Backhoe Loaders Operation and Test

TECHNICAL MANUAL

TM1512 07NOV03 (ENGLISH)

For complete service information also see:

410D, 510D, Backhoe Loader Operation and Test (Complete)	**TM1512**
410D, 510D Backhoe Loader Repair (Complete)	**TM1513**

PREVIEW - YOUFIXTHIS.COM

Worldwide Construction And Forestry Division

LITHO IN U.S.A.

Download full manual at youfixthis.com

Contents

SECTION 9000—General Information
Group 01—Safety Information
Group 02—General Specifications
Group 03—Torque Values
Group 04—Fuels And Lubricants

SECTION 9005—Operational Checkout Procedure
Group 10—Operational Checkout Procedure

SECTION 9010—Engine
Group 05—Theory Of Operation
Group 10—System Operational Checks
Group 15—System Diagnostic Information
Group 20—Adjustments
Group 25—Tests

SECTION 9015—Electrical System
Group 05—System Information
Group 10—System Diagrams
Group 15—Sub-System Diagnostics
Group 20—References

SECTION 9020—Power Train
Group 05—Theory Of Operation
Group 10—System Operational Checks
Group 15—System Diagnostic Information
Group 20—Adjustments
Group 25—Test

SECTION 9025—Hydraulics
Group 05—Theory Of Operation
Group 10—System Operational Checks
Group 15—Diagnostic Information
Group 20—Adjustments
Group 25—Tests

SECTION 9031—Heating And Air Conditioning
Group 05—Theory Of Operation
Group 10—System Operational Checks
Group 15—Diagnostic Information
Group 20—Adjustments
Group 25—Test

PREVIEW - YOUFIXTHIS.COM

All information, illustrations and specifications in this manual are based on the latest information available at the time of publication. The right is reserved to make changes at any time without notice.

COPYRIGHT © 1996
DEERE & COMPANY
Moline, Illinois
All rights reserved
A John Deere ILLUSTRUCTION® Manual

Download full manual at youfixthis.com

9000
01
1

Handle Fluids Safely—Avoid Fires

When you work around fuel, do not smoke or work near heaters or other fire hazards.

Store flammable fluids away from fire hazards. Do not incinerate or puncture pressurized containers.

Make sure machine is clean of trash, grease, and debris.

Do not store oily rags; they can ignite and burn spontaneously.



TS227 –UN–23AUG88

DX,FLAME –19–29SEP98–1/1

Prevent Battery Explosions

Keep sparks, lighted matches, and open flame away from the top of battery. Battery gas can explode.

Never check battery charge by placing a metal object across the posts. Use a volt-meter or hydrometer.

Do not charge a frozen battery; it may explode. Warm battery to 16°C (60°F).



TS204 –UN–23AUG88

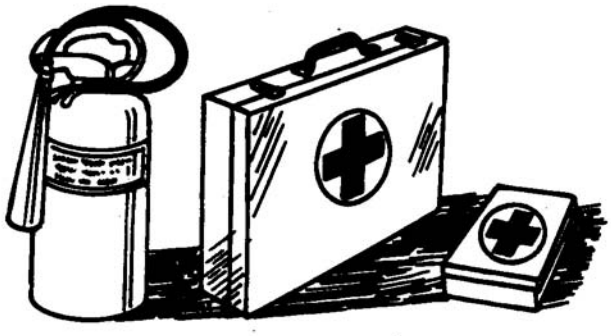
DX,SPARKS –19–03MAR93–1/1

Prepare for Emergencies

Be prepared if a fire starts.

Keep a first aid kit and fire extinguisher handy.

Keep emergency numbers for doctors, ambulance service, hospital, and fire department near your telephone.



TS291 –UN–23AUG88

DX,FIRE2 –19–03MAR93–1/1

PREVIEW - YOUFIXTHIS.COM

Download full manual at youfixthis.com

NOTE: Specifications and design subject to change without notice. Wherever applicable, specifications are in accordance with SAE Standards. Except where otherwise noted, these specifications are based on a standard machine with 17.5L-24 rear tires; 11L-15 front tires; 1.0 cu. yd. (0.76 m ^{3}) loader bucket; 24 in. (610 mm) backhoe bucket; ROPS/FOPS; full fuel tank and 175 lb. (79 kg) operator.

Key:	Standard Dipperstick	1.22 m (4 ft) Extendible Dipperstick	
Retracted	**Extended**		
A—Loading height, truck loading position	3.61 m (11 ft 10 in.)	3.51 m (11 ft 6 in.)	4.24 m (13 ft 11 in.)
B—Reach from center of swing mast	5.61 m (18 ft 5 in.)	5.42 m (17 ft 9 in.)	6.53 m (21 ft 5 in.)
C—Reach from center of rear axle	6.76 m (22 ft 2 in.)	6.55 m (21 ft 6 in.)	7.67 m (25 ft 2 in.)
D—Digging depth (SAE):			
(1) 610 mm (2 ft.) flat bottom	4.65 m (15 ft 3 in.)	4.42 m (14 ft 6 in.)	5.61 m (18 ft 5 in.)
(2) 2440 mm (8 ft.) flat bottom	4.32 m (14 ft 2 in.)	4.09 m (13 ft 5 in.)	5.34 m (17 ft 6 in.)
E—Maximum digging depth	4.67 m (15 ft 4 in.)	4.46 m (14 ft 8 in.)	5.62 m (18 ft 5 in.)
F—Ground clearance, minimum	305 mm (12 in.)	305 mm (12 in.)	305 mm (12 in.)
G—Bucket rotation	160° and 180°	160° and 180°	160° and 180°
H—Transport height	3.49 m (11 ft 5 in.)	3.56 m (11 ft 8 in.)	3.56 m (11 ft 8 in.)
I—Overall length, transport	6.99 m (23 ft 5 in.)	7.01 m (23 ft)	7.01 m (23 ft)
J—Stabilizer width-transport	2.34 m (7 ft 8 in.)	2.34 m (7 ft 8 in.)	2.34 m (7 ft 8 in.)
K—Stabilizer spread-operating	3 m (9 ft 10 in.)	3 m (9 ft 10 in.)	3 m (9 ft 10 in.)
L—Width over tires	2.15 m (7 ft 1 in.)	2.16 m (7 ft 1 in.)	2.16 m (7 ft 1 in.)
M—Wheelbase	2100 mm (83 in.)		
N—Dig below ground—bucket level	100 mm (4 in.)	100 mm (4 in.)	100 mm (4 in.)
O—Rollback at ground level	40°	40°	40°
P—Dump clearance, bucket at 40°	2.74 m (9 ft)	2.74 m (9 ft)	2.74 m (9 ft)
Q—Maximum height to bucket hinge pin	3.35 m (11 ft)	3.35 m (11 ft)	3.35 m (11 ft)
R—Maximum bucket dump angle	45°		
S—Reach at full height, bucket at 40°	711 mm (28 in.)	711 mm (28 in.)	711 mm (28 in.)
Backhoe Performance Ratings:			
Digging force, bucket cylinder (power dig position)	52 kN (11 700 lb)	52 kN (11 700 lb)	52 kN (11 700 lb)
Digging force, crowd cylinder	28 kN (6300 lb)	30.3 kN (6800 lb)	20.50 kN (4600 lb)
Swing arc	180°	180°	180°
Operator control	Two levers	Right foot treadle	Right foot treadle
Bucket positions	9° and 18° rollback	8° and 17° rollback	12° and 22° rollback
Stabilizer angle rearward	14.5°	14.5°	14.5°
Lifting capacity, maximum boom @ 65°	1980 kg (4400 lb)	2087 kg (4600 lb)	1310 kg (2900 lb)
Leveling angle	14 °	14°	14°

