drive is ready for operation. Opto outputs are inactive when power is removed or a fault occurs. | None |
| 1 "At Frequency" | Drive reaches commanded frequency. | 0.5 Hz above; 1.0 Hz below |
| 2 "MotorRunning" | Motor is receiving power from the drive. | None |
| 3 "Reverse" | Drive is commanded to run in reverse direction. | None |
| 4 "Motor Overld" | Motor overload condition exists. | 100 ms time delay on or off |
| 5 "Ramp Reg" | Ramp regulator is modifying the programmed accel/decel times to avoid an overcurrent or overvoltage fault from occurring. | 100 ms time delay on or off |
| 6 "Above Freq" | Drive exceeds the frequency (Hz) value set in t070 or t073 [Opto Outx Level]. | 100 ms time delay on or off |
| 7 "Above Cur" | Drive exceeds the current (% Amps) value set in t070 or t073 [Opto Outx Level].<br>**IMPORTANT** Value for t070 or t073 [Opto Outx Level] must be entered in percent of drive rated output current. | 100 ms time delay on or off |
| 8 "Above DCVolt" | Drive exceeds the DC bus voltage value set in t070 or t073 [Opto Outx Level]. | 100 ms time delay on or off |
| 9 "Retries Exst" | Value set in A541 [Auto Rstrt Tries] is exceeded. | None |
| 10 "Above Anlg V" | Analog input voltage (0-10V input) exceeds the value set in t070 or t073 [Opto Outx Level].<br>**IMPORTANT** Do not use if t093 [10V Bipolar Enbl] is set to 1 "Bi-Polar In". | 100 ms time delay on or off |
| 11 "Above PF Ang" | Power Factor angle exceeds the value set in t070 or t073 [Opto Outx Level]. | 100 ms time delay on or off |
| 12 "Anlg In Loss" | Analog input loss has occurred. Program t094 [Anlg In V Loss] or t097 [Anlg In mA Loss] for desired action when input loss occurs. | On, 2 mA / ±1V<br>Off, 3 mA / ±1.5V |
| 13 "ParamControl" | Output is directly controlled by the state of the t070 or t073 [Opto Outx Level]. A value of 0 causes the output to turn off. A value of 1 or greater in this parameter causes the output to turn on. | None |
| 14 "NonRec Fault" | • Value set in A541 [Auto Rstrt Tries] is exceeded or<br>• A541 [Auto Rstrt Tries] is not enabled or<br>• A non-resettable fault has occurred. | None |
| 15 "EM Brk Cntrl" | EM Brake is energized. Program t087 [EM Brk On Delay] and t086 [EM Brk Off Delay] for desired action. | None |
| 16 "Thermal OL" | Relay energizes when thermal Motor overload counter is above the value set in t077 or t082 [Relay Outx Level]. It also energizes if the drive is within 5 °C of the drive overheat trip point. | None |
| 17 "Amb OverTemp" | Relay energizes when control module over temperature occurs. | None |
| 18 "Local Active" | Active when drive P046, P048 or P050 [Start Source x] is in local keypad control. | None |
| 19 "Comm Loss" | Active when communication is lost from any comm source with reference or control. | None |
| 20 "Logic In 1" | An input is programmed as "Logic Input 1" and is active. | None |
| 21 "Logic In 2" | An input is programmed as "Logic Input 2" and is active. | None |
| 22 "Logic 1 & 2" | Both Logic inputs are programmed and active. | None |
| 23 "Logic 1 or 2" | One or both Logic inputs are programmed and one or both is active. | None |
| 24 "StpLogic Out" | Drive enters StepLogic step with Command Word set to enable Logic output. | None |
| 25 "Timer Out" | Timer has reached the value set in t070 or t073 [Opto Outx Level] or not timing. | None |
| 26 "Counter Out" | Counter has reached the value set in t070 or t073 [Opto Outx Level] or not counting. | None |
| 27 "At Position" | Drive is in Positioning mode and has reached the commanded position. Tolerance is adjusted with A564 [Encoder Pos Tol]. | – |
| 28 "At Home" | Drive is in Positioning mode and has reached the home position. Tolerance is adjusted with A564 [Encoder Pos Tol]. | – |
| 29 "Safe-Off" | Both safe-off inputs are active. | – |
| 30 "SafeTqPermit"(1) | Both safe-off inputs are inactive (closed). | – |
| 31 "AutoRst Ctdn"(1) | Drive is counting down to an automatic restart. | – |

| Values | | |
|---|---|---|
| | Default:<br>Opto Out1 Sel:<br>Opto Out2 Sel: | <br>2<br>1 |
| | Min/Max: | 0/31 |
| | Display: | 1 |

(1) Setting is available in FRN 5.xxx and later.

## Terminal Block Group *(continued)*

**t070 [Opto Out1 Level]**
**t073 [Opto Out2 Level]**

Related Parameter(s): t069, t072

32 32 bit parameter.

PF 525 PowerFlex 525 only.

Determines the on/off point for the digital outputs when t069 or t072 [Opto Outx Sel] is set to the values shown below.

| Min/Max Value Range Based On [Opto Outx Sel] Setting | | | | | | | |
|---|---|---|---|---|---|---|---|
| 6: | 0...500 Hz | 10: | 0...100% | 16: | 0.1...9999 s | 20: | 0/1 |
| 7: | 0...180% | 11 | 0/1 | 17: | 1...9999 counts | 26: | 0...150% |
| 8: | 0...815V | 13 | 0...800 | 18: | 0...180° | – | |

| | | |
|---|---|---|
| **Values** | Default: | 0.0 |
| | Min/Max: | 0.0/9999.0 |
| | Display: | 0.1 |

**t075 [Opto Out Logic]**

PF 525 PowerFlex 525 only.

Determines the logic (Normally Open/NO or Normally Closed/NC) of the digital outputs only.

| Setting | Digital Out 1 Logic | Digital Out 2 Logic |
|---|---|---|
| 0 | NO | NO |
| 1 | NC | NO |
| 2 | NO | NC |
| 3 | NC | NC |

| | | |
|---|---|---|
| **Values** | Default: | 0 |
| | Min/Max: | 0/3 |
| | Display: | 1 |

**t076 [Relay Out1 Sel]** Related Parameter(s): P046, P048, P050, t070, t073, t077, t082, t086, t087, t093, t094, t097, A541, A564

**t081 [Relay Out2 Sel]**

PF 525 PowerFlex 525 only.

Determines the operation of the programmable output relay.

| Options | Output Relay Changes State When... | Hysteresis |
|---|---|---|
| 0 "Ready/Fault" | Relay changes state when power is applied. Indicates that the drive is ready for operation. Relay returns drive to shelf state when power is removed or a fault occurs. | None |
| 1 "At Frequency" | Drive reaches commanded frequency. | 0.5 Hz above; 1.0 Hz below |
| 2 "MotorRunning" | Motor is receiving power from the drive. | None |
| 3 "Reverse" | Drive is commanded to run in reverse direction. | None |
| 4 "Motor OverId" | Motor overload condition exists. | 100 ms time delay on or off |
| 5 "Ramp Reg" | Ramp regulator is modifying the programmed accel/ decel times to avoid an overcurrent or overvoltage fault from occurring. | 100 ms time delay on or off |
| 6 "Above Freq" | Drive exceeds the frequency (Hz) value set in t077 or t082 [Relay Outx Level]. | 100 ms time delay on or off |
| 7 "Above Cur" | Drive exceeds the current (% Amps) value set in t077 or t082 [Relay Outx Level].<br>**IMPORTANT** Value for t077 or t082 [Relay Outx Level] must be entered in percent of drive rated output current. | 100 ms time delay on or off |
| 8 "Above DCVolt" | Drive exceeds the DC bus voltage value set in t077 or t082 [Relay Outx Level]. | 100 ms time delay on or off |
| 9 "Retries Exst" | Value set in A541 [Auto Rstrt Tries] is exceeded. | None |
| 10 "Above Anlg V" | Analog input voltage (0-10V input) exceeds the value set in t077 or t082 [Relay Outx Level].<br>**IMPORTANT** Do not use if t093 [10V Bipolar Enbl] is set to 1 "Bi-Polar In". | 100 ms time delay on or off |
| 11 "Above PF Ang" | Power Factor angle exceeds the value set in t077 or t082 [Relay Outx Level]. | 100 ms time delay on or off |
| 12 "Anlg In Loss" | Analog input loss has occurred. Program t094 [Anlg In V Loss] or t097 [Anlg In mA Loss] for desired action when input loss occurs. | On, 2 mA / ±1V<br>Off, 3 mA / ±1.5V |
| 13 "ParamControl" | Output will be directly controlled by the state of the t077 or t082 [Relay Outx Level]. A value of 0 causes the output to turn off. A value of 1 or greater in this parameter causes the output to turn on. | None |
| 14 "NonRec Fault" | • Value set in A541 [Auto Rstrt Tries] is exceeded or<br>• A541 [Auto Rstrt Tries] is not enabled or<br>• A non-resettable fault has occurred. | None |
| 15 "EM Brk Cntrl" | EM Brake is energized. Program t087 [EM Brk On Delay] and t086 [EM Brk Off Delay] for desired action. | None |
| 16 "Thermal OL" | Relay energizes when thermal Motor overload counter is above the value set in t077 or t082 [Relay Outx Level]. It also energizes if the drive is within 5°C of the drive overheat trip point. | None |
| 17 "Amb OverTemp" | Relay energizes when control module over temperature occurs. | None |
| 18 "Local Active | Active when drive P046, P048 or P050 [Start Source x] is in local keypad control. | None |
| 19 "Comm Loss" | Active when communication is lost from any comm source with reference or control. | None |
| 20 "Logic In 1"(1) | An input is programmed as "Logic Input 1" and is active. | None |
| 21 "Logic In 2"(1) | An input is programmed as "Logic Input 2" and is active. | None |
| 22 "Logic 1 & 2"(1) | Both Logic inputs are programmed and active. | None |
| 23 "Logic 1 or 2"(1) | One or both Logic inputs are programmed and one or both is active. | None |
| 24 "StpLogic Out"(1) | Drive enters StepLogic step with Command Word set to enable Logic output. | None |
| 25 "Timer Out" | Timer has reached the value set in t077 or t082 [Relay Outx Level] or not timing. | None |
| 26 "Counter Out" | Counter has reached the value set in t077 or t082 [Relay Outx Level] or not counting. | None |
| 27 "At Position"(1) | Drive is in Positioning mode and has reached the commanded position. Tolerance is adjusted with A564 [Encoder Pos Tol]. | – |
| 28 "At Home"(1) | Drive is in Positioning mode and has reached the home position. Tolerance is adjusted with A564 [Encoder Pos Tol]. | – |
| 29 "Safe-Off"(1) | Both safe-off inputs are active. | – |
| 30 "SafeTqPermit"(1)(2) | Both safe-off inputs are inactive (closed). | – |
| 31 "AutoRst Ctdn"(1)(2) | Drive is counting down to an automatic restart. | – |

| Values | | |
|---|---|---|
| | Default:<br>Relay Out1 Sel:<br>Relay Out2 Sel: | <br>0<br>2 |
| | Min/Max: | 0/31 |
| | Display: | 1 |

(1) Setting is specific to PowerFlex 525 drives only.

(2) Setting is available in FRN 5.xxx and later.

### t077 [Relay Out1 Level]

Related Parameter(s): t076, t081

### t082 [Relay Out2 Level]

PF 525 PowerFlex 525 only.

32 32 bit parameter.

Determines the on/off point for the output relay when t076 or t081 [Relay Outx Sel] is set to the values shown below.

| Min/Max Value Range Based On [Relay Outx Sel] Setting | | | | | | | |
|---|---|---|---|---|---|---|---|
| 6: | 0...500 Hz | 10: | 0...100% | 16: | 0.1...9999 s | 20: | 0/1 |
| 7: | 0...180% | 11: | 0/1 | 17: | 1...9999 counts | 26: | 0...150% |
| 8: | 0...815V | 13: | 0...800 | 18: | 0...180° | – | |

| | | |
|---|---|---|
| **Values** | Default: | 0.0 |
| | Min/Max: | 0.0/9999.0 |
| | Display: | 0.1 |

### t079 [Relay 1 On Time]

### t084 [Relay 2 On Time]

PF 525 PowerFlex 525 only.

Sets the delay time before Relay energizes after required condition is met.

| | | |
|---|---|---|
| **Values** | Default: | 0.0 s |
| | Min/Max: | 0.0/600.0 s |
| | Display: | 0.1 s |

### t080 [Relay 1 Off Time]

### t085 [Relay 2 Off Time]

PF 525 PowerFlex 525 only.

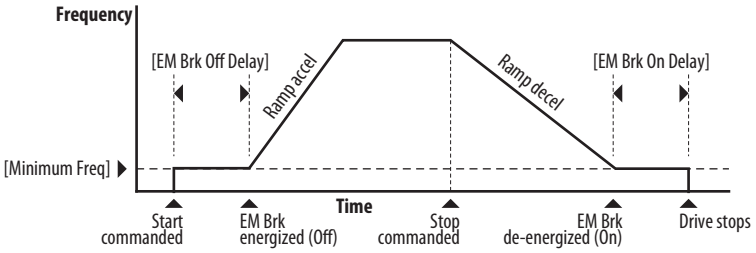
Sets the delay time before Relay de-energizes after required condition ceases.

| | | |
|---|---|---|
| **Values** | Default: | 0.0 s |
| | Min/Max: | 0.0/600.0 s |
| | Display: | 0.1 s |

### t086 [EM Brk Off Delay]

Related Parameter(s): P045

Sets the time the drive remains at minimum frequency before ramping up to the commanded frequency (and engaging the brake coil relay) if Electromechanical (EM) Brake Control Mode is enabled with P045 [Stop Mode].

