



Service Bulletin

LOCATION Charles City
SUBJECT 1650 Tractor Open Chamber Diesel Engine Specifications
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FILE A

This bulletin contains 1650 Tractor open chamber diesel engine service specifications.

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Service Department

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ENGINE SPECIFICATIONS

GENERAL

Engine Serial Number Location	Right side of crankcase on alternator bracket mounting flange
Weight of Engine (Pounds)	900
Number of Cylinders	6
Firing Order	1-5-3-6-2-4
Bore	3-7/8
Stroke	4
Piston Displacement	283
Engine Speed (rpm)	
Low Idle	675
Rated	2200
High No Load	2420
Compression Ratio	16:1
Cranking Speed (rpm)	150
Compression Pressure at Cranking Speed (psi)	350
Allowable Compression Pressure Variation between Cylinders	10% total
Engine Operating Temperature	155-212° F.

DIESEL

LUBRICATION

Type	Pressure
Main Oil Gallery Pressure Control Valve	Non-adjustable, spring loaded, poppet type
Oil Filter Type	Full flow
Recommended Oil	Refer to Operator's Manual
Minimum Oil Pressure at Engine Operating Temperature	
Main Gallery	
Idle Speed	20 psi
2400 RPM	30-45 psi
Oil Pressure Relief Valve Spring -- Main Gallery	
Free Length	1-3/8"
Compressed Length	1" @ 10 lbs.
Oil Pressure Relief Valve Plunger Diameter Main Oil Gallery	0.498-0.497
Oil Change Period	100 hrs.
Filter Change Period	Every other oil change
Crankcase Capacity (without filter)	8 qts.

CAMSHAFT

Material	Cast iron (proferal) with hardened cam lobes
End Play	Controlled by spring pressure and thrust button
Thrust Button spring	
Free Length	1-3/16
Compressed Length	25/32 @ 15-1/2 - 18-1/2 lbs.
Type of Drive	Gear driven
Method of Checking Misalignment	"V" Blocks
Maximum Misalignment	0.002
Cam Lift - Intake & Exhaust	0.302
Journal Diameters	1.7495-1.7485

CAMSHAFT BUSHING AND BORE

	DIESEL
Type	Steel back, lead base, tin plate
Bushing Bore	1.8755-1.8745
Bushing Inside Diameter	
Standard	1.7520-1.7515
Maximum	1.7560
Bushing Width	1"
Running Clearance	
Standard	0.002-0.0035
Maximum	0.005

CONNECTING RODS

Material	SAE 1045 steel forging
Rod Misalignment	None
Length from Center of Small End to Center of Large End	6.750-6.749
Connecting Rod Side Clearance	
Standard	0.0075-0.0135
Diameter of Piston Pin Bushing Bore	1.312-1.313
Diameter of Rod Bearing Bore	2.5885-2.5890
Weight Variation between Lightest and Heaviest Rod in Set	1/4 oz.
Number of Connecting Rod Bolts	2
Bolt Size	3/8 - 24

CONNECTING ROD BEARINGS

Type	Replaceable shell, precision bearings
Material	Steel backed, copper-lead base, tin plate
Manner of Adjustment	None
Running Clearance	
Standard	0.0005-0.0015
Maximum	0.0025
Bearing Width	1.125-1.115
Undersize	0.003
	0.020

CRANKSHAFT

Type	Dynamically balanced
Material	C1046 steel forging
End Play Controlled by	No. 5 main bearing
End Play	
Standard	0.0045-0.0095
Maximum	0.010
Number of Main Bearings	7
Main Bearing Journal Diameter	2.625-2.624
Connecting Rod Journal Diameter	2.4375-2.4365
Maximum Journal Out-of-Round or Taper	0.0003
Maximum Main Bearing Journal Length	
Front	1-57/64
2nd, 3rd, 4th, 6th and 7th	1.745-1.755
5th	1.5025-1.5045
Maximum Connecting Rod Journal Length	1.375-1.379
Main Bearing Cap Bolt Size	5/8-11
Maximum Allowable Shaft Misalignment	0.002
Flywheel Mounting Flange Runout	0.001

