



PowerFlex 700 Drive w/Vector Control Option (Revision 9.001)

These release notes correspond to major revision 9.001 of firmware for PowerFlex 700 Drives with the Vector Control option. Refer to publications 20B-RN001 through 20B-RN0016 for a complete description of the changes implemented in previous firmware versions.

New Features/ Enhancements

HIM DPI Communication Loss

The user can configure the drive to continue operating at a defined speed reference if a HIM DPI Port 1-3 loss occurs, which is indicated by bits 21, 22, and 23 in read-only parameter 211 [Drive Alarm 1]. These three ports can be configured independently. Using this feature will allow the drive to operate at the speed defined in parameter 173 [DPI Loss Action], and indicate a DPI Port x Loss as configured in parameter 238 [Fault Config 1] and parameter 259 [Alarm Config 1]. If the HIM was supplying the speed reference when removed, the drive speed reference cannot be adjusted from any other source while the HIM is disconnected.

If the present speed reference was not from the DPI port that was disconnected, the drive speed will continue to be commanded by that reference.

If the drive stops while the HIM is disconnected and the DPI Port x loss is activated, the last commanded HIM speed reference will be saved in the drive. When the user issues a start command, the last commanded HIM speed reference will be used.

NOTE: When using parameter 173 [DPI Loss Action], the user must make certain that the HIM is not the sole stopping source. The user must verify that an alternate stop source is available. If the HIM is the sole stopping source and it is disconnected, the drive will fault regardless of the configuration in parameter 238 [Fault Config 1].

When the HIM is reconnected to the original DPI port, the drive speed reference will be transferred to the HIM, providing a constant drive speed while the HIM regains control of the speed reference. Once communication between the drive and HIM is re-established, the DPI Port x Loss alarm will clear and the HIM will control the speed reference.

In the default condition, a DPI loss fault will occur if a HIM is disconnected. To avoid or override a DPI loss fault and keep the drive running:

1. Set parameter 173 [DPI Loss Action] to “1” (Hold OutFreq) or “2” (Goto Preset1).

2. Change the respective bit that corresponds to the DPI port (bits 16...18) in parameter 238 [Fault Config 1] to a value of "0" to disable the fault.
3. Verify that the respective bit that corresponds to the DPI port (bits 21...23) in parameter 259 [Alarm Config 1] are in their default states of "1" (condition true).

Added New Parameter 173 [DPI Loss Action]

UTILITY	HIM Ref Config	173	<p>[DPI Loss Action]</p> <p>Selects the speed reference that will be selected when a "DPI Px Loss" alarm occurs on the HIM that is providing the speed reference.</p> <p>"Hold OutFreq" (1) - selects the last HIM commanded speed reference.</p> <p>"Goto Preset1" (2) - selects the value that was saved in parameter 101 - [Preset Speed 1].</p> <p>Important: The HIM reference is not retained if power is lost or removed.</p> <p>NOTE: The user must make certain that the HIM is not the sole stopping source. The user must verify that an alternate stop source is available. If the HIM is the sole stopping source and it is disconnected, the drive will fault regardless of the configuration in parameter 238 [Fault Config 1].</p> <p>NOTE: To avoid or override a DPI loss fault and keep the drive running, change the respective bit that corresponds to the DPI port (bits 16...18) in parameter 238 [Fault Config 1] to a value of "0" to disable the fault.</p>	Default: 0 "Disabled" Options: 0 "Disabled" 1 "Hold OutFreq" 2 "Goto Preset1"	238 259

Added New Bits 21, 22, and 23 to Parameter 211 [Drive Alarm 1]

UTILITY	Diagnostics	211	<p>[Drive Alarm 1] Read Only</p> <p>Alarm conditions that currently exist in the drive.</p> <p>"Prof SetHome" will be set if the alarm is configured in [Alarm Config 1], "Prof/Indexer" is configured in [Speed/Torque Mod] and the homing routine has not been successfully completed.</p>	212
		<div style="text-align: center;"> <p>Legend: 1=Condition True, 0=Condition False, x=Reserved</p> </div> <p style="text-align: center;">(1) Firmware 6.002 and later. (2) Firmware 9.001 and later.</p>		

Stop Dwell Function

A new parameter 452 [Stop Dwell Time] has been added. It sets an adjustable delay time between detecting zero speed and disabling the speed and torque regulators, when responding to a stop command.

Important: Consult industry and local codes when setting the value of this parameter.

DYNAMIC CONTROL	Stop/Brake Modes	452	[Stop Dwell Time]	Default: 0.00 Secs
		Sets an adjustable delay time between detecting zero speed and disabling the speed and torque regulators, when responding to a stop command. For more information, please see Stop Dwell Time on page C-45 .		Min/Max: 0.00/60.00 Secs Units: 0.01 Secs
		Important: Consult industry and local codes when setting the value of this parameter.		

Encoder Filtering

A new Bit 11 (EncFiltStop) has been added to parameter 56 [Compensation] to enable the use of the filtering selected in parameter 416 [Fdbk Filter Sel] to be used during the stop sequence for zero speed detection.