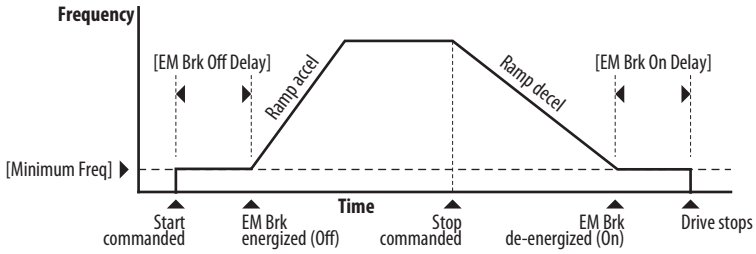



| | | |
|---|---|---|
| **Values** | Default: | 2.00 s |
| | Min/Max: | 0.00/10.00 s |
| | Display: | 0.01 s |

## Terminal Block Group *(continued)*

**t087 [EM Brk On Delay]** Related Parameter(s): P045

Sets the time the drive remains at minimum frequency (after releasing the brake coil relay) before stopping if EM Brake Control Mode is enabled with P045 [Stop Mode].




| | | |
|---|---|---|
| **Values** | Default: | 2.00 s |
| | Min/Max: | 0.00/10.00 s |
| | Display: | 0.01 s |

**t088 [Analog Out Sel]** Related Parameter(s): t090

The 0-10V, 0-20 mA or 4-2 0 mA analog output can be used to provide a signal proportional to several drive conditions. This parameter also selects which analog calibration parameters to use.(1)

| Options | Output Range | Minimum Output Value | Maximum Output Value = t089 [Analog Out High] | Filter(1) | Related Parameter |
|---|---|---|---|---|---|
| 0 "OutFreq 0-10" | 0-10V | 0V = 0 Hz | [Maximum Freq] | None | b001 |
| 1 "OutCurr 0-10" | 0-10V | 0V = 0 A | 200% Drive Rated Current | Filter A | b003 |
| 2 "OutVolt 0-10" | 0-10V | 0V = 0V | 120% Drive Rated Output Volts | None | b004 |
| 3 "OutPowr 0-10" | 0-10V | 0V = 0 kW | 200% Drive Rated Power | Filter A | b017 |
| 4 "OutTorq 0-10" | 0-10V | 0V = 0 A | 200% Drive Rated Current | Filter A | d382 |
| 5 "TstData 0-10" | 0-10V | 0V = 0000 | 65535 (Hex FFFF) | None | – |
| 6 "Setpnt 0-10" | 0-10V | 0V = 0% | 100.0% Setpoint setting | None | t090 |
| 7 "DCVolt 0-10" | 0-10V | 0V = 0V | 100.0% of trip value | None | b005 |
| 8 "OutFreq 0-20" | 0-20 mA | 0 mA = 0 Hz | [Maximum Freq] | None | b001 |
| 9 "OutCurr 0-20" | 0-20 mA | 0 mA = 0 A | 200% Drive Rated Current | Filter A | b003 |
| 10 "OutVolt 0-20" | 0-20 mA | 0 mA = 0V | 120% Drive Rated Output Volts | None | b004 |
| 11 "OutPowr 0-20" | 0-20 mA | 0 mA = 0 kW | 200% Drive Rated Power | Filter A | b017 |
| 12 "OutTorq 0-20" | 0-20 mA | 0 mA = 0 A | 200% Drive Rated Current | Filter A | d382 |
| 13 "TstData 0-20" | 0-20 mA | 0 mA = 0000 | 65535 (Hex FFFF) | None | – |
| 14 "Setpnt 0-20" | 0-20 mA | 0 mA = 0% | 100.0% Setpoint setting | None | t090 |
| 15 "DCVolt 0-20" | 0-20 mA | 0 mA = 0V | 100.0% of trip value | None | b005 |
| 16 "OutFreq 4-20" | 4-20 mA | 4 mA = 0 Hz | [Maximum Freq] | None | b001 |
| 17 "OutCurr 4-20" | 4-20 mA | 4 mA = 0 A | 200% Drive Rated Current | Filter A | b003 |
| 18 "OutVolt 4-20" | 4-20 mA | 4 mA = 0V | 120% Drive Rated Output Volts | None | b004 |
| 19 "OutPowr 4-20" | 4-20 mA | 4 mA = 0 kW | 200% Drive Rated Power | Filter A | b017 |
| 20 "OutTorq 4-20" | 4-20 mA | 4 mA = 0 A | 200% Drive Rated Current | Filter A | d382 |
| 21 "TstData 4-20" | 4-20 mA | 4 mA = 0000 | 65535 (Hex FFFF) | None | – |
| 22 "Setpnt 4-20" | 4-20 mA | 4 mA = 0% | 100.0% Setpoint setting | None | t090 |
| 23 "DCVolt 4-20" | 4-20 mA | 4 mA = 0V | 100.0% of trip value | None | b005 |

(1) Filter A is a single pole digital filter with a 162 ms time constant. Given a 0...100% step input from a steady state, the output of Filter A takes 500 ms to get to 95% of maximum, 810 ms to get to 99%, and 910 ms to get to 100%.

| | | |
|---|---|---|
| **Values** | Default: | 0 |
| | Min/Max: | 0/23 |
| | Display: | 1 |

(1) Parameter is also available in PowerFlex 523 FRN 3.xxx and later. PowerFlex 523 series B drive is required.

## Terminal Block Group *(continued)*

**t089 [Analog Out High]**

Scales the maximum output value (V or mA) when the source setting is at maximum.(1)

| | | |
|---|---|---|
| **Values** | Default: | 100% |
| | Min/Max: | 0/800% |
| | Display: | 1% |

(1) Parameter is also available in PowerFlex 523 FRN 3.xxx and later. PowerFlex 523 series B drive is required.

**t090 [Anlg Out Setpt]** Related Parameter(s): t088

Sets the percentage of output desired when t088 [Analog Out Sel] is set to 6, 14 or 22 "Analog Setpoint".(1)

| | | |
|---|---|---|
| **Values** | Default: | 0.0% |
| | Min/Max: | 0.0/100.0% |
| | Display: | 0.1% |

(1) Parameter is also available in PowerFlex 523 FRN 3.xxx and later. PowerFlex 523 series B drive is required.

**t091 [Anlg In 0-10V Lo]** Related Parameter(s): P043, t092, t093

Stop drive before changing this parameter.

Sets the percentage (based on 10V) of input voltage applied to the 0-10V analog input used to represent P043 [Minimum Freq].
Analog inversion can be accomplished by setting this value larger than t092 [Anlg In 0-10V Hi].
If t093 [10V Bipolar Enbl] is set to 1 "Bi-Polar In", this parameter is ignored.

| | | |
|---|---|---|
| **Values** | Default: | 0.0% |
| | Min/Max: | 0.0/200.0% |
| | Display: | 0.1% |

**t092 [Anlg In 0-10V Hi]** Related Parameter(s): P044, t091, t093

Stop drive before changing this parameter.

Sets the percentage (based on 10V) of input voltage applied to the 0-10V analog input used to represent P044 [Maximum Freq].
Analog inversion can be accomplished by setting this value smaller than t091 [Anlg In 0-10V Lo].
If t093 [10V Bipolar Enbl] is set to 1 "Bi-Polar In", the same value applies to positive and negative voltage.

| | | |
|---|---|---|
| **Values** | Default: | 100.0% |
| | Min/Max: | 0.0/200.0% |
| | Display: | 0.1% |

**t093 [10V Bipolar Enbl]** Related Parameter(s): t091, t092

PF 525 PowerFlex 525 only.

Enables/disables bi-polar control. In bi-polar mode direction is commanded by the polarity of the voltage.
If bi-polar control is enabled, P043 [Minimum Freq] and t091 [Anlg In 0-10V Lo] are ignored.

| | | | |
|---|---|---|---|
| **Options** | 0 | "Uni-Polar In" (Default) | 0-10V only |
| | 1 | "Bi-Polar In" | ±10V |

## Terminal Block Group *(continued)*

**t094 [Anlg In V Loss]** Related Parameter(s): P043, P044, A426, A427

Sets the response to a loss of input. When the 0-10V input (or –10 to +10V) is used for any reference, any input less than 1V is reported as a signal loss. Input must exceed 1.5V for the signal loss condition to end.

If enabled, this function affects any input that is being used as a speed reference, PID reference or PID setpoint in the drive.

| | | |
|---|---|---|
| **Options** | 0 | "Disabled" (Default) |
| | 1 | "Fault (F29)" |
| | 2 | "Stop" |
| | 3 | "Zero Ref" |
| | 4 | "Min Freq Ref" |
| | 5 | "Max Freq Ref" |
| | 6 | "Key Freq Ref" |
| | 7 | "MOP Freq Ref" |
| | 8 | "Continu Last" |

**t095 [Anlg In4-20mA Lo]** Related Parameter(s): P043, t096

Stop drive before changing this parameter.

Sets the percentage (based on 4-20 mA) of input current applied to the 4-20 mA analog input used to represent P043 [Minimum Freq].

Analog inversion can be accomplished by setting this value larger than t096 [Anlg In4-20mA Hi].

| | | |
|---|---|---|
| **Values** | Default: | 0.0% |
| | Min/Max: | 0.0/100.0% |
| | Display: | 0.1% |

**t096 [Anlg In4-20mA Hi]** Related Parameter(s): P044, t095

Stop drive before changing this parameter.

Sets the percentage (based on 4-20 mA) of input current applied to the 4-20 mA analog input used to represent P044 [Maximum Freq].

Analog inversion can be accomplished by setting this value smaller than t095 [Anlg In4-20mA Lo].

| | | |
|---|---|---|
| **Values** | Default: | 100.0% |
| | Min/Max: | 0.0/200.0% |
| | Display: | 0.1% |

**t097 [Anlg In mA Loss]** Related Parameter(s): P043, P044, A426, A427

Sets the response to a loss of input. When the 4-20mA input is used for any reference, any input less than 2 mA is reported as a signal loss. Input must exceed 3 mA for the signal loss condition to end.

If enabled, this function affects any input that is being used as a speed reference or PID reference or PID setpoint in the drive.

| | | |
|---|---|---|
| **Options** | 0 | "Disabled" (Default) |
| | 1 | "Fault (F29)" |
| | 2 | "Stop" |
| | 3 | "Zero Ref" |
| | 4 | "Min Freq Ref" |
| | 5 | "Max Freq Ref" |
| | 6 | "Key Freq Ref" |
| | 7 | "MOP Freq Ref" |
| | 8 | "Continu Last" |

## Terminal Block Group *(continued)*

**t098 [Anlg Loss Delay]** Related Parameter(s): t094, t097

Sets the length of time after power-up during which the drive detects no analog signal loss.
Response to an analog signal loss is set in t094 or t097 [Analog In x Loss].

| | | |
|---|---|---|
| **Values** | Default: | 0.0 s |
| | Min/Max: | 0.0 /20.0 s |
| | Display: | 0.1 s |

**t099 [Analog In Filter]**

Sets the level of additional filtering of the analog input signals. A higher number increases filtering and decreases bandwidth. Each setting doubles the applied filtering (1 = 2x filter, 2 = 4x filter, and so on).

| | | |
|---|---|---|
| **Values** | Default: | 0 |
| | Min/Max: | 0/14 |
| | Display: | 1 |

**t100 [Sleep-Wake Sel]** Related Parameter(s): t101, t102, t103

Drive "sleeps" if the appropriate analog input drops below the set t101 [Sleep Level] for the time set in t102 [Sleep Time] and the drive is running. When entering sleep mode the drive ramps to zero and the run indicator on the keypad display flashes to indicate the drive is in "sleep" mode.
When the appropriate analog input rises above the set [Wake Level], the drive "wakes" and ramps to the commanded frequency.
Inversion can be accomplished by setting [Sleep Level] to a higher setting than t103 [Wake Level].

**ATTENTION:** Enabling the Sleep-Wake function can cause unexpected machine operation during the Wake mode. Equipment damage and/or personal injury can result if this parameter is used in an inappropriate application. In addition, all applicable local, national and international codes, standards, regulations or industry guidelines must be considered.

| | | | |
|---|---|---|---|
| **Options** | 0 | "Disabled" (Default) | |
| | 1 | "0-10V Input" | Sleep enabled from 0-10V Analog Input 1 |
| | 2 | "4-20mA Input" | Sleep enabled from 4-20 mA Analog Input 2 |
| | 3 | "Command Freq" | Sleep enabled based on drive commanded frequency |

**t101 [Sleep Level]**

Sets the analog input level the drive must reach to enter sleep mode.

| | | |
|---|---|---|
| **Values** | Default: | 10.0% |
| | Min/Max: | 0.0/100.0% |
| | Display: | 0.1% |

**t102 [Sleep Time]**

Sets the analog input time the drive must stay below to enter sleep mode.

| | | |
|---|---|---|
| **Values** | Default: | 0.0 s |
| | Min/Max: | 0.0/600.0 s |
| | Display: | 0.1 s |

**t103 [Wake Level]**

Sets the analog input level the drive must reach to wake from sleep mode.

| | | |
|---|---|---|
| **Values** | Default: | 15.0% |
| | Min/Max: | 0.0/100.0% |
| | Display: | 0.1% |

## Terminal Block Group *(continued)*

**t104 [Wake Time]**

Sets the analog input time the drive must stay above to wake from sleep mode.

| | | |
|---|---|---|
| **Values** | Default: | 0.0 s |
| | Min/Max: | 0.0/600.0 s |
| | Display: | 0.1 s |

**t105 [Safety Open En]**

PF 525 PowerFlex 525 only.

Sets the action when both safety inputs (Safety 1 and Safety 2) are disabled (de-energized – no power is applied).

| | | |
|---|---|---|
| **Options** | 0 | "FaultEnable" (Default) |
| | 1 | "FaultDisable" |

**t106 [SafetyFlt RstCfg]**

PF 525 PowerFlex 525 only.

(With FRN 5.xxx and later.)

Sets the method of resetting fault F111 "Safety Hardware" either by means of a power cycle or fault clear operation.

| | | | |
|---|---|---|---|
| **Options** | 0 | "PwrCycleRset" (Default) | Reset fault F111 using power cycle. |
| | 1 | "FltClr Reset" | Reset fault F111 using fault clear mechanism without power cycle. |

# Communications Group

**C121 [Comm Write Mode]**

Saves parameter values in active drive memory (RAM) or in drive non-volatile memory (EEPROM).

**ATTENTION:** If Automatic Drive Configuration (ADC) is used, this parameter must remain at its default value of 0 “Save”.

**IMPORTANT** Parameter values set prior to setting 1 “RAM only” are saved in RAM.

| | | |
|---|---|---|
| **Options** | 0 | “Save” (Default) |
| | 1 | “RAM only” |

**C122 [Cmd Stat Select]**

PF 525 PowerFlex 525 only.

Selects velocity-specific or position/fibers-specific Command and Status Word bit definitions for use over a communication network. See Writing (06) Logic Command Data on page 203 for more information. This parameter cannot be changed when an I/O connection is established through the communication adapter or the drive’s embedded EtherNet/IP port.

| | | |
|---|---|---|
| **Options** | 0 | “Velocity” (Default) |
| | 1 | “Position” |

**C123 [RS485 Data Rate]**

Sets the communications baud rate (bits/second) for the RS485 port. A reset or power cycle is required after selection is made.

| | | |
|---|---|---|
| **Options** | 0 | “1200” |
| | 1 | “2400” |
| | 2 | “4800” |
| | 3 | “9600” (Default) |
| | 4 | “19,200” |
| | 5 | “38,400” |

**C124 [RS485 Node Addr]**

Sets the Modbus drive node number (address) for the RS485 port if using a network connection. A reset or power cycle is required after selection is made.

| | | |
|---|---|---|
| **Values** | Default: | 100 |
| | Min/Max: | 1/247 |
| | Display: | 1 |

**C125 [Comm Loss Action]** Related Parameter(s): P045

Sets the drive's response to a loss of connection or excessive communication errors on the RS485 port.

| | | | |
|---|---|---|---|
| **Options** | 0 | “Fault” (Default) | |
| | 1 | “Coast Stop” | Stops drive using “Coast to stop”. |
| | 2 | “Stop” | Stops drive using P045 [Stop Mode] setting. |
| | 3 | “Continu Last” | Drive continues operating at communication commanded speed saved in RAM. |

**C126 [Comm Loss Time]** Related Parameter(s): C125

Sets the time that the drive remains in communication loss with the RS485 port before taking the action specified in C125 [Comm Loss Action]. See Appendix C for more information.

