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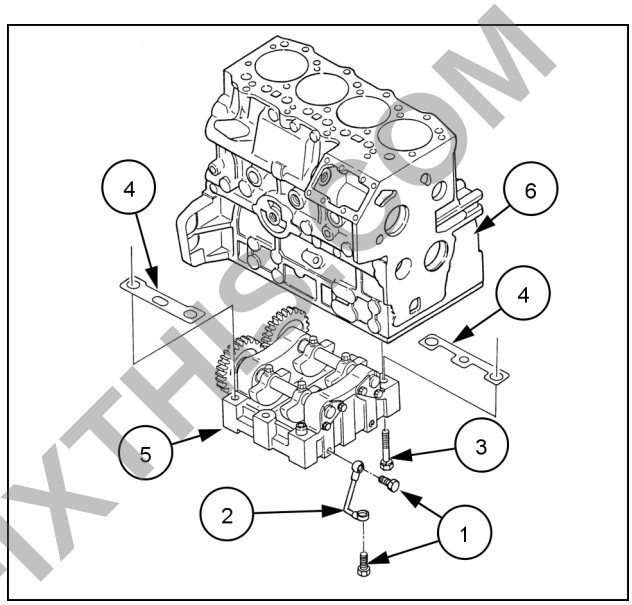
Balancer - Remove

Boomer™ 54D CVT TIER 4B (FINAL), Cab	WE
Boomer™ 54D CVT TIER 4B (FINAL), ROPS	WE
Boomer™ 54D CVT	WE

Prior operation:
Engine oil pump - Remove (10.304) .

1. Remove the banjo bolts **(1)**, and the oil transfer pipe **(2)**.
2. Loosen and remove the balancer retaining bolts **(3)**.
3. Remove the balancer assembly **(5)**, from the engine block **(6)**.

NOTE: *Observe the quantity and thickness of the shims **(4)**, (if used) for reinstallation upon assembly.*



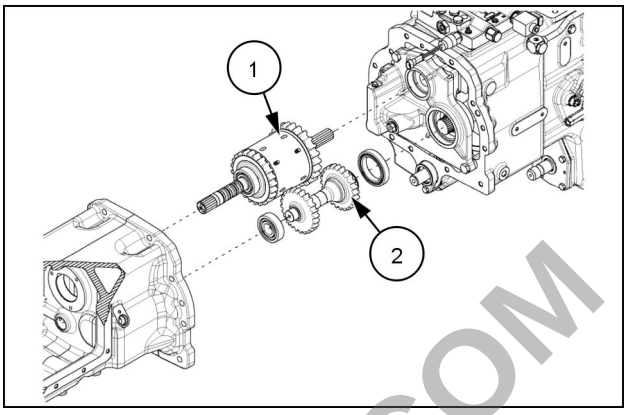
20002374A 1

Next operation:
Engine flywheel - Remove (10.103).
Next operation:
Balancer - Install (10.110).

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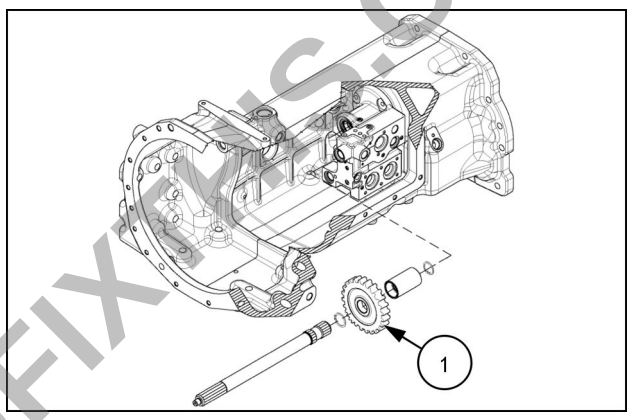
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8. Remove the forward/reverse shuttle clutch, **(1)**, and main input shaft, **(2)**.



