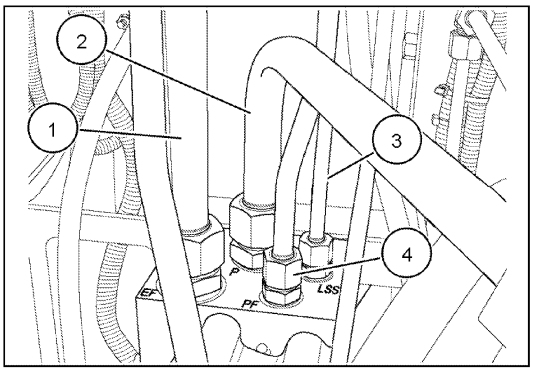
20.8R42 LI 155 R1	20.8R42 LI 155 R1W
20.8R42 LI 155 R2	620/70R432 160A8 R1W
REAR STEER TIRES	
480/70R30 LI152 R1W	540/65R30 LI150 R1W
600/65R28 LI147 R1W	28L-26 10PR R1
28L-26 10PR R2	

WHEELS AND TIRES

FRONT DRIVE TIRES	
Single Drive Tires	
800/65-R32 LI 172 R1W	900/60R32 LI 176 R1
900/60R32 LI 176 R1W	710/70R38 LI 166 R1W
1050/50R32 LI 178 HF3	
REAR STEER TIRES	
480/70R30 LI152 R1W	540/65R30 LI150 R1W
600/65R28 LI147 R1W	460/70R24 LI 150 R4

LIGHTS

Halogen Stadium Roof Lights	6
HID Stadium Roof Lights (Opt.)	2
After Cut Lights	2
Left and Right Side Lights	Standard
Grain Tank, Unloader, and Rear Work-lights	Standard
Combination Amber Flashing Warning Lights	Standard
Tail and Brake Lights, Turn Signal Lights	Standard
Portable Service Light	Standard
Cleaning Sieve Light	Standard
Under Panel Service Lights	Optional
Distance HID Light	Optional
Beacons	Standard



83061451 5

Top View of Main Stack Valve

1. Supply Line to Feeder Stack Valve
2. Supply Line from PFC Pump
3. Sense Line from Steering Motor
4. Supply Line to Steering Motor

Contents

DISTRIBUTION SYSTEMS - A

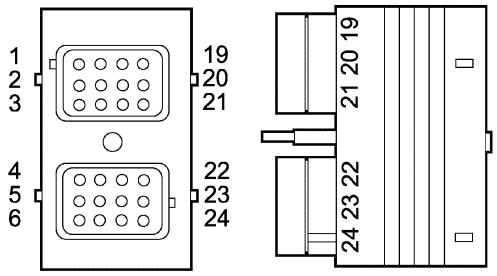
SECONDARY HYDRAULIC POWER SYSTEM - 12.A

Alternator - Torque

AXIAL-FLOW 7010 [HAJ000000 - HAJ201245], AXIAL-FLOW 8010 [HAJ000000 - HAJ201245]

Screw securing alternator bracket to crankcase

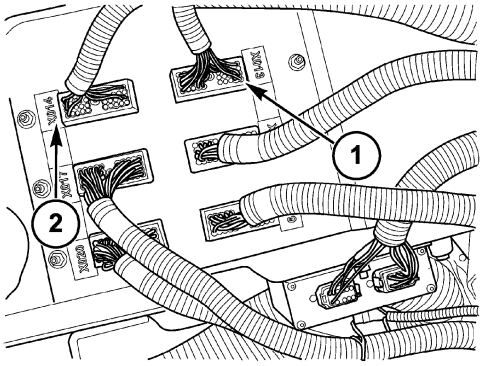
Bolt Length	Bolt Spec	Torque	
L = 35mm	M10x1.5	**27 - 33 Nm**	**20 - 24 lb ft**
L = 60mm	M10x1.5	**40 - 48 Nm**	**29 - 35 lb ft**
L = 30mm	M8x1.25	**22 - 27 Nm**	**16 - 20 lb ft**



DE_DRC16-24S 5

Cavity	Circuit ID	Description
1	049 (RD)	Keep alive power from fuse F-39
2	open	
3	open	
4	101 (OR)	Power from key switch S-02
5	open	
6	787 (WH)	Output to upper / lower sieve relay K-18
7	1061 (YE)	Signal from separator engage S-30
8	217 (BK)	To cab ground 3
9	open	
10	open	
11	open	
12	open	
13	134 (GN)	CAN low
14	133 (YE)	CAN high
15	open	
16	open	
17	1212 (YE)	Signal from separator engage S-30
18	open	
19	open	
20	open	
21	open	
22	open	
23	open	
24	open	

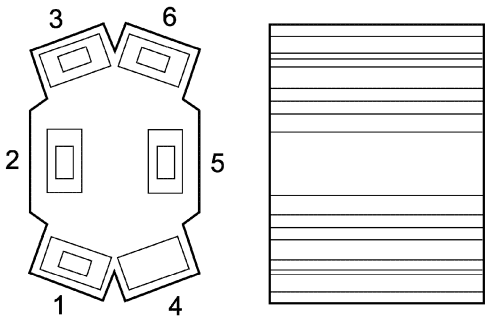
Connector X013 (WHITE) - Expansion Harness to CCM3



10033631C5 6

1. Connector X013 (WHITE)
2. Connector **X014** (DARK GREY)

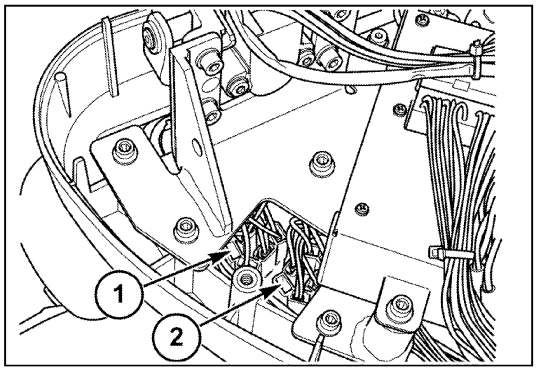
2. Connector **X056** to Feeder Engage switch S-31



PAC_8911352 4

Cavity	Circuit ID	Description
1	1122 (WH)	Signal to RHM X029 pin 8 (deslug)
2	110 (OR), 300 (OR)	Power from fuse F-48 (110-OR), supply to neutral switch S-22 (300-OR)
3	302 (YE), 1212 (YE)	Signal to feeder engage S-31 (302-YE), signal to CCM3 J1-17 (1212-YE)
4	plug	
5	110 (OR), 1180 (OR)	Power from fuse F-48 (1180-OR), jumper to pin 2 (110-OR)
6	147 (YE)	Signal to CCM2 J1-7 and CCM3 J1-7

Connector X056 - Right Console Harness to Feeder Engage S-31



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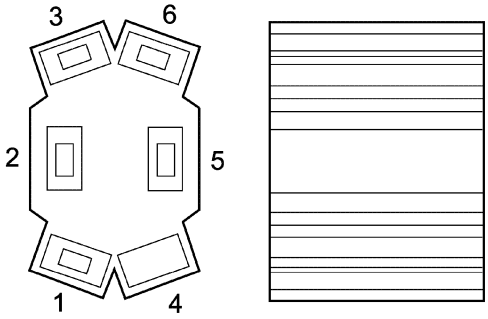
Inside right hand console

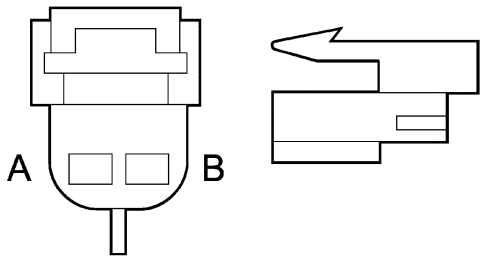
1. Connector **X055** to Separator Engage switch S-30
2. Connector X056 to Feeder Engage switch S-31



PAC_8911352 6

Cavity	Circuit ID	Description
2	956 (GY)	Mirror adjust switch S-27 to RH mirror motors M-19 & M-20
3	932 (OR)	Mirror heat switch S-19 to RH mirror heat R-10
4	955 (WH)	Switch bypass fuses F-64 OR mirror select switch S-57 to RH mirror up / down M-19
5	072 (PU)	Side work light relays K-34 & K-35 to RH side work light E-26
6	670 (BK)	RH side work light E-26 to cab roof ground 4

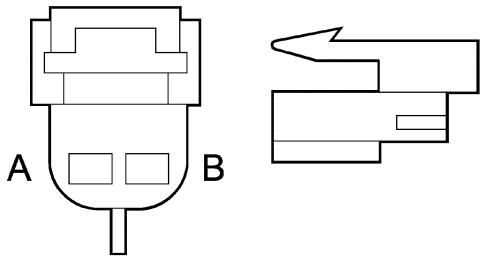
Connector X122 - Cab Roof Harness to Rear Right Speaker H-06



PAC_12052832 35

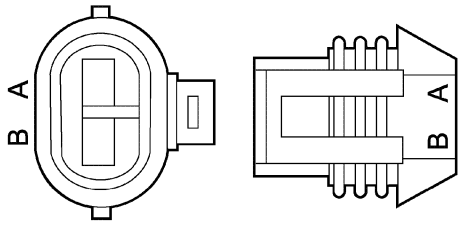
Cavity	Circuit ID	Description
A	979 (BL)	Ground to radio A-04 X315 pin 2
B	974 (WH)	Signal from radio A-04 X315 pin 1

Connector X123 - Cab Roof Harness to Rear Left Speaker H-04



PAC_12052832 36

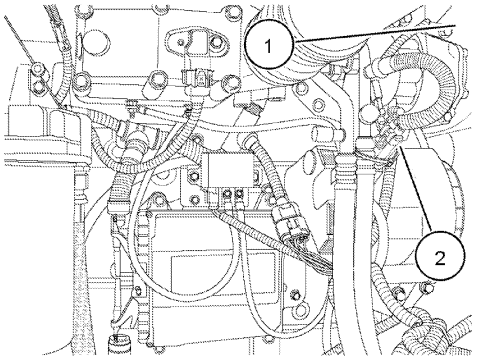
Cavity	Circuit ID	Description
A	982 (BL)	Ground to radio A-04 X315 pin 8
B	975 (WH)	Signal from radio A-04 X315 pin 7



AMP_282080-1 6

Cavity	Circuit ID	Description
1	818 (WH)	Power from ECU power relay K-14
2	822 (BK)	Ground to ECU A-01 X193 pin 10

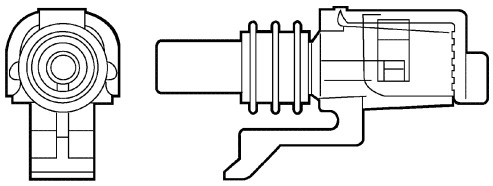
Connector X215 - Engine Harness to A/C Clutch L-07



83054617 7

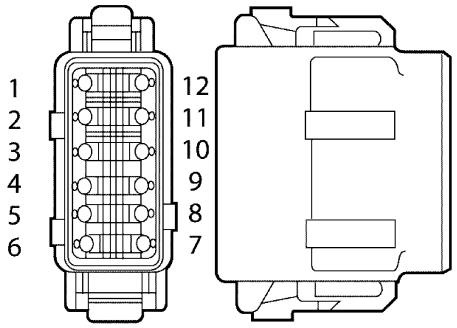
Rear of Engine

1. A/C Clutch L-07
2. Connector X215



PAC_12015791 8

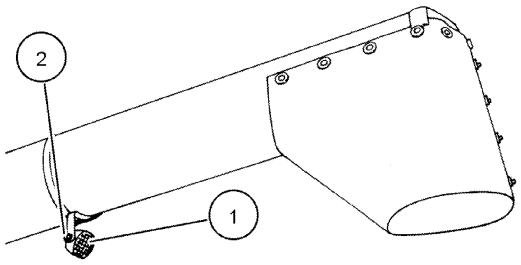
Cavity	Circuit ID	Description
A	178 (WH)	Power from A/C clutch relay K-10



D_DTM06-12S_P_3 5

Cavity	Circuit ID	Description
1	1241 (YE)	CAN 2 High, also DGPS Termination Resistor R-27
2	1219 (RD)	To Navigation Control Module A-24 connector X496 pin 2
3	1220 (BL)	From Navigation Control Module A-24 connector X496 pin 31
4	1234 (YE)	To Navigation Control Module A-24 connector X496 pin 21
5	1246 (YE)	To Navigation Control Module A-24 connector X496 pin 12
6		
7		
8		
9		
10	1238 (OR)	Power from fuse F-48 (K-26 Switched), also to Navigation Control Module A-24 connector X496 pin 11
11	1239 (BK)	Frame ground 3, also to Navigation Control Module A-24 connector X496 pin 1
12	1240 (GN)	CAN 2 Low, also DGPS Termination Resistor R-27

Connector X322 - Unload Tube Light Harness to Unload Tube Light E-29



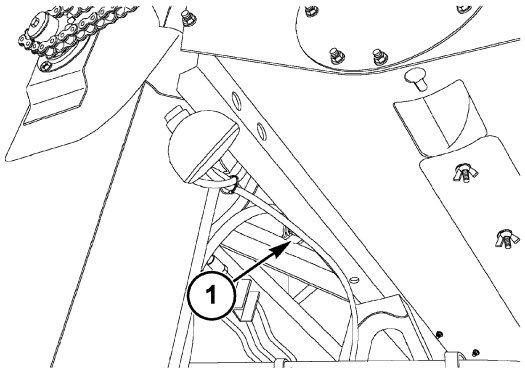
20021827 6

End of unload tube

1. Unload Tube Light E-29
2. Connector X322

Cavity	Circuit ID	Description
6	698 (WH/YE)	Yield sensor B-57 X223 pin 2 signal (+) to YMIU module A-12 X412 pin 8
7	563 (WH)	Yield sensor B-57 X223 pin 3 signal (-) to YMIU module A-12 X412 pin 7
8	1235 (WH/BK)	Yield sensor X223 pin 4 ground to YMIU module A-12 X412 pin 9

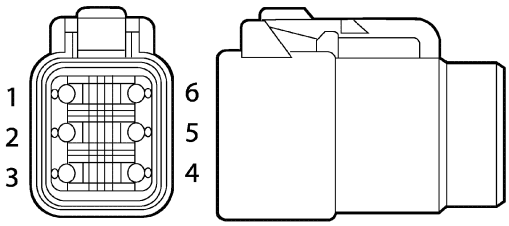
Connector X443 - Expansion Harness to Precision Farming Harness



40031054A5 17

Right side of main frame, behind grain tank

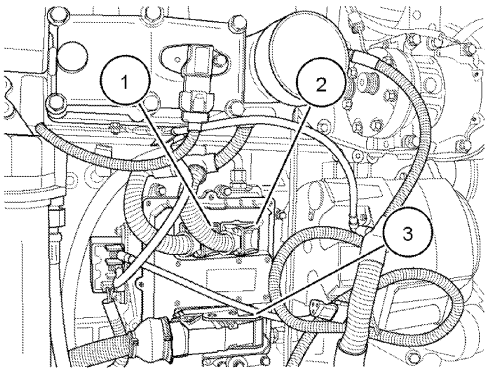
1. Connectors **X442** and X443



DEU_DTM06-6S 18

Cavity	Circuit ID	Description
1	699 (OR)	YMIU module A-12 X412 pin 1 power to moisture sensor B-12 X221 pin 1
2	565 (BK)	Moisture sensor B-12 X221 pin 2 ground to YMIU module A-12 X412 pin 12
3	593 (YE)	Moisture sensor B-12 (+) to YMIU module A-12 X412 pin 2
4	594 (YE)	Moisture sensor B-12 (-) to YMIU module A-12 X412 pin 3
5	595 (YE)	Moisture sensor B-12 temp to YMIU module A-12 X412 pin 4
6	Drain wire (BK)	Yield sensor B-57 harness shield wire to battery clean ground 6

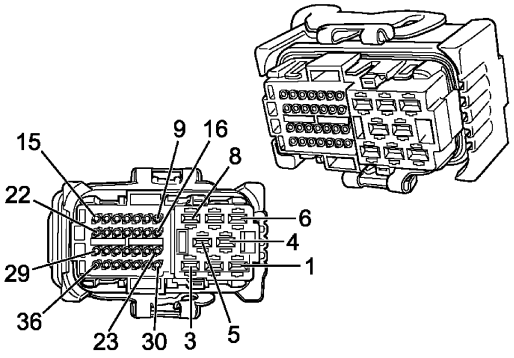
Connector X516 - Iveco Harness; ECU to Sensors



83063848 21

ECU, Rear of Engine

1. Connector X516
2. Connector X515
3. Connector X193

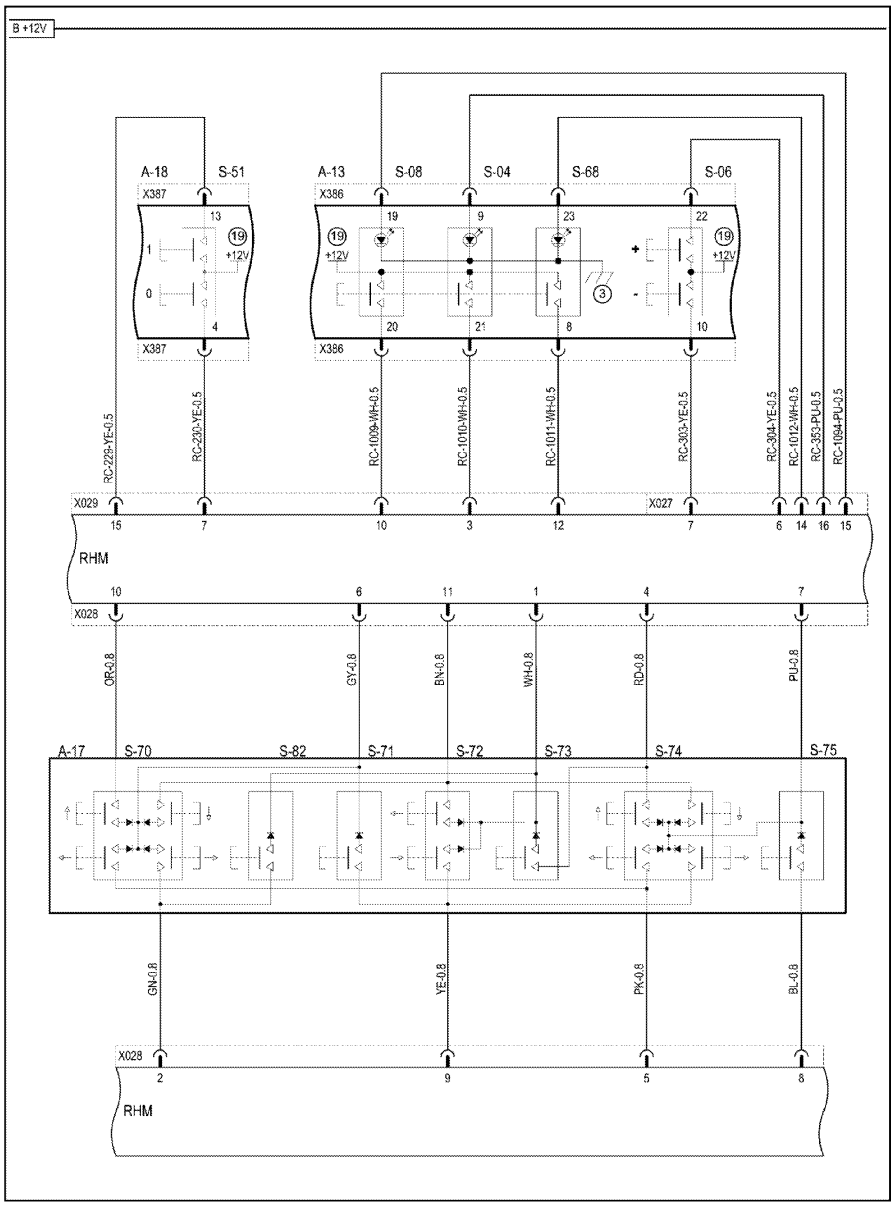


BSCH_1928404202 22

Axial-Flow 7010

Cavity	Circuit ID	Description
1 to 8	open	Not used
9	BK	Engine Camshaft RPM B-07
10	WH	Engine Camshaft RPM B-07
11	open	Not used
12	YE	Signal from Common Rail Pressure sensor
13	PU	Source / Reference for Common Rail Pressure sensor
14	OR	Source / Reference for Common Rail Pressure sensor
15	PK	Coolant temperature sensor B-44
16 to 17	open	Not used
18	OR/BK	Fuel temperature sensor B-36
19	BK	Engine Flywheel RPM B-05
20 to 22	open	Not used
23	WH	Engine Flywheel RPM B-05
24	WH	Oil temperature/pressure sensor B-75 (common)
25	WH	Air temperature/Boost pressure sensor B-41 (common)
26	YE	Coolant temperature sensor B-44 (common)
27	GN	Oil temperature/pressure sensor B-75 (pressure signal)
28	OR	Oil temperature/pressure sensor B-75 (temperature signal)
29 to 31	open	Not used
32	RD	Oil temperature/pressure sensor B-75 (+ **5 volts**)
33	RD	Air temperature/Boost pressure sensor B-41(+ **5 volts**)

Wiring harness - Electrical schematic frame 11

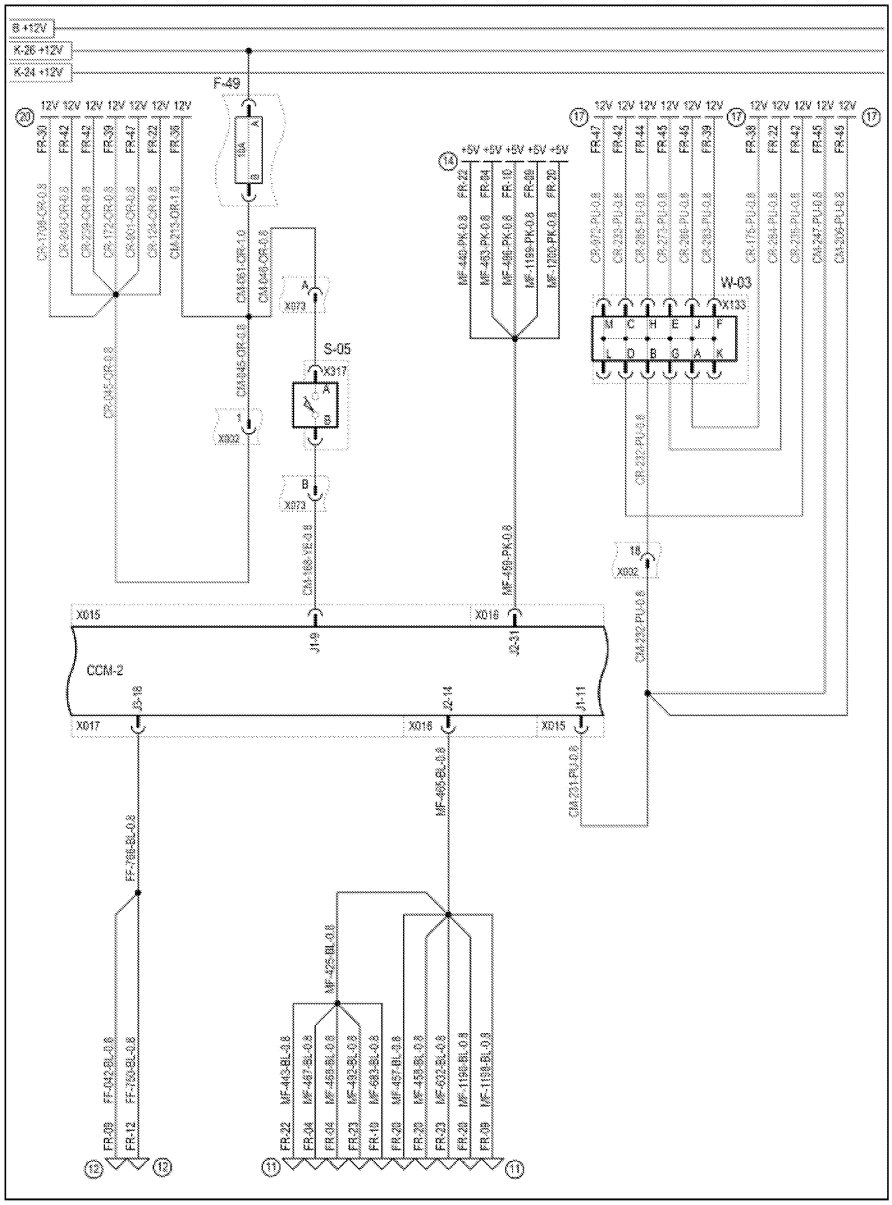


AF_MY07_FR11 1

HEADER

AXIAL-FLOW® 7010 [HAJ000000 - HAJ201245], AXIAL-FLOW® 8010 [HAJ000000 - HAJ201245]

A-13 Front Switch Panel	**A-18** Rear Switch Panel	**A-17** Multifunction Handle
S-04 Header Height Mode 1	**S-06** Header Height Control Fine Adjust	**S-08** Reel Speed Mode
S-51 Vertical Knives	**S-68** Header Height Mode 2	**S-70** Header Position
S-71 Header Resume	**S-72** Unload Swing	**S-73** Unload Engage
S-74 Reel Position	**S-75** Emergency Stop	**S-82** Shift Button

