

Module Number: 03

Subject: Differential Lock Module

Objective:

At the conclusion of this module you will be able to:

- Perform a function test of the differential lock system
- Apply SDS/DAS in diagnosing the differential lock system
- Diagnose faults in the differential locking system
- List the 5 steps to approach a differential lock system problem

Vehicle and tools required:

- Bugged G Class with wheels lifted of the ground
- Fender covers
- SDS/DAS
- 220 Electrical test kit
- Long nose pliers
- Plastic wedge
- Flashlight

Required materials:

- Hand out material for Differential Locks
- WIS

Instructions:

1. Follow the attached instructions step by step
2. Answer the questions
3. Use your hand out and ask your instructor for assistance
3. Stop at “★ *Instructor check point* _____” for signature
4. It should take you about 60 minutes



Means cease all activity and get your instructor (safety issue).



Means the instructor needs to discuss or provide information.

Part A:

1. Switch ignition on (**engine off**) and make a center differential lock request
Is the differential vacuum pump running? YES NO
2. Is this what you expected? YES NO
3. Does the vacuum pump stop running? YES NO
4. Is this normal behavior if the engine is not running? YES NO
5. If not, discuss amongst your group, and make a list of possible causes

Call your instructor prior to proceeding

Discussion and clarification point

6. Verify that the pumps internal pressure switch is working properly. How would you recommend doing this?

7. Is there vacuum present at the switchover valve? YES NO
8. Check the vacuum supply circuit to center differential lock. Describe what you found to correct the problem

9. Correct the fault and carry out a function test of the center differential lock (It may be necessary to turn wheels to engage lock). Did you get a red LED confirming lock engagement? YES NO



Do not proceed. Contact your instructor.


Safety note: Exercise care, vehicle may need to be operated on the hoist.

Part B:

10. Continue the differential lock function test by making a rear differential lock request (It may be necessary to turn wheels to engage lock).
Did you get a red LED confirming lock engagement? YES NO
11. With the transmission shifter in 'N', determine which differential locks are engaged.
Center: *engaged* *disengaged*
Rear: *engaged* *disengaged*
Front: *engaged* *disengaged*
12. Did you get a red LED confirming lock engagement for the front when requesting the rear differential lock? YES NO
13. If so, discuss amongst your group, and make a list of possible causes

14. Make a front differential lock request. Did you get a red LED confirming a rear differential lock engagement? YES NO
15. Using SDS/DAS go to "Control modules">"Chassis">"Differential locks".
Does this system have a fault memory? YES NO
16. Which aids are offered in SDS/DAS to diagnose the differential lock system?

17. Under "Complete list of guided test", do you see a test that can help you to diagnose the problem at hand? YES NO
If yes, then which test? _____

 Call your instructor prior to proceeding
Discussion and clarification point

18. Remove the differential switch group and perform the test as indicated in SDS/DAS. What is the measured value? _____Ω

19. Is this value within specification indicated in SDS/DAS? YES NO

20. Discuss amongst your group, and make a list of possible causes

21. Using the electrical wiring diagram in WIS, determine the wire colors for all three of the differential switch-over valves. Fill in the table

Hint: Use F6 from within SDS/DAS

	Pin 1	Pin 2
Center (Y68):	_____	_____
Rear (Y68/1):	_____	_____
Front (Y68/2):	_____	_____

22. Is the center differential switch-over valve activated directly from the switch group or through a relay? Relay Directly

23. What other component is operated in parallel? _____

24. Which control units supply the Differential Switch Group with power?
Circuit 30 _____
Circuit 87 _____

25. Verify the pin assignment with the wiring on the vehicle. Why were your measured values in step 17 incorrect?

26. Discuss in your group and explain why the Differential Switch Group did not engage the rear differential when requesting the front one? _____

27. Looking at the scenario in question 12, could you have fixed the problem by switching the front and rear vacuum output lines? YES NO

28. What problems may be experienced by the customer if this solution is used (think vacuum supply differences!)? _____

29. Taking the results in account, discuss in your group how you should approach a similar problem in order to avoid creating additional problems like in step 28? Put the listed test steps in the correct order

#	Test step
	Verify correct electrical connection using wire colors
	Check electrical and hydraulic system
	Verify position of check valves at center and rear switch-over valves
	Verify (test exchange) vacuum output from respective switch-over valve
	Check vacuum supply to switch-over valves

30. If no differential lock function is verified, what fuse should be checked for the Differential Lock system? _____

 **Call your instructor for final discussion and clarification.**

If you observe any damaged parts or missing fasteners on this vehicle, please inform your instructor prior to leaving this workstation.

★ Instructor check point _____