1030 Series Comfort King Draft-O-Matic Tractors

Service Manual

9-76931

Reprinted

CASE IH

1030 SERIES COMFORT KING
DRAFT-O-MATIC TRACTORS
Table of Contents

I-SPECIFICATIONS

II-ENGINE

III-FUEL SYSTEM

IV-HYDRAULIC SYSTEM

V-STEERING

VI-TRANSMISSION

SECTION

C

SPECIFICATIONS FOR

CASE A451

DIESEL ENGINE

Rae. Form 9-76791

PRINTED IN U.S.A.

C-2

A451 ENGINE SPECIFICATIONS

Type ---------- CASE Full Diesel, 6 Cylinder 4 Stroke Cycle Valve-in-Head Engine

Cylinder Heads ------- Multiple Cylinder Heads can be removed individually for Servicing (2 cylinders per head).

Firing Order ---------- 1-5-3-6-2-4

Bore ---------- 4-3/8 Inches

Stroke ---------- 5 Inches

Piston Displacement ---------- 451 Cubic Inches

Compression Ratio ---------- 15 to 1

Oil Filter, Crankcase ---------- Replaceable Full Flow Element Type.

Method of Starting Diesel Engine -------- Engine Starts on Diesel Fuel (Electric Starting Motor).

Exhaust Valve Rotators ---------- Positive Type

Maximum Compression Pressures

(At Cranking Speed of 200 RPM -- Injectors Removed from Engine)

Altitude	Sea Level	1000 ft.	2000 ft.	3000 ft.	4000 ft.	5000 ft.
Compression	350 PSI	335 PSI	325 PSI	315 PSI	300 PSI	290 PSI

Allowable Variance Between Cylinders ---------- 25 Pounds Pressure

CYLINDER SLEEVES

Type ---------- Replaceable Wet Type: Two Rubber O-Ring Seals carried on each sleeve.

Inside Diameter of Sleeve Bore -------- 4.375 to 4.376 Inches. Replace Sleeve when inside Diameter below Top Ring Ridge Exceeds 4.383 Inches.

Piston Clearance in Sleeve (At Skirt) ---------- .0035 to .0055

Cylinder Sleeve Out-of-Round ---------- Max. .002 Inch

PISTON AND PISTON PINS

Piston Material ---------- Aluminum

Piston Weight (Less Pin) ----------3.937 to 3.939 Pounds

Diameter of Piston at Top of Skirt (Below Oil Ring Perpendicular to Pin) -------- 4.3635 to 4.3665 Inches

Diameter of Piston at Bottom of Skirt (Perpendicular to Pin) ---------- 4.3705 to 4.3715 Inches

Piston Pins ---------- Full Floating Type:Held in Position with Snap Rings in Piston. Replaceable Bronze Bushing in Connecting Rod.

Piston Pin Length ---------- 3.670 to 3.675 Inches

Piston Pin Diameter ----------1.4994 to 1.4995 Inches

Piston Pin Fit in Piston ----------.0000 to .0003

Piston Pin Fit in Connecting Rod Bushing --------- .0009 to .0014 Inch

PISTON RINGS

Rings Per Piston----------4-(3 Compression and 1 Oil).

Compression Rings
Width of Ring (All 3) ---------- .0930 to .0935 Inch

Ring End Gap (All 3) When Compressed in 4.375 Inch Cylinder ----------.013 to .023 Inch

Side Clearance in Groove of 1st (Top) Ring -------- .0035 to .0050 Inch

Side Clearance in Groove of 2nd and 3rd Ring --------.0025 to .004 Inch

Oil Ring ---------- To install Replacement Ring, Follow Instructions Packed with Rings.

CONNECTING RODS

Connecting Rod Bushing ----------Replaceable Bronze Bushing Replacement Bushing Must Be Reamed. Use 1.5004 to 1.5008 Reamer.

Piston Pin Hole Diameter in Rod(Without Bushing)--1.686 to 1.688 Inches

Inside Diameter of Piston Pin Bushing in Rod----- 1.5004 to 1.5008 Inches. Install New Bushing if inside Diameter Exceeds 1.5025 Inches.

Connecting Rod Bearing -------- Replaceable, Precision, Steel Backed Copper Lead Alloy Liners.

