1520
Tractor

JOHN DEERE

TECHNICAL MANUAL

1520

Tractor

TM1012 (01JAN71) English

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John Deere Tractor Works

TM1012 (01JAN71)

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ENGLISH

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1520 TRACTOR
TECHNICAL MANUAL
TM-1012 (Jan-71)

CONTENTS

SECTION 10 - GENERAL
- Group 5 - Specifications
- Group 10 - Predelivery, Delivery, and After-Sale Services
- Group 15 - Tune-Up and Adjustment
- Group 20 - Lubrication
- Group 25 - Separation

SECTION 20 - ENGINE
- Group 5 - General Information, Diagnosis, and Tests
- Group 10 - Cylinder Head, Valve Train, and Camshaft
- Group 15 - Cylinder Block, Liners, Pistons, and Rods
- Group 20 - Crankshaft, Main Bearings, and Flywheel
- Group 25 - Timing Gear Train
- Group 30 - Lubrication System
- Group 35 - Cooling System
- Group 40 - Governor and Speed Control Linkage

SECTION 30 - FUEL SYSTEM
- Group 5 - Diagnosing Malfunctions
- Group 10 - Fuel Injection System
- Group 15 - Gasoline Fuel System

SECTION 40 - ELECTRICAL SYSTEM
- Group 5 - Information and Diagrams
- Group 10 - Charging Circit
- Group 15 - Starting Circuit
- Group 20 - Ignition Circuit
- Group 25 - Lighting and Accessory Circuits

SECTION 50 - POWER TRAIN
- Group 5 - Clutches
- Group 10 - Hi-Lo Shift Unit
- Group 15 - Reverser
- Group 20 - Collar Shift Transmission
- Group 25 - Differential
- Group 30 - Final Drive
- Group 35 - Continuous and Transmission PTO
- Group 40 - Independent PTO
- Group 45 - Belt Pulley

SECTION 60 - STEERING AND BRAKES
- Group 5 - General Information

SECTION 70 - HYDRAULIC SYSTEM
- Group 5 - General Information, Diagnosis and Tests
- Group 10 - Miscellaneous Hydraulic Components
- Group 15 - Hydraulic Pumps
- Group 20 - Steering System
- Group 25 - Hydraulic Brakes
- Group 30 - Rockshaft System
- Group 35 - Selective Control Valve, Breakaway Couplers, and Remote Cylinders

SECTION 80 - MISCELLANEOUS
- Group 5 - Front Axle

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Section 10
GENERAL

CONTENTS OF THIS SECTION

Page

GROUP 5 - SPECIFICATIONS
General Tractor Specifications 5-1

GROUP 10 - PREDELIVERY, DELIVERY , AND AFTER-SALE SERVICES
Predelivery Service 10-1
Delivery Service 10-4
After-Sale Inspection 10-4

GROUP 15 - TUNE-UP
Preliminary Engine Testing 15-1
Engine Tune-Up 15-1
Final Engine Test 15-3
Tractor Tune-Up 15-4

GROUP 20 - LUBRICATION
Lubrication Chart 20-1
Engine Lubricating Oils 20-2
Transmission - Hydraulic Oil 20-2
Multi-purpose Gear Lubricants 20-2
Greases 20-2
Storing Lubricants 20-2

GROUP 25 - SEPARATION
Separating Engine from Clutch Housing 25-1
Separating Clutch Housing from Transmission Case 25-2
Separating Tractor Front End from Engine . . . 25-3
Removing Engine 25-4
Removing Final Drive Assembly 25-5
Specifications 25-6
Torques for Hardware 25-6
Special Tools 25-6

Group 5
GENERAL TRACTOR SPECIFICATIONS

	Gasoline	Diesel
ENGINE		
Maximum PTO horsepower*	47.86	46.52
Number of cylinders	3	3
Bore and stroke, inches	4.02 x 4.33	4.02 x 4.33
Displacement in cubic inches	164.0	164.0
Compression ratio	8.0 to 1	16.3 to 1
Firing order	1-2-3	1-2-3
Intake valve clearance	0.014-in.	0.014-in.
Exhaust valve clearance	0.022-in.	0.018-in.
Slow idle	600 rpm	800 rpm
Fast idle	2680 rpm	2650 rpm

ELECTRICAL SYSTEM	
Battery dry voltage	12 volts
Battery specific gravity at full charge (corrected to 80°F.)	1.260
Battery terminal grounded	negative
CAPACITIES (U.S. Standard Measures)	
Fuel tank	19-1/2 gals.
Cooling system	3 gals.
Crankcase (including filter)	6 qts.
Transmission-hydraulic system	10 gals.
Belt pulley	2-1/2 pts.
CLUTCH	Single or dual stage, spring-loaded, dry disk, foot-operated.

