

November 2018
CA-32001

Subject: Airliner Rear Suspension/Hadley Smart Valve Calibration

**Models Affected: Specific Freightliner, Cascadia, 2018 Year Model
vehicles manufactured at the Santiago manufacturing plant from
April 23, 2018 to September 14, 2018**

General Information

Our records indicate that you are the owner of certain vehicles, and DTNA has decided to share the following documentation with you.

Trucks equipped with the Hadley smart valve installation require a calibration procedure to properly set the suspension dump and raise limits. 168 trucks were shipped from the Santiago truck manufacturing plant without the calibration procedure being completed.

Refer to Daimler work instruction K09-P0016-043 that outlines the procedure to perform the Hadley smart valve calibration procedure.

DAIMLER		Smart Valve Hadley Calibration Procedure		1	of 24
Work Instruction	Module:	91C,910	Approved:	K09-P0016-043	
	Product Type:		Issued:	Revised:	
			R.Contreras	08/20/17	05/10/18 B

Procedure for Normal Suspension Level (Smart Valve Hadley)

Purpose:
To ensure proper frame height setting for the Hadley SmartValve drive axle suspension control system (ECAS).

Vehicle Preparation

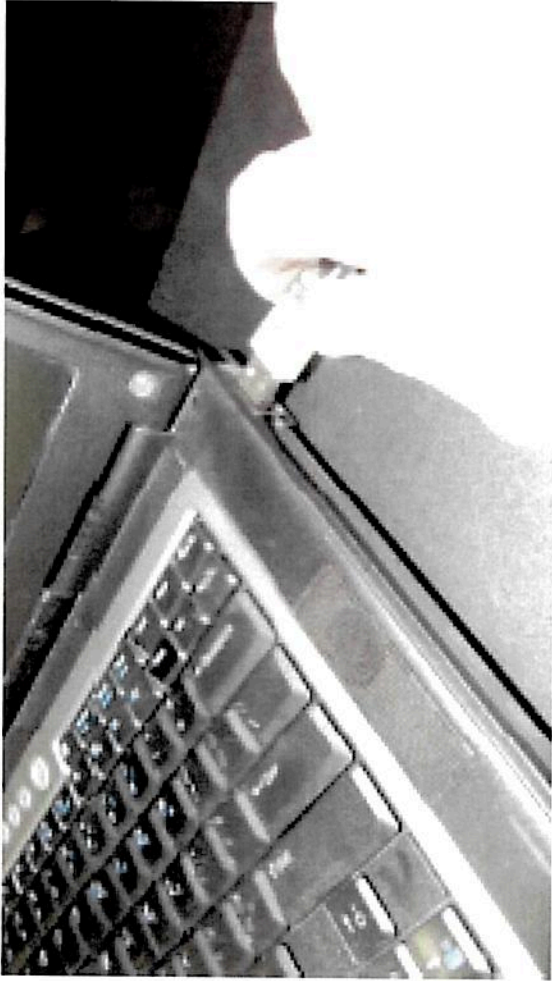
1. Position truck in bay or flat ground. Normally the truck is based (axle stop lies directly on U-Bolts; lowest ride height level).
2. Apply park brake.
3. To provide air for tests, keep the truck running. Optionally, for non-running trucks, disconnect airline from air dryer to air tank and apply shop air. Vehicle must provide >90 Psi during adjustment procedure.



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Connecting and Starting Program

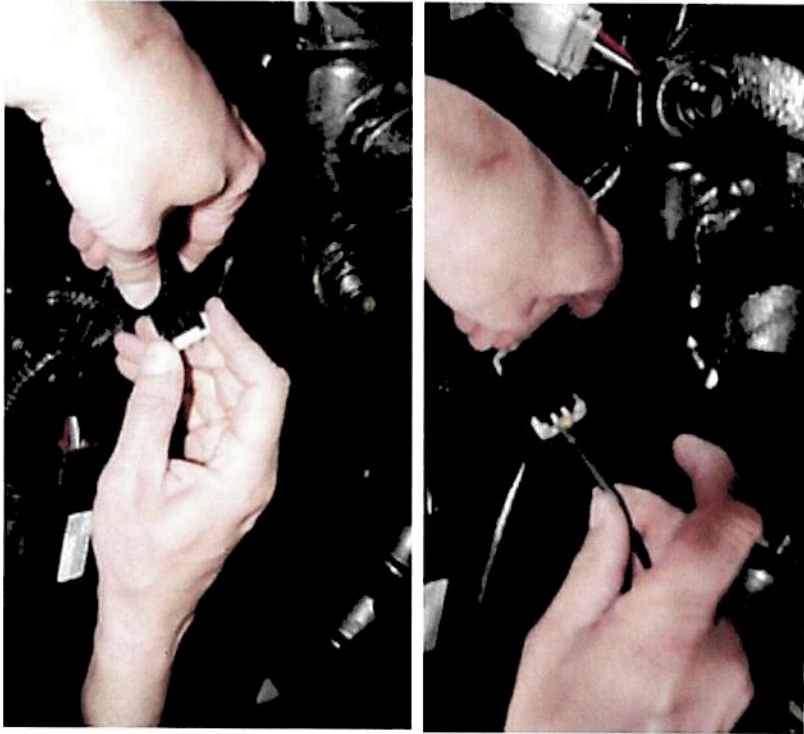
4. Connect the USB CABLE with connector from Hadley (hadley part number H18289).



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Work Instruction								

Connecting and Starting Program

- Locate the three pin connector on the Hadley harness near to the SmartValve on the frame rail. (Note: remove the environmental cap before proceeding).
- Plug the other end of the USB programming cable to the three pin connector. Note: The environmental connector must be replaced when finished with the USB cable.



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Connecting and Starting Program

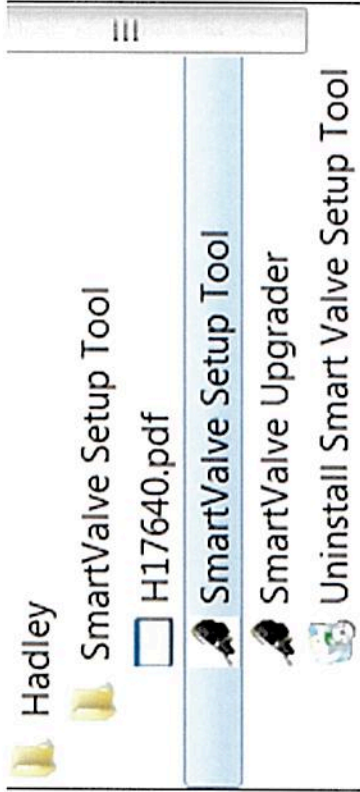
- Turn on the vehicle power: The vehicle's main battery switch and the ignition switch should be turned to the "on" position. When the ignition is turned "on", the SmartValve LED indicator located on the rear suspension Height control switch should show red for about 3 seconds and then go out.



