Capacities

Fuel tank

Capacity	
SR130 and SR160	**60.5 l** (**16.0 US gal**)
SR175 and SV185	**75.5 l** (**20.0 US gal**)
SR250, SV300, TR320, and TV380	**95.5 l** (**25.5 US gal**)
Specifications	#1 or #2 Diesel ultra low sulfur

Cooling system

Capacity	
SR130	**15.0 l** (**4.0 US gal**)
SR175, SV185, and SR160	**15.6 l** (**4.2 US gal**)
SR250, SV300, TR320, and TV380	**19 l** (**5 US gal**)
Specifications	**50 %** distilled water and **50 %** ethylene glycol

Hydraulic system

Reservoir capacity	**15.0 l** (**3.96 US gal**)
System capacity:	
SR130 and SR160	**29.2 l** (**7.7 US gal**)
SR175 and SV185	**38.1 l** (**10.0 US gal**)
SR250, SV300, TR320, and TV380	**45.4 l** (**12.0 US gal**)
Specifications	**CASE AKCELA ENGINE OIL 10W-30**

Chain compartments

Capacity - each side	
SR130 and SR160	**6.25 l** (**6.6 US qt**)
SR175 and SV185	**7.4 l** (**7.9 US qt**)
SR250 and SV300,	**22.2 l** (**23.5 US qt**)
Specifications	**CASE AKCELA ENGINE OIL 10W-30**

Grease fittings

Quantity	As required
Specifications	Molydisulfide grease

Engine crank case oil

Capacity - with filter change	
SR130, SR160, SR175, and SV185	**7 l** (**7.5 US qt**)
SR250, SV300, TR320, and TV380	**8.5 l** (**8.9 US qt**)
Specifications	**CASE AKCELA UNITEK NO. 1™ SBL CJ-4**

Final track drive

Capacity - each side	**1.0 l** (**1.06 US qt**) +/- **0.1 l** (**0.1 US qt**)
Specifications	**CASE AKCELA GEAR 135 EP**

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Engine - Remove

SR220 TIER 4 [NDM457559 -]	NA Mechanical hydraulic controls
SR250 TIER 4 [NCM442784 -]	NA Mechanical hydraulic controls
TR320 TIER 4 [NCM440597 -]	NA Mechanical hydraulic controls

⚠ WARNING

Avoid injury! Always do the following before lubricating, maintaining, or servicing the machine.
1. **Disengage all drives.**
2. **Engage parking brake.**
3. **Lower all attachments to the ground, or raise and engage all safety locks.**
4. **Shut off engine.**
5. **Remove key from key switch.**
6. **Switch off battery key, if installed.**
7. **Wait for all machine movement to stop.**

Failure to comply could result in death or serious injury.

W0047A

⚠ WARNING

Fire hazard!
When handling diesel fuel, observe the following precautions:
1. **Do not smoke.**
2. **Never fill the tank when the engine is running.**
3. **Wipe up spilled fuel immediately.**

Failure to comply could result in death or serious injury.

W0099A

⚠ WARNING

Escaping fluid!
Hydraulic fluid or diesel fuel leaking under pressure can penetrate the skin and cause infection or other injury. To prevent personal injury: Relieve all pressure before disconnecting fluid lines or performing work on the hydraulic system. Before applying pressure, make sure all connections are tight and all components are in good condition. Never use your hand to check for suspected leaks under pressure. Use a piece of cardboard or wood for this purpose. If injured by leaking fluid, see your doctor immediately.
Failure to comply could result in death or serious injury.

W0178A

⚠ WARNING

Heavy objects!
Lift and handle all heavy components using lifting equipment with adequate capacity. Always support units or parts with suitable slings or hooks. Make sure the work area is clear of all bystanders.
Failure to comply could result in death or serious injury.

W0398A

Prior operation:
Tilt the ROPS.
Prior operation:
Disconnect the battery. See **Battery - Disconnect (55.302)**.
Prior operation:
Drain the coolant. See **Radiator - Drain fluid (10.400)**.
Prior operation:
Drain the engine oil.
Prior operation:
Remove the rear engine access door. See **Engine inspection door - Remove (90.102)**.
Prior operation:
Evacuate the A/C system (if equipped). See **Air conditioning - Evacuate (50.200)**.

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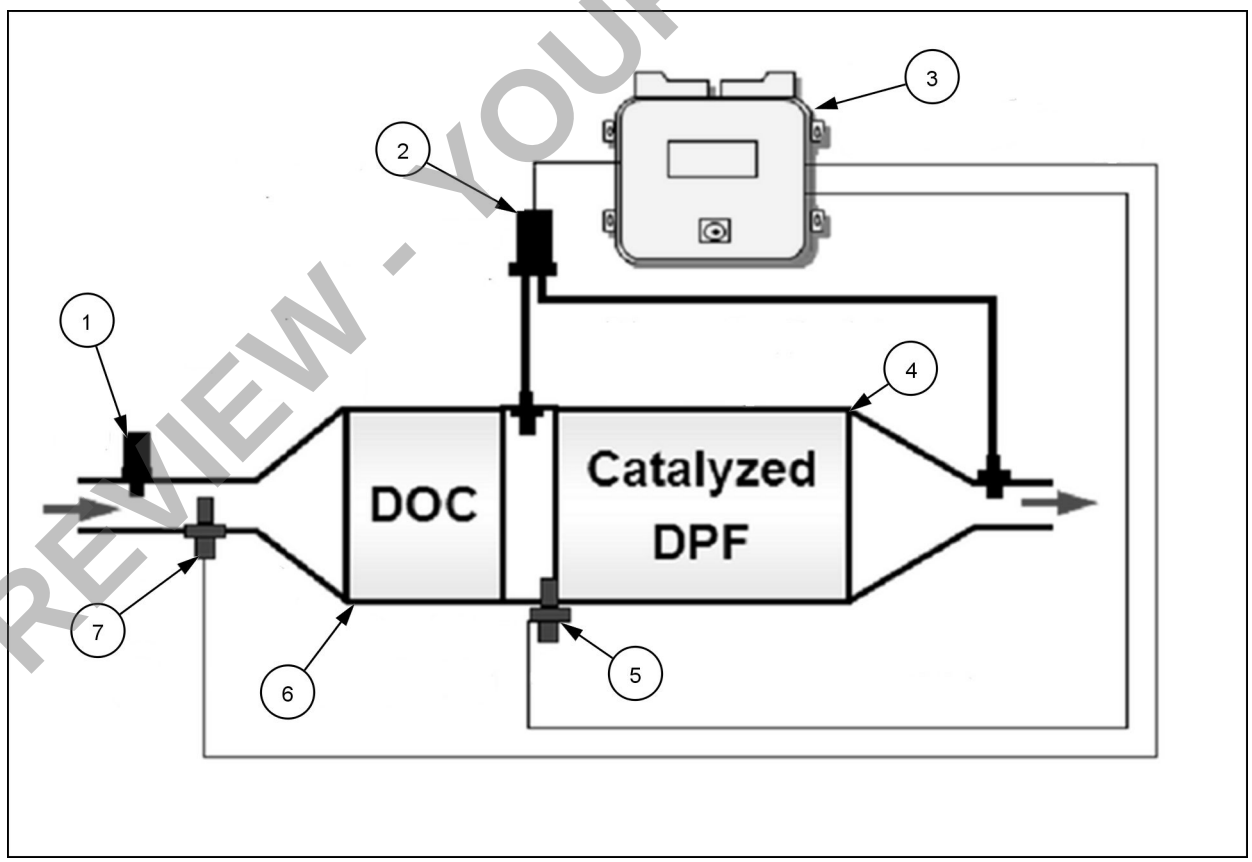
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Diesel Particulate Filters (DPF) - Dynamic description

During normal operation, the diesel engine generates certain pollutants. Federal law regulates the levels of exhaust pollutants that a vehicle is allowed to emit. Pollutants generated during the normal operation of these engines require after-treatment. The Diesel Oxidation Catalyst (DOC) and Diesel Particulate Filter (DPF) system controls these pollutants.

The DPF system uses a heated exhaust gas oxygen sensor **(1)** which provides information about combustion efficiency to the Engine Control Unit (ECU) **(3)**. The ECU **(3)** uses this information to determine the fuel injection requirements. The system also uses a Diesel Oxidation Catalyst (DOC) **(6)** which converts carbon monoxide and hydrocarbons into carbon dioxide and water. During normal operation, lower combustion temperature created by the Exhaust Gas Recirculation (EGR) system lowers the NOx levels, but also creates particulate matter. The DPF **(4)** traps this particulate matter. Restriction of the DPF **(4)** is monitored by the DPF differential pressure sensor **(2)**, which measures the inlet and outlet pressure of the DPF **(4)**. When the pressure at the inlet side differs from the pressure at the outlet side, the DPF **(4)** is cleaned of particulate matter by elevating the exhaust temperature. This process is called regeneration. Normally, the ECU **(3)** controls regeneration while the machine is operating under normal conditions, but if the operator inhibits regeneration too many times, the ECU **(3)** will request a forced regeneration, which demands that the machine be parked and idling. During regeneration, the ECU **(3)** closes the throttle valve to restrict air flow into the engine. Then the ECU **(3)** injects fuel into the exhaust by spraying the fuel injectors during the exhaust stroke of the cylinder. The high temperature combined with the fuel creates the heat needed to regenerate the DPF **(4)**. The ECU **(3)** monitors the DOC inlet temperature sensor **(7)** and the DPF inlet temperature sensor **(5)** during regeneration. The DOC **(6)** outlet temperature will be higher than the DOC **(6)** inlet temperature because of the chemical reactions occurring inside the DOC **(6)**. Extreme temperatures will damage the DOC **(6)** and DPF **(4)**.

The DPF requires replacement after four thousand hours of usage. After replacement of the DPF, the technician needs to reset the DPF data in the ECU. The technician can reset the data by following the directions located within the diagnostic software associated with this machine's engine.



