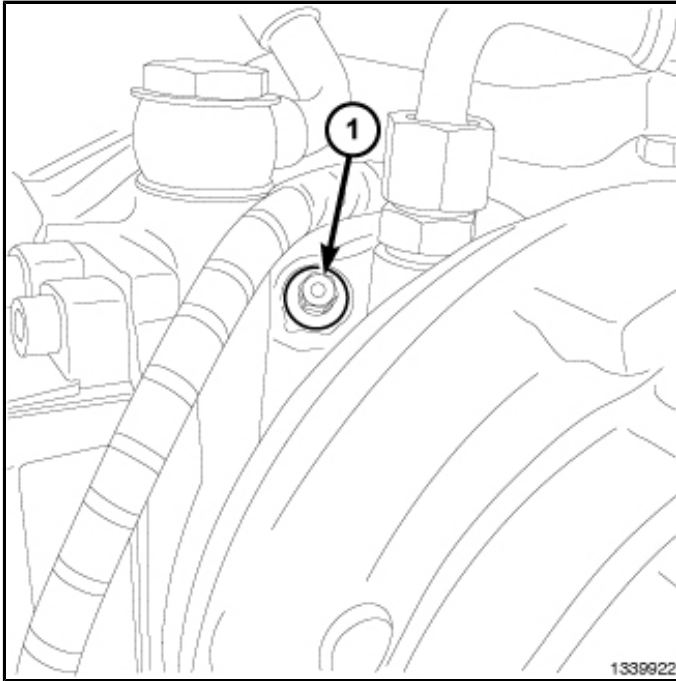


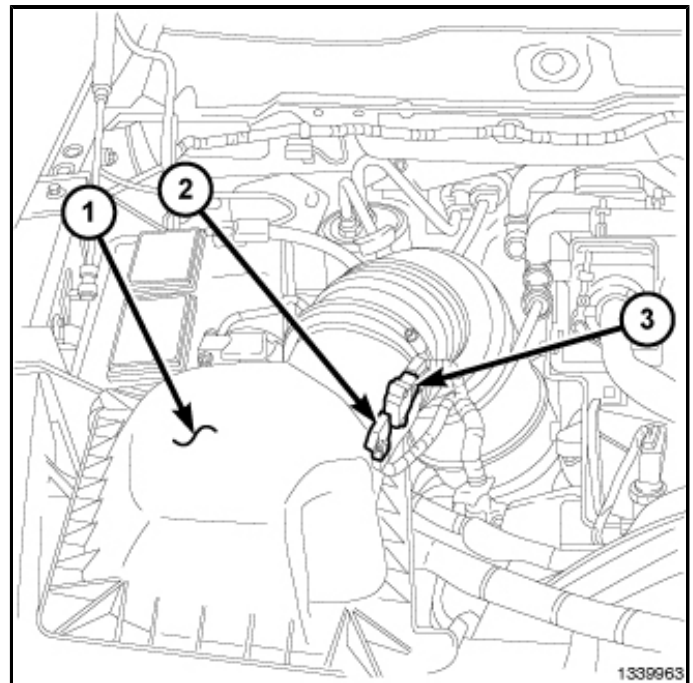
## CLEANING



## INSTALL A TURBOCHARGER CLEANING PORT

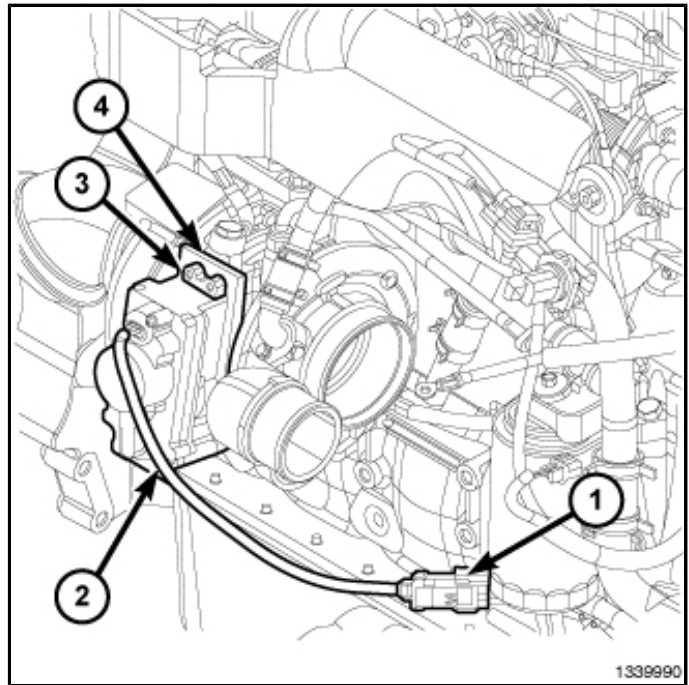
**WARNING:** At no time should a combustible cleaner be used. To introduce a combustible cleaner to the engine and/or exhaust aftertreatment system may cause damage to those systems and possible personal injury.

1. At the air filter housing cover, disconnect the Mass Air Flow (MAF) and the Inlet Air Temperature / Pressure (TBAP) sensors electrical connectors from the engine harness.
2. Remove the air filter housing cover (1) and fresh air tube together as an assembly.
3. With the turbocharger actuator electrical connector connected, turn the vehicle ignition switch to "ON/RUN" position. **DO NOT start the engine.**



4. Disconnect the turbocharger actuator electrical connector (1) from the engine harness.
5. Turn the vehicle ignition switch to the “OFF” position.
6. Disconnect and isolate negative battery cables on each battery.

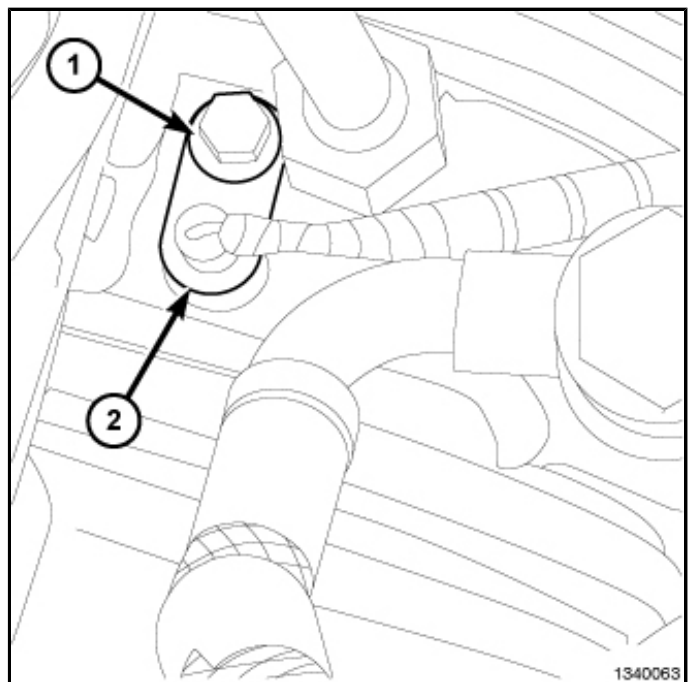
**CAUTION:** Performing the above steps now will become very important later in this procedure. The above steps should not be overlooked. The above steps will insure that the nozzle ring inside the turbocharger is moved so that it will not come in contact with the drill bit or tap. Failure to perform the above steps may damage the turbocharger mechanism.



7. Locate the Closed Crankcase Ventilation (CCV) tube hold down cap screw on the steel section of the CCV tube. Remove the CCV tube hold down cap screw.
8. Rotate the CCV tube upward and out of the way of the turbocharger.
9. Locate the turbocharger speed sensor that is mounted on top of the center section (bearing housing) of the turbocharger housing.

**NOTE:** Clean the area of any dirt and/or debris that may be around the turbocharger speed sensor prior to removal.

10. Remove the turbocharger speed sensor attaching bolt (1). The bolt will be used later to hold in place the drill/tap guide of the # 10143 turbocharger drill/tap kit
11. Remove the turbocharger speed sensor (2). Verify that the speed sensor o-ring remains with the speed sensor and does not remain in the turbocharger center section / bearing housing.



