150-190, T90
2310, 2510 & 2712
Compact Tractors

Service Manual

9-77981

Reprinted

CASE

THIS SAFETY ALERT SYMBOL INDICATES IMPORTANT SAFETY MESSAGES IN THIS MANUAL. WHEN YOU SEE THIS SYMBOL, CAREFULLY READ THE MESSAGE THAT FOLLOWS AND BE ALERT TO THE POSSIBILITY OF PERSONAL INJURY OR DEATH.

M171B

If Safety Decals on this machine use the words **Danger, Warning or Caution,** which are defined as follows:

- **DANGER:** Indicates an immediate hazardous situation which if not avoided, will result in death or serious injury. The color associated with Danger is RED.
- **WARNING:** Indicates an potentially hazardous situation which if not avoided, will result in serious injury. The color associated with Warning is ORANGE.
- **CAUTION:** Indicates an potentially hazardous situation which if not avoided, may result in minor or moderate injury. It may also be used to alert against unsafe practices. The color associated with Caution is YELLOW.

If Safety Decals on this machine are ISO two panel Pictorial, decals are defined as follows:

- The first panel indicates the nature of the hazard.
- The second panel indicates the appropriate avoidance of the hazard.
- Background color is YELLOW.
- Prohibition symbols such as  and 

if used, are RED.

WARNING

IMPROPER OPERATION OF THIS MACHINE CAN CAUSE INJURY OR DEATH. BEFORE USING THIS MACHINE, MAKE CERTAIN THAT EVERY OPERATOR:

- Is instructed in safe and proper use of the machine.
- Reads and understands the Manual(s) pertaining to the machine.
- Reads and understands ALL Safety Decals on the machine.
- Clears the area of other persons.
- Learns and practices safe use of machine controls in a safe, clear area before operating this machine on a job site.

It is your responsibility to observe pertinent laws and regulations and follow Case Corporation instructions on machine operation and maintenance.

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issued November, 1994

Service Manual
150-190 & T90 Compact Tractors
2310, 2510 & 2712
Compact Tractors

Rac 9-77981

J I Case
A Tenneco Company

CASE 150, 190 AND T90 COMPACT TRACTOR

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Rac. Form 9-77981

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COLT 2310, 2510 AND 2712 COMPACT TRACTORS
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Series

General

SECTION

C

SPECIFICATIONS FOR

K 241 AND K 301

ENGINES

Rac. Form 9-77761

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K241 engine

K241 ENGINE SPECIFICATIONS

Type ---------- Kohler, 1 Cylinder, 4 Stroke Cycle Air Cooled, "L" Head Engine
Bore ---------- 3.250 Inches
Stroke ---------- 2.880 Inches
Piston Displacement ---------- 23.9 Cubic Inches
Compression Ratio ---------- 6 to 1
Max. Comp. at Cranking Speed (Engine at Operating Temperature)---------- 110 to 120 PSI at Sea Level
Crankcase Vacuum(Engine Running)--- 5 to 10 Inches Vacuum at Sea Level
Ignition ---------- 12 Volt Coil, Breaker Point

CYLINDER BORE

Diameter of Cylinder Bore Std. A, B ---------- 3.2505-3.2545 Inches
.010 Oversize A, B + 10 ---------- 3.2605-3.2615 Inches
.020 Oversize A, B + 20 3.2705-3.2715 Inches
.030 Oversize A, B + 30 ---------- 3.2805-3.2815 Inches
Cylinder Bore Must Be Bored or Honed Oversize If Taper or Out of Round Exceeds ---------- .005 Inches

PISTON AND PISTON PIN

Diameter of Std. Piston at Bottom of Skirt -------- 3.2470-3.2480 Inches
Diameter of Std. Piston at Top of Skirt ---------- 3.2425-3.2535 Inches (Measured Just Below Oil Ring)
Diameter of Std. Piston at Top ---------- 3.218-3.220 Inches
Piston Pin ---------- Full Floating Type, Retained In Place With Two Retainer Rings.
Piston Pin Bore in Piston Std. ---------- .8595-.8596 Inches
Piston Pin Diameter Std. ---------- .8591-.8593 Inches
.005 Oversize ---------- .8641-.8643 Inches
Piston Pin Length ---------- 2.738-2.753 Inches
Piston Pin Fit in Piston (Select Fit) ---------- .0000-.0003 Inches
Piston Pin Fit in Connecting Rod ---------- .0003-.0008 Inches

