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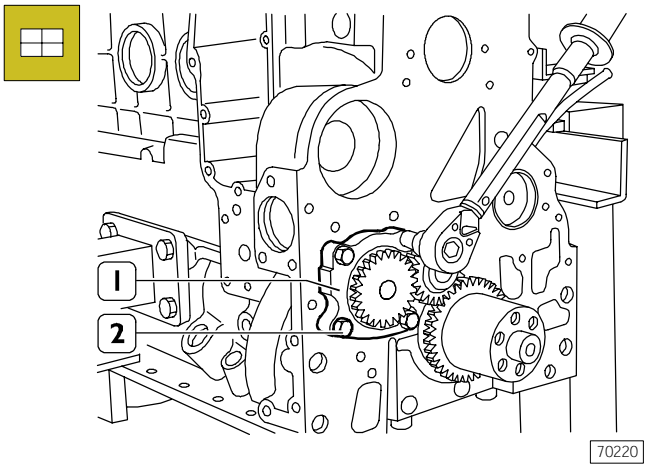
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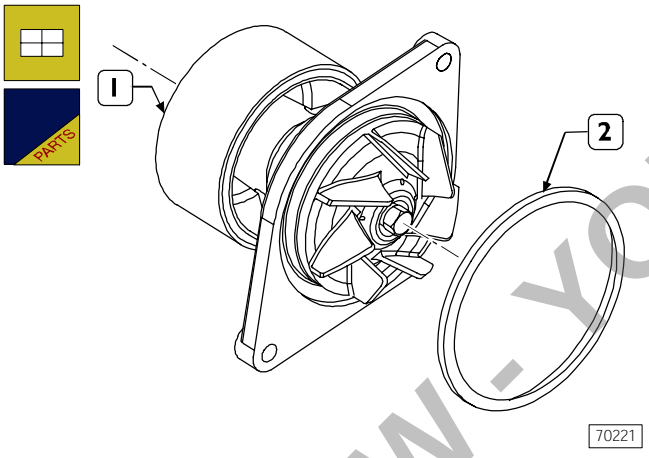
Figure 48



Fit the oil pump (1).

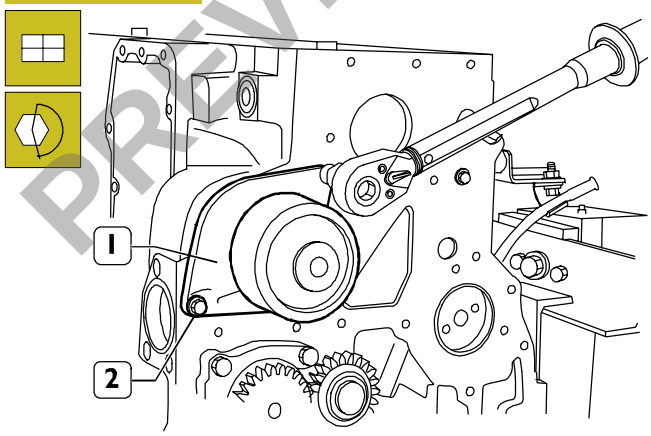
Tighten the fastening screws (2) to the specified torque.

Figure 49



Apply a new sealing ring (2) to the water pump (1).

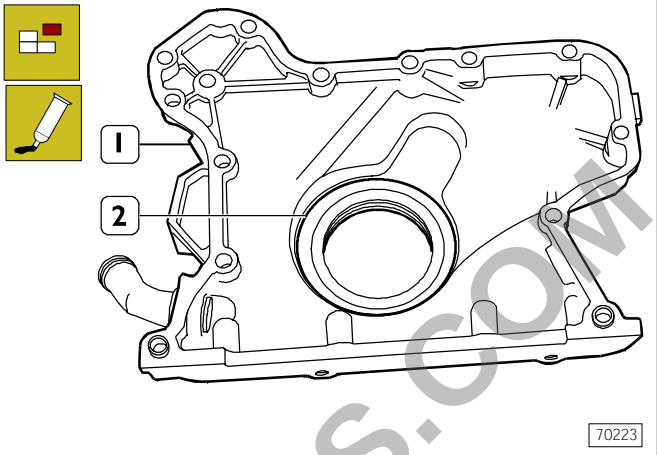
Figure 50



Fit the water pump (1).

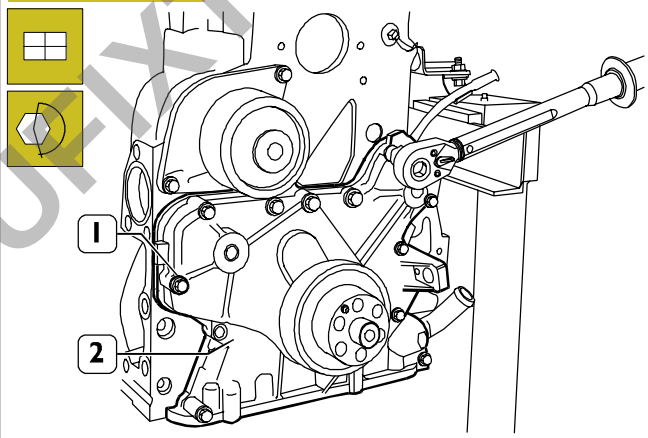
Tighten the screws (2) to the specified torque.

Figure 51



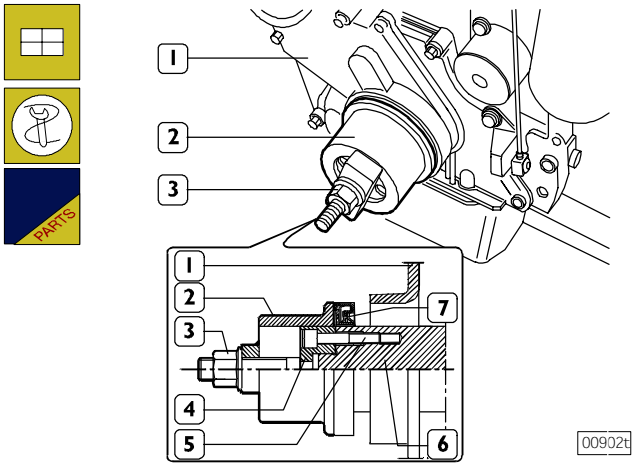
Remove the sealing ring (2) from the front cover (1), clean accurately the coupling surfaces and smear them with LOCTITE 5205.

Figure 52



Clean accurately the front cover (2) surface and refit it. Tighten the screws (1) to the specified torque.

