

SAKAI

SW654



SW654
Diagnostic
Information

Please See Operators and Service Manual for additional information.

ALL Work Must be performed by a factory trained technician to prevent injury. This manual is not intended to replace the service manual but to assist with additional information.



⚠ WARNING

Unexpected machine movement may cause a serious accident. When inspecting the machine while the engine is running, always follow the instructions below.

- Park the machine on level, flat ground.
- Apply the parking brake.
- Set chocks in front and behind each drum or tire.
- Make sure that service personnel are given the appropriate information at the appropriate time.
- Make sure that no one can enter any hazardous area.

⚠ CAUTION

Do not work on the hydraulic system while the engine is running and the system is hot and under pressure. Do not disconnect hydraulic hoses or fittings until the system has cooled and pressure has been properly relieved.

Before removing any plugs from the pressure measurement ports, always release any residual pressure from the piping and open the cap of the fluid tank to release and pressure.

⚠ WARNING

Inadvertent starting the engine may cause a serious accident.

When inspecting the engine, make sure to exchange the appropriate cues and hand signal with the person at the operator station to avoid any accidents.

⚠ CAUTION

Before inspecting inside of the engine compartment, always stop the engine.

Contact with the fan, V-belt or exhaust system parts while the engine is running may cause serious injury.



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SW654

SW654 Operators Manual
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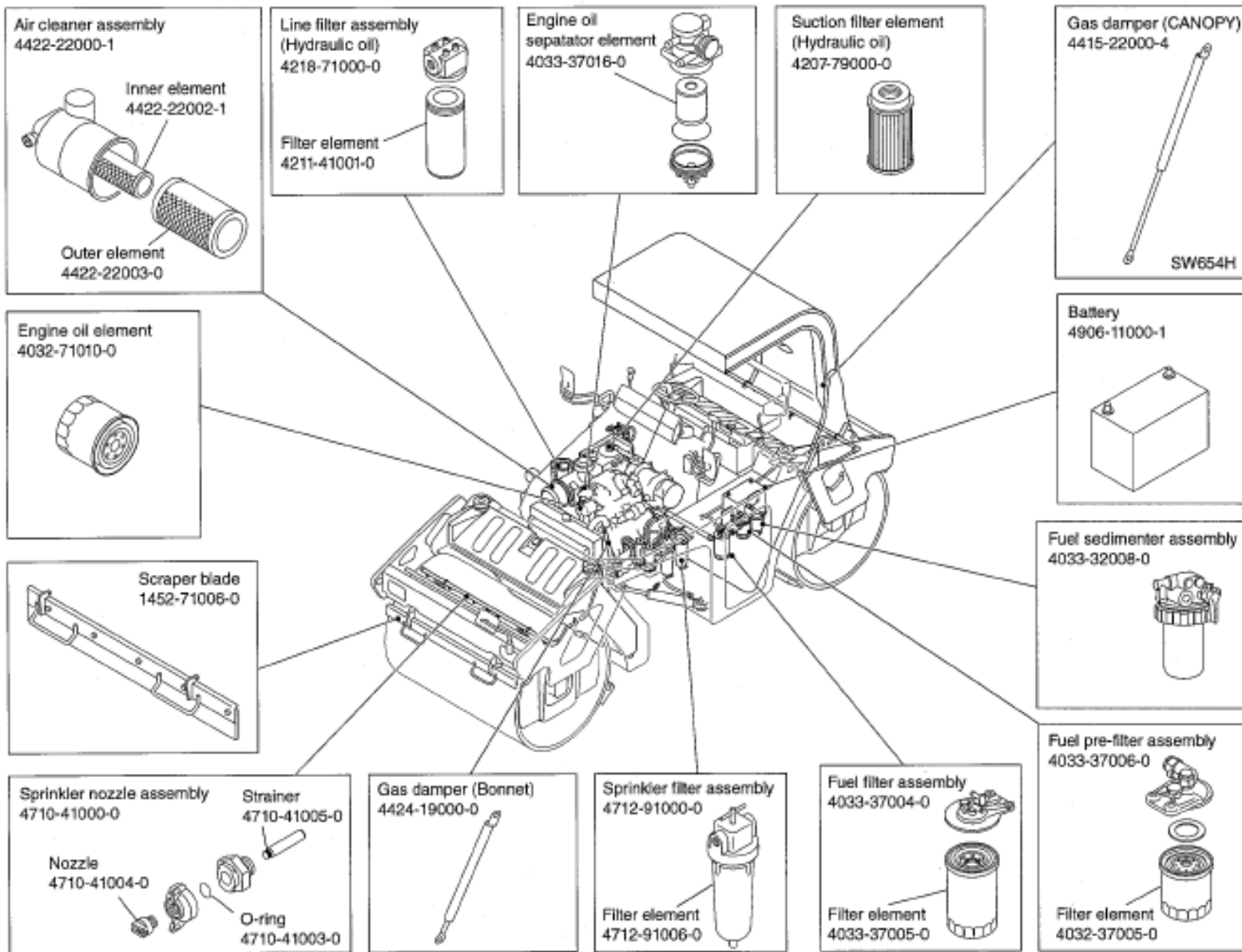


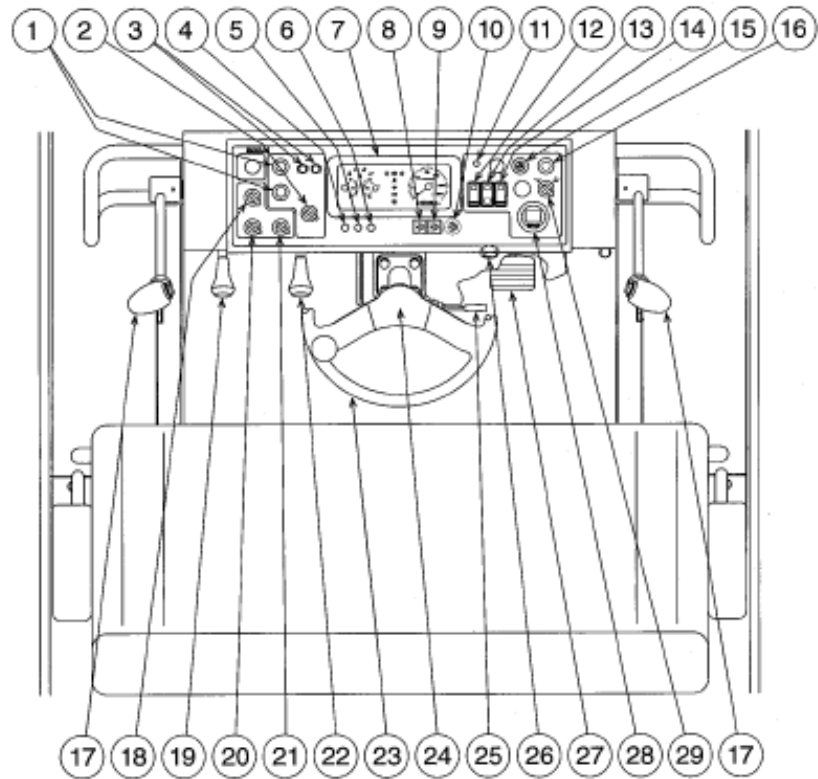
SAKAI
MASTERS OF COMPACTION

Engine	Model		KUBOTA V3307-CR-T-EF05 (Diesel, EPA-Tier 4)	
	Type		4-cycle, water-cooled, 4-cylinder in-line, overhead valve, direct injection type, with turbocharger	
	Bore x Stroke		94 mm x 120 mm (3.7 in. x 4.72 in.)	
	Displacement		3.331 L (203.3 cu.in.)	
	Performance	Rated speed	2,200 min ⁻¹	
		Rated output	54.6 kW (73 HP)	
		Max. torque	261 N·m (193 lbf·ft) at 1,500 min ⁻¹	
		Fuel consumption rate	227 g/kW·h (0.373 lb/HP·h) at 2,200 min ⁻¹	
		Fuel consumption	15 L/h with full load (3.9 gal. with full load)	
	Fuel system	Fuel	Diesel (ASTM D975-2D)	
		Fuel injection pump	High pressure commonrail	
		Fuel injection time regulator	Electric speed control	
	Lubrication system	Lubrication type	Full forced pressure feed	
		Oil filter type	Full flow plastic fiber element	
		Oil cooler type	Integrated water cooled	
	Air intake system	Air cleaner type	Dry	
	Cooling system	Cooling type	Pressurized water forced circulation	
		Cooling fan type	Exhale	
	Electrical system	Alternator	12 V 90 A	
		Starter	12 V 3.0 kW	
Battery		12 V (72 Ah, CCA750A) x 1 pcs. (12 V)		
Dry weight		311 kg (688 lbs.)		
Drive system	Transmission	Type	Hydrostatic	
		Speeds	8 speed shifts	
	Reverser			Switching the direction of flow delivered from the variable pump
	Differential type	Front	N/A	
		Rear	N/A	
	Final drive	Front	Planetary gear	
Rear		Planetary gear		

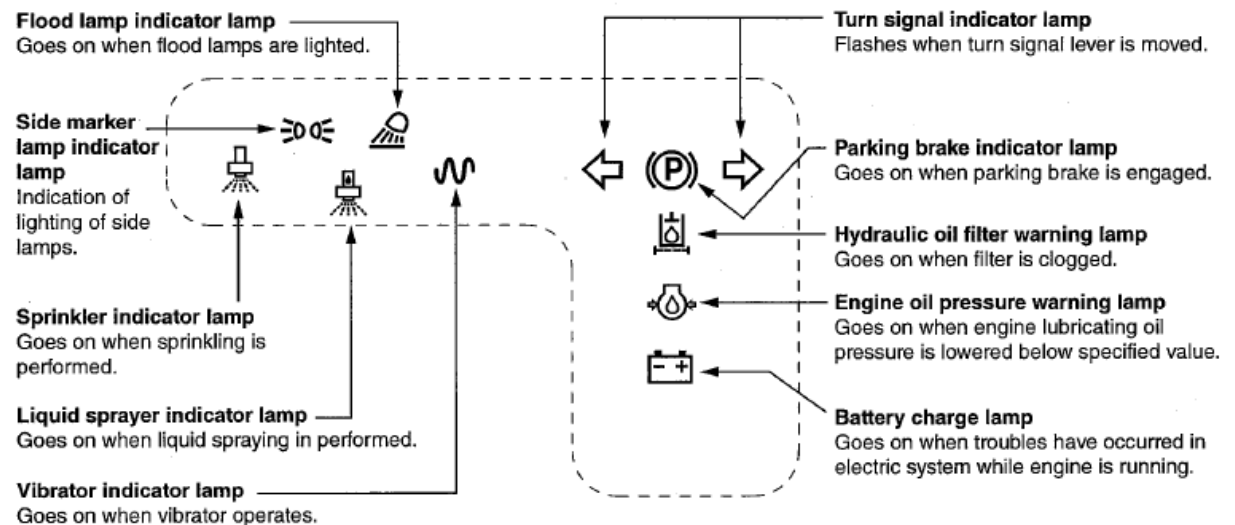
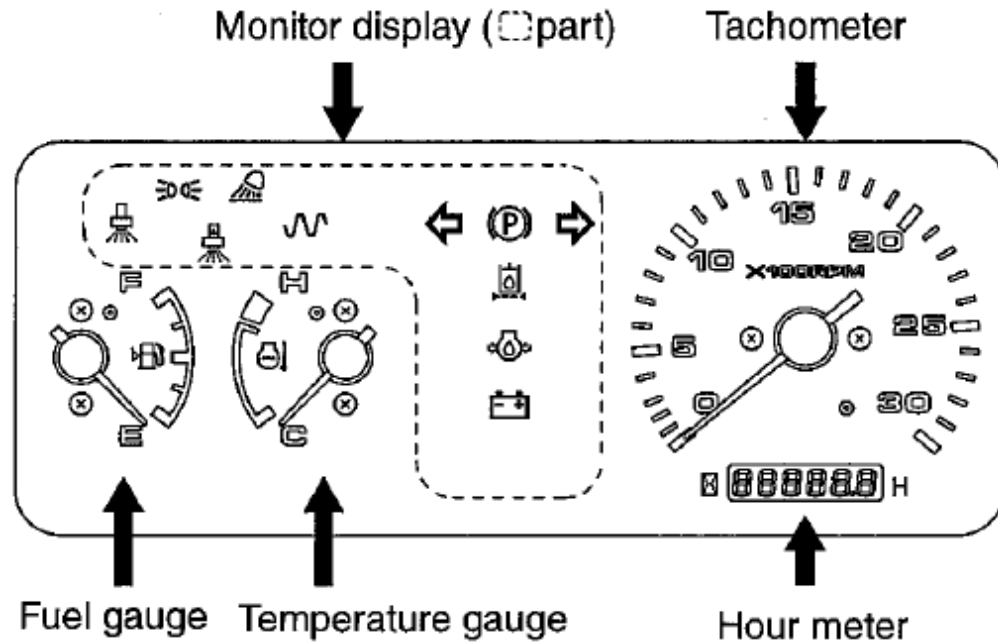
Compartment	Type of fluid	Capacity in liters (gal.)		
		SW654, SW654H	SW654B	SW654ND
Engine oil pan	Engie oil	11.2 (3.0)		
Wheel motor	Gear oil	1.2 (0.3) x 2		
Vibrator	Gear oil	4.0 (1.1) x 2	1.7 (0.4) x 2	10.4 (2.7) x 2
Hydraulic tank	Hydraulic oil	44 (11.6)		
Fuel tank	Diesel oil	120 (32)		
Radiator	Coolant	9 (2.4)		
Sprinkler tank	Water	300 (79) x 2		

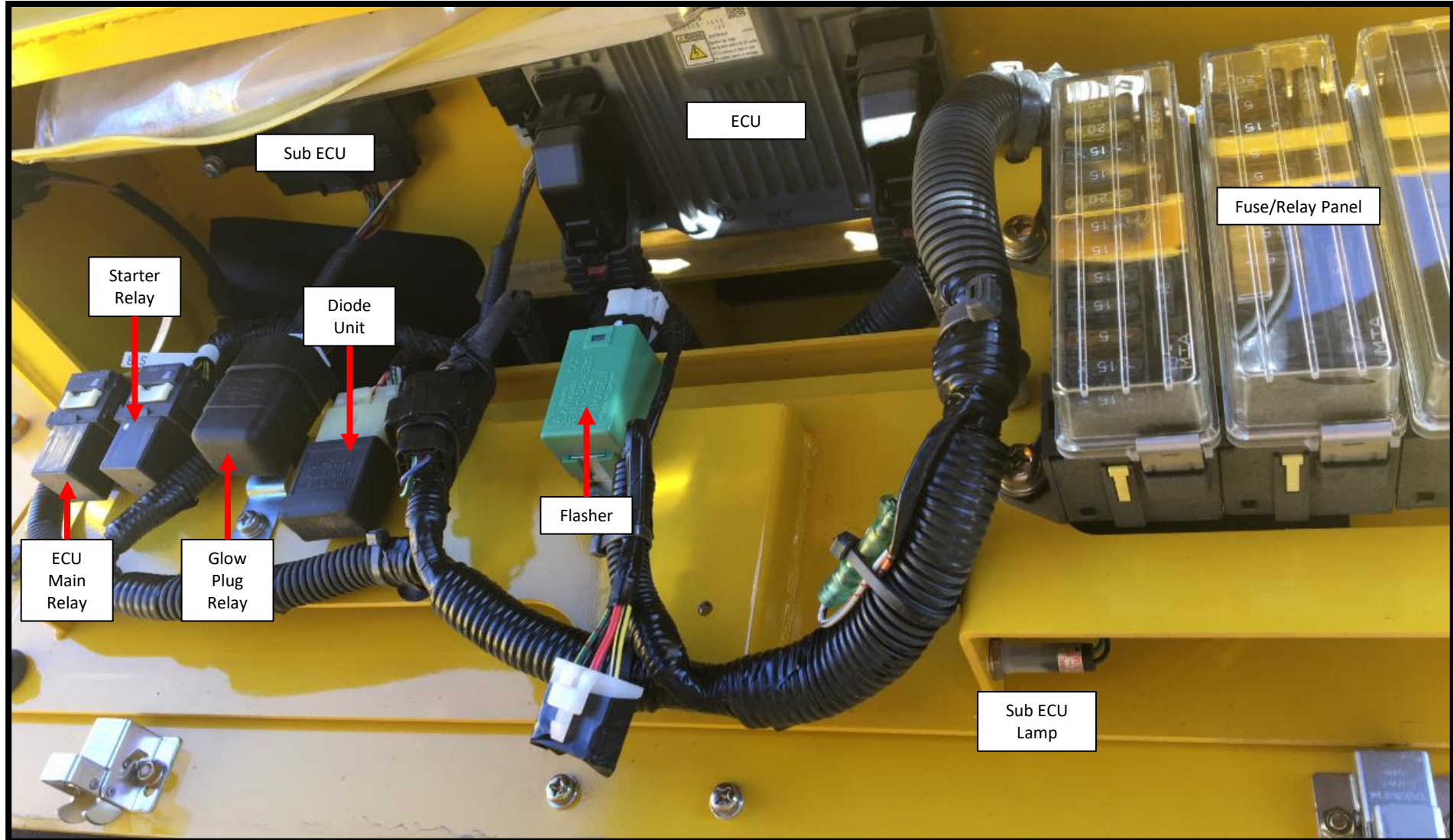
Lubricant	Service classification	Ambient temp. and applicable viscosity rating			Applicable standards
		-15 – 30°C (5 – 86°F) Cold	0 – 40°C (32 – 104°F) Moderate	15 – 55°C (59 – 131°F) Tropical	
Engine oil	API grade CJ-4	SAE 10W-30	SAE 30	SAE 40	—
Gear oil	API grade GL5	SAE 80W-90	SAE 90	SAE 140	MIL-L-2105C
Hydraulic oil	Wear resisting	ISO-VG32 over VI 140	ISO-VG46 over VI 140	ISO-VG68 over VI 110	ISO-3448
Grease	Lithium type extreme-pressure grease			NLGI-2	
Fuel	Diesel oil			ASTM-D975-2D	

