Allen-Bradley
by ROCKWELL AUTOMATION

Parameter Settings for PowerFlex Drives Using Sine-wave Filters, dV/dt Filters, and Adjustable Voltage

PowerFlex 753 AC Drives, PowerFlex 755 AC Drives, and PowerFlex 700 AC Drives

About This Document

This document applies to PowerFlex® 753, 755, and 700 AC Drives.

This document provides information about key parameters that can be adjusted when applying Adjustable Voltage Control, a type of Volts per Hertz (VHz) Control, through a filter at the output of a variable-frequency drive (VFD). Information is provided for the following types of output filters:

- Sine-wave filter
- Derivative of voltage with respect to time (dV/dt) filters including:
  - Inductor, and resistor (LR) dV/dt filter
  - Inductor, resistor, and capacitor (LRC) dV/dt filter

The drive parameter settings that are described in this document can be used to:

- Modify stability gains.
- Modify modulation mode.
- Help prevent over reaction to the charging current into the capacitor branch of a sine-wave filter.

Summary of Changes

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

Topic	Page
Throughout: Removed information about parameter settings that are not applicable.	Throughout
Added sections on parameter settings for applications using LR dV/dt filters.	7, 16

General Information About Motor Control Methods for Each Type of Output Filter

Different motor control methods and parameter settings are required depending on the type of output filter used.

Sine-wave Filter

The sine-wave filter uses an inductor, resistor, and capacitor. This filter design limits the filter to be used with only Volts per Hertz Control (VHz). It cannot be used with Flux Vector Control (FVC), or Sensorless Vector Control (SVC).

LR dV/dt Filter

The LR dV/dt filter uses an inductor and resistor, but no capacitor. This filter design enables the filter to be used with FVC, SVC, or VHz.

LRC dV/dt Filter

The LRC dV/dt filter uses an inductor, resistor, and capacitor. This filter design limits the filter to be used with only VHz Control. It cannot be used with FVC, or SVC.

IMPORTANT When using an LRC dV/dt filter, if parameter settings specific to LRC dV/dt filters are not used, the lower spectrum of current capacity rated drives are prone to nuisance F12 "HW Over Current" faults. We recommend to use the parameter settings specific to LRC dV/dt filters, especially if frequent instantaneous over current (IOC) faults occur.

Another issue is that dV/dt topologies that include rectification and connections to the drive DC bus are also prone to IOC faults and damage to the drive due to voltage ring up.

PowerFlex 753/755 Parameter Settings for Use with Sine-wave Filters

This section describes the required parameter settings for using a PowerFlex 753 or 755 drive with sine-wave filters and the operation theory behind each setting.

No.	Name / Bit	Required Setting
P035	Motor Ctrl Mode	0 "InductionVHz"
P038	PWM Frequency	2 kHz or 4 kHz
P040	Mtr Options Cfg	
	Bit 5 "Reflect Wave"	0 "Disabled"
	Bit 7 "PWM Type Sel"	1 "Full-time three-phase"
	Bit 8 "AsyncPWMLock"	1 "Enabled"
	Bit 11 "Elect Stab"	0 "Disabled"
	Bit 12 "Xsistor Diag"	0 "Disabled"
P043	Flux Up Enable	0 "Manual"
P044	Flux Up Time	0.000 s
P420	Drive OL Mode	1 "Reduce CLmt"
P1153	Dead Time Comp	Vary from 100% to 0% (755 Only)
P1154	DC Offset Ctrl	1 "Enable" (755 Only)

P035 [Motor Ctrl Mode]
The motor control mode is set to VHz because the sine-wave filter includes inductive, resistive, and capacitive components between the drive and motor. This filter design prevents the load from looking like an equivalent motor circuit to the drive for purposes of FVC or SVC. Therefore, VHz is the only motor control mode that can be used.

IMPORTANT Do not autotune. An autotune function is likely to fail to complete when a VHz setting is applied.

P038 [PWM Frequency]
See the filter instructions to set the pulse-width modulation (PWM) frequency. The setting is based on the drive rating.

P040 [Mtr Options Cfg]
Bit 5 "Reflect Wave"
The reflected wave bit is turned off so that:

- there are no missing pulses in the output voltage waveform
- any offsets that could appear are minimized

Bit 7 "PWM Type Sel"
The PWM type select bit is set to its default value of full-time three-phase modulation with no switch over to two-phase modulation. Two-phase modulation degrades filter performance.

Bit 8 "AsyncPWMLock"
The asynchronous PWM lock bit is turned on because the filter is tuned to the carrier frequency. If the carrier frequency changes, the filter does not work, so the carrier frequency must be fixed. The PWM frequency is set for whatever the filter is tuned to: either 2 kHz or 4 kHz.

Bit 11 "Elect Stab"
This bit affects angle and voltage stability. When electrical stability is set to 0 "Disabled," angle stability gain and voltage stability gain are set automatically. There is no compensation for the current going into the filter caps.

