

SAKAI

MASTERS OF COMPACTION



R2-4

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.



R2-4 Operators Manual
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Kubota V3307 Engine Specifications

Engine Model Kubota V3307
 Engine Type 4-Stroke, vertical, water-cooled diesel
 Number of Cylinders 4
 Total displacement, cc (cu.in) 3331 (203.3)
 Engine Bore, mm (in) 94.0 (3.70)
 Engine Stroke, mm (in) 120.0 (4.72)
 Rated Engine Power, hp (kW) 74.3 (55.4)
 Rated Engine Speed, rpm 2600
 Maximum Engine Speed, rpm 2820
 Idle Speed, rpm 775-825
 Compression Ratio 20:1
 Firing Order 1-3-4-2
 Lubrication System Forced lubrication by trochoid pump
 Oil Filter Type Full Flow Paper

Fuel System


Fuel System Type Direct injection
 Fuel Injection Pump Bosch PFR4KZ
 Injection Nozzle Bosch P type
 Governor Type All speed mechanical governor
 Injection Pressure, MPa (psi) 18.63 (2702) 1st stage, 22.56 (3271) 2nd stage
 Injection Timing, rad (deg) 0.023 (1.3) after T.D.C.

Cylinder Head and Valves

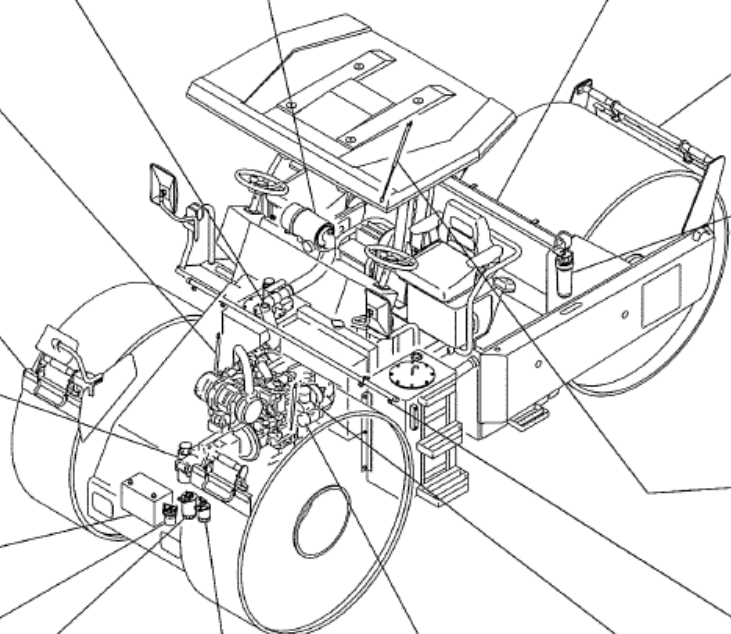
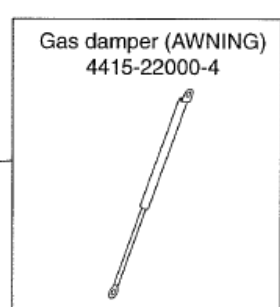
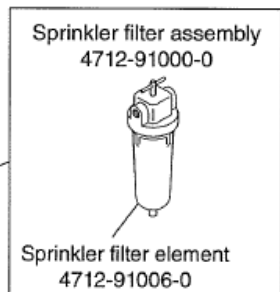
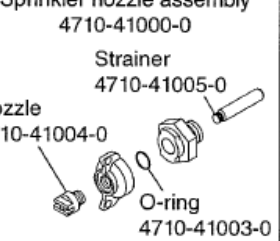
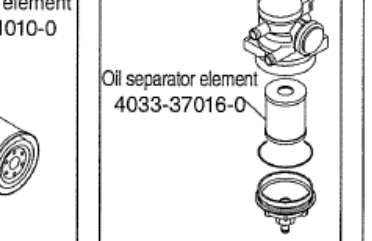
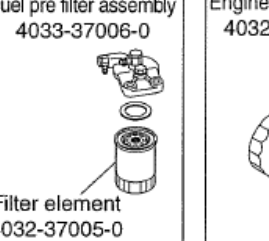
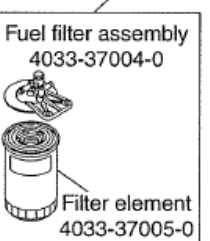
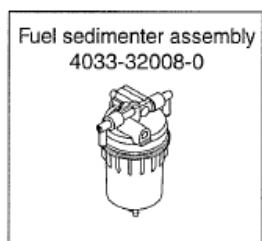
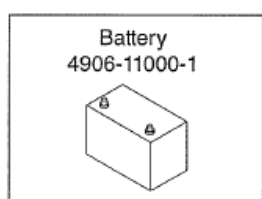
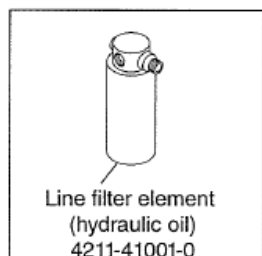
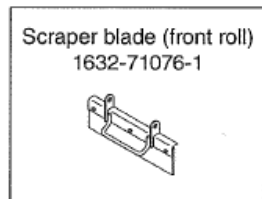
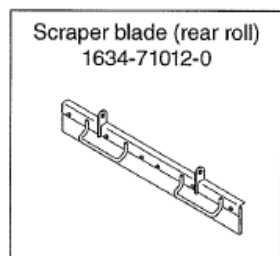
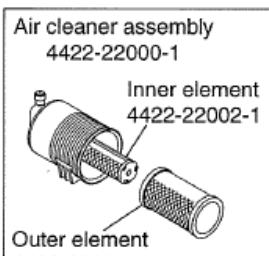
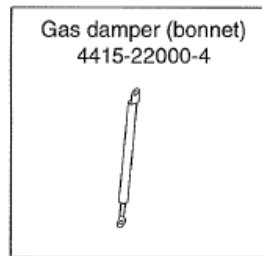
Cylinder Head Surface Flatness 0.05 mm (0.002 in.)
 Valve Clearance (Cold) 0.13-0.17 mm (0.0052-0.0068 in.)
 Top Clearance 0.60-0.80 mm (0.024-0.031 in.)
 Valve Recessing (Intake and Exhaust) 0.65-0.85 mm (0.026-0.033 in.)
 Compression Pressure 3.92 MPa (569 psi)

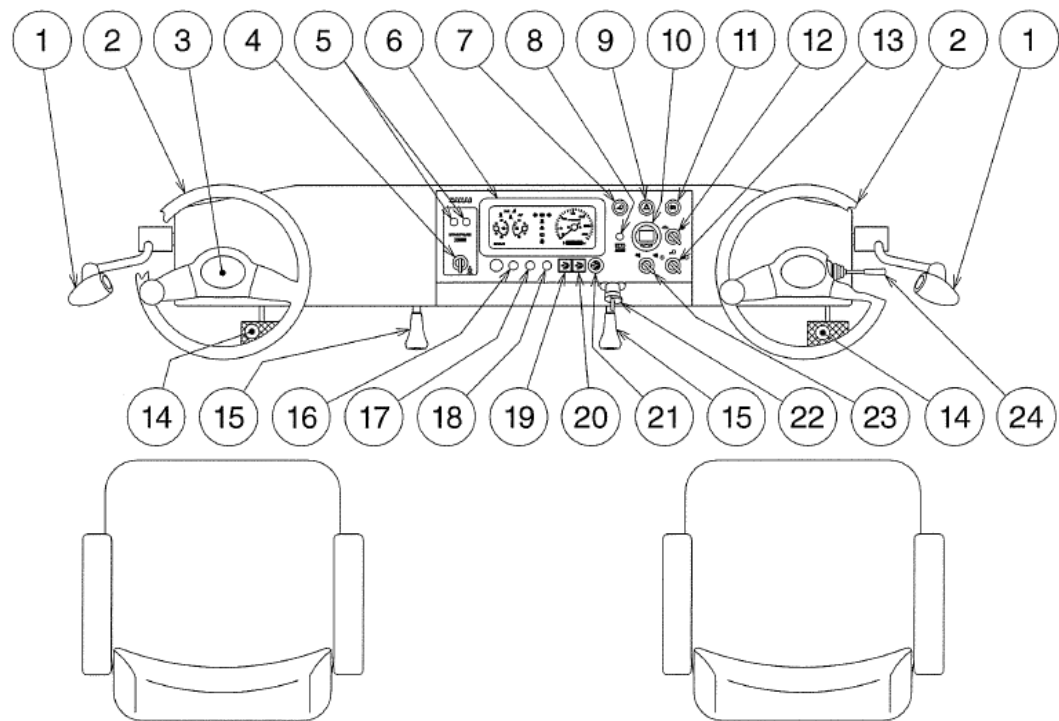
Lubricant	Service classification	Ambient temp. and applicable viscosity rating			Applicable Standards
		-15 to 30°C (5 to 86°F) Cold	0 to 40°C (32 to 104°F) Moderate	15 to 55°C (59 to 131°F) Tropical	
Engine oil	API-CJ-4 or JASO DH-2	SAE10W-30	SAE10W-30	SAE10W-30	—
Gear oil	API grade GL5	SAE80W-90	SAE90	SAE140	MIL-L-2105
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

Item	Standard value
Engine oil pan	11 L (2.9 gal.)
Fuel tank	100 L (26 gal.)
Coolant	9.0 L (2.4 gal.)
Gear box (front)	3.2 L × 2 (0.8 gal. × 2)
Gear box (rear)	3.6 L (1.0 gal.)
Hydraulic oil tank	85 L (22.5 gal.)
Water spray tank	680 L (180 gal.)

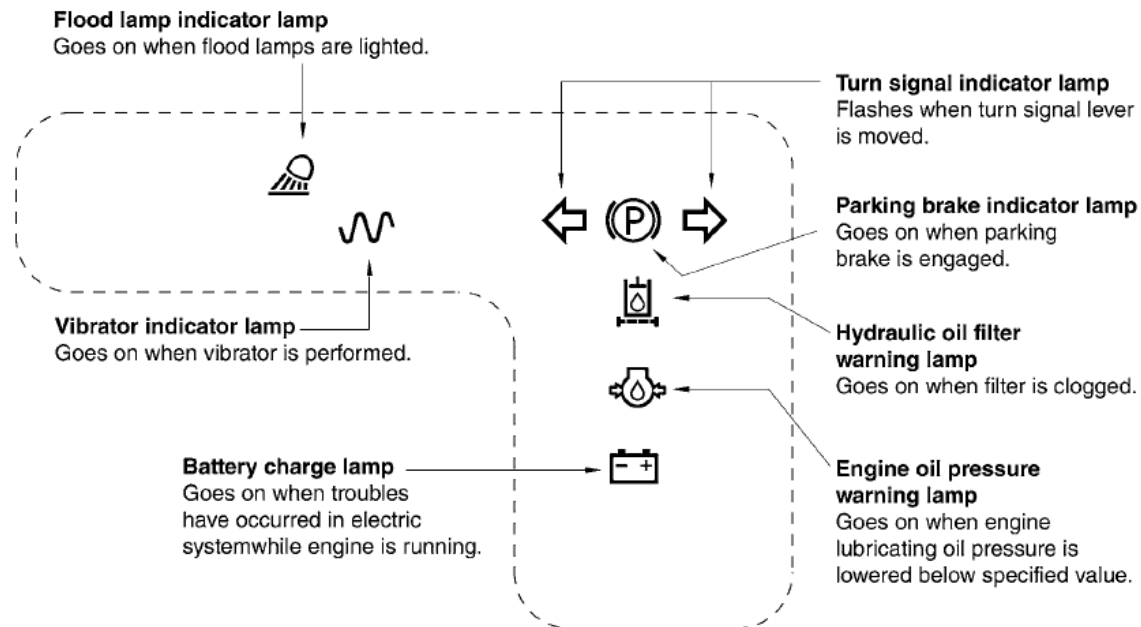
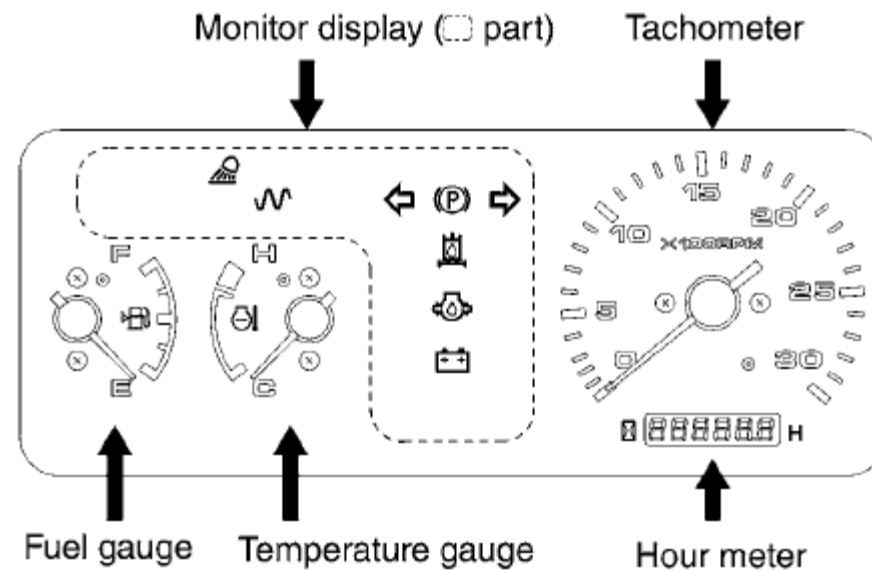
Item		Standard value		Remarks	
Propulsion	High pressure relief valve setting	41.8 ± 1.0 MPa	(6,061 ± 145 psi)	at 1,800 min ⁻¹	
	Charge relief valve setting	2.4 ± 0.2 MPa	(348 ± 29 psi)		
	Case pressure	Pump	0.3 MPa	(43.5 psi)	or less
		Front motor	0.3 MPa	(43.5 psi)	or less
		Rear motor	0.3 MPa	(43.5 psi)	or less
	Brake release pressure	Front motor	1.3 to 1.7 MPa	(189 to 247 psi)	
		Rear motor	1.3 to 1.6 MPa	(189 to 232 psi)	
		Rear axle	—		
	Motor drainage	Front motor	4.8 L/min	(1.3 gal./min)	
Rear motor		5.7 L/min	(1.5 gal./min)		
Steering oil pressure		17.6 ± 1.0 MPa	(2,552 ± 145 psi)	(orbitroll relief pressure + charge relief pressure)	

