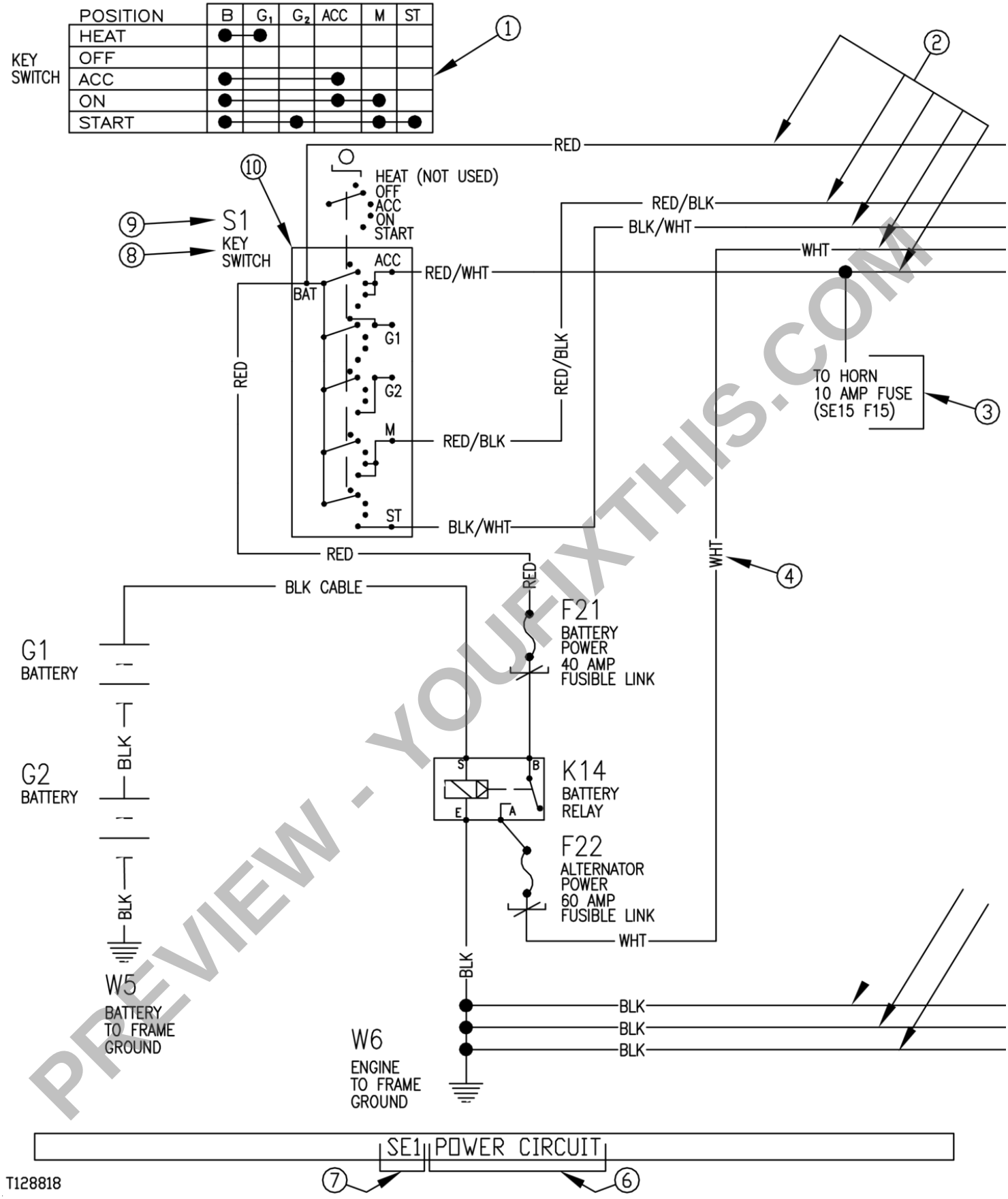


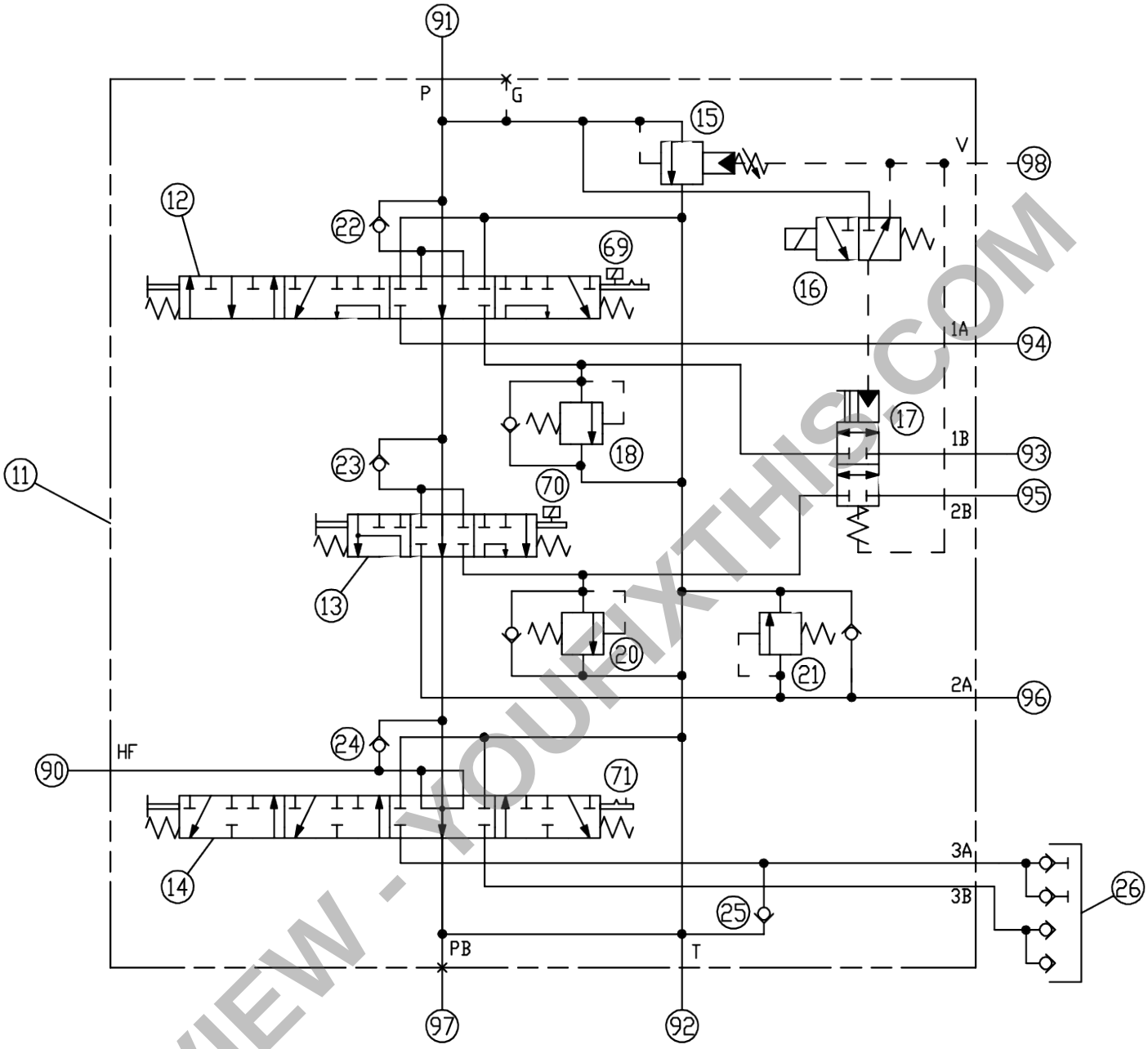
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System Functional Schematic Example

