WABCO

Technical Bulletin

Replacing the E4 ABS/ESC ECU and ESC Module on Vehicles Equipped with Electronic Stability Control (ESC)

FRK 400 869 XXX 7

Hazard Alert Messages

Read and observe all warnings and caution hazard alert messages in this publication. They provide information that can help prevent serious personal injury, damage to components, or both.

How to Obtain Additional Maintenance, Service and Product Information

If you have any questions regarding the material covered in this bulletin, or for information about the WABCO product line, please contact WABCO North America Customer Care at 855-228-3203 or visit our website wnacustomercare@wabco-auto.com.

Replacing the E4 ABS/ESC ECU and ESC Module Using Field Repair Kit (FRK) 400 869 XXX 7

This publication provides instructions for replacing the E4 ABS/ESC ECU and ESC module using FRK 400 869 XXX 7. Calibration instructions are also provided to complete the installation. The old ECU and ESC module must be returned to WABCO after removal.

NOTE: This replacement process consists of several different procedures. Procedures must be performed in the exact order presented in this publication. Please review all of the following instructions carefully first before proceeding.

Field Repair Kit

The E8 ECU/ESC module field repair kit, part number 400 869 XXX 7, consists of the following parts.

- E8 ABS/ESC ECU, part number 400 867 XXX 0 (depends on vehicle specifications)
- ESC5 Module Kit, part number 400 850 299 0
- Technical Bulletin TP-1739, FRK 400 869 XXX 7 Installation Instructions
- Follow the steps shown in the instructions document and use the return labels included in the kit when returning parts.
- Return labels

Procedures

Remove the ABS/ESC ECU

⚠ WARNING

To prevent serious eye injury, always wear safe eye protection when you perform vehicle maintenance or service.

Park the vehicle on a level surface. Block the wheels to prevent the vehicle from moving. Support the vehicle with safety stands. Do not work under a vehicle supported only by jacks. Jacks can slip or fall over. Serious personal injury and damage to components can result.

1. Wear safe eye protection. Park the vehicle on a level surface with the steering wheel centered and the front wheels positioned straight ahead.
2. Turn the ignition switch to the OFF position. Apply the parking brake.
3. Block the front and rear wheels to prevent the vehicle from moving.
4. If necessary, raise the vehicle off the ground and support it with safety stands.
5. Disconnect the wiring harness connectors from the ECU.
6. Remove the mounting hardware. Remove the ECU. Set aside the ECU for return to WABCO. Figure 1.

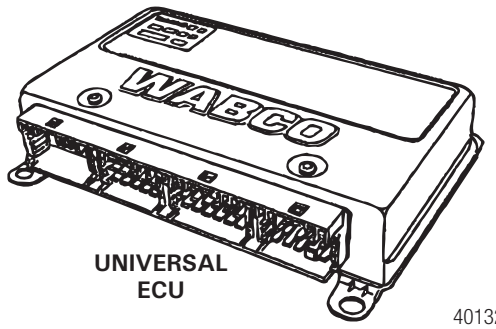

Figure 1

Install the New ABS/ESC ECU

1. Place the new ECU in mounting position and secure it with the manufacturer's mounting hardware. Tighten to the recommended torque specification per the manufacturer's instructions.
2. Install the wiring harness connectors to the ECU.

Remove the ESC Module

NOTE: This procedure requires a wrench or a ratchet appropriate for the type of capscrews used to attach the ESC module (ESC3) to the frame cross member.

⚠ WARNING

Ensure the vehicle is parked on a level surface with the steering wheel centered and the front wheels positioned straight ahead. The ignition switch must be turned to the OFF position and the parking brakes applied.

1. Disconnect the wiring harness connector from the ESC module.
2. Remove the two mounting capscrews and nuts. Remove the ESC3 module, part number 400 850 199 0. Retain the hardware for reuse. Set aside the ESC module for return to WABCO. Figure 2.