RAPH14SSL0022FA 1

DOC/DPF system

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Chain drive - Check

SR220	NA
SR250	NA
SV250	NA
SV300	NA

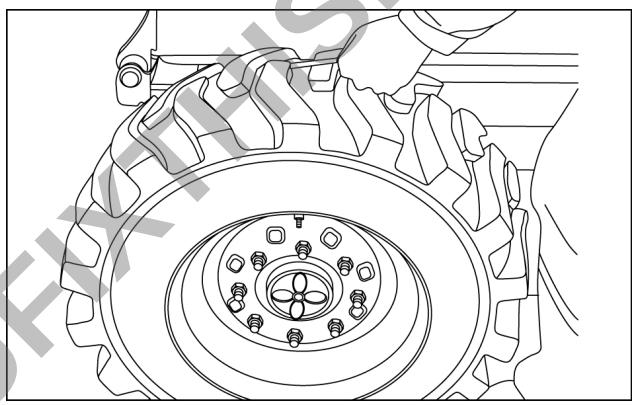
⚠ WARNING

Jack stands can slip or fall over. Dropping, tipping, or slipping of machine or its components is possible.
DO NOT work under a vehicle supported by jack stands only. Park machine on a level surface. Block wheels. Support machine with safety stands.
Failure to comply could result in death or serious injury.

W0069A

Check the tension of the four drive chains after the first 250 hours of operation on a new machine or if new chains have been installed and every 500 hours of operation.

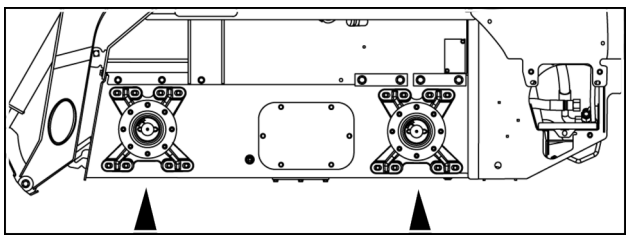
1. With the machine blocked up, rotate each tire and check for allowable movement. **0.5 - 1.5 °** or **6 - 12 mm** (**15/64 - 15/32 in**) of movement is the acceptable range.



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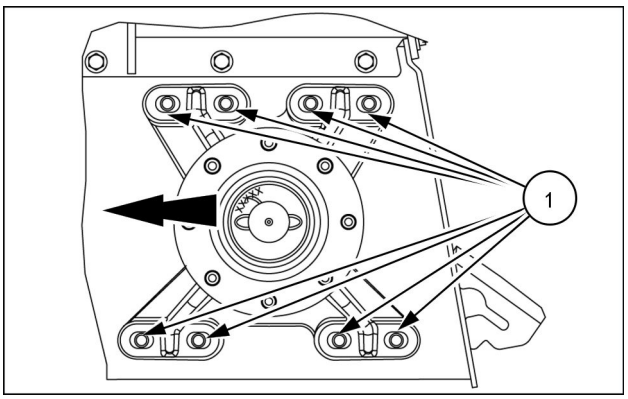
Drive chain adjustment

2. To adjust the final drive chains, jack up and block the complete skid steer securely off the ground.



931002280 2

3. Each axle drive chain is adjustable by loosening the retaining nuts **(1)** (left front shown) and sliding the axle-hub assembly to remove the excessive slack.
   To tighten the chains slide the front axle-hubs forward and rear axle-hubs rearward.
   Torque the axle retaining hardware to **224 - 264 N·m** (**165 - 195 lb ft**).



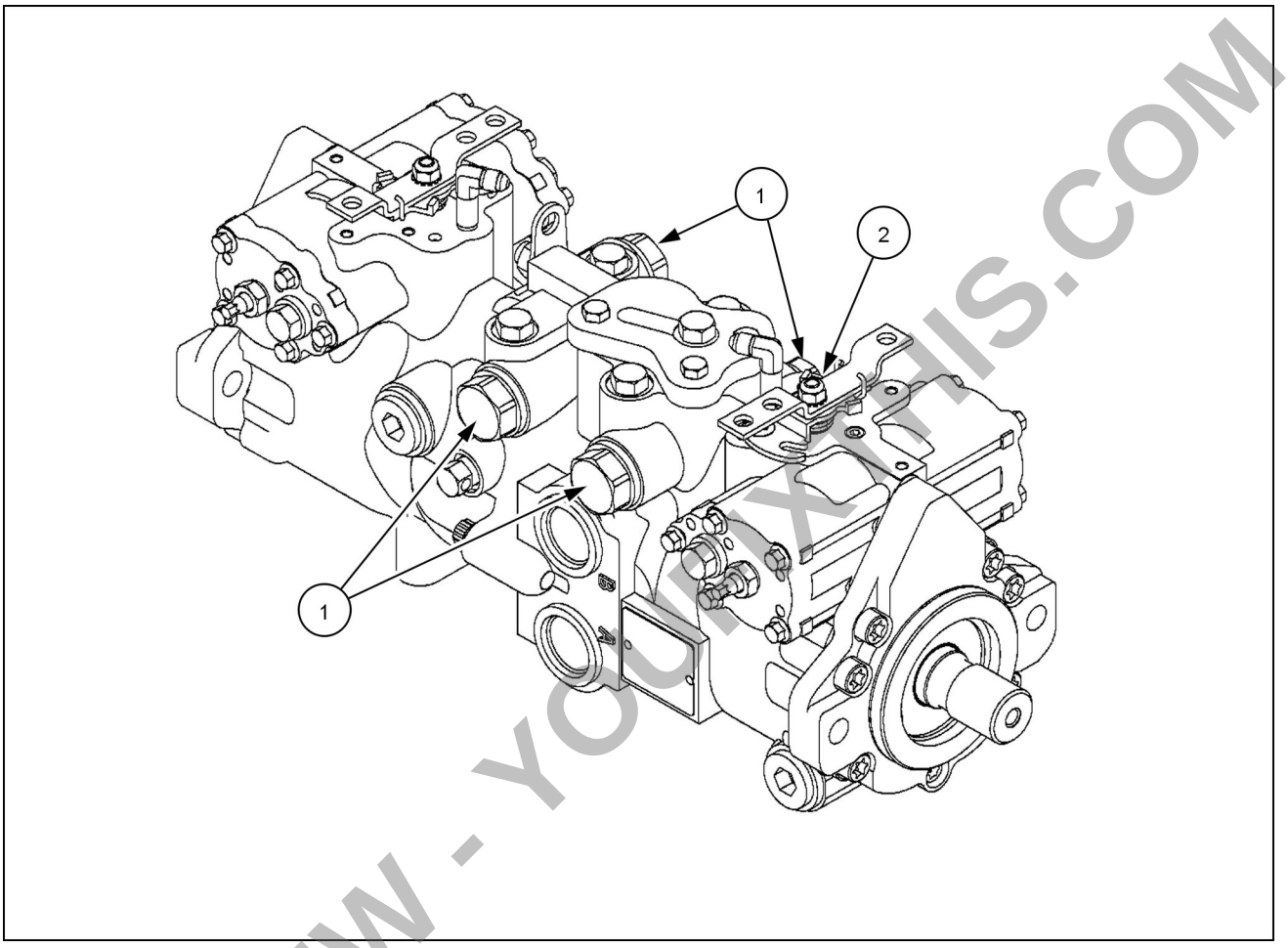
93109317 3

4. Repeat step **1**.

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Pump - General specification

SR220	NA Mechanical hydraulic controls
SR250	NA Mechanical hydraulic controls
SV250	NA Mechanical hydraulic controls
SV300	NA Mechanical hydraulic controls
TR320	NA Mechanical hydraulic controls
TV380	NA Mechanical hydraulic controls



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Hydrostatic pump

Manufacturer	Sauer-Danfoss
Pump displacement	**46 cm³** (**2.8 in³**)
Charge pump displacement	**22.9 cm³** (**1.4 in³**)
Charge pressure relief **(2)** at **1800 RPM**	**24 - 25 bar** (**350 - 370 psi**)
Main relief (**1**)	**360 - 378 bar** (**5220 - 5481 psi**)
Charge pump flow at **1800 RPM**	**30 l** (**8 US gal**)
Port identification	**A -** Service line
	B - Service line
	T - Case drain
	X1 - Control Pressure, before the orifice
	X2 - Control Pressure, before the orifice
	R - Air bleed
	Ma - Pressure gauge operating pressure A
	Mb - Pressure Gauge Operating pressure B
	G - Pressure for auxiliary circuit
	G2 - Pressure for auxiliary circuit
	S - Boost suction
	Mg - Pressure gauge operating pressure G
	Yst - Control pressure gauge

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NOTES:

1. FLUSHING VALVE
   -10 BAR SPRINGS
   -2 mm FLUSHING ORIFICE
   -290 PSI (20BAR) CUTOFF RELIEF
2. LOAD CHECK REMOVED IF HIGH FLOW INSTALLED.
3. IN-LINE ORIFICE AT MANIFOLD BLOCK FOR VERTICAL MACHINES ONLY.
4. LIFT CYLINDERS ARE CUSHIONED FOR VERTICAL FRAME MACHINES ONLY.