PISTON RINGS

Rings Per Piston ---------- (2 Compression-1 Oil)
1st(Top)Compression-Chrome, Taper Face. Relief Indicates Top Side
Side Clearance ---------- .002-.004 Inches
Width ---------- .093-.094 Inches
2nd Compression-Chrome, Relief Indicates Bottom Side
Side Clearance ---------- .0015-.0035 Inches
Width ---------- .093-.094 Inches
3rd Oil Ring ---------- Cast W/Expander
Side Clearance ---------- .001-.003 Inches
Width ---------- .1860-.1870 Inches
Ring End Gap - When Installed in Bore ---------- .010-.020 Inches
Replacement Ring Width
1st. Comp. ---------- .0925-.0935 Inches
2nd. Comp. ---------- .0665-.0675 Inches
2nd. Comp. Rail ---------- .0235-.0245 Inches
3rd. Oil Rail ---------- .0235-.0245 Inches
3rd Oil Ring ---------- .134-.135 Inches

CONNECTING RODS

Connecting Rod Length from Center of Pin Hole To Center of Bearing Journal ---------- 5.560-5.562 Inches
Piston Pin Hole Diameter in Rod ---------- .8596-.8599 Inches
Inside Diameter of Rod Journal, Std. ---------- 1.5005-1.5010 Inches
Undersize ---------- 1.4905-1.4910 Inches
Connecting Rod to Crank Journal Clearance -------- .0005-.0015 Inches
Connecting Rod to Crank End Play Clearance -------- .007-.016 Inches

CRANKSHAFT AND BEARINGS

Type Main Bearings ---------- Ball Bearings
Crankshaft Rod Journal ---------- 1.4995-1.5000 Inches
Crankshaft Rod Journal Width ---------- 1.079-1.084 Inches
Crankshaft End Play ---------- .003-.020 Inches
Measured at Bearing Plate and Shim to Proper End Play

CAMSHAFT

Camshaft End Play ---------- .005-.010 Inches
Camshaft Pin Diameter ----------.4980-.4985 Inches
Camshaft Inside Diameter ---------- .4995-.5015 Inches
Camshaft Pin to Camshaft Clearance ----------.001-.0035 Inches
Camshaft Pin to Breaker Cam Clearance ---------- .001-.0025 Inches

VALVE LIFTERS

Valve Lifter Outside Diameter in Block ---------- .6232-.6237 Inches
Valve Lifter Bore in Block ----------.6245-.6255 Inches
Valve Lifter to Block Clearance ----------.0008-.0023 Inches

VALVES

Intake Valve Tappet Clearance (Cold) ----------.008-.010 Inches
Exhaust Valve Tappet Clearance (Cold) ----------.017-.020 Inches
Angle of Valve Face - Intake and Exhaust ---------- 44 Degrees
Valve Length - Intake and Exhaust ---------- 4.572-4.582 Inches
Max. Valve Face Runout - Intake ---------- .0015 Inches
Max. Valve Face Runout - Exhaust ---------- .003 Inches
Valve Head Diameter - Intake ---------- 1.370-1.380 Inches
Valve Head Diameter - Exhaust ---------- 1.120-1.130 Inches
Valve Stem Diameter - Intake ---------- .3105-.3110 Inches
Valve Stem Diameter - Exhaust ---------- .3090-.3095 Inches
Intake Valve Stem to Guide Clearance ---------- .001-.0025 Inches
Exhaust Valve Stem to Guide Clearance ---------- .0025-.004 Inches

VALVE SEATS

Seat Angle - Intake and Exhaust ---------- 45 Degrees
Max. Seat Runout - Intake and Exhaust ---------- .002 Inches
Seat Width - Intake ---------- .037-.045 Inches
Seat Width - Exhaust ---------- .031-.062 Inches
Exhaust Seat Insert ---------- Replaceable
Outside Diameter of Exhaust Insert ---------- 1.2535-1.2545 Inches
Exhaust Insert Height ---------- .219-.221 Inches

VALVE GUIDES

Valve Guide Length ---------- 2.125 Inches
Valve Guide Outside Diameter ----------.6260-.6265 Inches
Valve Guide to Block (Press Fit) ---------- .0005-.002 Inches
Valve Guide Inside Diameter - Before Installing ----- .307-.308 Inches
Ream Valve Guides After Installing to ----------.312-.313 Inches

VALVE SPRINGS

Spring Free Length ---------- 1.793 Inches
Spring Pressure When Comp. to 1.469 In. (Valve Closed)--27 to 31 Lbs.
Spring Pressure When Comp. to 1.165 In. (Valve Open) --- 54 to 62 lbs.

