Gehl V420
Mustang 4200V

Form No.
50950421
Revision A
12/18

SKID-STEER LOADERS





Service Manual

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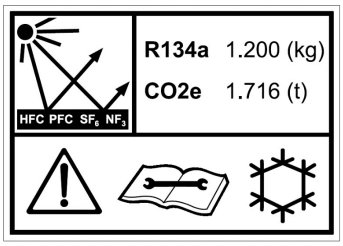
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Machines Equipped with Air Conditioning



This product contains R134a which is a fluorinated greenhouse gas with a Global Warming Potential of 1430. The decal shown indicates the amount of R134a gas contained within the machine's A/C system and its corresponding CO2e. "CO2e" means CO2 equivalent. The decal is located within the engine compartment and is positioned adjacent to the A/C system components that contain the R134a gas.

Do not allow the R134a gas to be discharged from the machine A/C system into the atmosphere when performing service and maintenance on this machine.

Mandatory Safety Shutdown Procedure

BEFORE cleaning, adjusting, lubricating or servicing the unit or leaving it unattended:

1. Move drive control handle(s) to the neutral position.

2. Lower the lift arm and attachment completely. If the lift arm *must* be left in the "raised" position, BE SURE to properly engage the lift arm support device.

3. Move the throttle to the low idle position, shut off the engine and remove the key.

4. Before exiting, move the lift/tilt control(s) to verify that controls do not cause movement of the lift arm or hitch.

Only after these precautions can you be sure it is safe to proceed. Failure to follow the above procedure could lead to death or serious injury.

Lift Arm Support Device

WARNING

BEFORE leaving operator's compartment to work on the loader with the lift arm raised, ALWAYS engage the lift arm support device. Turn the keyswitch to OFF, remove the key and take it with you.

Many service procedures require a raised lift arm to allow easier access to loader components. For operator and service personnel safety, a lift arm support device is standard on Gehl and Mustang skid-steer loaders. Used as a cylinder block, it helps prevent a raised lift arm from unexpectedly lowering.

BE SURE to engage the lift arm support device whenever the lift arm is raised. When the device is not being used, secure it to the left rear of the lift arm using the lynch pin provided.

The lift arm support device is a safety device which must be kept in proper operating condition at all times with decals in place.

The following procedures outline the correct way to engage and disengage the lift arm support device.

Lift Arm Support Device Engagement

1. Remove attachment from lift arm.
2. Raise the lift arm fully.
3. Turn keyswitch to OFF position to stop engine.
4. Have an assistant remove the lift arm support device from its storage location and place the lift arm support device on the left cylinder rod and secure with chain provided.



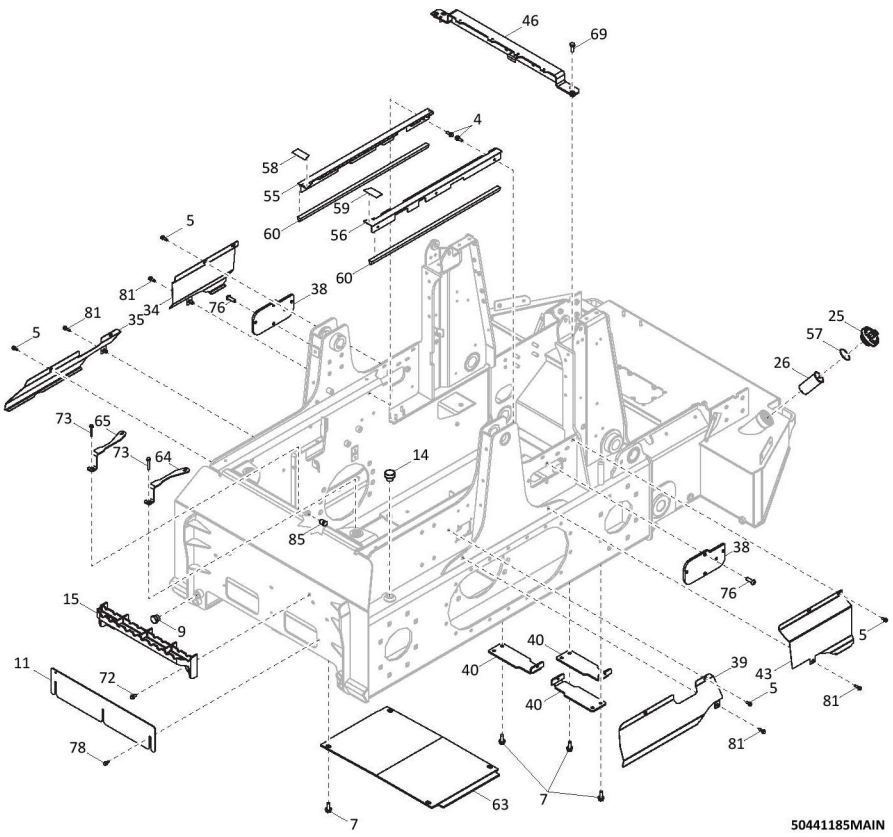
Introduction

Gehl V420 and Mustang 4200V model skid-steer loaders have a welded steel chassis. Maintenance, service and repair may be performed through standard access panels.

Two side chaincases provide mounting for the drive motors and for the front and rear axles. The side cases also serve as sealed housings for the drive chains and sprockets. Oil is used inside these cases to ensure the chains always receive proper lubrication.

The lift arm and the lift and tilt cylinders are mounted with pivot pins. Capscrews are used to secure the pivot pins. A Rollover Protective Structure/Falling Object Protective Structure (ROPS/FOPS) is standard for operator safety, and both the seat and restraint bar include safety interlock switches.

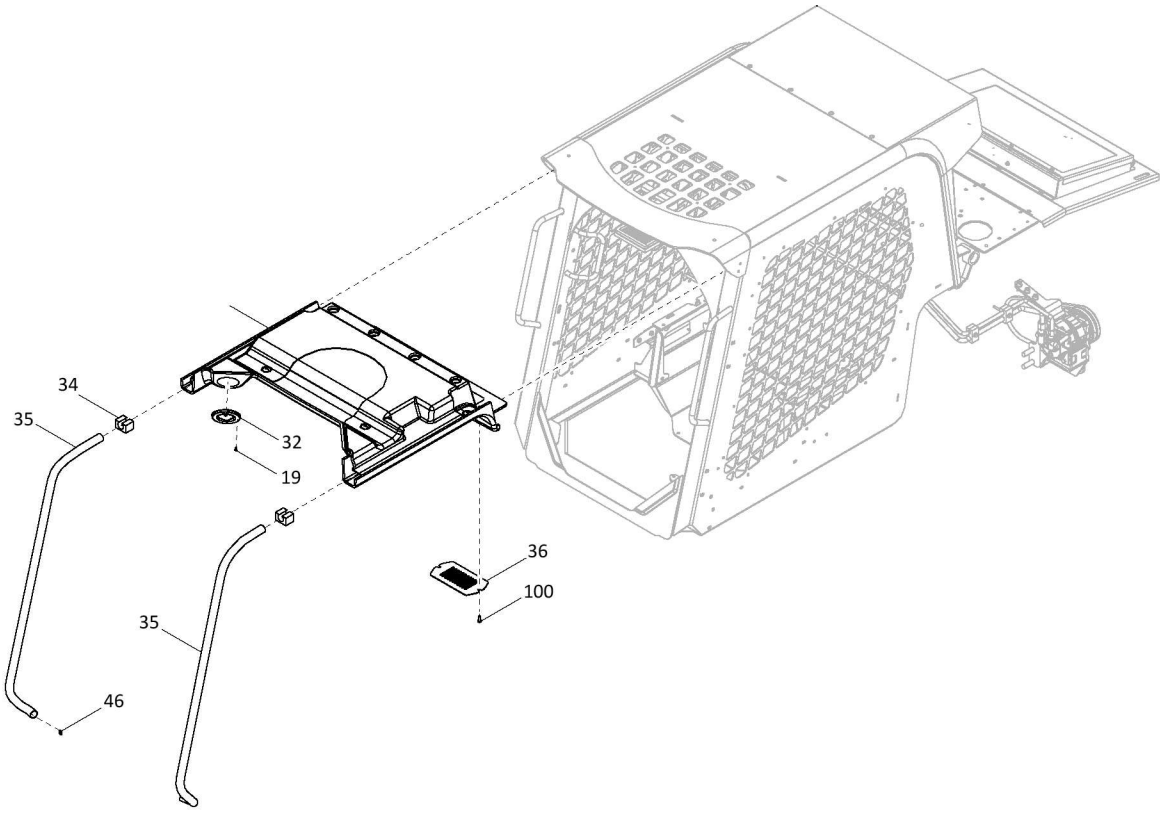
Mainframe - Chassis Components



3 LN 5/16 CBZY
4 CS FL LOCK 3/8X1 C5ZY
5 CS FL LOCK 5/16X3/4 C5ZY
7 CS FL LOCK 1/2X1-1/4 C5ZY
9 PLUG MORB12
11 COVER/TOEPLATE
14 BREATHER/ 3/4"NPT
15 WLDMT/STEP
25 CAP/FUEL FILLER
26 STRAINER/FUEL
34 ASSY/COVER/REAR RH
35 ASSY/COVER/FRONT RH
38 COVER/CHASSIS
39 ASSY/COVER/FRONT LH
40 COVER/FLOOR PLATE
43 ASSY/COVER/REAR LH
46 BRACE/TOWER
55 WLDMT/SEAL/RT
56 WLMT/SEAL/LEFT
57 SECTION/RETAINING RING
58 SEAL/PAD
59 SEAL/PAD
60 SEAL/CHASSIS
63 PLATE/FLOOR
64 HOLD DOWN/BATTERY LH
65 HOLD DOWN/BATTERY RH
69 CS 1/2X1-1/4 C5ZY
72 HWHMS 3/8X3/4 C2ZY
73 CS FL 5/16X2 C8ZY
76 BHSCS 1/2X 1-1/2 C8 OCB
78 HWHTRS TAP/R 5/16X3/4 CZY
81 CS FL 5/16X1 C5ZY
85 PLUG MP08