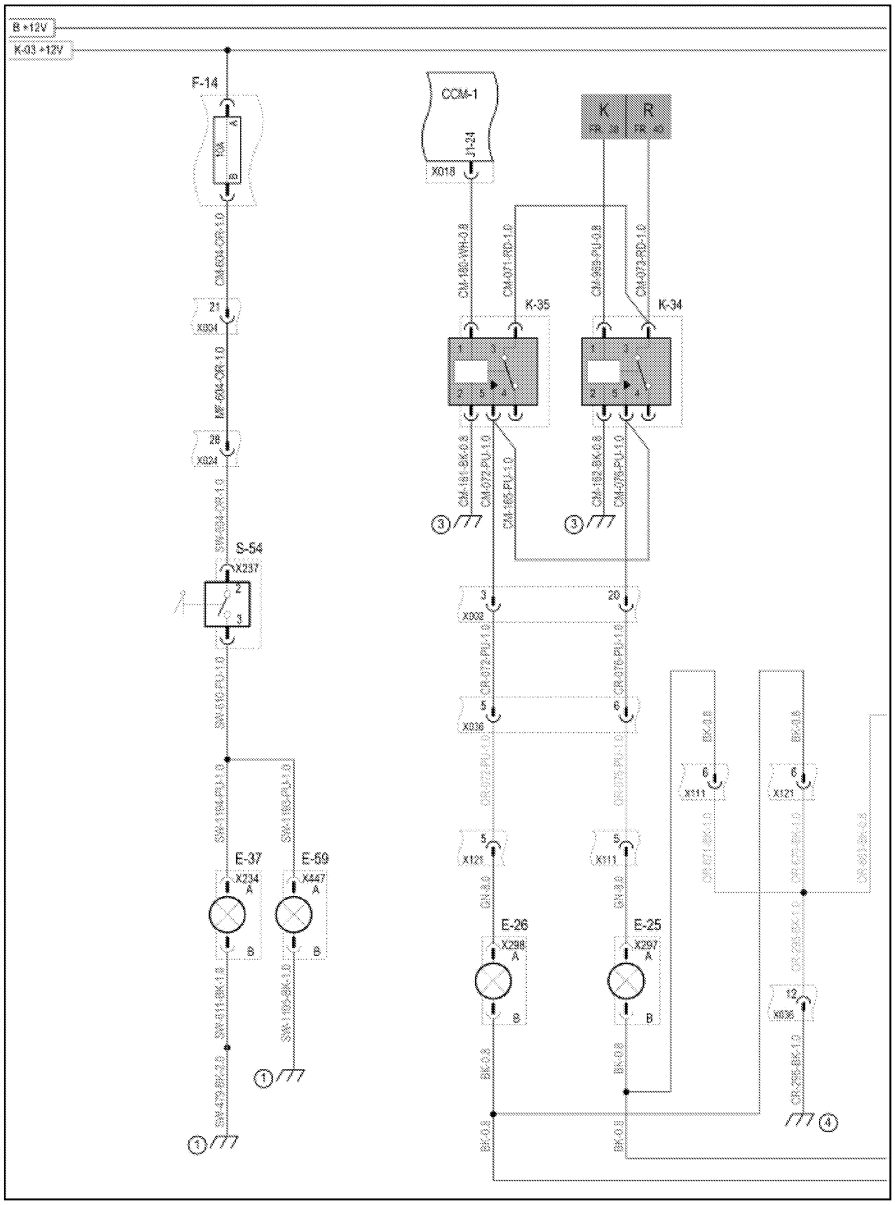


875752540FR27 2

DISTRIBUTION

AXIAL-FLOW® 7010 [HAJ202019 -], AXIAL-FLOW® 8010 [HAJ202003 -], AXIAL-FLOW® 9010

F-49 Cab Fuse	**S-05** Seat Switch	**W-03** Splice Block C



875752540FR43 2

LIGHTING

AXIAL-FLOW® 7010 [HAJ202019 -], AXIAL-FLOW® 8010 [HAJ202003 -], AXIAL-FLOW® 9010

E-25 Left Hand Side Work Light	**E-26** Right Hand Side Work Light	**E-37** Sieve Light
E-59 Sieve Light Rear	**F-14** Service Lights Fuse	**K-34** Timed Side Work Light Relay
K-35 Side Work Light Relay	**S-54** Sieve Light Switch	

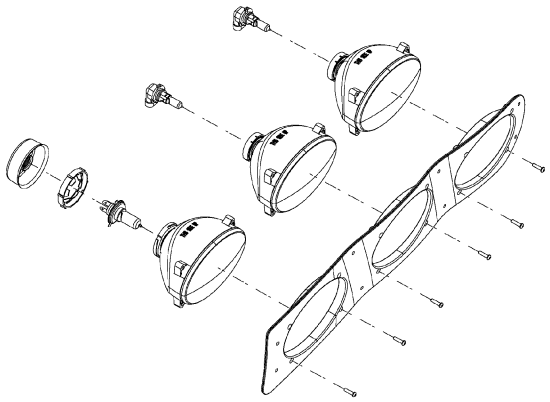
Fuses			
Code	**Name**	**Frame**	**System**
F-52	Dome / Brake Lts Fuse	**Wiring harness - Electrical schematic frame 38 (A.30.A)**	Lighting
F-53	Beacon Lts Fuse	**Wiring harness - Electrical schematic frame 39 (A.30.A)**	Lighting
F-54	Lower Work Lts Fuse	**Wiring harness - Electrical schematic frame 40 (A.30.A)**	Lighting
F-55	Rear Work Lts Fuse	**Wiring harness - Electrical schematic frame 42 (A.30.A)**	Lighting
F-56	Hazard Lights Fuse	**Wiring harness - Electrical schematic frame 33 (A.30.A)**	Lighting
F-64	Switch Bypass Fuses	**Wiring harness - Electrical schematic frame 44 (A.30.A)**	Lighting

Generators			
Code	**Name**	**Frame**	**System**
G-01	Alternator	**Wiring harness - Electrical schematic frame 02 (A.30.A)**	Starting
G-02	Front Battery	**Wiring harness - Electrical schematic frame 01 (A.30.A)**	Starting
G-03	Rear Battery	**Wiring harness - Electrical schematic frame 01 (A.30.A)**	Starting

Audio				
Code	**Name**	**Connector**	**Frame**	**System**
H-01	Audio Alarm	**X058**	**Wiring harness - Electrical schematic frame 25 (A.30.A)**	Distribution
H-02	Horn	**X172**	**Wiring harness - Electrical schematic frame 36 (A.30.A)**	Lighting
H-04	Rear Left Speaker	**X123**	**Wiring harness - Electrical schematic frame 46 (A.30.A)**	Accessory
H-05	Front Left Speaker	**X136**	**Wiring harness - Electrical schematic frame 46 (A.30.A)**	Accessory
H-06	Rear Right Speaker	**X122**	**Wiring harness - Electrical schematic frame 46 (A.30.A)**	Accessory
H-07	Front Right Speaker	**X139**	**Wiring harness - Electrical schematic frame 46 (A.30.A)**	Accessory
H-08	Back Up Alarm	**X248**	**Wiring harness - Electrical schematic frame 08 (A.30.A)**	Drives

Outlets				
Code	**Name**	**Connector**	**Frame**	**System**
J-01	RH Ft Service Socket	**X166**	**Wiring harness - Electrical schematic frame 39 (A.30.A)**	Lighting
J-03	RH Side Service Socket	**X252**	**Wiring harness - Electrical schematic frame 39 (A.30.A)**	Lighting
J-04	LH Side Service Socket	**X161**	**Wiring harness - Electrical schematic frame 39 (A.30.A)**	Lighting
J-05	Engine Service Socket	**X194**	**Wiring harness - Electrical schematic frame 39 (A.30.A)**	Lighting
J-06	Accessory Socket	**X067**	**Wiring harness - Electrical schematic frame 45 (A.30.A)**	Accessory
J-07	Transceiver Power Outlet	**X141**	**Wiring harness - Electrical schematic frame 46 (A.30.A)**	Accessory
J-08	Accessory Outlet	**X076** **X075** (Backlighting)	**Wiring harness - Electrical schematic frame 45 (A.30.A)**	Accessory

4. With the headlights installed into the bezel, install the bulbs into the headlights.



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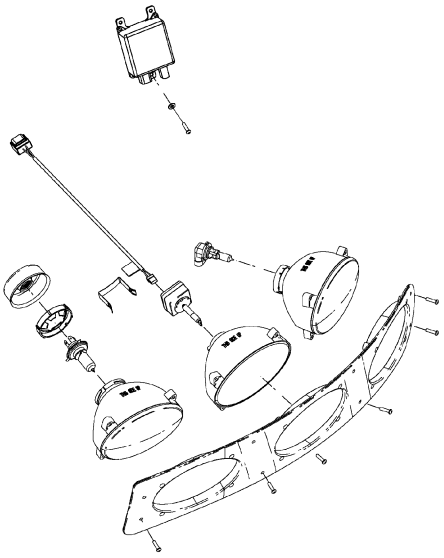
5. If you are using an HID light, your installation will be slightly different.



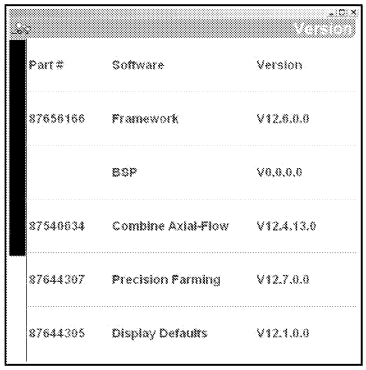
50044213 5

N°	Test Point	Expected Result	Other Result (Possible Cause)
7	**Condition** Disconnect the RH Lower Work Light E-24. **Check** Measure the resistance on circuit 655 (BK) between RH Lower Work Light E-24 connector X168 (pin B) and ground.	**Result** Less than **1 ohms** **Action** If good reading, replace the RH Lower Work Light bulb. Go to test **8**	**Action** Open in circuit 655 (BK) between RH Lower Work Light E-24 connector X168 (pin B) and ground.
8	**Condition** Place Key Switch S-02 in ON position. Close Work light Switch S-43. **Check** Measure for **12 volts** at Header Work Lights Relay K-22 (pin 5).	**Result** **12 volts** **Action** If good reading, Go to test **9**	**Action** Perform **Front work light Relay - Testing (A.40.A)** Steps 5 to 8.
9	**Check** Measure for **12 volts** at LH Cab Mid Work Light E-19 connector X114 (pin A).	**Result** **12 volts** **Action** If good reading, Go to test **10**	**Action** Open circuit 63 (PU) or 252 (PU) between Header Work Lights Relay K-22 (pin 5) and LH Cab Mid Work Light E-19 connector X114 (pin A).
10	**Condition** Disconnect the LH Cab Mid Work Light E-19. **Check** Measure the resistance on circuit 260 (BK) between LH Cab Mid Work Light E-19 connector X114 (pin B) and ground.	**Result** Less than **1 ohms** **Action** If good reading, replace the LH Cab Mid Work Light bulb. Go to test **11**	**Action** Open circuit 260 (BK) between LH Cab Mid Work Light E-19 connector X114 (pin B) and ground.
11	**Check** Measure for **12 volts** at RH Cab Mid Work Light E-20 connector X118 (pin A).	**Result** **12 volts** **Action** If good reading, Go to test **12**	**Action** Open circuit 63 (PU) or 253 (PU) between Header Work Lights Relay K-22 (pin 5) and RH Cab Mid Work Light E-20 connector X118 (pin A).
12	**Condition** Disconnect the RH Cab Mid Work Light E-20. **Check** Measure the resistance on circuit 263 (BK) between RH Cab Mid Work Light E-20 connector X118 (pin B) and ground.	**Result** Less than **1 ohms** **Action** If good reading, replace the RH Cab Mid Work Light bulb. Go to test **13**	**Action** Open circuit 263 (BK) between RH Cab Mid Work Light E-20 connector X118 (pin B) and ground.
13	**Condition** Place Key Switch S-02 in ON position. Close Work Light Switch S-43. **Check** Measure for **12 volts** at Outer Road / Work Lights Relay K-01 (pin 87).	**Result** **12 volts** **Action** If good reading, Go to test **14**	**Action** Perform **Front work light Relay - Testing (A.40.A)** Steps 9 to 12.
14	**Check** Measure for **12 volts** at Fuse F-6, circuit 23 (OR).	**Result** **12 volts** **Action** If good reading, Go to test **15**	**Action** Open circuit 23 (OR) between Fuse F-6 and Outer Road / Work Lights Relay K-01 (pin 87).
15	**Check** Measure for **12 volts** at LH Cab Outer Work Light E-15 connector X112 (pin A).	**Result** **12 volts** **Action** If good reading, Go to test **16**	**Action** Fuse F-6 failed, or Open circuit 58 (PU) or 251 (PU) between Fuse F-6 and LH Cab Outer Work Light E-15 connector X112 (pin A).

Main > Diagnostics > CAN, accesses the "CAN Status" screen. This screen is used to determine the status of the combine's electronic devices that access the CAN Network. The status should be "online" if the device is connected and operating properly. Again, the scroll bar is provided to access the devices not currently displayed. The SR# (serial number) is unique to each device and the Bootcode, Hardware and Software Versions may be needed for determining if firmware / software updates are required or appropriate.

VERSION TAB / SELECTION

Version Screen



20072424 44

Main > Diagnostics > Version, accesses the "Version" screen. This screen is used to determine which softwares and versions are currently available in the Display Monitor. Again, the scroll bar is provided to access information not currently being displayed. This information may be necessary for determining if software updates are required or appropriate.

THE "TOOLBOX" ICON

SERVICE TAB / SELECTION

Service Setup Screen

To select the Service Setup screen, Main > Toolbox > Service (from the "Main" screen, select the "Toolbox" ICON then the "Service" tab / selection). This screen displays the total engine hours and threshing hours recorded for the combine, and also shows the date and time set in the combine electrical system. This screen is used to configure four service intervals with selectable service ranges from 20 to 600 hours"

Range 1 = 20, 30, 40, or 50

Range 2 = 50, 60, 80, or 100

Range 3 = 125, 150, 175, or 200

Range 4 = 300, 400, 500, or 600

6. Disconnect the unload tube cradled sensor connector **X240**. Use a multimeter to check for continuity between the harness end of connector **X240** 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, continue with Step **7**.

7. Disconnect the straw hood rear (SH) harness from the straw hood front (SW) harness at connector **X071**. Use a multimeter to check for continuity between the straw hood front (SW) harness end of connector **X071** pin 12 and chassis ground.

   A. If there is continuity, the open circuit is in the straw hood rear (SH) harness between connector **X071** and the connector **X240** pin 1, wire 482 blue. Locate the open and repair.

   B. If there is no continuity, continue with Step **8**.

8. Disconnect the straw hood front (SW) harness from the main frame (MF) harness at connector **X024**. Use a multimeter to check for continuity between the main frame (MF) harness end of connector **X024** pin 11 and chassis ground.

   A. If there is continuity, the open circuit is in the straw hood front (SW) harness between connector **X071** and the connector **X024** wire 482 blue or 461 blue. Locate the open and repair.

   B. If there is no continuity, the open circuit is in the main frame (MF) harness between connector **X024** and connector **X019** pin J2-14 wire 461 blue, 401 blue or 460 blue. Locate the open and repair.

9. Turn the key to ON position. Observing the LED on the harness end side of the sensor, place ferrous metal in front of sensor then remove.

   A. The sensor is functioning if LED changes state. Adjust the sensor clearance to **3 mm** (1/8"). Erase the fault code and continue operation.

Wiring harness - Electrical schematic frame 21 (A.30.A.88 - C.20.E.21)
Wiring harness - Electrical schematic frame 26 (A.30.A.88 - C.20.E.26)

E0019-03-Right Header Height / Tilt Sensor

AXIAL-FLOW 7010 [HAJ000000 - HAJ201245], AXIAL-FLOW 8010 [HAJ000000 - HAJ201245]

Control Module : CCM1

Cause:
The right height/tilt sensor (R-13) 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 (12V).
2. Sensor ground wiring is open.
3. Module internal failure (internal regulator failure).

Solution:

1. Using the Display Monitor diagnostics capability to view "Parameter" status, reference **Monitor - Detailed view (A.50.A)**, if needed, check the voltage range. Manually raise and lower the header against the ground several times while monitoring the voltage; the voltage should stay within range, and should change smoothly with header sense plate movement.

   The voltage range for a properly adjusted sensor is **0.2 - 4.7 volts**.

   A. If the voltage reading is high (> **4.7 volts**) out of range, 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 **14**.

   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 X306, and use a multimeter to test for continuity to ground on connector X306 pin 1. There should be low resistance (< **1 ohms**) to ground.

   A. If continuity is found (< **1 ohms**), continue with Step **7**.

   B. If no continuity is found, or there is high resistance (> **1 ohms**) to ground, continue with Step **3**.
3. Key off. Disconnect connector **X032**, and use a multimeter to test for continuity to ground on connector **X032** pin 6. There should be low resistance (< **1 ohms**) to ground.

   A. If continuity is found (< **1 ohms**), there is an open circuit in the header (HH) harness between connector **X032** and connector X306 wire 847 blue. Locate the open and repair.

   B. If no continuity is found, or there is high resistance (> **1 ohms**) to ground, continue with Step **4**.
4. Key off. Disconnect connector **X007**. Use a multimeter to test for continuity between connector **X007** pin 12 and chassis ground. There should be low resistance (< **1 ohms**) to ground.

   A. If no continuity is found, or there is high resistance (> **1 ohms**) to ground, continue with Step **5**.

   B. If continuity is found, there is an open circuit in feeder (FE) harness between connector **X032** pin 6 and connector **X007** pin 12 wire 847 blue or 749 blue. Locate the open and repair.
5. Key off. Carefully remove connector **X020** from the bottom of CCM1. Use a multimeter to test for continuity between connector **X007** pin 12 and connector **X020** pin J3-18.

   A. If continuity is found, continue with Step **6**.

   B. If no continuity is found, there is an open circuit in front frame (FF) harness between connector **X007** pin 12 and connector **X020** pin J3-18 wire 749 blue or 501 blue. Locate the open and repair.

E0029-03-Header Tilt Angle Sensor

AXIAL-FLOW 7010 [HAJ000000 - HAJ201245], AXIAL-FLOW 8010 [HAJ000000 - HAJ201245]

Control Module : CCM1

Cause:
The lateral float sensor (R-02) 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 (**12 V**).
2. Sensor ground wiring is open.
3. Module internal failure (internal regulator failure).

Solution:

1. Using the Display Monitor diagnostics capability to view "Parameter" status, reference **Monitor - Detailed view (A.50.A)**, if needed, check the voltage range. Tilt the feeder cradle side to side several times while monitoring the voltage; the voltage should stay within range, and should change smoothly with feeder cradle movement.

   The proper voltage range for a properly adjusted sensor is **0.2 - 4.7 volts**.

   A. If the voltage reading is high (> **4.7 volts**) out of range, 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 **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 **X081**, and use a multimeter to test for continuity to ground on connector **X081** pin 3. There should be low resistance (< **1 ohms**) to ground.

   A. If continuity is found (< **1 ohms**), continue with Step **6**.

   B. If no continuity is found, or there is high resistance (> **1 ohms**) to ground, continue with Step **3**.

3. Key off. Disconnect connector **X007**. Use a multimeter to test for continuity between connector **X007** pin 12 and chassis ground. There should be low resistance (< **1 ohms**) to ground.

   A. If no continuity is found, or there is high resistance (> **1 ohms**) to ground, continue with Step **4**.

   B. If continuity is found, there is an open circuit in feeder (FE) harness between connector **X081** pin 3 and connector **X007** pin 12 wire 745 blue or 749 blue. Locate the open and repair.

4. Key off. Carefully remove connector **X020** from the bottom of CCM1. Use a multimeter to test for continuity between connector **X007** pin 12 and connector **X020** pin J3-18.

   A. If continuity is found, continue with Step **5**.

   B. If no continuity is found, there is an open circuit in front frame (FF) harness between connector **X007** pin 12 and connector **X020** pin J3-18 wire 749 blue or 501 blue. Locate the open and repair.

5. Key off. Use a multimeter to test for continuity between connector **X020** pin J3-18 on CCM1 and chassis ground. There should be low resistance (< **1 ohms**) to ground.

   A. If no continuity is found, or there is high resistance (> **1 ohms**) to ground, the CCM1 module is not supplying a ground path for the sensor due to an internal failure. Replace the CCM1 module.

   B. If continuity is found, the ground path for the sensor tests okay. Reconnect all connectors and retest for continuity to ground at Step **2**.

- wire 1286 pink, connector **X399** pin B to MF harness splice
- wire 453 pink, MF harness splice to connector **X019** pin J2-31.

Locate the short and repair.

7. Visually inspect harness and connectors for damage, bent or dislocated pins, corroded terminals or broken wires.

   A. If no damage is found erase fault code and continue operation.

Wiring harness - Electrical schematic frame 10 (A.30.A.88 - C.20.E.10)
Wiring harness - Electrical schematic frame 13 (A.30.A.88 - C.20.E.13)
Wiring harness - Electrical schematic frame 16 (A.30.A.88 - C.20.E.16)
Wiring harness - Electrical schematic frame 20 (A.30.A.88 - C.20.E.20)
Wiring harness - Electrical schematic frame 26 (A.30.A.88 - C.20.E.26)

5. Visually inspect the harness and connectors for damage, bent or dislocated pins, corroded terminals or broken wires.

   A. If no damage is found, erase the error code and continue operation.

Wiring harness - Electrical schematic frame 13 (A.30.A.88 - C.20.E.13)

E0065-11-Ground Drive Backup Alarm

AXIAL-FLOW 7010 [HAJ000000 - HAJ201245], AXIAL-FLOW 8010 [HAJ000000 - HAJ201245]

Control Module : CCM1

Cause:
The backup alarm (H-08) circuit open or shorted to ground.

Possible failure modes:

1. Circuit connection/wiring damaged between CCM1 and backup alarm.
2. Controller internal failure (internal regulator failure).

Solution:

1. Turn the key switch to the OFF position and disconnect the backup alarm connector **X248**. Use a multimeter to check the resistance of the backup alarm coil. The proper resistance range for the coil is **1.0 - 8.0 ohms**.

   A. If out of specification, replace coil.

   B. If the coil is within specification, continue with Step **2**.
2. Disconnect connector **X248**. Use a multimeter to check for continuity between connector **X248** pin 1 (white wire) and chassis ground. Flex the harness while making this check.

   A. If no continuity to ground is found, continue with Step **3**.

   B. If there is continuity to ground, continue with Step **6**.
3. Disconnect connector **X248**. Turn the key switch to the ON position. Using the Display Monitor, reference **Monitor - Detailed view (A.50.A)**, if needed, manually power the backup alarm. Use a multimeter to check for **12 volts** between connector **X248** pin 1 and chassis ground.

   A. If **12 volts** is not present, continue with Step **4**.

   B. If **12 volts** is found, continue with Step **8**.
4. Disconnect connector **X071**. Key switch to the ON position. Using the Display Monitor, reference **Monitor - Detailed view (A.50.A)**, if needed, manually power the backup alarm. Use a multimeter to check for **12 volts** between connector **X071** pin 14 and chassis ground.

   A. If **12 volts** is not present, continue with Step **5**.

   B. If there is **12 volts**, there is an open circuit in the straw hood rear (SH) harness between connector **X071** and connector **X248** wire 452 white. Locate the open and repair.
5. Disconnect connector **X024**. Key switch to the ON position. Using the Display Monitor, reference **Monitor - Detailed view (A.50.A)**, if needed, manually power the backup alarm. Use a multimeter to check for **12 volts** between connector **X024** pin 13 and chassis ground.

   A. If **12 volts** is not present, there is an open circuit in the main frame (MF) harness between connector **X024** and connector **X019** J2-6 wire 452 white.

   B. If there is **12 volts**, there is an open circuit in the straw hood front (SW) harness between connector **X024** and connector **X071** wire 452 white. Locate the open and repair.
6. Disconnect connector **X071**. Use a multimeter to check for continuity between connector **X071** pin 14 and chassis ground.

   A. If continuity is found, continue with Step **7**.

   B. If no continuity is found, the short to ground is in the straw hood rear (SH) harness between connector **X071** and connector **X248** wire 452 white. Locate the short and repair.

E0086-03-Feeder Reverse Flow Control Voltage Supply

AXIAL-FLOW 7010 [HAJ000000 - HAJ201245], AXIAL-FLOW 8010 [HAJ000000 - HAJ201245]

Control Module : CCM1

NOTE: *This fault code applies only to combines equipped with fixed speed feeder drive.*

Context:
The feeder and thresher engage circuits are linked together, both through physical wiring, as well as through software. The separator engage switch **S-30** receives power from fuse **F-48**; when the switch is activated, it sends power to CCM2 connector **X015** pin J1-7 (supply for Beater/Chopper clutch **L-22**), CCM3 connector **X012** pins J1-7 (supply for Rotor Engine to Ring clutch **L-45**) and J1-17 (supply for Rotor Pump Swash coils **L-40** & **L-41**), and to the feeder engage switch **S-31**. When CCM2 sees power at connector **X015** pin J1-7, it broadcasts a message on CAN indicating the separator switch **S-30** is engaged.

When the feeder engage switch **S-31** is activated, it sends power directly to the feeder disengage relay **K-19** and to CCM1 connector **X018** pin J1-7 (supply for Feeder Engine to Ring clutch **L-47**), as well as through the feeder engage diodes **D-01** to CCM1 connector **X018** pin J1-17 (supply for Feeder Reverse **L-63**).

This fault code is displayed if the input voltage to CCM1 connector **X018** pin J1-17 is greater than **18 volts**, or if there is input voltage at CCM1 connector **X018** pin J1-17, but the CCM2 status message on CAN indicates the separator switch **S-30** is NOT engaged.

Cause:
The Feeder Reverse Flow Control Voltage Supply circuit is shorted to a higher than normal voltage source (> **18 volts**), or voltage is present when the separator circuit is not engaged.

Possible failure modes:

1. Feeder Reverse Flow Control Voltage Supply wiring shorted to a high source (> **18 volts**).
2. Open circuit between separator engage switch **S-30** and CCM2 connector **X015** pin J1-7.
3. Faulty alternator/regulator.
4. Controller internal failure (internal regulator failure).

Solution:

1. Using the Display Monitor, reference **Monitor - Detailed view (A.50.A)**, if needed, view the fault code history.

   A. If fault code
   E0175-05 - Beater/Chopper Voltage Supply
   is active, refer to **Command Threshing engage switch - Open circuit (K.40.C)** to resolve this concern.

   B. If fault code
   E0175-05 - Beater/Chopper Voltage Supply
   is not present, continue with Step **2**.

2. Using the Display Monitor diagnostics capability to view "Parameter" status, reference **Monitor - Detailed view (A.50.A)**, if needed, check the voltage range.

   The proper voltage is **0 volts** with the feeder engage switch **S-31** OFF.

   A. If there is voltage, there is a short in the right console (RC) harness or cab main (CM) harness between CCM1 connector **X018** pin J1-17, the feeder engage diodes **D-01** connector **X400**, and the feeder engage switch **S-31** connector **X056** pin 6 wires 1243 or 225 yellow. Locate the short and repair.

   B. If there is no voltage, continue with Step **3**.

3. Key ON, engine running. Move the separator engage switch **S-30** and then the feeder engage switch **S-31** to the ON positions. Using the Display Monitor diagnostics capability to view "Parameter" status, reference **Monitor - Detailed view (A.50.A)**, if needed, check the voltage range.

E0130-04-Trans Shift Position 2 Sensor

AXIAL-FLOW 7010 [HAJ000000 - HAJ201245], AXIAL-FLOW 8010 [HAJ000000 - HAJ201245]

Control Module : CCM2

Cause:
The transmission shift position "2" sensor **B-37** circuit is shorted to ground.

