

## WORKHORSE BRAKE DIAGNOSTIC TROUBLE TREE

July 15, 2010

### ATTENTION: SERVICE MANAGERS SERVICE ADVISORS AND SERVICE TECHNICIANS

Workhorse Custom Chassis is pleased to announce the all new **Bosch 66 MM Trouble Tree** information guide for handling the interim caliper repair procedure and Campaign 50901-C.

This trouble tree has been designed to assist the service technician with the diagnosis and understanding the parameters in which these brake components should be diagnosed and or replaced. This document contains information pertaining to the comparison of good vs. bad components, torque specifications, fluid specifications and ABS code criteria.

This file must be downloaded to a computer that the technician will have access to and permission to use. Please insure that the instructions on "How To Use The Bosch Trouble Tree" are viewed and saved for later review. The first time you open the file the ZIP screen will appear. You will need to click on the "Extract" button in the center and that will pop up a folder with the opened files. Now clicking on the Trouble Tree.xls file will open the document and all the ABS trouble trees will work. In the case that you should have any questions please contact your Workhorse Custom Chassis Regional Service Manager or Workhorse technical Assistance @ 877-246-7731. Please share this information with your entire service team.

[Open In New Window](#)

### Files pertaining to message

[Bosch Trouble Tree How To.pptx](#) -

[Bosch Trouble Tree.zip](#) -



# Bosch Trouble Tree Instructions

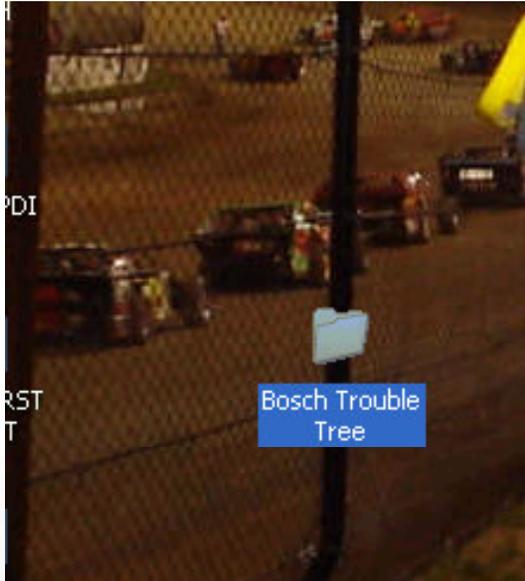
By: Workhorse Custom Chassis

A NEW BREED.



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# Bosch Trouble Tree Instructions

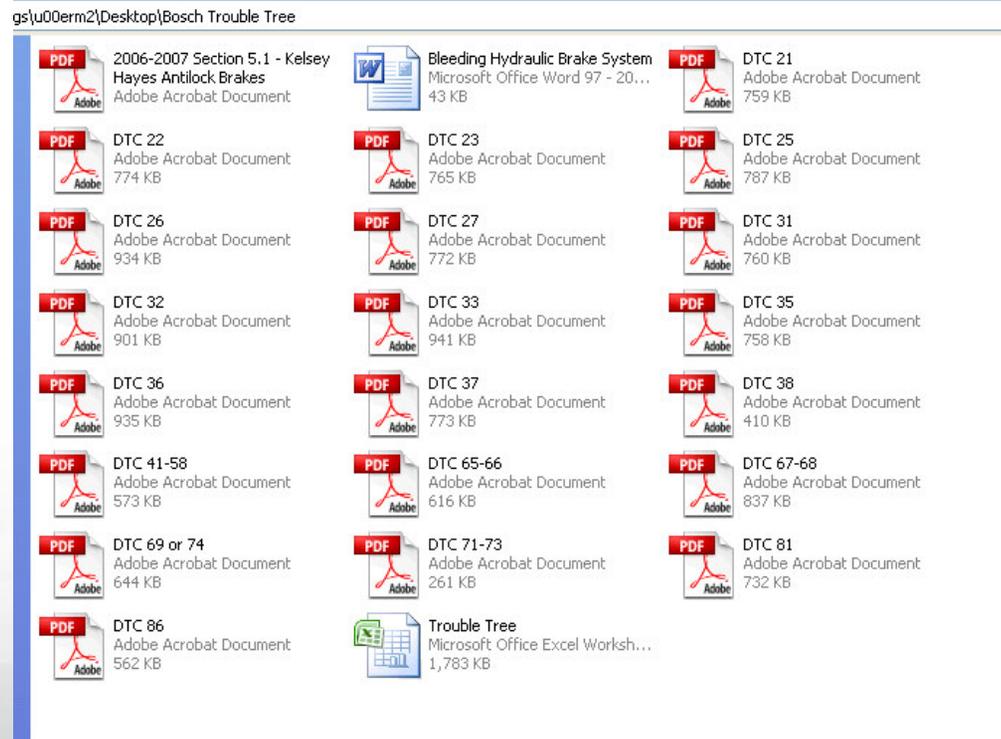


After Downloading the file to desktop this folder will appear.

Open the file and proceed to next Slide



# Bosch Trouble Tree Instructions



The following screen will open showing all the files seen to the left.