Main Control Valve Pressure Relief

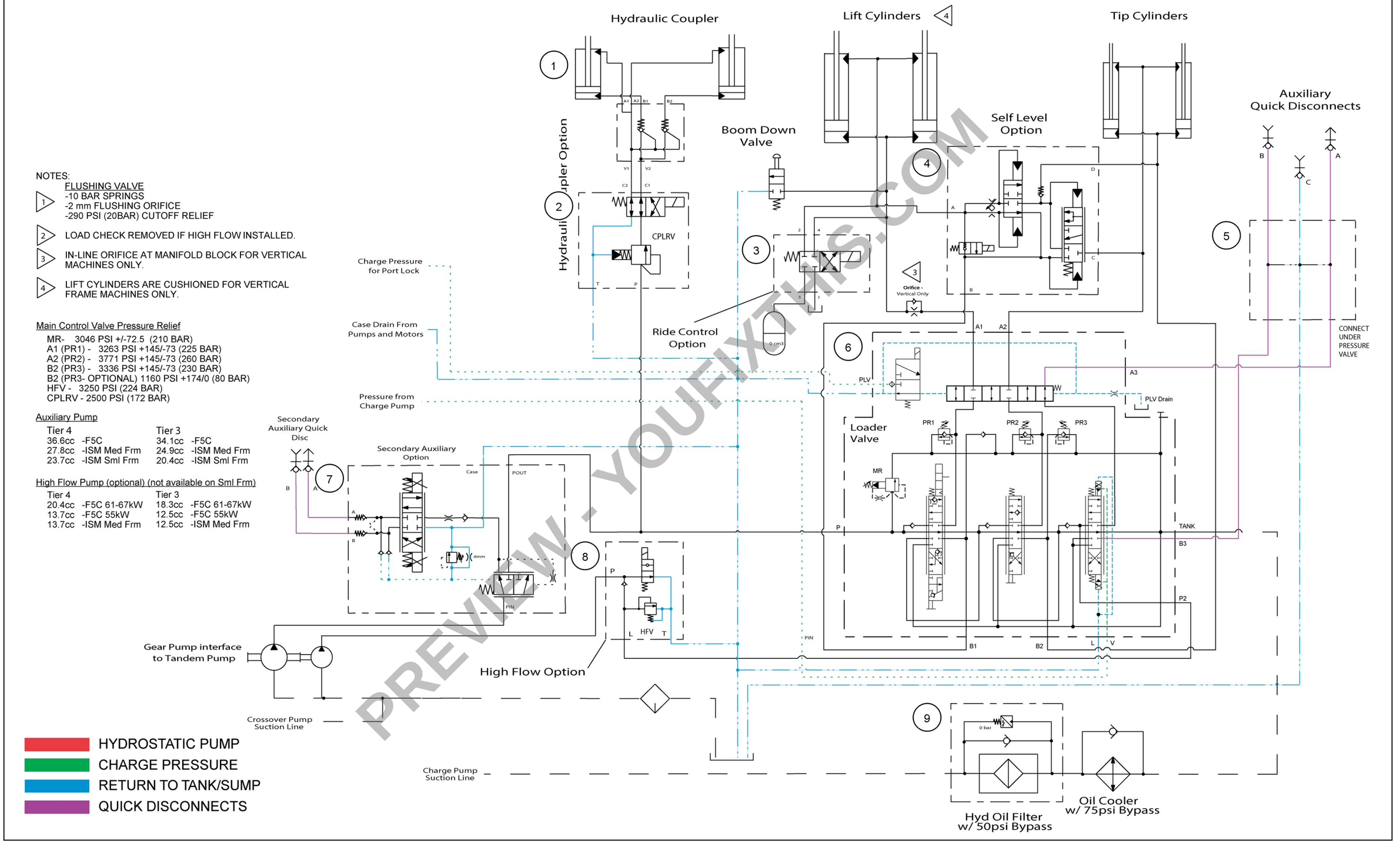
MR- 3046 PSI +/-72.5 (210 BAR)
A1 (PR1) - 3263 PSI +145/-73 (225 BAR)
A2 (PR2) - 3771 PSI +145/-73 (260 BAR)
B2 (PR3) - 3336 PSI +145/-73 (230 BAR)
B2 (PR3- OPTIONAL) 1160 PSI +174/0 (80 BAR)
HFV - 3250 PSI (224 BAR)
CPLRV - 2500 PSI (172 BAR)

Auxiliary Pump

Tier 4		Tier 3	
36.6cc	-F5C	34.1cc	-F5C
27.8cc	-ISM Med Frm	24.9cc	-ISM Med Frm
23.7cc	-ISM Sml Frm	20.4cc	-ISM Sml Frm

High Flow Pump (optional) (not available on Sml Frm)

Tier 4		Tier 3	
20.4cc	-F5C 61-67kW	18.3cc	-F5C 61-67kW
13.7cc	-F5C 55kW	12.5cc	-F5C 55kW
13.7cc	-ISM Med Frm	12.5cc	-ISM Med Frm

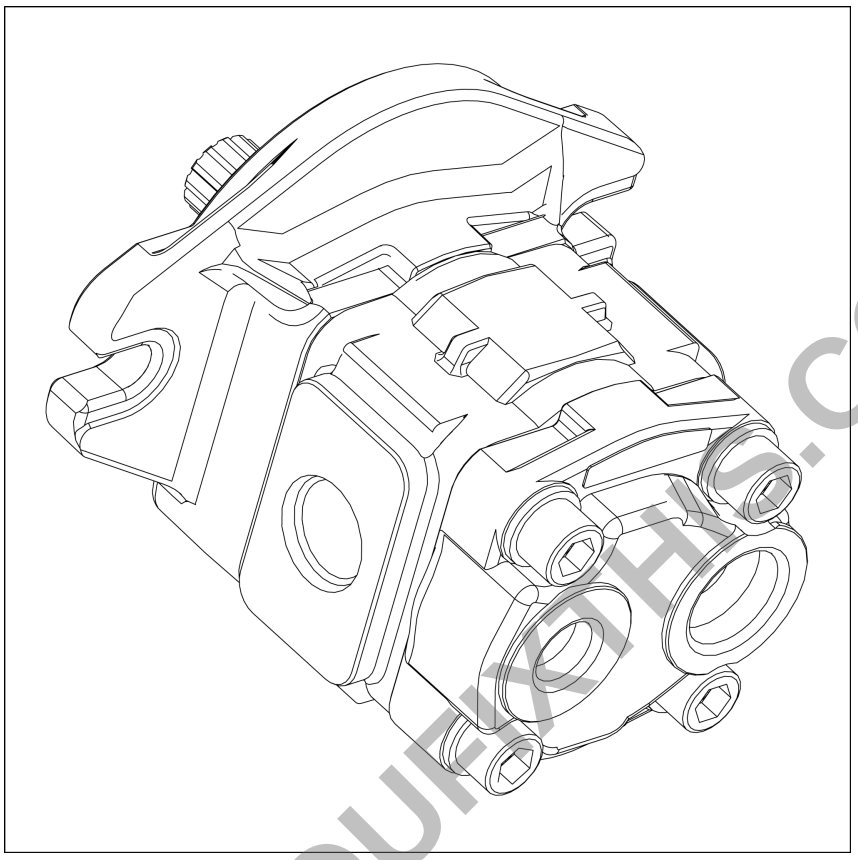


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Fixed displacement pump - General specification



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Fixed displacement pump

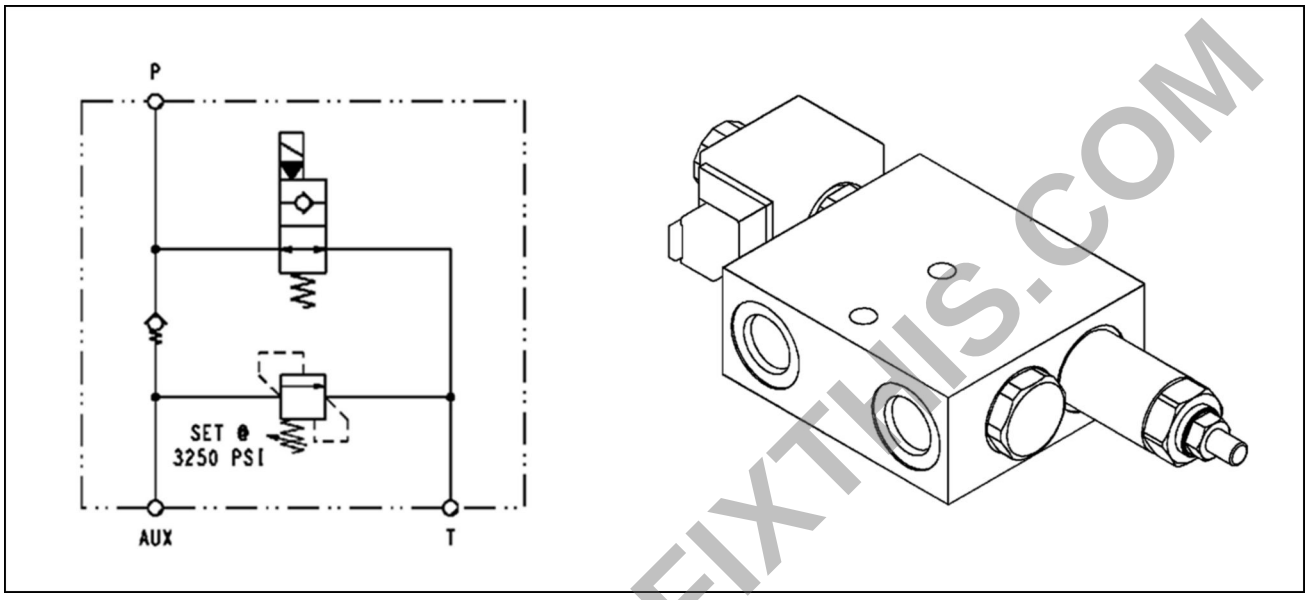
Type	Gear pump
Pump displacement	**36.6 cm³** (**2.23 in³**)
Engine RPM	**2475 RPM**
Pump flow at RPM	**92.3 l/min** (**24.4 US gpm**)
High flow pump displacement (if applicable)	**13.7 cm³** (**0.84 in³**)
Combined pump flow at RPM (if applicable)	**143.8 l/min** (**38.0 US gpm**)

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Pilot valve - General specification

SR220	NA
SR250	NA
SV250	NA
SV300	NA
TR320	NA
TV380	NA



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High flow valve

Hydraulic requirements	Flow : **45 l/min** (**12 US gpm**)
	System pressure: **210 bar** (**3050 psi**)
	Maximum pressure drop across the valve: **45 l/min** (**12 US gpm**) at **10 bar** (**145 psi**)
Relief valve setting	**224 bar** (**3250 psi**)
Port identification	**P –** Supply inlet
	T – Tank return
	AUX – Auxiliary outlet

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23. Tighten the gland to the torque of **407 Nm ± 68 Nm** (**300 lb ft ± 50 lb ft**).
24. If hoses were removed with the cylinder, install new O-rings, if equipped, on the hose fittings. Lubricate the new O-rings with clean hydraulic oil and install the hoses.

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Front wheels - General specification

SR220	NA
SR250	NA
SV250	NA
SV300	NA

⚠ WARNING

Explosion hazard!
Always maintain correct tire pressure as indicated in this manual. DO NOT inflate tires above the recommended pressure. Excessive pressure could result in tire failure.
Failure to comply could result in death or serious injury.

W0109A

⚠ WARNING

Explosion hazard!
Tires must be replaced by skilled personnel with the proper tools and technical knowledge. Unskilled personnel replacing wheels or tires could result in serious physical injuries, tire damage, and/or wheel distortion. Always have a qualified tire mechanic service wheels and tires.
Failure to comply could result in death or serious injury.