Possible failure modes:

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

⚠ **WARNING** ⚠

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 comply could result in death or serious injury.

46-77A

Solution:

1. Using the Display Monitor diagnostics capability to view "Parameter" status, reference **Monitor - Detailed view (A.50.A)**, if needed, to check the voltage range. The proper voltage when in shift position 2 is **5.6 - 7.3 volts**, normally **6.6 V** when target is present.
   . The proper voltage when not in shift position 2 is **0.5 - 5.6 volts**, normally **4.6 V** when target is not present.

   A. If the voltage reading is low (less than **0.5 volts**) out of range, 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 is 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. Disconnect the transmission shift position sensor from the transmission at connector **X093**. The voltage indicated should now be **7.3 - 9 volts**, with the sensor disconnected.

   A. If the voltage increases to **7.3 - 9 volts**, the short is in the sensor or sensor wiring. Replace the sensor.

   B. If the voltage remains low (less than **0.5 volts**) out of range, continue with step **3**.
3. Disconnect the lower frame (LF) harness from the front frame (FF) harness at connector **X023**.

   A. If the voltage increases to **7.3 - 9 volts**, there is a short to ground in the lower frame (LF) harness between connector **X023** pin 9 and connector **X093** pin 3 wire 406 yellow. Locate the short and repair.

   B. If the voltage remains low (less than **0.5 volts**) out of range, there is a short to ground in the front frame (FF) harness between connector **X023** pin 9 and connector **X017** pin J3-37 wire 406 yellow. Locate the short and repair.
4. If the short to ground is not persistent. It may be due to an intermittent electrical short (such as the transmission shift motor – the fault may only be visible while shifting). Completely reassemble the system. Monitor the Transmission Position 2 Sensor on the display. Functionally operate the combine. Activate one function at a time, monitor the sensor voltage.

   A. If a function is noted that causes the short to **12 V**, use the wiring schematic to locate the short to high source and repair. Completely reassemble the system and recheck.

   B. If a low (less than **0.5 volts**) out of range voltage reading cannot be generated, clear the fault code and continue operation.

Sensing system Shift position sensor - Overview (C.20.B.95.81 - C.10.A.10)

E0147-03-Tailings Volume Sensor

AXIAL-FLOW 7010 [HAJ000000 - HAJ201245], AXIAL-FLOW 8010 [HAJ000000 - HAJ201245]

Control Module : CCM2

Cause:
The tailings volume sensor (R-29) 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 (12V).
2. Sensor ground wiring is open.
3. Module internal failure (internal regulator failure).

Solution:

1. Using the Display Monitor diagnostics capability to view "Parameter" status, reference **Monitor - Detailed view (A.50.A)**, if needed, check the voltage range. Remove the cover from the bottom of the returns cross auger tube, and carefully move the arm on the tailings volume sensor while monitoring the voltage; the voltage should stay within range, and should change smoothly with movement of the sensor arm.

   The proper voltage range is **0.3 - 5.2 volts**.

   A. If the voltage reading is high (> **5.2 volts**) out of range, 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 **8**.

   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 **X445**, and use a multimeter to test for continuity to ground on connector **X445** pin 3. There should be low resistance (< **1 ohms**) to ground.

   A. If continuity to ground is found (< **1 ohms**), continue with Step **5**.

   B. If no continuity is found, continue with step **3**.
3. Key off. Carefully remove connector **X016** from the bottom of CCM2. Use a multimeter to test for continuity between connector **X445** pin 3 and connector **X016** pin J2-14.

   A. If continuity is found, continue with Step **4**.

   B. If no continuity is found, there is an open circuit in the main frame (MF) harness between connector **X445** pin 3 and connector **X016** pin J2-14 wire 1190 blue, 425 blue or 465 blue. Locate the open and repair.
4. Key off. Use a multimeter to test for continuity between connector **X016** pin J2-14 on CCM2 and chassis ground. There should be low resistance (< **1 ohms**) to ground.

   A. If no continuity is found, or there is high resistance (> **1 ohms**) to ground, the CCM2 module is not supplying a ground path for the sensor due to an internal failure. Replace the CCM2 module.

   B. If continuity is found, the ground path for the sensor tests okay. Reconnect all connectors and retest for continuity to ground at Step **2**.
5. Key ON. Disconnect connector **X445**, and use a multimeter to test for voltage on connector **X445** pin 2. There should not be any voltage present.

   A. If no voltage is found, continue with Step **7**.

   B. If high (> **5.2 volts**) voltage is found, continue with step **6**.

E0165-04-CCM2 J2 5V Reference

AXIAL-FLOW 7010 [HAJ000000 - HAJ201245], AXIAL-FLOW 8010 [HAJ000000 - HAJ201245]

Control Module : CCM2

Context:
The CCM2 J2 5V Reference circuit supplies power from connector **X016** pin J2-31 through the main frame (MF) harness to several different sensors;
- the grain bin level switches **S-28 & S-29** in the grain tank (GT) harness,
- the control pressure sensor **B-35** in the gearbox (GB) harness,
- the park brake pressure sensor **B-53** in the main frame (MF) harness,
- and the tailings volume sensor **R-29** in the main frame (MF) harness.

A short to ground on any of these supply wires will result in this fault code being displayed.

Cause:
The CCM2 J2 5V Reference circuit is shorted to ground.

Possible failure modes:

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

Solution:

1. Using the Display Monitor diagnostics capability to view "Parameter" status, reference **Monitor - Detailed view (A.50.A)**, if needed, to check the CCM2 J2 5V power supply voltage range.

   The proper voltage supply is **4.5 - 5.5 volts**.

   A. If the voltage reading is low out of range (< **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. Disconnect the grain tank (GT) harness from the main frame (MF) harness at connector **X009**.

   A. If the voltage increases to **4.5 - 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, continue with Step **3**.
3. Disconnect the gearbox (GB) harness from the main frame (MF) harness at connector **X011**.

   A. If the voltage increases to **4.5 - 5.5 volts**, the short is in the gearbox (GB) harness between connector **X011** pin 21 and connector **X098** pin B wire 486 pink. Locate the short and repair.

   B. If the voltage remains low, 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 - 5.5 volts**.

   A. If the voltage is within **4.5 - 5.5 volts**, the short is in the main frame (MF) harness on one of the following wires:
   - wire 459 pink, **X016** pin J2-31 to MF harness splice
   - wire 440 pink, MF harness splice to connector **X009** pin G
   - wire 463 pink, MF harness splice to connector **X010** pin 13 (not used)
   - wire 486 pink, MF harness splice to connector **X011** pin 21
   - wire 1199 pink, MF harness splice to connector **X368** pin B
   - wire 1200 pink, MF harness splice to connector **X445** pin 1

B. If there is no continuity, continue the testing at Step **5**.

4. Disconnect the main frame (MF) and gearbox (GB) harnesses at connector **X011**. Use a multimeter to check for continuity between connector **X011** pins 13 and 14. There should not be continuity.

   A. If there is continuity, there is a short in the main frame (MF) harness between connector **X011** and connector **X016** wires 878 white and 877 blue. Locate the short and repair.

   B. If there is no continuity, there is a short in the gearbox (GB) harness between connector **X011** and connector **X450** wires 878 white and 877 blue. Locate the short and repair.

5. Turn the key switch to the OFF position and carefully disconnect connector **X016** from the bottom of CCM2. Set the multimeter to check resistance, hold the test leads together, and record the reading (resistance of test leads). Use the multimeter to check the resistance between the controller pins J2-40 and J2-12. Subtract the test lead resistance from the reading to determine the actual resistance through the sense resistor. There should be approximately **0.2 ohms** resistance.

   A. If the resistance is high (> **0.5 ohms**), the sense resistor is damaged and is providing a false reading of current flow. Replace the CCM2 controller.

   B. If the resistance is correct, the sense resistor is not damaged. Continue the testing at Step **6**.

   NOTE: *A properly calibrated, high quality multimeter is required to properly test the resistance of the sense resistor.*

6. Visually inspect the harness and connectors for damage, bent or dislocated pins, corroded terminals or broken wires.

   A. If no damage is found, erase the error code and continue operation.

Wiring harness - Electrical schematic frame 17 (A.30.A.88 - C.20.E.17)

E0198-11-Backlighting

AXIAL-FLOW 7010 [HAJ000000 - HAJ201245], AXIAL-FLOW 8010 [HAJ000000 - HAJ201245]

Control Module : CCM2

Context:
The backlighting circuit is used to power the backlights in the HVAC module and all cab roof switches. Power is sent from the CCM2 module to the splice block C, W-03, in the cab roof. From there, power is distributed to all switches for backlighting. The backlighting circuits in each cab roof switch are grounded to the cab roof ground 4.
A short to ground between the module and any one of the switch backlights fed by this circuit will cause this error, while an open circuit must be between the CCM2 module and the splice block C, W-03, in order to generate this error. An open circuit between the splice block and one of the switches will result in that backlight not functioning, while the overall circuit will still perform properly.

Cause:
The backlighting lamps circuit is open, or shorted to ground.

Possible failure modes:

1. Supply wiring damaged.
2. Controller internal failure (internal regulator failure).

Solution:

1. Using the Display Monitor diagnostics capability to view "Parameter" status, reference **Monitor - Detailed view (A.50.A)**, if needed, to change the "Backlighting lamps" circuit output to "ON".

   A. If the status screen indicates "ERROR", the circuit is open or shorted to ground. Continue with step **2**.

   B. If the status screen indicates "OK", continue with step **15**.

2. Turn the key switch to the "ON" position. Use the Display screen controls to change the backlighting circuit output to "ON". Use a multimeter to check for **12 volts** between connector **X015** pin J1-11 and chassis ground. There should be **12 volts**.

   A. If **12 volts** is not present, the CCM2 module is not functioning properly. Reload the software in CCM2 module using the EST, and recheck the circuit operation. If the CCM2 module is still not providing **12 volts** output, replace the module.

   B. If **12 volts** is present, continue with step **3**.

3. Turn the key switch to the "OFF" position. Remove the HVAC controller from its DIN slot to provide access to the cab roof (CR) harness. Remove the cap/buss strip from the cab roof (CR) harness splice block C connector **X133**. Use a multimeter to check for continuity between connector **X133** pin B and chassis ground. There should not be any continuity to ground.

   A. If there is continuity to ground, there is a short to ground in the cab main (CM) harness or cab roof (CR) harness between connector **X015** pin J1-11 through connector **X002** pin 18 to connector **X133** pin B on one of the following wires;
   wire 231 purple, connector **X015** pin J1-11 to cab main (CM) harness splice,
   wire 247 purple, cab main (CM) harness splice to connector **X075** on accessory socket J-08,
   wire 206 purple, cab main (CM) harness splice to connector **X070** on cigar lighter R-08,
   wire 232 purple, cab main (CM) harness splice to connector **X002** pin 18,
   wire 232 purple, connector **X002** pin 18 to connector **X133** pin B. Locate the short and repair.

   B. If there is no continuity to ground, continue with step **4**.

4. Turn the key switch to the "ON" position. Use the Display screen controls to change the backlighting circuit output to "ON". Use a multimeter to check for **12 volts** between connector **X133** pin B and chassis ground. There should be **12 volts**.

E0263-04-Lower Sieve Increase - Rear Switch

AXIAL-FLOW 7010 [HAJ000000 - HAJ201245], AXIAL-FLOW 8010 [HAJ000000 - HAJ201245]

Control Module : CCM3

Cause:
The lower sieve rear adjust switch **S-46** circuit is shorted to ground since power up.

Possible failure modes:

1. Switch wiring shorted to ground.
2. Switch failure (stuck closed).
3. Controller failure.

Solution:

1. Using the Display Monitor diagnostics capability to view "Parameter" status, reference **Monitor - Detailed view (A.50.A)**, if needed, observe the voltage. The normal operating range for the lower sieve rear adjust circuit is **1.8 - 10.0 volts** when the switch is not actuated and **0.0 - 1.8 volts** when the switch is actuated.

   A. If the voltage reading is **<0.5 volts**, continue with Step **2**.

   B. If the voltage reading is within the proper limits, the wire may not be shorted at this time. Continue troubleshooting at Step **4**.

2. Disconnect the lower sieve rear adjust switch from the straw hood front (SW) harness at connector **X226**. Observe the voltage.

   A. If the voltage remains at **<0.5 volts**, continue with Step **3**.

   B. If the voltage returns to **1.8 - 10 volts**, there is a short to ground condition in the switch (contacts stuck closed). Replace lower sieve rear adjust switch **S-46**.

3. Disconnect the straw hood front (SW) harness from the expansion (EX) harness at connector **X025**.

   A. If the voltage returns to **1.8 - 10 volts**, the short to ground condition is in the straw hood front (SW) harness between connector **X025** and connector **X226** wire 542 yellow. Locate the short and repair.

   B. If the voltage remains at **<0.5 volts**, the short is in the expansion (EX) harness between connector **X025** and connector **X013** pin J2-35 wire 542 yellow. Locate the short and repair.

4. 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.

6. Move the feeder engage switch S-31 to the ON position, and observe fuse F48.

   A. If the fuse is okay, continue with Step **7**.

   B. If the fuse immediately fails, a short to ground exists in on one of the following wires:
   - wire 1243 yellow, feeder engage switch connector **X056** pin 6 to feeder engage diodes connector **X400** pin A
   - wire 225 yellow, feeder engage diodes connector **X400** pin B through connector **X001** pin 15 to connector **X018** pin J1-17
   - wire 112 yellow, feeder engage switch connector **X056** pin 6 through connector **X001** pin 19 to connector **X018** pin J1-7

   Locate short and repair.

7. Key switch in "Off" position. Check the voltage at fuse F42 using a multi-meter.

   A. If the voltage reading is between 10 and **18 volts**, continue with Step **8**.

   B. If the voltage reading is less than **10 volts**, there is excessive resistance between the batteries and the cab fuse panel, due to loose or corroded connections, or the batteries have discharged excessively, and are not capable of supplying the minimum voltage requirement for CCM3. Inspect the wiring from the batteries to the engine compartment, and from there to the cab. Recharge or replace the batteries.

8. Key switch ON. Move the separator switch S-30 to the ON position. Using the Display Monitor diagnostics capability to view "Parameter" status, reference **Monitor - Detailed view (A.50.A)**, if needed, check the voltage range.

   The proper voltage supply is **10.0 - 18.0 volts**.

   A. If the voltage reading is between 10 and **18 volts**, continue with Step **9**.

   B. If the voltage reading is less than **10 volts**, there is excessive resistance between the fuse panel and CCM3. Inspect the following for loose or corroded connections, or damage to the wires.
   - wire 109 orange, fuse F48 to relay K28, terminal 3
   - wire 108 orange, fuse F48 through connector **X001** pin 3 to RC harness splice
   - wires 110 orange & 1180 orange, RH harness splice to separator switch S-30 connector **X055** pin 2
   - wire 1212 yellow, separator engage switch connector **X055** pin 3 to connector **X012** pin J1-17

9. Start the combine engine. Using the Display Monitor diagnostics capability to view "Parameter" status, reference **Monitor - Detailed view (A.50.A)**, if needed, check the voltage range.

   With the engine RPM at low idle, engage road and work lights. Check voltage range.

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

   A. If the voltage reading is between **10 - 18 volts**, continue with Step **10**.

   B. If the voltage reading is less than **10 volts**, the alternator and/or regulator may have failed, and the charging system is not producing sufficient voltage. Refer to **Alternator - Problem solving (A.30.A)** for additional alternator testing information.

10. Operate the machine while observing the Display.

    A. If no low out of range readings are detected, erase the fault code and continue operation.

Wiring harness - Electrical schematic frame 15 (A.30.A.88 - C.20.E.15)
Wiring harness - Electrical schematic frame 17 (A.30.A.88 - C.20.E.17)
Wiring harness - Electrical schematic frame 25 (A.30.A.88 - C.20.E.25)

A. Repair any damage found during visual inspection. Erase the fault code and continue operation.

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

Wiring harness - Electrical schematic frame 17 (A.30.A.88 - C.20.E.17)

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 wire 785 gray. Locate the open and repair.

37. Use a multimeter to check for continuity between connector **X227** pin D and chassis ground.

A. If no continuity is found, continue with Step **38**.

B. If continuity is found, recheck the motor for continuity at Step **33**. Erase the fault codes and continue operation.

38. Disconnect connector **X072**. Use a multimeter to check for continuity between connector **X072** pin H and chassis ground.

A. If continuity is found, the open circuit is in the lower frame rear (LR) harness between connector **X227** pin D and connector **X072** pin H wire 792 white. Locate the open and repair.

B. If no continuity is found, continue with Step **39**.

39. Disconnect connector **X025**. Use a multimeter to check for continuity between connector **X025** pin 17 and chassis ground.

A. If continuity is found, the open circuit is in the straw hood front (SW) harness between connector **X072** pin H and connector **X025** pin 17 wire 792 white. Locate the open and repair.

B. If no continuity is found, continue with Step **40**.

40. Disconnect connector **X034**. Use a multimeter to check for continuity between connector **X034** pin 7 and chassis ground.

A. If continuity is found, the open circuit is in the expansion (EX) harness between connector **X025** pin 17 and connector **X034** pin 7 wire 792 white. Locate the open and repair.

B. If no continuity is found, continue with Step **41**.

41. Remove the upper/lower sieve relay K18 from the fuse panel. Use a multimeter to check for continuity between Upper/lower sieve relay K18 terminal 4 and chassis ground.

A. If no continuity is found, the open circuit is in the cab main (CM) or main frame (MF) harness wire 792 white from the fuse panel through connector **X005** pin 17 to connector **X034** pin 7. Locate the open and repair.

B. If continuity is found, continue with Step **42**.

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 33.*

42. Reconnect connector **X005**. Use a multimeter to check for continuity between Upper/lower sieve relay K18 terminal 3 and chassis ground.

A. If continuity is found, the relay has failed open between terminals 3 and 4. Replace the relay.

B. If no continuity is found, continue with Step **43**.

43. Disconnect connector **X005**. Use a multimeter to check for continuity between connector **X005** pin 15 and chassis ground.

A. If continuity is found, the open circuit is in the cab main (CM) harness between the Upper/lower sieve relay K18 terminal 3 on the fuse panel and connector **X005** pin 15 wire 786 red. Locate the open and repair.

B. If no continuity is found, continue with Step **44**.

44. Disconnect connector **X034**. Use a multimeter to check for continuity between connector **X034** pin 5 and chassis ground.

A. If continuity is found, the open circuit is in the main frame (MF) harness between connector **X034** pin 5 and connector **X005** pin 15 wire 786 red. Locate the open and repair.

B. If no continuity is found, , the open circuit is in the expansion (EX) harness between connector **X034** pin 5 and connector **X013** pin J2-21 wire 786 red. Locate the open and repair.

E1570-02- Crankshaft sensor failure - Data incorrect

AXIAL-FLOW 7010 [HAJ000000 - HAJ201245], AXIAL-FLOW 8010 [HAJ000000 - HAJ201245]

Control Module : ECU

Context:
The Engine Control Unit (ECU) has reported an error with the monitoring of the Crankshaft Position (CKP) sensor. If the engine has a defective CKP sensor it can run off the Camshaft Position (CMP) sensor. This is referred to as BACKUP mode. Diagnostics of the FMI=3 failures is only active if terminal 40 is on (KEY ON) and no errors are reported in the sensor supply voltage. For the FMI=4 failures, additional conditions for active diagnostics are included, such as the engine must be in startup mode and the engine speed must be above **450 RPM**.

Cause:
The ECU has determined that there is no signal coming in from the CKP sensor and the engine is now in BACKUP mode.

Possible failure modes:

1. Faulty CKP sensor **B-05**.
2. Faulty electrical wiring and/or connections.
3. Faulty ECU, supply voltages or grounds.

Solution:

1. Operation: Electrical Inspection.
   Vehicle Status: Key Off Engine Off.

   Remove CKP sensor connector **X519** and inspect housing body/latch, pins and wiring harness for damage or corrosion. Also, inspect connector portion of the CKP sensor **B-05**.

   A. If damage is determined after careful inspection, repair wiring and/or replace connector parts to ensure a good and sound electrical connection. Replace CKP sensor **B-05** if damaged.

   B. If no damage is determined, proceed to step **2**.
2. Operation: Resistance Check for Faulty CKP sensor **B-05**.
   Vehicle Status: Key Off Engine Off

   Remove CKP sensor connector **X519** and connect the test lead labeled "Coolant/Fuel Temp Sensor" from the Tier II (NEF) Diagnostic Repair Kit **380040185** to access the sensor terminals. See test table below.

Test Type	From	To	Results (Min)	Results (Max)
1. Resistance	**B-05** (Pin 1)	**B-05** (Pin 2)	**750 ohms**	**1000 ohms**

   A. If the resistance test does not fall in the specified range, replace CKP sensor **B-05**.

   B. If the resistance test does fall in the specified range, proceed to step **3**.
3. Operation: Check Output of CKP Sensor **B-05**.
   Vehicle Status: Key Off Engine Off (test setup)
   Vehicle Status: Key On Engine On (during test)

   Remove CKP sensor connector **X519** and make the following electrical tests in the table below. There will be (2) types of tests (in-line and single ended) that will need to be performed which use the test lead labeled "Coolant/Fuel Temp Sensor" from the Tier II (NEF) Diagnostic Repair Kit **380040185**. Reference the descriptions below to make the proper electrical connections for each test type.

   Single Ended Test Lead Connection Test (Standalone CKP Sensor **B-05** Test)
   Remove CKP sensor connector **X519** and connect the above mentioned special test lead to the CKP sensor **B-05**. Start the engine and measure the (AC) voltage using a multi-meter across the breakout alligator clips from the test leads. Use the test table below to determine the measurement results.

Important Note: Check and verify that the Vehicle Status is correct for each operation. Potential ECU damage could result when removing and replacing main ECU connectors if this is not followed.

Test Type	From	To	Expected Results
1. Voltage	**X193** (Pin: 2, 3, 8, 9, 40)	Ground (engine block)	Approx. **12.0 volts** (DC)
2. Continuity	**X193** (Pin: 5, 6, 10, 11)	Ground (engine block)	Approx. **0.0 - 0.1 ohms**

A. If the voltages and ground paths are correct, proceed to step **7**.

B. If the voltages and ground paths are not correct, refer to schematic **FRAME-2** and determine root cause of power and/or continuity problem(s).

7. Operation: Re-Initialize the ECU.
Vehicle Status: Key On Engine Off.

Using the EST service tool, re-initialize the ECU and load the appropriate data-set for this engine type. A call will have to be made to CNH TSS to get an authorization code for the ECU initialization download. Check to see if the fault code has cleared.

A. If the fault code did not clear, proceed to step **8**.

8. Operation: Replace Injector **L-35** (Cyl. #4).
Vehicle Status: Key Off Engine Off.

Replace the Cylinder #4 injector **L-35**. Refer to the Iveco C10 C13 Tier 3 Engine Maintenance and Repair Manual for the procedure for injector replacement and any special tools required for this operation. Check to see if the fault code has cleared.

A. If the fault code did not clear, replace the ECU.

A. If there was continuity on either or both pins to chassis ground, leave connector **X471** disconnected, and continue with step **4**

B. If there was no continuity on either pin to chassis ground, there is a short to ground condition in the engine injector harness between connector **X471** and connector **X515**. Locate and repair the grounded conductor.

4. Remove the injector (valve) cover and disconnect the injector harness from the injector for cylinder #5 at connector **X381** terminal 1 (high side ring terminal) Use a multi-meter to check for continuity, on the injector, from terminal 1 to chassis ground. There should not be continuity.

   A. If there is continuity, the injector solenoid coil has failed, replace the injector.

   B. If there is no continuity, there is a short to ground condition in the injector circuit, between connector **X381** and connector **X471 X515**. Locate and repair the grounded conductor.

5. Disconnect the engine injector harness from the injector cover at connector **X471** and use a multi-meter to check the resistance on the injector cover side of connector **X471** between pins I and L. There should be **0.4 - 0.5 Ω**.

   A. If the resistance was within range, there is a short circuit condition in the engine injector harness between connector **X471** and connector **X515**, locate and repair the short circuit.

   B. If the resistance was lower than range minimum, continue with step **6**

6. Remove the injector (valve) cover and disconnect the injector harness from the injector for cylinder #5 at connector **X381** terminal 1 (high side ring terminal) Use a multi-meter to check for continuity, on the injector, from terminal 1 to terminal 2. There should be **0.4 - 0.5 Ω**.

   A. If the resistance was within range, there is a short circuit condition in the injector harness, between connector **X381** and connector **X471 X515**. Locate and repair the shorted conductors.

   B. If the resistance was lower than minimum range, the injector solenoid coil has failed. Replace the injector.

from the injector for cylinder #5 at connector **X381** if recorded pin in Step 2 was pin 16, or disconnect the injector harness from the injector for cylinder #6 at connector **X379**, if recorded pin in Step 2 was pin 15. Use a multi-meter to check for continuity, on the injector, from terminal 2 to chassis ground. There should not be continuity.

A. If there is continuity, the injector solenoid coil has failed, replace the injector.

B. If there is no continuity, there is a short to ground condition in the injector circuit, between connector **X377**, if recorded pin in Step 2 was pin 14, or connector **X381** if recorded pin in Step 2 was pin 16, or connector **X379**, if recorded pin in Step 2 was pin 15. and connector **X471** pin H, L or N **X515** pin 14, 16, or 15. Locate and repair the grounded conductor.

E1705-04- Atmospheric Pressure Sensor - Shorted to low source

AXIAL-FLOW 7010 [HAJ000000 - HAJ201245], AXIAL-FLOW 8010 [HAJ000000 - HAJ201245]

Control Module : ECU

Context:
The engine control unit (ECU) has detected a failure of the atmospheric pressure sensor (APS), located inside the ECU. The sensor signal level is below **2.2 V** for over 800 milliseconds. This fault will reset if the raw signal level goes above **2.2 V** for over 480 milliseconds. In the case of a defective APS the atmospheric pressure is switched to a default value of **70 kPa** (**10.2 psi**). If the sensor is defective the ECU should be replaced only if required. It is not necessary to replace the ECU if never running in high altitude and if turbocharger is without VGT.

