160GLC Excavator Operation and Test

(PIN: 1FF160GX_ _F055671—)

OPERATION & TEST TECHNICAL MANUAL

160GLC Excavator (PIN: 1FF160GX_ _F055671—)

TM13345X19 23APR18 (ENGLISH)

Worldwide Construction
And Forestry Division
PRINTED IN U.S.A.

Inspect Machine

Inspect machine carefully each day by walking around it before starting.

Keep all guards and shields in good condition and properly installed. Fix damage and replace worn or broken parts immediately. Pay special attention to hydraulic hoses and electrical wiring.

T6607AQ —UN—15APR13

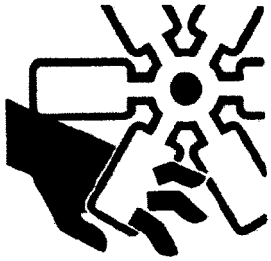
TX,INSPECT -19-08SEP10-1/1

Stay Clear of Moving Parts

Entanglements in moving parts can cause serious injury.

Stop engine before examining, adjusting, or maintaining any part of machine with moving parts.

Keep guards and shields in place. Replace any guard or shield that has been removed for access as soon as service or repair is complete.



T133592 —UN—15APR13

TX,MOVING,PARTS -19-20JAN11-1/1

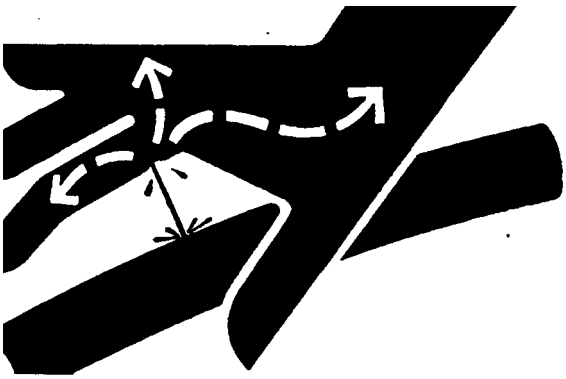
Avoid High-Pressure Fluids

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.



X9811 —UN—23AUG88

DX,FLUID -19-06OCT16-1/1

Remove Paint Before Welding or Heating

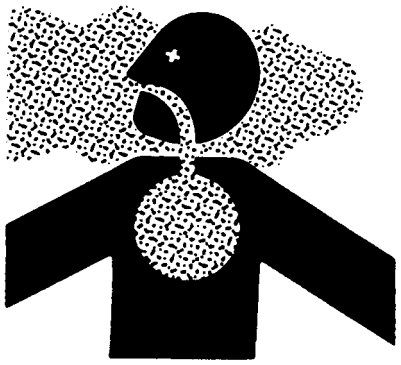
Avoid potentially toxic fumes and dust.

Hazardous fumes can be generated when paint is heated by welding, soldering, or using a torch.

Remove paint before heating:

- Remove paint a minimum of 100 mm (4 in.) from area to be affected by heating. If paint cannot be removed, wear an approved respirator before heating or welding.
- If you sand or grind paint, avoid breathing the dust. Wear an approved respirator.
- If you use solvent or paint stripper, remove stripper with soap and water before welding. Remove solvent or paint stripper containers and other flammable material from area. Allow fumes to disperse at least 15 minutes before welding or heating.

Do not use a chlorinated solvent in areas where welding will take place.



TS220 —UN—15APR13

Do all work in an area that is well ventilated to carry toxic fumes and dust away.

Dispose of paint and solvent properly.

DX,PAINT -19-24JUL02-1/1

Make Welding Repairs Safely

IMPORTANT: Disable electrical power before welding. Turn off main battery switch and disconnect positive (+) and negative (-) battery cables.

Do not weld or apply heat on any part of a reservoir or tank that has contained oil or fuel. Heat from welding and cutting can cause oil, fuel, or cleaning solution to create gases which are explosive, flammable, or toxic.

Avoid welding or heating near pressurized fluid lines. Flammable spray may result and cause severe burns if pressurized lines malfunction as a result of heating. Do not let heat go beyond work area to nearby pressurized lines.

Remove paint properly. Do not inhale paint dust or fumes. Use a qualified welding technician for structural repairs.

T133547 —UN—15APR13

Heating Near Pressurized Fluid Lines

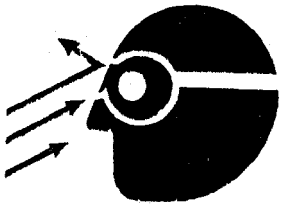
Make sure there is good ventilation. Wear eye protection and protective equipment when welding.

MB60223,0000212 -19-02JUL15-1/1

Drive Metal Pins Safely

Always wear protective goggles or safety glasses and other protective equipment before striking hardened parts. Hammering hardened metal parts such as pins and bucket teeth could dislodge chips at high velocity.

Use a soft hammer or a brass bar between hammer and object to prevent chipping.



T133738 —UN—15APR13

TX,PINS -19-20JAN11-1/1

❷ **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 (MCZ) be replaced. **NO:** Main controller (MCZ) malfunction. Replace main controller (MCZ). See Main Controller (MCZ) Remove and Install. (Group 9015-20.)

DF89619,00B57E5 -19-28JAN16-4/4

011002.02 — Abnormal A/D Converter

DF89619,00B57E6 -19-28JAN16-1/4

Abnormal A/D Converter Diagnostic Procedure

DF89619,00B57E6 -19-28JAN16-2/4

❶ **Code Check**	Clear and check again for diagnostic trouble codes (DTCs).	**YES:** Code is still present and machine does not operate. Replace main controller (MCZ). See Main Controller (MCZ) Remove and Install. (Group 9015-20.)
	Is DTC 011002.02 still present?	**YES:** Code is still present, but machine is still operable. Go to Machine Function Check. **NO:** Main controller (MCZ) is OK.

DF89619,00B57E6 -19-28JAN16-3/4

❷ **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 (MCZ) be replaced. **NO:** Main controller (MCZ) malfunction. Replace main controller (MCZ). See Main Controller (MCZ) Remove and Install. (Group 9015-20.)

DF89619,00B57E6 -19-28JAN16-4/4

011003.03 — Abnormal Sensor Voltage

Individual sensor or component diagnostic trouble code (DTC) may also be present within this code. Engine speed dial may not function correctly when this code is present.

DF89619,00B57E7 -19-28JAN16-1/4

Abnormal Sensor Voltage Diagnostic Procedure

Continued on next page

DF89619,00B57E7 -19-28JAN16-2/4

2 Component Check	**Key switch in OFF position.**	
	Disconnect pump 2 delivery pressure sensor (marked PP2) (B37).	
	Disconnect pump 1 delivery pressure sensor (marked PP1) (B35).	
	Connect pump 2 delivery pressure sensor (marked PP2) connector (B37) to pump 1 delivery pressure sensor (marked PP1) (B35).	
	Clear MCZ diagnostic trouble codes (DTCs).	
	Operate machine.	
	Check for active MCZ diagnostic trouble code 011202.04—Pump 2 Delivery Pressure Sensor Circuit Low Input.	
	Is code active?	**YES:** Go to Voltage Check.
	Return connectors to appropriate sensors after check is complete.	**NO:** Pump 2 delivery pressure sensor (marked PP2) (B37) malfunction. Replace sensor.

DF89619,00B57F5 -19-28JAN16-4/7

3 Voltage Check	**Key switch in OFF position.**	
	Disconnect pump 2 delivery pressure sensor (marked PP2) (B37).	
	Turn key switch to ON position.	
	Check voltage between pin 1 and pin 3 of pump 2 delivery pressure sensor (marked PP2) connector (B37) for approximately 5 V.	**YES:** Go to Open Circuit Check.
	Is correct voltage indicated?	**NO:** Repair or replace harness. See appropriate harness.

DF89619,00B57F5 -19-28JAN16-5/7

4 Open Circuit Check	**Key switch in OFF position.**	
	Pump 2 delivery pressure sensor (marked PP2) (B37) disconnected.	
	Disconnect cab harness-to-main controller 17-pin connector C (X33).	
	Check for continuity between pin 2 of pump 2 delivery pressure sensor (marked PP2) connector (B37) and pin 15 of cab harness-to-main controller 17-pin connector C (X33).	**YES:** Go to Short Circuit Check.
	Is continuity indicated?	**NO:** Repair or replace harness. See appropriate harness.

DF89619,00B57F5 -19-28JAN16-6/7

5 Short Circuit Check	**Key switch in OFF position.**	
	Pump 2 delivery pressure sensor (marked PP2) (B37) disconnected.	
	Check for continuity between pin 2 of pump 2 delivery pressure sensor (marked PP2) connector (B37) and machine ground.	**YES:** Repair or replace harness. See appropriate harness.
	Is continuity indicated?	**NO:** Checks complete.

DF89619,00B57F5 -19-28JAN16-7/7

2 Component Check	Switch boom up pressure sensor connector (B30) to another properly working pressure sensor. Clear MCZ diagnostic trouble codes. Operate machine. Check for active MCZ diagnostic trouble code 011302.04—Boom Up Pilot Pressure Sensor Circuit Low Input. Is code active? Return connectors to appropriate sensors after check is completed.	**YES:** Go to Voltage Check. **NO:** Boom up pressure sensor (B30) malfunction. Replace sensor.

DF89619,00B57FD -19-03FEB17-4/7

3 Voltage Check	Key switch in OFF position. Disconnect boom up pressure sensor (B30). **Turn key switch to ON position.** Check voltage between pin 1 and pin 3 of boom up pressure sensor connector (B30) for approximately 5 V. Is correct voltage indicated?	**YES:** Go to Open Circuit Check. **NO:** Repair or replace harness. See appropriate harness.

DF89619,00B57FD -19-03FEB17-5/7

4 Open Circuit Check	Key switch in OFF position. Boom up pressure sensor (B30) disconnected. Disconnect cab harness-to-main controller 30-pin connector D (X34). Check for continuity between pin 2 of boom up pressure sensor connector (B30) and pin 6 of cab harness-to-main controller 30-pin connector D (X34). Is continuity indicated?	**YES:** Go to Short Circuit Check. **NO:** Repair or replace harness. See appropriate harness.

DF89619,00B57FD -19-03FEB17-6/7

5 Short Circuit Check	Key switch in OFF position. Boom up pressure sensor (B30) disconnected. Check for continuity between pin 2 of boom up pressure sensor connector (B30) and machine ground. Is continuity indicated?	**YES:** Repair or replace harness. See appropriate harness. **NO:** Checks complete.

DF89619,00B57FD -19-03FEB17-7/7

011303.03 — Arm In Pressure Sensor Circuit High Input

Arm in pressure sensor (B31) signal voltage is high. (Above 4.5 V)

IMPORTANT: Avoid connector damage. Do not install connector with impact wrench or power tools.

Over torquing will result in permanent damage to connector. Torque only to specification.

Specification

100-Pin Connector
(X3)—Torque.....10 N·m
89 lb.-in.

Continued on next page

DF89619,00B57FE -19-12JUN14-1/6

4 Open Circuit Check	**Key switch in OFF position.** Bucket curl pressure sensor (marked BKC) (B56) disconnected. Disconnect cab harness-to-main controller 30-pin connector D (X34). Check for continuity between pin 2 of bucket curl pressure sensor (marked BKC) (B56) connector and pin 8 of cab harness-to-main controller 30-pin connector D (X34). Is continuity indicated?	**YES:** Go to Short Circuit Check. **NO:** Repair or replace harness. See appropriate harness.

DF89619,00B68BF -19-05DEC17-6/7

5 Short Circuit Check	**Key switch in OFF position.** Bucket curl pressure sensor (marked BKC) (B56) disconnected. Check for continuity between pin 2 of bucket curl pressure sensor (marked BKC) (B56) connector and machine ground. Is continuity indicated?	**YES:** Repair or replace harness. See appropriate harness. **NO:** Checks complete.

DF89619,00B68BF -19-05DEC17-7/7

011400.02 — Pump 2 Flow Rate Limit Solenoid Valve Feedback Abnormal

Pump 2 flow rate limit solenoid (marked SB) (Y20) current above 920 mA and below 70 mA.

IMPORTANT: Avoid connector damage. Do not install connector with impact wrench or power tools.

Over torquing will result in permanent damage to connector. Torque only to specification.

Specification	
100-Pin Connector (X3)—Torque	10 N·m 89 lb·ft

DF89619,00B5804 -19-28JAN16-1/8

Pump 2 Flow Rate Limit Solenoid Valve Feedback Abnormal Diagnostic Procedure

DF89619,00B5804 -19-28JAN16-2/8

1 Connector Check	Key switch in OFF position. Check the following connectors for damage, corrosion, or debris: • Pump 2 flow rate limit solenoid (marked SB) (Y20) and pump harness-to-machine harness connector (X40). See Pump Harness (W8) Component Location. (Group 9015-10.) • Cab harness-to-machine harness 100-pin connector (X3) and cab harness-to-main controller 31-pin connector A (X31). See Cab Harness (W1) Component Location. (Group 9015-10.) Are connectors in good condition and free of corrosion and debris?	**YES:** Go to Component Check. **NO:** Repair or replace connectors. See appropriate harness.

Continued on next page

DF89619,00B5804 -19-28JAN16-3/8

4 Short Circuit Check	Key switch in OFF position. Dig regenerative solenoid (marked SF) (Y22) disconnected. Cab harness-to-main controller 31-pin connector A (X31) disconnected. Check for continuity between: • Pin 1 of dig regenerative solenoid connector (marked SF) (Y22) to machine ground. • Pin 14 of cab harness-to-main controller 31-pin connector A (X31) to machine ground. Is continuity indicated?	**YES:** Short to ground. Repair or replace harness. See appropriate harness. **NO:** Go to Harness Check.

DF89619,00B580A -19-28JAN16-6/8

5 Harness Check	Key switch in OFF position. Cab harness-to-main controller 31-pin connector A (X31) disconnected. Check for continuity between pin 14 of cab harness-to-main controller 31-pin connector A (X31) to all other pins on connector. Is continuity indicated between any pins?	**YES:** Short to power. Repair or replace harness. See appropriate harness. **NO:** Go to Solenoid Check.

DF89619,00B580A -19-28JAN16-7/8

6 Solenoid Check	Key switch in OFF position. Disconnect dig regenerative solenoid (marked SF) (Y22). Test dig regenerative solenoid (marked SF) (Y22) and compare to specification. See Electrical Component Specifications. (Group 9015-20.) Is dig regenerative solenoid (marked SF) (Y22) within specification?	**YES:** Checks complete. **NO:** Dig regenerative solenoid (marked SF) (Y22) malfunction. Replace solenoid.

DF89619,00B580A -19-28JAN16-8/8

011402.03 — Dig Regenerative Solenoid Valve Feedback Current High

Dig regenerative solenoid (marked SF) (Y22) current above 920 mA.

IMPORTANT: Avoid connector damage. Do not install connector with impact wrench or power tools.

Over torquing will result in permanent damage to connector. Torque only to specification.

Specification

100-Pin Connector (X3)—Torque	10 N·m 89 lb·in

DF89619,00B580B -19-28JAN16-1/7

Dig Regenerative Solenoid Valve Feedback Current High Diagnostic Procedure

Continued on next page

DF89619,00B580B -19-28JAN16-2/7

5 Solenoid Check	Key switch in OFF position. Power dig/travel speed solenoid (marked SG) (Y24) disconnected. Test power dig/travel speed solenoid (marked SG) (Y24) and compare to specification. See Electrical Component Specifications. (Group 9015-20.) Is power dig/travel speed solenoid (marked SG) (Y24) within specification?	**YES:** Checks complete. **NO:** Power dig/travel speed solenoid (marked SG) (Y24) malfunction. Replace solenoid.

DF89619,00B58AB -19-28JAN16-7/7

011407.04 — Power Dig/Travel Speed Solenoid Valve Feedback Current Low

Power dig/travel speed solenoid (marked SG) (Y24) current below 70 mA.

IMPORTANT: Avoid connector damage. Do not install connector with impact wrench or power tools.

Over torquing will result in permanent damage to connector. Torque only to specification.

Specification

100-Pin Connector (X3)—Torque.....10 N·m (89 lb·in)

DF89619,00B58AC -19-28JAN16-1/7

Power Dig/Travel Speed Solenoid Valve Feedback Current Low Diagnostic Procedure

DF89619,00B58AC -19-28JAN16-2/7

1 Connector Check	Key switch in OFF position. Check the following connectors for damage, corrosion, or debris: • Power dig/travel speed solenoid (marked SG) (Y24) and cab harness-to-machine harness 100-pin connector (X3). See Machine Harness (W2) Component Location. (Group 9015-10.) • Cab harness-to-main controller 31-pin connector A (X31). See Cab Harness (W1) Component Location. (Group 9015-10.) Are connectors in good condition and free of corrosion and debris?	**YES:** Go to Component Check. **NO:** Repair or replace connectors. See appropriate harness.

DF89619,00B58AC -19-28JAN16-3/7

2 Component Check	Key switch in OFF position. Disconnect power dig/travel speed solenoid (marked SG) (Y24). Switch connectors of power dig/travel speed solenoid (marked SG) (Y24) with another solenoid in solenoid valve manifold. Clear MCZ diagnostic trouble codes (DTCs). Operate machine. Check for active MCZ diagnostic trouble code 011407.04—Power Dig/Travel Speed Solenoid Feedback Current Low. Is code active? Return connectors to appropriate solenoids after check is complete.	**YES:** Go to Continuity Check. **NO:** Power dig/travel speed solenoid (marked SG) (Y24) malfunction. Replace solenoid.

Continued on next page

DF89619,00B58AC -19-28JAN16-4/7

6 Solenoid Check	Test selector valve solenoid valve (Y40) and compare to specification. See Electrical Component Specifications. (Group 9015-20.) Is selector valve solenoid valve (Y40) within specification?	**YES:** Checks complete. **NO:** Selector valve solenoid valve (Y40) malfunction. Replace solenoid valve.

DF89619,00B581A -19-28JAN16-8/8

011459.02 — Idle Stop Relay Circuit Malfunction

DF89619,00B581B -19-03FEB17-1/6

Idle Stop Relay Circuit Malfunction Diagnostic Procedure

DF89619,00B581B -19-03FEB17-2/6

1 Fuse Check	Key switch in OFF position. Remove idle stop 5 A fuse (marked IDLE STOP) (F18) from fuse box (F50). See Fuse and Relay Specifications. (Group 9015-10.) Test idle stop 5 A fuse (marked IDLE STOP) (F18) for continuity. Is continuity indicated?	 **YES:** Go to Voltage Check. **NO:** Replace fuse.

DF89619,00B581B -19-03FEB17-3/6

2 Voltage Check	Install idle stop 5 A fuse (marked IDLE STOP) (F18) in fuse box (F50). Key switch in ON position. Remove idle stop relay (K11). See Cab Harness (W1) Component Location. (Group 9015-10.) Check voltage at idle stop relay (K11) connector pin 1. Are approximately 24 volts present?	 **YES:** Go to Relay Check. **NO:** Open circuit in cab harness (W1) between idle stop relay (K11) and idle stop 5 A fuse (marked IDLE STOP) (F18). Repair or replace harness.

DF89619,00B581B -19-03FEB17-4/6

3 Relay Check	Key switch in OFF position. Test idle stop relay (K11). See Electrical Component Checks. (Group 9015-20.) Is idle stop relay (K11) within specification?	 **YES:** Go to Cab Harness (W1) Continuity Check. **NO:** Replace idle stop relay (K11).

Continued on next page

DF89619,00B581B -19-03FEB17-5/6

5 Solenoid Check	**Key switch in OFF position.**	
	AFL solenoid A (marked 1A) (Y61) disconnected.	
	Test AFL solenoid A (marked 1A) (Y61) and compare to specification. See Electrical Component Specifications. (Group 9015-20.)	**YES:** Checks complete.
	Is AFL solenoid A (marked 1A) (Y61) within specification?	**NO:** AFL solenoid A (marked 1A) (Y61) malfunction. Replace solenoid.

RH60123,00022D6 -19-01SEP15-7/7

011817.02 — OPT Solenoid 2 Feedback Abnormal

Auxiliary function lever (AFL) solenoid B (marked 1B) (Y62) current above 920 mA and below 70 mA.

RH60123,00022D7 -19-01SEP15-1/8

Auxiliary Function Lever (AFL) Solenoid B (marked 1B) (Y62) Abnormal Feedback Diagnostic Procedure

RH60123,00022D7 -19-01SEP15-2/8

1 Connector Check	**Key switch in OFF position.**	
	Check the following connectors for damage, corrosion, or debris: • See Cab Harness (W1) Component Location. (Group 9015-10.) - Cab harness-to-main controller 31-pin connector A (X31). • See Auxiliary Function Lever (AFL) Harness (W75) Component Location. (Group 9015-10.) - Auxiliary function lever (AFL) connector 1 (X574). • See Auxiliary Function Lever (AFL) Solenoid Harness (W76) Component Location. (Group 9015-10.) - Auxiliary function lever (AFL) solenoid B (marked 1B) (Y62). - Auxiliary function lever (AFL) harness-to-auxiliary function lever (AFL) solenoid harness connector (X577).	**YES:** Go to Component Check.
	Are connectors in good condition and free of corrosion and debris?	**NO:** Repair or replace connectors. See appropriate harness.

RH60123,00022D7 -19-01SEP15-3/8

2 Component Check	**Key switch in OFF position.**	
	Disconnect AFL solenoid B (marked 1B) (Y62). Disconnect AFL solenoid A (marked 1A) (Y61). Connect AFL solenoid B (marked 1B) (Y62) connector to AFL solenoid A (marked 1A) (Y61). Clear MCZ diagnostic trouble codes. Operate machine. Check for active MCZ diagnostic trouble code 011817.02—OPT Solenoid 2 Feedback Abnormal.	
	Is code active?	**YES:** Go to Continuity Check.
	Return connectors to appropriate solenoids after check is complete.	**NO:** AFL solenoid B (marked 1B) (Y62) malfunction. Replace solenoid.

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RH60123,00022D7 -19-01SEP15-4/8

1 Connector Check	**Key switch in OFF position.** Check the following connectors for damage, corrosion, or debris: • Cab harness (W1). See Cab Harness (W1) Component Location. (Group 9015-10.) - Cab harness-to-machine harness 100-pin connector (X3). - Cab harness-to-main controller 30-pin connector D (X34). - Cab harness-to-main controller 26-pin connector F (X36). • Machine harness (W2). See Machine Harness (W2) Component Location. (Group 9015-10.) - Arm out pressure sensor (marked AMD) (B61). - Cab harness-to-machine harness 100-pin connector (X3). - Machine harness power splice (X98). - Machine harness ground splice (X104). Are connectors in good condition and free of corrosion and debris?	**YES:** Go to Component Check. **NO:** Repair or replace connectors. See appropriate harness.

DF89619,00B68C4 -19-05DEC17-3/7

2 Component Check	**Key switch in OFF position.** Switch arm out pressure sensor (marked AMD) (B61) to another properly working pressure sensor. **Turn key switch to ON position.** Clear main controller (MCZ) diagnostic trouble codes (DTCs). Operate machine. Check for active MCZ diagnostic trouble code 011995.04—Arm Roll-Out Pilot Pressure Sensor Circuit Low Input. Is code active? Return connectors to appropriate sensors after check is complete.	**YES:** Go to Voltage Check. **NO:** Arm out pressure sensor (marked AMD) (B61) malfunction. Replace sensor.

DF89619,00B68C4 -19-05DEC17-4/7

3 Voltage Check	**Key switch in OFF position.** Disconnect arm out pressure sensor (marked AMD) (B61). **Turn key switch to ON position.** Check voltage between pin 1 and pin 3 of arm out pressure sensor (marked AMD) (B61) connector for approximately 5 V. Is correct voltage indicated?	**YES:** Go to Open Circuit Check. **NO:** Repair or replace harness. See appropriate harness.

Continued on next page

DF89619,00B68C4 -19-05DEC17-5/7

3 Open Circuit Check	Disconnect the following connectors: • Variable speed fan solenoid (Y5014). • Engine control unit (ECU) connector 1 (X5501). • Engine control unit (ECU) connector 2 (X5502). Check for continuity between: • Pin 1 of variable speed fan solenoid (Y5014) connector and pin 32 of engine control unit (ECU) connector 2 (X5502). • Pin 2 of variable speed fan solenoid (Y5014) connector and pin 21 of engine control unit (ECU) connector 1 (X5501). Is continuity indicated?	**YES:** Program controller. **NO:** Repair or replace harness as necessary.

JL58967,00002E8 -19-07MAR18-5/5

000647.06 — Variable Speed Fan Solenoid High Current

Variable speed fan solenoid (Y5014) high current.

JL58967,00002E9 -19-13OCT15-1/6

Variable Speed Fan Solenoid High Current Diagnostic Procedure

Alarm Level:

Warning Alarm Illuminated—Highlighted Yellow (warning)

JL58967,00002E9 -19-13OCT15-2/6

1 Connector Check	Check the following connectors for damage, corrosion, or debris: • Fan harness (W57). See Fan Harness (W57) Component Location. (Group 9015-10.) - Variable speed fan solenoid (Y5014). • Engine interface harness (W5). See Engine Interface Harness (W5) Component Location. (Group 9015-10.) - Engine control unit (ECU) connector 1 (X5501). - Engine control unit (ECU) connector 2 (X5502). - Fan harness connector (X5005). Are connectors in good condition and free of corrosion and debris?	**YES:** Go to Component Check. **NO:** Repair or replace connectors or pins. See Engine Interface Harness (W5) Wiring Diagram. (Group 9015-10.) See Fan Harness (W57) Wiring Diagram. (Group 9015-10.)

JL58967,00002E9 -19-13OCT15-3/6

2 Component Check	Disconnect and test variable speed fan solenoid (Y5014). See Electrical Component Specifications. (Group 9015-20.) Does variable speed fan solenoid (Y5014) meet specification?	**YES:** Go to Continuity Check. **NO:** Variable speed fan solenoid (Y5014) malfunction. Replace solenoid.

Continued on next page

JL58967,00002E9 -19-13OCT15-4/6

5 Short to Voltage Check	Connect engine interface harness-to-DEF harness connector 1 (X5037).	
	Ignition ON, engine OFF.	
	Using a multimeter, measure voltage between coolant control valve (Y5019) connector pin 1 and ground.	
	Using a multimeter, measure voltage between coolant control valve (Y5019) connector pin 4 and ground.	**YES:** Go to next check.
	Are both measurements less than 0.5 V?	**NO:** Repair short to voltage in harness. See Engine Interface Harness (W5) Wiring Diagram and see Diesel Exhaust Fluid (DEF) Harness (W54) Wiring Diagram. (Group 9015-10.)

JR05199,0000E9C -19-18OCT17-7/11

6 Continuity Check	Ignition OFF, engine OFF.	
	Using a multimeter, measure the resistance between engine control unit (ECU) connector 2 (X5502) pin 20 and coolant control valve (Y5019) pin 1.	
	Using a multimeter, measure the resistance between engine control unit (ECU) connector 2 (X5502) pin 51 and coolant control valve (Y5019) pin 4.	**YES:** Go to next check.
	Are both resistance measurements less than 5 ohms?	**NO:** Repair open or high resistance in harness. See Engine Interface Harness (W5) Wiring Diagram and see Diesel Exhaust Fluid (DEF) Harness (W54) Wiring Diagram. (Group 9015-10.)

JR05199,0000E9C -19-18OCT17-8/11

7 Short to Ground Check	Connect engine interface harness-to-DEF harness connector 1 (X5037).	
	Disconnect ECU connector 2 (X5502).	
	Ignition OFF, engine OFF.	
	Using a multimeter, measure resistance between coolant control valve (Y5019) connector pin 1 and ground.	
	Using a multimeter, measure resistance between coolant control valve (Y5019) connector pin 4 and ground.	**YES:** Repair short to ground in harness. See Engine Interface Harness (W5) Wiring Diagram and see Diesel Exhaust Fluid (DEF) Harness (W54) Wiring Diagram. (Group 9015-10.)
	Is either measurement less than 100 kilo-ohms?	**NO:** Go to next check.

Continued on next page

JR05199,0000E9C -19-18OCT17-9/11

7 DEF Tank Temperature Check	Ignition ON, engine speed at high idle. In Service ADVISOR™, perform DEF header coolant purge test. Using Service ADVISOR™, monitor DEF tank fluid temperature. Operate engine for 20 minutes. Does the DEF tank fluid temperature increase by more than 5°C (9°F) in 20 minutes?	**YES:** Checks complete. **NO:** Replace coolant control valve (Y5019). See Diesel Exhaust Fluid (DEF) Harness (W54) Component Location. (Group 9015-10.)

JR05199,0000E9F -19-16OCT17-10/10

005484.05 — Reversing Fan Solenoid Open Circuit

Reversing fan solenoid (Y5015) open circuit.

JL58967,00002EE -19-13OCT15-1/5

Reversing Fan Solenoid Open Circuit Diagnostic Procedure

Alarm Level:

Warning Alarm Illuminated—Highlighted Yellow (warning)

JL58967,00002EE -19-13OCT15-2/5

1 Connector Check	Check the following connectors for damage, corrosion, or debris: • Fan harness (W57). See Fan Harness (W57) Component Location. (Group 9015-10.) - Reversing fan solenoid (Y5015). • Engine interface harness (W5). See Engine Interface Harness (W5) Component Location. (Group 9015-10.) - Engine control unit (ECU) connector 1 (X5501). - Engine control unit (ECU) connector 2 (X5502). - Fan harness connector (X5005). Are connectors in good condition and free of corrosion and debris?	**YES:** Go to Component Check. **NO:** Repair or replace connectors or pins. See Engine Interface Harness (W5) Wiring Diagram. (Group 9015-10.) See Fan Harness (W57) Wiring Diagram. (Group 9015-10.)

JL58967,00002EE -19-13OCT15-3/5

2 Component Check	Disconnect and test reversing fan solenoid (Y5015). See Electrical Component Specifications. (Group 9015-20.) Does reversing fan solenoid (Y5015) test OK?	**YES:** Go to Open Circuit Check. **NO:** Reversing fan solenoid (Y5015) malfunction. Replace solenoid.

Continued on next page

JL58967,00002EE -19-13OCT15-4/5

014021.02 — Communication Terminal Security Error

Security failure of mobile communication equipment.

For more information:

- See Controller Area Network 0 (CAN 0) Circuit Diagnostics. (Group 9001-10.)
- See Controller Area Network 1 (CAN 1) Circuit Diagnostics. (Group 9001-10.)
- See Interface Controller Area Network (N-CAN) Diagnostics. (Group 9001-10.)
- See Engine Controller Area Network (Engine CAN) Diagnostics. (Group 9001-10.)

DF89619,00B5858 -19-16MAY14-1/1

014022.02 — SIM Card Error

For more information, see JDLink™ / (MTG) Technical Manual. (TM114519.) If (MTG) is 4G see JDLink™ (MTG) 4G LTE Technical Manual. (TM143019).

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DF89619,00B5859 -19-26OCT17-1/1

014023.02 — Security Error

Communication error with the main controller (MCZ).

For more information:

- See Controller Area Network 0 (CAN 0) Circuit Diagnostics. (Group 9001-10.)
- See Controller Area Network 1 (CAN 1) Circuit Diagnostics. (Group 9001-10.)
- See Interface Controller Area Network (N-CAN) Diagnostics. (Group 9001-10.)
- See Engine Controller Area Network (Engine CAN) Diagnostics. (Group 9001-10.)

DF89619,00B585A -19-16MAY14-1/1

020100.02 — Overheat Alarm

Not applicable to this machine.

DF89619,00B585B -19-27MAY14-1/1

020101.02 — Engine Warning Alarm

Diagnose the diagnostic trouble codes (DTCs) of the engine control unit (ECU).

See Engine Control Unit (ECU) Diagnostic Trouble Codes. (Group 9001-20.)

DF89619,00B585C -19-16MAY14-1/1

020102.02 — Engine Oil Pressure Alarm

Diagnose the diagnostic trouble codes (DTCs) of the engine control unit (ECU).

See Engine Control Unit (ECU) Diagnostic Trouble Codes. (Group 9001-20.)

DF89619,00B585D -19-16MAY14-1/1

020103.02 — Alternator Alarm

Alternator output above 33.5 volts.

DF89619,00B585E -19-27MAY14-1/3

Alternator Alarm Diagnostic Procedure

Continued on next page

DF89619,00B585E -19-27MAY14-2/3

5 Short to Ground Check	Turn key switch to OFF position. Ambient air temperature sensor (B22) disconnected. Air conditioner controller (ACF) (A7) disconnected. Check continuity between pin 2 of sensor and machine ground. Is continuity indicated?	**YES:** Repair or replace harness. See appropriate wiring diagram or schematic. **NO:** Checks complete.

DF89619,00B587C -19-16JUN14-7/7

18 — Short-Circuited Solar Radiation Sensor

Solar sensor (B21) circuit is open.

Additional References:

- See Air Conditioning System Cycle of Operation. (Group 9031-05.)
- See System Functional Schematic. (Group 9015-10.)

