



Subject: MTM Solenoid Fault Codes and Vehicle Air System Contamination – Endurant HD, XD and PACCAR TX-12, TX-18

Document Number: TAIB-1006

Date: April 6, 2023

Updated: March 18, 2024

Issue Description:

Customers are reporting transmission service lamp on with one or more solenoid valve fault codes. During fault code isolation troubleshooting procedure no fault may be found and leads to Mechatronic Transmission Module (MTM) replacement.

During the MTM warranty return inspection process, engineering identified contamination in the MTM housing air inlet, passages, and internal components, and determined the source of contamination is from the vehicle air system.

MTM air passages and internal components contaminated by the vehicle air system results in sticking Rail Solenoid valves causing incomplete shifts and setting Active Rail Solenoid fault codes.

Fault Codes associated to vehicle air system contamination:

Fault Code	SPN	Description	FMI
596	5901	Rail B Fore Solenoid (A5)	7, 17, 31
597	5909	Rail B Aft Solenoid (A1)	7, 17, 31
616	5902	Rail C Fore Solenoid (C1)	7, 14, 15, 17, 31
617*	5910	Rail C Aft Solenoid (B1)	7, 14**, 15, 17, 31
636	5903	Rail D Fore Solenoid (C2)	7, 14, 15, 17, 31
637	4216	Rail D Aft Solenoid (B3)	7, 14, 15, 17, 31
740	6145	Rail B Operation	7, 16, 17

**If Fault Code 617 FMI 14 is set, go to [TAIB-0994](#).

CAUTION: Before performing service on the MTM, create a Service Activity Report (SAR) and select “Send to Eaton” (internet connection required) and ensure at least one of the associated Fault Codes are present. **If no associated Fault Code is present, this document does not apply.** Failure to send a SAR, or filing a claim without an associated Fault Code present, results in a rejected warranty claim.

Containment/Corrective Action:

Effective immediately, MTMs with Rail Solenoid valve fault codes with vehicle air system contamination, amber substance, moisture, and/or carbon particulates found in the MTM housing air inlet, passages and/or internal components are considered Secondary Damage and a Non-Warrantable Repair.

Refer to [Vehicle Maintenance Recommendations](#) regarding transmission vehicle air system requirements to ensure proper air supply and air quality to the transmission.

Affected Models/Population:

- Endurant HD
- PACCAR TX-12
- Endurant XD / XD PRO
- PACCAR TX-18 / TX-18 PRO

Field Strategy:

**If Fault Code 617 FMI 14 is set, go to [TAIB-0994](#)

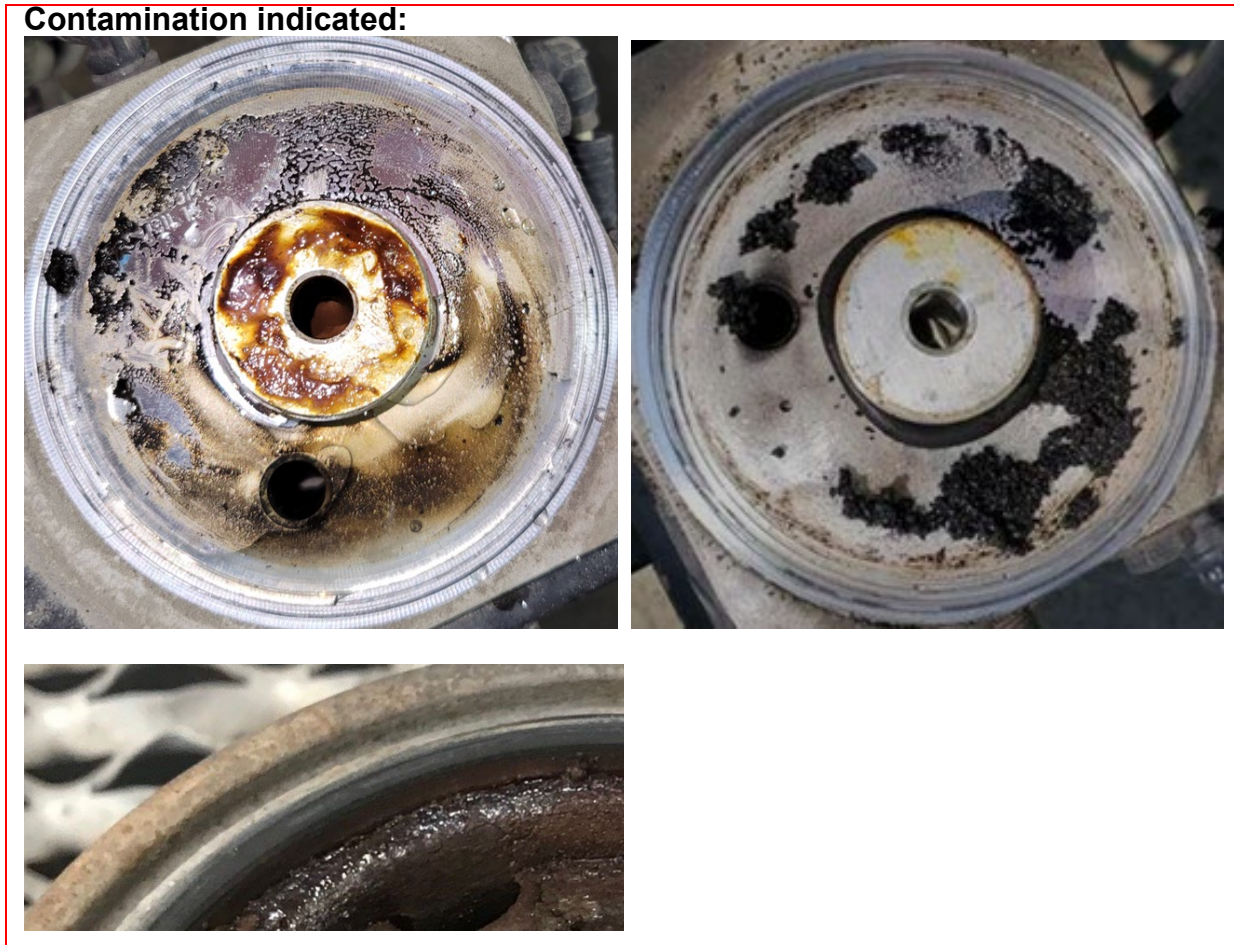
1. Key on engine off.
2. Connect ServiceRanger.
3. Create a Service Activity Report (SAR).
4. Select “Send to Eaton”.
5. Record the transmission fault codes, FMIs, occurrences, and timestamps.
6. Compare SAR fault codes with fault codes in table - Issue Description:
 - If one or more SAR fault code are in the table, go to **Step 7**.
 - If other transmission related fault codes are set, go to [TRTS0950 – Fault Code Isolation Procedure Index](#) for the troubleshooting procedure for a specific fault code.
7. Refer to OEM and/or air system manufacturer guidelines and remove vehicle air system Air Dryer Cartridge.
8. Inspect and record condition of the cartridge and mounting surface for oil and/or debris and compare to **Air Dryer Cartridge** images below.
 - If **no** contamination is found, record findings in warranty claim, go to **Step 9**.
 - If contamination is found, record findings in warranty claim, go to **Step 9**.

Air Dryer Cartridge:

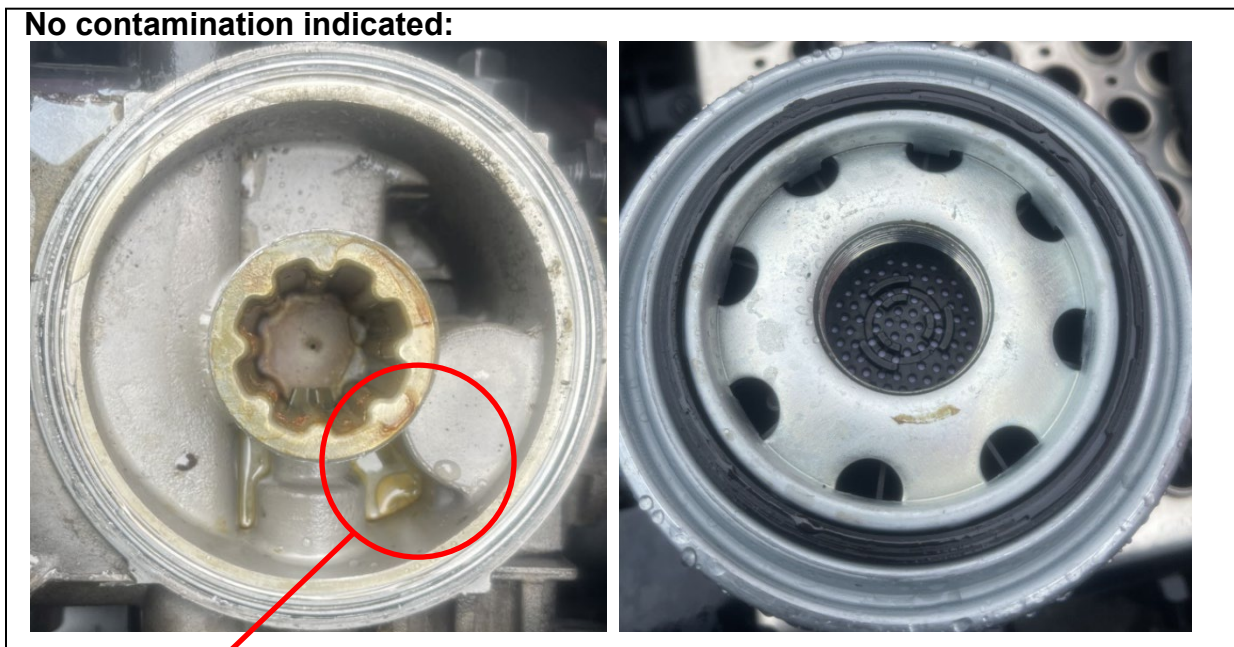
Contamination indicated:



**Air Dryer Cartridge (continued):
Contamination indicated:**



No contamination indicated:



Note: Moisture (Water) droplets found on the cartridge base is normal.

9. Refer to OEM guidelines and remove the vehicle air supply line at the MTM.

10. Inspect vehicle air supply line and MTM air inlet port for contamination and compare to **MTM Air Inlet Port** images below.

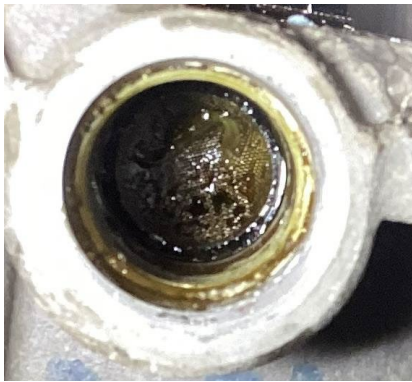
- If **no** contamination is found, record findings in warranty claim, go to **Step 11**.
- If contamination* is found, record findings in warranty claim, go to **Step 11**.

***NOTICE:** Eaton Cummins Automated Transmission Technologies recommends inspection and repair of the vehicle air system to correct the source of contamination. Refer to OEM and/or vehicle air system manufacturer maintenance guidelines to ensure proper air system operation, i.e., drain water from air tanks, replace air system filters and cartridges. Refer to [Vehicle Maintenance Recommendations](#).

MTM Air Inlet Port:

Contamination indicated:

Amber Contamination and Moisture



Amber Contamination



Moisture / Rust



Carbon Particles



MTM Air Inlet Port (continued)

No contamination indicated

45 months in service



New



11. Remove 16 MTM Cover to MTM Housing T45 cap screws and remove cover.



12. Inspect and record MTM cover and components for contamination, record color of substance(s) and compare to **MTM Cover** image examples below:

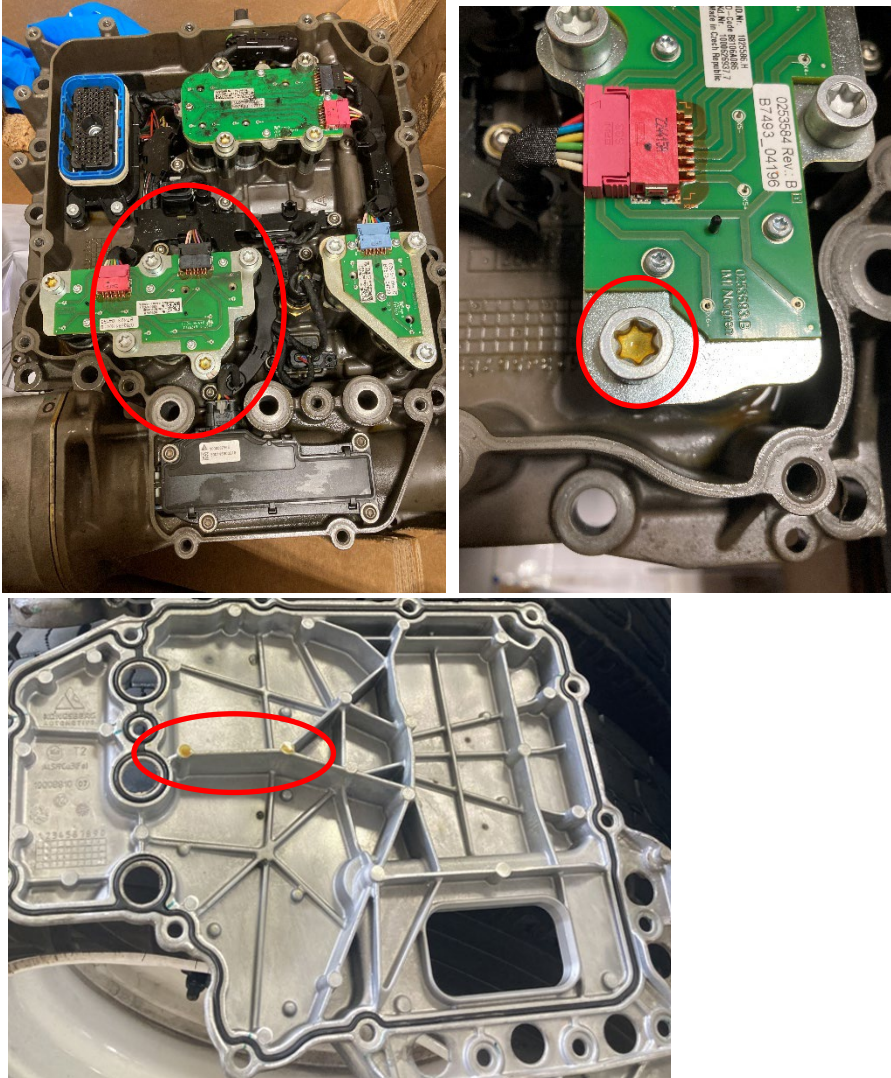
- If **no** contamination is found, record findings in warranty claim, go to **Step 15**.
- If contamination is found, recording findings in warranty claim. Based on color of substance – determine next steps:
 - If **Amber* only** substance is found, MTM fault codes are due to contamination from the vehicle air system and not a transmission product defect. Recommend MTM replacement and inspect Inertia Brake air line for Amber substance contamination – If contamination found, recommend replacement of Inertia Brake Assembly and air line (Non-Warrantable Repair). Process complete.
 - If **Black only** (beyond normal trace amounts) or **Black** (beyond normal trace amounts) and **Amber*** substance is found, go to **Step 13**.

***NOTICE:** Eaton Cummins Automated Transmission Technologies recommends inspection and repair of the vehicle air system to correct the source of contamination. Refer to OEM and/or vehicle air system manufacturer maintenance guidelines to ensure proper air system operation, i.e., drain water from air tanks, replace air system filters and cartridges. Refer to [Vehicle Maintenance Recommendations](#).

MTM Cover:

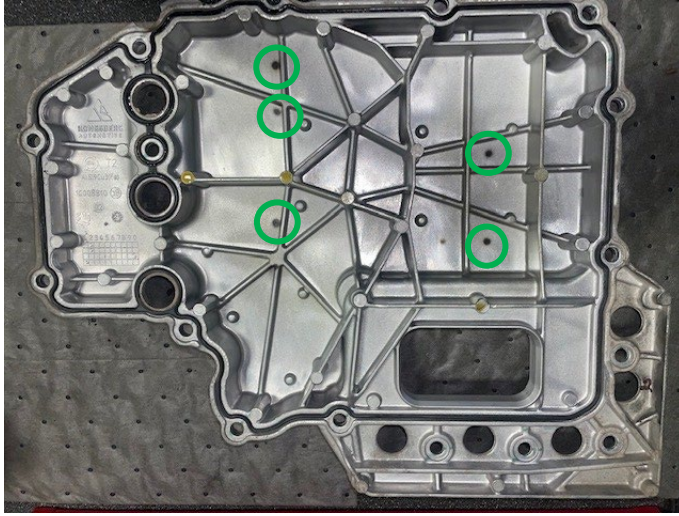
MTM - Non-warrantable:

Amber only substance contamination:



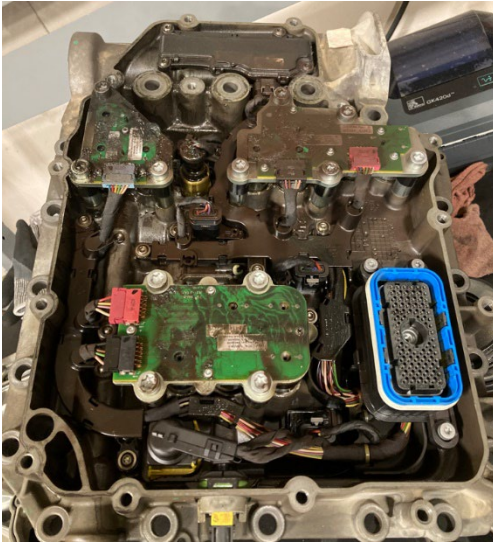
MTM – Normal

Trace amounts of transmission oil exhausted from the valve is considered normal.



MTM - Warrantable:

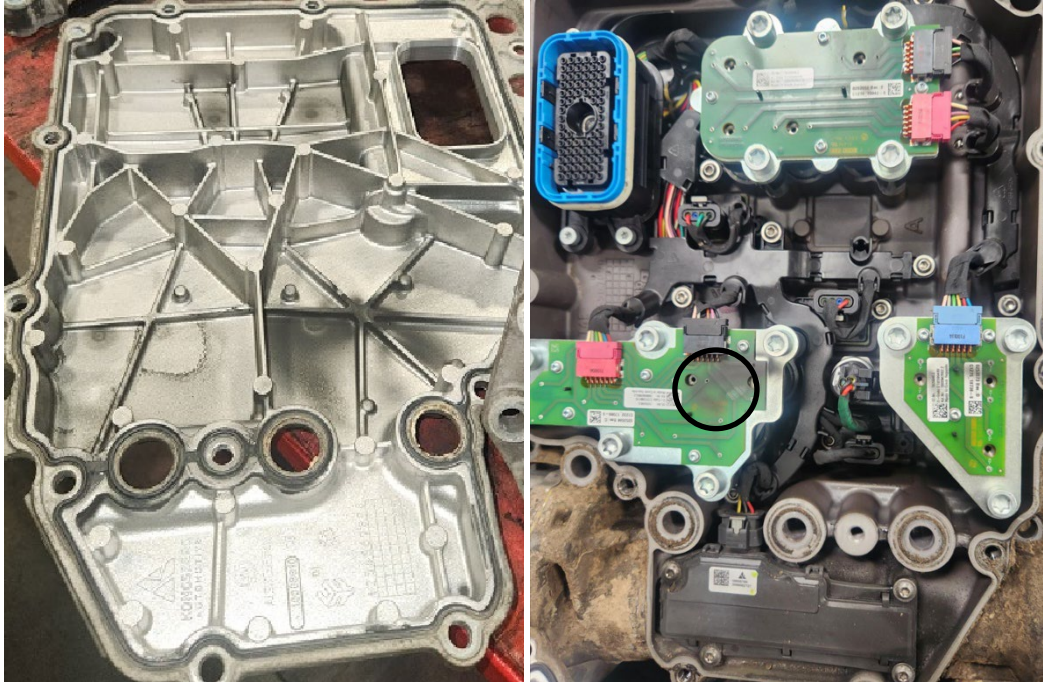
Black substance contamination:



MTM Cover (continued):

MTM - Warrantable

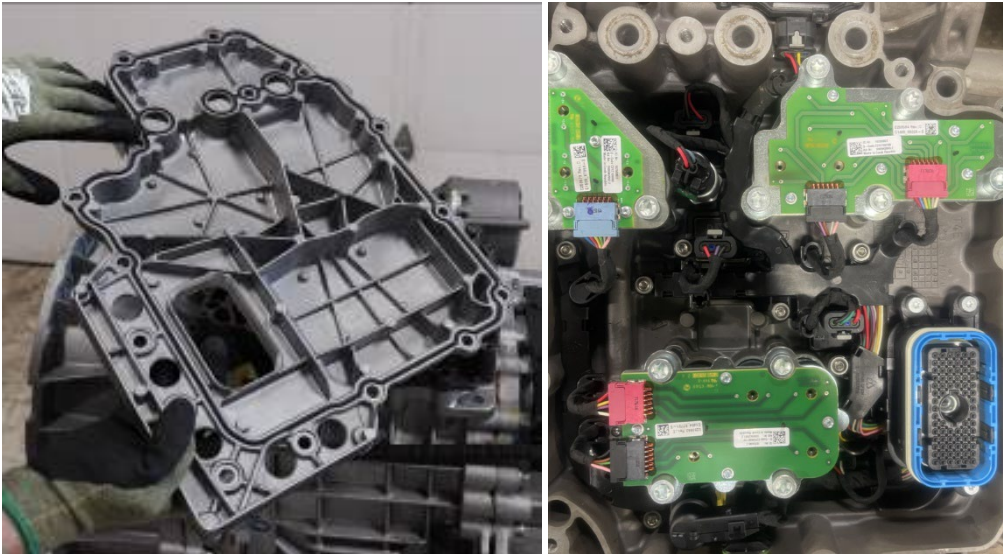
Black substance contamination:



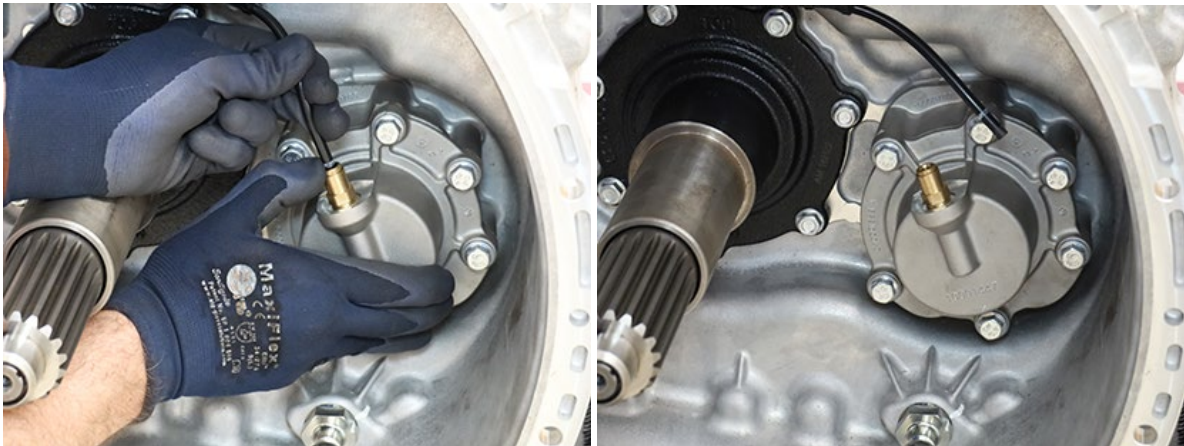
MTM Cover (continued):

MTM - Warrantable

No Contamination:



13. Depress and hold collar on air line fitting and disconnect the air line from the Inertia Brake Cover.



14. Inspect Inertia Brake Air Line and fitting for Black and Amber substance.
 - If Black or Amber substance present, recording findings in warranty claim, and replace: MTM, Inertia Brake Assembly and Inertia Brake Air Line (Warrantable Repair).
Note: Reinstall MTM Cover per **Steps 15, 16** and **17**.
 - If **no** Black or **no** Amber substance is present, **reconnect** Inertia Brake Air Line and record findings in warranty claim. Go to **Step 15**.
Note: Ensure air line is fully seated into fitting.

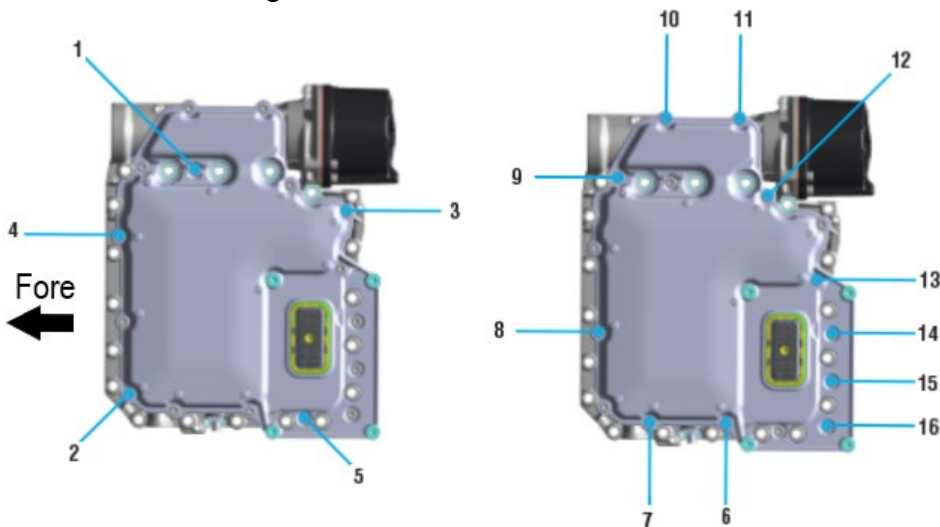
15. Install MTM Cover to MTM Housing.