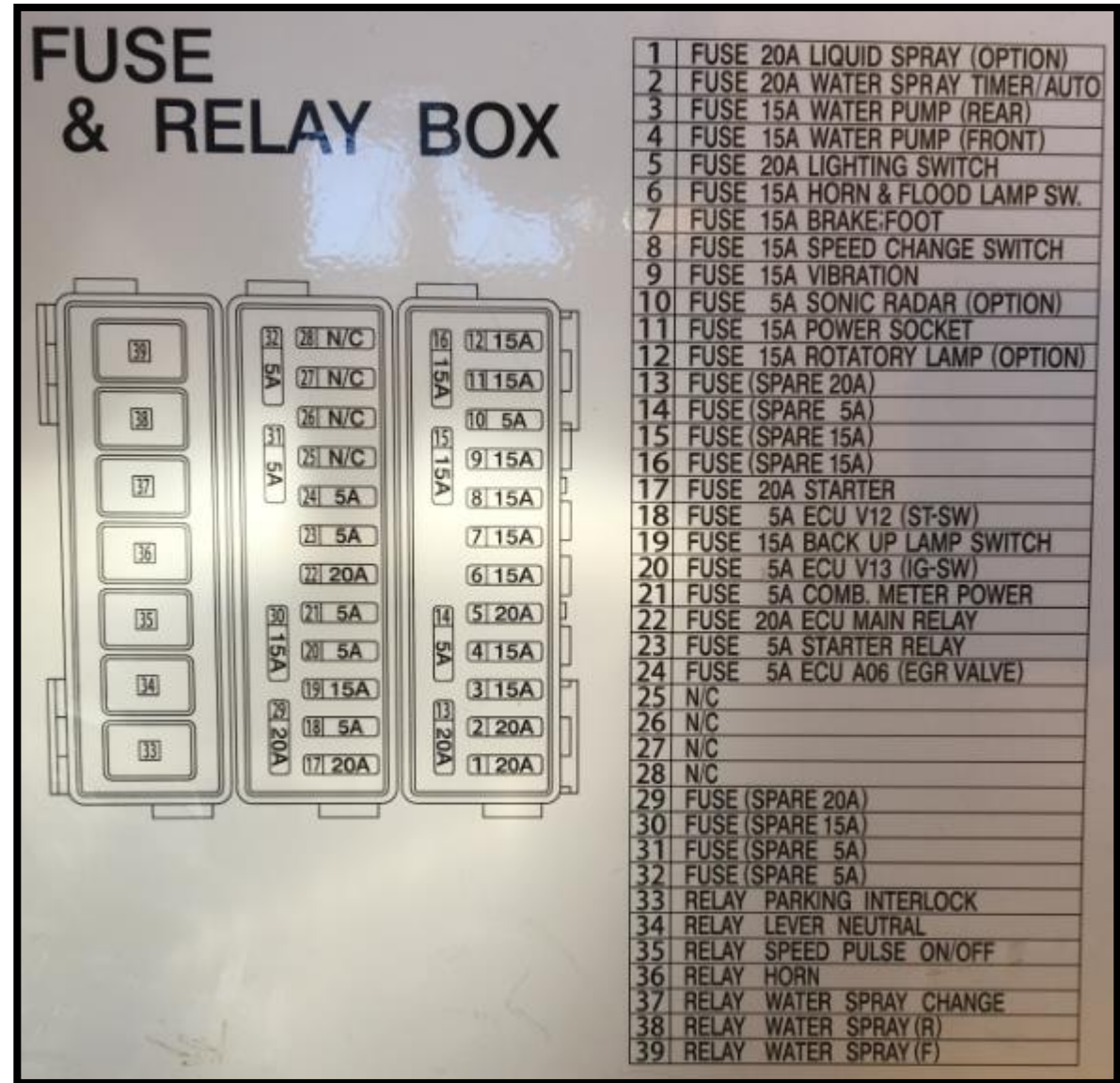
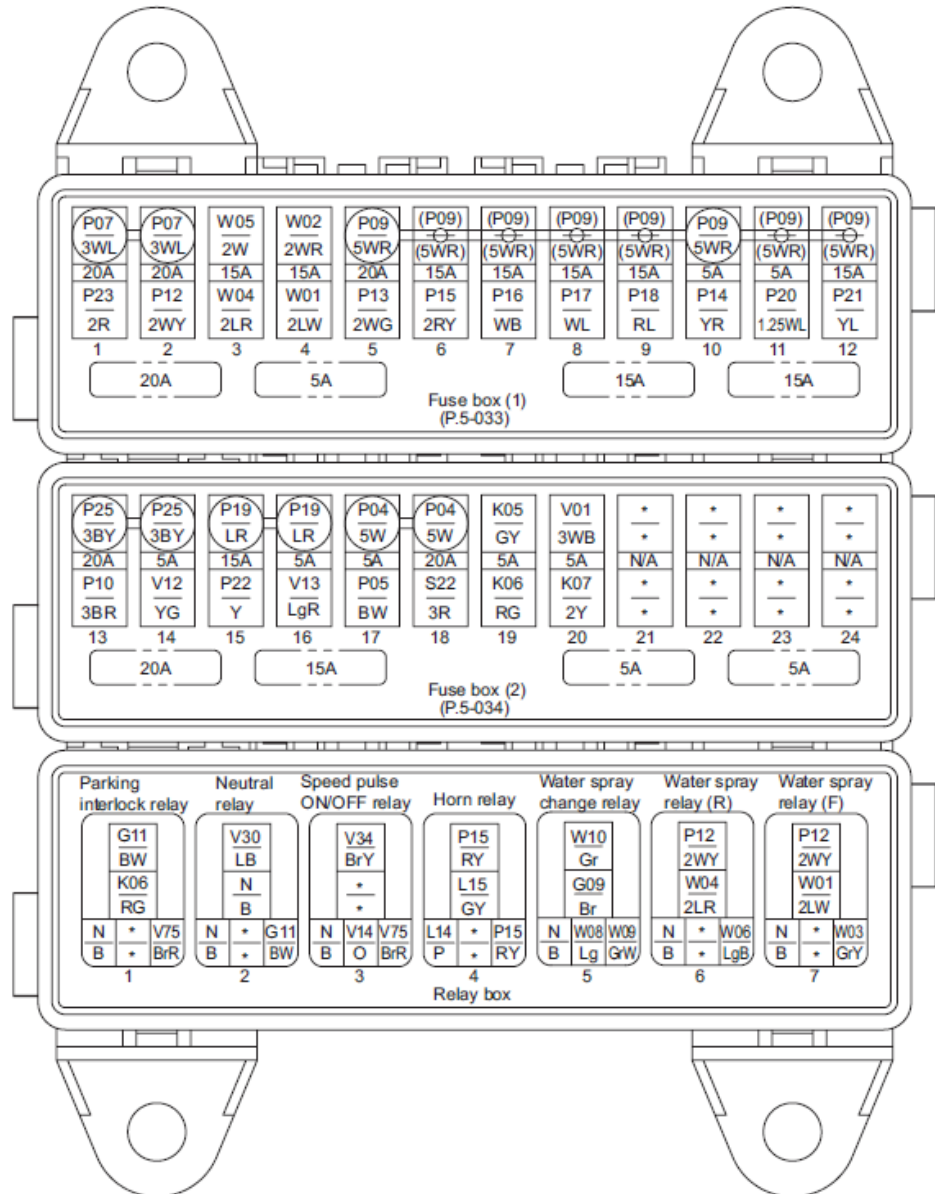


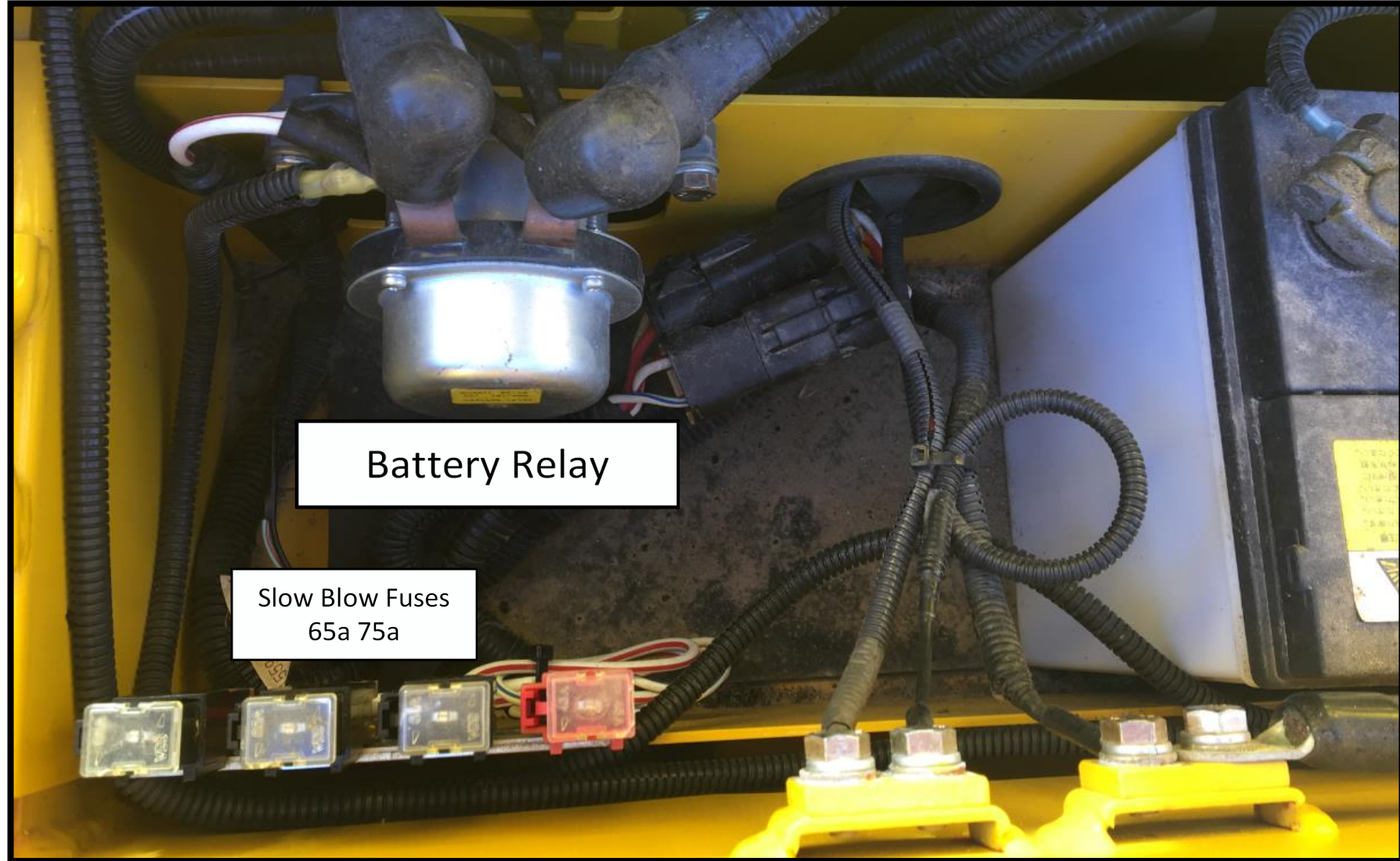


- | | | |
|--|--|----------------------------------|
| ① Sprinkler switch | ⑩ Parked regeneration switch | ⑳ Vibration drum selector switch |
| ② Sprinkler selector switch | ⑪ ECO lamp | ㉑ Vibrator switch |
| ③ Sprinkler timer | ⑫ Flood lamp switch | ㉒ Throttle lever |
| ④ Engine warning lamp | ⑬ Dimmer switch | ㉓ Steering wheel |
| ⑤ Engine stop lamp | ⑭ Lamp switch | ㉔ Horn switch |
| ⑥ Overheat lamp | ⑮ Hazard switch | ㉕ Turn signal lever |
| ⑦ Combination meter | ⑯ Parking brake switch | ㉖ Starter switch |
| ⑧ Auto regeneration lamp (green) | ⑰ Forward-Neutral-Reverse (F-N-R) lever with vibrator switch | ㉗ Brake pedal |
| ⑨ Parked regeneration request lamp (amber) | ⑱ Vibration selector switch | ㉘ DPF meter |
| | ⑲ Speed shift lever | ㉙ Speed shift switch |



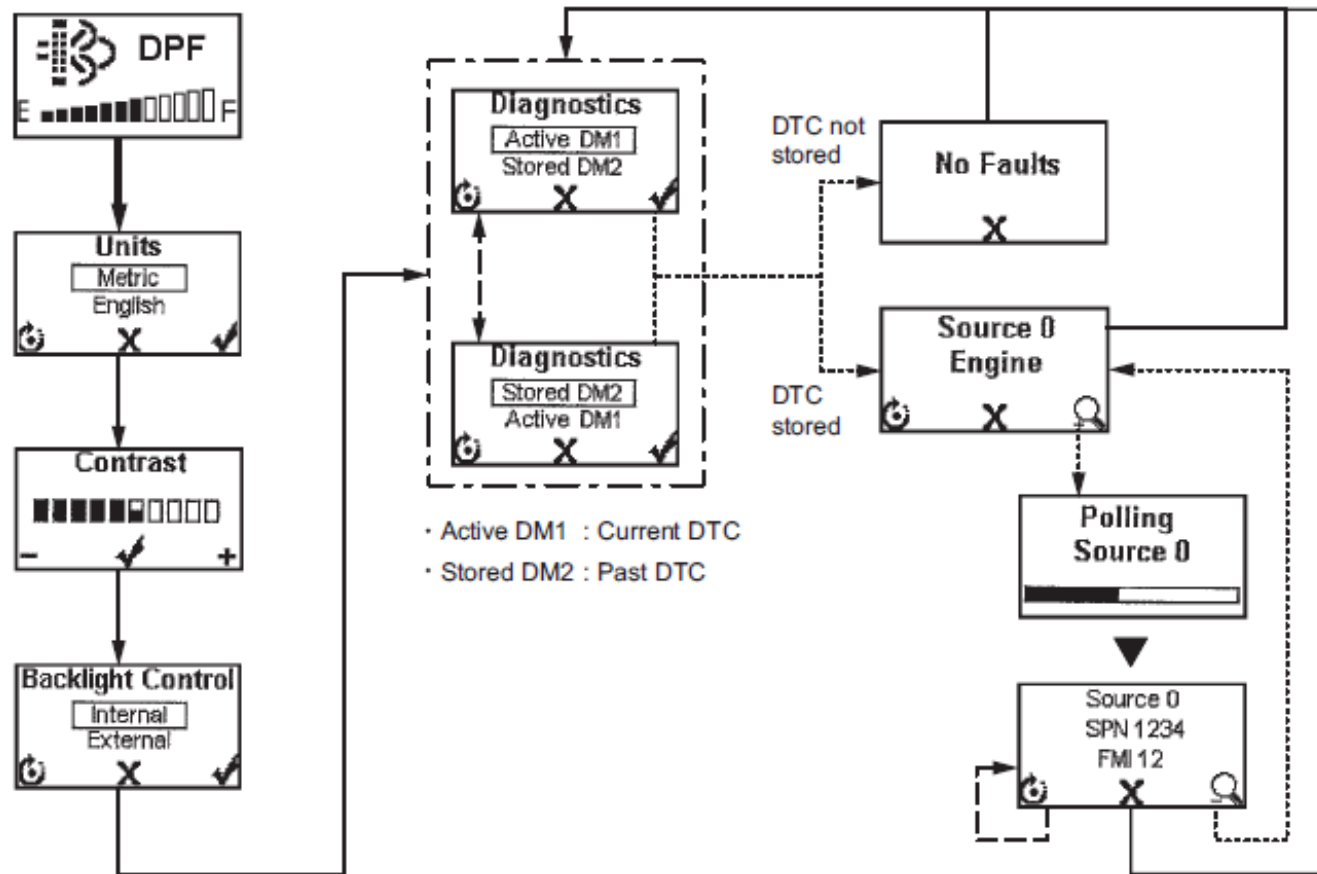
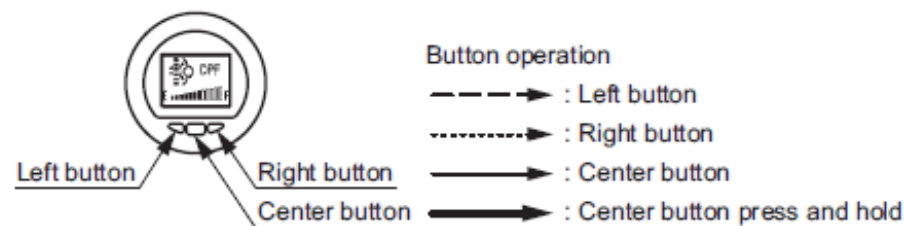
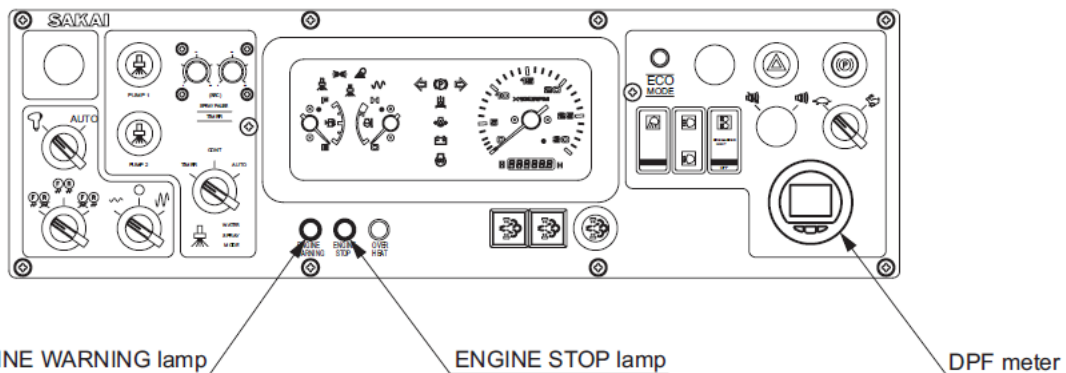




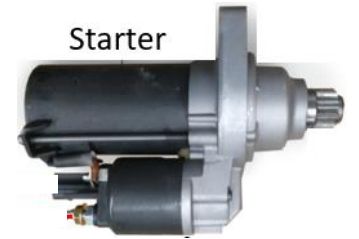


Battery Relay

Slow Blow Fuses
65a 75a



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No Crank, No Start

Does the display come on when key is turned on?

Yes, Is machine in "Neutral" drive position

No, Test Battery, is there 12v present?

Yes, Is the park brake "ON"?

No, Shift drive lever to "Neutral". Does engine crank?

Yes, Does Battery Relay, engage when key switch is turned to "ON" position?