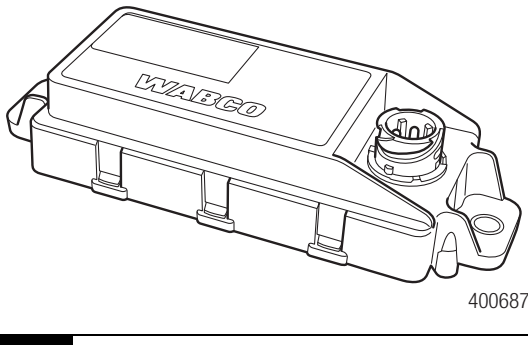

Figure 2

Install the New ESC Module

NOTE: It is important that the module is aligned correctly by making sure the tab on the ESC module mounting surface fits into the appropriate hole.

1. Place the new ESC module, part number 400 850 299 0, in mounting position and secure it with the two capscrews and nuts. Tighten the nuts per the manufacturer's recommended torque specification. Figure 3.

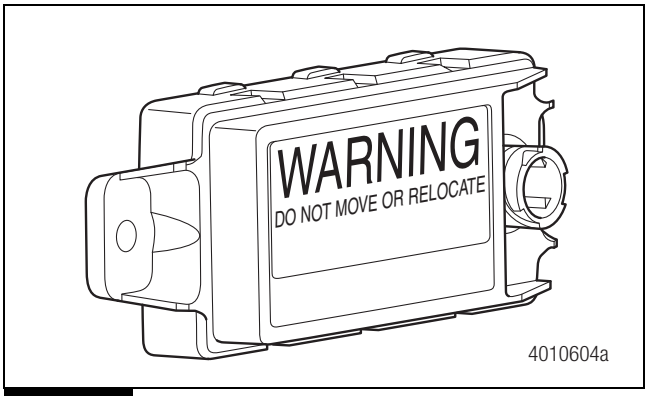

Figure 3

2. Connect the wiring harness connector to the ESC module. Hand-tighten only.
3. If necessary, remove the stands and lower the vehicle.
4. Remove the blocks from the wheels.

E8 ECU End-Of-Line Calibration Procedure

The process consists of two operations. The first one is the SAS Calibration while the vehicle is stationary, followed by the ESC Initialization while driving the vehicle. The status of the ESC End of Line (EOL) procedure can be verified using one of the following allowed faults:

- SAS not calibrated — SPN 1807, FMI 08
- ESC initialization required — SPN 520210 FMI 14

⚠ CAUTION

Additional faults must not be active. Any other active faults must be resolved before one of the main menu items is available.

NOTE: To prevent false activations of the system, SAS Calibration and ESC Initialization must be done separately. It is necessary to perform the SAS calibration prior to the ESC initialization. For any questions or assistance, please contact WABCO North America Customer Care at 855-228-3203 or visit wnacustomercare@wabco-auto.com for further details.

SAS Calibration

NOTE: The SAS Calibration must be done after a front wheel alignment has been performed.

The E8 software version requires TOOLBOX™ Software version 12 or higher to communicate with the vehicle. Pneumatic ABS J1939 must be used to complete the end of line procedure.

In the Main Menu, select Pneumatic ABS (J1939), the ABS Main Screen will appear. Figure 4 and Figure 5.

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Figure 4

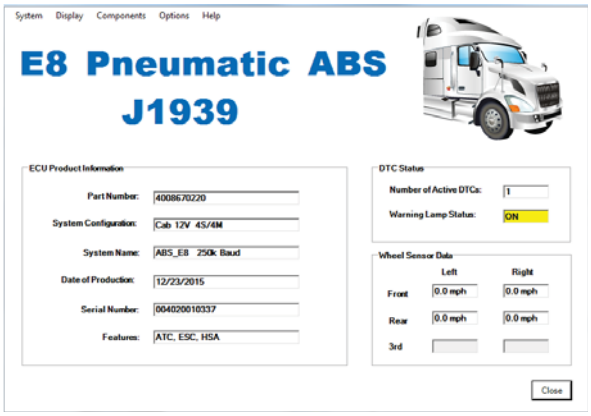

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Figure 5

To access the ESC EOL:

- From the bar menu at the initial screen, click on the "Components" button. A drop-down menu will appear. Select the option "ESC." Figure 6.