Bit 12 "Xsistor Diag"
The transistor diagnostics bit is turned off. This is because the sequence that turns the transistors on and off charges the capacitors in the filter and can cause an F12 "HW OverCurrent" fault.

P043 [Flux Up Mode]
Set P043 to 0 "Manual" to accommodate motor control because it looks less like an equivalent motor circuit to the drive.

P044 [Flux Up Time]
Flux up time is set to zero because the output load looks less like an equivalent motor circuit to the drive. It is less effective to build stator flux independently before accelerating.

P420 [Drive OL Mode]
Drive overload mode is set for reduce current limit, and not the PWM frequency, for the same reason as P040 [Mtr Options Cfg] Bit 8 "AsyncPWMLock."

P1153 [Dead Time Comp]
Dead time compensation is best set to 0% when the output of the sine-wave filter is fed into a transformer.

P1154 [DC Offset Ctrl]
DC offset control is enabled when the PWM inverter output is used for non-motor loads. When enabled, P1153 [Dead Time Comp] is disabled.

PowerFlex 753/755 Parameter Settings for Use with Adjustable Voltage Application with a Sine-wave Filter

This section describes the required parameter settings for using a PowerFlex 753 or 755 drive in an adjustable voltage application and the operation theory behind each setting.

No.	Name / Bit	Required Setting
P035	Motor Ctrl Mode	9 "Adj VltgMode"
P038	PWM Frequency	2 kHz or 4 kHz
P040	Mtr Options Cfg	
	Bit 5 "Reflect Wave"	0 "Disabled"
	Bit 7 "PWM Type Sel"	1 "Full-time three-phase"
	Bit 8 "AsyncPWMLock"	1 "Enabled"
	Bit 11 "Elect Stab"	0 "Disabled"
	Bit 12 "Xsistor Diag"	0 "Disabled"
	Bit 15 "Jerk Select"	0 "Disabled"
P043	Flux Up Enable	0 "Manual"
P044	Flux Up Time	0.000 s
P060	Start Acc Boost	0.00
P061	Run Boost	0.00
P062	Break Voltage	0.00
P420	Drive OL Mode	1 "Reduce CLmt"
Basic Adjustable Voltage Control Parameters		
P1131	Adj Vltg Config	
	Bit 0 "PhaseSetting"	0 "3-Phase" or 1 "1-Phase"
P1133	Adj Vltg Select	Preset 1 (1142)
P1134	Adj Vltg Ref Hi	100.0%
P1140	Adj Vltg AccTime	Required number of seconds
P1141	Adj Vltg DecTime	Required number of seconds
P1142	Adj Vltg Preset1	Required VAC
P1153	Dead Time Comp	Vary from 100% to 0% (755 Only)
P1154	DC Offset Ctrl	1 "Enable" (755 Only)

P035 [Motor Ctrl Mode]

The adjustable voltage control mode is typically a non-motor load control function. This mode provides an independent output voltage with an independent output frequency.

IMPORTANT Do not autotune. An autotune function is likely to fail to complete when the Adjustable Voltage mode is applied.

P038 [PWM Frequency]

See the filter instructions to set the PWM frequency. The setting is based on the drive rating.

P040 [Mtr Options Cfg]

Bit 5 "Reflect Wave"

The reflected wave bit is turned off so that:

- there are no missing pulses in the output voltage waveform
- any offsets that could appear are minimized

Bit 7 "PWM Type Sel"

The PWM type select bit is set to its default value of full-time three-phase modulation with no switch over to two-phase modulation. Two-phase modulation degrades filter performance.

Bit 8 "AsyncPWMLock"

The asynchronous PWM lock bit is turned on because the filter is tuned to the carrier frequency. If the carrier frequency changes, the filter does not work, so the carrier frequency must be fixed. The PWM frequency is set for whatever the filter is tuned to: either 2 kHz or 4 kHz.

Bit 11 "Elect Stab"
This bit affects angle and voltage stability. When electrical stability is set to 0 "Disabled," angle stability gain and voltage stability gain are set automatically. There is no compensation for the current going into the filter caps.

Bit 12 "Xsistor Diag"
The transistor diagnostics bit is turned off. This is because the sequence that turns the transistors on and off charges the capacitors in the filter and can cause an F12 "HW OverCurrent" fault.

Bit 15 "Jerk Select"
This bit is used when PowerFlex 753/755 sine-wave filters are used with linear induction motors (LIMs) with a short acceleration rate. Disable this bit to allow acceleration rates of 0.1 s in the frequency channel to be smooth and not be limited at some lower frequency value.

P043 [Flux Up Mode]
Set P043 to 0 "Manual" to accommodate motor control because it looks less like an equivalent motor circuit to the drive.

P044 [Flux Up Time]
Flux up time is set to zero because the output load looks less like an equivalent motor circuit to the drive. It is less effective to build stator flux independently before accelerating.

P060 [Start Acc Boost]
P061 [Run Boost]
P062 [Break Voltage]
P063 [Break Frequency]
These parameters can cause DC offsets in Adjustable Voltage mode.