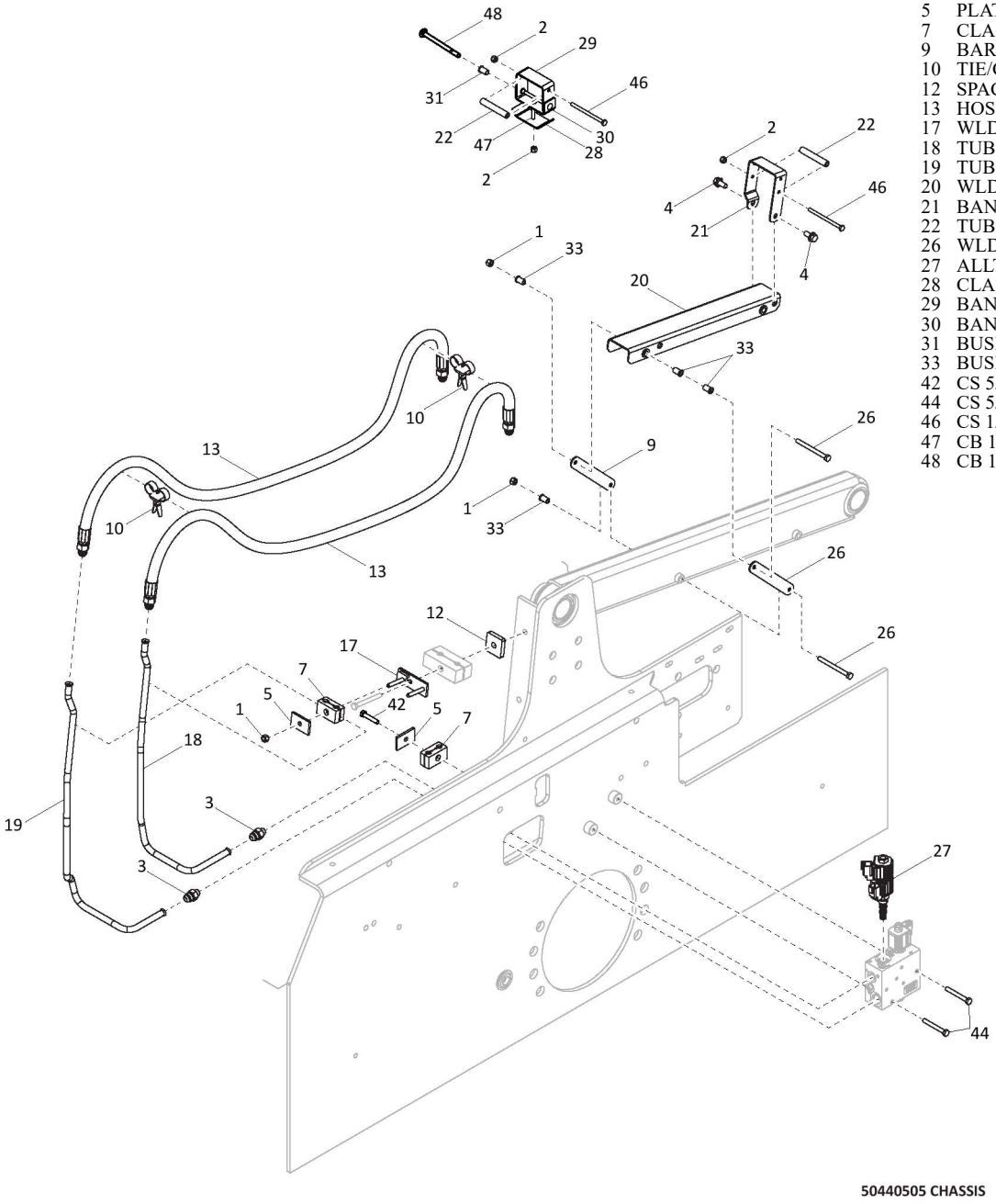
HVAC Assembly - Front - ROPS/FOPS

19 SCREW/#8 X .5 SM/PHIL FH
32 VENT
34 PLUG/PASS-THROUGH TUBE
35 TUBE/FORWARD HVAC
36 COVER/RECIRC
46 CLIP/HOSE RETAINING
100 PHMS CR 1/4X3/4 OCB



50441142 Front

Power-A-Tach® Components - Chassis



1 HLN INST 5/16 CZY
2 HLN INST 1/4 CZY
3 ST MJ08-MORB06
4 CS FL LOCK 3/8X3/4 C5ZY
5 PLATE/TOP SIZE 2 TWIN
7 CLAMP/TUBE .50 TWIN
9 BAR/HOSE PIVOT LINKAGE
10 TIE/CABLE .50X12.90 BLACK
12 SPACER/CLAMP
13 HOSE/ASSY/.50 X 76.50
17 WLDMT/TUBE MOUNT
18 TUBE/ALLTACH/HYD
19 TUBE/ALLTACH/HYD
20 WLDMT/HOSE PIVOT
21 BAND
22 TUBE/HOSECARRIAGE
26 WLDMT/ARM/CARRIAGE
27 ALLTACH/COIL KIT
28 CLAMP/HYD HOSE
29 BAND/HYD HOSE
30 BAND/HYD HOSE/BASE
31 BUSHING/0.275X0.118
33 BUSHING/.313X.75
42 CS 5/16X2 C5ZY
44 CS 5/16X2-1/2 C5ZY
46 CS 1/4X3-3/4 C5ZY
47 CB 1/4X2-1/4 C5ZY
48 CB 1/4X3-3/4 C5ZY

NOTE: After removing/replacing any components of the lift and tilt system, ALWAYS prime hydraulic system by operating the lift arm and attachment (NO LOAD) slowly up and down for several cycles. Check system for hydraulic oil leaks. Fill the hydraulic reservoir until fluid becomes visible on the hydraulic oil dipstick.

NOTE: Refer to the lift arm bushing installation procedure in this chapter if bushings require replacement.

Rear Link Removal and Installation

WARNING

BEFORE continuing this service procedure, perform the following SAFETY procedures:

- **Shut off the engine and remove the key.**
- **Raise the loader, block and remove the tires.**
- **Procure two suitable hoist systems.**

(For detailed instructions, refer to the *Safety* chapter of this manual.)

Removal Procedure

1. Raise the lift arm to a height of 6 ft. (1.8 m) and secure it in place with an appropriate lifting device.
2. Complete the mandatory safety shutdown procedure.
3. Raise and support the rear of the machine with an appropriate supporting device. Remove the rear wheels from the machine.
4. Attach an appropriate lifting device to the rear link (A, Fig. 31) and remove the two capscrews and locknuts (B).

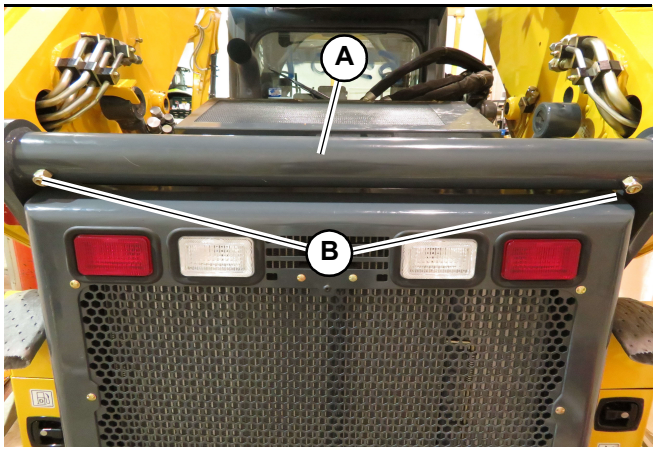


Fig. 31 – Rear Link Capscrews and Locknuts

5. Remove the capscrew and washer (C, Fig. 32) from the upper rear timing link pivot pin. Repeat this step for the opposite side.

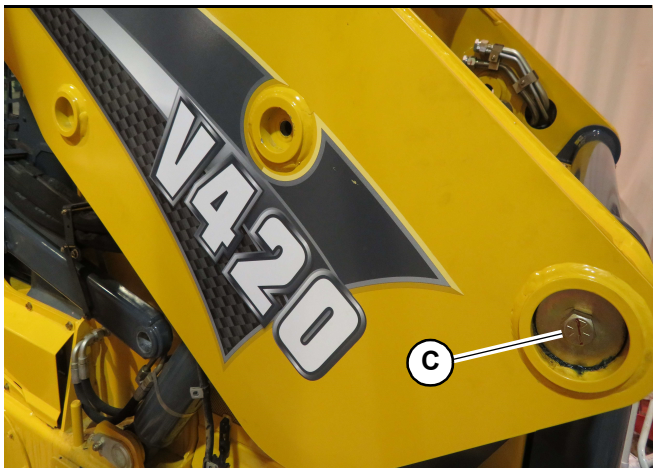


Fig. 32 – Pivot Pin Capscrew and Washer

WARNING

Lift arm may shift or move when the rear arm pivot pins are removed.

Fuel Sensor Removal and Installation

Removal Procedure

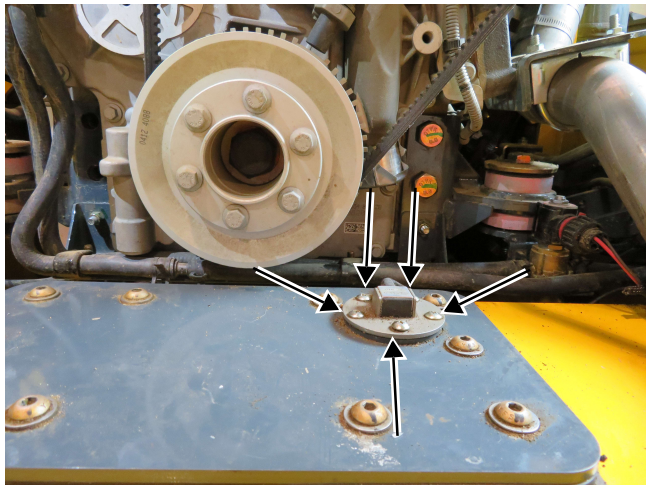
WARNING

BEFORE beginning this service procedure, perform the following SAFETY procedures:

• Shut off the engine and allow it to cool.

(For detailed instructions, refer to the *Safety* chapter of this manual.)

1. Remove the lower right radiator hose from the engine and unplug the sensor (below).
2. Remove the five screws securing the bracket and sensor, then remove the sensor and gasket from the tank.



Installation Procedure

1. Clean old gasket adhesive off fuel tank.
2. Install new gasket using Form-A-Gasket #765-1211 (or equivalent) to seal sensor opening on fuel tank.
3. Install the sensor in the fuel tank.
4. Install the sensor electrical plug to the sensor.
5. Install the five screws through the sensor into the fuel tank. DO NOT OVERTIGHTEN.

Rear Grille Removal and Installation

The rear grille is pinned onto the chassis and can be removed to perform work on the cooling system, engine, engine fan and shrouds.