LEGEND:

1	Continuity Chart
2	Power Wires
3	Routing Location Information
4	Wire Identification
5	Ground Wires
6	Circuit Name

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T194627

Control Valve Schematic (S.N. —150522)

LEGEND:

11	Control Valve
12	Boom Spool
13	Bucket Spool
14	Auxiliary Spool
15	System Relief Valve
16	Port Lock Solenoid Valve
17	Port Lock Spool
18	Boom Up Circuit Relief and Anticavitation Valve
20	Bucket Rollback Circuit Relief and Anticavitation Valve
21	Bucket Dump Circuit Relief and Anticavitation Valve
22	Boom Lift Check Valve
23	Bucket Lift Check Valve
24	Auxiliary Lift Check Valve
25	Anticavitation Valve
26	Auxiliary Coupler
69	Boom Spool Lock Solenoid

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Diagnostic Trouble Codes

Symptom	Problem	Solution
F9D0	**Coolant Temperature Sensor Input at 0 Volts.** Coolant temperature sensor signal at engagement and monitor unit less than 0.27 volts, coolant temperature gauge at left most position, and “ERROR” appears in engagement and monitor unit display.	Check harness. See Engine Harness (W1) Wiring Diagram . (Group 9015-10.)
F9D5	**Coolant Temperature Sensor Input at 5 Volts.** Coolant temperature sensor signal at engagement and monitor unit is 4.96 volts or greater, coolant temperature gauge at left most position, and “ERROR” appears in engagement and monitor unit display.	Check harness. See Engine Harness (W1) Wiring Diagram . (Group 9015-10.) Check coolant temperature sensor. See Temperature Sensor Test . (Group 9015-10.)
F965	**Fuel Level Sensor Input at 5 Volts.** Fuel level sensor signal at engagement and monitor unit is 4.81 volts or greater, fuel gauge at left most position, and “ERROR” appears in engagement and monitor unit display.	Check harness. See Engine Harness (W1) Wiring Diagram . (Group 9015-10.) Check fuel level sensor. See Electrical Component Specifications . (Group 9015-20.)
F974	**Alternator Voltage Out of Range High.** System voltage is greater than 16 volts.	Check alternator output. See Alternator Test . (Group 9015-20.)
F980	**Hydraulic Oil Temperature Sensor Input at 0 Volts.** Hydraulic oil temperature sensor signal at engagement and monitor unit is less than 0.27 volts and “ERROR” appears in engagement and monitor unit display.	Check harness. See Engine Harness (W1) Wiring Diagram . (Group 9015-10.)
F985	**Hydraulic Oil Temperature Sensor Input at 5 Volts.** Hydraulic oil temperature sensor signal at engagement and monitor unit is 4.96 volts or greater and “ERROR” appears in engagement and monitor unit display.	Check harness. See Engine Harness (W1) Wiring Diagram . (Group 9015-10.) Check coolant temperature sensor. See Temperature Sensor Test . (Group 9015-10.)
F9P8	**Park Brake Output Open or Shorted to Power.** “CHECK CODES” appears in engagement and monitor unit display.	**→NOTE:** **Diagnostic Trouble Code F9P8 can be caused by the use of the remote start box. If the remote start box has been used, clear the code and operate machine. Recheck codes to verify code has been cleared.** **If park brake output open, park brake is engaged at all times. Check park brake solenoid. See Solenoid Test . (Group 9015-20.)** **Check harness. See Engine Harness (W1) Wiring Diagram . (Group 9015-10.)**
		If park brake output shorted to power, park brake is disengaged at all times. Check harness. See Engine Harness (W1) Wiring Diagram . (Group 9015-10.)
F9P9	**Park brake output shorted to ground.** Park brake is engaged at all times and “CHECK CODES” appears in engagement and monitor unit display.	Check park brake solenoid. See Solenoid Test . (Group 9015-20.) Check harness. See Engine Harness (W1) Wiring Diagram . (Group 9015-10.)
F9H8	**Hydraulic Output Open or hydraulic output shorted to power.** “CHECK CODES” appears in engagement and monitor unit display.	If hydraulic output is open, boom and/or bucket will not operate. Check boom spool lock, bucket spool lock and port lock solenoid. See Solenoid Test . (Group 9015-20.) Check front chassis wire harness.
		If hydraulic output is shorted to power, boom and/or bucket are enabled at all times. Check front chassis wire harness.
F9H9	**Hydraulic output shorted to ground.** Boom and bucket will not operate and “CHECK CODES” appears in engagement and monitor unit display.	Check boom spool lock, bucket spool lock and port lock solenoid. See Solenoid Test . (Group 9015-20.) Check front chassis wire harness.
F9J8	**Glow plug relay output open or shorted to power.**	If glow plug relay output is open, glow plugs will not operate. Check relay. See Glow Plug Relay Check . (Group 9015-20.) Check harness. See Engine Harness (W1) Wiring Diagram . (Group 9015-10.)
		If glow plug relay output is shorted to power, glow plugs will operate at all times. Check relay. See Glow Plug Relay Check . (Group 9015-20.) Check harness. See Engine Harness (W1) Wiring Diagram . (Group 9015-10.)
F9J9	**Glow plug relay output shorted to ground.** Glow plugs do not operate	Check relay. See Glow Plug Relay Check . (Group 9015-20.) Check harness. See Engine Harness (W1) Wiring Diagram . (Group 9015-10.)
F9K8	**Auto shutdown relay output open or shorted to power.** “CHECK CODES” appears in engagement and monitor unit display.	If auto shutdown relay output is open, engine will shut down or crank and not start. Check relay. See Relay Test . (Group 9015-20.) Check harness. See Engine Harness (W1) Wiring Diagram . (Group 9015-10.)
		If auto shutdown relay output is shorted to power, auto shutdown protection is disabled. Check relay. See Relay Test . (Group 9015-20.) Check harness. See Engine Harness (W1) Wiring Diagram . (Group 9015-10.)
F9K9	**Auto shutdown relay output shorted to ground.** Engine shuts down, cranks but will not start and “CHECK CODES” appears in engagement and monitor unit display.	Check relay. See Relay Test . (Group 9015-20.) Check harness. See Engine Harness (W1) Wiring Diagram . (Group 9015-10.)
F9M9	**Engagement and monitor unit warning alarm output shorted to ground.** Alarm will not operate.	Check harness. See Cab Harness—Standard (W2) Wiring Diagram or see Cab Harness—Deluxe (W12) Wiring Diagram . (Group 9015-10.)

