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Subject: Fuel Line & In-line fuel filter replacement, ET software update, ZF trans calibration, ZF trans Automatic mode.

Models Affected: All 2011 AS1020 & AS1220

Date: June 22, 2011

Concern:

1. Too fine of fuel filter causing frequent fuel restrictions due to debris buildup.
 - a. Inconsistent assembly placement of filter and/or line location to the tank.
2. ET software was not utilizing 100% throttle position. This software update will increase the high rpm to 2500-2600.
3. Potential incorrect transmission calibration at startup.
4. Sub-optimal performance could occur in manual mode of transmission. Please educate the owner/operator to understand how to change from automatic to manual modes.

Solution: (1) Replace the existing 3/8" fuel supply line, fittings, and in-line filter with 1/2" fuel line, fittings, and in-line strainer. (2) Update ET software version. (3) Calibrate ZF transmission. (4) ZF transmission Automatic/ Manual mode. Each solution will have it's own set of directions. Be sure to have all copies.

<u>Parts Required:</u>	<u>Part number</u>	<u>Quantity</u>	<u>Description</u>
	K65000220	1	Fuel Line Update Kit

Procedure (1): Fuel line & In-line fuel filter replacement

NOTE: Be certain that the line, fittings, and filter that you are replacing are on the supply side of the system, NOT the return side. Make sure that the return side is located in the correct ports and there is no inline filter/strainer.

1. Place a bucket suitable to catch diesel fuel under the water separator fuel filter on the left side of the engine. Loosen knob on bottom of water separator fuel filter and drain any water that may be present from the filter. Tighten knob when all water is drained out.
2. Remove the 3/8" fuel line from the 3/8" barb on the inlet side of the fuel/water separator (see figure 1) and keep fuel line above the top of the tank. Remove the 3/8" barb fitting from the fuel/water separator and replace with the 1/2" barb fitting from the kit.
3. Install the new 1/2" fuel supply line with clamp on the 1/2 fitting on the water separator fuel filter along with the in-line strainer and clamps, making sure that the strainer is facing the correct direction (direction of flow arrow pointing toward the engine).



4. Place a bucket suitable to catch diesel fuel under the suction fitting of the fuel tank. The fitting is located on the bottom, inside portion of the tank, toward the front of the machine. (See figure 2)
5. You can either put a 3/8" bolt in the end of the 3/8" fuel line or fold the end and zip tie it to help minimize fuel loss. Then remove the 3/8" hose and 90 degree elbow together and quickly replace it with the 1/2" 90 degree elbow. Tighten the elbow, then install the 1/2" fuel line and clamp onto the hose barb and tighten the clamp. NOTE: You can "plug" the 1/2" hose barb to help minimize fuel loss by putting a bolt or plug in the end of a short piece of 1/2" hose and sliding it over the barb prior to installing the fitting.
6. Verify the newly installed 1/2" fuel line and filter was installed from the suction fuel line to the engine, and the direction of flow on the filter is pointed toward the engine. Discard the 3/8" fuel line, fittings, and the in-line fuel filter. Check for leaks, start and run the engine until it reaches operating temperature, then re-check the hose clamps for proper tightness.

Figure 1. 3/8" straight hose barb fitting in the primary fuel filter head.

