PowerFlex® 700S Drives with Phase II Control (4.002)

These release notes correspond to major revision (4), minor revision (2) of firmware for PowerFlex® 700S drives with Phase II control.

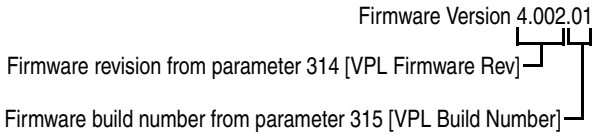
Introduction

The following information is included in this document:

Determining Firmware Revision Level

To determine the firmware version for a PowerFlex 700S drive, view parameters 314 [VPL Firmware Rev] and 315 [VPL Build Number]. The firmware version is the combination of the data in these parameters.

Example:



Firmware Upgrades

This section describes procedures for upgrading your firmware:

When updating firmware version 1.xx to version 2.xx or higher, boot code v1.06 must be flashed into the drive. Use the following procedure to upgrade the boot code along with the application code:

Upgrading from version 1.12 (or before 2.xx release)

1. Flash 700S2bt01_06.bin using 1203-SSS Series B and HyperTerminal.
2. Cycle the power (automatically).
3. HIM displays "No System Application..." error message - ignore this error.
4. Flash 700S2ap04_002.bin using 1203-SSS Series B and HyperTerminal.
5. Cycle the power (automatically).
6. HIM displays as normal.

If upgrading firmware version after version 2.xx (i.e., v2.03), upgrading the application firmware only is required.

Enhancements

This section describes the enhancements included in this revision:

Added PCCC N-File Function to Software Control Bar

This function has been added to allow drive control via the Control Bar from DriveExecutive and the ability to use the available DriveTools SP Wizards when controlling a PowerFlex 700S Phase II drive with DriveLogix using all DriveLogix communications options.

Added Full DPI Configuration Support

This new configuration allows a drive to support all Automatic Device Configuration (previously, Automatic Device Replacement) requirements.

Added Support for Frame 14 Drive

This firmware revision supports the new frame 14 rating; 690 volts AC input, 1500 amps.

Added New "RideThru" Alarm (F92)

This feature provides a "RideThru" (F92) alarm when the drive is in a Ride Through condition and parameter 406 [Power Loss Mode] is set to 0 "Coast" or 5 "Flux Only". When in a RideThru alarm state the HIM displays the alarm icon (bell), the alarm queue displays F92 and bit 27 "Reserved" of parameter 328 [Alarm Status 3] is set.

Bits 8, 9 and 21 of Parameter 513 [V/Hz Mode Config] now "Run Read Only"

The firmware has been updated to inhibit changing bits 8 "BusGain Comp", 9 "ReflWaveComp" and 21 "VltMinorLpEn" while the drive is in run mode.

Prevent Automatic Tach Switch in Permanent Magnet Mode

With this firmware revision, bit16 "Auto Tach Sw" of parameter 153 [Control Options] cannot be set when the drive is in the Permanent Magnet mode (Par 485 [Motor Ctrl Mode] = 2 "PMag Motor"), thus, not allowing a switch to another feedback device (i.e. another encoder or sensorless feedback).

Improved the "Fast Flux Up" Function and Flux Current (Id) Reference

This enhancement improved the fast flux up performance and the transition from a fast flux up reference to rated flux reference.

Motor Control Test Point Parameters now Updated in Task 1

With this enhancement the Motor Control test point parameters (466, 467, 468, 473, 474, 475 and 476) are now updated in Task 1 (the fastest VPL interrupt routine), providing more meaningful data.

Enhanced Slip Tuning for High Inertia Motors

The "Slip Tune" function was enhanced to improve slip tuning for high inertia motors.

Changed the Turn-Off Point for the Analog Output Scale Parameters

The turn-off point (minimum value) of the Analog Output Scale parameters (835 and 842) has been changed from +/-0.001 to +/-0.0001. This change allows you to monitor a smaller analog output value.

