Countries:	CANADA, UNITED STATES	**Document ID:**	IK1201511
Availability:	ISIS, FleetISIS, IsSIR	**Revision:**	0
Major System:	ENGINE	**Created:**	3/19/2025
Current Language:	English	**Last Modified:**	3/26/2025
Other Languages:	NONE	**Author:**	Brandon Heisler
Viewed:	684		

Less Info

Hide Details Coding Information

Copy Link	Copy Relative Link	Bookmark	Add to Favorites	Print	Provide Feedback	Helpful	Not Helpful
		View My Bookmarks				5	1

Title: Supplemental A26 MAF Fault Diagnostics

Applies To: All A26 Engines

CHANGE LOG

Please refer to the change log text box below for recent changes to this article:

03/26/2025 - Initial Article Release

PLEASE COMPLETE ALL PUBLISHED DIAGNOSTICS BEFORE PERFORMING THESE STEPS.

The diagnostics within this document are supplemental diagnostic steps only. This article is intended to be followed once all published diagnostics have been exhausted with no current repair direction or solution. Failure to follow published diagnostics can result in improper diagnostics being performed, and can also result in extended downtime for the customer. Technical Service Support teams have created this article for a short-term solution while pending published diagnostics are enhanced and updated. Once those diagnostics have been updated, this article will be retired. Always reference published manuals, FCAPs, and GUIDE sessions before performing the steps below.

DESCRIPTION

This document will guide users through supplemental diagnostics for SPN 132, Mass Air Flow, fault codes.

SYMPTOM(s)

- MIL
- MAF calibration will not complete.

Diagnostic Trouble Code(s) & Dashboard Indicator Light(s):

DTC/Light	Description
2017 A26 ESN 4500000 - 4599999	
SPN 132 FMI 0	Engine Intake Air Mass Flow Rate: Data Valid But Above Normal Operational Range - Most Severe Level
SPN 132 FMI 13	Engine Intake Air Mass Flow Rate: Out Of Calibration
SPN 132 FMI 16	Engine Intake Air Mass Flow Rate: Data Valid But Above Normal Operating Range - Moderately Severe Level
SPN 132 FMI 18	Engine Intake Air Mass Flow Rate: Data Valid But Below Normal Operating Range - Moderately Severe Level
SPN 132 FMI 20	Engine Intake Air Mass Flow Rate: Data Drifted High
SPN 132 FMI 21	Engine Intake Air Mass Flow Rate: Data Drifted Low
2021 A26 ESN 4600000 - 4699999	**Description**

SPN 132 FMI 0	Engine Intake Air Mass Flow Rate: Data Valid But Above Normal Operational Range - Most Severe Level
SPN 132 FMI 13	Engine Intake Air Mass Flow Rate: Out Of Calibration
SPN 132 FMI 16	Engine Intake Air Mass Flow Rate: Data Valid But Above Normal Operating Range: Moderately Severe Level
SPN 132 FMI 18	Engine Intake Air Mass Flow Rate: Data Valid But Below Normal Operating Range - Moderately Severe Level

Customer Observations or Concerns:

- MIL On

SPECIAL TOOL(s) / SOFTWARE

Tool Description	Tool Number	Comments	Instructions
SDS	N/A	N/A	Review Introduction to SDS

Tools Resource Center

SERVICE PARTS INFORMATION

Please consult with the parts department for current service part numbers.

DIAGNOSTIC STEP(s)

2017 A16 ESN 4500000 - 4599999

2021 A26 ESN 4600000 - 4699999

WARNING! To prevent property damage, personal injury, and / or death, park vehicle on a hard, flat surface, turn the engine off, set the parking brake, and install wheel chocks to prevent the vehicle from moving in either direction.

WARNING! To prevent property damage, personal injury, and / or death, if the vehicle must be raised, do not work under the vehicle supported only by jacks. Jacks can slip or fall over.

WARNING! To prevent personal injury and / or death, always wear safe eye protection when performing vehicle maintenance.

WARNING! To prevent property damage, personal injury, and / or death, keep flames or sparks away from vehicle and do not smoke while servicing the vehicle's batteries. Batteries expel explosive gases.

WARNING! To prevent property damage, personal injury, and / or death, remove the ground cable from the negative terminal of the battery box before disconnecting any electrical components. Always connect the ground cable last.

2017 A26 ESN 4500000 - 4599999

Step	Confirm base diagnostics have been completed.	Decision
#1	**Review FCAP/GUIDE and symptom-based diagnostics from the diagnostic manual:**	**Yes**.

