Authorized Field Change

AFC G-06919

Date: January, 2007

Subject File: ENGINE

Subject: Engine Air Management System Upgrade for Certain International® 1652, 3200, 3300, 4200, CE Bus and RE Bus Models Built Between January 1, 2003 and December 31, 2003 with International® VT 365 Engines

Model: 1652
Start Date: 01/01/2003 End Date: 12/31/2003

Model: 3200
Start Date: 01/01/2003 End Date: 12/31/2003

Model: 3300
Start Date: 01/01/2003 End Date: 12/31/2003

Model: 4200
Start Date: 01/01/2003 End Date: 12/31/2003

Model: CE Bus
Start Date: 01/01/2003 End Date: 12/31/2003

Model: RE Bus
Start Date: 01/01/2003 End Date: 12/31/2003

DESCRIPTION

NOTE – Do a thorough search of the warranty history to make certain this repair has not already been completed.

NOTE – If the repair has not been previously completed and before ordering parts, make arrangements with the customer to have all applicable International® VT 365 engine AFC's completed during a single visit. Only order parts for vehicles that have been scheduled with the customer.

NOTE – Should a unit involved in this AFC come in for a major engine repair, before proceeding with this AFC, verify that the engine does not require replacement and is viable for this and any other open AFC's.

During AFC repairs perform the "Replace Power Steering Gear Train Gears" first.

International has released a service kit to upgrade engine hardware and calibration to provide the best overall durability and performance improvements.

PARTS INFORMATION

Table 1 Air Management System Service Kit

Part Number	Description	Quantity
8000858R91	Exhaust Gas Recirculation (EGR) valve assembly (1) Manifold Absolute Pressure (MAP) sensor (1) Exhaust Back Pressure (EBP) sensor (1) EBP tube assembly (1) EVRT® control valve kit (1) Instruction sheet (1)	1
1870713C91	Turbocharger Reconditioning Kit, Contains the Following: Oil Supply Gasket (1) Oil Drain O-Ring Seal (2) M8 X 30 mm, Non Locking (3) M6 X 20 mm Bolt (1) .484 X .623 O-Ring (1) Large Yellow Cap for Compressor Inlet (1) 2 1/2 Inch Red Cap Plug for Compressor Outlet (1) 2 1/2 Inch Red Cap Plug for Turbine Wheel (1) Large Yellow Molded Cap Plug for Oil Inlet (1) 1.06 Inch Yellow Cap Plug for Oil Drain (1) 3M Grinding/Sanding/Finishing Kit (1) Roll Formed V-Clamp (1) V-Clamp Nut (1) Permatex Anti Seize Lubricant 5 gram Packet (2) Instructions	1

PROCEDURE

Initial Inspection: Service Write-Up

1. Using ISIS open the Vehicle Information Page located under the “Write Up” menu option

   A. Enter the Chassis Number and click the submit/view button.

   B. Once the page refreshes, click on the Calibration Scorecard link.

   C. A new window will open and provide you with the correct directions to follow regarding whether to recalibrate or not (Figure 1). NOTE: Figure 2 is the old ISIS screen.

