PowerFlex 755 Drives (revision 10.003)

These release notes correspond to major revision 10, minor revision 3 of firmware for PowerFlex® 755 drives.

Introduction

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Determining Firmware Revision Level

This section describes procedures to determine the firmware revision of your PowerFlex 755 drive.

Using the Drive LCD HIM

1. Access the Status screen, which is displayed on HIM power up.

Figure 1 - Status Screen

2. Use the 4 or 6 key to scroll to Port 00 for the Host Drive.
3. Press the  key to display its last-viewed folder.
4. Use the 4 or 6 key to scroll to the DIAGNOSTIC folder.
5. Use the 2 or 8 key to select Device Version.
6. Press the 5 (Enter) key to display device version information.

FW Revision is listed under –Main Control Board; see Figure 2.

Figure 2 - Device Version Information Screen
Using DriveExplorer Lite/Full

**IMPORTANT** You need DriveExplorer version 6.01 or later to interface with the PowerFlex 755 drive. To obtain the latest version, visit the Allen-Bradley Web Updates site located at [http://www.ab.com/support/abdrives/webupdate](http://www.ab.com/support/abdrives/webupdate).

1. Launch DriveExplorer and go online with the PowerFlex 755 drive. To connect to the drive, use a 1203-USB converter, a 1203-SSS converter, or an EtherNet/IP network connection.

2. In the Devices hardware view, select the PowerFlex 755 drive.

   Once selected, information regarding the PowerFlex 755 drive is shown in the right panel including the current firmware revision number.

Using DriveExecutive

**IMPORTANT** You need DriveExecutive version 5.01 or later to interface with the PowerFlex 755 drive. To obtain the latest version, visit the Allen-Bradley Web Updates site located at [http://www.ab.com/support/abdrives/webupdate](http://www.ab.com/support/abdrives/webupdate).

1. Launch DriveExecutive and go online with the PowerFlex 755 drive. To connect to the drive, use a 1203-USB converter, a 1203-SSS converter, or an EtherNet/IP network connection.

2. In the Drives hardware view, select the PowerFlex 755 drive (in Figure 3 on page 4).

3. Click the information icon (in Figure 3) to display the drive’s Properties dialog box.

   In the Properties dialog box the “Revision:” field (in Figure 3) will show the drive’s current firmware revision number.
Firmware Flashing

This section describes procedures to flash upgrade your drive firmware. Flash kits for drives are provided on the Allen-Bradley Web Updates site located at http://www.ab.com/support/abdrives/webupdate.

Flashing can be performed using a 1203-USB or 1203-SSS converter. For information on connecting either converter to your drive, refer to the 1203-USB USB Converter User Manual, publication DRIVES-UM001 or the 1203-SSS Smart Self-powered Serial Converter User Manual, publication 20COMM-UM001.

Frame 8 and Larger Drives

When a Frame 8 or larger drive is flashed with firmware earlier than V4, a F361 “Rerate See Manual” fault will result.

1. Confirm the drive's current configuration by viewing Port 10, P21 [Effctv I Rating].
2. Save the current parameter settings using the Human Interface Module (HIM), DriveExecutive, or DriveExplorer.
3. Perform the Flash update.
   When concluded, an F361 “Rerate See Manual” fault is indicated.
4. Set Port 10, P20 [Recfg Acknowledg] to 1 “Acknowledge” to accept the reconfiguration.

**IMPORTANT** Drive parameters are set to factory defaults when the reconfiguration is acknowledged. If a condition exists that does not allow the drive parameters to be set to factory defaults, setting P20 to 1 “Acknowledge” will not be accepted. Such conditions include the drive is currently running, DeviceLogix is currently running, or the drive is communicating with a PLC.

5. Download the saved drive configuration.
   Confirm the motor and drive ratings before running the drive.

**Installing the Flash Kit**

1. Install the flash kit utility from the Allen-Bradley Web Updates site for the PowerFlex 755 drive, which includes the latest version of the ControlFLASH utility and deploys firmware files for using HyperTerminal on your computer.

2. You are now ready to use DriveExplorer, DriveExecutive, ControlFLASH or HyperTerminal to update the drive. Refer to the respective section below and follow the instructions.

**Using DriveExplorer Lite/Full to Flash Update**

1. With the Flash Kit installed (see Installing the Flash Kit), launch DriveExecutive and go online (via a 1203-USB or 1203-SSS converter) with the PowerFlex 755 drive.