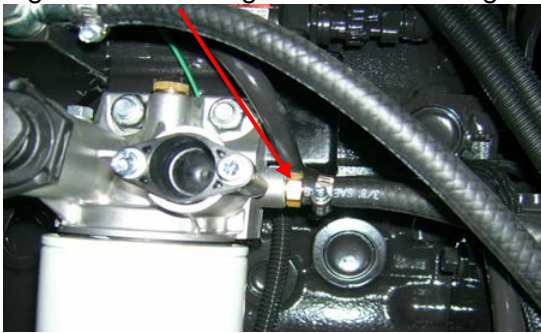


Figure 2. Fitting to be replaced

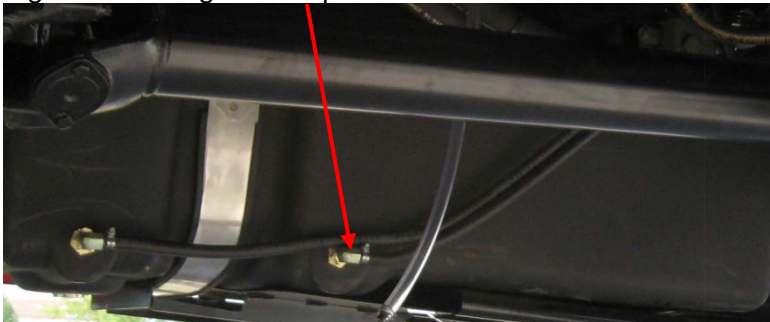


Figure 3. 1/2" STOR x 3/8" hose barb 90 degree tank fitting

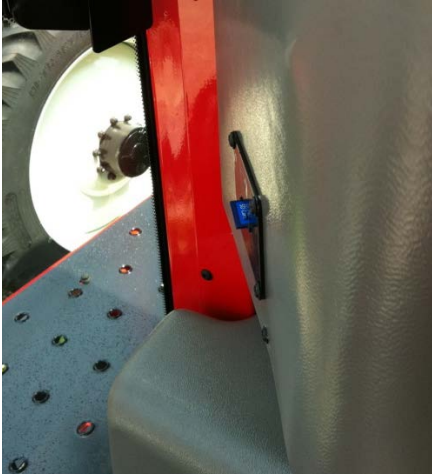


3/8" fuel supply line



Procedure (2): Update ET software

1. Shut key off
2. Install SD card



3. Turn key to "ON" position
4. Board will read "Updating." (will take a couple of minutes)
5. Select **PRESS 'AGITATE DOWN' FOR 1220ZF** or **PRESS 'FOAM AUTO' FOR 1020ZF**



6. Select **PRESS 'CRUISE CNTRL' FOR MPH**





7. Remove SD card
8. Turn key to "OFF" position
9. Turn key to "ON" position and verify version **02.02.06**



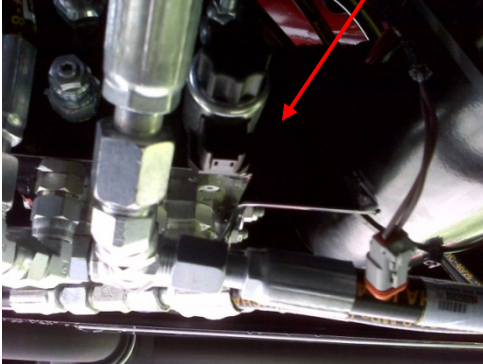
10. Start machine
11. In neutral throttle machine to high idle and verify RPM's to 2500-2600 rpm.
12. Turn machine OFF
13. Prepare to begin ZF (AEB) calibration process
14. Software V02.02.06 highlights
 - o Defaults to Manual Mode during calibration sequence automatically.
 - o Displays actual transmission gear in upper left corner of gear window in automatic mode.
 - o Displays an icon in upper right corner of gear window when converter is engaged.
 - o Increases RPM to 2500-2600 rpm for AS1020 & AS1220

20 mph				
2250 rpm				
80 <small>psi</small>	180 <small>°F</small>	14	1/8	2 4F ⁺
OIL	TEMP	VOLT	FUEL	GEAR

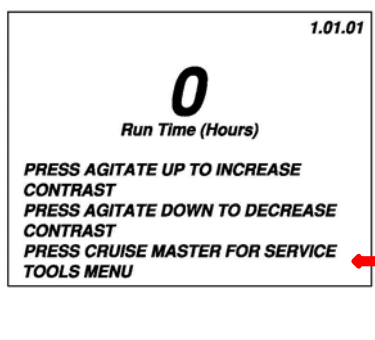


Procedure (3): ZF transmission calibration

1. Start machine and run until engine reaches normal operating temperature.
2. Move the machine to a safe, level, area.
3. Shut the machine OFF.
4. Unplug the parking brake coil, 2-pin Deutsch plug, on Junction Block under the cab.



