5310N, 5410N and 5510N Tractors

TECHNICAL MANUAL

5310N, 5410N, 5510N

TM4772 29MAY02 (ENGLISH)

For complete service information also see:

Alternators and Starting Motors	**CTM77**
PowerTech 4.5L and 6.8L Diesel Engines Mechanical Fuel Systems	**CTM207**
PowerTech 2.9L Diesel Engines	**CTM125**
PowerTech 4.5L & 6.8L Diesel Engines Tier 1/Stage I, Tier 2/Stage II, Tier 3/Stage IIIA, Tier 3/Stage IIA Tier 3/Stage III, (Base Engine)	**CTM104**

John Deere Agriculture

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Group 05 - Specifications

Engine

Engine specification

	5310N Tractor	5410N Tractor	5510N Tractor
Engine type	3029DAT50	3029TAT50	4045TAT50
Aspiration	Natural	Turbocharged	Turbocharged
Power, ECE-R24 at rated speed	39 kW (53 hp)	53 kW (72 hp)	59 kW (80 hp)
Maximum torque	191 N·m at 1500 rpm	265 N·m at 1500 rpm	314 N·m at 1500 rpm
Number of cylinders	3	3	4
Bore	106.5 mm (4.19 in.)	106.5 mm (4.19 in.)	106.5 mm (4.19 in.)
Stroke	110 mm (4.33 in.)	110 mm (4.33 in.)	127 mm (5.00 in.)
Displacement	2.9 L (176.9 cu.in.)	2.9 L (176.9 cu.in.)	4.5 L (274.6 cu.in.)
Compression ratio	17.2 : 1	17.2 : 1	17.0 : 1
Firing order	1-2-3	1-2-3	1-3-4-2
Intake valve clearance	0.35 mm (0.014 in.)	0.35 mm (0.014 in.)	0.35 mm (0.014 in.)
Exhaust valve clearance	0.45 mm (0.018 in.)	0.45 mm (0.018 in.)	0.45 mm (0.018 in.)
Slow idle	800-850 rpm	800-850 rpm	800-850 rpm
Fast idle	2460-2510 rpm	2460-2510 rpm	2460-2510 rpm
Engine rated speed	2300 rpm	2300 rpm	2300 rpm
Operating speed range	1500-2300 rpm	1500-2300 rpm	1500-2300 rpm
Engine oil capacity (including oil filter)	8.5 L (2.3 U.S.gal.)	8.5 L (2.3 U.S.gal.)	8.0 L (2.0 U.S.gal.)
Speed for PTO operation			
- 540 rpm rear PTO	1938 rpm	1938 rpm	1938 rpm
- 540E rpm rear PTO	1648 rpm	1648 rpm	1648 rpm
- 1000 rpm rear PTO	1962 rpm	1962 rpm	1962 rpm
Start Aid	Air Heater	Air Heater	Air Heater
Cooling	Liquid Cooled	Liquid Cooled	Liquid Cooled
Air Cleaner	Dry Type w/Safety Element	Dry Type w/Safety Element	Dry Type w/Safety Element
Engine Shut-off	Key Switch	Key Switch	Key Switch

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Capacities

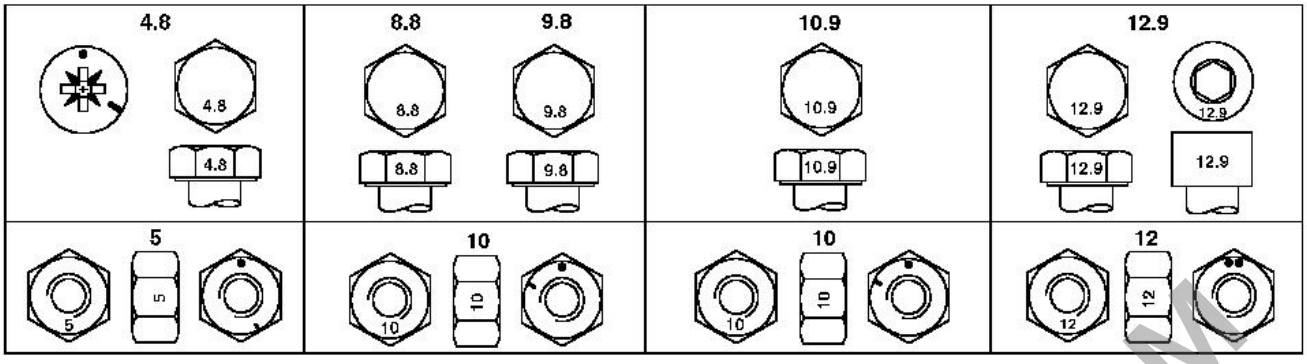
Capacities

	5310N	5410N	5510N
Fuel Tank	65 L (17.2 U.S. gal)	65 L (17.2 U.S. gal)	65 L (17.2 U.S. gal)
Cooling System			
- Tractors without cab	9.5 L (10 U.S. qt.)	9.5 L (10 U.S. qt.)	12 L (12.6 U.S. qt.)
- Tractors with cab	10.5 L (11.1 U.S. qt.)	10.5 L (11.1 U.S. qt.)	13 L (13.7 U.S. qt.)
Crankcase (including filter change)	8.5 L (9 U.S. qt.)	8.5 L (9 U.S. qt.)	8 L (8.5 U.S. qt.)
Transmission/Hydraulic System			
- Tractors without front wheel drive	36 L (9.5 U.S. gal)	36 L (9.5 U.S. gal)	36 L (9.5 U.S. gal)
- Tractors with front wheel drive (30 km/h; 18.5 mph version)	38 L (10 U.S. gal)	38 L (10 U.S. gal)	38 L (10 U.S. gal)
- Tractors with front wheel drive (40 km/h; 25 mph version)	43 L (11.4 U.S. gal)	43 L (11.4 U.S. gal)	43 L (11.4 U.S. gal)
Front Wheel Drive			
Narrow Tractors:			
- Final drive (each side)	0.5 L (0.5 U.S. qt.)	0.5 L (0.5 U.S. qt.)	0.5 L (0.5 U.S. qt.)
- Axle housing	5.0 L (5.2 U.S. qt.)	5.0 L (5.2 U.S. qt.)	5.0 L (5.2 U.S. qt.)
Narrow Tractors SuperNarrow Version:			
- Final drive (each side)	0.6 L (0.6 U.S. qt.)	0.6 L (0.6 U.S. qt.)	0.6 L (0.6 U.S. qt.)
- Axle housing	3.9 L (4.1 U.S. qt.)	3.9 L (4.1 U.S. qt.)	3.9 L (4.1 U.S. qt.)
Brake System			
- Oil reservoir	0.32 L (0.34 U.S. qt.)	0.32 L (0.34 U.S. qt.)	0.32 L (0.34 U.S. qt.)
Air-conditioning system (Tractors with cab)			
- R134a refrigerant	800 g (1.76 lb)	800 g (1.76 lb)	800 g (1.76 lb)

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Metric Bolt and Cap Screw Torque Values



