350DLC Excavator Operation and Test

OPERATION & TEST TECHNICAL MANUAL

350DLC Excavator Operation and Test

TM2359 10OCT14 (ENGLISH)

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For complete service information also see:

350DLC Excavator Repair	TM2360
350DLC Operator's Manual	OMT221098
POWERTECH®POWERTECH PLUS™ 9.0 L Tier 3/Stage IIIA Diesel Engines, Base Engine	CTM400
POWERTECH PLUS™ 9.0 L Diesel Engines, Level 14 Electronic Fuel Systems with Denso HPCR	CTM385
Alternators and Starting Motors	CTM77
Undercarriage Appraisal Manual	SP326VOL1
Specifications Manual	SP458VOL2

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Original Instructions. 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.

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Recognize Safety Information

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.



T133555 —UN—15APR13

T133588 —19—28AUG00

TX03679,00016CC -19-03JAN07-1/1

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.



T133556 —UN—24AUG00

TX03679,00016F9 -19-03JAN07-1/1

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 training and instruction.

Operator should be familiar with the job site and surroundings before operating. Try all controls and machine functions with the machine in an open area before starting to work.

Know and observe all safety rules that may apply to every work situation and work site.

TX03679,00016FA -19-03JAN07-1/1

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Section 9001
Diagnostics

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Main Controller (MCF) Diagnostic Trouble Codes

For additional information on the main controller circuit.See Main Controller (MCF) Circuit Theory of Operation. (Group 9015-15.)

Main controller diagnostic trouble codes (DTCs) can be displayed on the monitor, connection with Service Advisor, or by connection with WinDr.See Reading Diagnostic Trouble Codes with Monitor Display. Reading Diagnostic Trouble Codes with Service ADVISOR™ Diagnostic Application. (Group 9015-20.)

AH91621,0000244 -19-23JUN10-1/1

11000.02 — Abnormal EEPROM

AH91621,0000245 -19-02MAY07-1/4

Controller Hardware Diagnostics

AH91621,0000245 -19-02MAY07-2/4

1 **Code Check**	Clear and re-check diagnostic trouble codes. Is DTC 11000.02-Abnormal EEPROM still present?	**YES:** Code is still present and machine does not operate. Replace main controller (MCF). See Main Controller (MCF) Remove and Install. (Group 9015-20.) **YES:** Code is still present but machine is still operable. Go to Machine Function Check. **NO:** Main controller (MCF) is OK.

AH91621,0000245 -19-02MAY07-3/4

2 **Machine Function Check**	Is operation of machine normal? See Operational Checkout. (Group 9005-05.)	**YES:** Machine may be operated but it is recommended that the main controller (MCF) be replaced. **NO:** Main controller (MCF) malfunction. Replace main controller (MCF). See Main Controller (MCF) Remove and Install. (Group 9015-20.)

AH91621,0000245 -19-02MAY07-4/4

11001.02 — Abnormal RAM

AH91621,0000246 -19-02MAY07-1/4

Controller Hardware Diagnostics

Continued on next page

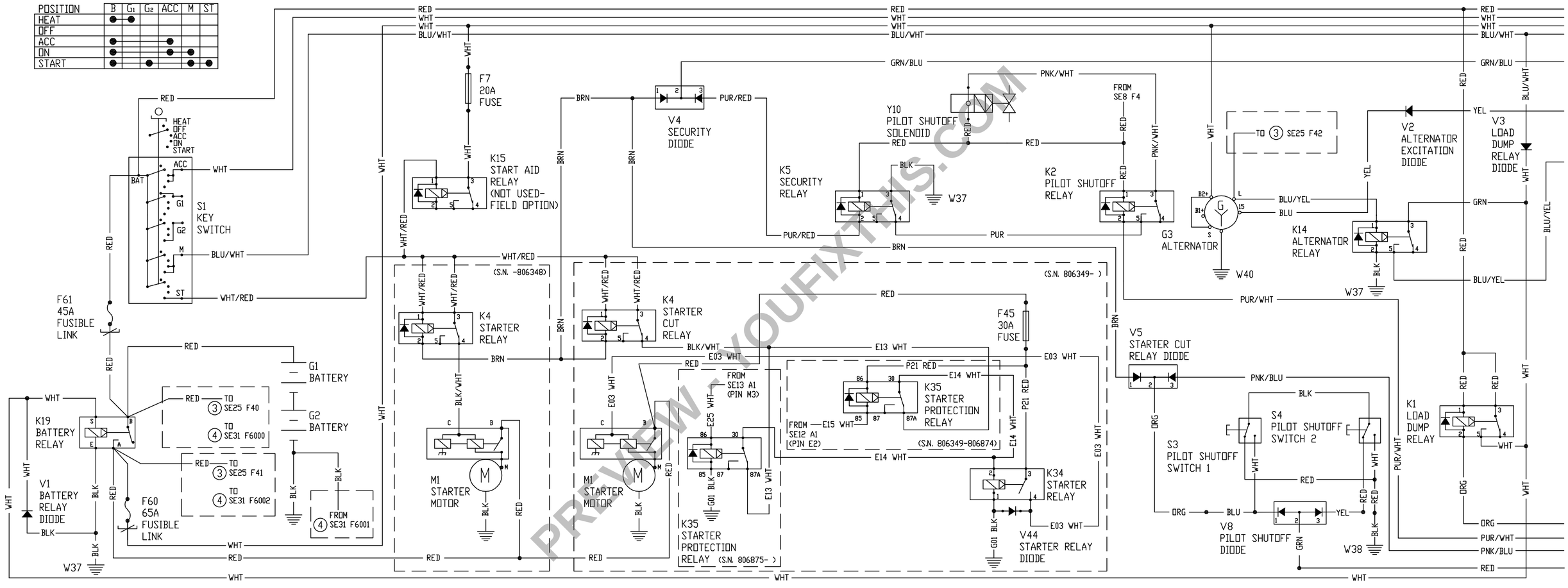
AH91621,0000246 -19-02MAY07-2/4

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System Functional Schematic

TX1146925 —UN—05NOV13



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TX1146925

350DLC SYSTEM FUNCTIONAL SCHEMATIC (1 OF 9)

