

PowerFlex 700S Drives with Phase II Control (5.002)














These release notes correspond to major revision (5), minor revision (2) of firmware for PowerFlex[®] 700S drives with Phase II control.

Topic	Page
Determining the Firmware Revision	Below
Firmware Flashing	4
Enhancements	8
Corrected Anomalies	9
Known Anomalies	10
Restrictions	11

Determining the Firmware Revision

This section describes procedures to determine the firmware revision of your PowerFlex 700S Phase II drive.

Using the LCD HIM

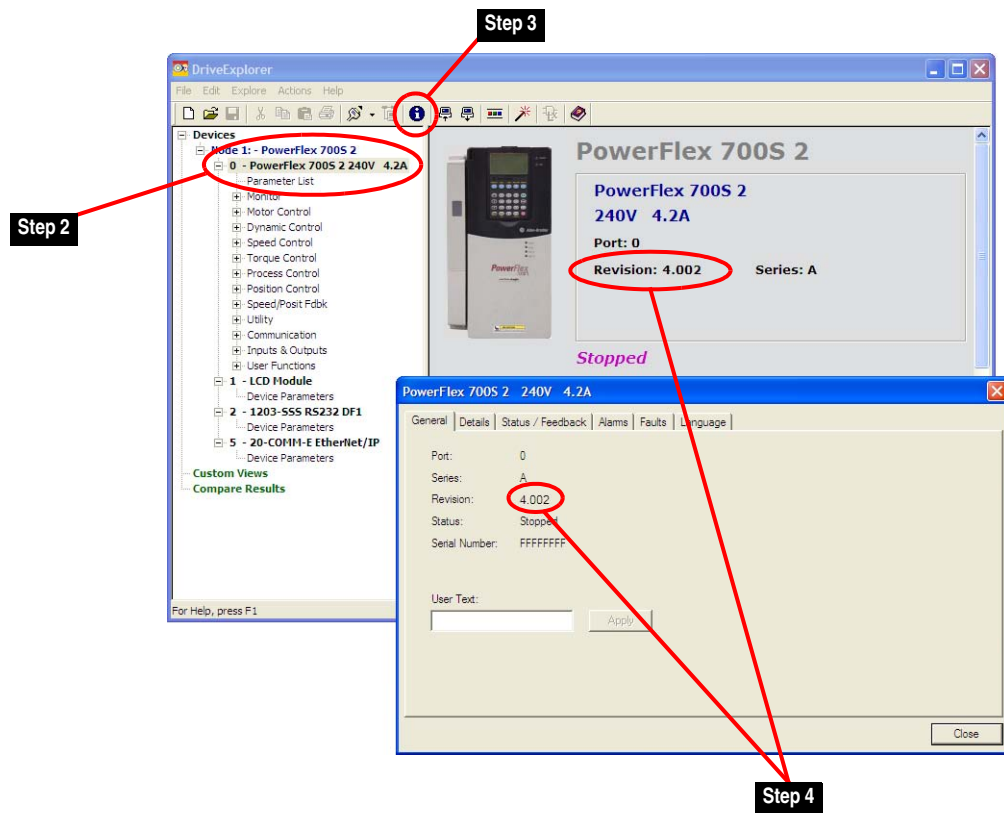
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7. Press the Up Arrow or Down Arrow to scroll to Device Version .	 or 																			
8. Press Enter to display the Product Data screen.		<table border="1"> <tr> <td>F-></td> <td>Stopped</td> <td>Auto</td> </tr> <tr> <td colspan="3">Diag: Product Ver</td> </tr> <tr> <td colspan="3">FW Ver: 4.002</td> </tr> <tr> <td colspan="3">Series: A</td> </tr> <tr> <td colspan="3">Date: 01/02/2009</td> </tr> </table>	F->	Stopped	Auto	Diag: Product Ver			FW Ver: 4.002			Series: A			Date: 01/02/2009					
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9. Press Enter again to display the drive's firmware version (as shown in the example to the right).																				

Using DriveExplorer Lite/Full

1. Launch DriveExplorer and go online (via EtherNet/IP using DriveExplorer Full only, or a 1203-USB or 1203-SSS converter) with the drive.
2. In the DriveExplorer treeview, click on the PowerFlex 700S 2 drive as shown in [Figure 1 - Example DriveExplorer Window](#).
3. Click the information icon to display the drive's Properties screen.
4. The "Revision:" field shows the present revision (for example, 4.002) of the drive firmware.