P420 [Drive OL Mode]
Drive overload mode is set for reduce current limit, and not the PWM frequency, for the same reason as P040 [Mtr Options Cfg] Bit 8 "AsyncPWMLock."

P1131 [Adj Vltg Config]
P1133 [Adj Vltg Select]
P1134 [Adj Vltg Ref Hi]
P1140 [Adj Vltg AccTime]
P1141 [Adj Vltg DecTime]
P1142 [Adj Vltg Preset1]
These essential parameters are configured when P035 [Motor Ctrl Mode] is set to 9 "Adj VltgMode."

P1153 [Dead Time Comp]
Dead time compensation is best set to 0% when the output of the sine-wave filter is fed into a transformer.

P1154 [DC Offset Ctrl]
DC offset control is enabled when the PWM inverter output is used for non-motor loads. When enabled, P1153 [Dead Time Comp] is disabled.

PowerFlex 753/755 Parameter Settings for Use with dV/dt Filters

PowerFlex 753 and 755 drives can be used with both LR dV/dt filters and LRC dV/dt filters.

PowerFlex 753/755 with LR dV/dt Filters

This section describes the required parameter settings for using a PowerFlex 753 or 755 drive with LR dV/dt filters and the operation theory behind each setting.

No.	Name / Bit	Required Setting
P035	Motor Ctrl Mode	VHz, SVC, or FVC
P038	PWM Frequency	2 kHz or 4 kHz
P040	Mtr Options Cfg	
	Bit 5 "Reflect Wave"	0 "Disabled"
	Bit 7 "PWM Type Sel"	1 "Full-time three-phase"
	Bit 8 "AsyncPWMLock"	1 "Enabled"
	Bit 11 "Elect Stab"	0 "Disabled"
	Bit 12 "Xsistor Diag"	0 "Disabled"
P043	Flux Up Enable	0 "Manual"
P044	Flux Up Time	0.000 s
P420	Drive OL Mode	1 "Reduce CLmt"

P035 [Motor Ctrl Mode]
P035 can be operated in VHz, SVC, or FVC motor control modes.

P038 [PWM Frequency]
See the filter instructions to set the PWM frequency. The setting is based on the drive rating.

P040 [Mtr Options Cfg]
Bit 5 "Reflect Wave"
The reflected wave bit is turned off so that:

- there are no missing pulses in the output voltage waveform
- any offsets that could appear are minimized

Bit 7 "PWM Type Sel"
The PWM type select bit is set to its default value of full-time three-phase modulation with no switch over to two-phase modulation. Two-phase modulation degrades filter performance.

Bit 8 "AsyncPWMLock"
The asynchronous PWM lock bit is turned on because the filter is tuned to the carrier frequency. If the carrier frequency changes, the filter does not work, so the carrier frequency must be fixed. The PWM frequency is set for whatever the filter is tuned to: either 2 kHz or 4 kHz.

Bit 11 "Elect Stab"
This bit affects angle and voltage stability. When electrical stability is set to 0 "Disabled," angle stability gain and voltage stability gain are set automatically. There is no compensation for the current going into the filter caps.

Bit 12 "Xsistor Diag"
The transistor diagnostics bit is turned off. This is because the sequence that turns the transistors on and off charges the capacitors in the filter and can cause an F12 "HW OverCurrent" fault.

P043 [Flux Up Enable]
Set P043 to 0 "Manual," to accommodate motor control because it looks less like an equivalent motor circuit to the drive.

P044 [Flux Up Time]
Flux up time is set to zero because the output load looks less like an equivalent motor circuit to the drive. It is less effective to build stator flux independently before accelerating.

P420 [Drive OL Mode]
Drive overload mode is set for reduce current limit, and not the PWM frequency, for the same reason as P040 [Mtr Options Cfg] Bit 8 "AsyncPWMLock."

PowerFlex 753/755 with LRC dV/dt Filters

This section describes the required parameter settings for using a PowerFlex 753 or 755 drive with LRC dV/dt filters and the operation theory behind each setting.

No.	Name / Bit	Required Setting
P035	Motor Ctrl Mode	0 "Induction VHz"
P038	PWM Frequency	2 kHz or 4 kHz
P040	Mtr Options Cfg	
	Bit 5 "Reflect Wave"	0 "Disabled"
	Bit 7 "PWM Type Sel"	1 "Full-time three-phase"
	Bit 8 "AsyncPWMLock"	1 "Enabled"
	Bit 11 "Elect Stab"	0 "Disabled"
	Bit 12 "Xsistor Diag"	0 "Disabled"
P043	Flux Up Enable	0 "Manual"
P044	Flux Up Time	0.000 s
P420	Drive OL Mode	1 "Reduce CLmt"

P035 [Motor Ctrl Mode]
P035 can be operated in VHz control mode.

P038 [PWM Frequency]
See the filter instructions to set the PWM frequency. The setting is based on the drive rating.

