# TM

M.F.W.D. FOR TRACTORS 1030, 1130, 1630, 1830 AND 2030

## Technical Manual

# John Deere Mechanical Front Wheel Drive for Tractors 1030, 1130, 1630, 1830 and 2030

**TM-4326**

John Deere Werke Mannheim

Printed in Germany (New)
(Engl.)

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TM-4326 (Aug-76)

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## FOREWORD

This technical manual is a concise guide for the serviceman, containing all the vital information he requires on the Mechanical Front Wheel Drive for the JD Tractors 1030, 1130, 1630, 1830 and 2030.

The table of contents at front of the manual enables the serviceman to easily find detailed information and special characteristics of each group.

The characteristics of each subassembly group of the front wheel drive include: removal, disassembly, repair, assembly, installation, adjustments, specifications, hardware torques and special tools.

Specifications, hardware torques and special tools are shown together at the end of each group.

**IMPORTANT: Your technical manual contains the new SI metric measurements which have been standardized internationally.**

**Example:**

| New | Old |
|---|---|
| 10 N (Newton) | 1 kp |
| 10 Nm (Newton-Meter) | 1 mkp |
| 1 bar | 1 $kp/cm^2$ |
| 1 kW = 1.36 PS (1.34 HP) | |

This technical manual was planned and written for you — the serviceman.

Always keep it handy in the workshop, ready for reference, whenever in doubt about correct service or specifications.

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

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# Group 5
# Description, Operation and Specifications



## Description

The Mechanical Front Wheel Drive (MFWD) is available as optional equipment on 1030, 1130, 1630, 1830 and 2030 tractor models.

The mechanical front wheel drive can be engaged and disengaged by means of a tumbler switch when "on the go".

A multiple-disk clutch, which simultaneously protects the front drive against overloading, transmits the power through a drive shaft to the front axle.

### TUMBLER (OPERATING) SWITCH

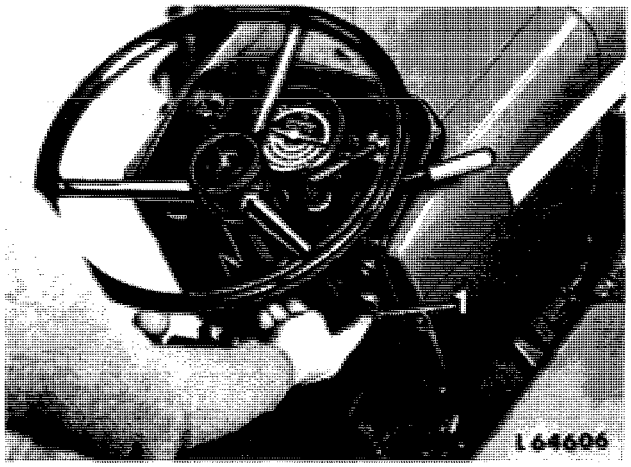


Fig. 1 — MFWD Tumbler Switch
(Tractor shown without cab)

1 Tumbler switch

The MFWD tumbler switch is located on the lower section of the instrument panel *on tractors without operator's cab* and on the upper section of the instrument panel on *tractors with operator's cab.*

### SOLENOID

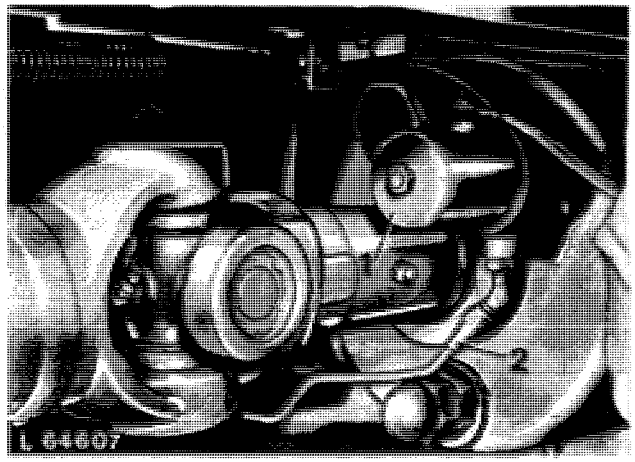


Fig. 2 — MFWD Solenoid

1 Solenoid
2 Oil pressure line

The solenoid is mounted on the drive housing cover.