* *Official test at 2500 engine rpm.*

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ASSEMBLY

Install a new gasket on transmission case. Be sure brake disk is properly positioned on final drive shaft.

Join axle housing to transmission case. Tighten cap screws to specified torque. Remove caplugs.

Reverse the removal steps. Fill transmission with oil to the proper level.

Start engine and check operation.

SPECIFICATIONS

Item	Specification
Fan belt adjustment	3/4-inch deflection, 20 lb. force

TORQUES FOR HARDWARE

Item	Torque (ft-lbs)
Engine-to-clutch housing	170
Drag link nuts	55
Clutch housing-to-transmission case	85
Front end support-to-engine block	
5/8-inch	170
9/16-inch	130
Hydraulic pump drive coupling nuts	25
Axle housing-to-transmission case	85
Roll-Gard-to-axle housing	300
Rear wheel-to-hub bolts (rack and pinion axle)	300
Rim-to-wheel disk nuts	170
Rear wheel-to flanged axle cap screws	
Cast wheel (regular and power adj.)	130
Steel wheel	100
Demountable rim wheel	100
Front wheel bearing	35
Front wheel hub bolts	
Tires 6.00-16 or smaller	85
Tires larger than 6.00-16	100

TORQUE CHART (ft-lbs)

Bolt Diameter	Plain Head*	Three Radial Dashes*	Six Radial Dashes*
1/4	6	10	14
5/16	13	20	30
3/8	23	35	50
7/16	35	55	80
1/2	55	85	120
9/16	75	130	175
5/8	105	170	240
3/4	185	300	425
7/8	160* *	445	685
1	250* *	670	1030

** The types of bolts and cap screws are identified by head markings as follows:*

Plain Head: regular machine bolts and cap screws.

3-Dash Head: tempered steel high-strength bolts and cap screws.

6-Dash Head: tempered steel extra high-strength bolts and cap screws.

** * Machine bolts and cap screws 7/8-inch and larger are sometimes formed hot rather than cold, which accounts for the lower torque.*

SPECIAL TOOLS

No.	Name	Use
JDG-1†	Engine Sling	Engine removal
JD-244†	Engine Lifting Eyes	Engine removal
JDG-2K†	Support Stand	Tractor separation

† Order from Service Tools, Inc., 1901 Indiana Avenue, Chicago, Illinois 60616.

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Group 5
GENERAL INFORMATION AND DIAGNOSIS

GENERAL INFORMATION

The engine is a 3-cylinder valve-in-head, vertical in-line four cycle engine. Two types of fuel each with the appropriate fuel delivery device are available—gasoline, and diesel.

For basic theory of engine operation see the FOS Manual 30—ENGINES.

DIAGNOSING MALFUNCTIONS

Will Not Start

Fuel System Malfunction—See Section 30
- Foreign matter in fuel
- Improper fuel
- Faulty fuel pump
- Fuel shut off at tank
- Restricted air intake system
- Faulty injection nozzles
- Plugged fuel filter
- Carburetor malfunction
- Sticking choke

Electrical System Malfunction—See Section 40
- Corroded or loose battery connections
- Faulty or loose wiring
- Weak battery
- Faulty key switch
- Faulty safety start switches
- Faulty ignition system

Uneven Running or Frequent Stalling

Basic Engine Problem—See This Section
- Improper valve clearance.
- Cylinder head gasket leaking
- Valves sticking or burned
- Worn or broken compression rings
- Low compression
- Incorrect timing
- Coolant temperature below normal
- Engine overheating

Fuel System Malfunction—See Section 30
- Low fuel supply
- Restricted fuel lines or filters
- Faulty fuel pump
- Faulty injection pump
- Faulty injection nozzles
- Exhaust system restricted
- Carburetor adjusted incorrectly
- Leaking carburetor or intake manifold gaskets

Electrical System Malfunction—See Section 40
- Faulty ignition system

Engine Misses

Basic Engine Problem—See This Section
- Worn camshaft lobes
- Weak valve springs
- Incorrect valve clearance
- Burned, warped, pitted or sticking valves
- Low compression
- Incorrect timing
- Engine overheating
- Faulty governor
- Detonation or pre-igntion

Fuel System Malfunction—See Section 30
- Air in fuel
- Faulty injection nozzles
- Faulty injection pump
- Water in fuel
- Mixture of gasoline and diesel fuels
- Faulty fuel pump
- Faulty carburetor

Electrical System Malfunction—See Section 40
- Incorrect type spark plugs (pre-igntion)
- Leaks in wiring
- Faulty ignition system

Lack of Power

Basic Engine Problem—See This Section
- Blown cylinder head gasket
- Worn camshaft lobes
- Incorrect valve clearance
- Burned, warped, pitted or sticking valves
- Weak valve springs
- Incorrect timing
- Low compression
- Wrong oil viscosity
- Coolant temperature above or below normal
- Engine overheating
- Incorrect throttle linkage
- Governor binds

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Group 25
SEPARATION

SEPARATING ENGINE FROM CLUTCH HOUSING

Remove right-hand cowl. Disconnect battery cable and ground strap. Remove battery, side grille screens, hood, muffler, and front ballast (if used). Drain cooling system.

