SERVICE MANUAL

Engines

6T-830

6TA-830

7-65441

1. Trim along dashed line.
2. Slide into pocket on Binder Spine.

TYPE 1-4

SERVICE MANUAL

Engines

6T-830

6TA-830

7-65441

1. Trim along dashed line.
2. Slide into pocket on Binder Spine.

TYPE 1-4

SERVICE MANUAL

Engines

6T-830

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7-65441

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SERVICE MANUAL

Engines

6T-830

6TA-830

7-65441

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TYPE 1-4

6T-830 and 6TA-830 Engine Service Manual 7-65441

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CASE CORPORATION
700 State Street
Racine, WI 53404 U.S.A.

CASE CANADA CORPORATION
3350 South Service Road
Burlington, ON L7N 3M6 CANADA

Rac 7-66690

Printed in U.S.A.
March, 1996

Section

1001

STANDARD TORQUE SPECIFICATIONS

CASE CORPORATION
700 State Street
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CASE CANADA CORPORATION
3350 South Service Road
Burlington, ON L7N 3M6 CANADA

Rac 8-71601

Printed in U.S.A.
Issued November, 1991

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TORQUE SPECIFICATIONS - DECIMAL HARDWARE

Use the torques in this chart when special torques are not given. These torques apply to fasteners with both UNC and UNF threads as received from suppliers dry, or when lubricated with engine oil. Not applicable if special graphities, Molydisulfide greases, or other extreme pressure lubricants are used.

Grade 5 Bolts, Nuts, and Studs

Size	Pound-Inches	Newton metres
1/4 inch	108 to 132	12 to 15
5/16 inch	204 to 252	23 to 28
3/8 inch	420 to 504	48 to 57
Size	**Pound-Feet**	**Newton metres**
7/16 inch	54 to 64	73 to 87
1/2 inch	80 to 96	109 to 130
9/16 inch	110 to 132	149 to 179
5/8 inch	150 to 180	203 to 244
3/4 inch	270 to 324	366 to 439
7/8 inch	400 to 480	542 to 651
1.0 inch	580 to 696	787 to 944
1-1/8 inch	800 to 880	1085 to 1193
1-1/4 inch	1120 to 1240	1519 to 1681
1-3/8 inch	1460 to 1680	1980 to 2278
1-1/2 inch	1940 to 2200	2631 to 2983

Grade 8 Bolts, Nuts, and Studs

Size	Pound-Inches	Newton metres
1/4 inch	144 to 180	16 to 20
5/16 inch	288 to 348	33 to 39
3/8 inch	540 to 648	61 to 73
Size	**Pound-Feet**	**Newton metres**
7/16 inch	70 to 84	95 to 114
1/2 inch	110 to 132	149 to 179
9/16 inch	160 to 192	217 to 260
5/8 inch	220 to 264	298 to 358
3/4 inch	380 to 456	515 to 618
7/8 inch	600 to 720	814 to 976
1.0 inch	900 to 1080	1220 to 1465
1-1/8 inch	1280 to 1440	1736 to 1953
1-1/4 inch	1820 to 2000	2468 to 2712
1-3/8 inch	2380 to 2720	3227 to 3688
1-1/2 inch	3160 to 3560	4285 to 4827

NOTE: *Use thick nuts with Grade 8 bolts.*

Retyped November, 1994

Rac 8-71601 Issued 11-91 Printed in U.S.A

TORQUE SPECIFICATIONS - METRIC HARDWARE

Use the following torques when specifications are not given.

These values apply to fasteners with coarse threads as received from supplier, plated or unplated, or when lubricated with engine oil. These values do not apply if graphite or Molydisulfide grease or oil is used.

Grade 8.8 Bolts, Nuts, and Studs

Size	Pound-Inches	Newton metres
M4	24 to 36	3 to 4
M5	60 to 72	7 to 8
M6	96 to 108	11 to 12
M8	228 to 276	26 to 31
M10	456 to 540	52 to 61
Size	Pound-Feet	Newton metres
M12	66 to 79	90 to 107
M14	106 to 127	144 to 172
M16	160 to 200	217 to 271
M20	320 to 380	434 to 515
M24	500 to 600	675 to 815
M30	920 to 1100	1250 to 1500
M36	1600 to 1950	2175 to 2600

Grade 10.9 Bolts, Nuts, and Studs

Size	Pound-Inches	Newton metres
M4	36 to 48	4 to 5
M5	84 to 96	9 to 11
M6	132 to 156	15 to 18
M8	324 to 384	37 to 43
Size	Pound-Feet	Newton metres
M10	54 to 64	73 to 87
M12	93 to 112	125 to 150
M14	149 to 179	200 to 245
M16	230 to 280	310 to 380
M20	450 to 540	610 to 730
M24	780 to 940	1050 to 1275
M30	1470 to 1770	2000 to 2400
M36	2580 to 3090	3500 to 4200

Grade 12.9 Bolts, Nuts, and Studs

Usually the torque values specified for grade 10.9 fasteners can be used satisfactorily on grade 12.9 fasteners.

TORQUE SPECIFICATIONS - STEEL HYDRAULIC FITTINGS

Tube OD Hose ID	Thread Size	Pound-Inches	Newton metres
37 Degree Flare Fitting			
1/4 inch 6.4 mm	7/16-20	72 to 144	8 to 16
5/16 inch 7.9 mm	1/2-20	96 to 192	11 to 22
3/8 inch 9.5 mm	9/16-18	120 to 300	14 to 34
1/2 inch 12.7 mm	3/4-16	180 to 504	20 to 57
5/8 inch 15.9 mm	7/8-14	300 to 696	34 to 79
Tube OD Hose ID	Thread Size	Pound-Inches	Newton metres
3/4 inch 19.0 mm	1-1/16-12	40 to 80	54 to 108
7/8 inch 22.2 mm	1-3/16-12	60 to 100	81 to 135
1.0 inch 25.4 mm	1-5/16-12	75 to 117	102 to 158
1-1/4 inch 31.8 mm	1-5/8-12	125 to 165	169 to 223
1-1/2 inch 38.1 mm	1-7/8-12	210 to 250	285 to 338

Tube OD Hose ID	Thread Size	Pound-Inches	Newton metres
Straight Threads with O-ring			
1/4 inch 6.4 mm	7/16-20	144 to 228	16 to 26
5/16 inch 7.9 mm	1/2-20	192 to 300	22 to 34
3/8 inch 9.5 mm	9/16-18	300 to 480	34 to 54
1/2 inch 12.7 mm	3/4-16	540 to 804	57 to 91
Tube OD Hose ID	Thread Size	Pound-Inches	Newton metres
5/8 inch 15.9 mm	7/8-14	58 to 92	79 to 124
3/4 inch 19.0 mm	1-1/16-12	80 to 128	108 to 174
7/8 inch 22.2 mm	1-3/16-12	100 to 160	136 to 216
1.0 inch 25.4 mm	1-5/16-12	117 to 187	159 to 253
1-1/4 inch 31.8 mm	1-5/8-12	165 to 264	224 to 357
1-1/2 inch 38.1 mm	1-7/8-12	250 to 400	339 to 542

Split Flange Mounting Bolts		
Size	Pound-Inches	Newton metres
5/16-18	180 to 240	20 to 27
3/8-16	240 to 300	27 to 34
7/16-14	420 to 540	47 to 61
Size	Pound-Feet	Newton metres
1/2-13	55 to 65	74 to 88
5/8-11	140 to 150	190 to 203