Removal Procedure

1. Raise the engine access cover.
2. Push down the rear grille latch (A, Fig. 50) and open the rear grille.

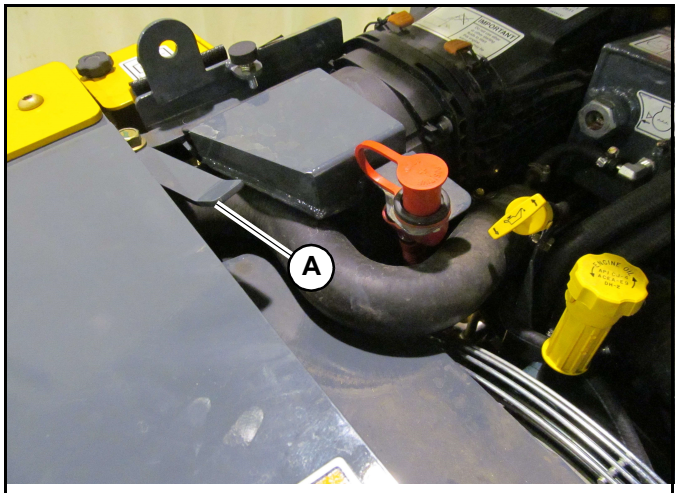


Fig. 50 – Rear Grille Latch

3. Disconnect the taillight electrical connector (B, Fig. 51), located between the charge air cooler and the lower rear grille hinge.

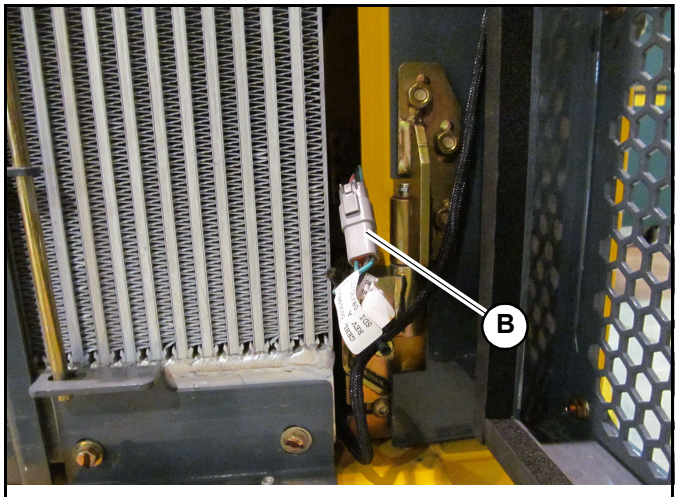
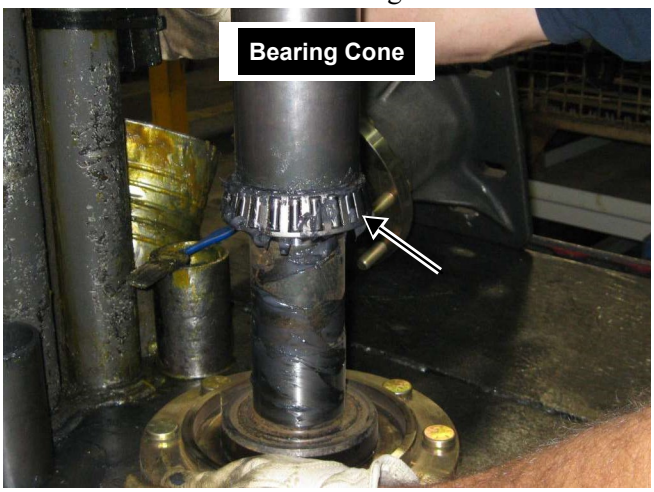
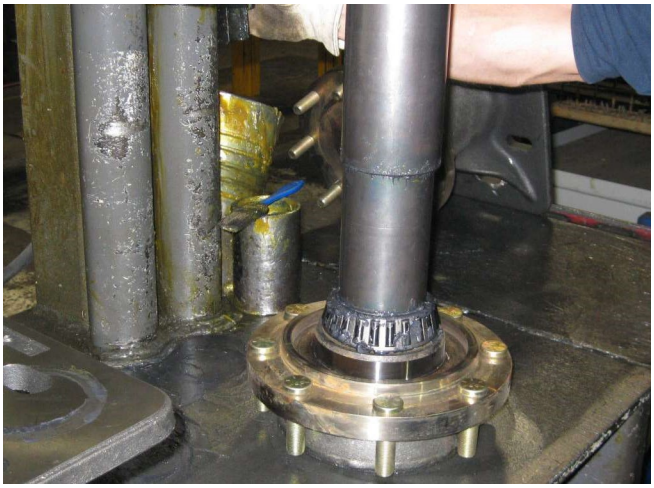


Fig. 51 – Taillight Electrical Connector

4. Place the axle shaft on a flat surface with the shaft in a vertical position. Press the inner bearing cone onto the axle shaft with a suitable driver or a press at a force of 6000 lbf. (26,7 kN). Note the proper orientation of the first bearing cone.





5. Place axle housing onto axle shaft.



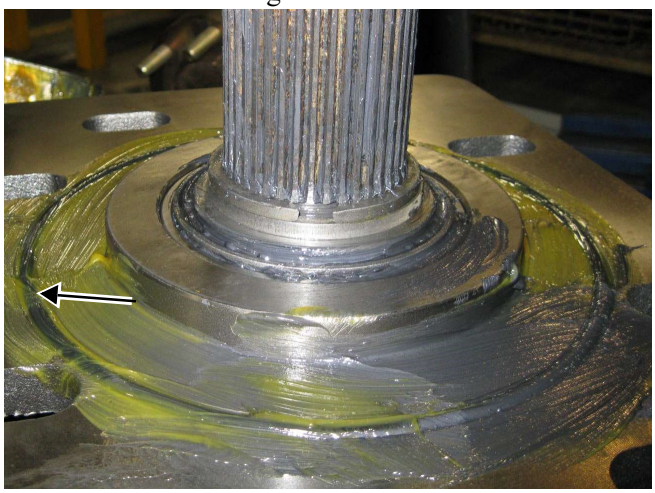
6. Press another inner bearing cone onto the axle shaft. Note the proper orientation of the second inner bearing cone.



7. Spread the bearing grease around the cone surface.



8. Install a new o-ring on the axle housing assembly and secure it with grease.



7. Block ports A and B ports and apply the parking brake.
8. Start the machine observing safety practices.
9. Loosen the jam nuts on the neutral adjustment screws.
10. Turn the mechanical centering adjusting screw until 1000 psi (70 bar) is read on the pressure ports.
11. Turn the screw back, splitting the distance between the previous two positions.

Note: Pressure on M_A and M_B should be equal.

12. Tighten the jam nut on the adjustment screws when equal pressure is measured on both gauges.
13. Stop the pump drive.
14. Remove the hose connecting ports X_1 and X_2. Reinstall plugs where M_A and M_B were checked.
15. Adjust NEUTRAL in the other section, if necessary.

Electrical Foot Throttle Removal and Installation

Gehl V420 and Mustang 4200V machines have an electric foot throttle located beside the right foot rest for increasing/decreasing the engine speed.

Removal Procedure

WARNING

BEFORE beginning this service procedure, perform the following SAFETY procedures:

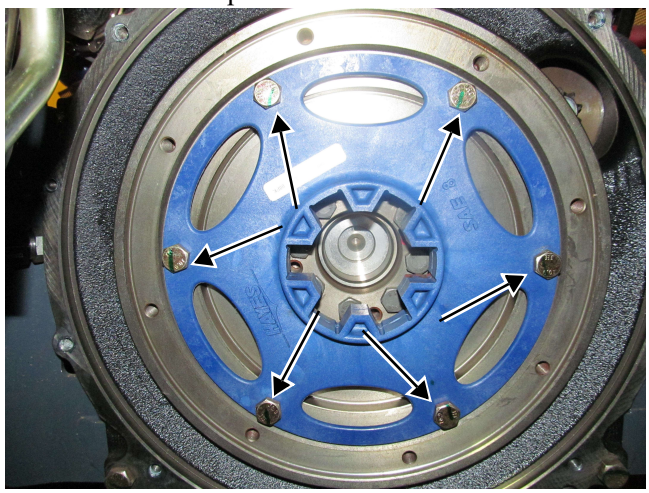
- **Remove attachment from lift arm.**
- **Raise lift arm; engage lift arm support device.**
- **Shut off the engine.**

(For detailed instructions, refer to the *Safety* chapter of this manual.)

1. Remove the front kickplate cover just below the cab entry step.



3. Remove the capscrews (35 lbf.) (47 N•m) attaching the flexible coupling plate to the engine. Use Loctite™ 242 or equivalent to reinstall.



Installation Procedure - Follow all warnings first, then reverse the removal steps.

Drive Motor Removal and Installation

WARNING

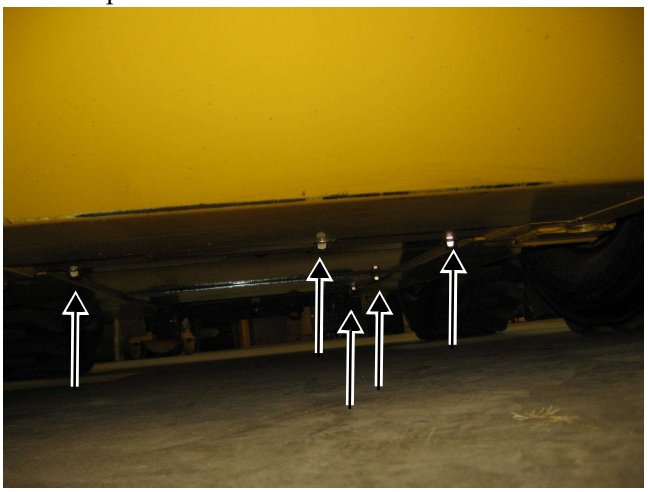
BEFORE beginning this service procedure, perform the following SAFETY procedures:

- **Remove attachment from lift arm.**
- **Raise and securely block the loader so all four tires are off the ground.**
- **Raise lift arm; engage lift arm support device.**
- **Shut off the engine.**
- **Tilt back ROPS/FOPS until lock engages.**

(For detailed instructions, refer to the *Safety* chapter of this manual.)

Removal Procedure

1. Underneath the skid-steer loader, remove the capscrews securing the belly pans and then remove both pans from the chassis.



2. Remove the drive chains per the procedure in the *Wheel Drives* chapter.
3. If necessary, drain oil from the hydraulic reservoir and chaincases per their procedures in the *Lubrication* chapter.

NOTE: If the hydraulic hoses and tubes are plugged after removal to prevent oil leakage, it should not be necessary to drain the hydraulic reservoir. Hydraulic hoses and tubes, along with the auxiliary suction hose and other components should be plugged to prevent contaminants from entering the hydraulic system.

4. BEFORE disconnecting hydraulic hoses and tubes from the drive motor, mark each hose/tube and the port where it attaches to the drive motor (so that

Introduction

This chapter covers troubleshooting, testing, removal, installation and adjustment procedures for hydraulic system components on Gehl V420 and Mustang 4200V model skid-steer loaders.

Power for the lift arm functions and auxiliary hydraulics is provided by a axial piston pump attached to the front of the tandem pump. An additional gear pump provides oil for fan and All-Tach® functions.