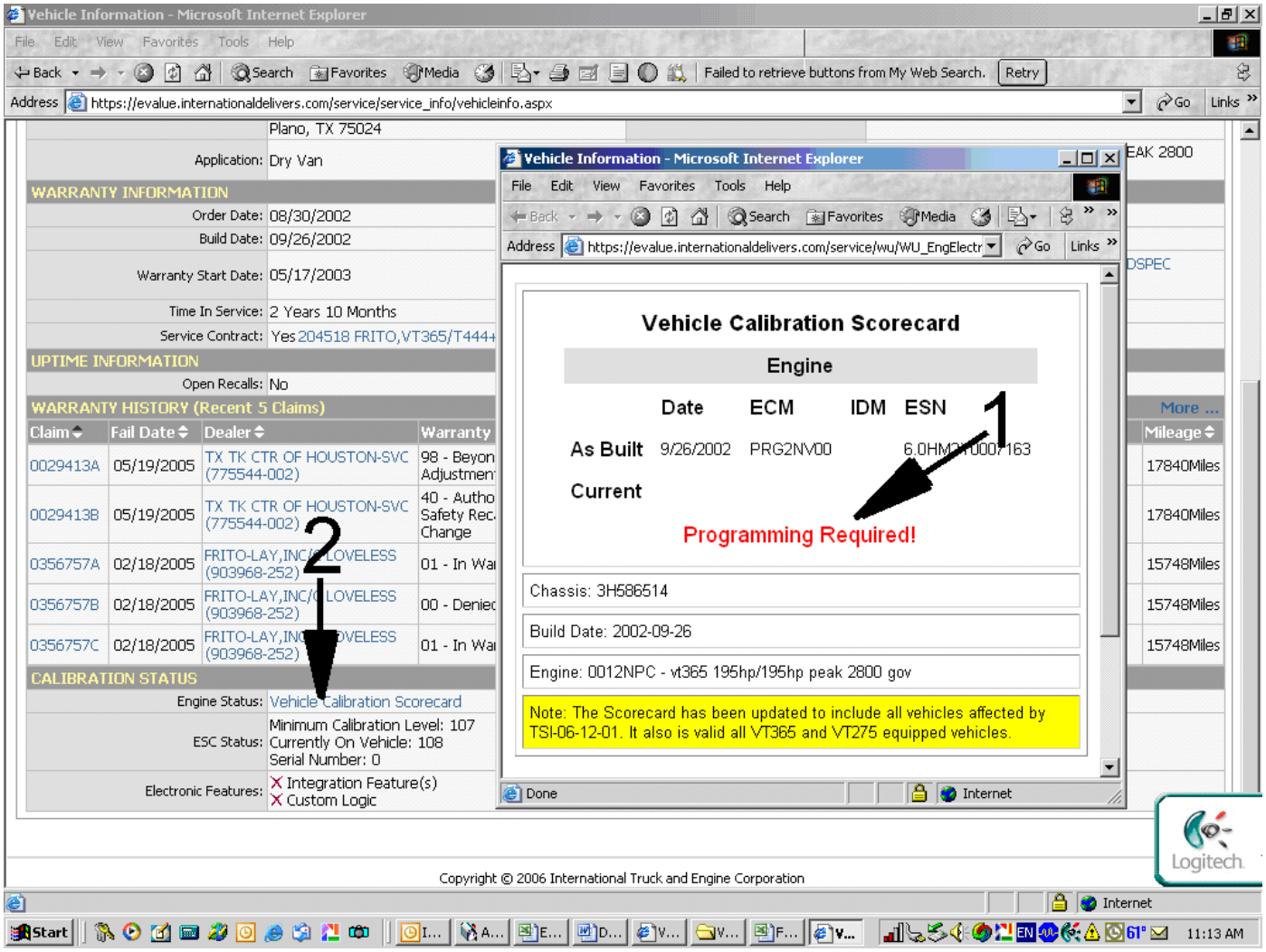


Figure 1 New ISIS Screen

1. Programming Required
2. Vehicle Calibration Scorecard

PROCEDURE (CONT.)