- Using the # 10143 turbocharger drill/tap kit, install the drill/tap guide (1) into the turbocharger center section / bearing housing. Secure the drill/tap guide (1) in place with the previously removed turbocharger speed sensor attaching bolt. Tighten the bolt to 10 N-m (89 in. lbs.)

**NOTE:** There are two different size guide bushings that come with the # 10143 turbocharger drill/tap kit. The guide bushing with the smaller inner diameter center bore is used for guiding the drill bit. The guide bushing with the larger inner diameter center bore is used to guide the tap.

- Using the # 10143 turbocharger drill/tap kit, install and secure the guide bushing with the small diameter bore hole (drill bit guide bushing) into the drill/tap guide bore.

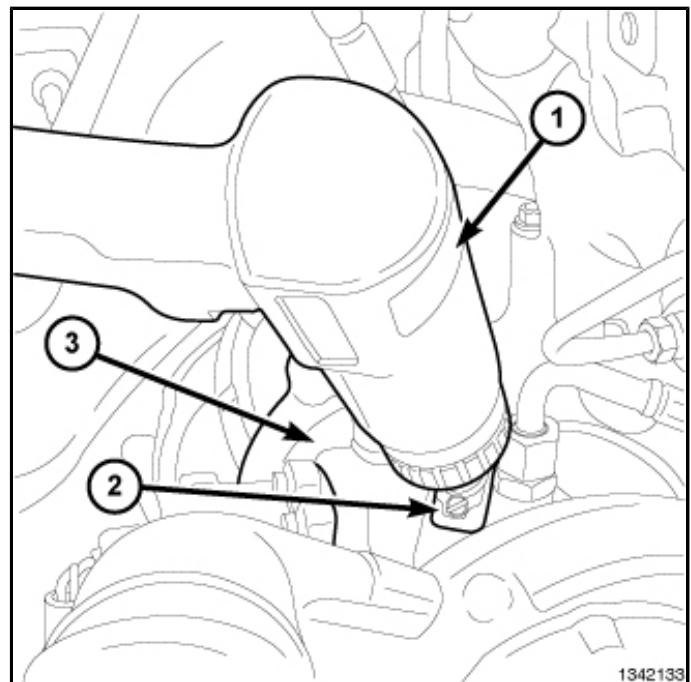
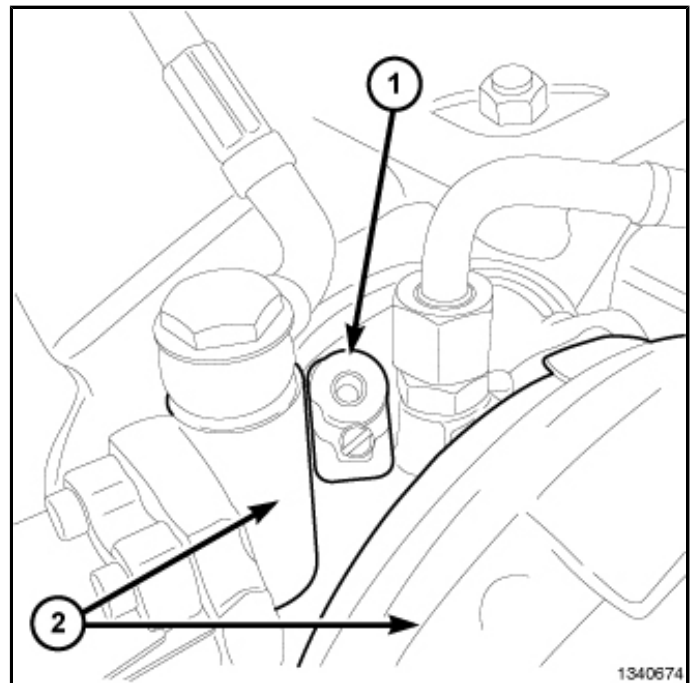
**NOTE:** Only use special tool drill bit and stop (# 10143-4 ) and tap (# 10143-5 ) supplied in the Turbocharger Drill/Tap Kit #10143 to perform this Repair Procedure. ALWAYS check the drill stop to see if it is set correctly. It should be 42 mm (1 5/8 in.) from drill bit tip to bottom surface of the stop. VERIFY that the drill stop is set to the correct depth. VERIFY that the stop set screws are fully tightened. DO NOT over drill the hole.