P040 [Mtr Options Cfg]
Bit 5 "Reflect Wave"
The reflected wave bit is turned off so that:

- there are no missing pulses in the output voltage waveform
- any offsets that could appear are minimized

Bit 7 "PWM Type Sel"
The PWM type select bit is set to its default value of full-time three-phase modulation with no switch over to two-phase modulation. Two-phase modulation degrades filter performance.

Bit 8 "AsyncPWMLock"
The asynchronous PWM lock bit is turned on because the filter is tuned to the carrier frequency. If the carrier frequency changes, the filter does not work, so the carrier frequency must be fixed. The PWM frequency is set for whatever the filter is tuned to: either 2 kHz or 4 kHz.

Bit 11 "Elect Stab"
This bit affects angle and voltage stability. When electrical stability is set to 0 "Disabled," angle stability gain and voltage stability gain are set automatically. There is no compensation for the current going into the filter caps.

Bit 12 "Xsistor Diag"
The transistor diagnostics bit is turned off. This is because the sequence that turns the transistors on and off charges the capacitors in the filter and can cause an F12 "HW OverCurrent" fault.

P043 [Flux Up Enable]
Set P043 to 0 "Manual," to accommodate motor control because it looks less like an equivalent motor circuit to the drive.

P044 [Flux Up Time]
Flux up time is set to zero because the output load looks less like an equivalent motor circuit to the drive. It is less effective to build stator flux independently before accelerating.

P420 [Drive OL Mode]
Drive overload mode is set for reduce current limit, and not the PWM frequency, for the same reason as P040 [Mtr Options Cfg] Bit 8 "AsyncPWMLock."

PowerFlex 700 Parameter Settings for Use with Sine-wave Filters

This section describes the required parameter settings for using a PowerFlex 700 drive with sine-wave filters and the operation theory behind each setting.

No.	Name / Bit	Required Setting
P053	Motor Cntl Sel	2 "Custom VHz"
P056	Compensation	
	Bit 0 "Reflect Wave"	0 "Disabled"
	Bit 3 "Xsistor Diag"	0 "Disabled"
	Bit 7 "PWM FreqLock"	1 "Enabled"
P057	Flux Up Mode	0 "Manual"
P058	Flux Up Time	0.000 s
P150	Drive OL Mode	1 "Reduce CLim"
P151	PWM Frequency	2 kHz or 4 kHz
P069	Start/Acc Boost	Start with low values and increase until effective.
P070	Run Boost	Per motor
P071	Break Voltage	Per need
P072	Break Frequency	Per need
Reserved Parameters These parameters can only be viewed when P196 [Param Access Lvl] is set to 2 "Reserved."		
P506	Angle Stability Gain	0
P507	Volt Stability Gain	10
P524	Modulation Mode	1 "Space Vector" only
P552	Dead Time Comp	0%

P053 [Motor Cntl Sel]
The motor control select is set to VHz. Because of the sine-wave filter, with its inductive, resistive, and capacitive (LRC) components between the drive and motor, the load no longer looks like an equivalent motor circuit to the drive for purposes of FVC or SVC. Therefore, the drive is operated in VHz mode.

IMPORTANT Do not autotune. An autotune function is likely to fail to complete when a VHz setting is applied.

P056 [Compensation]
Bit 0 "Reflect Wave"
The reflected wave bit is turned off so that:

- there are no missing pulses in the output voltage waveform
- any offsets that could appear are minimized

Bit 3 "Xsistor Diag"
The transistor diagnostics bit is turned off. This is because the sequence that turns the transistors on and off charges the capacitors in the filter and can cause an F12 "HW OverCurrent" fault.

Bit 7 "PWM FreqLock"
The PWM frequency lock bit is turned on because the filter is tuned to the carrier frequency. If the carrier frequency changes, the filter does not work, so the carrier frequency must be fixed. The PWM frequency is set for whatever the filter is tuned to: either 2 kHz or 4 kHz.

P057 [Flux Up Mode]
Set P057 to 0 "Manual" to accommodate motor control because it looks less like an equivalent motor circuit to the drive.

P058 [Flux Up Time]
Flux up time is set to zero because the output load looks less like an equivalent motor circuit to the drive. It is less effective to build stator flux independently before accelerating.

P150 [Drive OL Mode]
Drive overload mode is set for reduce current limit, and not the PWM frequency, for the same reason as P056 [Compensation] Bit 7 "PWM FreqLock."

P151 [PWM Frequency]
See the filter instructions to set the PWM frequency. The setting is based on the drive rating.

P069 [Start/Acc Boost]
P070 [Run Boost]
P071 [Break Voltage]
P072 [Break Frequency]
These parameters can cause DC offsets in Adjustable Voltage mode.

P506 [Angle Stability Gain]
Angle stability gain is set to 0 so it does not try to compensate for the current going into the filter capacitors.

P507 [Volt Stability Gain]
Voltage stability gain is set to 10 for the same reason as angle stability gain.