Enhanced Processor Utilization

The Processor utilization was improved in order to provide more time for FOC/Encoder modes for frames 1 - 6. Note: This change had previously been implemented for the high horse power drives (frame 9 and up).

Minimum Value of Parameter 415 [BusReg/Brake Ref] Changed to 100.0 for 600V Drives

The minimum value of parameter 415 [BusReg/Brake Ref] has been changed from 110.5 to 100.0 when 600V is selected on a 600V/690V AC input, frame 5 and above drive. This change provides the ability to adjust the dynamic brake turn on voltage level in order to prevent bus over voltages for shared bus applications when 690V, frames 5 and above drives, are used in combination with frame 4 and lower drives.

Miscellaneous Database Changes

The following database changes were made for this firmware revision:

- The maximum value of parameter 2 [Motor NP FLA] has been changed from 2000 to 3000 amps to accommodate frame 14 drives. Note: This value is calculated by the drive.
- The maximum value of parameter 7 [Motor Poles] has been changed from 60 to 128. This change allows the drive to use higher pole count motors.
- Parameters 48 [Spd Ref Bypass2] and 916 [SL Clr Events] are now “recallable”. This change now saves the link for these parameters.
- Added the following Fault Test Point selections to parameter 329 [Fault TP Sel]:
  - 24 “ElpsSec.mSec”, Elapsed time in seconds and milliseconds since the last power up
  - 25 “ElpsMin.Sec”, Elapsed time in minutes and seconds since the last power up
  - 26 “ElpsHour.Min”, Elapsed time in hours and minutes since the last power up
  - 27 “ElpsDay.Hour”, Elapsed time in days and hours since the last power up
- The default value for parameter 370 [HiHp InPhsLs Cfg] was changed from 3 “Flt RampStop” to 2 “FltCoastStop”.
- The maximum value of parameter 400 [Rated Amps] has been changed from 2500 to 3000 amps to accommodate frame 14 drives.

- Added Motor Control test point selection 163 “Flux Up Time” to parameters 466 [MC TP1 Select] and 473 [MC TP2 Select]. The Motor Control test point allows you to see the flux up time for both Fast Flux Up and standard flux conditions.

Corrected Anomalies

This section describes the anomalies corrected in this revision:

“HiHp Drv OvrLoad” Fault (F71) Occurs when Saving to EEPROM while Drive is Running

The high horse power drives would experience a “HiHP Drv OvrLoad” (F71) fault when manually invoking the EEPROM function while the drive is running. This firmware revision corrects this anomaly.

Improved Thermal Regulator Behavior for PowerFlex 700L Drives

The behavior of the thermal regulator has been improved to support PowerFlex 700L drives.

Incorrect Torque Reference Calculation in Permanent Magnet Mode

The torque reference calculation for Permanent Magnet Motor control mode has been corrected in this firmware revision to provide a more accurate torque current.

“Inv Otemp Trip” (F15) Occurs During 600/690V AC Frame 12 Drive Power Up

This firmware revision provides a different power up time for the 600/690V AC frame 12 drive to correct an erroneous “Inv Otemp Trip” fault (F15).

Motion Homing Position Error in Rotary Mode and Registration Problem

This firmware corrects an anomaly that caused the drive to look for the “Armed” bit when it should be looking for the “Found” bit (Lgx73742).

Over Junction Temperature at 2 kHz Carrier Frequency with PowerFlex 700L Drive

The junction temperature calculation for the PF700L did not correctly compensate for a change in carrier frequency from 4 KHz to 2 KHz. This anomaly has been corrected with this firmware revision.