Connecting Rod Capscrews --------Self Locking Type, No. Lock Wires Required May Be Used More Than Once

Connecting Rod Length (Center to Center Between Pin Hole and Bearing Journal Hole) --- 10.499 to 10.501 Inches

Bearing Liner Width ---------- 1-5/8 Inch

Diameter of Crankshaft Journal Hole in Rod (Without Liner) ---------- 2.9005 to 2.9010 Inches

Inside Diameter of Bearing Liner (Standard Liner in place in Rod and Capscrews Tight) ---- 2.7503 to 2.7518 Inches

Diameter of Crankshaft Rod Journal ---------- 2.748 to 2.749 Inches

Clearance Between Rod Bearing and Crankshaft Journal ---------- .0013 to .0038 Inch; Install New Bearing Liners When Clearance Exceeds .006 Inch.

Undersize Bearing Liners Available for Service---------- .002,.010,.020,.030 Inch

Allowable Connecting Rod End Play ---------- .005 to .012 Inch

CRANKSHAFT AND MAIN BEARINGS

Crankshaft ---------- Balanced; Drilled to Provide Pressure Lubrication to Main and Connecting Rod Bearings.

Type Main Bearings ---------- Replaceable, Precision, Steel Backed Copper - Lead Alloy Liners.

Bearing Capscrews ---------- Self Locking Type, No Lock Wires Required May Be Used More than Once.

Bearing Taking End Thrust ---------- 5th (Two Replaceable Bronze Thrust Washers).

Crankshaft End Play (Measured at No. 5 Main Bearing) ---------- .004 to .012 Inch; Install New Thrust Washers If End Play Exceeds .020 Inch

Oversize Thrust Washers for End Play Available for Service ---------- .006 Inch

Connecting Rod Bearing Journal Diameter ------- 2.748 to 2.749 Inches

Main Bearing Journal Diameter ----------2.998 to 2.999 Inches

Crankshaft Main and Connecting Rod Journal Bearings out of Round ---------- Maximum .001 Inch

Maximum Allowable Taper on Crankshaft Rod Journal ---------- .002 Inch

Inside Diameter of Main Bearing Liners (In Place and Capscrews Tight)---------- 3.0006 to 3.0026 Inches

Clearance Between Main Bearing Liner and Journal ---------- .0016 to .0046 Inch:Install New Bearing Liner When Clearance Exceeds .0065 Inches.

Width of 1st, 3rd 5th and 7th Main Bearing Liners ---------- 2-7/32 Inches

Width of 2nd, 4th and 6th Main Bearing Liners ---------- 1-5/32 Inches

Width Between Crankshaft Main Bearing Cheeks

A. 3rd, 7th ----------2.620 to 2.630 Inches

B. 2nd, 4th and 6th ---------- 1.5575 to 1.5675 Inches

C. 5th ---------- 2.624 to 2.626 Inches

Width Between Crankshaft Rod Bearing Journal Cheeks ---------- 1.9975 to 2.0025 Inches

Undersize Main Bearing Liners
Available for Service ---------- .002,.010,.020,.030 Inch

Crankshaft Main Bearing
Journals Should Be
2.988-2.989 Inches for .010 Inch Undersize Bearing
2.978-2.979 Inches for .020 Inch Undersize Bearing
2.968-2.969 Inches for .030 Inch Undersize Bearing

Undersize Connecting Rod Bearing
Shells Available for Service ---------- .002,.010,.020,.030 Inch

Connecting Rod Crankshaft Journals Should
Be Ground to ------2.738-2.739 Inches for .010 Inch Undersize Bearing
2.728-2.729 Inches for .020 Inch Undersize Bearing
2.718-2.719 Inches for .030 Inch Undersize Bearing

CAMSHAFT AND BUSHINGS

Number of Bearing Surfaces on Camshaft ---------- 5

Type Bushing ---------- Replaceable, Precision, Steel Backed Babbit

Bushing Lubrication ------ Pressure Lubricated from Oil Pump; Camshaft Drilled to Provide Pressure Lubrication to Valve Rocker Arm Assembly, and to Timing Gear Train.

Diameter of Camshaft at Each Bearing Surface -----2.246 to 2.247 Inches

Inside Diameter of Each Bushing
(Measured when in Place in Block) ---------- 2.2484 to 2.5414 Inches

No. 1 (Front) Bushing Length ---------- 1-21/32 Inches

No.2, 3 and 4 Bushing Lengths ---------- 1-7/16 Inches

No. 5 Bushing Length (w/cup type Camshaft plug) ------- 1-5/32 Inches

Camshaft End Play ---------- Automatically Taken Up by Spring Loaded Thrust Button in Front End of Camshaft. Camshaft Washer Provided Between Drive Gear and Front Bearing.