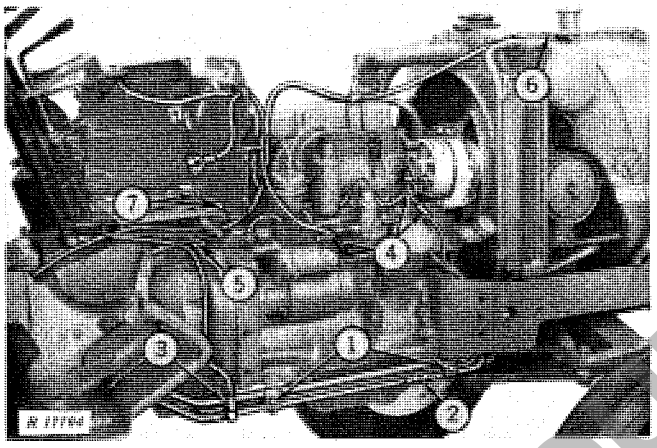

Fig. 1-Right-Hand Separation Procedures

1. Remove clamps securing hydraulic oil pipes to engine (Fig. 1).

2. Disconnect hydraulic pump pressure pipe at connector.

3. Remove retaining clamp from pump inlet and reservoir return pipes. Remove power steering pressure pipe.

4. Disconnect battery cable and wiring harness from starter solenoid. Disconnect wiring harness at oil pressure switch, ignition coil, alternator, and fuel gauge sending unit connector. Remove wiring band from harness.

5. Disconnect tachometer cable, and remove from clutch housing.

6. Disconnect hydraulic oil reservoir vent hose from top of reservoir, and remove hose from support clamp.

7. Remove the two cowl-to-flywheel housing cap screws.

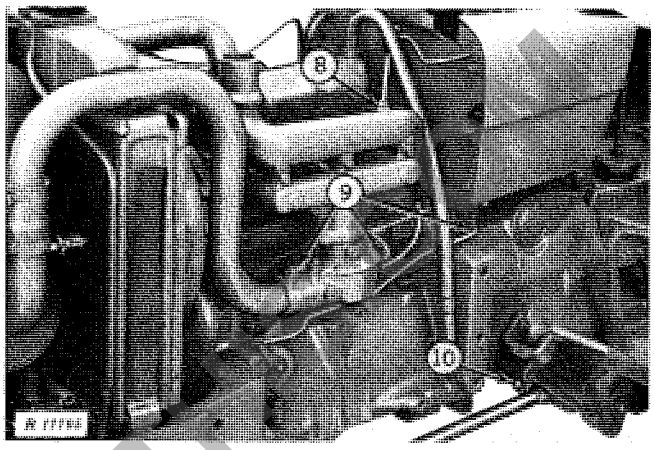

Fig. 2-Left-Hand Separation Procedures

8. Disconnect temperature gauge sensing bulb from engine (Fig. 2). Remove ether starting aid pipe (diesel).

9. Disconnect speed control rod, choke cable, and carburetor solenoid wire. Remove wiring bands that fasten wiring to fuel pipe. Disconnect underneath exhaust.

10. Disconnect steering drag link rod from steering arm.

Install JDG-2K support stand (Fig. 3). Place a floor jack under the rear portion of clutch housing.

⚠ CAUTION: Install a wood block between front axle and engine front support on both sides of tractor.