**IMPORTANT** This setting is effective only if I/O that controls the drive is transmitted through the RS485 port.

| | | |
|---|---|---|
| **Values** | Default: | 5.0 s |
| | Min/Max: | 0.1/60.0 s |
| | Display: | 0.1 s |

## Communications Group *(continued)*

**C127 [RS485 Format]**

Determines the details related to the specific Modbus protocol used by the drive. A reset or power cycle is required after selection is made.

| | | |
|---|---|---|
| **Options** | 0 | "RTU 8-N-1" (Default) |
| | 1 | "RTU 8-E-1" |
| | 2 | "RTU 8-O-1" |
| | 3 | "RTU 8-N-2" |
| | 4 | "RTU 8-E-2" |
| | 5 | "RTU 8-O-2" |

**C128 [EN Addr Sel]** Related Parameter(s): C129-C132, C133-C136, C137-C140

PF 525 PowerFlex 525 only.

Enables the IP address, subnet mask and gateway address to be set with a BOOTP server. Identifies the connections that would be attempted on a reset or power cycle. A reset or power cycle is required after selection is made.

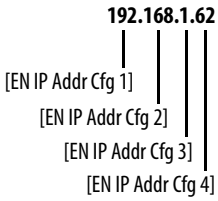
| | | |
|---|---|---|
| **Options** | 1 | "Parameters" |
| | 2 | "BOOTP" (Default) |

**C129 [EN IP Addr Cfg 1]**
**C130 [EN IP Addr Cfg 2]**
**C131 [EN IP Addr Cfg 3]**
**C132 [EN IP Addr Cfg 4]**

Related Parameter(s): C128

PF 525 PowerFlex 525 only.

Sets the bytes in the IP address. A reset or power cycle is required after selection is made.




**IMPORTANT** C128 [EN Addr Sel] must be set to 1 "Parameters".

| | | |
|---|---|---|
| **Values** | Default: | 0 |
| | Min/Max: | 0/255 |
| | Display: | 1 |

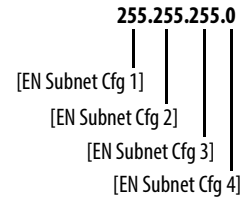
## Communications Group *(continued)*

**C133 [EN Subnet Cfg 1]**
**C134 [EN Subnet Cfg 2]**
**C135 [EN Subnet Cfg 3]**
**C136 [EN Subnet Cfg 4]**

Related Parameter(s): C128

PF 525 PowerFlex 525 only.

Sets the bytes of the subnet mask. A reset or power cycle is required after selection is made.




**IMPORTANT** C128 [EN Addr Sel] must be set to 1 "Parameters".

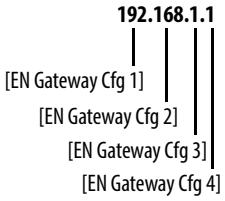
| | | |
|---|---|---|
| **Values** | Default: | 0 |
| | Min/Max: | 0/255 |
| | Display: | 1 |

**C137 [EN Gateway Cfg 1]**
**C138 [EN Gateway Cfg 2]**
**C139 [EN Gateway Cfg 3]**
**C140 [EN Gateway Cfg 4]**

Related Parameter(s): C128

PF 525 PowerFlex 525 only.

Sets the bytes of the gateway address. A reset or power cycle is required after selection is made.




**IMPORTANT** C128 [EN Addr Sel] must be set to 1 "Parameters".

| | | |
|---|---|---|
| **Values** | Default: | 0 |
| | Min/Max: | 0/255 |
| | Display: | 1 |

**C141 [EN Rate Cfg]**

PF 525 PowerFlex 525 only.

Sets the network data rate at which EtherNet/IP communicates. A reset or power cycle is required after selection is made.

| | | |
|---|---|---|
| **Options** | 0 | "Auto detect" (Default) |
| | 1 | "10Mbps Full" |
| | 2 | "10Mbps Half" |
| | 3 | "100Mbps Full" |
| | 4 | "100Mbps Half" |

## Communications Group *(continued)*

**C143 [EN Comm Flt Actn]** Related Parameter(s): P045, C145, C146, C147-C150

PF 525 PowerFlex 525 only.

Sets the action that the EtherNet/IP interface and drive takes if the EtherNet/IP interface detects that Ethernet communications have been disrupted.

**IMPORTANT** This setting is effective only if I/O that controls the drive is transmitted through the EtherNet/IP interface.

**ATTENTION:** Risk of injury or equipment damage exists. Parameter C143 [EN Comm Flt Actn] lets you determine the action of the EtherNet/IP interface and connected drive if communications are disrupted. By default, this parameter faults the drive. You can set this parameter so that the drive continues to run. Precautions should be taken to ensure that the setting of this parameter does not create a risk of injury or equipment damage. When commissioning the drive, verify that your system responds correctly to various situations (for example, a disconnected drive).

| | | | |
|---|---|---|---|
| **Options** | 0 | "Fault" (Default) | |
| | 1 | "Stop" | Drive stops per P045 [Stop Mode] setting. |
| | 2 | "Zero Data" | Note: The Reference and Datalink values transmitted to the drive will be set to "0". |
| | 3 | "Hold Last" | Note: The Logic Command, Reference, and Datalink values transmitted to the drive will be held at their last value. |
| | 4 | "Send Flt Cfg" | Note: The Logic Command, Reference, and Datalink values will be transmitted to the drive as configured in C145, C146, and C147...C150. |

**C144 [EN Idle Flt Actn]** Related Parameter(s): P045, C145, C146, C147-C150

PF 525 PowerFlex 525 only.

Sets the action that the EtherNet/IP interface and drive takes if the EtherNet/IP interface detects that the scanner is idle because the controller was switched to program mode.

**ATTENTION:** Risk of injury or equipment damage exists. Parameter C144 [EN Idle Flt Actn] lets you determine the action of the EtherNet/IP interface and connected drive if the scanner is idle. By default, this parameter faults the drive. you can set this parameter so that the drive continues to run. Precautions should be taken to ensure that the setting of this parameter does not create a risk of injury or equipment damage. When commissioning the drive, verify that your system responds correctly to various situations (for example, a disconnected drive).

| | | | |
|---|---|---|---|
| **Options** | 0 | "Fault" (Default) | |
| | 1 | "Stop" | Drive stops per P045 [Stop Mode] setting. |
| | 2 | "Zero Data" | Note: The Reference and Datalink values transmitted to the drive will be set to "0". |
| | 3 | "Hold Last" | Note: The Logic Command, Reference, and Datalink values transmitted to the drive will be held at their last value. |
| | 4 | "Send Flt Cfg" | Note: The Logic Command, Reference, and Datalink values will be transmitted to the drive as configured in C145, C146, and C147...C150. |

**C145 [EN Flt Cfg Logic]** Related Parameter(s): C143, C144

32 32 bit parameter.

PF 525 PowerFlex 525 only.

Sets the Logic Command data that is sent to the drive if any of the following is true:

– C143 [EN Comm Flt Actn] is set to 4 "Send Flt Cfg" and communications are disrupted.

– C144 [EN Idle Flt Actn] is set to 4 "Send Flt Cfg" and the scanner is put into Program or Test mode.

See Writing (06) Logic Command Data on page 203 for more information.

| | | |
|---|---|---|
| **Values** | Default: | 0000 |
| | Min/Max: | 0000/FFFF |
| | Display: | 0000 |

## Communications Group *(continued)*

**C146 [EN Flt Cfg Ref]** Related Parameter(s): C143, C144

32 32 bit parameter.

PF 525 PowerFlex 525 only.

Sets the Reference data that is sent to the drive if any of the following is true:
– C143 [EN Comm Flt Actn] is set to 4 "Send Flt Cfg" and communications are disrupted.
– C144 [EN Idle Flt Actn] is set to 4 "Send Flt Cfg" and the scanner is put into Program or Test mode.

| | | |
|---|---|---|
| **Values** | Default: | 0 |
| | Min/Max: | 0/50000 |
| | Display: | 1 |

**C147 [EN Flt Cfg DL 1]**
**C148 [EN Flt Cfg DL 2]**
**C149 [EN Flt Cfg DL 3]**
**C150 [EN Flt Cfg DL 4]**

PF 525 PowerFlex 525 only.

Sets the Ethernet Datalink Input data that is sent to the drive if any of the following is true:
– C143 [EN Comm Flt Actn] is set to 4 "Send Flt Cfg" and communications are disrupted.
– C144 [EN Idle Flt Actn] is set to 4 "Send Flt Cfg" and the scanner is put into Program or Test mode.

| | | |
|---|---|---|
| **Values** | Default: | 0 |
| | Min/Max: | 0/65535 |
| | Display: | 1 |

**C153 [EN Data In 1]**
**C154 [EN Data In 2]**
**C155 [EN Data In 3]**
**C156 [EN Data In 4]**

PF 525 PowerFlex 525 only.

Datalink parameter number whose value is written from the embedded EtherNet/IP data table. This parameter cannot be changed when an I/O connection is established through the drive's embedded EtherNet/IP port.

| | | |
|---|---|---|
| **Values** | Default: | 0 |
| | Min/Max: | 0/800 |
| | Display: | 1 |

**C157 [EN Data Out 1]**
**C158 [EN Data Out 2]**
**C159 [EN Data Out 3]**
**C160 [EN Data Out 4]**

PF 525 PowerFlex 525 only.

Datalink parameter number whose value is read from the embedded EtherNet/IP data table. This parameter cannot be changed when an I/O connection is established through the drive's embedded EtherNet/IP port.

| | | |
|---|---|---|
| **Values** | Default: | 0 |
| | Min/Max: | 0/800 |
| | Display: | 1 |

## Communications Group *(continued)*

**C161 [Opt Data In 1]**
**C162 [Opt Data In 2]**
**C163 [Opt Data In 3]**
**C164 [Opt Data In 4]**

Datalink parameter number whose value is written from the High Speed Drive Serial Interface (HSDSI) data table. This parameter cannot be changed when an I/O connection is established through the communication adapter.

| | | |
|---|---|---|
| **Values** | Default: | 0 |
| | Min/Max: | 0/800 |
| | Display: | 1 |

**C165 [Opt Data Out 1]**
**C166 [Opt Data Out 2]**
**C167 [Opt Data Out 3]**
**C168 [Opt Data Out 4]**

Datalink parameter number whose value is read from the HSDSI data table. This parameter cannot be changed when an I/O connection is established through the communication adapter.

| | | |
|---|---|---|
| **Values** | Default: | 0 |
| | Min/Max: | 0/800 |
| | Display: | 1 |

**C169 [MultiDrv Sel]**

Sets the configuration of the drive that is in multi-drive mode. A reset or power cycle is required after selection is made.

| | | |
|---|---|---|
| **Options** | 0 "Disabled" (Default) | No multi-drive master from the internal network option module or embedded Ethernet port. The drive can still function as a multi-drive slave or as a single drive (no multi-drive used). |
| | 1 "Network Opt" | Multi-drive is enabled with the internal network option as a multi-drive master. The host drive is "Drive 0" and up to four slave drives can be daisy-chained from its RS485 port. |
| | 2 "EtherNet/IP"(1) | Multi-drive is enabled with the embedded Ethernet port as the multi-drive master. The host drive is "Drive 0" and up to four slave drives can be daisy-chained from its RS485 port. |

(1) Setting is specific to PowerFlex 525 drives only.

**C171 [Drv 1 Addr]**
**C172 [Drv 2 Addr]**
**C173 [Drv 3 Addr]**
**C174 [Drv 4 Addr]**

Related Parameter(s): C169

Sets the corresponding node addresses of the daisy-chained drives when C169 [MultiDrv Sel] is set to 1 "Network Opt" or 2 "EtherNet/IP". A reset or power cycle is required after selection is made.

| | | |
|---|---|---|
| **Values** | Default:<br>Drv 1 Addr:<br>Drv 2 Addr:<br>Drv 3 Addr:<br>Drv 4 Addr: | <br>2<br>3<br>4<br>5 |
| | Min/Max: | 1/247 |
| | Display: | 1 |

**C175 [DSI I/O Cfg]**

Sets the configuration of the Drives that are active in the multi-drive mode. Identifies the connections that would be attempted on a reset or power cycle. A reset or power cycle is required after selection is made.

| | | |
|---|---|---|
| **Options** | 0 "Drive 0" (Default) | |
| | 1 "Drive 0-1" | |
| | 2 "Drive 0-2" | |
| | 3 "Drive 0-3" | |
| | 4 "Drive 0-4" | |

# Logic Group

**L180 [Stp Logic 0]** **L181 [Stp Logic 1]**
**L182 [Stp Logic 2]** **L183 [Stp Logic 3]**
**L184 [Stp Logic 4]** **L185 [Stp Logic 5]**
**L186 [Stp Logic 6]** **L187 [Stp Logic 7]**

Related Parameter(s):

Stop drive before changing this parameter.

PF 525 PowerFlex 525 only.

| **Values** | Default: | 00F1 |
|---|---|---|
| | Min/Max: | 0000/FAFF |
| | Display | 0001 |

See Appendix D and Appendix E for more information on applying Step Logic and Position StepLogic.

Parameters L180...L187 are only active if P047, P049, or P051 [Speed Referencex] is set to 13 "Step Logic" or 16 "Positioning". These parameters can be used to create a custom profile of frequency commands. Each "step" can be based on time, status of a Logic input or a combination of time and the status of a Logic input.

Digits 1...4 for each [Stp Logic x] parameter must be programmed according to the desired profile. A Logic input is established by setting a digital input, parameters t062, t063, t065...t068 [DigIn TermBlk xx] to 24 "Logic In 1" and/or 25 "Logic In 2" or by using Bits 6 and 7 of A560 [Enh Control Word].

A time interval between steps can be programmed using parameters L190...L197 [Stp Logic Time x]. See the table below for related parameters.

The speed for any step is programmed using parameters A410...A417 [Preset Freq x].

| Step | StepLogic Parameter | Related Preset Frequency Parameter (Can be activated independent of StepLogic Parameters) | Related StepLogic Time Parameter (Active when L180...L187 Digit 1 or 2 are set to 1, b, C, d or E) |
|---|---|---|---|
| 0 | L180 [Stp Logic 0] | A410 [Preset Freq 0] | L190 [Stp Logic Time 0] |
| 1 | L181 [Stp Logic 1] | A411 [Preset Freq 1] | L191 [Stp Logic Time 1] |
| 2 | L182 [Stp Logic 2] | A412 [Preset Freq 2] | L192 [Stp Logic Time 2] |
| 3 | L183 [Stp Logic 3] | A413 [Preset Freq 3] | L193 [Stp Logic Time 3] |
| 4 | L184 [Stp Logic 4] | A414 [Preset Freq 4] | L194 [Stp Logic Time 4] |
| 5 | L185 [Stp Logic 5] | A415 [Preset Freq 5] | L195 [Stp Logic Time 5] |
| 6 | L186 [Stp Logic 6] | A416 [Preset Freq 6] | L196 [Stp Logic Time 6] |
| 7 | L187 [Stp Logic 7] | A417 [Preset Freq 7] | L197 [Stp Logic Time 7] |

The position for any step is programmed using parameters L200...L214 [Step Units x].

| Step | StepLogic Position Parameter |
|---|---|
| 0 | L200 [Step Units 0] & L201 [Step Units F 0] |
| 1 | L202 [Step Units 1] & L203 [Step Units F 1] |
| 2 | L204 [Step Units 2] & L205 [Step Units F 2] |
| 3 | L206 [Step Units 3] & L207 [Step Units F 3] |
| 4 | L208 [Step Units 4] & L209 [Step Units F 4] |
| 5 | L210 [Step Units 5] & L211 [Step Units F 5] |
| 6 | L212 [Step Units 6] & L213 [Step Units F 6] |
| 7 | L214 [Step Units 7] & L215 [Step Units F 7] |

**How StepLogic Works**

The StepLogic sequence begins with a valid start command. A normal sequence always begins with L180 [Stp Logic 0].