- Obtain a shop vacuum with a crevice attachment end to collect drill bit fillings. Make certain that the crevice tool is held as close as possible to the drill tip when drilling, and to the tap tip when tapping the drilled hole. A small amount of filings that may enter into the drilled hole is acceptable.

**NOTE:** DO NOT use any machining oil or other lubrication oil during the drilling and tapping operation. Use of machining oil or other lubricating oil may increase the number of drill and tap shavings introduced into the turbocharger, potentially leading to turbocharger mechanism failure.

- Using a drill on **SLOW speed** and the shop vacuum to collect filings, drill a hole through the turbocharger center housing casting to the correct depth. Continue to drill until the drill stop just makes contact with the turbocharger housing.

- Remove the drill bit from the drill/tap guide. Remove the drill guide bushing from the drill/tap guide. First,



**vacuum** any excess metal filings. Next, using a **pencil magnet** with a magnetic tip smaller than the drilled hole, insert the magnet through the drilled hole and remove shavings as possible. **DO NOT** use the magnet during the process of drilling and tapping as this would cause the drill/tap fixture and the turbocharger housing to become magnetized.

- Using the # 10143 turbocharger drill/tap kit, install and secure the guide bushing with the larger diameter guide bore (tap guide bushing) into the drill/tap guide bore.

**NOTE:** Only use special tool drill bit and stop (# 10143-4 ) and tap (# 10143-5 ) supplied in the Turbocharger Drill/Tap Kit #10143 to perform this Repair Procedure. ALWAYS check the drill stop to see if it is set correctly. It should be 42 mm (1 5/8 in.) from drill bit tip to bottom surface of the stop. VERIFY that the drill stop is set to the correct depth. VERIFY that the stop set screws are fully tightened. DO NOT over drill the hole.

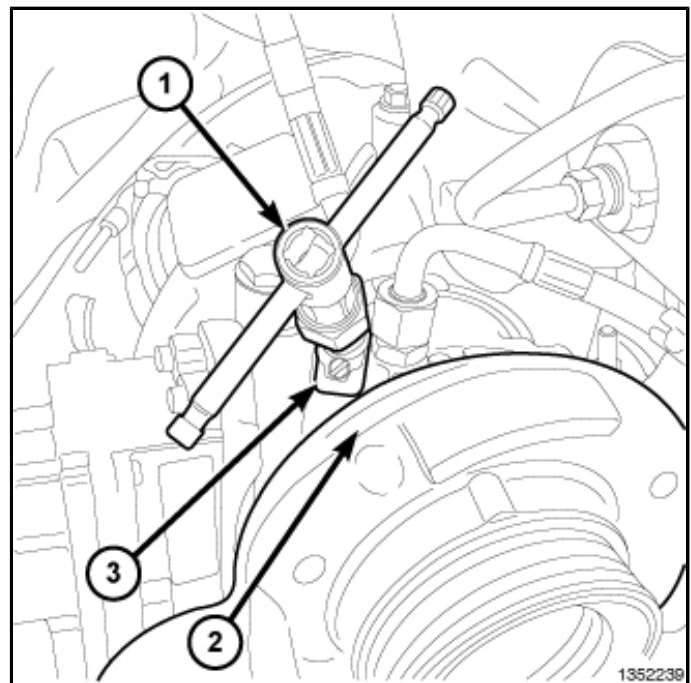
- Using the # 10143 turbocharger drill/tap kit, install the tap into the tap bushing bore of the drill/tap guide.

- Using the # 10143 turbocharger drill/tap kit, install the tap handle to the drive end of the tap. If additional clearance is desired, install the female end of a 3 inch or 6 inch long 1/4 inch drive socket extension to the tap and then install the male end of the 1/4 inch extension to the tap handle.