The oil pressure line 2 (fig. 2) connects the power steering flow control valve with the MFWD solenoid.

Depending upon the position of the tumbler switch, the solenoid control valve regulates or blocks the oil coming from the flow control valve under full system pressure.

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## DRIVE TRAIN

The drive housing is located on the left side of the tractor between transmission case and final drive housing (see fig. 3).

It contains the bevel pinion shaft with drive gear, the idler gear with bearing pin and the multiple-disk clutch.

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The ring gear of the pinion shaft is located in the transmission case.

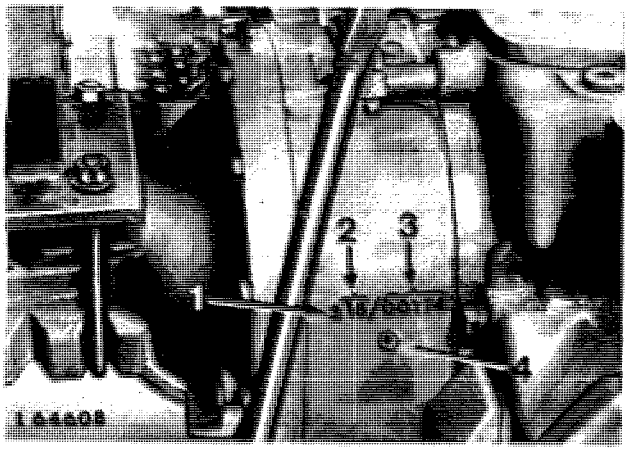


Fig. 3 — Drive Housing, Installed

1 Number of engine cylinders
2 Number of teeth on drive gear
3 Drive housing serial number
4 Drive housing

The number of teeth on the drive gear (18 or 19), depends on the combination of tire sizes used on the tractor; this number is stamped on the drive housing (see 2, fig. 3).

## MULTIPLE-DISK CLUTCH

The multiple-disk clutch is located in the front section of the drive housing.

A pre-loaded spring washer between the pressure cup and bearing quill compensates for clutch disk wear.

The number of clutch disks used for 3 or 4-cylinder tractor engines differs as follows:

Tractors with 3-Cylinder Engines:
*Up to Tractor Serial No. 221 627 L*

9 clutch drive disks
9 clutch separator plates

*From Tractor Serial No. 221 628 L*

11 clutch drive disks
11 clutch separator plates

*Tractors with 4-Cylinder Engines:*

11 clutch drive disks
11 clutch separator plates

On tractors with 3-cylinder engines *up to Tractor Serial No. 221 627 L:* The difference in the number of disks compared to 4-cylinder engine tractors is compensated by use of a thicker clutch pressure ring.

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## DRIVE SHAFT

The drive shaft connects the clutch shaft with the differential drive shaft of the front axle and has two universal joints located in needle bearings, fitted with a sliding yoke at the rear end and a flanged yoke at the front.

The drive shaft for 4-cylinder engines is longer than those used on 3-cylinder engines.

## FRONT AXLE

The MFWD front axle primarily consists of the front axle centerpiece, the steering flanges, the steering bellcranks, the steering knuckle housings and the wheel flanges. The differential and front pinion shaft are located in the front axle centerpiece.

The right and left universal joints are also located in the front axle. Both drive shafts are engaged in the differential bevel gears.

### Differential and Front Pinion Shaft

The front axle differential rotates in two taper roller bearings and is equipped with four bevel pinions, two bevel gears and two differential shafts. The bevel gears and bevel pinions are fitted with thrust washers. The front differential shaft is engaged in the differential ring gear.