NOTE: Backhoe specifications are with 610 mm x 0.21 m^3 (24 in. x 7.5 cu ft standard bucket. Loader specifications are with 1.5 m ^{3} (1.5 yd^3) bucket.

PREVIEW - YOUFIXTHIS.COM

TX,9000,DY609 –19–24JUL96–2/2

Download full manual at youfixthis.com

9000
02
10

410D And 510D Backhoe Loader Drain And Refill Capacities

	Metric	U.S.
Engine coolant	16 L	17 qt
Engine oil (including filter)	8.5 L	9 qt
Torque converter and reverser	13 L	14 qt
Fuel tank	129 L	34 gal
Hydraulic reservoir:		
410D (SN 796855—)		
510D (SN 796891—)	41.5 L	11 gal
Transaxle:		
410D (SN —796854)		
510D (SN —796890)		
Without MFWD	23 L	24 qt
With MFWD	24 L	25 qt
410D (SN 796855—801199)		
510D (SN 796891—801199)		
Without MFWD	18 L	19 qt
With MFWD	19 L	20 qt
410D, 510D (SN 801200—)		
Without MFWD	21 L	22 qt
With MFWD	24 L	25 qt
Front axle	6.5 L	7 qt
Front wheel planetary (MFWD) (per side)	1 L	1 qt

TX,9000,DY615 –19–25JUL96–1/1

PREVIEW - YOUFIXTHIS.COM

Download full manual at youfixthis.com

9000
03
2

Unified Inch Bolt and Cap Screw Torque Values

SAE Grade and Head Markings	NO MARK	1 or 2[b]	5 5.1 5.2	8 8.2
SAE Grade and Nut Markings	NO MARK	2	5	8

Size	Grade 1				Grade 2[b]				Grade 5, 5.1, or 5.2				Grade 8 or 8.2			
	Lubricated[a]		Dry[a]		Lubricated[a]		Dry[a]		Lubricated[a]		Dry[a]		Lubricated[a]		Dry[a]	
	N·m	lb-ft	N·m	lb-ft	N·m	lb-ft	N·m	lb-ft	N·m	lb-ft	N·m	lb-ft	N·m	lb-ft	N·m	lb-ft
1/4	3.7	2.8	4.7	3.5	6	4.5	7.5	5.5	9.5	7	12	9	13.5	10	17	12.5
5/16	7.7	5.5	10	7	12	9	15	11	20	15	25	18	28	21	35	26
3/8	14	10	17	13	22	16	27	20	35	26	44	33	50	36	63	46
7/16	22	16	28	20	35	26	44	32	55	41	70	52	80	58	100	75
1/2	33	25	42	31	53	39	67	50	85	63	110	80	120	90	150	115
9/16	48	36	60	45	75	56	95	70	125	90	155	115	175	130	225	160
5/8	67	50	85	62	105	78	135	100	170	125	215	160	240	175	300	225
3/4	120	87	150	110	190	140	240	175	300	225	375	280	425	310	550	400
7/8	190	140	240	175	190	140	240	175	490	360	625	450	700	500	875	650
1	290	210	360	270	290	210	360	270	725	540	925	675	1050	750	1300	975
1-1/8	400	300	510	375	400	300	510	375	900	675	1150	850	1450	1075	1850	1350
1-1/4	570	425	725	530	570	425	725	530	1300	950	1650	1200	2050	1500	2600	1950
1-3/8	750	550	950	700	750	550	950	700	1700	1250	2150	1550	2700	2000	3400	2550
1-1/2	1000	725	1250	925	990	725	1250	930	2250	1650	2850	2100	3600	2650	4550	3350

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 grade.

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

Make sure fasteners 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.

[a] "Lubricated" means coated with a lubricant such as engine oil, or fasteners with phosphate and oil coatings. "Dry" means plain or zinc plated without any lubrication.

[b] Grade 2 applies for hex cap screws (not hex bolts) up to 152 mm (6-in.) long. Grade 1 applies for hex cap screws over 152 mm (6-in.) long, and for all other types of bolts and screws of any length.

TS1656 –19–02APR97

DX,TORQ1 –19–20JUL94–1/1

PREVIEW - YOUFIXTHIS.COM
Download full manual at youfixthis.com

Operational Checkout Procedure

Use this procedure to check all systems and functions on the machine.

This checkout procedure is designed so technician can make a quick check of the operation of machine while sitting in operator's seat.

A location will be required which is level, has adequate space to complete the driving checks and to work machine. The engine, power train and hydraulic oil must be at operating temperature.

Complete the necessary visual checks (oil levels, oil condition, external leaks, loose hardware, loose linkage) prior to doing the checkout procedure.

No special tools or gauges are needed. Always start in the left column and read completely, follow this sequence from left to right. Read each check completely before performing. Make a copy of the Operational Checkout Record Sheet and record the results of each check on this sheet.

At the end of each check if no problem is found (OK:), you will instructed to GO TO NEXT CHECK. If problem (NOT OK:) is indicated, you will be given repair required or CTM number. If verification is needed, you will be given next best source of information after GO TO:

Group 10 (System Operational Checks)

Group 15 (System Diagnostic Checks)

Group 20 (Adjustments)

Group 25 (Test)

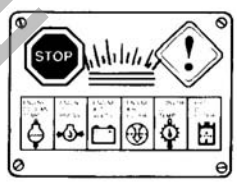
CTM (Component Technical Manual)

