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Revision G



2066/2076/2086 Skid-Steer Loader Service Manual

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9. 917261	Rexroth AA20VG Tandem Pump Repair Manual	A
10. 917172	Yanmar TNV Engine Workshop Manual	A
11. 917292	Tier 3 Yanmar Engine Addendum	A



Mustang 2066/2076/2086 Service Manual

Form No. 917152

Mustang 2066

Mustang 2076

Mustang 2086

SKID-STEER LOADERS

with Tier3 Yanmar Engine

SERVICE MANUAL

Addendum

PART #917292

Revision A - 10/08

INTRODUCTION

With correct maintenance and proper use, Gehl and Mustang skid-steer loaders will give years of dependable service. This service manual is intended to be a guide in the assembly and disassembly, installation and removal, adjustment and testing, troubleshooting and replacement of components that together make up the Mustang 2066/76/86 family of skid-steer loaders.

In many of the procedures found within, the installation steps are the exact opposite of the removal steps and vice versa, and therefore, the opposite procedure is not written. Instead, a note to reverse the procedure will be stated. This reduces redundancy and excessive pages in the manual. In cases though, where the assembly and disassembly or removal and installation procedures differ and additional steps or safety concerns are paramount, the entire reverse procedure will be written out to include the new information.

The Table of Contents and Index can be used to make the procedure you need to find an easier process. Also, there are black tabs extending off the pages highlighting the chapters for those who prefer to thumb through the manual. Many schematics, photographs, and line-art drawings are used to help perform the necessary repairs, tests or adjustments that the Mustang 2066/76/86 skid-steer loaders need to keep them in good running condition.

If you have any additional questions, please contact your authorized Gehl or Mustang dealer or call the Gehl Service Department for assistance.

IMPORTANT

For maximum engine life, when shutting the engine down, allow the engine to idle, without load, for five minutes. This will allow engine components that operate at high temperatures to cool slightly before the engine itself is shut down.

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SPECIFICATIONS

	2066	2076/5640	2086/6640
Make of Engine	Yanmar	Yanmar	Yanmar
Model	4TNV98-ZNMS	4TNV98T-ZNMS	4TNV98T-ZNMS
Fuel	Diesel	Diesel	Diesel
Displacement	202 in ³ (3,31 L)	202 in ³ (3,31 L)	202 in ³ (3,31 L)
Horsepower - Net	68.4 hp (51,0 kW) @ 2500 rpm	84.4 hp (62,9 kW) @ 2500 rpm	84.4 hp (62,9 kW) @ 2500 rpm
Peak Torque	182 lb-ft (247 Nm) @ 1600 rpm	222 lb-ft (301 Nm) @ 1850 rpm	222 lb-ft (301 Nm) @ 1850 rpm
Operating Load - SAE*	2018 lbs. (915 kg)	2018 lbs. (915 kg)	2581 lbs. (1171 kg)
Operating Weight	7460 lbs. (3384 kg)	7460 lbs. (3384 kg)	7900 lbs. (3583 kg)
Shipping Weight	6716 lbs. (3046 kg)	6716 lbs. (3046 kg)	7106 lbs. (3223 kg)

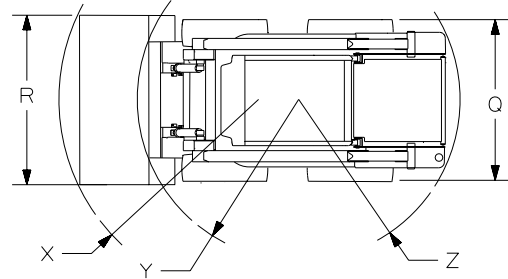
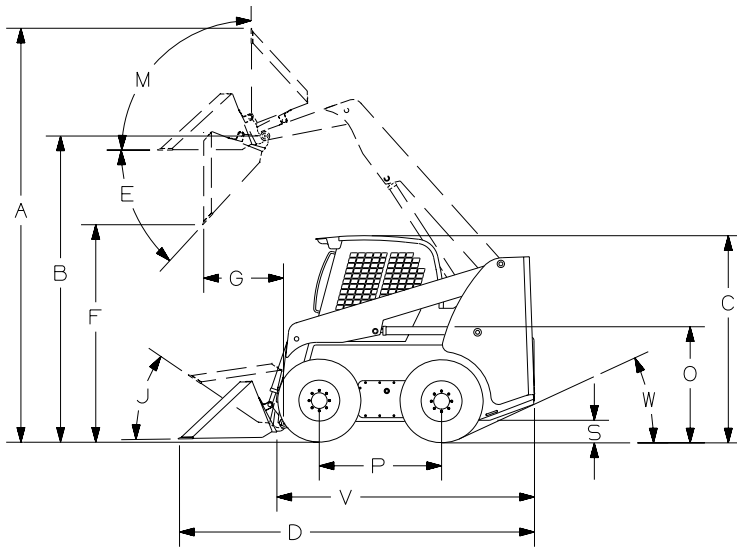
Specifications below apply to all 2066/76/86 and 56/6640 Models

Capacities	
Engine Oil	11.8 U.S. qts. (11,2 L)
Fuel Tank	24 U.S. gal (91 L)
Chaincase (each)	9 U.S. qts. (8,5 L)
Hydraulic Reservoir	16 U.S. gal. (61 L)
Engine Coolant	12 U.S. qts. (11,4 L)
Electrical	
Battery	12-Volt DC, 950 CCA
Starter	12-Volt DC (3,0 kW)
Alternator	14-Volt DC, 95 A
Hydraulic System	
Hydraulic System Pressure	3000 psi (207 bar)
Standard Aux. Flow Rate	21.5 gpm (81,4 L/min)
Hi-Flow Aux. Flow Rate (2076/86 only)	35.8 gpm (135, L/min)
Travel Speed - Single-Speed	8.1 mph (13,03 km/h)
Travel Speed - Two-Speed	12.3 mph (19,8 km/h)

Tire Options	
10 (12) x 16.5 - 8-ply (10-ply)	High Clearance Flotation tires
10 (12) x 16.5 - 8-ply (10-ply)	Heavy Duty Poly-filled tires
10 (12) x 16.5 - 8-ply (12-ply)	Severe Duty tires
10 (12) x 16.5 - 8-ply (12-ply)	Severe Duty Poly-filled tires
6.50 (7.50) x 16 Solid	Solid Rubber tires
33 x 15.50 x 16.5 - 12-ply	Heavy Duty 2000 II tires
14 x 17.5 - 14-ply	High Clearance Flotation tires

Buckets and Capacities			
Width - inches (millimeters)	Bucket Description	Capacity (Heaped)	
70 inches (1778 mm)	Dirt/Construction	15 cubic feet	0,42 cubic meters
70 inches (1778 mm)	Dirt/Construction	19 cubic feet	0,54 cubic meters
74 inches (1879 mm)	Dirt/Construction	20.4 cubic feet	0,58 cubic meters
74 inches (1879 mm)	Utility	27 cubic feet	0,76 cubic meters
74 inches (1879 mm)	Utility/Snow	32.5 cubic feet	0,92 cubic meters
92 inches (2336 mm)	Snow	41.1 cubic feet	1,16 cubic meters
67.5 inches (1715 mm)	Earth and Foundry	14 cubic feet	0,40 cubic meters
15.75, 19.68, 24 inches (400, 500, 670 mm)	Pallet Fork	NA	NA

*Operating load rated with a 70.0" inch (1778 mm) 2066/2076 dirt and construction bucket in accordance with SAE J818.



Dimensional Specifications		2066/2076/5640 (EU) ¹		2086/6640 (EU) ¹	
		in.	mm	in.	mm
A	Overall operation height - fully raised	164.5	4178	164.3	4173
B	Height to hinge pin - fully raised	123.1	3127	123.2	3129
C	Overall height - top of ROPS	80.5	2045	81.2	2062
D	Overall length - bucket down	134.1	3406	138.8	3526
E	Dump angle @ full height	40°		41°	
F	Dump height	91.1	2314	91.6	2327
G	Dump reach - bucket (full height)	32.0	813	36.0	914
J	Rollback at ground	24.1°		26.6°	
M	Rollback angle at full height	94.5°		94.5°	
O	Seat-to-ground height	40.2	1021	40.6	1031
P	Wheelbase - nominal	43.2	1097	48.4	1229
Q	Overall width - less bucket	66.3	1684	66.3	1684
R	Overall bucket width	69.8	1773	69.1	1755
S	Ground clearance to chassis (between wheels)	7.6	193	7.6	193
U	Maximum back grading angle	83°		83°	
V	Overall length (less bucket)	99.1	2517	104.3	2649
W	Departure angle	21°		21°	
X	Clearance circle - front (with bucket)	84.0	2134	86.3	2192
Y	Clearance circle - front (less bucket)	49.3	1252	52.2	1326

¹ - w/ 0.63 cu. yd. bkt., w/ 12 x 16.5 tires



General Information

The above safety alert symbol means: ATTENTION! BECOME ALERT! YOUR SAFETY IS INVOLVED! It stresses an attitude of “Heads Up for Safety” and can be found throughout this service manual and on the decals on the machine.

Before operating or working on this machine, read and study the following safety information. In addition, be sure that everyone who operates or works on this equipment is familiar with these safety precautions. It is essential to have competent and careful operators, who are not physically or mentally impaired, and who are thoroughly trained in the safe operation of the machine and the handling of loads. It is recommended that the operator be capable of obtaining a valid motor vehicle operator’s license.

The use of skid-steer loaders is subject to certain hazards that cannot be eliminated by mechanical means, but only by exercising intelligence, care and common sense. Such hazards include, but are not limited to, hillside operation, overloading, instability of the load, poor maintenance and using the equipment for a purpose for which it is not intended or designed.

The Gehl Company and Mustang Manufacturing Company ALWAYS considers the operator’s safety when designing its machinery and guards exposed moving parts for the operator’s protection. However, some areas cannot be guarded or shielded in order to assure proper operation. Furthermore, the Operator’s Manual and the decals on the machine warn of additional hazards and should be read and observed closely.

This section of the manual includes procedures, which when followed, will allow safe performance of service procedures: Mandatory Safety Shutdown Procedure, Lift Cylinder Lift Arm Support Device, Roll Over Protective Structure (ROPS)/Falling Object Protective Structure (FOPS) Lock Mechanism, Loader Raising and Lowering Procedures, and Relieving Hydraulic Pressure.

Signal Words



“DANGER” indicates an imminently hazardous situation which, if not avoided, will result in death or serious injury.



“WARNING” indicates a potentially hazardous situation which, if not avoided, could result in death or serious injury.



“CAUTION” indicates a potentially hazardous situation which, if not avoided, may result in minor or moderate injury. May also alert against unsafe practices.

Additional Safety Reminders



Read and understand the Service Manual and all decals before maintaining, adjusting or servicing this equipment.

Doors, Guards and Shields - Some photographs in this manual may show doors, guards and shields open or removed for illustrative purposes only. BE SURE all doors, guards and shields are in their proper operating positions BEFORE starting engine to operate unit.

Damaged or Worn-out Parts - For safe operation, replace damaged or worn-out parts with genuine Mustang service parts, BEFORE operating this equipment.

Attachments - Gehl and Mustang skid-steer loaders are designed and intended to be used only with Gehl Company and Mustang Manufacturing Company attachments or approved referral attachments. The Gehl Company and Mustang Manufacturing Company cannot be responsible for operator safety if the loader is used with a non-approved attachment.



Battery Safety - To avoid injury from a spark or short circuit, disconnect the negative (-) battery cable before servicing any part of the electrical system. Do not tip the battery more than 45° to avoid spilling electrolyte.

Loader Stability - A skid-steer loader's stability is determined by its wheel base and tread width. The following elements can affect stability: terrain, engine speed, load being carried or dumped, and sudden control movements. **DISREGARDING ANY OF THESE FACTORS CAN CAUSE THE LOADER TO TIP, POSSIBLY RESULTING IN DEATH OR SERIOUS INJURY.** Therefore, **ALWAYS** have the operator restraint bar lowered and wear the seat belt. Operate the controls only from the operator's seat. Operate the controls smoothly and gradually at an appropriate engine speed that matches the operating conditions.

DO NOT exceed the rated operating load of the machine. For additional stability when operating on inclines or ramps, **ALWAYS** travel with the heavier end of the loader toward the top of the incline.

ALWAYS look to the rear before backing up.

When parking machine, before leaving seat, check restraint bar for proper operation. The restraint bar, when raised, applies the parking brake and deactivates lift/tilt controls and auxiliary hydraulics.

Keyswitch - NEVER attempt to bypass the keyswitch to start the engine. Use the jump-starting procedure detailed in the *Service* chapter of your Operator's Manual.

Hydraulic Fluid Leaks - NEVER use hands to search for hydraulic fluid leaks. Instead, use paper or cardboard. Fluid under pressure can be invisible, penetrate the skin and cause a serious injury. If any fluid is injected into skin, see a doctor at once. Injected fluid **MUST** be surgically removed by a doctor or gangrene may result.



Wear Safety Glasses - **ALWAYS** wear safety glasses with side shields when operating the machine or striking metal against metal. In addition, it is recommended that a softer (chip-resistant) material be used to cushion the blow. Failure to heed could lead to serious injury to eyes or other parts of the body.



ALWAYS wear safety glasses when searching for hydraulic leaks or when working near batteries.

Loaded Bucket/Fork - DO NOT raise or lower a loaded bucket or fork suddenly. Abrupt movements under load can cause serious loader instability.

NEVER push the lift control into the "float" position with the bucket or attachment loaded or raised, because this will cause the lift arm to lower rapidly.

DO NOT drive too close to an excavation or ditch. **BE SURE** that the surrounding ground has adequate strength to support the weight of the loader and the load.



DO NOT smoke or have any spark producing equipment in the area while filling the fuel tank or while working on the fuel or hydraulic systems.

Exhaust Gases - Exhaust fumes can kill. DO NOT operate this machine in an enclosed area unless there is adequate ventilation.

Engine - NEVER use ether or starting fluid.

People - NEVER carry riders. DO NOT allow others to ride on the machine or attachment, because they could fall or cause an accident.

BE SURE all persons are away from the machine and give a warning before starting the engine.

ALWAYS face machine and use handholds and steps when getting on or off. DO NOT jump off machine.



Wear appropriate ear protection for prolonged exposure to excessive noise.

ALWAYS perform a daily inspection of the machine **BEFORE** using it. Look for damage, loose or missing parts, leaks, etc.

Remove trash and debris from the machine and engine compartment each day to minimize risk of fire.

New operators **MUST** operate loader in an open area away from bystanders. Practice with controls until loader can be operated safely and efficiently.

Mandatory Safety Shutdown Procedure

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

1. Move the drive control handle(s) to the NEUTRAL position.
2. Lower the lift arm and attachment completely.
3. Move the throttle to the low idle position, shut off the engine and remove the key.
4. However, if the lift arm **MUST** be left in the "raised" position, **BE SURE** to properly engage the lift arm support device.

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.



Fig. 2-1 The lock pin secures the lift arm support device underneath the left lift arm



Fig. 2-2 Flip lock pin down and grab with finger



Fig. 2-3 Pull ring out of welded post

Lift Arm Support Device

! WARNING

BEFORE leaving the 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 skid-steer loaders. Used as a cylinder block, it is intended to 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 anchor on the underside of the lift arm using the lock pin and retainer provided.

The lift arm support device is a safety device, which must be kept in proper operating condition at ALL times.

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

Lift Arm Support Device Engagement

1. Lower lift arm until contact with loader frame.
2. Turn the keyswitch to the OFF position to stop the engine.
3. Leave operator's compartment. Flip lock pin ring down and pull out of welded post to release its locking mechanism. Allow support device to come down into contact with lift cylinder. **Figs. 2-1, 2-2 and 2-3**
4. Return to the operator's compartment and restart the engine.
5. Use lift control to raise lift arm until lift arm support device drops over the end of the lift cylinder and around cylinder rod. Slowly lower lift arm until free end of support device contacts top end of lift cylinder. **Fig. 2-4**
6. Make sure the support device is secure against the base end of the lift cylinder. Then, stop the loader engine, remove the key and leave the operator's compartment.

Lift Arm Support Device Disengagement**WARNING**

NEVER leave the operator's compartment to disengage the lift arm support device with the engine running.

To return the lift arm support device to its storage position, proceed as follows:

1. Raise the lift arm completely.
2. Turn the keyswitch to the OFF position to stop the engine, remove the key and take it with you.

**WARNING**

BEFORE testing the machine, **ALWAYS** clear people from the area.

3. Before leaving the operator's compartment, check to be sure the lift arm is being held in the raised position by the solenoid valve (See NOTE).

NOTE: With the keyswitch OFF, and the solenoid valve functioning properly, the lift arm will not move when the lift control is moved forward. If the valve does NOT hold the lift arm, do NOT leave the operator's compartment. Instead, have someone store the support device for you. Then, contact your Gehl or Mustang dealer to determine the reason why the lift arm lowers while the keyswitch is in the OFF position.

4. To store lift arm support device, lift it up and inside the lift arm. Insert lock pin through the hole in the lift arm and through the support device.

ROPS – Raising

For service, the ROPS can be unbolted and tilted back. Gas-charged springs help tilt it back. A self-actuating lock mechanism engages to lock the ROPS in a rolled-back position.

1. The lift arm should be lowered or locked in the raised position as per the "Lift Arm Support Device Engagement" procedure in this chapter.
2. Turn the keyswitch to the OFF position to stop the engine. Remove the key and take it with you.
3. Leave the operator's compartment.



Fig. 2-4 The lift arm support device dropped over and around the cylinder rod

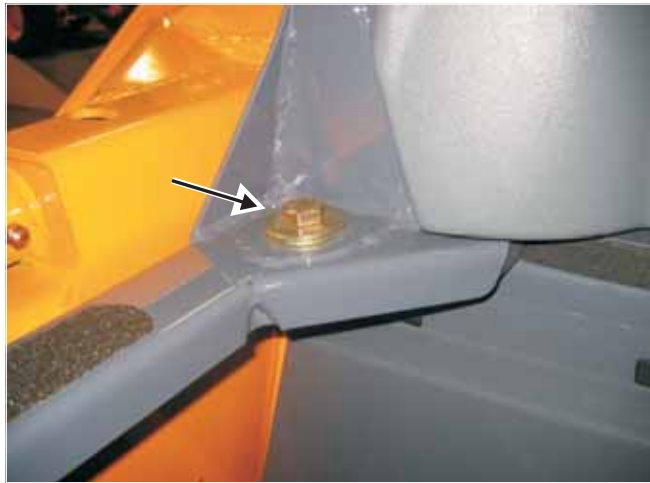


Fig. 2-5 Front right ROPS mounting area where the ROPS is secured to the chassis, left side same



Fig. 2-6 Location of the self-actuating lock mechanism



Fig. 2-7 Push up on ROPS to release locking mechanism



Fig. 2-8 Lower the ROPS until it contacts the chassis



Fig. 2-9 Be sure control handles clear the ROPS

WARNING

DO NOT leave the operator's compartment with the engine running. Before leaving the loader, shut off the engine according to the "Mandatory Safety Shutdown Procedure" described in this chapter.

4. Remove one capscrew and washer on each side of the ROPS forward stations. **Fig. 2-5**
5. Lift ROPS up and tilt it back until the self-actuating lock mechanism engages. The lock mechanism locks the ROPS in a rolled-back position. **Fig. 2-6**

IMPORTANT

BEFORE raising the ROPS, position the seat as far back as it will go. Avoid damaging control handles by slowly raising the ROPS. **BE SURE** the control handles clear the ROPS.

ROPS – Lowering

1. Apply upward force on the ROPS and push the lock mechanism handle toward the front of the loader. **Fig. 2-7**
2. Lower the ROPS until it contacts the chassis. **Fig. 2-8**

IMPORTANT

Avoid damaging control handles by slowly lowering the ROPS. **BE SURE** the control handles clear the ROPS.

3. Be sure control handles clear the ROPS. **Fig. 2-9**
4. Reinstall the two capscrews and flat washers that secure the ROPS front uprights to the chassis. **Fig. 2-5**

Relieving Hydraulic Pressure

The following procedure should be used to relieve pressure in the hydraulic system prior to performing service procedures on hydraulic system components.

1. Completely lower the bucket or attachment.
2. Turn keyswitch to OFF position to shut down engine.
3. With the operator in the seat and the restraint bar lowered, turn the keyswitch to the ON position but DO NOT start the engine.
4. Move the lift, tilt and auxiliary hydraulics controls through several cycles. **Figs. 2-10 - 2-12**
5. Turn the keyswitch to the OFF position.

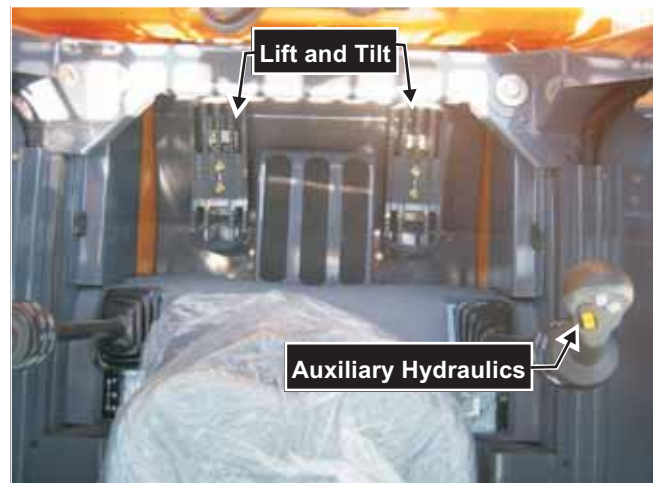


Fig. 2-10 On Hand/Foot models, the lift and tilt functions are controlled with the foot pedals on the floor of the ROPS. The auxiliary hydraulics are controlled in the right control handle.

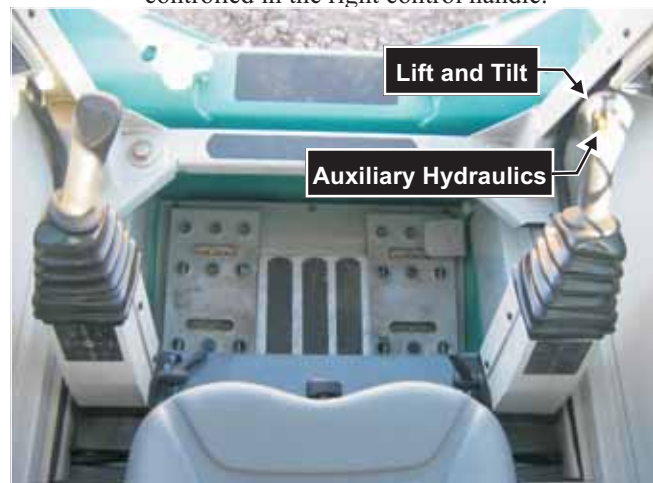


Fig. 2-11 On Dual Joystick and T-Bar/Joystick models, lift and tilt functions are controlled with the right control handle. The auxiliary hydraulics are controlled with the right control handle.



Fig. 2-12 On Dual T-Bar models, lift and tilt functions are controlled with the right control handle. The auxiliary hydraulics are controlled with the left foot on the auxiliary pedal assembly.

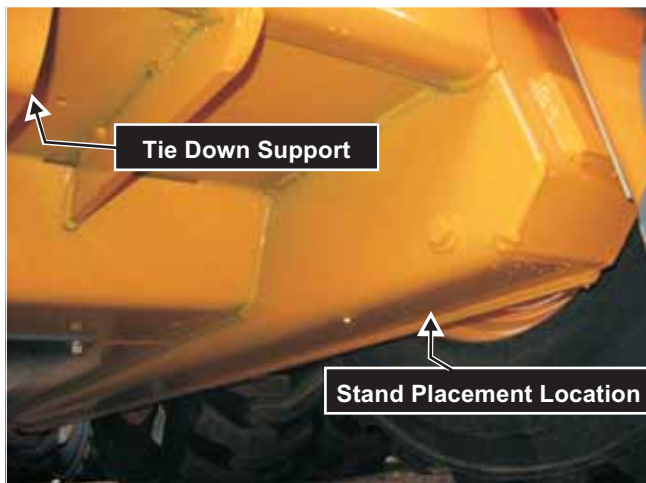


Fig. 2-13 View of the stand placement and tie down support locations at front of loader

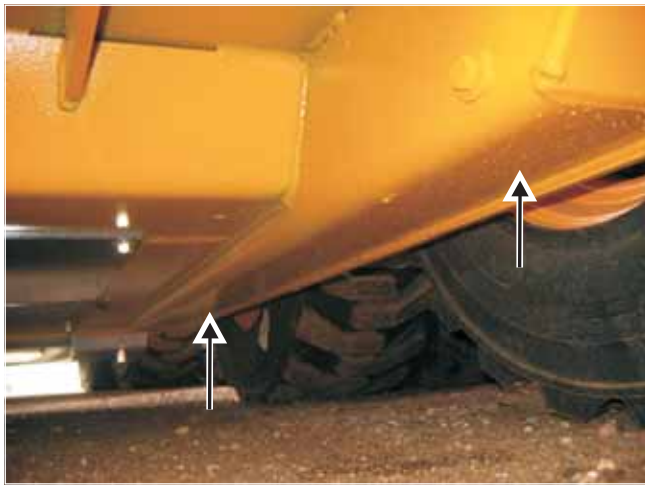


Fig. 2-14 Location underneath the left rear skid loader to position stands or blocks. View is from the rear of the loader.



Fig. 2-15 Location underneath the right rear skid loader to position stands or blocks. View is from the rear of the loader.

Loader Raising Procedure

The following procedure is used to raise the skid-steer loader so that all four tires are off the ground.

! WARNING

BEFORE servicing the machine, exercise the “Mandatory Safety Shutdown Procedure” described in this chapter.

! WARNING

DO NOT rely on a jack or hoist to maintain the “raised” position without additional blocking and supports. Serious personal injury could result from improperly raising or blocking the skid-steer loader.

1. To raise and block the skid-steer loader, obtain four jack stands (or blocks) of sufficient strength to support the loader.
2. Using a jack or hoist capable of raising the fully-equipped loader, lift the rear of the loader until the tires are off the ground.
3. Place two jack stands (or blocks) under the flat part of the loader chassis. Place them parallel with, but not touching, the rear tires.
4. Slowly lower the loader so that its weight rests on the jack stands (or blocks).
5. Repeat steps 2-4 for the front end. When the procedure is finished, all four tires will be off the ground, and the wheels can be removed as necessary.

Loader Lowering Procedure

When the service procedures are complete, the skid-steer loader can be taken down from the “raised” position. To lower the loader onto its tires:

1. Using a jack or hoist, raise the front of the loader until its weight no longer rests on the jack stands (or blocks).
2. Carefully remove the jack stands (or blocks) under the front of the loader.
3. Slowly lower the loader until the front tires are on the ground.
4. Repeat steps 1-3 for the rear of the loader.

NOTES



Fig. 3-1 Hydraulic oil level indicator (1) and hydraulic oil fill (2)



Fig. 3-2 Hydraulic oil drain plug located behind the right rear tire

General Information

! WARNING

NEVER service this unit when any part of the machine is in motion. **ALWAYS BE SURE** to exercise the “Mandatory Safety Shutdown Procedure” (see *Safety* chapter) **BEFORE** servicing this equipment.

Routine lubrication is an important factor in preventing excessive part wear and early failure. Loader and engine operation depends on using correct grade, high-quality lubricating oils. This chapter and the chart below list locations, temperature ranges and types of recommended lubricants to be used when servicing this machine.

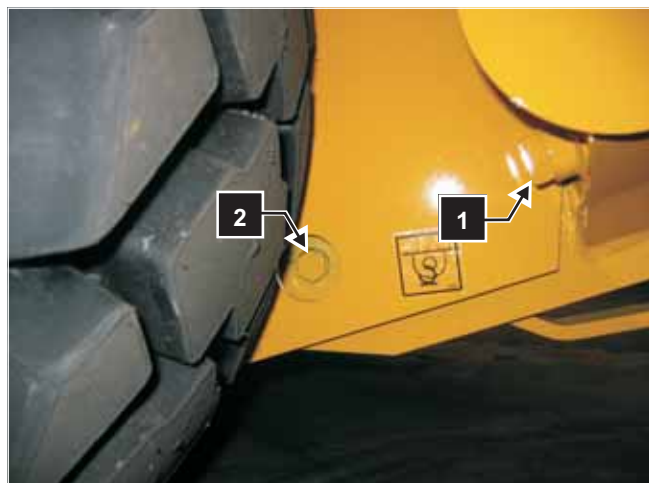
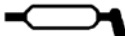


Fig. 3-3 Fuel tank drain (1) and remote engine oil drain (2) located behind the left rear tire

 Hydraulic System Reservoir	 Chaincases	 Grease Fittings	 Crankcase Oil (Diesel Engine)
Use a Mobil DTE 15M, or Petro-Canada Premium HVI60, or equivalent that contains anti-rust, anti-foam, and anti-oxidation additives & conforms to ISO VG46 or ISO VG48. Capacity: 16 Gallons (61 L)	Use hydraulic system oil or SAE grade 15W-40 motor oil. Capacity (each side): 9.0 Quarts (8,5 L)	Use lithium-based grease	☉ Below 32°F (0°C) use SAE Grade* 10 or 10W-30 ☉ Above 32°F (0°C) use SAE Grade* 15W-40 *Service Classification: API - CF-4/CG-4 Capacity: 11.8 Quarts (11,2 L)

NOTE: Whenever service is performed on hydraulic components (valves, cylinders, hoses, etc.), fuel tanks and lines, care must be taken to prevent discharging fluid onto the ground. Catch and dispose of fluid per local waste disposal regulations.

Hydraulic Oil Reservoir

The oil reservoir for hydraulic and hydrostatic systems has a capacity of 16 U.S. gallons (61 liters). A visual oil level indicator (**Fig. 3-1**) is located on right riser for convenient maintenance of hydraulic oil level.

The hydraulic oil reservoir should be drained (**Fig. 3-2**) and filled after every 500 hours of operation or annually (whichever happens first). Use Mobil DTE 15M or Petro-Canada Premium HV I60 hydraulic oil (or ISO VG46 or ISO VG48 equivalent) which contains anti-rust, anti-foam and anti-oxidation additives. Hydraulic oil filter element should be replaced when filter indicator on filter head shows red (See NOTE, **Fig. 3-9**). For details, refer to “Hydraulic Oil Filter Element Replacement” procedure in the *Hydraulic* chapter.

NOTE: Hydraulic filter indicator should be read with engine running at full throttle and normal operating temperature.

Crankcase Oil

The Yanmar diesel engine crankcase has a capacity of 11.8 qts. (11,2 L). The chart below lists recommended oil viscosity for the Cummins engine.

Engine oil should be changed and filter element replaced every 250 hours of service. A remote engine oil drain can be found behind right rear tire. Refer to engine operator’s manual (see NOTE) for details on changing oil and to “Oil Filter Removal” and “Oil Filter Installation” procedures in *Engine* chapter.

NOTE: Refer to engine operator’s manual for additional information on oil change intervals, including a 50-hour initial oil change interval.

Ambient Temperature	Viscosity
Below 32°F (0°C)	SAE 10 or 10W-30
Above 32°F (0°C)	SAE 15W-40
Service classification: API-CF-4/CG-4	

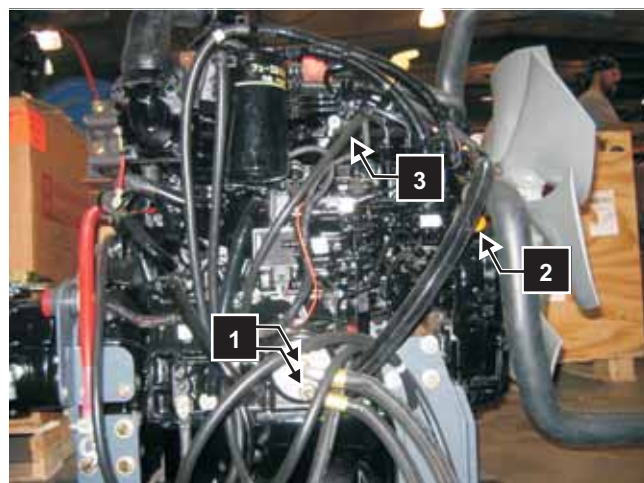


Fig. 3-4 Location of remote engine oil filter hoses (1), oil fill (2), and dipstick tube (3) on left side of engine



Fig. 3-5 Battery access location behind the left engine side cover



Fig. 3-6 Engine oil filter access location behind the rear grille and left of the cooler/radiator



Fig. 3-7 Location of engine oil dipstick



Fig. 3-8 Location of engine oil fill



Fig. 3-9 Location of the hydraulic filter indicator underneath the muffler

Chaincases

Each chaincase requires 9 U.S. qts (8,5 L) of any high grade motor oil. This quantity of oil should be maintained at all times. The oil in both chaincases should be drained and refilled every 500 hours of operation or annually, whichever occurs first.

Change Chaincase Oil

1. Remove drain plug on chaincase and drain the oil. **Fig. 3-10**
2. Reinstall the drain plug.
3. Remove both oil fill and oil level check plugs. **Figs. 3-10, 3-11**
4. Add oil through the fill plug (between tires on the chassis) until the oil starts to flow out of the check plug. **Figs. 3-10, 3-11**
5. Reinstall the check plug, then the fill plug.

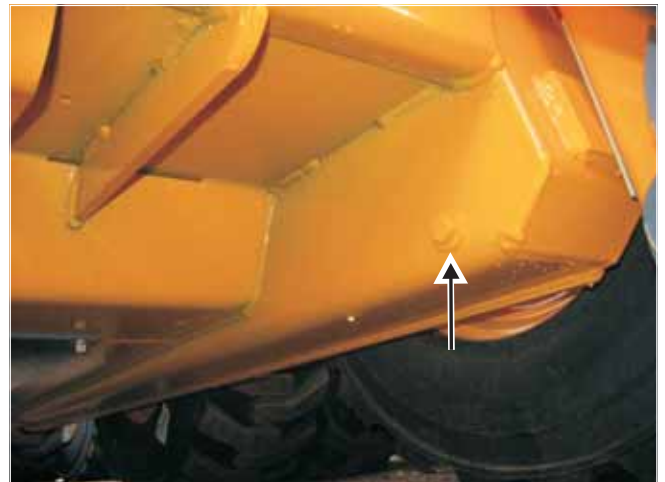


Fig. 3-10 Location of the chaincase oil drain check plug behind left front tire. Right side same



Fig. 3-11 Location of the anti-freeze drain cock located at the bottom left on the radiator/cooler

Grease Fitting Locations

Use lithium-based grease on all grease fittings. **Figs. 3-13, 3-14**

Grease every 10 hours of operation (or daily)

1. Grease lift arm, lift and tilt cylinder pivots
2. Grease All-Tach™ attachment pivots

Cooling System Drain Procedures

Gehl 5640E/6640E and Mustang 2066/76/86 skid-steer loaders use a radiator cooler design to help keep the engine and hydraulic oil from overheating. Many procedures in this Service Manual require you to partially or fully drain the radiator cooler to perform those procedures.



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.)

Hydraulic Oil Drain Procedure

1. Place a 20-gallon (75,5 L) catch pan under the hydraulic oil drain plug behind the right rear tire. **Fig. 3-2**

2. Remove the drain plug and drain oil.
3. Replace the drain plug.

Engine Coolant Drain Procedure (Fig. 3-11)

1. Remove the rear belly pan underneath the chassis.
2. Place a 4-gallon (15,1 L) catch pan under the opening in the chassis.
3. Loosen anti-freeze drain cock on bottom left of the radiator and drain coolant fluid.
4. Retighten the drain cock.



Fig. 3-12 Location of the left chaincase oil fill plug. Right side same



Fig. 3-13 Grease fitting locations

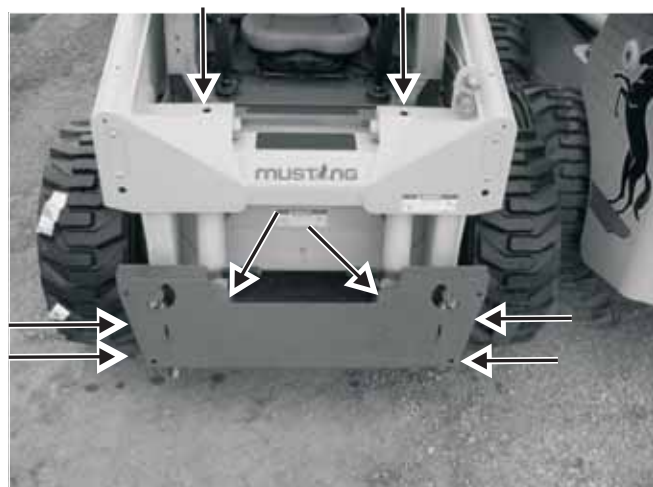


Fig. 3-14 Grease fitting locations

Introduction

Gehl 5640E/6640E and Mustang 2066/76/86 skid-steer loaders have a welded steel chassis. Maintenance, service and repair may be performed through standard access panels.

Two side cases 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 interlock switches.

Rollover & Falling Object - Protective Structure (ROPS/FOPS) Components

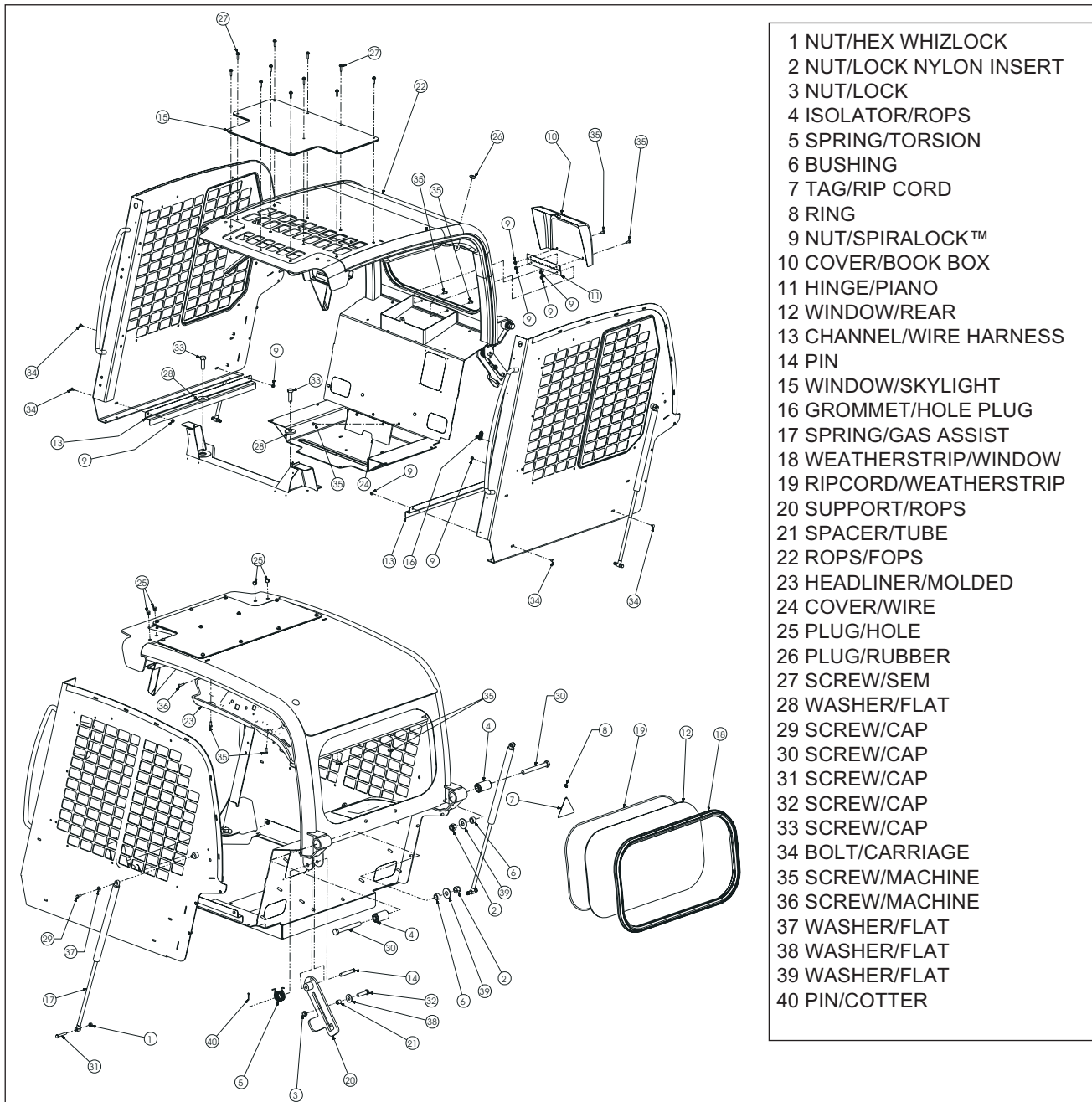


Fig. 4-1 Exploded view of ROPS/FOPS components

Engine Access Cover - Removal and Installation



WARNING

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

- ☐ It is recommended that this service procedure be performed by a certified Gehl or Mustang dealer mechanic.
- ☐ Shut off the engine.