No, Replace or Charge Battery as needed.

Yes, Is there power at Terminal 50 Black/White wire on the Starter when turned to "Crank" position?

No, Engage Park Brake. Does engine crank?

Yes, End diagnosis.

No, Is the park brake "ON"?

Yes, Check connections and replace Battery Relay as needed.

No, Is there 12V power from key switch (Light Green/Red stripe) at Battery Relay?.

Yes, End diagnosis.

No, Engage Park Brake. Does engine crank?

Yes, End diagnosis.

Yes, Repair Connection or Replace Battery Relay as needed.

No, Repair Wiring from Key Switch.

No, Is there power at the Starter Red/White wire on the Starter when turned to "Crank" position?

Yes, Repair connections or replace starter as needed.

No, Check continuity across the Park Brake switch and Neutral Switch? Does the switches test good?

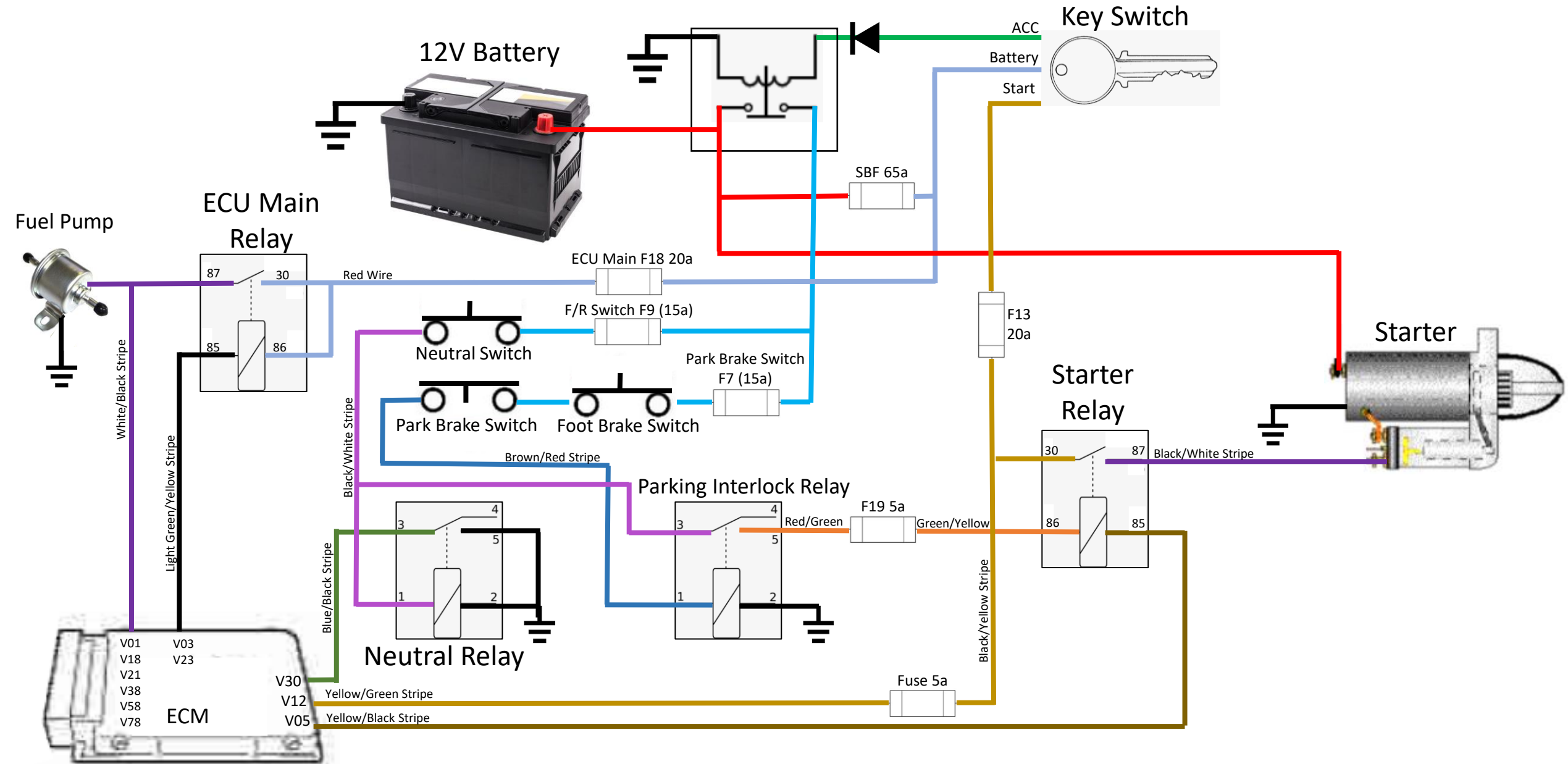
Yes, Test for power across relays for Starter, Starter Interlock, park brake switch and Neutral Switch? Do the switches test good?

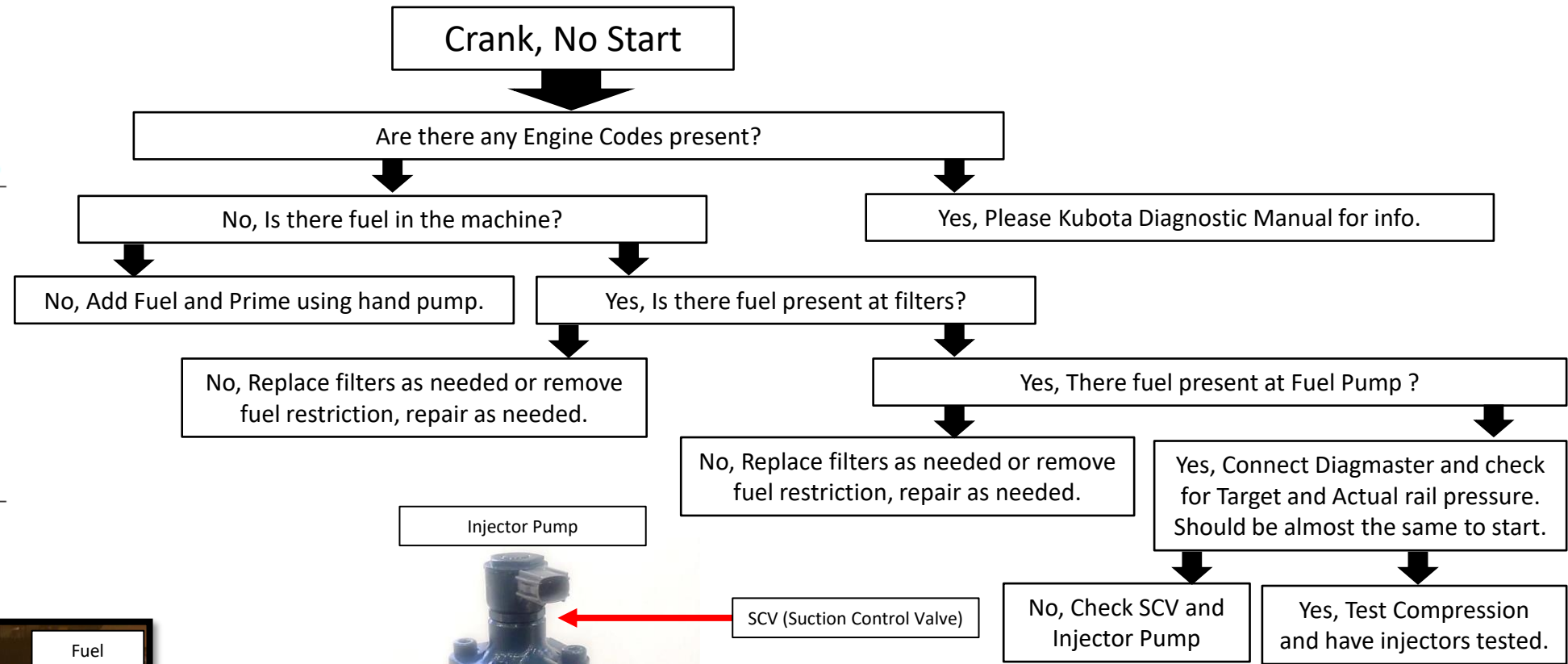
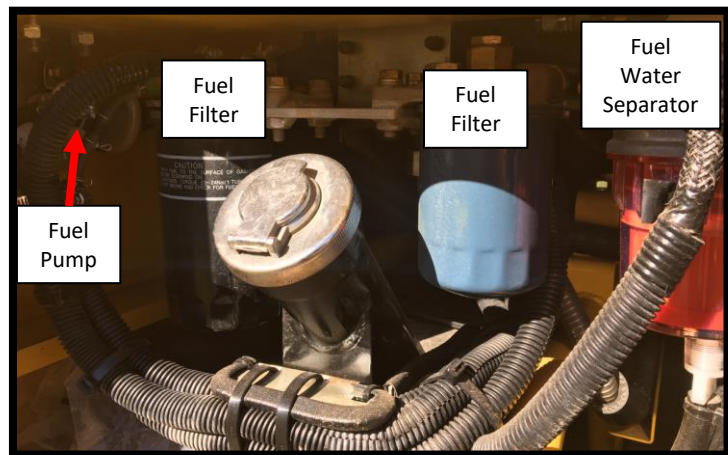
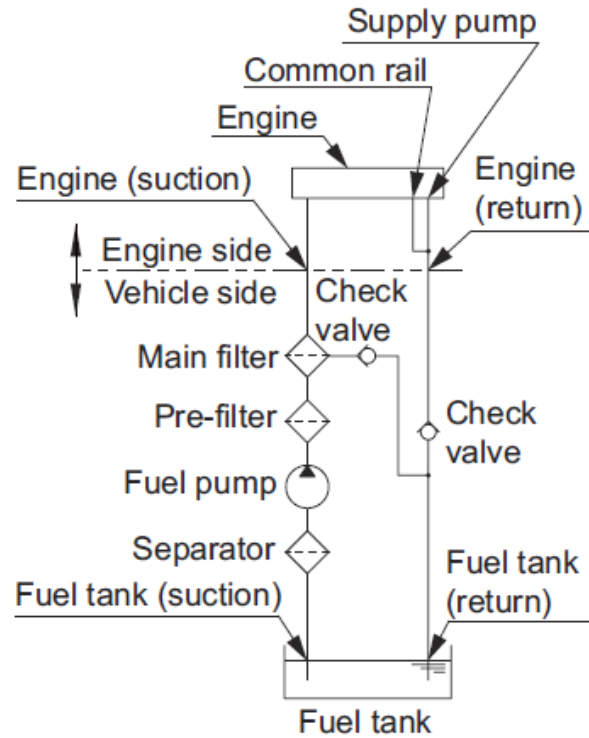
No, Repair or replace as needed.

Yes, Check fuse for ECM 20a, Park Brake Switch 15a, Interlock 15a, and Starter Relay 30a.

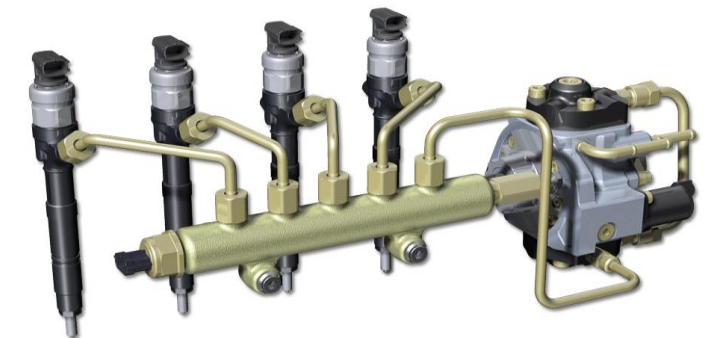
No, Replace fuses as needed or ECM needs to be tested.

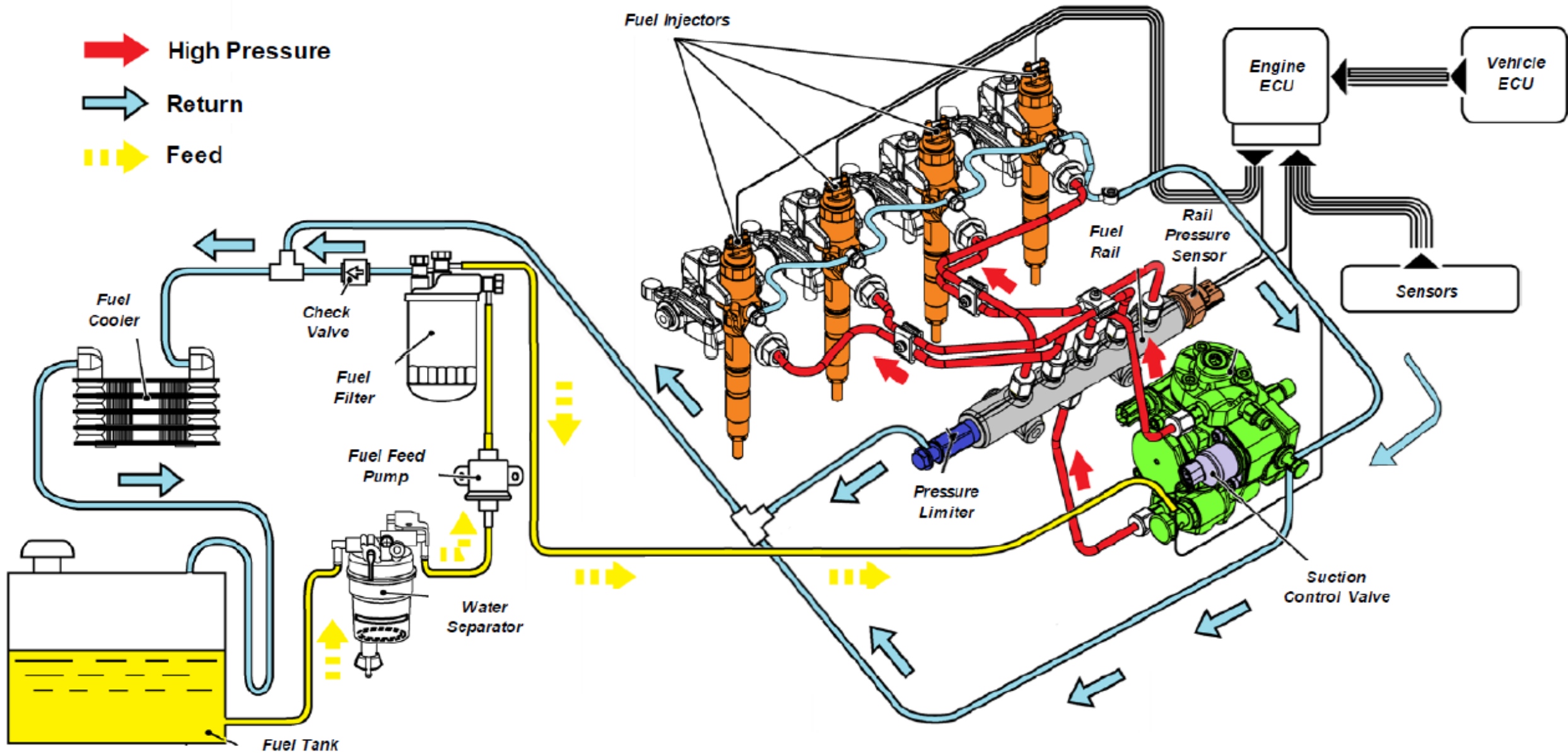
No, Repair or replace as needed.





SCV (Suction Control Valve)

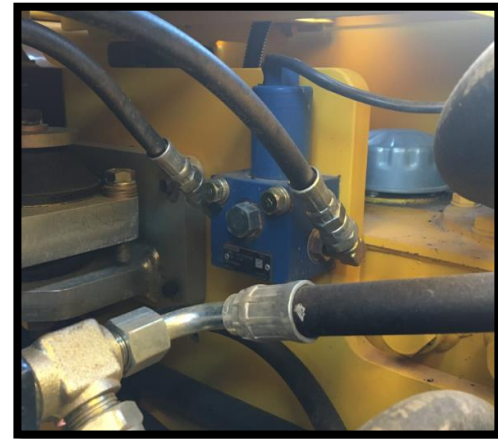
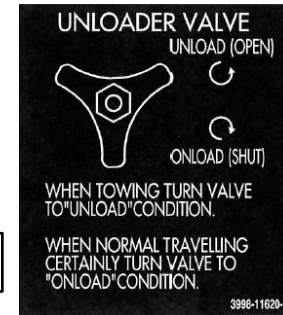
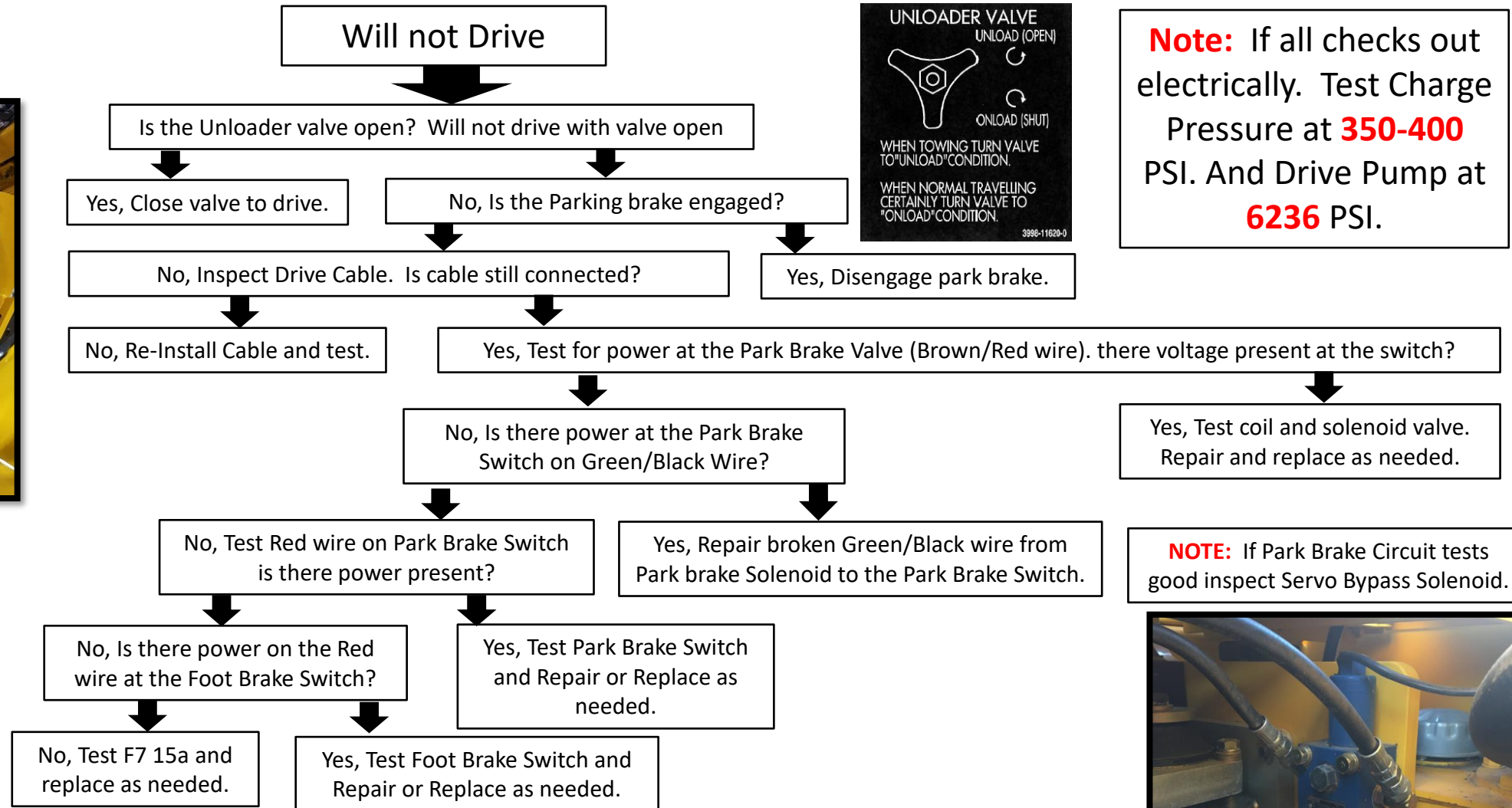