TORQUE SPECIFICATIONS - STEEL HYDRAULIC FITTINGS

Nom. SAE Dash Size	Tube OD	Thread Size	Pound-Inches	Newton metres	Thread Size	Pound-Inches	Newton metres
O-ring Face Seal End					**O-ring Boss End Fitting or Lock Nut**		
-4	1/4 inch 6.4 mm	9/16-18	120 to 144	14 to 16	7/16-20	204 to 240	23 to 27
-6	3/8 inch 9.5 mm	11/16-16	216 to 240	24 to 27	9/16-18	300 to 360	34 to 41
-8	1/2 inch 12.7 mm	13/16-16	384 to 480	43 to 54	3/4-16	540 to 600	61 to 68
					Thread Size	Pound-Inches	Newton metres
-10	5/8 inch 15.9 mm	1-14	552 to 672	62 to 76	7/8-14	60 to 65	81 to 88
Nom. SAE Dash Size	Tube OD	Thread Size	Pound-Inches	Newton metres	1-1/16-12	85 to 90	115 to 122
					1-3/16-12	95 to 100	129 to 136
-12	3/4 inch 19.0 mm	1-3/16-12	65 to 80	90 to 110	1-5/16-12	115 to 125	156 to 169
-14	7/8 inch 22.2 mm	1-3/16-12	65 to 80	90 to 110	1-5/8-12	150 to 160	203 to 217
-16	1.0 inch 25.4 mm	1-7/16-12	92 to 105	125 to 140	1-7/8-12	190 to 200	258 to 271
-20	1-1/4 inch 31.8 mm	1-11/16-12	125 to 140	170 to 190			
-24	1-1/2 inch 38.1 mm	2-12	150 to 180	200 to 254			

NOTE: Case Corporation reserves the right to make improvements in design or changes in specifications at any time without incurring any obligation to install them on units previously sold.

LOCTITE PRODUCT CHART

Product	Color	Similar Products	Gap (In Inches)	Strength (Steel/Steel)	Working Temperature Range-Farenheit	Fixture/Full Cure (Steel/Steel) Time	Primer	Description
#3	Dark Brown					24 hr	N/A	Form a Gasket (works with oil, fuel or grease) Pliable
80	Yellow					Fast	N/A	Weatherstrip Adhesive
123	Clear					N/A	N/A	Parts Cleaner Fluid
220	Blue	290	0.003	57/143 in lbs	-65 to +250	6 min/24 hrs	747	Wicking Threadlocker
221	Purple	222	0.005	75/44 in lbs	-65 to +300	2 min/24 hrs	747	Low Strength Threadlocker
222	Purple		0.005	53/30 in lbs	-65 to +300	20 min/24 hrs	764	Low Strength Threadlocker (Small Screws)
225	Brown	222	0.010	45/25 in lbs	-65 to +300	7 min/24 hrs	747	Low Strength Threadlocker
242	Blue		0.005	80/50 in lbs	-65 to +300	10 min/24 hrs	764	Medium Strength Threadlocker
262	Red	271	0.005	160/190 in lbs	-65 to +300	5 min/24 hrs	747	High Strength Threadlocker
270	Green	271	0.007	160/320 in lbs	-65 to +300	3 min/24 hrs	747	High Strength Threadlocker
271	Red	262	0.007	160/320 in lbs	-65 to +300	10 min/24 hrs	764	High Strength Threadlocker
272	Red	620	0.007	180/220 in lbs	-65 to +450	30 min/24 hrs	764	High Temperature, High Strength
275	Green	277	0.010	210/300 in lbs	-65 to +300	3 min/24 hrs	747	High Strength Threadlocker
277	Red		0.010	225/300 in lbs	-65 to +300	60 min/24 hrs	764	High Strength Threadlocker
290	Green		0.003	85/350 in lbs	-65 to +300	6 min/24 hrs	764	Wicking Threadlocker
*404	Clear	495	0.006	3200 psi	-65 to +180	30 sec/24 hrs	NA	Instant Adhesive
*406	Clear		0.004	3200 psi	-65 to +180	15 sec/24 hrs	N/A	Surface Insensitive Adhesive
*409	Clear	454	0.008	2500 psi	-65 to +180	50 sec/24 hrs	N/A	Gel Instant Adhesive
*414	Clear		0.006	2500 psi	-65 to +180	30 sec/24 hr	N/A	Instant Adhesive
*415	Clear	454	0.010	2500 psi	-65 to +180	50 sec/24 hrs	N/A	Gap Filling Instant Adhesive (Metals)
*416	Clear	454	0.010	2500 psi	-65 to +180	50 sec/24 hrs	N/A	Gap Filling Instant Adhesive (Plastics)
*420	Clear		0.002	2500 psi	-65 to +180	15 sec/24 hrs	N/A	Wicking Instant Adhesive
*422	Clear	454	0.020	2800 psi	-65 to +180	60 sec/24 hrs	N/A	Gap Filling Instant Adhesive
*430	Clear		0.005	2500 psi	-65 to +180	20 sec/24 hrs	N/A	Metal Bonding Adhesive
*445	White/Black		0.250	2000 psi	-65 to +180	5 min/24 hrs	N/A	Fast Setting 2 Part Epoxy
*454	Clear		0.010	3200 psi	-65 to +180	15 sec/24 hrs	N/A	Surface Insensitive Gen Instant Adhesive
*495	Clear		0.004	2500 psi	-65 to +180	20 sec/24 hrs	N/A	General Purpose Instant Adhesive
*496	Clear		0.005	2500 psi	-65 to +180	20 sec/24 hrs	N/A	Metal Bonding Adhesive
504	Brt Orange	515	0.030	750 psi	-65 to +300	90 min/24 hrs	None	Rigid Gasket Eliminator
509	Light Blue		0.020	750 psi	-65 to +320	6 hr/72 hrs	764	Flange Sealant
510	Red		0.020	1000 psi	-65 to +400	30 min/24 hrs	764	High Temperature, GAsket Eliminator
515	Purple		0.010	750 psi	-65 to +300	1 hr/24 hrs	764	Gasket Eliminator 515

Rac 8-98902 * Products 404-496 (except for #445) are all instant adhesives (super glues) they differ mostly in viscosity Printed in U.S.A.