The dimensions of the front taper roller bearing and the spacer bushing on 3-cylinder tractors *up to Tractor Serial No. 221 627 L* differ from the 4-cylinder tractors.

*On 3-cylinder tractors from Serial No. 221 628 L* these dimensions are the same as for the 4-cylinder tractors.

### Double-Jointed Drive Shafts

The right and left-hand double-jointed shafts of the front axle run in needle bearings in each steering flange.

The length of the two jointed shafts differ, with the longer shaft in the right-hand side of the axle center piece.

Each double-jointed shaft consists of two shafts, each fitted with one universal joint section. Both shafts are bolted together by means of a carrier sleeve.



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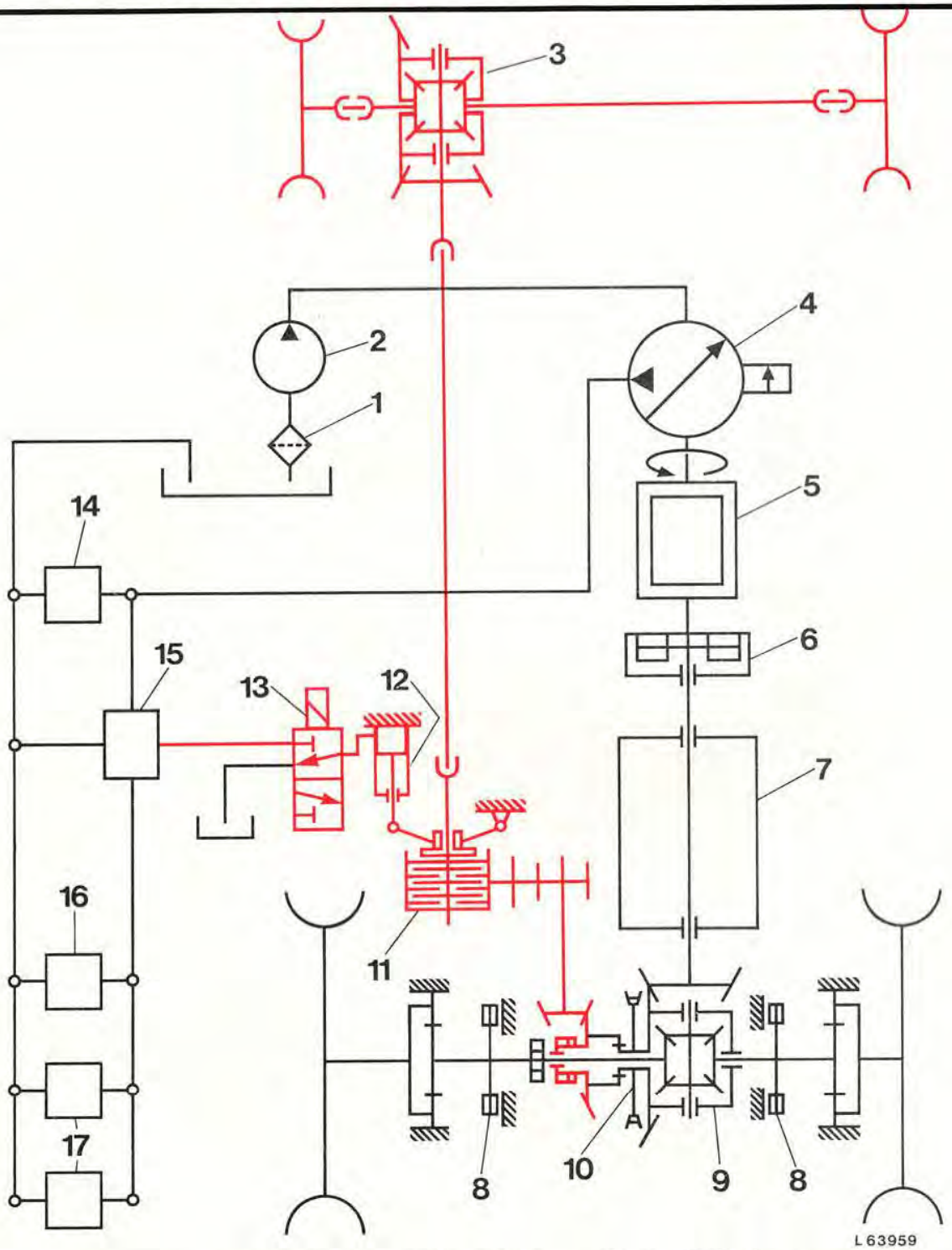