Ramp to Stop, Current Limit Stop and Coast to Stop Fault Response Not Functioning

This anomaly prevented faults that could be configured as 2 “FltCoastStop”, 3 “Flt RampStop” or 4 “FltCurLimStp” from responding with the corresponding action (i.e., coast to stop, ramp to stop or current limit stop) when the corresponding fault occurred. This anomaly has been corrected in this firmware revision. The default value for parameter 370 was changed from 3 “Flt RampStop” to 2 “FltCoastStop” in order to maintain the functionality that was present in earlier firmware releases.

Skip Band Anomalies with Zero and Negative Set Points in V/Hz Mode

This anomaly caused the drive to ignore the minimum value when a zero value was set between the maximum and minimum skip frequency values when the drive is running in V/Hz mode. The firmware has been corrected to recognize a zero value set between the maximum and minimum skip frequency values.

Save HIM Password into EEPROM after Power Down

The anomaly where the HIM password was deleted when power was cycled to the drive has been corrected in this firmware version. When utilized, the HIM password will now be saved into EEPROM when the drive is powered down.

Known Anomalies

This firmware revision contains the following known anomalies:

DriveTools SP Alarm Message when Connecting to PowerFlex 700S Phase II Drive with DriveLogix

The following alarm message displays in DriveTools SP v4.002 and earlier when connecting to a PowerFlex 700S Phase II drive with DriveLogix via the Ethernet:

"The peripheral device port number (0) is invalid. Valid port number range from 1 to 7."

This anomaly can be prevented by completing the following:

1. From the **Drive** menu, select **Create Database**.
2. When the database has been created, shut down DriveTools SP.
3. Restart DriveTools SP and reconnect to the drive.

Instantaneous Overcurrent Fault (F27) May Occur when Saving to EEPROM on High Horsepower Drives

An instantaneous over current fault (“Inst Overcurrent” - F27) may occur when saving to EEPROM from the HIM or DriveExecutive while the drive is running on high horsepower drives (frames 9 - 14). Note: The drive automatically saves all parameter values to EEPROM.

“MC Firmware” Fault (F30) Occurs when Downloading Parameters from HIM after Flash Upgrade to Firmware v3.001 and Higher

At drive start up, an “MC Firmware” (F30) fault will occur for drive frame sizes 9-13 if the following conditions are met:

- You have flash upgraded to firmware v3.001 or higher,
- You have downloaded parameters to the drive from an earlier firmware version via the HIM, and
- Parameter 551 [CurrFdbk AdjTime] is set to a value less than 5

In this case, parameter 551 must be set to the correct value. The correct values are:

- Frame 9, set P551 to 5
- Frame 10, set P551 to 33
- Frame 11, set P551 to 34
- Frame 12, set P551 to 33
- Frame 13, set P551 to 40
- Frames 1-6, P551 should be set to 0

With firmware version 3.001 or higher, the drive will automatically set the correct value for the drive. This is completed at power up, provided the value was not changed manually.

Parameter 414 [Brake/Bus Cnfg] Incorrectly Set after Start Up Wizard Completes

When the PowerFlex 700S Phase II Start Up Wizard is run, the drive correctly sets bit 2 “Bus Ref High” and 3 “Bus Reg En” of parameter 414 [Brake/Bus Cnfg], but does not set this parameter back to the previous settings (if different) when the wizard is complete.

Parameter 554 [LED Status] Not Functioning Properly

Parameter 554 [LED Status], bit 15 “DL ComActive”, does not work.

SynchLink Does Not Reset Properly when "SL Reset" Bit is Set

Setting bit 3 "SL Reset" of parameter 904 [SL Node Cnfg] in PowerFlex 700S Phase II drives does not appear to reset SynchLink properly for DriveLogix Motion control. A power cycle is required to reset SynchLink so that the CST master is set and DriveLogix Motion control works or to reset the Timekeeper.

Trend Functions May Cause Drive to Stop Running

When using the trend functions, a PowerFlex 700S drive may stop running. The power to the drive must be cycled in order to correct this condition. If the DriveLogix option is present the 5730 controller may lose its program.