E1559-04-Coolant temperature sensor

AXIAL-FLOW 7010 [HAJ000000 - HAJ201245], AXIAL-FLOW 8010 [HAJ000000 - HAJ201245]

Control Module : EGM

Context:
The Engine Control Unit (ECU) generated an error from a fault associated with the Coolant Temperature Sensor (CTS). This error could result from a signal out of range or a signal that is either erratic or intermittent. When the ECU determines that the CTS temperature value is not valid, it will substitute another value to be used. In case of a defective CTS during engine warm-up, a default coolant temperature value is derived from the ramp of the currently logged sensor data. If an error would occur during normal engine operation, the oil temperature is used as the default value. If the oil temperature sensor is defective, **85 °C** (**185 °F**) is substituted as the default value.

Cause:
The CTS Sensor **B-44** signal to the ECU is out of range of the lower threshold limit.

Possible failure modes:

1. Faulty CTS sensor **B-44**.
2. Faulty electrical wiring or short to LOW (ground).
3. Faulty ECU, supply voltages or grounds.

Solution:

1. Operation: Electrical Inspection.
   Vehicle Status: Key Off Engine Off.

   Remove CTS sensor connector **X373** and inspect housing body/latch, pins and wiring harness for damage. Also, inspect connector portion of the CTS sensor **B-44**.

   A. If damage is determined after careful inspection, repair wiring and/or replace connector parts to ensure a good and sound electrical connection. Replace CTS sensor **B-44** if damaged.

   B. If no damage is determined, proceed to step **2**.
2. Operation: Check Open Circuit Supply Voltage for CTS Sensor **B-44**.
   Vehicle Status: Key On Engine Off.

   Remove **X373** connector from CTS sensor **B-44** and check for (DC) voltage outlined in the table below. Use the test lead labeled "Coolant/Fuel Temp Sensor" from the Tier II (NEF) Diagnostic Repair Kit **380040185** to access the pins on the connector.

Test Type	From	To	Expected Results
1. Voltage	**X373** (Pin 1) (+)	**X373** (Pin 2) (-)	Approx. **5 volts** (DC)

   A. If **5 volts** (DC) is present, proceed to step **4**.

   B. If **5 volts** (DC) is not present, proceed to step **3**.
3. 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 intermittent 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 multi-meter (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:

C. If the voltages and ground paths are correct and the ECU was re-initialized on a prior diagnostic of this type, replace the ECU.

D. If the voltages and ground paths are not correct, refer to schematic **FRAME-2 AND 29** and determine root cause of power or continuity problem(s).

Test Type	From	To	Results (Min)	Results (Max)
1. Resistance	**B-05** (Pin 1)	**B-05** (Pin 2)	**750 ohms**	**1000 ohms**

A. If the resistance test does not fall in the specified range, replace CKP sensor **B-05**.

B. If the resistance test does fall in the specified range, proceed to step **4**.

4. Operation: Check CKP Sensor **B-05** Output Voltage and Harness Wiring.

Perform both (2) electrical tests defined below:

1) AC output voltage test for CKP sensor **B-05**
Vehicle Status: Key Off Engine Off (test setup)
Vehicle Status: Key On Engine On (during test)

NOTE: When performing this electrical test, use the test lead labeled "Coolant/Fuel Temp Sensor" from the Tier II (NEF) Diagnostic Repair Kit **380040185**.

Remove CKP sensor connector **X519** and connect the Coolant/Fuel Temp Sensor test lead in-line with the sensor and the engine wiring harness. Make sure that the signal polarity is not swapped during the connection process. Start the engine and measure the (AC) voltage using a multi-meter across the breakout alligator clips from the Coolant/Fuel Temp Sensor test lead. Use the table below to determine test parameters and the measurement results.

Test Type	From	To	Expected Results
1. Voltage (AC) - In-line connection at low RPM (**1000 - 1100 RPM**)	CKP sensor **B-05** (Pin 1)	CKP sensor **B-05** (Pin 2)	Approx. **10 - 12 volts** (AC)
2. Voltage (AC) - In-line connection at high RPM (**2000 - 2200 RPM**)	CKP sensor **B-05** (Pin 1)	CKP sensor **B-05** (Pin 2)	Approx. **14 - 17 volts** (AC)

2) Harness wiring continuity/shorts electrical test (CKP Sensor **B-05**).
Vehicle status: Key Off Engine Off.

Remove and perform continuity tests between connectors **X519** and **X516** on engine wiring harness. Flex harness during test to check for any intermittent 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 **X519**. Also, use the **0.4 mm** (**0.017 in**) diameter test probes from the repair kit when connecting the digital multi-meter (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	CKP Sensor Connector **X519** (Pin: 1)	ECU Connector **X516** (Pin: 23)	Approx. **0 - 0.1 ohms**
2. Continuity	CKP Sensor Connector **X519** (Pin: 2)	ECU Connector **X516** (Pin: 19)	Approx. **0 - 0.1 ohms**
3. Shorts	ECU Connector **X516** (Pin: 23)	ECU Connector **X516** (Pin: 19)	Open Circuit

A. If both electrical tests are successful, proceed to step **7**.

B. If harness wiring continuity/shorts test was not successful, find and repair the damaged section(s) of the wiring harness.

C. If the voltage test was not successful and the continuity/shorts test was successful, proceed to step **5**.

5. Operation: CKP Sensor Alignment.
Vehicle Status: Key Off Engine Off.

E0662-04-Fan Speed Increase Switch

AXIAL-FLOW 7010 [HAJ000000 - HAJ201245], AXIAL-FLOW 8010 [HAJ000000 - HAJ201245]

Control Module : RHM

Cause:
The Right Hand Module (RHM) has detected that the Fan Speed Increase Switch circuit voltage is **<0.500 volts**.

Possible failure modes:

1. The Fan Speed Increase Switch circuit is shorted to **<0.500 volts**.
2. RHM internal failure.

Solution:

1. Verify the fault is present.
   Using the Display Monitor diagnostics capability to view "Parameter" status, reference **Monitor - Detailed view (A.50.A)**, if needed, observe the voltage.

   The normal operating range for the Fan Speed Increase Switch circuit is **0.5 - 12.0 volts**.

   Note that the Universal Display is limited to **0.0 - 5.0 volts**.

   A. If the voltage reading is **<0.500 volts**, continue with Step **2**.

   B. If the voltage reading is within the proper limits, the wire may not be shorted at this time. Continue troubleshooting at Step **4**.
2. Verify the RHM is good.
   Turn off the ignition switch.
   Disconnect the Right Console Harness connector **X030**.
   Using the proper tool, remove pin 10 wire 345 yellow from **X030**.
   With the wire removed from the connector, reconnect **X030**.
   Turn the ignition back on and recheck the "FAN SPD INC SW" voltage.

   A. If the voltage now reads **>0.500 volts**, the RHM is good. Continue troubleshooting at Step **3**.

   B. If the voltage is still **<0.500 volts**, then the fault is in the RHM. Reinstall the wire removed for troubleshooting. 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 **4**
3. Verify circuit 345 yellow is good.
   Inspect for a short to ground between RHM connector **X030** pin 10 and Front Switch Panel A-13 connector **X386** pin 4.

   A. If the circuit checks good, Continue troubleshooting at Step **4**.

   B. Locate the short. Repair the shorted wiring. Continue troubleshooting at Step **4**.
4. 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.

Wiring harness - Electrical schematic frame 19 (A.30.A.88 - C.20.E.19)

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

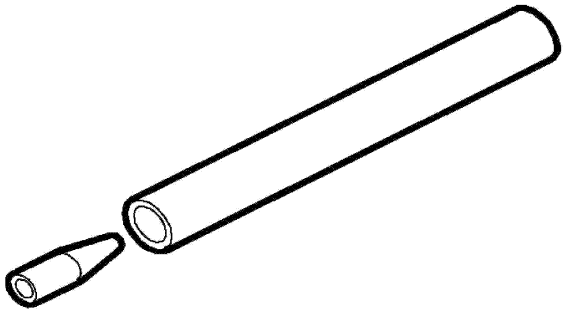
Wiring harness - Electrical schematic frame 19 (A.30.A.88 - C.20.E.19)

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

Wiring harness - Electrical schematic frame 11 (A.30.A.88 - C.20.E.11)

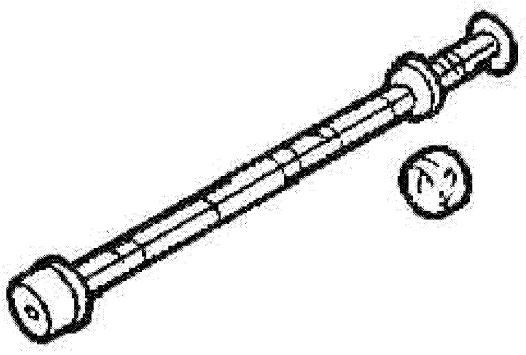
B. If no damage is found, erase the fault code and continue operation.

Wiring harness - Electrical schematic frame 11 (A.30.A.88 - C.20.E.11)



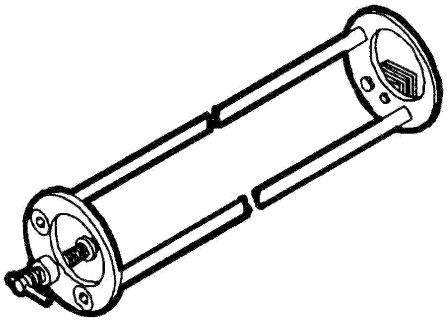
380000139 2

380000139 - Valve Guide Seal Installer



380000146 3

380000146 - Camshaft Bushing Remover/Installer



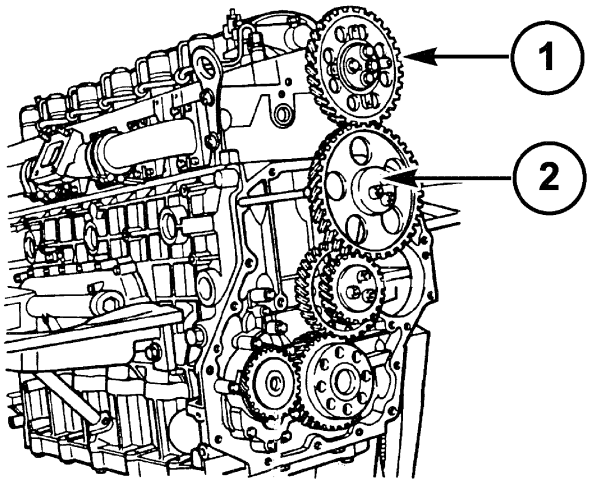
380000148 4

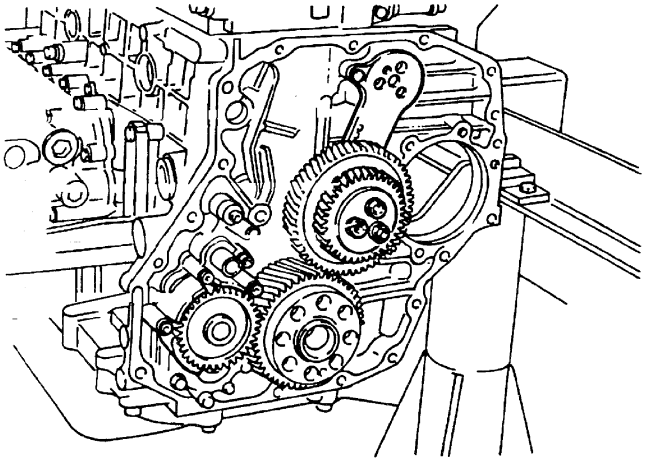
380000148 - Rocker Shaft Remover/Installer

Timing gear - Static description

AXIAL-FLOW 8010 [HAJ000000 - HAJ201245], AXIAL-FLOW 8010 [HAJ202019 -]

The camshaft is driven by a series of helical gears in a cascade unit located to the rear of the engine. The upper intermediate gear **(2)**, is fitted on an adjustable mount. This maintains the correct clearance between this gear and gear **(1)**whose position is affected by head gasket thickness tolerances. The center of rotation of all other gears is fixed and determined by machining. Timing gears are not marked with notches or codes as on conventional models because gear timing adjustment is no longer necessary on the new engines.





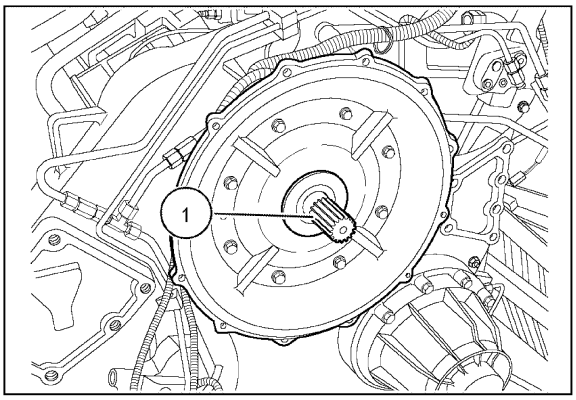
50015809A5 1

ENGINE - Install

AXIAL-FLOW 7010 [HAJ000000 - HAJ201245], AXIAL-FLOW 7010 [HAJ202019 -]

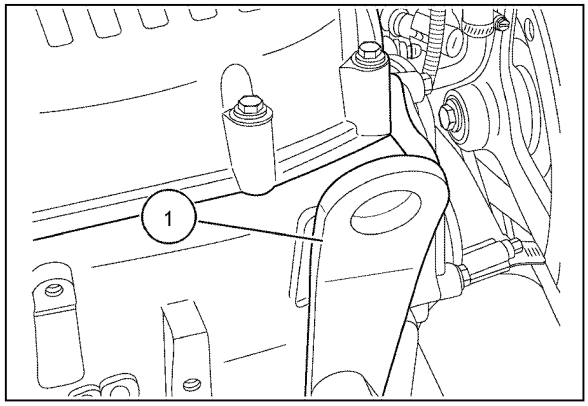
Prior operation:
ENGINE - Remove (B.10.A).

1. Before installing the engine, apply **LOCTITE 767 ANTI-SEIZE** to the input shaft **(1)** of the gearbox.



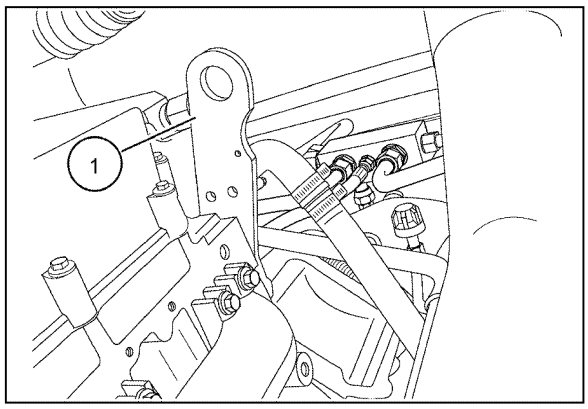
83070284 1

2. Attach a suitable chain to the front lift eye **(1)** at the front of the engine.



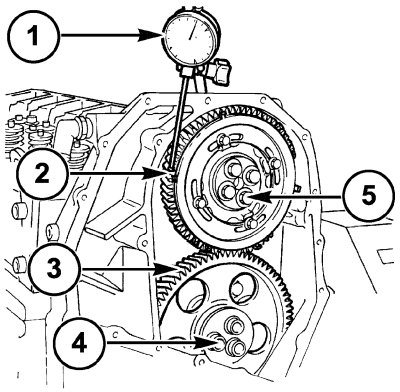
86070259 2

3. Attach a suitable chain to the back lift eye **(1)** at the rear of the engine.



86070260 3

4. Fit the gear **(2)** back on the camshaft, without fully locking the screws **(5)** positioning it so that the 4 slots are centered with the camshaft fixing holes. Using a dial gauge with a magnetic base **(1)** check the clearance between the gears **(2)** and **(3) 4.39 - 4.49 mm 0.173 - 0.177 in**. If this is not so, adjust the clearance as follows: loosen the screws **(4)** fixing the transmission gear **(3)** loosen the screw fixing the lever, then move the connecting rod to obtain the required clearance; lock the screw fixing the connecting rod and the screws fixing the transmission gear to the required torque. See **Timing gear - Torque (B.10.A)**.



20043353 4

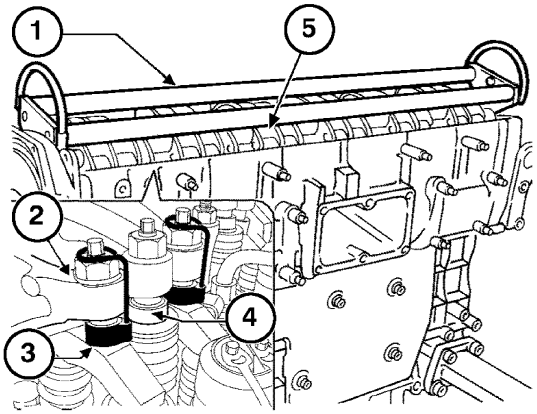
5. Position the exhaust and intake valve control crosspieces.

IMPORTANT: *Position the crosspieces on the valve stem, all with the largest hole on the same side.*

IMPORTANT: *Before refitting the rocker arm shaft assembly, make sure that all the adjustment screws have been fully unscrewed.*

6. With tool **380000128 (3)** constrain the sliding blocks **(4)** to the rocker arms **(3)**. Apply tool **380000148 (1)** to the rocker arm shaft **(5)** and position it on the cylinder head.

IMPORTANT: *Before assembly, the screws* ***(2)*** *must be lubricated with engine oil.*



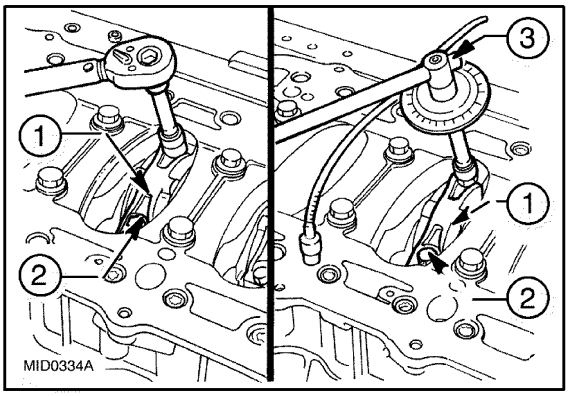
20043352 5

4. Connect the connecting rods to the relevant pins of the crankshaft. Fit on the caps of the connecting rod **(1)**, together with the half bearings. Screw down the fixing screws **(2)**, and tighten them in two stages to the torques given in the table at: **Cylinder head - Torque (B.10.A)**.

IMPORTANT: *The connecting rod cap fixing screws of the engine must be lubricated with engine oil before assembly.*

5. Angle closing is performed with tool **380000304**, **(3)**. Remove the caps and determine the existing clearance, comparing the width of the calibrated wire with the graduated scale on the bag containing the wire.

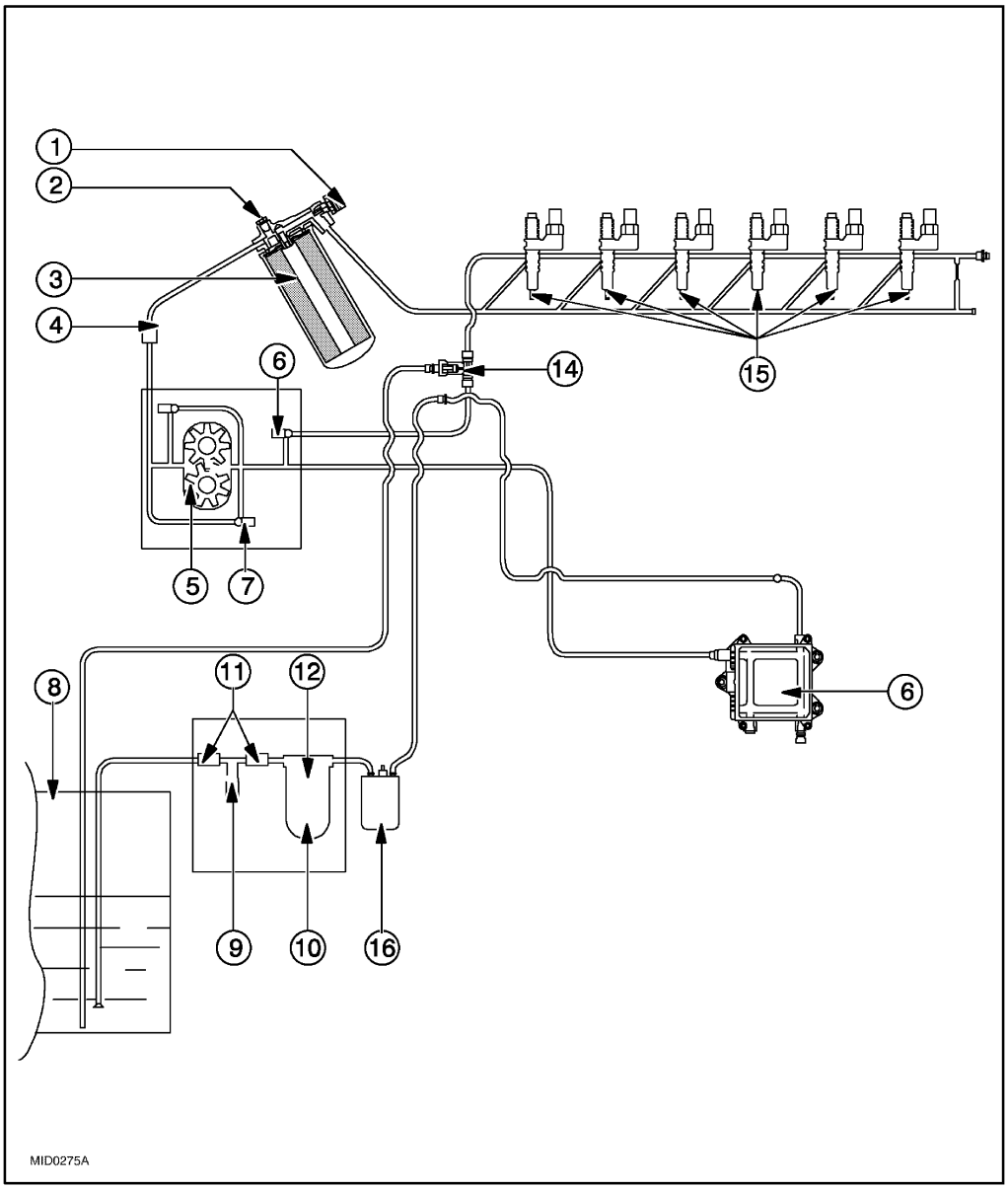
IMPORTANT: *Lubricate all relevant parts before final assembly with engine oil. Before reusing the connecting rod cap fixing screws, measure the thread diameter. If a connecting rod cap fixing screw diameter is lower than* ***13.4 mm*** *(* ***.528 in****), it must be replaced.*



mid0334a 4

FUEL AND INJECTION SYSTEM - Overview

AXIAL-FLOW 7010 [HAJ000000 - HAJ201245], AXIAL-FLOW 8010 [HAJ000000 - HAJ201245]



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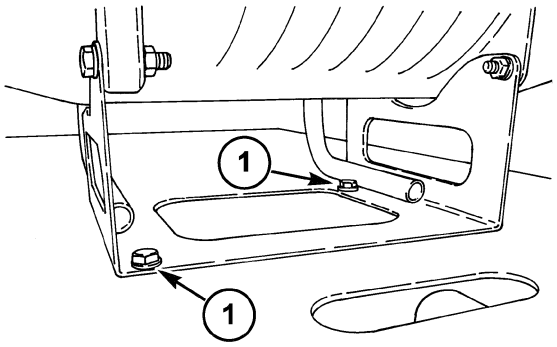
Fuel supply system diagram

1. Temperature sensor	5. Fuel supply pump	9. Priming pump	13. Electronic control unit
2. Bleeder	6. Integrated valve **3.5 bar** (**50.8 psi**)	10. Primary fuel filter	14. Fuel return fitting with incorporated valve **0.2 bar** (**3 psi**)
3. Secondary fuel filter	7. Pressure relief valve **5 bar** (**72.5 psi**)	11. Check valve opening **0.1 bar** (**1.5 psi**)	15. Injector unit
4. Bypass valve **0.3 - 0.4 bar** (**4.4 - 5.8 psi**)	8. Fuel tank	12. Heater	16. Fuel pump

4. Remove the two bolts **(1)** securing the air box frame to the deck. The bolts are secured by weld nuts so they can be removed easily by one person.



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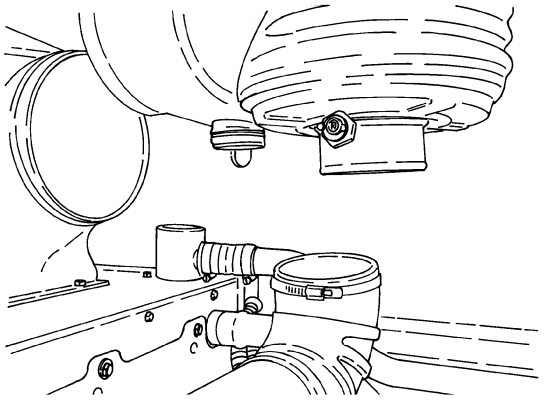
5. Carefully move the air box and frame together to pull the unit away from the tubing.



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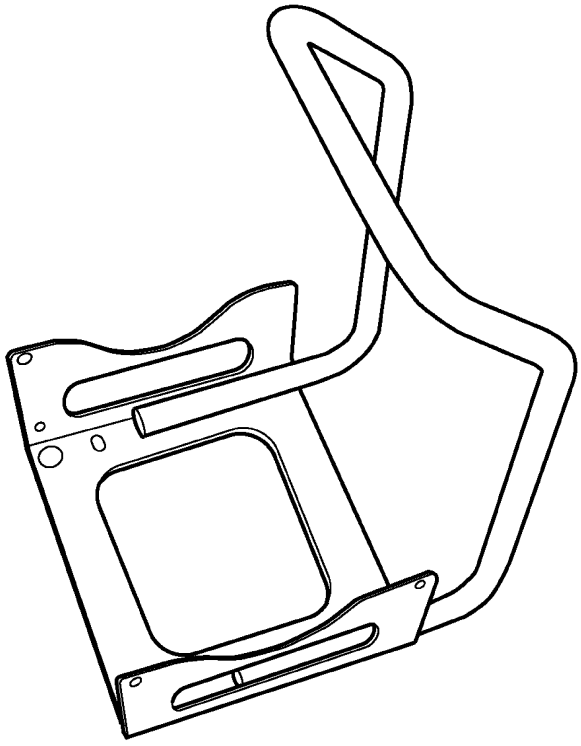
6. To remove the tube frame from the air box, remove the four bolts from the frame securing the air box to it.