Figure 53

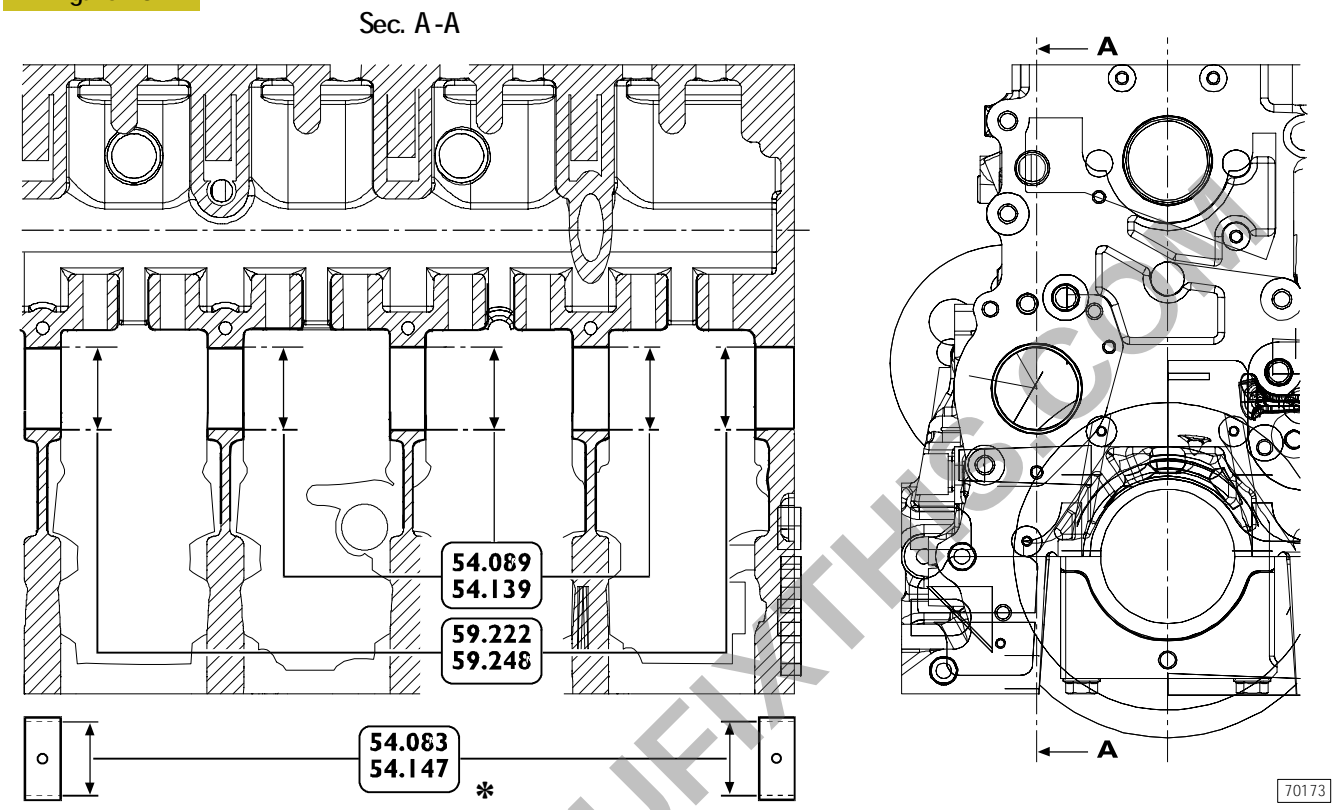


Apply tool 99346252 part (4) to the front output shaft tang (6), secure it by screws (5) and fit the new sealing ring (7). Position part (2) on part (4), screw nut (3) until completing sealing ring (7) fitting into front cover (1).

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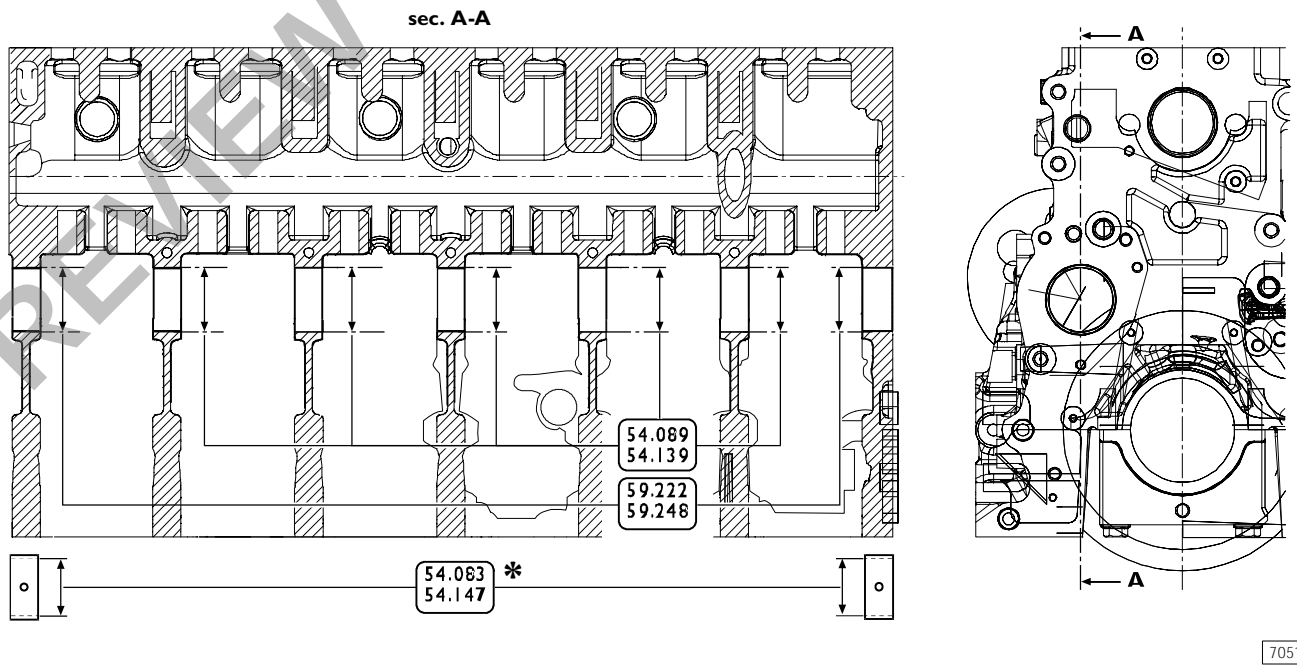
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Figure 16



CAMSHAFT BUSH AND HOUSING MAIN DATA
* Value to be obtained after driving the bushes.

Figure 17



MAIN DATA ABOUT CAMSHAFT BUSHES AND RELATED HOUSINGS
*Height to be obtained after driving the bushes.

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Indedendent Front Suspension Axle Controller ..... Section 10003
Cab and Transmission Controller ..... Section 10006
Instrument Cluster Controller ..... Section 10009
Cab Suspension Controller ..... Section 10011
Automatic Temperature Control ..... Section 10012

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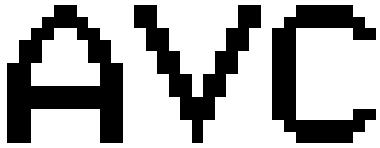
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Programming the Auxiliary/Remote Valve Constants (Menu10)



STEP 1



Momentarily press the menu button to enter the menu.

STEP 2





Use the UP and Down buttons to input the constant as follows:
0 = XtraSpeed and XtraSpeed - E Tractors only.
1 = XtraSpeed - E Plus Tractors only.

STEP 3



Momentarily press the menu button to store the new constant and return to the main menu.

To reset the total timer to zero (Menu 11-5):

STEP 1

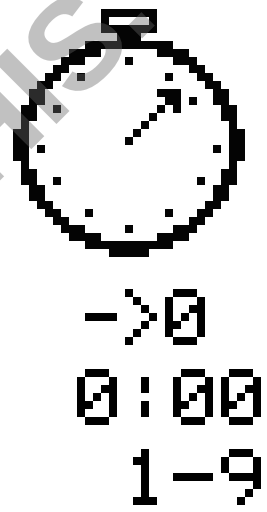


Momentarily press the menu button to enter the sub menu.

STEP 2



Use the UP button to scroll through the sub menus until the correct menu is displayed, as shown below.



Once you have found the correct menu,



momentarily press the menu button to reset the total area counter.

NOTE: When you reset the total timer each individual field counter will also be reset and will return to Menu 11-4.

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REAR AXLE OPTIONS

There are two options of Rear Axle, either flanged or sliding bar type axle half shafts.

Each rear axle incorporates an epicyclic gear reduction assembly which is mounted outboard of the brakes. The axle uses a three pin planetary reduction arrangement.

The side shaft drives planetary gears which are mounted with bearings on individual shafts secured to the reduction carrier.

The planetary gears are also in mesh with a ring gear which is fixed to the axle housing and is not removable.

When the side shaft and planetary gears rotate, the planetary gears travel around the ring gear causing the reduction carrier to rotate.

The axle shaft is splined to the reduction carrier and will therefore rotate with it.

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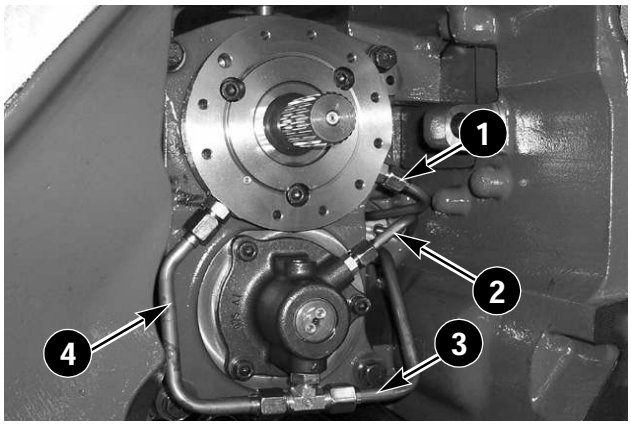
HIGH AND LOW SPEED CLUTCH SHAFTS

Removal

STEP 1

Separate the speed transmission from the range transmission.