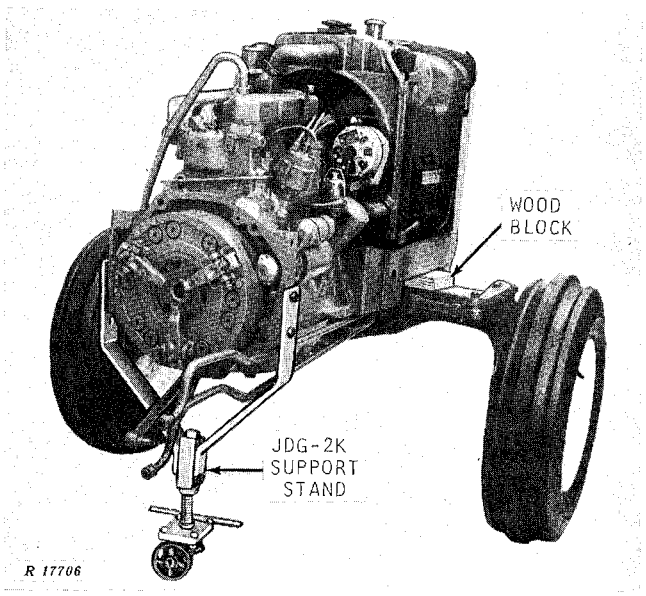

Fig. 3-Engine Separated From Clutch Housing

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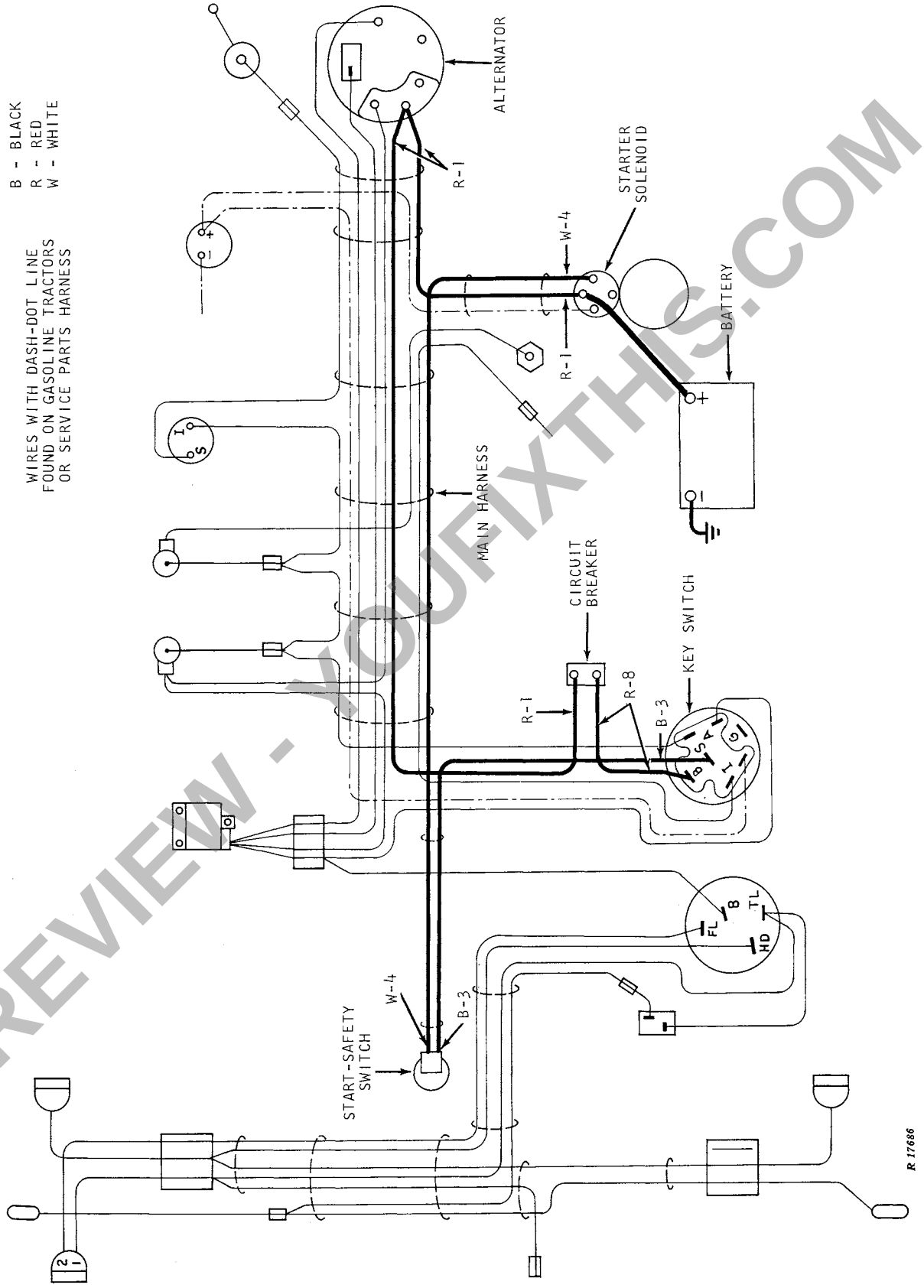

Fig. 1-Starting Circuit for Tractors Serial No. 117500 and After (Shown in Bold Line)
Tractors Prior to Serial No. 117500 are Similar. See Figs. 4 and 6