Top, Property Class and Head Markings; Bottom, Property Class and Nut Markings

Metric Bolt and Cap Screw Torque Values, 1 of 2

	Class 4.8		Class 8.8 or 9.8		Class 10.9		Class 12.9	
Size	**Lubricated [a] N·m(lb-ft)**	**Dry [b] N·m(lb-ft)**	**Lubricated [a] N·m(lb-ft)**	**Dry [b] N·m(lb-ft)**	**Lubricated [a] N·m(lb-ft)**	**Dry [b] N·m(lb-ft)**	**Lubricated [a] N·m(lb-ft)**	**Dry [b] N·m(lb-ft)**
M6	4.7 (3.5)	6 (4.4)	9 (6.6)	11.5 (8.5)	13 (9.5)	16.5 (12.2)	15.5 (11.5)	19.5 (14.5)
M8	11.5 (8.5)	14.5 (10.7)	22 (16)	28 (20.5)	32 (23.5)	40 (29.5)	37 (27.5)	47 (35)
M10	23 (17)	29 (21)	43 (32)	55 (40)	63 (46)	80 (59)	75 (55)	95 (70)
M12	40 (29.5)	50 (37)	75 (55)	95 (70)	110 (80)	140 (105)	130 (95)	165 (120)
M14	63 (46)	80 (59)	120 (88)	150 (110)	175 (130)	220 (165)	205 (150)	260 (190)
M16	100 (74)	125 (92)	190 (140)	240 (175)	275 (200)	350 (255)	320 (235)	400 (300)
M18	135 (100)	170 (125)	265 (195)	330 (245)	375 (275)	475 (350)	440 (325)	560 (410)
M20	190 (140)	245 (180)	375 (275)	475 (350)	530 (390)	675 (500)	625 (460)	790 (580)
M22	265 (195)	330 (245)	510 (375)	650 (480)	725 (535)	920 (680)	850 (625)	1080 (800)
M24	330 (245)	425 (315)	650 (480)	820 (600)	920 (680)	1150 (850)	1080 (800)	1350 (1000)
M27	490 (360)	625 (460)	950 (700)	1200 (885)	1350 (1000)	1700 (1250)	1580 (1160)	2000 (1475)
M30	660 (490)	850 (625)	1290 (950)	1630 (1200)	1850 (1350)	2300 (1700)	2140 (1580)	2700 (2000)
M33	900 (665)	1150 (850)	1750 (1300)	2200 (1625)	2500 (1850)	3150 (2325)	2900 (2150)	3700 (2730)
M36	1150 (850)	1450 (1075)	2250 (1650)	2850 (2100)	3200 (2350)	4050 (3000)	3750 (2770)	4750 (3500)
[a] "Lubricated" means coated with a lubricant such as engine oil, or fasteners with phosphate and oil coatings.								
[b] "Dry" means plain or zinc plated without any lubrication.								

Metric Bolt and Cap Screw Torque Values, 2 of 2

DO NOT use these values if a different torque value or tightening procedure is given for a specific application. Torque values listed are for general use only. Check tightness of fasteners periodically.

Shear bolts are designed to fail under predetermined loads. Always replace shear bolts with identical property class.

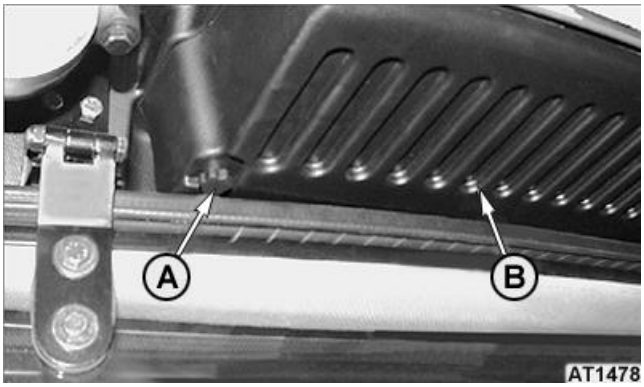
Fasteners should be replaced with the same or higher property class. If higher property class fasteners are used, these should only be tightened to the strength of the original.

Make sure fastener threads are clean and that you properly start thread engagement. This will prevent them from failing when tightening.

Tighten plastic insert or crimped steel-type lock nuts to approximately 50 percent of the dry torque shown in the chart, applied to the nut, not to the bolt head. Tighten toothed or serrated-type lock nuts to the full torque value.

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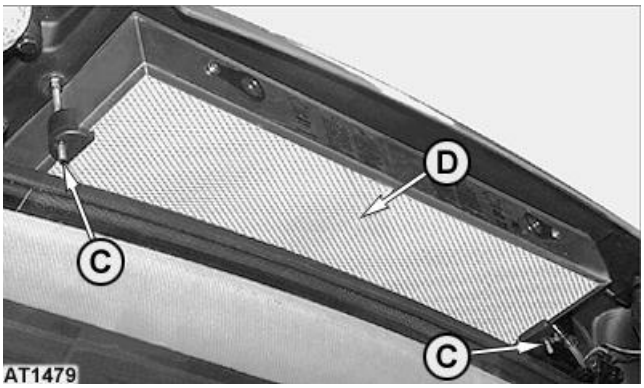
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Cab Air Filter Cover and Screws

Remove the two screws (A) and filter cover (B).

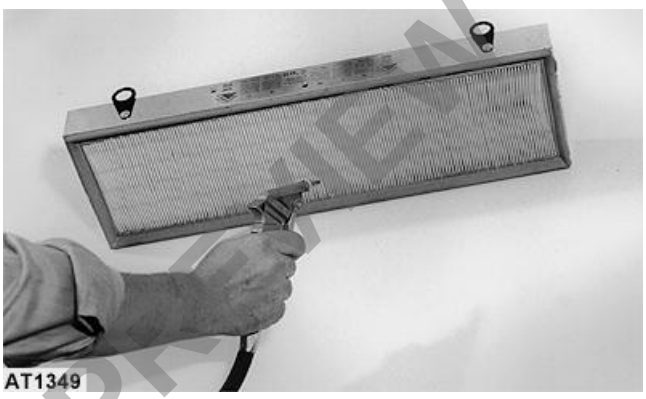
[2] -



Cab Air Filter Element

Remove the two screws (C) and air filter element (D). Note the position of element for re-installation.

[3] -



Clean Element with Compressed Air

Clean element with compressed air following the instructions on the filter.

→NOTE:

When working in dusty conditions clean filter element frequently. After the filter has been cleaned several times it has to be replaced.

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Group 00 - Removal and Installation of Engine Components

Engine Repair



Component Technical Manual

For complete engine repair information refer to CTM Engines (Component Technical Manual) in conjunction with this manual.

Specifications

Item	Measurement	Specification
Cap Screws and Hex Nut, Front Axle Support to Engine	Torque	318 N·m
		235 lb-ft
Cap Screws, Engine to Front Axle Support	Torque	176 N·m
		130 lb-ft
Cap Screws, Thermostat Cover to Engine	Torque	50 N·m
		37 lb-ft

Remove Engine

[1] - Remove radiator, (see "Remove and Inspect Radiator" in this Group).