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

Continued on next page

CONTINUE NEXT PAGE

LD30992,00001A4 -19-17SEP14-1/16

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Cab Harness (W1) Wiring Diagram

(S.N. —806923)

TX1073328 —UN—09APR10

NUMBER	COLOR	END #1	END #2
(1)	RED	X28	F4
(2)	RED	X28	(1)
(3)	BLU/BLK	X28	X3
(4)	BLU/RED	X28	X3
(5)	BRN/WHT	X28	X3
(6)	GRN/WHT	X28	X3
(7)	RED/WHT	X28	X3
(8)	BLK/WHT	X28	X3
(9)	WHT	X28	X3
(10)	GRN	X28	X3
(11)	YEL	X28	X3
(12)	BLK	X28	W37
(13)	BLK	X28	(12)
(14)	WHT/GRN	X28	X3
(15)	BLU	X28	X3
(16)	RED	X28	X3
(17)	RED	X28	X4
(18)	YEL/GRN	X28	X4
(21)	ORG	X28	X4
(22)	RED/GRN	X28	X4
(26)	WHT/RED	X28	X4
(34)	BLK/GRN	X29	X27
(35)	BLK/RED	X29	X27
(38)	GRN	X29	X27
(39)	BLU	X29	F10
(40)	BLK	X29	W37
(41)	GRN/BLK	X29	X38
(42)	BLU	X29	(39)
(43)	GRN/BLU	X29	X45
(45)	GRN/WHT	X29	X45
(47)	GRN/RED	X29	X45
(48)	GRN	X29	X27
(49)	GRN	X23	(48)
(50)	BLK	X29	(40)
(51)	RED/YEL	X31	X3
(52)	RED/YEL	X31	(51)
(53)	BLK/YEL	X31	X3
(54)	BLK/YEL	X31	(53)
(55)	YEL	(51)	X27
(56)	GRN/YEL	(53)	X27
(58)	RED/GRN	X31	X3
(59)	YEL/BLK	X31	X3
(60)	YEL/RED	X30	X3
(61)	GRN/YEL	X31	X3
(62)	RED/BLK	X30	X3
(63)	WHT	X30	X27
(64)	WHT/GRN	X31	X3

NUMBER	COLOR	END #1	END #2
(68)	WHT/BLU	X31	X4
(69)	WHT/PUR	X31	X4
(70)	YEL/BLK	X31	X3
(71)	BLK/RED	X30	X3
(72)	BLK/GRN	X31	X4
(78)	RED	X30	X3
(81)	BLU/YEL	X31	X3
(88)	RED/BLK	X29	(764)
(103)	BLU	X29	X45
(138)	GRN/BLK	X4	X50
(139)	BLK	X50	W38
(141)	WHT/YEL	X4	(610)
(202)	BLU/YEL	X3	K14
(203)	YEL	X3	V2
(205)	RED	X27	X23
(206)	RED/BLK	X27	X23
(207)	RED/WHT	X27	X23
(223)	GRN/BLU	X3	X22
(228)	GRN	X27	X23
(229)	GRN/WHT	X27	X23
(230)	BLU/BLK	X27	X23
(235)	BRN	X3	X24
(250)	WHT/BLU	X3	X22
(400)	RED	X4	X12
(401)	WHT	X4	X12
(402)	GRN	X12	(611)
(501)	BLK	X42	X99
(502)	BLK	W35	X99
(503)	BLK	X45	W37
(505)	BLK/WHT	X3	K4
(506)	WHT	X42	F1
(507)	BLK	W38	X99
(508)	WHT	X3	V3
(509)	BLK	W37	X99
(510)	WHT	V1	(508)
(511)	RED	X41	X47
(512)	BLK	W36	X99
(513)	BLK	V1	W37
(517)	BRN	K4	V4
(519)	RED	K1	(511)
(520)	RED	K1	(511)
(521)	BLK	W37	K5
(522)	BLU/WHT	X47	F15
(523)	RED	(532)	K5
(524)	WHT	K1	(508)
(525)	PUR	K5	K2
(527)	PUR/RED	K5	V4

NUMBER	COLOR	END #1	END #2
(528)	BRN	V5	(517)
(529)	PUR/WHT	X24	K2
(530)	ORG	V5	X65
(531)	PNK/WHT	K2	Y10
(532)	RED	Y10	(1)
(533)	RED	K2	(532)
(536)	RED/BLU	X3	K8
(537)	RED	X3	K7
(538)	GRN	(524)	K14
(539)	BLK	K14	W37
(540)	BLK	K3	W37
(541)	PNK/GRN	K3	H2
(542)	BRN/BLK	X3	K10
(543)	RED/BLU	K3	F9
(544)	RED/BLU	H2	(543)
(545)	WHT/PUR	S5	K10
(546)	BRN/WHT	X3	K9
(550)	PNK/BLU	V5	X24
(560)	RED	F10	(511)
(561)	WHT	X43	(506)
(562)	BLK	X43	X99
(566)	YEL/RED	X38	F11
(568)	RED/YEL	X38	(543)
(569)	GRY	X38	B25
(570)	WHT	X38	B25
(571)	GRY/BLK	X38	B26
(572)	WHT/BLK	X38	B26
(573)	BLK	X38	(501)
(583)	WHT	X3	K11
(586)	RED	X27	(537)
(587)	BLK	X27	W36
(588)	BRN/YEL	X3	X38
(589)	BLK	M5	K6
(590)	BLK/YEL	M5	K6
(591)	BLK/RED	M5	F2
(592)	BLK	M5	W38
(593)	BLK/RED	K6	(591)
(594)	BLK	K6	W37
(595)	BLK/RED	K9	(591)
(596)	BLK/RED	K9	(591)
(597)	BLK/GRN	X3	X38
(598)	GRN	K7	F1
(599)	GRN	K7	(598)
(600)	GRN	K8	(598)
(601)	GRN	K8	(598)
(602)	WHT	K10	(603)
(603)	WHT	K10	F17

