CR9040, CR9060, CR9070 REPAIR MANUAL COMPLETE CONTENTS

The following pages are the collation of the contents pages from each section and chapter of the CR9040, CR9060, and CR9070 Repair manual. Complete Repair part # 87682452.

The sections used through out all New Holland product Repair manuals may not be used for each product. Each Repair manual will be made up of one or several books. Each book will be labeled as to which sections are in the overall Repair manual and which sections are in each book.

The sections listed above are the sections utilized for the CR9040, CR9060, and CR9070 Combines.

Printed In U.S.A.

87682467 6/07
1st Printing

SECTION 55 – ELECTRICAL SYSTEMS

BOOK 4 - 87682456

Chapter 5 – Engine Systems (Continued)

CONTENTS

SECTION 60 - PRODUCT FEEDING

BOOK 12 - 87682464

Chapter 2 - Feeder Drives (Continued)

CONTENTS

MINIMUM HARDWARE TIGHTENING TORQUES

IN NEWTON-METERS (FOOT POUNDS) FOR NORMAL ASSEMBLY APPLICATIONS

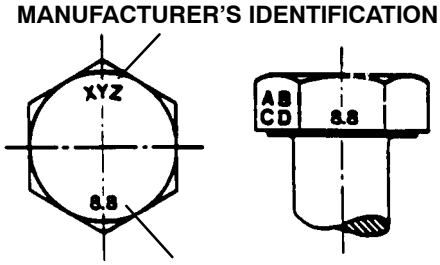
METRIC NON-FLANGED HARDWARE AND LOCKNUTS

NOMINAL SIZE	CLASS 5.8		CLASS 8.8		CLASS 10.9		LOCKNUT CL.8 W/CL8.8 BOLT
	UNPLATED	PLATED W/ZnCr	UNPLATED	PLATED W/ZnCr	UNPLATED	PLATED W/ZnCr	
M4	1.7 (15)*	2.2 (19)*	2.6 (23)*	3.4 (30)*	3.7 (33)*	4.8 (42)*	2.3 (20)*
M6	5.8 (51)*	7.6 (67)*	8.9 (79)*	12 (102)*	13 (115)*	17 (150)*	7.8 (69)*
M8	14 (124)*	18 (159)*	22 (195)*	28 (248)*	31 (274)*	40 (354)*	19 (169)*
M10	28 (21)	36 (27)	43 (32)	56 (41)	61 (45)	79 (58)	38 (28)
M12	49 (36)	63 (46)	75 (55)	97 (72)	107 (79)	138 (102)	66 (49)
M16	121 (89)	158 (117)	186 (137)	240 (177)	266 (196)	344 (254)	164 (121)
M20	237 (175)	307 (226)	375 (277)	485 (358)	519 (383)	671 (495)	330 (243)
M24	411 (303)	531 (392)	648 (478)	839 (619)	897 (662)	1160 (855)	572 (422)

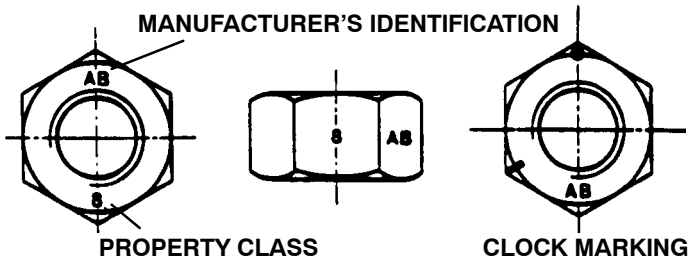
NOTE: Torque values shown with * are inch pounds.

IDENTIFICATION

HEX CAP SCREW AND CARRIAGE BOLTS CLASSES 5.6 AND UP

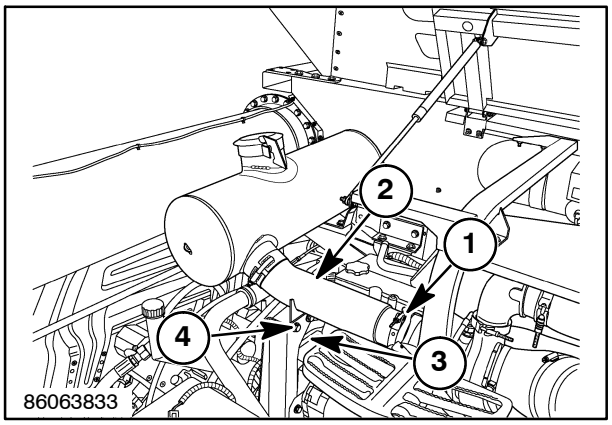


HEX NUTS AND LOCKNUTS CLASSES 05 AND UP



86529681 REV F 5.1

35. Install the exhaust pipe clamp, 1, and install the exhaust pipe, 2, to the turbocharger.
36. Install hardware, 4, securing exhaust pipe, 2, to the exhaust pipe support bracket, 3. Tighten hardware, 4.



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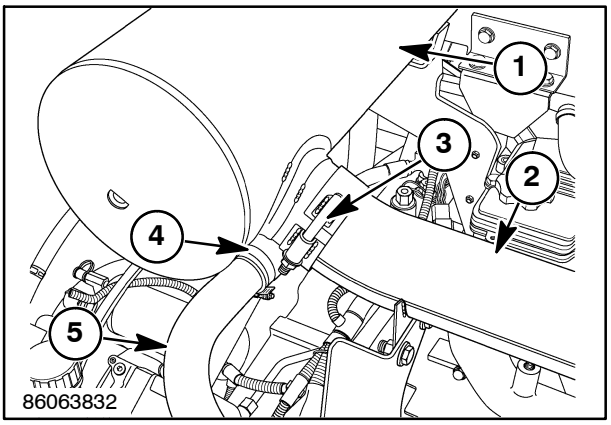
37. Install the muffler, 1, to the exhaust pipe, 2.
38. Tighten clamp, 3, to the exhaust pipe, 2.
39. Install clamp, 4, to the exhaust aspiration pipe, 5. Install aspiration pipe to muffler, 1. Adjust position of clamp, 1, to seal. Tighten clamp.



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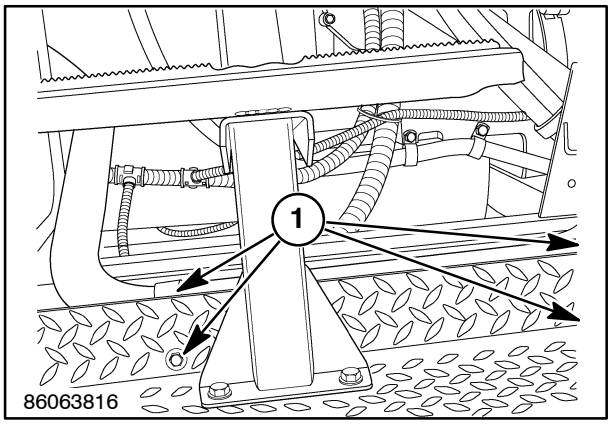
40. Install hardware, 1, securing the exhaust aspiration pipe to the platform, 2. Tighten hardware.



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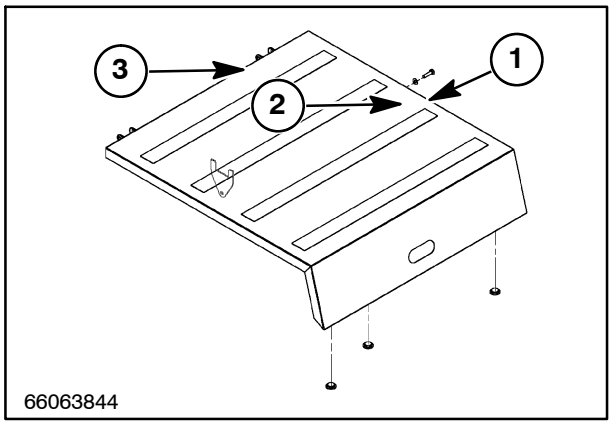
57. Install the engine lid to the combine. Install the two retaining rings, 1, washers, 2, and hinge pins, 3, to the engine lid.



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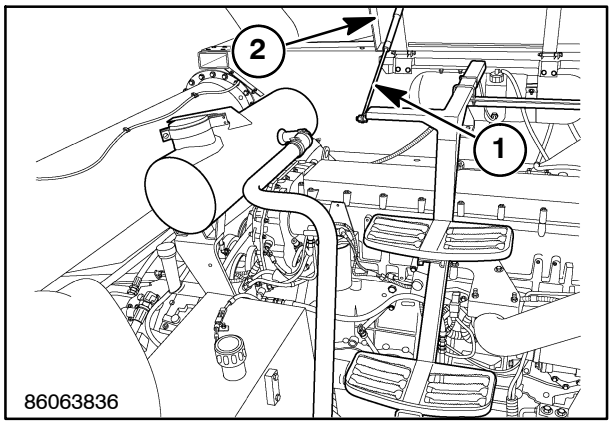
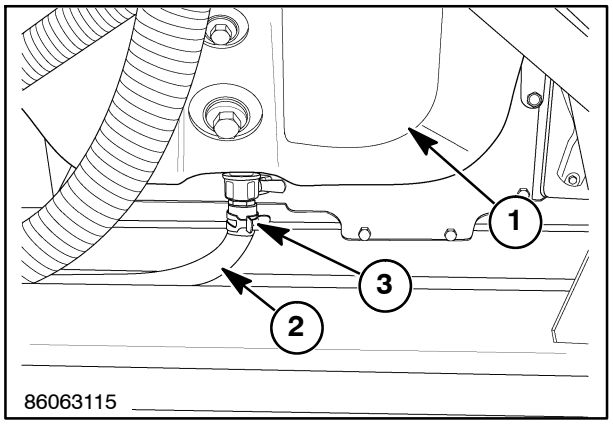
58. Connect the shock absorber, 1, to the engine lid, 2.



85

59. Remove the plug from the oil pan, 1, and connect the oil hose, 2, to the oil pan. Secure with the clamp, 3.



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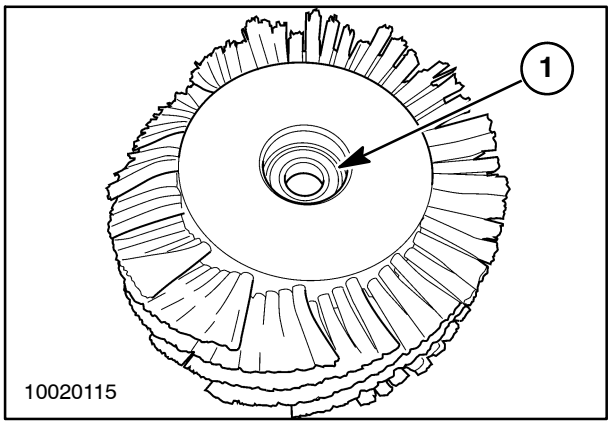
2. Press a new bearing, 1, into each brush wheel.



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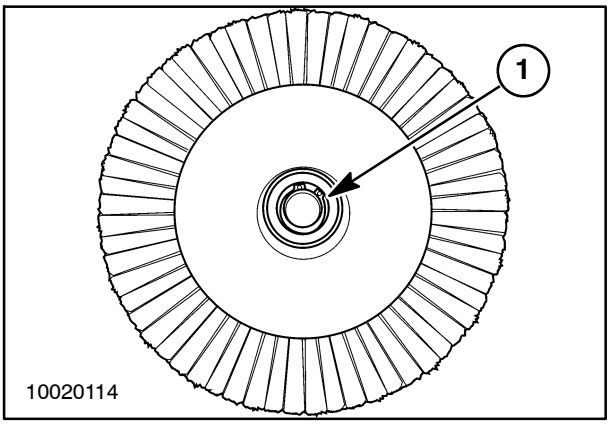
3. Install the rotary screen brush wheels onto the shafts. Secure the brushes in place with snap rings, 1.



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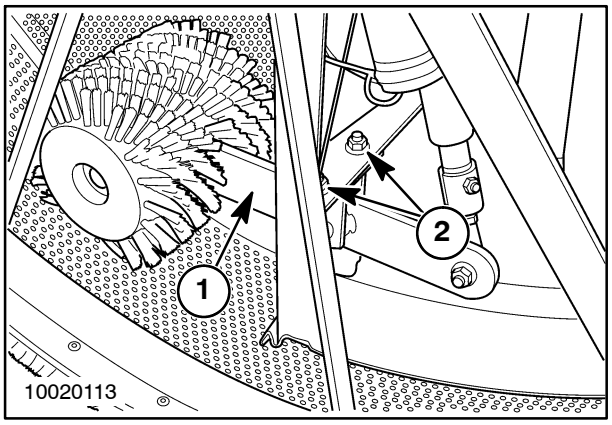
4. Set the brush assembly, 1, into place and secure to the rotary screen using carriage bolt, washers and nuts at 2.



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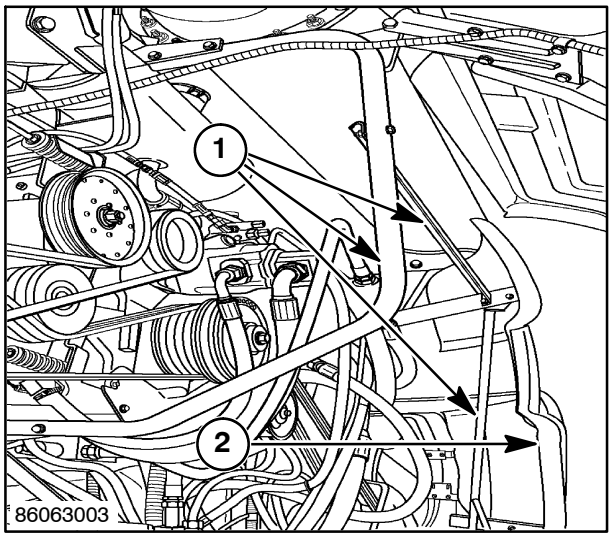
GEARBOX

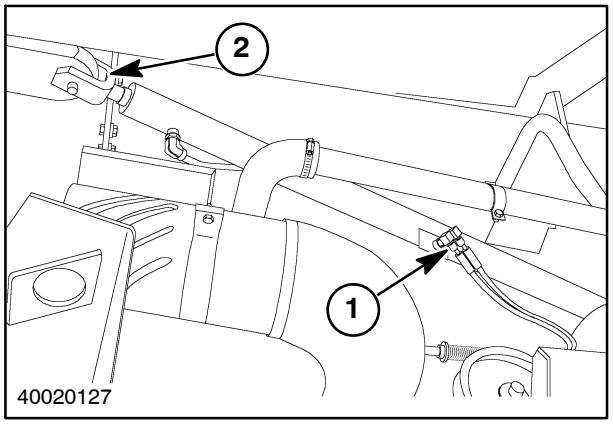
Removal

1. Remove left-hand side shield as described in Section 90.
2. Remove rear hinge support, 1, and rear fixed shield, 2.



1

3. If hydraulic pressure is available to operate the unloading auger, rotate the auger away from the combine and securely block it in place.
4. If hydraulic pressure is not available to operate the unloading auger, loosen the hydraulic lines, 1, to the unloading auger cylinder. Detach the rod end of the cylinder, 2, from the auger.
5. Rotate the unloading auger away from the combine, tie and block it securely in place.



2

⚠ CAUTION ⚠

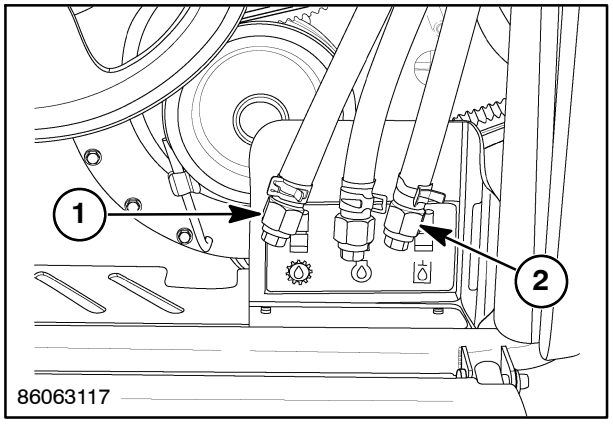
As the auger is rotated further away from the combine, the force on the auger to return to its standby position increases. Only move the auger far enough to allow sufficient room to remove the gearbox with a tow motor. Failure to comply could cause serious injury.

NOTE: *The engine gearbox holds approximately 11 liters (11.6 qts) of oil.*

6. Drain the engine gearbox oil through hose, 1, and catch the oil in a clean suitable container.

NOTE: *The hydraulic reservoir holds approximately 60 liters (16 gals) of oil.*

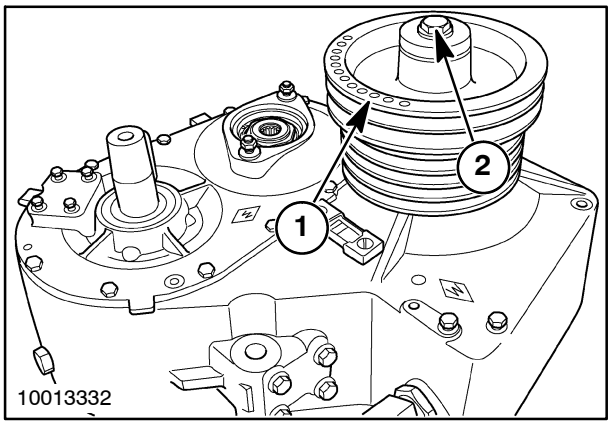
7. Drain the hydraulic reservoir through hose, 2, and catch the oil in a clean suitable container.



3

Assembly

1. Install shaft key.
2. Set the main output sheave, 1, onto the shaft, and turn in cap screw, 2, installed with washers.
3. Torque to 345 - 405 N·m (254.46 - 298.71 ft-lb).
4. Strike the sheave with a hammer and retorque.



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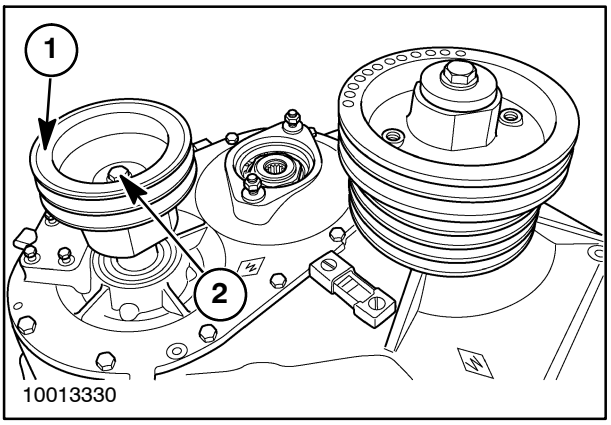
5. Install the shaft key.
6. Apply an anti-seize compound to the shaft.
7. Set the unloading sheave, 1, onto the shaft, and turn in cap screw, 2.
8. Torque to 95 - 105 N·m (70.06 - 77.44 ft-lb).
9. Strike the sheave with a hammer and retorque.



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Shifting Disc and Drive Gear

⚠ WARNING ⚠

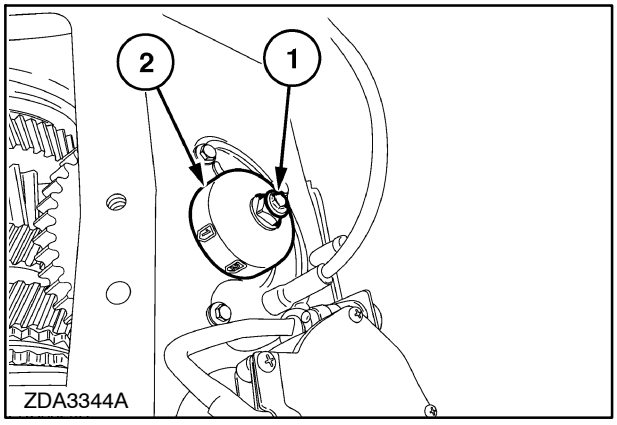
Raised equipment or machine movement without an operator can cause injury or death. Before you service this machine do the following:

- **Park the machine on a level surface.**
- **Support or lower the equipment (backhoe, blade, boom, bucket, etc.) to the ground (if equipped).**
- **Apply the parking brake (if equipped).**
- **Stop engine.**
- **Block the machine (wheels, tracks, etc.) to prevent machine movement.**

Failure to comply could result in serious injury or death.

NOTE: *It is possible to remove and to install the shifting disc and the shifting drive gear without disassembly of the gearbox shafts.*

44. Remove nut, 1, and indicator plate, 2.



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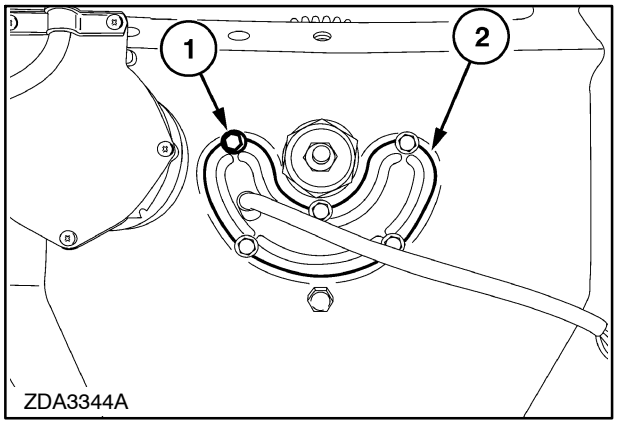
45. Remove five M6 x 16 bolts with flat washers, 1, and remove sensor, 2.



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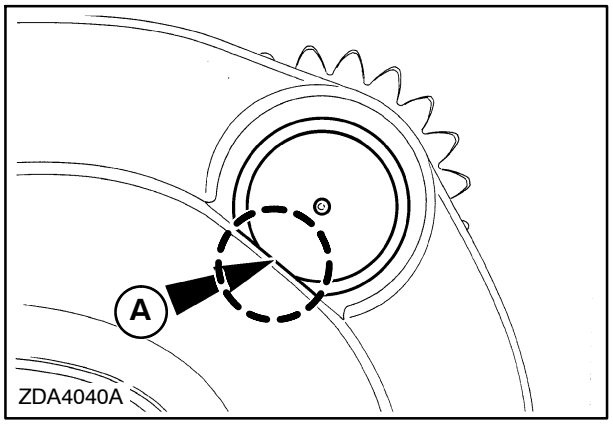
SECTION 25 - FRONT MECHANICAL DRIVE

Chapter 1 - Planetary Final Drive

CONTENTS

IMPORTANT: *Make sure the notch (A) on the pin is in line with the notch on the planet gear carrier.*



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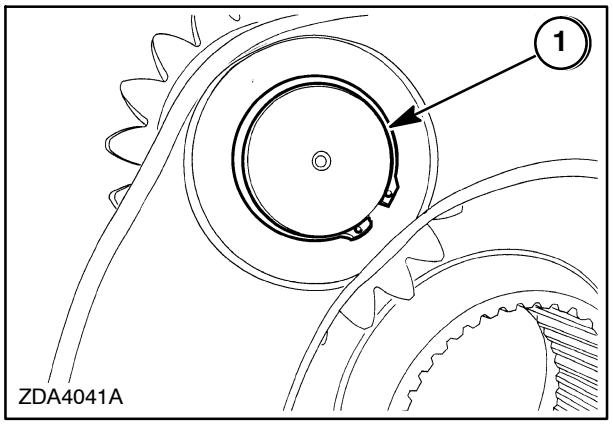
7. Install retaining ring, 1. Repeat steps 1 - 7 for the other two planet gears.



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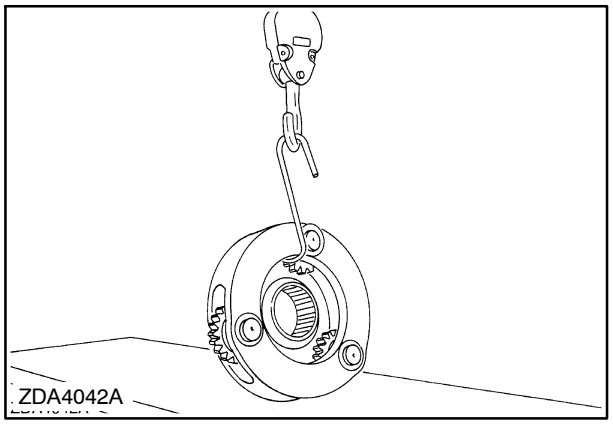
8. The pre-assembled planet gear carrier is heavy, use a lifting device to handle it.



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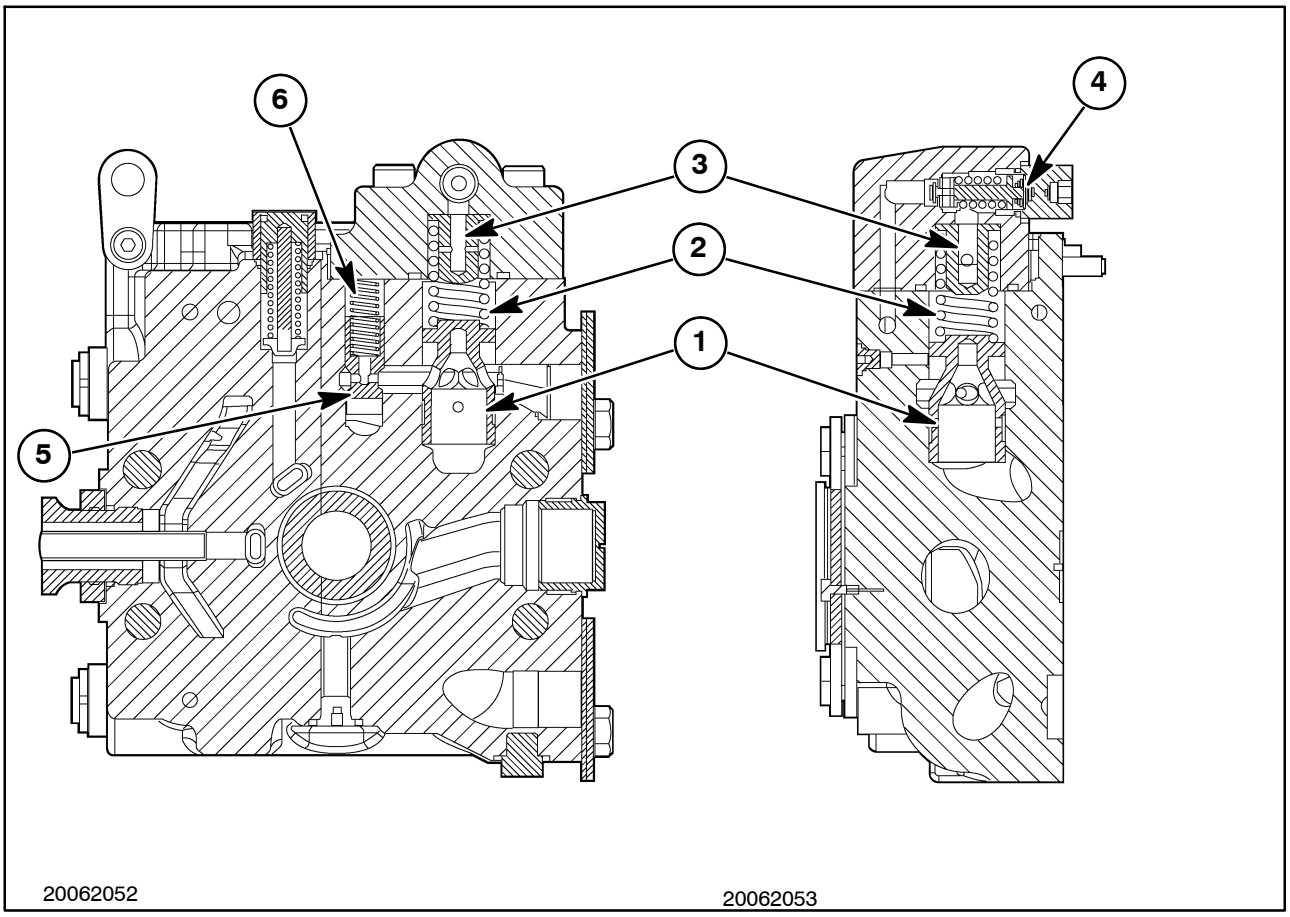

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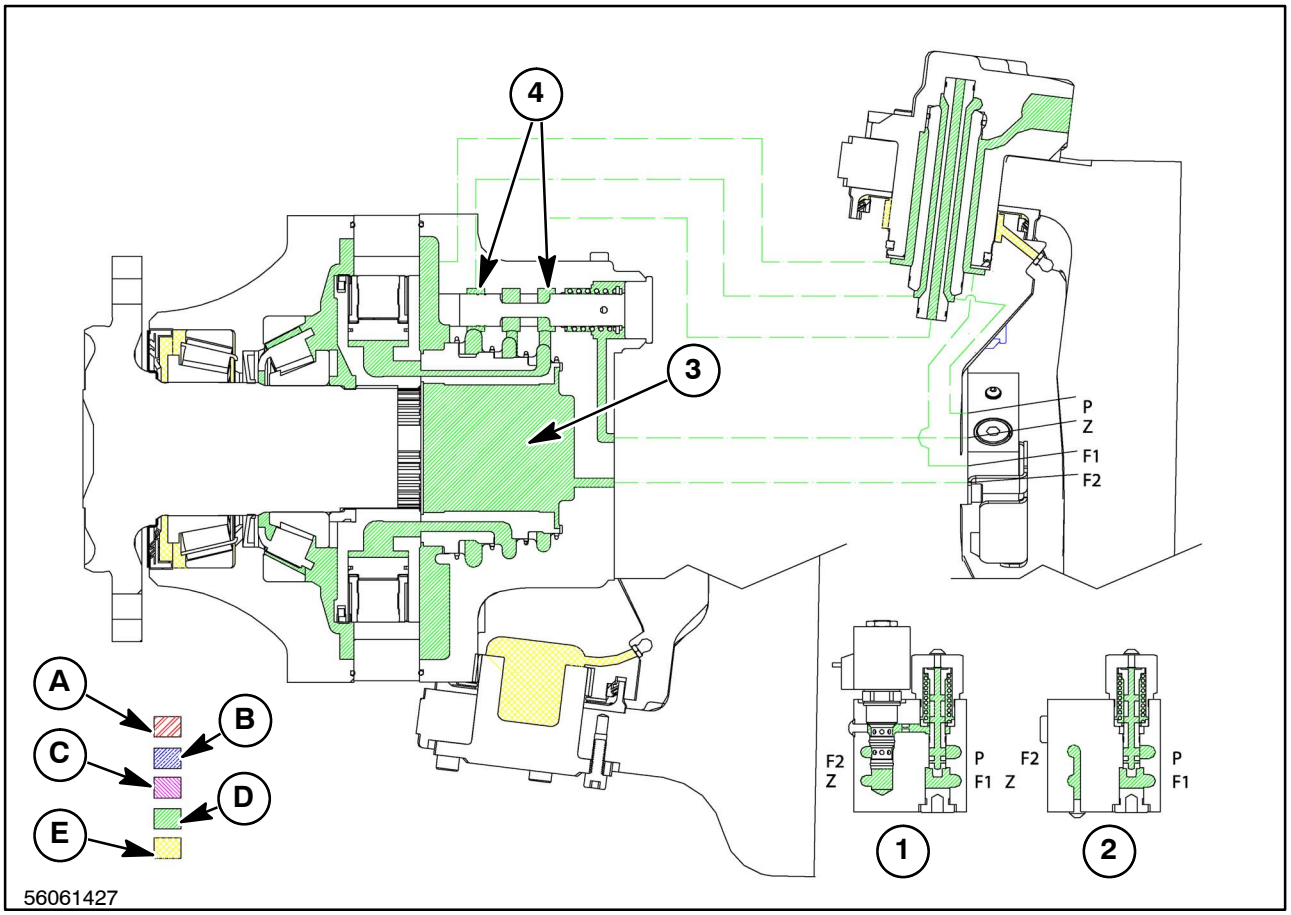
Sectional View of Integrated Hydrostatic Brake

Position	Description
1	Pressure regulator valve body (with by-pass bores)
2	Spring on pressure regulator valve body
3	Spring Guide
4	Pilot Relief valve (SCR-type)
5	Check Valve
6	Spring on check valve

Powered Rear Axle OFF (Free Wheeling Mode)



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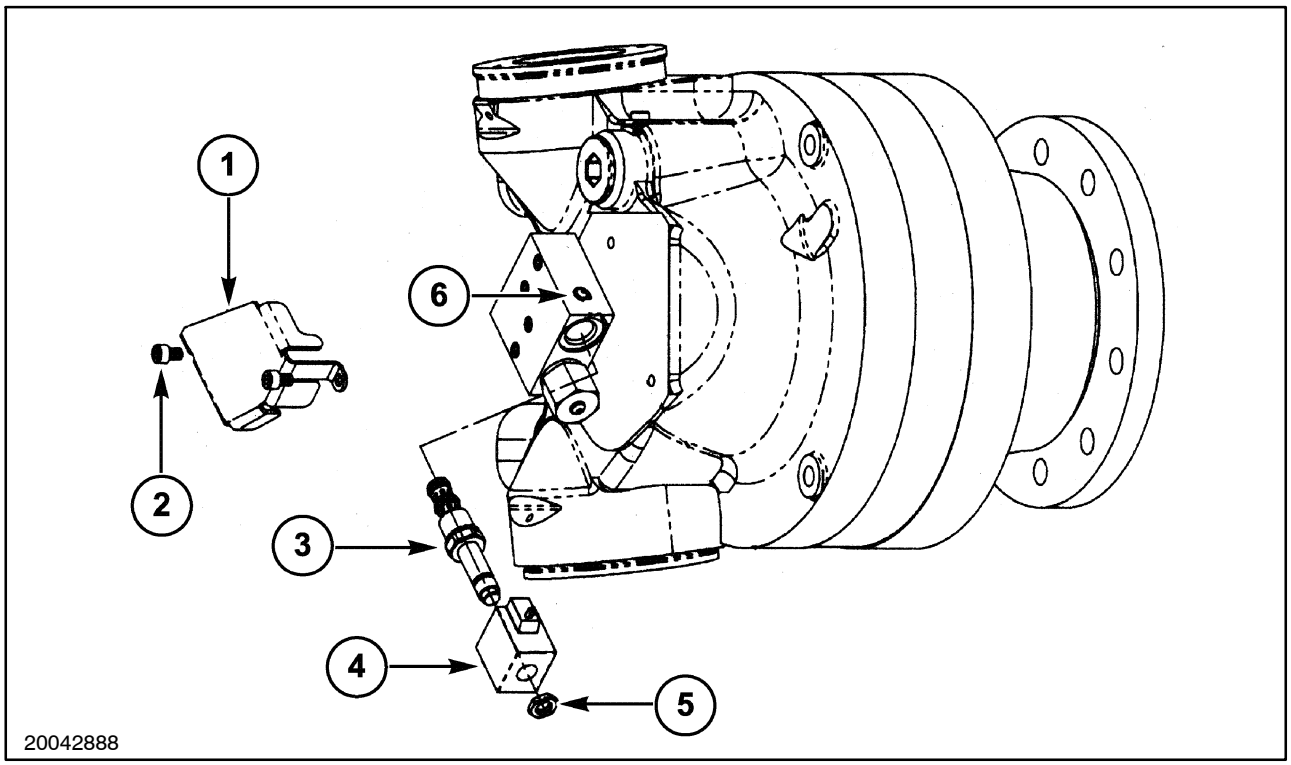
Powered Rear Axle OFF (Free Wheeling Mode)

A. High Pressure
B. Charge Pressure
C. Pilot Pressure
D. Case Drain
E. Grease Cavities

The high pressure lines, 4, of the wheel motors are connected directly to the hydraulic fluid reservoir through the case drain line on the powered rear axle selector valve (not part of the steerable motor). The wheel motor case drain, 3, however, is connected to the oil cooling circuit line in order to circulate the wheel motor case drain oil through the oil cooler. Because of the slight [approximately 1.5 bar (22 psi)] pressure differential between the two case drain pressures, the pistons of the motor are pushed into the cylinder block to avoid hard contact between the piston rollers and the motor cam ring due to centrifugal force while driving.