Machines include a standard-flow auxiliary hydraulics system with connections on the lift arm for attachment hookup. They are also equipped with high-flow hydraulics, which includes connectors on the right side of the lift arm, for operating attachments that require higher hydraulic flow.

Information on recommended hydraulic fluids, capacities and filter change intervals is in the *Lubrication* chapter. For detailed information on axial-piston pump or control valve internal repair, consult the Gehl-Mustang Service Department and/or the hydraulic component manufacturer's service manual. Hydraulic components related to the drive system are covered in the *Hydrostatic System* chapter.

The following troubleshooting guide lists potential hydraulic system problems, as well as possible causes and remedies, for Gehl V420 and Mustang 4200V skid-steer loaders.

If you cannot locate a particular hydraulic system problem in this chart, consult the *Hydrostatic System* chapter troubleshooting chart or call a Service technician.

When a problem occurs, don't overlook simple causes. A malfunction could be caused by something as simple as low fluid level in the hydraulic reservoir. After a mechanical failure has been corrected, be sure to locate the cause of the problem.

IMPORTANT

DO NOT attempt to service or repair major hydraulic system components, such as the pump, unless authorized to do so by your Gehl or Mustang dealer. Any unauthorized repair will void the warranty.

Troubleshooting Guide

Problem	Possible Cause	Remedy
Lift/tilt controls fail to respond	Hydraulic oil viscosity too heavy	Allow longer warm-up or replace with proper viscosity oil.
	Hydraulic oil level low	Check oil level in reservoir. If oil is low, check for an external leak. Repair and add oil.
	Hydraulic oil flow to the pump blocked	Inspect suction hose. Clean or replace as needed.
	Inlet relief valve malfunctioning	Adjust or replace relief valve as needed in the control valve.
	Drive disconnected	Check for broken or worn pump drive coupling. Replace as needed.
	Sheared spline or broken shaft in hydrostatic pump assembly	Check splined shaft of pump closest to engine. Replace shaft if broken or if splines are sheared.
	Sheared spline or broken shaft in pump	Remove gear pump from hydrostatic pump and inspect the splined shaft and coupler. Replace components as needed.
	Restraint bar switch or seat switch not closing	Check switches and wiring. Replace as needed. Check indicator light on the interlock module.
	Solenoid lock valve(s) malfunctioning	Check electrical connections to sole-noid. Replace as needed.
	Low or no charge	Check charge.

Hydraulics - High-Flow Auxiliary Lift Arm Components

Parts Listing For Previous Drawing

1 ST MJ16-MORB12
2 HLN INST 5/16 CZY
3 HLN INST 1/4 CZY
4 ST MJ08-MORB06
5 CS FL LOCK 3/8X3/4 C5ZY
6 90 MJ16-FJS16
7 BAR/HOSE PIVOT LINKAGE
8 TIE/CABLE .50X12.90 DUAL BLACK
9 CLAMP/TUBE 1.00 TWIN
10 PLATE/TWIN COVER T4
11 BLOCK/COUPLER
12 COVER/HI FLOW COUPLER
13 TUBE/HI-FLOW
14 TUBE/HI-FLOW
15 TUBE/FRONT HI FLO DRAIN
16 PLATE/SPACER
17 TUBE/REAR HI FLO
18 HOSE/ASSY/1.00 X 73.00
19 90-LL MJ16-MAORB12
20 VALVE/DPX160
21 TUBE/HYD -08 DRAIN
22 WLDMT/HOSE PIVOT
23 BAND
24 TUBE/HOSECARRIAGE
25 TUBE/HYD -08 DRAIN
26 PLATE/TWIN COVER/ASSY
27 WLDMT/ARM/CARRIAGE
28 TUBE/HYD -16 JOY STICK
29 TUBE/HYD -16 JOY STICK
30 HOSE/ASSY/.50 X 76.00
31 PLATE/CLAMP BASE
32 STRIP/TRIM 20.75
33 HOSE/ASSY/1.00 X 71.00
34 BUSHING/.313X.75
35 TIE/CABLE .50X19.20 DUAL
36 CLAMP/TUBE SINGLE RELIEF
37 PLATE/COVER
38 CS FL 3/8X3-1/2 C5ZY
39 CS 5/16X3-3/4 C5ZY
40 CS 5/16X4-1/2 C5ZY
41 CS 1/4X3-3/4 C5ZY

Hydraulic Oil Filter Element Replacement

Gehl V4200 and Mustang 4200V model skid-steer loaders have one hydraulic oil filter. The filter needs to be replaced when the restriction indicator light on the right instrument keypad comes on, indicating the return filter is restricted or, at the regular maintenance interval. The filter element should be replaced after every 500 hours of operation or annually (whichever occurs first).

NOTE: There is an initial 50-hour element replacement schedule for new skid-steer loaders with original filters.

Replacement Procedure

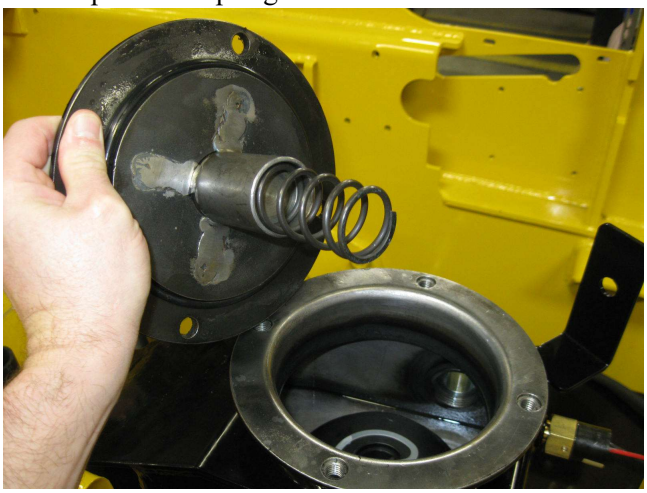
⚠ WARNING

BEFORE beginning this service procedure, perform the following SAFETY procedure:

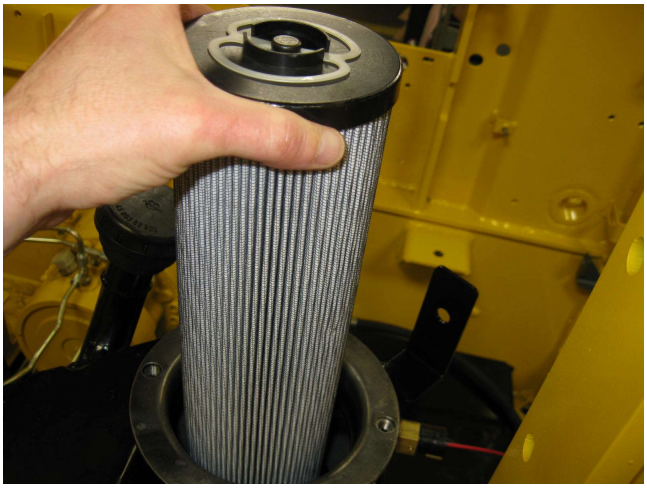
- **Remove attachment from lift arm.**
- **Raise lift arm; engage lift arm support device.**
- **Shut off the engine.**
- **Tilt back ROPS/FOPS until lock engages.**

(For detailed instructions, refer to the *Safety* chapter in this manual.)

1. At the left side of the chassis, remove the left side access cover.
2. Clean any dirt/debris off the surface of the filter housing.
3. Remove four bolts on the cover plate and remove the plate and spring.



4. Pull up on the filter element and remove it from the reservoir.



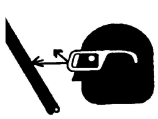
5. Install the new filter element in the reservoir.
6. After properly positioning the spring, reinstall the cover plate and its hardware.
7. Refill the hydraulic reservoir. Refer to the *Lubrication* chapter in this manual for the hydraulic fluid requirements and specifications.

⚠ WARNING



NEVER use your hands to search for hydraulic fluid leaks. Use a piece of cardboard or paper. Escaping fluid under pressure can be invisible and penetrate the skin causing serious injury. If any fluid is injected into your skin, see a doctor at once. Injected fluid MUST be surgically removed by a doctor familiar with this type of injury or gangrene may result.

⚠ WARNING



ALWAYS wear safety glasses when checking for hydraulic fluid leaks. Escaping fluid under pressure can be invisible and can cause permanent eyesight damage if safety glasses are not worn.

8. ALWAYS check for hydraulic fluid leaks after reassembling components of the hydraulic system.

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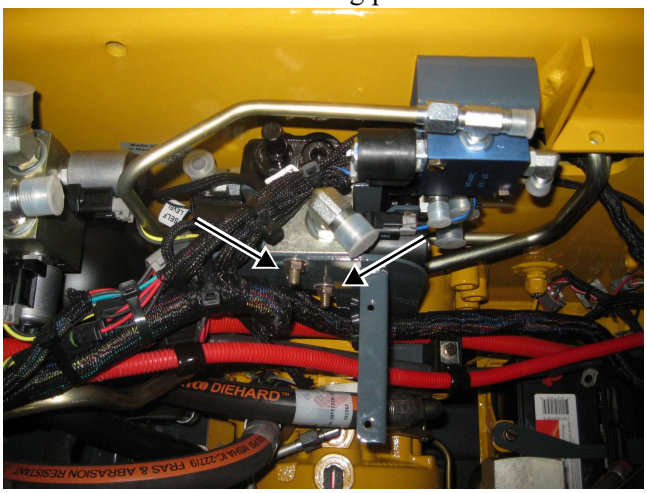
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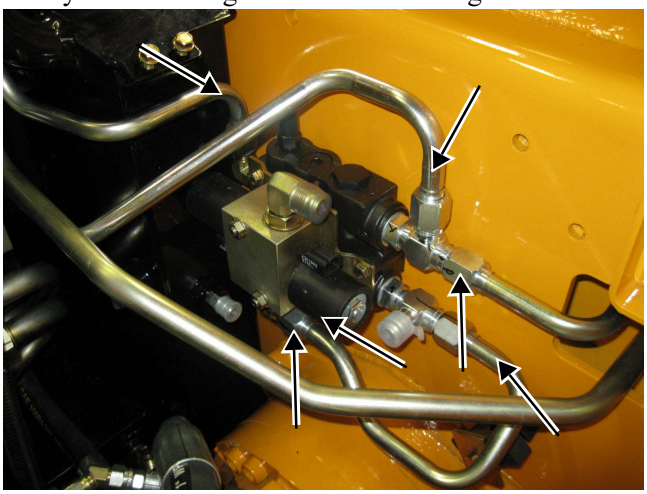
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2. Remove the two locknuts securing the safety lock valve to the valve mounting plate. Slide the safety lock valve off its mounting plate.



3. Disconnect all the hydraulic tubes from their hydraulic fittings on the self-leveling valve.



4. Remove the two capscrews and locknuts securing the self-leveling valve to the chassis.
5. Remove the self-leveling valve.