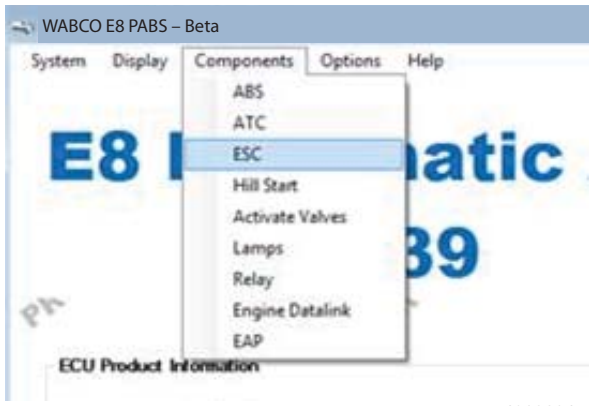

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Figure 6

On the screen that appears, click the "ESC EOL" button. Figure 7.

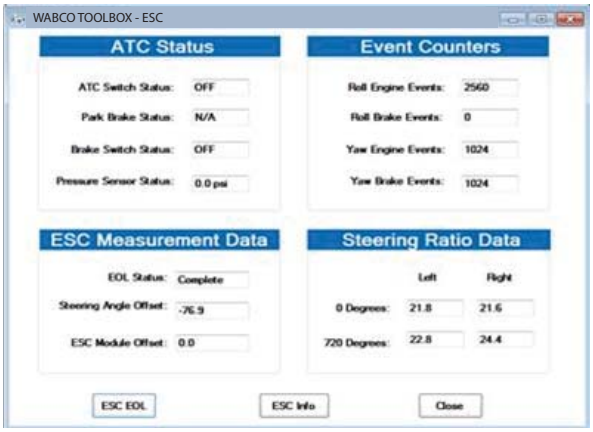

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Figure 7

NOTE: If SAS has NOT been replaced but vehicle has had an alignment performed or other steering components have been replaced, it is necessary to recalibrate SAS regardless of current calibration.

NOTE: The vehicle needs to be sitting still during SAS calibration with the parking brake ON.

To complete the SAS Calibration, position the steer axle tires straight ahead and click "SAS Calibration". Upon successful calibration, the status box will display "SAS Calibration message sent successfully". Figure 8.

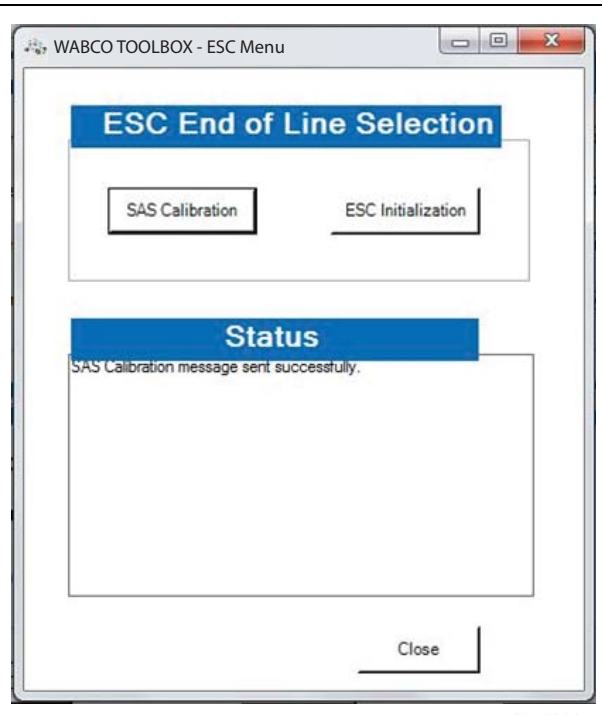

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Figure 8

The SAS calibration is now completed. Click the “Close” button to close the screen.

If SAS calibration fails, recheck the SAS connection and verify SAS mounting. Cycle the ignition and retry SAS calibration again.

ESC Initialization

Access the ESC EOL menu as done for the SAS calibration, but instead in the message box that appears, click the “ESC Initialization” button. Check the message box that appears. The ATC lamp will start blinking to inform driver ECU is in learning mode. Figure 9.