9005
10
1

TX,D300,DS1984 –19–06APR95–1/1

Gauge And Indicator Check With Engine Off

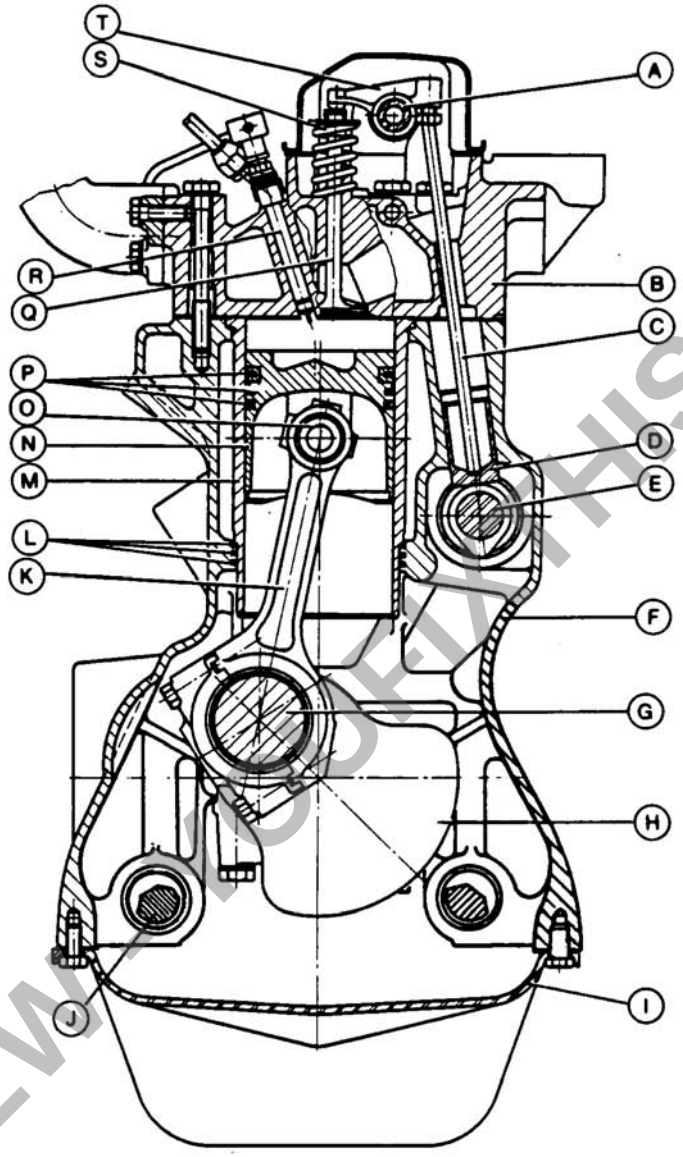
–––1/1

❶ **Monitor Indicator Lights And Alarm Check**	 T7394BH –UN–10DEC90	Turn key switch to BULB CHECK position and hold. *LOOK: All six monitor indicator lights and CAUTION light must be on. STOP light must flash and alarm must "beep".* *LISTEN: Starting motor must NOT operate.*	**OK:** Go to next check . **NOT OK:** Check monitor fuse. **NOT OK:** Go to Group 9015-15, Gauges and Monitor Checks, Display Monitor Check . **NOT OK:** If motor starts and bulb check position is OK, key switch is failed or there is a short in wiring. Go to Group 9015-15, Key Switch Test .

–––1/1

PREVIEW - YOUFIXTHIS.COM
Download full manual at youfixthis.com

Engine—Sectional View



RG7248 –UN–11JUL95

A—Rocker Arm Shaft
B—Cylinder Head
C—Push Rod
D—Cam Follower
E—Camshaft
F—Cylinder Block
G—Crankshaft
H—Crankshaft Counterweight
I—Oil Pan
J—Balancer Shafts
K—Connecting Rod
L—Liner Packing Rings
M—Cylinder Liner
N—Piston
O—Piston Pin
P—Piston Rings
Q—Valve
R—Fuel Injection Nozzle
S—Valve Spring
T—Rocker Arm

S11,2000,EH –19–11JUL95–1/1

PREVIEW ONLY FIXTHIS.COM

Download full manual at youfixthis.com

Diagnose Engine Malfunctions

NOTE: Diagnostic charts are arranged from most probable and simplest to verify, to least likely and more difficult to verify. Remember the following steps when diagnosing a problem:

- *Step 1. Operational Checkout Procedure (See Group 9005-10).*
- *Step 2. Engine Operational Checkout Procedure (See Group 9010-10).*
- *Step 3. Adjustments and/or Tests (See Group 9010-20 and/or 9010-25).*

Symptom	Problem	Solution
Engine Will Not Start Or Starts Hard	Fuel tank empty	Check fuel quantity
	Fuel tank vent plugged	Remove cap and listen for sound of air entering tank. Replace cap.
	No electrical power to injection pump solenoid	Turn key switch to "On". Must hear click at injection pump. Replace fuse. Repair wiring.
	Water in fuel or water frozen in fuel line.	Drain water from fuel tank. Inspect fuel filter for water. Change filter.
	Debris in fuel or wrong grade of fuel	Check fuel tank outlet strainer for type of fuel debris. Check bottom of fuel tank for debris.
	Air leak on suction side of fuel system	Check for bubbles in fuel filter and tighten connections. Inspect fuel lines for damage.
	Fuel transfer pump diaphragm leaking	Check engine oil for fuel dilution. Replace fuel pump.
	Slow cranking speed	Check battery and connections. Incorrect engine oil (Cold weather).
	Restricted air filter	Check air filter restriction indicator and air filters. Clean.

