



INSTRUCTION TO SERVICE

ITS-61178		10/18/2024
SECTION:	204 - Rear Suspension	
SUBJECT:	Retrofit breather system to ZF AVE-130 Axle.	
ISSUE:	Updated axle assemblies require a breather system.	
SUMMARY:	Install new breather hoses, brackets and breather boxes on each side of the center axle.	

ITS-61178

Ref. NHTSA Recall No.	Ref. Transport Canada Recall No.
Not Applicable	Not Applicable

THIS ITS DOCUMENT SHOULD BE RETAINED AND REFERRED TO FOR FUTURE MAINTENANCE UNTIL THE NEW FLYER PARTS AND/OR SERVICE MANUAL IS UPDATED TO REFLECT WORK DONE AS A RESULT OF THIS DOCUMENT. ENSURE THAT THIS DOCUMENT IS AVAILABLE FOR PARTS AND MAINTENANCE STAFF GOING FORWARD.

PROCEDURE:

1. Check the new AVE-130 axle for encoder brackets. If encoder brackets are already installed,
 - a) Remove the cable ties that secure the encoder cable and speed sensor cable to the encoder bracket,
 - b) Remove and set aside the p-clamp and hardware that secure the speed sensor cable.
 - c) Remove the four screws that hold the encoder cable connector to the encoder bracket and move the encoder cable aside.
 - d) Unbolt the encoder bracket and discard.
2. Repeat step #1 on the other side of the axle.

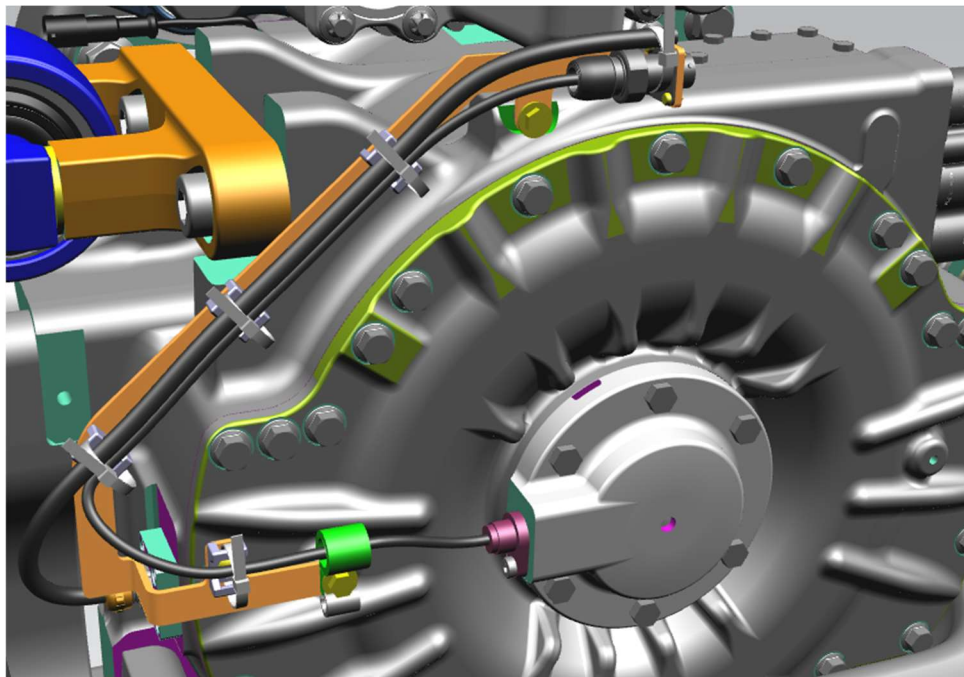


Figure 1: Existing Encoder Bracket (Curbside Shown)

3. Install a new encoder bracket NF P/N 1068792 on the curbside of the axle using two bolts NF P/N 230663 bolts, two washers NF P/N 10W04000. A spacer NF P/N 707967 is required between the encoder bracket and the axle motor casing on the upper bolt. Install a p-clamp NF P/N 247221 under the lower bolt to secure the speed sensor cable Figure 2.
4. Attach the encoder and speed sensor cables to the encoder bracket using four cable tie mounts NF P/N 291987 attached to the encoder bracket with four self-tapping screws NF P/N 34S00006 and four tyrapas NF P/N 5958112.
5. Attach the speed sensor connector to the encoder bracket using four screws NF P/N 34S94004.