5. Start the machine.
6. Press the 'CRUISE MASTER' button while at the startup screen to enter the *SERVICE TOOLS MENU*.



7. Select Service Tool
 - A. Press 'AGITATE DOWN' to enter *CALIBRATE TRANSMISSION* mode.

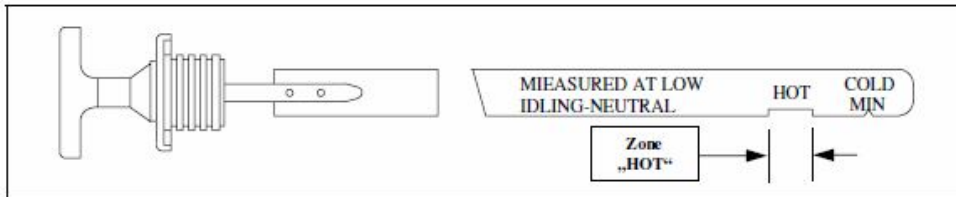




8. Warm transmission oil to **180 deg F**
 - A. Depress the brakes and shift the transmission into 6th gear.
 - B. While still holding the brakes rev the engine to full throttle and hold for a maximum of 30 seconds. (parking brake should still be unplugged)
 - C. Idle down and shift into **neutral**. Wait at least 15 seconds to allow the hot oil in the torque converter to properly distribute.
 - D. Repeat steps “A” – “C” until the transmission temp reaches **180 deg F**. Do not extend step “B” beyond 30 seconds., damage to the transmission could occur.

Calibrate Trans			
APPLY PARKING BRAKE IDLE ENGINE			
PRESS CRUISE MASTER TO BEGIN			
180_f	180_f	900	6F
TRANS	ENG	RPM	GEAR

9. Check transmission oil. With the parking brake applied, engine idling and transmission in **neutral**, check the transmission oil level. **It should be within the HOT zone.** Fill or drain as required.



10. Warm transmission oil to **185 deg F**
 - A. Depress the brakes and shift the transmission into 6th gear.
 - B. While still holding the brakes rev the engine to full throttle and hold for a maximum of 30 secs. (parking brake should still be unplugged)
 - C. Idle down and shift into **neutral**. Wait at least 15 secs to allow the hot oil in the torque converter to properly distribute.
 - D. Repeat steps “A” – “C” until the *TRANS* temp reaches **185 deg F**. Do not extend step “B” beyond 30 secs., damage to the transmission could occur.

11. Calibrate transmission. With the *TRANS* temp at **185 deg F**, parking brake applied, engine idling and transmission in **neutral**, *PRESS ‘CRUISE MASTER’ TO BEGIN* transmission calibration.
NOTE: Transmission will switch to Manual Mode during cal with software V02.02.06

Calibrate Trans			
APPLY PARKING BRAKE IDLE ENGINE			
PRESS CRUISE MASTER TO BEGIN			
185_f	180_f	900	N
TRANS	ENG	RPM	GEAR



12. The calibration sequence will take a few minutes as it runs through 7 clutches; K1, K2, K3, K4, KV, KR and WK. The current clutch and stage are displayed on screen. The *TRANS* temperature will decrease during calibration.

Calibrate Trans			
CALIBRATING...			
CLUTCH: K2 STAGE: 3			
185_r	180_r	900	N
TRANS	ENG	RPM	GEAR

13. If there is an error during the calibration, the calibration will stop and an error code will be displayed on the screen. Refer to the ZF Fault Code List to determine the error code. Resolve the error, restart the machine and return to step 10 to rerun the calibration.

Calibrate Trans			
CALIBRATION ERROR			
ERROR CODE: FB			
RESTART MACHINE			
145_r	180_r	900	N
TRANS	ENG	RPM	GEAR

14. *CALIBRATION SUCCESSFUL* will be displayed once calibration is complete.

Calibrate Trans			
CALIBRATION SUCCESSFUL			
RESTART MACHINE			
170_r	180_r	900	N
TRANS	ENG	RPM	GEAR

15. Turn key to OFF position and WAIT at least 30 seconds. Do not turn key to ON position within 30 seconds of turning key OFF.
16. Reconnect the parking brake 2-pin Deutsch plug on Junction Block under the cab.
17. Start the machine and verify functionality of the transmission.
18. Shut machine off and educate operator of Automatic/ Manual mode procedure.



NOTE: If *TRANS* temp is out of range, 180 deg F – 190 deg F, the calibration will not be allowed to initiate or a bad calibration could occur.

Calibrate Trans			
TRANSMISSION TEMP OUT OF RANGE FOR CALIBRATION			
TRANS TEMP MIN: 180_F TRANS TEMP MAX: 190_F			
180_F	180_F	2250	2F
TRANS	ENG	RPM	GEAR

NOTE: If *TRANS* temp falls below 145 deg F during calibration an error is likely to occur. Return to step 10 to restart calibration.