TIP When clicking on the drive using version 5.01 or higher DriveExplorer Lite/Full, the adapter firmware revision is also shown in the right pane of the DriveExplorer window.

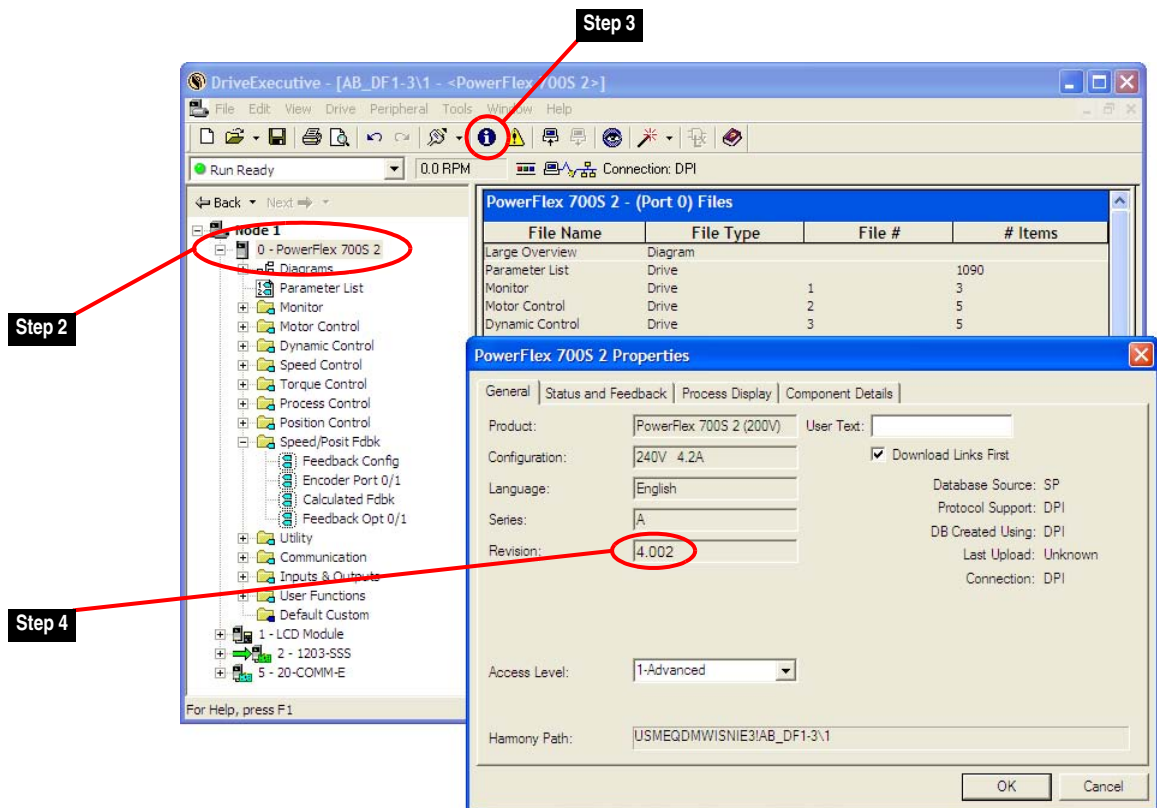
Figure 1 - Example DriveExplorer Window



Using DriveExecutive

1. Launch DriveExecutive and go online (via EtherNet/IP, or a 1203-USB or 1203-SSS converter) with the drive.
2. In the DriveExecutive treeview, click on the PowerFlex 700S 2 drive as shown in [Figure 2 - Example DriveExecutive Window](#).
3. Click the information icon to display the drive's Properties screen.
4. The "Revision:" field shows the present revision (for example, 4.002) of the drive firmware.

Figure 2 - Example DriveExecutive Window



Firmware Flashing

This section describes procedures to flash upgrade your drive firmware. Flash kits for drives and communications adapters are provided on the Allen-Bradley Web Updates site located at <http://www.ab.com/support/abdrives/webupdate>. Flashing can be performed using a drive software tool over EtherNet/IP, or a 1203-USB or 1203-SSS converter. For information about how to connect to your drive, please refer to the 1203-USB or 1203-SSS User Manual. They can be viewed/downloaded on the Literature Library web site located at www.literature.rockwellautomation.com.



