

SAKAI

MASTERS OF COMPACTION



SV414

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.



SAKAI

SV414

414 Operators Manual
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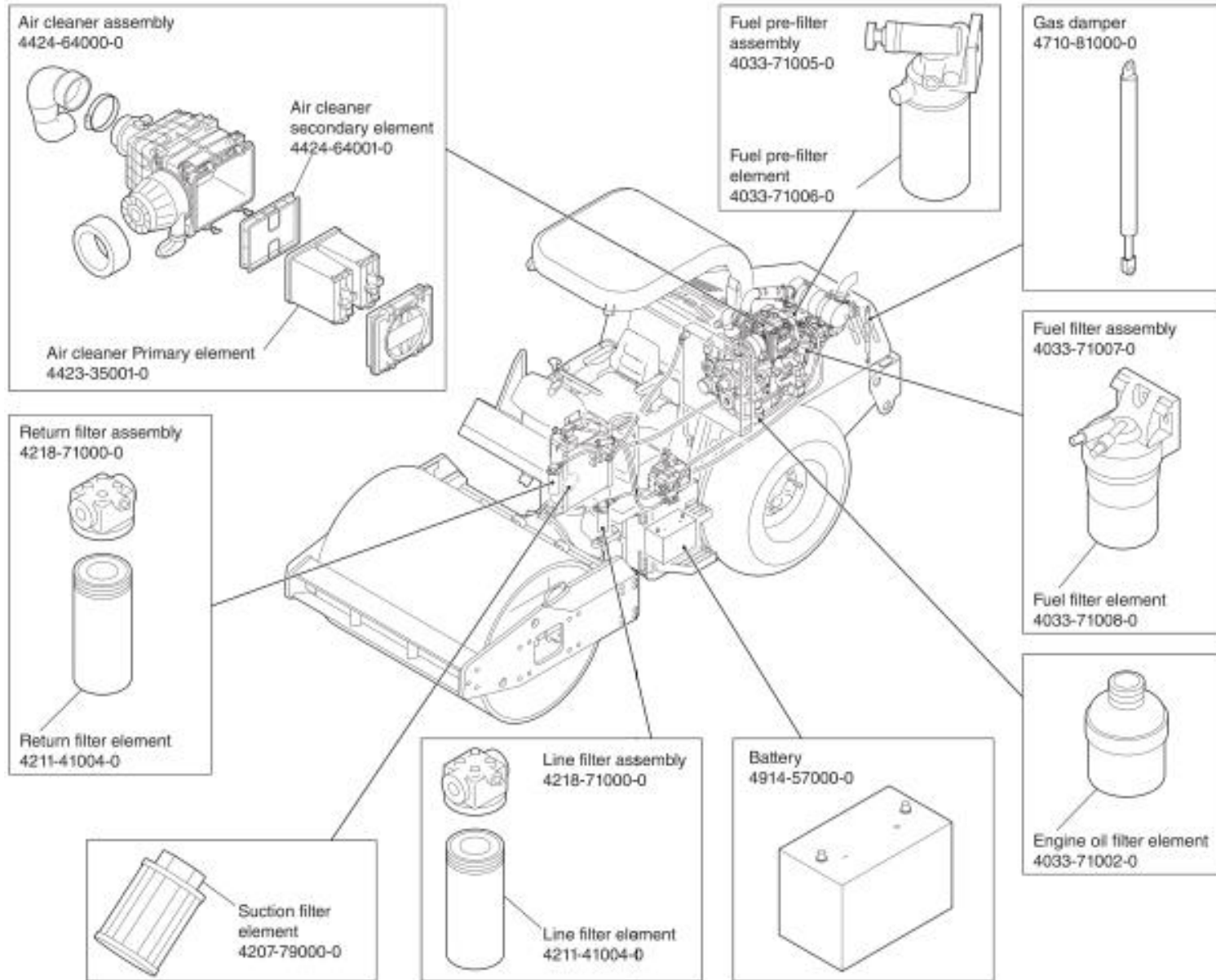


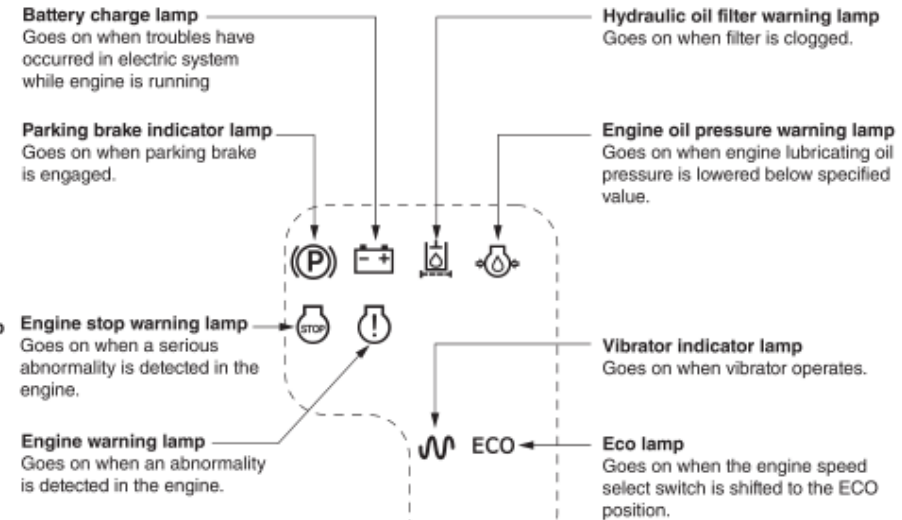
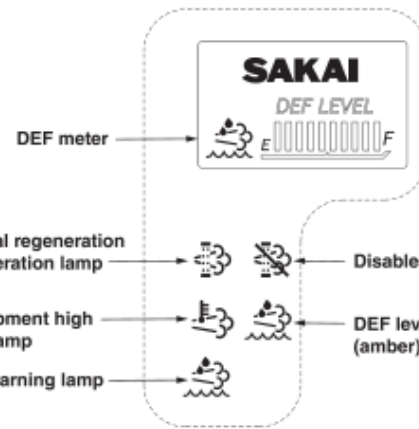
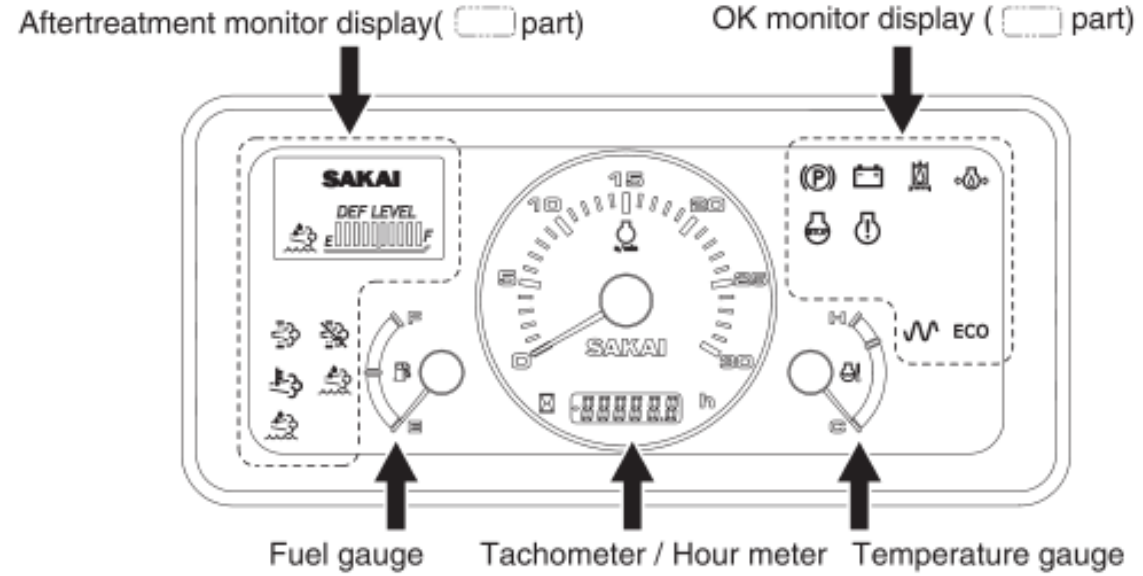
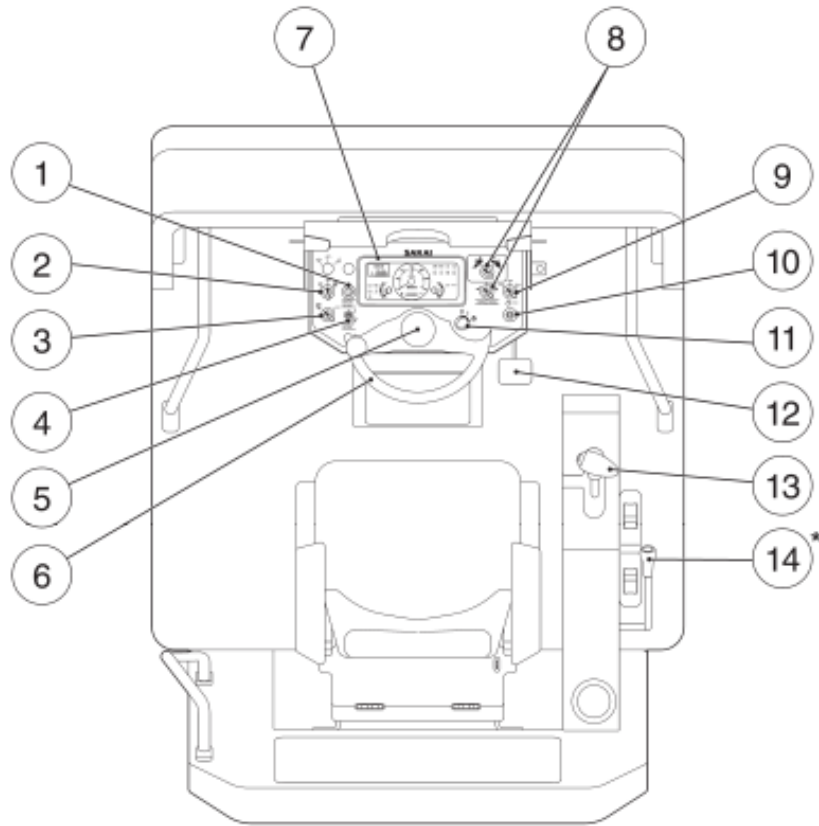
SAKAI
MASTERS OF COMPACTION