P524 [PWM Type Sel]
PWM type select is set to 1 "Space Vector only," because two-phase modulation degrades filter performance.

Avoid transformer saturation potential by minimizing long acceleration ramp times from start to approximately 5 Hz command speed. Program the drive to skip to 3 or up to 5 Hz at the fastest (0.1 s) acceleration rate. Then switch to the desired acceleration ramp rate the remainder increase to desired speed command.

P552 [Dead Time Comp]
Dead time compensation is best set to 0% when output of the sine-wave filter is fed into a transformer.

Parameters 506, 507, 524, and 552 are only active in Sensorless Vector and Custom VHz modes of operation, therefore these parameters require modification when in Sensorless Vector control mode.

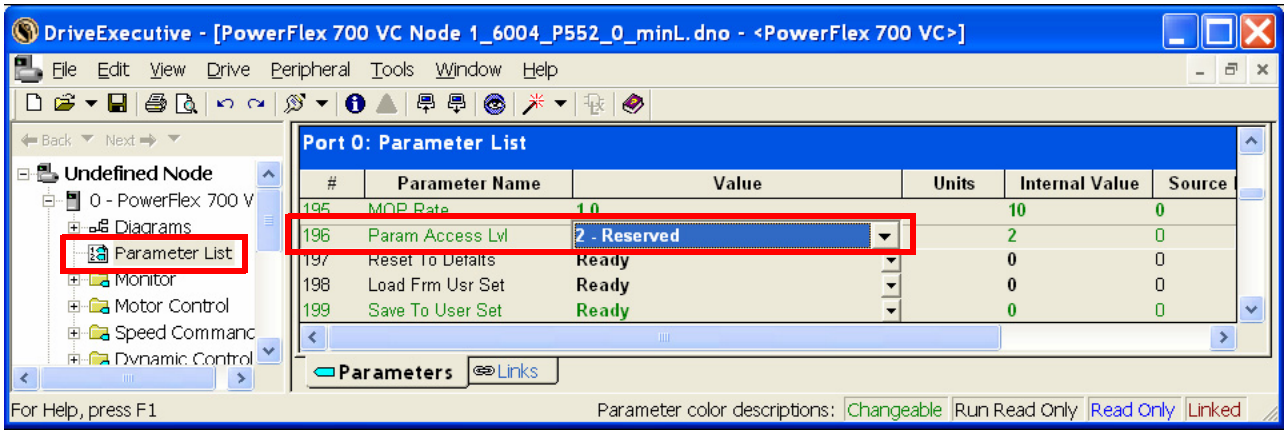
Find Reserved Engineering Parameters

For the drive current regulator to tolerate the surge of current into the capacitors of the sine-wave filter branch circuit, it is necessary to modify some parameters that affect the vector algorithm and sensitivity of the current regulator.

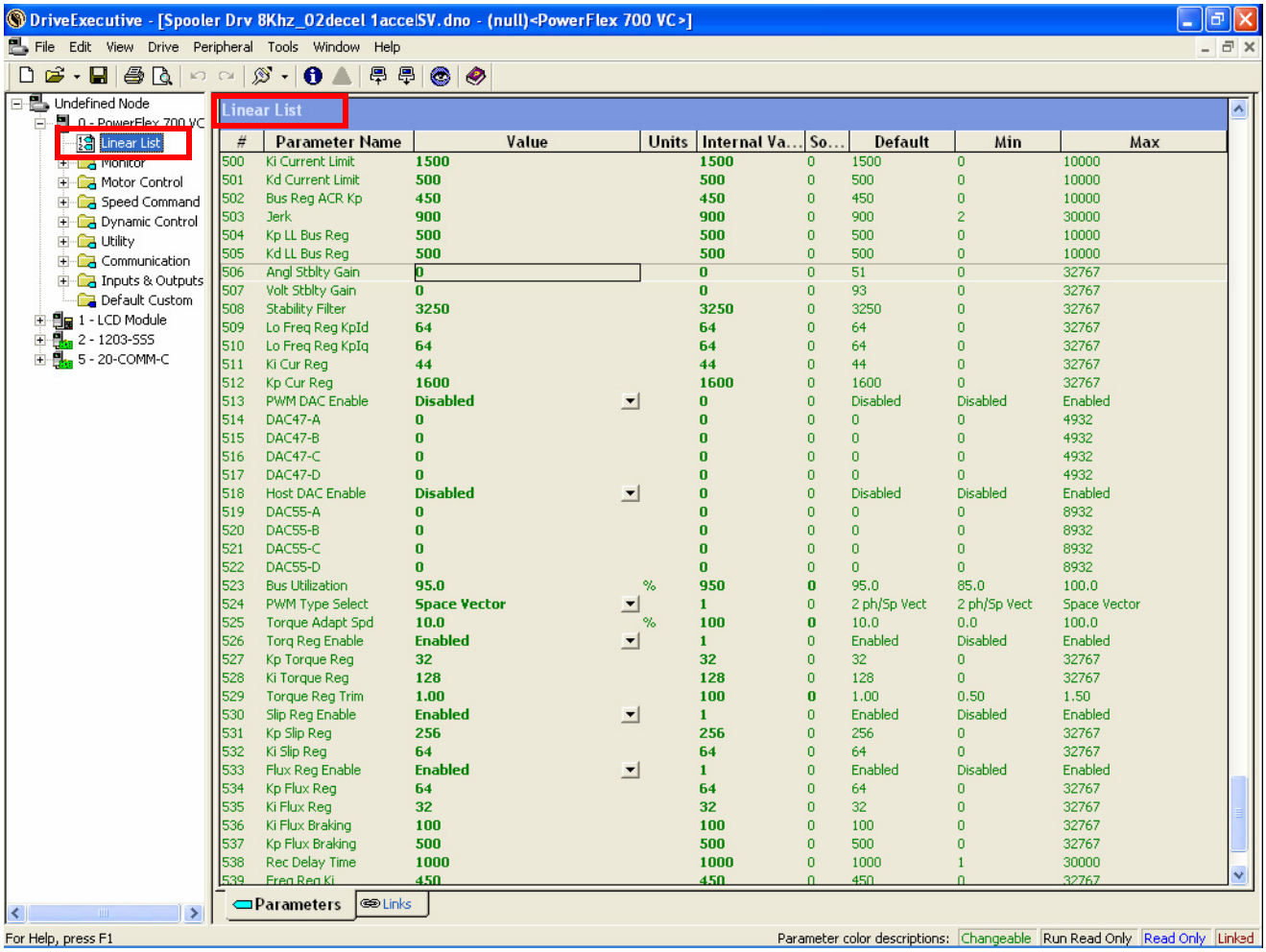
Some drive parameters are in a Reserved state, because they are rarely changed or are preferred not to be changed. In rare cases, such as for use with a sine-wave filter, you must access some of the Reserved parameters and change them from their default values to other values. You can only gain access to Reserved parameters via the HIM and software tools such as DriveExecutive™ software, DriveExplorer™ software, or CCW Connected Components Workshop. Access must be through the drive DPI™ ports or Ethernet. The Reserved parameters are part of the 500 group of parameters under the first menu folder.