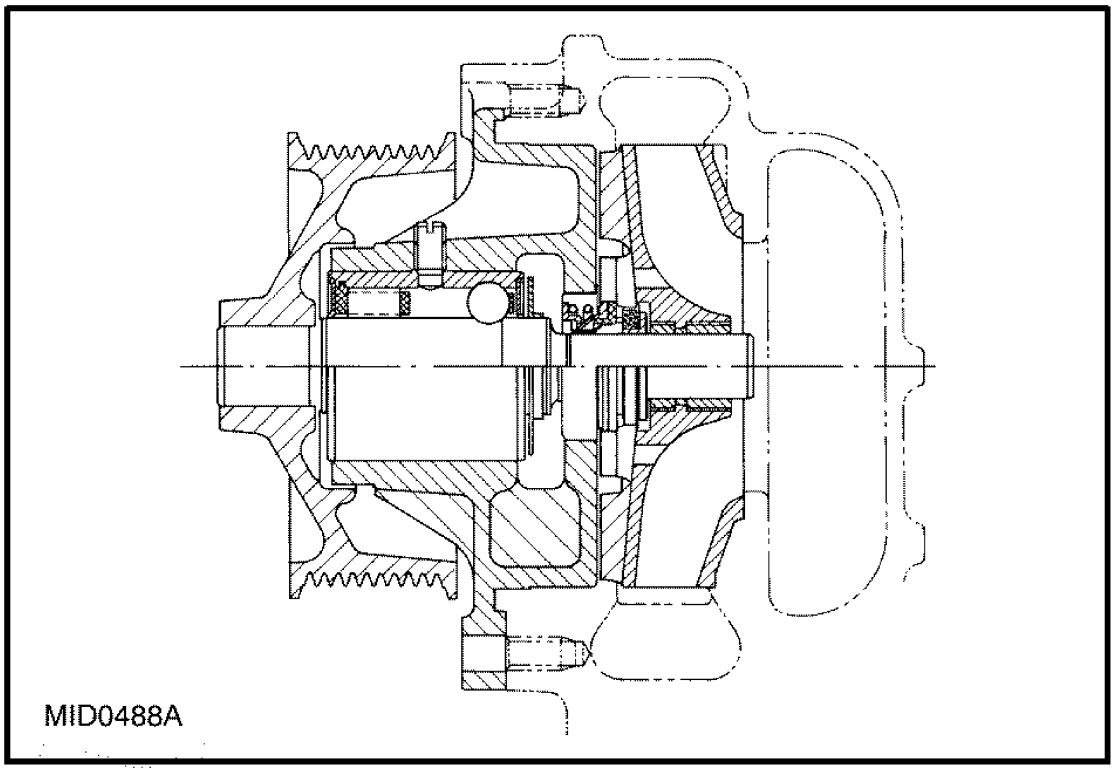


10034858 6

Water pump - Sectional view

AXIAL-FLOW 7010 [HAJ000000 - HAJ201245], AXIAL-FLOW 7010 [HAJ202019 -], AXIAL-FLOW 8010 [HAJ000000 - HAJ201245]

Sectional View of the Water Pump - The water pump is a centrifugal vane pump. The pump bearing forms a single piece with the impeller shaft. The drive pulley is keyed onto this shaft.



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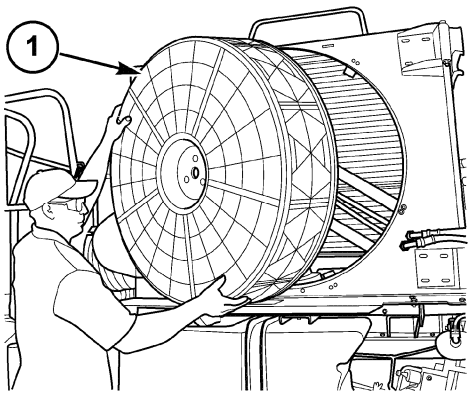
Rotary screen - Install

AXIAL-FLOW 7010 [HAJ000000 - HAJ201245], AXIAL-FLOW 7010 [HAJ202019 -], AXIAL-FLOW 8010 [HAJ000000 - HAJ201245]

1. Place the rotary screen **(1)** up to the door panel and line up the holes with the motor hub.



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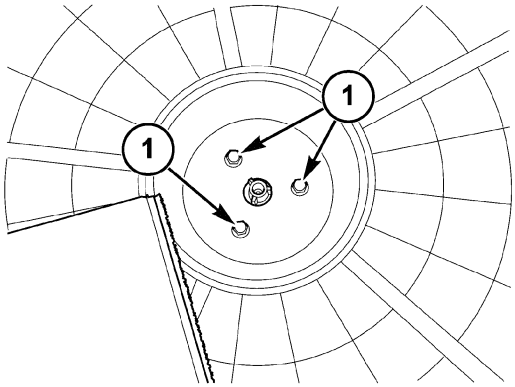
2. Install the three M10 x 25 bolts **(1)** to secure the screen, and tighten.



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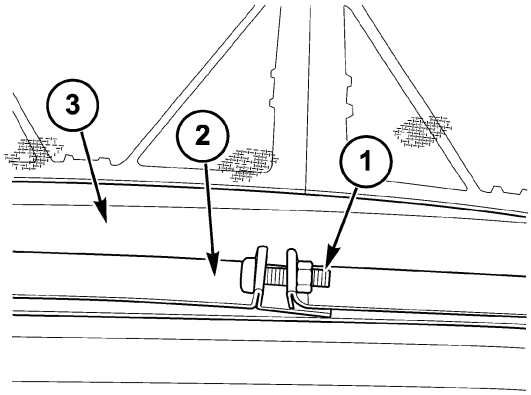
3. Install the rotary screen seal **(3)** over the screen and to the door panel. The seal must fully seat against the door surface after tightening the clamp **(2)** with the M6 x 25 bolt **(1)**.

NOTE: *The seal clamp must remain fully engaged on door ring after tightening.*

NOTE: *If the baffle was for any reason removed or replaced, it must be adjusted 4-7mm clearance to the screen.*



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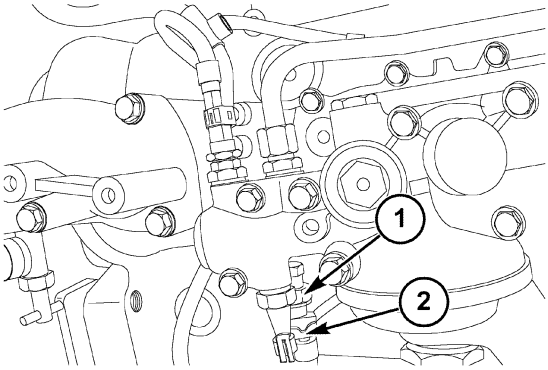
Sensing system Oil pressure - Overview

AXIAL-FLOW 7010 [HAJ000000 - HAJ201245], AXIAL-FLOW 8010 [HAJ000000 - HAJ201245]



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The Engine Oil Pressure Sensor B-52 **(1)** monitors the engine oil pressure and sends the information to the CCM2 module connector **X016** pin J2-33. The CCM2 module monitors the engine oil pressure in an effort to prevent major engine damage, and to warn the operator of insufficient oil pressure. If the engine has been running for at least 10 seconds, and the oil pressure drops to < **1 bar** (**14 psi**) for 3 seconds, the alarm message "A0002 Engine Oil Pressure LOW" will be displayed to the operator, and the engine will shut down automatically within 7 seconds to prevent damage.

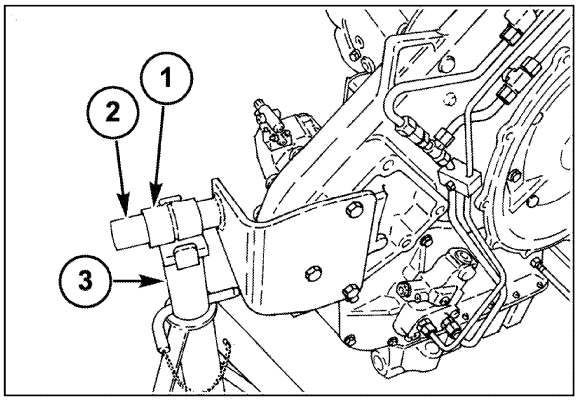
The engine oil pressure sensor circuit is also monitored by the CCM2 module; in the event that a fault occurs with the sensor itself or the wiring to the sensor, a fault code will be displayed to the operator.
E0161-01 - Oil Pressure Sensor

E0161-03 - Oil Pressure Sensor

E0161-05 - Oil Pressure Sensor

For additional information on the engine oil pressure sensor electrical circuit, refer to: **Wiring harness - Electrical schematic frame 04 (A.30.A)**

4. On the Left Hand Side, use an adjustable jack stand, **(3)** , to help share the load of the gearbox. The stand should have at least a **907 kg** (**2000 lb**) capacity. Install rubber O-ring on shaft, **(2)** , so collar, **(1)** , does not slide off the shaft during rotation.



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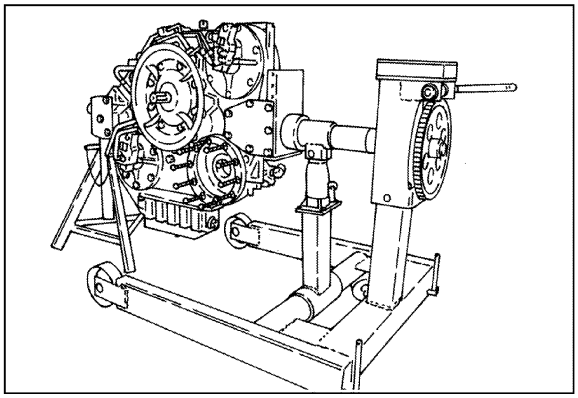
⚠ WARNING ⚠

The gearbox weighs approximately 680 kg (1500 pounds) with All pumps off. Always use the proper safety equipment and lifting techniques when working with heavy objects. The lift chain and device used to lift the gearbox should be rated for 907 kg (2000 pounds) . Failure to comply may result in minor or moderate injury.

M1266

5. Torque all plated M16 bolts to **230 Nm** (**170 lb ft**) and all un-plated bolts to **176 Nm** (**130 lb ft**).



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Next operation:
PTO drive - Disassemble (C.10.B).

TRANSMISSION Mechanical - Torque

TIGHTENING TORQUES

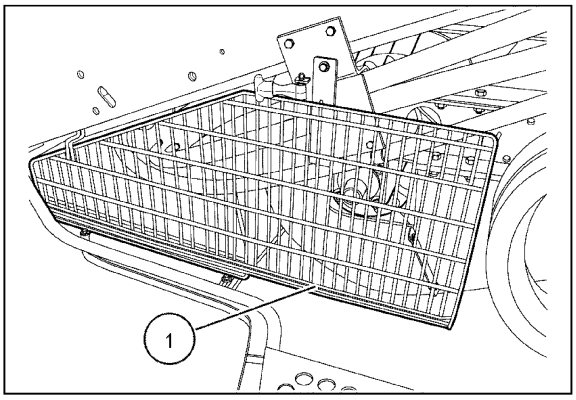
Nut on drive shaft	**150 - 170 Nm** (**111 - 125 lb ft**)
Nut on input shaft	**150 - 170 Nm** (**111 - 125 lb ft**)
Shifting Disc Shaft Castle Head Lock Nut	**25 - 30 Nm** (**19 - 22 lb ft**)
Nut on indicator plate	**8 - 12 Nm** (**71 - 106 lb in**)
Sensor Bolts	**4 - 6 Nm** (**36 - 53 lb in**)
Shifting Disc Housing Insert	**190 - 210 Nm** (**140 - 155 lb ft**)
Top cover bolts.	**45 - 55 Nm** (**33 - 41 lb ft**)
Drain Plug	**90 - 110 Nm** (**66 - 81 lb ft**)
Breather	**90 - 110 Nm** (**66 - 81 lb ft**)

TRANSMISSION Mechanical - General specification

Model Usage:	**AXIAL-FLOW®7010**
Differential ratio	16/71
Differential lock	Yes/No
Gear ratio	
1st gear ratio	18/58
2nd gear ratio	35/62
3rd gear ratio	45/61
4th gear ratio	63/44
Maximum input rpm (high idle)	**3027 RPM**
Maximum input rpm (full load)	**3027 RPM**
Maximum input torque	**977 Nm** (**720 lb ft**)
Maximum output rpm (high idle)	**977 RPM**
Maximum output torque (1st gear)	**8242 Nm** (**6079 lb ft**)
Maximum power (motor - transmission input)	**187 kW** (**250 Hp**)
Brake disc diameter	**330 mm** (**13.0 in**)
Approximate total weight	**402 kg** (**886 lb**)

Model Usage:	**AXIAL-FLOW®8010** **(optional on AXIAL-FLOW®7010)**
Differential ratio	20/61
Differential lock	Yes/No
Gear ratio	
1st gear ratio	18/58
2nd gear ratio	35/62
3rd gear ratio	45/61
4th gear ratio	63/44
Maximum input rpm (high idle)	**2752 RPM**
Maximum input rpm (full load)	**2752 RPM**
Maximum input torque	**823 Nm** (**607.0 lb ft**)

28. Install the lower forward fan shield **(1)**.



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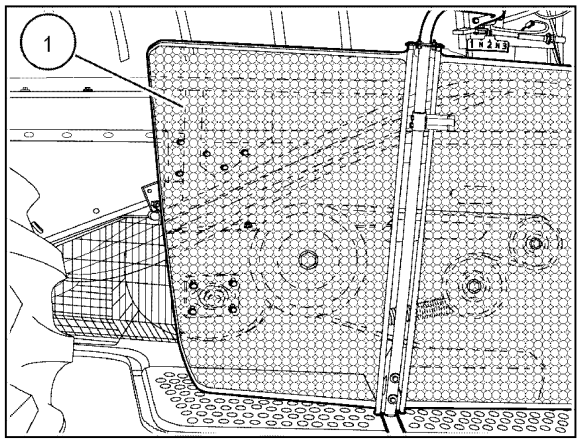
29. Install or close the side screen shield **(1)**.
30. Bleed the service brakes. **SERVICE BRAKE Hydraulic - Bleed (D.30.C)**.
31. Check all lines are secure and tight.
32. Remove the blocks or wheel chocks from the unit.



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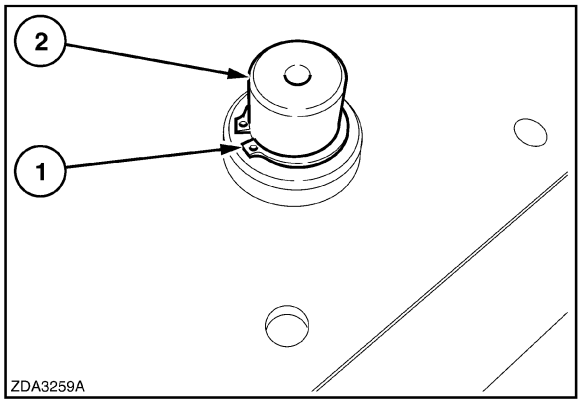
IMPORTANT: *Be sure to check the fluid level of transmission fluid before operation, failure to do so could result in transmission failure.*

4. Install differential lock control shaft **(2)**.

   Install retaining ring **(1)**.



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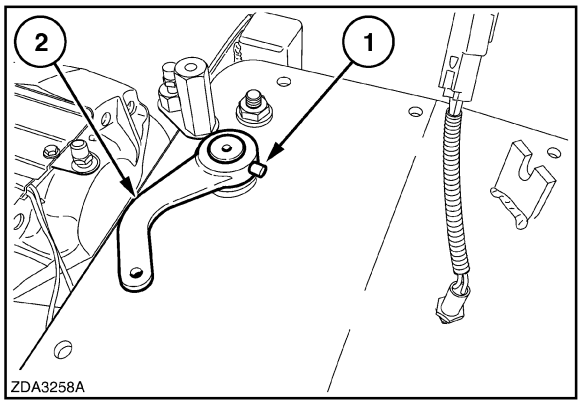
5. Install differential lock control lever **(2)**.

   Secure control lever with retaining pin **(1)** as shown.

NOTE: *Control lever can be installed in two positions. The correct position is shown.*



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TRANSMISSION Hydrostatic - Component identification

AXIAL-FLOW 7010 [HAJ000000 - HAJ201245], AXIAL-FLOW 8010 [HAJ000000 - HAJ201245]

The Axial Flow 7010 series combine comes with a 110 cc pump and 100 cc motor as standard equipment. However, the 130 cc pump/motor combination is optional on the 7010. Characteristics of both pump and motor types are presented here.

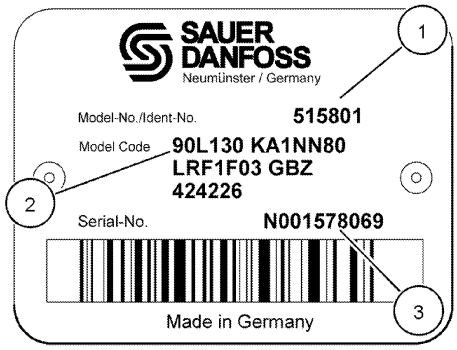
PUMP NAME PLATE

Each pump has a name plate attached to the housing. The name plate includes the model number, model code and serial number.

Model Number **(1)**
The Sauer Danfoss model number is used by the factory in manufacturing. A new unit can be ordered by the model number.

Model Code **(2)**
The Sauer Danfoss model code defines the specific build configuration of each unit and must be used when ordering spare parts or a new pump.

Serial Number **(3)**
The Sauer Danfoss serial number identifies the location and date of manufacture and the unit sequence in the build. The letter coding indicates the location of original assembly. "A" indicates assembly in Ames, Iowa, USA. "N" indicates assembly in Neumunster, Germany. The first number (two digits) indicates the year of manufacture. For example, a unit built in 2001 would have the number "01" in this space. The second number (two digits) indicates the calendar week of manufacture, from week 1 to week 52. The third number (five digits) is the sequential build number identifying the specific unit.



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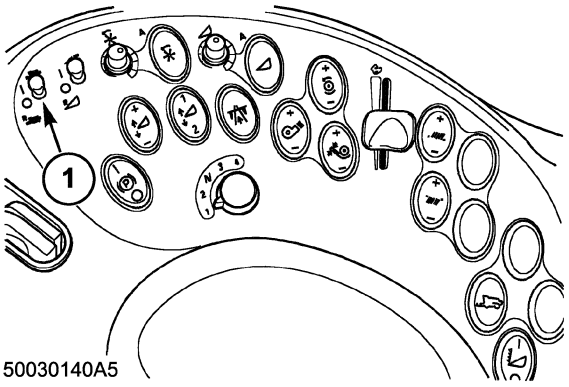
Pump Label Example

PUMP CHARACTERISTICS
The pump characteristics are coded on the pump identification plate.

Pump, 110 cc with 100 cc motor and HD 11/111 final drive

90 L 130 KP 5 NN 85 R R F1 H 09 GBA 42 42 20	
90	Series 90, closed circuit
L	Left hand (counterclockwise rotation)
130	Maximum displacement **130 cc/rev** (**7.9 in³/rev**).
KP	Electric displacement control; Packard Weather-Pack connector.
5	Pressure limiter function in ports A and B with orifice to limit overshoot.
NN	No auxiliary mounting pad.
85	Twin ports with internal loop flushing.
R	Remote pressure filtration without element.
R	Mechanical displacement limitation - **110 cc/rev**(**6.71 in³/rev**).
F1	Splined shaft - 13 teeth, pitch 8/16
H	Charge pump displacement **34 cc/rev** (**2.07 in³/rev**)

19. Start and run the engine at low idle until a minimum pressure gauge reading of **20 bar** (**290 psi**) is obtained.
20. Release the parking brake.
21. Slowly stroke the hydro to 1/2 stroke forward. Check to make sure that the transmission output shafts are turning properly.
22. Engage the rear wheel assist, if equipped. Make sure rear wheels are turning forward. Stroke the hydro and run the wheels forward for three minutes and then rearward for another three minutes.
23. Shift the combine into fourth gear and hold the brake pedals down.
24. Move the hydrostatic lever slightly rearward until the pressure gauge plumbed into the forward (M1) port reads a minimum of **30 bar** (**435 psi**). Do this for approximately 1 minute.
25. Move the hydrostatic lever slightly rearward until the pressure gauge plumbed into the forward (M2) ports reads a minimum of **30 bar** (**435 psi**). Do this for approximately 1 minute.
26. Shut off the combine engine and check for oil leaks. Check the PTO gearbox oil level, and add as necessary.
27. Check for oil leaks.
28. Restart the combine engine. With the gearshift in neutral and engine speed at low RPM, place the hydrostatic lever at half stroke for one minute in forward and reverse.
29. With the gearshift still in the neutral position, increase the throttle to full engine RPM. Move the hydro handle to maximum stroke for two minutes in both forward and reverse.
30. Move the gearshift to 4th gear and set engine speed to high idle. Apply maximum stroke on the control lever in forward position for a maximum of 10 seconds. Pressure should be **420 - 460 bar** (**6090 - 6670 psi**); repeat the procedure for reverse.
31. Press the switch **(1)** to engage the separator (perform only if shields are closed). Verify cleaning fan and spreader direction. Disengage the separator and operate the feeder reverser and rotor reverser for 10 seconds.



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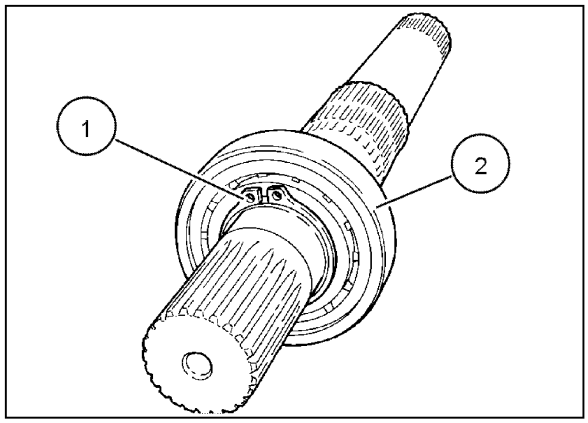
32. Shift the hydro into neutral, disengage the rear wheel assist and shut off engine.

10. Using a snap ring pliers, remove the snap ring **(1)** that secures the roller bearing assembly **(2)**.



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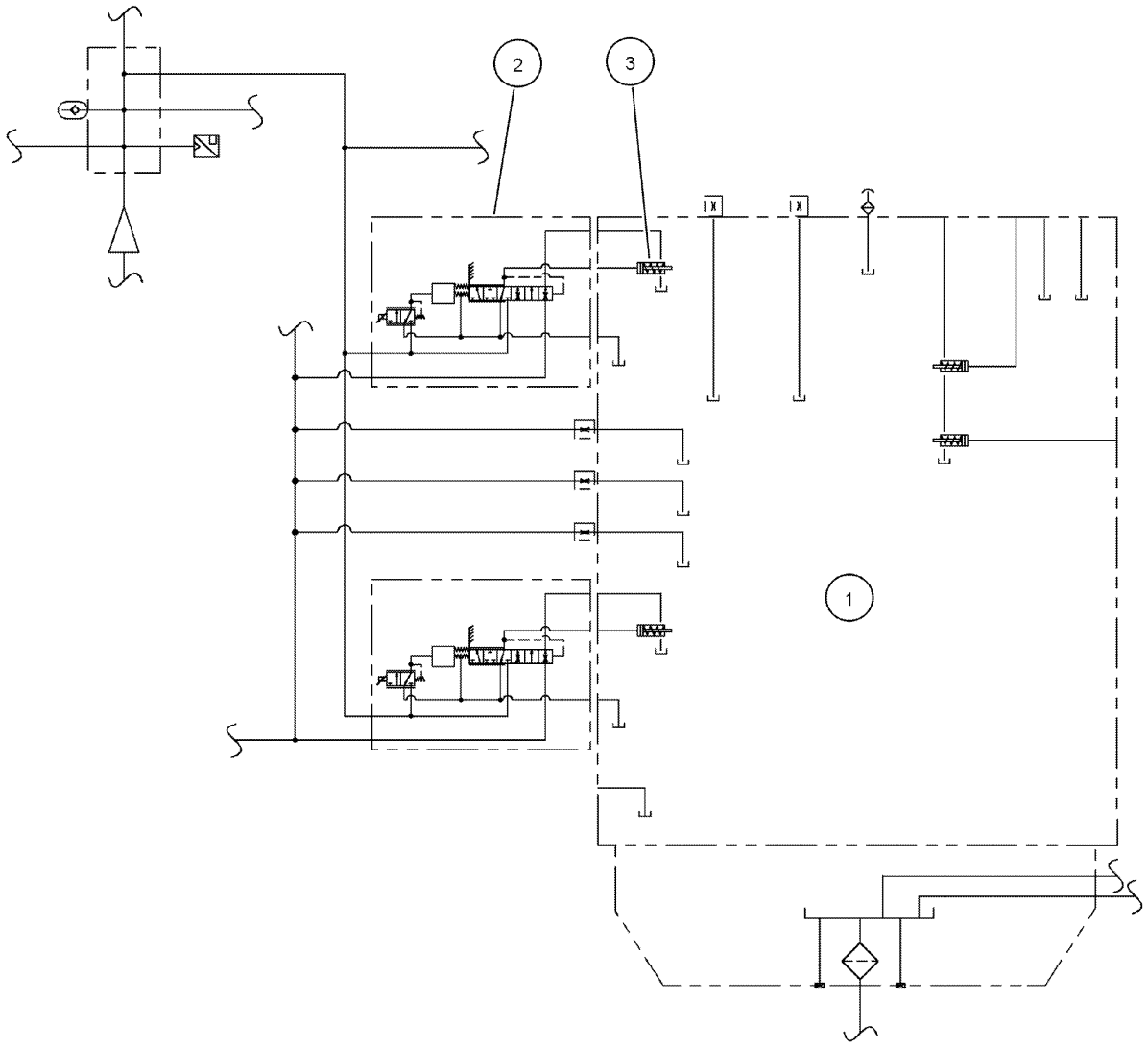
11. Press the roller bearing assembly off the shaft.

NOTE: *If the shaft is being replaced, the roller bearing assembly can be transferred to the new shaft.*

Index

POWER TRAIN - C

TRANSMISSION Hydrostatic - 20.F



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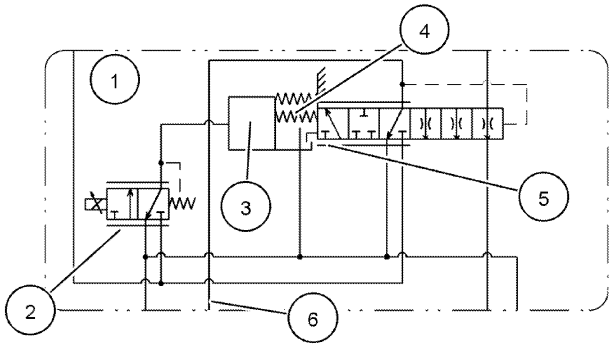
Hydraulic Schematic of PTO Box

Figure **3** is the hydraulic schematic of the PTO box **(1)**. The solenoid-activated control valve **(2)** directs control pressure oil to the beater/chopper clutch **(3)**.



