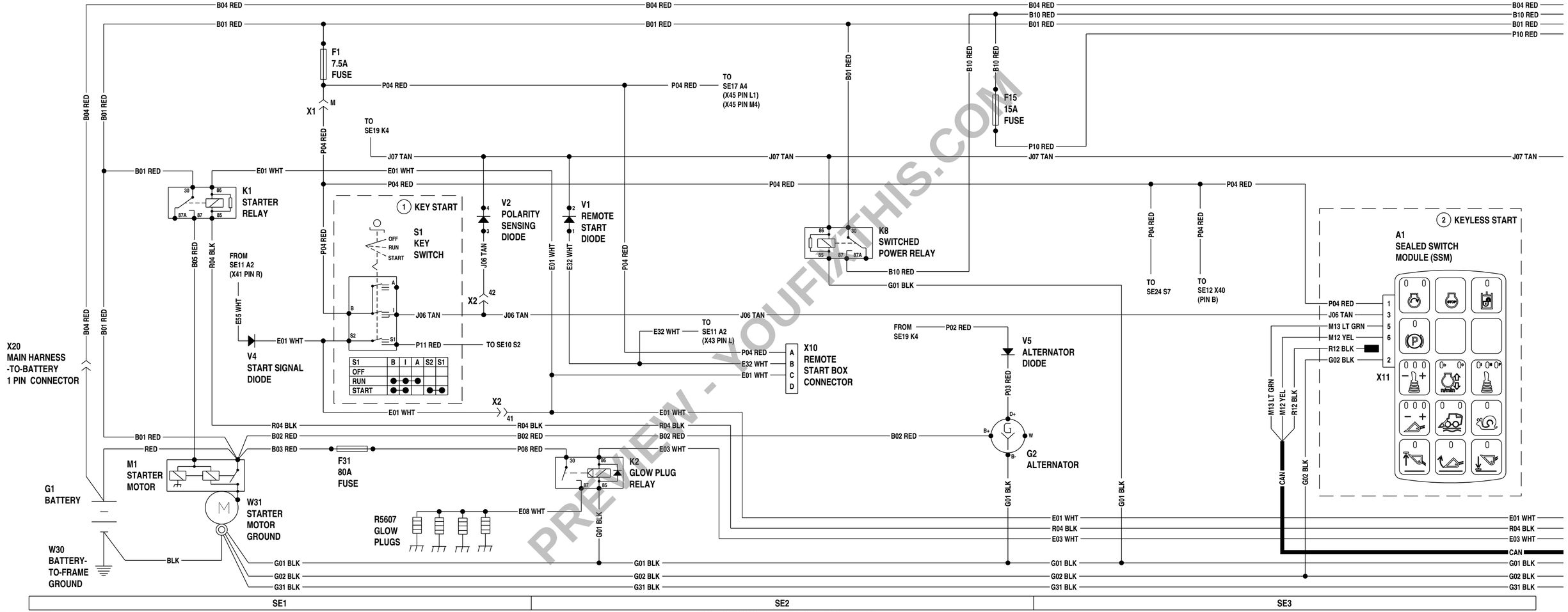
System Functional Schematic

TX1127281 —UN—30JAN13



PREVIEW - YOUFIXTHIS.COM

TX1127281

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EH CONTROLS SYSTEM FUNCTIONAL SCHEMATIC

System Functional Schematic (SE1—SE3) (1 of 9)

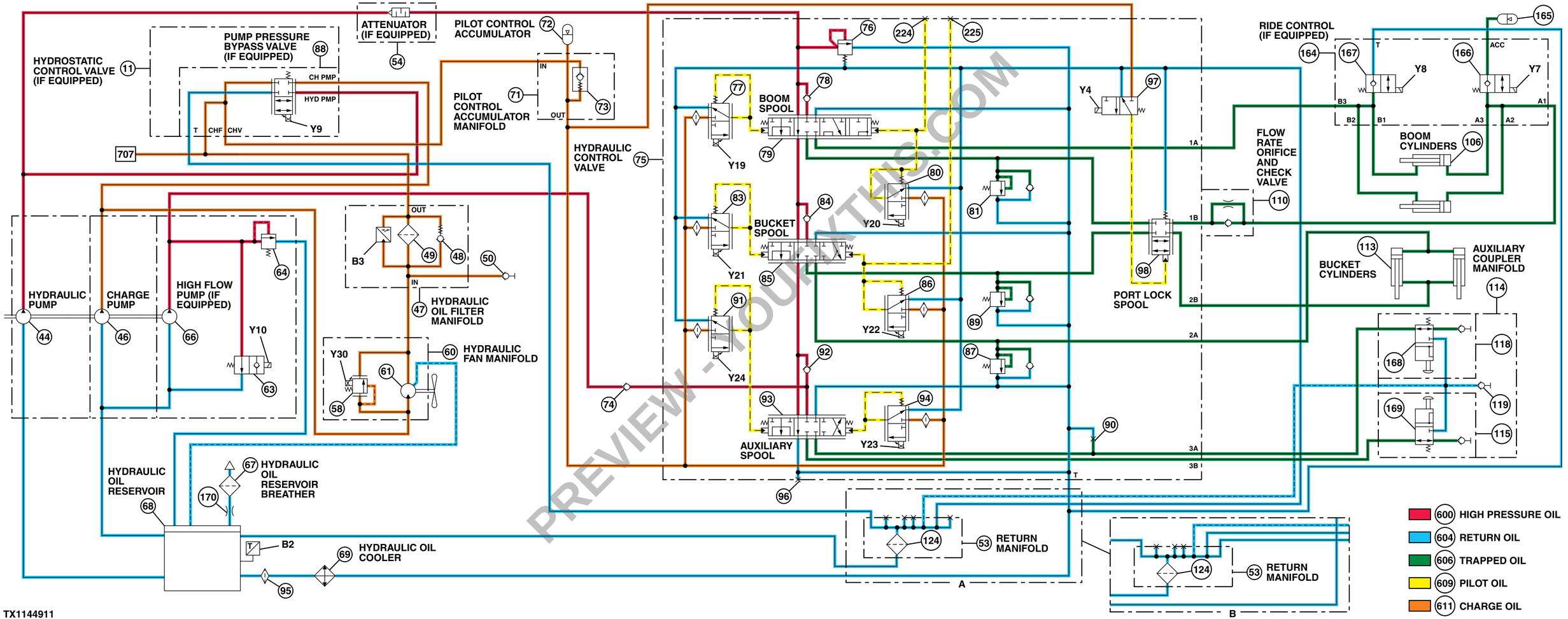
RN74443,00000B4 -19-17JAN19-1/18

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Hydraulic System Schematic

Single Speed (S.N. —269401)

TX1144911 —UN—04OCT13



TX1144911

Continued on next page

Hydraulic System Schematic (S.N. —269401) (standard fan and ride control shown)

DS35042,000003F -19-12MAR19-1/12

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Hydraulic System Relief Valve Test

SPECIFICATIONS	
Hydraulic Oil Temperature	43°C 110°F
Engine Speed	Fast Idle
Hydraulic System Relief Valve Pressure	23 097—24 476 kPa 231—245 bar 3350—3550 psi

SERVICE EQUIPMENT AND TOOLS
JT02158 Digital Pressure and Temperature Analyzer
JT02162 34 000 kPa (350 bar) (5000 psi) Transducer
AT430719 (or similar) 3/4-in. Auxiliary Quick Coupler (female) OR AT430721 (or similar) 1/2-in. Auxiliary Quick Coupler (female)
Adapter Fittings (as needed)
Diagnostic Quick Coupler

This test is to ensure that the hydraulic system relief valve is working properly to protect the hydraulic system from excessive pressures.

1. Remove front attachment and park machine on flat, level surface. See Park and Prepare for Service Safely. (Operator's Manual.)

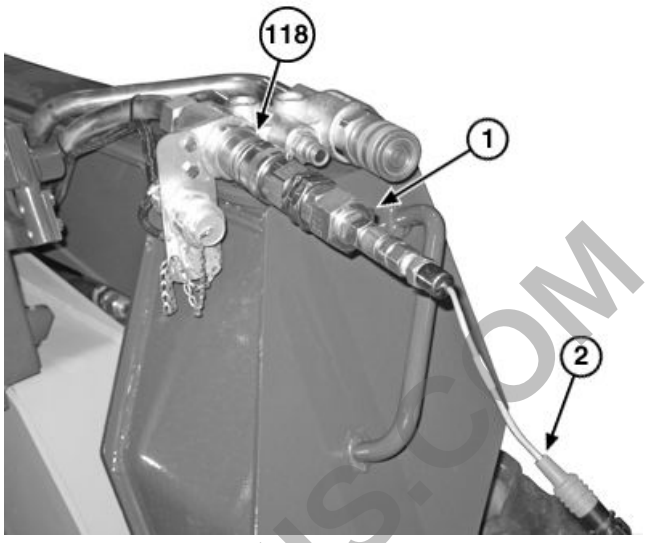
CAUTION: To avoid injury from escaping fluid under pressure, stop engine and relieve the pressure in the system before disconnecting or connecting hydraulic or other lines. Tighten all connections before applying pressure.

2. Stop engine and relieve hydraulic pressure. See Hydraulic System Pressure Release. (Group 9025-25.)
3. Connect auxiliary quick coupler, adapter fittings (as needed), and diagnostic quick coupler (1) to male auxiliary port (118).
4. Connect JT02158 Digital Pressure Analyzer with JT02162 35 000 kPa (350 bar) (5000 psi) Transducer to diagnostic quick coupler.
5. Start engine and warm hydraulic oil to specification.

Specification

Hydraulic Oil—Temperature..... 43°C 110°F

NOTE: If equipped with high flow hydraulics, ensure that high flow hydraulics are not activated.