	Did the applicable FCAP/GUIDE or symptom-based diagnostics identify a repair path? **NOTE: If a symptom is associated with the fault code, the diagnostics for that symptom should be performed before moving on to the next step.**	Follow the repair path established by the published diagnostics. **No**. Proceed to step 2.

Step	Verify ECM calibration	Decision
#2	**Confirm the ECM calibration is up to date:** Is the ECM calibration SV*B or greater?	**Yes.** Proceed to step 3. **No.** Update the ECM calibration and then re-test for the issue. If the issue persists, proceed to step 3.

Step	Review health reports	Decision
#3	**If the ECM calibration was already up to date, review the health report history from the past 100 engine hours. Check for VGT (641) fault codes.** **If the ECM calibration was updated, confirm a VGT (641) fault did not log pending or active when re-testing:** Were any VGT faults found, without associated repairs?	**Yes.** Proceed to step 4. **No.** Proceed to step 5.

Step	Inspect the VGT	Decision
#4	**Disconnect the VGT actuator linkage from the turbo. Cycle the turbo vanes by hand both cold and hot, to check for binding/sticking:** Was any binding or sticking found when sweeping the VGT (turbo) vanes? **NOTE: Do NOT turn the key-on while the actuator arm is disconnected from the turbo, as this can cause damage to the assembly.**	**Yes.** Replace the turbo assembly, perform a MAF calibration, and then re-test for the issue. If the issue persists, proceed to step 5.

		No. Proceed to step 5.

Step	Confirm EGRV operation	Decision
#5	**Perform an Air Management Test and inspect for EGRV operation per IK1201492:** Was a failed EGRV identified?	**Yes.** Replace the EGRV, perform a MAF calibration, and re-test for the issue. If the issue persists, proceed to step 6. **NOTE: If the EGRV was replaced, another AMT should be completed before proceeding to step 6.**
		No. Proceed to step 6.

Step	Validate airflow.	Decision
#6	**At the same point in the graph, the EGRV was checked (half way between test start and EGRV command position), verify the Mass Air Flow, Intake Manifold Pressure, and Exhaust Back Pressure readings:** Is MAF below 1000 kg/hr, IMP below 10 psi, and/or EBP below 20 psi?	**Yes**. Proceed to step 7.
		No. Proceed to step 8.

Step	Locate the source of low-airflow.	Decision
#7	**Perform smoke testing on the intake and exhaust, and CAC pressure testing, to determine if a leak is present:** Was a leak identified?	**Yes.** Perform repairs/replacements as needed and then re-test. If the issue persists, proceed to step 9.

		No. Proceed to step 9.

Step	Validate airflow.	Decision
#8	**At the same point in the graph, the EGRV was checked (halfway between test start and EGRV command position), verify the Mass Air Flow, Intake Manifold Pressure, and Exhaust Back Pressure readings:** Is MAF above 1400 kg/hr or IMP above 25 psi, with EBP above 45 psi and/or DPFDP above 0.4 psi?	**Yes**. Drop the DOC and DPF for inspection. Inspect them per the re-use guidelines to determine if they can be reused or if they should be replaced. If they can be replaced, have the DOC cleaned, and the DPF cleaned AND baked. Once repairs are completed, re-test for the issue. If the issue persists, proceed to step 9. **NOTE: International no longer requires or provides iApprovals for DOC or DPF replacements.**
		No. Proceed to step 9.

Step	Check for biased sensors.	Decision
#9	**Perform a 5-minute KOEO signal monitor session with SDS. Review the session and confirm the EBP sensor, IMP sensor, and MAF sensors are reading 0 with the engine off:** Are all of the listed sensors reading 0 at KOEO?	**Yes.** Proceed to step 11.
		No. Proceed to step 10.

Step	Confirm the circuits to the identified biased sensor.	Decision
#10	**Perform connector body, pin drag, pin inspections, and circuit checks at the biased sensor (connector and pins should be inspected at each connection point):** Was a failed connector/pin identified, or was a failed circuit identified?	**Yes.** Repair/replace the failed connector/pin or replace the engine sensor harness and re-test. If the issue persists, proceed to step 11.
		No. Replace the biased sensor and re-test. If the issue persists, proceed to step 11.

Step	Perform a regen.	Decision
#11	**Perform a regen and review per IK0700123:** Was an issue found during the regeneration diagnostics?	**Yes.** Perform repairs as needed and then re-test for the issue. If the issue persists, proceed to step 12.
		No. Proceed to step 12.