LOCTITE PRODUCT CHART

Product	Color	Similar Products	Gap (In Inches)	Strength (Steel/Steel)	Working Temperature Range-Farenheit	Fixture/Full Cure (Steel/Steel) Time	Primer	Description
518	Red	515	0.030	500psi	-65 to +300	1hr/24 hrs	764	Gasket Eliminator 518 for Aluminum
542	Brown	569	N/A	132/92 in lbs	-65 to +300	2 hr/24 hrs	747	Hydraulic Sealant
545	Purple		N/A	25/20 in lbs	-65 to +300	4 hr/24 hrs	747	Low Strength Pneumatic/Hydraulic Sealant
549	Orange	504	0.020	2500 psi	-65 to +300	2 hr/24 hrs	747	Instant Seal Plastic Gasket
554	Red	277	0.015	240/240 in lbs	-65 to +300	2 to 4 hrs/24 hrs	764	Refrigerant Sealant
567	White	592	N/A	500 psi	-65 to +400	4 hrs/24 hrs	764	Pipe Sealant for Stainless Steel
568	Orange	277	0.015	2500 psi	-65 to +300	12 hrs/24 hrs	764	Plastic Gasket
569	Brown	545	0.010	40/25 in lbs	-65 to +300	1 hr/24 hrs	764	Hydraulic Sealant
570	Brown	592	N/A	25/40 in lbs	-65 to +300	6 hrs/72 hrs	764	Steam Sealant
571	Brown	592	0.015	40/20 in lbs	-65 to +300	2 to 4 hrs/24 hrs	764	Pipe Sealant
572	White	578.575	N/A	80/27 in lbs	-65 to +300	24 hrs/72 hrs	None	Gasketing
592	White		0.020	500 psi	-65 to +400	4 hrs/72 hrs	736	Pipe Sealant with Teflon
593	Black		0.250	400 psi	-95 to +400	30 min/24 hrs	N/A	RTV Silicone
601	Green	609	0.005	3000 psi	-65 to +300	10 min/24 hrs	764	Current PIN #609
609	Green		0.005	3000 psi	-65 to +300	10 min/24 hrs	764	General Purpose Retaining Compound
620	Green	640	0.015	3000 psi	-65 to +450	30 min/24 hrs	747	High Temperature Retaining Compound
635	Green	680	0.010	4000 psi	-65 to +300	1 hr/24 hrs	747	High Strength Retaining Compound
638	Green	680	0.015	4100 psi	-65 to +300	10 min/24 hrs	747	High Strength Retaining Compound
640	Green	620	0.007	3000 psi	-65 to +400	1 hr/24 hrs	747	High Temperature Retaining Compound
660	Silver		0.020	3000 psi	-65 to +300	20 min/24 hrs	764	Quick Metal
675	Green	609	0.005	3000 psi	-65 to +300	20 min/24 hrs	747	General Purpose Retaining Compound
680	Green	635	0.015	4000 psi	-65 to +300	10 min/24 hrs	747	High Strength Retaining Compound
706	Clear	755	N/A	N/A	N/A	N/A	N/A	Cleaning Solvent
707	Amber		N/A	N/A	N/A	N/A	N/A	Activaltor for Structural Adhesives
736	Amber		N/A	N/A	N/A	N/A	N/A	Primer NF
738	Amber		N/A	N/A	N/A	N/A	N/A	Depend Activator
747	Yellow	N/A	N/A	N/A	N/A	N/A	N/A	Primer T
751	Clear		N/A	N/A	N/A	N/A	N/A	Activator for Structural Adhesives
755	Clear		N/A	N/A	N/A	N/A	N/A	Cleaning Solvent
764	Green		N/A	N/A	N/A	N/A	N/A	Primer N
767	Silver		N/A	N/A	-65 to +1600	N/A	N/A	Anti-Seize Lubricant

Printed in U.S.A.

Section

2011

AFTERCOOLER

6-830 Diesel Engine

IMPORTANT: *This engine was made using the metric measurement system. All measurements and checks must be made with metric tools to make sure of an accurate reading when inspecting parts.*

CASE CORPORATION
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Burlington, ON L7N 3M6 CANADA

Rac 8-91703 January, 1991 (Revised March 1996)

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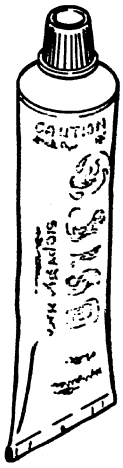
SPECIAL TOOLS



404L94

THREAD SEALANT WITH TEFLON - B17503 6ml TUBE

485L94

THREE BOND SILVER RTV SEALER
J823494 - 3 oz TUBE

SPECIAL TORQUES

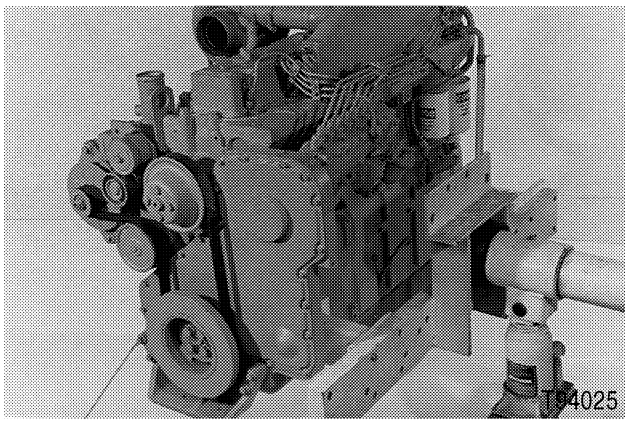
Aftercooler Mounting Bolts ..... 21 to 27 Nm

Crossover Tube Clamps ..... 4 to 6 Nm

NOTE: Case Corporation reserves the right to make improvements in design or changes in specifications at any time without incurring any obligation to install them on units previously sold.

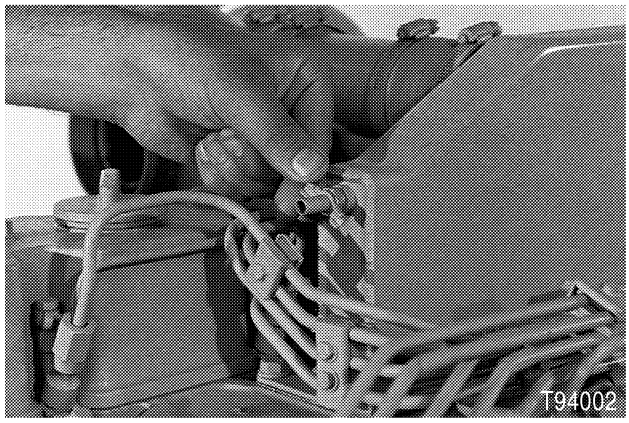
SERVICING THE AFTERCOOLER
Removal

STEP 1



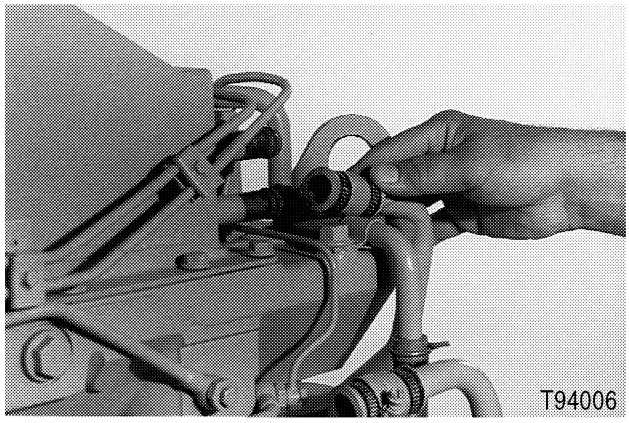
Case 6TA 830 engine.

STEP 2



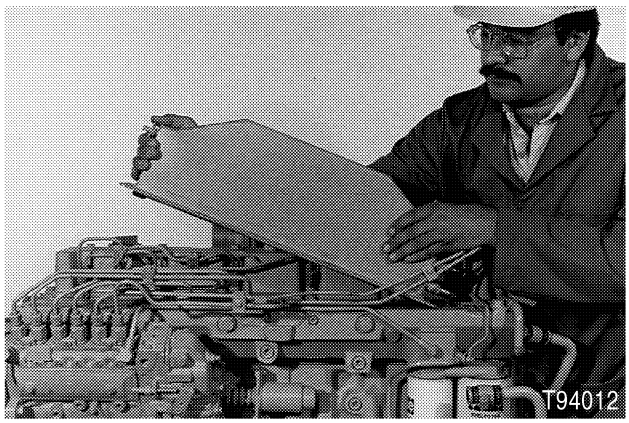
Drain the coolant from the engine. Open the air vent valve on the aftercooler to help drain the coolant.