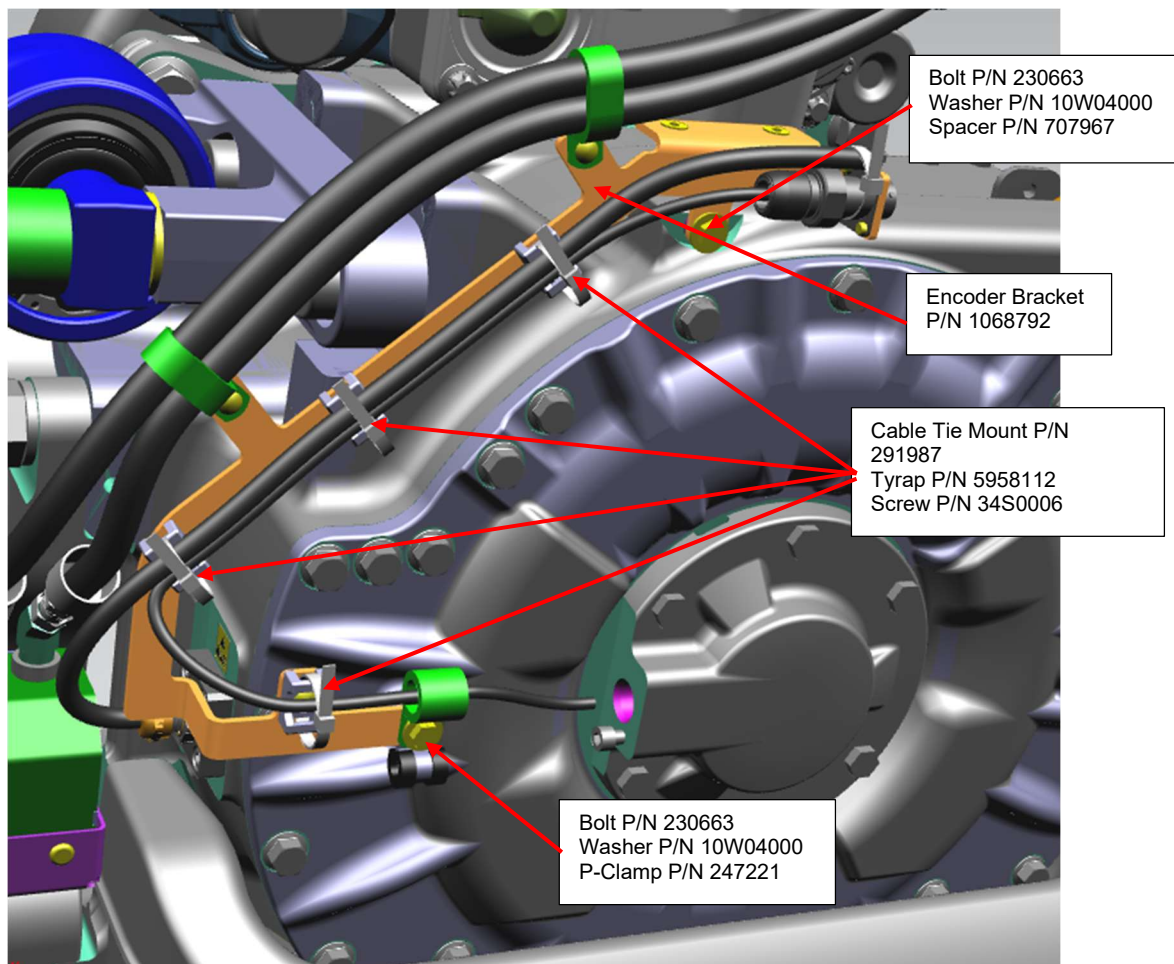


Figure 2: New Curbside Encoder Bracket Installation.