TX1135397A —UN—22APR13

Hydraulic System Relief Valve Test

1— Auxiliary Quick Coupler (female), Adapter Fittings (as needed), and Diagnostic Quick Coupler
2— JT02162 34 000 kPa (350 bar) (5000 psi) Transducer
118— Male Auxiliary Port

6. If equipped, ensure that high flow hydraulics are not activated.
7. Set engine speed to specification.

Specification

Engine—Speed..... Fast Idle

8. Operate auxiliary function to supply hydraulic flow to the male auxiliary port. See Operating Auxiliary Hydraulics. (Operator's Manual.)

   Pressure in auxiliary circuit will open system relief valve. Record pressure reading when system relief valve opens.

9. Compare system relief valve pressure reading to specification.

Specification

Hydraulic System Relief Valve—Pressure..... 23 097—24 476 kPa 231—245 bar 3350—3550 psi

Continued on next page

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4 Short to Power Check	**Switched power OFF.** Disconnect fuse block 2 connector (X62). Disconnect engine control unit (ECU) 48-pin connector (X5501). **Switched power ON.** Check for voltage at pin D1 (wire R19 BLK) of ECU 48-pin connector (X5501). Is voltage indicated?	**YES:** Harness is short to power. Repair or replace harness. See Main Harness (W3) Wiring Diagram. (Group 9015-10.) **NO:** Go to Short to Ground Check.

MP01188,000026E -19-05MAY16-6/7

5 Short to Ground Check	**Switched power OFF.** Fuse block 2 connector (X62) disconnected. Engine control unit (ECU) 48-pin connector (X5501) disconnected. Check for continuity between pin M1 (wire P40 RED) and machine ground. Is continuity indicated?	**YES:** Harness is short to ground. Repair or replace harness. See Main Harness (W3) Wiring Diagram. (Group 9015-10.) **NO:** Program controller.

MP01188,000026E -19-05MAY16-7/7

522243.02 — Start Assist / Relay

No Warning Indicator

Engine control unit (ECU) has detected glow plug relay (K2) driver circuit is invalid.

Alarm Level:

Additional References:

- See Starting Circuit Theory of Operation. (Group 9015-15.)

MP01188,0000271 -19-12MAY16-1/8

Air Heater Relay Driver Circuit Invalid Diagnostic Procedure

MP01188,0000271 -19-12MAY16-2/8

1 Intermittent Check	Does diagnostic trouble code (DTC) periodically “go away”?	**YES:** DTC is intermittent. See Intermittent Diagnostic Trouble Code (DTC) Diagnostics. (Group 9015-20.) **NO:** Go to Connector Check.

Continued on next page

MP01188,0000271 -19-12MAY16-3/8

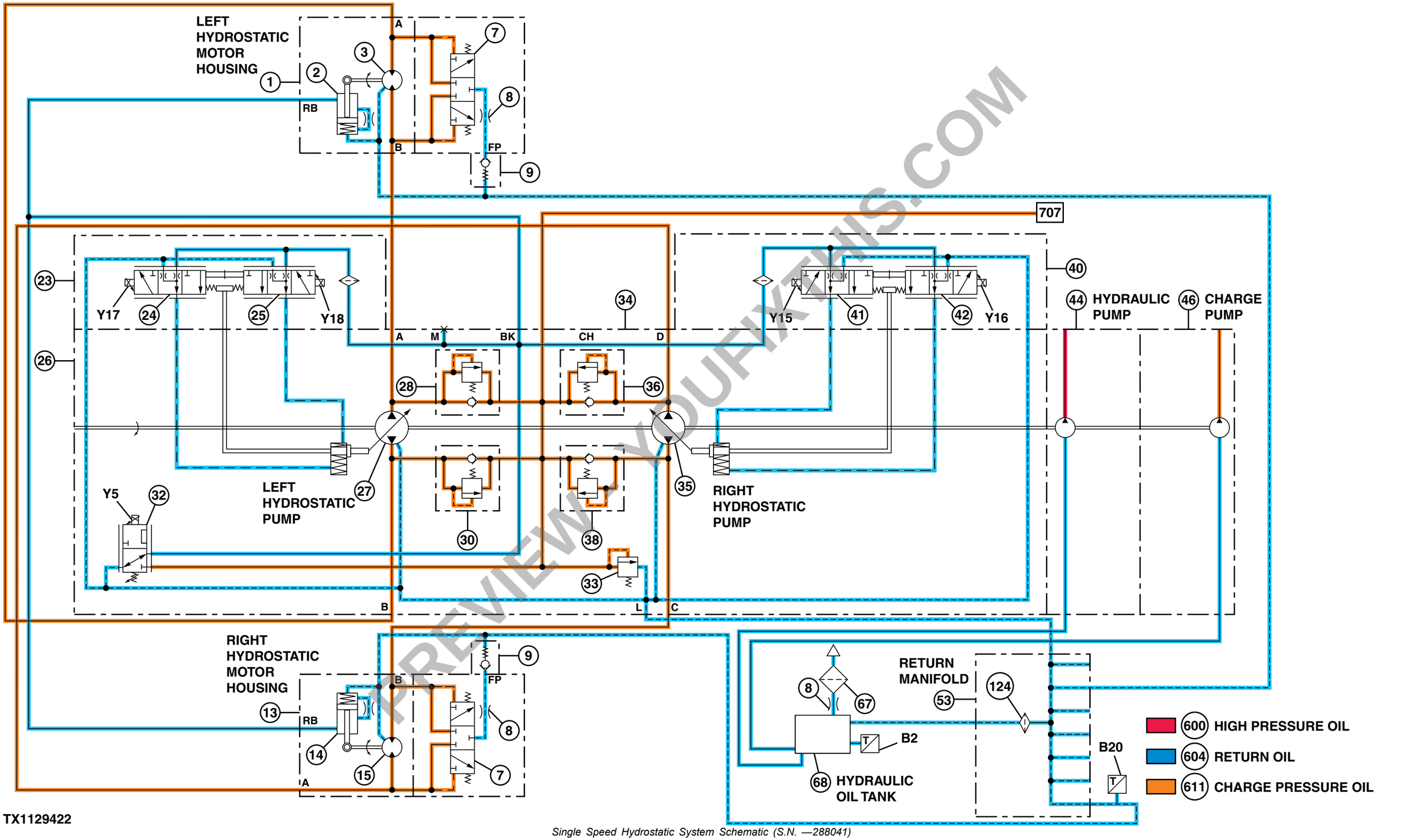
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Hydrostatic System Schematic

Hydrostatic Schematic (S.N. —288041)

TX1129422 —UN—01MAY13



TX1129422

Single Speed Hydrostatic System Schematic (S.N. —288041)

Continued on next page

AB06447,0000949 -19-17SEP15-1/8

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Bucket Curl Drift Check	*NOTE: This check may require two people.* *NOTE: Machine must be equipped with a bucket for this check.* Close cab door—if equipped. Operate hydraulic system until hydraulic oil reaches temperature specification. **Specification** Hydraulic Oil—Temperature ..... 43°C 110°F Dump bucket half way. Actuate boom down function to raise front of machine off of the ground. Engage park brake. Mark and record a distance on the bucket cylinder rod from the cylinder barrel. Disengage park brake. Allow machine to sit with engine speed at slow idle for 5 minutes. Engage park brake. Measure marked distance on bucket cylinder rod. **Specification** Bucket Cylinder—Drift (maximum) ..... 13 mm/5 min. 0.5 in./5 min. *LOOK: Does bucket drift up more than specification?*	**NO:** Go to next check. **YES:** Go to next step in this check.
	Dump bucket half way. Actuate boom down function to raise front of machine off of the ground. Engage park brake. Turn engine off. Allow machine to sit for 5 minutes. **Specification** Bucket Cylinder—Drift (maximum) ..... 13 mm/5 min. 0.5 in./5 min. *LOOK: Does bucket drift up more than specification?*	**YES:** For troubleshooting information. See Bucket Drifts Up. (Group 9025-15.) **NO:** Go to next check.

AD32822,00003E3 -19-08JAN18-38/42

Cycle Times Check—328E	*NOTE: Operate machine without bucket or attachment for this check.* Operate hydraulic system until hydraulic oil reaches temperature specification. **Specification** Hydraulic Oil—Temperature ..... 43°C 110°F Position engine speed control dial in fast idle position. Record cycle time for each function. Does machine perform within specification? **Cycle Times—Specification** Boom Raise—Cycle Time (maximum) ..... 4.2 sec. Boom Lower—Cycle Time (maximum) ..... 2.6 sec. Bucket Curl—Cycle Time (maximum) ..... 2.4 sec. Bucket Dump—Cycle Time (maximum) ..... 1.7 sec.	**YES:** Go to next check. **NO:** See Hydraulic Functions Slow or No Power. (Group 9025-25.)

Continued on next page

AD32822,00003E3 -19-08JAN18-39/42

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The PIN identifies the producing factory, machine model number, machine option, year of manufacture, engine emission level, and machine serial number.

17-Character PIN Example																
(3)			(4)				(5)	(6)	(7)	(8)	(9)					
1	T	0	3	2	8	E	_	_	_	E	2	3	6	6	7	3
1	T	0	3	3	2	E	_	_	_	E	2	3	6	6	7	0

- **(3)—World Code**—Identifies location where machine is manufactured.
- **(4)—Machine Model Identifier**—Identifies model number.
- **(5)—Machine Option Code**—Identifies which major machine option is equipped. This character will change from one machine to another.
- **(6)—Check Letter**—This is a random character assigned by the factory. This is not used in machine identification.
- **(7)—Manufacturing Year Code**—Identifies year of machine manufacture.
- **(8)—Engine Emission Code**—Represents engine emission certification.
- **(9)—Machine Serial Number**—Identifies machine serial number. This character will change from one machine to another.