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Overhaul

NOTE: *The solenoid valve can be replaced without removing the motor from the C-frame.*

1. Turn the wheel to the steering stop to gain access to the valve.

⚠ CAUTION ⚠

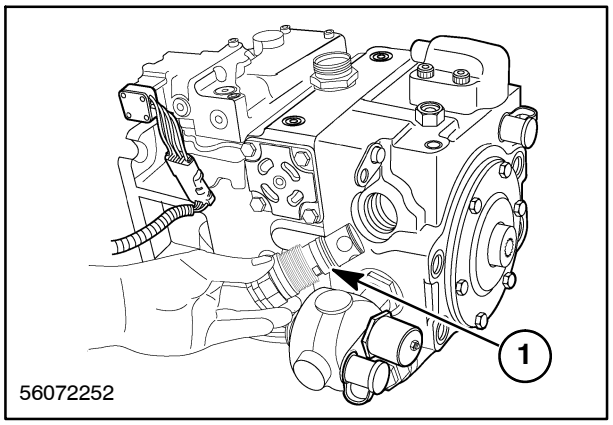
Before you do service under the machine, put the machine on a level surface, engage the parking brake and stop the engine. Put blocks at the front and rear of the tires. Failure to follow these instructions can cause injury.

2. Release the pressure in the supply circuit.
3. Disconnect the drain line at the tank level to avoid siphoning.
4. Disconnect the electrical connection.
5. Remove the two capscrews, 2, and cover, 1.
6. Remove the Hex nut, 5, magnetic winding, 4, and cartridge valve, 3.
7. Make sure new cartridge valve is clean. Lubricate O-rings with hydraulic fluid. Install new cartridge valve, 3, and torque to 24- 30 N·m (17.8 - 22.2 ft-lb).
8. Install new magnetic winding, 4, and Hex nut, 5. Torque nut to 2.7 - 3.3 N·m (2.0 - 2.4 ft-lb).
9. Re-clamp electrical leads and reconnect the electrical connection.
10. Reconnect the drain line and pressurize the supply line.
11. Bleed air from system by loosening bleed screw, 6, approximately one turn. Tighten after all air is bled from the system.
12. Re-install cover, 1, with capscrews, 2. Torque the capscrews, 2, to 22.5 - 27.5 N·m (16.6 - 20.2 ft-lb).

Op. 29 218

Installation

1. Install the cartridge, 1, in the multi-function valve cavity.



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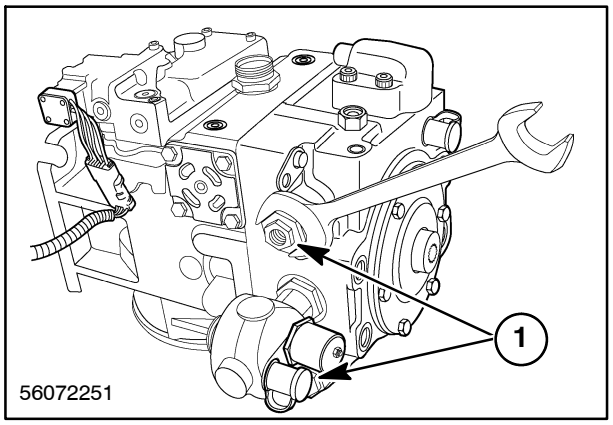
2. Torque to 89 N·m (66 ft-lb).

⚠ CAUTION ⚠

Do not over torque the multi-function valve cartridge.



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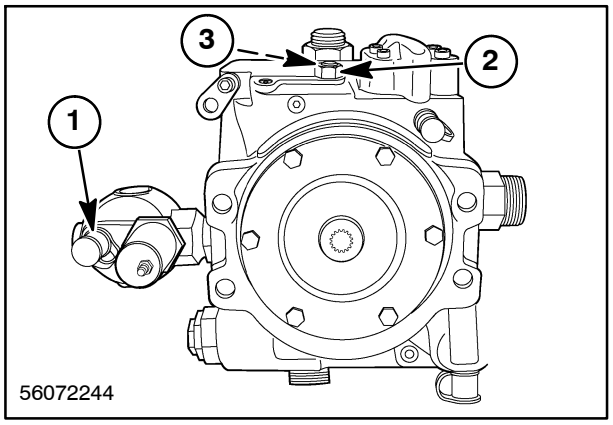
PUMP CHARGE PRESSURE RELIEF VALVE

Adjustment

To measure the pump charge pressure relief valve setting, install a 35 bar (500 psi) gauge in port 1. Start the combine and, with the hydrostatic transmission in neutral, record the pressure.

⚠ CAUTION ⚠

Block the wheels so the machine cannot move. make certain that everyone is clear of the machine.



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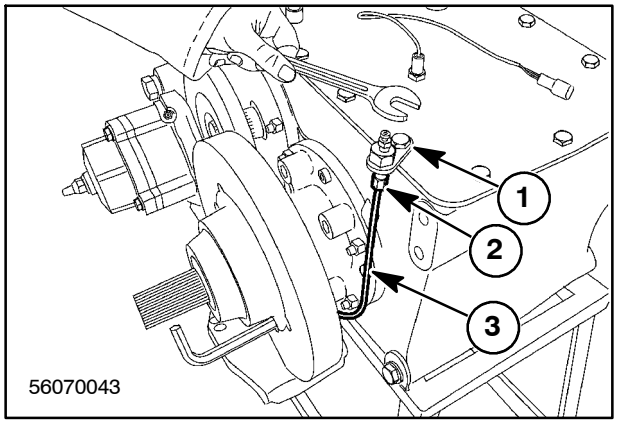
The charge pump pressure reading should be 20.1 – 21.2 bar (291 – 308 psi). The gauge will read 22 – 23 bar (320 – 340 psi). This includes case pressure.

If the pump charge pressure is not within specifications, adjust the relief valve as follows:

1. Loosen the jam nut, 2.
2. Turn the adjusting screw, 3, clockwise to increase the pressure and counterclockwise to decrease the pressure.
3. When the charge pump relief valve setting is within specifications, tighten the jam nut to 52 N·m (38 ft-lb) and remove the gauge.

NOTE: *The pressure will change at a rate of approximately 3.4 bar (50 psi) per turn.*

8. Secure the bleed line, 3, to the transmission with bolt, 1. Torque to 45 - 55 N·m (33 - 40 ft-lb.). If bleed line fittings, 2, were loosened, torque to 13 - 15 N·m (10 - 11 ft-lb).



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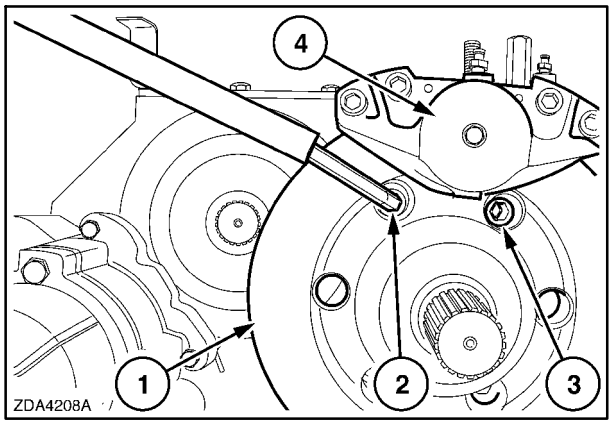
9. Rotate the brake disc, 1, to align the hardware access holes to the caliper mounting holes in the transmission housing.
10. Apply Loctite 242/243, on Hex Socket Head Screws, 2 and 3.
11. Install upper brake caliper, 4, with the Hex Socket Head Screws.
12. Tighten and torque screws, 2 and 3, to 260 - 270 N·m (192 - 200 ft-lb).



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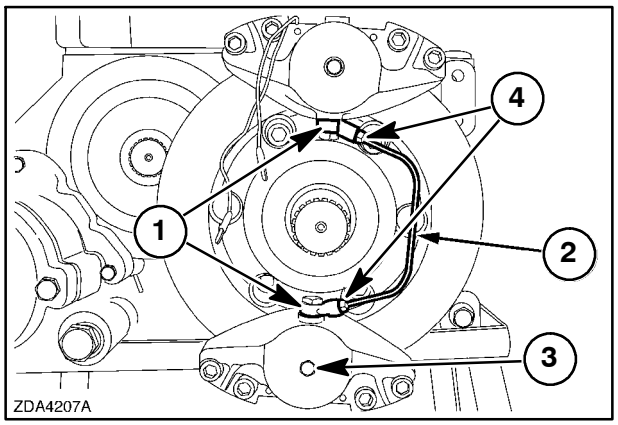
13. Connect the banjo bolts, 1, of brake line, 2, to the upper and lower brake calipers.
14. Tighten and torque the banjo bolts to 25 - 35 N·m (19 - 26 ft-lb).
15. If the brake line fittings, 4, were loosened, torque the fitting to 13 - 15 N·m (10 - 11 ft-lb).
16. Connect the supply brake line banjo bolt to the supply port, 3, of the lower caliper.
17. Tighten and torque the banjo bolt to 25 - 35 N·m (19 - 26 ft-lb).
18. If the supply brake line fitting was loosened from the banjo bolt at the supply port, 3, torque the fitting to 13 - 15 N·m (10 - 11 ft-lb).
19. Repeat the procedure for the opposite side.



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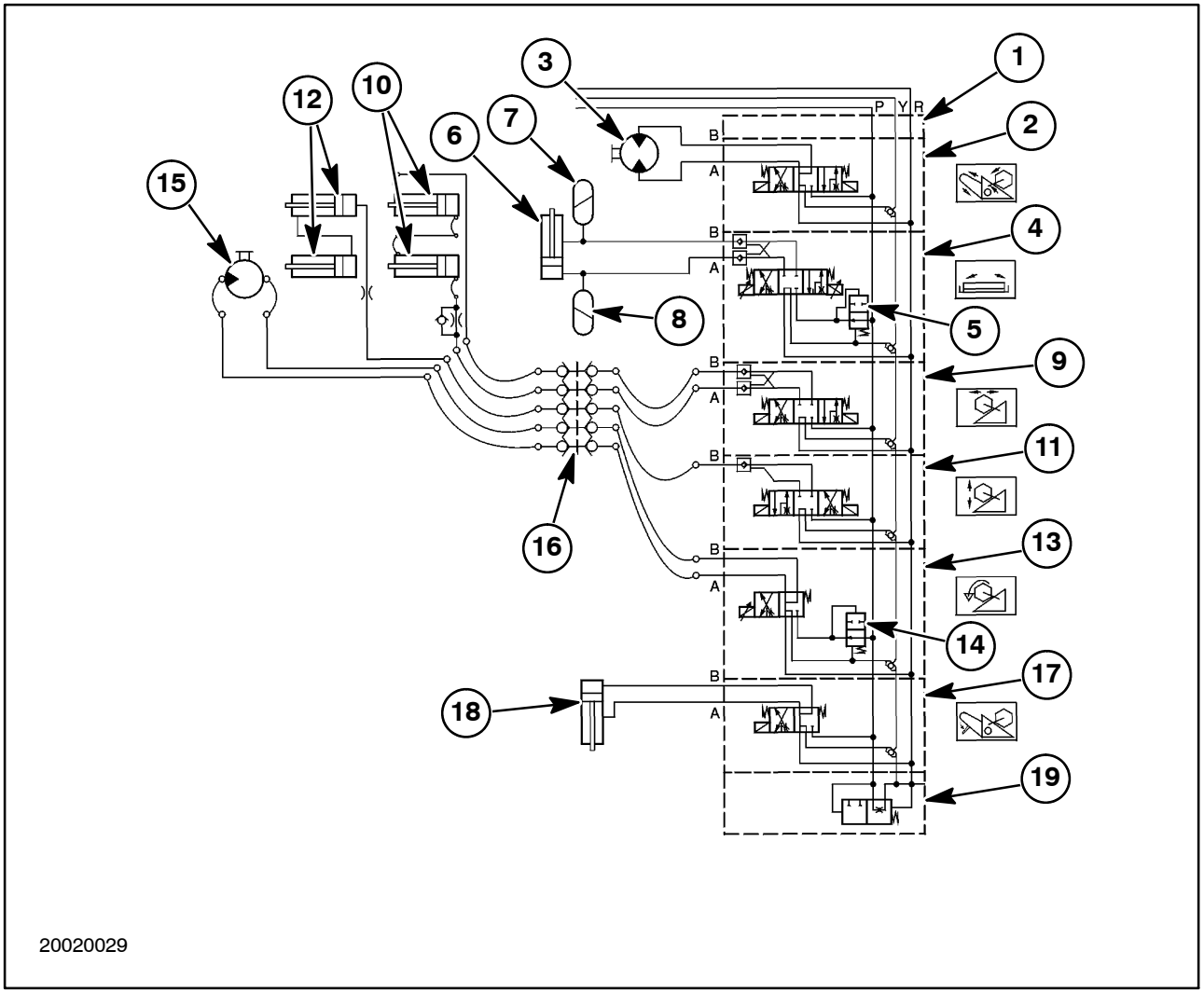
Install the half-shafts. Reference Section 25, Chapter 1, “Half-shaft - Installation.”



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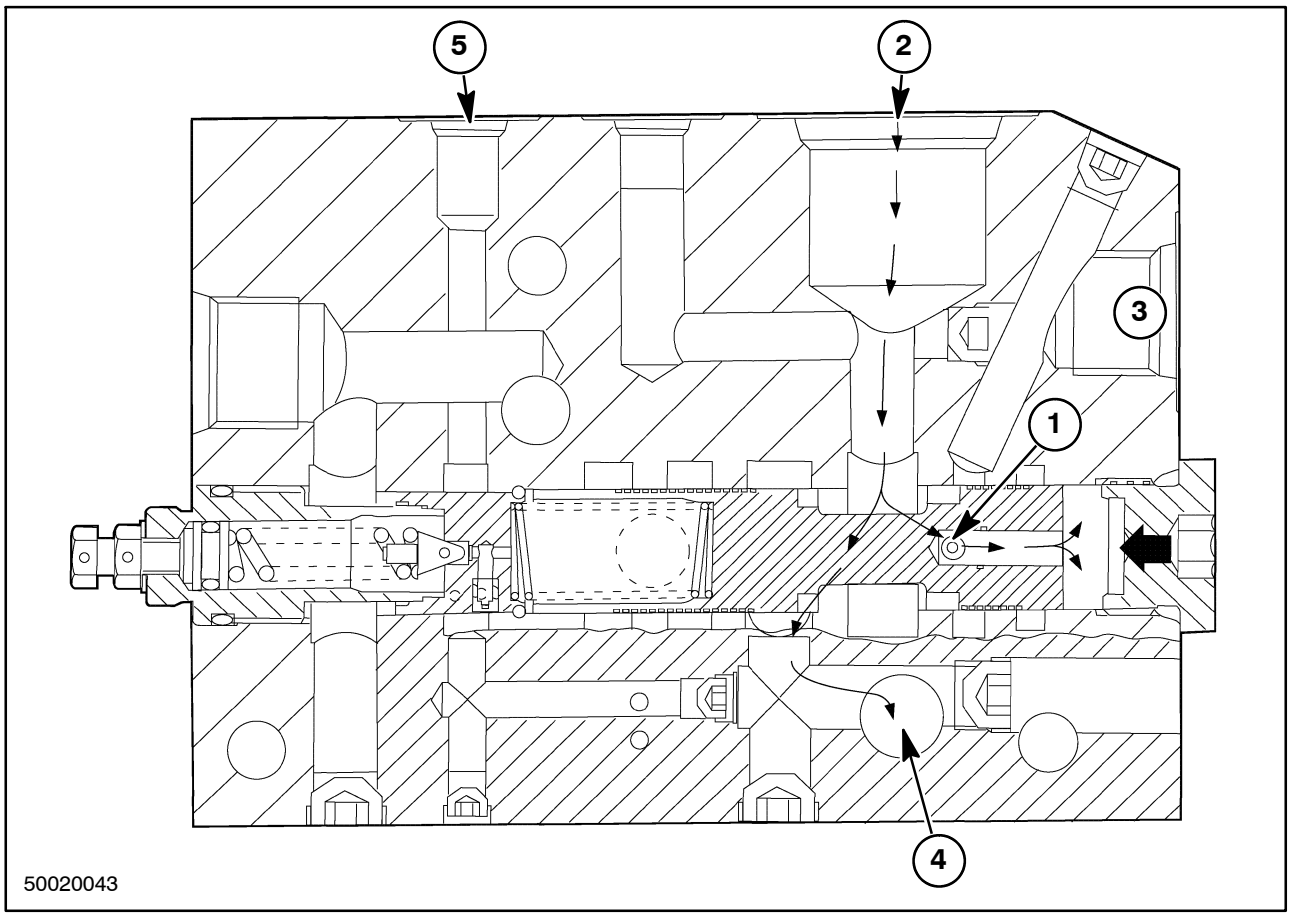

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Steering Neutral

When the steering valve is in neutral, the inlet to the steering valve is blocked and the pressure will increase in the priority port. The pressure is felt on the right end of the spool through an internal passage, 1. The pressure at the end of the spool will overcome the spring and shift the spool to the left and close the path from the inlet, 2, to the priority port, 3, and open the path from the inlet to the main pressure gallery, 4, in the main stack valve. The signal from the steering valve, 5, which is open to the spool spring chamber, will be near 0 bar (0 psi) and therefore will not assist the spring in opposing the spool. Because the steering system does not require any flow, all flow is available to the main and feeder stack valves.

The steering system uses a dynamic signal non-reactive neutral logic steering motor; this motor allows a small amount of oil to “leak” through the motor from the priority port to the load sense port. As a result, there is typically always a 7 – 10 bar (100 – 145 psi) pressure in the load sense line, even when all circuits are in neutral. This flow accomplishes two things: it provides some flow of oil through the motor at all times to warm up the components, and it provides improved steering system response.

Oil overheating (high pressure system):

Relief valve continually blowing, check for broken spring or dirt ingress and reset.
Oil cooler blocked or thermostatic bypass valve faulty not allowing oil to circulate around the cooler.

If hydrostatic temperature control system (TCS) is limiting hydrostat operation, hydrostatic system overload is causing oil overheat. Shift transmission to lower gear to reduce load on hydrostatic system.

Jerky or inconsistent operation:

On functions requiring consistent and fine control, the system pressure is maintained by a pressure compensation valve located within the valve slices. If these stick and fail to operate, jerky or inconsistent operation may result.

Components may drop gradually or move gradually out of position without being operated:

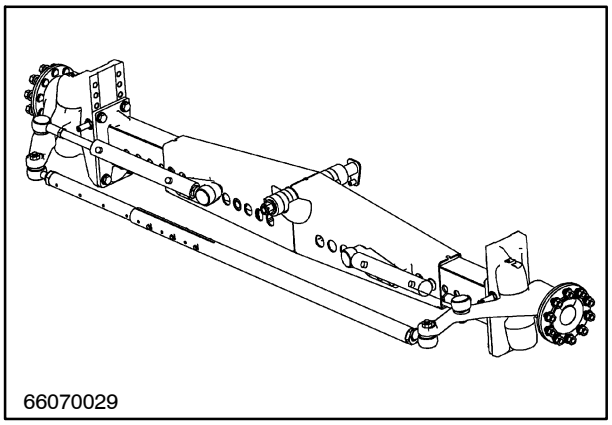
Functions that contain lock-out valves may drop or move if the seals within that function are slightly worn and the lock out valve is not functioning. This may be due to dirt ingress or the valve sticking open. If the lock out valve sticks closed this may lead to a function not operating or operating very slowly.

Accumulator faults:

An accumulator is installed into a circuit to absorb spikes created in the hydraulic system, i.e., generated by forces acting on a raise/lower cylinder. If an accumulator fails, the system will become rigid and the component will have no damping.

Heavy Duty Adjustable Steering Axle (HDASA)

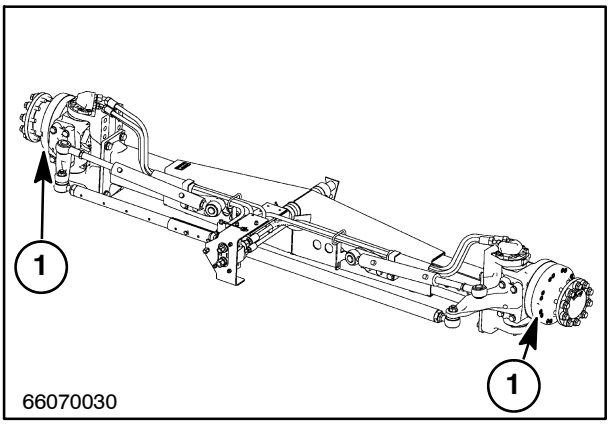
The Heavy Duty Adjustable Steering Axle is designed to support the weight of the combine and provide directional control to the operator.



3

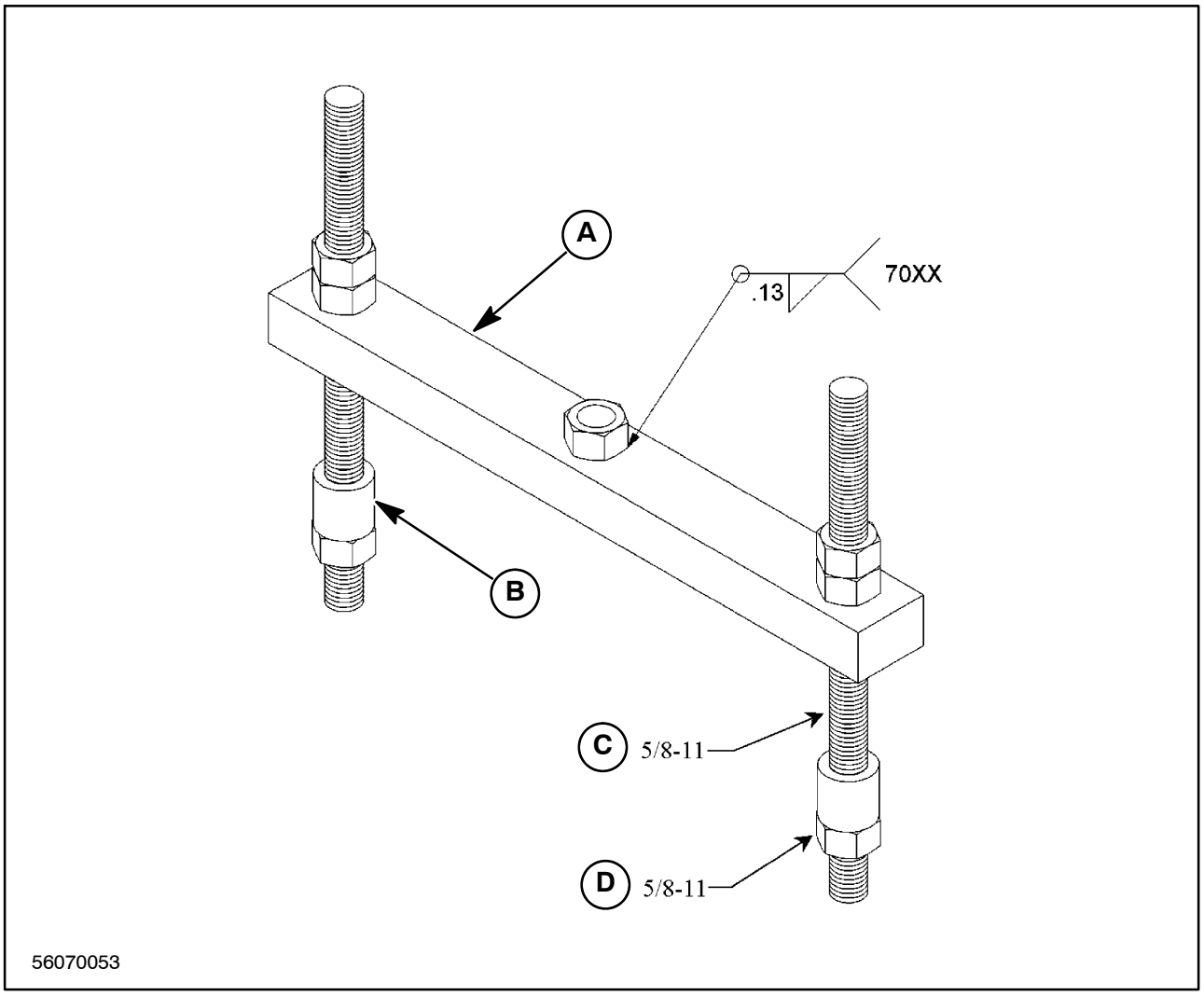
Powered Rear Axle (PRA)

The Powered Rear Axle is designed to support the weight of the combine, provide directional control to the operator and increase traction by the addition of two hydrostatic motors, 1, to drive the steering axle tires.



4

Rotational Torque Tool



8

A. Bar, Rotational Torque Tool
B. Spacer (Qty. 2)
C. Rod, All Thread 5/8-11 (Qty. 2)
D. Hex Nut 5/8-11 (Qty. 7)

NOTE: *Specifications for Rotational Torque Tool Bar are on the following page; specifications for the All Thread Rod and Spacer are on the previous page.*

TROUBLESHOOTING

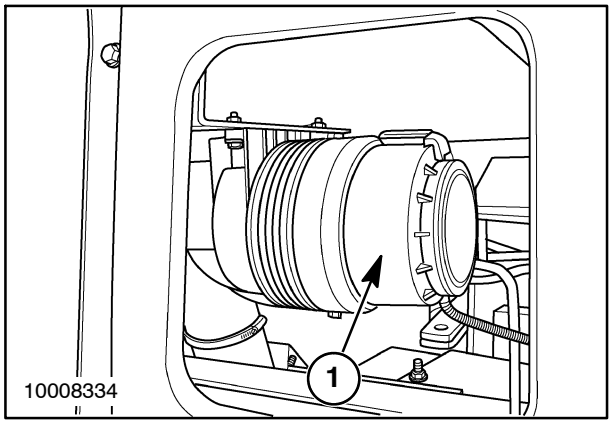
GENERAL

Problem	Possible Cause	Correction
Fault Code indicated in display window.	System problem.	Troubleshooting Fault Codes
No cooling.	A/C Mode switch not on.	Turn A/C Mode switch on.
	Loss of refrigerant.	Overhaul - Pressure Test
	Insufficient air flow through evaporator.	Check air filter. Check evaporator core and clean as necessary. Check blower motor operation. Refer to "Blower Motor - Testing"
	Loose or broken compressor drive belt.	Check belt and tension. Adjust or replace as necessary.
	Compressor clutch does not engage.	Electrical Control Relay - Testing
	Faulty expansion valve.	Expansion Valve - Testing
	Faulty compressor and/or compressor clutch.	Compressor Magnetic Clutch - Testing
Insufficient cooling	Defrost on.	Press Mode Control Button to turn defrost off.
	Dirty evaporator coil and/or filter.	Visually inspect. Clean as necessary.
	Dirty condenser core.	Visually inspect. Clean as necessary.
	Compressor drive belt slipping.	Visually inspect. Adjust as necessary.
	Faulty cab temperature sensor.	Sensing System Cab Temperature Sensor - Testing
	Faulty expansion valve operation.	Expansion Valve - Testing
	Evaporator icing up.	Overhaul - Pressure Test
	Low refrigerant charge.	Overhaul - Pressure Test
	Heater Valve leak through.	Operate engine at 1500 rpm for 15 minutes to warm engine coolant. Operate the A/C system at maximum cooling. Install stem thermometer in mid-cab louver and record temperature. Close heater core supply valve at engine. Wait a few minutes and check the temperature. If the temperature drops, valve leak through is the problem; replace heater valve. Refer to "Heater Valve - Removal."

DESCRIPTION OF OPERATION

The combine is provided with two mechanisms for filtering the air entering and circulating through the cab.

Intake air is drawn down the left, rear cab frame post into the separator filter, 1, by the separator fan. The separator filter and fan are located inside the cavity next to the left cab door.

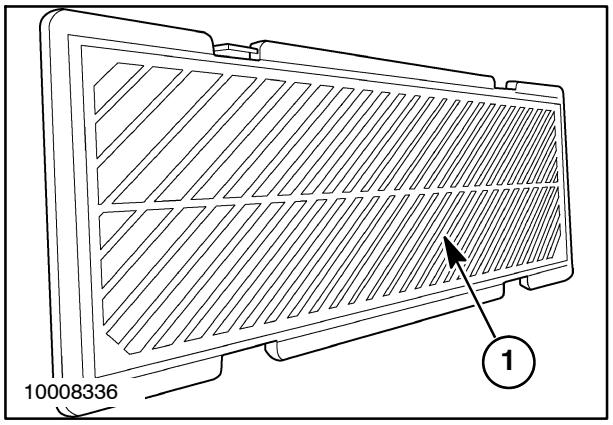


1

Air entering the separator is directed into a circular path around the paper element filter. Centrifugal force will cause the heavier material to move toward the outside. An outlet port is provided on the cap of the separator to allow continuous removal of the material separated. The separating action of the unit extends the life of the paper filter.

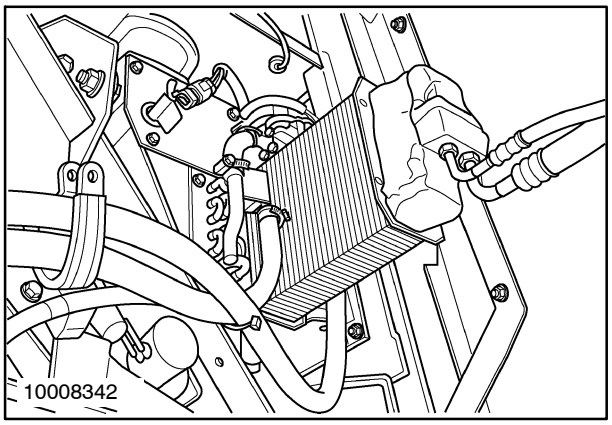
The Recirculation Air Filter, 1, located behind the operators' control console filters the air circulating inside the cab. The paper element filter removes small particles from the air to prevent clogging of the air conditioning system evaporator located directly behind the filter.

NOTE: *Operating the combine with the cab door open will cause premature filter plugging.*



2

Carefully pull the evaporator core from the housing.



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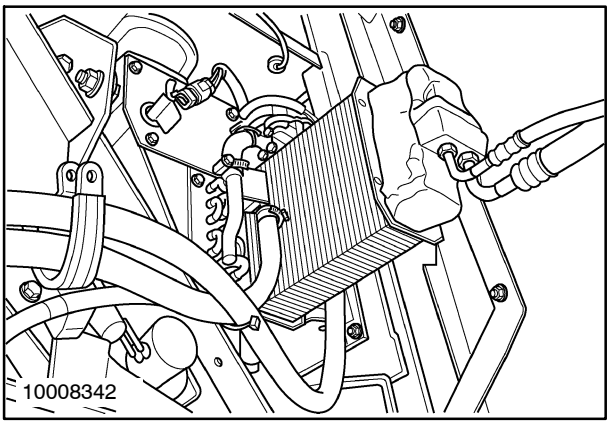
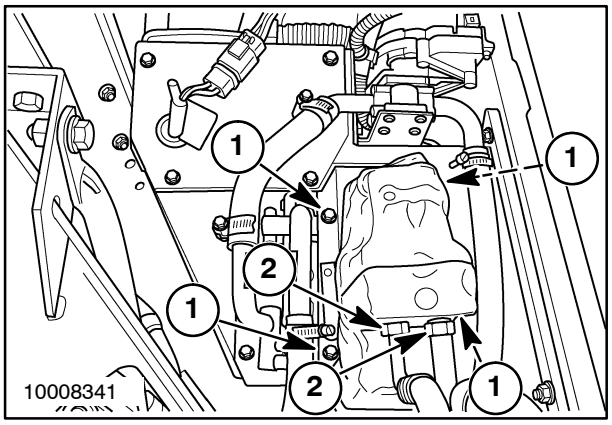
Installation

Install a new seal, and slide the evaporator core into the ventilation housing with the ports of the thermal expansion valve facing down.



9

Secure the evaporator core to the housing using four cap screws, 1. Lubricate the O rings with refrigerant oil and connect the supply and return lines, 2, if they had been previously removed. Torque the smaller line to 18 – 23 N·m (13 – 17 ft-lbs) and the larger line to 30 – 37 N·m (22 – 27 ft-lbs).

