8N
FORD TRACTOR

SERVICE TRAINING MANUAL

PREPARED BY THE SERVICE DEPARTMENT
DEARBORN MOTORS CORPORATION

Ford TRACTOR

Dearborn FARM EQUIPMENT

FOREWORD

This manual contains materials for use in connection with the 8N FORD TRACTOR ADVANCED SERVICE TRAINING PROGRAM. It is designed to help you train dealer service personnel in the latest methods of servicing and overhauling the 8N Ford Tractor. This knowledge is one of the important fundamentals to our over-all objective of providing quality service to the owners of Ford Tractors and Dearborn Farm Equipment.

ADVANCED SERVICE TRAINING OUTLINE
FOR
8N FORD TRACTOR

The Service Training conference topics outlined below, represent related material that will be presented to the entire group in training on a directed conference basis, prior to actual performance of Service Training Jobs.

The Service Training Jobs listed below are the jobs personnel in Training will be required to perform in connection with and following each training conference outlined in the left hand column.

CONFERENCE TOPIC	CONFERENCE GUIDE NO.	TIME (HRS.)	SERVICE TRAINING JOBS	JOB PLAN NUMBER	TIME (HRS.)
INTRODUCTION TO 8N FORD TRACTOR ADVANCED SERVICE TRAINING PROGRAM I. ABC's of Quality Service A. Introduction B. The Formula for Quality Service C. The Key to Quality Service II. Service Training and Its Relationship to Quality Service III. The 8N Ford Tractor Advanced Service Training Program A. Specific Objective of the Program B. Organization of Training Material IV. Conference Conclusion	1	1	**DISASSEMBLY OF 8N FORD TRACTOR FOR TRAINING PURPOSES** I. Draining the Tractor II. Removing the Hood III. Removing the Radiator IV. Removing the Battery and Tool Box V. Removing the Air Cleaner and Battery Rack VI. Removing the Wiring Harness VII. Removing the Engine Accessories VIII. Removing the Instrument Panel IX. Removing the Steering Assembly, Seat and Fenders X. Removing the Engine XI. Removing the Transmission	1	1¼
ENGINE AND CLUTCH ASSEMBLY I. Introduction A. Tie-in with previous conference B. Subject of conference C. Objectives	2	¾	**SERVICING THE VALVES AND CAMSHAFT** I. Removing Valve Assemblies II. Removing, Checking and Replacing the Camshaft III. *Grinding Valves and Valve Seats (Demonstration)*	2	1 1

CONFERENCE TOPIC	CONFERENCE GUIDE NO.	TIME (HRS.)	SERVICE TRAINING JOBS	JOB PLAN NUMBER	TIME (HRS.)
ENGINE AND CLUTCH ASSEMBLY—Contd. II. Basic Principles of Four Cycle Internal Combustion Engine Operation A. Principle parts of such an engine B. Operation—the four strokes of a cycle C. Summary of operation III. 8N Ford Tractor A. Importance of servicing B. Servicing the valves C. Servicing the camshaft D. Servicing the rods, pistons and cylinders E. Servicing the camshaft and flywheel F. Engine lubrication IV. The Clutch A. Construction and operation B. Servicing the clutch assembly V. Conference Conclusion			**SERVICING THE VALVES AND CAMSHAFT—Contd.** A. *Cleaning* B. *Refacing valves* C. *Reseating Valve seats* D. *Testing refaced valves and seats* IV. Installing Valves **SERVICING THE RODS, PISTONS AND CYLINDERS** I. Removing the Rods and Pistons II. Servicing Piston Rings III. Removing and Replacing Piston Pins and Bushings IV. Renewing the Rod Bearing Inserts V. *Checking the Piston (Steel) Clearance, Removing and Installing Cylinder Sleeves (Demonstration)* VI. Installing Rods and Pistons **SERVICING THE CRANKSHAFT, CLUTCH FLYWHEEL ASSEMBLY AND OIL PUMP** I. Removing the Crankshaft II. Renewing the Crankshaft Oil Seals III. Checking Crankshaft Journals and Replacing the Bearing Shells IV. Checking the Oil Pump V. Installing the Crankshaft VI. Installing the Rods and Pistons VII. *Renewing the Flywheel Ring Gear (Demonstration—Optional)*	3 1 4	¾ 1¾
TRANSMISSION ASSEMBLY I. Introduction A. Tie-in with previous conference B. Usefulness of the tractor C. Objectives II. The 8N Ford Tractor Transmission A. Construction and operation B. The main drive gear C. The reverse idler gear assembly D. The transmission shift assembly E. Servicing the transmission	3	1	**TRANSMISSION ASSEMBLY OVERHAUL** I. Disassembling the Gearshift Unit II. Reassembling the Gearshift Unit III. Disassembling the Transmission IV. Servicing the Reverse Idler Gear Assembly V. Servicing the Countershaft Assembly VI. Servicing the PTO Shifter Assembly VII. Servicing the Main Shaft Assembly	5	3¼