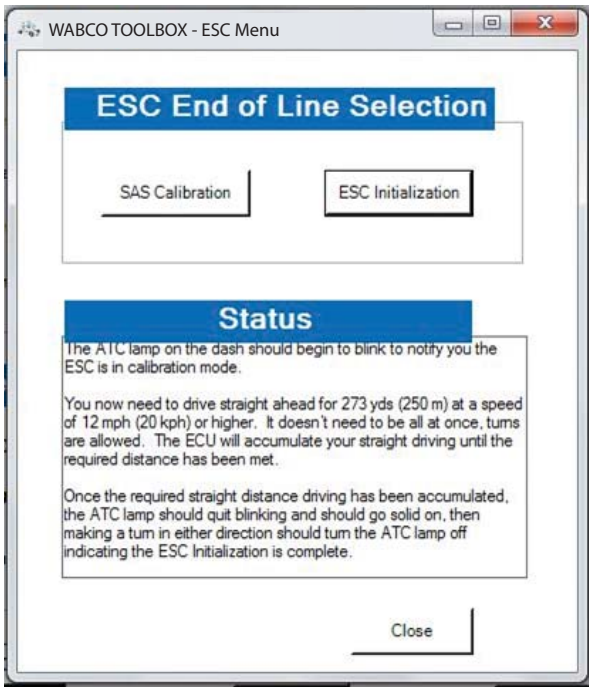

Figure 9

Tip: Carefully follow the instructions that appear in the message box. Once the ESC initialization is started, the messages will automatically change as the requirements are met. DO NOT click the “continue” button again as this may cause the process to fail. The ESC Initialization procedure requires the vehicle to be driven.

The straight driving adjustment can be done in segments as the ECU will accumulate the information until the 273 yards is reached. Cornering and stopping is allowed as long as calibration is done within the same ignition cycle.

When the Straight Driving Adjustment is completed after ECU accumulated 273 yards of straight driving, the ATC lamp will stop blinking and will remain ON.

Once the straight driving portion of the calibration is completed, make a left or right turn to complete the initialization procedure. At this point the ATC lamp will turn off indicating the ESC initialization was successful.

For the ECU to be able to save ratios and ESC EOL data, the ignition MUST be cycled. With the vehicle stopped, close window that appeared and cycle the ignition for around 10 seconds.

NOTE: Power down cycle time and sequence will vary among vehicle manufacturers. Some vehicles might require the key to be removed from the ignition for ignition power to be completely turned off. Please follow the vehicle manufacturer’s procedure to make sure ignition is turned off.

When the ignition is turned back ON, check that no active or stored faults are logged in the ECU and that the ABS and ATC/ESC warning lamps are OFF.

To check ESC system status, open the ESC menu and click the “ESC Info” button. Figure 10.

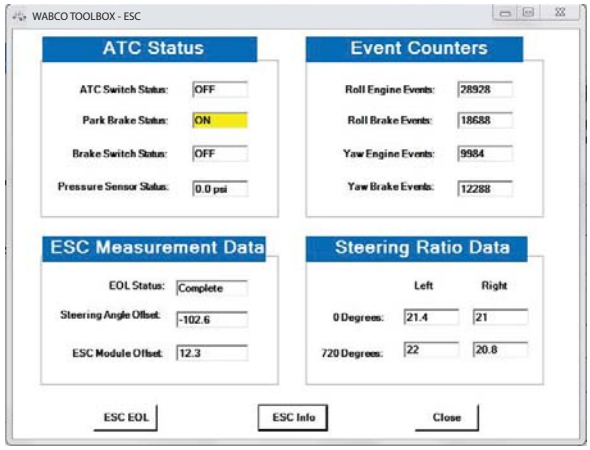

Figure 10

The ESC Information screen will display the ESC straight driving, Steering Ratio Learning, and ESC End of Line Status as “Complete”. Figure 11.