**NOTE:** DO NOT use any machining oil or other lubrication oil during the drilling and tapping operation. Use of machining oil or other lubricating oil may increase the number of drill and tap shavings introduced into the turbocharger, potentially leading to turbocharger mechanism failure.

- Using the tap and tap handle from the # 10143 turbocharger drill/tap kit in conjunction with the shop vacuum to collect filings, tap the previously drilled hole made in the turbocharger center housing casting approximately **11 1/2 turns**. This should be just about when turbocharger housing just touches the bottom of the tap stop. **DO NOT OVER TAP THE HOLE.**

- Remove the tap from the drill/tap guide. Remove the tap bushing from the drill/tap guide. First, **vacuum** any excess metal filings. Next, using a **pencil magnet** with a magnetic tip smaller than the drilled hole, insert the



magnet through the drilled hole and remove as many shavings as possible. **DO NOT** use the magnet during the process of drilling and tapping as this would cause the drill/tap fixture and the turbocharger housing to become magnetized.

22. Remove the drill/tap guide from the turbocharger center housing. First, **vacuum** any excess metal filings. Next, using a **pencil magnet** with a magnetic tip smaller than the drilled hole, insert the magnet through the drilled hole and remove as many shavings as possible.
23. Install the turbocharger speed sensor and attaching bolt to the turbocharger center housing. Tighten the attaching bolt to 10 N-m (89 in. lbs.).
24. Install the stainless steel Mopar® turbocharger cleaning port plug into the cleaning port of the turbocharger. Tighten the plug to 10 N-m (89 in. lbs.). Verify correct fit before proceeding.

**NOTE:** The use of the proper Mopar® Turbocharger Cleaning Port plug is critical. Use of an unapproved plug of different material type and/or thread may cause damage to the turbocharger.

25. Connect the engine harness connector to the turbocharger actuator connector.
26. Rotate the CCV tube into position and install the CCV tube cap screw. Tighten the cap screw to 10 N-m (89 in. lbs.).
27. Install the air filter housing cover and fresh air tube hose. Tighten the fresh air hose clamp to 4 N-m (35 in. lbs.). Verify that there is a good seal at each end of the air tube hose.
28. Connect the engine harness connectors to the MAF and the inlet air temperature / pressure (TBAP) sensor connectors.
29. Connect the negative battery cable to each battery.
30. Start the vehicle engine and verify correct engine operation.
31. Turn off vehicle engine. Verify that the ignition switch is in the “OFF” position.