DF89619,00B587D -19-16JUN14-1/6

Short-Circuited Solar Radiation Sensor Diagnostic Procedure

DF89619,00B587D -19-16JUN14-2/6

1 Connector Check	Turn key switch to OFF position. Check the following connectors for damage, corrosion, or debris: • Solar sensor (B21) and cab harness-to-monitor harness connector (X17). See Monitor Harness (W3) Component Location. (Group 9015-10.) • Air conditioner controller (ACF) (A7) and air conditioner 10-pin connector (X52). See Heater and Air Conditioner Harness (W41) Component Location. (Group 9015-10.) Are connectors in good condition and free of corrosion and debris?	**YES:** Go to Voltage Check. **NO:** Repair or replace harness. See appropriate wiring diagram or schematic.

DF89619,00B587D -19-16JUN14-3/6

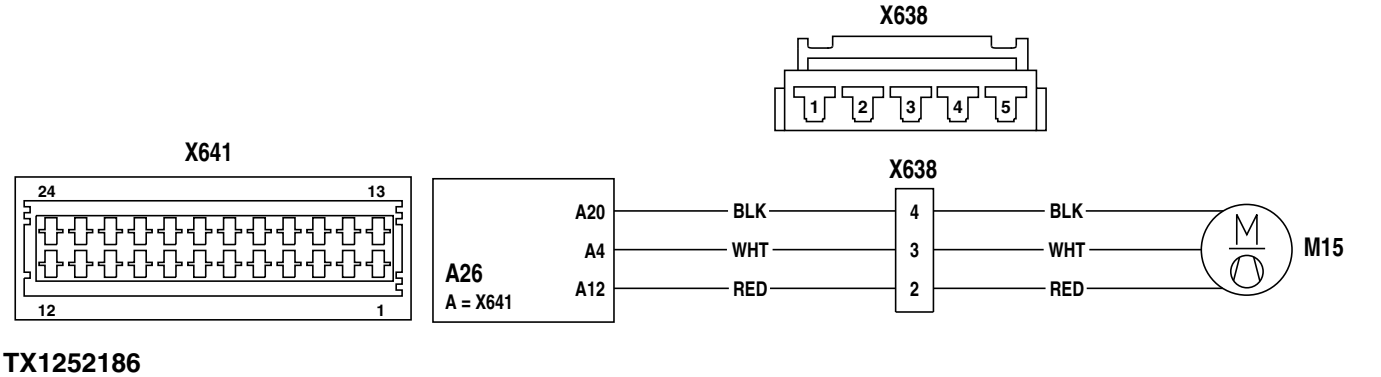
2 Voltage Check	Turn key switch to OFF position. Solar sensor (B21) disconnected. **Turn key switch to ON position.** Check for voltage at: • Pin 1 of sensor for approximately 5 V. • Pin 2 of sensor for 0.0 V. Is correct voltage indicated?	**YES:** Go to Continuity Check. **NO:** Repair or replace harness. See appropriate wiring diagram or schematic.

Continued on next page

DF89619,00B587D -19-16JUN14-4/6

2 — Cushion Blower Short to Power

Battery voltage detected from premium seat blower (M15) at pin A4 of premium seat controller (PSC) (A26).



TX1252186

Premium Seat Blower Circuit Schematic

A26— Premium Seat Controller (PSC)
M15— Premium Seat Blower
X638— Premium Seat Blower Connector
X641— Premium Seat Controller (PSC) Connector A

Code-Induced Condition:

- Seat Heating and Cooling Operations Inoperable

Circuit Information:

- See System Functional Schematic. (Group 9015-15.)

Component Location:

- See Premium Seat Harness (W87) Component Location. (Group 9015-15.)

Diagnostic Test Box Information:

- Not Applicable

Additional References:

- None

Possible Causes:

1. Circuit is shorted to power.
2. Component malfunction.
3. Software malfunction. Replace controller.

DF89619,00B690C -19-19FEB18-1/1

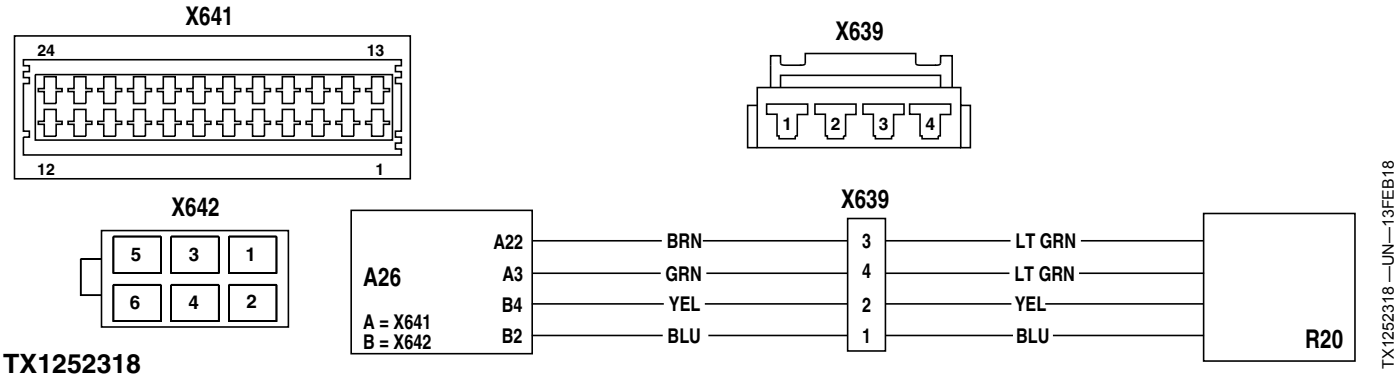
3 — Back Blower Short to Power

Not applicable to machine.

DF89619,00B690D -19-07FEB18-1/1

17 — Upper Thermal Duct Module Over Temperature

Premium seat controller (PSC) (A26) detects upper thermal duct module (R20) is over temperature.



Upper Thermal Duct Module Circuit Schematic

A26— Premium Seat Controller (PSC)
R20— Upper Thermal Duct Module
X639— Upper Thermal Module Connector
X641— Premium Seat Controller (PSC) Connector A
X642— Premium Seat Controller (PSC) Connector B

Code-Induced Condition:

- Seat Heating and Cooling Operations Inoperable

Circuit Information:

- See System Functional Schematic. (Group 9015-15.)

Component Location:

- See Premium Seat Harness (W87) Component Location. (Group 9015-15.)

Diagnostic Test Box Information:

- Not Applicable

Additional References:

- None

Possible Causes:

1. Circuit is shorted to power.
2. Component malfunction.
3. Software malfunction. Replace controller.

DF89619,00B691C -19-19FEB18-1/1

CAUTION: To avoid possible injury or death to operator or others, the rear view camera image is designed to supplement other safety practices and is not intended to be the sole method of collision avoidance. Always be alert and aware of the surroundings when operating this machine.

Turn key to ON position.

When the default screen (5) is displayed, press monitor dial (2) on the switch panel.

LOOK: Does main menu screen (1) display?

Rotate monitor dial to highlight settings menu.

Press monitor dial.

LOOK: Does settings menu display?

At settings menu, rotate monitor dial to highlight rear view camera monitor.

Press monitor dial to display rear view camera monitor menu.

LOOK: Does rear view camera monitor menu display?

Press monitor dial to turn camera ON (enable).

Press home button (4).

TX1160752A —UN—15MAY14

Rear View Image

6— Rear View Image

LOOK: Does rear view image (6) display on default screen?

Repeat above steps.

At rear view camera monitor menu, press monitor dial to turn camera OFF (disable).

Press home button.

LOOK: Does default screen appear without rear view image?

YES: Go to next check.

NO: See Rear Camera Harness (W19) Component Location and see Rear Camera Harness (W19) Wiring Diagram. (Group 9015-10.)

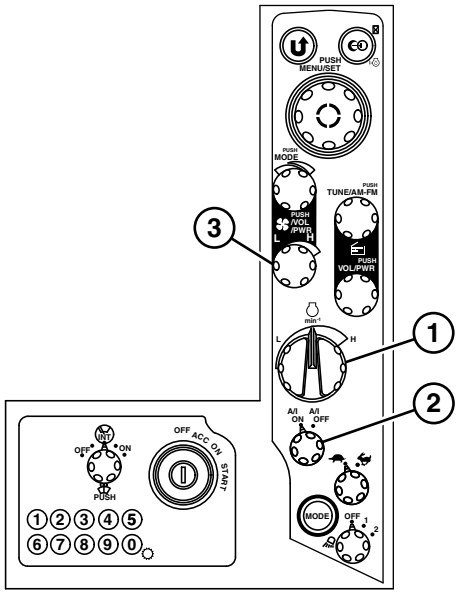
Continued on next page

JJ03229,0001128 -19-23JAN18-13/55

Reversing Fan System (if equipped)

TX1015264A —UN—09JAN07

Reversing Fan Switch



TX1088406 —UN—21FEB11

Switch Panel

1— Engine Speed Dial
2— Auto-Idle Switch
3— Blower Speed Switch
9— Reversing Fan Switch

Place pilot shutoff lever in unlocked (DOWN) position.

Turn engine speed dial (1) to H (fast idle) position.

Warm hydraulic oil to greater than 12°C (54°F).

Turn auto-idle switch (2) to A/I OFF position.

Press blower speed switch (3) OFF.

Press reversing fan switch (9) to MANUAL position.

LISTEN: Does fan speed slow down?

LOOK/LISTEN: After approximately 20 seconds, does the fan speed increase and rotate in reverse direction for approximately 30 seconds?

LISTEN/LOOK: Does the fan speed slow for approximately 20 seconds? Does fan direction return to normal?

LISTEN: Does fan speed increase?

YES: Go to next check.

NO: See Reversing Fan Switch Harness (W23) Wiring Diagram, see Reversing Fan Switch Harness (W23) Component Location, and see Cab Harness (W1) Wiring Diagram. (Group 9015-10.)

IMPORTANT: Avoid connector damage. Do not install connector with impact wrench or power tools. Over torquing will result in permanent damage to connector. Torque only to specification.

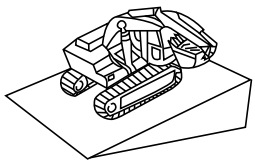
Specification

100-Pin Connector (X3)—Torque.....10 N·m
89 lb·in

Continued on next page

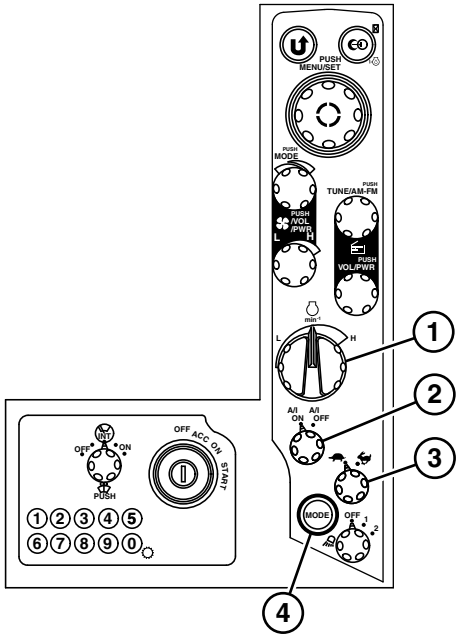
JJ03229,0001128 -19-23JAN18-26/55

Swing Power Check



TX1093770 —UN—28JUN13

Machine Position



TX1086753 —UN—11JAN11

Switch Panel

1— Engine Speed Dial
2— Auto-Idle Switch
3— Travel Speed Switch
4— Power Mode Button

Fill the bucket with dirt.

Position machine on a hillside with a slope of approximately 25%. If a hill is not available, raise one side of machine approximately 300 mm (1 ft) with the boom and insert a block under the track.

Move arm to the fully extended position. Raise boom so arm-to-bucket pivot pin is the same height as boom-to-frame pivot pin.

Swing upperstructure clockwise so it is 90 degrees to the slope.

Turn engine speed dial (1) to H (fast idle) position.

Press and release power mode button (4) until H/P (high power) mode is displayed on monitor.

Actuate the swing function to swing uphill.

LOOK: Does upperstructure swing uphill?

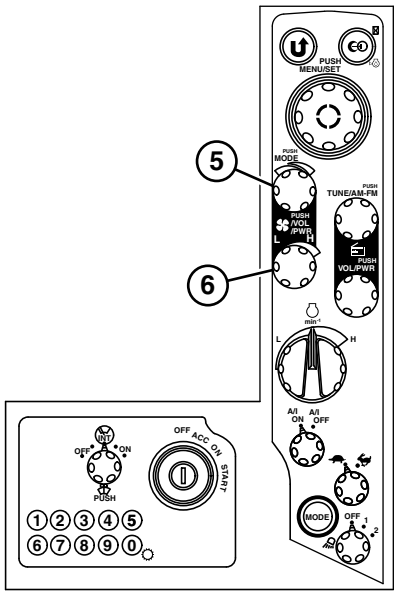
Swing upperstructure 180 degrees counterclockwise and repeat procedure.

YES: Go to next check.

NO: Perform Swing Motor Crossover Relief Valve Test and Adjustment. (Group 9025-25.)

Continued on next page

Heater and Air Conditioner Circuit Check



TX1086866 —UN—13JAN11

Switch Panel

5— Temperature Control/Mode Switch
6— Blower Speed Switch

Start engine and warm to normal operating temperature.

Turn temperature control/mode switch (5) clockwise to maximum heat position.

FEEL: Does warm air come from the vents?

Turn temperature control/mode switch counterclockwise to maximum cold position.

LISTEN: Does air conditioner compressor clutch solenoid "click"?

YES: Checks complete.

NO: Heater does not operate. Check air conditioner and heater 20 A fuse (F3) (marked HEATER). See Fuse and Relay Specifications. (Group 9015-10.)

FEEL: Does cool air come from the vents?

NO: Check wiring harnesses. See Cab Harness (W1) Wiring Diagram and see Heater and Air Conditioner Harness (W41) Wiring Diagram. (Group 9015-10.)

IMPORTANT: Avoid connector damage. Do not install connector with impact wrench or power tools. Over torquing will result in permanent damage to connector. Torque only to specification.

Specification

100-Pin Connector (X3)—Torque.....10 N·m
89 lb·in

NO: Check system operation. See Heater and Air Conditioner Operational Checks. (Group 9031-25.)

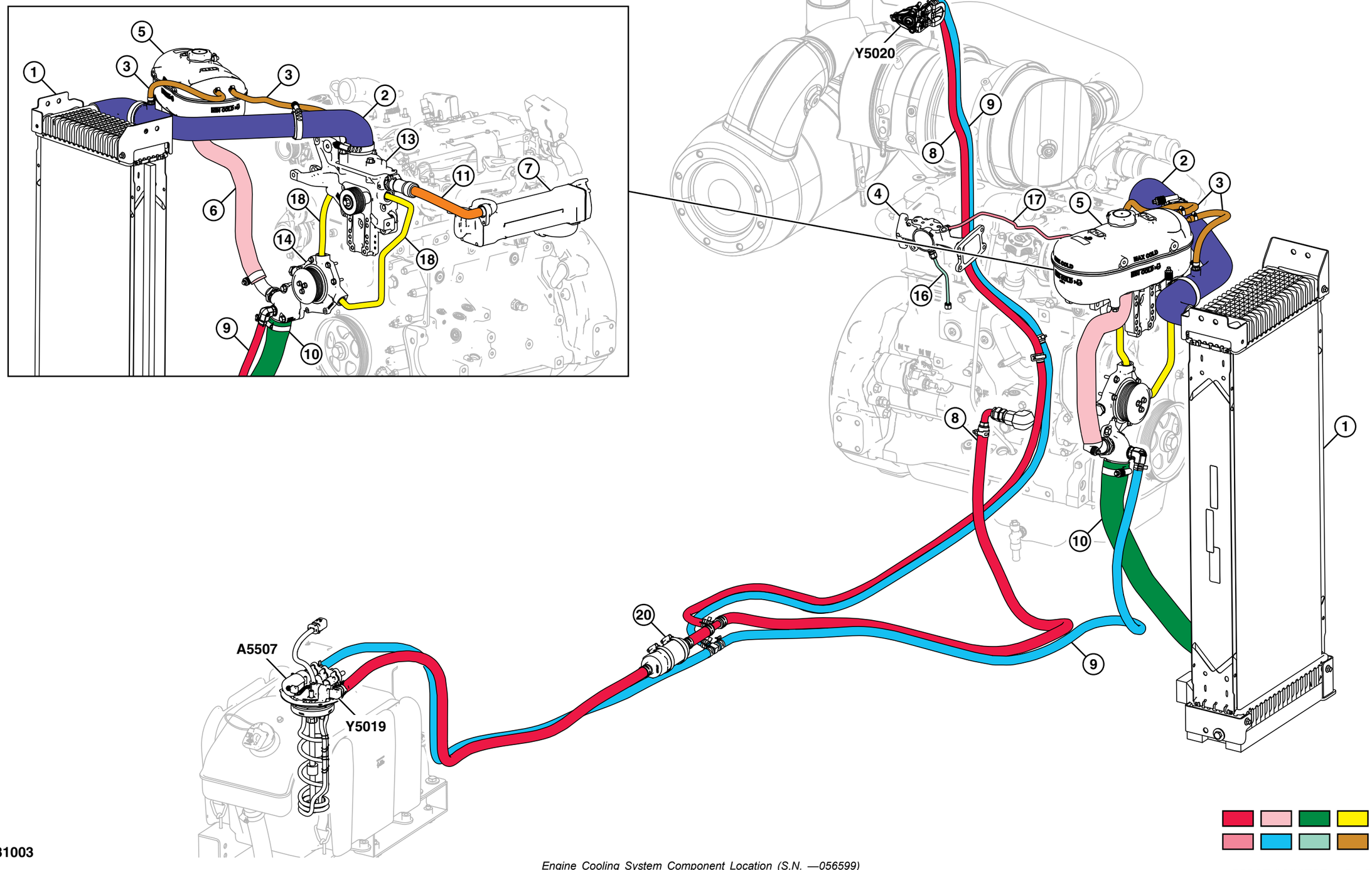
Continued on next page

JJ03229,0001128 -19-23JAN18-53/55

Engine Cooling System Component Location

Engine Cooling System Component Location (S.N. —056599)

TX1231003 —UN—20DEC16



TX1231003

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Engine Cooling System Component Location (S.N. —056599)

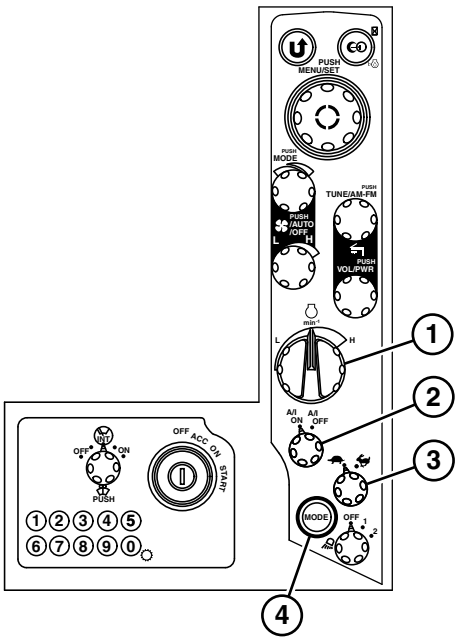
JL58967,0000737 -19-19DEC16-1/4

The engine speed is controlled by the following items:
- Engine speed dial (1)
- Power mode
  - H/P (high power)
  - PWR (power)
  - ECO (economy)
- Work mode
- Travel HP (high power) mode control
- Heater control
- Auto-idle control
- Auto warm-up control
- Engine coolant temperature management
- Idle speed-up control
- ECO control
- Cold fluid component protection (CFCP) system

Engine Speed Dial

The purpose of the engine speed dial is to control the engine speed via operator input.

The main controller (MCZ) uses input signals from the engine speed dial, hydraulic pressure sensors, and temperature sensors to determine appropriate engine speed. The main controller then sends a signal via controller area network (CAN) to the engine control unit (ECU). The ECU then sets engine rpm.



TX1131978 —UN—28JUN13

Switch Panel

1— Engine Speed Dial
2— Auto-Idle Switch
3— Travel Mode Switch
4— Power Mode Button

H/P (High Power) Mode

The purpose of H/P mode is to increase engine speed using certain hydraulic functions.

The main controller sends a signal to the ECU via CAN to raise engine rpm when the following conditions are met:

- Power mode: H/P.
- Work mode: Bucket.
- Engine speed dial set to fast idle.
- Arm in, boom up, or a combination of both functions actuated.
- Pump delivery pressure high.

PWR (Power) Mode

The function of PWR mode is to control the engine speed from slow idle to fast idle in response to the position of the engine speed dial.

ECO (Economy) Mode

The purpose of ECO mode is to lower engine speed to reduce fuel consumption and noise level.

The main controller receives input signals from the engine speed dial, power mode button (4), and pump delivery pressure sensors, and then sends a signal via CAN to the ECU to reduce engine rpm when the following conditions are met:

- Engine speed dial set to greater than ECO mode speed.
- Power mode: ECO.

Travel HP (High Power) Mode Control

The purpose of travel HP mode control is to increase engine speed for faster travel.

The main controller uses input signals from the travel pressure sensor, engine speed dial, travel mode switch (3), and delivery pressure sensors to determine appropriate engine speed. The main controller then sends a signal via CAN to the ECU to increase engine speed when the following conditions are met:

- Engine speed dial set to fast idle.
- Travel mode switch is at fast (rabbit) speed position.
- Travel pressure sensor is on.
- Either pump 1 or pump 2 delivery pressure sensor must indicate high pressure.

Heater Control

NOTE: Heater control engine mode is independent of heating and air conditioning system operation. Operation of heating and air conditioning system will not change engine speeds.

The purpose of the heater control selection is to accelerate the warm-up speed of the cab heater by increasing the engine speed at low engine coolant temperature.

The main controller sends a signal via CAN to the ECU to increase the engine rpm when the following conditions are met:

- Engine speed dial set to fast idle.
- Engine coolant temperature is 5°C (41°F) or lower.
- Pilot shutoff lever in the locked (UP) position.

Heater control selection is activated when the key switch is turned ON and is deactivated if any other engine speed controls are activated.

Continued on next page

JF80813,0000212 -19-17OCT17-2/7

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Fuse Box 2

Additional fuses located inside left front service door:

- F6001—JDLink™ Unswitched Power 7.5 A Fuse
- F6003—JDLink™ Switched Power 7.5 A Fuse

Additional fuses located near engine control unit (ECU):

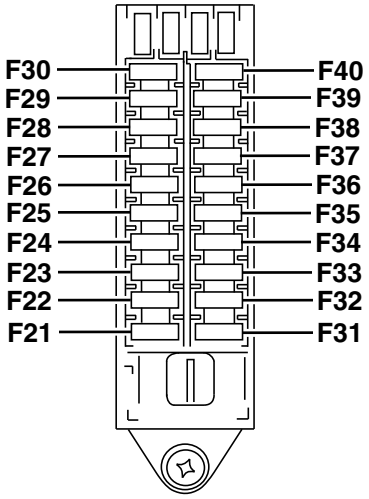
- F5004—Flex Power Controller (FPC) In-Line 10 A Fuse

Additional fuses located in the engine compartment:

- F45—Starter In-Line 30 A Fuse
- F63—Glow Plug 50 A Fuse

Additional fuses located under cover behind cooling package door:

- F46—Engine Light In-Line 7.5 A Fuse
- F60—Alternator 65 A Fuse
- F61—Battery 45 A Fuse



TX1086712 —UN—28JUN13

Fuse Box 2

F21— Heated Air Seat 10 A Fuse (marked SEAT HEATER)
F22— Front Cab Light 1 10 A Fuse (marked CAB LAMP FRONT)
F23— Rear Cab Light 10 A Fuse (marked CAB LAMP REAR)
F24— IMMOBI 5 A Fuse (marked IMOBI)
F25— Quick Hitch 5 A Fuse (marked QUICK HITCH)
F26— Cab Auxiliary Power Connector 3 5 A Fuse (marked AUX_3)
F27— Not Used (S.N. —057099)
F27— Seat Heat/Cool 20 A Fuse (marked SEAT_HEAT/COOL) (S.N. 057100—)
F28— Not Used
F29— Not Used
F30— Not Used
F31— Seat Compressor 10 A Fuse (marked SEAT COMPR)
F32— Front Cab Light 2 10 A Fuse (marked CAB LAMP FRONT +2)
F33— Warning Lamp 10 A Fuse (marked WARNING LAMP)
F34— Cab Auxiliary Power Connector 2 10 A Fuse (marked AUX_2)
F35— Service ADVISOR™ Diagnostic Connector 5 A Fuse (marked DIAG)
F36— Engine Control Unit (ECU) 20 A Fuse (marked ECU P2)
F37— Engine Control Unit (ECU) 20 A Fuse (marked ECU P3)
F38— Fuel Transfer Pump and Controllers 20 A Fuse (marked ECU P4)
F39— Not Used
F40— Not Used

Continued on next page

E22— Battery Disconnect Indicator Light
F4— Solenoid 20 A Fuse (marked SOLENOID)
F7— Start Position Signal 5 A Fuse (marked START)
F18— Idle Stop 5 A Fuse (marked IDLE STOP)
F45— Starter In-Line 30 A Fuse
F60— Alternator 65 A Fuse
F61— Battery 45 A Fuse
G1—Battery
G2—Battery
G3—Alternator
K1—Load Dump Relay
K2—Pilot Shutoff Solenoid Relay
K4—Starter Cut Relay
K5—Security Relay
K11— Idle Stop Relay
K12— Accessory Cut Relay
K13— Key Cut Relay
K19— Battery Relay
K34— Starter Relay
M1—Starter Motor
S1—Key Switch
S3—Pilot Shutoff Switch 1
S4—Pilot Shutoff Switch 2
S91— Battery Disconnect Switch
V1—Battery Relay Diode
V3—Load Dump Relay Diode
V4—Security Diode
V5—Starter Cut Relay Diode
V7—Start Relay Diode
V9—Pilot Shutoff Diode
V10— Starter Protection Diode
V11— Accessory Cut Diode
V12— Starter Cut Diode
V20— Pilot Shutoff Switch Diode
V44— Starter Relay Diode
X47— Cab Harness-to-Key Switch Harness Connector
X65— Cab Harness-to-Pilot Shutoff Switch Harness Connector
X67— Machine Harness Auxiliary Power Connector
X75— Cab Harness-to-Pilot Shutoff Valve Harness Connector
X175— Machine Harness-to-Engine Interface Harness Connector 1
Y10— Pilot Shutoff Solenoid

Continued on next page
JJ03229,000116D -19-06APR18-2/34

A3—Main Controller (MCZ)
B30— Boom Up Pressure Sensor (marked PI1)
B31— Arm In Pressure Sensor (marked PI2)
B32— Front Attachment Pressure Sensor (marked FRT)
B33— Swing Pressure Sensor (marked S3)
B34— Travel Pressure Sensor (marked TR)
B35— Pump 1 Delivery Pressure Sensor (marked PP1)
B36— Pump 1 Control Pressure Sensor (marked PC1)
B37— Pump 2 Delivery Pressure Sensor (marked PP2)
B38— Pump 2 Control Pressure Sensor (marked PC2)
B40— Hydraulic Oil Temperature Sensor
B56— Bucket Curl Pressure Sensor (marked BKC)
B57— Bucket Dump Pressure Sensor
B60— Attachment Pressure Sensor
B61— Arm Out Pressure Sensor
F5— Optional and Attachment Connector 5 A Fuse (marked OPT. 1 ALT)
F10— Data Converter and Main Controller Battery Power 5 A Fuse (marked CONTROLLER)
F11— Travel Alarm 5 A Fuse (marked TRAVEL ALARM)
H4—Travel Alarm
R15— Engine Speed Dial
S8—Auto-Idle Switch
S11— Travel Mode Switch
S12— Power Mode Button
S13— Travel Alarm Cancel Switch
V40— Selector Valve Solenoid Valve Diode
V41— Secondary Relief Solenoid Valve Diode
V43— 2-Speed Activation Solenoid Valve Diode
X3—Cab Harness-to-Machine Harness 100-Pin Connector
X29— Cab Harness-to-Switch Panel Connector 3
X31— Cab Harness-to-Main Controller 31-Pin Connector A
X32— Cab Harness-to-Main Controller 24-Pin Connector B
X33— Cab Harness-to-Main Controller 17-Pin Connector C
X34— Cab Harness-to-Main Controller 30-Pin Connector D
X35— Cab Harness-to-Main Controller 24-Pin Connector E
X36— Cab Harness-to-Main Controller 26-Pin Connector F
X40— Pump Harness-to-Machine Harness Connector
X46— Attachment Connector
X86— Machine Harness-to-Travel Alarm Harness Connector
Y20— Pump 2 Flow Rate Limit Solenoid (marked SB)
Y21— Torque Control Solenoid (marked ST)
Y22— Dig Regenerative Solenoid (marked SF)
Y23— Arm Regenerative Solenoid (marked SC)
Y24— Power Dig/Travel Speed Solenoid (marked SG)
Y26— Pump 1 Flow Rate Limit Solenoid (marked SA)
Y40— Selector Valve Solenoid Valve
Y41— Secondary Relief Solenoid Valve
Y43— 2-Speed Activation Solenoid Valve
Y44— Flow Rate Adjustment Solenoid Valve

Continued on next page
JJ03229,000116D -19-06APR18-8/34

A1—Engine Control Unit (ECU)
A5507—Diesel Exhaust Fluid (DEF) Tank Header Assembly
B5105—Crankcase Pressure Sensor
B5113—Fuel Rail Pressure Sensor
B5205—Charge Air Cooler Outlet Temperature Sensor
B5206—Manifold Air Temperature (MAT) Sensor
B5211—Diesel Exhaust Fluid (DEF) Tank Temperature Sensor
B5217—Aftertreatment Inlet NOx Sensor
B5218—Aftertreatment Outlet NOx Sensor
B5301—Crankshaft Position Sensor
B5302—Camshaft Position Sensor
B5500—Intake Air Sensor
B5501—Diesel Exhaust Fluid (DEF) Dosing Unit
B5502—Selective Catalytic Reduction (SCR) Inlet NOx Sensor
B5503—Selective Catalytic Reduction (SCR) Outlet NOx Sensor
B5601—Diesel Exhaust Fluid (DEF) Tank Level Sensor
F38— Fuel Transfer Pump and Controllers 20 A Fuse (marked ECU P4)
R5603—Engine CAN Termination Resistor
R5605—Aftertreatment CAN Termination Resistor
X5000—Engine Harness-to-Fuel Injector Harness Connector
X5016—Engine Interface Harness-to-Engine Harness Connector 2
X5018—Machine Harness-to-Engine Interface Harness Connector 2
X5068—Engine Interface Harness-to-Engine Harness Connector 3
X5501—Engine Control Unit (ECU)-to-Engine Interface Harness Connector 1
X5502—Engine Control Unit (ECU)-to-Engine Interface Harness Connector 2
X5503—Engine Control Unit (ECU)-to-Engine Interface Harness Connector 3
Y1—Electronic Injector (cylinder 1)
Y2—Electronic Injector (cylinder 2)
Y3—Electronic Injector (cylinder 3)
Y4—Electronic Injector (cylinder 4)
Y5019—Coolant Control Valve
Y5024—Fuel Rail Pressure Relief Valve (PRV)

Continued on next page

JJ03229,000116D -19-06APR18-14/34

A1—Engine Control Unit (ECU)
B5109—Exhaust Filter Delta Pressure Sensor
B5201—Diesel Oxidation Catalyst (DOC) Inlet Temperature Sensor
B5202—Diesel Oxidation Catalyst (DOC) Outlet Temperature Sensor
B5204—Exhaust Filter Temperature Module
B5213—Diesel Particulate Filter (DPF) Outlet Pressure Sensor
B5214—Diesel Particulate Filter (DPF) Inlet Pressure Sensor
B5216—Selective Catalytic Reduction (SCR) Inlet Temperature Sensor
E5601—Diesel Exhaust Fluid (DEF) Dosing Unit Pressure Line Heater
E5602—Diesel Exhaust Fluid (DEF) Dosing Unit Supply Line Heater
E5603—Diesel Exhaust Fluid (DEF) Dosing Unit Return Line Heater
F36— Engine Control Unit (ECU) 20 A Fuse (marked ECU P2)
F37— Engine Control Unit (ECU) 20 A Fuse (marked ECU P3)
F63— Glow Plug 50 A Fuse
K16— Glow Plug Relay
R1—Glow Plug 1
R2—Glow Plug 2
R3—Glow Plug 3
R4—Glow Plug 4
R19— Glow Plug Resistor
S15— Reversing Fan Switch
S16— Exhaust Filter Parked Cleaning Switch
X83— Cab Harness-to-Reversing Fan Switch Harness (marked VSF-SW)
X5016—Engine Interface Harness-to-Engine Harness Connector 2
X5018—Machine Harness-to-Engine Interface Harness Connector 2
X5501—Engine Control Unit (ECU)-to-Engine Interface Harness Connector 1
X5502—Engine Control Unit (ECU)-to-Engine Interface Harness Connector 2
X5503—Engine Control Unit (ECU)-to-Engine Interface Harness Connector 3
X5604—Engine Harness-to-Glow Plug Harness Connector
Y5002—Suction Control Valve (SCR)
Y5014—Variable Speed Fan Solenoid
Y5015—Reversing Fan Solenoid
Y5020—Diesel Exhaust Fluid (DEF) Dosing Injector
Y5501—Fuel Transfer Pump

