

## Meritor MTC4208/10X Transfer Case Service Manual

Pro Gear Meritor MTC4208/10X Transfer Case Service Manual to assist in identifying your Meritor unit.

If you need any assistance identifying the correct transfer case unit for your truck and equipment, contact your Meritor replacement part specialists at Pro Gear and Transmission.

Pro Gear Transmission has same day shipping and 1000's of products in stock and ready to ship internationally for your next project.

For parts or service contact the Meritor / Fabco specialists at Pro Gear & Transmission, Inc.

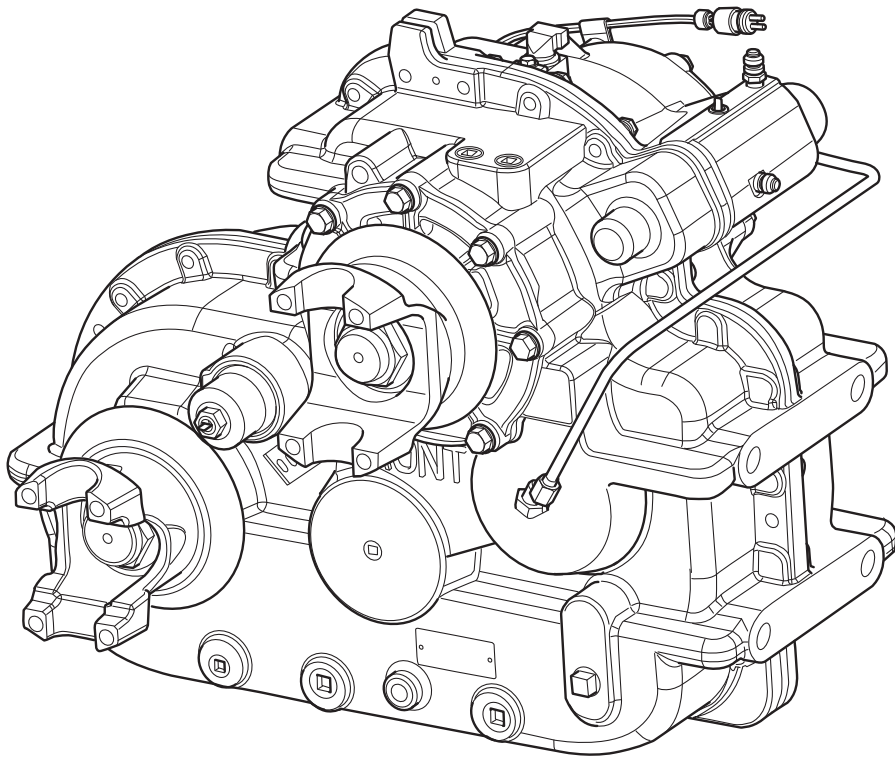
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Maintenance Manual MM-0861

# Transfer Cases

## MTC-4208X/XL/XP/XLEV, MTC-4210X/XL/XP/XLEV and MTC-4213X Series

Revised 09-16



# Service Notes

## About This Manual

This manual provides maintenance and service procedures for the Meritor MTC-4208X/XL/XP/XLEV, MTC-4210X/XL/XP/XLEV and MTC-4213X transfer cases.

## Transfer Case Interchangeability

**The MTC-4208XL/XLEV and MTC-4210XL/XLEV transfer case models are directly interchangeable with MTC-4208XL and MTC-4210XL transfer case specifications.**

Interface points for the oil cooler inlet and outlet lines (if equipped) on the XL and XLEV models are different from the X and XP, which affect the lengths of the oil cooler lines. The exterior geometry of the housing and location of lubrication lines also change, which potentially impacts clearances to surrounding components. In addition, GS models cannot be used in place of the X models in applications with “engage-on-the-fly” systems or mid-ship pumps.

**The MTC-4208XP, MTC-4210XP and MTC-4213X transfer case models are backward-compatible with MTC-4208GS, MTC-4210GS and MTC-4213GS transfer case specifications.**

There are no changes to the oil cooler interface points with these models.

For more information on MTC-4208, MTC-4210 and MTC-4213GS Series transfer cases, refer to Maintenance Manual MM-0146, Transfer Cases. To obtain this publication, visit Literature on Demand at [meritor.com](http://meritor.com).

## Before You Begin

1. Read and understand all instructions and procedures before you begin to service components.
2. Read and observe all Warning and Caution hazard alert messages in this publication. They provide information that can help prevent serious personal injury, damage to components, or both.
3. Follow your company's maintenance and service, installation, and diagnostics guidelines.
4. Use special tools when required to help avoid serious personal injury and damage to components.

## Hazard Alert Messages and Torque Symbols

### WARNING

A Warning alerts you to an instruction or procedure that you must follow exactly to avoid serious personal injury and damage to components.

### CAUTION

A Caution alerts you to an instruction or procedure that you must follow exactly to avoid damage to components.

 This symbol alerts you to tighten fasteners to a specified torque value.

## How to Obtain Additional Maintenance, Service and Product Information

Visit Literature on Demand at [meritor.com](http://meritor.com) to access and order additional information.

Contact the Meritor OnTrac™ Customer Call Center at 866-668-7221 (United States and Canada); 001-800-889-1834 (Mexico); or email [OnTrac@meritor.com](mailto:OnTrac@meritor.com).

## How to Obtain Tools and Supplies Specified in This Manual

Call Meritor's Commercial Vehicle Aftermarket at 888-725-9355 to obtain Meritor tools and supplies.

Information contained in this publication was in effect at the time the publication was approved for printing and is subject to change without notice or liability. Meritor Heavy Vehicle Systems, LLC, reserves the right to revise the information presented or to discontinue the production of parts described at any time.

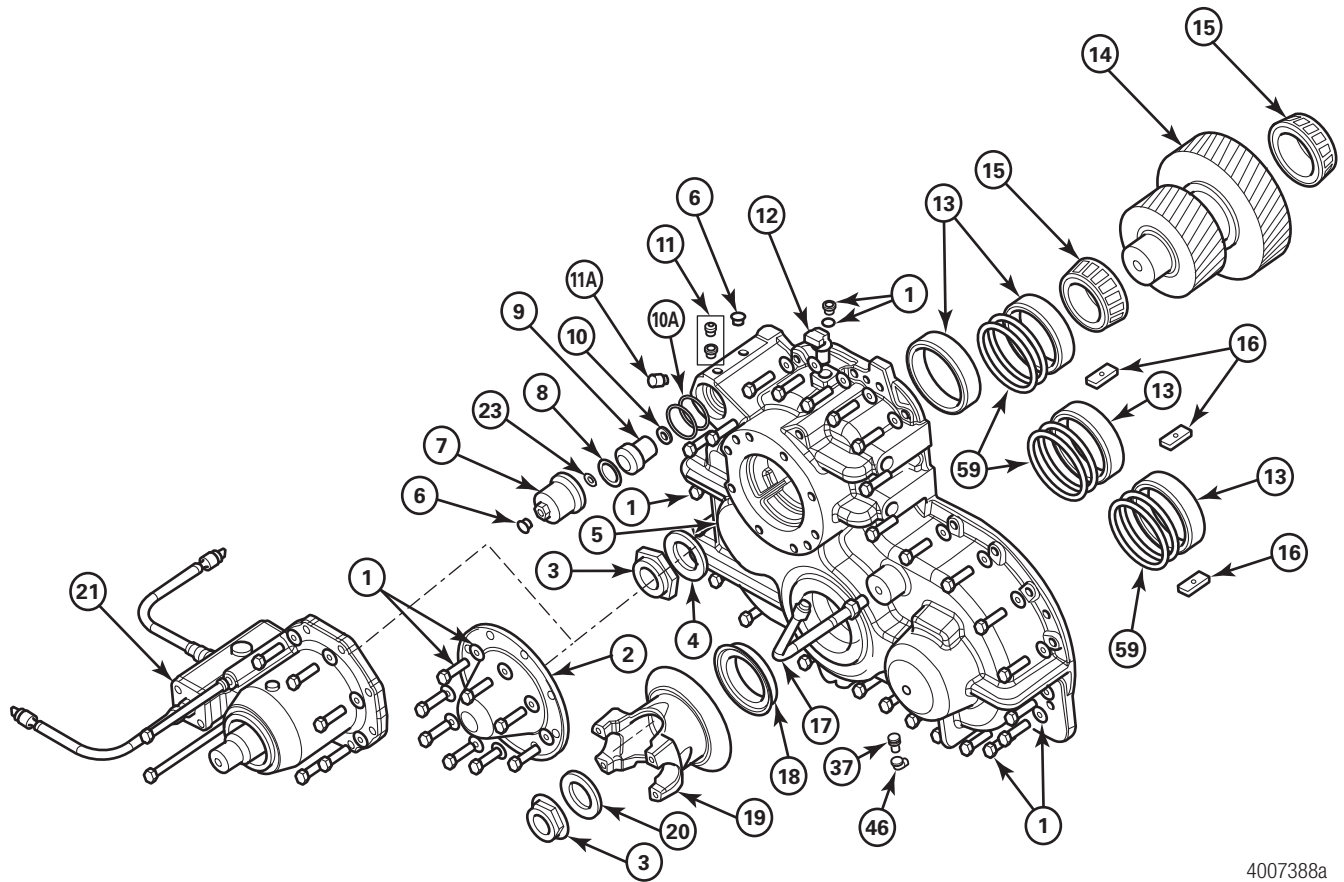
<p>pg. 1    <b>Section 1: Exploded Views</b>  MTC-4208X/XP Transfer Case Rear Cover  2    MTC-4208X/XP Transfer Case Front Cover  4    MTC-4208XL Transfer Case Rear Cover  5    MTC-4208XL Transfer Case Front Cover  7    MTC-4208XLEV Transfer Case Rear Cover  8    MTC-4208XLEV Transfer Case Front Cover  10   MTC-4210X/XP Transfer Case Rear Cover  11   MTC-4210X/XP Transfer Case Front Cover  13   MTC-4210XL Transfer Case Rear Cover  14   MTC-4210XL Transfer Case Front Cover  16   MTC-4210XLEV Transfer Case Rear Cover  17   MTC-4210XLEV Transfer Case Front Cover  19   MTC-4213X Transfer Case Rear Cover  20   MTC-4213X Transfer Case Front Cover  22   MTC-4208XP and MTC-4210XP Declutch/PTO</p> <p><b>23 Section 2: Introduction</b>  Model Nomenclature  Meritor Transfer Case — Model Nomenclature  24 Description  28 Operation  Front Axle Declutch  Oil Cooler Option  29 Blow-by Breather  Full-Torque Power Take-Off (PTO)</p> <p><b>30 Section 3: Removal</b>  Remove the Transfer Case Assembly</p> <p><b>33 Section 4: Disassembly</b>  Remove the Input Shaft Assembly from an Assembled  Transfer Case (for input shaft repairs only)  34 Disassemble the Transfer Case  Front and Rear Output Yokes  Rear-Mounted Pump Assembly (MTC-4208XL/XLEV and  MTC-4210XL/XLEV Only)  36 Optional PTO Assembly on MTC-4208XP and  MTC-4210XP Transfer Cases  Remove the Front Input Shaft, Input Bearing Cage and  Internal Pump Assembly (If Equipped)  38 High/Low Shift Cylinder Components  40 Disassemble the Front Output Shaft Assembly  Disassemble the Rear Output Shaft Assembly on  MTC-4213X  41 Disassemble the Front Input Shaft, Input Shaft Bearing  Cage and Internal Oil Pump, If Equipped  43 Idler Gear and Rear Output Shaft Disassembly  Remove the Bearing Cups</p>	<p>pg. 44    <b>Section 5: Prepare Parts for Assembly</b>  Clean, Dry and Inspect Parts  Ground and Polished Parts  Parts with a Rough Finish  Transfer Case Assemblies  Dry Cleaned Parts  Prevent Corrosion  45 Inspect Parts  48 Preparing the Case and Cover and Seal Replacement</p> <p><b>49 Section 6: Assembly</b>  Gear and Shaft Subassembly Build Up  Assemble the Front Output Shaft Subassembly  50 Assemble the Single Idler Gear Subassembly (MTC-4213X  Only)  Assemble the Rear Output Shaft Subassembly  (MTC-4208X/XP/XL/XLEV and MTC-4210X/XP/XL/XLEV  Only)  51 Assemble the Double Idler Gear Subassembly (All Models)  Assemble the Input Shaft Subassembly (MTC-4213X Only)  Assemble the Front Input Shaft, Input Shaft Bearing Cage  and Internal Oil Pump (If Equipped) Subassemblies  (MTC-4208X/XP/XL/XLEV and MTC-4210X/XP/XL/XLEV  Only)  53 Assemble the Upper Rear Output Shaft (MTC-4213X Only)  54 Gear and Shaft Installation into the Transfer Case Halves  Install the Gear Shafts and Assemble the Case Halves  55 Install the Front Input Shaft, Input Bearing Cage and  Internal Oil Pump Assembly Installation (If Equipped)  56 Install the Upper Rear Output Shaft (MTC-4213X Only)  57 End Play Check and Adjustment  Shim Pack Starting Thickness Requirements  MTC-4208X/XL/XP/XLEV and MTC-4210X/XL/XP/XLEV  Lower Rear Output Shaft End Play  58 Front Output Shaft End Play (All Models)  Idler Shaft (Single or Double) Bearing End Play (All Models)  59 MTC-4213X Rear Output Shaft End Play  60 Front Input Shaft End Play Check and Adjustment (All  Models)  61 Final Assembly  62 High and Low Shifter  Input Shaft Oil Seal and Yoke  65 Front Axle Shift Cylinder  Output Shaft Oil Seal and Yoke  Rear-Mounted Pump  67 Breather, Speed Sensor and Plugs  68 Transfer Case Shifting Check  Transfer Case Assembly Test</p>
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## MTC-4208X/XP Transfer Case Rear Cover



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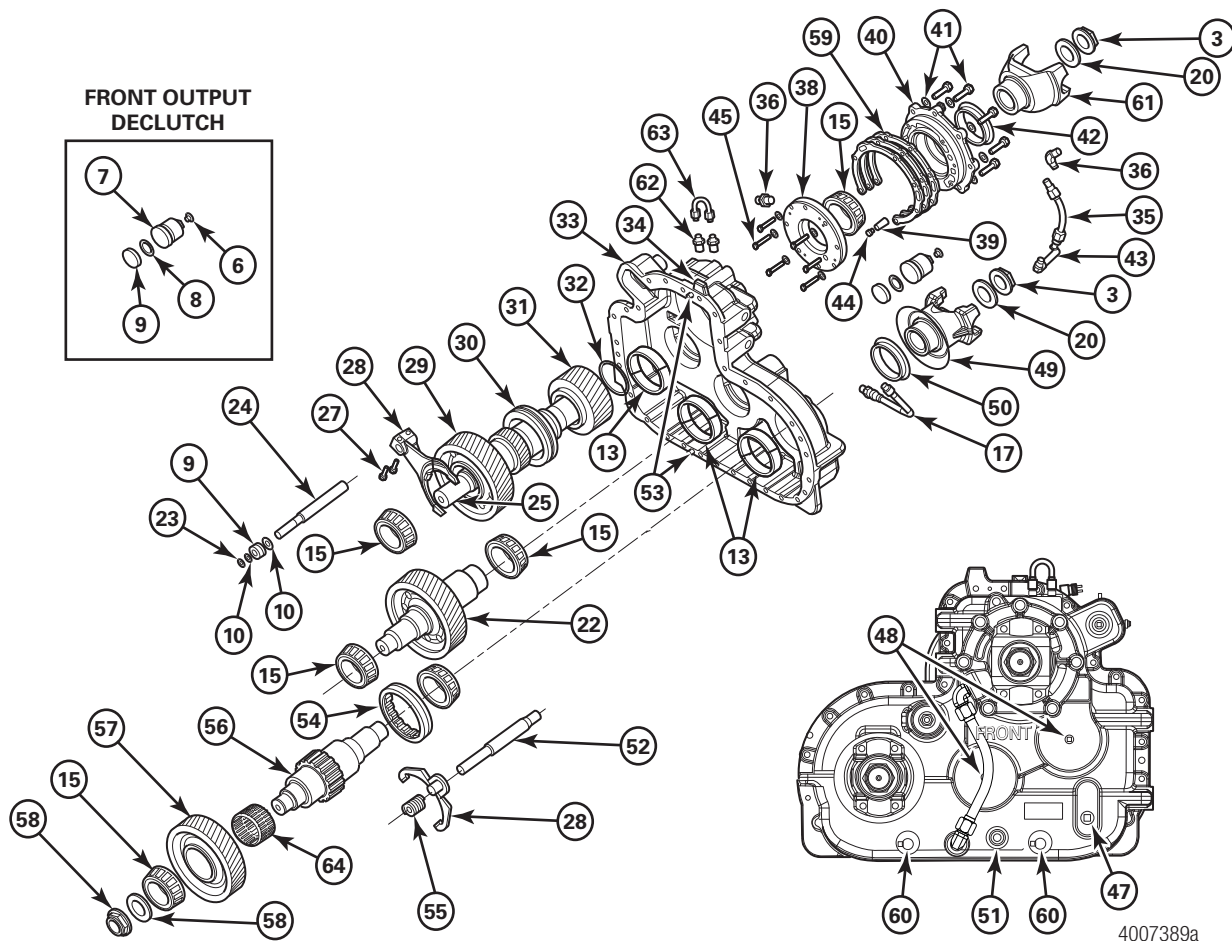
Item	Description	Item	Description
1	Capscrew and Washer	12	Speed Sensor
2	Cover	13	Bearing Cup
3	Locknut	14	Idler Gear
4	Hardened Washer	15	Bearing Cone
5	Transfer Case Rear Cover	16	Ceramic Magnet
6	Shipping Protector	17	Switch Assembly
7	Shift Cylinder	18	Rear Output Oil Seal
8	Shift Piston O-Ring	19	Rear Output Yoke
9	Shift Piston	20	Flat Washer
10	O-Ring	21	Optional PTO Assembly
10A	O-Ring, Housing	22	Driven Gear and Rear Output Shaft
11	Neutral Breather*	23	Snap Ring
11A	Blow-by Breather	24	Shift Shaft

# 1 Exploded Views

Item	Description
25	Input Shaft
27	Shift Fork Capscrew
28	Shift Fork
29	Helical Drive Gear, High Range
30	High and Low Clutch Collar
31	Helical Drive Gear, Low Range
32	Snap Ring
33	Transfer Case Front Case

\*Vehicles not equipped with a transfer case neutral air control may be equipped with a neutral breather which allows the shift cavity to exhaust. On vehicles equipped with a neutral air control, the solenoid allows this cavity to exhaust.

## MTC-4208X/XP Transfer Case Front Cover

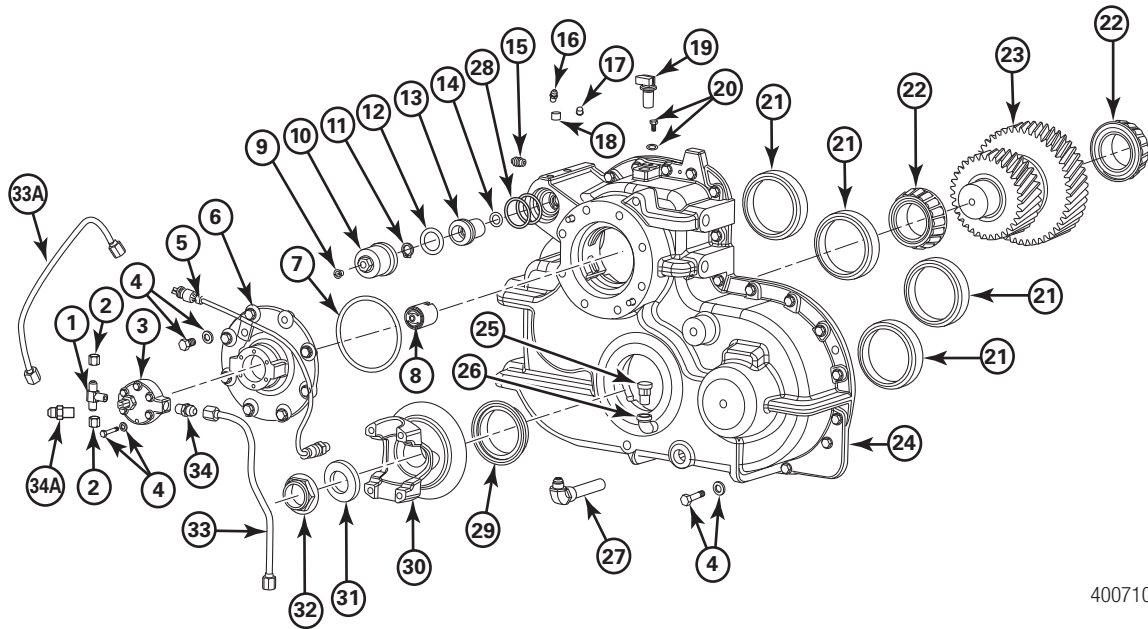


<b>Item</b>	<b>Description</b>
34	Locating Dowel Pin
35	Inlet Oil Tube Assembly
36	Male Fitting
37	Breather Assembly
38	Oil Pump Assembly
39	Relief Valve Spring
40	Input Bearing Cage
41	Bearing Cage Capscrew and Washer
42	Input Oil Seal
43	Oil Fitting Assembly
44	Relief Valve
45	Oil Pump Capscrew and Washer
46	Elbow
47	Oil Fill Plug
48	3/8-Inch Plug
49	Front Output Yoke
50	Front Output Oil Seal
51	Magnetic Drain Plug
52	Push Rod
53	Locating Dowel Pin
54	Front Output Clutch Collar
55	Spring
56	Front Output Shaft
57	Helical Driven Gear
58	Locknut and Flat Washer
59	Shim
60	Drain Plug
61	Input Yoke
62	Oil Cooler Male Connector
63	Loop Tube
64	Needle Bearing



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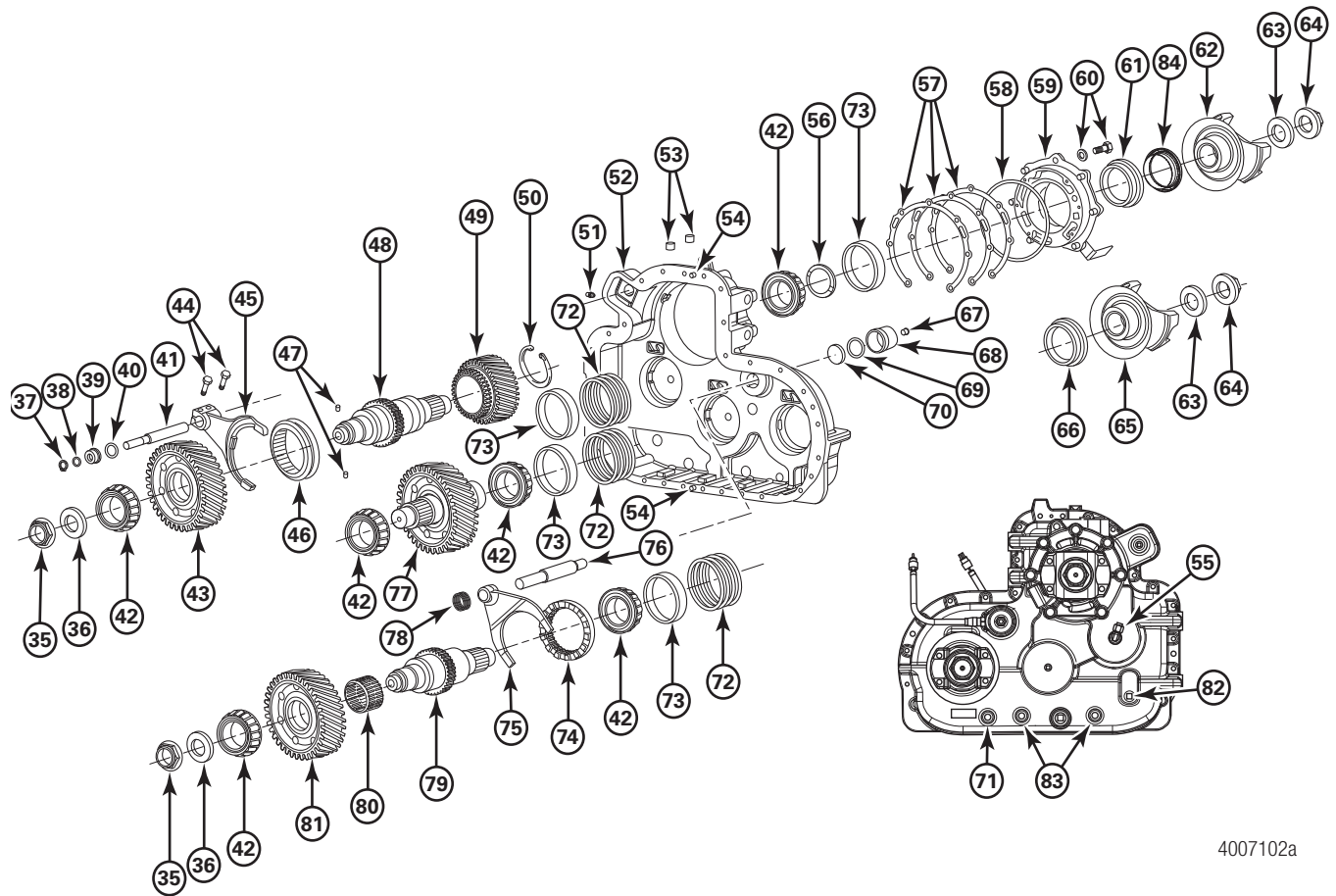
## MTC-4208XL Transfer Case Rear Cover



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Item	Description	Item	Description
1	T-Fitting	20	Capscrew and Washer
2	Cap	21	Bearing Cups
3	Oil Pump Cover	22	Bearing Cone
4	Capscrew and Washer	23	Double Idler Gear
5	Switch Assembly	24	Rear Housing
6	Oil Pump Housing	25	Breather
7	Pump Cover O-Ring	26	Elbow
8	Oil Pump Assembly	27	Filter Screen Assembly Tube
9	Shipping Protector	28	O-Ring, Housing
10	Shift Cylinder	29	Rear Output Oil Seal
11	Snap Ring	30	Rear Output Yoke
12	Shift Piston O-Ring	31	Flat Washer
13	Shift Piston	32	Locknut
14	O-Ring	33	Oil Pump Inlet Tube
15	Blow-by Breather	33A	Tube Assembly, Without Oil Cooler
16	Neutral Breather	34	Oil Pump Inlet Fitting
17	Shipping Protector	34A	Fitting, Without Oil Cooler
18	Neutral Breather Fitting		
19	Speed Sensor		

## MTC-4208XL Transfer Case Front Cover



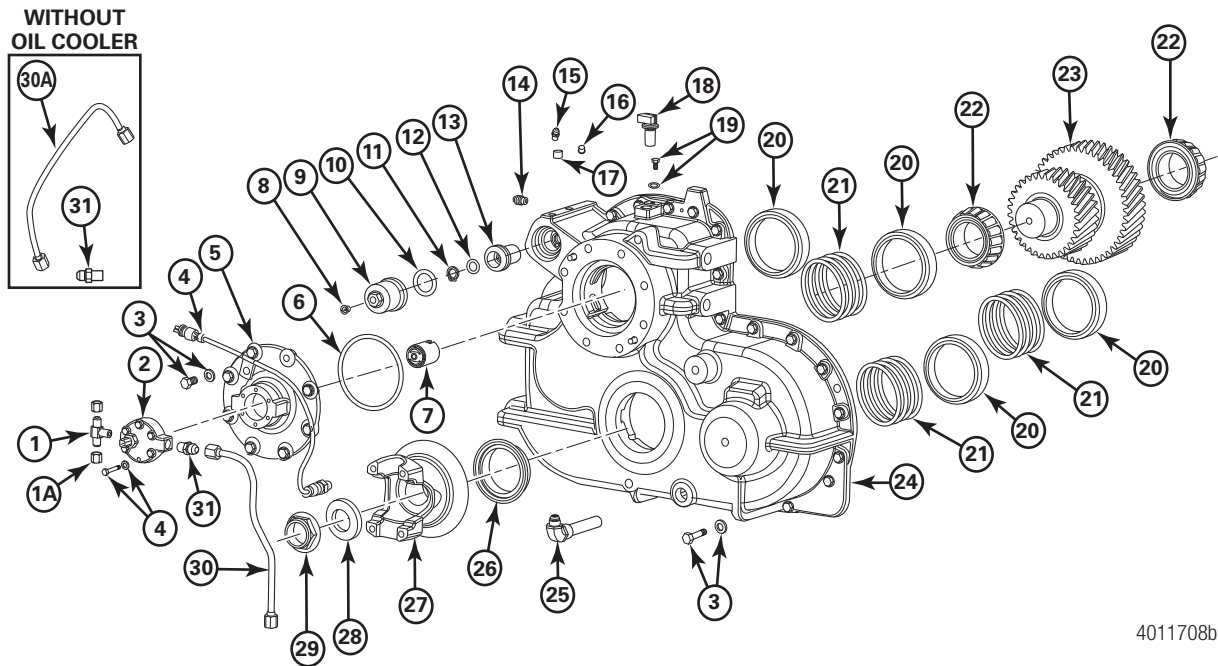
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Item	Description	Item	Description
35	Locknut	48	Input Shaft
36	Washer	49	Helical Drive Gear, Low Range
37	Snap Ring	50	Snap Ring
38	Shift Piston O-Ring	51	Male Fitting
39	Shift Piston	52	Front Cover Housing
40	O-Ring	53	Plug
41	Shift Shaft	54	Locating Dowel Pin
42	Bearing Cone	55	Elbow
43	Helical Drive Gear, High Range	56	Oil Spacer
44	Shift Fork Capscrew	57	Shim
45	Shift Fork	58	O-Ring
46	High and Low Clutch Collar	59	Input Bearing Cage
47	Oil Pump Pin	60	Bearing Cage Capscrew and Washer

# 1 Exploded Views

<b>Item</b>	<b>Description</b>
61	Input Oil Seal
62	Input Yoke
63	Flat Washer
64	Locknut
65	Front Output Yoke
66	Front Output Oil Seal
67	Plug/Fitting
68	Declutch Cylinder
69	O-Ring
70	Declutch Cylinder Piston
71	Drain Plug
72	Shim
73	Bearing Cup
74	Front Output Clutch Collar
75	Shift Fork
76	Push Rod
77	Driven Gear and Rear Output Shaft
78	Spring
79	Front Output Shaft
80	Needle Bearing
81	Helical Driven Gear
82	Fill Plug
83	Magnetic Drain Plug
84	Yoke Sleeve

## MTC-4208XLEV Transfer Case Rear Cover

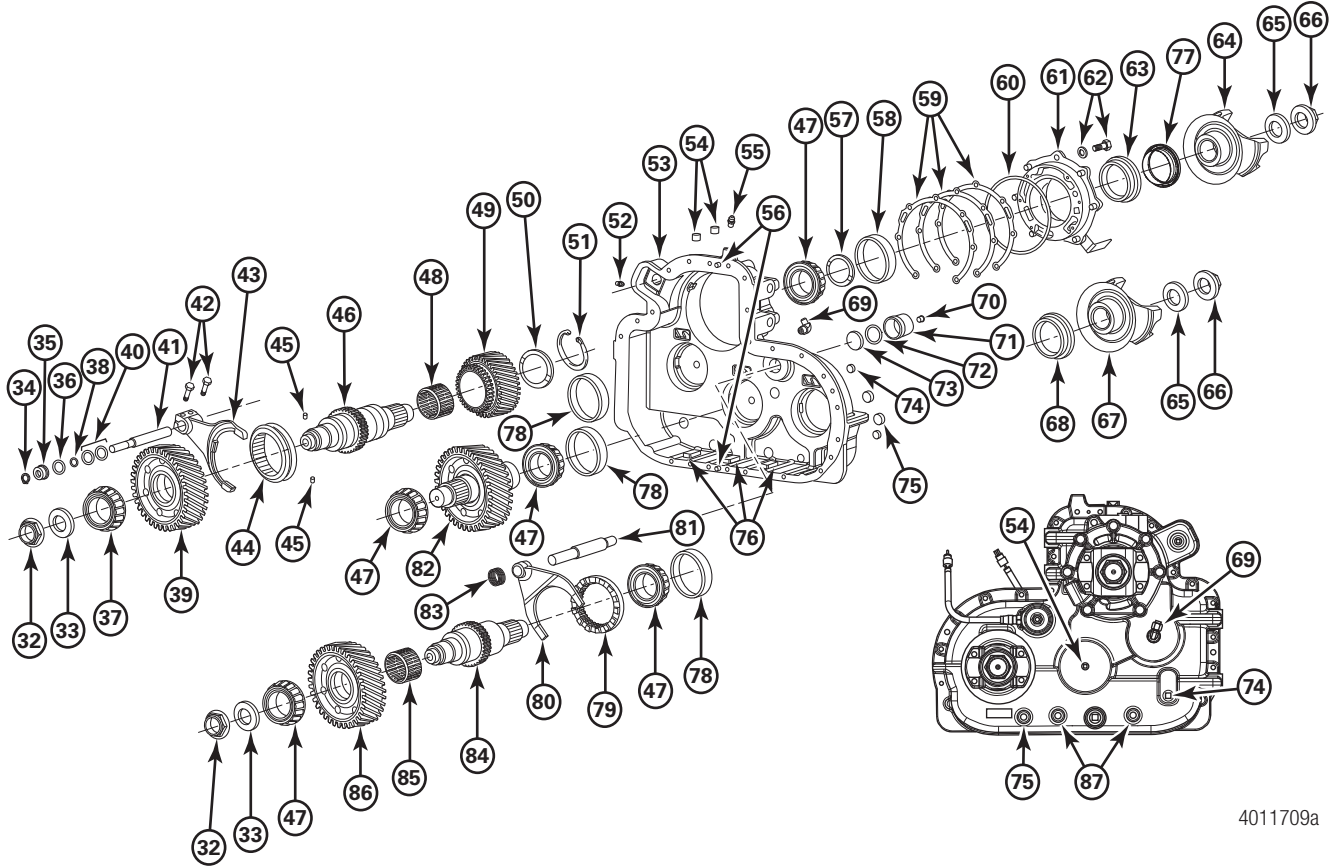


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Item	Description	Item	Description
1	T-Fitting	18	Speed Sensor
1A	Cap	19	Capscrew and Washer
2	Oil Pump Cover	20	Bearing Cups
3	Capscrew and Washer	21	Shims
4	Switch Assembly	22	Bearing Cone
5	Oil Pump Housing	23	Double Idler Gear
6	Pump Cover O-Ring	24	Rear Housing
7	Oil Pump Assembly	25	Filter Screen Assembly Tube
8	Shipping Protector	26	Rear Output Oil Seal
9	Shift Cylinder	27	Rear Output Yoke
10	Shift Piston O-Ring	28	Flat Washer
11	Snap Ring	29	Locknut
12	O-Ring	30	Oil Pump Inlet Tube
13	Shift Piston	30A	Tube Assembly, Without Oil Cooler
14	Blow-by Breather	31	Fitting, Without Oil Cooler
15	Neutral Breather		
16	Shipping Protector		
17	Neutral Breather Fitting		

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## MTC-4208XLEV Transfer Case Front Cover



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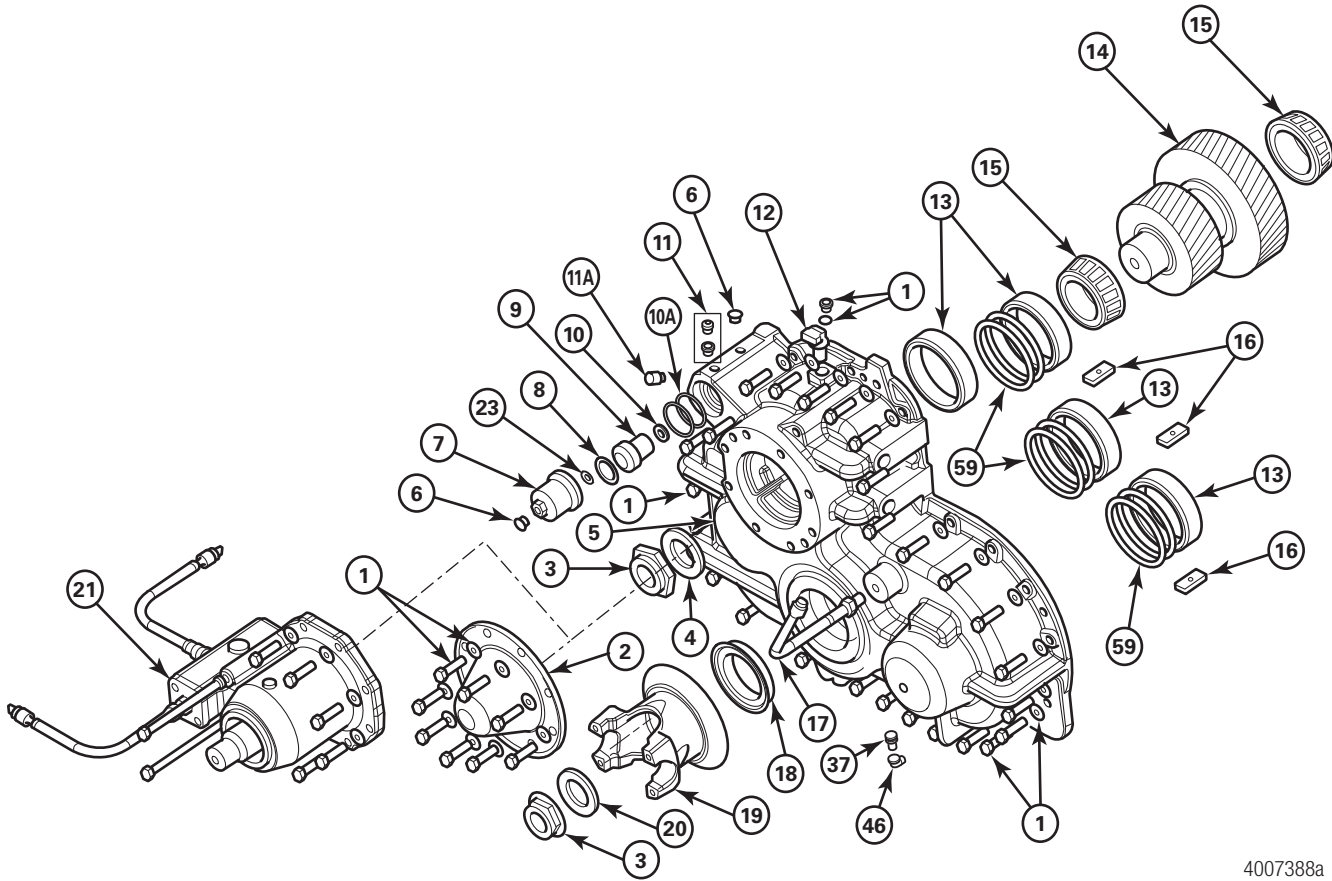
Item	Description	Item	Description
32	Locknut	45	Oil Pump Pin
33	Washer	46	Input Shaft
34	Snap Ring	47	Bearing
35	Shift Piston	48	Needle Bearing
36	O-Ring	49	Helical Drive Gear, Low Range
37	Bearing Cone	50	Spacer
38	Shift Piston O-Ring	51	Snap Ring
39	Helical Drive Gear, High Range	52	Male Fitting
40	O-Ring	53	Front Cover Housing
41	Shift Shaft	54	Plug
42	Shift Fork Capscrew	55	Breather
43	Shift Fork	56	Locating Dowel Pin
44	High and Low Clutch Collar	57	Oil Spacer

<b>Item</b>	<b>Description</b>
58	Bearing Cup
59	Shim
60	O-Ring
61	Input Bearing Cage
62	Bearing Cage Capscrew and Washer
63	Input Oil Seal
64	Input Yoke
65	Flat Washer
66	Locknut
67	Front Output Yoke
68	Front Output Oil Seal
69	Elbow
70	Plug/Fitting
71	Declutch Cylinder
72	O-Ring
73	Declutch Cylinder Piston
74	Fill Plug
75	Drain Plug
76	Magnets
77	Yoke Sleeve
78	Bearing Cup
79	Front Output Clutch Collar
80	Shift Fork
81	Push Rod
82	Driven Gear and Rear Output Shaft
83	Spring
84	Front Output Shaft
85	Needle Bearing
86	Helical Driven Gear
87	Magnetic Drain Plug



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## MTC-4210X/XP Transfer Case Rear Cover



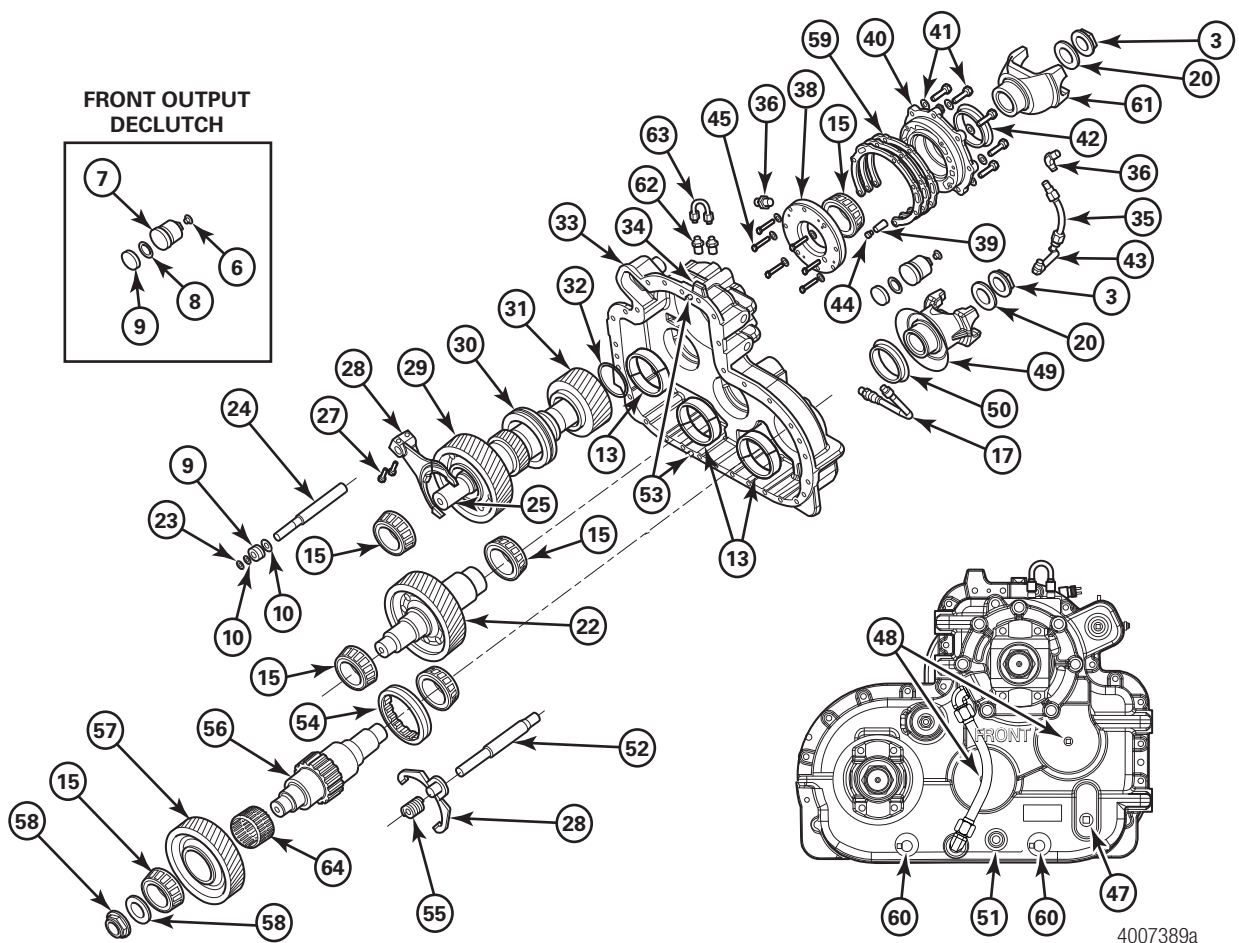
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Item	Description	Item	Description
1	Capscrew and Washer	12	Speed Sensor
2	Cover	13	Bearing Cup
3	Locknut	14	Idler Gear
4	Hardened Washer	15	Bearing Cone
5	Transfer Case Rear Cover	16	Ceramic Magnet
6	Shipping Protector	17	Switch Assembly
7	Shift Cylinder	18	Rear Output Oil Seal
8	Shift Piston O-Ring	19	Rear Output Yoke
9	Shift Piston	20	Flat Washer
10	O-Ring	21	Optional PTO Assembly
10A	O-Ring, Housing	22	Driven Gear and Rear Output Shaft
11	Neutral Breather*	23	Snap Ring
11A	Blow-by Breather	24	Shift Shaft

Item	Description
25	Input Shaft
27	Shift Fork Capscrew
28	Shift Fork
29	Helical Drive Gear, High Range
30	High and Low Clutch Collar
31	Helical Drive Gear, Low Range
32	Snap Ring
33	Transfer Case Front Case

\*Vehicles not equipped with a transfer case neutral air control may be equipped with a neutral breather which allows the shift cavity to exhaust. On vehicles equipped with a neutral air control, the solenoid allows this cavity to exhaust.

