

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

Service Manual

9-77981

Reprinted

CASE

CASE 150, 190 AND T90 COMPACT TRACTOR

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COLT 2310, 2510 AND 2712 COMPACT TRACTORS

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10

Series

General

SECTION

C

SPECIFICATIONS FOR

K 241 AND K 301

ENGINES

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 (Measured Just Below Oil Ring)	3.2425-3.2535 Inches
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.	.0865-.0875 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

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.

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Camshaft Pin Diameter ----- .4980-.4985 Inches
Camshaft Inside Diameter ----- .4995-.5015 Inches
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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

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Ream Valve Guides After Installing to ----- .312-.313 Inches

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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

Thread Size	Torque Inch Pounds		Torque Foot Pounds	
	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

NOTE: The J I Case Company 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

F

ELECTRICAL SYSTEM

THE CHARGING CIRCUIT



THE STARTING CIRCUIT



IGNITION SYSTEM



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INTRODUCTION

Section F contains the specifications and wiring diagrams necessary to diagnose and make minor adjustments on the electrical components on the garden tractors.

All major adjustments and overhaul of electrical components should be performed by an Authorized Electrical Service Station (Delco-United Motors Service) where specialized equipment and trained personnel are available.

DO NOT ATTEMPT EVEN MINOR ELECTRICAL ADJUSTMENTS WITHOUT THE AID OF PROPER TEST EQUIPMENT

BATTERY SERVICE AND INSPECTION

IMPORTANT Working with storage batteries all exposed metal surfaces are "live". Never lay a metal object on top of a battery as a short circuit may result. Sparks or open flame must be kept away from batteries due to the presence of explosive gas in and around the batteries while they are being charged or in use.

The sulfuric acid or electrolyte present in a battery is very harmful to your eyes, skin and clothing. If contact is made with it, wash it with a weak solution of baking soda and water. This will neutralize the acid.

Visual Inspection

Check the battery terminals and cables for dirty or corroded conditions which will cause high resistance, resulting in undercharged batteries and very poor cranking speed.

The battery tray, holddown terminals and cable ends must be cleaned when contaminated, use baking soda and water. This will help to prevent self discharge of batteries. After cleaning and drying, a thin coating of vaseline, light cup grease or paint will help prevent contamination.

A cracked or leaking battery case will let the electrolyte leak out and cause damage to the equipment, a battery in this condition should be replaced. When just the top sealing compound is leaking the battery can be resealed.

Vent holes in the filler caps should always be kept open to let the battery gases escape. Never remove battery caps except to add water.

The electrolyte level should be checked each week. Never let the level drop to a point where the plates are exposed. Pure or distilled water should only be added when the electrolyte level is low. DO NOT OVERFILL, refer to Figure F-1.

Normal water consumption would be approximately 1 oz. every 25 hours or weekly. If it is greater, either the case is leaking or regulator is overcharging and must be adjusted.

Specific Gravity Check

The most reliable way to determine the concentration of sulfuric acid in the electrolyte is to measure the relative weight or specific gravity of the solution. A hydrometer is used for this, and only enough solution is removed from a battery cell so the float is suspended freely and not touching the top, bottom or sides of the glass tube, Figure F-2. Always hold the hydrometer at eye level and in vertical position when taking a reading. A hydrometer reading is only correct when the temperature of the solution is 80° F.

NOTE Most hydrometers have a calibrated thermometer to correct this.

When it is above or below this reading, it has to be corrected either by adding .004 gravity points for every 10° above 80°F. or subtracting .004 gravity points for every 10° below 80° F., Figure F-3.

When the specific gravity readings between the cells show a variation of .025, the battery should be replaced.

Specific gravity readings will change depending upon climate.

State of Charge	Specific Gravity Range for Climate Zone		
	Frigid	Temperate	Tropical
100%	1.280	1.260	1.225
75%	1.230	1.215	1.180
50%	1.180	1.170	1.135
Discharged	1.080	1.070	1.045

The battery should never be allowed to drop below 75% charge while not in use.

When a battery is to be charged, it may be charged at any rate which does not allow the battery terminal voltage to exceed 15.5 volts (12 volt battery) while charging. The battery temperature should never exceed 110°F. while charging, if it does reduce charging rate.

The charger should be left on until the specific gravity readings stay the same after three checks of an hour apart.

A fast charge method is used only to give the batteries a boost for starting. This type of charge puts out a very high amperage until the battery temperature is up to 110°F., then it shuts off.

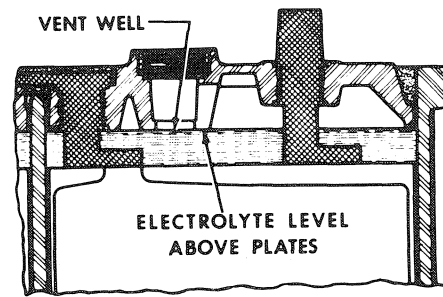


Figure F-1

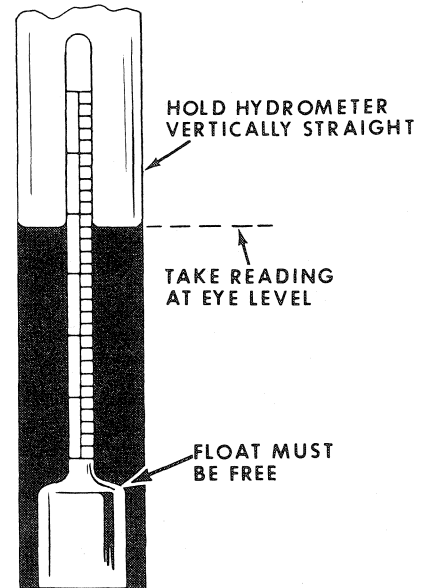


Figure F-2

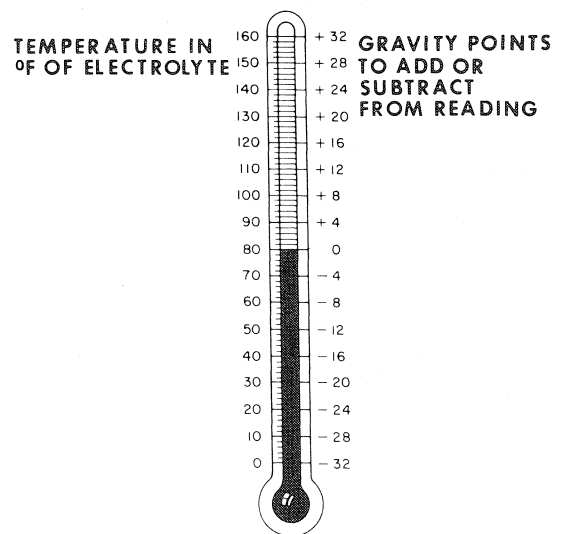


Figure F-3

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