ATTENTION: Risk of permanent equipment damage exists. Once a flash update has been started, do not remove power from the drive (or the 20-XCOMM-DC-BASE External Comms Kit, if used) until after the download has completed and the adapter MOD status indicator starts FLASHING GREEN. If power is removed before this occurs, the adapter may be permanently damaged. An adapter that has been damaged in this way cannot be repaired.

Installing the Flash Kit

1. Install the flash kit utility from the Allen-Bradley Web Updates site for the PowerFlex 700S 2 drive. (This also automatically installs the latest version of the ControlFLASH utility and deploys the firmware files on your computer for flashing the drive using software tools, such as DriveExplorer, DriveExecutive, or HyperTerminal.
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

1. With the Flash Kit installed (see [Installing the Flash Kit](#) above), launch DriveExplorer and go online (via EtherNet/IP using DriveExplorer Full only, or a 1203-USB or 1203-SSS converter) with the drive.
2. In the DriveExplorer treeview, click on the PowerFlex 700S 2 drive. Then click the information icon as shown in [Figure 1 - on page 2](#) to display the drive's Properties screen.
3. On the PowerFlex 700S 2 Properties screen, click the Details tab.

Important: This update may cause the drive parameters to revert to their default values. You may want to save your configuration using DriveExplorer or the HIM CopyCat feature before upgrading.

4. To start the flash update, click the **Flash Update...** button. Then select “5.002” from the list of available updates and click **Next >**. Follow the remaining screen prompts until the flash update procedure completes and displays the new firmware revision (v5.002).

Using DriveExecutive

1. With the Flash Kit installed (see [Installing the Flash Kit on page 4](#)), launch DriveExecutive and go online (via EtherNet/IP, or a 1203-USB or 1203-SSS converter) with the drive.
2. In the DriveExecutive treeview, click on the PowerFlex 700S 2 drive. Then click the information icon as shown in [Figure 2 - on page 3](#) to display the drive’s Properties screen.
3. On the PowerFlex 700S 2 Properties screen, click the Component Details tab.

Important: This update may cause the drive parameters to revert to their default values. You may want to save your configuration using DriveExecutive or the HIM CopyCat feature before upgrading.

4. To start the flash update, click the **Flash Update** button. Then select the PowerFlex 700S 2 drive from the list of available devices and click **Next >**.
5. Select “5.002” from the list of available updates and click **Next >**. Follow the remaining screen prompts until the flash update procedure completes and displays the new firmware revision (v5.002).

Using ControlFLASH

1. With the Flash Kit installed (see [Installing the Flash Kit on page 4](#)), launch ControlFLASH by selecting **Start > (All) Programs > Flash Programming Tools > ControlFLASH**.
2. On the ControlFLASH Welcome screen, click **Next >**.
3. From the Catalog Number list, choose one of the following and click **Next >**.
 - Select “PowerFlex 700S 2 via DPI Comms” if flashing the drive using a 20-COMM adapter (except 20-COMM-Q), 1203-SSS, or 1203-USB converter.
 - Select “PowerFlex 700S 2 via 20-COMM-Q” if flashing the drive using a 20-COMM-Q adapter.

- Select “PowerFlex 700S 2 via NetLinx Cards” if flashing the drive using a NetLinx communications card (for example, 1788-DNB).

Important: This update may cause the drive parameters to revert to their default values. You may want to save your configuration using the HIM CopyCat feature, DriveExplorer or DriveExecutive before upgrading.

4. Expand the treeview for the communication path you are using, and select the drive icon that represents the drive you are updating. Then click **OK**.
5. With the Firmware Revision window displayed, select “5.002” from the list of available updates and click **Next >** (if revision “5.002” does not display in the window, click the “Show all revisions” check box). Follow the remaining screen prompts until the flash procedure completes and displays the new firmware revision (v5.002).

Using HyperTerminal

1. With the Flash Kit installed (see [Installing the Flash Kit on page 4](#)), launch HyperTerminal and go online (via 1203-USB or 1203-SSS converter) with the drive.
2. Press the **Enter** key until the main menu ([Figure 3 - Main Menu](#)) appears.