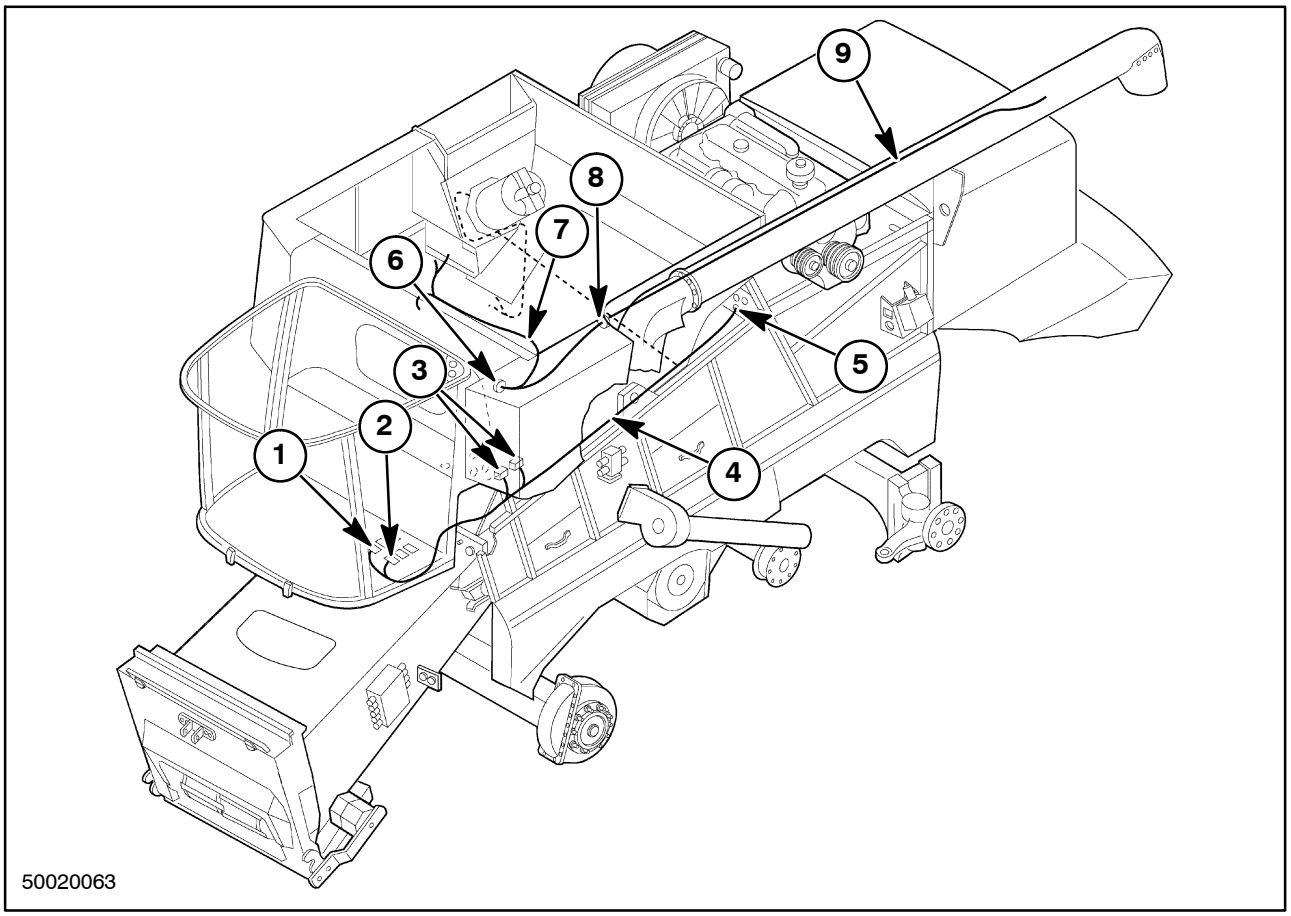


10

SECTION 55 - ELECTRICAL SYSTEMS

Chapter 2 - IntelliView™ (II or Plus II) Monitor Diagnostic Functions

CONTENTS

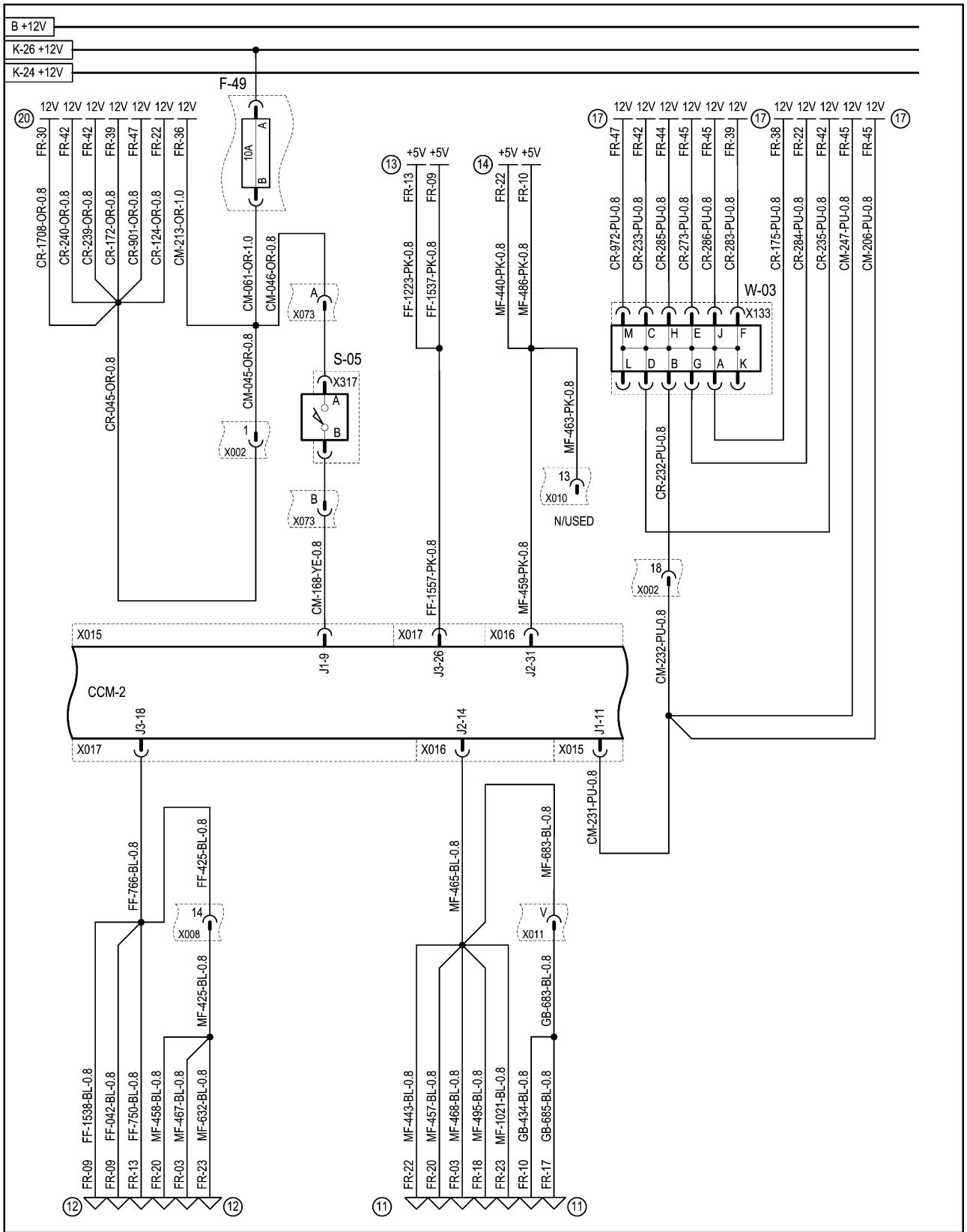


20

Expansion (EX), Grain Tank (GT) and Unload Tube Light Wire Harnesses

1. Connector X014, CCM3 – J3
2. Connector X013, CCM3 – J2
3. Connectors X034, X219 to Main Frame harness
4. Expansion (EX) wire harness
5. Connector X025 to Straw Hood Front harness
6. Connector X009 to Main Frame harness
7. Grain Tank (GT) wire harness
8. Connector X105 to Unload Tube Light harness
9. Unload Tube Light wire harness

2007 PRODUCTION - SN HAJ110001 AND ABOVE



F-49 = CAB FUSE
S-05 = SEAT SWITCH
W-03 = SPLICE BLOCK C

DISTRIBUTION
FRAME-27

2. Access the three CCM modules under the training seat. Remove connector X018, 1, from module CCM1. This essentially splits the CAN network in half. Connector X018, pins J1-19 and J1-20 will be referred to as LEG 1. Connector X018 pins J1-13 and J1-14 will be referred to as LEG 2. Use a multimeter to measure the resistance across pins J1-19 and J1-20 on the harness end of connector X018.

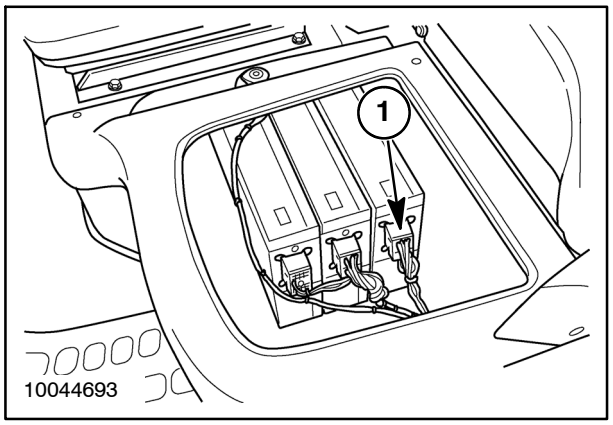
   A. A reading of 0 ohms indicates that the short circuit is in LEG 1. Continue with "Troubleshooting LEG 1, Short Circuit" in this section.

   B. A reading of 120 ohms indicates that LEG 1 is okay. Go to Step 3.

3. Using the multimeter, measure the resistance across pins J1-13 and J1-14 on the harness end of connector X018.

   A. A reading of 0 ohms indicates that the short circuit is in LEG 2. Continue with "Troubleshooting LEG 2, Short Circuit" in this section.

   B. A reading of 120 ohms indicates that LEG 2 is okay. Go to Step 4.



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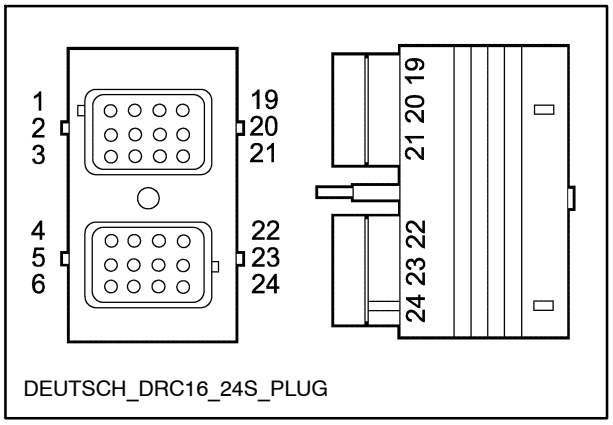


10

4. Using the multimeter, measure the resistance across pins J1-19 and J1-20 on the CCM1 side of connector X018.

   A. A reading of 0 ohms indicates that the short circuit is in CCM1. Replace CCM1.

   B. A high or infinite (OL) resistance reading indicates that the short is not in CCM1. Reconnect connector X018 and retest the system.

5. Using the multimeter, measure the resistance across pins J1-19 and J1-20 on the harness end of connector X018.

   A. A reading of OL (overload – open circuit) indicates that the open circuit is in LEG 1. Continue with "Troubleshooting LEG 1, Open Circuit" in this section.

   B. A reading of 120 ohms indicates that LEG 1 is okay. Go to Step 6.

6. Measure the resistance across pins J1-13 and J1-14 on the harness end of connector X018.

   A. A reading of OL (overload – open circuit) indicates that the open circuit is in LEG 2. Continue with "Troubleshooting LEG 2, Open Circuit" in this section.

   B. A reading of 120 ohms indicates that LEG 2 is okay. Go to Step 7.

7. Measure the resistance across pins J1-14 and J1-20 on the CCM1 side of connector X018.

   A. A reading of OL (overload – open circuit) indicates that the open circuit is in CCM1. Replace CCM1.

   B. A reading of 0 ohms indicates continuity of the CAN HI circuit through CCM1. Go to Step 8.

8. Measure the resistance across pins J1-13 and J1-19 on the CCM1 side of connector X018.

   A. A reading of OL (overload – open circuit) indicates that the open circuit is in CCM1. Replace CCM1.

   B. A reading of 0 ohms indicates continuity of the CAN LO circuit through CCM1. Reconnect X018 and retest the circuit.

CHARGING SYSTEM

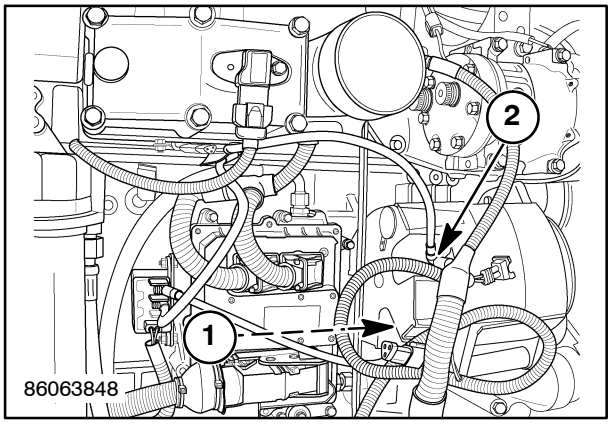
DESCRIPTION OF OPERATION

The Alternator (B+) connector X213A, 1, is connected to the battery via terminal B+ on the Starter Motor and is grounded to the engine through connector X213B, 2.

NOTE: *Alternator installation is shown on IVECO 10.3L engine. Installation on CNH 9.0L engine is similar.*

The Alternator is self exciting and does not require an excitation circuit. Charging system output is controlled by an integral voltage regulator/brush assembly. The regulator is set to 14.2 volt regulation. The Alternator is temperature compensated so that output will drop as the Alternator warms up.

Refer to schematic frames 1 and 2.



9

ALTERNATOR SPECIFICATIONS

Brand and Part #	Leece-Neville 8SC2282V
Volts/Amps	12V/185A
Adjustable	No
Internal or External Regulator	Internal
Excitation: Ignition/ Self Excite	Self Excite
Regulator Sense	Local Sense
Lamp Driver (Y/ N)	Y
Adjusting Ear: Style/ Thread Size	1/2-13UNC-2A
Termination Requirements: (Size, SAE, Metric)	B+ 7/16-14UNC preferred(5/16-24UNF sample), Lamp 10-24 UNC , Neg 7/16-14UNC preferred (1/4-28UNF sample)
Shaft Diameter (5/8, 7/8, 17mm)	7/8″

POWER DISTRIBUTION: UNSWITCHED AND SWITCHED

Power is supplied to the system in two modes: unswitched and switched.

1. Unswitched power is that which is available to the system at all times, regardless of the position of the ignition switch. In this mode, the battery voltage is applied directly to the power buss bar in the electrical system fuse/relay panel, located in the cab. Those circuits intended to be energized at all times get their power from this buss.

   Unswitched power is supplied to these fuses:

   F-1 to F-5

   F-15 to F-19

   F-22 to F-35

   F-38 to F-42

   F-50 to F-56

2. Switched power is supplied to the system only when ignition switch S-02 is turned on. This switches battery power to the following relays, which, when energized, supply battery power to the fuses listed:

   K-03, accessory 2 relay, supplying power to fuses F-11, F-12, F-13, and F-14.

   K-06, wiper relay, supplying power to wiper switch S-20.

   K-08, accessory 1 relay, supplying power to fuses F-08, F-09 and F-10.

NOTE: *K-03, K-06 and K-08 are energized in both ACC and IGN positions of key switch S-02.*

   K-24, CCM1 power relay, supplying power to fuses F-43, F-44 and F-45.

   K-25, CCM2 power relay, supplying power to fuses F-36, F-37 and F-46.

   K-26 CCM3/cab power relay, supplying power to fuses F-47, F-48 and F-49.

   Other fuses receive switched power by way of the following relays switched from CCM1:

   K-01, cab roof lights relay, supplying power to F-06 and F-07.

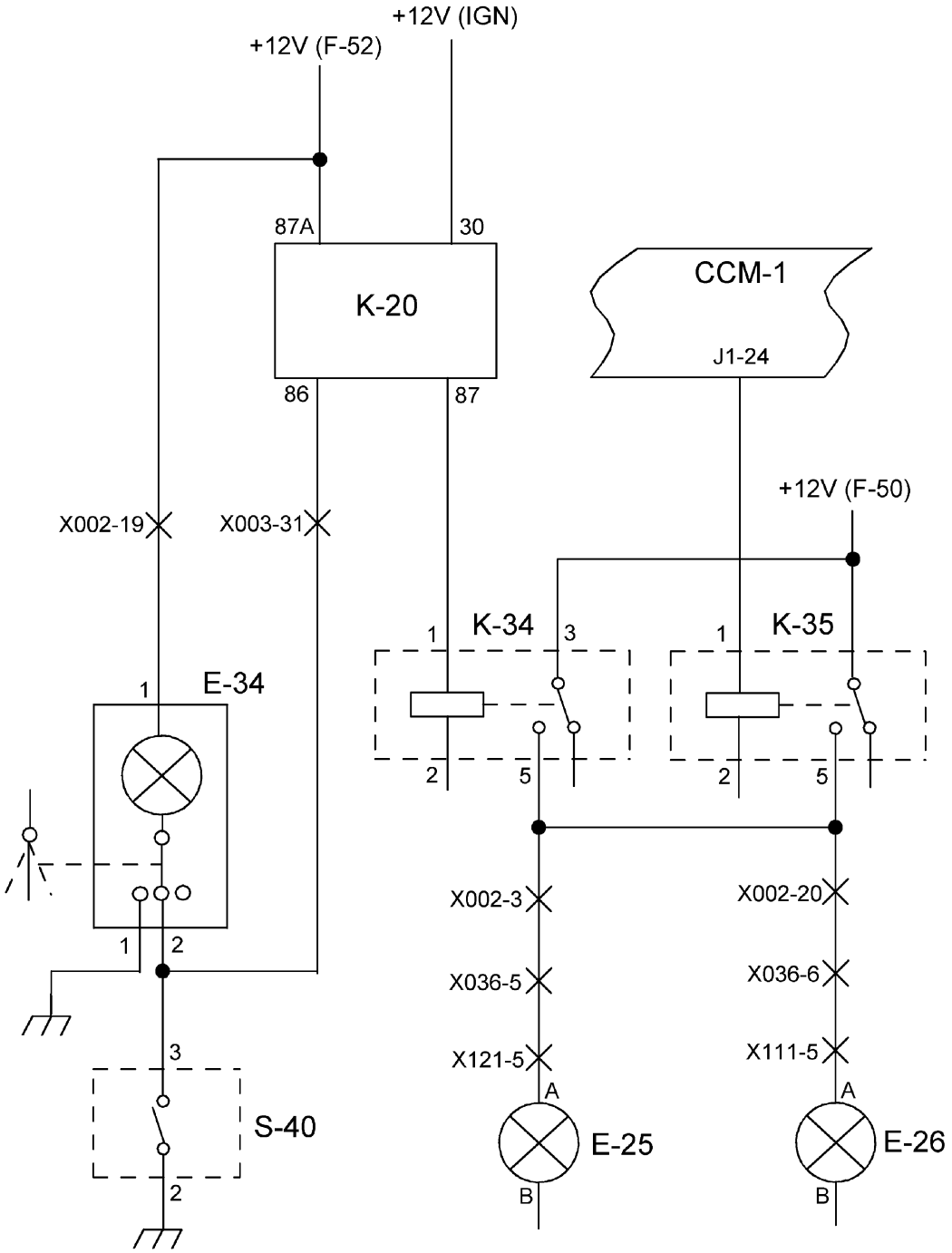
   K-02, light control relay, supplying power to F-20 and F-21.

The Fuse/Circuit Chart lists the system fuses, their power feed mode (unswitched or switched) and the circuits they supply.

POWER DISTRIBUTION CIRCUIT TROUBLESHOOTING

When starting out to troubleshoot a problem in the power distribution system, checking for obvious things first can save time.

1. First of all, for safety purposes, make sure all operating controls are in neutral or park lock position.
2. Make sure the batteries are fully charged and all connections are clean and tight.
3. If the problem circuit is a switched circuit, make sure the key switch is on.
4. Check the fuse supplying the problem circuit. If blown, replace. If the fuse blows again, further troubleshooting is needed to find the cause of the excessive current.
5. Check the electrical connectors supplying the problem circuit for loose, corroded or pushed-out terminals. Check also for pulled-out or broken wires. Make sure the connectors are fully seated.


+12V (IGN)
+12V (F-52)
87A
30
K-20
86
87
CCM-1
J1-24
+12V (F-50)
X002-19
X003-31
1
K-34
3
2
5
1
K-35
2
5
1
E-34
2
3
S-40
2
X002-3
X036-5
X121-5
A
E-25
B
X002-20
X036-6
X111-5
A
E-26
B
60050039

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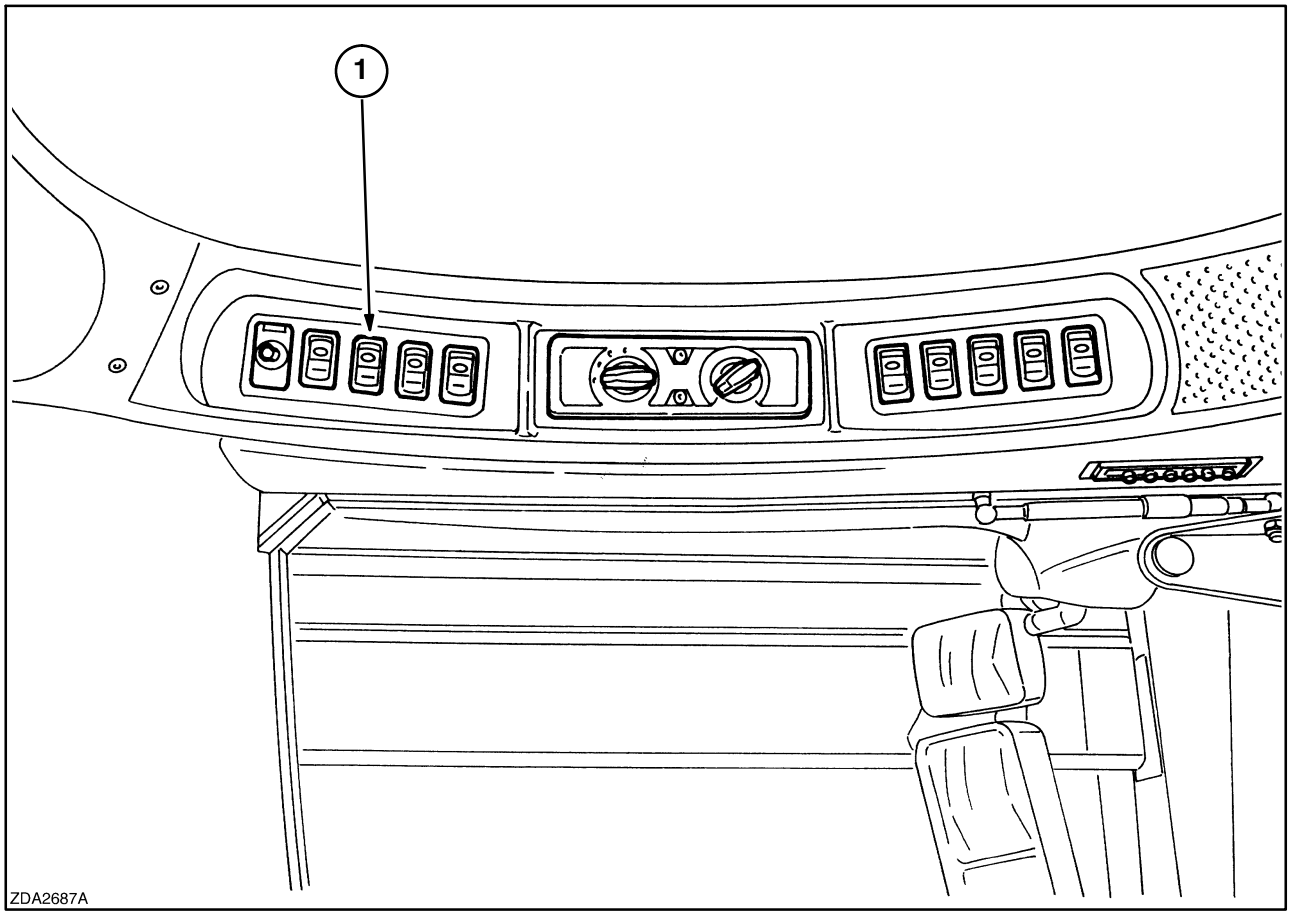
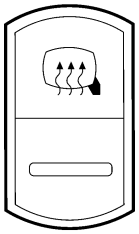
JJ - SIDE WORK LIGHT RELAY TEST			
	Test Point	**Good Reading**	**Possible Cause of Bad Reading**
1	Place Key Switch S-02 in "ON" position. Close Work Light Switch S-43. Measure for 12 volts at Side Work Light Relay K-35 (pin 5).	12 volts. If good reading, the relay is operating properly.	Side Work Light Relay K-35. Adjacent circuits. Go to next test point.
2	Partially remove Side Work Light Relay K-35. Measure for 12 volts at Side Work Light Relay K-35 (pin 1).	12 volts If good reading, go to next test point.	Open or short to ground in circuit 180 (WH) between Side Work Light Relay K-35 (pin 1) and CCM1 connector X018 (pin J1-24). Fault in CCM1.
3	Measure for 12 volts at Side Work Light Relay K-35 (pin 3).	12 volts If good reading, go to next test point.	Open circuit 071 (RD) or 073 (RD) between Side Work Light Relay K-35 (pin 3) and Fuse #50. Short to ground on circuit 072 (PU), 165 (PU) or 076 (PU) between Side Work Light Relay K-35 (pin 5) and Side Work Lights E-25 and E-26 connectors X297 and X298 (pin A). A short will cause Fuse 0#50 to blow.
4	Disconnect the Side Work Light Relay K-35. Measure the resistance on circuit 162 (BK) between Side Work Light Relay K-35 (pin 2) and ground.	Less than 1 ohm. If good reading, replace Side Work Light Relay K-35.	Open in circuit 161 (BK) between Side Work Light Relay K-35 (pin 2) and ground.

KK - UNLOAD TUBE LIGHT RELAY TEST			
	Test Point	**Good Reading**	**Possible Cause of Bad Reading**
1	Place Key Switch S-02 in "ON" position. Unload tube must be swung out from its cradle to activate Unload Tube Light Relay K-32. Measure for 12 volts at Unload Tube Light Relay K-32 (pin 5).	12 volts. If good reading, the relay is operating properly.	Unload Tube Light Relay K-32. Adjacent circuits. Go to next test point.
2	Measure for 12 volts at Unload Tube Light Relay K-32 (pin 1).	12 volts If good reading, go to test point 4.	Open or short to ground in circuit between Unload Tube Light Relay K-32 (pin 1) and CCM1 (J1-12). Go to next test point.

HEATED MIRROR CIRCUIT OPERATION



7

1. 

Mirror heating rocker switch (if equipped)

- ON
- OFF

Switched power is supplied to the mirror heat switch through fuse F09 from the Accessory 1 relay.

Chassis ground is supplied to the LH, RH, and German Mirror heaters through connectors X111, X121, and X287.

The mirror heat switch controls the LH, RH, and German Mirror Heaters simultaneously and allows the operator to determine the length of the heating cycle required to defrost the power mirrors.

When the ignition switch is in the RUN position and the mirror heat switch is in the closed position, current flows through the heating elements, in each mirror, to chassis ground.

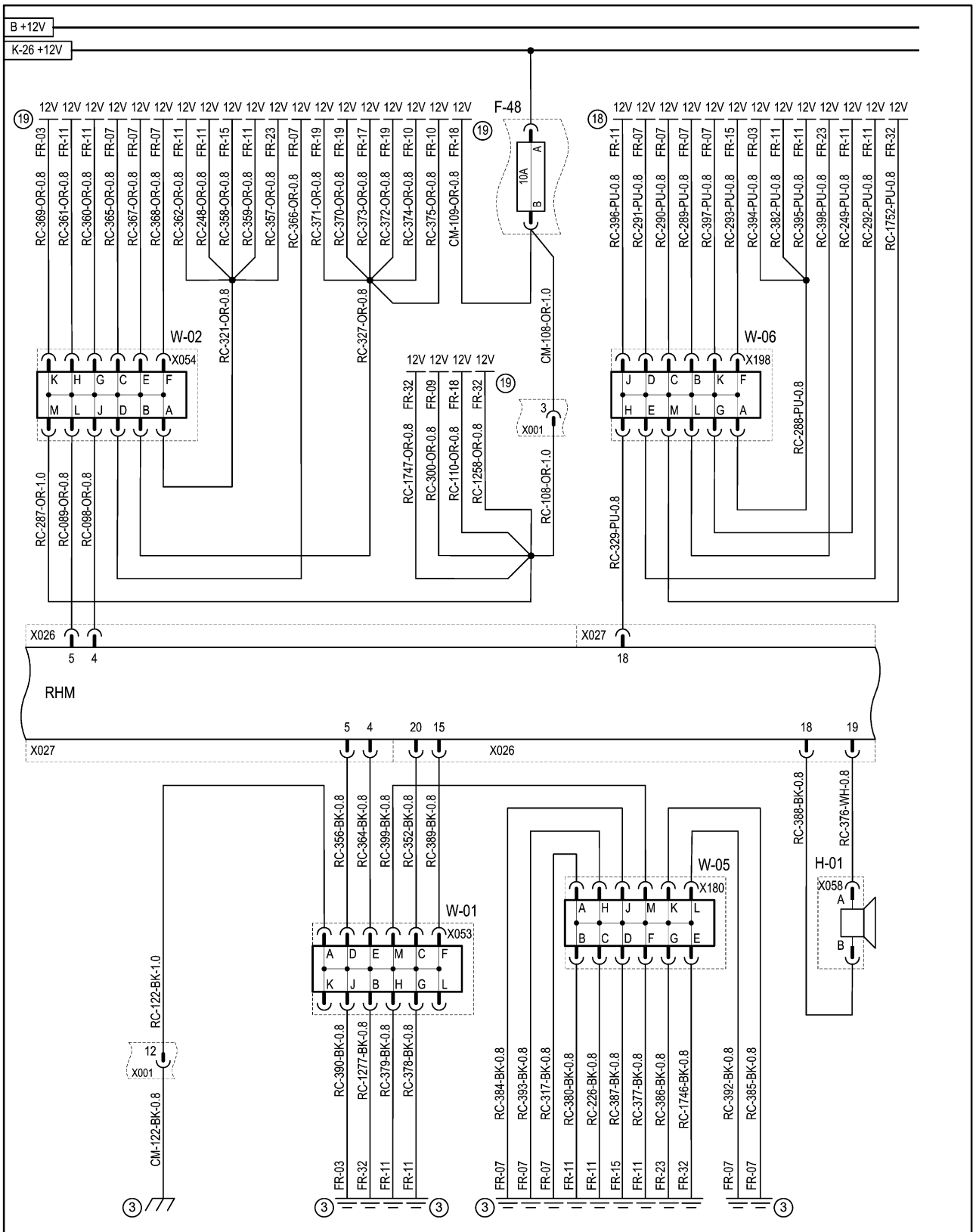
F - Antenna Test

	Test Point	Good Reading	Possible Cause of Bad Reading
1	Disconnect Antenna from Radio A04. Measure resistance between center terminal of Antenna (radio end) and Antenna Mast.	Less than 1 ohm If good reading, go to next test point.	Antenna.
2	Measure resistance from Antenna ground wire to chassis ground.	Less than 1 ohm Antenna is good.	Open circuit between Antenna and chassis ground.

SECTION 55 - ELECTRICAL SYSTEMS

Chapter 10 - Header Systems

CONTENTS



F-48 = RH CONSOLE FUSE
H-01 = AUDIO ALARM
W-01 = SPLICE BLOCK A
W-02 = SPLICE BLOCK B
W-05 = SPLICE BLOCK E
W-06 = SPLICE BLOCK F

DISTRIBUTION
FRAME-25

Before CCM2 actually directs the power from the thresher switch S30 to the gearbox clutch solenoid L22, several things happen in software, as follows:

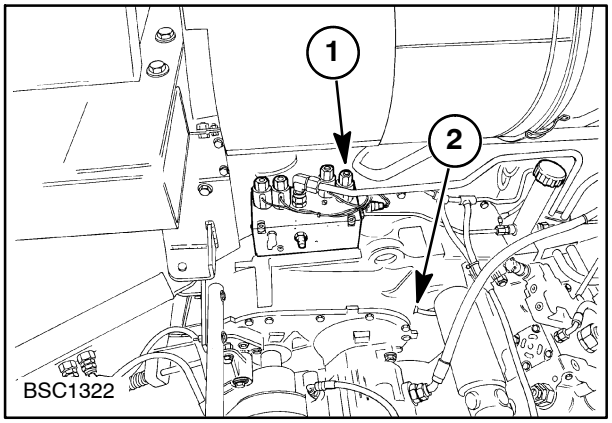
- Road/Field mode switch must be in the 'Field' position – thresher will not be engaged if in "Road" position
- Engine must be running – must be engine rpm sensor information
- Rear ladder is in the 'raised' position – thresher will not engage if ladder is down
- Status of engine throttle switch is determined (depressed v. not depressed) – affects clutch engagement of normal v. aggressive
- Status of gearbox clutch temperature sensor is determined (OK v. error) – affects clutch engagement of normal v. aggressive

Once the appropriate parameters are met, CCM2 will set the engine RPM, and begin engaging the gearbox clutch using the appropriate engagement curve. There are two different engagement curves that may be selected; normal and aggressive. The aggressive curve engages the clutch much quicker, putting more stress on driveline components, but preventing heat build-up and wear in the gearbox clutch itself, while the normal curve allows for less stress on the driveline components, but generates more heat and wear in the gearbox clutch due to the increased amount of slippage required for a smooth start-up. The curve that is selected depends on several factors, as follows:

Throttle switch status	Gearbox clutch temperature sensor status	Engine RPM	Gearbox clutch engagement curve
Not depressed	OK	1500	Normal
Not depressed	Error	1500	Aggressive
Depressed	OK	2100	Aggressive
Depressed	Error	1500	Aggressive

NOTE: *The combination of the first two items in the table determine the settings that the CCM2 will make (the last two items in the table).*

Once the appropriate engagement curve is selected, the CCM2 starts modulating the gearbox clutch solenoid L22, 1, to engage the threshing system. While engaging the clutch, CCM2 monitors the rotor RPM sensor B01 to confirm that the rotors are beginning to rotate, OR the left returns sensor B06 for returns movement. If there is no rotor RPM increase (or returns rotation) during the start of gearbox clutch engagement, CCM2 will disengage the gearbox clutch fully. If rotor RPM is sensed (or returns rotation) during engagement, CCM2 will maintain clutch engagement.