16. Install 16 MTM Cover to MTM Housing T45 cap screws.

17. Torque MTM Cover cap screws 1 through 5 and 6 through 16 to 23–27 Nm (17-19 ft-lb) as shown in the torque sequence below.

CAUTION: Follow the MTM Cover cap screw torque specification and sequence as shown. Failure to follow torque specification and sequence may damage MTM Housing, Cover and O-ring.



18. Replace MTM only (Warrantable Repair).

Warranty Information:

Contamination from the vehicle's air supply is not a warrantable repair and is considered secondary damage. Warranty covers defects in materials and/or workmanship. Reference Eaton Cummins Automated Transmission Technologies Warranty Manual [ECWY3000](#).

- Claim is submitted through normal Warranty channels
- Repairing customer / dealer to provide SAR verifying VIN, transmission serial number and fault codes.

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Warranty Parts:

- No contamination (Warrantable Repair):
 - MTM Kit only.
- Black only or Black and Amber substance present (Warrantable Repair):
 - If **no** Black or **no** Amber substance present in the Inertia Brake Air Line:
 - MTM Kit only.
 - If Black or Amber substance present in the Inertia Brake Airline:
 - MTM Kit
 - Inertia Brake Assembly
 - Inertia Brake Air Line.

Note: Amber only substance present – vehicle air system contamination (Non-Warrantable Repair):

- Recommend MTM replacement and Inertia Brake inspection.
- Refer to OEM and repair/maintain vehicle air system.
- Refer to [Vehicle Maintenance Recommendations](#).

Warranty Labor:

No contamination or Black substance present:

- Diagnostics (OEM SRT up to 1.0 hour)
- Air Dryer Inspection (Remove Cartridge / up to 0.5 hour)
- MTM Cover R&R and pictures up to 0.5 hour
- Transmission R&R (OEM SRT up to 6.0 hours)
- MTM R&R up to 2.0 hours
- Software Update and calibration/configuration (OEM SRT up to 0.5 hour) (If required by the software level indicated in the Service Manual)
- Clutch and Rail Calibration after Repair (OEM SRT up to 0.5 hour)
- Test Drive up to 0.5 hour

Warrantable General Claim Coding:

- Line Item tab – Repair Line List
 - Primary Causal Part # Use MTM A-XXXXXXXX
 - Secondary Causal Part #: N/A
 - Complaint Code: Varies
 - Failure Mode Description: Black Oil Contamination (TFM-0528)
 - Responsibility Code: Design (402)

Non-Warrantable General Claim Coding:

- Line Item tab – Repair Line List
 - Primary Causal Part # Interface
 - Secondary Causal Part #: N/A
 - Complaint Code: Varies
 - Failure Mode Description: Air Supply Contamination TFM-0043
 - Responsibility Code: Rejected Claim (414)