6. Install a new encoder bracket NF P/N 1068793 on the streetside of the axle using two bolts NF P/N 230663 bolts, two washers NF P/N 10W04000. A spacer NF P/N 707967 is required between the encoder bracket and the axle motor casing on the upper bolt. Install a p-clamp NF P/N 247221 under the lower bolt to secure the speed sensor cable Figure 3.
7. Attach the encoder and speed sensor cables to the encoder bracket using four cable tie mounts NF P/N 291987 attached to the encoder bracket with four self-tapping screws NF P/N 34S00006 and four tyrap NF P/N 5958112.
8. Attach the speed sensor connector to the encoder bracket using four screws NF P/N 34S94004.

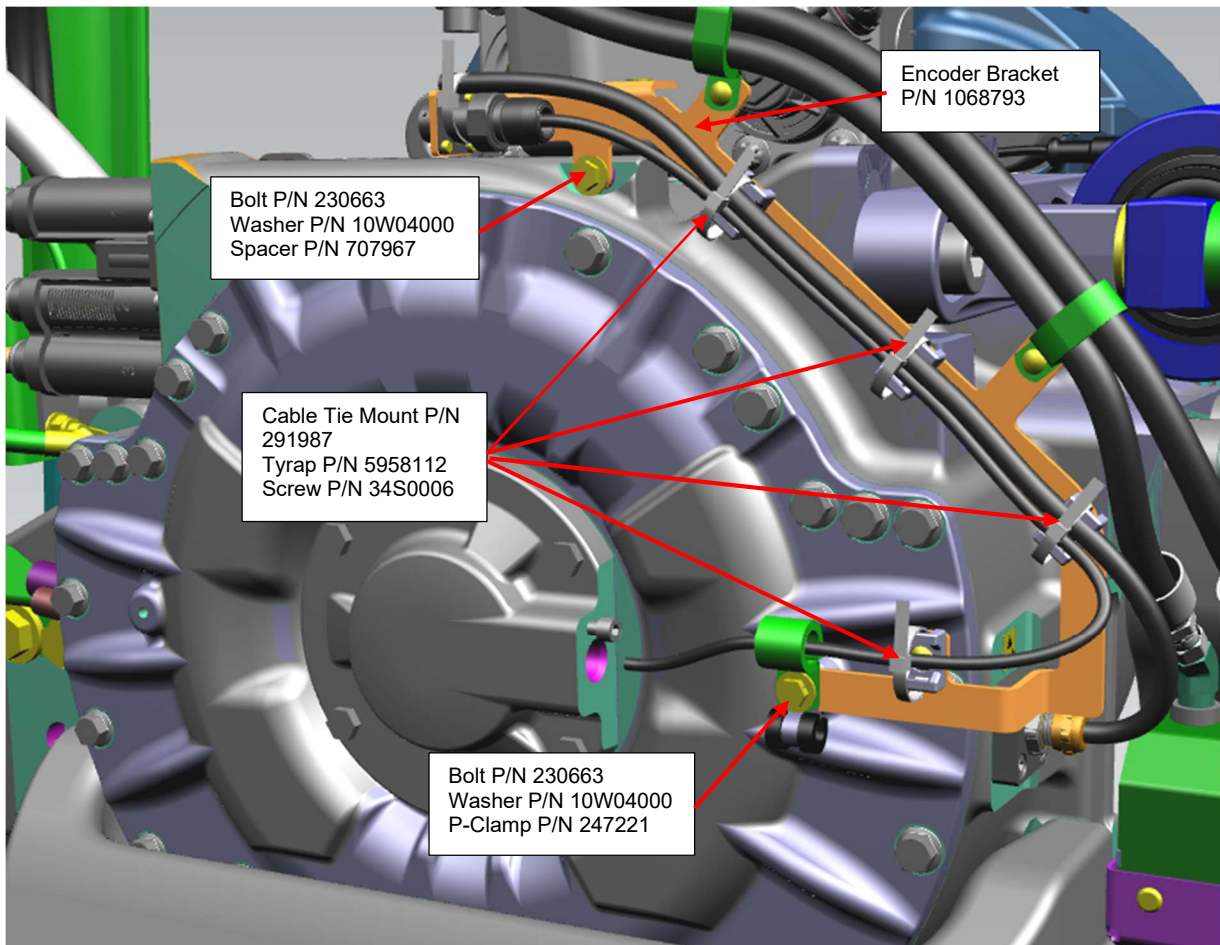


Figure 3: New Streetside Encoder Bracket Installation.

9. Assemble the curb side breather box assembly.