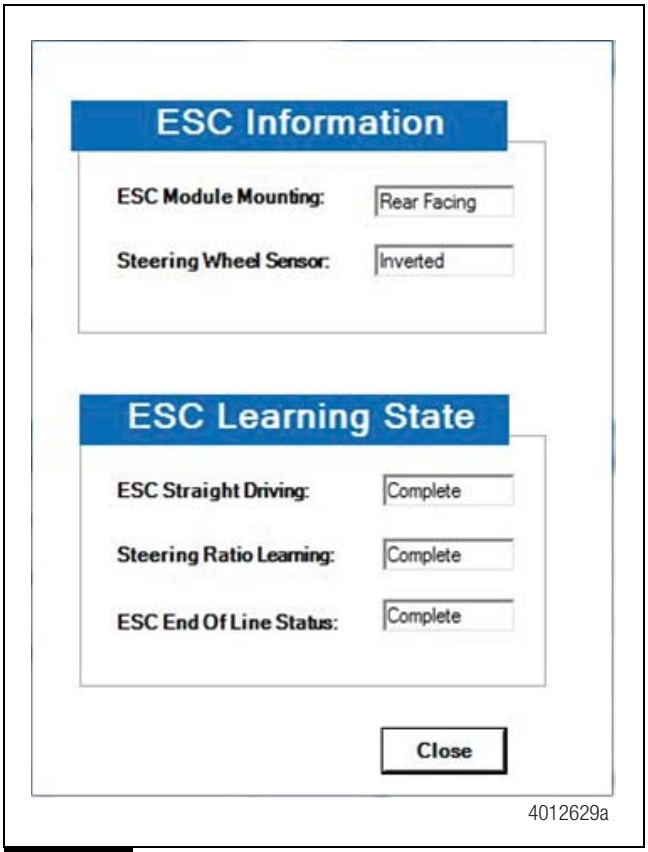

Figure 11

The ESC EOL Initialization procedure is completed. Click the "Close" button to close the screen.

NOTE: If ESC EOL initialization was not properly completed and/or ratios correctly saved, code SPN 520210 88 FMI 14 will be active. Follow the ESC initialization again and make sure each portion is successfully completed. Make sure ignition power down is completed for the ECU to successfully save data.

Do not attempt to operate vehicle under normal conditions (outside these limited install parameters) until all steps have been successfully completed.

Return Removed Parts

The old ECU and ESC module must be returned to WABCO after removal.

Follow the instructions shown in the PDF document and labels included in the kit when returning parts.

Additional Information

Hill Start Aid Wiring

In some vehicles, it might be necessary to modify the wiring harness that is installed in the vehicle for the Hill Start Aid warning lamp. Please do the following if you encounter DTC "AUX1 Out of Calibration – SPN 701 FMI 13" after updating the vehicle from E4 to E8:

1. Locate Pin 1 on the X3 ABS ECU connector.
2. Remove the wire from the connector.
3. Tape the end of the wire to prevent corrosion.
4. Clear the DTC.

OnGuard™ ABS E8 Compatibility Software and Parameter Update

After completing the ABS E4 to E8 ECU update, vehicles with older versions of the WABCO OnGuard™ system will require a Radar software update. Some previous versions of OnGuard™ are not compatible with the new E8 ABS ECU and will need to be updated. This OnGuard™ update applies to the following part numbers:

400 871 020 0	400 871 240 0
400 871 021 0	400 871 250 0
400 871 140 0	400 871 254 0
400 871 150 0	400 871 255 0
400 871 210 0	400 871 256 0
400 871 220 0	400 871 257 0

Procedures

This update requires installation of the OnGuard™ ABS E8 Compatibility Update Tool software. The OnGuard™ ABS E8 Compatibility Update Tool software must be downloaded from our website, wabco-na.com. After downloading the update tool, run the update.

Once complete, email the VIN and parameter files to WABCO at toolbox@wabco-na.com.

Installing the OnGuard™ Programming Tool Software onto a Laptop

An internet connection is required to obtain the OnGuard™ ABS E8 Compatibility Update Tool. The files must be downloaded from the wabco-na.com website to a laptop; once the files have been downloaded, they must be unzipped ("Extracted") to a known location, such as your "Desktop".

NOTE: It will not be necessary to download the update file from the website for each vehicle that is updated. Once you have the update tool, just click on the desktop folder and run the OnGuard™ Programming Tool for each vehicle you update.