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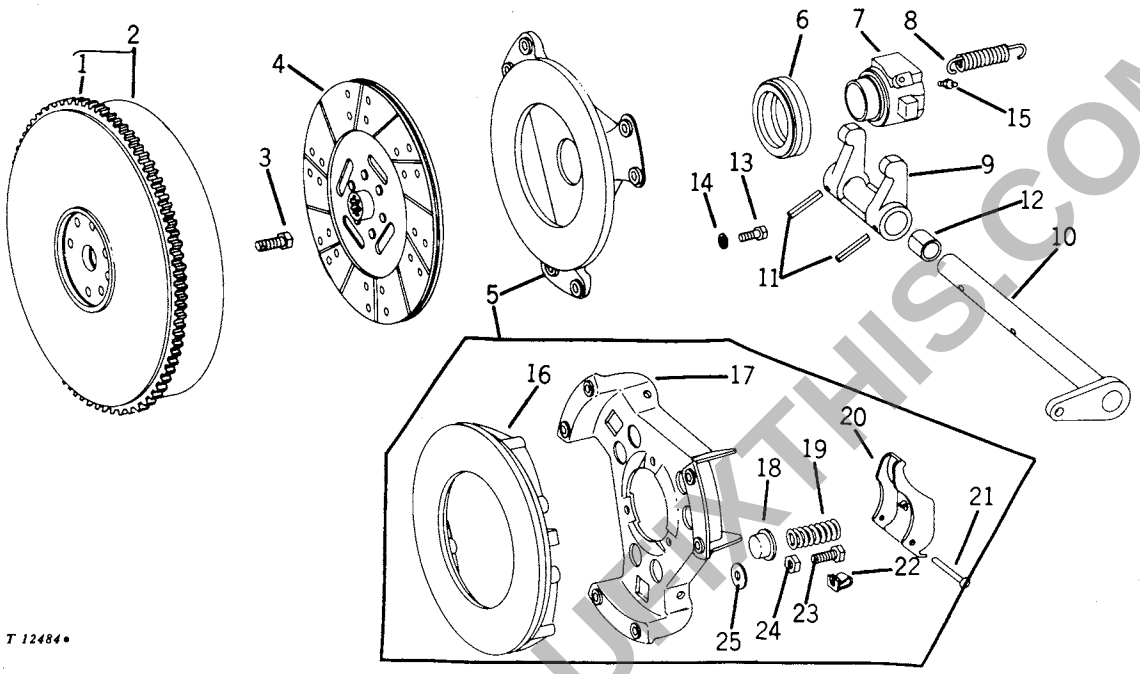
Repair

Pressure Plate Assembly



1—Ring Gear (142 Teeth)
2—Flywheel
3—Cap Screw (4 used)
4—Clutch Disk
5—Pressure Plate Assembly
6—Thrust Bearing
7—Carrier
8—Spring
9—Fork
10—Clutch Fork Shaft
11—Spring Pin (2 used)
12—Bushing
13—Cap Screw (6 used)
14—Lock Washer (6 used)
15—Grease Fitting
16—Pressure Plate
17—Bracket
18—Spring Cup (6 used)
19—Spring (6 used)
20—Clutch Lever (3 used)
21—Pivot Pin (3 used)
22—Return Clip (3 used)
23—Screw (3 used)
24—Nut (3 used)
25—Washer (3 used)

Fig. 2-Single Stage Clutch (Unit Without Reverser)

Separate engine from clutch housing as instructed in Section 10, Group 25.

Remove pressure plate attaching cap screws and lift pressure plate and driven disk from flywheel.

NOTE: Do not immerse clutch disks in any type of cleaning solution as it will tend to glaze them.

Refer to Fig. 2 for identification of parts and proceed as follows:

Remove flywheel (2) from crankshaft (or use another flywheel of same design) and place on work bench. Install pressure plate assembly (5) in flywheel. Remove the return clips (22) from levers.

Place flywheel with pressure plate on press and depress inner ends of release levers (20) as far as possible without forcing against bracket (17).

Loosen adjusting screw lock nuts (24) and back the three screws out of pressure plate. Remove screws (23) with nuts and washers (25).

Release assembly by gradually releasing load on press. The clutch may then be disassembled for inspection.

To separate release levers from bracket, first grind off peened ends of pivot pins (21).