IMPORTANT Do not alter any Reserved parameters other than those you must alter for your application (such as use with a sine-wave filter).

To access the reserved engineering parameters via the drive HIM, set parameter 196 [Param Access Lvl] to 2 "Reserved".



Linear Parameter List



File	Group	No.	Parameter Name and Description	Values
UTILITY	Diag-Motor Cntl	506	**[Angl Stblty Gain]** Angle Stability Gain adjusts the electrical angle to maintain stable motor operation. An increase in the value increases the angle adjustment.	Default: 51 Min/Max: 0/32767 Units: 1
		507	**[Volt Stblty Gain]** Adjusts the output voltage to maintain stable motor operation. An increase in the value increases the output voltage adjustment.	Default: 93 Min/Max: 0/32767 Units: 1
	Diag-DACs	524	**[PWM Type Sel]** Allows selection of the active PWM type. A value of 0 is default, and results in a change of PWM method at approx 2/3 of rated motor frequency. If unacceptable for harmonic or audible reasons, a value of 1 disables the change.	Default: 0 Min/Max: 0/1 Units: 1
	Diag-Vector	552	**Dead Time Comp** Voltage compensation for off time between PWM switching events.	Default: 75 Min/Max: 50/100 Units: %

PowerFlex 700 Parameter Settings for Use with Adjustable Voltage Application with a Sine-wave Filter

This section describes the required parameter settings for using a PowerFlex 700 drive in an adjustable voltage application with a sine-wave filter, and the operation theory behind each setting. Many but not all adjustable voltage applications require a sine-wave filter.

No.	Name / Bit	Required Setting
P196	Param Access Lvl	2 "Reserved"
P053	Motor Cntl Sel	5 "Adj Voltage"
P056	Compensation	
	Bit 0 "Reflect Wave"	0 "Disabled"
	Bit 3 "Xsistor Diag"	0 "Disabled"
	Bit 7 "PWM FreqLock"	1 "Enabled"
P057	Flux Up Mode	0 "Manual"
P058	Flux Up Time	0.000 s
Set the next group of parameters when P053 [Motor Cntl Sel] has been set to 5 "Adj Voltage".		
P069	Start/Acc Boost	0
P070	Run Boost	0
P071	Break Voltage	0
P072	Break Frequency	0
P150	Drive OL Mode	1 "Reduce CLim"
P151	PWM Frequency	2 kHz or 4 kHz
Reserved Parameters These parameters can only be viewed when P196 [Param Access Lvl] is set to 2 "Reserved."		
P506	Angl Stblty Gain	0
P507	Volt Stblty Gain	10
P524	PWM Type Sel	1 "Space Vector" only
P552	Dead Time Comp	0%

P196 [Param Access Lvl]

The parameter access level is set to 2 "Reserved" to enable access to the reserved engineering parameters. See Find Reserved Engineering Parameters on page 11.