NOTE: After removing and/or replacing any component in the hydraulic system, ALWAYS check the level of the hydraulic fluid in the reservoir. Add fluid if necessary. Refer to the *Lubrication* chapter for the hydraulic fluid specifications.

Installation Procedure - Follow all warnings first, then reverse the removal steps.

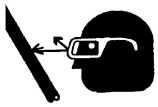
ALWAYS check for hydraulic fluid leaks after reassembling components of the hydraulic system.

WARNING



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WARNING



ALWAYS wear safety glasses when checking for hydraulic fluid leaks. Escaping fluid under pressure can be invisible and can cause permanent eyesight damage if safety glasses are not worn.

6. ALWAYS check for hydraulic fluid leaks after reassembling components of the hydraulic system.

Control Valve Solenoid Removal and Installation

The main control valve contains two electrical solenoids for standard flow units or four electrical solenoids for high-flow units.

Removal Procedure

WARNING

BEFORE beginning this service procedure, perform the following SAFETY procedures:

- **Remove attachment from lift arm.**
- **Raise lift arm; engage lift arm support device.**
- **Shut off the engine.**
- **Relieve hydraulic system pressure.**
- **Tilt back ROPS/FOPS until lock engages.**

(For detailed instructions, refer to the *Safety* chapter of this manual.)

1. Unplug the electrical connector on the valve solenoid to be serviced.
2. Using an Allen wrench, remove two screws securing the solenoid to the valve.
3. Check the condition of the cartridge and clean off any debris. Check the solenoid output, if necessary (see the *Electrical System* chapter).

Inlet Relief Valve and Drain Orifice Removal and Installation

An inlet relief valve and drain orifice are integrated within the standard-flow control and high-flow control valves. A relief valve activates when oil pressure inside the control valve reaches an unacceptable level, to relieve that pressure and prevent damage to valve and hydraulic system. The drain orifice, opposite the inlet relief valve, can be removed for cleaning too, if simultaneous functions of the control valve are suspect.

Removal Procedure

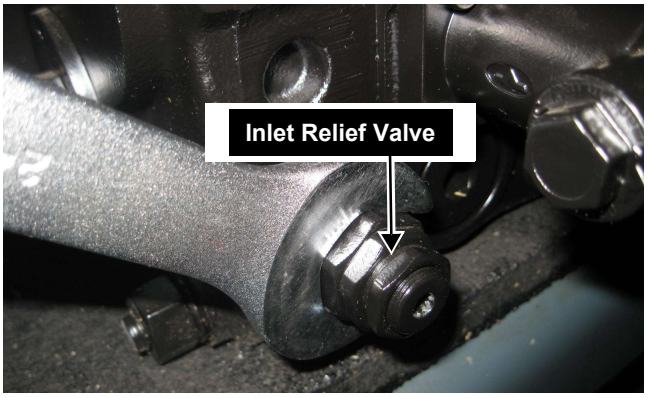
WARNING

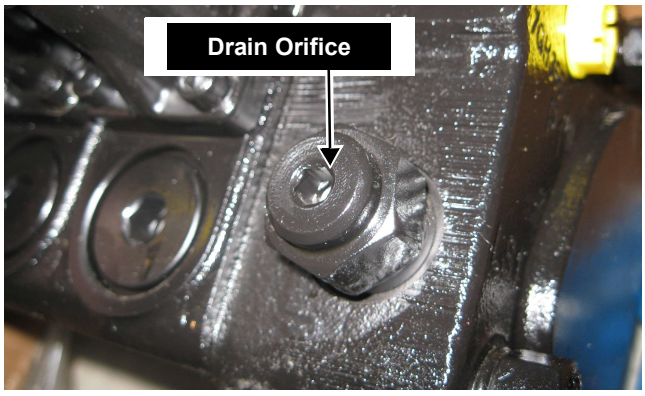
BEFORE beginning this service procedure, perform the following SAFETY procedures:

- **Shut off the engine.**
- **Relieve hydraulic system pressure.**
- **Tilt back ROPS/FOPS until lock engages.**

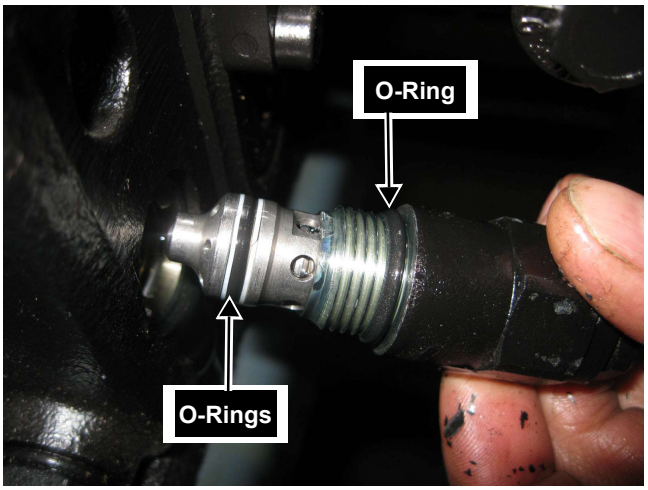
(For detailed instructions, refer to the *Safety* chapter of this manual.)

1. With a wrench, loosen and remove the inlet relief valve or drain orifice from the main control valve.



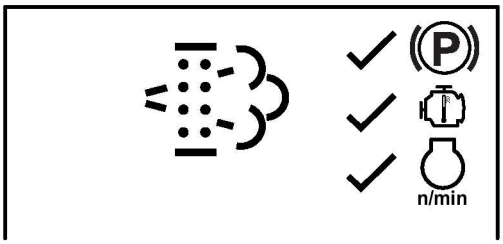
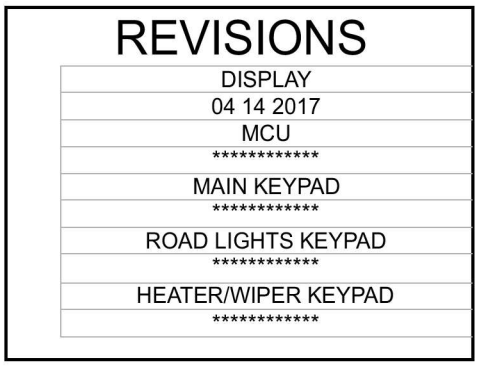
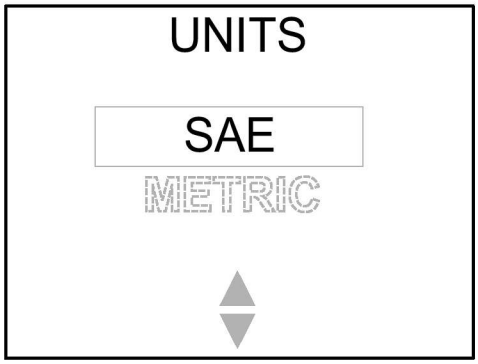


2. Check condition of o-rings and clean off any debris.



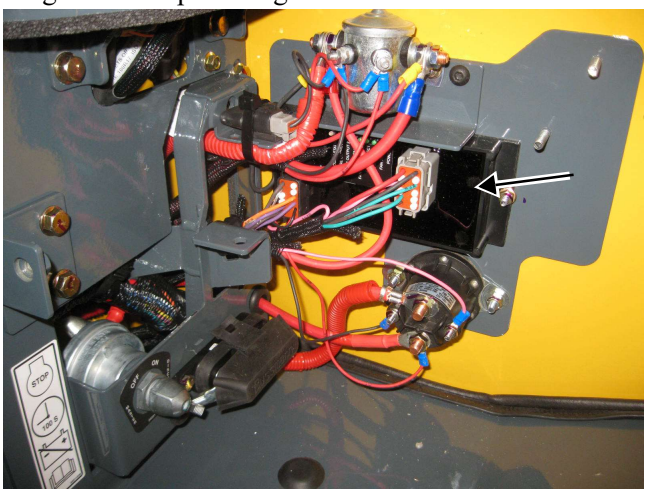
Installation Procedure - Follow all warnings first, then reverse removal steps.

Table 3: Status and Maintenance Screens

Display Mode	Description
	**Regeneration Screens** These screens are associated with the Selective Catalytic Reduction (SCR) standstill regeneration procedure. See “Selective Catalytic Reduction (SCR) Standstill Regeneration”.
Secondary Screens	
All Secondary Screens	Secondary screens are accessed by holding down the ok button (E, Fig. 5) for 10 seconds while either the primary or dual gauge display screen is displayed. Press the left/right side of navigation rocker button (A, Fig. 5) to switch between secondary screens. **NOTE:** Press “esc” button (G, Fig. 5) to exit secondary screens and return to the previously selected status screen.
	**Revision Screen** Displays information for control modules software information.
	**Units Screen** Press the top/bottom of navigation rocker button (A, Fig. 5) to switch between SAE or metric units for values displayed in the screens.

Fan Control Module Test

Check the fan control module by verifying that it powers up with the keyswitch in its “ON” position and the green LED power light is illuminated.



WARNING

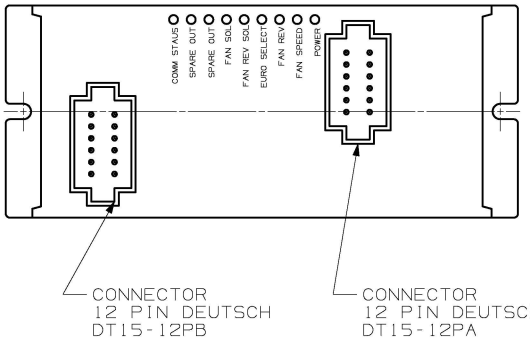
BEFORE beginning this service procedure, perform the following SAFETY procedure:

- **Remove attachment from lift arm.**
- **Raise lift arm; engage lift arm support device.**
- **Shut off the engine.**

(For detailed instructions, refer to the *Safety* chapter of this manual.)

1. The fan module controls the speed of the fan as well as the the fan reverse function. The module monitors the charge air cooler, hydraulic, and coolant temperatures.
2. The module then sends a signal to the fan control valve from pins 6 and 9 of connector J2. If the connector is unplugged from the fan control valve, the fan will operate at FULL speed. The coil on the fan control valve can be checked by measuring resistance across its terminals. Measure across pins 6 and 9. The resistance should be 7.58 ohms (Ω) at room temperature.
3. The charge air cooler and hydraulic sensors are hardwired to the module. The coolant temperature is obtained from the Controller Area Network (CAN) system.
4. Charge air cooler and hydraulics can be checked by measuring the resistance across their terminals.
5. Unplug the 12-pin connectors and measure resistance across pins 1 and 2 of each connector. The resistance should be 3.51 ohms (Ω) at room temperature.
6. Check the main display to check engine temperature.
7. The fan module also monitors fan speed via a sensor mounted near the fan hub. The fan speed is shown on the main display. If the fan speed is not displaying correctly, investigate the sensor and/or connections. May need to review the schematic.
8. Fan reversing is intiated by pressing the self-level and light buttons for 10 seconds. A LED should illuminate on the fan module. The fan reversing solenoid is located in the fan shroud, directly in front of the charge air cooler.

