FORM NO. [illegible]
FOR USE IN SERVICE MANUAL
D8K TRACTOR REG01707
583K PIPELAYER SENR[illegible]
VOLUME I SPECIFICATIONS
REG01312

CATERPILLAR

D342

AGOSTO 1977

RUTHZIL TRATOR COMERCIAL DE PEÇAS LTDA 11 97083-6612 ROLANDO

SPECIFICATIONS

FOR

D342 VEHICULAR ENGINE

SERIAL NUMBERS
17S1-UP
50V1-UP

INTRODUCTION

The specifications given in this book are on the basis of information available at the time the book was written. These specifications give the torques, operating pressure, measurements of new parts, adjustments and other items that will affect the service of the product.

When the words "use again" are in the description, the specification given can be used to determine if a part can be used again. If the part is equal to or within the specification given, use the part again.

When the word "permissible" is in the description, the specification given is the "maximum or minimum" tolerance permitted before adjustment, repair and/or new parts are needed.

A comparison can be made between the measurements of a worn part, and the specifications of a new part to find the amount of wear. A part that is worn can be safe to use if an estimate of the remainder of its service life is good. If a short service life is expected, replace the part.

NOTE: The specifications given for "use again" and "permissible" are intended for guidance only and Caterpillar Tractor Co. hereby expressly denies and excludes any representation, warranty or implied warranty of the reuse of any component.

77200X1

NOTE: This book has been completely changed from the former issue.

D342 VEHICULAR ENGINE

Number of Cylinders 6
Bore and Stroke ..... 5 3/4" x 8"
Firing Order 1, 5, 3, 6, 2, 4

NOTE: For System Operation and Testing and Adjusting, make reference to the D342 VEHICULAR ENGINE, Form No. SENR7003.

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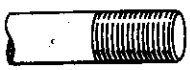
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GENERAL TIGHTENING TORQUE FOR BOLTS, NUTS AND TAPERLOCK STUDS



The following charts give the standard torque values for bolts, nuts and taperlock studs of SAE Grade 5 or better quality. Exceptions are given in other sections of the Service Manual where needed.

THREAD DIAMETER		STANDARD TORQUE	
inches	millimeters	lb. ft.	N·m*
Standard thread 		Use these torques for bolts and nuts with standard threads (conversions are approximate).	
1/4	6.35	9 ± 3	12 ± 4
5/16	7.94	18 ± 5	25 ± 7
3/8	9.53	32 ± 5	45 ± 7
7/16	11.11	50 ± 10	70 ± 15
1/2	12.70	75 ± 10	100 ± 15
9/16	14.29	110 ± 15	150 ± 20
5/8	15.88	150 ± 20	200 ± 25
3/4	19.05	265 ± 35	360 ± 50
7/8	22.23	420 ± 60	570 ± 80
1	25.40	640 ± 80	875 ± 100
1 1/8	28.58	800 ± 100	1100 ± 150
1 1/4	31.75	1000 ± 120	1350 ± 175
1 3/8	34.93	1200 ± 150	1600 ± 200
1 1/2	38.10	1500 ± 200	2000 ± 275
		Use these torques for bolts and nuts on hydraulic valve bodies.	
5/16	7.94	13 ± 2	20 ± 3
3/8	9.53	24 ± 2	35 ± 3
7/16	11.11	39 ± 2	50 ± 3
1/2	12.70	60 ± 3	80 ± 4
5/8	15.88	118 ± 4	160 ± 6
Taperlock stud 		Use these torques for studs with Taperlock threads.	
1/4	6.35	5 ± 2	7 ± 3
5/16	7.94	10 ± 3	15 ± 5
3/8	9.53	20 ± 3	30 ± 5
7/16	11.11	30 ± 5	40 ± 10
1/2	12.70	40 ± 5	55 ± 10
9/16	14.29	60 ± 10	80 ± 15
5/8	15.88	75 ± 10	100 ± 15
3/4	19.05	110 ± 15	150 ± 20
7/8	22.23	170 ± 20	230 ± 30
1	25.40	260 ± 30	350 ± 40
1 1/8	28.58	320 ± 30	400 ± 40
1 1/4	31.75	400 ± 40	550 ± 50
1 3/8	34.93	480 ± 40	650 ± 50
1 1/2	38.10	550 ± 50	750 ± 70

*1 newton meter (N·m) is approximately the same as 0.1 mkg.

FUEL INJECTION EQUIPMENT

Firing order (injection sequence) 1, 5, 3, 6, 2, 4

Injection timing before TC (top center) ..... 14° 17' ± 1°

(1) Torque for bushing .... 140 +10 −5 lb. ft. (190 +14 −7 N·m)

(2) Thickness of spacers:

- 5M2697 Spacer ..... .170 in. (4.32 mm)
- 2M4208 Spacer ..... .174 in. (4.42 mm)
- 2M4209 Spacer ..... .178 in. (4.52 mm)
- 2M4210 Spacer ..... .182 in. (4.62 mm)
- 2M4211 Spacer ..... .186 in. (4.72 mm)
- 2M4212 Spacer ..... .190 in. (4.83 mm)
- 5M2691 Spacer ..... .194 in. (4.93 mm)
- 5S7189 Spacer ..... .198 in. (5.03 mm)

(3) 1S7592 Spring:

- Length under test force ..... 1.522 in. (38.66 mm)
- Test force ..... 22.6 ± 1.1 lb. (100 ± 4 N)
- Free length after test ..... 1.751 in. (44.47 mm)
- Outside diameter ..... .995 in. (25,27 mm)

(4) Timing dimension for the fuel injection pumps:

On engine with 5P4158 or 8S7167 Gauge ..... 4.2956 ± .0020 in. (109,108 ± 0.051 mm)

Off engine with 5P4158 or 8S7167 Gauge ..... 4.3689 ± .0020 in. (110.970 ± 0.051 mm)

(5) Length of pump plunger ..... 2.7212 ± .0015 in. (69.118 ± 0.038 mm)

Minimum permissible length ..... 2.7147 in. (68.953 mm)

(6) Bore in the bearings for the rack:

Bearing at the rear .... .5018 ± .0018 in. (12.746 ± 0.046 mm)

Bearing at the front ... .5023 ± .0018 in. (12.758 ± 0.046 mm)

Diameter of fuel rack .. .4985 ± .0002 in. (12.662 ± 0.005 mm)

Maximum permissible clearance between rack and bearings:

- rear ..... .005 in. (0.13 mm)
- front ..... .006 in. (0.15 mm)

(7) Bore in bearings for the camshaft ..... 2.1250 ± .0005 in. (53.975 ± 0.013 mm)

Diameter of bearing surfaces (journals) of the camshaft ..... 2.1220 ± .0005 in. (53.899 ± 0.013 mm)

Maximum permissible clearance between the bearings and the camshaft bearing surfaces (journal) ..... .010 in. (0.25 mm)

(8) Torque for the nuts that hold the fuel lines using the 5P144 Fuel Line Socket ..... 30 ± 5 lb. ft. (40 ± 7 N·m)

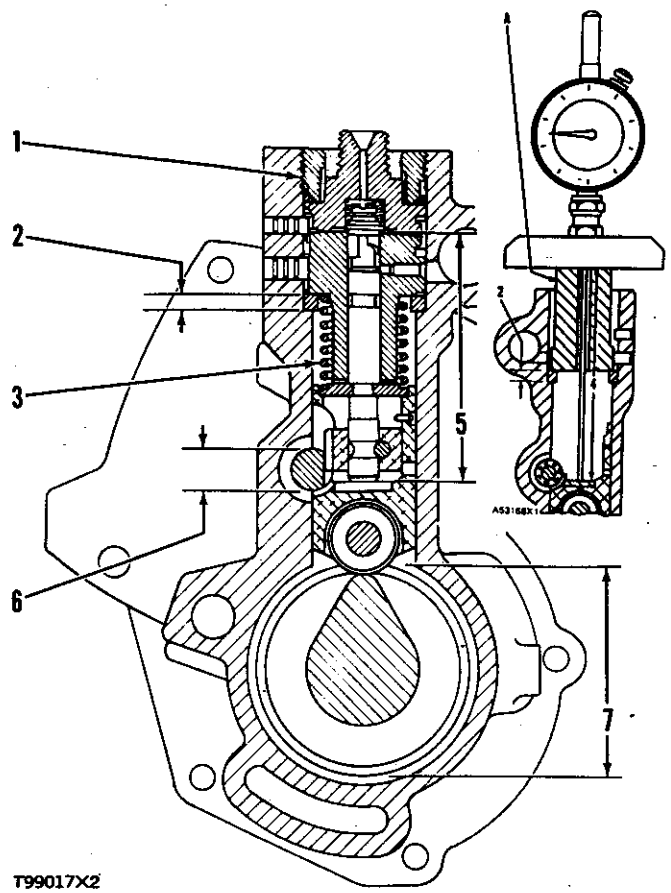
(9) Torque for the nuts that hold the nozzles ..... 105 ± 5 lb. ft. (142 ± 7 N·m)

(10) Body.

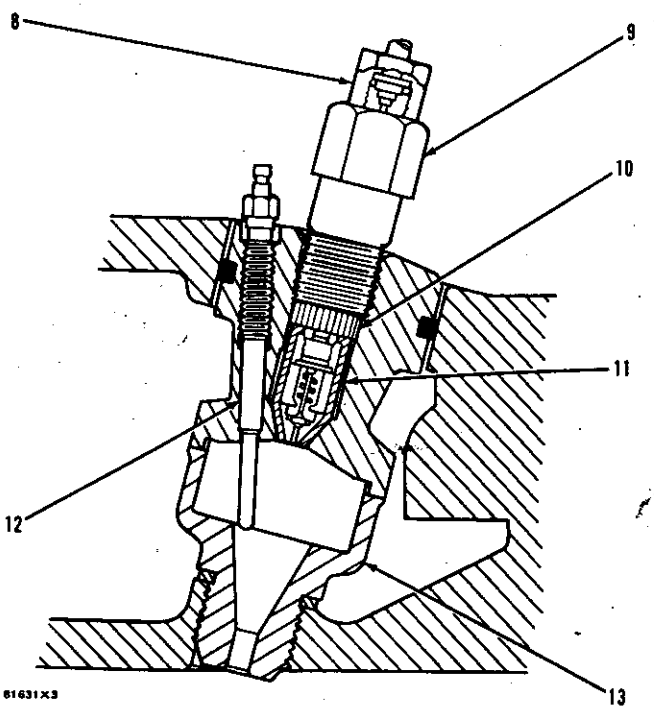
(11) Tighten nozzle finger tight in body (10).

(12) Torque for glow plug ..... 9 ± 1 lb. ft. (12 ± 1 N·m)

(13) Torque for precombustion chamber ..... 200 lb. ft. (270 N·m)



A. 5P4158 GAUGE ILLUSTRATED



NOTE: FOR TORQUE VALUES NOT GIVEN, SEE THE FIRST PAGE OF SPECIFICATIONS FOR GENERAL TIGHTENING TORQUES

FUEL TRANSFER PUMP

Pressure of fuel at full load speed to injection pump ..... 30 ± 5 psi (205 ± 35 kPa)

(1) Bore of bearing ..... .4953 ± .0003 in. (12.581 ± 0.008 mm)

(2) Depth of bore in body ..... .3750 ± .0003 in. (9.525 ± 0.008 mm)

(3) Torque for nut ..... 22 ± 5 lb. ft. (28 ± 7 N·m)

(4) Clearance between gear and cover ..... .0014 to .0026 in. (0.036 to 0.066 mm)

Maximum permissible clearance between gear and cover ..... .0035 in. (0.089 mm)

(5) Shaft diameter ..... .4937 ± .0001 in. (12.540 ± 0.003 mm)

Bore in shaft bearing ..... .4953 ± .0003 in. (12.581 ± 0.008 mm)

Maximum permissible clearance between shaft and bearing ..... .003 in. (0.08 mm)

(6) Bore in gear ..... .4926 ± .0003 in. (12.512 ± 0.008 mm)

Shaft diameter ..... .4914 ± .0003 in. (12.482 ± 0.008 mm)

(7) 2P4252 Spring:

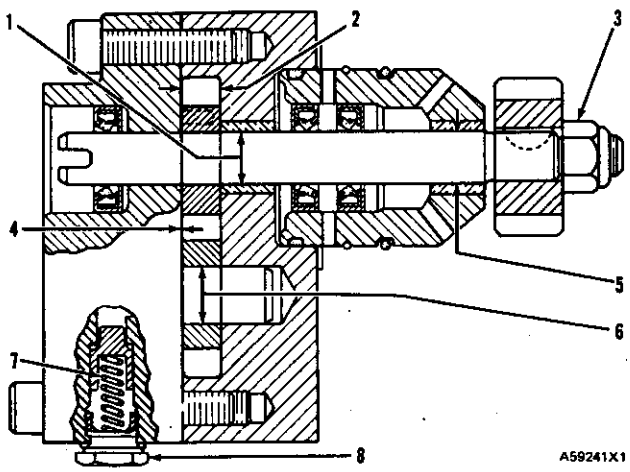
Length under test force ..... 1.75 in. (44.5 mm)

Test force ..... 2.03 ± .12 lb. (9.0 ± 0.5 N)

Free length after test ..... 1.97 in. (50.0 mm)

Outside diameter ..... .406 in. (10.31 mm)

(8) Torque for plug ..... 27 ± 3 lb. ft. (38 ± 4 N·m)



PRIMARY FUEL FILTER

(1) Tighten nut to ..... 23 ± 3 lb. ft. (29 ± 4 N·m)

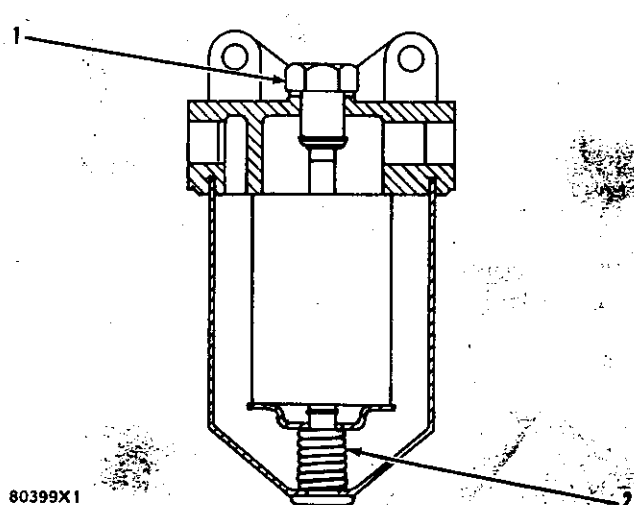
(2) 7S9323 Spring:

Length under test force ..... 1.10 in. (27.9 mm)

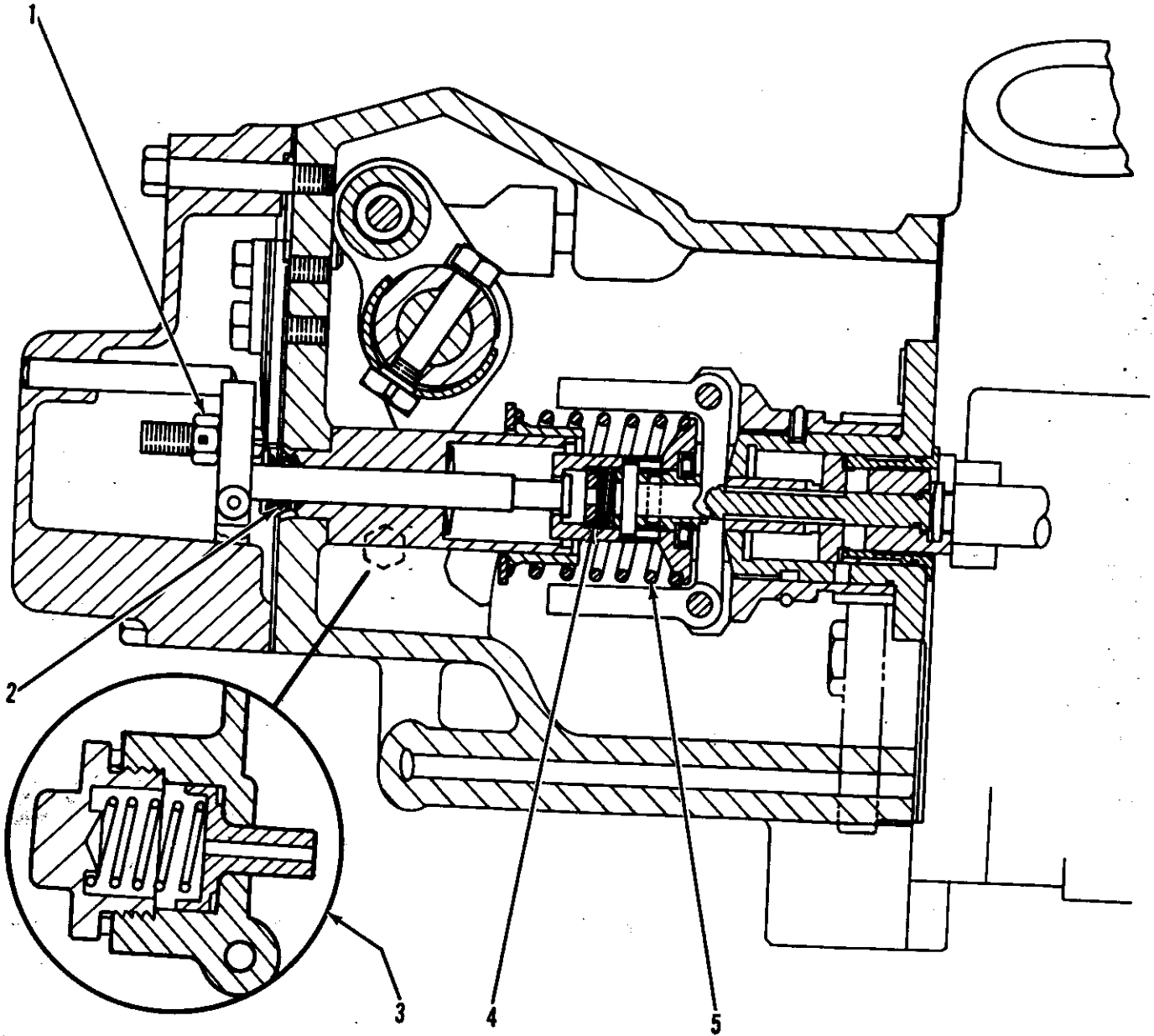
Test force ..... 27.7 to 32.3 lb. (123 to 144 N)

Free length after test ..... 1.68 in. (42.7 mm)

Outside diameter ..... .682 in. (17.32 mm)



GOVERNOR



(1) Torque for nut ..... 9 ± 3 lb. ft. (12 ± 4 N·m)

(2) 2S7235 Spring for collar guide:

Length under test force ..... .375 in. (9.53 mm)

Test force ..... .39 ± .03 lb. (1.75 ± 0.13 N)

Free length after test ..... .68 in. (17.3 mm)

Outside diameter ..... .425 in. (10.80 mm)

(3) Torque for plug ..... 27 ± 5 lb. ft. (38 ± 7 N·m)

1S9312 Spring for speed limiter:

Length under test force ..... .86 in. (21.8 mm)

Test force ..... 2.38 ± .19 lb. (10.60 ± 0.85 N)

Free length after test ..... 2.62 in. (66.5 mm)

Outside diameter ..... .671 in. (17.04 mm)

(4) 9M6303 Spring:

Length under test force ..... .180 in. (4.57 mm)

Test force ..... 10.0 ± .5 lb. (45 ± 2.2 N)

Free length after test ..... .344 in. (8.74 mm)

Outside diameter ..... .480 in. (12.19 mm)

(5) 4N5693 Spring for governor:

Put force on spring of ..... 4.0 lb. (18 N)

Then add more force to make spring shorter by ..... .900 in. (22.86 mm)

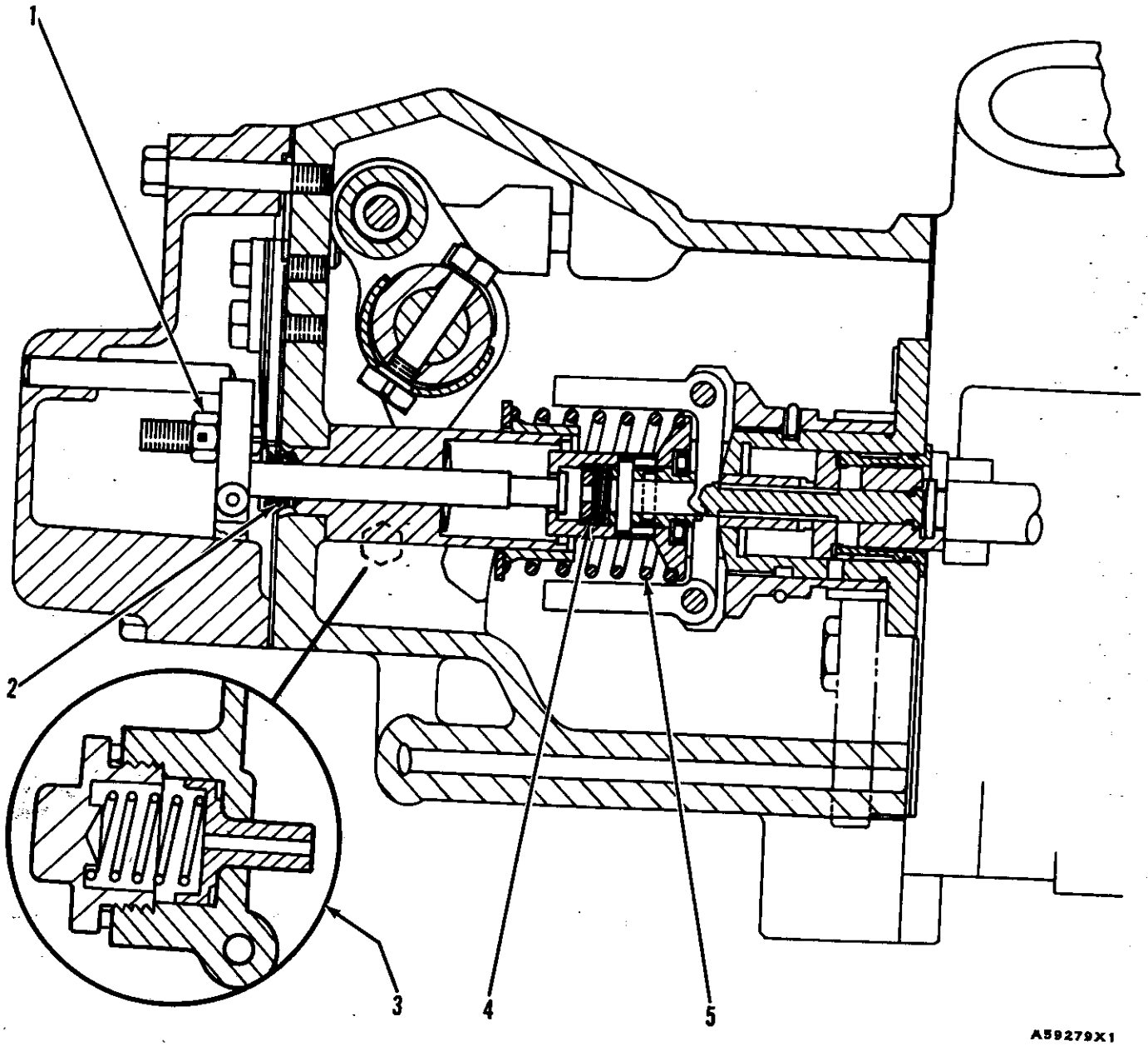
Total test force ..... 11.74 ± .38 lb. (52.25 ± 1.70 N)