Figure 3 - Main Menu

```
Main Menu - Enter Number for Selection
1> Display Setup Parameters
2> Display Event Queue
3> Flash Upgrade
```

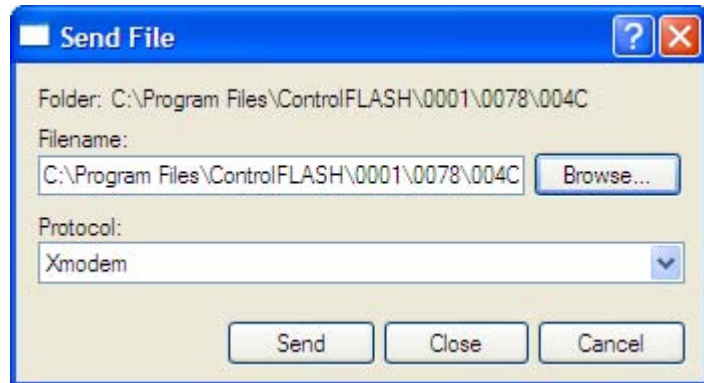
3. In the main menu, press **3** to flash upgrade. Then press the number key that corresponds to the “PowerFlex 700S 2” in the list, and press **Y** (for Yes) to update the flash code. The terminal program will start displaying the letter “C”. This signals the XMODEM protocol that the download may proceed. You then have one minute to start the transfer.



ATTENTION: Risk of injury or equipment damage exists. When you perform a flash update, the drive will fault if it is receiving control I/O from the adapter. Verify that the drive has stopped safely or is receiving control I/O from an alternate source before beginning a flash update.

4. Select **Transfer > Send File** to display the Send File screen ([Figure 4 - Send File Screen](#)).
5. Click **Browse** and navigate to the flash file located in:

C:\Program Files\ControlFLASH\0001\0078\004C

Figure 4 - Send File Screen

6. In the Select File to Send window list, click on the “700S2ap05_02.bin” file. Then click **Open**. This file name now appears in the Filename box in the Send File screen.
7. In the Protocol box, select “Xmodem.”
8. Click **Send**. A dialog box appears and reports the progress of the update. When it is complete, the message “Flash Complete” appears. Press any key to continue.

Important: Keep the device powered for 15 seconds after the operation has completed or until the adapter MOD status indicator starts flashing green.

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

9. Press the **Enter** key to return to the main menu.

Enhancements

This section describes the enhancements included in this firmware revision.

Added Sleep Wake Mode Functionality

The sleep/wake function starts and stops the drive via an analog input voltage or current signal. The drive will start when the analog input signal exceeds the programmed wake level for the duration of the programmed wake time. The drive will stop when the analog input signal falls below the programmed sleep level and remains there for the duration of the programmed sleep time.

The following parameters have been added/changed to accommodate this enhancement.

- 278 [Sleep-Wake Mode]
- 279 [Sleep-Wake Ref]
- 280 [Wake Level]
- 281 [Wake Time]
- 282 [Sleep Level]
- 283 [Sleep Time]
- 284 [Sleep Control]
- Added option 8 “Sleep Config” to parameter 159 [DigIn ConfigStat]
- Added bits 24 “Drv Waking” and 27 “RideThruAlrm” to parameter 328 [Alarm Status 3]
- Added bits 21 “Sleep Stop” and 22 “Sleep Config” to parameter 156 [Start Inhibits]
- Added option 11 “Sleep Mode” to parameter 150 [Logic State Mach]

Added Torque Ripple Compensation for Permanent Magnet Motor Control

When running the drive in speed mode, at low speed, the motor poles create a disturbance as the motor is turning. The torque ripple compensation sends an opposite signal to provide compensation.

The following parameters have been added/changed to accommodate this enhancement.

- 534 [Nth CompOff Freq]
- 535 [Mth CompOff Freq]
- 594 [Nth Torq Compen]
- 595 [Nth Amplitude]
- 596 [Nth Phase Shift]
- 597 [Mth Torq Compen]
- 598 [Mth Amplitude]
- 599 [Mth Phase Shift]
- Added bit 0 “PM Cogging” to parameter 512 [PMag Mode Config].