The following is an example for a 328E machine that meets Interim Tier 4 and Stage III B emission levels:

1T0328E_ _ _E236673

1T0 ..... **World Code** (manufacturing location)
- 1DW ..... Davenport Works
- 1T8 ..... Thibodaux Works
- 1T0 ..... Dubuque Works

328E ..... **Machine Model Identifier**

_ ..... **Machine Option Code**
- J ..... Single Speed Electrohydraulic (EH)
- K ..... 2-Speed Electrohydraulic EH
- L ..... Single Speed High Flow Electrohydraulic (EH)
- M ..... 2-Speed High Flow Electrohydraulic (EH)

_ ..... **Check Letter** (variable)

_ ..... **Manufacturing Year Code** (variable)
- C 2012
- D 2013
- E 2014
- F 2015
- G 2016

E ..... **Engine Emission Code**
- C ..... Tier 2 and Stage II
- D ..... Tier 3 and Stage III A
- E ..... Interim Tier 4 and Stage III B
- F ..... Tier 4 Stage IV
- G ..... Interim Tier 4 and Stage III A (19-56 kW)

236673 ..... **Machine Serial Number**

JK47244,00001A5 -19-05APR13-2/2

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6 Controller Ground Check	**Switched power OFF.** Disconnect ECU connector 2 (X5502). Check for continuity between: • Pin 20 (wire G31 BLK) of ECU connector 2 (X5502) and machine ground. • Pin 39 (wire G31 BLK) of ECU connector 2 (X5502) and machine ground. • Pin 40 (wire G31 BLK) of ECU connector 2 (X5502) and machine ground. • Pin 59 (wire G31 BLK) of ECU connector 2 (X5502) and machine ground. • Pin 60 (wire G31 BLK) of ECU connector 2 (X5502) and machine ground. • Pin 79 (wire G31 BLK) of ECU connector 2 (X5502) and machine ground. • Pin 80 (wire G31 BLK) of ECU connector 2 (X5502) and machine ground. Is continuity indicated?	**YES:** Checks complete. **NO:** Repair or replace harness. See appropriate wiring diagram or schematic.

AB06447,0000974 -19-13FEB13-8/8

000237.13 — Vehicle Identification / Number

No Warning Indicator

The engine control unit (ECU) vehicle identification number does not match.

Alarm Level:

Additional References:

- See Engine Control Unit (ECU) Circuit Theory of Operation. (Group 9015-15.)

AB06447,0000975 -19-15FEB13-1/4

Engine Control Unit (ECU) Configuration Invalid Diagnostic Procedure

AB06447,0000975 -19-15FEB13-2/4

1 Intermittent Check	Does diagnostic trouble code (DTC) periodically “go away”?	**YES:** DTC is intermittent. See Intermittent Diagnostic Trouble Code (DTC) Diagnostics. (Group 9015-20.) **NO:** Go to Controller Area Network (CAN) Circuit Check.

AB06447,0000975 -19-15FEB13-3/4

2 Controller Area Network (CAN) Circuit Check	Perform CAN circuit test. See Controller Area Network (CAN) Circuit Test. (Group 9015-20.) Does CAN circuit test good?	**YES:** Program controller. **NO:** Repair CAN circuit.

AB06447,0000975 -19-15FEB13-4/4

000237.31 — Vehicle Identification / Number

No Warning Indicator

Vehicle identification number (VIN) sent by engine control unit (ECU) does not match or is not available.

Alarm Level:

Additional References:

- See Engine Control Unit (ECU) Circuit Theory of Operation. (Group 9015-15.)

Continued on next page

AB06447,0000976 -19-15FEB13-1/4

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522827.04 — Fan Auto / Switch Input

Input signal for selecting auto mode from reversing fan switch (S35) short to ground.

Alarm Level:

No Warning Indicator

Additional References:

- See Engagement and Monitor Unit (EMU) Circuit Theory of Operation. (Group 9015-15.)

AB06447,0000998 -19-20MAR17-1/6

VSF Purge Switch Input Out of Range Low Diagnostic Procedure

AB06447,0000998 -19-20MAR17-2/6

1 Intermittent Check	Does diagnostic trouble code (DTC) periodically "go away"?	**YES:** DTC is intermittent. See Intermittent Diagnostic Trouble Code (DTC) Diagnostics. (Group 9015-15.) **NO:** Go to Connector Check.

AB06447,0000998 -19-20MAR17-3/6

2 Connector Check	Disconnect negative (-) terminal from battery. Check the following connectors for damage, corrosion, or debris. Use JDG10466 Flex Probe Kit to check for pin fit and continuity. • Cab harness (W2). See Cab Harness (W2) Component Location. (Group 9015-10.) - Reversing fan switch (S35). - EMU 14-pin connector (X42). Are connectors in good condition?	**YES:** Go to Component Check. **NO:** Repair or replace connector.

AB06447,0000998 -19-20MAR17-4/6

3 Component Check	**Switched power OFF.** Reversing fan switch (S35) disconnected. Check continuity through reversing fan switch (S35). See Electrical Component Checks. (Group 9015-20.) Is continuity indicated?	**YES:** Go to Wire Harness Check. **NO:** Reversing fan switch (S35) malfunction. Replace switch.

AB06447,0000998 -19-20MAR17-5/6

4 Wire Harness Check	**Switched power OFF.** Disconnect reversing fan switch (S35) and EMU 14-pin connector (X42). Check for continuity at pin D (wire E40 WHT) of EMU 14-pin connector (X42) to machine ground. Is continuity indicated?	**YES:** Repair or replace harness. See appropriate wiring diagram or schematic. **NO:** Program controller.

AB06447,0000998 -19-20MAR17-6/6

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516193.04 — Left Foot Pedal / Signal 1

Left pedal sensor (B11) circuit open or voltage out of range low (below 0.5 V).

Alarm Level:

No Warning Indicator

Additional References:

- See Hydraulic System Control Circuit Theory of Operation. (Group 9015-15.)

DS35042,00001DA -19-19JUL13-1/8

Left Pedal Signal Diagnostic Procedure

DS35042,00001DA -19-19JUL13-2/8

1 Intermittent Check	Does diagnostic trouble code (DTC) periodically "go away"?	**YES:** DTC is intermittent. See Intermittent Diagnostic Trouble Code (DTC) Diagnostics. (Group 9015-15.) **NO:** Go to Connector Check.

DS35042,00001DA -19-19JUL13-3/8

2 Connector Check	Disconnect negative (-) terminal from battery. Check the following connectors for damage, corrosion, or debris. Use JDG10466 Flex Probe Kit to check for pin fit and continuity. • Main harness (W3). See Main Harness (W3) Component Location. (Group 9015-10.) - Hydraulic control unit (HCU) 32-pin connector 3 (X46). - Main harness-to-hydraulic valve harness connector 2 (X4). • Hydraulic valve harness (W10). See Hydraulic Valve Harness (W10) Component Location. (Group 9015-10.) - Left pedal sensor harness connector (X13). • Left pedal sensor harness (W23). See Left Pedal Sensor Harness (W23) Component Location. (Group 9015-10.) - Left pedal sensor (B11). Are connectors in good condition?	**YES:** Go to Open Circuit Check. **NO:** Repair or replace connector.

DS35042,00001DA -19-19JUL13-4/8

3 Open Circuit Check	**Switched power OFF.** Disconnect the following: • Left pedal sensor (B11). • Hydraulic Control Unit (HCU) 32-Pin Connector 3 (X46) Check for continuity between the following: • Pin F4 (wire H42 GRN) of HCU connector (X46) and pin A of left pedal position sensor (B11) connector. • Pin G4 (wire H43 GRN) of HCU connector (X46) and pin F of left pedal position sensor (B11) connector.	**YES:** Go to Short Circuit Check. **NO:** Wire without continuity is open. Repair or replace harness as necessary.

Continued on next page

DS35042,00001DA -19-19JUL13-5/8

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5 Solenoid Check	**Switched power OFF.** Check resistance of boom up solenoid (Y19). See Electrical Component Specifications. (Group 9015-20.) Is resistance within specification?	**YES:** Program controller. **NO:** Replace boom up solenoid (Y19).

DS35042,000020E -19-28FEB13-7/7

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3 Hydraulic Oil Cooler Check	Check hydraulic oil cooler for excessive debris buildup. See Hydraulic System Component Location. (Group 9025-15.) Is hydraulic oil cooler free of excessive debris?	**YES:** Go to Component Check. **NO:** Clean hydraulic oil cooler. See Check and Clean Cooling Package. (Operator's Manual.)

AB06447,00009EA -19-28FEB13-5/6

4 Component Check	**Switched power OFF.** Disconnect hydraulic oil temperature sensor (B2). Measure resistance between: • Pins A and B of hydraulic oil temperature sensor (B2). Compare resistance to specification. See Electrical Component Specifications. (Group 9015-20.) Is resistance within specification?	**YES:** Hydraulic oil is overheating. See Hydraulic Oil Overheats. (Group 9025-15.) **NO:** Replace hydraulic oil temperature sensor (B2).

AB06447,00009EA -19-28FEB13-6/6

001508.03 — Hydraulic Oil / Temperature

Hydraulic oil temperature sensor (B2) input voltage is greater than 4.96 volts for 4 seconds or is shorted to power.

Alarm Level:
No Warning Indicator

Machine Response:

Power Train Derated 50%

- See Hydraulic System Control Circuit Theory of Operation. (Group 9015-15.)

Additional References:

- See Hydraulic System Control Circuit Theory of Operation. (Group 9015-15.)

NOTE: Vehicle control unit (VCU) software is contained within hydraulic control unit (HCU) (A4), but VCU software functions independently of HCU.

AB06447,00009EB -19-23MAY13-1/6

Hydraulic Oil Temperature Sensor Short to Power Diagnostic Procedure

AB06447,00009EB -19-23MAY13-2/6

1 Intermittent Check	Does diagnostic trouble code (DTC) periodically "go away"?	**YES:** DTC is intermittent. See Intermittent Diagnostic Trouble Code (DTC) Diagnostics. (Group 9015-20.) **NO:** Go to Connector Check.

Continued on next page

AB06447,00009EB -19-23MAY13-3/6

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Reversing Fan Check (if equipped)



TX1125087 —UN—02NOV12

Reversing Fan Switch

Press reversing fan switch to upper position.

LISTEN/LOOK: Does fan reverse direction and operate at full speed for 15 seconds?

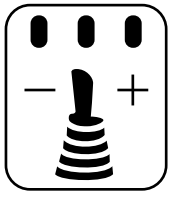
YES: Go to next check.