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Beater/Chopper Clutch Control Valve Schematic

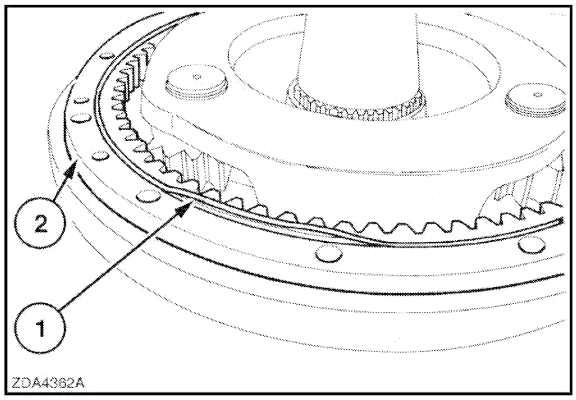
Figure **4** is the hydraulic schematic of the beater/chopper clutch control valve. Control pressure oil enters the beater/chopper control valve assembly at port **(1)**. Solenoid **L-22**-controlled valve **(2)** passes the oil in proportion to the

Contents

POWER TRAIN - C

TRANSMISSION LUBRICATION SYSTEM - 90.A

15. Remove O-ring **(1)** from ring gear **(2)**.



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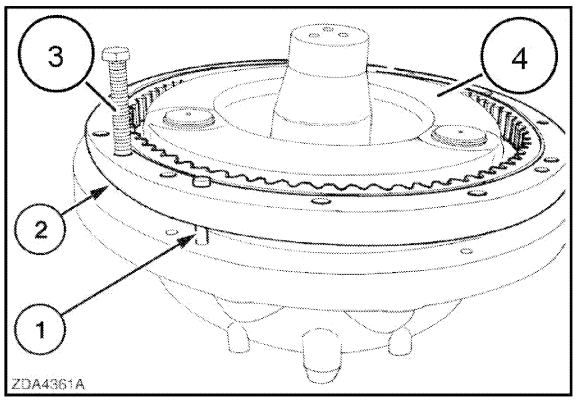
16. Install three M16 bolts **(3)** into the threaded jack holes located around the face of the ring gear **(2)**.

    Turn the bolts equally to raise the ring gear off of the planet gear carrier **(4)**. Remove the ring gear.

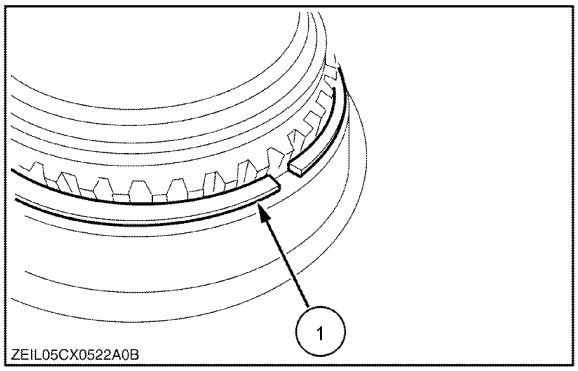
    Remove the two dowel pins **(1)** from the inner or outer housing, as required.

    Remove the second ring gear O-ring from the outer housing cover.



zda4361a 15

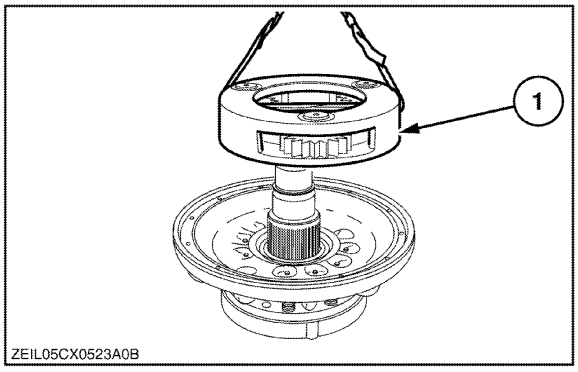
17. Remove the retaining ring **(1)** from the output shaft.



ZEIL05CX0522A0C 16

18. Remove planet gear carrier **(1)** with planet gears.

NOTE: *To disassemble the planetary carrier, reference* ***Final drive Reducer, satellite and planetary - Disassemble (D.10.A)****.*



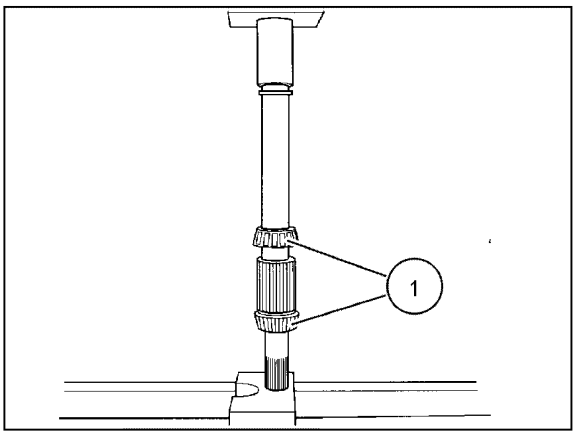
ZEIL05CX0523A0B 17

Final drive - Assemble - Bull Gear Type - 11:111 Ratio

AXIAL-FLOW 7010 [HAJ000000 - HAJ201245]

1. If the bearings **(1)** were removed from the input shaft, press the bearings onto the shaft using a piece of pipe that has a minimum inner diameter of **43 mm** (**1.7 in**), a maximum outer diameter of **51 mm** (**2.0 in**) and a length of **127 mm** (**5.0 in**).

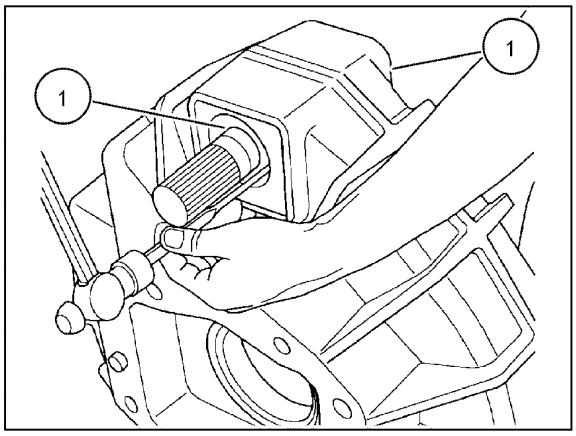
   Coat the bearings in **CASE AKCELA 135H EP GEAR LUBE SAE 80W-90** gear oil.



23074972 1

2. To aid installation, chill the input shaft bearing races in ice or a freezer for 15 minutes. Ensure the races are dry before installation.

   Install the input shaft into the final drive housing. Install the bearing races **(1)** into the housing using a hammer and a brass punch to drive the races into the housing. Ensure the races are properly seated against the bearing.



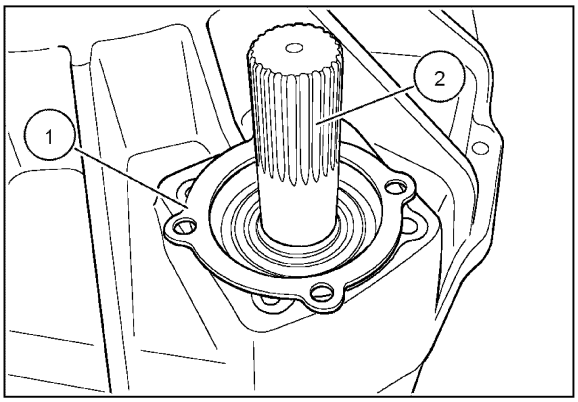
23074973 2

3. Install the outer endplate, not shown, for the input shaft onto the drive housing, using a new gasket between the plate and housing.

   Apply Loctite 242/243 to the four M10 x 30 endplate mounting bolts and install the bolts with lock washers into drive housing.

   Torque the bolts to **54 - 60 Nm** (**40 - 44 lb ft**).

   Place the inner endplate and shims **(1)** for the input shaft onto the drive housing. Use care not to damage the O-ring oil seal when installing the plate. Torque the bolts to **54 - 60 Nm** (**40 - 44 lb ft**). This will seat the bearing races.



53021334 3

Hydrostatic motor - Bleed

AXIAL-FLOW 7010 [HAJ000000 - HAJ201245], AXIAL-FLOW 8010 [HAJ000000 - HAJ201245]

A specific start up procedure must be performed after servicing the powered rear axle system. This ensures adequate flushing or bleeding after a component of the powered rear axle system has been serviced or replaced. The following procedure serves to bleed air out of the powered rear axle system and flush any contamination of the system out. Air in the powered rear axle system is pushed out of the hydrostatic system through the hydrostatic fluid reservoir. It is imperative to follow the exact procedure described; otherwise, the purpose of the procedure will be defeated. Steps 1 through 7 of the procedure are to be performed with the rear wheels off the ground and the front wheels of the machine securely blocked.

IMPORTANT: *If air is introduced into the powered rear axle system at any time during the following procedure, restart the procedure at step one.*

⚠ WARNING ⚠

Unexpected machine motion or moving parts can cut and crush. Apply parking brake and shut down the engine before working on the machine. Put the machine on blocks only if the surface is solid, even, and level. Make sure that any blocks used to support the machine are solid, one-piece units. Put blocks next to the tires that are not being raised to prevent movement of the machine.

M625

⚠ WARNING ⚠

Pressurized hydraulic fluid can penetrate the skin and cause severe injuries. Tighten all of the connections before starting the engine. If hydraulic fluid has penetrated the skin, seek medical assistance immediately.

M950

⚠ WARNING ⚠

Use care not to exceed the 13 mm (1/2 inch) movement of the hydrostatic control lever in order to avoid excessive oil flow from the Powered Rear Axle system.

M951

⚠ WARNING ⚠

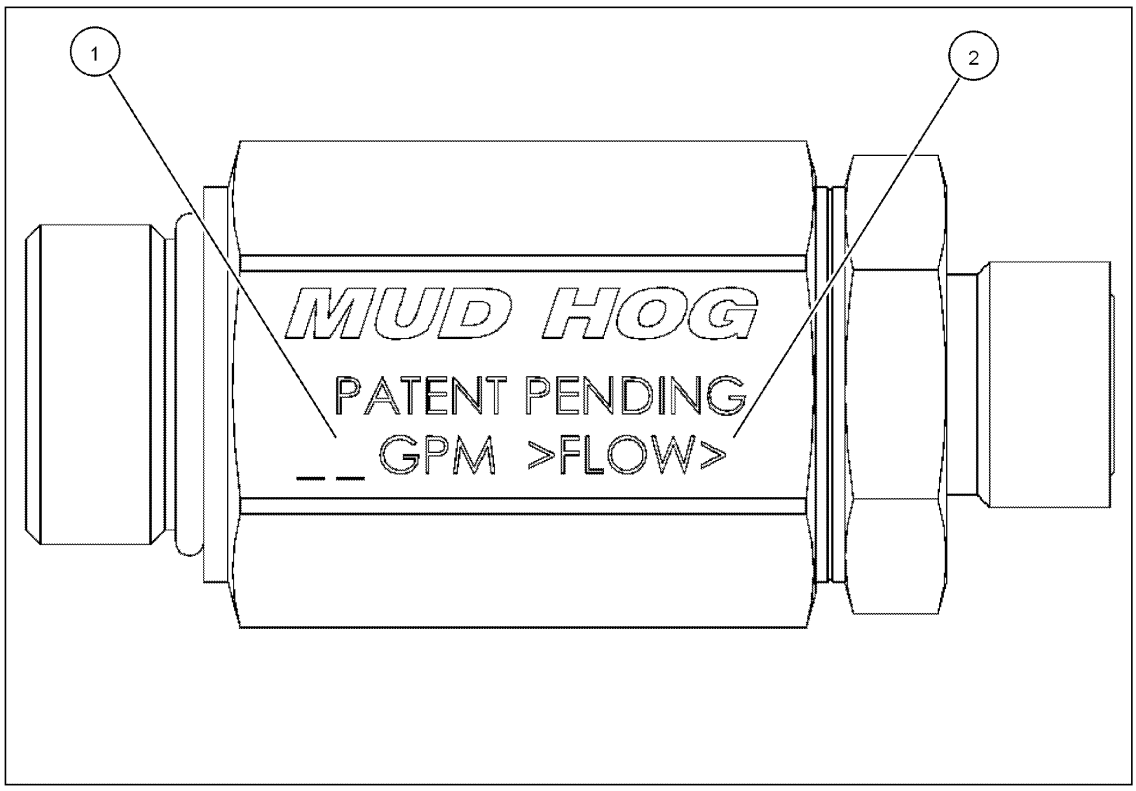
Make sure the hydraulic fluid in the reservoir is at the proper level at all times. Failure to maintain the proper fluid level may cause damage to the machine hydrostatic components.

M952

IMPORTANT: *If air is introduced into the system at any time during the following procedure, restart the procedure at step 1.*

1. Raise the rear wheels from the ground and support with jack stands.
2. BLEED AIR FROM ENTIRE SYSTEM - Raise the rear wheels from the ground and support with jack stands. Run the engine at half throttle. Select NEUTRAL on the gear selector. Activate the powered rear axle. Move the Hydro control lever to NEUTRAL. Run the combine for a duration of 3 minutes.
3. FLUSH FORWARD MAIN SYSTEM - Run the engine at HIGH idle. Select NEUTRAL on the gear selector. Deactivate the powered rear axle. Move the Hydro control lever **13 mm (1/2 in)** FORWARD. Run the combine for a duration of 2 minutes.

Flow Regulator Identification

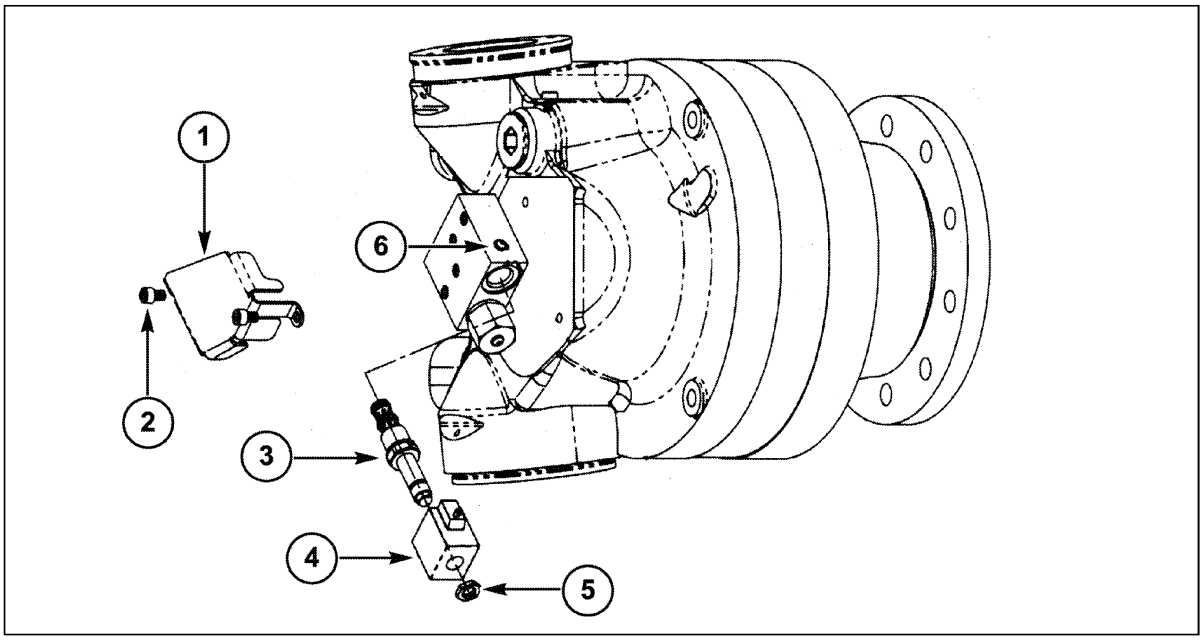


53061401 2

Each Flow Regulator shows the direction of regulated flow and has a flow rate (gpm) stamped in the outer housing. (Text on regulator may be different than shown.)

1. Flow Rate (gpm)
2. Direction of regulated flow

Control valve - Overhaul



20042888 1

⚠ WARNING ⚠

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 comply could result in death or serious injury.

46-77A

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.

⚠ WARNING ⚠

Hydraulic fluid escaping under pressure can have enough force to penetrate the skin. Hydraulic fluid may also infect a minor cut or opening in the skin. If injured by escaping fluid, see a doctor at once. Serious infection or reaction can result if medical treatment is not given immediately. Make sure all connections are tight and that hoses and lines are in good condition before applying pressure to the system. Relieve all pressure before disconnecting the lines or performing other work on the hydraulic system. To find a leak under pressure use a small piece of cardboard or wood. Never use hands. Failure to comply could result in death or serious injury.

M252A

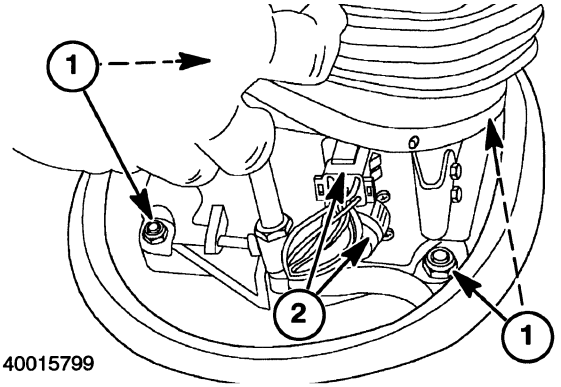
2. Release the pressure in the supply circuit.
3. Disconnect the drain line at the tank level to avoid siphoning.
4. Disconnect the electrical connection.
5. Remove the two capscrews **(2)** and cover **(1)**.
6. Remove the Hex nut **(5)**, magnetic winding **(4)** and cartridge valve **(3)**.
7. Make sure new cartridge valve is clean. Lubricate O-rings with hydraulic fluid. Install new cartridge valve **(3)** and torque to **24 - 30 Nm (17.8 - 22.2 lb ft)**.

Steering column - Install

AXIAL-FLOW 7010 [HAJ000000 - HAJ201245], AXIAL-FLOW 8010 [HAJ000000 - HAJ201245]

Prior operation:
Steering column - Assemble (D.20.C)

1. Slide column onto its mount.
2. Secure column to the combine cab floor with four M8 nuts and lock washers **(1)**. Attach two electrical connectors **(2)**.
3. Secure boot to cab floor mat.



40015799a 1

PARKING BRAKE Hydraulic - Bleed

⚠ WARNING ⚠

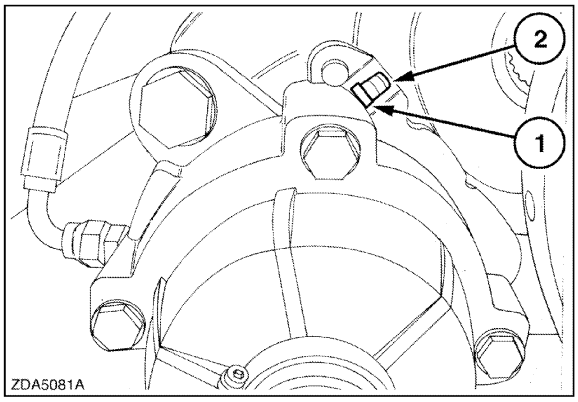
If machine is on a slope and the above procedure is performed, the machine will roll. Perform the above procedure only when machine is on a flat surface or completely restrained by blocking the wheels. Failure to comply could result in death or serious injury.

M1278

NOTE: *Catch bleed hydraulic fluid in a container. Dispose of used hydraulic fluid per local regulations. Do not reuse.*

As a safety precaution, this bleed operation is performed with the combine engine stopped, and unit blocked to prevent rolling. This bleed procedure uses only the hydraulic head pressure created by the elevated location of the hydraulic oil reservoir.

1. To bleed the hydraulic parking brake assembly, proceed as follows:
    1. Park the combine on level ground and block the wheels adequately to prevent the combine form moving.
    2. Remove rubber cap **(2)** from bleed screw **(1)**.
    3. Slide a transparent hose over the bleed screw **(1)** to direct bleed hydraulic fluid into a catch container.
    4. Open the bleed screw until the oil, free of air bubbles, escapes through the bleed screw.
    5. Close the bleed screw. Torque bleed screw to **15 - 18 Nm** (**11 - 13 lb ft**).
    6. Remove transparent hose and reinstall rubber cap **(1)**.
    7. Exit from underneath the combine to check the parking brake operation.
    8. Ensure no one is under the combine. Start the combine engine.
    9. From the cab, electrically disengage and engage the parking brake a few times to verify operation.
    10. Engage the parking brake and stop the engine.
    11. If parking brake is not properly disengaging, repeat the bleed procedure.
    12. Check the Hydraulic Reservoir for correct oil level. Add **CASE AKCELA HY-TRAN ULTRA** as needed.



ZDA5081A 1

NOTE: *A long [* ***2 m (6 ft)****] test lead will be required for one person to be able to complete this test. Construct the test lead using a Deutsch Size 16 Series 30 pin (Deutsch part #0460-215-16141) on one end, and a suitable socket on the other that can connect to the multimeter test probe.*

N°	Test Point	Expected Result	Other Result (Possible Cause)
1	**Condition** Unplug the small connector at the base of the mirror support bracket. Insert the pin of the test lead into socket 2 of this connector. Turn key switch ON. Set Mirror Adjust Switch to Right mirror. Set the Mirror Select switch **S-57** to position 2. Hold Mirror Adjust Switch in RIGHT, and then UP positions. **Check** Use a multimeter to check for voltage at German Mirror connector pin 2.	**Result** If there is **12 volts** in each position, **Action** Go to test **2**	**Action** If there is no voltage, check the condition of fuse **F-09**. If fuse **F-09** has failed, there is a short to ground in this circuit. If fuse **F-09** has not failed, there is an open circuit. This circuit is in the cab roof (CR) or outer roof (OR) harnesses between Mirror Adjust Switch connector **X126** pin F, through connector **X036** pin 26 and connector **X287** pin 2 to the mirror connector wire 954 gray or 966 gray. Locate the short or open and repair.
2	**Condition** Move the test lead pin to socket 4 of the mirror support bracket connector. Hold Mirror Adjust Switch in DOWN position. **Check** Use a multimeter to check for voltage at German Mirror connector pin 4.	**Result** If there is **12 volts**, **Action** Go to test **3**	**Action** If there is no voltage, check the condition of fuse **F-09**. If fuse **F-09** has failed, there is a short to ground in the circuit. If fuse **F-09** has not failed, there is an open circuit. This circuit is in the cab roof (CR) or outer roof (OR) harnesses between connector **X178** pin 1, through connector **X036** pin 20 and connector **X287** pin 4 to the mirror connector wire 963 white. Locate the short or open and repair.
3	**Condition** Move the test lead pin to socket 1 of the mirror support bracket connector. Hold Mirror Adjust Switch in LEFT position. **Check** Use a multimeter to check for voltage at German Mirror connector pin 1.	**Result** If there is **12 volts**, the circuits to the left mirror are functioning properly. **Action** Test the German mirror assembly. Go to test **4**	**Action** If there is no voltage, check the condition of fuse **F-09**. If fuse **F-09** has failed, there is a short to ground in the circuit. If fuse **F-09** has not failed, there is an open circuit. This circuit is in the cab roof (CR) or outer roof (OR) harnesses between connector **X178** pin 4, through connector **X036** pin 24 and connector **X287** pin 1 to the mirror connector wire 964 white. Locate the short or open and repair.
4	**Condition** Key switch OFF. **Check** Use a multimeter to check resistance through the mirror at the small connector pins 1 and 2.	**Result** If there is **10 - 40 ohms** resistance, **Action** Go to test **5**	**Action** If there is zero or infinite resistance, the German mirror in/out motor **M-31** has failed. Repair or replace the mirror assembly.
5	**Condition** Key switch OFF. **Check** Use a multimeter to check resistance through the mirror at the small connector pins 2 and 4.	**Result** If there is **10 - 40 ohms** resistance, the mirror adjust motors should be functioning properly.	**Action** If there is zero or infinite resistance, the German mirror up/down motor **M-30** has failed. Repair or replace the mirror assembly.

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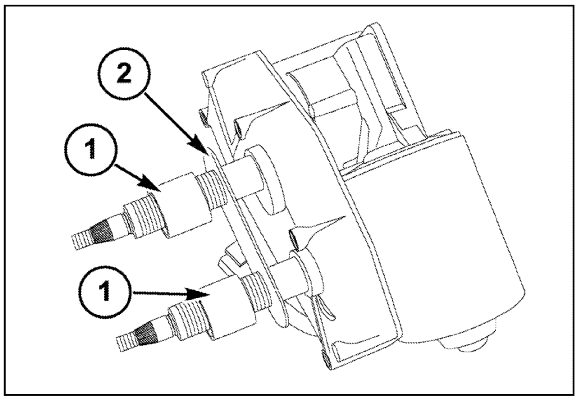
BODY AND STRUCTURE - E

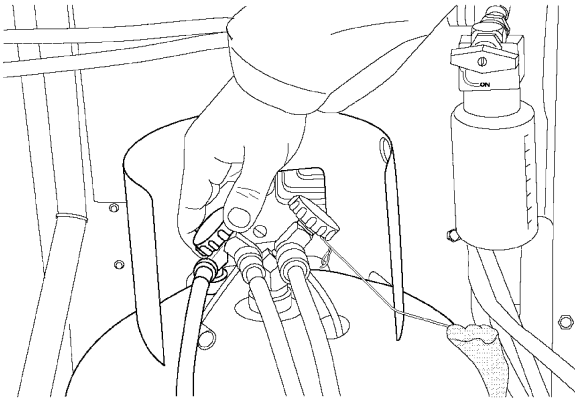
SHIELD - 20.A

12. Remove spacers **(1)** and spacer plate **(2)** from motor.



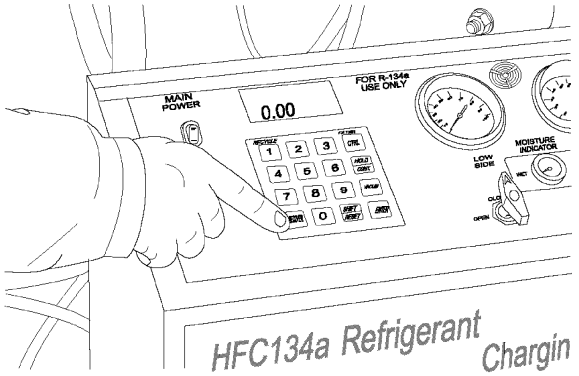
40044134A5 12

6. Make certain the refrigerant tank gas and liquid valves are open.



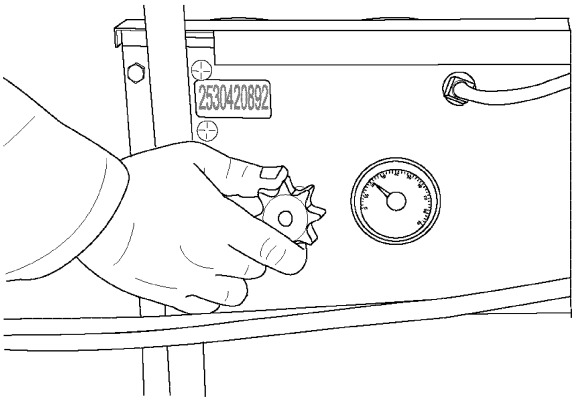
83060842 3

7. Connect the main power plug to a 115 volt AC outlet. Move the main power switch to the ON position and depress the recovery start switch. The compressor will shut OFF automatically when recovery is complete. Wait for five minutes and observe the manifold pressure gauges for a pressure rise. If pressure rises above zero PSI, depress the hold/cont switch. Then wait for the compressor to automatically shut OFF.