# TURBOCHARGER CLEANING PROCEDURE

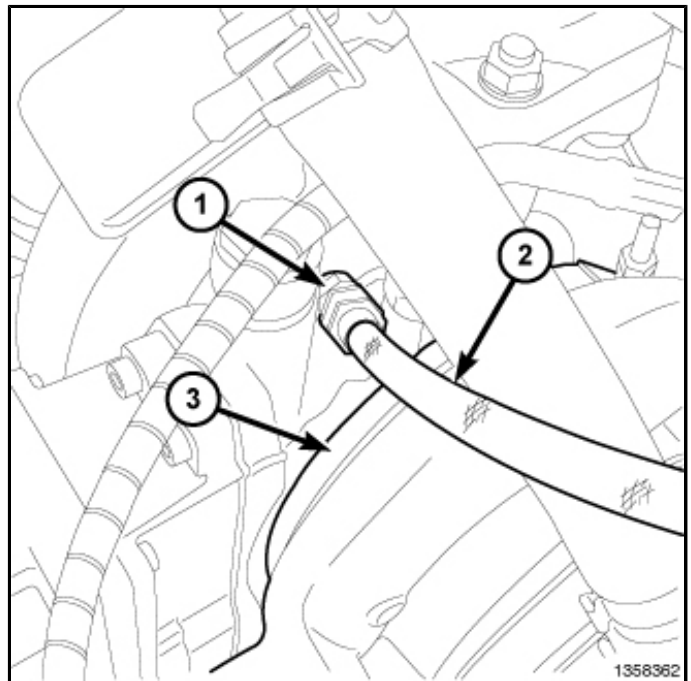
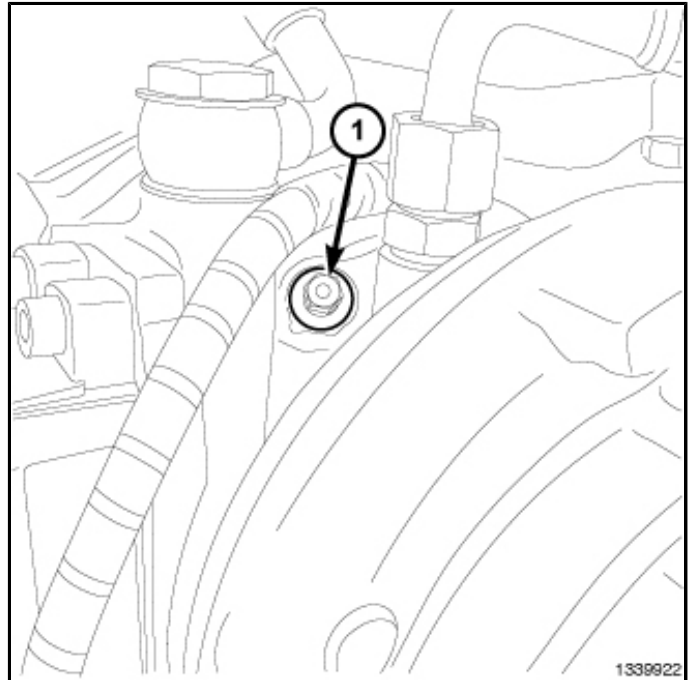
**WARNING:** Use ONLY Mopar® Diesel Turbocharger Cleaner (# 68044565AA) to perform this repair. Mopar® Diesel Turbocharger Cleaner is a specially made WATER BASED solvent. Use of a flammable, or any low temperature combustible liquid/solvent, may cause severe damage to the engine and exhaust aftertreatment system components. Introduction of a flammable liquid/solvent to the engine intake system may cause engine run away, engine damage, and possible personal injury.

1. Connect the vehicle tailpipe to the shop exhaust ventilation system. Turn the shop exhaust ventilation system ON.
2. If installed, remove the turbocharger cleaning port access plug (1).
3. Locate the cleaning tool's hose and nozzle (1,2) from the # 10142 turbocharger cleaning kit special tool.

**NOTE:** The spray nozzle in the # 10142 Turbocharger Cleaning Kit uses a very small orifice for the cleaner to pass through. The design of the nozzle is important for the proper application of the chemical. If the orifice in the spray nozzle becomes restricted, carefully inspect and clean the filtering screen at the entrance to the nozzle of any debris. If careful, the nozzle may be partially disassembled for cleaning, should this be needed.

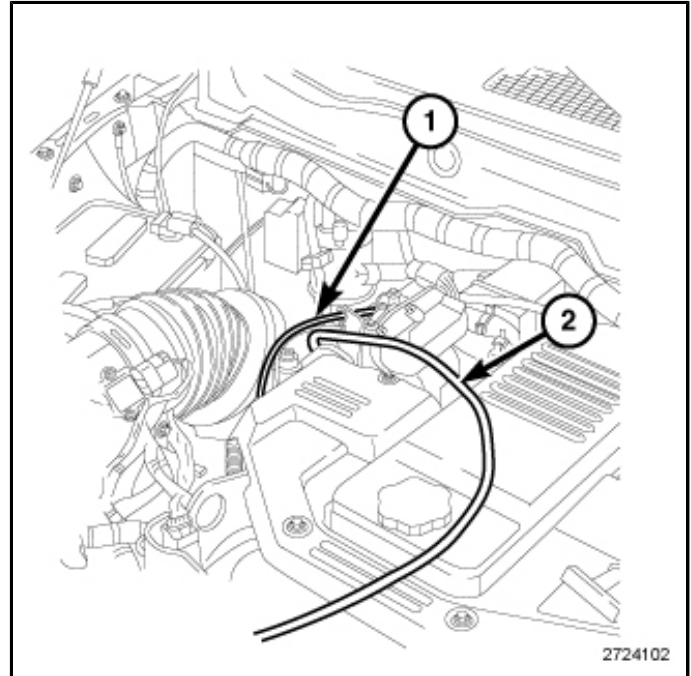
4. Using the # 10142 turbocharger cleaning kit, install the nozzle (1) of the turbocharger cleaning tool into the turbocharger cleaning port tapped hole. Use care not to cross-thread the tapped hole. Tighten the nozzle to 5.6 N-m (50 in. lbs.).
5. Place a fender cover over the top of the right battery to isolate/insulate the battery terminal ends from the cleaning tool hose (2).