NO: Check reversing fan circuit. See Hydraulic Fan Will Not Reverse Direction. (Group 9025-15).

AD32822,00003E3 -19-08JAN18-29/42

Transmission Response Check (if equipped)

CAUTION: Prevent injury from unexpected machine movement. Keep bystanders clear of machine.



TX1125284 —UN—06NOV12

Transmission Response Switch

Position engine speed control dial in slow idle position.

NOTE: Engagement and monitor unit (EMU) will display the following rates:

- *Precision Rate—Machine will move at a slower rate suited precise work (1 LED illuminated).*
- *Utility Rate—Machine will move at a rate suited for efficient work (2 LEDs illuminated).*
- *Production Rate—Machine will move at a fast rate suited for quick work (3 LEDs illuminated).*

Press transmission response switch selecting precision rate (1 LED illuminated).

Drive machine forward.

Press transmission response switch selecting utility rate (2 LEDs illuminated).

Drive machine forward.

LOOK/FEEL: Does machine move faster than precision rate?

Press transmission response switch selecting production rate (3 LEDs illuminated).

Drive machine forward.

YES: Go to next check.

NO: See Hydrostatic System Control Circuit Theory of Operation. (Group 9015-15.)

LOOK/FEEL: Does machine move faster than utility rate?

NO: See Slow Response To Changes In Speed. (Group 9026-05.)

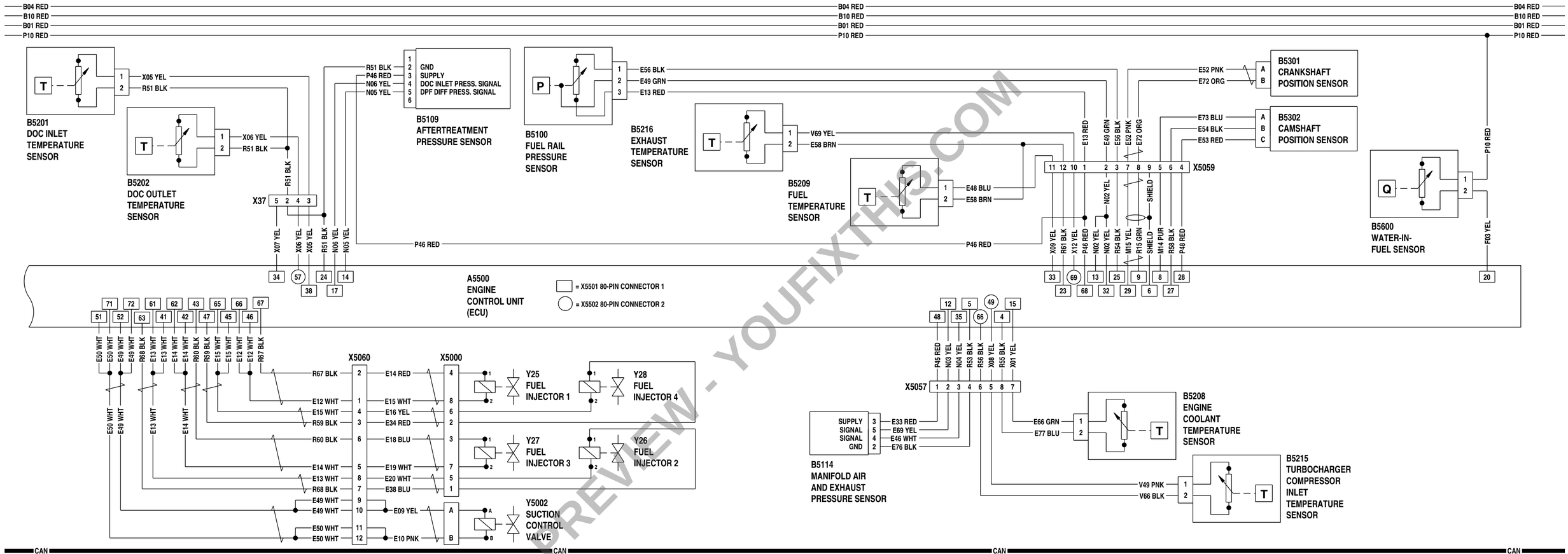
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AD32822,00003E3 -19-08JAN18-30/42

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TX1138011 —UN—03JUN13



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TX1138011

EH CONTROLS SYSTEM FUNCTIONAL SCHEMATIC
System Functional Schematic (SE7—SE9) (3 of 9)

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RN74443,00000B4 -19-17JAN19-5/18

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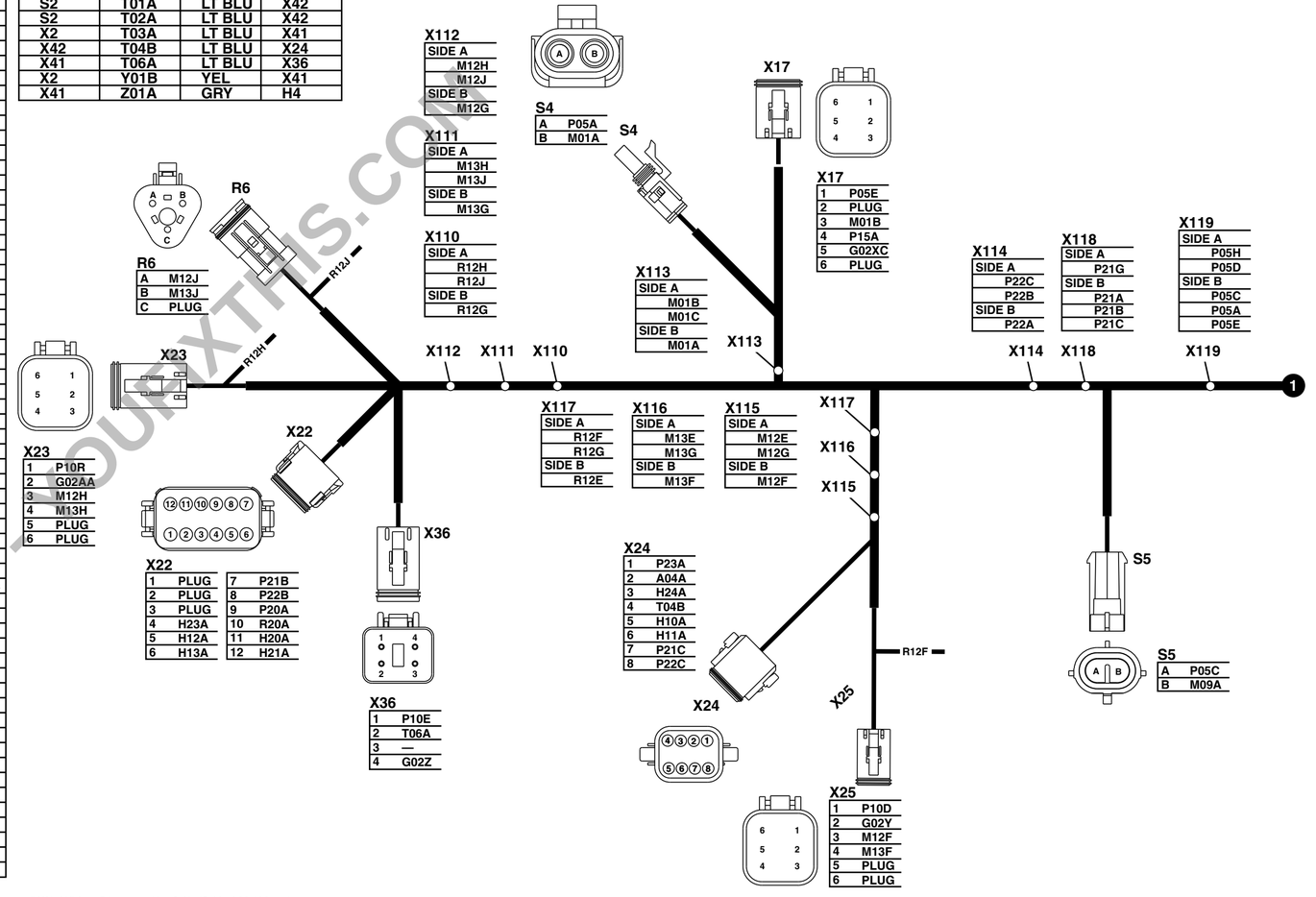
XJ1270072 —UN—18DEC18

END #1	NUMBER	COLOR	END #2
X2	A02B	ORG	M4, S12
X24	A04A	ORG	H3
S9	A05A	ORG	X134
X134	A05C	ORG	S19
X2	A05D	ORG	X134
X2	A06A	ORG	S9
X2	A07A	ORG	S9
X2	A08A	ORG	S19
X2	A11A	ORG	R3
X2	A13A	ORG	S9
X127	E01A	WHT	S1
V4	E01E	WHT	X127
X127	E01F	WHT	X2
X2	E32B	WHT	X43
X2	E33B	WHT	B18
X42	E40A	WHT	S35
X42	E41A	WHT	S35
X41	E55A	WHT	V4
X1	G02A	BLK	X135
X139	G02AA	BLK	X23
X139	G02AO	BLK	X21
X1	G02AQ	BLK	X135
X139	G02B	BLK	S38
X135	G02C	BLK	S26
X135	G02D	BLK	K5
X139	G02F	BLK	S7
X135	G02FA	BLK	S8
X139	G02FB	BLK	S35
X139	G02H	BLK	E2
X139	G02I	BLK	R3
X139	G02J	BLK	S19
X139	G02K	BLK	S2
X139	G02L	BLK	S6
X135	G02M	BLK	S33
X135	G02N	BLK	E9, S24
X135	G02O	BLK	X11
W32	G02P	BLK	X135
X135	G02Q	BLK	G3
X135	G02R	BLK	X40
X139	G02S	BLK	H4
X139	G02T	BLK	X42
X139	G02U	BLK	E1
X139	G02V	BLK	H3
X135	G02W	BLK	M4, S12
X139	G02XC	BLK	X17
X139	G02Y	BLK	X25
X139	G02Z	BLK	X36
X43	H02A	DK GRN	S8
X2	H04A	DK GRN	S26
X2	H05A	DK GRN	S26
X136	H07A	DK GRN	X2
X136	H07B	DK GRN	S38
X136	H07C	DK GRN	X41
X2	H10A	GRN	X24
X2	H11A	GRN	X24
X2	H12A	DK GRN	X22
X2	H13A	DK GRN	X22
X2	H14B	DK GRN	S33
X2	H15B	DK GRN	S33
X43	H20A	DK GRN	X22