Engine	Model		CUMMINS QSF 2.8 (Diesel, EPA-Tier 4)
	Type		4-cycle, water-cooled, 4-cylinder in-line, overhead valve, direct injection type, with turbo charger
	Cylinders - Bore x Stroke		94 mm x 100 mm (3.700 in. x 3.940 in.)
	Displacement		2.800 L (171.0 cu.in.)
	Performance	Rated speed	2,400 min ⁻¹
		Rated output	55.0 kW (74 HP)
		Max. torque	300 N·m (221 lbf·ft) at 1,600 min ⁻¹
		Fuel consumption rate	239 g/kW·h (0.393 lb/HP·h) at 2,400 min ⁻¹
		Fuel consumption	15 L/h with full load (4.0 gal with full load)
	Fuel system	Fuel	Diesel (ASTM D975-2D)
		Fuel injection pump	Inline injection pmp
		Fuel injection time regulator	All speed governor
	Lubrication system	Lubrication type	Full forced pressure feed
		Oil filter type	Full flow
		Oil cooler type	Integrated water cooled
	Air intake system	Air cleaner type	Dry
	Cooling system	Cooling type	Pressurized water forced circulation
		Cooling fan type	Inhale
	Electrical system	Alternator	12 V 120 A
		Starter	12 V 3.0 kW
		Battery	12 V (CCA1000) x 1 pcs. (12 V)
Dry weight		244 kg (538 lbs.)	

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 grade CJ4	SAE15W-40	SAE15W-40	SAE15W-40	MIL-L-2104B
Gear oil	API grade GL5	SAE80W-90	SAE90	SAE140	MIL-L-2105
Hydraulic oil	Anti wear	ISO-VG32	ISO-VG46	ISO-VG68	ISO-3448
Grease	Lithium type extreme pressure			NLGI-2	
Fuel	Diesel oil			ASTM D975-2D	

Item	Standard value
Engine oil pan	8.2 L (2.2 gal.)
Fuel tank	145 L (38.3 gal.)
Coolant	16 L (4.2 gal.)
Gear box (front)	2.0 L (0.53 gal.)
Center housing (rear axle)	7.3 L (1.9 gal.)
Hub reduction gear case (rear left and right)	1.3 L x 2 (0.33 gal. x 2)
Hydraulic oil tank	53 L (14.0 gal.)
Vibrator case (front)	21 L (5.5 gal.)

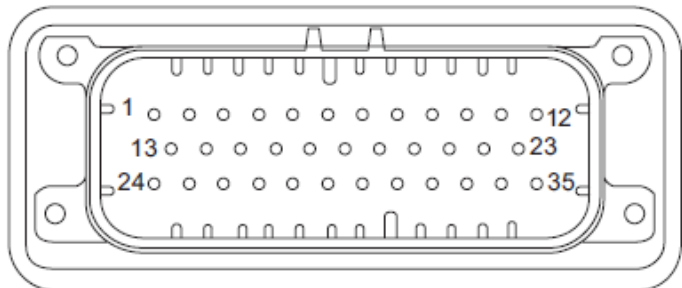
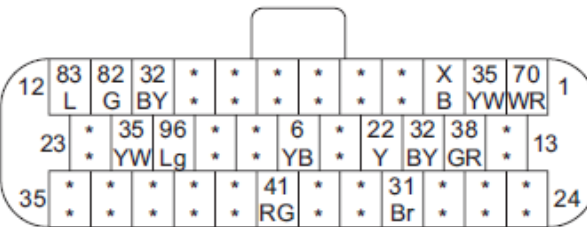
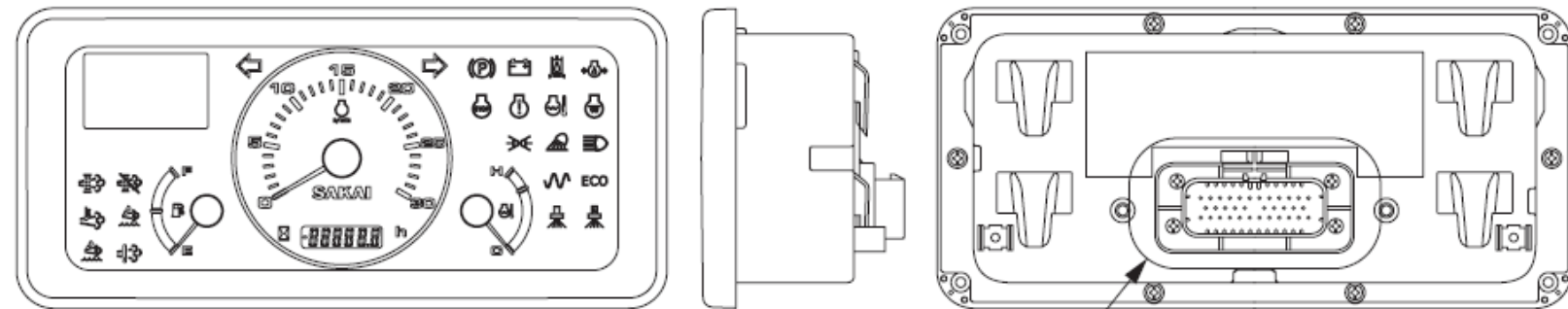




- ① Manual regeneration switch
- ② Vibrator switch
- ③ Vibration selector switch
- ④ Disable regeneration switch
- ⑤ Horn switch button
- ⑥ Steering wheel
- ⑦ Combination meter
- ⑧ Travel mode switch
- ⑨ Engine speed select switch
- ⑩ Parking brake switch
- ⑪ Starter switch
- ⑫ Brake pedal
- ⑬ Forward-Neutral-Reverse (F-N-R) lever with vibration switch
- ⑭ Leveling blade lift lever

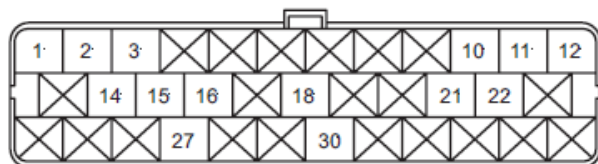
- Parked manual regeneration lamp / Regeneration lamp
- Exhaust equipment high temperature lamp
- DEF quality warning lamp (red)
- Disable regeneration lamp
- DEF level warning lamp (amber)

- Battery charge lamp
Goes on when troubles have occurred in electric system while engine is running
- Parking brake indicator lamp
Goes on when parking brake is engaged.
- Engine stop warning lamp
Goes on when a serious abnormality is detected in the engine.
- Engine warning lamp
Goes on when an abnormality is detected in the engine.
- Hydraulic oil filter warning lamp
Goes on when filter is clogged.
- Engine oil pressure warning lamp
Goes on when engine lubricating oil pressure is lowered below specified value.
- Vibrator indicator lamp
Goes on when vibrator operates.
- Eco lamp
Goes on when the engine speed select switch is shifted to the ECO position.

