



Specifications

14M and 16M Motor Graders Power Train

B9H1-Up (Machine)
R9H1-Up (Machine)
B9J1-Up (Machine)
R9J1-Up (Machine)

Important Safety Information

Most accidents that involve product operation, maintenance and repair are caused by failure to observe basic safety rules or precautions. An accident can often be avoided by recognizing potentially hazardous situations before an accident occurs. A person must be alert to potential hazards. This person should also have the necessary training, skills and tools to perform these functions properly.

Improper operation, lubrication, maintenance or repair of this product can be dangerous and could result in injury or death.

Do not operate or perform any lubrication, maintenance or repair on this product, until you have read and understood the operation, lubrication, maintenance and repair information.

Safety precautions and warnings are provided in this manual and on the product. If these hazard warnings are not heeded, bodily injury or death could occur to you or to other persons.

The hazards are identified by the "Safety Alert Symbol" and followed by a "Signal Word" such as "DANGER", "WARNING" or "CAUTION". The Safety Alert "WARNING" label is shown below.



The meaning of this safety alert symbol is as follows:

Attention! Become Alert! Your Safety is Involved.

The message that appears under the warning explains the hazard and can be either written or pictorially presented.

A non-exhaustive list of operations that may cause product damage are identified by "NOTICE" labels on the product and in this publication.

Caterpillar cannot anticipate every possible circumstance that might involve a potential hazard. The warnings in this publication and on the product are, therefore, not all inclusive. You must not use this product in any manner different from that considered by this manual without first satisfying yourself that you have considered all safety rules and precautions applicable to the operation of the product in the location of use, including site-specific rules and precautions applicable to the worksite. If a tool, procedure, work method or operating technique that is not specifically recommended by Caterpillar is used, you must satisfy yourself that it is safe for you and for others. You should also ensure that the product will not be damaged or become unsafe by the operation, lubrication, maintenance or repair procedures that you intend to use.

The information, specifications, and illustrations in this publication are on the basis of information that was available at the time that the publication was written. The specifications, torques, pressures, measurements, adjustments, illustrations, and other items can change at any time. These changes can affect the service that is given to the product. Obtain the complete and most current information before you start any job. Cat dealers have the most current information available.



When replacement parts are required for this product Caterpillar recommends using Cat replacement parts or parts with equivalent specifications including, but not limited to, physical dimensions, type, strength and material.

Failure to heed this warning can lead to premature failures, product damage, personal injury or death.

In the United States, the maintenance, replacement, or repair of the emission control devices and systems may be performed by any repair establishment or individual of the owner's choosing.

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Specifications Section

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Torsional Coupling

i04018070

SMCS Code: 3279

Part No.: 250-0154

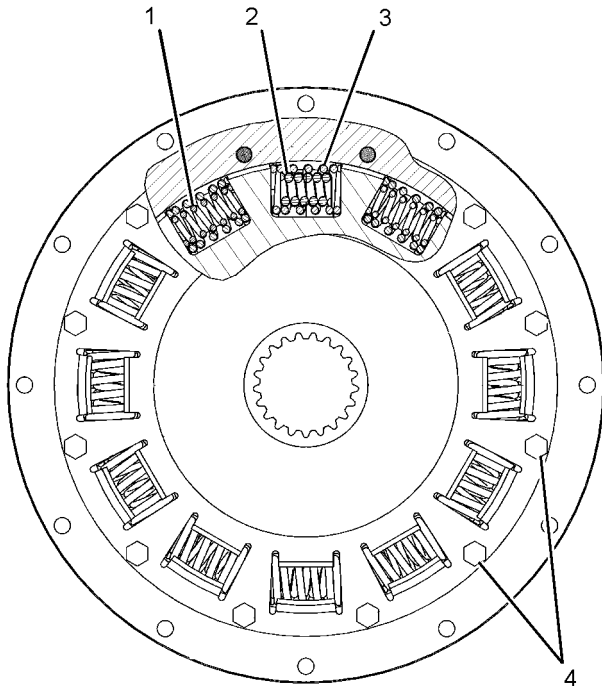


Illustration 1

g02191915

(1) 244-6850 Spring

Free length after test .. 45.974 mm (1.8100 inch)
Outside diameter 22.61 mm (0.890 inch)

(2) 244-6851 Spring

Free length after test .. 33.781 mm (1.3300 inch)
Outside diameter 22.606 mm (0.8900 inch)

(3) 244-6849 Spring

Free length after test .. 45.974 mm (1.8100 inch)
Outside diameter 33.02 mm (1.300 inch)

(4) Torque for bolts 50 ± 10 N·m (37 ± 7 lb ft)

Magnetic Screen (Transmission)

SMCS Code: 3067

Part No.: 246-8789, 316-5385
S/N: B9H1-Up

Part No.: 316-5385
S/N: R9H1-Up

Part No.: 246-8789, 316-5385
S/N: B9J1-Up

Part No.: 316-5385
S/N: R9J1-Up

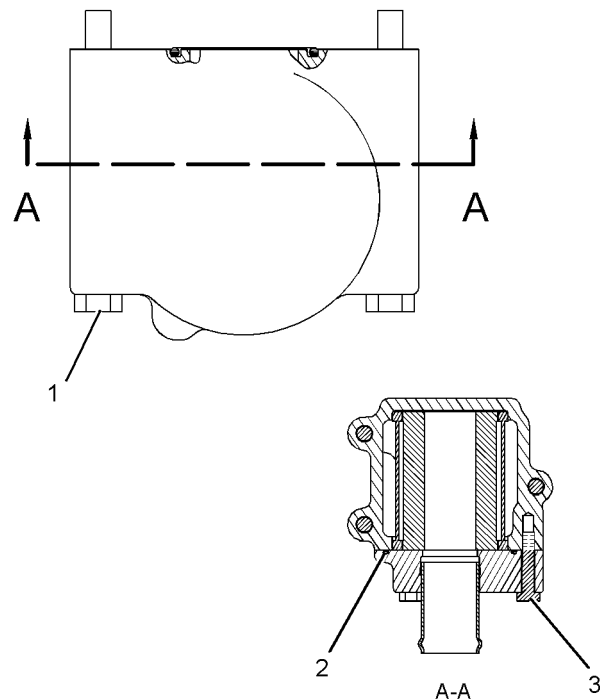


Illustration 2

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(1) Torque for three bolts ... 55 ± 10 N·m (41 ± 7 lb ft)

Note: Replace O-ring seal (2) when the filter is serviced.

(3) Torque for three bolts 28 ± 7 N·m
(248 ± 62 lb in)

i02986597

Gear Pump (Transmission Charging and Scavenge)

SMCS Code: 3066; 3115

Part No.: 246-8066

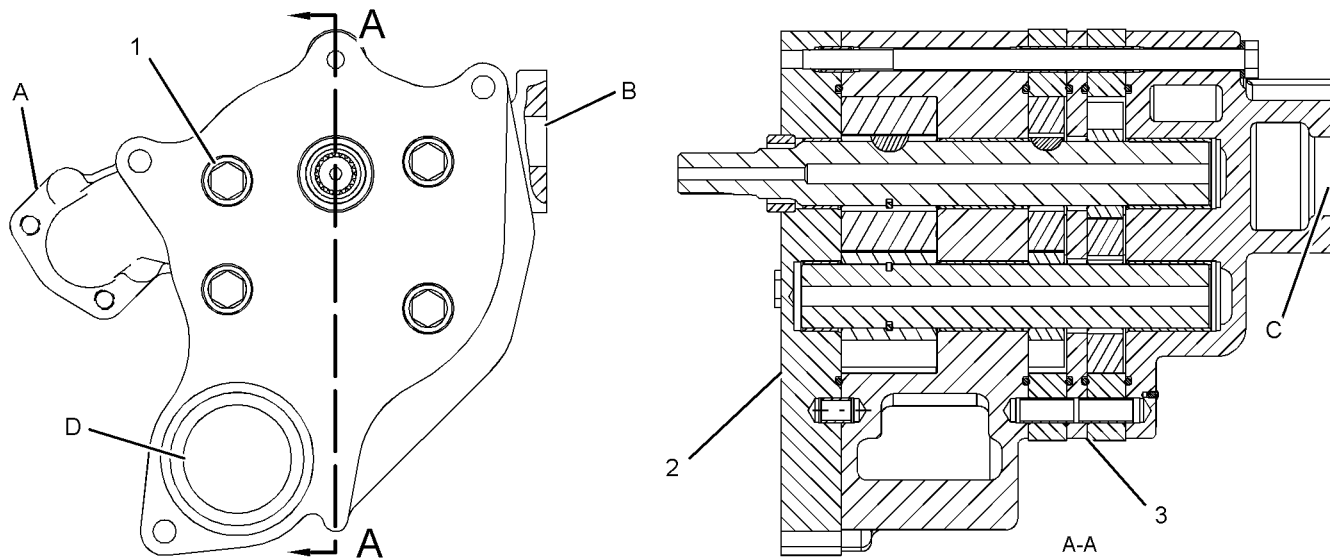


Illustration 3

g01513215

- | | |
|--|------------------------------|
| (1) Bolts (four) | (A) Outlet for Scavenge Pump |
| (2) Transmission Scavenge Pump Section | (B) Outlet for Charge Pump |
| (3) Transmission Charge Pump Section | (C) Inlet for Charge Pump |

(D) Inlet for Scavenge Pump

Pump rotation Counterclockwise

Note: Lubricate the pump with oil before running the pump.

The pump must rotate freely.

The following information is for testing the pump on the test stand.

(2) Transmission scavenge pump section

Minimum output 236 L/min (60 US gpm)
 Pump speed 1800 rpm
 Pump pressure 200 kPa (29 psi)

(3) Transmission charge pump section

Minimum output 177 L/min (45 US gpm)
 Pump speed 1800 rpm
 Pump pressure 2700 kPa (390 psi)

Install 6Y-5010 Washer on both sides of 3S-0004 Washer for four bolts (1).

i04026369

Transmission Oil Cooler

SMCS Code: 1375

Part No.: 240-5403

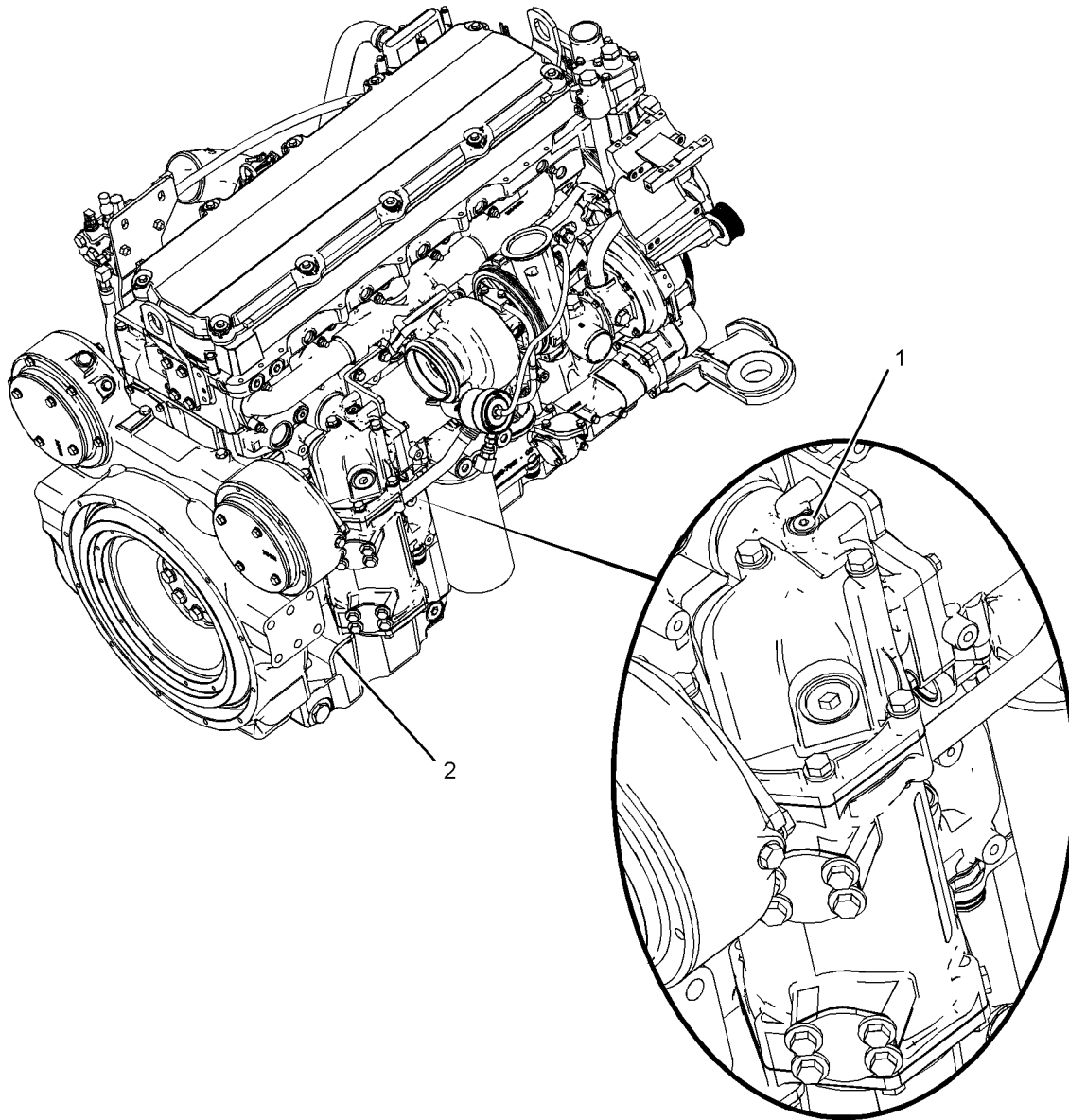


Illustration 4

g02210693

(1) Apply white Loctite Low Breakloose PST to the threads of the plug assembly.

Use the following procedure to install the brackets (2):

1. Torque bracket bolts to upper elbow.
2. Torque bracket bolts to lower cooler bonnet.
3. Torque bracket bolts to flywheel housing and cylinder block.
4. Loosen bracket bolts to upper elbow and lower bonnet.