Step	Validate Airflow	Decision
#12	**Perform a 0-60/Lugdown and road test during a signal monitor session in SDS.** **Review DPFDP:** Is DPFDP lower than 0.5 psi throughout the entire snapshot?	**Yes.** Proceed to step 13.
		No, DPFDP is greater than 0.5 PSI. If the DPF was already cleaned AND baked (not just cleaned), replace the DPF and re-test. If the issue persists, validate the results of this step with a new/current 0-60/Lugdown. If the DOC and DPF have not been inspected per the reuse guidelines, do so at this time. If they pass re-use, have the DOC cleaned and the DPF cleaned AND baked. If they were not cleaned AND baked before this step, another 0-60/Lugdown and this step should be performed again. If the issue persists, proceed to step 13. **NOTE: International no longer requires or provides iApprovals for DOC or DPF replacements.**

Step	Validate airflow	Decision
#13	**Review the 0-60/Lugdown snapshot from step 12** **Graph IMP vs. IMP desired:** Is IMP meeting or exceeding desired values throughout? **NOTE: This should be reviewed during an acceleration or steady state portion of the snapshot. The IMP may drop below desired values during decel, and shouldn't be used for this step to determine a failure.**	**Yes.** Replace the NOX-IN sensor, perform a MAF calibration, and then re-test for the issue. If the issue persists, open a tech service case file providing the step-by-step results with numerical readings where applicable from this article, and other published diagnostics completed.
		No.

		Proceed to step 14.

Step	Locate the source of low-airflow.	Decision
#14	**Perform smoke testing on the intake and exhaust, and CAC pressure testing, to determine if we have a leak:** Was a leak identified?	**Yes.** Perform repairs/replacements as needed and then re-test. If the issue persists, perform a fresh 0-60/Lugdown, and perform step 13 again.
		No. Replace the VGT (turbo) assembly, perform a MAF calibration, and then re-test for the issue. If the issue persists, perform a fresh 0-60/Lugdown, and perform step 13 again.

2021 A26 ESN 4600000 - 4699999

Step	Confirm base diagnostics have been completed.	Decision
#1	**Review FCAP/GUIDE and symptom-based diagnostics from the diagnostic manual:** Did the applicable FCAP/GUIDE or symptom-based diagnostics identify a repair path? NOTE: **If there is a symptom associated with the fault code, the diagnostics for that symptom should be performed before moving on to the next step.**	**Yes**. Follow the repair path established by the published diagnostics.
		No. Proceed to step 2.

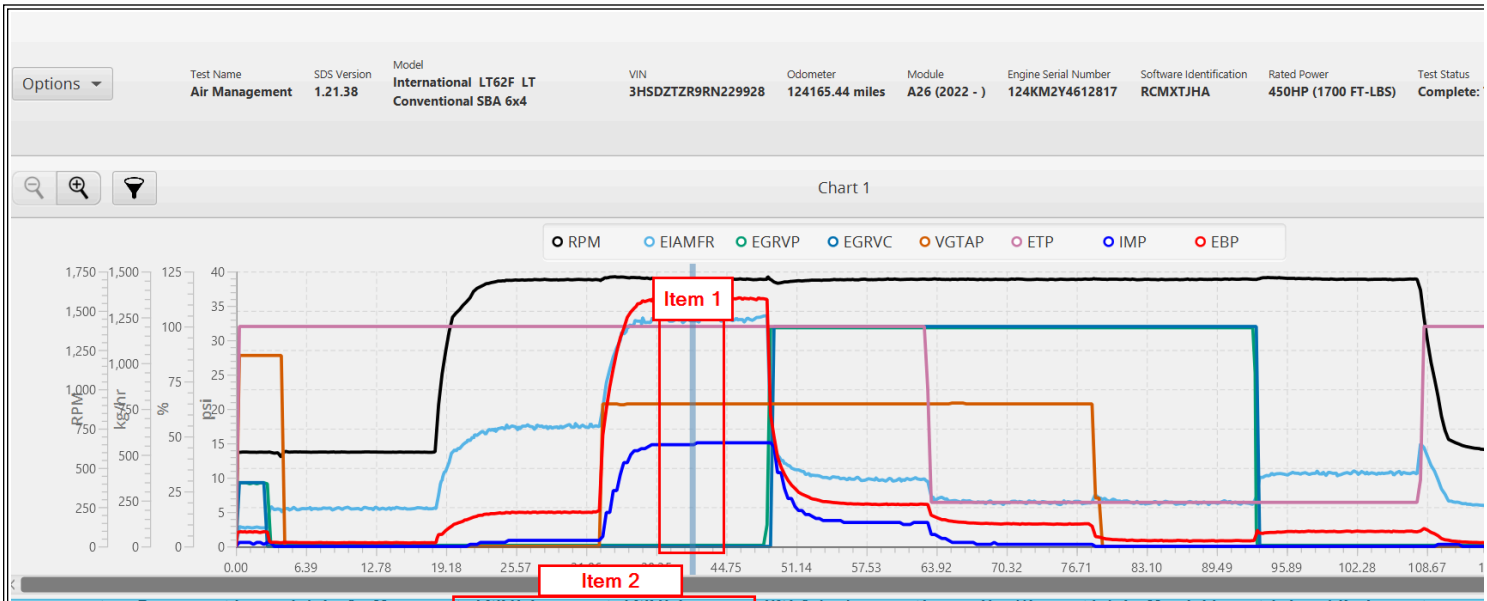
Step	Confirm ECM calibration	Decision
#2	**Confirm the ECM calibration is up to date:** Is the ECM calibration TK*A or greater?	**Yes.** Proceed to step 3.
		No. Update the ECM calibration and then re-test for the issue. If the issue persists, proceed to step 3.