**NOTE:** In the following steps, DO NOT INSTALL the cleaner can on the tool. In some instances, the scantool may perform a series of tests that may instruct the technician NOT to clean the turbocharger. The tool is installed prior to warming the engine to

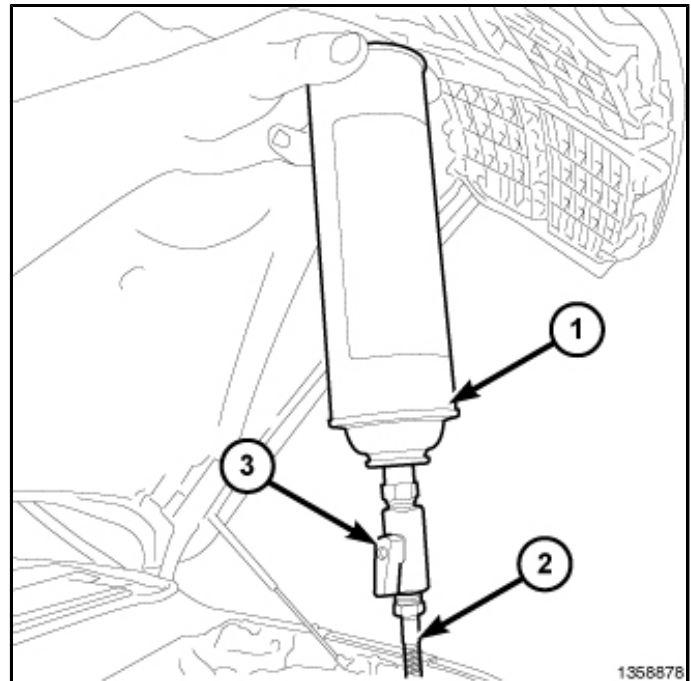


prevent the technician from having to work on a hot turbocharger. Installing the can on the hose will puncture the can.

6. Using the # 10142 turbocharger cleaning kit, install the hose (2) of the turbocharger to the other end of the cleaning nozzle (1).
7. Route the tap end of the cleaning tool hose under both cable sleeves of the EGR Cooler By-Pass Valve Assembly so that the cleaning tool hose is held away from the positive battery terminal by the throttle body cable sleeves.



8. Verify that the turbocharger cleaning tool tap cutoff valve is in the CLOSED position, the handle (3) should be positioned 90° to the hose (2). **Do not install cleaner can (1) at this time.**
9. Make sure the truck is in "Park" (automatic transmission equipped) or "Neutral" (manual transmission equipped) and the parking brake is ON.
10. Start the vehicle engine and allow the engine to idle and warm.
11. Using the scan tool, from the "HOME" menu select, "PCM".
12. Using the scan tool, select "More Options".
13. Using the scan tool, select "System Test".
14. Using the scan tool, select "Start".
15. Using the scan tool, select "Set engine speed to 2,000 RPM".
16. Follow the scan tool prompts, then select "Actuate".



17. Monitor the engine temperature and continue to run the vehicle engine until the engine temperature is **ABOVE 82C (180F)**.

**NOTE:** The vehicle engine must be fully warmed (82C/180F or higher) so that the turbocharger and accumulated soot are at the correct higher temperatures for this repair to be effective. The exhaust side of the turbocharger will be significantly higher in temperature than the 82C/180F engine operating temperature.