Fig. 4 — Diagram of Transmission and Hydraulic System
(MFWD section shown in red; tractor transmission and hydraulic system in black)

1 Intake filter
2 Transmission oil pump
3 Front axle differential
4 Hydraulic pump
5 Engine
6 Engine clutch
7 Transmission
8 Foot brake
9 Rear axle differential
10 Handbrake
11 Multiple-disk clutch
12 Clutch piston
13 Solenoid
14 Power steering
15 Power steering flow control valve
16 Rockshaft
17 Hydraulic cylinder

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# Operation

## ELECTRICAL CONTROL CIRCUIT

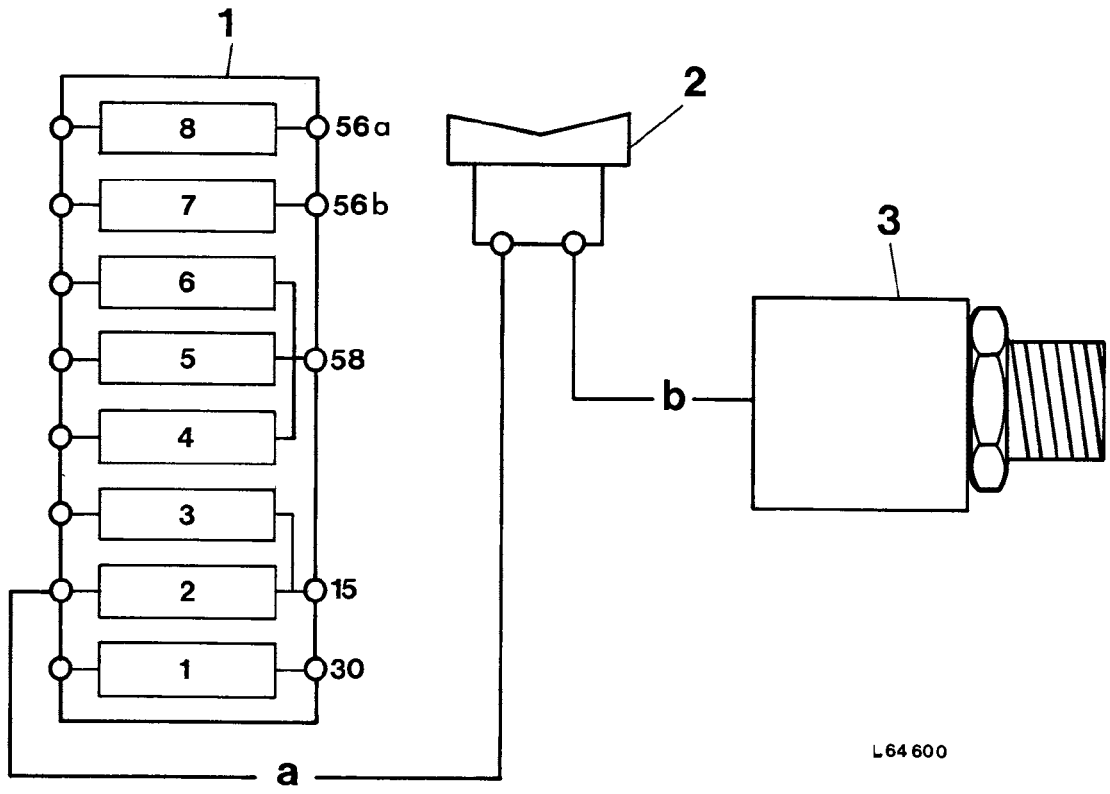


Fig. 5 — Wiring Diagram

a Cable from fuse box to tumbler switch
b Cable from tumbler switch to solenoid

1 Fuse box
2 Tumbler switch
3 Solenoid

Electrical current operating the MFWD solenoid 3 (fig. 5), is taken from the fuse box terminal 15.