W0171A

NOTE: *The following also applies to rear wheels.*

The skid steer will be hard to turn and the tires will wear faster if the correct pressure is not maintained. When a worn or damaged tire is replaced, the replacement must be the same size and tread design as the other tires on the machine. Two different sized tires on one side of the machine will cause accelerated tire wear, loss of power, and excessive strain on the drivetrain. Replace worn tires in pairs with the two new tires used on the same side of the loader. If this tilts the loader too much, replace all four tires.

Adding air to the tires

Tire pressure gauges should be checked at regular intervals for calibration and accuracy.

TIRE	SIZE	PRESSURE
XD2002	10x16.5	40 - 60 psi
XD2002	12x16.5	40 - 60 psi
Beefy Baby II	10x16.5	40 - 60 psi
Beefy Baby II	12x16.5	40 - 60 psi
Hulk	10x16.5	40 - 60 psi
Hulk	12x16.5	40 - 60 psi
Bulky Hulk	33/15.5x16.5	40 - 60 psi
King Kong	10x16.5	40 - 60 psi
King Kong	12x16.5	40 - 60 psi
Hippo	31/15.5x16.5	40 - 60 psi
Hippo	33/15.5x16.5	40 - 60 psi

Wheel torque

Taper nut	**169.5 N·m** (**125 lb ft**)
Flange nut	**203.5 N·m** (**150 lb ft**)

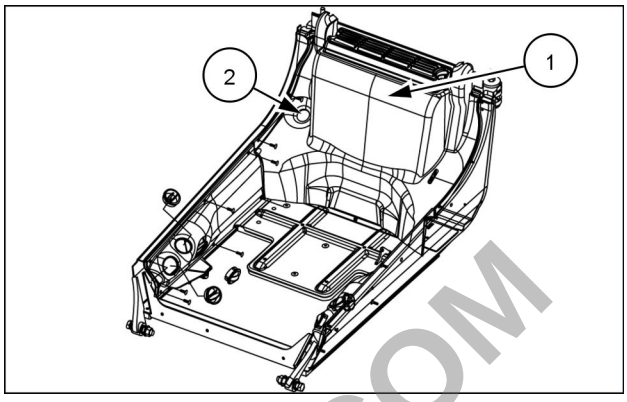
This procedure is only for adding air to the tire. If the tire has lost most or all of the air, do the following:

1. Before you add air, have the wheel correctly installed on the machine or put the wheel in a restraining device (tire inflation cage).
2. Use an air hose with a remote shutoff valve, self-locking air chuck and wear eye protection.
3. Stand behind the tread of the tire and make sure all persons are away from the side of the tire before you start to add air.

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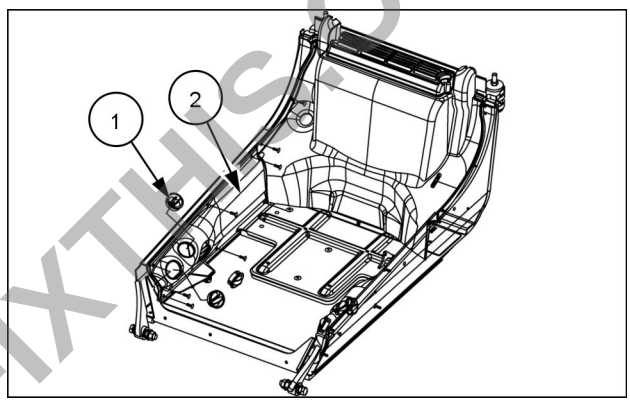
12. Remove three fir tree fasteners, to remove the rear trim panel **(1)**, over the heater box and washer bottle.

NOTE: *Washer bottle cap **(2)**, must be removed first.*



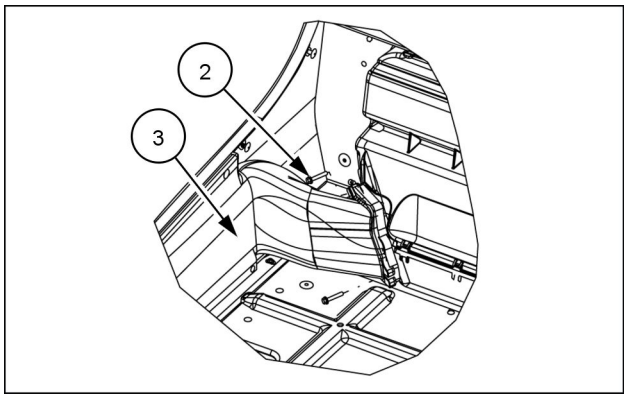
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13. Remove the six directional louvers **(1)**, in the ducts **(2)**.

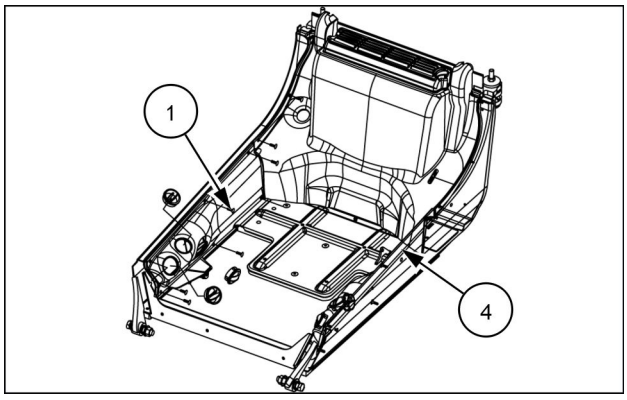


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14. Remove the fir tree fasteners **(1)**, from cab side, and bolts **(2)** from the heater box. Remove ducts **(3)**, and **(4)**, from the heater box.



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93104640 11

15. Disconnect heater box electrical connector from the cab harness.

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Electrical system - Overview

SR220	NA
SR250	NA
SV250	NA
SV300	NA
TR320	NA
TV380	NA

An electrical circuit is comprised of three basic elements; a source of electrical energy which provides the current used by the electrical circuit, a load which converts the electrical current into a work form such as heat or light or an electromagnetic energy field and conductors which are used to route the electrical current from the source to the load and back to the source. The device used to provide the electrical current in a direct current (DC) circuit is typically a battery. The battery uses a chemical action to create and store the needed electrical energy. An alternator which converts mechanical energy into electrical energy and is driven by an engine is used to recharge the battery. Load devices are designed to utilize the two natural products created when electrical current flows through a conductive material, that being heat and a magnetic field. Lamps heat alloyed conductive materials to a temperature that produces visible light where as heater elements use an alloyed material to produce heat. Solenoids and motors use the magnetic field produced by the current flow to attract or repel ferrous material and produce linear or rotary motion. Stranded or solid copper or copper clad wire is used to conduct the electrical current between the source and the loads. The return path to the source from the loads in battery sourced systems is often the metallic materials that are the components of the machine or what is referred to as frame or chassis ground. The negative terminal on the battery is then connected to the frame or chassis, thus completing the electrical circuit. In addition to the basic elements required in a electrical circuit, most also contain protective devices, fuses or circuit breakers, that are designed to interrupt the current flow should it exceed the amount the conductors or loads in the circuit are capable of handling without damage.

An electrical control scheme is comprised of three categories of devices; input devices like switches, potentiometers and sensors, control or logic devices like relays and programmed or programmable electronic modules and output devices like lights, motors and solenoids. Input devices provide information in the way of an electrical signal to the logic devices. The signal provided may be a digital signal; on or off, high or low, a transition from one predefined level to another either higher or lower which is referred to as leading or trailing edge or an analog signal which is variable measurable levels. Logic or control devices use the signals provided by the input devices to determine how the output devices should be controlled, energized or de-energized and to what level and polarity. Programmed and programmable logic devices often use the system source voltage, battery voltage, to create other voltages which are referred to as reference voltages. The reference voltage or reference source as well as a reference ground or control module ground is provided by the logic or control device to inputs and outputs. This means the control or logic device is capable of switching, sensing or varying different signal levels and types.

Configuring the electrical control scheme is done in a variety of ways. The input devices may use:

- system source, which is the battery, or
- system ground, which is the frame or chassis, or
- a reference voltage, which is created by the control module, or
- a reference ground, which is provided by the control module,

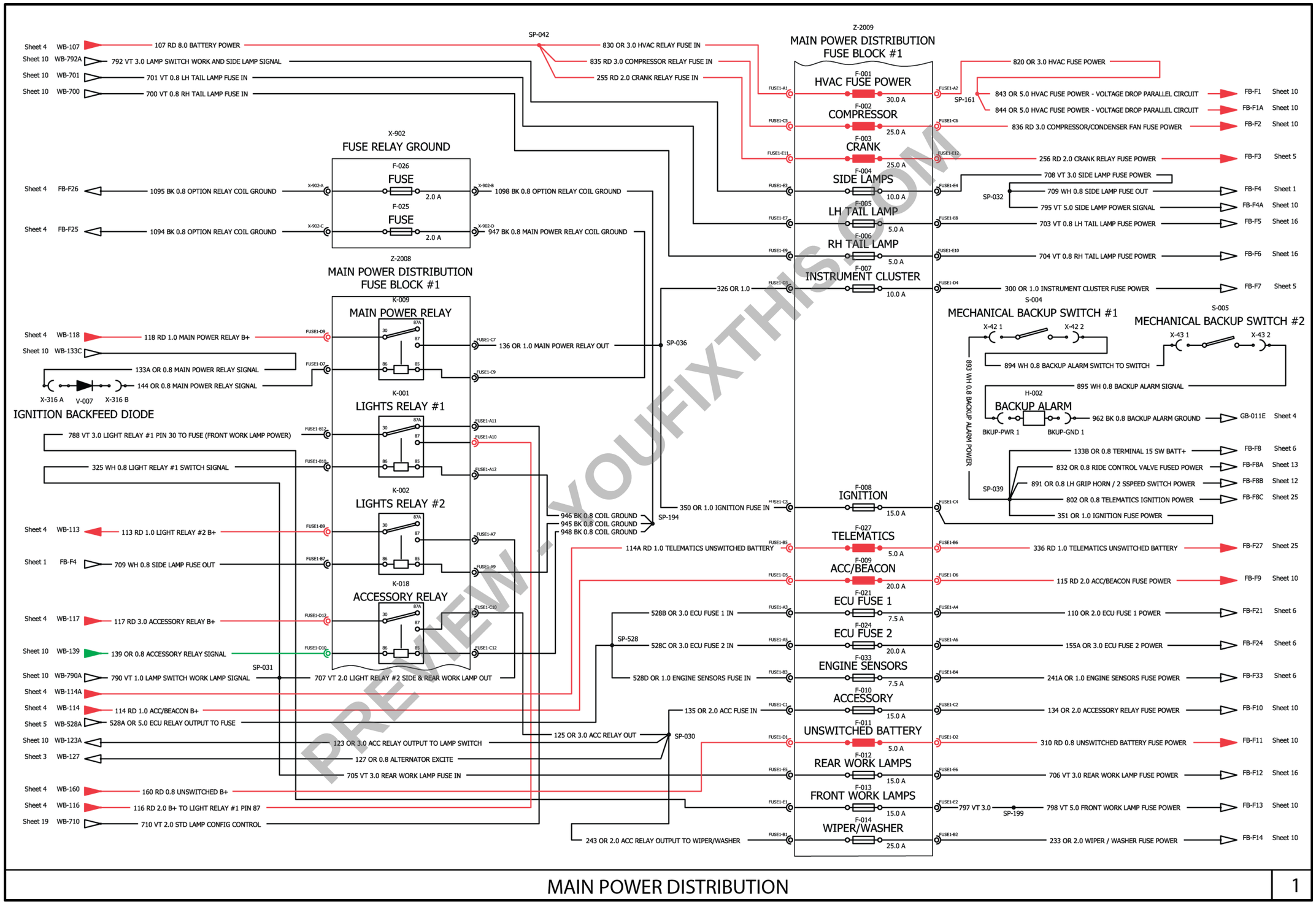
to provide a digital or analog signal to the control or logic device.