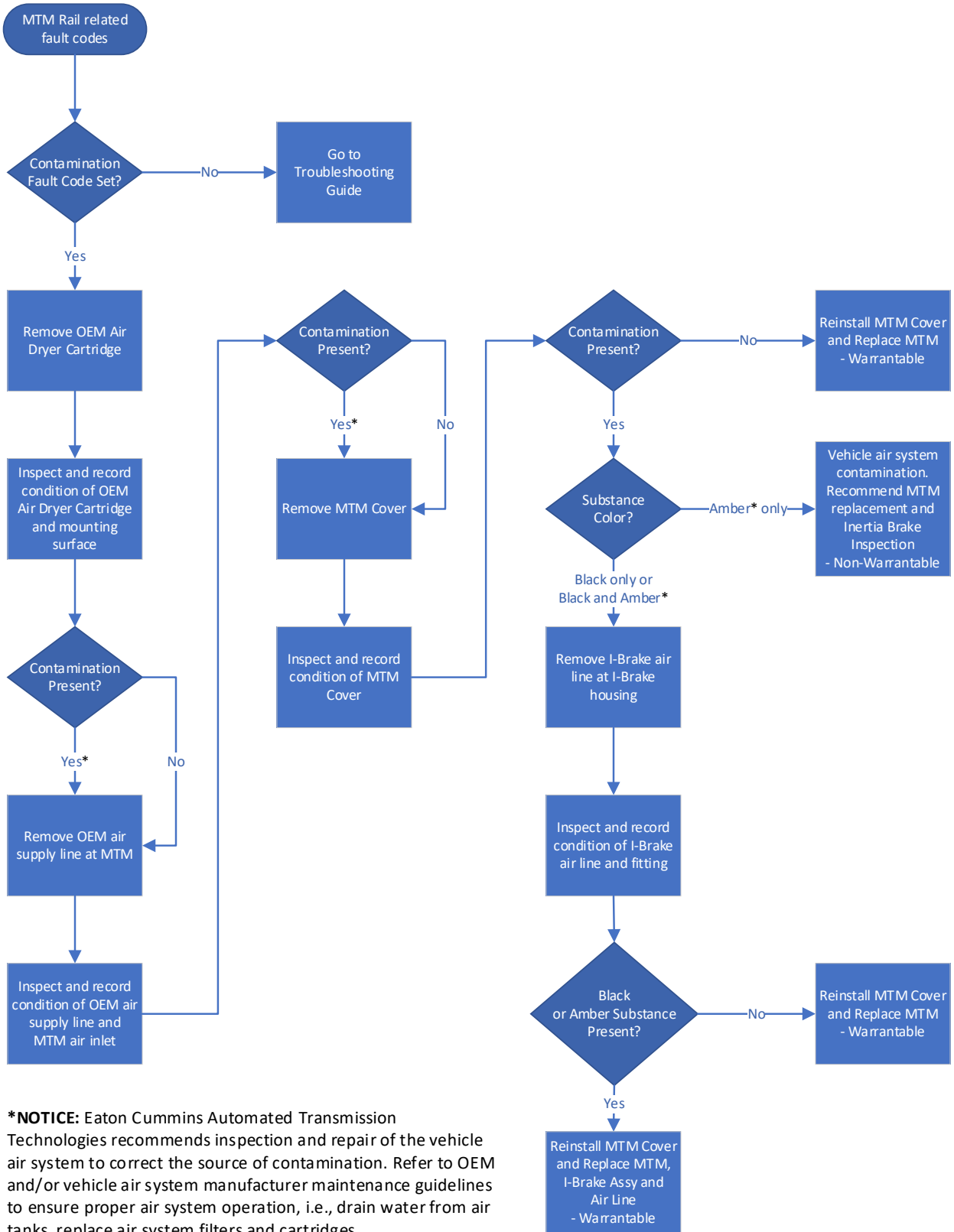
Part Return Instructions:

Return all parts per Eaton Cummins Automated Transmission Technologies Warranty Manual [ECWY3000](#)

Warranty Coverage:

Reference Eaton Cummins Automated Transmission Technologies Warranty Manual [ECWY3000](#).

TAIB-1006 Process Flow



Service Bulletin – Product

The material contained in this bulletin is product improvement information. Eaton Corporation is not committed to, or liable for, canvassing existing products. FSUD: 2023-FSUD-4512

Change Log

Date	Description
03/18/2024	Further clarification for step 12.
03/05/2024	Added additional caution under fault codes. Added images for normal valve exhaust.
10/16/2023	Updated Field Strategy section contamination inspection process, Inertia Brake component replacement decisions with black substance contamination and Warranty Parts section. Added bulletin process flow.
09/18/2023	Added reference to TAIB-0994 to field strategy Added Endurant XD / XD-PRO and PACCAR TX-18 / TX-18-PRO to the affected population. Added statement that moisture (water) droplets found within the air drier base is normal.
09/11/2023	Updated non-warrantable and warrantable images. Updated Step 14, 15 and related caution.
08/21/2023	Moved air cartridge inspection before MTM air inlet inspection. Added images and identified as non-warrantable/warrantable. Updated Warranty Information section.
06/26/2023	Added FMI 7 and 17 to fault code table, restructured contamination criteria, added contaminated air dryer pictures, and added air dryer inspection time.

Keyword Index:

1. Contamination
2. MTM