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

Removal Procedure

1. Open engine access cover until gas spring is completely extended.
2. Disconnect the gas spring from engine access cover by removing gas spring clip at access cover end of gas spring, then pull gas spring off ball stud on access cover. **Fig. 4-2**
3. Remove two capscrews, spacers and washers on ROPS bolts securing access cover to frame. **Fig. 4-3**
4. Turn both ROPS bolts out until flush with welded tab, remove engine cover. **Figs. 4-4, 4-5**

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

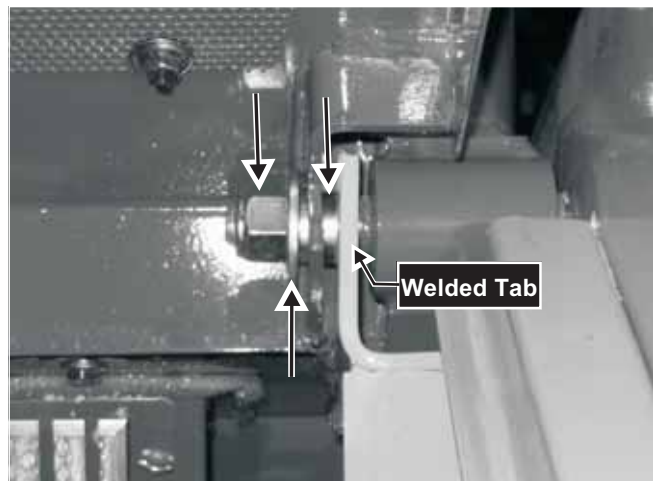


Fig. 4-3 Capscrew, spacer and washer to remove from the right ROPS bolt, left side same

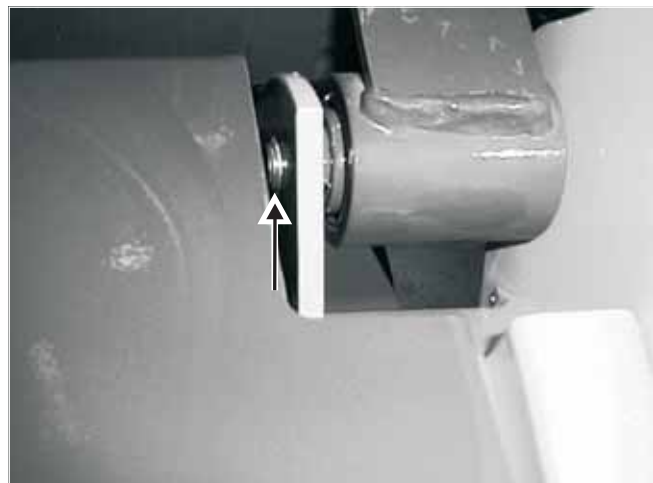


Fig. 4-4 ROPS bolt turned out just enough to release engine cover while still supporting the ROPS structure

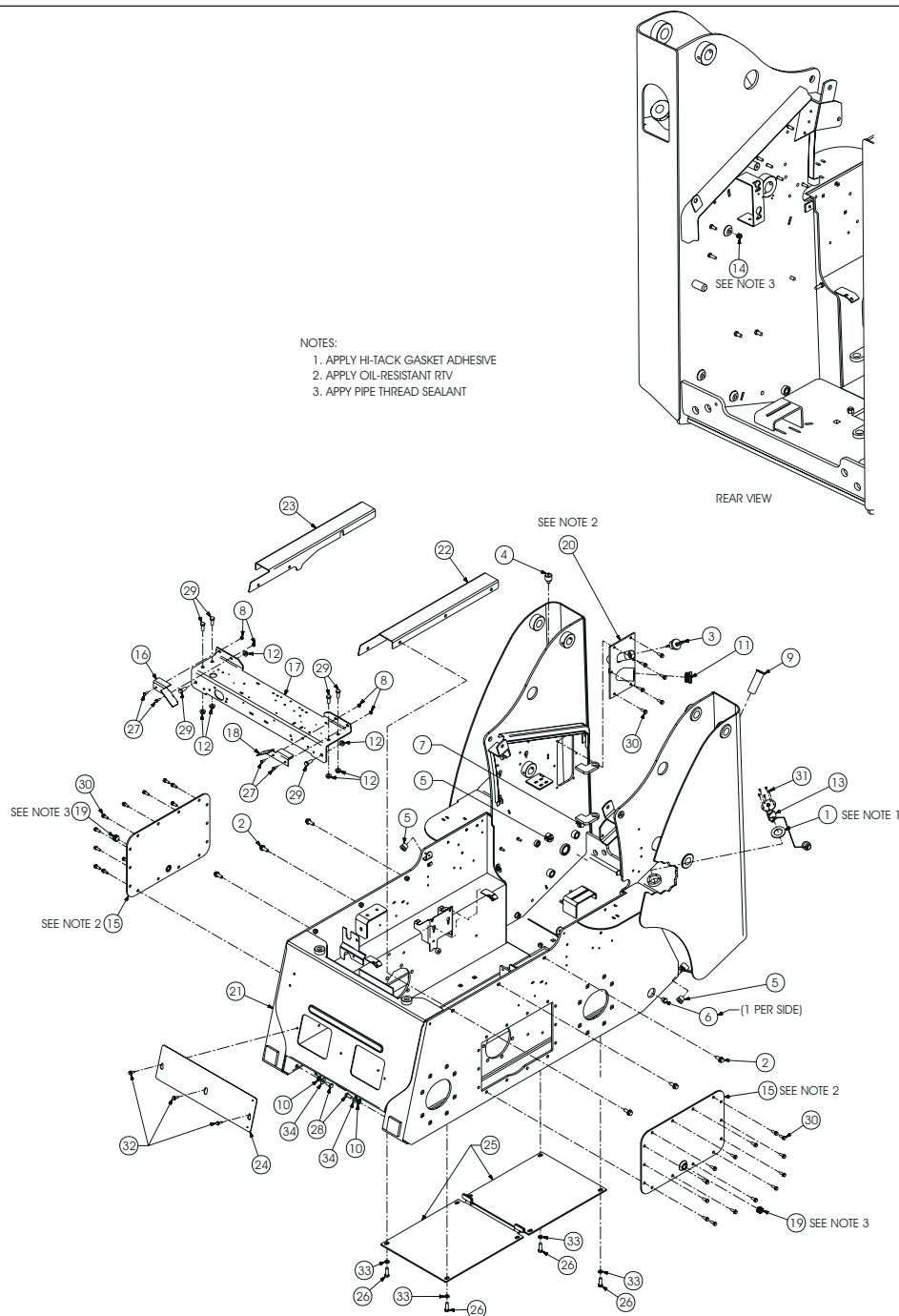


Fig. 4-2 View of the gas spring that supports the engine access cover



Fig. 4-5 View of ROPS bolt turned out just enough to release the engine access cover, but not enough to release the ROPS

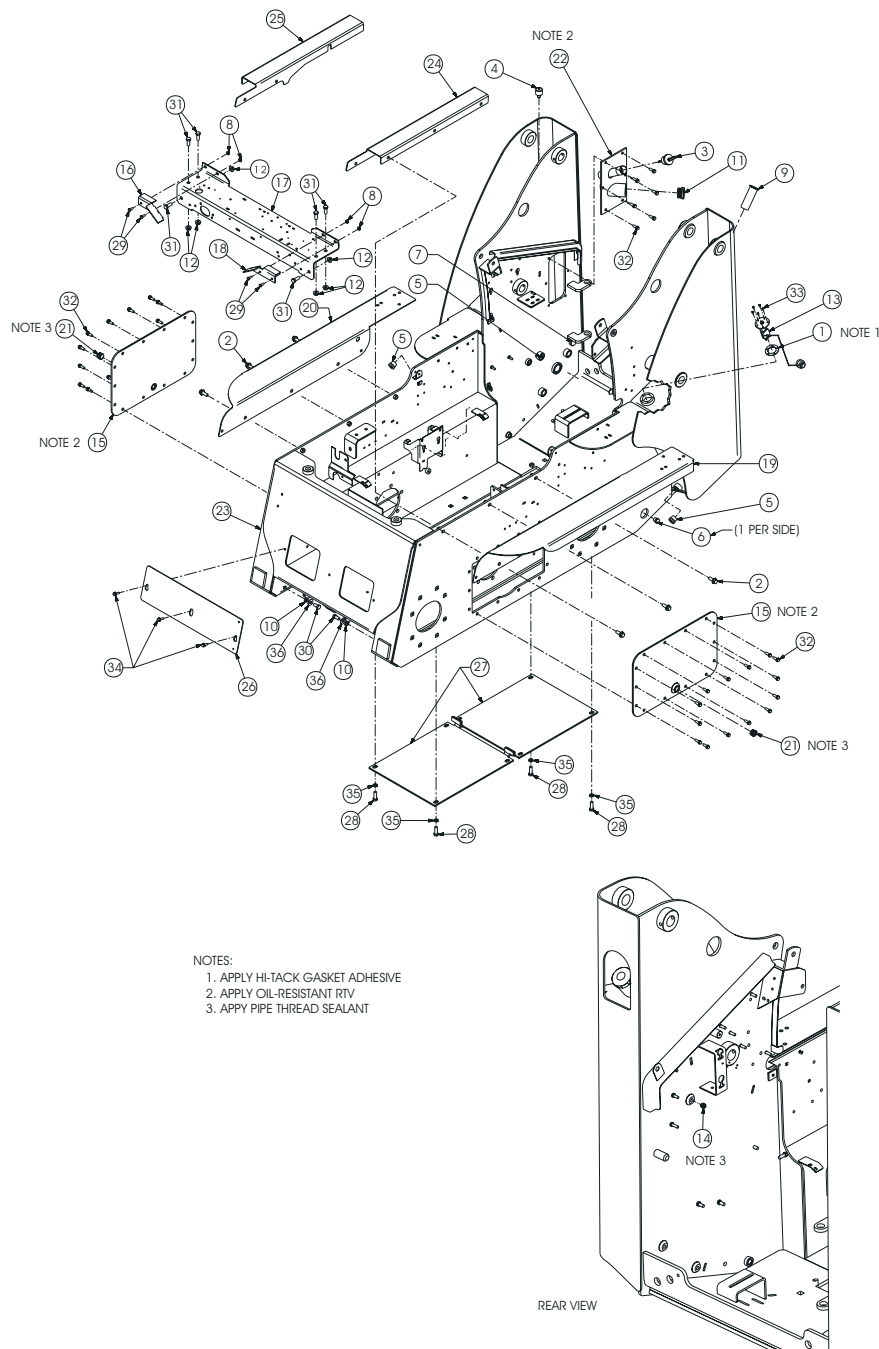
Chassis Components - 2066/76/86 Models



1 GASKET	10 WASHER/SEAL	19 PLUG/PIPE SOCKET	28 SCREW/CAP
2 SCREW/HEX	11 SIGHT PORT	20 RESERVOIR COVER	29 SCREW/CAP
3 RESERVOIR CAP	12 NUT/SPIRALOCK™	21 WELDMENT/CHASSIS	30 SCREW/MACHINE
4 BREATHER	13 FUEL SENSOR	22 ROPS FILLER	31 SCREW/MACHINE
5 PLUG	14 PLUG/HS	23 ROPS FILLER	32 SCREW/CAP TFS
6 PLUG	15 CHAINCASE COVER	24 COVER/TOEPLATE	33 WASHER/LOCK
7 PLUG	16 SEAT COVER RIGHT	25 BELLYPAN	34 WASHER/FLAT
8 NUT/SPIRALOCK™	17 CROSSMEMBER	26 SCREW/CAP	
9 STRAINER/FUEL	18 SEAT COVER LEFT	27 SCREW/CAP	

Fig. 4-6 Exploded view of the Mustang chassis

Chassis Components - 56/6640 Models



1 GASKET/FUEL SENDER	10 WASHER/SEAL	19 FENDER/LEFT	28 SCREW/CAP
2 SCREW/HEX	11 SIGHT PORT/OIL	20 FENDER/RIGHT	29 SCREW/CAP
3 CAP/RESERVOIR	12 NUT/SPIRALOCK™	21 PLUG/PIPE	30 SCREW/CAP
4 BREATHER/RESERVOIR	13 FUEL SENSOR/VDO	22 RESERVOIR COVER	31 SCREW/CAP
5 PLUG	14 PLUG/SCREW	23 CHASSIS	32 SCREW/MACHINE
6 PLUG	15 CHAINCASE COVER	24 ROPS FILLER	33 SCREW/MACHINE
7 PLUG	16 COVER/UNDER SEAT	25 ROPS FILLER	34 SCREW/CAP
8 NUT/SPIRALOCK™	17 PLATE/CROSS	26 COVER/TOEPLATE	35 WASHER/LOCK
9 STRAINER/FUEL FILL	18 COVER/UNDER SEAT	27 BELLYPAN	36 WASHER/FLAT

Fig. 4-7 Exploded view of the Gehl chassis

Control Cover Components - Hand and Foot

- 1 SUPPORT/BOOT BEZEL
- 2 SPACER
- 3 COVER/BOOT
- 4 COVER/PUMP
- 5 COVER/PANEL LEFT
- 6 COVER/PANEL RIGHT
- 7 LATCH/SWELL
- 8 STRIP/FOAM
- 9 PAD/INTERIOR SOUND
- 10 PLUG/HARNESS
- 11 CONTROL COVER
- 12 SCREW/MACHINE
- 13 SCREW/CAP TFS
- 14 SCREW/TAPPING TF
- 15 SCREW/TORX

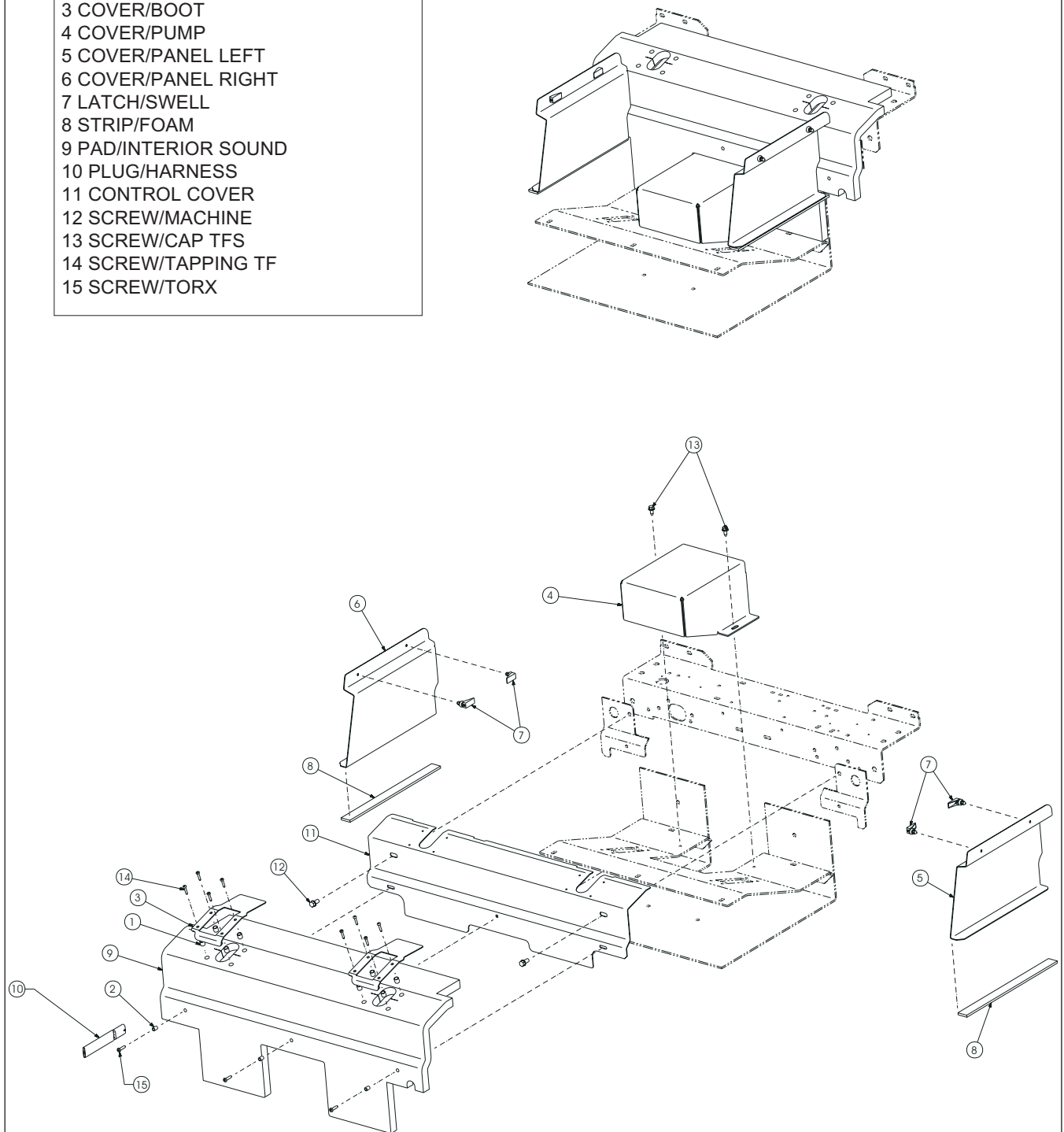


Fig. 4-8 Exploded view of the control covers

Control Cover Components - Dual Joystick

- 1 SPACER
- 2 WELDMENT/CONTROL COVER
- 3 PLATE/FLOOR FOOT
- 4 PLATE/FLOOR SUPPORT
- 5 SUBFLOOR/FRONT SUPPORT
- 6 COVER/PUMP
- 7 COVER/PANEL LEFT
- 8 LATCH/SWELL
- 9 STRIP/FOAM
- 10 WELDMENT/FOOT SUPPORT
- 11 PAD/INTERIOR SOUND
- 12 COVER/PANEL RIGHT
- 13 HARNESS/THROTTLE
- 14 SCREW/MACHINE
- 15 SCREW/THREAD FORMING
- 16 SCREW/TORX HEAD

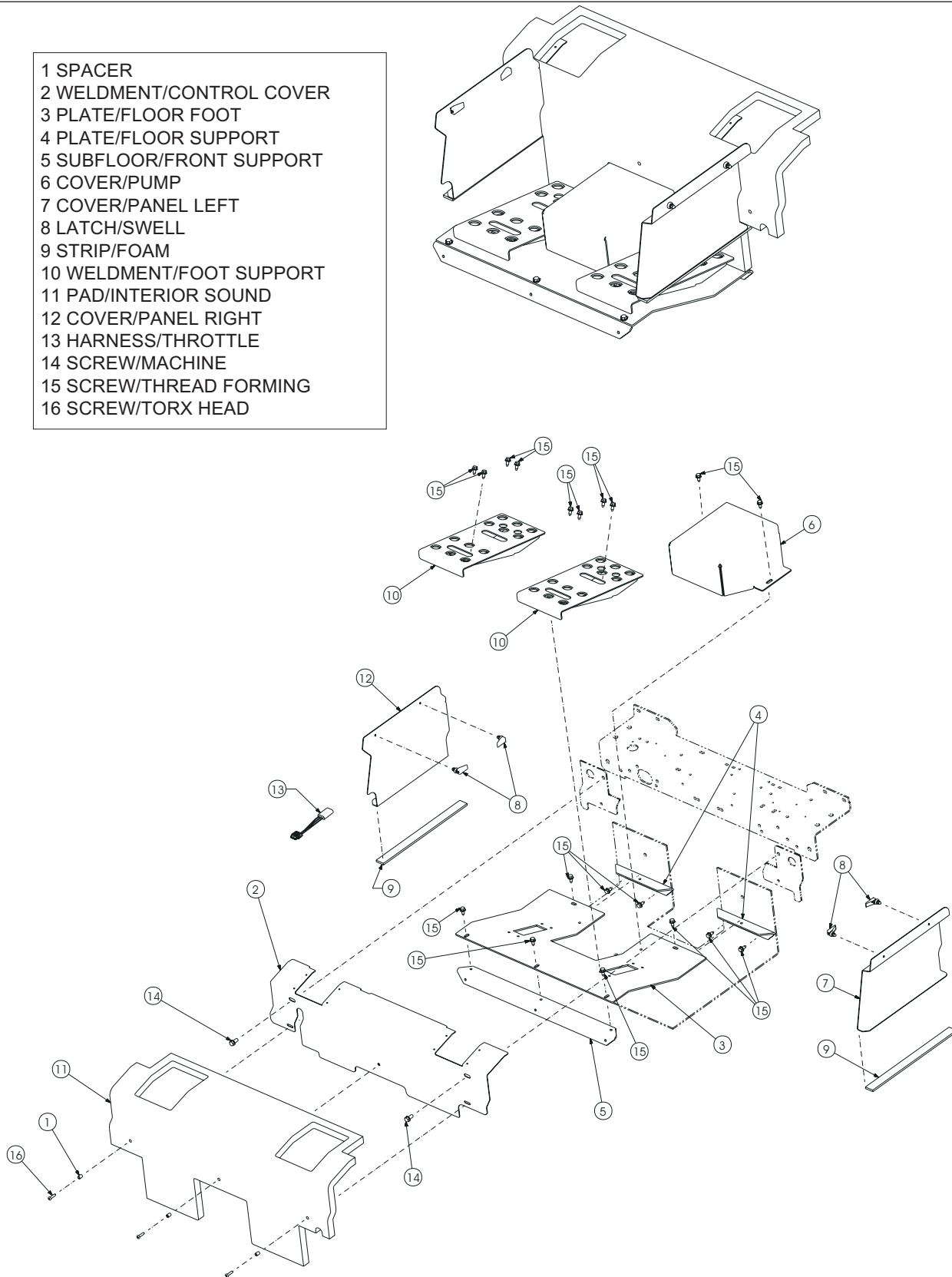


Fig. 4-9 Exploded view of the control covers

Control Cover Components - T-Bar - 56/6640 Models

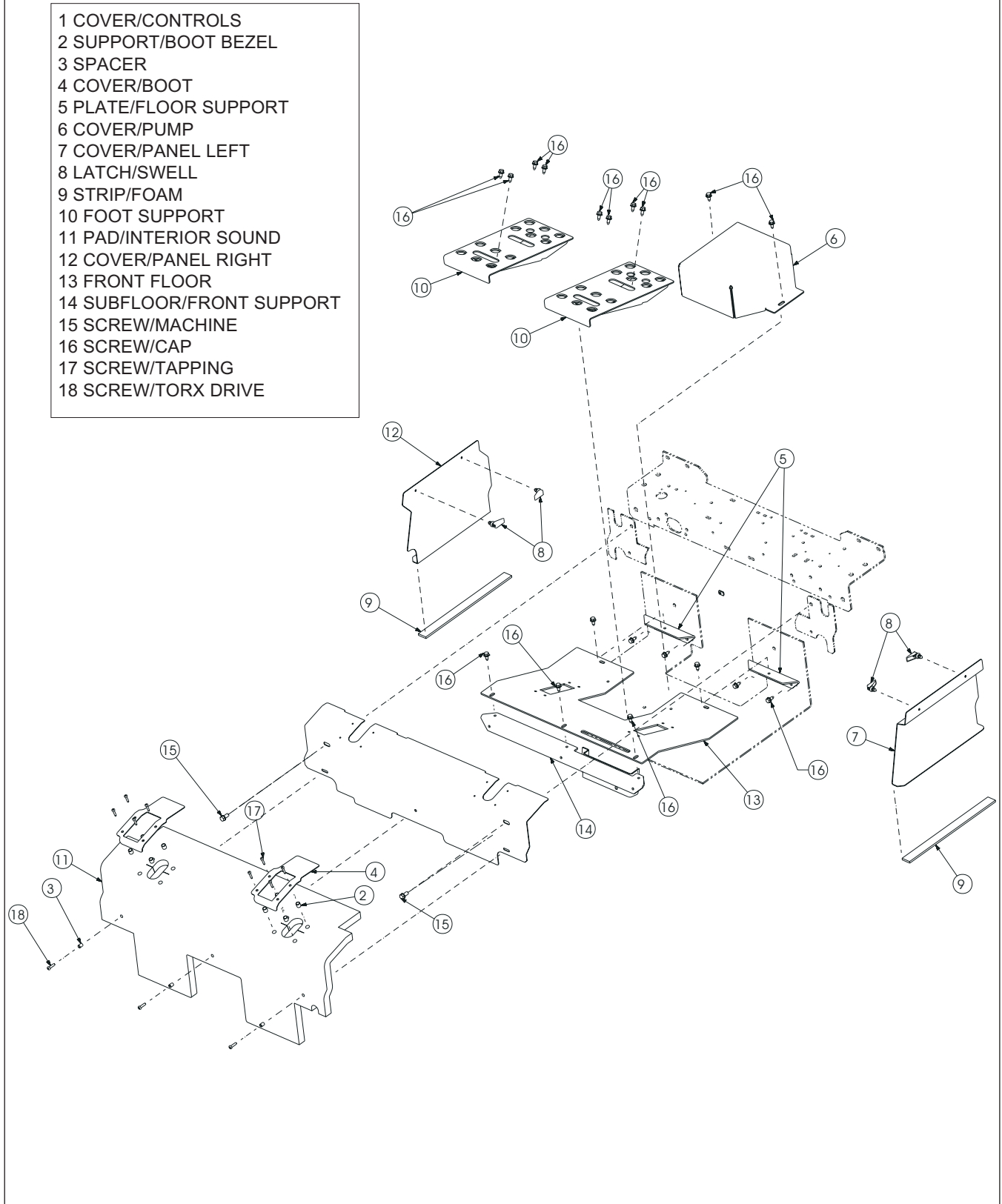
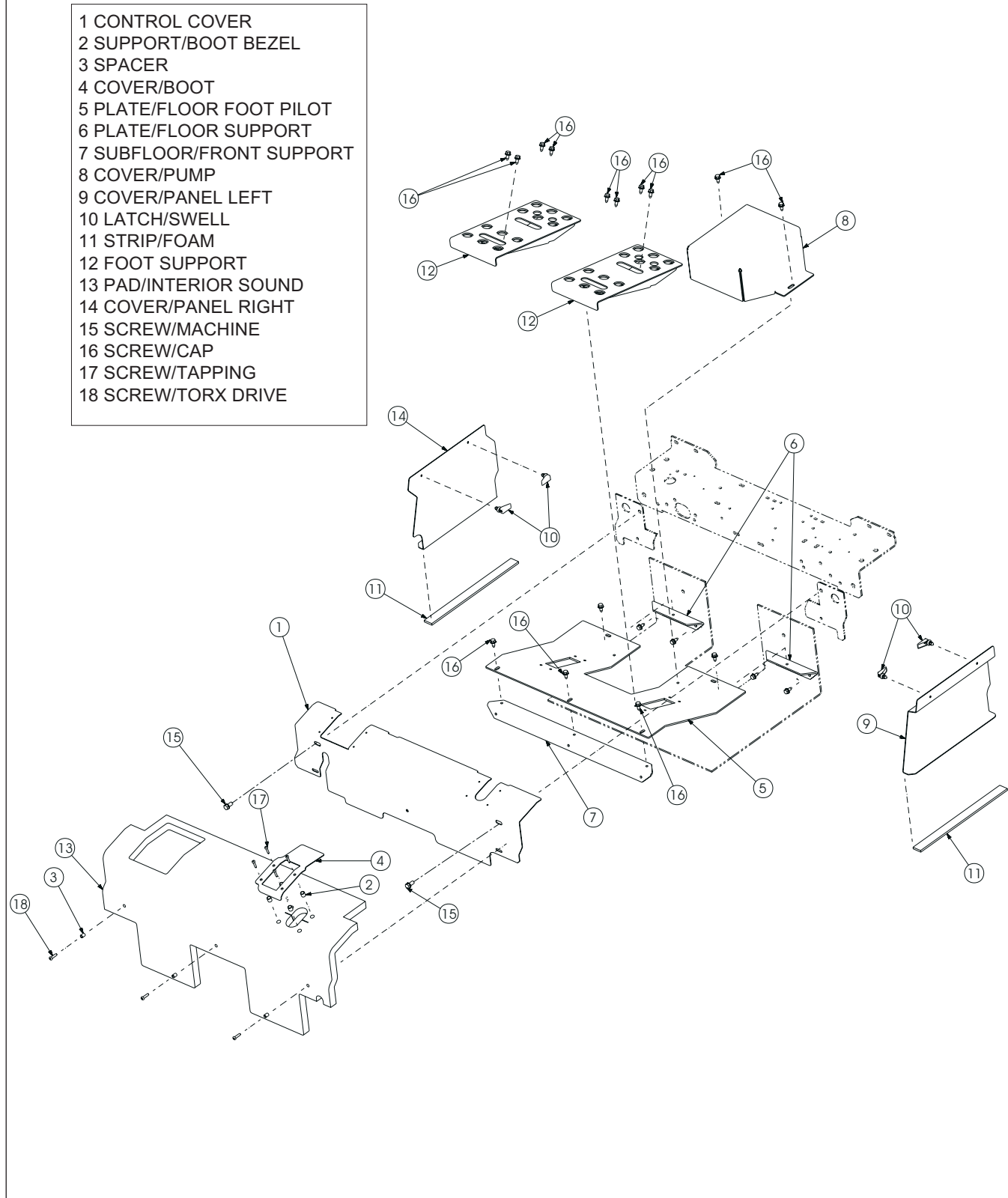


Fig. 4-10 Exploded view of the control covers

Control Cover Components - T-Bar/ Joystick - 56/6640 Models**Fig. 4-11** Exploded view of the control covers

NOTES

ROPS Removal and Installation

WARNING

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

- ☐ Shut off the engine.

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

Removal Procedure

1. Remove the engine access cover per the procedure in this chapter.
2. Disconnect negative (-) battery cable from battery.
3. Disconnect instrument panel wiring harness connector at harness bulkhead attached to chassis bracket. **Fig. 4-12**
4. Raise the ROPS per the procedure found in the *Safety* chapter.
5. With the ROPS rolled and locked back, attach a hoist so that it is supporting the weight of the ROPS.

WARNING

The hoist **MUST BE** situated precisely above the ROPS, or else performing the following steps may cause the ROPS to swing as the bolts are removed. This could cause serious bodily injury and/or damage the loader.

6. Remove one capscrew and flat washer securing each gas spring to the ROPS. **Fig. 4-13**
7. Disassemble ROPS lock mechanism by removing cotter pin, torsion spring and pin. Remove limiter assembly from ROPS. **Fig. 4-14**
8. On each side, carefully remove capscrew securing ROPS pivot to frame. **Figs. 4-1, 4-3**
9. Lift the ROPS off the loader.

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

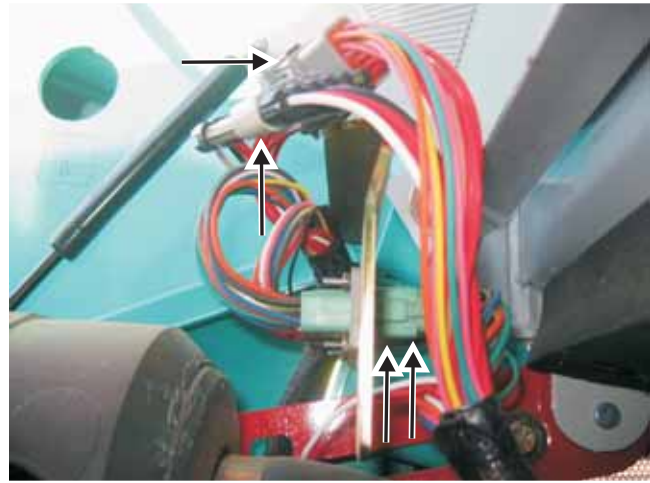


Fig. 4-12 The harness bulkhead is where the engine harness assembly meets the instrument panel harness. Remove instrument panel harness at front of bulkhead.

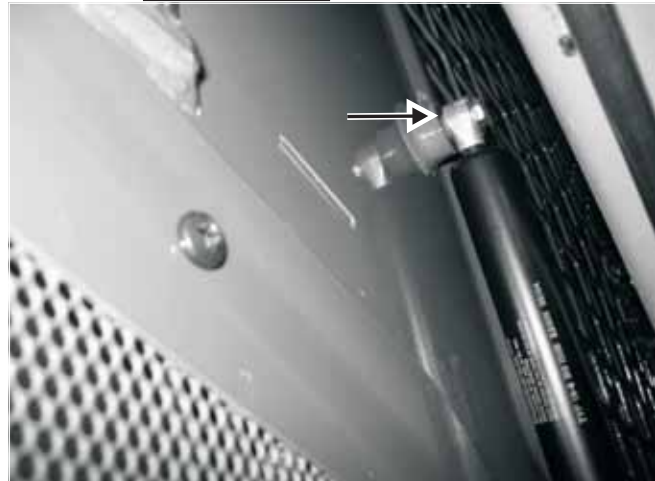


Fig. 4-13 Gas spring attached to ROPS, one on each side

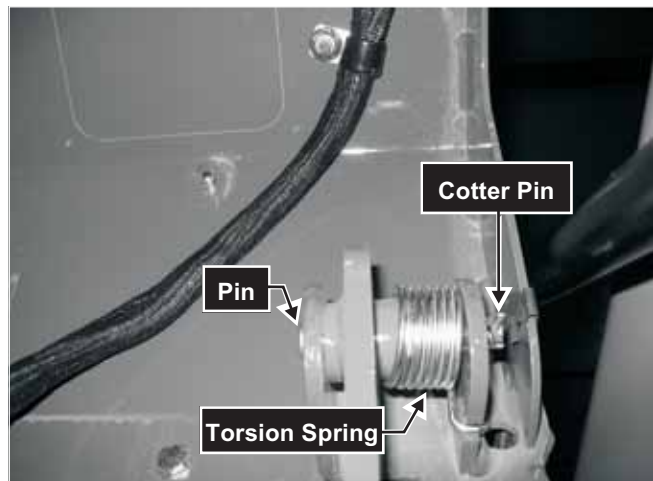
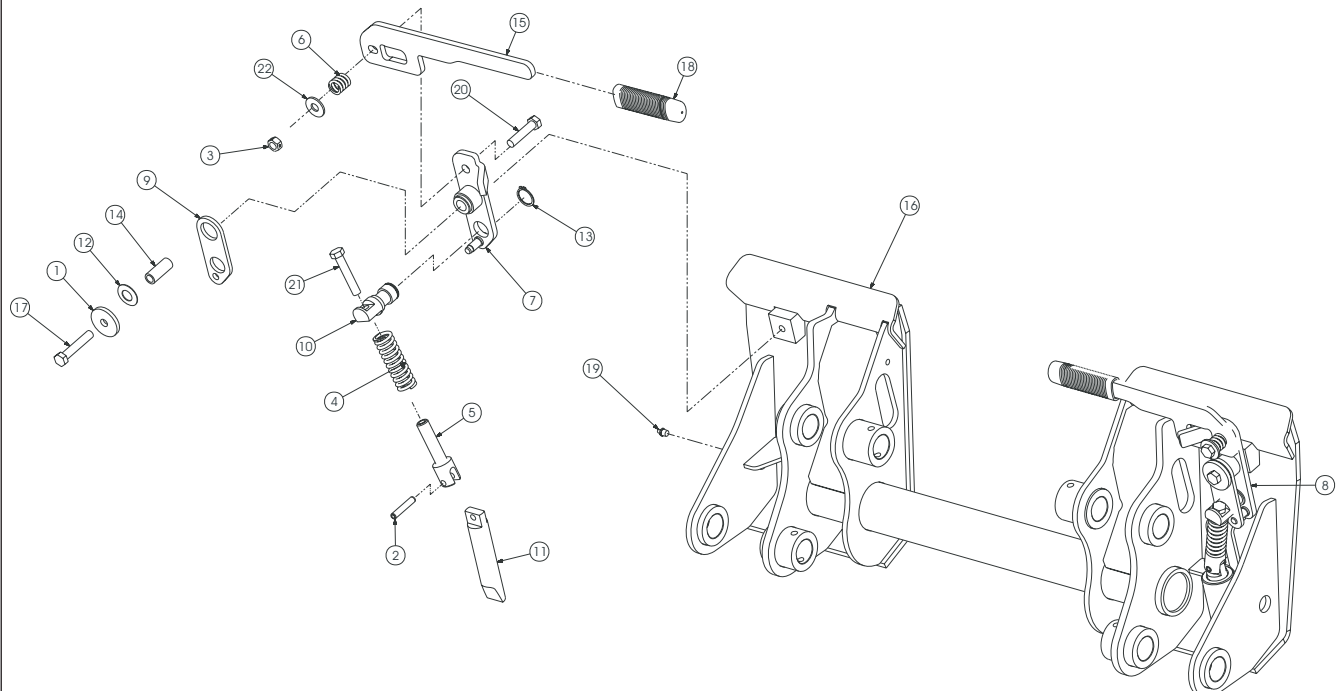


Fig. 4-14 ROPS lock mechanism

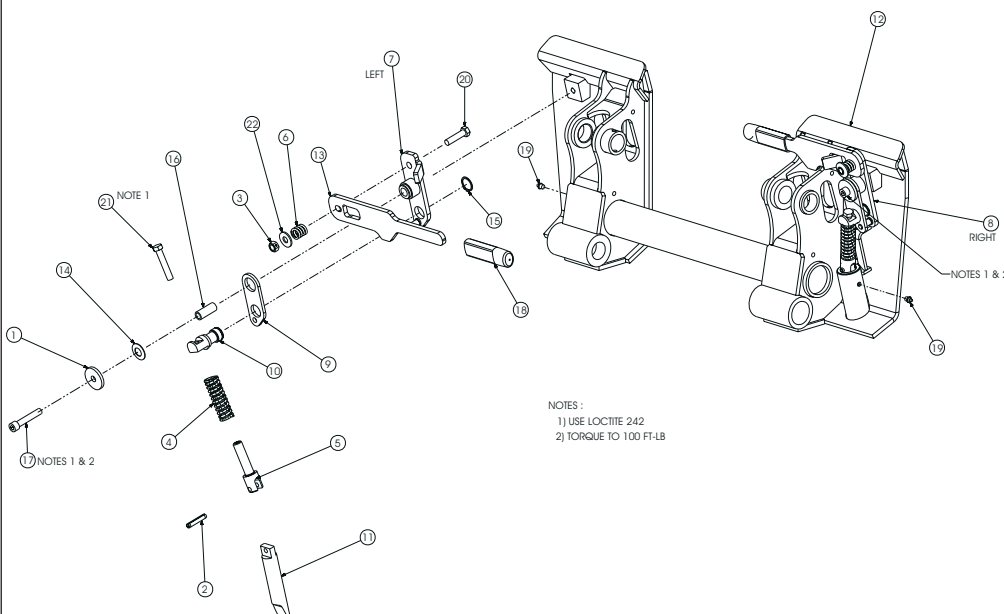
All-Tach™ Hitch Components - 2066/76/86 Models

1 WASHER/FLAT
2 PIN/SPRING
3 NUT/LOCK
4 SPRING
5 ADAPTOR/ROD
6 SPRING

7 LINK/LATCH LEFT
8 LINK/LATCH RIGHT
9 PLATE/LATCH LINK
10 ADAPTOR/PUSH ROD
11 PIN/LATCH
12 WASHER/BEVEL

13 RING/RETAINING
14 SPACER
15 HANDLE
16 FAST-A-TACH™
17 SCREW/CAP
18 GRIPS

19 FITTING/GREASE
20 SCREW/CAP
21 SCREW/CAP
22 WASHER/FLAT

All-Tach™ Hitch Components - 56/6640 Models

1 WASHER/FLAT
2 PIN/SPRING
3 NUT/LOCK
4 SPRING
5 ROD/PUSH
6 SPRING
7 LINK/LATCH
8 LINK/LATCH
9 PLATE/LATCH LINK
10 ADAPTOR/ROD
11 PIN/LATCH
12 ALL-TACH®
13 HANDLE
14 WASHER/BEVEL
15 RING/RETAINING
16 SPACER
17 SCREW/CAP
18 GRIPS
19 FITTING/GREASE
20 SCREW/CAP
21 SCREW/CAP
22 WASHER/FLAT

NOTES :
1) USE LOCTITE 242
2) TORQUE TO 100 FT-LB

Fig. 4-15 Exploded view of the All-Tach™ hitches

Control Cover/Floor Cover Removal and Installation

The control cover may be removed for access to handle assemblies and connections to control rods.