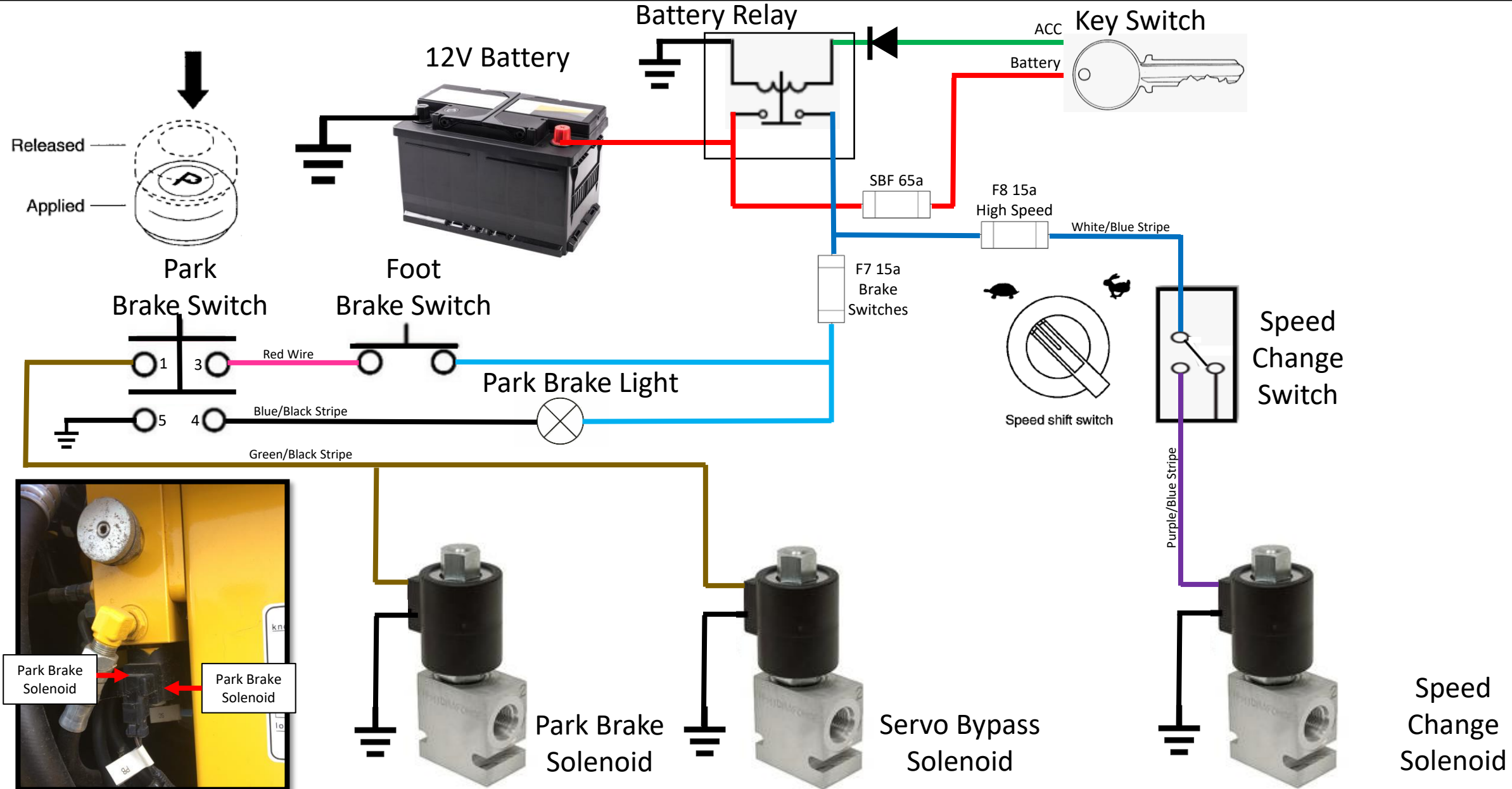


Drive Cable



Foot Brake Switch



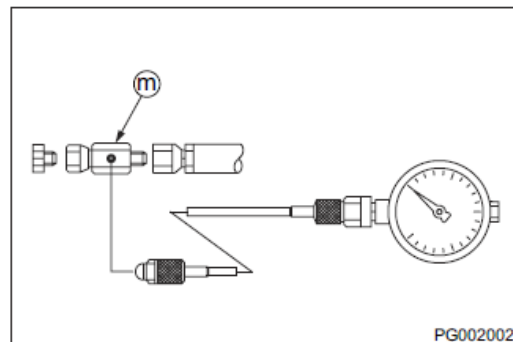
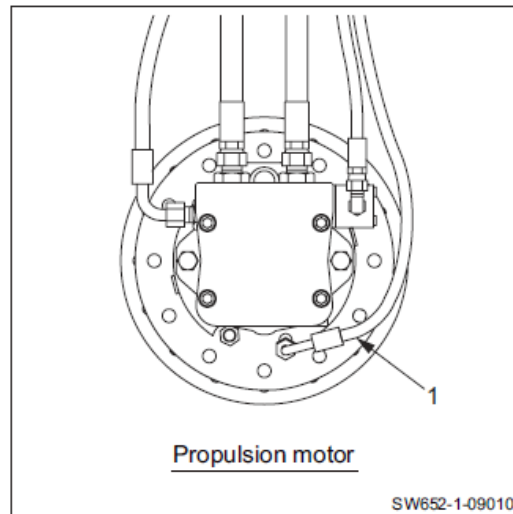


MEASUREMENT OF PARKING BRAKE RELEASE PRESSURE

Oil temperature during measurement : $50 \pm 5^{\circ}\text{C}$ ($122 \pm 9^{\circ}\text{F}$)

- ① Disconnect hose (1) from propulsion motor. Attach pressure gauge through adapter m .
 - Adapter m : G1/4
 - Pressure gauge : 0 to 5 MPa (0 to 725 psi)
- ② Confirm that F-R lever is "N".
- ③ Apply parking brake by pressing parking brake switch button.
- ④ Start the engine and set throttle lever to "Full".
- ⑤ Release parking brake by pressing parking brake switch button.
- ⑥ Read brake release pressure indicated by pressure gauge.

★ Brake release pressure : More than 1.8 MPa (261 psi)

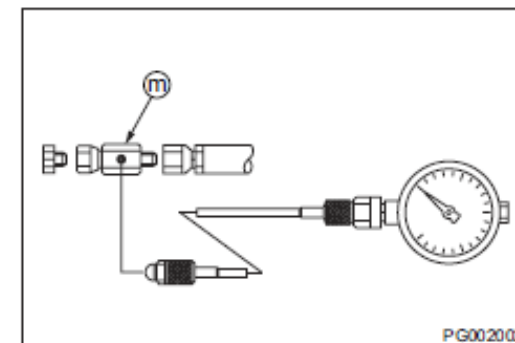
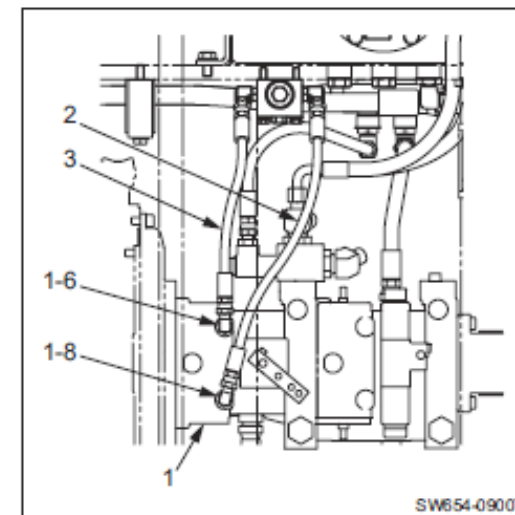


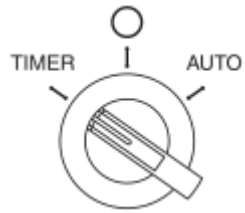
MEASUREMENT OF PROPULSION SERVO CIRCUIT PRESSURE

Oil temperature during measurement : $50 \pm 5^{\circ}\text{C}$ ($122 \pm 9^{\circ}\text{F}$)

- ① Disconnect hoses (2) and (3) from propulsion pump (1). Attach pressure gauge through adapter m .
 - Adapter m : G1/4
 - Pressure gauge : 0 to 5 MPa (0 to 725 psi)
- ② Confirm that F-R lever is "N".
- ③ Apply parking brake by pressing parking brake switch button.
- ④ Start the engine and set throttle lever to "Full".
- ⑤ Operate F-R lever and then read pressure indicated by pressure gauge.
 - With parking brake applied (ON), measured pressures of (1-6) and (1-8) are same.
 - With parking brake released (OFF), measured pressures of (1-6) and (1-8) are different.

★ Standard charge relief pressure setting : 2.4 ± 0.2 MPa (348 ± 29 psi)





○ : Continuous sprinkling
 AUTO : Spraying is done interlocking with forward / backward movement.
 TIMER : Intermittent (timer) sprinkling

Will not Spray Water

Is there water in the tanks?

No, Fill tanks with water and test.

Yes, Are both Front and Rear Pump sprayers not spraying?

No, Isolate circuit and Test.

Yes, Check F2 20a for Power. Is fuse good?

Is the pump running?

Yes, Is there Power at the Spray Mode Switch on White/Yellow Wire?

No, Remove and Replace as needed and Test.

No, Is there good Power and Ground at Pump?

Yes, check for obstruction or replace pump as needed.

Yes, Move the Spray Mode Selector Switch and Test for power across switch on Green/White and Light Green/Yellow wire. Is there Power Across the Switch?

No, Test wire from F2 to Switch and Repair or Replace as needed.

No, Check F3-F4 15a. Is the fuse Good?

Yes, check connections or replace pump as needed.

Yes, With Spray Selector on Constant, is there power at Pump switches Green Wire?

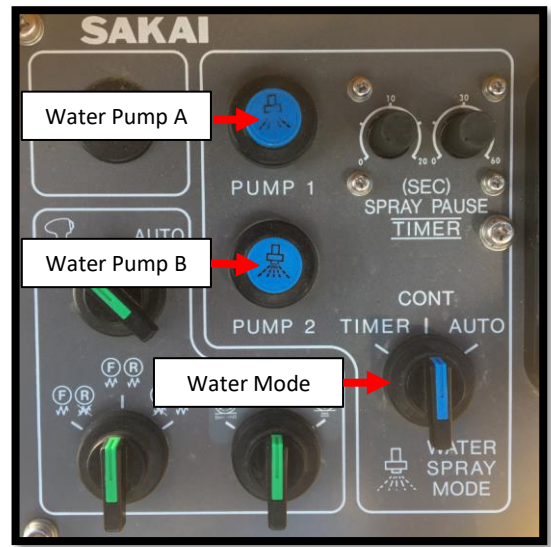
No, Replace defective switch and test.

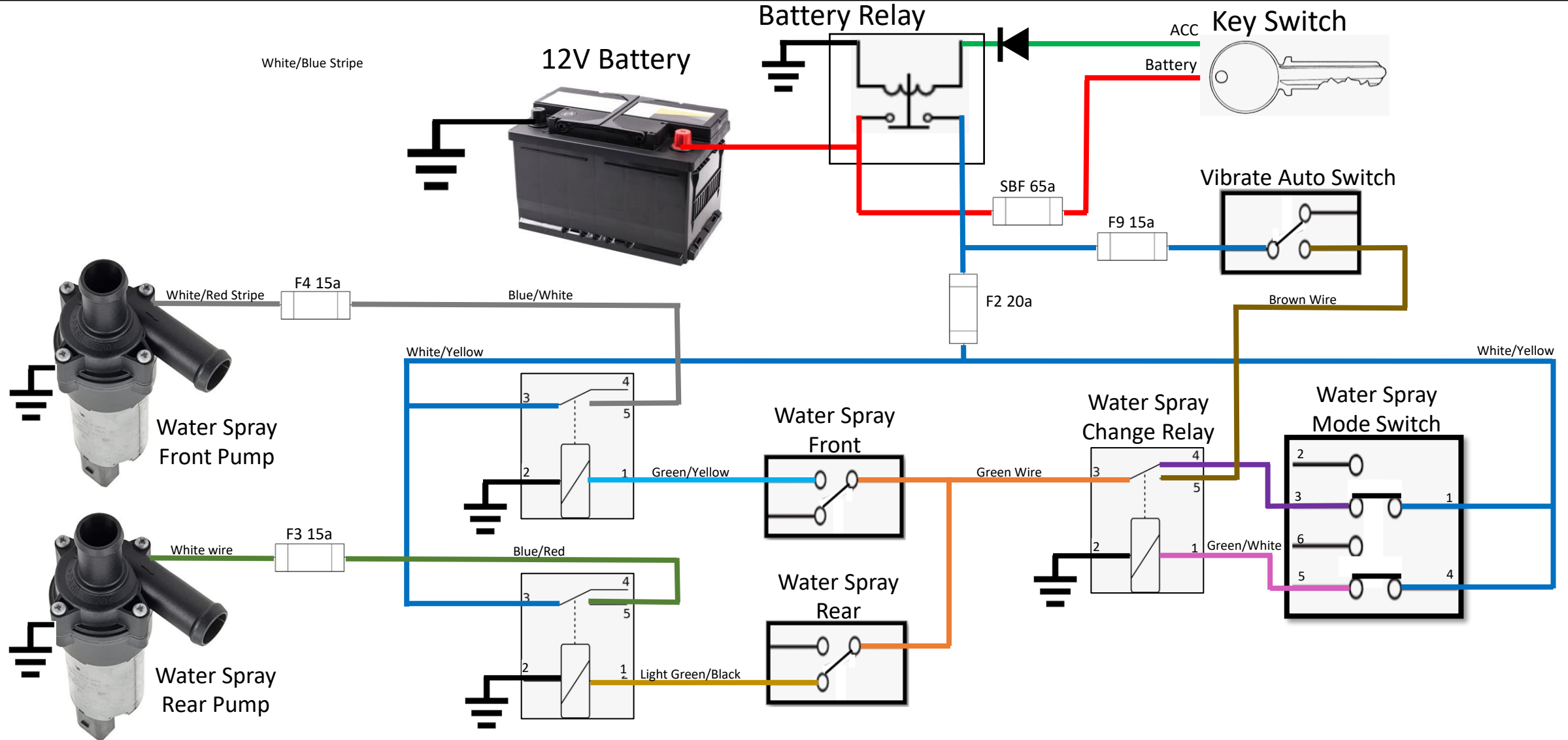
No, Replace fuse and Test.

Yes, Check Pump Relay for that Circuit and replace as needed.

Yes, Test Light Green/Black Wire from Water Spray Relay Rear. And Green/Yellow wire to Water Spray Relay Front and repair as needed.

No, Repair or replace broken wire from mode selector to Pump Switch.





Front Drum will not vibrate

With Front selected. Is there Power on the Brown/White stripe at the F/R Mode Vibrate Switch?

No, Is there Power on the Red/Blue stripe at the F/R Mode Vibrate Switch?

No, Inspect fuse F9 (F15a). Is there power across the fuse?

Yes, Replace defective F/R Selector Mode Switch.

Yes, Repair break in wire Red/Blue stripe.

No, replace fuse or inspect SBF 75a from battery relay.