2. In the Devices hardware view, select the PowerFlex 755 drive (1 in Figure 4).

3. Click the information icon (2 in Figure 4) to display the drive’s Properties dialog box.

4. In the Properties dialog box, click the Component Details tab (3 in Figure 4).
5. With the Main Control Board selected, click **Flash Update**.

6. From the list of available updates, select “v10.003.xxx” and click **Next >**.

7. Follow the remaining prompts until the flash update procedure completes and displays the new firmware revision.

**IMPORTANT** Flash updating the device firmware may cause the device to load defaults. It is recommended that you save the setting to your PC before proceeding.
Using DriveExecutive to Flash Update

1. With the Flash Kit installed (see Installing the Flash Kit), launch DriveExecutive and go online (via a 1203-USB or 1203-SSS converter) with the PowerFlex 755 drive.

2. In the Drives hardware view, select the PowerFlex 755 drive (1 in Figure 3 on page 4).

3. Click the information icon (2 in Figure 3) to display the drive’s Properties dialog box.

4. In the Properties dialog box, click the Component Details tab (3 in Figure 3).

5. With the PowerFlex 755 drive selected, click Flash Update.

6. From the list of available devices, select the PowerFlex 755 drive and click Next >.

**IMPORTANT** Flash updating the device firmware may cause the device to load defaults. It is recommended that you save the settings to your PC before proceeding.
7. From the list of available updates, select “v10.003.xxx” and click **Next >**.

![Select Flash Update - PowerFlex 755](image)

8. Follow the remaining screen prompts until the flash update procedure completes and displays the new firmware revision.

**Using ControlFLASH to Flash Update**

1. With the Flash Kit installed (see **Installing the Flash Kit on page 5**), launch ControlFLASH by selecting **Start > (All) Programs > Flash Programming Tools > ControlFLASH**.

2. On the ControlFLASH Welcome screen, click **Next >**.

![Welcome to ControlFLASH](image)

3. The Catalog Number dialog box appears. From the list, choose the communication device you will use to update the PowerFlex 755 drive. In the figure below, the embedded EtherNet device is selected.
Once the appropriate communication device is selected, click **Next >**.

4. Now that the correct communication device has been selected, you must select which device is being updated. With the Select the PowerFlex... dialog box displayed, follow these steps.
   a. Expand the hardware view for the communication path you are using (in **Figure 5**).
   b. Select the drive icon that represents the PowerFlex 755 drive you are updating (in **Figure 5**).
   c. Click **OK** (in **Figure 5**).
Figure 5 - Selecting the Correct Drive to Flash

5. In the Multiple Assemblies Found display box, select “Port x-PowerFlex 755” from the list and click OK.
6. In the Firmware Revision dialog box, select “v10.003...” from the list of available updates and click Next >.

![Firmware Revision Dialog Box](image)

7. Follow the remaining prompts until the flash procedure completes and displays the new firmware revision.

**Using HyperTerminal to Flash Update**

**IMPORTANT** The HyperTerminal process takes at least one hour to complete.

1. With the Flash Kit installed (see Installing the Flash Kit on page 5), access and launch HyperTerminal as shown below.

![HyperTerminal](image)
2. A New Connection dialog box appears.
   a. Enter the connection device name in the Name field or select an icon from the library.
   b. Click **OK** once you have finished.

3. A Connect To dialog box appears,
   a. Use the “Connect using:” drop-down menu to select the appropriate connection device.
   b. Click **OK** once you have finished.
4. A Properties dialog box will appear for the selected connection device.
   a. Use any of the drop-down menus to change the various port settings.
   b. Click OK once you have finished.

5. After you click OK, you will get a blank screen.

   Press Enter on your computer keyboard so the following test screen appears.

6. From the Main Menu, select the flash upgrade (1 in Figure 6) by pressing the number 3 key on your computer keyboard.

7. Additional text appears. From the Flash Upgrade menu, select the PowerFlex 775 drive (2 in Figure 6) by pressing the number 0 key on your computer keyboard.

8. Additional text appears. After reading the conditions, select Yes (3 in Figure 6) to proceed by pressing the letter Y key on your computer keyboard.
The terminal program will start displaying the letter "C". This signals the XMODEM protocol that the download may proceed.

**IMPORTANT**  You have one minute to complete steps 9…14 or HyperTerminal will return to step 5, where you must repeat steps 5…8.