Free length after test ..... 2.485 ± .030 in. (63.12 ± 0.76 mm)

Outside diameter ..... 1.361 in. (34.57 mm)

NOTE: FOR TORQUE VALUES NOT GIVEN, SEE THE FIRST PAGE OF SPECIFICATIONS FOR GENERAL TIGHTENING TORQUES

GOVERNOR



(1) Torque for nut ..... 9 ± 3 lb. ft. (12 ± 4 N·m)

(2) 2S7235 Spring for collar guide:

Length under test force ..... .375 in. (9.53 mm)

Test force ..... .39 ± .03 lb. (1.75 ± 0.13 N)

Free length after test ..... .68 in. (17.3 mm)

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(5) 4N5693 Spring for governor:

Put force on spring of ..... 4.0 lb. (18 N)

Then add more force to make spring shorter by ..... .900 in. (22.86 mm)

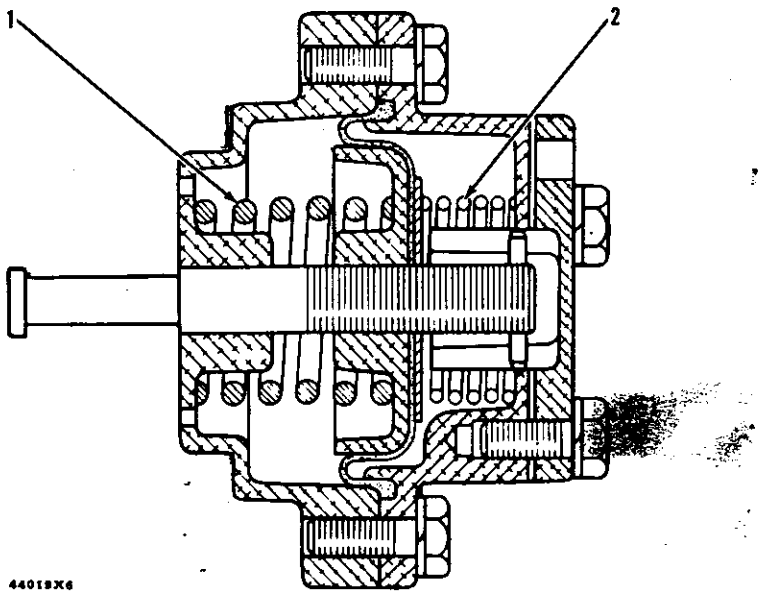
Total test force ..... 11.74 ± .38 lb. (52.25 ± 1.70 N)

Free length after test ..... 2.485 ± .030 in. (63.12 ± 0.76 mm)

Outside diameter ..... 1.361 in. (34.57 mm)

NOTE: FOR TORQUE VALUES NOT GIVEN, SEE THE FIRST PAGE OF SPECIFICATIONS FOR GENERAL TIGHTENING TORQUES

AIR-FUEL RATIO CONTROL



(1) 6N698 Spring:

Color code	one green stripe
Length under test force	1.375 in. (34.93 mm)
Test force	15 ± 1.0 lb. (67 ± 4 N)
Free length after test	1.500 in. (38.10 mm)
Outside diameter	1.28 in. (32.5 mm)

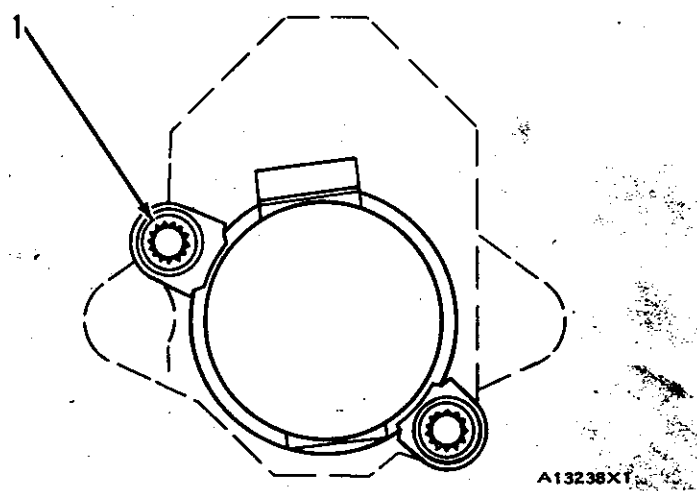
(2) 6N3017 Spring:

Color code	one red stripe
Length under test force	.660 in. (16.76 mm)
Test force	6.0 ± 1.0 lb. (27 ± 4 N)
Free length after test	1.30 in. (33.0 mm)
Outside diameter	1.28 in. (32.5 mm)

(2) 6N1606 Spring:

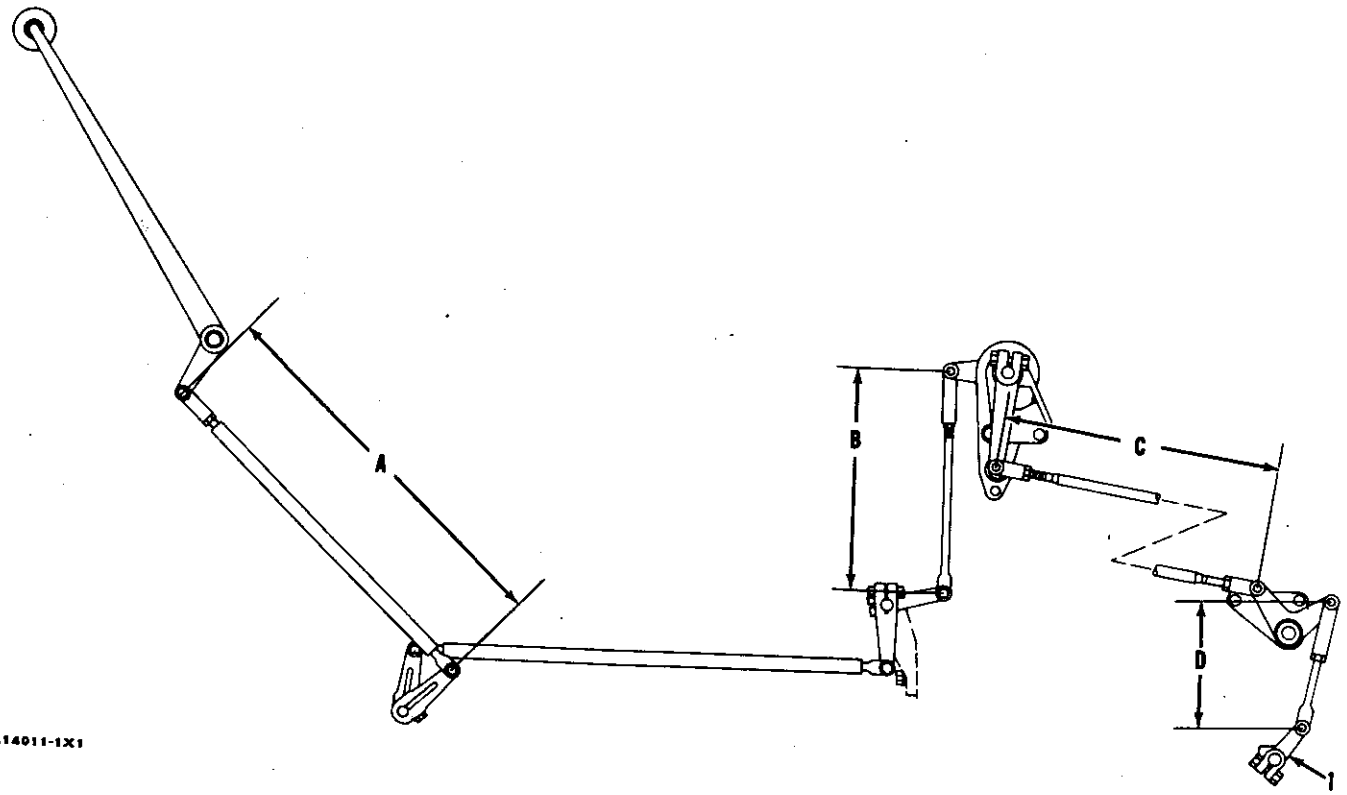
Color code	one green stripe
Length under test force	.955 in. (24.26 mm)
Test force	7.7 ± .45 lb. (34.0 ± 2.0 N)
Free length after test	1.38 in. (35.1 mm)
Outside diameter	1.268 in. (32.21 mm)

SERVICE METER



(1) Torque for bolts holding service meter to transfer pump ..... 8 ± 2 lb. ft. (11 ± 3 N·m)

GOVERNOR CONTROL LINKAGE
583K PIPELAYER



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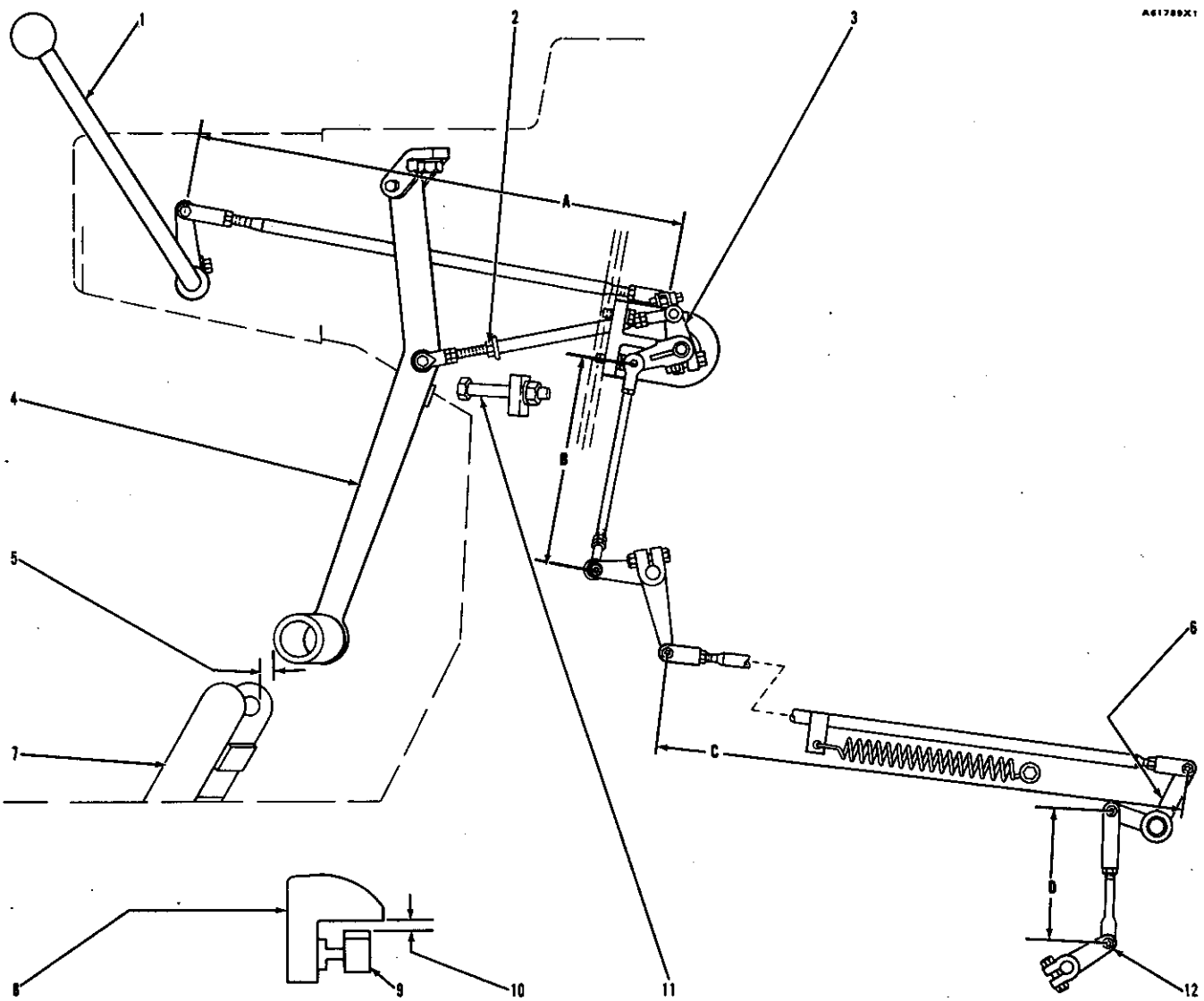
ADJUSTMENT PROCEDURE:

1. Move governor lever (1) to the **FUEL OFF** position.
2. Adjust linkage rods to the following lengths:

(A)	18.38 in. (466.9 mm)
(B)	10.50 in. (266.7 mm)
(C)	32.40 in. (823.0 mm)
(D)	6.00 in. (152.4 mm)

NOTE: FOR TORQUE VALUES NOT GIVEN, SEE THE FIRST PAGE OF SPECIFICATIONS FOR GENERAL TIGHTENING TORQUES

GOVERNOR AND DECELERATOR CONTROL LINKAGE
D8K POWER SHIFT & DIRECT DRIVE WITH MODULAR CAB



ADJUSTMENT PROCEDURE:

1. Adjust linkage rods to the dimensions in the chart.

NOTE: Earlier models used the 4H963 cast iron lever (6). Later models used the 8P3633 fabricated lever (6).

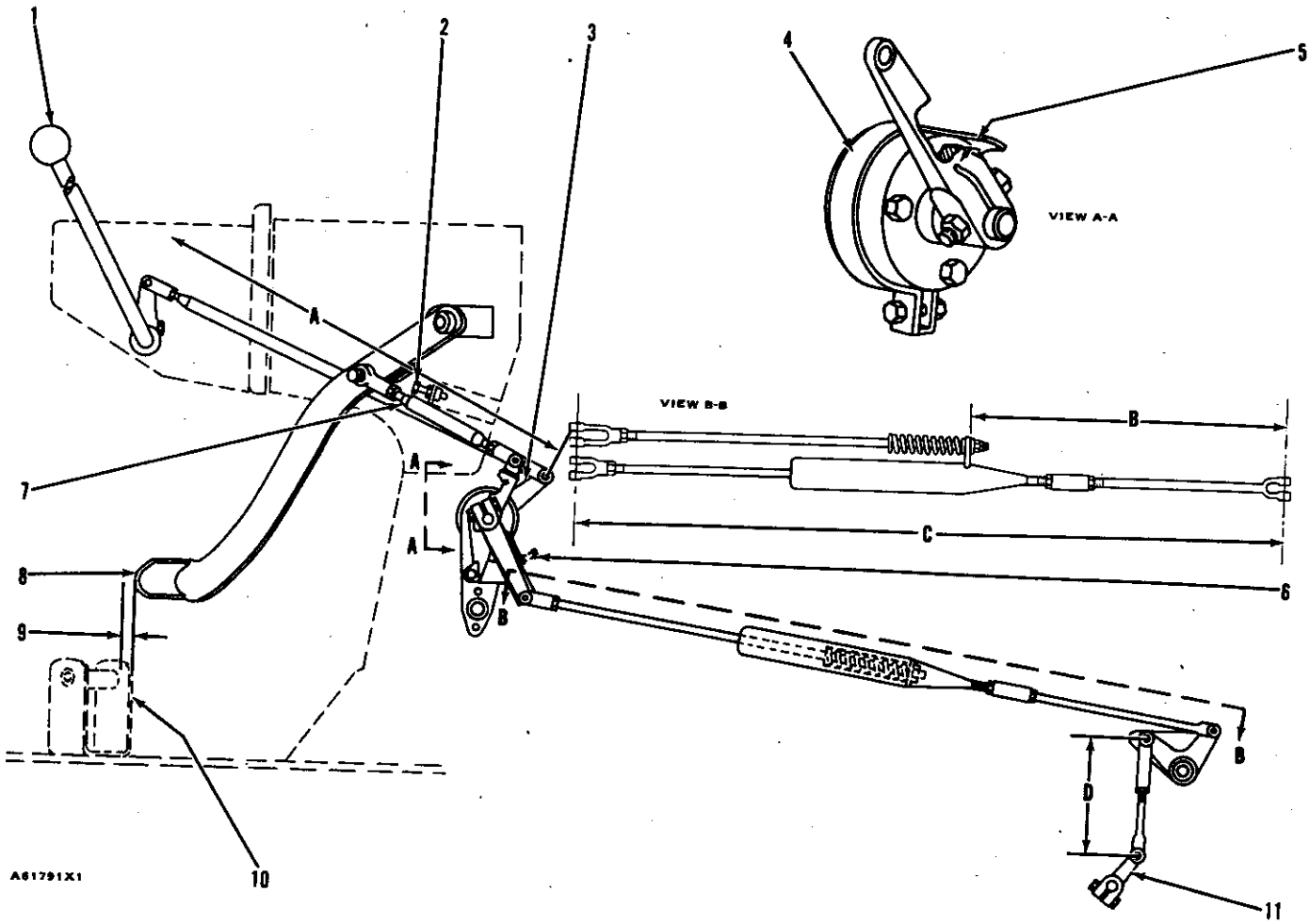
LINKAGE ROD DIMENSIONS IN INCHES (mm)		
	Earlier	Later
A	21.08 ± .12 (535.4 ± 3.1)	21.08 ± .12 (535.4 ± 3.1)
B	6.90 ± .12 (175.3 ± 3.1)	9.00 ± .12 (228.6 ± 3.1)
C	35.81 ± .12 (909.6 ± 3.1)	35.94 ± .12 (912.9 ± 3.1)
D	6.00 ± .12 (152.4 ± 3.1)	5.50 ± .12 (139.7 ± 3.1)

2. Start engine. Move governor lever (12) until engine speed is at high idle.
3. Push throttle handle (1) forward until lever (3) begins to move.
4. Adjust clamp (8) until dimension (10) between bracket (9) and clamp (8) is ..... .12 in. (3.1 mm)
5. Turn nut (2) until dimension (5) between footrest (7) and pedal (4) is ..... 1.65 in. (41.9 mm)
6. Adjust stopbolt (11) so that engine speed with pedal (4) depressed is ..... 650 rpm

GOVERNOR AND DECELERATOR CONTROL LINKAGE

D8K POWER SHIFT (Earlier)

D8K DIRECT DRIVE (Earlier Attachment)



ADJUSTMENT PROCEDURE:

1. Move governor lever (11) to the **FUEL OFF** position.
2. Adjust linkage rods to the following dimensions:

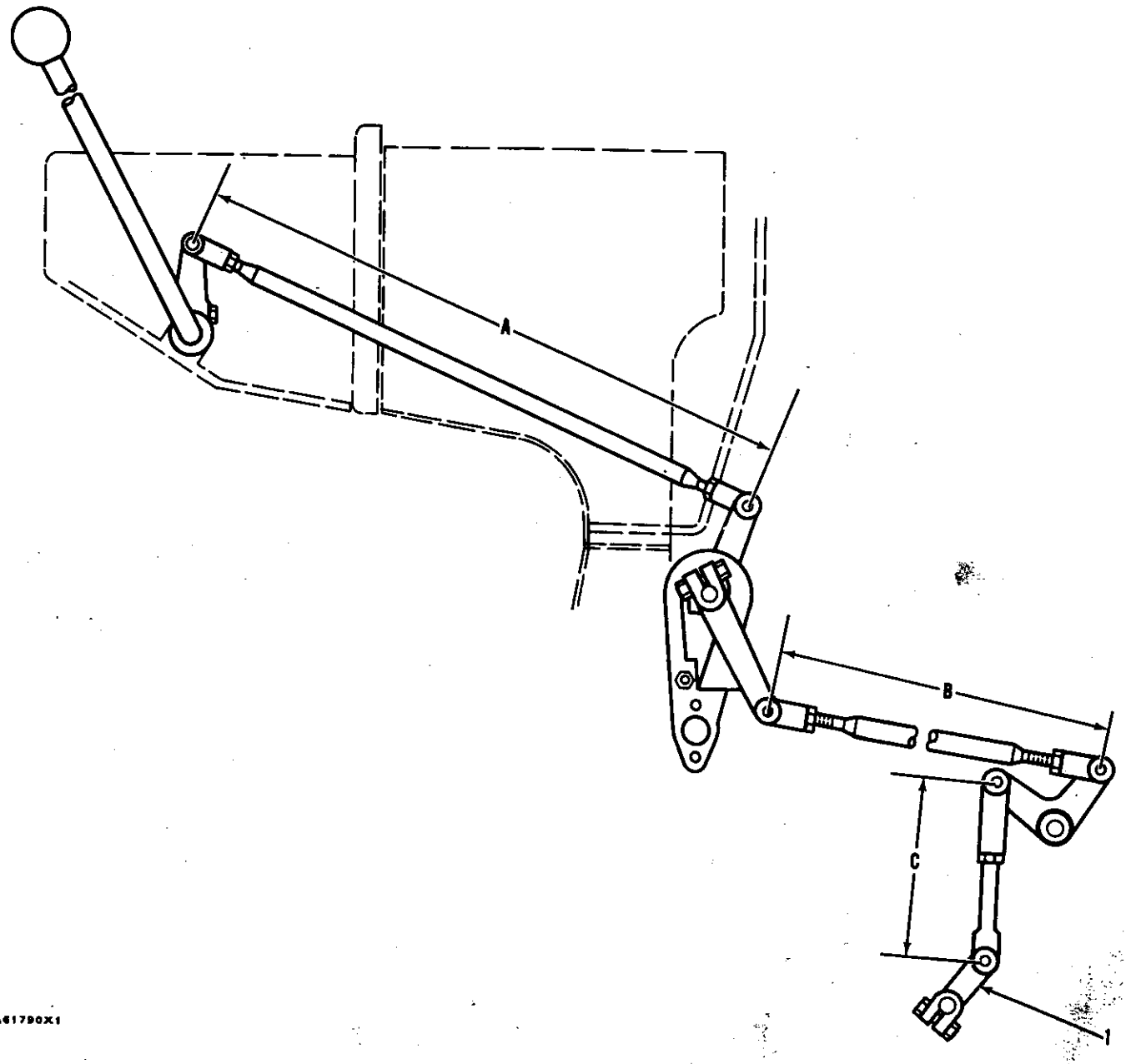
   (A) ..... 20.84 in. (529.3 mm)
   (B) ..... 16.14 in. (410.0 mm)
   (C) ..... 35.80 in. (909.3 mm)
   (D) ..... 6.00 in. (152.4 mm)