Camshaft Washer

Outside Diameter ---------- 3.240 to 3.260 Inches

Inside Diameter ---------- 2.250 to 2.260 Inches

Thickness ---------- .1225 to .1275 Inch

VALVE PUSH ROD LIFTERS

Type ----------Mushroom Type

Outside Diameter of End that Projects into Block --- .8097 to .8102 Inch

Diameter of Bore in Block for Lifter ---------- .8115 to .8130 Inch

Oversize Lifter Available for Service -------- .010 In. Oversize Lifter

Bore in Block Must Be Reamed to -------- .8215 to .8225 Inch for .010 Inch Oversize Lifter.

VALVES

Valve Tappet Clearance

Intake and Exhaust ---------- .025 Inch, Engine cold

Intake and Exhaust ---------- .020 Inch, Engine Hot
Hot Settings Are Made At Low Idle After The Engine Has Operated At Thermostat Control Temperature For At Least Fifteen Minutes

Exhaust Valves

Angle of Valve Face . . . . . .44 Degrees

Valve Length ----------6.382 Inches

Maximum Valve Face Runout ---------- .002 Inch as Determined with a Dial Indicator.

Diameter of Valve Stem --- .4000 to .401 Inch Install New Valve if there is More than .002 Inch Difference in Diameter at any Point on Stem

Diameter of Valve Head ---------- 1.562 Inches

Inside Diameter of Valve Guide -- .4045 to .4055 Inch (After Assembly).

Valve Stem Clearance in Guide ---------- .0035 to .0055 Inch

Exhaust Valve Seat Insert

Seat Angle ---------- 45 Degrees

Seat Contact Width ---------- .073 to .084 Inch

Insert Height ---------- .312 to .317 Inch

Outside Diameter of Insert ----------1.722 to 1.723 Inches

Inside Diameter of Insert ---------- 1.401 to 1.411 Inches

Maximum Allowable Seat Runout ----------.002 Inch as Determined with a Dial Indicator.

Intake Valves

Angle of Valve Face ---------- 44 Degrees

Valve Length ---------- 7.358 Inches

Maximum Valve Face Runout ----------.002 Inch as Determined with a Dial Indicator.

Diameter of Valve Stem ---------- .402 to .403 Inch Install New Valve if there is More than .002 Inch Difference in Diameter at any Point on Stem.

Diameter of Valve Head ---------- 1.825 Inches

Inside Diameter of Valve Guide --- .4045 to .4055 Inch.(After Assembly)

Stem Clearance in Guide ---------- .0015 to .0035 Inch

Intake Valve Seat

Seat Angle ---------- 45 Degrees

Seat Contact Width ---------- .070 to .086 Inch

Maximum Allowable Seat Runout ---------- .002 Inch as Determined with a Dial Indicator.

Exhaust Valve Guides

Length ---------- 3-7/32 Inches

Outside Diameter ---------- .7510 to .7515 Inch

Inside Diameter ---------- .4045 to .4055 Inch.(After Assembly)

Valve Stem Clearance in Guide ---------- .0035 to .0055 Inch

Distance Above Head Guide Must Protrude --- 1-1/16 Inches, Press Fit

Intake Valve Guides

Length ---------- 4-3/8 Inches

Outside Diameter ---------- .7510 to .7515 Inch

Inside Diameter ---------- .4045 to .4055 Inch (After Assembly)

Valve Stem Clearance in Guide ---------- .0015 to .0035 Inch

Distance Above Head
Guide Must Protrude ---------- 1-1/16 Inches, Press Fit

VALVE SPRINGS

Free Length ----------Approximately 2.438 Inches

Spring Pressure at Compressed Height of
1-31/64 Inches (Valve Open) -------- 102 Pounds; Install New Spring if Pressure is Less than 92 Pounds.

Spring Pressure at Compressed Height of
1-15/16 Inches (Valve Closed) ------ 45 Pounds; Install New Spring if Pressure is Less than 41 Pounds.

ROCKER ARM ASSEMBLY

Rocker Arm Bushing ---------- Replaceable Precision Bronze Bushing

Number of Bushings ---------- 12

Lubrication ---------- Pressure Lubricated;Crankcase Oil to Rocker Arms Metered by Camshaft.

Oil Holes in Rocker Arm Shaft ---------- Oil Holes must Face Valve Side of Engine Only.Shaft Cannot Be Rotated.

Positioning of Exhaust
Valve Rocker Arms ---------- Spacer Washers Position Exhaust Valve Rocker Arm and Eliminate End Play without Binding.