36084717N 7

9. From the front of the transmission box, remove the engine speed sensor shaft assembly, **(1)**.

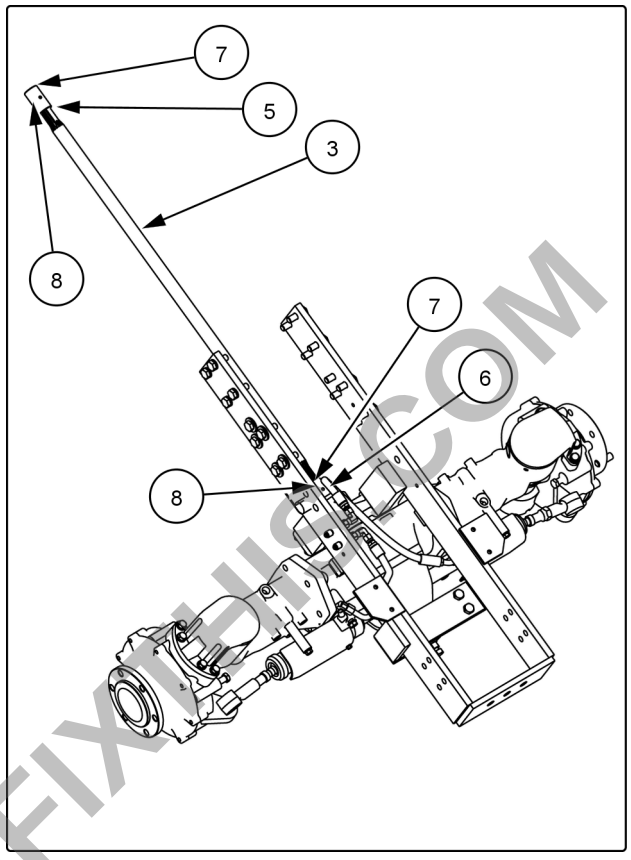


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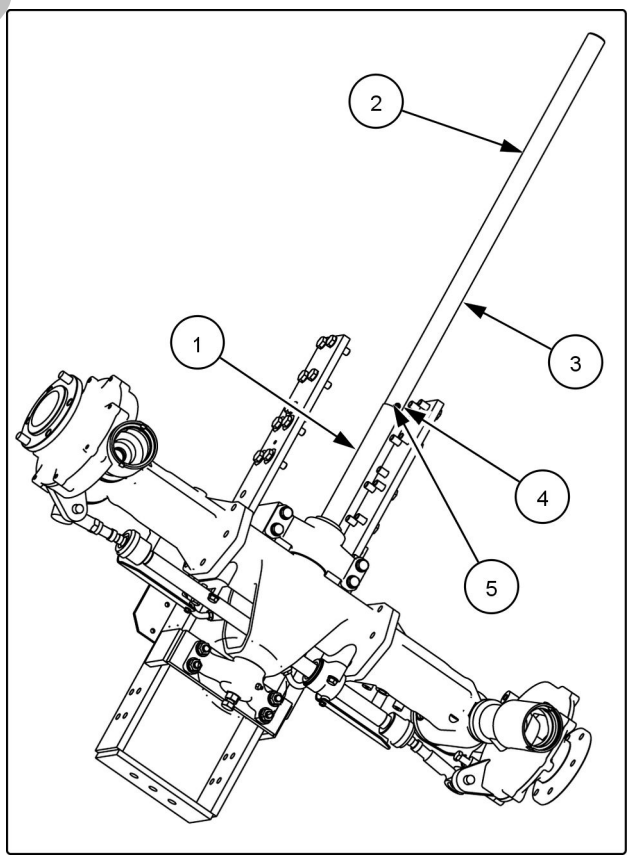
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3. Install the FWD shaft **(3)** at the transmission end **(5)** and the front axle pinion shaft **(6)**.
4. Slide the splined couplers **(7)**on the shafts to engage the transmission end **(5)** and the pinion shaft end **(6)**. Install the spring pins **(8)**.



NHPE13CT00805BA 13

5. Spread the forward **(1)** and rear **(2)** shaft guards on the shaft **(3)**.
6. Install the machine screw **(4)** and washer **(5)**.