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Software Connection

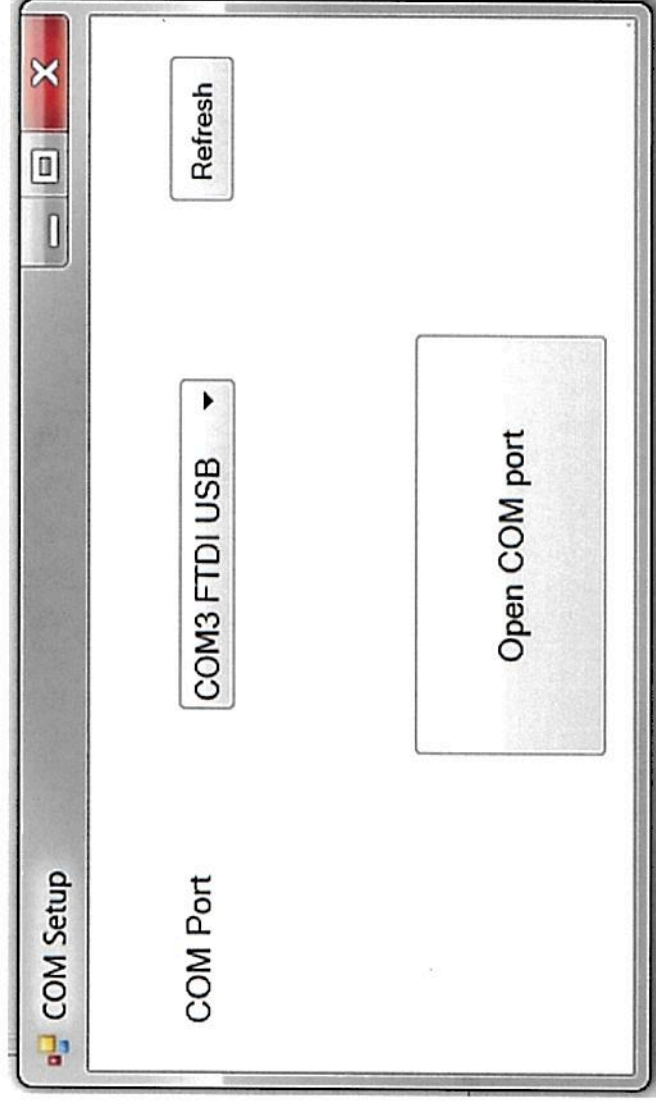
- Turn the portable computer “on”, locate the Hadley SmartValve icon on the screen desktop and start the application or find the Hadley program folder and select the “SmartValve Setup Tool” to begin the application. The SmartValve Setup Tool program is accessible in the Start menu on Windows 7.



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Software Connection

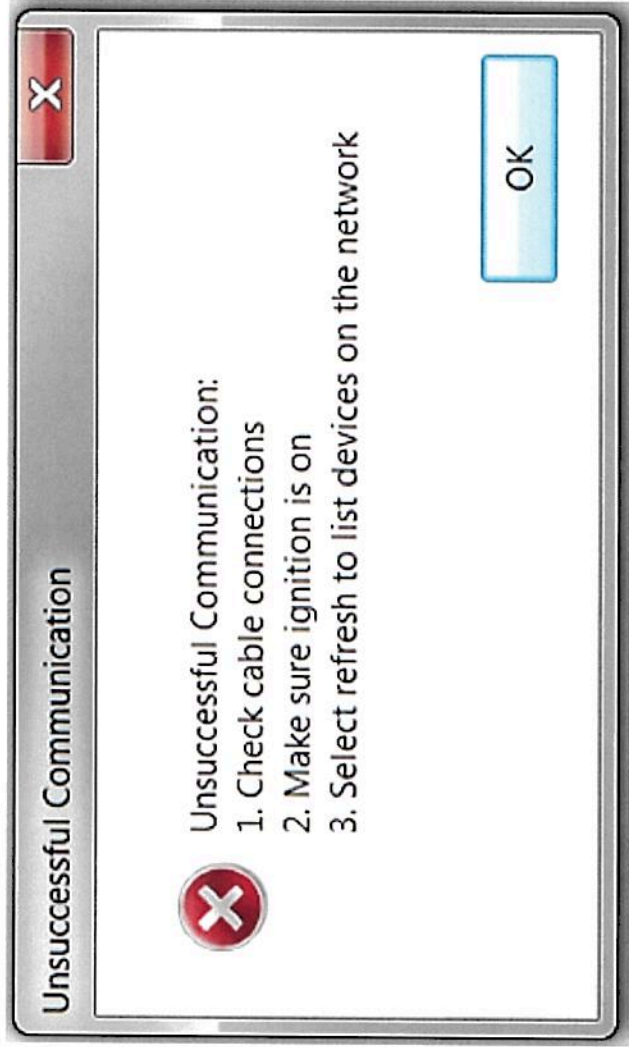
- The COM Setup window should appear on the screen.
- The Com Port window should show "COMxx FTDI USB"(xx is the port number); if necessary, select the refresh button or down arrow symbol to locate the FTDI USB cable, then select the "Open Com port" button.