**Digit 1: Logic for next step**

This digit defines the logic for the next step. When the condition is met the program advances to the next step. Step 0 follows Step 7. Example: Digit 1 is set to 3. When "Logic In 2" becomes active, the program advances to the next step.

**Digit 2: Logic to jump to a different step**

For all settings other than F, when the condition is met, the program overrides Digit 0 and jumps to the step defined by Digit 3.

**Digit 3: Different step to jump**

When the condition for Digit 2 is met, this digit setting determines the next step or to end the program.

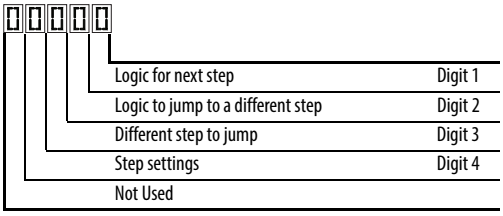
**Digit 4: Step settings**

This digit defines additional characteristics of each step.

Any StepLogic parameter can be programmed to control a relay or opto output, but you can not control different outputs based on the condition of different StepLogic commands.

### StepLogic Settings

The logic for each function is determined by the four digits for each StepLogic parameter. The following is a listing of the available settings for each digit. See Appendix D for more information.




### Velocity Control Settings (Digit 4)

| Required Setting | Accel/Decel Param. Used | StepLogic Output State | Commanded Direction |
|---|---|---|---|
| 0 | Accel/Decel 1 | Off | FWD |
| 1 | Accel/Decel 1 | Off | REV |
| 2 | Accel/Decel 1 | Off | No Output |
| 3 | Accel/Decel 1 | On | FWD |
| 4 | Accel/Decel 1 | On | REV |
| 5 | Accel/Decel 1 | On | No Output |
| 6 | Accel/Decel 2 | Off | FWD |
| 7 | Accel/Decel 2 | Off | REV |
| 8 | Accel/Decel 2 | Off | No Output |
| 9 | Accel/Decel 2 | On | FWD |
| A | Accel/Decel 2 | On | REV |
| b | Accel/Decel 2 | On | No Output |

### Positioning Settings (Digit 4)

| Required Setting | Accel/Decel Param. Used | StepLogic Output State | Direction From Home | Type of Command |
|---|---|---|---|---|
| 0 | Accel/Decel 1 | Off | FWD | Absolute |
| 1 | Accel/Decel 1 | Off | FWD | Incremental |
| 2 | Accel/Decel 1 | Off | REV | Absolute |
| 3 | Accel/Decel 1 | Off | REV | Incremental |
| 4 | Accel/Decel 1 | On | FWD | Absolute |
| 5 | Accel/Decel 1 | On | FWD | Incremental |
| 6 | Accel/Decel 1 | On | REV | Absolute |
| 7 | Accel/Decel 1 | On | REV | Incremental |
| 8 | Accel/Decel 2 | Off | FWD | Absolute |
| 9 | Accel/Decel 2 | Off | FWD | Incremental |
| A | Accel/Decel 2 | Off | REV | Absolute |
| b | Accel/Decel 2 | Off | REV | Incremental |
| C | Accel/Decel 2 | On | FWD | Absolute |
| d | Accel/Decel 2 | On | FWD | Incremental |
| E | Accel/Decel 2 | On | REV | Absolute |
| F | Accel/Decel 2 | On | REV | Incremental |

### Settings (Digit 3)

| Setting | Description |
|---|---|
| 0 | Jump to Step 0 |
| 1 | Jump to Step 1 |
| 2 | Jump to Step 2 |
| 3 | Jump to Step 3 |
| 4 | Jump to Step 4 |
| 5 | Jump to Step 5 |
| 6 | Jump to Step 6 |
| 7 | Jump to Step 7 |
| 8 | End Program (Normal Stop) |
| 9 | End Program (Coast to Stop) |
| A | End Program and Fault (F2) |

### Settings (Digit 2 and 1)

| Setting | Description |
|---|---|
| 0 | Skip Step (Jump Immediately) |
| 1 | Step Based on [Stp Logic Time x] |
| 2 | Step if “Logic In 1” is Active |
| 3 | Step if “Logic In 2” is Active |
| 4 | Step if “Logic In 1” is Not Active |
| 5 | Step if “Logic In 2” is Not Active |
| 6 | Step if either “Logic In 1” or “Logic In 2” is Active |
| 7 | Step if both “Logic In 1” and “Logic In 2” are Active |
| 8 | Step if neither “Logic In 1” nor “Logic In 2” is Active |
| 9 | Step if “Logic In 1” is Active and “Logic In 2” is Not Active |
| A | Step if “Logic In 2” is Active and “Logic In 1” is Not Active |
| b | Step after [Stp Logic Time x] and “Logic In 1” is Active |
| C | Step after [Stp Logic Time x] and “Logic In 2” is Active |
| d | Step after [Stp Logic Time x] and “Logic In 1” is Not Active |
| E | Step after [Stp Logic Time x] and “Logic In 2” is Not Active |
| F | Do Not Step/Ignore Digit 2 Settings |

## Logic Group *(continued)*

**L190 [Stp Logic Time 0]** **L191 [Stp Logic Time 1]**
**L192 [Stp Logic Time 2]** **L193 [Stp Logic Time 3]**
**L194 [Stp Logic Time 4]** **L195 [Stp Logic Time 5]**
**L196 [Stp Logic Time 6]** **L197 [Stp Logic Time 7]**

PF 525 PowerFlex 525 only.

Sets the time to remain in each step if the corresponding command word is set to "Step based on time".

| | | |
|---|---|---|
| **Values** | Default: | 30.0 s |
| | Min/Max: | 0.0/999.9 s |
| | Display: | 0.1 s |

**L200 [Step Units 0]** **L202 [Step Units 1]**
**L204 [Step Units 2]** **L206 [Step Units 3]**
**L208 [Step Units 4]** **L210 [Step Units 5]**
**L212 [Step Units 6]** **L214 [Step Units 7]**

32 32 bit parameter.

PF 525 PowerFlex 525 only.

Sets the position in user-defined units the drive must reach at each step.

| | | |
|---|---|---|
| **Values** | Default: | 0.00 |
| | Min/Max: | 0.00/6400.00 |
| | Display: | 0.01 |

# Advanced Display Group

**d360 [Analog In 0-10V]** Related Parameter(s): t091, t092

Displays the 0-10V analog input as a percent of full scale.

| | | |
|---|---|---|
| **Values** | Default: | Read Only |
| | Min/Max: | 0.0/100.0% |
| | Display: | 0.1% |

**d361 [Analog In 4-20mA]** Related Parameter(s): t095, t096

Displays the 4-20 mA analog input as a percent of full scale.

| | | |
|---|---|---|
| **Values** | Default: | Read Only |
| | Min/Max: | 0.0/100.0% |
| | Display: | 0.1% |

**d362 [Elapsed Time-hr]** Related Parameter(s): A555

Displays the total elapsed powered-up time (in hours) since timer reset. The timer stops when it reaches the maximum value.

| | | |
|---|---|---|
| **Values** | Default: | Read Only |
| | Min/Max: | 0/32767 hr |
| | Display: | 1 hr |

**d363 [Elapsed Time-min]** Related Parameter(s): d362, A555

Displays the total elapsed powered-up time (in minutes) since timer reset. Resets to zero when maximum value is reached and increments d362 [Elapsed Time-hr] by one.

| | | |
|---|---|---|
| **Values** | Default: | Read Only |
| | Min/Max: | 0.0/60.0 min |
| | Display: | 0.1 min |

**d364 [Counter Status]**

Displays the current value of the counter if enabled.

| | | |
|---|---|---|
| **Values** | Default: | Read Only |
| | Min/Max: | 0/65535 |
| | Display: | 1 |

**d365 [Timer Status]**

32 32 bit parameter.

Displays the current value of the timer if enabled.

| | | |
|---|---|---|
| **Values** | Default: | Read Only |
| | Min/Max: | 0.0/9999.0 s |
| | Display: | 0.1 s |

**d367 [Drive Type]**

Displays the Drive type setting. Used by Rockwell Automation field service personnel (not write accessible by non Rockwell Automation technical personnel).

| | | |
|---|---|---|
| **Values** | Default: | Read Only |
| | Min/Max: | 0/65535 |
| | Display: | 1 |

## Advanced Display Group *(continued)*

**d368 [Testpoint Data]** Related Parameter(s): A483

Displays the present value of the function selected in A483 [Testpoint Sel].

| | | |
|---|---|---|
| **Values** | Default: | Read Only |
| | Min/Max: | 0/FFFF |
| | Display: | 1 |

**d369 [Motor OL Level]**

Displays the motor overload counter.

| | | |
|---|---|---|
| **Values** | Default: | Read Only |
| | Min/Max: | 0.0/150.0% |
| | Display: | 0.1% |

**d375 [Slip Hz Meter]** Related Parameter(s): P032

Displays the current amount of slip or droop (absolute value) being applied to the motor frequency. Drives applies slip based on the setting for P032 [Motor NP Hertz].

| | | |
|---|---|---|
| **Values** | Default: | Read Only |
| | Min/Max: | 0.0/25.0 Hz |
| | Display: | 0.1 Hz |

**d376 [Speed Feedback]**

32 32 bit parameter.

Displays the value of the actual motor speed whether measured by encoder/pulse train feedback or estimated.

| | | |
|---|---|---|
| **Values** | Default: | Read Only |
| | Min/Max: | 0.0/64000.0 rpm |
| | Display: | 0.1 rpm |

**d378 [Encoder Speed]**

32 32 bit parameter.

Provides a monitoring point that reflects the speed measured from the feedback device. This shows the encoder or pulse train speed even if not used directly to control motor speed.(1)

| | | |
|---|---|---|
| **Values** | Default: | Read Only |
| | Min/Max: | 0.0/64000.0 rpm |
| | Display: | 0.1 rpm |

(1) Parameter is also available in PowerFlex 523 FRN 3.xxx and later.

**d380 [DC Bus Ripple]**

Displays the real-time value of the DC bus ripple voltage.

| | | |
|---|---|---|
| **Values** | Default: | Read Only |
| | Min/Max: | 0/410VDC for 230V AC drives; 820VDC for 460VAC drives; 1025VDC for 600VAC drives |
| | Display: | 1V DC |

**d381 [Output Powr Fctr]**

Displays the angle in electrical degrees between motor voltage and motor current.

| | | |
|---|---|---|
| **Values** | Default: | Read Only |
| | Min/Max: | 0.0/180.0 deg |
| | Display: | 0.1 deg |

## Advanced Display Group *(continued)*

**d382 [Torque Current]**

Displays the current value of the motor torque current measured by the drive.

| | | |
|---|---|---|
| **Values** | Default: | Read Only |
| | Min/Max: | 0.00/(Drive Rated Amps x 2) |
| | Display: | 0.01 A |

**d383 [PID1 Fdbk Displ]**

**d385 [PID2 Fdbk Displ]**

PF 525 PowerFlex 525 only.

Displays the active PID Feedback value.

| | | |
|---|---|---|
| **Values** | Default: | Read Only |
| | Min/Max: | 0.0/100.0% |
| | Display: | 0.1% |

**d384 [PID1 Setpnt Disp]**

**d386 [PID2 Setpnt Disp]**

PF 525 PowerFlex 525 only.

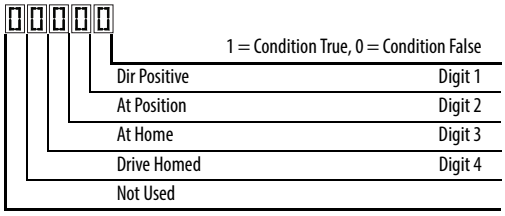
Displays the active PID Setpoint value.

| | | |
|---|---|---|
| **Values** | Default: | Read Only |
| | Min/Max: | 0.0/100.0% |
| | Display: | 0.1% |

**d387 [Position Status]**

PF 525 PowerFlex 525 only.

Displays the present operating condition of the drive. When in Positioning mode, Bit 1 indicates positive or negative position in relation to Home.




| | | |
|---|---|---|
| **Values** | Default: | Read Only |
| | Min/Max: | 0000/1111 |
| | Display: | 0000 |

**d388 [Units Traveled H]** Related Parameter(s): d387

Stop drive before changing this parameter.

32 bit parameter.

PF 525 PowerFlex 525 only.

Displays the number of user-defined units traveled from the home position. See d387 [Position Status] for direction of travel.

| | | |
|---|---|---|
| **Values** | Default: | Read Only |
| | Min/Max: | 0/64000 |
| | Display: | 1 |

## Advanced Display Group *(continued)*

**d389 [Units Traveled L]** Related Parameter(s): d387

Stop drive before changing this parameter.

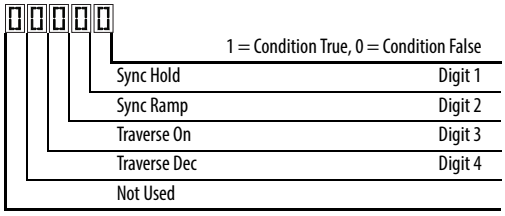
PF 525 PowerFlex 525 only.

Displays the number of user-defined units traveled from the home position. See d387 [Position Status] for direction of travel.

| | | |
|---|---|---|
| **Values** | Default: | Read Only |
| | Min/Max: | 0.00/0.99 |
| | Display: | 0.01 |

**d390 [Fiber Status]**

Present status of the Fibers features.




| | | |
|---|---|---|
| **Values** | Default: | Read Only |
| | Min/Max: | 0000/1111 |
| | Display: | 0000 |

**d391 [Stp Logic Status]** Related Parameter(s): P047, L180-L187

PF 525 PowerFlex 525 only.

Displays the current step of the Step Logic profile as defined by parameters L180...L187 [Step Logic x] when P047 [Speed Reference1] is set to 13 “Step Logic” or 16 “Positioning”.

| | | |
|---|---|---|
| **Values** | Default: | Read Only |
| | Min/Max: | 0/8 |
| | Display: | 1 |

**d392 [RdyBit Mode Act]** Related Parameter(s): A574

(With PowerFlex 525 FRN 3.xxx and later.)
(With PowerFlex 523 FRN 3.xxx and later.)

Displays the value of A574 [RdyBit Mode Cfg].

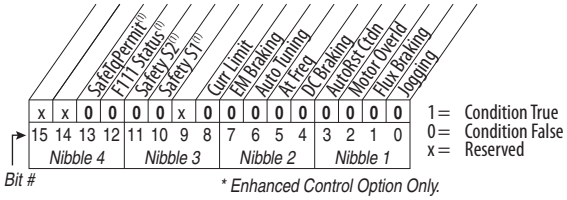
| | | |
|---|---|---|
| **Values** | Default: | Read Only |
| | Min/Max: | 0/1 |
| | Display: | 1 |

## Advanced Display Group *(continued)*

### d393 [Drive Status 2]

(With PowerFlex 525 FRN 5.xxx and later.)
(With PowerFlex 523 FRN 3.xxx and later.)