Continued on next page
JJ03229,000116D -19-06APR18-20/34

A5—Data Converter
A11— Machine Controller (BCZ)
A6000—Modular Telematics Gateway (MTG) Controller
A6001—GPS/Cellular Antenna
A6002—Satellite (SAT) Module Control Unit (if equipped)
A6003—Satellite (SAT) Antenna
E3—Cab Dome Light
E9—Key Switch Light
E10— Switch Panel Back Light 5
F6001—JDLink™ Unswitched Power 7.5 A Fuse
F6003—JDLink™ Switched Power 7.5 A Fuse
R10— Interface CAN Resistor 1
R11— Interface CAN Resistor 2
S2—Cab Dome Light Switch
S9—Windshield Wiper and Washer Switch
S14— Door Switch
V13— Work Light 1 Diode
V14— Work Light 2 Diode
X10— Machine Controller 8-Pin Connector A
X11— Machine Controller 20-Pin Connector B
X27— Cab Harness-to-Switch Panel Connector 1
X5018—Machine Harness-to-Engine Interface Harness Connector 2
X6007— JDLink™ Harness Ground 1
X6014—Modular Telematics Gateway (MTG) Control Unit 48-Pin Connector
X6015—Satellite (SAT) Module Control Unit 48-Pin Connector
X6016—Engine Interface Harness-to-Satellite (SAT) Harness Connector

Continued on next page

B68— Secondary Hydraulic Oil Temperature Sensor
B85— Auxiliary Function Lever (AFL) Solenoid Pressure Sensor (marked PS1)
K31— Right Solenoid Relay A (marked RSW1)
K32— Left Solenoid Relay B (marked LSW1)
K33— Left Solenoid Relay A (marked LSW3)
S5— Horn Switch
S7— Power Dig Switch
S29— Auxiliary Function Lever (AFL) Proportional Control Switch
S31— Right Pilot Control Lever Switch A
S32— Left Pilot Control Lever Switch B
S33— Left Pilot Control Lever Switch A
S34— Right Enable Switch (marked ON/OFF)
S35— Left Enable Switch (marked ON/OFF)
S45— Auxiliary Function Enable Switch (marked AFL_SW)
V22— Pilot Shutoff Solenoid Diode
X26— Optional Connector
X534— Right Auxiliary Solenoid Connector (marked SR/H)
X535— Left Auxiliary Solenoid Connector (marked SL/H)
X536— Right Auxiliary Function Lever (AFL) Connector (marked R_GRIP)
X537— Left Auxiliary Function Lever (AFL) Connector (marked L_GRIP)
X543— Horn Switch Connector
X544— Power Dig Switch Connector
X574— Auxiliary Function Lever (AFL) Connector 1
X577— Auxiliary Function Lever (AFL) Harness-to-Auxiliary Function Lever (AFL) Solenoid Harness Connector
Y61— Auxiliary Function Lever (AFL) Solenoid A (marked 1A)
Y62— Auxiliary Function Lever (AFL) Solenoid B (marked 1B)
Y66— Secondary Pilot Shutoff Solenoid Valve (marked PiC)

Continued on next page
JJ03229,000116D -19-06APR18-32/34

A3—Main Controller (MCZ)
A4—Monitor Controller (DSZ)
A5—Data Converter
A6—Radio
A8—12-Volt Power Converter
A11— Machine Controller (BCZ)
E3—Cab Dome Light
F50— Fuse Box 1
F51— Fuse Box 2
G5—12-Volt Power Outlet
G6—USB Connector
H2—Security Alarm
K1—Load Dump Relay
K2—Pilot Shutoff Solenoid Relay
K3—Security Alarm Relay
K4—Starter Cut Relay
K5—Security Relay
K6—Windshield Wiper Relay
K7—Work Light Relay
K8—Boom Light Relay
K9—Windshield Washer Relay
K10— Horn Relay
K11— Idle Stop Relay
K12— Accessory Cut Relay
K13— Key Cut Relay
R9—Lighter
R10— Interface CAN Resistor 1
R15— Engine Speed Dial
S1—Key Switch
S5—Horn Switch
S7—Power Dig Switch
S8—Auto-Idle Switch
S9—Windshield Wiper and Washer Switch
S10— Work Light Switch
S11— Travel Speed Switch
S12— Power Mode Button
S13— Travel Alarm Cancel Switch
S14— Door Switch
S15— Reversing Fan Switch
S16— Exhaust Filter Parked Cleaning Switch
S18— Service ADVISOR™ Remote (SAR) Switch
S21— Blower Motor Speed Switch
S22— Temperature Control/Mode Switch
S23— Radio Volume and Power Switch
S24— Radio Tuning Switch
S25— Monitor Dial
S26— Back Button
S27— Home Button
S34— Right Enable Switch (marked ON/OFF)
S60— Keypad
V1—Battery Relay Diode
V2—Not Used
V3—Load Dump Relay Diode
V4—Security Diode
V5—Starter Cut Relay Diode
V6—Auxiliary Power Connector Diode
V7—Start Relay Diode
V8—Air Conditioner Clutch Diode
V9—Pilot Shutoff Diode
V10— Starter Protection Diode
V11— Accessory Cut Diode
V12— Starter Cut Diode
V13— Work Light 1 Diode
V14— Work Light 2 Diode
W1—Cab Harness
W3—Monitor Harness
W9—Exhaust Filter Parked Cleaning Switch Harness
W10—Service ADVISOR™ Remote (SAR) Switch Harness
W16—Travel Alarm Cancel Switch Harness
W22—Auxiliary 3-Button Cancel Switch Harness
W23—Reversing Fan Switch Harness
W29—Starter Switch Harness
W35—Cab Harness Ground 1
W36—Cab Harness Ground 2
W37—Cab Harness Ground 3
W82—USB Harness
W83—USB Jumper Harness
X1—Service ADVISOR™ Diagnostic Connector
X2—MPDr 6-Pin Connector
X3—Cab Harness-to-Machine Harness 100-Pin Connector
X10— Machine Controller (BCZ) 8-Pin Connector A
X11— Machine Controller (BCZ) 20-Pin Connector B
X17— Cab Harness-to-Monitor Harness Connector
X20— Monitor Controller 28-Pin Connector A
X21— Monitor Controller 36-Pin Connector B
X22— Monitor Controller 16-Pin Connector D
X23— Monitor Controller 12-Pin Connector C
X24— Monitor Controller 2-Pin Connector G
X25— Cab Harness Auxiliary Power Connector 1 (marked AUX +/-)
X26— Optional Connector
X27— Cab Harness-to-Switch Panel Connector 1
X28— Cab Harness-to-Switch Panel Connector 2
X29— Cab Harness-to-Switch Panel Connector 3
X30— Cab Harness-to-Switch Panel Connector 4
X31— Cab Harness-to-Main Controller 31-Pin Connector A
X32— Cab Harness-to-Main Controller 24-Pin Connector B
X33— Cab Harness-to-Main Controller 17-Pin Connector C
X34— Cab Harness-to-Main Controller 30-Pin Connector D
X35— Cab Harness-to-Main Controller 24-Pin Connector E
X36— Cab Harness-to-Main Controller 26-Pin Connector F
X37— Cab Harness-to-Exhaust Filter Switch Harness Connector
X39— Cab Harness-to-Window Switch Connector
X42— CAN 1 Connector
X45— Option 2 12-Pin Connector (not used)
X47— Cab Harness-to-Key Switch Harness Connector
X50— Cab Harness-to-Travel Alarm Cancel Switch Harness Connector
X51— Air Conditioner 4-Pin Connector
X52— Air Conditioner 10-Pin Connector
X54— Heated Air Seat Harness 3-Pin Connector (marked SEAT HEATER)
X55— Front Cab Light 1 Connector (marked CAB LAMP FRONT)
X56— Front Cab Light 2 Connector (marked CAB LAMP FRONT +2)
X57— Rear Cab Light Connector (marked CAB LAMP REAR)
X58— Warning Light Connector (marked WARNING LAMP)
X59— Satellite Communication Connector (marked IMMOBI)
X61— Quick Hitch Connector (marked QUICK HITCH)
X62— Cab Auxiliary Power Connector 2 (marked AUX_2)
X63— Cab Auxiliary Power Connector 3 (marked AUX_3)
X65— Cab Harness-to-Pilot Shutoff Switch Harness Connector
X73— Cab Harness-to-Speakers Connector
X74— Cab Harness-to-Service ADVISOR™ Remote (SAR) Switch Harness Connector (marked ADV-SW)
X75— Cab Harness-to-Pilot Shutoff Valve Harness Connector
X76— Cab Harness Connector 1 (marked HMST) (not used)
X77— Radio Auxiliary Connector
X78— Optional Switch Connector
X81— Multi-Function Pilot Control Lever Harness-to-Auxiliary 3-Button Cancel Switch Harness Connector
X83— Cab Harness-to-Reversing Fan Switch Harness Connector (marked VSF-SW)
X99— Cab Ground Splice
X543— Horn Switch Connector
X544— Power Dig Switch Connector
X573— Exhaust Solenoid Harness Connector (not used)
X574— Auxiliary Function Lever (AFL) Connector 1
X575— Auxiliary Function Lever (AFL) Connector 2
X603— Not Used
X623— Cab Harness CAN Connector
X630— Premium Seat Harness Connector (marked 24V POWER)
X631— USB Harness Connector (marked USB)

JA92389,000015D -19-13FEB18-5/5

Cab Harness (W1) Wiring Diagram

IMPORTANT: Avoid connector damage. Do not install connector with impact wrench or power tools. Over torquing will result in permanent damage to connector. Torque only to specification.

	Specification
Cab Harness-to-Machine Harness 100-Pin Connector (X3)—Torque	10 N·m 89 lb·in

Continued on next page

JA92389,000015E -19-14FEB18-1/19

2— Continued on Sheet 3
3— Continued on Sheet 5
K1—Load Dump Relay
K2—Pilot Shutoff Solenoid Relay
K3—Security Alarm Relay
K4—Starter Cut Relay
K5—Security Relay
K6—Windshield Wiper Relay
K7—Work Light Relay
K8—Boom Light Relay
K9—Windshield Washer Relay
K10— Horn Relay
K11— Idle Stop Relay
K12— Accessory Cut Relay
K13— Key Cut Relay
V1—Battery Relay Diode
V4—Security Diode
V7—Start Relay Diode
V8—Air Conditioner Clutch Diode
V10— Starter Protection Diode
V13— Work Light 1 Diode
V14— Work Light 2 Diode
W36—Cab Harness Ground 2
X10— Machine Controller 8-Pin Connector A
X11— Machine Controller 20-Pin Connector B
X17— Cab Harness-to-Monitor Harness Connector
X42— CAN 1 Connector
X78— Optional Switch
X574— Auxiliary Function Lever (AFL) Connector 1
X575— Auxiliary Function Lever (AFL) Connector 2 (not used)

Continued on next page

JA92389,000015E -19-14FEB18-8/19

1— Continued on Sheet 2
2— Continued on Sheet 4
A5— Data Converter
E3— Cab Dome Light
H2— Security Alarm
R10— N CAN Resistor 1
V2— Alternator Excitation Diode
V3— Load Dump Relay Diode
V5— Starter Cut Relay Diode
V9— Pilot Shutoff Diode
V11— Accessory Cut Diode
V12— Starter Cut Diode
X3— Cab Harness-to-Machine Harness 100-Pin Connector
X31— Cab Harness-to-Main Controller 31-Pin Connector A
X32— Cab Harness-to-Main Controller 24-Pin Connector B
X33— Cab Harness-to-Main Controller 17-Pin Connector C
X51— Air Conditioner 4-Pin Connector
X52— Air Conditioner 10-Pin Connector
X73— Cab Harness-to-Speakers Connector
X99— Cab Ground Splice
X573— Exhaust Solenoid Harness Connector (not used)

Continued on next page

JA92389,000015E -19-14FEB18-15/19

A12— Rear Camera
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 (marked PI1)
B31— Arm In Pressure Sensor (marked PI2)
B32— Front Attachment Pressure Sensor (marked FRT)
B33— Swing Pressure Sensor (marked S3)
B34— Travel Pressure Sensor (marked TR)
B56— Bucket Curl Pressure Sensor (marked BKC) (S.N. 057100—)
B57— Bucket Dump Pressure Sensor (S.N. 057100—)
B61— Arm Out Pressure Sensor (S.N. 057100—)
E1—Work Light
E2—Boom Light
F60— Alternator 65 A Fuse
F61— Battery 45 A Fuse
G3—Alternator
K19— Battery Relay
M6—Windshield Washer Motor
S40— Hydraulic Oil Temperature Switch (if equipped)
W2—Machine Harness
W19—Rear Camera Harness
X3—Cab Harness-to-Machine Harness 100-Pin Connector
X40— Pump Harness-to-Machine Harness Connector
X46— Attachment Connector
X64— Machine Harness-to-Rear Camera Harness Connector
X67— Machine Harness Auxiliary Power Connector
X86— Machine Harness-to-Travel Alarm Harness Connector
X90— Machine Harness-to-Hydraulic Oil Temperature Switch Connector
X98— Machine Harness Power Splice
X104— Machine Harness Ground Splice
X175— Machine Harness-to-Engine Interface Harness Connector 1
X590— Exhaust Solenoid Harness Connector (not used)
X5018—Machine Harness-to-Engine Interface Harness Connector 2
Y11— Air Conditioner Compressor Clutch Solenoid
Y22— Dig Regenerative Solenoid (marked SF)
Y23— Arm Regenerative Solenoid (marked SC)
Y24— Power Dig/Travel Speed Solenoid (marked SG)

JA92389,0000169 -19-31JAN18-3/3

Machine Harness (W2) Wiring Diagram

IMPORTANT: Avoid connector damage. Do not install connector with impact wrench or power tools. Over torquing will result in permanent damage to connector. Torque only to specification.

	Specification
Cab Harness-to-Machine Harness 100-Pin Connector (X3)—Torque	10 N·m 89 lb·in

Continued on next page

JA92389,0000157 -19-14FEB18-1/9

1— Continued on Sheet 2
B18— Fuel Level Sensor
B23— High Note Horn
B24— Low Note Horn
B32— Front Attachment Pressure Sensor (marked FRT)
B33— Swing Pressure Sensor (marked S3)
B34— Travel Pressure Sensor (marked TR)
E1— Work Light
E2— Boom Light
X3— Cab Harness-to-Machine Harness 100-Pin Connector
X67— Machine Harness Auxiliary Power Connector
X90— Machine Harness-to-Hydraulic Oil Temperature Switch Connector
X590— Exhaust Solenoid Harness Connector (not used)
X5018—Machine Harness-to-Engine Interface Harness Connector 2

Continued on next page

JA92389,0000157 -19-14FEB18-7/9

B5101—Engine Oil Pressure Sensor
B5102—Exhaust Manifold Pressure Sensor
B5103—Exhaust Gas Recirculation (EGR) Delta Pressure Sensor
B5104—Intake Manifold Pressure Sensor
B5105—Crankcase Pressure Sensor
B5107—Inlet Fuel Pressure Sensor
B5205—Charge Air Cooler Outlet Temperature Sensor
B5206—Manifold Air Temperature (MAT) Sensor
B5207—Exhaust Gas Recirculation (EGR) Temperature Sensor
B5209—Fuel Temperature Sensor
G3—Alternator
W4—Engine Harness
X5001—Static Ground
X5015—Engine Interface Harness-to-Engine Harness Connector 1
X5016—Engine Interface Harness-to-Engine Harness Connector 2
X5021—Fuel Injector Harness Connector
X5040—Engine Harness-to-Front Engine Harness Connector 1
X5068—Engine Interface Harness-to-Engine Harness Connector 3
X5141—Engine Harness-to-Front Engine Harness Connector 2
X5604—Engine Harness-to-Glow Plug Interface Harness Connector
Y5400—Exhaust Gas Recirculation (EGR) Valve

JA92389,0000163 -19-04SEP15-2/2

A1—Engine Control Unit (ECU)
A15— Flex Power Controller (FPC)
A6000—Modular Telematics Gateway (MTG) Controller
A6001—GPS/Cellular Antenna
A6002—Satellite (SAT) Module Control Unit (if equipped)
A6003—Satellite (SAT) Antenna
B5600—Water-in-Fuel (WIF) Sensor
E22— Battery Disconnect Indicator Light
F45— Starter In-Line 30 A Fuse
F46— Engine Light In-Line 7.5 A Fuse
F5004—Flex Power Controller (FPC) In-Line 10 A Fuse
F6001—JDLink™ Unswitched Power 7.5 A Fuse
F6003—JDLink™ Switched Power 7.5 A Fuse
K19— Battery Relay
K34— Starter Relay
M1—Starter Motor
R11— Interface CAN Resistor 2
R90— Diesel Particulate Filter (DPF) Regen Active Lamp Resistor
R92— Service ADVISOR™ Remote (SAR) Switch Accept LED Resistor
R93— Service ADVISOR™ Remote (SAR) Switch Decline LED Resistor
R5601—CAN 0 Termination Resistor
V44— Starter Relay Diode
W5—Engine Interface Harness
W39—Engine Interface Harness Ground
W6003—Satellite (SAT) Harness
X175— Machine Harness-to-Engine Interface Harness Connector 1
X5005—Fan Harness Connector
X5015—Engine Interface Harness-to-Engine Harness Connector 1
X5016—Engine Interface Harness-to-Engine Harness Connector 2
X5018—Machine Harness-to-Engine Interface Harness Connector 2
X5037—Engine Interface Harness-to-Diesel Exhaust Fluid (DEF) Harness Connector 1
X5039—Engine Interface Harness-to-Exhaust Aftertreatment Harness Connector
X5068—Engine Interface Harness-to-Engine Harness Connector 3
X5501—Engine Control Unit (ECU) Connector 1
X5502—Engine Control Unit (ECU) Connector 2
X5503—Engine Control Unit (ECU) Connector 3
X6014—Modular Telematics Gateway (MTG) Control Unit 48-Pin Connector
X6015—Satellite (SAT) Module Control Unit 48-Pin Connector
X6016—Engine Interface Harness-to-Satellite (SAT) Harness Connector
Y5501—Fuel Transfer Pump

JL58967,0000733 -19-22FEB17-4/4

Engine Interface Harness (W5) Wiring Diagram (S.N. 056600—)

TX1230666 —UN—17JAN17

END #1	NUMBER	COLOR	END #2
X5018	1356A	YEL	X152
A15	1356B	YEL	X152
X152	1356C	YEL	X168
X168	1356D	YEL	X6014
X168	1356E	YEL	R11
X5018	1357A	GRN	X153
A15	1357B	GRN	X153
X153	1357C	GRN	X167
X167	1357D	GRN	X6014
X167	1357E	GRN	R11
Y5501	5003	ORG	X5501
X5502	5010	BLK	X5016
X5502	5014	YEL	X5005
X5501	5015	GRN	X5005
X5501	5016	BLU	X5015
X5501	5018	GRY	X5015
X5018	5022A	RED	X176
X176	5022B	RED	X5503
X176	5022C	RED	X5503
X5502	5023	ORG	X5005
X140	5030A	CLR	X156
X140	5030B	CLR	X156
X5016	5030C	CLR	X140
X5501	5030E	BLK	X140
X156	5030F	BLK	X5015
X5502	5051	BRN	X5016
X5016	5053	ORG	X5502
X5018	5122A	RED	X177
X177	5122B	RED	X5503
X177	5122C	RED	X5503
X5005	5125	GRN	X5502
X5502	5126	BLU	X5005
X5502	5141	BRN	X5037
X5502	5146	BLU	X5037
X5018	5222A	RED	X178
X178	5222B	RED	X5503
X178	5222C	RED	X5503
X5502	5246	BLU	X5016
X5037	5301	BRN	X5502
X5502	5303	ORG	X5037
X5037	5304	YEL	X5502
X5037	5305	GRN	X5502
X5037	5306	BLU	X5502
X5037	5307	VLT	X5502
X5037	5308	GRY	X5502
X5037	5309	WHT	X5502
X5037	5311	BRN	X5502
X5037	5313	ORG	X5502
X5037	5314	YEL	X5502
X5037	5315	GRN	X5502
X5037	5317	VLT	X5502
X5037	5318	GRY	X5502
X5037	5321	BRN	X5502
X5037	5324	YEL	X5502
X5037	5329	WHT	X5502
X5039	5331	BRN	X5502
X5039	5333	ORG	X5502
X181	5410A	CLR	X195
X181	5410B	CLR	X195
X5501	5410C	BLK	X181

END #1	NUMBER	COLOR	END #2
X195	5410D	BLK	X5068
X5501	5415	GRN	X5015
X5501	5419	WHT	X5068
X5501	5421	BRN	X5015
X5501	5423	ORG	X5015
X5501	5425	GRN	X5015
X5015	5427	VLT	X5501
X5016	5429	WHT	X5501
X5501	5443	YEL	X5015
X5501	5445	GRN	X5015
X5501	5447	YEL	X5015
X5501	5448	GRN	X5015
B5600	5453	ORG	X5501
X5502	5455	GRN	X5016
X5502	5456	BLU	X5016
X5501	5461	BRN	X5015
X5502	5463	ORG	X5016
X5501	5465	GRN	X5015
X5501	5467	VLT	X5015
X5502	5468	GRY	X5016
X5015	5469	WHT	X5501
X5068	5491	RED	X5501
X5068	5493	BRN	X5501
X5068	5495	GRN	X5501
X5068	5496	ORG	X5501
X5068	5498	YEL	X5501
X5068	5499	BLU	X5501
X5015	5509	WHT	X5501
X5501	5611	BRN	X5015
X5501	5613	ORG	X5015
X5501	5614	YEL	X5015
X5502	5621	BRN	X5016
X5502	5623	ORG	X5016
X5502	5624A	YEL	X143
X5016	5624B	YEL	X143
X5005	5624C	YEL	X143
X5502	5625A	GRN	X147
X147	5625B	GRN	X5016
X147	5625C	GRN	X5039
X5037	5625D	GRN	X147
X5501	5626	BLU	X5015
X5502	5628	GRY	X5016
X5501	5631	BRN	X5015
X5501	5633	ORG	X5015
X5039	5634	YEL	X5502
X5039	5636	BLU	X5502
X5501	5646	BLK	X5016
X5502	5647	VLT	X5005
X5501	5658A	GRY	X145
X5015	5658B	GRY	X145
X5005	5658C	GRY	X145
X5501	5671	BRN	X5016
X5068	5756	RED	X5501
X5501	5761	YEL	X5068
X5068	5767	BLK	X5501
X5502	5783A	ORG	X160
X5016	5783B	ORG	X160
X5039	5783C	ORG	X160
X5039	5785	GRN	X5502
X5039	5786	BLU	X5502

END #1	NUMBER	COLOR	END #2
X5018	5796A	BLU	X169
R90	5796B	BLU	X169
X5503	5796C	BLU	X169
X5501	5804	YEL	X5016
X5501	5805	GRN	X5016
X5501	5817	VLT	Y5501
X5501	5821	BRN	X5015
X5501	5826A	BLU	X266
X5015	5826B	BLU	X266
B5600	5826C	BLU	X266
X5503	5947	VLT	X5018
K19	B022A	RED	F46
X5005	B022B	RED	F46
K34	E003A	WHT	X149
M1	E003B	WHT	X149
V44	E003C	WHT	X149
K34	E013	WHT	X175
X5018	E305	GRN	X5503
X5503	E330	WHT	E22
X5018	E332	BRN	X5503
W39	G001A	BLK	X150
X5018	G001B	BLK	X150
X5005	G001C	BLK	X150
X150	G001E	BLK	X179
A15	G001F	BLK	X150
A15	G001G	BLK	X150
X150	G001H	BLK	X6014
X150	G001K	BLK	X6014
X150	G001L	BLK	X6016
X179	G001M	BLK	X5503
X179	G001N	BLK	X5503
X179	G001P	BLK	X5503
X179	G001R	BLK	X5503
X179	G001S	BLK	X5503
M1	G002A	BLK	X148
K34	G002B	BLK	X148
E22	G002C	BLK	X148
M1	G002D	BLK	V44
X5018	J050	TAN	X5503
X5018	J051	TAN	X5503
A15	L055	BRN	X5005
X6016	M001	VLT	X6014
X6016	M002	VLT	X6014
X6014	M003	TAN	X6016
X5018	M012A	YEL	X164
A15	M012B	YEL	X164
X174	M012C	YEL	X164
X5503	M012D	YEL	X174
X187	M012E	YEL	X174
X187	M012F	YEL	X6014
X187	M012G	YEL	R5601
X5018	M013A	GRN	X165
A15	M013B	GRN	X165
X173	M013C	GRN	X165
X5503	M013D	GRN	X173
X173	M013E	GRN	X188
X188	M013F	GRN	X6014
X188	M013G	GRN	R5601
X5018	M042	VLT	A15
X5018	M043	VLT	A15

END #1	NUMBER	COLOR	END #2
X5018	P004A	RED	X163
X163	P004B	RED	F5004
X163	P004C	RED	F6001
F5004	P004D	RED	X190
F6001	P004E	RED	X183
X183	P004F	RED	X6014
X6016	P004G	RED	X183
X190	P004H	RED	A15
X190	P004J	RED	A15
K19	P022A	RED	F45
F45	P022B	RED	K34
A15	P023	RED	X5005
X5018	P307A	RED	X162
R90	P307B	RED	X162
R92	P307C	RED	X162
R93	P307D	RED	X162
A15	P307E	RED	X162
X162	P307F	RED	X5503
X162	P307G	RED	F6003
X6014	P307H	RED	F6003
X5018	R002A	BLK	X166
A15	R002B	BLK	X166
X166	R002C	BLK	X172
X5503	R002D	BLK	X172
X172	R002E	BLK	X189
X189	R002F	BLK	X6014
X189	R002G	BLK	R5601
X5018	W042A	BLU	X171
R92	W042B	BLU	X171
A15	W042C	BLU	X171
X5018	W043A	BLU	X170
R93	W043B	BLU	X170
A15	W043C	BLU	X170

TX1230666

SHEET 1 OF 3

Continued on next page

Engine Interface Harness (W5) Wiring Diagram (S.N. 056600—) (1 of 3)

JL58967,0000721 -19-11JAN17-6/10

B5113—Fuel Rail Pressure Sensor
B5208—Engine Coolant Temperature Sensor
B5301—Crankshaft Position Sensor
B5302—Camshaft Position Sensor
B5500—Intake Air Sensor
W7—Front Engine Harness
X5040—Engine Harness-to-Front Engine Harness Connector 1
X5141—Engine Harness-to-Front Engine Harness Connector 2
Y5002—Suction Control Valve (SCV)
Y5024—Fuel Rail Pressure Relief Valve (PRV)

JA92389,000016A -19-18SEP15-2/2

B35— Pump 1 Delivery Pressure Sensor (marked PP1)
B36— Pump 1 Control Pressure Sensor (marked PC1)
B37— Pump 2 Delivery Pressure Sensor (marked PP2)
B38— Pump 2 Control Pressure Sensor (marked PC2)
B40— Hydraulic Oil Temperature Sensor
X40— Pump Harness-to-Machine Harness Connector
Y20— Pump 2 Flow Rate Limit Solenoid (marked SB)
Y21— Torque Control Solenoid (marked ST)
Y26— Pump 1 Flow Rate Limit Solenoid (marked SA)

JA92389,0000153 -19-06AUG15-2/2

Exhaust Filter Parked Cleaning Switch Harness (W9) Component Location

See Cab Harness (W1) Component Location. (Group 9015-10.)

JN86345,00002DA -19-08SEP14-1/1

Exhaust Filter Parked Cleaning Switch Harness (W9) Wiring Diagram

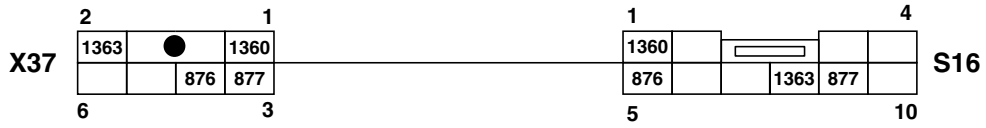
NUMBER	COLOR	END #1	END #2
876	ORG/BLK	S16	X37
877	ORG/GRN	S16	X37
1360	RED/BLK	S16	X37
1363	BLK	S16	X37

X37

1	(1360)	RED/BLK	S16
2	(1363)	BLK	S16
3	(877)	ORG/GRN	S16
4	(876)	ORG/BLK	S16
5	—		
6	—		

S16

1	(1360)	RED/BLK	X37
2	—		
3	—		
4	—		
5	(876)	ORG/BLK	X37
6	—		
7	—		
8	(1363)	BLK	X37
9	(877)	ORG/GRN	X37
10	—		



TX1187554 —UN—12MAR15

TX1187554

Exhaust Filter Parked Cleaning Switch Harness (W9) Wiring Diagram

S16— Exhaust Filter Parked Cleaning Switch
X37— Cab Harness-to-Exhaust Filter Switch Harness Connector

DP27668,00009E8 -19-10MAR15-1/1

Service ADVISOR™ Remote (SAR) Switch Harness (W10) Component Location

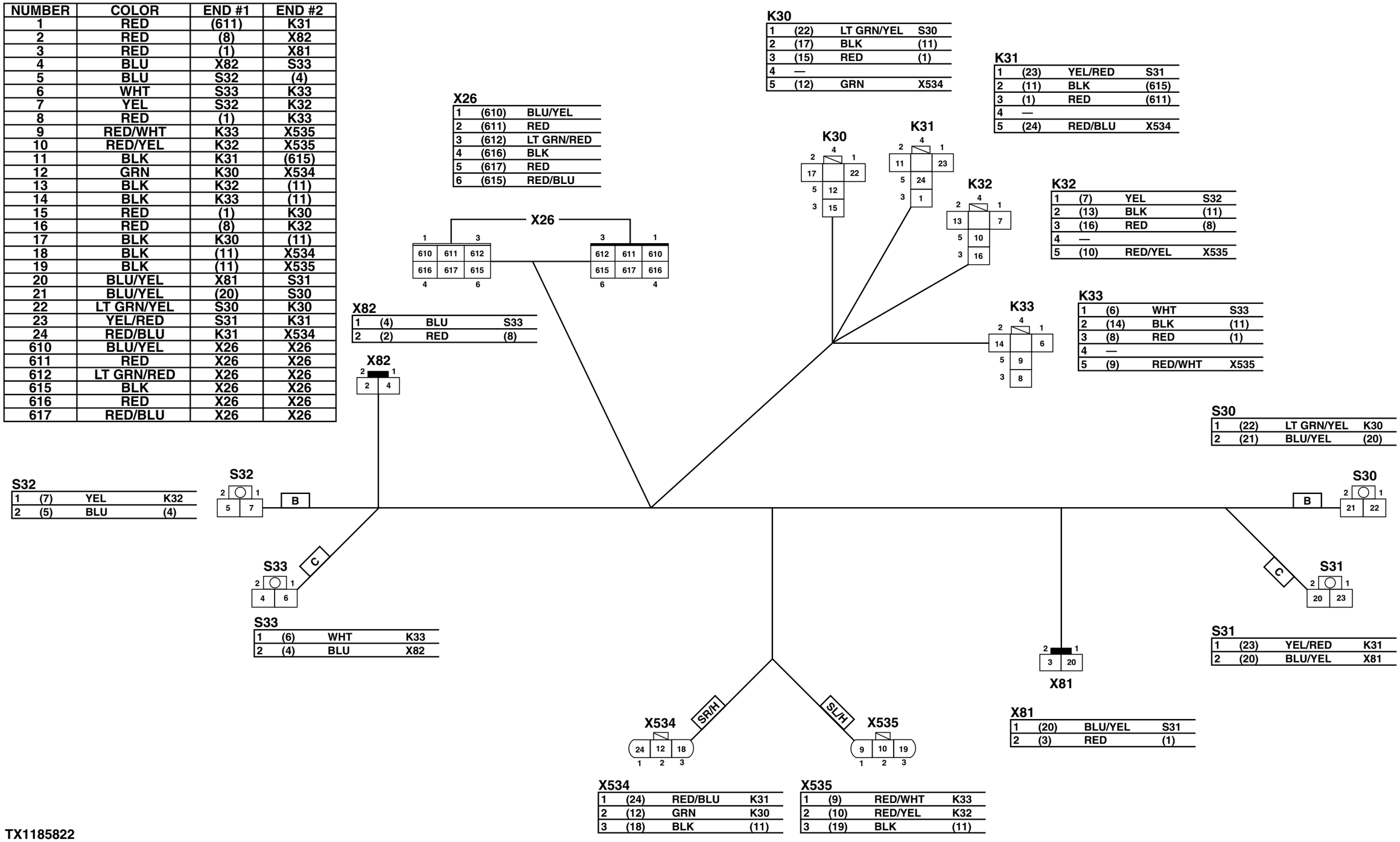
See Cab Harness (W1) Component Location. (Group 9015.)