3

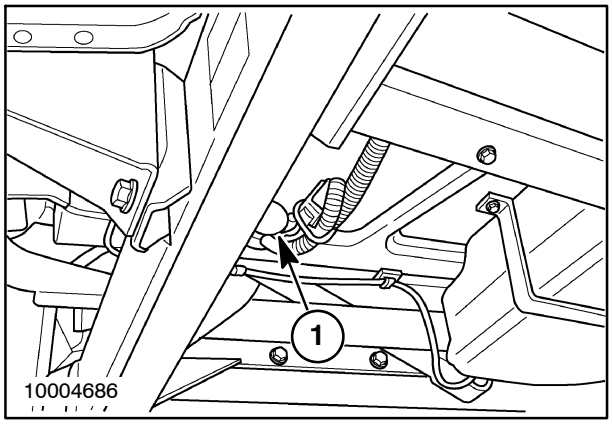
NOTE: *Left returns sensor B06 is used as a back-up RPM source, so that the threshing system may be engaged with the rotor gearboxes in neutral, to allow for rotor RPM changes for better belt tension when unplugging the machine.*

If, during gearbox clutch engagement, the gearbox clutch temperature increases by more than 60°C (140°F) from the temperature measured at the start of clutch engagement, the gearbox clutch will be fully disengaged.

DESCRIPTION AND OPERATION

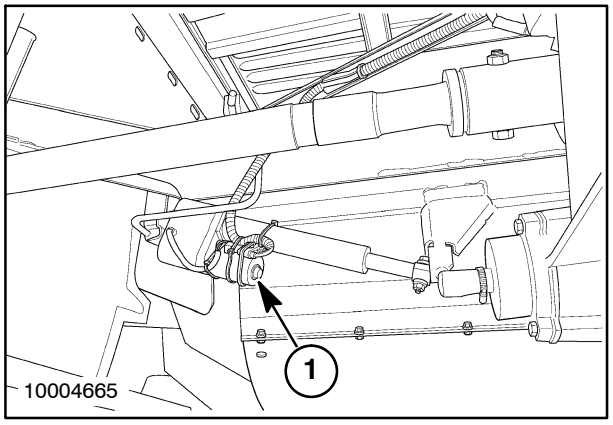
SELF-LEVELING CLEANING SHOE

The function of the self-leveling cleaning shoe is quite simple. The lateral inclination sensor B-02, 1, monitors the tilt of the combine and sends the information to pin J2-33 of CCM1. CCM1 uses this information to determine how far the cleaning shoe must be tilted to be level.



1

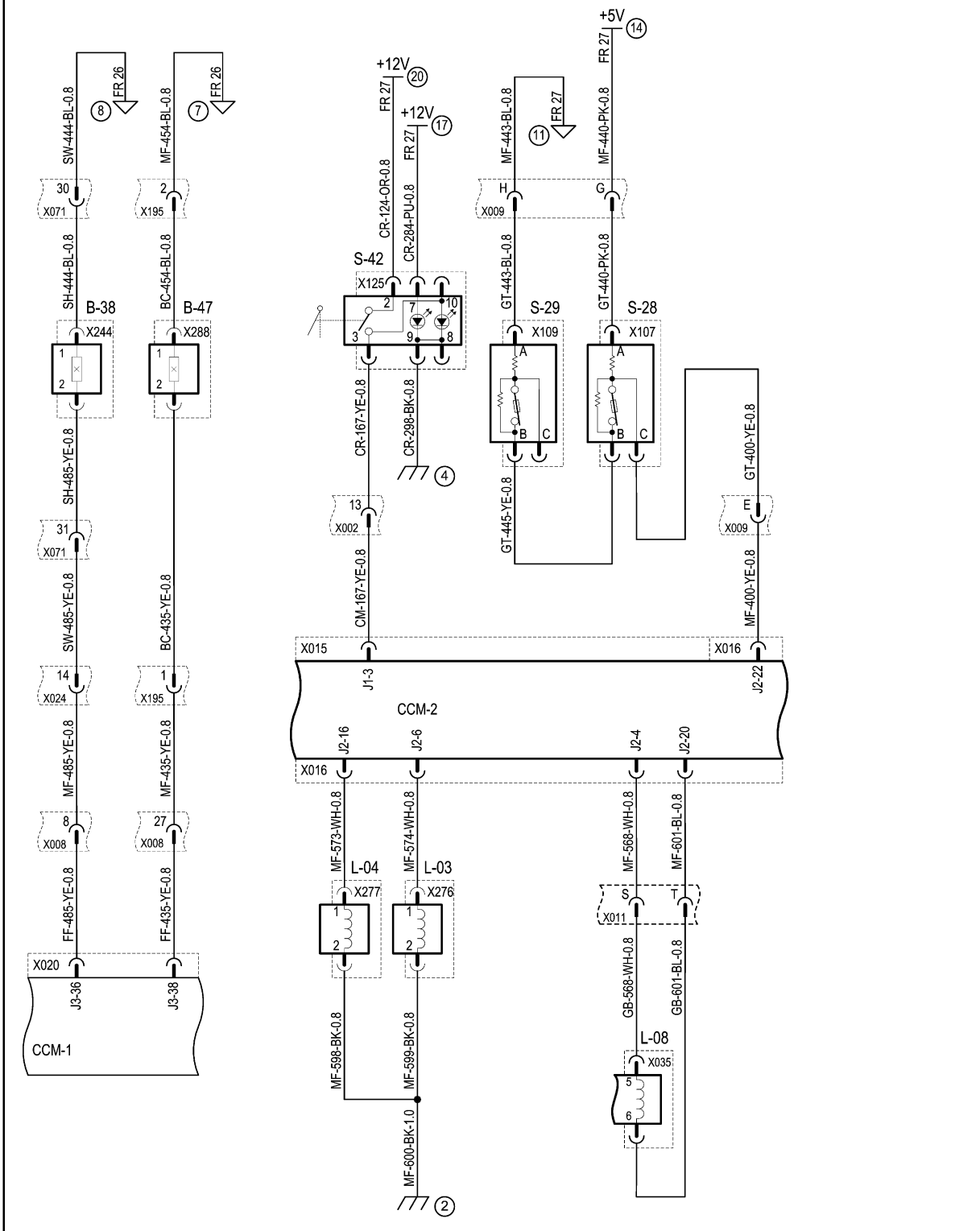
CCM1 uses two pairs of pins to send current to the shoe leveling actuator. This allows CCM1 to reverse the polarity and change the direction of the actuator. The first pair of pins, J-39 and J-40, send current through to a wire splice and through connector X023 pin 2 to connector X088 pin D of the actuator (M-03). The second pair of pins, J3-19 and J3-20, send current through a wire splice to Pin E of the shoe leveling actuator (M-03).



2

The Shoe Leveling Actuator M-03 at the front right of cleaning shoe (behind the transmission) is also used to monitor the angle in which the cleaning shoe is tilted. Voltage is applied to pin A of the actuator. The ground path travels from pin B. As the actuator moves through its travel, the resistance through the actuator changes. A signal is sent from pin C of the actuator to connector X020 pin J3-32 of CCM1. CCM1 receives the signal and uses the changes in resistance to monitor the position of the actuator.

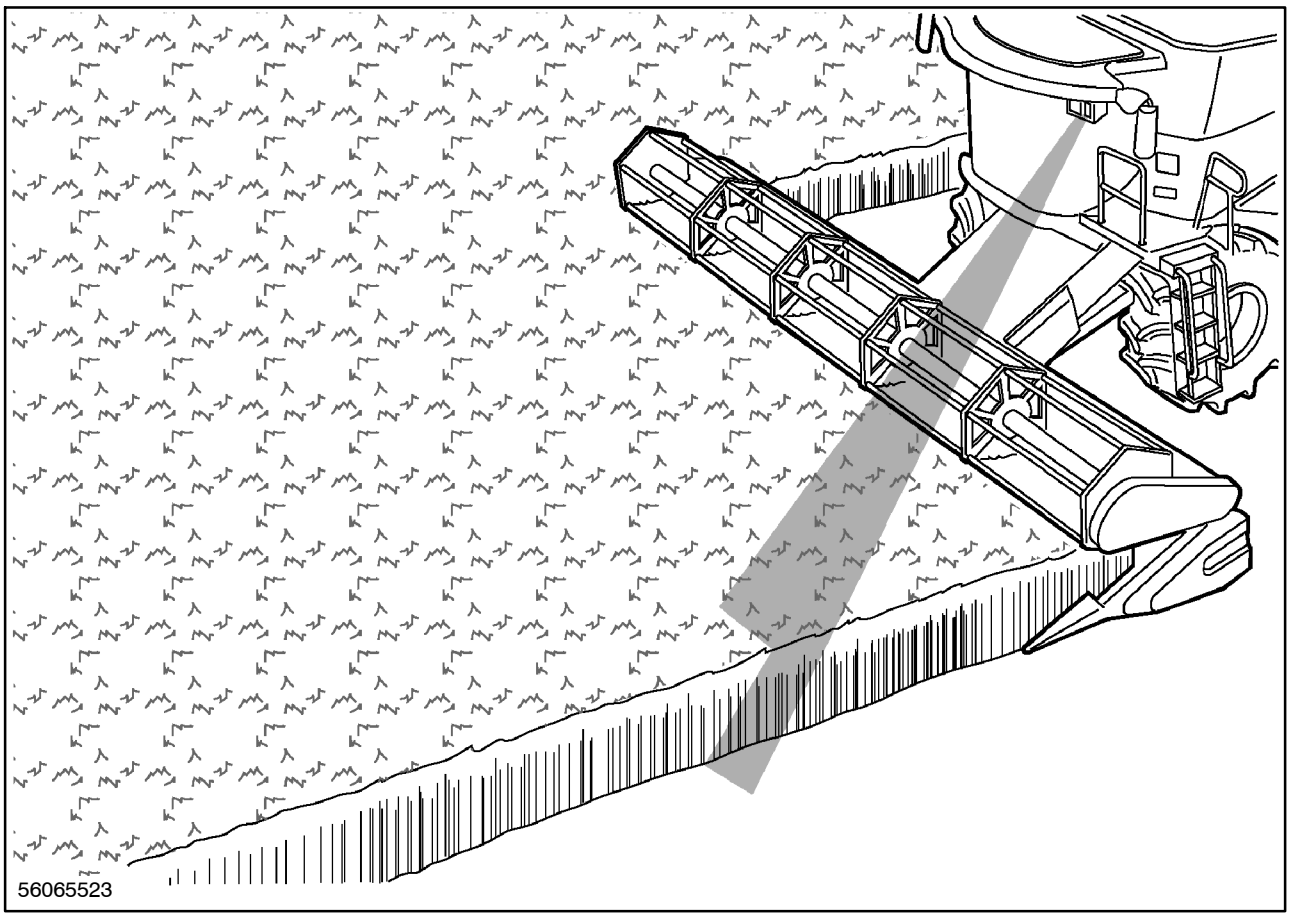
CCM1's software detects when the self-leveling cleaning shoe makes contact with the frame (by detecting that the actuator motor is stalled) and establishes the limit of travel. These limits are NOT stored in non-volatile memory so they are established at least once per key-on cycle (each direction) when threshing is engaged.



UNLOAD FRAME-22	B-38 = UNLOAD CRADLE B-47 = COVERS CLOSED L-03 = UNLOAD TUBE IN L-04 = UNLOAD TUBE OUT	L-08 = UNLOAD TUBE CLUTCH S-28 = GRAIN BIN 3/4 FULL S-29 = GRAIN BIN FULL S-42 = TANK COVERS SWITCH

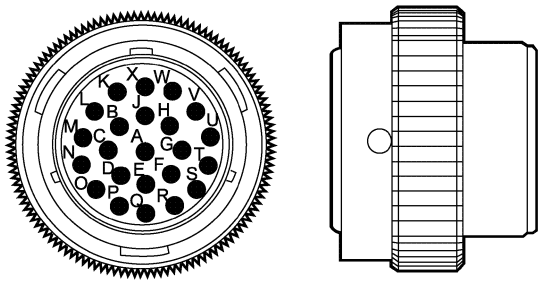
EDGE GUIDANCE

Edge guidance is a technique used to precisely and automatically guide the path of a harvester along the edge of a standing crop, that is, along the separation point between the yet-uncut plants and bare ground or the stubble left from the prior cutting pass.



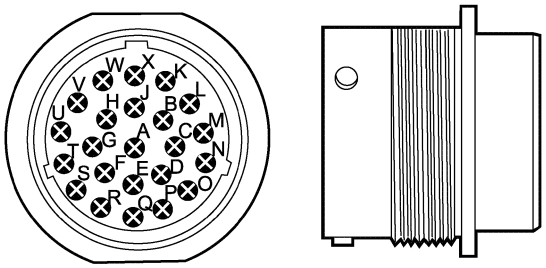
14

CONNECTOR X011 MAIN FRAME/GEARBOX		
CAV	WIRE NUMBER	CIRCUIT REFERENCE
A	422 (YE)	X019 - CCM-1 J2-27, GEARBOX TEMP SENSOR B32
B	423 (YE)	X016 - CCM-2 J2-19, CONTROL PRES SENSOR B35
C	424 (YE)	X016 - CCM-2 J2-39, HYD. RESERVOIR LEVEL S33
D	486 (PK)	X016 - CCM-2 J2-31, 5V REF. VOLTAGE
E	446 (YE)	X019 - CCM-1 J2-24, HYD. RESERVOIR TEMP B18
F	874 (BL)	X020 - CCM-1 J3-35, NOT USED
G	881 (BL)	X017 - CCM-2 J3-35, REF. GROUND FOR HYDRO EDC VALVE L23
H	488 (BL)	REF. GROUND FOR SENSORS, X020 CCM-1 J3-18
J	872 (GY)	X020 - CCM-1 J3-21, NOT USED
K	873 (WH)	X020 - CCM-1 J3-31, NOT USED
L	875 (BL)	X019 - CCM-1 J2-40, FEEDER CLUTCH L24
M	876 (WH)	X019 - CCM-1 J2-30, FEEDER CLUTCH L24
N	877 (BL)	X016 - CCM-2 J2-40, GEARBOX CLUTCH L22
O	878 (WH)	X016 - CCM-2 J2-30, GEARBOX CLUTCH L22
P	879 (GY)	X017 - CCM-2 J3-21, HYDROSTAT EDC VALVE L23
Q	880 (WH)	X017 - CCM-2 J3-31, HYDROSTAT EDC VALVE L23
R	572 (WH)	X016 - CCM-2 J2-15, PARK BRAKE DISENGAGE VALVE L10
S	568 (WH)	X016 - CCM-2 J2-4, UNLOAD TUBE CLUTCH L08
T	601 (BL)	X016 - CCM-2 J2-20, UNLOAD TUBE CLUTCH L08
U	682 (YE)	X017 - CCM-2 J3-33, GEARBOX CLUTCH TEMP B45
V	683 (BL)	X016 - CCM-2 J2-14, REF. GROUND FOR SENSORS
W	684 (YE)	X016 - CCM-2 J2-35, CHARGE PRES SWITCH S37
X	-	



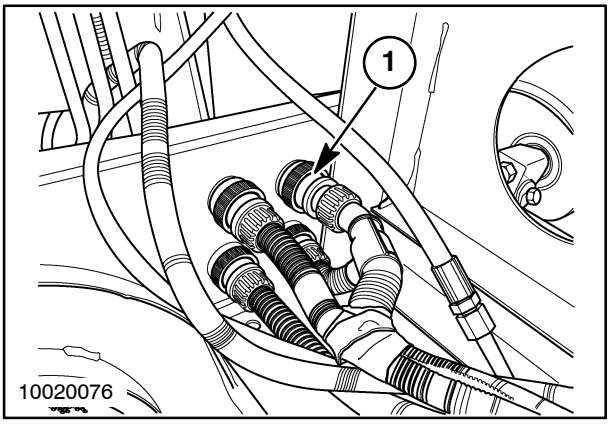
DEUTSCH_HDP26-24-23S_PLUG

X011
MAIN FRAME



DEUTSCH_HDP24-24-23P_RECEPTACLE

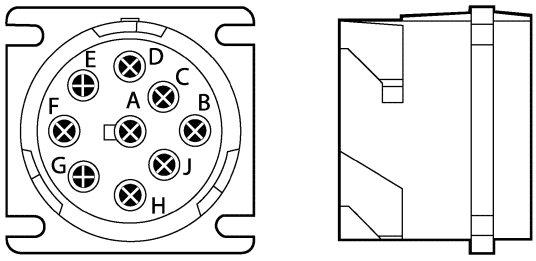
X011
GEARBOX



11

1. IN-LINE CONNECTOR X011 - GEARBOX (GB) HARNESS TO MAIN FRAME (MF) HARNESS

CONNECTOR X065		
DIAGNOSTICS AND MAINTENANCE		
CAV	**WIRE NUMBER**	**CIRCUIT REFERENCE**
A	146 (BK)	GROUND
B	142 (RD)	FUSE F39, KEEP ALIVE POWER (B+)
C	271 (YE)	CAN HI
D	270 (GN)	CAN LO
E	827 (YE)	ISO-K, ECU CONNECTOR X193 PIN 89
F	135 (RD)	RS-232 RX
G	136 (BK)	RS-232 TX
H	1221 (YE)	CAN 2 HI
J	1222 (GN)	CAN 2 LO



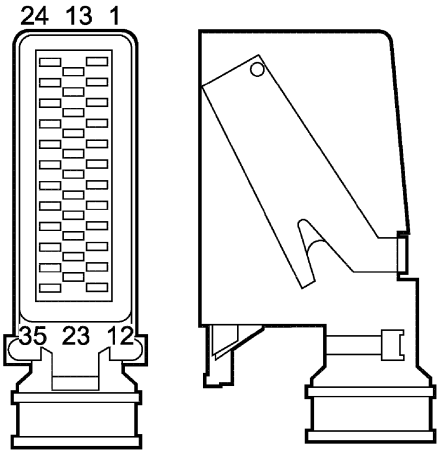
DEUTSCH_HD10-9-1939PE

X065

DIAGNOSTICS AND MAINTENANCE

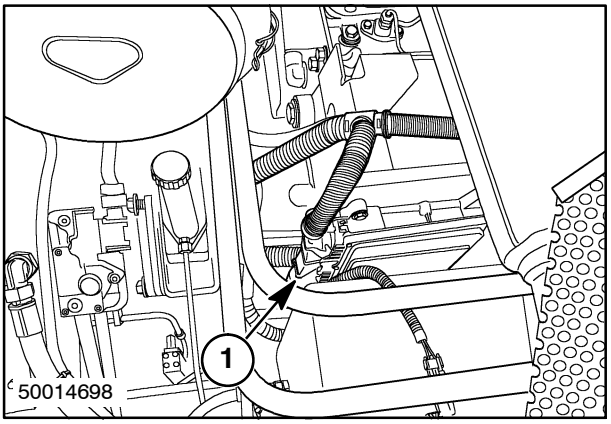
CONNECTOR X193 ECU CONNECTOR B		
CAV	WIRE NUMBER	CIRCUIT REFERENCE
1	-	
2	810 (WH)	F-01 (B+)
3	811 (WH)	F01 (B+)
4	-	
5	815 (BK)	TO FRAME GROUND
6	816 (BK)	TO FRAME GROUND
7	-	
8	1625 (WH)	F-01 (B+)
9	1626 (WH)	F-01 (B+)
10	1627 (BK)	TO FRAME GROUND
11	1628 (BK)	TO FRAME GROUND
12	822 (BK)	GRID HEATER RELAY K-39
13	-	
14	-	
15	-	
16	-	
17	-	
18	-	
19	-	
20	-	
21	-	
22	-	
23	-	
24	-	
25	-	
26	-	
27	-	
28	-	
29	-	
30	-	
31	-	
32	-	
33	-	
34	820 (GN)	CAN 1 LO
35	819 (YE)	CAN 1 HI
40	859 (OR)	KEYSWITCH S-02
42	1131 (YE)	WATER IN FUEL SENSOR B-59
75	818 (WH)	GRID HEATER RELAY K-39
89	827 (YE)	DIAGNOSTIC OUTLET J-10 X065 PIN E

NOTE: *CAN 1 termination (ECU) located within IVECO ECU.*

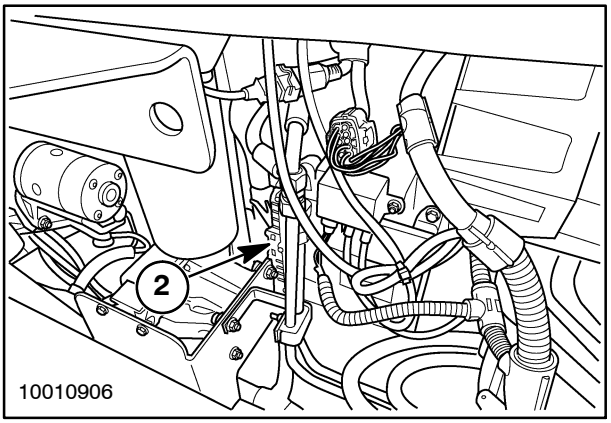


BOSCH 1928401982

X193
ECU CONNECTOR B



40

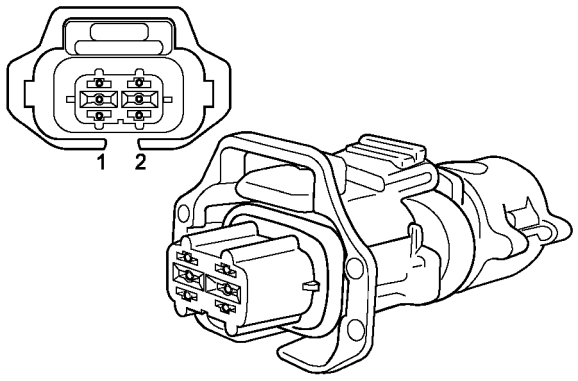


41

1. CONNECTOR X193 -ECU CONNECTOR B (7.5L)
2. CONNECTOR X193 -ECU CONNECTOR B (IVECO)

CONNECTOR X373 IVECO HARNESS TO COOLANT TEMPERATURE B-44		
CAV	**WIRE NUMBER**	**CIRCUIT REFERENCE**
1	PINK	TO ECU A-01 CONNECTOR X516 PIN 15
2	YELLOW	TO ECU A-01 CONNECTOR X516 PIN 26

NOTE: *Wire colors are not generally visible due to harness sheathing.*



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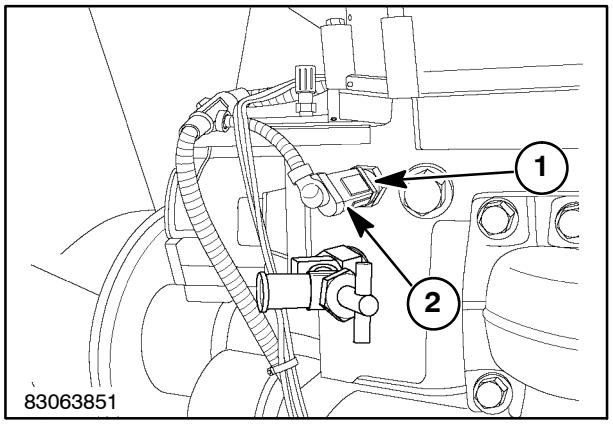
X373

IVECO HARNESS TO COOLANT TEMPERATURE B-44



44

Cylinder head, under valve cover

1. Coolant Temperature B-44
2. Connector X373

FAULT CODE – E0001-05 Bin Covers Open Sensor Line Disconnected

Cause:
The **bin *covers open sensor (B47)*** has an open circuit.

Possible failure modes:

1. Sensor supply wiring is open.
2. Controller internal failure (internal regulator failure).

Solution:

1. Using the display monitor diagnostic capability to view “item” status, reference Section 55 Chapter 2, if needed, check voltage range.

   The proper voltage for covers open - 5.6 to 7.3 volts.

   The proper voltage for covers closed - 0.5 to 5.6 volts.

   If there is an open in the supply, the voltage will read 7.3 to 9.0 volts.

   A. If the voltage reading is high indicating an open, continue with Step 2.
   B. If the voltage reading is within the proper limits, continue the troubleshooting at Step 7.
2. The voltage reading is 7.3 to 9.0 volts. Disconnect the covers closed proximity sensor **connector X288** in the grain bin. Install a jumper wire between pins 1 and 2 on **connector X288**.
   A. If the voltage drops to 0 to 0.5 volts, the open is in the sensor, or sensor wiring. Replace the sensor.
   B. If the voltage remains at 7.3 to 9.0 volts, continue with Step 3.
3. The voltage reading is 7.3 to 9.0 volts. Check for continuity between pin 1 on the bin covers (BC) harness side of **connector X288** and chassis ground.
   A. If no continuity is found, continue with Step 4.
   B. If continuity is found, continue with Step 5.
4. Disconnect **connector X195**. Check for continuity between pin 2 on the main frame (MF) harness side of **connector X195** and chassis ground.
   A. If continuity is found, the open is between **connector X195** and **X288** wire 454 blue. Locate open and repair.
   B. If no continuity is found, the open is n the main frame (MF) harness between **connector X195** and **connector X019 pin J2-14** CCM1, wires 454, or 460 blue. Locate open and repair.
5. The voltage reading is 7.3 to 9.0 volts. Disconnect the **connector X195**. Install a jumper wire between pins 1 and 2 on **connector X195**.
   A. If the voltage drops to 0 to 0.5 volts, the open is between **connector X195** and **X288** on wire 435 yellow. Locate and repair the open.
   B. If the voltage remains at 7.3 to 9.0 volts, continue with Step 6.
6. The voltage reading is 7.3 to 9.0 volts. Disconnect the **connector X008**. Install a jumper wire between pin 27 on **connector X008** and chassis ground.
   A. If the voltage drops to 0 to 0.5 volts, the open is in the main frame (MF) harness between **connector X008** and **X195** wire 435 yellow. Locate and repair the open.
   B. If the voltage remains at 7.3 to 9.0 volts, the open is in the front frame (FF) harness between **connector X008** and **connector X020 J3-38** wire 435 yellow. Locate and repair the open.
7. Visually inspect harness and connectors for damage, bent or dislocated pins, corroded terminals or broken wires. If no damage is found, erase fault code and continue operation.

FAULT CODE – E0011-04 Road Lights Signal Shorted To Low Source

Cause:
The ***road light switch (S26)*** circuit is shorted to ground.

Possible failure modes:

1. Switch or CCM1 supply wiring shorted to ground.
2. Controller internal failure (internal regulator failure).

Solution:
The input to CCM1 for the road light signal is supplied by the "Park" lights output (Pin1) of the road light switch (S26).

1. Using the display monitor diagnostic capability to view "item" status, reference Section 55 Chapter 2, if needed, check voltage range.

   The normal operating range for the road lights signal switch - ON is 4.0 to 5.0 volts.

   The normal operating range for the road lights signal switch - OFF is 0.25 to 4.0 volts.

   If a short to ground is present, the voltage indicated will be less than 0.25V.

2. Check fuse F49. If a short to ground occurred, the fuse will have failed.
   A. If fuse F49 has failed, go to Step 3.
   B. If the fuse is okay, go to Step 8.
3. Replace fuse F49.
   A. If fuse F49 immediately fails, the short to ground is in the cab main (CM) harness wire 213 red to road light switch S26 pin 5 (lights). Locate the short and repair.
   B. If fuse F49 is okay, go to Step 4.
4. Turn the Road Light switch S26 to the "Park" lights position and inspect fuse F49.
   A. If fuse F49 immediately fails, the short to ground is in the cab main (CM) harness in one of the following wires:

      wire 173 orange, road light switch S26 pin 1 to light control relay K02 pin 5

      wire 114 orange, light control relay K02 pin 5 to pin 1

      wire 212 orange, light control relay K02 pin 1 to CCM1 **connector X018** pin J1-21
   B. If fuse F49 is okay, go to Step 5.
5. Turn the Road Light switch S26 to the "Road" lights, "Low Beam" position and inspect fuse F49.
   A. If fuse F49 immediately fails, the short to ground is in the cab main (CM) harness wire 169 yellow, from the road light switch S26 pin 7 to the Low Beam relay K05 pin 1. Locate the short and repair.
   B. If fuse F49 is okay, go to Step 6.
6. Turn the Road Light switch S26 to the "Road" lights, "High Beam" position and inspect fuse F49.
   A. If fuse F49 immediately fails, the short to ground is in the cab main (CM) harness in one of the following wires:

      wire 218 yellow, road light switch S26 pin 4 to CM harness splice

      wire 191 yellow, CM splice to High Beam relay K04 pin 1.

      wire 043 purple, CM splice to High Beam indicator lamp E10

Locate the short and repair.

   B. If fuse F49 is okay, go to Step 7.

FAULT CODE – E0018-05 Right Returns RPM Sensor Line Disconnected

Cause:
The ***right returns RPM sensor (B39)*** circuit is open.

Possible failure modes:

1. Sensor supply wiring is open.
2. Controller internal failure (internal regulator failure).

Solution:

1. Using the display monitor diagnostic capability to view “item” status, reference Section 55 Chapter 2, if needed, check voltage range.

   The proper voltage for sensor unblocked by ferrous metal is 0.5 to 5.6 volts.

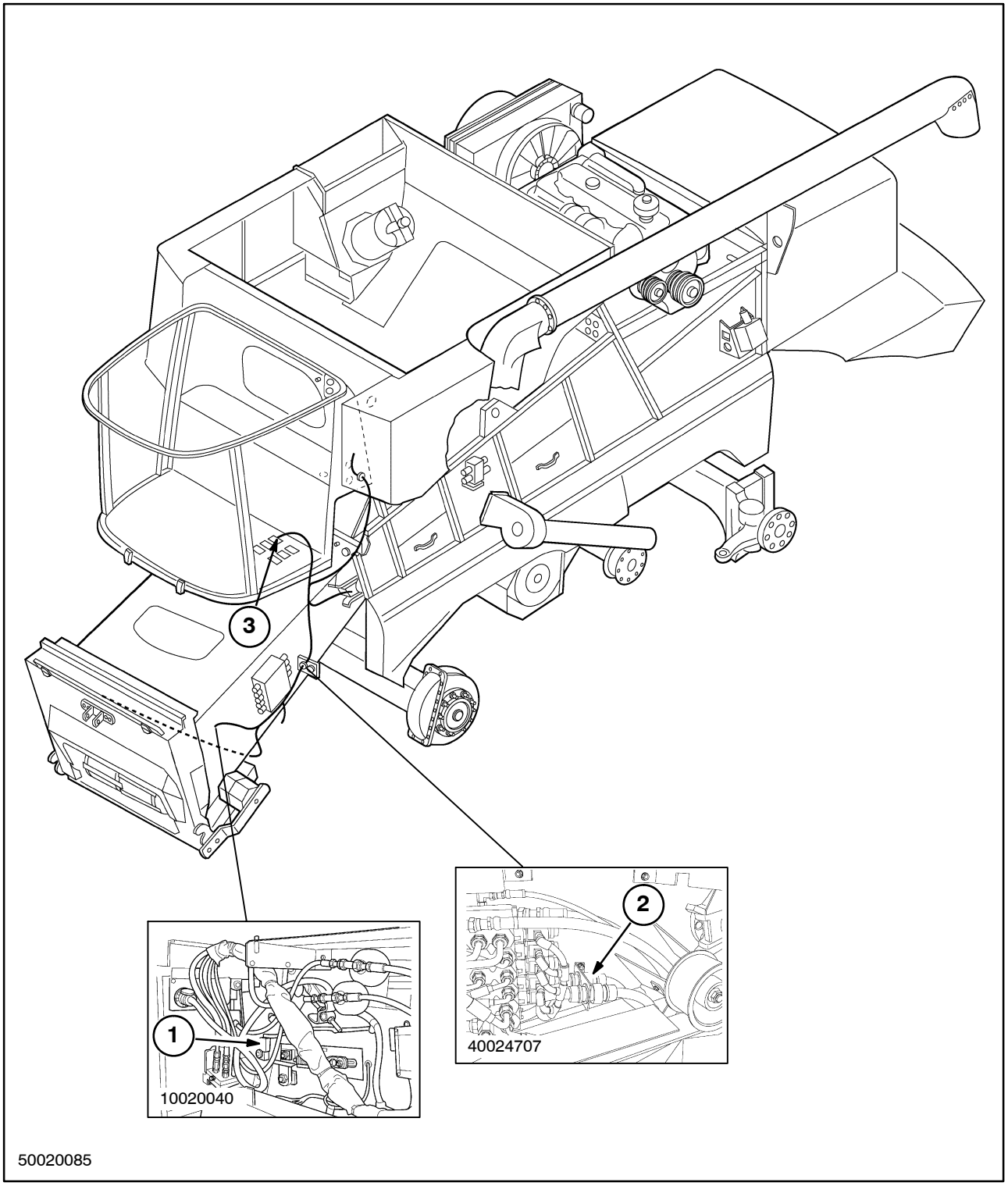
   The proper voltage for sensor blocked by ferrous metal is 5.6 to 7.3 volts.

   The proper voltage with sensor disconnected is 7.3 to 9.0 volts.

   A. If the voltage reading is high (7.3 to 9.0 volts), continue with Step 2.
   B. If the voltage reading is within the proper limits, the open is not present at this time. Continue the troubleshooting at step 5.

NOTE: *Visually inspect the wiring harness and connectors. Verify that the connector was fully installed. Inspect the terminals and wires at the connector for pushed back or corroded terminals or damaged wires. Flex the harnesses involved to reveal intermittent breaks or shorts in the wiring concerned.*

2. The voltage reading is 7.3 to 9.0 volts. Disconnect the right returns RPM sensor **connector X186**. Use a jumper wire to short the harness end of **connector X186 pin 2** to chassis ground.
   A. If the display monitor drops to 0 to 0.5 volts indicating a ground, the open circuit is not in the supply side of the circuit. Continue with step 3.
   B. If the display monitor still displays 7.3 to 9.0 volts, the open circuit is in the main frame (MF) harness between **connector X186 pin 2** and **connector X019 pin J2-37** wire 441 yellow. Locate the open and repair.
3. Disconnect the right returns RPM sensor **connector X186**. Use a multimeter to check for continuity between the harness end of **connector X186 pin 1** and chassis ground.
   A. If there is continuity, the ground path for the sensor is complete, and the fault is in the sensor itself. Replace the sensor.
   B. If there is no continuity to ground, the ground path for the sensor is open. Continue with step 4.
4. Disconnect the main frame (MF) harness from the front frame (FF) harness at **connector X008**. Use a multimeter to check for continuity between the harness end of **connector X008 pin 7** and chassis ground.
   A. If there is continuity, the open circuit is in the main frame (MF) harness between **connector X186 pin 1** and **connector X008 pin 7** wire 442 blue or 401 blue. Locate the open and repair.
   B. If there is no continuity to ground, the open circuit is in the front frame (FF) harness between **connector X008 pin 7** and **connector X020 pin J3-18** wire 401 blue or 501 blue. Locate the open and repair.
5. Erase the error code and, continue operation.