CONFERENCE TOPIC	CONFERENCE GUIDE NO.	TIME (HRS.)	SERVICE TRAINING JOBS	JOB PLAN NUMBER	TIME (HRS.)
TRANSMISSION ASSEMBLY—Contd. III. The PTO Shifter Assembly A. Function B. Construction and Operation C. Servicing the PTO Shifter Assembly IV. Conference Conclusion			**TRANSMISSION ASSEMBLY OVERHAUL—Contd.** VIII. Servicing the Main Drive Gear and Shaft IX. Complete Transmission Assembly		
FINAL DRIVE AND BRAKES I. Introduction A. Tie-in with previous conference B. Objectives II. The Final Drive A. Basic Parts III. Servicing The Final Drive A. Drive Shaft B. Drive Pinion C. Ring Gear and Differential D. Rear Axle Assembly IV. Conference Conclusion	4	¾	**SERVICING THE DRIVING PINION** I. Removing The Pinion Assembly II. Disassembling The Pinion Unit III. Assembling The Pinion IV. Removing and Replacing The Rear Pinion Bearing V. Installing the Pinion Gear	6	1½
			SERVICING THE DIFFERENTIAL I. Removing the Differential II. Disassembling the Differential III. Assembling the Differential IV. Removing and Replacing the Differential Bearing Cup	7	1
			SERVICING THE REAR AXLE I. Disassembling the Rear Axle II. Renewing the Rear Axle Bearing (Outer) III. Servicing the Rear Axle Bearing Cup (Outer) IV. Reassembling the Rear Axle Unit	8	1
			SERVICING THE BRAKES I. Removing the Brake Shoes II. *Relining Brakes (Demonstration)* III. Installing the Brake Shoes IV. Adjusting the Brakes	9	½ ½
			PARTIAL ASSEMBLY OF THE TRACTOR I. Attaching the Transmission to the Center Housing II. Attaching the Engine to the Transmission Housing III. Attaching the Front Axle Assembly IV. Completing the Assembly	10	½

CONFERENCE TOPIC	CONFERENCE GUIDE NO.	TIME (HRS.)	SERVICE TRAINING JOBS	JOB PLAN NUMBER	TIME (HRS.)
STEERING ASSEMBLY, FRONT AXLE, WHEELS AND TIRES I. Introduction A. Tie-in with previous conference B. Objectives II. Front Axle Assembly A. Construction B. Servicing the Front Axle Assembly and Front Wheels III. Steering Assembly A. Construction and Operation B. Servicing the Steering Assembly IV. Liquid Weighting Tires A. Introduction B. What Liquid Weighting Is C. What solution is best D. Liquid Weighting Procedure V. Conference Conclusion	5	¾	**SERVICING THE STEERING ASSEMBLY** I. Disassembling the Steering Unit (with unit removed from the tractor) II. Replacing the Lower Bearing Cup III. Replacing the Sector Shaft Housing Bushing IV. Reassembling and Adjusting the Steering Unit	11	1¼
			SERVICING THE FRONT AXLE I. Replacing the Axle Pin Bushing (Hood, Radiator, and Engine accessories Removed) IA. Replacing the Axle Pin Bushing (Hood, Radiator and all accessories on the tractor) II. Replacing the Spindle Bushings III. Replacing the Front Wheel Bearings IV. Adjusting the Toe-In	12	1
			LIQUID WEIGHTING TIRES *(Demonstration)* I. *Filling the Tires With Liquid* II. *Emptying Liquid From The Rear Tires* III. *Front Tires*	13	1
ENGINE ACCESSORIES (Non-Electrical) I. Introduction A. Tie-in with previous conference II. The Manifold A. Function B. Servicing III. The Carburetor A. Function B. Construction and Operation C. Servicing IV. The Air Cleaner A. Introduction B. Servicing	6	¾	**SERVICING THE GOVERNOR** I. Removing the Governor From the Tractor II. Disassembling the Governor III. Overhauling the Governor IV. Assembling the Governor	14	¾
			SERVICING THE CARBURETOR I. Removing the Carburetor from the Tractor II. Disassembling the Carburetor III. Assembling the Carburetor IV. Adjustment	15	½