[2] - Remove battery, (see "Remove and Install Battery" in Section 40, Group 05).

[3] - Remove fuel filter, (see "Remove and Install Fuel Filter / Primer Pump Assembly" in Section 30, Group 10).

[4] - Remove drive shaft, if equipped, (see "Remove, Inspect and Install Front Axle Drive Shaft" in Section 80, Group 00).

→NOTE:

Close all openings using caps and plugs.

[5] - Drain transmission oil, (see "Capacities" in Section 10, Group 05).

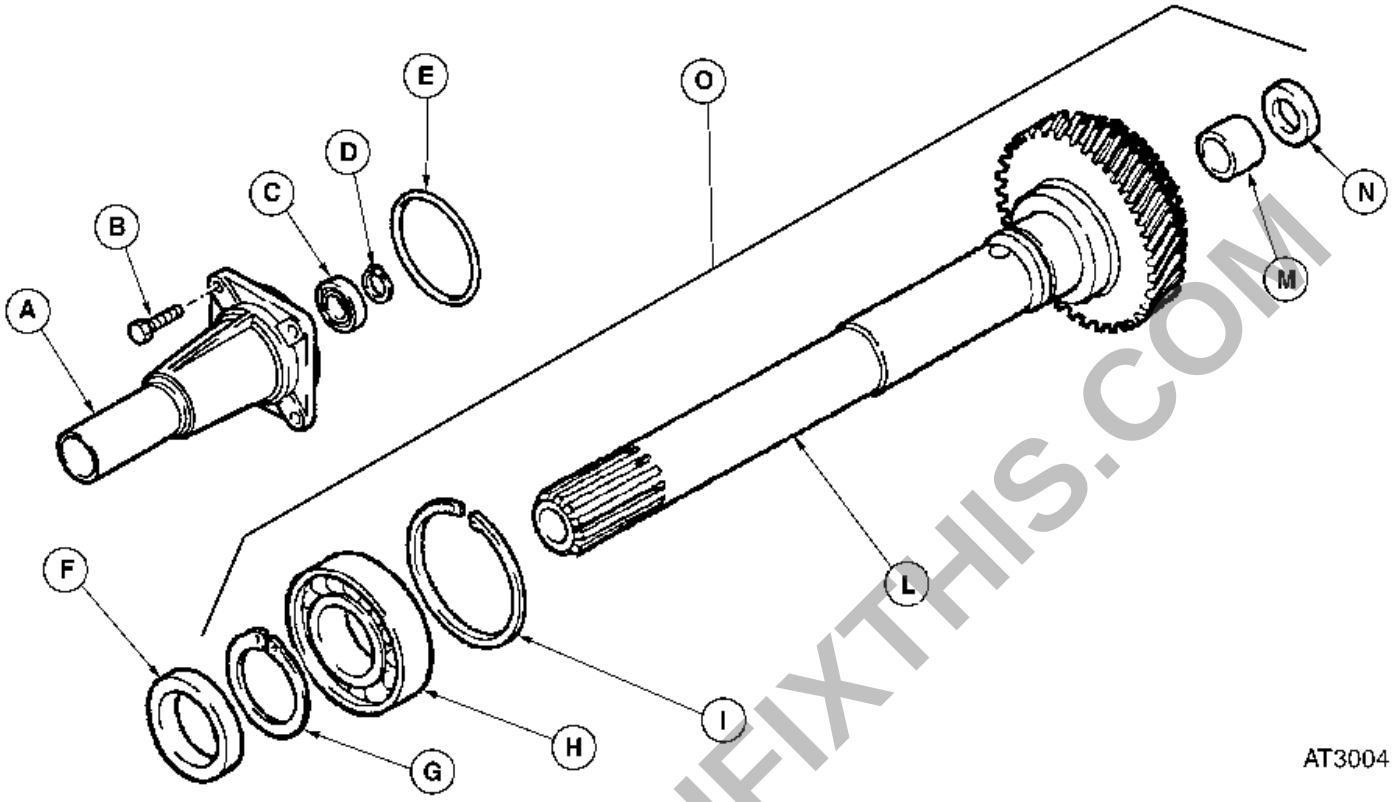
[6] - Disconnect engine from clutch housing, (see "Separate Engine from Clutch Housing - Tractors Without Cab" or "Separate Engine from Clutch Housing - Tractors With Cab" in Section 50, Group 00).

[7] - Disconnect wiring connectors (A) and (B).

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[6] - Remove three cap screws (B) and remove transmission shaft assembly.



Remove transmission shaft assembly

LEGEND:

A	Guide
B	Cap screw (3 used)
C	O-ring
D	Snap ring
E	O-ring
F	Seal
G	Snap ring
H	Bearing
I	Snap ring
L	Transmission shaft
M	Bushing
N	Seal
O	Transmission shaft assembly

[7] - Remove snap ring (I) and remove guide (A).

[8] - Pry out seal (A). Install seal into guide bore with lips facing toward the rear of clutch housing, until it stops, using an applicable driver set D01072AA