## MTC-4210X/XP Transfer Case Front Cover



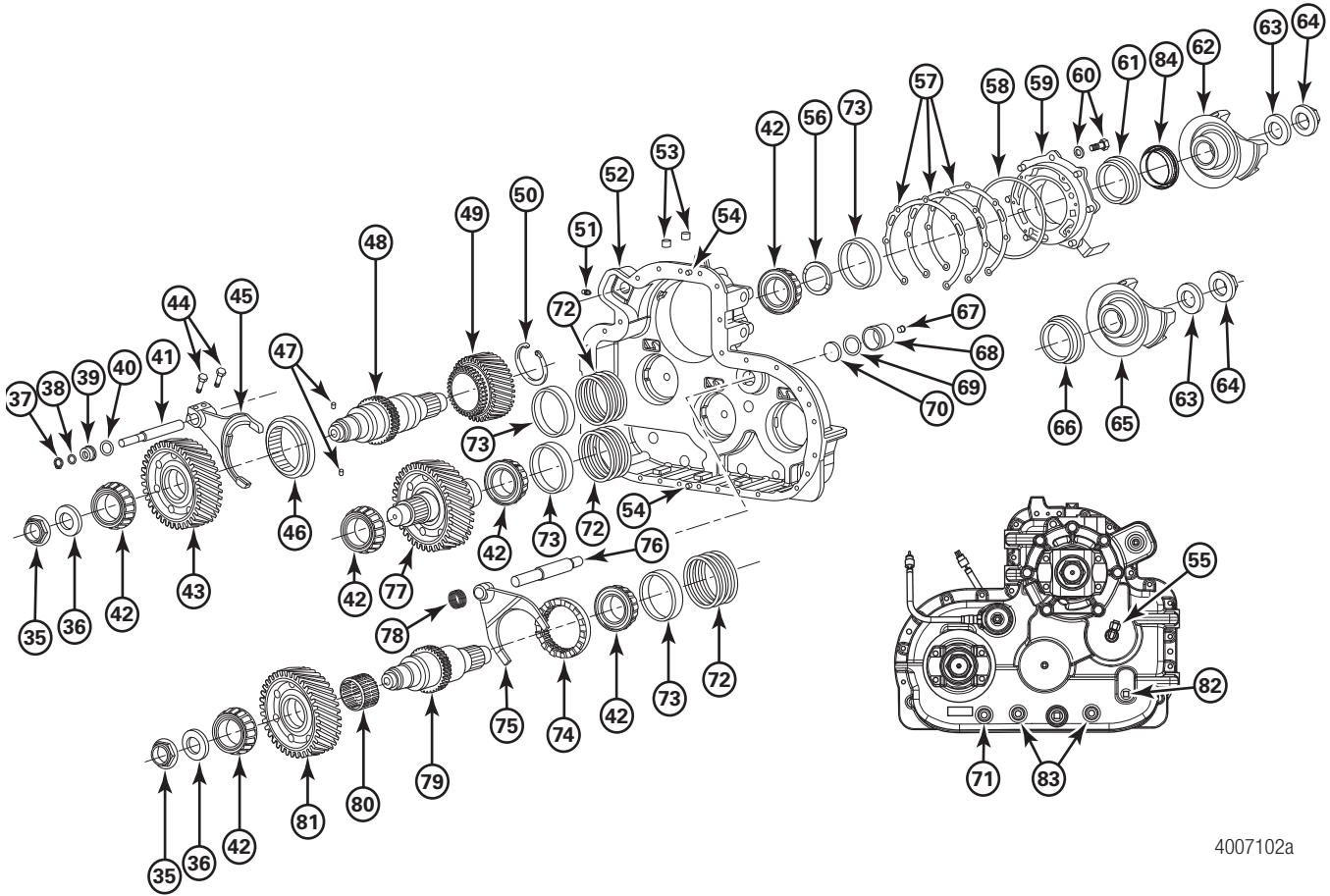
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<b>Item</b>	<b>Description</b>
34	Locating Dowel Pin
35	Inlet Oil Tube Assembly
36	Male Fitting
37	Breather Assembly
38	Oil Pump Assembly
39	Relief Valve Spring
40	Input Bearing Cage
41	Bearing Cage Capscrew and Washer
42	Input Oil Seal
43	Oil Fitting Assembly
44	Relief Valve
45	Oil Pump Capscrew and Washer
46	Elbow
47	Oil Fill Plug
48	3/8-Inch Plug
49	Front Output Yoke
50	Front Output Oil Seal
51	Magnetic Drain Plug
52	Push Rod
53	Locating Dowel Pin
54	Front Output Clutch Collar
55	Spring
56	Front Output Shaft
57	Helical Driven Gear
58	Locknut and Flat Washer
59	Shim
60	Drain Plug
61	Input Yoke
62	Oil Cooler Male Connector
63	Loop Tube
64	Needle Bearing



# 1 Exploded Views

## MTC-4210XL Transfer Case Front Cover



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Item	Description	Item	Description
35	Locknut	48	Input Shaft
36	Washer	49	Helical Drive Gear, Low Range
37	Snap Ring	50	Snap Ring
38	Shift Piston O-Ring	51	Male Fitting
39	Shift Piston	52	Front Cover Housing
40	O-Ring	53	Plug
41	Shift Shaft	54	Locating Dowel Pin
42	Bearing Cone	55	Elbow
43	Helical Drive Gear, High Range	56	Oil Spacer
44	Shift Fork Capscrew	57	Shim
45	Shift Fork	58	O-Ring
46	High and Low Clutch Collar	59	Input Bearing Cage
47	Oil Pump Pin	60	Bearing Cage Capscrew and Washer

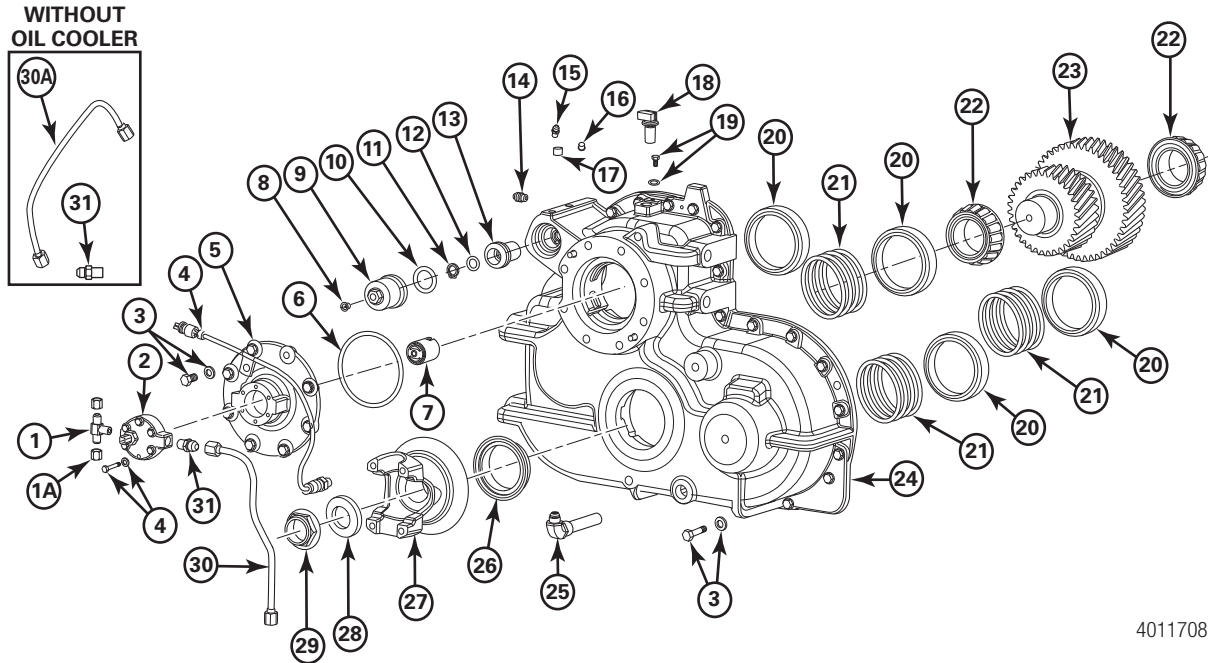
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<b>Item</b>	<b>Description</b>
61	Input Oil Seal
62	Input Yoke
63	Flat Washer
64	Locknut
65	Front Output Yoke
66	Front Output Oil Seal
67	Plug/Fitting
68	Declutch Cylinder
69	O-Ring
70	Declutch Cylinder Piston
71	Drain Plug
72	Shim
73	Bearing Cup
74	Front Output Clutch Collar
75	Shift Fork
76	Push Rod
77	Driven Gear and Rear Output Shaft
78	Spring
79	Front Output Shaft
80	Needle Bearing
81	Helical Driven Gear
82	Fill Plug
83	Magnetic Drain Plug
84	Yoke Sleeve



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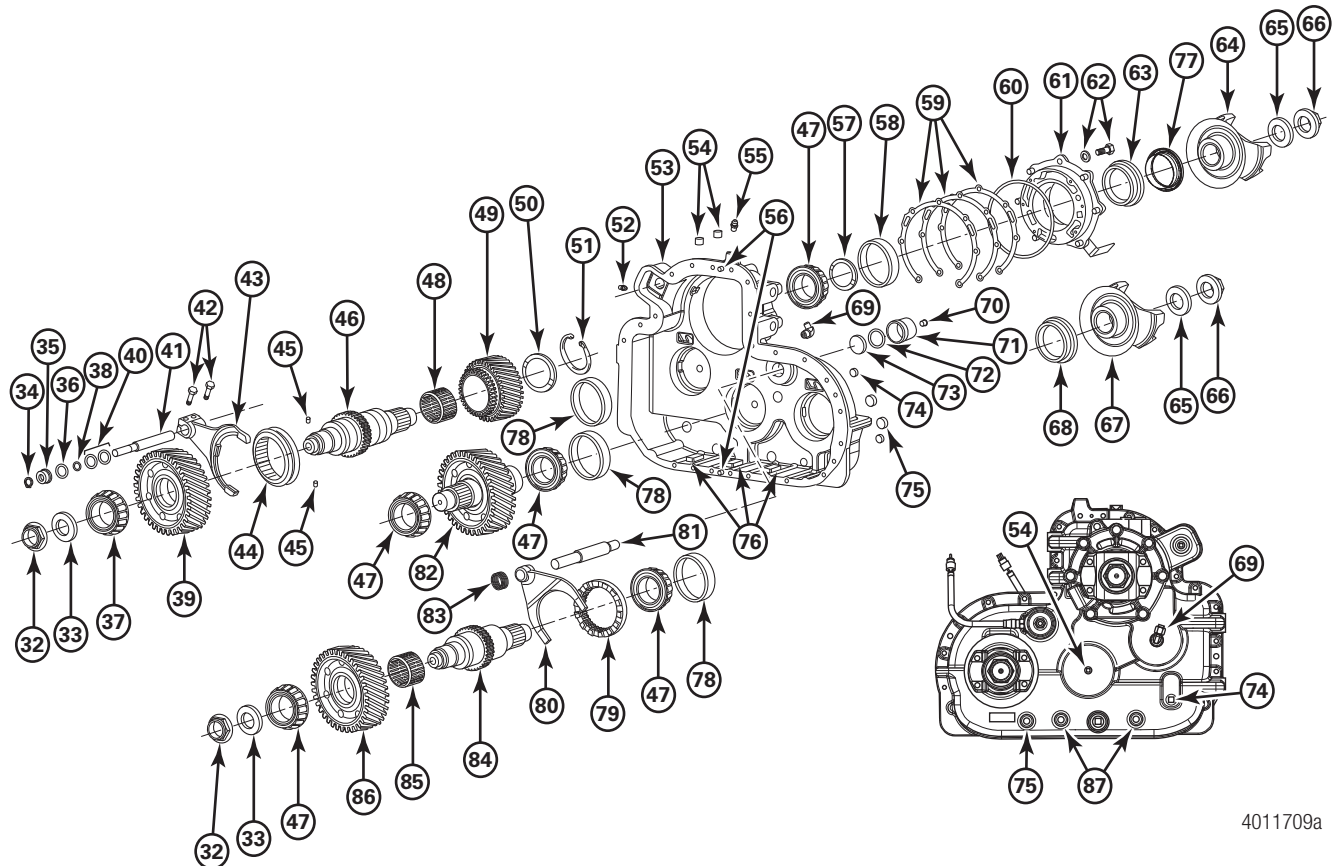
## MTC-4210XLEV Transfer Case Rear Cover



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Item	Description	Item	Description
1	T-Fitting	18	Speed Sensor
1A	Cap	19	Capscrew and Washer
2	Oil Pump Cover	20	Bearing Cups
3	Capscrew and Washer	21	Shims
4	Switch Assembly	22	Bearing Cone
5	Oil Pump Housing	23	Double Idler Gear
6	Pump Cover O-Ring	24	Rear Housing
7	Oil Pump Assembly	25	Filter Screen Assembly Tube
8	Shipping Protector	26	Rear Output Oil Seal
9	Shift Cylinder	27	Rear Output Yoke
10	Shift Piston O-Ring	28	Flat Washer
11	Snap Ring	29	Locknut
12	O-Ring	30	Oil Pump Inlet Tube
13	Shift Piston	30A	Tube Assembly, Without Oil Cooler
14	Blow-by Breather	31	Fitting, Without Oil Cooler
15	Neutral Breather		
16	Shipping Protector		
17	Neutral Breather Fitting		

## MTC-4210XLEV Transfer Case Front Cover



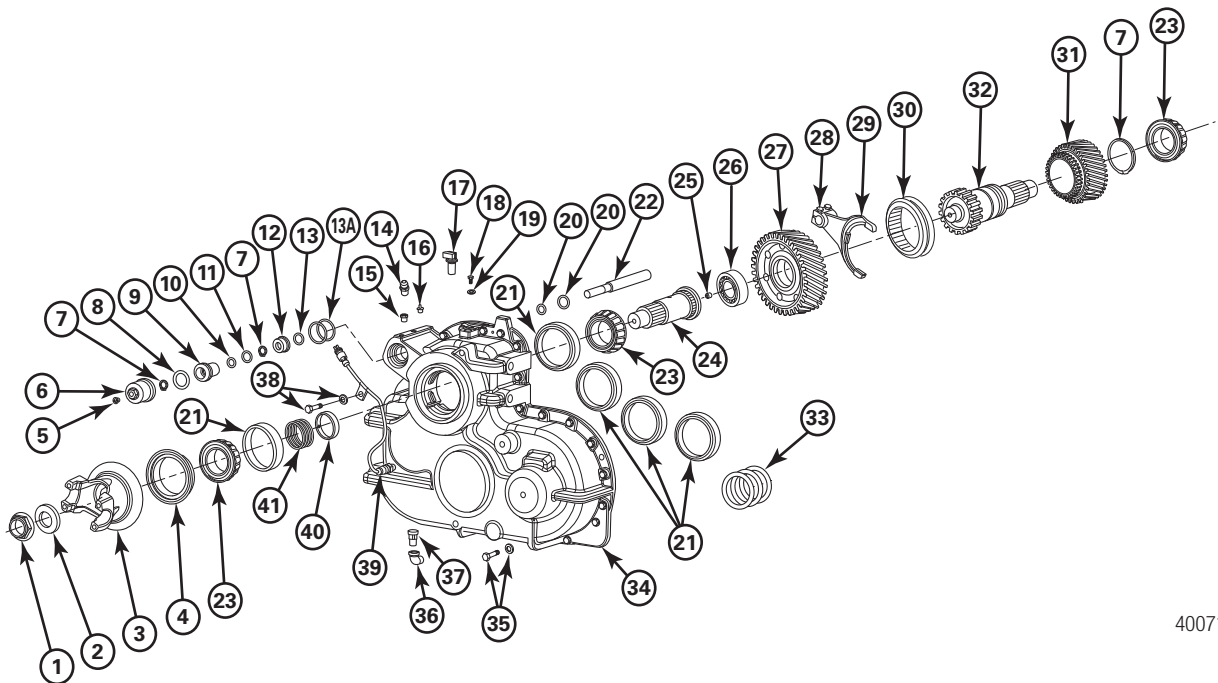
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Item	Description	Item	Description
32	Locknut	45	Oil Pump Pin
33	Washer	46	Input Shaft
34	Snap Ring	47	Bearing
35	Shift Piston	48	Needle Bearing
36	O-Ring	49	Helical Drive Gear, Low Range
37	Bearing Cone	50	Spacer
38	Shift Piston O-Ring	51	Snap Ring
39	Helical Drive Gear, High Range	52	Male Fitting
40	O-Ring	53	Front Cover Housing
41	Shift Shaft	54	Plug
42	Shift Fork Capscrew	55	Breather
43	Shift Fork	56	Locating Dowel Pin
44	High and Low Clutch Collar	57	Oil Spacer

# 1 Exploded Views

<b>Item</b>	<b>Description</b>
58	Bearing Cup
59	Shim
60	O-Ring
61	Input Bearing Cage
62	Bearing Cage Capscrew and Washer
63	Input Oil Seal
64	Input Yoke
65	Flat Washer
66	Locknut
67	Front Output Yoke
68	Front Output Oil Seal
69	Elbow
70	Plug/Fitting
71	Declutch Cylinder
72	O-Ring
73	Declutch Cylinder Piston
74	Fill Plug
75	Drain Plug
76	Magnets
77	Yoke Sleeve
78	Bearing Cup
79	Front Output Clutch Collar
80	Shift Fork
81	Push Rod
82	Driven Gear and Rear Output Shaft
83	Spring
84	Front Output Shaft
85	Needle Bearing
86	Helical Driven Gear
87	Magnetic Drain Plug

## MTC-4213X Transfer Case Rear Cover



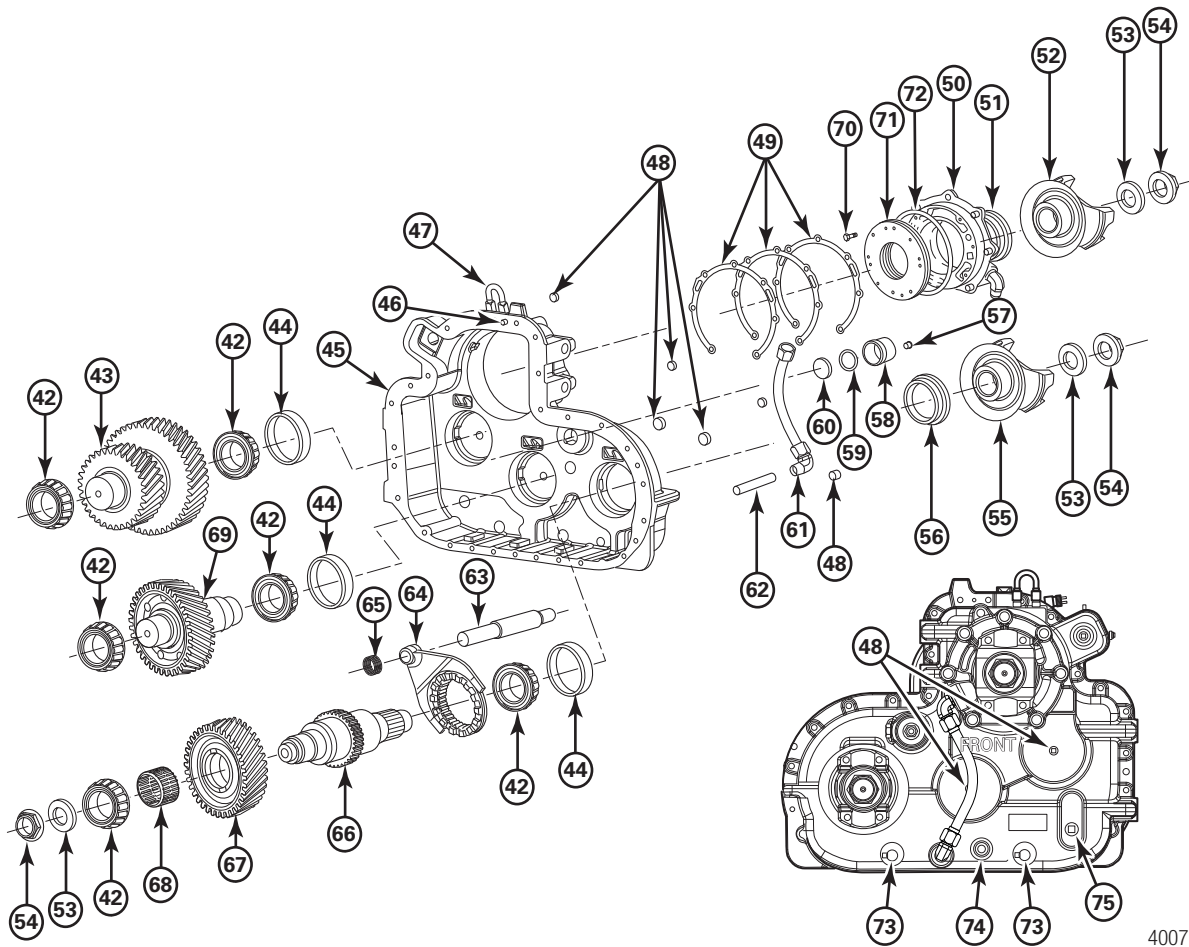
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Item	Description	Item	Description
1	Locknut	18	Capscrew
2	Flat Washer	19	Washer
3	Rear Output Yoke	20	O-Ring
4	Rear Output Oil Seal	21	Bearing Cup
5	Plug	22	High and Low Shift Shaft
6	Shift Cylinder	23	Bearing Cone
7	Snap Ring	24	Rear Output Shaft
8	O-Ring	25	Plug
9	Outer Shift Piston	26	Pocket Bearing
10	O-Ring	27	Helical Drive Gear, High Range
11	Piston O-Ring	28	Shift Fork Capscrew
12	Inner Shift Piston	29	High and Low Shift Fork
13	O-Ring	30	High and Low Clutch Collar
13A	O-Ring, Housing	31	Helical Drive Gear, Low Range
14	Neutral Breather	32	Input Shaft
15	Neutral Breather Fitting	33	Shims
16	Plug	34	Rear Housing
17	Speed Sensor	35	Capscrew and Washer

# 1 Exploded Views

Item	Description
36	Elbow
37	Breather
38	Capscrew and Washer
39	Switch Assembly
40	Spacer
41	Shims

## MTC-4213X Transfer Case Front Cover



Item	Description
42	Bearing Cone
43	Double Idler Gear
44	Bearing Cup
45	Front Housing

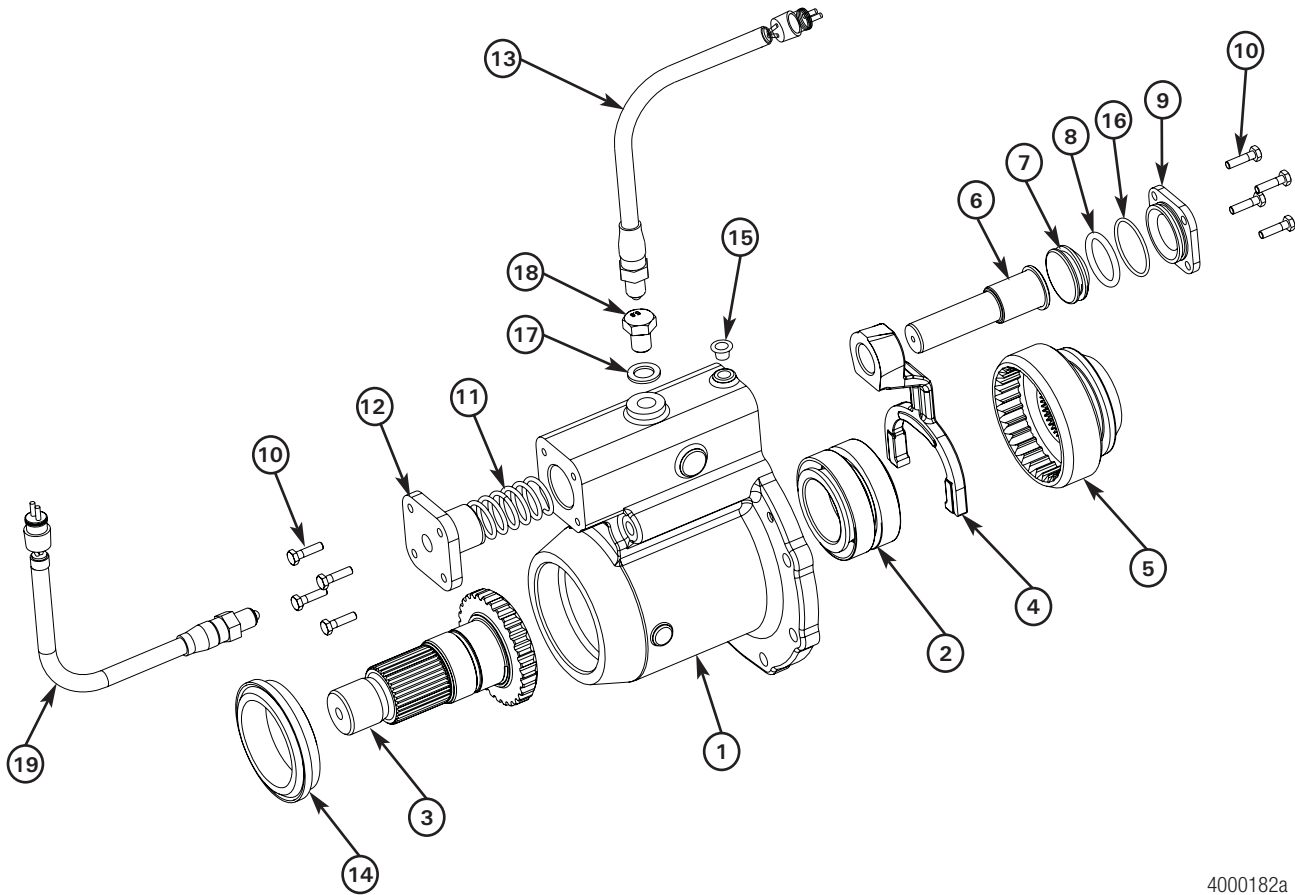
Item	Description
46	Locating Dowel Pin
47	Oil Loop Tube
48	Shipping Plug
49	Shims

<b>Item</b>	<b>Description</b>
50	Input Bearing Cage
51	Input Oil Seal
52	Input Yoke
53	Flat Washer
54	Locknut
55	Front Output Yoke
56	Front Output Oil Seal
57	Plug
58	Declutch Shift Cylinder
59	Shift Piston O-Ring
60	Declutch Shift Piston
61	Oil Inlet Line
62	Inlet Tube
63	Shift Shaft
64	Shift Fork
65	Shift Fork Spring
66	Front Output Shaft
67	Helical Drive Gear
68	Needle Bearing
69	Single Idler Gear
70	Oil Pump Capscrew
71	Front Oil Pump
72	O-Ring
73	Drain Plug
74	Magnetic Drain Plug
75	Oil Fill Plug



# 1 Exploded Views

## MTC-4208XP and MTC-4210XP Declutch/PTO



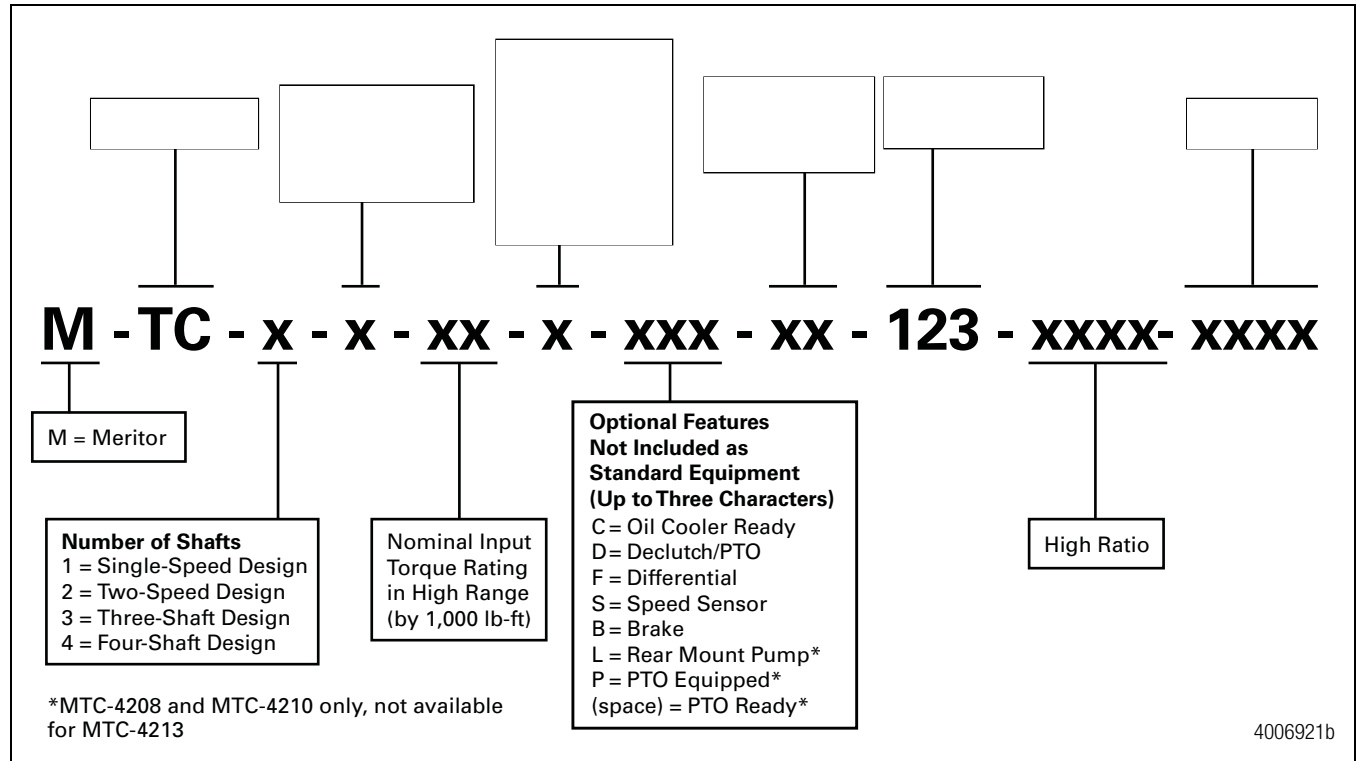
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Item	Description
—	Declutch Assembly
1	PTO Housing
2	Bearing Assembly
3	PTO Shaft
4	Shift Fork
5	Clutch Collar
6	Push Rod
7	Shifter Piston
8	O-Ring
9	Cover Plate
10	Capscrew
11	Shifter Spring
12	Cap

Item	Description
13	Connector Switch Assembly — Disengage, Optional
14	Oil Seal Assembly
15	Shipping Protector
16	O-Ring
17	Flat Washer
18	Special Screw
19	Connector Switch Assembly — Engage

## Model Nomenclature

### Meritor Transfer Case — Model Nomenclature



**Figure 2.1**

Transfer case model nomenclature is illustrated in the following example.

## 2 Introduction

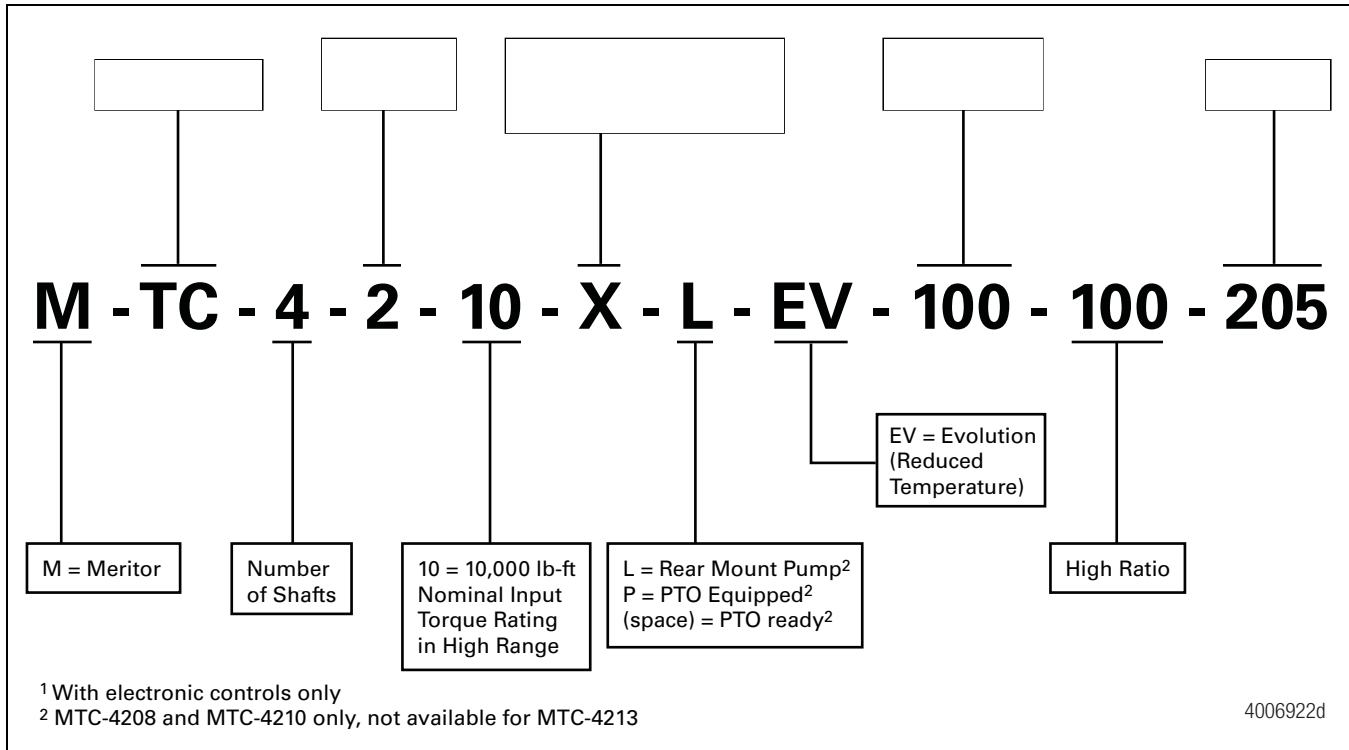
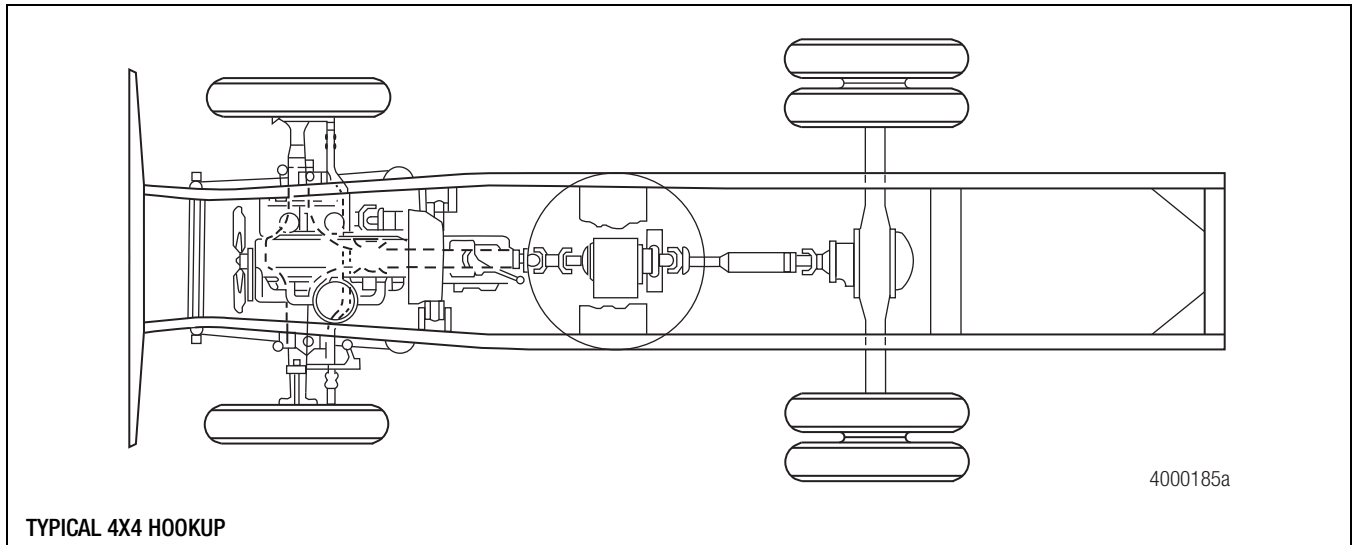


Figure 2.2

### Description

Meritor MTC-4208X/XL/XP/XLEV, MTC-4210X/XL/XP/XLEV and MTC-4213X Series transfer cases are four-shaft designs with two-speed front and rear output having a 1:1 and a 1:2.05 ratio for use with part-time 4x4 and 6x6 vehicles. The MTC-4208 and MTC-4210 Series are designed specifically for use in 4x4 vehicles (the MTC-4213 Series is designed specifically for 6x6) as part of the Meritor medium-duty 4x4 drive system. Figure 2.3.



**Figure 2.3**

The air-actuated front-axle declutch (if equipped), high and low shifter and full-torque power take-off (PTO) lockup are controlled from the cab. An air plunger or electric switch, usually mounted on the instrument panel, engages or disengages a mechanical clutch.

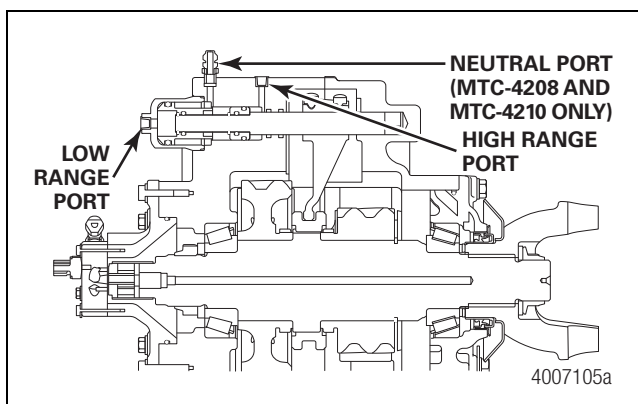
An optional speed sensor measures transfer case output driveline rpm. Optional switches indicate when the front axle declutch is fully engaged or disengaged.

These transfer cases provide for two-speed output (high range and low range) and a neutral position that is used for PTO-equipped transfer cases only. Non-PTO cases can have this neutral position plugged with a breather. Figure 2.4.

The front axle declutch permits shifting from part-time 4x4 or 6x6 operation to rear-wheel drive (RWD). Figure 2.5, Figure 2.6 and Figure 2.7. You will know that engagement occurs by hearing it, noticing improved vehicle performance, or observing the optional indicator light in the cab.

The full-torque PTO option provides an outlet to drive auxiliary power devices. Figure 2.8.

Optional switches for full-torque PTOs indicate full engagement or disengagement.



**Figure 2.4**

## 2 Introduction

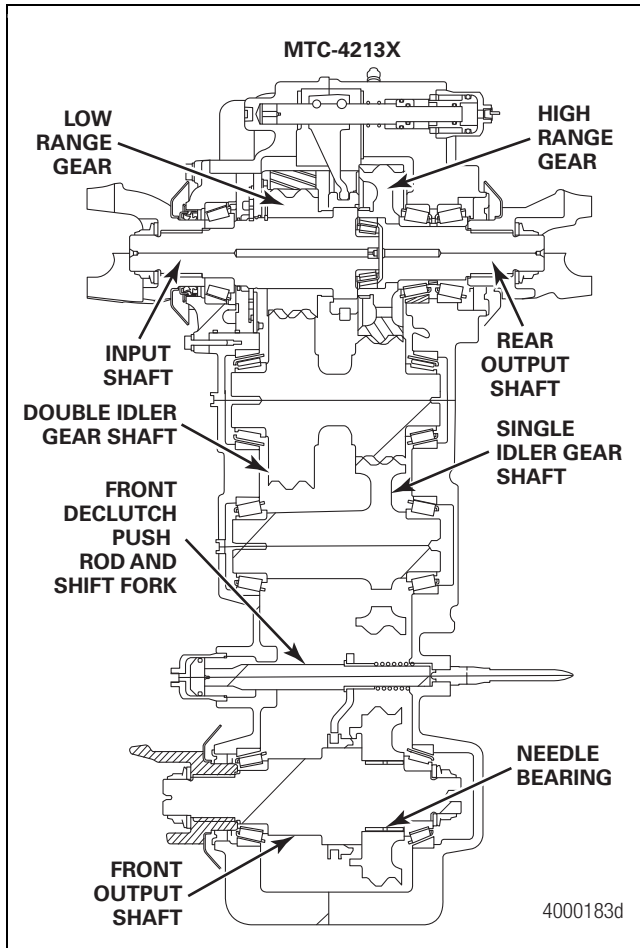


Figure 2.5

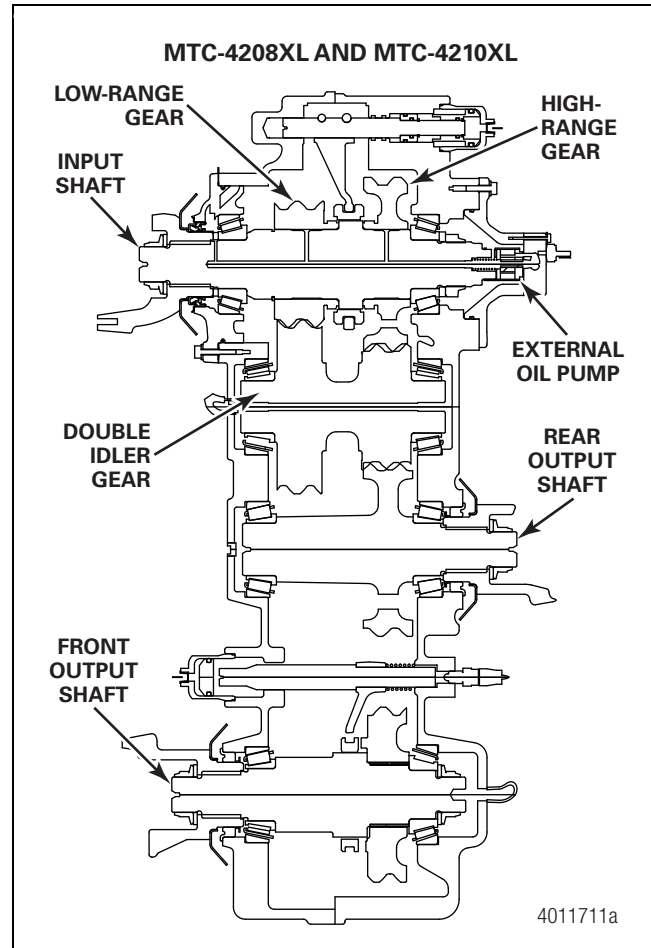


Figure 2.6

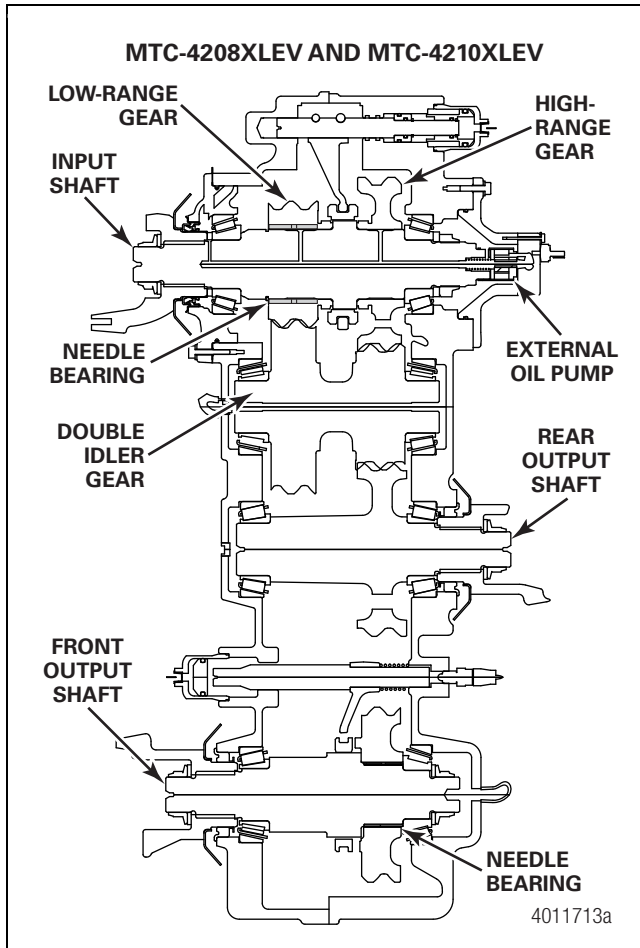


Figure 2.7

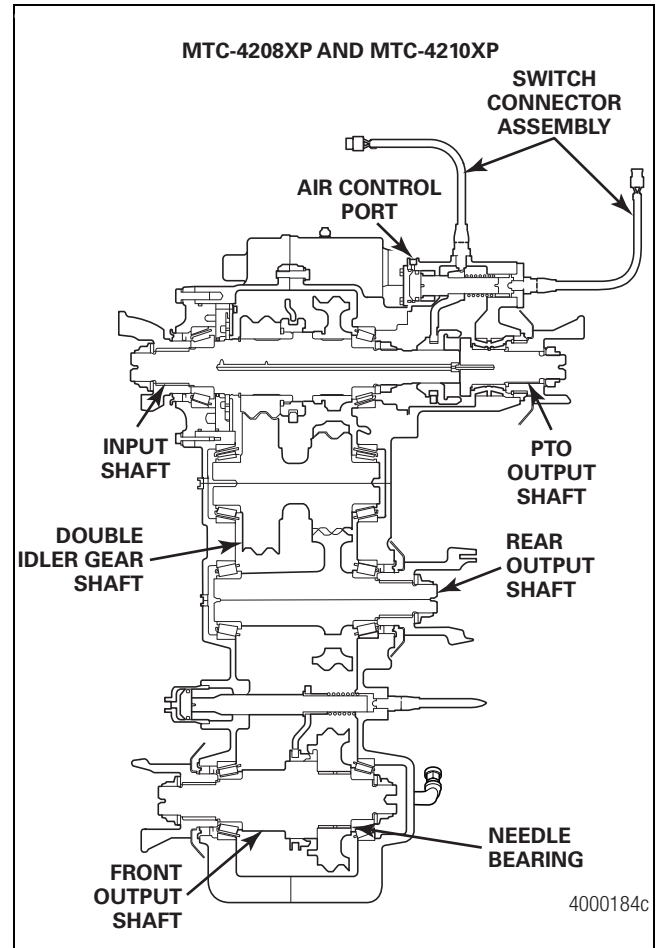


Figure 2.8



## 2 Introduction

### Operation

#### Front Axle Declutch

##### **⚠ WARNING**

Do not engage the front axle declutch when the vehicle's wheels are slipping or when moving up or down a steep hill or grade, which can cause the vehicle to lose stability. Serious personal injury and damage to components can result.

Operation of the front axle should occur only on off-road or poor traction conditions. Engaging the declutch affects the vehicle's turning and steering responsiveness. Do not engage the declutch or low gear range under normal operating conditions. Serious personal injury and damage to components can result.

Speeds of under 20 mph or 32 km/h are recommended for part-time 4x4 or 6x6 operation.

Engage the declutch when the vehicle is stationary or operating at constant low speed, below 10 mph or 4 km/h.

**NOTE:** Front engagement can take place when the wheels are slipping, but a 150 rpm driveline differential speed guideline must be adhered to. Special ECU programming is required.

#### High-Low Shifting

Shift the transfer case into low from high gear or from high to low gear when the vehicle is stationary. Apply the parking brake with the transmission in Neutral on automatic or manual transmissions.

- **If the clutch does not fully engage:** Turn the steering wheel in one direction and rock the vehicle back and forth until engagement occurs.

You will know that engagement occurs by hearing it, noticing improved vehicle performance, or observing the optional indicator light in the cab.

#### Oil Cooler Option

Vehicle configuration can have a significant impact on MTC model transfer cases. Vehicles with overdrive transmissions used primarily for high-speed highway routes run at higher transfer case input speeds. Transfer case running temperature is primarily affected by input speed, regardless of rear-wheel-drive only or part-time 4x4 or 6x6 operation.

A transfer case oil cooler reduces operating temperatures which will improve yoke seal life, reduce oil degradation and reduce the likelihood for other oil and air leaks. Figure 2.9, Figure 2.10 and Figure 2.11.

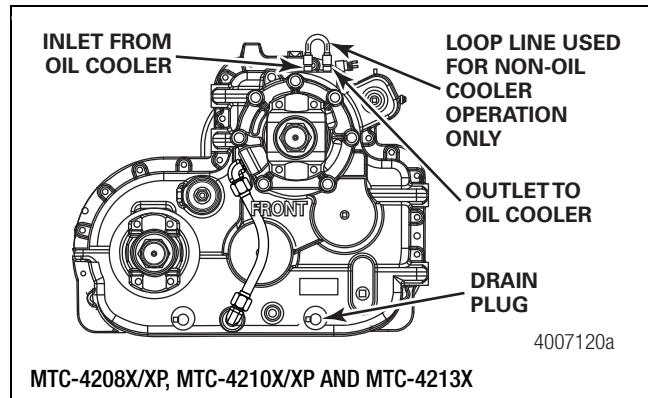


Figure 2.9

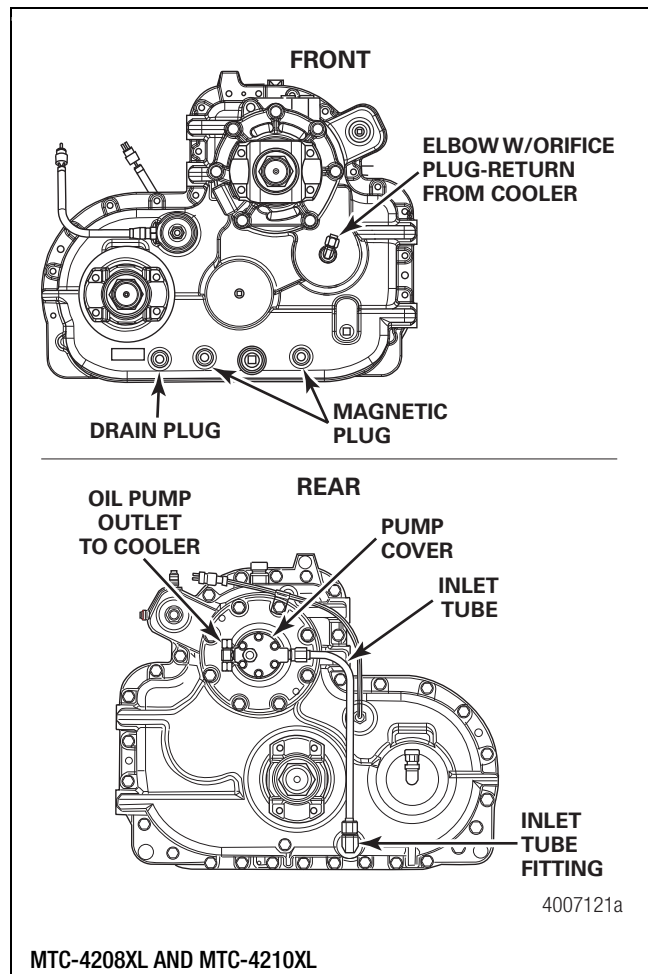


Figure 2.10

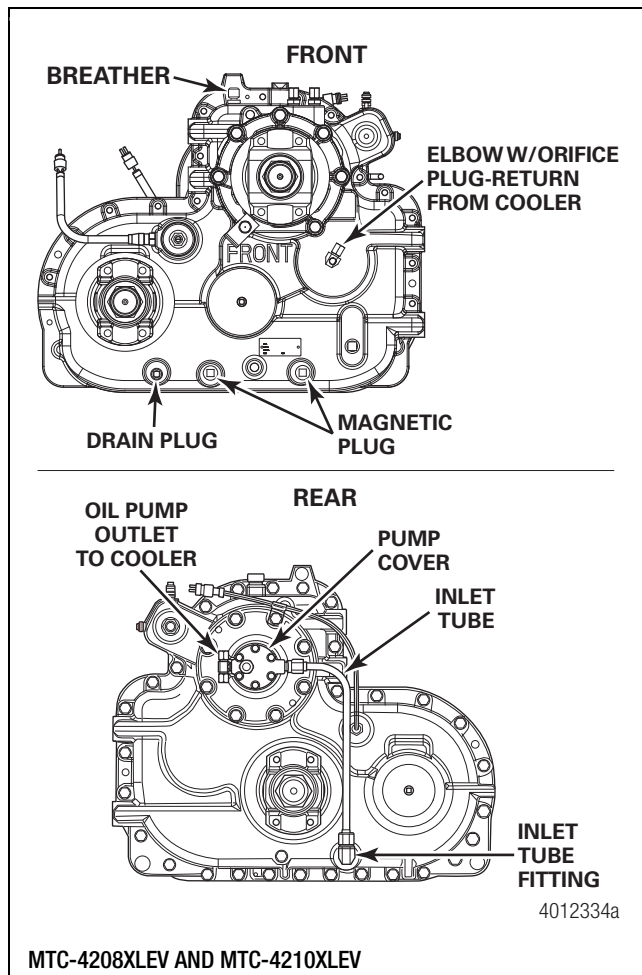


Figure 2.11

### Blow-by Breather

The rear cover portion of the housing is equipped with a blow-by breather for the high/low shifter. Figure 2.12. The breather, which points sideways on the driver side of the housing, prohibits pressurization of the housing if an O-ring becomes damaged. Because all range shifts require full time pressurization, a damaged O-ring would allow air to fill the housing which could further damage the yoke seals or blow oil from the housing.

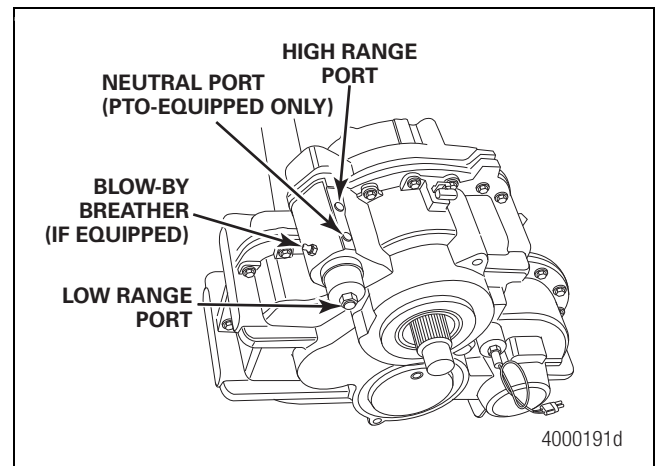


Figure 2.12

### Full-Torque Power Take-Off (PTO)

#### ⚠ CAUTION

Do not engage the full-torque power take-off (PTO) when the transfer case prop shafts are turning. Damage to the transfer case will result.

Engage or disengage the PTO when the vehicle is stationary, the transmission is in Neutral, and the transfer case prop shafts are not turning. Do not load the driven auxiliary device when PTO is initially engaged. Use the transfer case in-cab switches to place the transfer case into Neutral.

You will know that engagement occurs by hearing it or observing the optional indicator light in the cab.

The PTO may be operated in high/low/Neutral range.

When operating the PTO in Neutral range, do not exceed 2,000 rpm. Control the transmission shift range and engine rpm to ensure you do not exceed this limit.

### 3 Removal

## Hazard Alert Messages

Read and observe all Warning and Caution hazard alert messages in this publication. They provide information that can help prevent serious personal injury, damage to components, or both.

### ⚠ WARNING

To prevent serious eye injury, always wear safe eye protection when you perform vehicle maintenance or service.

Park the vehicle on a level surface. Block the wheels to prevent the vehicle from moving. Support the vehicle with safety stands. Do not work under a vehicle supported only by jacks. Jacks can slip and fall over. Serious personal injury and damage to components can result.

## Remove the Transfer Case Assembly

1. Wear safe eye protection.
2. Park the vehicle on a level surface. Place blocks under the wheels not being raised to keep the vehicle from moving.
3. Raise the vehicle so that the area to be serviced is off the ground. Support the vehicle with safety stands.
4. Place a large container under the transfer case.
5. Remove the magnetic drain plug from the bottom of the transfer case. Drain and discard the oil correctly. Clean the magnetic drain plug. Figure 3.1, Figure 3.2 and Figure 3.3.