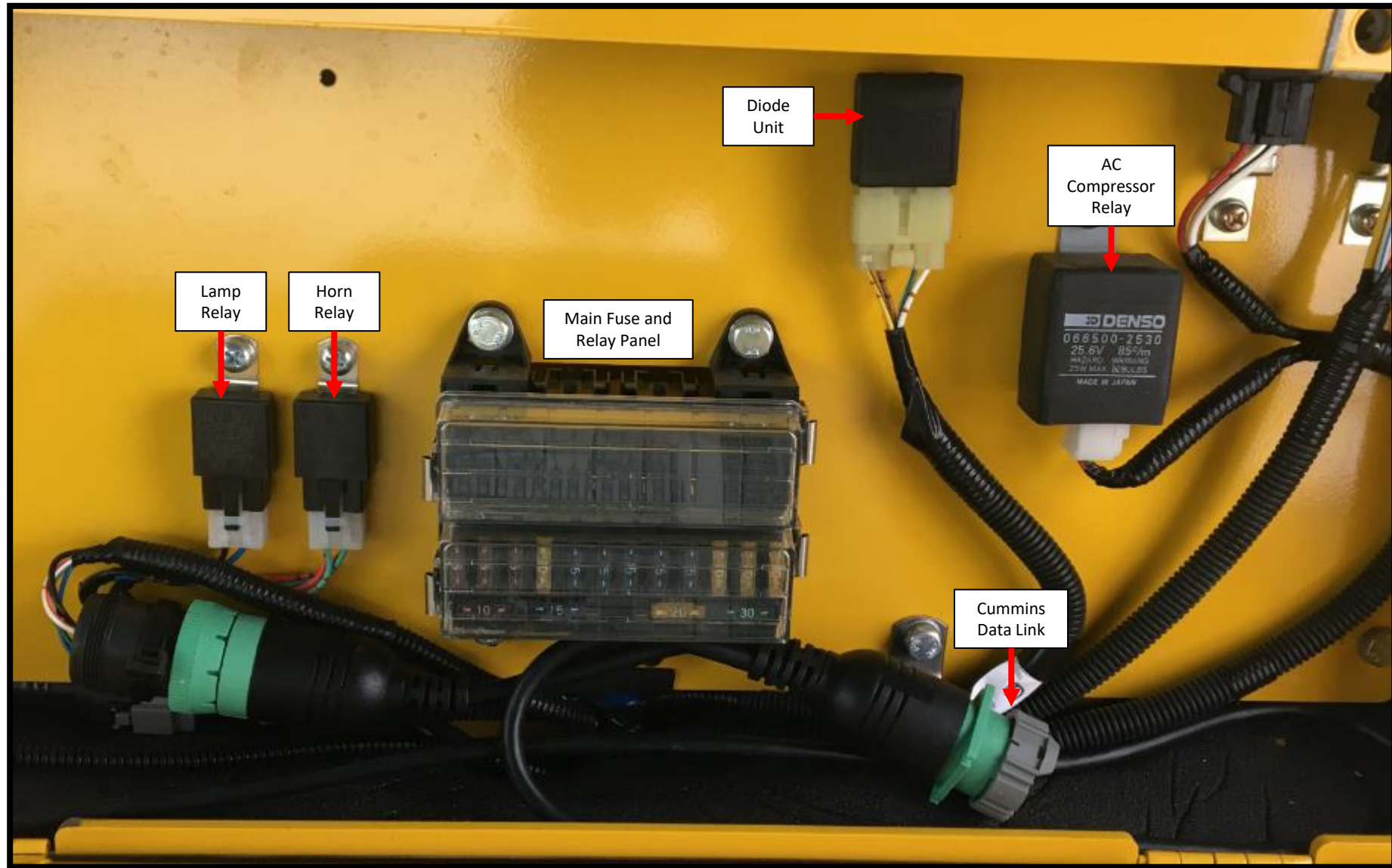


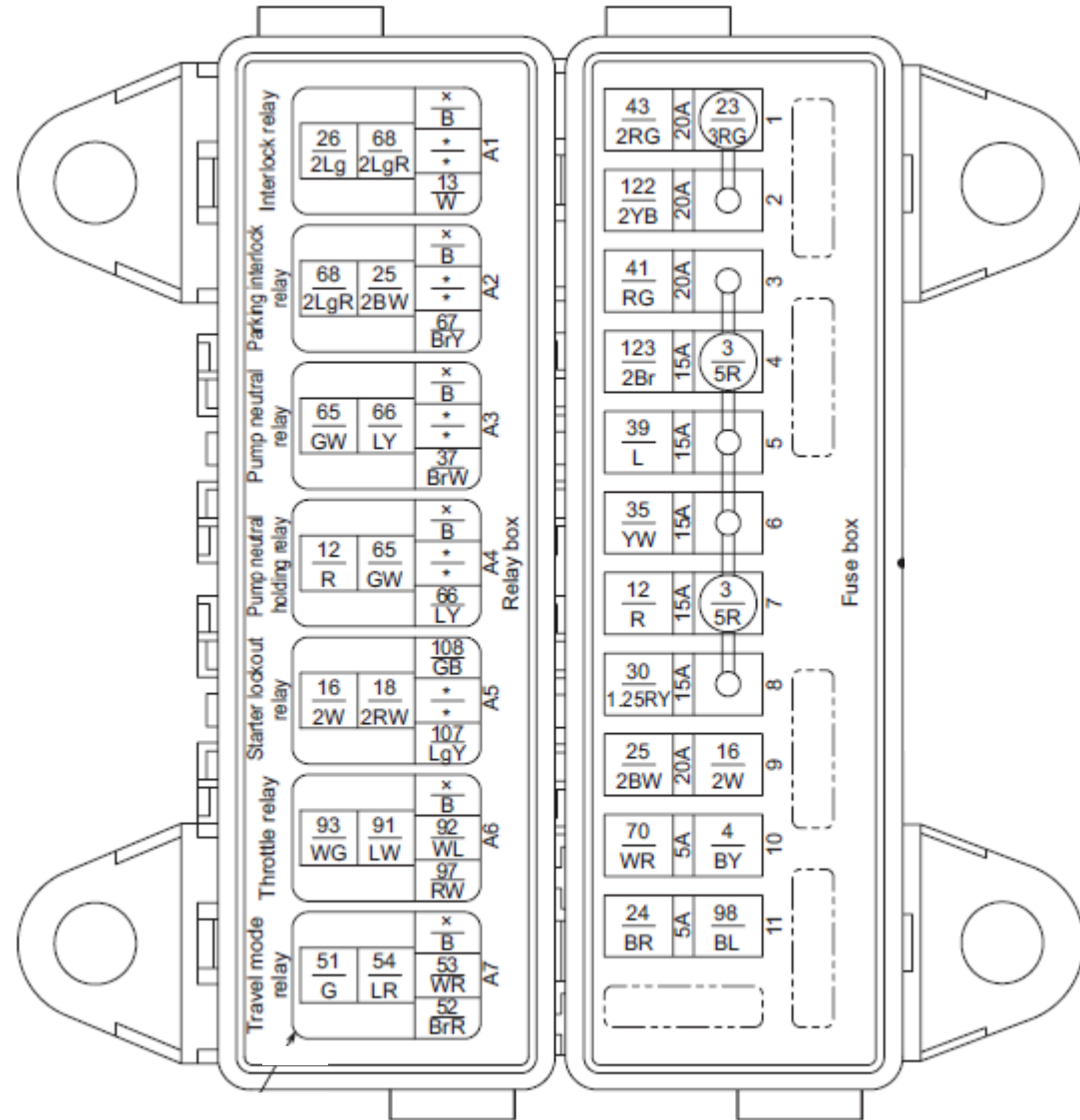
Harness side

- | | | |
|------------------------|----------------------------|------------------------------------|
| 1 Battery 12V (+) | 13 Head lamp | 25 Water splay |
| 2 Starter switch (ACC) | 14 Parking brake | 26 Flood lamp |
| 3 Ground | 15 Charge warning | 27 Vibrator |
| 4 Turn signal (R) | 16 HYD. oil filter warning | 28 Liquid spray |
| 5 Engine stop | 17 Engine warning | 29 High beam |
| 6 Over heat | 18 Fuel meter | 30 COMBI. meter ILLUMI. |
| 7 REV. ratio SEL.1 | 19 REV. ratio SEL.2 | 31 Exhaust system high temperature |
| 8 REV. ratio SEL.3 | 20 REV. ratio SEL.4 | 32 DEF low level |
| 9 Buzzer | 21 DTC display | 33 Manual regeneration |
| 10 Lamp check | 22 Hour meter | 34 LYS pin |
| 11 CAN(+) | 23 Turn signal (L) | 35 ECO mode |
| 12 CAN(-) | 24 Preheating | |



PIN	DESCRIPTION	NO.	PIN	DESCRIPTION	NO.
1	Battery 12V (+)	(70)	19	REV. ratio SEL.2	
2	Starter switch (ACC)	(35)	20	REV. ratio SEL.4	
3	Ground	(X)	21	DTC display	(96)
4	Turn signal (R)		22	Hour meter	(35)
5	Engine stop		23	Turn signal (L)	
6	Over heat		24	Preheating	
7	REV. ratio SEL.1		25	Water splay	
8	REV. ratio SEL.3		26	Flood lamp	
9	Buzzer		27	Vibrator	(31)
10	Lamp check	(32)	28	Liquid spray	
11	CAN(+)	(82)	29	High beam	
12	CAN(-)	(83)	30	COMBI. meter ILLUMI.	(41)
13	Head lamp		31	Exhaust system high temperature	
14	Parking brake	(38)	32	DEF low level	
15	Charge warning	(32)	33	Manual regeneration	
16	HYD. oil filter warning	(22)	34	LYS pin	
17	Engine warning		35	ECO mode	
18	Fuel meter	(6)			