With tumbler switch in Off position electrical current flow is interrupted.

To engage the front wheel drive, the tumbler switch 2 is switched to "ON" position, thus closing the circuit and energizing the solenoid control valve which then opens the oil passage behind the clutch piston.

## HYDRAULIC OIL FLOW

### Oil Flow with MFWD Engaged

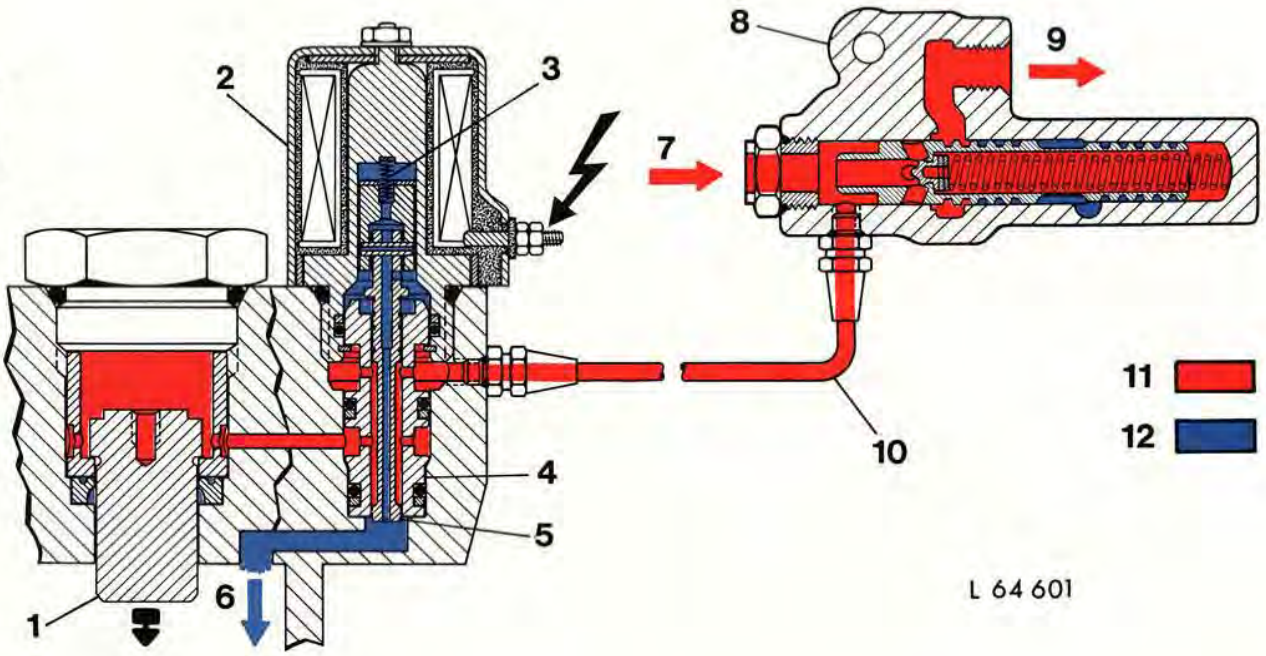


Fig. 6 — Oil Flow to the Clutch Piston with MFWD Engaged

1 Clutch piston
2 Solenoid
3 Spring
4 Valve control sleeve
5 Control valve
6 Return to sump
7 Inlet from hydraulic pump
8 Power steering flow control valve
9 To selective control valves
10 Oil pressure line
11 Pressure oil
12 Pressure-free oil

The oil under full system pressure flows from the hydraulic pump 7 to the flow control valve 8 (fig. 6) into the drive housing cover and to the valve control sleeve 4 of the solenoid.