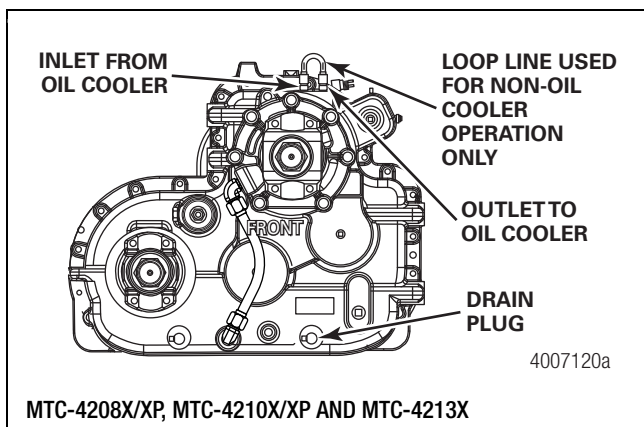


Figure 3.1

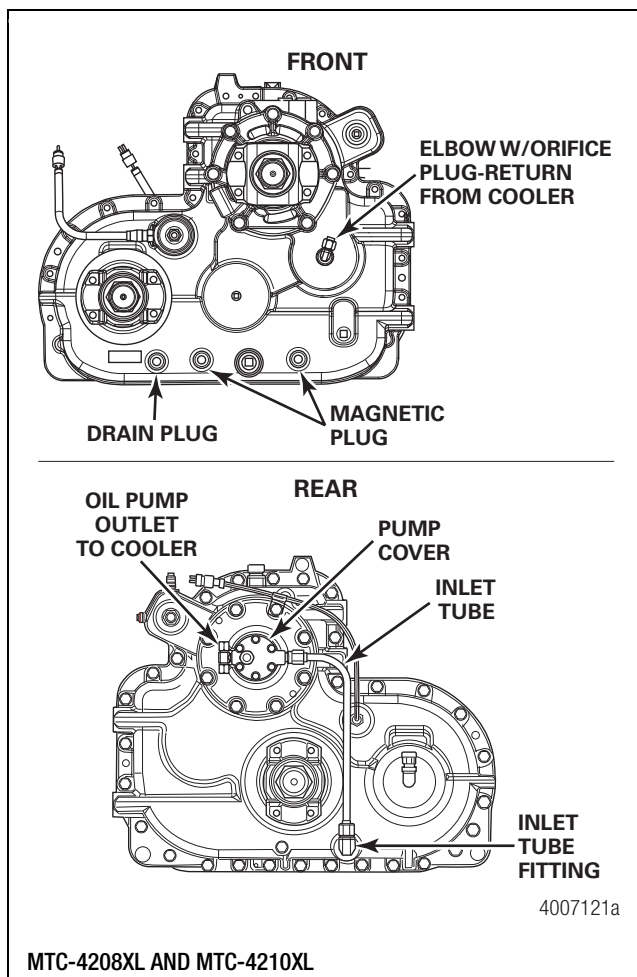
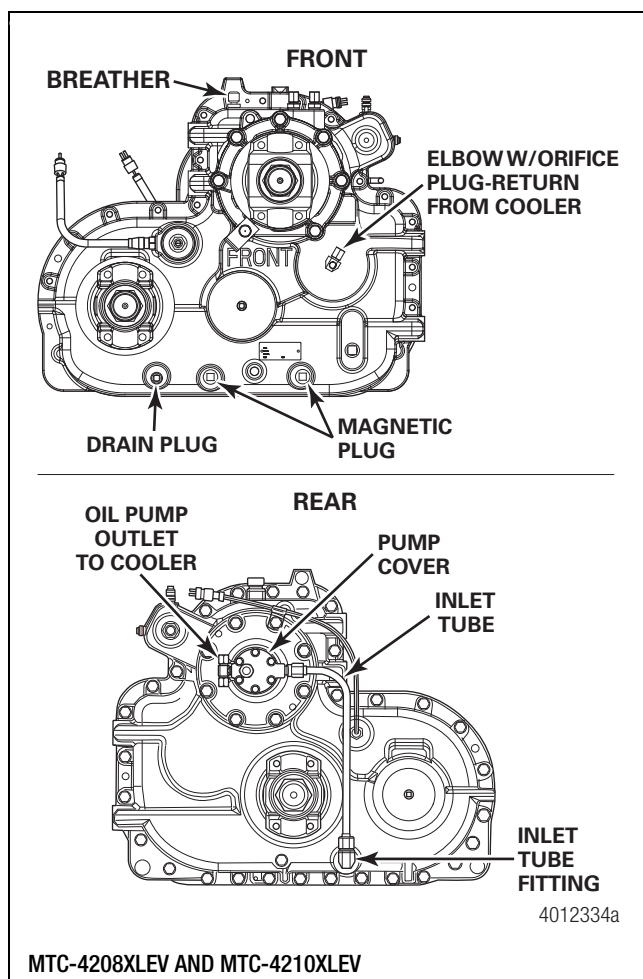


Figure 3.2



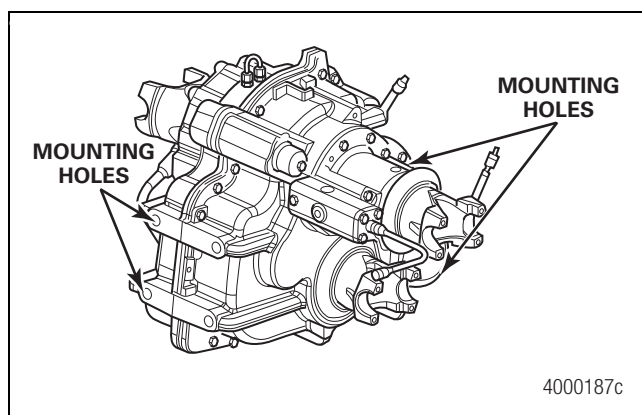
**Figure 3.3**

6. Disconnect the drivelines from the input and output yokes or flanges of the transfer case.
7. Disconnect the cooler lines. Figure 3.1, Figure 3.2 and Figure 3.3.
8. Disconnect the air lines at the shift cylinders of the transfer case.
9. Disconnect the harness for the indicator switch wires.
10. Use a hydraulic roller jack to support the transfer case. Remove the mounting bolts that hold the transfer case to the vehicle.
11. Carefully remove the transfer case with the hydraulic jack.

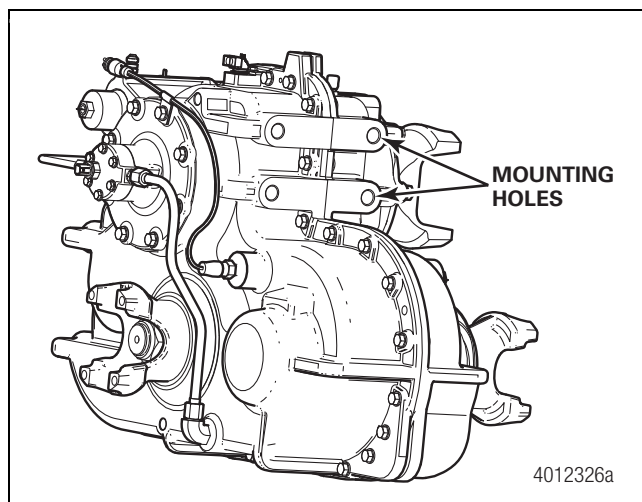
**⚠ CAUTION**

Close or cover all openings, including the breather, oil drain and speed sensor, before steam cleaning the outside of the transfer case. Steam can damage components.

12. Close or cover all openings before steam cleaning. These openings include the breather, oil drain and speed sensor.
13. Steam clean the outside of the transfer case to remove heavy amounts of dirt.
14. Construct suitable mounting brackets or similar fixtures. Attach the brackets to the front half of the transfer case by installing bolts through the mounting holes in the transfer case. Figure 3.4 and Figure 3.5.



**Figure 3.4**



**Figure 3.5**

**NOTE:** Eye-bolts permit easier lifting of the transfer case.

15. Install eye-bolts in the lifting holes located in either half of the transfer case housing. Lifting holes are located at the top and bottom of each half of the transfer case near the center. Figure 3.6.

### 3 Removal

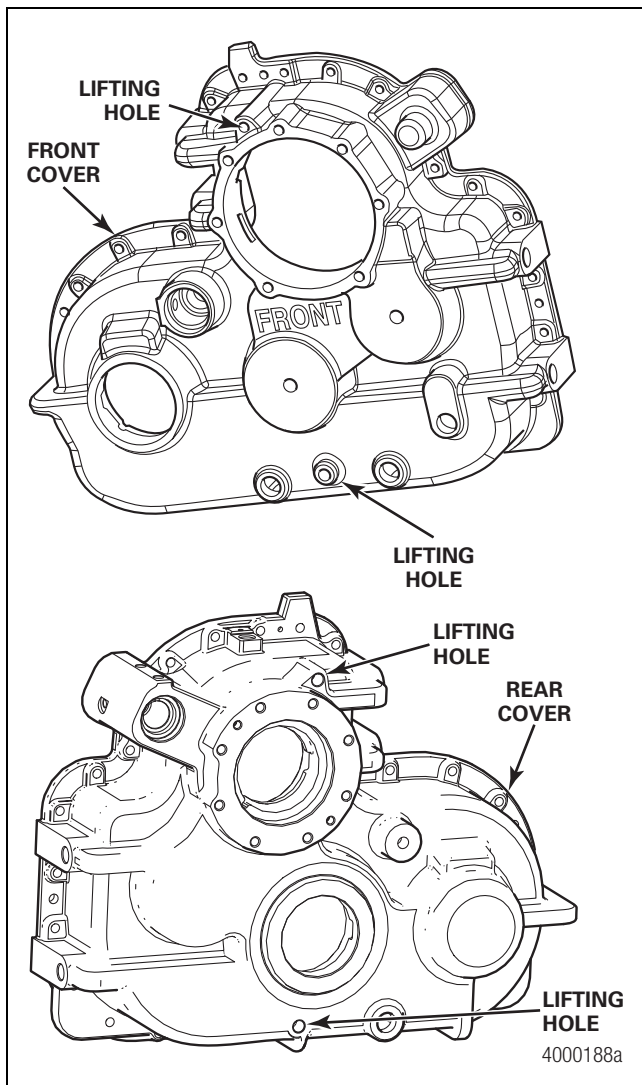


Figure 3.6

#### **⚠ WARNING**

Support the transfer case with a lifting strap before mounting the transfer case into the repair stand. A transfer case that is not supported correctly can fall. Serious personal injury and damage to components can result.

**NOTE:** The transfer case filled with lubricant weighs approximately 750 lbs (340.2 kg) without the PTO.

16. Attach a suitable lifting device to the eye-bolts to lift the transfer case. Use suitable brackets to mount the case in the repair stand. Figure 3.4 and Figure 3.5.



## Hazard Alert Messages

Read and observe all Warning and Caution hazard alert messages in this publication. They provide information that can help prevent serious personal injury, damage to components, or both.

### WARNING

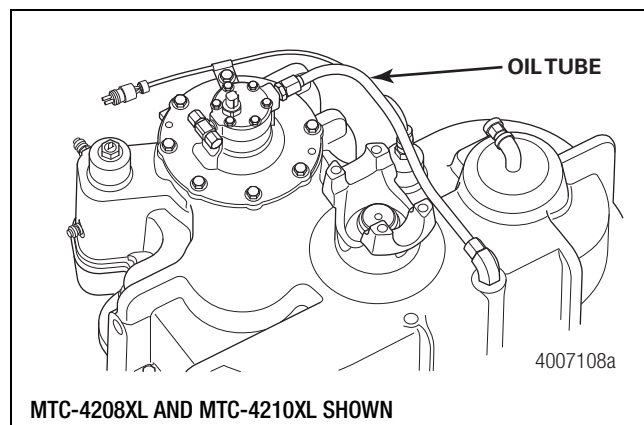
To prevent serious eye injury, always wear safe eye protection when you perform vehicle maintenance or service.

## Remove the Input Shaft Assembly from an Assembled Transfer Case (for input shaft repairs only)

If necessary, the input shaft may be removed without separating the transfer case halves. Once you've removed the transfer case from the vehicle and drained the oil, Meritor recommends that you check and record the end play for the input shaft, output shafts and idler gears before you begin this procedure. Refer to the procedures in Section 3 and Section 6.

### 1. MTC-4208XL/XLEV and MTC-4210XL/XLEV transfer cases only:

- A. Disconnect the transfer case oil inlet line from the oil pump cover. Figure 4.1.

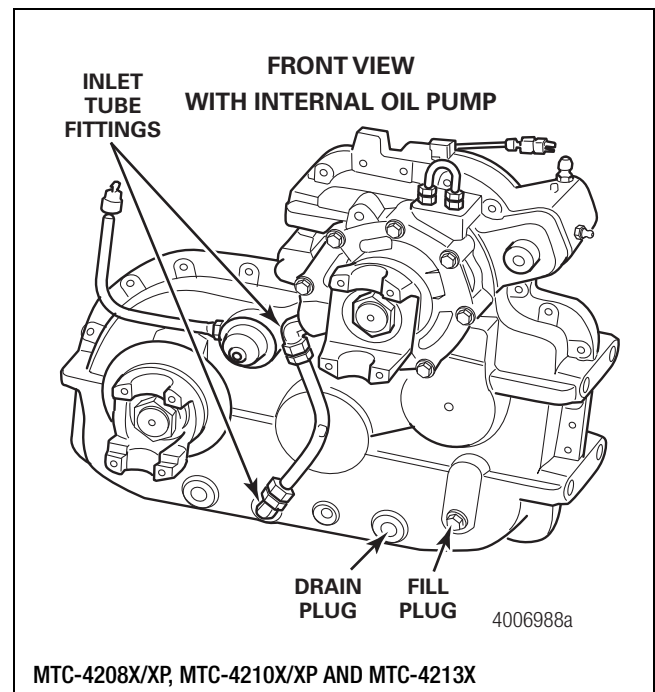


**Figure 4.1**

- B. Disconnect the oil cooler-to-pump cover oil lines.
- C. Plug the oil lines and cap the oil cover fittings.
- D. Remove the external oil pump housing from the transfer case.
- E. Remove the oil pump assembly from the rear of the input shaft. Refer to the procedure in this section.

### 2. MTC-4208X and MTC-4210X transfer cases only:

- A. Disconnect the transfer case oil inlet line from the oil pump cover. Figure 4.2.



**Figure 4.2**

- B. Remove the PTO capscrews and remove the PTO cover.
- ### 3. MTC-4208XP and MTC-4210XP transfer cases only:
- A. Disconnect the transfer case oil inlet line from the oil pump cover. Figure 4.2.
  - B. Remove the PTO air lines.
  - C. Remove the PTO-to-transfer case capscrews.
  - D. Remove the PTO.
4. Remove the 3-inch (76 mm) diameter locknut and washer from the rear half of the input shaft.
  5. Apply shop air to the high range shift cylinder air port to engage the clutch collar in the high range position. This will prevent the high range gear and bearing from falling out of position when you remove the input shaft from the transfer case assembly.
  6. Rotate the transfer case so that it is in the normal operating position.
  7. Remove the input bearing cage capscrews and washers.

## 4 Disassembly

- Remove the input bearing cage and input shaft assembly from the transfer case. If necessary, use a yoke puller or an appropriate lifting device. It may be necessary to gently pry the input bearing cage up to dislodge it from the transfer case. Figure 4.3.

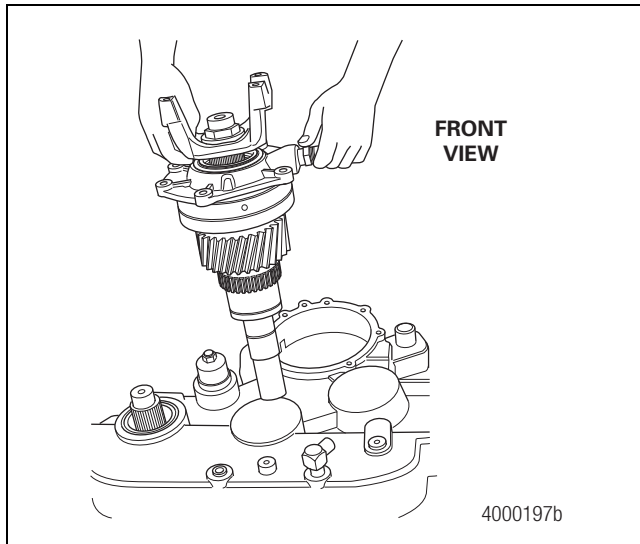


Figure 4.3

- Remove the shims.
- Remove the input bearing cage oil seal (O-ring) and discard it.
- Remove the air line from the high range port. The high/low shift is air actuated and will remain in the high position.

**NOTE:** For disassembly of the input shaft, refer to Section 4.

### MTC-4213X Only

- Disconnect the oil line from the input bearing cage. Figure 4.2.
- Apply shop air to the high range shift cylinder air port to engage the high range gear. This will prevent the clutch collar from falling into the transfer case half.
- Rotate the transfer case so that it is in the normal operating position.
- Remove the input bearing cage capscrews and washers.
- Remove the input bearing cage and input shaft assembly from the transfer case. If necessary, use a yoke puller or an appropriate lifting device. It may be necessary to gently pry the input bearing cage up to dislodge it from the transfer case.
- Remove the shims.

**NOTE:** The MTC-4213X has a two piece through shaft. Because of this design, only the forward half of the input shaft will be removed while the upper rear output shaft will remain in place.

## Disassemble the Transfer Case

### Front and Rear Output Yokes

- Rotate the transfer case in the repair stand so that the yoke being removed faces UPWARD.
- Use a yoke holder to secure the yokes from turning. Remove the yoke locknuts and washers from the front and rear output shafts. Figure 4.4.

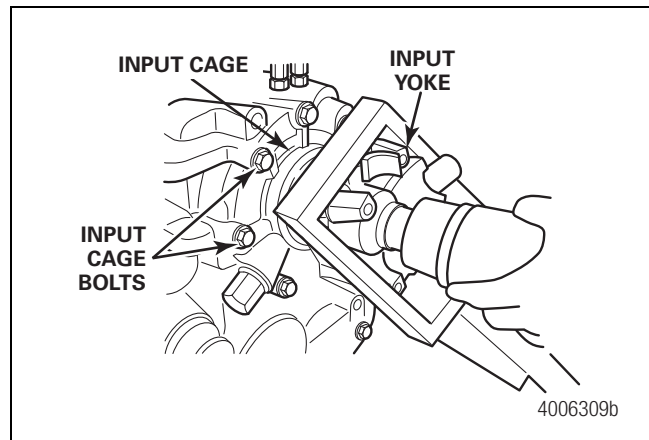


Figure 4.4

- Use a yoke puller to remove the yokes from the output shafts. Do not remove the deflector from the yoke or flange unless it is damaged.
- Use a yoke holder to secure the input yoke from turning. Loosen but do not remove the front input yoke, locknut and washer from the front input shaft. The yoke is used to lift the input shaft assembly from the transfer case. Figure 4.4.
- MTC-4208XP and MTC-4210XP transfer cases only:** Remove the PTO, if equipped, or rear-mounted pump assembly from the rear of the transfer case. Refer to the procedure in this section.

### Rear-Mounted Pump Assembly (MTC-4208XL/XLEV and MTC-4210XL/XLEV Only)

- Disconnect the inlet oil line and original lube fittings. Figure 4.5 and Figure 4.6.

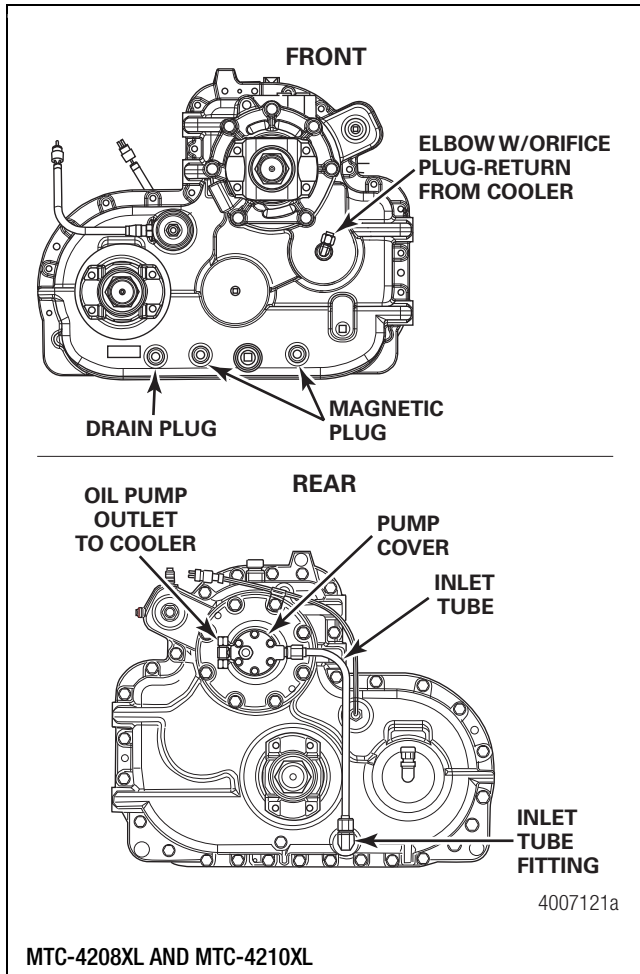


Figure 4.5

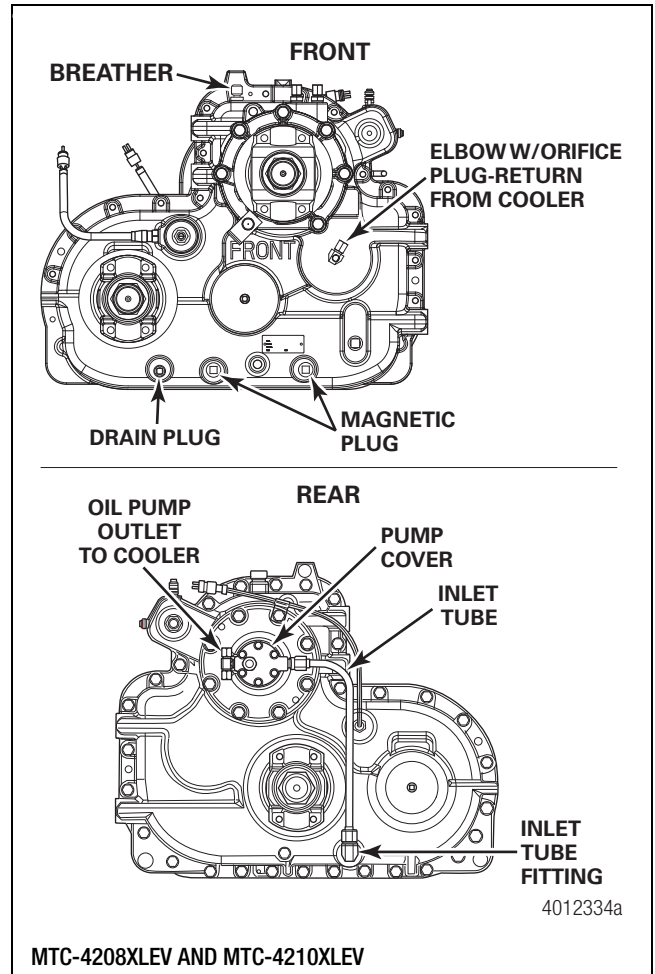


Figure 4.6

2. Remove the pump housing washers and bolts. Remove the pump housing and cover. Figure 4.7.

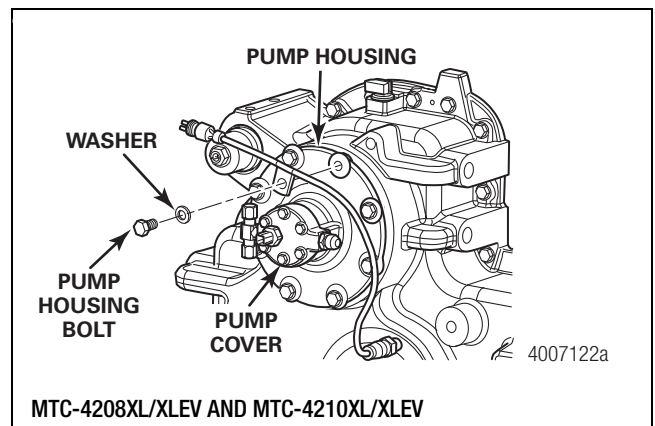


Figure 4.7



## 4 Disassembly

3. Remove the pump by applying forward pressure to the pump assembly and disengage the assembly from the oil pump drive pins located on the rear half on the input shaft. Figure 4.8.

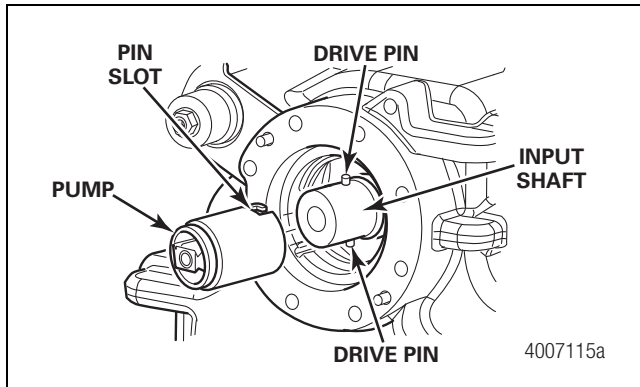


Figure 4.8

4. If necessary, disassemble the pump as follows.
  - A. Remove the spring from the rear half of the input shaft.
  - B. Gently tap the idler carrier out of the rotor. The idler and floating plate will come out with the idler carrier. Figure 4.9.

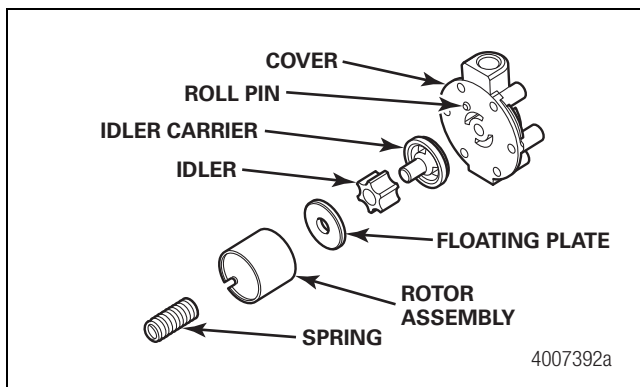


Figure 4.9

### Optional PTO Assembly on MTC-4208XP and MTC-4210XP Transfer Cases

1. Rotate the transfer case in the repair stand so that the PTO assembly, if so equipped, is facing UPWARD. Figure 4.10.

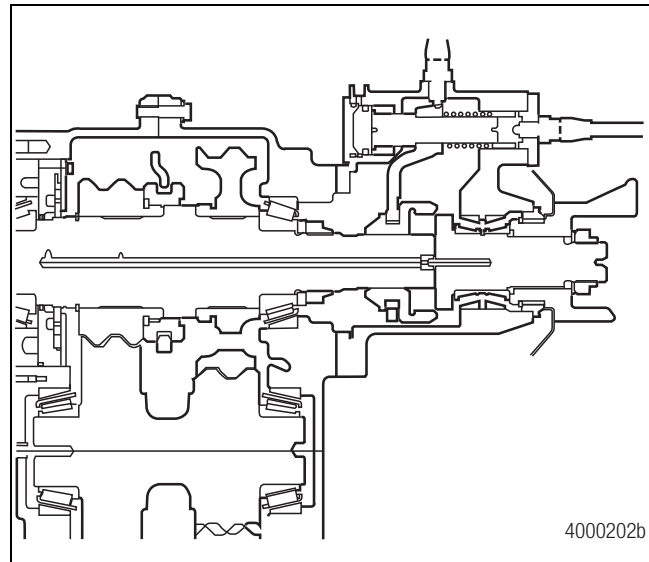
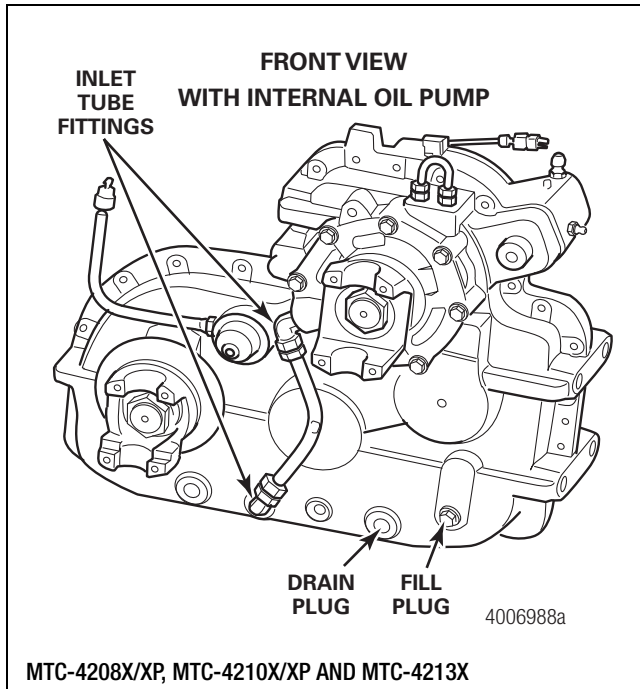


Figure 4.10

2. Remove the yoke nut, washer and yoke. Use a yoke puller to remove the yoke.
3. Remove the PTO indicator switch from the shift plate, if equipped.
4. Remove the cage mounting capscrews and washers from the PTO. Lift the PTO assembly off the transfer case.

### Remove the Front Input Shaft, Input Bearing Cage and Internal Pump Assembly (If Equipped)

1. On transfer cases with an internal oil pump, remove the inlet oil tube from the transfer case by loosening the fittings at the lower front case and input-bearing cage. Figure 4.11.



**Figure 4.11**

- On transfer case models MTC-4208X/XP and MTC-4210X/XP, remove the PTO cover or PTO, whichever applies. Use a three-inch socket to remove the large retaining nut and washer from the rear half of the input shaft. Use a yoke tool on the input shaft yoke to prevent the shaft from rotating when you remove the retaining nut.

If you are not able to remove the input shaft retaining nut, you will not be able to remove the front input shaft before you open the housing. Skip this procedure.

**NOTE:** The MTC-4213X has a split shaft design. It is only necessary to remove the front half of the input shaft during disassembly. The rear half of the input shaft is pressed into the rear case half and cannot be removed until after the transfer case halves are separated.

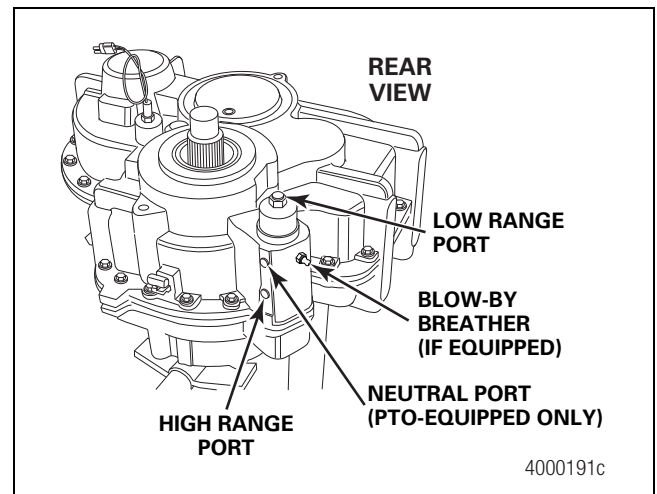
- On transfer case models MTC-4208XL/XLEV and MTC-4210XL/XLEV, use a three-inch socket to remove the large retaining nut and washer from the rear half of the input shaft. Use a yoke tool on the input shaft yoke to prevent the shaft from rotating when you remove the retaining nut.

If you are not able to remove the input shaft retaining nut, you will not be able to remove the front input shaft before you open the housing. Skip this procedure.

- Remove the capscrews securing the input bearing cage and internal pump assembly, if equipped.

**NOTE:** The high- and low-range clutch collar becomes loose on the shift fork as the input bearing cage and pump assembly is removed and may drop into the case. Shifting the transfer case into high range keeps the shift collar on the high-range gear, which keeps it in place. Also, shifting into high range allows easier rear cover removal on the MTC-4208 and MTC-4210 transfer cases.

- Shift the transfer case into high range using compressed air at the high-range port of the shift cylinder. Figure 4.12 and Figure 2.4.



**Figure 4.12**

### **CAUTION**

Use a pry bar and mallet to remove the input cage cover. Take care not to damage the shim pack. Damage to the transfer case will result.

- Use a pry bar and mallet to loosen the input cage cover and internal pump assembly, if equipped. Figure 4.13.

## 4 Disassembly

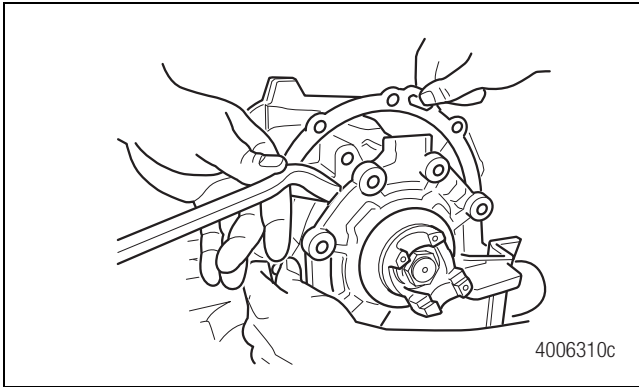


Figure 4.13

7. Remove the shim pack. Figure 4.13.
8. With the front input yoke still installed, remove the yoke, input shaft, input bearing cage and pump, if equipped, as an assembly. Figure 4.14.

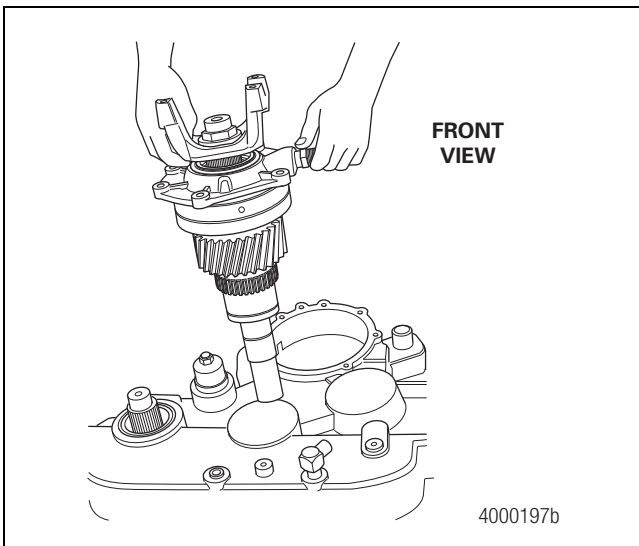


Figure 4.14

### High/Low Shift Cylinder Components

Use the following procedure to disassemble the high/low shift components before you separate the case halves.

1. Rotate the transfer case so the shift cylinder is facing UP.

**NOTE:** After the air source is removed, the high range gear may move out of position.

2. Disconnect the air lines used to shift in the previous steps. Figure 4.15.

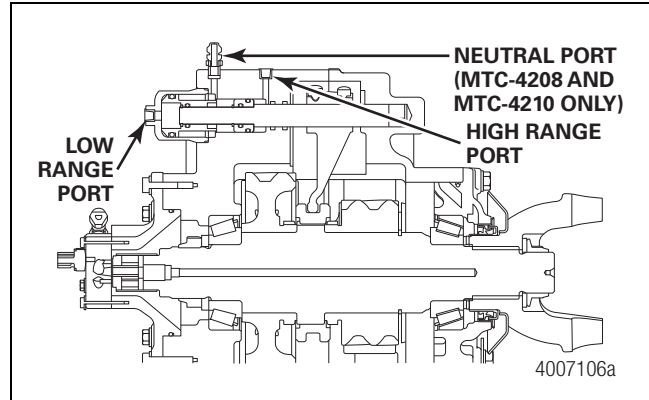


Figure 4.15

3. Remove the high and low range shift cylinder from the rear cover of the transfer case.
4. Remove the outer shift piston snap ring from the shift shaft. Remove the shift piston. Figure 4.16.

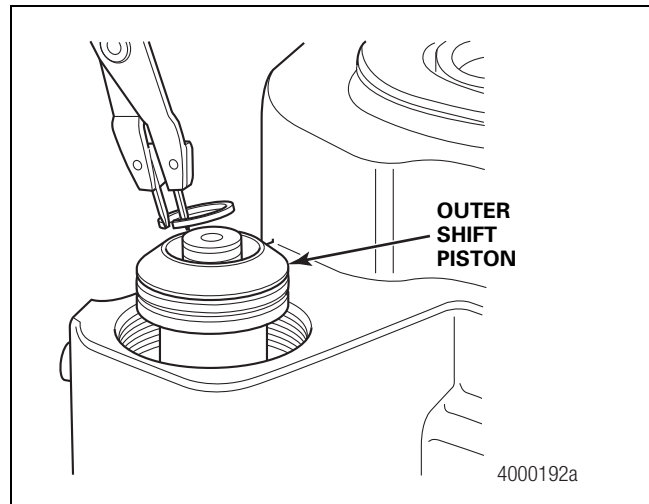


Figure 4.16

5. To remove the inner piston, reinstall and hand tighten the shift cylinder. Apply air to the high gear input port. When the air pressure pushes the inner piston UP, remove the snap ring and inner piston. Figure 4.17.

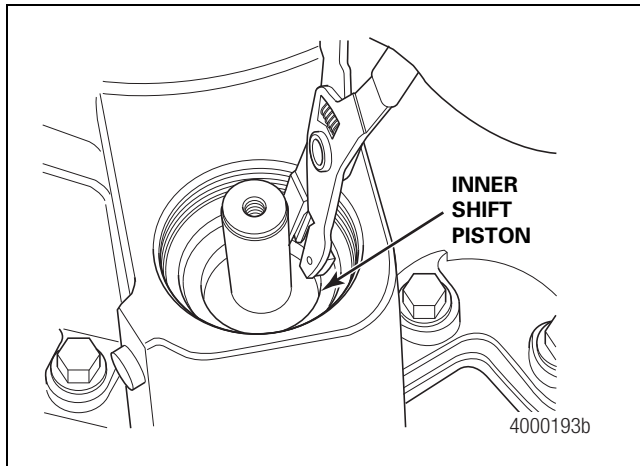


Figure 4.17

### Split the Case Halves

1. Remove the capscrews securing the rear cover to the front case.
2. Use a pry bar to separate the two halves of the transfer case at the pry tab locations around the case.
3. Place eye-bolts into the rear cover lift holes located at the top and bottom of the cover.

#### **CAUTION**

As the rear cover is lifted, apply **DOWNWARD** pressure on the shift rod to prevent the gears from dropping out of the rear transfer case half.

4. Attach a suitable lifting device to the eye-bolts. Lift the rear cover from the front case. Figure 4.18.

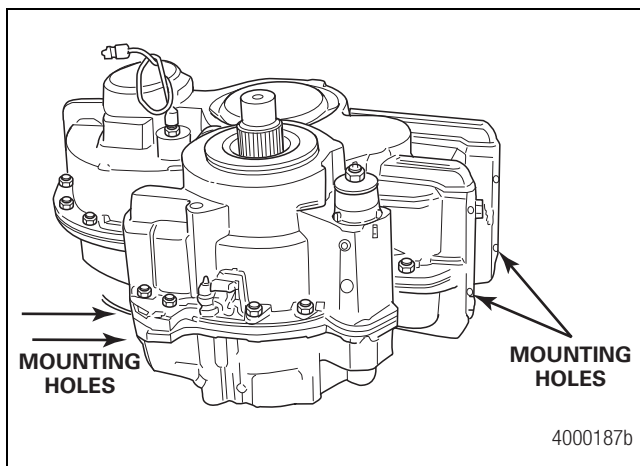


Figure 4.18

5. As the rear cover is lifted, verify that the high and low shift shaft remains in the case by placing pressure on the shaft while separating the transfer case halves.
6. **MTC-4213X transfer case only:** The rear output shaft and high-range gear are removed as an assembly along with the rear cover. The shaft is pressed into the bearing assembly which keeps the shaft retained in the housing. Refer to the MTC-4213X rear output shaft disassembly procedure in this section.
7. **MTC-4208X/XP/XL/XLEV and MTC-4210X/XP/XL/XLEV transfer cases only:** Remove the high range helical gear.
8. Remove the high and low shift fork, shift shaft and clutch collar from the front case. Figure 4.19.

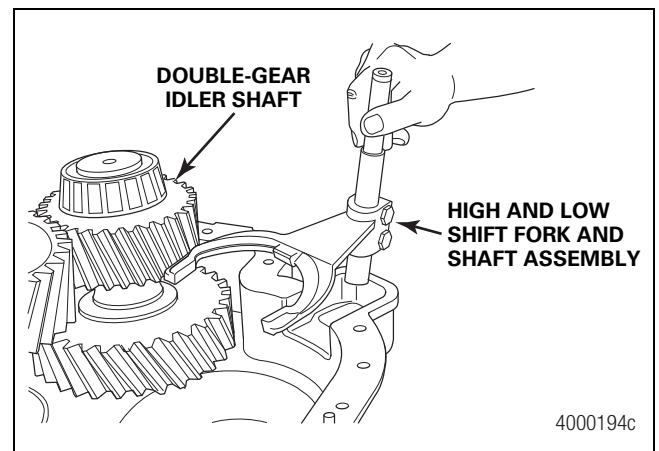


Figure 4.19

9. Remove the single-gear idler shaft on MTC-4213X, or rear output on MTC-4208X/XP/XL/XLEV and MTC-4210X/XP/XL/XLEV, and the double-gear idler shaft from the case. Figure 4.20.

## 4 Disassembly

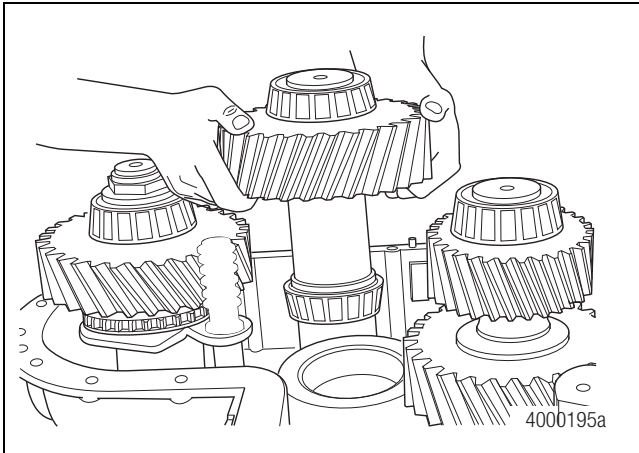


Figure 4.20

10. Remove the front output shaft, clutch collar, shift fork and spring as an assembly.
11. Remove the shift cylinder and push rod from the front case.
12. Remove the two locating dowel pins. Note their correct location.

### Disassemble the Front Output Shaft Assembly

1. Temporarily install the yoke and nut. Secure the yoke to prevent the shaft from rotating when you remove the rear nut. Support the shaft correctly.
2. Remove the rear nut and washer.
3. Remove the yoke.
4. Prepare the shaft for bearing and gear removal. Install the front output shaft into a press with the rear of the output shaft facing UP. Support the shaft correctly. Figure 4.21.

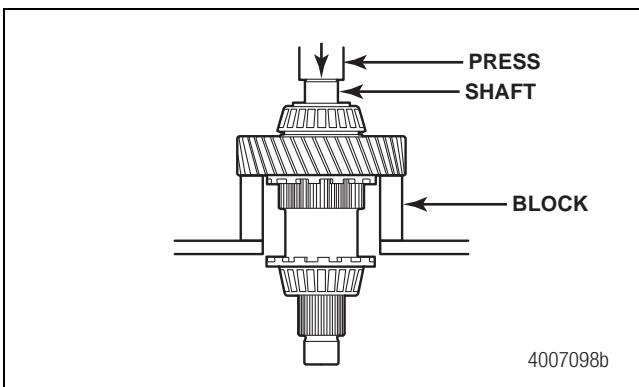


Figure 4.21

5. Press the shaft **DOWNWARD** to remove the rear tapered roller bearing, helical gear, clutch collar and needle bearing from the assembly.
6. Install a bearing separator or other suitable tool below the forward roller bearing. Figure 4.22.

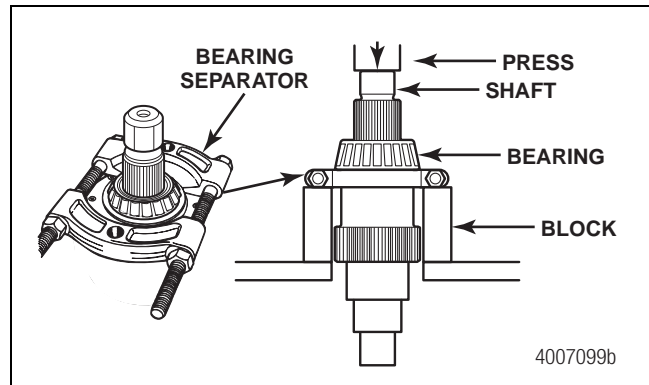


Figure 4.22

7. Install the output shaft assembly into a press and support it correctly. Figure 4.22.
8. Press the output shaft **DOWNWARD** to remove the front roller bearing.

### Disassemble the Rear Output Shaft Assembly on MTC-4213X

#### ⚠ WARNING

Observe all warnings and cautions provided by the press manufacturer to avoid damage to components and serious personal injury.

Use a chain and suitable lifting device to secure the rear cover in the press to prevent serious personal injury and damage to components.

1. Set the rear cover with the rear output shaft as an assembly into a suitable press. Figure 4.23.

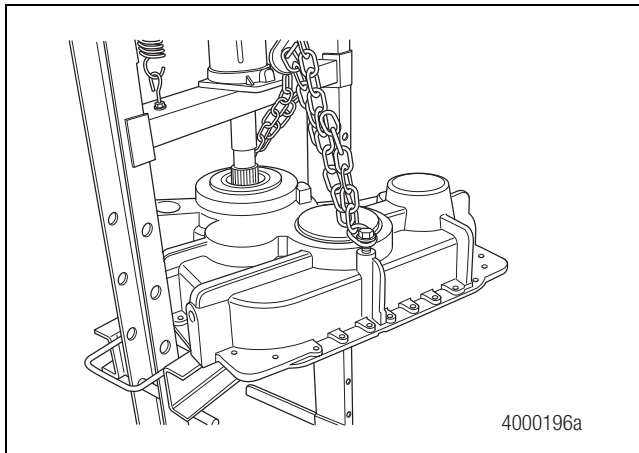


Figure 4.23

### ⚠ WARNING

The rear output shaft assembly is heavy. Support the assembly to prevent it from dropping during the pressing operation. Serious personal injury and damage to components can result.

2. Press the rear output shaft assembly out of the rear cover. Figure 4.23.
3. Use a suitable puller to remove the rear output shaft outer bearing cup from the rear cover if required. Discard the cone and cup.
4. Inspect the rear output shaft inner bearing cone and cup for wear or damage. Replace a worn or damaged bearing cone and cup.
5. Remove the high range helical gear from the upper rear output shaft. The gear is splined to the shaft.
6. Turn the shaft assembly over. Install a bearing separator or suitable tool under the bearing.
7. Install the shaft assembly into a press.
8. Press the shaft assembly DOWNWARD until the bearing is free from the shaft.

## Disassemble the Front Input Shaft, Input Shaft Bearing Cage and Internal Oil Pump, If Equipped

1. Support the front input shaft and bearing cage assembly at the workbench. Figure 4.24.

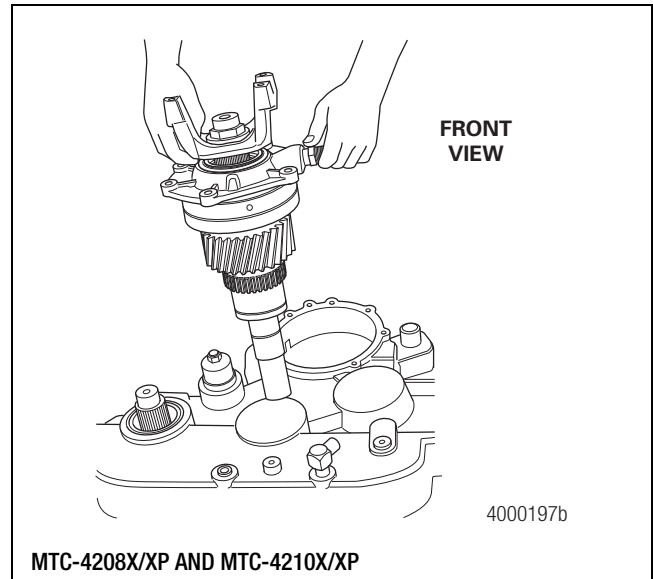


Figure 4.24

2. Remove the yoke nut and washer.
3. Use a yoke puller to remove the front input yoke. Figure 4.25.

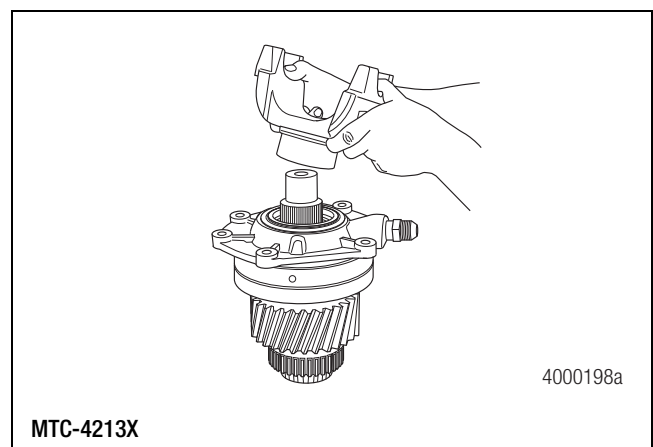


Figure 4.25

4. Lift the front input bearing cage and internal oil pump assembly, if equipped, off the input shaft. Figure 4.26.



## 4 Disassembly

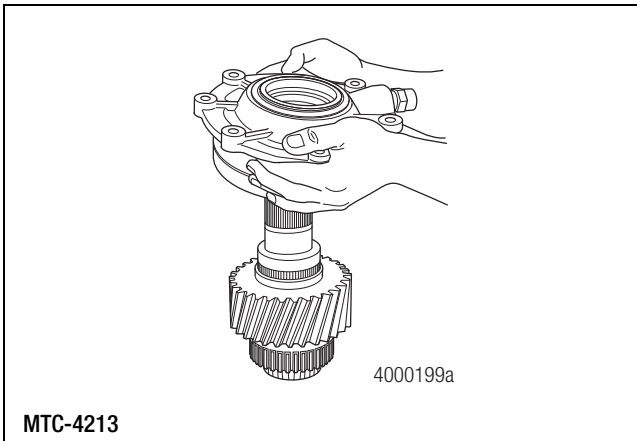


Figure 4.26

5. Remove the snap ring that retains the small helical gear on the input shaft. For MTC-4208XLEV and MTC-4210XLEV, remove the spacer from the input shaft. Lift the small helical gear off the shaft. For MTC-4208XLEV and MTC-4210XLEV, remove the needle bearing from the input shaft. Figure 4.27 and Figure 4.28.