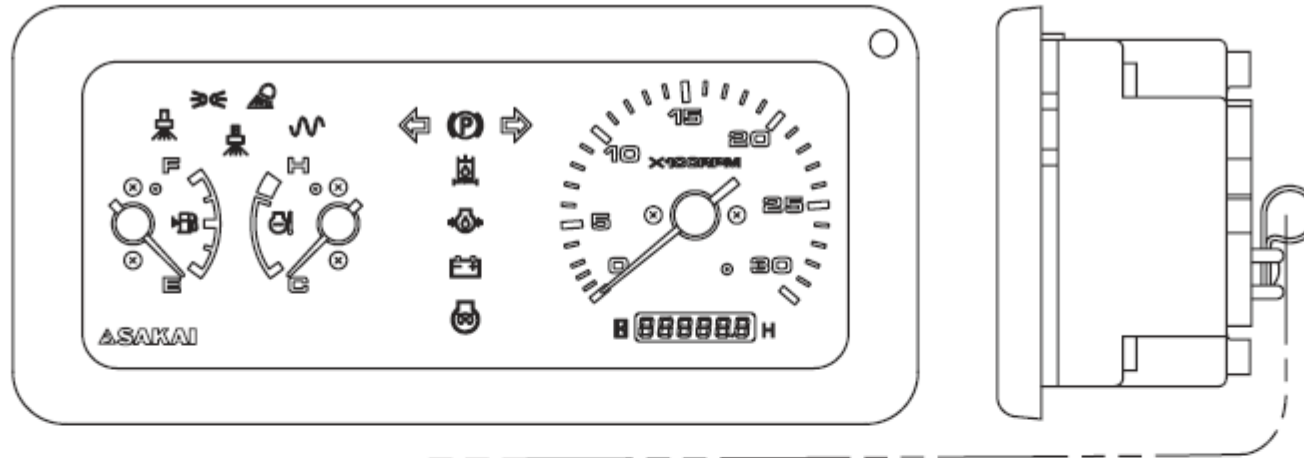






- | | | |
|---|------------------------|--|
| ① Forward-Neutral-Reverse lever (F-N-R lever) | ⑩ DPF meter | ⑲ Auto regeneration lamp (green) |
| ② Steering wheel | ⑪ Parking brake switch | ⑳ Parked regeneration request lamp (amber) |
| ③ Horn switch | ⑫ Speed shift switch | ㉑ Parked regeneration switch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





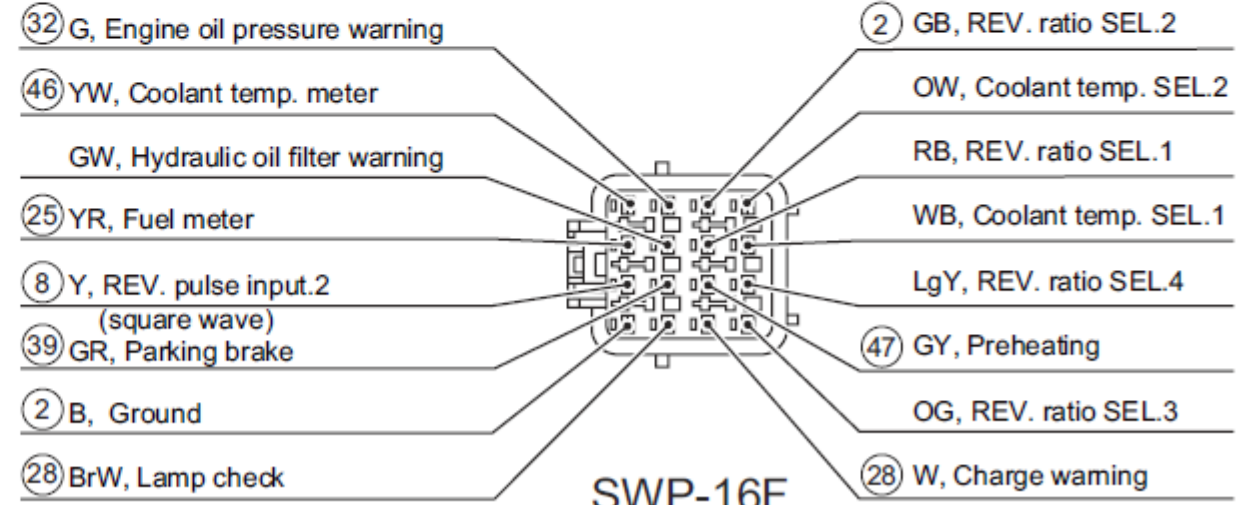
Harness side

2	28	28	*
B	BrR	BrR	*
8	39	47	*
Br	YL	GL	*
25	*	*	*
YB	*	*	*
46	32	2	*
YW	YG	B	*

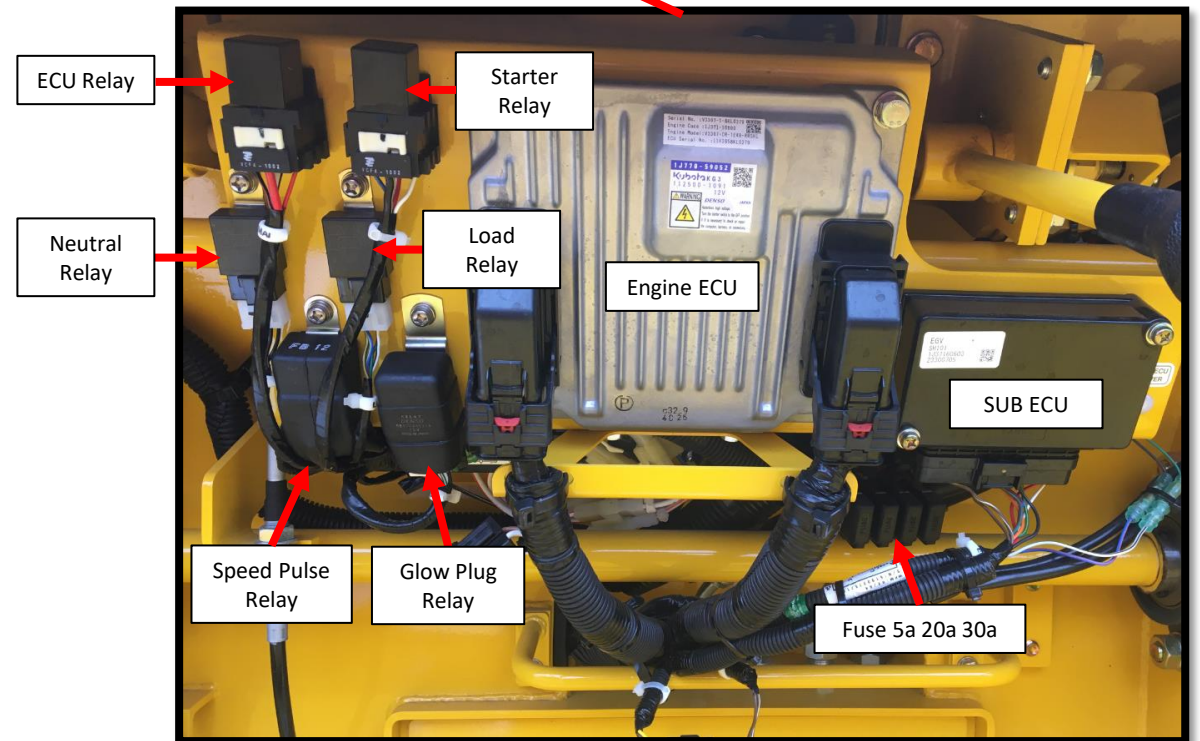
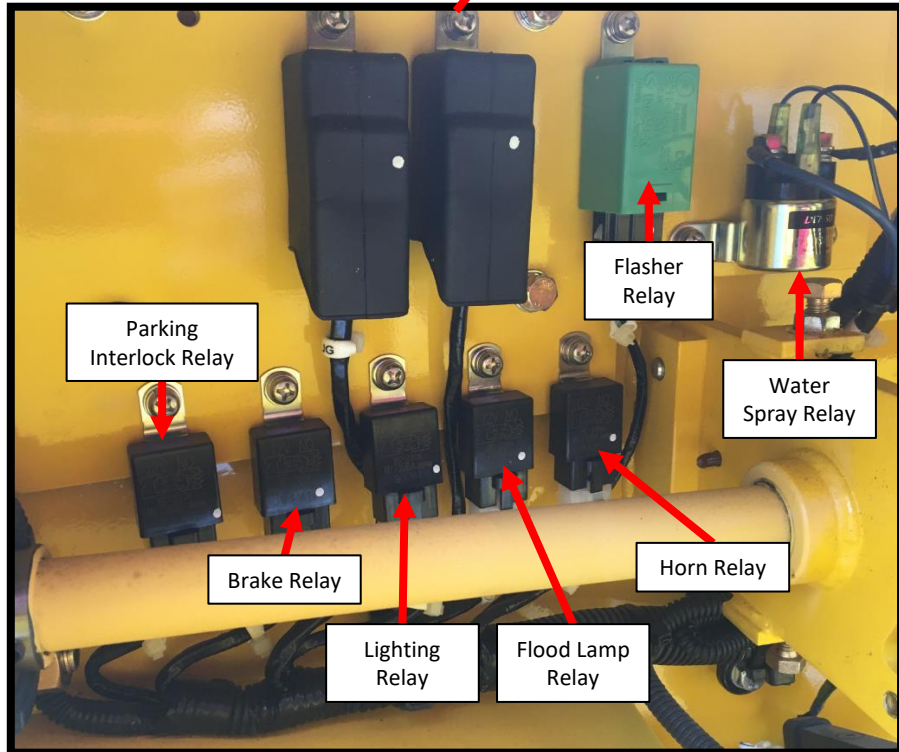
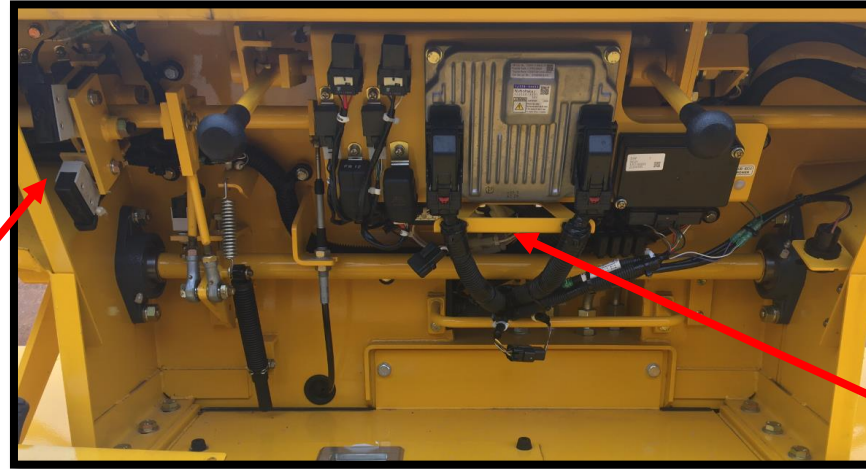
SWP-16M