**TIP**  To cancel the flash update at any time, press **CTRL-X**.

9. Select **Transfer > Send File** to display the Send File dialog box.

10. Click **Browse** and navigate to one of the following locations:
   - For PowerFlex 755 drive frames 1…7, go to 
     C: > Program Files > ControlFLASH > 0001 > 0086 > 0890
   - For PowerFlex 755 drive frames 8 and larger, go to 
     C: > Program Files > ControlFLASH > 0001 > 0086 > 0C90
11. Search within the appropriate subfolder until the “PF755_LP_App_v10_003_xxx.dpi” file appears in the Select File to Send list.

12. With the file name highlighted, click **Open** so it appears in the Filename data field in the Send File dialog box.

![Send File dialog box](image)

13. In the Protocol box, select “Xmodem.”

14. Click **Send**.

A dialog box appears and reports the update progress, which **takes about one hour for HyperTerminal to complete**. When it is complete, the message “Flash Complete” appears.

![Xmodem file send for test1](image)

15. Press any key to continue.

16. Press the **Enter** key to return to the main menu.
Enhancements

Scratch Pad and Scale Block Parameters for Options Developer Toolkit

This revision of drive firmware adds parameters to support the options developer toolkit. The additions include “User Data” integer [1700-1731], “User Data” floating point [1800-1831], and “Scale Block” integer/floating point [1900-1931].

Drive Performance Parameter Updates

With this revision of drive firmware two parameters have been updated to increase performance. First, the maximum limit of the “Notch Filter Attenuation” [688] has been increased to 1000. The previous limit was 500. Second, the maximum limit of the “Position KI Limit” [838] has been increased to 12500. The previous limit was 2500.

Corrected Anomalies

High Torque with IPM Motors

This revision of drive firmware increases the max allowable percentage of motor torque for IPM motors. The calculation for torque in previous firmware revisions did not accommodate for the derived formula used with IPM motors which have different $d$ and $q$ inductance values. This limited the max percentage of motor torque that could be applied to 150%. With this release of drive firmware, the derived calculation for IPM motors has been updated to enable IPM motors to calculate up to 250% of motor torque within the drive.

Floor Mount Drives with Safe Speed

In previous revisions of drive firmware a nuisance fault condition was experienced when using a PF755 floor mount drive (frames 8-10) with the safe speed option card (20-750-51) installed. The safe speed option card would fault with an “MP Out Fault” [F3], typically on a deceleration, which then caused the drive to fault with a “Safety Board Fault” [F211]. The drive may also experience “Inverter Comm Loss” [331] and/or “Converter Comm Loss” [341] as a result. The FPGA logic has been revised to eliminate this nuisance fault condition.

Drive NV Function for IPM Motors with CIP Motion Connection

This revision resolves an anomaly when using a CIP motion connection with a setting of Drive NV and the motor parameters are not saved when the drive is power cycled. With previous revisions of firmware, the motor data would be reset to default values after a power cycle. This revision of drive firmware retains the motor parameter data through a power cycle.
Fatal Exception 917 for Low Power Drives

A fatal 917 exception is a FPGA CRC fault. This fault occurs when the FPGA on the main control board experiences a soft error and is in place to prevent potential changes in drive performance. Previous revisions of drive firmware would require a power cycle of the drive when the fault occurs. With this revision of drive firmware, the fault behavior of the wall mount drives (frames 1-7) has changed and will no longer fault when a soft error occurs. The fault behavior for floor mount drives (frames 8-10) has remained the same as previous drive firmware revisions.

DeviceLogix Parameters not Updating

This revision of drive firmware resolves an anomaly within DeviceLogix where parameters display an incorrect value for short period of time. When this behavior occurs the parameter value will show correctly, then switch to an incorrect value, then back to the correct value.

Module Keying within Studio5000 for Embedded EtherNet/IP Port

This revision of firmware provides an update to electronic keying within the Studio5000 programming environment. For a “Compatible Module” the major/minor firmware revision combination shall be greater than or equal to the selected version in Logix system. This will allow a replacement drive with a greater major or an equal major revision with a greater than or equal minor revision to be compatible.

Drive Behavior when a Reverse Commanded is given at Zero Speed

This revision of drive firmware resolves an anomaly when a reverse command is given and the drive is at zero speed. In previous firmware revisions, when the drive is given a run reverse command and a zero speed command the drive would run forward at the minimum speed. The drive will now use the sign bit of the speed command to determine the minimum value it shall use.