END #1	NUMBER	COLOR	END #2
X43	H21A	DK GRN	X22
X2	H23A	DK GRN	X22
X43	H24A	DK GRN	X24
X2	H34A	DK GRN	X43
X2	H35B	DK GRN	X43
X41	H51A	DK GRN	X2
X41	H52B	DK GRN	X2
S7	J03A	TAN	K5
X137	J06A	TAN	S1
X137	J06C	TAN	X11
X2	J06D	TAN	X137
X129	L01A	BRN	E2
X129	L01B	BRN	S6
X129	L01C	BRN	E1
X1	L01H	BRN	X129
X1	L01I	BRN	X129
X2	L02B	BRN	S6
X2	L03A1	BRN	X130
X2	L03A2	BRN	X130
X130	L03G	BRN	K5
X42	L07A	BRN	S6
X41	L08A	BRN	V9
E9, S24	L09A	BRN	V9
X113	M01A	BRN	S4
X113	M01B	BRN	X17
X42	M01C	BRN	X113
X42	M03A	BRN	S13
X42	M09A	BRN	S5
X140	M12A	YEL	X121
X40	M12B	YEL	X121
X121	M12C	YEL	X124
X41	M12D	YEL	X124
X124	M12E	YEL	X115
X25	M12F	YEL	X115
X112	M12G	YEL	X115
X23	M12H	YEL	X112
R6	M12J	YEL	X112
X140	M12K	YEL	X11
X2	M12L	YEL	X140
X141	M13A	DK GRN	X122
X122	M13B	DK GRN	X40
X122	M13C	DK GRN	X125
X41	M13D	DK GRN	X125
X125	M13E	DK GRN	X116
X116	M13F	DK GRN	X25
X116	M13G	DK GRN	X111
X23	M13H	DK GRN	X111
R6	M13J	DK GRN	X111
X141	M13K	DK GRN	X11
X2	M13L	DK GRN	X141
X41	M16A	BRN	M4, S12
X133	P02A	RED	S9
X133	P02B	RED	R3
X133	P02C	RED	S26
X133	P02D	RED	S6
X133	P02E	RED	M4, S12
X133	P02J	RED	S38
X133	P02M	RED	X21
X1	P02P	RED	X133
X132	P04A	RED	S7

END #1	NUMBER	COLOR	END #2
X132	P04B	RED	X11
X132	P04C	RED	S1
X132	P04D	RED	X40
X1	P04J	RED	X132
X119	P05A	RED	S4
X119	P05C	RED	S5
X119	P05D	RED	X42
X119	P05E	RED	X17
X1	P05H	RED	X119
X1	P10AJ	RED	X138
X138	P10AS	RED	S13
S2	P10AW	RED	S2
X138	P10C	RED	S38
X138	P10D	RED	X25
X138	P10E	RED	X36
S35	P10E1	RED	S35
S35	P10E2	RED	S35
S35	P10E3	RED	X138
X138	P10G	RED	S19
S8	P10G1	RED	S8
S8	P10G2	RED	X138
X138	P10H	RED	S7
X138	P10K	RED	S26
X138	P10L	RED	S2
S2	P10M	RED	S2
X138	P10N	RED	S6
X42	P10P	RED	X138
X138	P10R	RED	X23
S1	P11A	RED	S2
X1	P15A	RED	X17
G3	P17A	RED	X120
X120	P17C	RED	E9, S24
X1	P17D	RED	X120
X43	P20A	RED	X22
X1	P21A	RED	X118
X118	P21B	RED	X22
X118	P21C	RED	X24
S33	P21D1	RED	S33
S33	P21G	RED	X118
X1	P22A	RED	X114
X114	P22B	RED	X22
X114	P22C	RED	X24
X1	P23A	RED	X24
X2	P32D	RED	X41
X2	P33A	RED	X43
X2	P41B	RED	B18
X2	R01B	BLK	X42
X2	R08B	BLK	B18
X123	R12A	BLK	X142
X123	R12B	BLK	X40 (DRAIN)
X123	R12C	BLK	X126
X126	R12D	BLK	X41 (DRAIN)
X117	R12E	BLK	X126
X117	R12F	BLK	X25 (DRAIN)
X110	R12G	BLK	X117
X110	R12H	BLK	X23 (DRAIN)
X110	R12J	BLK	R6 (DRAIN)
X142	R12K	BLK	X11 (DRAIN)
X2	R12L	BLK	X142
X43	R20A	BLK	X22

END #1	NUMBER	COLOR	END #2
X2	R38B	BLK	X43
S2	T01A	LT BLU	X42
S2	T02A	LT BLU	X42
X2	T03A	LT BLU	X41
X42	T04B	LT BLU	X24
X41	T06A	LT BLU	X36
X2	Y01B	YEL	X41
X41	Z01A	GRY	H4



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XJ1270072

Continued on next page

Cab Harness (W2) Wiring Diagram (1 of 2) (S.N. 269402—)

DW9628,000074A -19-17JAN19-5/8

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4— Continued on Sheet 3
5— Continued on Sheet 3
B17— Right Motor Speed Sensor
B19— Engine Speed Control Pedal
B5109—Aftertreatment Pressure Sensor
M5—Windshield Washer Motor
X1— Cab Harness-to-Main Harness 14-Pin Connector
X2— Cab Harness-to-Main Harness 47-Pin Connector
X3— Main Harness-to-Hydraulic Valve Harness Connector 1
X4— Main Harness-to-Hydraulic Valve Harness Connector 2
X5— Main Harness-to-Hydraulic Valve Harness Connector 3
X7— Main Harness-to-Quik-Tatch™ Frame Harness 2-Pin Connector
X12— Main Harness-to-Dual Flasher Harness 6-Pin Connector
X34— Main Harness-to-Rear Engine Harness 12-Pin Connector
X37— Main Harness-to-Rear Engine Harness 8-Pin Connector
X44— Hydraulic Control Unit (HCU) 32-Pin Connector 1
X45— Hydraulic Control Unit (HCU) 48-Pin Connector 2
X46— Hydraulic Control Unit (HCU) 32-Pin Connector 3
X59— Hydrostatic Oil Temperature Sensor Harness Connector
X81— Two-Speed Solenoid Harness Connector
X164— R44 BLK Splice
X165— P35 RED Splice
X180— L01 BRN Splice
X184— R51 BLK Splice

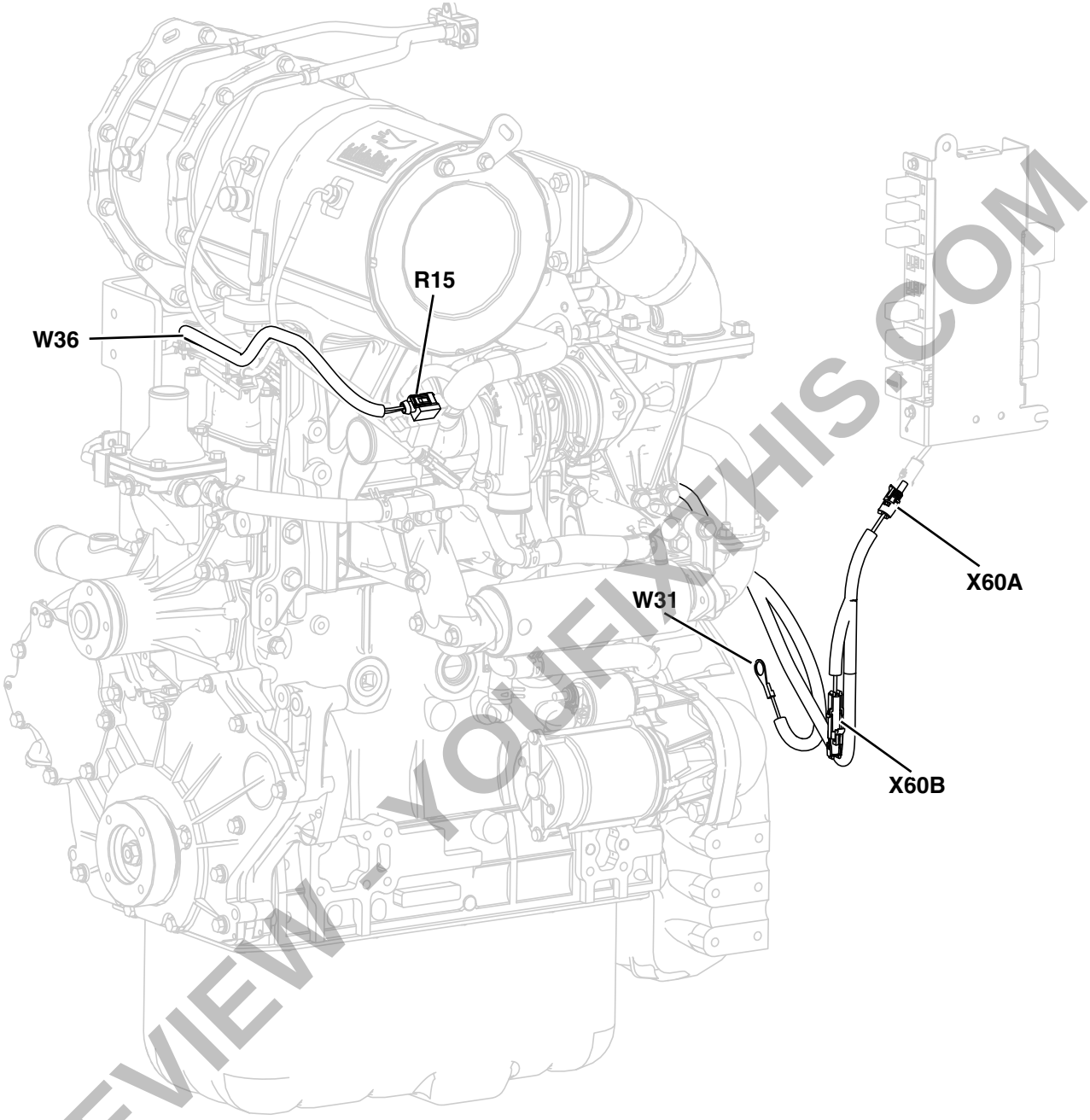
Quik-Tatch is a trademark of Deere & Company