 - a) Bolt the lower breather bracket mount NF P/N 1069671 to the breather assembly NF P/N 1069392 using two bolts NF P/N 10B04008 and two washers NF P/N 10W04000.
 - b) Install two 45 deg elbows NF P/N 5944641 in the fittings on the top of the breather assembly. Orient the 45 deg elbows as seen in Figure 4B.
10. Assemble the street side breather box assembly.
 - a) Bolt the lower breather bracket mount NF P/N 1069671 to the breather assembly NF P/N 1068612 using two bolts NF P/N 10B04008 and two washers NF P/N 10W04000.
 - b) Install two 45 deg elbows NF P/N 5944641 in the fittings on the top of the breather assembly. Orient the 45 deg elbows as seen in Figure 4B.

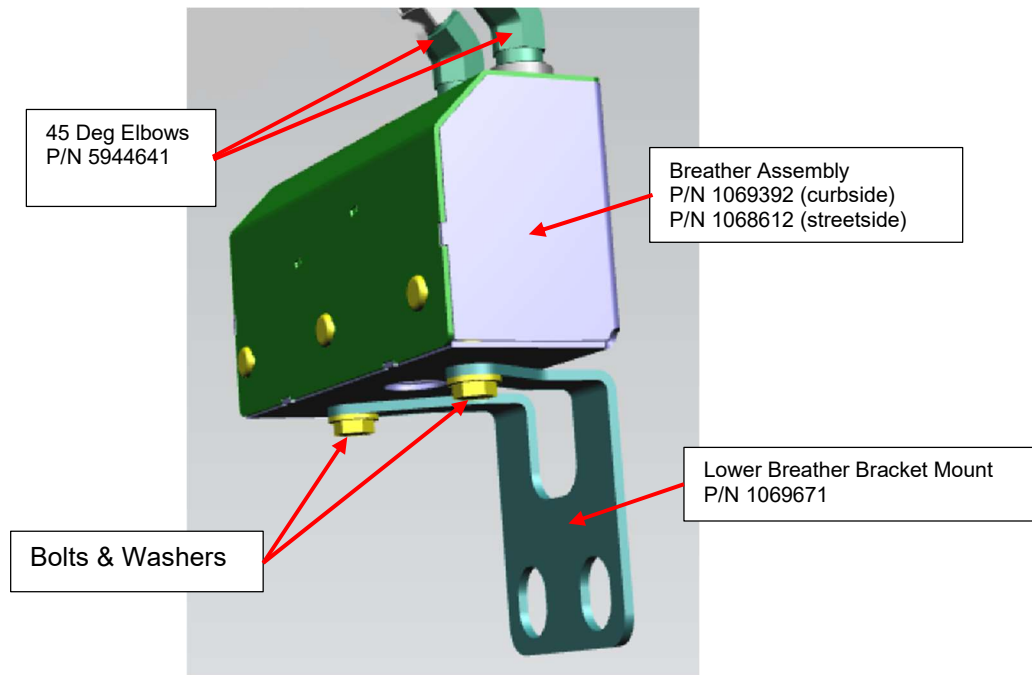


Figure 4: Breather Assembly. (Curbside shown)