Incorrect Frame Rating Value for High Power Drives

The frame rating table for floor mount drives has been updated to accurately display the power ratings for the 600/690V offering. The current ratings and overload ratings displayed in previous revisions are correct and remain the same with this release.

Interpolator Rollover in CIP Motion Mode

This revision of drive firmware resolves an anomaly in CIP motion mode when motor velocity is unstable and there is correlating instability with the torque and position error. This instability was identified to be in correspondence with the rollover of the interpolator. The logic has been corrected to verify the operation of the interpolator function and eliminate the instability.
Inertia Compensation with Current Limit Stop

This revision of drive firmware resolves an anomaly when using inertia compensation, a current limit stop, and the drive is in an I/O connection or a CIP motion connection. In previous revisions of drive firmware, when “Inertia Compensation LPFBW” [698] is set to 0 the inertia compensation would become unstable on a current limit stop and may not always ramp to 0. This revision of drive firmware corrects this behavior to ensure the current limit stop ramps to 0 under the condition previously described.

Flying Start Causing Absolute Overspeed

This revision of drive firmware resolves an issue with the flying start feature of the drive. When the drive had a reverse speed limit set to 0 and a flying start was performed at 0 speed, the drive would trip on an “Overspeed Limit” [F25] when it began to sweep in the reverse direction in previous revisions of firmware. This behavior has been corrected with this drive firmware release to no longer fault.

PTC Status on 22-Series I/O Cards

This revision of drive firmware resolves an issue with the 22-Series I/O option cards more specifically the PTC function. The “PTC Status” [P41] has three different status configurations that are dependent on the PTC voltage threshold. The behavior of the PTC status has been updated to properly align with the engineering thresholds.

Automatic and Manual Speed Reference During Comm Loss

This revision of drive firmware corrects an anomaly when a “Comm Loss” fault occurs and a communication card is in port 6 of the drive and in manual mode. Previously, when the fault occurred and the communication card switched the command to an automatic mode, but the reference would remain in manual mode with port 6. With this revision of drive firmware the logic has been corrected to allow the control of the reference to switch to automatic mode when a “Comm Loss” fault occurs.
Start Command with Manual Speed Reference and Configured Digital Input

This revision of drive firmware corrects an anomaly when a drive has a communication card in port 6 and configured in manual mode and a start command is given with a digital input configured for run level. This revision of drive firmware has corrected the drive logic to allow the communicated command word to start drive in manual mode when there is a discrete digital input configured for run level.

High Speed Trending Configuration on Power Cycle

This revision of drive firmware resolves an issue with the Drive Executive High Speed Trend Wizard when used with floor mount drives. Upon a power cycle the trend configuration would be reset back to its default state and lose modifications to the configuration. The logic has been updated so the configuration will be retained through a power cycle.

Offline Minimum and Maximum Values for Frame 10 Drives

This revision of drive firmware updates offline minimum and maximum values for a frame 10 drive. The updated parameters include “Motor NP Amps” [24], “Shear Pin 1 Level” [436], and “Shear Pin 2 Level” [439]. These values have been updated so they can be configured offline.

Offline Maximum Value for Frame 9 Drives

This revision of drive firmware updates an offline maximum value for a frame 9 drive. The “Inverter2 Alarm Status” [207] parameter has been updated so the value can be configured offline.

Datalink Connections in Floor Mount Drives

This revision of drive firmware resolves an anomaly when datalinking to floor mount drives. The logic has been updated to allow for datalinking to port 10 and 11 of the drive.
Known Anomalies

This section describes the known anomalies that are present in this revision.

Feedback Selection
The HIM startup on the PowerFlex 755 drive includes a feedback device selection step. Depending on the option modules installed, that step may first ask the user to choose a port, then a parameter. In some situations, the list of ports incorrectly shows multiple copies of “Port 0 - PowerFlex 755” followed by the feedback port/module.

The incorrect behavior happens only under the following conditions:
- It is the first time that startup feedback selection has been run since flashing the drive.
- The feedback module is a dual encoder or UFB and no other option modules are installed.
- A reset to defaults of the drive NVS parameters has not been performed since the drive was last flashed.

When the incorrect port list appears, it is still possible to successfully select the feedback module port by following one of these methods.
- Scroll past the multiple copies of Port 0 to reach the desired feedback module.
- Press the Esc soft key to back up one screen, then select “Feedback” and press the Enter soft key to display the port selection screen a second time. This time the correct list will be shown.