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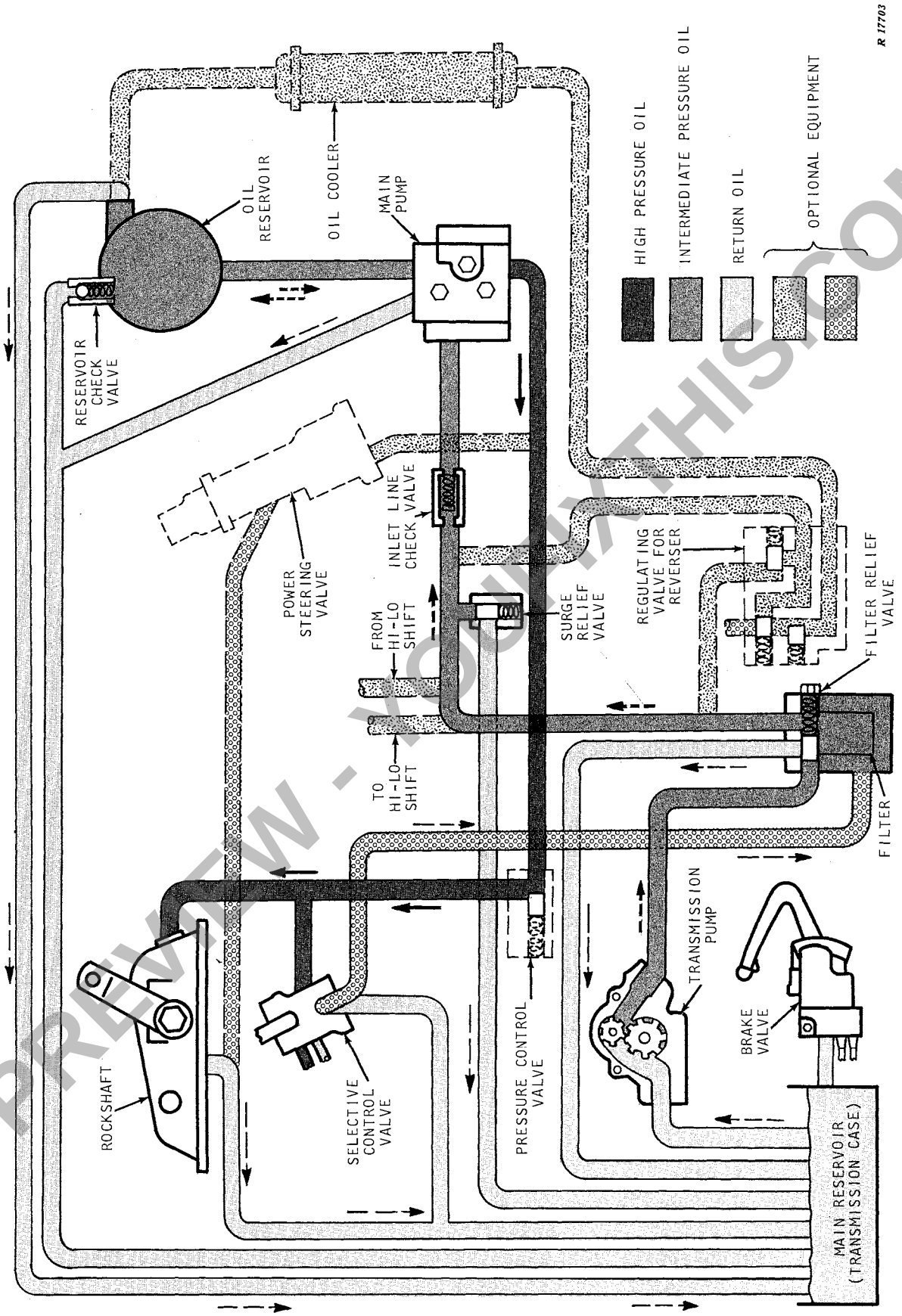

Fig. 1-System Flow Diagram

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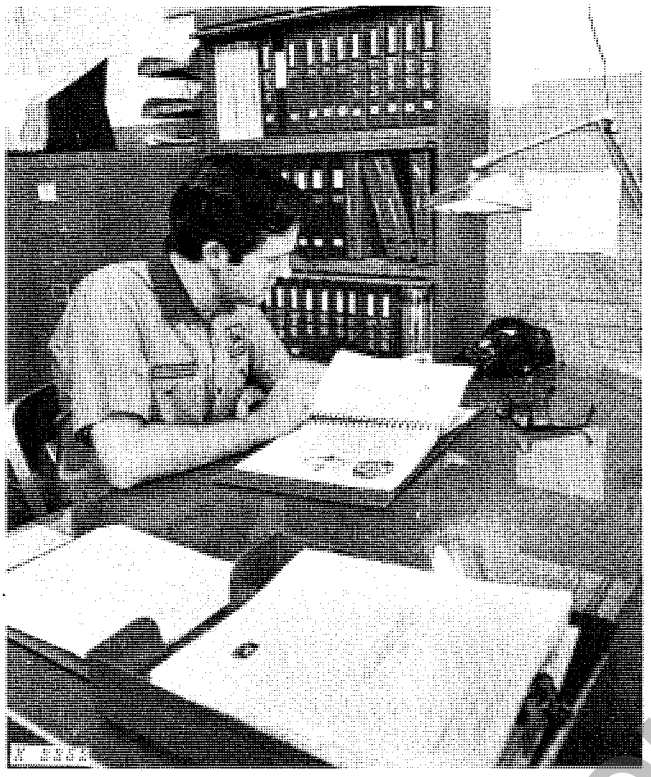
INTRODUCTION