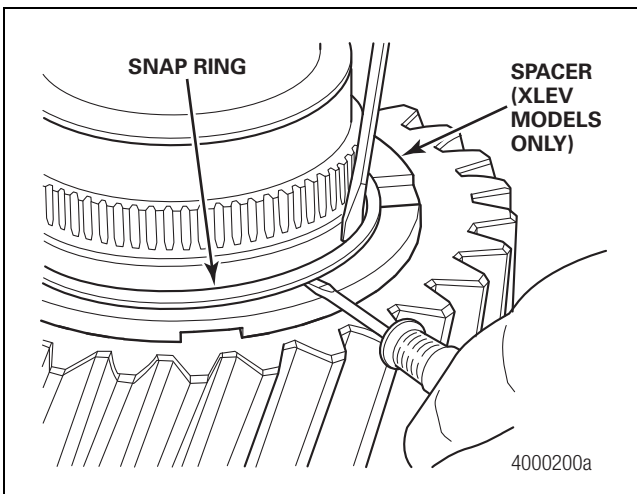


Figure 4.27

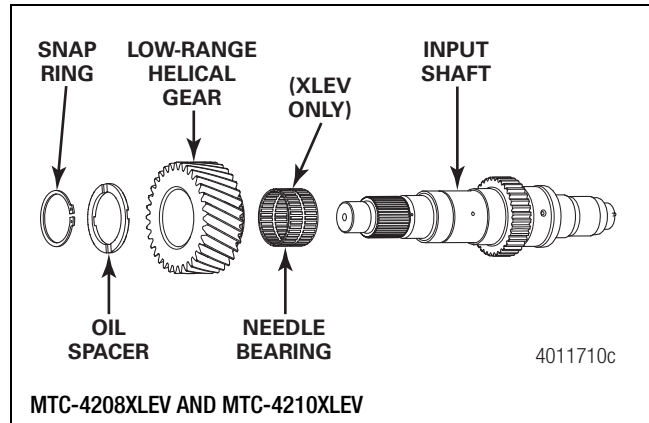


Figure 4.28

6. **MTC-4208X/XP and MTC-4210X/XP transfer cases only:** Remove the internal pump, if equipped, from the input-bearing cage to service the front input shaft tapered roller bearing cone and cup.
  - A. Remove the six bolts retaining the oil pump to the input-bearing cage.
  - B. Mark the position of the pump to the cage for reassembly. Figure 4.29.

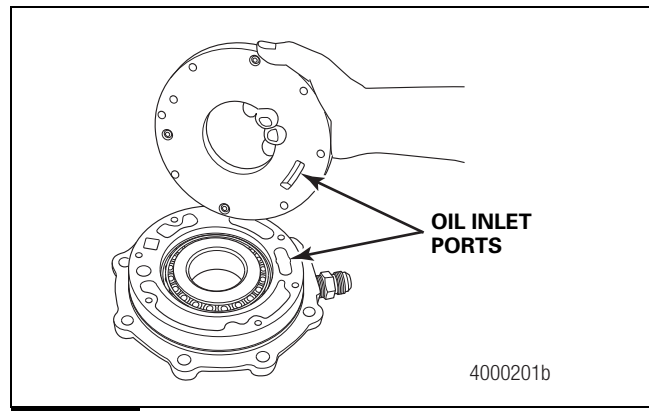


Figure 4.29

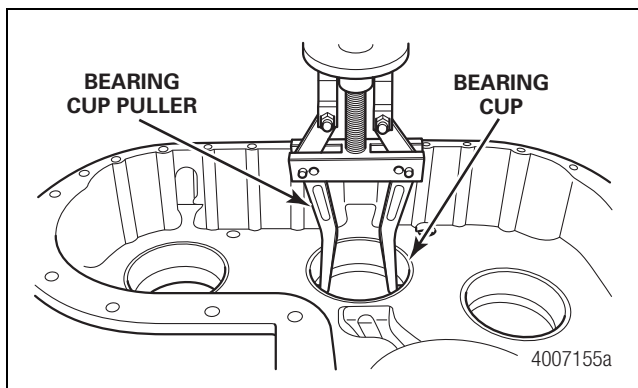
- C. Inspect the pump inner rotor in the spline area for cracks or other damage. The entire pump must be replaced if the pump or inner gear rotor is damaged in any way. The bearing cup is pressed into the bearing cage.
  - D. Remove the relief valve and spring.
7. Replace the bearing cone and cup as necessary.

## Idler Gear and Rear Output Shaft Disassembly

1. Use a suitable bearing cone puller to remove the bearing cones as necessary from the single idler-gear shaft, rear output shaft on MTC-4208 and MTC-4210 transfer cases, or double idler-gear shaft assemblies.
2. Inspect and replace bearing cones with new as needed. Replace bearing cones and cups as a set.
3. Inspect the shafts and gears for wear or damage.

## Remove the Bearing Cups

1. Correctly support the transfer case half.
2. Use a suitable puller to remove the bearing cups from the transfer case half. Figure 4.30.



**Figure 4.30**

3. Clean and save the shims so they can be used to measure the shim pack thickness during reassembly, if necessary.



## 5 Prepare Parts for Assembly

### Hazard Alert Messages

Read and observe all Warning and Caution hazard alert messages in this publication. They provide information that can help prevent serious personal injury, damage to components, or both.

#### WARNING

To prevent serious eye injury, always wear safe eye protection when you perform vehicle maintenance or service.

### Clean, Dry and Inspect Parts

#### Ground and Polished Parts

#### WARNING

Solvent cleaners can be flammable, poisonous and cause burns. Examples of solvent cleaners are carbon tetrachloride, and emulsion-type and petroleum-base cleaners. Read the manufacturer's instructions before using a solvent cleaner, then carefully follow the instructions. Also follow the procedures below.

- Wear safe eye protection.
- Wear clothing that protects your skin.
- Work in a well-ventilated area.
- Do not use gasoline or solvents that contain gasoline. Gasoline can explode.
- You must use hot solution tanks or alkaline solutions correctly. Read the manufacturer's instructions before using hot solution tanks and alkaline solutions. Then carefully follow the instructions.

#### CAUTION

Do not use hot solution tanks or water and alkaline solutions to clean ground or polished parts. Damage to parts can result.

If required, use a sharp knife to remove gasket material from parts. Be careful not to damage the ground or polished surfaces.

1. Use a cleaning solvent to clean ground or polished parts or surfaces. NEVER USE GASOLINE.
2. Remove gasket material from the parts. Take care not to damage the ground surfaces.

3. DO NOT clean ground or polished parts in a hot solution tank, water, steam or alkaline solution.

### Parts with a Rough Finish

1. Use a cleaning solvent or a hot solution tank with a weak alkaline solution to clean parts with a rough finish.
2. Leave the parts in the hot solution tank until they are completely cleaned and heated. When the parts are clean, remove them from the tank.
3. Wash the parts with water until you completely remove the alkaline solution.
4. Clean the three internal magnets attached to the bottom of the front case.
5. Remove and clean the magnetic drain plug.

### Transfer Case Assemblies

#### CAUTION

Close or cover all openings before steam cleaning. Steam can cause component damage.

1. Steam clean transfer cases on the outside to remove heavy amounts of dirt.
2. Before steam cleaning the transfer case, close or put a cover over all openings in the case.
3. Remove any remaining silicone sealant from the transfer case halves using a suitable scraper or wire wheel.

### Dry Cleaned Parts

#### CAUTION

Dry bearings with clean paper or rags. Do not use compressed air, which can cause abrasive particles to contaminate the bearings. Damage to the components and reduced lining life can result.

Immediately after cleaning, use clean paper, rags or compressed air to dry the parts.

### Prevent Corrosion

**NOTE:** Parts must be clean and dry before you lubricate them.

1. If you assemble the parts immediately after you clean them, lubricate the clean, dry parts with grease to prevent corrosion.

## 5 Prepare Parts for Assembly

2. If you store the parts after you clean them, apply a corrosion-preventive material to all machined surfaces. Store the parts in a special paper or other material that prevents corrosion.

### Oil Seals and O-Rings

Discard all oil seals and O-rings. Replace with new parts.

### Inspect Parts

It is very important to inspect all parts carefully and completely before the transfer case is assembled. Check all parts for wear and stress. Replace all damaged parts.

1. Inspect the cup, cone, rollers and cage of all tapered roller bearings in the assembly. If any of the following conditions exist, the bearing must be replaced:
  - The center of the large diameter end of the rollers is worn level with or below the outer surface.
  - The radius at the large diameter end of the rollers is worn to a sharp edge. Figure 5.1.
  - A visible roller groove is worn in the inner race surfaces of the cup or cone. The groove can be seen at the small or large diameter end of both parts.
  - Deep cracks or breaks appear in the surfaces of the cup, cone inner race or rollers. Figure 5.2.
  - Bright wear marks appear on the outer surface of the roller cage. Figure 5.3.
  - The rollers and surfaces of the cup and cone inner race that touch the rollers are damaged. Figure 5.4.
  - The cup and cone inner race surfaces that touch the roller are damaged. Figure 5.5.

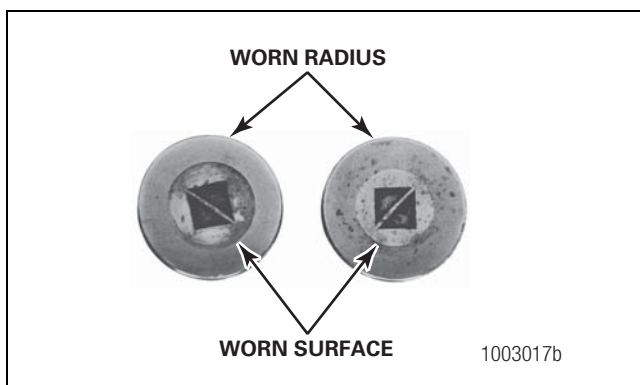


Figure 5.1

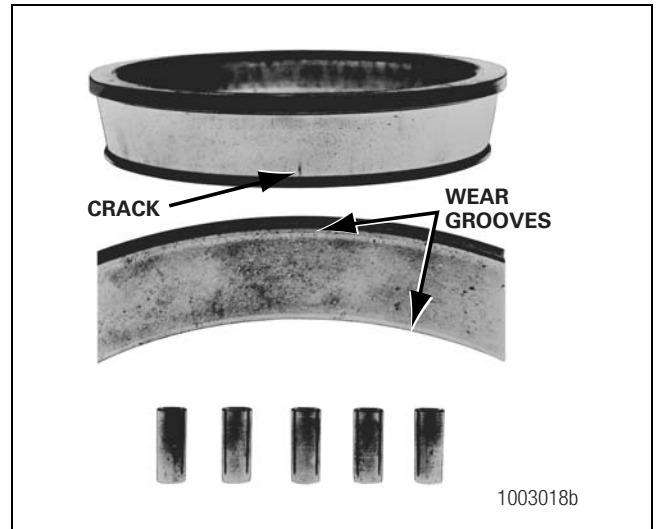


Figure 5.2

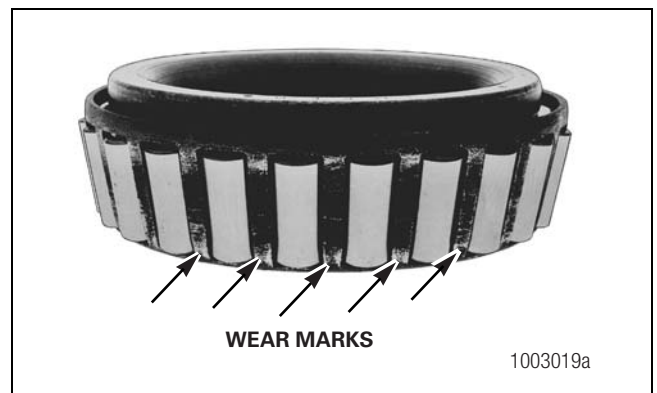


Figure 5.3

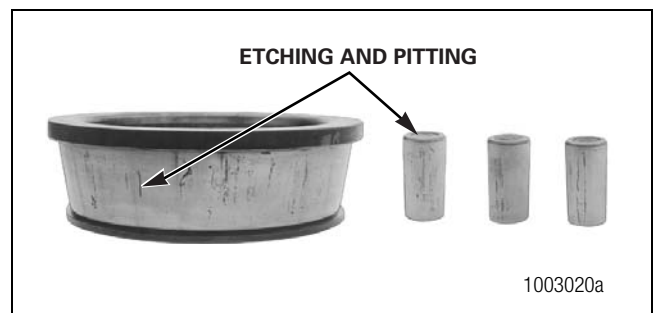
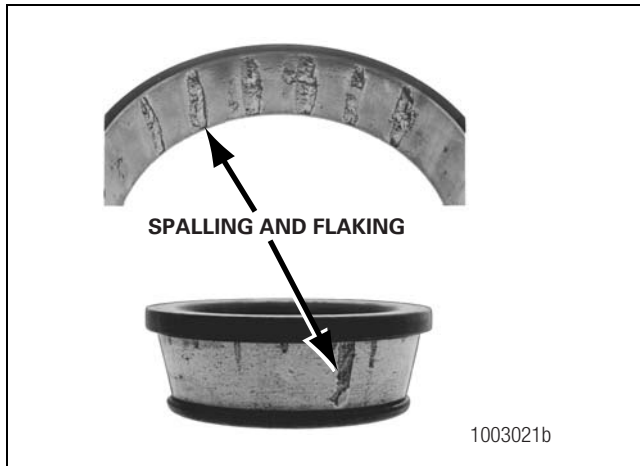


Figure 5.4

## 5 Prepare Parts for Assembly



**Figure 5.5**

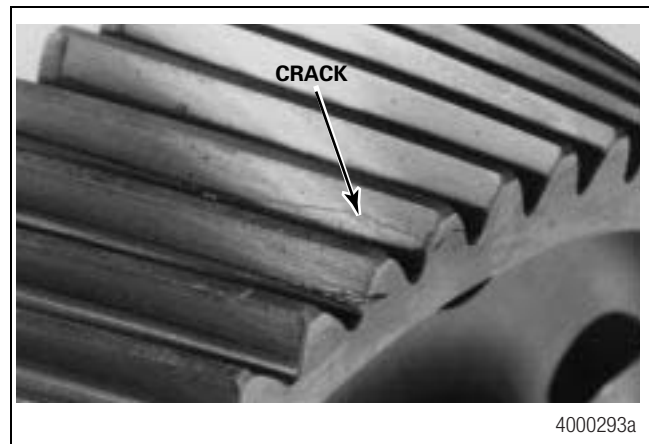
2. Inspect the gears for wear or damage. Replace worn or damaged gears.
3. Inspect the housing.
  - A. Remove all dirt from the housing and oil lubrication passages, troughs, slots and holes.
  - B. Inspect machined surfaces for cracks and damage. Repair or replace damaged parts.
4. Inspect all shafts, flanges and yokes for wear, stress and cracks at the splines, shaft and yoke ears. Replace shafts, flanges and yokes that are worn or cracked.
5. Verify that any oil passages in the shafts are clean and free of debris.
6. Inspect the declutch and output shaft components, if applicable.
  - A. Inspect the clutch collar internal splines, external declutch teeth and shift fork for grooves. Replace worn, cracked or damaged collars.
  - B. Inspect the collar pads of the shift fork for wear. If the pads are worn, replace the shift fork.
  - C. Inspect the declutch shaft and yoke for wear, stress and cracks at the splines, shaft and yoke ears. Replace worn or cracked shafts and yokes.
  - D. Inspect the declutch or PTO push rod and piston for wear or damage. Replace worn or damaged parts.
7. Inspect the splines on the pump inner rotor for cracks along the spline area. Also, check for excessive wear. Replace the pump if these conditions exist.

8. Remove and inspect the restrictor plug at the end of the input shaft.
9. Verify that the restrictor plug orifice is clear of debris.

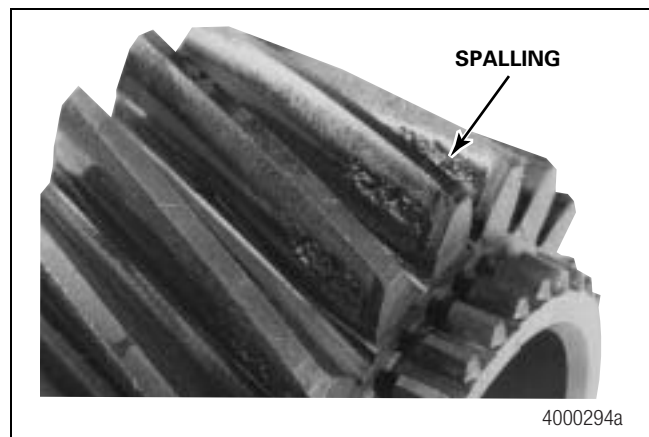
### Helical Gears

Inspect the helical gear teeth, splines and journals. If any of the following conditions exist, replace the gear.

- A crack in the root of a tooth or along the tooth flank. Figure 5.6.
- Severe scoring or fretting on the surface of a tooth. Gears with scoring and fretting on the teeth, but without cracks, may continue to operate satisfactorily with higher noise. Figure 5.7.
- Cracks along the internal journal of the input gears. Figure 5.8.
- Deep gouges or metal transfer along the input gear journals. Figure 5.9.
- Chipped or severely worn shifting splines on the input gears.
- Chipped or cracked splines on the output gears.



**Figure 5.6**



**Figure 5.7**

## 5 Prepare Parts for Assembly

### Shafts

Inspect the input and output shafts for damage to the gear journals, shifting splines, threads and gear retaining splines. If any of the following conditions exist, replace the shaft.

- Deep gouges or metal transfer along the input shaft journals. Figure 5.10.
- Chipped or worn shifting splines on the input shaft.
- Chipped or cracked splines on the output shaft. Figure 5.11.
- Cracks along the yoke splines, bearing journal abutments or cross-drilled holes. Magnaflux may be necessary to see small cracks.

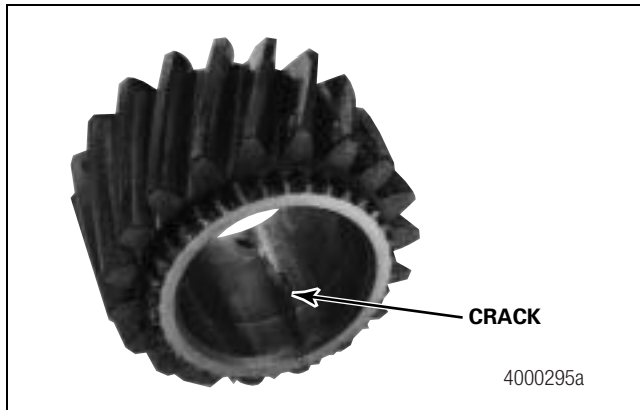


Figure 5.8

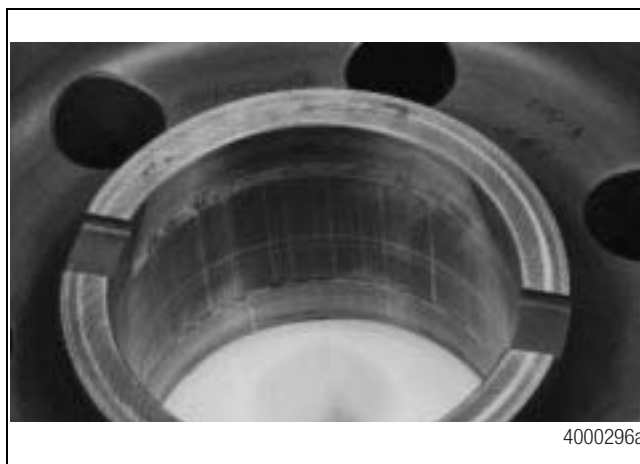


Figure 5.9

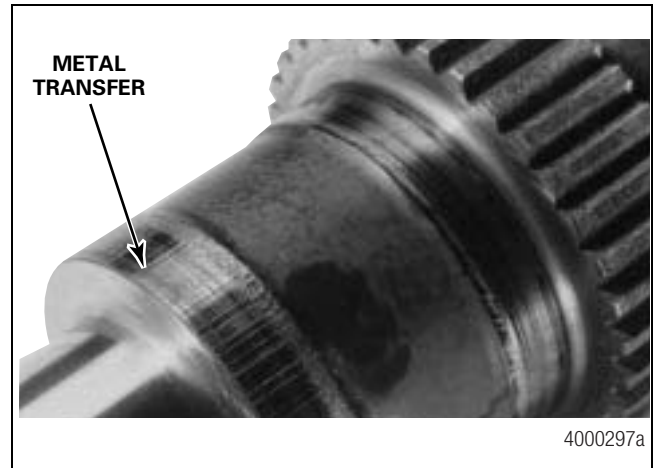


Figure 5.10

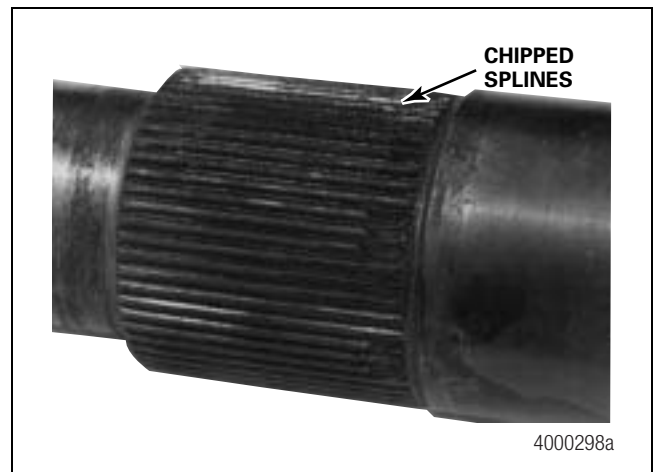


Figure 5.11

### PTO Components

Inspect the PTO housing, shaft, taper bearings, shift collar, shift fork and sensors for damage. If any of the following conditions exist, replace the component.

- Cracks in the housing.
- Cracks along the shaft yoke spline or ball bearing abutment. Magnaflux may be necessary to see small cracks.
- Chipped or cracked shifting splines on the shift collar or shaft.
- The rollers of the taper bearings do not roll easily or lack lubrication. The raceway is cracked or dented.
- Cracked or missing tangs on the shift fork arms.

## 5 Prepare Parts for Assembly

- The sensor ball sticks or does not return to its resting position. The sensors do not complete a circuit when tested with a volt-ohm meter (VOM).

### High and Low Shifting Components

Inspect the shift collar, shift fork, shift shaft, retaining pins, shift cylinder, piston, O-ring and case halves for damage. If any of the following conditions exist, replace or repair the component.

- Cracked or missing tangs on the shift fork arms.
- Chipped or cracked shifting splines on the shift collar.
- Cracks or deep gouges on the shift shaft.
- The retaining pins in the shift shaft are not 0.100-inch (2.54 mm) above the shaft diameter. Remove and set to the correct position.
- Gouges on the inside of the shift cylinder.
- Torn or feathered areas on the O-ring.
- Deep gouges in the shifting bores of the case halves.

### Oil and Lubrication System

The lubrication system is extremely important to the performance of the transfer case. Inspect all parts closely for excessive wear or damage. Perform the following checks.

1. Inspect the oil for metal shavings, dirt and consistency. Perform an oil analysis if the oil appears contaminated.
2. Check the magnets for metal shavings. A small amount of metal shavings is normal. However, excessive build-up indicates gear and bearing damage. Thoroughly remove all metal shavings from the magnets. The magnets must be firmly fastened to the case.
3. Check the sump screen. Remove any material that may restrict oil flow through the mesh.
4. Check the oil line for damage. Replace if it is dented or kinked.

### Internal Oil Pump

1. Inspect the oil ring seal for damage and replace if necessary.
2. Inspect the input shaft and oil pump splines for damage.
3. Check the pump for easy rotation. If the internal gear does not spin easily or jams when rotating, replace the pump.
4. Verify the relief valve spring and bushing are in good condition and replace if necessary.

**NOTE:** Internal oil pumps have two stages of rotational pressure. Therefore, pump rotation torque may vary and may not be a sign of a damaged pump.

### External Rear-Mounted Oil Pump

1. Verify the pump drive pins on the rear half of the input shaft correctly engage the pump. If necessary, remove the pump and reinstall it in the correct position.
2. Inspect the pump gear for damage.
3. Verify the transfer spring is in good condition.
4. Once the transfer case has been installed on the vehicle, verify the pump pressure is correct. Refer to the pump pressure check instructions in the final assembly procedures.

### Transfer Case Halves

Inspect the case halves for cracks and internal wear. If any of the following conditions exist, replace the damaged parts.

- A crack in either case half.
- Deep gouges in the shifting bores.

### Preparing the Case and Cover and Seal Replacement

1. Pry out all oil seals using a suitable pry bar.
2. As necessary, use a suitable puller to remove the bearing cups pressed into the transfer case halves. For idler shaft cups on MTC-4208XL/XLEV and MTC-4210XL/XLEV, modify Snap-on tool, part number CJ82B. Refer to Section 13 for details. For cups on other models, any suitable puller can be used. Retain the shims, if equipped. Reuse the shims if they are not damaged.
3. Clean and inspect the transfer case and cover for cracks, worn threaded holes or other wear or damage. Clean the gasket surfaces of both transfer case halves using a suitable gasket scraper or wire wheel.
4. Press new bearing cups into the case halves as necessary. Refer to Section 6 for bearing settings and starting shim pack procedures, if required.
5. Inspect the bearing end play to ensure that it's within specification. Adjust the end play, if required. Refer to Section 6.
6. Install new oil seals into the case halves. Refer to Table 1 in Section 10 for correct seal part numbers and installation tool kit numbers. Refer to the Service Notes page on the front inside cover of this manual to obtain new seals and installation tools. Refer to Section 6 for seal and sleeve installation instructions.

## Hazard Alert Messages

Read and observe all Warning and Caution hazard alert messages in this publication. They provide information that can help prevent serious personal injury, damage to components, or both.

### **⚠ WARNING**

To prevent serious eye injury, always wear safe eye protection when you perform vehicle maintenance or service.

When you apply some silicone gasket materials, a small amount of acid vapor is present. To prevent serious personal injury, ensure that the work area is well-ventilated. Read the manufacturer's instructions before using a silicone gasket material, then carefully follow the instructions. If a silicone gasket material gets into your eyes, follow the manufacturer's emergency procedures. Have your eyes checked by a physician as soon as possible.

Take care when you use Loctite® adhesive to avoid serious personal injury. Read the manufacturer's instructions before using this product. Follow the instructions carefully to prevent irritation to the eyes and skin. If Loctite® adhesive material gets into your eyes, follow the manufacturer's emergency procedures. Have your eyes checked by a physician as soon as possible.

## Gear and Shaft Subassembly Build Up

### Assemble the Front Output Shaft Subassembly

1. Use an appropriate holding fixture to fully support the shaft assembly. Refer to tool number 905473-140 in Section 13.

### **⚠ WARNING**

Observe all warnings and cautions provided by the press manufacturer to avoid damage to components and serious personal injury.

2. Use a press and sleeve, tool number 905473-82, to press the forward bearing DOWN onto the output shaft until it is fully seated. Refer to Section 13 for the tool drawing. Press down only on the inner race of the bearing during installation. Use a 0.002-inch shim or feeler gauge to check that the bearing is correctly seated. Figure 6.1.

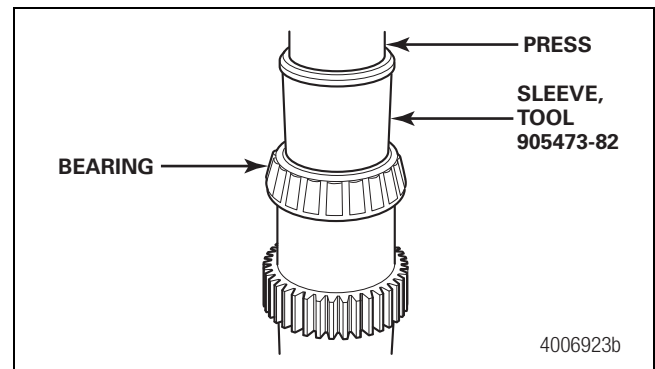


Figure 6.1

3. Turn the shaft over and reinstall it into the holding fixture. Refer to tool number 905473-140 in Section 13.
4. Install the clutch collar. Figure 6.2.

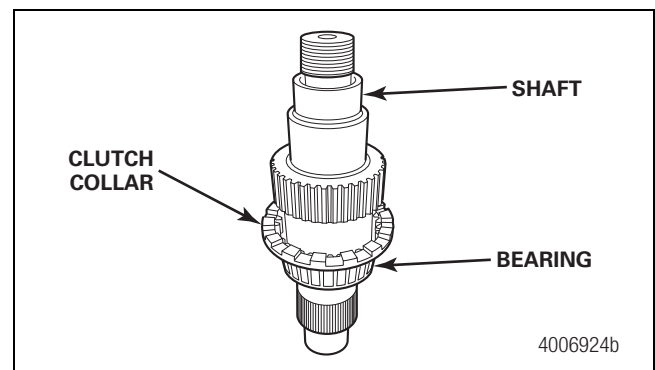


Figure 6.2

5. Install the needle bearing onto the rear half of the output shaft and lubricate it with a light coat of lithium-based grease, Meritor specification O-668. The needle bearing is a slip fit assembly. Figure 6.3.

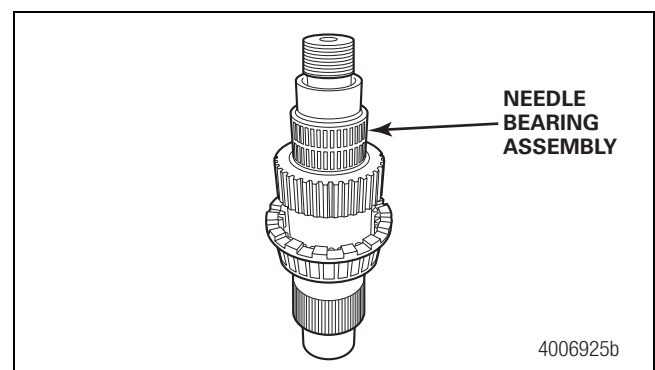


Figure 6.3



## 6 Assembly

6. Install the helical gear onto the shaft. The helical gear is a slip fit gear.
7. Remove the shaft from the holding fixture and install it into a press. Correctly support the shaft in the press.
8. Use tool number 905473-92 to install the bearing onto the top of the output shaft with the small tapered end UP. Use a press and sleeve to push the bearing DOWN onto the output shaft until it is fully seated. Refer to Section 13 for tool drawings. Press down only on the inner race of the bearing during installation. Use a 0.002-inch shim or feeler gauge to check that the bearing is correctly seated. Figure 6.4.

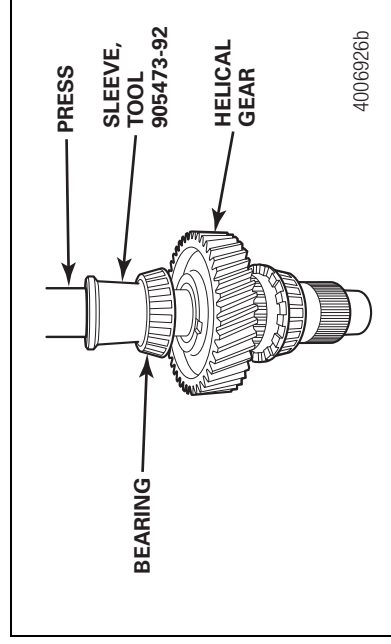



Figure 6.4



### WARNING

To avoid serious personal injury and damage to components, take care when using lifting devices during service and maintenance procedures. Inspect a lifting strap to ensure that it is not damaged. Do not subject the lifting straps to shocks or drop-loading.

9. Remove the output shaft from the press and reinstall it into the holding fixture. Refer to tool number 905473-140 in Section 13. Use an appropriate lifting device to lift the shaft.
10. Lubricate the output shaft threads with synthetic SAE 50 oil, Meritor specification O-81.
11. Install the washer and the locknut onto the shaft. Tighten the locknut to 700-900 lb-ft (949-1220 N•m). Figure 6.5. 

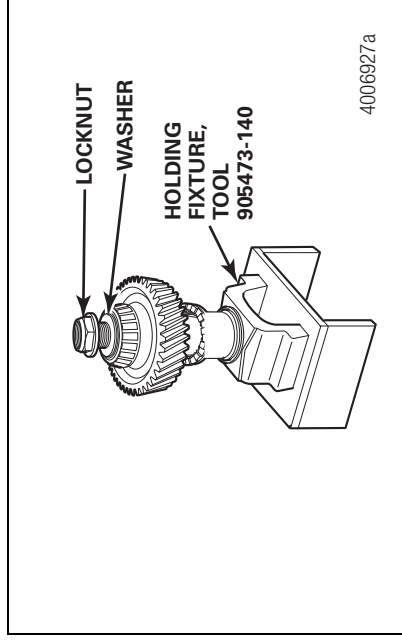


Figure 6.5

### Assemble the Single Idler Gear Subassembly (MTC-4213X Only)

1. Install the shaft assembly into a press and support it correctly with the forward end facing UP.
2. Place the bearing onto the forward end of the shaft assembly. Use a sleeve, tool number 905473-82, and press to push the forward bearing cone DOWN until it is fully seated. Refer to Section 13 for tool drawings. Only press on the inner race of the bearing cone. Use a 0.002-inch shim or feeler gauge to ensure the bearing cone is correctly seated.
3. Rotate the shaft so the rear half of the shaft is facing UP. Use a sleeve, tool number 905473-92, and press to push the rear bearing cone DOWN until it is fully seated. Refer to Section 13 for tool drawings. Only press on the inner race of the bearing cone. Use a 0.002-inch shim or feeler gauge to ensure the bearing cone is correctly seated.


### Assemble the Rear Output Shaft Subassembly (MTC-4208X/XP/XL/XLEV and MTC-4210X/XP/XL/XLEV Only)


1. Install the shaft assembly into a press and support it correctly.
2. Place the bearing cone onto the end of the shaft assembly with the appropriate end facing UP. Use a sleeve, tool number 905473-82, and press to push the bearing cone DOWN until it is fully seated. Refer to Section 13 for a tool drawing. Only press on the inner race of the bearing cone. Use a 0.002-inch shim or feeler gauge to ensure the bearing cone is correctly seated.
3. Turn the shaft assembly over and install the bearing cone on the other end using Steps 1-2.

### Assemble the Double Idler Gear Subassembly (All Models)

1. Install the shaft assembly into a press and support it correctly.
2. Place the bearing cone onto the end of the shaft assembly with the appropriate end facing UP. Use a sleeve (non-XLEV models use tool number 905473-82) (XLEV models use tool number 4FI20-27110-000008-D01/D02) and press to push the bearing cone DOWN until it is fully seated. Refer to Section 13 for tool drawings. Only press on the inner race of the bearing cone. Use a 0.002-inch shim or feeler gauge to ensure the bearing cone is correctly seated.
3. Turn the shaft assembly over and install the bearing cone on the other end using Steps 1-2.

### Assemble the Input Shaft Subassembly (MTC-4213X Only)

1. Press the bearing cup into the input bearing cage until it is fully seated.
2. Place the large O-ring around the groove on the bearing cage.
3. Install the relief valve and spring into the oil pump. The plunger should be seated into the relief valve orifice.
4. Install the internal oil pump using the following procedure.
  - A. Pack lithium-complex grease, Meritor specification O-668, into the pump oil inlet port before assembling the oil pump to the input bearing cage.
  - B. Place the bearing cone on the race in the bearing cage.
  - C. Insert the relief valve and spring into the relief port of the input bearing cage. Install the large diameter end of the spring down. Align the oil pump inlet with the oil inlet port of the input bearing cage.
  - D. Install the six pump-to-inlet bearing cage capscrews and washers. Apply Loctite® 277 sealant to the capscrews. Tighten the capscrews to 35-50 lb-ft (48-68 N•m). 
  - E. Lubricate the sealing rings on the inside diameter of the pump and the shaft journal adjacent to the pump splines.
5. Place the small helical gear over the input shaft with the spline side of the gear down and install the spiral snap ring. The gear is a slip fit.
6. Install the shaft assembly into a press and support it correctly.

7. Place the bearing cone onto the end of the shaft assembly with the appropriate end facing UP. Use a sleeve, tool number 905473-82, and press to push the bearing cone DOWN until it is fully seated. Refer to Section 13 for tool drawings. Only press on the inner race of the bearing cone. Use a 0.002-inch shim or feeler gauge to ensure the bearing cone is correctly seated.
8. Apply Loctite® 592 threadlocker to the restrictor plug and install it into the end of the bearing cone. Tighten the plug to 15 lb-ft (20 N•m). Figure 6.6. 

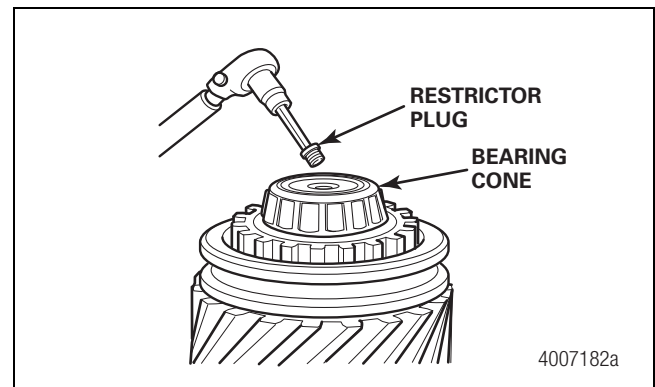


Figure 6.6

### Assemble the Front Input Shaft, Input Shaft Bearing Cage and Internal Oil Pump (If Equipped) Subassemblies (MTC-4208X/XP/XL/XLEV and MTC-4210X/XP/XL/XLEV Only)

1. Use tool number 910203-37 to press the bearing cup into the input bearing cage until it is fully seated. Refer to Section 13 for tool drawings.
2. Place the large O-ring around the groove on the bearing cage. Figure 6.7.



## 6 Assembly

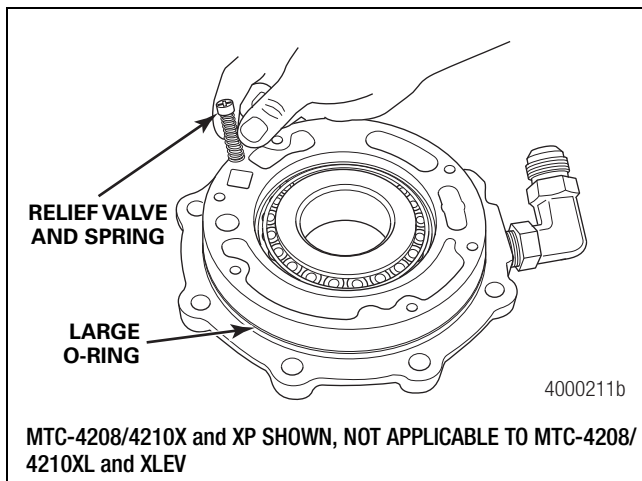


Figure 6.7

3. Install the internal oil pump, if equipped, using the following procedure.

- A. **MTC-4208X/XP and MTC-4210X/XP transfer cases only:** Pack lithium-complex grease, Meritor specification O-668, into the pump oil inlet port before assembling the oil pump to the input bearing cage. Figure 6.8.

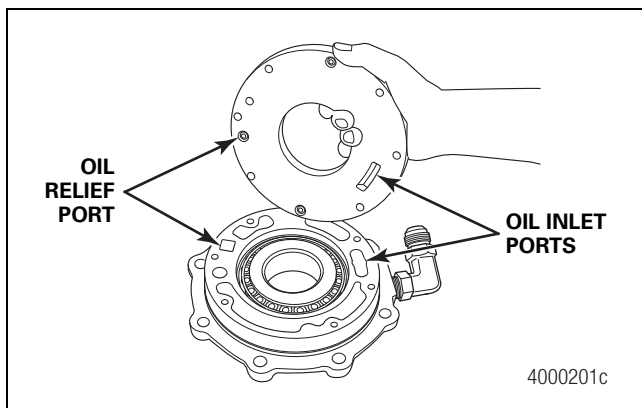


Figure 6.8

- B. Place the bearing cone on the race in the bearing cage.
- C. **MTC-4208X/XP and MTC-4210X/XP transfer cases only:** Insert the relief valve and spring into the relief port of the input bearing cage. Install the large diameter end of the spring down. Figure 6.7. Align the oil pump inlet with the oil inlet port of the input bearing cage. Figure 6.8.

- D. **MTC-4208X/XP and MTC-4210X/XP transfer cases only:** Install the six pump-to-inlet bearing cage capscrews and washers. Apply Loctite® 277 sealant to the capscrews. Tighten the capscrews to 22-29 lb-ft (29-39 N•m).
- E. **MTC-4208X/XP and MTC-4210X/XP transfer cases only:** Lubricate the sealing rings on the inside diameter of the pump and the shaft journal adjacent to the pump splines. Figure 6.9.

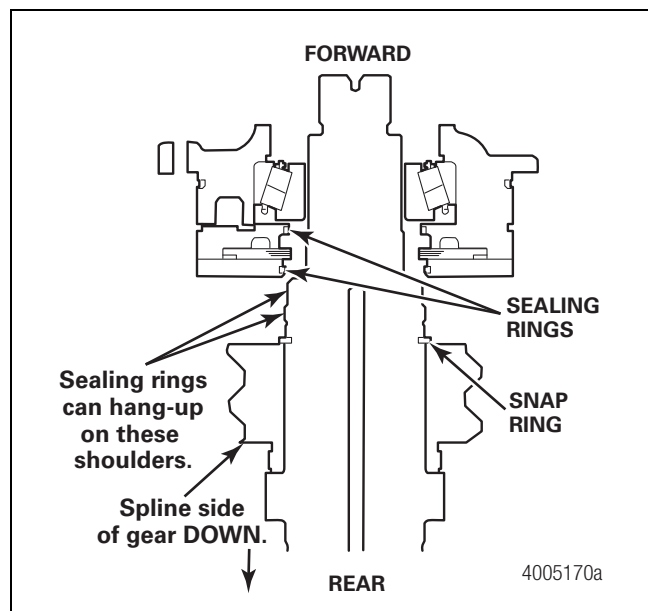


Figure 6.9

4. **MTC-4208XLEV and MTC-4210XLEV transfer case only:** Install the needle bearing on the input shaft. Figure 6.10.

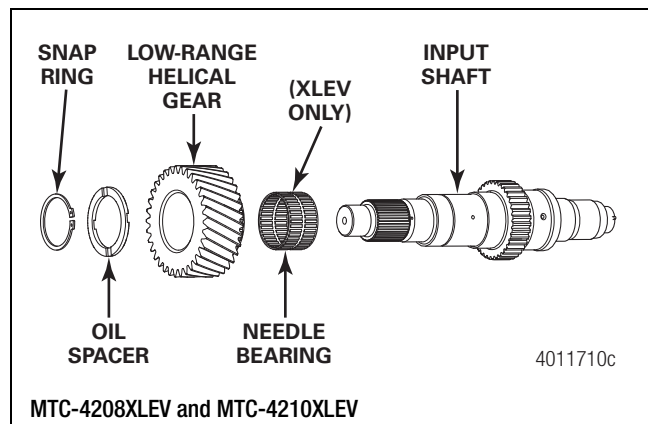


Figure 6.10

5. Place the low-range helical gear over the input shaft with the spline side of the gear down. For MTC-4208XLEV and MTC-4210XLEV, install the oil spacer. The oil spacer has two oil channels cut into it. The oil channels can face forward or aft when installed. Install the spiral snap ring to secure the helical gear. The gear is a slip fit. Figure 6.10.
6. Lubricate the gear and shaft before assembly.
7. **MTC-4208XL/XLEV and MTC-4210XL/XLEV transfer cases only:** Install the high- and low-range clutch collar over the input shaft splines. Place the high-range helical gear over the input shaft with the spline side of the gear facing the low-range helical gear. Install the bearing cone with the large end of the cone toward the high-range gear. Install the spacer on the shaft next to the bearing cone. Figure 6.11.

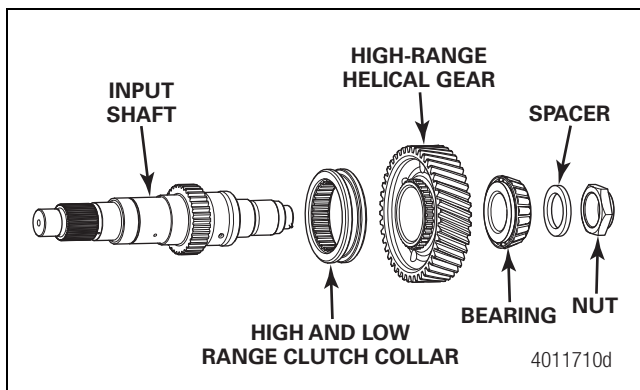



Figure 6.11

### ⚠ CAUTION

Exercise care when assembling the input shaft to the pump. Line up and slowly direct the input shaft into the pump opening. Misalignment during assembly can cause the shaft to “hang up” on the pump sealing rings resulting in damage to the rings.

**NOTE:** Use care when you install the input bearing cage to prevent damage to the O-ring.

8. Place the oil pump, if equipped, and input bearing cage assembly over the input shaft. The drive teeth on the inner pump rotor must engage the teeth on the input shaft. Do not use force to engage the splines. If a sealing ring is broken, remove and replace the pump.
9. Place the assembly into a holding fixture, tool number 905043-140, and install the yoke assembly. Refer to Section 13 for tool drawings.

10. Install the washer and yoke nut. Tighten the yoke nut to 700-900 lb-ft (949-1220 N•m). 

### Assemble the Upper Rear Output Shaft (MTC-4213X Only)

1. Place the shaft into a holding fixture with the larger end facing UP.
2. Align the internal splines of the high range helical gear with the shaft splines and install the gear onto the shaft. Ensure that the clutch collar gears are facing UP. Figure 6.12.

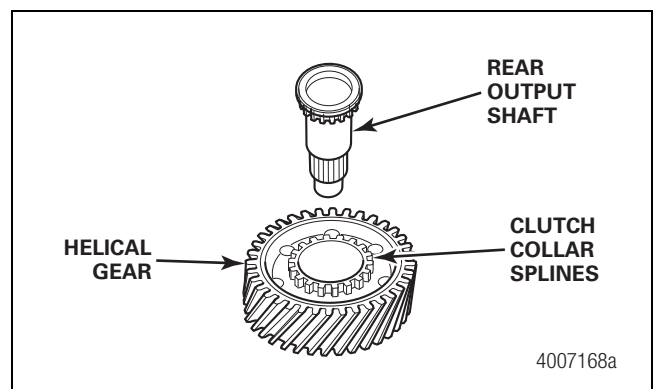


Figure 6.12

3. Turn the shaft assembly over and secure it in a holding fixture.
4. Use a press and sleeve to press the bearing DOWNWARD onto the output shaft until it bottoms out against the helical gear. Refer to Section 13 for tool number 905473-82. Use a 0.002-inch shim or feeler gauge to check that the bearing is fully seated against the gear. Figure 6.13.

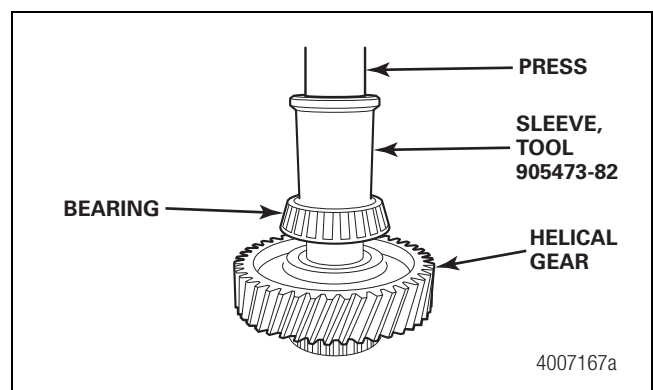


Figure 6.13

## 6 Assembly

- Continue with the procedures for checking and adjusting end play and final assembly of the transfer case. Refer to the procedures in this section.

### Gear and Shaft Installation into the Transfer Case Halves

Before you install the gear shafts, refer to the end play check information in this section for the correct shim pack starting thickness.

#### Install the Gear Shafts and Assemble the Case Halves

- Lubricate all bearing cups and cones, gears and shaft assemblies before installation into the case. Use synthetic SAE 50 oil, Meritor specification O-81.
- Use a mallet or press and sleeve to install the bearing cups into the bore until correctly seated. Refer to Section 13 to identify the correct sleeve for the model you are servicing. Refer to the end play procedures for initial shim stack up requirements. Figure 6.14.

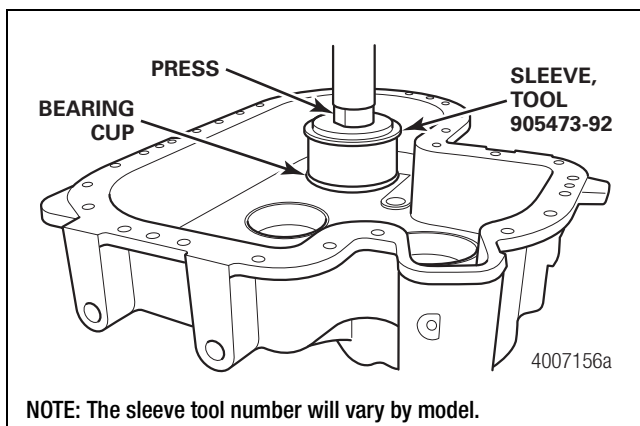


Figure 6.14

- With the inside of the front case facing UPWARD, install the single idler shaft (MTC-4213X only), or rear output shaft (MTC-4208X/XP/XL/XLEV and MTC-4210X/XP/XL/XLEV), and double-gear idler shaft assemblies (all models). Figure 6.15.

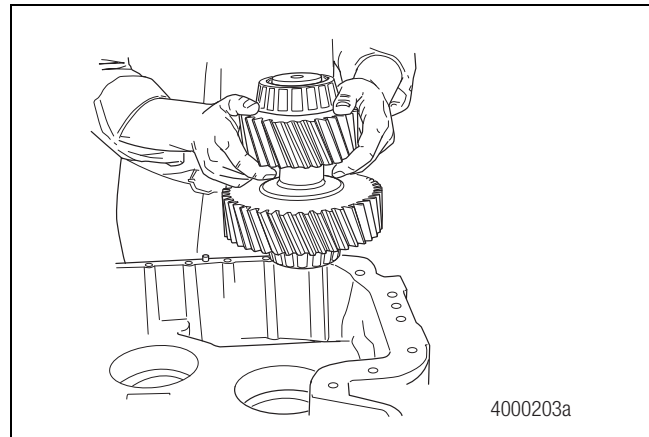


Figure 6.15

- Position the clutch collar onto the shift fork. Position the shift fork and clutch collar onto the front output shaft clutch hub.
- Install the push rod into the transfer case.
- Install the front output shaft, shift fork and clutch collar in the front case. The shift fork will slide over the push rod. Figure 6.16 and Figure 6.17.