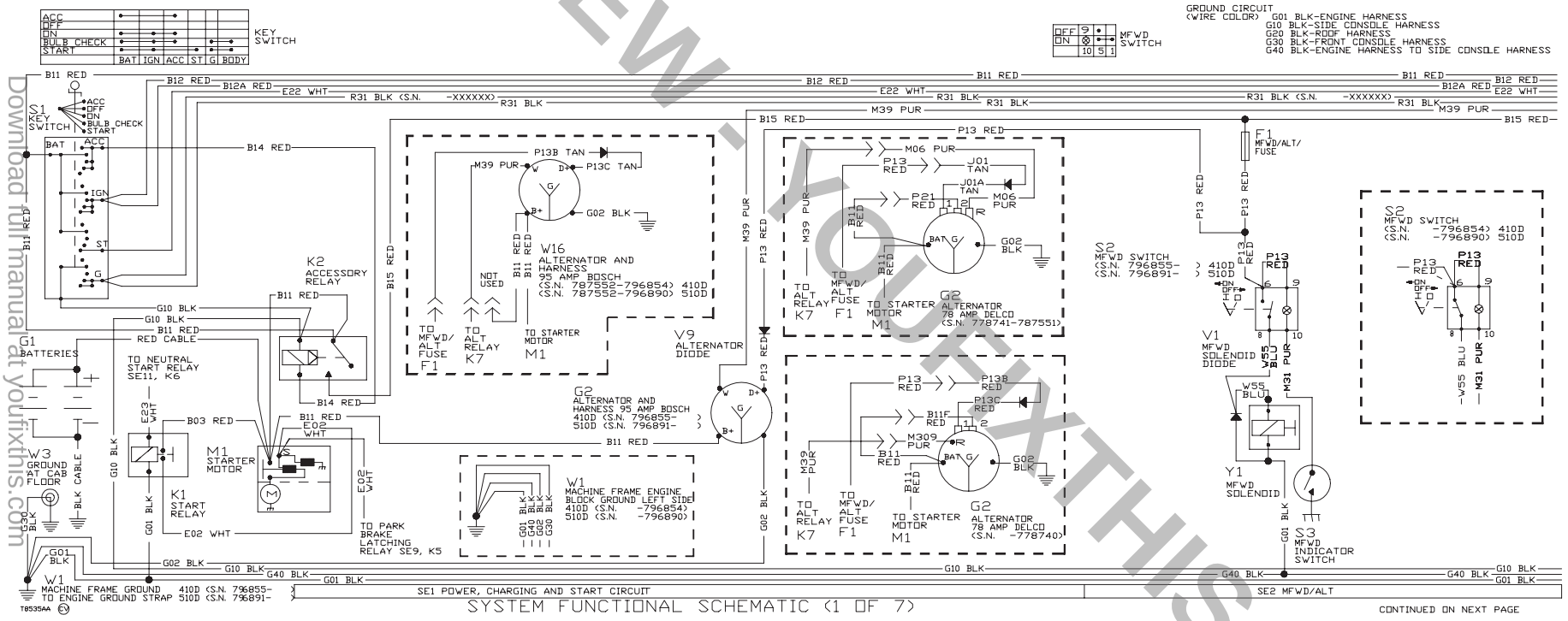
Continued on next page

PREVIEW - YOUFIXTHIS.COM

Download full manual at youfixthis.com

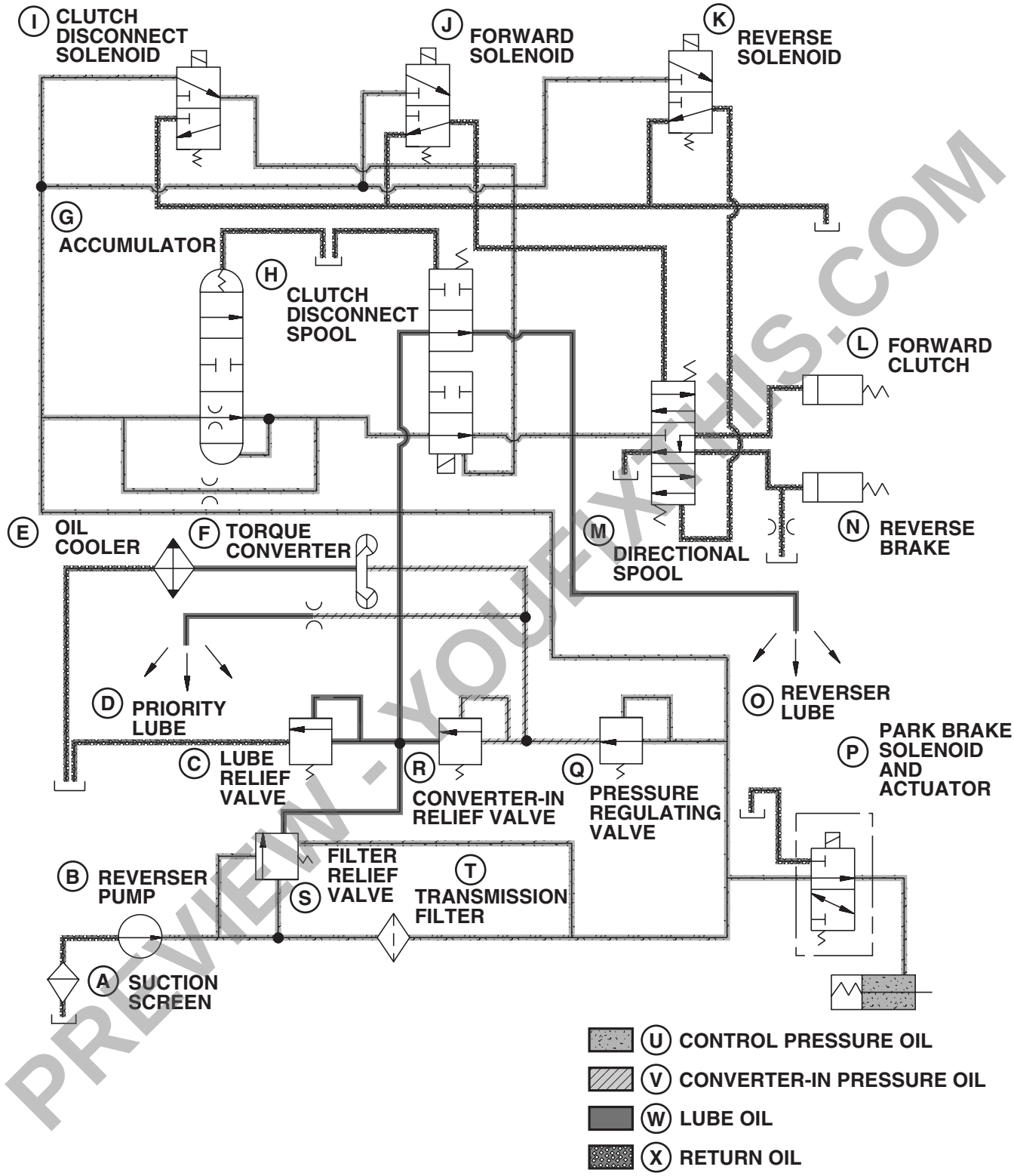
System Functional Schematic

T8535AA –19–05JAN99



SYSTEM FUNCTIONAL SCHEMATIC (1 OF 7)

PREVIEW - YOUFIXTHIS.COM
Download full manual at youfixthis.com



TXC7998AA CV

Y REVERSER HYDRAULIC SCHEMATIC - NEUTRAL WITH PARK BRAKE RELEASED

T7998AA –19–01JAN99

Continued on next page

TX,9020,YY754 –19–04JUN93–2/3

PREVIEW - YOUFIXTHIS.COM
Download full manual at youfixthis.com

PREVIEW - YOUFIXTHIS.COM

Download full manual at youfixthis.com

Service Recommendations for 37° Flare and 30° Cone Seat Connectors

1. Inspect flare and flare seat. They must be free of dirt or obvious defects.
2. Defects in tube flare cannot be repaired. Overtightening a defective flared fitting will not stop leaks.
3. Align tube with fitting before attempting to start nut.
4. Lubricate male threads with hydraulic fluid or petroleum jelly.
5. Index angle fittings and tighten by hand.
6. Tighten fitting or nut to torque value shown on torque chart. Do not allow hoses to twist when tightening fittings.



T6234AC –UN–18OCT88

STRAIGHT FITTING OR SPECIAL NUT TORQUE CHART		
Thread Size	**N•m**	**lb-ft**
3/8 - 24 UNF	8	6
7/16 - 20 UNF	12	9
1/2 - 20 UNF	16	12
9/16 - 18 UNF	24	18
3/4 - 16 UNF	46	34
7/8 - 14 UNF	62	46
1-1/16 - 12 UN	102	75
1-3/16 - 12 UN	122	90
1-5/16 - 12 UN	142	105
1-5/8 - 12	190	140
1-7/8 - 12 UN	217	160
NOTE: Torque tolerance is ± 10%.		