5. Retorque bracket bolts to upper elbow and lower bonnet.

i04020465

Relief Valve (Cooler Bypass)

i02566589

SMCS Code: 5071

Part No.: 148-1925

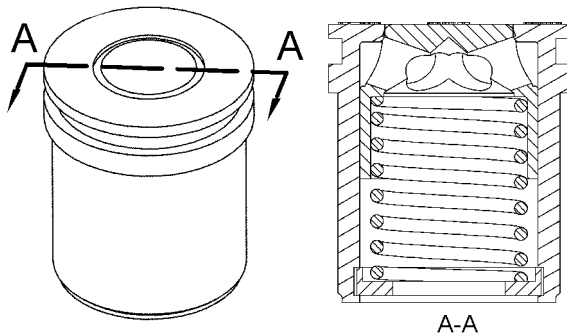


Illustration 5

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Cracking pressure 520 ± 35 kPa (75 ± 5 psi)

Override pressure at 120 L/min
(32 US gpm) 725 kPa (105 psi)

Reseating pressure (minimum) 440 kPa (64 psi)

Oil Filter (Transmission)

SMCS Code: 3067; 5068

Part No.: 253-7939

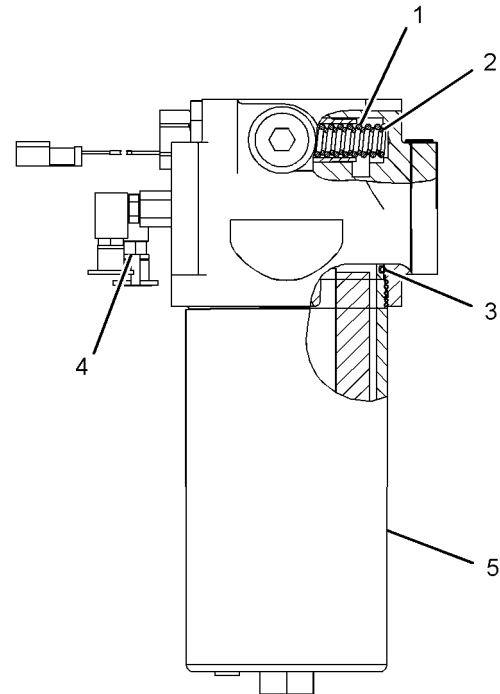


Illustration 6

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(1) 334-2679 Spring

Length under test force ... 57.57 mm (2.267 inch)
 Test force 179.53 ± 8.98 N (40.36 ± 2.02 lb)
 Free length after test 85.6 mm (3.37 inch)
 Outside diameter 22.35 mm (0.880 inch)

(2) 334-2680 Spring

Length under test force ... 57.57 mm (2.267 inch)
 Test force 98.67 ± 4.93 N (22.18 ± 1.11 lb)
 Free length after test 68.2 mm (2.69 inch)
 Outside diameter 16.17 mm (0.637 inch)

- (3) Before installation, lubricate the O-ring seal with the lubricant that is being filtered.

- (4) Torque for the fuel sampling valve .. 11 to 13 N·m
(97 to 115 lb in)

Note: Do not use an air wrench to tighten the filter housing group (5).

Bypass Switch (Oil Filter Bypass)

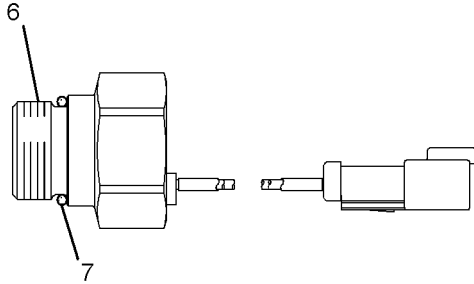


Illustration 7

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(6) Final installation torque for the
switch $80 \pm 10 \text{ N}\cdot\text{m}$ ($59 \pm 7 \text{ lb ft}$)

Operating temperature $-32 \text{ to } 121 \text{ }^\circ\text{C}$
($-26 \text{ to } 250 \text{ }^\circ\text{F}$)

Contact position Normally open

(7) Before assembly, lubricate the O-ring seal with
the lubricant that is being sealed.

i04040753

Transmission Hydraulic Control

SMCS Code: 3073; 3167

Part No.: 253-8428

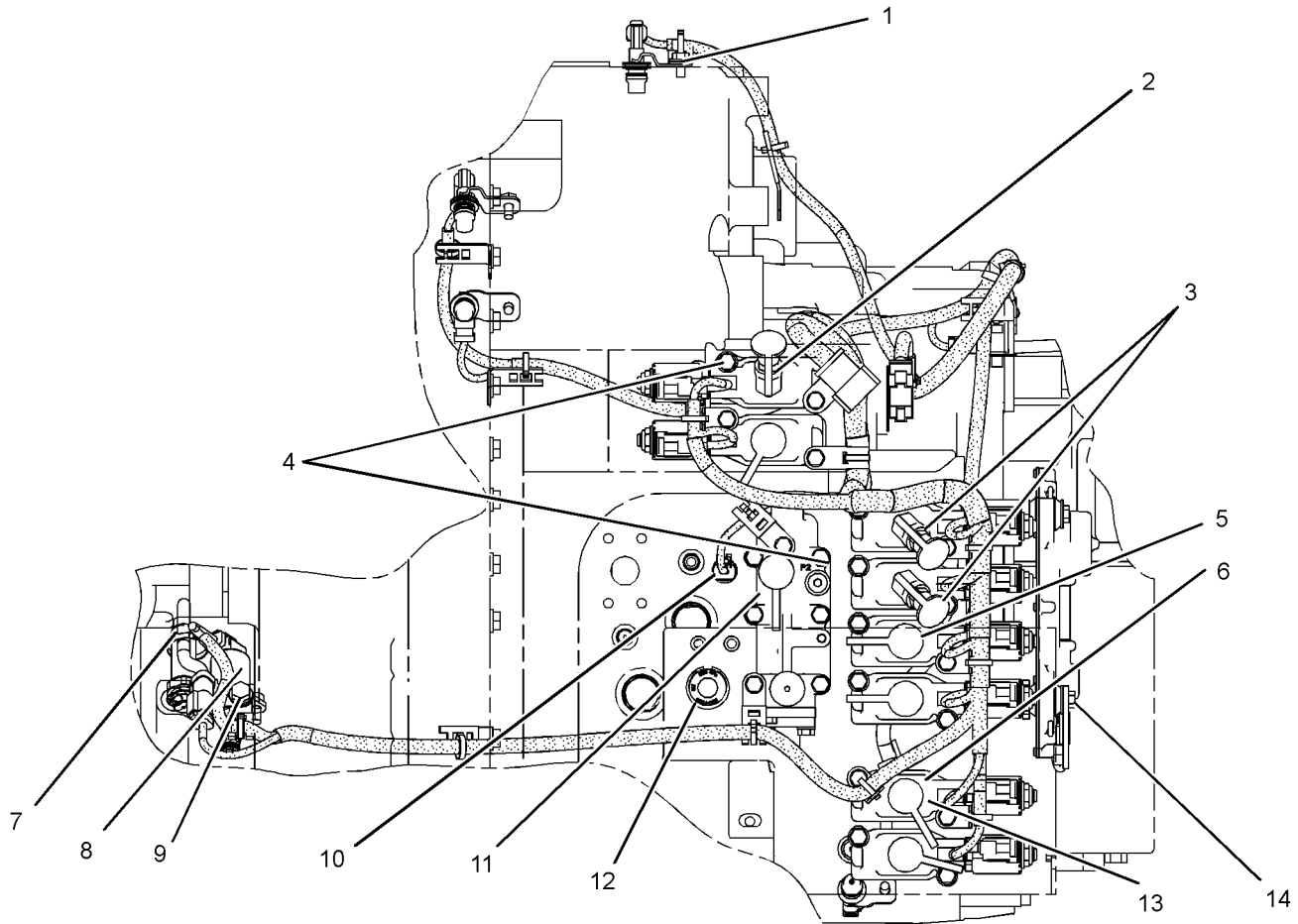


Illustration 8

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Transmission Control Valve (Left side of transmission)

- | | |
|--|---|
| (1) Torque for bolts 28 ± 7 N·m (248 ± 62 lb in) | (5) Torque for nine fitting assemblies 14 ± 4 N·m (125 ± 35 lb in) |
| (2) Angle of elbow assembly 90 ± 5 Degrees from horizontal | (6) For information concerning the eight modulating valves, refer to Specifications, "Modulating Valve (Transmission Hydraulic Control)". |
| (3) Angle of two elbow assemblies 45 ± 5 Degrees from horizontal | (7) Torque for the pressure switch 60 ± 6 N·m (44 ± 4 lb ft) |
| (4) Torque for 19 bolts 30 ± 4 N·m (267 ± 35 lb in) | (8) Torque for the solenoid valve 12 ± 3 N·m (106 ± 27 lb in) |
| Note: To achieve the proper angle, remove the nipple assembly from the valve and position elbow assembly according to the specified angle that is given above. Tighten the elbow assembly to 14 ± 4 N·m (125 ± 35 lb in). Install the nipple assembly into the elbow assembly and tighten to 14 ± 4 N·m (125 ± 35 lb in). | (9) Torque for bolts 55 ± 10 N·m (41 ± 7 lb ft) |
| | (10) Temperature Sensor
Installation torque 20 ± 3 N·m (177 ± 27 lb in) |

Operating temperature -40 to 150 °C
 (-40 to 302 °F)
 Type Passive

- (11) For information concerning the transmission hydraulic control relief valve, refer to Specifications, "Relief Valve (Main Relief)".
- (12) For information concerning the relief valve, refer to Specifications, "Relief Valve (Transmission Gear Lube)".
- (13) For information concerning the relief valve, refer to Specifications, "Relief Valve (Drain (Clutch 7))".
- (14) Torque for four bolts 28 ± 7 N·m
 (248 ± 62 lb in)

Note: Refer to Specifications, SENR3130, "Installation of Fittings".

Note: Refer to Specifications, SENR3130, "Straight Thread O-ring Fittings".

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Modulating Valve (Transmission Hydraulic Control)

SMCS Code: 3073; 3139-T3

Part No.: 244-3114

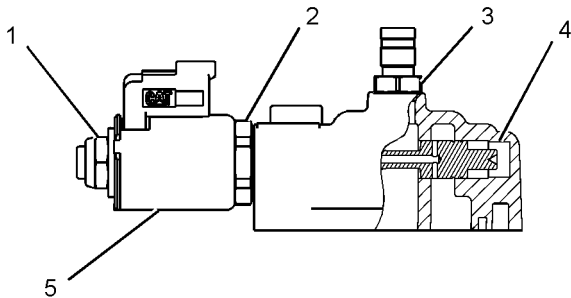


Illustration 9

g02247333

- (1) Torque for the nut 13.0 ± 1.5 N·m
 (115.0 ± 13.0 lb in)

Note: Lightly lubricate the threads of the valve assembly with the lubricant that is being sealed.

- (2) Torque for the valve assembly 50 ± 5 N·m
 (37 ± 4 lb ft)

- (3) Torque for the fitting .. 14 ± 4 N·m (124 ± 35 lb in)

- (4) 118-3731 Spring

Length under test force 14 mm (0.6 inch)
 Test force 36.0 ± 1.8 N (8.1 ± 0.4 lb)
 Free length after test 15.99 mm (0.630 inch)
 Outside diameter 12.1 mm (0.48 inch)

- (5) Coil

Position Open
 Operating voltage 24 VDC
 Resistance at 25 °C (77 °F) 8.7 ± 0.4 ohms
 Operating temperature range -40 to 121 °C
 (-40 to 250 °F)

i04038431

Relief Valve (Drain (Clutch 7))

SMCS Code: 3073; 5069; 5117; 7428

Part No.: 290-4134

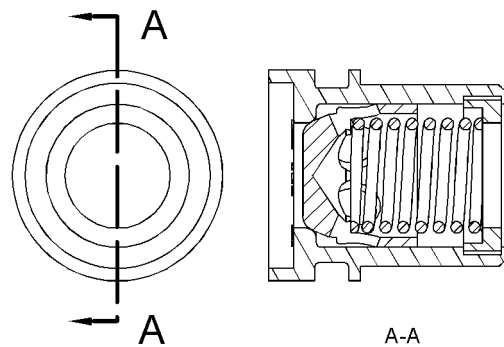


Illustration 10

g02241217

Maximum cracking pressure 13.8 kPa (2.0 psi)

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i02566613

Relief Valve (Main Relief)

SMCS Code: 3073; 5069; 5117; 7428

Part No.: 257-5026

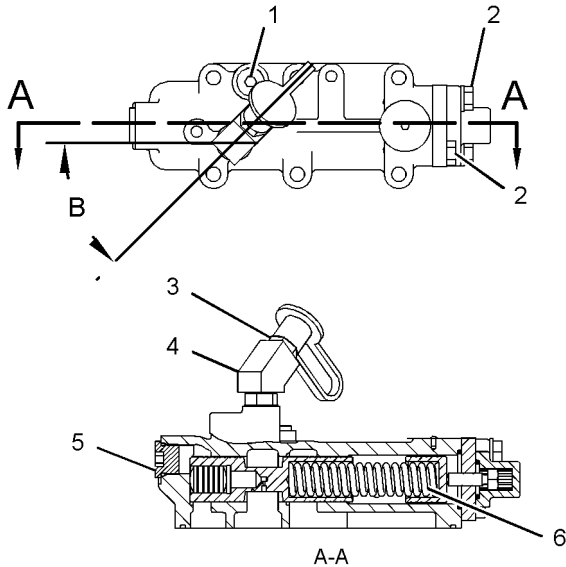


Illustration 11

g02196596

(B) Angle for the elbow assembly 45 ± 5 degrees

(1) Torque for the plug assembly 17.0 ± 1.5 N·m
(150.5 \pm 13.3 lb in)

(2) Torque for bolts 28 ± 7 N·m (248 \pm 62 lb in)

(3) Torque for the quick disconnect coupler
assembly 17.0 ± 1.5 N·m (150.5 \pm 13.3 lb in)

(4) Torque for the elbow assembly 14 ± 2 N·m
(124 \pm 18 lb in)

(5) Torque for the plug assembly 35.0 ± 3.5 N·m
(25.8 \pm 2.6 lb ft)

(6) 174-7449 Spring

Length under test force 102.22 mm
(4.024 inch)

Test force 228.55 ± 11.43 N (51.38 \pm 2.57 lb)

Free length after test 115.44 mm (4.545 inch)

Outside diameter 20.75 mm (0.817 inch)

Relief Valve (Transmission Gear Lube)