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Group 10 - Operational Checkout Procedure

Operational Checkout

Use this procedure to make a quick check of machine operation by doing a walk around inspection and performing specific checks from operator's seat.

Complete visual checks (oil levels, oil condition, external leaks, loose hardware, linkage, wiring, etc.) before performing checkout.

Most checks will require machine systems to be at normal operating temperatures and a level area with adequate space to operate machine. Some checks may require varied surfaces.

No special tools are necessary to perform the checkout.

If no problem is found, go to next check. If problem is indicated, an additional check or repair procedure will be suggested.

Key Switch OFF, Engine OFF Checks

(1) Diagnostic Trouble Code Check

Action:

Always check for diagnostic trouble codes and correct them before performing the operational checkout.

Diagnostic trouble codes are displayed on the Engagement Monitor Unit.

Sit in seat and access diagnostic trouble code menu.

sss:

Are diagnostic trouble codes present?

Result:

YES: Correct all diagnostic trouble codes. See Reading Engagement and Monitor Unit Diagnostic Trouble Codes . (Group 9015-20.)

NO: Proceed with operational checkout.

(2) Monitor and Gauge Circuits Check

Action:

Sit in operator's seat.

sss:

Do gauges move to far right position, then move to the center position, and then display the machine status?

sss:

Do all indicators illuminate and then go out depending on machine status?

sss:

Do all monitor display segments turn on, turn off, display correct machine model setting for 3 seconds, display hour meter for 10 seconds, and then display last selected run display item?

Close cab door if equipped.

sss:

Does cab door indicator go off?

Buckle seat belt.

sss:

Do seat and seat belt indicators go off?

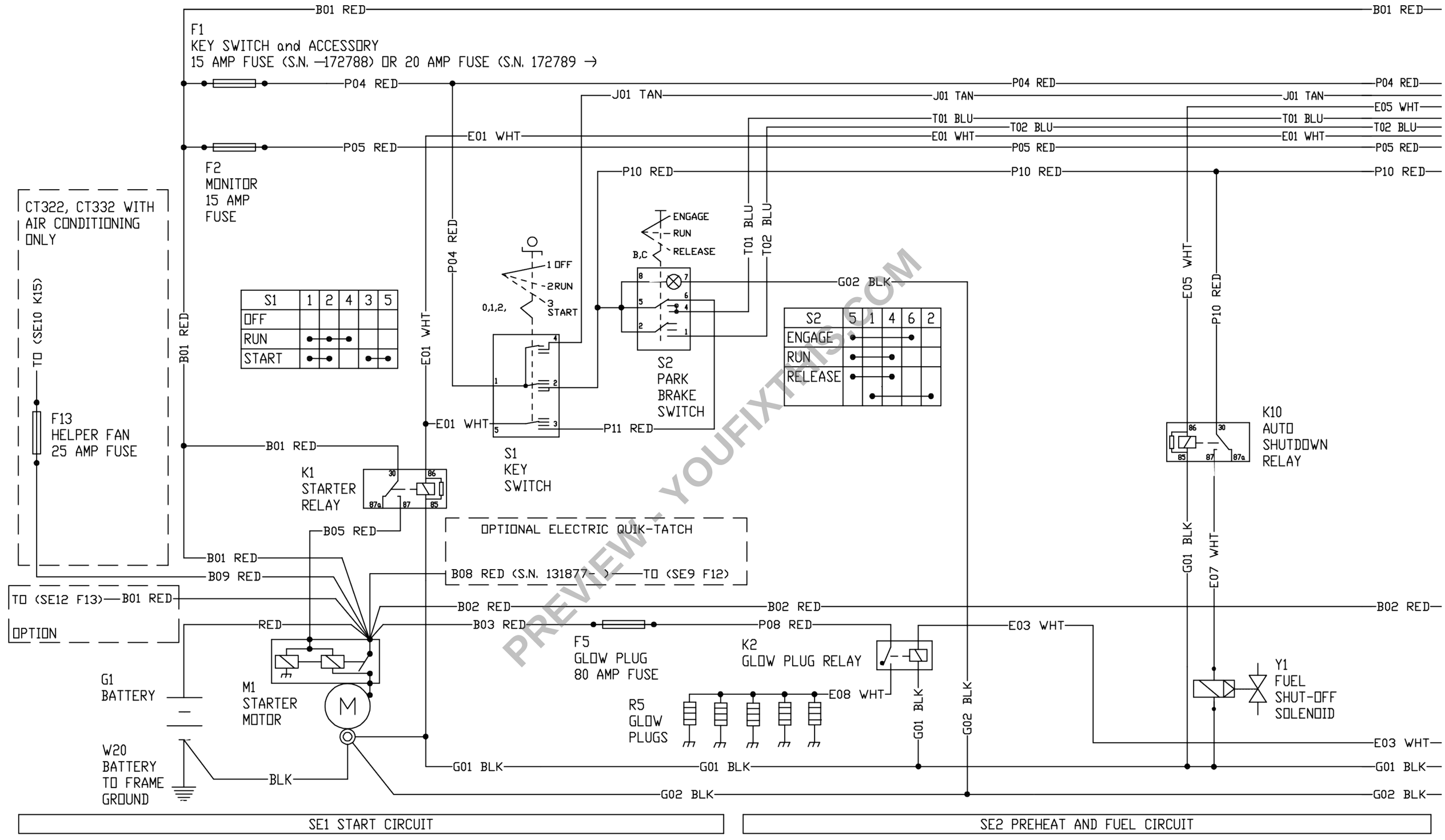
Result:

YES: Go to next check.