- A single input device may provide a signal directly or
- two or more input devices sharing the same signal wire, in parallel, may provide the signal or
- two or more input devices may provide the signal through one another, in series,

to the control or logic device.

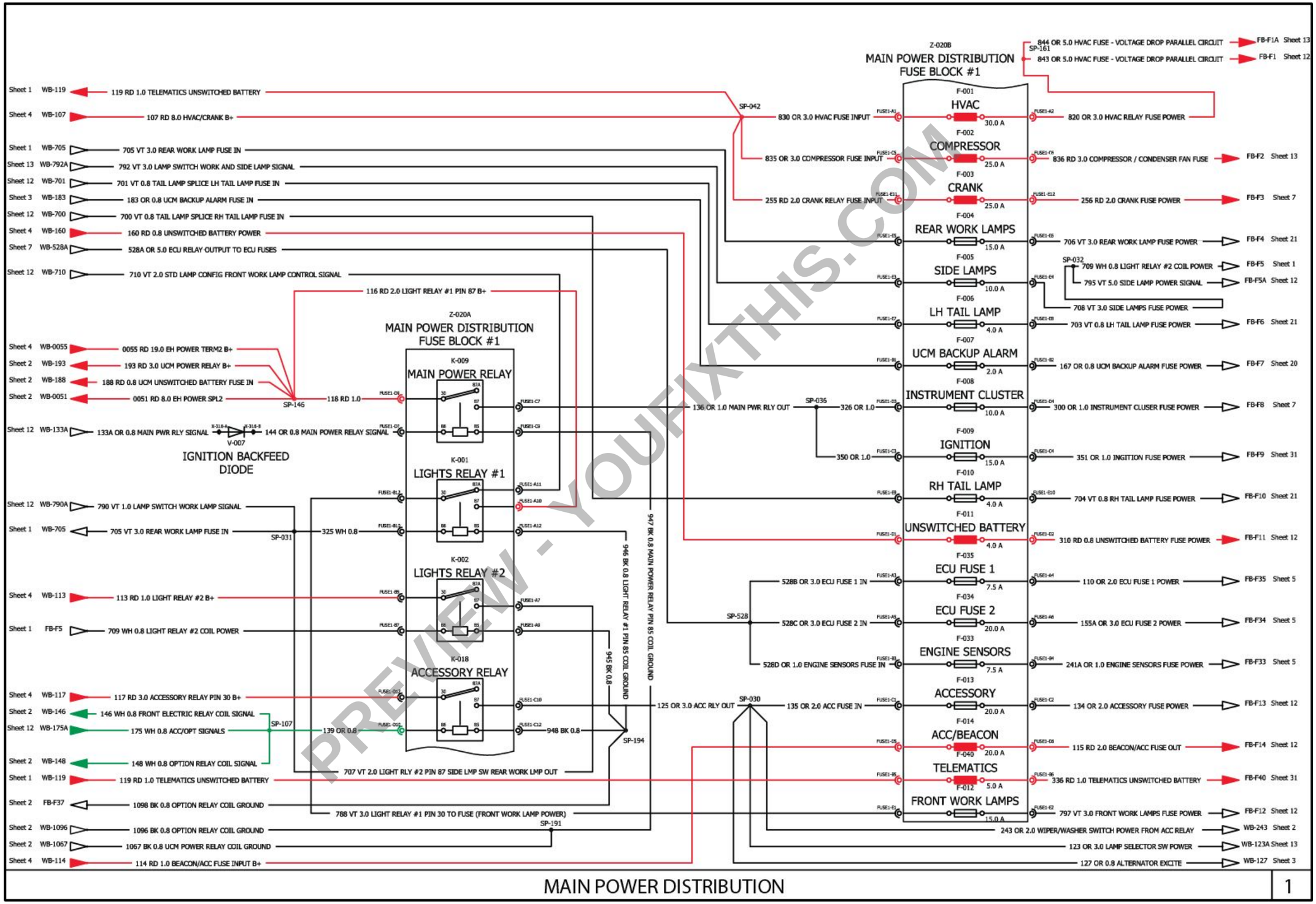
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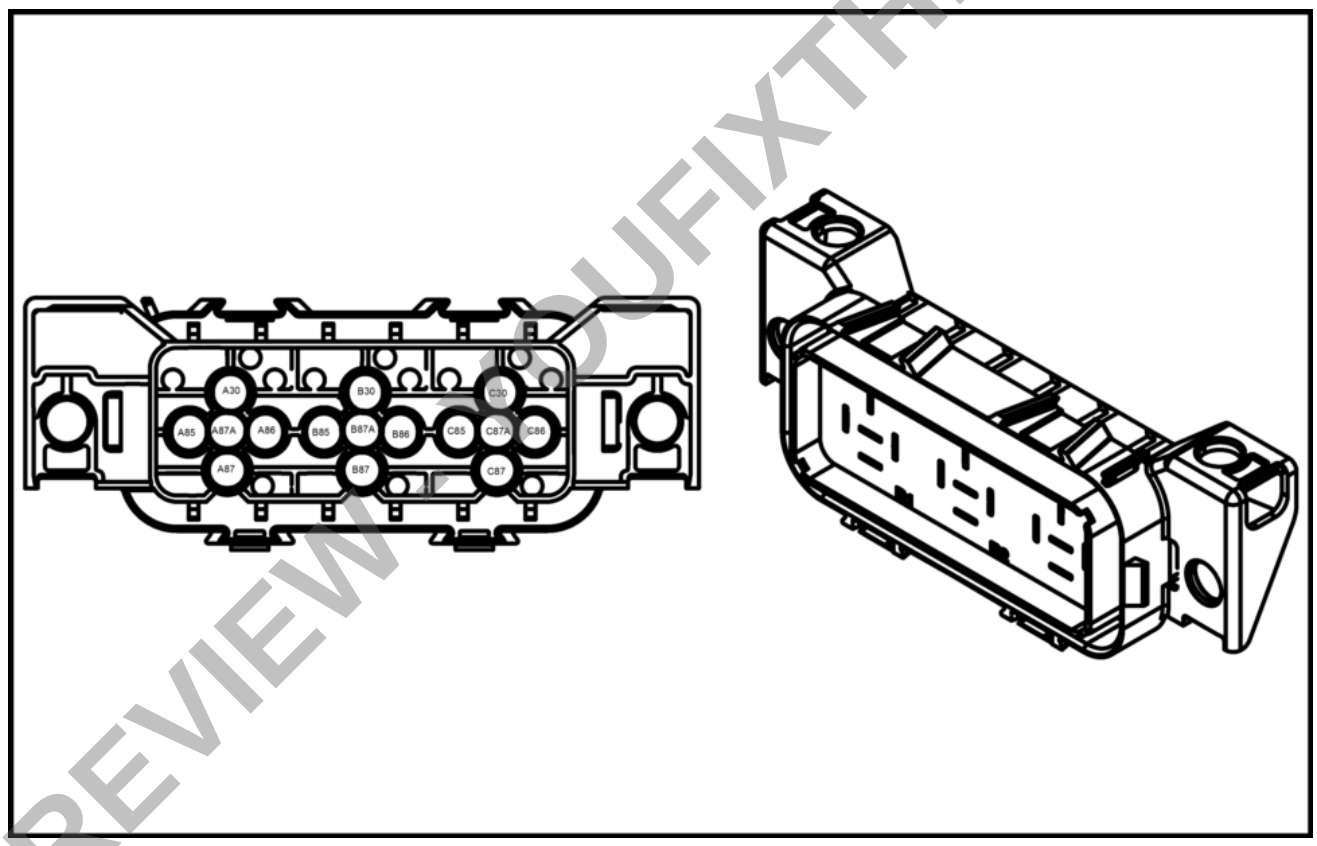
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Wire connectors - Component Diagram 00

SR220 TIER 4 [NDM457559 -]	NA Mechanical hydraulic controls
SR250 TIER 4 [NCM442784 -]	NA Mechanical hydraulic controls
SV250 TIER 4 [NDM460776 -]	NA Mechanical hydraulic controls
SV300 TIER 4 [NCM445399 -]	NA Mechanical hydraulic controls
TR320 TIER 4 [NCM440597 -]	NA Mechanical hydraulic controls
TV380 TIER 4 [NCM450857 -]	NA Mechanical hydraulic controls

CONNECTOR X-001 - ENGINE RELAY BOX

CONNECTOR X-001 - ENGINE RELAY BOX		
PIN NUMBER	**WIRE NUMBER**	**CIRCUIT REFERENCE**
A30	256 (RD)	CRANK RELAY FUSE POWER
A85	161 (YE)	CRANK ENABLE FROM ECU
A86	121 (YE)	CRANK ENABLE FROM ECU
A87	520 (WH)	STARTER MOTOR POWER
C85	112 (BL)	ECU MAIN RELAY ENABLE FROM ECU
C86	527C (RD)	BATT+
C87	528A (OR)	ECU RELAY OUTPUT TO FUSE