Fan Control Module Test Module Illustration



PIN DESCRIPTIONS 12PB:

1. SIGNAL FROM CAC TEMP
2. COMMON FOR SENSORS
3. SPARE
4. NOT USED
5. SHIELD
6. FAN SOLENOID RETURN
7. SPARE OUTPUT
8. SPARE OUTPUT
9. FAN SOLENOID PWM
10. FAN REV SOLENOID
11. CAN L
12. CAN H

MATING CONNECTOR:
DEUTSCH DT06-12SA

PIN DESCRIPTIONS 12PA:

1. SENSOR GROUND
2. HYD TEMP SENSOR
3. 5V OUTPUT
4. 12V KEYED POWER
5. SPARE INPUT
6. 12V LIVE POWER
7. MODULE GROUND
8. NOT USED
9. FAN SPEED
10. FAN REV SWITCH
11. EURO SELECT
12. NOT USED

MATING CONNECTOR:
DEUTSCH DT06-12SB

Controller Area Network (CAN) Functional Detail

The electrical system uses the SAE J1939 standard for Controller Area Network (CAN) communication and diagnostics. The following table describes the basic functionality of the CAN system logic.

NOTE: The "Malfunction Indicators" column in the following table contains information about possible causes of function - inputs/conditions - outputs/actions logic disagreement or problems. In some cases, additional information about specific malfunctions is included.

Table 7: Controller Area Network (CAN) Functional Detail

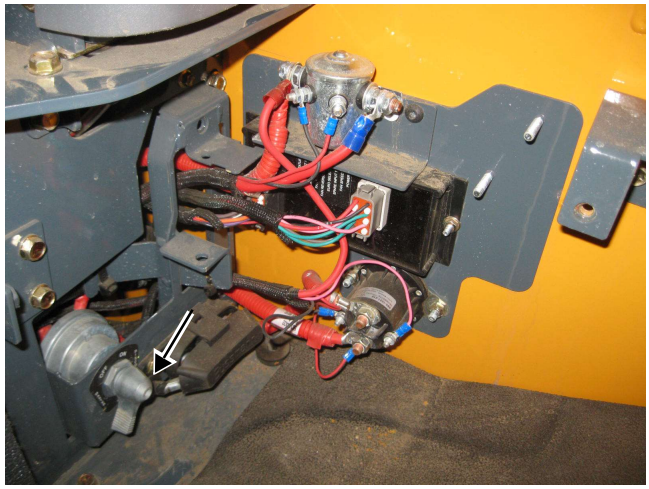
Function	Inputs/Conditions	Outputs/Actions	Malfunction Indicators
Activate Dome Light	• Ignition switch in OFF position. • Seat switch CLOSED (seat occupied), or a button on the control keypad is pressed.	Dome light turns on for 30 seconds or until the ignition switch is turned on. Pressing any button on the control keypad toggles the dome light on/off and resets the 30-second timer. **NOTE:** Dome light gradually dims when turning off.	• Dome light bulb burned out. • Electrical fault (switch, components, connections or battery).
Power On	• Ignition switch in ON / RUN position.	All indicator lights, key pad button backlights and audible alarm activate for 3 seconds to test; test interrupted if the ignition switch is turned to the START position. Parking brake is set and parking brake indicator is turned on.	• Ignition switch malfunction. • Electrical fault (switch, components, connections or battery). • Component / safety interlock system malfunction.
Power Off	• Ignition switch in OFF position. • Seat switch OPEN (seat not occupied). • Dome light OFF.	Control keypad enters low-power state. **NOTE:** Backlights on the control keypad buttons remain on until inputs/conditions are met.	• Ignition switch malfunction. • Electrical fault (switch, components, connections or battery). • Component / safety interlock system malfunction.
Start Engine	• Seat switch CLOSED (seat occupied). • Restraint bar switch CLOSED (restraint bar down). • If equipped with a door, door proximity switch ON (door closed). • Ignition switch in START position.	Turns on and holds engine start. Engine start disabled if the ignition is in the START position for longer than 15 seconds.	• Ignition switch malfunction. • Electrical fault (switch, components, connections or battery). • Starter malfunction. • Component / safety interlock system malfunction.

Table 7: Controller Area Network (CAN) Functional Detail

Function	Inputs/Conditions	Outputs/Actions	Malfunction Indicators
Activate Right Turn (Directional) Signal Light (optional road lights installed)	• Ignition switch in ON / RUN or START position. • Right directional button pressed.	Turns on right directional light and indicator (flashes at 60 flashes / min); turns off left directional light and indicator if on. Subsequent presses of the right directional button toggles right directional light and indicator on / off.	• Electrical/mechanical fault (components, connections or battery).
Activate Left Turn (Directional) Signal Light (optional road lights installed)	• Ignition switch in ON / RUN or START position. • Left directional button pressed.	Turns on left directional light and indicator (flashes at 60 flashes/ min); turns off right directional light and indicator if on. Subsequent presses of the left directional button toggles left directional light and indicator on / off.	• Electrical/mechanical fault (components, connections or battery).
Activate Hazard Lights (optional road lights installed)	• Hazard lights button pressed	Turns on hazard (right and left directional) lights and hazard lights indicator flash (lights flashes at 60 flashes / min). Subsequent presses of the hazard lights button toggles these hazard lights and indicator on / off. **NOTE:** Left / right directional signal lights are disabled when hazard lights are activated.	• Electrical/mechanical fault (components, connections or battery).
Hydraulic Lockout (optional road lights installed)	• Engine is running (engine oil pressure detected). • Hydraulics lock-out button pressed.	Disables attachment lift and tilt hydraulics and turns on hydraulics lock-out indicator. Subsequent presses of the hydraulics lock-out button toggles lift and tilt hydraulic and lock-out indicator on/off.	• Electrical/mechanical fault (components / connections).

Master Disconnect Switch - Remote Battery Terminal Removal and Installation

Gehl V420 and Mustang 4200V model skid-steer loaders have a master electrical disconnect switch located below the left control handle behind a cover inside the ROPS/FOPS.



Removal Procedure

WARNING

BEFORE beginning this service procedure, perform the following SAFETY procedure:

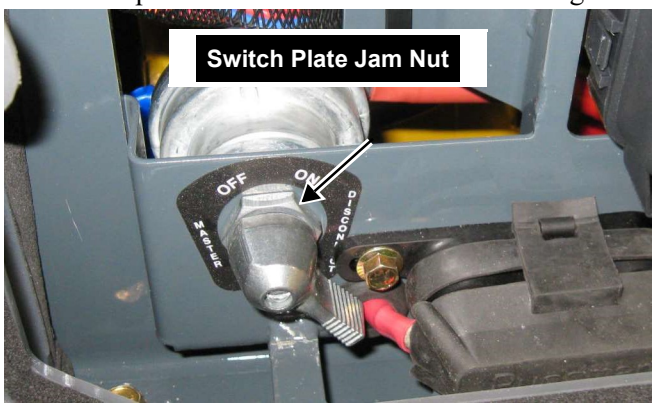
- **Remove attachment from lift arm.**
- **Raise lift arm; engage lift arm support device.**
- **Shut off the engine.**
- **BE SURE the engine electrical disconnect switch is in the OFF position.**

(For detailed instructions, refer to the *Safety* chapter of this manual.)

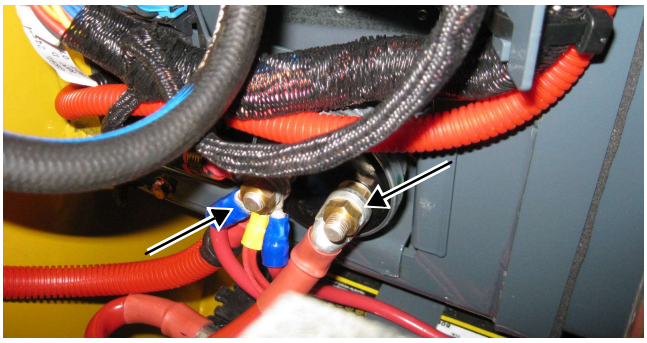
1. Remove the battery cables from the two batteries. Reference the "Batteries Removal and Installation" procedure in the *Engine* chapter.
2. On the switch, find a small screw securing the switch knob to the switch. Remove the screw from the switch and remove the knob.



3. Remove the switch plate jam nut securing the switch plate and the switch into the mounting hole.



4. On the back of the disconnect switch, remove two nuts and all cables/wires attached to the disconnect switch. Pull the disconnect switch rearward and out of the skid-steer loader.



NOTE: Keep a record of the cable/wire connections for reinstallation.

Installation Procedure - Follow all warnings first, then reverse the removal steps.

Introduction

This chapter covers troubleshooting, removal, installation, and adjustment procedures for engine components on Gehl V420 and Mustang 4200V model skid-steer loaders. The primary engine system components are shown on following pages.

They are equipped with a Deutz TCD36 turbocharged diesel engine. The four-cylinder engines are 221 cubic inch displacement (3,62 L) engines. The turbo engine compression ratio is 18.0:1. The four-cylinder engines are direct injection four-stroke engines with a firing order of 1, 3, 4, 2.

A “full-flow” oil filter is used in the lubrication system. As with any engine, clean oil, fuel and air are critical to satisfactory performance and long engine life. If properly maintained, this engine can be expected to provide thousands of hours of trouble-free operation.

When ordering engine parts, always check the Gehl or Mustang Parts Manual to see if a special part has been fitted to the engine. If Gehl or Mustang parts are required, they can be ordered from Gehl Company.

Troubleshooting Guide

The following troubleshooting guide lists potential engine problems, as well as possible causes and remedies, for Gehl V420 and Mustang 4200V model skid-steer loaders.

When a problem occurs, don’t overlook simple causes. A malfunction could be caused by something as simple as an empty fuel tank. After a mechanical failure has been corrected, be sure to locate the cause of the problem. For further troubleshooting information, refer to the engine manufacturer’s manual.

IMPORTANT

DO NOT attempt to service or repair major components, such as the fuel injector pump, unless authorized to do so by your Gehl or Mustang dealer. Any unauthorized repair will void the warranty.