Step	Review health reports	Decision
#3	**If the ECM calibration was already up to date, review the health report history from the past 100 engine hours. Check for VGT (641) fault codes.** **If the ECM calibration was updated, confirm a VGT (641) fault did not log pending or active when re-testing:** Were any VGT faults found, without associated repairs?	**Yes.** Proceed to step 4.
		No. Proceed to step 5.

Step	Inspect the VGT	Decision
#4	**Disconnect the VGT actuator linkage from the turbo. Cycle the turbo vanes by hand both cold and hot, to check for binding/sticking:** Was any binding or sticking found when sweeping the VGT (turbo) vanes? **NOTE: Do NOT turn the key-on while the actuator arm is disconnected from the turbo, as this can cause damage to the assembly.**	**Yes.** Replace the turbo assembly, perform a MAF calibraiton, and then re-test for the issue. If the issue persists, proceed to step 5.
		No. Proceed to step 5.

Step	Confirm EGRV operation	Decision
#5	**Perform an Air Management Test and inspect for EGRV operation per Image #1:** Was a failed EGRV identified? **NOTE: At the selection point in Image 1, the EGRV should be 0.00% when commanded is 0.00%. If it is not, this should be considered a failed EGRV.**	**Yes.** Replace the EGRV, perform a MAF calibration, and re-test for the issue. If the issue persists, proceed to step 6. **NOTE: If the EGRV was replaced, another AMT should be completed before proceeding to step 6.**
		No. Proceed to step 6.

STEP 5



Time	Engine Speed (RPM)	Engine Intake Air Mass Flow Rate (EIAMFR) (kg/hr)	EGR Valve Position (EGRVP) (%)	EGR Valve Control (EGRVC) (%)	VGT Actuator Position (VGTAP) (%)	Engine Throttle Position (ETP) (%)	Intake Manifold Pressure (IMP) (psi)	Exhaust Back Pressure (EBP) (psi)
40.13	1701.50	1238.80	0.47	0.00	64.80	100.00	14.79	35.91
40.23	1704.50	1208.65	0.47	0.00	64.80	100.00	14.79	36.04
40.33	1703.00	1217.35	0.47	0.00	64.80	100.00	14.79	35.95
40.43	1704.00	1233.70	0.47	0.00	64.80	100.00	14.79	36.19
40.53	1703.00	1248.95	0.47	0.00	64.80	100.00	14.79	35.91
40.63	1701.50	1254.05	0.47	0.00	64.80	100.00	14.79	36.10
40.73	1701.00	1221.15	0.47	0.00	64.80	100.00	14.79	36.01

Item 1: Selection point of the AMT
Item 2: Example of EGRV position blowing open from commanded position

Step	Validate airflow.	Decision
#6	**At the same point in the graph the EGRV was checked (halfway between VGT command and EGRV command positions start), verify the Mass Air Flow, Intake Manifold Pressure, and Exhaust Back Pressure readings:** Is MAF below 1100 kg/hr, IMP below 10 psi, and/or EBP below 20 psi?	**Yes**. Proceed to step 7.
		No. Proceed to step 8.