NO: Check F2 monitor 15 amp fuse. See Fuse Specifications . (Group 9015-10.)

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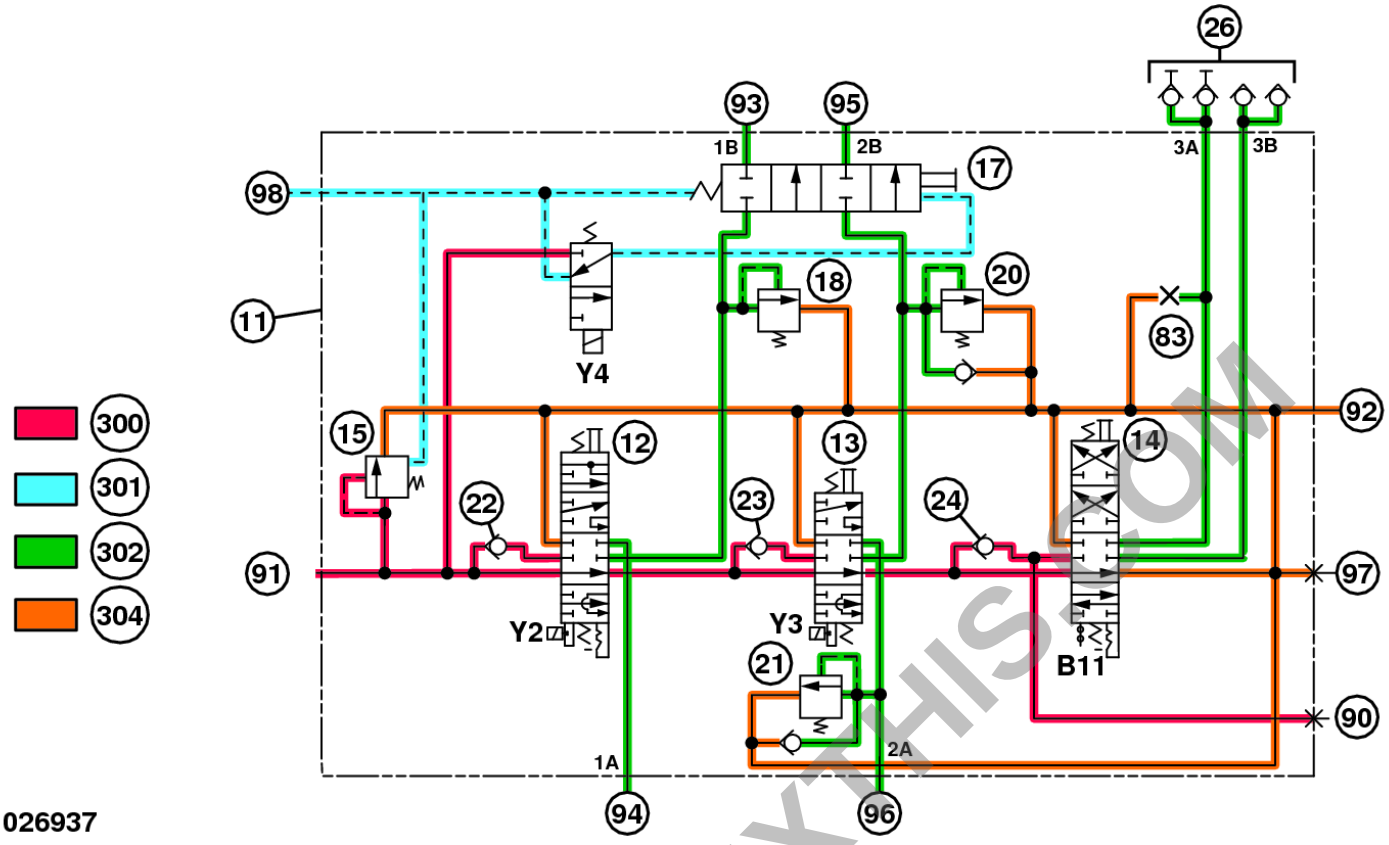
TX1073875

SYSTEM FUNCTIONAL SCHEMATIC (1 OF 5)

System Functional Schematic (SE1 and SE2) (1 of 5)

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TX1026937

Control Valve Schematic (S.N. 150523—)

LEGEND:

11	Control Valve
12	Boom Spool
13	Bucket Spool
14	Auxiliary Spool
15	System Relief Valve
17	Port Lock Spool
18	Boom Up Circuit Relief Valve
20	Bucket Rollback Circuit Relief and Anticavitation Valve
21	Bucket Dump Circuit Relief and Anticavitation Valve
22	Boom Lift Check Valve
23	Bucket Lift Check Valve
24	Auxiliary Lift Check Valve
26	Auxiliary Coupler
83	Plug
90	From High Flow Hydraulic Pump
91	From Hydraulic Pump
92	To Hydraulic Oil Tank
93	Boom Up Port
94	Boom Down Port
95	Bucket Rollback Port
96	Bucket Dump Port
97	Power Beyond Port—If Equipped
98	To Hydraulic Oil Tank
99	Auxiliary Port
300	High Pressure Oil
301	Return Oil
302	Trapped Oil
304	Charge Pressure Oil
B11	Auxiliary Hydraulic Spool Neutral Switch
Y2	Boom Spool Lock Solenoid
Y3	Bucket Spool Lock Solenoid
Y4	Port Lock Solenoid Valve

The control valve (11) integrates three valve spools and pressure relief valves for the individual circuits and the entire system into one housing.

Boom Cylinder Circuit

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Diagnostic Trouble Codes Quick Reference

Engagement and Monitor Unit Diagnostic Trouble Codes

Code	Description
F9D0	Coolant Temperature Sensor Input Low
F9D5	Coolant Temperature Sensor Input High
F965	Fuel Level Sensor Input High
F974	Alternator Voltage Out of Range High
F980	Hydraulic Oil Temperature Sensor Input Low
F985	Hydraulic Oil Temperature Sensor Input High
F9P8	Park Brake Output Open or Shorted to Power
F9P9	Park Brake Output Shorted to Ground
F9H8	Hydraulic Output Open or Shorted to Power
F9H9	Hydraulic Output Shorted to Ground
F9J8	Glow Plug Relay Output Open or Shorted to Power
F9J9	Glow Plug Relay Output Shorted to Ground
F9K8	Auto Shutdown Relay Output Open or Shorted to Power
F9K9	Auto Shutdown Relay Output Shorted to Ground
F9M9	Engagement and Monitor Unit Warning Alarm Output Shorted to Ground.