CW0833,0000AA9 -19-27JAN15-1/1

Multi-Function Pilot Control Lever Harness (W15) Wiring Diagram

TX1185822 —UN—23FEB15

NUMBER	COLOR	END #1	END #2
1	RED	(611)	K31
2	RED	(8)	X82
3	RED	(1)	X81
4	BLU	X82	S33
5	BLU	S32	(4)
6	WHT	S33	K33
7	YEL	S32	K32
8	RED	(1)	K33
9	RED/WHT	K33	X535
10	RED/YEL	K32	X535
11	BLK	K31	(615)
12	GRN	K30	X534
13	BLK	K32	(11)
14	BLK	K33	(11)
15	RED	(1)	K30
16	RED	(8)	K32
17	BLK	K30	(11)
18	BLK	(11)	X534
19	BLK	(11)	X535
20	BLU/YEL	X81	S31
21	BLU/YEL	(20)	S30
22	LT GRN/YEL	S30	K30
23	YEL/RED	S31	K31
24	RED/BLU	K31	X534
610	BLU/YEL	X26	X26
611	RED	X26	X26
612	LT GRN/RED	X26	X26
615	BLK	X26	X26
616	RED	X26	X26
617	RED/BLU	X26	X26



TX1185822

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Multi-Function Pilot Control Lever Harness (W15) Wiring Diagram

DP27668,00009E3 -19-19FEB15-1/2

Auxiliary 3-Button Cancel Switch Harness (W22) Wiring Diagram

NUMBER	COLOR	END #1	END #2
2		S34/S35	X81/X82
3		S34/S35	S34/S35
4		S34/S35	X81/X82

S34/S35

1	—	
2	—	
3	(2)	X81/X82
4	—	
5	—	
6	—	
7	(3)	S34/S35
8	(4)	X81/X82
9	(3)	S34/S35
10	—	

X81/X82

1	(4)	S34/S35
2	(2)	S34/S35

TX1115340 —UN—19JUL12

TX1115340

Auxiliary 3-Button Cancel Switch Harness (W22) Wiring Diagram

S34— Right Enable Switch
S35— Left Enable Switch
X81— Multi-Function Pilot Control Lever Harness-to-Auxiliary 3-Button Cancel Switch Harness Connector
X82— Multi-Function Pilot Control Lever Harness-to-Auxiliary 3-Button Cancel Switch Harness Connector

BG71862,0000C0E -19-20MAR13-1/1

Reversing Fan Switch Harness (W23) Component Location

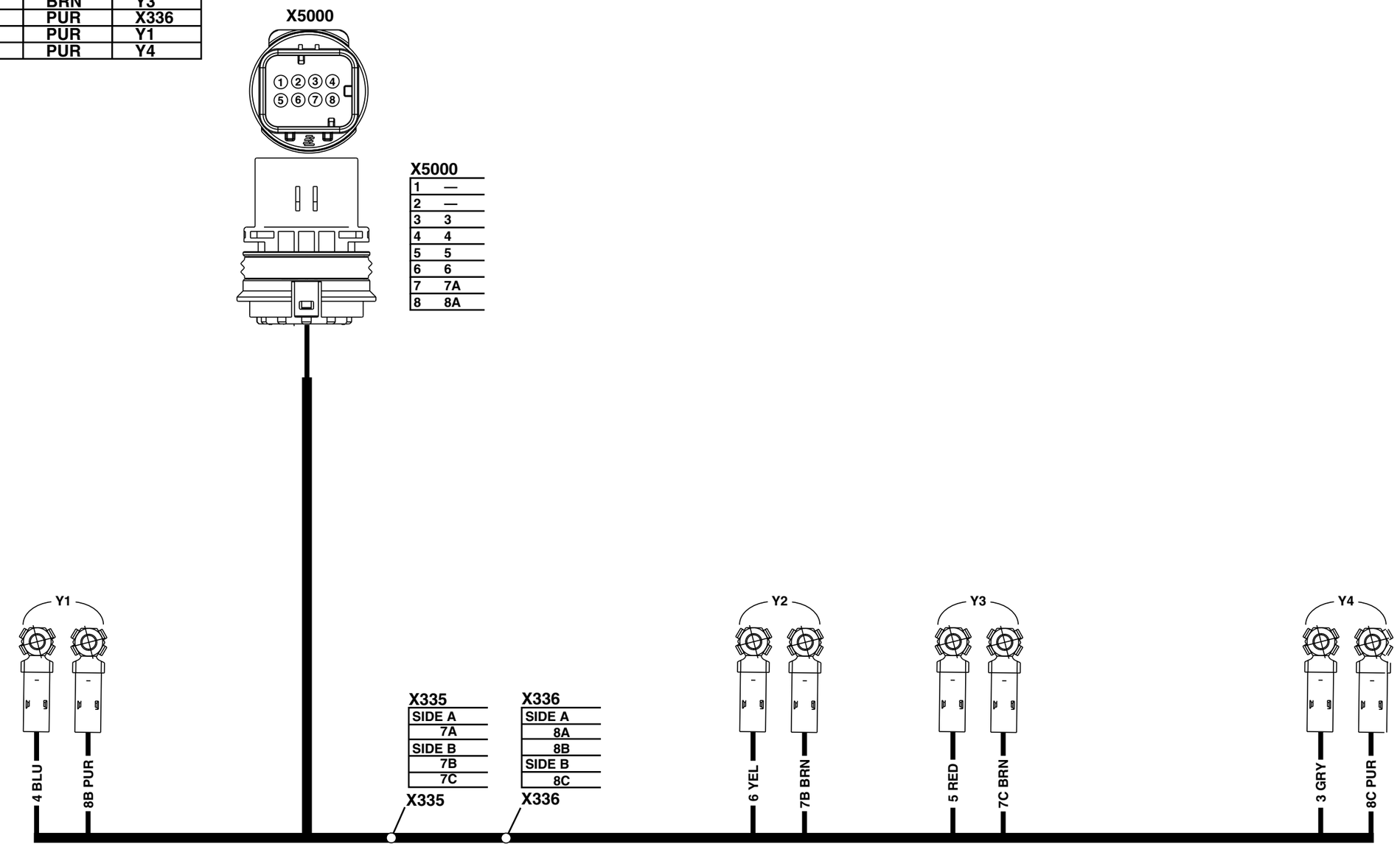
See Cab Harness (W1) Component Location. (Group 9015.)

DS35042,000005B -19-10MAR11-1/1

Fuel Injector Harness (W38) Wiring Diagram

TX1199191 —UN—06AUG15

END #1	NUMBER	COLOR	END #2
X5000	3	GRY	Y4
X5000	4	BLU	Y1
X5000	5	RED	Y3
X5000	6	YEL	Y2
X5000	7A	BRN	X335
X335	7B	BRN	Y2
X335	7C	BRN	Y3
X5000	8A	PUR	X336
X336	8B	PUR	Y1
X336	8C	PUR	Y4



TX1199191

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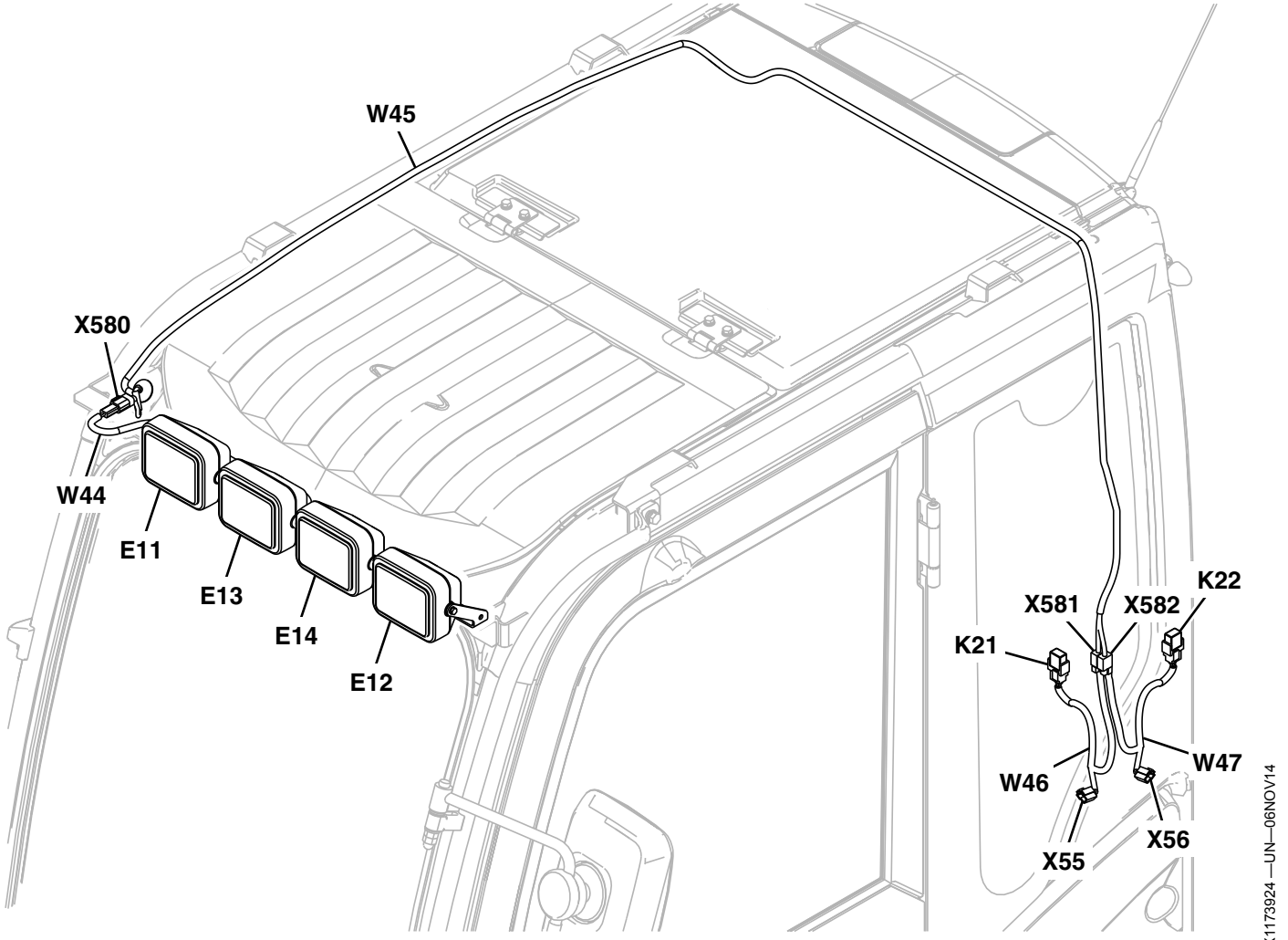
Fuel Injector Harness (W38) Wiring Diagram

JA92389,000015A -19-06AUG15-1/2

A7—Air Conditioner Controller (ACF)
B41— Air Conditioner Freeze Control Switch
B55— Air Recirculation Sensor
M7—Air Conditioner and Heater Blower Motor
M9—Air Conditioner and Heater Internal and External Servomotor
M10— Air Conditioner and Heater Blower Port Change Servomotor
M11— Air Conditioner and Heater Mixer Servomotor
R16— Blower Motor Transistor
R17— Blower Motor Resistor
X51— Air Conditioner 4-Pin Connector
X52— Air Conditioner 10-Pin Connector
X418— 978 BLK Splice
X419— BLK/RED Splice
X420— BLK/YEL Splice
X421— 979 RED Splice
X422— RED/BLK Splice

BG71631,00007C7 -19-16JUN14-2/2

Cab Roof Light Harness (W44) Component Location



TX1173924

Cab Roof Light Harness (W44) Component Location

E11— Cab Roof Light 1
E12— Cab Roof Light 2
E13— Cab Roof Light 3
E14— Cab Roof Light 4
K21— Cab Roof Light 1 Relay
K22— Cab Roof Light 2 Relay
W44—Cab Roof Light Harness
W45—Cab Roof Light Jumper Harness
W46—Cab Roof Light 1 Relay Harness
W47—Cab Roof Light 2 Relay Harness
X55— Front Cab Light 1 Connector (marked CAB LAMP FRONT)
X56— Front Cab Light 2 Connector (marked CAB LAMP FRONT+2)
X580— Cab Roof Light Harness Connector
X581— Cab Roof Light Jumper Harness Connector 1
X582— Cab Roof Light Jumper Harness Connector 2

JN86345,00002E5 -19-03MAR15-1/1

B5503—Selective Catalytic Reduction (SCR) Outlet NOx Sensor
W53—Exhaust Aftertreatment Harness
X5039—Engine Interface Harness-to-Exhaust Aftertreatment Harness Connector
X5070—Exhaust Aftertreatment Harness-to-Diesel Particulate Filter (DPF) Harness Connector
Y5020—Diesel Exhaust Fluid (DEF) Dosing Injector

JA92389,0000174 -19-19OCT15-2/2

A5507B—Diesel Exhaust Fluid (DEF) Tank Header B
B5211—Diesel Exhaust Fluid (DEF) Tank Temperature Sensor
B5501—Diesel Exhaust Fluid (DEF) Dosing Unit
B5506—Diesel Exhaust Fluid (DEF) Tank Concentration Sensor
B5601—Diesel Exhaust Fluid (DEF) Tank Level Sensor
E5601—Diesel Exhaust Fluid (DEF) Dosing Unit Pressure Line Heater
E5602—Diesel Exhaust Fluid (DEF) Dosing Unit Supply Line Heater
E5603—Diesel Exhaust Fluid (DEF) Dosing Unit Return Line Heater
W54—Diesel Exhaust Fluid (DEF) Harness
X5037—Engine Interface Harness-to-Diesel Exhaust Fluid (DEF) Harness Connector 1
Y5019—Coolant Control Valve

JL58967,0000730 -19-15DEC16-4/4

B5009—Engine Coolant Loss Level Sensor
B5303—Fan Speed Sensor
E15— Engine Compartment Light
S90— Engine Compartment Light Switch
W5—Engine Interface Harness
W57—Fan Harness
W58—Engine Light Harness
X5005—Fan Harness Connector
X5041—Fan Harness-to-Engine Light Harness Connector
Y5014—Variable Speed Fan Solenoid
Y5015—Reversing Fan Solenoid

JA92389,0000177 -19-19OCT15-2/2

B5109—Exhaust Filter Delta Pressure Sensor
B5204—Exhaust Filter Temperature Module
B5502—Aftertreatment Inlet NOx Sensor
R5605—Aftertreatment CAN Termination Resistor
X110— Machine Harness-to-Exhaust Aftertreatment Harness Connector
X200— 5604 YEL Splice 1
X201— 5605 GRN Splice 1
X202— 5030 BLK Splice
X203— 5636 BLU Splice
X208— 5625 GRN Splice
X210— 5634 YEL Splice

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JL58967,0000723 -19-12DEC16-2/4

B68— Secondary Hydraulic Oil Temperature Sensor
B85— Auxiliary Function Lever (AFL) Solenoid Pressure Sensor (marked PS1)
W76—Auxiliary Function Lever (AFL) Solenoid Harness
X577— Auxiliary Function Lever (AFL) Harness-to-Auxiliary Function Lever (AFL) Solenoid Harness Connector
Y61— Auxiliary Function Lever (AFL) Solenoid A (marked 1A)
Y62— Auxiliary Function Lever (AFL) Solenoid B (marked 1B)
Y66— Secondary Pilot Shutoff Solenoid Valve (marked PiC)

JA92389,0000180 -19-22OCT15-2/2

M12— Seat Air Compressor Motor
S61— Seat Compressor Switch
X630— Premium Seat Harness Connector (marked 24V POWER)
X630A—Premium Seat Harness Jumper Connector A
X630B—Premium Seat Harness Jumper Connector B
X634— Premium Seat Compressor Harness Connector (marked COMPRESSOR)
X635— Heated/Cooled Seat Switch Connector
X636— Premium Seat Power Converter Connector (marked INVERTER)
X637— Heat Cool Lumbar Connector (marked HEAT/COOL LUMBAR)
X638— Premium Seat Blower Connector
X639— Upper Thermal Module Connector
X640— Lower Thermal Module Connector
X641— Premium Seat Controller (PSC) Connector A
X642— Premium Seat Controller (PSC) Connector B

DF89619,00B68F4 -19-29JAN18-2/2

Satellite (SAT) Harness (W6003) Component Location

See Engine Interface Harness (W5) Component Location. (Group 9015-10.)

RH60123,0000109 -19-10MAR11-1/1

Satellite (SAT) Harness (W6003) Wiring Diagram

END #1	NUMBER	COLOR	END #2
X6015	G01	BLK	X6016
X6015	M01	PUR	X6016
X6015	M02	PUR	X6016
X6015	M03	PUR	X6016
X6015	P01	RED	X6016

X6016

1	M01
2	M02
3	M03
4	G01
5	P01
6	PLUG

X6015

A1 M01	D1 PLUG	G1 PLUG	K1 PLUG
A2 M02	D2 PLUG	G2 PLUG	K2 PLUG
A3 PLUG	D3 PLUG	G3 PLUG	K3 PLUG
A4 PLUG	D4 PLUG	G4 PLUG	K4 PLUG
B1 PLUG	E1 PLUG	H1 PLUG	L1 PLUG
B2 PLUG	E2 PLUG	H2 PLUG	L2 PLUG
B3 PLUG	E3 PLUG	H3 PLUG	L3 PLUG
B4 PLUG	E4 PLUG	H4 PLUG	L4 PLUG
C1 PLUG	F1 PLUG	J1 PLUG	M1 G01
C2 PLUG	F2 PLUG	J2 PLUG	M2 P01
C3 PLUG	F3 PLUG	J3 M03	M3 PLUG
C4 PLUG	F4 PLUG	J4 PLUG	M4 PLUG

TX1111520

TX1111520 —UN—09APR12

Satellite (SAT) Harness (W6003) Wiring Diagram

X6015—Satellite (SAT) Module Control Unit 48-Pin Connector
X6016—Engine Interface Harness-to-Satellite (SAT) Harness Connector

DP27668,00009DC -19-31MAR15-1/1

E22— Battery Disconnect Indicator Light
F4— Solenoid 20 A Fuse (marked SOLENOID)
F7— Start Position Signal 5 A Fuse (marked START)
F18— Idle Stop 5 A Fuse (marked IDLE STOP)
F45— Starter In-Line 30 A Fuse
F60— Alternator 65 A Fuse
F61— Battery 45 A Fuse
G1—Battery
G2—Battery
G3—Alternator
K1—Load Dump Relay
K4—Starter Cut Relay
K11— Idle Stop Relay
K12— Accessory Cut Relay
K13— Key Cut Relay
K19— Battery Relay
K34— Starter Relay
M1—Starter Motor
S1—Key Switch
S3—Pilot Shutoff Switch 1
S4—Pilot Shutoff Switch 2
S91— Battery Disconnect Switch
V1—Battery Relay Diode
V3—Load Dump Relay Diode
V4—Security Diode
V5—Starter Cut Relay Diode
V7—Start Relay Diode
V9—Pilot Shutoff Diode
V10— Starter Protection Diode
V11— Accessory Cut Diode
V12— Starter Cut Diode
V20— Pilot Shutoff Switch Diode
V44— Starter Relay Diode
X47— Cab Harness-to-Key Switch Harness Connector
X65— Cab Harness-to-Pilot Shutoff Switch Harness Connector
X175— Machine Harness-to-Engine Interface Harness Connector 1

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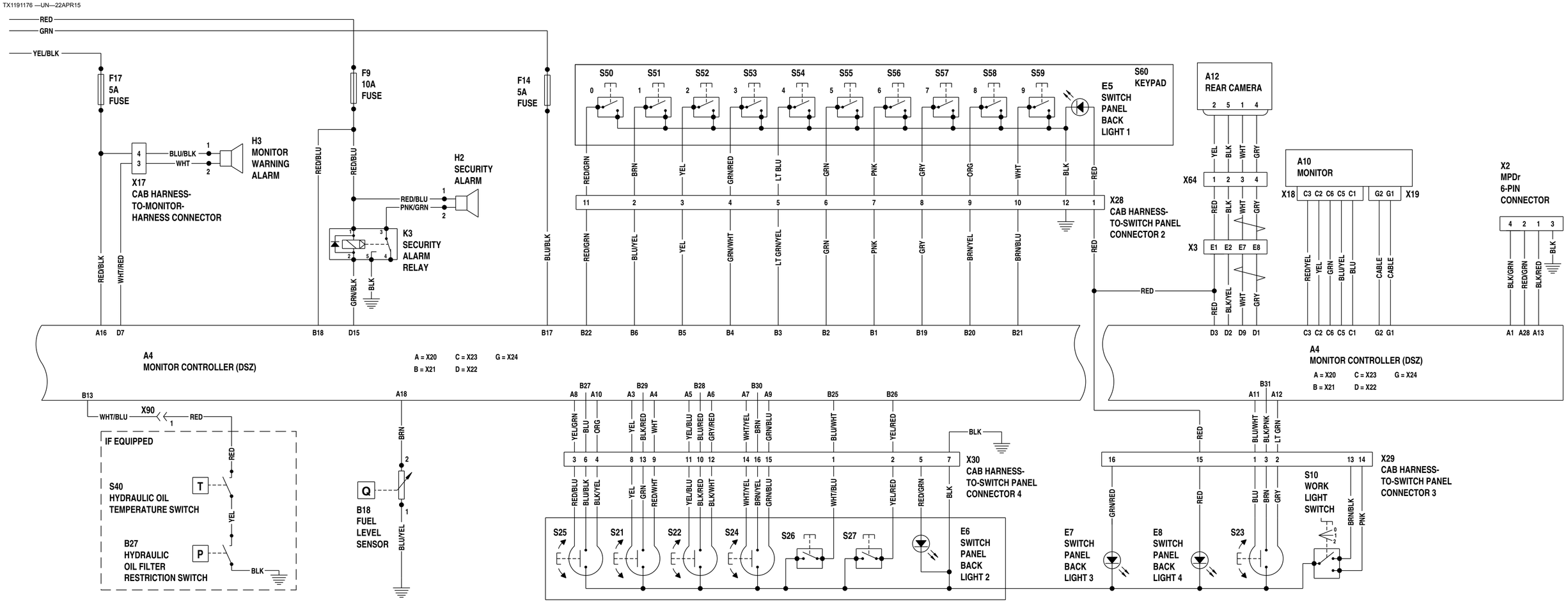
JJ03229,0001173 -19-06APR18-2/6



TX1191176

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Monitor Controller (DSZ) Circuit Schematic (2 of 2)

JJ03229,0000ED1 -19-06APR18-3/6

A1—Engine Control Unit (ECU)
A15— Flex Power Controller (FPC)
B5009—Engine Coolant Loss Level Sensor
B5101—Engine Oil Pressure Sensor
B5102—Exhaust Manifold Pressure Sensor
B5103—Exhaust Gas Recirculation (EGR) Delta Pressure Sensor
B5104—Intake Manifold Pressure Sensor
B5107—Inlet Fuel Pressure Sensor
B5207—Exhaust Gas Recirculation (EGR) Temperature Sensor
B5208—Engine Coolant Temperature Sensor
B5209—Fuel Temperature Sensor
B5303—Fan Speed Sensor
B5600—Water-in-Fuel (WIF) Sensor
F8— Engine Control Unit (ECU) 20 A Fuse (marked ECU P1)
F36— Engine Control Unit (ECU) 20 A Fuse (marked ECU P2)
F37— Engine Control Unit (ECU) 20 A Fuse (marked ECU P3)
F5004—Flex Power Controller (FPC) In-Line 10 A Fuse
R5601—CAN 0 Termination Resistor
S16— Exhaust Filter Parked Cleaning Switch
S18— Service ADVISOR™ Remote (SAR) Switch
X1—Service ADVISOR™ Diagnostic Connector
X5015—Engine Interface Harness-to-Engine Harness Connector 1
X5016—Engine Interface Harness-to-Engine Harness Connector 2
X5018—Machine Harness-to-Engine Interface Harness Connector 2
X5501—Engine Control Unit (ECU) Connector 1
X5502—Engine Control Unit (ECU) Connector 2
X5503—Engine Control Unit (ECU) Connector 3
Y5400—Exhaust Gas Recirculation (EGR) Valve
Y5402—Exhaust Throttle Actuator

Service ADVISOR™ Remote (SAR) Switch (S18)—The Service ADVISOR™ Remote (SAR) switch (S18) allows the operator to accept or decline available updates. The flex power controller (FPC) (A15) will create DTCs under certain trigger conditions, which will send a message via CAN to the monitor controller (DSZ) (A4) to prompt the vehicle to display operator instructions on the monitor.

When key switch (S1) is in the ON position, current flows from pin M of key switch to pin 3 of key cut relay (K13) and through idle stop 5 A fuse (F18) to pin 1 of key cut relay. Utilizing the normally closed contacts of the key cut relay, current is passed through power on 5 A fuse (F17) to pins 1, 7, and 10 of Service ADVISOR™ Remote (SAR) switch (S18). When the SAR switch is pressed to the ACCEPT position, current is sent through pin 3 of the SAR switch to pin C1 of FPC. Pin E3 of FPC, is then grounded, completing the circuit to pin 5 of the SAR switch, activating the ACCEPT (green) light emitting diode (LED). When the SAR switch is pressed to the DECLINE position, current is sent through pin 2 of the SAR switch to pin F2 of FPC. Pin F3 of FPC, is then grounded, completing the circuit to pin 4 of the SAR switch, activating the DECLINE (red) light emitting diode (LED).

Cold Weather Starting Aid—Power is available to pin 3 of glow plug relay (K16) from glow plug 50 A fuse (F63). Ground is provided at pin 1 of glow plug relay and to glow plugs (R1—R4).

When key switch (S1) is in the ON position, current flows from pin M of key switch to pin 3 of key cut relay (K13) and through idle stop 5 A fuse (F18) to pin 1 of key cut relay. Utilizing the normally closed contacts of the key cut relay, current is passed to pin 7 of engine control unit (ECU) connector 3 (X5503) through power on 5 A fuse (F17), causing the ECU to power up. The ECU now determines if the glow plugs need to be activated. If the ECU determines the glow plugs are necessary, power is sent out pin 32 via engine control unit (ECU) connector 1 (X5501) to pin 2 of glow plug relay, energizing the relay. Power is sent to glow plugs and through glow plug resistor (R19) to engine control unit (ECU) connector 1 (X5501) pin 54. For more information on cold start aid, see Cold Weather Starting Aid. (Group 9010-05.)

Hydraulic Variable Speed Fan—The variable speed fan cools the machine's systems by a hydraulic pump and motor controlled by a variable speed fan solenoid, providing machine efficiency and reducing fan noise levels by only operating the fan at the minimum speed necessary to cool the machine systems. The engine control unit (ECU) uses the following inputs to determine the proper fan speed:

- B22—Ambient air temperature sensor if air conditioner is ON via CAN.
- B40—Hydraulic oil temperature sensor via controller area network (CAN).
- B5205—Charge air cooler outlet temperature sensor at pin 29 of engine control unit (ECU) connector 2 (X5502).
- B5208—Engine coolant temperature sensor at pin 16 of engine control unit (ECU) connector 1 (X5501).
- B5209—Fuel temperature sensor at pin 48 of engine control unit (ECU) connector 1 (X5501).

The input that requires the most cooling takes precedence over the other inputs and the fan is run at a speed sufficient to cool the warmest input. If any of the three temperature sensor inputs are invalid, the fan will run at maximum speed to ensure proper cooling. The maximum fan speed is limited to engine speed. Temperature thresholds and variable speed fan solenoid duty cycles (fan speeds) are preprogrammed into the ECU and cannot be changed. The variable speed fan solenoid (Y5014) is driven from engine control unit (ECU) pin 32 of engine control unit (ECU) connector 2 (X5502).

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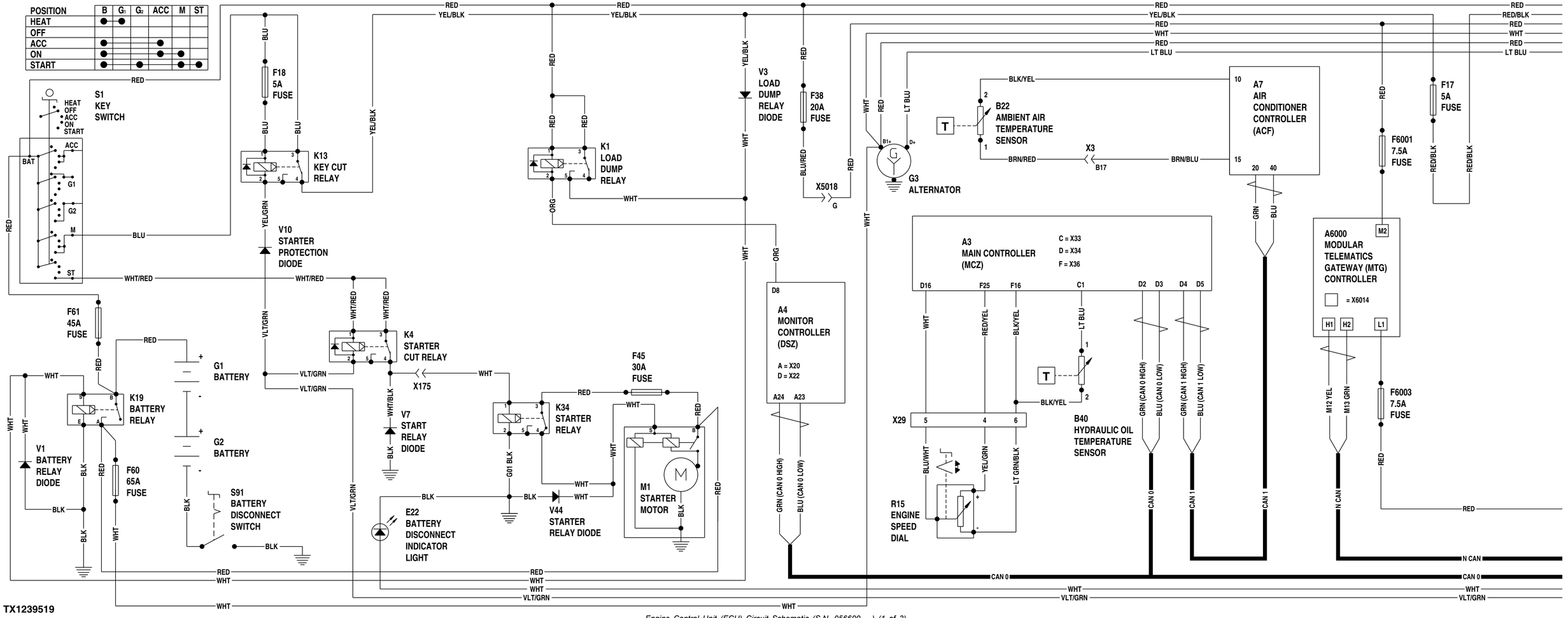
Engine Control Unit (ECU) Circuit Theory of Operation (S.N. 056600—)

TX1239519 —UN—02JUN17



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Engine Control Unit (ECU) Circuit Schematic (S.N. 056600—) (1 of 3)

JL58967,0000742 -19-01JUN17-15/28

A1—Engine Control Unit (ECU)
B5105—Crankcase Pressure Sensor
B5113—Fuel Rail Pressure Sensor
B5205—Charge Air Cooler Outlet Temperature Sensor
B5206—Manifold Air Temperature (MAT) Sensor
B5301—Crankshaft Position Sensor
B5302—Camshaft Position Sensor
B5500—Intake Air Sensor
F6— Optional Connector and Reversing Fan 20 A Fuse (marked OPT. 2 ALT)
F63— Glow Plug 50 A Fuse
K16— Glow Plug Relay
R1—Glow Plug 1
R2—Glow Plug 2
R3—Glow Plug 3
R4—Glow Plug 4
R19— Glow Plug Resistor
R5603—Engine CAN Termination Resistor
S15— Reversing Fan Switch
X83— Cab Harness-to-Reversing Fan Switch Harness Connector
X5000—Engine Harness-to-Fuel Injector Harness Connector
X5068—Engine Interface Harness-to-Engine Harness Connector 3
X5015—Engine Interface Harness-to-Engine Harness Connector 1
X5016—Engine Interface Harness-to-Engine Harness Connector 2
X5501—Engine Control Unit (ECU) Connector 1
X5502—Engine Control Unit (ECU) Connector 2
X5503—Engine Control Unit (ECU) Connector 3
X5604—Engine Harness-to-Glow Plug Harness Connector
Y1—Electronic Injector 1 (cylinder 1)
Y2—Electronic Injector 2 (cylinder 2)
Y3—Electronic Injector 3 (cylinder 3)
Y4—Electronic Injector 4 (cylinder 4)
Y5002—Suction Control Valve
Y5014—Variable Speed Fan Solenoid
Y5015—Reversing Fan Solenoid
Y5024—Fuel Rail Pressure Relief Valve (PRV)
Y5501—Fuel Transfer Pump

Fuel Rail Pressure Sensor (B5113)—The fuel rail pressure sensor (B5113) sends a pressure equivalent signal to the engine control unit (ECU). The ECU monitors fuel pressure to control the amount and timing of fuel being transferred from the high-pressure fuel pump to the high-pressure common rail (HPCR). The ECU uses this signal input to determine if fuel rail pressure is adequate for the current operating condition. The ECU will command more or less fuel from the high-pressure fuel pump by altering the signal to the high-pressure fuel pump pressure control valve (PCV) 1 (Y5022) and high-pressure fuel pump pressure control valve (PCV) 2 (Y5023). The ECU also uses this sensor to determine if there is an electronic injector problem by measuring the drop of pressure in the HPCR during each injection. The fuel rail pressure sensor is used for engine protection.