SMCS Code: 3073; 5069; 5117; 7428

Part No.: 260-7595

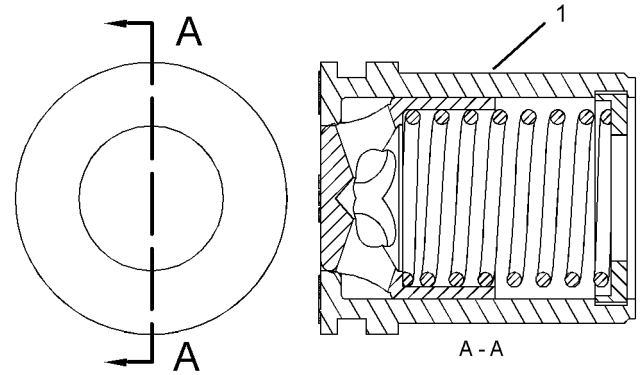


Illustration 12

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(1) 260-7595 Relief Valve

Cracking pressure 380 ± 35 kPa (56 \pm 5 psi)

Maximum override pressure at 170 L/min
(45 us gallon per minute) 690 kPa (100 psi)

Reseating pressure (minimum) 330 kPa
(48 psi)

i04039339

Transmission

SMCS Code: 3030; 3155

Part No.: 253-8407

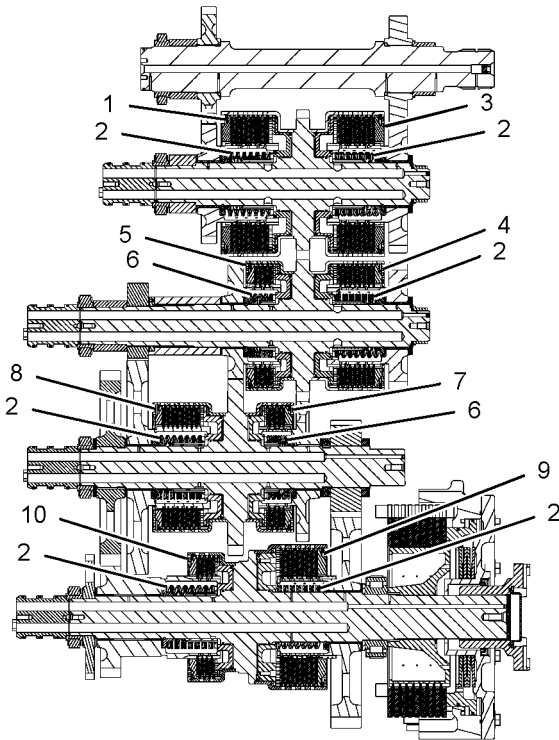


Illustration 13

g02243119

(1) No. 1 clutch

Thickness of eight new 6I-8911 Friction Discs and of eight new 248-2226 Separator Plates 64.00 ± 1.28 mm (2.520 ± 0.050 inch)
 Thickness of one new 6I-8911 Friction Disc 4.00 ± 0.08 mm (0.158 ± 0.003 inch)
 Minimum allowable thickness for reusability of one 6I-8911 Friction Disc 3.41 mm (0.134 inch)
 Thickness of one new 248-2226 Separator Plate 4.00 ± 0.08 mm (0.158 ± 0.003 inch)

(2) 246-8800 Wave Spring

Length under test force 1 74.08 mm (2.917 inch)
 Test force 2958 ± 296 N (665 ± 67 lb)
 Length under test force 2 68.05 mm (2.679 inch)
 Test force 3750 ± 750 N (843 ± 168 lb)
 Length under test force 3 62.789 mm (2.4720 inch)
 Test force 4118 N (926 lb)
 Outside diameter 104.5 ± 0.7 mm (4.114 ± 0.028 inch)
 Free length after test 102.85 mm (4.049 inch)

Number of turns 16

(3) No. 2 clutch

Thickness of eight new 6I-8911 Friction Discs and of eight new 248-2226 Separator Plates 64.00 ± 1.28 mm (2.520 ± 0.050 inch)
 Thickness of one new 6I-8911 Friction Disc 4.00 ± 0.08 mm (0.158 ± 0.003 inch)
 Minimum allowable thickness for reusability of one 6I-8911 Friction Disc 3.41 mm (0.134 inch)
 Thickness of one new 248-2226 Separator Plate 4.00 ± 0.08 mm (0.158 ± 0.003 inch)

(4) No. 3 clutch

Thickness of eight new 6I-8912 Friction Discs and of eight new 8E-0401 Plates 64.00 ± 1.28 mm (2.520 ± 0.050 inch)
 Thickness of one new 6I-8912 Friction Disc 4.00 ± 0.08 mm (0.158 ± 0.003 inch)
 Minimum allowable thickness for reusability of one 6I-8912 Friction Disc 3.41 mm (0.134 inch)
 Thickness of one new 8E-0401 Plate 4.00 ± 0.08 mm (0.158 ± 0.003 inch)

(5) No. 4 clutch

Thickness of four new 6I-8912 Friction Discs and of four new 8E-0401 Plates 32.00 ± 0.64 mm (1.260 ± 0.025 inch)
 Thickness of one new 6I-8912 Friction Disc 4.00 ± 0.08 mm (0.158 ± 0.003 inch)
 Minimum allowable thickness for reusability of one 6I-8912 Friction Disc 3.41 mm (0.134 inch)
 Thickness of one new 8E-0401 Plate 4.00 ± 0.08 mm (0.158 ± 0.003 inch)

(6) 246-8801 Wave Spring

Length under test force 1 39.20 mm (1.544 inch)
 Test force 2958 ± 296 N (665 ± 67 lb)
 Length under test force 2 36.091 mm (1.4209 inch)
 Test force 3700 ± 740 N (832 ± 166 lb)
 Length under test force 3 33.41 mm (1.315 inch)
 Test force 4011 N (902 lb)
 Free length after test 55.35 mm (2.179 inch)
 Outside diameter 104.5 ± 0.7 mm (4.114 ± 0.028 inch)
 Number of turns Nine

(7) No. 5 clutch

Thickness of four new 6I-8912 Friction Discs and of four new 8E-0401 Plates 32.00 ± 0.64 mm (1.260 ± 0.025 inch)
 Thickness of one new 6I-8912 Friction Disc 4.00 ± 0.08 mm (0.158 ± 0.003 inch)

Minimum allowable thickness for reusability of
one 6I-8912 Friction Disc 3.41 mm
(0.134 inch)

Thickness of one new 8E-0401
Plate 4.00 ± 0.08 mm (0.158 ± 0.003 inch)

(8) No. 6 clutch

Thickness of eight new 6I-8912 Friction
Discs and of eight new 8E-0401
Plates 64.00 ± 1.28 mm (2.520 ± 0.050 inch)
Thickness of one new 6I-8912 Friction
Disc 4.00 ± 0.08 mm (0.158 ± 0.003 inch)
Minimum allowable thickness for reusability of
one 6I-8912 Friction Disc 3.41 mm
(0.134 inch)

Thickness of one new 8E-0401
Plate 4.00 ± 0.08 mm (0.158 ± 0.003 inch)

(9) No. 7 clutch

Thickness of eight new 6I-8911 Friction Discs
and of eight new 248-2226 Separator Plates
..... 64.00 ± 1.28 mm (2.520 ± 0.050 inch)
Thickness of one new 6I-8911 Friction
Disc 4.00 ± 0.08 mm (0.158 ± 0.003 inch)
Minimum allowable thickness for reusability of
one 6I-8911 Friction Disc 3.41 mm
(0.134 inch)

Thickness of one new 248-2226 Separator
Plate 4.00 ± 0.08 mm (0.158 ± 0.003 inch)

(10) No. 8 clutch

Thickness of four new 6I-8912 Friction
Discs and of four new 8E-0401
Plates 32.00 ± 0.64 mm (1.260 ± 0.025 inch)
Thickness of one new 6I-8912 Friction
Disc 4.00 ± 0.08 mm (0.158 ± 0.003 inch)
Minimum allowable thickness for reusability of
one 6I-8912 Friction Disc 3.41 mm
(0.134 inch)

Thickness of one new 8E-0401
Plate 4.00 ± 0.08 mm (0.158 ± 0.003 inch)

Transmission Case

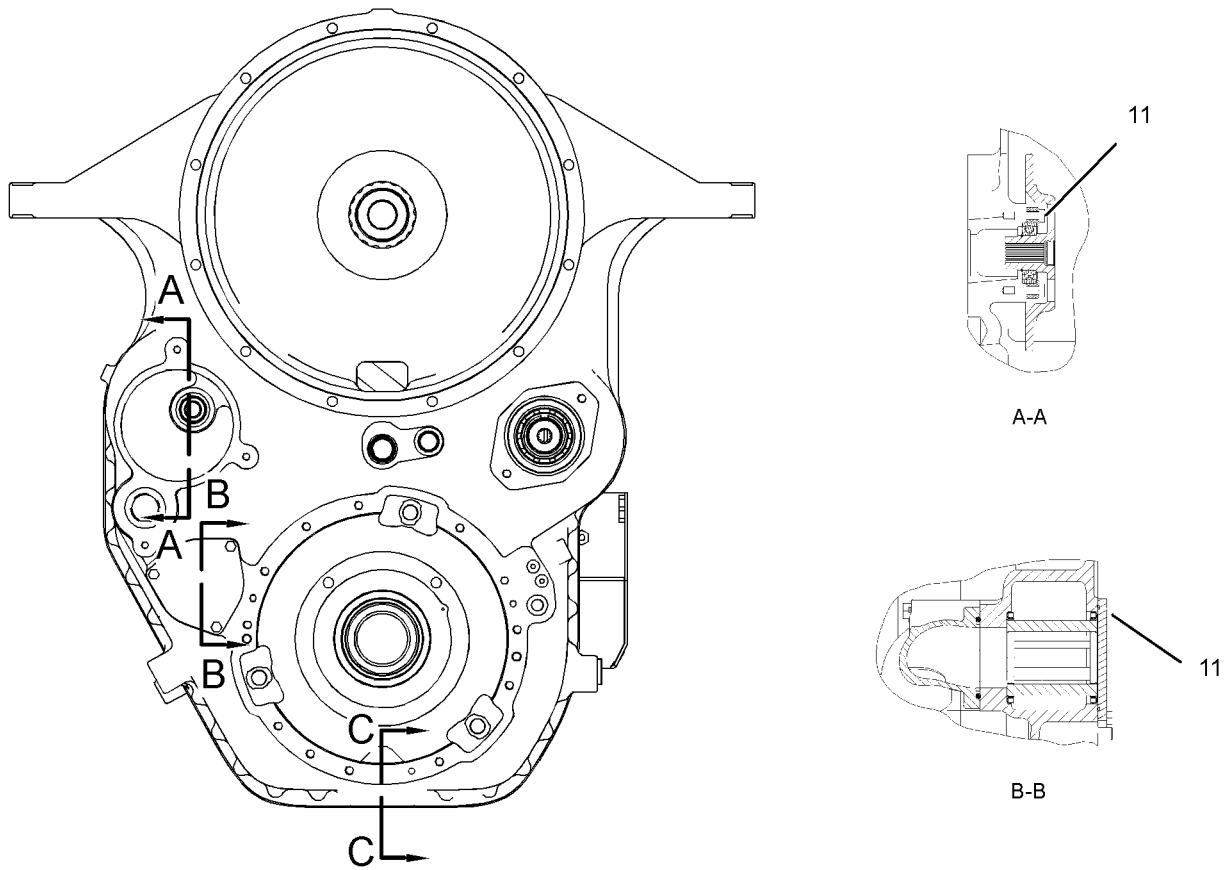


Illustration 14
Front view

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(11) Torque for bolts 28 ± 7 N·m (248 ± 62 lb in)

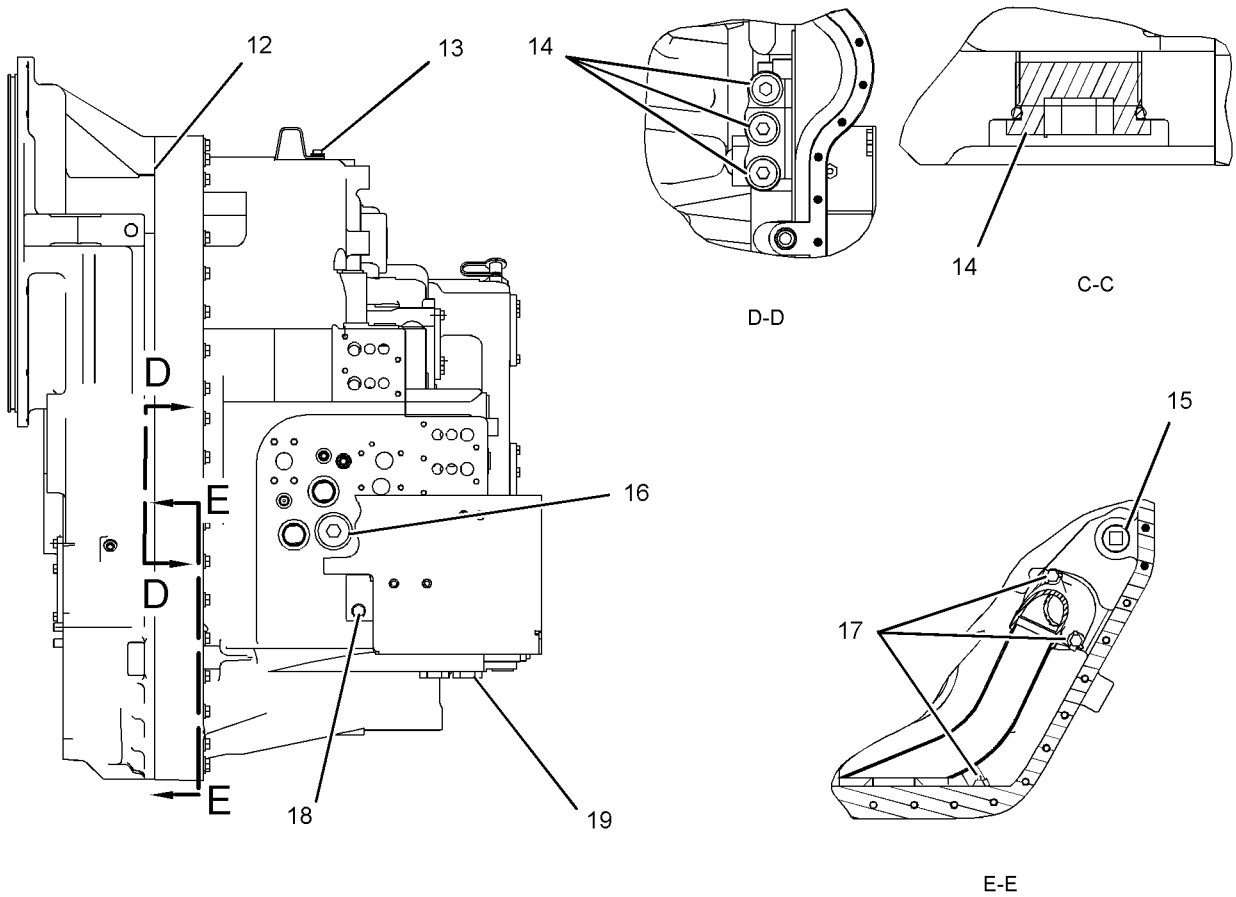


Illustration 15
Right side view

g02243116

Note: Before you apply sealant, make sure that the transmission cover and the transmission case are free of oil and free of grease.