With the tumbler switch in ON position, control valve 5 opens the upper ring passage of the valve control sleeve 4. The pressurized oil then flows through the lower ring passage to the valve control sleeve 4 behind the disk clutch piston 1.

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## Oil Flow with MFWD Disengaged

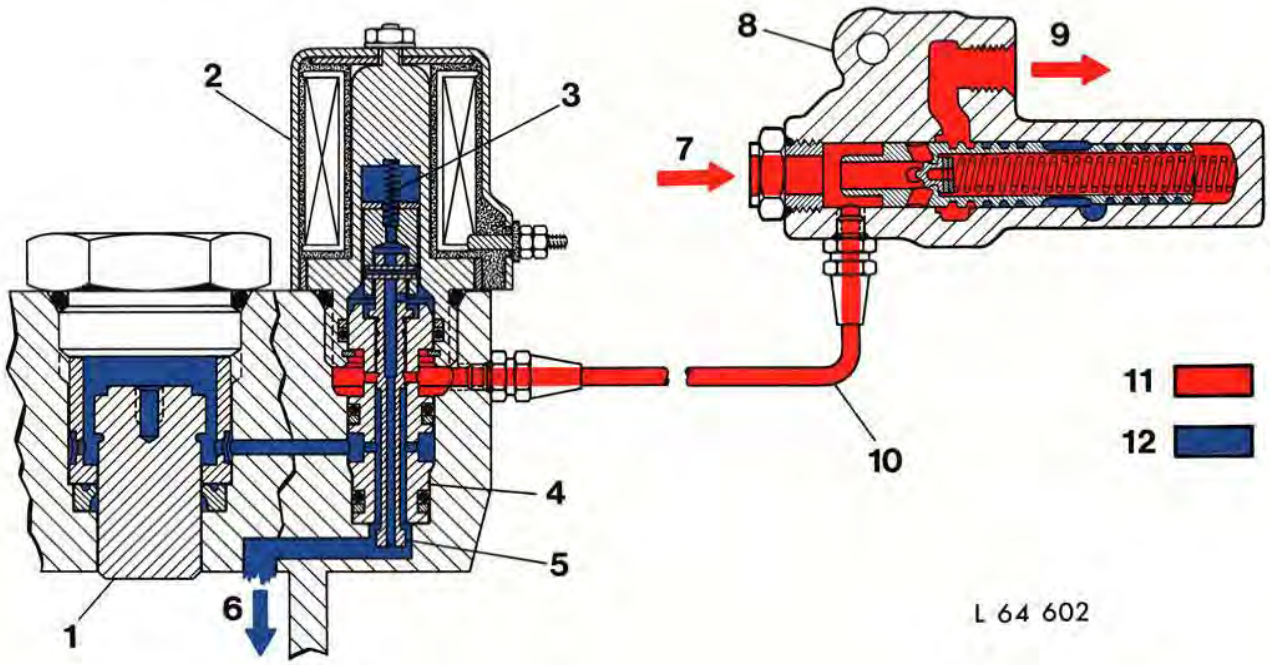


Fig. 7 — Oil Flow with MFWD Disengaged

1 Clutch piston
2 Solenoid
3 Spring
4 Valve control sleeve
5 Control valve
6 Return oil to sump
7 Inlet from hydraulic pump
8 Power steering flow control valve
9 To selective control valves
10 Oil pressure line
11 Pressure oil
12 Pressure-free oil

After switching the tumbler switch to OFF position, the solenoid control valve 5 (fig. 7) is pressed downwards by return spring 3, closing the valve control sleeve 4 through the upper oil passage ring.

In this position the oil, coming from the flow control valve, is blocked.