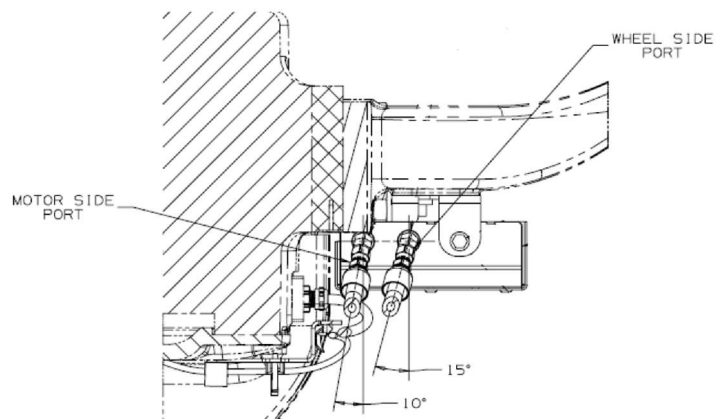


Figure 4B: Orientation of 45 Deg Elbows.

11. On each side of the axle forward of the drive motor, install a upper breather bracket NF P/N 1069725 using a bolt NF P/N 015341 and hardened washer NF P/N 20W10000. Torque the mounting bolt to 174 Ft-Lbs (Dry). Figure 5.

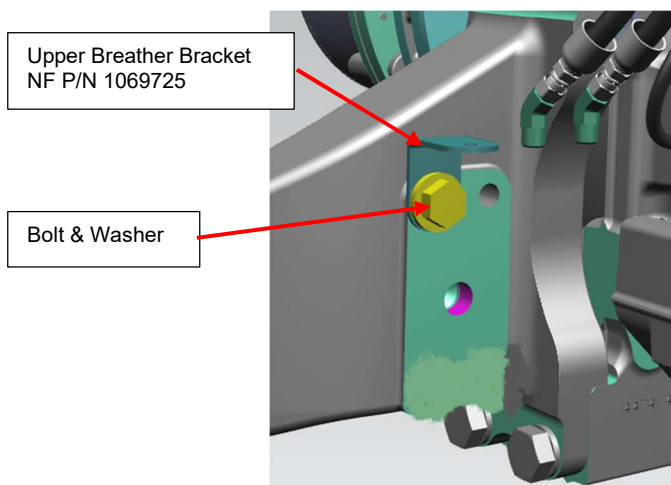


Figure 5: Upper Breather Bracket Installation (Curbside shown)

12. Mount the curbside and streetside breathers assembled earlier to the axle on their respective sides using two bolts NF P/N 015341 and two hardened washers NF P/N 20W10000. Torque the mounting bolts to 174 Ft-Lbs (Dry)
13. Secure the breathers to the upper breather brackets using a bolt NF P/N 10B04008 and a washer NF P/N 10W04000.
14. Attach a breather shroud NF P/N 1069684 to the curbside breather using three rivets NF P/N 51R03007.
15. Attach a breather shroud NF P/N 1068614 to the streetside breather using three rivets NF P/N 51R03007.