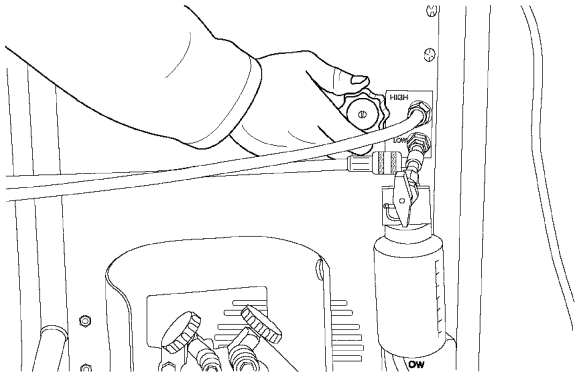
83060846 4

8. Drain the oil separator of the A/C system oil. Open the air purge valve long enough to let some of the compressor discharge pressure back into the separator.



83060843 5

9. Slowly open the oil drain valve and drain the oil into the reservoir. When the oil stops draining, close the oil drain valve completely.

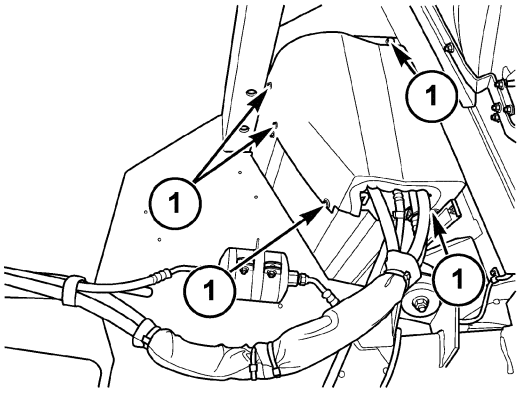


83060844 6

Expansion valve - Remove

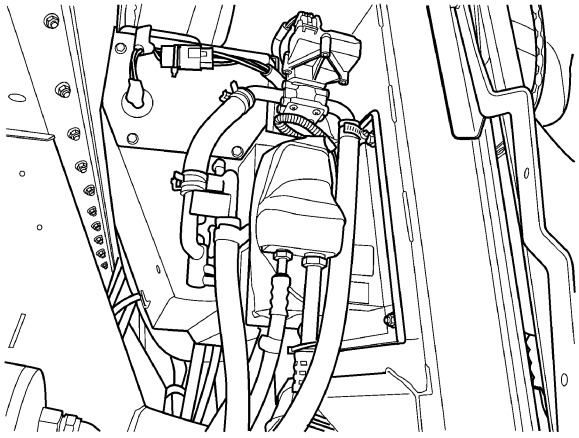
AXIAL-FLOW 7010 [HAJ000000 - HAJ201245], AXIAL-FLOW 8010 [HAJ000000 - HAJ201245]

1. Turn out the five cap screws **(1)** holding the ventilation system shield in place. Lift the shield from the combine.



10036357A5 1

2. Recover refrigerant in accordance with local regulations.
3. Fold back the insulation from the thermal expansion valve. Disconnect refrigerant lines and cap them to prevent moisture or foreign material from entering the system. Turn out cap screws.



10036359 2

⚠ **CAUTION** ⚠

DO NOT use a self-powered test light for any of these tests. Use of a self-powered light can cause damage to components in this system.

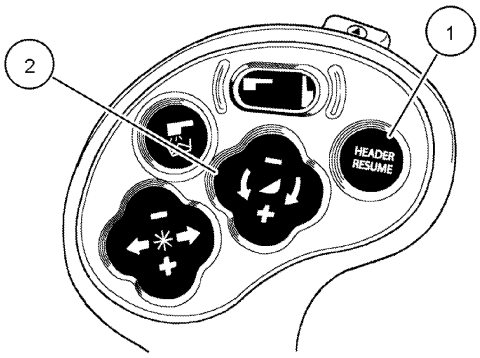
M979

⚠ **WARNING** ⚠

Before performing any of the electrical tests, be sure all operating controls are in neutral or park lock position. This will eliminate accidental movement of the machine or start-up of power driven equipment. Failure to comply could result in death or serious injury.

M980

N°	Test Point	Expected Result	Other Result (Possible Cause)
1	**Condition** Keyswitch ON. **Check** Measure voltage at HVAC Control Module connector X128 pin C2.	**Result** **12 volts**. If good reading, **Action** Go to test **2**	**Action** Open in Switched Ignition Power Supply to HVAC Unit. Repair or replace circuit.
2	**Condition** Keyswitch OFF. **Check** Measure resistance between HVAC Control Module connector X128 pin D14 and ground.	**Result** Less than **1 ohm**. If good reading, **Action** Repair or replace HVAC Control Module.	**Action** Open in ground circuit to HVAC Unit. Repair or replace circuit.



50030101 17

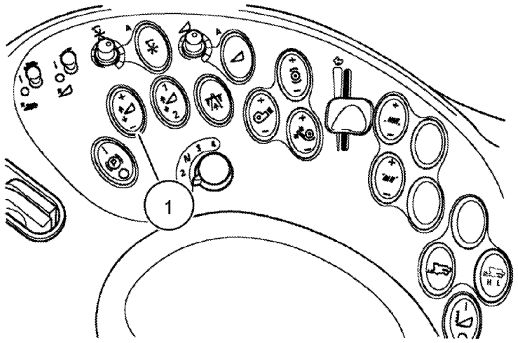
Propulsion Control Lever

PRESSURE FLOAT Mode

When the operator presses the momentary HEADER RESUME switch **(1)** on the propulsion control lever, Figure **17**, the header is raised or lowered to the feeder position setting called for in the initial header setup. If the header is a grain header and if the settings (# 1 or # 2) call for the PRESSURE FLOAT mode, the header height control system will enable PRESSURE FLOAT mode when the actual feeder position matches the working feeder position within +/- 0.4%.

The system raises or lowers the feeder to maintain the header lift pressure at the working setting. Recall that the working setting for PRESSURE FLOAT mode is the pressure measured when the header is at ground level. If the lift pressure decreases, indicating the header height has decreased (ground rising), the feeder is raised to support more of the weight of the header to restore the pressure to the working setting. If the lift pressure increases, indicating the header height has increased (ground lowering), the feeder is lowered to support less of the weight of the header to restore the pressure to the working setting.

CCM1 monitors the input from header lift pressure sensor **B-29** and compares this value against the pressure setting information from the RHM. (The settings on the Universal Display Plus monitor are sent to the RHM via the CAN bus. The RHM, in turn, sends the setting information to CCM1, also via the CAN bus). When necessary to maintain the header height, CCM1 sends PWM signals to header raise solenoid **L-11** or header lower solenoid **L-12**.



50031293 18

Right-Hand Control Panel

The operator can fine adjust the header height working setting with the AUTO HEADER HEIGHT FINE ADJUSTMENT control, **(1)**, on the right-hand control panel, Figure **18**. Pressing (+) raises the feeder. The new feeder height becomes the new working setting, and this is saved to the Header Height Mode being used (# 1 or # 2), with the appropriate header type. Pressing (–) lowers the feeder, and this new height becomes the new working setting.

The AUTO HEADER HEIGHT FINE ADJUSTMENT control is 2-pole momentary action switch **S-06**. When activated, the switch applies **12 volts** to pin 6 or pin 7 of RHM. RHM transmits this switching information to CCM1 via the CAN bus. CCM1 applies a PWM signal to header raise solenoid **L-11** or header lower solenoid **L-12**, depending on the amount and direction of fine adjustment called for.

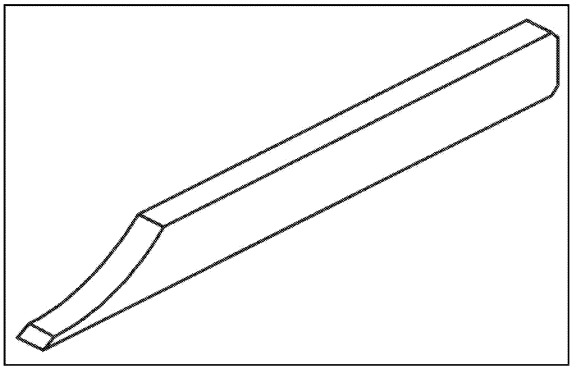
Index

TOOL POSITIONING - G

LEVELLING - 30.A

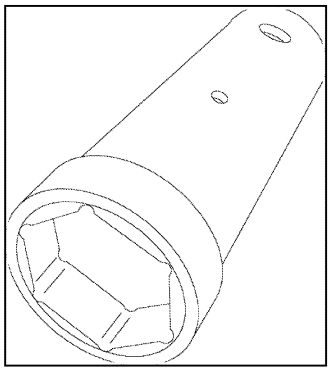
FEEDING Feeder housing - Special tools

AXIAL-FLOW 7010 [HAJ000000 - HAJ201245], AXIAL-FLOW 8010 [HAJ000000 - HAJ201245]



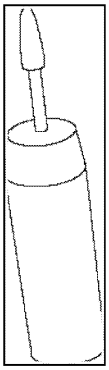
380000660 1

380000660 Nut Un-Stake Chisel.



40042942 2

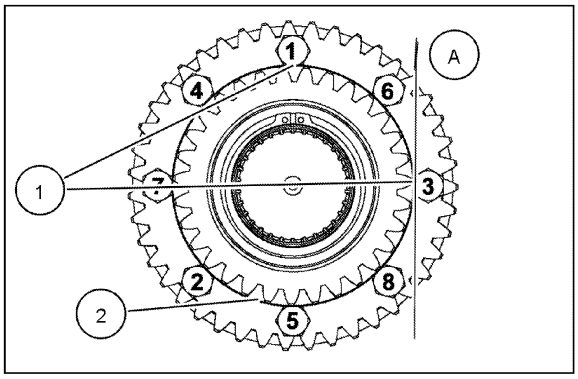
380000506 60 mm Extended Deep Well Socket.



40042946 3

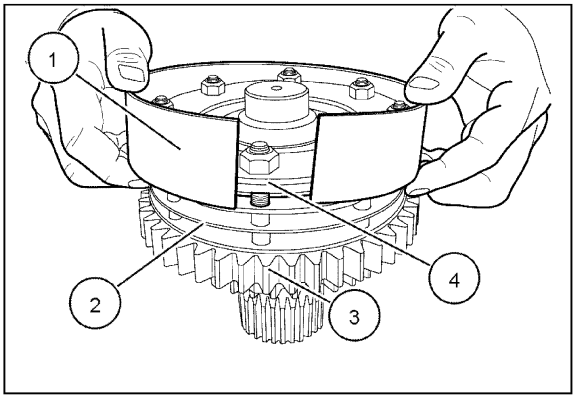
CAS2002A Expander/Protector Sleeve.

11. Ensure a flat **(1)** on the hex head of each cap screw is indexed so that the flat is tangent **(A)** to the raised offset surface **(2)** on the gear assembly. The cap screw head must make flush contact to the gear assembly.



63070090 11

12. Install special tool, **380002825**, Clutch Spring Installer gauge **(1)** to fit the circumference of the external separator discs **(2)** between the gear assembly **(3)** and the Belleville spring plate **(4)**.

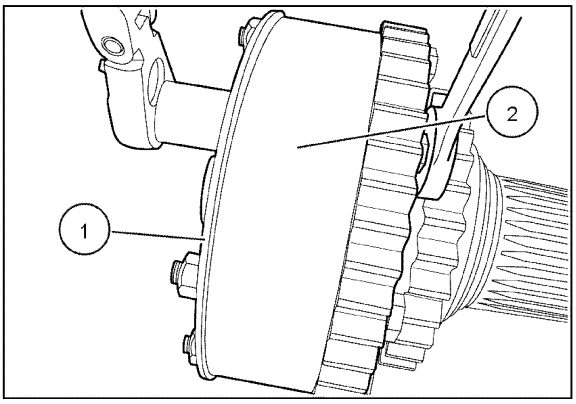


83070086 12

13. Continue to tighten the M10 lock nuts gradually in repeated rotation until first resistance or positive pressure of the Belleville spring plate **(1)** to the special tool spring gauge **(2)** is noted at each lock nut around the entire circumference.

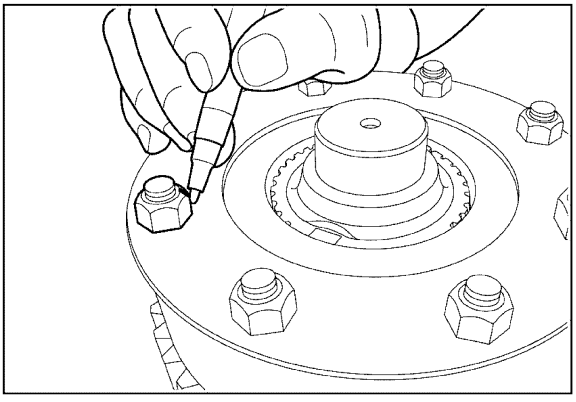
IMPORTANT: *Do not use an impact wrench to tighten this hardware as the Belleville spring plate and special tool may be deformed if over tightened.*
The spring gauge will be locked (unmovable) and no gap between the spring plate and spring gauge when properly tightened.

Ensure the cap screw heads are indexed and flush against the gear assembly, not resting on the offset, as previously described.



83070087 13

14. With a paint marker, mark each nut to the Belleville spring plate with a short line that radiates to the center of the clutch shaft.



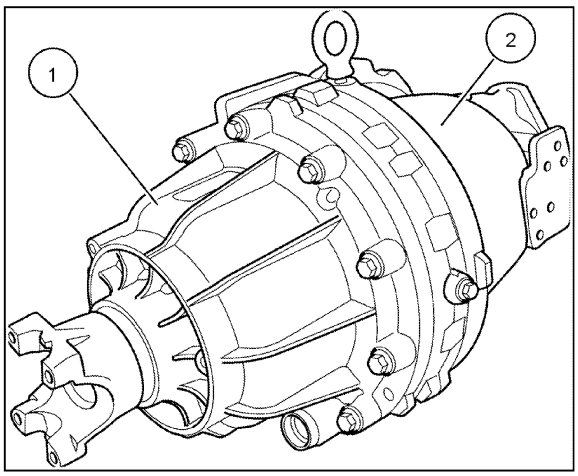
83070088 14

Continuously Variable Transmission (CVT) - Disassemble - Feeder CVT

AXIAL-FLOW 7010 [HAJ000000 - HAJ201245], AXIAL-FLOW 8010 [HAJ000000 - HAJ201245]

Prior operation:
Continuously Variable Transmission (CVT) - Remove (K.25.E).

1. Separate the CVT main housing **(1)** from the bevel gear housing **(2)**.

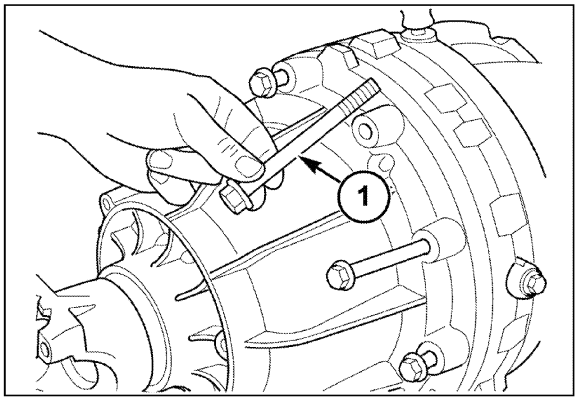


10036343 1

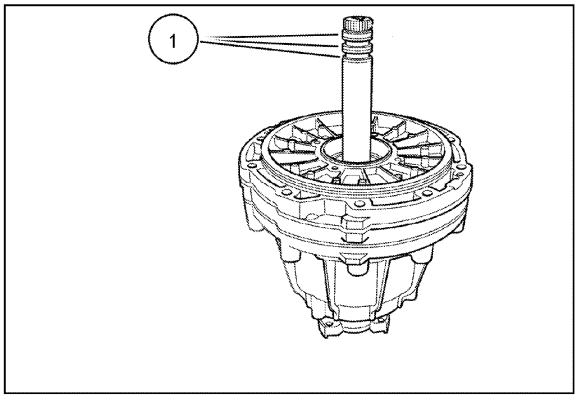
2. Remove the ten M12 x 125 bolts **(1)** that secure the two housings.
3. When the bolts are removed, carefully pry the two housings sections apart. Alignment dowel pins and a bonding sealant may cause separation to be difficult.

IMPORTANT: *The housing is made of aluminum, use care when separating the bevel gear housing from the CVT to not mar or damage the two surfaces.*

4. Pull the main housing straight out from bevel gear housing to clear the bevel gear output shaft from the housing.
5. Slide the spline end of bevel gear hollow output shaft from the clutch basket and off of the inner shaft.
6. Remove the three Teflon seals **(1)** from the shaft.

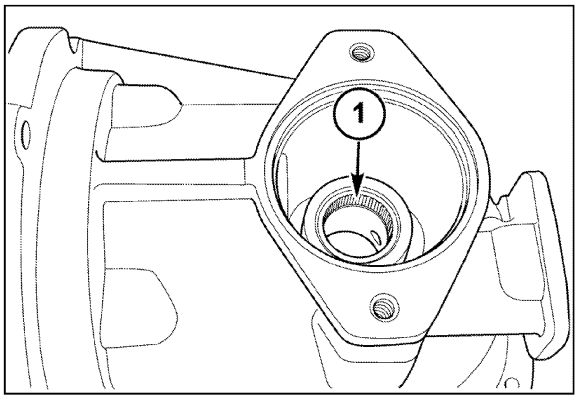


10036344B5 2



10035898A5 3

10. Remove the needle bearing **(1)** from the bevel gear drive housing using a puller.



10036339B5 10

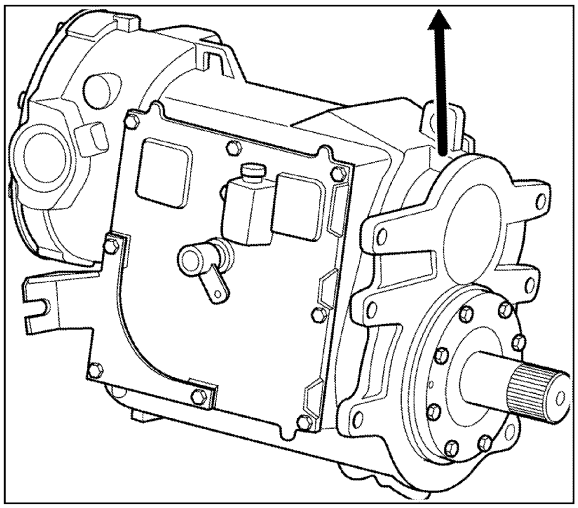
Next operation:
Continuously Variable Transmission (CVT) Bevel gear - Assemble (K.25.E).

Contents

CROP PROCESSING - K

THRESHING Axial flow threshing - 40.C

10. Using an overhead hoist and a chain or safety strap capable of lifting the gearbox hook into the cast loop on the housing.
11. Exert tension on the gearbox so when the bolts securing it are removed it does not drop.
12. Remove the bolts attaching the gearbox to the machine.
13. Pry the gearbox out of the rotor coupler and turn it sideways.
14. Slowly hoist the gearbox from the machine.

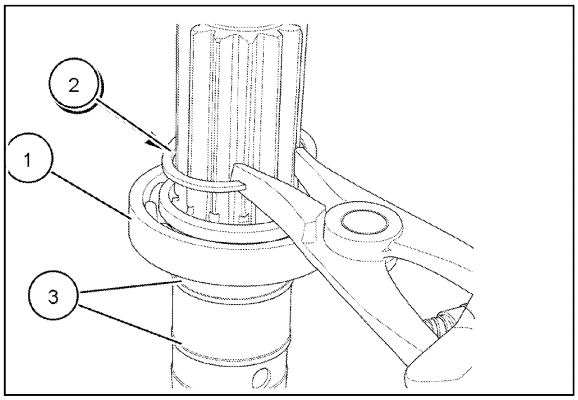


10041864 7

7. Press a new roller bearing **(1)** on the input shaft.

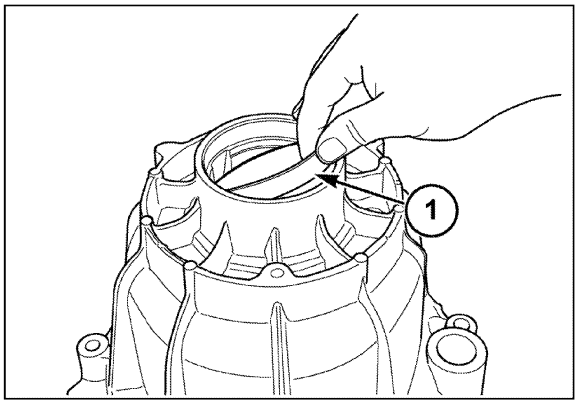
   Install the retaining ring **(2)** in the groove on the shaft after the bearing is in place.

   Using special tools **CAS2002A**, **CAS2327**, and **CAS2005-4**, install the two shaft seals, **(3)** , onto shaft near the bearing.



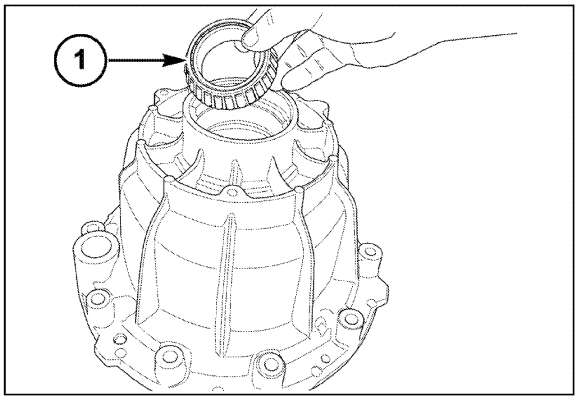
10035946B5 7

8. Press new bearing cup **(1)** into main housing.



10035942B5 8

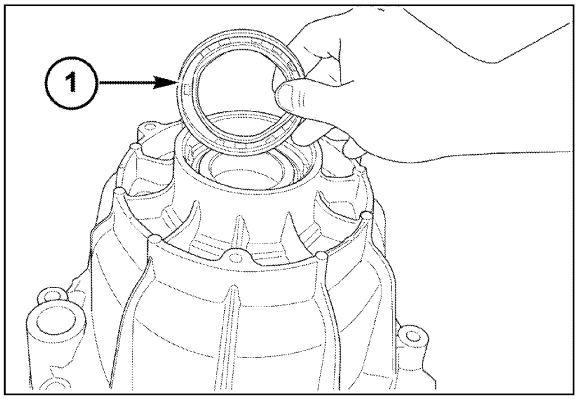
9. Install bearing cone **(1)** into cup.



10035939B5 9

10. Apply a light film of grease on seal lip.

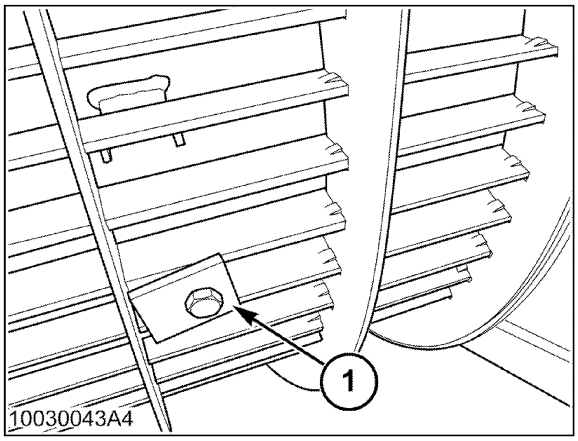
    Install seal **(1)** into main housing. The seal should be pressed in **2 - 3 mm** (**0.08 - 0.12 in**) below the housing surface



10035938B5 10

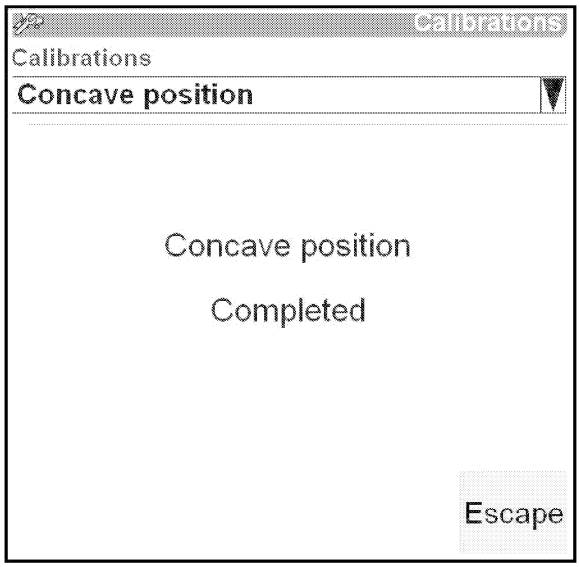
30. Remove the block of wood by lowering the concaves, and also remove the rotor retaining tool **(1)** from the rotor if it has not been done already in a previous step.

    Install the rotor access cover, and the grain tank access door.