Modified Auto-tune Algorithm for Very Low Inertia Motors

The auto-tune algorithm has been modified in order to automatically tune the drive to a motor with very low inertia (as is the case with permanent magnet motors).

Miscellaneous Database Changes

The following database changes were made for this firmware revision.

- Added bit 2 “VltFdbkReCal” to parameter 510 [FVC Mode Config].

Corrected Anomalies

This section describes the anomalies corrected in this firmware revision.

Invalid Position Feedback for Multi-Device Interface (MDI) Option Board

CORRECTED: When using the MDI feedback board, the position feedback is invalid for six seconds after a drive clear fault.

Overflow on Start Causes IOC Fault in Frame 9 and up Drives

CORRECTED: Missing frame ratings for frame 9 and up drives caused an overflow in the current setting that caused an IOC fault on a drive start.

False Overtemperature Trips for PowerFlex 700L AC Drive Using PowerFlex 700S Phase II Control

CORRECTED: False overtemperature trips on the PowerFlex 700L drive occur when using PowerFlex 700S Phase II Control.

Feedback Spikes Ignored by Drive Cause Motor Control Firmware Malfunctions

CORRECTED: An anomaly in the feedback functionality caused the drive to ignore a spike in feedback and Motor Control firmware malfunctions causing the drive to run at slip frequency and current limit (while controlling an induction motor).

Known Anomalies

This firmware revision contains the following known anomalies.

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 and up). Note: The drive automatically saves all parameter values to EEPROM.

Parameter 554 [LED Status] Not Functioning Properly

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

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.

Overload Faults for Frames 9 and Up Drives Due to Power Limits

The Power Limits directly set the Torque Limit value for frame 9 and up drives running in the Encoder or Sensorless modes. The Power Limit also directly controls the value of Torque Limit for frames 1...6 drives in the Sensorless mode. Thus, the divide by speed term is not used to determine the Torque Limit. The drive is configured in this manner to prevent the frame 9 and up drives from tripping on F71 (HiHp Drv OvrLoad) faults. In the sensorless mode, during regeneration, the drive can also trip because the Bus Voltage Regulator interacts with the negative Power Limit. This interaction is made worse on frame 9 and up drives because of the smaller capacitor bank.

Current Limit in V/Hz Mode

The current limit in the V/Hz mode is controlled by parameter 356 [Mtr Current Lim] and 362 [Current Limit Gain], 363 [Ki Current Limit], and 364 [Kd Current Limit].

HIM Downloads Cause Incorrect Values in Some Parameters

A HIM download can cause parameters 81 [Spd Reg P Gain] and 82 [Spd Reg I Gain] to set to the wrong values. This occurs if parameter 90 [Spd Reg BW] is set to a value of zero. If [Spd Reg BW] is set to a non-zero value than parameters 81 and 82 are set correctly. This same situation occurs with parameters 30 [Min Spd Ref Lim] and 31 [Max Spd Ref Lim] and 532 [Maximum Freq]. In the case of parameter 90 the default could be set to zero. Generally, a change to the default value requires a major revision change. This will also affect customers that are expecting the default value of parameter 90 to be 10. The speed limit issue is more complex since no single value of parameter 532 will establish the proper speed limits values and could set parameters 30 and 31 too high.

Random IOC Trips

The direction bit may prevent nuisance IOC trips. If the drive is running and experiences random IOC trips, the direction bit can be set to a zero to possibly eliminate this issue.

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.

Rockwell Automation Support

Rockwell Automation provides technical information on the Web to assist you in using its products. At <http://www.rockwellautomation.com/support/>, you can find technical manuals, a knowledge base of FAQs, technical and application notes, sample code and links to software service packs, and a MySupport feature that you can customize to make the best use of these tools.

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/>.

Installation Assistance

If you experience a problem within the first 24 hours of installation, review the information that is contained in this manual. You can contact Customer Support for initial help in getting your product up and running.

United States or Canada	1.440.646.3434
Outside United States or Canada	Use the Worldwide Locator at http://www.rockwellautomation.com/support/americas/phone_en.html , or contact your local Rockwell Automation representative.

New Product Satisfaction Return

Rockwell Automation tests all of its 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, follow these procedures.

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

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