Outside Diameter of
Rocker Arm Shaft ----------.872 to .873 Inch

Inside Diameter of Rocker Arm Bushing (Installed) ---------- .8745 to .8760 Inch

Rocker Arm Shaft Spring

Spring Pressure at Compressed Height of 1-9/16 Inches ---------- 10 Pounds; Install New Spring If Pressure is Less than 8-1/2 Pounds.

OIL PUMP

Type ---------- Positive Displacement, Gear Type Pump; Driven Off Camshaft.

Pressure Relief Valve --------- Maintains 40 to 45 Pounds Full Pressure (Oil Warm, Engine Operating at Full Governed Speed) Relief Valve is Adjustable.

WATER PUMP AND THERMOSTAT

Type of System ---------- Pressurized Thermostat Controlled By-Pass Type; Forced Circulation (Pump).

Type Pump ---------- Impeller Vane Type

Radiator ---------- Heavy Duty Fin and Tube Type

Temperature Control ----------By-Pass Type Thermostat

FUEL SYSTEM

Injection Pump ------- Robert Bosch, Type PES Multiple Plunger Pump

Direction of Pump Rotation ---------- Counter-Clockwise

Pump Mounting ---------- Right Hand Side of Engine

Pump Drive ------ Gear Driven from Camshaft Gear at Camshaft Speed

Injection Pump Drive Lubrication --------- Pressure Lubricated From Front Camshaft Bearing.

Injection Pump Drive Shaft Diameter --------- 1.3700 to 1.3705 Inches

Normal Clearance Between Drive Shaft and Bushings ---------- .001 to .002 Inch

Number of Drive Shaft Bushings ---------- (2) These Bushings are Not Replaceable. A Replacement Drive Housing with Bushings in Place Aligned and Fine Bored is Provided.

Injection Pump Drive Shaft End Play ---------- Automatically Taken Up By A Spring Loaded Thrust Button on Front End Of Drive Shaft. Thrust Washers Provided Between Front Drive Gear and Drive Shaft Housing.

Thrust Washer

Outside Diameter ----------2.085 to 2.105 Inches

Inside Diameter ----------1.3725 to 1.3825 Inches

Thickness ---------- .1225 to .1275 Inch

Timing Marks on Engine -------- Timing Marks Located on Crankshaft Pulley Flange (0 through 5 and 20 through 35 Degrees Before Top Dead Center). Pointer Located on Timing Gear Cover.

Fuel Injectors ---------- Robert Bosch Pintle Type: Opening Pressure 2000 Pounds Per Square Inch.

Governor ---------- Mechanical Variable Speed Fly-Weight Centrifugal Type; Integral Part of Injection Pump.

Fuel Filters

Fuel Tank Breather Air Filter ----- Located in Fuel Tank Filler Cap

Fuel Tank Water Trap ---------- Located in Base of Fuel Tank

1st Stage Fuel Filter ---------- Replaceable Element Type

2nd Stage Fuel Filter ---------- Replaceable Element Type

Final Fuel Filter ---------- Replaceable Sealed "Can" Type Filter.

TIGHTENING TORQUE SPECIFICATIONS

Engine	Torque in Ft. Lbs.	Size	Threads per In.	Type
Camshaft Nut	125 to 135	1-1/8	12	NF*
Connecting Rod Bearing Capscrews	95 to 105	1/2	20	NF
Crankshaft Pulley Bolt	100 to 110	5/8	18	NF
Cylinder Head Cover (Valve Cover) Stud Nuts	10 Max.	7/16	20	NF
Cylinder Head Stud Nuts	145 to 155	9/16	18	NF
Cylinder Head Bolts (Grade 8)	145 to 155	9/16	18	NF
Engine to Flywheel Housing	80	1/2	20	NF
Dust Cover and Capscrews	50	1/2	13	NC**
Flywheel to Crankshaft Capscrews	100 to 110	5/8	18	NF
	100 to 110	9/16	18	NF
Engine Mount	200	3/4(spring Mounted)	10	NC
Clamp Stud Nuts, Injector to Cylinder Head (Diesel)	14 to 17	3/8	24	NF
Injector Nozzle Cap Nut (Diesel)	50 to 55			
Powrcel Clamp Screws (Diesel)	100 to 110	1-1/8	16	NC
Mainbearing Capscrews	145 to 155	5/8	11	NC
Manifold Clamp Stud Nuts	25	7/16	20	NF
Water Manifold Hold Down Capscrews	15	5/16	18	NC
Oil Filter Mounting Capscrews	25	3/8	16	NC
Oil Pan Capscrews	35	3/8	16	NC
Oil Pump Cover Capscrews	25	1/4	20	NC
Rocker Arm Bracket Studs and Capscrews	40	7/16	14	NC
Water Pump and Fan Shaft Nut	60	5/8	18	NF
Water Pump Mounting Capscrews	25	3/8	16	NC
Generator Mounting Capscrews	15	5/16	18	NC