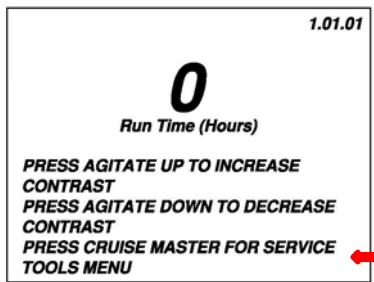
Calibrate Trans			
CALIBRATION ERROR			
ERROR CODE: FB			
RESTART MACHINE			
145_F	180_F	900	N
TRANS	ENG	RPM	GEAR



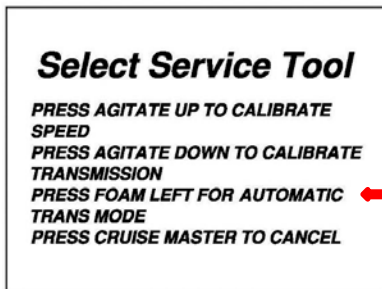
Procedure (4): ZF transmission Automatic/ Manual mode selection. Operator may select Manual mode, as default, with procedure below if desired.

Note: V02.02.06 software update will default ZF transmission to Automatic mode.

1. Start the machine.
2. Press the 'CRUISE MASTER' button while at the startup screen to enter the *SERVICE TOOLS MENU*.



3. Select Service Tool
 - a. To set the transmission in *AUTOMATIC MODE*. *PRESS 'FOAM LEFT' FOR AUTOMATIC TRANS MODE*



Note:

AUTOMATIC TRANS MODE WILL GIVE THE OPERATOR THE BEST TORQUE AND RPM PERFORMANCE THAT EACH GEAR REQUIRES IN THE ZF TRANSMISSION. AUTOMATIC TRANS MODE *ALLOWS THE OPERATOR TO SHIFT TO THE GEAR DESIRED AT ANY TIME. THIS DOES NOT DISENGAGE AUTOMATIC TRANS MODE. THIS OPTION COULD BE CONSIDERED AS "SEMI"-AUTOMATIC TRANS MODE; ALLOWING THE OPERATOR COMPLETE FLEXIBILITY IN SHIFTING, OPTIMIZING THE MACHINE'S PERFORMANCE IN A VARIETY OF OPERATING CONDITIONS.*

AUTOMATIC MODE OPERATION:

YOU MUST SET THE HIGHEST GEAR YOU WANT THE TRANSMISSION TO OPERATE IN.

EXAMPLE 1: IF YOU ARE SPRAYING AND WANT TO SET THE HIGHEST GEAR YOU REACH TO BE 4TH GEAR, SHIFT UP TO 4TH. THE TRANSMISSION WILL ONLY AUTOMATICALLY SHIFT FROM 2ND THRU 4TH GEAR. WHEN YOU SLOW DOWN, THE TRANSMISSION WILL AUTOMATICALLY DOWNSHIFT TO THE CORRECT GEAR AND GIVE THE OPERATOR THE BEST PERFORMANCE AT THAT SPEED AND RPM. IN THIS EXAMPLE THE RANGE OF OPERATION WOULD BE BETWEEN 2ND, 3RD, AND 4TH GEAR.

EXAMPLE 2: UNDER THE SAME CONDITIONS AS EXAMPLE 1, AN OPERATOR APPROACHES A TIGHT AREA; THE OPERATOR CAN SHIFT DOWN TO 2ND GEAR WHILE NAVIGATING THE TIGHT AREA. THE TRANSMISSION WILL NOT SHIFT PAST 2ND GEAR. ONCE THROUGH, THE OPERATOR HAS TO MANUALLY SHIFT BACK TO 4TH GEAR. THE TRANSMISSION WILL ONLY AUTOMATICALLY SHIFT TO THE HIGHEST GEAR THE OPERATOR SELECTS.

Labor Hours to Complete: 1 hour



**Service Update 2011-04
has been completed on the following machine**

UPON COMPLETION OF THIS UPDATE, EMAIL THIS SIGNED FORM TO
WARRANTY@ETSPRAYERS.COM.

Apache Serial Number: _____

Machine Hours: _____

Date repair was made: _____

Owner of Apache: _____

Name of dealer completing update: _____

Name of person who performed
update: _____

Owner signature: _____

Labor to complete update: _____

Parts required for update: _____

Miles driven to complete this update: _____

Please scan and email this completed form to warranty@etsprayers.com or fax ET at 317-834-4501. We will assign a warranty claim number to this sheet and return a copy to the dealership for your records. We will pay the warranty claim from this completed form. There will be no need to file an online warranty claim for this update; we will pay from this completed form.

Warranty claim number: _____ (assigned by ET)