NUMBER	COLOR	END #1	END #2
(604)	BLK	X65	W38
(605)	BLK	S5	W38
(606)	BLU	V3	(522)
(607)	WHT	X47	F12
(609)	RED/BLK	K11	F3
(610)	WHT/YEL	X26	F5
(611)	RED	X26	F6
(612)	LTGRN/RED	X26	F20
(615)	BLK	X26	W38
(616)	RED	X26	(537)
(617)	RED/BLU	X26	(536)
(618)	RED/BLU	(536)	X44
(631)	YEL/RED	(566)	E3,S2
(632)	BLU/YEL	R9	F12
(633)	BLK	R9	W38
(650)	BLU/WHT	X28	X4
(651)	YEL/BLK	X28	X4
(652)	BLU/BLK	X29	X4
(655)	YEL/BLK	X29	X4
(661)	GRN	X25	F13
(662)	BLK	X25	W38
(664)	WHT/YEL	X3	(610)
(665)	WHT/YEL	(610)	X45
(666)	BLK	(662)	V6
(667)	GRN	(661)	V6
(762)	GRN	X4	X23
(763)	BLU/YEL	X22	K14
(764)	YEL	X3	F16
(765)	YEL	V2	(764)
(771)	BLU	X34	39
(772)	BLU	X34	39
(773)	BLK	X34	W37
(774)	BLK	X34	W37
(775)	BLU/YEL	X34	(763)
(776)	RED/BLK	X34	(764)
(777)	RED/WHT	X34	X36
(779)	BLK	X32	W37
(780)	RED	X32	X2
(781)	RED/BLK	X32	X2
(782)	BLK	X32	X2
(783)	BLK/GRN	X32	X2
(784)	BLK/BLU	X32	X2
(785)	BLK/PNK	X32	X2
(786)	BLK/WHT	X32	X36
(787)	BLU	X32	X36
(788)	GRN	X32	X37
(789)	YEL	X32	X37

NUMBER	COLOR	END #1	END #2
(790)	BLK	X32	X37
(791)	BLU/YEL	X36	(763)
(792)	RED/BLK	X36	(764)
(793)	BLU	X36	(39)
(794)	BLK	X36	W36
(795)	BLK	X36	W36
(796)	BLK	X36	W36
(800)	GRN	X30	X4
(801)	BLU	X30	X4
(802)	GRN	(804)	X24
(803)	BLU	(805)	X24
(804)	GRN	X34	(800)
(805)	BLU	X34	(801)
(810)	RED	X41	F8
(821)	RED	X65	X23
(824)	RED/BLK	X23	(764)
(825)	RED	X24	X64
(826)	WHT	X24	X64
(827)	BLK	X64	W38
(850)	GRN	X22	K7
(851)	GRN/WHT	X22	K6
(852)	GRN/BLK	X22	K3
(853)	GRN/BLU	X22	V4
(854)	RED	X22	K8
(855)	BLK	X22	K9
(856)	ORG	X22	K1
(860)	WHT	X22	H3
(861)	BLU/BLK	H3	(870)
(870)	BLU/BLK	X23	F19
(871)	BLK	X23	W36
(875)	WHT	F18	X3
(880)	RED/BLK	X3	K15
(882)	RED/BLU	F7	K15
(883)	WHT/RED	K15	(900)
(884)	BLK/WHT	K15	S17
(885)	BLK	S17	W38
(886)	BLK/RED	V7	(880)
(887)	BLK	V7	W38
(890)	RED/YEL	A8	(611)
(891)	BLK	A8	W38
(892)	BLU	A8	G5
(893)	ORG	A8	G5
(900)	WHT/RED	X47	K4
(904)	BRN/WHT	X23	(63)
(905)	WHT/YEL	X23	(56)
(910)	WHT/RED	K4	(900)
(940)	WHT/GRN	X38	F15

NUMBER	COLOR	END #1	END #2
(941)	RED/BLK	K12	(609)
(944)	BRN/BLU	X38	X24
(953)	BLK/GRN	X24	(597)
(955)	BRN/RED	X38	K12
(961)	BRN/BLK	X38	K13
(972)	BLU	X39	K12
(975)	PNK	X38	K11
(978)	BLK	X39	W36
(979)	RED	X39	K13
(980)	WHT/GRN	K11	(940)
(981)	WHT/GRN	K12	(940)
(982)	WHT/GRN	K13	(940)
(983)	BLK	K13	W37
(990)	YEL/RED	X24	X36
(991)	BLU/YEL	X24	X36
(999)	GRN/WHT	(851)	X23