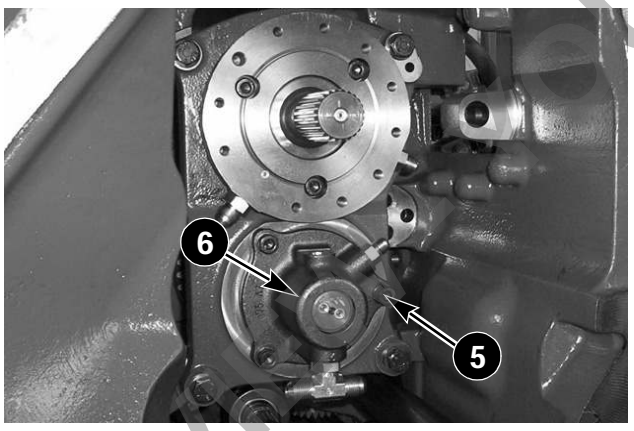
STEP 2



MD05J047

Remove and cap oil feed tubes (1), (2), (3) and (4).

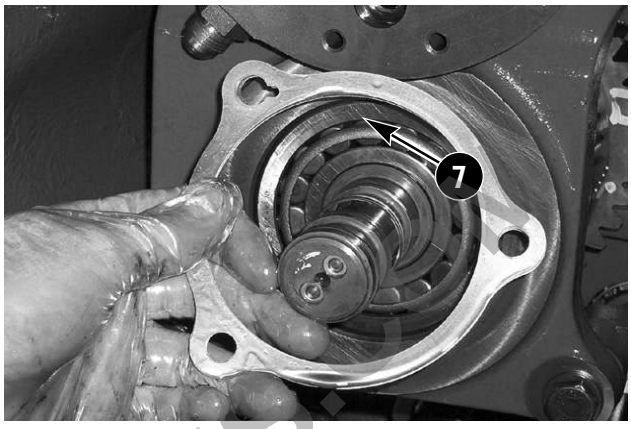
STEP 3



MD05J050

Remove the three retaining bolts (5) and the low clutch oil distribution manifold (6).

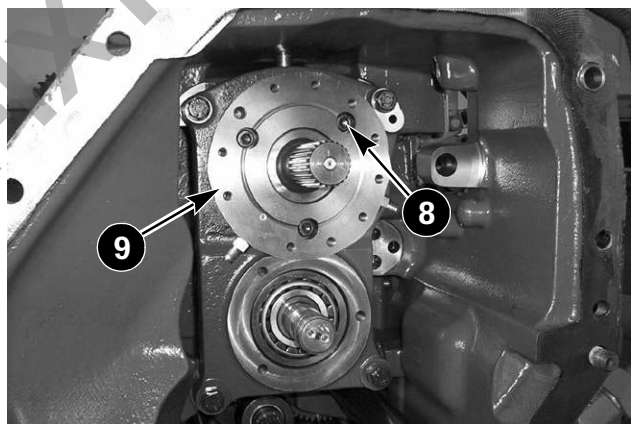
STEP 4



MD05J048

Remove the low clutch oil distribution manifold shims (7).

STEP 5



MD05J053

Remove the three retaining bolts (8). Remove the high clutch oil distribution hub and shims (9).

NOTE: *Retain shims for assembly.*

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First Gear Shimming Procedure

STEP 1

Heat bearing cone (36) in a bearing oven to a temperature of 110°C (230°F). Install bearing cone (36) onto the pinion shaft. Make sure the bearing is against pinion gear.

> **WARNING:** ***Always wear heat protective gloves or mittens when handling heated parts.***

STEP 2

Install thrust washer (33), thrust bearing (32) and thrust washer (31)

NOTE: *Do not install the needle rollers at this stage.*

STEP 3

Install first gear (25), thrust washer (24), thrust bearing (23) and thrust washer (22).

STEP 4

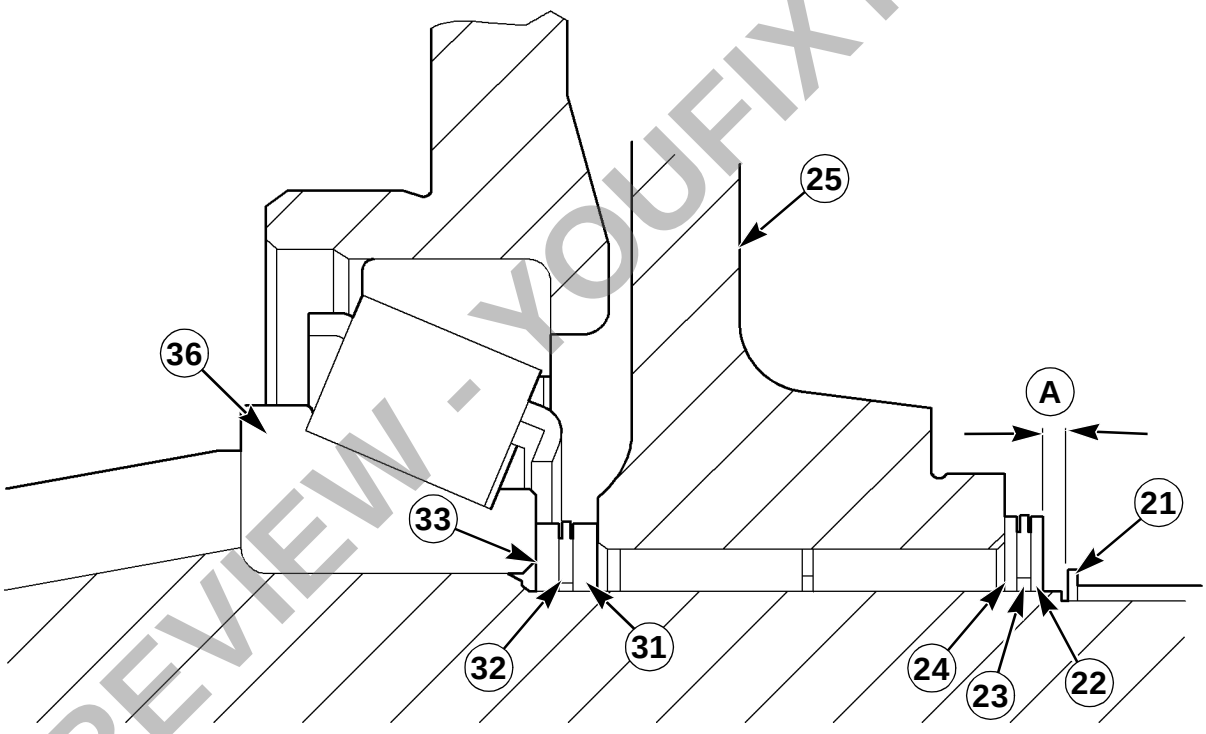
Install retaining ring (21).

STEP 5

Measure the end play (A) between thrust washer (22) and retaining ring (21).

STEP 6

Disassemble the first range gear from the pinion shaft. Remove the rear thrust washers and thrust bearing. Select the required shims from the table below based on measurement (A).



MD06C038

MEASUREMENT A	0 - 0.5 mm	0.51 - 0.8 mm	0.81 - 1.10 mm	1.11 - 1.40 mm
NO OF SHIMS REQUIRED	0	1	2	3

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Section 6021

MFD FRONT AXLE

XTX Series Tractors

20.29 Axles

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McCORMICK

SM 8-15250

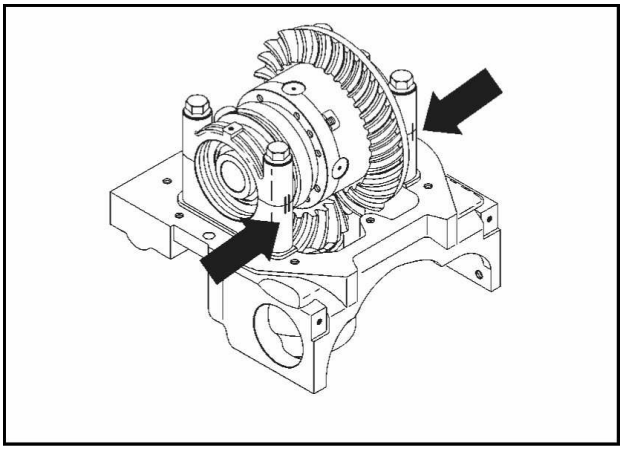
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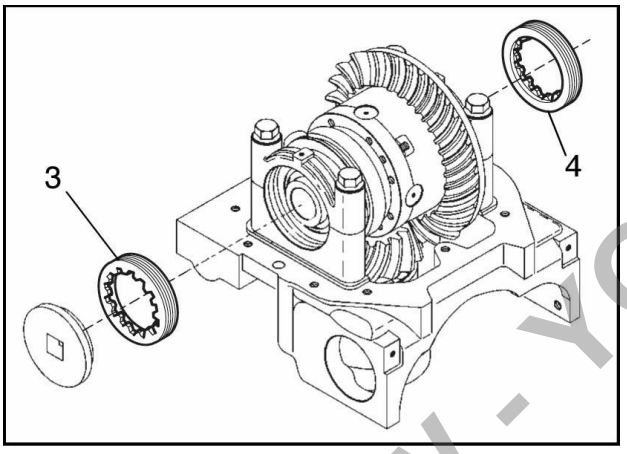
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STEP 5