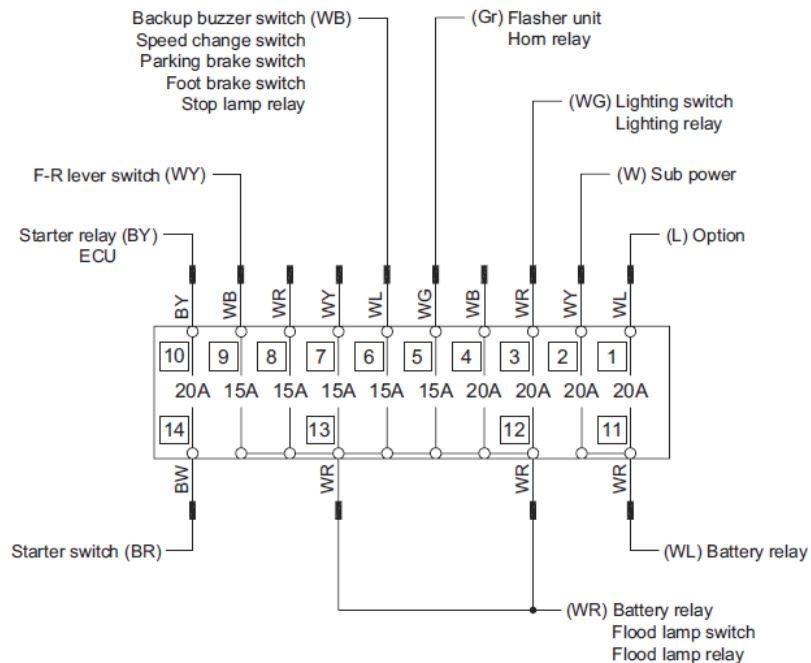
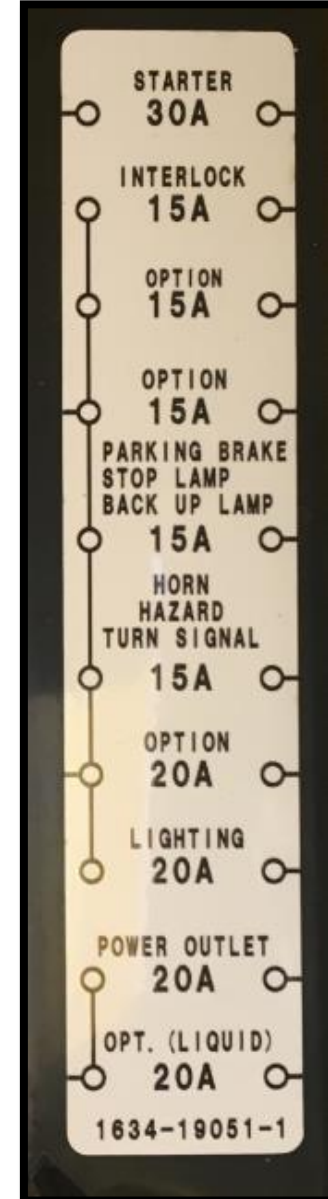
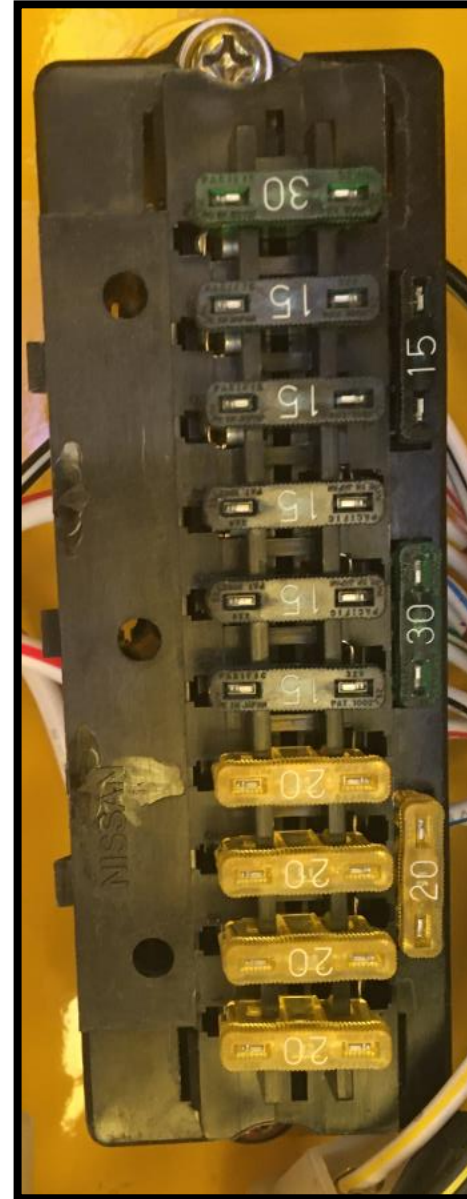
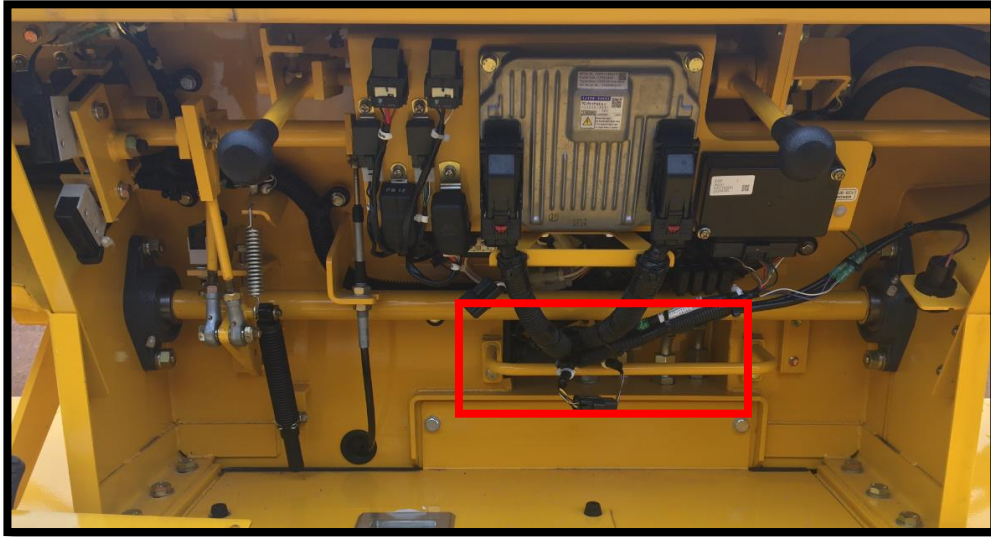
SWP-16F

SWP-12M



SWP-16F







R2-4



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?

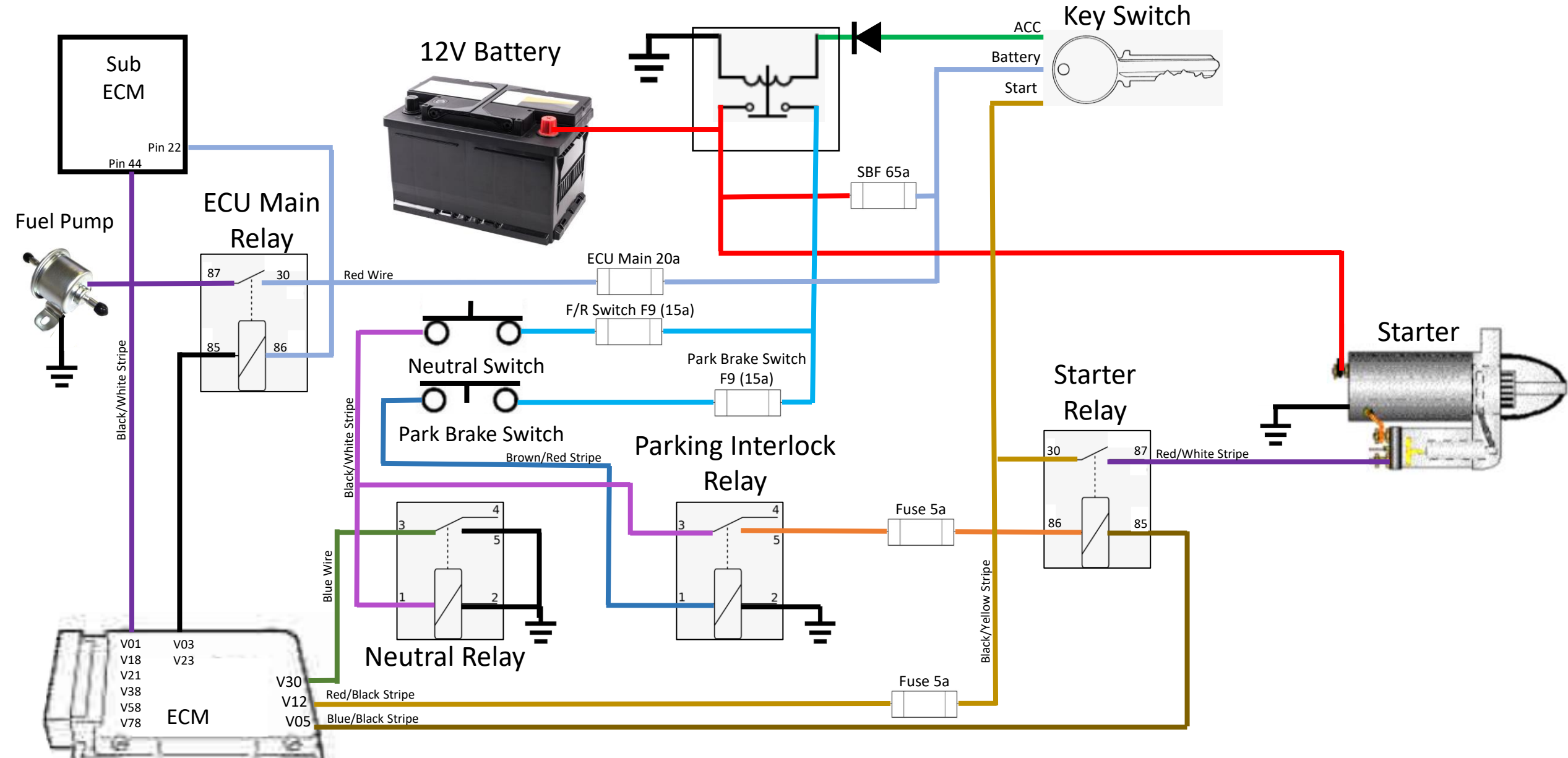
Yes, Test for power across relays for Starter, Starter Interlock, park brake switch and Neutral Switch? Do the switches test good?

No, Repair or replace as needed.

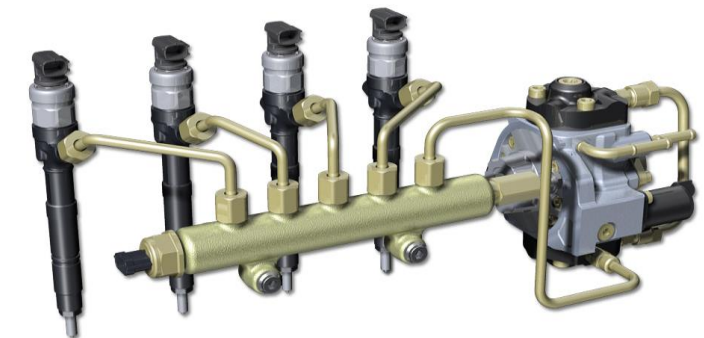
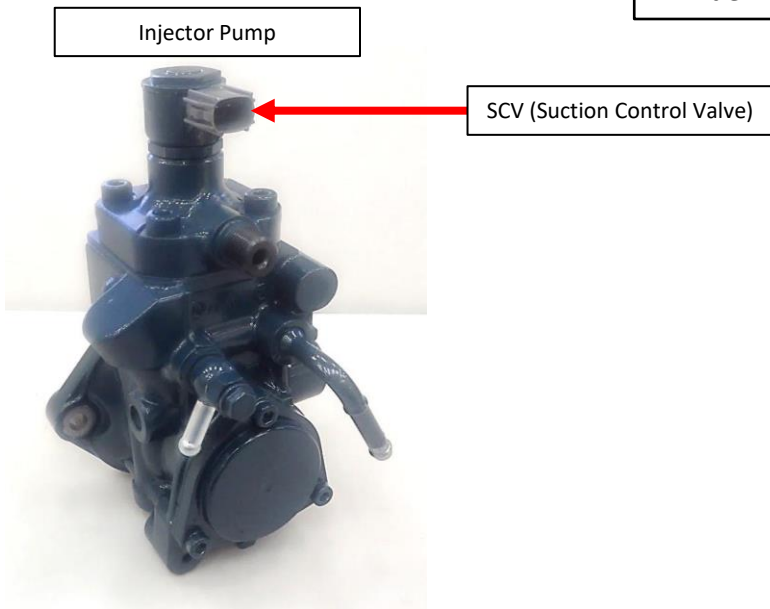
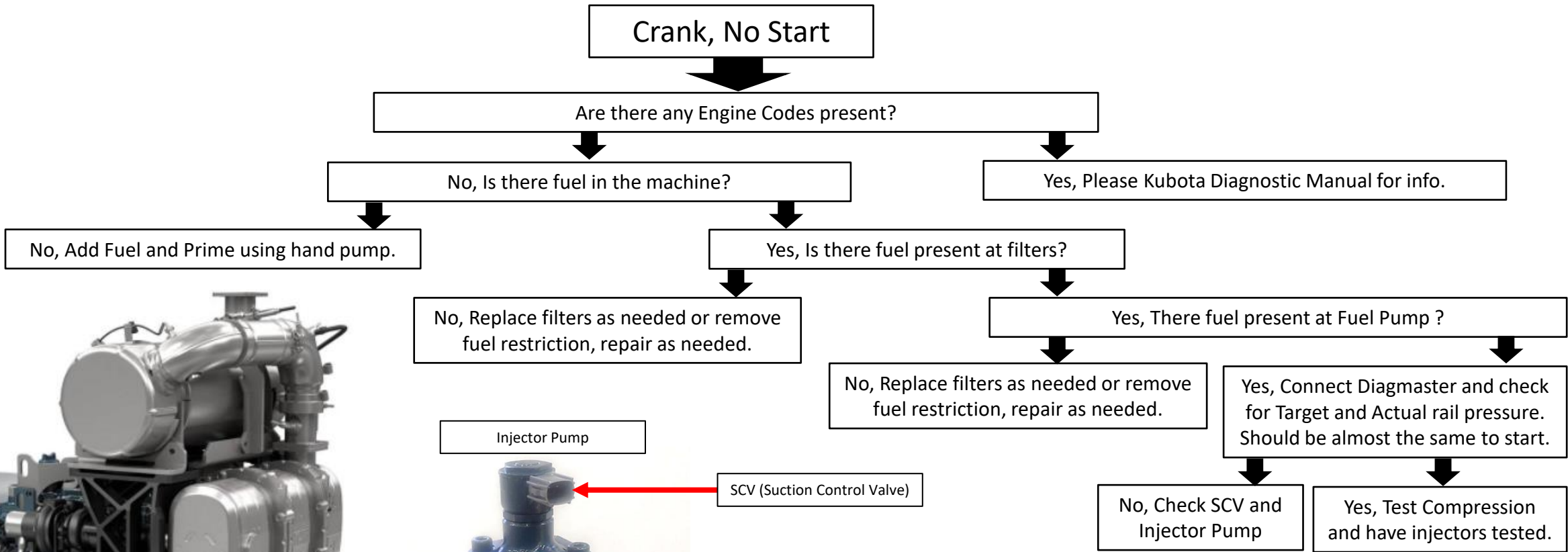
Yes, Check fuse for ECM 20a, Park Brake Switch 15a, Interlock 15a, and Starter Relay 30a.