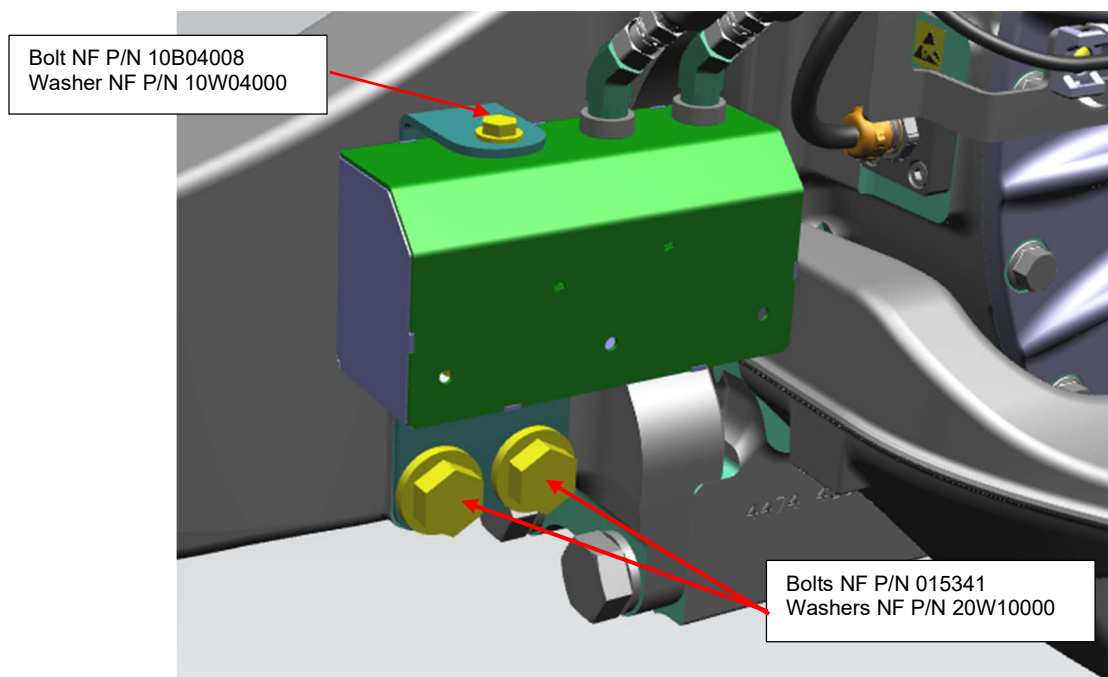


Figure 6: Breather Installation (Curbside)

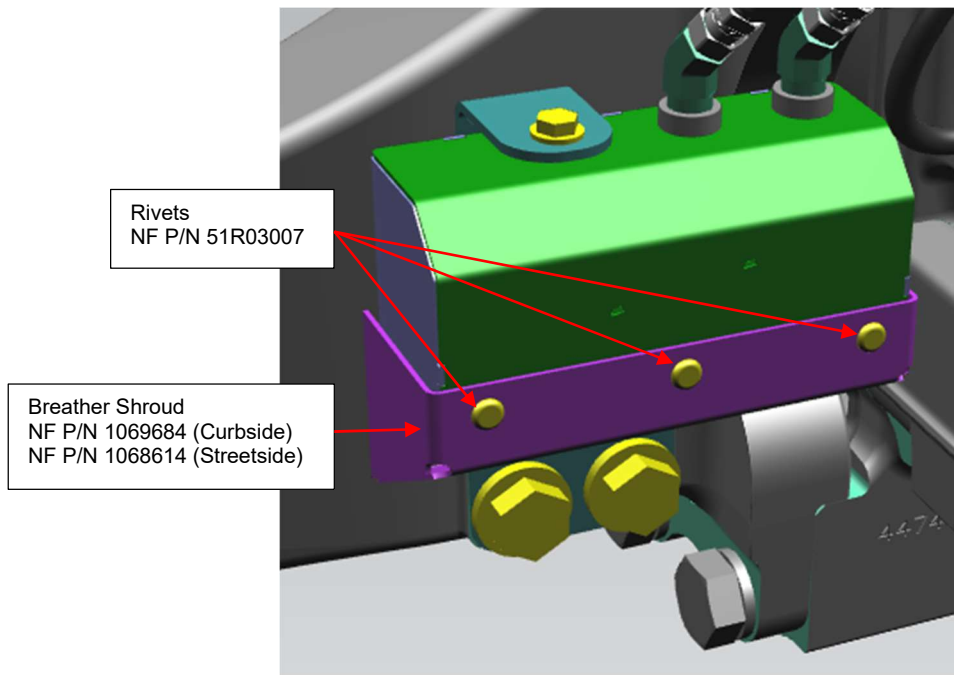


Figure 7: Completed Breather Installation (Curbside Shown)