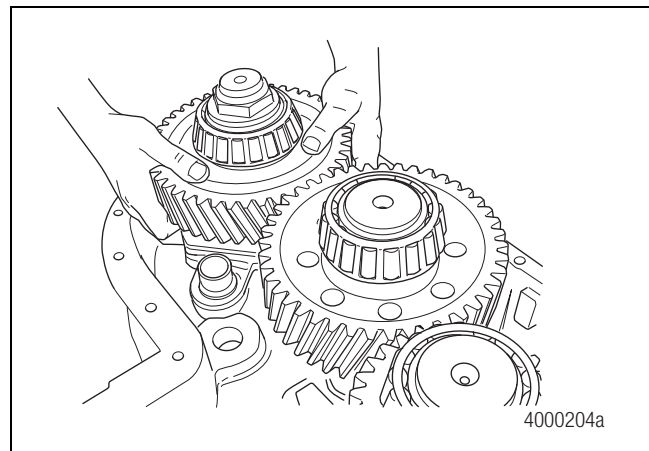


Figure 6.16

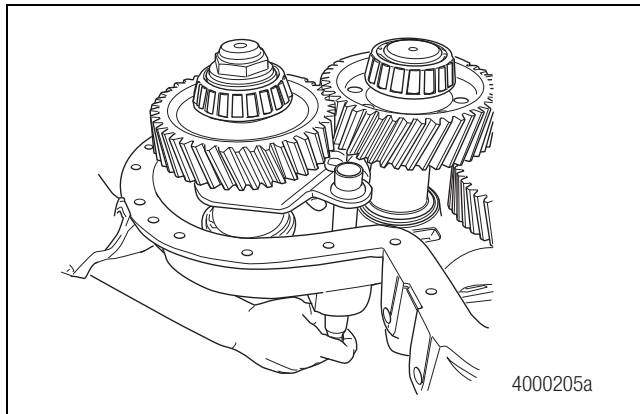


Figure 6.17

7. Install the release spring over the push rod and shift fork.
8. Temporarily install the shift cylinder onto the case to secure the push rod in place.
9. The shift cylinder requires Loctite® 272 sealant for final assembly.
10. Install the input shaft, input bearing cage and internal oil pump, if equipped. Refer to the procedure in this section.
11. For MTC-4213X transfer cases, install the upper rear output shaft into the rear transfer case half. Refer to the procedure in this section.
12. Install the pocket bearing into the recess in the input shaft.

**NOTE:** You must determine all shaft bearing end plays before final assembly. Refer to the end play check and adjustment procedures in this section.

13. Install the two locating dowel pins into the corresponding holes in the front case.

**NOTE:** Do not install sealant at this time.

14. Use a suitable lifting device to install the rear cover and output shaft as an assembly over the front case. Figure 6.18. Guide the cover over the shift fork and push rod as the cover is being set into place over the case.

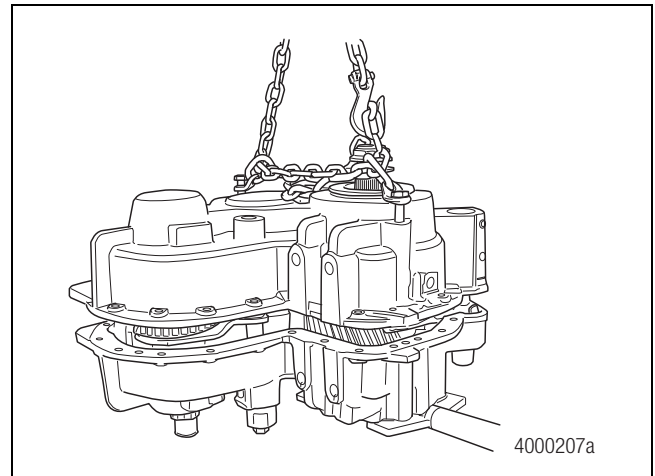



Figure 6.18

15. Verify that the locating dowel pins have engaged both the case and the cover and that the cover is fully seated on the case.
16. Secure the case to the cover joint by assembling at least six equally spaced case-to-cover capscrews.

### Install the Front Input Shaft, Input Bearing Cage and Internal Oil Pump Assembly (If Equipped)

1. Rotate the transfer case so that the front is facing UPWARD.
2. Position the shim pack for the input bearing cage and internal oil pump assembly, if equipped, over the front input opening. Position so that the open areas of the shims face the bottom of the transfer case.
  - **For MTC-4208X/XL/XP/XLEV and MTC-4210X/XL/XP/XLEV models:** The initial input bearing cage shim pack thickness is 0.036 inch.
  - **For MTC-4213X:** The initial input bearing cage shim pack thickness is 0.056 inch.
3. Lubricate the input bearing cage large O-ring, internal oil pump if equipped, helical drive gear and bearing cone before installation. Use synthetic SAE 50 oil, Meritor specification O-81.
4. Install the input shaft with the bearing cage and internal oil pump assembly, if equipped, into the transfer case. Position the assembly so that the inlet oil tube fitting is facing the correct direction.
5. Install at least three input bearing cage-to-housing capscrews. Tighten the capscrews to 85-115 lb-ft (115-156 N•m). 

## 6 Assembly

**NOTE:** For MTC-4208X/XL/XP/XLEV and MTC-4210X/XL/XP/XLEV models, continue with the steps in this procedure. For MTC-4213X shaft completion, proceed to the upper rear output shaft procedure and the input shaft procedure in this section.

6. Install the high range helical gear and bearing cone onto the input shaft. The gear and bearing are a slip-type fit.
7. **MTC-4208X/XL/XP/XLEV and MTC-4210X/XL/XP/XLEV transfer cases only:** Install the 3-inch (76 mm) diameter nut and washer onto the rear end of the input shaft. Tighten the nut to 700-900 lb-ft (949-1220 N•m). **ⓘ**
8. After installing all gearing and shaft assemblies into the transfer case half, continue the assembly of the transfer case by installing the rear cover. Refer to the end play check and adjustment procedures in this section.

### Install the Upper Rear Output Shaft (MTC-4213X Only)

1. Position the output shaft under the rear transfer case half. Use an appropriate lifting device to place the shaft and transfer case into a press.
2. Use bar stock or other material to support the rear output shaft underneath the rear transfer case half. Ensure the bar stock does not rest under the transfer case mounting flange, but only supports the gear and shaft assembly. Figure 6.19.

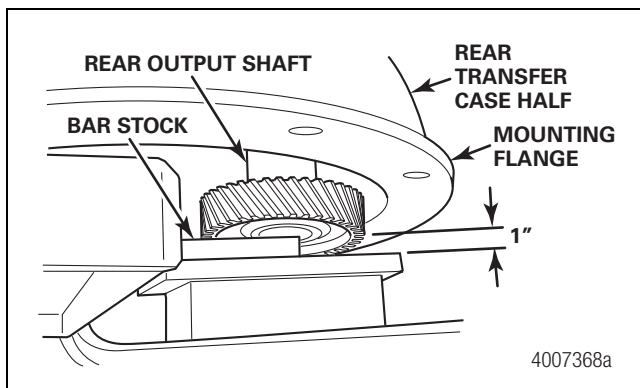


Figure 6.19

3. Check that the inner bearing is seated in the bearing cup and that the gear is vertical and not leaning.
4. Install the shims and spacer over the shaft. If you are replacing the bearings, install a starting shim pack thickness of 0.036 inch (0.91 mm) or use the same thickness that was removed. Figure 6.20.

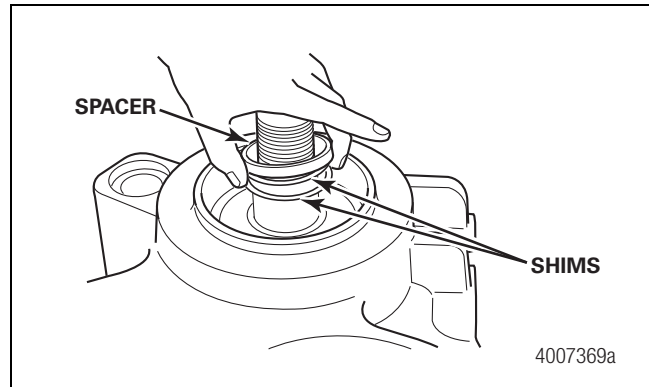


Figure 6.20

5. Use a bearing cone driver, tool number 905473-82, and a press to press the bearing down on the shaft until it is fully seated. Press only on the inner race of the bearing during installation. Figure 6.21.

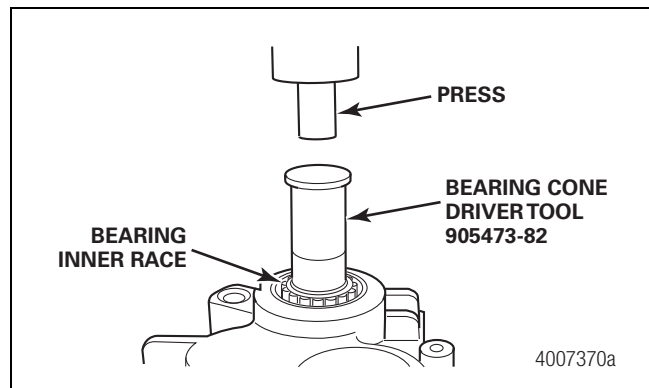


Figure 6.21

6. Install the yoke, washer and locknut. Tighten the locknut to 700-900 lb-ft (949-1220 N•m). **ⓘ**
7. Use a dial indicator to check the end play on the rear upper output shaft. Refer to the procedure in this section. The end play must be 0.002-0.004-inch (0.051-0.102 mm). To adjust the end play, you will need to remove the rear output shaft and outer bearing cone and add or remove shims as necessary to achieve the correct end play.

**NOTE:** The end play for the MTC-4213X upper rear output can be completed before installing the rear case half onto the front case half.

## End Play Check and Adjustment

### Shim Pack Starting Thickness Requirements

End play must be checked and adjusted at all shaft positions before final assembly.

**NOTE:** Reuse the existing yoke nuts during end play preliminary measurements. Install new yoke nuts only on final assembly.

**NOTE:** Unless otherwise noted, all 29 fasteners must be installed and tightened to the specified torque prior to checking end plays.


Start with the following shim pack thicknesses to begin this process.

- MTC-4213X input shaft starting thickness must be equal to or greater than 0.056 inch.
- MTC-4213X upper output starting thickness is 0.039 inch.
- MTC-4213X begins by setting the upper rear output end play first with a starting shim pack size of 0.039 inch. Set the end play to 0.002-0.004 inch (0.051-0.102 mm). After setting the MTC-4213X upper rear output, rotate the transfer case and set the input shaft end play to 0.002-0.004 inch (0.051-0.102 mm). All other MTC-4213X shaft end plays are 0.001-0.005 inch (0.025-0.127 mm).
- MTC-4208X/XP/XL/XLEV and MTC-4210X/XP/XL/XLEV input shaft initial starting shim pack thickness is 0.036 inch.
- MTC-4208XP and MTC-4210XP upper rear output yoke does not require an end play check.

For all other locations, determine the starting shim pack size by cleaning and measuring the thickness of shims removed from the respective bearing cup location. Use new shims to obtain the same thickness as the original shim pack. This will be the starting shim pack thickness to use when setting the respective shaft's end play.

### MTC-4208X/XL/XP/XLEV and MTC-4210X/XL/XP/XLEV Lower Rear Output Shaft End Play

Determine the rear output shaft bearing end play before final assembly. Seals should not be installed until the end plays are set.

1. Install the rear output shaft yoke. Temporarily tighten the yoke nut to 700-900 lb-ft (949-1220 N•m). 
2. Rotate the output shaft several times to seat the bearings.

3. Use a dial indicator to check output shaft bearing end play. Center the dial indicator over the shaft. **NOTE:** For accuracy, place a ball bearing into the recess found on the end of the shaft, then place the tip of the dial indicator on top of the ball bearing. Figure 6.22 and Figure 6.23.

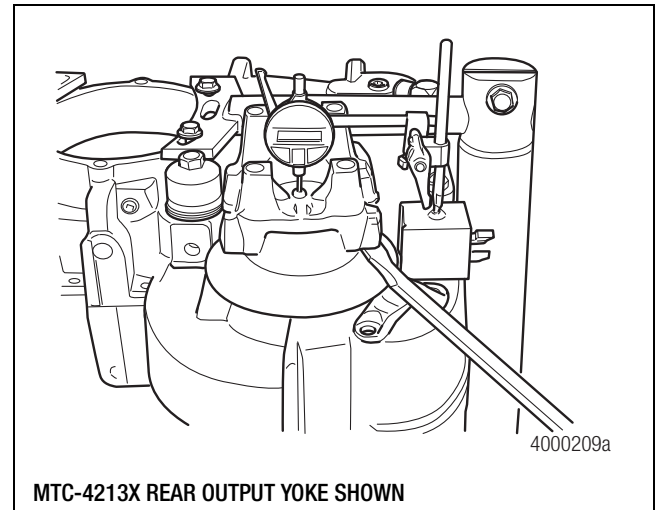


Figure 6.22

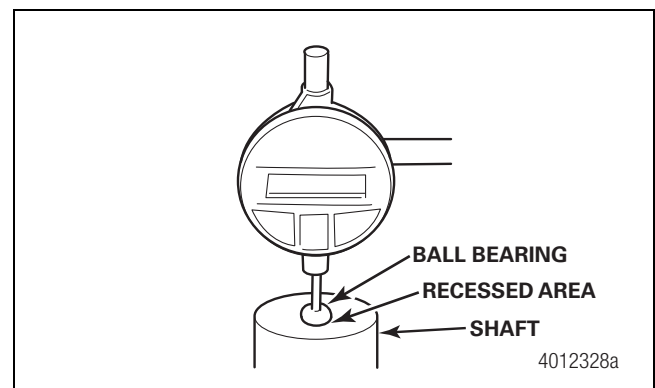


Figure 6.23

4. Use a pry bar to lift the yoke to obtain a measurement. To obtain a consistent and averaged reading, perform this operation two or three times. Record the reading for this shaft. The end play should be 0.002-0.006 inch (0.051-0.152 mm).
  - **If the end play reading is not within 0.002-0.006 inch (0.051-0.152 mm):** Add shims to reduce end play or remove shims to increase end play. Bearing shims come in 0.003-, 0.005- and 0.010-inch (0.08, 0.13 and 0.25 mm) thicknesses.




## 6 Assembly

5. If rear output shaft bearing end play requires adjustment, remove the rear output shaft yoke so that the case and cover can be easily separated.
6. Measure the end play on the remaining shafts before splitting the case to make adjustments.
7. After performing all bearing end play measurements, separate the transfer case halves as necessary to adjust shims and achieve the correct end play on the shaft requiring adjustment.
8. Adjust shims to achieve the correct bearing end play on all shafts as required.

### Front Output Shaft End Play (All Models)

Determine the front output shaft bearing end play before final assembly. Seals should not be installed until the end plays are set.

1. Install the front output shaft yoke. Temporarily tighten the yoke nut to 700-900 lb-ft (949-1220 N•m). 
2. Rotate the output shaft several times to seat the bearings.
3. Set up a dial indicator to check the output shaft bearing end play. Center the dial indicator over the shaft. NOTE: For accuracy, place a ball bearing into the recess found on the end of the shaft, then place the tip of the dial indicator on top of the ball bearing. Figure 6.23 and Figure 6.24.

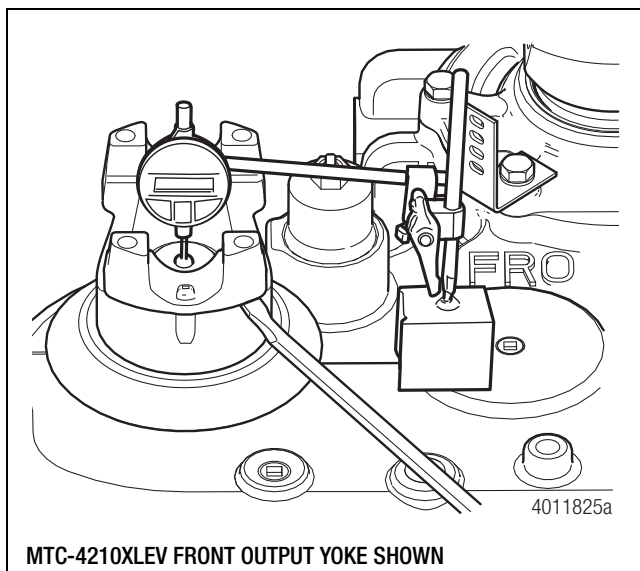


Figure 6.24

4. Use a pry bar to lift the yoke to obtain a measurement. To obtain a consistent and averaged reading, perform this operation two or three times. Record the reading for this shaft.

- **If the end play reading is greater than 0.002-0.006-inch (0.051-0.152 mm):** Add shims to reduce end play.
  - **If the end play reading is less than specification:** Remove shims to increase end play. Bearing shims come in 0.003-, 0.005- and 0.010-inch (0.08, 0.13 and 0.25 mm) thicknesses.
  - **If the front output shaft bearing end play requires adjustment:** Remove the front output shaft yoke so that the case and cover can be easily separated.
5. Measure the end play on the remaining shafts before splitting the case to make adjustments.
  6. After performing all bearing end play measurements, separate the transfer case halves as necessary to adjust the shims and achieve the correct end play on the shaft requiring adjustment.
  7. Adjust the shims to achieve the correct bearing end play on all shafts as required and recheck.
  8. Before installing the yoke, clean the splines of old silastic. Apply a 1/8-inch (3.175 mm) bead of RTV 732 sealant 360 degrees around the underside of the washer. Figure 6.25.

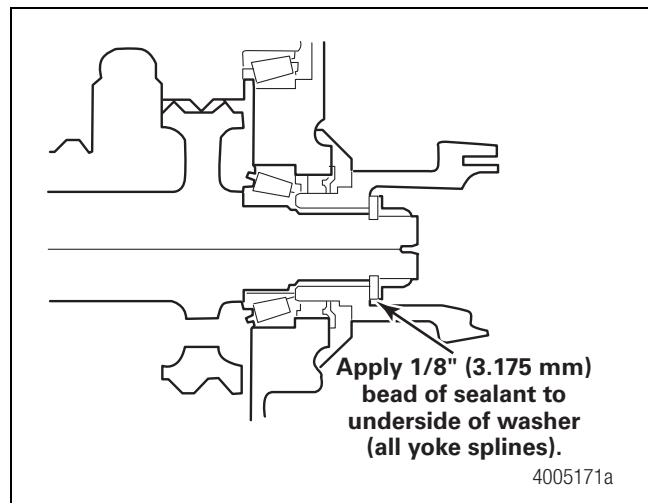


Figure 6.25

### Idler Shaft (Single or Double) Bearing End Play (All Models)

Determine the shaft bearing end play before final assembly. The MTC-4213X has both single idler and doubler idler gear shafts while all other models have a double idler gear shaft. Seals should not be installed until the end plays are set.

1. Rotate the transfer case so that the front of the case faces UPWARD.
2. Remove the 3/8-inch (9.5 mm) pipe plugs at the shaft locations on the front of the case.
3. To prepare to check shaft bearing end play, insert a 1/2"-13 bolt into the shaft through the pipe plug hole, until the bolt is fully seated. The bolt should extend out of the transfer case enough for you to use it to lift the idler shaft.
4. Tighten the bolt so that it bottoms in the shaft for an accurate end play measurement.
5. Rotate the idler shaft several times to help seat the bearing cones.
6. Set up the dial indicator to check the idler shaft bearing end play. Center the dial indicator on the bolt head. Zero the indicator. Figure 6.26.

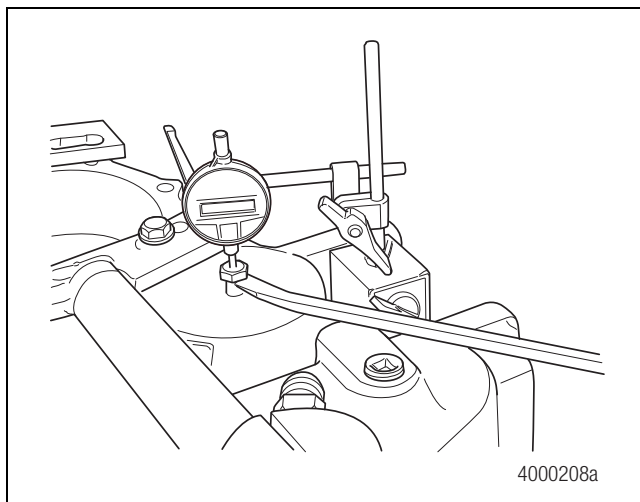


Figure 6.26

7. Use pry bars to lift up on the bolt head to obtain a measurement. To obtain a consistent and averaged reading, perform this operation two or three times. Record the reading for this shaft. The specification is 0.002-0.006-inch (0.051-0.152 mm).
  - **If the end play reading is greater than 0.006-inch (0.152 mm):** Add shims to reduce end play.
  - **If the end play reading is less than 0.002-inch (0.051 mm):** Remove shims to increase end play. Bearing shims come in 0.003-, 0.005- and 0.010-inch (0.08, 0.13 and 0.25 mm) thicknesses.

8. Remove the bolt from the shaft. Install the 3/8-inch pipe plug or breather assembly depending on shaft measured. Tighten the bolt to 20-25 lb-ft (27-34 N•m).
9. After performing all bearing end play measurements, if adjustment is required, separate the transfer case halves.
10. Adjust the shims to achieve the correct bearing end play on all shafts as required and recheck. Refer to the procedure in this section.

## MTC-4213X Rear Output Shaft End Play

**NOTE:** Determine the rear output shaft bearing end play before installing the rear cover onto the front case.

1. If the rear output shaft and cover assembly has been disassembled, install the rear output shaft, bearing cones, spacer and shims, yoke into the rear cover. Temporarily tighten the yoke nut to 700-900 lb-ft (949-1220 N•m). Place the rear cover on the bench to measure bearing end play. Refer to the bearing cup and shim installation procedures in this section. Figure 6.27.

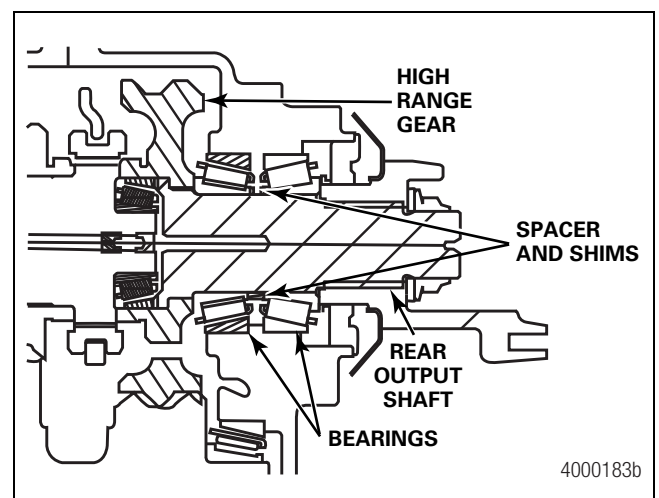


Figure 6.27

2. Rotate the output shaft several times to seat the bearings.
3. Use a suitable dial indicator setup and pry UP on the yoke to determine bearing end play. End play should be 0.002-0.004-inch (0.051-0.102 mm). To obtain a consistent reading, perform this operation two or three times. Record the reading for this shaft. Figure 6.28.
  - **If the bearing end play is within specification:** The rear cover assembly is ready for installation.



## 6 Assembly

- **If the bearing end play is out of specification:** Remove the rear output shaft and install an appropriate spacer and shim combination between the bearing cones.

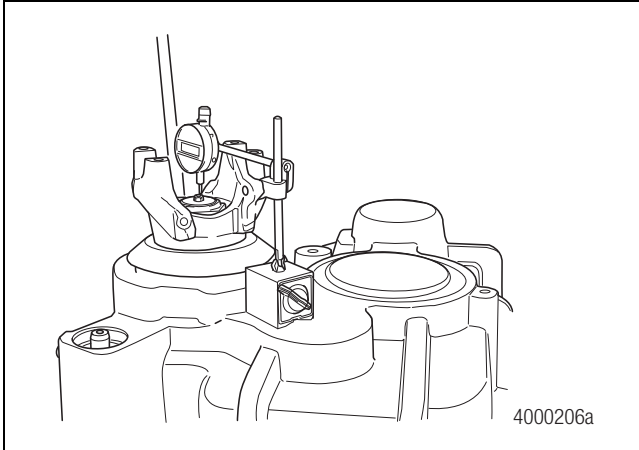


Figure 6.28

4. If necessary, remove the rear output shaft. Add shims to increase end play or remove shims to reduce end play. Reinstall the rear output shaft assembly.
5. Recheck the end play.

### Front Input Shaft End Play Check and Adjustment (All Models)

1. Set up a dial indicator to check input shaft bearing end play. Center the dial indicator over the shaft using a ball bearing for accuracy. Figure 6.29.

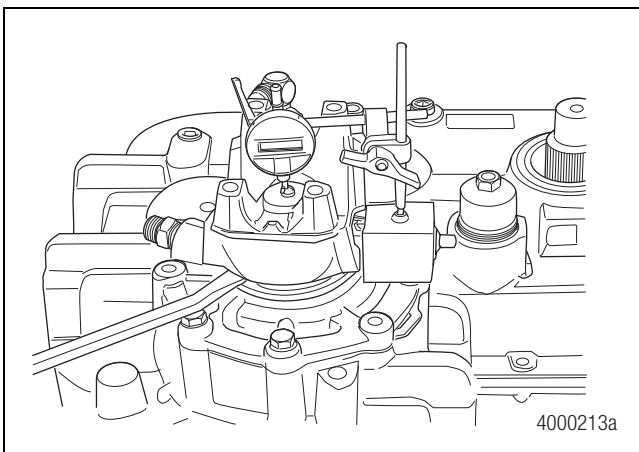



Figure 6.29

2. Use a pry bar to lift the yoke to obtain a measurement. To obtain a consistent and averaged reading, perform this operation two or three times. Record the reading for the input shaft. The specification for MTC-4208 and MTC-4210 transfer cases is 0.002-0.006-inch (0.052-0.152 mm), and 0.002-0.004-inch (0.051-0.102 mm) for the MTC-4213 transfer case.

- **If the end play reading is greater than 0.006-inch (0.152 mm) for MTC-4208 and MTC-4210 transfer cases, or 0.004-inch (0.051-0.102 mm) for the MTC-4213 transfer case:** Remove shims to decrease end play.
- **If the end play reading is less than specification:** Add shims to increase end play. Bearing shims come in 0.003-, 0.005- and 0.010-inch (0.08, 0.13 and 0.25 mm) thicknesses.

3. If it is necessary to add or remove shims, remove the input bearing cage and oil pump assembly capscrews and lift the assembly enough to insert or remove shims.
  - This can be done without completely removing the pump and shaft assembly from the housing.
  - The nut on the rear end of the shaft on MTC-4208 and MTC-4210 transfer cases must be removed first. Refer to the exploded views in this manual.
4. When the correct shim pack is chosen, reinstall all seven input bearing cage and oil pump assembly capscrews. Tighten the capscrews to 85-115 lb-ft (115-156 N•m). 
5. Recheck the input shaft bearing end play. Adjust the end play as necessary.

### Shim Assembly

In order to adjust the end play on any shaft, it is necessary to split the transfer case.

**NOTE:** The exception is the input shaft which can have the horseshoe-style shims removed or added by loosening or removing the input bearing cage capscrews.

1. Rotate the transfer case in the stand so that the rear cover is facing UP. Remove the case-to-cover capscrews.
2. Use a suitable lift to remove the rear cover. Mount the cover so that the pressed-in bearing cups can be removed.

- Use a bearing puller to remove the bearing cups from the cover. Shims are placed between the cover and the cup. Refer to the disassembly procedure.
- Select the correct shim or shims to achieve the correct end play. If the end play measurement is below 0.002-inch (0.051 mm), which indicates a pre-loaded shaft, start by removing shims until some measurable end play is observed.

**Table A: Example of shim selection:**

Initial measurement (idler shaft)	0.018-inch (0.46 mm)
Specification	0.002-0.006-inch (0.051-0.152 mm)
Required shim stack	0.016-0.012-inch (0.406-0.305 mm)

**Table B: Possible combinations that meet required shim stack:**

1 (0.010)	2 (0.005)	1 (0.010)
<u>1 (0.005)</u>	<u>1 (0.003)</u>	<u>2 (0.003)</u>
0.015-inch	0.013-inch	0.016-inch
1 (0.25 mm)	2 (0.13 mm)	1 (0.25 mm)
<u>1 (0.13 mm)</u>	<u>1 (0.08 mm)</u>	<u>2 (0.08 mm)</u>
0.38 mm	0.34 mm	0.41 mm


- After selecting the correct shim combination, place the shims in the bottom of the bearing bore. Refer to the exploded views in this manual.
- Press the bearing cup into the bore until it is completely seated. The shims must be centered in the bore while pressing in the bearing cup.

**NOTE:** On MTC-4208 and MTC-4210 models, shims are installed between the bearing cups and housing bore on the rear cover, except at the input shaft position. The shims for input shaft are installed between the input cage and front cover.

On MTC-4213 models, the front input shaft is shimmed between the input cage and front case half. The rear output shaft is shimmed between the two tapered bearing set. All others shafts are shimmed between the bearing cup and housing bore on the rear case cover.

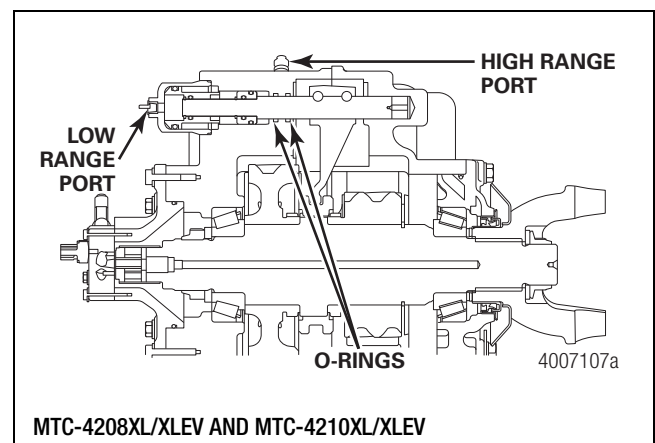
- Repeat Step 3 through Step 6 for each bearing needing an end play adjustment.

**NOTE:** Before final assembly, verify that each shim selection procedure results in the correct end play specification. Repeat the end play measurement steps, as necessary, to obtain the correct end play specification on all shafts.


- Reassemble the cover to the case. Install all 29 case-to-cover capscrews and flat washers. Tighten the capscrews to 60-75 lb-ft (81-102 N•m). 
- Recheck the end play. Once the measurements are correct, remove the cover and prepare for final assembly.

## Final Assembly

- Lubricate and install the O-ring into the rear cover push rod journal. Use a light coat of lithium-based grease, Meritor specification O-668, prior to cover installation. Figure 6.30.



**Figure 6.30**

- Apply Loctite® 518 sealant to the case-to-cover flange. Apply a 1/8-inch (3 mm) bead of sealant around the entire flange between each bolt hole making sure to encircle each hole.
- Reinstall the rear cover over the front case. Guide the high and low shift shaft and push rod through the cover as necessary. Verify that the cover is aligned with the locating dowel pins and correctly seated.
- If the capscrews are not pre-covered, apply Loctite® 272 sealant to the first three threads of the cover-to-case capscrews.
- Install all cover-to-case capscrews and flat washers. Tighten the capscrews to 60-75 lb-ft (81-102 N•m). 
- Recheck the end play. Repeat the end play measurements on all shafts. Repeat the adjustment procedures as required.

## 6 Assembly

### High and Low Shifter

1. Grease all O-ring seals. Use a light coat of lithium-based grease, Meritor specification O-668. Refer to Figure 6.31 for shifter component arrangement.

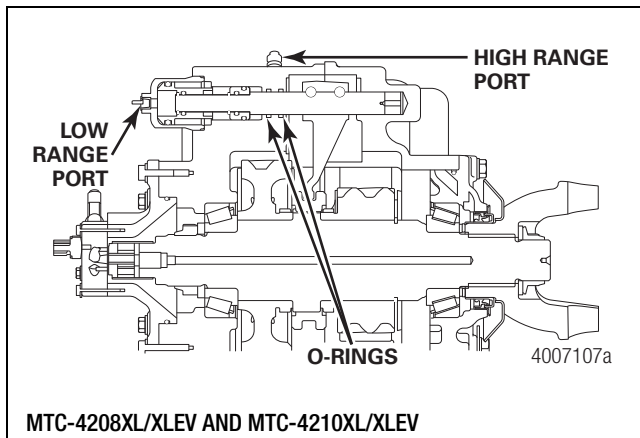


Figure 6.31

2. Install O-rings onto the inside diameter and outside diameter of the inner piston. Install the inner shift piston and snap ring onto the shift shaft. Figure 6.32.

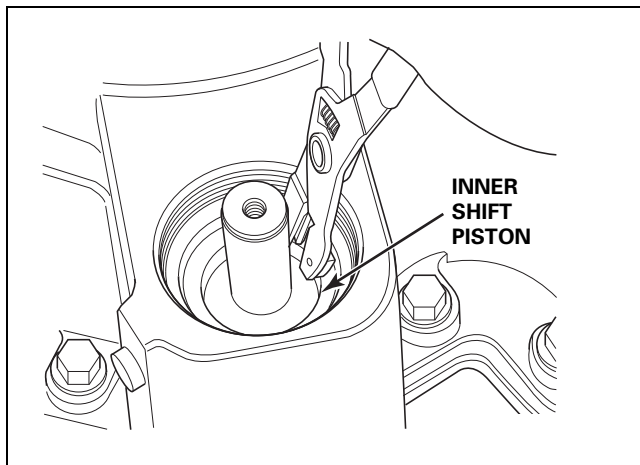


Figure 6.32

3. Install O-rings onto the inside diameter and outside diameter of the outer piston. Install the outer shift piston with the O-ring end first to ensure the piston is facing the correct direction.
4. Install the outer shift piston outer snap ring onto the shift shaft. Figure 6.33.

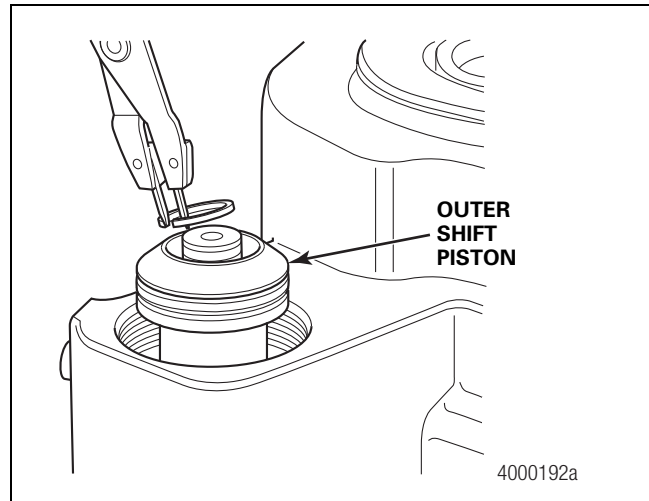



Figure 6.33

5. Apply a 1/8-inch (3 mm) bead of Loctite® 277 sealant to the first three threads of the shift cylinder.
6. Install the high and low shift cylinder. Tighten the cylinder to 80-100 lb-ft (108-136 N•m). 

### Input Shaft Oil Seal and Yoke

- **For all transfer cases:** Install the input seal and sleeve using Meritor kits 2728T1 and 2728T2 respectively. Install the forward output shaft seal using Meritor Kit 4454.
- **For MTC-4208X/XL/XP/XLEV and MTC-4210X/XL/XP/XLEV transfer cases:** Install the rear output shaft seal using Meritor Kit 4454.
- **For MTC-4213X transfer case:** Install the rear output shaft seal using Meritor Kit 4454.

**⚠ WARNING**

Solvent cleaners can be flammable, poisonous and cause burns. Examples of solvent cleaners are carbon tetrachloride, and emulsion-type and petroleum-base cleaners. Read the manufacturer's instructions before using a solvent cleaner, then carefully follow the instructions. Also follow the procedures below.

- Wear safe eye protection.
- Wear clothing that protects your skin.
- Work in a well-ventilated area.
- Do not use gasoline or solvents that contain gasoline. Gasoline can explode.
- You must use hot solution tanks or alkaline solutions correctly. Read the manufacturer's instructions before using hot solution tanks and alkaline solutions. Then carefully follow the instructions.

1. If a seal sleeve is installed onto a yoke, remove the sleeve using a bearing puller. Do not reuse the seal sleeves.
2. Inspect the yoke seal area for damage that could cause lubricant leaks after you install the seal. Use emery paper or an equivalent product to remove scratches, nicks or burrs only.
3. Clean the ground and polished surface of the yoke journal using a clean shop towel and a safe cleaning solvent. Do not use abrasive cleaners, towels or scrubbers to clean the yoke or flange surface. Do not use gasoline.
4. Inspect the yoke seal area for damage that could cause lubricant leaks after you install the seal. Use emery paper or an equivalent product to remove scratches, nicks or burrs only.

**⚠ WARNING**

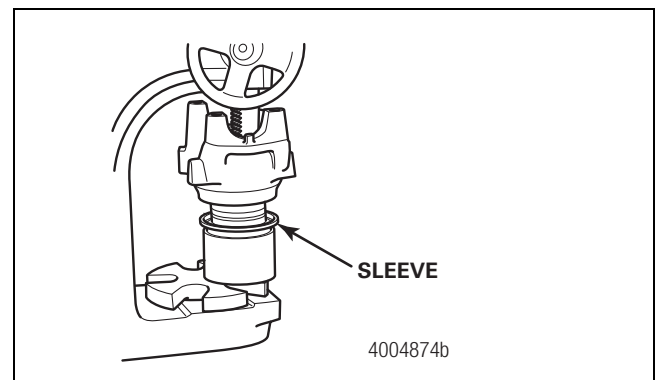
Observe all warnings and cautions provided by the press manufacturer to avoid damage to components and serious personal injury.

Do not hit steel parts with a steel hammer. Pieces of a part can break off. Serious personal injury and damage to components can result.

5. Apply a light coat of lubricant to the yoke seal journal. Position the sleeve into the yoke sleeve driver. Do not touch the greased areas of the sleeve. The sleeve must be kept clean prior to assembly into the seal. Use an arbor press and the appropriate driver to install the sleeve into the yoke. Verify that the sleeve is fully seated in the yoke to prevent damage to components. Figure 6.34.

The yoke must be fully pressed into the sleeve driver until the end of the yoke bottoms out in the sleeve driver. This will correctly position the sleeve on the yoke. When correctly seated, the sleeve is positioned 0.030-inch  $\pm$  0.030-inch (0.76 mm  $\pm$  0.76 mm) from the end of the yoke. Figure 6.35.

- **If you do not have a press:** Position the yoke on a five-inch (127 mm) spacer on a workbench. Use a dead-blow hammer and the appropriate driver to install the sleeve into the yoke. Figure 6.36.



**Figure 6.34**

## 6 Assembly

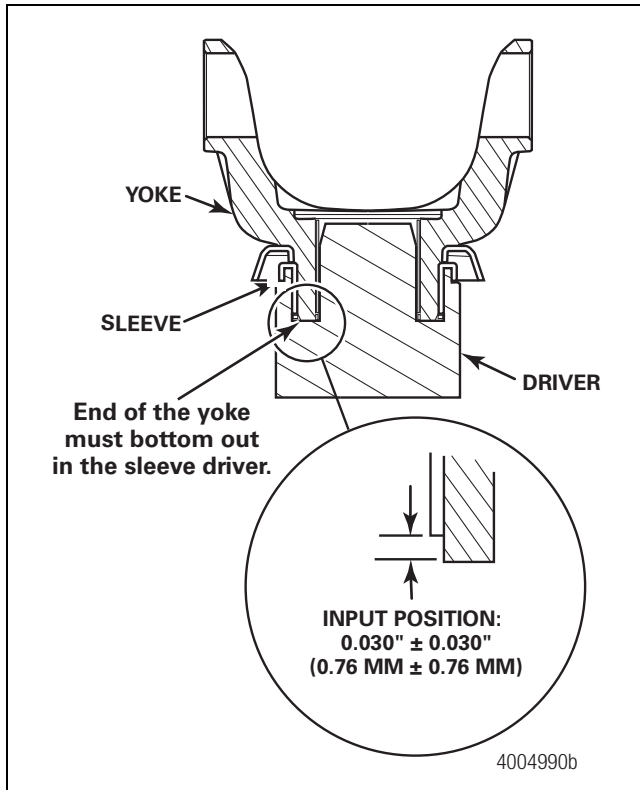


Figure 6.35

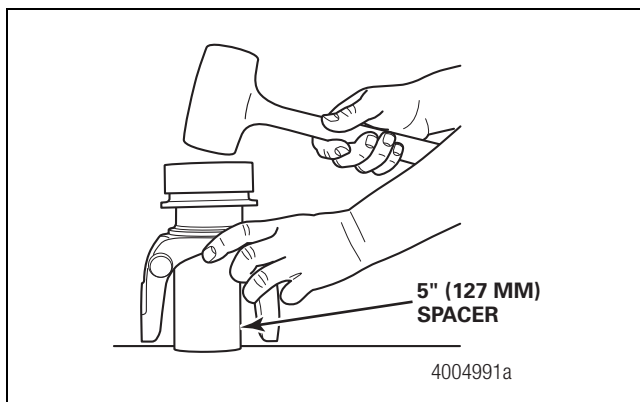


Figure 6.36

6. Install the input seal. Hold the sleeve and seal only on the outer diameter. Position the seal onto the input seal driver and align it with the shaft. Do not touch the lips in the inner diameter of the seal. Use a dead-blow hammer and the appropriate driver to install the seal onto the input bearing cage. Figure 6.37.

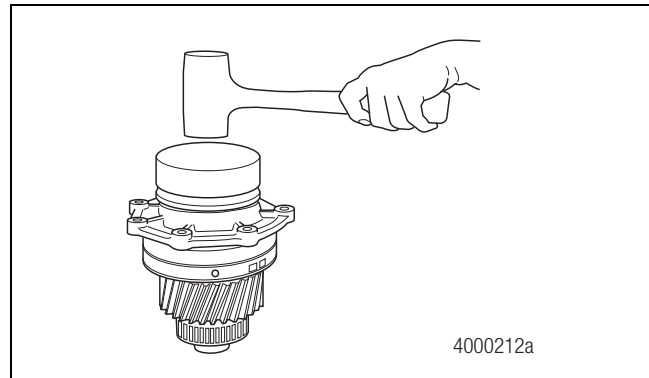


Figure 6.37

7. Use a feeler gauge to check the seal gap. The seal is correctly installed if the gap is less than 0.005-inch (0.127 mm) around the circumference of the seal flange.
  - **If the gap is more than 0.005-inch (0.127 mm):** Use a dead-blow hammer and the appropriate driver to completely install the seal.
8. Clean the splines of the old Silastic before you install the yoke. Apply a light coat of transfer case oil to the yoke seal journal and then use a mallet to install the yoke.
9. Verify the yoke is fully seated on the input shaft.
10. Apply a 1/8-inch (3.175 mm) bead of Silastic RTV 732 sealant 360 degrees around the underside of the washer. Figure 6.38.

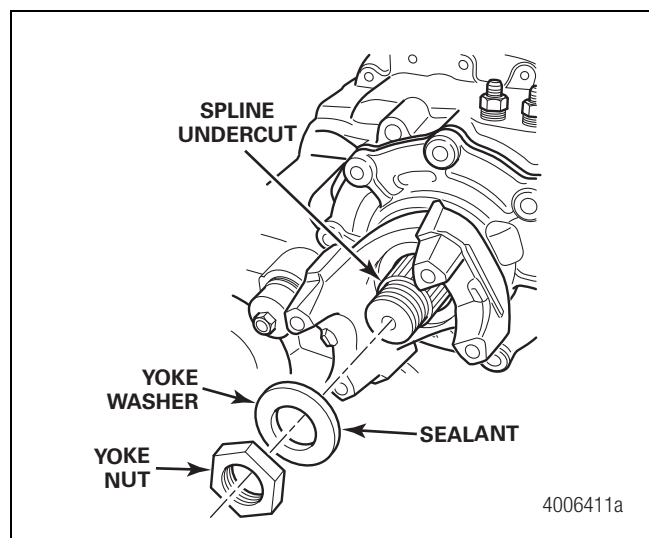




Figure 6.38

11. Install the rear output shaft yoke washer and new yoke nut. Tighten the nut to 700-900 lb-ft (949-1220 N•m). 

## Front Axle Shift Cylinder

1. Rotate the transfer case to install the front axle shift cylinder.
2. Remove the front axle shift cylinder used to temporarily hold the shift shaft in place.
3. Grease the O-ring on the piston and install the piston into the cylinder.
4. Apply a 1/8-inch (3 mm) bead of Loctite® 277 sealant to the first three threads of the shift cylinder.
5. Install and tighten the shift cylinder to 80-100 lb-ft (108-136 N•m). 

## Output Shaft Oil Seal and Yoke

- **For all transfer cases:** Install the input seal and sleeve using Meritor kits 2728T1 and 2728T2 respectively. Install the forward output shaft seal using Meritor Kit 4454.
- **For MTC-4208X/XL/XP/XLEV and MTC-4210X/XL/XP/XLEV transfer cases:** Install the rear output shaft seal using Meritor Kit 4454.
- **For MTC-4213X transfer case:** Install the rear output shaft seal using Meritor Kit 4454.

1. Install the front output shaft oil seal using the appropriate seal driver. Drive the seal until it is fully seated. Figure 6.39.

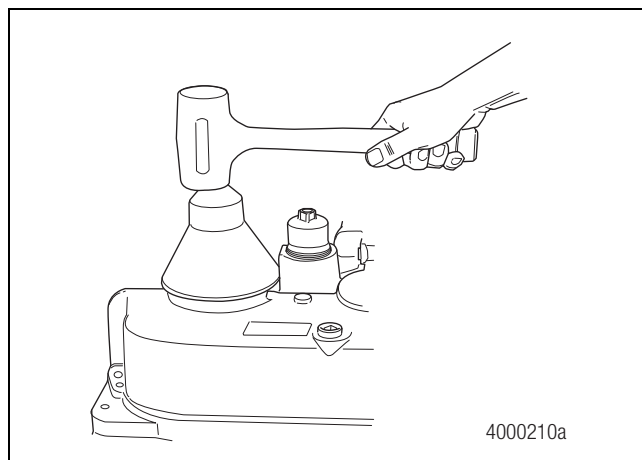



Figure 6.39

2. Apply a light coat of transfer case oil to the yoke journal. Install the front output yoke, washer and new yoke nut. Tighten the yoke nut to 700-900 lb-ft (949-1220 N•m). 
3. Repeat Steps 1 and 2 for the rear output seal and yoke.

4. Once final assembly of the transfer case has been completed and the yokes have been installed, remeasure the input and output yoke end plays to ensure they are within specification.

## Rear-Mounted Pump

### Assembly

1. Install the floating plate, idler and idler carrier into the rotor body. Figure 6.40.

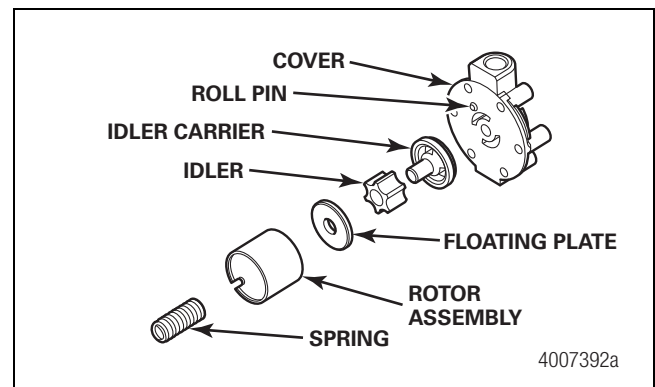


Figure 6.40

2. Install the pump assembly according to the procedure in this section.

### Installation

1. Verify that the drive pins are installed into the input shaft. Figure 6.41.

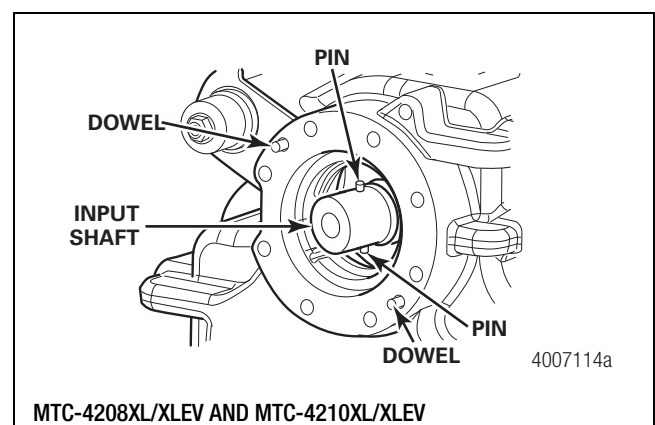


Figure 6.41

2. Install the pump spring into the orifice at the rear of the input shaft.



## 6 Assembly

- Place the pump onto the input shaft. Rotate the pump assembly to engage the drive pins. Ensure that the pump is correctly seated. Leave 3/16-inch (4.763 mm) of the drive pins extending from the input shaft. Figure 6.42.

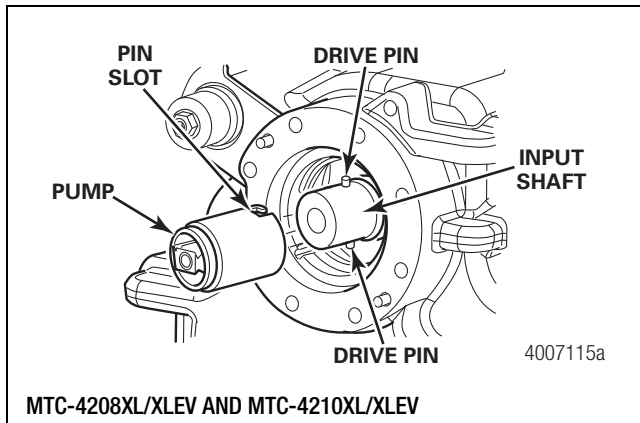


Figure 6.42

- Apply a 0.125-inch (3.175 mm) bead of Loctite® 518 sealant around the rear housing face. Figure 6.43.

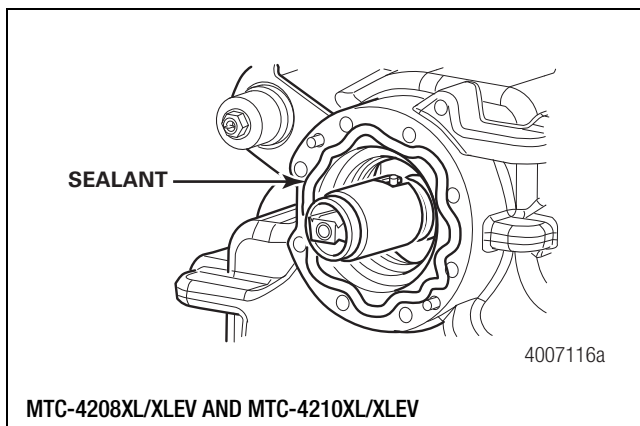


Figure 6.43

- Install the pump housing and align with the transfer case alignment dowels. Tap the cover into place with a mallet. Figure 6.44.