Persistent Stop Command with Profile Message Fault Action
In an application with the use of a PowerFlex 755 along with the 20-750-ENETR dual port Ethernet/IP module, a persistent stop command may appear in some cases. The action of disconnecting the Ethernet cable from the 20-750-ENETR module, which will result in the drive stopping, may follow with a nuisance fault action. This fault action previously noted is persistent communication of stop commands.

Saving Parameters using DriveExplorer
In an application with the use of a PowerFlex 755 along with the 20-750-ENETR dual port Ethernet/IP module, in which a user attempts to save all parameters using Drive Explorer in some causes the save execution does not complete. When attempting to execute the save all parameters in Drive Explorer the software tool enters an infinite loop and does not progress through the save in some instances. To exit the loop, press the cancel button and check if the text file has been saved.
Restrictions and Compatible Revisions

The following restrictions apply to this revision of firmware.

Max Output Frequency Limited to 590Hz

This revision of drive firmware places a limit on the maximum output frequency of the drive. In previous versions of drive firmware the maximum operating frequency of the drive was 650Hz. The new maximum output frequency limit is 590Hz. If a previous application allows for a maximum output frequency greater than 590Hz, the drive will ramp to the command frequency set point and once it reaches a value greater than 590Hz for a period of time greater than 16ms the drive will trip on a Fault 31, “Over-Freq”.

Implementation of Secure Flash

With this revision of drive firmware, an encryption layer with digital signature has been attached to the drive firmware flash file. This encryption layer will not allow the flashing of firmware files that have not been digitally signed by Rockwell Automation. When flashing from a revision of firmware that is not digitally signed, users will first need to flash up to V11.001 to enable the secure flash feature to read the digital signature. Once at V11.001, a customer can flash to any desired firmware revision level that has a secure digital signature. Previous versions of drive firmware that don't have a secure digital signature embedded in the flash file will display the error shown below when a flash is attempted.

Series A Frame 8 Drives Can Not Use Revision 10 Firmware

Revision 10.xxx is not compatible with Series A frame 8...10 drives. Revision 10.xxx is compatible with Series A frame 1...7 drives and Series B frame 8...10 drives.
Embedded EtherNet/IP Port and 20-750-ENETR Require Quality of Service (QoS)

With this firmware revision, the drive’s embedded EtherNet/IP port and 20-750-ENETR require the EtherNet/IP scanner to use a compatible method of specifying Quality of Service (QoS). The following table details the compatible products and firmware revisions.

<table>
<thead>
<tr>
<th>Product</th>
<th>Compatible Rev. No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>DriveLogix 5730 Embedded Ethernet Port</td>
<td>Rev. 3.1.4</td>
</tr>
<tr>
<td>CompactLogix (1769-L2x/L3x)</td>
<td>Rev. 17.03</td>
</tr>
<tr>
<td>ControlLogix (1756-ENBT)</td>
<td>Rev. 4.005</td>
</tr>
<tr>
<td>CompactLogix (1768-ENBT)</td>
<td>Rev. 2.001</td>
</tr>
<tr>
<td>FlexLogix (1788-ENBT)</td>
<td>Rev. 2.004</td>
</tr>
<tr>
<td>ControlLogix 1756-EN2T (F)(XT)</td>
<td>No Update needed</td>
</tr>
<tr>
<td>SoftLogix I/O Messaging</td>
<td>No Update needed</td>
</tr>
</tbody>
</table>

Rockwell Automation Support

To assist you, Rockwell Automation provides technical information on the web. At http://www.rockwellautomation.com/support, you can find technical manuals, a knowledge base of Frequently Asked Questions (FAQs), technical and application notes, sample code and links to software service packs, and a MySupport feature you can customize to make the best use of these tools.

Rockwell Automation also provides complimentary phone support for drives, option modules, and peripherals. If you experience a problem with an option module, please review its documentation. For further help, contact a Customer Support representative:

<table>
<thead>
<tr>
<th>United States</th>
<th>(1) 262.512.8176 Monday – Friday, 7am – 6pm CST</th>
</tr>
</thead>
<tbody>
<tr>
<td>Outside United States</td>
<td>Please contact your local Rockwell Automation representative for any technical support issues.</td>
</tr>
</tbody>
</table>

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://www.rockwellautomation.com/support.