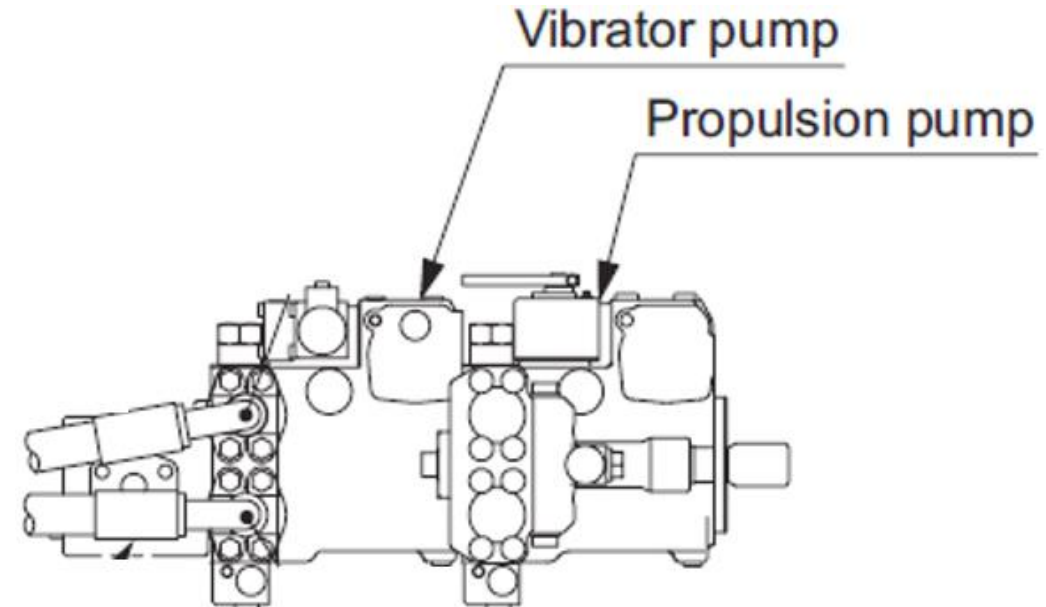
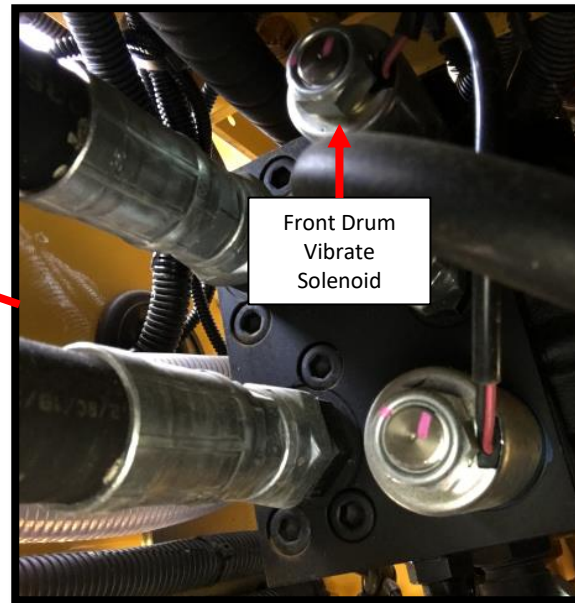
Yes, At the Front Vibrate Solenoid. Is there power on the Brown/White stripe wire?

No, Repair break in wire Brown/White stripe.

Yes, Remove coil from solenoid valve. Place metal instead. Does the coil magnetize?

No, replace defective coil or repair ground wire on coil.

Yes, replace defective solenoid valve. Or test vibrate motor and pressures.



Rear Drum will not vibrate

With Rear selected. Is there Power on the Green/White stripe at the F/R Mode Vibrator Switch?

No, Is there Power on the Red/Blue stripe at the F/R Mode Vibrator Switch?

No, Inspect fuse F9 (F15a). Is there power across the fuse?

Yes, Repair break in wire Red/Blue stripe.

No, replace fuse or inspect SBF 75a from battery relay.

Yes, Replace defective F/R Selector Mode Switch.

Yes, At the Front Vibrator Solenoid. Is there power on the Green/White stripe wire?

No, Repair break in wire Green/White stripe.

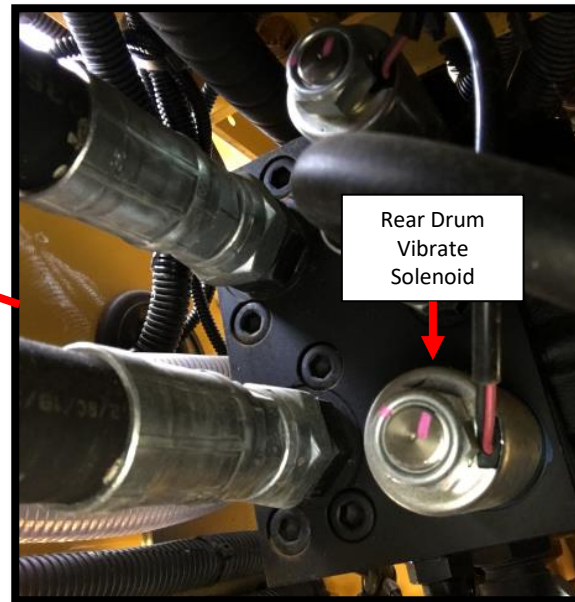
No, replace defective coil or repair ground wire on coil.

Yes, Remove coil from solenoid valve. Place metal instead. Does the coil magnetize?

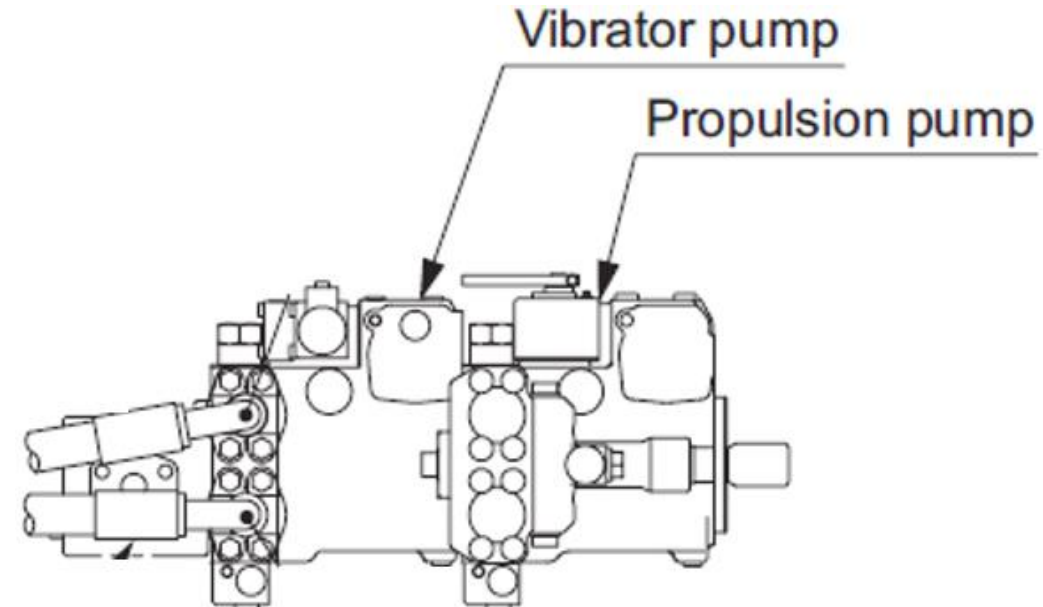
Yes, replace defective solenoid valve. Or test vibrator motor and pressures.



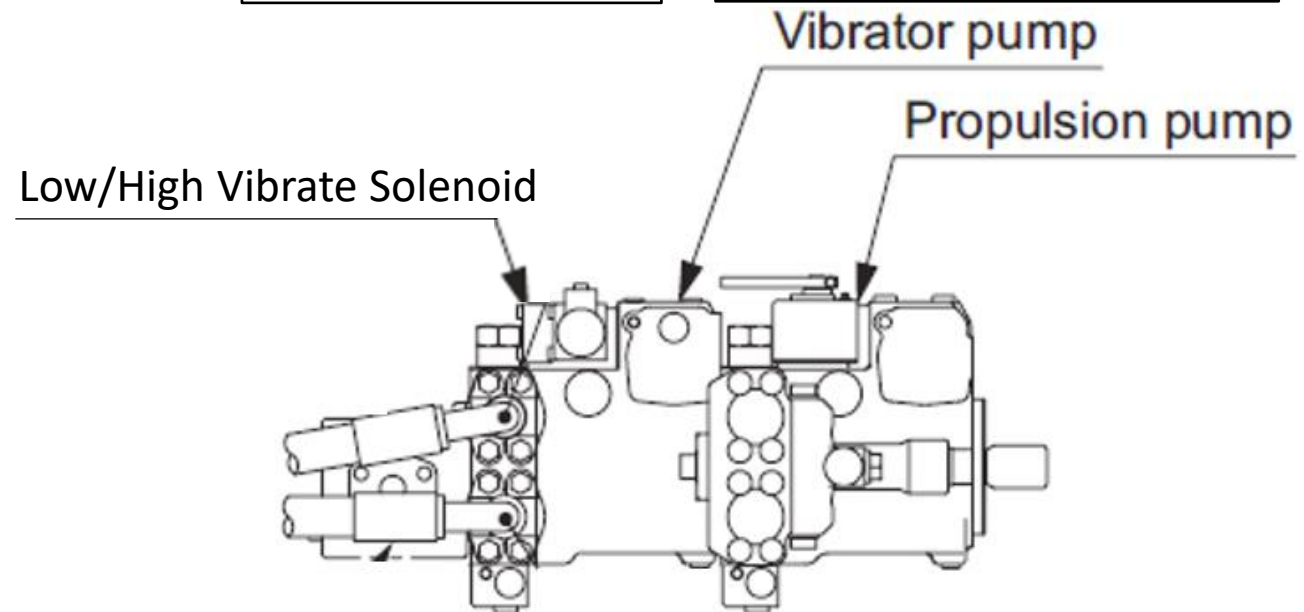
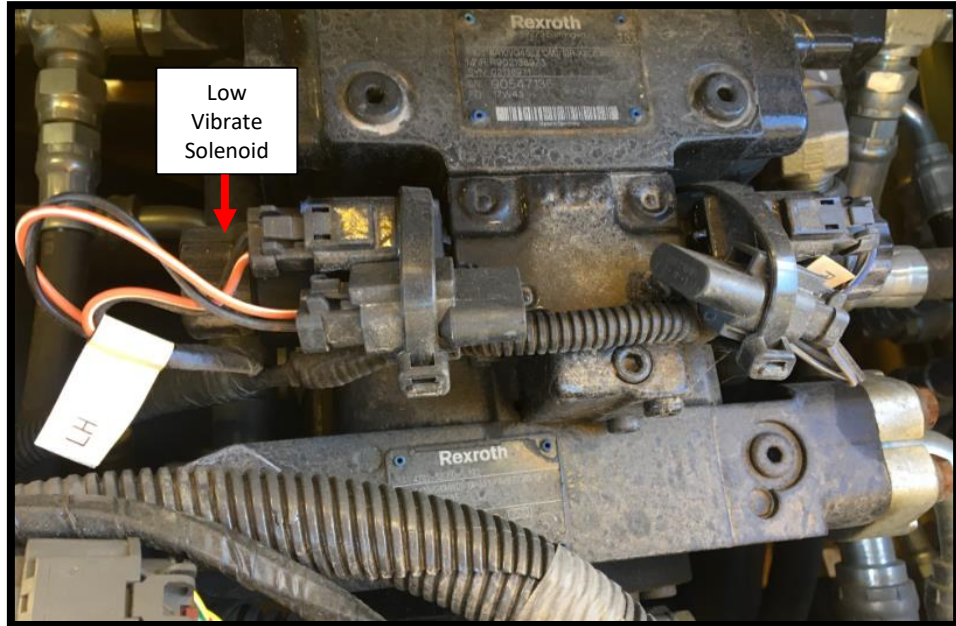
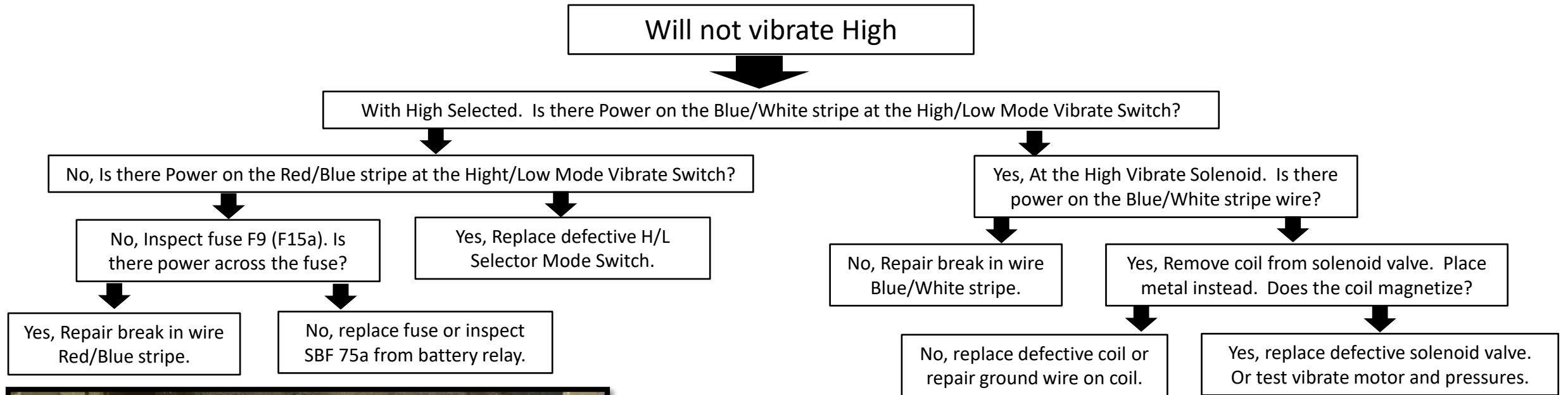
Behind Tank



Rear Drum Vibrator Solenoid



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Will not vibrate Low

With Low Selected. Is there Power on the Orange/White stripe at the High/Low Mode Vibrate Switch?

No, Is there Power on the Red/Blue stripe at the High/Low Mode Vibrate Switch?

No, Inspect fuse F9 (F15a). Is there power across the fuse?

Yes, Repair break in wire Red/Blue stripe.

No, replace fuse or inspect SBF 75a from battery relay.

Yes, Replace defective H/L Selector Mode Switch.

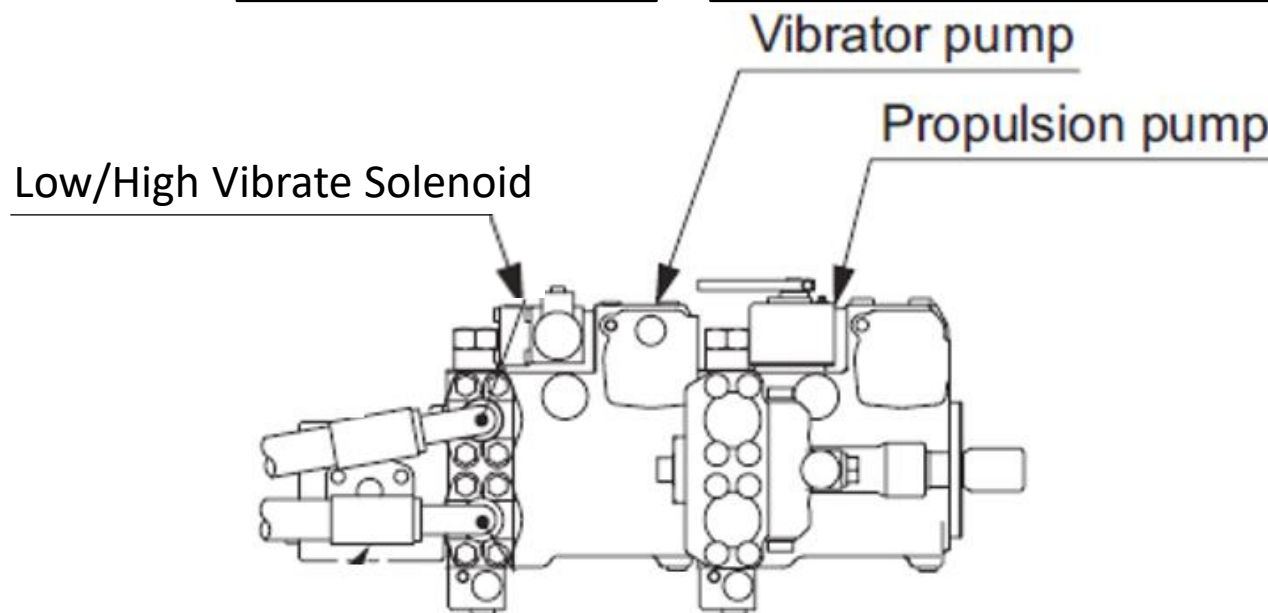
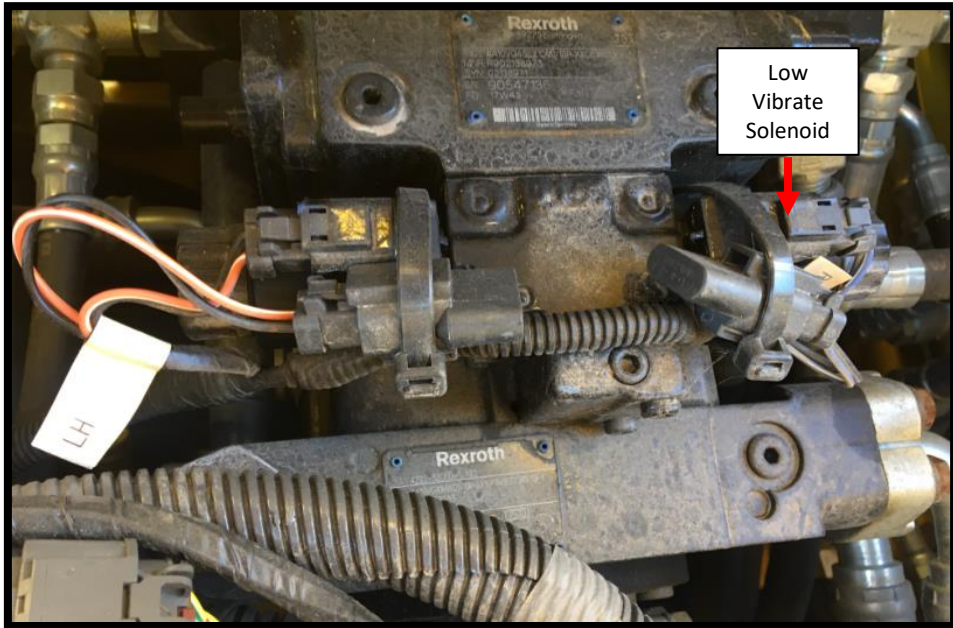
Yes, At the Low Vibrate Solenoid. Is there power on the Orange/White stripe wire?