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1. LATERAL FLOAT POTENTIOMETER R02
2. CONNECTOR X007
3. CONNECTOR X020

FAULT CODE – E0040-03 CCM1 Key Switch Voltage Shorted To High Source

Cause:

The circuit is shorted to a higher than normal source.

Possible failure modes:

1. Circuit wiring shorted to high voltage source.
2. Faulty alternator/regulator.
3. Controller internal failure (internal regulator failure).

Solution:

Key switch voltage is used to initialize (wake-up) the module, and also supplies power to the 5V and 8V regulators for the regulated voltage circuits. The module will shutdown if the voltage is less than 9 volts, but there is no shutdown for excessive voltage.

1. Start the combine engine. Using the display monitor diagnostic capability to view “item” status, reference Section 55 Chapter 2, if needed, check voltage range.

   Increase the engine RPM to high idle (maximum) and check voltage range.

   The acceptable voltage range for the module is 10 to 18 volts.

   A. If the voltage reading is greater than 18 volts, continue with Step 2.

   B. If the voltage reading is between 10 and 18 volts, go to Step 5.

2. Shut off the combine engine, and then turn the key switch on again. Using the display monitor diagnostic capability to view “item” status, reference Section 55 Chapter 2, if needed, check voltage range.

   The acceptable voltage range for the module is 10 to 18 volts.

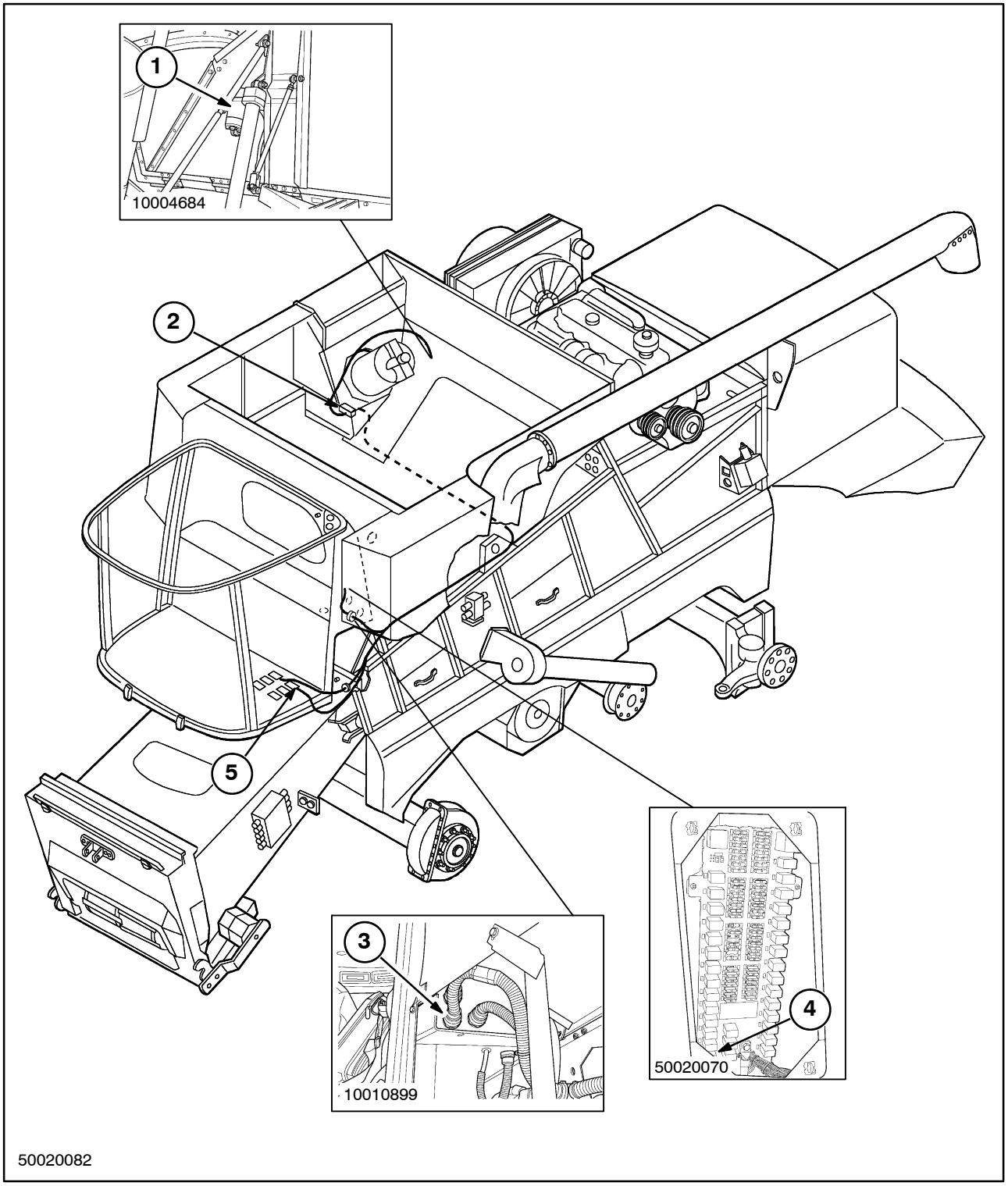
   A. If the voltage reading is between 10 and 18 volts, the alternator and/or regulator has failed, and is producing excessive voltage. Refer to “Charging Systems” in Chapter 5 – Engine Systems in this section for additional alternator testing information.

   B. If the voltage reading is greater than 18 volts, continue with Step 3.

3. Turn the key switch off to power down the system. Check the voltage at fuse F38 using a multi-meter.

   A. If the voltage reading is greater than 18 volts, then the batteries have been mistakenly connected in series, or there is a fault in the wiring of the 24V starting system. Refer to “Starting Systems” in Chapter 5 – Engine Systems in this section for additional information.

   B. If the voltage reading is between 10 and 18 volts, continue with Step 4.



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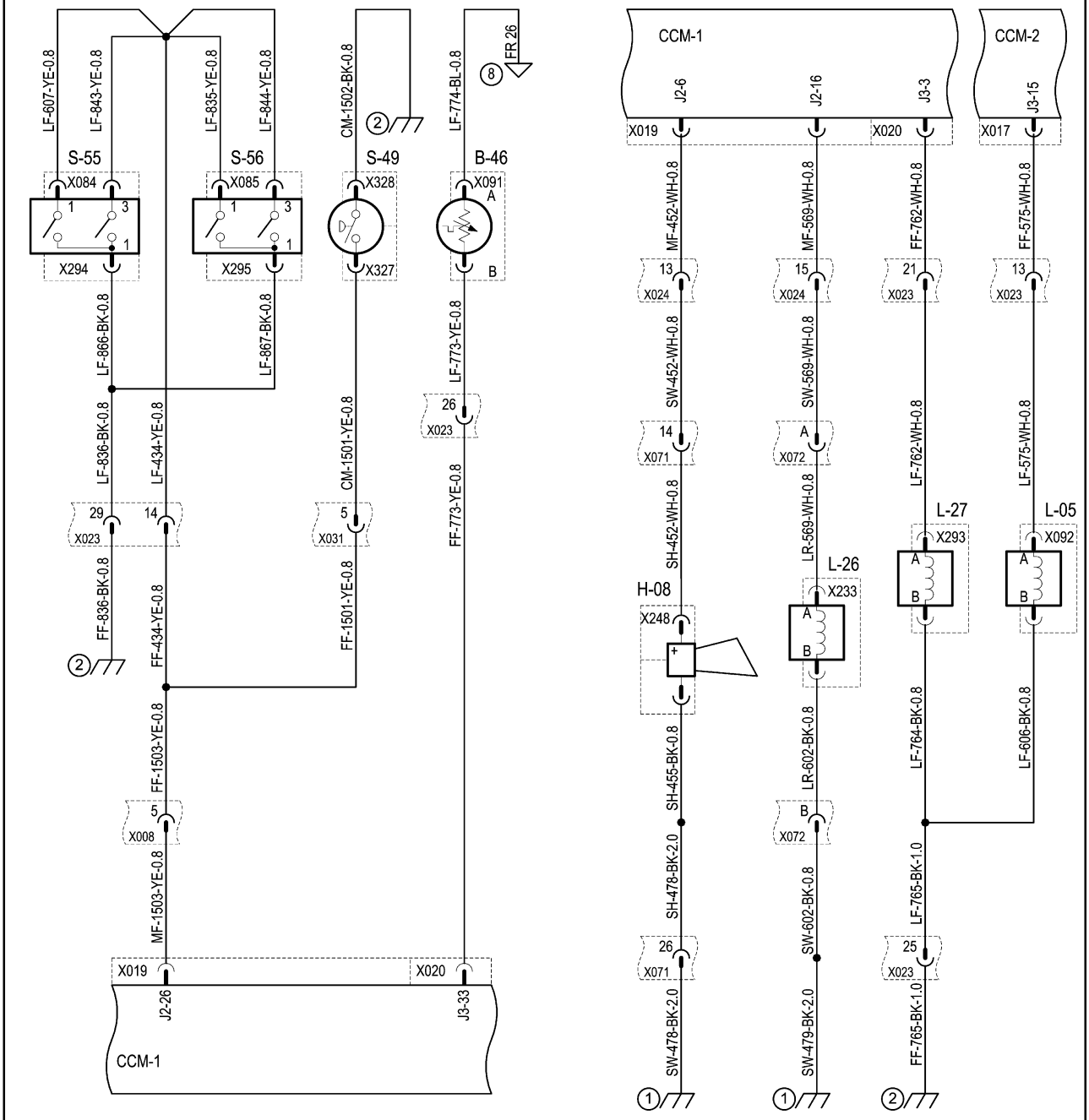
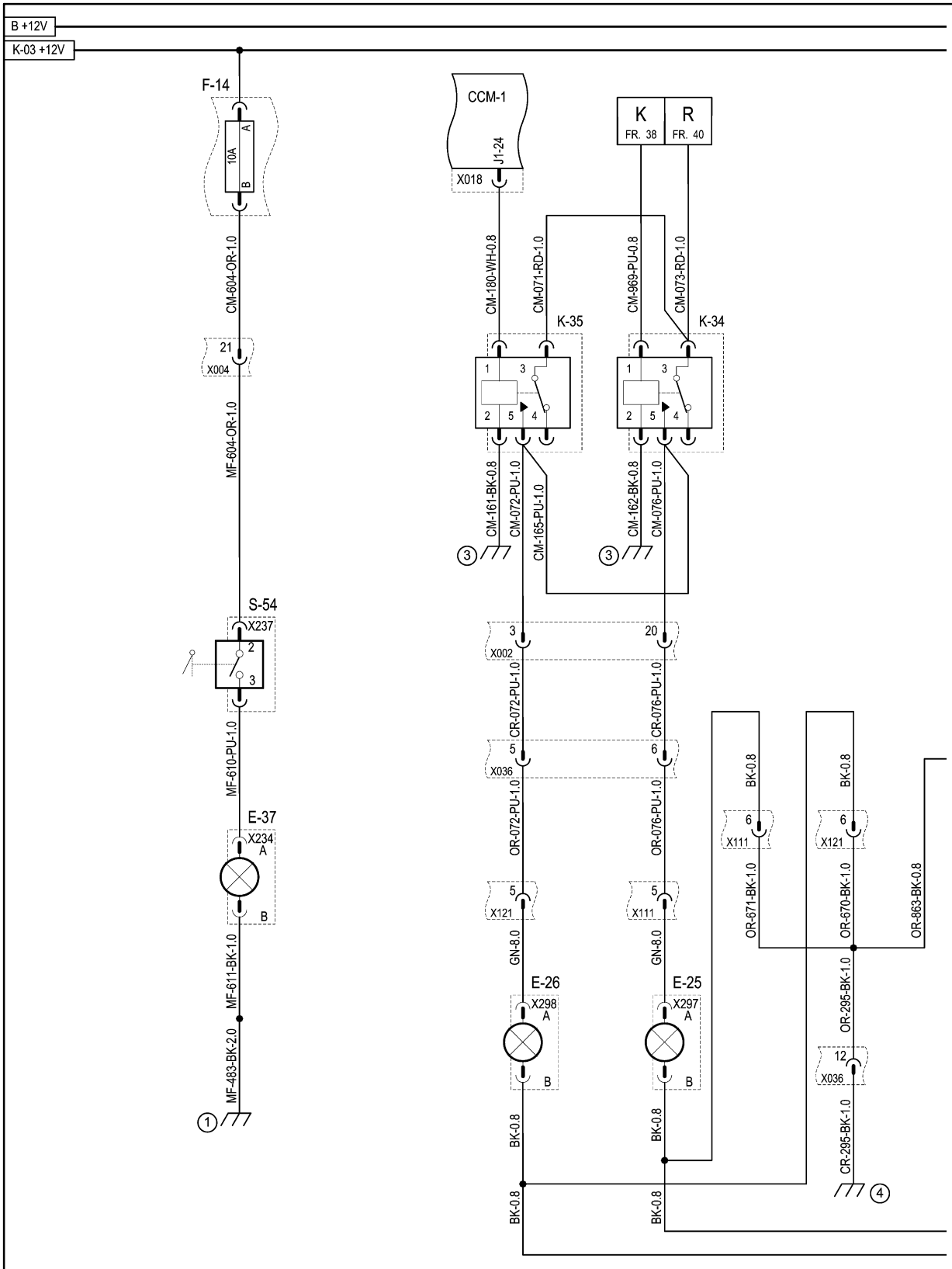
1. GRAIN BIN COVERS MOTOR M12
2. CONNECTOR X195
3. CONNECTOR X004
4. CONCAVE / COVERS RELAY K16
5. CONNECTOR X019



DRIVES
FRAME-8

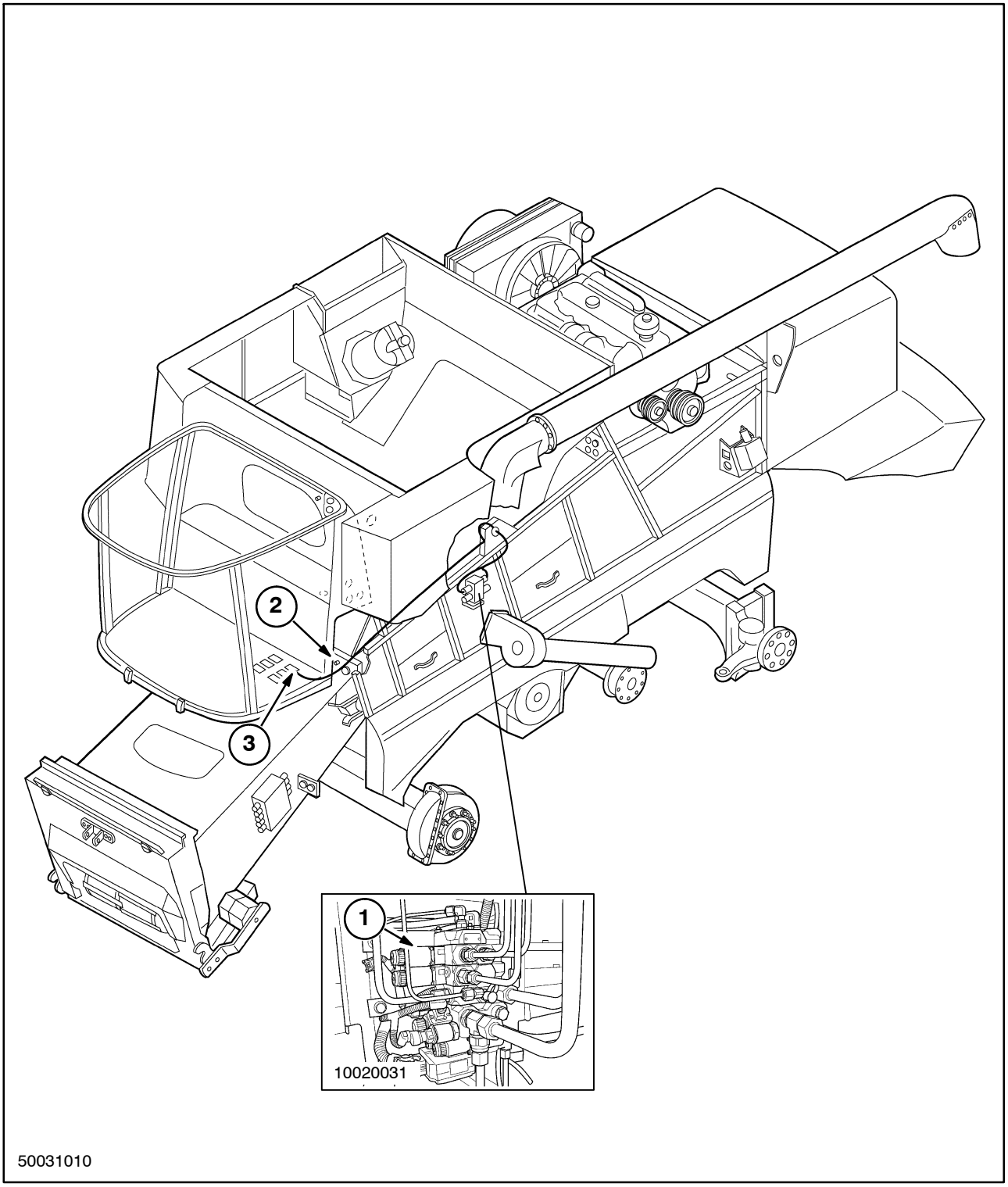
B-46 = HYDROSTAT MOTOR TEMP
H-08 = BACK UP ALARM
L-05 = PRESSURE RELEASE
L-26 = REAR WHEEL ASSIST
L-27 = DUAL RANGE
S-49 = BRAKE FLUID LEVEL SWITCH
S-55 = LH BRAKE WEAR SWITCH
S-56 = RH BRAKE WEAR SWITCH



E-25 = LH SIDE WORK LIGHT
E-26 = RH SIDE WORK LIGHT
E-37 = SIEVE LIGHT
F-14 = SERVICE LTS FUSE

K-34 = TIMED SIDE WORK LIGHT RELAY
K-35 = SIDE WORK LIGHT RELAY
S-54 = SIEVE LIGHT SWITCH

LIGHTING
FRAME-43



54

1. FEEDER SPEED INCREASE SOLENOID L12
2. FRONT FRAME GROUND #2
3. CONNECTOR X019

FAULT CODE – E0132-05 Trans Shift Gear 4 Sens Line Disconnected

Cause:
The **transmission shift position 4 sensor (B37)** circuit is open.

Possible failure modes:

1. Sensor supply or ground wiring is open.
2. Controller internal failure (internal regulator failure).

Solution:

1. Using the display monitor diagnostic capability to view “item” status, reference Section 55 Chapter 2, if needed, check voltage range.

   The proper voltage when in shift position 4- 5.6 to 7.3 volts

   The proper voltage when not in shift position 4- 0.5 to 5.6 volts

   A. If the voltage reading is 7.3 to 9.0 volts continue with Step 2.

   B. If the voltage reading is within the proper limits. Continue the troubleshooting at Step 6.

NOTE: *Visually inspect the wiring harness and connectors. Verify that the connector was fully installed. Inspect the terminals and wires at the connector for pushed back or corroded terminals or damaged wires. Flex the harnesses involved to reveal intermittent breaks or shorts in the wiring concerned.*

2. The voltage reading on the display monitor is 7.3 to 9.0 volts. Disconnect the transmission shift position sensor **connector X093** at the transmission. Use a jumper wire to short **connector X093 pin 5** to chassis ground.

   A. If the display monitor drops to 0 to 0.5 volts indicating a ground, the open circuit is not in the supply side of the circuit. Continue with Step 4.

   B. If the display monitor still displays 7.3 to 9.0 volts continue with Step 3.

3. The voltage reading on the display monitor is 7.3 to 9.0 volts. Disconnect the lower frame harness from the front frame harness at **connector X023**. Use a jumper wire to short **connector X023 pin 12** to chassis ground.

   A. If the display monitor drops to 0 to 0.5 volts indicating a ground, the open circuit is in the lower frame (LF) harness between **connector X023 pin 12** and **connector X093 pin 5** wire 409 yellow. Locate the open and repair.

   B. If the display monitor still displays 7.3 to 9.0 volts, the open is in the front frame (FF) harness between **connector X023 pin 12** and **CCM2 connector X017 pin J3-27**, wire 409 yellow. Locate the open and repair.

4. Disconnect the transmission shift position sensor **connector X093**. Use a multimeter to check for continuity between the harness end of **connector X093 pin 6** and chassis ground.

   A. If there is continuity, the ground path for the sensor is complete, and the fault is in the sensor itself. Replace the sensor.

   B. If there is no continuity to ground, the ground path for the sensor is open. Continue with Step 5.

5. Disconnect the lower frame harness from the front frame harness at **connector X023**. Use a multimeter to check for continuity between the harness end of **connector X023 pin 5** and chassis ground.

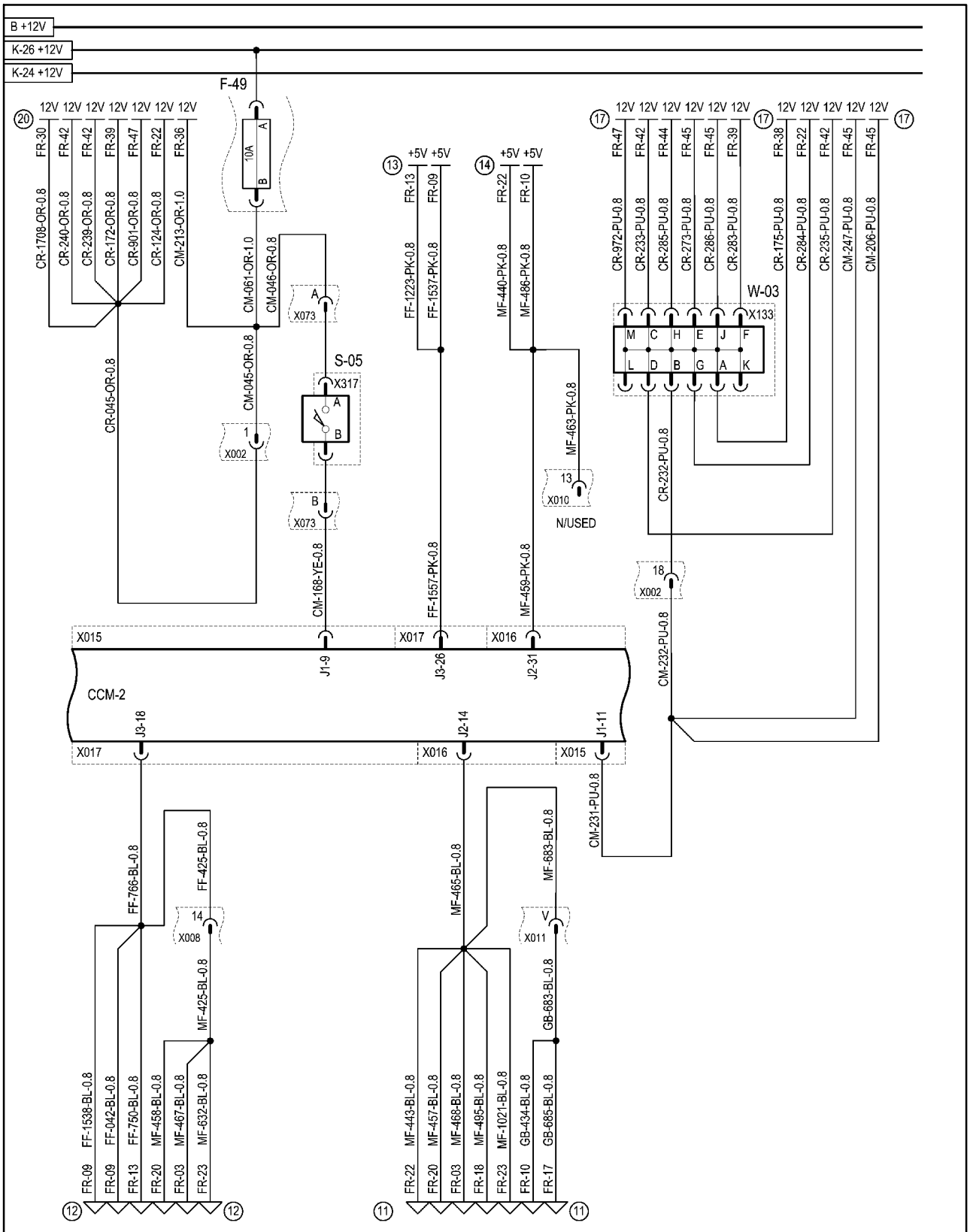
   A. If there is continuity, the open circuit is in the lower frame (LF) harness between **connector X023 pin 5** and **connector X093 pin 6** wire 426 blue or 042 blue. Locate the open and repair.

   B. If there is no continuity to ground, the open is in the front frame (FF) harness between **connector X023 pin 5** and **CCM2 connector X017 pin J3-18** wire 042 blue or 766 blue. Locate the open and repair.

6. Shift the transmission through all gears and monitor the voltage readings.

   A. If a 7.3 to 9.0 voltage reading is now viewed continue with Step 2.

   B. If 7.3 to 9.0 voltage reading cannot be generated erase the fault code and continue operation.



F-49 = CAB FUSE
S-05 = SEAT SWITCH
W-03 = SPLICE BLOCK C

DISTRIBUTION
FRAME-27

FAULT CODE – E0152-05 Air Filter Switch Line Disconnected

Cause:
The ***air filter switch (S-61*)** circuit is open.

Possible failure modes:

1. Sensor supply or ground wiring is open.
2. Controller internal failure (internal regulator failure).

Solution:

1. Using the display monitor diagnostic capability to view “item” status, reference Section 55 Chapter 2, if needed, check voltage range.

   The proper voltage range is 0.5 to 4.9 volts.

   A. If the voltage reading is high out of range (4.9 to 5.2 volts), continue with Step 2.

   B. If the voltage reading is within the proper limits, continue the troubleshooting at Step 6.

NOTE: *Visually inspect the wiring harness and connectors. Verify that the connector was fully installed. Inspect the terminals and wires at the connector for pushed back or corroded terminals or damaged wires. Flex the harnesses involved to reveal intermittent breaks or shorts in the wiring concerned.*

2. The voltage reading on the display monitor is high (4.9 to 5.2 volts). Disconnect the air filter switch **connector X202.** Use a jumper wire to short **connector X202 pin 2** to chassis ground.

   A. If voltage drops to less than 0.5 volts, the open circuit is not in the supply side of the circuit. Continue with Step 4.

   B. If the voltage remains high, continue with Step 3.

3. The voltage reading on the display monitor is high (4.9 to 5.2 volts). Disconnect the engine harness from the main frame harness at **connector X010**. Use a jumper wire to short **connector X010 pin 8** to chassis ground.

   A. If voltage drops to less than 0.5 volts, the open is in the engine (EN) harness between **connector X010 pin 8** and air filter switch **connector X202 pin 2** wire 864 yellow. Locate the open and repair.

   B. If voltage remains high, the open is in the main frame (MF) harness between **connector X010 pin 8** and **connector X016 pin J2-24** wire 864 yellow. Locate the open and repair.

4. Disconnect the air filter switch **connector X202**. Use a multimeter to check for continuity between the harness end of **connector X202 pin 1** and chassis ground.

   A. If there is continuity, the ground path for the sensor is complete, and the fault is in the sensor itself. Replace the sensor.

   B. If there is no continuity to ground, the ground path for the sensor is open. Continue with Step 5.

5. Disconnect the engine harness from the main frame harness at **connector X010**. Use a multimeter to check for continuity between the harness end of **connector X010 pin 14** and chassis ground.

   A. If there is continuity, the open circuit is in the engine (EN) harness between **connector X010 pin 14** and **connector X202 pin 1** wire 851 blue or 468 blue. Locate the open and repair.

   B. If there is no continuity, the open circuit is in the main frame (MF) harness between **connector X010 pin 14** and **connector X016 pin J2-14** wire 468 blue or 465 blue. Locate the open and repair.

6. Operate the machine while monitoring display. If no high out of range readings are indicated, erase the fault code and continue operation.

FAULT CODE – E0165-04 CCM2 5V Ref Voltage 3 Shorted to Low Source

Cause:
The ***CCM2 5V Ref Voltage 3*** circuit is shorted to ground.

Possible failure modes:

1. Sensor supply wiring shorted to ground.
2. Controller internal failure (internal regulator failure).

Solution:
The CCM2 5V Ref Voltage 3 circuit supplies power from **connector X016 pin J2-31** to two different sensors; the grain bin sensors S28 & S29 in the grain tank harness, and the control pressure sensor B35 in the gearbox harness. A short to ground on any of these supply wires will result in this fault code being displayed.

1. Using the display monitor diagnostic capability to view "item" status, reference Section 55 Chapter 2, if needed, check voltage range.

   The proper voltage supply is 4.5 to 5.5 volts.

   A. If the voltage reading is low (<4.5 volts), continue with Step 2.

   B. If the voltage reading is within the proper limits, continue the troubleshooting at Step 5.

NOTE: *Visually inspect the wiring harness and connectors. Verify that the connector was fully installed. Inspect the terminals and wires at the connector for pushed back or corroded terminals or damaged wires. Flex the harnesses involved to reveal intermittent breaks or shorts in the wiring concerned.*

2. The voltage reading on the display monitor is low. Disconnect the grain tank harness from the main frame harness at **connector X009**.

   A. If the voltage increases to 4.5 to 5.5 volts, the short is in the grain tank (GT) harness between **connector X009 pin G** and **connector X107 pin A** wire 440 pink. Locate the short and repair.

   B. If the voltage remains low on display monitor, continue with Step 3.

3. The voltage reading on the display monitor is low. Disconnect the gearbox harness from the main frame harness at **connector X011**.

   A. If the voltage increases to 4.5 to 5.5 volts, the short is in the gearbox (GB) harness between **connector X011 pin D** and **connector X098 pin B** wire 486 pink. Locate the short and repair.

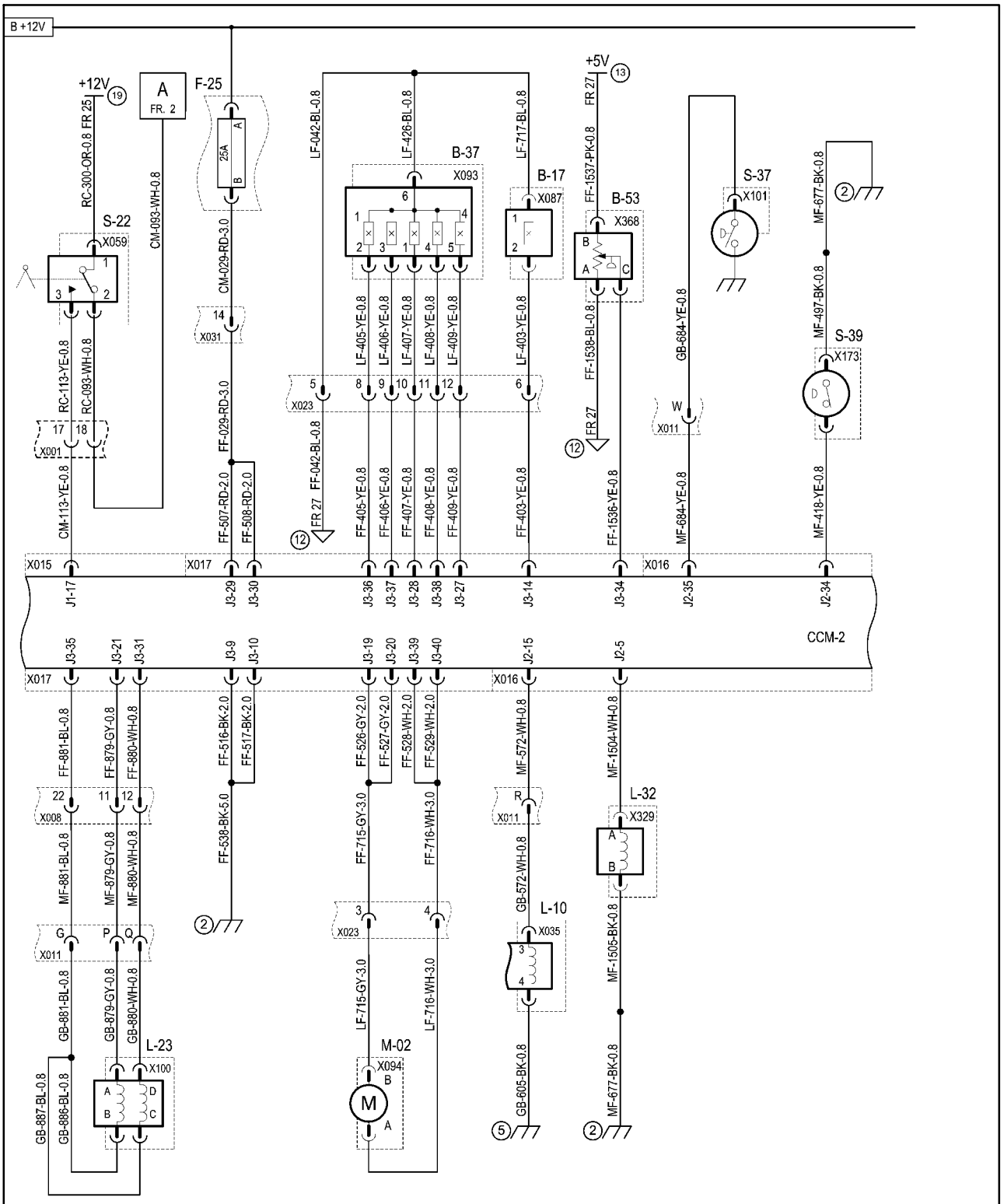
   B. If the voltage remains low on display monitor, continue with Step 4.

4. Carefully disconnect **connector X016** from the bottom of the CCM2 module. Use a multimeter to check for voltage at **connector X016 pin J2-31**. There should be 4.5 to 5.5 volts.