1. Using a web browser, navigate to wabco-na.com to download the OnGuard™ ABS E8 Compatibility Update Tool.

   NOTE: Before downloading and running the OnGuard™ Update Tool, please close all unnecessary programs or windows.

2. When the WABCO home page has loaded, cursor over "Downloads", from the drop-down menu, select OnGuard™ ABS E8 Compatibility Update.

   NOTE: Depending on your computer and operating system vintage, the process may vary, but the steps below should work for most users.

3. When prompted to open or save the file, select "Save as" and save the files to your desktop (recommended), or to a known location.

4. After the OnGuard™ ABS E8 Compatibility Update.zip file is finished downloading to your desktop, double-click on the new zip file or "right" click on the file and select "Open with WinZip".

5. Click on "Extract", and then select "Desktop" as the "Extract to" location and click "Extract". A new folder will appear on your desktop labeled "OnGuard™ ABS E8 Compatibility Update".

6. Double-click the new "OnGuard™ ABS E8 Compatibility Update" folder. Figure 12. The folder will contain 5 files:
   - PAR file
   - 4460670400_1.60.1.6.1.9.4.3.1.4.hex
   - Adapter_Selection
   - J1939Diag_UDS.dll
   - OnGuard Programming Tool E8U 250K 2.0.9.0

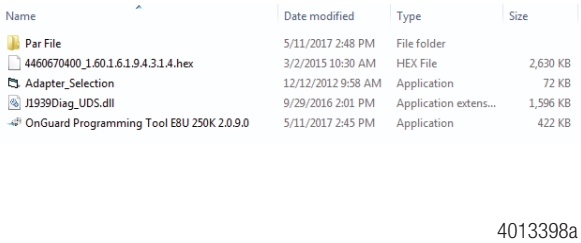

Figure 12

NOTE: The files in the folder must appear in this exact format as in Figure 12.

Running the Software and Parameter Update

NOTE: To expedite the update, it is recommended that you update the device drivers of your interface device via the manufacturer's website before proceeding. The update process should take less than 10 minutes.

1. Connect the computer to the vehicle's SAE J1939-13 Off-Board Diagnostic Connector using a diagnostic interface with the ignition key on.

2. Navigate to the "OnGuard™ ABS E8 Compatibility Update" folder containing the unzipped update files. Run the program file by double-clicking on "OnGuard Programming Tool E8U 250K 2.0.9.0 file". Figure 12.

3. A window will open when the application is launched. Select "UPDATE RADAR SOFTWARE". Figure 13.

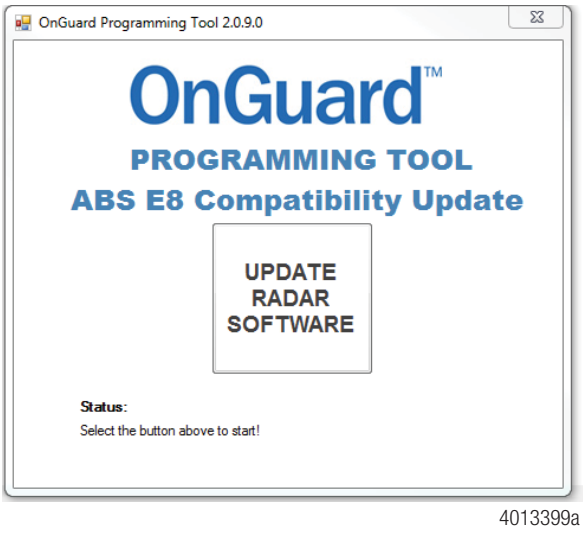

Figure 13

If the tool is unable to connect to the adapter, an error message will be displayed. Perform the following steps to connect to the adapter.

A. Click “OK” in the following window. Figure 14.

4013400a

Figure 14

B. Select “OK” in the following window. Figure 15.

4013401a

Figure 15

C. Select the correct Vendor, Protocol and Adapter being used from the list and select “OK”. Figure 16.

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Figure 16

4. The programming tool will attempt to connect as follows.

   If the software connects to the radar, but this radar already has the latest application software, the following screen will be displayed. Figure 17. No further action is needed; select “No” to exit the program. If you wish to save the parameter file, selecting “Yes” will take you through the parameter saving process, then exit.