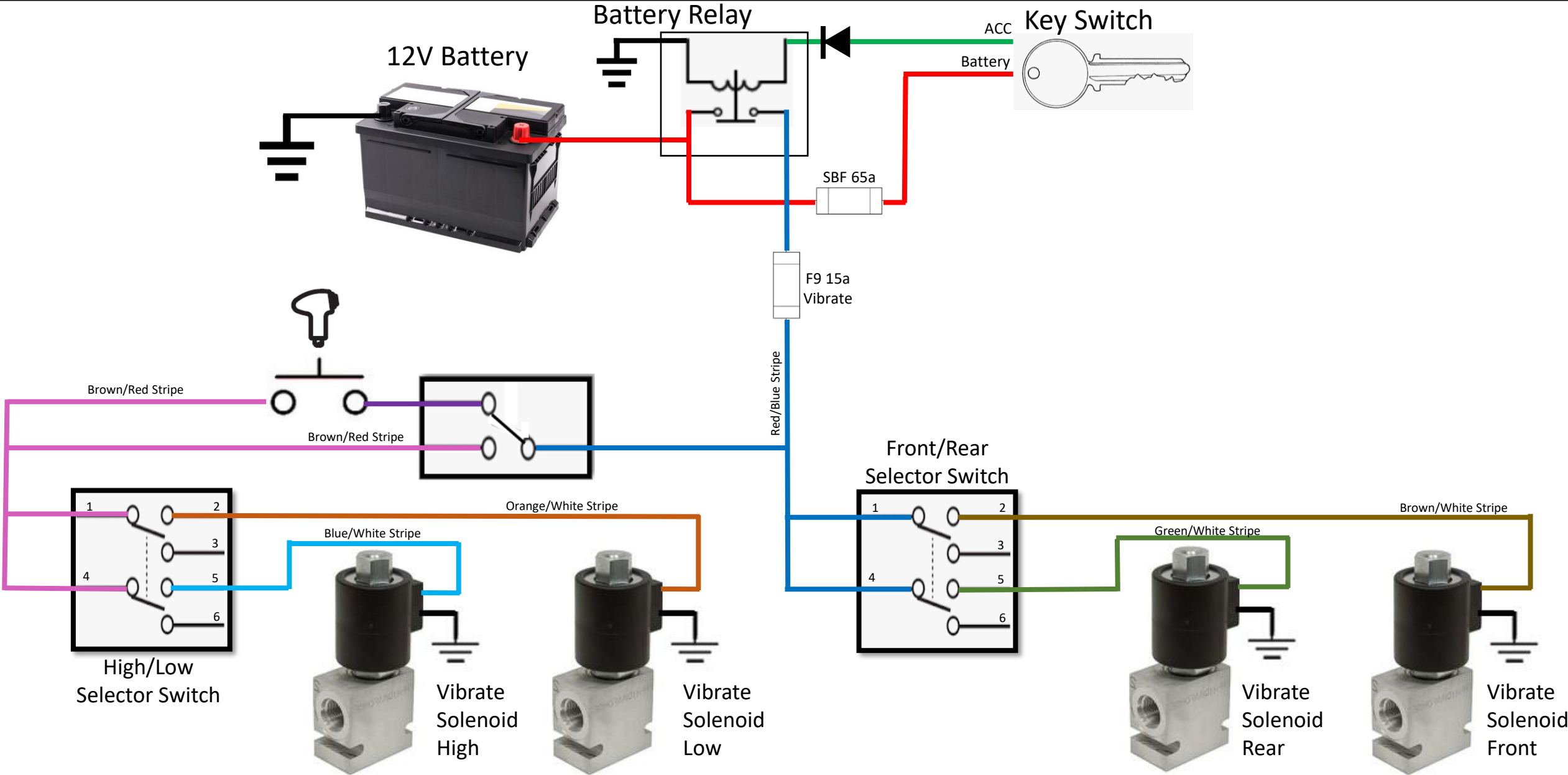
No, Repair break in wire Orange/White stripe.

No, replace defective coil or repair ground wire on coil.

Yes, Remove coil from solenoid valve. Place metal instead. Does the coil magnetize?

Yes, replace defective solenoid valve. Or test vibrate motor and pressures.





MEASUREMENT AND ADJUSTMENT OF VIBRATOR CIRCUIT PRESSURE

- Oil temperature during measurement : $50 \pm 5^{\circ}\text{C}$ ($122 \pm 9^{\circ}\text{F}$)

① Remove plugs from high pressure gauge port (2-5) and (2-13) of vibrator pump. Attach pressure gauge with adapter (Y) .

- Adapter (Y) : 7/16-20UNF
- High pressure gauge port : (2-5)
(Low amplitude/Oscillation)
- High pressure gauge port : (2-13)
(High amplitude/Normal)
- Pressure gauge : 0 to 50 MPa (0 to 7,250 psi)

② Confirm that F-R lever is "N".

③ Apply parking brake by pressing parking brake switch button.

④ Set shift lever to "1st".

⑤ Set vibratory drum select switch to "F/R".

⑥ Set vibration mode change switch to "F".

⑦ Start the engine and set throttle lever to "Full".

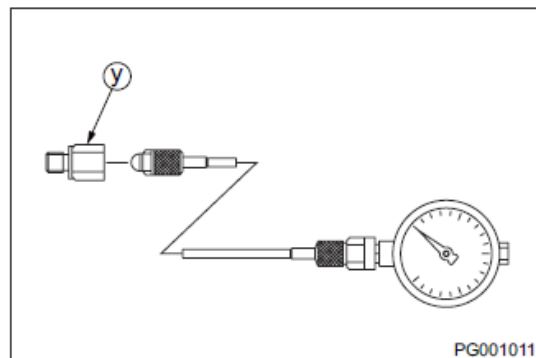
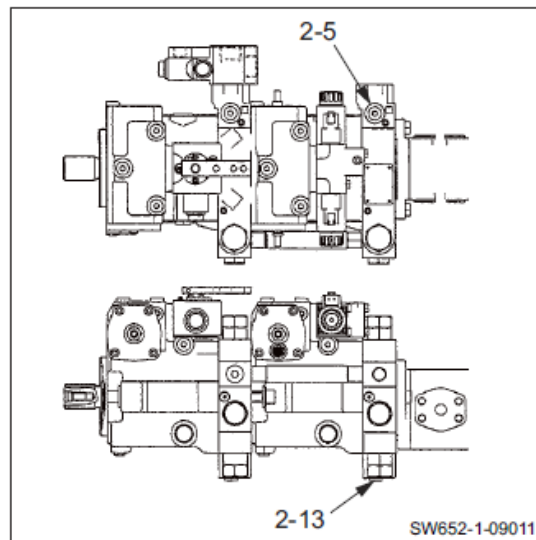
⑧ Press F-R lever vibration switch ON.

⑨ Slowly move F-R lever to forward or reverse side.

⑩ Read pressure gauge for maximum value of vibrator circuit pressure.

⑪ Turn F-R lever vibration switch OFF or move back F-R lever to "N" as soon as measurement is finished.

★ **Maximum circuit pressure (cut off valve setting)**
: 32.5 ± 1.0 MPa ($4,713 \pm 145$ psi)



① Check nut (1) of cut off valve (2-15) for evidence of having loosened.

② If there is evidence of nut having loosened, adjust cut off valve so that pressure becomes within maximum circuit pressure range while watching pressure gauge.

- To adjust pressure, loosen nut and turn adjustment screw (2).

Adjustment screw turned clockwise

: Pressure rise

Adjustment screw turned counterclockwise

: Pressure drop

Pressure change rate : 10 MPa/turn (1,450 psi/turn)

③ If there is no evidence of nut having loosened, remove cut off valve.

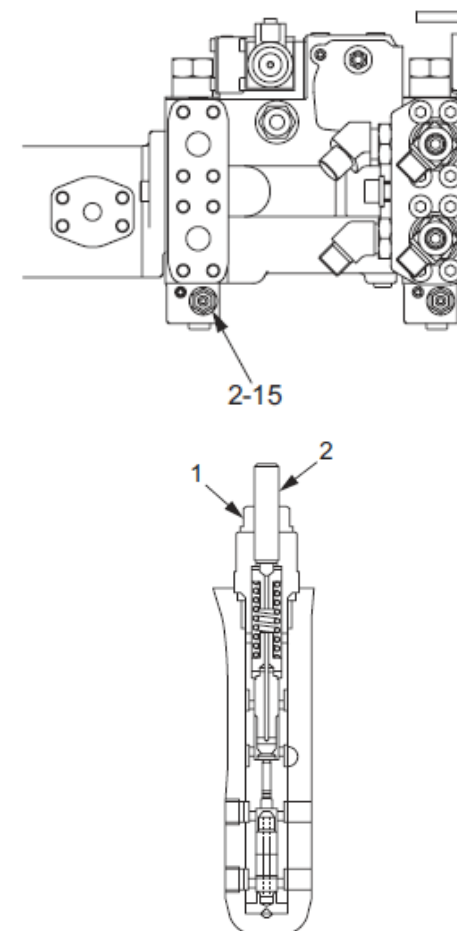
④ Check removed cut off valve for trapped dirt and scratches on its seat.

⑤ If trapped dirt is present, disassemble and clean cut off valve.

⑥ If a scratch is found on seat, replace cut off valve.

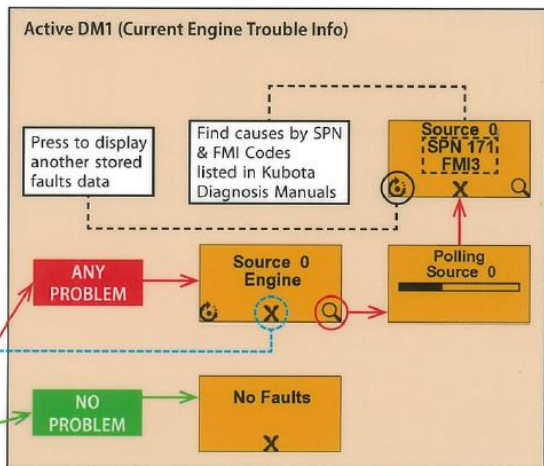
⑦ After adjustment, measure pressure again and check that pressure reaches maximum circuit pressure range.

- (1) Nut : 22 N·m (16 lbf-ft)
- (2-15) Cut off valve : 35 N·m (26 lbf-ft)



Engine Diagnosis

Active DM1 (Current Engine Error Code)



Code No.	Description
P0016	Crankshaft Position Sensor (NE)
P0087	Pressure Limiter Opening Abnormal
P0088	High Rail Pressure Abnormality
P0089	SCV Stuck
P0093	High Pressure Fuel Leak
P0112	Intake Air Temp Abnormal (Low)
P0113	Intake Air Temp Abnormal (High)
P0117	Coolant Temp Sensor Abnormal (Low)
P0118	Coolant Temp Sensor Abnormal (High)
P0182	Fuel Temp Sensor Abnormal (Low)
P0183	Fuel Temp Sensor Abnormal (High)
P0192	Rail Pressure Sensor Abnormal (Low)
P0193	Rail Pressure Sensor Abnormal (High)
P0200	Overcharge
P0201	Fuel Injector Cylinder 1 Open Circuit
P0202	Fuel Injector Cylinder 2 Open Circuit
P0203	Fuel Injector Cylinder 3 Open Circuit
P0204	Fuel Injector Cylinder 4 Open Circuit
P0217	Engine Overheat
P0219	Engine Overrun
P0335	Crankshaft Sensor Abnormal (Low)
P0336	Crankshaft Sensor Abnormal (High)
P0340	Camshaft Sensor Abnormal (Low)
P0341	Camshaft Sensor Abnormal (High)
P0380	Air Heater Relay Abnormality
P0400	EGR Feedback Abnormal
P0404	EGR Motor Temp Abnormal
P0628	SCV Abnormal (Low)
P0269	SCV Abnormal (High)

NOTE:
For full description and additional troubleshooting, please see the Kubota Diagnostic manual.



SW: 1.1
SW P/N: 1000B

Set Optimum Rotation Range
Low Limit

DPF EMPTY SELECT
20%
30%

Diagnostics
Active DM1
Stored DM2

Units
Metric
English

Contrast

Backlight Control
External
Internal

Main Screen
DPF Display

E: Empty

DPF Gauge indicates current DPF percentage level between zero (0) to twelve (12)

F: Full(12)

Left Botton(LB)

Right Botton(RB)

Center Botton(CB)

Levels 1 – 3 machine can be regen'd using the interior switch.

Level 4 – Diagmaster Needed to perform soot load reset, and force, reset intervals.

Level 5 – Diagmaster needed. Filter must be cleaned, and soot load reset performed along with intervals.

DO NOT FORCE REGEN WITHOUT CLEANING AT LEVEL 5!

Regen Conditions Needed:

1. Machine above 65 deg C or 150 deg F.
2. Apply the Parking Brake.
3. Engine at low Idle
4. No engine codes present

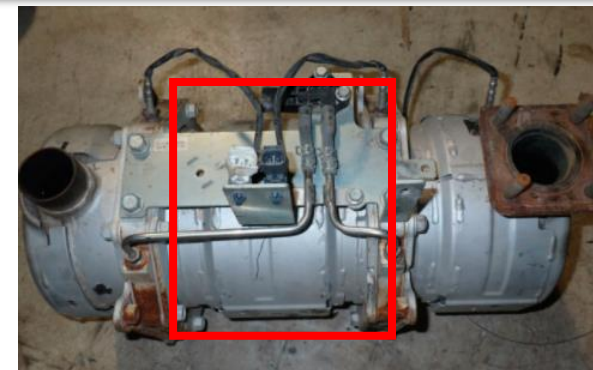
To Regen:

Press and Hold “Regen” button up to 10 seconds or until you hear engine pitch change and begin to idle up. **DO NOT TOUCH CONTROLS!** Leave machine alone until process has finished.

Level (Stage)	DPF Gauge	Green Lamp	Amber Lamp	Black Switch	Red Lamp	Auto RGN	Parked Manual RGN	Limit of Engine Output	Operations	
	DPF Gauge	Auto RGN	Parked RGN Request	Parked RGN	Emission Sys. Warning					
0 (No RGN Needed)	1 - 11	Off	Off		Lamp Off	No Need	No Need	NO	RGN is not required. Normal machine operation is available.	
1 (Auto RGN)	12 (Max) RGN may start even below level 12 according to amount of soot left at DPF.	Lamp On	Off		Lamp Off	Applicable	No Need	NO	When green lamp goes on during Auto RGN, keep engine RPM at Max for 30 min to perform best RGN. Normal machine operation is available.	
2 (Requesting Parked RGN)		Lamp On	Blinking		Lamp Off	Applicable	Applicable	NO	Perform a Parked RGN as early as possible by following instructions, "Procedure of Parked RGN" below, when the Amber lamp starts blinking while Green lamp is on. Parked RGN may be cancelled even though Amber lamp blinks, if Max RPM can be maintained for 30 min.	
3 (Parked RGN Urgent Request)		Blinking		Lamp On	Start Parked RGN by pushing the switch. Amber lamp blinking changes to light-on.	Lamp On	Not Applicable	Applicable	YES	URGENT: If Red Warning lamp turns on while the Green and Amber lamps are blinking a Parked RGN must be performed urgently to prevent possible costly repairs. If Red lamp doesn't go off after Parked RGN, access the engine error codes at DPF Meter and contact your Sakai dealer or company Techs.
4 (RGN with Service Tools)		Blinking	Off			Lamp On	Not Applicable	Not Applicable	YES	If Green lamp is blinking and Red lamp goes on, Parked RGN by operator is impossible. In this condition DPF may only be regenerated using special service tools. Contact your Sakai dealer or company Techs.
5 (DPF Cleaning)		Blinking	Off		Lamp On	Not Applicable	Not Applicable	YES	The engine controller may shut down the engine if above request for parked RGN are ignored. The engine will not restart until the DPF unit is replaced or cleaned using special tools. Contact your Sakai dealer or company Techs.	



Diesel Particulate Filter (DPF)





Engine Service Info in DPF Meter

Counterclockwise

Hold a right button (RB) about 10 sec.

DPF Gauge display is changed (goes down) to "RPM" as indicated by yellow arrow.

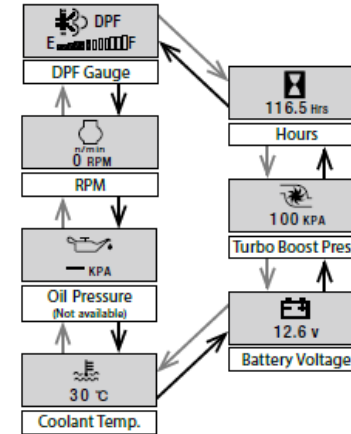
Every time pressing the RB, the display goes down as indicated by red arrows, and then comes back to DPF Gauge display.

Clockwise

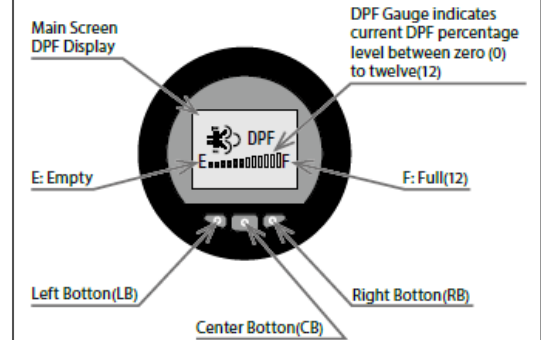
Hold a left button (LB) about 10 sec.

Display is changed from DPF Gauge to "Hours" at bottom as indicated by green arrow.

Every time the LB is pressed, the display goes up as indicated by green arrows, and then comes back to DPF Gauge display.



DPF Meter



Engine Diagnosis in DPF Meter

How to access to Engine Error Codes?

When Green lamp blinks on and Red lamp goes on, check engine error codes in the Diagnosis section of DPF Meter.

Hold Center button about 10 sec until next Display is shown.

"Metric or English", Press "X" at Center button.

"Contrast", Press "✓" at Center button.

"Backlight Control", Press "X" at Center button.

"Diagnosis", Select "Active DM1" and press "✓" at Right button.

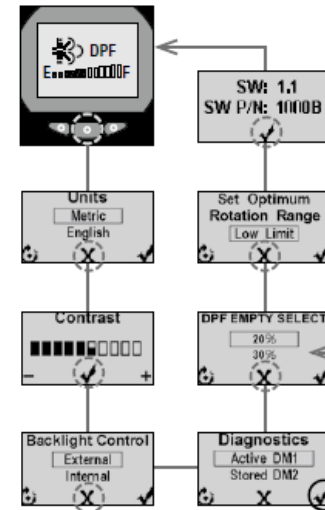
If no problem, display shows "No Faults", and then press "X" at Center button to move next display.

If there are problems, display shows "Source 0 Engine". Press "Q" at Right button.

"SPN and FMI" code numbers are displayed after showing "Polling Source" with bar graph.