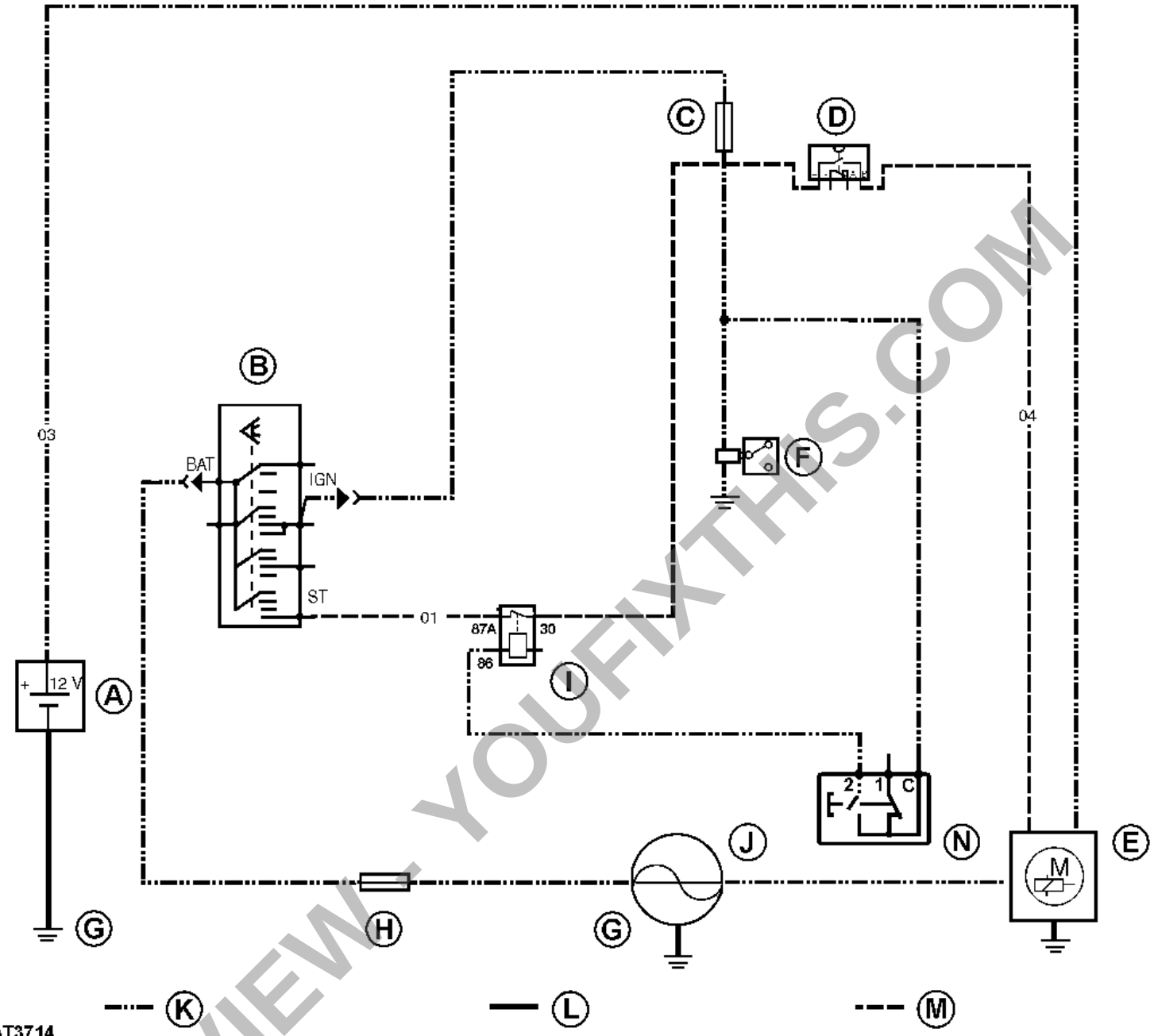
Bushing, Bearing, and Seal Driver Set

D01072AA

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Starting System Operation



AT3714

Starting system operation

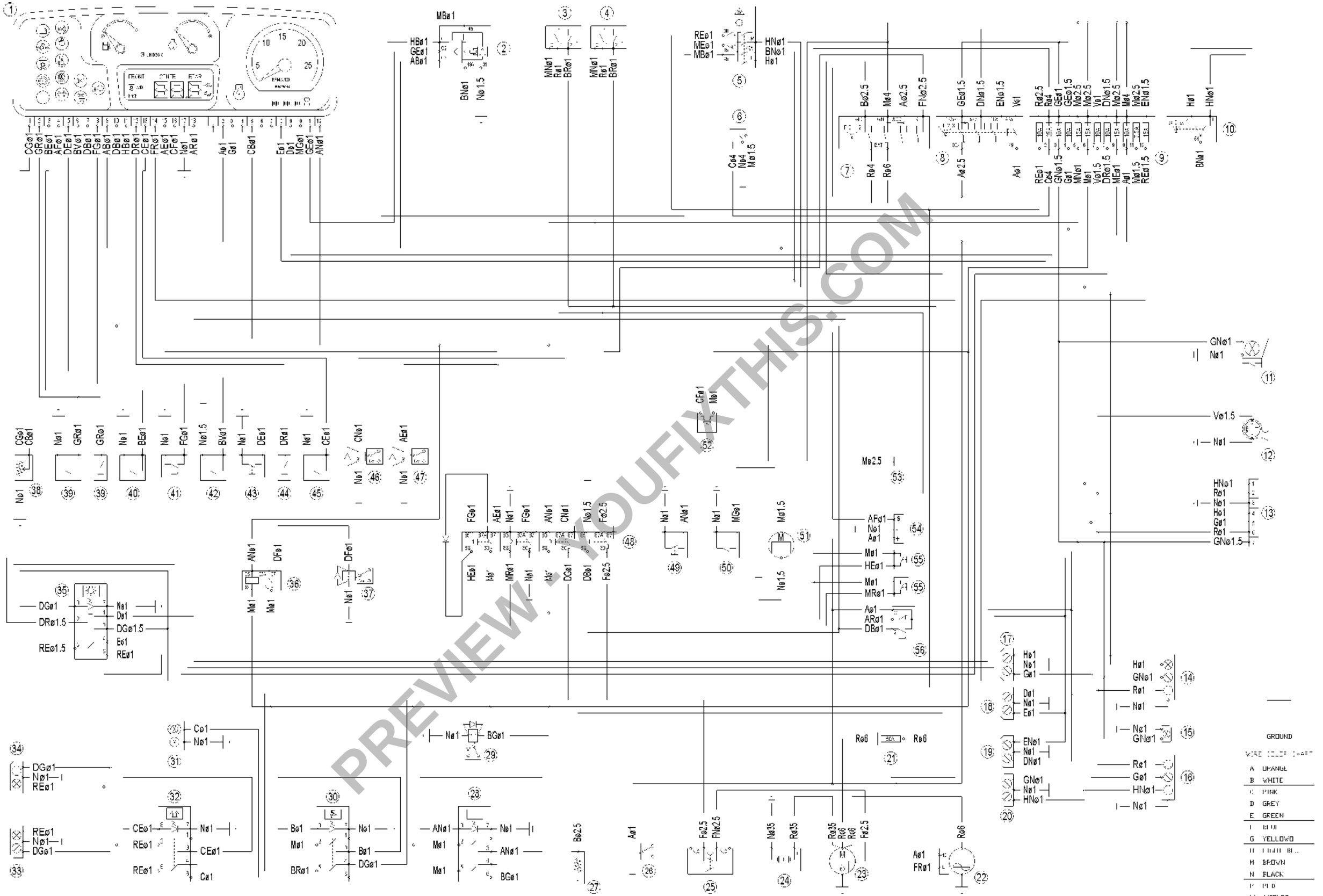
LEGEND:

A	Battery
B	Key switch
C	Fuse (11), 7.5 amp
D	Neutral start switch
E	Starter
F	Fuel shut-off solenoid
G	Ground
H	Main fuse
I	Neutral start relay
J	Alternator/regulator
K	Power circuit
L	Ground circuit
M	Energizing circuit
N	Safety PTO switch

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Wiring Diagram for Narrow Tractors and SuperNarrow Version (Picture)



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Wiring diagram for Narrow tractors and SuperNarrow version