RN74443,00000C1 -19-24SEP18-21/21

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Intake Air Heater Harness (W36) Component Location



Intake Air Heater Harness (W36) Component Location

R15— Intake Air Heater
W31—Starter Motor Ground
W36—Intake Air Heater Harness
X60A— Accessory Power Switch 1-Pin Connector
X60B— Accessory Power Switch 1-Pin Connector

BP63692,0000349 -19-21JUL15-1/1

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2—Keyless Start
A1—Sealed Switch Module (SSM)
A2—Engagement and Monitor Unit (EMU)
A4—Hydraulic Control Unit (HCU)
A5—Left Joystick Controller (JSL)
A6—Right Joystick Controller (JSR)
B11—Left Pedal Sensor
B12—Right Pedal Sensor
F15—Switched Power 15 A Fuse
F17—Handle Switches 5 A Fuse
G1—Battery
K8—Switched Power Relay
M1—Starter Motor
S27—Float Switch
W30—Battery-to-Frame Ground
W31—Starter Motor Ground
X1—Cab Harness-to-Main Harness 14-Pin Connector
X2—Cab Harness-to-Main Harness 47-Pin Connector
X3—Main Harness-to-Hydraulic Valve Harness Connector 1
X4—Main Harness-to-Hydraulic Valve Harness Connector 2
X11—Sealed Switch Module (SSM) 6-Pin Connector
X13—Left Pedal Sensor Harness Connector
X14—Right Pedal Sensor Harness Connector
X22—Right Joystick 12-Pin Connector
X23—Right Joystick Controller (JSR) 6-Pin Connector
X25—Left Joystick Controller (JSL) 6-Pin Connector
X41—Engagement and Monitor Unit (EMU) 16-Pin Connector 1
X44—Hydraulic Control Unit (HCU) 32-Pin Connector 1
X45—Hydraulic Control Unit (HCU) 48-Pin Connector 2
X46—Hydraulic Control Unit (HCU) 32-Pin Connector 3
Y19—Boom Up Solenoid
Y20—Boom Down Solenoid
Y21—Bucket Curl Solenoid
Y22—Bucket Dump Solenoid

Boom and Bucket Hydraulic Operation

The hydraulic control unit (HCU) controls the loader (boom and bucket) hydraulic functions by energizing or de-energizing the boom and bucket solenoids (Y19—Y22) on the hydraulic control valve. When energized, the solenoids shift to allow pilot pressure oil (internal to the control valve) to shift the control valve spool, actuating the hydraulic function. See Hydraulic Control Valve Operation. (Group 9025-05.)

NOTE: For component location of boom and bucket solenoids (Y19—Y22), see Hydraulic Valve Harness (W10) Component Location. (Group 9015-10.)

The HCU energizes the pump solenoids based on operator movement of the left and right joysticks and the left and right pedal sensors, if equipped.

Joystick Controllers (A5 and A6)—The joystick movements are communicated by left joystick controller (JSL) (A5) and right joystick controller (JSR) (A6) to HCU via CAN.

If operator is using hands only (ISO pattern) controls, the right joystick controls both boom and bucket functions. If operator is using hands only (H pattern) controls, left joystick controls boom function and right joystick controls bucket function.

Left and Right Pedal Sensors (B11 and B12) (if equipped)—The left and right pedal sensors are connected directly to the HCU. The hydraulic control unit (HCU) (A4) supplies a 5-volt reference voltage to pedal sensors at pin J1 of HCU connector (X45). The HCU provides ground for the pedal sensors at pin J2 of HCU connector (X45).

If operator is using electrohydraulic (EH) hand and foot controls, the left pedal controls boom function and right pedal controls bucket function.

For pedal sensor specifications, see Electrical Component Specifications. (Group 9015-25.)

For example, with a machine using electrohydraulic (EH) hands only (H pattern) controls, the operator pulls back on the right joystick to raise the boom. The joystick movement is communicated by right joystick controller (JSR) (A6) to HCU via CAN. The HCU then energizes the boom up solenoid (Y19). With the solenoid energized, pilot oil inside the control valve is routed to one end of the boom spool, shifting the spool. As the spool shifts, high-pressure oil from the hydraulic pump flows to the boom cylinders to raise the boom.

Boom Float Function

The float switch (S27) is located on the trigger position on the right joystick.

NOTE: For component location, see Cab Harness (W2) Component Location. (Group 9015-10.)

Pressing the float switch while pivoting the joystick to the boom down enables boom float. During boom float operation, the boom down solenoid shifts the boom spool to allow the boom to move up and down with no up or down hydraulic force as ground contour deflects the front attachment.

The boom float function is activated if all of the following conditions are met:

- Machine hydraulics are enabled.
- No active diagnostic trouble codes (DTCs) on either the boom up or boom down solenoids.
- Joystick pivots to command boom down function (any amount).
- Float switch (S27) transitions from opened to closed in less than 1 second prior to joystick commanding boom down.

The boom float function becomes inactive if any of the following conditions are met:

- Commanding a boom up or down function with the joystick by more than 10%.
- Machine hydraulics are disabled.
- A DTC occurs on either the boom up or boom down solenoids.
- A DTC occurs on either of the joysticks.

Hydraulic Response Rate—If Equipped

If machine is equipped with hydraulic response rate option, three rates of speed for boom and bucket controls can be selected by pressing the hydraulic response rate switch on the SSM.

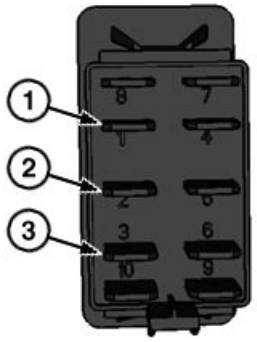
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SK44377,000036D -19-18DEC18-4/10

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Creep Mode Speed Switch (S36) Check



TX1128950A —UN—13FEB13

Creep Mode Speed Switch (S36)

1— Pin 1
2— Pin 2
3— Pin 3

Remove switch from harness. Use multimeter to check for continuity.

Pins 2 and 3 in the INCREASE position.

Pins 1 and 2 in the DECREASE position.

No continuity between pin 2 and either pin 1 or 3 in neutral (center) position.

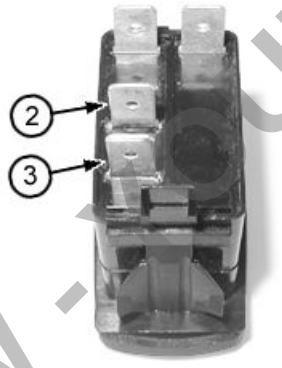
Is correct continuity indicated?

YES: Switch is OK.

NO: Replace switch.

DS35042,00000A0 -19-04SEP14-13/17

Self Leveling Switch (S38) Check



TX1128924A —UN—04JAN13

Self Leveling Switch (S38)

2— Pin 2
3— Pin 3

Remove switch from harness. Use multimeter to check for continuity.

Pins 2 and 3 in the ON position.

Is continuity measured?

YES: Switch is OK.

NO: Replace switch.

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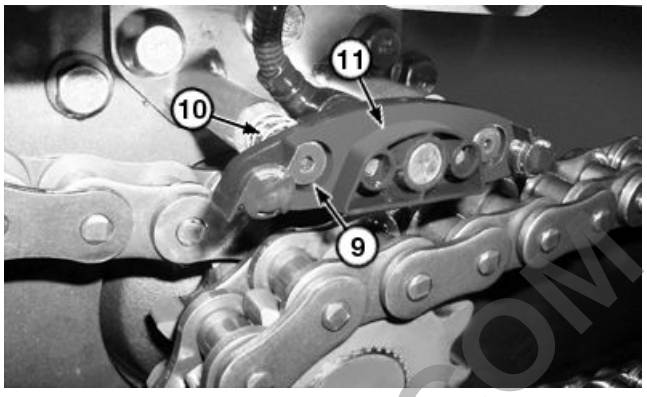
DS35042,00000A0 -19-04SEP14-14/17

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17. Install springs (10) and bracket (11).
18. Install socket head cap screws (9).