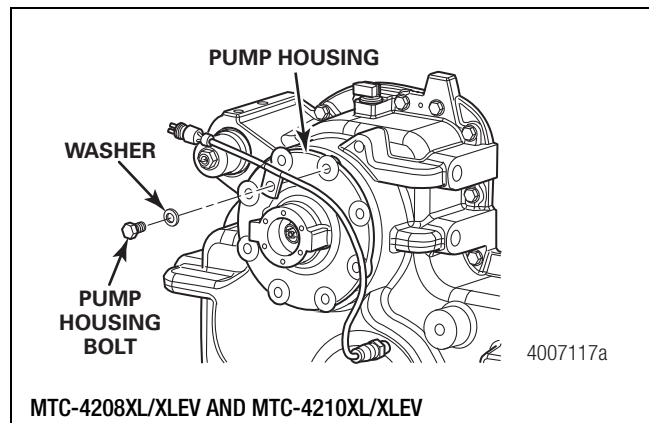



Figure 6.44

- Install the pump housing washers and bolts.
- Use a 5/8-inch socket and tighten the housing bolts in a cross pattern to 60-75 lb-ft (101 N•m). 
- Apply a very light bead of Loctite® 518 sealant onto the pump housing. Do not allow the sealant to enter the pump cavity. Damage to the pump can result. Figure 6.45.

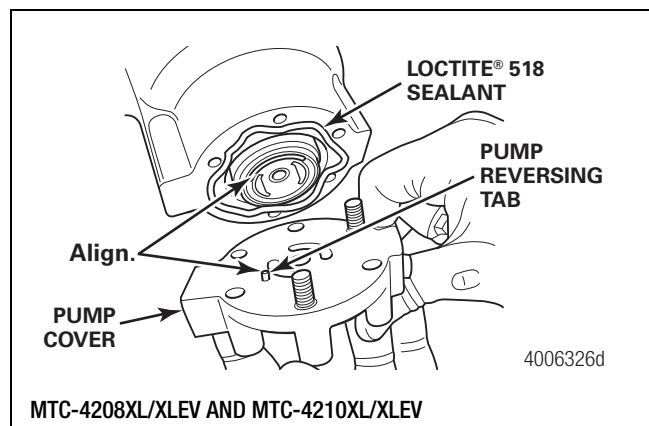


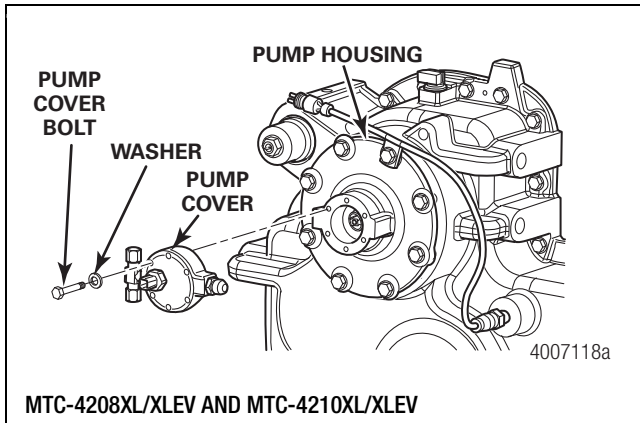
Figure 6.45

### CAUTION

You must verify the pump cover pin is the correct height or the transfer case can become damaged due to low oil pressure.

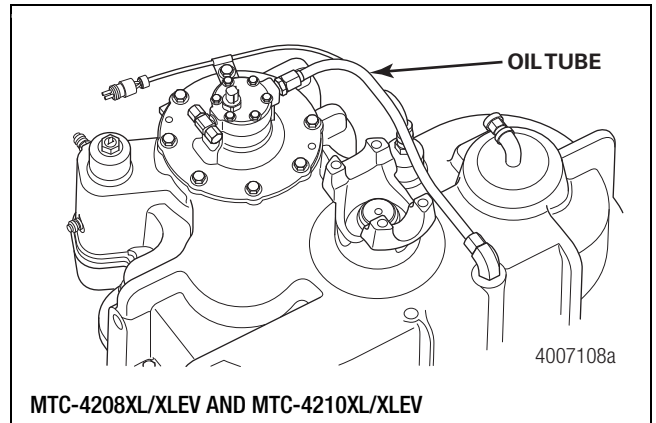
- Install the pump cover at the 9 o'clock position.
- Align the reversing tab (roll pin) on the pump cover with the corresponding recess on the pump. The pump cover must be at this orientation to prevent damage to components. Figure 6.46.






MTC-4208XL/XLEV AND MTC-4210XL/XLEV

Figure 6.46



MTC-4208XL/XLEV AND MTC-4210XL/XLEV

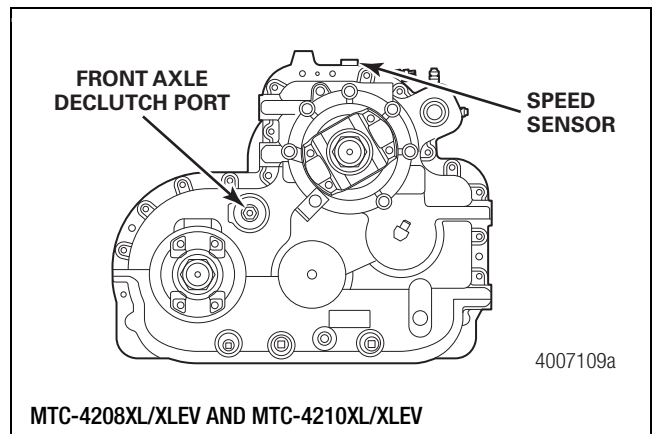
Figure 6.48

11. Install the pump cover washers and bolts. Figure 6.46.
12. Use a 7/16-inch socket and tighten the bolts in a cross pattern to 10-13 lb-ft (14-18 N•m). 

3. If removed, install the speed sensor into the top of the transfer case. Figure 6.49. Fasten with a capscrew and washer.

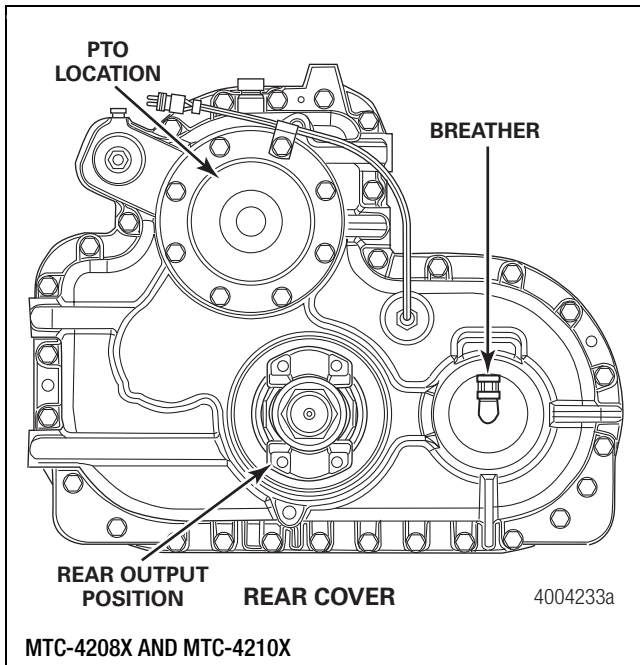
### Breather, Speed Sensor and Plugs

1. If necessary, install the breather into the rear cover. Figure 6.47.



MTC-4208XL/XLEV AND MTC-4210XL/XLEV


Figure 6.49




MTC-4208X AND MTC-4210X

Figure 6.47


4. On MTC-4208XP and MTC-4210XP, install the PTO engagement and disengagement switch assemblies, if equipped. Otherwise, install a nut and washer into the open port.
5. Reinstall all other pipe threaded plugs using Loctite® 592 threadlocker.

2. Install the oil inlet tube to the lower and upper fittings. Tighten the fitting nuts to 35-40 lb-ft (48-54 N•m). Figure 6.48. 

### Oil Cooler Connections

1. Reinstall the male connector fittings, if removed. Apply Loctite® 592 threadlocker to the pipe threads. Tighten the fittings to 25 lb-ft (34 N•m). 
2. Connect the oil cooler lines. Refer to Section 8.

## 6 Assembly

- **MTC-4213X, MTC-4208X/XP and MTC-4210X/XP, PTO Ready:** Reconnect the loop line. Tighten the fittings to 20 lb-ft (27 N•m). 
- **MTC-4208XL/XLEV and MTC-4210XL/XLEV with Rear-Mounted Pump:** Reconnect the tube between the pump outlet and front idler bearing orificed elbow.

### Transfer Case Shifting Check

1. Apply 60 psi (4.14 bar) or greater of air pressure to the front axle declutch. Figure 6.49.
2. Turn the input shaft by hand to verify that the front output turns at same rate as the rear output.
3. Remove the air pressure.
4. Apply 60 psi (4.14 bar) or greater of air pressure to the high-range shaft air port. Figure 6.50.

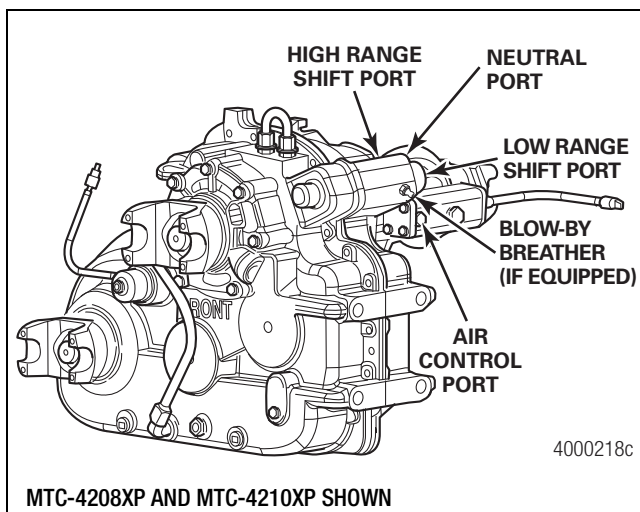


Figure 6.50

5. Turn the input shaft by hand to verify that the rear output turns at same rate as the input.
6. Remove the air pressure.
7. Apply 60 psi (4.14 bar) or greater of air pressure to the low-range shaft cylinder air port. Figure 6.50.
8. Turn the input shaft by hand to verify that the rear output turns at approximately half the rate as the input.
9. Remove the air pressure.
10. For PTO-equipped cases, apply 60 psi (4.14 bar) or greater of air pressure to the neutral shift location. Figure 6.50.

11. Turn the input shaft by hand to verify that the rear output does not turn at all. Have someone hold the output shafts to prevent them from turning while spinning the input.
12. Remove the air pressure.
13. Remove the transfer case from the stand.

### Transfer Case Assembly Test

#### CAUTION

The air pressure must not exceed 10 psi (0.69 bar). Damage to components can result.

1. Pressure test the transfer case assembly for air leakage.
2. Check that the fittings are installed correctly.
3. Remove the breather assembly. Figure 6.47.
4. With the correct fitting installed into the breather port, apply a pressure of 8-10 psi (0.55-0.69 bar).
5. Shut the air supply off.
  - If the pressure decreases by more than 2 psi (0.14 bar) in 10 minutes: Check for external leaks at the fittings.
6. Correct the leakage problem and retest.
7. Reinstall the breather assembly.

### External Oil Pump Pump Priming Procedure (MTC-4208XL/XLEV and MTC-4210XL/XLEV)

Prior to the pump priming procedure, check the oil fill level in the transfer case. The level should be the bottom of the fill hole.

#### CAUTION

Prior to performing a pump pressure test or operating the vehicle, verify that the oil pump is primed. If the pump is not primed, damage to components can result.

1. Prior to connecting the oil cooler line to the tee fitting, remove the tee fitting upper cap and add SAE Grade 50W full-synthetic oil, Meritor specification O-81, to the tee fitting until the tee fitting cavity is completely filled. Figure 6.51.

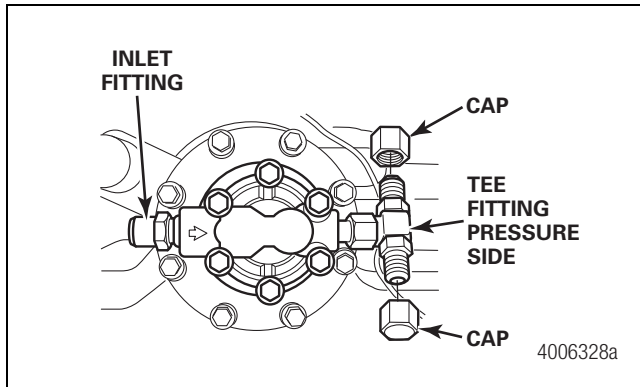


Figure 6.51

2. Reinstall the cap on the upper tee fitting.

### Pump Pressure Test and Oil Fill Check


1. The transfer case and oil lines may be hot. With the vehicle on a level surface, fill the transfer case to the bottom of the fill hole with SAE Grade 50W full-synthetic oil, Meritor specification O-81.
2. Install the 3/8-inch female JIC fitting onto one end of the 10-foot (3.05 meter) pressure hose and the pressure gauge onto the other end.
3. Connect the female fitting to the unused port of the diagnostic tee fitting. Figure 6.51.
4. Route the gauge to a position where it can be viewed in the cab of the vehicle.

#### **CAUTION**

**When performing an oil pump pressure diagnostic check, road test the system for one mile (1.6 km). If the oil pressure is not at least 3 psi (0.21 bar) after one mile, turn the vehicle OFF. Do not repeat the road test. Damage to components can result. Call the Meritor OnTrac™ Customer Call Center at 866-668-7221 for assistance.**

5. Perform an oil pump pressure diagnostic check. Road test the system for one mile (1.6 km) above 30 mph (48 kph) or until the oil pressure reaches 10 psi (0.69 bar), whichever comes first.
  - A positive pressure greater than 3 psi (0.21 bar) indicates that the pump and oil cooler system are primed.

- **If oil pressure is not at least 3 psi (0.21 bar) after one mile:** Turn the vehicle off. Do not repeat the test or damage to components can result. Call the Meritor OnTrac™ Customer Call Center at 866-668-7221 for further assistance.

6. Remove the diagnostic equipment and plug the diagnostic port.
7. Reinstall the diagnostic port cap. Tighten to 35-40 lb-ft (47-54 N•m). 
8. Check the system for leaks at all fitting connections and transfer case oil ports.
9. Check the oil fill level in the transfer case. The level should be below the fill hole following the priming run.
10. Refill the transfer case to the bottom of the fill hole.

### Optional Oil Pressure Test and Oil Fill Check

1. Park the vehicle on a level surface and set the parking brake.
2. The transfer case and oil lines may be hot. With the vehicle on a level surface, fill the transfer case to the bottom of the fill hole with SAE Grade 50W full-synthetic oil, Meritor specification O-81.
3. Install the 3/8-inch female JIC fitting onto one end of the 10-foot (3.05 meter) pressure hose and the pressure gauge onto the other end.
4. Connect the female fitting to the unused port of the diagnostic tee fitting. Figure 6.51.
5. Route the gauge to a position where it can be viewed in the cab of the vehicle.
6. Verify the parking brake is set.
7. Start and idle the vehicle for one minute with the pressure gauge connected. If necessary, refer to the original equipment manufacturer (OEM) instructions to start the vehicle.
8. Verify that the vehicle primary and secondary air pressures are at least 90 psi (6.2 bar).
9. Move the transfer case toggle switch to the Neutral (middle) position. The transfer case will not shift into Neutral if the air pressure is below 90 psi (6.2 bar). If necessary, refer to the original equipment manufacturer (OEM) instructions to start the vehicle.
10. Place the transmission into drive.

## 6 Assembly

11. Verify that the transmission is in the highest range possible. If not, refer to the vehicle operator's manual for shifting instructions.

### WARNING

**Keep clear from under the vehicle when you check the input shaft to prevent serious personal injury.**

12. With the transmission in High, have an assistant outside the vehicle verify the input shaft to the transfer case is turning. Keep clear from under the vehicle when you check the input shaft. If the input shaft is not turning, the transfer case is not in Neutral. If the transfer case is not in Neutral, perform the following procedure.
  - A. Shift the transmission back into Neutral.
  - B. Shift the transfer case to high and low range and back to Neutral.
  - C. Attempt to place the vehicle back into drive and repeat the procedure until the transfer case goes into Neutral.

### CAUTION


**Run the engine for no longer than one minute. Do not repeat the test or damage to components can result.**

**When performing the optional oil pump pressure diagnostic check, test the system for no longer than one minute. If the oil pressure is not at least 3 psi (0.21 bar) after one minute, turn the vehicle OFF. Do not repeat the test. Damage to components can result. Call the Meritor OnTrac™ Customer Call Center at 866-668-7221 for assistance.**

13. Once the transfer case is in Neutral and the transmission is in High, press the accelerator and run the engine at 1800-2200 rpm for no longer than one minute or until oil pressure reaches 10 psi (0.69 bar), whichever occurs first. With the transmission in High, observe the reading on the pressure gauge. The reading should be 5-20 psi (0.34-1.38 bar).
  - **If oil pressure is not at least 3 psi (0.21 bar) after one minute:** Turn the vehicle off. Do not repeat the test or damage to components can result. Call the Meritor OnTrac™ Customer Call Center at 866-668-7221 for further assistance.
14. Once the test is complete, allow the engine to idle back down. Shift the transmission back to Low.
15. Shift the transmission back to Neutral.

### WARNING

**Shift the transfer case into high range for this procedure. Refer to the vehicle operator's manual instructions. If you do not shift into high range, serious personal injury and damage to components can result.**

16. Shift the transfer case back into high range. If necessary, refer to the vehicle operator's manual instructions.
17. Turn the vehicle off. If necessary, refer to the original equipment manufacturer (OEM) instructions.
18. Remove the diagnostic equipment.
19. Reinstall the diagnostic port cap. Tighten to 35-40 lb-ft (47-54 N•m). 
20. Check the system for leaks at all fitting connections and transfer case oil ports.
21. Check the oil fill level in the transfer case. The level should be below the fill hole following the priming run.
22. Refill the transfer case to the bottom of the fill hole.

## Hazard Alert Messages

Read and observe all Caution and Warning safety alerts below and those that precede instructions or procedures you will perform.

### WARNING

To prevent serious eye injury, always wear safe eye protection when you perform vehicle maintenance or service.

When you apply some silicone gasket materials, a small amount of acid vapor is present. To prevent serious personal injury, ensure that the work area is well-ventilated. Read the manufacturer's instructions before using a silicone gasket material, then carefully follow the instructions. If a silicone gasket material gets into your eyes, follow the manufacturer's emergency procedures. Have your eyes checked by a physician as soon as possible.

Take care when you use Loctite® adhesive to avoid serious personal injury. Read the manufacturer's instructions before using this product. Follow the instructions carefully to prevent irritation to the eyes and skin. If Loctite® adhesive material gets into your eyes, follow the manufacturer's emergency procedures. Have your eyes checked by a physician as soon as possible.

Observe all warnings and cautions provided by the press manufacturer to avoid damage to components and serious personal injury.

Park the vehicle on a level surface. Block the wheels to prevent the vehicle from moving. Support the vehicle with safety stands. Do not work under a vehicle supported only by jacks. Jacks can slip and fall over. Serious personal injury and damage to components can result.

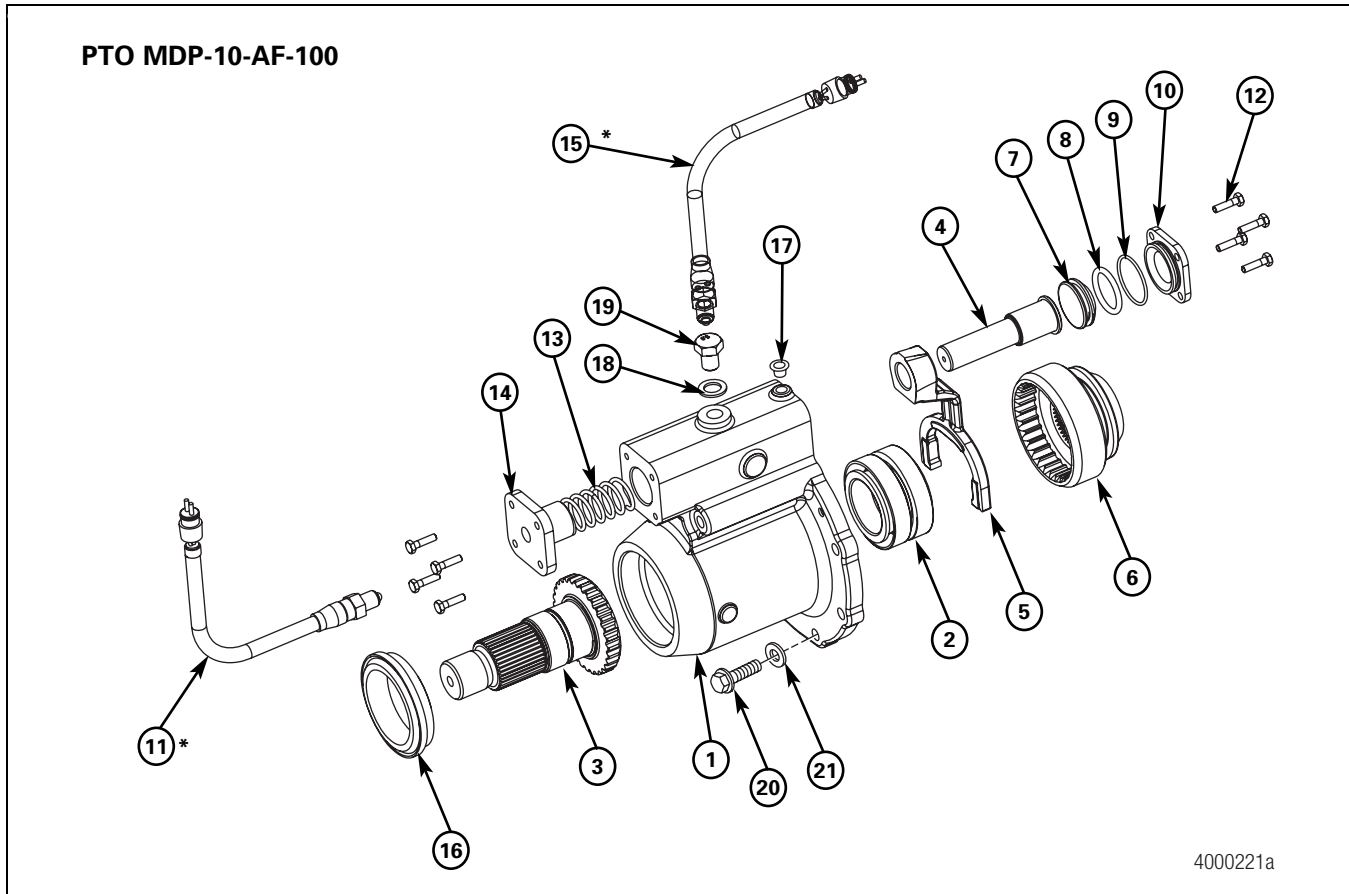
## Installation

This section provides instructions on installing a power take-off (PTO) assembly onto Meritor MTC-4208 and MTC-4210 transfer cases using Kit 2540. Refer to Table C and Figure 7.1. Refer to the Service Notes page on the front inside cover of this manual to obtain this Kit.

Table C: Kit 2540

Part Name	Qty.	Part Number	Description
PTO Assembly	1	MDP-10-AF-100	10,000 lb-ft (13 500 N•m) torque rating
Washer	8	1229-E-1513	0.81" O.D. x 0.47" I.D. x 0.09" thickness
Capscrew	6	S-2710-2	7/16" - 14 thread x 1.25" long
Capscrew	2	S-2746-2	7/16" - 14 thread x 5.75" long
Washer	1	1229-T-1736	2.36" x 1.56 I.D. x 0.12" thickness
Locknut	1	40-X-1237	M39 x 1.5 thread
Dowel Pin	2	1246-T-1190	3/8" diameter x 1" long

## 7 Power Take-Off (PTO)



**Figure 7.1**

Item	Description	Qty.	Item	Description	Qty.
1	Bearing Cage	1	15*	Declutch Switch Assembly	1
2	Bearing Assembly	1	16	Oil Seal Assembly	1
3	PTO Shaft	1	17	Shipping Protector	1
4	Push Rod	1	18	Flat Washer	2
5	Shift Fork	1	19	Special Screw	2
6	Differential Lockout Collar	1	20	Capscrew, 1.25-inch (32 mm) Long	6
7	Shifter Piston	1	20	Capscrew, 5.75-inch (146 mm) Long	2
8	O-Ring, 1.46-inch (37 mm) Diameter	1	21	Washer	8
9	O-Ring, 1.80-inch (46 mm) Diameter	1			
10	Cover Plate	1			
11*	Switch Assembly, Standard	1			
12	Capscrew	1			
13	Shifter Spring	1			
14	Cap	1			

\*Optional

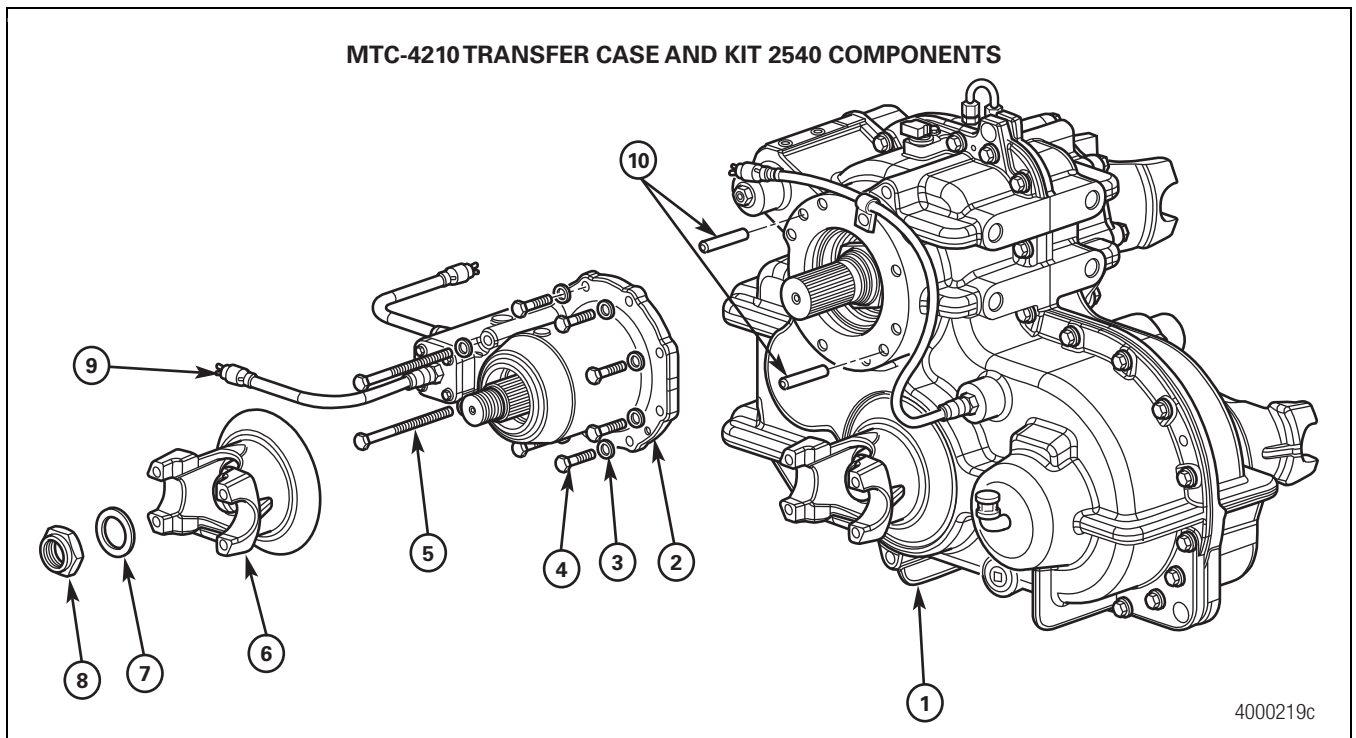
## Remove the Transfer Case Rear Access Cover

1. Park the vehicle on a level surface. Block the wheels to prevent the vehicle from moving.
2. Remove the air from the vehicle's system.
3. Place a suitable container under the transfer case to catch the hydraulic fluid that will drain when you remove the rear access cover.

4. Remove the mounting bolts and washers that secure the rear-mounted pump housing. Figure 7.2.

**NOTE:** It is necessary to replace the rear-mounted pump with the internal pump in order to install the PTO. Refer to Technical Bulletin TP-0708 for the correct kit and instructions.

5. Clean the PTO mounting surface to remove all sealant.



**Figure 7.2**

Item	Description
1	Transfer Case
2 <sup>1</sup>	PTO Assembly
3 <sup>1</sup>	Washer, 0.47-inch (12 mm) Inside Diameter
4 <sup>1</sup>	Capscrew, 1.25-inch (32 mm) Long
5 <sup>1</sup>	Capscrew, 5.75-inch (146 mm) Long
6	Yoke
7 <sup>1</sup>	Washer, Yoke Mounting
8 <sup>1</sup>	Locknut, Yoke Mounting
9	Switch and Connector Assembly

Item	Description
10	Dowel Pin

<sup>1</sup> Kit 2540 component

## Install the Yoke Onto the PTO

You must install a Meritor yoke with the spline code "RAI" onto the PTO. For yoke options, refer to Table D and Figure 7.3.



## 7 Power Take-Off (PTO)

Table D: PTO Yoke Options and Dimensions

Part Number	Yoke Description	Dimensions				E	F
		A	B	C	D		
		Center to End	Spline Length	Hub Diameter	Bearing Diameter	Across Ears	Spline Size
17NYS32-100A1	Full Round	5.16 (131)	2.32 (59)	3.00 (76)	1.94 (49)	6.00 (152)	2.00 x 39 (51 x 991)
17TYS32-68A1	Easy Service™	5.47 (139)	2.32 (59)	3.00 (76)	1.94 (49)	6.20 (157)	2.00 x 39 (51 x 991)

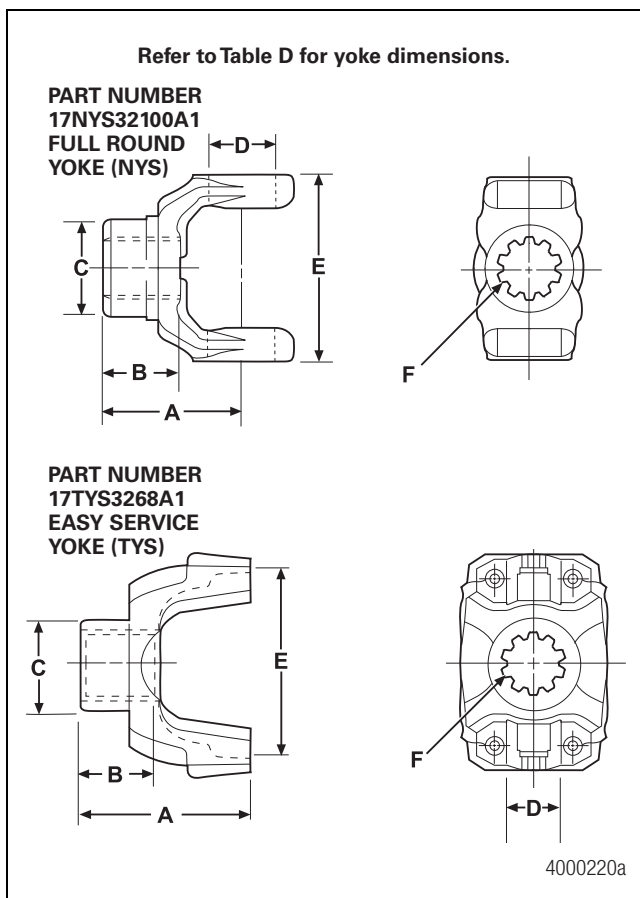


Figure 7.3

1. Use a press and an applied press force of 500-1500 lbs (227-680 kg) to install a Meritor yoke, spline code RAI, onto the PTO shaft. Figure 7.2.
2. Apply a 1.8-inch (46 mm) bead of RTV silicone gasket material around the end of the yoke spline under the washer surface.

3. Install the washer and locknut supplied in the kit. Tighten the locknut to 700-900 lb-ft (949-1220 N•m).

### Install the Optional Indicator Switch

You must install the optional PTO switch listed in Table E.

Table E: PTO Switch Option

Part Name	Qty.	Part Number	Description
Switch and Connector Assembly	1	3237-W-1167	2 Amp x 12 VDC, M16 x 1" thread

1. Remove the screw and washer from the end of the PTO cap. Figure 7.4.

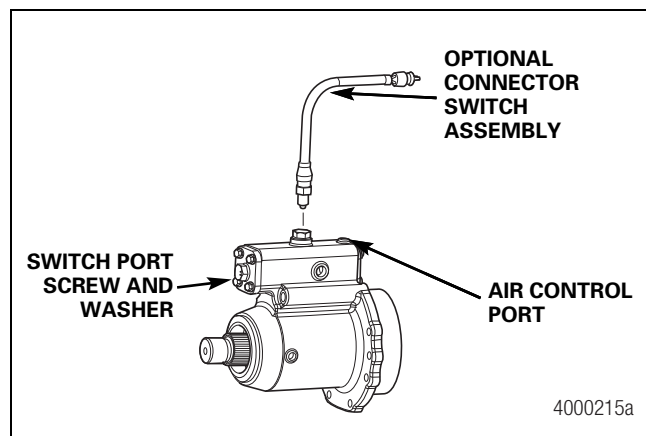


Figure 7.4

2. Apply Loctite® 518 gasket sealant to the indicator switch threads.
3. Install the indicator switch. Tighten the switch to 25-30 lb-ft (34-41 N•m). Figure 7.5.

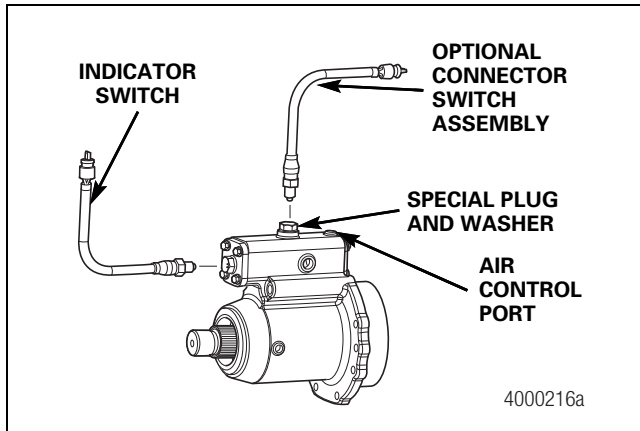


Figure 7.5

### Install the PTO Onto the Transfer Case

1. Install two dowel pins into the transfer case PTO flange.
2. Apply a thin coating of Loctite® 518 gasket sealant to the entire PTO flange mounting surface. Figure 7.2.
3. Slide the PTO assembly onto the output shaft spline. Align the assembly to the two dowel pins.
4. Install the washers and mounting bolts. Tighten the bolts to 60-75 lb-ft (81-102 N•m).
5. Install the PTO air control line and fitting. Follow the vehicle manufacturer's instructions.

### Test the PTO Installation

#### CAUTION

The PTO clutch must be engaged to operate the drive. Always engage and disengage the PTO with the vehicle stationary and in Neutral. Do not apply a load to the PTO drive until the drive has been engaged. Damage to components can result.

The air pressure must not exceed 90 psi (6.2 bar). Damage to components can result.

1. Connect a regulated air pressure line to the air control port. Figure 7.6.

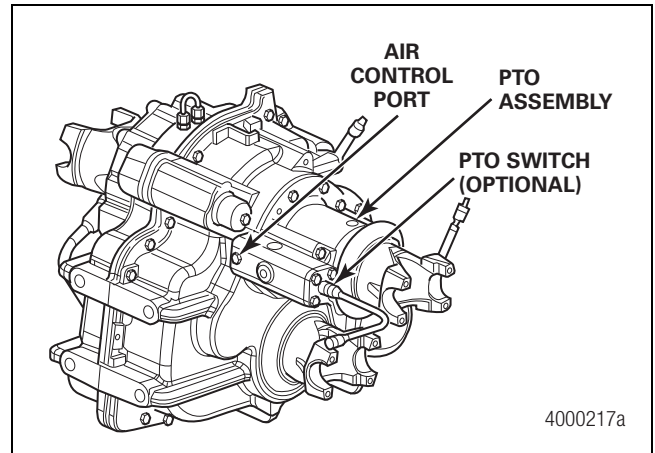


Figure 7.6

2. Apply 90 psi (6.2 bar) of air pressure.
3. Check for leaks in the PTO air control line.
4. Cycle the air control pressure. Follow the procedures below to check that the PTO clutch engages correctly.

### PTO Without an Optional Indicator Switch

1. Remove the switch port screw and washer. Figure 7.4.
2. Measure the PTO push rod travel to verify that the travel is 0.75-inch (19 mm) and that the clutch is fully engaged.
  - **If the push rod travel is not at 0.75-inch (19 mm) and the PTO clutch is not fully engaged:** Disengage the clutch by releasing the air pressure. Rotate the clutch output shaft by hand and retest.
  - **If the clutch still is not fully engaged:** Remove the PTO assembly. Check the transfer case output shaft splines and the PTO clutch collar splines. Replace worn or damaged parts. Repeat the assembly procedures.

### PTO with an Optional Indicator Switch

1. Install the indicator switch. Tighten the switch to 25-30 lb-ft (34-40.8 N•m).
2. Verify that the indicator switch closes when the PTO completes a shift to engage the drive. Figure 7.5.
  - **If the indicator switch does not close to fully engage the drive:** Measure the PTO push rod travel to verify that the travel is 0.75-inch (19 mm) and that the clutch is fully engaged.

## 7 Power Take-Off (PTO)

- **If the push rod travel is not at 0.75-inch (19 mm) and the PTO clutch is not fully engaged:** Disengage the clutch by releasing the air pressure. Rotate the clutch output shaft by hand and retest.
- **If the clutch still is not fully engaged:** Remove the PTO assembly. Check the transfer case output shaft splines and the PTO clutch collar splines. Replace worn or damaged parts. Repeat the assembly procedures.

### Test the Transfer Case with the PTO Assembly Installed

#### ⚠ CAUTION

The air pressure must not exceed 10 psi (0.69 bar). Damage to components can result.

1. Connect a regulated air pressure line to the air transfer case breather. Figure 7.7.

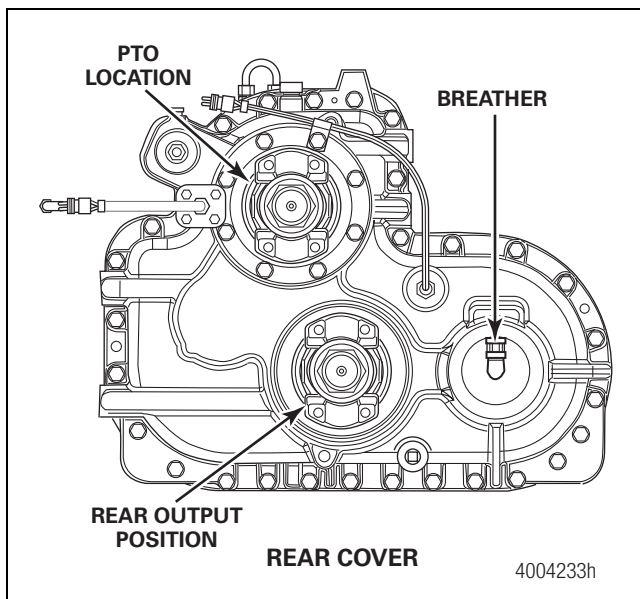


Figure 7.7

2. Check that the air pressure line fittings are installed correctly.
3. With the correct fitting installed into the breather port, apply a pressure of 8-10 psi (0.55-0.69 bar).
4. Turn the air supply OFF. Check the pressure.
  - **If the pressure decreases by more than 2 psi (0.14 bar) in 10 minutes:** Check for external leaks at the fittings. Correct any leaks. Recheck the pressure.

5. Install the breather.

### PTO Disassembly

Once you've removed the PTO according to the procedure in Section 4, use the following procedure for disassembly.

#### ⚠ WARNING

Take care when you remove the spring-loaded PTO cap. Serious personal injury and damage to components can result.

1. Carefully remove the spring-loaded PTO cap by turning each bolt a few turns at a time until all the bolts can be removed at once.
2. Remove the capscrews from the cover of the declutch piston. Remove the cover.
3. Remove the PTO piston push rod and the return spring. Remove the O-ring seal from the PTO piston.
4. Remove the O-ring seal on the cover. Discard the seal. Remove the shift fork and clutch collar.
5. Remove the oil and dirt seals from the bearing cage assembly. Discard the seals.
6. Press the shaft out of the bearing cage. Remove the bearing assembly.
7. Remove the bearing cups as a unit with the bearing spacer by pressing the cups out of the bearing cage. Do not separate these parts. They are a matched set.

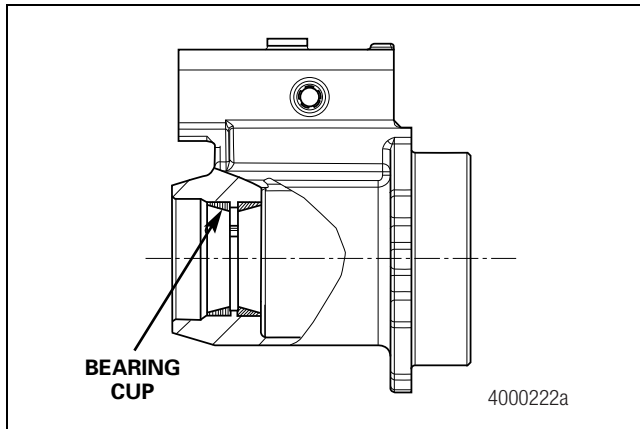
### PTO Assembly

1. Rotate the transfer case in the repair stand so that the output shaft to the PTO is facing UPWARD.

#### ⚠ CAUTION

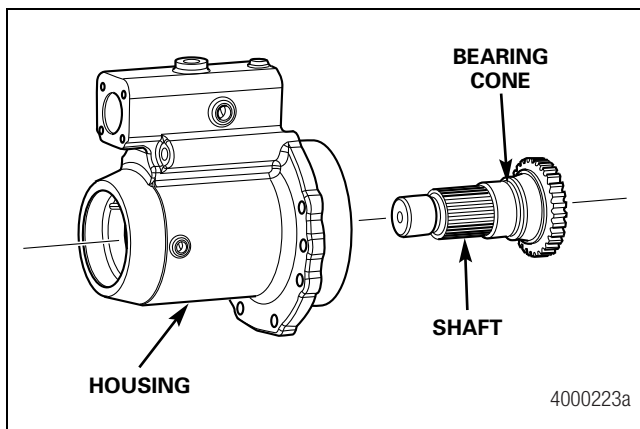
The cups must fit securely in the housing bores. Damage to the components can result.

2. Assemble the PTO components by performing the following steps.
  - A. Install the bearing cups into the PTO bearing cage housing. This is an interference fit. Freeze the bearing to  $-65^{\circ}\text{F}$  ( $-54^{\circ}\text{C}$ ) and position the two cups into the housing bores. Figure 7.8.
    - **If the cups are loose after the cup temperature warms:** Replace the housing.



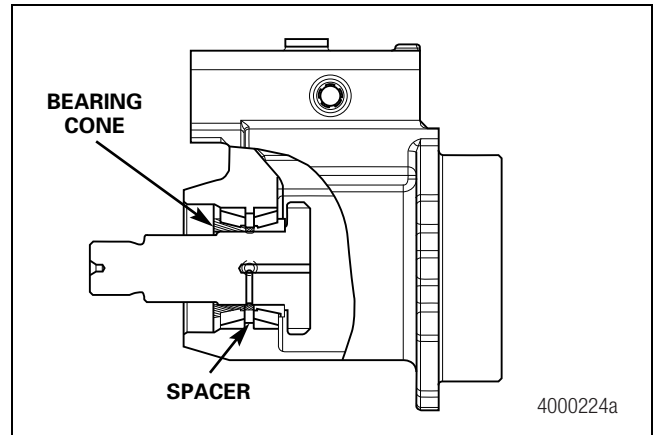
**Figure 7.8**

- B. Preheat the first bearing cone to 200°F (93°C). Support the shaft and slide the heated cone in place onto the output shaft. Figure 7.9.



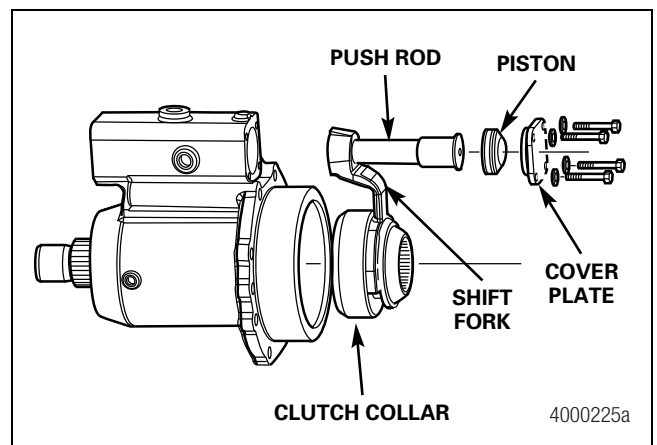
**Figure 7.9**

- C. Install the shaft assembly into the housing. Slide the bearing spacer onto the splined end of the shaft.
- D. With the bearing spacer in position, the second bearing cone can be heated to 200°F (93°C) and installed onto the shaft. Figure 7.10.



**Figure 7.10**


- E. Support the shaft and apply a press of 50-60 lbs (23-27 kg) to the bearing cone to set the bearing in place while the bearing cools.
- F. Apply a light film of SAE 50W synthetic lubricant.
- G. Assemble the shift fork to the clutch collar. Install this unit into the bearing cage housing.
- H. Install the push rod into the housing and through the shift fork assembly.
- I. Apply 20-30 lbs (9-14 kg) of pressure to insert the piston into the housing. Figure 7.11.



**Figure 7.11**

- J. Install the cover plate with the O-ring seal in place.
- K. Lightly lubricate all parts with SAE 50W synthetic lubricant.

## 7 Power Take-Off (PTO)

- L. Install the 1/4-20 screws using Loctite® 242 sealant. Tighten the screws to 10-14 lb-ft (14-19 N•m). 
- M. Insert the spring into the housing over the push rod. Figure 7.12.

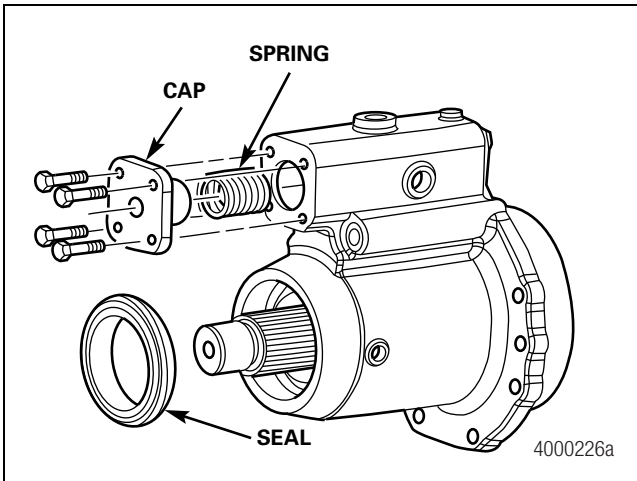






Figure 7.12

- N. Apply a thin film of Loctite® 518 gasket material to the cap surface. Install the cap with the 1/4-20 screws using Loctite® 242 sealant. Tighten the screws to 10-14 lb-ft (14-19 N•m). Figure 7.12. 
  - O. Install the PTO shaft seal into the housing.
  - P. Press the seal into position until the seal is seated on the housing.
3. Install the PTO assembly onto the transfer case.
  4. Apply a thin film of Loctite® 518 gasket material to the housing.
  5. Slide the housing onto the output shaft of the transfer case, aligning the splines of the clutch to the shaft.
  6. Install the eight 7/16-inch (11 mm) diameter screws and washers using Loctite® 277 sealant. Tighten the screws to 60-75 lb-ft (81-102 N•m). 
  7. Check that the clutch engages and disengages correctly.
  8. Pressure test the PTO shifter for air leakage by performing the following steps.
    - A. With the correct fitting installed into the air control port, apply a pressure of 90 psi (6.2 bar).
    - B. Shut off the air supply.

### CAUTION

Check for external leaks at the cover plate joint and fitting if the pressure decreases more than 5 psi (0.3 bar) in 10 minutes. Leaks can cause component damage.

- C. Check for external leaks at the cover plate joint and fitting if the pressure decreases more than 5 psi (0.3 bar) in 10 minutes.
  - **If the external joints are sealed and the leakage is still more than 5 psi (0.3 bar):** Remove the piston and inspect the O-ring and housing bore for damage. Repair parts as necessary.
9. Install the indicator switch. Tighten the switch to 25-30 lb-ft (34-40 N•m). Figure 7.13. 
  - **If a switch is not used:** Install the special plug and washer used to cap the access hole. Tighten the plug to 25-30 lb-ft (34-40 N•m). Figure 7.13. 

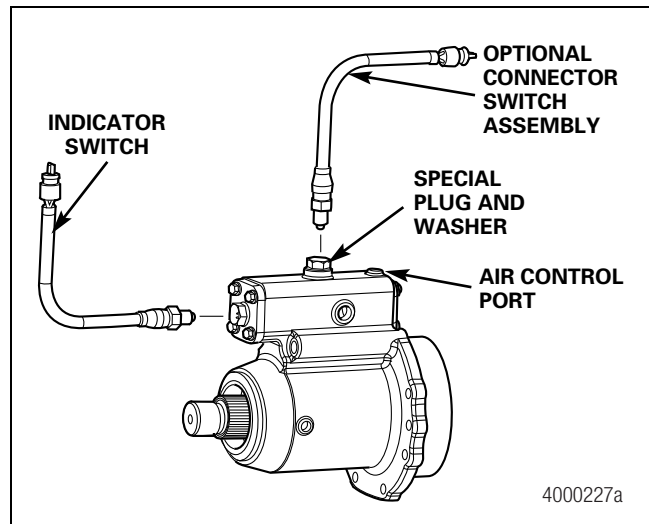


Figure 7.13

10. Repeat Step 1 through Step 9 for each remaining declutch, PTO or proportional differential lockout assemblies.

## Hazard Alert Messages

Read and observe all Warning and Caution hazard alert messages in this publication. They provide information that can help prevent serious personal injury, damage to components, or both.

### **⚠ WARNING**

To prevent serious eye injury, always wear safe eye protection when you perform vehicle maintenance or service.

## Install the Transfer Case

### **⚠ WARNING**

Support the transfer case with a lifting device before moving the transfer case. A transfer case that is not supported correctly can fall. Serious personal injury and damage to components can result.