3. Start engine. Move governor lever (11) until engine speed is at high idle.
4. Adjust clamp (4) until the dimension (5) between clamp (4) and lever (3) is ..... .12 in. (3.1 mm)
5. Adjust rod (7) until dimension (9) between footrest (10) and pedal (8) is ..... 1.38 in. (35.1 mm)
6. Adjust stopbolt (2) or stopbolt (6) so that engine speed with pedal (8) depressed is ..... 650 rpm

NOTE: FOR TORQUE VALUES NOT GIVEN, SEE THE FIRST PAGE OF SPECIFICATIONS FOR GENERAL TIGHTENING TORQUES

GOVERNOR CONTROL LINKAGE

D8K DIRECT DRIVE (Early)



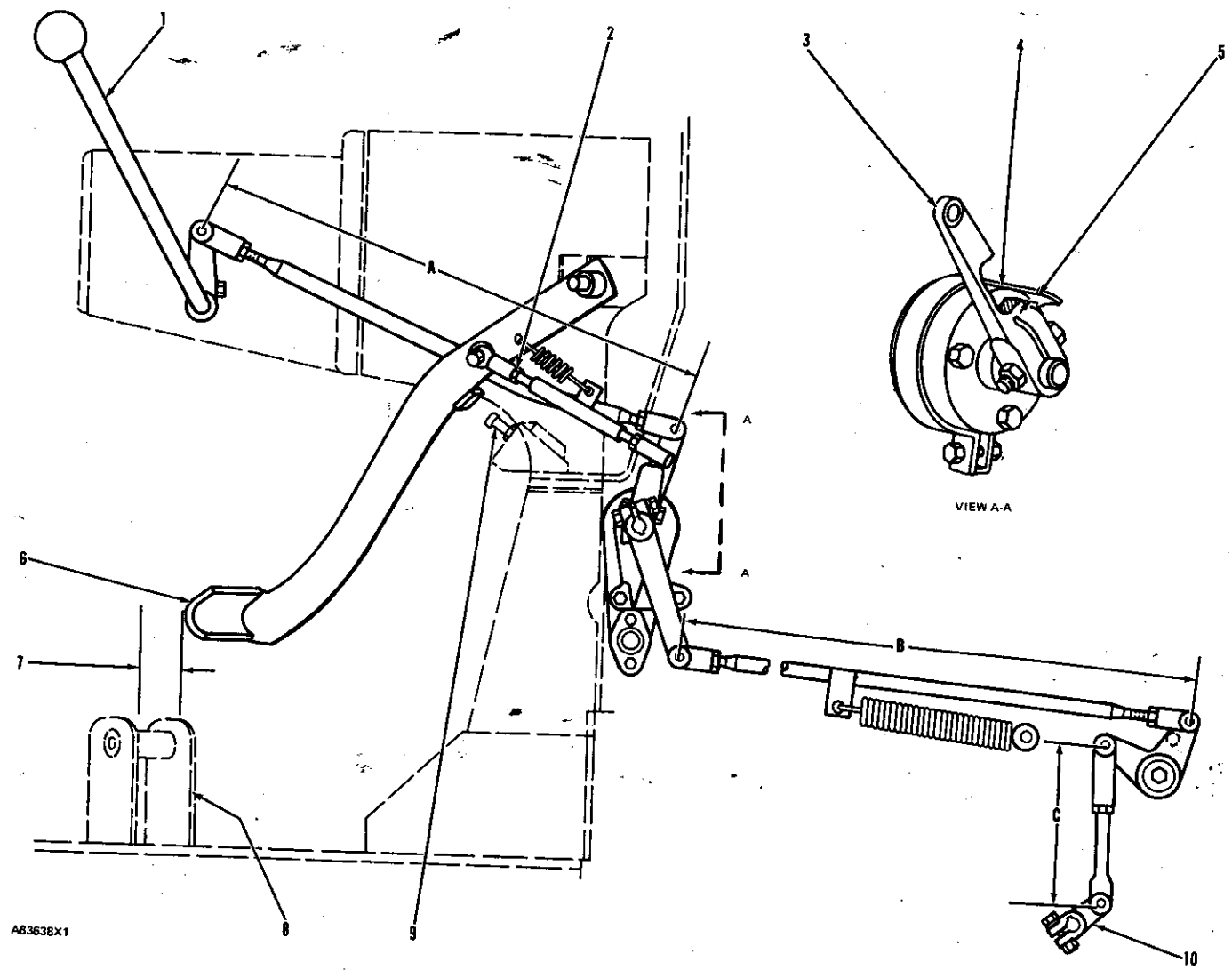
ADJUSTMENT PROCEDURE:

1. Move governor lever (1) to the **FUEL OFF** position.
2. Adjust linkage rods to the following dimensions:

(A)	20.84 in. (529.3 mm)
(B)	35.80 in. (909.3 mm)
(C)	6.00 in. (152.4 mm)

GOVERNOR AND DECELERATOR CONTROL LINKAGE

D8K POWER SHIFT & DIRECT DRIVE (Later)



ADJUSTMENT PROCEDURE:

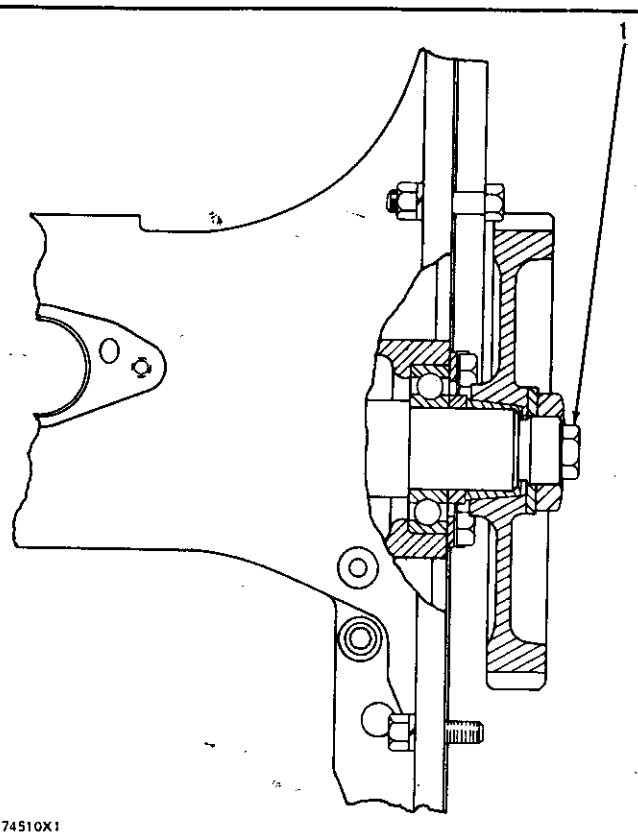
1. Move governor lever (10) to the FUEL OFF position.
2. Adjust linkage rods to the following dimensions:

   (A) ..... 20.75 in. (527.1 mm)
   (B) ..... 35.80 in. (909.3 mm)
   (C) ..... 6.00 in. (152.4 mm)

3. Start engine. Move governor lever (10) until engine speed is at high idle.
4. Adjust clamp (4) until dimension (5) between lever (3) and clamp (4) is ..... .12 in. (3.1 mm)
5. Turn nut (2) until dimension (7) between footrest (8) and pedal (6) is ..... 1.38 in. (35.1 mm)
6. Adjust stopbolt (9) so that engine speed with pedal (6) depressed is ..... 650 rpm

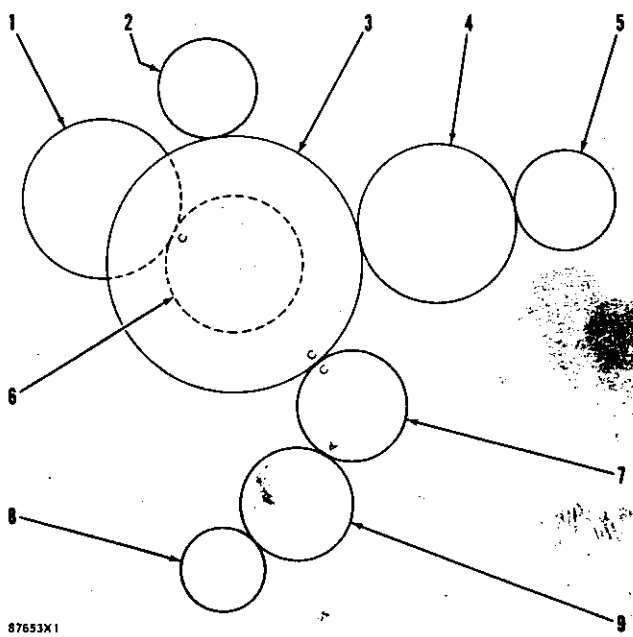
NOTE: FOR TORQUE VALUES NOT GIVEN, SEE THE FIRST PAGE OF SPECIFICATIONS FOR GENERAL TIGHTENING TORQUES

ACCESSORY DRIVE GROUP



(1) Torque for nut ..... 125 ± 10 lb. ft. (170 ± 14 N·m)

TIMING GEARS



(1) 1P7321 Gear; for fuel pump drive and accessory drive.
(2) 4H9448 Gear; for drive shaft for power take off.
(3) 4H7384 Gear; large outer gear on camshaft.
(4) 2M6548 Gear; water pump drive idler.
(5) 2M6569 Gear; water pump drive.
(6) 2M4091 Gear; small inner gear on camshaft.
(7) 6N2142 Gear; on crankshaft.
(8) 6N2141 Gear; oil pump drive.
(9) 2F7651 Gear; oil pump drive idler.

NOTE: Timing mark "A" on gear (7) is not for this engine.

VALVES

NOTE: GUIDELINE FOR REUSABLE PARTS; VALVES AND VALVE SPRINGS, Form SEBF8002, has the procedure necessary for checking used valves and valve springs.

(1) 9M5350 Spring for valve (outer):

Length under test force ..... 2.219 in. (56.4 mm)

Test force ..... 65 ± 3 lb. (290 ± 13 N)

Use again minimum load at length under test force ..... 59 lb. (260 N)

Length of spring at valve open position .... 1.606 in. (40.8 mm)

Use again minimum load at valve open position . 166 lb. (740 N)

Free length after test ..... 2.574 in. (65.4 mm)

Outside diameter ..... 1.713 in. (43.5 mm)

Spring must not be bent more than ..... .090 in. (2.3 mm)

(2) 9M5349 Spring for valve (inner):

Length under test force ..... 1.791 in. (45.5 mm)

Test force ..... 20 ± 1 lb. (90 ± 4 N)

Use again minimum load at length under test force ..... 18 lb. (80 N)

Length of spring at valve open position .... 1.178 in. (29.9 mm)

Use again minimum load at valve open position ..... 48 lb. (215 N)

Free length after test ..... 2.179 in. (55.3 mm)

Outside diameter ..... 1.125 in. (28.6 mm)

Spring must not be bent more than ..... .076 in. (1.9 mm)

(3) Diameter of valve stem ..... .4955 ± .0005 in. (12.586 ± 0.013 mm)

Minimum permissible diameter of valve stem ..... .494 in. (12.55 mm)

Bore in valve guide with guide installed in the head:

Exhaust valve ..... .5010 ± .0010 in. (12.725 ± 0.025 mm)

Intake valve ..... .5010 ± .0010 in. (12.725 ± 0.025 mm)

Maximum permissible diameter of bore in valve guide:

Exhaust valve ..... .5025 in. (12.764 mm)

Intake valve ..... .5025 in. (12.764 mm)

(4) Thickness of valve lip:

Exhaust valve, minimum permissible ..... .106 in. (2.69 mm)

Intake valve, minimum permissible ..... .158 in. (4.01 mm)

(5) Diameter of valve head:

Exhaust valve ..... 2.282 ± .005 in. (57.96 ± 0.13 mm)

Intake valve ..... 2.343 ± .005 in. (59.51 ± 0.13 mm)

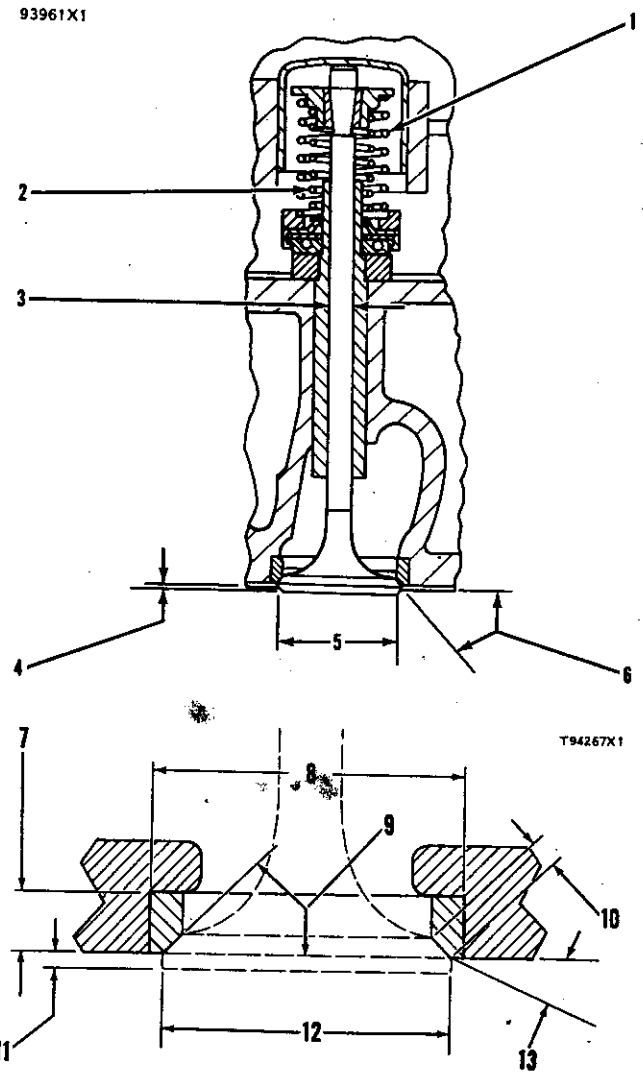
(6) Angle of valve face ..... 44° 30' ± 0° 15'

(7) Depth of bore in head for valve seat insert ..... .509 ± .001 in. (12.93 ± 0.03 mm)

(8) Diameter of valve seat insert ..... 2.5030 ± .0005 in. (83.576 ± 0.013 mm)

Bore in head for valve seat insert ..... 2.5000 ± .0005 in. (83.500 ± 0.013 mm)

(9) Angle of face of valve seat insert ..... 45° 00' ± 0° 15'



(10) Maximum permissible width of valve seat:

Exhaust valve ..... .197 in. (5.00 mm)

Intake valve ..... .160 in. (4.06 mm)

(11) Dimension from top of closed valve to face of head:

Maximum permissible dimension for exhaust valve ..... .130 in. (3.30 mm)

Minimum permissible dimension for exhaust valve ..... .080 in. (2.03 mm)

Maximum permissible dimension for intake valve ..... .185 in. (4.70 mm)

Minimum permissible dimension for intake valve ..... .137 in. (3.48 mm)

(12) Outside diameter of the face of the valve seat insert:

Exhaust seat ..... 2.2665 ± .0015 in. (57.569 ± 0.038 mm)

Maximum permissible, exhaust seat ..... 2.291 in. (58.19 mm)

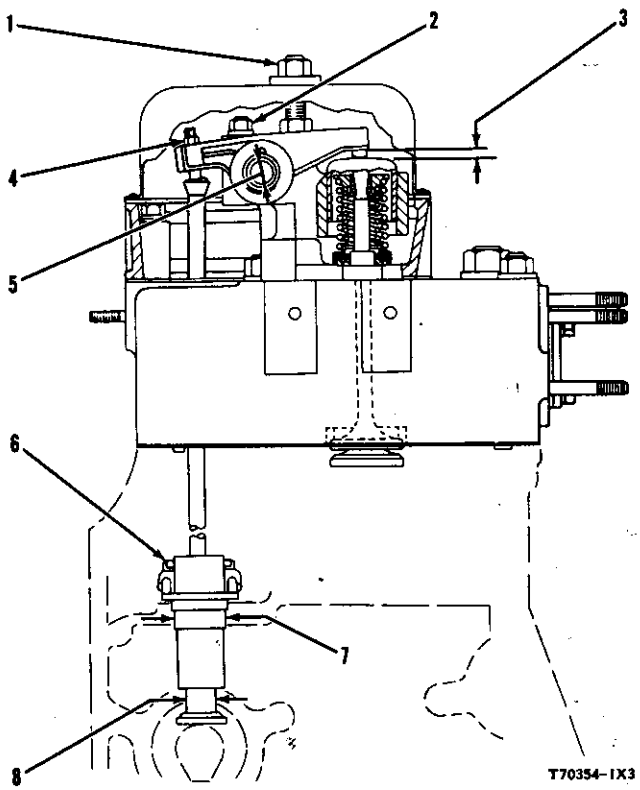
Intake seat ..... 2.3195 ± .0015 in. (58.915 ± 0.038 mm)

Maximum permissible, intake seat ..... 2.343 in. (59.51 mm)

(13) Angle to grind seat face of the insert to get a reduction of maximum seat diameter ..... 15°

NOTE: FOR TORQUE VALUES NOT GIVEN, SEE THE FIRST PAGE OF SPECIFICATIONS FOR GENERAL TIGHTENING TORQUES

VALVE ROCKER ARMS AND LIFTERS



TYPICAL ILLUSTRATION

(1) Turn nut until contact is made with washer, then turn an additional ..... 2¼ Turns

(2) Torque for nuts holding bracket for rocker arm shaft ..... 30 ± 5 lb. ft. (40 ± 7 N·m)

(3) Clearance for valves:

Exhaust valves ..... .020 ± .003 in. (0.51 ± 0.08 mm)

Intake valves ..... .016 ± .003 in. (0.41 ± 0.08 mm)

(4) Torque for locknut on valve adjustment screw ..... 40 ± 5 lb. ft. (55 ± 7 N·m)

(5) Diameter of shaft ..... 1.223 to 1.224 in. (31.06 to 31.09 mm)

Bore in bearing for shaft ..... 1.2260 ± .0005 in. (31.140 ± 0.013 mm)

Maximum permissible clearance between bearing and shaft ..... .010 in. (0.25 mm)

(6) Torque for bolts holding guide for valve lifter (follower) ..... 25 ± 5 lb. ft. (35 ± 7 N·m)

(7) Diameter of guide for valve lifter (follower) ..... 1.6875 ± .001 in. (42.862 ± 0.03 mm)

Bore in block for guide for valve lifter (follower) ..... 1.691 ± .002 in. (42.95 ± 0.05 mm)

(8) Diameter of valve lifter (follower) ..... .9965 ± .0005 in. (25.311 ± 0.013 mm)

Bore in guide for valve lifter (follower) ..... .9995 ± .0005 in. (25.387 ± 0.013 mm)

Maximum permissible clearance between lifter (follower) and bore in guide ..... .008 in. (0.20 mm)

GLOW PLUG POSITIONING

(1) Centerline of the crankshaft.

Put 9M3710 or 4S9416 Anti-Seize Compound on the threads of the precombustion chamber.

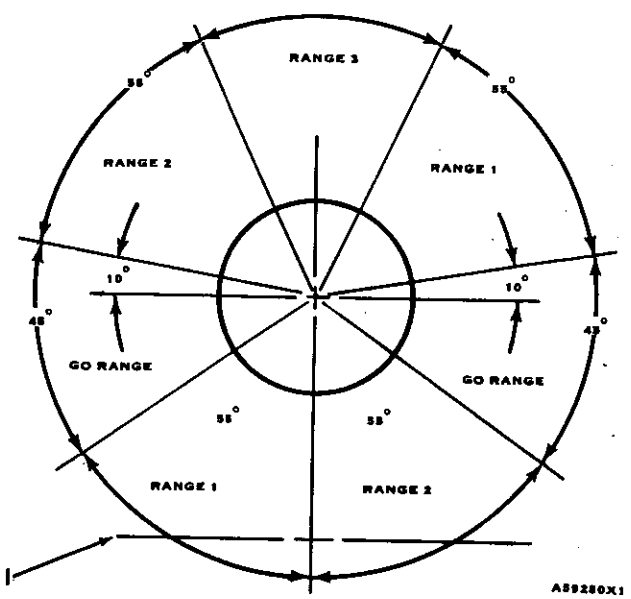
Put 1P6442 Gasket, with "4D" on it, on the precombustion chamber. Install the precombustion chamber in the cylinder head and tighten to ..... 200 lb. ft. (270 N·m)

NOTE: If the hole for the glow plug is not in the GO range, remove the precombustion chamber. Remove the gasket.