(12) Apply blue Loctite High Flex GM to the joint between the transmission cover and the transmission case.

(13) Torque for the bolt ... 28 ± 7 N·m (248 ± 62 lb in)

(14) Torque for the plug assemblies 270 ± 25 N·m
(200 ± 18 lb ft)

Note: Apply thread sealant to first three threads of the pipe plug starting from small end of the pipe plug.

(15) Torque for the pipe plug 95 ± 10 N·m
(70 ± 7 lb ft)

(16) Torque for the plug assembly 285 ± 25 N·m
(210 ± 18 lb ft)

(17) Torque for three bolts 55 ± 10 N·m
(41 ± 7 lb ft)

Note: Make sure that the locking tabs are folded over bolts (16) after torque.

(18) Torque for the bolt 55 ± 10 N·m (41 ± 7 lb ft)

(19) Torque for two magnetic plugs 210 ± 20 N·m
(155 ± 15 lb ft)

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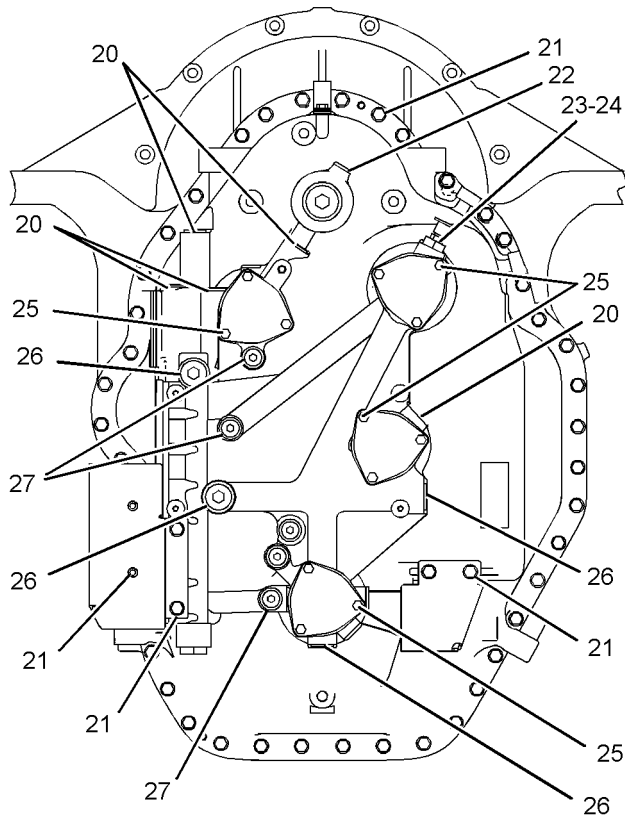


Illustration 16
Rear view

g02244694

- (20) Torque for plug assemblies 170 ± 15 N·m
(125 ± 11 lb ft)
- (21) Torque for the bolts 55 ± 10 N·m (41 ± 7 lb ft)
- (22) Torque for the plug assembly 285 ± 25 N·m
(210 ± 18 lb ft)
- (23) Torque for adapter assembly 140 ± 14 N·m
(103 ± 10 lb ft)
- (24) Torque for quick disconnect coupler
assembly 35 ± 3 N·m (26 ± 2 lb ft)
- (25) Torque for bolts 28 ± 7 N·m (248 ± 62 lb in)
- (26) Torque for plug assemblies 270 ± 25 N·m
(200 ± 18 lb ft)
- (27) Torque for plug assemblies 100 ± 10 N·m
(74 ± 7 lb ft)

Note: Refer to Specifications, SENR3130, "Torque Specifications".

Temperature Sensor (Transmission Oil)

SMCS Code: 301T

Part No.: 238-0112

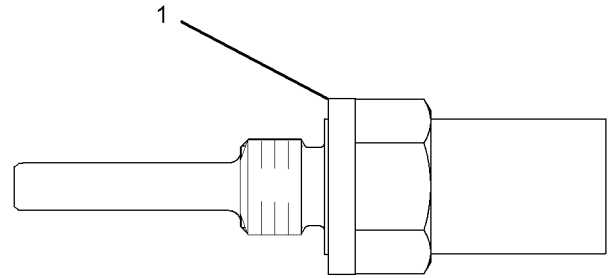


Illustration 17

g02151150

- (1) Final installation torque for the temperature
sensor group 20 ± 3 N·m (177 ± 27 lb in)
 - Operating temperature -40 to 150 °C
(-40 to 302 °F)
 - Output type Passive
- Note:** Do not connect to battery voltage.

i04038475

Parking Brake

SMCS Code: 4267

Part No.: 253-8427

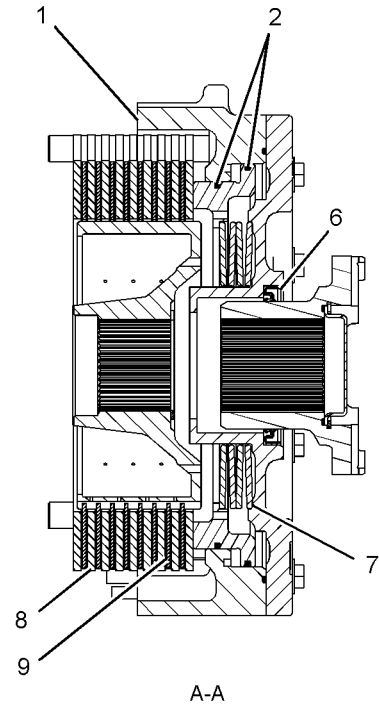
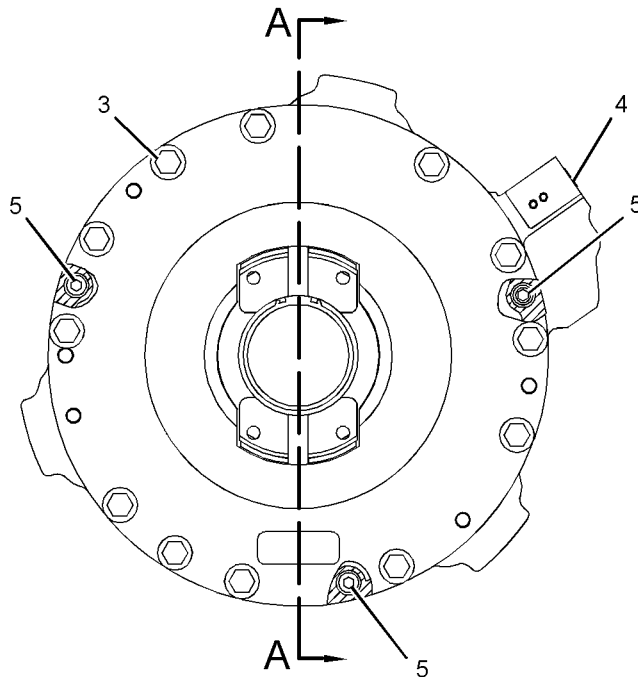


Illustration 18

g02241614

- (1) Apply blue Loctite High Flex GM to the brake housing prior to assembly.
- (2) Lightly lubricate the bore for the seal brakes with the lubricant that is being sealed.
- (3) Torque for 12 bolts ... $100 \pm 20 \text{ N}\cdot\text{m}$ ($74 \pm 15 \text{ lb ft}$)
- (4) Torque for the plug assembly $35.0 \pm 3.5 \text{ N}\cdot\text{m}$
($26.0 \pm 3.0 \text{ lb ft}$)
- (5) Torque for three bolts ... $55 \pm 10 \text{ N}\cdot\text{m}$ ($41 \pm 7 \text{ lb ft}$)
- (6) Lightly lubricate the sealing lip of the lip type seal with the lubricant that is being sealed.
- (7) 187-3369 Spring
Test force $16765 \pm 838 \text{ N}$ ($3769 \pm 188 \text{ lb}$)
Free height after test $11.1 \pm 0.2 \text{ mm}$
($0.44 \pm 0.01 \text{ inch}$)
- (8) Thickness of one new 246-8780
Plate $6.25 \pm 0.08 \text{ mm}$ ($0.246 \pm 0.003 \text{ inch}$)
- (9) 343-8739 Friction Disc

Thickness of one new
disc $4.95 + 0.08 - 0.13 \text{ mm}$
($0.195 + 0.003 - 0.005 \text{ inch}$)
Minimum allowable thickness for reusability of
one disc 4.75 mm (0.187 inch)

i02594003

i02593878

Solenoid Valve (Parking Brake)

SMCS Code: 5479

Part No.: 248-5523, 352-5517
S/N: B9H1-Up

Part No.: 248-5523, 352-5517
S/N: B9J1-Up

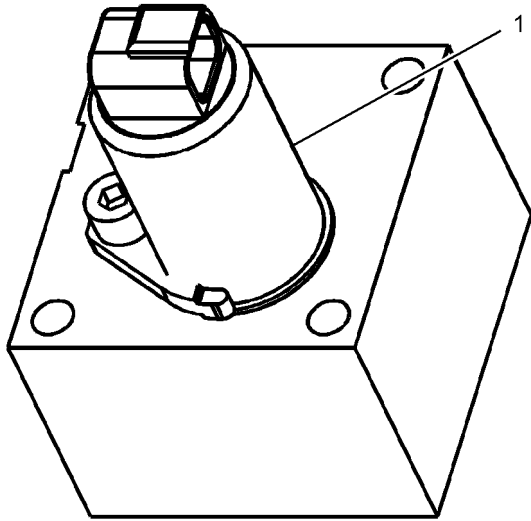


Illustration 19

g01101896

Coil (1)

Nominal Voltage 24 VDC
 Nominal current at 25 °C (77 °F) 0.80 Ampere
 Nominal resistance at 20° ± 5°C
 (68° ± 9°F) 30 ± 1.5 ohms
 Operating temperature -40 to 121 °C
 (-40 to 250 °F)

Pressure Switch (Parking Brake)

SMCS Code: 1408-QW; 4267-QW

Part No.: 229-1537, 356-0841
S/N: B9H1-Up

Part No.: 229-1537, 356-0841
S/N: B9J1-Up

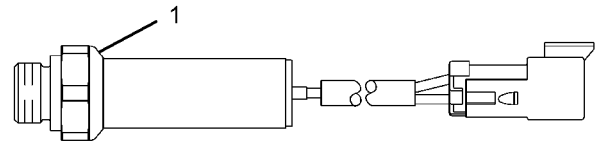


Illustration 20

g01215569

(1) Torque for installing the switch 50 ± 5 N·m
(37 ± 5 lb ft)

Maximum actuation pressure at -40°C to +121°C
(-40°F to +250°F) 2100 kPa (305 psi)

Deactuation pressure at -40°C to +121°C
(-40°F to +250°F) 1750 ± 108 kPa (254 ± 16 psi)

Contacts are normally closed below the deactuation pressure.

i02560369

Drive Shaft

SMCS Code: 3253

Part No.: 250-8212

S/N: B9H1-Up

Part No.: 250-8212

S/N: R9H1-Up

Part No.: 237-8199

S/N: B9J1-Up

Part No.: 237-8199

S/N: R9J1-Up

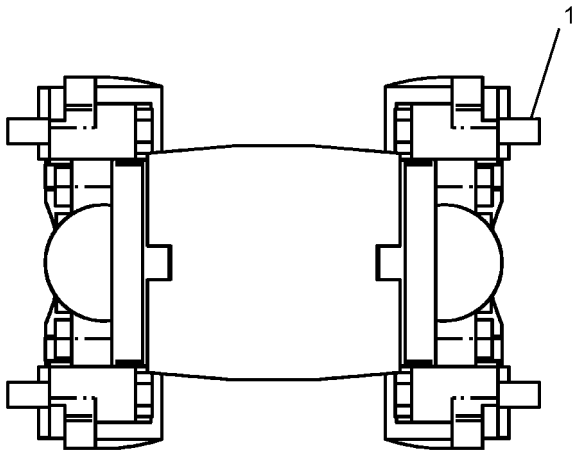


Illustration 21

g01281832

Note: All of the bearings and all of the connecting passages are permanently lubricated at the factory.

(1) Torque for eight bolts 120 ± 20 N·m
(90 ± 15 lb ft)

Note: The bearing cap must be clean of all debris prior to assembly. The mounting surfaces for the yoke must be clean of all debris prior to assembly.