Displays the present operating condition of the drive.



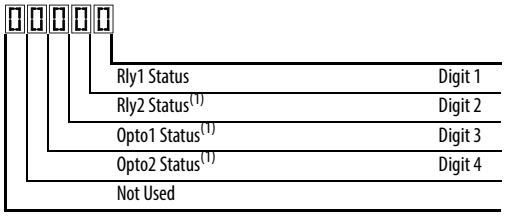

(1) Bit status is specific to PowerFlex 525 drives only.

| Values | | |
|---|---|---|
| | Default: | Read Only |
| | Min/Max: | 0/65535 |
| | Display: | 1 |

### d394 [Dig Out Status]

(With PowerFlex 525 FRN 5.xxx and later.)
(With PowerFlex 523 FRN 3.xxx and later.)

Displays relay output and opto output status.




| Status | Bit Value = 0 | Bit Value = 1 |
|---|---|---|
| Relay 1 status (Normally Open) | Not activated (Relay 1 open) | Activated (Relay 1 closed) |
| Relay 2 status (Normally Closed) | Not activated (Relay 2 closed) | Activated (Relay 2 open) |
| Opto 1 status | Not activated | Activated |
| Opto 2 status | Not activated | Activated |

(1) Setting is specific to PowerFlex 525 drives only.

| Values | | |
|---|---|---|
| | Default: | Read Only |
| | Min/Max: | 0/15 |
| | Display: | 1 |

# Advanced Program Group

**A410 [Preset Freq 0]** **A411 [Preset Freq 1]**
**A412 [Preset Freq 2]** **A413 [Preset Freq 3]**
**A414 [Preset Freq 4]** **A415 [Preset Freq 5]**
**A416 [Preset Freq 6]** **A417 [Preset Freq 7]**

**A418 [Preset Freq 8]** **A419 [Preset Freq 9]**
**A420 [Preset Freq 10]** **A421 [Preset Freq 11]**
**A422 [Preset Freq 12]** **A423 [Preset Freq 13]**
**A424 [Preset Freq 14]** **A425 [Preset Freq 15]**

PF 525 PowerFlex 525 only.

Sets the frequency of the drive outputs to the programmed value when selected.

**For PowerFlex 525**

| | Default Accel/Decel Used | Preset Input 1 (DigIn TermBlk 05) | Preset Input 2 (DigIn TermBlk 06) | Preset Input 3 (DigIn TermBlk 07) | Preset Input 4 (DigIn TermBlk 08) |
|---|---|---|---|---|---|
| Preset Setting 0[1] | 1 | 0 | 0 | 0 | 0 |
| Preset Setting 1 | 1 | 1 | 0 | 0 | 0 |
| Preset Setting 2 | 2 | 0 | 1 | 0 | 0 |
| Preset Setting 3 | 2 | 1 | 1 | 0 | 0 |
| Preset Setting 4 | 1 | 0 | 0 | 1 | 0 |
| Preset Setting 5 | 1 | 1 | 0 | 1 | 0 |
| Preset Setting 6 | 2 | 0 | 1 | 1 | 0 |
| Preset Setting 7 | 2 | 1 | 1 | 1 | 0 |
| Preset Setting 8 | 1 | 0 | 0 | 0 | 1 |
| Preset Setting 9 | 1 | 1 | 0 | 0 | 1 |
| Preset Setting 10 | 2 | 0 | 1 | 0 | 1 |
| Preset Setting 11 | 2 | 1 | 1 | 0 | 1 |
| Preset Setting 12 | 1 | 0 | 0 | 1 | 1 |
| Preset Setting 13 | 1 | 1 | 0 | 1 | 1 |
| Preset Setting 14 | 2 | 0 | 1 | 1 | 1 |
| Preset Setting 15 | 2 | 1 | 1 | 1 | 1 |

**For PowerFlex 523**

| | Default Accel/Decel Used | Preset Input 1 (DigIn TermBlk 05) | Preset Input 2 (DigIn TermBlk 06) | Preset Input 3 (DigIn TermBlk 03) | – |
|---|---|---|---|---|---|
| Preset Setting 0[1] | 1 | 0 | 0 | 0 | – |
| Preset Setting 1 | 1 | 1 | 0 | 0 | |
| Preset Setting 2 | 2 | 0 | 1 | 0 | |
| Preset Setting 3 | 2 | 1 | 1 | 0 | |
| Preset Setting 4 | 1 | 0 | 0 | 1 | |
| Preset Setting 5 | 1 | 1 | 0 | 1 | |
| Preset Setting 6 | 2 | 0 | 1 | 1 | |
| Preset Setting 7 | 2 | 1 | 1 | 1 | |

(1) Preset Setting 0 is only available if P047, P049 or P051 [Speed Referencex] is set to 7 “Preset Freq”.

| | | |
|---|---|---|
| **Values** | Defaults: | |
| | Preset Freq 0: | 0.00 Hz |
| | Preset Freq 1: | 5.00 Hz |
| | Preset Freq 2: | 10.00 HZ |
| | Preset Freq 3: | 20.00 Hz |
| | Preset Freq 4: | 30.00 Hz |
| | Preset Freq 5: | 40.00 Hz |
| | Preset Freq 6: | 50.00 Hz |
| | Preset Freq 7...15: | 60.00 Hz |
| | Min/Max: | 0.00/500.00 Hz |
| | Display: | 0.01 Hz |

## Advanced Program Group *(continued)*

**A426 [Keypad Freq]** Related Parameter(s): P047, P049, P051

Provides the drive frequency command using the built-in keypad navigation. When P047, P049 or P051 [Speed Referencex] selects 2 "Keypad Freq", the value set in this parameter controls the frequency of the drive. The value of this parameter can also be changed when navigating with the keypad by pressing the Up or Down arrow keys.

| | | |
|---|---|---|
| **Values** | Default: | 60.00 Hz |
| | Min/Max: | 0.00/500.00 Hz |
| | Display: | 0.01 Hz |

**A427 [MOP Freq]**

Provides the drive frequency command using the built-in Motor Operated Potentiometer (MOP).

**IMPORTANT** Frequency is not written to non-volatile storage until drive is powered-down. If both MOP Up and MOP Down are applied at the same time, the inputs are ignored and the frequency is unchanged.

| | | |
|---|---|---|
| **Values** | Default: | 60.00 Hz |
| | Min/Max: | 0.00/500.00 Hz |
| | Display: | 0.01 Hz |

**A428 [MOP Reset Sel]**

Determines if the current MOP reference command is saved on power down.

| | | |
|---|---|---|
| **Options** | 0 "Zero MOP Ref" | Resets the MOP frequency to zero on power down and stop. |
| | 1 "Save MOP Ref" (Default) | |

**A429 [MOP Preload]**

Determines the operation of the MOP function.

| | | |
|---|---|---|
| **Options** | 0 "No preload" (Default) | |
| | 1 "Preload" | Bumpless Transfer: whenever MOP mode is selected, the current output value of the speed is loaded. |

**A430 [MOP Time]**

Sets the rate of change of the MOP reference.

| | | |
|---|---|---|
| **Values** | Default: | 10.0 s |
| | Min/Max: | 0.1/600.0 s |
| | Display: | 0.1 s |

**A431 [Jog Frequency]** Related Parameter(s): P044

Sets the output frequency when a jog command is issued.

| | | |
|---|---|---|
| **Values** | Default: | 10.00 Hz |
| | Min/Max: | 0.00/[Maximum Freq] |
| | Display: | 0.01 Hz |

**A432 [Jog Accel/Decel]**

Sets the acceleration and deceleration time used when in jog mode.

| | | |
|---|---|---|
| **Values** | Default: | 10.00 s |
| | Min/Max: | 0.01/600.00 s |
| | Display: | 0.01 s |

## Advanced Program Group *(continued)*

**A433 [Purge Frequency]** Related Parameter(s): t062, t063, t065-t068

Provides a fixed frequency command value when t062, t063, t065-t068 [DigIn TermBlk xx] is set to 40 "Purge".

| | | |
|---|---|---|
| **Values** | Default: | 5.00 Hz |
| | Min/Max: | 0.00/500.00 Hz |
| | Display: | 0.01 Hz |

**A434 [DC Brake Time]** Related Parameter(s): P045, A435

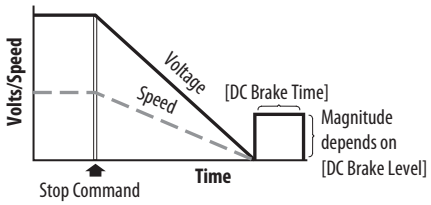
Sets the length of time that DC brake current is "injected" into the motor.

| | | |
|---|---|---|
| **Values** | Default: | 0.0 s |
| | Min/Max: | 0.0/99.9 s |
| | Display: | 0.1 s |

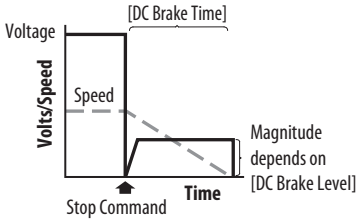
**A435 [DC Brake Level]** Related Parameter(s): P045

Defines the maximum DC brake current, in amps, applied to the motor when P045 [Stop Mode] is set to either 4 "Ramp" or 6 "DC Brake".

**Ramp-to-Stop Mode**




**DC Injection Stop Mode**

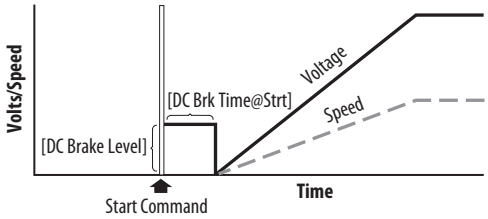



**ATTENTION:** If a hazard of injury due to movement of equipment or material exists, an auxiliary mechanical braking device must be used. This feature should not be used with synchronous motors. Motors may be demagnetized during braking.

| | | |
|---|---|---|
| **Values** | Default: | Drive Rated Amps x 0.05 |
| | Min/Max: | 0.00/(Drive Rated Amps x 1.80) |
| | Display: | 0.01 A |

**A436 [DC Brk Time@Strt]** Related Parameter(s): P045, A435

Sets the length of time that DC brake current is "injected" into the motor after a valid start command is received.




| | | |
|---|---|---|
| **Values** | Default: | 0.0 s |
| | Min/Max: | 0.0/99.9 s |
| | Display: | 0.1 s |

## Advanced Program Group *(continued)*

**A437 [DB Resistor Sel]** Related Parameter(s): A438, A550

Stop drive before changing this parameter.

Enables/disables external dynamic braking and selects the level of resistor protection.

**IMPORTANT** When A437 [DB Resistor Sel] is set to a value greater than "0", the value set in parameter A550 [Bus Reg Enable] will not take effect.

| | | | |
|---|---|---|---|
| **Options** | 0 | "Disabled" (Default) | |
| | 1 | "Norml RA Res" | 5% |
| | 2 | "NoProtection" | 100% |
| | 3...99 | "3...99% DutyCycle" | |

**A438 [DB Threshold]** Related Parameter(s): A437

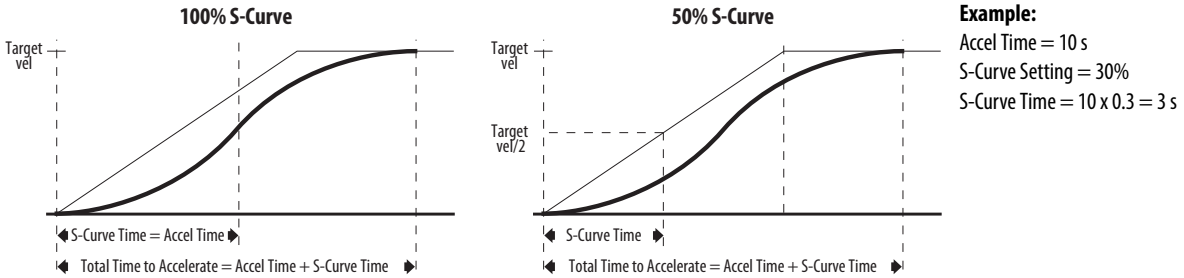
Sets the DC bus voltage threshold for Dynamic Brake operation. If DC bus voltage rises above this level, Dynamic Brake turns on. Lower values makes the dynamic braking function more responsive but may result in nuisance Dynamic Brake activation (IGBT can modulate continuously).

**ATTENTION:** Equipment damage may result if this parameter is set to a value that causes the dynamic braking resistor to dissipate excessive power. Parameter settings less than 100% should be carefully evaluated to ensure that the Dynamic Brake resistor's wattage rating is not exceeded. In general, values less than 90% are not needed. This parameter's setting is especially important if parameter A437 [DB Resistor Sel] is set to 2 "NoProtection".

| | | |
|---|---|---|
| **Values** | Default: | 100.0% |
| | Min/Max: | 10.0/110.0% |
| | Display: | 0.1% |

**A439 [S Curve %]**

Enables a fixed shape S-Curve that is applied to the acceleration and deceleration ramps (including jog).
S-Curve Time = (Accel or Decel Time) x (S-Curve Setting in percentage)



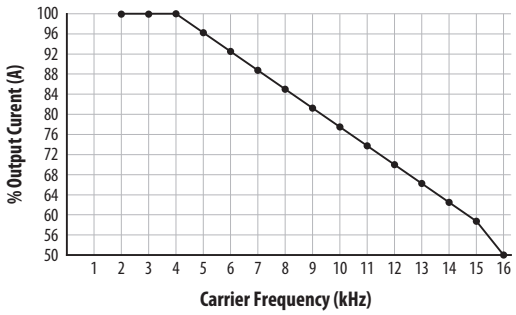

**Example:**
Accel Time = 10 s
S-Curve Setting = 30%
S-Curve Time = 10 x 0.3 = 3 s

| | | |
|---|---|---|
| **Values** | Default: | 0% |
| | Min/Max: | 0/100% |
| | Display: | 1% |

## Advanced Program Group *(continued)*

**A440 [PWM Frequency]** Related Parameter(s): A540

Sets the carrier frequency for the PWM output waveform. The chart below provides derating guidelines based on the PWM frequency setting.




Note: If Vector mode (open loop) is selected and 16 kHz is selected, the drive will forcibly reduce the carrier frequency to 8 kHz.

**IMPORTANT** Ignoring derating guidelines can cause reduced drive performance. The drive may automatically reduce the PWM carrier frequency at low output speeds, unless prevented from doing so by A540 [Var PWM Disable].

| | | |
|---|---|---|
| **Values** | Default: | 4.0 kHz |
| | Min/Max: | 2.0/16.0 kHz |
| | Display: | 0.1 kHz |

**A441 [Droop Hertz@ FLA]**

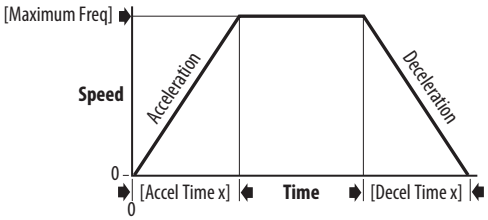
PF 525 PowerFlex 525 only.