TX1073328

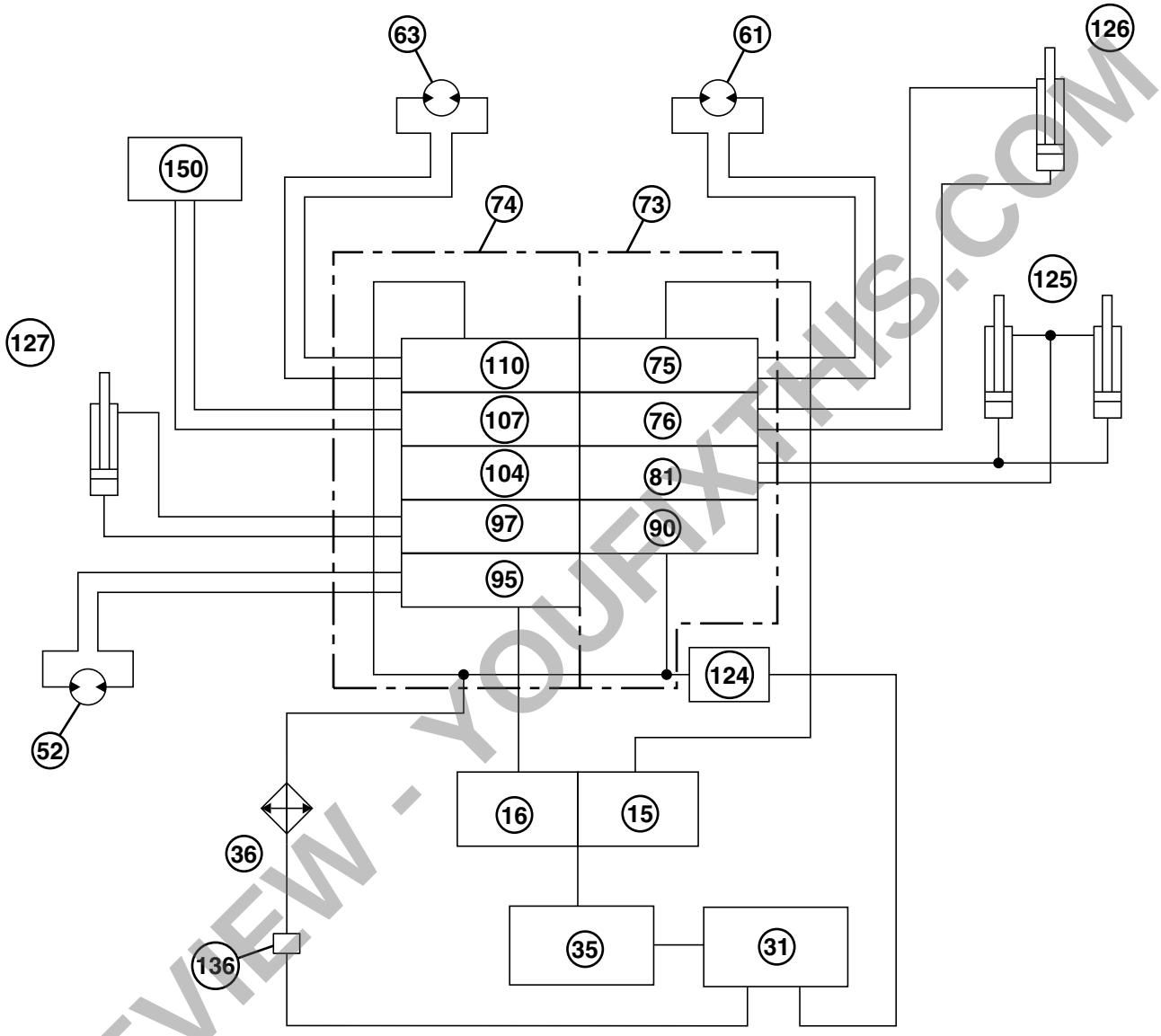
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Cab Harness (W1) Wiring Diagram (S.N. —806923) (1 of 3)

LD30992,00001A6 -19-12AUG13-1/10

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Hydraulic System Diagram and Operation



TX1139146 —UN—25JUN13

TX1139146

Hydraulic System Diagram

15— Pump 1
16— Pump 2
31— Hydraulic Oil Tank
35— Suction Screen
36— Hydraulic Oil Cooler
52— Swing Motor
61— Right Travel Motor
63— Left Travel Motor
73— Right Control Valve (4-spool)
74— Left Control Valve (5-spool)
75— Right Travel Spool
76— Bucket Spool
81— Boom 1 Spool
90— Arm 2 Spool
95— Swing Spool
97— Arm 1 Spool
104— Boom 2 Spool
107— Auxiliary Spool
110— Left Travel Spool
124— Hydraulic Oil Cooler Bypass Valve
125— Boom Cylinder (2 used)
126— Bucket Cylinder
127— Arm Cylinder
136— Restriction Valve
150— Auxiliary Attachment

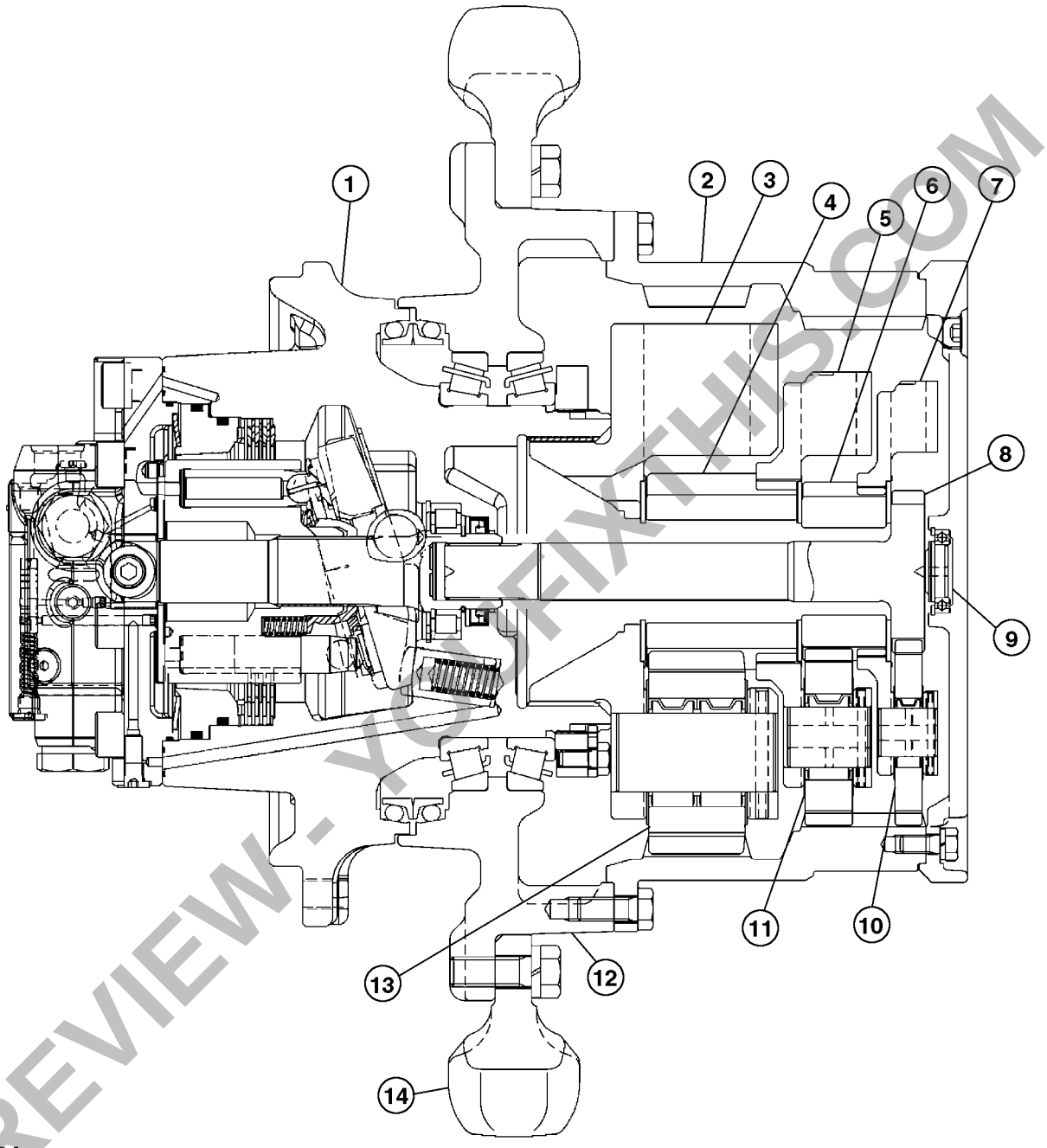
Main hydraulic system is open-center hydraulic system.