Troubleshooting

Problem	Possible Cause	Corrective Action
Engine does not start.	Dead batteries.	Charge or replace battery(ies).
	Operator not in operator’s seat.	Operator’s seat must be occupied for the engine to start.
	Malfunctioning seat switch or safety bar arm/rest switch.	Replace seat switch or safety bar arm/rest switch. Check MCU LED's.
	Swing-out cab door open (if equipped).	Close swing-out cab door.
	Starter malfunction.	Contact dealer.
	Engine electronics logic error.	Contact dealer.
	Fuel pump malfunction.	Check electrical connections / voltage to fuel pump. Contact dealer.
Engine turns over but does not start	Engine cranking speed too slow.	Check batteries and charge/replace as necessary.
		Tighten cables at battery terminals.
	Paraffin separation in winter.	Use winter grade diesel fuel.
	Pre-heating module malfunction.	Check connection and voltage and charge/replace as necessary.
	Fuel pump malfunction.	Contact dealer.

Air Filter Element Removal and Installation

Service the air filter element when the electrical air filter restriction indicator lamp lights, or the standard maintenance interval. The filter restriction indicator lamp indicates a clogged air filter. Replace the primary air filter element. The secondary air filter element should be replaced every third time the primary element is replaced, unless the primary element is damaged or the secondary element is visibly dirty.

Removal Procedure

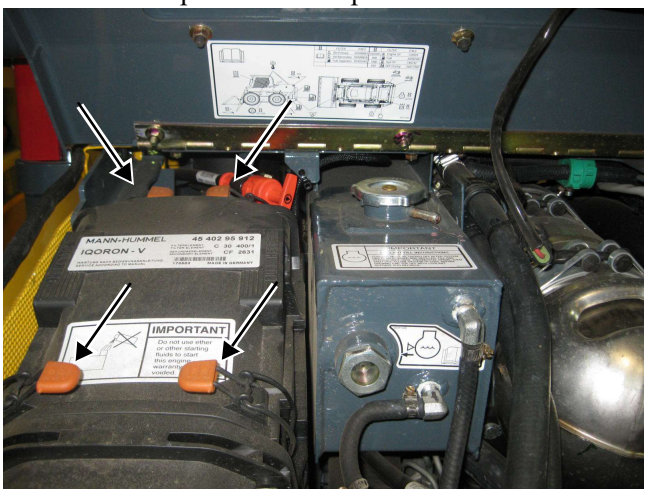
WARNING

BEFORE beginning this service procedure, perform the following SAFETY procedure:

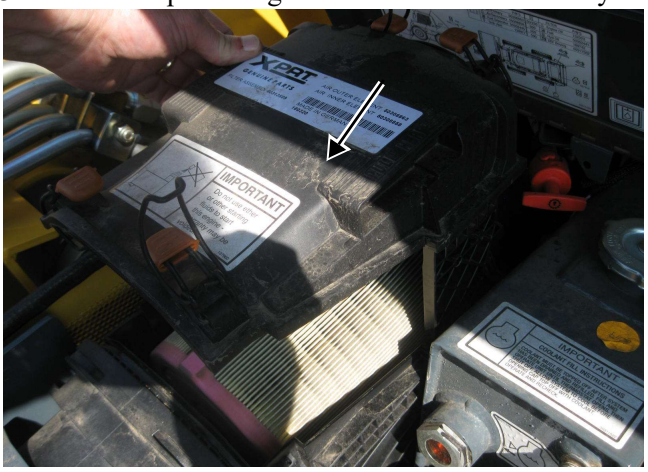
• Shut off the engine and allow to cool.

(For detailed instructions, refer to the *Safety* chapter of this manual.)

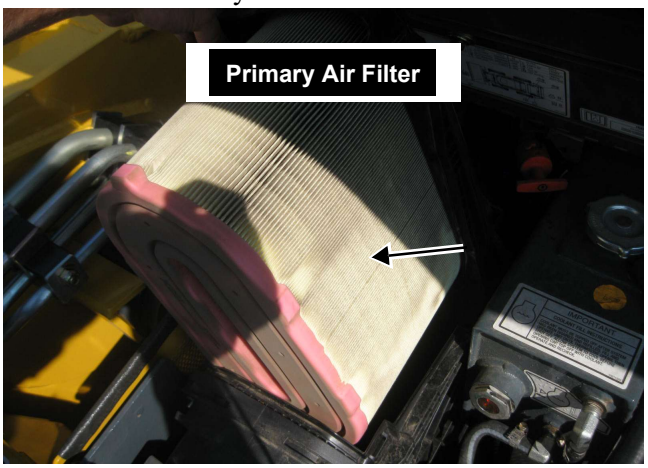
1. Open the engine access cover.
2. Release the four spring clips securing the top filter housing and remove the top housing. Clean out any dirt build-up in the end cap.

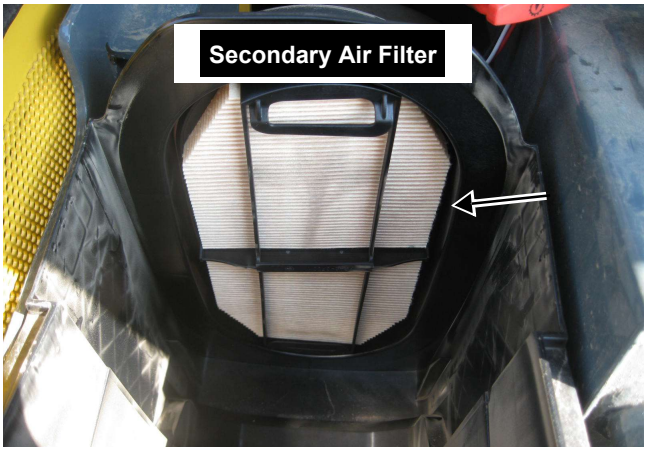


3. Pull the top housing off the air cleaner assembly.



4. Pull the primary air filter element from the air cleaner assembly.





5. Replace both air filter elements, if needed. (See *Service* chapter of the Operator's Manual.)
6. Check the condition of the dust ejector.Vacuum out the inside of the housing, if needed.

Installation Procedure - Follow all warnings first, then reverse the removal steps.*

* Clean the radial seal surfaces of the mating plastic body.

6. Apply a vacuum or drain the hydraulic system.
7. Loosen the hose clamp (D, Fig. 21) that secures the upper radiator hose (E) to the radiator. Remove the upper radiator hose from the radiator. Close all openings.

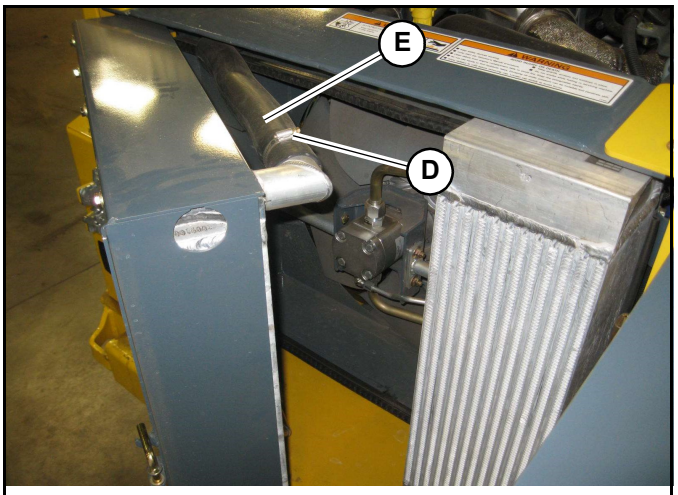


Fig. 21 – Upper Radiator Hose

8. Loosen the hose clamp (F, Fig. 22) that secures the lower radiator hose (G) to the radiator (H). Remove the upper radiator hose from the radiator. Close all openings.

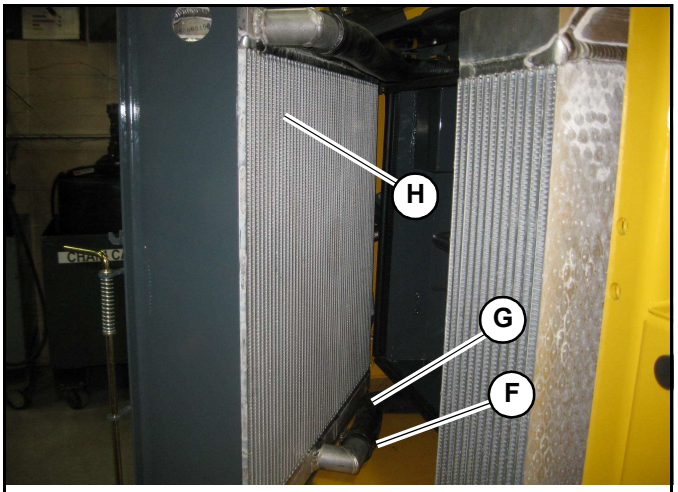


Fig. 22 – Lower Radiator Hose

9. Remove the upper hydraulic cooler hose quick connect clip, or remove the entire fitting (I, Fig. 23). Disconnect the hydraulic hose (J). Close all openings using caps and plugs.

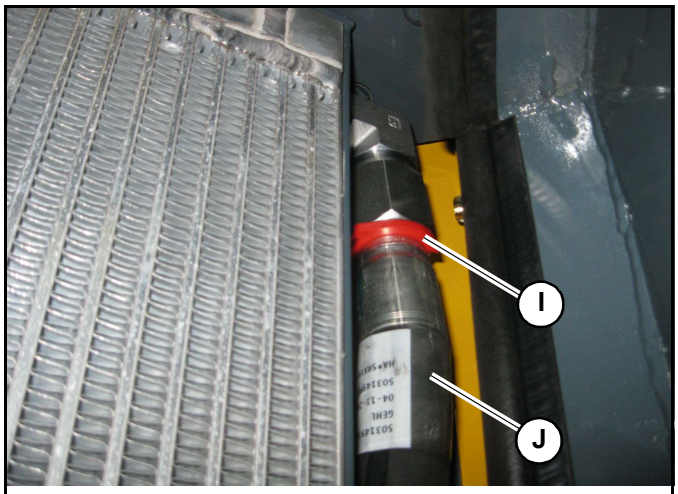


Fig. 23 – Upper Hydraulic Cooler Hose

10. Remove the lower hydraulic cooler hose quick connect clip, or remove the entire fitting (K, Fig. 24). Tag and disconnect the hydraulic hose (L). Close all openings using caps and plugs.