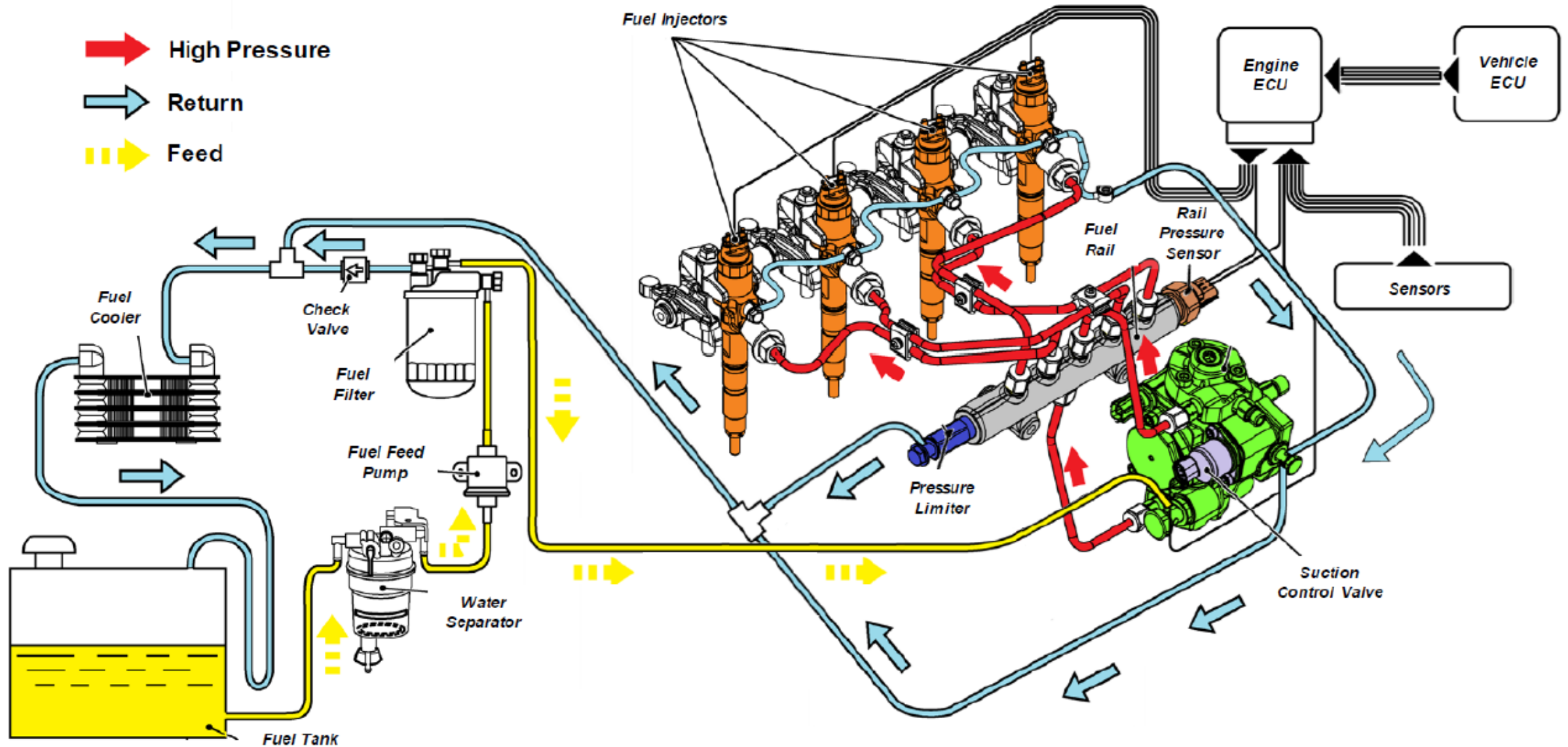
No, Replace fuses as needed or ECM needs to be tested.

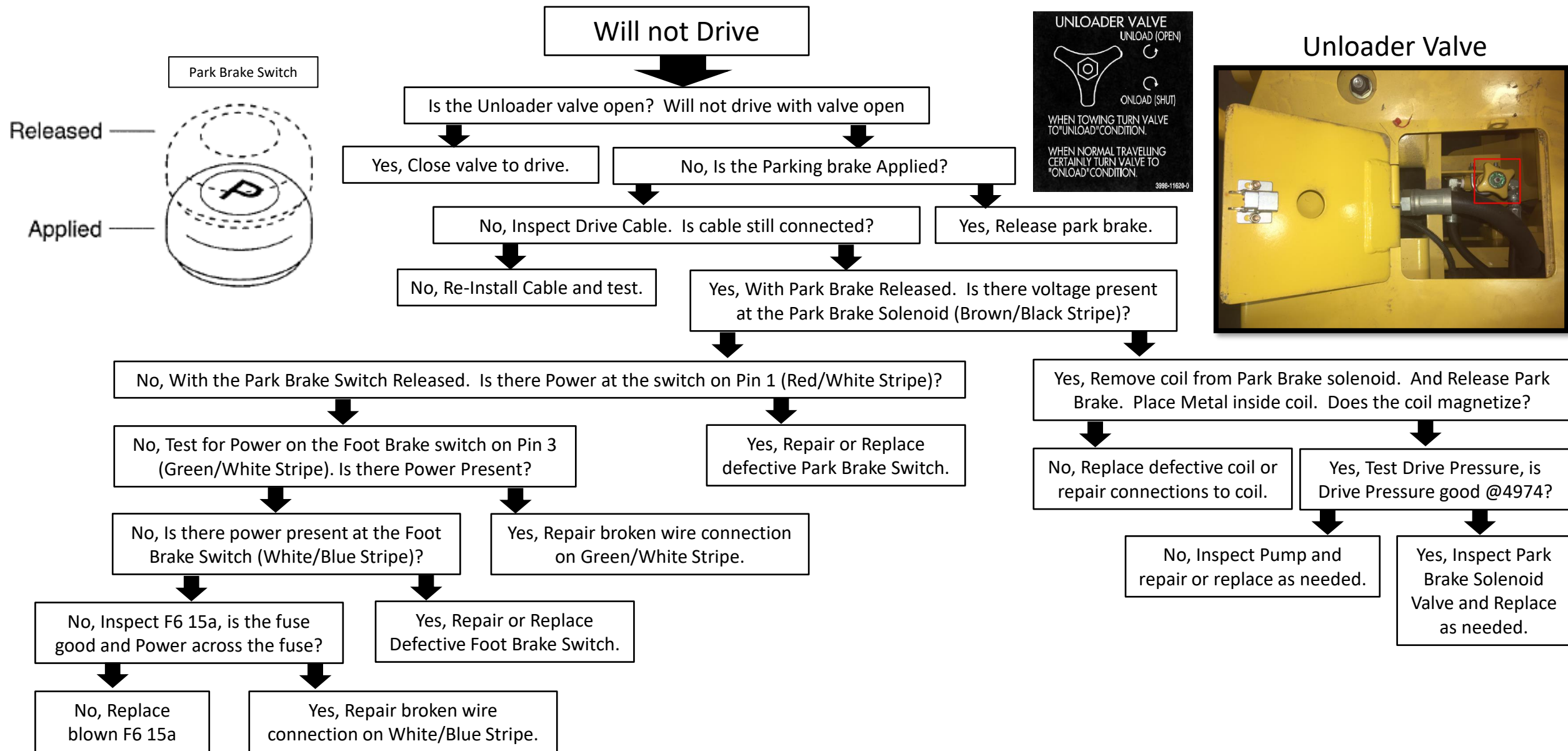
No, Repair or replace as needed.

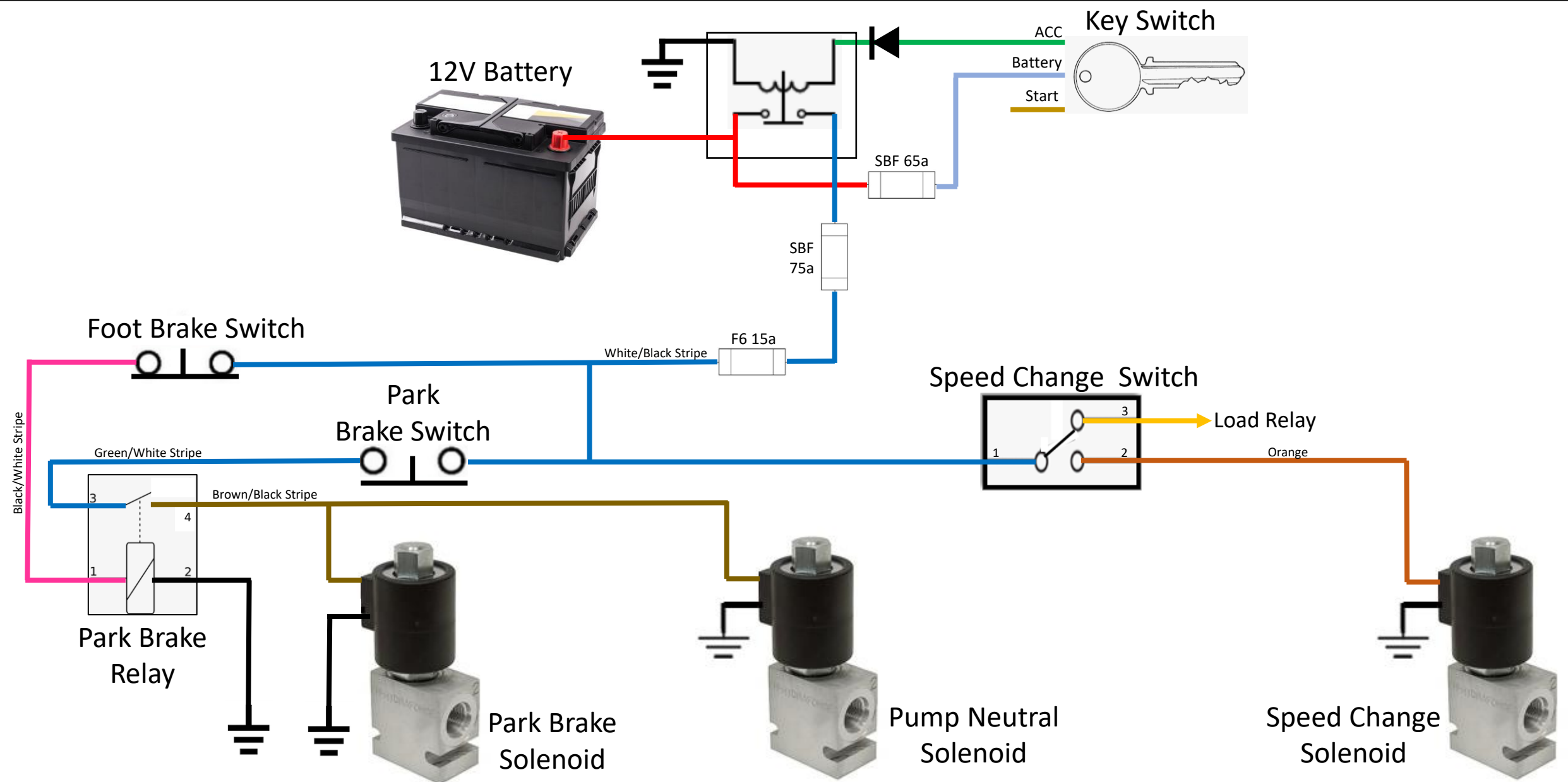


R2-4









MEASUREMENT AND ADJUSTMENT OF PROPULSION 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 (1-8) and (1-9) of propulsion pump. Attach pressure gauge with the adapter (h).

- Adapter : 9/16-18UNF
- High pressure gauge port (Reverse) : (1-8)
- High pressure gauge port (Forward) : (1-9)
- 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 speed change switch to "🐢".

⑤ Start the engine and set throttle lever to "FULL".

⑥ Establish a condition in which machine propulsion load becomes maximum. (Pressure does not build up unless propulsion load is applied.)

⑦ With propulsion load at maximum, slowly move F-R lever to the side to be measured.

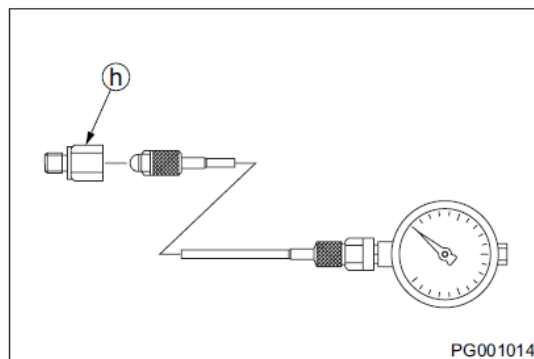
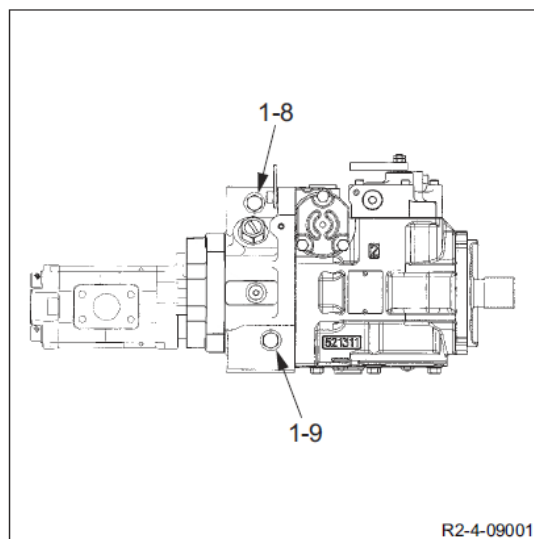
⑧ Read pressure indicated by pressure gauge.