9— Socket Head Cap Screw (2 used)
10— Spring (2 used)
11— Bracket



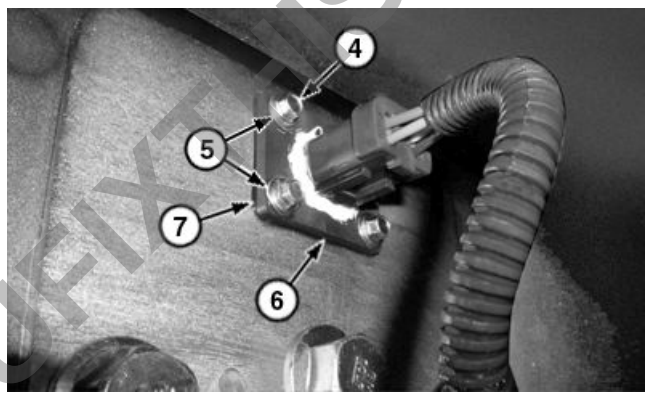
TX1130292A —UN—29JAN13

Motor Speed Sensor

DS35042,00000B2 -19-25FEB16-6/17

19. Install plate (6) and new gasket (7).
20. Install washers (5) and cap screws (4).

4— Cap Screw (4 used)
5— Washer (4 used)
6— Plate
7— Gasket



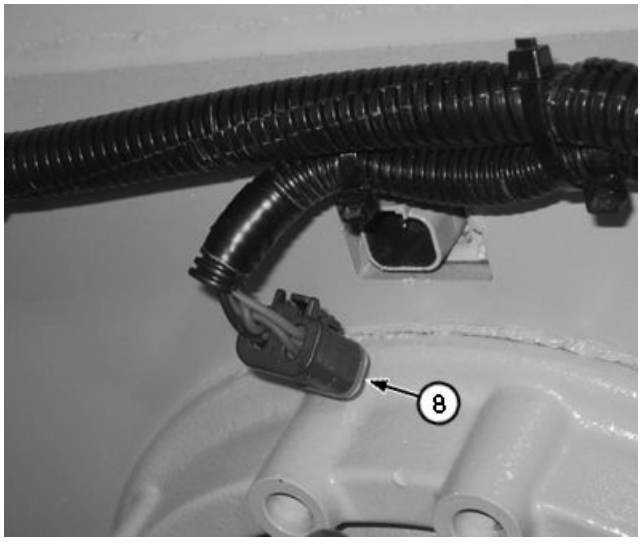
TX1130287A —UN—29JAN13

Motor Speed Sensor

DS35042,00000B2 -19-25FEB16-7/17

21. Connect motor speed sensor (8).

8— Motor Speed Sensor



TX1128602A —UN—29JAN13

Motor Speed Sensor Harness

Continued on next page

DS35042,00000B2 -19-25FEB16-8/17

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75— Hydraulic Control Valve
106— Boom Cylinder (2 used)
164— Ride Control Valve (if equipped)
165— Ride Control Accumulator (if equipped)
166— Ride Control Accumulator Valve (if equipped)
167— Ride Control Reservoir Valve (if equipped)
234— Hydraulic Control Valve (boom up port)-to-Ride Control Valve (if equipped) Line
235— Ride Control Valve-to-Hydraulic Control Valve (boom down port) Line
238— Ride Control Valve-to-Boom Cylinder (head end) Line
239— Ride Control Valve-to-Boom Cylinder (rod end) Line
241— Hydraulic Control Valve-to-Hydraulic Oil Cooler Line
245— Ride Control Valve-to-Ride Control Accumulator Line
252— Ride Control Valve-to-Hydraulic Oil Cooler Line
600— High Pressure Oil
604— Return Oil
Y7— Ride Control Accumulator Solenoid
Y8— Ride Control Reservoir Solenoid
Y19— Boom Up Solenoid
Y20— Boom Down Solenoid

When traveling over rough terrain at high speeds with loaded or empty bucket, machine develops a rocking motion in a fore and aft direction. Ride control valve (if equipped) (164) provides a cushioning effect, reducing rocking motion and improving machine ride. Ride control valve allows oil from head end of boom cylinders (106) to travel in and out of ride control accumulator (if equipped) (165) to reduce rocking motion. Return oil from ride control valve flows to either return manifold (early machines) or hydraulic oil cooler (later machines) to hydraulic oil reservoir.

When ride control is OFF, machine is in normal operating mode. In this mode, both ride control solenoids are de-energized. Ride control reservoir solenoid (Y8) blocks rod end oil of boom cylinders from returning to hydraulic oil reservoir. Ride control accumulator solenoid (Y7) blocks head end oil of boom cylinders from the accumulator.

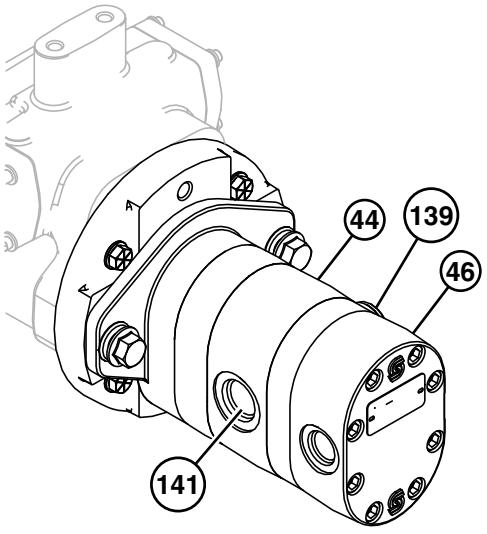
When ride control is ON, both ride control solenoids are energized connecting head end oil of boom cylinders to accumulator and rod end of boom cylinders to hydraulic oil reservoir. Pressure spikes from head ends of boom cylinders flow into accumulator where they are absorbed. The rod end oil of boom cylinders is now open to allow return oil to flow to or from the hydraulic oil reservoir to prevent cylinder cavitation. As boom is raised, accumulator is charged with system oil through ride control valve, equalizing cylinder head end pressure and accumulator pressure. Boom cylinder rod end hoses are connected directly to hydraulic oil reservoir. Boom will lower from boom weight and gravity only. Power boom down function will not operate when ride control is engaged. Ride control can be activated during bucket loading, but must be turned off when a boom power down operation is desired.

Machine can not be equipped with both ride control and self leveling options.

DS35042,000003E -19-23SEP13-4/4

Hydraulic Pump Operation

44— Hydraulic Pump
46— Charge Pump
139— Hydraulic Oil Reservoir-to-Hydraulic Pump Port
141— Hydraulic Pump Outlet



TX1065006 —UN—05OCT09

Hydraulic Pump (S.N. —288041)

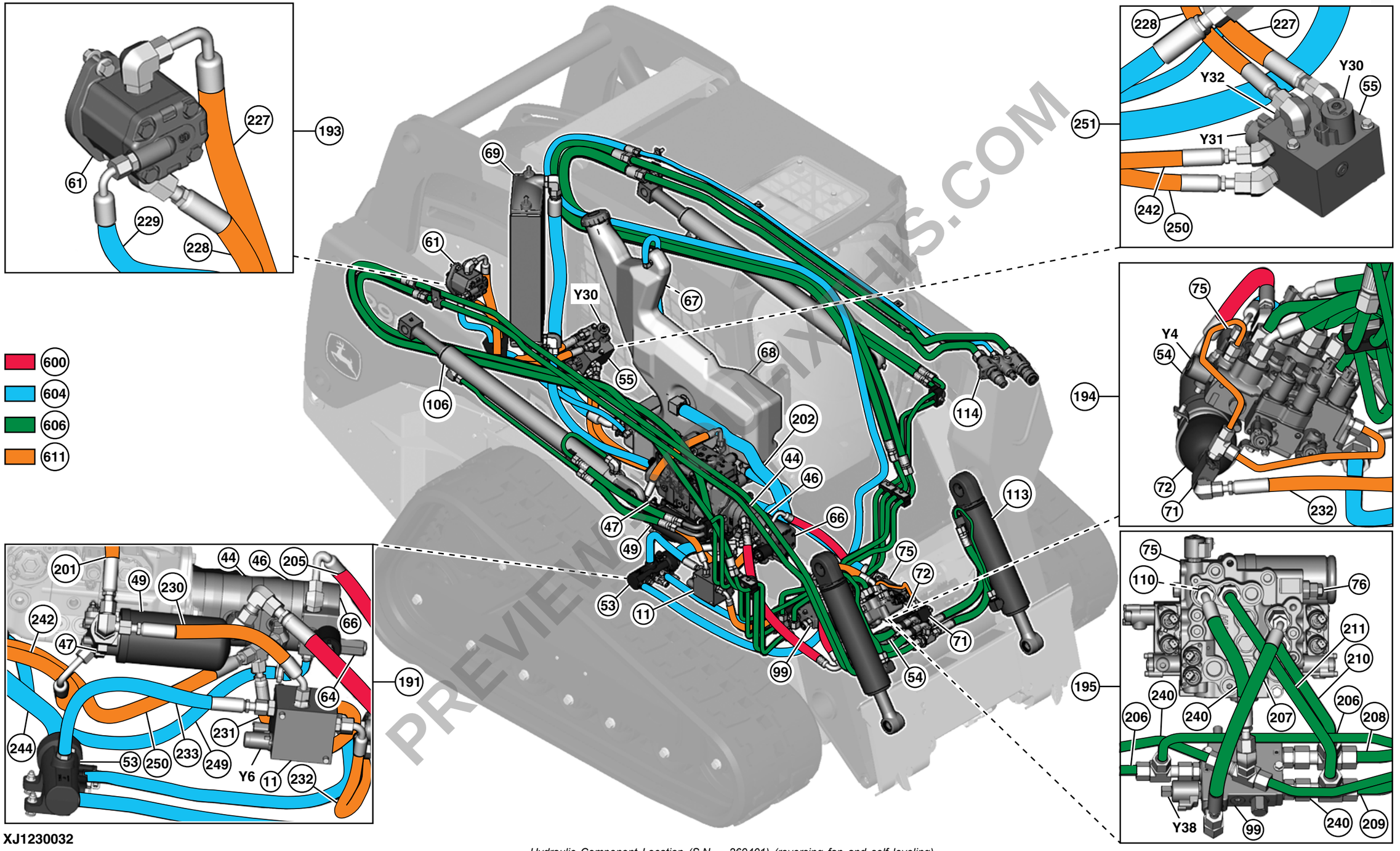
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DS35042,000003B -19-16SEP15-1/3

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XJ1230032 —UN—06DEC16



XJ1230032

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Hydraulic Component Location (S.N. —269401) (reversing fan and self leveling)

NM95233,0000606 -19-07DEC16-3/12

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3 Hydraulic Fan Speed Check (System Cold)	Check fan speed at fast idle with machine cool. Hydraulic oil, engine coolant, and manifold air temperatures should be less than 38°C (100°F).	
	See Hydraulic Fan Motor Speed Test. (Group 9025-25.)	**YES:** Go to Charge Oil Pressure Check (System Cold).
	Is fan speed below 1500 rpm at fast idle?	**NO:** Check electrical connections to hydraulic fan speed solenoid (Y30). See Rear Engine Harness (W1) Component Location. (Group 9015-10.) Check resistance of hydraulic fan speed solenoid (Y30). See Electrical Component Checks. (Group 9015-20.) Remove hydraulic fan speed solenoid. Inspect for any debris that would prevent normal solenoid operation.