STEP 3



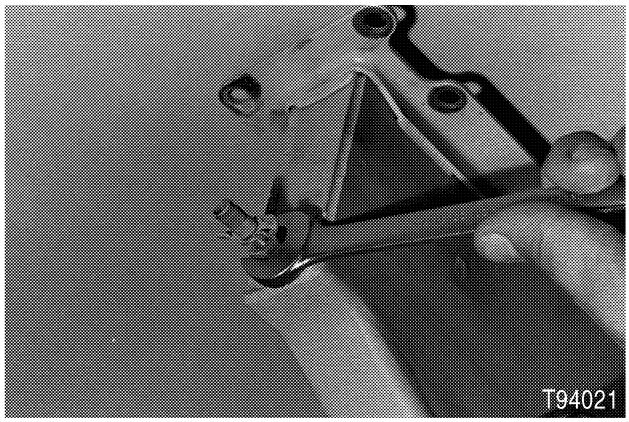
Remove all fuel lines and water hoses from the aftercooler.

STEP 4



Remove the bolts and aftercooler. Discard the gasket. Clean the gasket surfaces. Inspect the housing and core for damage.

STEP 5

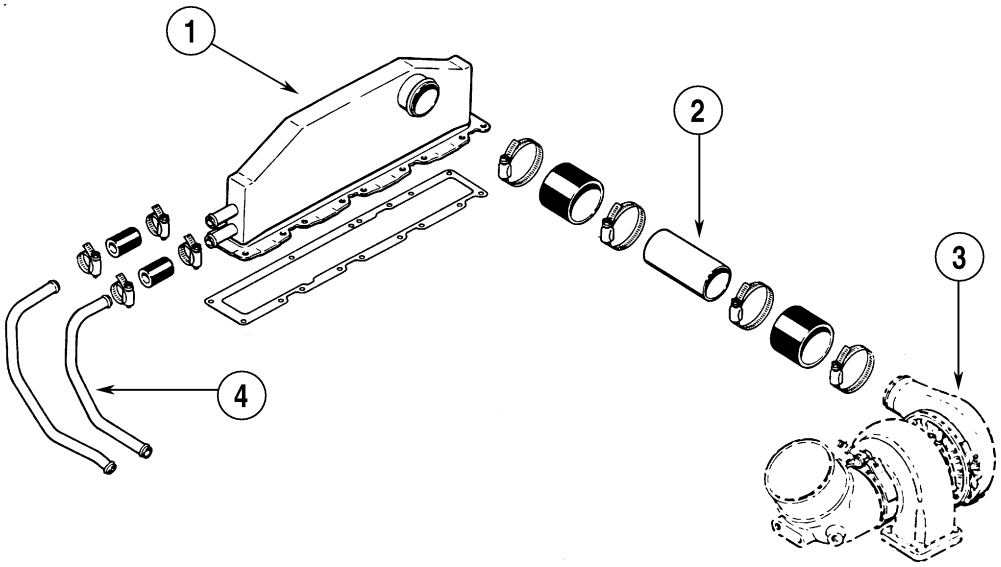


Remove the air vent valve from the aftercooler.

STEP 6

Install a plug in the air vent valve and put a cap on one of the aftercooler water hose tube. Attach regulated air pressure to the other water hose tube. Pressurize the core to 206 kPa (2 bar) (30 PSI) and submerge the aftercooler in water. Inspect for any air leaks. If there leaks or damage, the aftercooler must be replaced.

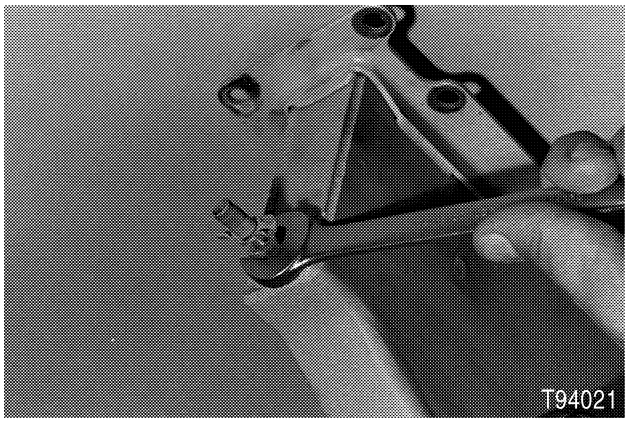
Installation



87L91

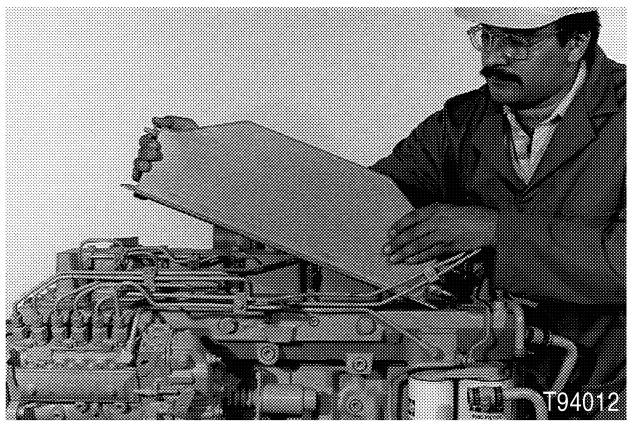
1. Aftercooler
2. Crossover Tube
3. Turbocharger
4. Water Line

STEP 7



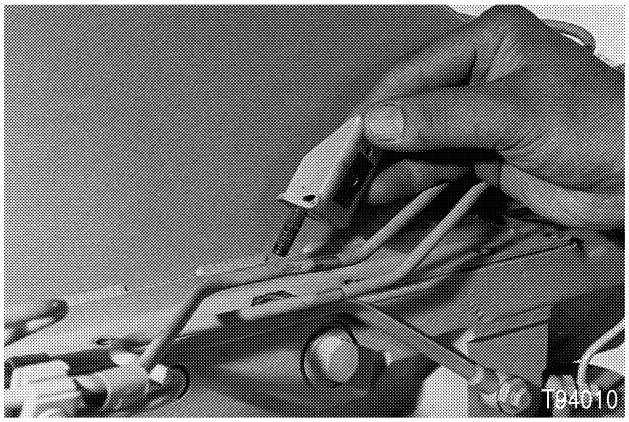
Apply teflon thread sealant to threads of air vent valve and install in the aftercooler.

STEP 8



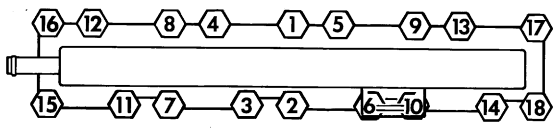
Apply a thin layer of Three Bond RTV Silver Sealer to both sides of a new gasket. Install the gasket and aftercooler on the cylinder head.