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Wire connectors - Component diagram – Connectors A – Z

SR220 TIER 4 [NDM457559 -]	NA Electro hydraulic controls
SR250 TIER 4 [NCM442784 -]	NA Electro hydraulic controls
SV250 TIER 4 [NDM460776 -]	NA Electro hydraulic controls
SV300 TIER 4 [NCM445399 -]	NA Electro hydraulic controls
TR320 TIER 4 [NCM440597 -]	NA Electro hydraulic controls
TV380 TIER 4 [NCM450857 -]	NA Electro hydraulic controls

CONNECTOR X-C23 - INSTRUMENT CLUSTER

CONNECTOR X-C23 - INSTRUMENT CLUSTER		
PIN NUMBER	WIRE NUMBER	CIRCUIT REFERENCE
2	261	HYDRAULIC OIL FILTER
3	624	KEY START OUTPUT
5	505	CAN LO
6	500	CAN HI
7	301	INSTRUMENT CLUSTER SWITCHED POWER
8	302	INSTRUMENT CLUSTER SWITCHED POWER
9	313	INSTRUMENT CLUSTER UNSWITCHED POWER
10	132	KEY IGNITION
11	267	AIR FILTER/ENGINE MALFUNCTION
12	328	SEAT SW CLUSTER INPUT
13	205C	TELEMATICS CRANK DISABLE
16	264	HYDRAULIC OIL TEMP SENDER
17	259	THROTTLE SENSOR SUPPLY
19	251	DOOR SW SIGNAL
22	543	THROTTLE SIGNAL
24	234	FUEL LEVEL SENDER
25	1070	THROTTLE SENSOR GROUND
29	137	ACCESSORY RELAY SIGNAL
30	303	HYDRAULIC LOADER INTERLOCK SIGNAL
32	622	START SIGNAL FROM CLUSTER
33	133	MAIN POWER RELAY SIGNAL
34	1011	INSTRUMENT CLUSTER GROUND

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Instrument cluster - Configure

Use the four switch buttons to navigate through the instrument cluster Menu by following the setup menu functions.

(1) TEXT DISPLAY

Displays the menu text.

(2) START

Navigates selections on every menu level.

Certain menus will prompt the user to enter an access code or allow the user to change a numerical value.

NOTE: *Pushing the Start button will increment the flashing digit 1,2,3 for number entry.*

(3) OPERATE

Increments the flashing digit 7,8,9,0 for number entry.

(4) AUX OVERRIDE

Exits the sub-menu and moves top level to the next option.

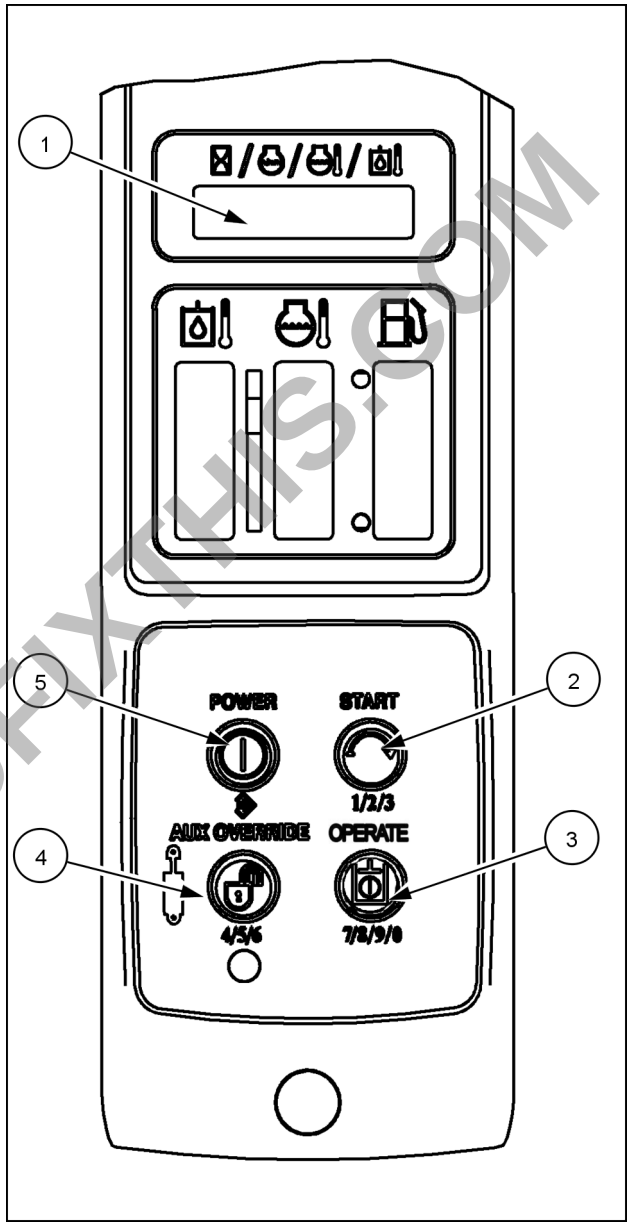
Increments the flashing digit 4,5,6 for number entry.

(5) POWER

For number entry, moves flashing digit to the next place.

Saves entry.

Enters the sub-menu.



931002267 1

Top level menu options

- **EXIT** - Exit the setup menu.
- **EH** - Customize the speed of the machine's Electro hydraulic controls (if equipped).
- **dSPLY** - Alternate method to select between the selected display parameters.
- **UNITS** - Allows the operator to select between Fahrenheit/Imperial units and Celsius/SI units.
- **JTIME** - Job timer. Timer that displays engine operating hours since last reset. Ideal for rentals or job tracking.
- **dPF** or **REGEN** - Used to Inhibit regeneration of the Diesel Particulate Filter (DPF) for one key cycle.
- **OIL** - Used to reset the oil life monitoring status after an oil change.
- **LOCK** - Used to create/change owner and user codes

NOTE: *The Advanced Instrument Cluster (AIC) images are shown in this section for the four switch buttons* ***(2)****,* ***(3)****,* ***(4)*** *and* ***(5)*** *used to navigate through the instrument cluster. The top two switch buttons on the Electronic Instrument*

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1045-Fuel Level Sensor Open Circuit

Context:
The instrument cluster has detected an open circuit in the fuel sender signal.

Cause:
The instrument cluster has determined that the fuel level sensor resistance has failed high.

Possible failure modes:

1. Open wire in circuit.
2. Faulty fuel level sensor.
3. Instrument cluster has internal failure.

Solution:

1. Verify that the fault code is active.

   Connect the Electronic Service Tool to the service tool connector.

   To check for fault codes: Start and operate the machine.

   A. The fault code is not recorded again. OK to return the machine to service.

   B. Fault code 1045 is recorded again. Go to step **2**.
2. Verify that the wiring and connectors are free of damage.

   Inspect the instrument cluster and the fuel level sender connections. All connections should be secure, tight, free of corrosion, abrasion and damage.

   Inspect the harness from the instrument cluster to the fuel level sender. Verify that the harness is free of damage, corrosion, abrasion or incorrect attachment.

   A. The connectors are secure and the harness is free of damage. Go to step **3**.

   B. The connectors or the harness has damage. Repair or replace the harness or connectors as required. Return to step **1** to confirm elimination of fault.
3. Measure the resistance at the fuel level sensor.

   Disconnect the harness from the sender.

   Tilt the cab and remove the fuel level sender from the tank.

   Move the fuel level float from the low position to the high position while measuring the resistance across the sender. The resistance should change linearly from approximately **4.5 Ω** at the full tank position to approximately **340 Ω** at the empty tank position. The resistance should change linearly without any fluctuations to a higher or lower resistance.

   A. The resistance measurements from the sensor were within specifications. Go to step **4**.

   B. The resistance readings from the sensor were not steady or the values were not accurate. Temporarily replace the sensor and retest. Return to step **1** to confirm elimination of fault.
4. Check fuel level wiring.

   Measure the resistance between X-14 pin A and chassis ground. The resistance should be less than **10 Ω**. Wiggle the harness during measurement to reveal an intermittent condition.

   Measure the resistance from X-14 pin B to instrument cluster connector X-C23, pin 24. The resistance should be less than **10 Ω**. Wiggle the harness during measurement to reveal an intermittent condition.

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3390-Engine Air Filter Restriction

Context:
The instrument cluster detects a signal to ground on X-C23 pin 11 indicating that the air filter restriction switch has been tripped. The instrument cluster will illuminate the air filter restriction lamp while this fault is active.

Cause:
The instrument cluster detects a signal to ground indicating that the air filter restriction switch has been tripped.

Possible failure modes:

1. Clogged air filter.
2. Signal wire short circuit to minus battery or chassis ground.
3. Faulty air filter restriction switch.
4. Faulty instrument cluster.

Solution:

1. Verify that the fault code is active.

   Connect the Electronic Service Tool to the service tool connector.

   To check for fault code: Start and operate machine.

   A. The fault code is not recorded again. OK to return the machine to service.

   B. Fault code 3390 is recorded again. Go to step **2**.
2. Inspect the engine air filter.

   Inspect the engine air filter. Replace the filter as required.

   A. The filter is OK and does not need to be replaced. Go to step **3**.

   B. The filter is in poor condition or is clogged. Replace the filter. Return to step **1** to confirm elimination of the fault.
3. Verify that the wiring and connectors are free of damage.

   Inspect the instrument cluster and the air filter restriction switch connections. All connections should be secure, tight, free of corrosion, abrasion and damage.

   Inspect the harness from the instrument cluster and the air filter restriction switch. Verify that the harness is free of damage, corrosion, abrasion and incorrect attachment.

   A. The connectors are secure and the harness is free of damage. Go to step **3**.

   B. The connectors or the harness has damage. Repair or replace the harness or connectors as required. Return to step **1** to confirm elimination of fault.
4. Check the air filter restriction circuit.

   Disconnect the signal wire from air filter restriction switch.

   Turn the ignition switch ON.

   Access the fault code screen on the Electronic Service Tool. The air filter restriction fault code should no longer be active.

   A. The fault code is no longer active. Go to step **4**.

   B. Fault code 3390 is still active. Go to step **5**.
5. Check air filter restriction switch.

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3711-SCB error of the LSU Heater Power stage

NOTE: *When testing the oxygen sensor a high impedance digital volt meter must be used. A normal analogue multi-meter will draw too much current and will burn out the sensor or give false readings.*

NOTE: *Two people may be required to perform this test correctly.*

NOTE: *When replacing the oxygen sensor, re-flash the control module to allow for the new sensor adjustments to be learned.*

Context:
The heater power stage of oxygen sensor is monitored for a short circuit to battery, as long as the heater is working.