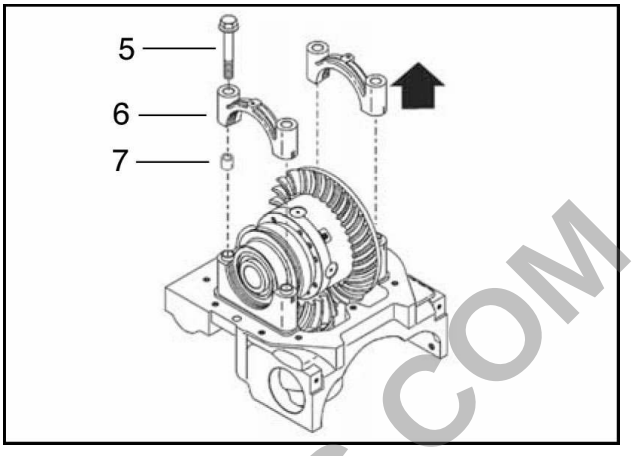
Before removing bearing cup bolts, mark bearing cups and the differential carrier with permanent reference marks to avoid incorrect assembly.

STEP 6



Unscrew the adjuster rings nuts (3) and (4), using special tool CA119030.

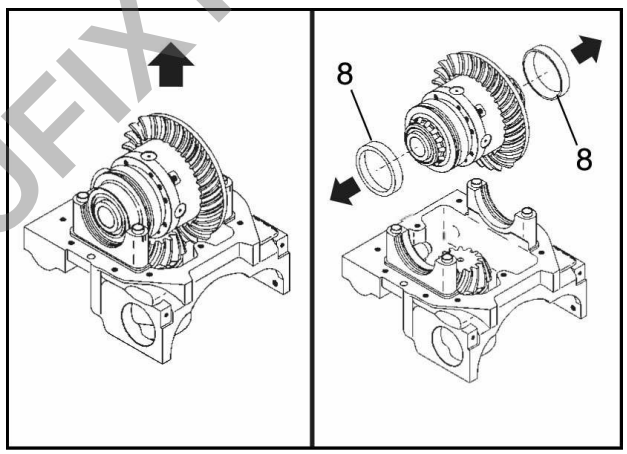
STEP 7



Unscrew the four screws (5) and remove the two half-collars (6).

Retain the four locating dowels (7).

STEP 8



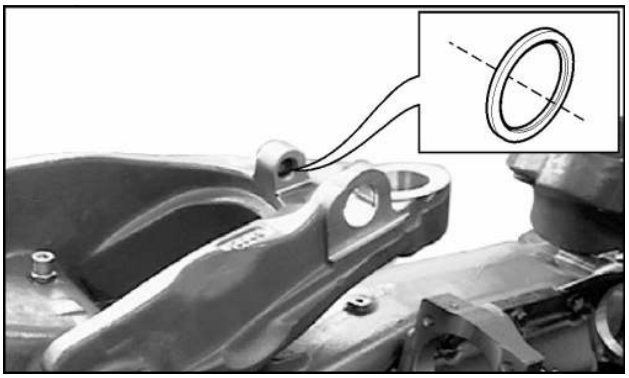
Remove the differential unit.

ATTENTION: *Do not mismatch the bearing cups cups if they are not to be replaced.*

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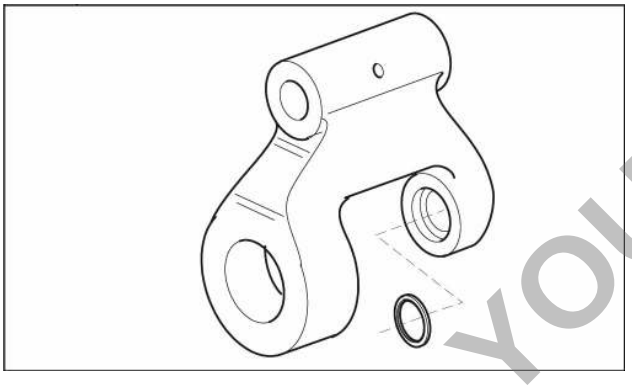
STEP 11



If necessary, remove the seal ring from the upper arm.

NOTE: *This is a destructive operation for the seal ring.*

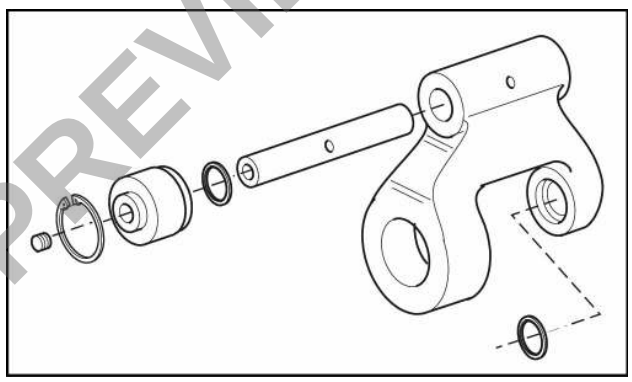
STEP 12



If necessary, remove the seal ring from the support fork.

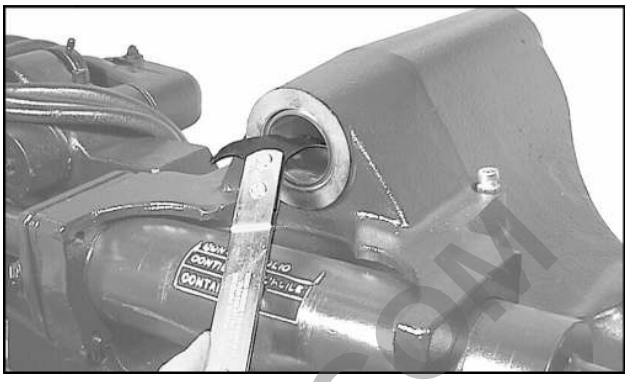
NOTE: *this is a destructive operation for the seal ring.*

STEP 13



Carefully check all the components and replace them if necessary.

STEP 14



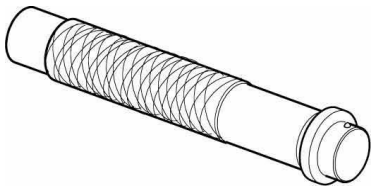
Remove the pivot seal ring with a suitable tool.

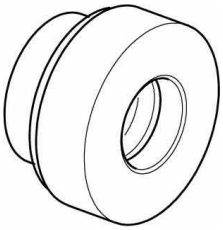
NOTE: *This is a destructive operation for the pivot seal ring.*

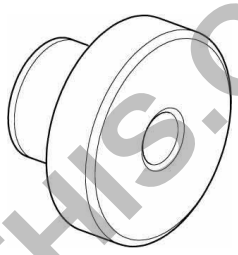
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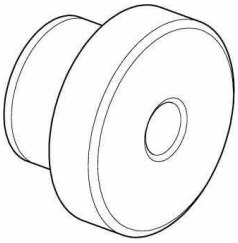
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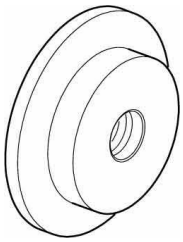

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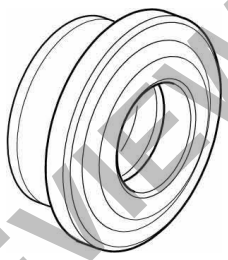

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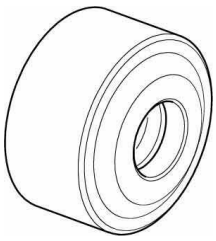

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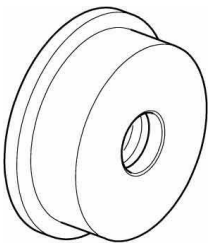

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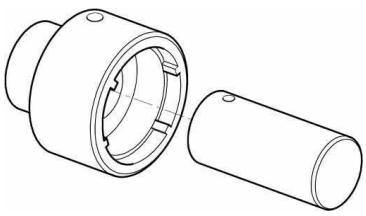