STEP 9

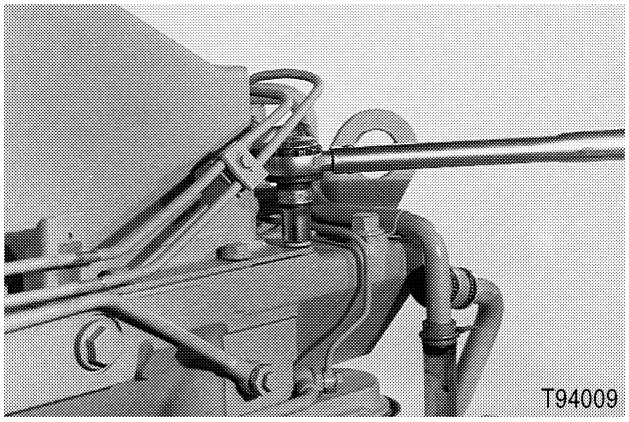


Apply Loctite liquid teflon thread sealer on the injector line mounting bracket bolts. Install the injector line mounting brackets on the aftercooler.

STEP 10

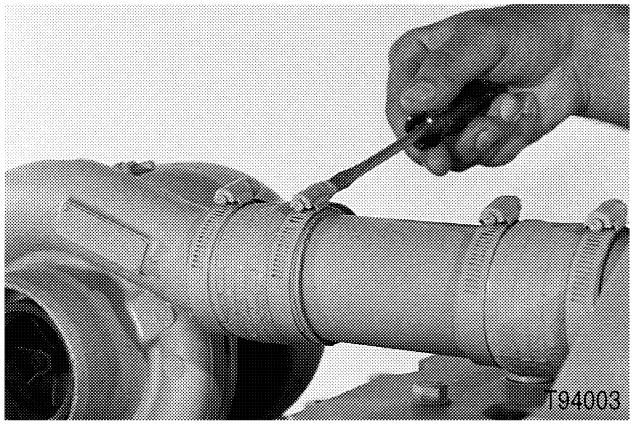


78L91



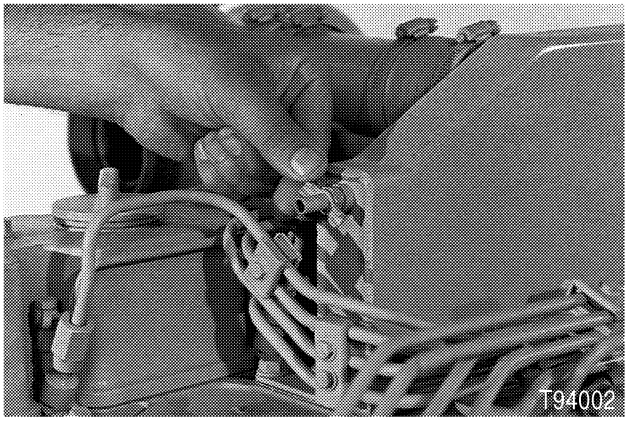
Apply Loctite liquid teflon thread sealer to the remaining aftercooler bolts. Install the aftercooler mounting bolts and tighten to a torque of 21 to 27 Nm following the torque sequence shown above.

STEP 11



Install the crossover tube, injector tubes and water hoses on the aftercooler and turbocharger. Tighten the water hose clamps to a torque of 4 to 6 Nm.

STEP 12



Fill the cooling system with coolant. Open the air vent valve to remove trapped air. Close the valve when coolant appears.

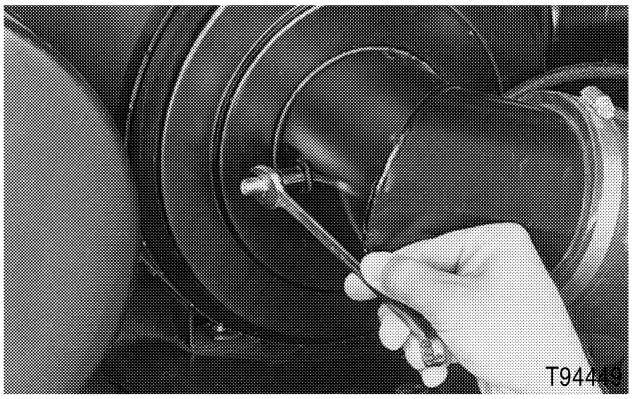
Induction System Leak Check

NOTE: *The induction system must be checked for air leaks anytime that there has been service work done on the system.*

STEP 13

Remove both air cleaner filter elements. Completely wrap the mesh area of a used secondary element with duct tape. No air should be able to pass through this element during the test. Install the wrapped element into the air cleaner housing and install the cover.

STEP 14

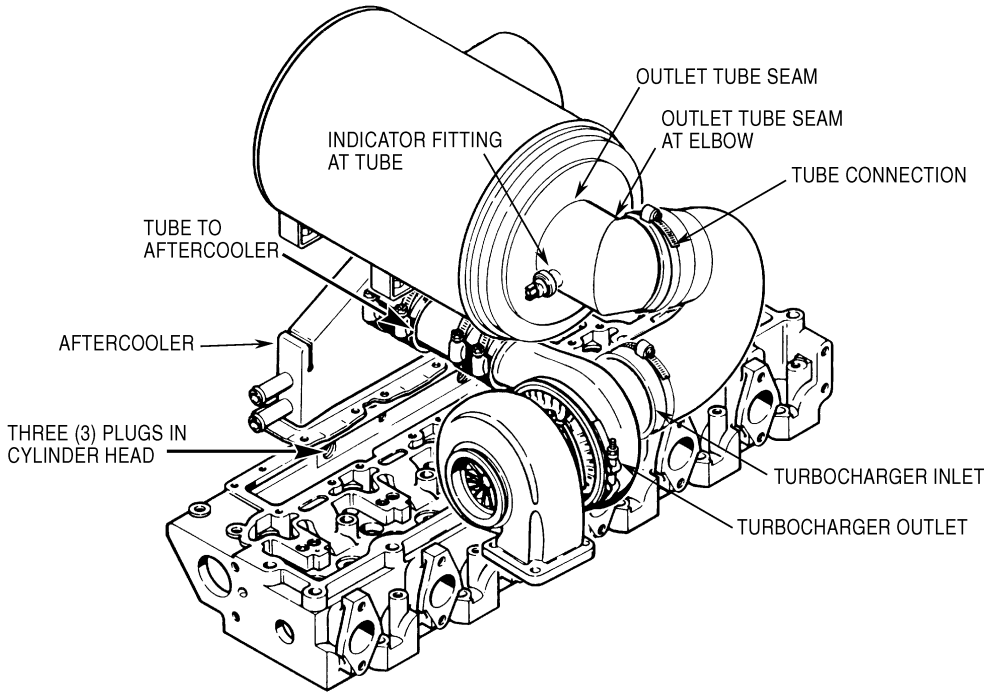


Remove the restrictor indicator and install a fitting to connect a source for compressed air. Regulate the air source to a maximum of 20 to 30 kPa (3 to 5 PSI).

IMPORTANT: *Do not exceed a maximum pressure of 20 to 30 kPa (3 to 5 PSI) or damage to induction components could result.*

NOTE: *The restrictor indicator is designed to see a vacume and not pressure and therefor must not be in the system when the leak check is performed.*

STEP 15



150L96

1. Make a solution of liquid soap and water.
2. With the induction system pressurized, apply the solution to the complete air induction system as shown above.
3. There must not be any signs of air leakage except for the turbocharger center housing ends.
4. Correct any leaks and test the system again.
5. When the test is done, install the restrictor indicator and a new secondary filter element.