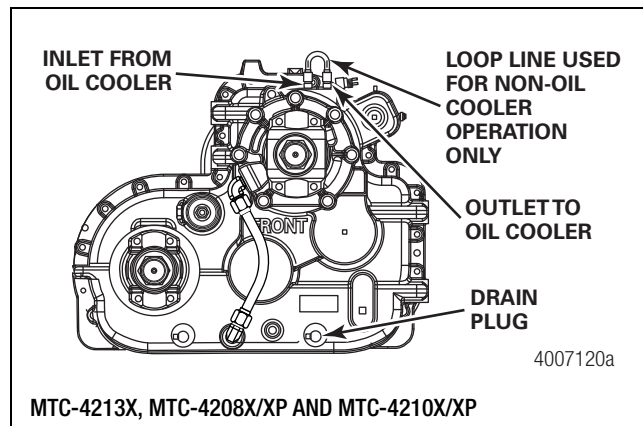
1. Use a suitable lifting device to move the transfer case from the repair stand to a suitable hydraulic roller jack. If used, remove the temporary eye-bolts and mounting brackets from the transfer case housing.
2. Move the transfer case into position under the vehicle with the hydraulic roller jack.
3. Install the transfer case into the vehicle with the mounting bolts. Tighten the bolts to the torque specification supplied by the vehicle manufacturer.
4. Connect the drivelines to the input and output yokes of the transfer case. Refer to the vehicle manufacturer's recommended procedure.
5. Connect any switch or speed sensor wiring.
6. Fill the transfer case with the correct quantity of specified lubricant. Refer to Section 10.

## Oil Cooler Line Connections for MTC-4213, or MTC-4208 and MTC-4210 with Oil Cooler

**NOTE:** There are different transfer case lubrication systems available. First, familiarize yourself with which model transfer case you have in order to identify cooler adaptation ports.

## MTC-4213, or MTC-4208 and MTC-4210 Models with PTO

1. Disconnect the loop line on top of the transfer case connecting the pump exit and return ports on the transfer case. Figure 8.1, Figure 8.2.



**Figure 8.1**

2. Install the cooler inlet and outlet lines.

## MTC-4208 and MTC-4210 with Rear-Mounted Pump

1. Disconnect the tube between the pump outlet and orificed elbow fitting at the front idler bearing port.
2. Install the cooler inlet line at the pump outlet. Connect the cooler outlet line to the front idler bearing orificed elbow. Figure 8.2 and Figure 8.3.



## 8 Installation

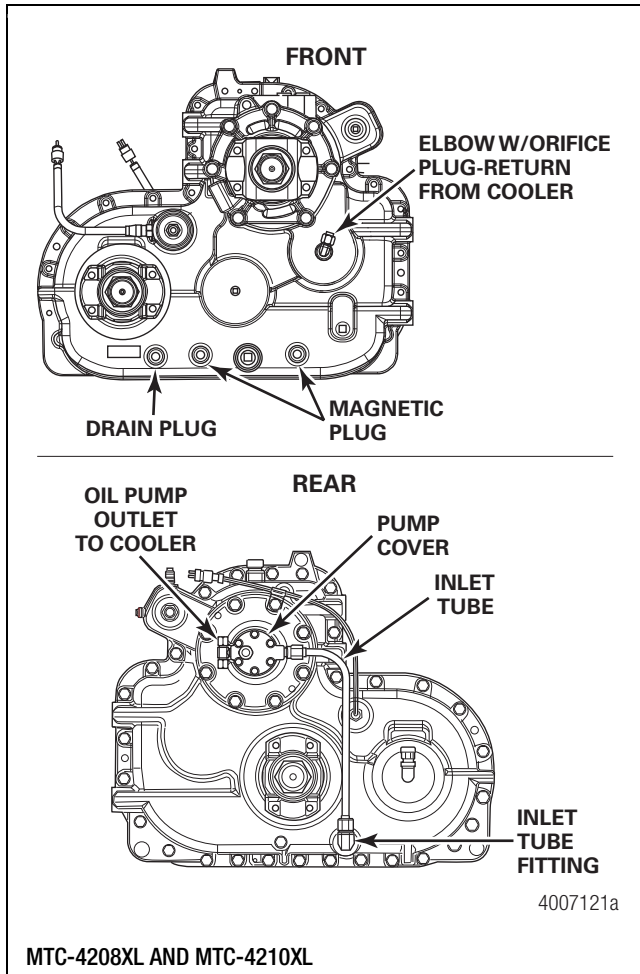


Figure 8.2

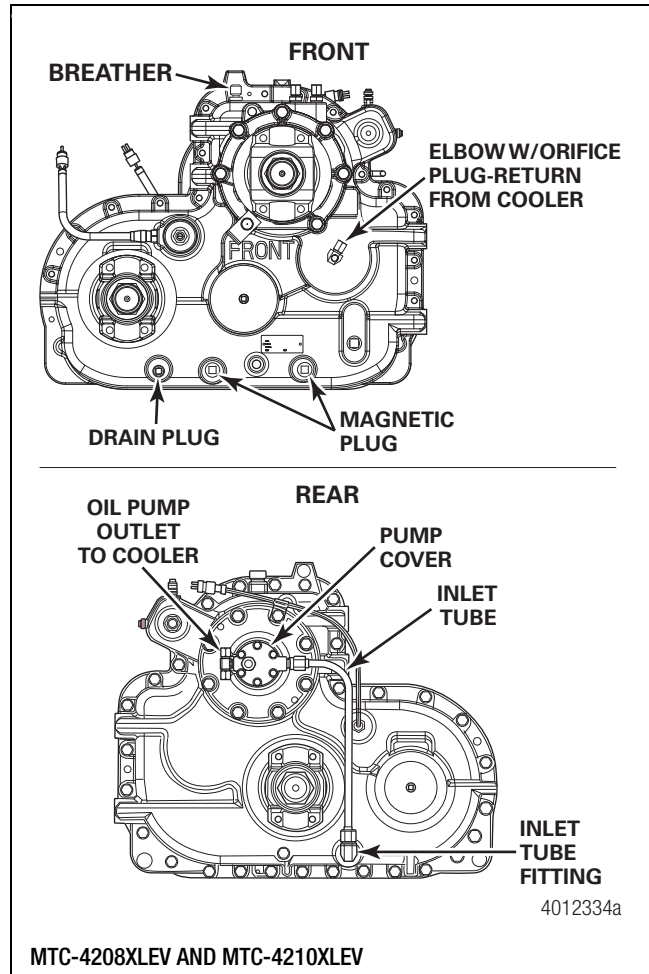




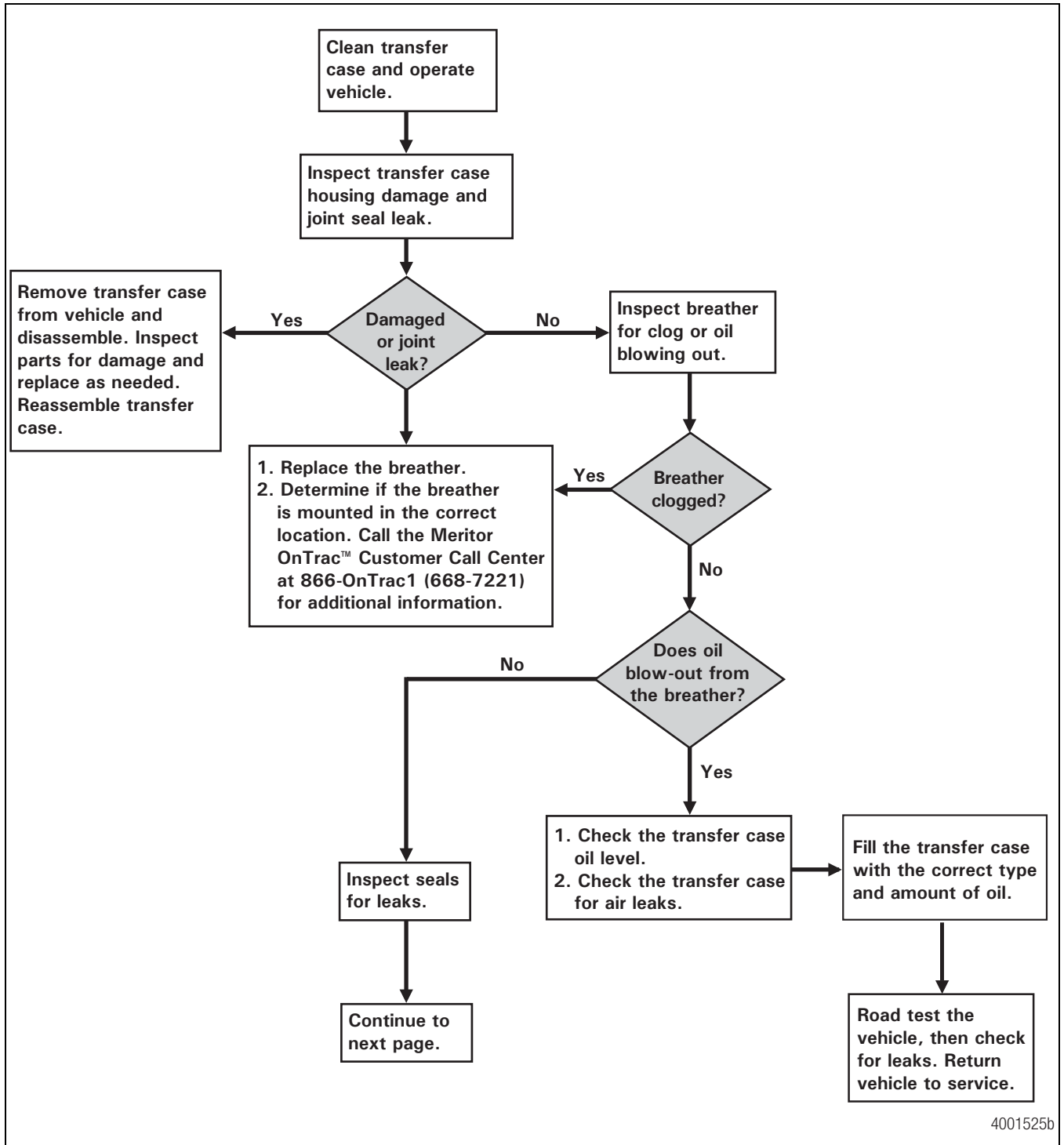
Figure 8.3

3. Connect the oil exit line JIC fitting to the transfer case. Tighten to 20 lb-ft (27.2 N•m). 
4. Connect the oil return line JIC fitting to the transfer case. Tighten to 20 lb-ft (27.2 N•m). 



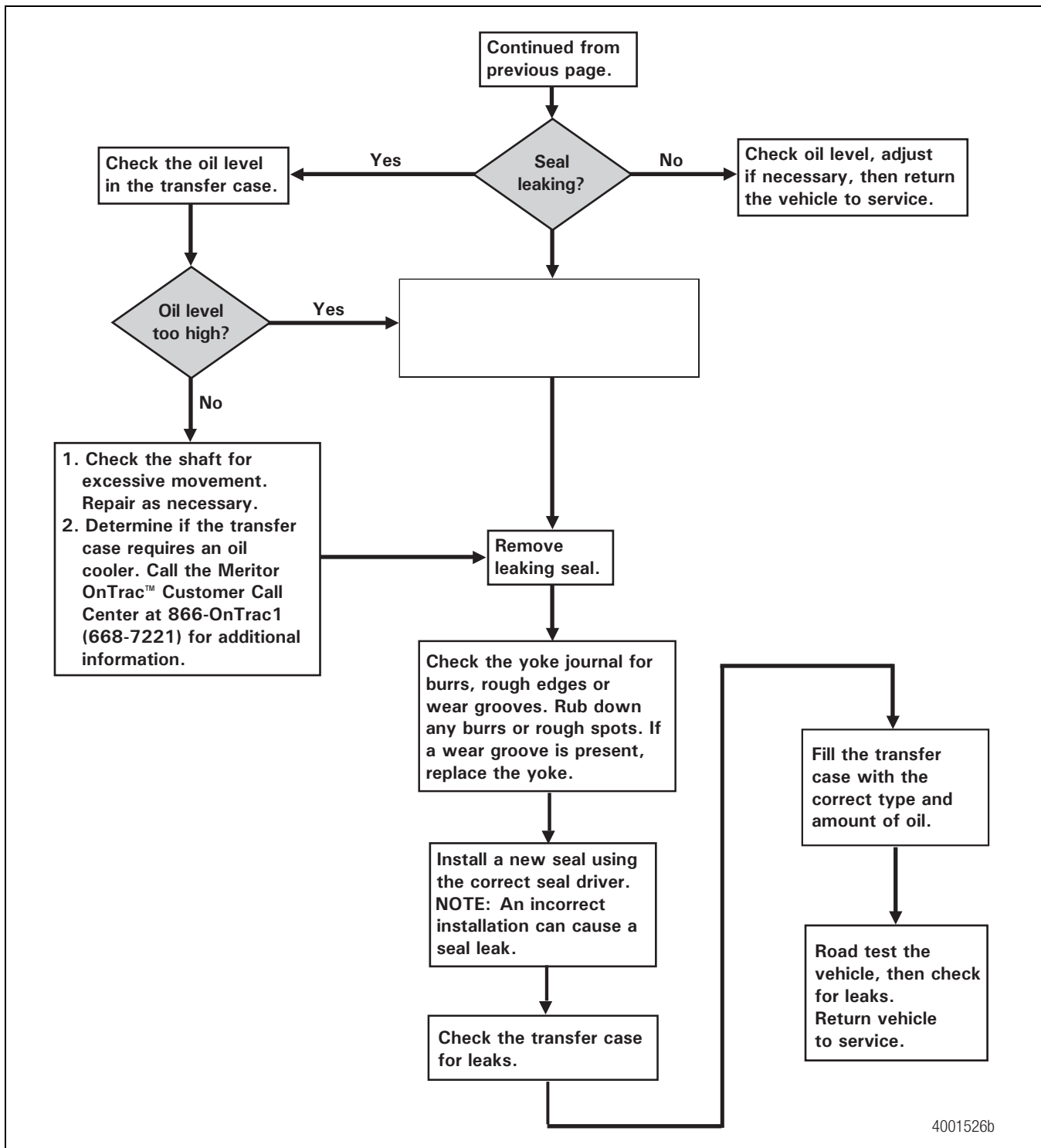
## Troubleshooting

### Transfer Case Lubrication Diagnostics



4001525b

Figure 9.1



4001526b

Figure 9.2

Excessive Noise and Vibration Diagnostics

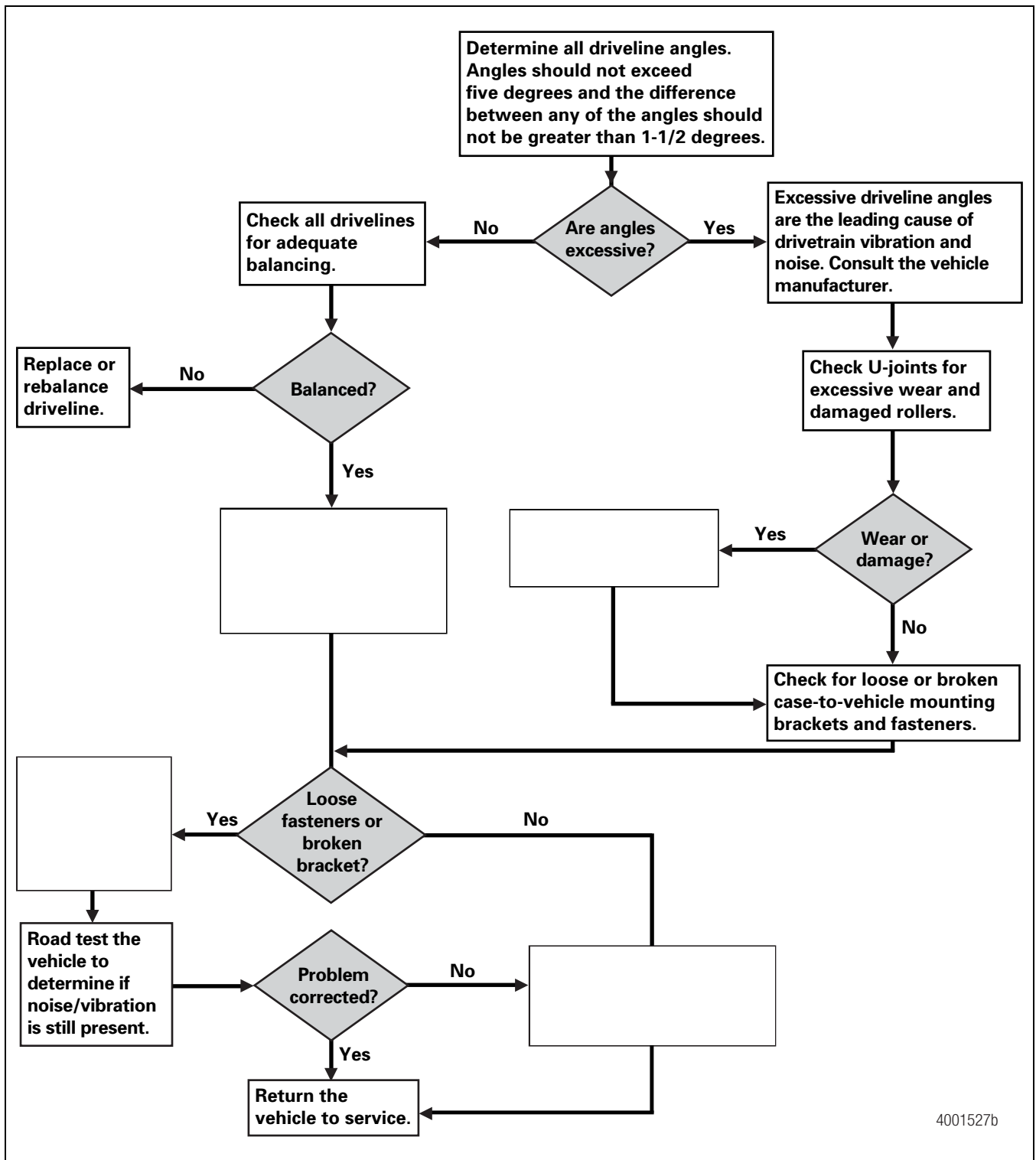


Figure 9.3

PTO Does Not Engage/Disengage Diagnostics

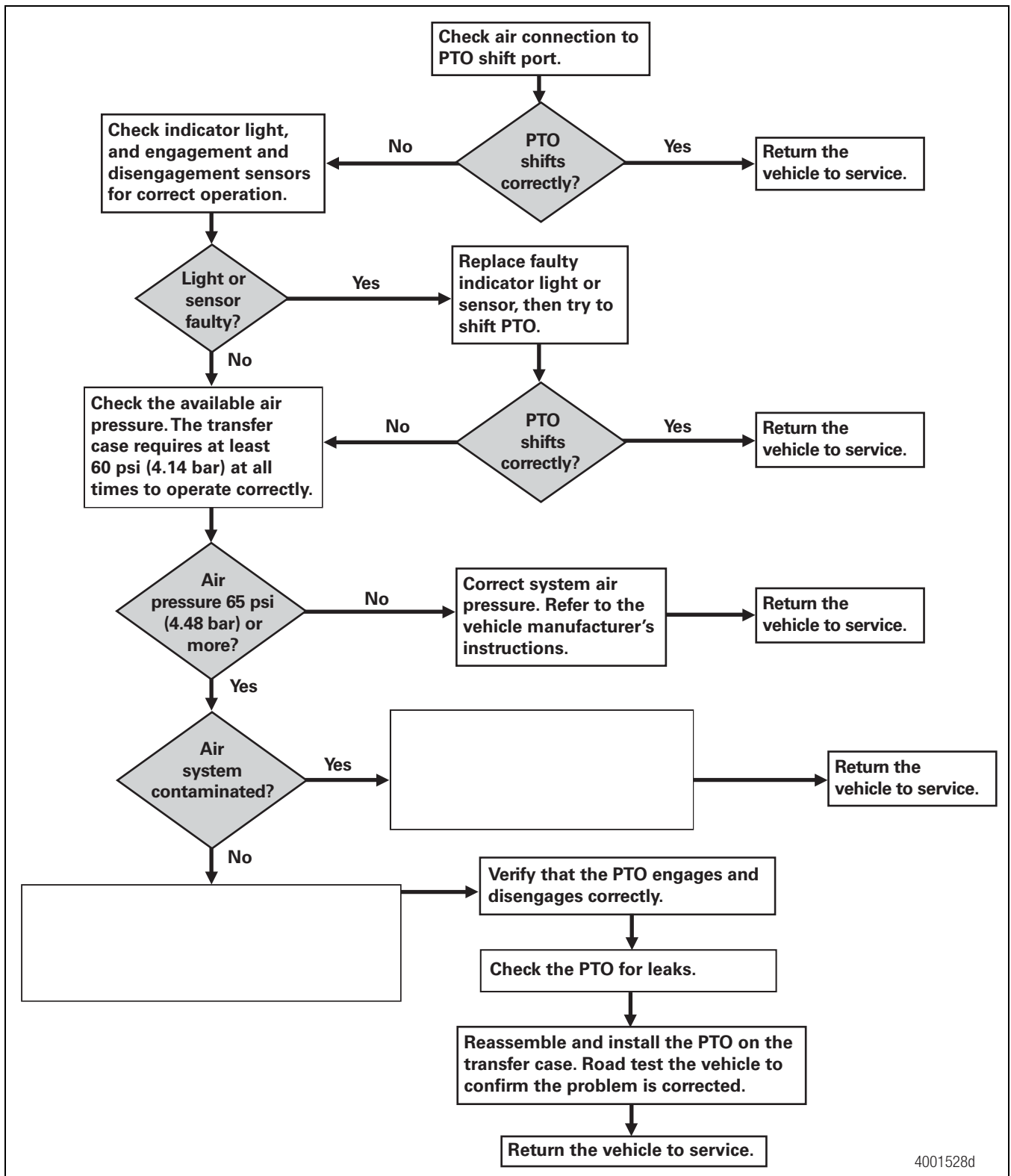


Figure 9.4

4001528d

Front Axle Declutch Does Not Engage/Disengage Diagnostics

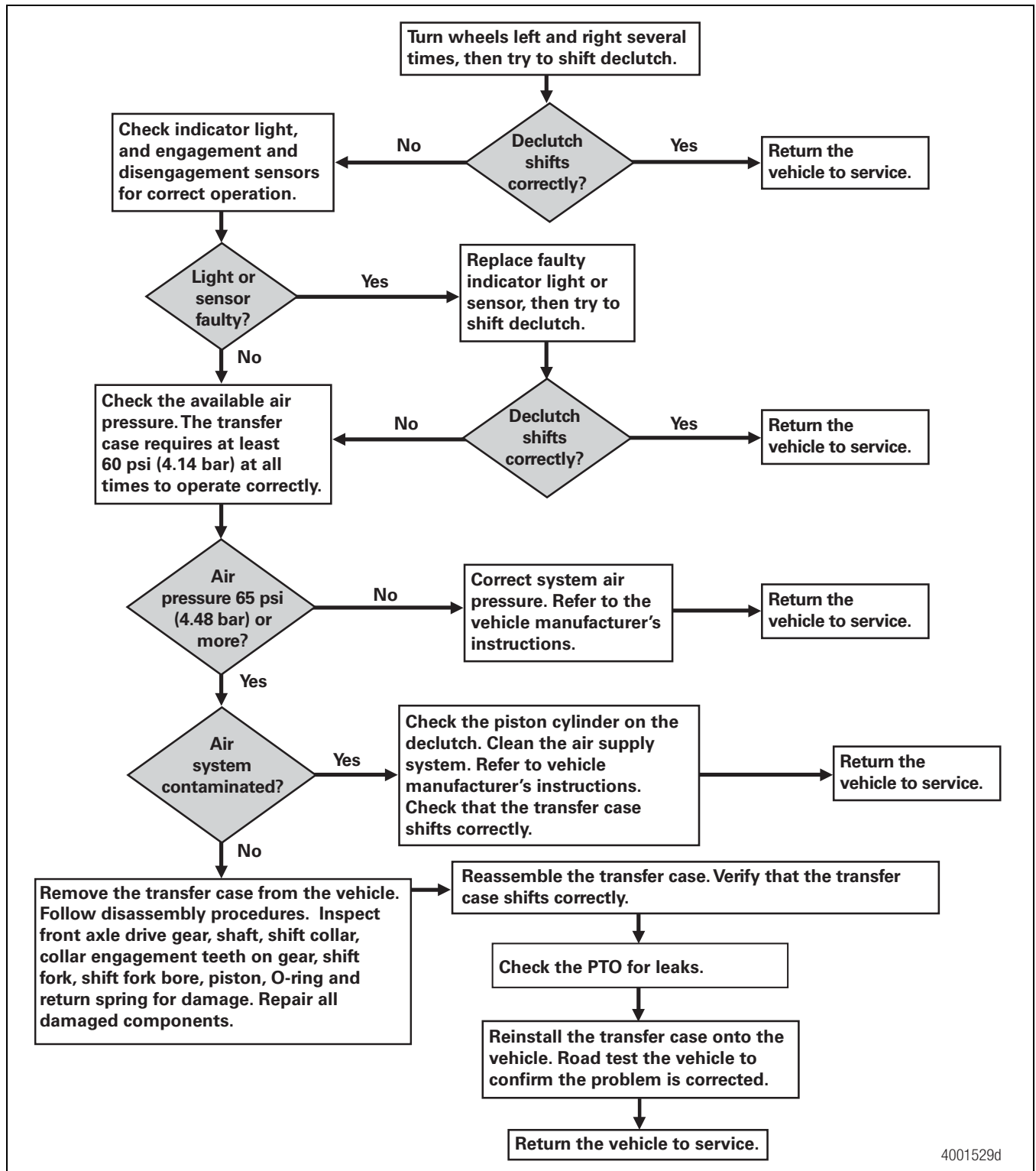
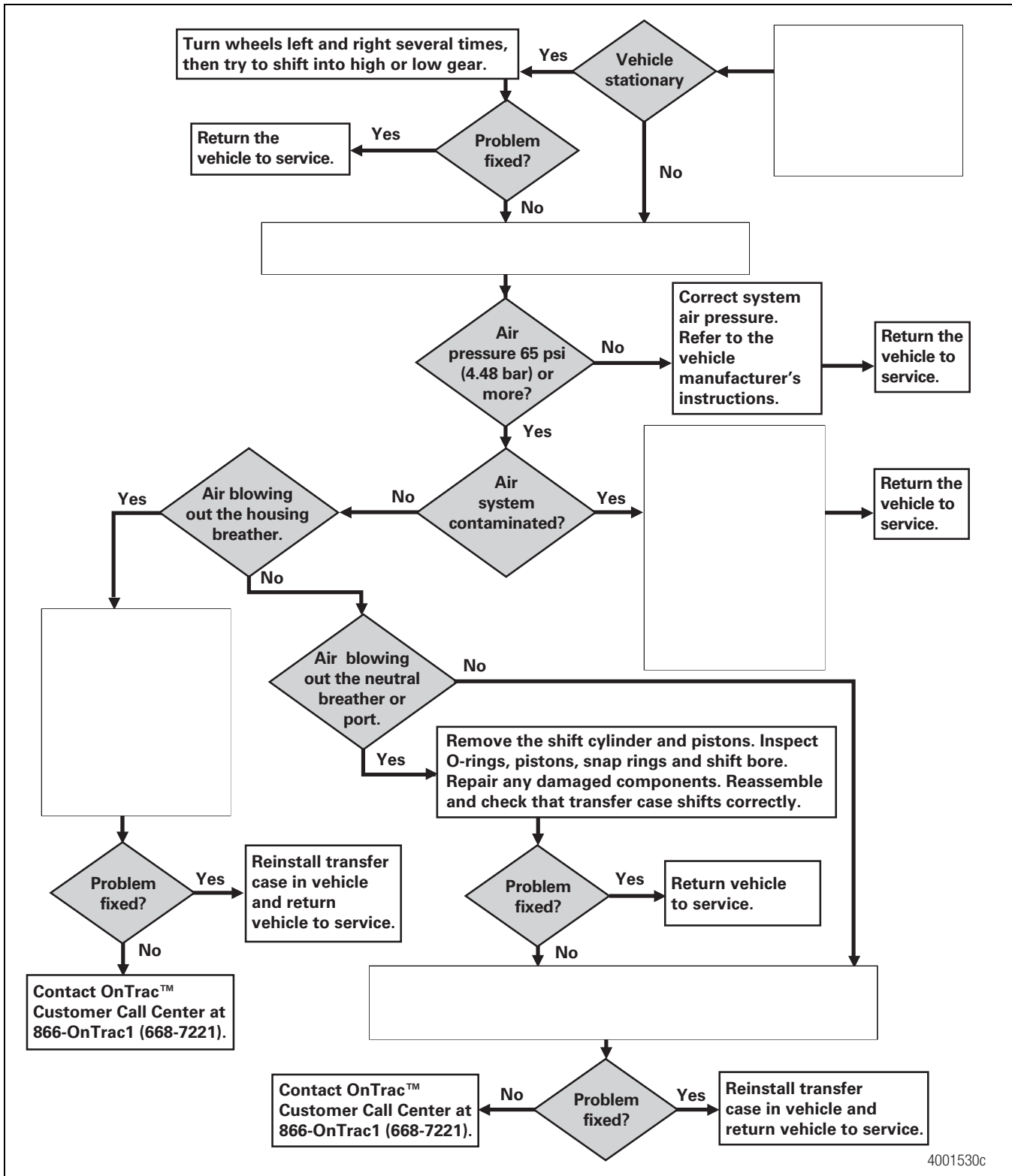


Figure 9.5

4001529d

High/Low Gear Shifting Diagnostics



4001530c

Figure 9.6

## Hazard Alert Messages

Read and observe all Warning and Caution hazard alert messages in this publication. They provide information that can help prevent serious personal injury, damage to components, or both.

### WARNING

To prevent serious eye injury, always wear safe eye protection when you perform vehicle maintenance or service.

## How to Obtain Additional Maintenance, Service and Product Information

For complete lubrication information for Meritor's transfer cases, refer to Maintenance Manual 1, Preventive Maintenance and Lubrication. To obtain a copy of this publication or access it on Meritor's website, refer to the Service Notes page on the inside front cover of this manual.

## Lubricant Temperatures

### Meritor MTC-4208, MTC-4210 and MTC-4213 Series Transfer Cases

#### CAUTION

Meritor MTC-4208, MTC-4210 and MTC-4213 Series transfer cases may operate with an oil temperature above 300°F (148°C). However, if the oil temperature reaches 350°F (177°C), stop the vehicle immediately. Check for the cause of overheating to prevent damage to components.

Meritor MTC-4208, MTC-4210 and MTC-4213 Series transfer cases may operate with an oil temperature above 300°F (148°C). However, if the oil temperature reaches 350°F (177°C), stop the vehicle immediately and check for the cause of overheating. Oil temperatures at this range should only occur in linehaul or utility applications that operate under high speed for long periods of time.

### Do Not Install API GL-5 Oils

#### CAUTION

Meritor does not approve petroleum-based and multiviscosity oil. Do not install API GL-5 oils, which contain extreme-pressure (EP) additives. These additives can form sludge at normal operating temperatures. Damage to components can result. Use only SAE Grade 50W synthetic oil in the transfer case.

Use only SAE Grade 50W oil, Meritor specification O-81, in the transfer case.

Do not install API GL-5 oils in a transfer case. This specification contains extreme pressure (EP) additives that can form sludge at normal operating temperatures and damage transfer case components.

## Petroleum-Base and Multi-Viscosity Oils

Meritor does not approve the use of petroleum-base and multi-viscosity motor oils. Refer to Maintenance Manual 1, Preventive Maintenance and Lubrication; or TP-90114, Transmission Lubricant Specifications, for a list of approved oils.

Meritor does approve the use of synthetic-base oils.

## Operating Information

### Magnets and Magnetic Drain Plugs

Most Meritor transfer cases are equipped with magnetic drain plugs with a minimum pick-up capacity of 20 ounces (0.57 kg) of low carbon steel. Replace the magnetic drain plug each time you change the oil. Use the correct part. If you use a pipe plug instead of a drain plug, the pipe plug will leak.

You can reuse a drain plug you removed if it has a minimum pick-up capacity of 20 ounces (0.57 kg) of low carbon steel after you clean it.

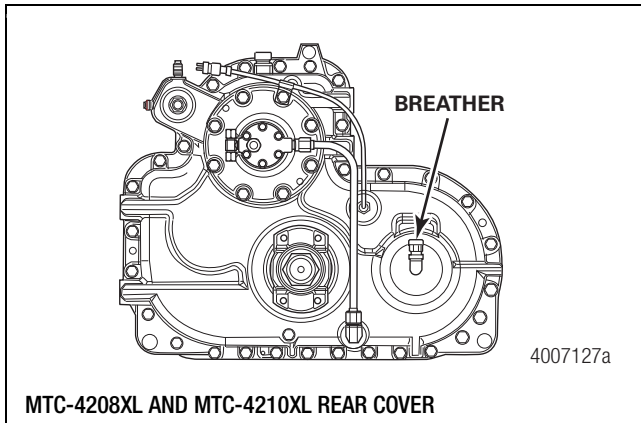
### Breather

#### CAUTION

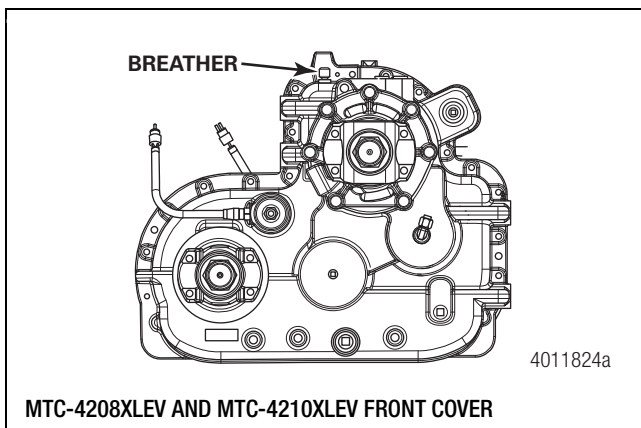
Cover the breather when steam cleaning the housing. If the breather is not covered, water can enter the housing and contaminate the oil.

The breather releases pressure that builds up inside the transfer case during vehicle operation. Figure 10.1, Figure 10.2 and Figure 10.3.

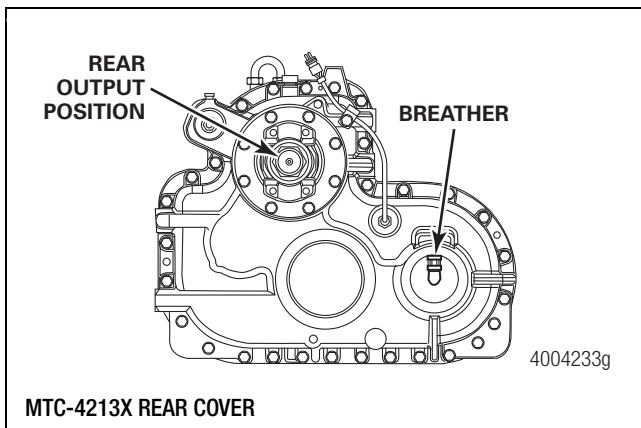




**Figure 10.1**



**Figure 10.2**



**Figure 10.3**

## Seals

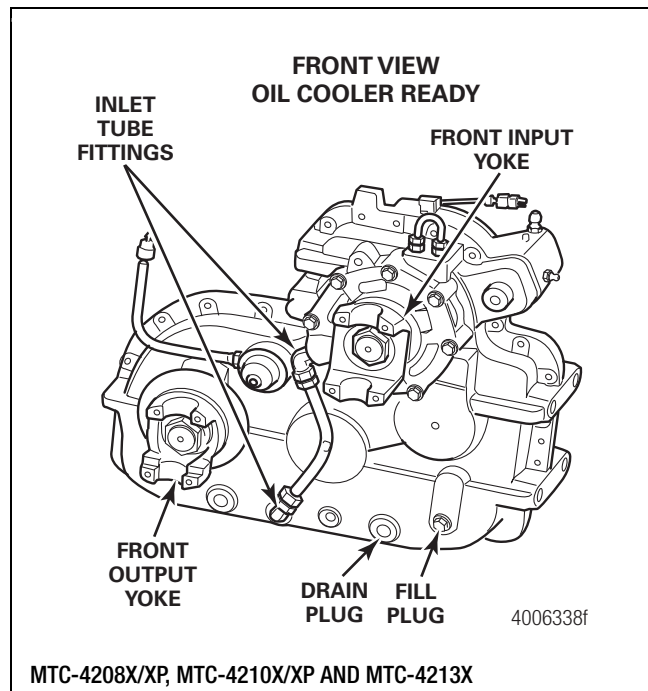
### ⚠ CAUTION

Always use the correct tools and procedures when you replace a seal. A seal that is not correctly installed can leak. Damage to components can result.

Seals keep lubricant in and dirt out of a component. When they are worn or damaged, seals leak and produce low lubricant levels which may damage components.

Always replace unitized seals after yokes have been removed. MLS seals may be reused if they are not damaged or leaking.

Meritor has released the multiple-lip seal (MLS) for use in the INPUT POSITION ONLY on the MTC-4208, MTC-4210 and MTC-4213 transfer cases. The multiple-lip seal is compatible with the current input shaft seal and can be used in service. Refer to Figure 10.4 for the INPUT position and front OUTPUT position. Refer to Figure 10.1 for the MTC-4208 and MTC-4210 rear OUTPUT position. Refer to Figure 10.3 for the MTC-4213 rear OUTPUT position.



**Figure 10.4**

## ⚠ CAUTION

Only install the Meritor multi-lip unidirectional seal at the input position from the transmission in an MTC-4208, MTC-4210 or MTC-4213 Series transfer case. If you install the multi-lip seal in either the rear output position or forward output position on these transfer cases, loss of lubricant and damage to components can occur.

The multiple-lip seal must be serviced with the seal and sleeve. The service part number provides both when required. Check your application carefully before installing the multiple-lip seal.

## Special Tools and Installation Procedure

Refer to Section 6 in this manual for the correct seal installation procedure. To obtain these sleeves, seals and drivers, call Meritor's Commercial Vehicle Aftermarket at 888-725-9355.

## Check and Adjust the Oil Level

### ⚠ CAUTION

Only use new lubricant when you change or adjust the oil in the transfer case. Do not reuse lubricant, which can contain metallic particles and other contaminants. Damage to components can result.

Meritor does not approve petroleum-based and multiviscosity oil. Do not install API GL-5 oils, which contain extreme-pressure (EP) additives. These additives can form sludge at normal operating temperatures. Damage to components can result. Use only SAE Grade 50W synthetic oil in the transfer case.

Do not operate the transfer case if the oil level is below the bottom of the fill hole, which may be an indication that the transfer case is leaking. Damage to components can result. If the transfer case is leaking, repair the leak. Adjust the oil level before returning the transfer case to service.

When servicing the transfer case, add the specified lubricant until the oil level is even with the bottom of the fill hole. Do not overfill the transfer case, which can cause the transfer case to overheat. Damage to components can result.

1. Park the vehicle on a level surface.
2. Ensure all of the transfer case oil has drained from the cooler lines into the transfer case sump.

3. Clean the area around the fill plug. Remove the fill plug from the transfer case. Figure 10.5. The oil level must be even with the bottom of the fill plug hole.
  - If oil flows from the hole when you loosen the plug: The oil level is high. Drain the oil to the bottom of the fill hole.
 

**NOTE:** Oil can drain back from the oil cooler, giving the appearance of an over full condition.
  - If the oil level is below the bottom of fill/level plug hole: Add SAE Grade 50W full-synthetic oil (Meritor specification O-81) into the transfer case until oil is even with the bottom of the fill hole.
4. Install and tighten the fill plug to 35-50 lb-ft (47-68 N•m). ⚠
5. Test drive the vehicle for at least one mile (1.6 km). Allow the oil to settle for five minutes and recheck the fluid level. Top off the oil level by adding oil to the fill opening. Reinstall and tighten the fill plug to 35-50 lb-ft (47-68 N•m). ⚠

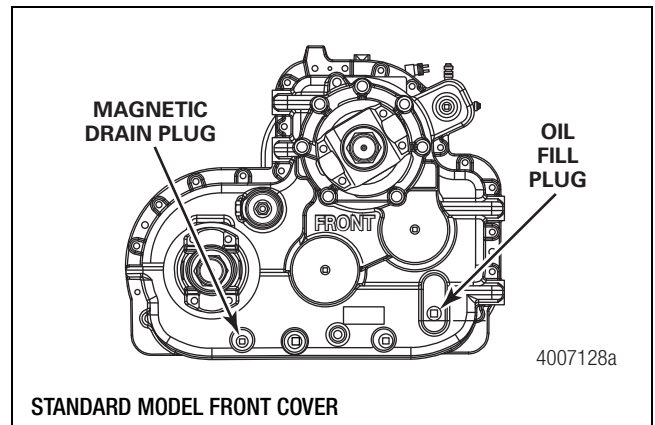




Figure 10.5

## Drain and Replace the Oil

1. Park the vehicle on a level surface. Place a large container under the transfer case.
2. Remove the magnetic drain plug from the bottom of the transfer case. Drain and discard the oil correctly. Clean the plug. Figure 10.5.
3. Install and tighten the drain plug to 35-50 lb-ft (47-69 N•m). Clean the area around the fill plug. Remove the fill plug from the transfer case. ⚠

## 10 Lubrication and Maintenance

4. Add SAE Grade 50W full-synthetic oil (Meritor specification O-81) into the transfer case until the oil level is even with the bottom of the fill plug hole. Install and tighten the fill plug to 35-50 lb-ft (47-68 N•m). 
5. Test drive the vehicle for at least one mile (1.6 km). Allow the oil to settle for five minutes and recheck the fluid level. Top off the oil level by adding oil to the fill opening. Reinstall and tighten the fill plug to 35-50 lb-ft (47-68 N•m). 

### Transfer Case Inspection

Visually inspect the transfer case daily for any leaks. The oil level should be inspected every 1,000 miles (1069 km), 100 hours or every month, whichever comes first. In addition, the transfer case should be inspected for leaks and the correct oil level before and after extended time high speed road trips. Areas to inspect are:

- Cooler lines and fittings
- Seals
- Breather
- Fill and drain plugs
- Pump inlet tube and fittings
- Gaskets and shims
- During the inspection visually check to ensure the transfer case oil level is to the bottom of the oil fill hole.

<b>Operation</b>	<b>Frequency</b>
Inspect for oil leaks	Daily
Check oil level	1,000 miles (1609 km), 100 hours or every month, whichever occurs first
Check oil level	Before and after extended time high speed road trips
Initial oil change	2,500 miles (4000 km) or 125 hours, whichever occurs first
Synthetic oil change	Every 25,000 miles (40 000 km), 1,250 hours or every 12 months, whichever occurs first

**Table F: Transfer Case Oil Specifications**

<u>Oil Description<sup>1 2</sup></u>	<u>Meritor Specification</u>	<u>A.P.I. Specification</u>	<u>Military Specification</u>	<u>SAE Grade</u>	<u>Outside Temperature</u>
Full Synthetic Oil <sup>3</sup>	0-81	—	—	50W	Above -40°F (-40°C)
A.P.I. GL-5 (Axle Lube) <sup>4</sup>	DO NOT USE IN TRANSFER CASES				

<sup>1</sup> Do not mix or switch oil types. Use the same oil that initially filled the transfer case.

<sup>2</sup> Do not use multi-viscosity oils.

<sup>3</sup> Meritor-approved full synthetic oil for Meritor manual transmissions is also approved for Meritor transfer cases. Refer to publication TP-90114, Transmission Lubricant Specifications, for a list of approved distributors.

<sup>4</sup> Do not use multi-viscosity (i.e., 80/90W) GL-5 Gear Oil, axle lube.

**Table G: Transfer Case Oil Capacities**

<u>Transfer Case Model</u>	<u>Oil Capacity<sup>1</sup></u>	
	<u>Without Oil Cooler, Pints (Liters)<sup>2</sup></u>	<u>With Oil Cooler, Pints (Liters)<sup>3</sup></u>
MTC-4208	14.0 (6.62)	16.0 (7.57)
MTC-4210	14.0 (6.62)	16.0 (7.57)
MTC-4208XLEV	12.0 (5.68)	12.0 (5.68)
MTC-4210XLEV	12.0 (5.68)	12.0 (5.68)
MTC-4213	15.0 (7.1)	17.0 (8.04)

**CAUTION:** Transfer case input speed requirements apply. Damage to the transfer case can occur if TP-0468 requirements are not followed.

<sup>1</sup> Due to the varied transfer case configurations, these fill quantities are for reference only. The fill procedure for all transfer cases is in this section.

<sup>2</sup> Speed requirements apply. See TP-0468.

<sup>3</sup> All oil-cooler equipped transfer cases will use additional oil to compensate for the cooler and cooler lines except for XLEV models.

**Table H: Dry Weight**

<u>Unit</u>	<u>Weight lbs (kg)</u>
Base Model	670 (304)
PTO	65 (29.5)

**Table I: Transfer Case Model**

<u>Transfer Case Model</u>	<u>Seal Position</u>	<u>Seal Service Part Number</u>	<u>Previous Seal Part Number</u>	<u>Seal Driver</u>	<u>Sleeve Driver</u>
MTC-4208, MTC-4210 and MTC-4213	Input Shaft	A1-1205X2728	A 1205R2592	2728T1	2728T2
MTC-4208 and MTC-4210	Forward and Rear Output	R945007	A 1205R2592	KIT 4454	NA
MTC-4213	Forward Output	R945007	A 1205R2592	KIT 4454	NA
MTC-4213	Rear Output	R945010	A 1205Q2591	KIT 4454	NA
MTC-4208 and MTC-4210	PTO Seal	R945008	A 1205P2590	KIT 4454	NA

# 11 Specifications

## Torque Specifications

### Standard MTC-4213X, MTC-4208XP and MTC-4210XP

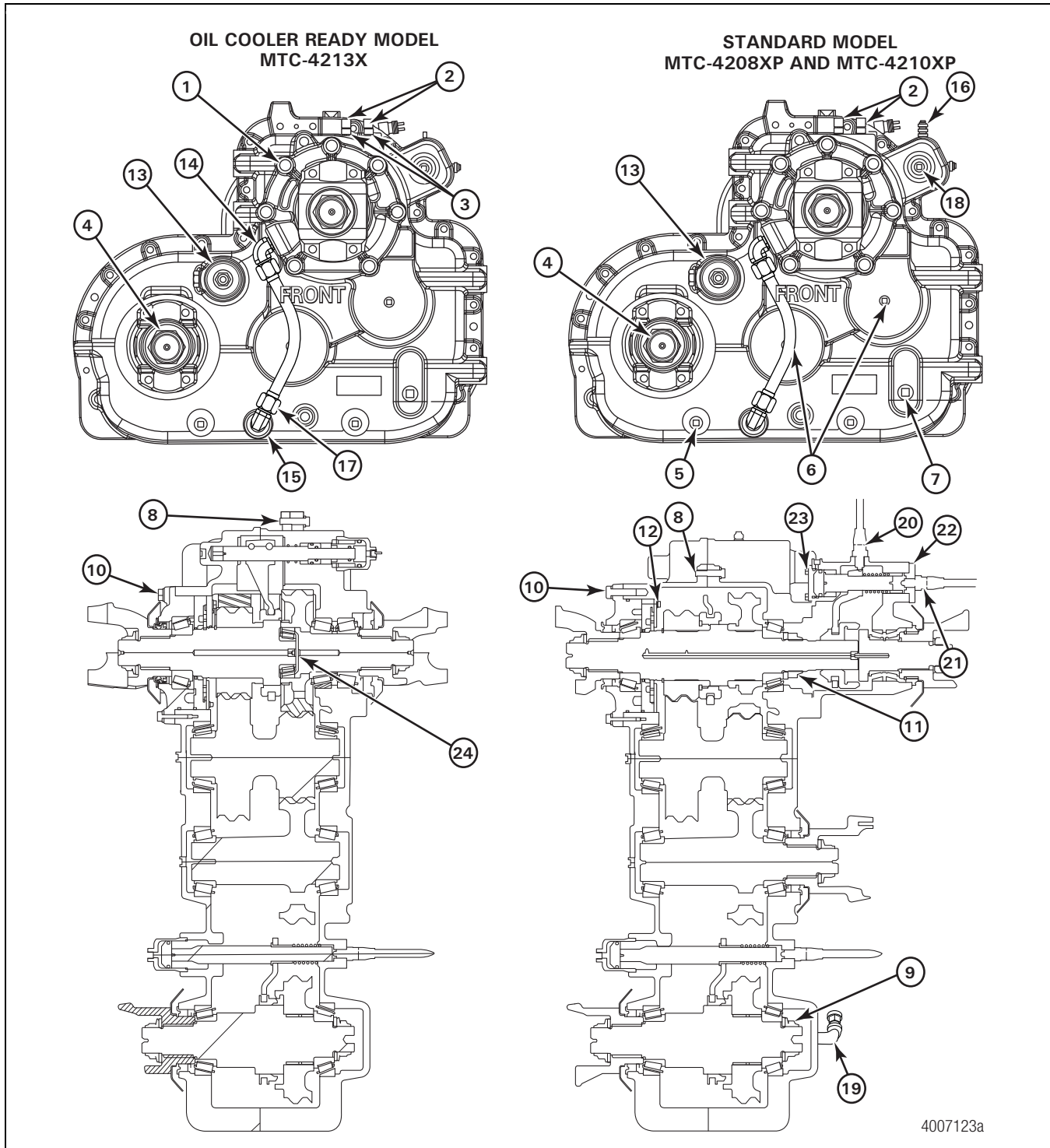


Figure 11.1

Item	Description	Torque lb-ft (N•m)
1	Bearing Cage Cover Capscrews	85-115 (115-156)
2	Loop Tube Fittings	20 (27)
3	Oil Cooler Male Connectors <sup>1</sup>	25 (34)
4	Yoke Locknuts	700-900 (949-1220)
5	Magnetic Drain Plug <sup>2</sup>	35-50 (48-68)
6	3/8-Inch (9.5 mm) Plug <sup>2</sup>	20 (27)
7	Fill Plug <sup>2</sup>	35 (48)
8	Cover-to-Case Capscrews	60-75 (81-102)
9	Shaft Locknut	700-900 (949-1220)
10	Bearing Cage Capscrews	85-115 (115-156)
11	Shaft Locknut	700-900 (949-1220)
12	Oil Pump Capscrews <sup>3</sup>	22-29 (29-39)
13	Shift Cylinders <sup>4</sup>	80-100 (108-136)
14	Male Connector	35 (49)
15	Fitting — Screen	35-50 (48-68)
16	Neutral Breather/Bushing	10 (14)
17	Female Connector	25 (34)
18	3/8-Inch (9.5 mm) Plug <sup>2</sup>	20 (27)
19	Elbow <sup>2</sup>	20 (27)
20	Fitting	25-30 (34-41)
21	Fitting	25-30 (34-41)
22	Capscrews	10-13 (14-18)
23	Capscrews	10-13 (14-18)
24	Restrictor Plug <sup>2</sup>	15 (20)

<sup>1</sup> Apply Loctite® 582 threadlocker to pipe threads.

<sup>2</sup> Apply Loctite® 592 threadlocker.