10030043A4 27

31. Perform concave position calibration as described in Operator's Manual.



20063189 28

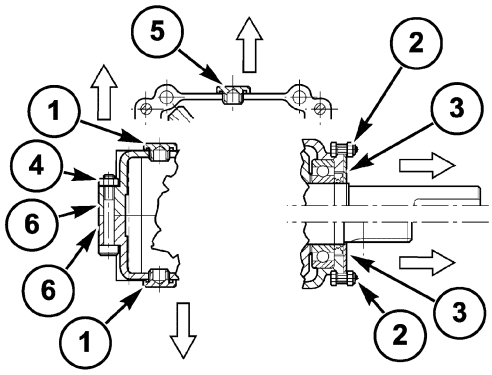
Next operation:
FEEDING Feeder housing - Install (K.25.E).

Tank delivery - Disassemble Gearbox

AXIAL-FLOW 7010 [HAJ000000 - HAJ201245], AXIAL-FLOW 8010 [HAJ000000 - HAJ201245]

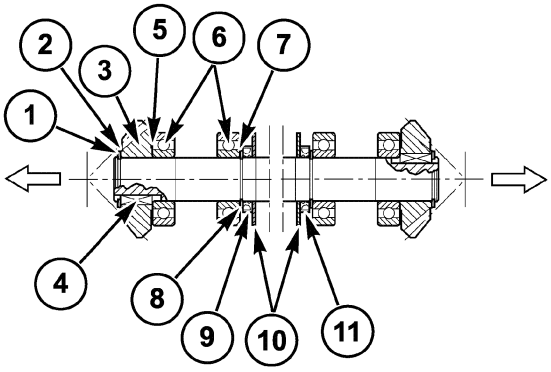
Prior operation:
Remove bubble-up auger assembly per **Bubble-up auger - Remove (K.60.B)**
Prior operation:
Remove gearbox from bubble-up assembly.

1. The gearbox assembly consists of two very similar 90 degree bevel gear boxes. Many operations for the second box are identical to that for the first box. To disassemble the gearbox, proceed as follows: Remove oring plugs **(1)** to drain oil from both boxes. Remove nuts and bolts **(2)** and remove plate **(3)**. Remove eight bolts and nuts **(4)**. Remove the oring plug **(5)** on the centerline seam taking care not to damage oring. Separate gearbox housing halves **(6)** and remove connecting shaft.



20041751A5 1

2. Remove snap ring **(1)**. Remove shim **(2)** and gear **(3)** with hammer and soft punch and mark parts and appropriate shaft end. Remove parallel key **(4)** then shim **(5)**. Pull or press off bearings **(6)** marking these parts as well. Remove shim **(7)** and snap ring **(8)** oil seal **(9)** and two plates **(10)** and seal **(11)**. Repeat process from other end, again marking parts as to original location.



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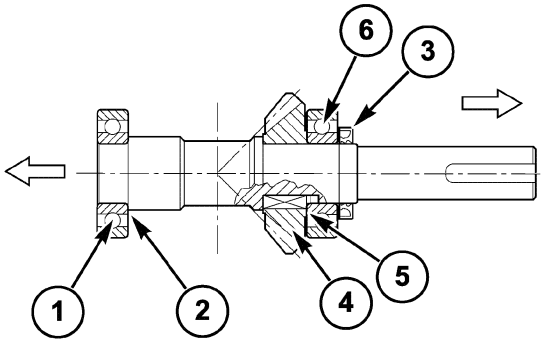
3. Pull bearing **(1)** from input shaft and remove shim **(2)**. Remove oil seal **(3)**. Press gear **(4)** shim **(5)** and bearing **(6)** off of shaft.



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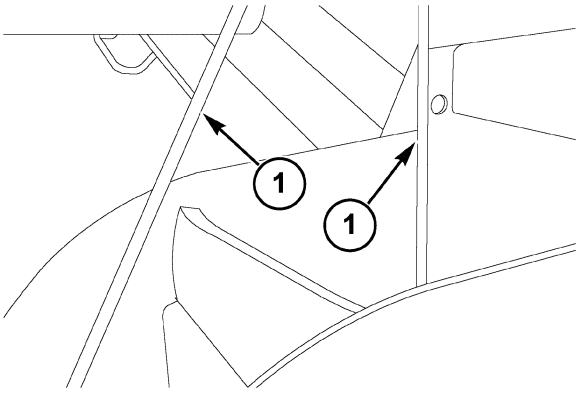
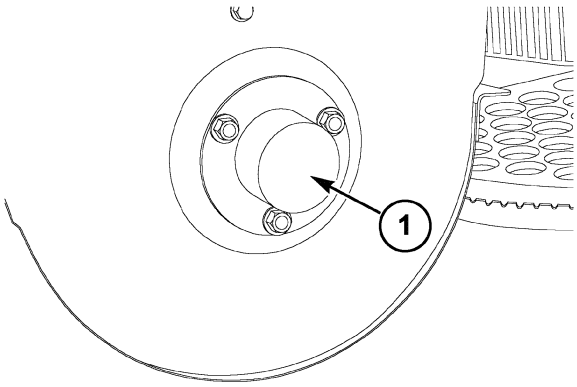
8. Pull upwards on center of rope **(1)** to raise both ends of chain up above the bolted flange joint of the lower body and the main elevator housing.

NOTE: *If the main elevator housing or the upper shaft is to be removed as well, perform step 6 and then turn the chain out of the bottom while holding the rope to control chain speed.*



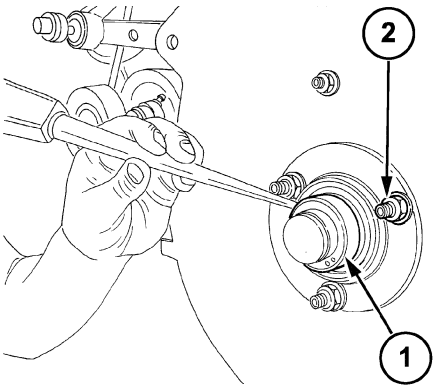
40037320A5 7

9. Remove nuts to remove cover **(1)**.



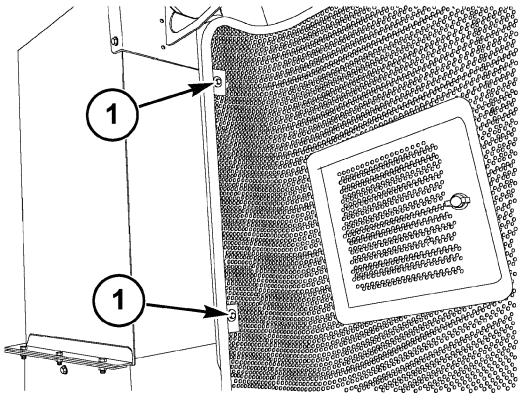
40033213A5 8

10. Remove lock collar **(1)**. Loosen nuts **(2)** and remove the outer bearing flange, the bearing, and the inner flange.



50037327A5 9

11. Remove two cap screws, lock washers and nuts **(1)** from right hand drives screen and the bracket on front of the elevator.



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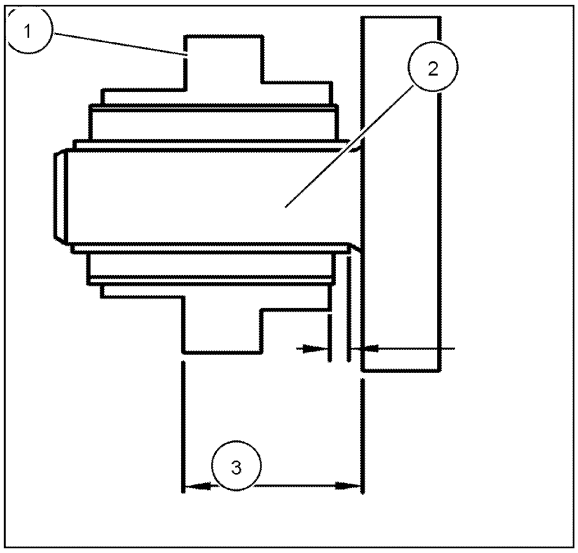
17. Press flange and bushing assembly **(1)** onto pivot pin **(2)** until the top of flange to top of mounting plate dimension **(3)** is **35 - 37 mm** (**1.38 - 1.46 in**).

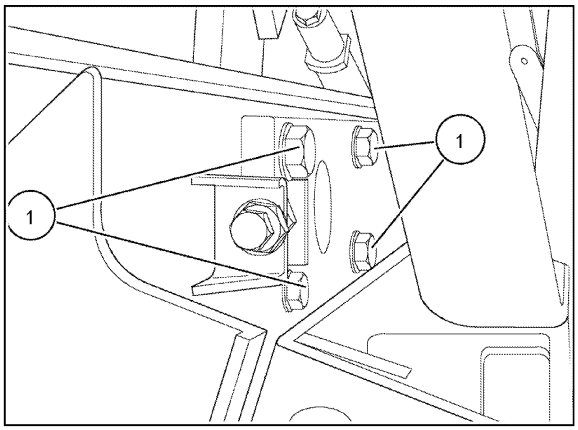


43015722 13

18. Install pivot plate against frame. If installing left pivot plate, secure plate using four M12 x 40 cap screws and lock washers **(1)**.

NOTE: *Right side shown. Left side is similar with no adjuster.*

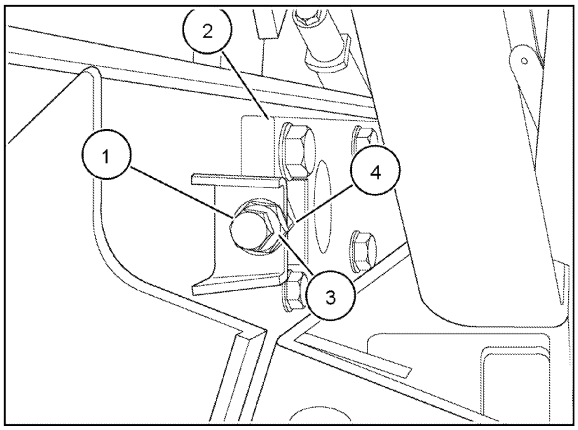
19. If installing right pivot plate, tighten the hardware only enough to hold plate steady until adjusted.



40015720 14

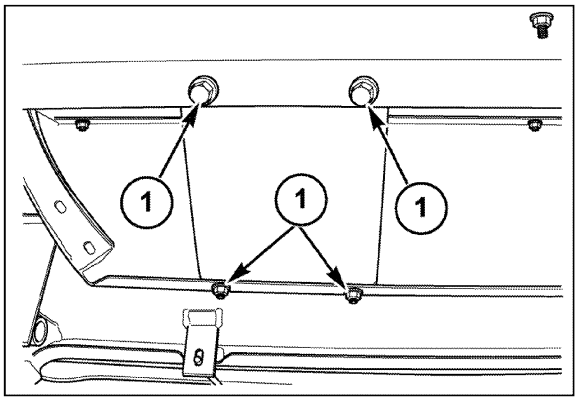
20. On the right side, turn in adjusting screw **(1)** until it is seated tight in plate **(2)**. Set plate into its previously known position by turning nuts **(3)** and **(4)**. Tighten lock nuts and plate clamping hardware.

NOTE: *Right side shown.*



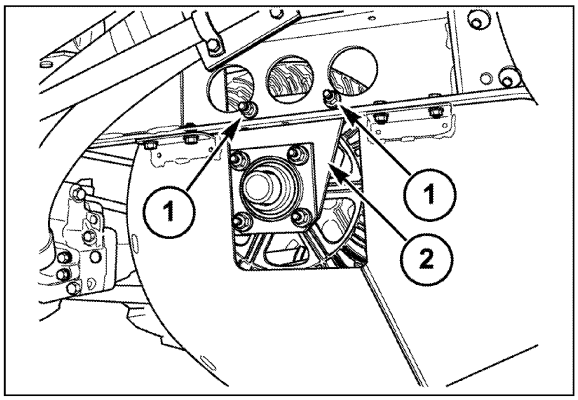
40015720 15

9. Install and tighten four M8 x 20 cap screws, lock washers and nuts **(1)** onto two housing support brackets.



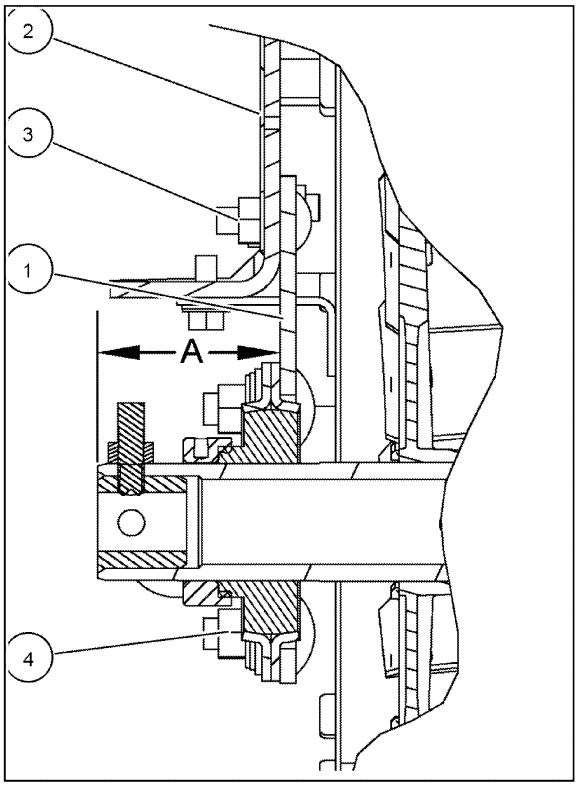
10042962A5 8

10. Install two M10 x 30 carriage bolts, lock washers and nuts **(1)** securing left hand bearing support plate bracket **(2)** but do not tighten at this time.



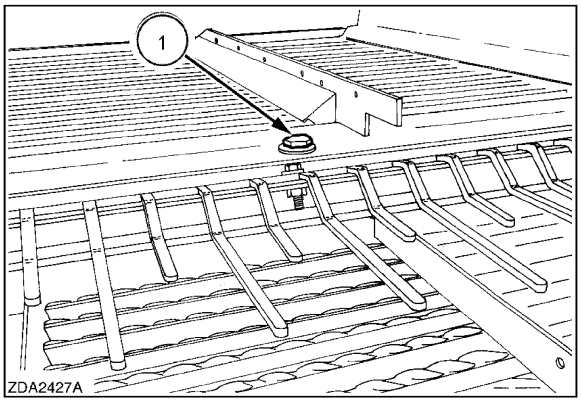
10042955A5 9

11. If equipped with bracket-mounted motor, attach the right hand bearing support plate **(1)** to self-leveling frame **(2)** with two M10 x 30 bolts, lock washers and nuts **(3)**, but do not tighten at this time. Tighten four previously installed flangette bolts **(4)**.



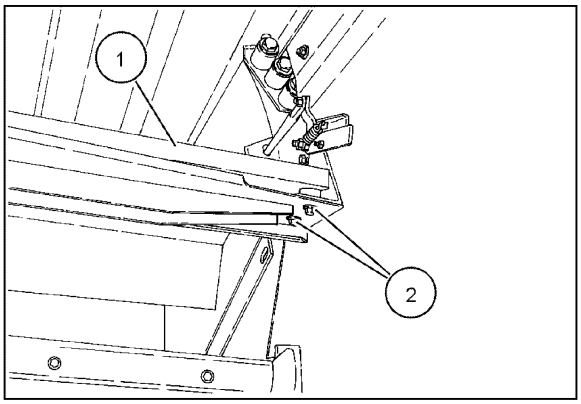
63071505 10

19. Slide pre-sieve into position on upper cleaning shoe and secure with two cap screws and lock washers **(1)**.



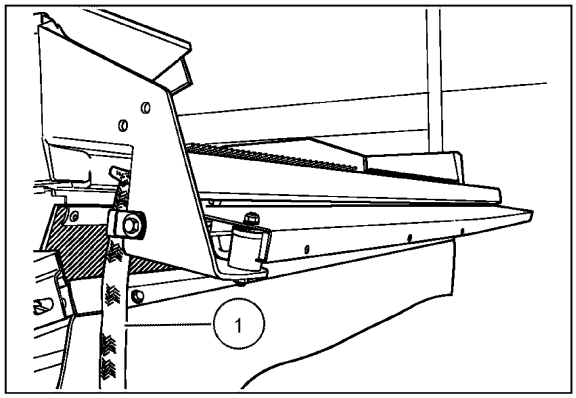
ZDA2427 17

20. Install lower sieves per **Lower sieve - Install (K.62.B)**.
21. Install upper sieves per **Upper sieve - Install (K.62.B)**.
22. Set grain sensing pad **(1)** into position and secure using four locknuts **(2)** previously removed. Connect sensing pad electrical connector.



53073029 18

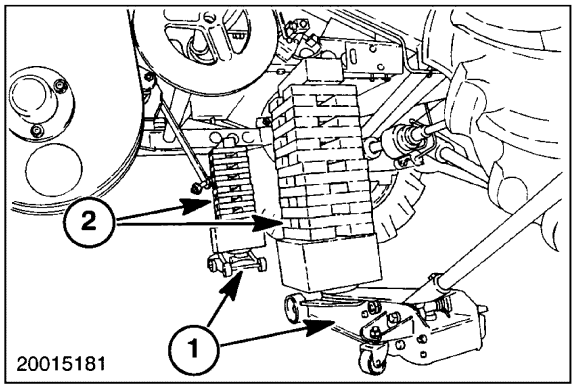
23. Reinstall upper sieve actuator harness **(1)**, if equipped.



73073054 19

24. Using procedures described in appropriate section **RESIDUE HANDLING Spreader - Install (K.64.D)** or **RESIDUE HANDLING Straw chopper - Install (K.64.C)**, install any crop residue handling components previously removed.

12. Lower floor jacks **(1)**. Remove wood blocks **(2)**.

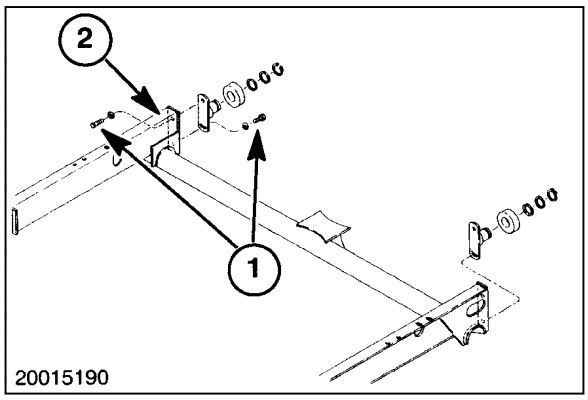


20015181a 12

13. Install cleaning fan. **Fan - Install (K.62.B)**.

Leveling frame side rollers - Replace

14. Loosen and remove cap screws **(1)** and washers securing roller assembly to leveling frame **(2)**.



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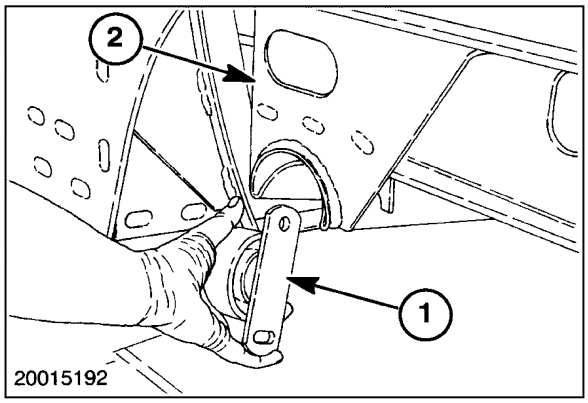
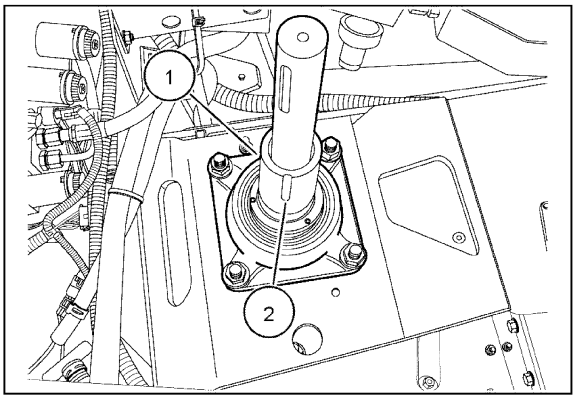
15. Remove roller assembly, **(1)** from leveling frame **(2)**.



20015192 14

20. Rotate chopper shaft **(1)** to position the key slot **(2)** at bottom dead center.

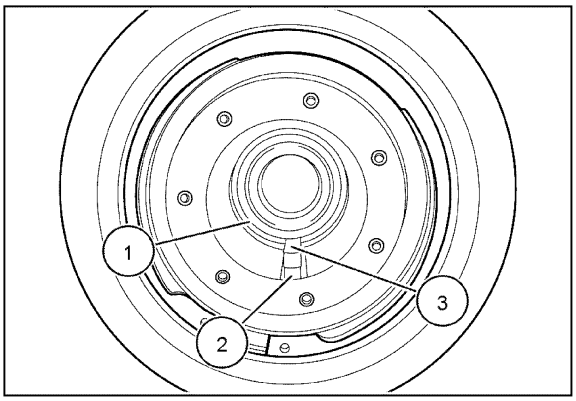


83072951 21

21. From the back of the concentric hub assembly, ensure the spiral retaining ring **(1)** that limits the key movement inside the hub, is install and seated in the groove.

    Position the hub with the key slot **(2)** at bottom dead center, and then install the key **(3)** in the key slot as shown.

    Maintain this bottom dead center position as the hub is slid onto the inner shaft.



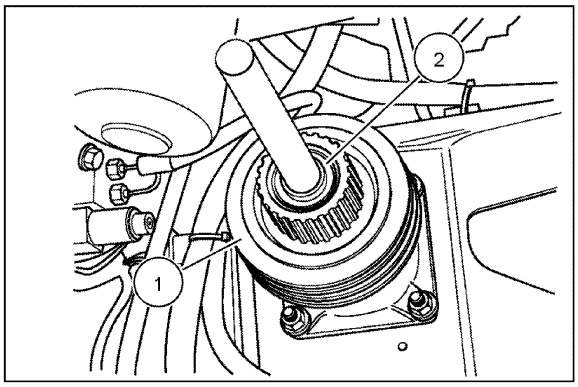
83072950 22

22. Install the high speed sheave and concentric hub assembly **(1)** onto the shaft.

    Locate the sheave to the measurement taken before removal for proper drive sheave and belt alignment. If not measured, perform correct alignment using a straight edge tool before proceeding to lock the concentric hub.

IMPORTANT: *Do not strike the splined hub* ***(2)*** *directly with any hammer or mallet when positioning hub on shaft; the splines can be easily deformed. Use a block of wood against the splines.*

Position the locking hub mounting collar, and then tighten and torque the seven sets screws on the concentric hub mounting collar behind the sheave **(2)**. **Clutch - Service instruction (K.64.C) Drive system - Sectional view (K.64.C) Drive system - Exploded view (K.64.C)**.



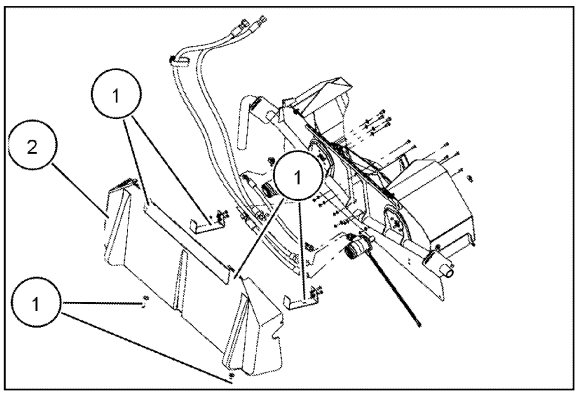
63072906 23

Drive system - Remove Hydraulic Motor

AXIAL-FLOW 7010 [HAJ000000 - HAJ201245], AXIAL-FLOW 8010 [HAJ000000 - HAJ201245]

This procedure can be performed with the spreader unit "on" or "off" the machine.

1. Remove the hardware, **(1)**, securing the straw spreader cover, **(2)**, to the unit.
   Remove the cover, **(2)**.
   Clean any and all debris thoroughly on the spreader deck surrounding the hydraulic motors using pressurized water or air.



63062003 1

⚠ WARNING ⚠

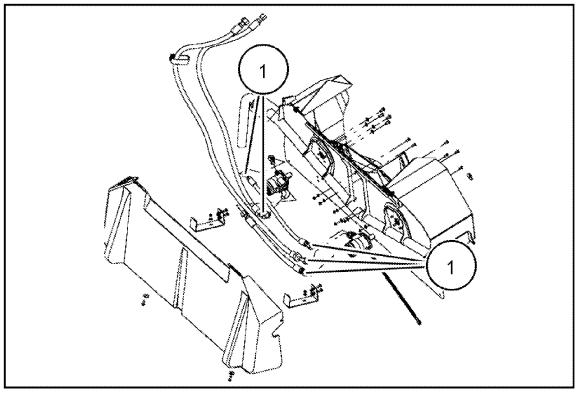
To prevent eye injury, always wear goggles or full face protection before using compressed air or high pressure washers.

M786

NOTE: *If pressurized water was used, allow the area to dry thoroughly before proceeding to the next step.*

2. Using a paint pen or permanent marker, mark the hoses to the fittings, **(1)**, from where they were removed, this will allow for easy installation during assembly.
   Remove the hoses from the fittings. Cap all hose ends and fittings using the proper plugs or caps.

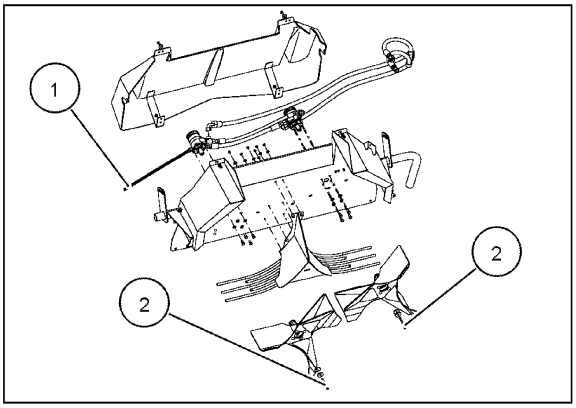
NOTE: *Be sure the area around the hose ends and fittings is clean to prevent any contamination from entering the system.*



63062003 2

3. Disconnect the electrical connection, **(1)**, from the sensor on the RHS hydraulic motor to the wiring harness.
   Remove the M8 x 90 mm bolt, **(2)**, from the motor shaft securing the impeller blades in place. Remove the two washers under the bolt from each shaft.

NOTE: *The M8x90mm bolts are locked with a pre-applied threadlocker. An impact device or heat will be necessary to unlock the bolts from the motor shafts.*



63062002 3