P053 [Motor Cntl Sel]

Motor control select is set to adjustable voltage for applications that involve nontraditional/non-motor type of loads. Generally a sine-wave filter (SWF) is used for optimal control and performance, however not all adjustable voltage applications require a SWF. If the recommended parameter value changes listed are not made, nuisance IOC trips are likely to occur when the SWF capacitor is being charged.

IMPORTANT Do not autotune. An autotune function is likely to fail to complete when the adjustable voltage setting is applied.

P056 [Compensation]

Bit 0 "Reflect Wave"

The reflected wave bit is turned off so that:

- there are no missing pulses in the output voltage waveform
- any offsets that could appear are minimized

Bit 3 "Xsistor Diag"

The transistor diagnostics bit is turned off. This is because the sequence that turns the transistors on and off charges the capacitors in the filter and can cause an F12 "HW OverCurrent" fault.

Bit 7 "PWM FreqLock"
The PWM frequency lock bit is turned on because the filter is tuned to the carrier frequency. If the carrier frequency changes, the filter does not work, so the carrier frequency must be fixed. The PWM frequency is set for whatever the filter is tuned to: either 2 kHz or 4 kHz.

P057 [Flux Up Mode]
Set P057 to 0 "Manual" to accommodate motor control because it looks less like an equivalent motor circuit to the drive.

P058 [Flux Up Time]
Flux up time is set to zero because the output load looks less like an equivalent motor circuit to the drive. It is less effective to build stator flux independently before accelerating.

P069 [Start/Acc Boost]
P070 [Run Boost]
P071 [Break Voltage]
P072 [Break Frequency]
These parameters can cause DC offsets in Adjustable Voltage mode.

P150 [Drive OL Mode]
Drive overload mode is set for reduce current limit, and not the PWM frequency, for the same reason as P056 [Compensation] Bit 7 "PWM FreqLock."

P151 [PWM Frequency]
See the filter instructions to set the PWM frequency. The setting is based on the drive rating.

P506 [Angle Stability Gain]
Angle stability gain is set to 0 so it does not try to compensate for the current going into the filter capacitors.

P507 [Volt Stability Gain]
Voltage stability gain is set to 10 for the same reason as angle stability gain.

P524 [PWM Type Sel]
PWM type select is set to 1 "Space Vector" only, because two-phase modulation degrades filter performance.

Avoid transformer saturation potential by minimizing long acceleration ramp times from start to approximately 5 Hz command speed. Program the drive to skip to 3 or up to 5 Hz at the fastest (0.1 s) acceleration rate. Then switch to the desired acceleration ramp rate the remainder increase to desired speed command.

P552 [Dead Time Comp]
Dead time compensation is best set to 0% when output of the sine-wave filter is fed into a transformer.

Parameters 506, 507, 524, and 552 are only active in Sensorless Vector, Custom VHz, and Adjustable Voltage modes of operation. Therefore, these parameters require modification when in Adjustable Voltage control mode (which is a form of VHz).

PowerFlex 700 Parameter Settings for Use with dV/dt Filters

PowerFlex 700 drives can be used with both LR dV/dt filters and LRC dV/dt filters.

PowerFlex 700 with LR dV/dt Filters

This section describes the required parameter settings for using a PowerFlex 700 drive with LR dV/dt filters and the operation theory behind each setting.

No.	Name / Bit	Required Setting
P053	Motor Cntl Sel	VHz, SVC, FVC
P056	Compensation	
	Bit 0 "Reflect Wave"	0 "Disabled"
	Bit 3 "Xsistor Diag"	0 "Disabled"
	Bit 7 "PWM FreqLock"	1 "Enabled"
P057	Flux Up Mode	0 "Manual"
P058	Flux Up Time	0.000 s
P150	Drive OL Mode	1 "Reduce CLim"
P151	PWM Frequency	2 kHz or 4 kHz
Reserved Parameters These parameters can only be viewed when P196 [Param Access Lvl] is set to 2 "Reserved."		
P506	Angle Stability Gain	0
P507	Volt Stability Gain	10
P524	Modulation Mode	0 or 1

P053 [Motor Cntl Sel]

Motor control select can be set to VHz, SVC, or FVC motor control modes.

P056 [Compensation]

Bit 0 "Reflect Wave"

The reflected wave bit is turned off so that:

- there are no missing pulses in the output voltage waveform
- any offsets that could appear are minimized

Bit 3 "Xsistor Diag"

The transistor diagnostics bit is turned off. This is because the sequence that turns the transistors on and off charges the capacitors in the filter and can cause an F12 "HW OverCurrent" fault.

Bit 7 "PWM FreqLock"

The PWM frequency lock bit is turned on because the filter is tuned to the carrier frequency. If the carrier frequency changes, the filter does not work, so the carrier frequency must be fixed. The PWM frequency is set for whatever the filter is tuned to: either 2 kHz or 4 kHz.