GOVERNOR

Governor Stub Shaft Outside Diameter ----------.3735-.3740 Inches
Governor Gear Bore for Stub Shaft ----------.3745-.3755 Inches
Stub Shaft to Governor Gear Clearance ---------- .0005-.002 Inches
Governor Spring Free Length With 2 Lbs. Pre-Load -------2.62 Inches
Governor Spring Extended to 2.88 Inches ---------- 5.5 to 6.5 Pounds

K301 ENGINE SPECIFICATIONS

Type ---------- Kohler, 1 Cylinder, 4 Stroke Cycle, Air Cooled, "L" Head Engine
Bore ---------- 3.380 Inches

Stroke ---------- 3.250 Inches

Piston Displacement ---------- 29.07 Cubic Inches

Compression Ratio ---------- 6 to 1

Max. Comp. at Cranking Speed
(Engine at Operating Temperature) --------- 110 to 120 PSI at Sea Level

Crankcase Vacuum (Engine Running) --- 5 to 10 Inches Vacuum at Sea Level

Ignition ---------- 12 Volt Coil, Breaker Points

CYLINDER BORE

Diameter of Cylinder Bore Std. A, B ---------- 3.3745-3.3785 Inches
.010 Oversize A, B + 10 ---------- 3.3845-3.3855 Inches
.020 Oversize A, B + 20 ---------- 3.3945-3.3955 Inches
.030 Oversize A, B + 30 ---------- 3.4045-3.4055 Inches
Cylinder Bore Must Be Bored or Honed Oversize If Taper or Out of Round Exceeds ---------- .005 Inches

PISTON AND PISTON PIN

Diameter of Std. Piston at Top ---------- 3.356-3.360 Inches

Diameter of Std. Piston at Top of Skirt
(Measured Just Below Oil Ring) ---------- 3.369-3.370 Inches

Diameter of Std. Piston at Bottom of Skirt --------- 3.371-3.372 Inches

Piston Pin ---------- Full Floating Type Retained In Place With Two Retainer Rings.

Piston Pin Bore In Piston, Std. ---------- .8752-.8754 Inches

Piston Pin Diameter Std. ---------- .8752-.8754 Inches
.005 Oversize ---------- .8802-.8804 Inches

Piston Pin Length ---------- 2.735-2.750 Inches

Piston Pin Fit In Piston ---------- One Thumb Push Fit

Piston Pin Fit In Connecting Rod ---------- .0003-.0008 Inches

PISTON RINGS

Rings Per Piston ---------- (2 Compression-1 Oil)
1st (Top) Compression - Chrome, Tapered Face. Relief Indicates Top Side.
Side Clearance ---------- .002-.004 Inches
Width ---------- .078 Inches
2nd - Compression -------- Chrome, Relief Indicates Bottom Side
Side Clearance ---------- .002-.004 Inches
Width ---------- .078 Inches
3rd - Oil Ring ---------- Cast W/Expander
Side Clearance ---------- .001-.003 Inches
Width ---------- .1870 Inches
Ring End Gap When Installed In Bore ---------- .010-.020 Inches

Replacement Ring Width
1st Comp. ---------- .077-.078 Inches
2nd Comp. ---------- .077-.078 Inches
3rd Oil Rail ---------- .0235-.0245 Inches
3rd Oil Ring ---------- .134-.135 Inches

CONNECTING RODS

Connecting Rod Length From Center of Pin Hole
To Center of Bearing Journal ---------- 5.295-5.297 Inches

Piston Pin Hole Diameter In Rod ---------- .8757-.8760 Inches

Inside Diameter of Rod Journal, Std. ---------- 1.5005-1.5010 Inches
Undersize ---------- 1.4905-1.4910 Inches

Connecting Rod To Crank Journal Clearance ---------- .0005-.0015

Connecting Rod To Crank End Play Clearance --------- .007-.016 Inches

CRANKSHAFT AND BEARINGS

Type Main Bearings ---------- Ball Bearings

Crankshaft Rod Journal ---------- 1.4995-1.5000 Inches

Crankshaft Rod Journal Width ---------- 1.079-1.084 Inches

Crankshaft End Play ---------- .003-.020 Inches
Measured at Bearing Plate and Shim to Proper End Play.