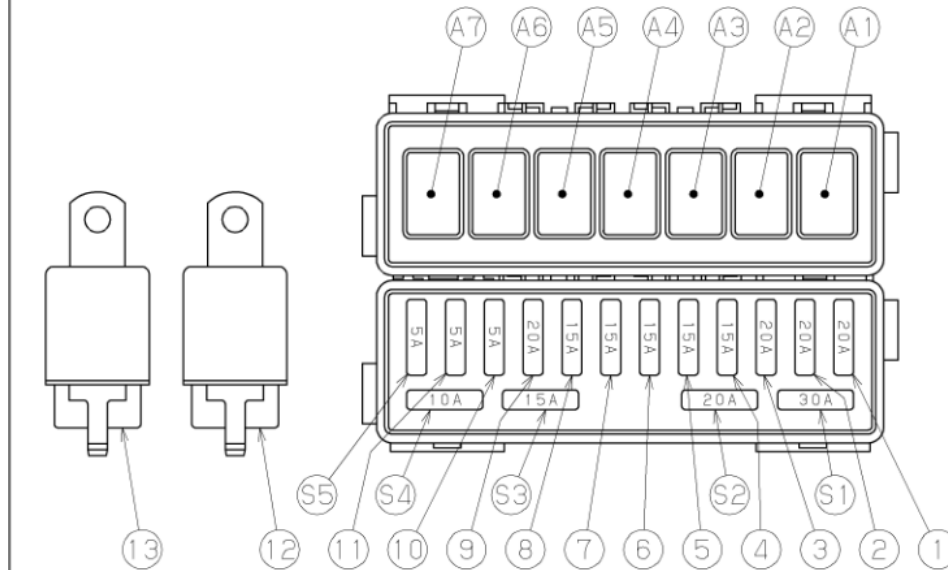


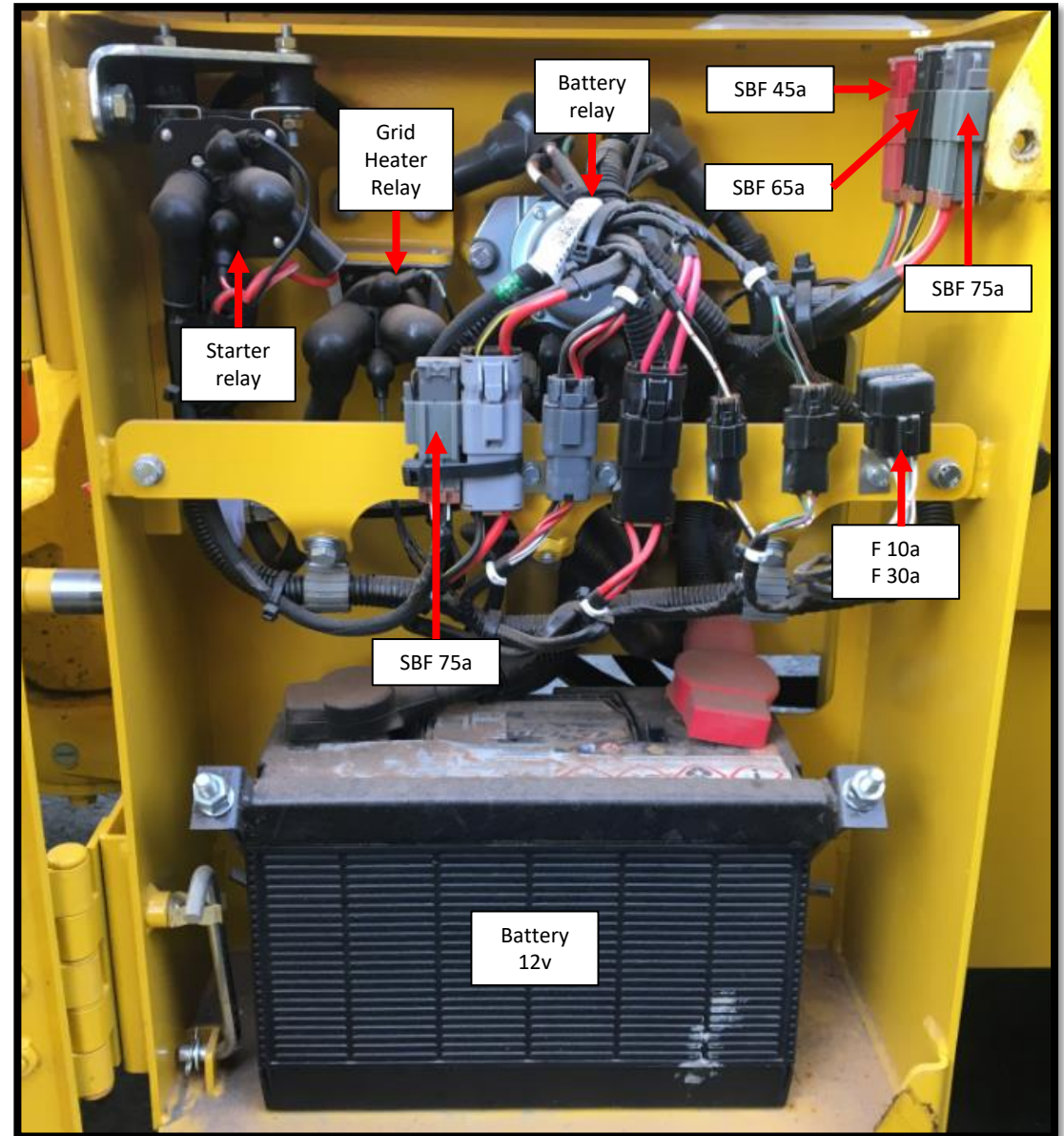
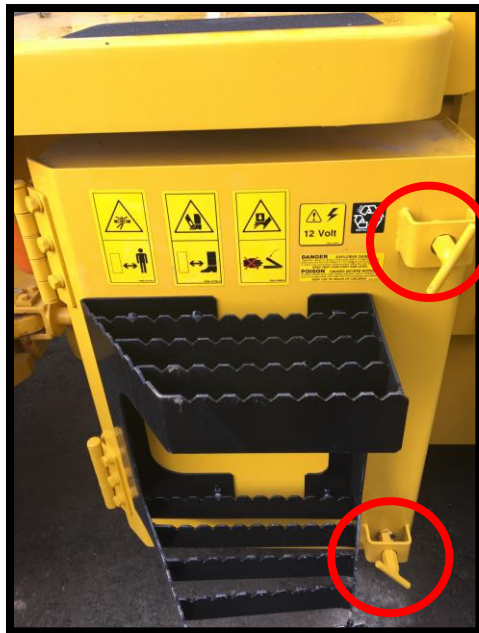


FUSE & RELAY BOX

A1	L-INTERLOCK RELAY
A2	P-INTERLOCK RELAY
A3	HYDRAULIC PUMP NEUTRAL RELAY
A4	HYDRAULIC PUMP NEUTRAL HOLDING RELAY
A5	STARTER LOCKOUT RELAY
A6	THROTTLE RELAY
A7	TRAVEL MODE RELAY

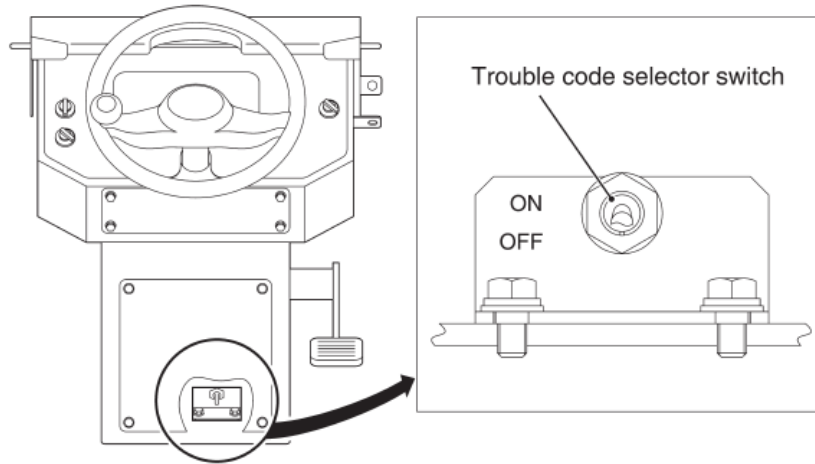
1	SPARE POWER SOURCE
2	SPARE POWER SOURCE
3	COMBINATION METER (PANEL LIGHT)
4	POWER OUTLET
5	SPEED CHANGE SWITCH
6	COMBINATION METER (POWER (+), HOUR METER)
7	HYDRAULIC PUMP NEUTRAL HOLDING RELAY BACK UP BUZZER SWITCH F/R LEVER SWITCH FOOT BRAKE SWITCH PARKING BRAKE
8	HORN RELAY THROTTLE SWITCH VIBRATION SWITCH
9	STARTER LOCKOUT RELAY
10	COMBINATION METER (CONTINUOUS POWER (+))
11	ECM (KEY SWITCH SIGNAL)
12	HORN RELAY
13	LAMP CHECK RELAY
S1	SPARE 30A
S2	SPARE 20A
S3	SPARE 15A
S4	SPARE 10A
S5	SPARE 5A





NOTE:

For full description and additional troubleshooting, please see the engine Diagnostic Manual.



Self-diagnosis in progress.

Wait to start

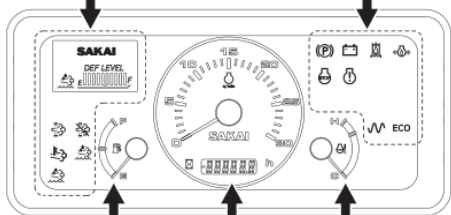
DTC MESSAGE : 0 OF 0
SPN : _____
FMI : ____
SA : ____

Occurrence of fault code.

DTC MESSAGE : 4 OF 5
SPN : 32
FMI : 24
SA : 1

Aftertreatment monitor display (part)

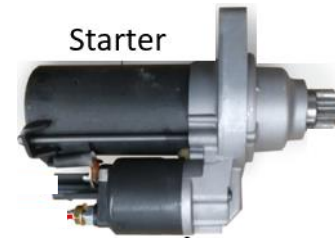
OK monitor display (part)



Fuel gauge Tachometer / Hour meter Temperature gauge



ECM Fuse 5A



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 Red 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 (Black/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 Terminal Red 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?