Reduces the frequency based on current. This frequency is subtracted from the commanded output frequency. Generally Slip and Droop would not both be used, but if both are enabled they simply subtract from each other. Typically used in load sharing schemes.

| | | |
|---|---|---|
| **Values** | Default: | 0.0 Hz |
| | Min/Max: | 0.0/10.0 Hz |
| | Display: | 0.1 Hz |

**A442 [Accel Time 2]** Related Parameter(s): P044

Time for the drive to ramp from 0.0 Hz to P044 [Maximum Freq] if Accel Time 2 is selected.
Accel Rate = [Maximum Freq] / [Accel Time]




| | | |
|---|---|---|
| **Values** | Default: | 10.00 s |
| | Min/Max: | 0.00/600.00 s |
| | Display: | 0.01 s |

**A443 [Decel Time 2]** Related Parameter(s): P044

Time for the drive to ramp from P044 [Maximum Freq] to 0.0 Hz if Decel Time 2 is selected.
Decel Rate = [Maximum Freq] / [Decel Time]

| | | |
|---|---|---|
| **Values** | Default: | 10.00 s |
| | Min/Max: | 0.00/600.00 s |
| | Display: | 0.01 s |

## Advanced Program Group *(continued)*

**A444 [Accel Time 3]**
**A446 [Accel Time 4]**

Sets the rate of acceleration for all speed increases when selected by digital inputs.

| | | |
|---|---|---|
| **Values** | Default: | 10.00 s |
| | Min/Max: | 0.00/600.00 s |
| | Display: | 0.01 s |

**A445 [Decel Time 3]**
**A447 [Decel Time 4]**

Sets the rate of deceleration for all speed decreases when selected by digital inputs.

| | | |
|---|---|---|
| **Values** | Default: | 10.00 s |
| | Min/Max: | 0.00/600.00 s |
| | Display: | 0.01 s |

**A448 [Skip Frequency 1]**
**A450 [Skip Frequency 2]**
**A452 [Skip Frequency 3]**
**A454 [Skip Frequency 4]**

PF 525 PowerFlex 525 only.

Related Parameter(s): A449, A451, A453, A455

Works in conjunction with A449, A451, A453 and A455 [Skip Freq Band x] creating a range of frequencies at which the drive does not operate continuously.

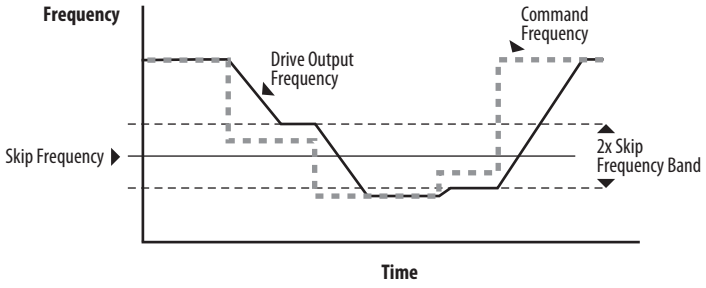
| | | |
|---|---|---|
| **Values** | Default: | 0.0 Hz (Disabled) |
| | Min/Max: | 0.0/500.0 Hz |
| | Display: | 0.1 Hz |

**A449 [Skip Freq Band 1]**
**A451 [Skip Freq Band 2]**
**A453 [Skip Freq Band 3]**
**A455 [Skip Freq Band 4]**

PF 525 PowerFlex 525 only.

Related Parameter(s): A448, A450, A452, A454

Determines the band around A448, A450, A452 and A454 [Skip Frequency x].




| | | |
|---|---|---|
| **Values** | Default: | 0.0 Hz |
| | Min/Max: | 0.0/30.0 Hz |
| | Display: | 0.1 Hz |

## Advanced Program Group *(continued)*

**A456 [PID 1 Trim Hi]**

**A468 [PID 2 Trim Hi]**

PF 525 PowerFlex 525 only.

Scales the upper value of the trim frequency when trim is active.

| | | |
|---|---|---|
| **Values** | Default: | 60.0 Hz |
| | Min/Max: | 0.0/500.0 Hz |
| | Display: | 0.1 Hz |

**A457 [PID 1 Trim Lo]**

**A469 [PID 2 Trim Lo]**

PF 525 PowerFlex 525 only.

Scales the lower value of the trim frequency when trim is active.

| | | |
|---|---|---|
| **Values** | Default: | 0.0 Hz |
| | Min/Max: | 0.0/500.0 Hz |
| | Display: | 0.1 Hz |

**A458 [PID 1 Trim Sel]**

**A470 [PID 2 Trim Sel]**

PF 525 PowerFlex 525 only.

Stop drive before changing this parameter.

Sets the PID output as trim to the source reference.

| | | | |
|---|---|---|---|
| **Options** | 0 | "Disabled" (Default) | PID Trim is disabled. |
| | 1 | "TrimOn Pot" | |
| | 2 | "TrimOn Keypd" | |
| | 3 | "TrimOn DSI" | |
| | 4 | "TrimOn NetOp" | |
| | 5 | "TrimOn 0-10V" | |
| | 6 | "TrimOn 4-20" | |
| | 7 | "TrimOn Prset" | |
| | 8 | "TrimOn AnMlt"(1) | |
| | 9 | "TrimOn MOP" | |
| | 10 | "TrimOn Pulse" | |
| | 11 | "TrimOn SIgic"(1) | |
| | 12 | "TrimOn Encdr"(1) | |
| | 13 | "TrimOn ENet"(1) | |

(1) Setting is specific to PowerFlex 525 drives only.

## Advanced Program Group *(continued)*

**A459 [PID 1 Ref Sel]**

**A471 [PID 2 Ref Sel]**

PF 525 PowerFlex 525 only.

Stop drive before changing this parameter.

Selects the source of the PID reference.

| | | |
|---|---|---|
| **Options** | 0 | "PID Setpoint" (Default) |
| | 1 | "Drive Pot" |
| | 2 | "Keypad Freq" |
| | 3 | "Serial/DSI" |
| | 4 | "Network Opt" |
| | 5 | "0-10V Input" |
| | 6 | "4-20mA Input" |
| | 7 | "Preset Freq" |
| | 8 | "AnIgIn Multi"(1) |
| | 9 | "MOP Freq" |
| | 10 | "Pulse Input" |
| | 11 | "Step Logic"(1) |
| | 12 | "Encoder"(1) |
| | 13 | "EtherNet/IP"(1) |

(1) Setting is specific to PowerFlex 525 drives only.

**A460 [PID 1 Fdback Sel]**

**A472 [PID 2 Fdback Sel]**

PF 525 PowerFlex 525 only.

Selects the source of the PID feedback.

| | | | |
|---|---|---|---|
| **Options** | 0 | "0-10V Input" (Default) | Note: PID does not function with bipolar input. Negative voltages are ignored and treated as zero. |
| | 1 | "4-20mA Input" | |
| | 2 | "Serial/DSI" | |
| | 3 | "Network Opt" | |
| | 4 | "Pulse Input" | |
| | 5 | "Encoder"(1) | |
| | 6 | "EtherNet/IP"(1) | |

(1) Setting is specific to PowerFlex 525 drives only.

**A461 [PID 1 Prop Gain]**

Related Parameter(s): A459, A471

**A473 [PID 2 Prop Gain]**

PF 525 PowerFlex 525 only.

Sets the value for the PID proportional component when the PID mode is enabled.

| | | |
|---|---|---|
| **Values** | Default: | 0.01 |
| | Min/Max: | 0.00/99.99 |
| | Display: | 0.01 |

## Advanced Program Group *(continued)*

**A462 [PID 1 Integ Time]** Related Parameter(s): A459, A471

**A474 [PID 2 Integ Time]**
PF 525 PowerFlex 525 only.

Sets the value for the PID integral component when PID mode is enabled.

| | | |
|---|---|---|
| **Values** | Default: | 2.0 s |
| | Min/Max: | 0.0/999.9 s |
| | Display: | 0.1 s |

**A463 [PID 1 Diff Rate]** Related Parameter(s): A459, A471

**A475 [PID 2 Diff Rate]**
PF 525 PowerFlex 525 only.

Sets the value (in 1/second) for the PID differential component when PID mode is enabled.

| | | |
|---|---|---|
| **Values** | Default: | 0.00 |
| | Min/Max: | 0.00/99.99 |
| | Display: | 0.01 |

**A464 [PID 1 Setpoint]** Related Parameter(s): A459, A471

**A476 [PID 2 Setpoint]**
PF 525 PowerFlex 525 only.

Provides an internal fixed value for process setpoint when PID mode is enabled.

| | | |
|---|---|---|
| **Values** | Default: | 0.0% |
| | Min/Max: | 0.0/100.0% |
| | Display: | 0.1% |

**A465 [PID 1 Deadband]**

**A477 [PID 2 Deadband]**
PF 525 PowerFlex 525 only.

Sets a range, in percent above and below the PID Reference, that the PID output will ignore.

| | | |
|---|---|---|
| **Values** | Default: | 0.0% |
| | Min/Max: | 0.0/10.0% |
| | Display: | 0.1% |

**A466 [PID 1 Preload]**

**A478 [PID 2 Preload]**
PF 525 PowerFlex 525 only.

Sets the value used to preload the integral component on start or enable.

| | | |
|---|---|---|
| **Values** | Default: | 0.0 Hz |
| | Min/Max: | 0.0/500.0 Hz |
| | Display: | 0.1 Hz |

**A467 [PID 1 Invert Err]**

**A479 [PID 2 Invert Err]**
PF 525 PowerFlex 525 only.

Changes the sign of the PID error.

| | | |
|---|---|---|
| **Options** | 0 | "Normal" (Default) |
| | 1 | "Inverted" |

## Advanced Program Group *(continued)*

**A481 [Process Disp Lo]** Related Parameter(s): b010, P043

Sets the value displayed in b010 [Process Display] when the drive is running at P043 [Minimum Freq].

| | | |
|---|---|---|
| **Values** | Default: | 0.00 |
| | Min/Max: | 0.00/99.99 |
| | Display: | 0.01 |

**A482 [Process Disp Hi]** Related Parameter(s): b010, P044

Sets the value displayed in b010 [Process Display] when the drive is running at P044 [Maximum Freq].

| | | |
|---|---|---|
| **Values** | Default: | 0.00 |
| | Min/Max: | 0.00/99.99 |
| | Display: | 0.01 |

**A483 [Testpoint Sel]**

Used by Rockwell Automation field service personnel.

| | | |
|---|---|---|
| **Values** | Default: | 400 |
| | Min/Max: | 0/FFFF |
| | Display: | 1 |

**A484 [Current Limit 1]** Related Parameter(s): P033

Maximum output current allowed before current limiting occurs.

| | | |
|---|---|---|
| **Values** | Default: | Drive Rated Amps x 1.1 (Normal Duty); Drive Rated Amps x 1.5 (Heavy Duty) |
| | Min/Max: | 0.0/Drive Rated Amps x 1.5 (Normal Duty); Drive Rated Amps x 1.8 (Heavy Duty) |
| | Display: | 0.1 A |

**A485 [Current Limit 2]** Related Parameter(s): P033

PF 525 PowerFlex 525 only.

Maximum output current allowed before current limiting occurs.

| | | |
|---|---|---|
| **Values** | Default: | Drive Rated Amps x 1.1 |
| | Min/Max: | 0.0/Drive Rated Amps x 1.5 (Normal Duty); Drive Rated Amps x 1.8 (Heavy Duty) |
| | Display: | 0.1 A |

**A486 [Shear Pin1 Level]** Related Parameter(s): A487, A489

**A488 [Shear Pin2 Level]**

PF 525 PowerFlex 525 only.

Sets the value of current at which the shear pin fault occurs after the time set in A487, A489 [Shear Pin x Time]. Setting the value at 0.0 A disables this function.

| | | |
|---|---|---|
| **Values** | Default: | 0.0 A (Disabled) |
| | Min/Max: | 0.0/(Drive Rated Amps x 2) |
| | Display: | 0.1 A |

**A487 [Shear Pin 1 Time]** Related Parameter(s): A486, A488

**A489 [Shear Pin 2 Time]**

PF 525 PowerFlex 525 only.

Sets the continuous time the drive must be at or above the value set in A486, A488 [Shear Pinx Level] before a shear pin fault occurs.

| | | |
|---|---|---|
| **Values** | Default: | 0.00 s |
| | Min/Max: | 0.00/30.00 s |
| | Display: | 0.01 s |

## Advanced Program Group *(continued)*

**A490 [Load Loss Level]** Related Parameter(s): A491

PF 525 PowerFlex 525 only.

Provides a software trip (Load Loss fault) when the current drops below this level for the time specified in A491 [Load Loss Time].

| | | |
|---|---|---|
| **Values** | Default: | 0.0 A |
| | Min/Max: | 0.0/Drive Rated Amps |
| | Display: | 0.1 A |

**A491 [Load Loss Time]** Related Parameter(s): A490

PF 525 PowerFlex 525 only.

Sets the required time for the current to be below A490 [Load Loss Level] before a Load Loss fault occurs.

| | | |
|---|---|---|
| **Values** | Default: | 0 s |
| | Min/Max: | 0/9999 s |
| | Display: | 1 s |

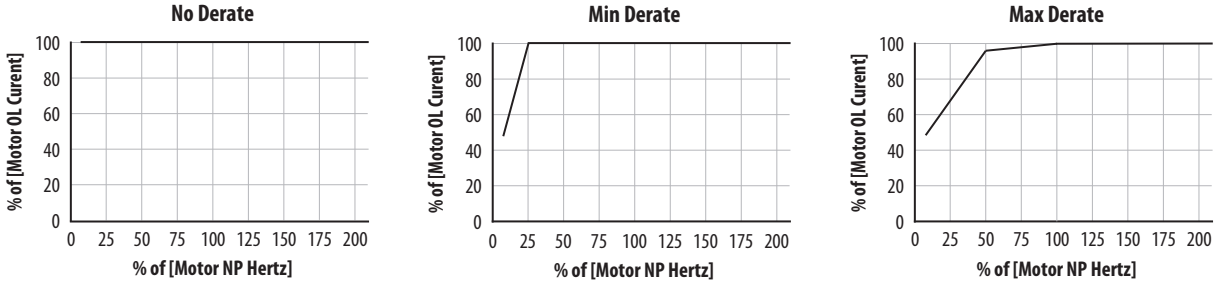
**A492 [Stall Fault Time]**

Sets the time that the drive remains in stall mode before a fault is issued.

| | | |
|---|---|---|
| **Options** | 0 | "60 Seconds" (Default) |
| | 1 | "120 Seconds" |
| | 2 | "240 Seconds" |
| | 3 | "360 Seconds" |
| | 4 | "480 Seconds" |
| | 5 | "Flt Disabled" |

**A493 [Motor OL Select]** Related Parameter(s): P032, P033

Drive provides Class 10 overload protection. Settings 0...2 select the derating factor for the $I^2t$ overload function.




| | | |
|---|---|---|
| **Options** | 0 | "No Derate" (Default) |
| | 1 | "Min. Derate" |
| | 2 | "Max. Derate" |

**A494 [Motor OL Ret]**

Selects whether the motor overload counter is saved on power-down or reset on power-up.

| | | |
|---|---|---|
| **Options** | 0 | "Reset" (Default) |
| | 1 | "Save" |

## Advanced Program Group *(continued)*

**A495 [Drive OL Mode]**

Determines how the drive handles overload conditions that would otherwise cause the drive to fault.

| | | |
|---|---|---|
| **Options** | 0 | "Disabled" |
| | 1 | "Reduce CLim" |
| | 2 | "Reduce PWM" |
| | 3 | "Both-PWM 1st" (Default) |

**A496 [IR Voltage Drop]** Related Parameter(s): P040

Value of volts dropped across the resistance of the motor stator (autotune) for induction motor.

| | | |
|---|---|---|
| **Values** | Default: | Based on Drive Rating |
| | Min/Max: | 0.0/600.0VAC |
| | Display: | 0.1VAC |

**A497 [Flux Current Ref]** Related Parameter(s): P040

This is the current necessary for full motor flux. The value should be set to the full speed no-load current of the motor.

| | | |
|---|---|---|
| **Values** | Default: | Based on Drive Rating |
| | Min/Max: | 0.00/(Drive Rated Amps x 1.4) |
| | Display: | 0.01 A |

**A498 [Motor Rr]**

PF 525 PowerFlex 525 only.