Restrictions

The following restrictions apply to this revision of firmware:

Clearing the "Find Home" Bit in Parameter 741 [Position Status]

If bit 24 "Find Home" in parameter 740 [Position Control] is set, bit 15 "Homed" in parameter 741 [Position Status] remains set until a start command is issued.

Current Draw Down with Multi-Motor Drive Operation

When using a PowerFlex 700S drive to run multiple motors, the drive must be sized in order to provide the total current required to run the connected motors plus the current required to line start any disconnected motors. If the drive's total current rating is not capable of providing the total current described above, the motor speed may slow, possibly to zero, and re-accelerate the motors back to the set speed when line starting a disconnected motor.

DC Bus Overvoltage Fault (Fault 24) for High Horsepower Drives

A DC Bus overvoltage fault may occur for high horsepower drives when executing a flying start within 2 seconds of a commanded stop with no or light loads.

Homing to a Switch and Then to a Marker Not Functional with DriveLogix

When using the Homing function with a PowerFlex 700S Phase II drive with DriveLogix, you can either Home to a Switch or Home to a Marker. However, you cannot Home to a Switch and a Marker in the same command.

Motion Registration Input Limited to Digital Input 1 or Registration Input 0

The Registration input to the drive is limited to Digital Input 1 and Registration Input 0. Therefore, the RSLogix MAR (Motion Arm Registration) instruction will not function properly if Registration Input 1 is used.

Operating Mode Configuration Parameters Should Not be Changed

The following parameters should not be changed by a user:

- 510 [FVC Mode Config]
- 511 [FVC2 Mode Config]
- 512 [PMag Mode Config]
- 513 [V/Hz Mode Config]

Position Control Bits Not Available for Controller

The following bits were added to parameters 740 [Position Control] and 741 [Position Status] as part of the Position Control Static Assembly for firmware version 3.01.

- [Position Control]
  - bit 24 "Find Home"
  - bit 25 "Pos Redefine"
  - bit 26 "Home Dir"
  - bit 27 "Return Home"
  - bit 28 "Home Switch"
  - bit 29 "Home Marker"
- [Position Status]
  - bit 13 "Home Required"
  - bit 14 "Homing"
  - bit 15 "Homed"

However, these bits were not added to the Controller side of the Static Assembly. Therefore, the controller cannot connect to these bits when using the Position Control Communication Format via the static assembly. If it is necessary to have a controller connect to these bits, the User Defined or Custom User Defined Communication format or explicit messaging must be used.

Speed Limited Adjustable Torque (SLAT) Bits Not Available for Controller

Bits 7 "SLAT Minimum" and 8 "SLAT Maximum" were added to parameter 110 [Speed/TorqueMode] as part of the Speed Control Static Assembly for firmware version 3.01. However, these bits were not added to the Controller side of the Static Assembly. Therefore, the controller cannot connect to bits 7 and 8 when using the Speed Control Communication Format. If it is necessary to have a controller connect to these bits, the User Defined or Custom User Defined Communication format or explicit messaging must be used.

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For an additional level of technical phone support for installation, configuration and troubleshooting, we offer TechConnect Support programs. For more information, contact your local distributor or Rockwell Automation representative, or visit http://support.rockwellautomation.com.

Installation Assistance

If you experience a problem with a hardware module within the first 24 hours of installation, please review the information that's contained in this document. You can also contact a special Customer Support number for initial help in getting your module up and running:

United States	1.440.646.3223 Monday – Friday, 8am – 5pm EST
Outside United States	Please contact your local Rockwell Automation representative for any technical support issues.

New Product Satisfaction Return

Rockwell tests all of our products to ensure that they are fully operational when shipped from the manufacturing facility. However, if your product is not functioning and needs to be returned:

United States	Contact your distributor. You must provide a Customer Support case number (see phone number above to obtain one) to your distributor in order to complete the return process.
Outside United States	Please contact your local Rockwell Automation representative for return procedure.

Notes:

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