WARNING

BEFORE beginning this Service procedure, perform the following **SAFETY** procedures:

- ☐ 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. On both left and right sides, remove three screws securing the fender and ROPS filler on 56/6640 units or just the ROPS filler on 2066/76/86 units. **Fig. 4-16**
2. Remove the two panels (right and left) on both sides of the control cover area by releasing their swell latches. **Fig. 4-17**
3. Remove three screws with their spacers at front of sound pad and carefully remove the sound pad, up and over the control handles. **Fig. 4-18**
4. Remove eight screws securing front two boot flanges to the control cover. **Fig. 4-19**
5. Remove two screws that secure the control cover to the welded frame tab. Remove two screws that secure floor cover to chassis.
6. Remove either cover at this time. **Fig. 4-20**

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

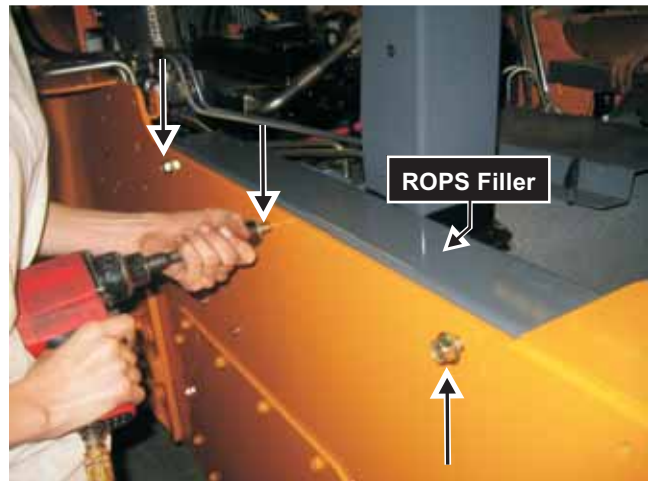


Fig. 4-16 Location of three screws securing ROPS filler

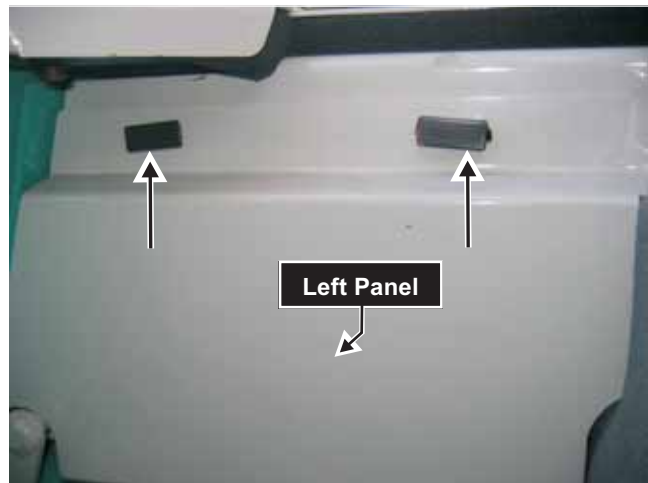


Fig. 4-17 Location of swell latches securing the left side panel in the foot area of the ROPS, right side is the same



Fig. 4-18 Location of one of three screws securing the sound pad to the control cover

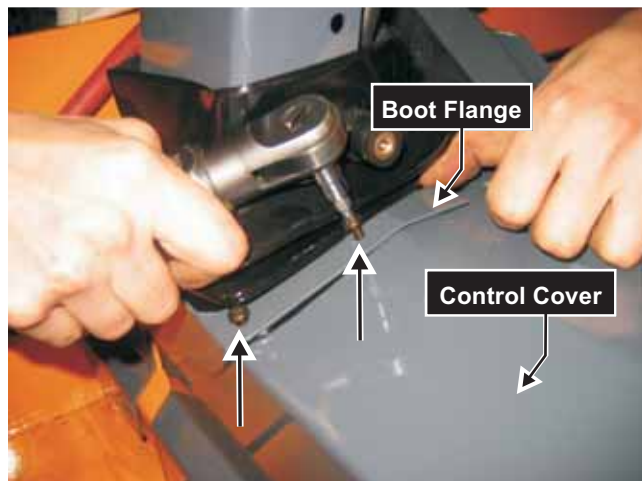


Fig. 4-19 The front boot flanges secure the rubber boots to the control cover. There are four screws to remove the boot flange.



Fig. 4-20 The control cover removed from the skid-steer loader

NOTES

Crossmember Removal and Installation

The crossmember can be removed as a complete unit with the control handles to facilitate work on the hydraulic/hydrostatic tandem pump found beneath it or to perform work on the control handles.

Removal Procedure

WARNING

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

- ☐ 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.)

1. Remove the control cover per the procedure found in this chapter.
2. **Hand/Foot, T-Bar and T-Bar/Joystick:** Underneath the crossmember, find the two wheel drive control rods connecting the pivot tube to the top of the hydrostatic pump at the pump control arms. Disconnect both control rods at the pivot tube. **Fig. 4-21**
3. Dual Joysticks:
 - a. **Right Control Handle:** Disconnect four hose lines at the control valve (two front, two rear), and two more hoses at the manifold. **Figs. 4-22, 4-23, 4-24**
 - b. **Left Control Handle:** Disconnect four hose lines at the top of the hydrostatic pump, and two more hoses, one on each side of the hydrostatic pump. **Fig. 4-25**

NOTE: To prevent contamination, ALWAYS clean the area around the hydraulic fittings before disconnecting any hydraulic plug, hose or tube.

NOTE: To aid in the correct reassembly of the hydraulic hoses, mark the hoses to be removed **BEFORE** removal in step 3.

4. Disconnect any electrical connectors attached to the control handles. **Fig. 4-26**



Fig. 4-21 Disconnect wheel drive control rods at pivot tube on hand/foot, t-bar and t-bar/joystick units

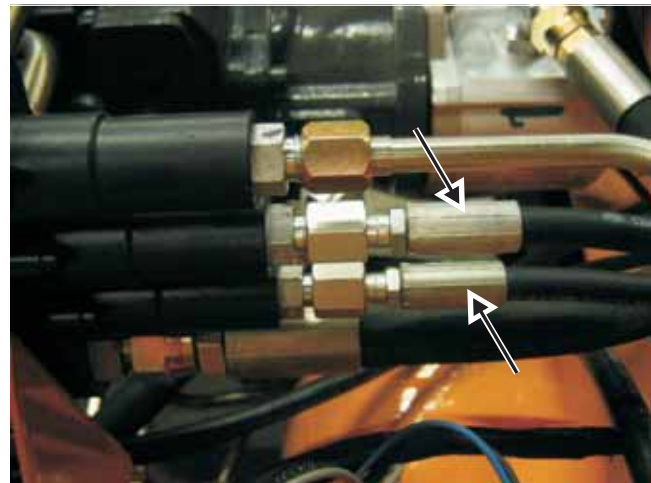


Fig. 4-22 Location of two hose lines at front of the control valve joined to the right dual joystick control handle



Fig. 4-23 Location of two hose lines at rear of the control valve joined to the right dual joystick control handle

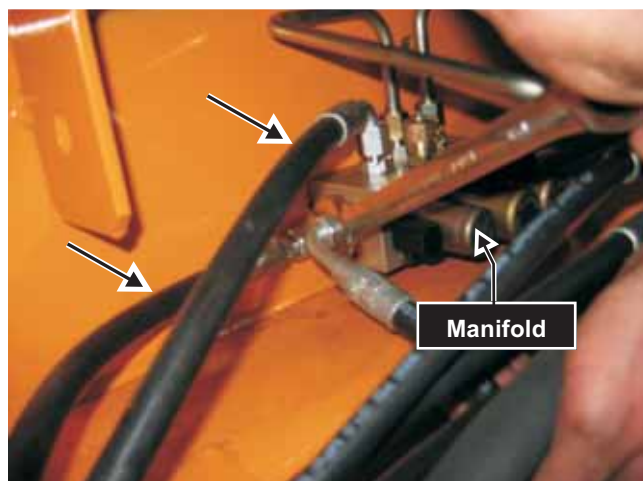


Fig. 4-24 Location of two hoses connected at the other end of the right dual joystick control handle at the manifold

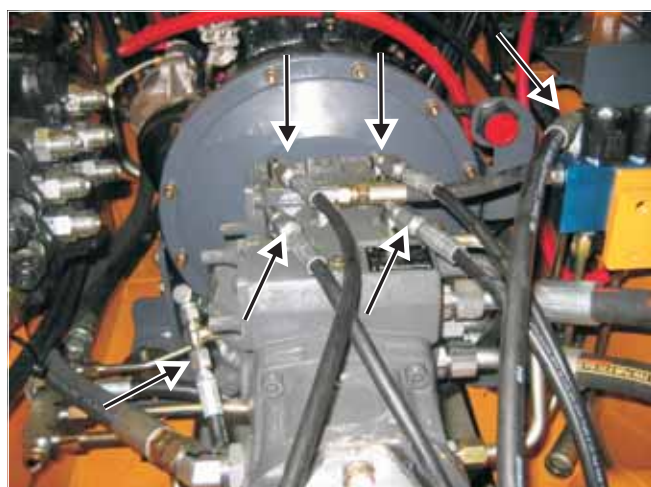


Fig. 4-25 Six hoses to remove at the hydrostatic pump joined to the left dual joystick control handle



Fig. 4-26 Left control handle electrical connector underneath the crossmember, right side same

5. Remove six locking capscrews securing the crossmember to the chassis. **Fig. 4-27**
6. With an assistant's help, carefully lift the crossmember out of the chassis.

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

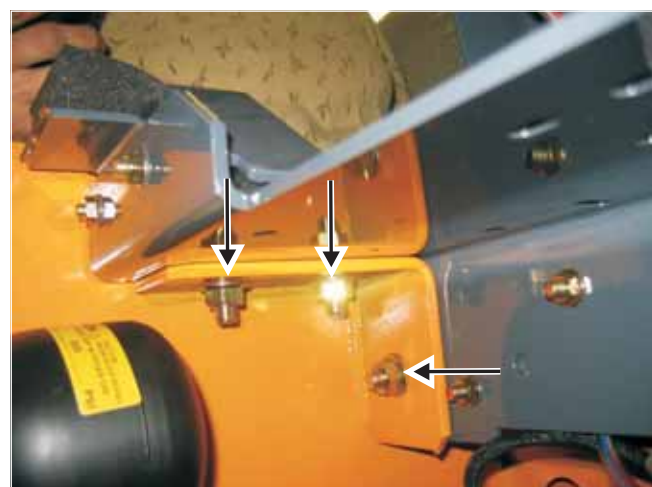


Fig. 4-27 Three capscrews securing crossmember on left side, right side same

Rear Grille Removal and Installation

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

Removal Procedure

1. Open the engine access cover and swing the rear grille fully open.
2. Disconnect the rear grille electric lights at the connector. **Fig. 4-28**
3. Remove lock pin from its storage position and set it to keep rear grille from closing. **Fig. 4-29**
4. Remove one capscrew, washer, and locknut that fasten the grille to the chassis. **Fig. 4-30**
5. Support the rear grille with a suitable hoist and lift the rear grille off its mounts.

Installation Procedure - Reverse the removal steps

Rear Grille Latch Removal and Installation

Removal Procedure

1. Open rear grille and lock open with lock pin. **Fig. 4-29**
2. Remove two locknuts securing latch to rear grille. **Fig. 4-31**
3. Maneuver the handle rod out of the tab welded to the rear grille and remove the latch assembly.

Installation Procedure - Reverse the removal steps



Fig. 4-28 Location of the rear grille lights connector



Fig. 4-29 Rear grille lock pin shown in its storage position. The hole visible in the welded tab in front of the pin keeps the rear grille from closing.

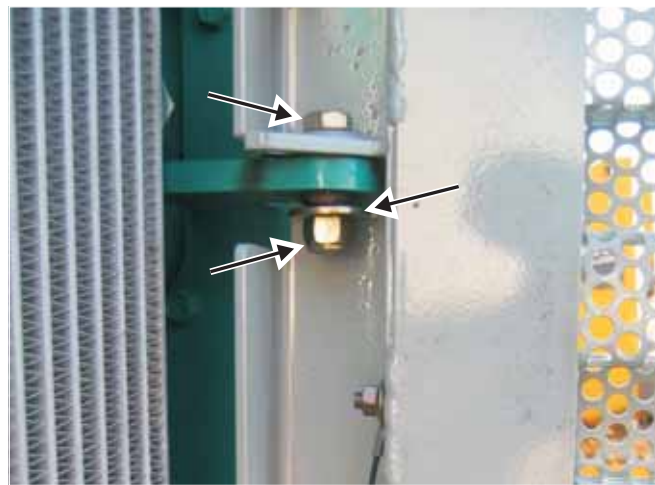
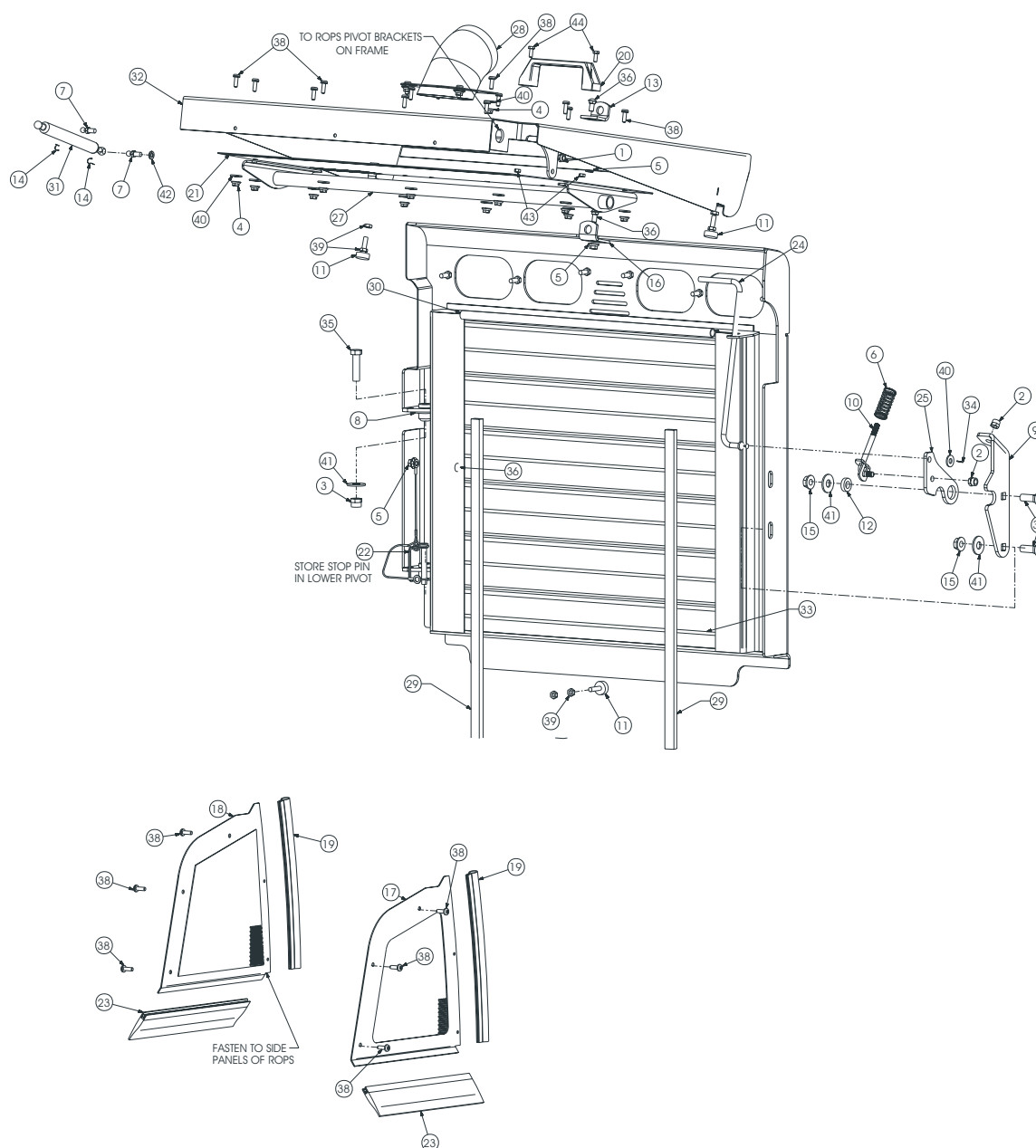


Fig. 4-30 Location of hardware fastening the rear grille to the chassis



Fig. 4-31 Location of hardware securing the rear grille latch assembly to the rear grille

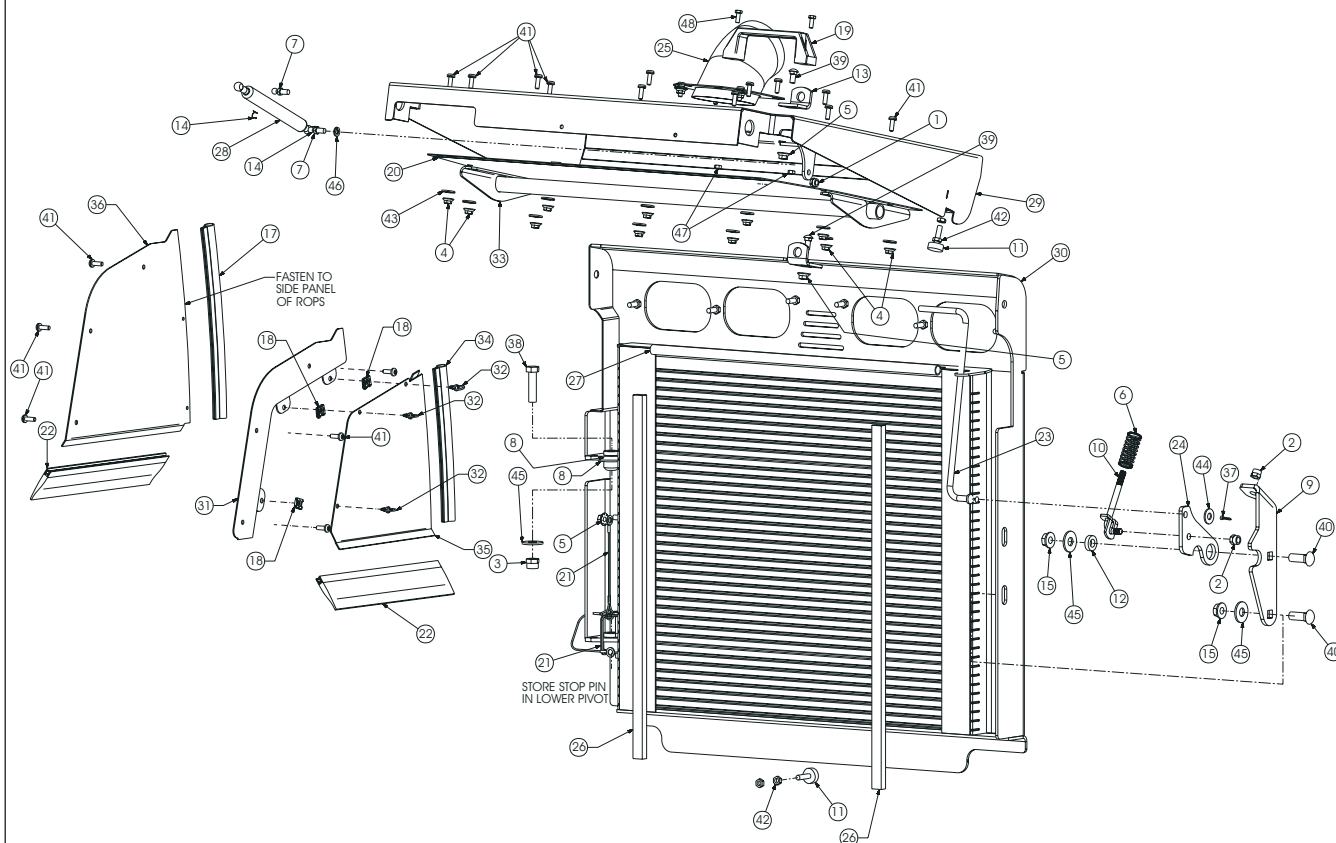
Rear Grille and Engine Cover Components - 2066/76/86



1 NUT/HEX WHIZLOCK	12 BUSHING	23 SEAL/EDGE	34 PIN/COTTER
2 NUT/HEX	13 BRACKET	24 ROD/HANDLE	35 SCREW/CAP
3 NUT/HEX	14 CLIP/GAS SPRING	25 LATCH/REAR DOOR	36 BOLT/CARRIAGE
4 NUT/LOCK	15 NUT/SPIRALOCK™	26 SEAL/BULB	37 BOLT/CARRIAGE
5 NUT/LOCK	16 BRACKET	27 TORSION BAR	38 SCREW/MACHINE
6 SPRING/COMPRESS	17 COVER LEFT	28 TUBE/EXHAUST	39 NUT/JAM
7 STUD/BALL	18 COVER RIGHT	29 SEAL/FOAM	40 WASHER/FLAT
8 WASHER/FLAT	19 SEAL/BULB	30 SEAL/BULB	41 WASHER/FLAT
9 MOUNT/LATCH	20 HANDLE/GRAB	31 GAS SPRING	42 WASHER/LOCK
10 ASSY/LATCH ROD	21 SCREEN	32 COVER/ENGINE	43 NUT/HEX
11 BUMPER	22 PIN/LOCK	33 REAR GRILLE	44 SCREW/CAP

Fig. 4-32 Exploded view of the rear grille and engine cover

Rear Grille and Engine Cover Components - 56/6640



1 NUT/HEX	17 SEAL/BULB	33 TORSION BAR
2 NUT/HEX	18 RECEPTACLE/CLIP ON	34 SEAL/BULB
3 NUT/HEX	19 HANDLE/GRAB	35 COVER/SIDE
4 NUT/LOCK	20 SCREEN	36 COVER/SIDE
5 NUT/LOCK	21 PIN/LOCK	37 PIN/COTTER
6 SPRING	22 SEAL/EDGE	38 SCREW/CAP
7 STUD/BALL	23 ROD/HANDLE	39 BOLT/CARRIAGE
8 WASHER/FLAT	24 LATCH/REAR DOOR	40 BOLT/CARRIAGE
9 MOUNT/LATCH	25 TUBE/EXHAUST SHROUD	41 SCREW/MACHINE
10 LATCH ROD	26 SEAL/FOAM	42 NUT/JAM
11 BUMPER	27 SEAL/BULB	43 WASHER/FLAT
12 BUSHING	28 GAS SPRING	44 WASHER/FLAT
13 BRACKET	29 COVER/ENGINE	45 WASHER/FLAT
14 CLIP/GAS SPRING	30 REAR GRILLE	46 WASHER/LOCK
15 NUT/SPIRALOCK™	31 SIDE COVER	47 NUT/HEX
16 BRACKET	32 STUD	48 SCREW/CAP

Fig. 4-33 Exploded view of the rear grille and engine cover

Introduction

This chapter covers removal, installation, assembly, and adjustment procedures for standard and optional control equipment on Gehl 5640E/6640E and Mustang 2066/76/86 skid-steer loaders.

Equipment Identification

Because there are a variety of options available for 2066/76/86 models, it is IMPORTANT to properly identify equipment BEFORE beginning service procedures. Illustrations and photographs are provided with procedures to aid in servicing this equipment.

Hand/Foot Controls

On loaders with "Hand/Foot controls," left and right drive control handles operate independently of each other. Pushed forward together moves the loader forward, but push either one further forward than the other and the loader turns. Separate foot pedals control lift and tilt functions of lift arm and bucket. Engine speed is controlled with hand throttle dial located in the right instrument panel. A yellow rocker switch in the right control handle controls standard auxiliary hydraulics in tandem with a lock-on (red) button switch. On high-flow models, a rocker switch in the right instrument panel activates high-flow hydraulics.

Dual Joystick Controls

On loaders with "Dual Joystick controls," the left control handle operates the drive wheels. The right control handle operates lift and tilt functions of the lift arm and bucket. Engine speed is controlled with a foot throttle pedal and dial in the right instrument panel. A yellow rocker switch in the right control handle controls standard auxiliary hydraulics in tandem with a lock-on (red) button switch. On high-flow models, a rocker switch in the right instrument panel activates high-flow hydraulics.

T-Bar/Joystick Controls

On skid-steer loaders with "T-Bar/Joystick controls," the right joystick handle controls the lift and tilt functions of the lift arm and bucket and the left T-Bar operates the wheel drives for both sides of the skid-steer loader. Engine speed is controlled with a foot throttle pedal and dial in the right instrument panel. A yellow rocker switch in the right control handle controls standard auxiliary hydraulics in tandem with a lock-on (red) button switch. On high-flow models, a rocker switch in the right instrument panel activates the high-flow hydraulics.

T-Bar Controls

On skid-steer loaders with "T-Bar controls," the left T-Bar operates the wheel drives and pumps for both sides of the skid-steer loader. The right T-Bar controls the lift and tilt functions of the lift arm and bucket. Engine speed is controlled with a foot throttle pedal and dial in the right instrument panel. Standard-flow auxiliary hydraulics is controlled by a foot pedal. On high-flow models, a rocker switch in the right instrument panel activates the high-flow hydraulics.

Float Control

The float control on skid-steer loaders is controlled by a momentary button switch in the right control handle and lights a panel light.

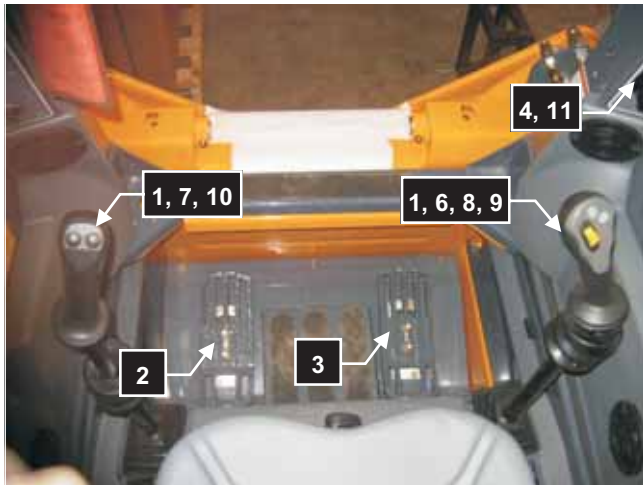
Two-Speed Control (Optional)

Skid-steer loaders have a high and low speed setting. It is controlled by a button switch in left control handle and lights a panel light in the left instrument panel.

Hydraglide™ Ride Control

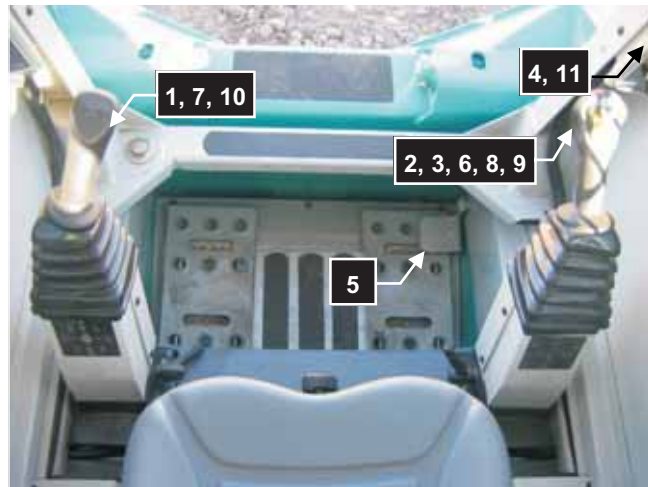
The Hydraglide™ Ride Control is controlled by a button switch in right control handle and lights a panel light in the left instrument panel.

Hand/Foot Controls



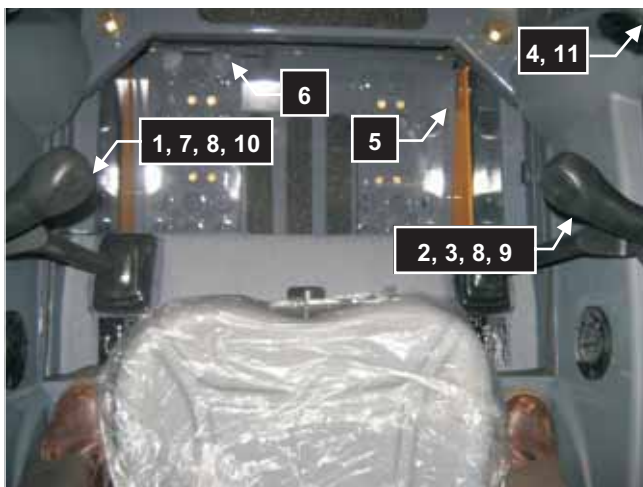
- 1 - Drive Control
- 2 - Lift Control
- 3 - Tilt Control
- 4 - Hand Throttle
- 5 - Foot Throttle
- 6 - Standard Auxiliary Hydraulics Control

Dual Joystick Controls



- 7 - Two-Speed Button Switch (optional)
- 8 - Hydraglide™ Ride Control Switch
- 9 - Float Control Switch
- 10 - Horn Button Switch
- 11 - High-Flow Auxiliary Hydraulics Control

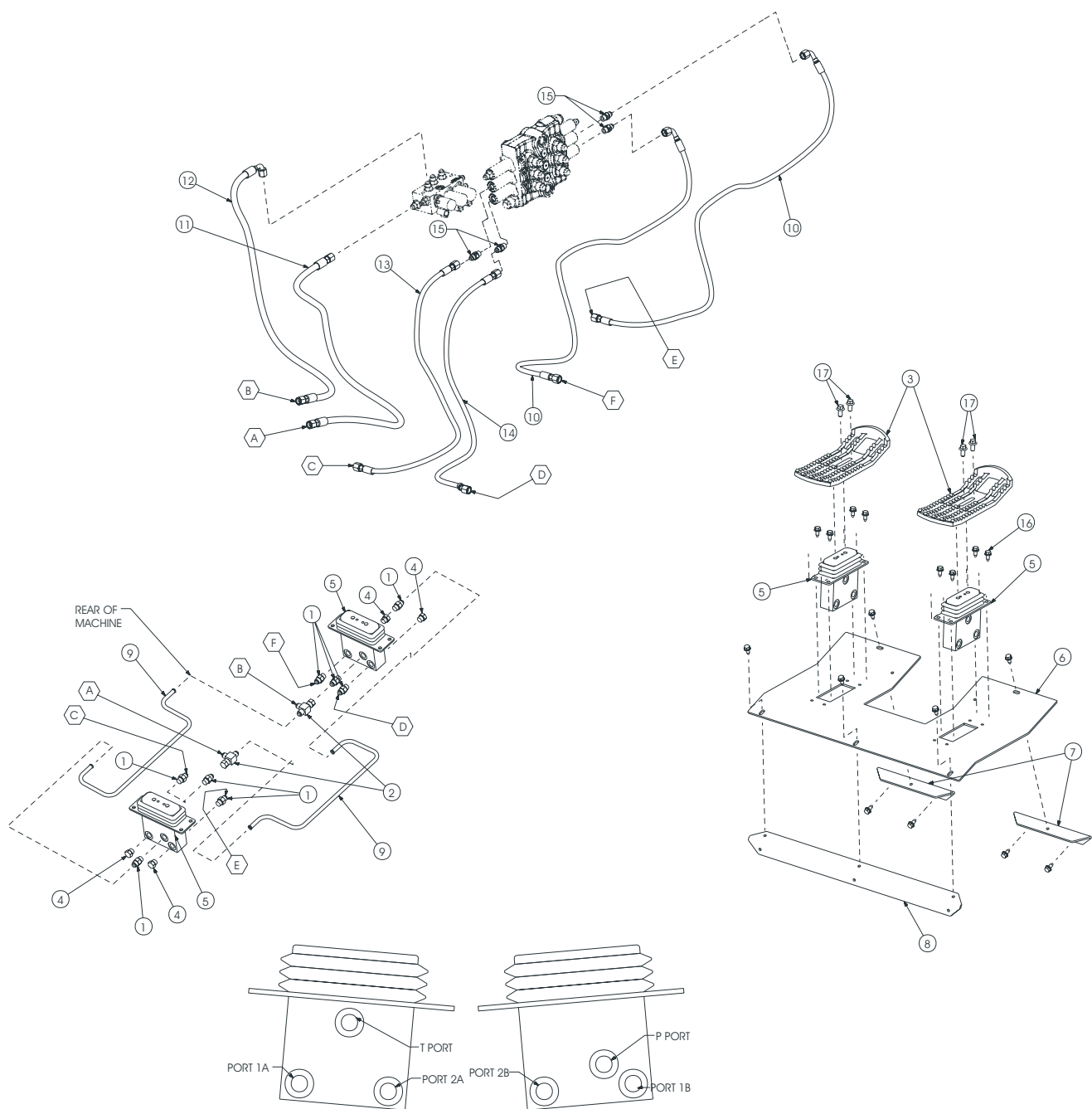
T-Bar Controls



T-Bar/Joystick Controls



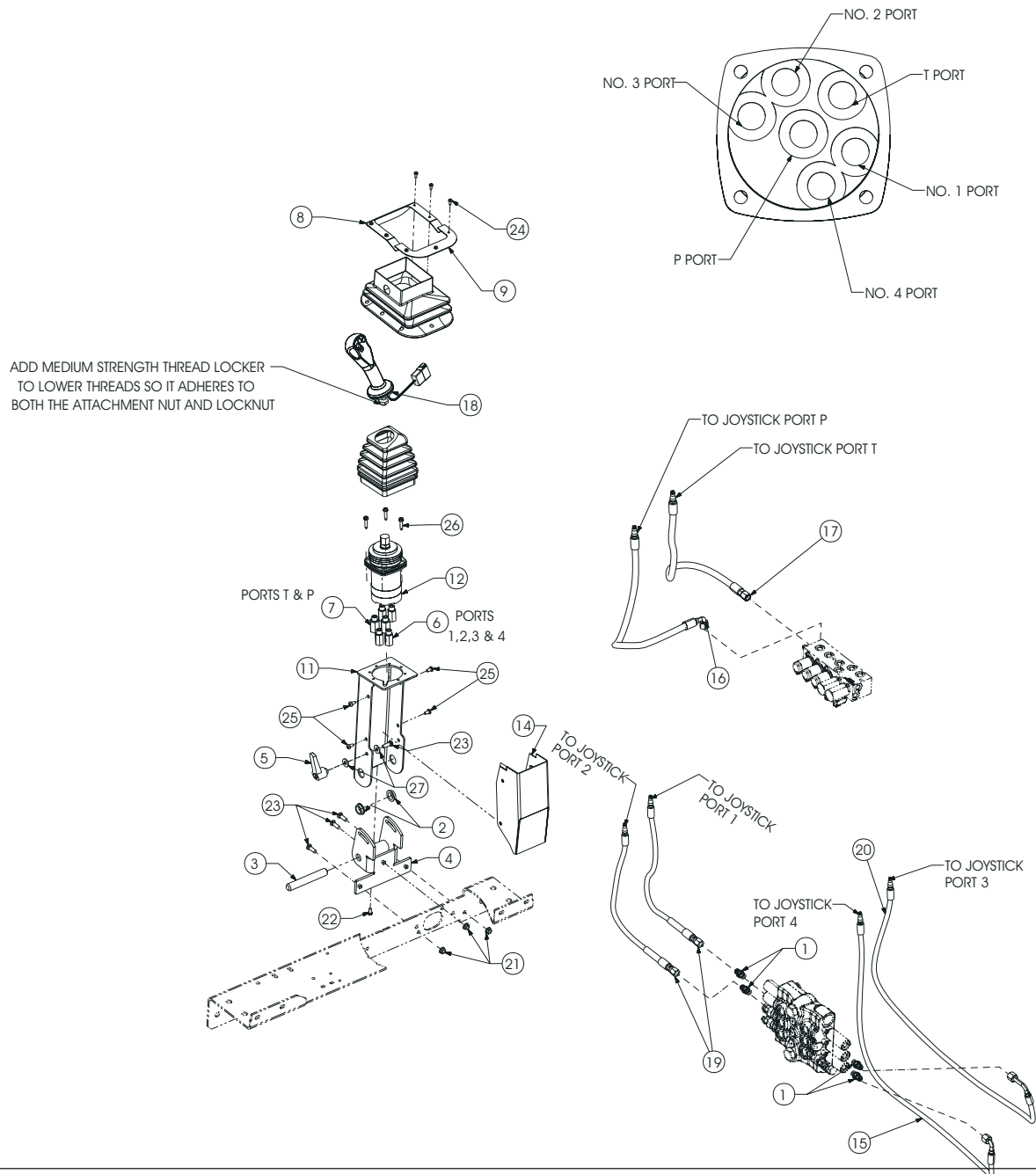
Lift and Tilt Components - Hand/Foot Control Models



- | | | |
|--------------------------|--------------------------|------------------------|
| 1 FITTING/STRAIGHT | 7 PLATE/FLOOR SUPPORT | 13 HOSE/PRESSURE |
| 2 TEE/FEMALE RUN | 8 SUBFLOOR/FRONT SUPPORT | 14 HOSE/PRESSURE |
| 3 PEDAL/FOOT | 9 TUBE/PILOT | 15 ORIFICE/CHECK VALVE |
| 4 PLUG/O-RING | 10 HOSE/PRESSURE | 16 SCREW/CAP TF |
| 5 VALVE/FOOT | 11 HOSE/PRESSURE | 17 SCREW/CAP |
| 6 PLATE/FLOOR FOOT PILOT | 12 HOSE/PRESSURE | |

Fig. 6-1 Exploded view of Hand/Foot lift and tilt components

Lift and Tilt Components - Dual Joystick and T-Bar/Joystick Control Models

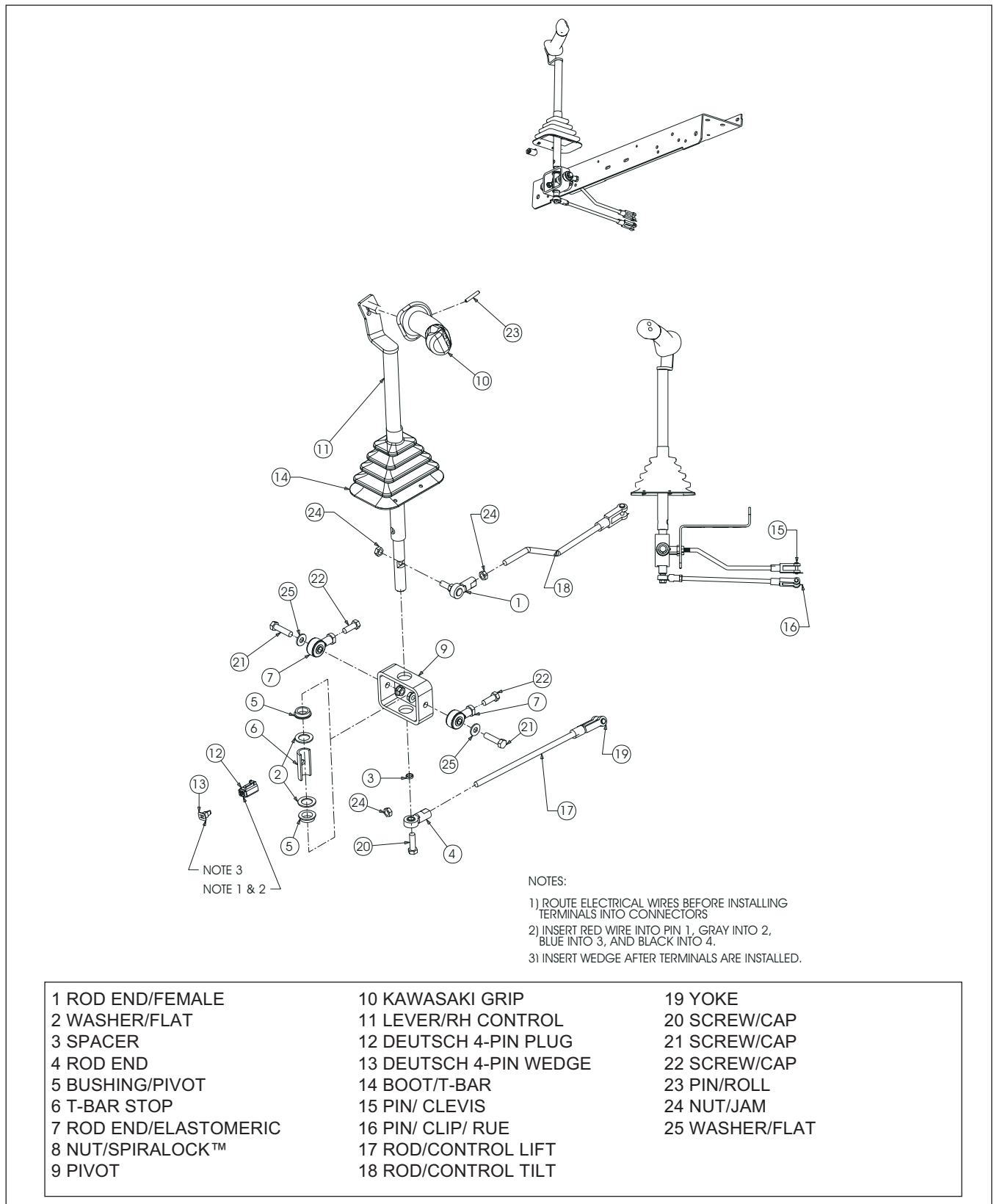


- 1 FITTING/STRAIGHT
- 2 BUSHING/PIVOT
- 3 PIN/TILT CONSOLE
- 4 MOUNT/TOWER
- 5 HANDLE/RATCHET
- 6 ADAPTER/QD/HD
- 7 ADAPTER/QD/HD
- 8 FLANGE/BOOT/JOYSTICK
- 9 FLANGE/BOOT/JOYSTICK