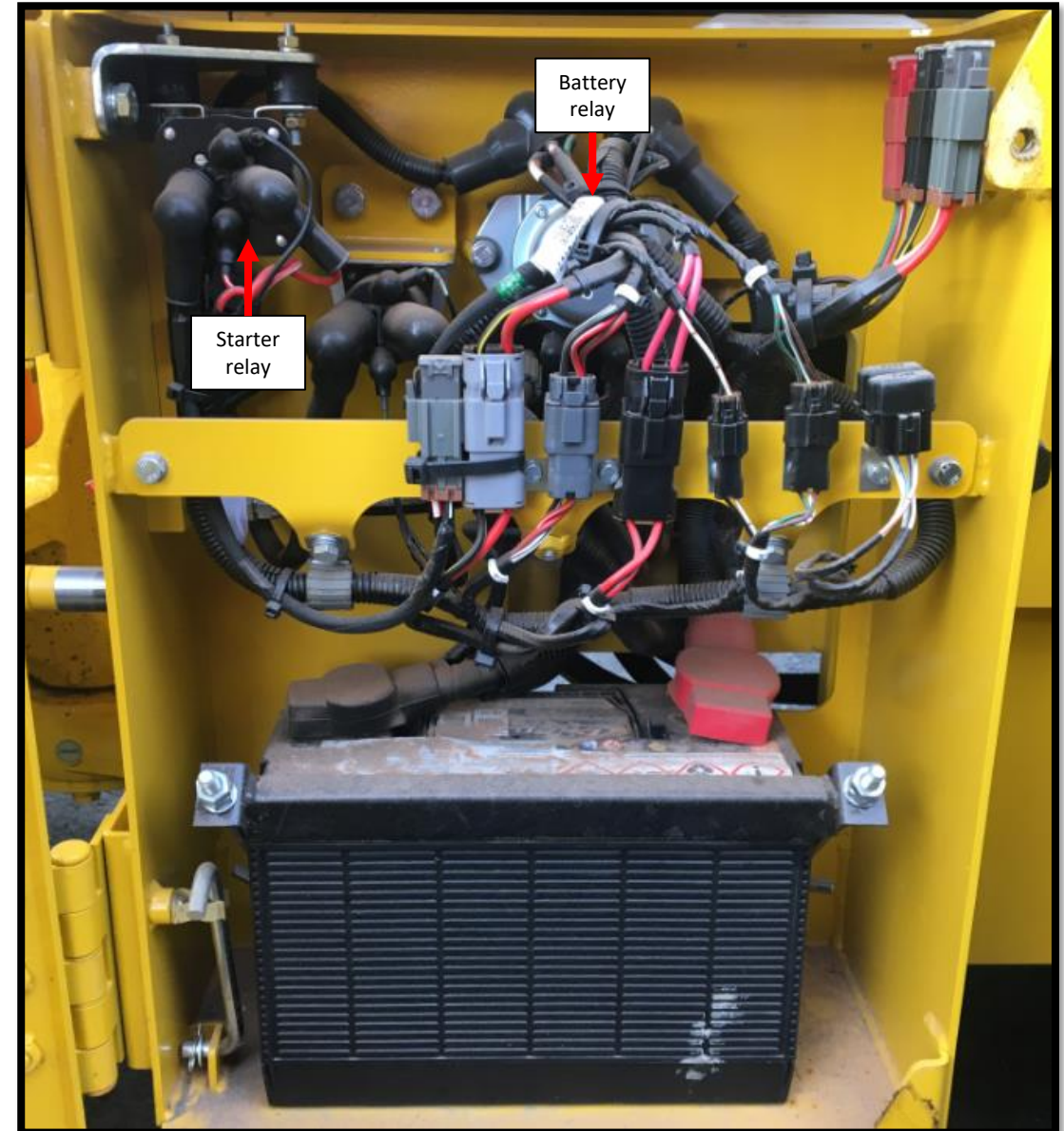
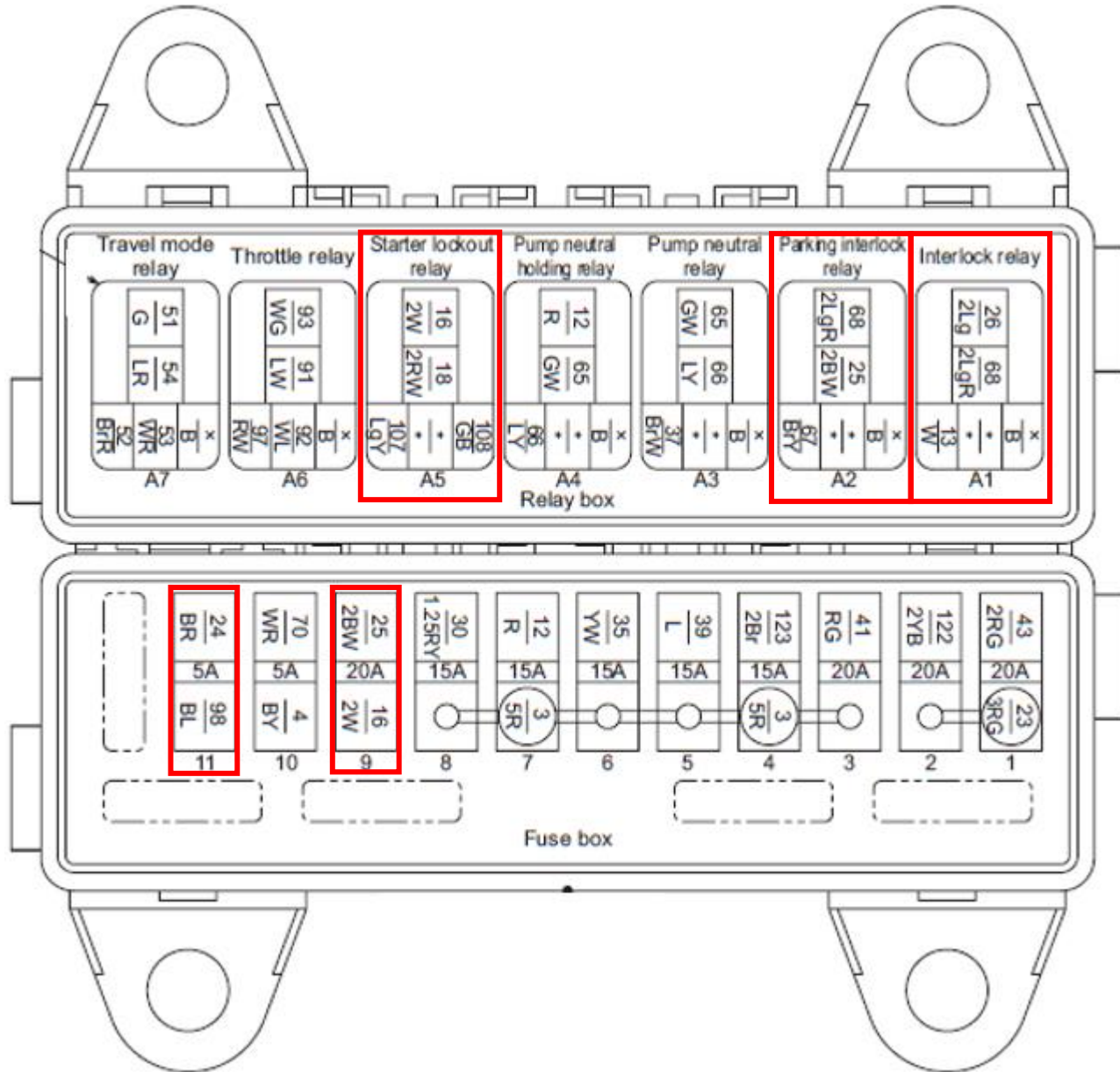
Yes, Test for power across relays for Starter, Starter Interlock, park brake switch and Neutral Switch? Do the switches test good?

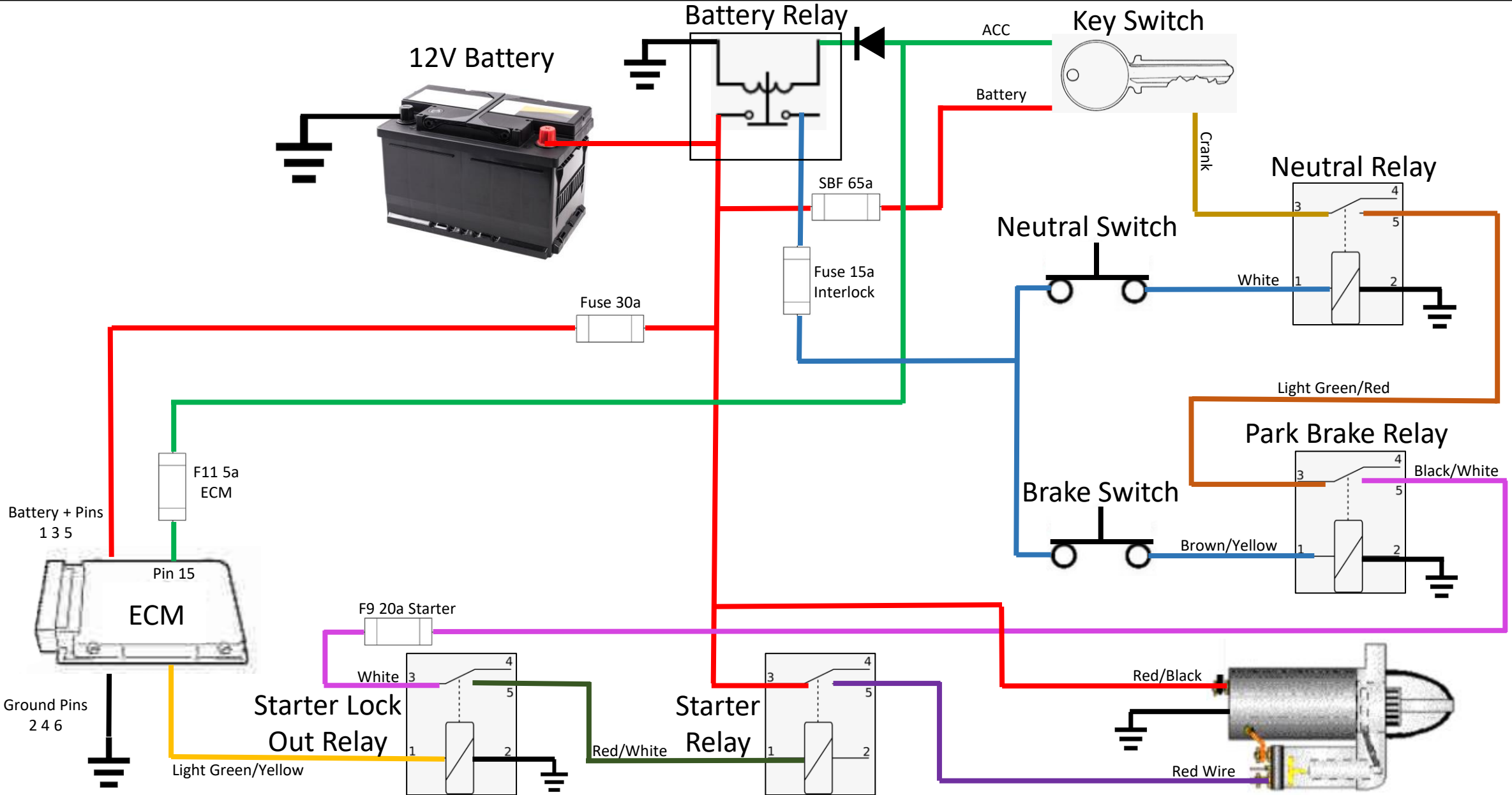
No, Repair or replace as needed.

Yes, Check fuse for ECM F11 5a, Interlock F9 (20a), and Starter Relay 20a.

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

No, Repair or replace as needed.





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Crank, No Start

Are there any Engine Codes present?

No, Is there fuel in the machine?

Yes, Please consult local Cummins Dealer

No, Add Fuel and Prime using hand pump.

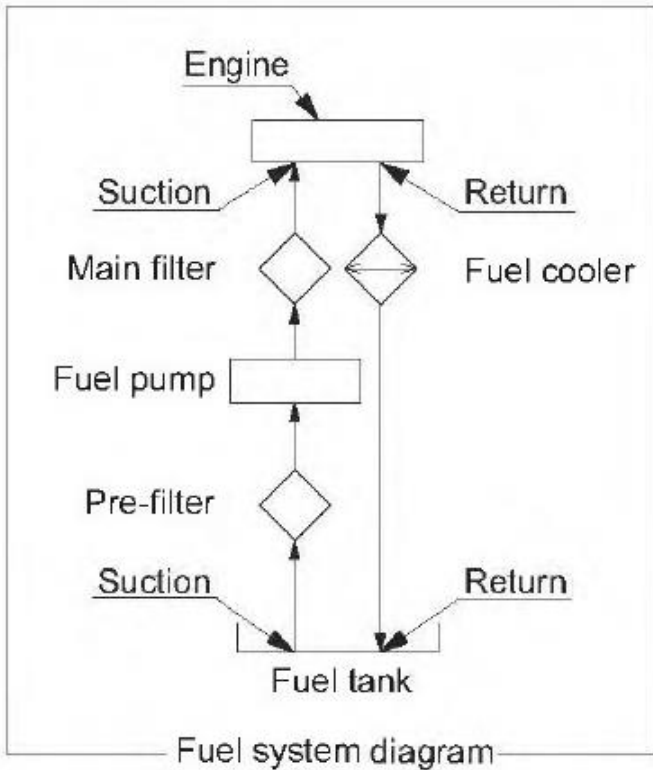
Yes, Is there fuel present at filters?