   A. If the voltage is within 4.5 to 5.5 volts, the short is in the main frame harness. Carefully inspect the main frame harness between **connector X016** and the grain tank and gearbox harnesses for any signs of chaffing, pinch marks, or other damage which could result in an internal short. Repair any damage found.

   B. If the voltage is less than 4.5 volts, there is a problem with an internal component in the CCM2 module. Replace the module.

5. Operate the machine while monitoring the display monitor. If no high out of range readings are indicated, erase the fault code and continue operation.



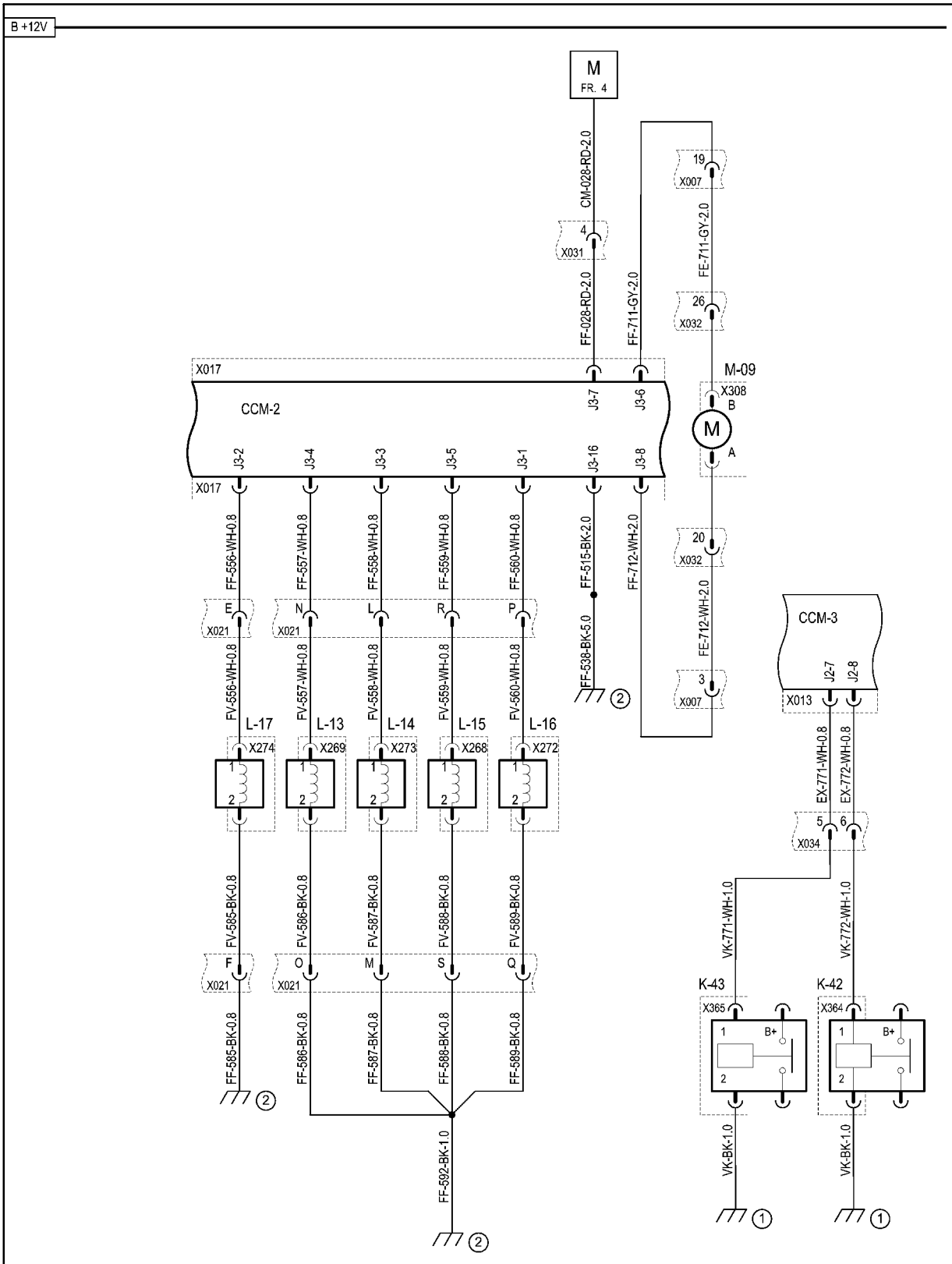
B-17 = GROUND SPEED RPM
B-37 = TRANS SHIFT POSITION
B-53 = PARK BRAKE PRESSURE
F-25 = TRANSMISSION SHIFT FUSE

L-10 = PARK BRAKE DISENGAGE
L-23 = GROUND SPEED HYDROSTAT
L-32 = BRAKE LIMITING
M-02 = TRANSMISSION SHIFT MOTOR

S-22 = NEUTRAL
S-37 = CHARGE PRESSURE
S-39 = BRAKE PRESSURE

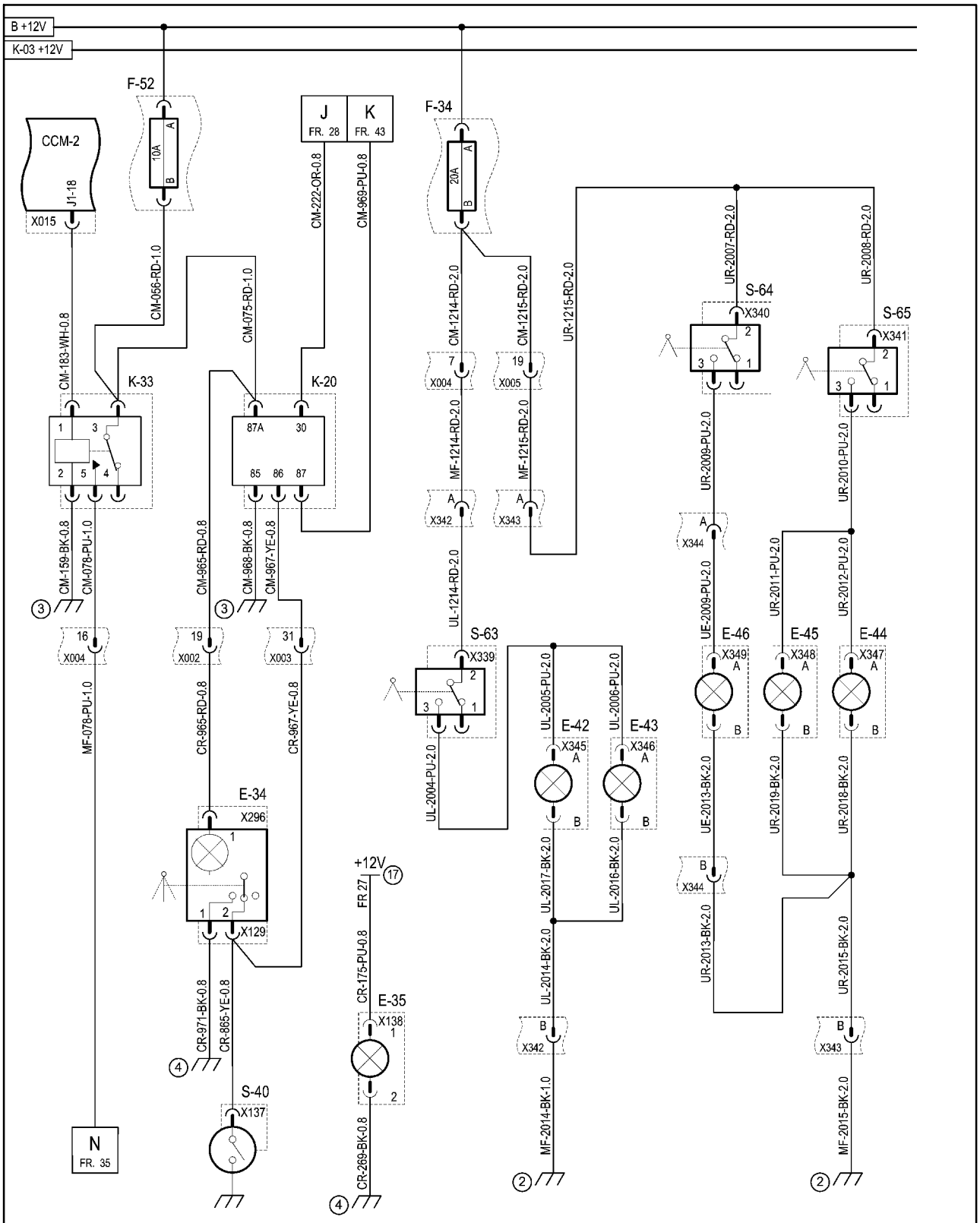
DRIVES
FRAME-9

11. Disconnect **connector X008**. Use a multimeter to check for continuity between the front frame (FF) harness end of **connector X008** pin 11 and chassis ground. There should not be continuity to ground.
    A. If there is no continuity to ground, there is a short to ground in the main frame (MF) harness between **connector X011** and **connector X008** wire 879 grey. Locate the short and repair. Continue with Step 12.
    B. If there is continuity to ground, there is a short to ground in the front frame (FF) harness between **connector X008** and **connector X017** pin J3-21 wire 879 grey. Locate the short and repair. Continue with Step 12.
12. Visually inspect the harness and connectors for damage, bent or dislocated pins, broken or pinched wires. Reinstall all connectors and wiring disconnected during troubleshooting. Repair any damage found during visual inspection. If no damage is found, erase the fault code and continue operation.



HEADER
FRAME-12

K-42 = RH VERTICAL KNIFE RELAY (OP)
K-43 = LH VERTICAL KNIFE RELAY (OP)
L-13 = REEL DOWN
L-14 = REEL UP
L-15 = REEL AFT
L-16 = REEL FORE
L-17 = REEL DRIVE
M-09 = REEL SPEED MOTOR



LIGHTING
FRAME-38

E-34 = DOME LIGHT
E-35 = CONSOLE LIGHT
E-42 = LH FRONT SHIELD LT
E-43 = LH REAR SHIELD LT
E-44 = RH FRONT SHIELD LT
E-45 = RH REAR SHIELD LT
E-46 = ENGINE LT
F-34 = UNDERSHIELD LIGHTS
F-52 = DOME/BRAKE LT FUSE
K-20 = TIME DELAY MODULE
K-33 = BRAKE LIGHTS RELAY
S-40 = LH DOOR SWITCH
S-63 = LEFT SHIELD LT SW
S-64 = ENGINE LT SW
S-65 = RIGHT SHIELD LT SW

FAULT CODE - E0283-05 Moisture Temp Sensor Line Disconnected

Cause:

The ***moisture sensor (B-12) temperature*** circuit is open or shorted to ground.

Possible failure modes:

1. Temperature sensor wiring is open or shorted to ground.
2. Controller internal failure (internal regulator failure).

Solution:

1. Using the display monitor diagnostic capability to view “item” status, reference Section 55 Chapter 2, if needed, check voltage range.

   The proper voltage range is 0.1 to 9.4 volts.

   A. If the voltage reading is low out of range (0.0 volts), continue with Step 2.

   B. If the voltage reading is within the proper limits, continue the troubleshooting at Step 4.

NOTE: *Visually inspect the wiring harness and connectors. Verify that the connector was fully installed. Inspect the terminals and wires at the connector for pushed back or corroded terminals or damaged wires. Flex the harnesses involved to reveal intermittent breaks or shorts in the wiring concerned.*

2. The voltage reading on the display monitor is low out of range. Disconnect the sensor **connector X221.** Use a multimeter to check for continuity between **connector X221 pin 5** on the expansion (EX) harness side and chassis ground.

   A. If there is continuity to ground, there is a short to ground in the expansion (EX) harness between **connector X221 pin 5** and **connector X014 pin J3-34** wire 595 yellow. Locate short and repair.

   B. If there is no continuity, continue with Step 3.

3. Key off. Carefully disconnect **connector X014** from the bottom of the CCM3 module. Install a jumper wire to short **connector X221 pin 5** on the expansion (EX) harness side to ground. Use a multimeter to check continuity between **connector X014 pin J3-34** on the expansion (EX) harness side to chassis ground.

   A. If there is no continuity, there is an open circuit in the expansion (EX) harness between **connector X014 pin J3-34** and **connector X221 pin 5** wire 595 yellow**.** Locate the open and repair.

   B. If there is continuity, there is a fault in the moisture sensor. Replace the moisture sensor.

4. Operate the machine while monitoring display monitor. If no low out of range readings are indicated, erase the fault code and continue operation.

FAULT CODE – E0290-03 Lower Sieve Position Sensor Shorted To High Source

Cause:

The Lower Sieve Position sensor (M-07) circuit is shorted to high voltage, or the sensor ground is open.

Possible failure modes:

1. Sensor supply or signal wiring is shorted to high voltage **>5.2 volts**.
2. Sensor ground wiring is open.
3. Module internal failure (internal regulator failure).

Solution:

1. Verify the fault is present. Using the display monitor diagnostic capability to view “item” status, reference Section 55 Chapter 2, if needed, observe the voltage. Raise and lower the sieves several times while monitoring the voltage; the voltage should stay within range, and should change smoothly with sieve movement.

   The normal operating range is **0.3 - 5.2 volts**.

   A. If the voltage reading is **>5.2 volts**, continue with Step **2**.

   B. If the voltage reading is within the proper limits, the circuit may not be shorted at this time. Continue the troubleshooting at Step **5**.

2. Verify the power supply and ground function. Check for an **E0293-03 - CCM3 5V Ref Voltage 3** fault. If present, correct that fault and resume operation. Disconnect and measure the voltage at lower frame rear (LR) **connector X228** between pin B(-) and pin A(+) on the lower frame rear (LR) harness side.

   A. If the voltage is **<4.5 volts**, there is an open in the ground circuit. Continue with Step **3**.

   B. If the voltage reads between **4.5 and 5.5 volts**, then the CCM3 5V REF and circuit ground function properly. The fault is in the sense circuit. Continue with Step **4**.

3. Check for multiple faults on common circuits. If fault codes **E0287-03**, **E0290-03**, and **E0289-03** (if installed) are all active, the fault will most likely be found between CCM3 and straw hood front (SW) harness **connector X072**.

   A. If these fault codes are all present, then check the continuity between straw hood front (SW) harness **connector X072** pin L wire 796 blue and straw hood front (SW) harness **connector X025** pin 2 wire 439 blue. Also check the segment from expansion (EX) harness **connector X025** pin 2 to expansion (EX) harness **connector X013** pin 14. Locate and repair the open. Continue with Step **5**.

   B. If only one code is present, then check the continuity between lower frame rear (LR) harness **connector X228** pin B and straw hood front (SW) harness connector **X072** pin F. Also check the segment from straw hood front (SW) harness connector **X072** pin F to straw hood front (SW) harness connector **X025** pin 2. Locate and repair the open. Continue with Step **5**.

18. If fuse has failed, replace the fuse.
    A. If fuse immediately fails, a short to ground exists on one of the **following wires**:

       Wire 031 red, from fuse F27 to **connector X005** pin 4

       Wire 031 red, **connector X005 pin 4** to **connector X034** pin 2

       Wire 031 red, **connector X034** pin 2 to splice in expansion (EX) harness

       Wire 511 red, harness splice to **connector X013** pin J2-11 on CCM3 module.

       Wire 512 red, harness splice to **connector X014** pin J3-7 on CCM3 module.

       Visually inspect the harnesses for damage, bent or dislocated pins, corroded terminals or broken wires. Locate the short to ground and repair.

    B. Fuse is okay. Go to Step 19.

19. Test for 12V power at **connector X014 pin J3-7** on the CCM3 module under the cab.
    A. If there is no power, there is an open circuit on one of the **following wires**:

       Wire 031 red, from fuse F27 to **connector X005** pin 4

       Wire 031 red, **connector X005** pin 4 to **connector X034** pin 2

       Wire 031 red, **connector X034** pin 2 to splice in expansion (EX) harness

       Wire 512 red, harness splice to **connector X014** pin J3-7 on CCM3 module.

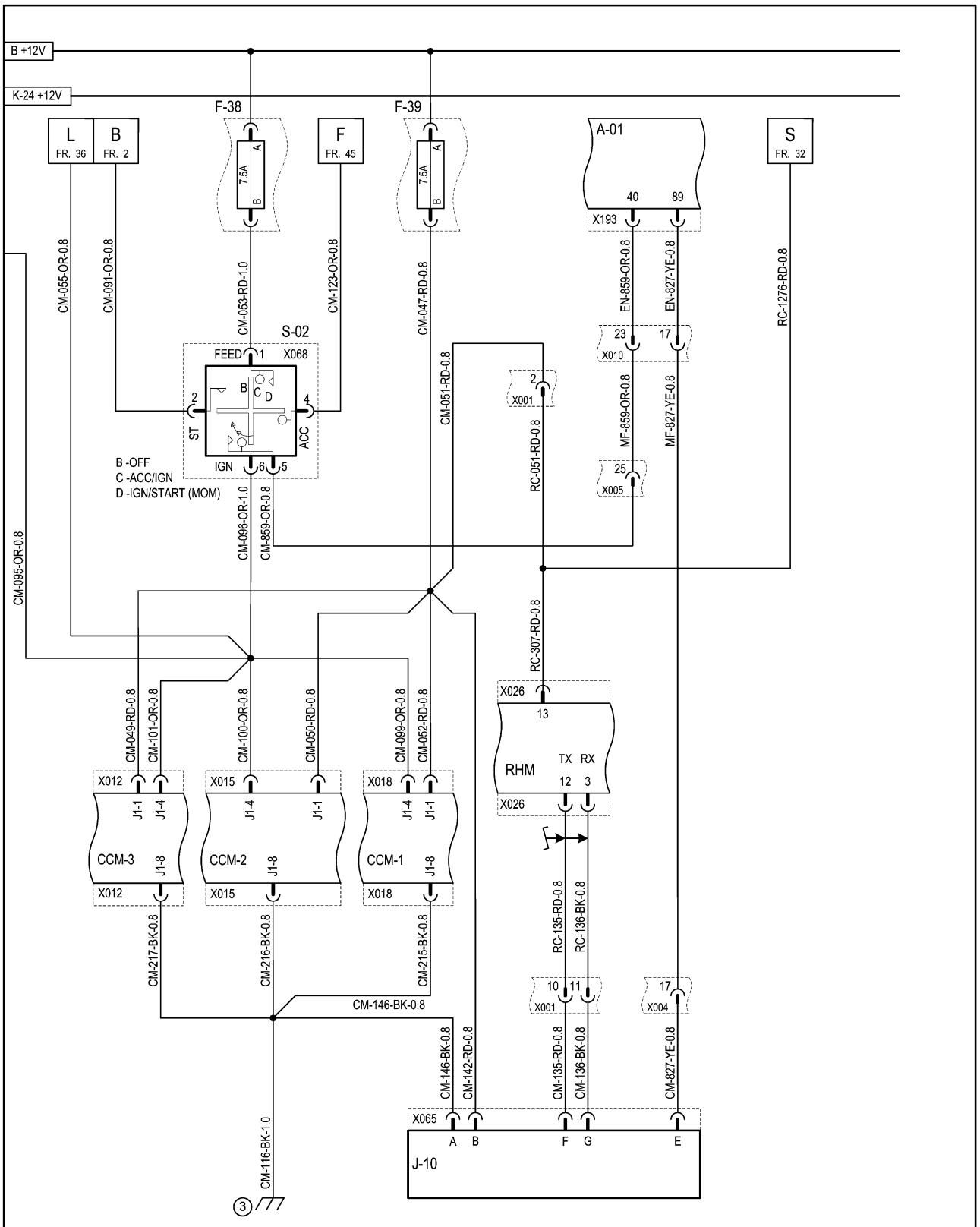
       Visually inspect the harnesses for damage, bent or dislocated pins, corroded terminals or broken wires. Locate the open and repair. After repair, go to Step 20.

    B. If there is power, go to Step 20.

20. Test for continuity to ground at **connector X014 pin J3-16** on the expansion (EX) harness side on the CCM3 module under the cab.
    A. If there is no continuity to ground, there is an open circuit in the expansion (EX) harness between **connector X014 pin J3-16** and chassis ground 2 wire 521 black. Locate the open and repair. After repair, go to Step 21.

    B. If there is continuity to ground, go to Step 21.

21. Once it has been verified that power is being supplied to the module, recheck the circuit operation as described in Step 1. If the fuse fails during the testing, a short to ground on the circuit is causing the fuse to fail. Start the troubleshooting at Step 3 to locate the short to ground.



F-38 = KEY SWITCH FUSE
F-39 = MEMORY (KAPWR)
J-10 = DIAGNOSTIC OUTLET
S-02 = KEY SWITCH

A-01 = ENGINE CONTROL UNIT

DISTRIBUTION
FRAME-29

17. Disconnect inline **connector X072.** Use a multimeter to check for continuity between **connector X072 pin P** on the straw hood front (SW) harness side and chassis ground.
    A. If continuity is found, the open circuit is in the lower frame rear (LR) harness between **connector X072 pin P** and **connector X228 pin E** wire 789 gray. Locate the open and repair.
    B. If no continuity is found, continue with Step 18.
18. Disconnect inline **connector X025.** Use a multimeter to check for continuity between **connector X025 pin 14** on the expansion (EX) harness side and chassis ground.
    A. If continuity is found, the open circuit is in the straw hood front (SW) harness between **connector X025 pin 14** and **connector X072 pin P** wire 789 gray or 785 gray. Locate the open and repair.
    B. If no continuity is found, the open circuit is in the expansion (EX) harness between **connector X025 pin 14** and **connector X013 pin J2-1** on wire 785 gray. Locate the open and repair.
19. Remove the Upper/lower sieve relay K18 on the fuse panel, and install a jumper wire between terminals 3 & 5. Use a multimeter to check for continuity between **connector X228 pin D** on the lower frame rear (LR) harness side and chassis ground.
    A. If no continuity is found, continue with Step 20.
    B. If continuity is found, recheck the motor for continuity at Step 14. Erase the fault codes and continue operation.
20. Disconnect **connector X072.** Use a multimeter to check for continuity between **connector X072 pin N** on the straw hood front (SW) harness side and chassis ground.
    A. If continuity is found, the open circuit is in the lower frame rear (LR) harness between **connector X228 pin D** and **connector X072 pin N** wire 790 white. Locate the open and repair.
    B. If no continuity is found, continue with Step 21.
21. Disconnect **connector X025.** Use a multimeter to check for continuity between **connector X025 pin 15** on the expansion (EX) harness side and chassis ground.
    A. If continuity is found, the open circuit is in the straw hood front (SW) harness between **connector X025 pin 15** and **connector X072 pin N** wire 790 white. Locate the open and repair.
    B. If no continuity is found, continue with Step 22.
22. Disconnect **connector X219.** Use a multimeter to check for continuity between **connector X219 pin 2** on the main frame (MF) harness side and chassis ground.
    A. If continuity is found, the open circuit is in the expansion (EX) harness between **connector X219 pin 2** and **connector X025 pin 15** wire 790 white. Locate the open and repair.
    B. If no continuity is found, continue with Step 23.
23. Remove the jumper wire between terminals 3 & 5 for relay K18 on the fuse panel**.** Use a multimeter to check for continuity between **Upper/lower sieve relay K18 terminal 5** on the cab main (CM) harness side and chassis ground.

NOTE: *Continuity check is being done back through circuit through the motor. The resistance will read significantly higher than previous tests, but should not be higher than 10 ohms above the motor resistance measured in Step 14.*

    A. If no continuity is found, the open circuit is in wire 790 white from the fuse panel through **connector X005 pin 16** to **connector X219 pin 2**. Locate the open and repair.
    B. If no continuity is found, continue with Step 24.

12. Disconnect **connector X032** (header connector)**,** and use a multimeter to test for voltage on the feeder (FE) harness end of **connector X032 pin 5 or 23**.
    A. If 10 volts is found, there is a short to high voltage in the header (HH) harness to the sensor supply circuit. Refer to the appropriate header Operator's manual for wiring information. Locate the short and repair.
    B. If high voltage is found, continue with Step 13.
13. Disconnect **connector X007,** and use a multimeter to test for voltage on the front frame (FF) harness end of **connector X007 pin 26**.
    A. If 10 volts is found, there is a short to high voltage in the feeder (FE) harness between **connector X007 pin 26** and **connector X032 pin 5 or 23** on one of the following wires:

       Wire 758 pink, **connector X007 pin 26** to FE harness splice

       Wire 848 pink, FE harness splice to **connector X032 pin 5**

       Wire 849 pink, FE harness splice to **connector X032 pin 23**

       Locate the short and repair.
    B. If high voltage is found, continue with Step 14.
14. Disconnect **connector X008,** and use a multimeter to test for voltage on the main frame (MF) harness end of **connector X008 pin 18**.
    A. If 10 volts is found, there is a short to high voltage in the front frame (FF) harness between **connector X008 pin 18** and **connector X007 pin 26** wire 758 pink. Locate the short and repair.
    B. If high voltage is found, there is a short to high voltage in the main frame (MF) harness between **connector X008 pin 18** and **connector X281 pin 5** on one of the following wires:

       Wire 751 pink, **connector X174 pin 3** to MF harness splice

       Wire 758 pink, MF harness splice to **connector X008 pin 18**

       Wire 728 pink, **connector X279 pin 3** to MF harness splice

       Wire 474 pink, MF harness splice to **connector X281 pin 5**

       Locate the short and repair.
15. Operate the machine while monitoring display monitor. If no high out of range readings are indicated, erase the fault code and continue operation. If the fault code immediately resets, replace the HHC module with a known good one.

FAULT CODE - E0524-11 10V Reference Voltage Unidentified Failure Code

Cause:
The ***10V Reference Voltage Supply*** circuit is shorted to a high source, or shorted to ground.

Possible failure modes:

1. 10V reference voltage supply wiring is shorted to ground.
2. 10V reference voltage supply wiring is shorted to a high source (>10V).
3. Module internal failure (internal regulator failure).

Solution:
The HHC module provides a 10V regulated power supply to the header lift pressure sensor B29, feeder angle sensor R03, left stubble height sensor R12 and right stubble height sensor R13. There is no diagnostic screen currently available for troubleshooting this concern.

1. Disconnect **connector X279** from the **header lift pressure sensor B29**. Use a multimeter to check for voltage on **connector X279 pin 3** on the main frame (MF) harness side. The proper voltage range is 9.5 to 10.5 volts.
   A. If the voltage reading is zero, the regulated voltage circuit is shorted to ground, and the HHC module is no longer powering this circuit. Continue with Step 2.
   B. If the voltage reading is high out of range continue with Step 7.
   C. If the voltage reading is within the proper limits, the circuit may not be shorted high or shorted to ground at this time. Continue the troubleshooting at Step 11.

NOTE: *Visually inspect the wiring harness and connectors. Verify that the connector was fully installed. Inspect the terminals and wires at the connector for pushed back or corroded terminals or damaged wires. Flex the harnesses involved to reveal intermittent breaks or shorts in the wiring concerned.*

2. Key off. Disconnect **connector X279** from the **header lift pressure sensor B29**, and use a multimeter to test for continuity between **connector X279 pin 3** on the main frame (MF) harness side and chassis ground.
   A. If continuity to ground is found, continue with Step 3.
   B. If no continuity is found, the **HHC module** is not powering the 10V Reference Voltage circuit due to an internal fault. Replace the HHC module.
3. Disconnect **connector X008**, and use a multimeter to test for continuity between the front frame (FF) harness end of **connector X008 pin 18** and chassis ground.
   A. If no continuity to ground is found, there is a short to ground in the main frame (MF) harness between **connector X281 pin 5, connector X279 pin 3, connector X174 pin 3** and **connector X008 pin 18** on one of the following wires:
      wire 728 pink, MF harness splice to **connector X279 pin 3**
      wire 751 pink, MF harness splice to **connector X174 pin 3**
      wire 758 pink, MF harness splice to **connector X008 pin 18**
      wire 474 pink, MF harness splice to **connector X281 pin 5**
      Locate the short and repair.
   B. If continuity to ground is found, continue with Step 4.

4. Verify circuit 391 yellow is good. Measure the continuity between RHM **X027** pin 11 and Gear Select Switch S-24 **connector X048** (harness side) pin 2.
   A. If the circuit tests good, continue troubleshooting at Step **5**.
   B. If the circuit is open, locate and repair the open. Continue troubleshooting at Step **6**.
5. Verify the RHM is good. Observe the “Gear Select Input” voltage on the display monitor.
   A. If the Gear Select Input voltage is still **<0.2 volts**, reload the system software to see if the fault code clears. If the fault is still present after reloading the software, replace the RHM. Continue troubleshooting at Step **6**.
   B. If the fault is still present after replacing the RHM, continue troubleshooting at Step **6**.
6. Visually inspect the harness and connectors for damage, bent or dislocated pins, broken or pinched wires.
   A. Repair any damage found during visual inspection.
   B. If no damage is found, erase the fault code and continue operation.

FAULT CODE – E0664-04 RHM Rotor Speed (Increase) Shorted to Low Source

Cause:
The Right Hand Module (RHM) has detected that the Rotor Speed switch S-17 increase circuit voltage is **<0.5 volts**.

Possible Failure Modes:
1. The rotor speed increase circuit is shorted to ground.
2. The RHM has failed internally.

Solution:
1. Using the display monitor diagnostic capability to view "Item" status; reference Section 55 Chapter 2, if needed, observe the voltage while operating the switch.

   The normal operating range for the rotor speed increase switch in the "Off" position is **0.5 – 3.5 volts**.

   The normal operating range for the rotor speed increase switch in the "On" position is **3.5 – 5.0 volts**.

NOTE: *The switch actually supplies 12 volts (battery voltage) to the module when in the "On" position, however, the Diagnostic screen bar graph only displays to 5 volts.*

   A. If the voltage reading remains low **(0.0 to 0.5 volts)** out of range, continue with step 2.

   B. If the voltage reading is within the proper limits, continue the troubleshooting with step 5.

2. Turn the ignition switch off. Disconnect **connector X046** from the Rotor Speed switch S-17. Use a multimeter to check for continuity between the harness side of **connector X046** pin 3 and chassis ground. There should not be continuity to ground.

   A. If continuity is found, continue with step 3.

   B. If no continuity is found, the Rotor Speed switch S-17 has failed. Replace the switch.

3. Disconnect **connector X030** from the RHM. With the Rotor Speed switch in the "Off" position, use a multimeter to check for continuity between the harness side of **connector X030** pin 11 and chassis ground. There should not be continuity to ground.

   A. If continuity is found, there is a short to ground in the RH Console (RC) harness between RHM **connector X030** pin 11 and **connector X046** pin 3 wire 349 yellow. Locate and repair the short.

   B. If no continuity is found, continue with step 4.

4. Disconnect **connector X030** from the RHM. Use a multimeter to check for continuity between **connector X030** pin 11 on the RHM and chassis ground. There should not be continuity to ground.

   A. If continuity is found, the RHM has failed. Replace the module.

   B. If no continuity is found, continue with step 5.

5. The fault is either intermittent or is no longer valid. Visually inspect the harness and connectors for damage, bent or dislocated pins, broken or pinched wires and repair any damage found. Erase the error code and continue operation. If the fault reoccurs, reload the RHM software. If that does not correct the concern, replace the RHM.

FAULT CODE – E0676-07 RHM HHC Fine Adjust (Increase) Mechanical Out of Range

Cause:
The Right Hand Module (RHM) has detected that the HHC Fine Adjust switch S-06 increase circuit voltage is >**3.5 volts** since power up.

Possible Failure Modes:
1. The work width increase circuit is out of range.
2. The RHM has failed internally.
3. The HHC Fine Adjust switch S-06 is stuck or shorted to **>3.5 volts.**

Solution:
1. Using the display monitor diagnostic capability to view "Item" status; reference Section 55 Chapter 2, if needed, observe the voltage while operating the switch.

   The normal operating range for the HHC Fine Adjust increase switch in the "Off" position is **0.5 – 3.5 volts**.

   The normal operating range for the HHC Fine Adjust increase switch in the "On" position is **3.5 – 5.0 volts**.

NOTE: *The switch actually supplies 12 volts (battery voltage) to the module when in the "On" position, however, the Diagnostic screen bar graph only displays to 5 volts.*

   A. If the voltage reading remains high **(> 3.5 volts)** out of range, continue with step 2.

   B. If the voltage reading is within the proper limits, continue the troubleshooting with step 5.

2. Turn the ignition switch off. Disconnect **connector X062** from the HHC Fine Adjust switch S-06. Turn the ignition switch on and actuate the HHC Fine Adjust switch S-06. Use a multimeter to check for **12 volts** on the switch side of **connector X062** pin 7 and chassis ground. There should be **12 volts** to ground.

   A. If **12 volts** is found, continue with step 3.

   B. If **12 volts** is not found, the HHC Fine Adjust switch S-06 has failed. Replace the switch.

3. Turn the ignition switch off. Reconnect **connector X062** and disconnect **connector X027** from the RHM. With the HHC Fine Adjust switch S-06 in the off position, turn the ignition switch on. Use a multimeter to check for **12 volts** between the harness side of **connector X027** pin 7 and chassis ground. There should not be **12 volts** to ground.

   A. If **12 volts** is found, there is a short to a high source in the RH Console (RC) harness between RHM **connector X027**pin 7 and **connector X062** pin 1 wire 303 yellow. Locate and repair the short.

   B. If **12 volts** is not found, continue with step 4.

4. With **connector X030** disconnected from the RHM and the ignition switch on. Use a multimeter to check for voltage at **connector X027** pin 7 on the RHM and chassis ground. There should not be any voltage to ground.

   A. If **> 3.5 volts** is found, the RHM has failed. Replace the module.

   B. If no voltage is found, continue with step 5.

5. The fault is either intermittent or is no longer valid. Visually inspect the harness and connectors for damage, bent or dislocated pins, broken or pinched wires and repair any damage found. Erase the error code and continue operation. If the fault reoccurs, reload the RHM software. If that does not correct the concern, replace the RHM.

A. If all of the switches and wires test good, then the MFH is good. Reload the system software to see if the fault code clears. If the fault is still present after reloading the software, replace the RHM. Continue troubleshooting at Step **3**.

B. If the ohmmeter reads outside the range given above, then the fault is in the MFH. Replace the MFH. Continue troubleshooting at Step **3**.