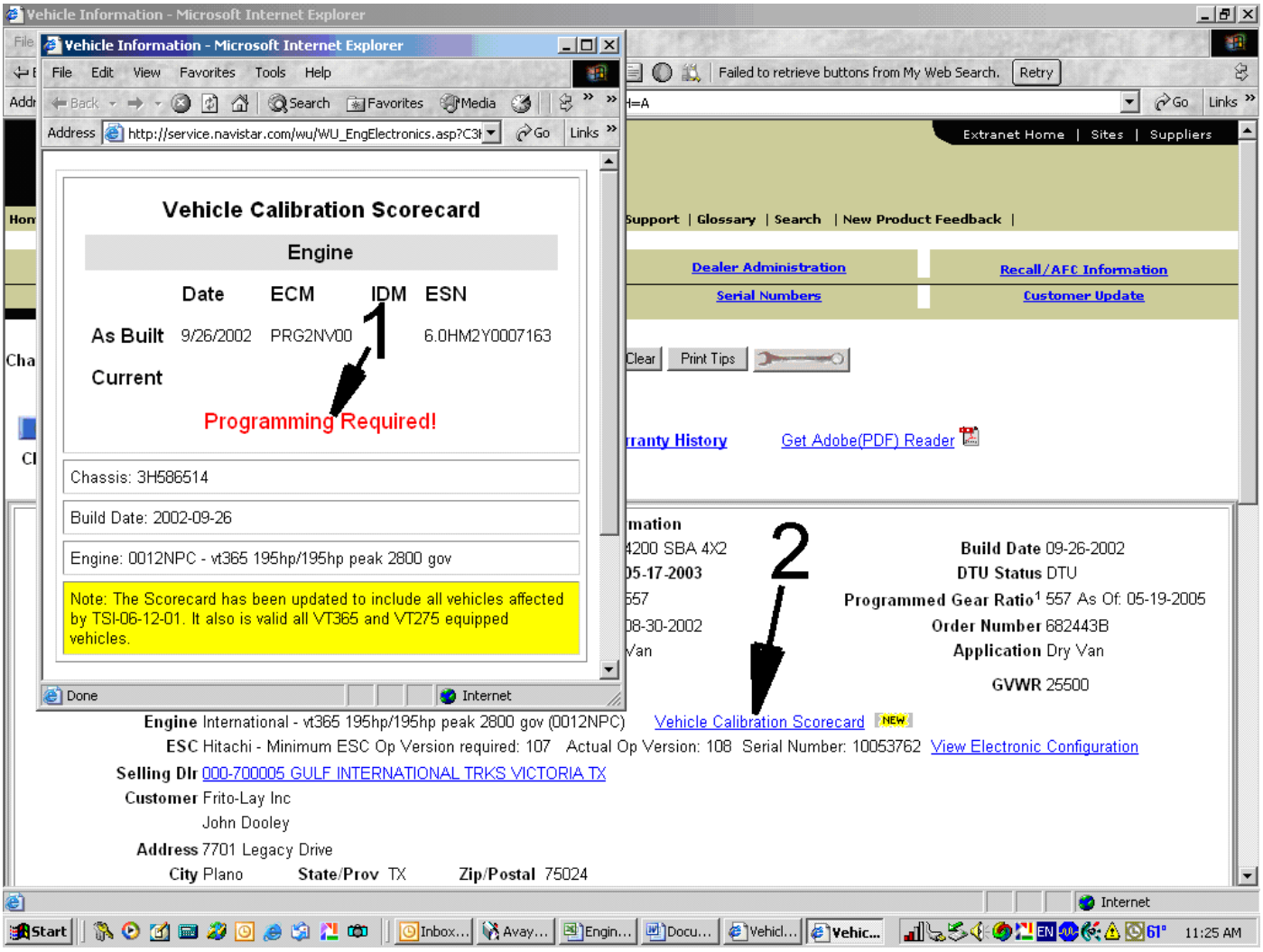


Figure 2 Old ISIS Screen

1. Programming Required
2. Vehicle Calibration Scorecard

Repairs: Technician

1. If the ECM Calibration is not current and the message located in the scorecard indicates that, the ECM / IDM must be reprogrammed using Navistar Electronic Technical Support System (NETS).

2. Verify engine startup after programming before proceeding with other repairs. If engine will not start, contact Technical Service Vehicle Programming Group for assistance.

3. Install the Air Management System Service Kit:

   a. Replace MAP sensor and clean sensor port in intake manifold.

   b. Replace EBP sensor and tube. Clean tube fitting in exhaust manifold and EBP sensor support bracket.

   c. Replace EGR valve.