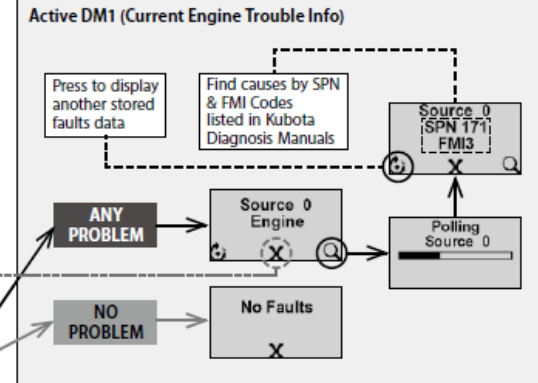
To see another error codes, press "Q" at Left button, then press "X" at Center button to move next display.

Contact Sakai dealer or company Techs to let them know the codes.

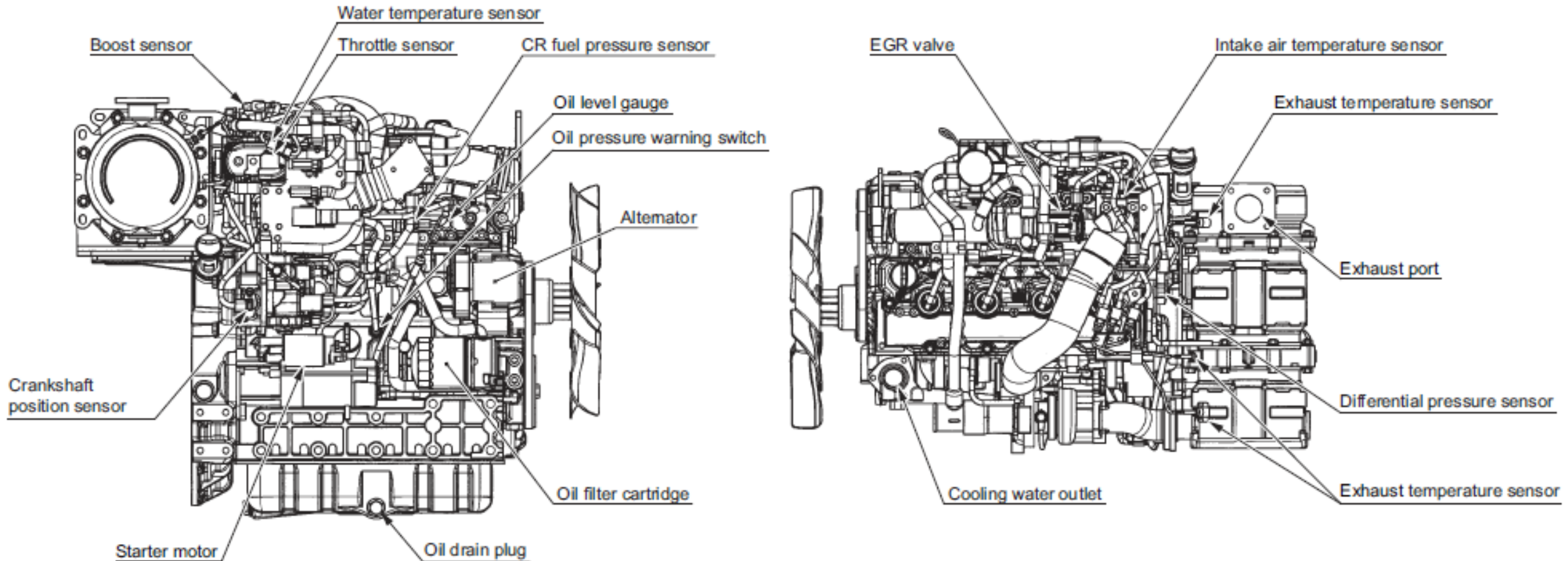


Engine Diagnosis

Active DM1 (Current Engine Error Code)

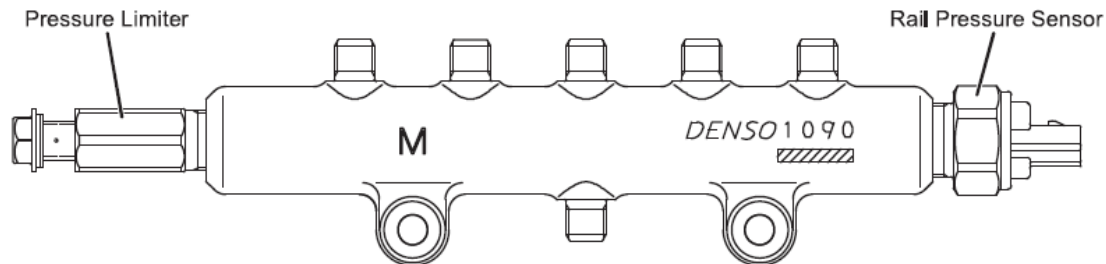


Sensor Locations



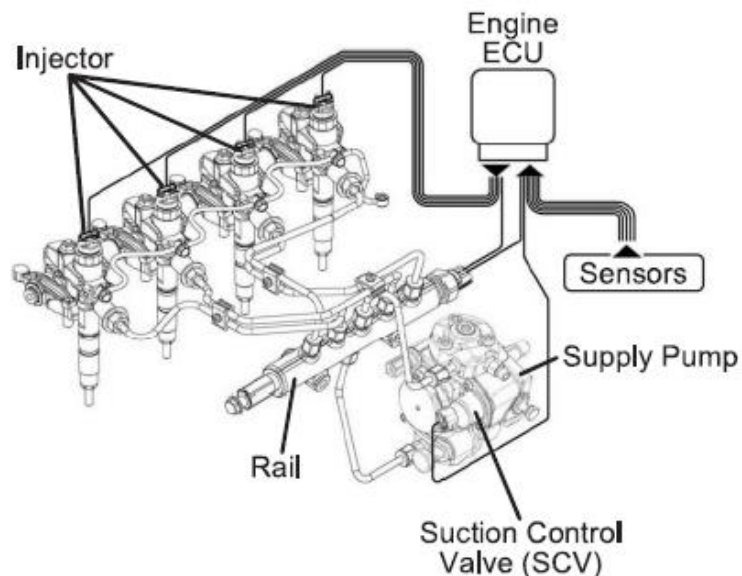
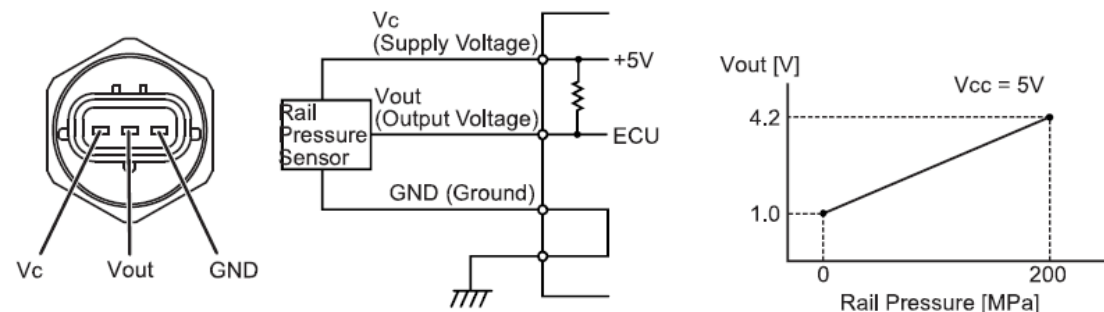
Part Name	DENSO Part Number	Car Manufacturer Part Number
Supply Pump	294000-069#	1J574-50501
Injector	095000-680#	1J574-53051
Rail	095440-109#	1J574-50601
Engine ECU	275800-722#	1J574-59053
Accelerator Position Sensor	198300-719#	1J574-59701
Cylinder Recognition Sensor	949979-186#	1J574-59711
Crankshaft Position Sensor	949979-038#	1J574-59661
Coolant Temperature Sensor	179700-022#	5H601-41941
Boost Pressure Sensor	079800-559#	1J574-59671
Intake Air Temperature Sensor	071500-249#	1J574-59681

- The rail accumulates pressurized fuel (0 to 130 MPa) delivered from the supply pump for distribution to the injector for each cylinder. A rail pressure sensor, and pressure limiter are attached to the rail.
- The rail pressure sensor (Pc sensor) detects rail internal fuel pressure, and sends a signal to the engine ECU; the pressure limiter control excess pressure. These devices ensure optimum combustion and reduce combustion noise.



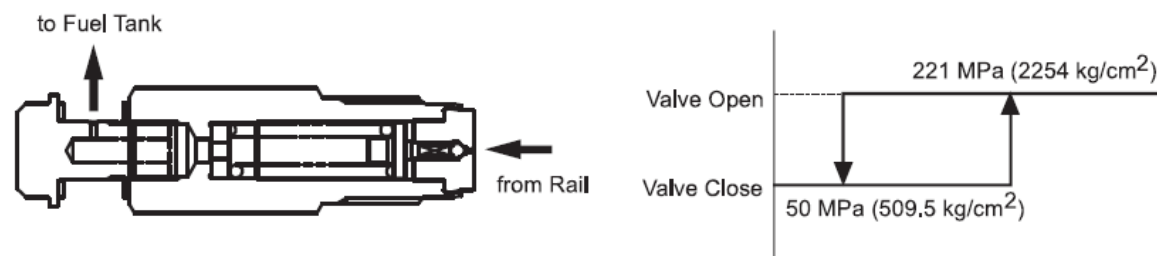
Rail Pressure Sensor

- The rail pressure sensor detects fuel pressure inside the rail, and sends a signal to the engine ECU. The rail pressure sensor is made from a semiconductor, and uses the "Piezoelectric Resistive Effect" to detect changes in electrical resistance based on the pressure applied to the elemental silicon. In comparison to the conventional rail pressure sensor, this sensor responds better to high pressure.



Pressure Limiter

- The pressure limiter releases pressure when the rail internal pressure becomes abnormally high. The pressure limiter opens when internal pressure reaches approximately 221MPa (2254 kg/cm²), and closes when rail pressure reaches a given set pressure. Fuel released from the pressure limiter is returned to the fuel tank.

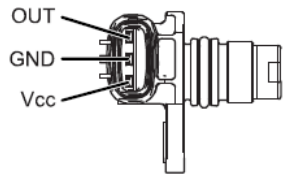


Crankshaft position sensor (NE sensor) and cylinder recognition sensor (G)

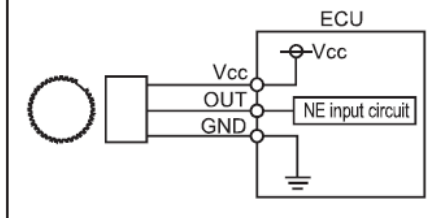
Crankshaft Position Sensor (NE)

- The crankshaft position sensor is installed near the flywheel pulsar gear on the flywheel to detect the crankshaft angle, and output the engine speed signal. The sensor unit is an MRE (Magnetic Resistance Element) type. The pulsar gear has 56 pulses.

Exterior Diagram

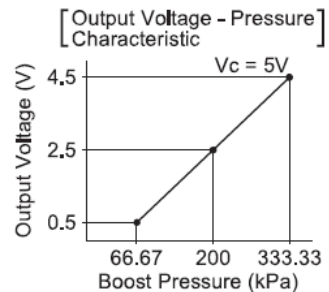
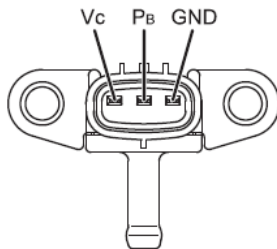
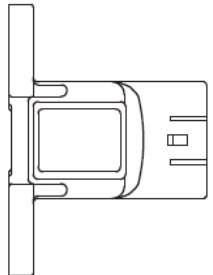


Circuit Diagram



Boost pressure sensor

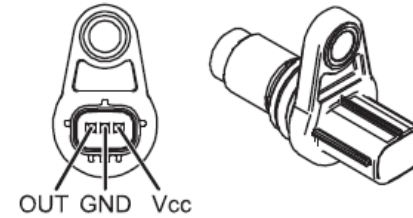
- The boost pressure sensor is identical to the conventional sensor in construction and operational characteristics. The boost pressure sensor uses the "Piezoelectric Resistive Effect" to detect air pressure inside the intake manifold. Under the "Piezoelectric Resistive Effect", changes in electrical resistance accompany changes in voltage applied to the silicon element inside the sensor.



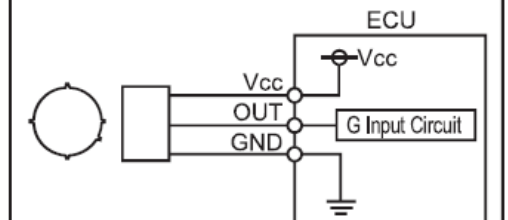
Cylinder recognition sensor (G)

- The cylinder recognition sensor is installed near the camshaft pulsar gear to identify each cylinder. The sensor unit is an MRE type. The pulsar gear has five pulses.

Exterior View Diagram



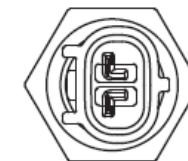
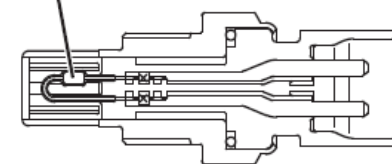
Circuit Diagram



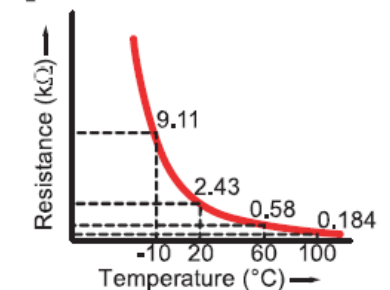
Intake air temperature sensor

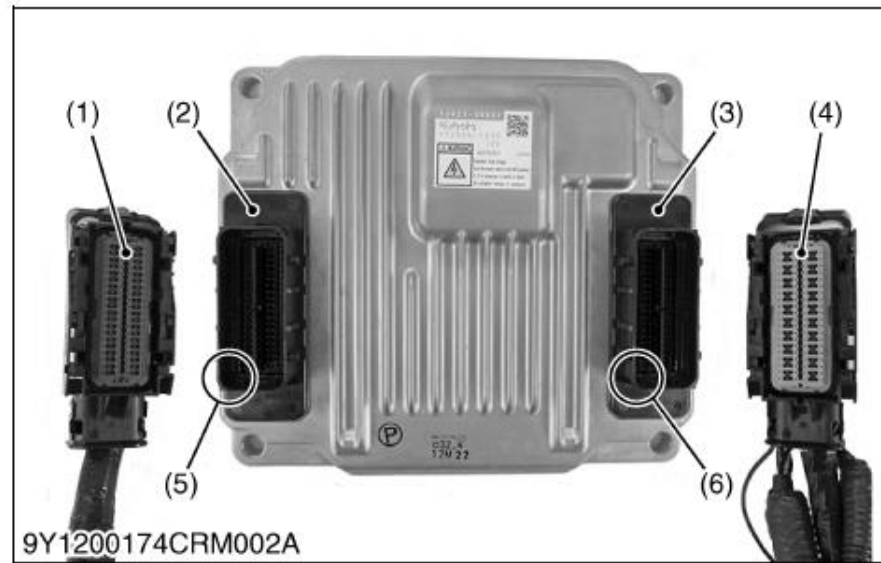
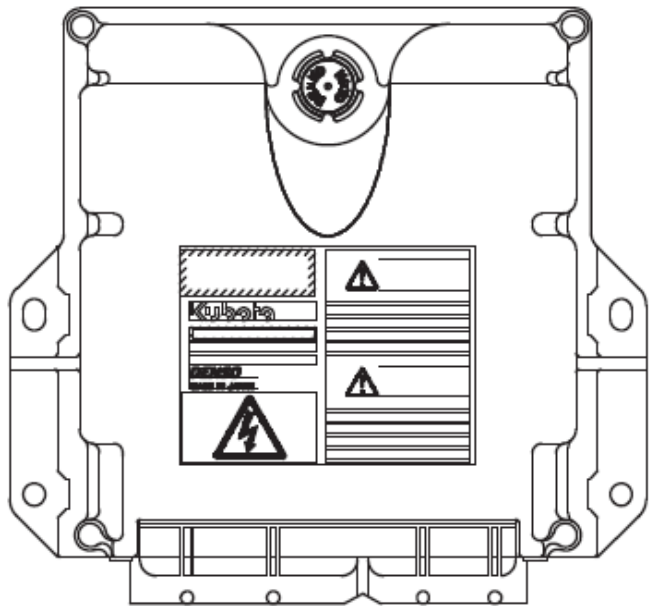
- The intake air temperature sensor detects the temperature of the intake air that has passed through the turbocharger. The sensor portion of the unit that detects the temperature contains a thermistor. The electrical resistance of the thermistor changes with temperature to detect the intake air temperature.