⑨ After measuring, promptly return F-R lever to "N".




★ Maximum circuit pressure

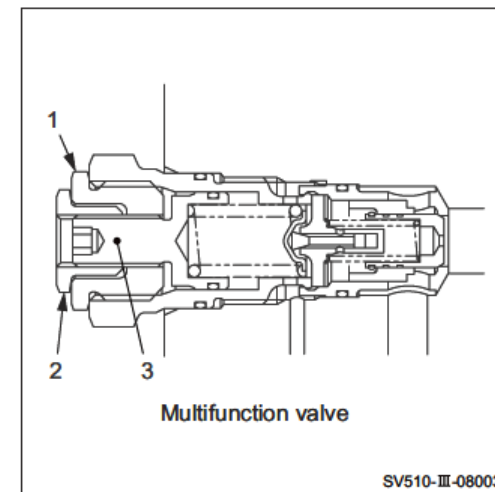
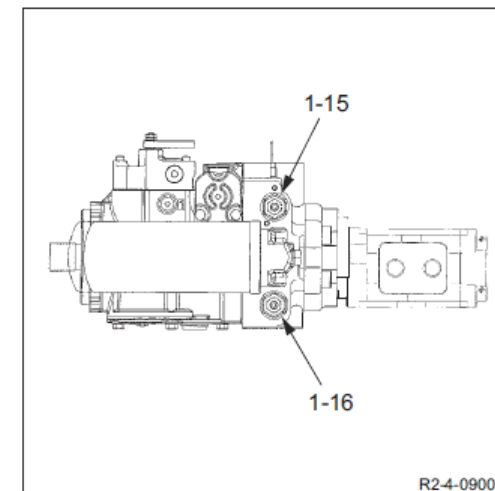
(high pressure relief valve setting)

: 41.8 ± 1.0 MPa ($6,061 \pm 145$ psi)



- ① Check nut (2) of multifunction valve (1-15) or (1-16) for evidence of having loosened.
- Multifunction valve (Reverse) : (1-15)
 - Multifunction valve (Forward) : (1-16)
- ② If there is evidence of nut having loosened, adjust multifunction valve so that pressure becomes within maximum circuit pressure range while watching pressure gauge.
- To adjust pressure, loosen nut and turn adjustment screw (3).
- Adjustment screw turned clockwise : Pressure rise
- Adjustment screw turned counterclockwise : Pressure drop
- Pressure change rate : 9 MPa/turn (1,305 psi/turn)
- ③ If there is no evidence of nut having loosened, remove multifunction valve.
- ④ Check removed multifunction valve for trapped dirt and scratches on its seat.
- ⑤ If trapped dirt is present, disassemble and clean multifunction valve.
- ⑥ If a scratch is found on seat, replace multifunction valve.
- ⑦ After adjustment, measure pressure again and check that pressure reaches maximum circuit pressure range.

	(1) Nut	: 41 N-m (30 lbf-ft)
	(2) Nut	: 20 N-m (15 lbf-ft)
	(1-15) Multifunction valve	: 89 N-m (66 lbf-ft)
	(1-16) Multifunction valve	: 89 N-m (66 lbf-ft)



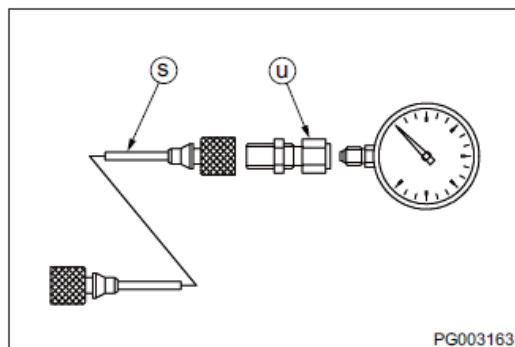
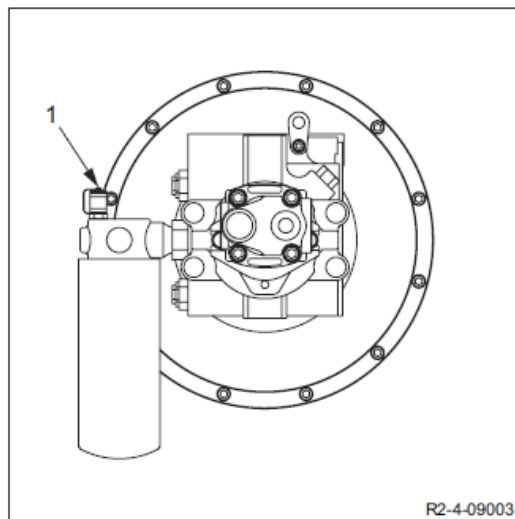
MEASUREMENT AND ADJUSTMENT OF PROPULSION CHARGE CIRCUIT PRESSURE

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

- Remove plug from coupling (1) of propulsion pump.
Attach pressure gauge with hose (S) and connector (U).
 - Coupling : 9/16-18UNF×M16
 - Adapter for hose (S) : M16 P=2.0
 - Pressure gauge connector (U) : M16×G3/8
 - Pressure gauge : 0 to 5 MPa
(0 to 725 psi)

- Confirm that F-R lever is "N".
- Apply parking brake by pressing parking brake switch button.
- Start the engine and set throttle lever to "FULL".
- Read pressure indicated by pressure gauge.

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



- Check nut (2) of charge relief valve (1-7) for evidence of having loosened.
 - If there is evidence of nut having loosened, adjust charge relief valve so that pressure becomes within standard charge relief valve pressure setting range while watching pressure gauge.
- To adjust pressure, loosen nut and turn adjustment screw (3).

Adjustment screw turned clockwise

: Pressure rise

Adjustment screw turned counterclockwise

: Pressure drop

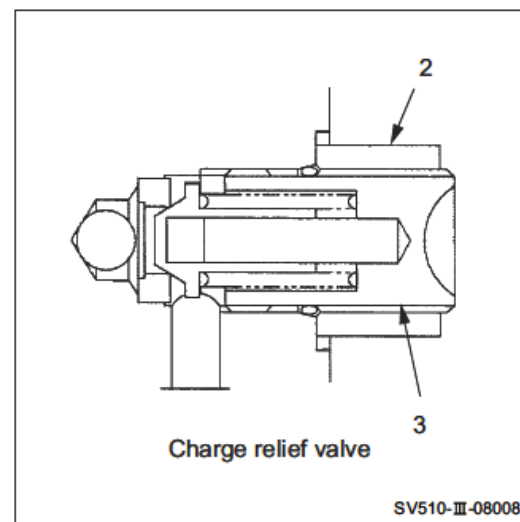
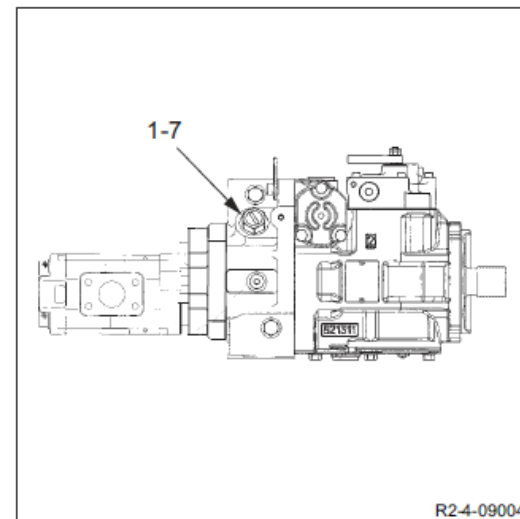
Pressure change rate : 0.39 MPa/turn (57 psi/turn)

- If there is no evidence of nut having loosened, remove charge relief valve.
- Check removed charge relief valve for trapped dirt and scratches on its seat.
- If trapped dirt is present, disassemble and clean charge relief valve.
- If a scratch is found on seat, replace charge relief valve.
- After adjustment, measure pressure again and check that pressure reaches standard charge relief valve setting range.

 (2) Nut : 52 N·m (38 lbf·ft)

(NOTICE)




- Carefully disassemble and reassemble after taking steps to prevent foreign material from getting in.



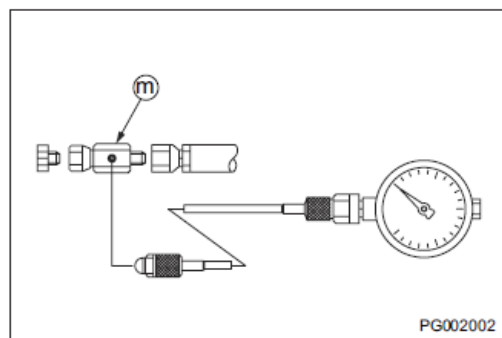
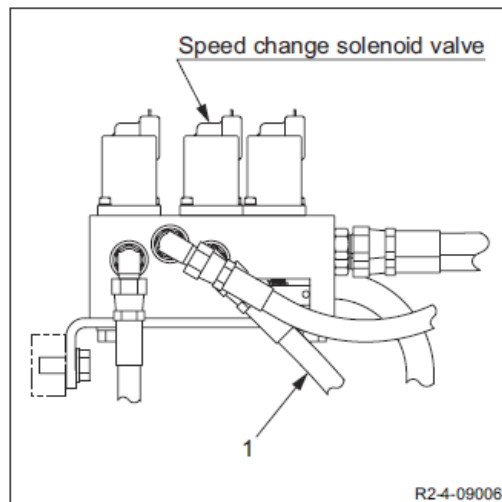
MEASUREMENT OF MACHINE HIGH/LOW SPEED CHANGE CIRCUIT PRESSURE

- Since oil in charge circuit is supplied from steering circuit, confirm that steering operation is normal before measurement.

Measurement

- Oil temperature during measurement : $50 \pm 5^{\circ}\text{C}$ ($122 \pm 9^{\circ}\text{F}$)
- ① Disconnect hose (1) from valve. Attach pressure gauge through adapter  .
 - Adapter  : 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 Set speed change switch to "  ".
- ⑤ Start the engine and set throttle lever to "FULL".
- ⑥ Read pressure indicated by pressure gauge.



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



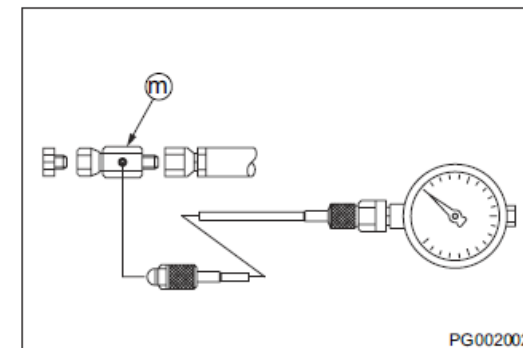
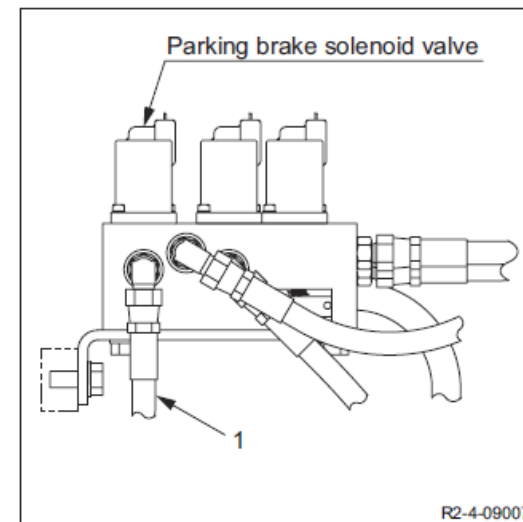
MEASUREMENT OF PARKING BRAKE RELEASE PRESSURE

- Since oil in charge circuit is supplied from steering circuit, confirm that steering operation is normal before measurement.

Measurement of propulsion motor (F)

- Oil temperature during measurement : $50 \pm 5^{\circ}\text{C}$ ($122 \pm 9^{\circ}\text{F}$)
- ① Disconnect hose (1) from valve. Attach pressure gauge through adapter  .
 - Adapter  : 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.