Main pump housing contains a pilot pump, pump 1 (15), and pump 2 (16). Pump 1 is on the right side as you are looking at the pump compartment (toward front of machine) and pump 2 is on the left side (toward rear of machine). The engine drives the pumps through a coupler and a gearbox.

Continued on next page

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Travel Gearbox Operation



Travel Gearbox Operation

1— Housing
2— Ring Gear
3— Third Stage Carrier
4— Third Stage Sun Gear
5— Second Stage Carrier
6— Second Stage Sun Gear
7— First Stage Carrier
8— First Stage Sun Gear (Input Shaft)
9— Thrust Pad
10— First Stage Planet Gear
11— Second Stage Planet Gear
12— Drum
13— Third Stage Planet Gear
14— Sprocket

Travel Gearbox Operation The travel gearbox is a triple reduction planetary drive gearbox. The gearbox is interchangeable from the right to the left side of the machine. The travel motor housing (1), which is fastened to the track frame, serves as the main support for the drum (12) and planetary gears (2—8, 10, 11, and 13).

Continued on next page

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Operational Checkout

This procedure is used to check operation of the machine. It is designed so you can do a walk around inspection, check machine operation, and perform specific checks from the operator's seat.

If there is a problem with the machine, diagnostic information in this checkout will help pinpoint the probable cause. This information may allow you to perform a simple adjustment to correct the problem. Use the table of contents to help find adjustment procedures.

A location will be required which is level and has adequate space to complete the checks. No tools or equipment are needed to perform the checkout.

Complete the necessary visual checks (oil levels, oil condition, external leaks, loose hardware, linkage, wiring) prior to doing the checkout. The machine must be at operating temperature for many of the checks.

Read each check completely before performing. If no problem is found, you will be instructed to go to the next check. If a problem is indicated, you will be referred to a procedure for adjustment, repair, or replacement.

The monitor can be used to perform diagnostic and operational checks. The monitor can display engine speed, pressures, and Diagnostic Trouble Codes (DTCs).

TK40086,00015AA -19-19NOV12-1/47

Diagnostic Trouble Code Check

TK40086,00015AA -19-19NOV12-2/47

Display and Clear Trouble Codes	Always check for diagnostic trouble codes and correct them before performing the operational checkout. Diagnostic trouble codes can be displayed by using several methods: • Monitor Controller • With Service Advisor *LOOK: Are diagnostic trouble codes present?*	**YES:** Correct all diagnostics trouble codes before proceeding. See Reading Diagnostic Trouble Codes With Service ADVISOR™ Diagnostic Application (Group 9015-20.) or see Reading Diagnostic Trouble Codes With Monitor Display. (Group 9015-20.) **NO:** Proceed with operational checkout.

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Operational Checks—Key Switch Off, Engine Off Checks

Continued on next page

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Radiator Temperature Differential Check

SPECIFICATIONS	
Radiator Temperature Differential Check	
Engine RPM Dial Position	Fast Idle
Work Mode Switch Position	Dig Mode
Power Mode Switch Position	HP (high power)
Auto Idle Switch Position	Off
Top to Bottom of Radiator Temperature Differential	4—7°C (typical)
Top to Bottom of Radiator	8—12°F (typical)

SERVICE EQUIPMENT AND TOOLS
JT07253 Noncontact Temperature Measuring Gun
JT05800 Digital Thermometer

NOTE: Test will be more accurate at higher ambient temperatures.

1. Before this test is performed the following should be checked to determine these are not the cause of the overheating:
   - Correct coolant is in engine and at the proper level.
   - Radiator and any screens are clean of any dirt or debris.
   - Fan blades not damaged and fan is installed correctly.
   - Make sure proportional fan speed solenoid is functioning properly.
   - All shields, guards, shrouds, baffles, and hoods are in place and properly fastened.
   - Any foam or seals are in place and in good condition.

NOTE: Engine must be at or above 200°F and readings must be taken when engine is under full load. Allow heat to transfer throughout engine components.

2. Warm engine to 200°F to allow thermostats to open fully. See Hydraulic Oil Warm-Up Procedure (Group 9025-25.)
3. Run machine at specifications.

Radiator Temperature Differential Check—Specification

Engine RPM Dial—Position ..... Fast Idle
Work Mode Switch—Position ..... Dig Mode
Power Mode Switch—Position ..... HP (high power)
Auto Idle Switch—Position ..... Off

4. Hold arm-in function, at relief, to keep a full load on engine. Temperature readings must be taken with full load on engine.

NOTE: Coolant enters radiator through upper radiator hose, travels through the radiator, then exits radiator through lower radiator hose.

See Engine Cooling System Component Location (Group9010-05.)

5. Measure the temperature differential between the top and bottom of radiator. Repeat test three times.
6. Average readings and compare to specification.

Specification

Top to Bottom of Radiator—Temperature Differential ..... 4—7°C (typical)
8—12°F (typical)

7. A higher temperature differential than specification indicates low coolant flow.

   A lower temperature differential than specification indicates low air flow.

   See 9.0 L - C1 - Engine Coolant Temperature Above Normal. (CTM400.) for diagnosing problems.

Continued on next page

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Monitor Data Items

Monitor Data Items List can be rearranged.