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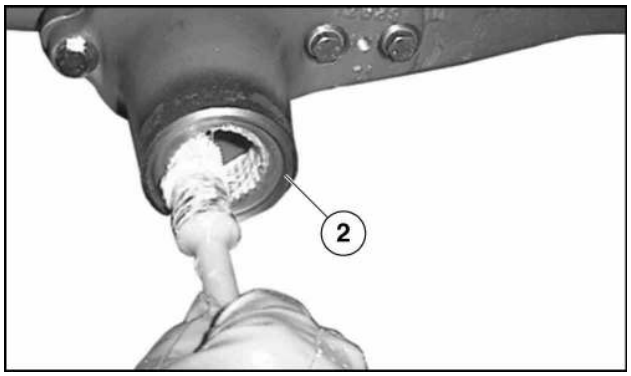

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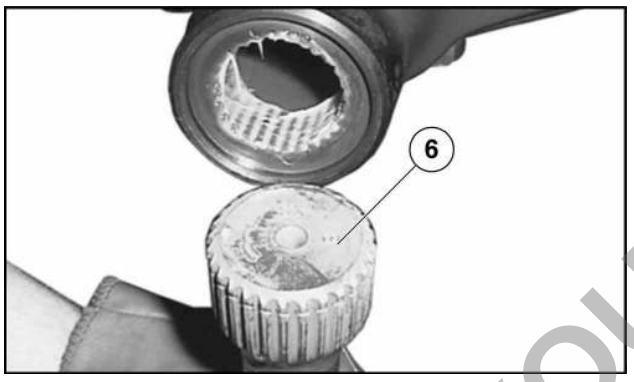
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STEP 7



Lubricate with McCormick LX Mulit-Purpose EP2 Grease, the inner teeth of the front flange (2).

STEP 8



Before introducing the torsion bar (6), check the marks stamped on the end:

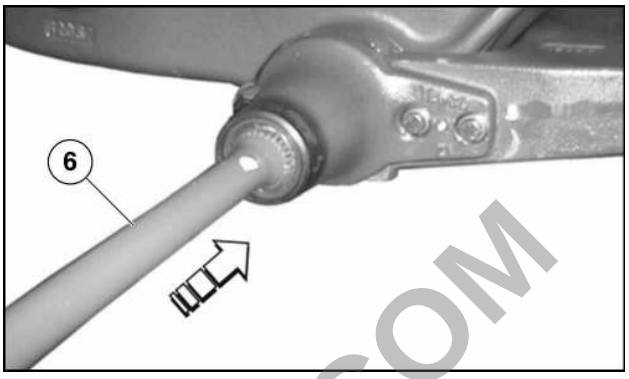
-sx = left torsion bar;

-dx = right torsion bar.

NOTE: *The arrow indicates the direction of rotation during preload.*

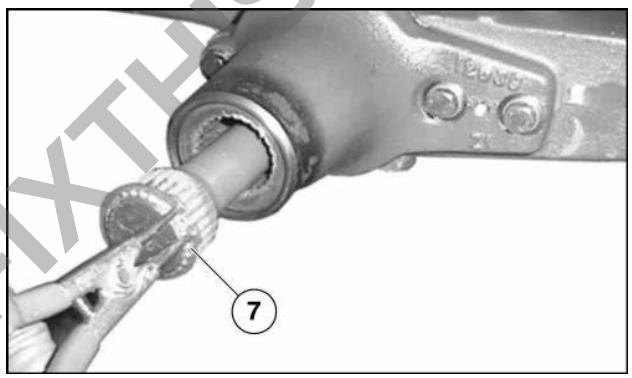
NOTE: *The "dx" and "sx" sides must be viewed from the pinion flange side.*

STEP 9



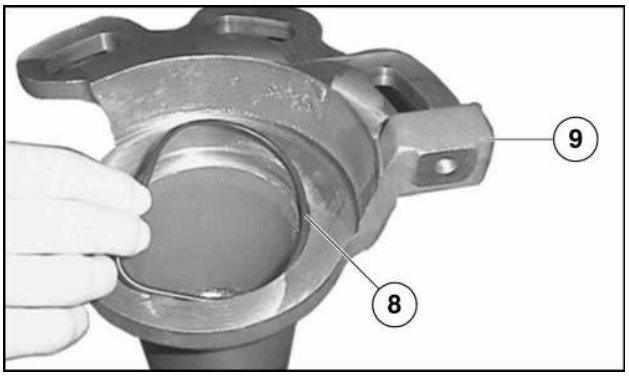
Install the torsion bar (6) in its seat.

STEP 10



Install the torsion bar snap ring (7) (front flange side).

STEP 11

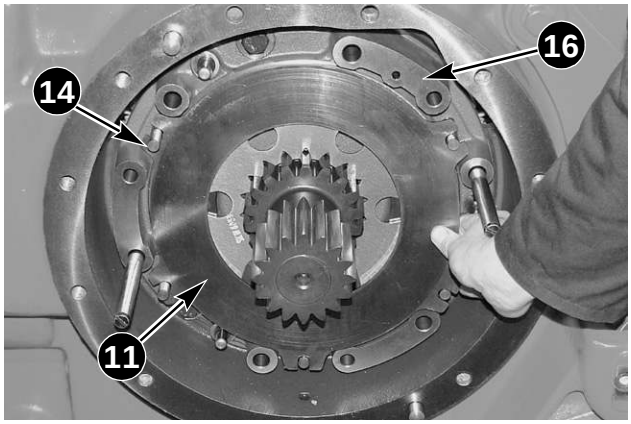


Install a new O-Ring (8) to the rear flange (9).

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STEP 42



MD06D099

Install one separator plate (11) into the differential bearing carrier (16), make sure separator plate locates correctly onto the locating pins (14).

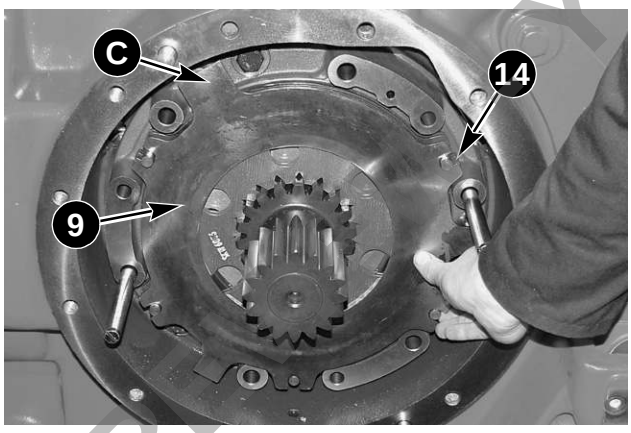
STEP 43

Continue to install one separator plate (11) and one friction plate (10) until two separator plates and three friction plates have been installed.

NOTE: *The friction plates must be installed with the elongated holes in line.*

IMPORTANT: *The last plate installed must be a friction plate.*

STEP 44

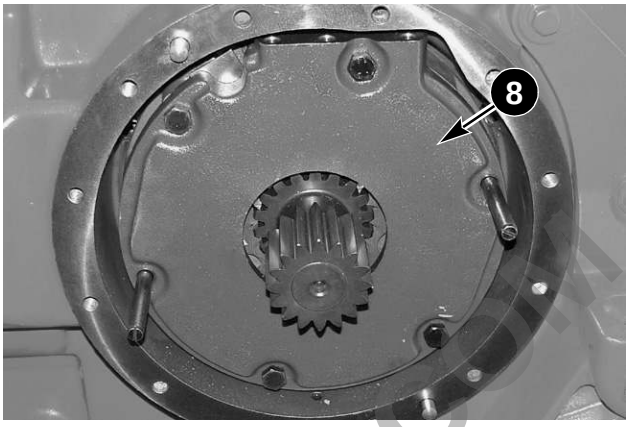


MD06D103

Install the adjuster return plate (9) make sure adjuster return plate locates correctly onto the locating pins (14).

IMPORTANT: *Make sure tabs (C) are in contact with the brake adjusters (13).*

STEP 45

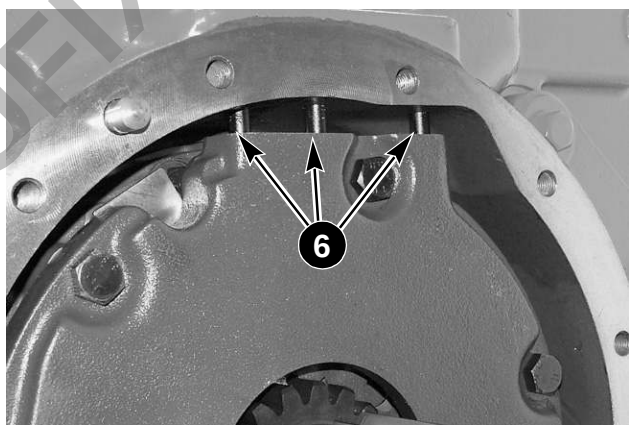


MD06D101

Install the brake piston housing (8) and install four housing retaining bolts. Remove the two alignment studs and install the two remaining retaining bolts.