<sup>3</sup> Apply Loctite® 242 threadlocker.

<sup>4</sup> Apply Loctite® 518 threadlocker to the first three threads.

# 11 Specifications

## Standard MTC-4208X/XL/XLEV and MTC-4210X/XL/XLEV

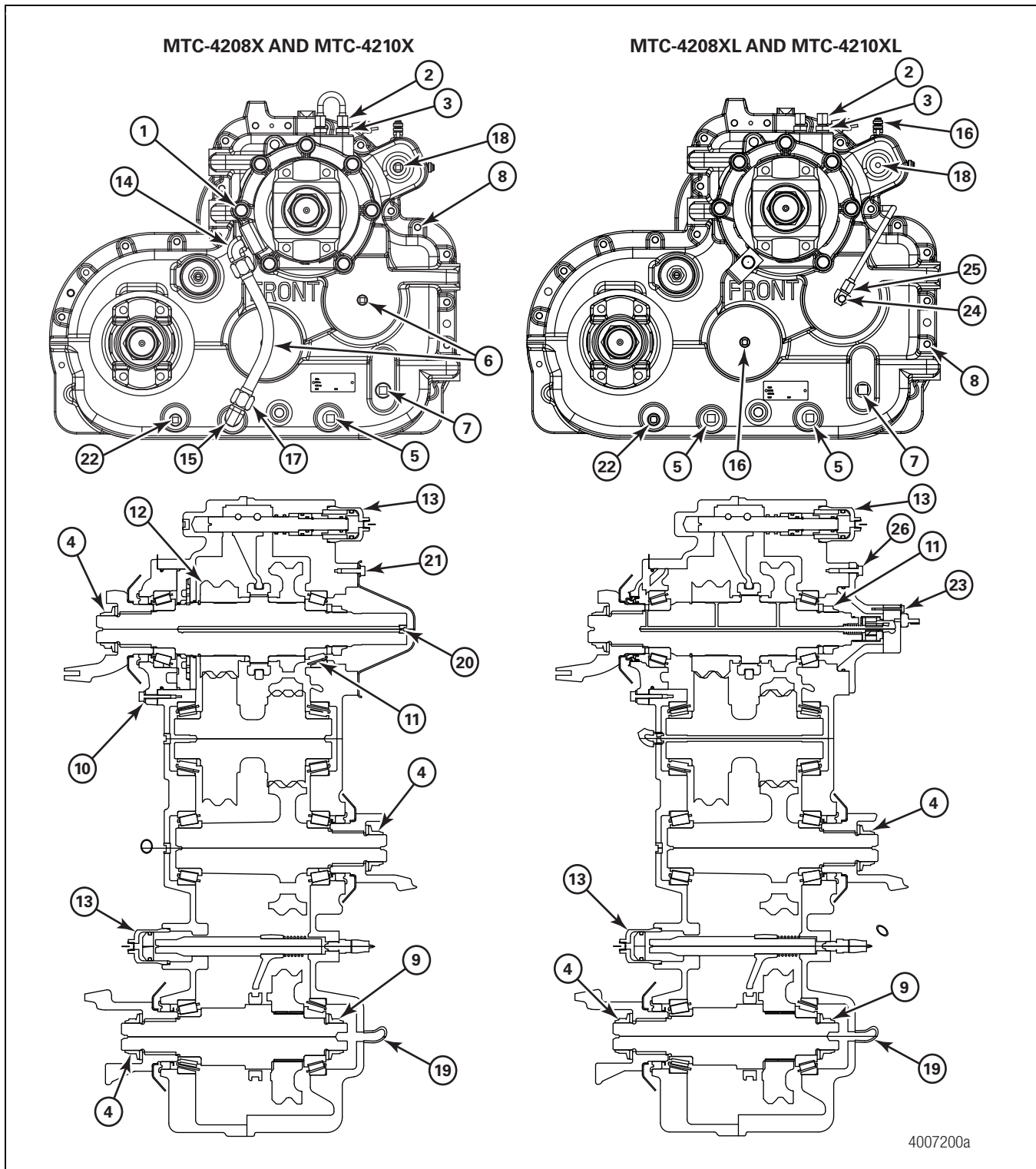
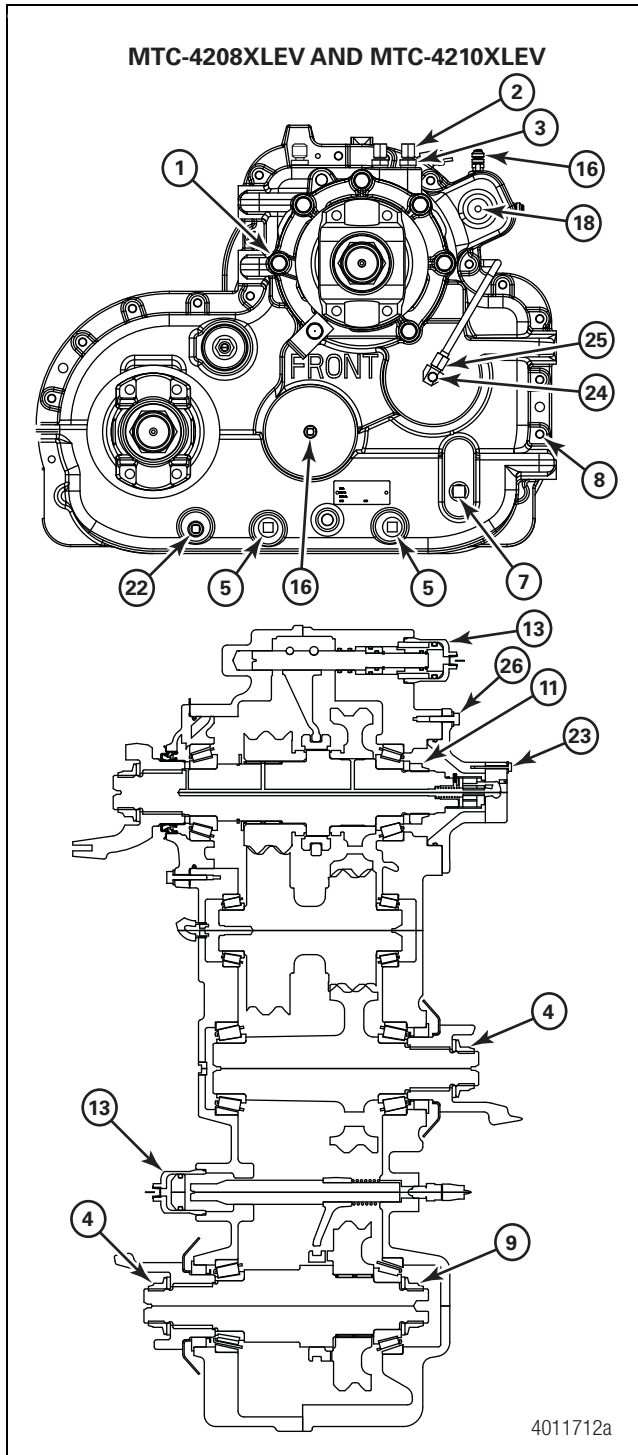


Figure 11.2





**Figure 11.3**

Item	Description	Torque lb-ft (N•m)
1	Bearing Cage Cover Capscrews	85-115 (115-156)
2	Loop Tube Fittings	20 (27)
3	Loop Tube Connectors <sup>1</sup>	25 (34)
4	Yoke Locknuts	700-900 (949-1220)
5	Magnetic Drain Plug <sup>2</sup>	35-50 (48-68)
6	3/8-Inch (9.5 mm) Plug <sup>2</sup>	20 (27)
7	Fill Plug <sup>2</sup>	35 (48)
8	Cover-to-Case Capscrews	60-75 (81-102)
9	Shaft Locknut	700-900 (949-1220)
10	Bearing Cage Capscrews	85-115 (115-156)
11	Shaft Locknut	700-900 (949-1220)
12	Oil Pump Capscrews <sup>3</sup>	22-29 (29-39)
13	Shift Cylinders <sup>4</sup>	80-100 (108-136)
14	Male Connector	35 (49)
15	Fitting — Screen	35-50 (48-68)
16	Neutral Breather/Bushing	10 (14)
17	Female Connector	25 (34)
18	3/8-Inch (9.5 mm) Plug <sup>2</sup>	20 (27)
19	Elbow <sup>2</sup>	20 (27)
20	Restrictor Plug <sup>2</sup>	15 (20)
21	7/16 x 1.75 PTO Cover Capscrews	60-75 (81-102)
22	Plug	25 (34)
23	Oil Pump Cover Capscrews <sup>3</sup>	10-13 (14-18)
24	Elbow	20 (27)
25	Connector	20 (27)
26	Pump Housing Capscrews	60-75 (81-102)

<sup>1</sup> Apply Loctite® 582 threadlocker to pipe threads.

<sup>2</sup> Apply Loctite® 592 threadlocker.

<sup>3</sup> Apply Loctite® 242 threadlocker.

<sup>4</sup> Apply Loctite® 518 threadlocker to the first three threads.

## 12 Vehicle Towing Instructions

### Guidelines

#### CAUTION

Follow towing procedures recommended by Meritor to prevent internal damage to the transfer case.

Meritor recommends that you use one of the two methods below when towing a vehicle equipped with an MTC-4208, MTC-4210 or MTC-4213 transfer case to prevent damage to the transfer case.

**NOTE:** For complete towing information and instructions on axle shaft removal, refer to Technical Bulletin TP-9579, Driver Instruction Kit.

#### Method 1

Remove both axle shafts from the axles that will remain on the road when the vehicle is transported.

#### Method 2

Remove the drive shafts from axles that contact the ground.

Tool Drawings

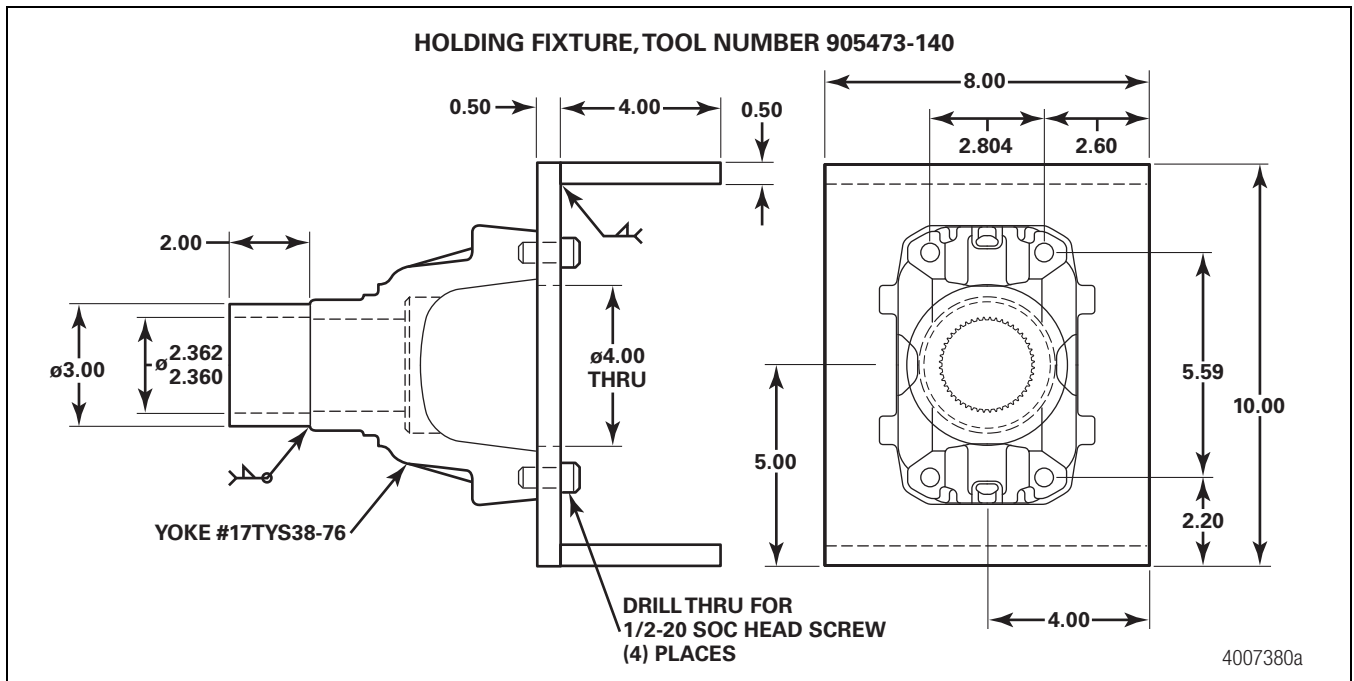


Figure 13.1

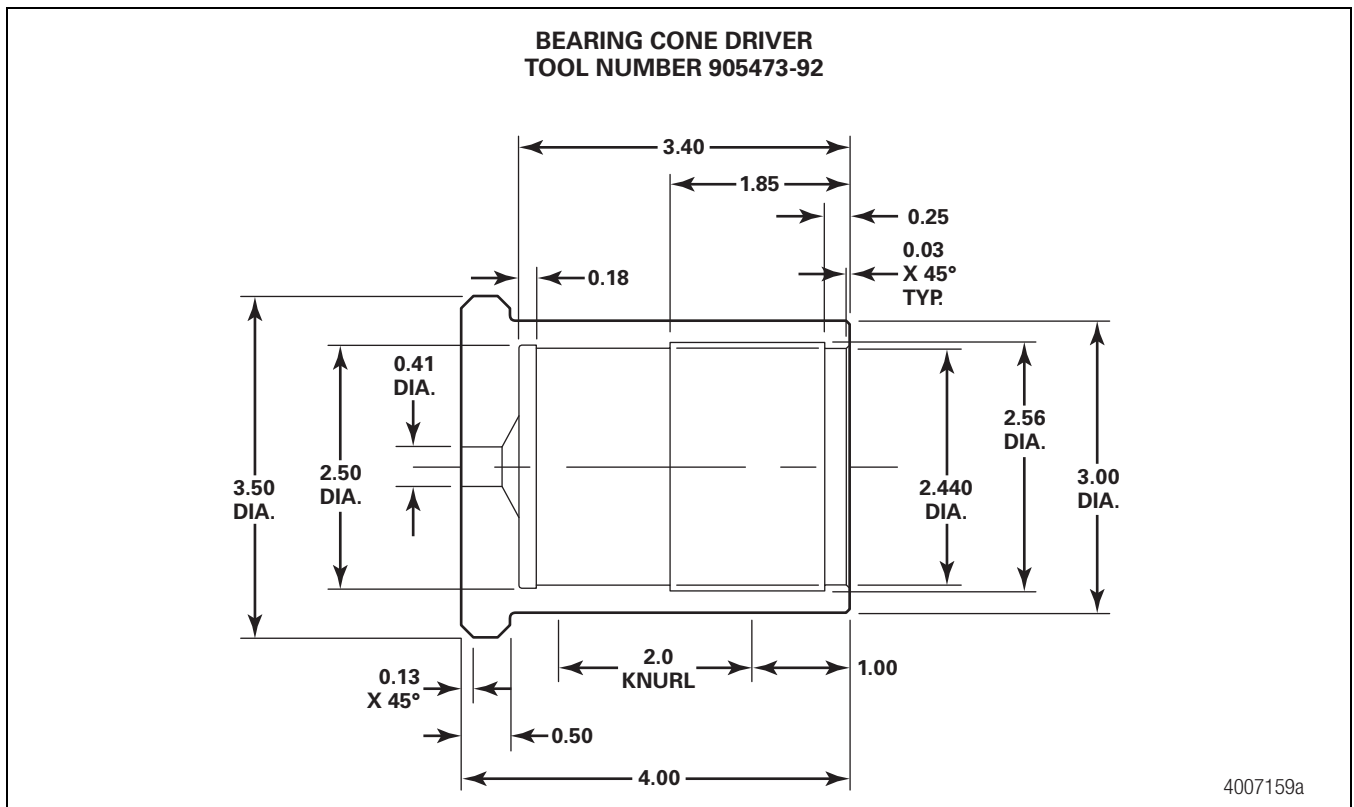


Figure 13.2

# 13 Special Tools

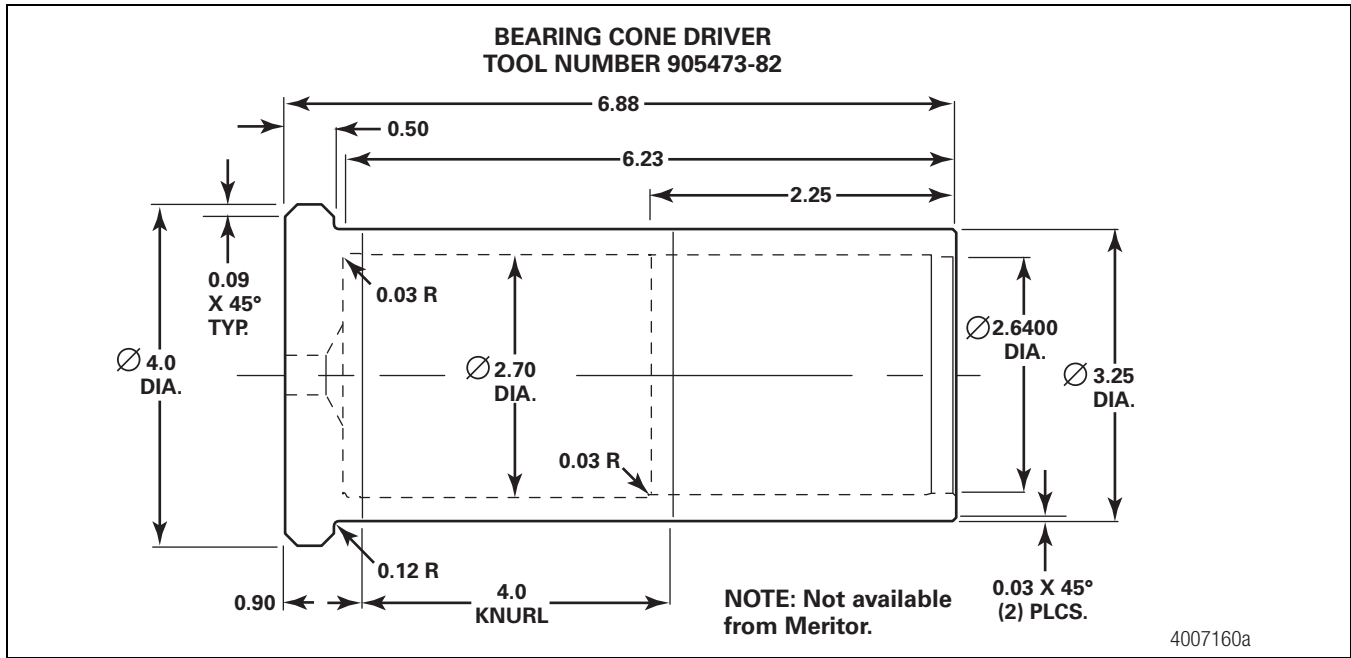


Figure 13.3

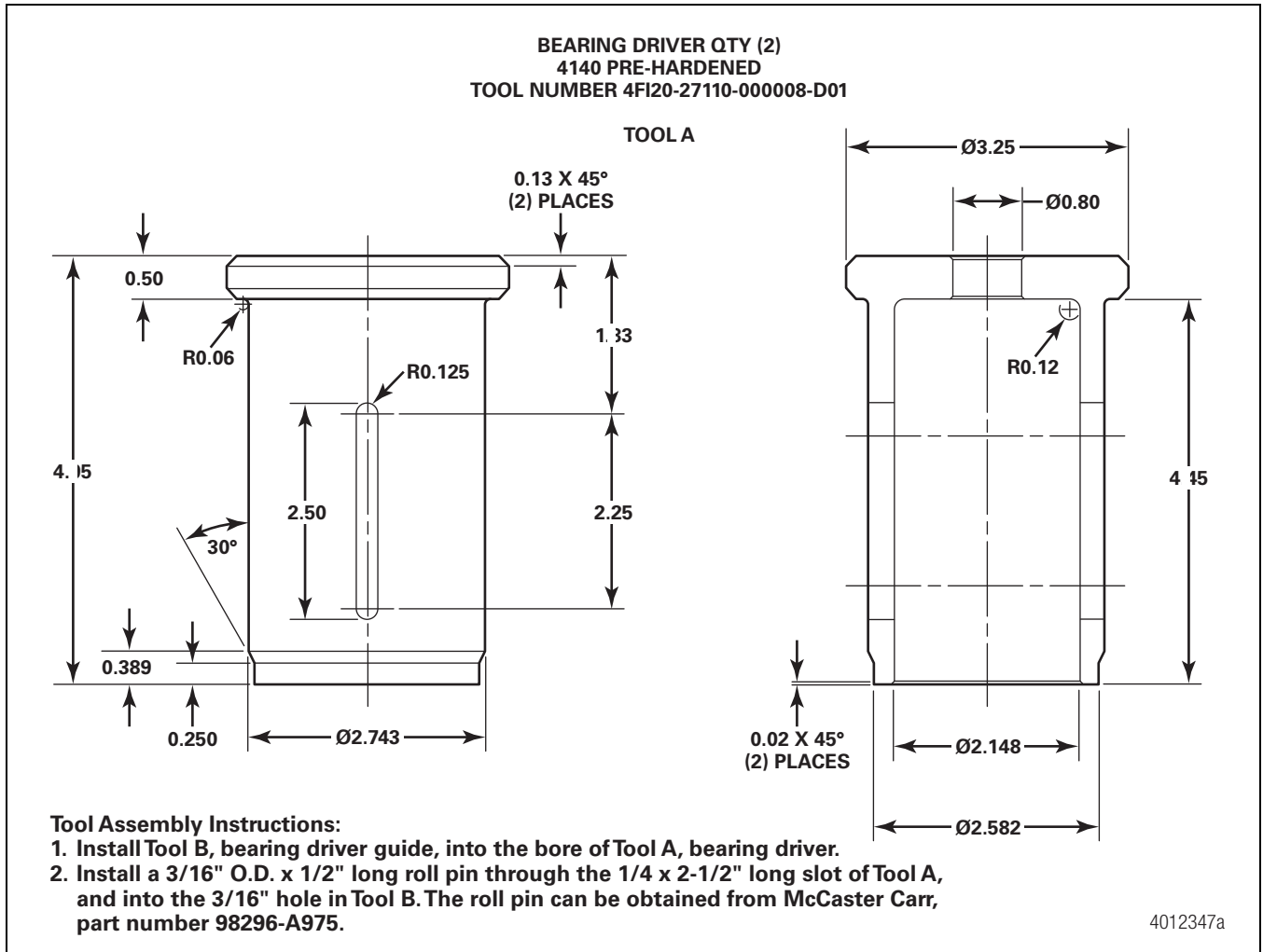
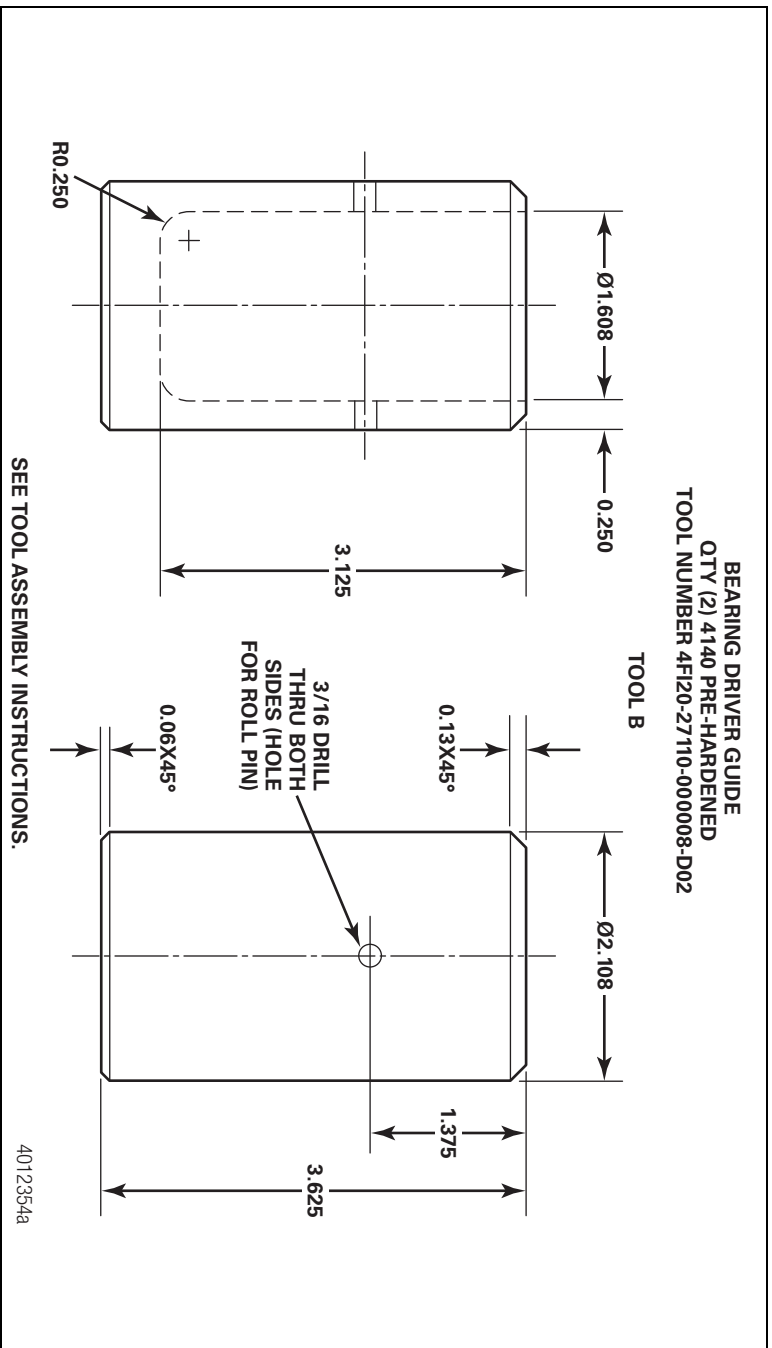
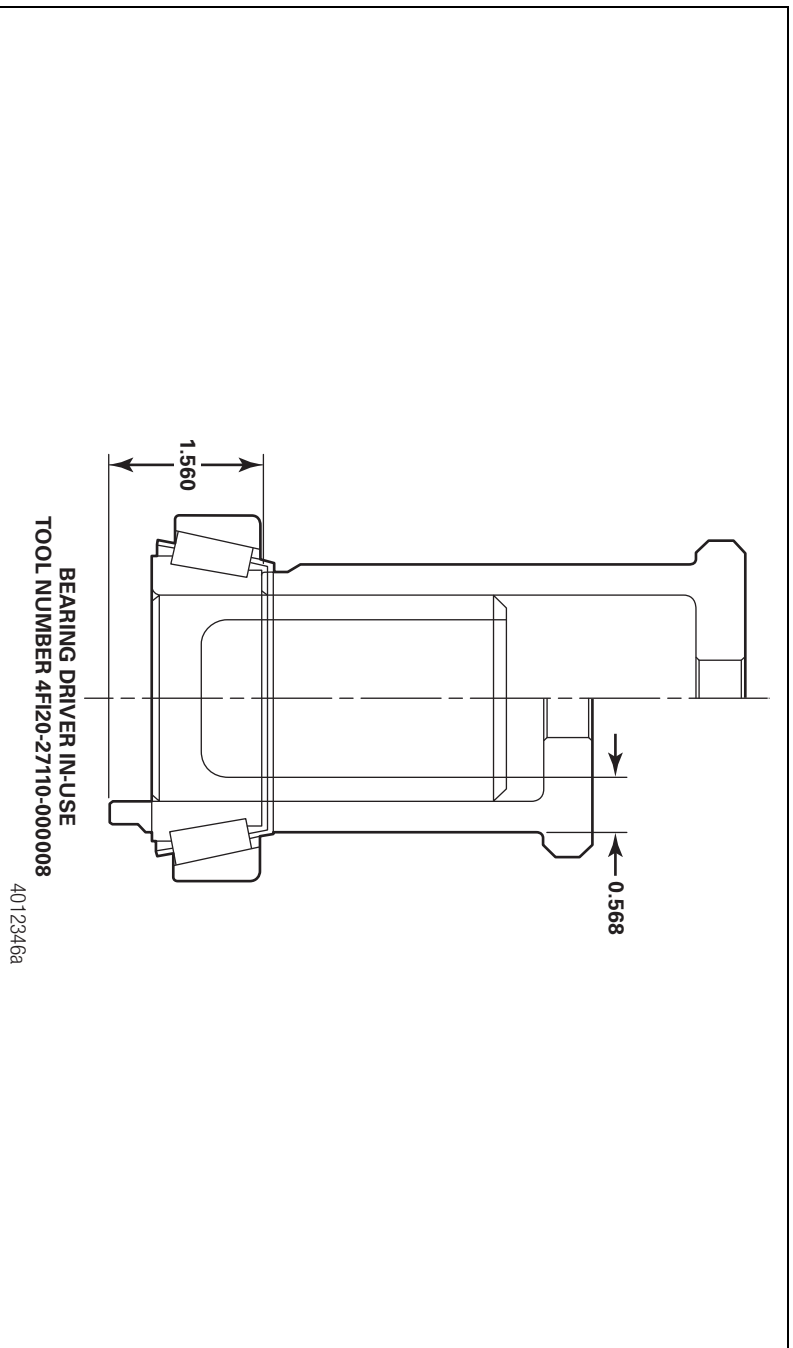


Figure 13.4



**Figure 13.5**



**Figure 13.6**

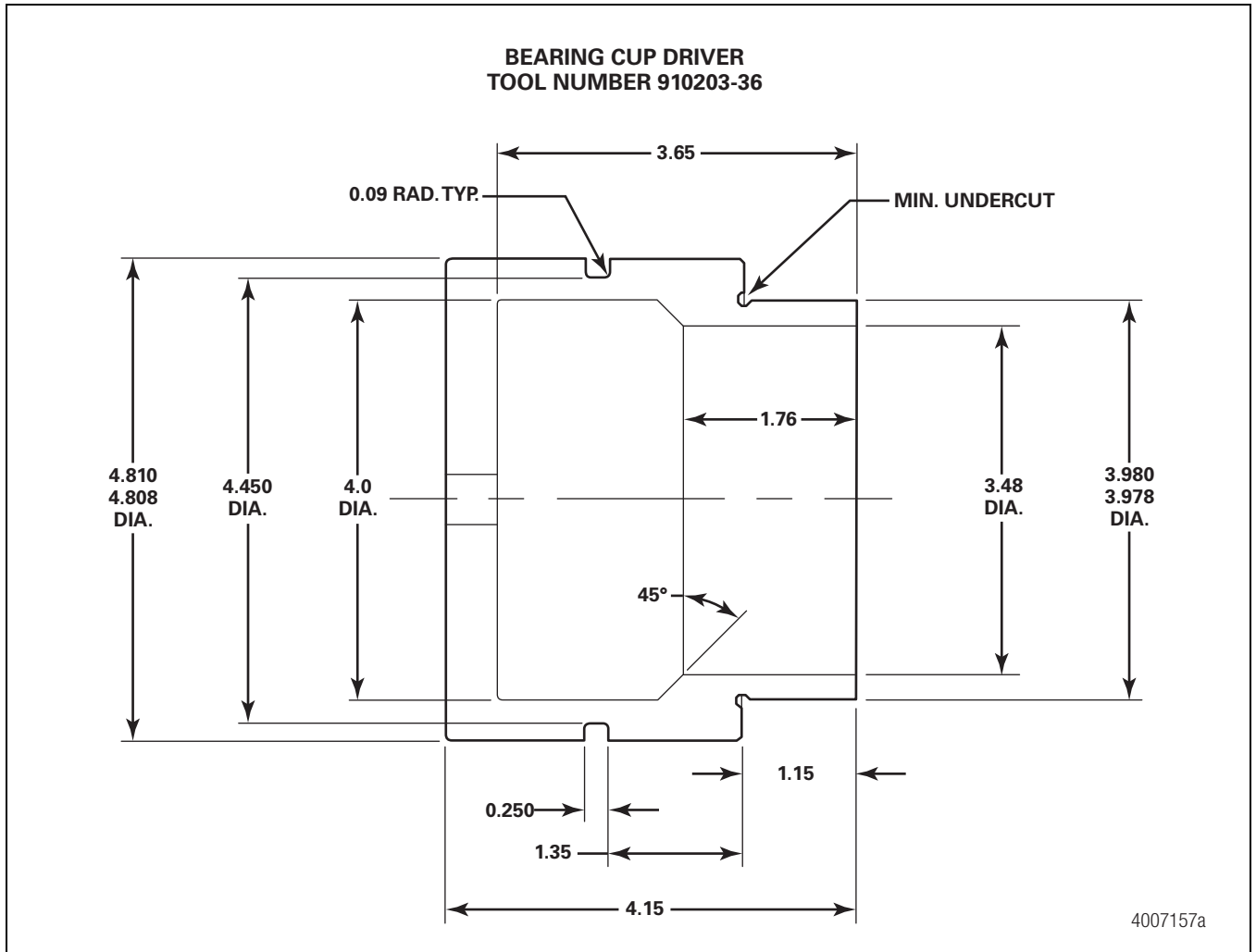
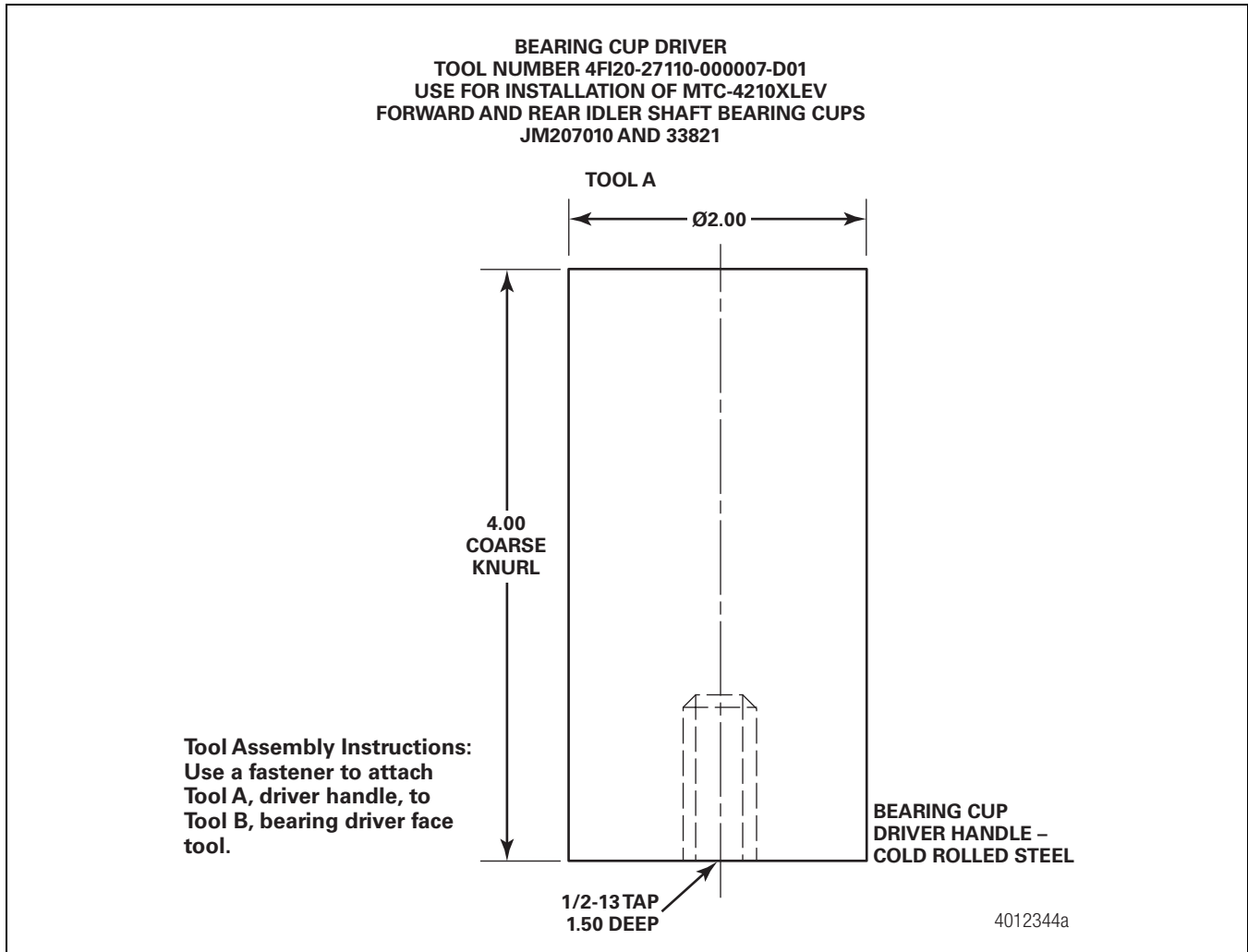


Figure 13.7



# 13 Special Tools



**Figure 13.8**

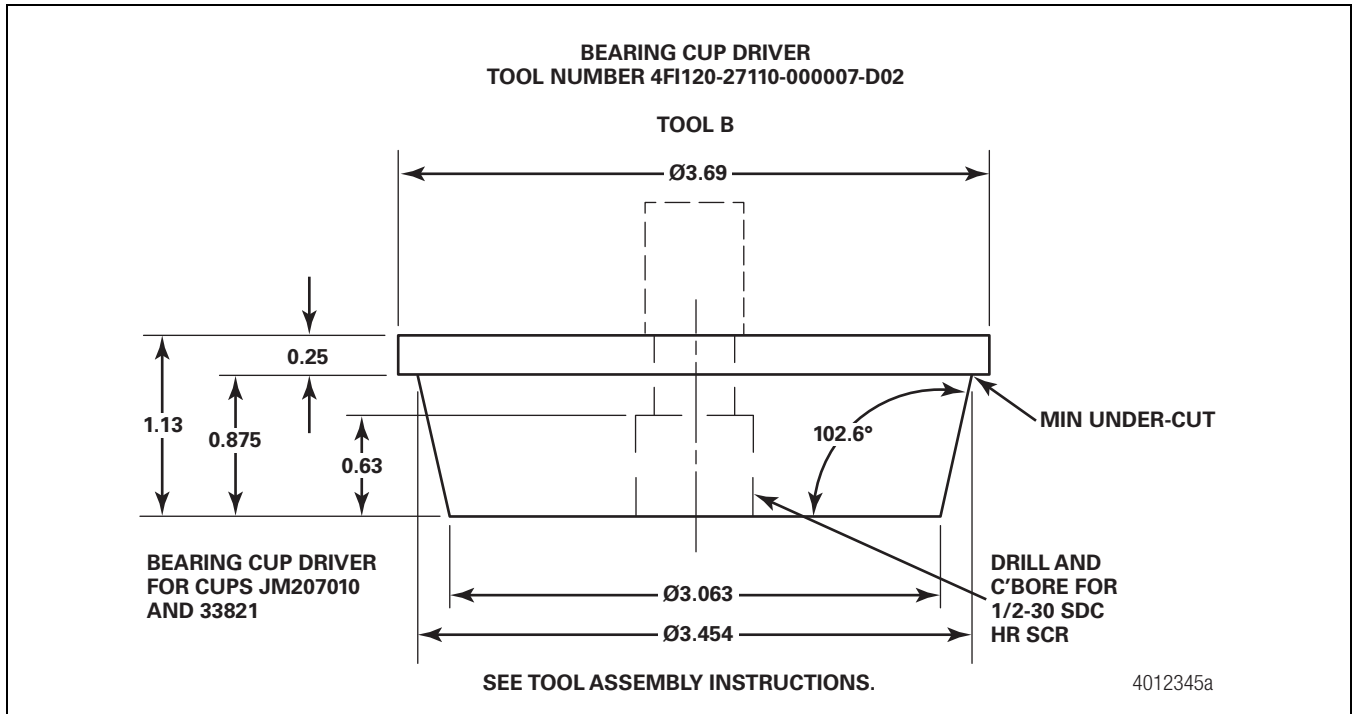
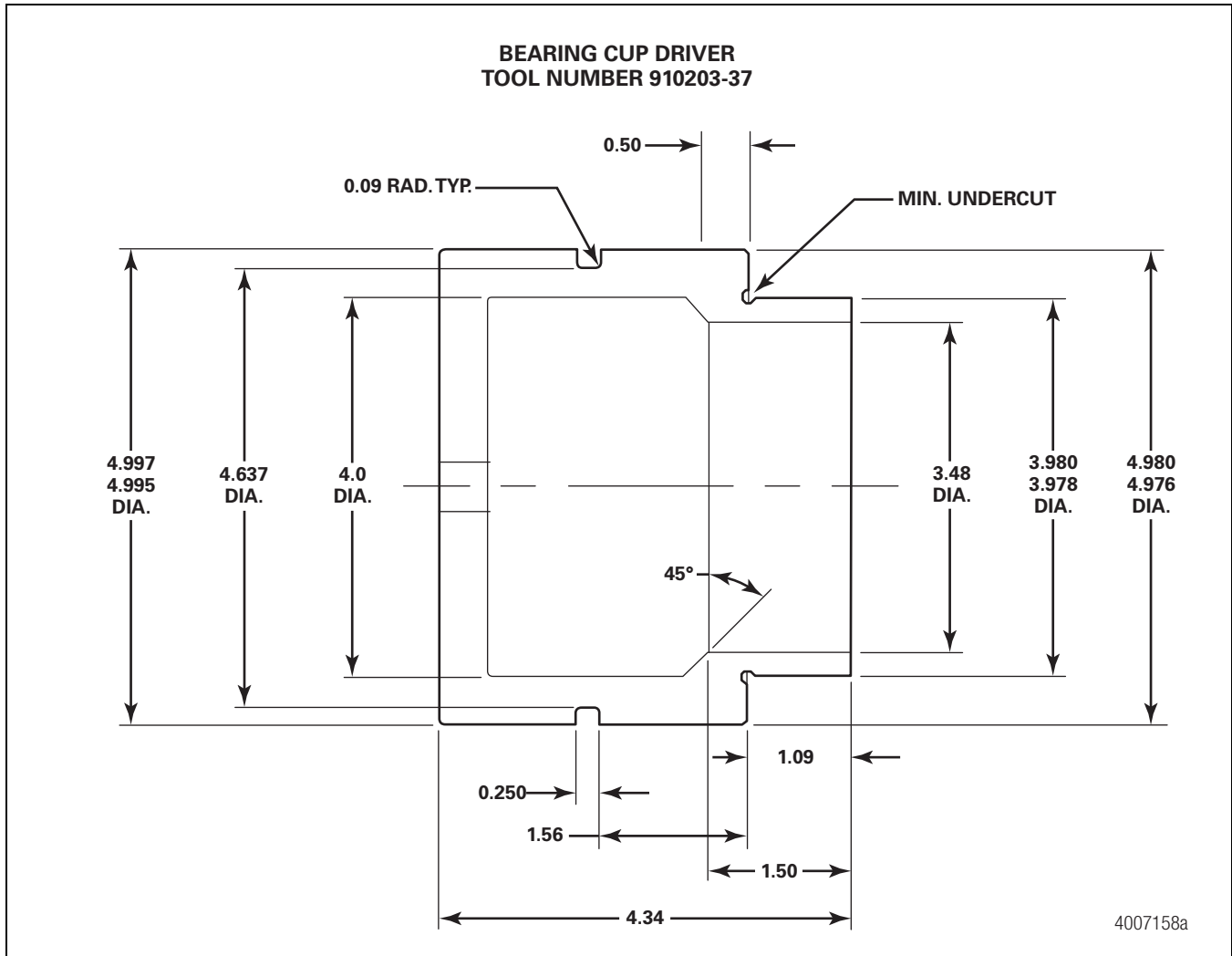
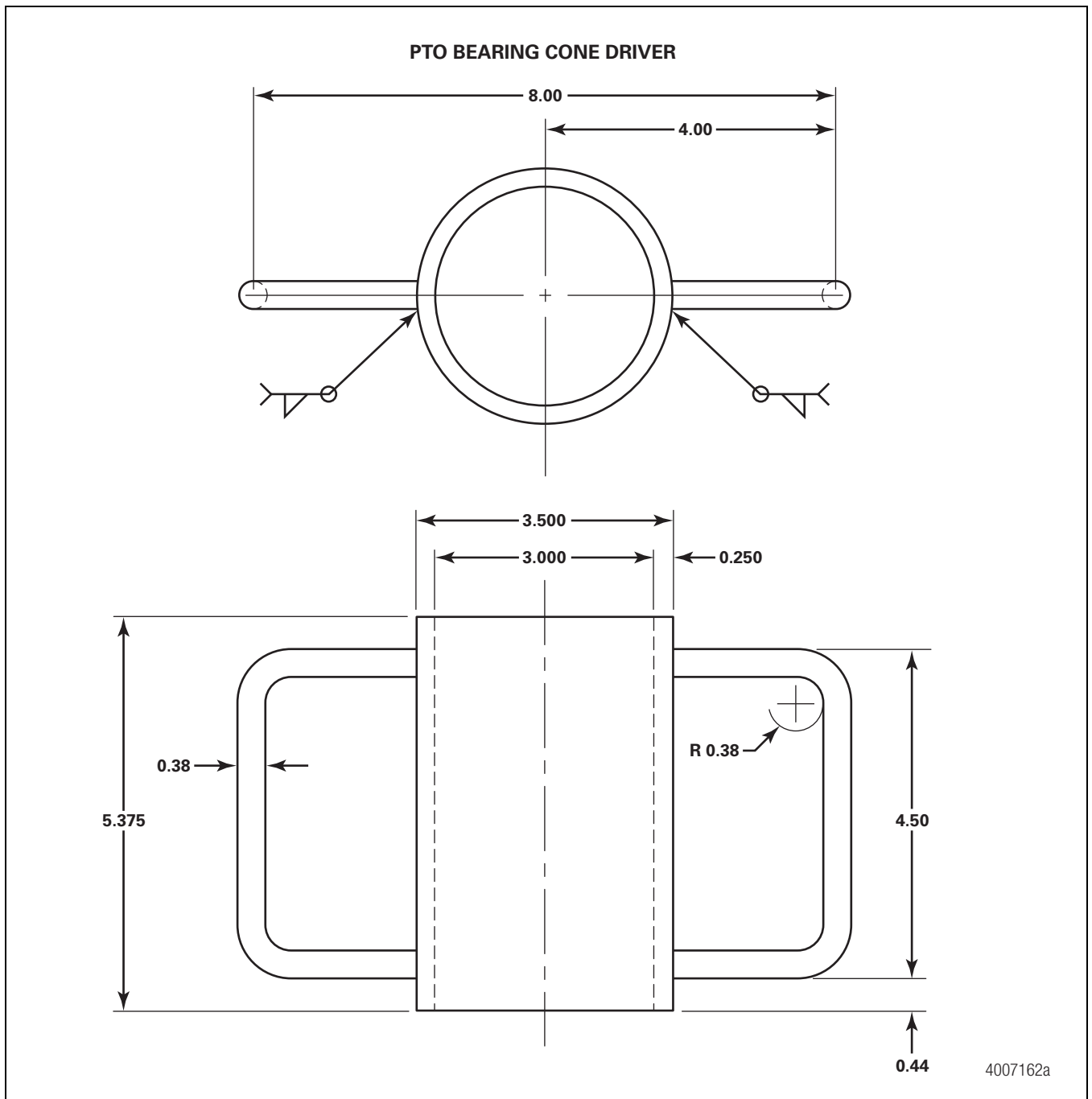


Figure 13.9

# 13 Special Tools



**Figure 13.10**



**Figure 13.11**

4007162a

## 13 Special Tools

### MODIFIED BEARING CUP PULLER USE FOR REMOVAL OF IDLER SHAFT BEARING CUPS ON MTC-4208XL/XLEV AND MTC-4210XL/XLEV

**Tool Instructions:**  
Obtain Snap-On tool, part number CJ82B,  
and modify as described here.

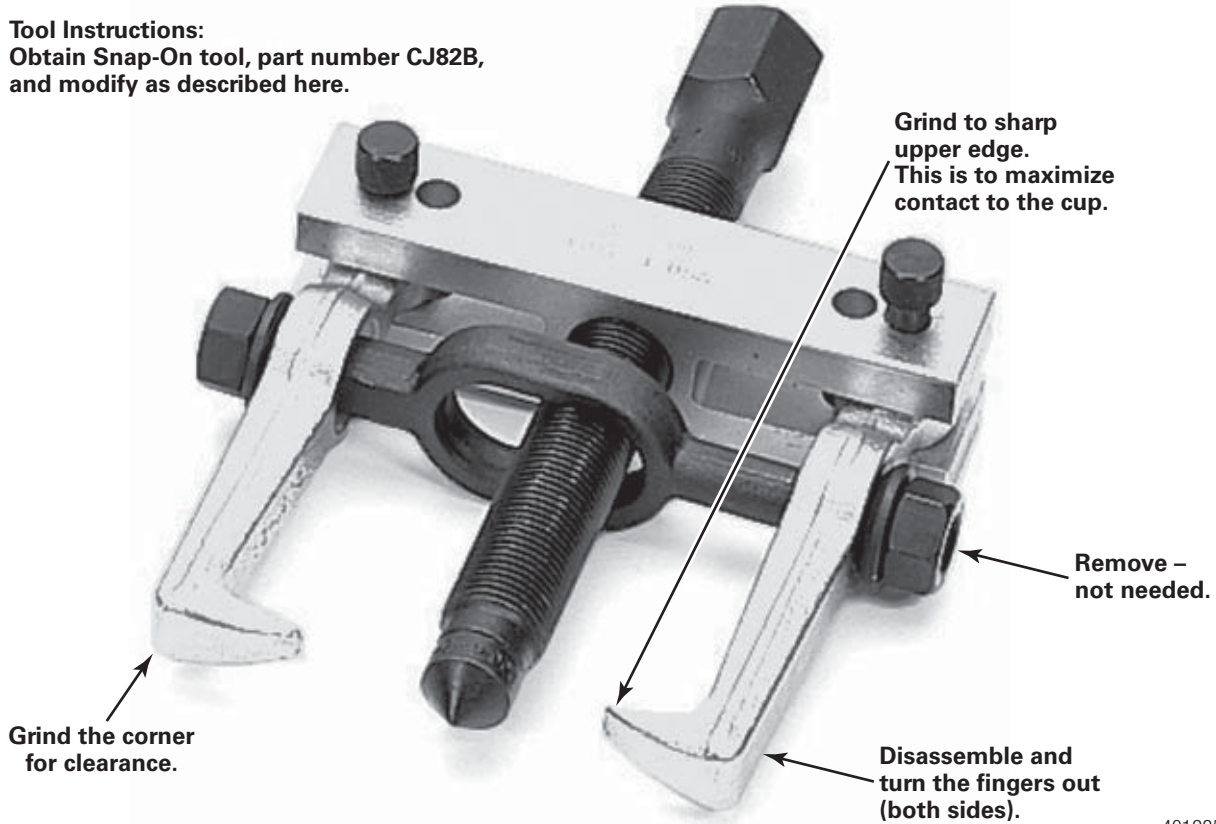


Figure 13.12

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