If the hole was in range 1, install 5H2579 Gasket, with "4C" on it, on the precombustion chamber. Install the precombustion chamber in the cylinder head and tighten to ..... 200 lb. ft. (270 N·m)

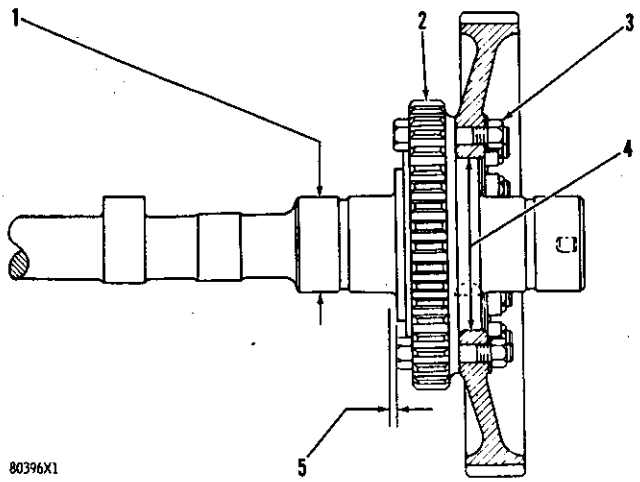
If the hole was in range 2, install 1P6441 Gasket, with "4J" on it, on the precombustion chamber. Install the precombustion chamber in the cylinder head and tighten to ..... 200 lb. ft. (270 N·m)

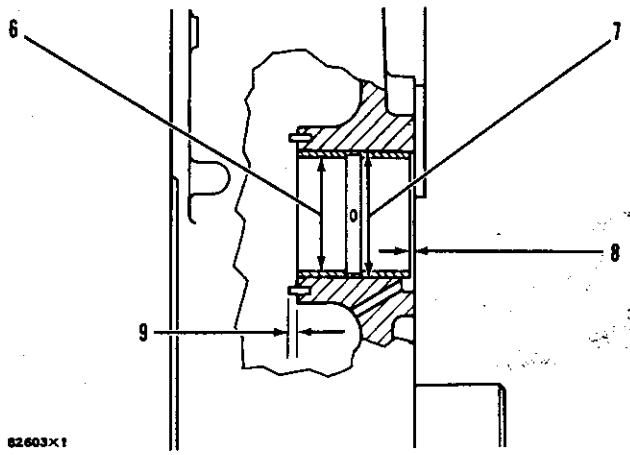
If the hole was in range 3, install 7N6758 Gasket, with "4B" on it, on the precombustion chamber. Install the precombustion chamber in the cylinder head and tighten to ..... 200 lb. ft. (270 N·m)



NOTE: FOR TORQUE VALUES NOT GIVEN, SEE THE FIRST PAGE OF SPECIFICATIONS FOR GENERAL TIGHTENING TORQUES

CAMSHAFT





(1) Diameter of bearing surface (journal) of the camshaft ..... 2.6195 ± .0005 in. (66.535 ± 0.013 mm)

(2) Get temperature of the gear to a maximum of 750°F (398°C) before installation on the camshaft.

Diameter of shaft for gear ..... 2.6833 ± .0005 in. (68.156 ± 0.013 mm)

Bore in gear ..... 2.6795 ± .0003 in. (68.059 ± 0.008 mm)

(3) Torque for nuts ..... 75 ± 10 lb. ft. (100 ± 14 N·m)

(4) Diameter of seat for gear ..... 4.748 ± .001 in. (120.60 ± 0.03 mm)

Bore in gear ..... 4.750 to 4.751 in. (120.65 to 120.68 mm)

(5) End play for the camshaft ..... .010 to .020 in. (0.25 to 0.51 mm)

Maximum permissible end play for the camshaft ..... .035 in. (0.89 mm)

(6) Bore in bearings for camshaft ..... 2.6235 ± .0015 in. (66.637 ± 0.038 mm)

(7) Bore in housing for bearings ..... 2.874 to 2.875 in. (73.00 to 73.03 mm)

(8) Distance from bearing to face of housing ..... .03 in. (0.8 mm)

(9) Distance from end of dowel to face of housing ..... .19 in. (4.8 mm)

(10) Height of camshaft lobes.

To find lobe lift, use the following procedure:

A. Measure camshaft lobe height (11).

B. Measure base circle (12).

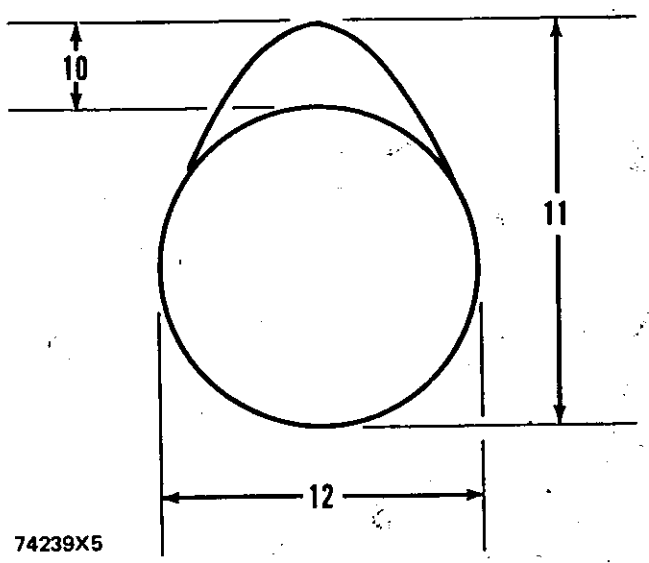
C. Subtract base circle (STEP B) from lobe height (STEP A). The difference is actual lobe lift (10).

D. Specified camshaft lobe lift (10) is:

a. Exhaust lobe ..... .4030 in. (10.236 mm)

b. Intake lobe ..... .4030 in. (10.236 mm)

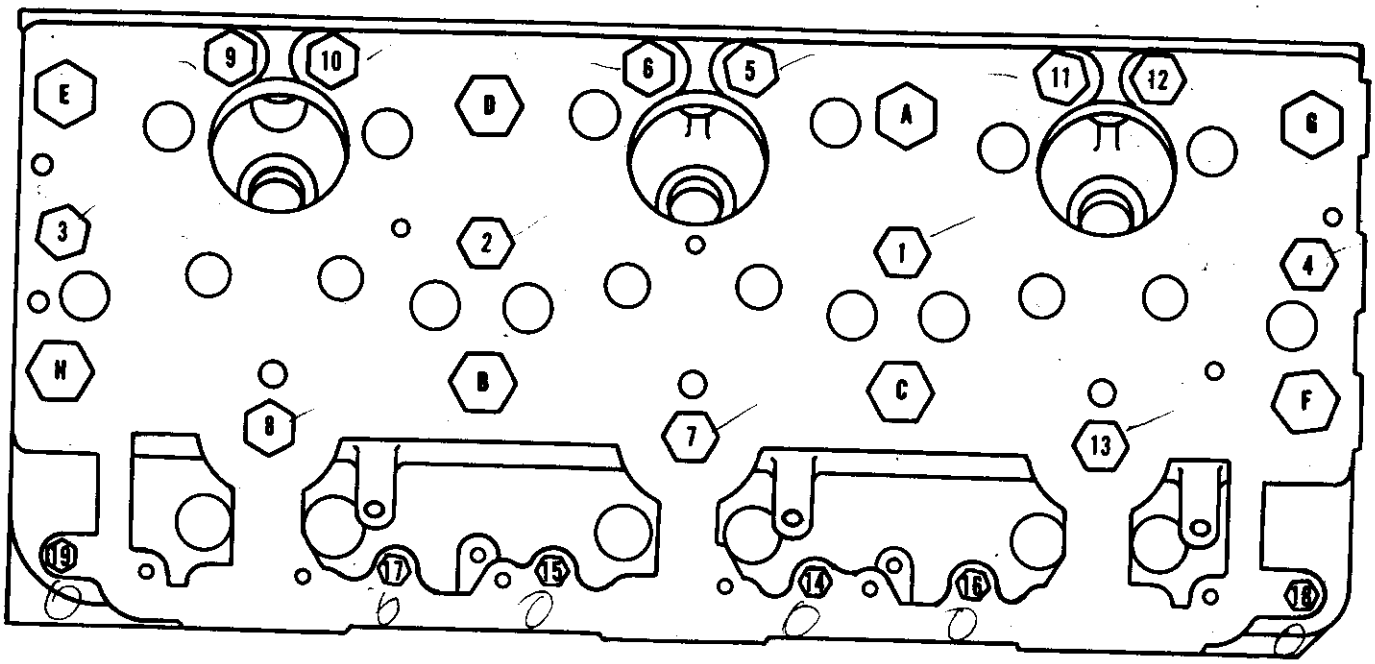
Maximum permissible difference between actual lobe lift (STEP C) and specified lobe lift (STEP D) is .010 in. (0.25 mm).



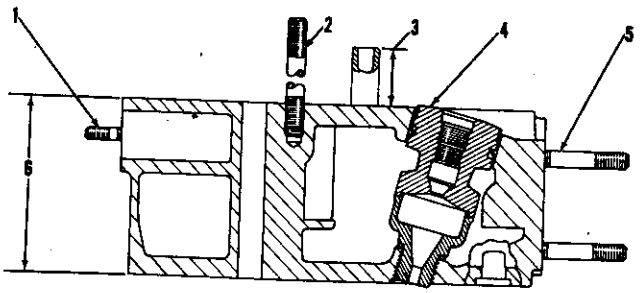
CYLINDER HEAD

(Engines With Spacer Plates)

CON ESPACIADOR



A61597X1



80397-1X2

Put 4S9416 Anti-Seize Compound on bolt threads and tighten bolts in the following Step sequence:

TORNILLOS 1 A 13

Step 1. Tighten bolts 1 thru 13 in number sequence to ..... 100 lb. ft. (135 N·m)

PASO

Step 2. Tighten bolts A thru H in letter sequence to ..... 210 lb. ft. (284 N·m)

2 LETRA A – H

Step 3. Again tighten bolts A thru H in letter sequence to ..... 420 lb. ft. (565 N·m)

3 LETRA A – H

Step 4. Again tighten bolts 1 thru 13 in number sequence to..... 200 lb. ft. (270 N·m)

4 TORNILLOS 1A 13

Step 5. Tighten bolts 14 thru 19 in number sequence (hand torque only) to ..... 75 lb. ft. (100 N·m)

Step 6. Again tighten bolts A thru H in letter sequence (hand torque only) to ..... 420 lb. ft. (565 N·m)

Step 7. Again tighten bolts 1 thru 13 in number sequence (hand torque only) to ..... 200 lb. ft. (270 N·m)

(1) Torque for studs for water manifold ..... 20 ± 5 lb. ft. (25 ± 7 N·m)

(2) Torque for studs for valve covers ..... 75 ± 10 lb. ft. (100 ± 14 N·m)

(3) Distance from face of cylinder head to the end of valve guides ..... 1.690 ± .020 in. (42.93 ± 0.51 mm)

(4) Torque for precombustion chamber (put 9M3710 Anti-Seize Compound on threads) ..... 200 lb. ft. (270 N·m)

(5) Torque for studs for exhaust manifold ..... 40 ± 5 lb. ft. (55 ± 7 N·m)

(6) Thickness of cylinder head (new) ..... 5.3775 ± .0025 in. (136.589 ± 0.064 mm)

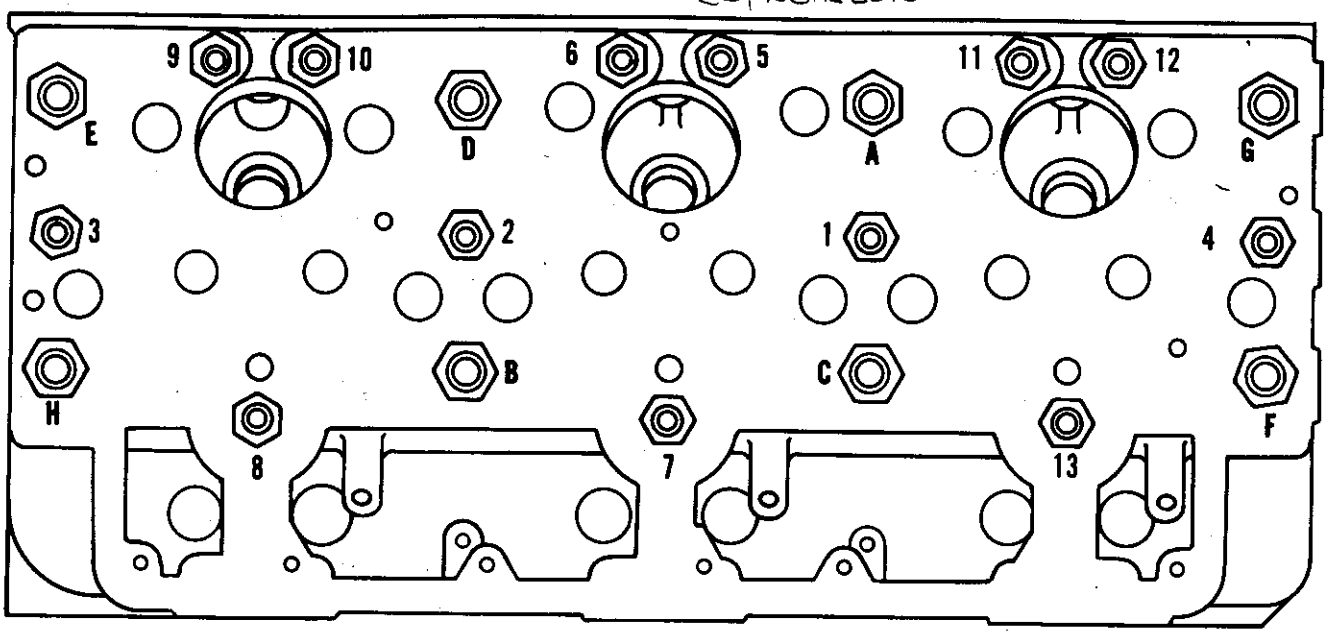
NOTE: Spacer plate gasket must be replaced if cylinder head has been removed.

NOTE: FOR TORQUE VALUES NOT GIVEN, SEE THE FIRST PAGE OF SPECIFICATIONS FOR GENERAL TIGHTENING TORQUES

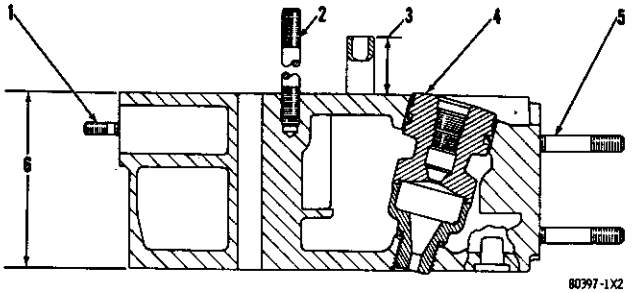
CYLINDER HEAD

(Engines Without Spacer Plates)

SIN. ESPACIADOR



A61598X1



80397-1X2

Put 4S9416 Anti-Seize Compound on stud threads and tighten nuts in the following Step sequence:

Step 1. Tighten all nuts in number sequence to ..... 60 lb. ft. (80 N·m)

Step 2. Tighten all nuts in letter sequence to ..... 150 lb. ft. (205 N·m)

Step 3. Again tighten all nuts in letter sequence to ..... 300 lb. ft. (410 N·m)

Step 4. Again tighten all nuts in number sequence to ..... 120 lb. ft. (160 N·m)

Step 5. Again tighten all nuts in letter sequence (hand torque only) to ..... 300 lb. ft. (410 N·m)

Step 6. Again tighten all nuts in number sequence (hand torque only) to ..... 120 lb. ft. (160 N·m)

Step 7. Check all nuts in number sequence after dynomometer engine test.

Minimum torque ..... 105 lb. ft. (142 N·m)

Step 8. Check all nuts in letter sequence after dynomometer engine test.

Minimum torque ..... 260 lb. ft. (354 N·m)

(1) Torque for studs for water manifold ..... 20 ± 5 lb. ft. (25 ± 7 N·m)

(2) Torque for studs for valve covers ..... 50 ± 5 lb. ft. (70 ± 7 N·m)

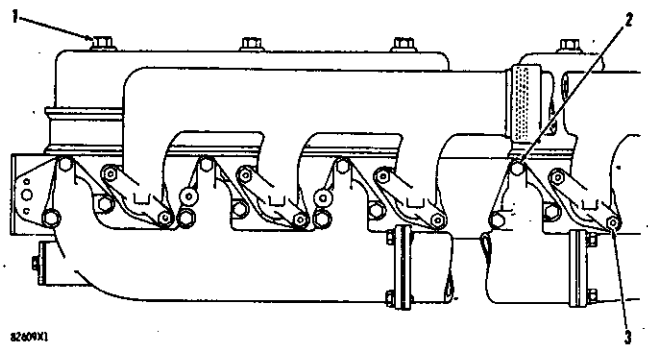
(3) Distance from face of cylinder head to the end of valve guides ..... 1.690 ± .020 in. (42.93 ± 0.51 mm)

(4) Torque for precombustion chamber (put 9M3710 Anti-Seize Compound on threads) ..... 200 lb. ft. (270 N·m)

(5) Torque for studs for exhaust manifold ..... 40 ± 5 lb. ft. (55 ± 7 N·m)

(6) Thickness of cylinder head (new) ..... 5.3775 ± .0025 in. (136.589 ± 0.064 mm)

VALVE COVER AND MANIFOLDS

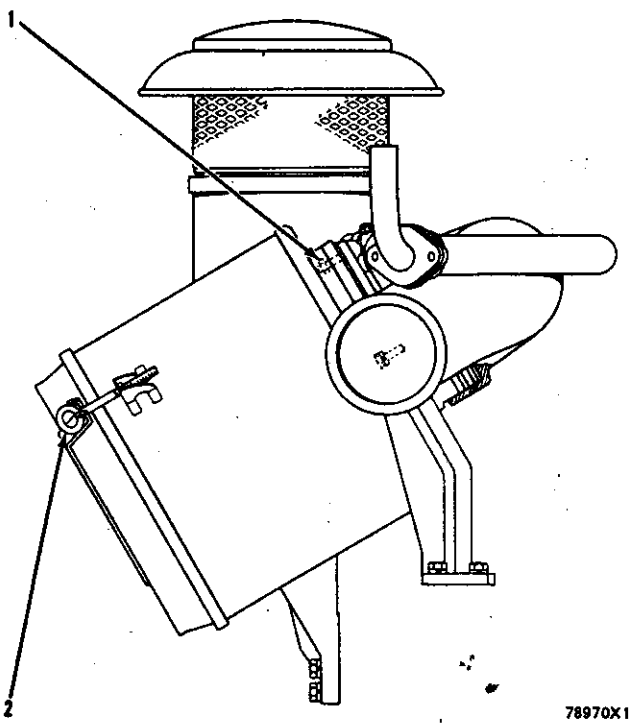


(1) Turn nut until contact is made with washer, then turn an additional ..... 2¼ Turns

(2) Torque for bolts holding inlet manifold ..... 75 ± 10 lb. ft. (100 ± 14 N·m)

(3) Torque for nuts holding exhaust manifold (put 9M3710 Anti-Seize Compound on threads) ..... 75 ± 10 lb. ft. (100 ± 14 N·m)

AIR CLEANER



(1) Torque for nut ..... 20 ± 3 lb. ft. (25 ± 4 N·m)

(2) Torque for wing bolt ..... 35 ± 5 lb. in. (4.0 ± 0.6 N·m)

NOTE: FOR TORQUE VALUES NOT GIVEN, SEE THE FIRST PAGE OF SPECIFICATIONS FOR GENERAL TIGHTENING TORQUES

TURBOCHARGER IMPELLER INSTALLATION

(AiResearch ONLY)

TEST FOR TYPE OF IMPELLER INSTALLATION

1. Install the proper thrust collar and seal carrier spacer on the shaft-wheel assembly to be used.
2. Install impeller on shaft by hand.
3. Measure the distance between impeller and seal carrier at the point where impeller no longer moves freely on shaft.
4. If the distance is:
   (a) more than .31 in. (7.9 mm), use heat for installation.*
   (b) .31 in. (7.9 mm) or less, use room temperature installation.**

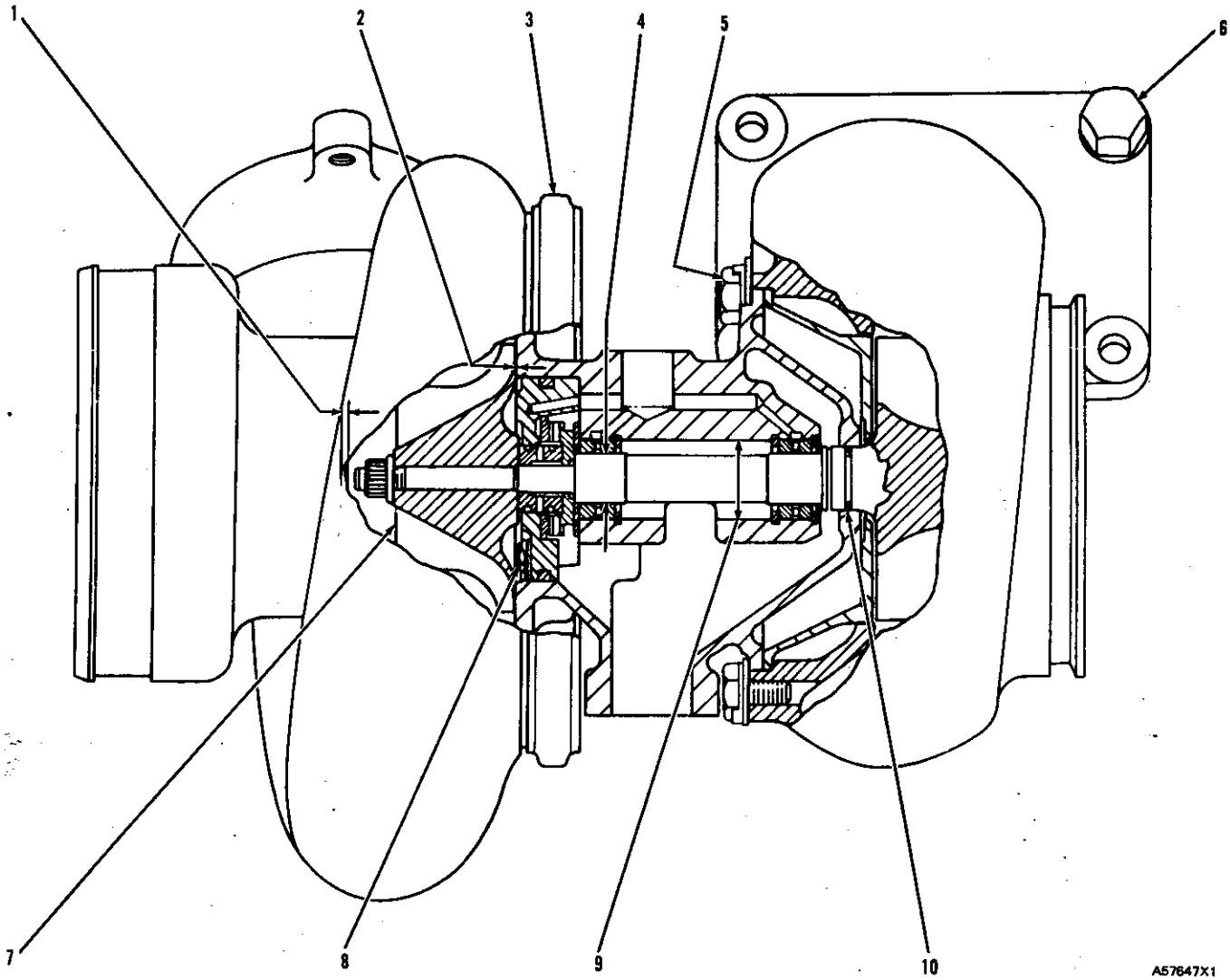
INSTALLATION PROCEDURE CHART

Type of Installation	Step by Step Procedure	Turbochargers T12, TV61, TW61	Turbochargers T18, TV81, TW81
*Impeller Heated	A. Heat impeller to (for 10 minutes max):	350 ± 25° F (177 ± 14° C)	350 ± 25° F (177 ± 14° C)
	B. Install impeller on shaft.		
	C. Tighten nut to:	120 lb. in. (14 N·m)	150 lb. in. (17 N·m)
	D. Let impeller become cool to below:	150° F (70° C)	150° F (70° C)
	E. Loosen nut and put oil on shaft threads and nut face.		
	F. Tighten nut again to:	30 lb. in. (3 N·m)	30 lb. in. (3 N·m)
	G. Tighten nut more:	120°	90°
**Impeller at Room Temperature	A. Put impeller on shaft.		
	B. Tighten nut to:	120 lb. in. (14 N·m)	150 lb. in. (17 N·m)
	C. Loosen the nut and put oil on nut seat face and threads.		
	D. Tighten the nut again to:	30 lb. in. (3 N·m)	30 lb. in. (3 N·m)
	E. Tighten the nut more:	120°	90°

NOTE: Do not bend or add stress to the shaft when nut is tightened.