Items	Units	Comment
Engine Torque	%	N/A
Coolant Temperature (E)	°C	Reading From Engine Coolant Temperature Sensor B4
Fuel Temperature	°C	Reading From Fuel Temperature Sensor B5
Engine Oil Pressure	kPa	Reading From Engine Oil Pressure Sensor B11
Atmospheric Pressure	kPa	
Intake Air Pressure	°C	Reading From Turbocharger Compressor Inlet Temperature Sensor B7
Boost Pressure	kPa	Reading From Manifold Air Pressure Sensor B14
Boost Temperature	°C	Reading From Exhaust Gas Recirculation (EGR) Fresh Air Temperature Sensor B10
Coolant Temperature (M)	°C	N/A
Target Engine Speed	min^{1}	Reading From Main Controller (MCF) A3
Actual Engine Speed	min^{1}	Reading From Engine Control Unit (ECU) A1
Pump 1 Delivery Pressure	MPa	Reading From Pump 1 Delivery Pressure Sensor B35
Pump 1 Pump Control Pressure	MPa	Reading From Pump 1 Control Pressure Sensor B36
Pump 1 Target Flow Rate	L/min	Calculated From Main Controller (MCF) A3
Pump 2 Delivery Pressure	MPa	Reading From Pump 2 Delivery Pressure Sensor B37
Pump 2 Pump Control Pressure	MPa	Reading From Pump 2 Control Pressure Sensor B38
Pump 2 Target Flow Rate	L/min	Calculated From Main Controller A3
Front Attachment Control Pilot Pressure	MPa	Reading From Front Attachment Pressure Sensor B32
Boom Raise Control Pilot Pressure	MPa	Reading From Boom Up Pressure Sensor B30
Arm Rool-In Pilot Pressure	MPa	Reading From Arm In Pressure Sensor B31
Swing Control Pilot Pressure	MPa	Reading From Swing Pressure Sensor B33
Travel Control Pilot Pressure	MPa	Reading From Travel Pressure Sensor B34
Attachment Control Pilot Pressure	MPa	Main Controller A3 Calculated For Y20
EC Dial Angle	V	Reading From Engine Speed Dial R15
Hydraulic Oil Temperature	°C	Reading From Hydraulic Oil Temperature Sensor B40
Pump Torque Proportional Valve	MPa	Main Controller A3 Calculated For Y21
Digging Regeneration Valve	MPa	Main Controller A3 Calculated For Y22
Arm Regeneration Valve	MPa	Main Controller A3 Calculated For Y23
Travel Mode Control Pressure	MPa	Main Controller A3 Calculated For Y25
Power Digging Control Pressure	MPa	Main Controller A3 Calculated For Y24
Power Mode	-	Reading From Power Mode Switch S12
Travel Mode Switch	-	Reading From Travel Speed Switch S11
Power Digging Switch	-	Reading From Power Dig Switch S7
Radio Signal Strength	-	N/A

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6. Return all control levers and pedals to the neutral position.

   Record the pressure readings from monitor and gauge.

NOTE: An example of monitor reading is given in the chart below for the pump torque proportional valve (torque control solenoid valve).

When a function is actuated, the readings starts to decrease. The reading will vary depending on the load on the function.

Example of Monitor Reading	
	Neutral
Example of Monitor Reading	3.99 MPa 3990 kPa 39.9 bar 580 psi

7. Apply tolerance to monitor reading to obtain a pressure range.

Specification

Torque Control Solenoid Valve—Pressure..... Monitor Reading ± 0.2 MPa
Monitor Reading ± 200 kPa
Monitor Reading ± 2.0 bar
Monitor Reading ± 29.0 psi

8. Compare the gauge pressure reading to the pressure range.

   Gauge reading must be within the pressure range.

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9. Adjust the solenoid valve (H) as needed.

IMPORTANT: Turning adjusting screw out too far may cause oil leakage because the O-ring has come off its seat.

   a. Loosen nut (J).

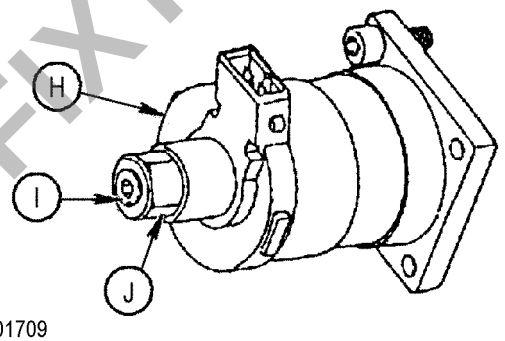
   b. Turn adjusting screw (I) in to increase pressure setting; turn adjusting screw out to decrease pressure setting. The length from end of adjusting screw to nut must not exceed specification.

Specification

Adjusting Screw—Pressure Change.....0.069 MPa approximate per 1/4 turn
69 kPa approximate per 1/4 turn
0.69 bar approximate per 1/4 turn
10 psi approximate per 1/4 turn

End of Adjusting Screw-to-Nut—Length.....2 mm or less
0.079 in. or less

   c. Hold adjusting screw. Tighten nut.



T101709

T101709 —UN—20JUN96

H—Solenoid Valve
I— Adjusting Screw
J— Nut

Specification

Adjusting Screw-to-Housing Nut—Torque.....3 N·m
27 lb-in.

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1 Continuity Check	Disconnect harness from pump 1 flow rate limit solenoid and main controller (MCF). Check continuity between pump 1 flow rate limit solenoid connector pin 1 and main controller (MCF) connector A (X28) pin A20. Check continuity between pump 1 flow rate limit solenoid connector pin 2 and main controller (MCF) connector A (X28) pin A6. Is there continuity between solenoid and main controller (MCF)?	**YES:** Go to DTC Check. **NO:** Open circuit in harness. Repair or replace harness. See Cab Harness (W1) Wiring Diagram, See Machine Harness (W2) Wiring Diagram, and See Pump Harness (W8) Wiring Diagram. (Group 9015-10.)