Tighten all the retaining bolts to a torque of 235 to 260 Nm (173 to 192 lb ft).

STEP 46



MD06E007

Lubricate and install new o-rings (7) onto the plastic feed tubes (6). Install the feed tubes through the transmission housing into the brake piston housing.

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MECHANICALLY OPERATED AUXILIARY REMOTE VALVES

Raise position (Diagram 1)

When the control lever is moved to the raise position, the main control spool (21a) is pulled out of the valve bore. This spool movement compresses the centring spring (21c) and also engages the detent balls (21b) into a detent, which mechanically holds the spool in this position.

Oil flows past the main control spool and pushes open the load check valve (21m), then flows out from the raise port (B) to the couplers. The amount of flow is determined by the setting of the adjustable flow control valve (21f) from 0 to 95 litre/min. The pressure of this flow at the raise port is also exposed to the spring end of the priority flow control spool (21h) ensuring that the no.1 priority valve always receives the pre selected flow of oil. Oil also flows past the signal check valve (LS) into the signal line for the pump to increase its flow.

Return oil from the couplers is directed into the lower port (A) and past the main control spool to the tank port (T). From here it is directed to the inlet side of the filter housing.

Lower Position (Diagram 2)

When the control lever is moved to the lower position, the main control spool (21a) is pushed into the valve bore, engaging the detent balls (21b) into their detents.

Oil flows past the main spool to the lower port (A) to the quick release coupling. As the main control spool is pushed into the valve bore the load check valve pin (21n) is forced up the ramp of the main spool (21a) unseating the load check valve (21m) to allow the return oil at port (B) to flow to tank (T).

The pressure at the lower port (A) is also directed to the spring end of the priority flow control spool (21h) and to the signal check valve (LS) to signal the pump to increase its flow. This pressure is also exposed to the detent kickout mechanism (21u) which will control the maximum operating pressure in the lower port (A) in exactly the same way as explained for raise position.

Float Position (Diagram 3)

When the control lever is moved to the float position, the main control spool (21a) is moved to its maximum travel into the valve bore, engaging the detent balls (21b) into their detents.

The spool blocks oil supply to the ports (A and (B) and both of these ports are now open to tank (T). The check valve pin (21n) has been pushed upwards by the main spool (21a) opening the load check valve (21m). This valve will now allow a double acting or single acting cylinder to float.

The detent kickout mechanism does not function in the float position and the main control spool (21a) must be manually returned to neutral.

Signal Check Valves

When the main control spool (21a) of valve number 1 is moved to the raise or lower position pump pressure enters the signal line (LS1) moving the signal check valve (21p) to the left closing the signal port to the next valve and allowing the oil to flow down the signal line (LS) to the pump, this increases the pump flow to meet the demand of the valve. see diagram A.

If two remote valves are operated at the same time the valve requiring the highest pressure will control the pump. If remote valve two is operated, diagram B, the pump pressure at (LS2) moves the signal check valve (21r) to the left closing the signal port to remote valve three but flowing to remote valve one, if remote valve one is operating at a lower pressure the signal line pressure from remote valve two will hold the signal check valve (21p) to the right closing the signal port to remote valve one. The oil will then flow around the check valve (21p) and on to the pump.

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TOOLS REQUIRED

One flowmeter 0-300 L/min. (0-75 US gpm) or equivalent.

HYDRAULIC TEST KIT 1002T2
Two 1 7/16 inch plugs MC2544

TEST CONNECTIONS

Disconnect the PFC piston pump outlet hose (1) and install the 1 7/16 inch plug (2) in the hose end swivel connector.

Connect the flowmeter inlet hose to the piston pump outlet port (3), (Provide a tee at the pump outlet for the signal line connection).

Disconnect the remote return flow tube (4) at the filter head. Install the 1 7/16 inch plug in the tube end swivel connector (5).

Connect the flowmeter outlet hose to the open port (6) on top of the filter head.

Disconnect the compensator signal line at the tee or four way connector, cap the tee or four way connector (7). Connect a hose into the compensator signal line tube (8) and connect the other end of the hose at the pump outlet tee.

TEST REQUIREMENTS

- The load valve on the flowmeter must be fully open.
- Place the tractor in neutral. Apply the parking brake.
- Start and run engine.
- Heat the hydraulic oil to a temperature of 49℃.
- Run engine at 2200 rpm.
- Adjust the flowmeter load valve to 50 bar (725 psi) and record flow reading.
- The PFC piston pump outlet flow must be as follows:

Model	Pump Type	Flow (New Pump)	Minimum Flow
XTX185/200/215	Rexroth	113 - 123L/min. (329.8 - 32.5 US gpm)	100 L/min. (26.4 US gpm)
XTX185/200/215	Sauer Sundstrand High Flow (Optional)	150 - 160L/min. (39.6 - 42.2 US gpm)	140 L/min. (37 US gpm)

- If the flow is not correct refer to POSSIBLE CAUSES.

POSSIBLE CAUSES

- Charge pump pressure or flow is low, carry out Test 2 - Charge Pump Pressure Test and Test 3 - Charge Pump Flow Test.
- Worn PFC pump. Replace as necessary, refer to Section 8002 Hydraulic Pump.
- Compensator signal line screen is blocked.
- Broken spring, seized or misadjusted compensator spool (9). Repair or adjust compensator spool as necessary.
- Broken spring, seized or misadjusted main relief valve (10). Repair or adjust Main relief valve as necessary.

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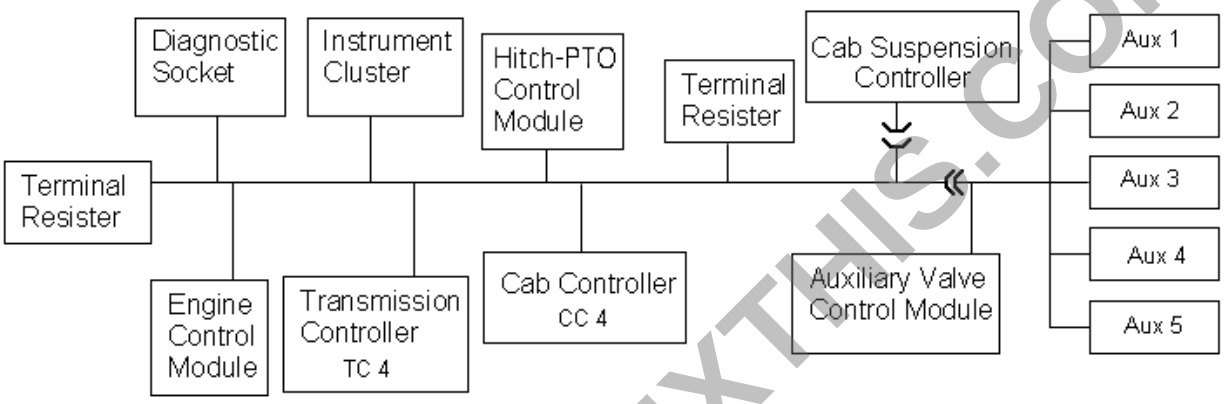
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XTX TRACTOR CAN BUS LAYOUT

General Description

The XTX tractor uses a CAN BUS electrical system to control its functions of all the major components. The diagram below shows the components connected to the CAN BUS.

NOTE: *There are auxiliary valves and auxiliary valve controller fitted to XTX Eplus tractors only. The diagram below shows all options.*



Control modules

There are up to 9 separate control modules located around the tractor, to control its functions depending on the options that are fitted. These are as follows:

- Engine Control Module.
- Transmission Control Module.
- Cab Control Module.
- Hitch Control Module.
- Instrument Cluster.
- Auxiliary Valve Control Module (Only XtraSpeed E*plus* Tractors).
- Automatic Temperature Control Module (Not Connected To The CAN) - (Optional).
- Cab Suspension Control Module - (Optional).
- Independent Front Axle Suspension Control Module (Not Connected To The CAN) - (Optional).

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Controller Error Code 57

Fault Description.