- 10 BOOT/JOYSTICK
- 11 STAND/DRV/JOYSTICK
- 12 JOYSTICK/KAWASAKI
- 13 BOOT/JOYSTICK
- 14 COVER/CONSOLE
- 15 HOSE/LP
- 16 HOSE/LP
- 17 HOSE/LP
- 18 GRIP/AUX/ELEC

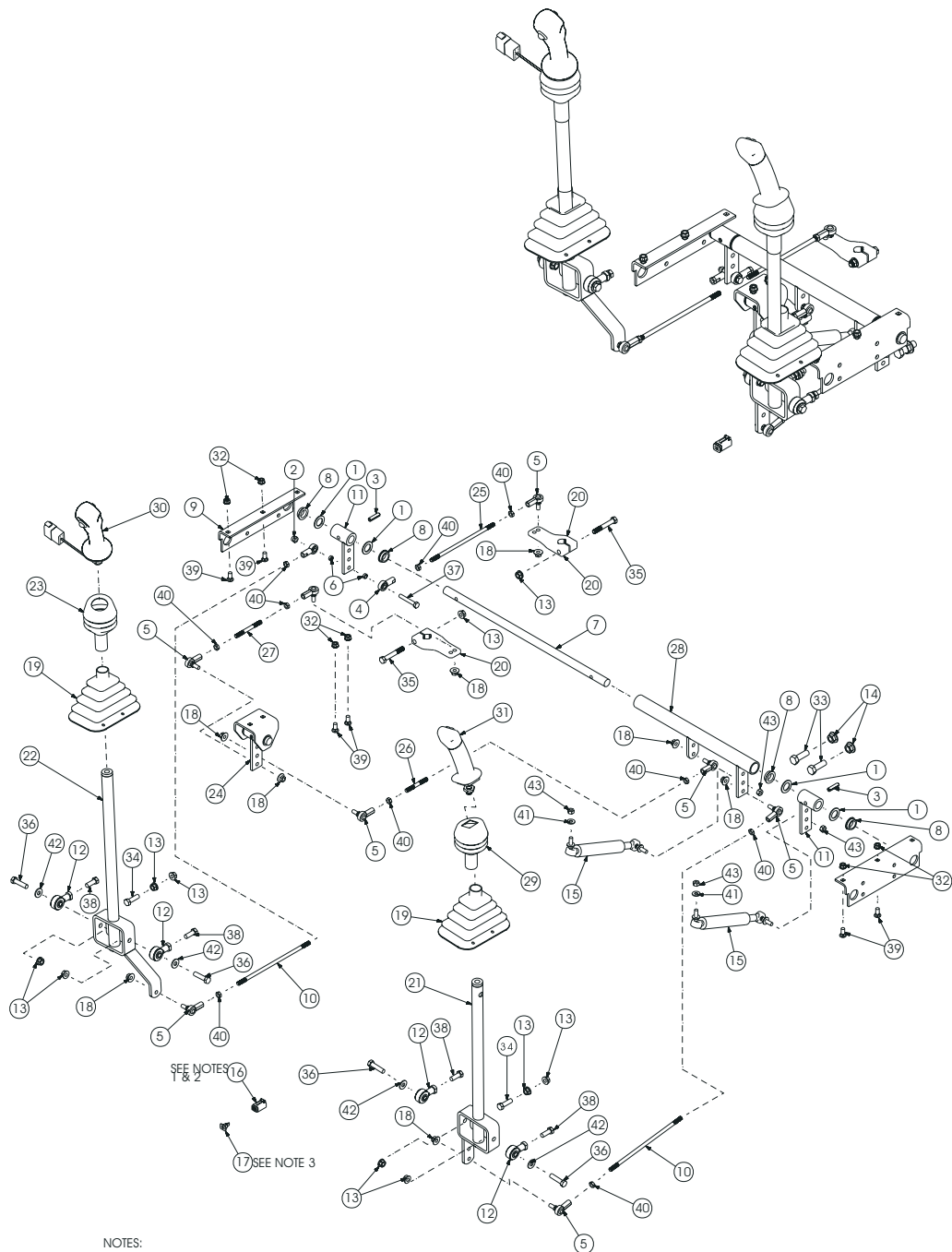
- 19 HOSE/LP
- 20 HOSE/LP
- 21 NUT/LOCK
- 22 SCREW/CAP
- 23 BOLT/CARRIAGE
- 24 SCREW/TORX TF
- 25 SCREW/MACHINE TF
- 26 SCREW/CAP TFS
- 27 WASHER/FLAT

Fig. 6-2 Exploded view of Dual Joystick and T-Bar/Joystick lift and tilt components

Lift and Tilt Components - T-Bar Control Models**Fig. 6-3** Exploded view of T-Bar lift and tilt components

Drive Control Components - Hand/Foot Models

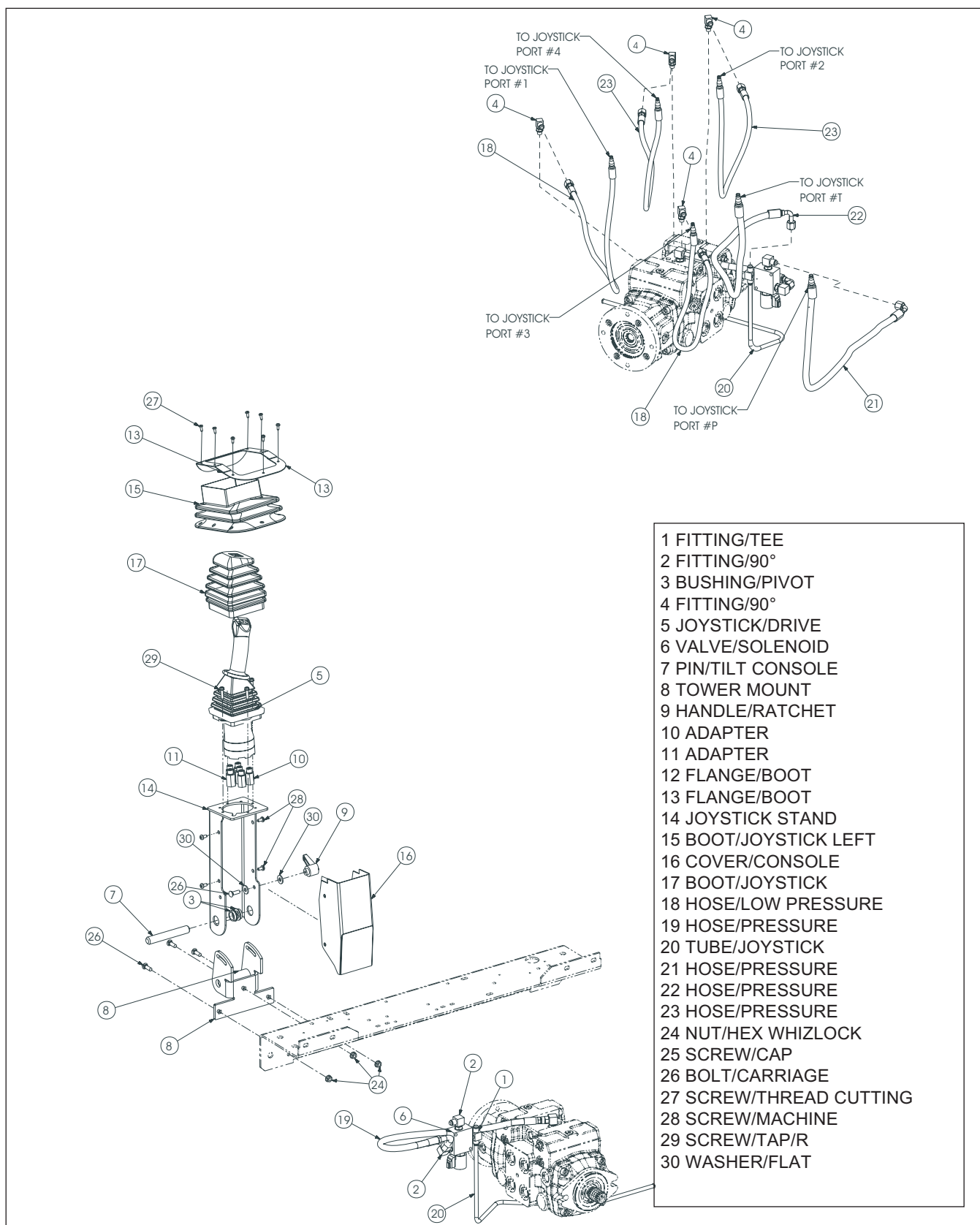
- 1 WASHER/FLAT
- 2 NUT/HEX LOCK
- 3 PIN/ROLL
- 4 ROD END/FEMALE
- 5 ROD END/FEMALE
- 6 SPACER
- 7 SHAFT/PIVOT
- 8 BUSHING/PIVOT
- 9 BRACKET/PIVOT
- 10 ROD
- 11 ARM/ASSEMBLY
- 12 ROD END
- 13 NUT/SPIRALLOCK
- 14 NUT/SPIRALLOCK
- 15 DEVICE/CENTER
- 16 PLUG 4-PIN
- 17 WEDGE 4-PIN
- 18 NUT/LOCK
- 19 BOOT/T-BAR
- 20 ARM/PUMP
- 21 PILOT H-F/LEFT
- 22 PILOT H-F/RIGHT
- 23 BOOT/H-F PILOT
- 24 ASSEMBLY/PIVOT
- 25 STUD/ROD
- 26 ROD/THREADED
- 27 ROD/THREADED
- 28 PIVOT TUBE
- 29 BOOT/H-F PILOT
- 30 GRIP/AUXILIARY
- 31 GRIP
- 32 NUT/HEX LOCK
- 33 SCREW/CAP
- 34 SCREW/CAP
- 35 SCREW/CAP
- 36 SCREW/CAP
- 37 SCREW/CAP
- 38 SCREW/CAP
- 39 BOLT/CARRIAGE
- 40 NUT/JAM
- 41 WASHER/FLAT
- 42 WASHER/FLAT
- 43 NUT/HEX



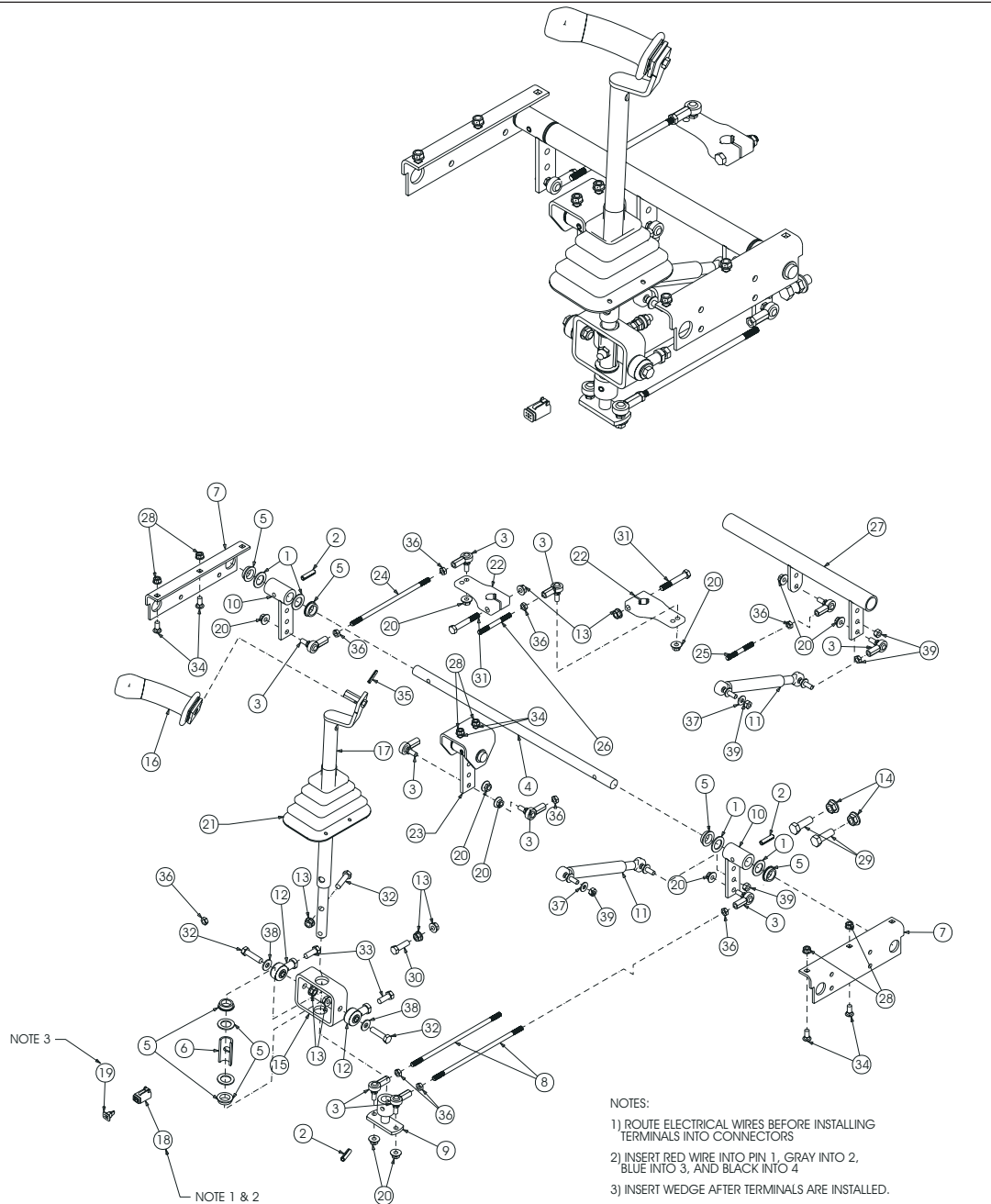
NOTES:

- 1) ROUTE ELECTRICAL WIRES BEFORE INSTALLING TERMINALS INTO CONNECTORS.
- 2) INSERT RED WIRE INTO PIN 1, GRAY INTO PIN 2, BLUE INTO 3, AND BLACK INTO 4.
- 3) INSERT WEDGE AFTER TERMINALS ARE INSTALLED.

Fig. 6-4 Exploded view of Hand/Foot wheel drives controls

Drive Control Components - Dual Joystick Models**Fig. 6-5** Exploded view of Dual Joystick wheel drives controls

Drive Control Components - T-Bar and T-Bar/Joystick Models - 56/6640



1 WASHER/FLAT	11 DAMPER	21 BOOT/T-BAR	31 SCREW/CAP
2 PIN/ROLL	12 ROD END	22 ARM/PUMP	32 SCREW/CAP
3 ROD END	13 NUT/SPIRALOCK™	23 PIVOT ASSEMBLY	33 SCREW/CAP
4 SHAFT/PIVOT	14 NUT/SPIRALOCK™	24 STUD/ROD	34 BOLT/CARRIAGE
5 BEARING	15 PIVOT/T-BAR	25 THREADED ROD	35 PIN/ROLL
6 T-BAR STOP	16 KAWASAKI GRIP	26 THREADED ROD	36 NUT/JAM
7 BRACKET/PIVOT	17 LEVER/CONTROL	27 PIVOT TUBE	37 WASHER/FLAT
8 ROD	18 DEUTSCH PLUG	28 NUT/HEX	38 WASHER/FLAT
9 ASSY/PIVOT	19 DEUTSCH WEDGE	29 SCREW/CAP	39 NUT/HEX
10 ARM/ASSEMBLY	20 NUT/HEX	30 SCREW/CAP	

Fig. 6-6 Exploded view of T-Bar and T-Bar/Joystick wheel drives controls

NOTES

Lift/Tilt Control Removal and Installation



WARNING

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

- ☐ 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 - Hand/Foot Controls

1. Remove the control cover per the procedure found in the *Mainframe* chapter.
2. Remove five capscrews securing floor plate to the chassis. **Fig. 6-7**
3. Pull the floor plate up to expose the foot valves and their hydraulic hose and tube connections. **Fig. 6-8**
4. Mark the hydraulic hoses prior to disconnecting them for easier re-assembly. Disconnect six hoses from foot valves. **Fig. 6-8**

NOTE: Hydraulic hoses and fittings should be capped/plugged after they are disconnected to prevent contaminants from entering the hydraulic system.

5. Lift foot pedal assembly out of chassis. **Fig. 6-9**
6. If needed, remove two capscrews securing each foot pedal to its foot valve.
7. If replacing a foot valve, mark and remove connecting hydraulic tubing and four capscrews on each foot valve securing them to the floor plate.

NOTE: Hydraulic tubes should be capped/plugged after they are disconnected to prevent contaminants from entering the hydraulic system.

8. To reassemble, refer to exploded view as a guide.

Installation Procedure - Hand/Foot Control - Follow all warnings first, then reverse the removal steps.



Fig. 6-7 Location of three of five capscrews securing floor plate to the chassis



Fig. 6-8 View of six hoses attached to foot valves



Fig. 6-9 Location of electrical connector to disconnect. Other control handle is similar

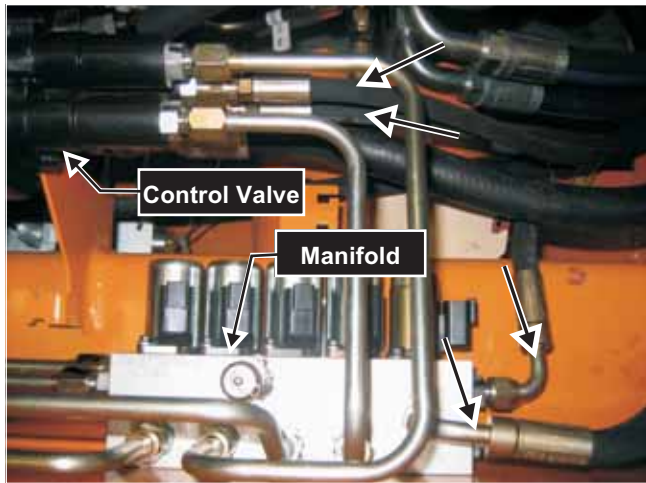


Fig. 6-10 Location of two hoses on the manifold and two hoses on the control valve that help control lift and tilt functions on dual joystick and t-bar/joystick control units



Fig. 6-11 Location of two hoses at the rear of the control valve that help control lift and tilt functions on dual joystick and t-bar/joystick control units

Removal Procedure - Dual Joystick and T-Bar/Joystick Controls

WARNING

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

- ☐ 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.)

1. Remove control cover per the procedure in the *Mainframe* chapter.
2. Disconnect four hydraulic hoses from the control valve, two in the rear and two in front. **Figs. 6-10, 6-11**

NOTE: Hydraulic hoses and fittings should be capped/plugged after they are disconnected to prevent contaminants from entering the hydraulic system.

3. Disconnect two hydraulic hoses from the three- or five-bank manifold located. **Fig. 6-10**

Installation Procedure - Dual Joystick and T-Bar/Joystick Controls - Follow all warnings first, then reverse the removal steps.

Electrical Hand Throttle Removal and Installation

Gehl 5640E/6640E and Mustang 2066/76/86 units have an electric hand throttle located in the right instrument panel for increasing/decreasing the engine's speed.

Removal Procedure

WARNING

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

- ☐ Shut off the engine.

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

1. Use an Allen wrench to loosen the set screw securing the throttle control knob to the instrument panel. **Fig. 6-12**
2. Remove two cross-recessed machine screws securing the throttle control to the instrument panel. The throttle control module should fall to the inside. **Fig. 6-13**
3. Remove four Phillips-head machine screws securing the instrument panel to the ROPS post/stanchion. Carefully pull the instrument panel away from the stanchion and remove the throttle control module. **Fig. 6-14**

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



Fig. 6-12 An Allen wrench is used to loosen the set screw on the hand throttle control knob

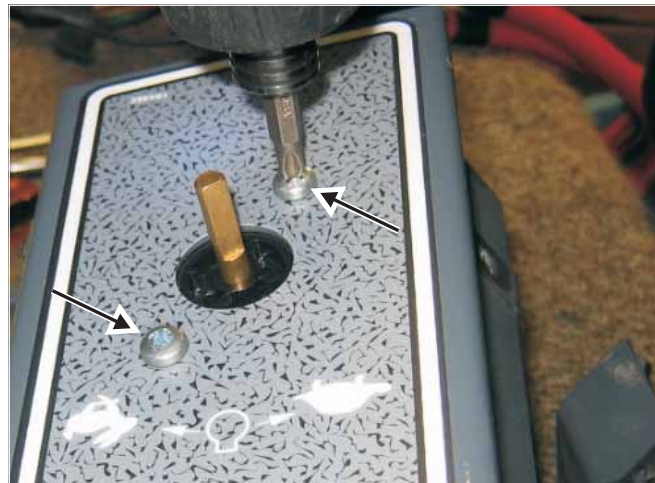


Fig. 6-13 Two cross-recessed machine screws to remove on the throttle control module



Fig. 6-14 Location of two of three machine screws securing the right instrument panel in the ROPS stanchion

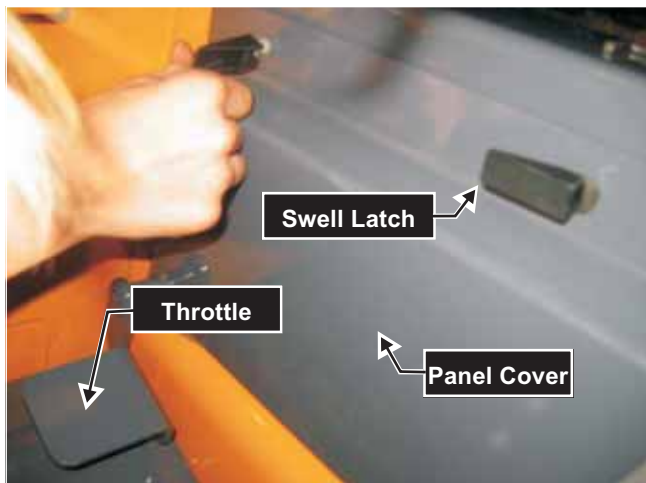


Fig. 6-15 Location of two swell latches securing the right panel cover to the side of the chassis



Fig. 6-16 Unplug this electrical wire connector from the throttle assembly

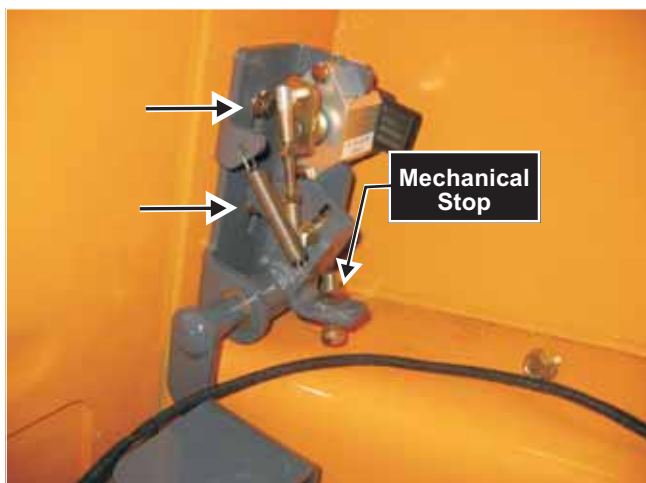


Fig. 6-17 Location of two hex nuts securing the foot throttle assembly to the front of the chassis

Electrical Foot Throttle Removal and Installation - Dual Joystick Controls

Gehl 5640E/6640E and Mustang 2066/76/86 dual joystick control units have an electric foot throttle located above the right foot rest for increasing/decreasing the engine's speed.

Removal Procedure

! WARNING

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

- ☐ **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 right panel cover by releasing its two swell latches. **Fig. 6-15**
- 2.** Unplug the electrical connector on the electric foot throttle. **Fig. 6-16**
- 3.** Remove the hex nuts on carriage bolts securing the foot throttle assembly to the chassis. **Fig. 6-17**
- 4.** Remove the entire electric foot throttle assembly from the skid-steer loader.

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

* The mechanical stop in **Fig. 6-17** is there to prevent physical stress on the throttle sensor associated with pressing a foot down on the pedal.

This exploded view diagram illustrates the assembly of a mechanical component, likely a bracket or support. The parts are numbered 1 through 21. The diagram shows the following components and their assembly sequence:

- Part 1:** A central mounting plate or bracket.
- Part 2:** Two circular washers or spacers.
- Part 3:** A small cylindrical pin or dowel.
- Part 4:** A small cylindrical pin or dowel.
- Part 5:** Two circular washers or spacers.
- Part 6:** Two small cylindrical pins or dowels.
- Part 7:** Two long, thin cylindrical pins or dowels.
- Part 8:** A large, L-shaped mounting plate or bracket.
- Part 9:** A small cylindrical pin or dowel.
- Part 10:** A small cylindrical pin or dowel.
- Part 11:** A small cylindrical pin or dowel.
- Part 12:** A small cylindrical pin or dowel.
- Part 13:** A small cylindrical pin or dowel.
- Part 14:** A small cylindrical pin or dowel.
- Part 15:** A small cylindrical pin or dowel.
- Part 16:** A small cylindrical pin or dowel.
- Part 17:** A small cylindrical pin or dowel.
- Part 18:** A small cylindrical pin or dowel.
- Part 19:** A small cylindrical pin or dowel.
- Part 20:** A small cylindrical pin or dowel.
- Part 21:** A small cylindrical pin or dowel.

The diagram shows the assembly sequence from left to right, with parts 1 through 21 being assembled onto the central mounting plate (1). The final assembly is shown on the right, with the central mounting plate (1) being secured by the large L-shaped bracket (8) and the various pins and washers (2, 3, 4, 5, 6, 7, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21).

- Fig. 6-18** Exploded view of the auxiliary hydraulics controls for T-Bar, T-Bar/Joystick and Dual Joystick control models

Introduction

This chapter covers troubleshooting, testing, removal, installation, and adjustment procedures for the hydrostatic system components on Gehl 5640E/6640E and Mustang 2066/76/86 skid-steer loaders.

In this system, a hydrostatic pump assembly coupled to the engine provides hydrostatic power to the two fixed-displacement hydrostatic drive motors. The drive motors drive the wheels on each side of the loader

through a chain and sprocket system. The hydrostatic pumps and drive motors are controlled individually allowing complete flexibility in forward, reverse, gradual, pivot and spin turns.

For detailed information on hydrostatic pump or drive motor internal repair, consult the Gehl or Mustang Service Department and/or the hydrostatic component manufacturer's service manual.

NOTES

Hydrostatic System - Single-Speed Components - Dual Joystick Controls

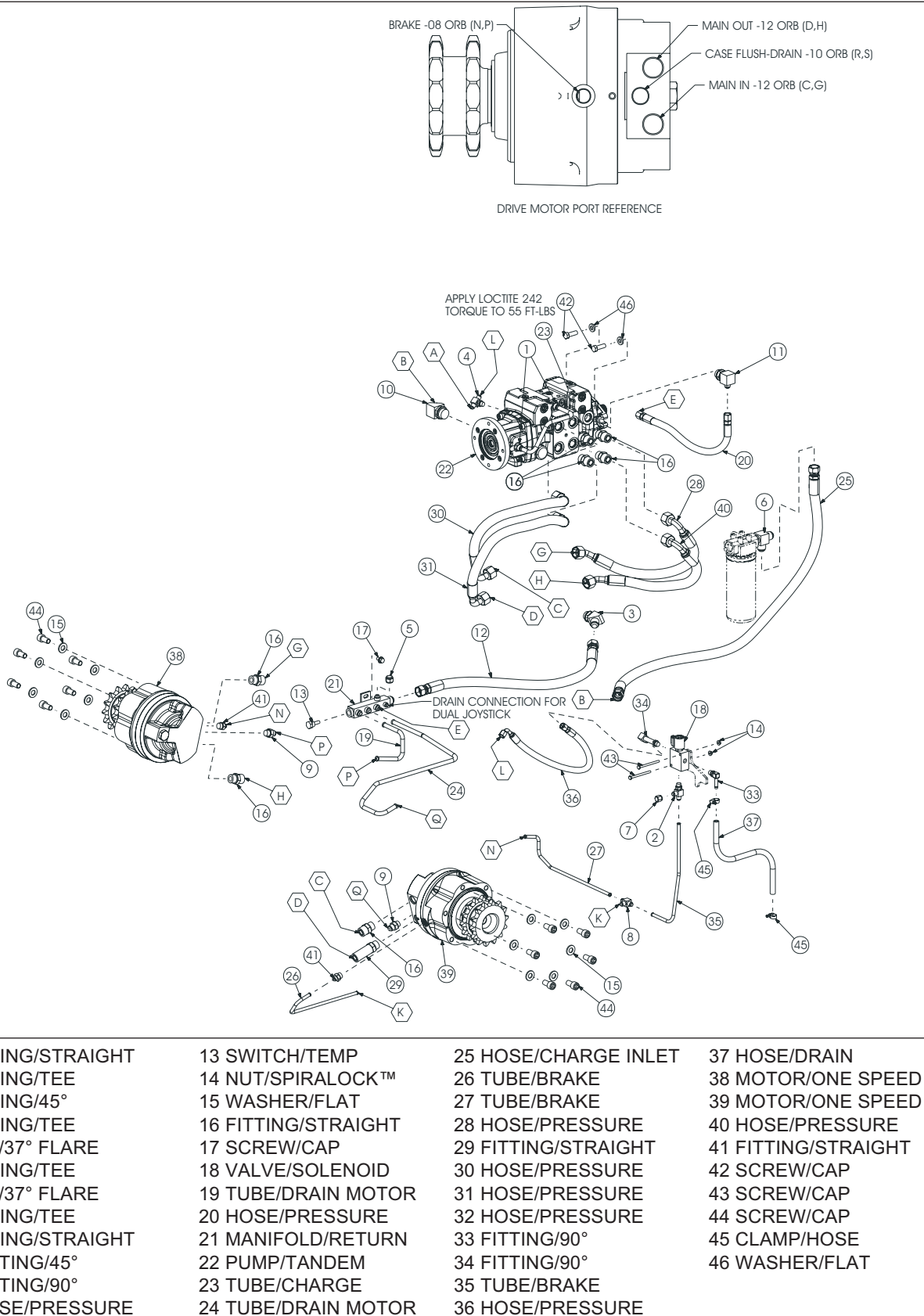
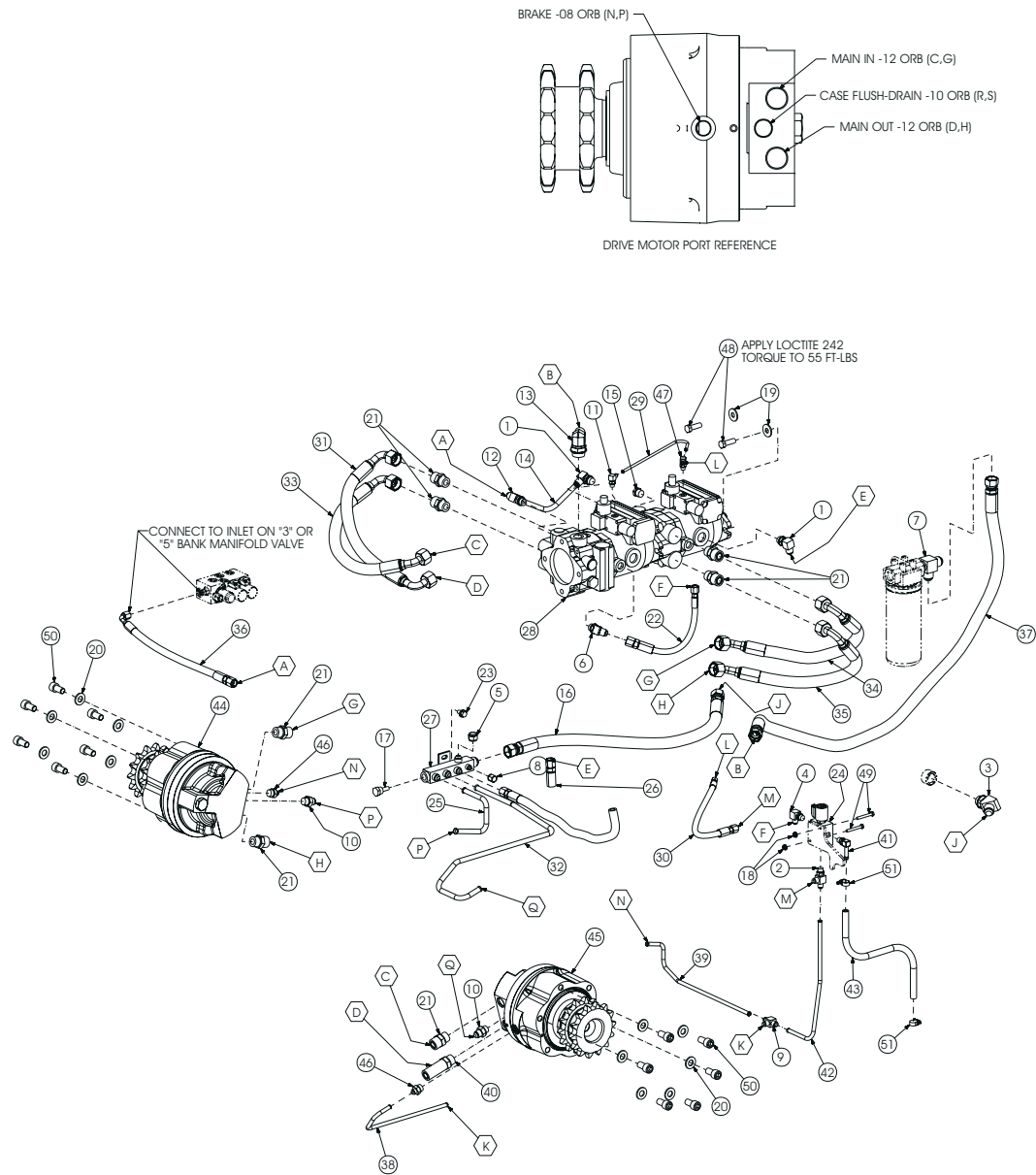


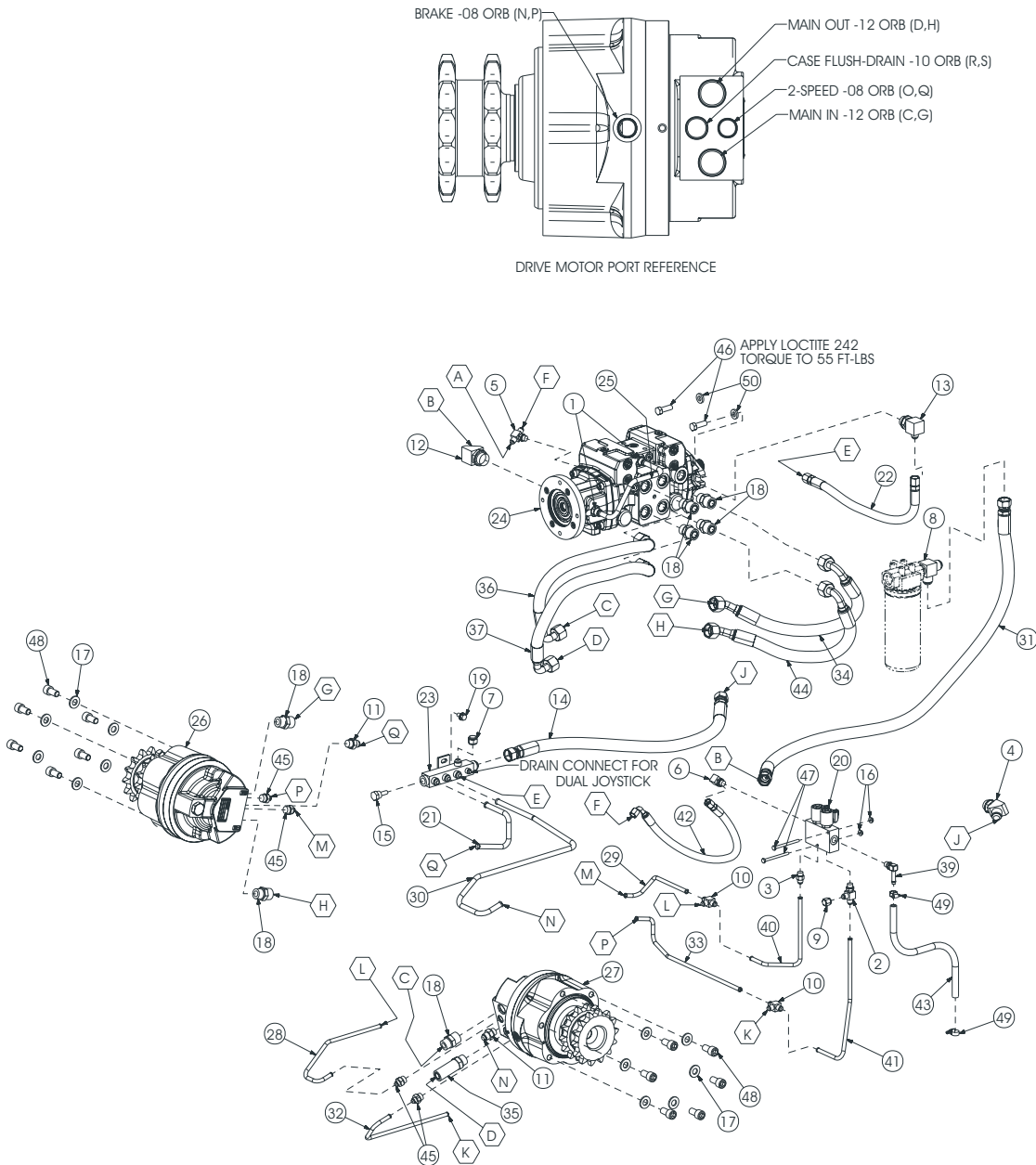
Fig. 7-1 Exploded view of the dual joystick hydrostatic single-speed system

Hydrostatic System - Single-Speed Components - T-Bar, T-Bar/Joystick and Hand/Foot

1 FITTING/90°	14 TUBE/CHARGE	27 MANIFOLD/RETURN	40 FITTING/STRAIGHT
2 FITTING/TEE	15 PLUG	28 PUMP/TANDEM	41 FITTING/90°
3 FITTING/45°	16 HOSE/PRESSURE	29 TUBE/TANDEM PUMP	42 TUBE/BRAKE
4 FITTING/90°	17 SWITCH/TEMP	30 HOSE/PRESSURE	43 HOSE/DRAIN
5 CAP/37° FLARE	18 NUT/SPIRALOCK™	31 HOSE/PRESSURE	44 MOTOR/ONE SPEED
6 FITTING/45°	19 WASHER/FLAT	32 TUBE/DRAIN MOTOR	45 MOTOR/ONE SPEED
7 FITTING/TEE	20 WASHER/FLAT	33 HOSE/PRESSURE	46 FITTING/STRAIGHT
8 CAP/37° FLARE	21 FITTING/STRAIGHT	34 HOSE/PRESSURE	47 FITTING/TEE
9 FITTING/TEE	22 HOSE/PRESSURE	35 HOSE/PRESSURE	48 SCREW/CAP
10 FITTING/STRAIGHT	23 SCREW/CAP	36 HOSE/CHARGE	49 SCREW/CAP
11 ADAPTER/90°	24 VALVE/SOLENOID	37 HOSE/CHARGE INLET	50 SCREW/CAP
12 FITTING/TEE	25 TUBE/DRAIN MOTOR	38 TUBE/BRAKE LEFT	51 CLAMP/HOSE
13 FITTING/90°	26 HOSE/PRESSURE	39 TUBE/BRAKE RIGHT	