The fuel rail pressure sensor uses pin 37 for supply voltage, pin 09 for ground, and pin 51 for signal on engine control unit (ECU) connector 1 (X5501).

NOTE: For component location, see Engine Harness (W4) Component Location. (Group 9015-10.)

For information on how pressure sensors operate, see Measuring Pressure. (CTM120119.)

For information on engine protection and derate programs, see Engine Derate and Shutdown Protection. (CTM120119.)

Engine Oil Pressure Sensor (B5101)—The engine oil pressure sensor (B5101) sends an oil pressure equivalent signal to the engine control unit (ECU). The ECU uses this signal to determine if engine oil pressure is adequate for the current operating conditions. The ECU monitors oil pressure for engine protection purposes.

The engine oil pressure sensor uses pin 17 for supply voltage, pin 26 for signal, and pin 41 for ground on engine control unit (ECU) connector 1 (X5501).

NOTE: For component location, see Engine Harness (W4) Component Location. (Group 9015-10.)

For information on how pressure sensors operate, see Measuring Pressure. (CTM120119.)

For information on engine protection and derate programs, see Engine Derate and Shutdown Protection. (CTM120119.)

Exhaust Manifold Pressure Sensor (B5102)—The exhaust manifold pressure sensor (B5102) provides feedback to the control systems for the exhaust throttle actuator (Y5402) and exhaust gas recirculation (EGR) valve (Y5400) in order to maximize engine performance while meeting the applicable emissions regulations. The ECU uses the exhaust manifold pressure for the volumetric efficiency calculation.

The exhaust manifold pressure sensor uses pin 27 for supply voltage, pin 11 for signal, and pin 25 for ground on engine control unit (ECU) connector 1 (X5501).

NOTE: For component location, see Engine Harness (W4) Component Location. (Group 9015-10.)

For information on how pressure sensors operate, see Measuring Pressure. (CTM120119.)

For information on engine protection and derate programs, see Engine Derate and Shutdown Protection. (CTM120119.)

Exhaust Gas Recirculation (EGR) Delta Pressure Sensor (B5103)—The exhaust gas recirculation (EGR) delta pressure sensor (B5103) measures the pressure drop across the EGR venturi tube. The ECU calculates the amount of the recirculated exhaust gas using this measurement and the venturi tube physical dimensions. The ECU controls the EGR valve (Y5400) and turbocharger actuator (Y5500) to recirculate the ideal amount of exhaust gas for the operating condition.

The EGR delta pressure sensor uses pin 36 for supply voltage, pin 05 for signal, and pin 24 for ground on engine control unit (ECU) connector 2 (X5502).

NOTE: For component location, see Engine Harness (W4) Component Location. (Group 9015-10.)

For information on engine protection and derate programs, see Engine Derate and Shutdown Protection. (CTM120119.)

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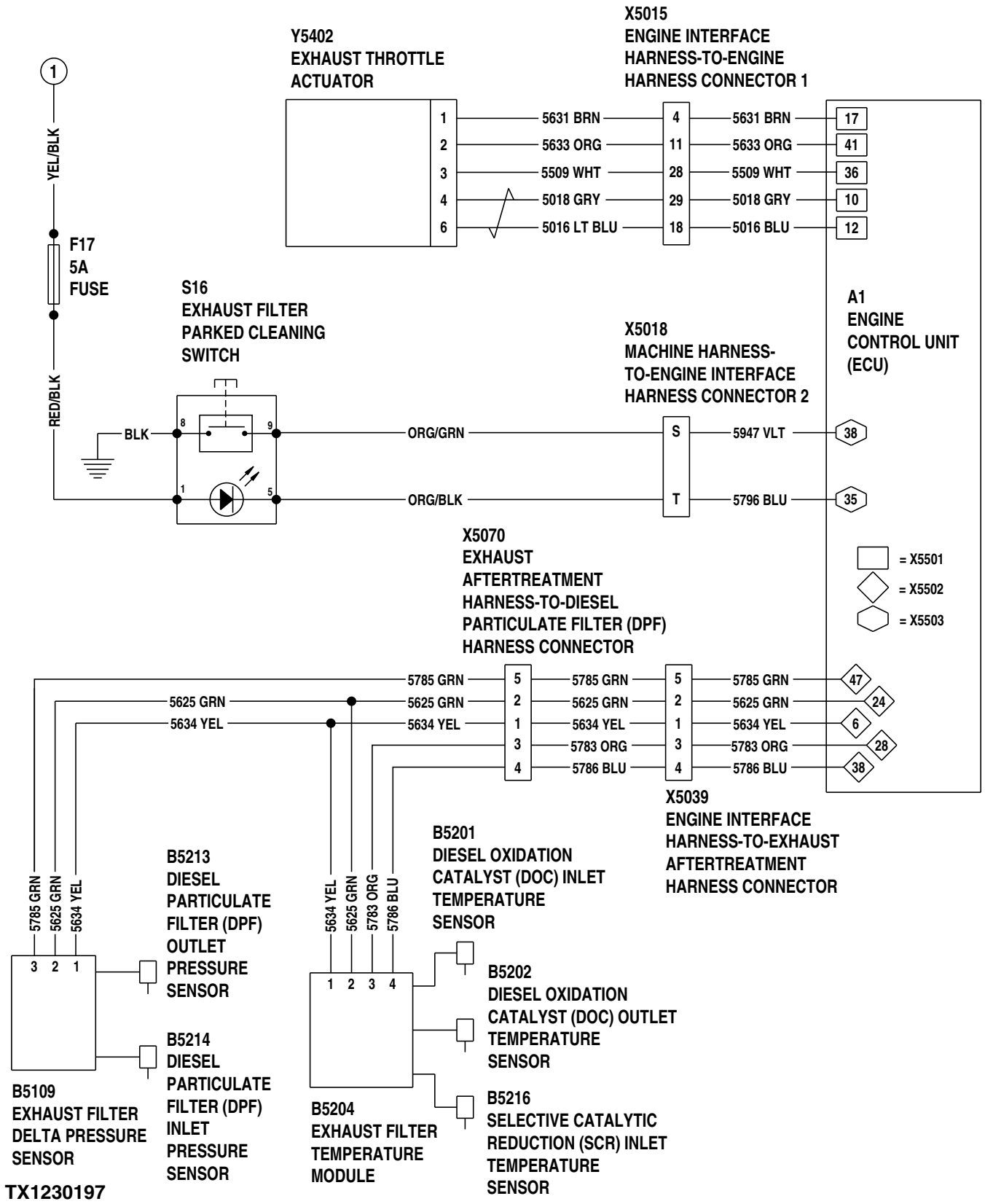
Exhaust Aftertreatment Circuit Theory of Operation (S.N. 056600—)



Diesel Oxidation Catalyst (DOC) and Diesel Particulate Filter (DPF) Circuit Schematic (S.N. 056600—)

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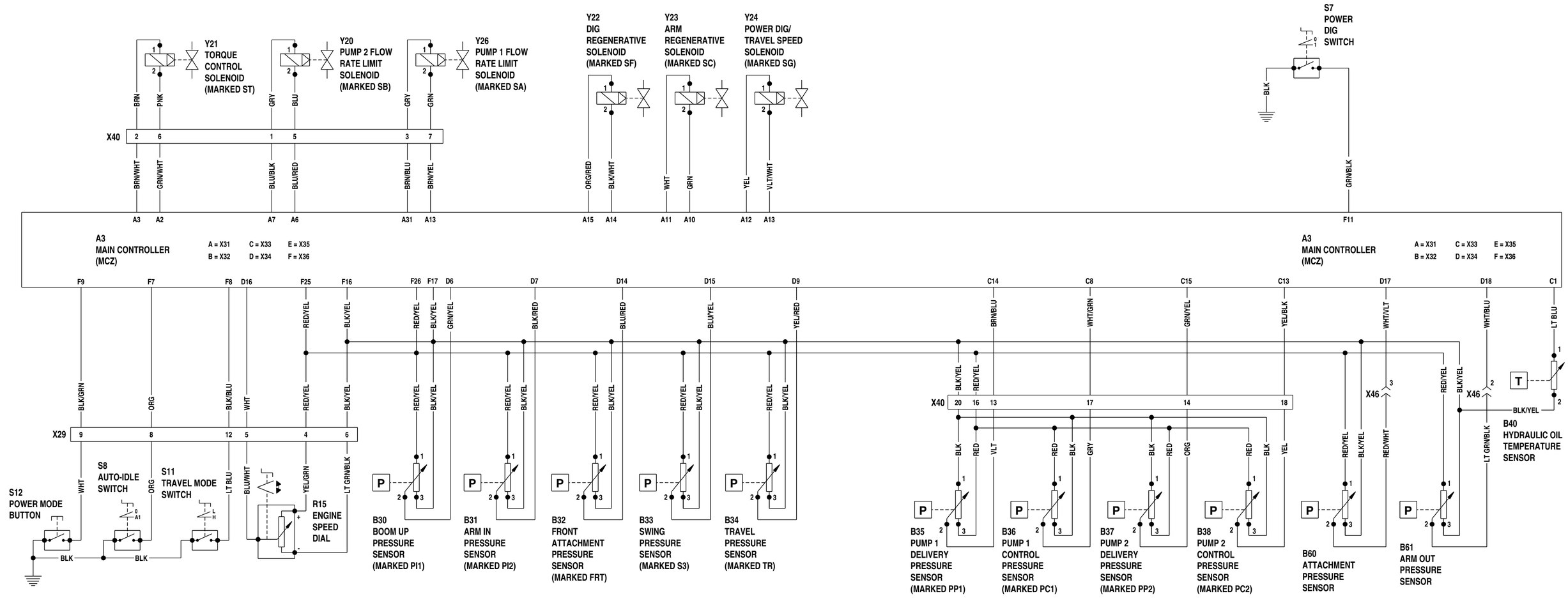
TX1250969 —UN—29JAN18



TX1250969

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Main Controller (MCZ) Circuit Schematic (2 of 2) (S.N. —057099)

TX03742,0000118 -19-13FEB18-3/11

A3—Main Controller (MCZ)
B68— Secondary Hydraulic Oil Temperature Sensor
B85— Auxiliary Function Lever (AFL) Solenoid Pressure Sensor (marked PS1)
F5— Optional and Attachment Connector 5 A Fuse (marked OPT. 1 ALT)
K31— Right Solenoid Relay A (marked RSW1)
S7—Power Dig Switch
S29— Auxiliary Function Lever (AFL) Proportional Control Switch
S31— Right Pilot Control Lever Switch
S45— Auxiliary Function Enable Switch (marked AFL_SW)
V22— Pilot Shutoff Solenoid Diode
W36—Cab Harness Ground 2
W37—Cab Harness Ground 3
X31— Cab Harness-to-Main Controller 31-Pin Connector A
X32— Cab Harness-to-Main Controller 24-Pin Connector B
X33— Cab Harness-to-Main Controller 17-Pin Connector C
X36— Cab Harness-to-Main Controller 26-Pin Connector F
X536— Right Auxiliary Function Lever (AFL) Connector (marked R_GRIP)
X574— Auxiliary Function Lever (AFL) Connector 1
X577— Auxiliary Function Lever (AFL) Harness-to-Auxiliary Function Lever (AFL) Solenoid Harness Connector
Y61— Auxiliary Function Lever (AFL) Solenoid A (marked 1A)
Y62— Auxiliary Function Lever (AFL) Solenoid B (marked 1B)
Y66— Secondary Pilot Shutoff Solenoid Valve (marked PiC)

Auxiliary Function Lever (AFL)— The main controller (MCZ) provides control for AFL control. For more information on MCZ, see Main Controller (MCZ) Circuit Theory of Operation. (Group 9015-15.)

Auxiliary hydraulic functions are controlled by the MCZ with inputs from the following components:

- B68—Secondary hydraulic oil temperature sensor
- B85—Auxiliary function lever (AFL) solenoid pressure sensor (marked PS1)
- S29—Auxiliary function lever (AFL) proportional control switch
- S45—Auxiliary function enable switch (marked AFL_SW)

After the MCZ processes received input signals, output signals are sent to the solenoids to control hydraulic speed and volume with the following components:

- Y61—Auxiliary function lever (AFL) solenoid A (marked 1A)
- Y62—Auxiliary function lever (AFL) solenoid B (marked 1B)
- Y66—Secondary pilot shutoff solenoid valve (marked PiC)

NOTE: AFL will work only when pilot control shutoff lever is in the (DOWN) unlocked position. If a cycle of the pilot control shutoff lever is done, AFL will need to be activated again.

By pressing the auxiliary function enable switch (S45), ground is supplied at pin F22. The MCZ provides ground at pin C6, activating the secondary pilot shutoff solenoid valve (marked PiC) (Y66) which is a normally closed solenoid. When the operator actuates AFL proportional control switch (S29) on the right pilot control lever, a proportional signal is sent to the MCZ. The MCZ converts this signal and energizes the appropriate AFL solenoid to allow flow to the attachment in the requested speed and volume.

The MCZ monitors secondary hydraulic oil temperature utilizing secondary hydraulic oil temperature sensor (B68) through pin C7 of the MCZ and grounded through pins F16 and F17 of the MCZ. When hydraulic oil temperature increases or decreases and remains past a predefined point, the MCZ sends the signal to the monitor controller (DSZ) (A4) via the controller area network (CAN).

The MCZ monitors hydraulic oil pressure utilizing AFL solenoid pressure sensor through pin B2 of the MCZ and grounded through pins F25 and F26 of the MCZ. When hydraulic oil pressure increases and remains past a predefined point, the MCZ sends the signal to the monitor controller (DSZ) (A4) via the controller area network (CAN).

TX03742,0000118 -19-13FEB18-11/11

Machine Controller (BCZ) Circuit Theory of Operation

The machine controller (BCZ) controls lighting, windshield wiper, and windshield washer circuits.

For more information on windshield wiper and washer circuit theory of operation, see Windshield Wiper and Washer Circuit Theory of Operation. (Group 9015-15.)

For more information on lighting circuit theory of operation, see Lighting Circuit Theory of Operation. (Group 9015-15.)

JS20420,0000D95 -19-29MAY14-1/1

A4—Monitor Controller (DSZ)
A10— Monitor
A11— Machine Controller (BCZ)
A15— Flex Power Controller (FPC)
E1—Work Light
E2—Boom Light
E3—Cab Dome Light
E9—Key Switch Light
E11— Cab Roof Light 1
E12— Cab Roof Light 2
E13— Cab Roof Light 3
E14— Cab Roof Light 4
E15— Engine Compartment Light
E18— Rear Cab Light
F1—Work and Boom Lights 20 A Fuse (marked LAMP)
F9—Radio Backup 10 A Fuse (marked BACK UP)
F10— Data Converter and Main Controller Battery Power 5 A Fuse (marked CONTROLLER)
F12— Radio and Dome 5 A Fuse (marked RADIO)
F17— Power On 5 A Fuse (marked POWER ON)
F22— Front Cab Light 1 10 A Fuse (marked CAB LAMP FRONT)
F23— Rear Cab Light 10 A Fuse (marked CAB LAMP REAR)
F32— Front Cab Light 2 10 A Fuse (marked CAB LAMP FRONT +2)
F46— Engine Light In-Line 7.5 A Fuse
F60— Alternator 65 A Fuse
F61— Battery 45 A Fuse
G1—Battery
G2—Battery
G3—Alternator
K1—Load Dump Relay
K7—Work Light Relay
K8—Boom Light Relay
K12— Accessory Cut Relay
K13— Key Cut Relay
K19— Battery Relay
K21— Cab Roof Light 1 Relay
K22— Cab Roof Light 2 Relay
K23— Rear Cab Light Relay
S1—Key Switch
S2—Cab Dome Light Switch
S10— Work Light Switch
S14— Door Switch
S36— Rear Cab Light Switch
S90— Engine Compartment Light Switch
S91— Battery Disconnect Switch
V3—Load Dump Relay Diode
V11— Accessory Cut Diode
V12— Starter Cut Diode
V13— Work Light 1 Diode
V14— Work Light 2 Diode
X3—Cab Harness-to-Machine Harness 100-Pin Connector
X10— Machine Controller 8-Pin Connector A
X11— Machine Controller 20-Pin Connector B
X18— Monitor 12-Pin Connector C
X20— Monitor Controller 28-Pin Connector A
X23— Monitor Controller 12-Pin Connector C
X26— Optional Connector
X27— Cab Harness-to-Switch Panel Connector 1
X29— Cab Harness-to-Switch Panel Connector 3
X55— Front Cab Light 1 Connector (marked CAB LAMP FRONT)
X56— Front Cab Light 2 Connector (marked CAB LAMP FRONT +2)
X57— Rear Cab Light Connector (marked CAB LAMP REAR)
X580— Cab Roof Light Harness Connector
X581— Cab Roof Light Jumper Harness Connector 1
X582— Cab Roof Light Jumper Harness Connector 2
X632— Rear Cab Light Harness Connector
X633— Rear Cab Light Switch Harness Connector (marked CAB LAMP REAR)

The machine controller (BCZ) (A11) receives unswitched power at pin A4 of machine controller 8-pin connector A (X10) from data converter and main controller battery power 5 A fuse (F10). Switched battery power is supplied to pin B19 of the BCZ through key cut relay (K13) with the key switch (S1) in the ON position. The BCZ is grounded at pin A8 of machine controller 8-pin connector A.

Work Light Operation—Turning the work light switch (S10) to position 1 activates the work light (E1).

When key switch (S1) is in the ON position, current from pin M of the key switch is passed to pin 3 of key cut relay (K13). Utilizing the normally closed contacts of key cut relay, power is passed through power on 5 A fuse (F17) to pin 1 of work light relay (K7). When work light switch is in position 1, ground is supplied to pin A6 through work light 1 diode (V13) and to pin B7 of machine controller 20-pin connector B (X11). When work light relay is energized, the work light will illuminate.

The BCZ communicates the work light switch position to the monitor controller (DSZ) (A4) via the controller area network (CAN). The DSZ then updates the monitor (A10) with the current work light operation. For more information on CAN theory of operation, see Controller Area Network (CAN) Theory of Operation. (Group 9015-15.)

Boom Light Operation—Turning the work light switch (S10) to position 2 will activate the work light and boom light (E2).

NOTE: When work light switch is in position 2, the monitor screen will change to nighttime mode screen. Daytime mode screen can be returned by pressing 0 on the keypad.

When key switch (S1) is in the ON position, current from pin M of the key switch is passed to pin 3 of key cut relay (K13). Utilizing the normally closed contacts of key cut relay, power is passed through load dump relay diode (V3) to energize the battery relay (K19) through pin S. The battery relay allows current to travel to the alternator B terminal through the alternator 65 A fuse (F60). At the B terminal of the alternator, current is then passed through the work and boom lights 20 A fuse (F1). Current then passes to boom light relay (K8) pins 1 and 3 and to work light relay (K7) pin 3. When work light switch is in position 2, ground is supplied to pins A2 and A6 of machine controller 8-pin connector A (X10) through work light 2 diode (V14) and to pin B17 of machine controller 20-pin connector B (X11). This energizes work light relay, boom light relay, cab roof light 1 relay, and cab roof light 2 relay and illuminates the work light, boom light, and cab roof lights 1—4.

When key switch is turned to the OFF position, ground through pin A6 to work light relay is disconnected and work light turns off. With work light switch in position 2 and no ground detected from the key cut relay (K13), BCZ provides ground to pins A2 and A7, illuminating the boom light and key switch light for 30 seconds. After 30 seconds, the MCZ provides ground for the key cut relay through pin 5 cab harness-to-main controller 17-pin connector C. When current passes through key cut relay, power is removed from battery relay and current is removed from lights.

The BCZ communicates the work light switch position to the monitor controller (DSZ) (A4) via the controller area network (CAN). The DSZ then updates the monitor (A10) with the current work light operation. For more information on CAN theory of operation, see Controller Area Network (CAN) Theory of Operation. (Group 9015-15.)

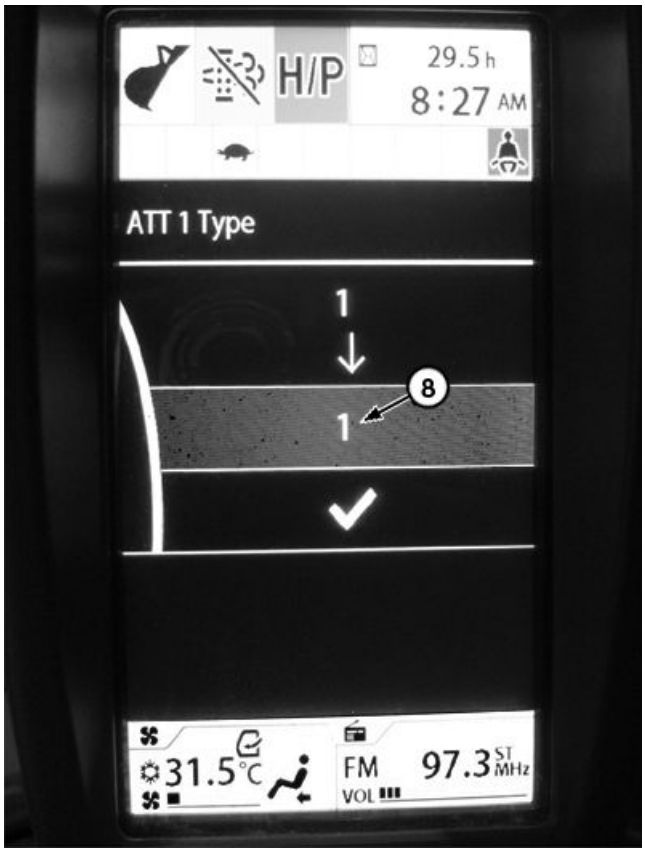
Engine Compartment Light Operation (S.N. —056599)—Turning the engine compartment light switch (S90) to position 1 activates the engine compartment light (E15).

Continued on next page

Attachment Number—Each attachment can be assigned a number from 1 through 5.

Each attachment also has a dynamic number that is user defined to help differentiate attachments with the same name. For example, ATT 1 (attachment 1) and ATT 2 (attachment 2) could both be set up as breaker 1. The number associated with the attachment name can be changed to any number from 1 through 5. ATT 2 (attachment 2) breaker 1 could be changed to ATT 2 (attachment 2) breaker 2 (3, 4, or 5) to distinguish between the beakers for ATT 1 (attachment 1) and ATT 2 (attachment 2).

8— ATT 1 Type (attachment 1)



TX1088891A —UN—01MAR11

Attachment Type

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JJ03229,0000ED2 -19-24APR15-4/9

Machine Setting

NOTE: Due to different controller versions, items listed in the monitoring section may not appear on or be in the same order as the monitor on the machine.

1. Access service menu. See Service Menu. (Group 9015-16.)
2. Rotate monitor dial to highlight MACHINE SETTING. Press monitor dial to enter machine setting menu.
3. Rotate monitor dial to highlight a setting in the machine setting selections. Press monitor dial to change machine setting.

List of Machine Setting Items (Constant Change)		
Item	**Unit**	**Data**
Li Speed	min^{-1}	Adjustment of slow idle speed.
Al Speed	min^{-1}	Adjustment of auto-idle engine speed.
Power Mode Memory Selection	0, 1	Setting of power mode with key switch on: 0: OFF (When power mode is H/P mode with the key switch OFF, PWR mode is selected when turning the key switch on. When power mode is ECO or PWR mode with the key switch OFF, ECO or PWR mode is kept when turning the key switch on.) 1: On (The power mode when turning the key switch OFF is kept.)
Heater Control Selection	0, 1	ON/OFF status of heater control: 0: OFF 1: ON
Work Mode Memory Selection	0, 1	ON/OFF status of attachment mode: 0: OFF 1: ON
Power Mode Selection	0—4	Setting of power mode selection: 0: ECO, PWR mode: Selected 1: ECO mode: Fixed 2: PWR mode: Fixed 3: ECO, PWR, H/P mode: Selected 4: H/P mode: Fixed
Auto Shut-Down Control	0—2	Setting of auto-shutdown control with the key switch ON: 0: OFF when starting 1: ON when starting 2: Previous setting is held
Auto Shut-Down Set Time Holding	0, 1	The time until starting shutdown control is held: 0: Settable 1: Unsettable
Air Conditioner Control Mode	0—10	Selection of air conditioner specification: 0: Unused (without an air conditioner) 1: STD Cab (middle) (with an air conditioner) 2: STD Cab (middle) (without an air conditioner) 3: STD Cab (large) (with an air conditioner) 4: STD Cab (large) (without an air conditioner) 5: US Cab (7 t class) (with an air conditioner) 6: US Cab (7 t class) (without an air conditioner) 7: US Cab (10 t class) (with an air conditioner) 8: US Cab (10 t class) (without an air conditioner) 9: US Cab (20 t class) (with an air conditioner) 10: US Cab (20 t class) (without an air conditioner)
ATT Speed Deceleration Waiting Time	ms	The time when the increased engine speed is held at attachment operation speed increased control.
Breaker Relief Hard Setting	0, 1	Selection of secondary pilot relief valve or breaker relief solenoid valve specification: 0: Fixed 1: Variable

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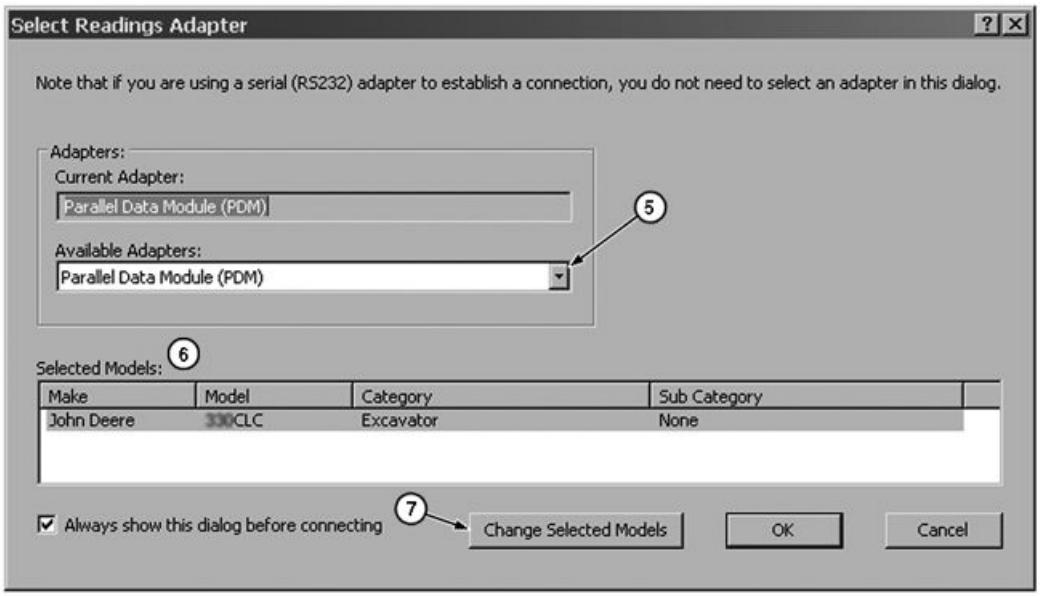

TX1003001A —UN—26JAN06

Select Readings Adapter Dialog Box

5— Available Adaptors Drop-Down List

6— Selected Models List

7— Change Selected Models Button

7. On the Select Readings Adapter dialog box, make sure the appropriate adapter is displayed. If not, select correct adapter from drop-down list (5). Options include:
   - Electronic Data Link (EDL) Stand-alone USB Device
   - Electronic Data Link (EDL) Using Bluetooth®
   - Parallel Data Module (PDM)
   - Parallel Data Module (PDM) With USB Adapter
8. Make sure to select the correct machine to connect to, shown in the Selected Models list (6) display list. If not, click the Change Selected Models button (7).
9. Click OK to connect to machine.
10. After Service ADVISOR™ connects to machine, both the Readings tab (3) and Connected Diagnostic Trouble Codes tab (4) display.
11. Double-click an underlined code on the Connected Diagnostic Trouble Codes tab to display a detailed description for servicing that diagnostic trouble code.

NOTE: Use the lock topic feature within Service ADVISOR™ to open multiple windows if machine is transmitting more than one diagnostic trouble code. Refer to Service ADVISOR™ system instructions for using this feature.

12. Click the Connected Diagnostic Trouble Codes tab (4) to select and view details for additional diagnostic trouble codes.

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JS20420,0000DA0 -19-30MAY14-3/3

MPDr Application

MPDr is an application that helps technicians diagnose and troubleshoot machines. MPDr provides access to machine diagnostic trouble codes, their descriptions and limited troubleshooting procedures. MPDr can also display and record live readings for the different controllers on the machine. Special functions in certain controllers may also be manipulated with MPDr. The special functions available to manipulate vary by controller and by machine model. MPDr is also used to set up some controllers after a controller has been replaced or after other work has been performed on the machine regarding a controller.

For more information, see MPDr Operation Manual.

DP09616,000057A -19-15MAY14-1/1

Electrical Component Specifications

NOTE: Resistance values for pump 1 delivery pressure sensor (B35) and pump 2 delivery pressure sensor (B37) may vary widely. To verify the sensor's functionality, use the monitor or check for diagnostic trouble codes (DTCs).

NOTE: For more information on engine electrical components, see engine related component technical manual (CTM).

Item	Measurement	Specification
Sensor Specifications		
B18—Fuel Level Sensor	Resistance	6—10 ohms @ 100% Fill (full) 26 ohms @ 75% Fill 33—43 ohms @ 50% Fill 53 ohms @ 25% Fill 82—88 ohms @ Low Fuel Alarm 90—100 ohms @ 0% Fill (empty)
B22—Ambient Air Temperature Sensor	Resistance	9.9 kilo-ohms @ 0°C (32°F) 1.6 kilo-ohms @ 40°C (104°F)
B30—Boom Up Pressure Sensor (marked PI1)	Resistance	5—15 kilo-ohms (Pins 1—2) 30—50 kilo-ohms (Pins 2—3)
B31—Arm In Pressure Sensor (marked PI2)	Resistance	5—15 kilo-ohms (Pins 1—2) 30—50 kilo-ohms (Pins 2—3)
B32—Front Attachment Pressure Sensor (marked FRT)	Resistance	5—15 kilo-ohms (Pins 1—2) 30—50 kilo-ohms (Pins 2—3)
B33—Swing Pressure Sensor (marked S3)	Resistance	5—15 kilo-ohms (Pins 1—2) 30—50 kilo-ohms (Pins 2—3)
B34—Travel Pressure Sensor (marked TR)	Resistance	5—15 kilo-ohms (Pins 1—2) 30—50 kilo-ohms (Pins 2—3)
B36—Pump 1 Control Pressure Sensor (marked PC1)	Resistance	5—15 kilo-ohms (Pins 1—2) 30—50 kilo-ohms (Pins 2—3)
B38—Pump 2 Control Pressure Sensor (marked PC2)	Resistance	5—15 kilo-ohms (Pins 1—2) 30—50 kilo-ohms (Pins 2—3)
B40—Hydraulic Oil Temperature Sensor	Resistance	13.8—16.3 kilo-ohms @ -20°C (-4°F) 5.7 kilo-ohms @ 0°C (32°F) 2.3—2.6 kilo-ohms @ 20°C (68°F) 1.2 kilo-ohms @ 40°C (104°F) 584 ohms @ 60°C (140°F) 310—326 ohms @ 80°C (176°F)
B55—Air Recirculation Sensor	Resistance	9.9 kilo-ohms @ 0°C (32°F) 1.6 kilo-ohms @ 40°C (104°F)
B56—Bucket Curl Pressure Sensor (marked BKC)	Resistance	5—15 kilo-ohms (Pins 1—2) 30—50 kilo-ohms (Pins 2—3)
B57—Bucket Dump Pressure Sensor	Resistance	5—15 kilo-ohms (Pins 1—2) 30—50 kilo-ohms (Pins 2—3)
B60—Attachment Pressure Sensor	Resistance	5—15 kilo-ohms (Pins 1—2) 30—50 kilo-ohms (Pins 2—3)
B61—Arm Out Pressure Sensor (marked AMD)	Resistance	5—15 kilo-ohms (Pins 1—2) 30—50 kilo-ohms (Pins 2—3)
B85—Auxiliary Function Lever (AFL) Solenoid Pressure Sensor (marked PS1)	Resistance	5—15 kilo-ohms (Pins 1—2) 30—50 kilo-ohms (Pins 2—3)

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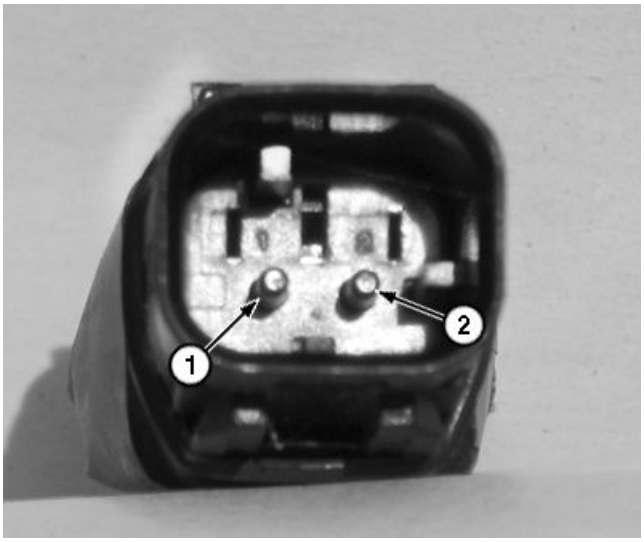
Alternator Resistor Check

Turn key switch OFF.