The signal from the auxiliary/remote valve AV3 timer control potentiometer is too high.

System Response.

Valve AV3 will not operate in timer mode.

Possible Cause.

1. Valve AV3 timer control potentiometer signal circuit, open or short circuit to ground.
2. Valve AV3 timer control potentiometer ground open circuit.
3. Damaged armrest harness or printed circuit board.
4. Bad AV3 timer control potentiometer.

IMPORTANT: *Before carrying out the following tests, refer to “CIRCUIT TESTING” on page 8.*

Circuit Checks/Corrective Action.

1. If a high potentiometer signal error code is present for all control, flow and timer potentiometers, refer to “Multiple Controller Potentiometer High Signal Error Codes” on page 50.
2. Disconnect the connector 50 (fender harness to armrest harness). Turn the key to the ON position, enable the auxiliary valve system and check for a voltage reading at connector 50 pin 5 for wire 510 Dark Blue.
   - If a voltage reading is detected check wire 510 Dark Blue between connector 44 and connector 50.
3. Remove the armrest lower cover and check the following:
   - The armrest harness between connector 50 and printed circuit board connector X2.
   - Armrest printed circuit board and connectors X2 and X7.
4. Disconnect the auxiliary/remote valve AV3 flow control and timer control potentiometers from the printed circuit board at connector X7. Check the resistance reading between terminals 4 and 6 (Red and Brown wires) of connector X7.
   - If a reading of approximately 5000 Ohms is not detected replace the AV3 flow control and timer control potentiometer assembly.
5. Turn the AV3 timer potentiometer knob to the 0 second position and check the resistance reading between terminals 4 and 5 (Red and White wires) of connector X7.
   - If a reading of approximately 5000 Ohms is not detected replace the AV3 flow control and timer control potentiometer assembly.
6. Slowly turn the AV3 timer potentiometer knob from the 0 second position to the 30 second position and check the resistance reading between terminals 4 and 5 (Red and White wires) of connector X7.
   - A steadily reducing Ohms reading from approximately 5000 Ohms to approximately 1.5 Ohms should be observed. If the readings are incorrect or an intermittent reading is detected replace the AV3 flow control and timer control potentiometer assembly.
7. Replace the auxiliary/remote valve controller.

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PTO Error Code 1806

Fault Description.
Operator error, with the auto PTO selected the controller has not detected a signal from the wheel speed sensor when hitch is above the OFF set point for more than 10 seconds.

Response.
The PTO will disengage and the PTO light and auto PTO light swill flash continually (0.5 seconds on and 0.5 seconds off).

Possible Cause.
1. The tractor has not moved within for 10 seconds with the auto PTO switch ON and the hitch position above the off set point.

IMPORTANT: *Before carrying out the following tests, refer to “CIRCUIT TESTING” on page 16.*

Circuit Checks/Corrective Action.
1. Cycle the PTO switch from ON to OFF and back to ON.

PTO Error Code 1807

Fault Description.
Operator error, with the auto PTO selected the controller has detected a signal from either the PTO on or PTO off remote switch.

Response.
The PTO will disengage and the PTO light and auto PTO light swill flash continually (0.5 seconds on and 0.5 seconds off).

Possible Cause.
1. A remote PTO on or off switch has been activated with the auto PTO switch in the ON position.

IMPORTANT: *Before carrying out the following tests, refer to “CIRCUIT TESTING” on page 16.*

Circuit Checks/Corrective Action.
1. Cycle the PTO switch from ON to OFF and back to ON.

PTO Error Code 1808

Fault Description.
Operator error, with the auto PTO selected the controller has not detected a signal from the operator presence switch for more than 5 seconds.

Response.
The PTO will disengage and the PTO light and auto PTO lights will flash continually (0.5 seconds on and 0.5 seconds off).

Possible Cause.
1. The operator moved out of the seat for more than 5 seconds.

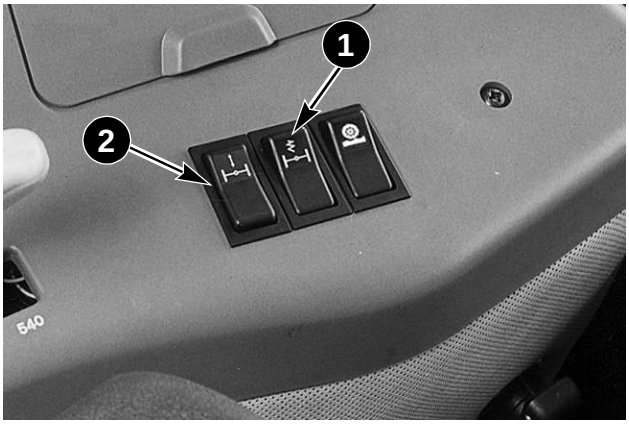
IMPORTANT: *Before carrying out the following tests, refer to “CIRCUIT TESTING” on page 16.*

Circuit Checks/Corrective Action.
1. Cycle the PTO switch from ON to OFF and back to ON while sitting in the seat.

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STEP 5



DP99G057

Start and run the engine at low idle. Press the suspension mode switch (1) to the suspension ON position. Wait until the axle has travelled to its mid position then hold the manual override switch (2) in the RAISE position. When the axle reaches upper mechanical stops release the switch and make a note of the multimeter reading.

> **WARNING:** *Never operate the engine in a closed building. Proper ventilation is required under all circumstances.*

STEP 6

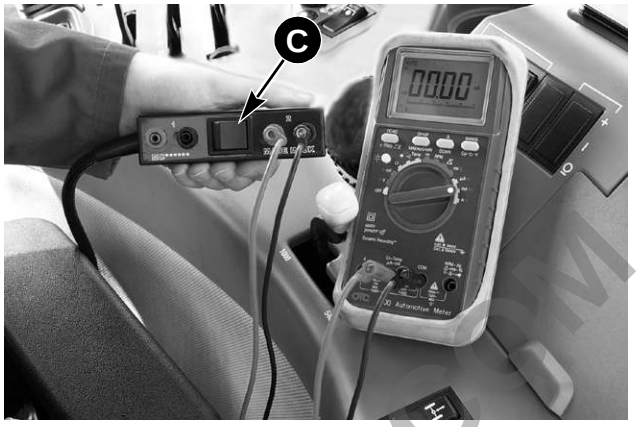


DP99G057

Hold the manual override switch (2) in the LOWER position, when the axle reaches the bottom mechanical stops release the switch and make a note of the multimeter reading.

NOTE: *If a second multimeter has been used and both position sensor readings have been taken, Go to STEP 8.*

STEP 7



MD01G015

If a second multimeter is not available STOP the engine and remove the test leads from test points 1 of MC3000 and install into test points 2. Press the switch (C) towards test point 2. Repeat STEP 5 and STEP 6 to check the right hand position sensor.

STEP 8

STOP the engine and remove the key.

STEP 9

The readings should be as follows:-

Bottom Stop .....5.00 mA (minimum)
Upper Stop .....18.86 mA (maximum)

The difference between the upper and bottom stop readings must NOT BE LESS than 9.05 mA.

Example:

Bottom stop reading..... 6.5 mA
Upper reading must not be less than.... 15.55 mA

IMPORTANT: *Bottom stop reading of less 4 mA and a upper stop reading of more than 19.68 mA will cause an error code to be displayed.*

STEP 10

If the readings are not correct adjust the position sensors, Refer to “Axle Position Sensor Adjustment” on page 9.

NOTE: *If no reading is obtained check the axle position sensor circuit.*

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Transmission Error Code 5028

Fault Description.
The controller has detected the voltage to the PS4-4 solenoid is too low.

Response.
Tractor will not operate in powershift 4 or 8 (gears 1-4, 1-8, 2-4, 2-8, 3-4, 3-8, 4-4 or 4-8).

Possible Cause.
1. Supply circuit between the transmission controller and the PS4-4 solenoid shorted to ground.
2. Bad PS4-4 solenoid.

IMPORTANT: *Before carrying out the following tests, refer to "CIRCUIT TESTING" on page 77.*

Circuit Checks/Corrective Action.
1. Check wire (PS4) Red between the transmission controller, connector 49 pin 28 and the PS4-4 solenoid for short circuit to ground.
2. Check the PS4-4 solenoid connection.
3. Check the PS4-4 solenoid coil resistance is approximately 8.5 Ohms at 20℃ (68℉) and replace as necessary.
4. Check the transmission controller connector.

Transmission Error Code 5029

Fault Description.
The controller has detected the voltage to the PS4-4 solenoid is too high.