Cause:
The oxygen sensor circuit is shorted to a high voltage source.

Possible failure modes:

1. Faulty electrical wiring or connection.
2. Faulty oxygen sensor.
3. Faulty control unit or software.

Solution:

1. Verify the fault code is still present and in an active state.

   A. If the fault is no longer active or present, check for an intermittent fault.

   B. If the fault is still present and active, continue with step **2**.
2. Place the ignition switch OFF. Disconnect the engine harness from the oxygen sensor at connector X-014. Inspect all connectors, pins, and wiring harness for broken connectors, corrosion, bent pins or wire breaks.

   A. If any damage is found, repair or replace connections, pins, or wiring.

   B. If no damage is found, reconnect the wiring harness to the sensor. Continue with step **3**.
3. Test the oxygen sensor for proper operation. Run the machine for approximately **10.0 min** to allow the sensor to warm up. Place the machine off. Use a back probe pin to connect the positive multi-meter lead to connector X-014 pin 3 on the oxygen sensor. Place the negative lead to chassis ground. Have someone start the machine. Rev the engine and monitor the voltage. The voltage range should vary between **0.1 - 0.9 V**.

   A. If the voltage is not in range the sensor has failed. Replace the sensor.

   B. If the sensor is in range, continue with step **4**.
4. Check wiring for shorted to power source. Place the ignition switch in the OFF position. Disconnect the engine harness from the oxygen sensor at connector X-014 and at ECU connector X-012. Place the ignition switch ON. Use a multi-meter to check for voltage from the engine harness side of connector X-014 pin 3 to chassis ground. There should be no voltage.

   A. If there is voltage, the damaged wiring is in the engine harness between connector X-014 pin 3 and connector X-012 pin 7. Locate and repair the damaged wiring harness.

   B. If there is no voltage, leave both connectors disconnected. Continue with step **5**.
5. Check to see if the wiring is shorted to the relay circuit. Place the ignition switch in the OFF position. Use a multi-meter to measure the resistance from the engine harness side of connector X-014 from pin 3 to pin 4. The resistance should be greater than **10.0 Ω**.

   A. If the resistance is below **10.0 Ω**, the damaged wiring is in the engine harness between connector X-014 pin 3 and connector pin 4. Locate and repair the damaged wiring harness.

   B. If the resistance is greater than **10.0 Ω**, continue with step **6**.

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5145-Aux Thumbwheel Axis - Pin B Short to Power

SR220 TIER 4 [NDM457559 -]	NA Electro hydraulic controls
SR250 TIER 4 [NCM442784 -]	NA Electro hydraulic controls
SV250 TIER 4 [NDM460776 -]	NA Electro hydraulic controls
SV300 TIER 4 [NCM445399 -]	NA Electro hydraulic controls
TR320 TIER 4 [NCM440597 -]	NA Electro hydraulic controls
TV380 TIER 4 [NCM450857 -]	NA Electro hydraulic controls

Context:
Diagnostic Trouble Code 5145 has an error priority of White. White errors are not displayed on the instrument cluster and are not known to the Owner/Operator. They will appear in the EST when the technician checks for active trouble codes.
The auxiliary hydraulics are disabled while Diagnostic Trouble Code 5145 is active.

Cause:
The UCM has sensed that the auxiliary thumbwheel signal has failed high. The fault is active when the ignition is ON and the aux thumbwheel axis input voltage, X-CN4B pin 21 is greater than **4.8 V**.

Possible failure modes:

1. Shorted wire in the circuit.
2. The right hand control handle has an internal failure.
3. The UCM has an internal failure.

Solution:

1. Verify that the fault code is active.

   Connect the Electronic Service Tool to the service tool connector.

   To check for fault code: Start and operate the machine.

   A. The fault code is not recorded again. OK to return the machine to service.

   B. Fault code 5145 is recorded again. Go to step **2**.
2. Verify that the wiring and connectors are free of damage.

   Inspect the **UCM** and the right hand joystick connections. All connections should be secure, tight, free of corrosion, abrasion and damage.

   Inspect the harness from the **UCM** to the right hand joystick. Verify that the harness is free of damage, corrosion, abrasion and incorrect attachment.

   A. The connectors are secure and the harness is free of damage. Go to step **3**.

   B. The connectors or the harness has damage. Repair or replace the harness or connectors as required. Return to step **1** to confirm elimination of fault.
3. Measure the voltage of the signal wire to chassis ground.

   Turn the ignition switch OFF.

   Disconnect UCM connector X-CN4B.

   Disconnect connector X-403.

   Turn the ignition switch ON.

   Measure the voltage between X-CN4B pin 21 and chassis ground. The voltage should be less than **0.5 V**. Wiggle the harness during measurement to reveal an intermittent condition.

   A. The voltage is less than **0.5 V**. Go to step **4**.

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Arm - Remove

SR220	NA
SR250	NA
TR320	NA

⚠ WARNING

Heavy objects!
Lift and handle all heavy components using lifting equipment with adequate capacity. Always support units or parts with suitable slings or hooks. Make sure the work area is clear of all bystanders.
Failure to comply could result in death or serious injury.

W0398A

⚠ WARNING

Burn hazard!
Before performing any service on the hydraulic system, you must allow it to cool. Hydraulic fluid temperature should not exceed 40 °C (104 °F).
Failure to comply could result in death or serious injury.

W0241A

⚠ WARNING

Pressurized hydraulic fluid can penetrate the skin and cause severe injuries.
Hydraulic fluid can also infect a minor cut or opening in the skin. Serious infection or reaction can result without immediate medical treatment. If injured by leaking fluid, see your doctor immediately.
Failure to comply could result in death or serious injury.

W0358A

⚠ WARNING

Pressurized system!
Never attempt to drain fluids or remove filters when the engine is running. Turn off the engine and relieve all pressure from pressurized systems before servicing the machine.
Failure to comply could result in death or serious injury.

W0905A

⚠ WARNING

Avoid injury! Always do the following before lubricating, maintaining, or servicing the machine.
1. **Disengage all drives.**
2. **Engage parking brake.**
3. **Lower all attachments to the ground, or raise and engage all safety locks.**
4. **Shut off engine.**
5. **Remove key from key switch.**
6. **Switch off battery key, if installed.**
7. **Wait for all machine movement to stop.**

Failure to comply could result in death or serious injury.

W0047A

NOTICE: *Before removing components from the hydraulic system, depressurize the system you are working on. See reference* ***Hydraulic systems - Depressurising (35.000)***

1. If applicable, disconnect the case drain hose **(1)** on the loader arm.

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Cab doors and hatches - Overview – Door switch

SR220	NA
SR250	NA
SV250	NA
SV300	NA
TR320	NA
TV380	NA

If a unit has a door, the door switch will prevent the operator from operating the loader arm and bucket while the door is open. This safety switch prevents damage to the machine and to the operator.

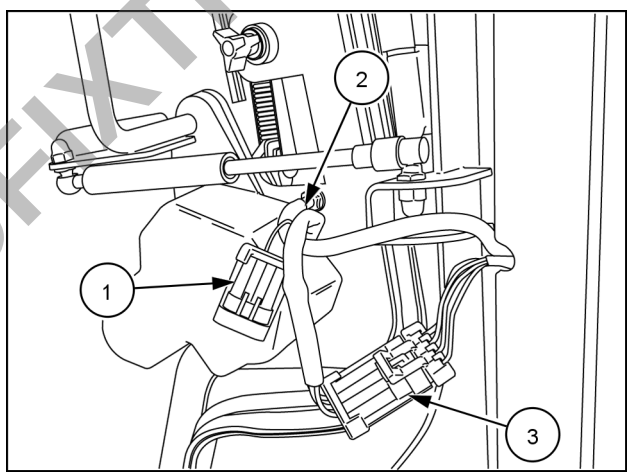
If the operator opens the door, the joystick control of loader and bucket will be shut off and the port locks will engage. Once the door is closed, the operator will regain control of the attachment.

The door switch is a magnetic reed switch. The switch operates on low current, and closes in the presence of metal. The switch mush be adjusted properly to function correctly.

The door switch function is active when Ignition is ON.

ATTENTION: *Usage of the override connector **(1)** will bypass all safety features associated with the door switch. Use the override connector with extreme caution. Failure to comply will result in serious injury or death. Failure to comply can result in machine damage.*

The operator can bypass the door switch by using the override connector **(1)**. To use, unplug the washer nozzle tube **(2)** and remove the override connector **(1)**, disconnect the door switch harness **(3)**, and plug the override connector **(1)** into the door switch harness **(3)**.