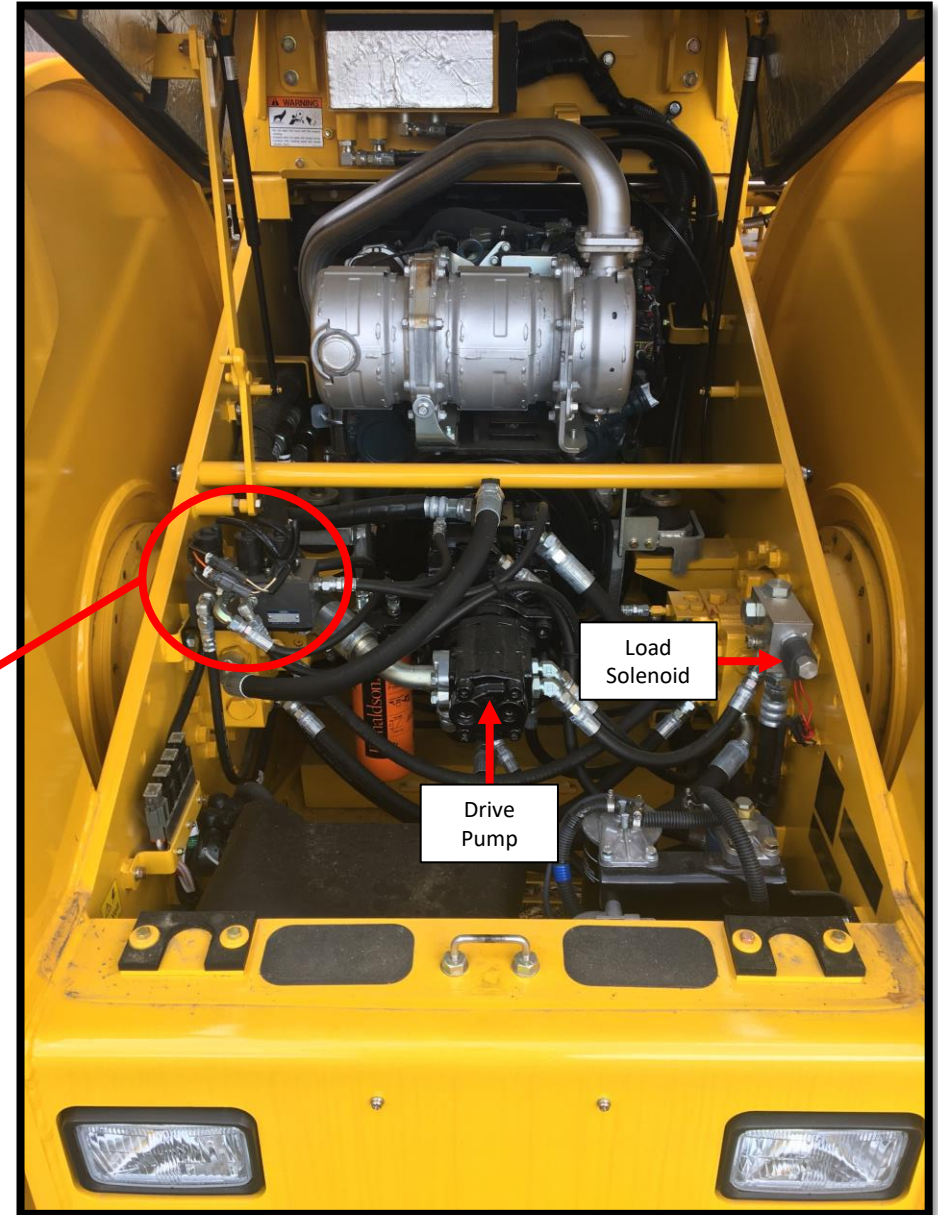
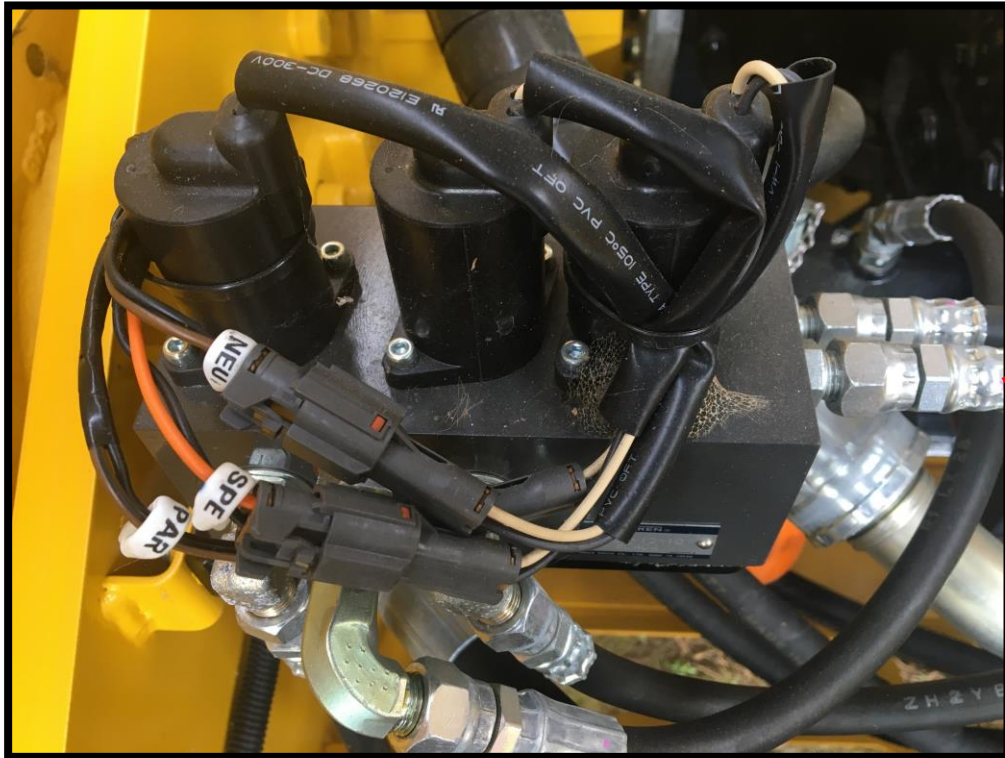
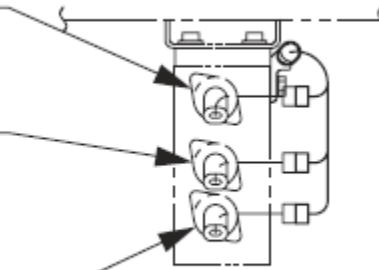
★ Brake release pressure
: 1.3 to 1.7 MPa (189 to 247 psi)



Parking brake solenoid **PAR**
(B),(BrB)

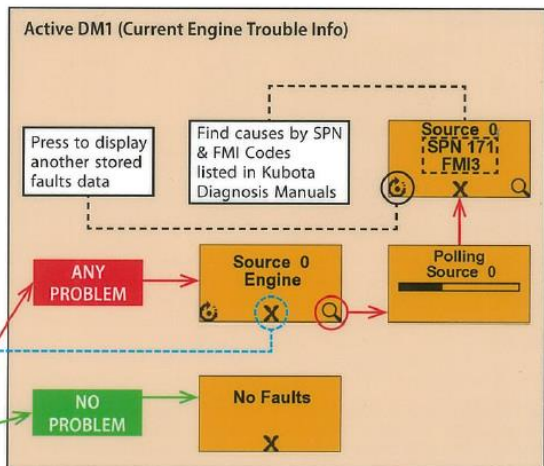
Speed change solenoid **SPE**
(B),(O)

Propulsion pump neutral solenoid **NEU**
(B),(BrB)



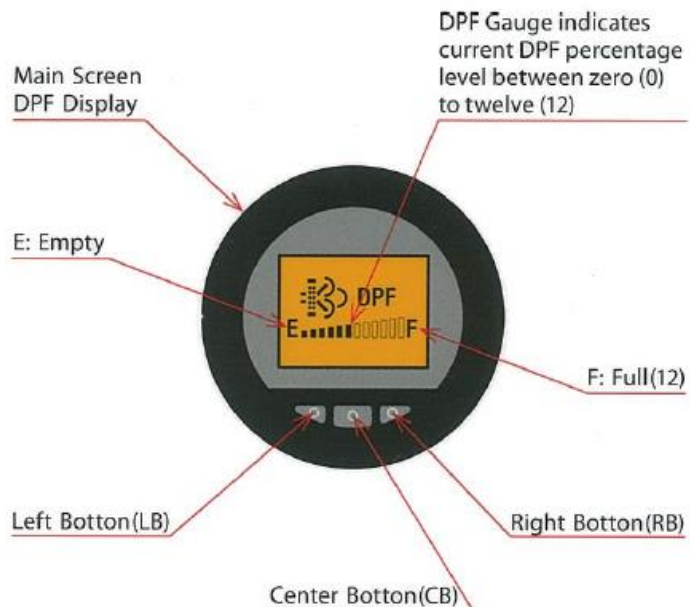
Engine Diagnosis

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.



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.

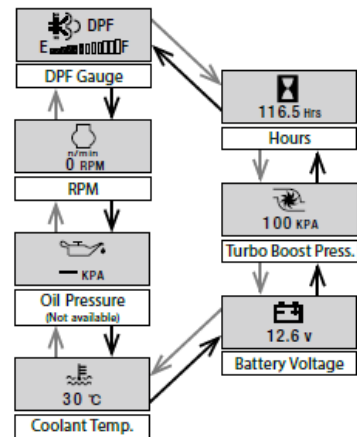
Every time pressing the RB, the display goes down as indicated by red arrows, and then comes back to DPF Gauge display.

Clockwise

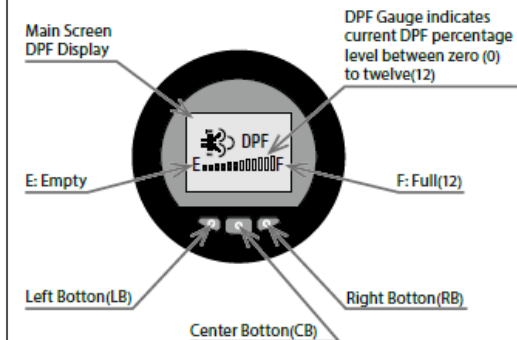
Hold a left button (LB) about 10 sec.

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.

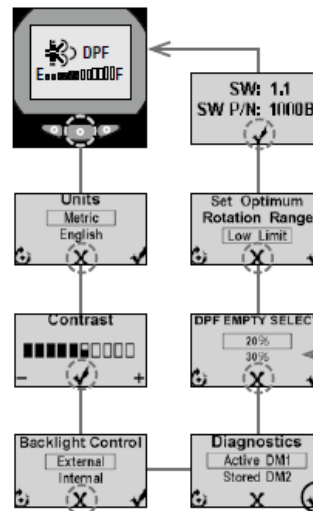
If no problem, display shows "No Faults", and then press "X" at Center button to move next display.

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. See SPN 171 and FMI 3, as an example.

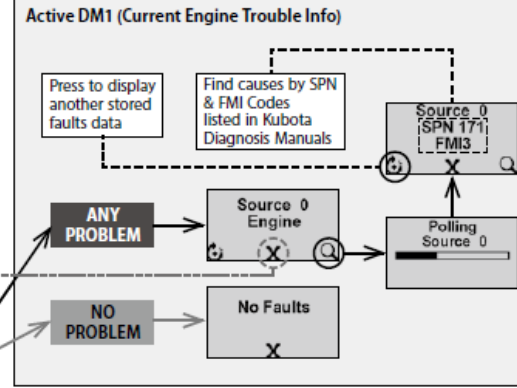
To see another error codes, press "Q" at Left button, then press "X" at Center button to move next display.

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

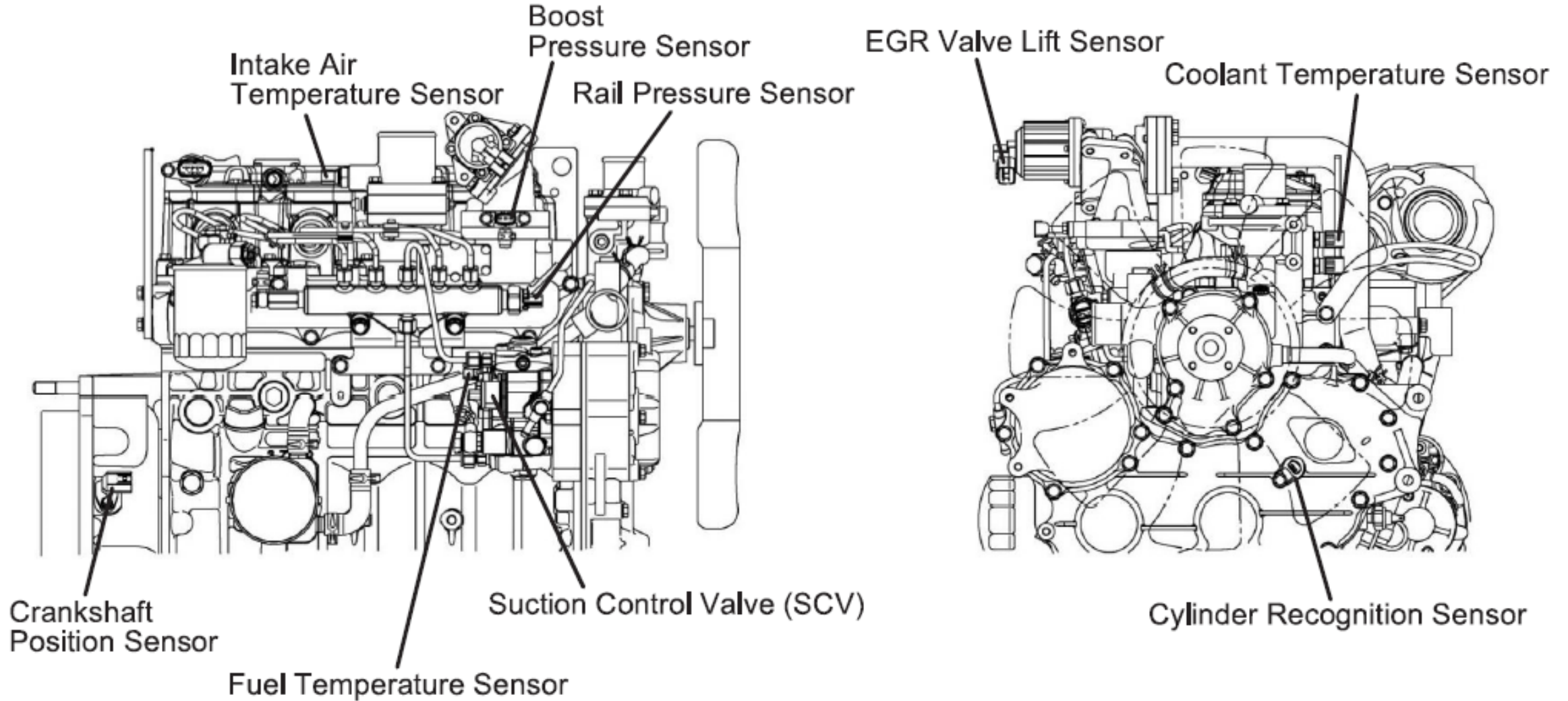


Engine Diagnosis

Active DM1 (Current Engine Error Code)