Simultaneously, the oil behind piston 1 returns through the lower passage ring of control sleeve 4 to the sump (see 6, fig. 7).

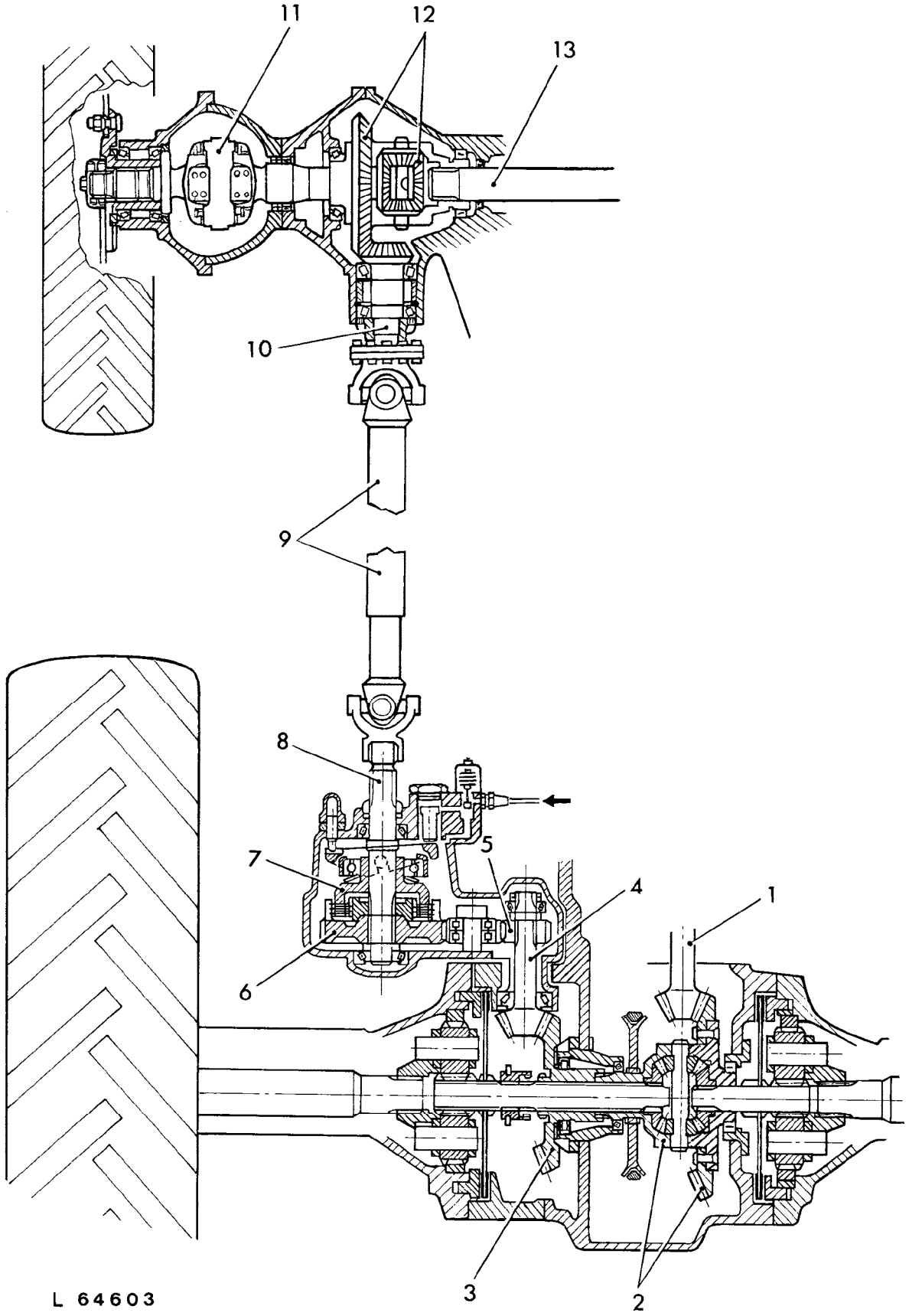


Fig. 8 — Tractor with Mechanical Front Wheel Drive
(Refer to Page 9 for explanation of items 1 to 13)