Step	Locate the source of low-airflow.	Decision
#7	**Perform smoke testing on the intake and exhaust, and CAC pressure testing, to determine if a leak is present:** Was a leak identified? **NOTE: The link for the exhaust smoke testing is to the 2017 manual. The process and tools should be the same, and the steps can be followed still.**	**Yes.** Perform repairs/replacements as needed and then re-test. If the issue persists, proceed to step 9.

		No. Proceed to step 9.

Step	Validate airflow.	Decision
#8	**At the same point in the graph the EGRV was checked (halfway between VGT command and EGRV command positions start), verify the Mass Air Flow, Intake Manifold Pressure, and Exhaust Back Pressure readings:** Is MAF above 1500 kg/hr or IMP above 25 psi, with EBP above 45 psi and/or DPFDP above 0.4 psi?	**Yes**. Drop the DOC and DPF for inspection. Inspect them per the re-use guidelines to determine if they can be reused or if they should be replaced. If they can be replaced, have the DOC cleaned, and the DPF cleaned AND baked. Once repairs are completed, re-test for the issue. If the issue persists, proceed to step 9. **NOTE: International no longer requires or provides iApprovals for DOC or DPF replacements.**
		No. Proceed to step 9.

Step	Check for biased sensors.	Decision
#9	**Perform a 5-minute KOEO signal monitor session with SDS. Review the session and confirm the EBP sensor, IMP sensor, and MAF sensors are reading 0 with the engine off:** Are all of the listed sensors reading 0 at KOEO?	**Yes.** Proceed to step 11.
		No. Proceed to step 10.

Step	Confirm the circuits to the identified biased sensor.	Decision
#10	**Perform connector body, pin drag, pin inspections, and circuit checks at the biased sensor (connector and pins should be inspected at each connection point):** Was a failed connector/pin identified, or was a failed circuit identified?	**Yes.** Repair/replace the failed connector/pin or replace the engine sensor harness and re-test. If the issue persists, proceed to step 11.
		No. Replace the biased sensor and re-test. If the issue persists, proceed to step 11.

Step	Perform a regen.	Decision
#11	**Perform a regen and review per IK1201494:** Was an issue found during the regeneration diagnostics?	**Yes.** Perform repairs as needed and then re-test for the issue. If the issue persists, proceed to step 12.
		No. Proceed to step 12.

Step	Validate Airflow	Decision
#12	**Perform a 0-60/Lugdown and road test during a signal monitor session in SDS.** **Review DPFDP:** Is DPFDP lower than 0.5 psi throughout the entire snapshot?	**Yes.** Proceed to step 13.
		No, DPFDP is greater than 0.5 PSI. If the DPF was already cleaned AND baked (not just cleaned), replace the DPF and re-test. If the issue persists, validate the results of this step with a new/current 0-60/Lugdown. If the DOC and DPF have not been inspected per the reuse guidelines, do so at this time. If they pass re-use, have the DOC cleaned and the DPF cleaned AND baked. If they were not cleaned AND baked before this step, another 0-60/Lugdown and this step should be performed again. If the issue persists, proceed to step 13. **NOTE: International no longer requires or provides iApprovals for DOC or DPF replacements.**

Step	Validate airflow	Decision
#13	**Review the 0-60/Lugdown snapshot from step 12** **Graph IMP vs. IMP desired:** Is IMP meeting or exceeding desired values throughout? **NOTE: This should be reviewed during an acceleration or steady state portion of the snapshot. The IMP may drop below desired values during decel, and shouldn't be used for this step to determine a failure.**	**Yes.** Replace the NOX-IN sensor, perform a MAF calibration, and then re-test for the issue. If the issue persists, open a tech service case file providing the step-by-step results with numerical readings where applicable from this article, and other published diagnostics completed.

		No. Proceed to step 14.

Step	Locate the source of low-airflow.	Decision
#14	**Perform smoke testing on the intake and exhaust, and CAC pressure testing, to determine if a leak is present:** Was a leak identified? NOTE: **The link for the exhaust smoke testing is to the 2017 manual. The process and tools should be the same, and the steps can be followed still.**	**Yes.** Perform repairs/replacements as needed and then re-test. If the issue persists, review step 13 again.
		No. Replace the VGT (turbo) assembly, perform a MAF calibration, and then re-test for the issue. If the issue persists, review step 13 again.

REPAIR STEP(s)

Please see the service manual for current service and repair procedures.

WARRANTY INFORMATION

Warranty Claim Coding:

Refer to the Warranty Coding Manual for Group and Noun Codes.

Standard Repair Time(s):

Refer to the SRT Manual for Repair Times

OTHER RESOURCES

Master Service Information Site