Rotor resistance of induction motor. The value of this parameter will populate when a full rotate tune is performed.

| | | |
|---|---|---|
| **Values** | Default: | Based on Drive Rating |
| | Min/Max: | 0.00/655.35 ohm |
| | Display: | 0.01 ohm |

**A499 [Motor Lm]**

PF 525 PowerFlex 525 only.

Mutual Inductance of induction motor. The value of this parameter will populate when a full rotate tune is performed.

| | | |
|---|---|---|
| **Values** | Default: | Based on Drive Rating |
| | Min/Max: | 0.0/6553.5 mH |
| | Display: | 0.1 mH |

**A500 [Motor Lx]**

PF 525 PowerFlex 525 only.

Leakage Inductance of induction motor. The value of this parameter will populate when a full rotate tune is performed.

| | | |
|---|---|---|
| **Values** | Default: | Based on Drive Rating |
| | Min/Max: | 0.0/6553.5 mH |
| | Display: | 0.1 mH |

**A501 [PM IR Voltage]**

PF 525 PowerFlex 525 only.

(With FRN 5.xxx and later.)

Voltage across the stator resistance of the PM motor at the rated motor current displayed in line-to-line rms value.

| | | |
|---|---|---|
| **Values** | Default: | 11.50V |
| | Min/Max: | 0.00/655.35V |
| | Display: | 0.01V |

## Advanced Program Group *(continued)*

**A502 [PM IXd Voltage]**

PF 525 PowerFlex 525 only.

(With FRN 5.xxx and later.)
Voltage across the d-axis stator inductance of the PM motor at the rated motor current and the rated motor frequency displayed in line-to-line rms value.

| | | |
|---|---|---|
| **Values** | Default: | 17.91V |
| | Min/Max: | 0.00/655.35V |
| | Display: | 0.01V |

**A503 [PM IXq Voltage]**

PF 525 PowerFlex 525 only.

(With FRN 5.xxx and later.)
Voltage across the q-axis stator inductance of the PM motor at the rated motor current and the rated motor frequency displayed in line-to-line rms value.

| | | |
|---|---|---|
| **Values** | Default: | 53.21V |
| | Min/Max: | 0.00/655.35V |
| | Display: | 0.01V |

**A504 [PM BEMF Voltage]**

PF 525 PowerFlex 525 only.

(With FRN 5.xxx and later.)
Back electromotive force (EMF) voltage.

| | | |
|---|---|---|
| **Values** | Default: | 1640.0 Drive Rated Volts |
| | Min/Max: | 0.0/6000.0 Drive Rated Volts |
| | Display: | 0.1V |

**A509 [Speed Reg Sel]** Related Parameter(s): A521, A522, A523, A524, A525, A526

PF 525 PowerFlex 525 only.

Determines if PI gain of the "Vector" control mode speed regulator is set automatically or manually. Parameters A521...A526 are set automatically by this parameter.

| | | |
|---|---|---|
| **Options** | 0 | "Automatic" (Default) |
| | 1 | "Manual" |

**A510 [Freq 1]**
**A512 [Freq 2]**
**A514 [Freq 3]**

PF 525 PowerFlex 525 only.

Sets the "Vector" control mode frequency.

| | | |
|---|---|---|
| **Values** | Default: | |
| | Freq 1: | 8.33% |
| | Freq 2: | 15.00% |
| | Freq 3: | 20.00% |
| | Min/Max: | 0.00/200.00% |
| | Display: | 0.01% |

## Advanced Program Group *(continued)*

**A511 [Freq 1 BW]**
**A513 [Freq 2 BW]**
**A515 [Freq 3 BW]**

PF 525 PowerFlex 525 only.

Speed control loop bandwidth for "Vector" control mode.

| | | |
|---|---|---|
| **Values** | Default: | 10 Hz |
| | Min/Max: | 0/40 Hz |
| | Display: | 1 Hz |

**A516 [PM Initial Sel]**

PF 525 PowerFlex 525 only.

(With FRN 5.xxx and later.)
PM initial angle detect.

| | | |
|---|---|---|
| **Options** | 0 "Align" (Default) | |
| | 1 "HFI" | High Frequency Injection to detect initial angle. |
| | 2 "Six Pulse" | |

**A517 [PM DC Inject Cur]**

PF 525 PowerFlex 525 only.

(With FRN 5.xxx and later.)
Maximum DC current in amps applied to the motor in order to reset the rotor position of a PM motor.

| | | |
|---|---|---|
| **Values** | Default: | 30% |
| | Min/Max: | 0/300% |
| | Display: | 1% |

**A518 [PM Align Time]**

PF 525 PowerFlex 525 only.

(With FRN 5.xxx and later.)
Magnetic pole reorientation time.

| | | |
|---|---|---|
| **Values** | Default: | 0.7 s |
| | Min/Max: | 0.0/60.0 s |
| | Display: | 0.1 s |

**A519 [PM HFI NS Cur]**

PF 525 PowerFlex 525 only.

(With FRN 5.xxx and later.)
High Frequency Injection (HFI) North South Current to detect N/S Magnet.

| | | |
|---|---|---|
| **Values** | Default: | 100% |
| | Min/Max: | 0/300% |
| | Display: | 1% |

**A520 [PM Bus Reg Kd]**

PF 525 PowerFlex 525 only.

(With FRN 5.xxx and later.)
Derivative gain for bus regulator.

| | | |
|---|---|---|
| **Values** | Default: | 2 |
| | Min/Max: | 0/500 |
| | Display: | 1 |

## Advanced Program Group *(continued)*

**A521 [Freq 1 Kp]**
**A523 [Freq 2 Kp]**
**A525 [Freq 3 Kp]**

Related Parameter(s): A509, A510

PF 525 PowerFlex 525 only.

Sets P-gain of "Vector" control mode when in frequency region 1, 2 or 3 for faster speed response during dynamic-state where motor is still accelerating. If A509 [Speed Reg Sel] is set to 1 "Manual", these parameters can be changed.

| | | |
|---|---|---|
| **Values** | Default: | 100.0% |
| | Min/Max: | 0.0/500.0% |
| | Display: | 0.1% |

**A522 [Freq 1 Ki]**
**A524 [Freq 2 Ki]**
**A526 [Freq 3 Ki]**

Related Parameter(s): A509, A510

PF 525 PowerFlex 525 only.

Sets I-gain of "Vector" control mode when in frequency region 1, 2 or 3 for faster speed response during steady-state where motor is at its rated speed. If A509 [Speed Reg Sel] is set to 1 "Manual", these parameters can be changed.

| | | |
|---|---|---|
| **Values** | Default: | 0.100 s |
| | Min/Max: | 0.000/10.000 s |
| | Display: | 0.001 s |

**A527 [PM FWKn 1 Kp]**

PF 525 PowerFlex 525 only.

(With FRN 5.xxx and later.)
The gain to ensure good performance in field weakening region.

| | | |
|---|---|---|
| **Values** | Default: | 250% |
| | Min/Max: | 0/2000% |
| | Display: | 1% |

**A528 [PM FWKn 2 Kp]**

PF 525 PowerFlex 525 only.

(With FRN 5.xxx and later.)
The gain to ensure robustness under step load in weakening region.

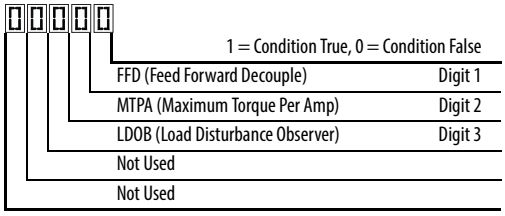
| | | |
|---|---|---|
| **Values** | Default: | 100% |
| | Min/Max: | 100/8000% |
| | Display: | 1% |

## Advanced Program Group *(continued)*

### A529 [PM Control Cfg]

PF 525 PowerFlex 525 only.

(With FRN 5.xxx and later.)
Control configuration for Feed Forward Decouple (FFD), Maximum Torque Per Amp (MTPA), and Load Disturbance Observer (LDOB).

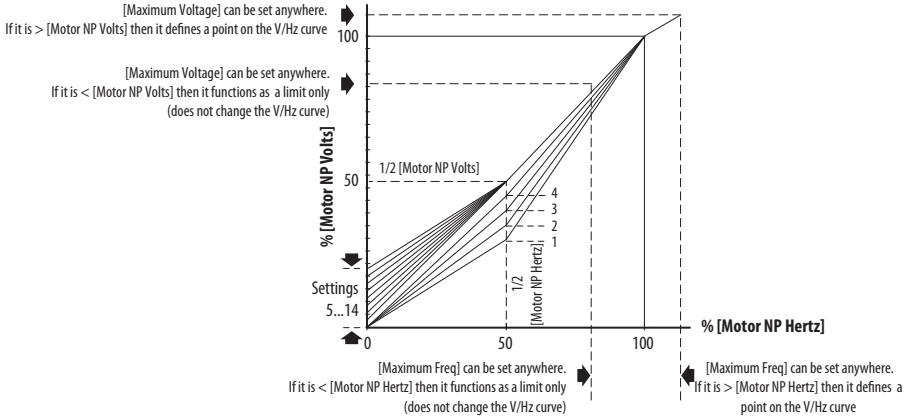



| | | |
|---|---|---|
| **Values** | Default: | 00111 |
| | Min/Max: | 00000/00111 |
| | Display: | 00000 |

### A530 [Boost Select]

Related Parameter(s): b004, P031, P032, P039

Sets the boost voltage (% of P031 [Motor NP Volts]) and redefines the V/Hz curve. Only used for V/Hz control modes.

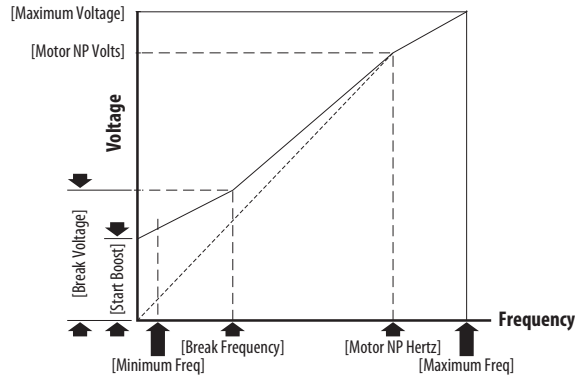



| | | | |
|---|---|---|---|
| **Options** | 0 | "Custom V/Hz" | |
| | 1 | "30.0, VT" | Fan/Pump Curves (Variable Torque) |
| | 2 | "35.0, VT" | |
| | 3 | "40.0, VT" | |
| | 4 | "45.0, VT" | |
| | 5 | "0.0, no IR" | Boost Voltage (% of Base) (Constant Torque) |
| | 6 | "0.0" (Default for 400V and 600V drives, 5 HP and above) | |
| | 7 | "2.5, CT" (Default for 200V drives, 5 HP and above) | |
| | 8 | "5.0, CT" (Default for drives below 5 HP) | |
| | 9 | "7.5, CT" | |
| | 10 | "10.0, CT" | |
| | 11 | "12.5, CT" | |
| | 12 | "15.0, CT" | |
| | 13 | "17.5, CT" | |
| | 14 | "20.0, CT" | |

## Advanced Program Group *(continued)*

**A531 [Start Boost]** Related Parameter(s): P031, P032, P039, A530

Sets the boost voltage (% of P031 [Motor NP Volts]) and redefines the V/Hz curve when A530 [Boost Select] = 0 "Custom V/Hz" and P039 [Torque Perf Mode] = 0 "V/Hz".




| | | |
|---|---|---|
| **Values** | Default: | 2.5% |
| | Min/Max: | 0.0/25.0% |
| | Display: | 0.1% |

**A532 [Break Voltage]** Related Parameter(s): P031, P032, P039, A530, A533

Sets the voltage (in percent of [Base Frequency]) at the A533 [Break Frequency] if A530 [Boost Select] is set to 0 "Custom V/Hz".

| | | |
|---|---|---|
| **Values** | Default: | 25.0% |
| | Min/Max: | 0.0/100.0% |
| | Display: | 0.1% |

**A533 [Break Frequency]** Related Parameter(s): P031, P032, P039, A530, A532

Sets the frequency where A532 [Break Voltage] is applied if A530 [Boost Select] is set to 0 "Custom V/Hz".

| | | |
|---|---|---|
| **Values** | Default: | 15.0 Hz |
| | Min/Max: | 0.0/500.0 Hz |
| | Display: | 0.1 Hz |

**A534 [Maximum Voltage]** Related Parameter(s): b004

Sets the highest voltage the drive outputs.

| | | |
|---|---|---|
| **Values** | Default: | Drive Rated Volts |
| | Min: | 10V AC (on 230V AC Drives); 20V AC (on 460V AC Drives); 25V AC (on 600V AC Drives) |
| | Max: | 255V AC (on 230V AC Drives); 510V AC (on 460V AC Drives); 637.5V AC (on 600V AC Drives) |
| | Display: | 1V AC |

## Advanced Program Group *(continued)*

### A535 [Motor Fdbk Type]

Related Parameter(s):P039, A537

Stop drive before changing this parameter.

Selects the encoder type.(1)

**ATTENTION:** The loss of analog input, encoder or other feedback may cause unintended speed or motion. Take appropriate precautions to guard against possible unintended speed or motion.

| | | | Allowable Control Modes (See P039 [Torque Perf Mode]) | Hardware Inputs |
|---|---|---|---|---|
| **Options** | 0 | "None" (Default) | V/Hz, SVC, Economize, Vector, PM Control | – |
| | 1 | "Pulse Train" | V/Hz, SVC, Economize, PM Control | [DigIn TermBlk 05] for PowerFlex 523<br>[DigIn TermBlk 07] for PowerFlex 525 |
| | 2 | "Single Chan"(2) | V/Hz, SVC, Economize, PM Control | Optional incremental encoder card (catalog number 25-ENC-1) |
| | 3 | "Single Check"(2) | V/Hz, SVC, Economize, PM Control | |
| | 4 | "Quadrature"(2) | V/Hz, SVC, Economize, Vector, PM Control | |
| | 5 | "Quad Check"(2) | V/Hz, SVC, Economize, Vector, PM Control | |

(1) Parameter is also available in PowerFlex 523 FRN 3.xxx and later.