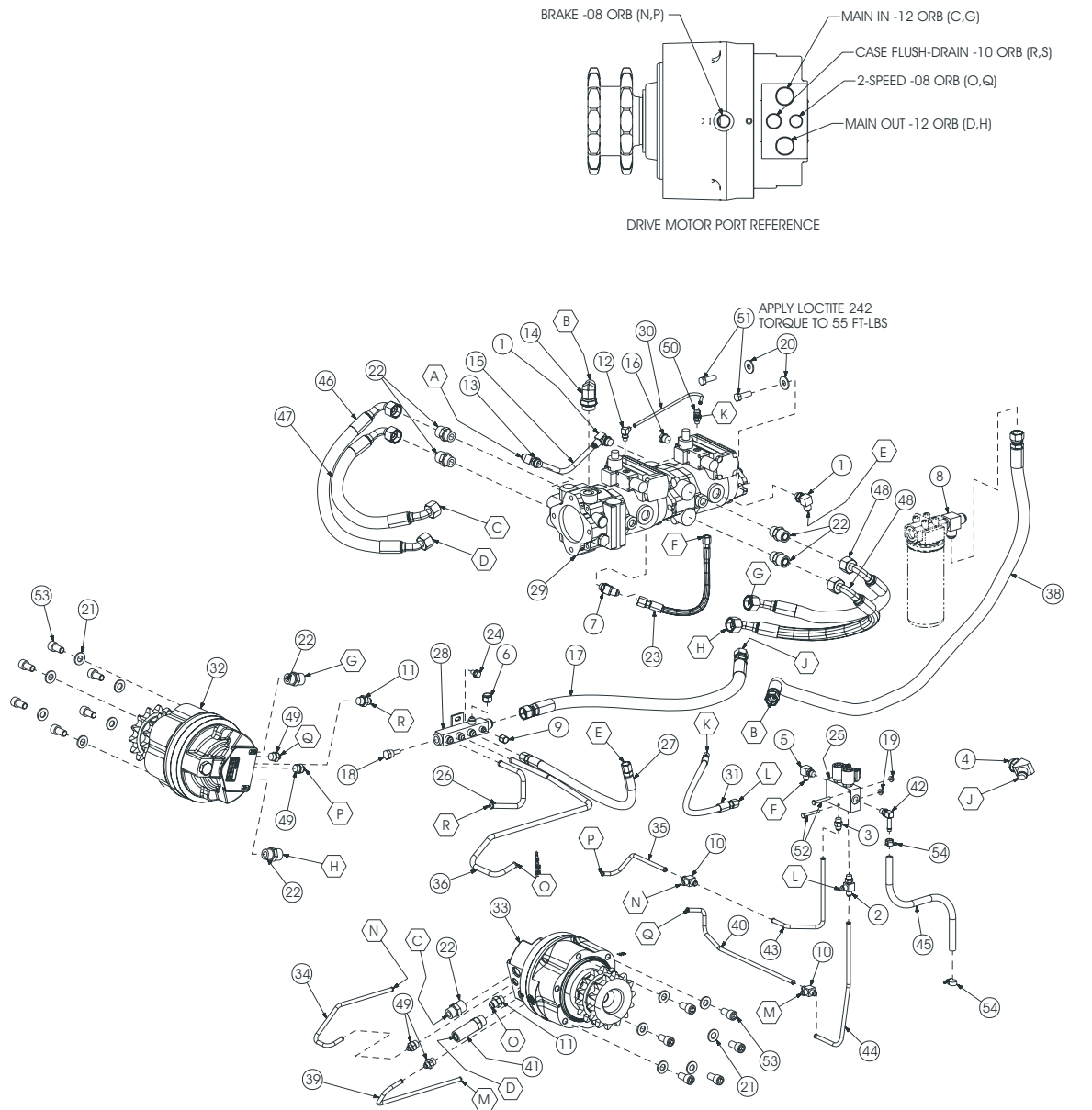
Fig. 7-2 Exploded view of the t-bar, t-bar/joystick and hand/foot hydrostatic single-speed system

Hydrostatic System - Two-Speed Components - Dual Joystick Controls



1 FITTING/STRAIGHT	14 HOSE/PRESSURE	27 MOTOR/TWO-SPEED	40 TUBE/CASE DRAIN
2 FITTING/TEE	15 SWITCH/TEMP	28 TUBE/TWO-SPEED	41 TUBE/BRAKE
3 FITTING/STRAIGHT	16 NUT/SPIRALOCK™	29 TUBE/TWO-SPEED	42 HOSE/PRESSURE
4 FITTING/45°	17 WASHER/FLAT	30 TUBE/MOTOR DRAIN	43 HOSE/DRAIN
5 FITTING/TEE	18 FITTING/STRAIGHT	31 HOSE/CHARGE INLET	44 HOSE/PRESSURE
6 FITTING/90°	19 SCREW/CAP	32 TUBE/BRAKE	45 FITTING/STRAIGHT
7 CAP/37° FLARE	20 MANIFOLD/VALVE	33 TUBE/BRAKE	46 SCREW/CAP
8 FITTING/TEE	21 TUBE/MOTOR DRAIN	34 HOSE/PRESSURE	47 SCREW/CAP
9 CAP/37° FLARE	22 HOSE/PRESSURE	35 FITTING/STRAIGHT	48 SCREW/CAP
10 FITTING/TEE	23 MANIFOLD/RETURN	36 HOSE/PRESSURE	49 CLAMP/HOSE
11 FITTING/STRAIGHT	24 PUMP/TANDEM	37 HOSE/PRESSURE	50 WASHER/FLAT
12 FITTING/45°	25 TUBE/CHARGE	38 HOSE/PRESSURE	
13 FITTING/90°	26 MOTOR/TWO-SPEED	39 FITTING/90°	

Fig. 7-3 Exploded view of the dual joystick hydrostatic two-speed system

Hydrostatic System - Two-Speed Components - T-Bar, T-Bar/Joystick and Hand/Foot

1 FITTING/90°	15 TUBE/CHARGE	29 PUMP/TANDEM	43 TUBE/CASE DRAIN
2 FITTING/TEE	16 PLUG	30 TUBE/TANDEM PUMP	44 TUBE/BRAKE
3 FITTING/STRAIGHT	17 HOSE/PRESSURE	31 HOSE/PRESSURE	45 HOSE/DRAIN
4 FITTING/45°	18 SWITCH/TEMP	32 MOTOR/TWO-SPEED	46 HOSE/PRESSURE
5 FITTING/90°	19 NUT/SPIRALLOCK™	33 MOTOR/TWO-SPEED	47 HOSE/PRESSURE
6 CAP/37° FLARE	20 WASHER/FLAT	34 TUBE/TWO-SPEED	48 HOSE/PRESSURE
7 FITTING/45°	21 WASHER/FLAT	35 TUBE/TWO-SPEED	49 FITTING/STRAIGHT
8 FITTING/TEE	22 FITTING/STRAIGHT	36 TUBE/DRAIN MOTOR	50 FITTING/TEE
9 CAP/37° FLARE	23 HOSE/PRESSURE	37 HOSE/CHARGE	51 SCREW/CAP
10 FITTING/TEE	24 SCREW/CAP	38 HOSE/CHARGE INLET	52 SCREW/CAP
11 FITTING/STRAIGHT	25 MANIFOLD/VALVE	39 TUBE/BRAKE	53 SCREW/CAP
12 ADAPTER/90°	26 TUBE/DRAIN MOTOR	40 TUBE/BRAKE	54 CLAMP/HOSE
13 FITTING/TEE	27 HOSE/PRESSURE	41 FITTING/STRAIGHT	
14 FITTING/90°	28 MANIFOLD/RETURN	42 FITTING/90°	

Fig. 7-4 Exploded view of the t-bar, t-bar/joystick and hand/foot hydrostatic two-speed system

Troubleshooting Guide

The following troubleshooting guide lists potential hydrostatic system problems, as well as possible causes and remedies, for Gehl 5640E/6640E and Mustang 2066/76/86 skid-steer loaders.

When a problem occurs, don't overlook simple causes. A malfunction can be caused by something as simple as low oil level. After a mechanical failure has been corrected, be sure to locate and correct the cause of the problem.

IMPORTANT

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

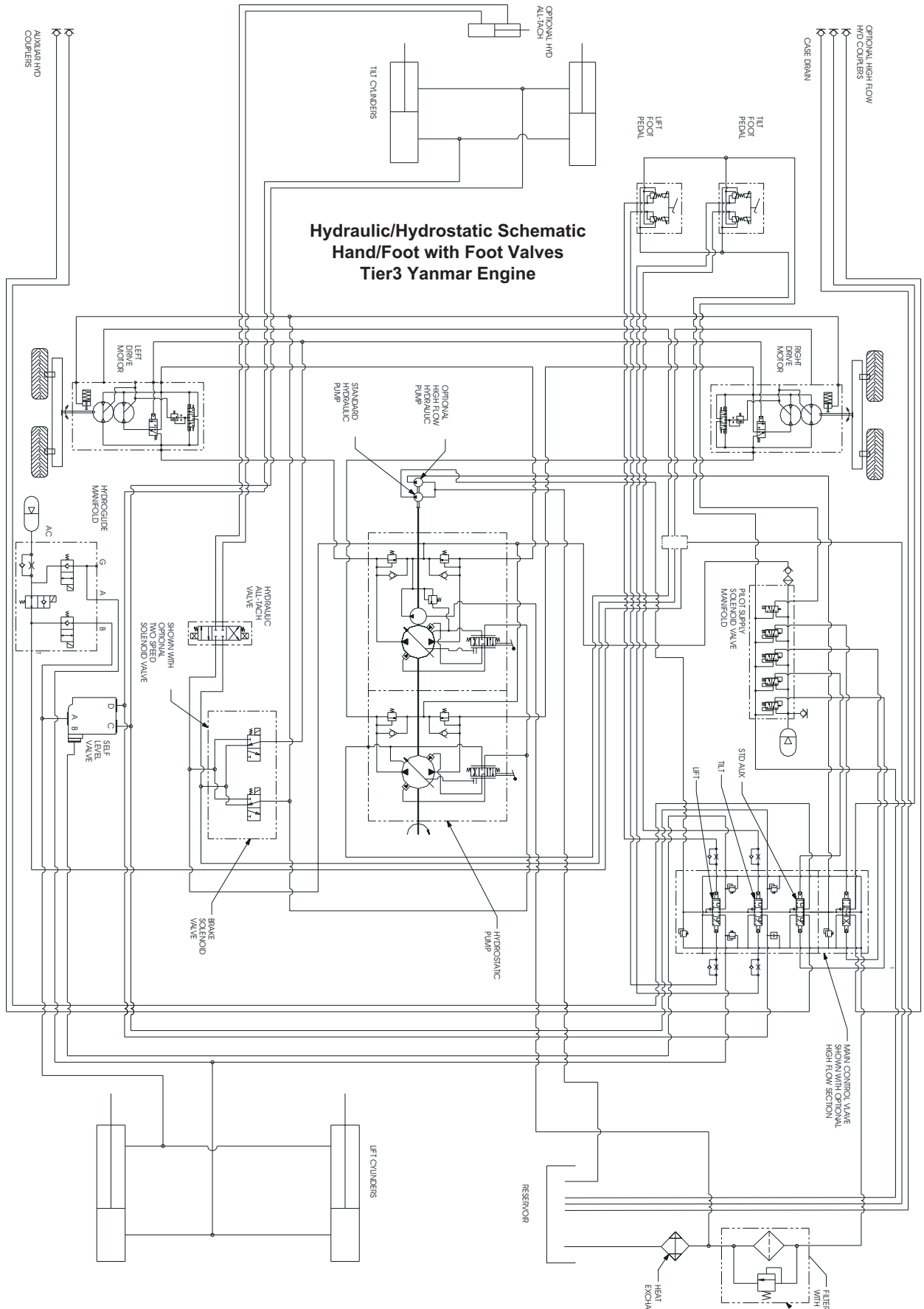
Problem	Possible Cause	Remedy
No response from the hydrostatic drive or the lift/tilt systems.	Restraint bar or seat switch malfunction.	Check switches.
	Pilot oil solenoid is malfunctioning.	Check electrical connections to solenoid and repair.
	Hydraulic oil viscosity is too high.	Allow longer warm-up or replace oil with the proper viscosity oil.
	Hydraulic oil supply is too low.	Check for low oil level in reservoir. Add oil as needed.
	Hydrostatic pump drive is disconnected. Drive coupling failure.	Check for broken or worn pump Drive Coupling and replace, as needed.
	Blown fuse or relay.	Replace fuse or relay.
Traction drive will not operate in either direction.	Parking brake is engaged.	Disengage parking brake.
	Hydraulic oil supply too low.	Check for low oil level in reservoir. Add oil if necessary.
	Control rod linkage disconnected.	Check linkage connection at control levers and neutral centering mechanisms. Reconnect linkage.
	Low or no charge pressure.	See hydrostatic pump manual.
	Hydrostatic pump relief valves are malfunctioning.	Inspect and clean the relief valves. Replace them as needed.
	Inadequate pilot supply oil pressure to joystick control.	Check pilot supply oil pressure. Check pilot supply cut-out solenoid.
Drive wheels do not turn in proper direction.	High pressure hydraulic hoses between hydrostatic pump and drive motors are connected wrong.	Reconnect hoses to proper ports on the drive motors. Refer to schematic and figures in the <i>Hydrostatic System</i> chapter.

Problem	Possible Cause	Remedy
Neutral is difficult to maintain.	Rod ends loose on centering mechanism or servo rod.	Check and tighten or replace components.
	Neutral centering mechanism(s) out of adjustment.	Adjust neutral centering mechanism(s).
	Clamping bolt is loose.	Tighten clamp bolt.
	Hydrostatic pump out of adjustment.	See hydrostatic pump manual.
	Joystick control valve malfunction.	Replace joystick control valve.
Sluggish response to acceleration.	Air in the hydraulic system.	Cycle the lift and tilt cylinders to maximum stroke and maintain pressure for a short time to clear air from system. Check hydraulic oil reservoir, fill as needed.
	Hydraulic oil supply is too low.	Check hydraulic oil reservoir. Add oil, if necessary.
	Low hydrostatic system charge pressure.	See hydrostatic pump manual.
	Drive motor(s) or hydrostatic pump(s) have internal damage or leakage.	Refer to component manufacturer's service manual.
	Engine is not responding under load.	Troubleshoot engine.
Hydrostatic drive is overheating.	Drive system overloaded continuously.	Improve efficiency of operation.
	Lift and tilt system overloaded continuously.	Improve efficiency of operation.
	Drive motor(s) or hydrostatic pump(s) have internal damage or leakage.	Refer to component manufacturer's service manual.
	Oil cooler is plugged with debris.	Clean oil cooler fins.
	Loader being operated in a high temperature area with no air circulation.	Reduce duty cycle and improve air circulation.
	Hydrostatic oil filter plugged or restricted.	Replace the filter.
Creeps in NEUTRAL.	Hydrostatic pump needs adjustment.	Refer to the "Neutral Centering Adjustment" procedure in the <i>Controls</i> chapter of the Form No. 917231 service manual addendum.
Turns slightly left or right in FORWARD or REVERSE position when using the traction drive control handle.	Hydrostatic pump needs adjustment.	Refer to the "Neutral Centering Adjustment" procedure in the <i>Controls</i> chapter of the Form No. 917231 service manual addendum.

Problem	Possible Cause	Remedy
Hydrostatic (drive) system is noisy.	Hydraulic oil viscosity is too high.	Allow longer warm-up or replace existing oil with the proper viscosity oil.
	Drive motor(s) or hydrostatic pump(s) have internal damage or leakage.	Refer to component manufacturer's service manual.
	Air in hydraulic system.	Cycle lift and tilt cylinders to maximum stroke and maintain pressure for a short time to clear air from system. Check oil level in reservoir, fill as needed.
Right side doesn't drive in either direction. Left side operates normally.	Excessive internal leakage in right drive motor.	Repair or replace as needed. Refer to motor manufacturer's service manual.
	Excessive leakage in engine-end hydrostatic pump.	Refer to the pump manufacturer's manual for service procedures. Repair or replace rear pump as needed.
	Servo controller malfunctioning.	Refer to the pump manufacturer's manual for service procedures. Repair or replace rear pump as needed.
	Relief valves on engine-end hydrostatic pump malfunctioning.	Switch valves with those on front hydrostatic pump. Problem should switch to the left side. Replace defective relief valve.
	Control rod linkage to engine-end hydrostatic servo is disconnected.	Reattach control rod linkage.
Right side doesn't drive in one direction.	Relief valve on engine-end hydrostatic pump is malfunctioning.	Switch one relief valve with the other relief valve on rear pump; problem should switch to reverse direction. Clean or replace the faulty valve as needed.
	Engine-end hydrostatic pump malfunctioning.	Refer to pump manufacturer's manual for service procedures. Repair or replace rear pump as needed.
	Servo controller malfunctioning.	Refer to pump manufacturer's manual for service procedures. Repair or replace rear pump as needed.
	Joystick control valve malfunction.	Replace joystick control valve.
Lift/tilt controls fail to respond.	Hydraulic oil viscosity is too heavy.	Allow longer warm-up or replace with proper viscosity oil.
	Hydraulic oil level is low.	Check oil level in reservoir. If oil is low, check for an external leak. Repair and add oil.
	Solenoid valve(s) malfunctioning.	Check electrical connections to lift solenoid and repair.
	Restraint bar or seat switch malfunction.	Check switches.

Problem	Possible Cause	Remedy
Left side doesn't drive in either direction. Right side operates normally.	Excessive internal leakage in left drive motor.	Perform "Case Drain Test" on left drive motor. Repair or replace as needed. Refer to motor manufacturer's service manual.
	Excessive leakage in gear-end hydrostatic pump.	Refer to pump manufacturer's manual for service procedures. Repair or replace the front pump as needed.
	Relief valves on gear-end hydrostatic pump malfunctioning.	Switch valves with those on rear hydrostatic pump. See "Hydrostatic Pump Relief Valves" information in this chapter; problem should switch to the right side. Replace defective relief valve as needed.
	Servo controller malfunctioning.	Refer to the pump manufacturer's manual for service procedures. Repair or replace rear pump as needed.
	Control rod linkage to gear-end hydrostatic servo is disconnected.	Reattach control rod linkage.
Left side doesn't drive in one direction.	Relief valve on gear-end hydrostatic pump is malfunctioning.	Switch relief valve with other relief valve on front pump; problem should switch to the reverse direction. Clean or replace the faulty valve as needed.
	Gear-end hydrostatic pump malfunctioning.	Refer to pump manufacturer's manual for service procedures. Repair or replace front pump as needed.
	Servo controller malfunctioning.	Refer to pump manufacturer's manual for service procedures. Repair or replace front pump as needed.





NOTES

Introduction and Troubleshooting Guide

This chapter covers troubleshooting, testing, removal, installation, and adjustment procedures for hydraulic system components on Gehl 5640E/6640E and Mustang 2066/76/86 skid-steer loaders.

Power for the lift arm functions and auxiliary hydraulics is provided by a gear pump attached to the front of the hydrostatic pumps.

Standard and high-flow models include a standard-flow auxiliary hydraulics system with connections on the lift arm for attachment hookup. High-flow models are equipped with high-flow hydraulics, which includes a 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 gear pump or control valve internal repair, consult the Gehl or 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 5640E/6640E and Mustang 2066/76/86 skid-steer loaders.

If you cannot locate a particular hydraulic system problem in this chart, you should also consult the *Hydrostatic System* chapter troubleshooting chart.

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 gear pump, unless authorized to do so by your Gehl or Mustang dealer. Any unauthorized repair will void the warranty.

Problem	Possible Cause	Remedy
Lift/tilt controls fail to respond.	Hydraulic oil viscosity is too heavy.	Allow longer warm-up or replace with proper viscosity oil.
	Solenoid valve(s) malfunctioning.	Check electrical connections to solenoid and repair connections as needed. Perform "Solenoid Valve Test". Replace solenoid as needed.
	Hydraulic oil level is low.	Check oil level in reservoir. If oil is low, check for an external leak. Repair and add oil.
	Hydraulic oil flow to the gear pump is blocked.	Inspect suction hose. Clean or replace as needed.
	System relief valve is malfunctioning.	Adjust or replace relief valve as needed.
	Drive is disconnected.	Check for broken or worn pump drive coupling and 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 gear pump.	Remove gear pump from hydrostatic pump, 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.

Troubleshooting Guide

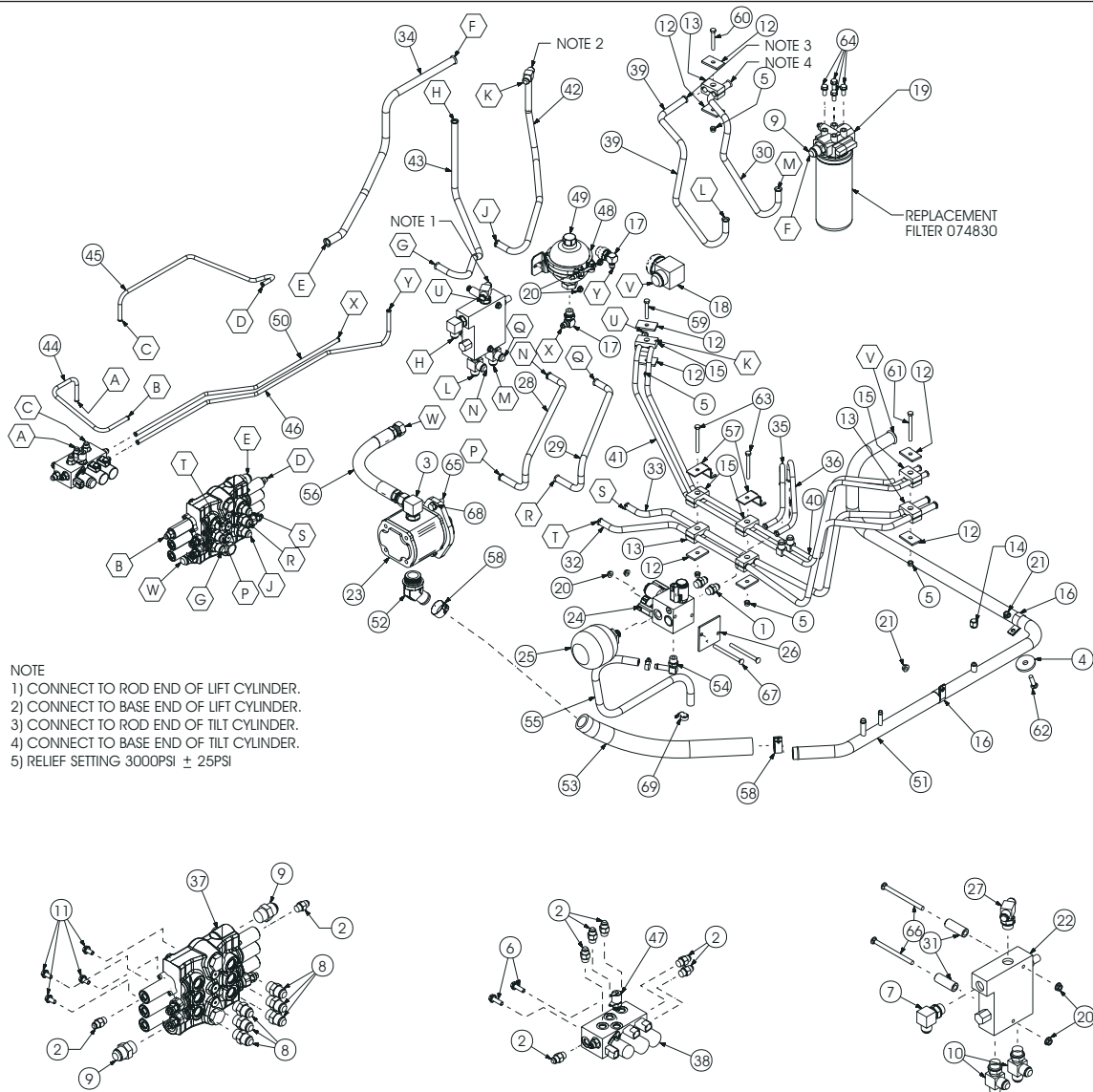
Problem	Possible Cause	Remedy
Hydraulic cylinder action is slow for lift/tilt functions.	Low engine speed.	Operate engine at higher speed.
	Hydraulic oil viscosity is too heavy.	Allow longer warm-up or replace existing oil with proper viscosity oil.
	Hydraulic oil leaking past cylinder piston seals.	Replace cylinder seals and o-rings as needed.
	Hydraulic oil level is low.	Check oil level in reservoir. If oil is low, check for an external leak. Repair and add oil.
	Inadequate pilot supply oil pressure to joystick, t-bar or foot controls.	Check pilot supply oil pressure.
	Inadequate pilot signal from control to the main control valve.	Check signal pressure, clean or replace as needed.
Lift Arm does not raise, bucket tilt works properly.	Lift spool in control valve not actuated or leaking.	Check hose or tube connection to valve. Check pressure and flow.
Jerky lift arm and bucket action.	Restraint bar switch or seat switch malfunction.	Check electrical connections to the switch. Replace switch as needed.
	Air in the hydraulic system.	Cycle lift and tilt cylinders to maximum stroke and maintain pressure for short time to clear air from system.
	Oil in hydraulic reservoir low.	Check and add oil to reservoir as needed.
Standard-flow auxiliary hydraulics function slowly.	Low engine speed.	Operate engine at higher engine speed.
	Hydraulic oil level low.	Add oil to reservoir.
	Hydraulic oil viscosity is too heavy.	Allow long warming period.
	Auxiliary spool in control valve is leaking or is not fully activated.	Repair any leak found; readjust the auxiliary spool for full travel.

Troubleshooting Guide

Problem	Possible Cause	Remedy
Lift Arm doesn't maintain raised position with lift control in NEUTRAL.	Oil leaking past lift cylinder seals (internal or external). Oil leaking past lift spool in control valve. Self-leveling valve is malfunctioning. Leaking hydraulic hoses, tubes, or fittings between control valve and cylinders. Hydraglide/Float control block with internal leakage. Float control is activated.	Check cylinder tube bore condition. Replace seals or cylinder tube as needed. Check valve body for scores or cracks. Replace control valve as needed. Repair or replace as needed. Inspect hoses and tubes, tighten fittings as needed. Replace hoses or tubes as needed. Repair or replace as needed. Deactivate float control by pressing the button on the control handle.
Lift Arm will not lower or raise.	Lift cylinder lift arm support device engaged. Solenoid valve is malfunctioning. Restraint bar not lowered. Restraint bar switch or seat switch malfunction. Blown fuse or relay.	Raise lift arm and disengage the lift arm support device. Check electrical connections to solenoid. Repair or replace as needed. Lower restraint bar. Check electrical connections to the switch. Replace switches as needed. Replace fuse or relay.
Bucket drifts downward with tilt control in NEUTRAL.	Oil leaking past tilt cylinder seals (external or internal). Self-leveling valve is malfunctioning. Leaking hydraulic hoses, tubes, or fittings between control valve and cylinders.	Check cylinder tube bore condition. Replace seals, o-rings, or cylinder as needed. Repair or replace as needed. Inspect hoses and tubes, tighten fittings as needed. Replace hoses or tubes as needed.
Lift Arm will not raise a heavy load or any load at all.	Lift port relief in the control valve is malfunctioning. Float control is activated. Main relief valve is malfunctioning.	Replace lift port relief or contact the Gehl or Mustang Service Department. Deactivate float control by pressing the button on the control handle. Check pressures in relief valve, repair or replace as needed.
Slow or no response for bucket tilt, lift works properly (Hand/Foot units only)	Pilot control lines have air in them. Low charge pressure. Linkage misadjusted.	Bleed the pilot control line from the main control valve. See hydrostatic pump manual. Readjust for full travel without restriction.

Troubleshooting Guide

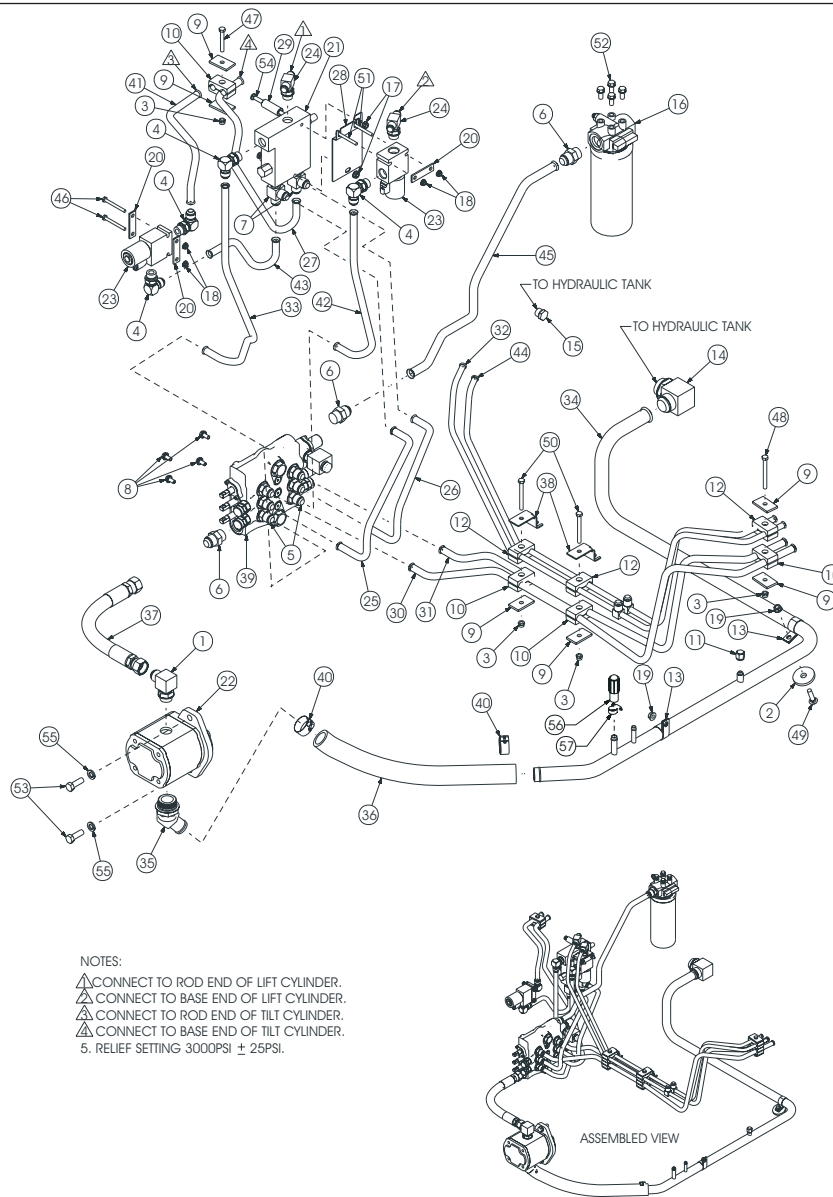
Problem	Possible Cause	Remedy
No downward pressure on the bucket.	Control valve in "float" position. Tilt cylinders are malfunctioning. Float control is activated.	Take control out of "float" position. Check condition of cylinder tube bore. Replace seals, O-rings, and/or cylinder tube as needed. Deactivate float control by pressing the button on the control handle.
Bucket does not level on the lift cycle.	Self-leveling valve misadjusted or malfunctioning.	Repair or replace self-leveling valve as needed.
Bucket will not tilt; lift arm works properly.	Tilt solenoid valve is malfunctioning. Tilt spool in control valve not actuated or leaking.	Check electrical connections to tilt solenoid and repair connections as needed. Replace solenoid as needed. Check hose or tube connection to Valve. Check pressure and flow.
High-flow auxiliary does not function.	Solenoid valves malfunctioning. Restraint bar is raised. Restraint bar switch or seat switch malfunctioning. Faulty fuse connections. Control modules malfunctioning.	Check electrical connections to solenoid. Repair or replace solenoid. Lower the restraint bar. Replace the malfunctioning switch. Check fuse connections for security, damage or broken wires; Repair or replace as needed. Contact your authorized Gehl or Mustang dealer.
Standard auxiliary or high-flow auxiliary functions slowly.	Control linkage misadjusted. Low engine speed. Hydraulic oil level low. Hydraulic oil viscosity is too heavy. Control valve relief pressure is low.	Check linkage, readjust for full spool travel. Operate engine at higher speed. Add oil to reservoir. Allow for longer warming period. Check pressure at control valve and readjust if necessary.
Standard-flow auxiliary hydraulics do not function.	Restraint bar is raised. Restraint bar switch or seat switch malfunctioning. Blown fuse or relay. Faulty electrical connections. Solenoid valve is malfunctioning.	Lower the restraint bar. Replace the malfunctioning switch. Replace fuse or relay. Check electrical connections for security, broken or damaged wires and replace as needed. Check electrical connections to solenoid. Repair or replace as needed.

Standard Auxiliary Hydraulics - Dual Joystick, Hand/Foot and T-Bar/Joystick

1 FITTING/STRAIGHT	18 FITTING/90°	36 TUBE/HYDRAGLIDE™	53 HOSE/PRESSURE
2 FITTING/STRAIGHT	19 ASSY/FILTER	37 VALVE/CONTROL	54 FITTING/90°
3 ELBOW/FITTING 90°	20, 21 NUT/SPIRALLOCK™	38 3-BANK/VALVE	55 HOSE/DRAIN
4 WASHER/FLAT	22 VALVE/SELF LEVEL	39 TUBE/TILT	56 HOSE/PRESSURE
5 NUT/HEX	23 PUMP/GEAR SINGLE	40 TUBE/LIFT	57 BRACKET/HARNES
6 SCREW/CAP	24 HYDRAGLIDE™	41 TUBE/LIFT	58 CLAMP/T-BOLT
7 FITTING/90°	25 ACCUMULATOR	42 TUBE/LIFT	59 SCREW/CAP
8 FITTING/STRAIGHT	26 PLATE/SPACER	43 TUBE/LIFT	60 SCREW/CAP
9 FITTING/STRAIGHT	27 FITTING/TEE	44 TUBE/AUX FEED	61 SCREW/CAP
10 FITTING/TEE	28 TUBE/TILT	45 TUBE/AUX RETURN	62 BOLT/CARRIAGE
11 SCREW/CAP	29 TUBE/TILT	46 TUBE/CASE DRAIN	63 SCREW/CAP
12 PLATE/TWIN COVER	30 TUBE/TILT	47 PORT/TEST	64 SCREW/MACHINE
13 CLAMP/TUBE	31 SPACER	48 CLAMP/ACCUM	65 SCREW/CAP
14 CAP/37° FLARE	32 TUBE/AUXILIARY	49 ACCUMULATOR	66 BOLT/CARRIAGE
15 CLAMP/TUBE	33 TUBE/AUXILIARY	50 TUBE/ACCUM	67 BOLT/CARRIAGE
16 CLAMP/HOSE	34 TUBE/FILTER	51 TUBE/SUCTION	68 WASHER/LOCK
17 FITTING/90°	35 TUBE/HYDRAGLIDE™	52 FITTING/45°	69 CLAMP/HOSE

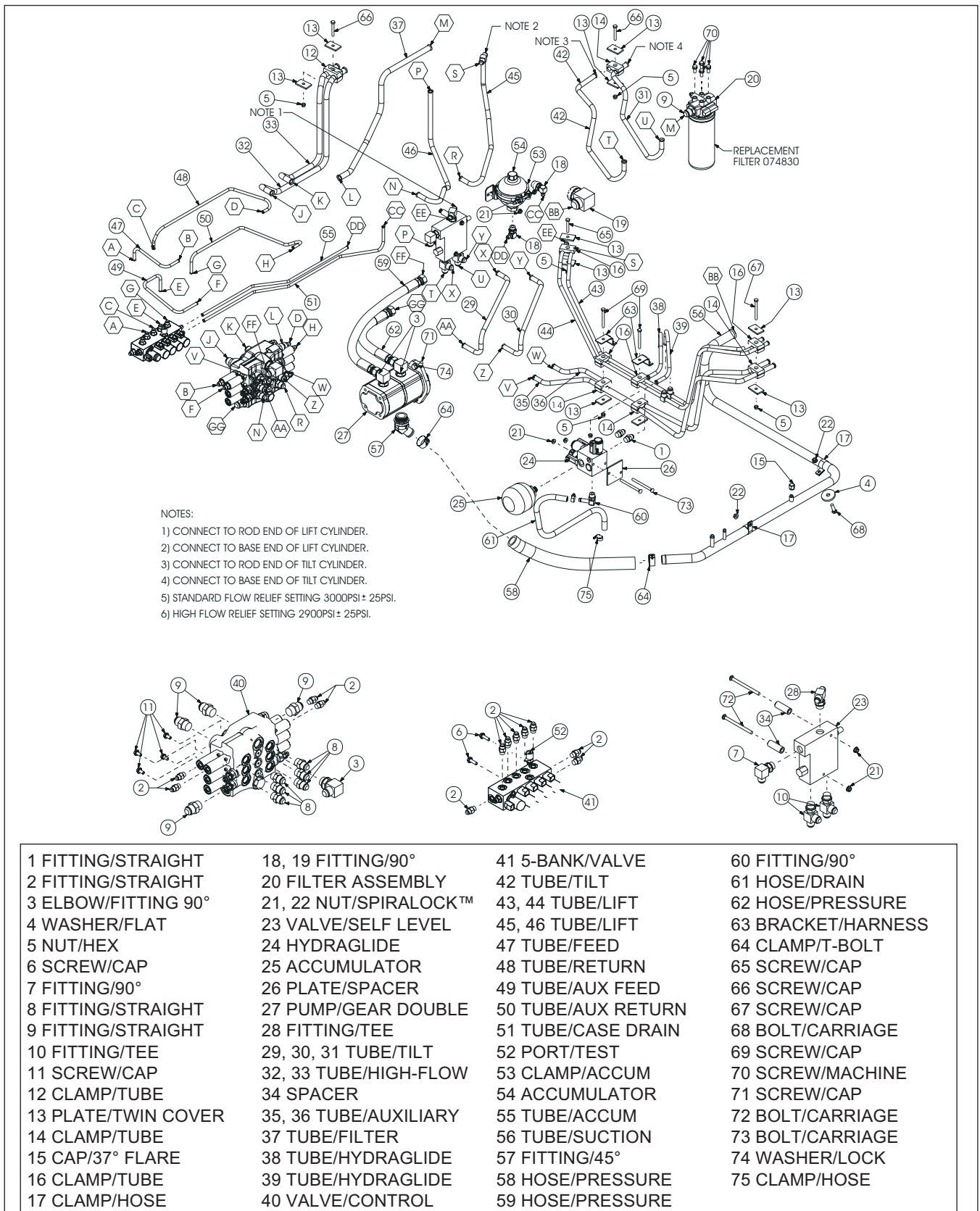
Fig. 8-1 Exploded view of the standard auxiliary hydraulics for dual joystick, hand/foot and t-bar/joystick controls

Standard Auxiliary Hydraulics - T-Bar Controls

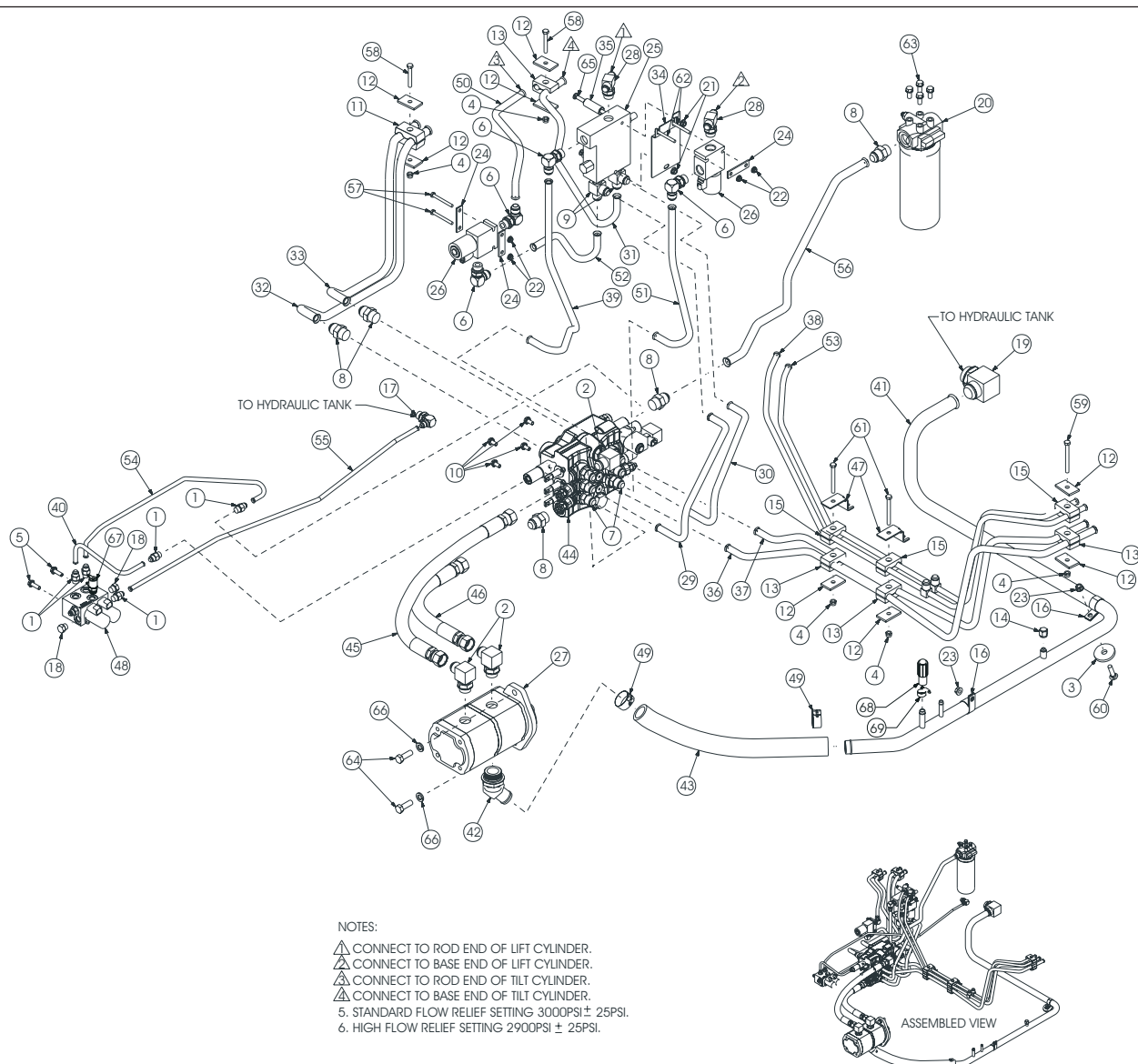


1 ELBOW/FITTING 90°	16 FILTER ASSEMBLY	31 TUBE/AUXILIARY	46 SCREW/CAP
2 WASHER/FLAT	17 NUT/SPIRALOCK™	32 TUBE/LIFT	47 SCREW/CAP
3 NUT/HEX	18 NUT/SPIRALOCK™	33 TUBE/LIFT	48 SCREW/CAP
4 FITTING/90°	19 NUT/SPIRALOCK™	34 TUBE/SUCTION	49 BOLT/CARRIAGE
5 FITTING/STRAIGHT	20 STRAP	35 FITTING/45°	50 SCREW/CAP
6 FITTING/STRAIGHT	21 VALVE/SELF LEVEL	36 HOSE/PRESSURE	51 SCREW/CAP
7 FITTING/TEE	22 PUMP/GEAR SINGLE	37 HOSE/PRESSURE	52 SCREW/MACHINE
8 SCREW/CAP	23 VALVE/SOLENOID	38 BRACKET/HARNESS	53 SCREW/CAP
9 PLATE/TWIN COVER	24 FITTING/TEE	39 VALVE/CONTROL	54 BOLT/CARRIAGE
10 CLAMP/TUBE	25 TUBE/TILT	40 CLAMP/T-BOLT	55 WASHER/LOCK
11 CAP/37° FLARE	26 TUBE/TILT	41 TUBE/TILT	56 CAP/TUBE
12 CLAMP/TUBE	27 TUBE/TILT	42 TUBE/LIFT	57 CLAMP/HOSE
13 CLAMP/HOSE	28 BRKT/SOLENOID LIFT	43 TUBE/TILT	
14 FITTING/90°	29 SPACER	44 TUBE/LIFT	
15 PLUG	30 TUBE/AUXILIARY	45 TUBE/FILTER	