NHPE13CT00806BA 14

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Power Take-Off (PTO) case - Assemble

Boomer™ 54D CVT	WE

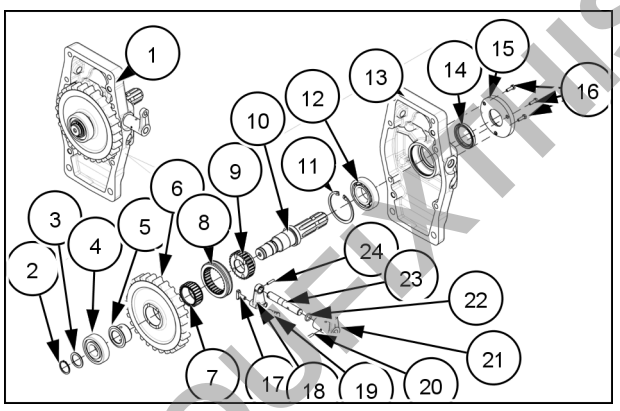
⚠ WARNING

Avoid injury!
Handle all parts carefully. Do not place your hands or fingers between parts. Use Personal Protective Equipment (PPE) as indicated in this manual, including protective goggles, gloves, and safety footwear.
Failure to comply could result in death or serious injury.

W0208A

Prior operation:
Power Take-Off (PTO) case - Disassemble (31.110)

Assembly



36080696N 1

PTO COVER COMPONENTS

(1) PTO Cover Assembly	**(5)** PTO Gear Bushing	**(9)** Rear PTO Fixed Hub	**(13)** Rear PTO Cover	**(17)** Sliding Pin	**(21)** External PTO Lever
(2) Snap Ring	**(6)** Rear PTO Gear	**(10)** Rear PTO Output Shaft	**(14)** Oil Seal	**(18)** PTO Lever	**(22)** O-ring
(3) Thrust Washer	**(7)** Needle Bearing Cage	**(11)** Snap Ring	**(15)** Seal Cover Plate	**(19)** Detent Screw	**(23)** PTO Lever Rod
(4) Bearing	**(8)** Rear PTO Sliding Sleeve	**(12)** Bearing	**(16)** Bolt, M6 x 12mm	**(20)** Spring Pin	**(24)** Spring Pin

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Fixed displacement pump - Flow test inlet restriction

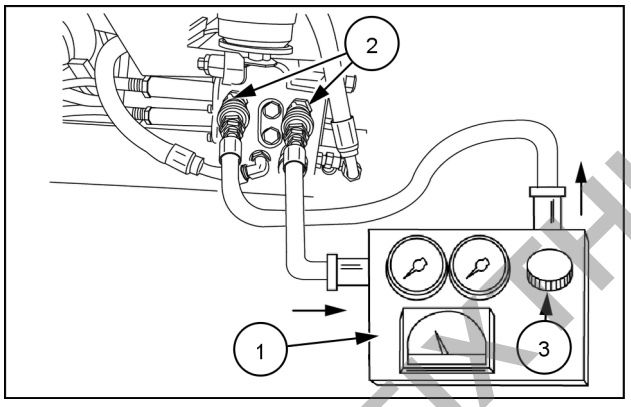
Boomer™ 54D CVT	WE

⚠ WARNING

Pressurized hydraulic fluid can penetrate the skin and cause severe injuries.
Tighten all of the connections before starting the engine. If hydraulic fluid has penetrated the skin, seek medical assistance immediately.
Failure to comply could result in death or serious injury.