PROCEDURE (CONT.)

d. Replace EVRT® control valve.

4. Recondition the turbocharger if needed. Refer to “Recondition Turbocharger” (See Recondition Turbocharger, page 7) for instructions.

5. After repairs have been made, secure engine and chassis harnesses away from:

- Exhaust related components
- Sharp edges of the Electronic Control Module and Injector Drive Module assembly
- Air compressor bracket (if equipped)

Final Inspection:

1. Road Test vehicle approximately 20 miles.

   a. Set up MasterDiagnostics® DLC II to record a snapshot if a problem occurs during the road test. Use FAQ 229051 for reference.

2. If any Diagnostic Trouble Codes (DTCs) become active during the road test, then repair as needed.

   NOTE – This procedure is only for the DTCs listed in Table 2. All other DTCs outside the scope of the VT 365 Uptime Procedure need to be addressed separately.

3. Return vehicle to customer if repairs are complete.

Table 2

DTC	PID	SID	FMI	CIRCUIT Index	Fault Description
343	0	34	0	AMS	Excessive exhaust back pressure (gauge)
344	0	34	13	ESP	Exhaust back pressure above specification when engine off
345	0	27	2	AMS	Faults detected during VGT portion of AMS test
346	27	0	2	AMS	Faults detected during EGR portion of AMS test
351	0	34	7	AMS	Change in exhaust back pressure did not occur when expected
355	103	0	0	AMS	Variable geometry turbo overspeed
361	0	27	10	AMS	VGT control input (MAP / EBP) above/below desired level
365	27	0	10	AMS	EGR valve position above / below desired level
367	27	0	0	AMS	Improper position signal when EGR valve is expected closed

Diagnosis Procedure

1. Using MasterDiagnostics® DLC II – Open VIN+ Session.

   a. Document DTCs and clear inactive DTCs.

PROCEDURE (CONT.)

Table 3 Active DTC(s)

Document Active DTC(s) Here		

2. Using MasterDiagnostics® DLC II - Open Continuous Monitor Session.
   a. Run Key-On Engine-Off (KOEO) standard test, check and document DTCs.
   b. Run Continuous Monitor test.
   c. Check and document EBP signal voltage _____ V.
   d. Check and document MAP signal voltage _____ V.
   e. Check and document BARO, it should be consistent with regional altitude. Compare value with BARO in another truck equipped with a Diamond Logic™ Controller.
      - BARO _____ psia
      - BARO (another vehicle) _____ psia
   f. Check and document Exhaust Gas Recirculation Position (EGRP) % and signal voltage (closed state) _____ %, _____ V.
   g. Cancel Continuous Monitor test.
   h. Run Output State - Low test.
   i. Check and document EGRP % (90 to 100%) _____ %.
   j. Cancel Output State - Low test.
   k. Check and document EGRP % (0%) _____ %.
3. Conduct AMS Performance Diagnostics.
   a. Run Key-On Engine-Running (KOER) - Standard test.
   b. Run KOER - AMS test.
   c. Run KOER VGT - Low, Medium, and High Duty Cycle test at low idle. Document EBP during each duty cycle - there should be distinct changes in EBP during each duty cycle.
      - Low _____
      - Med. _____
      - High _____
   d. Check, document and repair any active DTCs.
4. Create case file through Tech Services if assistance is needed.
5. Return to customer when repairs are complete.

PROCEDURE (CONT.)

Recondition Turbocharger

1. Remove the turbocharger from the engine following the procedure in the VT 365 Service Manual.

2. Inspect the compressor and turbine blades for damage. If blade damage is present, the turbocharger cannot be reconditioned.

3. Cover the turbocharger outlet with 2 1/2 inch red cap plug cover and compressor inlet with large yellow cap (Figure 3).