No, Replace filters as needed or remove fuel restriction, repair as needed.

Yes, There fuel present at Fuel Pump ?

No, Replace filters as needed or remove fuel restriction, repair as needed.

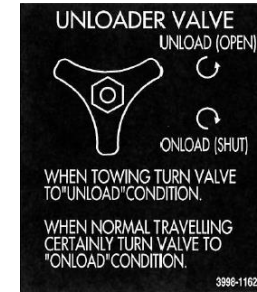
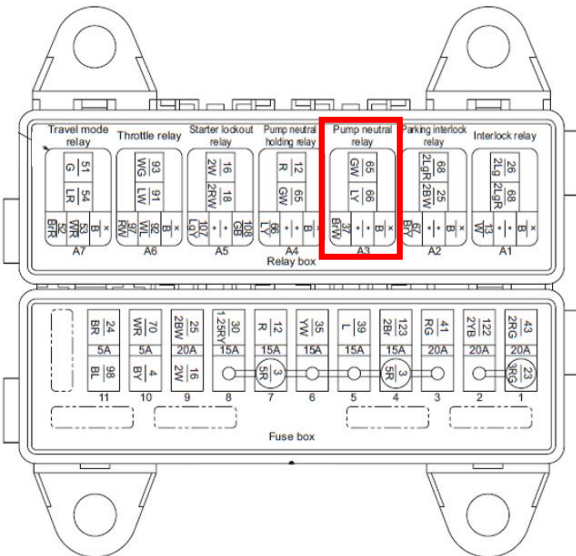
Yes, Please consult your local Cummins Dealer.



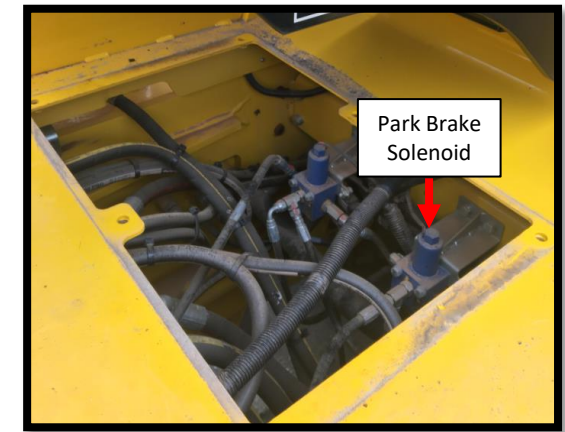
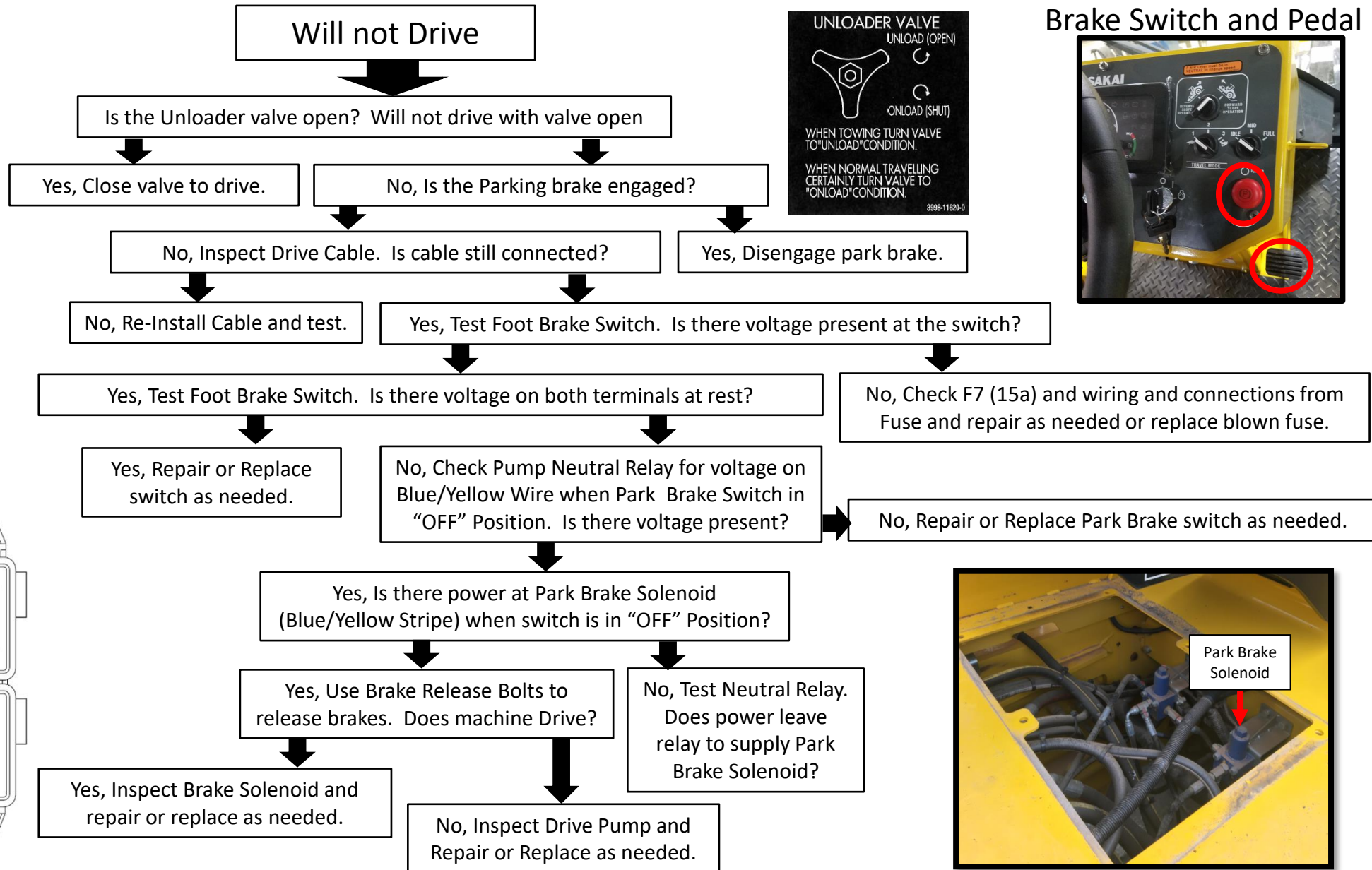
Drive Cable

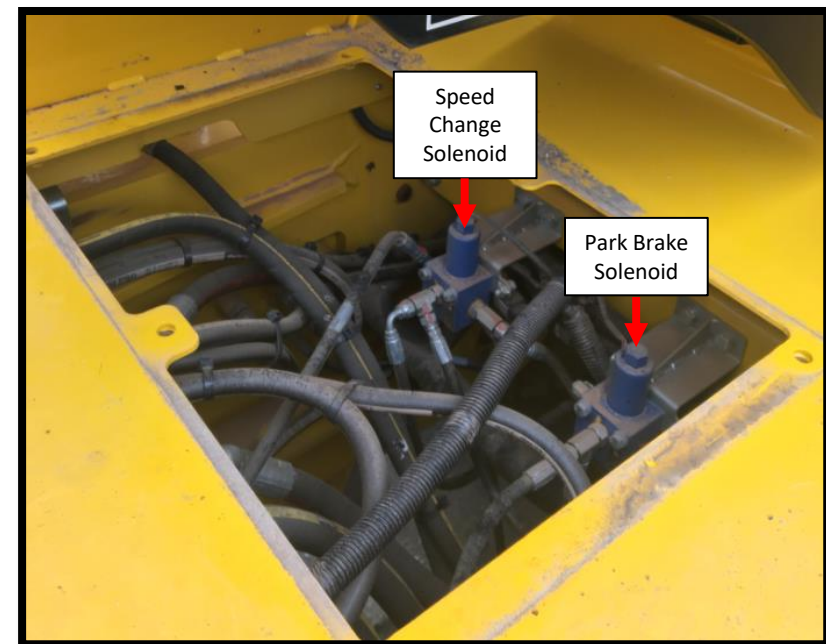
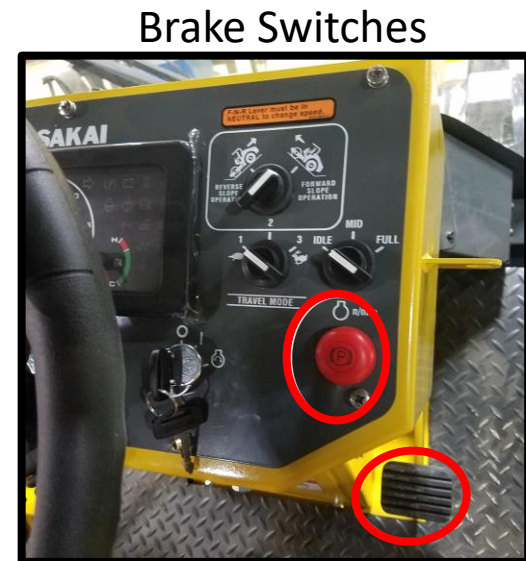
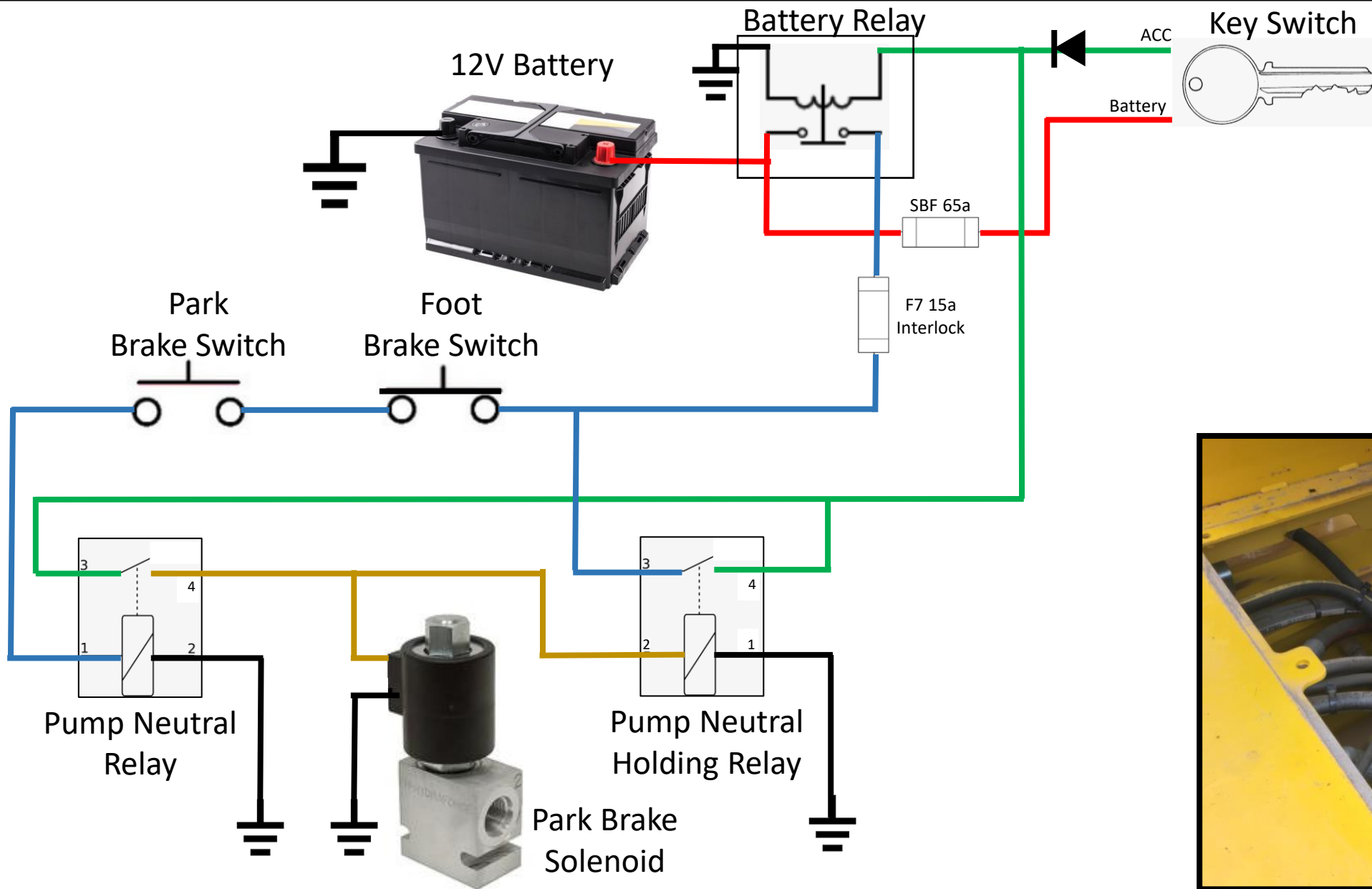