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2 DTC Check	Switch connectors of pump 1 flow rate limit solenoid and torque control solenoid. Clear DTCs and re-check for DTCs. Does DTC 11410.04-Pump 1 flow rate limit solenoid feedback current low display for torque control solenoid?	**YES:** Main controller (MCF) malfunction. Replace main controller (MCF). See Main Controller (MCF) Remove and Install. (Group 9015-20.) **NO:** Pump 1 flow rate limit solenoid malfunction. Replace solenoid.

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11901.03 — Hydraulic Oil Temperature Sensor Voltage High

AH91621,0000274 -19-02MAY07-1/6

Hydraulic Oil Temperature Sensor Diagnostics

Hydraulic oil temperature sensor 4.52 volts or higher.

AH91621,0000274 -19-02MAY07-2/6

1 Connector Check	Check harness connections to hydraulic oil temperature sensor, main controller (MCF) and between harness. Are connectors clean and free from debris? Are pins straight and make a good connection?	 **YES:** Go to Hydraulic Oil Temperature Sensor Check. **NO:** Repair or replace connector.

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9 MCF Short to Power Check	Disconnect all connectors to main controller (MCF), information controller (ICF), engine control unit (ECU), and monitor controller.	
	Check for continuity between main controller (MCF) pin C4 and pins A1, A12, B7, and B17.	
	Check for continuity between main controller (MCF) pin C15 and pins A1, A12, B7, and B17.	**YES:** CAN circuit short to power.
		Repair or replace harness. See Cab Harness (W1) Wiring Diagram. (Group 9015-10.)
	Is there continuity between CAN circuit and power circuit?	**NO:** Go to ECU Short to Power Check.

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10 ECU Short to Power Check	Disconnect all connectors to main controller (MCF), information controller (ICF), engine control unit (ECU), and monitor controller.	
	Check for continuity between engine control unit (ECU) pin A1 and pins L1 (X15), L4 (X15), M1 (X15), and M4 (X15).	
	Check for continuity between engine control unit (ECU) pin B1 and pins L1 (X15), L4 (X15), M1 (X15), and M4 (X15).	**YES:** CAN circuit short to power.
		Repair or replace harness. See Engine Interface Harness (W7) Wiring Diagram. (Group 9015-10.)
	Is there continuity between CAN circuit and power circuit?	**NO:** Go to ICF Short to Power Check.

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11 ICF Short to Power Check	Disconnect all connectors to main controller (MCF), information controller (ICF), engine control unit (ECU), and monitor controller.	
	Check for continuity between information controller (ICF) pin C5 and pins C1 and C2.	
	Check for continuity between information controller (ICF) pin C11 and pins C1 and C2.	**YES:** CAN circuit short to power.
		Repair or replace harness. See Cab Harness (W1) Wiring Diagram. (Group 9015-10.)
	Is there continuity between CAN circuit and power circuit?	**NO:** Go to Monitor Controller Short to Power Check.

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Electrical System

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B18— Fuel Level Sensor
B20— Air Conditioner High/Low Pressure Switch
B22— Ambient Air Temperature Sensor
B23— High Note Horn
B24— Low Note Horn
B27— Hydraulic Oil Filter Restriction Switch (if equipped)
B30— Boom Up Pressure Sensor
B31— Arm In Pressure Sensor
B32— Front Attachment Pressure Sensor
B33— Swing Pressure Sensor
B34— Travel Pressure Sensor
B40— Hydraulic Oil Temperature Sensor
E1—Drive Light
E2—Boom Work Light
F60— Fusible Link 65 A
F61— Fusible Link 45A
G3—Alternator
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X3—Cab Harness-to-Machine Harness 52-Pin Connector
X4—Cab Harness-to-Machine Harness 32-Pin Connector
X7—Engine Interface Harness-to-Machine Harness 8-Pin Connector
X8—Engine Interface Harness-to-Machine Harness 1-Pin Connector
X40— Pump Harness-to-Machine Harness Connector
X41— Cab Harness-to-Machine Harness 2-Pin Connector 1
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X46— Attachment Connector (not used)
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X90— Machine Harness-to-Hydraulic Oil Temperature Switch Connector
X98— Machine Harness Splice Connector
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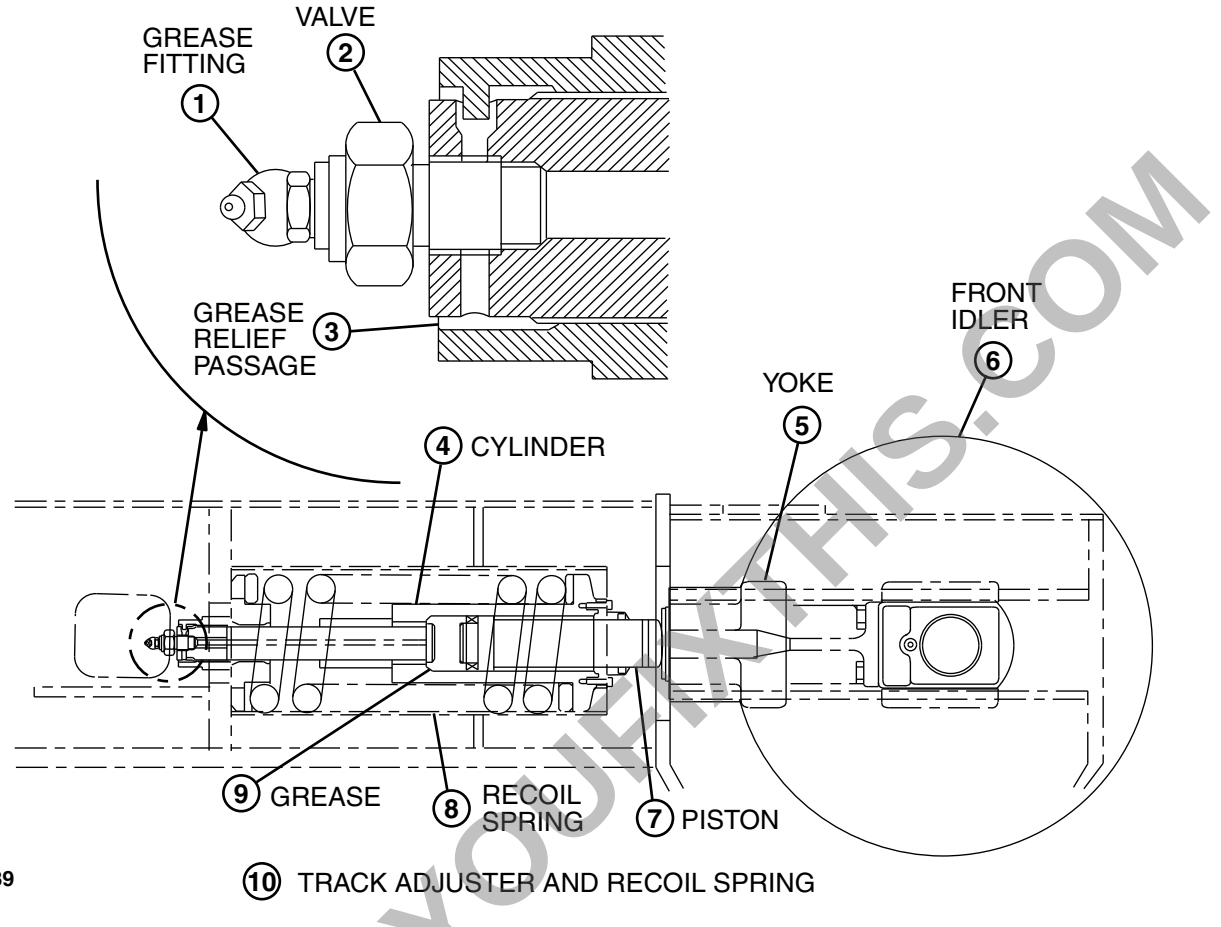
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Track Adjuster and Recoil Spring Operation