CONFERENCE TOPIC	CONFERENCE GUIDE NO.	TIME (HRS.)	SERVICE TRAINING JOBS	JOB PLAN NUMBER	TIME (HRS.)
ENGINE ACCESSORIES (Non-Electrical)—Contd. V. The Governor A. Function B. Construction C. Operation D. Servicing VI. The Oil Filter A. Function B. Operation C. Servicing D. Breather Cap VII. Conference Conclusion			**SERVICING THE WATER PUMP** I. Removing the Water Pump from the Tractor II. Disassembling the Water Pump III. Replacing the Water Seal Assembly IV. Assembling the Water Pump	16	½
THE ELECTRICAL SYSTEM I. Introduction A. Tie-in with previous conference B. Objectives II. Basic Principles of an Electrical System A. Introduction B. Ignition C. Starter and Generator D. The Regulator III. Servicing the Electrical System A. The Battery B. The Coil, Breaker Points, Condenser and Distributor Cap C. The Spark Plugs IV. Conference Conclusion	7	1	**SERVICING THE GENERATOR** I. Removing the Generator from the Tractor II. Disassembling the Generator III. Cleaning and Inspecting the Generator IV. Assembling the Generator V. Adjusting the Generator VI. Installation on the Tractor	17	½
			SERVICING THE DISTRIBUTOR I. Removing the Distributor from the Tractor II. Disassembling the Distributor III. Replacing and Adjusting the Points IV. Basic Timing of the Distributor	18	½
			SERVICING THE STARTER I. Removing the Starter from the Tractor II. Disassembling the Starter III. Cleaning and Inspecting the Starter IV. Assembling the Starter V. Disassembling the Bendix VI. Assembling the Bendix VII. Installing the Starter on the Tractor	19	½
			NOTE: Installation of Accessories		½

CONFERENCE TOPIC	CONFERENCE GUIDE NO.	TIME (HRS.)	SERVICE TRAINING JOBS	JOB PLAN NUMBER	TIME (HRS.)
THE HYDRAULIC CONTROL I. Introduction II. Construction of the Ford Tractor Hydraulic Control A. Introduction B. The Hydraulic Pump C. The Hydraulic Lift Cover Assembly III. Operation A. Introduction B. The Hydraulic Pump C. The Hydraulic Lift Cover Assembly IV. Servicing the Hydraulic Control A. The Pump B. The Lift Cover Assembly V. Conference Conclusion	8	1	**SERVICING THE HYDRAULIC PUMP** I. Removing the Hydraulic Pump from the Tractor II. Disassembling the Hydraulic Pump III. Cleaning and Inspecting the Hydraulic Pump IV. Assembling the Hydraulic Pump **SERVICING THE HYDRAULIC LIFT COVER ASSEMBLY** I. Removing the Hydraulic Lift Cover Assembly from the Tractor II. Disassembling the Hydraulic Lift Cover Assembly III. Cleaning and Inspecting the Hydraulic Lift Cover Assembly IV. Assembling the Hydraulic Lift Cover Assembly V. Adjusting the Hydraulic Control Mechanism VI. Installing the Hydraulic Lift Cover Assembly on the Tractor	20 21	1 1½
PRE-DELIVERY CHECK AND ENGINE ANALYSIS I. Introduction A. Tie-in with previous conference B. Objectives II. Pre-Delivery Check A. Introduction B. What constitutes a complete pre-delivery check III. Engine Analysis A. Introduction B. Selling Service C. The Owners Service Test Set IV. Conference Conclusion	9	½	**PRE-DELIVERY CHECK** **OWNERS SERVICE TEST SET (DEM.)** **ENGINE ANALYSIS** I. Battery Capacity and Condition Test II. Starter Amperage (Cranking Engine) Test III. Starter Amperage (No Load) Test IV. Starter Circuit Resistance Test V. Tachometer Test VI. Voltage, Regulator and Voltage Cut-In Test VII. Generator Output Test VIII. Generator Field Current Test IX. Generator Armature Test X. Cylinder Compression Test XI. Ignition Dwell Test XII. Ignition Circuit Resistance Test XIII. Spark Intensity at Plug Test XIV. Manifold Vacuum Test XV. Combustion Analysis Test	22 23	1½ 1 1½
ADVANCED SERVICE TRAINING TEST **IT'S ALL OVER BUT — - -?** I. Introduction II. Summary of Program A. Opening Session B. Overhaul Procedures C. The Other Fellow's Shoes	10	1 ½			