3. Visually inspect the harness and connectors for damage, bent or dislocated pins, broken or pinched wires.

   A. Repair any damage found during visual inspection.

   B. If no damage is found, erase the fault code and continue operation.

A. If all of the switches and wires test good, then the MFH is good. Reload the system software to see if the fault code clears. If the fault is still present after reloading the software, replace the RHM. Continue troubleshooting at Step **3**.

B. If the ohmmeter reads outside the range given above, then the fault is in the MFH. Replace the MFH. Continue troubleshooting at Step **3**.

3. Visually inspect the harness and connectors for damage, bent or dislocated pins, broken or pinched wires.

   A. Repair any damage found during visual inspection.

   B. If no damage is found, erase the fault code and continue operation.

A. If all of the switches and wires test good, then the MFH is good. Reload the system software to see if the fault code clears. If the fault is still present after reloading the software, replace the RHM. Continue troubleshooting at Step **3**.

B. If the ohmmeter reads outside the range given above, then the fault is in the MFH. Replace the MFH. Continue troubleshooting at Step **3**.

3. Visually inspect the harness and connectors for damage, bent or dislocated pins, broken or pinched wires.

   A. Repair any damage found during visual inspection.

   B. If no damage is found, erase the fault code and continue operation.

4. Operation: Check for Faulty Wiring.
   Vehicle Status: Key Off Engine Off.

   Remove and perform continuity tests between connectors X373 and X516 on engine sensor harness. Flex harness during test to check for any intermittant operation. Use the test lead labeled “Coolant/Fuel Temp Sensor” from the Tier II (NEF) Diagnostic Repair Kit **380040185** to access the pins on the sensor connector X373. Also, use the **0.4 mm** (**0.017 in**) diameter test probes from the repair kit when connecting the digital multimeter (DMM) to the X516 connector. Make sure the DMM’s test lead resistance is taken into account when making continuity measurements. See test table below.

IMPORTANT NOTE: *Check and verify that the Vehicle Status is correct. Potential ECU damage could result when removing main ECU connectors if this is not followed.*

Test Type	From	To	Expected Results
1. Continuity	X373 (Pin: 1)	X516 (Pin: 15)	Approx. **0 - 0.10 ohms**
2. Continuity	X373 (Pin: 2)	X516 (Pin: 26)	Approx. **0 - 0.10 ohms**
3. Short Circuit	X516 (Pin: 15)	X516 (Pin: 32)	Open Circuit
4. Short Circuit	X516 (Pin: 15)	X516 (Pin: 33)	Open Circuit
5. Short Circuit	X516 (Pin: 15)	X516 (Pin: 26)	Open Circuit

   A. If continuity test is successful, proceed to step **5**.

   B. If continuity test is unsuccessful, find and repair the damaged section(s) of the wiring harness.

5. Operation: CTS Sensor **B-44** Test
   Vehicle Status: Key Off Engine Off.

   Remove X373 connector and test resistance of CTS sensor **B-44** using the table of resistance vs. temp. below. Approximate the temperature when performing test. CTS **B-44** failures are typically at the extreme ends of the table or off the table entirely. Use the test lead labeled “Coolant/Fuel Temp Sensor” from the Tier II (NEF) Diagnostic Repair Kit **380040185** to access the pins on the sensor.

Coolant Temperature	Resistance Value
-20 °C (-4 °F)	10.5 kOhm
0 °C (32 °F)	7500 ohms
20 °C (68 °F)	4200 ohms
40 °C (104 °F)	980 ohms
60 °C (140 °F)	780 ohms
80 °C (176 °F)	500 ohms
100 °C (212 °F)	280 ohms
120 °C (248 °F)	97 ohms

   A. If the resistance measurement does not approximately match the table, replace the sensor.

   B. If the resistance measurement does approximately match the table, proceed to step **6**.

3. Operation: Check for Faulty Wiring.
   Vehicle status: Key Off Engine Off.

   Remove and perform continuity tests between connectors X372 and X516 on engine sensor harness. Flex harness during test to check for any intermittant operation. Use the test lead labeled “Coolant/Fuel Temp Sensor” from the Tier II (NEF) Diagnostic Repair Kit **380040185** to be able to access the pins on the sensor connector X372. Also, use the **0.4 mm** (**0.017 in**) diameter test probes from the repair kit when connecting the digital multimeter (DMM) to the X516 connector. Make sure the DMM’s test lead resistance is taken into account when taking continuity measurements. See test table below.

IMPORTANT NOTE: *Check and verify that the Vehicle Status is correct. Potential ECU damage could result when removing main ECU connectors if this is not followed.*

Test Type	From	To	Expected Results
1. Continuity	X372 (Pin: 1)	X516 (Pin: 35)	Approx. **0 - 0.10 ohms**
2. Continuity	X372 (Pin: 2)	X516 (Pin: 18)	Approx. **0 - 0.10 ohms**
3. Short Circuit	X516 (Pin: 35)	X516 (Pin: 32)	Open Circuit
4. Short Circuit	X516 (Pin: 35)	X516 (Pin: 33)	Open Circuit

   A. If continuity/shorts test is successful, go to step **4**.

   B. If continuity/shorts test is unsuccessful, find and repair the damaged section(s) of the wiring harness.

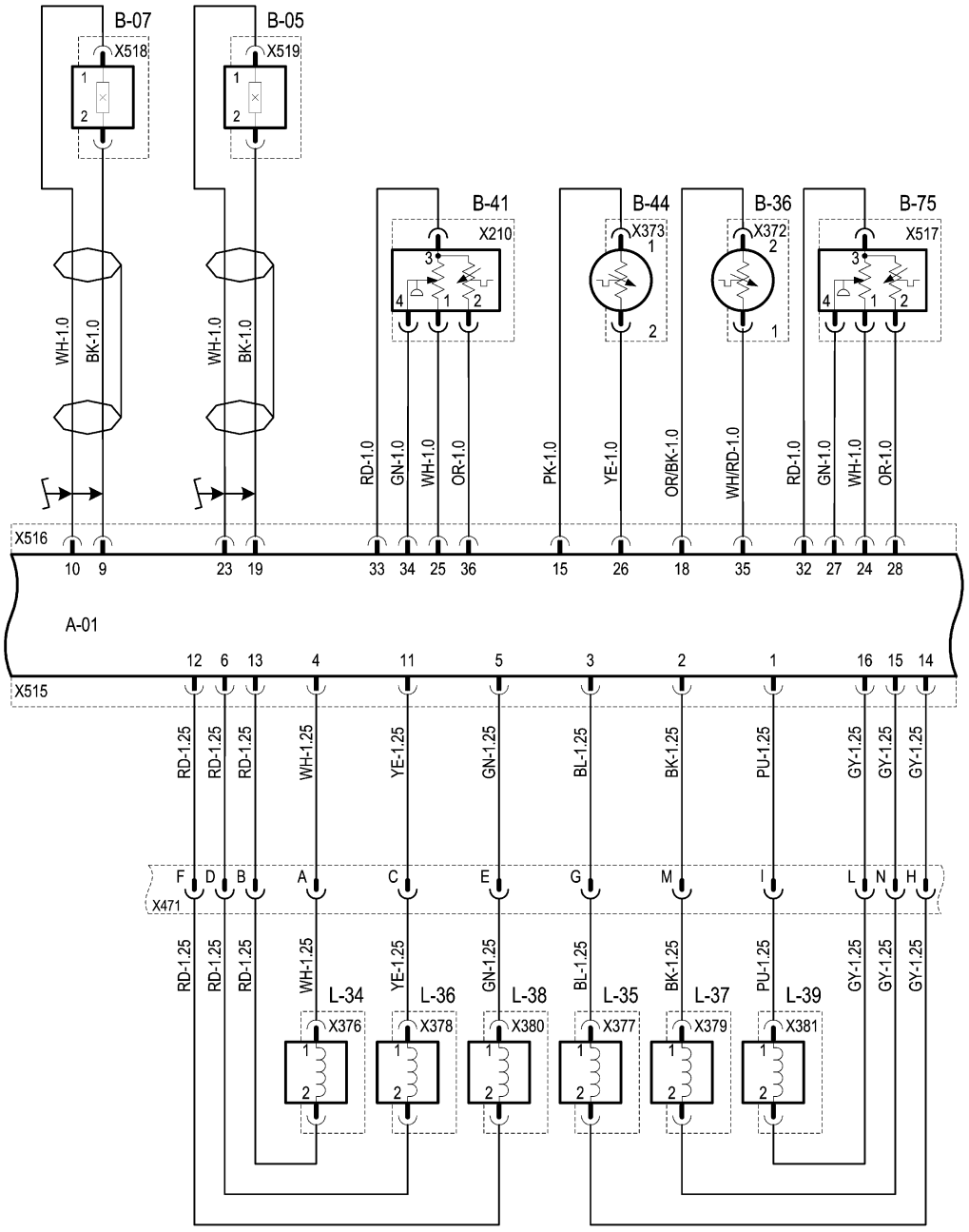
4. Operation: FTS Sensor **B-36** Test
   Vehicle Status: Key Off Engine Off.

   Remove FTS connector X372 and test resistance of FTS sensor **B-36** using the table of resistance vs. temp. below. Approximate the fuel temperature when performing test. FTS sensor **B-36** failures are typically at the extreme ends of the table or off the table entirely. Use the test lead labeled “Coolant/Fuel Temp Sensor” from the Tier II (NEF) Diagnostic Repair Kit **380040185** to access the pins on the sensor.

Fuel Temperature	Resistance Value
-20 °C (-4 °F)	10.5 kOhm
0 °C (32 °F)	7500 ohms
20 °C (68 °F)	4200 ohms
40 °C (104 °F)	980 ohms
60 °C (140 °F)	780 ohms
80 °C (176 °F)	500 ohms
100 °C (212 °F)	280 ohms
120 °C (248 °F)	97 ohms

   A. If the resistance measurement does not approximately match the table, replace the sensor.

   B. If the resistance measurement does approximately match the table, proceed to step **5**.



10.3L ENGINE
FRAME-4

A-01 = ENGINE CONTROL UNIT
B-05 = ENGINE FLYWHEEL RPM
B-07 = ENGINE CAMSHAFT RPM
B-36 = FUEL TEMP
B-41 = AIR TEMP/BOOST PRESS
B-44 = COOLANT TEMP
B-75 = OIL TEMP/PRESS
L-34 = FUEL ACTUATOR 1 (CYL 1)
L-35 = FUEL ACTUATOR 2 (CYL 4)
L-36 = FUEL ACTUATOR 3 (CYL 2)
L-37 = FUEL ACTUATOR 4 (CYL 6)
L-38 = FUEL ACTUATOR 5 (CYL 3)
L-39 = FUEL ACTUATOR 6 (CYL 5)

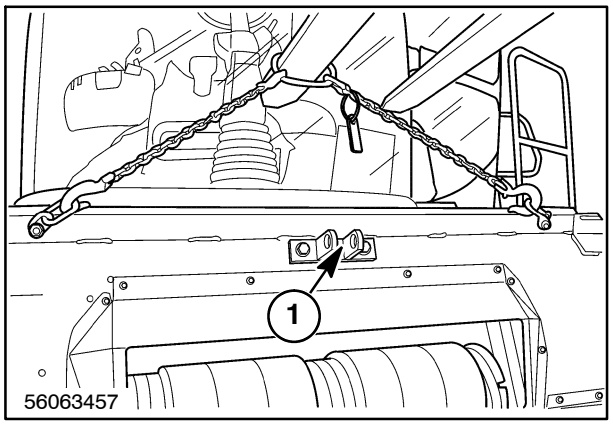
SECTION 55 - ELECTRICAL SYSTEMS

Chapter 25 - CNH 9.0L Engine Fault Codes

CONTENTS

NOTE: *Make sure the weight of the cradle is supported before removing the center pin from the cradle.*

7. Remove the two M16 x 45 cap screws and washers securing the center pin, 1, in the cradle. Remove the pin from the cradle.



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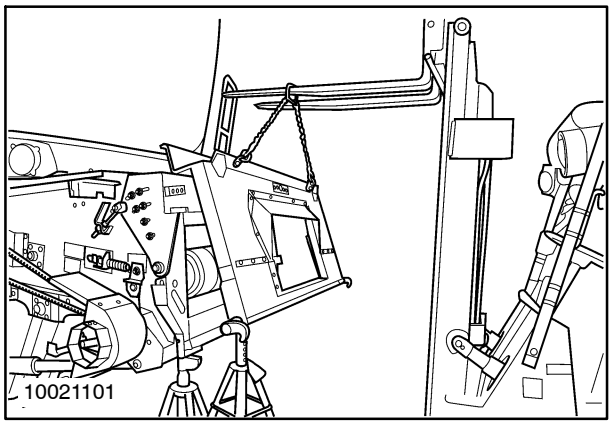
8. Lift the cradle up and away from the feeder house using the forklift or overhead hoist.

NOTE: *The wear strips, 7 and 8, in Figure 62, may drop off when the cradle is removed. They are trap secured between the cradle and feeder face plate.*



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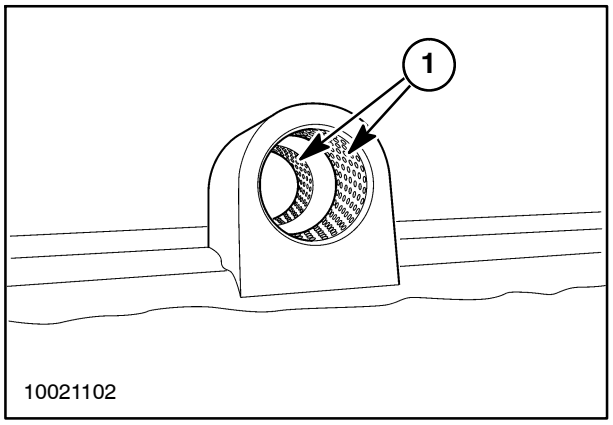
Installation

1. Before installing the cradle onto the feeder house, inspect the bushings, 1, for the cradle's center pin, located at the top of the feeder house face plate. Replace the bushings if worn or damaged excessively. Lubricate the bushings with lithium grease before installing the cradle.



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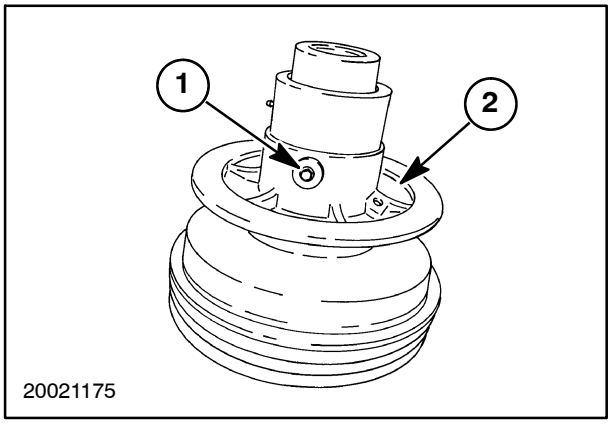
Disassembly

1. Before disassembly, remove crop residue and grease from the variable drive sheave using a suitable solvent.
2. Remove cross pin, 1, from the variable drive sheave by removing one 0.38 x 1.00 bolt, lock washer, and washer from one end of the cross pin.

   Slide the outer sheave half, 2, off the hub.



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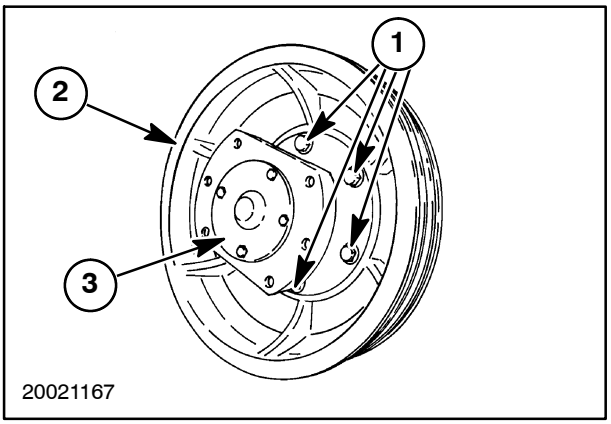
3. Remove the six M12 x 40 bolts, 1, which secure the inner sheave half, 2, to the hub assembly, 3. Tap the sheave half off the hub using a suitable mallet. Use care not to damage the sheave.



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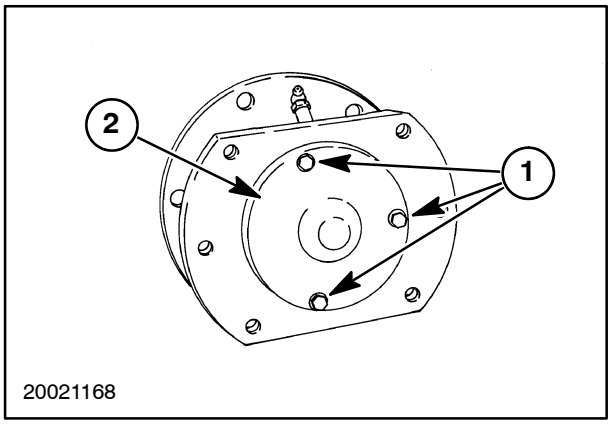
4. Remove the three M6 x 20 bolts, 1, which secure the bearing cover, 2, to the hub. Remove the cover from the hub.



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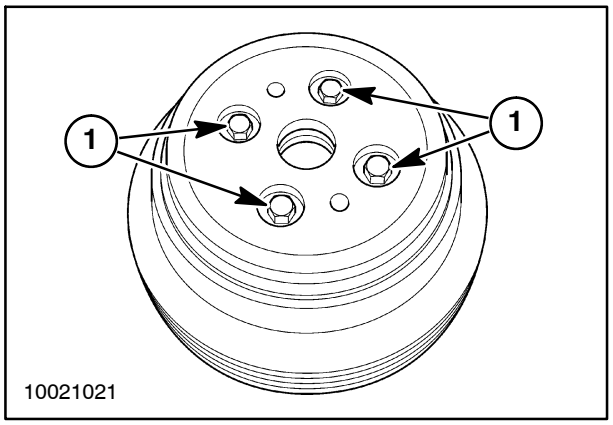
Disassembly

IMPORTANT: *Use care not to contaminate the feeder/header drive clutch when performing service or rebuilding. Service the clutch in a clean area, free from dirt and debris.*

1. Remove the four M12 x 50 bolts, 1, from the front of the clutch.



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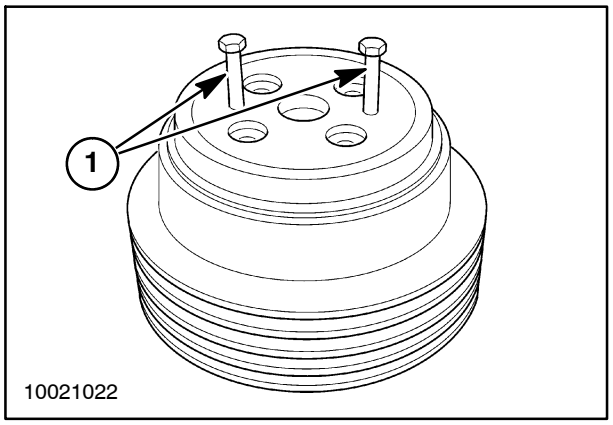
2. Thread two 12 mm bolts, 1, into the two small holes on the front of the clutch. Turn the bolts in evenly so the front of the clutch pushes away from the sheave. Lift the front cover of the clutch from the clutch body (sheave).



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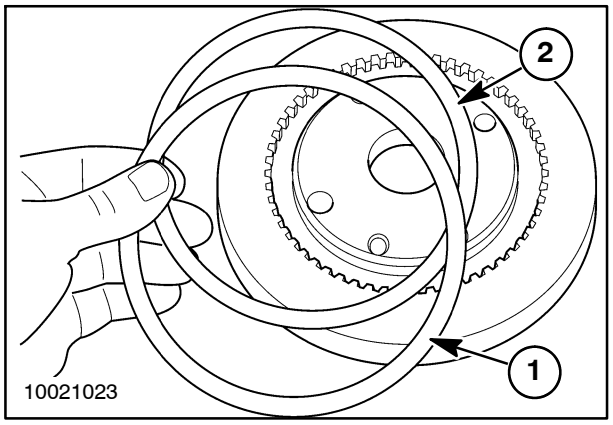
3. Remove the beveled washer, 1, and shim, 2, from the front cover.



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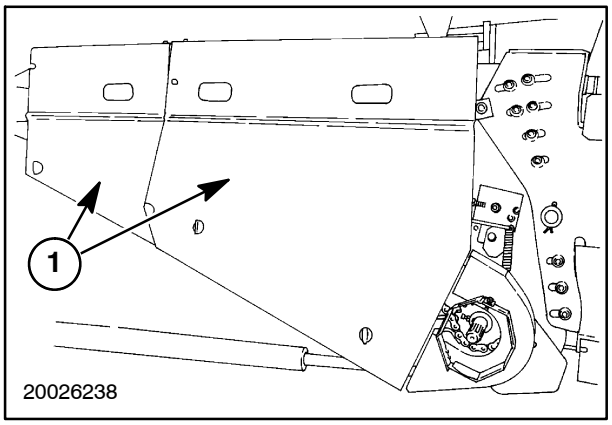
18. Install the feeder side shields, 1.



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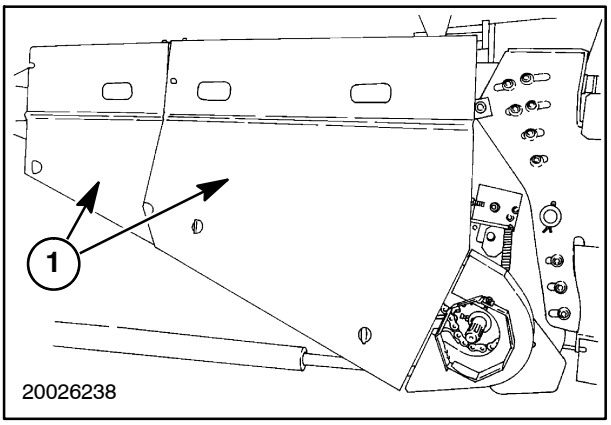
SLIP CLUTCH

Removal

1. Lower the feeder house to the lowest position.

NOTE: *If the feeder house is not at the lowest point of travel, the top slip clutch guard will be difficult to remove.*

2. Remove the feeder side shields, 1, from the right side of the feeder house. Place the shields on top of the feeder.



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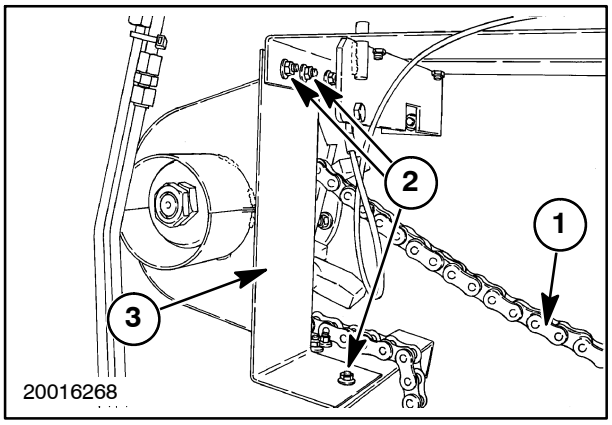
3. Position the chain, 1, to make the master link accessible. Relieve chain tension and remove the master link.
4. Remove the three cap screws and nuts, 2, and remove the guard, 3, from the feeder house.



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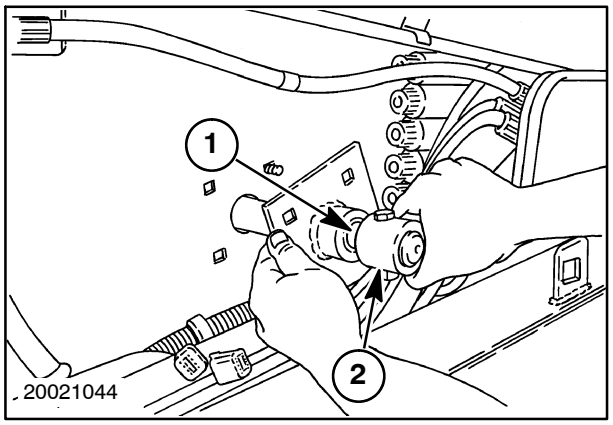
NOTE: *The spacers and shims for the right side of the skid plate will fall when the hex shaft is removed from the feeder. Use care not to lose these parts.*

6. Pull the hex shaft, 1, out the right side of the feeder house.

NOTE: *It is not necessary to remove the linkage arm, 2, unless servicing the shaft an linkage arm assembly.*



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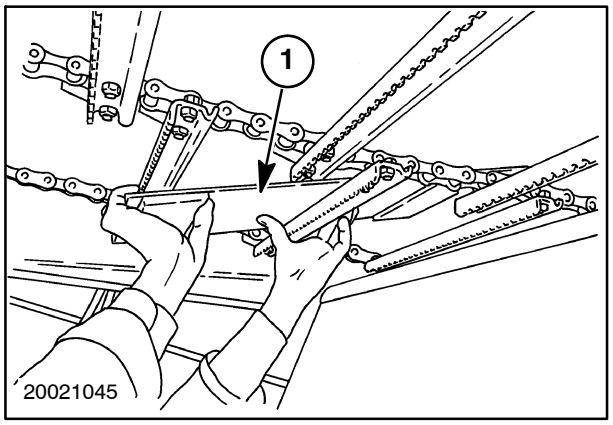
7. The skid plate, 1, can then be turned and pulled out of the feeder house through the feeder chain and stone door opening.



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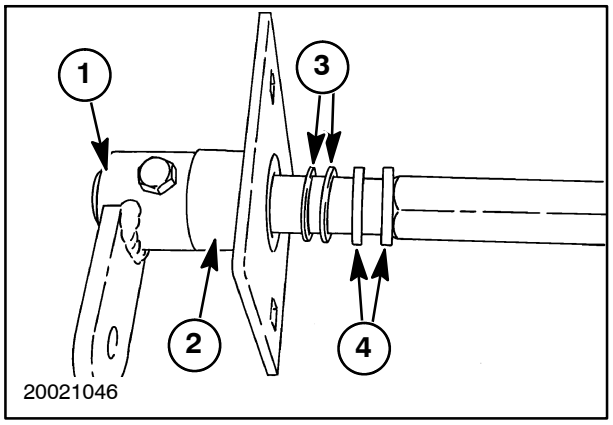
Installation

NOTE: *Steps 1 – 3 are only necessary if the linkage arm was removed. Coat the hex shaft hexagonal section with Loctite anti-seize compound in either case.*

1. Before installing the hex shaft, coat the hexagonal portion of the shaft with Loctite anti-seize compound. Lubricate the bore of the retaining plate, 2, with Molykote G-n Paste. Lubricate the bore of the linkage arm, 1, with Loctite anti-seize compound.
2. Install the two spacers, 4, and the two shims, 3, onto the left side of the shaft.
3. Install the retaining plate, 2, and the linkage arm, 1, onto the hex shaft. Secure the linkage arm to the hex shaft using the retaining bolt.



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TIGHTENING TORQUES

Description	Tightening torque	
	N·m	ft-lbs
Auger Flight	34 – 37	24 – 27
Front Rotor Flange	54 – 60	40.1 – 44.4
Rasp Bars	217 – 240	160 – 177
Rotor Blades	31 – 35	21 – 24
Counter Weight	27 – 30	20.2 – 22.3
Outer Drive Coupler – 17″ Rotor	95 – 105	70 – 77
Outer Drive Coupler – 22″ Rotor	235 – 260	173 – 192

⚠ WARNING ⚠

The variable drive sheave weighs approximately 73 kg (161 lb). Use care when handling the sheave, otherwise personal injury may occur.

7. Place a lifting strap around the center of the variable drive sheave. Secure the strap to a lifting hoist or part of the combine so the weight of the sheave will be supported when removed from the main cross shaft.
8. Place a piece of pipe or rod, 2, into the center of the sheave so the pipe rests against the washer. The pipe should be approximately 267 mm (10.5 in) long.

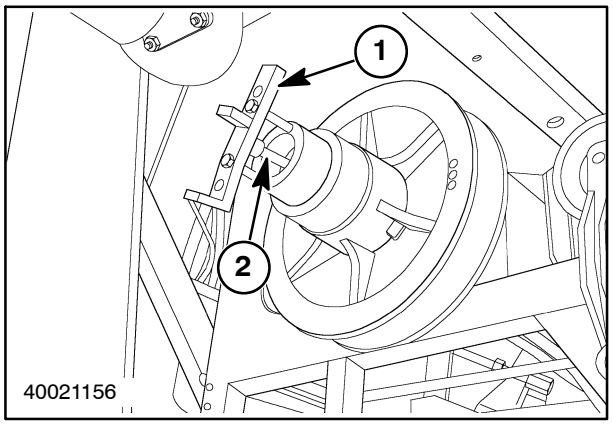
NOTE: *The tool used to remove the torque sensing sheave is used to pull the variable drive sheave.*

9. Install a puller, 1, onto the sheave, using the M10 x 1.5 tapped bolt holes in end of the sheave support hub. Tighten the bolts until the sheave becomes loose on the tapered splines of the main cross shaft.
10. Remove the puller from the sheave.
11. Remove the center bolt from the sheave and install the cross pin back into the sheave halves.

⚠ CAUTION ⚠

When sliding the sheave off the cross shaft, the sheave halves will tend to separate. Hold or clamp both halves together when removing and lowering the sheave.

12. Slide the sheave off the cross shaft and guide the sheave out of the combine while an assistant lowers the sheave.



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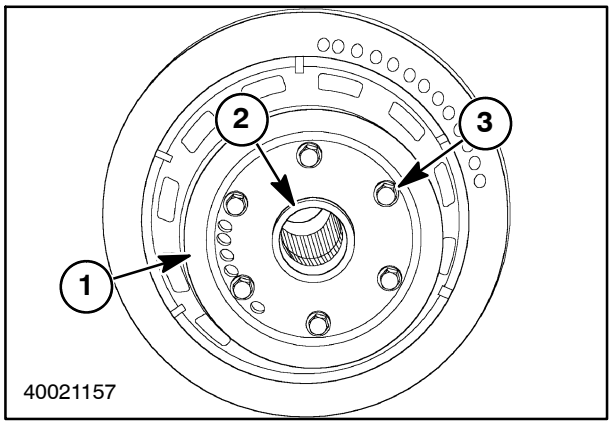
Inspection

1. Separate the sheave halves by removing the cross pin and lifting the outer sheave off the inner sheave. The inner sheave portion, 1, can be removed from the sheave support hub, 2, by removing the six mounting bolts, 3.
2. Inspect the sheave halves for excess wear or damage such as cracks or grooves. Replace as necessary.
3. Inspect the splines of the shaft for damage or wear. Inspect the shaft for excessive wear or damage. Replace the shaft as necessary.



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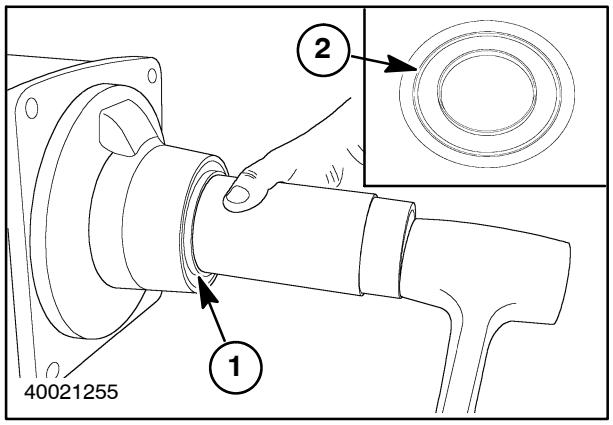
29. Lubricate a new output shaft oil seal with gear oil or petroleum jelly. Using a suitable seal driver, install the new oil seal, 1, over the output shaft and into the gearbox case. The seal should be recessed into the case approximately 10 mm (0.40 in).
30. Install the steel environmental seal, 2 (inset), over the oil seal.



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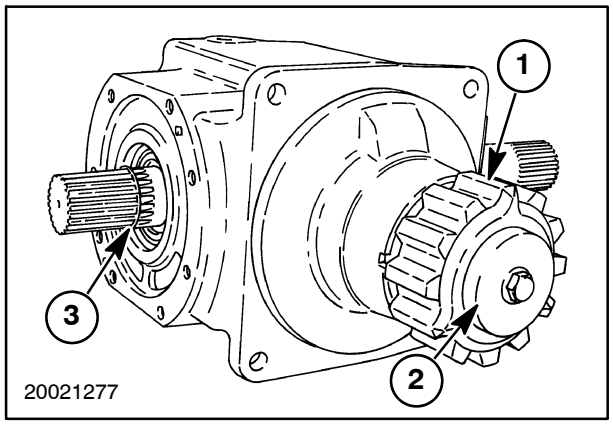
31. Install the snap ring (not shown) and rotor drive coupler, 1, on the output shaft. Apply Loctite® 271™ adhesive to internal threads of shaft and install M12 x 45 flange head class 10.9 bolt and washer, 2, if 22 inch rotors. For 17 inch rotors, install M12 x 70 flange head class 10.9 bolt and conical spacer. Torque to 150–165 N·m (111–122 ft-lb).
32. Install the external snap ring, 3, on the short splined end of the input shaft.



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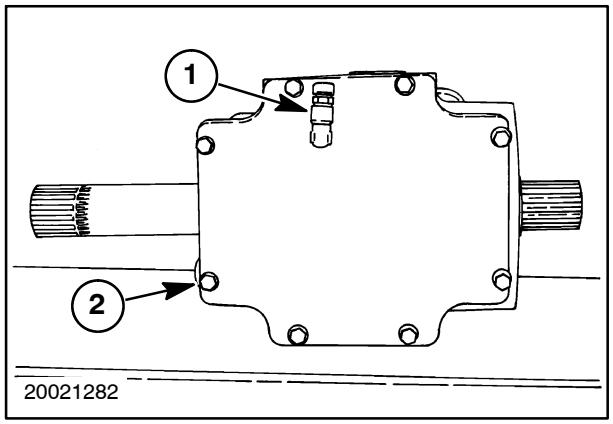
IMPORTANT: *The rear cover must be oriented so the breather, 1, on the cover is upright when the gearbox is installed in the combine.*

33. Place a 3 mm (1/8 inch) bead of Loctite® RTV sealant on the mounting surface of the rear cover. Install the cover, with the breather, 1, up, and secure using the eight mounting bolts, 2. Torque the bolts in a crossing pattern to 24 – 31 N·m (18 – 23 ft-lb).