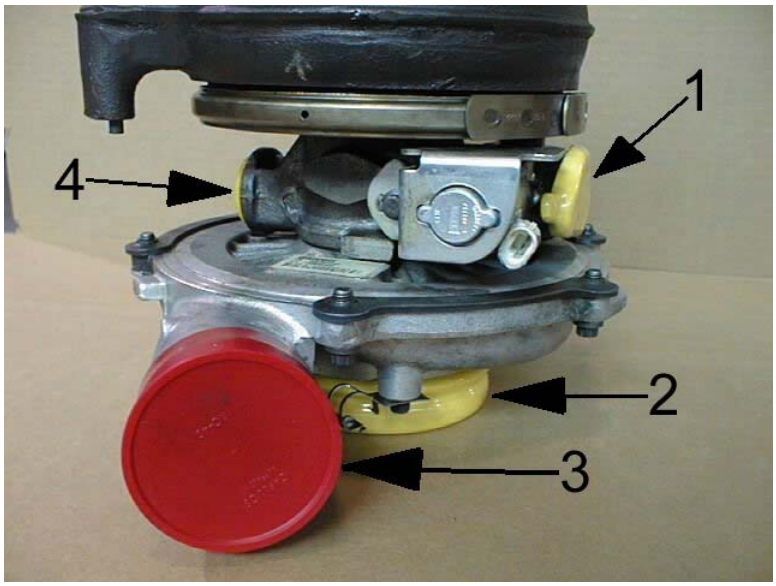


Figure 3 Cover Compressor Inlet, Outlet, Oil Inlet and Oil Outlet with Cap Plugs (Arrows)

1. Oil Inlet
2. Compressor Inlet
3. Compressor outlet
4. Oil Outlet

4. Clean turbocharger oil inlet mounting surface and cover with a molded yellow cap plug (Figure 3).

5. Place a yellow cap plug into the turbocharger oil outlet passage (Figure 3).

6. Using a paint pen, mark the location of the V-clamp split on center housing and direction of stud with an arrow (Figure 4).

PROCEDURE (CONT.)

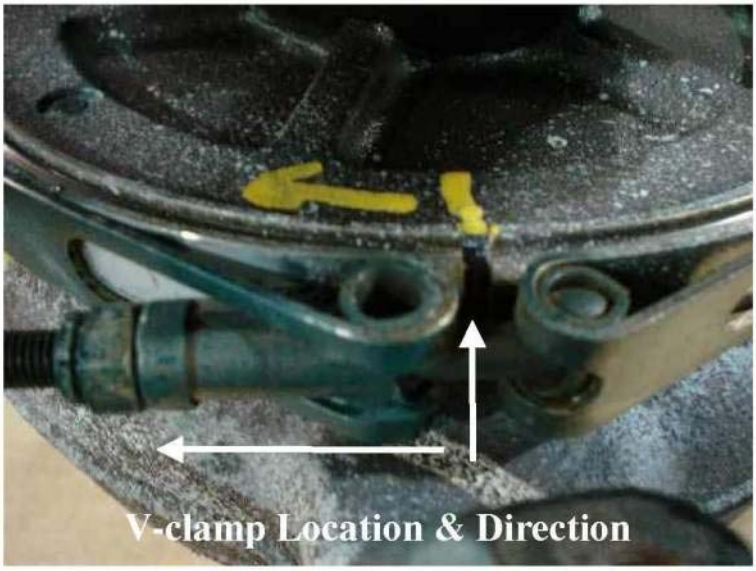


Figure 4

7. Using a paint pen, mark the location of the unison ring cam on the turbocharger housing to make re-assembly easier (Figure 5).

Figure 5

PROCEDURE (CONT.)

8. Remove the V-clamp retaining nut completely from the clamp assembly (Figure 6). Move the V-clamp off of the groove. Use a cable tie strap to hold the V-clamp in the open position as shown in Figure 6.