Response.
The instrument cluster Red STOP light will illuminate and the tractor will not shift out of powershift 4 or 8.
On power up the tractor may select and remain in powershift 4 or 8 (gears 1-4, 1-8, 2-4, 2-8, 3-4, 3-8, 4-4 or 4-8).
The tractor may not drive.

Possible Cause.
1. Supply circuit between the transmission controller and the PS4-4 solenoid shorted to a voltage supply.

IMPORTANT: *Before carrying out the following tests, refer to "CIRCUIT TESTING" on page 77.*

Circuit Checks/Corrective Action.
1. Check wire (PS4) Red between the transmission controller, connector 49 pin 28 and the PS4-4 solenoid for a short to a voltage supply.
2. Check the PS4-4 solenoid connection.
3. Check the transmission controller connector.

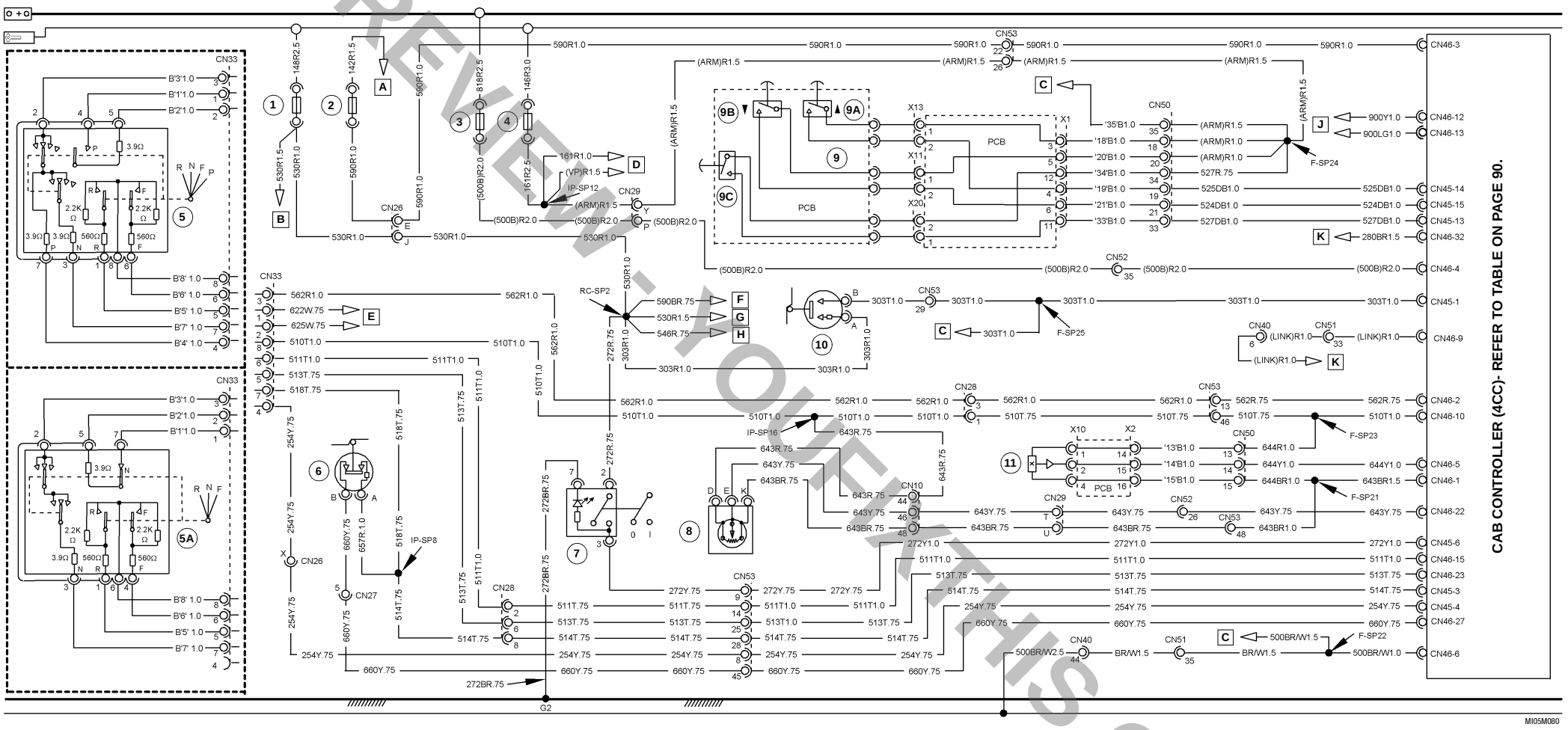
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Cab Controller Schematic Circuit (For XtraSpeed - E Plus Tractors from PIN JJE3500312)

SHUTTLE SWITCH, CLUTCH PEDAL BOTTOM OF CLUTCH SWITCH

CREEP SWITCH, FOOT THROTTLE, HAND THROTTLE, MULTI FUNCTION LEVER, OPERATOR PRESENCE SWITCH



Key

1. FUSE 26 (30 AMP)
2. FUSE 27 (7.5 AMP)
3. FUSE 38 (7.5 AMP)
4. FUSE 35 (7.5 AMP)
5. FORWARD/NEUTRAL/REVERSE /PARK SWITCH (IF EQUIPPED)

5A. FORWARD/NEUTRAL/REVERSE SWITCH (IF EQUIPPED)

6. CLUTCH PEDAL BOTTOM OF CLUTCH SWITCH
7. CREEP SWITCH (IF EQUIPPED)
8. FOOT THROTTLE POTENTIOMETER
9. MULTI FUNCTION LEVER

9A. GEAR UP SHIFT SWITCH

9B. GEAR DOWN SHIFT SWITCH

9C. RANGE SKIP SWITCH

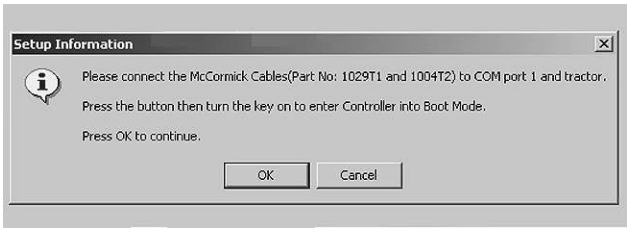
10. OPERATOR PRESENCE SWITCH
11. HAND THROTTLE

A. B+ FROM KEY SWITCH TERMINAL 5
B. TO BRAKE PEDAL SWITCHES
C. TO HITCH CONTROLLER CIRCUIT
D. TO AUXILIARY/REMOTE VALVE CONTROLLER CIRCUIT
E. TO NEUTRAL START CIRCUIT
F. TO AUDIBLE ALARM
G. TO MFD SWITCH
H. TO DIFFERENTIAL LOCK SWITCH
J. TO CAN BUS CIRCUIT
K. TO TRANSMISSION CONTROLLER CIRCUIT

NOTE: *Only use a HIGH IMPEDANCE multimeter to test the switches and circuits. Do not use a test lamp or damage to the switches may occur.*

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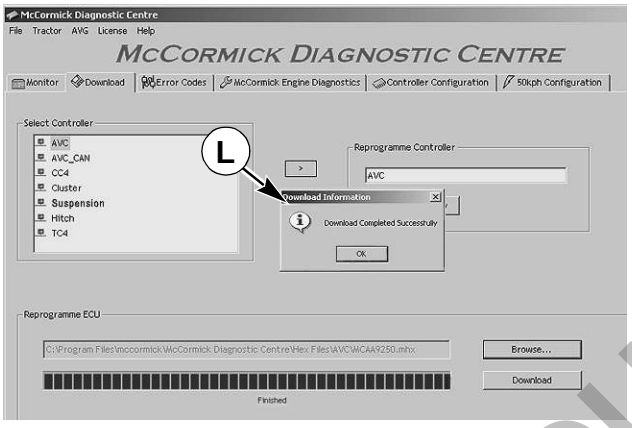
STEP 13



MH05G024

When the above dialogue box appears, press and hold the push button switch on the programming lead 1004T2. Turn the key to the ON position, release the switch and click on the 'OK' button.

STEP 14



MH05G040

The software will begin to download into the controller. When the software downloading is complete the 'Download Information' dialogue box (L) shown will appear, click 'OK' on the dialogue box.

STEP 15

Turn the key to the OFF position, exit the McCormick Diagnostics program, shut down the computer and disconnect the programming lead 1004T2. Install the plugs to the tractor auxiliary/remote valve controller diagnostic connectors.

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