Note: Do not reuse bolts. Discard bolts after initial torque is applied.

i04038824

Rear Axle

SMCS Code: 3278

Part No.: 270-9037
S/N: B9J1-Up

Part No.: 270-9037
S/N: R9J1-Up

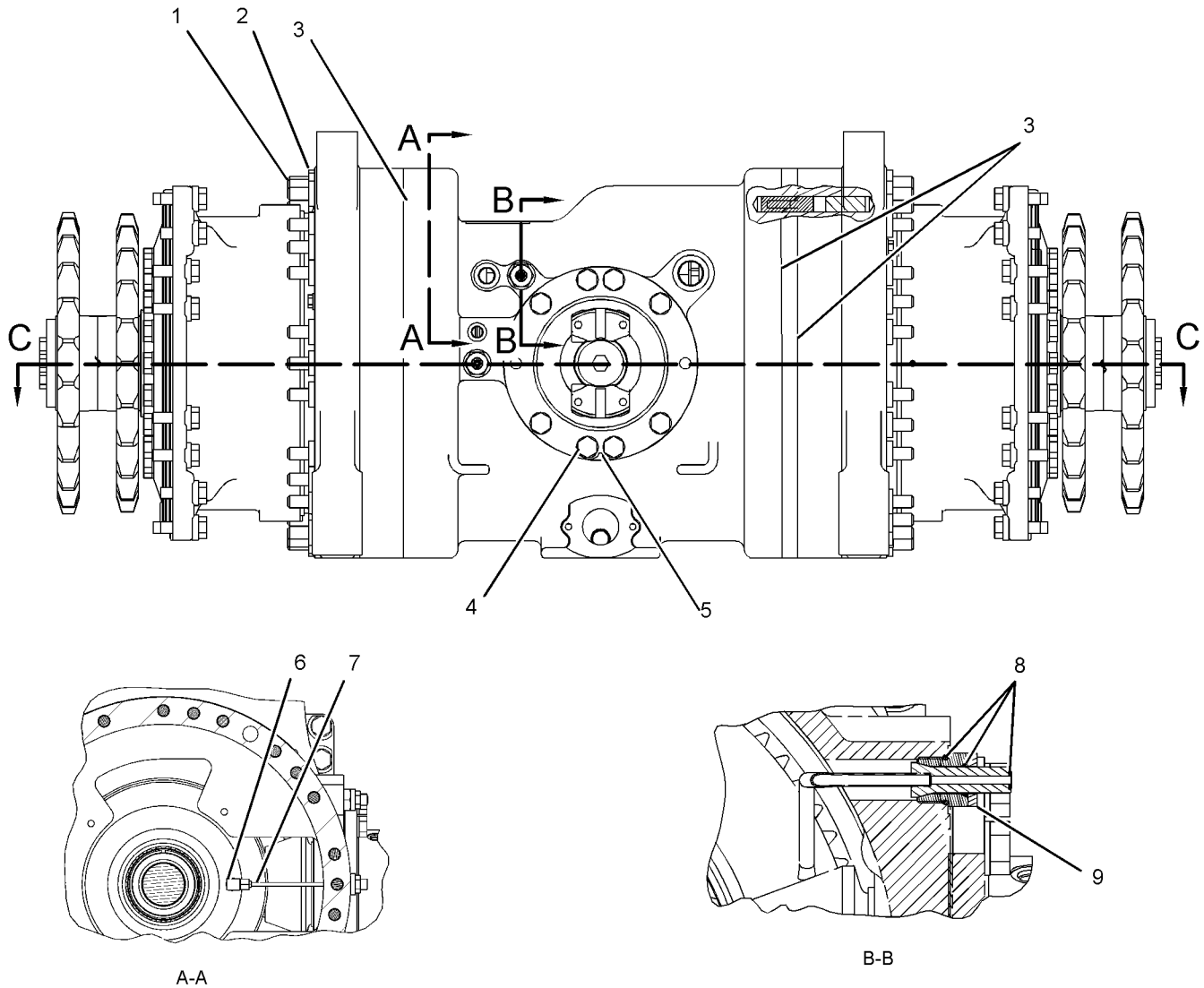


Illustration 22

g02242833

- | | |
|--|--|
| <p>(1) Torque for 54 taperlock studs 212 ± 30 N·m
(156 ± 22 lb ft)</p> <p>(2) Torque for 54 full nuts 520 ± 70 N·m
(384 ± 52 lb ft)</p> <p>(3) Apply blue Loctite High Flex GM prior to assembly. Make sure that the surfaces are clean prior to applying sealant.</p> | <p>(4) Torque for eight bolts 520 ± 70 N·m
(384 ± 52 lb ft)</p> <p>(5) Orient the notch in the pinion housing so that the cast notch facing toward downward position, when the housing is assembled with the central housing.</p> <p>(6) Torque for the elbow assembly 22 ± 2 N·m
(195 ± 18 lb in)</p> |
|--|--|

- (7) Torque for the tube assembly $25 \pm 3 \text{ N}\cdot\text{m}$
($221 \pm 27 \text{ lb in}$)
- (8) Lightly lubricate the bores, O-ring seals, and the shaft with the lubricant that is being sealed.
- (9) Torque for two nuts $105 \pm 10 \text{ N}\cdot\text{m}$ ($77 \pm 7 \text{ lb ft}$)

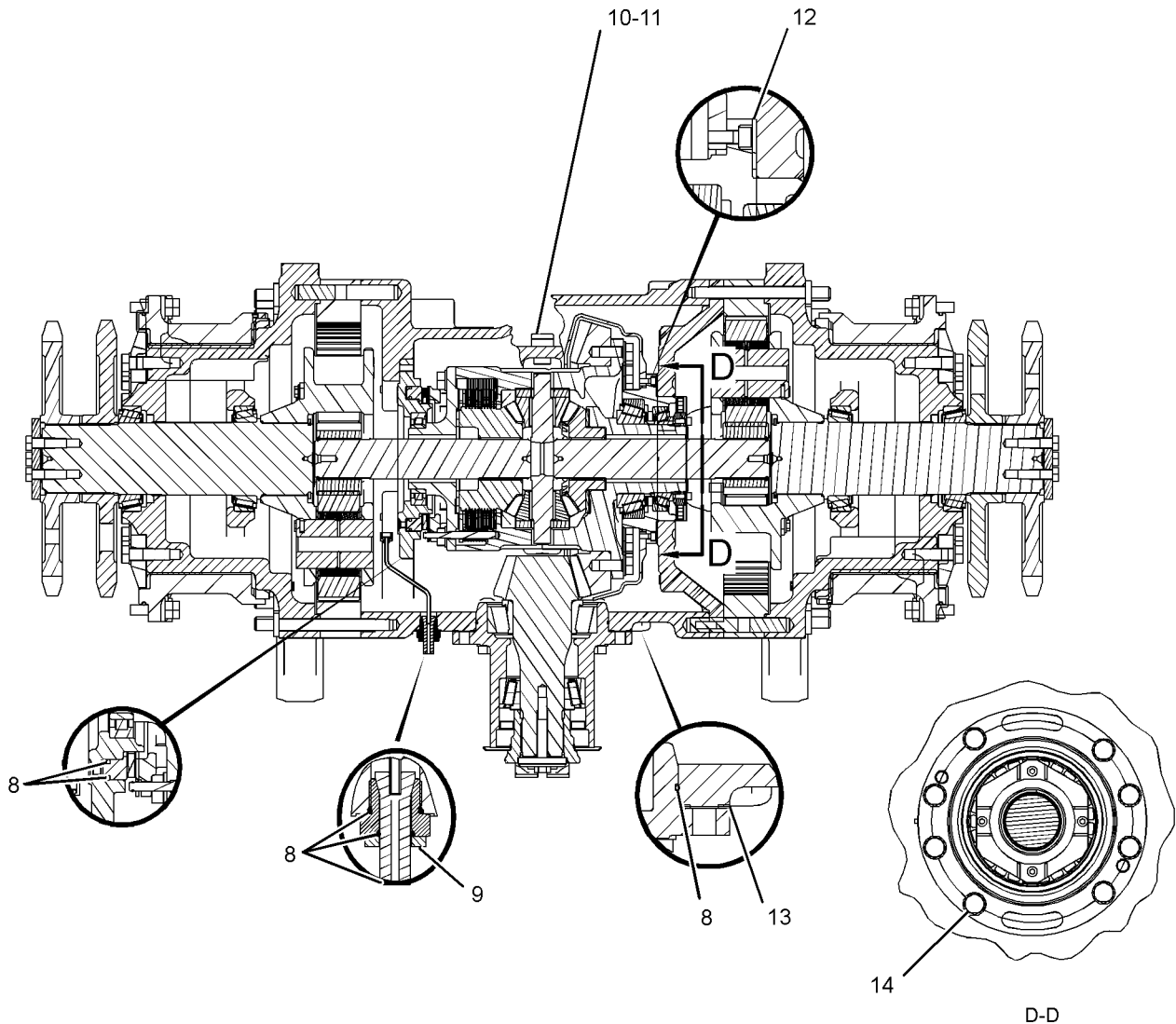


Illustration 23
Section C-C

g02242834

- (10) Installation torque for the ecology drain
..... $130 \pm 10 \text{ N}\cdot\text{m}$ ($96 \pm 7 \text{ lb ft}$)
- (11) Installation torque for the plug $65 \pm 6 \text{ N}\cdot\text{m}$
($48 \pm 4 \text{ lb ft}$)

Note: 1 inch pipe with NPTF pipe thread needed to activate the valve for draining.

- (12) As required use, 215-9665 Shim Pack to obtain proper mesh bevel gear backlash and contact pattern.

- Total thickness of shim pack $4.00 \pm 0.31 \text{ mm}$
($0.157 \pm 0.012 \text{ inch}$)
- Quantity of 0.05 mm (0.002 inch) thickness shim Three
- Quantity of 0.15 mm (0.006 inch) thickness shim Five
- Quantity of 0.8 mm (0.03 inch) thickness shim Four

- (13) As required use, 215-9666 Shim Pack to obtain proper mesh bevel gear backlash and contact pattern.

Total thickness of the shim pack .. 2.65 ± 0.31 mm
(0.104 ± 0.012 inch)

Quantity of 0.05 mm (0.002 inch) thickness
shim Three

Quantity of 0.15 mm (0.006 inch) thickness
shim Six

Quantity of 0.8 mm (0.03 inch) thickness
shim Two

(14) Torque for eight bolts 300 ± 40 N·m
(221 ± 30 lb ft)

Reference: See the Power Train Specifications,
“Differential and Bevel Gear” for more information.

i04038547

Rear Axle

SMCS Code: 3278

Part No.: 284 - 5026
S/N: B9H1-Up

Part No.: 284 - 5026
S/N: R9H1-Up

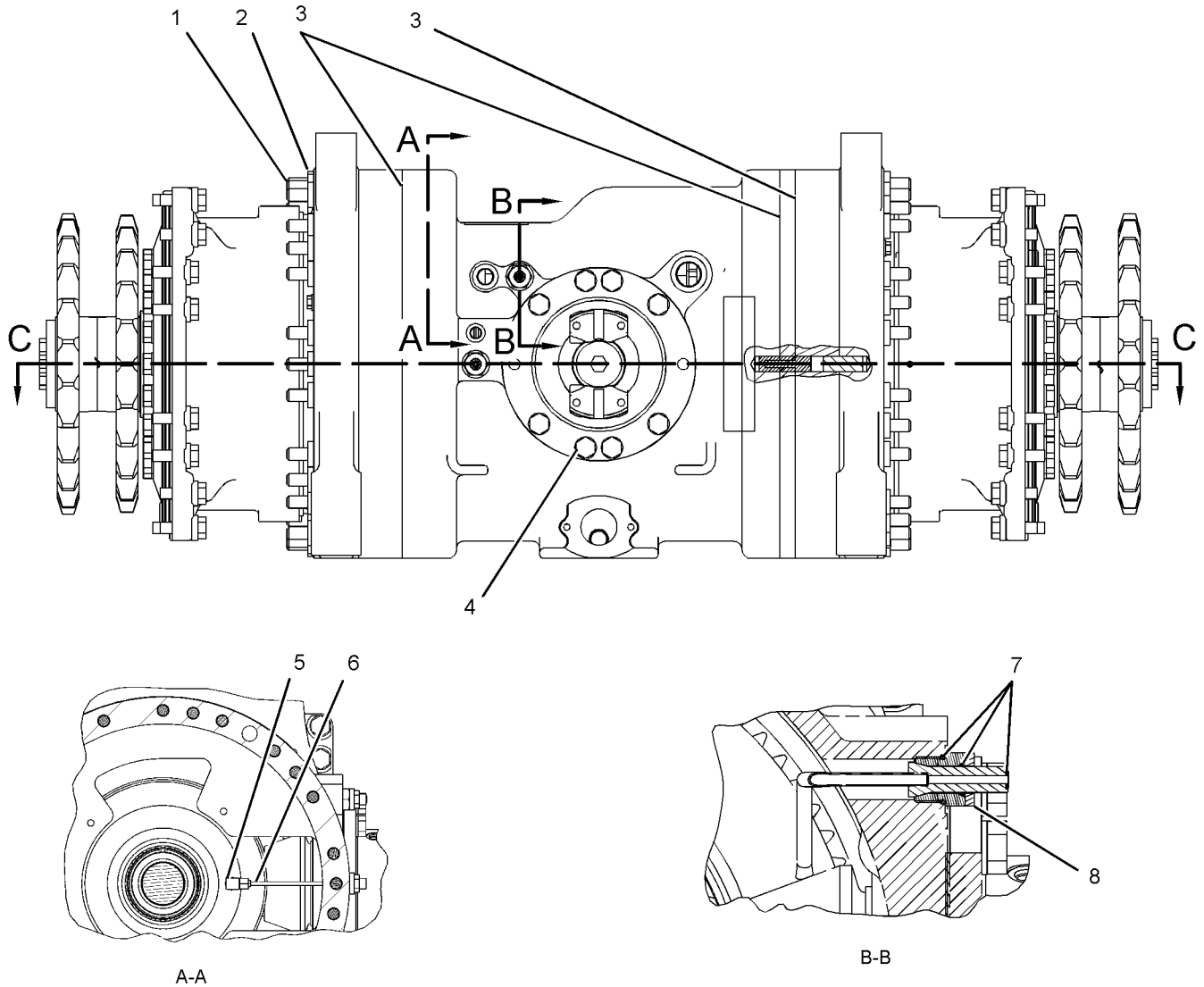


Illustration 24

g02242653

- | | |
|---|--|
| (1) Torque for 54 studs 212 ± 30 N·m
(156 ± 22 lb ft) | (4) Torque for eight bolts 520 ± 70 N·m
(384 ± 52 lb ft) |
| (2) Torque for 54 full nuts 520 ± 70 N·m
(384 ± 52 lb ft) | (5) Torque for the elbow assembly 22 ± 2 N·m
(195 ± 18 lb in) |
| (3) Apply blue Loctite High Flex GM prior to assembly. Make sure that the surfaces are clean prior to applying the sealant. | (6) Torque for the tube assembly 25 ± 3 N·m
(221 ± 27 lb in) |

- (7) Lightly lubricate the bores, O-ring seals, and the shaft with the lubricant that is being sealed.
- (8) Torque for two nuts $105 \pm 10 \text{ N}\cdot\text{m}$ ($77 \pm 7 \text{ lb ft}$)