W0117A

Inlet restriction test at mid mount remote valve

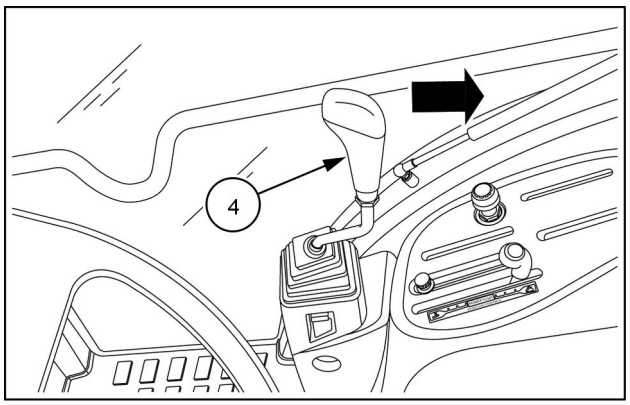


NHIL15CT01162AA 1

NOTICE: *Perform the inlet restriction test to check for the hydraulic lines and filter for damage, obstructions, or air leaks. A hydraulic flow meter is required to perform the inlet restriction test.*

(1) Flow Meter
(2) Mid mount valve female quick couplers
(3) Restrictor valve

1. Start the engine and operate the hydraulic system to warm the hydraulic fluid to normal operating temperature.
2. Connect the flow meter **(1)** to the mid mount valve female quick couplers **(2)**.
3. Open the restrictor valve **(3)** to allow full flow through the flow meter.
4. Operate the tractor engine at **1300 RPM**.
5. Pull the mid mount valve control lever **(4)** rearward and record the flow meter reading.



NHIL13CT00270AA 2

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7. Allow the tank temperature to restabilize at the temperature of the storage room by shaking it and allowing it to sit in the same spot for up to another 12 hours.
8. After making certain that container temperature has again stabilized to room temperature, repeat step 4 above.

If the pressure exceeds that in the table for the storage temperature you measured, the refrigerant in the tank has too much excess air to be used and must be recycled or reclaimed.
If the refrigerant being checked has been contaminated with other refrigerant such as R12, the tank pressure may indicate it contains air. If the tank is vented and the pressures still indicates a high reading and you think there is a possibility of the **R134A** refrigerant being contaminated with R12, the container must be sent to a reclaim facility.

Containers for Storing Recycled Refrigerant

Recycled refrigerant must be stored in DOT CFR Title 49 or UL containers approved for such use. The container must be specifically marked for the refrigerant type you are storing. The use of unmarked containers can lead to mixing of refrigerants and consequent air conditioning system failure.
Disposable refrigerant containers should not be used for the storage or recovery of used or recycled refrigerant. Disposable container are the type of container in which virgin refrigerant is often sold.
Any container of recycled refrigerant that has been stored or transferred must be checked prior to its use in accordance with the temperature/pressure check described previously in “Checking Refrigerant for Excess Air.”
New storage tanks must be evacuated to at least **635 mm** (**25 in**) of mercury prior to use. Otherwise, excess air may be introduced to the refrigerant.

Disposal of Empty or Near-Empty Disposable Containers

Improper scrapping of a disposable container can release some refrigerant into the atmosphere. This must be avoided by removing any of the remaining contents with a recovery or recycling machine as follows:

1. Attach the service hose of your recovery or recycling machine to the container.
2. Open the container valve and the recovery/recycling equipment shutoff valve and evacuate the container just as you would a mobile air conditioning system.
3. When the maximum stable vacuum has been achieved, close the container valve and the service hoses valve, allowing the vacuum to be in the container.
4. Mark the container “empty” and dispose of it properly.

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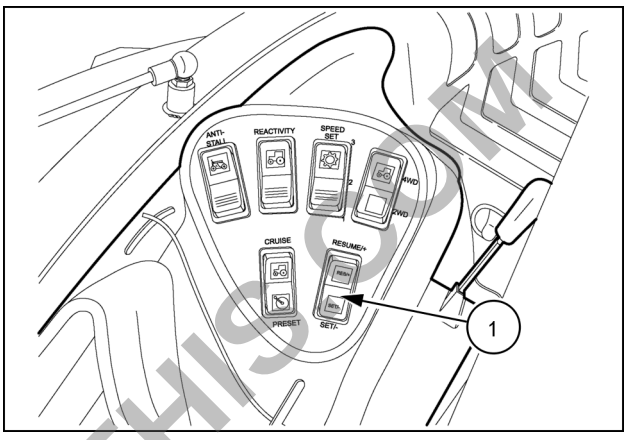
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Electrical system - Remove Cruise Resume / Set Switch

Boomer™ 54D CVT	WE

Prior operation:
Electrical system - Static description Cruise Set/Resume switch (55.000)

1. Disconnect the negative (-) battery cable from the negative (-) battery terminal.
2. To remove the cruise resume/set switch, **(1)**, from the left control pod. Use a flat tip screwdriver to pry the switch out of the control pod.
3. Once the switch is removed from the control pod, unplug the wire harness connector from the cruise resume/set switch.