Fig. 8-2 Exploded view of the standard auxiliary hydraulics for t-bar controls

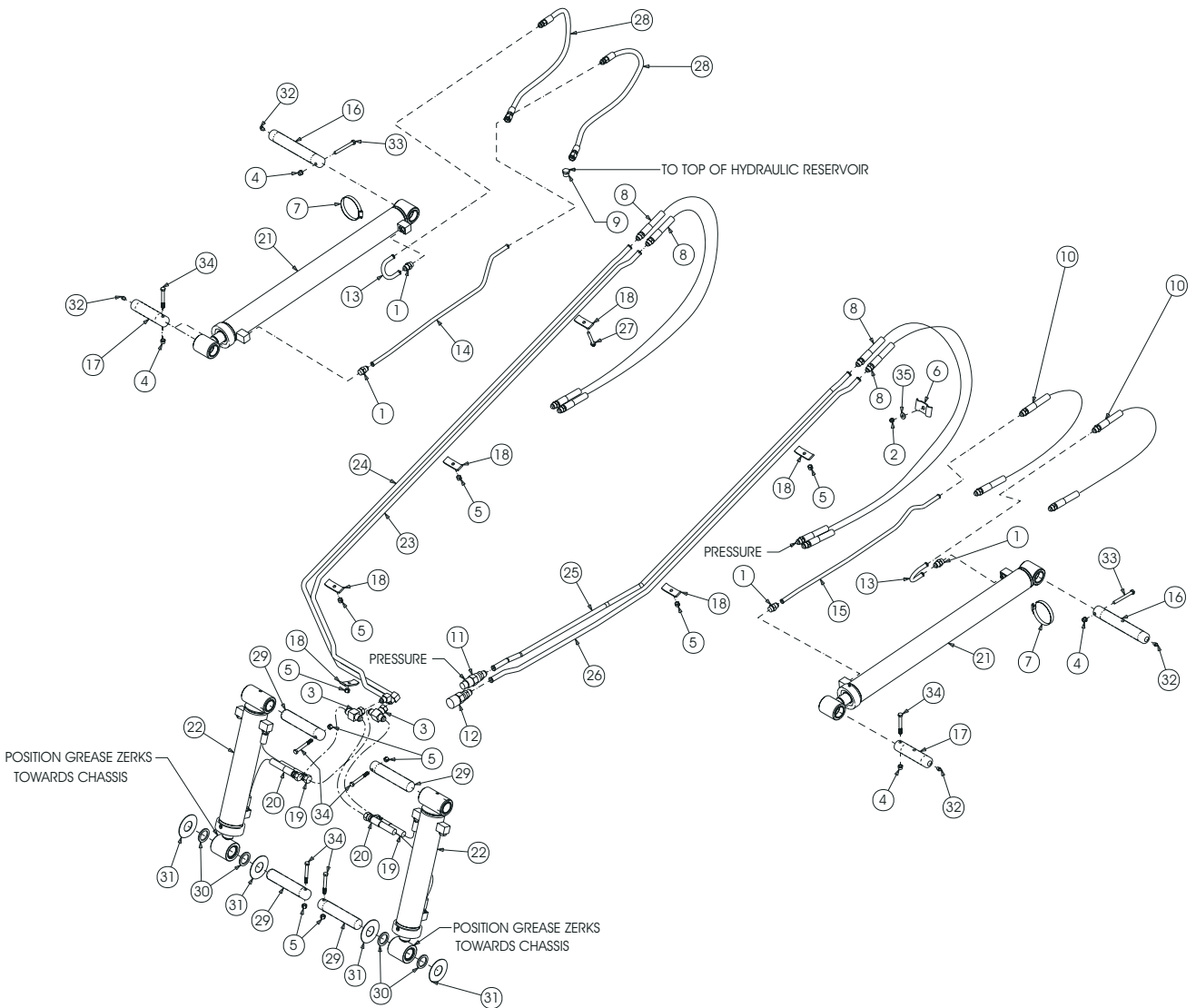
High-Flow Auxiliary Hydraulics - Dual Joystick, Hand/Foot and T-Bar/Joystick**Fig. 8-3** Exploded view of the high-flow auxiliary hydraulics for dual joystick, hand/foot and t-bar/joystick controls

High-Flow Auxiliary Hydraulics - T-Bar Controls



1 FITTING/STRAIGHT	18 PLUG/O-RING	36, 37 TUBE/AUXILIARY	54 TUBE/RETURN
2 ELBOW/FITTING 90°	19 FITTING/90°	38, 39 TUBE/LIFT	55 TUBE/CASE DRAIN
3 WASHER/FLAT	20 FILTER ASSEMBLY	40 TUBE/FEED	56 TUBE/FILTER
4 NUT/HEX	21 NUT/SPIRALOCK™	41 TUBE/SUCTION	57, 58, 59 SCREW/CAP
5 SCREW/CAP	22 NUT/SPIRALOCK™	42 FITTING/45°	60 BOLT/CARRIAGE
6 FITTING/90°	23 NUT/SPIRALOCK™	43 HOSE/PRESSURE	61, 62 SCREW/CAP
7, 8 FITTING/STRAIGHT	24 STRAP	44 VALVE/CONTROL	63 SCREW/MACHINE
9 FITTING/TEE	25 VALVE/SELF LEVEL	45 HOSE/PRESSURE	64 SCREW/CAP
10 SCREW/CAP	26 VALVE/SOLENOID	46 HOSE/PRESSURE	65 BOLT/CARRIAGE
11 CLAMP/TUBE	27 PUMP/GEAR DOUBLE	47 BRACKET/HARNESS	66 WASHER/LOCK
12 PLATE/TWIN COVER	28 FITTING/TEE	48 VALVE/PROPORTION	67 TEST PORT
13 CLAMP/TUBE	29, 30, 31 TUBE/TILT	49 CLAMP/T-BOLT	68 CAP/TUBE
14 CAP/37° FLARE	32 TUBE/HIGH-FLOW	50 TUBE/TILT	69 CLAMP/HOSE
15 CLAMP/TUBE	33 TUBE/HIGH-FLOW	51 TUBE/LIFT	
16 CLAMP/HOSE	34 BRACKET/SOLENOID	52 TUBE/TILT SOLENOID	
17 FITTING/90°	35 SPACER	53 TUBE/LIFT	

Fig. 8-4 Exploded view of the high-flow auxiliary hydraulics for t-bar controls

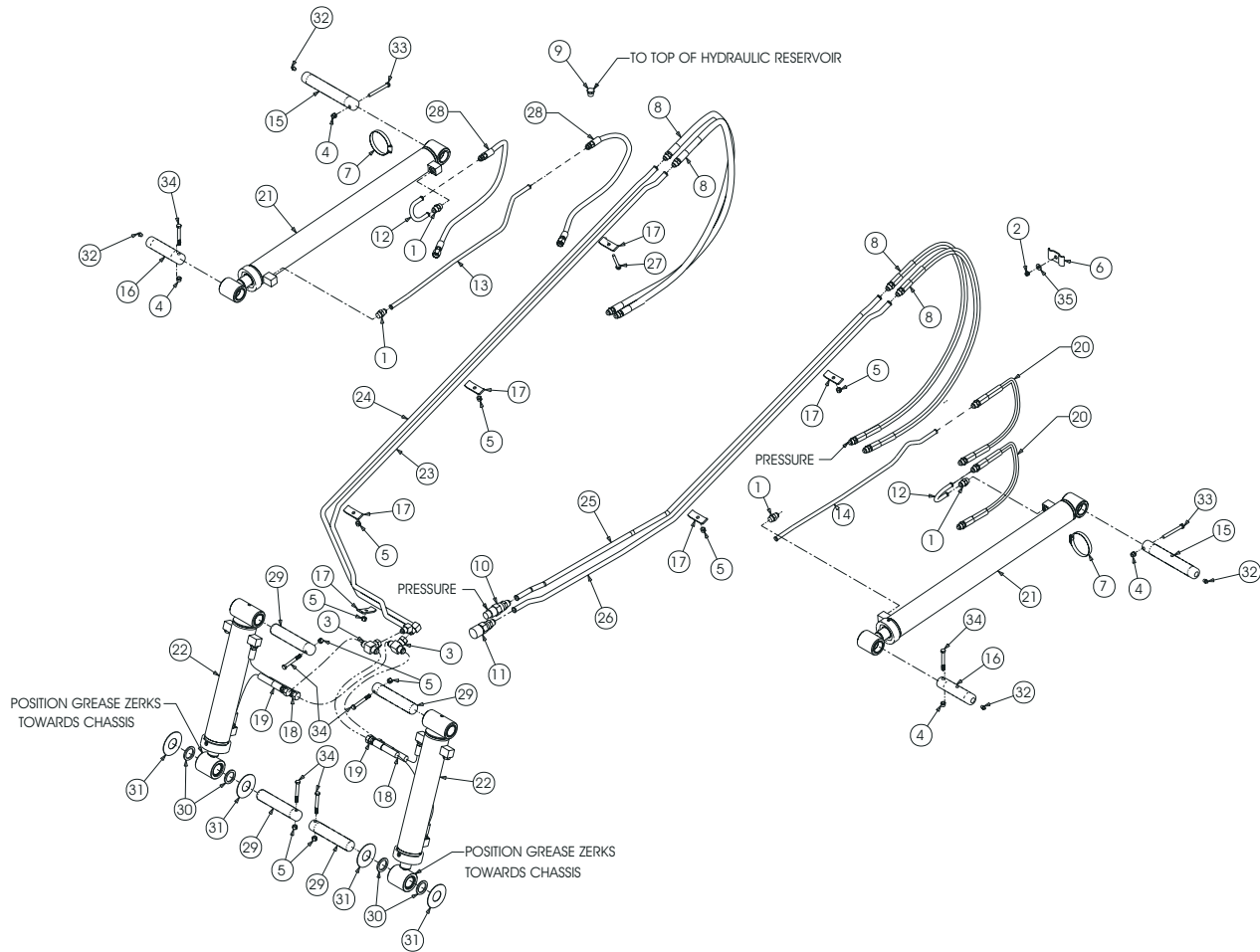
Lift Arm Hydraulics Components - 2066/76 Models

NOTE: APPLY LITHIUM GREASE TO PINS 220-32579, 135301 AND 135302.

1 FITTING/STRAIGHT	13 TUBE/LIFT CYLINDER	25 TUBE/AUX TOP
2 NUT/HEX	14 TUBE/LIFT CYLINDER	26 TUBE/AUX BOTTOM
3 FITTING/TEE	15 TUBE/LIFT CYLINDER	27 SCREW/CAP
4 NUT/HEX	16 PIN	28 HOSE/PRESSURE
5 NUT/LOCK	17 PIN	29 PIN/ PIVOT
6 CLAMP/HOSE	18 CLAMP/LINE	30 SEAL
7 CLAMP/HOSE	19 ASSY/HOSE	31 WASHER/ SPECIAL
8 HOSE/PRESSURE	20 ASSY/HOSE	32 FITTING/GREASE
9 PLUG	21 CYLINDER/LIFT	33 SCREW/CAP
10 HOSE/PRESSURE	22 CYLINDER/TILT	34 SCREW/CAP
11 COUPLER/MALE	23 TUBE/TILT INNER	35 WASHER/FLAT
12 COUPLER/FEMALE	24 TUBE/TILT OUTER	

Fig. 8-5 Exploded view of the 2066/76 lift arm hydraulic system

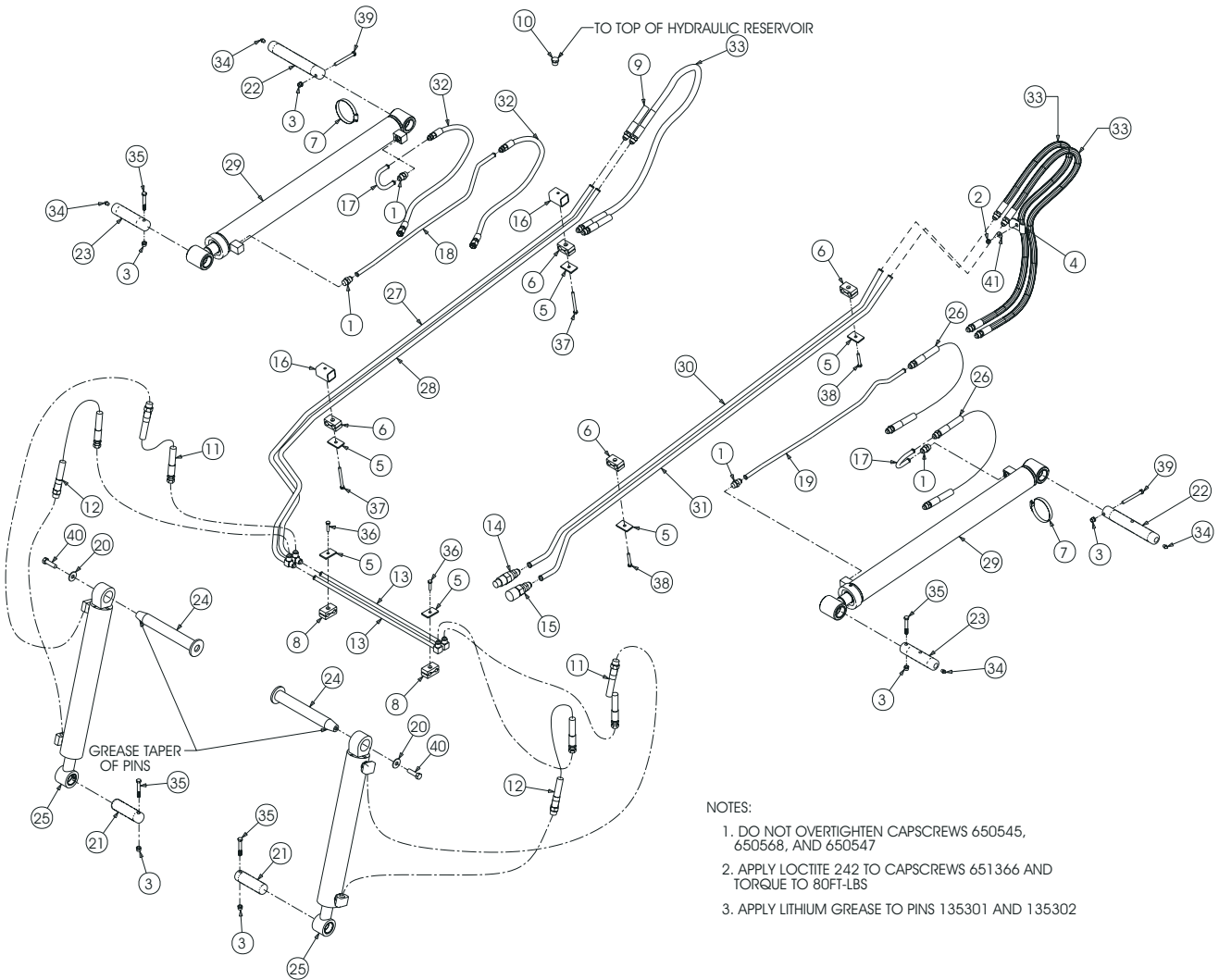
Lift Arm Hydraulics Components - 2086 Models



NOTE: APPLY LITHIUM GREASE TO PINS 220-32579, 135301, AND 135302.

1 FITTING/STRAIGHT	13 TUBE/LIFT	25 TUBE/AUXILIARY
2 NUT/HEX	14 TUBE/LIFT	26 TUBE/AUXILIARY
3 FITTING/TEE	15 PIN	27 SCREW/CAP
4 NUT/HEX	16 PIN	28 HOSE/PRESSURE
5 NUT/LOCK	17 CLAMP/LINE	29 PIN/ PIVOT
6 CLAMP/HOSE	18 ASSY/HOSE	30 SEAL
7 CLAMP/HOSE	19 ASSY/HOSE	31 WASHER/ SPECIAL
8 HOSE/PRESSURE	20 HOSE/PRESSURE	32 FITTING/GREASE
9 PLUG	21 CYLINDER/LIFT	33 SCREW/CAP
10 COUPLER/MALE	22 CYLINDER/TILT	34 SCREW/CAP
11 COUPLER/FEMALE	23 TUBE/TILT	35 WASHER/FLAT
12 TUBE/LIFT	24 TUBE/TILT	

Fig. 8-6 Exploded view of the 2086 lift arm hydraulic system

Lift Arm Hydraulics Components - 56/6640 Models

1 FITTING/STRAIGHT	15 COUPLER/FEMALE	29 CYLINDER/LIFT
2 NUT/HEX	16 SPACER/TILT TUBE	30 TUBE/LIFT ARM AUX INNER
3 NUT/HEX	17 TUBE/LIFT CYLINDER	31 TUBE/LIFT ARM AUX OUTER
4 CLAMP/HOSE	18 TUBE/LIFT CYLINDER	32 HOSE/PRESSURE
5 PLATE/TWIN COVER	19 TUBE/LIFT CYLINDER	33 HOSE/PRESSURE
6 CLAMP/TUBE	20 WASHER/FLAT	34 FITTING/GREASE
7 CLAMP/HOSE	21 PIN	35 SCREW/CAP
8 CLAMP/TUBE	22 PIN	36 SCREW/CAP
9 HOSE/PRESSURE	23 PIN	37 SCREW/CAP
10 PLUG	24 PIN/TILT CYLINDER	38 SCREW/CAP
11 HOSE/PRESSURE	25 CYLINDER/TILT	39 SCREW/CAP
12 HOSE/PRESSURE	26 HOSE/PRESSURE	40 SCREW/CAP
13 TUBE/TILT	27 TUBE/TILT OUTER	41 WASHER/FLAT
14 COUPLER/MALE	28 TUBE/TILT INNER	

Fig. 8-7 Exploded view of the 56/6640 lift arm hydraulic system

High-Flow Lift Arm Hydraulics Option - Dual Joystick, Hand/Foot, T-Bar/Joystick

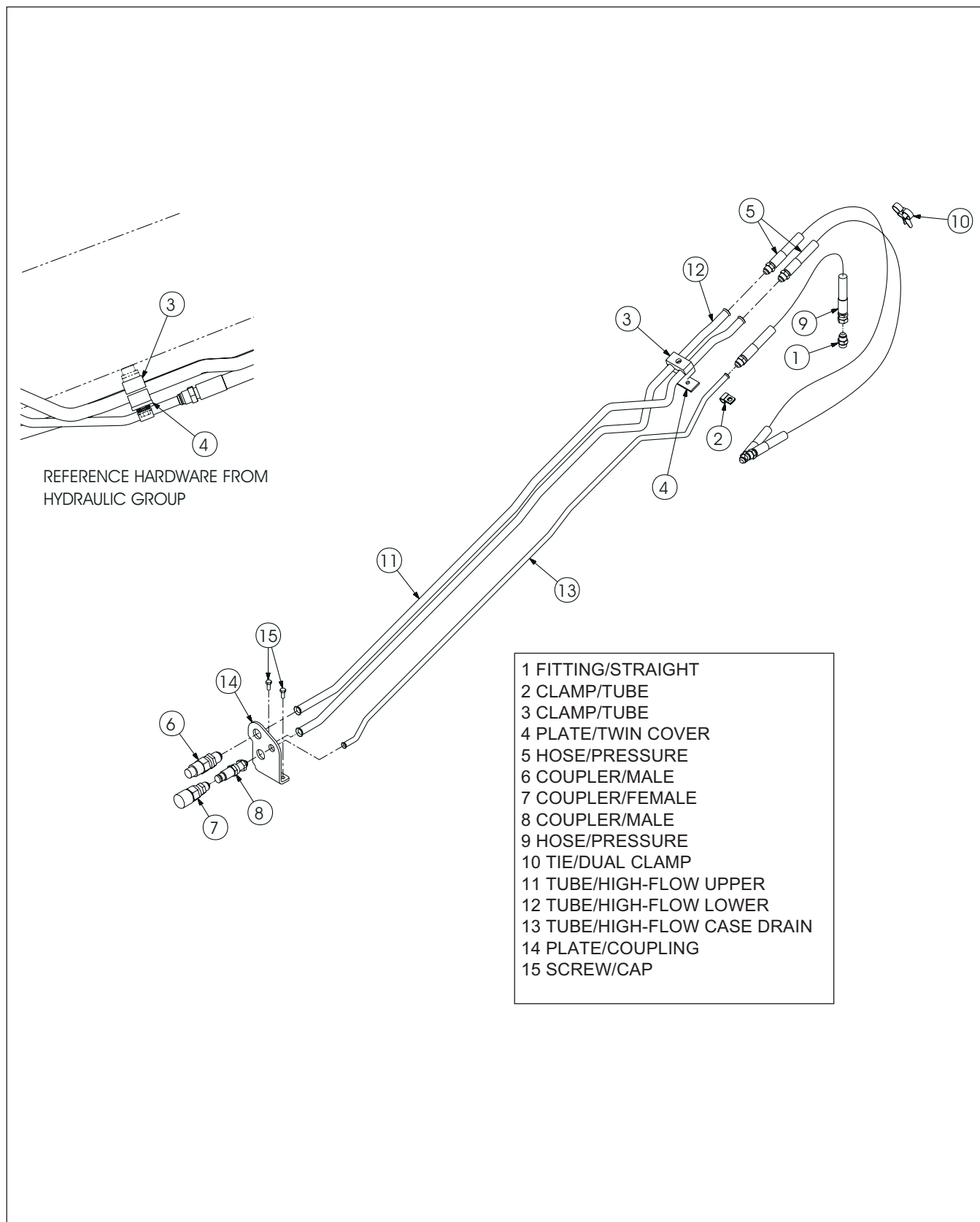
**Fig. 8-8** Exploded view of the high-flow lift arm hydraulic system



Fig. 8-9 System pressure test location on the left lift arm for standard flow hydraulic couplers



Fig. 8-10 System pressure test location on the right lift arm for high-flow hydraulic couplers

Pressure Tests, Standard-Flow and High-Flow Auxiliary

The control valve on the skid loader controls lift and tilt functions of the lift arm, standard and high-flow auxiliary hydraulics. It is located on the right side of the chassis. The relief valve(s) inside the control valve can be tested at the lift arm couplers.

Test Procedure

WARNING

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

- ☐ Shut off the engine.
- ☐ Relieve hydraulic system pressure.

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

NOTE: To prevent contamination, ALWAYS clean the area around the hydraulic fittings before disconnecting any hydraulic plug, hose or tube.

1. What you'll need: an assistant and a minimum 5000 PSI (345 bar) pressure gauge.
2. Perform the pressure reading test at the auxiliary hydraulic couplers located on the left lift arm and the high-flow couplers (if so equipped) located on the right lift arm of high-flow auxiliary loaders. **Figs. 8-9, 8-10**
3. Install the pressure gauge in the end of the male coupler and activate the auxiliary hydraulic (or turn on high-flow) to pressurize the line. **Figs. 8-9, 8-10**
4. For this test, engine should be running at HIGH IDLE.
5. Have assistant observe the pressure reading on the gauge. The pressure reading on your respective loader should be:
 - a. for standard flow units, at least 2975 PSI (205 bar), but NOT more than 3025 PSI (209 bar), and
 - b. for high-flow units, at least 2875 PSI (198 bar), but NOT more than 2925 PSI (202 bar).
6. If the pressure reading is NOT between the abovementioned pressures, adjust pressure as follows:



WARNING

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

- ☐ Shut off the engine.
- ☐ Tilt back ROPS/FOPS until lock engages.

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

- a. Remove the cap on the relief valve adjuster screw(s). **Figs. 8-11, 8-12**
 - b. With a flat-edge screwdriver, turn the adjuster screw IN to increase pressure or OUT to decrease pressure. **Fig. 8-13**
 - c. Repeat steps 4 through 5.
 - d. Once the pressure is within the correct PSI optimum setting, tighten the locknut on the control valve adjuster screw to secure the adjustment.
7. If, after the adjustment, there is **NO CHANGE** in the pressure reading, this indicates a defective hydraulic gear pump or relief valve cartridge (on the control valve). To determine which is the cause, first replace the relief valve cartridge. If the pressure reading still does not change, the hydraulic gear pump should be repaired or replaced.

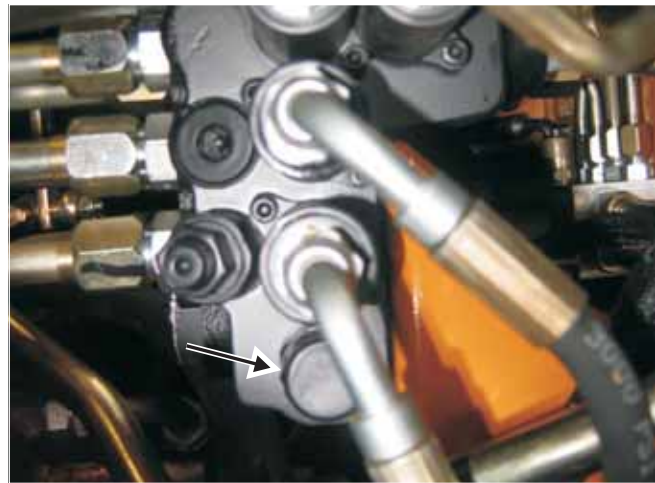


Fig. 8-11 Standard flow relief valve location at the bottom rear of the control valve



Fig. 8-12 An additional high-flow relief valve location at the top rear of the control valve



Fig. 8-13 View of the adjuster screw beneath the cap on the relief valve

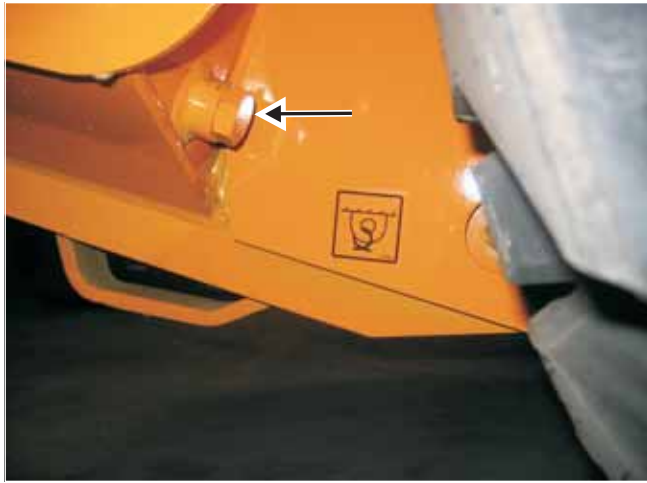


Fig. 8-14 Location of hydraulic reservoir drain plug behind the right rear tire



Fig. 8-15 Location of the hydraulic oil filter on the right riser, below the muffler



Fig. 8-16 Use a filter wrench on the element and turn the element counterclockwise to remove, clockwise to install

Hydraulic Oil Filter Element Replacement

Gehl 5640E/6640E and Mustang 2066/76/86 skid-steer loaders have one hydraulic oil filter. The hydraulic oil filter needs to be replaced when the restriction indicator shows red.

NOTE: When reading the restriction indicator, run the engine at HIGH idle with the hydraulic oil temperature at 70°F (21°C) or warmer.

Replacement Procedure

WARNING

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

☐ Shut off the engine.

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

1. Open the engine access cover and rear grille.
2. Remove hydraulic reservoir drain plug and drain oil (into a suitable container) to a level **BELOW** the point where the filter attaches to reservoir. **Fig. 8-14**
3. Reinstall the drain plug.
4. Using a filter wrench, turn the filter element counterclockwise to remove it from the filter head. **Fig. 8-15**
5. Install correct filter element (refer to Gehl or Mustang Parts Manual). **BEFORE** installation, apply a light coat of oil to gasket, then install it on filter head.
6. Hand tighten element until gasket contacts filter head. Turn element another 3/4 turn to seat gasket. **Fig. 8-16**
7. Refill the hydraulic reservoir. Refer to the *Lubrication* chapter in this manual for 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 assembling components of the hydraulic system.

NOTES

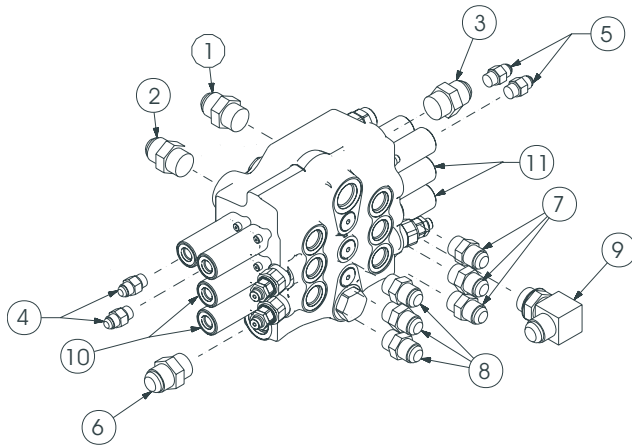


Fig. 8-17 Control valve port reference numbers (high-flow valve shown)

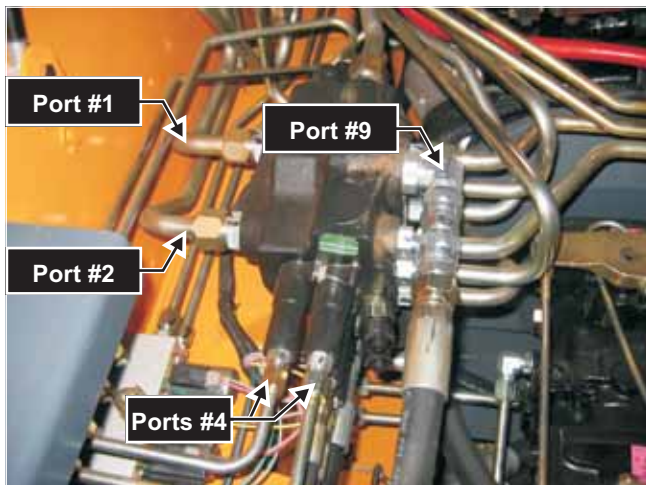


Fig. 8-18 Location of ports 1, 2, 4 and 9 on the high-flow control valve

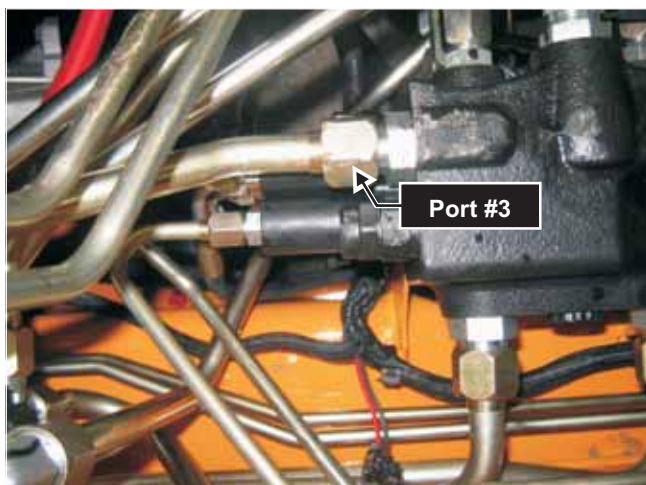


Fig. 8-19 Location of port 3 at rear of control valve

Control Valve Removal and Installation

The main hydraulic control valve is located on the right side of the chassis, in front of the engine. The control valve ports have been numbered for reference.

Removal Procedure

WARNING

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

- ☐ 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. If necessary (see following NOTE), drain oil from hydraulic reservoir. For this procedure refer to "Hydraulic Reservoir" in the *Lubrication* chapter.

NOTE: If hydraulic hoses and tubes are plugged to prevent oil leakage, it should not be necessary to drain hydraulic reservoir. BE SURE to plug/cap ALL hydraulic hose and tube fittings to prevent contamination of the hydraulic system.

NOTE: To aid in reassembly of hydraulic hoses and tubes, mark hoses and tubes to be removed **BEFORE** disassembly. **Figs. 8-17, 8-22, 8-26**

2. **Ports 1 and 2 (high-flow only):** Disconnect the high-flow tubes at the straight fittings on the control valve.
3. **Port 3:** Disconnect the hydraulic filter tube from the straight fitting on control valve.
4. **Ports 4:** Disconnect the auxiliary feed tube and high-flow feed tube (high-flow only) from straight fittings on the control valve.
5. **Ports 5:** Disconnect the auxiliary return tube and high-flow return tube (high-flow only) from straight fittings on the control valve.
6. **Port 6:** Disconnect the pressure hose from the straight fitting on the control valve, other end connects to gear pump.

7. **Ports 7:** Disconnect a lift, tilt and auxiliary tube from the straight fittings on the control valve.
8. **Ports 8:** Disconnect a lift, tilt and auxiliary tube from the straight fittings on the control valve.
9. **Port 9 (high-flow only):** Disconnect the pressure hose from the 90° fitting on the control valve, other end connects to gear pump.
10. **Ports 10 and 11:** Disconnect four remaining hoses from straight fittings on the control valve, two hoses in front and two more in the rear.
11. Remove four locking capscrews securing the control valve to the welded mounting bracket.
12. Lift the control valve out. Removal may require loosening the opposite ends of some of the disconnected tubes.

NOTE: Cap or plug ALL hydraulic hoses, tubes, fittings and control valve ports immediately after being disconnected to prevent fluid loss and contamination of the hydraulic system.

Installation Procedure

1. Secure the control valve to the welded bracket with four locking capscrews. If straight or 90° fittings are not in the control valve, install them at this time.
2. **Ports 10 and 11:** Connect four hoses to straight fittings on the control valve, two hoses in front and two more in the rear.
3. **Port 9 (high-flow only):** Connect the pressure hose to the 90° fitting on the control valve, other end connects to gear pump.
4. **Port 8:** Connect a lift, tilt and auxiliary tube to the straight fittings on the control valve.
5. **Port 7:** Connect a lift, tilt and auxiliary tube to the straight fittings on the control valve.
6. **Port 6:** Connect the pressure hose to the straight fitting on the control valve, other end connects to gear pump.
7. **Port 5:** Connect the auxiliary return tube and high-flow return tube (high-flow only) to straight fittings on the control valve.
8. **Port 4:** Connect the auxiliary feed tube and high-flow feed tube (high-flow only) to straight fittings on the control valve.

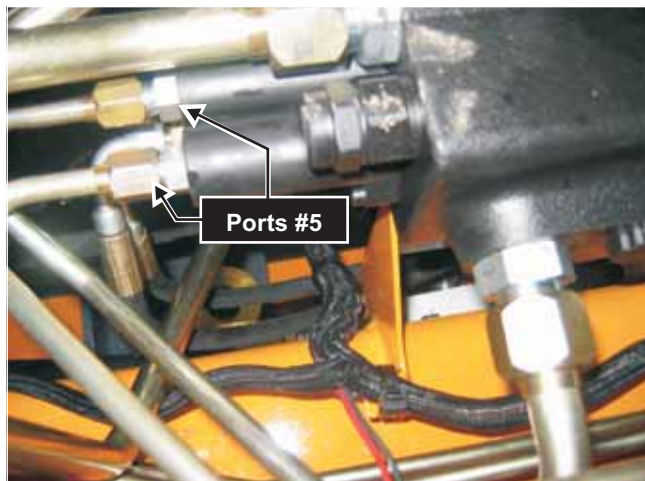


Fig. 8-20 Location of port 5 on the control valve

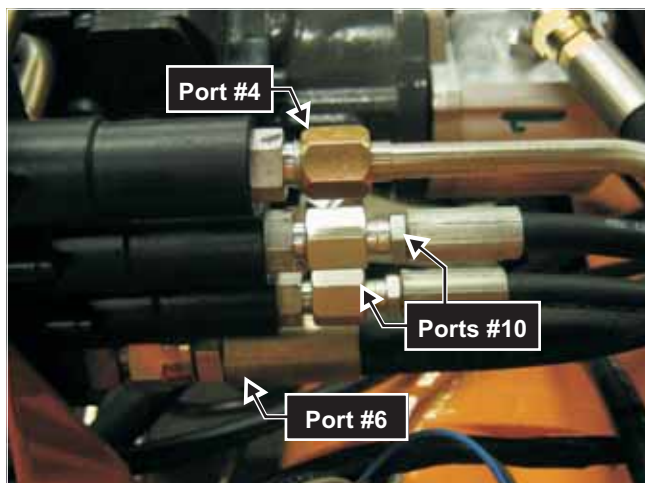


Fig. 8-21 Location of ports 4, 6 and 10 on the standard control valve

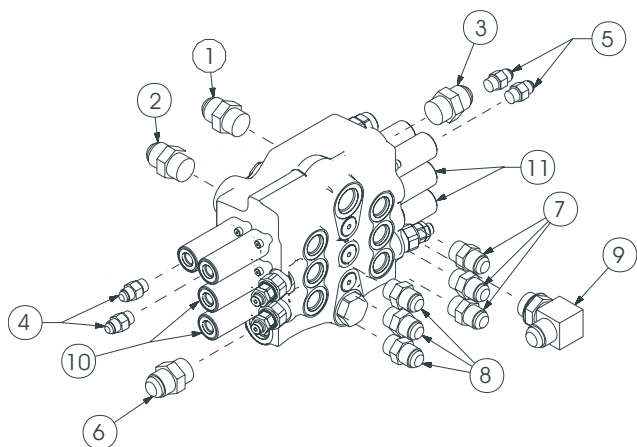


Fig. 8-22 Control valve port reference numbers (high-flow valve shown)

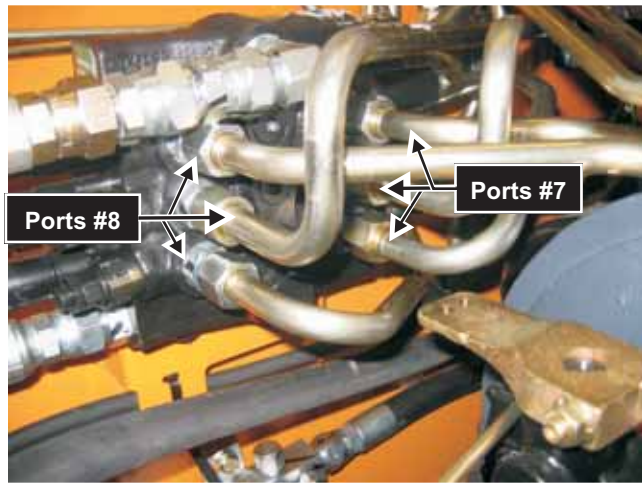


Fig. 8-23 Location of ports 7 and 8 on the control valve

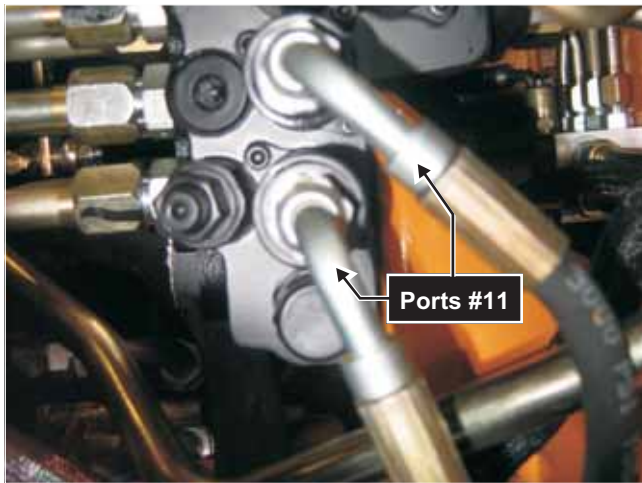


Fig. 8-24 Location of port 11 on the control valve

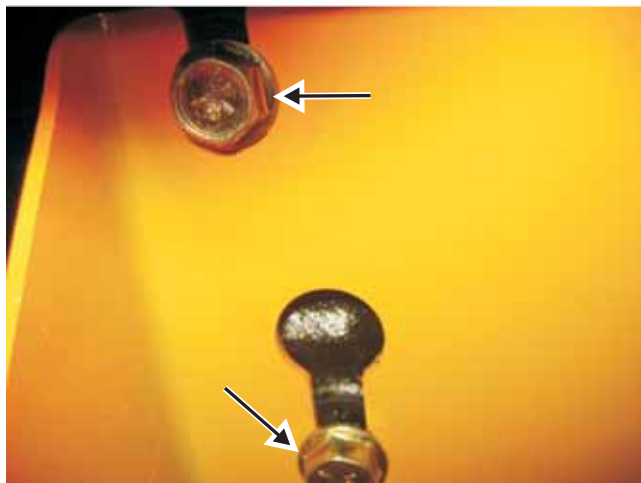


Fig. 8-25 View of 2 of 4 locking capscrews securing the control valve to a welded tab on the chassis

9. **Port 3:** Connect the hydraulic filter tube to the straight fitting on control valve.
10. **Ports 1 and 2 (high-flow only):** Connect the high-flow tubes at the straight fittings on the control valve.
11. Install hydraulic reservoir drain plug and refill with correct type of hydraulic oil. Refer to *Lubrication* chapter for hydraulic oil requirements and specifications.
12. ALWAYS check for hydraulic fluid leaks after assembling any component of the hydraulic system.