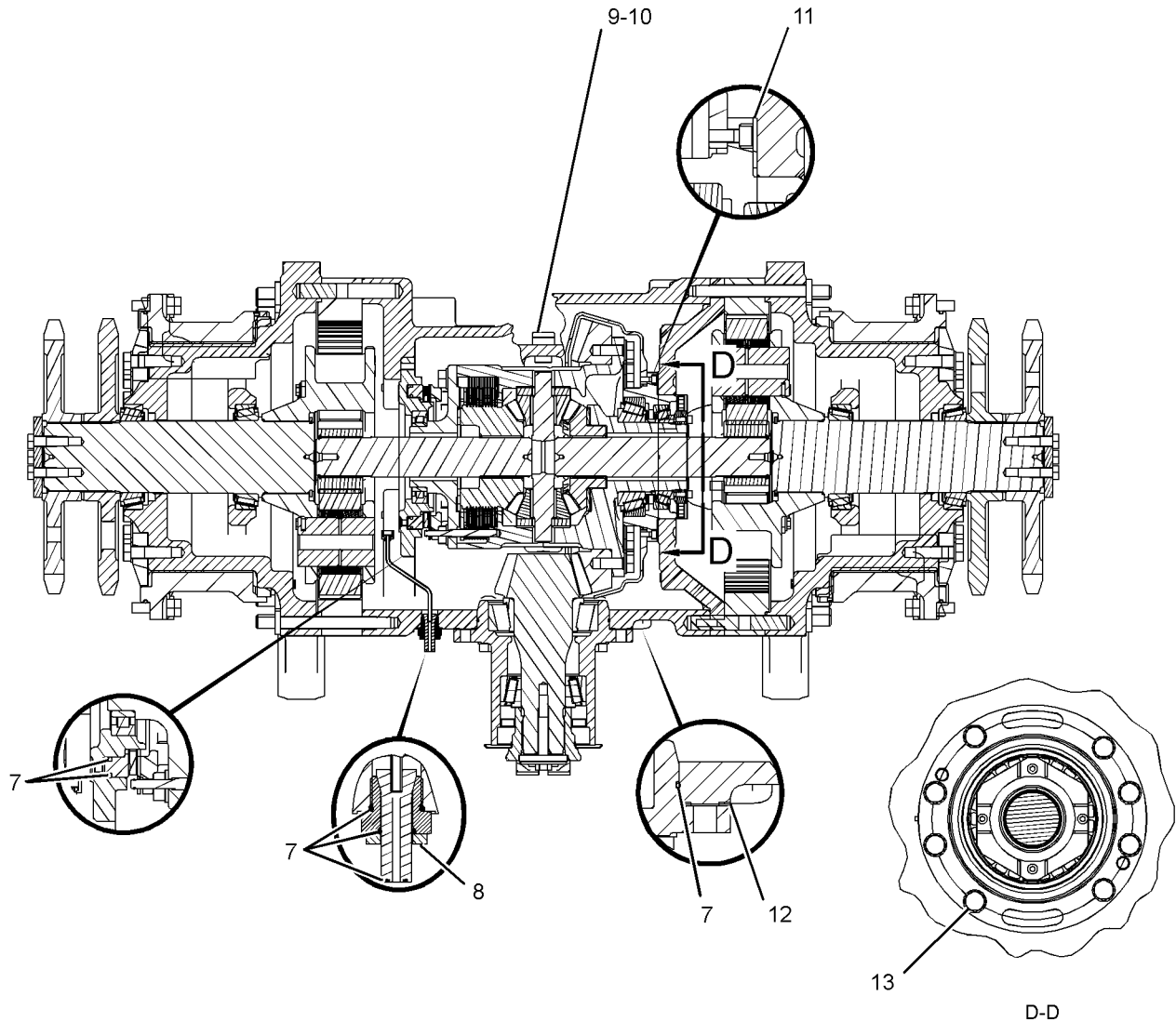


Illustration 25
Section C-C

g02242654

- (9) Installation torque for the ecology drain
..... $130 \pm 10 \text{ N}\cdot\text{m}$ ($96 \pm 7 \text{ lb ft}$)
- (10) Installation torque for the plug $65 \pm 6 \text{ N}\cdot\text{m}$
($48 \pm 4 \text{ lb ft}$)

Note: 1 inch pipe with NPTF pipe thread needed to activate the valve for draining.

(11) 215-9665 Shim Pack

Total thickness of shim pack $4.00 \pm 0.31 \text{ mm}$
($0.157 \pm 0.012 \text{ inch}$)
Quantity of 0.05 mm (0.002 inch) thickness
shim Three

Quantity of 0.15 mm (0.006 inch) thickness
shim Five
Quantity of 0.8 mm (0.03 inch) thickness
shim Four

- (12) As required use, 215-9666 Shim Pack to obtain proper mesh bevel gear backlash and contact pattern.

Total thickness of the shim pack .. $2.65 \pm 0.31 \text{ mm}$
($0.104 \pm 0.012 \text{ inch}$)
Quantity of 0.05 mm (0.002 inch) thickness
shim Three
Quantity of 0.15 mm (0.006 inch) thickness
shim Six

Quantity of 0.8 mm (0.03 inch) thickness shim Two

(13) Torque for eight bolts 300 ± 40 N·m
(221 ± 30 lb ft)

Reference: See the Power Train Specifications, "Differential and Bevel Gear" for more information.

i04027309

Differential and Bevel Gear

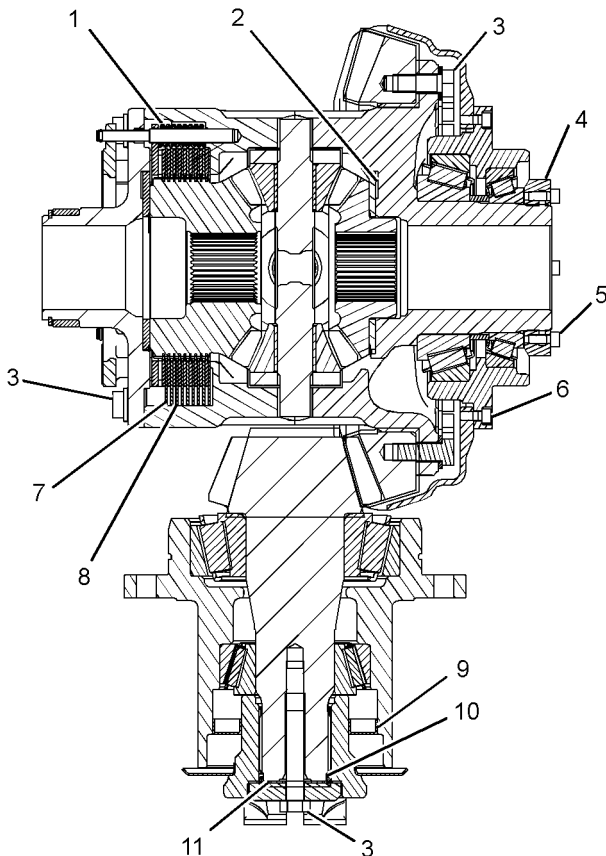
SMCS Code: 3256; 3258

Part No.: 272-5612

S/N: B9J1-Up

Part No.: 272-5612

S/N: R9J1-Up



(2) Assemble the washer with the groove side against the gear.

Reference: For the correct installation of the thrust washer (2), refer to the Disassembly and Assembly, "Differential and Bevel Gear - Assemble" for your machine.

(3) Torque for the bolts 300 ± 40 N·m
(221 ± 30 lb ft)

(4) Torque for the locknut assembly 300 ± 40 N·m
(221 ± 30 lb ft)

(5) Torque for bolts 28 ± 7 N·m (248 ± 62 lb in)

Note: Apply blue Loctite 242 to the threads of the bolts prior to assembly.

(6) Torque for bolts 28 ± 7 N·m (248 ± 62 lb in)

(7) Thickness of one new 205-4641 Separator Plate 2.00 ± 0.13 mm (0.079 ± 0.005 inch)

(8) Thickness of one new 217-4537 Friction Disc 2.87 ± 0.08 mm (0.113 ± 0.003 inch)

Minimum reusable thickness of one disc 2.70 mm (0.106 inch)

Note: Before assembly, lubricate both sides of the friction discs.

(9) Lightly, lubricate the sealing lip of the lip type seal with the lubricant that is being sealed.

(10) Lubricate the seal and the shaft, or lubricate the seal and the bore lightly with the lubricant that is being sealed.

(11) 271-8528 Shim Pack

Total thickness of shim pack .. 3.0 mm (0.12 inch)
Quantity of 0.025 mm (0.0010 inch) thickness shim Six
Quantity of 0.038 mm (0.0015 inch) thickness shim Four
Quantity of 0.15 mm (0.006 inch) thickness shim Eight
Quantity of 0.5 mm (0.02 inch) thickness shim Three

Illustration 26

g02212793

(1) 148-7841 Spring

Length under test force 37.1 mm (1.46 inch)
Test force 726 N (163 lb)
Free length after test 49.21 mm (1.937 inch)
Outside diameter 21.03 mm (0.828 inch)

Ecology Drain

i04027356

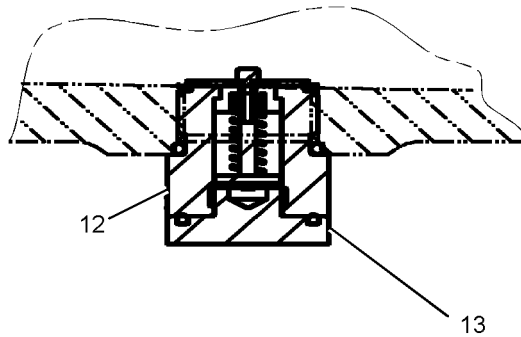


Illustration 27

g02212794

The ecology drain is located on the front of the center housing of the rear axle.

(12) Installation torque for the ecology drain $130 \pm 10 \text{ N}\cdot\text{m}$ ($96 \pm 7 \text{ lb ft}$)

(13) Installation torque for the plug $65 \pm 6 \text{ N}\cdot\text{m}$ ($48 \pm 4 \text{ lb ft}$)

Note: 1 inch pipe with NPTF pipe thread needed to activate the valve for draining.

Differential and Bevel Gear

SMCS Code: 3256; 3258

Part No.: 250-8204

S/N: B9H1-Up

Part No.: 250-8204

S/N: R9H1-Up

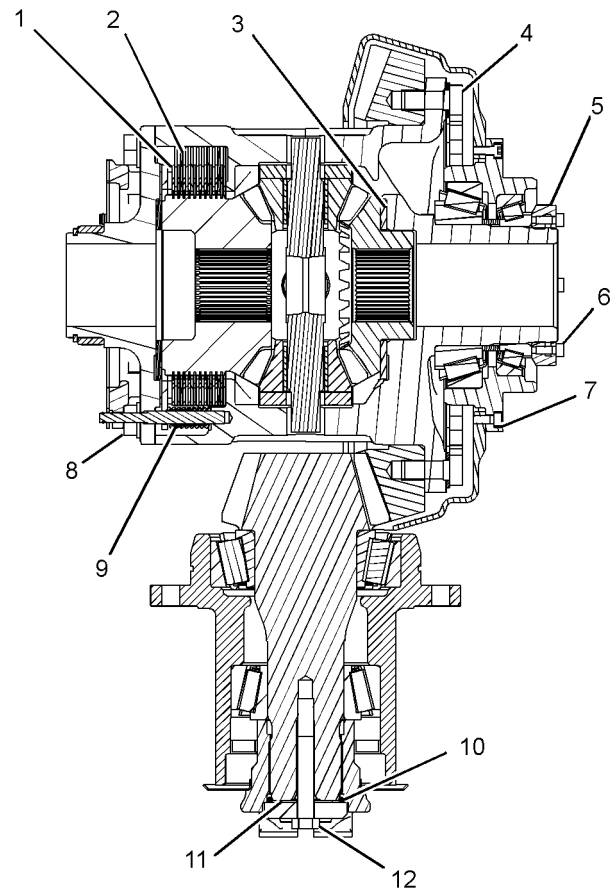


Illustration 28

g02213135

(1) Thickness of one new 217-4541 Friction Disc $2.87 \pm 0.08 \text{ mm}$ ($0.113 \pm 0.003 \text{ inch}$)

Minimum reusable thickness of one friction disc 2.70 mm (0.106 inch)

Note: Before assembly, lubricate both sides of the friction discs.

(2) Thickness of one new 270-1778 Separator Plate $2.50 \pm 0.13 \text{ mm}$ ($0.098 \pm 0.005 \text{ inch}$)

(3) Assemble the washer with the groove side against the gear.

Reference: For the correct installation of the thrust washer (3), refer to the Disassembly and Assembly, "Differential and Bevel Gear - Assemble" for your machine.

- (4) Torque for bolts 570 ± 80 N·m (420 ± 59 lb ft)
- (5) Torque for the locknut assembly 300 ± 40 N·m (221 ± 30 lb ft)
- (6) Torque for bolts 28 ± 7 N·m (248 ± 62 lb in)
- (7) Torque for bolts 28 ± 7 N·m (248 ± 62 lb in)

Note: Apply blue Loctite 242 to the threads of the bolts prior to assembly.

- (8) Torque for bolts 530 ± 30 N·m (391 ± 22 lb ft)
- (9) 148-7841 Spring
 - Length under test force 37.1 mm (1.46 inch)
 - Test force 726 N (163 lb)
 - Free length after test 49.21 mm (1.937 inch)
 - Outside diameter 21.03 mm (0.828 inch)

- (10) Lubricate the seal and the shaft, or lubricate the seal and the bore lightly with the lubricant that is being sealed.

- (11) 271-8528 Shim Pack
 - Total thickness of shim pack .. 3.0 mm (0.12 inch)
 - Quantity of 0.025 mm (0.0010 inch) thickness shim Six
 - Quantity of 0.038 mm (0.0015 inch) thickness shim Four
 - Quantity of 0.15 mm (0.006 inch) thickness shim Eight
 - Quantity of 0.5 mm (0.02 inch) thickness shim Three

- (12) Torque for the self locking bolt 300 ± 40 N·m (221 ± 30 lb ft)

Ecology Drain

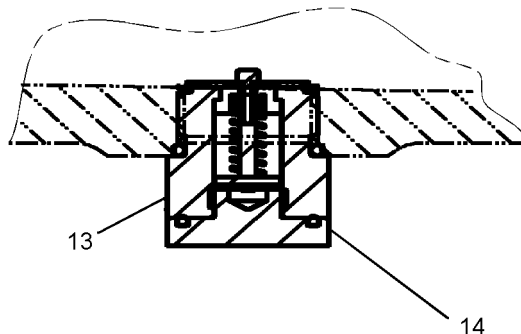


Illustration 29

g02213075

The ecology drain is located on the front of the center housing of the rear axle.