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Next operation:
Electrical system - Test Cruise Resume / Set Switch (55.000)

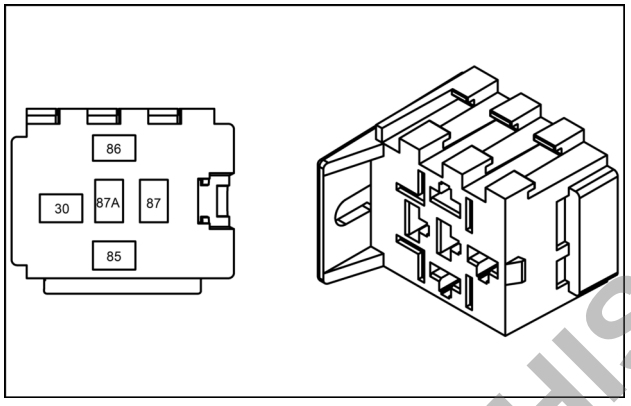
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Wire connectors - Component diagram 01 - Connectors X-010 to X-019

Boomer™ 54D CVT TIER 4B (FINAL), ROPS	WE Platform - With ROPS

X-010 - CRANK RELAY [K-013] (87692860) (Female)

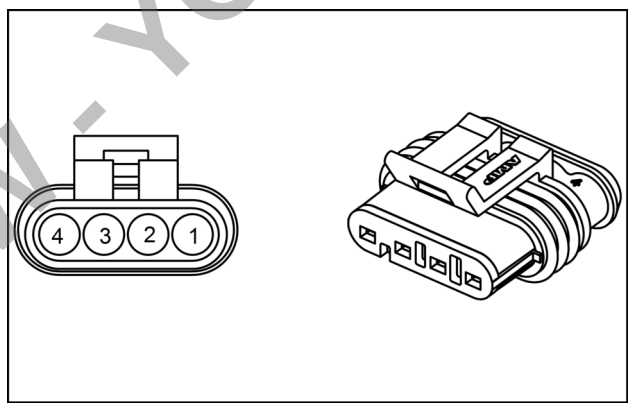


87692860 1

87692860

Pin	From	Wire	Description	Color-Size	Frame
30	SP-003-P-X	HM101A	UNSWITCHED BATTERY POSITIVE (B+)	RD - 2.0	**SHEET 04**
85	GND-002-P-1 MAIN GROUND	HM036	GROUND	BK - 0.8	
86	**X-150 (Female) pin 87** ENGINE CONTROL UNIT (ECU) START RELAY	HM074	NEUTRAL START	YE - 0.8	
87	SP-001-P-X	HM003C	CRANK SIGNAL	YE - 2.0	

X-011 - HAND THROTTLE [Z-005] (87687242) (Female)



87687242 2

87687242

Pin	From	Wire	Description	Color-Size	Frame
1	**X-030 (Female) pin 8** ANALOG DIGITAL INSTRUMENT CLUSTER (ADIC)	HM177	HAND THROTTLE SIGNAL	YE - 0.8	**SHEET 11**
2	**X-030 (Female) pin 12** ANALOG DIGITAL INSTRUMENT CLUSTER (ADIC)	HM072	THROTTLE GROUND	BL - 0.8	
3	**X-031 (Female) pin 14** ANALOG DIGITAL INSTRUMENT CLUSTER (ADIC)	HM105	HAND THROTTLE SUPPLY	PK - 0.8	