Section

2403

2403

SPECIFICATION DETAILS

6-830 Diesel Engines

IMPORTANT: *This engine was made using the metric measurement system. All measurements and checks must be made with metric tools to make sure of an accurate reading when inspecting parts.*

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Printed in U.S.A.
Rac 8-28426
January, 1987 (Revised March, 1996)

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RUN-IN INSTRUCTIONS

Engine Lubrication

Fill the 6-830 engine crankcase with CC/SF, CD/SF, CE/SF or CF-4 service classification oil. Use the correct viscosity rating for the ambient air temperature. Install new oil filters after the engine is rebuilt.

Fill the 6T 830 and the 6TA 830 engine crankcase with CE/SF or CF-4 service classification oil. Use the correct viscosity rating for the ambient air temperature. Install new oil filters after the engine is rebuilt.

Run-In Procedure for Rebuilt Engine

Step 1 Disconnect the wire to the electric shut-off on the injection pump so that the engine will not start. Crank the engine for 30 seconds until there is oil pressure, then reconnect the wire.

Step 2 Make sure the coolant level is correct.

Step 3 Run the engine at 1000 RPM minimum load for 5 minutes and check for oil leaks.

Step 4 Continue to check the oil pressure, coolant level and coolant temperature during run-in.

Run-In Procedure for Rebuilt Engines (with a Dynamometer)

The following procedure must be followed when using a PTO dynamometer to Run-In the engine. The dynamometer will control the engine load at each speed and will remove stress on new parts during Run-In.

Continue to check the oil pressure, coolant level and coolant temperature.

STEP	TIME	ENGINE SPEED	DYNAMOMETER SCALE LOAD
1	5 Minutes	1000 RPM	50
2	5 Minutes	1100 RPM	1/2
3	5 Minutes	2200 RPM	Full

Run-In Procedure for Rebuilt Engines (without a Dynamometer)

STEP	TIME	ENGINE SPEED	LOAD
1	5 Minutes	1000 RPM	No Load
2	5 Minutes	1100 RPM	Light Load
3	5 Minutes	2200 RPM	Full

Run-In Procedure (Agriculture Equipment)

Use one gear lower than normal for the first 8 hours of field operation. DO NOT lug the engine for the next 12 hours. Move the lever to a lower gear to prevent lugging the engine. Do not lug the engine below the rated engine RPM during early hours of life.

Run-In Procedure (Construction Equipment)

Operate the engine at full throttle with a normal load for the first 8 hours. Do not stall the converter or the hydraulics. Do not lug the engine below the Rated Engine RPM (Do not stall the engine more than 10 seconds).

ENGINE SPECIFICATION DETAILS

Cylinder Block Prior to Engine Serial Number 44487830

	Metric Value
Type	Wet Sleeved
Material	Cast Iron
Main Bearing Bore	104.987 to 105.013 mm
Camshaft Bore	63.987 to 64.013 mm
Lifter Bore	16.000 to 16.030 mm
Maximum Service Limit	16.055 mm
Cylinder Sleeve Bore	132.900 to 132.950 mm
Cylinder Sleeve Counterbore	132.938 to 132.958 mm
Warpage at Cylinder Head Mounting Surface (TOTAL)	0.075 mm
Within any 25 mm Diameter Area (Maximum)	0.02 mm

Cylinder Block Engine Serial Number 44487830 and After

Type	Wet Sleeved
Material	Cast Iron
Main Bearing Bore	104.987 to 105.013 mm
Camshaft Bore	63.987 to 64.013 mm
Lifter Bore	16.000 to 16.030 mm
Maximum Service Limit	16.050 mm
Cylinder Sleeve Bore	130.900 to 130.950 mm
Cylinder Sleeve Counterbore	130.938 to 130.958 mm
Warpage at Cylinder Head Mounting Surface (TOTAL)	0.075 mm
Within any 25 mm Diameter Area (Maximum)	0.02 mm

Cylinder Sleeve Prior to Engine Serial Number 44487830

Type	Wet, Can Be Replaced
Material	Cast Iron
OD of Cylinder Sleeve (At Top of Piston)	132.947 to 132.949 mm
ID of Cylinder Sleeve	114.000 to 114.040 mm
Maximum Service Limit	114.117 mm
Maximum Out of Round (Installed in Block)	0.04 mm
Maximum Taper (Installed in Block)	0.04 mm
Sleeve Protrusion Above Block	0.015 to 0.109 mm

Cylinder Sleeve Engine Serial Number 44487830 and After

Type	Wet, Can Be Replaced
Material	Cast Iron
OD of Cylinder Sleeve (At Top of Piston)	132.947 to 132.949 mm
ID of Cylinder Sleeve	114.000 to 114.040 mm
Maximum Service Limit	114.117 mm
Maximum Out of Round (Installed in Block)	0.04 mm
Maximum Taper (Installed in Block)	0.04 mm
Sleeve Protrusion Above Block	0.025 to 0.122 mm

Piston Pin

Type	Full Float
OD of Pin	44.997 to 45.002 mm
Maximum Service Limit	44.993 mm
Pin to Piston Clearance	0.003 to 0.015 mm
Pin to Rod Bushing Clearance	0.02 to 0.038 mm

Piston

Type ..... Cam Ground
Material ..... Aluminum Alloy
OD at 12 mm from the Bottom, Degrees from Piston Pin
  Standard Size Piston ..... 113.814 to 113.886
    Minimum Service Limit ..... 113.776 mm
ID of Piston Pin Bore ..... 45.006 to 45.012 mm
  Maximum Service Limit ..... 45.025 mm
Width of 1st Ring Groove (Top) ..... 3.50 mm
Width of 2nd Ring Groove (Intermediate) ..... 3.08 to 3.10 mm
Width of 3rd Ring Groove (Oil Ring) ..... 4.040 to 4.060 mm
Protrusion Above Cylinder Block (Maximum) ..... 0.380 mm
Protrusion Above Cylinder Block (Minimum) ..... 0.018 mm

Piston Rings

No. 1 Compression 6T830 and 6TA830 ..... Keystone Type (Barrel Face)
  End Gap in 114.020 ID ..... 0.35 to 0.65 mm (See Note)
No. 1 Compression 6-830 Engine ..... Keystone Type (Barrel Face)
  End Gap in 11.4020 ID ..... 0.35 to 0.65 mm (See Note)
  Side Clearance ..... Use Keystone Gauge
No. 2 Compression ..... Rectangular Type (Taper Face)
  End Gap in 114.020 ID ..... 0.35 to 0.65 mm (See Note)
  Side Clearance ..... 0.70 to 0.125 mm
No. 2 Compression ..... Keystone Type (Barrel Face)
  End Gap in 114.020 ID ..... 0.35 to 0.65 mm (See Note)
  Side Clearance ..... Use Keystone Gauge
No. 3 Oil Control Rings ..... Two Piece
  End Gap in 11.4020 ID ..... 0.30 to 0.60 mm (See Note)
  Side Clearance ..... 0.020 to 0.065 mm

NOTE: *Add 0.09 mm gap for every 0.03 mm of bore wear up to maximum worn limit.*

Cylinder Head

Cylinder Head Height (New) ..... 115.75 to 116.25 mm
Warpage (Maximum) Side to Side ..... 0.076 mm
Warpage (Maximum) Total Across Head ..... 0.20 mm
Maximum Material Removal ..... 1.00 mm
Minimum Head Height ..... 114.75 mm
New Head Thickness ..... 115.75 to 116.25 mm
Valve Guide Bore ..... 15.931 to 15.971 mm
Insert Bore (Intake) ..... 53897 to 53.927 mm
Insert Bore Depth (Intake) ..... 12.00 to 12.20 mm
Insert Bore (Exhaust) ..... 46.997 to 47.027 mm
Insert Bore Depth (Exhaust) ..... 9.63 to 9.83 mm
Local Flatness (Maximum) 51 mm Area ..... 0.0254 mm