Explanation to Fig. 8 (Page 8)

1 Differential drive shaft
2 Rear axle differential
3 Ring gear
4 Pinion shaft
5 Drive gear
6 Clutch drive gear
7 Pressure cup
8 Clutch shaft
9 Drive shaft
10 Front pinion shaft
11 L.H. double-jointed shaft
12 Front axle differential
13 R.H. double-jointed shaft

## DRIVE TRAIN



Power is transmitted from the differential drive shaft 1 (fig. 8) to ring gear of differential 2.

Ring gear 3, which is splined to the rear axle differential case transmits power to the pinion shaft 4.

Drive gear 5, which is splined to the pinion shaft 4, in turn, transmits the torque via an idler gear to clutch drive gear 6.

By switching on the MFWD, pressure cup 7 presses the clutch disk pack against drive gear 6 and thereby provides full power transmission to clutch shaft 8.

Power transmission continues via drive shaft 9 to front pinion shaft 10 of the front axle differential 12.

The two jointed shafts 11 and 13 are in mesh with the right, respectively left differential bevel gear 12 and transmit torque via the wheel flanges to the front wheels of the tractor.

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## SPECIFICATIONS

| | Front | Rear |
|---|---|---|
| Permissible Tire Combinations: | | |
| 1030 Tractor | 8.3 — 24 6 PR | 14.9 - 28 6 PR |
| | | 12.4 - 36 6 PR |
| 1130 Tractor | 8.3 — 24 6 PR | 14.9 -R30 6 PR |
| | 9.5 — 24 8 PR | 16.9 - 28 6 PR |
| | | 13.6 - 36 6 PR |
| 1630 Tractor | 9.5 — 24 8 PR | 16.9 - 30 6 PR |
| | | 16.9 -R30 6 PR |
| | | 13.6 - 36 6 PR |
| 1830 Tractor | 9.5 — 24 8 PR | 16.9 - 30 6 PR |
| | | 16.9 -R30 6 PR |
| | | 15.5 - 38 6 PR |
| 2030 Tractor | 9.5 — 24 8 PR | 16.9 - 30 6 PR |
| | | 16.9 -R30 6 PR |
| | | 15.5 - 38 6 PR |
| | | 13.6 - 38 6 PR |
| | | 13.6 -R38 6 PR |

| | | |
|---|---|---|
| Narrowest wheel tread for tractors | | |
| *up to Serial No. 214 649 L* | | |
| with tires 8.3 — 24 6 PR | 1.50 m | 59 in. |
| 9.5 — 24 8 PR | 1.60 m | 63 in. |
| Widest wheel tread for tractors | | |
| *up to Serial No. 214 649 L* | | |
| with tires 8.3 — 24 6 PR | 1.75 m | 69 in. |
| 9.5 — 24 8 PR | 1.70 m | 67 in. |
| Narrowest wheel tread for tractors | | |
| *from Serial No. 214 650 L* | 1.50 m | 59 in. |
| Widest wheel tread for tractors | | |
| *from Serial No. 214 650 L* | 1.80 m | 71 in. |
| Maximum front wheel steering angle | | 36.5° |
| Ground clearance to front axle | | |
| with tires 8.3 — 24 6 PR | 420 mm | 16.5 in. |
| 9.5 — 24 6 PR | 445 mm | 17.5 in. |
| Ground clearance to front axle differential housing | | |
| with tires 8.3 — 24 6 PR | 300 mm | 11.8 in. |
| 9.5 — 24 6 PR | 325 mm | 12.8 in. |
| Capacities: | | |
| Front axle differential housing | 2.5 liters | 0.66 U.S. gals |
| Front wheel drive housing (additional) | 1.5 liters | 0.40 U.S. gals |

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