Select the excel file “Trouble Tree” and proceed to next slide





# Bosch Trouble Tree Instructions

	A	B	C	D	E
1	Bosch Campaign Trouble Tree				
2					
3	Steps	Description	Notes	Yes	No
4	1	Is ABS Light On		Step 2	Step 10
5	2	<a href="#">Does the unit have abs codes 21, 25, 31, 35</a>	Record codes on tech hard copy	Step 4	Step 3
6	3	<a href="#">Record abs codes and proceed to strategy based diagnostics</a>	This will be done at customers expense. Failure is not due to caliper failure.	Step 4	Step 4
7	4	<a href="#">Do Cracks go all the way through rotor web</a>		Step 6	Step 5
8	5	<a href="#">Does Rotor show signs of severe pad Transfer</a>		Step 6	Step 14
9	6	<a href="#">Does ABS Sensor show signs of heat damage</a>		Step 7	Step 19
10	7	<a href="#">Does front hub oil cap show signs of leaking or lens discoloration</a>		Step 8	Step 9
11	8	Replace Rotor, hub oil cap, inboard seal, speed sensor, and pads	Covered	Done	Done
12	9	Replace Rotor, inboard seal, speed sensor, and pads	Covered	Done	Done
13					

This is a view of the trouble Tree. All descriptions that are in blue are hyperlinked to visual representation or proper information. You can select the descriptions in blue to jump right to information needed to complete that step.

The notes column informs the technician if the repair will be covered.



# Bosch Trouble Tree Instructions

	A	B
1		<a href="#">Return to Trouble Tree</a>
2		
3	<b>DTC Code</b>	<b>Trouble Tree</b>
4	21	<a href="#">RF Wheel Speed Sensor Circuit Open</a>
5	22	<a href="#">RF Wheel Speed Signal Missing</a>
6	23	<a href="#">RF Wheel Speed Signal Erratic</a>
7	25	<a href="#">LF Wheel Speed Sensor Circuit Open</a>
8	26	<a href="#">LF Wheel Speed Signal Missing</a>
9	27	<a href="#">LF Wheel Speed Signal Erratic</a>
10	31	<a href="#">RR Wheel Speed Signal Circuit Open</a>
11	32	<a href="#">RR Wheel Speed Signal Missing</a>
12	33	<a href="#">RR Wheel Speed Signal Erratic</a>
13	35	<a href="#">LR Wheel Speed Signal Circuit Open</a>
14	36	<a href="#">LR Wheel Speed Signal Missing</a>
15	37	<a href="#">LR Wheel Speed Signal Erratic</a>
16	38	<a href="#">Wheel Speed Mismatch</a>
17	41-58	<a href="#">EBCM Control Valve Circuit</a>
18	65 or 66	<a href="#">EBCM Relay Circuit</a>
19	67 or 68	<a href="#">Pump Motor Circuit Open/Shorted</a>
20	69 or 74	<a href="#">Excessive Dump/Isolation Time</a>
21	71-73	<a href="#">EBCM Malfunction</a>
22	81	<a href="#">Brake Switch</a>
23	86	<a href="#">ABS Indicator Lamp Circuit Shorted to B+</a>
24		
25		<a href="#">Kelsey-Hayes Service Manual</a>

By selecting the hyperlink in step two (2) it will jump you to this DTC Code List for the ABS. Then by selecting the appropriate code description it will pull the trouble tree that is needed.

By selecting “Return to Trouble Tree” the system will revert back to the trouble tree seen in slide five (5).

By selecting “Kelsey-Hayes Service Manual” the system will pull the entire manual from Kelsey-Hayes.

This screen is also available in the index under Section 2, DTC Chart



# Bosch Trouble Tree Instructions

1	<a href="#">Return to Trouble Tree</a>		
2			
3	<b>ABS SYSTEM</b>		
4		<b>Specification</b>	
5	<b>Application</b>	<b>Metric</b>	<b>English</b>
6	ABS Sensor Bolt (Bosch ZOH-T Caliper)	17-21 N-m	12-16 lb-ft
7	Anchor Plate Bolt Plug	22-37 N-m	16-27 lb-ft
8	Bleed Screw	17 N-m	150 lb-in
9	Brake hose Fitting	19 N-m	168 lb-in
10	Brake Hose Hold Down Clamp Bolt	17 N-m	13 lb-ft
11	Brake Shield Bolts	26 N-m	19 lb-ft
12	Caliper to Caliper Mounting Bracket Bolts	126-145 N-m	93-107 lb-ft
13	Caliper Mounting Bracket to Steering Knuckle Bolts	280 N-m	206 lb-ft
14	Rotor to Hub Bolts (5/8" OD-10 Bolt Pattern)	152 N-m	112 lb-ft
15	Rotor to Hub Bolts (9/16" OD-10 Bolt Pattern)	256 N-m	189 lb-ft
16	Support Key Bolt	20 N-m	15 lb-ft
17	EBCM Bracket Mounting Bolts	36 N-m	28 lb-ft
18	Combination Valve to BPMV	16 N-m	12 lb-ft
19	EBCM to BPMV	5 N-m	44 lb-ft
20	EHCUC to Bracket	9 N-m	7 lb-ft
21	Front Brake Line to Combination Valve	24 N-m	18 lb-ft
22	Front Wheel Speed Sensor Mounting Bolts	26 N-m	19 lb-ft
23	Rear Brake Line to Combination Valve	24 N-m	18 lb-ft
24	Splash Shield Mounting Bolts	11 N-m	9 lb-ft
25	Tube Adapters to BPMV	31 N-m	23 lb-ft

When selecting Torque Specs or Fluid Specifications information for all makes and models is included. The rows that are highlighted in yellow are the rows pertaining to units that will be involved in the campaign. All other rows are for different units within our model and series range.



# Bosch Trouble Tree Instructions

- Procedure for using Trouble Tree
  - The trouble tree must be printed off and attached to the technician copy of the claim.
  - Technician is required to mark sheet with answers for future review.
  - If customer insist that parts are to be covered, scan the trouble tree and send, along with photographs, to Regional Service Manager for review.
  - Regional Service Manager will be reviewing these claims when at dealership. All parts must be held thirty (30) days from day payment is received. ALL parts **MUST** contain the last eight (8) of VIN, repair order number, and customers last name.