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Symptom	Problem	Solution
Valve pressure increases and decreases slowly	Restrictions or squeezed hoses	Check piping and remove any excessively sharp hose bends.
Pressure values are not correct.	Pressure issues on trailer brake valve pilot line, housed on mechanical tie rods of tractor brake.	Bleed control circuit again should there be pressure issues on trailer brake valve pilot line, housed on mechanical tie rods of tractor brake.
Specified pressure of 13000 ± 1000 kPa (130 ± 10 bar; 1885 ± 145 psi) is not obtained	Tractor hydraulic pump flow rate and pressure are not sufficient at low engine rpm	Replace pump.
	Tractor brake pressure too low.	Check for air in system. ***CAUTION:*** ***Bleed brake system, (see "Bleed Brake System" in this Group).*** ***Increase trailer brake valve pressure by adding shims (A) inside piston (B)*** ***Check trailer brake valve and hydraulic pump (see procedure in this Section)***
	Braking pressure is not constant	Check orientation of piston (G); flattened part must be turned towards closing plug (H).
	Trailer brake valve vibrates	Replace iron pipes with rubber hoses.
	Trailer brake valve remains locked when braking	Unscrew bleed screws (C) and (D) on control valve (E); check whether there is any pressure in hoses coming from tractor brake valves (pedals not depressed).
	If there is pressure in the circuit, proceed as follows:	Check adjustment of brake pedals and handbrake, (see "Brake Pedal Adjustment" and "Handbrake Adjustment" in this Group).
	If there is no pressure in the circuit, proceed as follows:	Check piston seal (F); it could be swollen and obstruct piston movement.
		IMPORTANT: ***Trailer brake valves are manufactured to operate with a mineral-type oil, (see "Transmission and Hydraulic Oil" in Section 10, Group 05). O-rings and seats may be destroyed and leak if any other oil is used. In this case all seals and hoses have to be replaced.***

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Open the high and low pressure valve and close both valves after the pressure rise ends.

Read the pressure values and compare them with the values in the table.

Temperature and minimum pressure

Temperature		**Min. pressure**		
°F	°C	kPa	bar	psi
60	15	390	3.9	56
65	18	435	4.35	63
70	21	490	4.9	71
75	24	540	5.4	79
80	27	600	6	88
85	29	650	6.5	94
90	32	700	7	103
95	35	800	8	114
100	38	850	8.5	125
105	41	950	9.5	136
110	43	1000	10	144
115	46	1100	11	157

→NOTE:

A static pressure reading 20-30% greater than the values listed in the chart is an indication that the system has been charged with incorrect refrigerant or with a mix of different refrigerants.

In this case, discharge and refill the system, (see "Discharging the System" and then see "Filling the System" in Section 90, Group 15).

Result:

NO: If there is no possibility that the refrigerant in the system is incorrect or mixed, GO TO 8 . Then GO TO 4 and GO TO 6 .

YES: GO TO 5 .

(5) System Dynamic Pressure Test

Action:

Cab doors and windows must be closed.

With engine at 2000 rpm and air-conditioning at maximum output.

→NOTE:

At cool temperatures, the compressor may have to be connected directly to a battery source for this system check. If necessary, disconnect the lead at the compressor and use a jumper wire to connect the clutch coil to terminal 30 on the alternator.

At ambient temperatures below 21°C (70°F), bubbles may appear in the sight-glass.

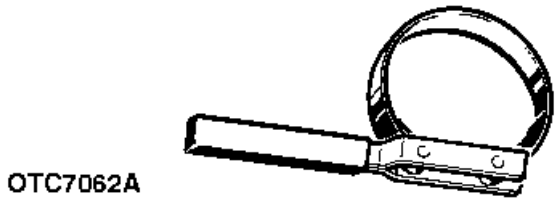
Check ambient temperature and pressure. Compare temperature and pressure readings with the figures in the chart below.

→NOTE:

The lower figures are valid at approx. 10% humidity, the higher figures at approx. 90% humidity.

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Clutch hub holding tool

Removing the clutch hub.

Specifications

Item	Measurement	Specification
Discharge pressure	Refrigerant pressure	760-2590 kPa 7.6-25.9 bar 110-375 psi
Suction pressure	Refrigerant pressure	7-200 kPa 0.07-2 bar 1-30 psi
Refrigerant circuit	Capacity	255 ml 8.5 fl. oz.
Refrigerant R134a	Capacity	800 g 1.76 lb
Hub to pulley	Clearance	0.35-0.65 mm 0.014-0.025 in.
Compressor clutch coil	Current draw at 12 V, 20°C (68°F)	2.6 amp
Compressor clutch	Resistance	3.5 - 4 Ohm
Clutch hub attaching screw	Torque	14 N·m (10 lb-ft)

Torques for Tightening Refrigerant Hoses

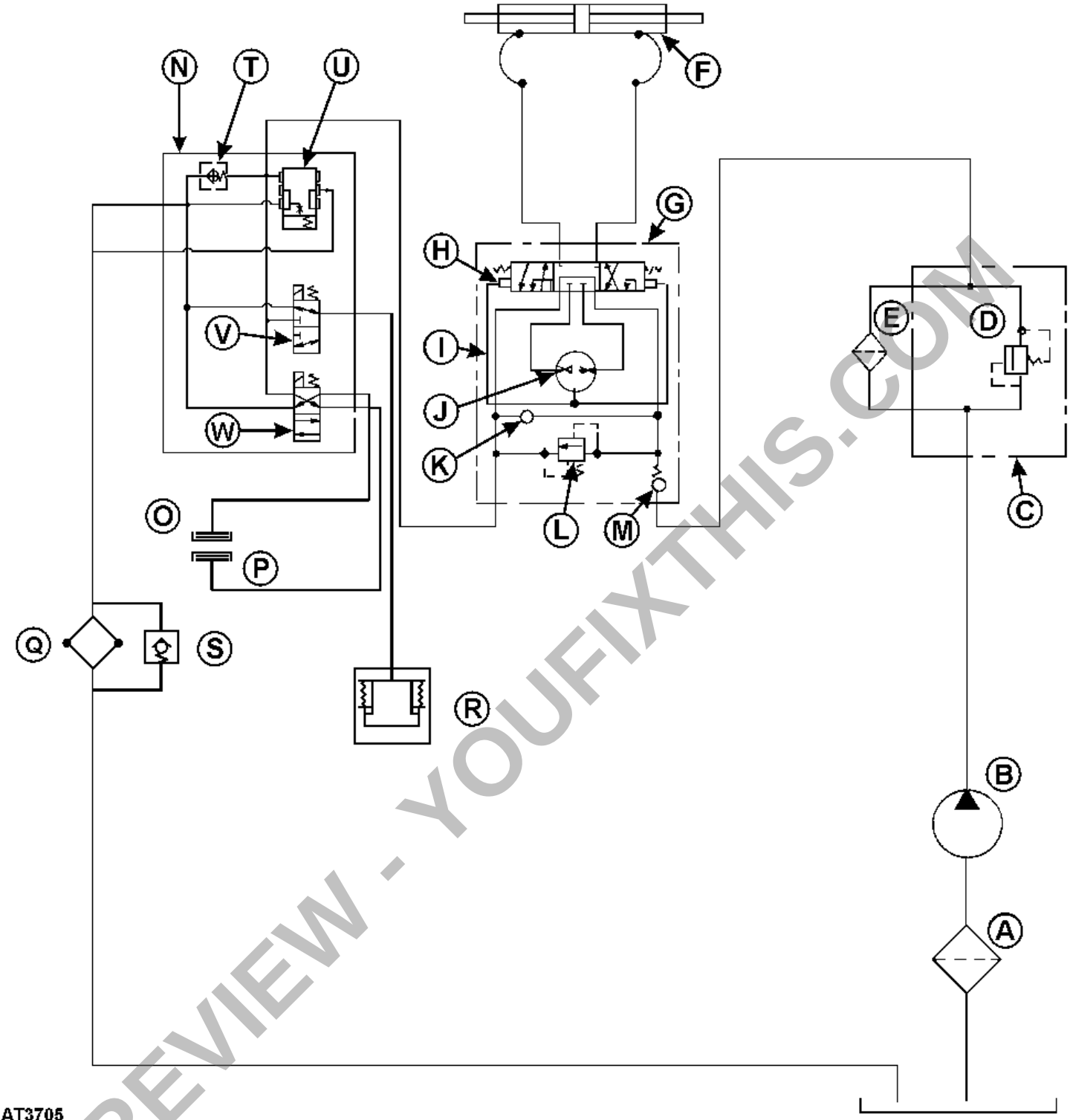
Torques for tightening refrigerant hoses