Disconnect harness from alternator resistor (R13).



TX1095684A —UN—08AUG11

Alternator Resistor

1— Terminal 1
2— Terminal 2

Measure resistance across resistor terminals 1 and 2.

LOOK: Does the multimeter read 900—1100 ohms?

YES: Alternator resistor is OK.

NO: Alternator resistor malfunctioned. Replace the alternator resistor.

JA66566,0003389 -19-18FEB15-13/13

The travel motor driveshaft is connected to the first stage sun gear (input shaft) (12) by a spline coupler. Travel motion is transferred from the first stage sun gear to the sprocket (18) by the three planetary gear sets that mesh with the ring gear (6). As the first stage sun gear is rotated, it rotates the first stage planetary gears (14), causing the first stage carrier (11) to rotate.

The first stage carrier is connected to the second stage sun gear (10). The second stage sun gear meshes with the second stage planetary gears (15). Second stage planetary gears are connected to the second stage carrier (9). The second stage carrier is connected to the third stage sun gear (8). The third stage sun gear rotate the third stage planetary gears (16). The third stage planetary gears are fastened to the gear case housing and do not rotate. The rotation is transferred to the ring gear. The ring gear, drum (17) and sprocket are fastened together and turn as one unit which rotates the track to move the machine. A replaceable thrust pad (13) is used in the gear case cover to keep the first stage sun gear in position.

MM16284,0001652 -19-24FEB12-2/2

Hydraulic System Operation

See Hydraulic System Schematic as a reference for hydraulic system operation. (Group 9025-15.)

Main hydraulic system is an open-center hydraulic system.

Main pump housing contains a pilot pump (28), 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), pump 2 is on the left side (toward rear of machine) and the pilot pump is mounted adjacent to pump 2 (toward the rear of machine). The engine drives the pumps through a coupler and a gear case.

Hydraulic oil flows from hydraulic oil tank (31) through suction screen (35) to pump 1 and pump 2. Pump 1 delivers high pressure oil to right control valve (4-spool) (73), and pump 2 delivers high pressure oil to left control valve (5-spool) (74). High pressure oil is routed to motor(s) (52, 61, and 63) and cylinder(s) (125, 126, and 127) by valve spool(s) of their respective valve section (75—110). Hydraulic oil tank is pressurized to ensure oil flows from hydraulic oil tank, through suction line, and into pumps.

Return oil from motor(s) and cylinder(s) is routed into return passages in control valve by valve spools. From return passages, return oil flows out of control valve, through hydraulic oil cooler (36), and then to hydraulic oil tank.

Oil cooler bypass valve (124) opens to route return oil around oil cooler and directly to hydraulic oil tank when resistance to flow through oil cooler becomes high because oil is cold (high viscosity), there is surge of return oil, or oil cooler becomes plugged. Back pressure in the return passage provides makeup oil to swing motor.

JA66566,000263D -19-03AUG12-1/1

1— Spool
2— Washer
3— Spring Guide
4— Plunger
5— Adjustment Screw
6— Cam and Pedal
7— Sleeve
8— Balance Spring
9— Return Spring
10— Port T to Hydraulic Oil Tank
11— Port P From Pilot Shutoff Solenoid Valve
12— Port 1, 2, 3, or 4 to Control Valve Pilot Cap
13— Travel Pilot Control Valve—Full Stroke
604— Return Oil
609— Pilot Oil

The travel pilot control valve regulates the pilot oil (609) pressure to actuate the pilot valves in the pilot signal manifold and to shift the control valve spools to actuate the travel functions.

See Pilot Signal Manifold Operation for pilot valve operation. (Group 9025-05.)

See Pilot Operation of Control Valve Operation for control valve operation. (Group 9025-05.)

One pilot control valve is used to control the travel functions. The pilot control valve contains four valve assemblies, one for each direction of travel for each track. The valves are pressure-reducing valves controlled by movement of the cams and pedals (6), against the plunger (4). The ports (10, 11, and 12) in housing are identified by numbers and letters next to each port.

In neutral, the spool is pushed up by the return spring (9) pushing the plunger up. The return springs hold the pedal in the neutral position. With the spool up, ports 1, 2, 3, and 4 to control valve pilot cap (12) are open to port T to the hydraulic oil tank (10) through the passage and holes in spool. Port P for pilot oil from the pilot shutoff solenoid valve (11) is blocked by the spool.

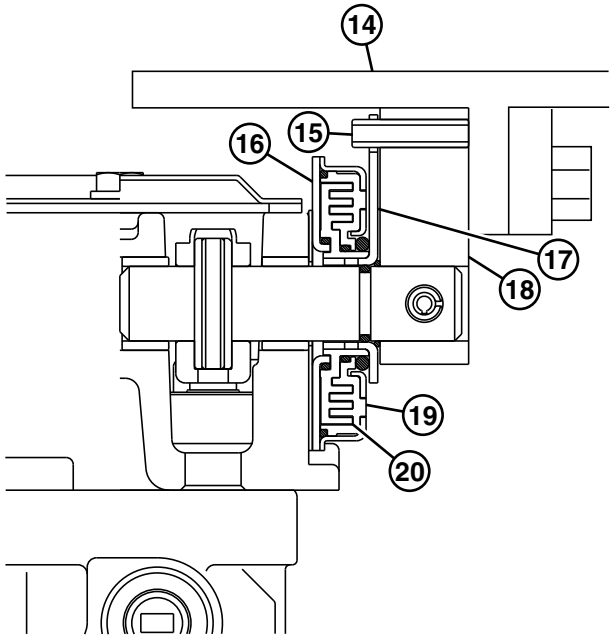
When the pedal is pushed to move the machine, the cam pushes the plunger and spring guide down against the return spring and balance spring. The balance spring pushes the spool down. As the spool is pushed down and the holes move through the deadband area, the passage from control valve pilot cap to the hydraulic oil tank is closed and then opened to the pilot oil from pilot shutoff solenoid valve. Pilot oil pressure increases until it is equal to the force applied by the balance spring pushing the spool up until the oil flow through the holes is blocked in the deadband area. With the oil flow blocked, the control valve spool is held stationary until the pedal is again actuated.

When the pedal and cam is pushed to full stroke, the plunger is pushed down farther by the balance spring opening the passage through the spool to pilot oil pressure. When pressure to the control valve pilot cap is equal to the force applied by the balance spring, the spool moves up until it contacts the plunger. The plunger holds the spool down so the passage through the spool remains open to pilot oil pressure. Oil pressure to the control valve pilot cap now approximately equals pilot oil pressure.

JA66566,0002642 -19-03AUG12-2/3

The travel pedal is equipped with a shockless function. The shockless function consists of a bracket (18) connected to the travel pedal (14) and a support (17) connected to the bracket with a spring pin (15). Gear 1 (20) is connected to the support. When the travel pedal is released while traveling, the spring forces the travel pedal to the neutral position. At this time gear 1 and gear 2 (19) inside the damper (16) receive resistance due to friction. The travel pedal gradually returns to neutral preventing a sudden stop due to sudden release of the travel pedal.

14— Travel Pedal
15— Spring Pin
16— Damper
17— Support
18— Bracket
19— Gear 2
20— Gear 1



TX1033296 —UN—02JAN08

Travel Pilot Pedal (shockless function)

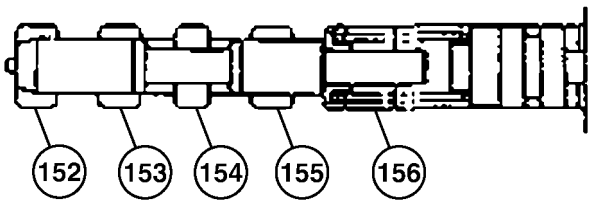
JA66566,0002642 -19-03AUG12-3/3

Bucket Flow Rate Pilot Valve (SK)

Bucket flow rate pilot valve is shifted by the pilot oil pressure (152) from arm in to port D and through the shuttle valves. The pilot valve routes pilot oil pressure from boom up (Port A) (155) to the bucket flow rate valve in the control valve. The bucket flow rate valve restricts the flow of supply oil to the bucket spool during arm in and boom up operation to ensure a flow of supply oil to the boom 1 spool.

152— Pilot Oil Pressure
153— To Hydraulic Oil Tank
154— To Bucket Flow Rate Valve
155— Pilot Oil Pressure from Boom Up
156— Spring

TX1086703 —UN—10JAN11



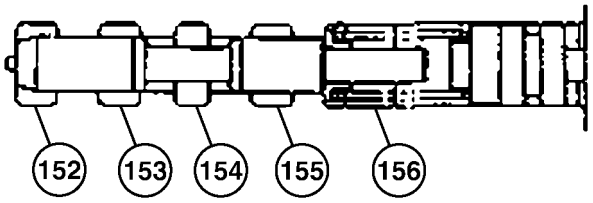
Bucket Flow Rate Pilot Valve

MM16284,0000FD2 -19-17DEC11-6/11

Travel Flow Combiner Pilot Valve (SL)

Travel flow combiner pilot valve is shifted by pilot oil pressure (152) from right travel to port L (right reverse) or port K (right forward) and through the shuttle valves. The pilot valve then routes control pressure pilot oil (155) from the swing park brake release pilot valve to the travel flow combiner valve in the control valve. The control pressure pilot oil is from the pilot shutoff solenoid valve port A4 to the pilot signal manifold through port PI. See Travel Flow Combiner Valve Operation. (Group 9025-05.)

TX1086703 —UN—10JAN11



Travel Flow Combiner Pilot Valve

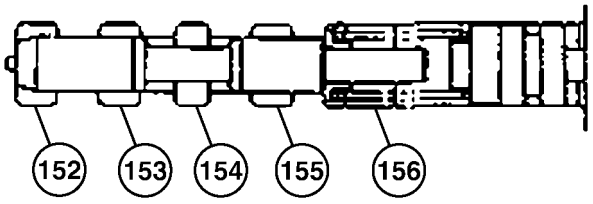
152— Pilot Oil Pressure
153— To Hydraulic Oil Tank
154— To Travel Flow Combiner Valve
155— Control Pressure Pilot Oil
156— Spring

MM16284,0000FD2 -19-17DEC11-7/11

Swing Park Brake Release Pilot Valve (SH)

Swing park brake release pilot valve is shifted by pilot oil pressure (152) from boom up to port A, boom down to port B, arm out to port C, arm in to port D, bucket curl to port G, bucket dump to port H, or auxiliary to port M or N and through the shuttle valves. The pilot valve routes control pressure pilot oil (155) out port SH to the swing motor park brake piston through port SH. The control pressure pilot oil is from the pilot shutoff solenoid valve port A4 to the pilot signal manifold through port PI. See Swing Motor Park Brake Release Circuit Operation. (Group 9025-05.)

TX1086703 —UN—10JAN11



Swing Park Brake Release Pilot Valve

152— Pilot Oil Pressure
153— To Hydraulic Oil Tank
154— To Travel Flow Combiner Valve
155— Control Pressure Pilot Oil
156— Spring

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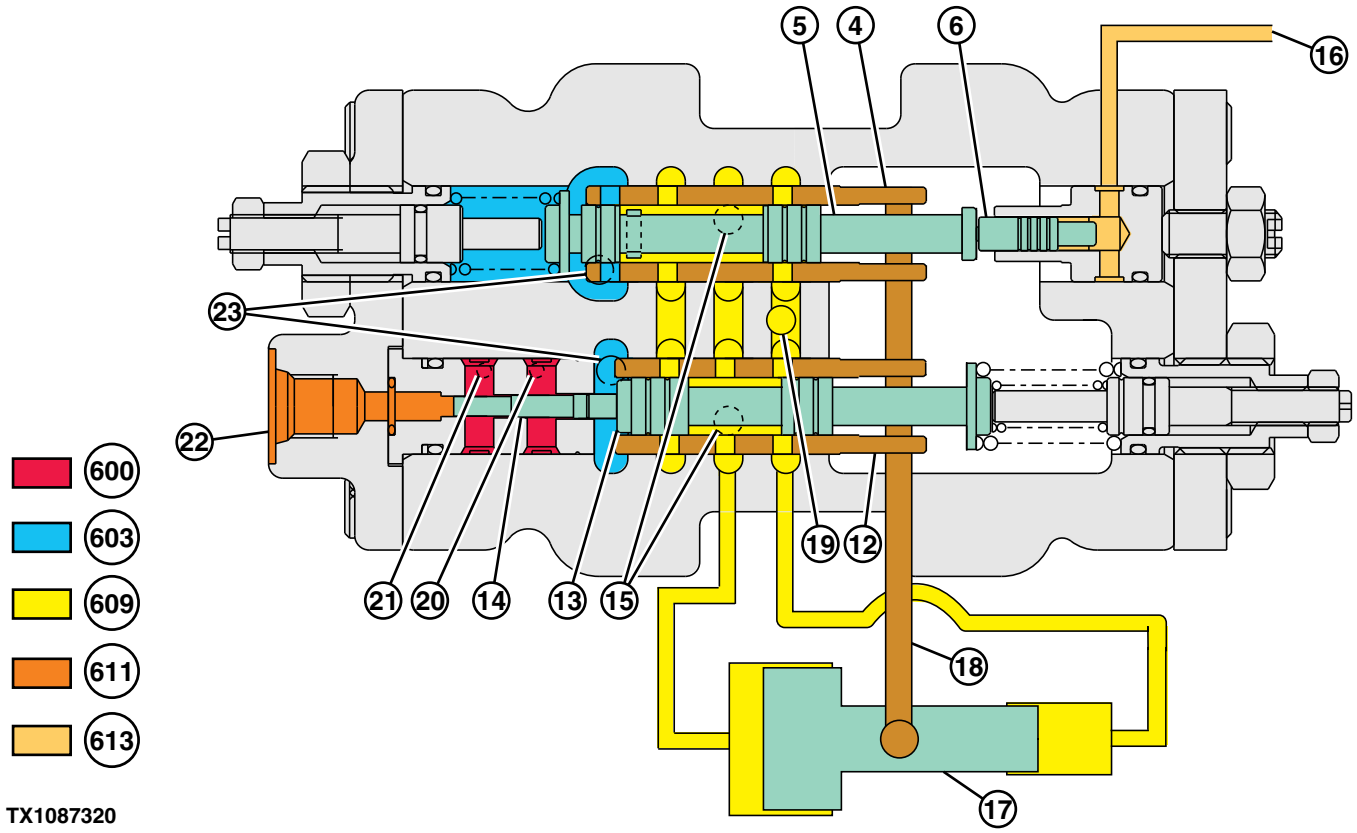
MM16284,0000FD2 -19-17DEC11-8/11



Pump Regulator Control by Speed Sensing Pilot Oil—Decreasing

4— Remote Control Sleeve
5— Remote Control Spool
6— Piston
12— Load Sleeve
13— Load Spool
14— Load Piston
15— To Large End of Servo Piston
16— From Pump 1 or Pump 2 Flow Rate Pilot Valve (SA or SB)
17— Servo Piston
18— Feedback Link
19— Pilot Oil Inlet
20— Pump 1 Pressure Inlet
21— Pump 2 Pressure Inlet
22— Torque Sensing Port
23— Return to Pump Housing
600— Supply Oil
603— Return or Pressure-Free Oil
609— Pilot Oil
611— Torque Sensing Pilot Oil
613— Flow Rate Valve Pilot Oil

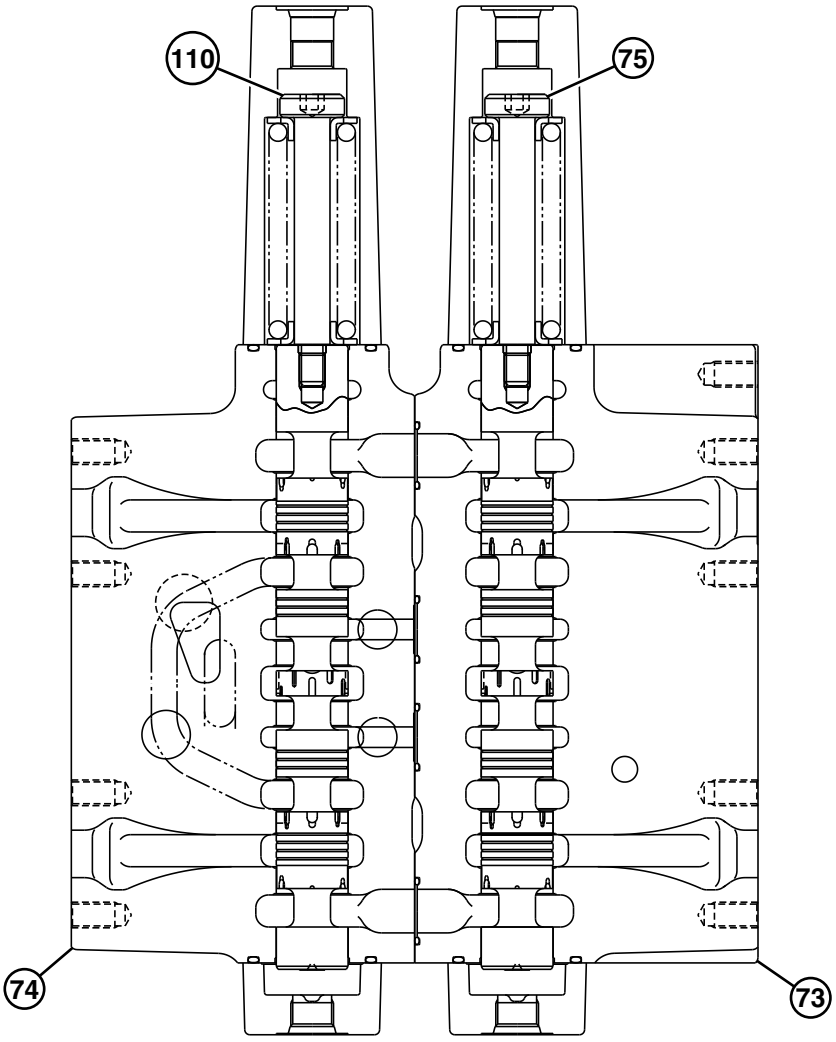
Pump Regulator Control by Speed Sensing Pilot Oil—As engine speed changes, the main controller calculates speed difference between target and actual engine speed. Main controller then actuates torque control solenoid valve to increase or decrease torque sensing pilot oil (611) pressure to torque sensing port (22) and load piston (14).

As load on engine increases, speed difference between target and actual engine speed increases. Main controller decreases voltage to torque control solenoid valve, which increases torque sensing pilot oil pressure to load piston. Torque sensing pilot oil along with supply oil pressure shifts load spool so pilot oil (609) flows to large end of servo piston (15), decreasing flow rate (displacement). As flow rate of both pumps decreases, load on engine also decreases allowing actual engine speed to increase.

As load on engine decreases, speed difference between target and actual engine speed decreases. Main controller increases voltage to torque control solenoid valve, which decreases torque sensing pilot oil pressure to load piston. Spring shifts load spool in response to decreasing torque sensing pilot oil pressure, releasing oil from large end of servo piston to return in pump housing (23) allowing pump displacement to increase. As pump flow rate increases engine output is used more efficiently.

Also, actuating travel function at slow engine speed causes pump flow rate to increase. Flow rate is increased to prevent mistracking, which may occur at lower flow rate if there are any differences between pump 1 and pump 2 flow rates. Main controller processes voltage signals from engine speed dial, travel pressure sensor, and pump 1 and pump 2 pressure sensors. Main controller sends an increasing voltage to torque control solenoid valve, which decreases torque sensing pilot oil pressure to load piston. Springs shift load spool in response to decreasing torque sensing pilot oil pressure, releasing oil from large end of servo piston allowing pump flow rate (displacement) to increase. At increased flow rate, machine does not mistrack at slow engine speed. Increased flow rate continues even if dig function is actuated while traveling at slow engine speed. See Engine Speed Sensing Control Circuit Operation. (Group 9025-05.)

MM16284,0000FD4 -19-13MAR18-5/5



TX1156513 —UN—20MAR14

TX1156513

Left and Right Travel Valve Cross Section From Rear

73— Right Control Valve (4-spool) 74— Left Control Valve (5-spool) 75— Right Travel Spool
110— Left Travel Spool

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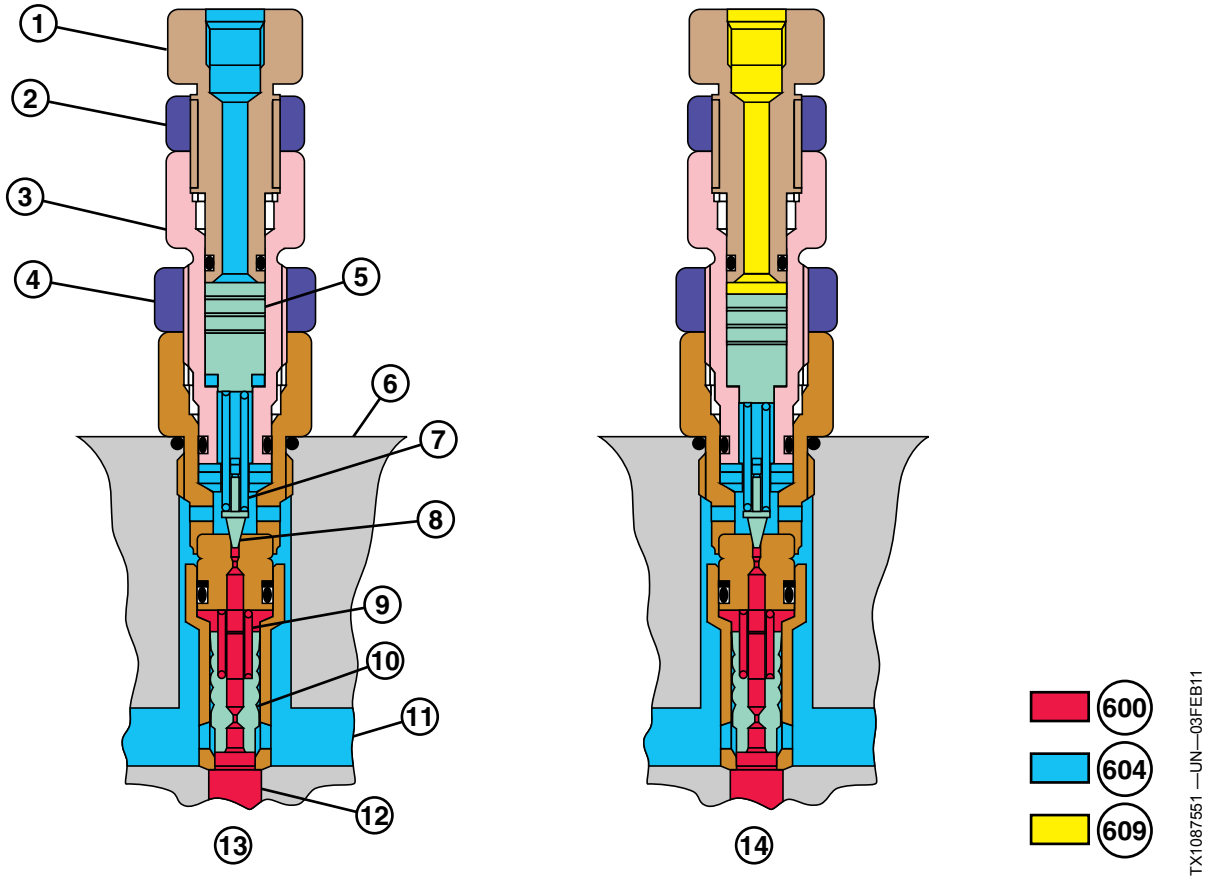
DF89619,00B5748 -19-08AUG16-9/16

Main Relief Valve Circuit Operation



TX1087551

Main Relief and Power Dig Valve

1— First Adjusting Plug
2— 27 mm Nut
3— Second Adjusting Plug
4— 32 mm Nut
5— Piston
6— Left Control Valve Housing
7— Pilot Poppet Spring
8— Pilot Poppet
9— Main Poppet Spring
10— Main Poppet
11— Return Passage
12— Power Passage
13— Normal Operation
14— Power Dig Operation
600— High-Pressure Oil
604— Return Oil
609— Pilot Oil

Main Relief and Power Dig Valve (117)—The function of the main relief and power dig valve is to limit the main hydraulic system operating pressure. Main relief and power dig valve is pilot operated, poppet type relief valve with a piston (5).

When the high-pressure oil (600) in the power passage (12) exceeds the relief valve pressure setting, pilot poppet (8) is pushed off its seat letting oil behind main poppet (10) flow to the return passage (11). A pressure difference is created across main poppet because oil flows out faster than oil can flow through orifice in the poppet. The main poppet is pushed open to relieve pressure oil to return passage.

For power dig operation (14), pilot oil (609) from the power dig/travel speed solenoid pushes the piston down to the bottom of its bore, increasing the pressure setting of pilot poppet spring (7). The main hydraulic system now operates at a higher operating pressure for approximately 8 seconds.

Main relief valve isolation check valves are used in the left and right control valve to route the higher high-pressure oil to the main relief and power dig valve. The higher pressure closes an isolation check valve against the lower pressure so it cannot flow to the lower pressure side. The higher pressure is then sensed by the main relief and power dig valve. For main relief valve isolation check valves, see Control Valve Check Valves Identification and Operation (Group 9025-05.)

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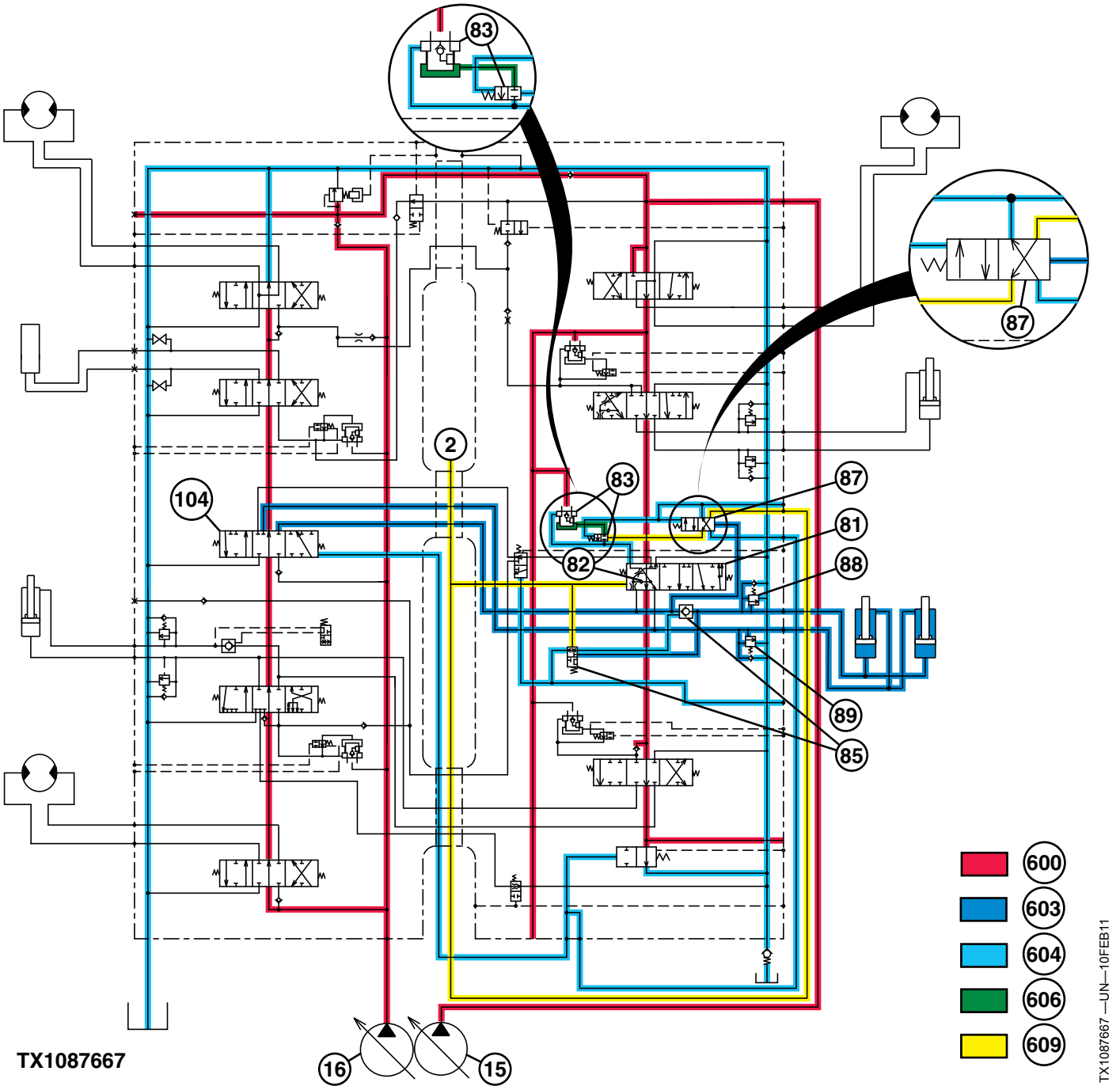
DF89619,00B58AD -19-19JAN16-1/4

Boom Lower Meter-In Cut Valve Operation



Boom Lower Meter-In Cut Valve Circuit Operation Schematic

2— Boom Down (pilot)
15— Pump 1
16— Pump 2
81— Boom 1 Spool
82— Boom Regenerative Valve
83— Boom Flow Rate Control Valve (switch valve and poppet)
85— Boom Reduced Leakage Valve
87— Boom Lower Meter-In Cut Valve
88— Boom Up Circuit Relief and Anticavitation Valve
89— Boom Down Circuit Relief and Anticavitation Valve
104— Boom 2 Spool
600— Supply Oil
603— Regenerative Oil
604— Return Oil
606— Trapped Oil
609— Control Pilot Oil

The boom lower meter-in cut valve (87), located in the boom lower circuit, controls the boom flow rate control valve (83) and control pilot oil (609) to the boom 2 spool (104).

Continued on next page

MM16284,0000FDA -19-10FEB11-1/3

1— Boom Up (pilot)
3— Arm Out (pilot)
4— Arm In (pilot)
5— Swing Left (pilot)
6— Swing Right (pilot)
15— Pump 1 (4-spool)
16— Pump 2 (5-spool)
43— From Arm 1 Flow Rate Pilot Valve (port SE)
52— Swing Motor
75— Right Travel Spool
76— Bucket Spool
81— Boom 1 Spool
90— Arm 2 Spool
91— Arm 2 Flow Rate Control Valve (valve and poppet)
94— Arm Regenerative Valve
95— Swing Spool
97— Arm 1 Spool
98— Arm 1 Flow Rate Control Valve (valve and poppet)
99— Check Valve (lift check)—Arm 1 Regenerative Circuit
104— Boom 2 Spool
107— Auxiliary Spool
110— Left Travel Spool
117— Main Relief and Power Dig Valve
127— Arm Cylinder
600— High-Pressure Oil
602— Low-Pressure Oil
604— Return Oil
606— Trapped Oil
609— Pilot Oil
610— Regenerative Oil
650— Voltage Signal
A3—Main Controller (MCZ)
B30— Boom Up Pressure Sensor (marked P11)
B31— Arm In Pressure Sensor (marked P12)
B33— Swing Pressure Sensor (marked S3)
B35— Pump 1 Delivery Pressure Sensor (marked PP1)
B37— Pump 2 Delivery Pressure Sensor (marked PP2)
DD—To Solenoid Valve Manifold Port DD
DE—To Solenoid Valve Manifold Port DE
Y23— Arm Regenerative Solenoid (marked SC)

The arm regenerative valve (94) improves arm control and prevents arm cylinder (127) cavitation during arm in operation by combining return oil from arm cylinder rod end with the pump supply oil to the arm cylinder.