MOTOR CONTROL	Torq Attributes	056	[Compensation]				
		Enables/disables correction options.					
						1 = Enabled 0 = Disabled x = Reserved	
		Bit # (1) For current limit (except FVC Vector mode). Factory Default Bit Values (2) Firmware 6.002 and later. (3) Firmware 9.001 and later.					
		Option Descriptions					
		Reflect Wave	Disables reflected wave overvoltage protection for long cable lengths. (typically enabled).				
		Enable Jerk	In non-FVC Vector modes, disabling jerk removes a short S-curve at the start of the accel/decel ramp.				
		Ixo AutoCalc	Not functional – reserved for future enhancements.				
		Xsistor Diag	"0" disables power transistor power diagnostic tests which run at each start command. "1" enables transistor diagnostic tests.				
		Rs Adapt	FVC w/Encoder Only - Disabling may improve torque regulation at lower speeds (typically not needed).				
		Mtr Lead Rev	Reverses the phase rotation of the applied voltage, effectively reversing the motor leads. Note: This bit is reset to "0" when parameters are reset to factory defaults.				
		PWM Freq Lock	Keeps the PWM frequency from decreasing to 2 kHz at low operating frequencies in FVC Vector mode without encoder.				
		DigIn DatLog	Enable [DigIn DataLogic], parameter 411.				
		NoSyncPWM	Disables synchronous PWM.				
		EncFiltStop	In FVC Vector mode only, sets the encoder filter based on parameter 416 [Fdbk Filter Sel] to detect when the drive is at zero speed during the stop sequence.				

Corrected Anomalies

This section describes the anomalies corrected in this revision.

Function	Anomaly	Correction
PC Oil Well	The minimum speed calculation for Progressive Cavity pumps was incorrect when using Hz for the speed command.	Minimum speed calculation corrected.
DC Bus Regulator	A drive on a high input line or an overhauling load causes the DC Bus Memory to be higher than usual. The high DC Bus Memory prevents the bus regulation or dynamic brake from operating, causing F5 OverVoltage faults.	Added an upper limit to the DC Bus Regulator to prevent problems with high line voltages. A max value of 775V DC (480V drive) is used to prevent nuisance Dynamic Braking and prevent OverVoltage faults.
Coast to Stop	When the drive stop mode is set to "Coast to Stop," an F12 OverCurrent fault may occur. This is known to occur when the active Decel Time is set to zero. It can also occur during the flux down of the motor.	The flux down routine was changed to a PI control. Parameters 558 [Ki Fluxdown] and 559 [Kp Fluxdown] have been added.
Decel with S Curve	When using FVC control with a small decel rate and the value in parameter 146 [S Curve %] is not zero, the motor may reverse when stopping.	Modified control to prevent reverse rotation.
Dynamic User Sets	When using Dynamic User Sets controlled by parameter 205 [Dyn UsrSet Sel], the parameters stored in the User Set are not recalled on Power Up.	When parameter 204 [Dyn UsrSet Cnfg] bit 0 (Dynamic Mode) is enabled, the parameters are restored on Power Up.

Determining Firmware Revision Level

To determine the firmware version for a PowerFlex 700 Drive, view parameter 29 [Control SW Ver].

Firmware Upgrade Procedure

This section describes procedures to flash upgrade your drive firmware. Downloads are provided on the Allen-Bradley Web Updates site located at <http://www.ab.com/support/abdrives/webupdate>. For a detailed explanation of the flash procedure, refer to <http://www.ab.com/support/abdrives/powerflex700vc/phase1/firmware/index.html>.



ATTENTION: Risk of drive damage exists if drive power is removed during the Boot Flash segment of the upgrade/download. To guard against damage, **Do Not Remove Power** to the drive until the download is complete and the drive has been reset.

Important: Once a flash update has been started, do not remove drive power until the download is complete and the drive has been reset. If power is removed during Boot Flash, the drive may be permanently damaged. A drive that has been damaged in this way cannot be repaired. If power is removed during Application Flash, the drive will remain in Boot and can be reflashed.

1. Remove/disconnect any HIMs before proceeding.
2. Install the “**v9.001 Flash Kit**” from the Allen-Bradley Web Updates site. This automatically installs the latest version of the ControlFLASH utility on your computer. ControlFLASH, DriveExplorer or DriveExecutive can now be used to update the drive using the following instructions.

Using ControlFLASH

Important: This method requires RSLinx.

1. Launch ControlFLASH (if it is not already running).
2. Follow the screen prompts until the flash procedure is completed and the new firmware version is displayed.

Using DriveExplorer Lite/Full

1. Exit the ControlFLASH program (if it is running) and launch DriveExplorer. Make a connection to the drive.
2. In the DriveExplorer treeview, select the appropriate drive. Then select the Information icon.
3. On the Properties screen, select the “Details” tab.
4. Select “Flash Update” and follow the screen prompts until the procedure is completed and the new firmware version is displayed.

Using DriveExecutive

Important: This method requires RSLinx.

1. Exit the ControlFLASH program (if it is running) and launch DriveExecutive. Make a connection to the drive.
2. In the DriveExecutive treeview, select the appropriate drive. Then select the Information icon.
3. On the Properties screen, select “Component Details.”
4. Select “Flash Update” and follow the screen prompts until the procedure is completed and the new firmware version is displayed.

Using HyperTerminal

For a detailed procedure using HyperTerminal, refer to:

<http://www.ab.com/support/abdrives/powerflex700vc/phase1/firmware/hyperterminal.html>

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