TURBOCHARGER

(AiResearch)



T1235 Serial Number 17S1-17S3461

T1238 Serial Number 17S3462-UP

(1) End play for shaft ..... .006 to .011 in. (0.15 to 0.27 mm)

(2) Compressor wheel clearance (minimum) .... .019 in. (0.48 mm)

(3) Torque for bolt holding compressor housing clamp ..... 120 ± 10 lb. in. (13.6 ± 1.1 N·m)

(4) Bore in the bearing . .6268 to .6272 in. (15.921 to 15.931 mm)

Diameter of journal for the bearing ..... .6250 to .6254 in. (15.875 to 15.885 mm)

(5) Put 9M3710 or 4S9416 Anti-Seize Compound on threads of bolts holding turbine housing and tighten to ..... 175 ± 15 lb. in. (19.8 ± 1.7 N·m)

(6) Put 9M3710 or 4S9416 Anti-Seize Compound on threads of bolts holding turbocharger to manifold and tighten to ..... 45 ± 5 lb. ft. (60 ± 7 N·m)

(7) Nut for impeller (See TURBOCHARGER IMPELLER INSTALLATION).

NOTE: Do not bend or add stress to the shaft when nut is tightened.

(8) Torque for bolts holding thrust plate ..... 35 ± 5 lb. in. (4.0 ± 0.6 N·m)

(9) Bore in housing .... .9827 to .9832 in. (24.961 to 24.973 mm)

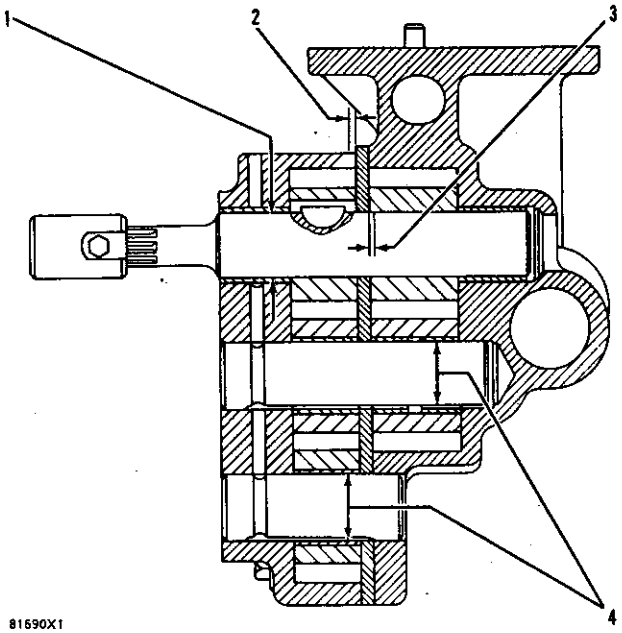
Outside diameter of the bearing ..... .9780 to .9785 in. (24.841 to 24.854 mm)

(10) Clearance between ends of oil seal ring in bore of .823 in. (20.90 mm) .... .008 to .015 in. (0.20 to 0.38 mm)

Side clearance between oil seal ring and groove (new) ..... .0020 to .0045 in. (0.051 to 0.114 mm)

NOTE: FOR TORQUE VALUES NOT GIVEN, SEE THE FIRST PAGE OF SPECIFICATIONS FOR GENERAL TIGHTENING TORQUES

OIL PUMP



81590X1

Pressure of SAE 10 oil at 195 ± 15°F (91 ± 9°C) when measured at the clean side of the oil filter at the oil filter base:

Full load rpm ..... 38 to 58 psi (260 to 400 kPa)

Low idle rpm (minimum) ..... 20 psi (140 kPa)

(1) Diameter of the drive shaft ..... 1.2278 ± .0003 in. (31.186 ± 0.008 mm)

Bore in the bearings for the drive shaft ..... 1.2305 ± .0005 in. (31.255 ± 0.013 mm)

Maximum permissible clearance between shaft and bearings ..... .006 in. (0.15 mm)

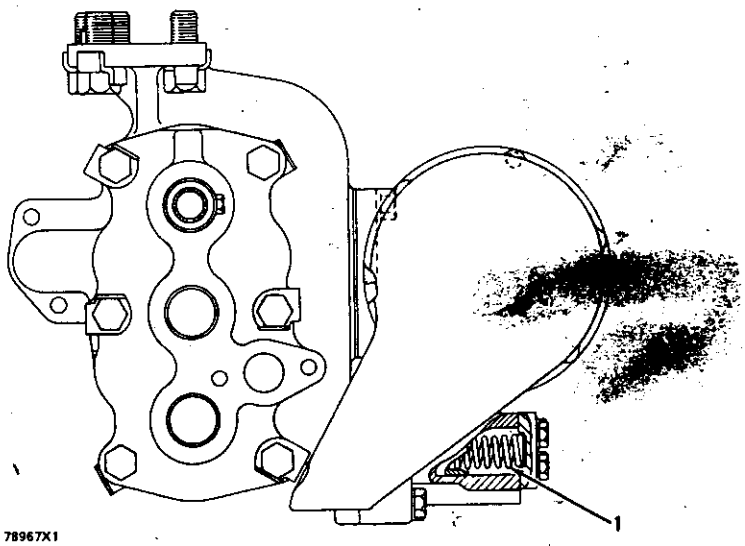
(2) Clearance between gears and spacer ..... .0020 to .0046 in. (0.051 to 0.117 mm)

(3) Clearance between gears and spacer ..... .0030 to .0056 in. (0.076 to 0.142 mm)

(4) Diameter of the idler shafts ..... 1.2278 ± .0003 in. (31.186 ± 0.008 mm)

Bore in the bearings in the gears for the idler shafts ..... 1.2305 ± .0005 in. (31.255 ± 0.013 mm)

OIL PUMP VALVE



78967X1

(1) 1S3921 Spring for oil pump relief valve:

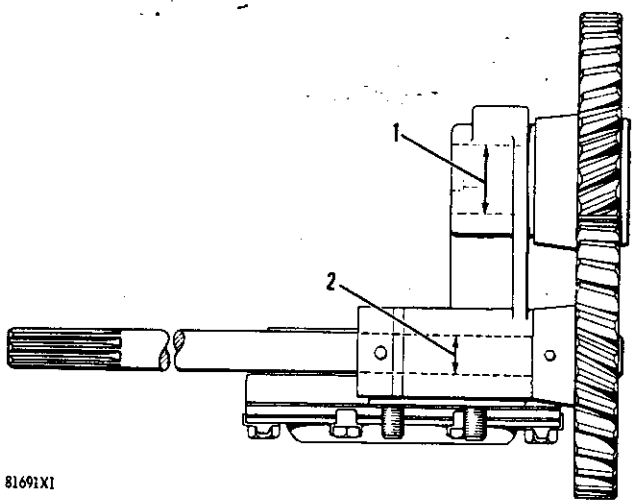
Length under test force ..... 3.25 in. (82.6 mm)

Test force ..... 39.8 ± 3.2 lb. (177.5 ± 14.0 N)

Free length after test ..... 3.57 in. (90.7 mm)

Outside diameter ..... .770 in. (19.6 mm)

OIL PUMP DRIVE
(Earlier)



Heat drive gear to a maximum of 600°F (316°C) for installation.

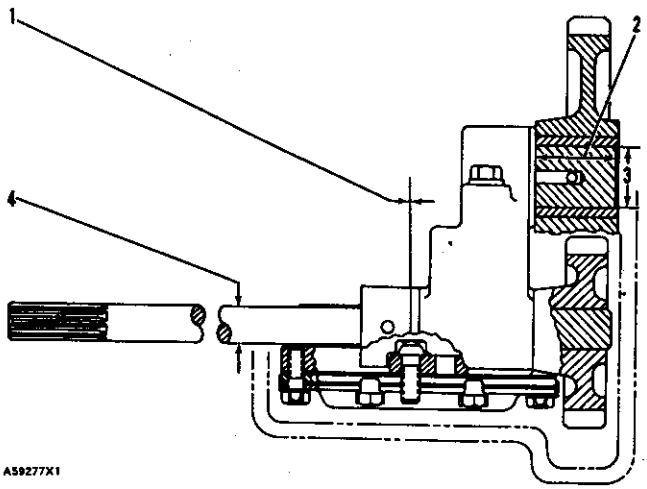
(1) Diameter of the shaft for the drive idler gear ..... 1.2475 to 1.2485 in. (31.687 to 31.712 mm)

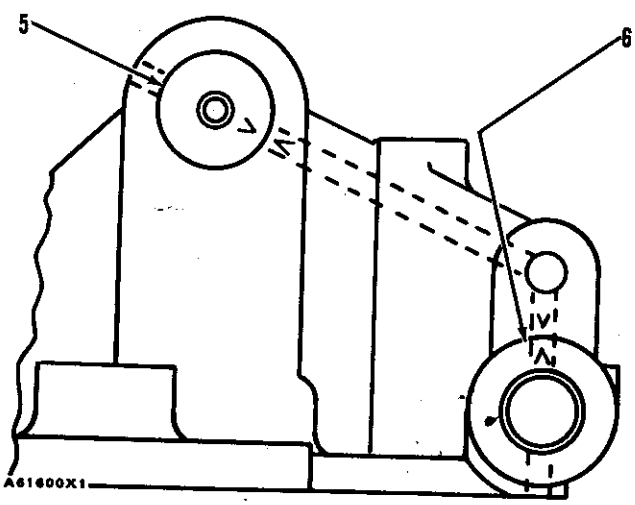
Bore in bearing for the shaft ..... 1.2510 ± .0015 in. (31.775 ± 0.038 mm)

(2) Diameter of the drive shaft for the oil pump ..... .7410 ± .0005 in. (18.821 ± 0.013 mm)

Bore in bearing for the drive shaft for the oil pump ..... .744 ± .001 in. (18.90 ± 0.03 mm)

OIL PUMP DRIVE
(Later)





(1) End play for shaft ..... .003 to .019 in. (0.08 to 0.48 mm)

(2) Length of shaft from bracket ..... 1.625 ± .010 in. (41.28 ± 0.25 mm)

(3) Diameter of the shaft for the drive idler gear ..... 1.2475 to 1.2485 in. (31.687 to 31.712 mm)

Bore in bearing for the shaft ..... 1.2510 ± .0015 in. (31.775 ± 0.038 mm)

(4) Diameter of the drive shaft for the oil pump ..... .7410 ± .0005 in. (18.821 ± 0.013 mm)

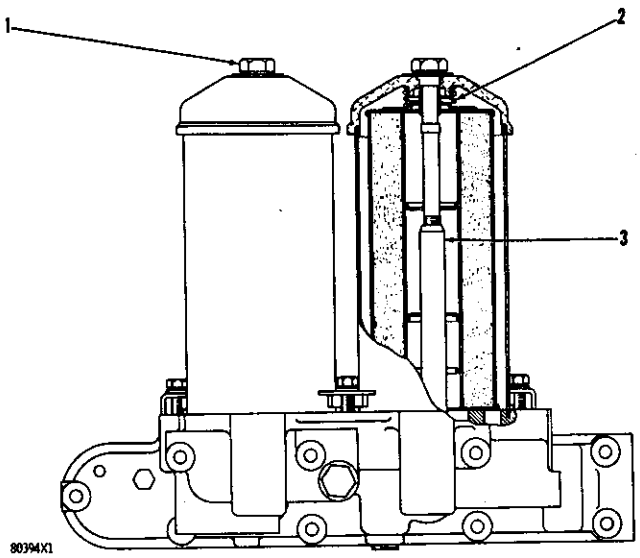
Bore in bearing for the drive shaft for the oil pump ..... .744 ± .001 in. (18.90 ± 0.03 mm)

(5) The "V" mark on idler shaft (5) must be in alignment with "V" mark on bracket.

(6) The "V" mark on bearing (6) must be in alignment with "V" mark on bracket.

NOTE: FOR TORQUE VALUES NOT GIVEN, SEE THE FIRST PAGE OF SPECIFICATIONS FOR GENERAL TIGHTENING TORQUES

OIL FILTER
(DOUBLE OIL FILTER)



(1) Torque for screw holding cap assembly to oil filter case ..... 50 ± 10 lb. ft. (70 ± 14 N·m)

(2) 6B806 Spring:

Length under test force ..... .75 in. (19.1 mm)

Test force ..... 27.8 to 32.6 lb. (123.5 to 145.5 N)

Free length after test ..... 1.75 in. (44.5 mm)

Outside diameter ..... 1.62 in. (41.1 mm)

(3) Torque for stud ..... 110 ± 15 lb. ft. (149 ± 20 N·m)

OIL FILTER BASE
(2S8877 Oil Filter Assembly)

Oil pressure that makes the oil filter bypass valve open ..... 26 ± 3 psi (180 ± 20 kPa)

Oil pressure that makes the oil cooler bypass valve open ..... 26 ± 3 psi (180 ± 20 kPa)

(1) 8M3182 Spring for bypass valve for the oil filter:

Length under test force ..... 2.50 in. (63.5 mm)

Test force ..... 8.92 lb. (39.7 N)

Free length after test ..... 3.61 in. (91.7 mm)

Outside diameter ..... .81 in. (20.6 mm)

(2) 8M3182 Spring for bypass valve for the oil cooler:

Length under test force ..... 2.50 in. (63.5 mm)

Test force ..... 8.92 lb. (39.7 N)

Free length after test ..... 3.61 in. (91.7 mm)

Outside diameter ..... .81 in. (20.6 mm)

(3) 8M9929 Retainer.

NOTE: Retainer (3) must be even with the face of the filter base after installation.

(4) Distance from face of filter base to inside face of plugs ..... .31 in. (7.9 mm)

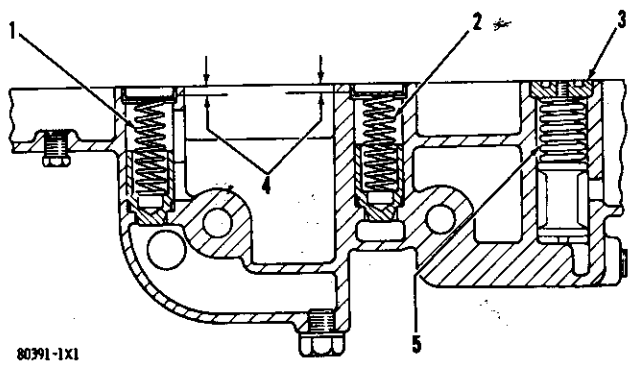
(5) 9M4685 Spring for turbocharger lubrication valve:

Length under test force ..... 1.78 in. (45.2 mm)

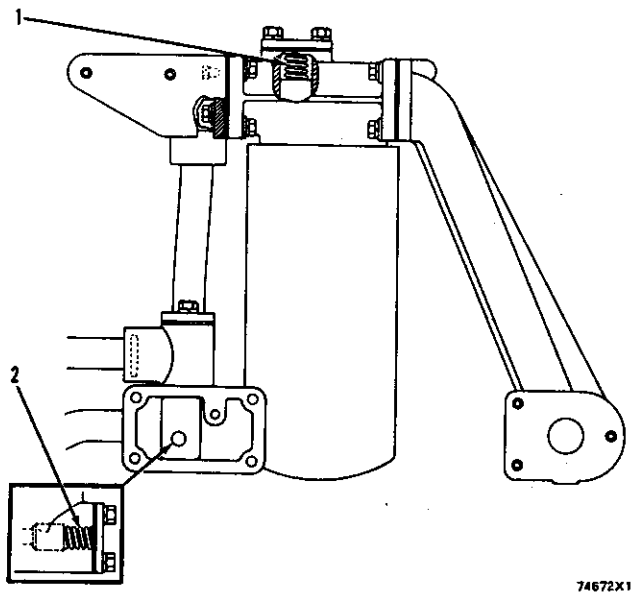
Test force ..... 29.80 ± 2.38 lb. (132.6 ± 10.6 N)

Free length after test ..... 3.06 in. (77.7 mm)

Outside diameter ..... 1.42 in. (36.1 mm)



OIL FILTER BASE
(SINGLE OIL FILTER)
(2P5103 Oil Filter Group)



Oil pressure that makes the oil filter bypass valve open ..... 25 ± 3 psi (170 ± 20 kPa)

Oil pressure that makes the oil cooler bypass valve open ..... 25 ± 3 psi (170 ± 20 kPa)

(1) 8M3182 Spring for bypass valve of the oil filter:

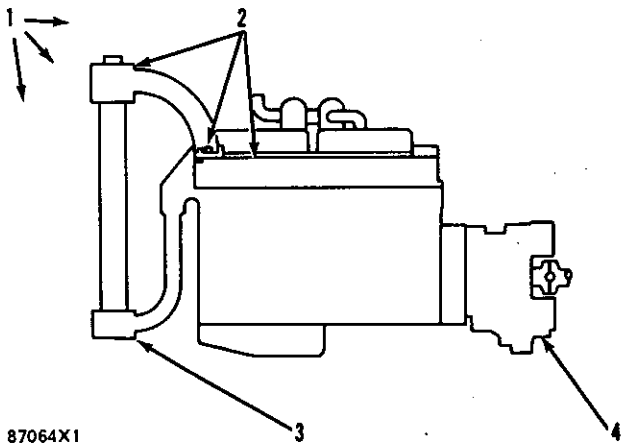
- Length under test force ..... 2.50 in. (63.5 mm)
- Test force ..... 8.92 lb. (39.7 N)
- Free length after test ..... 3.61 in. (91.7 mm)
- Outside diameter ..... .81 in. (20.6 mm)

(2) 8M3182 Spring for bypass valve for the oil cooler:

- Length under test force ..... 2.50 in. (63.5 mm)
- Test force ..... 8.92 lb. (39.7 N)
- Free length after test ..... 3.61 in. (91.7 mm)
- Outside diameter ..... .81 in. (20.6 mm)

NOTE: FOR TORQUE VALUES NOT GIVEN, SEE THE FIRST PAGE OF SPECIFICATIONS FOR GENERAL TIGHTENING TORQUES

COOLING SYSTEM



Make the temperature measurements below during a typical operating cycle.

Difference between top tank (2) and air away from engine (1) must not be more than ..... 110°F (61°C)

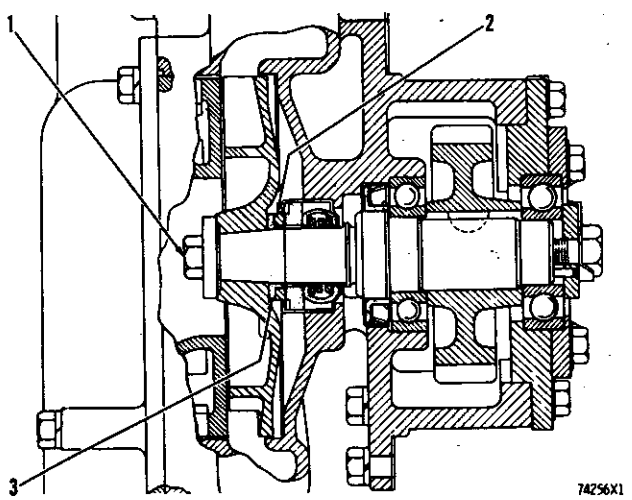
Difference between top tank (2) and bottom tank (3) must be less than ..... 15°F (8°C)

Difference between top tank (2) and torque converter oil outlet (4) must not be more than ..... 40°F (22°C)

NOTE: At stall condition the normal temperature of the torque converter oil must not be more than 270°F (132°C) for any extended period of time.

When regulators are open difference between top tank (2) and regulator housing (2) must not be more than ..... 2°F (1°C)

WATER PUMP

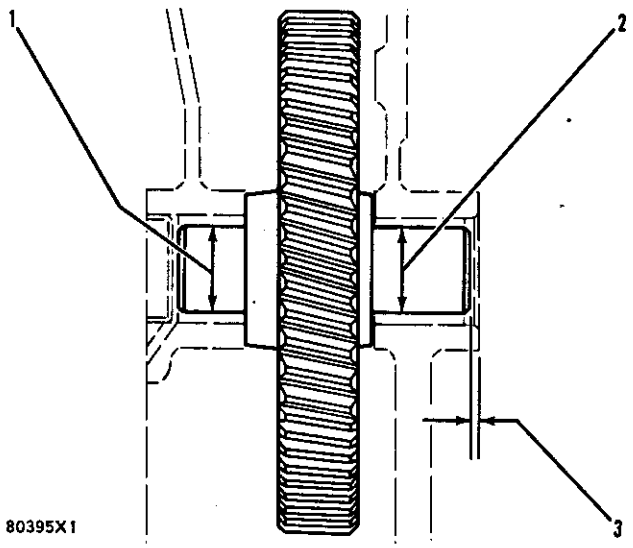


TYPICAL ILLUSTRATION

(1) Torque for bolt ..... 32 ± 5 lb. ft. (43 ± 7 N·m)

(2), (3) Put smooth surface of ring (2) against carbon surface of seal (3).