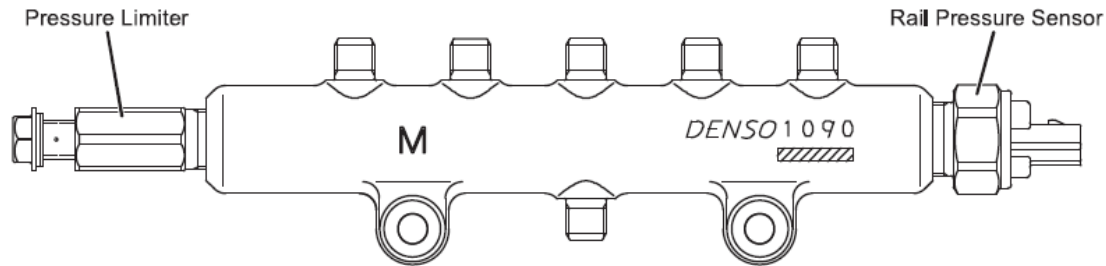


Sensor Locations



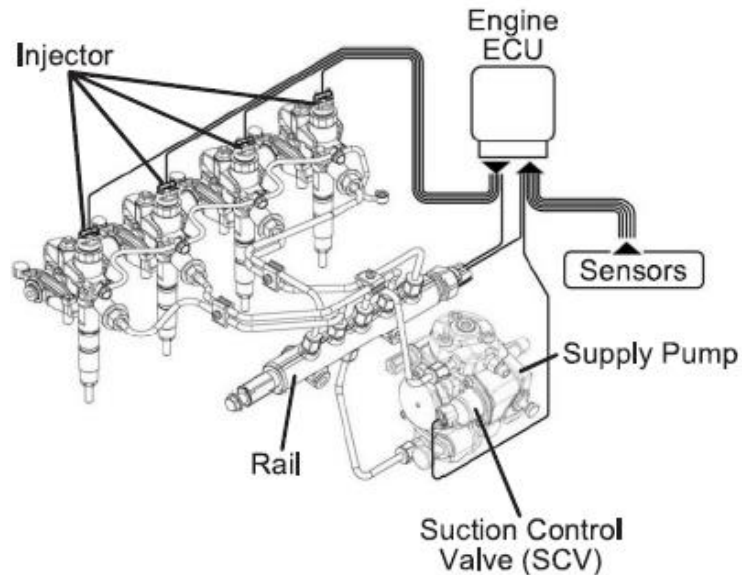
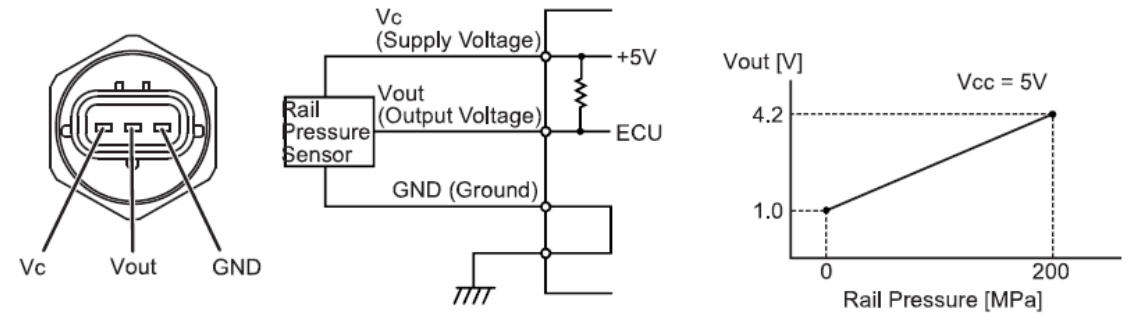
Part Name	DENSO Part Number	Car Manufacturer Part Number
Supply Pump	294000-069#	1J574-50501
Injector	095000-680#	1J574-53051
Rail	095440-109#	1J574-50601
Engine ECU	275800-722#	1J574-59053
Accelerator Position Sensor	198300-719#	1J574-59701
Cylinder Recognition Sensor	949979-186#	1J574-59711
Crankshaft 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.



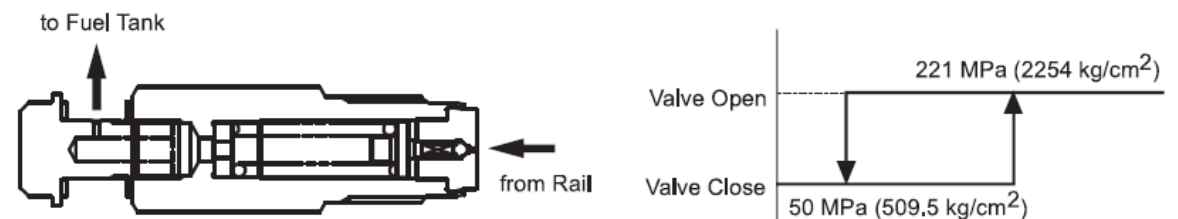
Rail Pressure Sensor

- 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

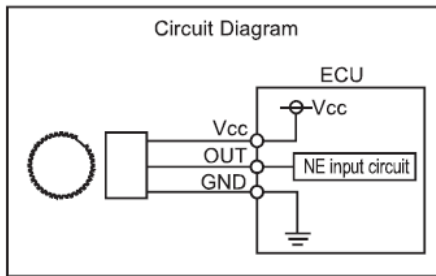
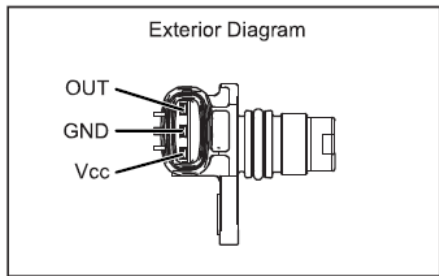
- The pressure limiter releases pressure when the rail internal pressure becomes abnormally high. The pressure limiter opens when internal pressure reaches approximately 221MPa (2254 kg/cm²), and closes when rail pressure reaches a given set pressure. Fuel released from the pressure limiter is returned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



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

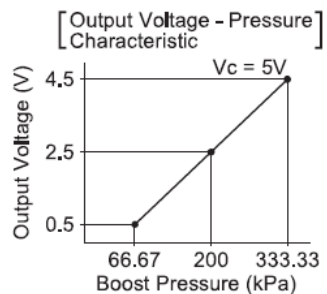
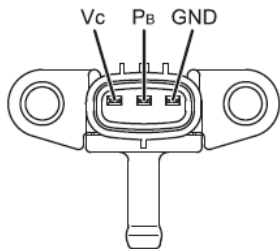
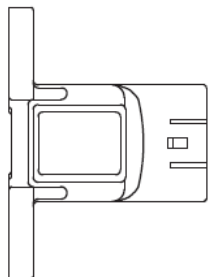
Crankshaft Position Sensor (NE)

- 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.



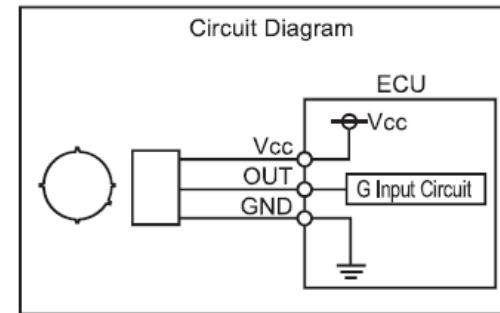
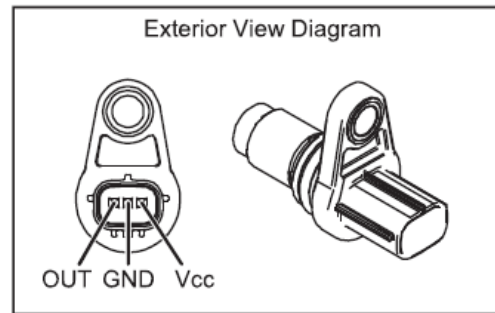
Boost pressure sensor

- 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.



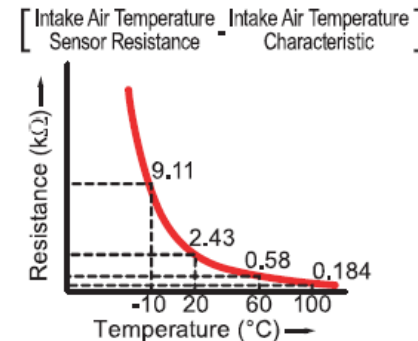
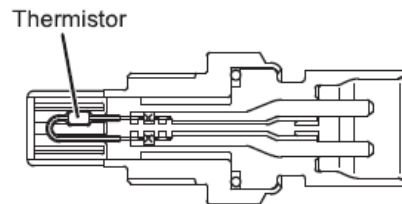
Cylinder recognition sensor (G)

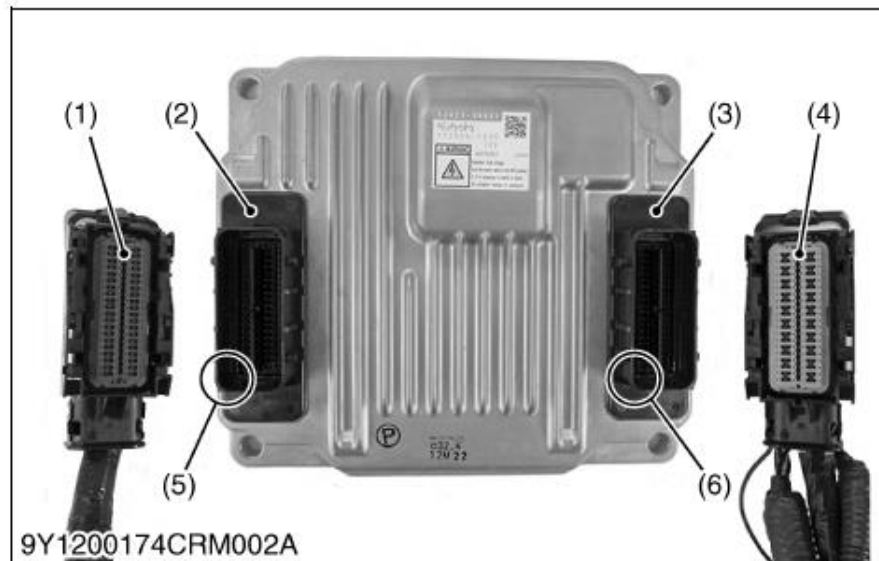
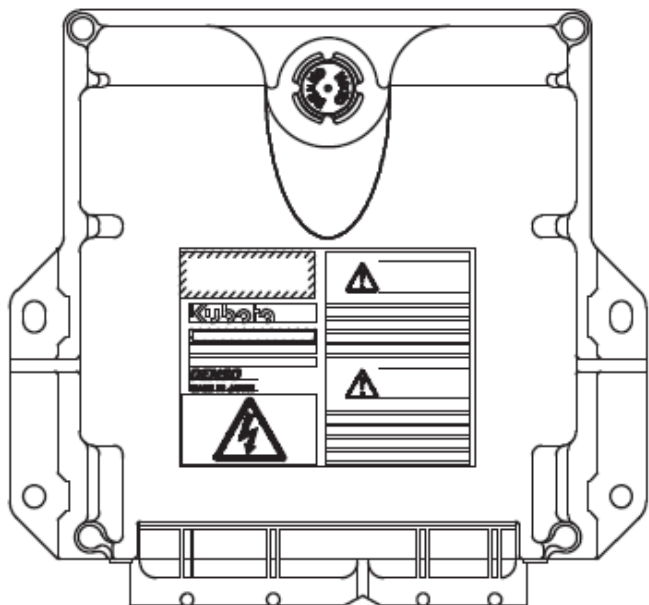
- The cylinder recognition sensor is installed near the camshaft pulsar gear to identify each cylinder. The sensor unit is an MRE type. The pulsar gear has five pulses.



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.