DS35042,0000051 -19-19JUL13-5/8

4 Charge Oil Pressure Check (System Cold)	Check charge oil pressure at hydraulic oil filter manifold with machine cool. Hydraulic oil, engine coolant, and manifold air temperatures should be less than 38°C (100°F).	
	See Charge Pressure Relief Valve Test. (Group 9025-25.)	**YES:** Go to next step in this check.
	Is charge oil pressure at hydraulic oil filter manifold above minimum specification?	**NO:** Check charge pump flow. See Charge Pump Flow Test. (Group 9025-25.) If charge pump flow meets specification, replace charge pressure relief valve.
	Check charge oil pressure at pump outlet and oil filter manifold at fast idle with machine cool. All systems should be less than 38°C (100°F). Compare charge oil pressure at pump outlet to pressure at hydraulic oil filter manifold. *NOTE: Pressure difference should be approximately 1380—2070 kPa (14—21 bar) (200—300 psi).*	**YES:** Remove hydraulic fan speed solenoid. Inspect for any debris or other malfunction that would prevent normal solenoid operation.
	Is pressure difference greater than 6900 kPa (69 bar) (1000 psi) with machine cool, less than 38°C (100°F)?	**NO:** Go to Charge Oil Pressure Check (Operating Temperature).

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DS35042,0000051 -19-19JUL13-6/8

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Charge Pump Operation

Charge pump (46) is a fixed-displacement, external gear pump. Charge pump is mounted and driven off end of hydraulic pump (44). Charge pump draws hydraulic oil from hydraulic oil reservoir and supplies a constant flow of charge oil to hydraulic fan system, hydraulic oil filter manifold, hydrostatic pumps and motors, pilot accumulator, and hydraulic control valve solenoids.

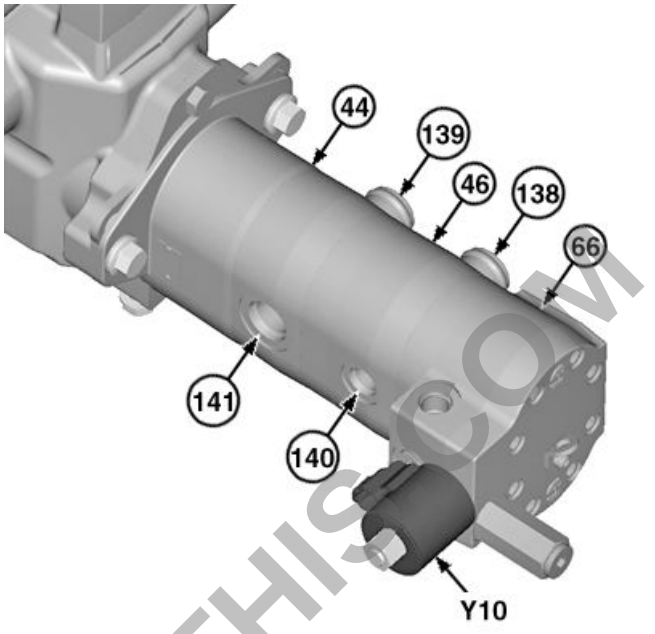
(S.N. 288042—)

Pump pressure bypass solenoid (Y9) on charge pump controls pressure oil from charge pump. Pump pressure bypass valve reduces engine load during cold-weather starting by bypassing some charge circuit components until a specific hydraulic temperature is reached.

When pump pressure bypass solenoid is not energized, valve blocks charge oil from flowing directly to two-speed valve (if equipped), pilot control accumulator, and hydrostatic pumps. Charge oil is forced through fan drive system and hydraulic oil filter manifold before all other charge system components.

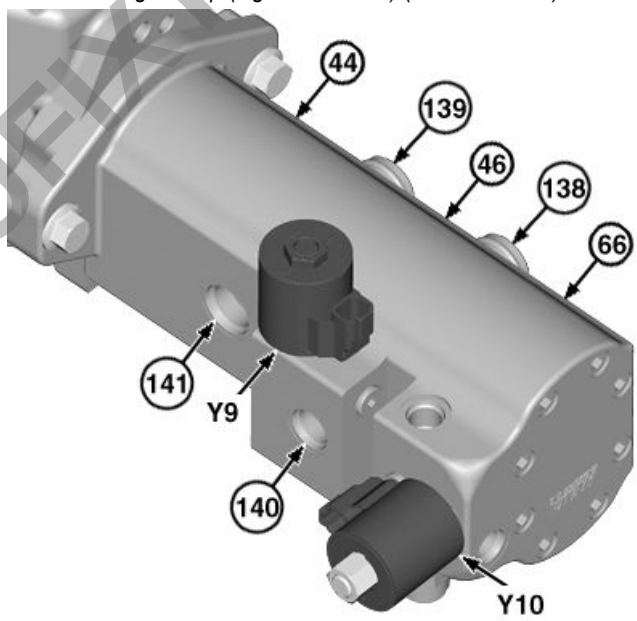
When pump pressure bypass solenoid is energized, valve opens charge oil directly to hydrostatic pumps. Charge oil bypasses fan system and hydraulic oil filter manifold, and excess charge oil is returned to hydraulic oil reservoir through charge pressure relief valve.

44— Hydraulic Pump
46— Charge Pump
66— High Flow Pump (if equipped)
138— Hydraulic Oil Reservoir-to-Charge Pump Port
139— Hydraulic Oil Reservoir-to-Hydraulic Pump Port
140— Charge Pump Outlet
141— Hydraulic Pump Outlet
Y9— Pump Pressure Bypass Solenoid
Y10— High Flow Solenoid



TX1200391A —UN—26AUG15

Charge Pump (high flow shown) (S.N. —288041)



TX1198770 —UN—30JUL15

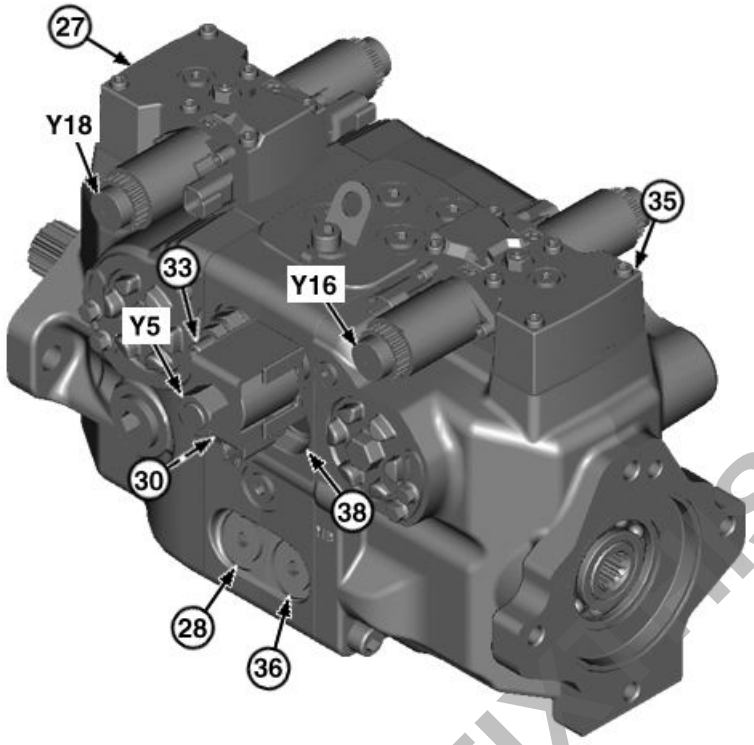
Charge Pump (high flow shown) (S.N. 288042—)

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AB06447,0000A7D -19-22SEP15-1/2

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TX1199081A —UN—05AUG15

Hydrostatic Pump Port Location (right side)

27— Left Hydrostatic Pump
28— Left Forward Multi-Function Valve
30— Left Reverse Multi-Function Valve
33— Charge Pressure Relief Valve
35— Right Hydrostatic Pump
36— Right Forward Multi-Function Valve
38— Right Reverse Multi-Function Valve
131— Left Forward Hydrostatic Motor Port
132— Left Reverse Hydrostatic Motor Port
133— Right Forward Hydrostatic Motor Port
134— Right Reverse Hydrostatic Motor Port
137— Hydrostatic Pump Case Drain Port
143— Park Brake Port
157— From Hydraulic Oil Filter Line
Y5— Park Brake Solenoid
Y15— Right C1 Hydrostatic Pump Solenoid
Y16— Right C2 Hydrostatic Pump Solenoid
Y17— Left C2 Hydrostatic Pump Solenoid
Y18— Left C1 Hydrostatic Pump Solenoid

8. Disconnect hydraulic line from left forward hydrostatic motor port (131).
9. Install JT02160 Transducer 68 900 kPa (689 bar) (10 000 psi) and JT02156A Digital Pressure/Temperature Analyzer into left forward hydrostatic motor port. See JT02156A Digital Pressure and Temperature Analyzer Kit Installation. (Group 9025-25.) Close all openings using caps and plugs.
10. Lower operator's station. See Raising Operator's Station. (Operator's Manual.)
11. Place JT02156A Digital Pressure/Temperature Analyzer in operator's station to be viewed by operator.
12. Start engine and run at specification.

Specification

Engine—Speed..... Fast Idle

13. Slowly engage left wheels/tracks in forward direction to test left forward multi-function valve (28).

NOTE: Charge pressure must be subtracted from pressure reading to obtain multi-function valve relief pressure.

14. Record pressure reading. Subtract charge pressure from pressure reading to obtain multi-function valve relief pressure. Compare result to specification.

Specification

Multi-Function
Valve—Relief Pressure..... 33 200—36 700 kPa
332—367 bar
4820—5330 psi

15. Repeat procedure for remaining multi-function valves as necessary.
16. If pressure is not within specification, replace the corresponding valve. See Hydrostatic Pump Disassemble and Assemble. (Group 0360.)

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