The main controller (MCZ) (A3) sends a voltage signal (650) to arm regenerative solenoid (Y23) to energize the coil under the following conditions:

- Low-pressure at pump 1 delivery pressure sensor (B35) or pump 2 delivery pressure sensor (B37)
- High-pressure (arm in fully actuated) at arm in pressure sensor (B31)
- Pressure at swing pressure sensor (B33) or boom up pressure sensor (B30)

See Main Controller (MCZ) Circuit Theory of Operation. (Group 9015-15.)

The solenoid valve then routes pilot oil (609) to shift the arm regenerative valve and arm 2 flow rate control valve (91) switch valve. The return oil (604) route from arm cylinder (127) rod end to tank is blocked while arm regenerative valve is shifted, causing pressure to rise. Return oil pressure opens check valve (99) and is combined with supply oil from pump 2 (16). Regenerative oil (610) and supply oil flows through arm 1 spool (97) and is routed to arm cylinder head end increasing cylinder speed and preventing cavitation.

For more information on arm 2 flow rate control valve, see Arm 2 Flow Rate Control Valve Circuit Operation. (Group 9025-05.)

Continued on next page

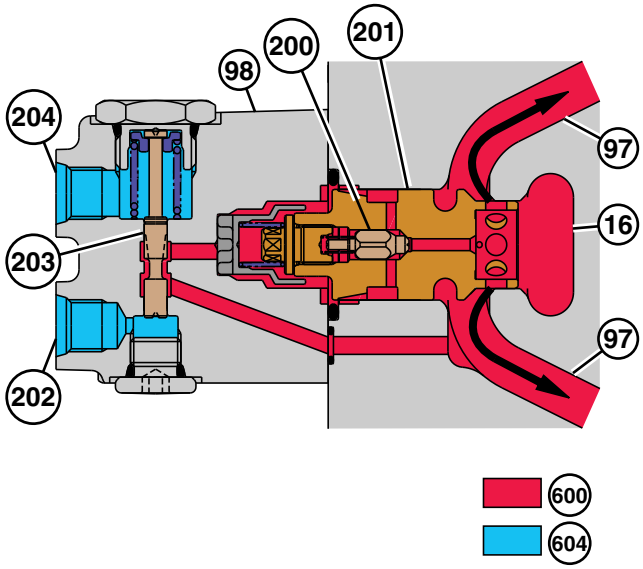
4— Arm In Pilot
5— Swing Left Pilot
15— Pump 1
16— Pump 2
52— Swing Motor
90— Arm 2 Spool
95— Swing Spool
97— Arm 1 Spool
98— Arm 1 Flow Rate Control Valve (switch valve and poppet)
102— Arm In Circuit Relief and Anticavitation Valve
103— Arm Out Circuit Relief and Anticavitation Valve
600— Supply Oil
602— Restricted Supply Oil
604— Return Oil
606— Trapped Oil
609— Pilot Oil
SE—From Pilot Signal Manifold (port SE)

The function of arm 1 flow rate control valve (switch valve and poppet) (98) is to restrict the flow of supply oil (600) from pump 2 (16) to the arm 1 spool (97) to ensure a priority flow of supply oil to the swing spool (95) during combined operation.

MM16284,0000FE0 -19-18JAN16-2/4

Normal Operation—Supply oil (600) from pump 2 opens the check valve (200) in the poppet (201) of arm 1 flow rate control valve because the switch valve (203) is open. Supply oil flows through the check valve and switch valve to the arm 1 spool (97). As the load increases, the pressure increases pushing the poppet open and supply oil flows through the poppet to arm 1 spool.

16— From Pump 2
97— To Arm 1 Spool
98— Arm 1 Flow Rate Control Valve
200— Check Valve
201— Poppet
202— To Solenoid Valve Manifold (port DE)
203— Switch Valve
204— From Arm 1 Flow Rate Pilot Valve (port SE)
600— Supply Oil
604— Return Oil



Arm 1 Flow Rate Control Valve Normal Operation

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MM16284,0000FE0 -19-18JAN16-3/4

1— Boom Up (pilot)
2— Boom Down (pilot)
3— Arm Out (pilot)
4— Arm In (pilot)
15— Pump 1
16— Pump 2
36— Hydraulic Oil Cooler
73— Right Control Valve (4-spool)
74— Left Control Valve (5-spool)
75— Right Travel Spool
76— Bucket Spool
81— Boom 1 Spool
82— Boom Regenerative Valve
83— Boom Flow Rate Control Valve (valve and poppet)
84— Dig Regenerative Valve
85— Boom Reduced Leakage Valve (valve and check valve)
86— Orifice
87— Boom Lower Meter-In Cut Valve
90— Arm 2 Spool
91— Arm 2 Flow Rate Control Valve (valve and poppet)
93— Bypass Shutoff Valve
95— Swing Spool
97— Arm 1 Spool
104— Boom 2 Spool
107— Auxiliary Spool
110— Left Travel Spool
117— Main Relief and Power Dig Valve
124— Oil Cooler Bypass Valve
125— Boom Cylinder (2 used)
127— Arm Cylinder
128— Check Valve
600— High-Pressure Oil
602— Low-Pressure Oil
604— Return Oil
606— Trapped Oil
609— Pilot Oil
610— Regenerative Oil
B30— Boom Up Pressure Sensor
B31— Arm In Pressure Sensor
DD—To Solenoid Valve Manifold Port DD

The purpose of the boom flow rate control valve (valve and poppet) (83) is to restrict supply oil in the circuit to ensure that there is sufficient supply oil for other functions during boom down and to restrict supply oil through boom 1 spool (81) during boom down so that boom regenerative valve (82) in boom 1 spool works properly.

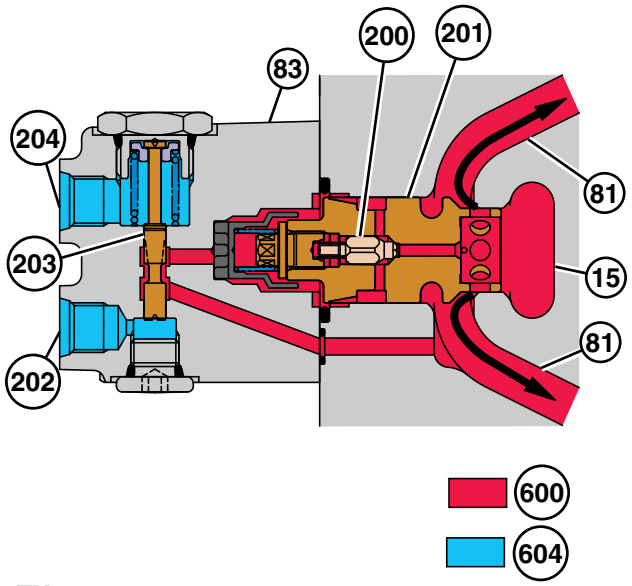
During boom down, the boom flow rate control valve restricts supply oil flow to the boom 1 spool from pump 1 (15).

During boom down and other functions, the boom lowers due to its own weight by the boom regenerative circuit and uses supply oil from the pump for other functions. This ensures that other functions maintain normal operation. See Boom Regenerative Valve Circuit Operation. (Group 9025-05.)

DF89619,00B574B -19-20JAN16-2/4

Normal Operation—When boom down is actuated, supply oil flows to the 4-spool side of the control valve from pump 1 (15). Supply oil opens the check valve (200) in the poppet (201) of the boom flow rate control valve (83) because the switch valve (203) is open due to no pilot oil pressure. Supply oil flows through boom flow rate control valve without any restriction and continues on to the boom 1 spool (81).

15— From Pump 1
81— To Boom 1 Spool
83— Boom Flow Rate Control Valve
200— Check Valve
201— Poppet
202— To Solenoid Valve Manifold Port DD
203— Switch Valve
204— From Boom Lower Meter-In Cut Valve
600— High-Pressure Oil
604— Return Oil



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Boom Flow Rate Control Valve Normal Operation

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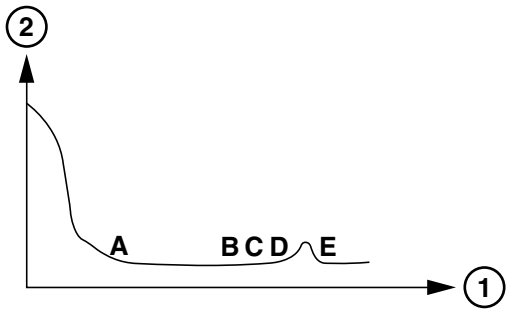
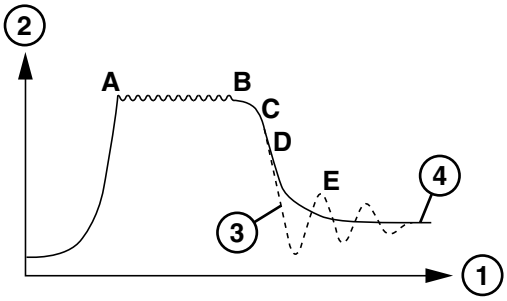


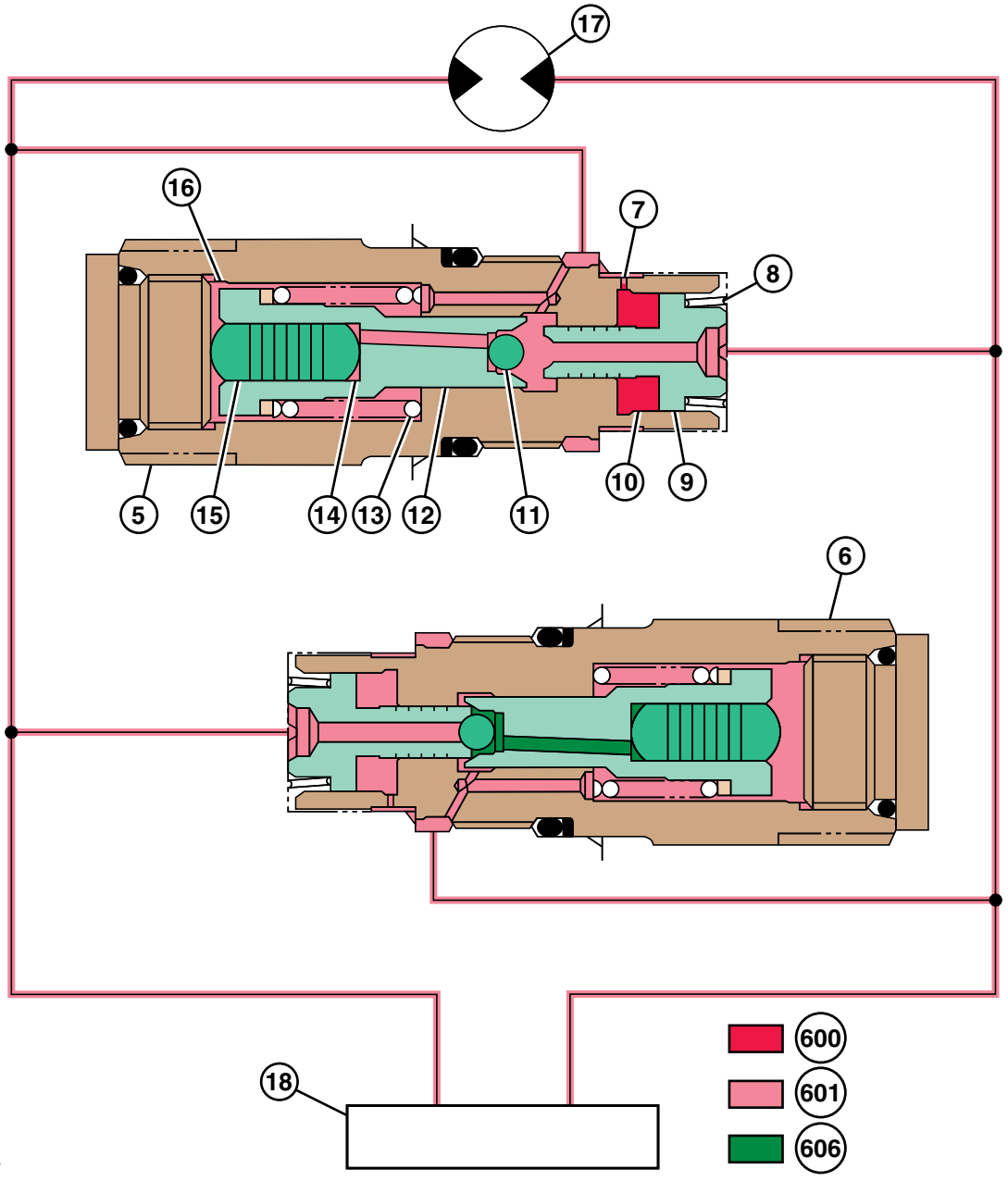
TX1014236 —UN—20NOV06

Time to Pressure Output Curve for Inlet Side



TX1014237 —UN—20NOV06

Time to Pressure Output Curve for Return Side



TX1088167 —UN—18FEB11

TX1088167

Swing Damper Valves—Pressure Begins to Decrease

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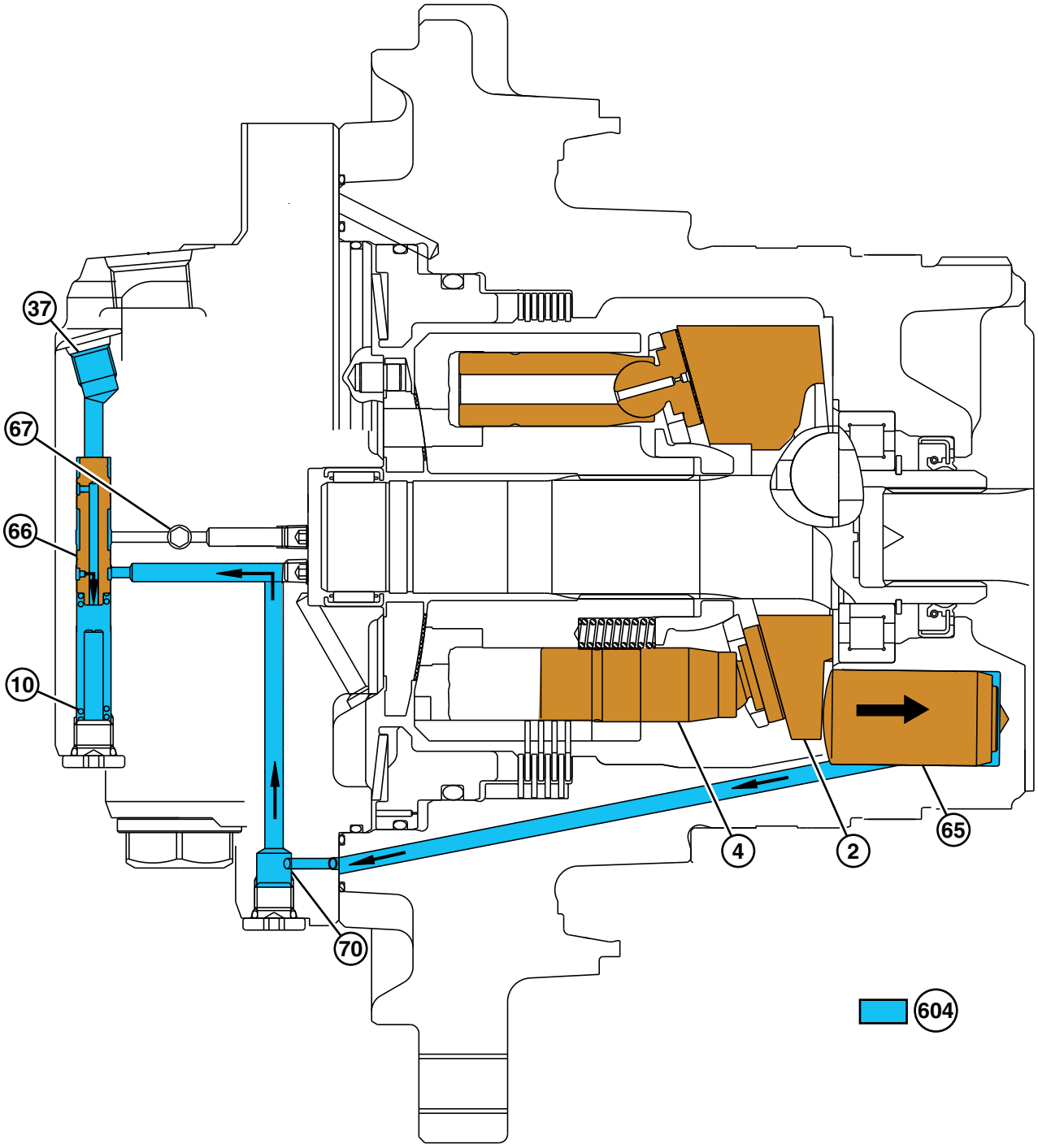
MM16284,0000FE7 -19-19JAN16-3/8



TX1088188 —UN—17FEB11

TX1088188

Travel Motor Slow Speed Operation

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MM16284,0000FEA -19-08MAR11-4/9

Auxiliary System Operation

NOTE: For auxiliary attachments to work properly multiple kits may be required.

The auxiliary system consist of a pilot control system to shift the auxiliary control valve spool. The shifted auxiliary control valve spool allows high pressure oil flow to work port of the auxiliary attachment depending on attachment and kits installed.

The following kits are available for auxiliary attachments:

- Auxiliary High Flow Line Kit, for more information, see Auxiliary High Flow Line Kit Operation. (Group 9025-05.)
- Two Pump Combined Flow Kit, for more information, see Two Pump Combined Flow Kit Operation. (Group 9025-05.)
- Low Flow Kit, for more information, see Low Flow Kit Operation. (Group 9025-05.)
- Secondary Auxiliary Relief Kit, for more information, see Secondary Auxiliary Relief Kit Operation. (Group 9025-05.)
- Two Way Solenoid Kit Operation, for more information, see Two Way Solenoid Kit Operation. (Group 9025-05.)
- Two Way Foot Pedal Kit.
- One Way Foot Switch.

For more information on attachment and required kits to operate go to info to go at www.dealernet.deere.com.

JJ03229,0000AE2 -19-19JUN14-1/1

Auxiliary Pilot Control Valve Operation

The auxiliary pilot control valve regulates the pilot oil pressure to actuate the pilot valve in the pilot signal manifold and to shift the auxiliary control valve spool to actuate the auxiliary functions.

See Pilot Signal Manifold Operation for pilot valve operation. (Group 9025-05.)

See Pilot Operation of Control Valve Operation for control valve operation. (Group 9025-05.)

Continued on next page

DF89619,00B572D -19-16OCT15-1/9

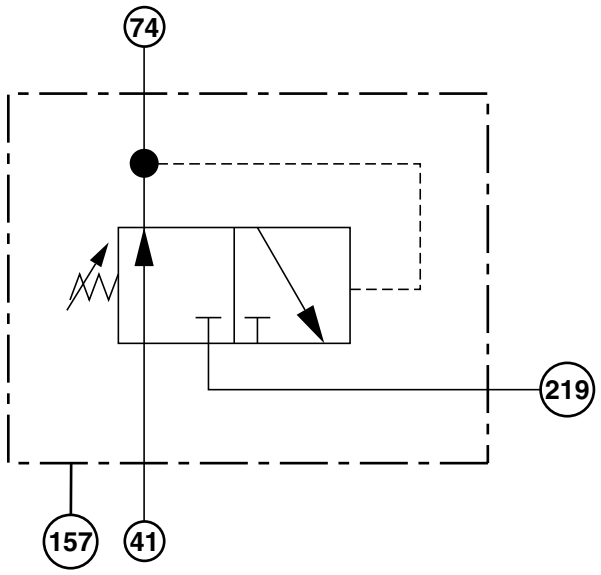
Flow Rate Pressure Reducing Valve Operation

The function of the flow rate reducing valve (157) is to control the amount of pump 1 flow that is directed to the auxiliary spool when combining auxiliary with a pump 1 function.

Pilot pressure is sent from pilot signal manifold port SN (41) when a pump 1 function is activated. The pilot oil is then routed through the flow rate pressure reducing valve (157) to control valve port SN (74). This shifts the auxiliary flow combiner valve to stop the flow of pump 1 high-pressure oil to the auxiliary spool, “de-combining” the flow. Flow rate reducing valve is adjustable, turn counterclockwise to give auxiliary priority flow over pump 1 functions or clockwise to give pump 1 functions priority over auxiliary.

When pilot oil pressure to control valve port SN exceeds set pressure of flow rate reducing valve, the valve shifts allowing pilot oil to control valve port SN to flow to hydraulic oil tank (219) allowing the auxiliary flow combiner valve to shift combining pump 1 and pump 2 high-pressure oil flow.

For more information, see Two Pump Combined Flow Kit Operation. (Group 9025-05.)



TX1135893 —UN—22MAY13

Flow Rate Pressure Reducing Valve Schematic

41— From Pilot Signal Manifold Port SN
74— To Control Valve Port SN
157— Flow Rate Reducing Valve
219— To Hydraulic Oil Tank

JJ03229,0000AE5 -19-19JUN14-1/1

Secondary Auxiliary Relief Valve Solenoid Valve Operation

The function of the secondary auxiliary relief valve solenoid valve (158) is to shift secondary auxiliary relief control valve to open or close high-pressure oil flow to secondary auxiliary relief valve.

The secondary auxiliary relief valve solenoid valve is controlled by settings in MP Dr and Service ADVISOR™. See Attachment Control Circuit Theory of Operation. (Group 9015-15.)

When the secondary auxiliary relief valve solenoid valve (158) is activated, valve is shifted and pilot oil from solenoid valve manifold port PE (218) is sent to secondary auxiliary relief control valve (160). This shifts the secondary auxiliary relief control valve to route high-pressure oil to the secondary auxiliary relief valve.

When the secondary auxiliary relief valve solenoid valve is deactivated, spring tension shifts the valve. Pilot oil to secondary auxiliary relief control valve is sent to hydraulic oil tank (219). This shifts the secondary auxiliary relief control valve to stop routing high-pressure oil to the secondary auxiliary relief valve.

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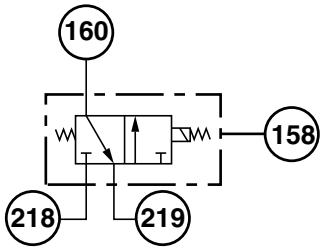


TX1136497 —UN—16MAY13

Secondary Relief Valve Solenoid Valve

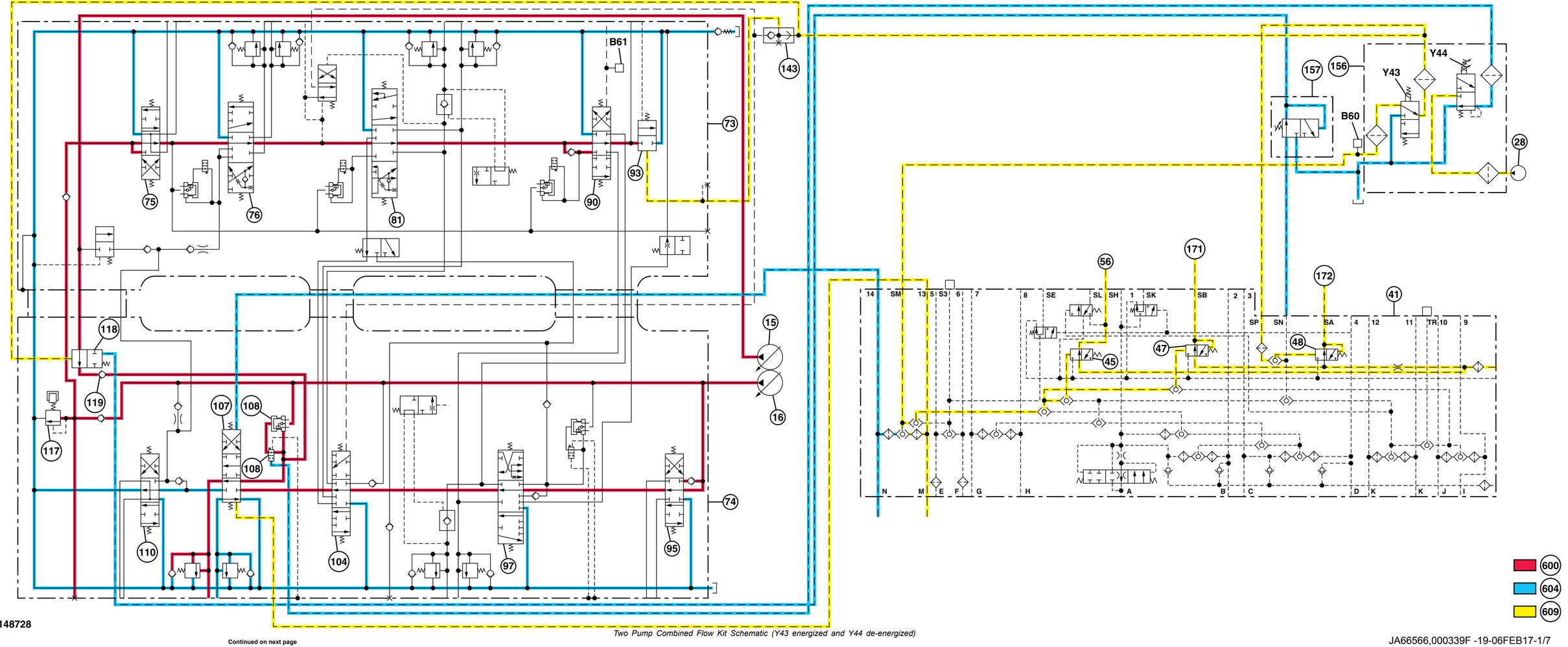
158— Secondary Auxiliary Relief Valve Solenoid Valve
160— To Secondary Auxiliary Relief Control Valve
218— From Solenoid Valve Manifold Port PE
219— To Hydraulic Oil Tank

For more information, see Secondary Auxiliary Relief Kit Operation. (Group 9015-15.)

JJ03229,0000AE6 -19-19JUN14-1/1

Two Pump Combined Flow Kit Operation

TX1148728 —UN—04DEC13



TX1148728

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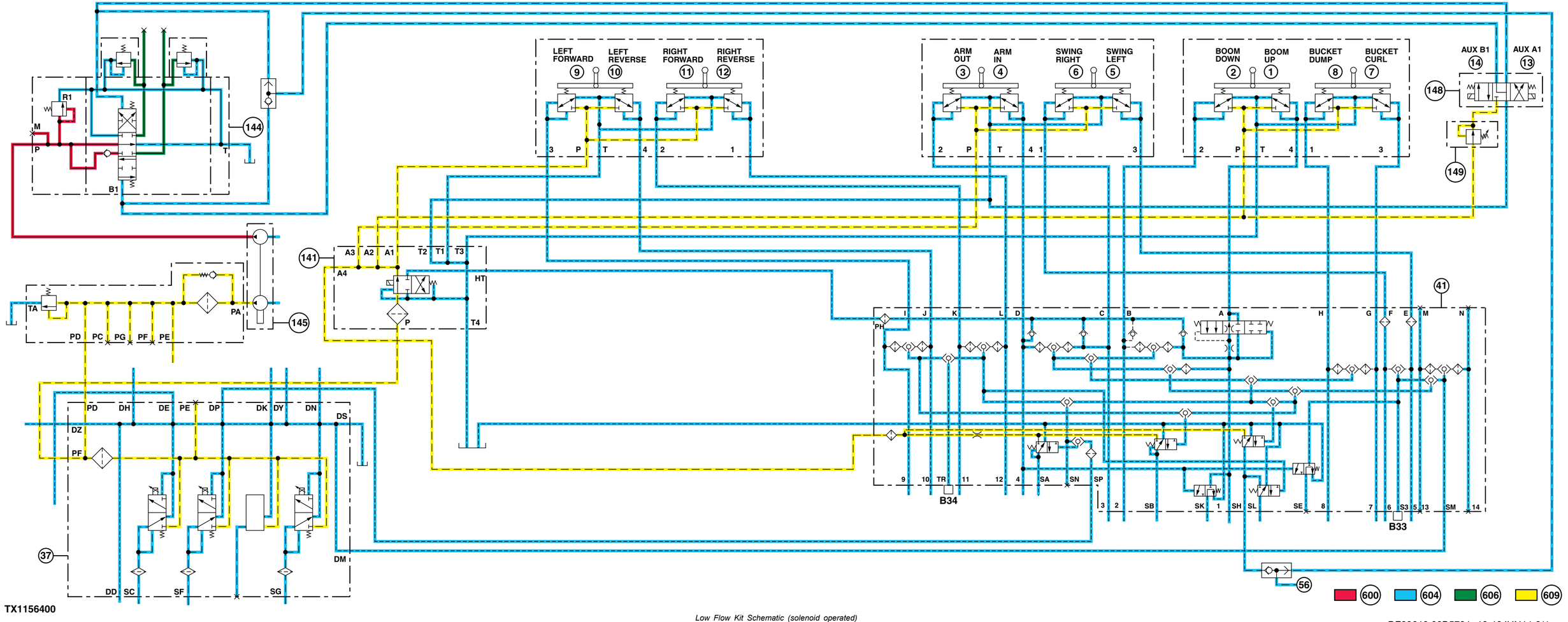
Two Pump Combined Flow Kit Schematic (Y43 energized and Y44 de-energized)

JA66566,000339F -19-06FEB17-1/7

TX1156400 —UN—26MAR14



TX1156400

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Low Flow Kit Schematic (solenoid operated)

DF89619,00B5731 -19-19JUN14-3/4

1 Cylinder Drift	Verify proper operation of machine cylinders. See Cylinder Drift Test—Boom, Arm, and Bucket. (Group 9025-25.) Does cylinder drift meet specification?	**YES:** Checks complete. **NO:** Go to Boom Manual Lower Screw Loose.

DF89619,00B57A6 -19-06AUG14-3/8

2 Boom Manual Lower Screw Loose	Inspect boom manual lower screw. See Lower Boom With Engine Stopped. (Operator's Manual.) Is boom manual lower screw tightened to specification?	**YES:** Go to Circuit Relief Valve Setting Too Low or Malfunctioning. **NO:** Tighten boom manual lower screw to specification.

DF89619,00B57A6 -19-06AUG14-4/8

3 Circuit Relief Valve Setting Too Low or Malfunctioning	Check circuit relief valve drifting function. Swap circuit relief valves for a particular function. Does cylinder drift continue on same function?	**YES:** Go to Reduced Leakage Valve. **NO:** Adjust, repair, or replace circuit relief valve. See Circuit Relief Valve Test and Adjustment. (Group 9025-25.) See Control Valve (5-Spool) Disassemble and Assemble and see Control Valve (4-Spool) Disassemble and Assemble. (Group 3360.)

DF89619,00B57A6 -19-06AUG14-5/8

4 Reduced Leakage Valve	*NOTE: Reduced leakage valve check should only be completed on machines showing symptoms of arm in or boom down cylinder drift.* Inspect reduced leakage valve pilot valve and poppet. For component identification, see Control Valve Operation. (Group 9025-05.) See Control Valve (5-Spool) Disassemble and Assemble and see Control Valve (4-Spool) Disassemble and Assemble. (Group 3360.) Is reduced leakage valve pilot valve or poppet scored or sticking?	 **YES:** Replace reduced leakage valve pilot valve or poppet. **NO:** Go to Control Valve Leakage.

DF89619,00B57A6 -19-06AUG14-6/8

5 Control Valve Leakage	Inspect control valve for leakage. See Hydraulic System Component Location. (Group 9025-15.) Is control valve free of leaks?	**YES:** Go to Cylinder Leakage. **NO:** Repair or replace control valve components. See Control Valve (5-Spool) Disassemble and Assemble and see Control Valve (4-Spool) Disassemble and Assemble. (Group 3360.)

Continued on next page

DF89619,00B57A6 -19-06AUG14-7/8

3 Drift Direction	Operate machine and check for drift in both directions. Does drift occur in both directions?	**YES:** Go to Case Drain Leakage. **NO:** Go to Swing Motor Make-Up Check Valve Leakage.

DF89619,00B57AA -19-12JUN14-5/11

4 Case Drain Leakage	Inspect swing motor for leakage. See Swing Motor Leakage Test. (Group 9025-25.) Does observed leakage meet specification?	**YES:** Go to Damper Valve Malfunction. **NO:** Repair or replace swing motor and park brake. See Swing Motor and Park Brake Remove and Install. (Group 4360.)

DF89619,00B57AA -19-12JUN14-6/11

5 Damper Valve Malfunction	Inspect swing motor dampener valves. See Swing Motor Damper Valve. (Group 9025-05.) Are damper valves OK?	**YES:** Checks complete. **NO:** Repair or replace damper valves. See Crossover Relief Valve and Make-Up Check Valve Remove and Install. (Group 4360.)