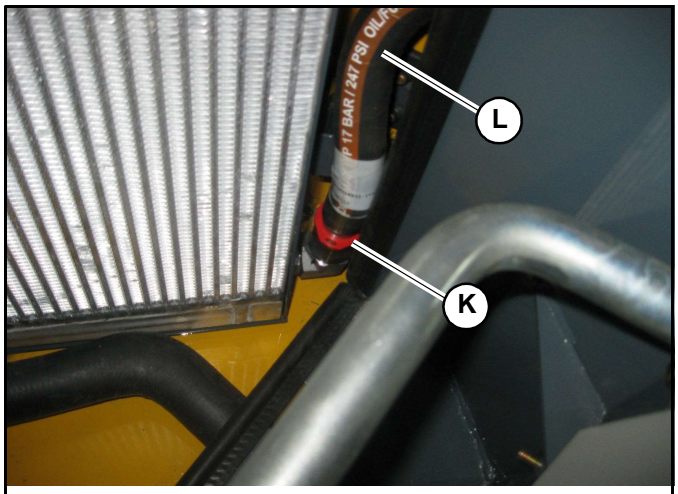


Fig. 24 – Lower Hydraulic Cooler Hose

30. Disconnect the pressure sensor and remove the electrical wire from the ECU bracket.

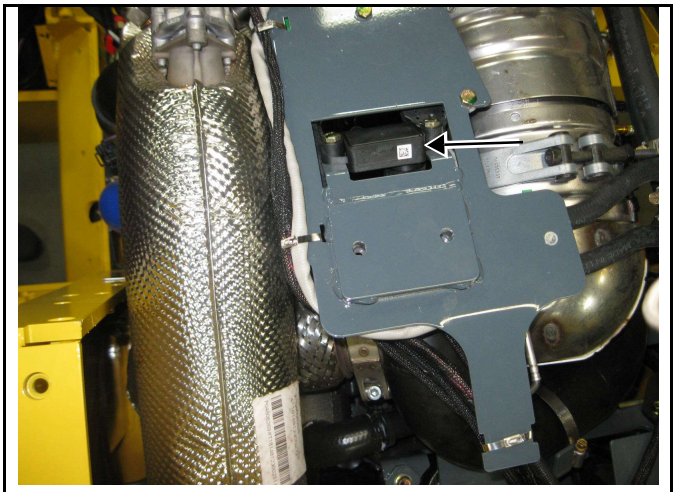


Fig. 49 – Pressure sensor to remove.

31. Remove electrical wires from the rear of the ECU bracket and remove the ECU.

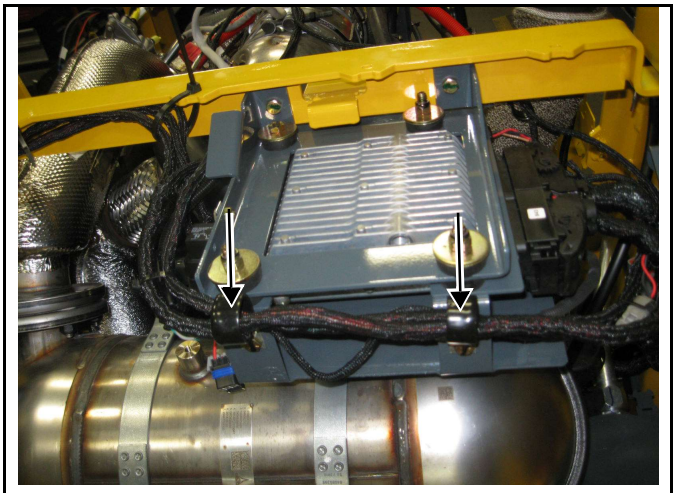


Fig. 50 – Remove electrical wires from ECU bracket.

32. Remove the tie band (V, Fig. 51) that secures the fuel line (W) to the A/C compressor bracket (X).

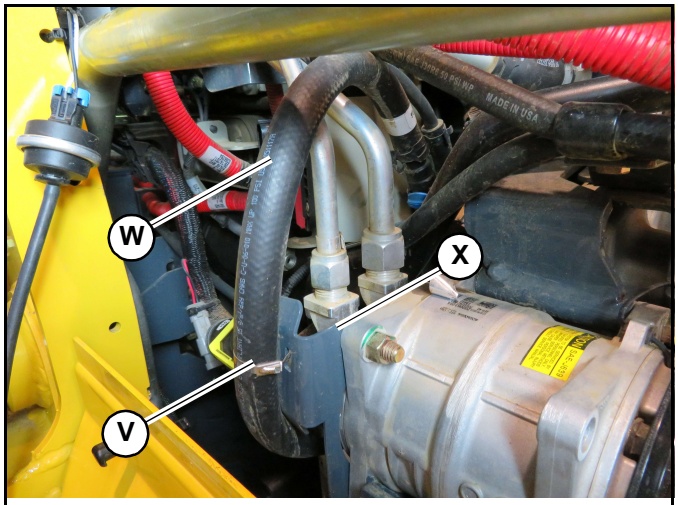


Fig. 51 – Fuel Line Tie Band

33. Disconnect the two A/C lines (Y, Fig. 52) at the compressor (Z). Close all openings using caps and plugs.

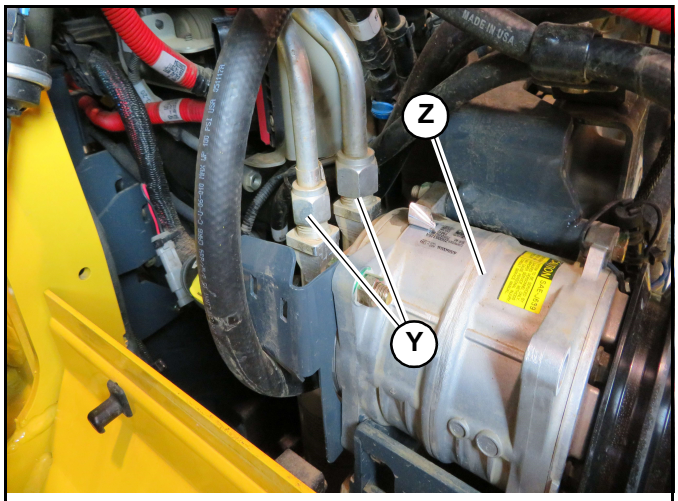


Fig. 52 – A/C Lines at Compressor

34. Tag and disconnect the A/C compressor electrical connector (A).

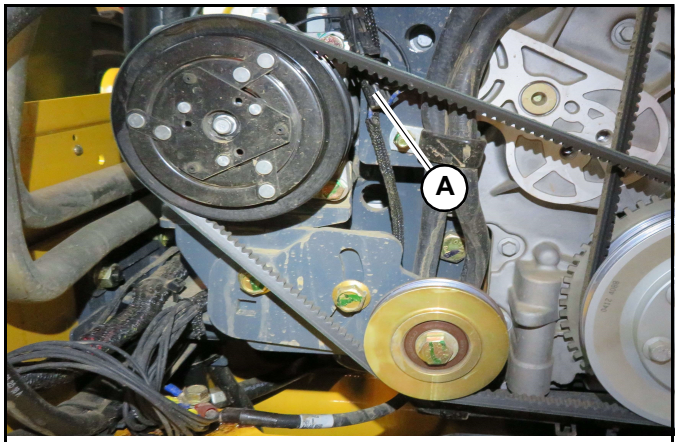


Fig. 53 – A/C Compressor Electrical Connector

Engine Diagnostic Fault Codes

DTC			
SPN	FMI	Trouble Code Type	Error Description
677	4	Starter Relay Error	Starter Relay (high side power stage): The current drop measured by ECU is above the target range; starter relay low side short circuit to ground. Starter Relay (high side power stage): The current drain measured by ECU is above the target range; starter relay high side, short circuit to ground
677	5	Starter Relay Error	Starter Relay (low side power stage): the current drop measured by ECU is above the target range; open circuit/disconnection LowSide-Output
677	12	Starter Relay Error	Starter Relay (low side power stage): the current drop measured by ECU is above the target range; starter relay powerstage over temperature
729	3	Short-Circuit Error	Intake Air Heater Device; short-circuit to battery
729	4	Short-Circuit Error	Air intake heater; Short circuit to ground error for powerstage on CJ945
729	5	Cold Start Error	Cold start aid relay open load
898	9	Timeout Error	Timeout error: limp mode activated
1079	13	(ECU) Error	Internal Hardware Monitoring: the ECU detects a deviation of the target range of the power supply voltage of sensor output 1
1080	13	(ECU) Error	Internal Hardware Monitoring: the ECU detects a deviation of the target range of the power supply voltage of sensor output 2
1109	2	Engine Shut-off Error	Operator ignores the engine shut off request within an allowed period.
1136	0	ECU Temperature Range Check Error	Physical range check high for ECU temperature
1176	0	Turbine Pressure Sensor Out-Of-Range Error	Pressure sensor upstream turbine, physical range check high
1176	3	Turbine Pressure Sensor Out-Of-Range Error	Pressure sensor upstream turbine, signal range check (SRC) high
1176	4	Turbine Pressure Sensor Out-Of-Range Error	Pressure sensor upstream turbine, signal range check (SRC) low
1231	14	CAN BusOff Error	CAN Bus 1: the ECU is not allowed to send messages, because the status “BusOff” is detected
1235	14	CAN Bus Error	CAN-Bus 2 = engine bus BusOff-Status
1237	2	Override Switch Error	Override Switch: the ECU receives a permanent signal, plausibility error

Engine Diagnostic Fault Codes

DTC			
SPN	FMI	Trouble Code Type	Error Description
524063	5	Electrial Error	Urea backflow line heater: broken wiring detected Threshold 1 < SCRHtr_rUHtrMeasRatio_mp < Threshold 2 SCR main relay not connected; SCR heater pressureline; open load; Relay Urea suction line: broken wiring detected (open load) -- SCR suction line (K28) SCR heater supply module; open load SCR heater tank; open load
524063	12	Timeout Error	DEF tank, time for defrosting too long
524065	0	Over-Pressure Error	Pressure sensor upstream SCR-CAT, pressure above upper physical threshold
524065	1	Under-Pressure Error	Pressure sensor upstream SCR-CAT, pressure below lower physical threshold
524065	2	Plausibility Error	Pressure sensor upstream SCR-CAT, plausibility error
524065	3	Electrial Error	Pressure sensor upstream SCR-CAT; short circuit battery or open load
524065	4	Short-Circuit Error	Pressure sensor upstream SCR-CAT; short circuit ground
524067	0	Over-Temperature Error	DEF supply module, heater temperature above upper physical threshold
524067	1	Under-Temperature Error	DEF supply module, heater temperature below lower physical threshold
524067	2	Plausibility Error	Supply module heater temperature, plausibility error
524074	9	Electrial Error	NOx sensor downstream SCR-CAT, sensor internally open load
524075	11	Short-Circuit Error	NOx sensor downstream SCR-CAT, sensor internally short circuit
524076	9	Electrial Error	NOx sensor upstream SCR-CAT, sensor internal open line
524077	11	Short-Circuit Error	NOx sensor upstream SCR-CAT, sensor internal short-circuit
524078	9	Plausibility Error	NOx sensor downstream SCR-CAT, lambda value above upper physical threshold
524079	9	Plausibility Error	NOx sensor downstream SCR-CAT, lambda value below lower physical threshold
524080	9	Plausibility Error	NOx sensor upstream SCR-CAT, lambda value above upper physical threshold

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