- (13) Installation torque for the ecology drain 130 ± 10 N·m (96 ± 7 lb ft)
- (14) Installation torque for the plug 65 ± 6 N·m (48 ± 4 lb ft)

Note: 1 inch pipe with NPTF pipe thread needed to activate the valve for draining.

i02858272

Solenoid Valve (Differential Lock)

SMCS Code: 3264; 3272; 5479

Part No.: 250-2139

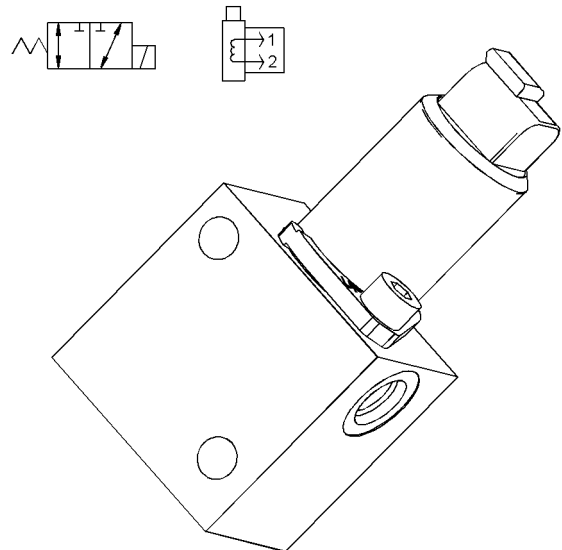


Illustration 30

g01098405

Coil

Nominal voltage 24 VDC
 Resistance at 20 ± 5 °C (68 ± 9 °F) 30.0 ± 1.5 ohms

i04027234

Final Drive

SMCS Code: 4050

Part No.: 285-0256, 285-0258
S/N: B9J1-Up

Part No.: 285-0256, 285-0258
S/N: R9J1-Up

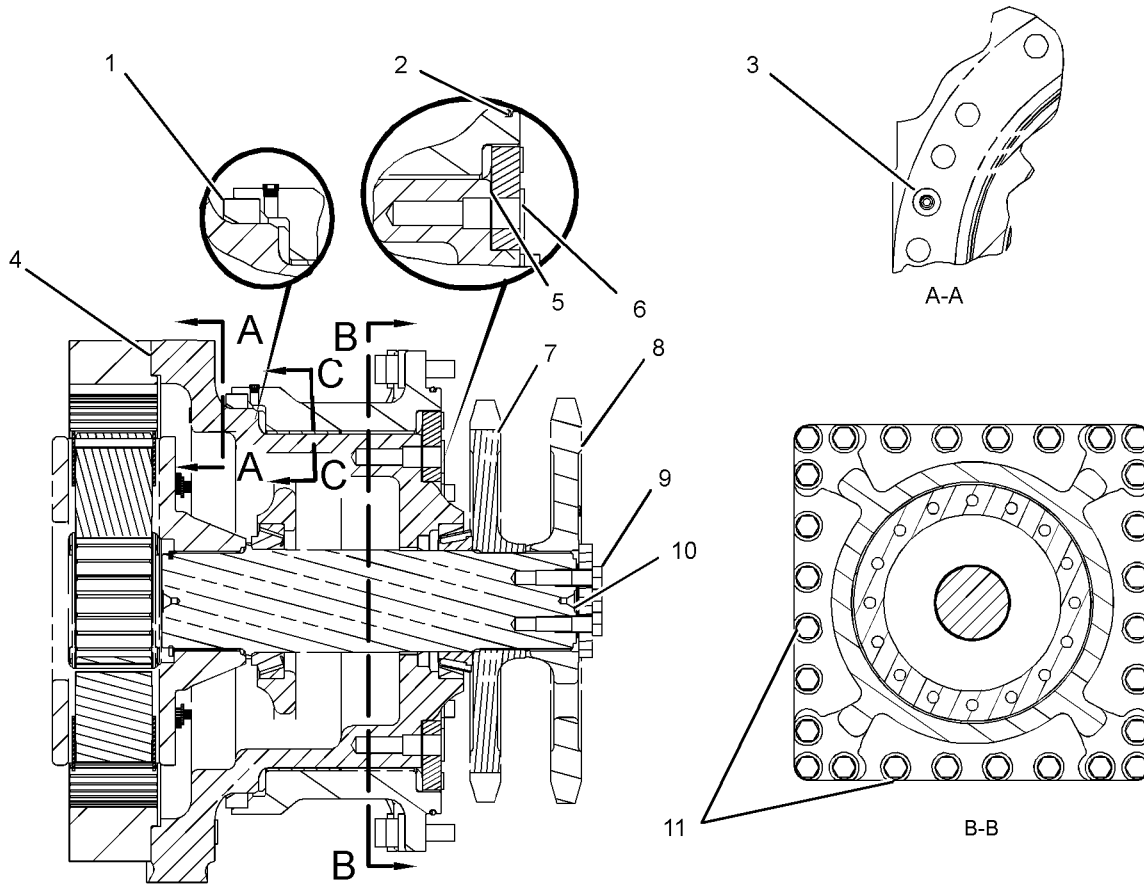


Illustration 31

g02212588

- (1) Lightly lubricate the sealing lip of the lip type seal with the lubricant that is being sealed.
- (2) Lightly lubricate the O-ring seal with the lubricant that is being sealed.
- (3) Torque for three bolts $105 \pm 20 \text{ N}\cdot\text{m}$
($75 \pm 15 \text{ lb ft}$)
- (4) Clean the surfaces of the parts in order to be free of oil, grease, fuel, or any other contaminants. Apply blue Loctite High Flex GM to the mating parts.
- (5) To obtain proper bearing preload, use the following shims:

Total thickness of 260-2989 Shim Pack $1.10 \pm 0.25 \text{ mm}$ ($0.043 \pm 0.010 \text{ inch}$)
Quantity of 0.20 mm (0.008 inch) thickness shim Four
Quantity of 0.05 mm (0.002 inch) thickness shim Six

- (6) Torque for bolts $520 \pm 70 \text{ N}\cdot\text{m}$ ($384 \pm 52 \text{ lb ft}$)

Reference: For the correct setting of end play (7), refer to Disassembly and Assembly, "Final Drive - Assemble" for your machine.

Reference: For the correct assembly of the sprocket (8), refer to Disassembly and Assembly, "Final Drive - Assemble" for your machine.

(9) Torque for bolts 270 ± 40 N·m (200 ± 30 lb ft)

(10) To obtain proper bearing pre-load, use the following shims. Refer to Disassembly and Assembly, "Final Drive - Assemble" for your machine for the correct procedure for setting the bearing preload.

Thickness of one 270-6942 Shim 0.12 mm
(0.005 inch)

Thickness of one 270-6943 Shim 0.18 mm
(0.007 inch)

Thickness of one 270-6944 Shim 0.5 mm
(0.02 inch)

Note: Do not use bolts (11) that are in the four corners to pull the final drive housing into initial contact with the tandem. when bolts (11) are removed for service apply, blue Loctite 242 to the threads of the bolts before assembly

(11) Torque for bolts 520 ± 70 N·m (384 ± 52 lb ft)

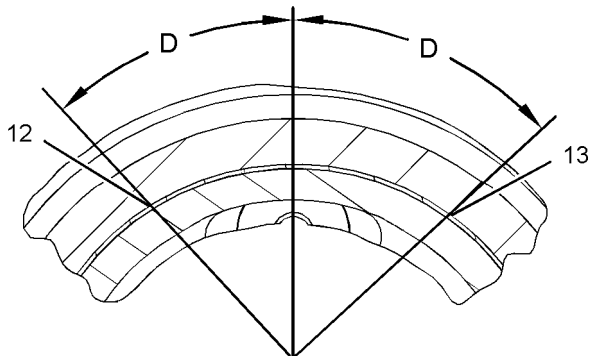


Illustration 32
Section C-C

g02212593

Note: The diagonal cut in the rings must be assembled within the point (12) and point (13).

(D) Angle for the diagonal cut in the rings 45 ± 10 degrees

i04021405

Final Drive

SMCS Code: 4050

Part No.: 284-5028, 284-5030
S/N: B9H1-Up

Part No.: 284-5028, 284-5030
S/N: R9H1-Up

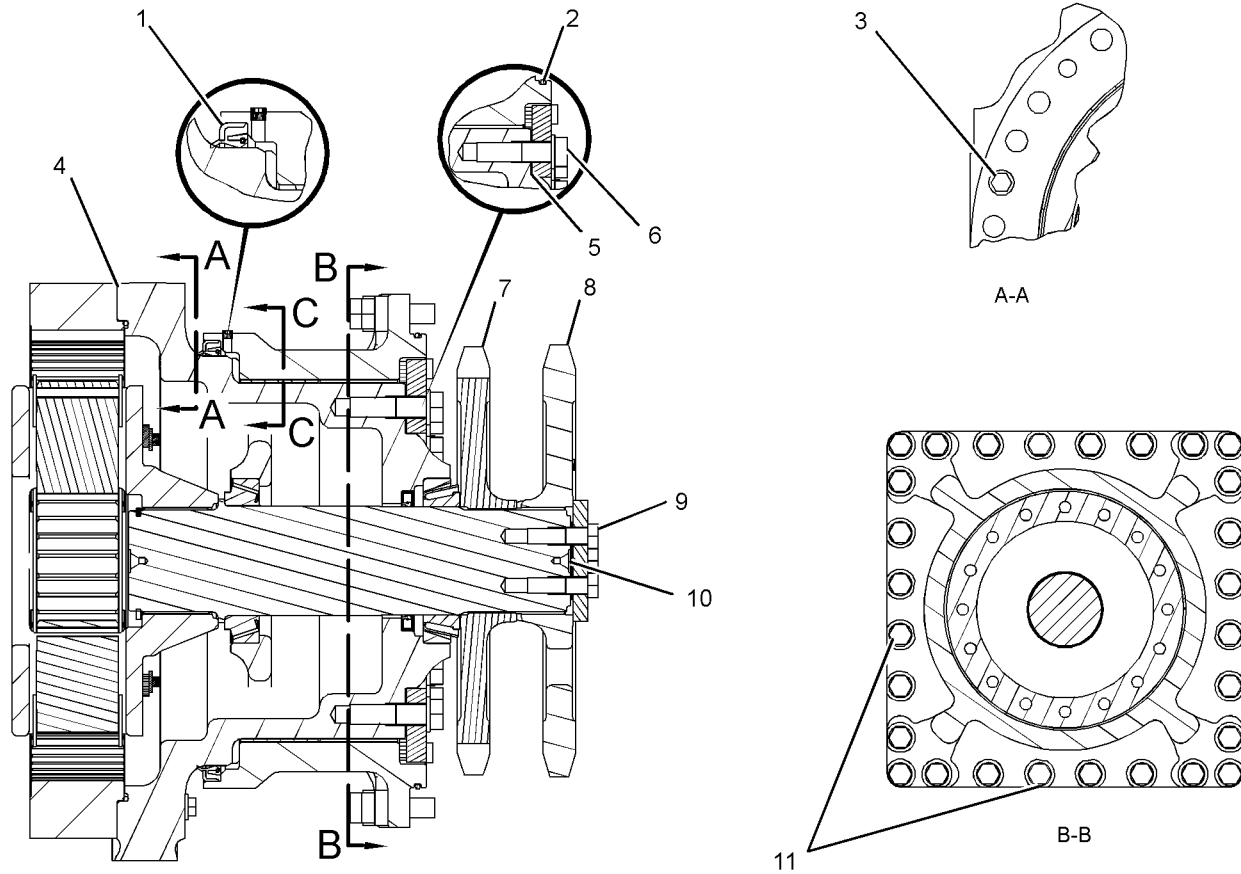


Illustration 33
Typical example

g02201393

- (1) Lightly lubricate the sealing lip of the lip type seal with the lubricant that is being sealed.
- (2) Lightly lubricate the O-ring seal with the lubricant that is being sealed.
- (3) Torque for three bolts 105 ± 20 N·m
(75 ± 15 lb ft)
- (4) Clean the surfaces of the parts in order to be free of oil, grease, fuel, or any other contaminants. Apply blue Loctite High Flex GM to the mating parts.

- (5) To obtain proper bearing preload, use the following shims:

Total thickness of 273-2460 Shim Pack 1.10 ± 0.25 mm (0.043 ± 0.010 inch)
Quantity of 0.20 mm (0.008 inch) thickness shim Four
Quantity of 0.05 mm (0.002 inch) thickness shim Six

- (6) Torque for bolts 520 ± 70 N·m (384 ± 52 lb ft)

Reference: For the correct setting of end play (7), refer to Disassembly and Assembly, "Final Drive - Assemble" for your machine.

Reference: For the correct assembly of the sprocket (8), refer to Disassembly and Assembly, "Final Drive - Assemble" for your machine.

(9) Torque for bolts 270 ± 40 N·m (200 ± 30 lb ft)

(10) To obtain proper bearing pre-load, use the following shims. Refer to Disassembly and Assembly, "Final Drive - Assemble" for your machine for the correct procedure for setting the bearing preload.

Thickness of one 273-7306 Shim 0.12 mm
(0.005 inch)

Thickness of one 273-7307 Shim 0.18 mm
(0.007 inch)

Thickness of one 273-7305 Shim 0.5 mm
(0.02 inch)

Note: Do not use bolts (11) that are in the four corners to pull the final drive housing into initial contact with the tandem. when bolts (11) are removed for service apply, blue Loctite 242 to the threads of the bolts before assembly

(11) Torque for bolts 520 ± 70 N·m (384 ± 52 lb ft)

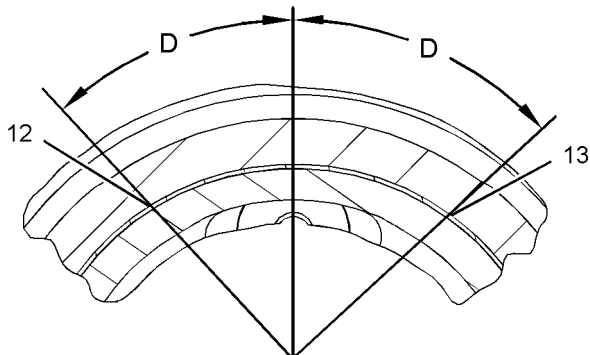


Illustration 34
Section C-C

g02199181

Note: The diagonal cut in the rings must be assembled within the point (12) and point (13).