Screw size	Width across flats	Tightening torque
5/8"	19 mm (3/4")	17 N·m (13 lb-ft)
3/4"	22 mm (7/8")	35 N·m (26 lb-ft)
7/8"	27 mm (1 1/16")	40 N·m (29 lb-ft)

Safety At Work

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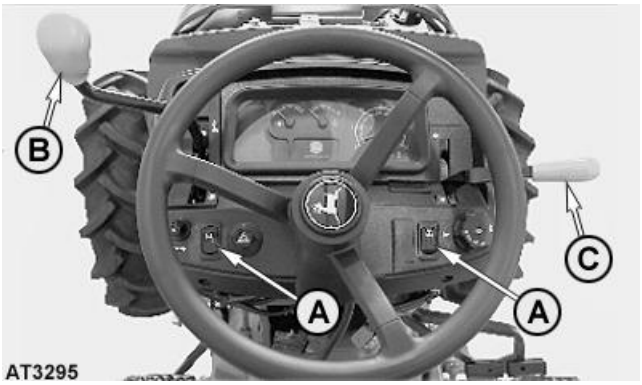
Steering, front wheel drive and Hi-Lo

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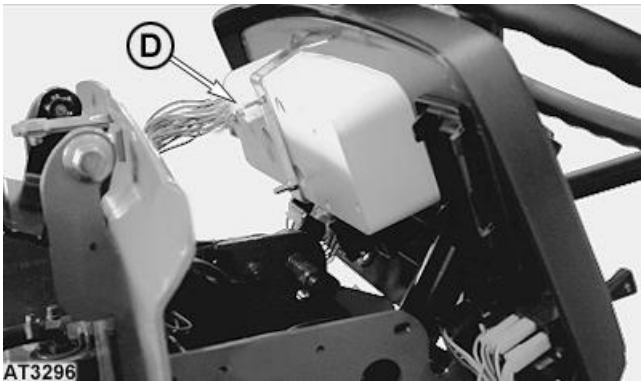
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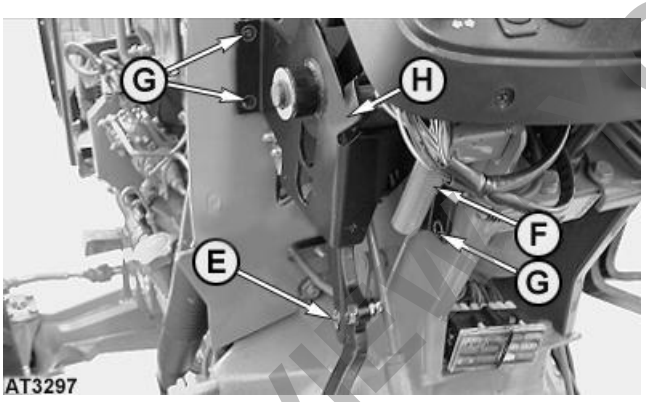
Replace Instrument Panel



Instrument panel



Instrument panel



Instrument panel

[1] - Remove turn signal switch, (see "Replace Turn Signal Switch" in this Group).

[2] - Remove light switch, (see "Replace Light Switch" in this Group).

[3] - Remove hazard warning light switch, (see "Replace Hazard Warning Light Switch" in this Group).

[4] - Disconnect switches (A).

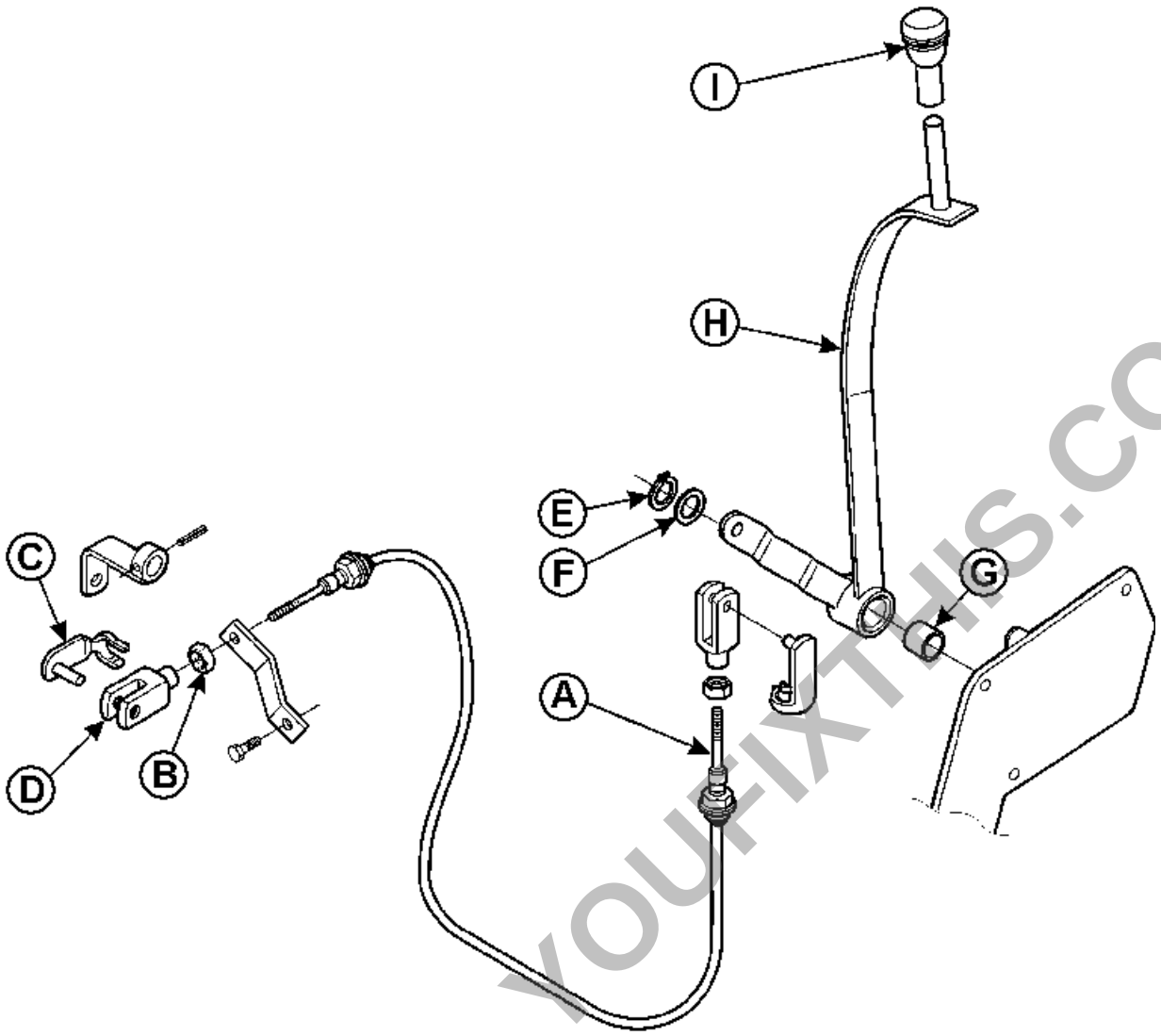
[5] - Remove knobs (B) and (C).