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Software Connection Failures

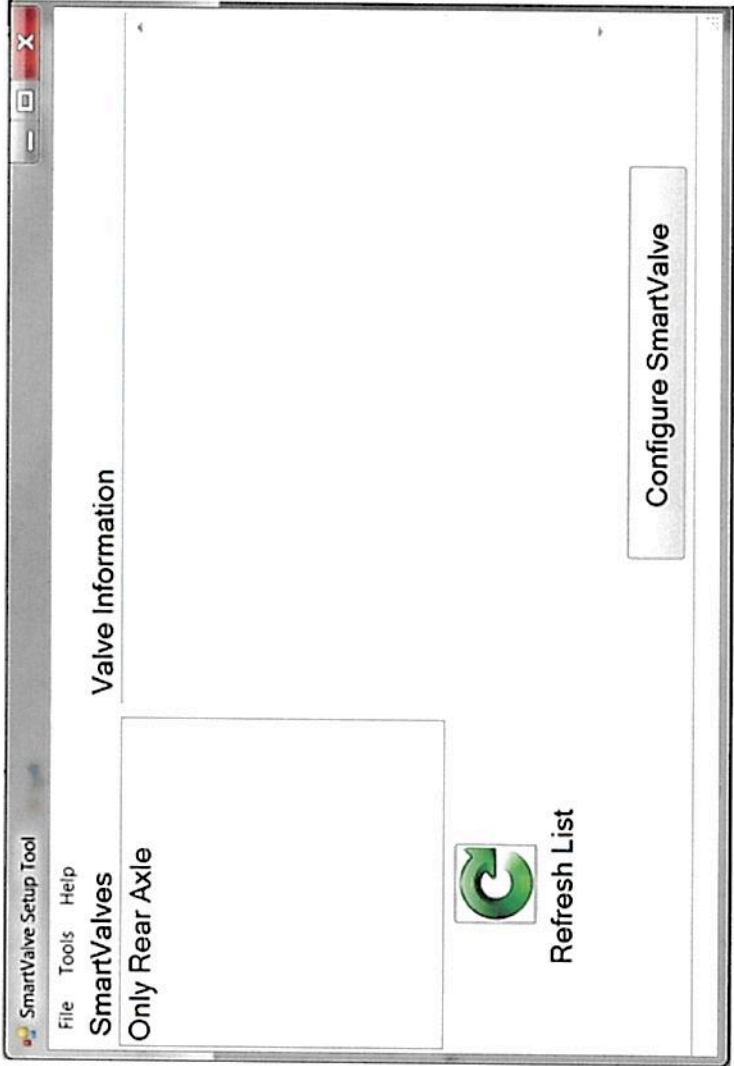
11. If the “FTDI USB” port does not appear as a selection, or the “Open COM port” button does not respond, check the cable connections and ignition switch. If necessary, restart the computer and restart the application.



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Calibration Procedure

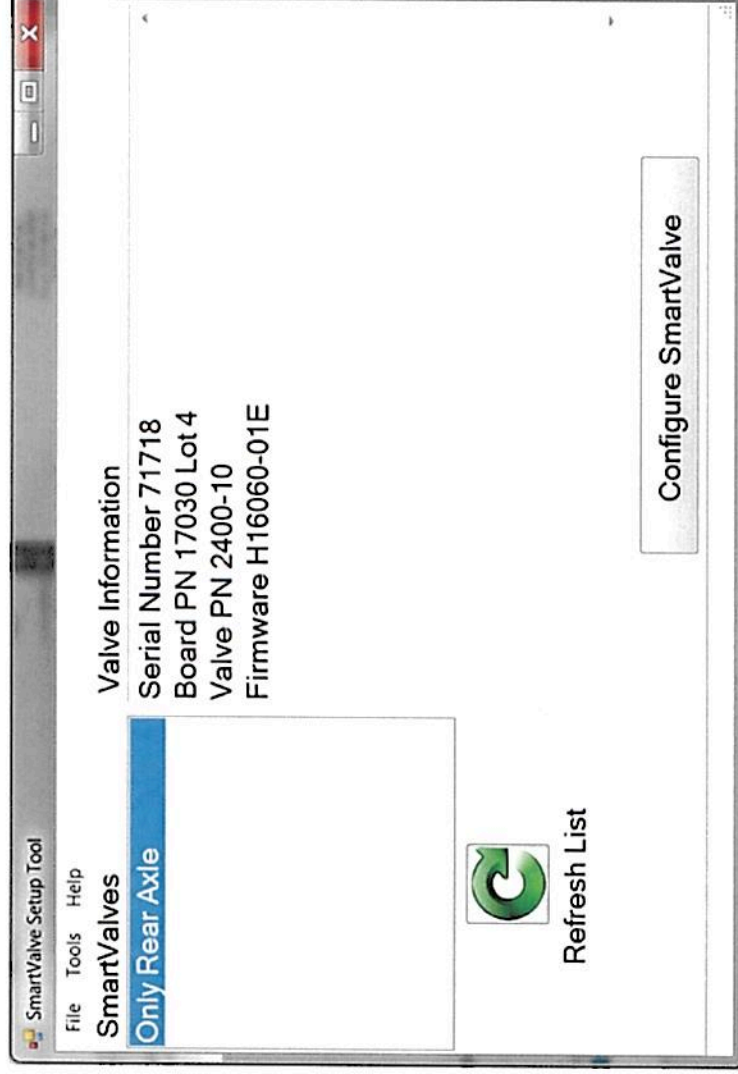
12. The "SmartValve Setup Tool" window should appear on the screen as shown below.



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Calibration Procedure

13. Select the SmartValve listed in the white box (press the refresh list if necessary) and then press "Enter" or "Configure SmartValve".

