PowerFlex 4® Custom Firmware

"DA" Option – 300Hz Maximum Frequency and Quick Stop

Overview

The purpose of this insert instructions manual is to provide the special information about the custom firmware version 51.xx (indicated by parameter D016).

This custom firmware option adds support for the maximum output frequency [Drive Speed] up to 300 Hz, and fast stop DC braking function.

ATTENTION: The Custom Firmware supplied is designed for a specific application and load condition. It differs from the standard PowerFlex4 product offering and must be installed and run only under this custom application. Attempting to run this Custom Firmware under any other type of applications, could result in unpredictable and/or hazardous conditions.

ATTENTION: The 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 application ESD protection handbook.

About Parameters

Compared to the standard firmware, the custom firmware has included the following new parameters and modified the following standard parameters.

P032 [Motor NP Hertz]

Values	Default	60 Hz
	Min/Max:	10/300 Hz
	Display:	1 Hz

P034 [Minimum Freq]

Values	Default	0.0 Hz
	Min/Max:	0.0/300.0 Hz
	Display:	0.1 Hz

P035 [Maximum Freq]

Values	Default	60 Hz
	Min/Max:	0/300.0 Hz
	Display:	1 Hz

A069 [Internal Freq]

Values	Default	60.0 Hz
	Min/Max:	0.0/300.0 Hz
	Display:	0.1 Hz

A070 [Preset Freq 0]
A071 [Preset Freq 1]
A072 [Preset Freq 2]
A073 [Preset Freq 3]

Values	A070 Default	0.0 Hz
	A071 Default	5.0 Hz
	A072 Default	10.0 Hz
	A073 Default	20.0 Hz
	Min/Max:	0.0/300.0 Hz
	Display:	0.1 Hz

P042 [DC Brk Pressure] – New Parameter
This is the new parameter, which affects the DC braking performance.

Values	Default	1200
	Min/Max:	80/2000
	Display:	1

A109 [Ground Fault Avoid] – New Parameter
This is a new parameter, which can be used to avoid the ground fault F13.

Values	Default	0
	Min/Max:	0/2
	Display:	1

Parameter Settings

The following parameters need to be adjusted for the fast stop application.

P037 [Stop Mode]

Set this parameter to one of the DC braking modes (2, 3, 6, or 7).

Mode 3 is probably the preferred mode, but mode 2 may provide slightly better performance if there is mechanical inertia and/or mechanical backlash. Mode 3 applies braking until the drive stops, then releases the brake. If there is still some external mechanical inertia when the brake is released, the drive (system) may coast for a short period. Mode 2 applies the brake for the full period of time specified in parameter 80 acting as a holding brake, even after the motor comes to rest. Mode 6 is the same as Mode 2 and Mode 7 is the same as Mode 3, except that Mode 6 and 7 do not permit a simple stop to clear faults if they occur.

P042 [DC Brk Pressure]

It is adjustable from 80 (minimum initial braking pressure) to 2000 (maximum initial braking pressure). The standard software version applied minimum initial brake “pressure” to minimize “jerk”, but let the drive coast an extended period before braking became effective. A higher value in the parameter increases the initial braking force. A value of 2000 during testing with some motors resulted in some “cogging” and noise. Values between 1200 and 1600 achieved good performance in general, but some modification in this range may yield better operation.

P080 [DC Braking Time]

Set to 0.1 sec for testing.
This is the maximum amount of time the DC brake will be applied.

P081 [DC Braking Current]

Set to maximum for testing (1.8 times drive rated output current).

To avoid the ground fault F13, the parameter A109 needs to be adjusted in addition to using a specified ferrite core. This feature is available with the custom firmware above version 51.02.

A109 [Ground Fault Avoid]

In some cases, the ground fault F13 occurs, especially when two motors are connected to one PowerFlex4 drive and the one motor is connected / disconnected by switching on / off a contactor, while the other motor is running.

To avoid the F13 fault, all three motor leads shall be wrapped through a specified ferrite core (TDK ZCAT3035-1330 or 1321-M001). Additionally, parameter A109 can be used to select the F13 fault-monitoring mode.

Values	Description
0	This is default setting. Ground faults will be monitored by both hardware and software. Hardware detection is delayed 5us, compared to standard firmware V3.05.
1	Hardware monitoring is switched off, and ground faults are monitored only by software.
2 	Both hardware and software monitoring are switched off. This can only be used when the drive system has additional external ground current protection.

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