Pump Neutral Relay



Brake Switch and Pedal





Will not Vibrate

No, Are the Vibrate Switches in correct position?

No, See Ops Manual for More Info.

Yes, Is Idle at Full Throttle?

No, Switch, Machine must be at Full Throttle to Vibrate.

Yes, With switch on Full Idle. Is there power on the Throttle Switch on the Red/White Stripe wire?

Yes, Is there power on the mode selector wire Red/White Stripe?

No, Is there power at the Throttle Switch Red/Yellow Stripe wire?

Yes, With Mode Selector on Auto and Idle on Full. Is there power on the Yellow wire of the Mode Selector Switch?

No, Repair broken wire from Throttle Switch to Mode Switch, Red/Yellow Stripe.

Yes, Repair Replace defective Idle Switch.

No, Inspect F8 15a. Is there power across the fuse?

Yes, Remove Shaft and inspect. Test Vibrate motor pressure.

No, Repair Replace defective Mode Switch.

Yes, Repair broken wire from F8 to Throttle Switch.

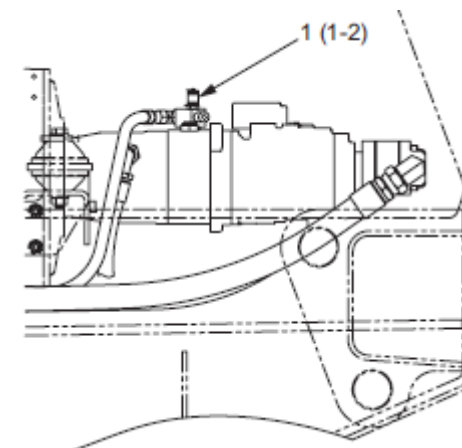
No, Replace defective F8 Fuse.

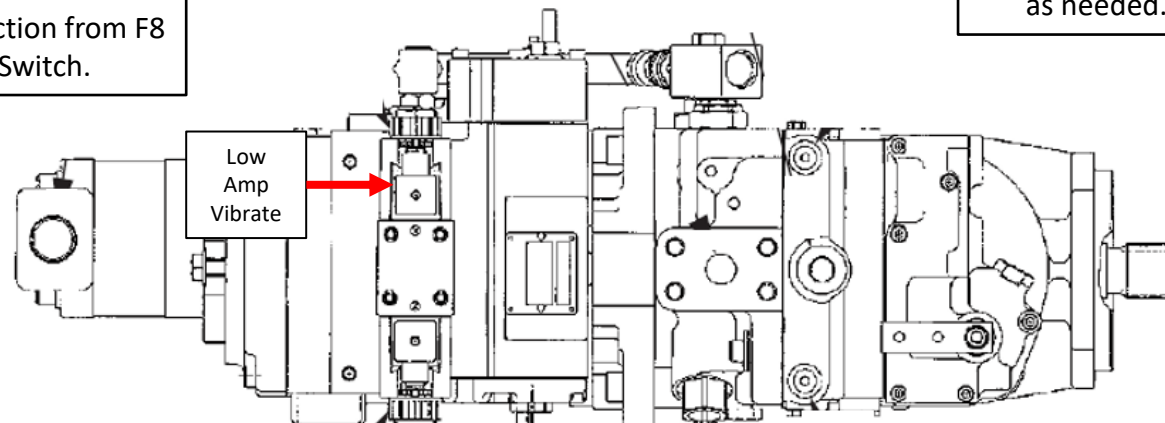
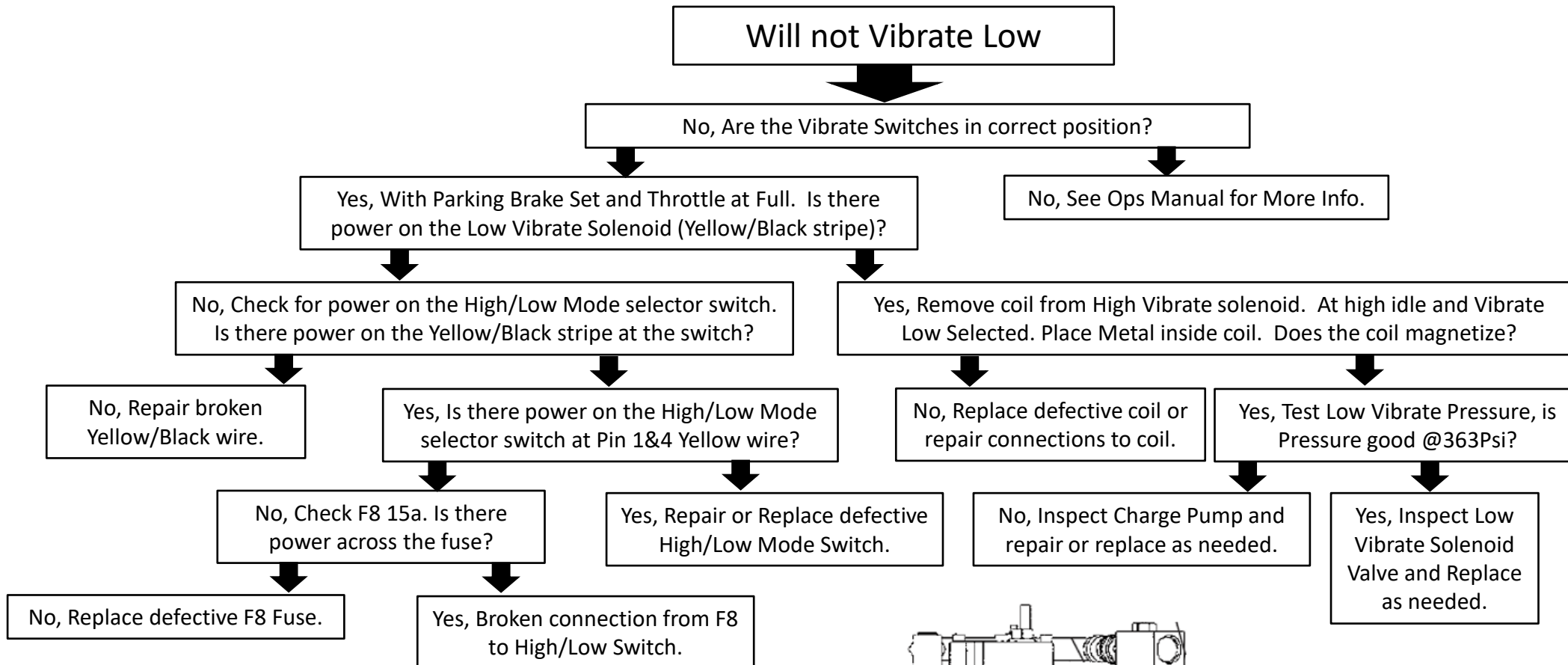
Pressure Testing Vibrate