DF89619,00B57AA -19-12JUN14-7/11

6 Swing Motor Make-Up Check Valve Leakage	Inspect swing motor make-up check valves. See Swing Motor, Crossover Relief Valve, and Make-Up Check Valve Operation. (Group 9025-05.) Are swing motor make-up check valves OK?	**YES:** Go to Swing Motor Crossover Relief Valve Malfunction. **NO:** Repair or replace swing motor make-up check valves. See Crossover Relief Valve and Make-Up Check Valve Remove and Install. (Group 4360.)

DF89619,00B57AA -19-12JUN14-8/11

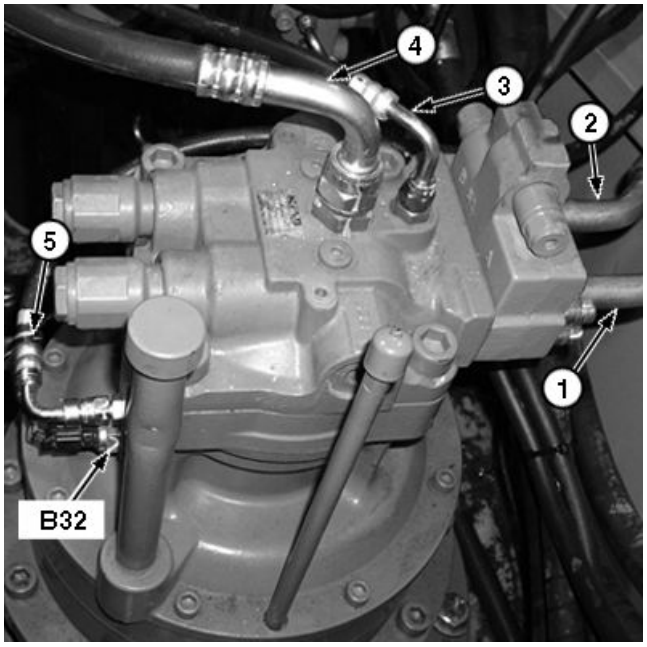
7 Swing Motor Crossover Relief Valve Malfunction	Remove crossover relief valves and install in opposite ports in park brake housing. See Crossover Relief Valve and Make-Up Check Valve Remove and Install. (Group 4360.) Does swing drift change directions?	**YES:** Repair or replace crossover relief valves. See Crossover Relief Valve and Make-Up Check Valve Remove and Install. (Group 4360.) **NO:** Checks complete.

Continued on next page

DF89619,00B57AA -19-12JUN14-9/11

Swing Motor Line Identification

1— From Control Valve Swing Left
2— From Control Valve Swing Right
3— To Hydraulic Oil Tank
4— To Control Valve
5— From Pilot Signal Manifold (port SH)
B32— Front Attachment Pressure Sensor



TX1107074A —UN—31JAN12

Swing Motor Line Identification

MM16284,00011FF -19-19DEC13-1/1

1— Port 1 to Boom Up Pilot Cap
3— Port 3 to Arm Out Pilot Cap
5— Port 5 to Swing Left Pilot Cap
8— Port 8 to Bucket Dump Pilot Cap
9— Port 9 to Left Travel Forward Pilot Cap
11— Port 11 to Right Travel Forward Pilot Cap
41— Control Valve Side of Pilot Signal Manifold
74— Control Valve (bottom)
B33— Swing Pressure Sensor
B34— Travel Pressure Sensot
S3— Swing Pressure Sensor Port
SL— Port (SL) to Travel Flow Combiner Valve
TR—Travel Pressure Sensor Port

JA66566,0002681 -19-03AUG12-4/4

28— Pilot Pump
37— Solenoid Valve Manifold
41— Pilot Signal Manifold
42— Boom Down Shockless Valve
44— Travel Flow Combiner Pilot Valve (port SL)
45— Swing Park Brake Release Pilot Valve (port SH)
46— Bucket Flow Rate Pilot Valve (port SK)
47— Pump 2 Flow Rate Pilot Valve (port SB)
56— To Swing Park Brake
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
93— Bypass Shutoff Valve
95— Swing Spool
97— Arm 1 Spool
104— Boom 2 Spool
107— Auxiliary Spool
110— Left Travel Spool
117— Main Relief
118— Auxiliary Function Flow Combiner Valve
120— Travel Flow Combiner Valve
164— Auxiliary Pilot Control Valve
171— To Pump 2 Flow Rate Solenoid Valve
604— Return Oil
609— Pilot Oil
B33— Swing Pressure Sensor (marked S3)
B34— Travel Pressure Sensor (marked TR)
B60— Attachment Pressure Sensor
Y22— Dig Regenerative Solenoid (marked SF)
Y23— Arm Regenerative Solenoid (marked SC)
Y24— Power Dig/Travel Speed Solenoid (marked SG)

Continued on next page

DF89619,00B5752 -19-19JUN14-2/14

15— Pump 1
16— Pump 2
28— Pilot Pump
41— Pilot Signal Manifold
45— Swing Park Brake Release Pilot Valve
47— Pump 2 Flow Rate Pilot Valve
48— Pump 1 Flow Rate Pilot Valve
56— To Swing Park Brake
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
93— Bypass Shutoff Valve
95— Swing Spool
97— Arm 1 Spool
104— Boom 2 Spool
107— Auxiliary Spool
108— Auxiliary Flow Rate Control Valve (valve and poppet)
110— Left Travel Spool
117— Main Relief and Power Dig Valve
118— Auxiliary Function Flow Combiner Valve
119— Check Valve—Auxiliary Flow Combiner Valve Circuit
143— Auxiliary Shuttle Valve
156— Flow Rate Select Solenoid Valve
157— Flow Rate Select Reducing Valve
171— To Pump 2 Flow Rate Solenoid Valve
172— To Torque Control Solenoid Valve
600— High-Pressure Oil
604— Return Oil
609— Pilot Oil
B60— Attachment Pressure Sensor
B61— Arm Out Pressure Sensor
Y43— 2-Speed Activation Solenoid Valve
Y44— Flow Rate Adjustment Solenoid Valve

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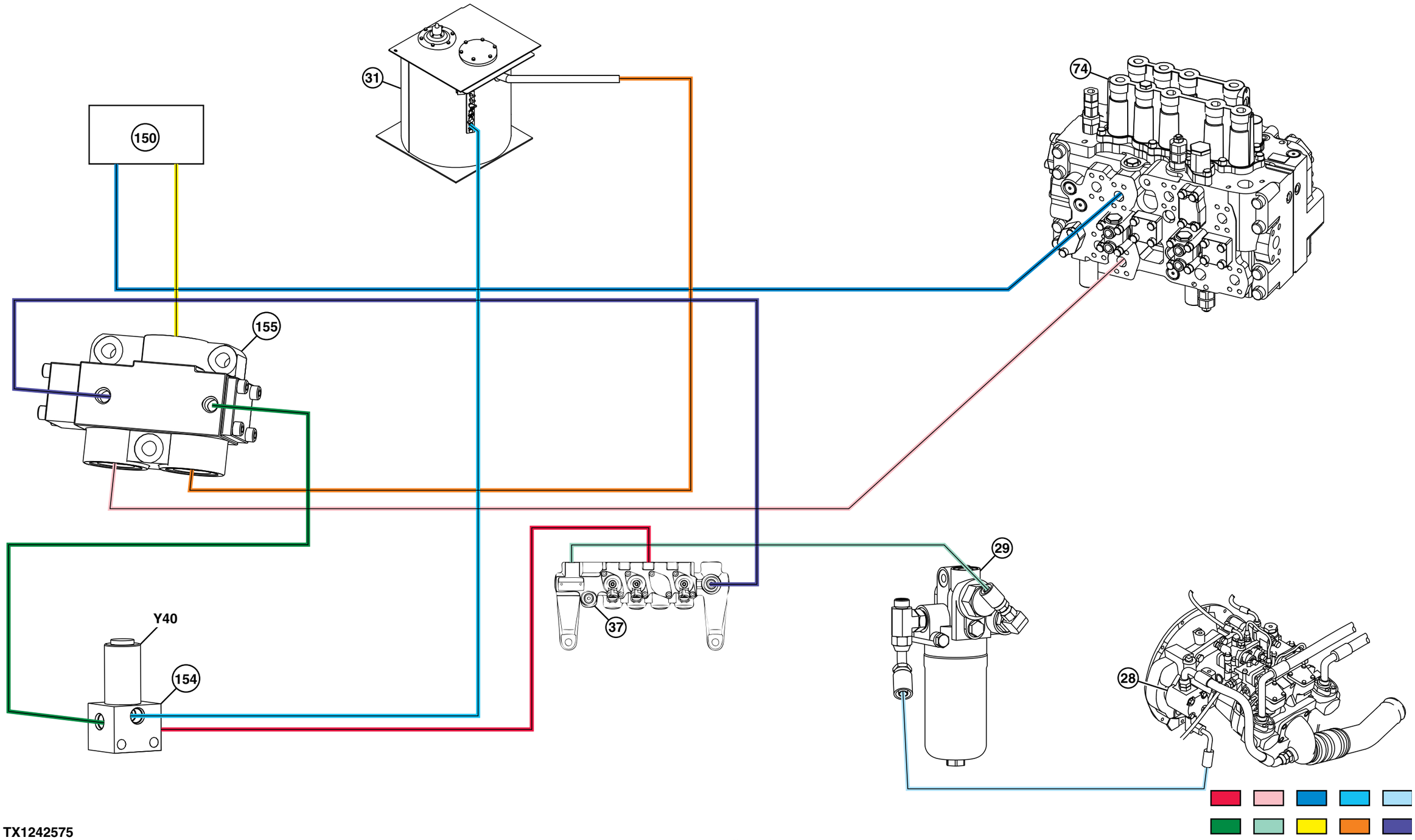
DF89619,00B5752 -19-19JUN14-8/14

Auxiliary System Line Connections

TX1242575 —UN—02AUG17



TX1242575

High Flow Line Connections

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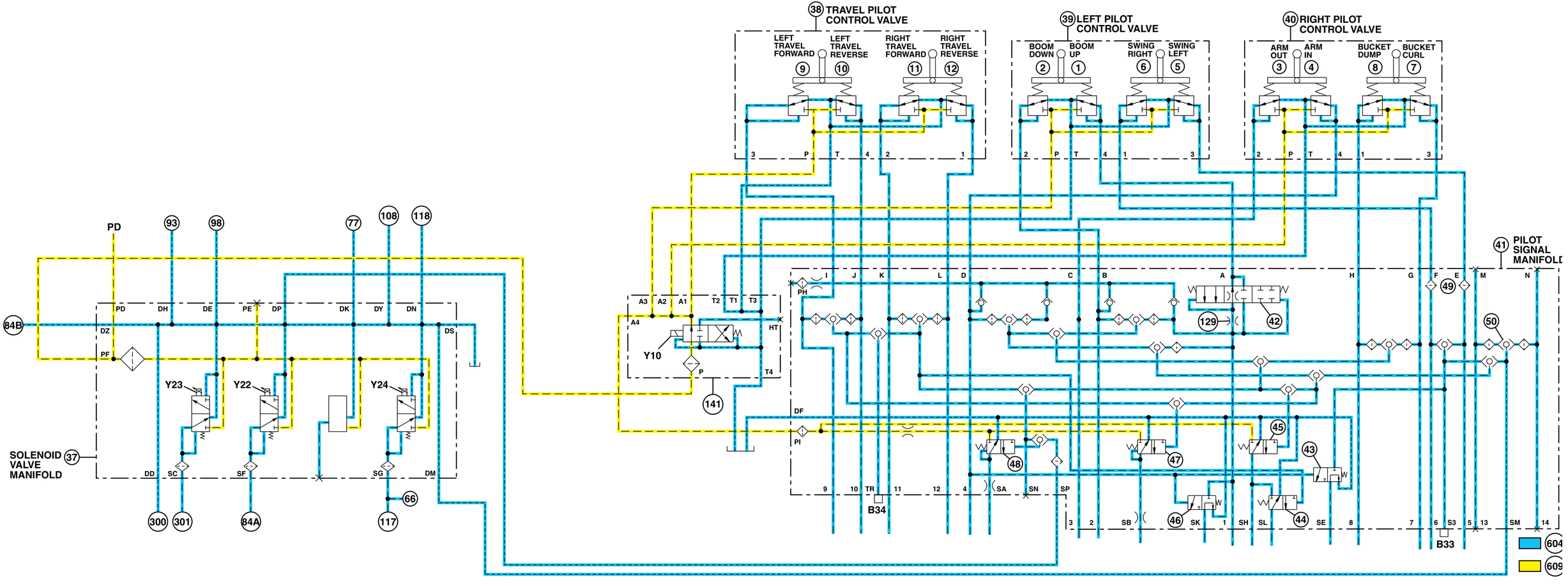
DF89619,00B565A -19-02AUG17-1/4

TX1248217 —UN—14DEC17



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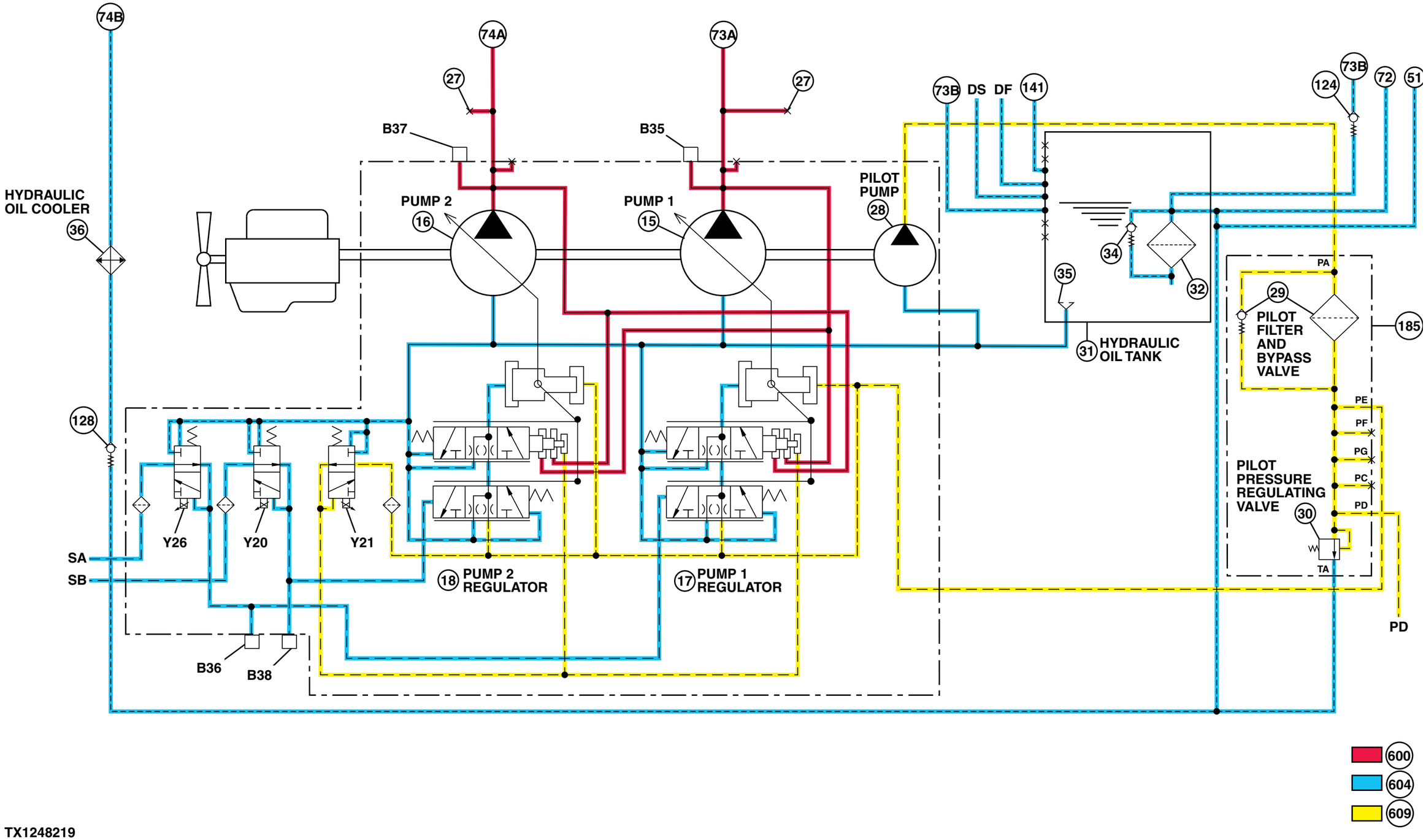
Pilot Control Valves and Pilot Signal Manifold Schematic—Backhoe Pattern

DF89619,00B68D2 -19-14FEB18-3/12

TX1248219 —UN—14DEC17



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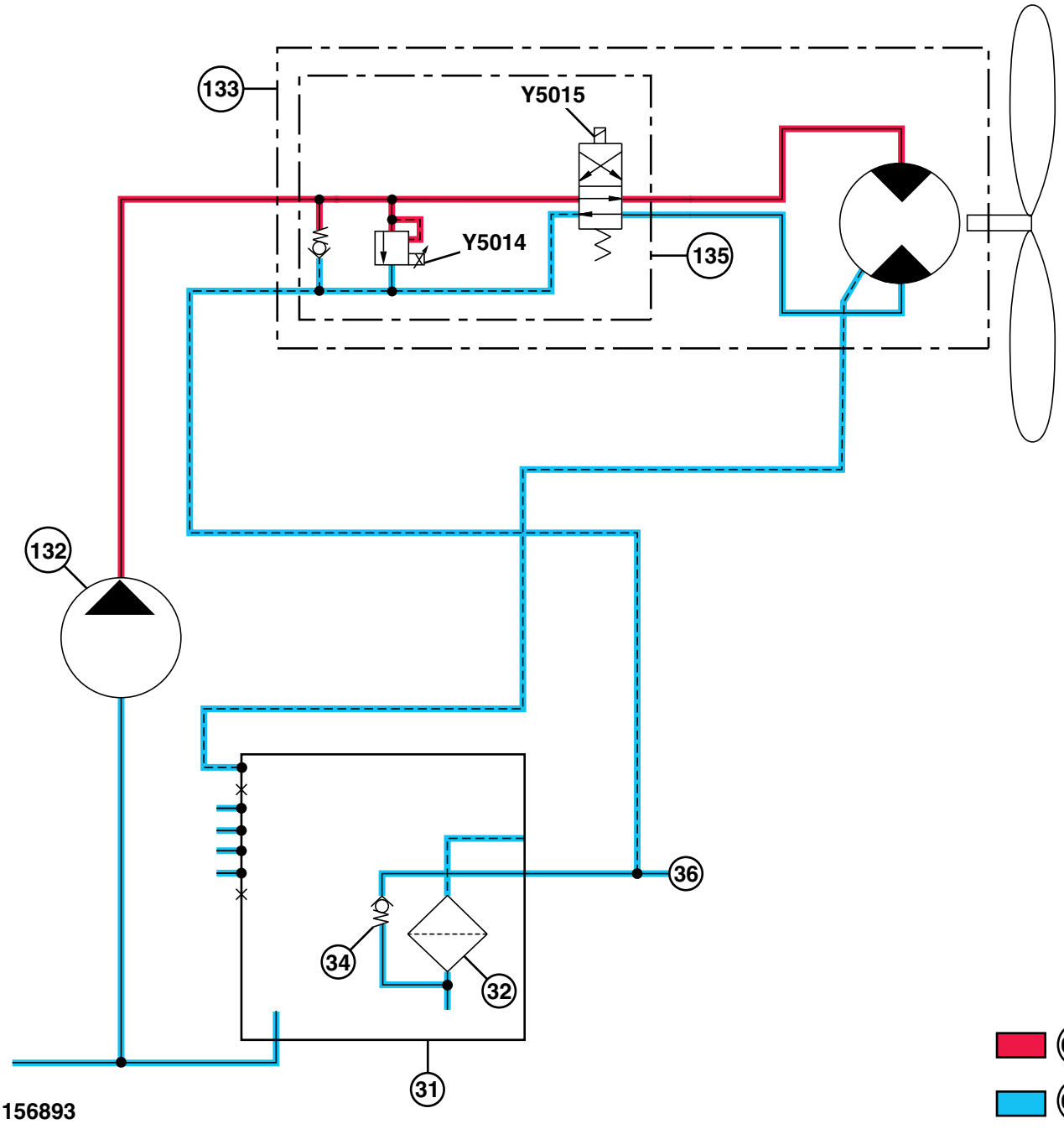
Hydraulic Oil Pumps and Regulators Schematic

DF89619,00B68D2 -19-14FEB18-11/12



Fan Drive Hydraulic System Schematic—Reversing (if equipped)

31— Hydraulic Oil Tank
32— Return Filter
34— Filter Bypass
36— From Hydraulic Oil Cooler
132— Fan Drive Pump
133— Fan Drive Motor
135— Fan Speed and Reversing Control Valve—If Equipped
600— High-Pressure Oil
604— Return Oil
Y9— Reversing Fan Solenoid Valve
Y5005—Proportional Fan Speed Solenoid Valve

DF89619,00B57C8 -19-07MAY14-2/2

If valve spool actuating pressure is not to specification check pilot system pressure. See Pilot Pressure Regulating Valve Test and Adjustment. (Group 9025-25.)

If pilot system pressure is to specification then check pressure at the solenoid valve manifold, pilot control shutoff solenoid valve, pilot controllers, and pilot signal manifold.

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DF89619,00B58B9 -19-29JUL15-2/2

7. Run machine at specification.

Specification

Hydraulic
Oil—Temperature.....45—55°C
110—130°F
Engine—Speed..... Fast Idle
Work Mode
Switch—Position..... Bucket Mode
Power Mode
Button—Position.....PWR (power) Mode
Auto-Idle
Switch—Position..... OFF

8. Actuate arm out function over relief. Record main relief pressure reading.
9. Actuate arm out function over relief while pressing power dig switch. Record power dig pressure reading.

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Pump Regulator Test and Adjustment—Maximum Flow

SPECIFICATIONS	
Hydraulic Oil Temperature	45—55°C 113—131°F
Hydraulic Oil	
End of Maximum Flow Adjusting Screw to 13 mm Nut Distance	3 mm
End of Maximum Flow Adjusting Screw to 13 mm Nut	0.125 in (1/8 in.)
Engine Speed	Fast Idle
Work Mode Switch Position	Bucket Mode
Power Mode Button Position	PWR (power) Mode
Auto-Idle Switch Position	OFF
Travel Speed Switch Position	Fast (rabbit)
Track Raised—3 Revolutions From a Running Start Cycle Time	24.7—28.7 s

SERVICE EQUIPMENT AND TOOLS
13 mm Combination Wrench
Flat Blade Screwdriver
Stop Watch
30 mm Combination Wrench

Purpose of test is to check and adjust the maximum flow rate of pump 1 and 2 using the cycle time for travel are approximately the same. Maximum flow rate cannot be significantly increased by turning out the flow adjusting cartridge.

1. Check and adjust track sag. See Maintenance—Check Track Sag in operator's manual.
2. Connect one of the following test equipment to monitor hydraulic oil temperature and actual engine speed.
   - Monitor application. See Service Menu for instruction to actuate the service menu on monitor in cab. (Group 9015-16.)
     Select the following items from monitoring list:
     - Hydraulic Oil Temperature
     - Actual Engine Speed
   - Service ADVISOR™ application. See Service ADVISOR™ Connection Procedure for instruction. (Group 9015-20.)
     Select the following items from the menu:
     - Hydraulic Oil Temperature
     - Actual Engine Speed
   - MPDr application. See MPDr Application for instruction. (Group 9015-20.)
     Select the following items from the monitor display:
     - Hydraulic Oil Temperature
     - Actual Engine Speed
3. Warm hydraulic oil to specification. See Hydraulic Oil Warm-Up Procedure. (Group 9025-25.)

Specification

Hydraulic Oil—Temperature ..... 45—55°C (110—130°F)

4. Check the distance from the end of maximum flow adjusting screw (2) to the 13 mm nut (3) for both pump 1 and pump 2 regulators. Adjust screw to specification as needed.

Specification

End of Maximum Flow Adjusting Screw to 13 mm Nut—Distance ..... 3 mm (0.125 in (1/8 in))

5. Run machine at specifications:

Specification

Engine—Speed ..... Fast Idle
Work Mode Switch—Position ..... Bucket Mode
Power Mode Button—Position ..... PWR (power) Mode
Auto-Idle Switch—Position ..... OFF
Travel Speed Switch—Position ..... Fast (rabbit)

6. Raise the left track off ground for pump 2 or the right track for pump 1.
7. Actuate travel function to full speed for the raised track. Record track cycle time for three revolutions.

   Repeat procedure for the other pump.
8. Adjust flow adjusting cartridge (track cycle time) (4) on pump 1 and pump 2 regulators so track cycle times are within the specification and approximately the same.

Specification

Track Raised—3 Revolutions From a Running Start—Cycle Time ..... 24.7—28.7 s

   Loosen 30 mm nut (5). Turn flow adjusting cartridge in for a slower track cycle time (decrease flow rate); turn flow adjusting cartridge out for a faster track cycle time (increase flow rate). Tighten 30 mm nut after adjustment.

Continued on next page

Travel Motor Leakage Test

SPECIFICATIONS	
Hydraulic Oil Temperature	45—55°C 110—130°F
Engine Speed	Fast Idle
Work Mode Switch Position	Bucket Mode
Power Mode Button Position	PWR (power) Mode
Auto-Idle Position	OFF
Travel Speed Switch Position	Fast (rabbit)
Travel Motor with Track Raised Leakage (maximum)	10.0 L/min 2.6 gpm
Travel Motor Stalled Leakage (maximum)	15.0 L/min 4.0 gpm

SERVICE EQUIPMENT AND TOOLS
JT03025 (3/4-16 F 37°) (Parker No. 06CP—8) Cap
Calibrated Container
76.2 mm (3 in.) OD Pin or Round Bar Stock (2 used)
JT03221 (3/4-16 M 37°) (Parker No. 03CP—8) Plug

1. Warm hydraulic oil to specification. See Hydraulic Oil Warm-Up Procedure. (Group 9025-25.)

Specification

Hydraulic Oil—Temperature.....45—55°C (110—130°F)

2. Release hydraulic oil tank pressure by pressing pressure release button on top of hydraulic oil tank. See Hydraulic Oil Tank Pressure Release Procedure. (Group 9025-25.)
3. Disconnect travel motor drain line (1) at return manifold. Put line in a calibrated container. Install cap on return manifold fitting.
4. Raise track off the ground for side being checked.
5. Run machine at specification.

Specification

Engine—Speed..... Fast Idle
Work Mode Switch—Position..... Bucket Mode
Power Mode Button—Position.....PWR (power) Mode
Auto-Idle—Position..... OFF
Travel Speed Switch—Position.....Fast (rabbit)

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Center Joint

1— Travel Motor Drain Line

6. For travel motor being checked, actuate travel forward function at full speed for 1 minute. Record amount of leakage. Repeat procedure for reverse.

   Compare leakage to specification. Repair or replace travel motor as necessary.

Specification

Travel Motor with Track Raised—Leakage.....10.0 L/min or less (2.6 gpm or less)

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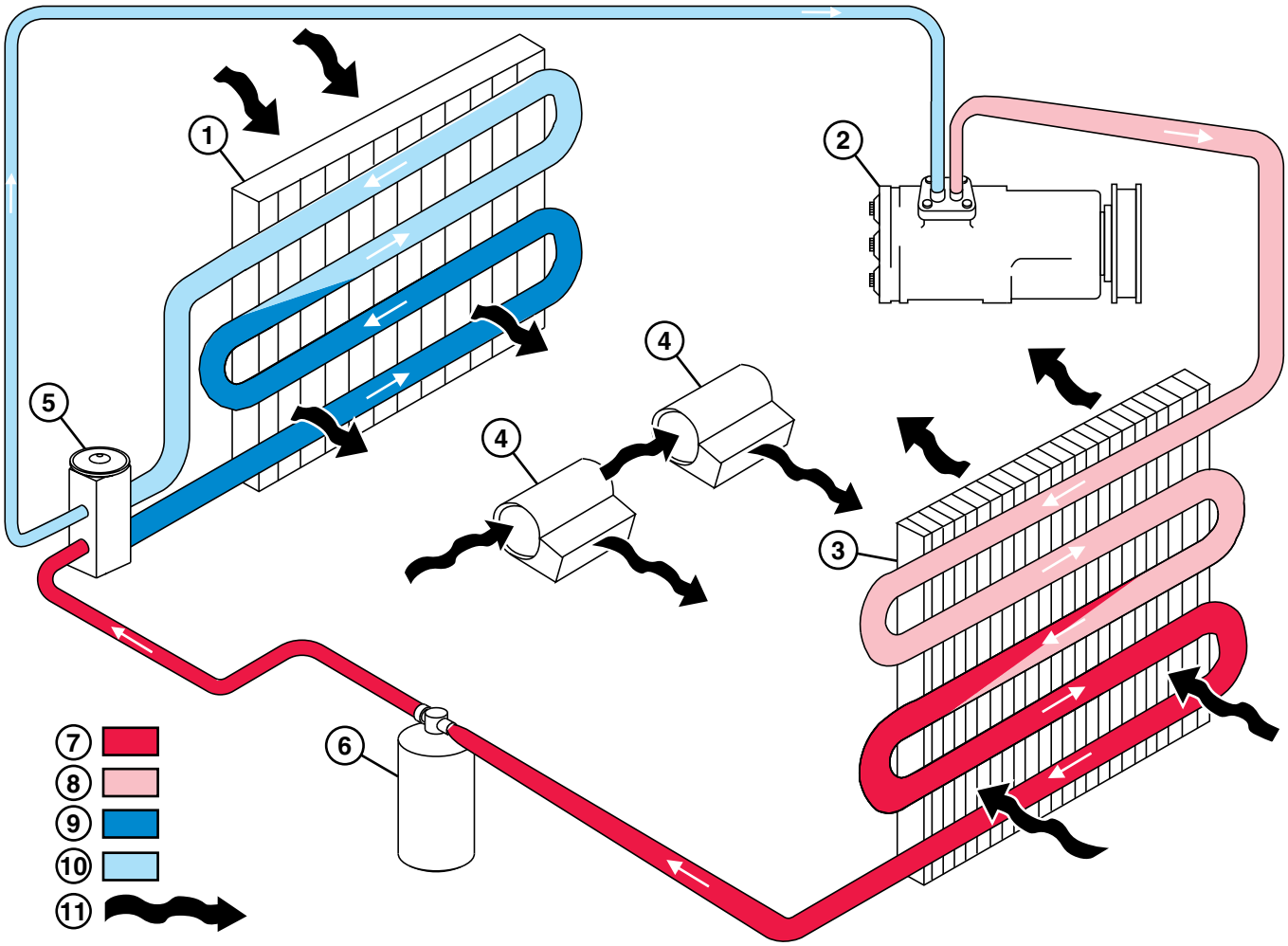
DF89619,00B58C1 -19-15MAR16-1/3

Air Conditioning System Cycle of Operation



TX1153371

TX1153371 —UN—11FEB14

Refrigerant System Cycle of Operation

1— Evaporator
2— Compressor
3— Condenser
4— Circulation Blower Motor
5— Expansion Valve
6— Receiver-Dryer
7— High-Pressure Liquid
8— High-Pressure Gas
9— Low-Pressure Liquid
10— Low-Pressure Gas
11— Air Flow

The compressor (2) is belt driven and engaged by an electromagnetic clutch. The air conditioner circuit automatically controls compressor engagement or disengagement when system is in operation.

The compressor draws low-pressure gas (10) from evaporator (1) and compresses it into high-pressure gas (8). High-pressure gas causes temperature of refrigerant to rise higher than outside air temperature.

High-pressure gas leaves compressor and flows through condenser (3). Inside condenser, heat is removed and transferred to outside air that is drawn through condenser core by the fan. Cooling refrigerant causes it to condense, and refrigerant leaves condenser as high-pressure liquid (7).

High-pressure liquid flows into receiver-dryer (6), where moisture and contaminants (acid, solids, etc.) are removed. The receiver-dryer contains a color moisture indicator. (Blue) indicates no moisture is present. (Pink) indicates moisture is present. Should moisture be combined with refrigerant, hydrofluoric and hydrochloric acids are formed. These acids are corrosive to metal surfaces, and leakage will eventually develop. The receiver-dryer also stores refrigerant, allowing a longer period of time before additional refrigerant is needed. Refrigerant hoses allow a small amount of refrigerant to migrate through their walls.

Continued on next page

1— Heater and Air Conditioner Unit
2— Heater Return Line
3— Heater Supply Line
4— Evaporator-to-Compressor Low Pressure Line
5— Condenser
6— Receiver-Dryer
7— Condenser-to-Receiver-Dryer High Pressure Line
8— Compressor-to-Condenser Line
9— Evaporator-to-Receiver-Dryer Line
A7— Air Conditioner Controller (ACF)
B20— Air Conditioner High/Low Pressure Switch
M7— Air Conditioner and Heater Blower Motor
Y11— Air Conditioner Compressor

JA66566,00016ED -19-20FEB12-2/2