(D) Angle for the diagonal cut in the rings 45 ± 10 degrees

i04021048

Tandem and Cover

SMCS Code: 4062; 4064

Part No.: 285-0600
S/N: B9J1-Up

Part No.: 285-0600
S/N: R9J1-Up

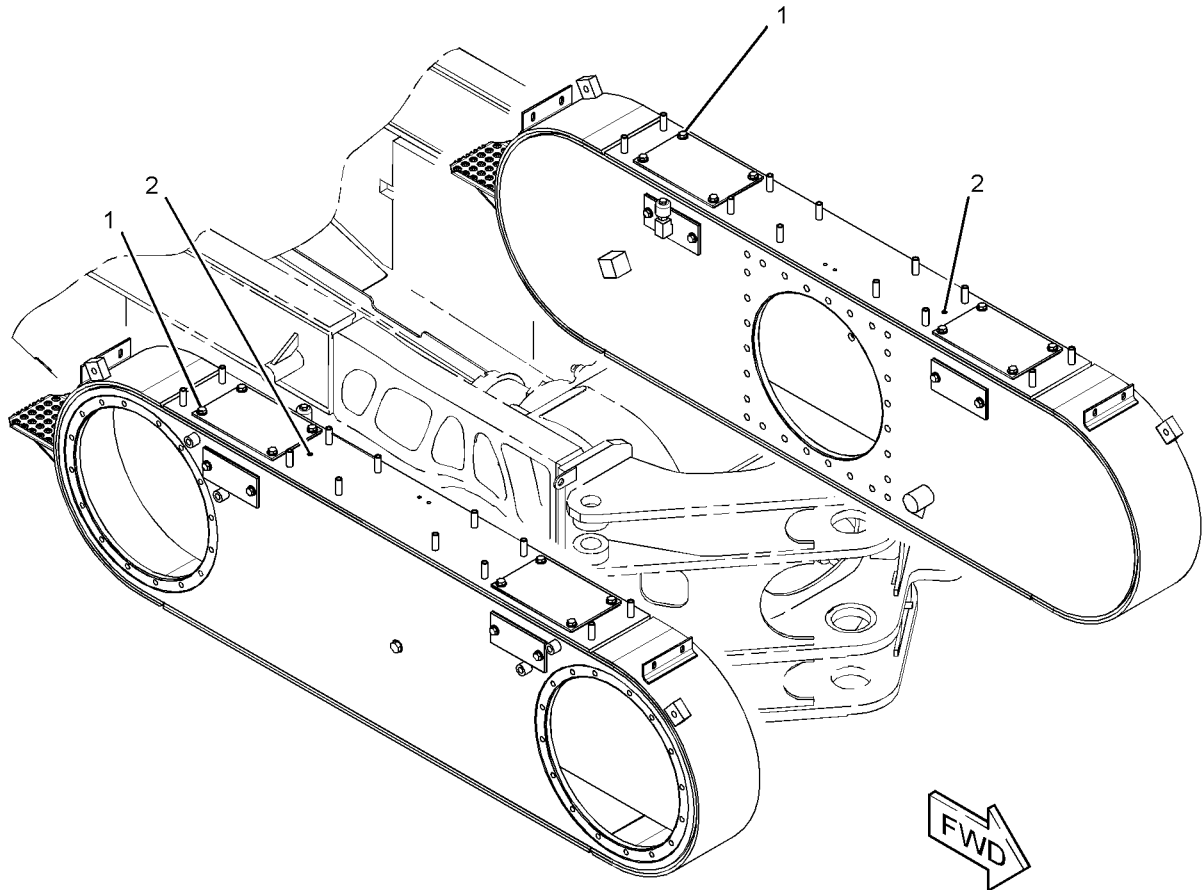


Illustration 35

g02196943

(1) Torque for 32 bolts 27 ± 7 N·m (239 ± 62 lb in)

(2) Apply white Loctite Low Breakloose PST to the threads of the pipe plugs.

i04021118

Tandem and Cover

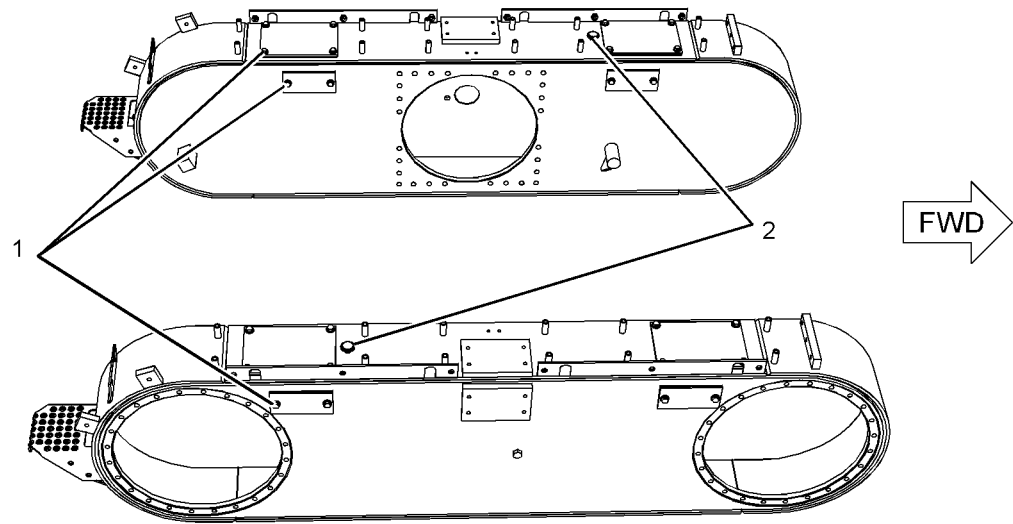
SMCS Code: 4062; 4064**Part No.:** 285-0604**S/N:** B9H1-Up**Part No.:** 285-0604**S/N:** R9H1-Up

Illustration 36
Typical example

g02197074

- (1) Torque for 32 bolts 27 ± 7 N·m (239 ± 62 lb in)
- (2) Apply white Loctite Low Breakloose PST to the threads of the pipe plugs.

i02864485

Drive Chain

SMCS Code: 4063

Part No.: 6G-1740
S/N: B9H1-Up

Part No.: 6G-1740
S/N: R9H1-Up

Part No.: 237-8197
S/N: B9J1-Up

Part No.: 237-8197
S/N: R9J1-Up

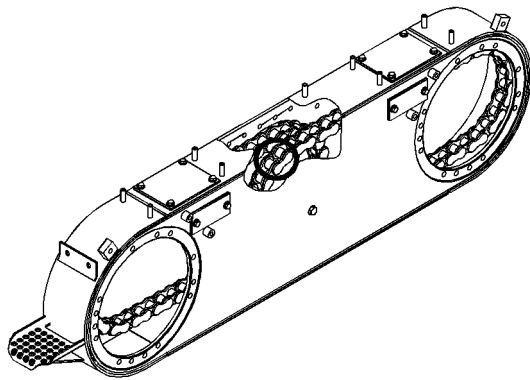


Illustration 37

g01286199

Reference: For the correct procedure for the installation of the connecting links, refer to Disassembly and Assembly, “Drive Chain - Install” for your machine.

Reference: For additional information on testing the wear of the chain, refer to Testing and Adjusting, “Drive Chain - Check” for your machine.

i04040842

Wheel and Mounting

SMCS Code: 4201-MT; 4208

Part No.: 286-0681, 286-0682
S/N: B9H1-Up

Part No.: 286-0681, 286-0682
S/N: R9H1-Up

Part No.: 284-5041, 284-5042
S/N: B9J1-Up

Part No.: 284-5041, 284-5042
S/N: R9J1-Up

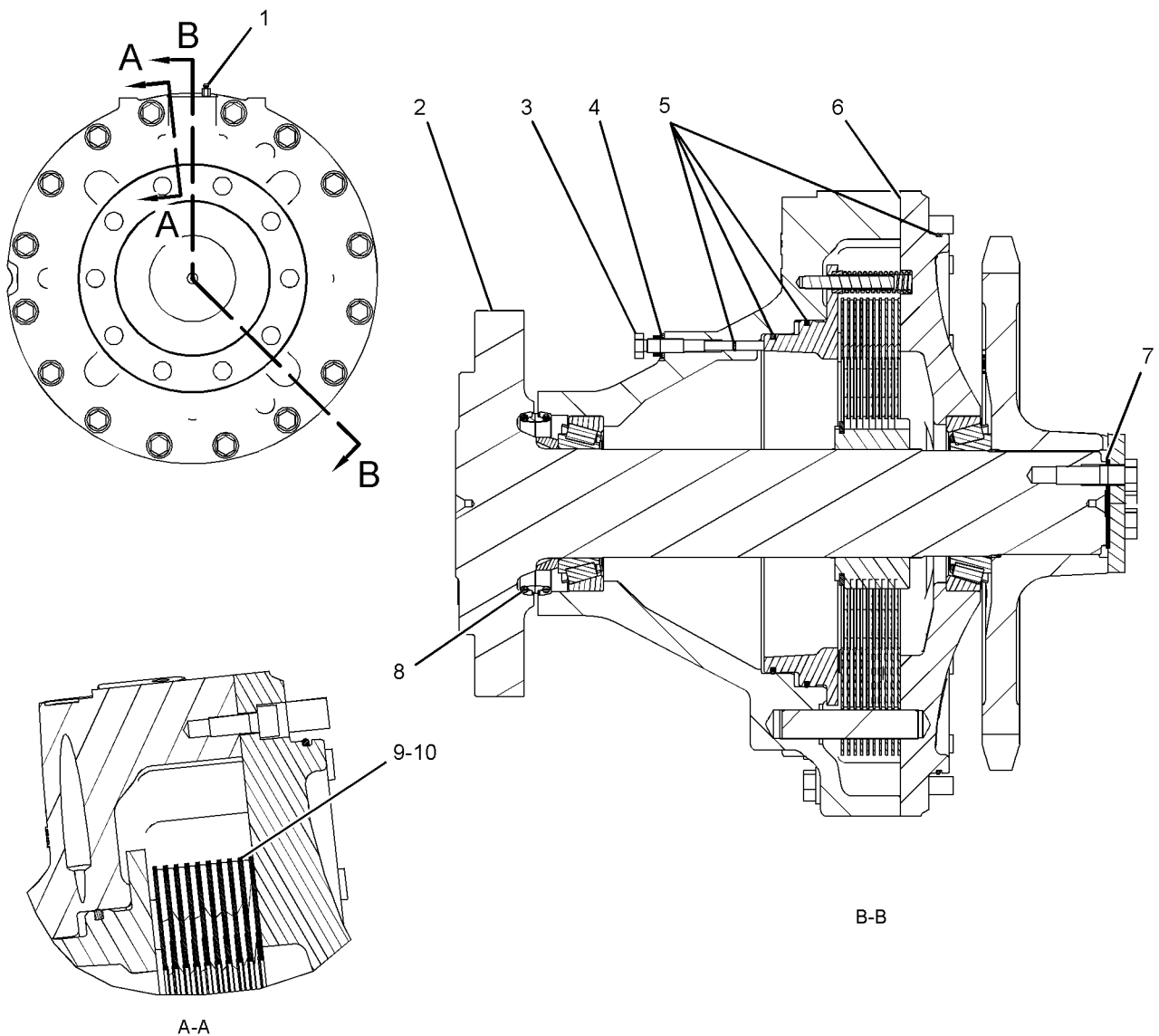


Illustration 38
Typical example

g02204676

Note: The front wheel group is shown. The sprocket for the rear wheel group will be mounted inboard.

(1) Torque for the purge screw $12 \pm 3 \text{ N}\cdot\text{m}$
($106 \pm 27 \text{ lb in}$)

i04040756

(2) Before assembly, make sure that the rim mounting surface of the spindle should be free of paint and grease.

(3) Torque for the nut 50 ± 10 N·m (37 ± 7 lb ft)

Note: Refer Hydraulic Brake and Fan Systems Operation/Testing and Adjusting, "Service Brakes" for more information.

(4) As required use the following washers as mentioned on assembly instructions

Thickness of one 284 - 8959 Washer 2.0 mm
(0.08 inch)

Thickness of one 284 - 8960 Washer 0.5 mm
(0.02 inch)

(5) Lightly lubricate the seals with the lubricant that is being sealed immediately before assembly.

(6) Clean all surfaces. Apply blue Loctite High Flex GM prior to assembling the wheel housing to the cover.

(7) To maintain proper bearing pre-load, use the following shims. Refer Disassembly and Assembly, "Final Drive - Assemble" of your machine for the correct procedure for setting the bearing preload.

Thickness of one 270 - 6942 Shim 0.12 mm
(0.005 inch)

Thickness of one 270 - 6943 Shim 0.18 mm
(0.007 inch)

Thickness of one 270 - 6944 Shim 0.50 mm
(0.020 inch)

(8) Rubber toric and all surfaces contacting the toric must be clean and dry at assembly. Apply a thin film of oil to the contacting surfaces of the metal seal rings before you assemble the rings. The seal rings must be assembled square with the bore. Also, the rings must be assembled square with the toric. The rings must not be bulged or twisted.

Note: Install the friction discs such that the ventilation holes are aligned.

(9) Thickness of one new 351 - 0925 Friction Disc 3.60 ± 0.08 mm (0.142 ± 0.003 inch)

(10) Thickness of one new 284 - 9557 Plate .. 1.910 ± 0.064 mm (0.0752 ± 0.0025 inch)

Wheel Group (Mounting)

SMCS Code: 4201; 4208

Part No.: 142-6233, 250-8213
S/N: B9H1-Up

Part No.: 250-8213
S/N: R9H1-Up

Part No.: 250-8213, 255-4966
S/N: B9J1-Up

Part No.: 250-8213, 255-4966
S/N: R9J1-Up

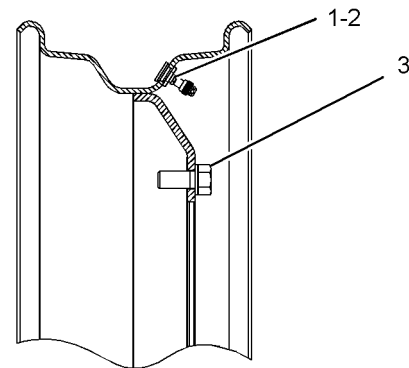


Illustration 39

g02247393

Note: Tighten the large nut first.

(1) Torque for large nut 21 ± 1 N·m (186 ± 9 lb in)

(2) Torque for small nut 9 ± 1 N·m (80 ± 9 lb in)

(3) Torque for bolts 1800 ± 200 N·m
(1328 ± 148 lb ft)

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