WARNING



NEVER use your hands to search for hydraulic fluid leaks. Use a piece of paper or cardboard. 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.



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

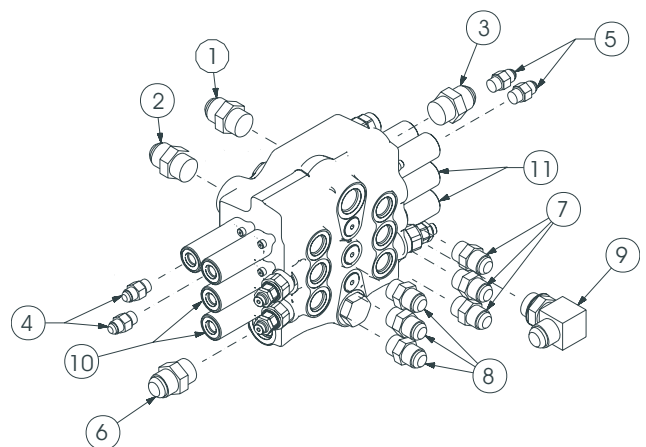


Fig. 8-26 Control valve port reference numbers (high-flow valve shown)

Manifold Valve Removal and Installation

Gehl 5640E/6640E and Mustang 2066/76/86 skid-steer loaders are equipped with a 3-bank or 5-bank manifold valve.

Removal Procedure



WARNING

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

- ☐ 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 in this manual.)

1. Disconnect the three or five electrical connectors from the manifold valve. **Figs. 8-27, 8-28**
2. Disconnect seven or nine hydraulic tubes/hoses from the manifold valve. **Fig. 8-27, 8-28**
3. Remove two locking capscrews securing the manifold valve to the chassis and remove the valve. Removal may require loosening the opposite ends of some of the disconnected tubes. **Fig. 8-29**

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

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 hydraulic fluid requirements and specifications.

ALWAYS check for hydraulic fluid leaks after assembling any component of the hydraulic system.



Fig. 8-27 View of 5-bank high-flow manifold valve on inside right of the chassis. Note the many electrical connectors attached to it



Fig. 8-28 View of 3-bank standard-flow manifold valve on inside right of the chassis



Fig. 8-29 Location of two locking capscrews securing the manifold valve to the right side of the chassis wall



Fig. 8-30 View of a hex socket capscrew, 1 of 2, used to securing the spool cap to the control valve



Fig. 8-31 Locate the o-ring found in the spool cap

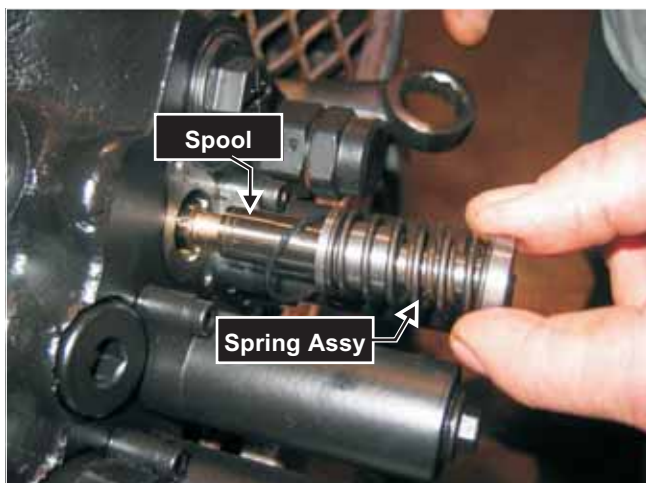


Fig. 8-32 Pull the spool out of the control valve by grabbing the spring assembly on the end of the spool

Control Valve Disassembly and Assembly

The main control valve is a mono-block designed control valve with spools.

Disassembly Procedure

1. Remove the main control valve per the procedure in this chapter and place valve on a flat surface that can retain or collect any hydraulic oil runoff.
2. To access the spools, use an Allen wrench to loosen two hex socket capscrews, one on each side of the spool cap. **Fig. 8-30**
3. Pull spool cap off the spool and retain the o-ring. **Fig. 8-31**
4. Grab the spring assembly on the end of the spool and pull the spool out of the control valve and retain all o-rings. **Fig. 8-32**
5. Repeat steps 1-4 for all spools needing removal from the control valve.
6. To remove port relief valves from the control valve, use a wrench to loosen the valve from the mono-block control valve. **Fig. 8-33**

Assembly Procedure - Reverse the disassembly steps.



Fig. 8-33 A wrench can be used to remove a port relief valve from the control valve body

Main Relief Valve Removal and Installation

An anti-cavitation relief valve is integrated within the standard-flow control valve, two anti-cavitation relief valves are integrated within the high-flow control valve. A relief valve(s) activates when oil pressures inside the control valve reach unacceptable levels; to relieve that pressure and prevent damage to valve and hydraulic system.

Removal Procedure

WARNING

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

- ☐ Shut off the engine.
- ☐ Relieve hydraulic system pressure.
- ☐ Roll back ROPS until lock engages.

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

1. With a wrench, loosen and remove the anti-cavitation relief valve from the main control valve. **Fig. 8-34**
2. Check condition of o-rings and clean off any debris. **Fig. 8-35**

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

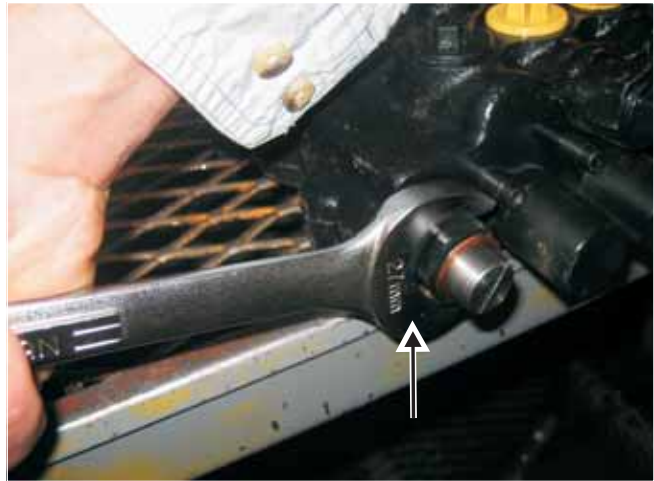


Fig. 8-34 Use a wrench to remove the relief valve(s) from the control valve

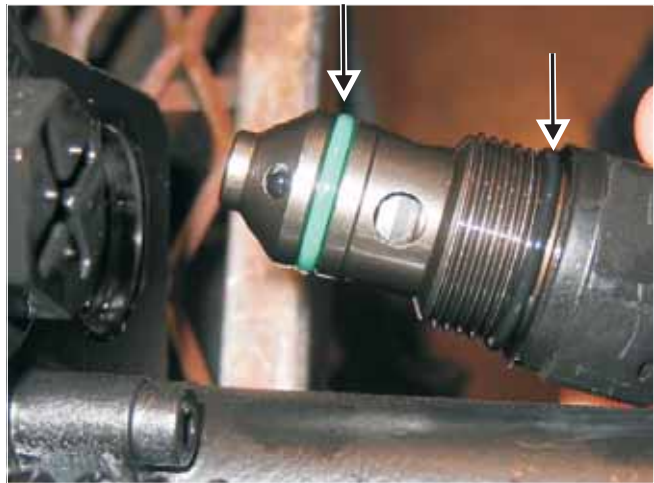


Fig. 8-35 Location of o-rings on the relief valve

Control Valve Components - Standard-Flow and High-Flow

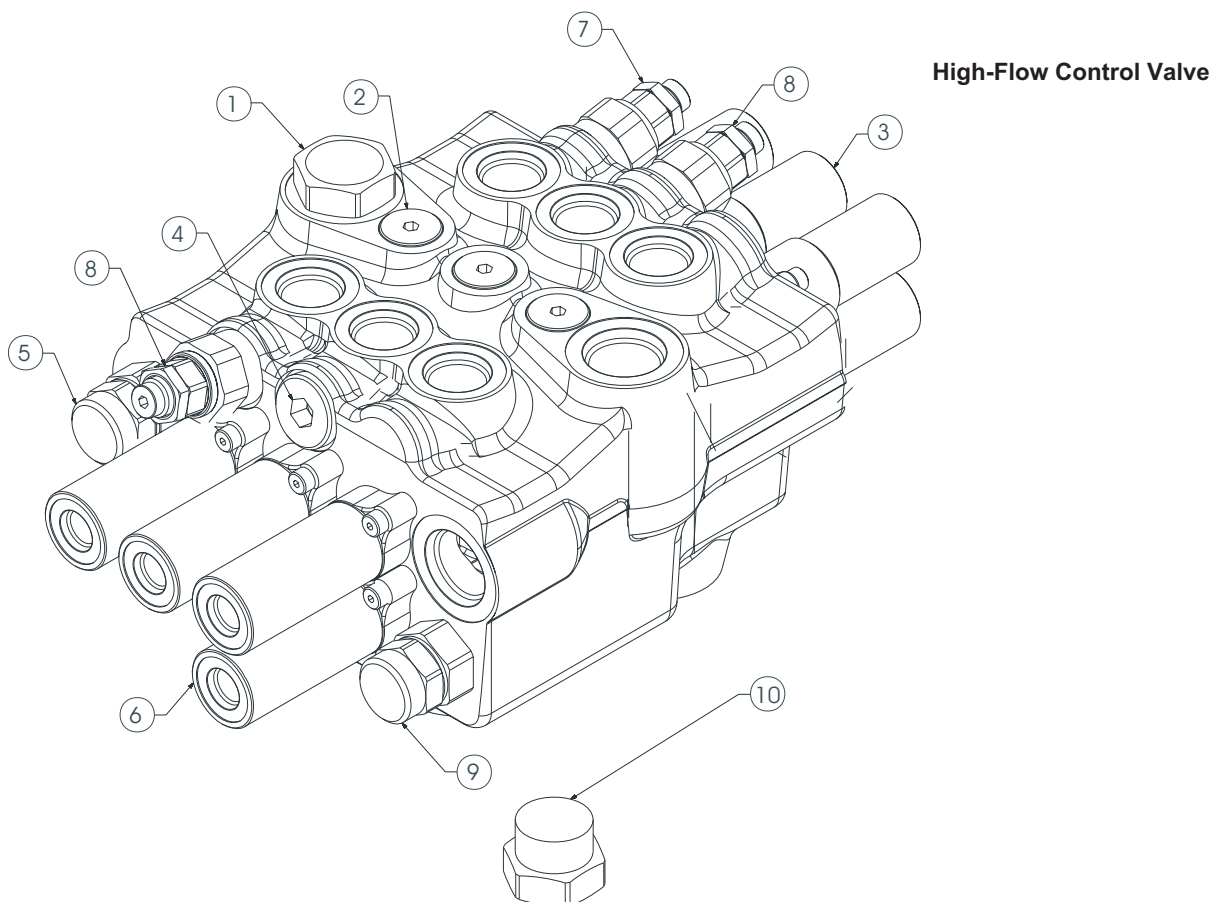
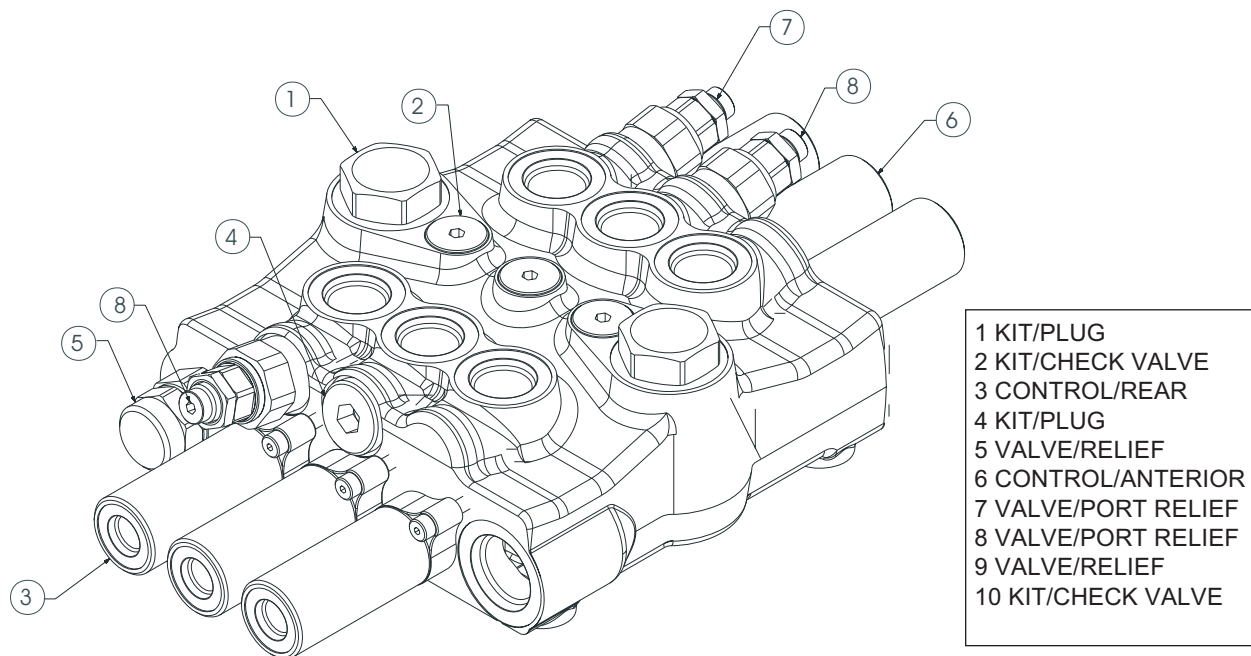


Fig. 8-36 Exploded view of the main control valve components

NOTES

Introduction

Description of Operation - Right and Left Instrument Panels

Right Instrument Panel

The right instrument panel for Gehl 5640E/6640E and Mustang 2066/76/86 skid-steer loaders includes gauges, a light switch, a keyswitch, indicator lights, a manual engine speed control knob and an (optional) high-flow auxiliary switch.

The following items describe the normal operation of electrical system components on the skid-steer loaders.

1. When the operator is in the seat, the restraint bar is down, and the keyswitch is turned to the "ON" position, the following indicator lamps will light:

- ☐ Fasten Seat Belt (momentary and buzzer will sound for five seconds)
- ☐ Engine malfunction lamp on left panel (two seconds)
- ☐ Battery

NOTE: The engine ECU (Electronic Control Unit) automatically controls the engine intake grid heater. When the operator is in the seat, the restraint bar is down, and the keyswitch is turned to the "ON" position, the pre-heat indicator lamp will light when active. Do not start engine until the engine pre-heat light has gone out.

2. The keyswitch can then be turned to the "START" position.

- ☐ The battery lamp will go out after the engine starts.

NOTE: To verify that the seat and restraint bar switches are working properly, after the keyswitch is turned to "ON," raise the restraint bar or lift body off the seat. Either action should prevent the engine from cranking with the keyswitch turned to "START."

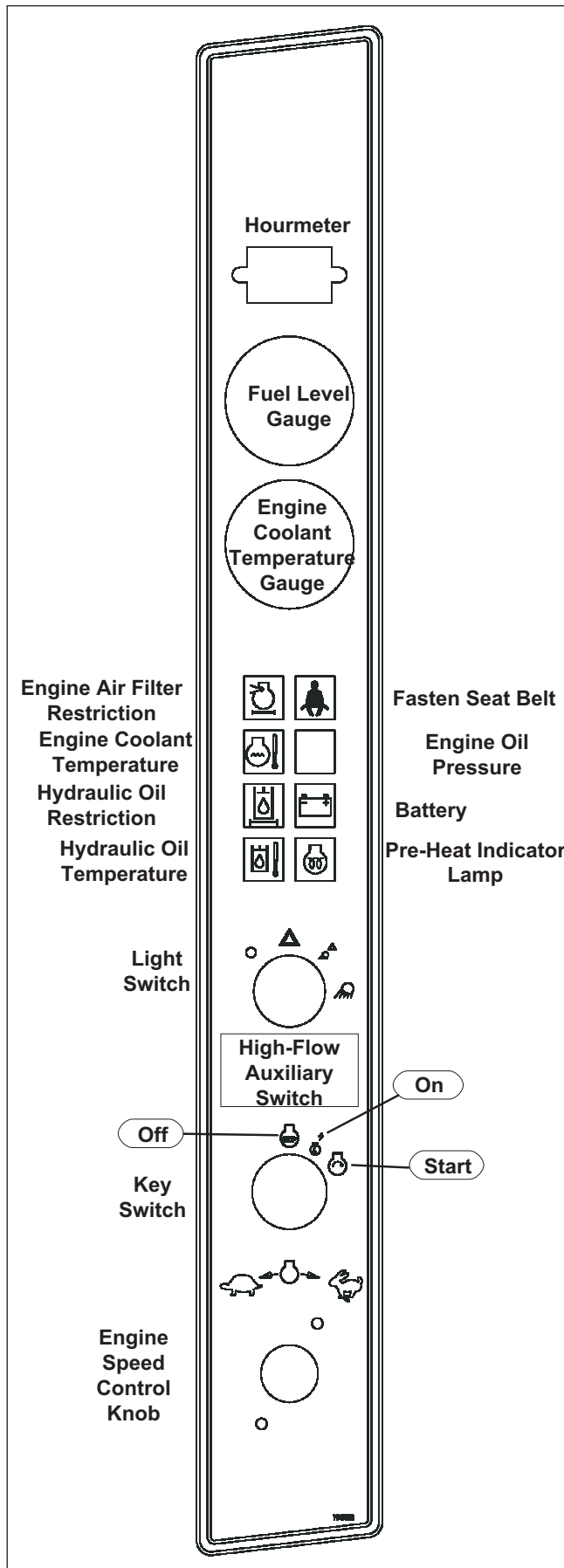


Fig. 9-1 Right instrument panel

Left Instrument Panel

The left instrument panel for Gehl 5640E/6640E and Mustang 2066/76/86 skid-steer loaders holds the manual parking brake switch, indicator lights and the accessory plug. Optional switches and HVAC controls are also on this panel.

1. Two-speed Indicator Lamp – it lights when skid-steer loader's two-speed HIGH range is engaged.
2. Parking Brake Indicator Lamp – it lights when skid-steer loader's parking brake is engaged.
3. Hydraglide™ Ride Control Indicator Lamp – it lights when loader's (optional) ride control is engaged.
4. Fan Switch – controls the (optional) fan on heater and/or air conditioning package.
5. HVAC Switch – controls the (optional) selection of heat or air conditioning.
6. 12-VDC Power Outlet – a plug-in outlet with rubber boot used for external electrical connections.
7. Parking Brake Switch – used to apply the parking brake.
8. Power Fast-A-Tach®/Power All-Tach® – used to actuate the (optional) Power Fast-A-Tach®/Power All-Tach®.
9. Engine Malfunction – engine warning light also displays flash codes.
10. Float Indicator Switch – it lights when the float function is electrically activated.

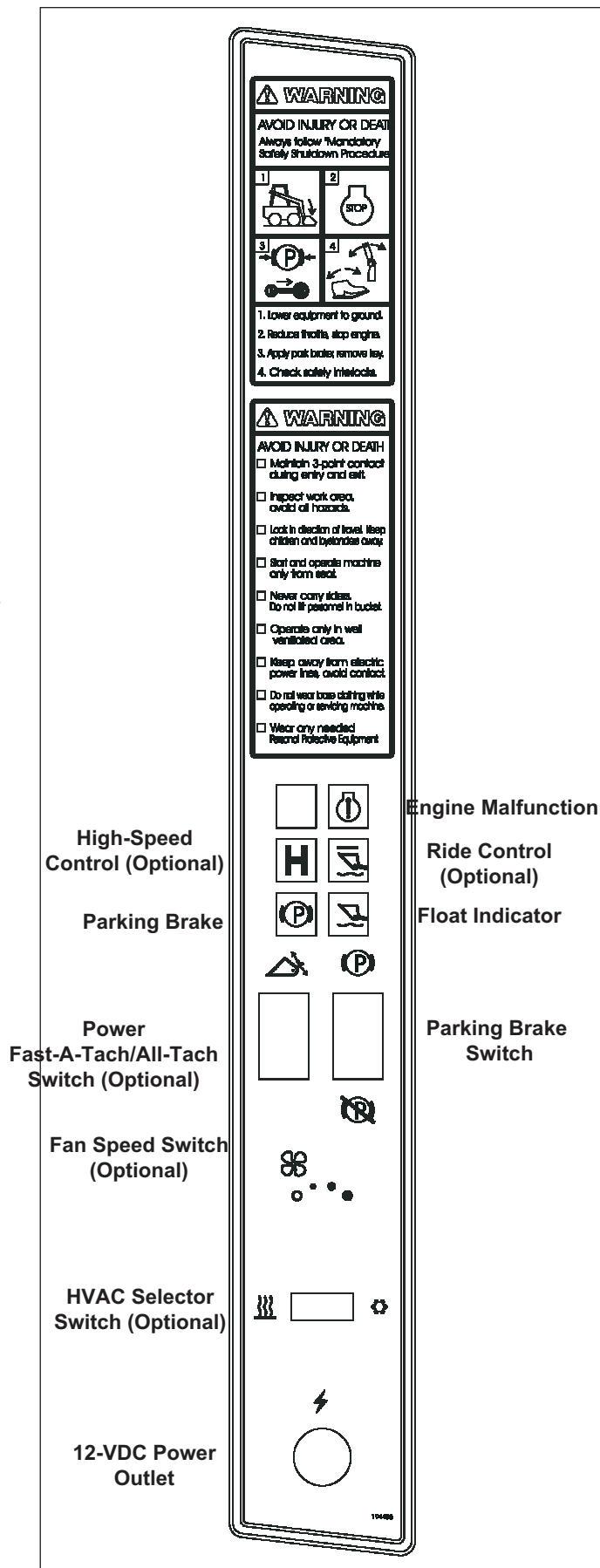


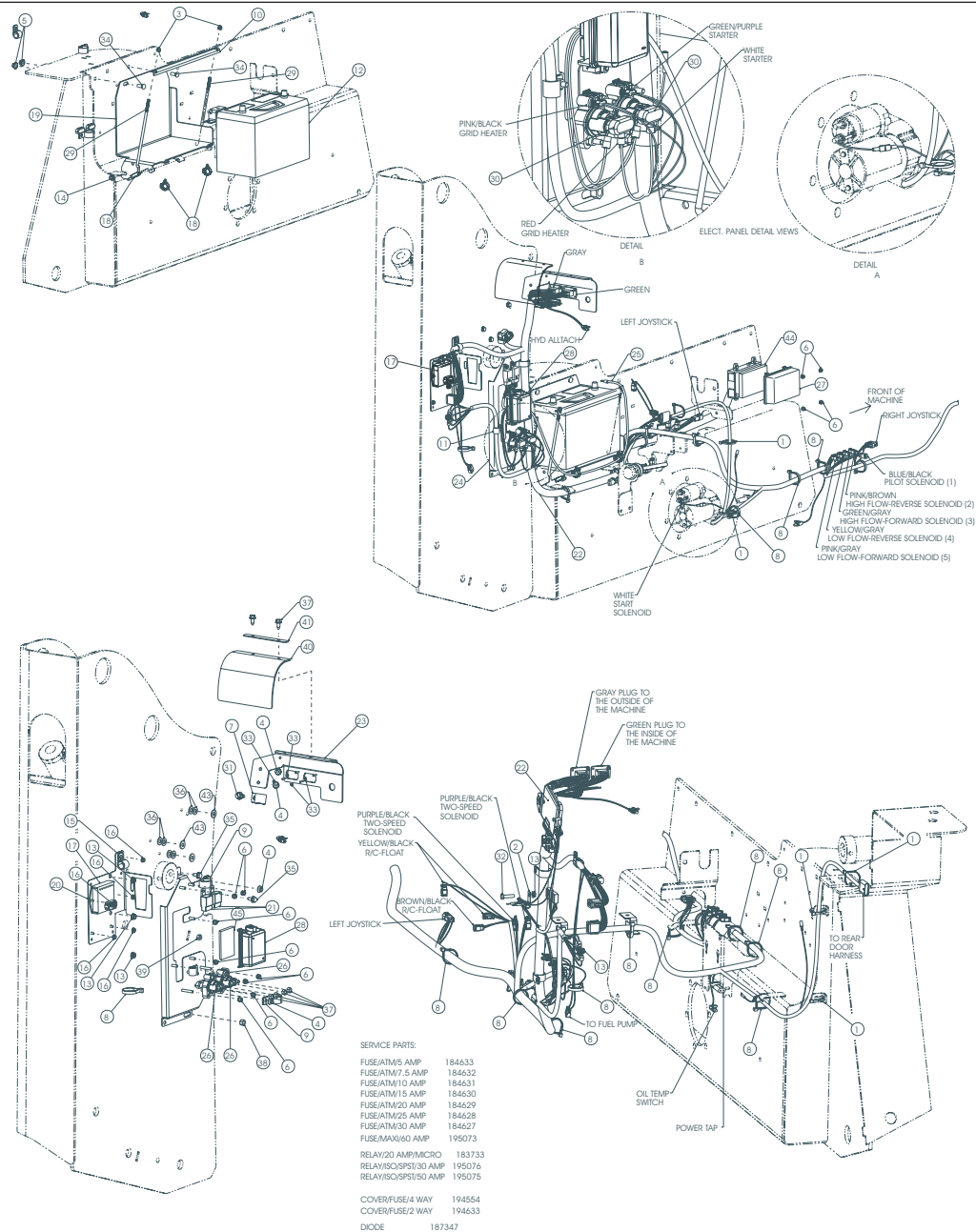
Fig. 9-2 Left instrument panel and switches

Troubleshooting Guide

Problem	Possible Cause	Remedy
Entire electrical system does not function.	Battery disconnect switch "OFF"	Turn battery disconnect switch to "ON."
	Faulty keyswitch	Replace keyswitch.
	10 A fuse blown (keyswitch)	Replace fuse (in power distribution center).
	Main wiring harness connectors at rear of ROPS not properly plugged-in	Check main connectors.
	Battery terminals or cables loose or corroded	Clean battery terminals and cables and tighten them.
	Battery faulty	Test battery and replace as needed.
No instrument panel lamps light with keyswitch turned to "ON."	Fuse blown	Replace fuse.
	Power relay has failed.	Replace relay.
	Main wiring harness connectors at rear of ROPS not properly plugged-in	Check main connectors.
	Distribution fuse failed	Replace fuse.
	Battery terminals or cables loose or corroded.	Clean battery terminals and cables and tighten them.
Seat belt buzzer indicator not sounding when key turned to "ON," indicator lamps work properly.	Plugged or obstructed buzzer	Clean out buzzer.
	Faulty buzzer	Replace interlock control module.
Fuel gauge does not work.	Faulty fuel gauge sender	Replace fuel gauge sender.
	Loose wiring/terminal connections	Verify wiring connections.
	Faulty fuel gauge	Replace fuel gauge.
	Gauge has blown fuse	Replace fuse.
Engine temperature gauge does not work.	Faulty sender	Replace temperature sender.
	Loose wiring/terminal connections	Verify wiring connections.
	Faulty temperature gauge	Replace temperature gauge.
	Gauge has blown fuse	Replace fuse.
Hourmeter does not work.	Loose wiring/terminal connections	Verify wiring connections.
	Faulty alternator	Repair or replace alternator.
	Faulty hourmeter	Replace hourmeter.

Troubleshooting Guide

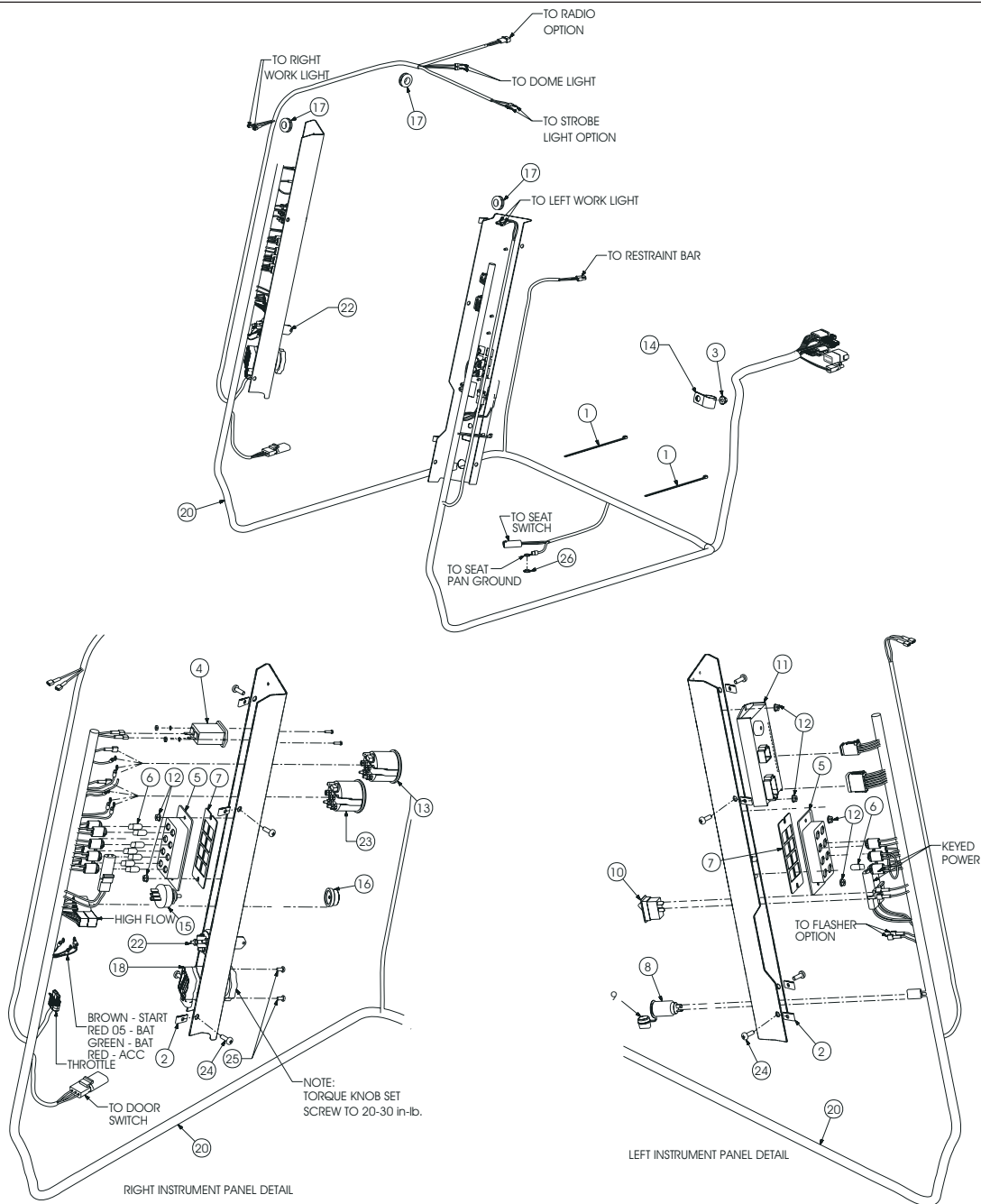
Problem	Possible Cause	Remedy
Starter will not engage when key is turned to "START."	Seat or restraint bar switch malfunctioning or not activated	Operator is in the seat with the restraint bar down. Replace switches as needed.
	Poor connections to starter relay in instrument panel	Verify relay connections.
	Faulty starter safety relay	Test starter safety relay, replace as needed.
	Battery terminals or cables loose or corroded	Clean battery terminals and cables and tighten them.
	Battery discharged or defective	Recharge or replace battery.
	Starter solenoid in chassis malfunctioning (Located on panel near battery)	Troubleshoot circuit per wiring diagram, locate trouble, replace starter solenoid.
	Ignition wiring, seat switch, restraint bar switch, etc. loose or disconnected	Check wiring for poor connections, broken leads; repair wiring or connection.
	Starter or pinion faulty	Remove starter; repair/replace as needed.
	Engine fault code: ECU will not allow crank if certain faults are present	Contact your dealer.
	Engine starter solenoid malfunctions	Replace engine starter solenoid.
Battery will not recharge.	Battery terminals or cables loose or corroded	Clean battery terminals and cables and tighten them, replace cables as needed.
	Battery or alternator defective	Test battery and alternator, replace as needed.
Work lights not functioning properly.	Single light doesn't work: Light bulb burned out, faulty wiring	Check and replace light bulb as needed. IMPORTANT: When changing the halogen bulb, DO NOT directly touch the light bulb. Use a clean rag to handle the bulb. Check wiring connection to light.
	No lights at all: 30 A light fuse blown	Check circuit and find trouble before replacing fuse.
	Faulty light switch/poor ground/bad connection	Replace light switch. Check ground wire connections.
Lift/Tilt and/or Drive Solenoids do not work.	Wiring to solenoids disconnected; faulty	Refer to wiring diagram, locate trouble and repair as needed.
	Faulty seat or restraint bar switch	Replace seat and/or restraint bar switches as needed.
	Faulty solenoid valve coil	Test and replace solenoid valve coil(s) as needed.
	Faulty hydraulic solenoid relay	Test relay; replace as needed.
	Faulty interlock module	Test module; replace as needed.