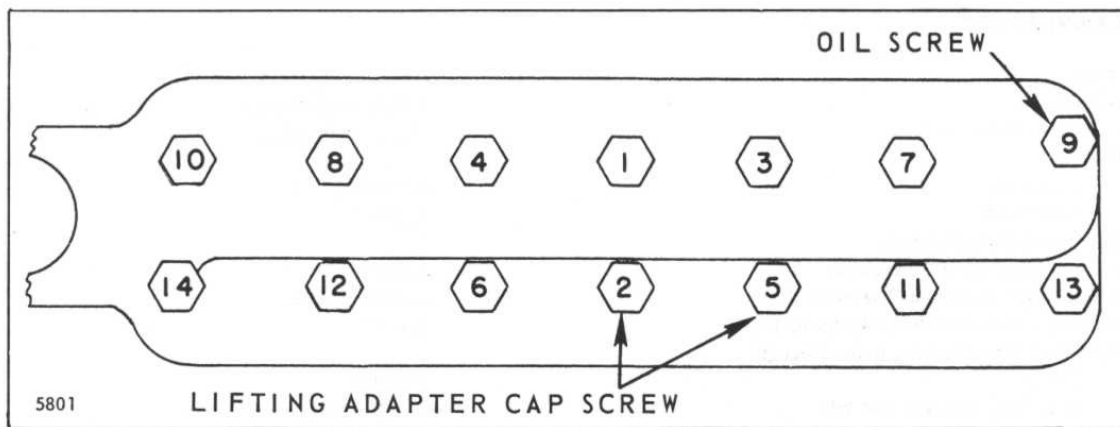
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CRANKSHAFT MAIN BEARINGS

	DIESEL
Type	Replaceable shell, precision
Material	Steel back, copper-lead base, lead-tin plate
Manner of Adjustment	None
Running Clearance	
Standard	0.0015-0.0045
Maximum	0.0065
Undersize	0.003
	0.020
Bearing Shell Width	1-1/4
Thrust Bearing Width	1.498-1.495
Crankcase Bore	2.8175-2.8165

CYLINDER HEAD

Type	Over head valve
Material	Cast alloy iron
Construction	One piece
Cap Screw Size	9/16-12
Number of Cap Screws	14
Maximum Cylinder Head Run-Out	0.005
Valve Port Diameters	
Intake	1-5/16
Exhaust	1-11/32
Valve Seat Angle	
Intake	30°
Exhaust	45°
Valve Seat Width	
Intake	0.079-0.089
Exhaust	0.062-0.072
Maximum Valve Seat Runout	0.002
Nozzle Bore Diameter	0.378-0.382



1650 Diesel Cylinder Head Cap Screw Tightening Sequence

FLYWHEEL WITH RING GEAR

	DIESEL
Maximum Runout Diameter	0.005
Diameter	13-5/16
Ring Gear Teeth (Number)	111

IDLER GEAR

Shaft Diameter	1.000-0.999
Shaft Running Clearance	
Standard	0.0015-0.003
Maximum	0.005
Bushing Inside Diameter	1.0015-1.002
Plunger Spring	31/32 at 7-1/2 lbs ± 1 lb.

OIL PUMP

Type	Gear
Relief Valve Setting	42 psi
Relief Valve Spring	
Free Length	2-11/16
Relief Valve Plunger Diameter	0.747-0.745
Drive Gear Clearance	
Standard	0.004
Maximum	0.008
Drive Shaft Running Clearance in Lower Bushing	
Standard	0.0015-0.004
Maximum	0.006
Drive Shaft Running Clearance in Upper Bushing	
Standard	0.0005-0.003
Maximum	0.045
Idler Gear Running Clearance	
Standard	0.0035-0.0045
Maximum	0.006

PISTONS

Material	Aluminum alloy
Surface Treatment	Tin plated
New Piston Fit in New Sleeves (Pull on Feeler Gauge)	3-6 lbs on 1/2 x 0.002
Pistons Removed from	Top
Length	4.418-4.408
Skirt Diameter	3-7/8
Maximum Allowance Out-of-Round	Cam ground
Piston Ring Groove Width	
Top	0.096-0.097
2nd	0.0955-0.0965
Oil Ring	0.1880-0.1890
Piston Pin Bore Diameter	
Coded Red	1.2499-1.2500
Coded Blue	1.2501-1.2502