P057 [Flux Up Mode]

Set P057 to 0 "Manual" to accommodate motor control because it looks less like an equivalent motor circuit to the drive.

P058 [Flux Up Time]

Flux up time is set to zero because the output load looks less like an equivalent motor circuit to the drive. It is less effective to build stator flux independently before accelerating.

P150 [Drive OL Mode]

Drive overload mode is set for reduce current limit, and not the PWM frequency, for the same reason as P056 [Compensation] Bit 7 "PWM FreqLock."

P151 [PWM Frequency]
See the filter instructions to set the PWM frequency. The setting is based on the drive rating.

P506 [Angle Stability Gain]
Angle stability gain is set to 0 so it does not try to compensate for the current going into the filter capacitors.

P507 [Volt Stability Gain]
Voltage stability gain is set to 10 for the same reason as angle stability gain.

P524 [PWM Type Sel]
PWM type select is set to 1 "Space Vector" only, because two-phase modulation degrades filter performance.

PowerFlex 700 with LRC dV/dt Filters

This section describes the required parameter settings for using a PowerFlex 700 drive with LRC dV/dt filters and the operation theory behind each setting.

No.	Name / Bit	Required Setting
P053	Motor Cntl Sel	VHz
P056	Compensation	
	Bit 0 "Reflect Wave"	0 "Disabled"
	Bit 3 "Xsistor Diag"	0 "Disabled"
	Bit 7 "PWM FreqLock"	1 "Enabled"
P057	Flux Up Mode	0 "Manual"
P058	Flux Up Time	0.000 s
P150	Drive OL Mode	1 "Reduce CLim"
P151	PWM Frequency	2 kHz or 4 kHz
Reserved Parameters These parameters can only be viewed when P196 [Param Access Lvl] is set to 2 "Reserved."		
P506	Angle Stability Gain	0
P507	Volt Stability Gain	10
P524	Modulation Mode	0 or 1

P053 [Motor Cntl Sel]
Motor control select can be set to VHz control mode.

P056 [Compensation]
Bit 0 "Reflect Wave"
The reflected wave bit is turned off so that:

- there are no missing pulses in the output voltage waveform
- any offsets that could appear are minimized

Bit 3 "Xsistor Diag"
The transistor diagnostics bit is turned off. This is because the sequence that turns the transistors on and off charges the capacitors in the filter and can cause an F12 "HW OverCurrent" fault.

Bit 7 "PWM FreqLock"
The PWM frequency lock bit is turned on because the filter is tuned to the carrier frequency. If the carrier frequency changes, the filter does not work, so the carrier frequency must be fixed. The PWM frequency is set for whatever the filter is tuned to: either 2 kHz or 4 kHz.

P057 [Flux Up Mode]
Set P057 to 0 "Manual" to accommodate motor control because it looks less like an equivalent motor circuit to the drive.

P058 [Flux Up Time]
Flux up time is set to zero because the output load looks less like an equivalent motor circuit to the drive. It is less effective to build stator flux independently before accelerating.

P150 [Drive OL Mode]
Drive overload mode is set for reduce current limit, and not the PWM frequency, for the same reason as P056 [Compensation] Bit 7 "PWM FreqLock."

P151 [PWM Frequency]
See the filter instructions to set the PWM frequency. The setting is based on the drive rating.

P506 [Angle Stability Gain]
Angle stability gain is set to 0 so it does not try to compensate for the current going into the filter capacitors.

P507 [Volt Stability Gain]
Voltage stability gain is set to 10 for the same reason as angle stability gain.

P524 [PWM Type Sel]
PWM type select is set to 1 "Space Vector" only, because two-phase modulation degrades filter performance.

Notes:

Additional Resources

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

Resource	Description
EtherNet/IP Network Devices User Manual, ENET-UM006	Describes how to configure and use EtherNet/IP devices to communicate on the EtherNet/IP network.
Ethernet Reference Manual, ENET-RM002	Describes basic Ethernet concepts, infrastructure components, and infrastructure features.
System Security Design Guidelines Reference Manual, SECURE-RM001	Provides guidance on how to conduct security assessments, implement Rockwell Automation products in a secure system, harden the control system, manage user access, and dispose of equipment.
Industrial Components Preventive Maintenance, Enclosures, and Contact Ratings Specifications, publication IC-TD002	Provides a quick reference tool for Allen-Bradley industrial automation controls and assemblies.
Safety Guidelines for the Application, Installation, and Maintenance of Solid-State Control, publication SGI-1.1	Designed to harmonize with NEMA Standards Publication No. ICS 1.1-1987 and provides general guidelines for the application, installation, and maintenance of solid-state control in the form of individual devices or packaged assemblies incorporating solid-state components.
Industrial Automation Wiring and Grounding Guidelines, publication 1770-4.1	Provides general guidelines for installing a Rockwell Automation industrial system.
Product Certifications website, rok.auto/certifications.	Provides declarations of conformity, certificates, and other certification details.

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

Rockwell Automation Support

Use these resources to access support information.

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

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