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Group 25 - Tests

Engine Speed Test and Adjustment

Specifications

SPECIFICATIONS	
Engine—Slow Idle Speed	1230—1370 rpm
Engine—Fast Idle Speed	2930—3070 rpm

[1] - Park machine on a flat level surface.

[2] - Run machine until engine reaches operating temperature.

[3] - Run machine at slow idle and record engine rpm from engagement and monitor unit display. Check measurement against specification.

Item	Measurement	Specification
Engine—Slow Idle	Speed	1230—1370 rpm

[4] - Repeat procedure for fast idle. Check measurement against specification.

Item	Measurement	Specification
Engine—Fast Idle	Speed	2930—3070 rpm

→NOTE:

Engine will pull down to 2800 rpm under load at fast idle. This is the rated rpm of the machine and is where the machine makes full power.

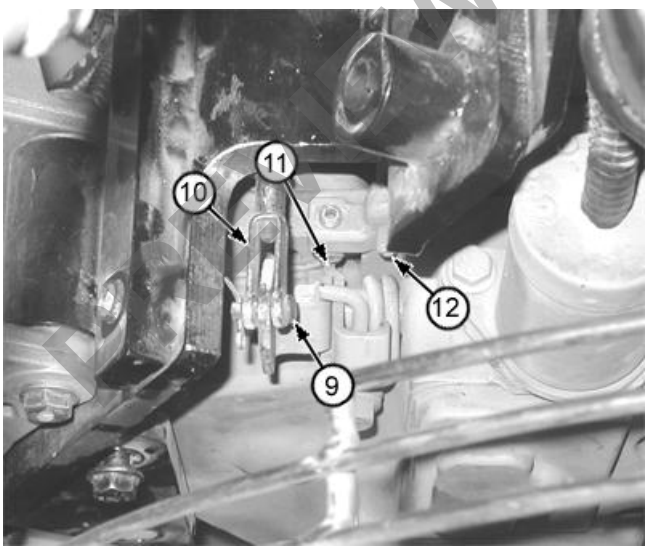
[5] - If engine speed does not meet specification, check adjustment of engine speed control linkage. If engine meets specification, but will not maintain engine speed, tighten engine speed control lever pivot cap screw.

[6] - Raise boom and engage boom lock.

[7] - Raise engine cover and remove side shields.

[8] - Remove air conditioner compressor from bracket (if equipped) and move aside. See Air Conditioner Compressor Remove and Install . (Group 1830.)

[9] -



LEGEND:

9	Pin
10	Clevis
11	Slow Idle Speed Stop Screw
12	Fast Idle Speed Stop Screw

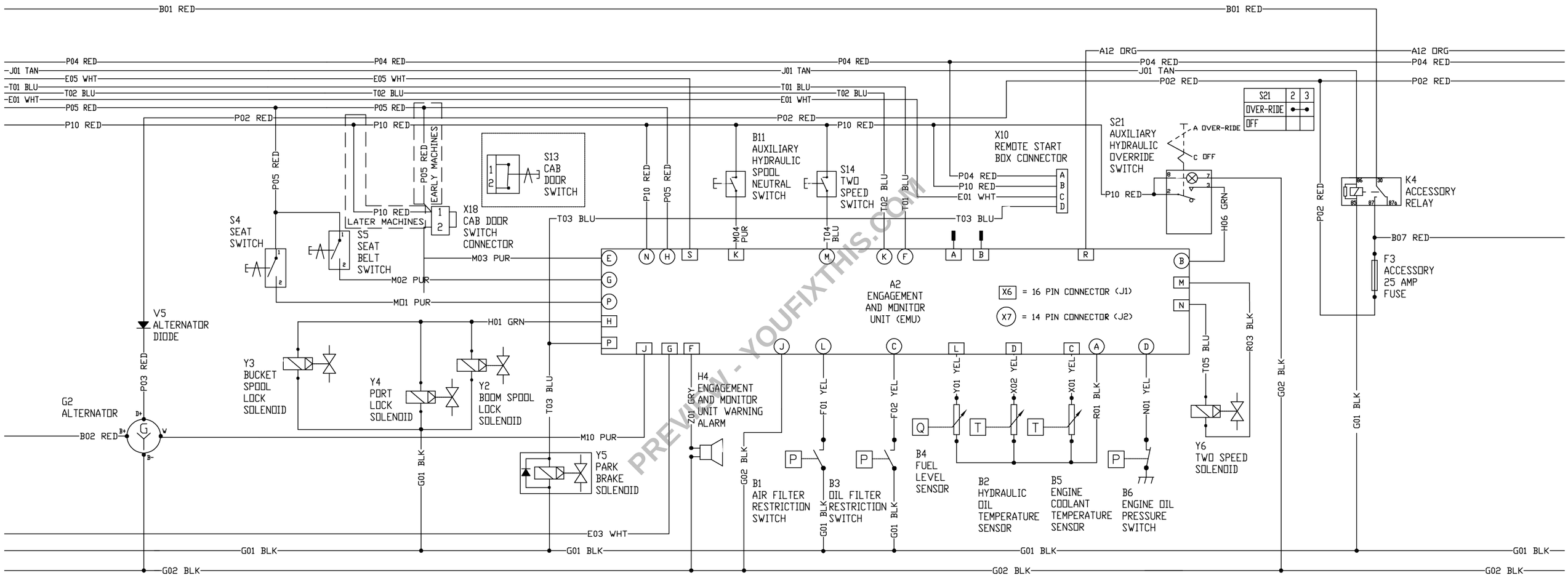
Engine Governor

Move engine speed control lever to slow and fast idle. Make sure governor control lever makes contact with both the fast (12) and slow (11) idle speed stop screws. If governor control lever does not make contact with stop screws, adjust engine speed control linkage.