[6] - Disconnect wiring connector (D).

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Inspect and Repair Hi-Lo Shift Lever



AT3602

Hi-Lo shift lever-exploded view

LEGEND:

A	Bowden cable
B	Lock nut
C	Locking pin
D	Yoke
E	Snap ring
F	Washer
G	Bushing
H	Shift lever
I	Knob

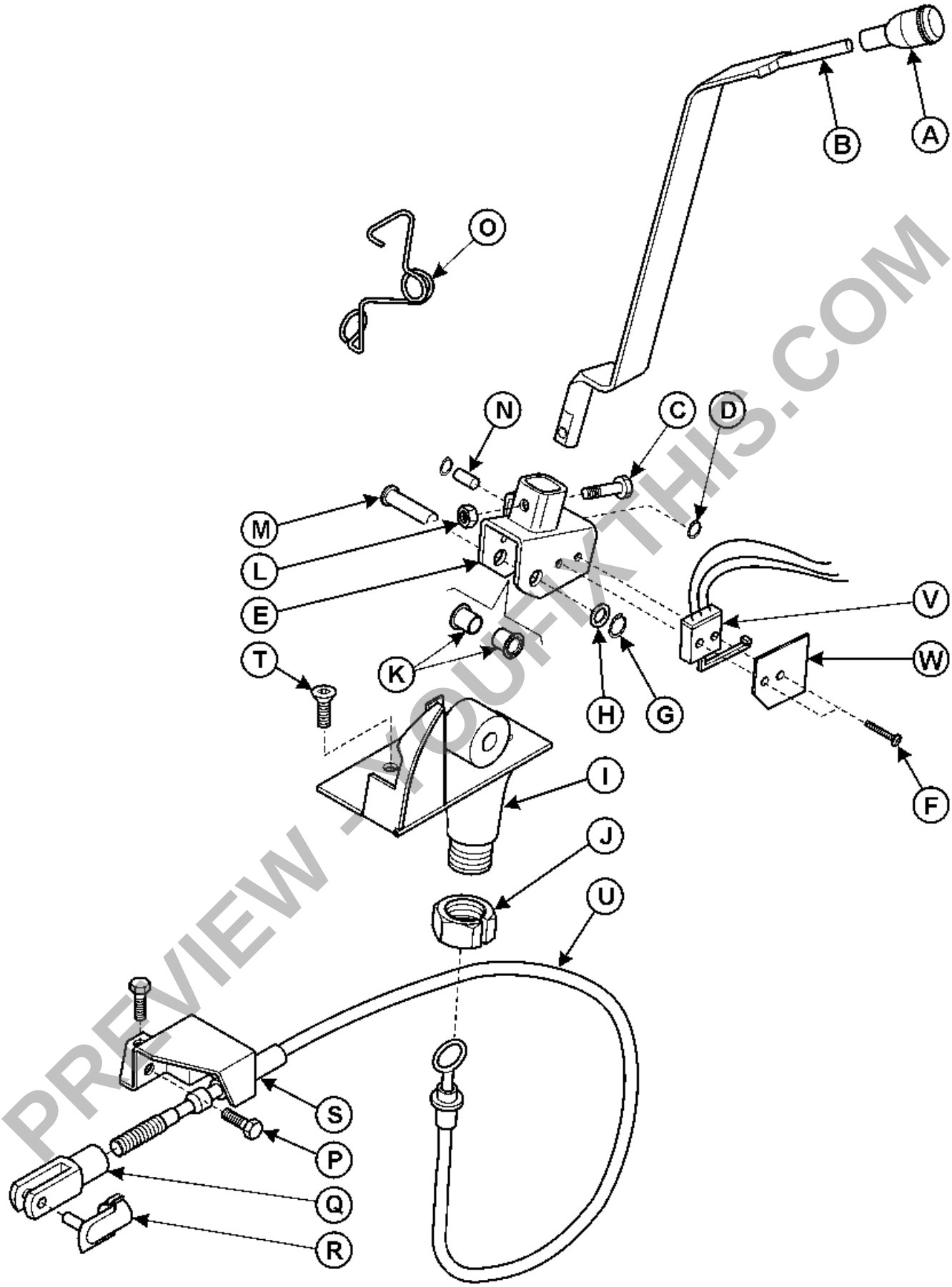
[1] - Remove seat and left lever cover, (see "Remove and Install Operator's Seat and Support" in Section 90, Group 35 and "Remove and Install Control Lever Moldings" in Section 90, Group 05).