16. Install a breather hose NF P/N 1068662 on each of the breather ports on the rear ward facing side of the curbside drive motor. Using a backup wrench install and torque the fitting nuts 28 – 31 Ft-lbs.
17. Install a breather hose NF P/N 1068662 on each of the breather ports on the rear ward facing side of the streetside drive motor. Using a backup wrench install and torque the fitting nuts to 28 – 31 Ft-Lbs.
18. Route the breather hoses over the tops of the electric drive motors towards the previously installed breather assemblies. The breather hose from the wheel side breather connection on the motor housing should be routed to the rearward connection point on the breather assembly.

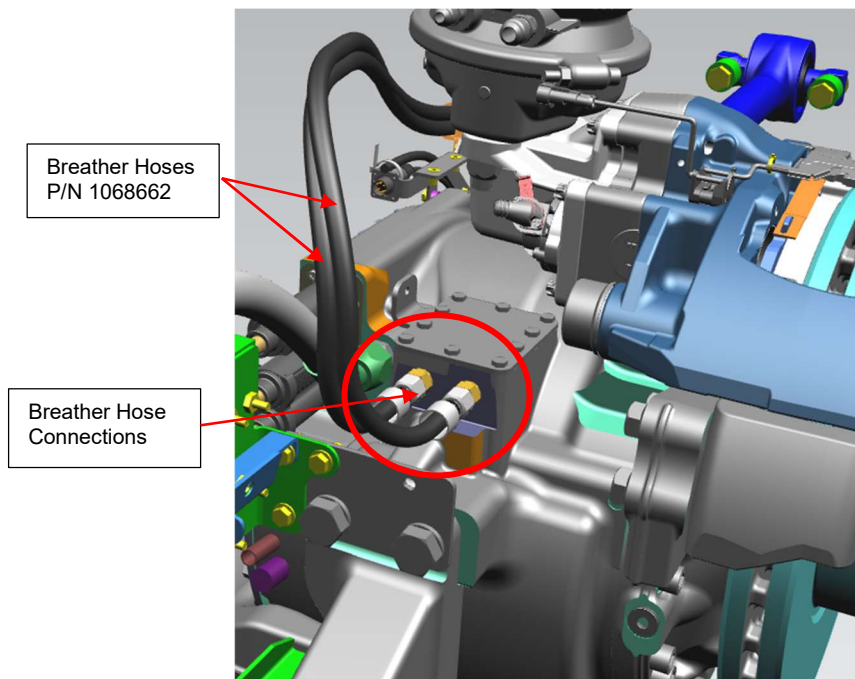


Figure 8: Breather Hose attachment at Motor (Curbside Shown).

19. Attach the breather hoses to the 45 deg elbows on the breather assemblies. Using a backup wrench install the nuts on the hose fittings and torque to 11 -13 Ft-Lbs.
20. Secure the breather hoses to the two mounting locations on the encoder brackets using a 0.750 P-clamp NF P/N 092586 secured with a screw NF P/N 34S00006.
21. Repeat the breather hose routing and securement on the other side of the axle. The two installations are mirror images of each other.