Maximum Backlash at Tightest Point (All Timing Gears) ---------- .002 to .005 Inch

Maximum Backlash at Loosest Point (All Timing Gears) ---------- .006 Inch

NOTE: The above Specifications are given in foot pounds dry torque.

*-National Fine
**-National Coarse

NOTE: The 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.

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

PUMP TIMING

ENGINE	FULL LOAD GOVERNED ENGINE SPEED	NUMBER OF DEGREES
A451D	2000	32° BTDC

VALVE TIMING

With valve clearances set correctly, dial indicator mounted above valve stem, reading taken with valve .040" off its seat.

Inset Opening (No. 1 Cyl.) ---------- 3° BTC

NOTE "Inlet opening" is the only position on this engine that can be checked by the crankshaft pulley marks - If this position is correct, it can be assumed that the timing gears are correctly marked and properly assembled.

PRINTED IN U.S.A.

INSTRUCTIONS

FOR

REMOVAL AND INSTALLATION

OF THE

FACTORY INSTALLED OPERATORS CAB

ON THE

930 AND 1030 SERIES TRACTORS.

Rac. Form 9-78351

PRINTED IN U.S.A.

OPERATORS CAB

Removal

1. Drain the engine coolant system and disconnect the two hoses to the heater, reference (3).
2. Disconnect the batteries.
3. Disconnect the wires to the cab. The warning lamp wire can be uncoupled. Unbolt the regulator mounting bracket, reference (8) and disconnect the wire to the "B" connection on the regulator that comes from the cab. Uncouple the cultivator light, rear flood and tail light wires.
4. Unbolt and remove the RH and LH firewall filler plates, reference (2).
5. Unbolt and remove the RH and LH rear trim panels, reference (4).
6. Remove the four nuts, bolts and washers from the RH & LH rear sides of the cab and wing plates, reference (7).
7. Remove the six nuts, bolts and washers from the RH & LH front sides of the cab and wing plates, reference (1).
8. Remove the two nuts, bolts and washers from the fuel tank mounting bracket, one each side of cab, reference (6).
9. Remove the muffler and air intake stack, reference (4).
10. Remove the four nuts, lockwashers and U bolts from the RH & LH channel supports to axle housings, reference (7).
11. Remove the four nuts, lockwashers and bolts from the cab to the RH & LH front cab supports and platform filler plates, reference (5). Remove the step mounting bolts.
12. Install four bolts into the cab (one each corner of the roof). Use these lifting points to lift the cab the required height of thirty inches for proper clearance, reference (4). The tractor can then be moved rearward and out from under the cab.

Installation

1. Lower the cab down onto the tractor aligning the mounting holes. If equipped with a heater, be sure it does not bind on the seat as the cab is lowered down.
2. Install the four bolts, lockwashers and nuts through the cab into the RH & LH front cab supports and platform filler plates, reference (5). Install the step and mounting bolts.
3. Install the U bolts around the axle housings and into the RH &LH channel supports. Retain in place with nuts and lockwashers, reference (7).
4. Install the two bolts, lockwashers and nuts through cab and fuel tank supports, reference (6).
5. Install the six bolts through the RH & LH front sides of the cab and wing plates, reference (1). Retain in place with lockwashers and nuts.
6. Install the four bolts through the RH & LH rear sides of cab and wing plates, reference (7). Retain in place with lockwashers and nuts.
7. Install the RH & LH rear trim panels, reference (4).
8. Install the RH & LH firewall filler plates, reference (2).
9. Reconnect the warning lamp wire, the wire from cab to regulator B, cultivator lights and rear flood light wires.
10. Install the regulator mounting bracket to tractor, reference (8).
11. Reconnect the batteries.
12. Reconnect the heater hoses, if equipped, reference (3) and refill the engine coolant system.

Thank you so much for reading.

Please click the “Buy Now!” button below to download the complete manual.

After you pay.

You can download the most perfect and complete manual in the world immediately.

Our support email:

ebooklibonline@outlook.com