T82,BHMA,EL –19–19MAR96–1/1

PREVIEW - YOUFIXTHIS.COM

Download full manual at youfixthis.com

The engine is equipped with a gear driven oil pump and full-flow oil filter. The oil filter has an internal bypass valve which opens if the filter element becomes restricted. Most engines are equipped with an oil cooler mounted externally on the cylinder block. The engine is equipped with a pressure regulator valve to relieve excessive pressure build-up in the main oil gallery, and a bypass valve to prevent oil starvation if the oil cooler and filter become plugged.

Balancer shafts are used on some four-cylinder engines to reduce vibration. The two shafts rotate on bushings in cylinder block and are counter-rotating at twice engine speed.

The engine has a pressurized cooling system, consisting of radiator, water pump, multi-blade fan, and one or two thermostats.

CTM8,GR01,11 –19–18FEB95–2/2

9010
05
3

PREVIEW - YOUFIXTHIS.COM

Download full manual at youfixthis.com

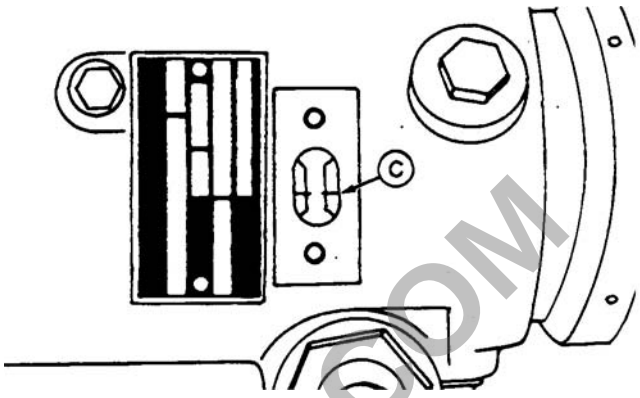
3. If timing line (C) on weight retainer cannot be seen, turn engine one revolution to get No. 1 cylinder at TDC on compression stroke.

Specification

No. 1 Cylinder—Position	At TDC on compression stroke
Line on Governor Weight Retainer—Position	Aligned with line on cam ring

4. To avoid backlash, always approach the timing lines by turning engine in direction of rotation. The normal backlash of gears is enough to throw the pump timing off several degrees, resulting in poor engine performance.

5. If lines are not aligned, loosen pump mounting flange retaining nuts and rotate pump housing until timing lines are aligned.



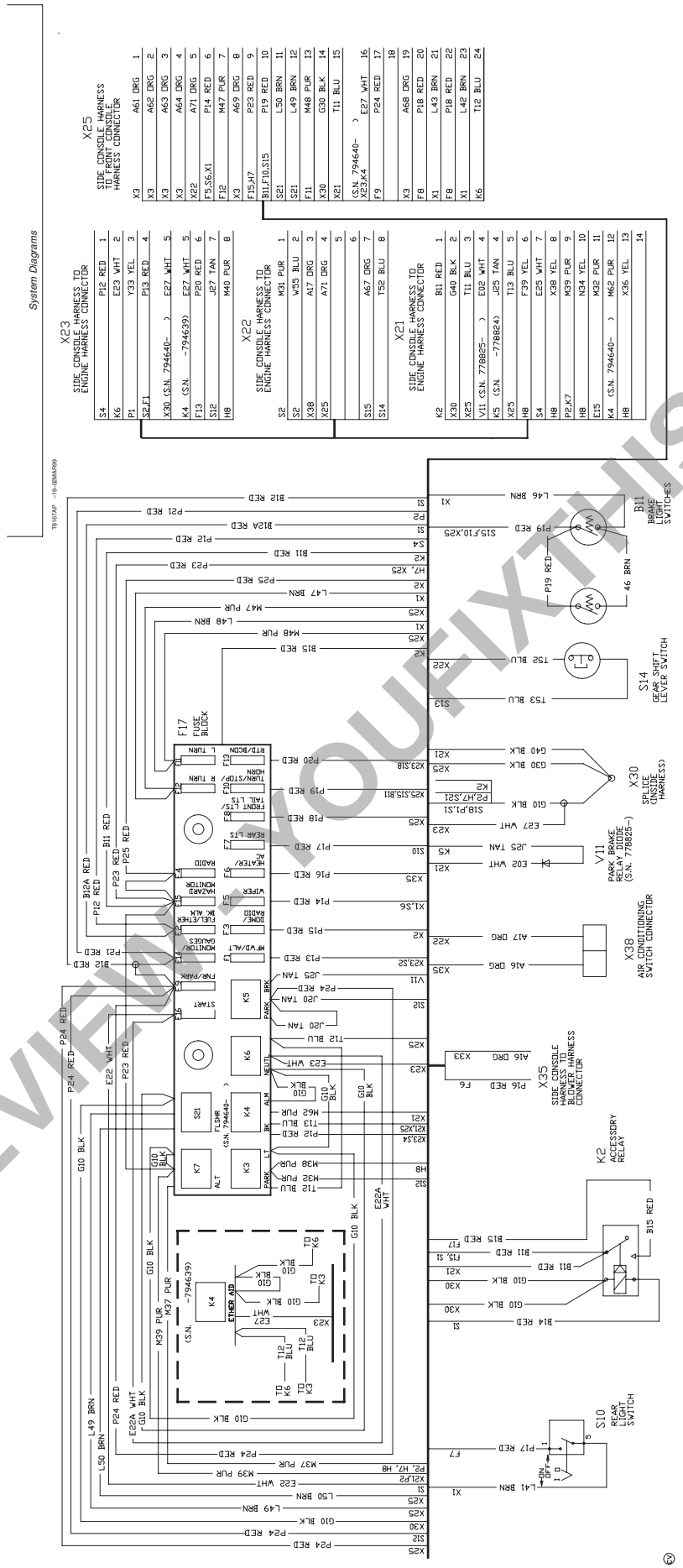
T6193AA1 –UN–25MAY89

9010
25
13

T59,9010,C111 –19–25MAR86–3/3

PREVIEW - YOUFIXTHIS.COM

Download full manual at youfixthis.com



PREVIEW - YOUFIXTHIS.COM
Download full manual at youfixthis.com

NOTE: For component identification code description, see Wiring and Schematic Diagrams Legend , Group 9015-10.

Continued on next page

TX,9015,QQ3188 –19–31AUG95–3/5

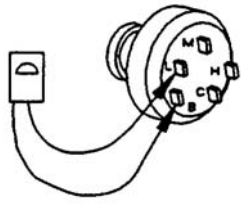
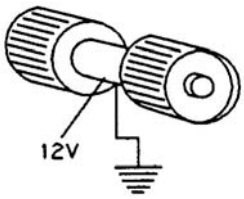
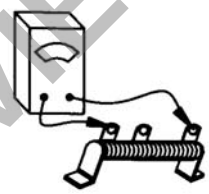
PREVIEW - YOUFIXTHIS.COM

Download full manual at youfixthis.com

Blower Circuit Diagnostic Procedures

This circuit is powered by the heater circuit breaker.