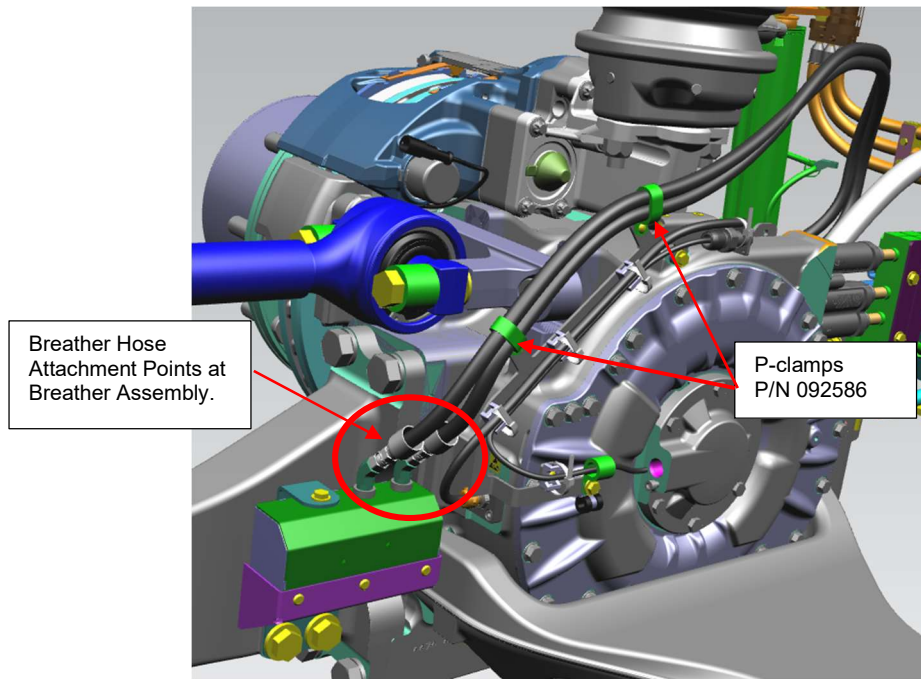


Figure 9: Breather Hose Routing (Curbside Shown)

22. This completes the breather assembly install on the AVE-130 axle.

LABOUR ESTIMATE

	Operation	Number of Technician(s)	Hours	Labor Time T X HR
1	Install breathers on AVE-130 axle	1	0.50	0.50

PARTS REQUIRED

Item	Part Number	Description	Qty. per Coach	Units	Notes
1	1068792	ASSY-BRACKET, ENCODER CABLE, CS	1	EA	
2	230663	BOLT-M6 X 1 X 20 CL10.9	4	EA	
3	10W04000	WASHER-FLAT 1/4 NOM	4	EA	
4	707967	SPACER-1.2" OD X .2" THK SST	2	EA	
5	247221	CLAMP-P 0.500	2	EA	
6	291987	TIE-CABLE MOUNT	8	EA	
7	34S00006	SCREW PH CROSS RECESS TPG. TYPE F #10 24 UNC X 3/8" LG.	12	EA	
8	5958112	TYRAP-7.0 BLACK	8	EA	
9	34S94004	SCREW TYPE F	8	EA	
10	1068793	ASSY-BRACKET, ENCODER CABLE, SS	1	EA	
11	1069392	ASSY-BREATHING CTR AXLE CS	1	EA	
12	1068612	ASSY-BREATHING CTR AXLE SS	1	EA	
13	10B04008	BOLT HEX 1/4" 20 UNC X 1/2" LG	6	EA	
14	10W04000	WASHER-FLAT 1/4 NOM	6	EA	
15	5944641	ELBOW 45° 1/4" PT X -4 JIC	4	EA	
16	1069671	BRACKET-BREATHING LWR MOUNT CTR AXLE	2	EA	
17	1069725	BRACKET-BREATHING UPPR MOUNT CTR AXLE	2	EA	
18	015341	BOLT-M16 X 1.5 X 30 CL8.8	6	EA	
19	20W10000	WASHER FLAT HARDENED 5/8"	6	EA	
20	1069684	SHROUD-BREATHING CTR AXLE CS	1	EA	
21	1068614	SHROUD-BREATHING CTR AXLE SS	1	EA	
22	51R03007	RIVET MONO BLIND SS 3/16" X .064/.270	6	EA	
23	1068662	ASSY-HOSE 387-04 FL45	4	EA	
24	092586	CLAMP-P 0.750	4	EA	

SPECIAL TOOLS REQUIRED					
Item	Part Number	Description	Qty.	Units	Notes
1		No Special Tools Required			