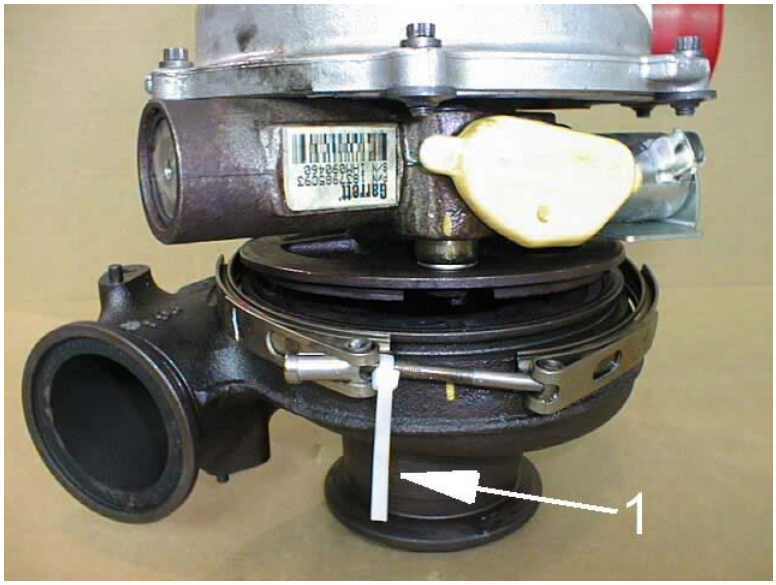


Figure 6 Remove V-clamp

1. Cable Tie Strap

9. Carefully separate the turbocharger housing from the center section with a hammer and brass drift. Inspect turbine wheel for damage:

   - If damage is found, the turbocharger cannot be reconditioned.
   - If no damage is found continue this procedure. Install a 2 1/2 inch red cap plug to protect the turbine wheel during cleaning (Figure 7).

PROCEDURE (CONT.)

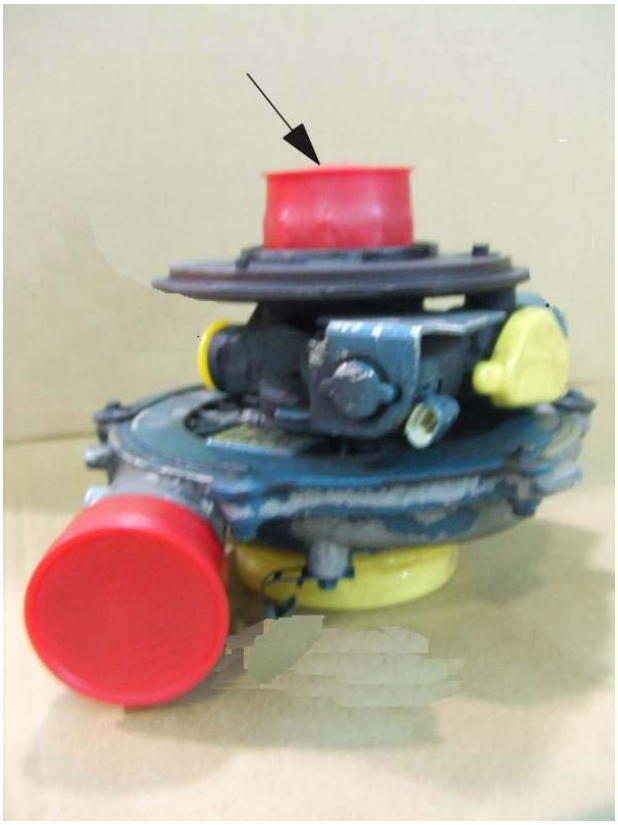


Figure 7 Install a 2 1/2 Inch Red Cap (Arrow)

10. Inspect the unison ring for cracks or excessive wear. If either is found, the turbocharger cannot be reconditioned (Figure 8 and Figure 9).

PROCEDURE (CONT.)

Figure 8 Unison Ring can be Reconditioned

Figure 9 Unison Ring Cannot be Reconditioned (Crack at Arrow)

PROCEDURE (CONT.)