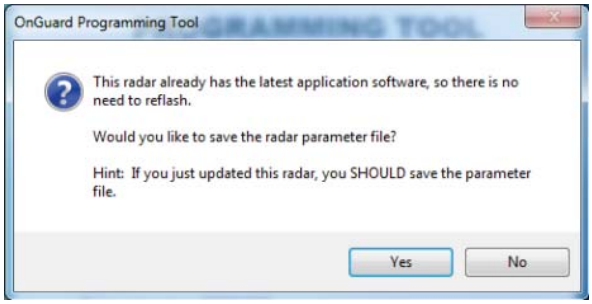

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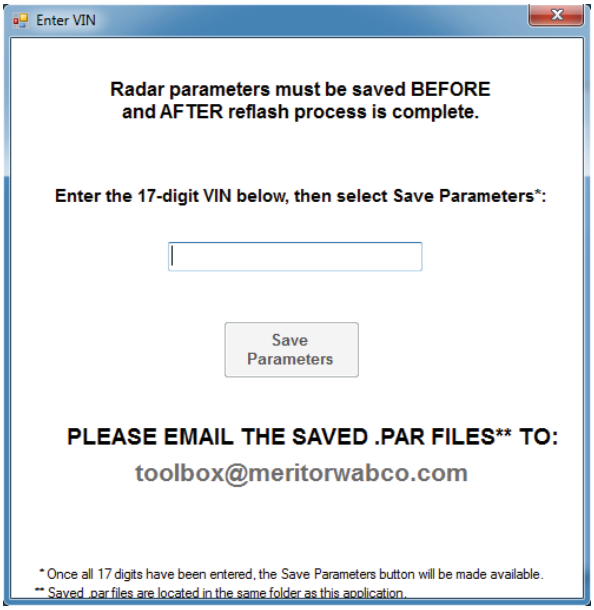
Figure 17

5. When continuing the procedure, the following screen will be displayed. Figure 18.



4013404a

Figure 18

6. Enter the 17-digit VIN in the text box and select “Save Parameters”.

   NOTE: You will not be able to select “Save Parameters” until the 17-digit VIN is entered. The progress bar in the following window shows that the parameters are being saved. Figure 19.

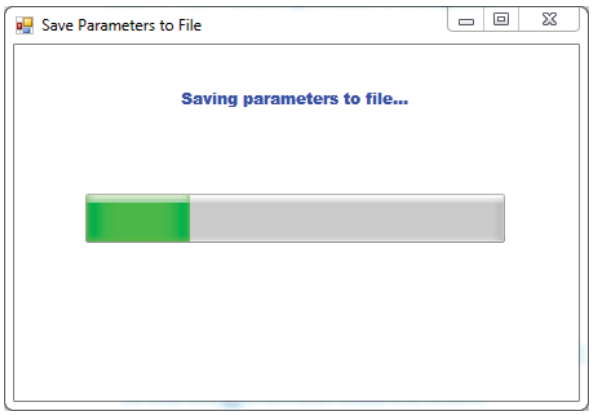


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Figure 19

7. If the radar requires this update, the following message will be displayed and programming will automatically begin. Figure 20.

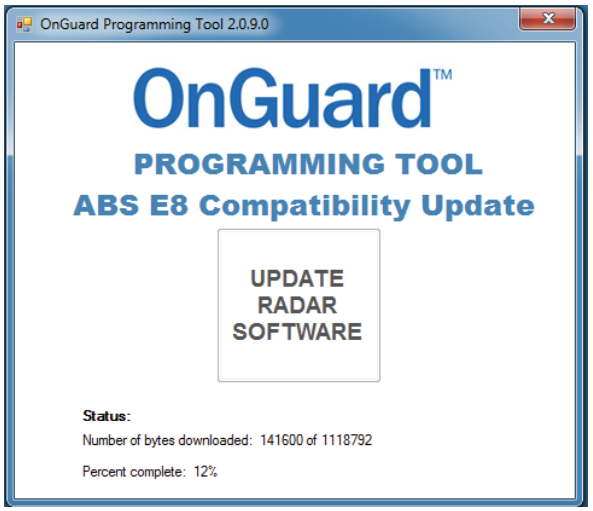

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Figure 20

NOTE: The "Status:" message will display the various files that are being updated and will also show the update progress as "Percent complete".