[2] - Remove left step

[3] -

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AT3648

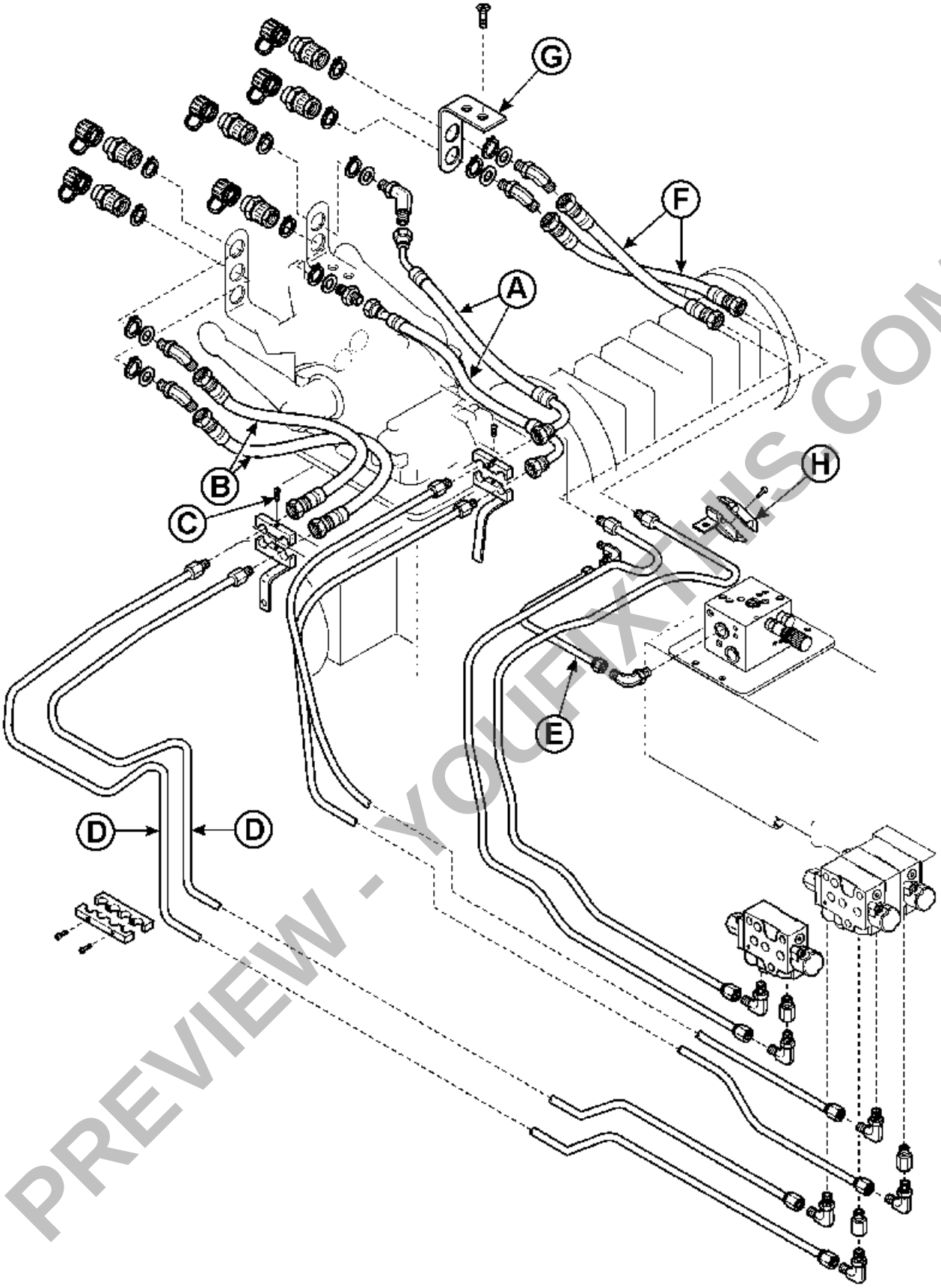
Rear PTO clutch lever and linkage

LEGEND:

A	Knob

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AT3630

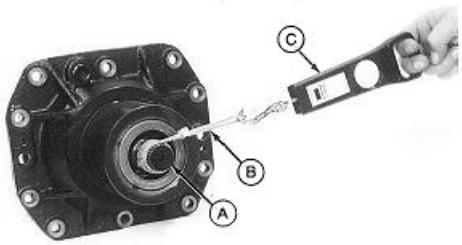
Tractors with 2-, 3-, or 4 double-acting selective control valves

[9] - Remove hydraulic lines (A) and (B). Close all openings with caps or plugs.

[10] - Remove bolt (C), hydraulic lines (D) from selective control valves and line (E).

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LEGEND:

A	Input Shaft
B	String
C	Spring Scale

Input shaft, spring scale and string

Measure pinion bearing preload using the following method:

a. Wrap a length of spring scale JDT42
Spring Scale
JDT42



Spring scale

For measuring the initial turning force.
(B) evenly (do not overlap) around the exposed input shaft (A).

b. Attach a spring scale JDT42
Spring Scale
JDT42



Spring scale

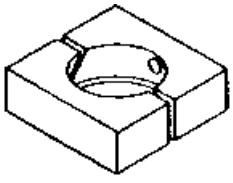
For measuring the initial turning force.
(C) to string. Pull scale firmly and evenly to measure the force required to rotate the pinion shaft.

c. Read scale during rotation of the pinion. Do not read scale at the point where rotation starts.
d. Record the reading obtained.

[12] - Attach JDG486 Pinion Shaft Holding Fixture

Pinion Shaft Holding Fixture

JDG486



JDG486

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F	Right turn indicator
G	Right warn/turn light
H	Left warn/turn light
I	Left turn indicator
J	Ground
K	Main fuse, 50 amp
L	Power circuit
M	Energizing circuit
N	Ground circuit
O	Flashing current

Function

Alerts approaching traffic of tractor's presence.

Major Components

- Fuse 1, 10 amp
- Light switch
- Hazard warning light switch
- Flasher
- Right warn/turn light
- Left warn/turn light
- Right turn indicator
- Left turn indicator
- Main fuse, 50 amp

Theory of Operation

Pressing the hazard warning light switch causes the warning lights to be activated on both sides, since the warning lights are connected directly to battery.

Current moves from battery (A), through key switch (B) and 10-amp fuse (C). The flow of current continues across light hazard warning switch contacts (30). Circuit 01 continues to pass current to flasher (E). Flasher turns current on and off and connects it to circuit 02. Flashing current returns to terminal 49A of hazard warning light switch (D). Current then flows simultaneously on circuits 03 and 04, flashing both left and right warning lights and their respective indicator lights on dash.

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Action:

(Disengage FWD)

Result must be same as battery voltage.

Result:

YES: GO TO 15

NO: Check for corroded or loose terminals. Replace FWD switch.

(15) Check voltage at grey/yellow wire terminal of FWD relay (Terminal 30)

Action:

(Disengage FWD)

Result must be same as battery voltage.

Result:

YES: GO TO 16

NO: Check for corroded connections or break in grey/yellow wire between FWD switch and FWD relay.

(16) Check voltage at FWD relay (Terminal 87A)

Action:

(Disengage FWD)

Result must be same as battery voltage.

Result:

YES: GO TO 17

NO: Check for corroded or loose terminals. Replace FWD relay.

(17) Check voltage at pink/black wire terminal of FWD solenoid valve.

Action:

(Disengage FWD)

Result must be same as battery voltage.

Result:

YES: GO TO 18

NO: Check for corroded connections or break in pink/black wire between FWD relay and FWD solenoid valve.

(18) Check voltage at black wire terminal of FWD solenoid valve.

Action:

(Disengage FWD)

Result must be less than 0.2 volt.

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L	PTO clutch pressure plate
M	PTO clutch disk
N	PTO clutch
O	Traction clutch

Depressing the clutch pedal moves clutch pedal linkage (G) upward, causing the traction clutch armshaft (I) to rotate and force traction clutch release bearing (E) against traction clutch release fingers (J). The clutch release bearing depresses the release fingers, causing traction clutch pressure plate (D) to move forward against spring washer (B), compressing the spring washer.

When the PTO clutch is disengaged (PTO lever released), pressure plate (L) is forced rearward by coil springs (C), removing contact between the pressure plate and PTO clutch disk (M). In this mode, no power will be transmitted from the flywheel to the PTO clutch shaft, because the PTO clutch disk does not rotate with flywheel (A).

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→NOTE:

See Section 260 for “steering operation” and “brake operation”. See this Group for “hydraulic pump operation” and “rockshaft operation”.

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