– – –1/1

Blower Switch	 T7199CL –UN–17SEP90	Disconnect harness from blower switch. Use a multimeter and check for continuity. Move blower switch to LOW, MEDIUM and HIGH checking terminals B and L, B and M, and B and H. Is continuity measured?	**YES:** Blower switch is good. **NO:** Replace blower switch. – – –1/1
Heater Blower Motor	 T7199CM –UN–16AUG90	Disconnect harness from heater blower motor. Connect 12 volts to heater blower motor, and ground motor. Does heater blower motor operate?	**YES:** Heater blower motor is good. Check wiring harness. **NO:** Replace heater blower motor. – – –1/1
Blower Resistor Check	 T8134AK –UN–03DEC93	Disconnect harness from resistor. Connect ohmmeter to outer terminals of resistor. Does ohmmeter read continuity?	**YES:** Resistor is OK. Check harness and blower motor. **NO:** Blower resistor has failed. Replace. – – –1/1

9015
15
74

PREVIEW - YOUFIXTHIS.COM

Download full manual at youfixthis.com

CAUTION: Battery gas can explode. Keep sparks and flames away from batteries. Use a flashlight to check battery electrolyte level.

Never check battery charge by placing a metal object across the posts. Use a voltmeter or hydrometer.

Always remove grounded (-) battery clamp first and replace it last.

Sulfuric acid in battery electrolyte is poisonous. It is strong enough to burn skin, eat holes in clothing, and cause blindness if splashed into eyes.

9015
20
6

Avoid the hazard by:

1. **Filling batteries in a well-ventilated area.**
2. **Wearing eye protection and rubber gloves.**
3. **Avoiding breathing fumes when electrolyte is added.**
4. **Avoiding spilling or dripping electrolyte.**
5. **Use proper jump start procedure.**

If you spill acid on yourself:

1. **Flush your skin with water.**
2. **Apply baking soda or lime to help neutralize the acid.**
3. **Flush your eyes with water for 10—15 minutes. Get medical attention immediately.**

If acid is swallowed:

1. **Drink large amounts of water or milk.**
2. **Then drink milk of magnesia, beaten eggs, or vegetable oil.**
3. **Get medical attention immediately.**

IMPORTANT: During freezing weather, batteries must be charged after water is added to prevent battery freezing. Charge battery using a battery charger or by running the engine.

1. Remove hold-down clamps.

Continued on next page

TX,9015,QQ1696 –19–01SEP95–2/4

Download full manual at youfixthis.com
PN=322

PREVIEW - YOUFIXTHIS.COM

Differential Lock And Linkage Check	Put transaxle in first gear. Move FNR lever to forward (F) position and operate engine at approximately 1500 rpm. Depress differential lock pedal. Turn steering wheel slightly right or left. Release differential lock pedal. *LOOK: Machine must try to go straight forward and pedal must return to UP position when traction is equal.*	**OK:** Check complete. **NOT OK:** Go to Group 9020-15, No Differential Lock Operation .

–––1/1

Differential Gear And Pinion Check *NOTE: Hold the wheel which is being braked stationary during this test or brake chatter could be confused with differential gear noise.*	Put transaxle in first gear and operate engine at approximately 1500 rpm. Move FNR lever to forward position. Steer machine in a maximum left turn and depress left brake pedal to stop the left wheel. Steer machine in a maximum right turn and depress right brake pedal to stop right wheel. *LISTEN: NO excessive gear noise must be heard in the differential or pinion gear area.*	**OK:** Check complete. **NOT OK:** Go to Group 9020-15, Unit Makes Excessive Noise .

–––1/1

Mechanical Front Wheel Drive (MFWD) Driving Checks

–––1/1

PREVIEW - YOUFIXTHIS.COM

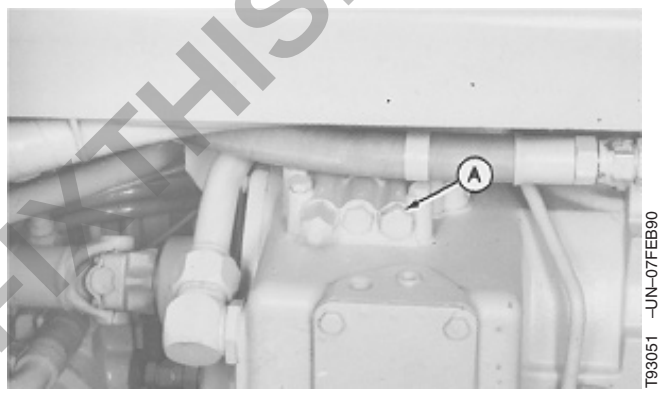
Download full manual at youfixthis.com

IMPORTANT: DO NOT install pin behind cooler relief valve until Step 6 of test procedure.

7. Make a 9.5 mm (0.38 in.) diameter by 92 mm (3.62 in.) length pin.

TX,D410,DS3055 –19–21APR94–2/3

In Step 6 of test procedure, remove plug (A) and spring from behind cooler relief valve. Install pin and plug (A). Hand tighten plug only. One or two threads must be showing when valve is tight against seat.