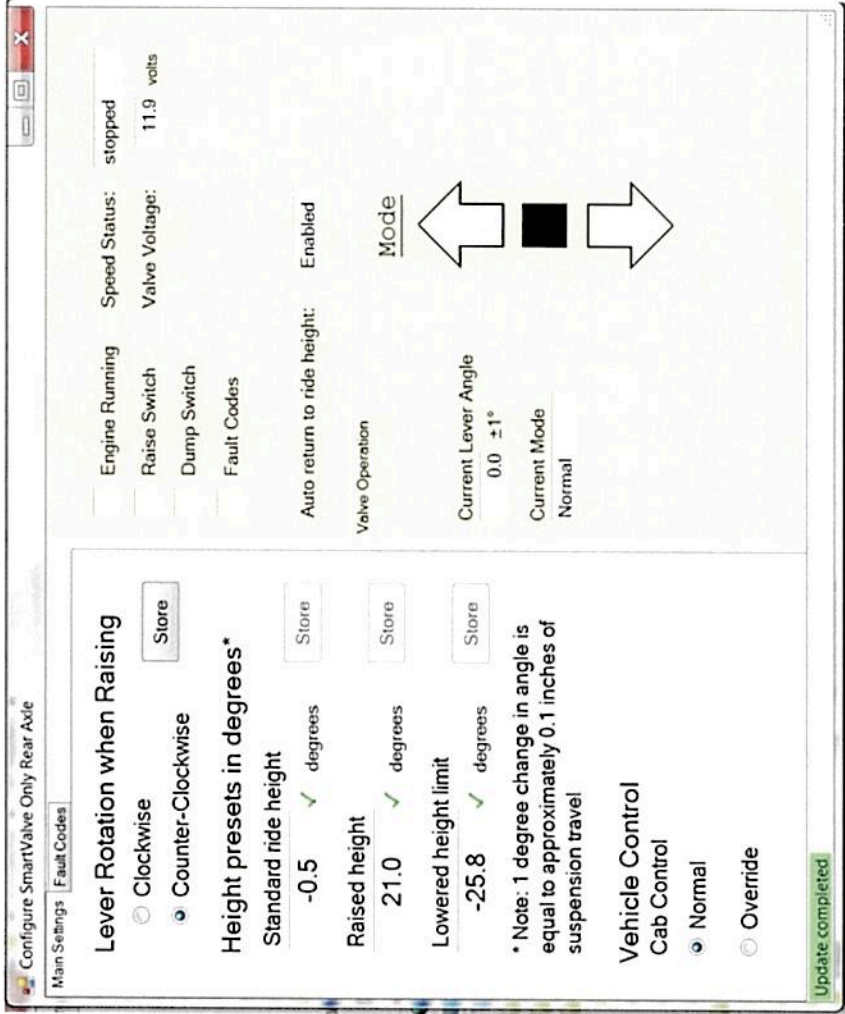


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Calibration Procedure

14. The "Configure SmartValve" window will appear on your desktop.

15. **Important Note:** The vehicle should be set to the normal ride height position (the Height control switch should be in normal position). The SmartValve LED on the switch should not be flashing.



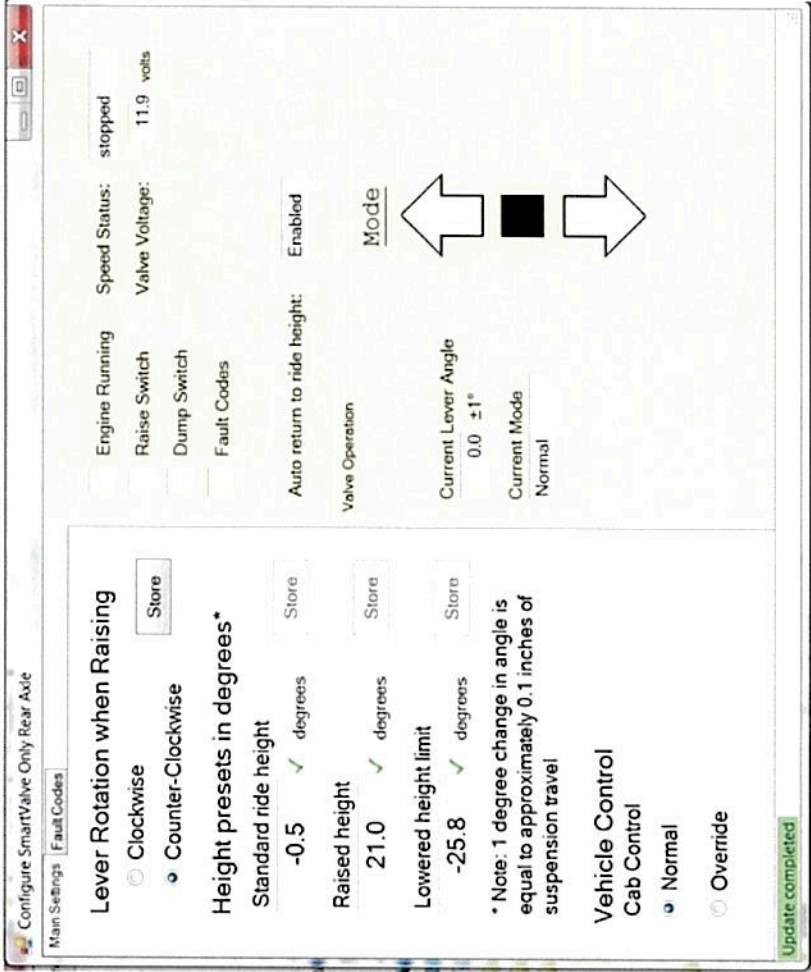
DAIMLER	Smart Valve Hadley Calibration Procedure				K09-P0016-043		11	of	24
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Calibration Procedure

Setting the Lever Rotation of the SmartValve.

- 16.If the valve is installed on the Right side of the chassis the valve is Counter-Clockwise.
- 17.If the valve is installed on the Left side of the chassis the valve is Clockwise.
- 18.Select the proper lever rotation by pressing the "Store" button to store the valve rotation information.

Note: In the lower position the Lever Angle must be negative.



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Calibration Procedure (SET Button Operation)

19. When the save is successful, "Update completed" appears in green in the lower left corner of the window (otherwise an error box appears warning that the transfer couldn't be completed).

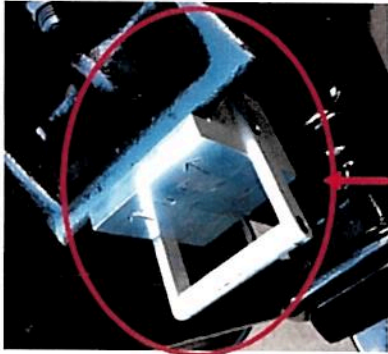


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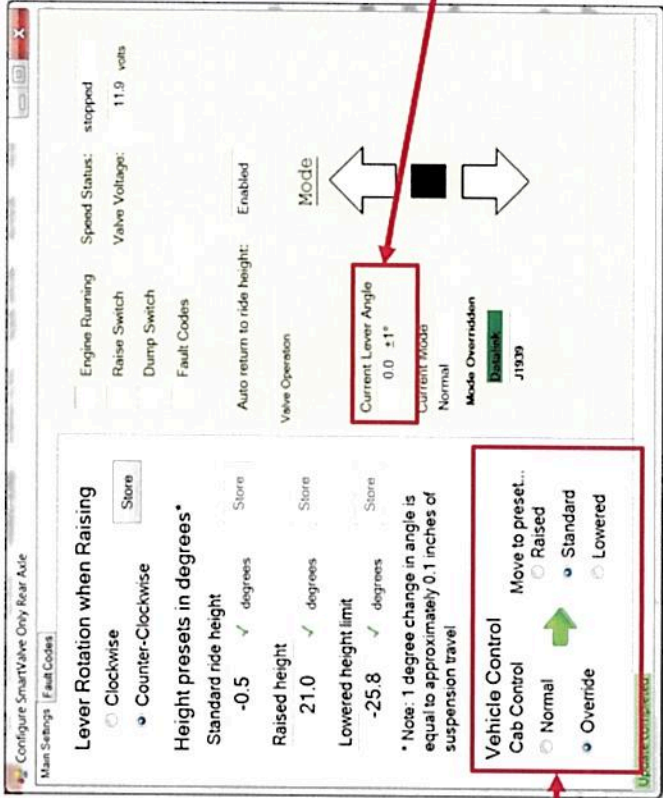
Calibration Procedure