11. Clean the center section (Figure 10):

    - Using 2 inch 3M® cleaning pad, remove corrosion from surfaces that contain moving parts and mating housing joints.
    - Using the least aggressive cleaning disc, clean surfaces until all corrosion and carbon has been removed. Take care to prevent damage or gouging the machined surfaces of the housings or unison ring cam.

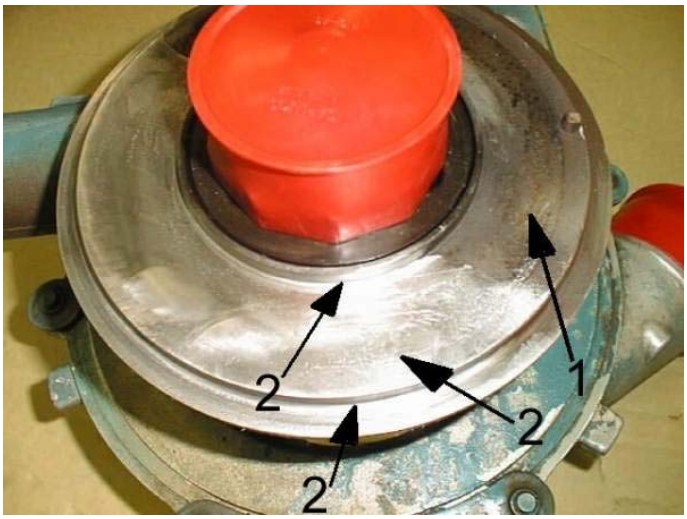


Figure 10

1. Un-Cleaned
2. Cleaned

12. Clean the pilot area of the center section that contacts the unison ring. Remove debris from the housing with brake cleaner and compressed air (Figure 10).

Figure 11 Remove Unison Ring and Vanes

PROCEDURE (CONT.)

13. Remove the unison ring and vanes from the turbine housing (Figure 11).

14. Using 2 inch 3M® cleaning pad, remove the corrosion from the surface of the unison ring (Figure 12) and the inner diameter of the ring where it contacts the center section.

    - Remove debris from the unison ring with brake cleaner and compressed air.
    - Recheck for cracks after cleaning. Refer to Figure 9.

Figure 12 Unison Ring

15. Prepare the sanding disc holder (Figure 13 and Figure 14):

    - Chuck the disc holder (Figure 13) into a slow speed drill and with the aid of a bench grinder run the drill at slow speed and grind the diameter of the disc holder to approximately 3/4 to 1 inch diameter.
    - Install the desired disc onto the disc holder (Figure 14) and use the same procedure to grind the disc to fit the disc holder.

Figure 13

PROCEDURE (CONT.)

Figure 14

16. Using the modified cleaning disc, remove corrosion from all surfaces that contain moving parts in the turbine housing and mating surfaces of the housing (Figure 15).

    - Aggressively clean surfaces until all corrosion and carbon have been removed and bright shining metal surfaces are exposed.
    - Take care to prevent damage to the machined surfaces and housing vane posts.
    - Remove debris from the housing with brake cleaner and compressed air.

Figure 15

17. Apply a light coating using one 5 gram packet of Permatex® Anti-Seize lubricant to the turbine housing and the second 5 gram packet to the center section, unison ring, and pilot diameters that have been cleaned (Figure 16, Figure 17, Figure 18).

PROCEDURE (CONT.)

- This procedure is to coat the surfaces, not lubricate the moving parts.
- Remove all excessive lubricant with clean paper towels.
- Do not apply Anti-Seize to the vanes or posts.

Figure 16 Apply 5 Gram Packet Permatex® Anti-Seize

Figure 17

PROCEDURE (CONT.)

Figure 18

18. Install the original vanes into the turbine housing.

- Remove the cap plugs from the compressor housing and center section.
- Index the unison ring onto the vanes.
- Verify free movement of the vanes and unison ring.
- Align the housing mark and unison ring cam slot (Figure 19).
- Position V-clamp on the turbine housing.
- Verify the V-clamp bolt is in the correct direction.