WATER PUMP IDLER GEAR

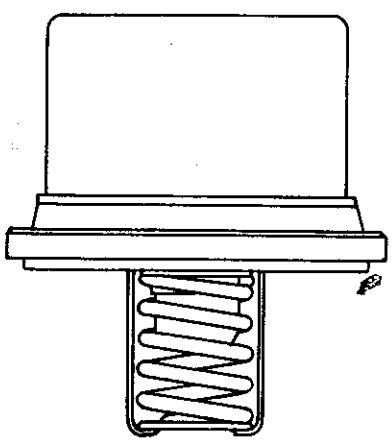


(1) Diameter of shaft . 1.4320 to 1.4325 in. (36.373 to 36.386 mm)
Bore in bearing
for shaft ..... 1.4350 ± .0005 in. (36.450 ± 0.013 mm)

(2) Diameter of shaft . 1.4940 to 1.4945 in. (37.948 to 37.960 mm)
Bore in bearing
for shaft ..... 1.4970 ± .0005 in. (38.024 ± 0.013 mm)

(3) Dimension from end of shaft to
outer face of front cover ..... .188 in. (4.78 mm)

WATER TEMPERATURE REGULATORS



6L5851 Regulator:

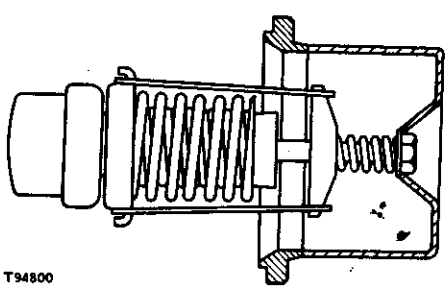
Temperature when completely open ..... 197°F (92°C)

Minimum opening distance ..... .375 in. (9.53 mm)

9S9160 Regulator:

Temperature when completely open ..... 185°F (85°C)

Minimum opening distance ..... .375 in. (9.53 mm)



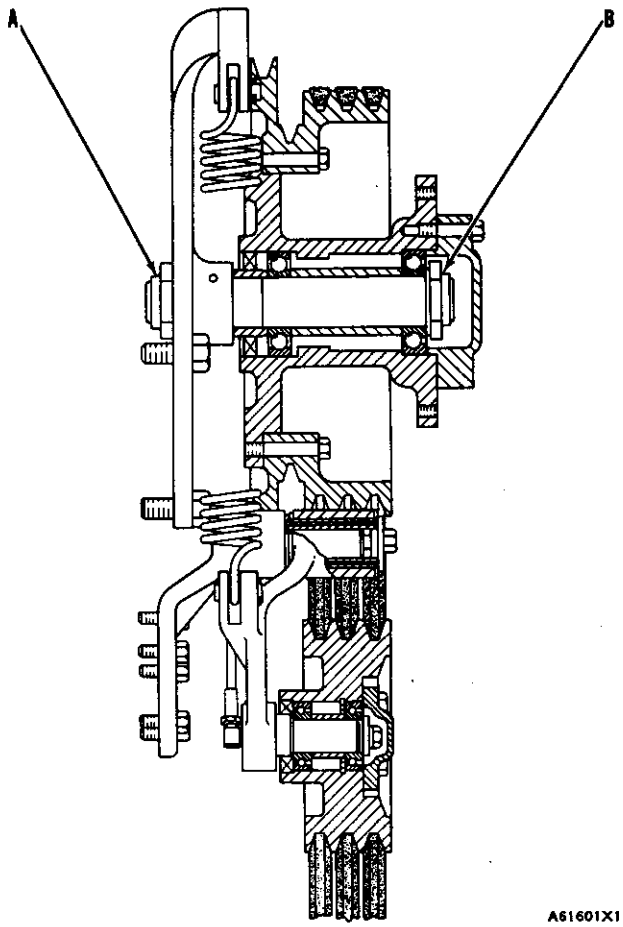
4L7615 Regulator:

Temperature when completely open ..... 180°F (82°C)

Minimum opening distance ..... .375 in. (9.53 mm)

NOTE: FOR TORQUE VALUES NOT GIVEN, SEE THE FIRST PAGE OF SPECIFICATIONS FOR GENERAL TIGHTENING TORQUES

FAN DRIVE



A61601X1

Fan speed at engine speed of 1280 rpm ..... 1210 rpm

NOTE: End (A) must be supported as tightening is done from end (B).

(1) Tighten nut to a torque of ..... 600 ± 80 lb. ft. (810 ± 110 N·m)

(2) Hit shaft with a hammer and again tighten to a torque of ..... 600 ± 80 lb. ft. (810 ± 110 N·m)

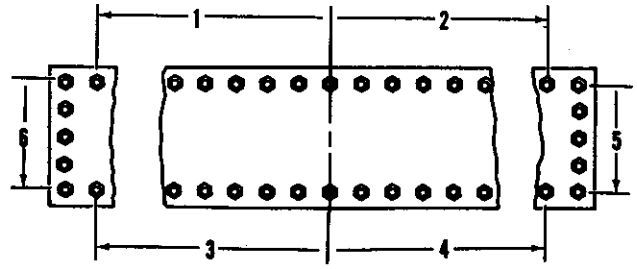
(3) "Stake" (make a mark with a punch) nut to shaft on end (B).

V-BELT TENSION CHART

BELT SIZE	WIDTH BELT TOP		WIDTH TOP OF PULLEY GROOVE		BELT TENSION "INITIAL"* GAUGE READING		BELT TENSION "USED"** GAUGE READING		BORROUGHS GAUGE NUMBERS	
	In.	mm	in.	mm	lb.	N	lb.	N	OLD GAUGE NO.	NEW GAUGE NO.
3/8	.422	10.72	.380	9.65	100 ± 5	445 ± 22	90 ± 5	400 ± 22	BT-33-73F	BT-33-95
1/2	.547	13.89	.500	12.70	120 ± 5	534 ± 22	90 ± 10	400 ± 44	BT-33-96-4-16	BT-33-95
5V	.625	15.88	.600	15.24	120 ± 5	534 ± 22	90 ± 10	400 ± 44	BT-33-72-4-15	BT-33-72C
11/16	.688	17.48	.625	15.88	120 ± 5	534 ± 22	90 ± 10	400 ± 44	BT-33-72-4-15	BT-33-72C
3/4	.750	19.05	.690	17.53	120 ± 5	534 ± 22	90 ± 10	400 ± 44	BT-33-72-4-15	BT-33-72C
15/16	.938	23.83	.878	22.30	120 ± 5	534 ± 22	90 ± 10	400 ± 44	BT-33-72-4-15	BT-33-72C

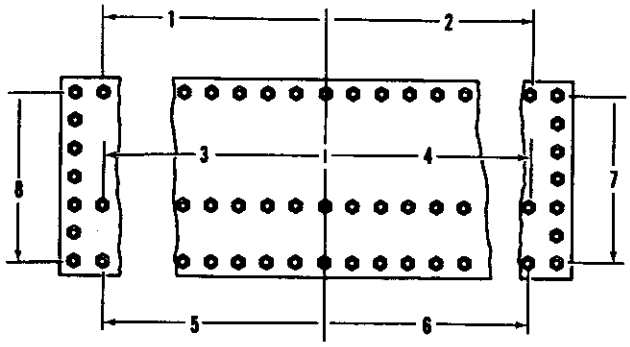
MEASURE TENSION OF BELT FARTHEST FROM THE ENGINE

*"INITIAL" BELT TENSION is for a new belt.
**"USED" BELT TENSION is for a belt which has more than 30 minutes of operation at rated speed of engine. A10232X5



A59222X1

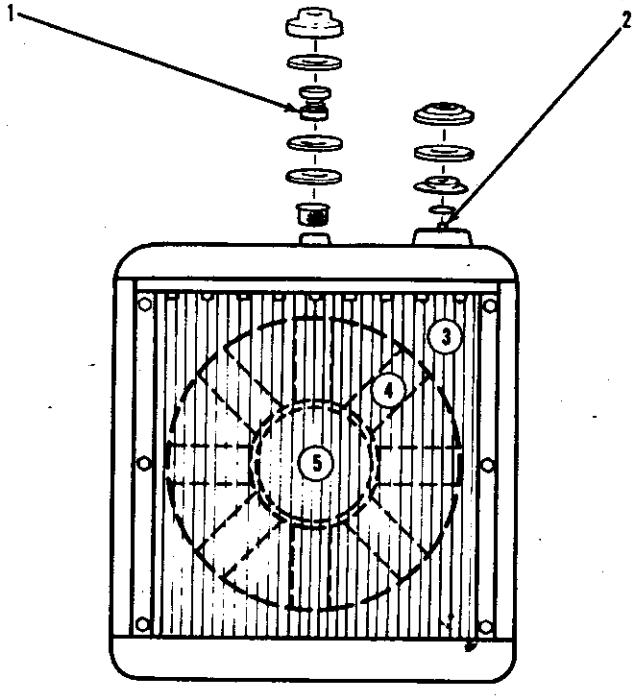
TIGHTENING PROCEDURE FOR TYPICAL TWO-ROW TANK



A59223X1

TIGHTENING PROCEDURE FOR TYPICAL THREE-ROW TANK

RADIATOR



85770-1X1

NOTE: Use the tightening procedures shown to install top and bottom tanks to radiator core.

(1) Vacuum relief valve to open at a maximum of ..... 1 psi (7 kPa)

Pressure relief valve must not leak at ..... 14 psi (95 kPa)

Pressure relief valve must be open at ..... 18 psi (125 kPa)

(2) Torque for stud for the filler cap ..... 40 ± 5 lb. ft. (55 ± 7 N·m)

Air flow for new machines with clean radiator cores in feet per minute at engine low idle.

Outside blade area (3) ..... 300 to 500

Blade area (4) ..... 500 to 600

Hub area (5) ..... 50 to 200

NOTE: FOR TORQUE VALUES NOT GIVEN, SEE THE FIRST PAGE OF SPECIFICATIONS FOR GENERAL TIGHTENING TORQUES

CYLINDER BLOCK

(Engines With Spacer Plate)

(1) Make expansion of tube assembly to make a tight fit, then flare end of tube.

(2) Thickness of top plate ..... .486 ± .001 in. (12.34 ± 0.03 mm)

Thickness of gasket between top plate and cylinder block ..... .008 ± .001 in. (0.20 ± 0.03 mm)

Height of liner over plate under installation pressure ..... .005 ± .003 in. (0.13 ± 0.08 mm)

Maximum permissible difference in height of liners next to each other in the same spacer plate ..... .002 in. (0.05 mm)

Maximum permissible difference between high and low measurements made at four places around each cylinder liner ..... .002 in. (0.05 mm)

(3) Length of dowels (four) out of the block face ..... .88 in. (22.4 mm)

(4) Bore in bearings for camshaft ..... 2.6243 ± .0012 in. (66.657 ± 0.030 mm)

(5) Bore in block for main bearing ..... 4.6245 ± .0005 in. (117.462 ± 0.013 mm)

Alignment for the bore in the block for the main bearings ..... .000 to .003 in. (0.00 to 0.08 mm)

(6) Clearance between main bearing caps and cylinder block ..... .0000 to .0005 in. (0.000 to 0.013 mm)

Maximum permissible clearance between cap for main bearings and cylinder block ..... .0012 in. (0.030 mm)

Install caps with part number toward front.

(7) Make expansion of tube assembly to make a tight fit, then flare end of tube.

(8) Bore in block for bearings for camshaft ..... 2.874 to 2.875 in. (72.99 to 73.03 mm)

(9) Torque for studs for main bearing caps ..... 170 ± 20 lb. ft. (230 ± 25 N·m)

(10) Torque for nuts holding caps for main bearings:

a. Put crankcase oil on threads and washer face.

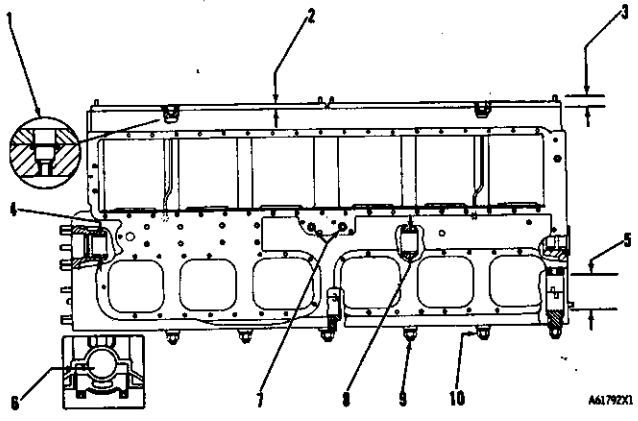
b. Tighten both nuts to ..... 100 ± 5 lb. ft. (135 ± 7 N·m)

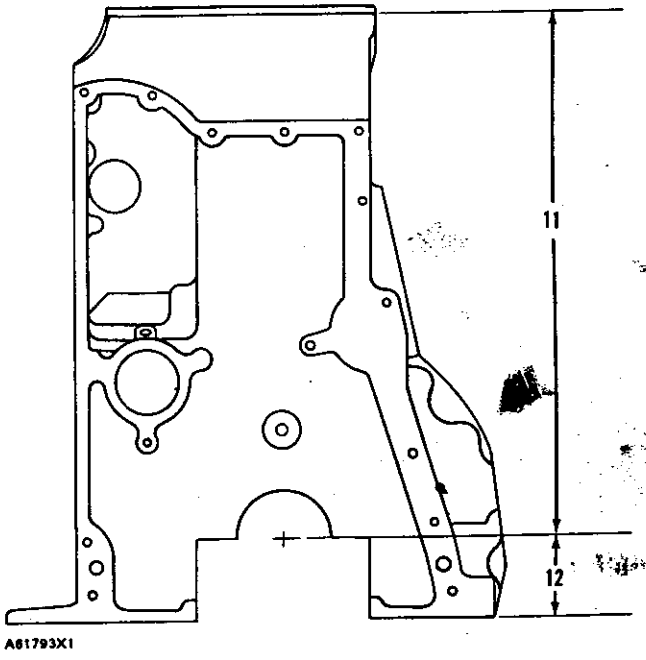
c. Put a mark on each nut and cap.

d. Tighten each nut from mark ..... 120°

(11) Dimension from center of main bearing bore to top of cylinder block (new) ..... 23.6945 ± .0035 in. (601.840 ± 0.089 mm)

(12) Dimension from center of main bearing bore to bottom of cylinder block (new) ..... 3.750 ± .001 in. (95.28 ± 0.03 mm)





CYLINDER BLOCK

(Engines Without Spacer Plate)

(1) Torque for 7/8 in. studs
for head ..... 170 ± 20 lb. ft. (230 ± 25 N·m)

(2) Torque for 5/8 in. studs
for head ..... 75 ± 10 lb. ft. (100 ± 14 N·m)

(3) Depth of bore in block
for liner ..... .492 to .494 in. (12.50 to 12.55 mm)

Maximum permissible depth of bore
after reconditioning ..... .538 in. (13.67 mm)

Height of liner over block, under
installation pressure ..... .004 to .008 in. (0.10 to 0.20 mm)

Maximum permissible difference in height
of liners next to each other under
the same cylinder head ..... .002 in. (0.05 mm)

Maximum permissible difference between
high and low measurements made at four
places around each cylinder liner ..... .002 in. (0.05 mm)

(4) Make expansion of tube assembly to make a tight fit, then flare end of tube.

(5) Bore in bearings
for camshaft ..... 2.6243 ± .0012 in. (66.657 ± 0.030 mm)

(6) Bore in block for
main bearing ..... 4.6245 ± .0005 in. (117.462 ± 0.013 mm)

Alignment for the bore in block for
the main bearings ..... .000 to .003 in. (0.00 to 0.08 mm)

(7) Clearance between main bearing caps and
cylinder block ..... .0000 to .0005 in. (0.000 to 0.013 mm)

Maximum permissible clearance between cap for
main bearings and cylinder block ..... .0012 in. (0.030 mm)

Install caps with part number toward front.

(8) Make expansion of tube assembly to make a tight fit, then flare end of tube.

(9) Bore in block for bearings
for camshaft ..... 2.874 to 2.875 in. (72.99 to 73.03 mm)

(10) Torque for studs for
main bearing ..... 170 ± 20 lb. ft. (230 ± 25 N·m)

(11) Torque for nuts holding caps for main bearings:

a. Put crankcase oil on threads and washer face.

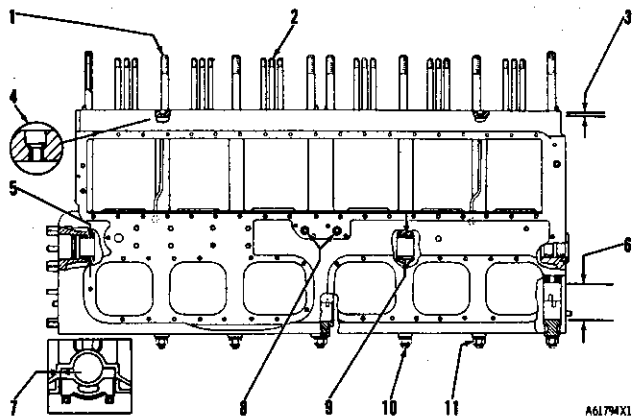
b. Tighten both nuts to ..... 100 ± 5 lb. ft. (135 ± 7 N·m)

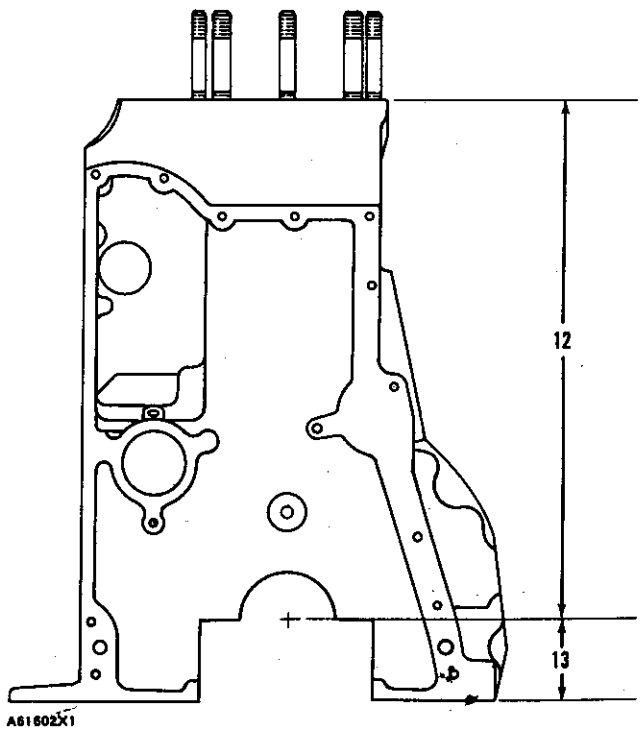
c. Put a mark on each nut and cap.

d. Tighten each nut from mark ..... 120°

(12) Dimension from center of main
bearing bore to top of cylinder block
(new) ..... 24.1875 ± .0035 in. (614.363 ± 0.089 mm)

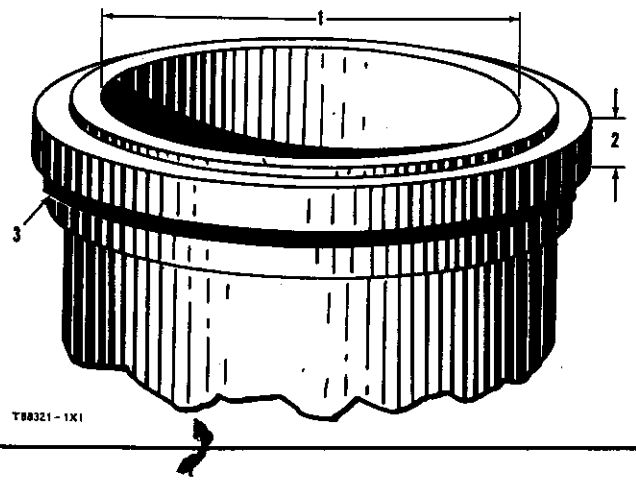
(13) Dimension from center of main
bearing bore to bottom of cylinder
block (new) ..... 3.750 ± .001 in. (95.28 ± 0.03 mm)





NOTE: FOR TORQUE VALUES NOT GIVEN, SEE THE FIRST PAGE OF SPECIFICATIONS FOR GENERAL TIGHTENING TORQUES

CYLINDER LINER



(1) Bore in liner ..... 5.751 ± .001 in. (146.08 ± 0.03 mm)

Use again maximum bore when measured near upper end of the wear surface of the cylinder liner ..... 5.755 in. (146.18 mm)

(2) Thickness of flange on liner ..... .4990 ± .0008 in. (12.675 ± 0.020 mm)

(3) Put filler band in diesel fuel, then immediately install it on the cylinder liner. Put a thin layer of SAE 30W oil on the band then immediately install the cylinder liner in the cylinder block before expansion of the band.

NOTE: Make reference to GUIDELINE FOR REUSABLE PARTS; PISTONS AND CYLINDER LINERS, FORM NO. SEBF8001.

CYLINDER LINER PROJECTION

(With Spacer Plate)

Make reference to CYLINDER LINER PROJECTION in Testing and Adjusting for the complete procedure.

1. Install gasket (10) and spacer plate (9) with bolts (1). Tighten bolts (1) evenly in four steps:

   1st step ..... 10 lb. ft. (14 N·m)

   2nd step ..... 25 lb. ft. (35 N·m)

   3rd step ..... 50 lb. ft. (70 N·m)

   4th step ..... 70 lb. ft. (95 N·m)

2. Install tooling as shown. Tighten bolts (4) evenly in four steps:

   1st step ..... 5 lb. ft. (7 N·m)

   2nd step ..... 15 lb. ft. (20 N·m)

   3rd step ..... 25 lb. ft. (35 N·m)

   4th step ..... 50 lb. ft. (70 N·m)

3. Measure cylinder liner projection with dial indicator (3) in 1P2402 Block (2) as shown. Measure at four places around each cylinder liner near the clamped area.

   Average of four projection measurements from any cylinder liner must be ..... .005 ± .003 in. (0.13 ± 0.08 mm)

   Maximum permissible difference between all four measurements..... .002 in. (0.05 mm)

   Maximum permissible difference between average projection of any two cylinder liners next to each other in the same spacer plate ..... .002 in. (0.05 mm)

4. Minimum permissible depth to machine counterbore to adjust cylinder liner projection ..... .030 in. (0.76 mm)

   Maximum permissible depth to machine counterbore to adjust cylinder liner projection ..... .045 in. (1.14 mm)

   Install a .030 in. (0.76 mm) shim plus any added shims necessary to get the correct cylinder liner projection.