Setting Ride Heights

- Go to "Vehicle Control" option to be able to control the suspension with the Software and select "Override" then select "Raised" option to raise the suspension.
- Once the truck is in the upper position insert the gauge blocks on both axle stops of the forward drive axle on the left and right hand sides, then lower the chassis by selecting the "Lowered" mode option located on the "Vehicle Control Mode" menu.
- Copy the value from "Current Lever Angle" to "Ride Height" box and click the "Store" Button to storage the Ride Height value.



Calibration block installation



Current Lever Angle

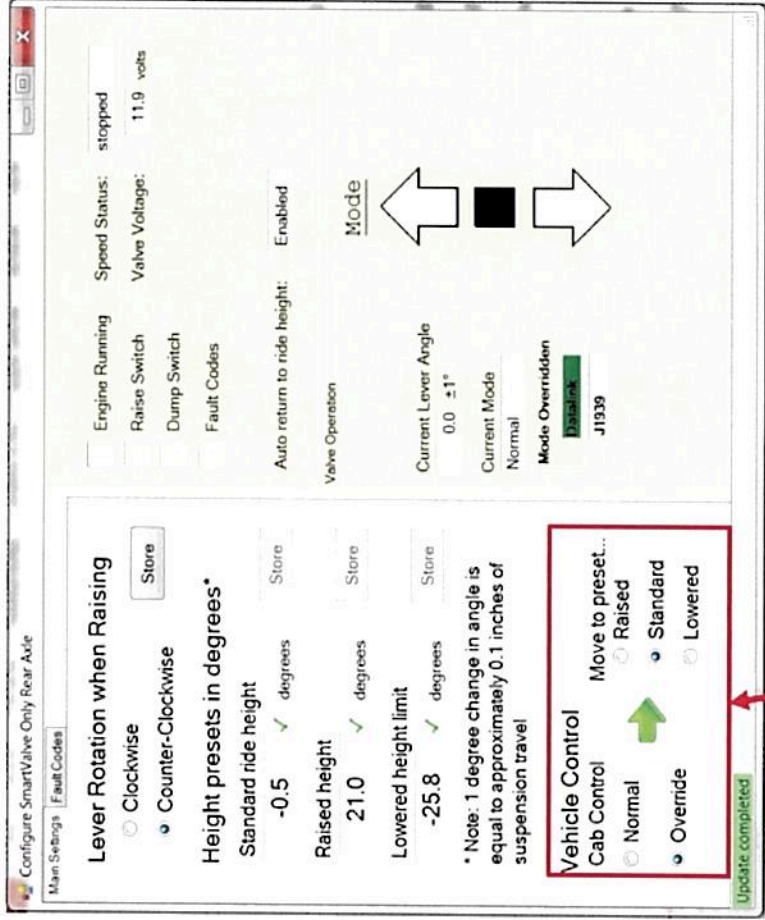
Vehicle Control Mode

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Calibration Procedure

Setting the Raised Height

23. Select the "Raised" option located on the "Vehicle Control Mode" menu.
24. To set the raised height, increase the current positive Raise height angle value by two.
25. Press the "Store" button to store this value into the SmartValve.
26. Continue to increase the Raise Height angle by two degrees until the suspension reaches maximum travel, the frame height stops increasing because the shocks travel limit is achieved." (Do not lift the any axle off of the ground). Lower the frame 1/4" (6mm).

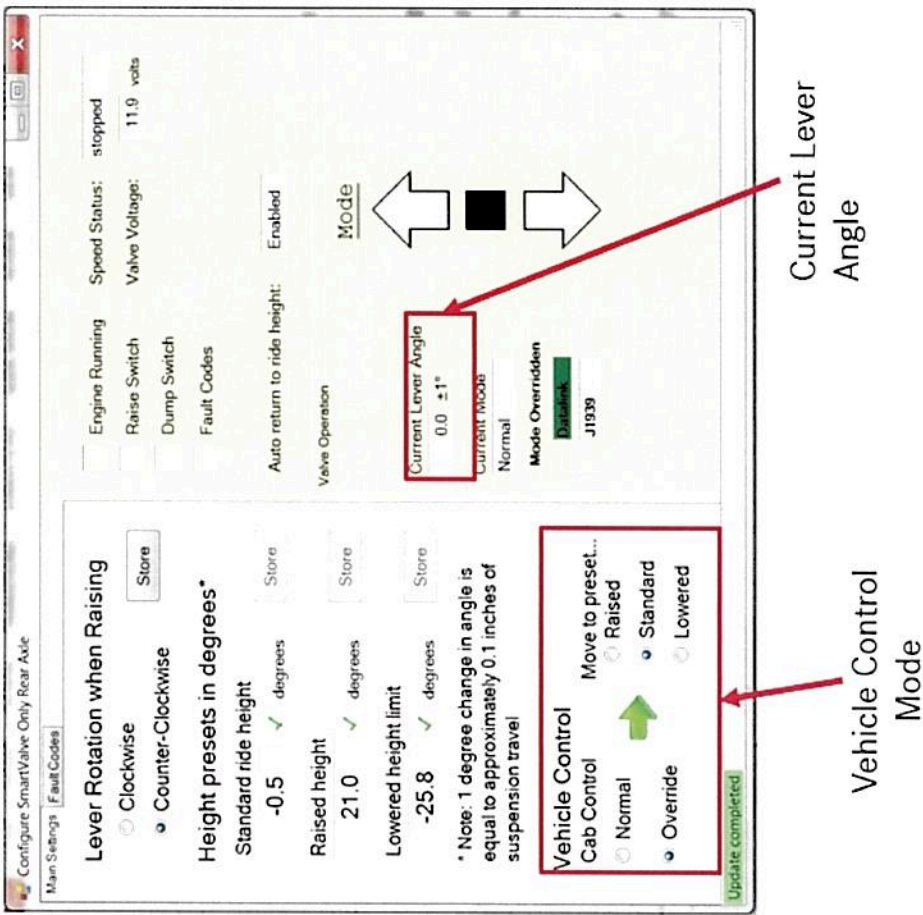


Vehicle Control Mode

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Calibration Procedure

- Monitor the "Current Lever Angle" (right lower box) and when the suspension visually stops to moving upward, this is the largest angle that is possible on this vehicle. The raise height entry must be reduced by 2 degrees below the maximum travel value. For example, if the "Current Lever Angle" stops increasing at 19 degrees, enter 17 degrees in the "Raise Height" box, and then press STORE.
- When the raise height setting has been set, re-check to verify that all tires are in contact with the ground and the shocks are not fully extended. The shocks should have a minimum of 1/2" of travel remaining. If necessary, repeat the adjustment.