Use FOS Manuals for Reference

Use Technical Manuals for Actual Service

This technical manual is part of a twin concept of service:

- **FOS Manuals—for reference**
- **Technical Manuals—for actual service.**

The two kinds of manuals work as a team to give you both the general background and technical details of shop service.

Fundamentals of Service (FOS) Manuals cover *basic* theory of operation, *fundamentals* of trouble shooting, *general* maintenance, and *basic* types of failures and their causes. FOS Manuals are for training new men and for reference by experienced men.

Technical Manuals are concise service guides for a *specific* machine. Technical Manuals are on-the-job guides containing only the vital information needed by a journeyman mechanic.

When a serviceman should refer to a FOS Manual for more information, a FOS symbol like the one at the left is used in the TM to identify the reference.

Some features of this technical manual:

- *Table of contents at front of whole manual*
- *Contents at front of each Section*
- *Specifications at end of each Group*
- *Special tools at end of each Group*

This safety alert symbol identifies important safety messages in this manual. When you see this symbol, be alert to the possibility of personal injury and carefully read the message that follows.

This technical manual was planned and written for you—a journeyman mechanic. Keep it in a permanent binder in the shop where it is handy. Refer to it whenever in doubt about correct service procedures or specifications.

Using the technical manual as a guide will reduce error and costly delay. It will also assure you the best in finished service work.

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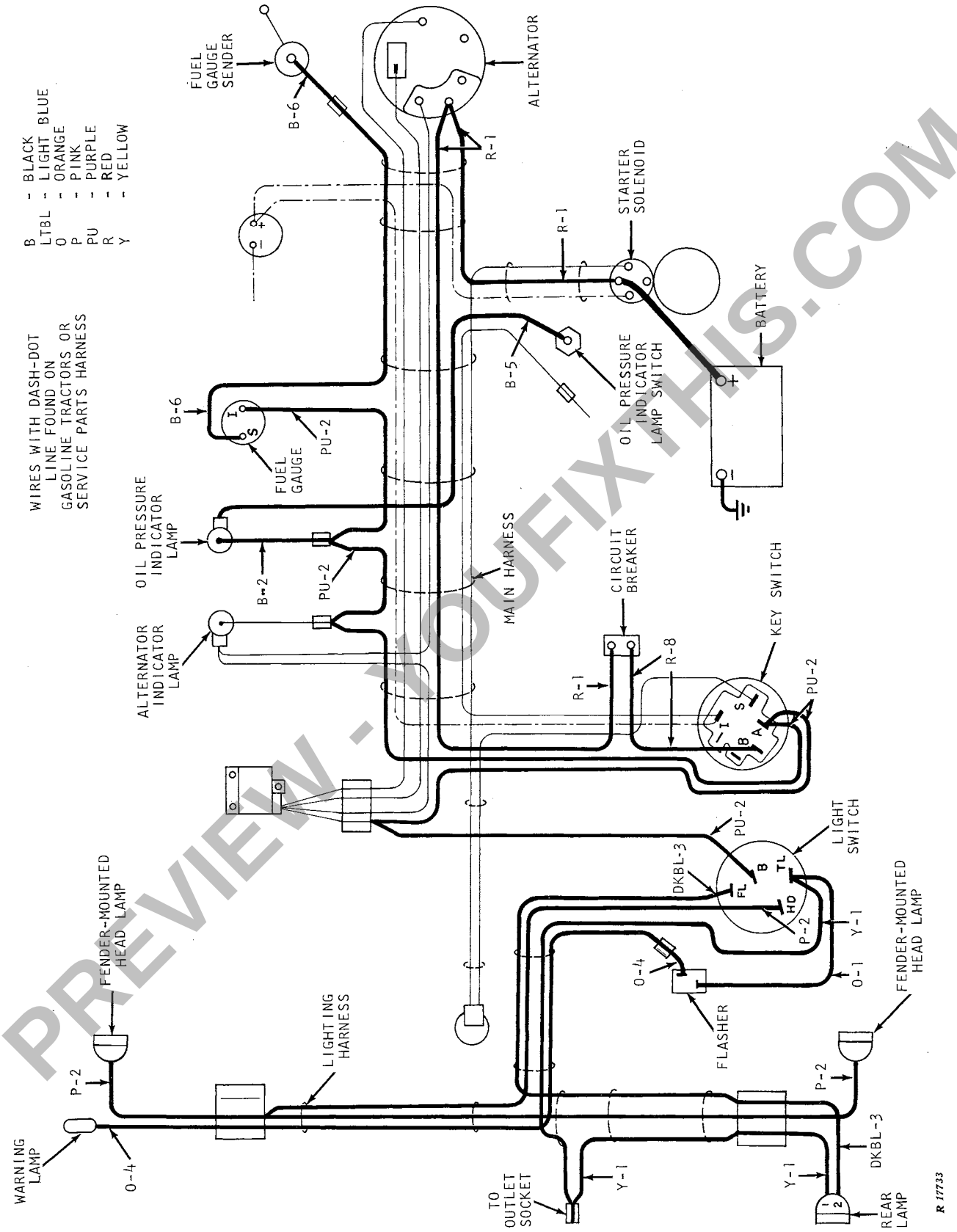