8. Once the process is finished, the parameters will automatically be saved. Figure 21 and the following messages will be displayed. Figure 22 and Figure 23. This indicates that the "OnGuard™ Programming Tool" successfully completed the programming and the parameters were automatically saved using the VIN that you entered earlier.

   Select "OK" (Figure 22), close the "Complete" screen (Figure 23), and power down the vehicle by cycling the ignition.

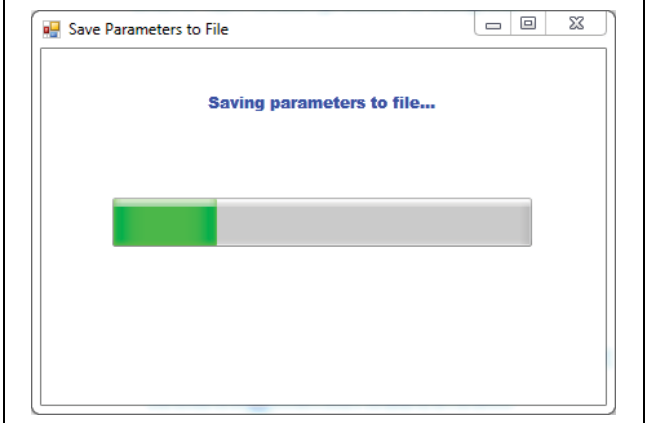

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Figure 21

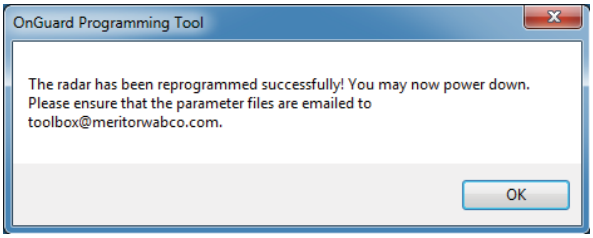

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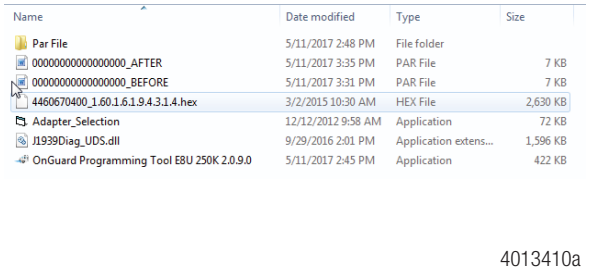
Figure 22

4013408a

Figure 23

9. After the radar has been successfully programmed, you must email the saved “Before” and “After” parameter files to toolbox@wabco-na.com. As noted in Figure 23, the parameter files will be located in the “OnGuard™ ABS E8 Compatibility Update Tool” folder, the same folder as the OnGuard Programming Tool E8U 250K 2.0.9.0 file. The .par files will have the VIN as the filename. The two .par files generated by this application will be named VIN_BEFORE.par and VIN_AFTER.par. Figure 24.



4013410a

Figure 24

Email these two parameter files to toolbox@wabco-na.com. Please enter “**OGE8U**” followed by the VIN in the subject line of the email message.

Installation Verification

You may verify that the procedure was completed correctly by checking the software level and APAR file with TOOLBOX™ Software.

With the ignition on, connect the TOOLBOX™ Software to the vehicle, click on the OnGuard™ icon to open the OnGuard™ TOOLBOX™ Software program. This will bring up the “Radar Product Information” screen. Note the “Software Version Name” and “APAR Version Name” fields. Figure 25.

If the process was completed correctly, the fields will display:

- Software Version Name: OnGuardPLUS 1.60.1.6.1.9.4.3.1.4
- APAR Version Name: OGP APAR 1.6.1.18

4013409a

Figure 25

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