   NOTE: Be sure that the .030 in. (0.76 mm) shim is directly under the cylinder liner flange.

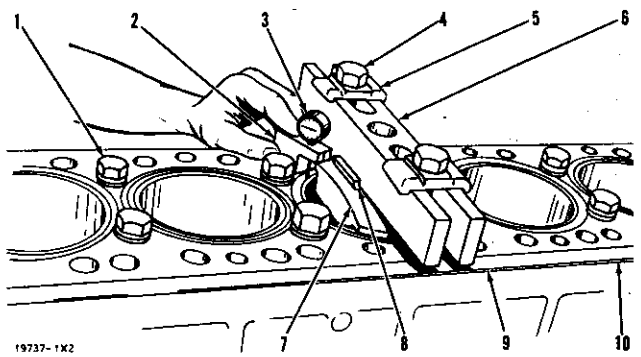
   Put 7M7260 Liquid Gasket on the top of the top shim and on the bottom of the bottom shim before installing.

(5) 3H465 Plate.

(6) 8B7548 Push-puller Crossbar.

(7) 1P2397 Adapter plate.

(8) 3H465 Plate (installed upside down).



ADJUSTMENT SHIMS FOR LINER PROJECTION				
SHIM THICKNESS, COLOR CODE, AND PART NUMBER				
.007 in. (0.18 mm)	.008 in. (0.20 mm)	.009 in. (0.23 mm)	.015 in. (0.38 mm)	.030 in. (0.76 mm)
BLACK 5S8143	RED 5S8144	GREEN 5S8145	BROWN 5S8146	BLUE 5S8147

CYLINDER LINER PROJECTION
(WITHOUT SPACER PLATE)

Make reference to CYLINDER LINER PROJECTION in Testing and Adjusting for the complete procedure.

1. Install tooling as shown. Tighten nuts for crossbar evenly in four steps:

   1st step ..... 5 lb. ft. (7 N·m)

   2nd step ..... 15 lb. ft. (20 N·m)

   3rd step ..... 25 lb. ft. (35 N·m)

   4th step ..... 50 lb. ft. (70 N·m)

2. Measure cylinder liner projection with dial indicator (2) in 1P2402 Block (3) as shown. Measure at four places around each cylinder liner near the clamped area.

   Average of four projection measurements from any cylinder liner must be ..... .004 to .008 in. (0.10 to 0.20 mm)

   Maximum permissible difference between all four measurements ..... .002 in. (0.05 mm)

   Maximum permissible difference between average projection of any two cylinder liners next to each other under any one head.... .002 in. (0.05 mm)

3. Depth of bore in block for liner ..... .492 to .494 in. (12.50 to 12.55 mm)

   Maximum permissible depth to machine counterbore to adjust cylinder liner projection ..... .538 in. (13.67 mm)

   Install a .030 in. (0.76 mm) shim plus any added shims necessary to get the correct cylinder liner projection.

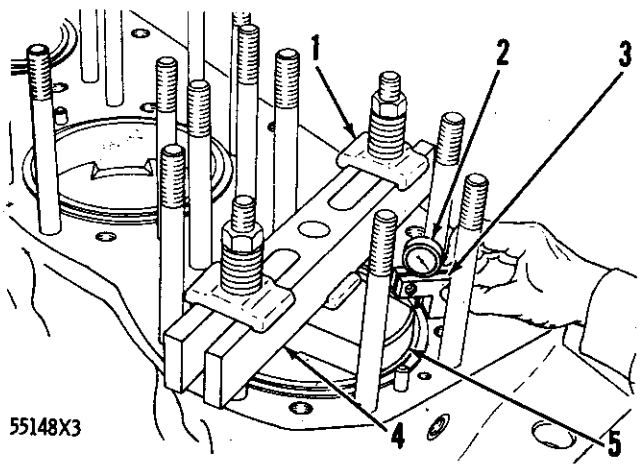
   NOTE: Be sure that the .030 in. (0.76 mm) shim is directly under the cylinder liner flange.

   Put 7M7260 Liquid Gasket on the top of the top shim and on the bottom of the bottom shim before installing.

(1) 3H465 Plate.

(4) 8B7548 Push-puller Crossbar.

(5) 1P2397 Adapter plate.



55148X3

ADJUSTMENT SHIMS FOR LINER PROJECTION				
SHIM THICKNESS, COLOR CODE, AND PART NUMBER				
.007 in. (0.18 mm)	.008 in. (0.20 mm)	.009 in. (0.23 mm)	.015 in. (0.38 mm)	.030 in. (0.76 mm)
BLACK 5S8143	RED 5S8144	GREEN 5S8145	BROWN 5S8146	BLUE 5S8147

PISTONS AND RINGS
(WITH KEYSTONE PISTON RING GROOVE)

Make reference to GUIDELINE FOR REUSABLE PARTS; PISTONS AND CYLINDER LINERS, Form No. SEBF8001.

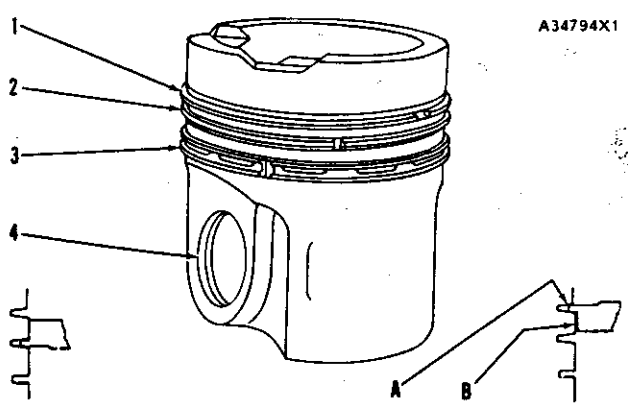
PISTONS AND PISTON RINGS			
	(1) TOP RING	(2) INTERMEDIATE RING	(3) OIL CONTROL RING
Part No.	*6N5025	*6N5026	**3H881
Width of groove in piston for piston ring (new).	*** —	*** —	.2510 ± .0005 in. (6.375 ± 0.013 mm)
Thickness of piston ring (new).	*** —	*** —	.2485 ± .0005 in. (6.312 ± 0.013 mm)
Clearance between groove and piston ring (new).	*** —	*** —	.0025 ± .0010 in. (0.064 ± 0.025 mm)
Clearance between ends of piston ring when installed in a cylinder liner with a bore size of 5.750 in. (146.05 mm)	.0305 ± .0075 in. (0.775 ± 0.191 mm)	.0475 ± .0075 in. (1.207 ± 0.191 mm)	.0275 ± .0075 in. (0.699 ± 0.191 mm)
Increase in clearance between ends of piston ring for each .001 in. (0.03 mm) increase in cylinder liner bore size.	.003 in. (0.08 mm)		

*Install piston ring with "UP" side toward top of piston.

NOTE: 6N5025 Top Ring (1) has the mark "UP-1."
6N5026 Intermediate Ring (2) has the mark "UP-2."

**Install 3H881 Oil Control Ring (3) with the gap in the spring 180° away from the gap in the ring.

***"Keystone" style piston rings and grooves in pistons. The 5P4812 KEYSTONE PISTON RING GROOVE GAUGE is necessary for measuring these grooves. Put the pin end (A) of gauge "3" in the groove at four places around the circumference. Do this to both grooves. The flat edge (B) of the gauge must be between grooves (1) and (2). If there is clearance between the flat edge (B) of the gauge and the piston at all test locations, for both grooves, the piston is reusable. If the flat edge (B) is in contact with the piston, at any of the test locations, the piston is not reusable. Install a new piston.



(4) Bore in piston for pin ..... 2.3906 ± .0003 in. (60.721 ± 0.008 mm)

Clearance between pin and bore in piston ..... .0003 to .0013 in. (0.008 to 0.033 mm)

Maximum permissible clearance (worn) ..... .002 in. (0.05 mm)

Pin diameter ..... 2.3898 ± .0002 in. (60.701 ± 0.005 mm)

NOTE: When installed in the engine, the "V" mark on top of the piston must be in alignment with the "V" mark on the cylinder block.

PISTONS AND RINGS

Make reference to GUIDELINE FOR REUSABLE PARTS; PISTONS AND CYLINDER LINERS, Form No. SEBF8001.

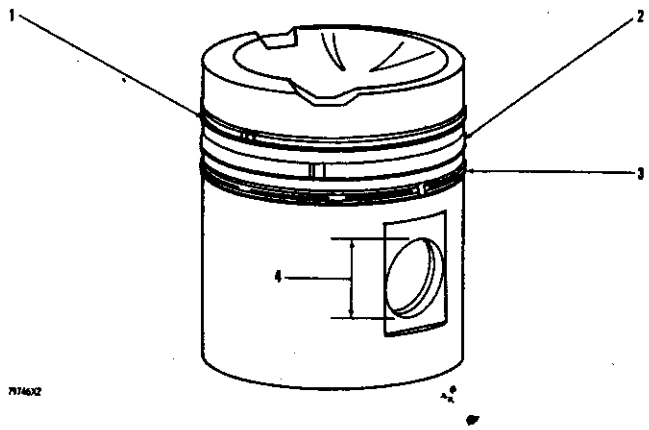
PISTONS AND PISTON RINGS			
	(1) TOP RING	(2) INTERMEDIATE RING	(3) OIL CONTROL RING
	*4N3875	*2S8884	**3H881
Width of groove in piston for piston ring (new).	.1916 ± .0005 in. (4.867 ± 0.013 mm)	.0970 ± .0005 in. (2.464 ± 0.013 mm)	.2510 ± .0005 in. (6.375 ± 0.013 mm)
Thickness of piston ring (new).	.1865 +.0000 to −.0008 in. (4.737 +0.000 to −0.020 mm)	.0935 +.0000 to −.0008 in. (2.375 +0.000 to 0.020 mm)	.2485 ± .0005 in. (6.312 ± 0.013 mm)
Clearance between groove and piston ring (new).	.0046 to .0064 in. (0.117 to 0.163 mm)	.0030 to .0048 in. (0.076 to 0.122 mm)	.0025 ± .0010 in. (0.064 ± 0.025 mm)
Clearance between ends of piston ring when installed in a cylinder liner with a bore size of 5.750 in. (146.05 mm)	.0305 ± .0075 in. (0.775 ± 0.191 mm)	.0285 ± .0075 in. (0.724 ± 0.191 mm)	.0275 ± .0075 in. (0.699 ± 0.191 mm)
Increase in clearance between ends of piston ring for each .001 in. (0.03 mm) increase in cylinder liner bore size.	.003 in. (0.08 mm)		

*Install piston ring with "UP" side toward top of piston.

NOTE: 4N3875 Top Ring (1) has the mark "UP-1."
2S8884 Intermediate Ring (2) has the mark "UP-2."

**Install 3H881 Oil Control Ring (3) with the gap in the spring 180° away from the gap in the ring.

NOTE: Use 5P3519 PISTON RING GROOVE GAUGE to check top and center ring grooves with straight sides. For instructions on the use of the gauge, see the GUIDELINE FOR REUSABLE PARTS; PISTONS AND CYLINDER LINERS, Form No. SEBF8001.



(4) Bore in piston for pin ..... 2.3906 ± .0003 in. (60.721 ± 0.008 mm)

Clearance between pin and bore in piston (new) ..... .0003 to .0013 in. (0.008 to 0.033 mm)

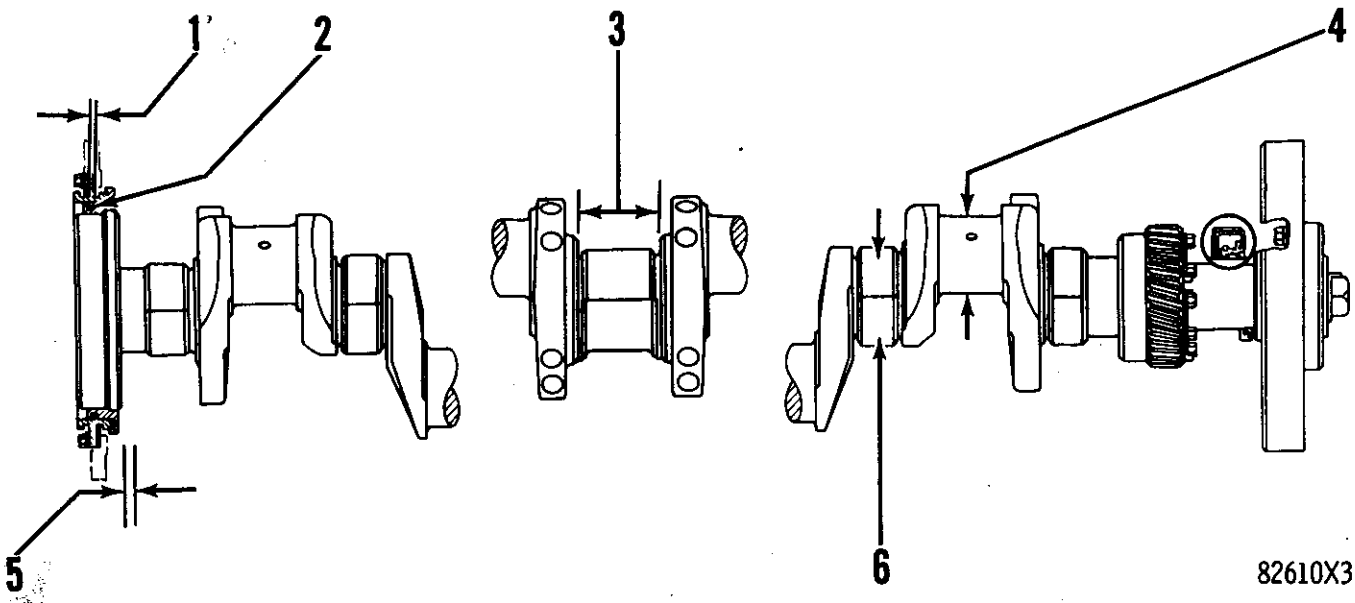
Maximum permissible clearance between piston pin and bore in piston (worn) ..... .002 in. (0.05 mm)

Torque for nut on heat plug ..... 30 ± 5 lb. ft. (40 ± 7 N·m)

NOTE: When installed in the engine, the "V" mark on top of the piston must be in alignment with the "V" mark on the cylinder block.

NOTE: FOR TORQUE VALUES NOT GIVEN, SEE THE FIRST PAGE OF SPECIFICATIONS FOR GENERAL TIGHTENING TORQUES

CRANKSHAFT



Get the temperature of the thrower to a maximum of 500°F (260°C) before installation on the crankshaft.

Get the temperature of the gear to a maximum of 400°F (204°C) before installation on the crankshaft.

(1) Width of groove in thrower ..... .2515 ± .0005 in. (6.388 ± 0.013 mm)

Clearance between seal ring and groove ..... .0025 to .0045 in. (0.064 to 0.114 mm)

Clearance between ends of seal ring ..... .010 to .050 in. (0.25 to 1.27 mm)

(2) Maximum "runout" (axial eccentricity) of groove in thrower for seal ring ..... .006 in. (0.15 mm)

(3) Distance between thrust faces of crankshaft for center main bearing ..... 3.875 ± .005 in. (98.43 ± 0.13 mm)

Distance between thrust faces of center main bearing ..... 3.857 ± .001 in. (97.97 ± 0.03 mm)

(4) Diameter of bearing surfaces (journals) for the connecting rods [standard, original size] ..... 3.624 ± .001 in. (92.05 ± 0.03 mm)

Minimum permissible diameter ..... 3.6175 in. (91.885 mm)

Diameter of bearing surfaces (journals) for the connecting rods [.025 in. (0.64 mm) smaller than the original size] ..... 3.599 ± .001 in. (91.41 ± 0.03 mm)

Minimum permissible diameter ..... 3.5925 in. (91.250 mm)

Diameter of bearing surfaces (journals) for the connecting rods [.050 in. (1.27 mm) smaller than the original size] ..... 3.574 ± .001 in. (90.78 ± 0.03 mm)

Minimum permissible diameter ..... 3.5675 in. (90.615 mm)

Maximum permissible difference from round bearing surface (journal) ..... .005 in. (0.13 mm)

Clearance between connecting rod bearing and connecting rod bearing surface (journal) of crankshaft ..... .0021 to .0063 in. (0.053 to 0.160 mm)

Maximum permissible clearance between connecting rod and connecting rod bearing surface (journal) of crankshaft ..... .012 in. (0.30 mm)

(5) End play for the crankshaft ..... .012 to .024 in. (0.30 to 0.61 mm)

Maximum permissible end play for the crankshaft ..... .035 in. (0.89 mm)

(6) Diameter of bearing surfaces (journals) for the main bearings [standard, original size] ..... 4.260 ± .001 in. (108.20 ± 0.03 mm)

Minimum permissible diameter ..... 4.2555 in. (108.090 mm)

Diameter of bearing surfaces (journals) for the main bearings [.025 in. (0.64 mm) smaller than the original size] ..... 4.235 ± .001 in. (107.57 ± 0.03 mm)

Minimum permissible diameter ..... 4.2305 in. (107.455 mm)

Diameter of bearing surfaces (journals) for the main bearings [.050 in. (1.27 mm) smaller than the original size] ..... 4.210 ± .001 in. (106.93 ± 0.03 mm)

Minimum permissible diameter ..... 4.2055 in. (106.820 mm)

Maximum permissible difference from round bearing surface (journal) ..... .005 in. (0.13 mm)

Clearance between main bearing and main bearing surface (journal) of crankshaft ..... .0024 to .0066 in. (0.061 to 0.168 mm)

Maximum permissible clearance between main bearing and main bearing surface (journal) of crankshaft ..... .010 in. (0.25 mm)

CONNECTING ROD

(1) Bore in bearing for piston pin ..... 2.3913 ± .0003 in. (60.739 ± 0.008 mm)

Maximum permissible clearance between bearing and piston pin ..... .003 in. (0.08 mm)

(2) Bore in connecting rod for bearing ..... 3.9670 ± .0005 in. (100.762 ± 0.013 mm)

(3) Distance between center of bearing for piston pin and center of bearing for crankshaft ..... 15.000 ± .001 in. (381.00 ± 0.03 mm)

(4) Diameter of piston pin ..... 2.3898 ± .0002 in. (60.701 ± 0.005 mm)

(5) Bore in bearing for crankshaft bearing surface (journal) ..... 3.6279 to 3.6300 in. (92.149 to 92.202 mm)

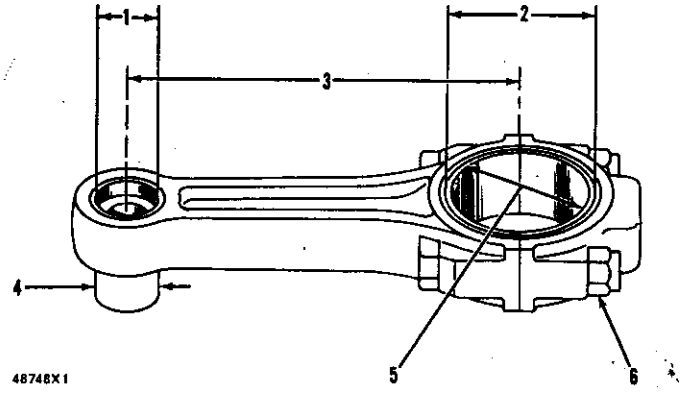
(6) Torque on nuts for connecting rod:

a. Put crankcase oil on threads and nut seat.

b. Tighten both nuts to ..... 75 ± 5 lb. ft. (100 ± 7 N·m)

c. Put a mark on each nut and end of bolt.

d. Tighten each nut from mark ..... 60°

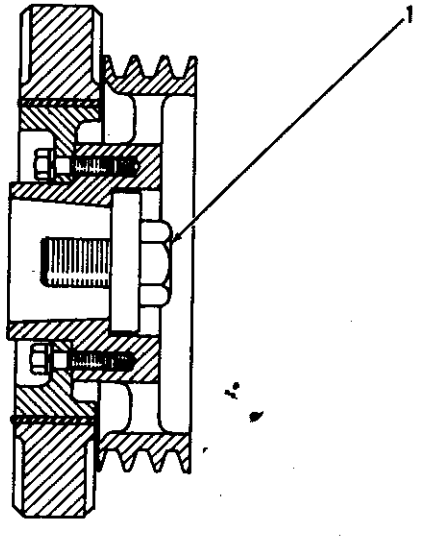


48748X1

VIBRATION DAMPER

(1) Torque for bolt holding hub and damper on crankshaft ..... 600 ± 50 lb. ft. (810 ± 70 N·m)

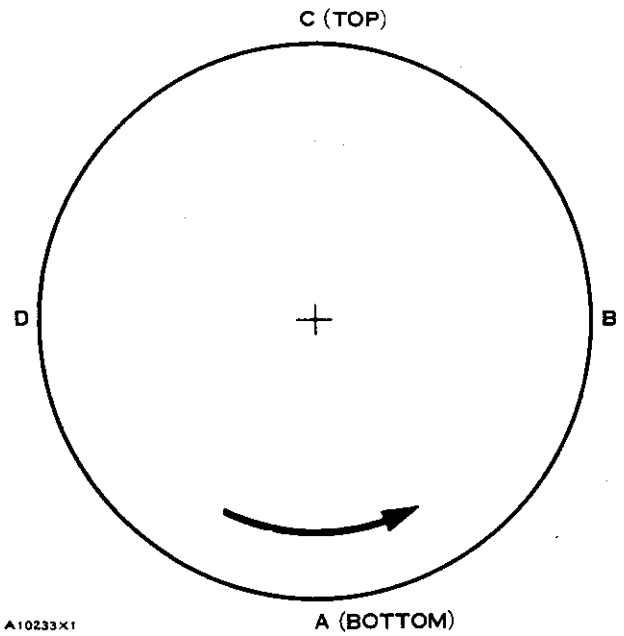
Hit bolt with hammer and again tighten bolt to ..... 600 ± 50 lb. ft. (810 ± 70 N·m)



A13481X1

NOTE: FOR TORQUE VALUES NOT GIVEN, SEE THE FIRST PAGE OF SPECIFICATIONS FOR GENERAL TIGHTENING TORQUES

FLYWHEEL HOUSING BORE



A10233X1

NOTE: Write the dial indicator measurements with their positive (+) and negative (−) notation (signs). This notation is necessary for making the calculations in the chart correctly.