**NOTE:** If the following function does not appear on the scantool, ensure the scantool software is version 10.02 or later. If the scantool has 10.02 or later, the PCM will need to be flashed to the latest available software before proceeding.

18. Using the scan tool, from the "HOME" menu select, "ECU View".
19. Using the scan tool, select "PCM".
20. Using the scan tool, select "Misc Functions".
21. Using the scan tool, select "VG Turbo Cleaning Procedure".
22. Using the scan tool, select "Start".
23. Follow the scan tool prompts. When instructed, verify that the turbocharger cleaning tool tap cutoff valve is in the CLOSED position and install the Mopar® Diesel Turbocharger Cleaner # 68044565AA (1).
24. Continue to follow the scan tool prompts. The prompts in the cleaning process may instruct the technician to clean the turbocharger using a second or possibly a third can of Mopar® Diesel Turbocharger Cleaner # 68044565AA. Use as many cans as requested but **no more than 3 cans**. If cleaning is ineffective, the scan tool may prompt the technician to replace the turbocharger.

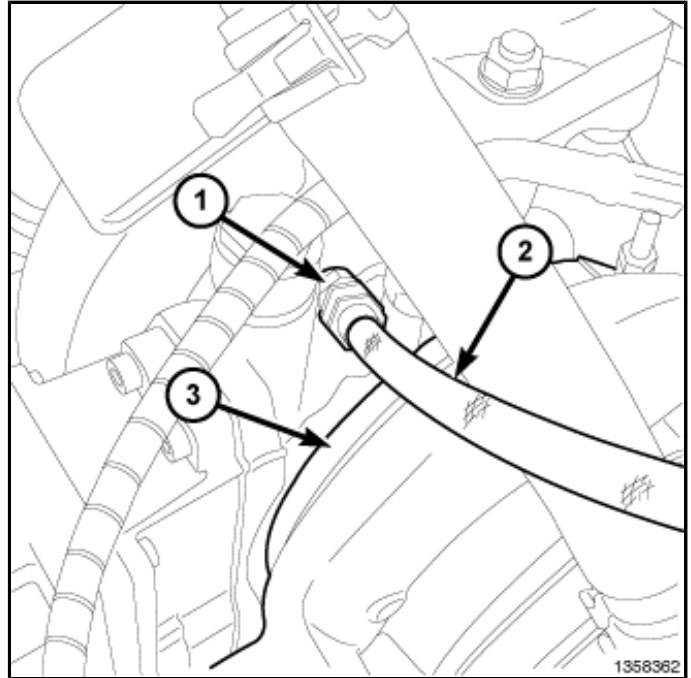
**NOTE:** During the cleaning process, be sure to follow the on screen instructions carefully. Specifically, do not key off, press the accelerator or brake pedals, unplug the scan tool, release

**NOTE:** To dispense the full contents of the cleaner correctly, the Mopar® Diesel Turbocharger Cleaner can # 68044565AA (1) must be



UPSIDE DOWN (can nozzle pointing towards the ground). It is preferred that the Mopar® Diesel Turbocharger Cleaner can # 68044565AA (1) be higher than the level of the turbocharger while the cleaner is being dispensed, if possible, hang the cleaner can on the hood latch.

25. After completing the cleaning procedure via the scan tool, remove the # 10143 turbocharger cleaning tool hose (2) from the cleaning tool nozzle.
26. Remove the # 10143 turbocharger cleaning tool nozzle (1) from the turbocharger housing (3).



27. Install the stainless steel Mopar® turbocharger cleaning port plug (1) into the cleaning port of the turbocharger. Tighten the plug to 10 N-m (89 in. lbs.).

**NOTE:** The use of the proper Mopar® plug is critical. Use of an unapproved plug of different material type and/or thread may cause damage to the turbocharger.

28. Remove the protective fender cover from the right battery.
29. Perform a powertrain verification test to ensure there are no additional issues.

**NOTE:** It is important to perform the complete repair when cleaning a turbocharger. DO NOT omit any steps in the cleaning process