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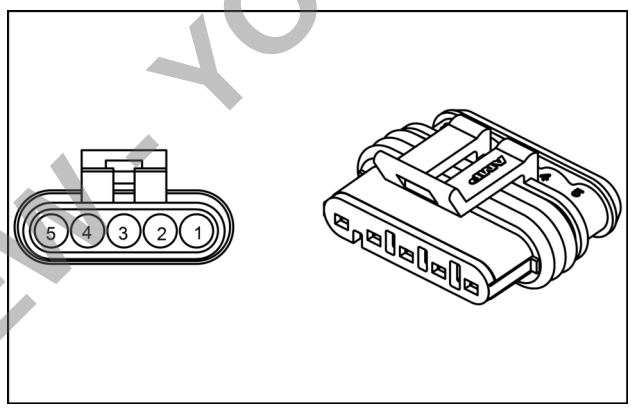
Wire connectors - Component diagram 13 - Connectors X-9130 to X-9139

Connector X-9130 - Electric fuel pump relay (optional)

CONNECTOR X-9130 - Electric fuel pump relay (optional)			
PIN NUMBER	**WIRE NUMBER**	**CIRCUIT REFERENCE**	**ELECTRICAL SCHEMATIC FRAME**
30	VE-9065	Controlled supply, battery disconnect switch	**SHEET 02**
85	VE-9066	Low Side Driver (LSD), Engine Control Unit (ECU)	
86	VE-9022	Controlled supply, main relay switched	
87	See product schematics	Controlled source, electric fuel pump motor	**SHEET 01**
87A			

Connector X-9131 - Diesel Exhaust Fluid (DEF)/AdBlue® temperature, level and quality sensor

CONNECTOR X-9131 - Diesel Exhaust Fluid (DEF)/AdBlue® temperature, level and quality sensor			
PIN NUMBER	**WIRE NUMBER**	**CIRCUIT REFERENCE**	**ELECTRICAL SCHEMATIC FRAME**
1	VE-9176	Controlled supply, auxiliary main relay switched	**SHEET 03**
2	VE-9177	To battery ground	
3	-	-	
4	VE-9174	CAN 2 low	
5	VE-9175	CAN 2 high	



87688719 1

Connector X-9132 - NH3 sensor controller

CONNECTOR X-9132 - NH3 sensor controller			
PIN NUMBER	**WIRE NUMBER**	**CIRCUIT REFERENCE**	**ELECTRICAL SCHEMATIC FRAME**
1	VE-9178	Supply	**SHEET 03**
2	VE-9188	CAN 2 high	
3	VE-9187	CAN 2 low	
4	VE-9179	To battery ground	

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Error Code	Description
2070	Lever in forward switch short circuit to **5 V** / **12 V**
2071	Lever in forward switch short circuit to ground
2072	Lever in reverse switch short circuit to **5 V** / **12 V**
2073	Lever in reverse switch short circuit to ground
2173	Excessive supply voltage to controller (**12 V**F)
2174	Low supply voltage to controller (**12 V**F)
2342	Forward clutch solenoid open circuit or shorted to ground
2343	Reverse clutch solenoid open circuit or shorted to ground
2352	Forward clutch solenoid short to **12 V**
2353	Reverse clutch solenoid short to **12 V**
2362	Forward clutch not calibrated
2363	Reverse clutch not calibrated
2429	Transmission oil pressure switch error
2430	Pulley 1 pressure sensor open circuit or short to ground
2431	Pulley 1 pressure sensor short to **5 V** or **12 V**
2432	Pulley 2 pressure sensor open circuit or short to ground
2433	Pulley 2 pressure sensor short to **5 V** or **12 V**
2440	Speed range switch disagreement
2460	Cruise selection switch disagreement
2480	Cruise set and resume switch disagreement
2600	Variator solenoid open or shorted to ground
2601	Variator solenoid short to **12 V**
2603	ARON valve stuck
2605	Transmission speed pedal (go pedal) potentiometer open circuit or shorted to ground
2606	Transmission speed pedal (go pedal) short to **5 V** or **12 V**
2607	Transmission speed pedal (go pedal) neutral switch error
2615	Torque pressure sensor open or short to ground
2616	Torque pressure sensor shorted to **5 V** or **12 V**
2620	Input pulley speed sensor open circuit or short to ground
2621	Input pulley speed sensor shorted to **5 V** or **12 V**
2630	Output pulley speed sensor short to **12 V** or open circuit
2631	Output pulley speed sensor shorted to ground speed
2640	Stand-still solenoid open circuit or shorted to ground
2641	Stand-still solenoid shorted to **12 V**
2650	Pressure sensor faulty
2700	Engine speed sensor shorted to **12 V** or open circuit
2702	Engine speed CAN message not received
5070	PTO clutch solenoid open circuit or shorted to ground
5080	PTO clutch solenoid excessive voltage