(2) Setting is specific to PowerFlex 525 drives only.

### A536 [Encoder PPR]

PF 525 PowerFlex 525 only.

Specifies the encoder Pulses Per Revolution (PPR) when an encoder is used.

To achieve speed range/accuracy for SVC and VVC closed loop control, a minimum of 1024 PPR encoder is recommended. The maximum encoder pulse is 250 kHz.

For more information, see Determine Encoder Pulse Per Revolution (PPR) Specification Based on Speed Resolution on page 217.

| | | |
|---|---|---|
| **Values** | Default: | 1024 PPR |
| | Min/Max: | 1/20000 PPR |
| | Display: | 1 PPR |

### A537 [Pulse In Scale]

Related Parameter(s): t065, t067, A535

Sets the scale factor/gain for the Pulse Input when t065 [DigIn TermBlk 05] or t067 [DigIn TermBlk 07] is set to 52 "Pulse Train", or A535 [Motor Fdbk Type] is set to 1 "Pulse Train".

Input frequency (Hz) / Pulse in Scale = Output frequency (Hz)

| | | |
|---|---|---|
| **Values** | Default: | 64 |
| | Min/Max: | 0/20000 |
| | Display: | 1 |

### A538 [Ki Speed Loop]

Sets the I-gain used in the PI calculation of the speed loop when feedback is used. Applicable to V/Hz and SVC modes in closed loop control only.(1)

| | | |
|---|---|---|
| **Values** | Default: | 2.0 |
| | Min/Max: | 0.0/400.0 |
| | Display: | 0.1 |

(1) Parameter is also available in PowerFlex 523 FRN 3.xxx and later.

### A539 [Kp Speed Loop]

Sets the P-gain used in the PI calculation of the speed loop when feedback is used. Applicable to V/Hz and SVC modes in closed loop control only.(1)

| | | |
|---|---|---|
| **Values** | Default: | 5.0 |
| | Min/Max: | 0.0/200.0 |
| | Display: | 0.1 |

(1) Parameter is also available in PowerFlex 523 FRN 3.xxx and later.

## Advanced Program Group *(continued)*

**A540 [Var PWM Disable]** Related Parameter(s): A440

Stop drive before changing this parameter.

Enables/disables a feature that varies the carrier frequency for the PWM output waveform defined by A440 [PWM Frequency].

| | | |
|---|---|---|
| **Options** | 0 | "Enabled" (Default) |
| | 1 | "Disabled" |

**A541 [Auto Rstrt Tries]** Related Parameter(s): A542

Sets the maximum number of times the drive attempts to reset a fault and restart. See Chapter 4 for more information on faults and fault codes.

**Clear a Type 1 fault and restart the drive.**
1. Set A541 [Auto Rstrt Tries] to a value other than "0".
2. Set A542 [Auto Rstrt Delay] to a value other than "0".

**Clear an OverVoltage, UnderVoltage or Heatsink OvrTmp fault without restarting the drive.**
1. Set A541 [Auto Rstrt Tries] to a value other than "0".
2. Set A542 [Auto Rstrt Delay] to "0".

**ATTENTION:** Equipment damage and/or personal injury may result if this parameter is used in an inappropriate application. Do not use this function without considering applicable local, national and international codes, standards, regulations or industry guidelines.

| | | |
|---|---|---|
| **Values** | Default: | 0 |
| | Min/Max: | 0/9 |
| | Display: | 1 |

**A542 [Auto Rstrt Delay]** Related Parameter(s): A541

Sets the time between restart attempts if A541 [Auto Rstrt Tries] is not zero.

| | | |
|---|---|---|
| **Values** | Default: | 1.0 s |
| | Min/Max: | 0.0/120.0 s |
| | Display: | 0.1 s |

**A543 [Start At PowerUp]**

Stop drive before changing this parameter.

Enables/disables drive start on power up without a Run command being cycled. Requires a digital input configured for Run and a valid run signal.

**ATTENTION:** Equipment damage and/or personal injury may result if this parameter is used in an inappropriate application. Do not use this function without considering applicable local, national and international codes, standards, regulations or industry guidelines.

| | | |
|---|---|---|
| **Options** | 0 | "Disabled" (Default) |
| | 1 | "Enabled" |

**A544 [Reverse Disable]** Related Parameter(s): b006

Stop drive before changing this parameter.

Enables/disables the function that allows the direction of motor rotation to be changed.

| | | |
|---|---|---|
| **Options** | 0 | "Rev Enabled" (Default) |
| | 1 | "Rev Disabled" |

**A545 [Flying Start En]**

Sets the condition that allows the drive to reconnect to a spinning motor at actual RPM.

| | | |
|---|---|---|
| **Options** | 0 | "Disabled" (Default) |
| | 1 | "Enabled" Catch and ramp to commanded speed at every drive start. |

## Advanced Program Group *(continued)*

**A546 [FlyStrt CurLimit]**

Used to determine when the drive has matched the motor frequency if flying start is enabled.

| | | |
|---|---|---|
| **Values** | Default: | 150% |
| | Min/Max: | 30/200% |
| | Display: | 1% |

**A547 [Compensation]**

Enables/disables correction options that may improve problems with motor instability.

| | | | |
|---|---|---|---|
| **Options** | 0 | "Disabled" | No compensation. |
| | 1 | "Electrical" (Default) | Some drive/motor combinations have inherent instabilities which are exhibited as non-sinusodial motor currents. This setting attempts to correct this condition |
| | 2 | "Mechanical" | Some motor/load combinations have mechanical resonances which can be excited by the drive current regulator. This setting slows down the current regulator response and attempts to correct this condition. |
| | 3 | "Both" | |

**A548 [Power Loss Mode]**

Sets the reaction to a loss of input power.

| | | | |
|---|---|---|---|
| **Options** | 0 | "Coast" (Default) | Drive faults and motor coasts to a stop. |
| | 1 | "Decel" | Drive decelerates and attempts to keep the DC bus voltage above the undervoltage level. |

**A549 [Half Bus Enable]**

Enables/disables the power ride through function which allows the drive to maintain power to the motor at 50% drive input voltage during short-term power sag conditions.

**ATTENTION:** To guard against drive damage, a minimum line impedance must be provided to limit inrush current when the power line recovers. The input impedance should be equal or greater than the equivalent of a 5% transformer with a VA rating 6 times the drive's input VA rating if Half Bus is enabled.

| | | |
|---|---|---|
| **Options** | 0 | "Disabled" (Default) |
| | 1 | "Enabled" |

**A550 [Bus Reg Enable]** Related Parameter(s): A437

Enables/disables the bus regulator.

| | | |
|---|---|---|
| **Options** | 0 | "Disabled" |
| | 1 | "Enabled" (Default) |

**A551 [Fault Clear]**

 Stop drive before changing this parameter.

Resets a fault and clears the fault queue.

| | | | |
|---|---|---|---|
| **Options** | 0 | "Ready/Idle" (Default) | |
| | 1 | "Reset Fault" | Resets the active fault but does not clear any fault buffer. |
| | 2 | "Clear Buffer" | Resets the active fault and clears all fault buffers to "0". |

**A552 [Program Lock]** Related Parameter(s): A553

Protects parameters against change by unauthorized personnel with a 4-digit password.

| | | |
|---|---|---|
| **Values** | Default: | 0000 |
| | Min/Max: | 0000/9999 |
| | Display: | 1111 |

## Advanced Program Group *(continued)*

**A553 [Program Lock Mod]** Related Parameter(s): A552

Determines the lock mode used in parameter A552 [Program Lock]. When set to 2 or 3, A552 [Program Lock] is added to the custom group to allow unlocking of parameters.

| | | | |
|---|---|---|---|
| **Options** | 0 | "Full Lock" (Default) | All parameters are locked except [Program Lock]. |
| | 1 | "Keypad Lock" | All parameters are locked except [Program Lock] from keypad access but can still be accessed over communications. |
| | 2 | "Custom Only" | All parameters are locked and hidden except custom group and [Program Lock]. |
| | 3 | "KeyPd Custom" | All parameters are locked and hidden except custom group and [Program Lock] from keypad access but can still be accessed over communications. |

**A554 [Drv Ambient Sel]**

Sets the maximum expected ambient of the drive when used above 50 °C. When ambient temperature is above 50 °C, the drive will apply necessary current derating.

| | | | |
|---|---|---|---|
| **Options** | 0 | "Normal" (Default) | |
| | 1 | "55C" | |
| | 2 | "60C" | |
| | 3 | "65C +Fan Kit" | Fan kit required. |
| | 4 | "70C +Fan Kit" | |

**A555 [Reset Meters]** Related Parameter(s): b019, b021, b022, b023, b024, b025, b026, d362, d363

Resets the values stored in the parameters that track fault times and energy usage.

| | | | |
|---|---|---|---|
| **Options** | 0 | "Ready/Idle" (Default) | |
| | 1 | "Reset Meters" | Resets kWh, MWh, Accum kWh, Cost, and CO2 Sav parameter values. |
| | 2 | "Reset Time" | Resets min, hr, and x10 hr. |

**A556 [Text Scroll]**

Sets the scrolling speed of the text in the LCD display.

| | | | |
|---|---|---|---|
| **Options** | 0 | "Off" | No scroll. |
| | 1 | "Low Speed" | |
| | 2 | "Mid Speed" (Default) | |
| | 3 | "High Speed" | |

**A557 [Out Phas Loss En]**

Enable/disable output phase loss detection.

**ATTENTION:** Equipment damage and/or personal injury may result if this parameter is used in an inappropriate application. Do not use this function without considering applicable local, national and international codes, standards, regulations or industry guidelines.

| | | | |
|---|---|---|---|
| **Options** | 0 | "Disable" (Default) | |
| | 1 | "Enable" | |

**A558 [Positioning Mode]**

Stop drive before changing this parameter.

PF 525 PowerFlex 525 only.

Defines the positioning transition mode used for the position steps.

| | | | |
|---|---|---|---|
| **Options** | 0 | "Time Steps" (Default) | Steps based on time. |
| | 1 | "Preset Input" | Preset inputs directly commands a given step. |
| | 2 | "Step Logic" | Use Step Logic Commands. Always start from Step 0. |
| | 3 | "Preset StpL" | Use Preset Inputs to determine starting step then Step Logic commands. |
| | 4 | "StpLogic-Lst" | Use Step Logic commands from last Step Logic step at last drive stop. |

## Advanced Program Group *(continued)*

### A559 [Counts Per Unit]

PF 525 PowerFlex 525 only.

Sets the number of encoder counts equal to one user-defined unit.

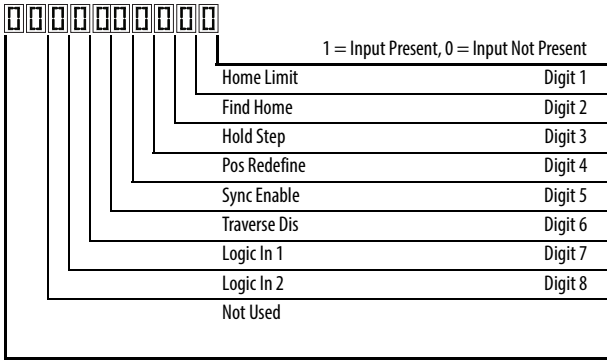
| | | |
|---|---|---|
| **Values** | Default: | 4096 |
| | Min/Max: | 1/32000 |
| | Display: | 1 |

### A560 [Enh Control Word]

Related Parameter(s): t062, t063, t065 - t068, A571

PF 525 PowerFlex 525 only.

Allows control of positioning and other functions through parameter control for use over comms. The functions replicate the digital input options and function in the same way.




| | | | |
|---|---|---|---|
| **Values** | Default: | | 0000 0000 |
| | Min/Max: | | 0000 0000/1111 1111 |
| | Display: | | 0000 0000 |
| **Digits** | 0 | "Home Limit" | In Positioning mode, this indicates the drive is at the home position |
| | 1 | "Find Home" | When set, the next start command causes the drive to find home. Set this bit to 0 after completing the homing routine. |
| | 2 | "Hold Step" | In Positioning mode, this input over-rides other inputs and causes the drive to remain at its current step (running at zero speed once it reaches its position) until released. |
| | 3 | "Pos Redefine" | In Positioning mode, this input resets the home position to the current position of the machine. Set this bit to 0 after completing the homing routine. |
| | 4 | "Sync Enable" | Must be used in order to hold the existing frequency when Sync Time is set to enable speed synchronization. When this bit is reset to zero the drive accelerates to the new commanded frequency based on A571 [Sync Time] setting. |
| | 5 | "Traverse Dis" | When set the traverse function is disabled. |
| | 6 | "Logic In 1" | This provides an identical function as the "Logic In1" Digital Input option. This bit is logically ORed with a digital input t062, t063, t065-t068 [DigIn TermBlk xx] set to 24 "Logic In1". It can be used to move through the Step-Logic functions (speed or position) using comms control without requiring actual digital input transitions. |
| | 7 | "Logic In 2" | This provides and identical function as the "Logic In2" Digital Input option. This bit is logically ORed with a digital input t062, t063, t065-t068 [DigIn TermBlk xx] set to 25 "Logic In2". It can be used to move through the Step-Logic functions (speed or position) using comms control without requiring actual digital input transitions. |

### A561 [Home Save]

PF 525 PowerFlex 525 only.

Determines whether the current position is saved on power down.

| | | | |
|---|---|---|---|
| **Options** | 0 | "Home Reset" (Default) | Position resets to zero on power up. |
| | 1 | "Home Saved" | |

## Advanced Program Group *(continued)*

**A562 [Find Home Freq]**

PF 525 PowerFlex 525 only.

Sets the maximum frequency the drive uses when "Find Home" is issued.

| | | |
|---|---|---|
| **Values** | Default: | 10.0 Hz |
| | Min/Max: | 0.1/500.0 Hz |
| | Display: | 0.1 Hz |

**A563 [Find Home Dir]**

Stop drive before changing this parameter.

PF 525 PowerFlex 525 only.

Sets the direction the drive commands when "Find Home" is issued.

| | | |
|---|---|---|
| **Options** | 0 | "Forward" (Default) |
| | 1 | "Reverse" |

**A564 [Encoder Pos Tol]**

PF 525 PowerFlex 525 only.

Sets the "At Position" and the "At Home' tolerance around the encoder count. The value is added to and subtracted from the target encoder unit value to create the tolerance range.

| | | |
|---|---|---|
| **Values** | Default: | 100 |
| | Min/Max: | 1/50000 |
| | Display: | 1 |

**A565 [Pos Reg Filter]**

PF 525 PowerFlex 525 only.

Sets the error signal filter in the position regulator.

| | | |
|---|---|---|
| **Values** | Default: | 8 |
| | Min/Max: | 0/15 |
| | Display: | 1 |

**A566 [Pos Reg Gain]**

PF 525 PowerFlex 525 only.

Sets the gain adjustment for the position regulator.

| | | |
|---|---|---|
| **Values** | Default: | 3.0 |
| | Min/Max: | 0.0/200.0 |
| | Display: | 0.1 |