CAPACITIES (U. S. MEASURES)

Fuel Tank	Crank-Case	Cooling System	Transmission & Center Housing	Steering Assembly	Belt Pulley	Air Cleaner
10 Gal.	6 Qts.	12 Qts.	5 Gal.	1 Pt.	5/8 Pt.	1 Pt.

ANTI-FREEZE CHART

Temperature	Alcohol (Denatured 90%—180 Proof)	Ethylene Glycol
20° F	5½ Pts.	4½ Pts.
10° F	8½ Pts.	7 Pts.
0° F	11¼ Pts.	8½ Pts.
—10° F	12½ Pts.	11¼ Pts.
—20° F	15½ Pts.	12½ Pts.
—30° F	17 Pts.	16¾ Pts.

TUNE-UP DATA

Intake Valve Stem Clearance	Exhaust Valve Stem Clearance	Firing Order	Breaker Opening	Spark Plug Gap	Carburetor Idle Adj.	Power Jet Adj.	Float Setting
.010 to .012 cold	.014 to .016 cold	1-2-4-3	.015	.025	1¼ TCCW to 1½ TCCW	1½ TCCW—Rich 1 TCCW—Lean	9/32"

BEARING PRE-LOAD

Main Shaft	20-35 in. lbs.
Countershaft	15-30 in. lbs.
Pinion	12-16 in. lbs.

TIGHTENING TORQUE VALUES

Main Bearing Nuts or Cap Screws	75 to 85 Ft. Lbs.
Rod Nuts—Castellated	35 to 40 Ft. Lbs.
Rod Nuts—Self Locking	35 to 40 Ft. Lbs.
Cylinder Head Nuts	50 to 55 Ft. Lbs.
Cylinder Head Cap Screws	65 to 70 Ft. Lbs.
Flywheel Cap Screws	75 to 85 Ft. Lbs.
Spark Plugs	25 to 30 Ft. Lbs.

INDENTIFICATION DATA

Model	Serial No. Range	Cylinders Bore & Stroke	Compression Ratio	Displacement Cu. In.
8N	8N-1 to 84999	4 Cylinders 3 3/16 x 3 3/4	6 to 1	119.7
8N	8N-85000 and up	4 Cylinders 3 3/16 x 3 3/4	6.2 to 1	119.7

ENGINE CLEARANCES AND DIMENSIONS

	New	Wear Limit
CYLINDER		
Diameter	3.1875-3.1885	
Out of Round		.003
Taper or Max. Wear		.004
PISTON, STEEL		
* Skirt Clearance	.0025-.004	.005
PISTON, ALUMINUM		
* Skirt Clearance	.0015-.0026	.0045
PISTON RINGS		
Side Clearance		
Compression Rings	.0015-.0035	.004
Oil Control Rings	.0010-.0025	.004
End Gap	.012-.017	.035
PISTON PIN		
Pin Diameter	.7501-.7504	
** Clearance in Piston	.0001-.0005	
*** Clearance in Rod	.0002-.0005	
VALVES (in tractors 8N-to 42160)		
Stem Diameter		
Intake and Exhaust	.3105-.3115	.004