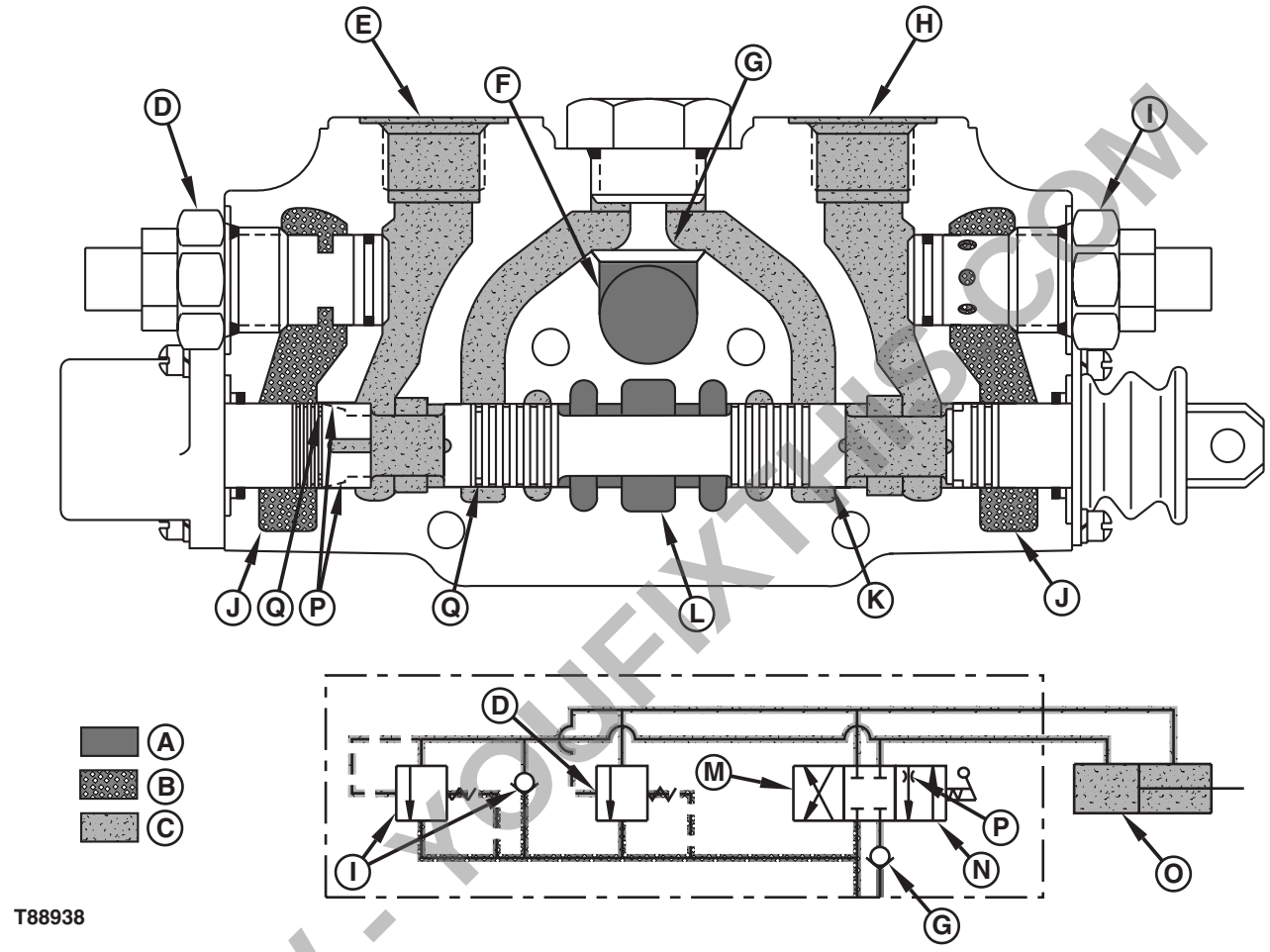
TX,D410,DS3055 –19–21APR94–3/3

9020
25
15

PREVIEW - YOUFIXTHIS.COM

Download full manual at youfixthis.com

Backhoe Boom Valve Operation—GRESEN



T88938 –UN–07FEB97

9025 05 35

Valve Shown In Neutral Position

A—High Pressure Oil
B—Charge Pressure Oil
C—Trapped Oil
D—Circuit Relief Valve
E—Boom Raise Work Port
F—Functional Inlet Passage
G—Lift Check
H—Boom Lower Work Port
I—Circuit Relief Valve with Anti-Cavitation Valve
J—Return Passage
K—Spool
L—Auxiliary Passage
M—Boom Up
N—Boom Down
O—Boom Cylinder
P—Metering Grooves
Q—Pressure Seal Passage

The boom valve control spool has "pressure side" metering. The spool (K) has grooves on both ends to "meter" oil flow through valve to prevent abrupt starts and stops. The boom down return oil metering grooves (P) are longer to give more control of boom down speed.

The boom valve is a three-position, four-way spool-type valve. The valve contains a lift check (G), a circuit relief valve (D) in boom rise circuit, and a circuit relief valve with anti-cavitation valve (I) in boom lower circuit.

Pressure seal passages (Q) are used to prevent leakage from the boom raise circuit to return passage (J) causing function drift. Oil flows from the inlet passage, through pressure seal passage to the land between boom raise work port (E) passage and return passage to form a high pressure seal between land and housing.

Continued on next page

PREVIEW - YOUFIXTHIS.COM

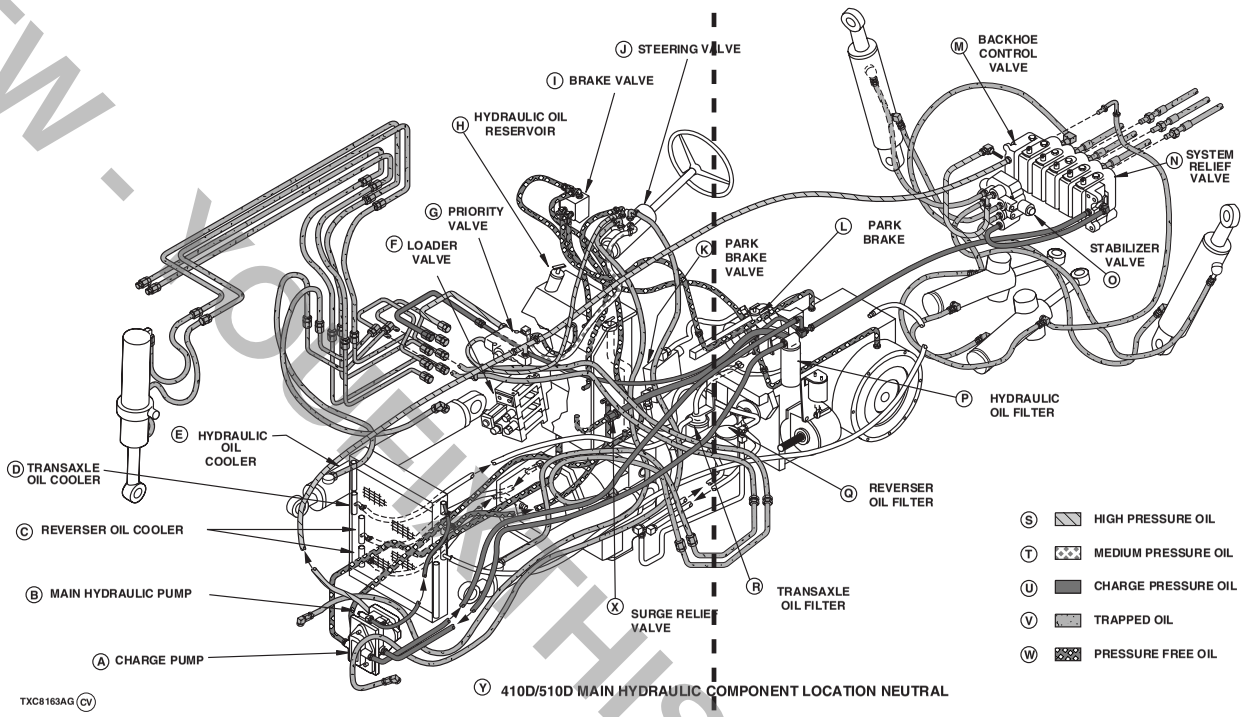
Download full manual at youfixthis.com

PREVIEW - YOUFIXTHIS.COM

Download full manual at youfixthis.com

Hyd. Component Location, 410D (S.N. 796855—801199), 510D (S.N. 796891—801199)