Lifters

Material ..... Hardened Iron
  OD of Lifter ..... 15.929 to 15.980 mm
    Minimum Service Limit ..... 15.925 mm

Connecting Rod

Bushing	Steel Backed Leaded Bronze
Bushing ID Installed (Ream to Size)	45.023 to 45.035 mm
Bearing Liners	Replaceable
Journal ID Without Bearing Liners	80.987 to 81.013 mm
Bearing Oil Clearance	0.033 to 0.117 mm
Side Clearance	0.100 to 0.300 mm
Maximum Service Limit	0.330 mm
Connecting Rod Bend (Maximum)	
Without Bushing	0.200 mm
With Bushing	0.150 mm
Connecting Rod Twist (Maximum)	
Without Bushing	0.500 mm
With Bushing	0.300 mm

Crankshaft

Type	Hardened Steel, Balanced
Main Bearing Liners	Replaceable
Crankshaft End Clearance	0.157 to 0.334 mm
Maximum Service Limit	0.381 mm
Center Main Bearing Thrust Surface Thickness	3.447 to 3.530 mm
Connecting Rod Journal	
OD Standard	75.987 to 76.013 mm
Maximum Service Limit	75.962 mm (See Note)
0.25 mm OD Undersize, Grind to	75.737 to 75.763 mm
Maximum Service Limit	75.712 mm
0.50 mm OD Undersize, Grind to	75.487 to 75.513 mm
Maximum Service Limit	75.462 mm
0.75 mm OD Undersize, Grind to	75.237 to 75.263 mm
Maximum Service Limit	75.212 mm
1.00 mm OD Undersize, Grind to	74.987 to 75.013 mm
Maximum Service Limit	74.962 mm
Connecting Rod Journal Maximum Taper	0.013 mm
Journals Out of Round Maximum	0.050 mm
Undersize Main Bearing Liners for Service	0.25, 0.50, 0.75 and 1.00 mm
Main Bearing Oil Clearance	0.66 to 0.134 mm
Main Bearing Journal	
OD, Standard	97.987 to 98.013 mm
Maximum Service Limit	97.962 mm
0.25 mm OD Undersize, Grind to	97.737 to 97.763 mm
Maximum Service Limit	97.712 mm
0.50 mm OD Undersize, Grind to	97.487 to 97.513 mm
Maximum Service Limit	97.462 mm
0.75 mm OD Undersize, Grind to	97.237 to 97.263 mm
Maximum Service Limit	97.212 mm
1.00 mm OD Undersize, Grind to	96.987 to 97.013 mm
Maximum Service Limit	96.972 mm
Main Bearing Thrust Surfaces	
Standard	42.975 to 43.076
0.25 mm Oversize	43.225 to 43. 326
0.50 mm Oversize	43.475 to 43.576
Main Bearing Journal Bore ID No Liners	104.987 to 105.013 mm
Main Journal Width:	
1st, 2nd, 3rd, 5th and 6th	42.924 to 43.076 mm
4th	42.975 to 43.025 mm
Connecting Rod Journals Width	45.950 to 46.050 mm

Camshaft

Type ..... Chilled Iron
Bushings ..... 7, Replaceable
Bushing Lubrication:
  Bushing Lubrication ..... Pressure Lubricated
Oil clearance ..... 0.045 to 0.123 mm
ID of Bushings (Installed) ..... 60.058 to 60.110 mm
  Maximum Service Limit ..... 60.122 mm
Width of Bushing ..... 24.75 to 25.25 mm
Camshaft Journal OD ..... 59.987 to 60.013 mm
  Minimum Service Limit ..... 59.962 mm
Camshaft Bore Diameter in Block Bushing Bore ..... 63.987 to 64.013 mm
Camshaft Thrust Thickness ..... 9.42 to 9.58 mm
  Minimum Service Limit ..... 9.34 mm
Camshaft Thrust Clearance ..... 0.120 to 0.340 mm
  Maximum Service Limit ..... 0.470 mm

Turbocharger

Horizontal Travel of Turbine Shaft ..... 0.038 to 0.093 mm
Radial Travel of Impeller ..... 0.326 to 0.496 mm

Gear Train

Backlash:
  Crankshaft Gear to Camshaft Gear ..... 0.152 to 0.254 mm
  Crankshaft Gear to Idler Gear ..... 0.08 to 0.33 mm
  Camshaft to Fuel Pump Gear ..... 0.152 to 0.254 mm
    Maximum Service Limit (Fuel Pump Gear) ..... 0.38 mm
  Idler Gear to Oil Pump ..... 0.152 to 0.254 mm
  Camshaft to Auxiliary ..... 0.152 to 0.254 mm
    Maximum Service Limit (All Gears Except as Noted) ..... 0.45 mm

Rocker Arm Assembly

OD to Shaft ..... 22.219 to 22.231 mm
  Minimum Service Limit ..... 22.199 mm
ID of Arm Bore ..... 22.256 to 22.282 mm
  Maximum Service Limit ..... 22.301 mm
Lubrication ..... Pressure from Oil Gallery

Intake Valve

Tappet Clearance (Cold) ..... 0.30 mm
Face Angle ..... 30 Degrees
Face Run-Out ..... 0.038 mm
Valve Head Edge Thickness, Minimum ..... 1.50 mm
Length ..... 150.65 to 151.21 mm
OD of Stem ..... 9.48 to 9.50 mm
  Minimum Service Limit ..... 9.46 mm
OD of Head ..... 53.897 to 53.927 mm
Seat Angle ..... 30 Degrees
Seat Contact Width ..... 1.38 to 1.98 mm
Seat Run-Out ..... 0.05 mm
Insert Height ..... 8.06 to 8.32 mm
OD of Valve Insert ..... 53.992 to 54.008 mm
ID of Valve Insert ..... 44.37 to 44.63 mm
Valve Recession Below Head Surface ..... 1.09 to 1.62 mm
ID of Valve Guide Bore (Installed in Head) ..... 9.539 to 9.559 mm
  Valve Guide Installed Height ..... 20.65 to 21.16 mm

Exhaust Valve

Tappet Clearance (Cold) ..... 0.60 mm
Face Angle ..... 45 Degrees
Face Run-Out ..... 0.038 mm
Valve Head Edge Thickness, Minimum ..... 1.50 mm
OD of Head ..... 45.87 to 46.13 mm
OD of Stem ..... 9.48 to 9.50 mm
  Minimum Service Limit ..... 9.46 mm
Length ..... 150.60 to 151.16 mm
Insert Seat Angle ..... 45 Degrees
Seat Contact Width ..... 1.92 to 2.68 mm
Seat Run-Out ..... 0.038 mm
Insert Height ..... 6.20 to 6.46 mm
OD of Insert ..... 47.092 to 47.108 mm
ID of Insert ..... 39.87 to 40.13 mm
Valve Recession Below Head Surface ..... 1.09 to 1.62 mm
ID of Valve Guide Bore (Installed in Head) ..... 9.539 to 9.559 mm
  Valve Guide Installed Height ..... 22.50 to 23.01 mm