Track Adjuster and Recoil Spring

1— Grease Fitting
2— Valve
3— Grease Relief Passage
4— Cylinder
5— Yoke
6— Front Idler
7— Piston
8— Recoil Spring
9— Grease
10— Track Adjuster and Recoil Spring

The track adjuster and recoil spring (10) is supported by the track frame. Shock loads on the track and front idler (6) are absorbed by the recoil spring (8).

To decrease track sag, grease (9) is pumped into the cylinder (4) through the grease fitting (1). The grease pushes the piston (7) against the yoke moving the front idler (6) out, reducing track sag. The grease fitting (1) is protected from excess pressure by a check ball.

Increasing track sag is accomplished by loosening the valve (2) to release grease from the cylinder through the grease relief passage (3). When releasing grease from the cylinder, only loosen the valve (2).

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4— From Arm In Pilot Valve
15— Pump 1
16— Pump 2
90— Arm 2 Spool
91— Arm 2 Flow Rate Control Valve
94— Arm Regenerative Valve
97— Arm 1 Spool
98— Arm 1 Flow Rate Control Valve
101— Arm Reduced Leakage Valve
102— Arm In Circuit Relief and Anticavitation Valve
103— Arm Out Circuit Relief and Anticavitation Valve
127— Arm Cylinder
145— Supply Oil
147— Pilot Oil
149— Return Oil
150— Regenerative Return Oil
300— Voltage
A3—Main Controller (MCF)
B30— Boom Up Pressure Sensor
B31— Arm In Pressure Sensor
B33— Swing Pressure Sensor
B35— Pump 1 Delivery Pressure Sensor
B37— Pump 2 Delivery Pressure Sensor
Y23— Arm Regenerative Solenoid Valve (SC)

The arm regenerative valve improves arm control and prevents arm cylinder cavitation during arm in operation by combining the return oil from arm cylinder rod end with the pump supply oil to the arm cylinder head end.

Under the following operating conditions: low pump 2 delivery pressure, pilot oil pressure to the pilot cap for arm in, and boom up actuated, gravity can pull the arm in faster than the pumps can supply oil to the arm cylinder head end. The operating conditions are sensed by the pump 2 delivery pressure sensor (B37), arm in pressure sensor (B31), and boom up pressure sensor (B30). The sensors send electrical signals to the main controller (A3). The main controller sends an electrical signal to the arm regenerative solenoid valve (Y23). The arm regenerative solenoid valve sends pilot oil pressure signal to the arm regenerative valve (94) blocking the passage to oil tank. The return oil from the arm cylinder rod end is combined with supply oil from pump 2 and routed to the arm cylinder head end.

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1	**Control valve spool stuck**	Inspect control valve spool. See Left Control Valve (5-Spool) Disassemble and Assemble and see Right Control Valve (4-Spool) Disassemble and Assemble. (Group 3360.) Does control valve spool move freely?	**YES:** Go to Pilot control valve malfunction. **NO:** Repair or replace control valve components as necessary.

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2	**Pilot control valve malfunction**	Inspect pilot control valve for sticking spool. See Control Valve Spool Actuating Pilot Pressure Test. (Group 9025-25.) Does pilot control valve spool move freely?	**YES:** Diagnostic checkout complete. **NO:** Inspect, repair or replace pilot control valve. See Left and Right Pilot Valve Disassemble and Assemble and See Travel Pilot Control Valve Disassemble and Assemble. (Group 3360.)

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Some Functions Cannot Be Operated, All Others Are Normal

TX19495,0000005 -19-24JUN10-9/20

1	**Pilot cap loose**	Inspect pilot cap for leakage or damage. Check pilot cap cap screw for proper torque specification. See Left Control Valve (5-Spool) Disassemble and Assemble and see Right Control Valve (4-Spool) Disassemble and Assemble. (Group 3360.) Do control valve components meet specification?	**YES:** Go to Pilot control valve or hydraulic line malfunction. **NO:** Repair or replace control valve components as necessary.

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2	**Pilot control valve or hydraulic line malfunction**	Inspect pilot control valve or hydraulic line for function that can not be operated. Check for leaks or damage. Are components free of damage?	**YES:** Go to Pump 1 or pump 2 flow rate pilot valve spool stuck. **NO:** Inspect, repair or replace pilot control valve. See Left and Right Pilot Valve Disassemble and Assemble and See Travel Pilot Control Valve Disassemble and Assemble. (Group 3360.) **NO:** Inspect, repair or replace hydraulic line.

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Diagnostic Information

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