T8163AG –19–11JAN99



Y 410D/510D MAIN HYDRAULIC COMPONENT LOCATION NEUTRAL

See Page 9025-15-9 A

See Page 9025-15-9 B

See Page 9025-15-9 C

Cycle Time Test

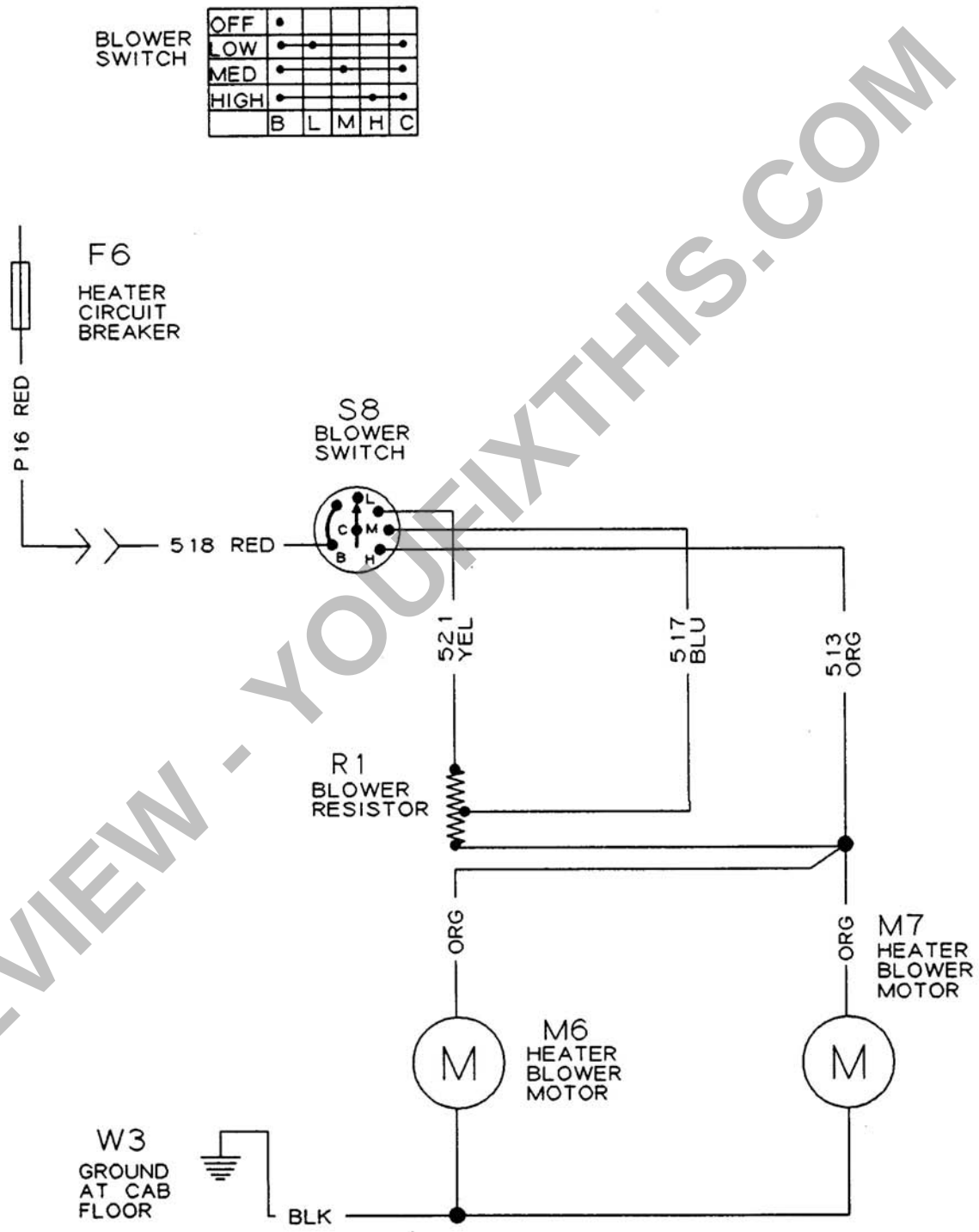
SPECIFICATIONS	
Oil Temperature	65 ± 5° C (150 ± 10°F)
Engine Speed	2000 rpm
Loader Boom Raise (Bucket Flat on Ground to Full Height) (Includes Bucket Self-Leveling) Maximum Cycle Time	5.0 sec.
Loader Boom Lower (Power Down) (Full Up to Ground) Maximum Cycle Time	3.5 sec.
Loader Boom Lower (Float Down) (Full Up to Ground) Maximum Cycle Time	3.6 sec.
Loader Bucket Dump (Bucket Just Clears Ground) Maximum Cycle Time	1.8 sec.
Loader Bucket Rollback (Bucket Just Clears Ground) Maximum Cycle Time	2.3 sec.
Backhoe Boom Raise (Backhoe at Max. Reach With Bucket Teeth on Ground up to Cylinder Cushion) Maximum Cycle Time	2.5 sec.
Backhoe Boom Lower (Backhoe at Max. Reach. Transport Position to Bucket Teeth on Ground) Maximum Cycle Time	2.2 sec.
Crowd In (Boom in Transport Position. Time Cycle to Cylinder Cushion)) Maximum Cycle Time	3.3 sec.
Crowd Out Maximum Cycle Time	2.5 sec.
Backhoe Bucket Dump Maximum Cycle Time	2.0 sec.
Backhoe Bucket Curl Maximum Cycle Time	2.5 sec.
Backhoe Swing (Boom Raised to Cushion, Bucket Curled, Dipperstick Parallel to Ground. Time Cycle to Cylinder Cushion) Maximum Cycle Time	2.7 sec.
Stabilizer Down (Full Up to Ground Level) Maximum Cycle Time	2.5 sec.
Stabilizer Up (Ground Level to Full Up) Maximum Cycle Time	2.1 sec.
Extendible Dipperstick Extend and Retract Maximum Cycle Time	2.4 sec.

PREVIEW - YOUFIXTHIS.COM

Continued on next page

Download full manual at youfixthis.com

Blower Circuit Schematic



T7857AD –19–30SEP92

TX,901515,QQ809 –19–17JUN94–1/1

PREVIEW - YOUFIXTHIS.COM

Download full manual at youfixthis.com

PREVIEW ONLY

You're viewing 25 of 647 pages

The full manual includes:

- All 647 pages, complete
- Searchable PDF (find any keyword)
- No watermarks
- Instant download
- Print-ready quality

GET FULL MANUAL NOW

John Deere 410D, 510D Technical Manual

Scan or click anywhere
youfixthis.com

Click anywhere on this page to get the full manual