Fig. 4-Instrument Circuit and Lighting Circuit for Tractors Prior to Serial Number 117500 (Shown in Bold Line)

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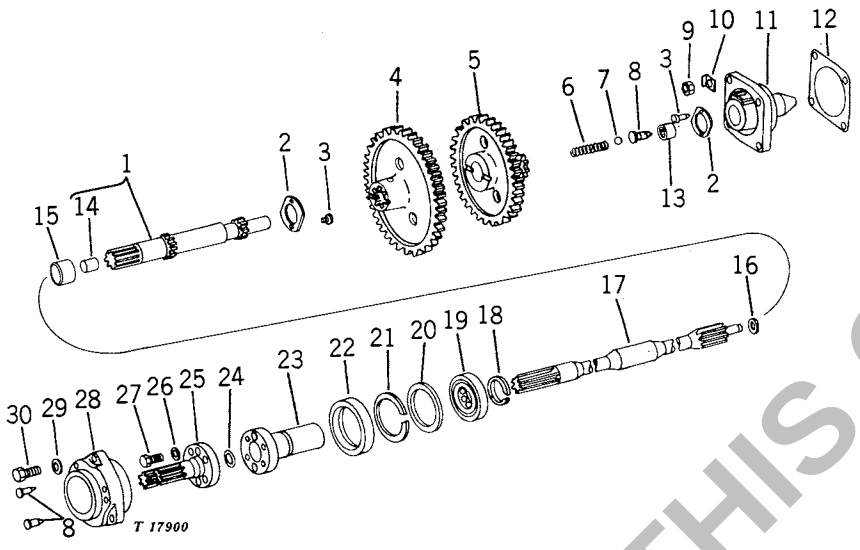

1—Drive Shaft
2—Thrust Washer (2 used)
3—Drive Screw (4 used)
4—Drive Gear (540 rpm)
5—Drive Gear (1000 rpm)
6—Spring
7—Ball
8—Drive Screw (3 used)
9—Nut (4 used)
10—Lock Plate (4 used)
11—Mid Cover
12—Gasket
13—Needle Bearing
14—Bushing
15—Bushing
16—Thrust Washer
17—Power Shaft
18—Snap Ring
19—Ball Bearing
20—Special Washer
21—Snap Ring
22—Oil Seal
23—Pilot
24—O-Ring
25—Stub Shaft
26—Lock Washer (4 used)
27—Cap Screw (4 used)
28—Rear Quill
29—Lock Washer (3 used)
30—Cap Screw (3 used)

Fig. 4-Dual 540 - 1000 rpm PTO

PTO Drive Shafts and Gears

Separate the tractor between transmission case and clutch housing as instructed in Section 10, Group 25.

Remove PTO drive gears from drive shaft (Fig. 3 and 4).

Install rear PTO shaft (if removed). Shift the PTO lever to the "ON" position. This will prevent shifter collar from falling into the case as drive shaft is removed.

PTO Disconnect

To service the PTO disconnect (Fig. 5), remove countershaft and low and high range shifter shafts from transmission as instructed in Group 20.

Holding shifter collar (12, Fig. 5), remove PTO drive shaft from transmission (if not removed). Remove shifter collar. Remove screw securing shifter to shaft.

Remove snap rings and washers from end of shifter shaft. Slide shaft out front of transmission case and remove shifter from transmission case.

Remove pin securing shifter arm to shifter lever. Remove lever and arm from transmission case.

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