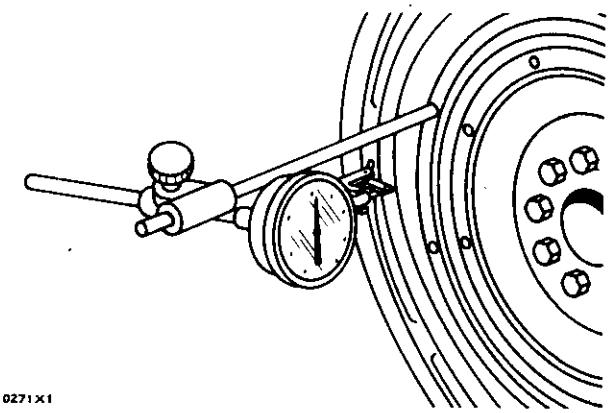
1. With the dial indicator in position at (C), adjust the dial indicator to "0" (zero). Push the crankshaft up against the top bearing. Write the measurement for bearing clearance on line 1 in column (C).
2. Divide the measurement from Step 1 by 2. Write this number on line 1 in columns (B) & (D).
3. Turn the crankshaft to put the dial indicator at (A). Adjust the dial indicator to "0" (zero).
4. Turn the crankshaft counterclockwise to put the dial indicator at (B). Write the measurement in the chart.
5. Turn the crankshaft counterclockwise to put the dial indicator at (C). Write the measurement in the chart.
6. Turn the crankshaft counterclockwise to put the dial indicator at (D). Write the measurement in the chart.
7. Add lines I & II by columns.
8. Subtract the smaller number from the larger number in line III in columns (B) & (D). The result is the horizontal "eccentricity" (out of round). Line III, column (C) is the vertical eccentricity.

CHART FOR DIAL INDICATOR MEASUREMENTS

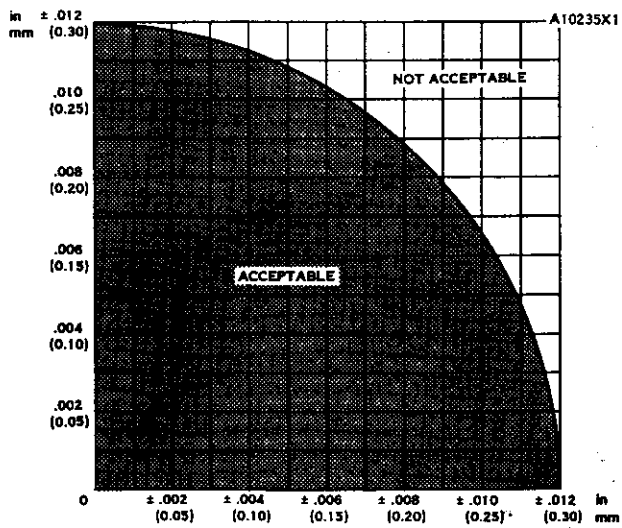
		Position of dial indicator			
	Line No.	A	B	C	D
Correction for bearing clearance	I	0			
Dial Indicator Reading	II	0			
Total of Line 1 & 2	III	0	**	*	**

*Total Vertical eccentricity (out of round).
**Subtract the smaller No. from the larger No. The difference is the total horizontal eccentricity.

A10234X1


A10271X1

9. On the graph for total eccentricity find the point of intersection of the lines for vertical eccentricity and horizontal eccentricity.
10. If the point of intersection is in the range marked "Acceptable" the bore is in alignment. If the point of intersection is in the range marked "Not Acceptable," the flywheel housing must be changed.

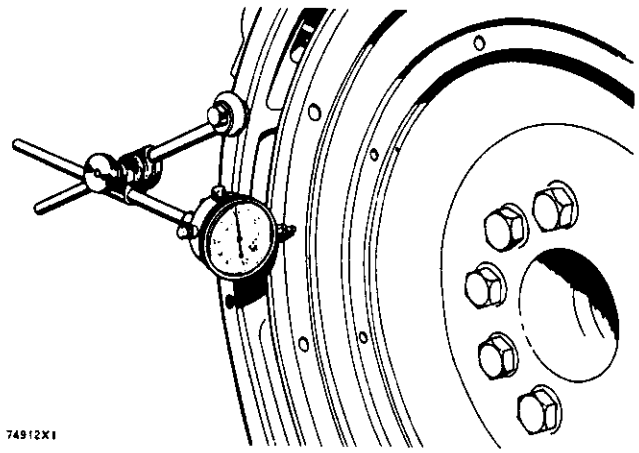


A10235X1

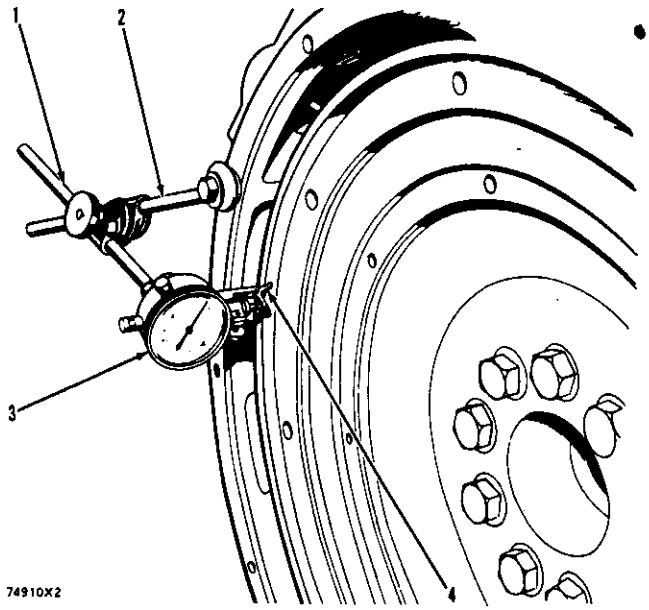
FLYWHEEL RUNOUT

Face Runout (axial eccentricity) of the Flywheel:

1. Install the dial indicator as shown. Put a force on the flywheel toward the rear.
2. Set the dial indicator to read .000 in. (0.0 mm).
3. Turn the flywheel and read the indicator every 90°. Put a force on the flywheel to the rear before each reading.
4. The difference between the lower and higher measurements taken at all four points must not be more than .006 in. (0.15 mm), which is the maximum permissible face runout (axial eccentricity) of the flywheel.



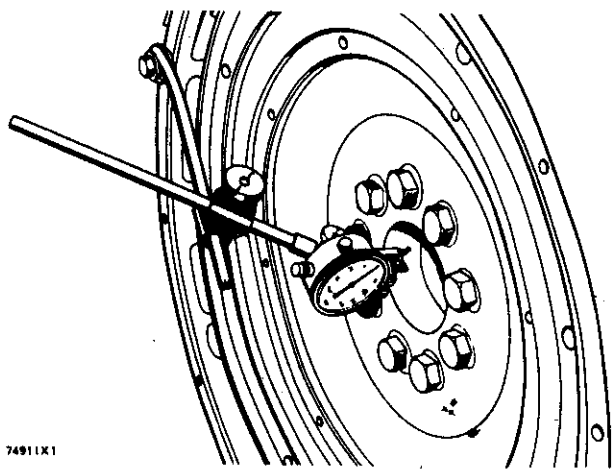
CHECKING FACE RUNOUT OF THE FLYWHEEL



CHECKING FLYWHEEL BORE

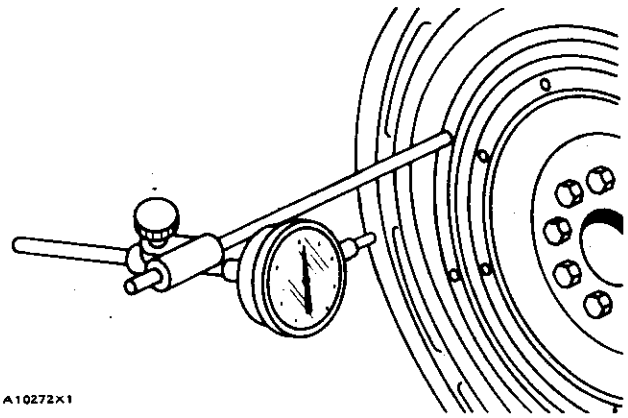
Bore Runout (radial eccentricity) of the Flywheel:

1. Install the dial indicator (3) and make an adjustment of the universal attachment (4) so it makes contact as shown.
2. Set the dial indicator to read .000 in. (0.0 mm).
3. Turn the flywheel and read the indicator every 90°.
4. The difference between the lower and higher measurements taken at all four points must not be more than .006 in. (0.15 mm), which is the maximum permissible bore runout (radial eccentricity) of the flywheel.
5. Runout (eccentricity) of the bore for the pilot bearing for the flywheel clutch, must not exceed .005 in. (0.13 mm).



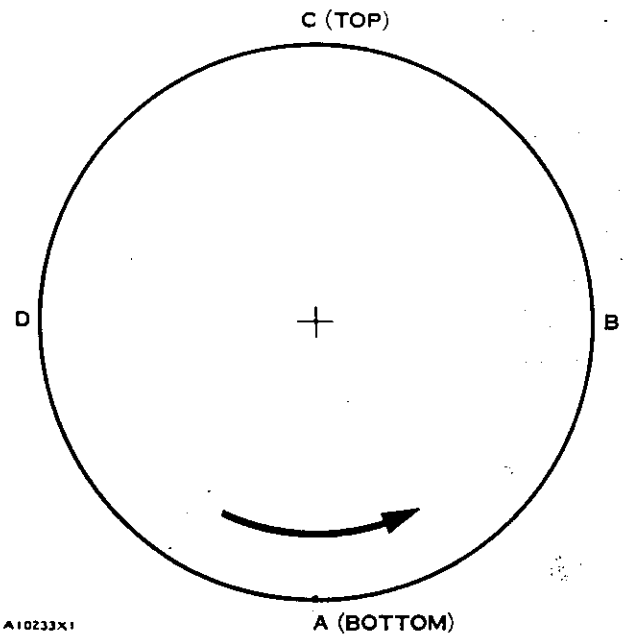
CHECKING FLYWHEEL CLUTCH PILOT BEARING BORE

NOTE: FOR TORQUE VALUES NOT GIVEN, SEE THE FIRST PAGE OF SPECIFICATIONS FOR GENERAL TIGHTENING TORQUES



8S2328 DIAL INDICATOR GROUP INSTALLED

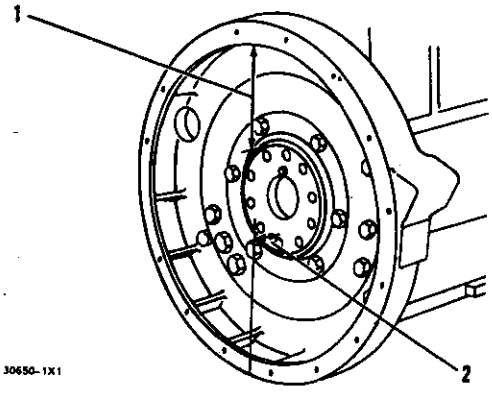
FLYWHEEL HOUSING RUNOUT



Face Runout (axial eccentricity) of the Flywheel Housing:

1. Fasten a dial indicator to the crankshaft flange so the anvil of the indicator will touch the face of the flywheel housing.
2. Put a force on the crankshaft toward the rear before reading the indicator at each point.
3. With dial indicator set at .000 in. (0.0 mm) at location (A), turn the crankshaft and read the indicator at locations (B), (C) and (D).
4. The difference between lower and higher measurements taken all four points must not be more than .012 in. (0.30 mm), which is the maximum permissible face run out (axial eccentricity) of the flywheel housing.

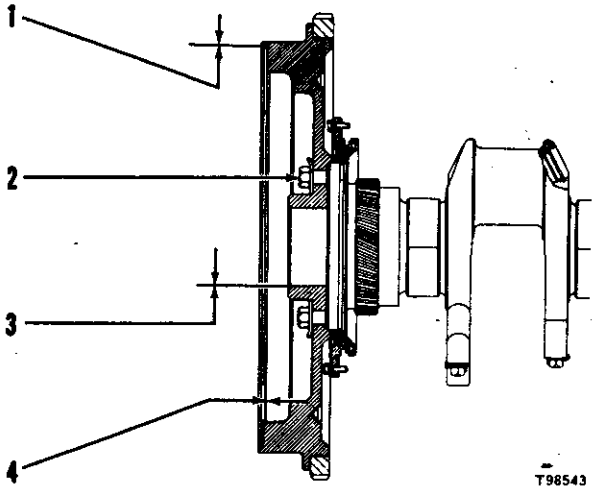
FLYWHEEL HOUSING



(1) See FLYWHEEL HOUSING BORE.

(2) Maximum permissible "run out" (axial eccentricity) of face (total indicator reading) ..... .012 in. (0.30 mm)

FLYWHEEL



(1) Maximum permissible "runout" (radial eccentricity) off center of bore (total indicator reading) ..... .006 in. (0.15 mm)

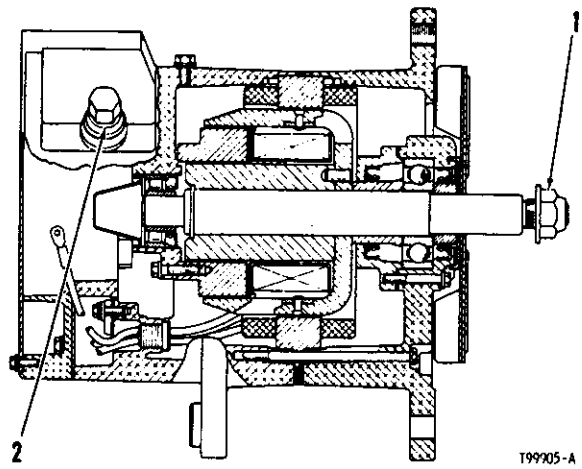
(2) Torque for bolts holding flywheel to crankshaft ..... 280 ± 20 lb. ft. (377 ± 25 N·m)

(3) Maximum permissible "runout" (radial eccentricity) off center of pilot bore (total indicator reading) ..... .005 in. (0.3 mm)

(4) Maximum permissible "runout" (axial eccentricity) of face (total indicator reading) ..... .006 in. (0.15 mm)

NOTE: FOR TORQUE VALUES NOT GIVEN, SEE THE FIRST PAGE OF SPECIFICATIONS FOR GENERAL TIGHTENING TORQUES

ALTERNATORS



5S9088 24V 50A (Delco-Remy Number 1117236 or 1117248)

Circuit ..... B

Polarity is negative ground.

Speed for testing ..... 5000 rpm

Rotation can be either direction.

Output when cold:

Fasten carbon pile to battery to get maximum output ..... 54 A

Rated output, hot ..... 50 A

Field current at 24V and 80° F (27° C) ..... 2.5 to 2.9 A

Voltage regulator:

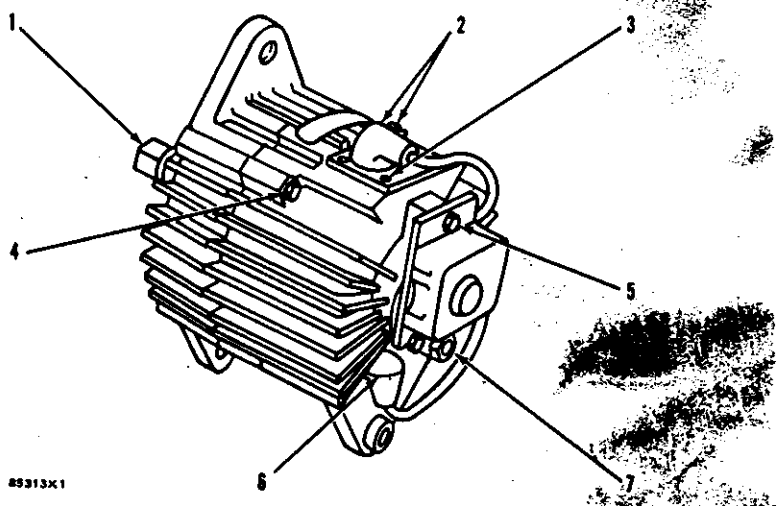
Voltage setting range ..... 26 to 30 V

Adjust voltage setting to ..... 28 V

then increase speed to get maximum output ..... 50 A

(1) Torque for nut ..... 75 ± 5 lb. ft. (100 ± 7 N·m)

(2) Torque for output terminal ..... 10 ± 1 lb. ft. (14 ± 1 N·m)



2P1204 24V 19A (Prestolite Number ANB7004)*

Polarity is negative ground.

Rated output at 28V ..... 19 A

Output at 1500 rpm and 28V ..... 10 A

Resistance of the rotor at 77° F (25° C) ..... 18 to 20 ohms

Current consumption (draw) at 77° F (25° C) and 24V ..... 1.20 to 1.33 A

(1) Torque for nut holding pulley ..... 75 ± 5 lb. ft. (100 ± 7 N·m)

(2) Torque for nuts for terminals for field and ground ..... 25 to 30 lb. in. (2.8 to 3.4 N·m)

(3) Torque for screws holding terminal plate ..... 10 to 15 lb. in. (1.1 to 1.7 N·m)

(4) Torque for bolts ..... 25 to 30 lb. in. (2.8 to 3.4 N·m)

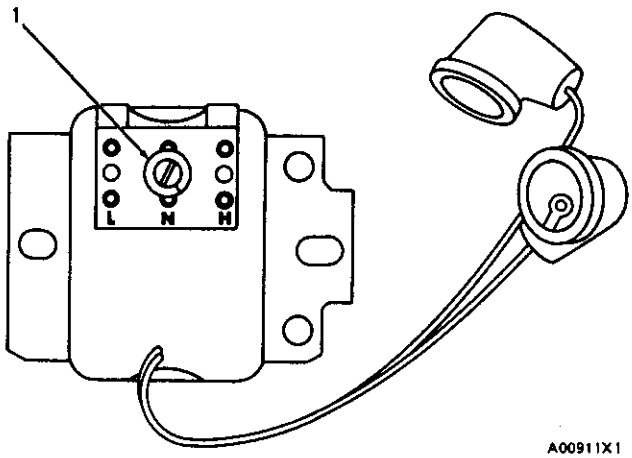
(5) Torque for bolts holding regulator ..... 45 to 50 lb. in. (5.1 to 5.7 N·m)

(6) Torque for nut for terminal ..... 45 to 50 lb. in. (5.1 to 5.7 N·m)

(7) Torque for nut for positive terminal ..... 225 to 250 lb. in. (25.4 to 28.3 N·m)

*Including the 4N5938 Regulator (Prestolite Number VSH-6401B) or 6N3821 Regulator (Prestolite Number VSH-6401C).

ALTERNATOR REGULATORS



6N3821 24V (Prestolite Number VSH-6401C)

4N5938 24V (Prestolite Number VSH-6401B)

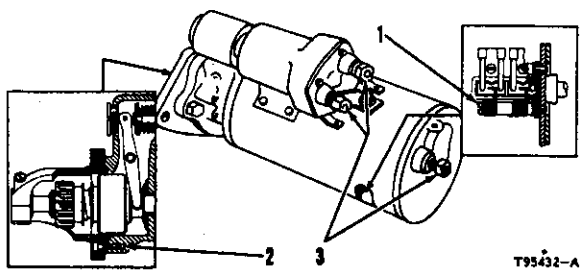
Polarity is negative ground.

Voltage setting range at 70° F (21° C) ..... 27.3 to 28.7 V*

(1) Adjustment screw and washer.

*With voltage adjustment screw (1) in position "N" (center). When screw (1) is in position "L", voltage will be 0.5V less. When screw (1) is in position "H", voltage will be 0.5V higher.

STARTING MOTOR



1P9182 24V (Delco-Remy Number 1109632)

Rotation is clockwise when seen from drive end.

Minimum speed with no load ..... 5500 rpm

Maximum speed with no load ..... 7500 rpm

Current consumption (draw) at no load:

Minimum with solenoid at 20V ..... 140 A

Maximum with solenoid at 20V ..... 170 A

Clearance between pinion and housing (pinion clearance) ..... .36 in. (9.1 mm)

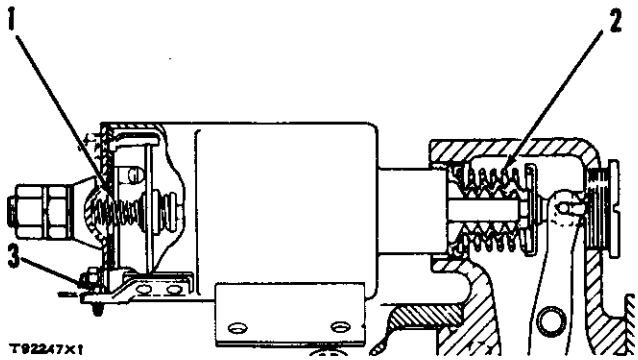
(1) Tension of brush spring ..... 80 oz. (22.2 N)

(2) Torque for screws holding nose housing to lever housing ..... 13 to 17 lb. ft. (18 to 23 N·m)

(3) Torque for terminal nuts ..... 20 to 25 lb. ft. (25 to 35 N·m)

NOTE: FOR TORQUE VALUES NOT GIVEN, SEE THE FIRST PAGE OF SPECIFICATIONS FOR GENERAL TIGHTENING TORQUES

STARTER SOLENOID



6N5123 24V (Delco-Remy Number 1115544)

1P9181 24V (Delco-Remy Number 1115526)

Current consumption (draw):

- Current at 20V ..... 40 to 45.5 A
- Current at 20 to 24V ..... 40 to 54.6 A

(1) 4M1815 Spring for contact release:

- Length under test force ..... .42 in. (10.7 mm)
- Test force ..... 8.5 to 9.5 lb. (38.0 to 42.5 N)
- Free length after test ..... .83 ± .015 in. (21.1 ± 0.38 mm)
- Outside diameter ..... .375 ± .010 in. (9.53 ± 0.25 mm)

(2) 9M7609 Spring to return the clutch lever:

- Length under test force ..... 1.56 in. (39.6 mm)
- Test force ..... 14 ± .5 lb. (62 ± 2.2 N)
- Free length after test ..... 2.79 in. (70.9 mm)
- Outside diameter ..... 1.393 ± .015 in. (35.38 ± 0.38 mm)

(3) Torque for terminal screws ..... 16 to 30 lb. in. (1.8 to 3.4 N·m)

CATERPILLAR

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CATERPILLAR FUNDAMENTALS ENGLISH
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