Figure 19

PROCEDURE (CONT.)

19. Lower the center section onto the turbine housing (Figure 20), aligning the unison ring cam first, then the housing dowel.

Figure 20 Lower the Center Section onto the Turbine Housing

20. Remove the cable tie strap from the V-clamp and align the V-clamp with the paint marks with stud and nut pointing in direction of arrow. Coat the threads with Anti-Seize lubricant. Install the lock nut and tighten to 160 to 176 Lbf-in (16 to 20 Nm). Loosen the nut to 43 to 53 Lbf-in (5 to 6 Nm). Retighten to 132 to 144 Lbf-in (15 to 16 Nm).

21. Insure the outer surface is clean and remove the cap plugs from the turbocharger.

    - Reinstall the turbocharger using the turbocharger mounting kit.
    - Use the appropriate service manual for reference.

Operation number must appear on all claims.

Table 4 Labor Information

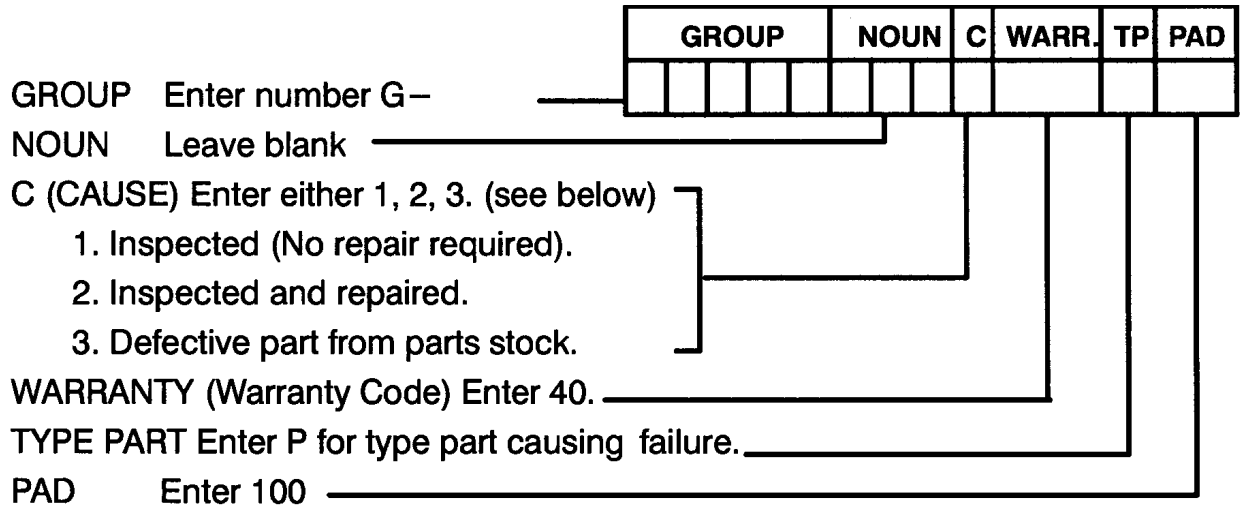
Operation No.	Description	Time
A40–06919–1	Air Management Upgrade Kit Installation with Turbo Cleaning	3.0 Hrs.
A40–06919–2	Add for Some Vehicles with Air Compressor	0.5 Hr.
A40–06919–3	Air Management Upgrade Kit Installation without Turbo Cleaning	0.8 Hr.

ADMINISTRATIVE PROCEDURE

Expense is to be charged to Warranty. Claims are to be submitted in the normal manner, making reference to Authorized Field Change Number G-06919.

It is important that the coding be completed properly to assist in processing the warranty claim. Complete instructions will be found in the Warranty Manual, Section 7–1. Special attention should be given to Items 39 through 44.

To assure this important improvement is made in a timely manner, all claims for G-06919 activity must be submitted by January 31, 2008 or within the normal warranty period for the vehicle, if after January 31, 2008.



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