Thermistor



[Intake Air Temperature Sensor Resistance - Intake Air Temperature] Characteristic





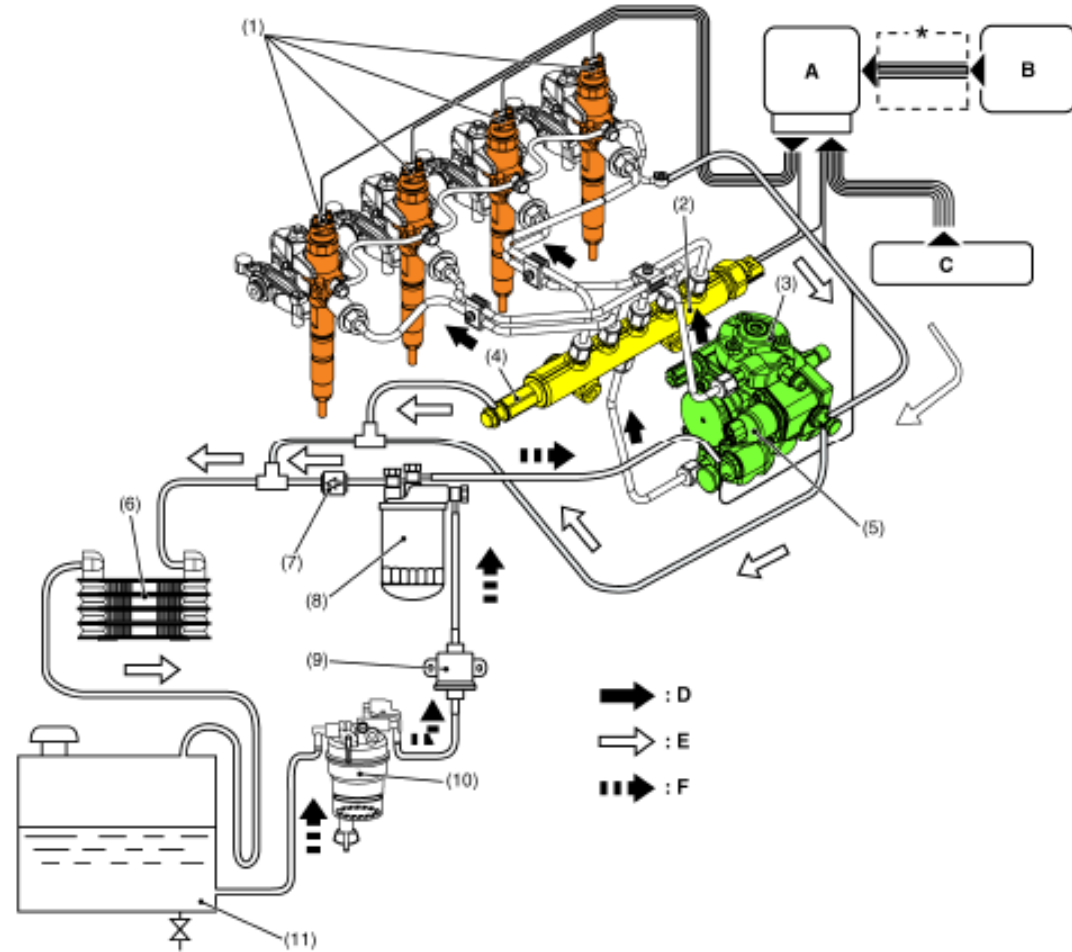
- (1) ECU Wiring Harness Connector 1 (Engine Side)
- (2) ECU Connector 1 (Engine Side)
- (3) ECU Connector 2 (Machine Side)
- (4) ECU Wiring Harness Connector 2 (Machine Side)
- (5) E01 Pin Position
- (6) V01 Pin Position

Engine Side Harness Pin Layout

E01				E05				E10				E15				E20					
ITV+								SCV+	SCV-					A-VCC1	COM1	TWV1	TWV3		COM2	TWV2	TWV4
ITV-								SCV+	SCV-					A-VCC2	COM1	TWV1	TWV3		COM2	TWV2	TWV4
E21				E25				E30				E35				E40					
E41				E45				E50				E55				E60					
		ODPF	IDOC	DPS		THA	THF	P FUEL2				NE+	G-VCC	G-GND	INJ-SLD	THA RTN	A-GND3	THF RTN			
		ODOC			THW	PIM	P FUEL1	AFS				NE-	G+		NE-SLD	THW RTN	PIM RTN	PFUEL RTN			
E61				E65				E70				E75				E80					

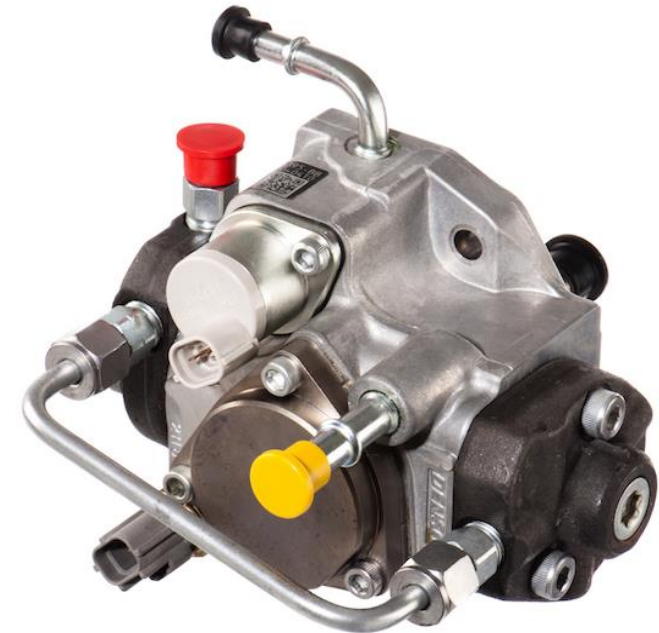
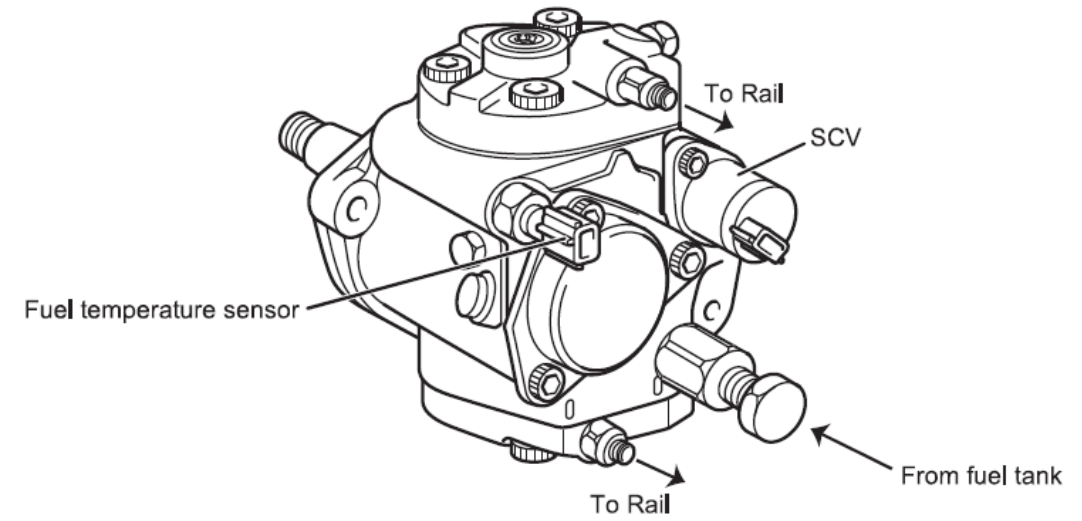
Machine Side Harness Pin Layout

V01				V05				V10				V15				V20			
+BF		MREL		STA-RLY	OIL-LAMP	GL-LAMP	STOP LAMP	ENG-WL			STA-SW	IG-SW	SPD		CAN1-L	CAN2-L	+BP	BATT	CASE-GND
+BF		MREL	GRLY	AR-LAMP	OH-LAMP	PRR-LAMP	OIL-SW	N-SW			STOP-SW	IG-SW			CAN1-H	CAN2-H	+BP	P-GND	S-GND
V21				V25				V30				V35				V40			
V41				V45				V50				V55				V60			
				A-GND10	APS1-GND	APS1	ITS	IATS	A-VCC10	A-VCC11							+BP	P-GND	S-GND
				A-GND11	APS2-GND	APS2			A-VCC12				RI-SW	P-SW			+BP	P-GND	P-GND
V61				V65				V70				V75				V80			



- (1) Injector
- (2) Rail
- (3) Supply Pump
- (4) Pressure Limiter
- (5) SCV (Suction Control Valve)
- (6) Fuel Cooler
- (7) Check Valve
- (8) Fuel Filter
- (9) Fuel Feed Pump
- (10) Water Separator
- (11) Fuel Tank

- A: ECU for Engine
- B: ECU for Machine
- C: Sensors
- D: Injected Fuel Flow
- E: Returned Fuel Flow
- F: Feed Fuel Flow



MAF Sensor Error 132

SPN 3251 FMI 3

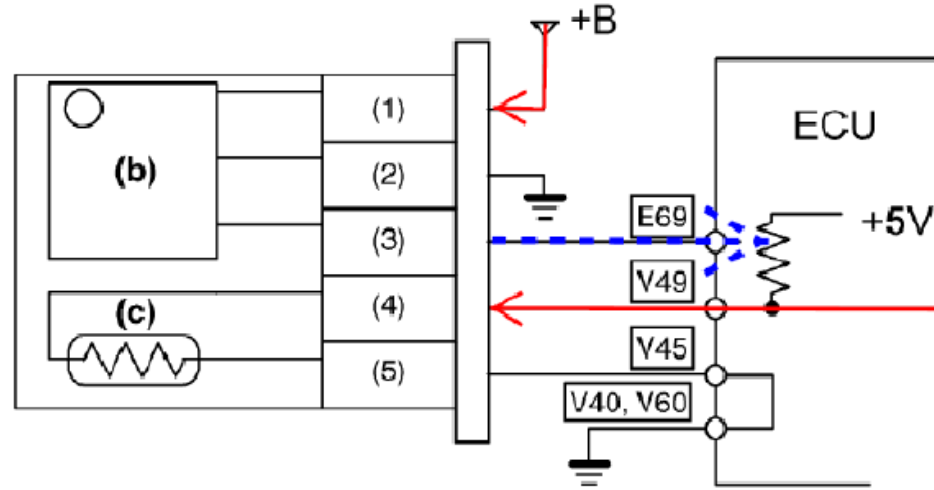
DPS (Differential Pressure Sensor Voltage Error (High)

1. Check Voltage signal back to ECU above 4.7v
2. Broken wires or Faulty Wires.

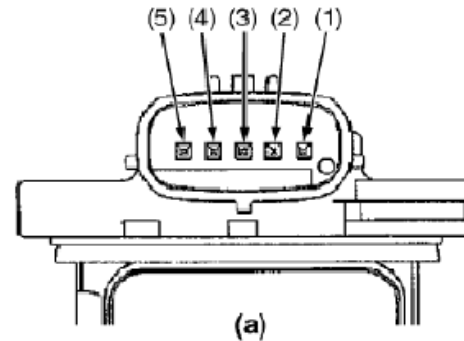
SPN 3251 FMI 4

DPS (Differential Pressure Sensor Voltage Error (Low)

1. Check Voltage signal back to ECU below .2v
2. Broken wires or Faulty Wires.



- Pin 1 – 12 VDC from Battery
- Pin 2 – Frame ground
- Pin 3 – Signal to ECU
- Pin 4 – 5 VDC from ECU
- Pin 5 – ECU ground



Signal wire goes to ECU pin E69 which is E12 on the Harness.



Code 3251 – DPS Error (Differential Pressure Sensor)

SPN 3251 FMI 3

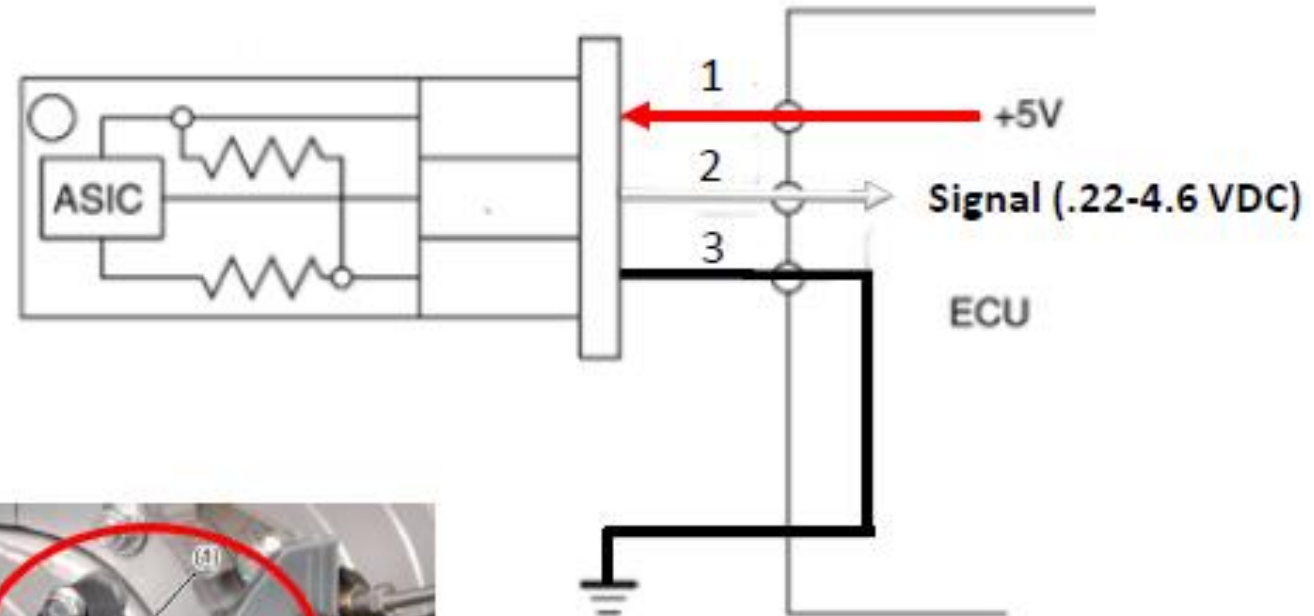
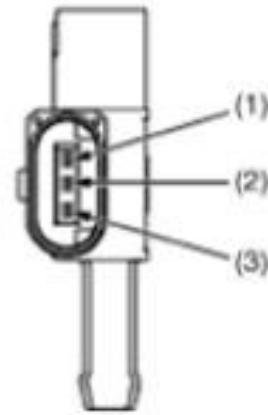
DPS (Differential Pressure Sensor Voltage Error (High)

1. Check Voltage signal back to ECU above 4.7v
2. Broken wires or Faulty Wires.

SPN 3251 FMI 4

DPS (Differential Pressure Sensor Voltage Error (Low)

1. Check Voltage signal back to ECU below .2v
2. Broken wires or Faulty Wires.



High Frequency Regen Code P3024

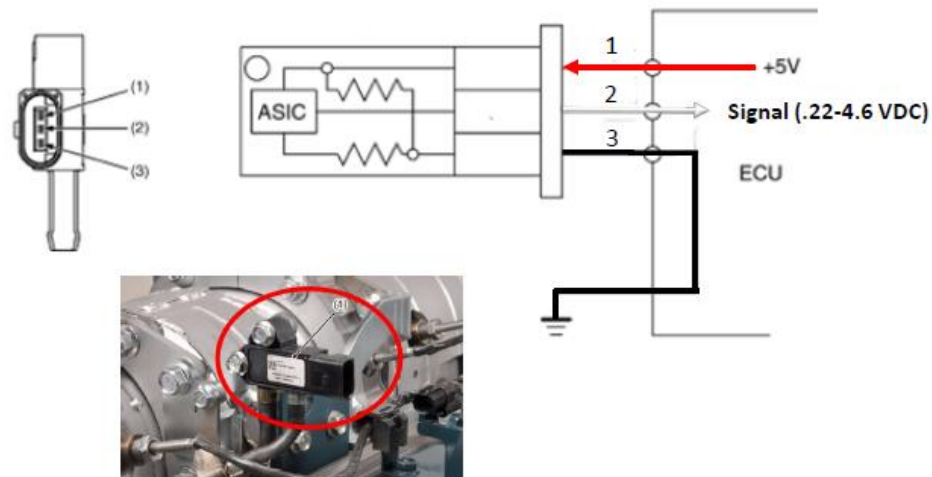
P3024 – High Frequency Regen

1. Reset Interval for Regen Request.
2. Reset Code in DTC.
If Code reappears, check the following.
3. Inspect Turbo/Air Intake for Oil.
4. Test Differential Pressure Sensor.
5. Check PM Quantity, if above 16k
filter must be cleaned or replaced.

Differential Pressure Sensor (DPS)



Inspect Turbo for Oil



T0 – Black Connector →

4765

0	Exhaust gas temperature sensor 0: High
2	Invalid DOC Inlet Temperature (T0) Data
3	Exhaust gas temperature sensor 0: High
4	Exhaust gas temperature sensor 0: Low

T1 – Grey Connector →

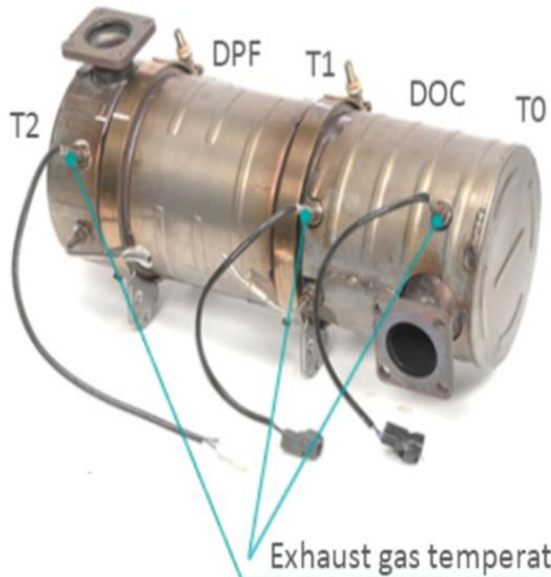
3242

0	Exhaust gas temperature sensor 1: High
3	Exhaust gas temperature sensor 1: High
4	Exhaust gas temperature sensor 1: Low

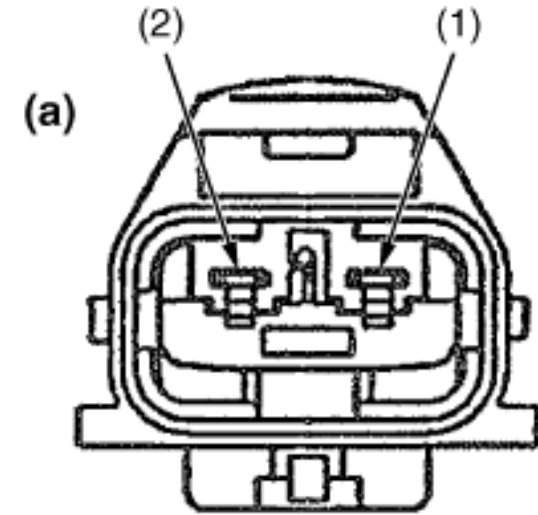
T2 – White Connector →

3246

0	Exhaust gas temperature sensor 2: High
3	Exhaust gas temperature sensor 2: High
4	Exhaust gas temperature sensor 2: Low



- **T0** – Inlet Temp.
- **T1** – Intermediate Temp. between DOC and DPF.
- **T2** – Outlet Temp. to the Muffler.



9Y1200244CRS025A

Factory specification

Temperature	Resistance
100 °C (212 °F)	Approx. 18.3 kΩ
150 °C (302 °F)	Approx. 7.88 kΩ
200 °C (392 °F)	Approx. 4.00 kΩ
250 °C (482 °F)	Approx. 2.30 kΩ

OK	Wiring harness open circuit or connector fault → Check and repair.
NG	Exhaust gas temperature sensor fault → Replace the exhaust gas temperature sensor 0 (T0).

(1) Terminal A-GND3

(2) Terminal IDOC