[10] -

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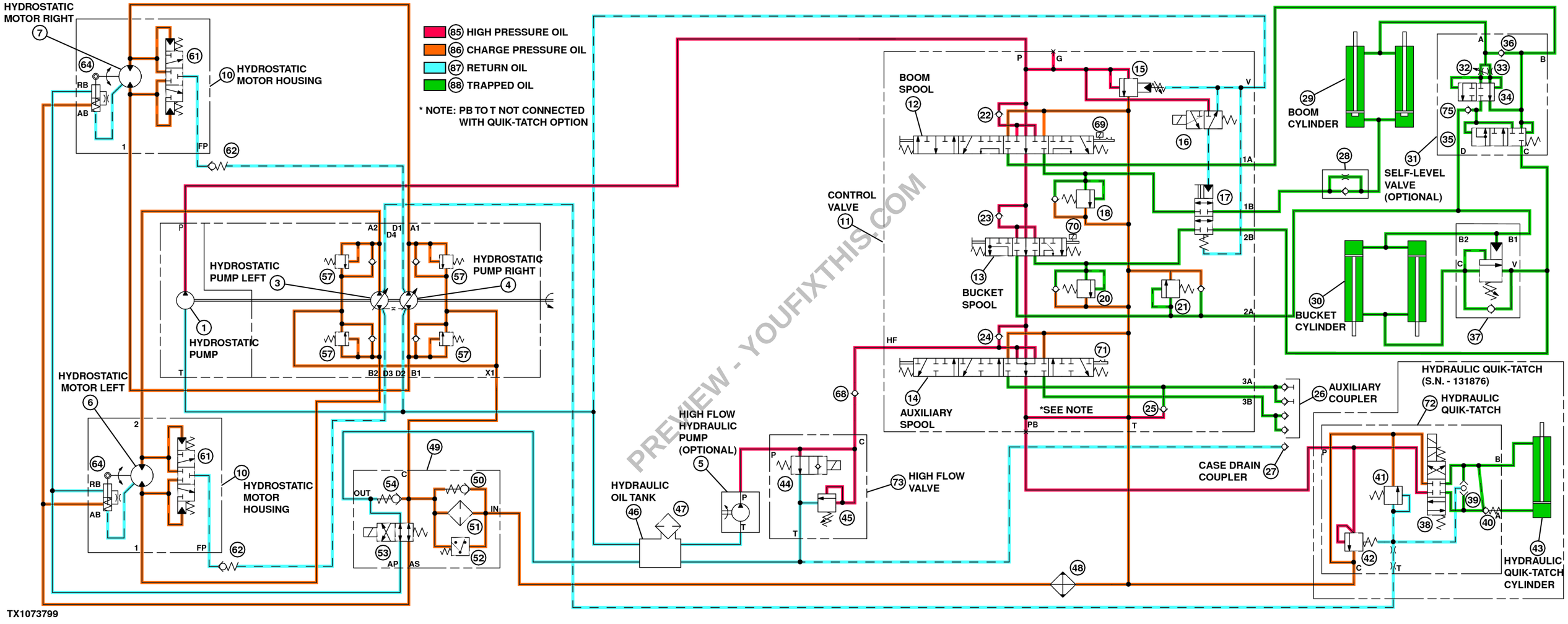
SYSTEM FUNCTIONAL SCHEMATIC (2 OF 5)

System Functional Schematic (SE3, SE4 and SE5) (2 of 5)

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Hydraulic System Schematic—Skid Steer Loader (S.N. —150522)



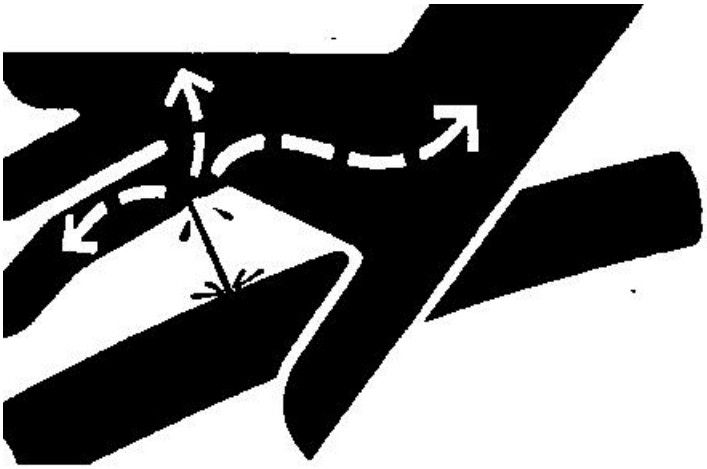
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Hydraulic System Schematic—Skid Steer Loader (S.N. —150522)

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Hydraulic System Pressure Release

CAUTION:



Escaping Fluid

Escaping fluid under pressure can penetrate the skin causing serious injury. Avoid the hazard by relieving pressure before disconnecting hydraulic or other lines. Tighten all connections before applying pressure. Search for leaks with a piece of cardboard. Protect hands and body from high pressure fluids.

If an accident occurs, see a doctor immediately. Any fluid injected into the skin must be surgically removed within a few hours or gangrene may result. Doctors unfamiliar with this type of injury should reference a knowledgeable medical source. Such information is available from Deere & Company Medical Department in Moline, Illinois, U.S.A.

→NOTE:

This procedure can also be used to lower the boom mechanically. For skid steer loader, see Boom Release . (Operator′s Manual.) For compact track loader, see Boom Release . (Operator′s Manual.)

This procedure is to relieve trapped hydraulic system pressure prior to performing hydraulic system repairs or tests.

[1] - Sit in seat. Close cab door if equipped.

[2] - Fasten seat belt.

[3] - Turn key switch to run position but do not start engine.

[4] - Move park brake switch to run position.

[5] -

CAUTION:

To prevent crushing injury, only perform hydraulic system pressure release with boom down or boom up with boom lock engaged. To lower boom after machine is stalled, see Boom Release in the skid steer loader Operator′s Manual, or see Boom Release in the compact track loader Operator′s Manual.

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Group 15 - Diagnose Observable Machine Symptoms
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Group 01 - Safety

Recognize Safety Information



Safety Alert Symbols



Safety Alert Symbols

This is the safety alert symbol. When this symbol is noticed on the machine or in this manual, be alert for the potential of personal injury.

Follow the precautions and safe operating practices highlighted by this symbol.

A signal word — DANGER, WARNING, or CAUTION — is used with the safety alert symbol. DANGER identifies the most serious hazards.

On the machine, DANGER signs are red in color, WARNING signs are orange, and CAUTION signs are yellow. DANGER and WARNING signs are located near specific hazards. General precautions are on CAUTION labels.

Follow Safety Instructions



Follow Safety Instructions

Read the safety messages in this manual and on the machine. Follow these warnings and instructions carefully. Review them frequently.

Be sure all operators of this machine understand every safety message. Replace operator's manual and safety labels immediately if missing or damaged.

Operate Only If Qualified

Do not operate this machine unless the operator's manual has been read carefully, and you have been qualified by supervised

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Foreword

This manual is written for an experienced technician. Essential tools required in performing certain service work are identified in this manual and are recommended for use.

Live with safety: Read the safety messages in the introduction of this manual and the cautions presented throughout the text of the manual.

CAUTION:

This is the safety-alert symbol. When you see this symbol on the machine or in this manual, be alert to the potential for personal injury.

Technical manuals are divided in two parts: repair and operation and tests. Repair sections tell how to repair the components. Operation and tests sections help you identify the majority of routine failures quickly.