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Calibration Procedure

29. Remove the blocks from the U-Bolt.

30. When the proper "Raise Height" setting is set, proceed to the "Low Height Limit" adjustment.

Setting the Low Height Limit

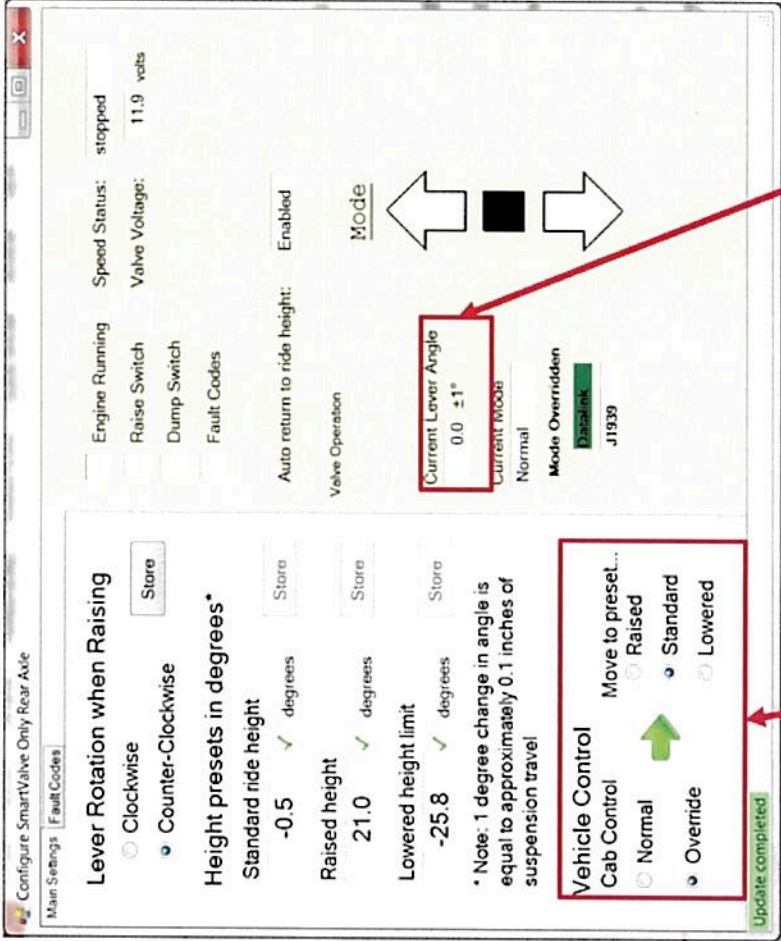
31. Select the "Lowered" option located on the "Vehicle Control Mode" menu to lower the suspension.

32. When the suspension is fully lowered, read the "Current Lever Angle" in the lower right-hand box. Enter this value into the "Low Height Limit" box. For example, if the "Current Lever Angle" is -22 degrees, then enter -22 into the "Low Height Limit" box. The lowered height limit is always negative.

33. Press the "Store" button to store this value into the Smart Valve.

34. Return the suspension to the normal position (Ride Height) by clicking the "dump" switch.

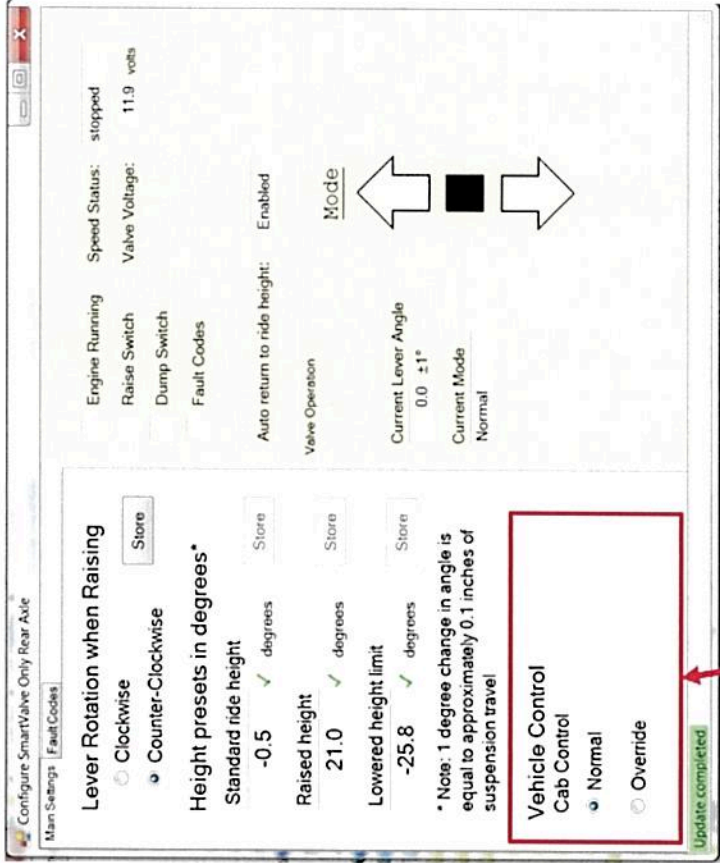
35. Re check the normal Ride Height and adjust if necessary.