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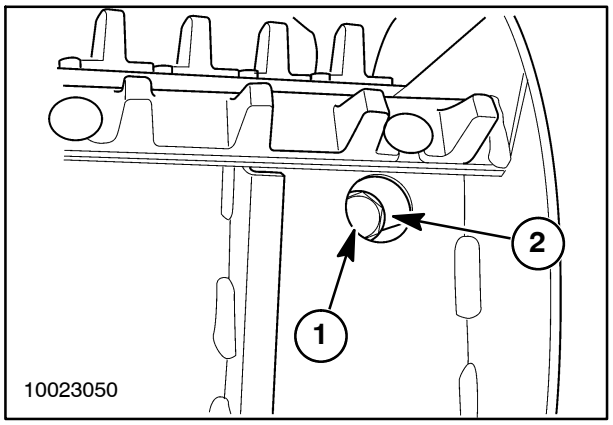
12. Remove the cap plugs from the clamp bolt access holes, 1, on both sides of the discharge beater.
13. Loosen the clamp bolts, 2, on both sides of the discharge beater.



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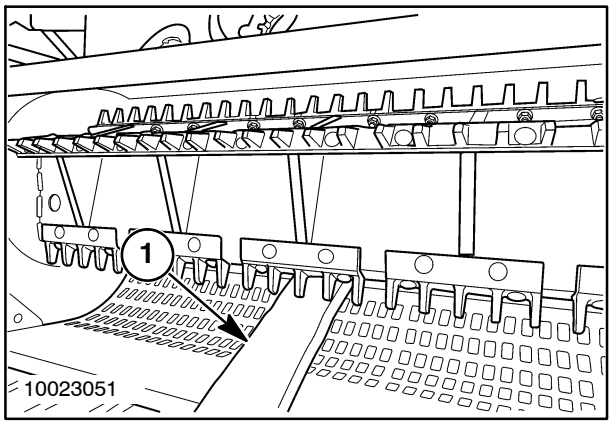
14. Support the weight of the discharge beater using boards, 1, or straps.
15. Drive the discharge beater shaft out of the right side of the combine.
16. Remove the discharge beater out the rear of the combine.



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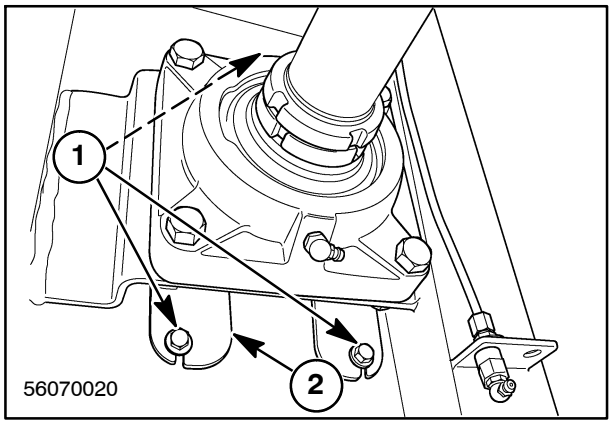
17. Clean and inspect the discharge beater shaft brush seals located between the beater bearings and the side walls on either side of the combine.
18. The brush seals can be inspected from inside the strawhood and/or removed for replacement or inspection by removing three M6 flange nuts, 1, and then removing the seal plate, 2.
19. Replace the brush seals if full of grease and dirt, and/or the bristles are worn or deformed as to no longer contact and brush the shaft during operation.



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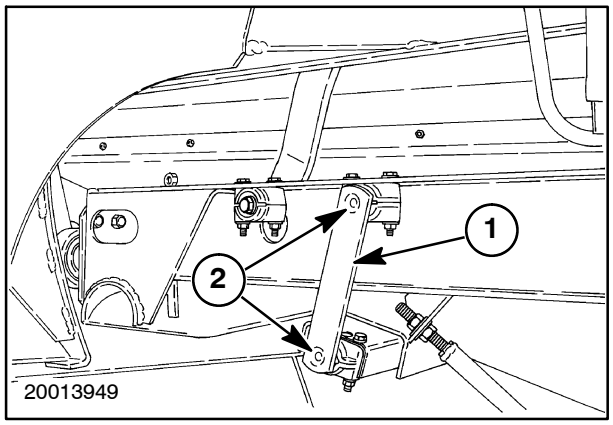
3. Attach the support arm, 1, using the hardware and clamps, 2, previously removed. Rotate the leveling frame as required to gain access to the support arm attachment points. **Do not tighten the hardware until instructed to do so.**

NOTE: *Anytime a rubber bushing is replaced, the drive arm must be in the neutral position prior to tightening the clamp.*



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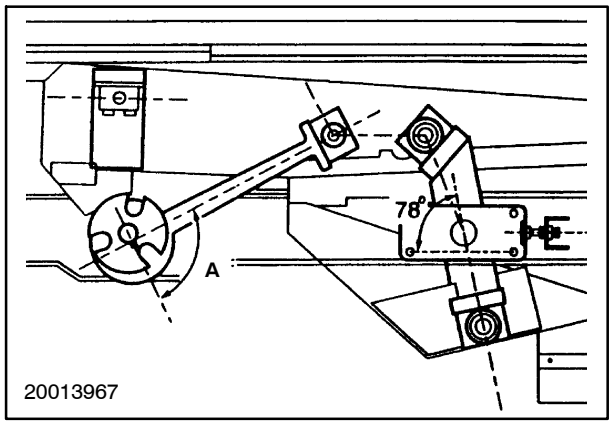
4. Position the drive arms so that the keyway is at angle A to the arm, this is known as the neutral position. Angle A = 90°. Tighten the bushing clamp hardware while holding the drive arm in the neutral position.



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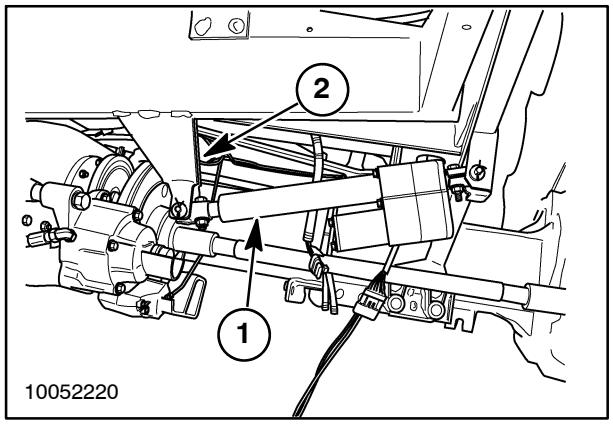
5. If the leveling frame positioning motor had been disconnected, attach the motor, 1, to the frame, 2.



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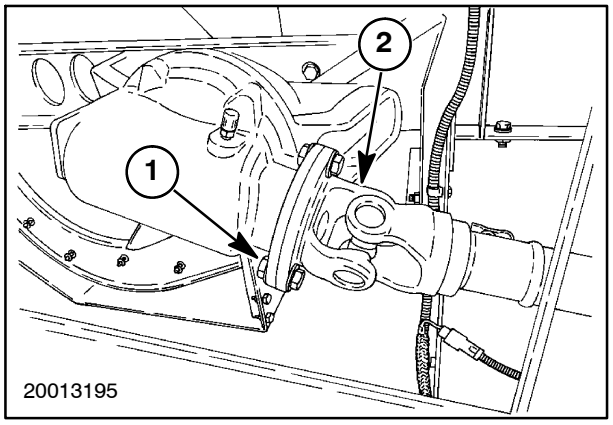
OVERHAUL

UPPER GEARBOX

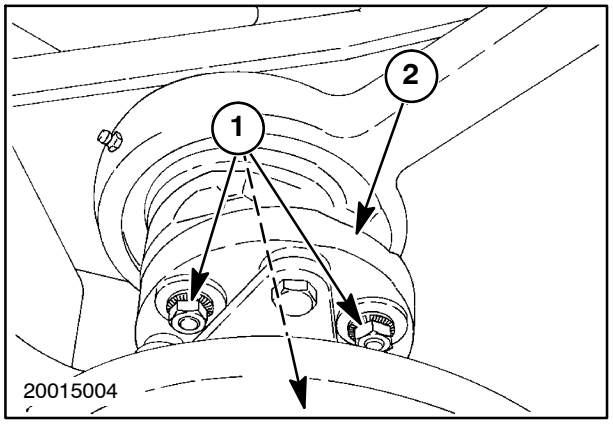
Removal

1. Loosen and remove the three bolts and nuts, 1, from the drive shaft coupling, 2. Separate the coupling.



1

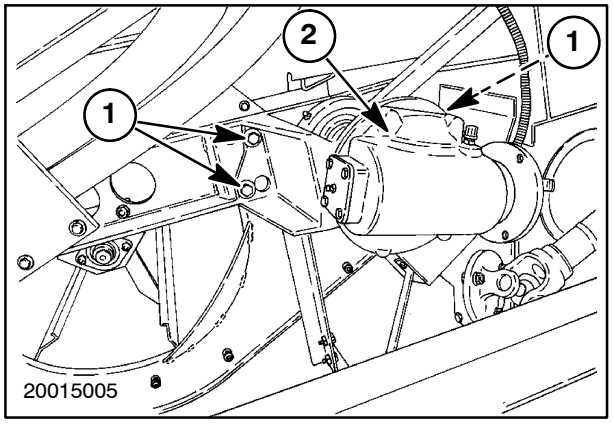
2. Loosen and remove the three nuts and washers, 1, on the elastic coupling, 2.



2

3. Loosen and remove the three gearbox mounting bolts, 1.
4. Remove the gearbox, 2, and elastic coupling from the eccentric shaft.

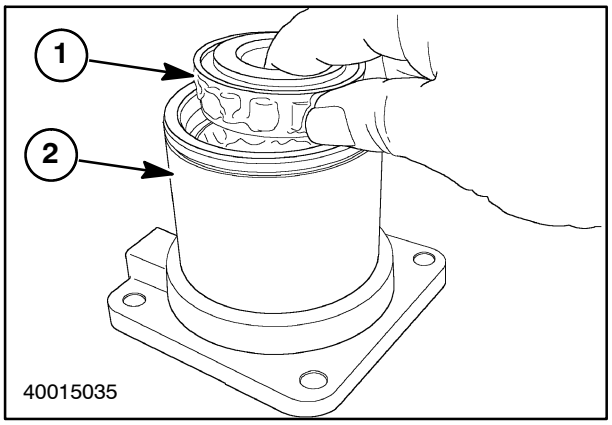
NOTE: *Use care not to lose the spacer washers between the elastic coupling and mounting block.*



3

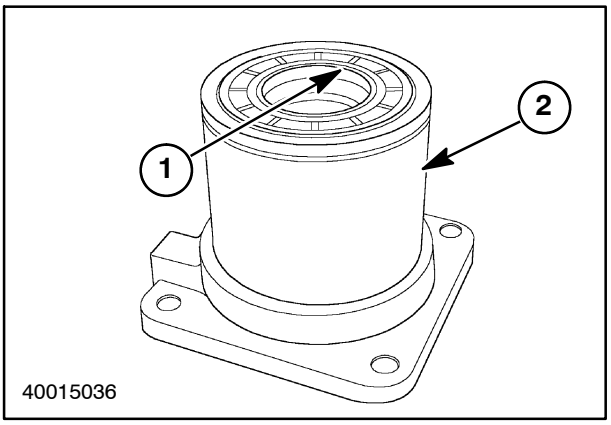
Assembling the Input Half

1. Pack the bearing, 1, with NH AMBRA GR-9 Multi-Purpose Grease and install into the gearbox case, 2.



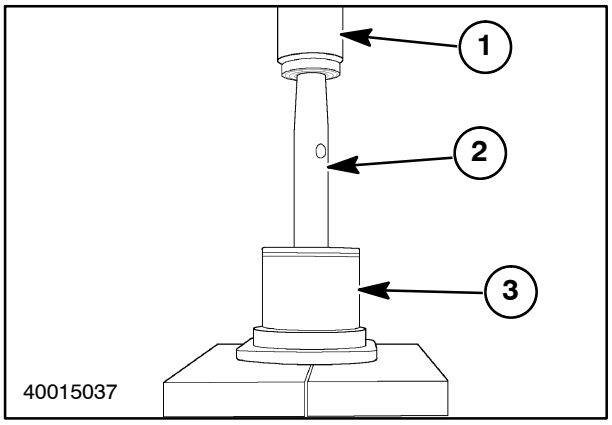
97

2. Install a new input shaft seal, 1, into the gearbox case, 2.
3. Lubricate the ID of the shaft seal, 1, with NH AMBRA GR-9 Multi-Purpose Grease.



98

4. Use a press, 1, to install the input shaft, 2, into the gearbox case, 3. Press the shaft until fully seated in the bearing.

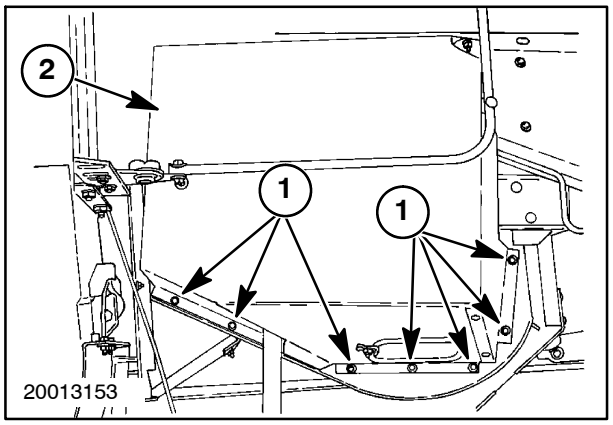


99

CLEANING FAN SHAFT

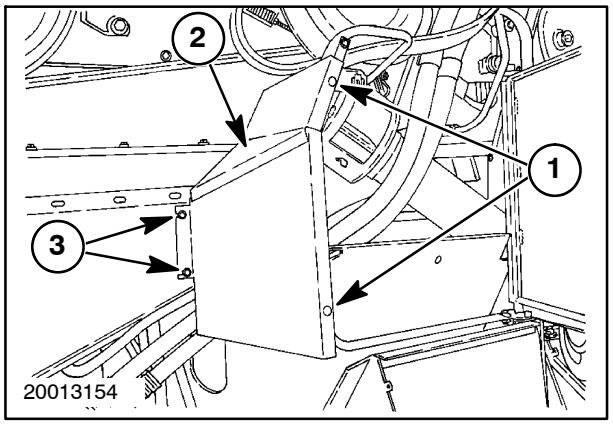
Removal

1. Loosen and remove the nuts and bolts, 1, securing the fan shield, 2, to the right side of the combine. Remove the shield from the combine.
2. For hydraulic drive fans, see “Hydraulic Drive Motor - Remove”.



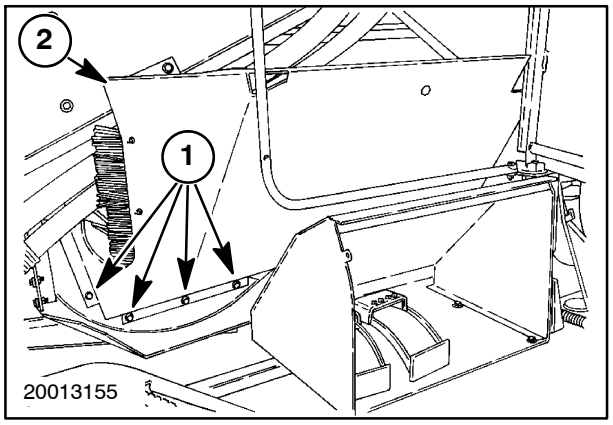
51

3. Loosen and remove the carriage bolts and nuts, 1, and cap screws, 3, securing the upper fan shield, 2, to the left side of the combine. Remove the upper fan shield from the combine.



52

4. Loosen and remove the nuts and bolts, 1, securing the lower fan shield, 2, to the left side of the combine. Remove the shield from the combine.

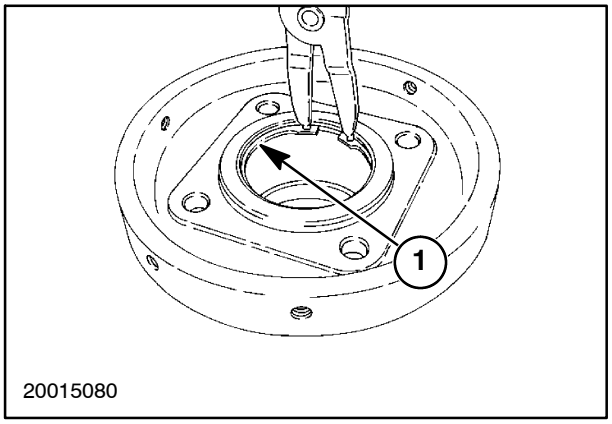


53

Assembly

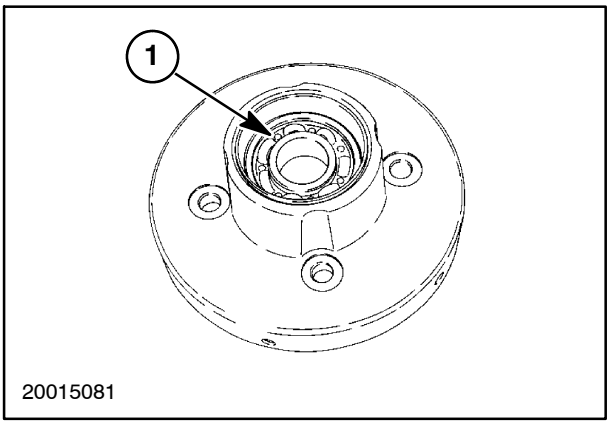
Output

1. Install the inner snap ring, 1, into the groove in the gearbox case.



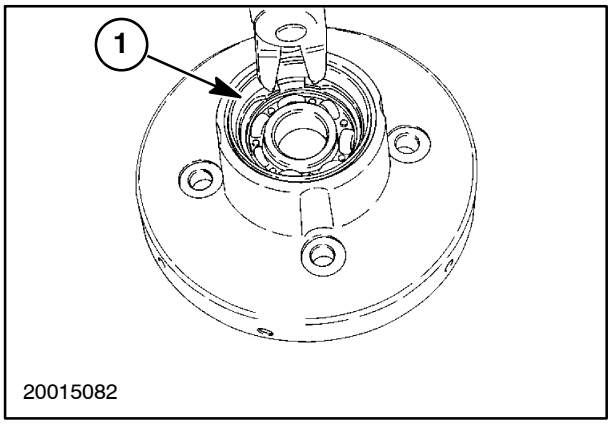
69

2. Turn the gearbox case over.
3. Pack the two bearings with NH AMBRA GR-9 Multi-Purpose Grease.
4. Install the bearings, 1, into the gearbox case.
5. Tap the bearings lightly until seated against the snap ring.



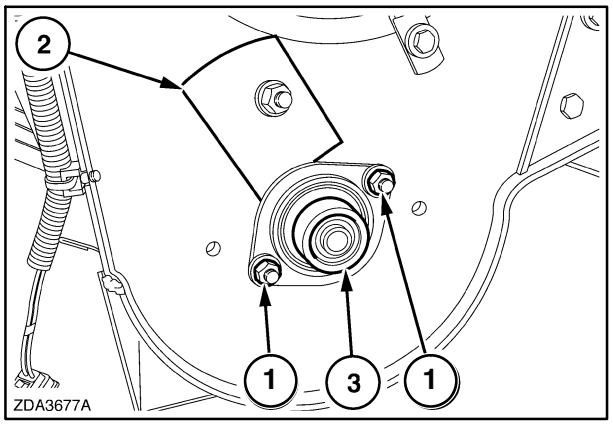
70

6. Install the outer snap ring, 1, into the groove in the gearbox case.
7. Place NH AMBRA GR-9 Multi-Purpose Grease above the bearing in the gearbox case.



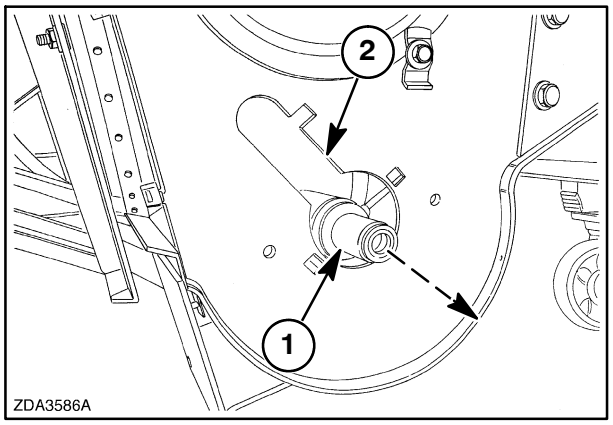
71

12. Loosen the mid nut to remove cover, 2.
13. Remove lock collar, 3.
14. Loosen two M10 nuts and lock washers, 1, and then remove the bearing flange.



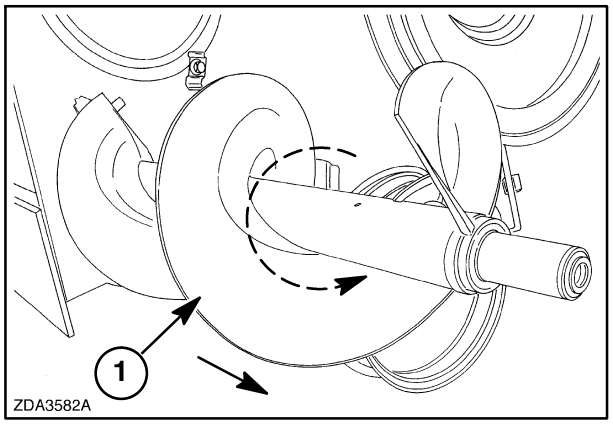
11

15. Pull the auger, 1, outward to remove it through the long key hole, 2, at the left-hand side.



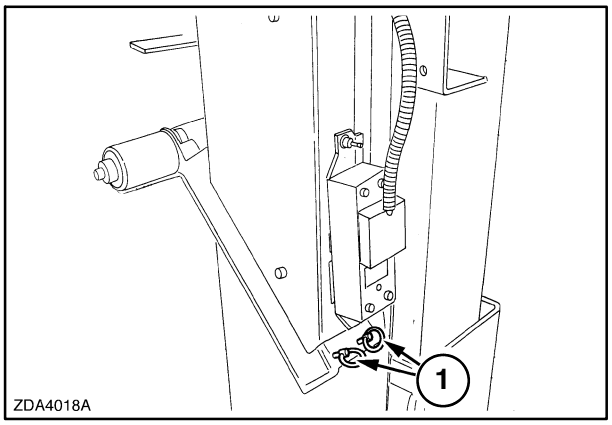
12

16. Turn the auger, 1, counterclockwise outward through the elongated keyhole.
17. Remove the sprocket at the right-hand side.



13

11. Install two pins, 1.



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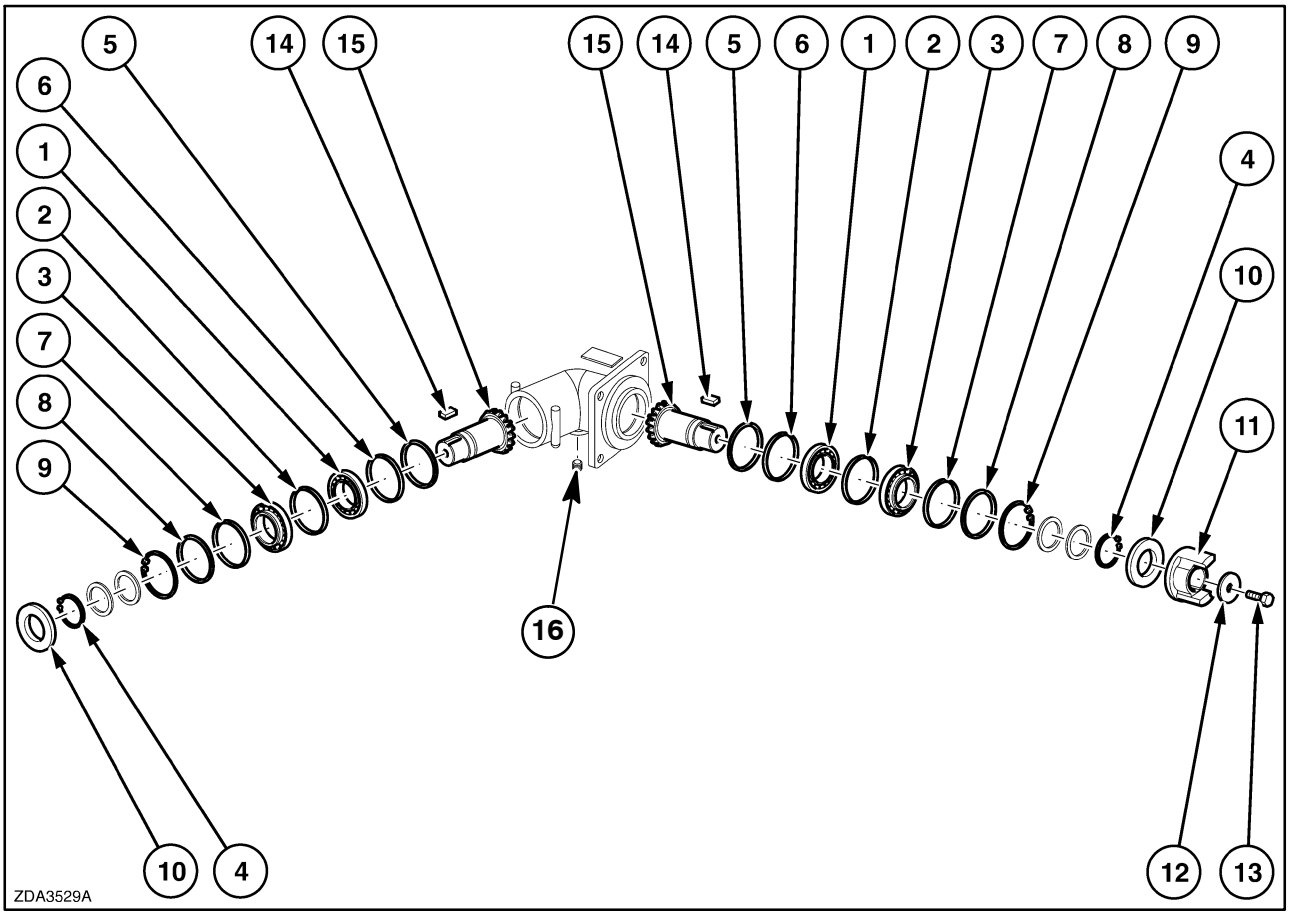
BUBBLE-UP GEARBOX

Bubble-up Gearbox – Exploded View



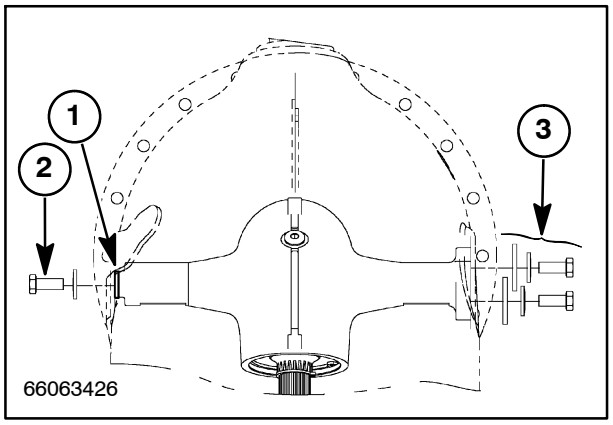
110

1. Bearing, Tapered Roller Type
2. Spacer
3. Bearing, Tapered Roller Type
4. Retaining ring
5. Shim
6. Spacer
7. Spacer
8. Shim
9. Retaining ring
10. Oil seal
11. Hub
12. Washer
13. Bolt, M12 x 25
14. Key
15. Shaft
16. Plug, Oil

Removal

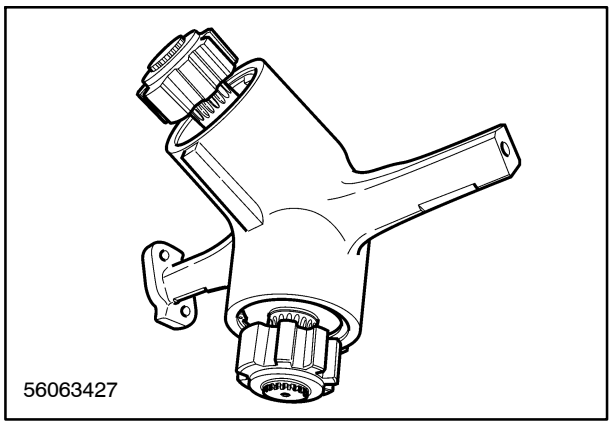
To remove the unloading gearbox, proceed as follows:

1. First remove the unloading tube and the vertical unloading auger and the unloading tube. Refer to “Unloading Auger – Vertical Auger – Removal” and “Unloading Auger – Unloading Tube and Auger – Removal” of this chapter.
2. Remove the single M8 x 20 mm cap screw and spring washer, 2, and capture the large washer, 1, that is between the gearbox arm and the inside of the elbow tube.
3. Remove two M8 x 20 mm cap screws, spring washers, and large washers, 3.



50

4. Remove the unloading tube gearbox.



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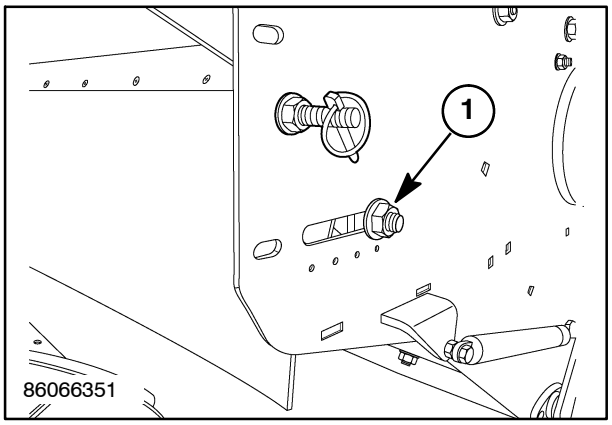
COUNTER KNIVES

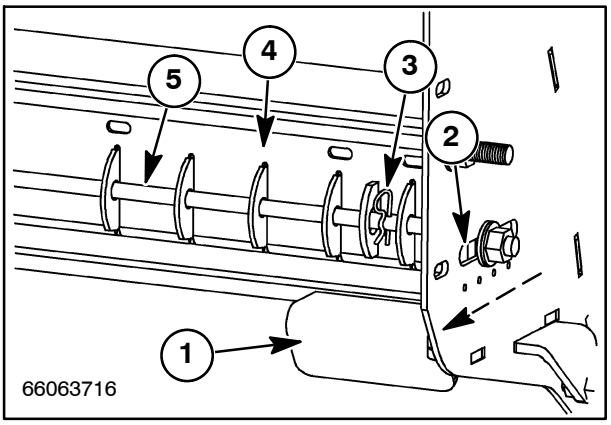
Removal

1. Loosen the M12 (prevailing torque) locknut, 1, on the left and right-hand sides of the combine, securing the counter knife bar to the chopper body.



14

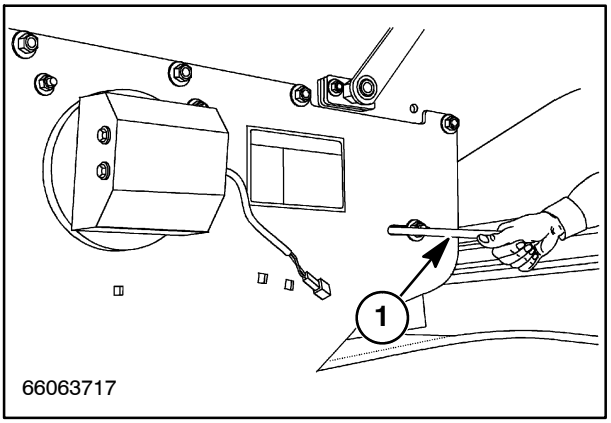
2. Use the hand grips, 1, on either side of the knife bar, 4, to slide the counter knife bar to the front of the slot, 2, as shown.
3. Remove the hairpin clip, 4, from the counter knife retaining rod, 5.



15

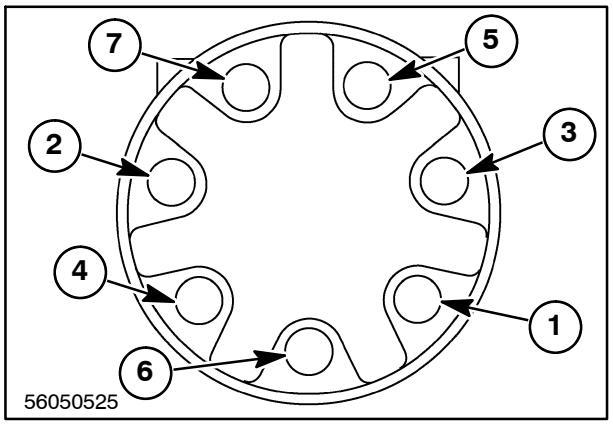
4. Pull the counter knife retaining rod, 1, out, to release the counter knives.

NOTE: *Counter knives must be removed one at a time as the retaining rod is pulled out.*



16

30. Pre-tighten screws to 7.4 N·m [40 in-lb]. Torque screws 27 – 28 N·m [235 – 250 in-ft] in sequence, as shown.



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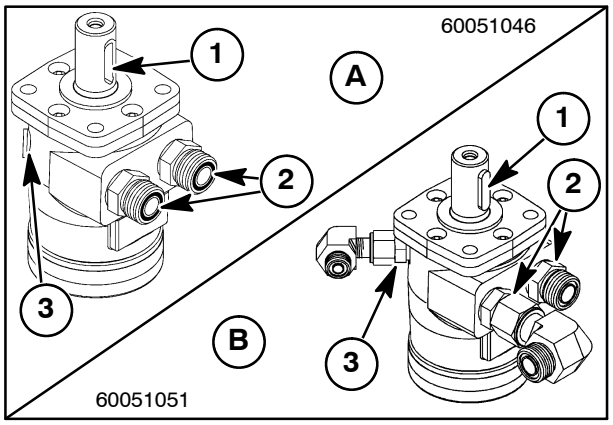
Install the marked fittings, 2, in their respective motor housing work ports. Torque to 136 – 149 N·m (100 – 110 ft-lb).

Install the plug or drain fitting, 3. Torque to 48 – 53 N·m (35 – 39 ft-lb).

Do not remove fitting caps until motor is installed and hoses are ready to connect.

Insert woodruff key, 1, for installation.



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