7. Error codes for the ZF module:

Error Code	Description
14001	Rear PTO sensor short to **12 V**
14002	Rear PTO sensor shorted to ground
14015	**5 V** supply voltage too high
14016	**5 V** supply voltage too low
14021	Cranking line shorted to **12 V**
14051	Fuel level sender shorted to **12 V** or open circuit
14052	Fuel lever sender shorted to ground
14900	SO module missing
14901	Transmission controller missing (SF)

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DTC 163-02-Short circuit error of injector in cylinder 3

Control Module : ECU

Context:
The Engine Control Unit (ECU) A-9000 monitors the fuel injector power stages for a short circuit condition. If the ECU A-9000 detects a short circuit condition in the injector number 3 Y-9003 circuit, this fault will occur.

Cause:
The ECU A-9000 has detected a short circuit in the fuel injector number 3 Y-9003 circuit.

Possible failure modes:

1. Faulty fuel injector number 3 Y-9003, wiring.
2. Faulty fuel injector number 3 Y-9003, internal failure.
3. Faulty ECU A-9000, software.

Solution:

1. Verify this fault code is still present and in an active state.

   Use the Easy Engine software provided on the Electronic Service Tool (EST) to check the fault status and to perform the cylinder cut-out test.

   A. If the fault is still present and active, continue with Step **2**.

   B. If the fault is no longer present or is in an inactive state, the fault may be intermittent and not currently active. Continue with Step **7**.

2. Check the fuel injector number 3 Y-9003 internal resistance.

   Disconnect the engine harness (EN) from the fuel injector number 3 Y-9003 at connector **X-9031**.

   Use a multimeter to measure the resistance of fuel injector number 3 Y-9003 on the injector pins :

From	To	Value
X-9031 pin 1	**X-9031 pin 2**	There should be between **.03 - .05 Ω**

   A. If there is between **.03 - .05 Ω**, leave connector **X-9031** disconnected and continue to Step **3**.

   B. If the resistance is not between **.03 - .05 Ω**, fuel injector number 3 Y-9003 solenoid coil has failed. Replace fuel injector number 3 Y-9003.

3. Check the fuel injector number 3 Y-9003 engine harness (EN) wiring for a short to a voltage source.

   With the key in the OFF position, use a multimeter to perform the following voltage check on the engine harness (EN) side :

From	To	Value
X-9031 pin 1	Chassis ground	There should be no voltage.
X-9031 pin 2	Chassis ground	There should be no voltage.

   With the key in the ON position, use a multimeter to perform the following voltage check on the engine harness (EN) side :

From	To	Value
X-9031 pin 1	Chassis ground	There should be no voltage.
X-9031 pin 2	Chassis ground	There should be no voltage.

   A. If there is no voltage, leave connector **X-9031** disconnected and continue to Step **4**.

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DTC 4D4-03-ECU internal failure - Overvoltage monitoring error

Control Module : ECU

Context:
The Engine Control Unit (ECU) A-9000 performs “shut-off paths” which deactivate all power stages relevant to fuel injection if certain ECU A-9000 errors are detected. If an over-voltage condition is detected during this test, this fault will occur.

Solution:

1. Check the ECU A-9000 for the appropriate software and re-flash, if necessary.
   A. If the fault has been resolved, return the machine to service.
   B. If the fault has not been resolved, escalate an ASIST concern.

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