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Calibration Procedure

36. Select "Normal" mode on the "Vehicle Control Mode" menu to put back the valve on the functional mode.

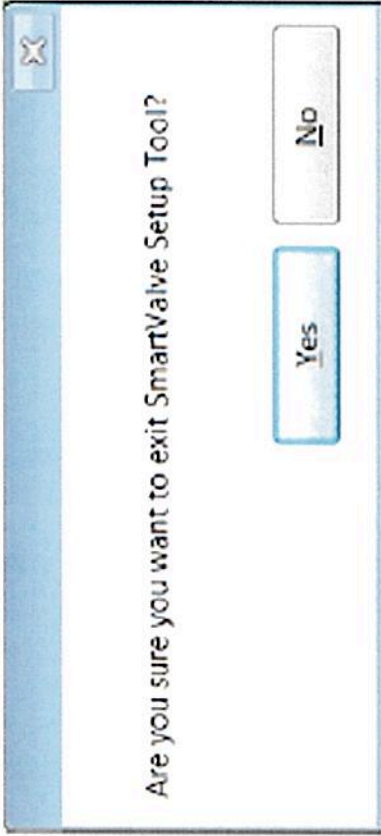


Vehicle Control
Mode

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Closing the Program

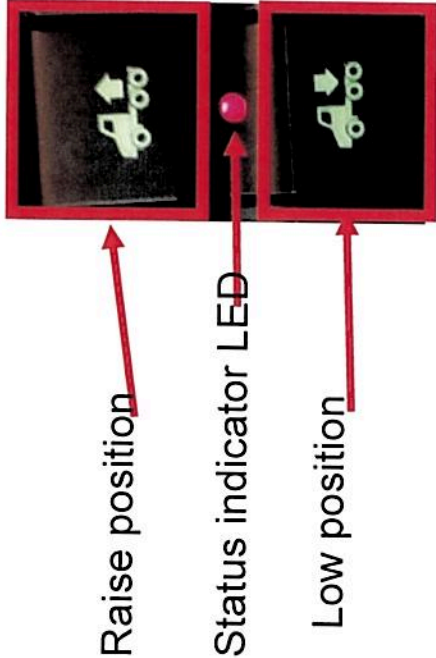
37. Close the configure window by selecting the “X” in the upper right edge of the window.
38. Close the program by selecting the “X” in the upper right edge of the SmartValve Setup Tool window.
39. Press the “yes” button to exit the program.
40. Remember to replace the environmental cap on the Hadley harness when finish.



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Test Dash Switch:

41. Make sure that you have disconnect the calibration software and removed the blocks from the truck suspension
42. Check that there is no one near the truck or there is nothing that can stop the suspension from moving
43. On the switch that we have on the dash press the Raise position only once, the LED should be blinking until we reach the maximum Raised height level
44. Press again the Raise position only once in order to back to normal Standard ride height
45. Press the Low position option only once to lower the truck to the maximum position, the LED should be blinking until we reach the Lowered height level
46. Press again the Low position only once in order to back to normal Standard ride height

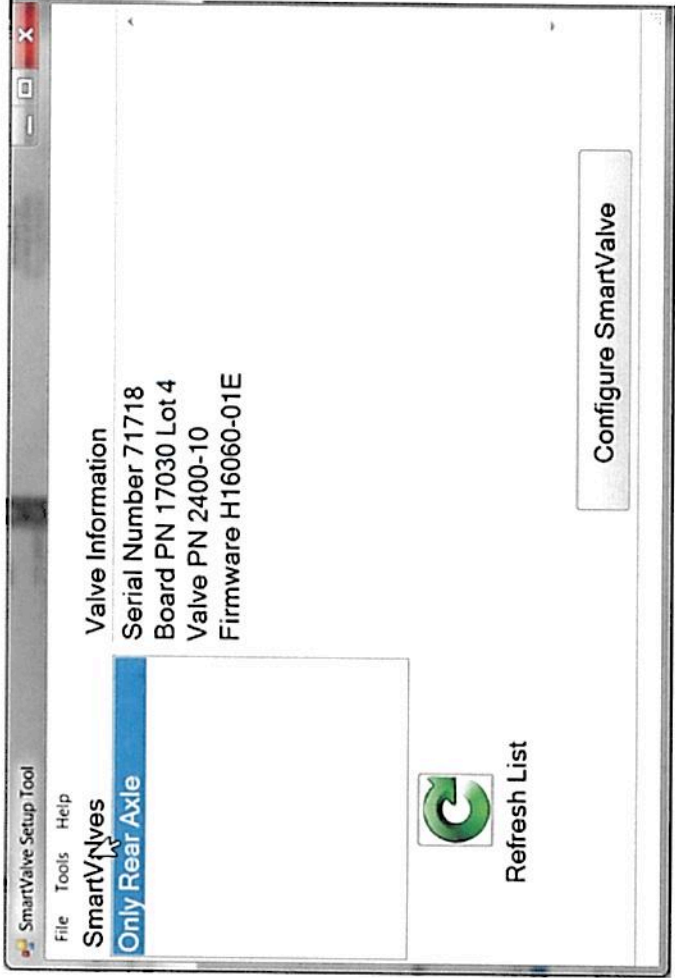


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Updating the Valve Firmware

Under special circumstances we will need to update the Firmware, the procedure is the following one:

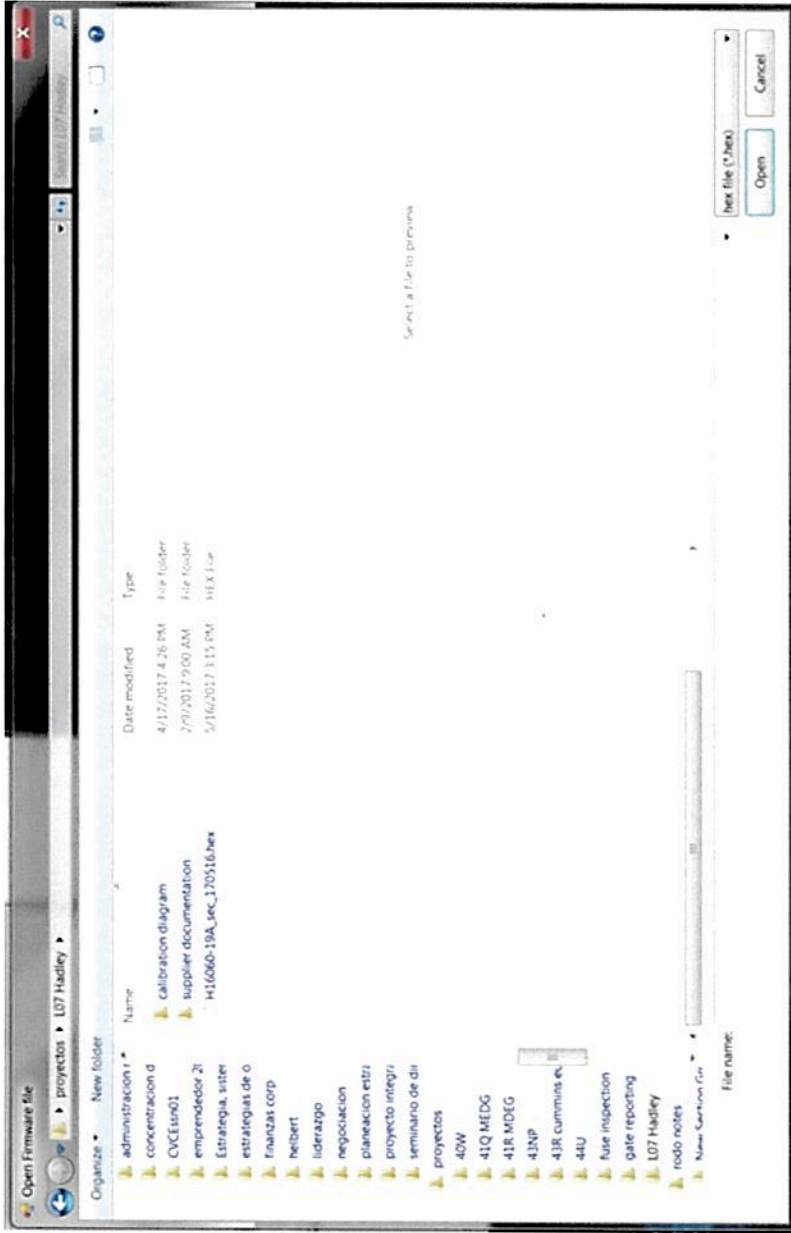
1. Set up the communication procedure to the Hadley valve.
2. Inside Tools Menu select "Load Firmware" option.



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Updating the Valve Firmware

- On the Open Firmware file select the Firmware file located on your computer or USD drive, then click “Open” button.
- The Firmware status will notify us when the Firmware is updated.
- Close Firmware windows by clicking the “Ok” button.



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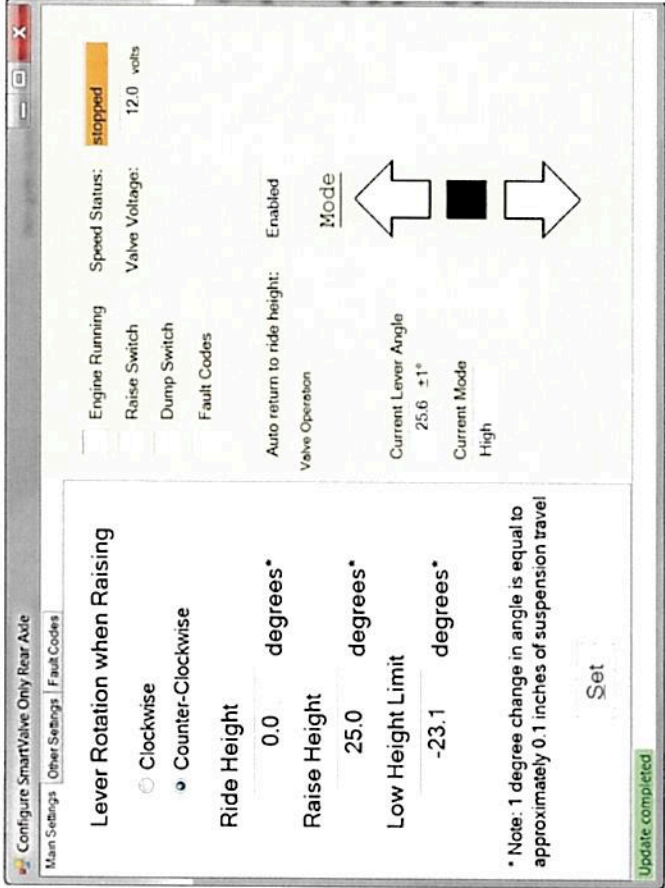
Erratic Valve Behavior during Troubleshooting

If we disconnect the Chassis to Valve connector (Gray connector) while being connected with the software we will get the following behavior:

- Speed Status: "Invalid"
- Current Mode status will change from High to Normal intermittently

How to fix it?

Turn off the truck, reconnect Grey connector and wait 20 sec for the system to turn off, then turn Ignition ON, this way the system should reestablish.



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List of Fault codes:

Fault Codes			
11: 1 blink, 1 blink	Angle sensor error	Internal valve fault or a lever severely out of position	
12: 1 blink, 2 blinks	Angle out of range	The lever is more than 65 degrees from center. May be a linkage failure.	
13: 1 blink, 3 blinks	Pressure Sensor Fault	Not used.	
14: 1 blink, 4 blinks	5 VDC fault	Indicates pressure sensor or wiring fault.	
21: 2 blinks, 1 blink	CAN data missing	No CAN bus signals are being received. Raise feature is disabled.	
22: 2 blinks, 2 blinks	Low Supply	Supply voltage is too low to operate valve. Poor ground connection(s).	
23: 2 blinks, 3 blinks	Ignition signal missing	Low voltage on valve pin 11	
24: 2 blinks, 4 blinks	Extreme Board Temperature	Indicates extreme temperature	
31: 3 blinks, 1 blink	Motor Feedback Fault	Internal valve fault	
32: 3 blinks, 2 blinks	Motor driver fault	Internal valve fault	
33: 3 blinks, 3 blinks	Motor not reaching target	Internal valve fault	
34: 3 blinks, 4 blinks	Motor Centering out of range	Internal valve fault	
41: 4 blinks, 1 blink	Suspension too high	Indicates the suspension is higher than expected. Valve is not able to correct.	
42: 4 blinks, 2 blinks	Suspension not raising	Suspension is not rising due to low air pressure, leakage, or other issues.	
43: 4 blinks, 3 blinks	Unable to close valve	Internal valve fault	
44: 4 blinks, 4 blinks	Valve not responding	Internal valve fault	

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Rev Level	Date Revised	Description	Revised By
-	08/20/17	Initial Release	R. Contreras
A	09/25/17	Revise and redraw process to improve clarity per L07 Smart Valve Pre-series results.	R. Contreras
B	05/10/18	WI Revision	R. Contreras