Valve Springs

Standard Spring Free Length ..... 65.66 mm
Compressed to 37.90 mm ..... 959.5 to 1060.5 N
  Maximum Service Limit ..... 940 N
Valve Rotator Spring Free Length 62.05mm
Compressed to 35.89 mm ..... 995 to 1095 N

Oil Pressure Regulator Spring:

Free Length ..... 86.61 mm
Compressed to 60.3 mm ..... 172.6 N

SPECIAL TORQUES

	Metric Valve
After Cooler Bolts	21 to 27 Nm
Alternator Bracket Bolts (Lower)	21 to 27 Nm
Alternator Bracket Bolts (Upper)	21 to 27 Nm
Alternator Retaining Bolt	21 to 27 Nm
Belt Tensioner Bracket Bolts	21 to 27 Nm
Belt Tensioner Retaining Bolt	39 to 47 Nm
Camshaft Thrust Plate	21 to 27 Nm
Connecting Rod Bolts	
Torque Plus Angle Method (Lubricate Threads with Engine Oil)	70 Nm Plus 60 Degrees
Standard Torque Step Method	1st. 40 Nm
	2nd. 80 Nm
	3rd. 120 Nm
Exhaust Manifold Bolts	39 to 47 Nm
Fan Pulley Bracket Bolts	21 to 27 Nm
Fan Pulley Bolts	
Grade 8.8 Size M8	26 to 31 Nm
Grade 10.9 Size M8	37 to 43 Nm
Grade 8.8 Size M10	51 to 62 Nm
Grade 10.9 Size M10	51 to 62 Nm
Flywheel Housing Bolts	54 to 66 Nm
Flywheel Retaining Bolts	130 to 144 Nm
Flywheel Housing Cover Bolts	21 to 27 Nm
Fuel Filter Inlet Bolt	29 to 35 Nm
Fuel Air Removal Bolt	7 to 9 Nm
Fuel Filter Inlet Nut	13 to 17 Nm
Fuel Line Fitting (High Pressure)	21 to 27 Nm
Fuel Line Fitting (Low Pressure)	13 to 17 Nm
Front Cover Bolts	21 to 27 Nm
Crankshaft Dampener Pulley	188 to 212 Nm
Cylinder Head Bolts - Prior to Engine Serial Number 44487830	
(Lubricate the Threads with Engine Oil)	200 Nm
Cylinder Head Bolts Engine Serial Number 44487830 and After (Lubricate Threads with Engine Oil)	
Short Bolts	70 Nm Plus 90 Degrees
Long Bolts	142 Nm Plus 90 Degrees
Injection Pump Drive Gear Nut	
Model A	92 Nm
Model MW	104 Nm
Model P	195 Nm
Model EP-9 Nippondenzo	104 Nm
Injection Pump Retaining Nuts	39 to 47 Nm
Injection Pump Timing Pin Cover	
Model A	30 Nm
Model MW	30 Nm
Model P	30 Nm
Model EP-9 Nippondenzo	70 Nm
Injector Leak Off Bolt	8 to 10 Nm
Injector Retaining Bolt	21 to 27 Nm
Intake Manifold Bolts	21 to 27 Nm
Engine Lift Bracket Bolts	71 to 83 Nm
Main Bearing Bolts	
Torque Plus Angle Method (Lubricate the Threads with Engine Oil)	95 Nm Plus 60 Degrees
Standard Torque Step Method	1st. 50 Nm
	2nd. 119 Nm
	3rd. 176 Nm

Oil Pan Drain Plug	76 to 84 Nm
Oil Pan Heater Plug	76 to 84 Nm
Oil Pan Retaining Bolts	21 to 27 Nm
Oil Pump Retaining Bolts	21 to 27 Nm
Oil Inlet Tube Bolts	8 to 10 Nm
Oil Inlet Tube Brace Bolts	8 to 10 Nm
Oil Filter Housing Bolts	21 to 27 Nm
Rear Seal Retaining Bolts	8 to 10 Nm
Rocker Arm Bolts	40 to 46 Nm
Starter Retaining Bolts	73 to 82 Nm
Thermostat Housing Bolts	21 to 27 Nm
Timing Pin Retaining Bolts	4 to 6 Nm
Fuel Shutoff Solenoid Bolts	8 to 12 Nm
Turbocharger Mounting Nuts	29 to 35 Nm
Turbocharger Mounting Nuts (HX40W)	45Nm
Turbocharger Drain Tube Bolts	21 to 27 Nm
Turbocharger Oil Supply (Both Ends)	21 to 27 Nm
Turbine Housing Bolts	9 to 13 Nm
Turbine Housing Bolts (HX40W)	20 Nm
Center Housing to Back Plate Bolts	5 to 7 Nm
Compressor Housing Bolts	5 to 7 Nm
Compressor Lock Nut	13 to 15 Nm
Thrust Bearing Screws (Torx Head)	4 to 6 Nm
Water Pump Mounting Bolts	21 to 27 Nm
Coolant Outlet Bolts	21 to 27 Nm
Valve Cover Bolts	21 to 27 Nm
Primer Pump Bolts	21 to 27 Nm
Oil Pressure Plug	76 to 84 Nm

NOTE: Case Corporation reserves the right to make improvements in design or changes in specifications at any time without incurring any obligation to install them on units previously sold.

Section

2415

CYLINDER HEAD AND VALVE TRAIN

6-830 Diesel Engine

2415

IMPORTANT: *This engine was made using the metric measurement system. All measurements and checks must be made with metric tools to make sure of an accurate reading when inspecting parts.*

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Rac 8-28434 January, 1987 (Revised March, 1996)

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SPECIFICATIONS

Intake Valve Guide Installation Specifications:

Valve Guide Diameter	15.988 to 16.000 mm
Diameter of Bore	15.931 to 15.971 mm
Installed Height	20.65 to 0.069 mm
Press Fit	0.017 to 0.069 mm

Exhaust Valve Guide Installation Specifications:

Valve Guide Diameter	15.988 to 16.000 mm
Diameter of Bore	15.931 to 15.971 mm
Installed Height	22.50 to 23.01 mm
Press Fit	0.017 to 0.069 mm

Exhaust Valve Insert Specifications:

Diameter of Insert	47.092 to 47.108 mm
Diameter of Bore	46.997 to 47.027 mm
Depth of Bore	9.63 to 0.111 mm
Press Fit	0.065 to 0.111 mm

Intake Valve Insert Specifications:

Diameter of Insert	53.992 to 54.008 mm
Diameter of Bore	53.397 to 53.927 mm
Depth of Bore	12.00 to 12.20 mm
Press Fit	0.065 to 0.111 mm

Valve Spring Specifications:

For Non Rotating Valves	
Free Length	65.66 mm
Outside Diameter	35.33 mm
Number of Coils	7.5
Compress to 50.80 mm	465 to 514 N
For Rotating Valves	
Free Length	62.05 mm
Outside Diameter	35.33 mm
Number of Coils	7.2
Compress to 48.79 mm	464.80 to 513.80 N

Cylinder Head Specifications:

New Cylinder Head Height	115.75 to 116.25 mm
Maximum Amount of Material That Can Be Removed During Resurfacing	1.0 mm
Minimum Head Height	114.75 mm
Injector Tip Protrusion	3.0 to 4.0 mm