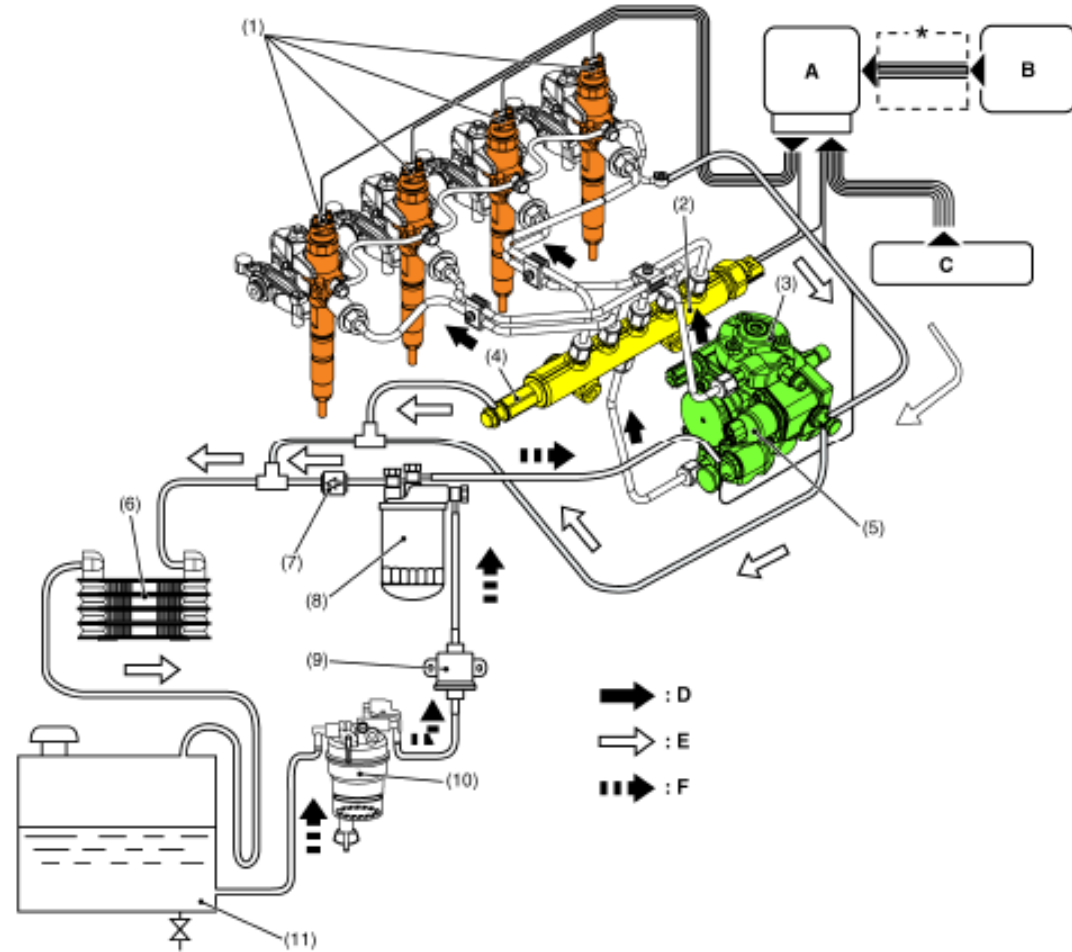
- (1) ECU Wiring Harness Connector 1 (Engine Side)
- (2) ECU Connector 1 (Engine Side)
- (3) ECU Connector 2 (Machine Side)
- (4) ECU Wiring Harness Connector 2 (Machine Side)
- (5) E01 Pin Position
- (6) V01 Pin Position

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					

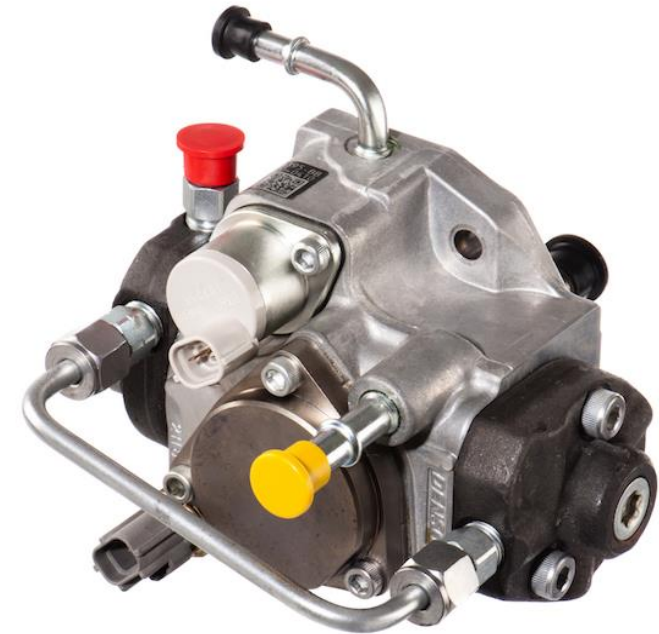
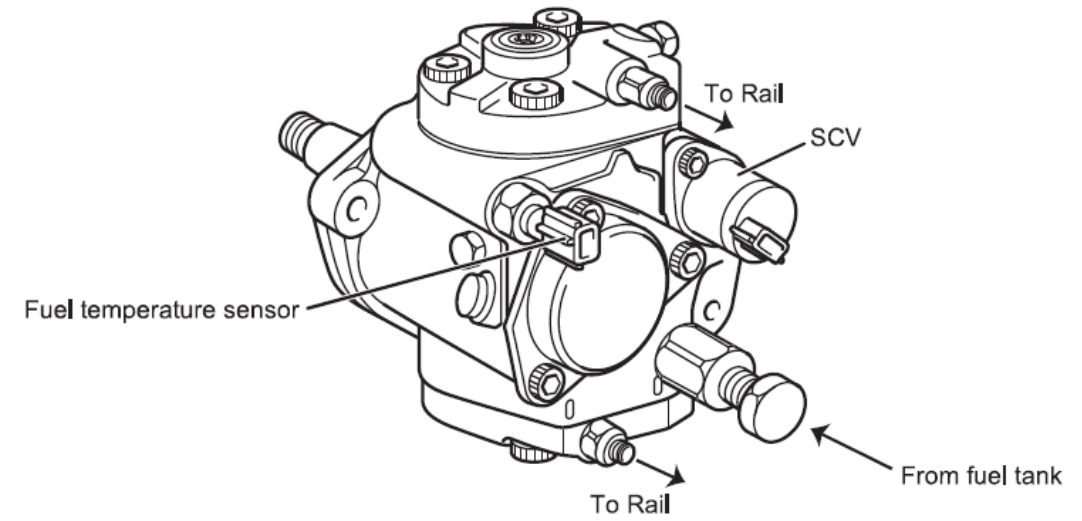
Machine Side Harness Pin Layout

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

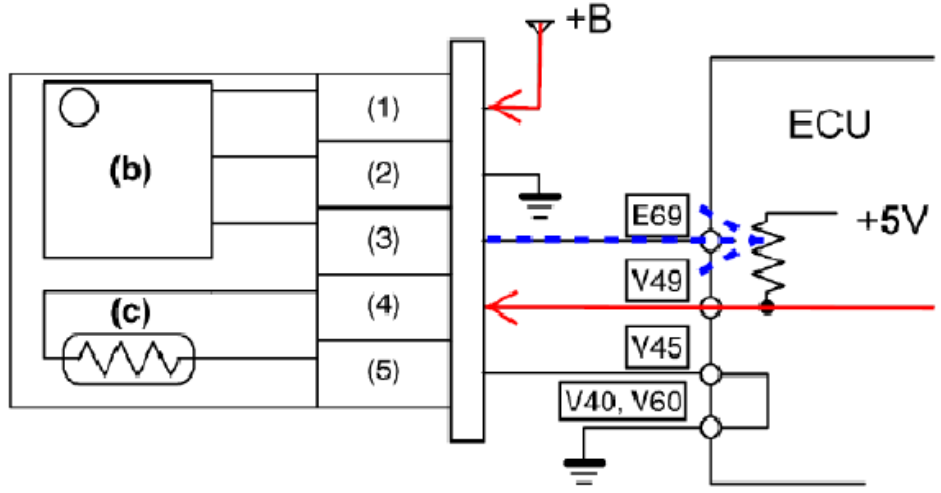
- A: ECU for Engine
- B: ECU for Machine
- C: Sensors
- D: Injected Fuel Flow
- E: Returned Fuel Flow
- F: Feed Fuel Flow



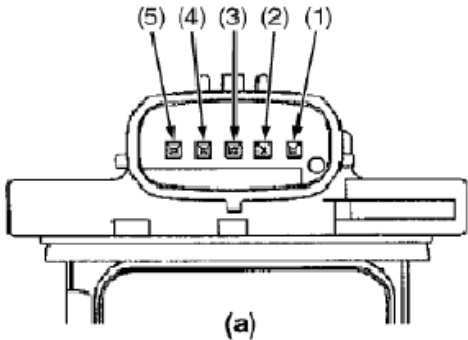
MAF Sensor Error 132

- 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

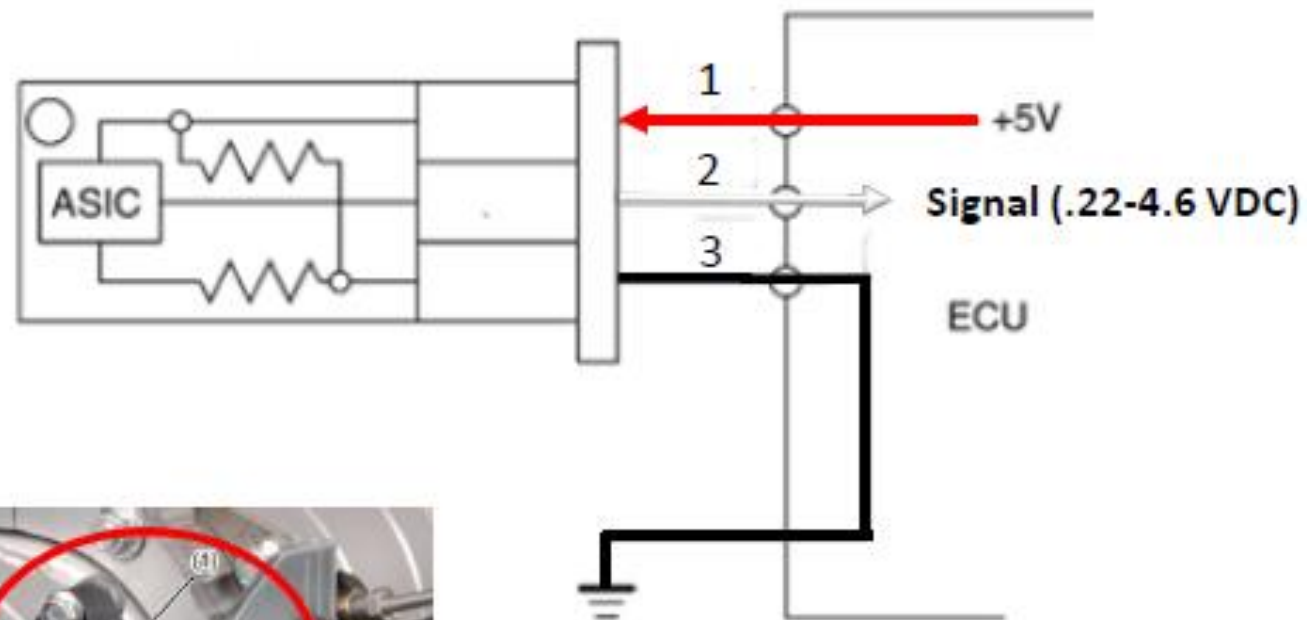
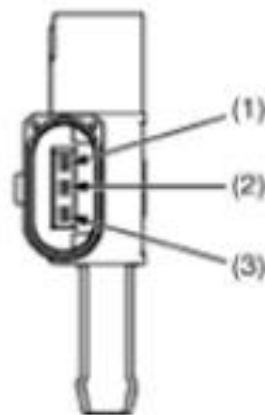
DPS (Differential Pressure Sensor Voltage Error (High)

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

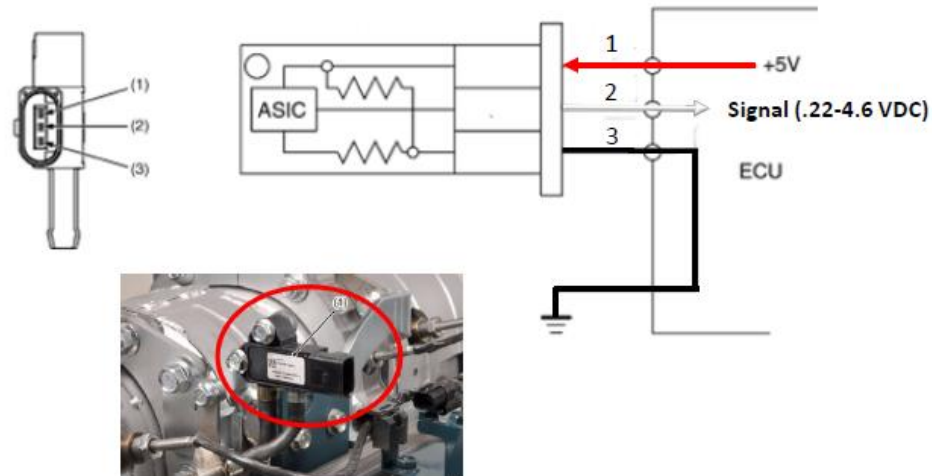
P3024 – High Frequency Regen

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 →

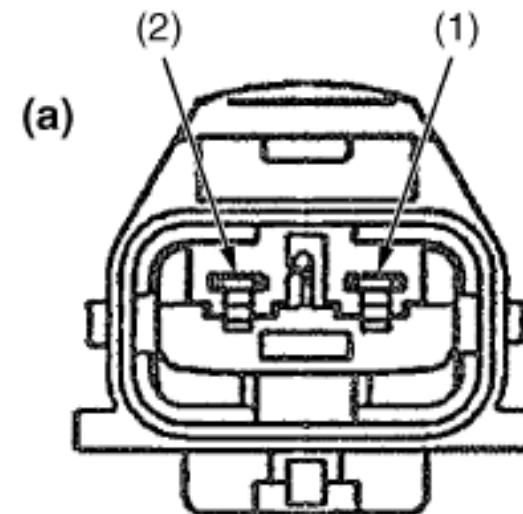
3242

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



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

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