	New	Wear Limit
PUSH RODS		
Diameter	.9994-.9996	.001
Bore Diameter	1.000-1.0005	.002
Clearance in Bore	.004-.0011	.003
Push Rod Length	1.722-1.723	*1.710
Valve Lash		
Intake	.010-.012	.013
Exhaust	.014-.016	.017
CRANKSHAFT		
Journal Diameter		
Main	2.248-2.249	
Crankpin	2.0935-2.0945	
Out of Round		
Main Crankpin		.0015
[illegible]		.001
Bearing Clearance		

ENGINE CLEARANCES AND DIMENSIONS

	New	Wear Limit
CYLINDER		
Diameter	3.1875-3.1885	
Out of Round		.003
Taper or Max. Wear		.004
PISTON, STEEL		
* Skirt Clearance	.0025-.004	.005
PISTON, ALUMINUM		
* Skirt Clearance	.0015.-0026	.0045
PISTON RINGS		
Side Clearance		
Compression Rings	.0015-.0035	.004
Oil Control Rings	.0010-.0025	.004
End Gap	.012-.017	.035
PISTON PIN		
Pin Diameter	.7501-.7504	
** Clearance in Piston	.0001-.0005	
*** Clearance in Rod	.0002-.0005	
VALVES (in tractors 8N-to 42160)		
Stem Diameter		
Intake and Exhaust	.3105-.3115	.004
Clearance in Guide		
Intake	.0025-.0045	.004
Exhaust	.0015-.0035	.006
Seat Angle	45°	
Spring Test	37-40 lbs. @ 2⅛"	36 lbs.
VALVES (in tractor 8N-42 161 and up)		
Stem Diameter		
Intake	.3410-.3420	.004
Exhaust	.3405-.3415	.004
Clearance in Guide		
Intake	.0020-.0040	.004
Exhaust	.0025-.0045	.006
Seat Angle	45	
Spring Test	41-44 lbs. @ 1.80"	36 lbs.
PUSH RODS		
Diameter	.9994-.9996	.001
Bore Diameter	1.000-1.0005	.002
Clearance in Bore	.004-.0011	.003
Push Rod Length	1.722-1.723	*1.710
Valve Lash		
Intake	.010-.012	.013
Exhaust	.014-.016	.017
CRANKSHAFT		
Journal Diameter		
Main	2.248-2.249	
Crankpin	2.0935-2.0945	
Out of Round		
Main Crankpin		.0015
Taper		
Main Crankpin		.001
Bearing Clearance		
Main	.001-.003	.005
Crankpin	.0013-.0035	.005
End Play	.002-.006	.008
CAMSHAFT		
Bore Diameter	1.7985-.1.7990	
Journal Diameter	1.7965-1.17970	.0015
Bearing Clearance	.001-.002	.004
End Play	.0015-.004	.005
TIMING GEAR BACKLASH	.003-.004	.006
OIL PUMP GEAR BACKLASH	.003-.004	.006

* 6-10 lbs. pull on ½ inch wide .003 feeler gauge.
** Thumb push fit.
*** Slip fit.
* Regrind limit.

GOVERNED ENGINE SPEEDS

	P.T.O. R.P.M.	Engine R.P.M.	Belt Pulley R.P.M.
FULL LOAD	727	2000	1358
% OF FULL LOAD	736	2025	1375
	745	2050	1392
	754	2075	1409
	763	2100	1426
	772	2125	1442
	782	2150	1460
	791	2175	1478
NO LOAD	800	2200	1494

TIRE CHART

Tire Size	Tire Pressure Lbs. Per Sq. In.	Max. Rec. Tire Loads Per Wheel (Pounds)	Max. Calcium Chloride Solutions		
			Pounds Cal. Chloride	Gallon of H_2O	Weight of Solution (Pounds)
Rear 10-28 4 Ply	12-14-	1575-1720	116	23	310
11-28 4 Ply	12	1890	163	33	434
Front 4-19 4 Ply	20-28-	470-575	15	3	40
6-16 4 Ply	20-	1020-1240	30	6	80