Information is organized in groups for the various components requiring service instruction. At the beginning of each group are summary listings of all applicable essential tools, service equipment and tools, other materials needed to do the job, service parts kits, specifications, wear tolerances, and torque values.

Technical Manuals are concise guides for specific machines. They are on-the-job guides containing only the vital information needed for diagnosis, analysis, testing, and repair.

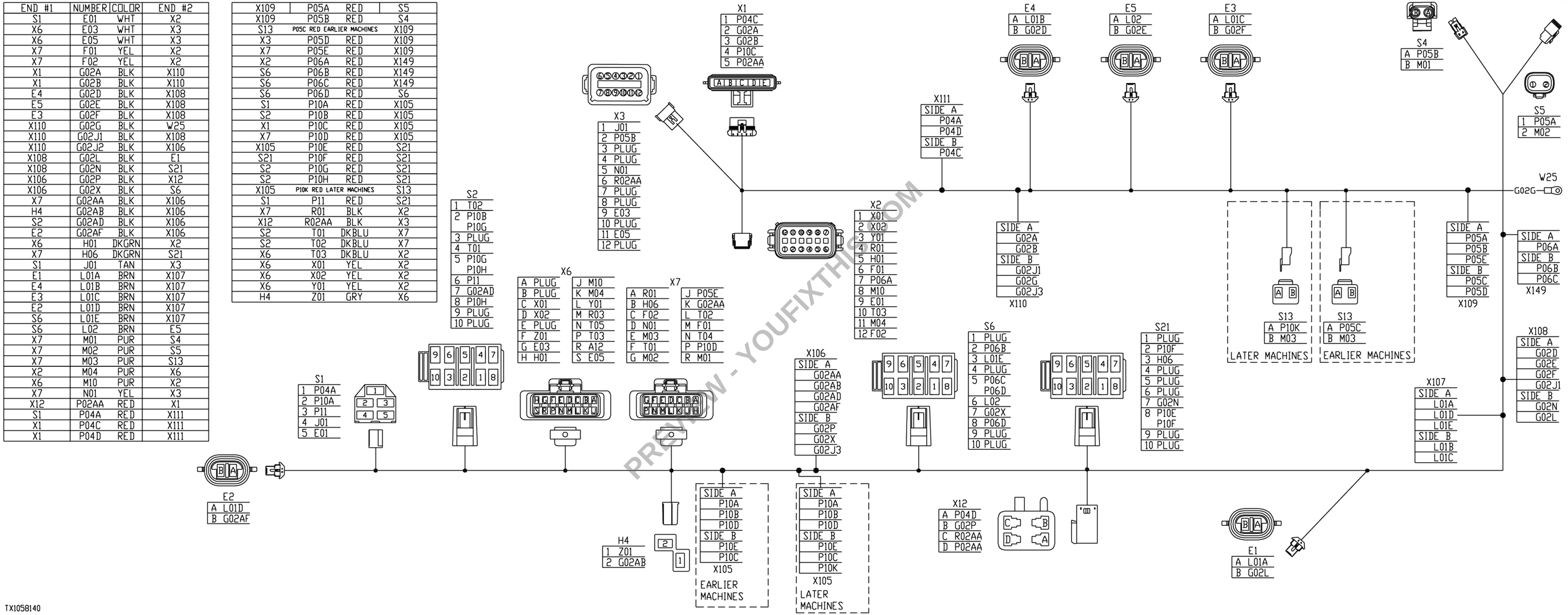
Fundamental service information is available from other sources covering basic theory of operation, fundamentals of troubleshooting, general maintenance, and basic type of failures and their causes.

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END #1	NUMBER	COLOR	END #2
S1	E01	WHT	X2
X6	E03	WHT	X3
X6	E05	WHT	X3
X7	F01	YEL	X2
X7	F02	YEL	X2
X1	G02A	BLK	X110
X1	G02B	BLK	X110
E4	G02D	BLK	X108
E5	G02E	BLK	X108
E3	G02F	BLK	X108
X110	G02G	BLK	W25
X110	G02J1	BLK	X108
X110	G02J2	BLK	X106
X108	G02L	BLK	E1
X108	G02N	BLK	S21
X106	G02P	BLK	X12
X106	G02X	BLK	S6
X7	G02AA	BLK	X106
H4	G02AB	BLK	X106
S2	G02AD	BLK	X106
E2	G02AF	BLK	X106
X6	H01	DKGRN	X2
X7	H06	DKGRN	S21
S1	J01	TAN	X3
E1	L01A	BRN	X107
E4	L01B	BRN	X107
E3	L01C	BRN	X107
E2	L01D	BRN	X107
S6	L01E	BRN	X107
S6	L02	BRN	E5
X7	M01	PUR	S4
X7	M02	PUR	S5
X7	M03	PUR	S13
X2	M04	PUR	X6
X6	M10	PUR	X2
X7	N01	YEL	X3
X12	P02AA	RED	X1
S1	P04A	RED	X111
X1	P04C	RED	X111
X1	P04D	RED	X111

X109	P05A	RED	S5
X109	P05B	RED	S4
S13	P05C RED EARLIER MACHINES		X109
X3	P05D	RED	X109
X7	P05E	RED	X109
X2	P06A	RED	X149
S6	P06B	RED	X149
S6	P06C	RED	X149
S6	P06D	RED	S6
S1	P10A	RED	X105
S2	P10B	RED	X105
X1	P10C	RED	X105
X7	P10D	RED	X105
X105	P10E	RED	S21
S21	P10F	RED	S21
S2	P10G	RED	S21
S2	P10H	RED	S21
X105	P10K RED LATER MACHINES		S13
S1	P11	RED	S21
X7	R01	BLK	X2
X12	R02AA	BLK	X3
S2	T01	DKBLU	X7
S2	T02	DKBLU	X7
X6	T03	DKBLU	X2
X6	X01	YEL	X2
X6	X02	YEL	X2
X6	Y01	YEL	X2
H4	Z01	GRY	X6