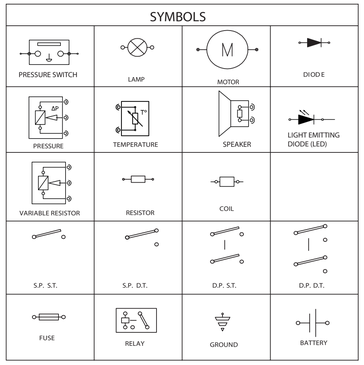


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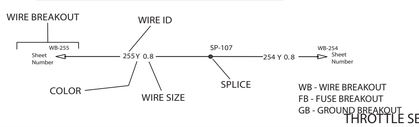
SYMBOLS



COLOR	ABBREVIATION	
BLACK	BK	
BLUE	BL	
LIGHT BLUE	LB	
BLACK/WHITE	BK/WH	
GREEN	GN	
LIGHT GREEN	LG	
ORANGE	OR	
PINK	PK	
VIOLET	VT	
RED	RD	
GREY	GY	
TAN	TN	
WHITE	WH	
YELLOW	YE	

WIRE SIZE CHART	
Sq. mm	AWG
0.5	20
0.8	18
1.0	16
2.0	14
3.0	12
5.0	10
8.0	8

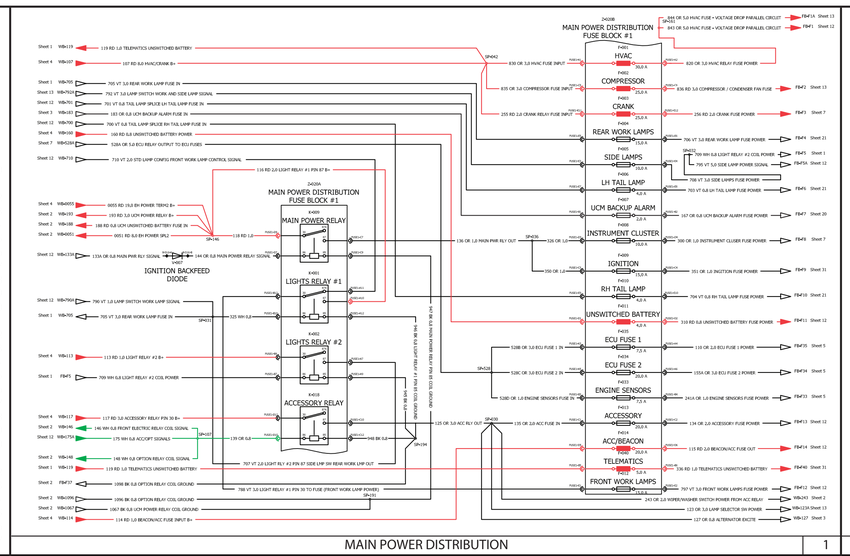
CIRCUIT DIAGRAM LEGENDS



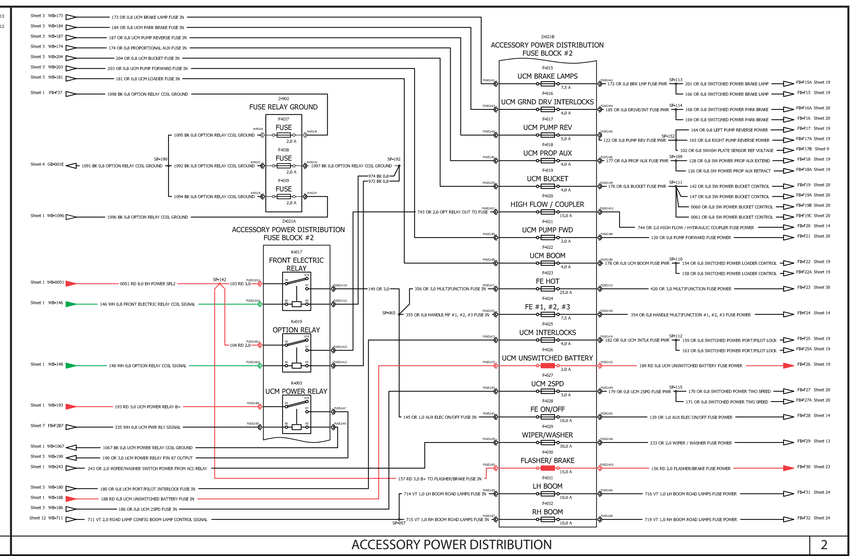
WB - WIRE BREAKOUT
FB - FUSE BREAKOUT
GB - GROUND BREAKOUT

THROTTLE SENSOR

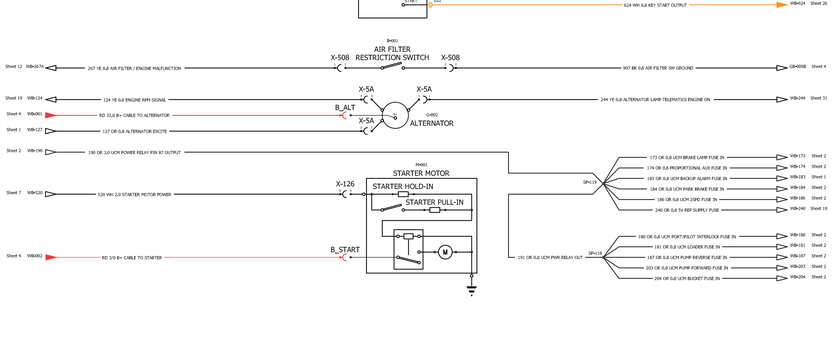
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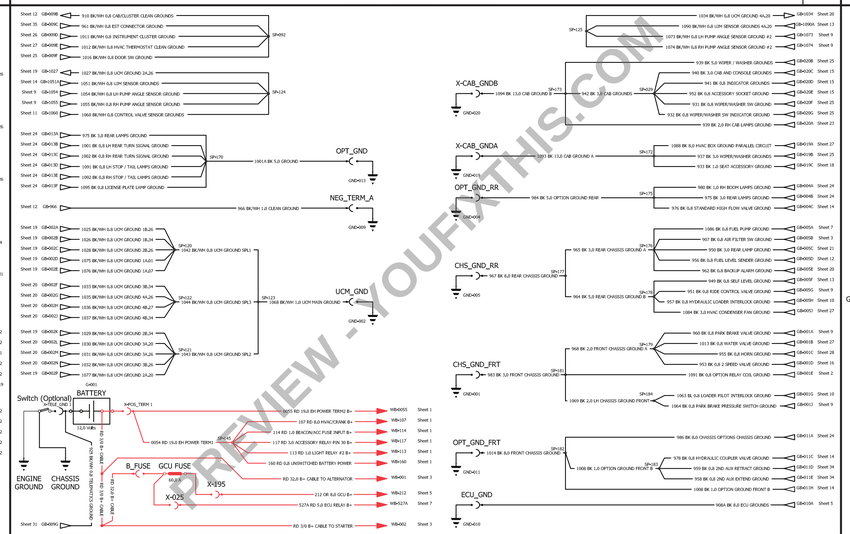
MAIN POWER DISTRIBUTION | 1



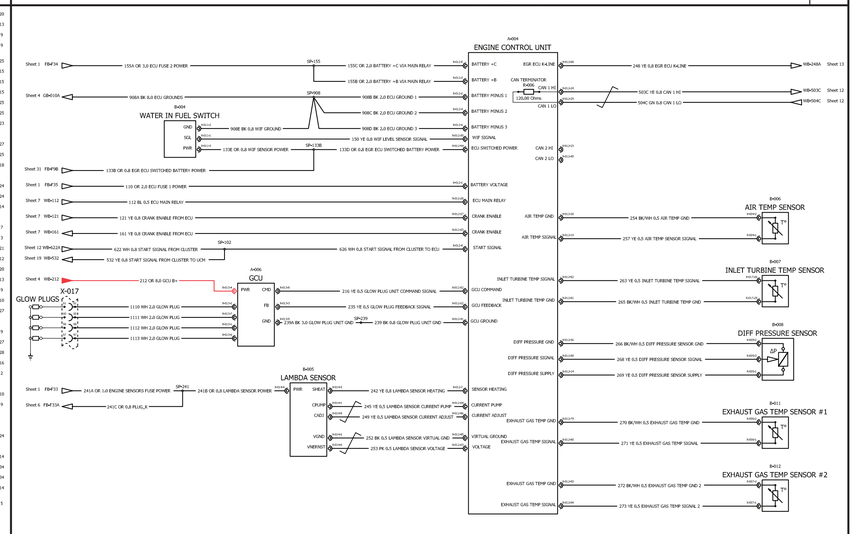
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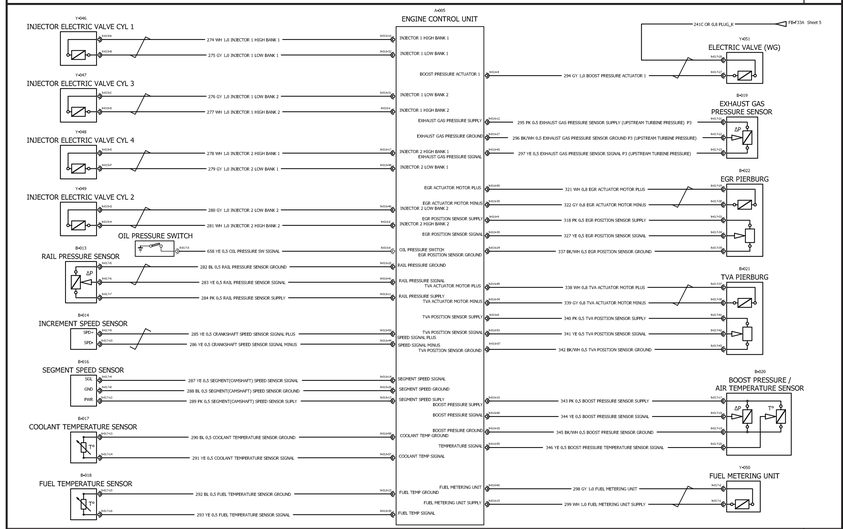
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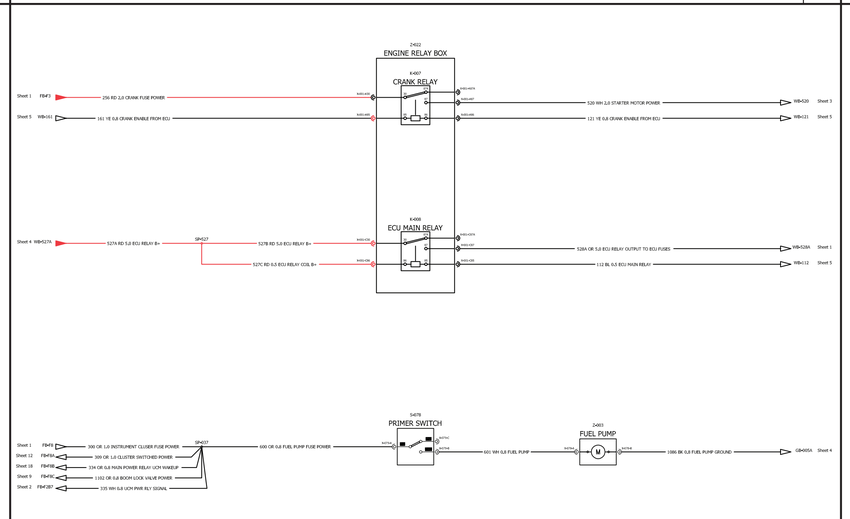
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ENGINE POWER DISTRIBUTION & FUEL PUMP | 7

SR210/ SR220/ SR250/ SV250/ SV300/ TR270/ TR320/ TR328
TIER 4 SSL EH MACHINES
ELECTRICAL SCHEMATIC
RAC 47686141

LEGEND

UNSWITCHED BATTERY POWER

SWITCHED BATTERY POWER

STARTING CIRCUIT

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