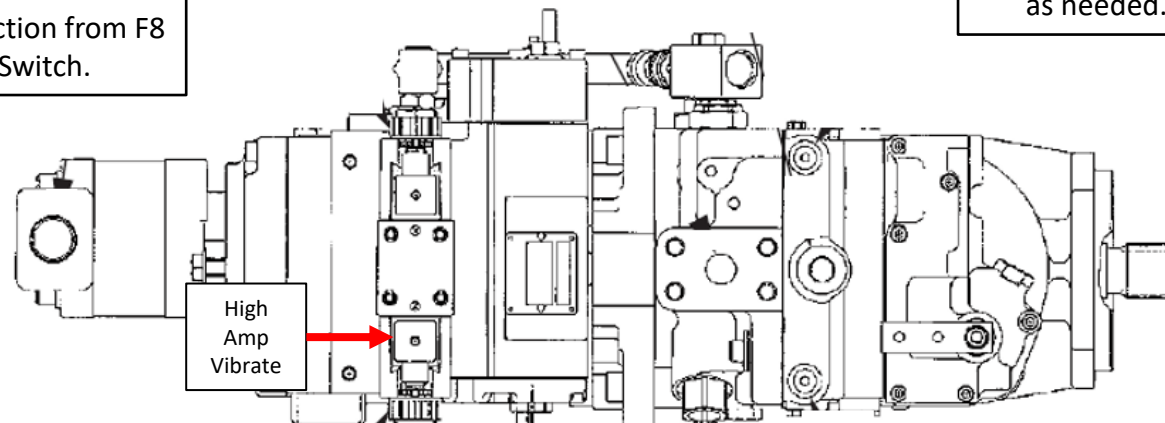
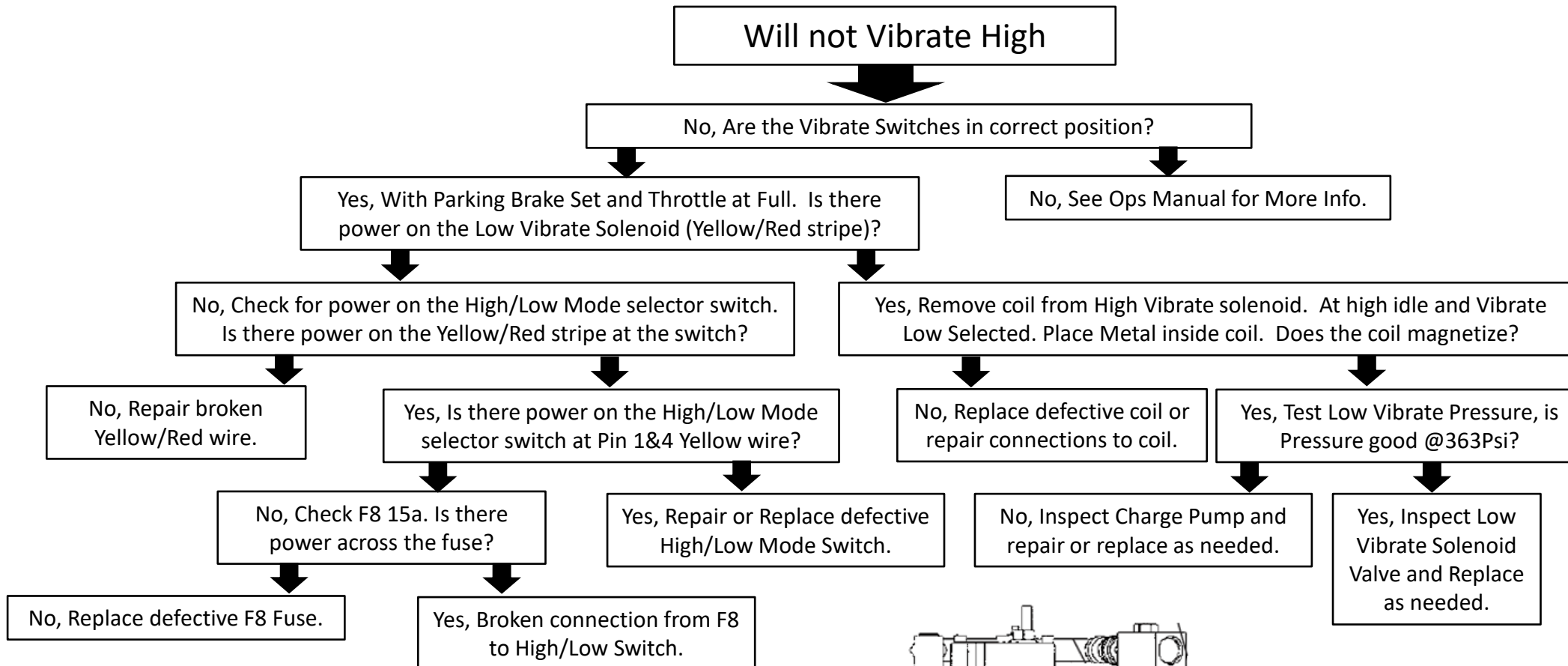
- Oil temperature during measurement : $50 \pm 5^{\circ}\text{C}$ ($122 \pm 9^{\circ}\text{F}$)
- ① Remove plug from coupling (1) of propulsion pump. Attach pressure gauge with hose (S) and connector (U).
 - Coupling : 9/16-18UNF×M16
 - Adapter for hose (S) : M16 P=2.0
 - Pressure gauge connector (U) : M16×G3/8
 - Pressure gauge : 0 to 5 MPa (0 to 725 psi)
- 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 switch to "FULL".
- ⑤ Read pressure indicated by pressure gauge.

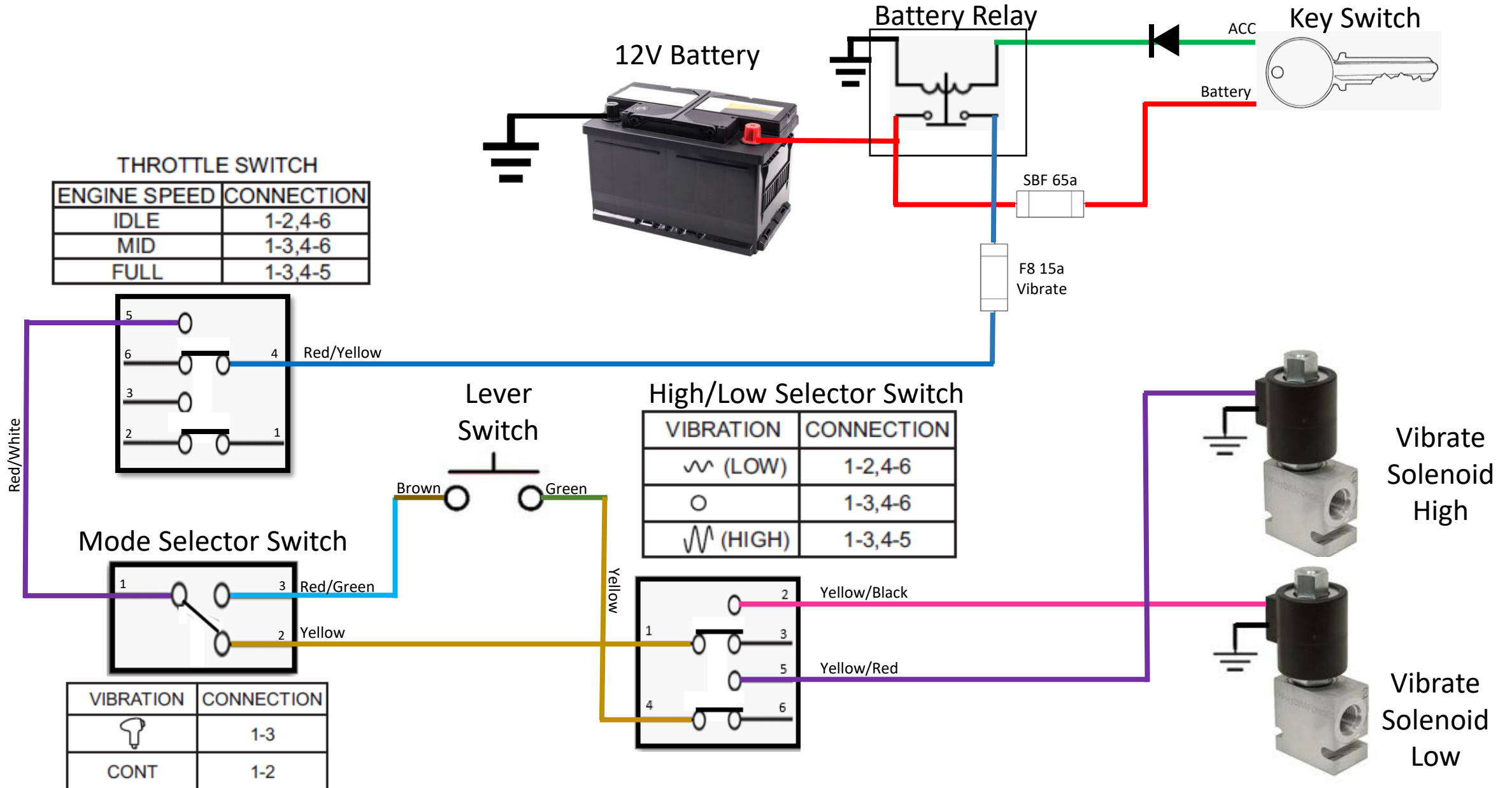
★ Standard charge relief valve setting

: 2.5 ± 0.2 MPa (363 ± 29 psi)



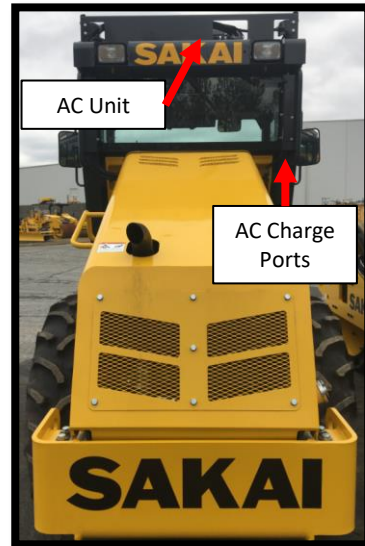






AC Capacity
1.75 lbs. of R134A
2 oz of Pag Oil

AC Control Panel



Use care so as not to release any R-134a refrigerant into the atmosphere. A/C systems operate under high pressure. At 77°F the R-134a container will be pressurized to approximately 80 psi. Use caution when working with these materials. Goggles are recommended. To function properly the A/C system must be clean and dry. Keep caps or protective covers on all refrigerant hoses and fittings until final assembly.