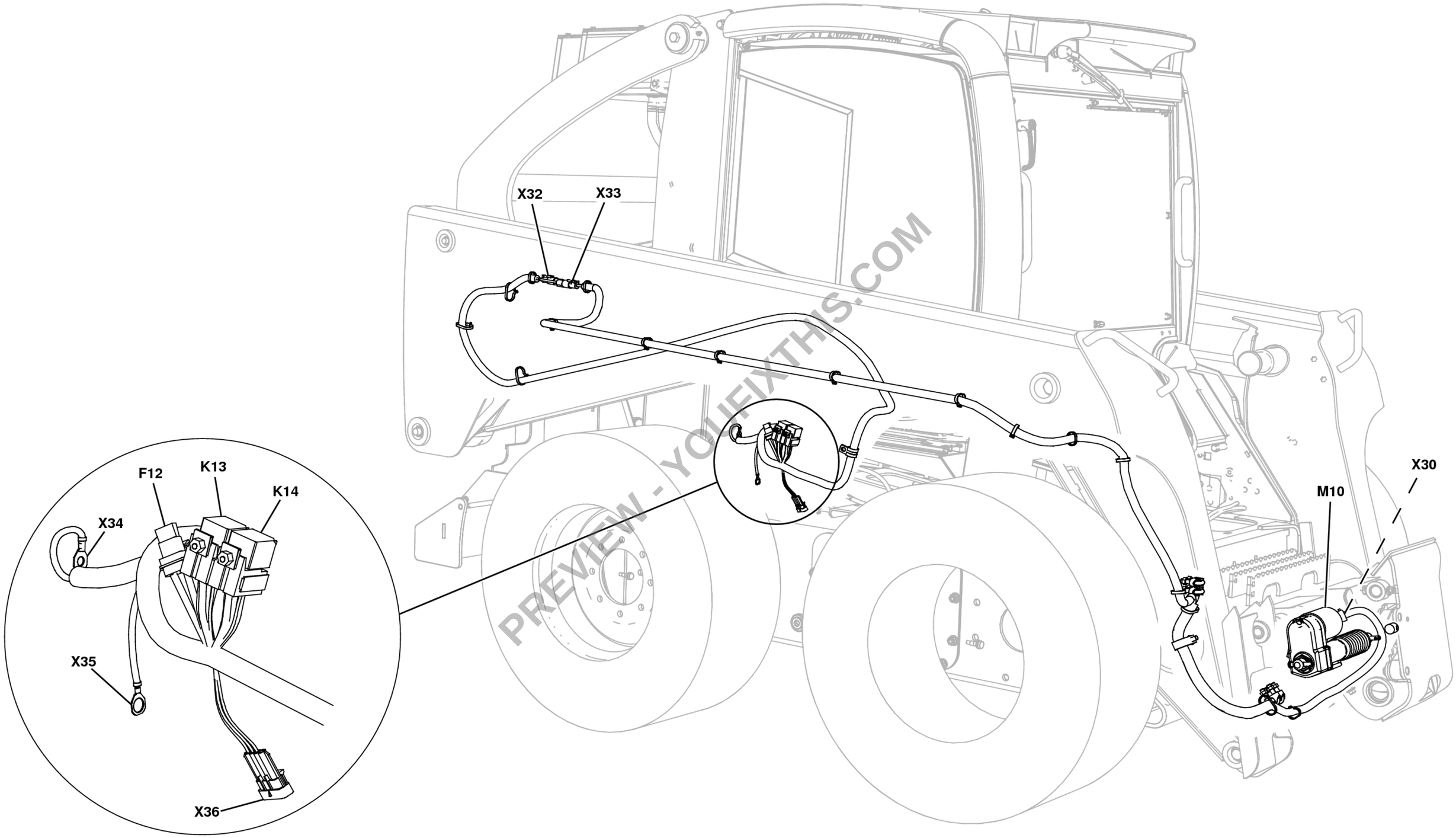
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Cab Harness—Standard (W2) Wiring Diagram (S.N. —170536)

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Electric Quik-Tatch (W28) Component Location (S.N. 131877—)



TX1009210

W28 Component Location

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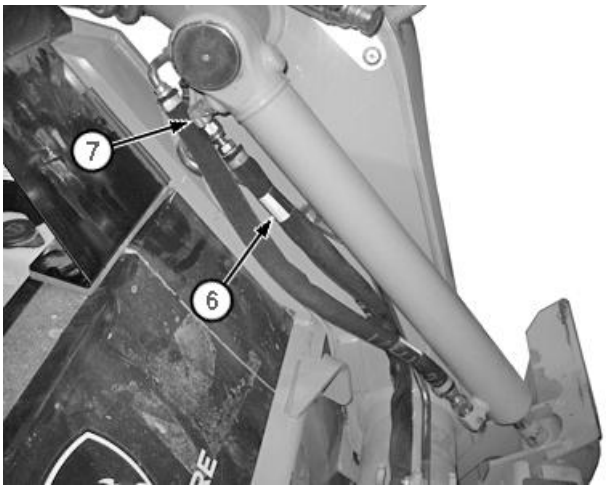
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CAUTION:

High pressure can remain in the boom and bucket hydraulic circuits indefinitely. Prevent injury from escaping hydraulic oil under pressure, relieve the pressure in the system before removing hydraulic lines.

Release hydraulic pressure. See Hydraulic System Pressure Release . (Group 9025-25.)

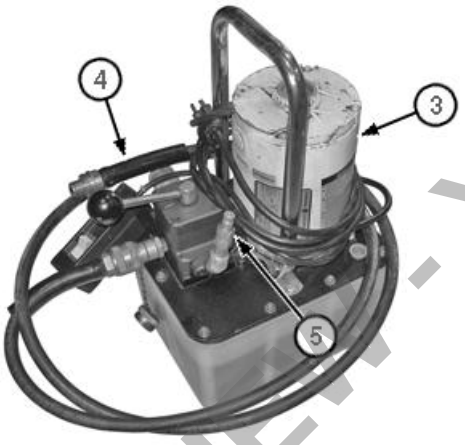
[5] -



Left Bucket Cylinder

LEGEND:

3	JT07192 Electric/Hydraulic Pump
4	Pump Hose
5	Quick Coupler (for attaching JT02156A Digital Pressure/Temperature Analyzer)
6	Left Bucket Cylinder Hose (piston end)
7	Left Bucket Cylinder Fitting (piston end)



JT07192 Electric/Hydraulic Pump

Disconnect hydraulic hose (6) to left bucket cylinder piston end.

[6] - Connect hose (4) from JT07192 Electric/Hydraulic Pump to line from control valve. Cap fitting (7) on hydraulic cylinder.

Electric/Hydraulic Pump

JT07192

This tool is used to pressurize work ports in the control valve.

[7] - Disconnect hydraulic hose to right bucket cylinder piston end. Cap and plug hose and fitting on hydraulic cylinder.

[8] - Connect JT02156A Digital Pressure/Temperature Analyzer with 34 000 kPa (350 bar) (5000 psi) Transducer to JT07192 Electric/Hydraulic Pump. See JT02156A Digital Pressure/Temperature Analyzer Installation . (Group 9025-05.)

Digital Pressure/Temperature Analyzer

JT02156A

This tool is used to measure circuit relief pressures.

[9] - Pull and hold the hydraulic pressure release cable handle.

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