CAMSHAFT

Camshaft End Play ---------- .005-.010 Inches

Camshaft Pin Diameter ---------- .4980-.4985 Inches

Camshaft Inside Diameter ---------- .4995-.5015 Inches

Camshaft Pin to Camshaft Clearance ---------- .001-.0035 Inches

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Valve Lifter Outside Diameter In Block ---------- .6232-.6237 Inches

Valve Lifter Bore In Block ---------- .6245-.6255 Inches

Valve Lifter To Block Clearance ---------- .008-.0023 Inches

VALVES

Intake Valve Tappet Clearance (Cold) ---------- .008-.010 Inches

Exhaust Valve Tappet Clearance (Cold) ---------- .017-.020 Inches

Angle of Valve Face - Intake and Exhaust ---------- 44 Degrees

Valve Length - Intake and Exhaust ---------- 4.572-4.582 Inches

Max. Valve Face Runout - Intake ---------- .0015 Inches

Max. Valve Face Runout - Exhaust ---------- .003 Inches

Valve Head Diameter - Intake ---------- 1.370-1.380 Inches

Valve Head Diameter - Exhaust ---------- 1.120-1.130 Inches

Valve Stem Diameter - Intake ---------- .3105-.3110 Inches

Valve Stem Diameter - Exhaust ---------- .3090-.3095 Inches

Intake Valve Stem to Guide Clearance ---------- .001-.0025 Inches

Exhaust Valve Stem to Guide Clearance ---------- .0025-.004 Inches

VALVE SEATS

Seat Angle - Intake and Exhaust ---------- 45 Degrees

Max. Seat Runout Intake and Exhaust ---------- .002 Inches

Seat Width - Intake ---------- .037-.045 Inches

Seat Width - Exhaust ---------- .031-.062 Inches

Exhaust Seat Insert ---------- Replaceable

Outside Diameter of Exhaust Insert ---------- 1.2535-1.2545 Inches

Exhaust Insert Height ---------- .219-.221 Inches

VALVE GUIDES

Valve Guide Length ---------- 2.125 Inches

Valve Guide Outside Diameter ---------- .6260-.6265 Inches

Valve Guide to Block (Press Fit) ---------- .0005-.002 Inches

Valve Guide Inside Diameter - Before Installing ------ .307-.308 Inches
Ream Valve Guides After Installing to ---------- .312-.313 Inches

VALVE SPRINGS

Spring Free Length ---------- 1.793 Inches

Spring Pressure When Comp. to 1.469 In. (Valve Closed) -27 to 31 Lbs.

Spring Pressure When Comp. to 1.165 In. (Valve Open) ---54 to 62 Lbs.

GOVERNOR

Governor Stub Shaft Outside Diameter ---------- .3735-.3740 Inches

Governor Gear Bore for Stub Shaft ---------- .3745-.3755 Inches

Stub Shaft to Governor Gear Clearance ---------- .0005-.002 Inches
Governor Spring Free Length with 2 Lb. Pre-Load -------- 2.62 Inches
Governor Spring Extended to 2.88 Inches ---------- 5.5 to 6.5 Inches

GENERAL TORQUE SPECIFICATION TABLE (Revised 5-64)

USE THE FOLLOWING TORQUES WHEN SPECIAL TORQUES ARE NOT GIVEN

NOTE: These values apply to fasteners as received from supplier, dry, or when lubricated with normal engine oil. They do not apply if special graphited or moly-disulphide greases or other extreme pressure lubricants are used. This applies to both UNF and UNC threads.

SAE Grade No.	5		8 *	
Bolt head identification marks as per grade Note: Manufacturing Marks Will Vary				
	Torque Foot Pounds		Torque Foot Pounds	
Bolt Size	Min.	Max.	Min.	Max.
1/4"	9	11	12	15
5/16	15	18	24	28
3/8	35	40	45	50
7/16	54	60	70	80
1/2	80	90	110	125
9/16	110	120	160	180
5/8	150	165	220	240
3/4	260	280	380	420
7/8	360	400	600	660
1"	540	600	900	1000
1-1/8	720	800	1280	1440
1-1/4	1000	1100	1800	2000
1-3/8	1460	1680	2380	2720
1-1/2	1940	2200	3160	3560

* Thick nuts must be used with Grade 8 bolts

GENERAL ENGINE TORQUE SPECIFICATION TABLE

	Torque Inch Pounds		Torque Foot Pounds	
Thread Size	UNC	UNF	UNC	UNF
Bolt Size				
1/4"	70	85		
5/16	150	165		
3/8			22	25
7/16			35	45
1/2			50	70

SPECIAL ENGINE TORQUE SPECIFICATIONS

Cylinder Head Bolts* ---------- Torque to 33 Ft. Lbs., Loosen, Retorque to 35 Ft. Lbs.

Connecting Rod Bolt* ---------- Torque to 25 Ft. Lbs.

Flywheel Nut ---------- Torque to 100 Ft. Lbs.

Spark Plug ---------- Torque to 27 Ft. Lbs.

*Lubricate With Grease Upon Assembly

SECTION

F

ELECTRICAL SYSTEM

THE CHARGING CIRCUIT

●

THE STARTING CIRCUIT

●

IGNITION SYSTEM

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