Chassis Electrical Components

1 TIE/WIRE	12 BATTERY	23 BRACKET/HARNESS	34 BOLT/CARRIAGE
2 CLAMP/HOSE	13 NUT/SPIRALOCK™	24 PLATE/ELECTRICAL	35 SCREW/CAP TF
3 NUT/HEX WHIZLOCK	14 NUT/SPIRALOCK™	25 CABLE/POSITIVE	36 WASHER/FLAT
4 NUT/SERRATED LOCK	15 CLAMP/TUBE	26 SOLENOID	37 NUT/HEX
5 NUT/HEX WHIZLOCK	16 NUT/SERRATED FL	27 COVER/FUSE	38 NUT/HEX
6 NUT/HEX	17 MODULE/2-SPEED	28 COVER/FUSE	39 NUT/HEX
7 CLAMP/TUBE	18 CLIP/CONDUIT	29 ROD/BATTERY	40 COVER/HARNESS
8 TIE/NYLON	19 BRACKET/BATTERY	30 COVER/ELECTRICAL	41 COVER/HOLDDOWN
9 CLAMP/HOSE	20 BRACKET/MATING	31 SCREW/TAPPING	43 WASHER/FLAT
10 ANGLE/BATTERY	21 RELAY 20AMP	32 SCREW/CAP	44 FOAM/COVER
11 CLAMP/TUBE	22 HARNESS/CHASSIS	33 NUT/HEX	45 FOAM/COVER

Fig. 9-3 Exploded view of the chassis electrical components

ROPS Electrical Components



- 1 TIE/WIRE
- 2 NUT/SPEED
- 3 NUT/LOCK
- 4 GAUGE/HOURLMETER
- 5 HOUSING/DISPLAY
- 6 BULB/LAMP
- 7 GASKET/HOUSING
- 8 CONNECTOR/POWER PORT
- 9 COVER/POWER PORT

- 10 SWITCH/PARK BRAKE
- 11 MODULE/INTERLOCK
- 12 NUT/SERRATED FL
- 13 GAUGE/FUEL
- 14 CLAMP/TUBE
- 15 SWITCH/LIGHT
- 16 KNOB/LIGHT SWITCH
- 17 GROMMET
- 18 CONTROL/THROTTLE

- 19 ASSY/PANEL RIGHT
- 20 HARNESS/ROPS
- 21 ASSY/PANEL LEFT
- 22 SWITCH/IGNITION
- 23 GAUGE/TEMP
- 24 SCREW/MACHINE
- 25 SCREW/MACHINE
- 26 WASHER/LOCK

Fig. 9-4 Exploded view of the ROPS's electrical components

Engine Electrical Components - Mustang 2066/76/86 Models

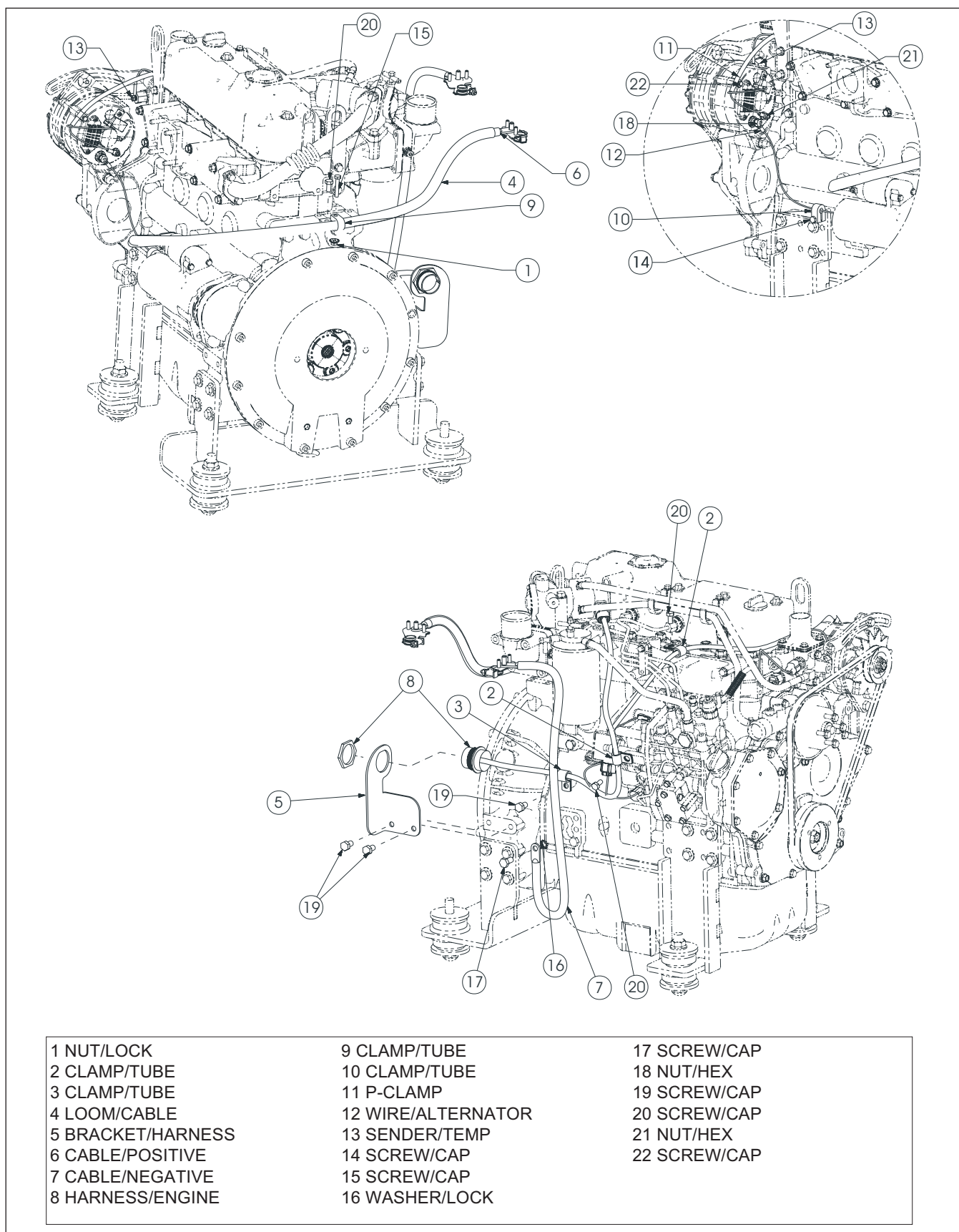


Fig. 9-5 Exploded view of the engine's electrical components

High-Flow and Two-Speed Electrical Components

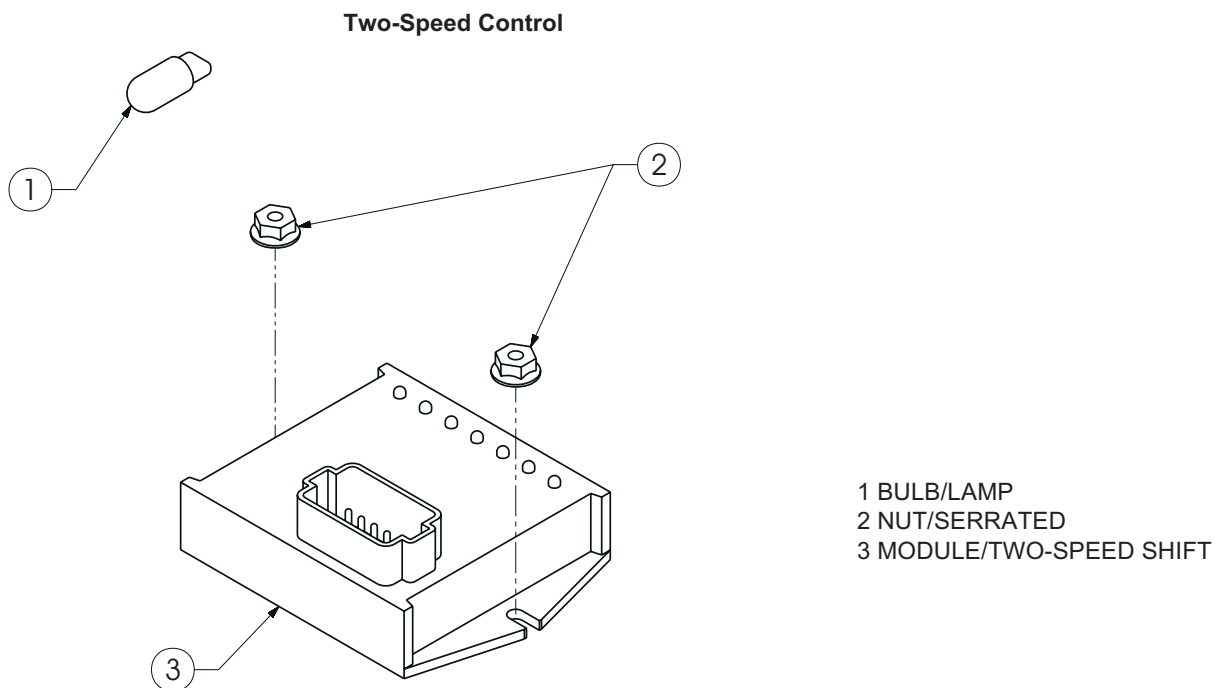
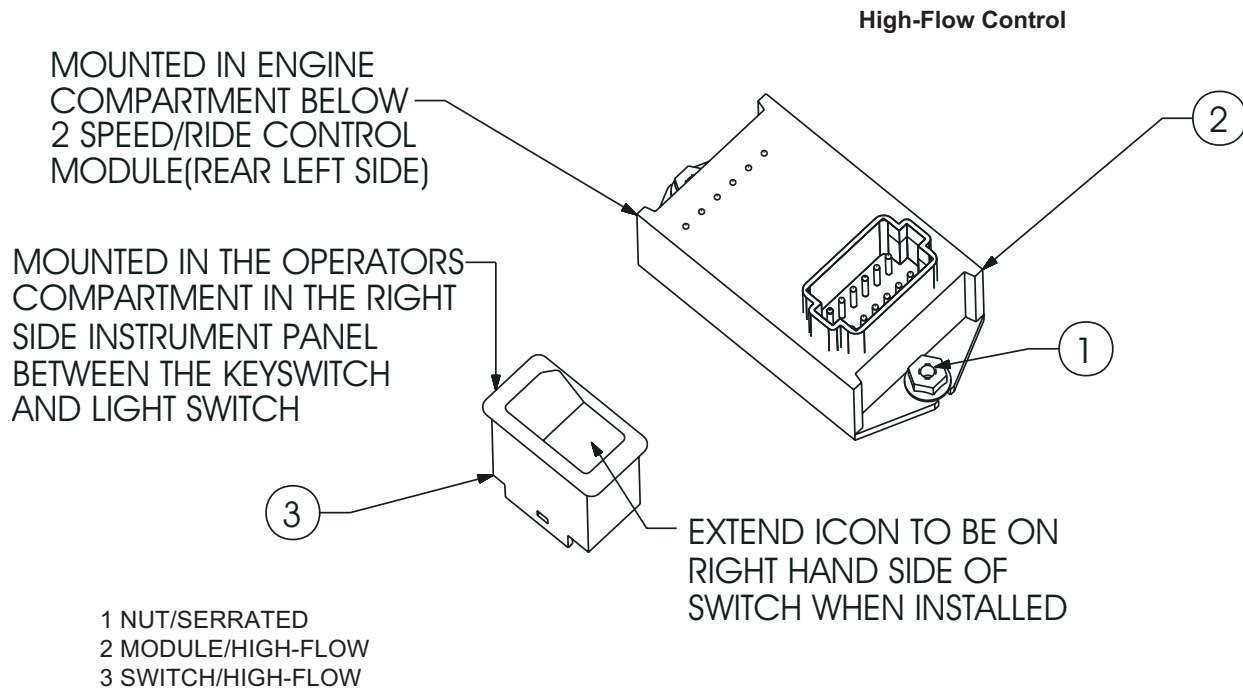


Fig. 9-6 Exploded view of the High-Flow and Two-Speed electrical components

NOTES

Power Distribution Panel Test and Operation

Gehl 5640E/6640E and Mustang 2066/76/86 skid-steer loaders utilize a power distribution panel in the electrical system to maximize the efficiency of engine, hydraulic, power and electrical operations. This panel is attached on the left riser, just behind the battery.

Power Distribution Panel Fuse Test (Figs. 9-7 – 9-10)

The following procedure can be used to test the fuses found inside the power distribution panel.

WARNING

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

- ☐ Shut off the engine.
- ☐ Raise engine cover and lock open the rear grille.

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

1. Using a volt/ohm multimeter or a test lamp, measure between test points and the chassis ground for 12 V with the wiring connected and the keyswitch in the "ON" position. The test lamp lights for functioning fuses, or the volt/ohm multimeter will read 12 V on both sides of the fuses.
 - ♦ Three 60 A fuses at the top of the panel are used for machine power. The fourth 60 A fuse at the bottom of the panel is used for the engine starter, and while the bottom 60 A fuse is used for the grid heater.
 - ♦ The upper 10 A mini-fuse is used by the engine's ECU (electronic control unit). The lower 10 A mini-fuse is used for the live power supply to the keyswitch.
 - ♦ **For units with HVAC:** Two 25 A fuses are used for the air conditioning condenser fan and the blower motor for the HVAC unit.
2. To test the micro-relay, the keyswitch must be in the "ON" position. This relay is used by the electrical auxiliary system. **Fig. 9-9**
 - ♦ The relay may be tested by removing it and taking it to a work bench. Apply a ground to terminal #85 and a 12 V source to terminal



Fig. 9-7 Location of the power distribution panel on the left riser (behind the battery)

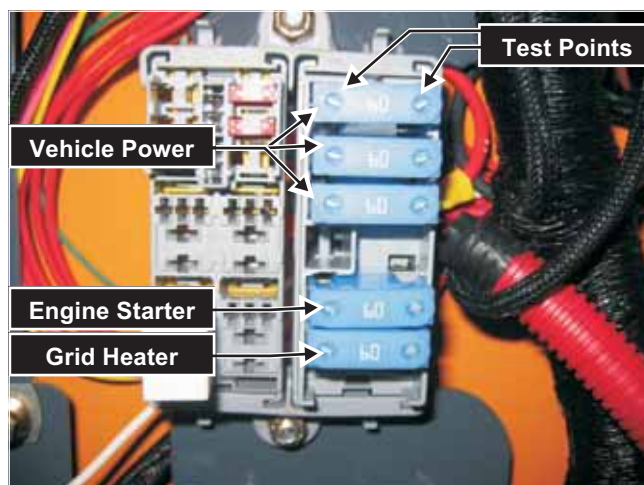


Fig. 9-8 View of the inside the power distribution panel

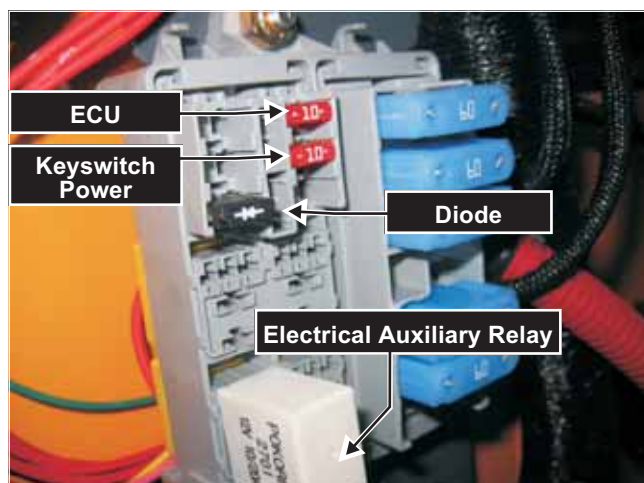


Fig. 9-9 View of the inside the power distribution panel

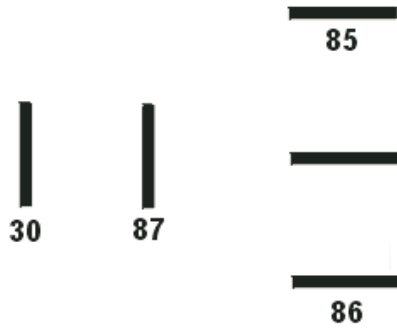


Fig. 9-10 Illustration of the electrical auxiliary relay terminals



Fig. 9-11 View of inside the fuse box panel located near the left knee of the operator inside the ROPS (shown with cover off)

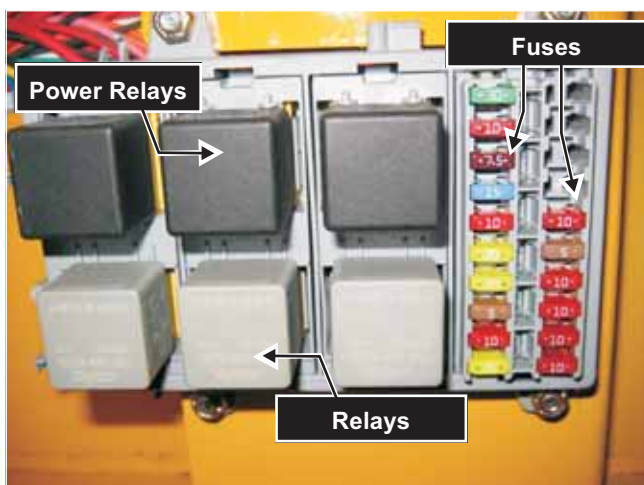


Fig. 9-12 Identification of fuses and relays inside the fuse box panel

#86. The relay should actuate. There should be continuity between terminal #30 and terminal #87.

- ♦ The relay may be checked on the machine as well. An assistant is required. Have the assistant sit in the operator's seat with the keyswitch in the ON position and the restraint bar lowered. Slowly remove the relay. You should hear and feel a "click" when it is removed from the panel.

3. Replace any fuse that did not have power at each test point. Replace any relay that does not have continuity between powered terminals.

Fuse Box Panel Test and Operation

Gehl 5640E/6640E and Mustang 2066/76/86 skid-steer loaders utilize a fuse box panel in the electrical system to maximize the efficiency of engine, hydraulic, power and electrical operations. This panel is near the operator's left knee inside the ROPS, behind a metal panel with two swell latches.

Fuse Box Panel Fuse Test (Figs. 9-11 and 9-12)

The following procedure can be used to test the fuses inside the fuse box panel. The plastic cover has a decal that identifies the fuses.

WARNING

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

- ☐ Shut off the engine.

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

1. Remove the left metal panel in the ROPS by unlatching the two swell latches.
2. Unlatch the fuse box panel cover to access the fuses.
3. Using a volt/ohm multimeter or a test lamp, measure between test points and the chassis ground for 12 V with the wiring connected and the keyswitch in the "ON" position. The lamp lights for functioning fuses, or the volt/ohm multimeter will read 12 V on both sides of the fuses.

Fuse Box Panel Relay Test (Figs. 9-11 and 9-12)

There are three power relays inside the fuse box panel that supply power to the fuses for individual circuits. The cover has a decal that identifies the fuses. These relays can be tested as:

1. Turning the keyswitch to the "ON" position should produce an audible "click" from each relay closing.
2. To test each relay individually, pull one relay out of the panel at a time, listening for the audible "click" of the relay opening.
3. Plug the relay back into the panel and listen for the audible "click" of the relay re-closing.
4. Replace any relay where there is no discernible "clicking" sound heard at keyed power or opening (removing) of the relay.
 - ♦ The solenoid lock relay and start safety relay will actuate only with the keyswitch in the "ON" position, the restraint bar down and an assistant in the seat. The horn relay will actuate only when the horn button is actuated.

Solenoid Test (Figs. 9-13 and 9-14)

There are two solenoids located near the battery on the power distribution panel. The most rearward solenoid is used for the engine glow circuit. The most forward solenoid is used by the engine starter.

⚠ **WARNING**

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

- ☐ Shut off the engine.
- ☐ Raise engine cover and lock open the rear grille.

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

1. Using a volt/ohm multimeter or a test lamp, confirm the following conditions with the wiring connected.
 - ♦ With keyswitch in the "OFF" position, there should be 12-VDC only on the left large copper stud of each solenoid.
2. The most rearward solenoid, the engine glow circuit, will only engage when the engine ECU senses an ambient temperature below 22° F (-6° C).



Fig. 9-13 Location of two solenoids on the power distribution panel

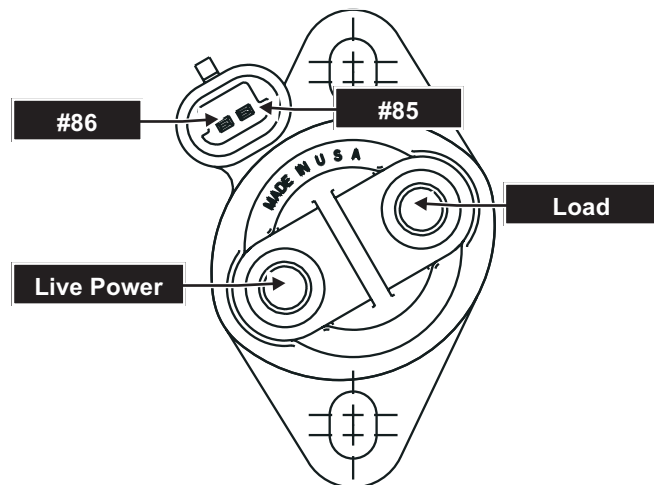


Fig. 9-14 Illustration of the solenoid

The engine's ECU provides both the control current and ground for the solenoid:

- ♦ With keyswitch in "OFF" position, there should be 12-VDC on the left large copper stud of each solenoid.
 - ♦ Unplug the control current connector and install a test lamp between #85 and #86. Have a second operator turn the keyswitch to "ON" position, the engine and the test lamp should light if ambient temperature is low enough.
3. For the engine starter solenoid:
 - ♦ With keyswitch in "OFF" position, there should be 12-VDC on the left large copper stud of each solenoid.

- ♦ The external starter solenoid will engage when the keyswitch output calls for START. The engine's ECU provides the ground (#85) for the ECU.
- ♦ Unplug the control current connector and install a test lamp between #85 and #86. Have a second operator turn the keyswitch to crank the engine and the test lamp should light.

Interlock Control Module Test (Figs 9-15 - 9-17)

The following procedure can be used to test the interlock control module located inside the left instrument panel.



WARNING

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

- ☐ Shut off the engine.

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

1. Remove four Phillips-head screws securing left instrument panel to ROPS. It should be possible to expose wiring and interlock control module without disconnecting any wires from panel.
2. Most module troubleshooting can be done by observing green diagnostic LED indicators.
 - ♦ Disconnect 12-pin and 6-pin connectors and inspect terminals. Be sure no pins are bent on module and no sockets are damaged on harness. Replace damaged components and reconnect harness to control module.
3. Refer to truth table (**Fig. 9-17**) to analyze functionality of module. The module controls operation of components listed in OUTPUTS section of truth table. The ON or OFF state of various outputs is determined by ON or OFF state of various input conditions listed in INPUTS section of truth table. The keyswitch must be in ON position.
 - ♦ **Example 1** (initial keyswitch "ON"): At initial keyswitch ON, input LED "12-VDC In" should light and internal seat belt alarm should sound for five seconds.
4. The truth table section "Diagnostic LED States" specifies active (ON) state of each input and output.
 - ♦ **Example:** Active (ON) state of engine oil pressure switch input (connector #1, pin #8) is a low or grounded input. Active state of seat switch input (connector #1, pin #3) is a high or 12-VDC input.



Fig. 9-15 Location of the interlock control module inside the left instrument control panel

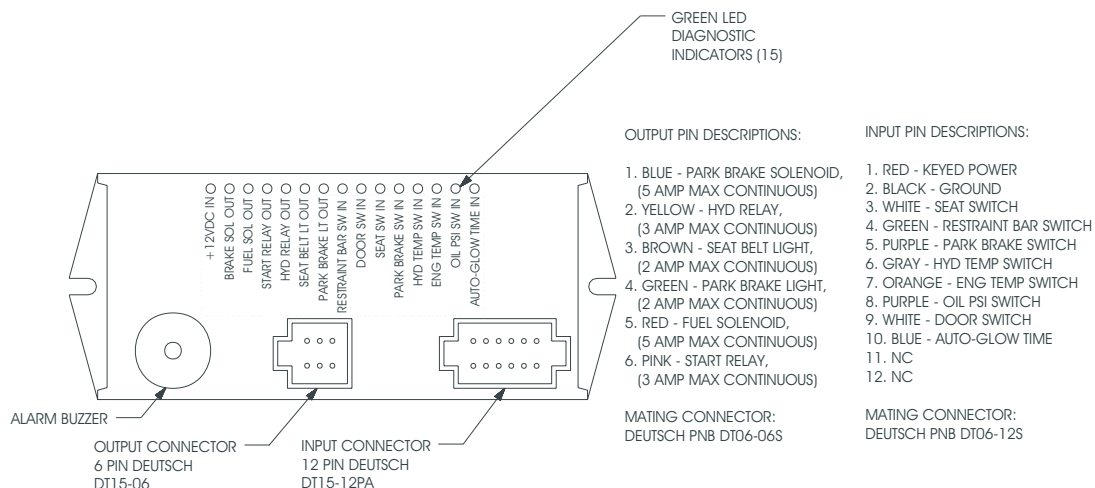


Fig. 9-16 Illustration of the interlock control module

Interlock Control Module Truth Table

Function	Pin No.	INPUTS (12 Pin Connector #1 X)												OUTPUTS (6 Pin Connector #2 X)						NOTES
		1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4	5	6	
AT POWER ON		ON	X													ON FOR 5 SEC		ON		Seat Belt Warning Light and Intermittent Alarm
HYD OVER TEMP WARNING		ON	X																	Intermittent Alarm Sounds when Start Functions are Present or until Power Off
AUTO-GLOW TIME		ON	X								ON							ON		Engine Shut Down Timer and Alarm Disabled During Auto-Glow
ENGINE OVER TEMP SHUT DOWN		ON	X						ON									OFF AFTER 30 SEC	ON	Fuel Solenoid Shut Down and Intermittent Alarm Sounds until Power Off
ENGINE LOW OIL PSI		ON	X						ON									OFF AFTER 30 SEC	ON	Fuel Solenoid Shut Down and Intermittent Alarm Sounds until Power Off
PARK BRAKE SHUT DOWN		ON	X	ON	ON	ON														Solenoid "ON" Releases Hyd Brake to Allow Loader Movement
SOLENOID ON RELEASE		ON	X	OFF AFTER 1 SEC																Seat Switch has 1 Second Delay for Park Brake Function
PARK BRAKE RELEASE		ON	X														ON			Instantaneous, Park Brake Slopes, Intermittent Alarm, Loader Movement
SOLENOID OFF		ON	X		OFF															Instantaneous, Park Brake Slopes, Intermittent Alarm, Loader Movement
PARK BRAKE		ON	X														ON			Instantaneous, Park Brake Slopes, Intermittent Alarm, Loader Movement
SOLENOID OFF RELEASE		ON	X																	Instantaneous, Park Brake Slopes, Intermittent Alarm, Loader Movement
SOLENOID OFF		ON	X	ON	ON	ON														Instantaneous, Hydraulics and Start Functions are Able to Operate
SAFETY RELAYS ENABLE		ON	X	ON	ON	ON				OFF										Instantaneous, Hydraulics and Start Functions are Disabled
SAFETY RELAYS DISABLE		ON	X	OFF														OFF		Instantaneous, Hydraulics and Start Functions are Disabled
SAFETY RELAYS		ON	X		OFF															Instantaneous, Hydraulics and Start Functions are Disabled
SAFETY RELAYS		ON	X																	Instantaneous, Hydraulics and Start Functions are Disabled
SAFETY RELAYS		ON	X																	Instantaneous, Hydraulics and Start Functions are Disabled

DIAGNOSTIC LED STATES		
LED Title	Pin No.	Type of Active Input/Output
+12VDC (IN)	1,1	HIGH (12VDC)
Brake Sol (OUT)	2,1	HIGH (12VDC)
Fuel Sol (OUT)	2,5	HIGH (12VDC)
Hyd Rel (OUT)	2,6	HIGH (12VDC)
Hyd Rel (OUT)	2,9	HIGH (12VDC)
Seat Belt L (OUT)	2,3	LOW (GND)
Park Brake L (OUT)	2,4	LOW (GND)
Restraint Bot Sw (IN)	1,4	HIGH (12VDC)
Seat Sw (IN)	1,5	HIGH (12VDC)
Seat Sw (IN)	1,3	HIGH (12VDC)
Park Brake Sw (IN)	1,6	LOW (GND)
Engine Temp Sw (IN)	1,7	LOW (GND)
Oil Psi Sw (IN)	1,8	LOW (GND)
Auto-Glow Time (IN)	1,10	LOW (GND)

INTERLOCK CONTROL MODULE TRUTH TABLE

Fig. 9-17 Truth table for the interlock control module

Two-Speed, Ride Control and Float Module Test

The following procedure can be used to test the two-speed, ride control and float module mounted on the left riser, just below the engine cover.

! WARNING

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

- ☐ Shut off the engine.
- ☐ Raise engine cover and lock open the rear grille.

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

1. Most troubleshooting of the two-speed, ride control and float module can be done by observing the green diagnostic LED indicators on the module.
 - ◆ Disconnect 12-pin connector and inspect terminals. Be sure no pins are bent on the module and no sockets are damaged on the

harness. Replace any damaged components and reconnect harness to control module.

2. Refer to truth table (**Fig. 9-20**) to analyze functionality of module.
 - ◆ With keyswitch ON, press #1 button on left control handle. The “High/Low Toggle” LED should be lit while button is depressed.



Fig. 9-18 Location of the two-speed, ride control and float module inside the engine compartment

Two-Speed, Ride Control and Float Module

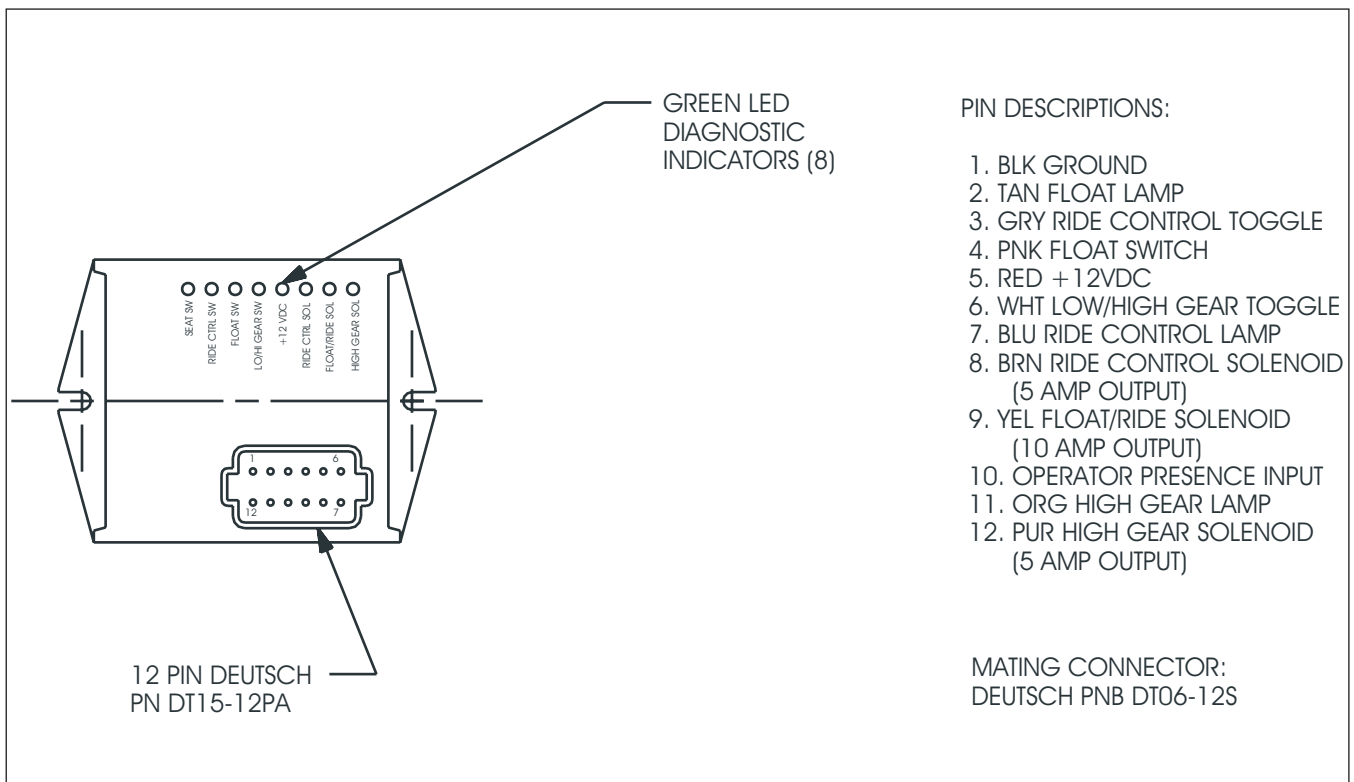


Fig. 9-19 Illustration of the two-speed, ride control and float module

MODULE TRUTH TABLE

ACTION		ACTION								COMMENTS		
		Low/High Gear Toggle Switch	Ride Control Toggle Switch	Float Momentary Switch	Seat State (Relay Output)	Float/Ride Solenoid	Ride Control Solenoid	High Gear Solenoid	Ride Control Lamp		High Gear Lamp	Float Lamp
At Power Up					0	0	0	0	0	0	0	
Toggle High Gear ON					X			1		1		Momentary press toggles high gear.
Toggle High Gear OFF					X			0		0		
Toggle Ride Control ON					1	1	1		1			Momentary press toggles ride control.
Toggle Ride Control OFF					1	0	0 (after .25 s delay)		0			
Ride Control No Effect					0	0	0		0			Momentary press has no effect. Seat state overrides press.
Activate Float					1	1	0 (after .25 s delay)		0		1	Float is activated only as long as switch is pressed. Lamp blinks at 2Hz rate. Float action has priority over ride control. If ride control is ON when float is pressed, ride control solenoid has .25 sec. OFF delay. Ride control sol. float/ride sol. & ride control lamp return to prior state when float deactivated
Float Hold ON				(hold for 5 sec)	1	1	0		0		1	Lamp blinks at 2Hz rate for 5 sec. then locks to continuous ON state. Solenoid output locks ON after 5 sec.
Toggle Float OFF					1	Prev State	Prev State		Prev State		0	Mom press when float hold condition is engaged causes float/ride sol. ride sol & ride lamp to revert to previous condition and turns off float lamp
Float No Effect					0	0	0		0		0	Momentary Press Has No Effect Seat State Overrides Press
Operator Leaving Seat						0	0 (after .25 s delay)		0 (after .25 s delay)		0	
Operator Taking Seat						0	0		0		0	

Fig. 9-20 Truth table for the two-speed, ride control and float module

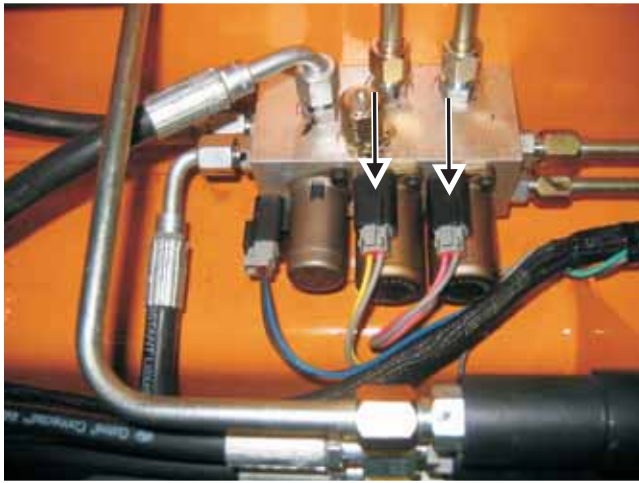


Fig. 9-21 Location of the standard flow coils on the 3-bank proportional solenoid valve

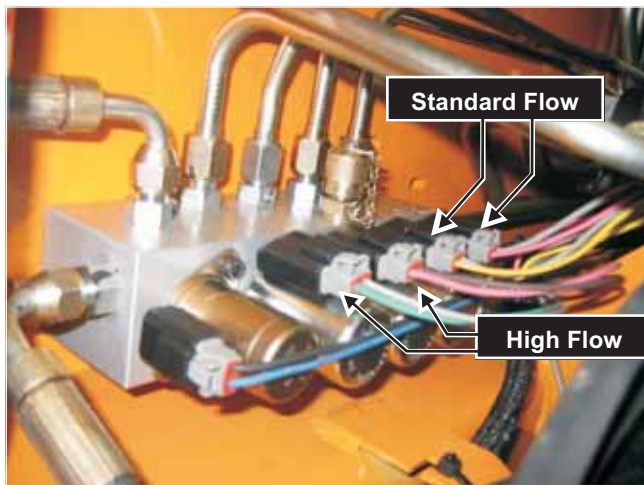


Fig. 9-22 Location of the standard flow coils and high-flow coils on the 5-bank proportional solenoid valve



Fig. 9-23 Location of the standard-flow auxiliary hydraulics slide and trigger switch on the right control handle

The “High Gear Sol” LED should toggle ON (light) and OFF with alternate pushes of button.

- ◆ With keyswitch “ON”, press #2 button on right control handle. The “Ride Ctrl Toggle” LED should be lit while button is depressed. The “Ride Ctrl Sol” LED should toggle ON (light) and OFF with alternate pushes of button.
- ◆ With keyswitch “ON”, press #1 button on right control handle. The “Float Toggle” LED should blink while button is depressed. The “Float Sol” LED should blink ON (light) and OFF with alternate pushes of button. Press and hold the #1 button for five seconds to lock the “Float” into a continuous “ON” state.

Electrically-controlled Standard Auxiliary Hydraulic Flow System Test and Operation

The standard auxiliary hydraulics flow is controlled by the slider and trigger switch (**Fig. 9-23**) in the right control handle, except on T-Bar control models. The control handle contains an integrated circuit that controls the signal to two proportional solenoid valves (a 3-bank or 5-bank) (**Figs. 9-21 and 9-22**) located on the right chaincase beneath and to the right of the operator’s seat.

Troubleshooting Test

1. Check the auxiliary control fuse in the fuse box panel.
2. Check the diode and micro-relay in the power distribution panel. **Fig. 9-9**
3. Check connections at the control handle and coils.
4. Be sure that the interlock control module is outputting a signal for the hydraulic solenoid safety relay.
 - ◆ The relay will actuate only with the keyswitch in the “ON” position, the restraint bar down and the seat switched closed.
5. Using a volt/ohm multimeter or a test lamp, probe the two wires going into pin 1 and pin 2 of the coil. DO NOT disconnect the plug. If the plug is disconnected the controller will shut down.

- ◆ The solenoid will actuate only with the keyswitch in the “ON” position, the restraint bar down and the seat switched closed. If the solenoid is unplugged, turn the keyswitch to “OFF”, wait two seconds and then turn the keyswitch to the “ON” position to reset the circuit.
- ◆ Monitor the voltage between pin 1 and pin 2 while operating the slider switch. Probe the wires going into pin 1 and 2 of the connector and monitor the voltage. With the help of an assistant, apply pressure to the operator’s seat and actuate the slider switch. The voltage should vary between 5.5 volts and 7.0 Volts. **Fig. 9-24**
- ◆ If performing this test alone, make a test harness to plug in between the chassis harness and the solenoid valve. Sit in the operator’s seat and monitor the voltage while actuating the slider switch. **Figs. 9-25 – 9-27**
- ◆ The coil resistance can be checked as well and should read 5.4 Ohms (Ω).

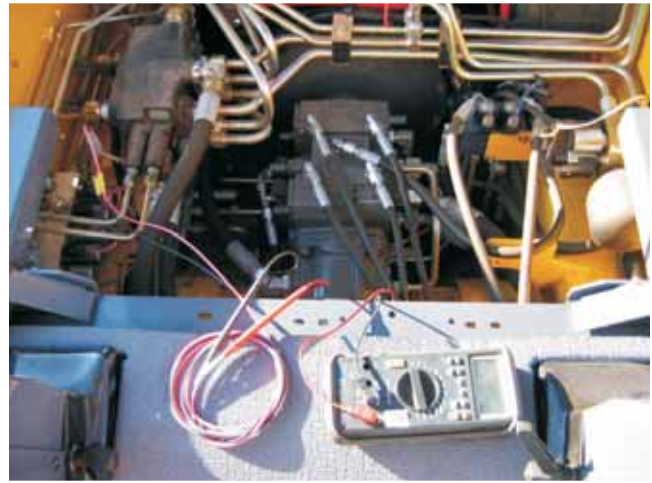


Fig. 9-25 Setup to measure voltage between pins A and B on solenoid coils

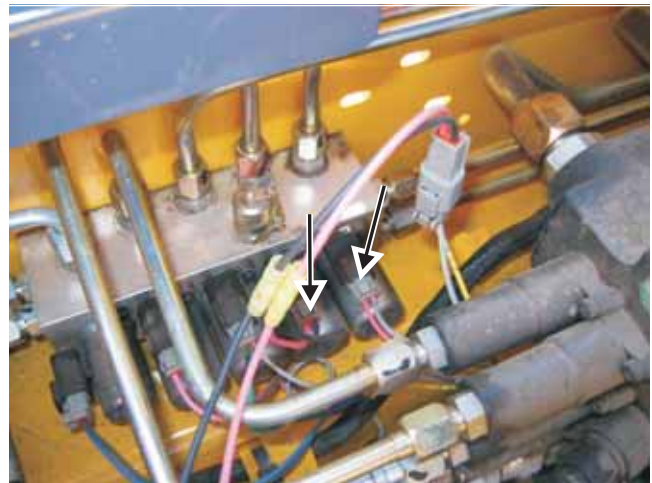


Fig. 9-26 View of the jumper wires attached at the standard auxiliary flow coils



Fig. 9-24 View of voltmeter pins probing the wires going into pin 1 and pin 2 of the connectors on the coils



Fig. 9-27 View of the jumper wires attached at the voltmeter pins



Fig. 9-28 Location of the high-flow auxiliary hydraulics control rocker switch in the right instrument panel



Fig. 9-29 Location of the high-flow auxiliary hydraulics high-flow module



Fig. 9-30 Location of the electronic rotary throttle on the right instrument panel

Electrically-controlled High-Flow Auxiliary Hydraulic Flow System Test and Operation

The high-flow auxiliary hydraulics flow is controlled by a rocker switch located beneath the light switch in the right instrument panel and a high-flow module located in the engine compartment on the left riser tower, below the two-speed ride control and float module. The rocker switch contains an integrated circuit that controls the signal to a proportional solenoid valve (5-bank) (**Fig. 9-22**) located on the right chaincase beneath and to the right of the operator's seat. **Figs. 9-26, 9-28, 9-29**

Troubleshooting Test

1. There are indicators on the high-flow module to aid in diagnosis. Have an assistant actuate the rocker switch and monitor the indicators on the module. This will provide direction on what to troubleshoot.
2. Check the auxiliary control fuse in the fuse box panel.
3. Check the electrical connections at the 5-bank proportional solenoid valve.
4. Be sure that the module is outputting a signal for the hydraulic solenoid safety relay.
 - ♦ The relay will actuate only with the keyswitch in the "ON" position, the restraint bar down and the seat switched closed.
5. Using a test lamp, probe the wire going into pin 1 of the coil. DO NOT disconnect the plug. If the plug is disconnected the controller will shut down. **Fig. 9-24**
 - ♦ The solenoid will actuate only with the keyswitch in the "ON" position, the restraint bar down and the seat switched closed. If the solenoid is unplugged, turn the keyswitch to "OFF", wait two seconds and then turn the keyswitch to the "ON" position to reset the circuit.
 - ♦ With the help of an assistant, apply pressure to the operator's seat and actuate the high-flow switch. The light will be dimmer than normal due to reduced voltage in this circuit. **Fig. 9-24**
6. The coil resistance can be checked as well and should read 5.4 Ohms (Ω).

Engine Throttle Test and Operation

The engine speed is controlled by an electronic rotary throttle (**Fig. 9-30**). The throttle is located on the right instrument panel. Dual Joystick and T-Bar controls models have a second throttle located near the operator's right foot. If there are problems with the throttle, the engine's ECU will supply an error message on the left instrument panel. See the *Engine* chapter for error code identification.

Solenoid Lock Valves Test and Operation - T-Bar Only

The solenoid locks for lift and tilt are located on the right side of the chassis in front of the muffler (**Fig. 9-31**). The solenoids are controlled by the interlock control module. When the restraint bar and seat switch are closed, the module sends a signal to the solenoid lock relay in the fuse box panel. The relay will close and send power to the solenoids. The circuit is protected by the "solenoid lock pilot" fuse.

Pilot Oil Solenoid Valve Test and Operation - Dual Joystick and Hand/Foot

Lift and Tilt Solenoid Test and Operation

The oil supply for the lift and tilt control functions is supplied by a solenoid valve (and coil) located on the same valve as the auxiliary hydraulics (**Fig. 9-32**). It is located on the right chaincase beneath and to the right of the operator's seat. The solenoid is controlled by the interlock control module. When the restraint bar and seat switch are closed, the module sends a signal to the solenoid lock pilot relay in the fuse box panel. The relay will close and send power to the solenoids. The circuit is protected by the "solenoid lock pilot" fuse.

Traction Solenoid Test and Operation

The solenoid valve that supplies oil to the left joystick (wheel drive functions) is located on the left side of the chassis in front of the battery (**Fig. 9-33**). The solenoid is controlled by the interlock control module. When the restraint bar and seat switch are closed, the module sends a signal to the solenoid lock pilot relay in the fuse box panel. The relay will close and send power to the solenoids. The circuit is protected by the "solenoid lock pilot" fuse.

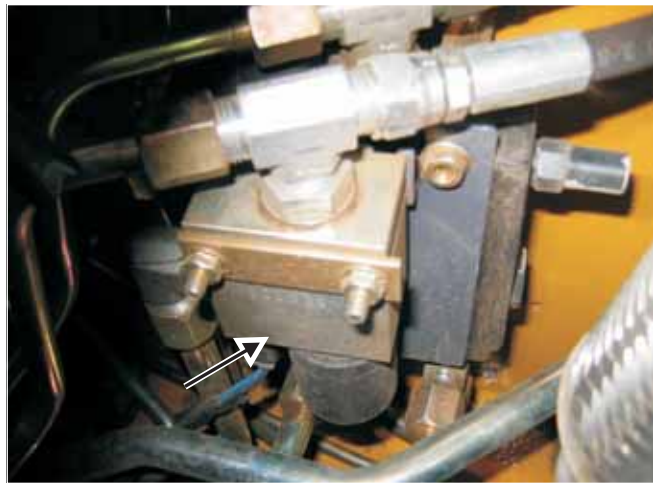


Fig. 9-31 Location of the solenoid lock valves for the lift and tilt functions of the T-Bar control skid-steer loader

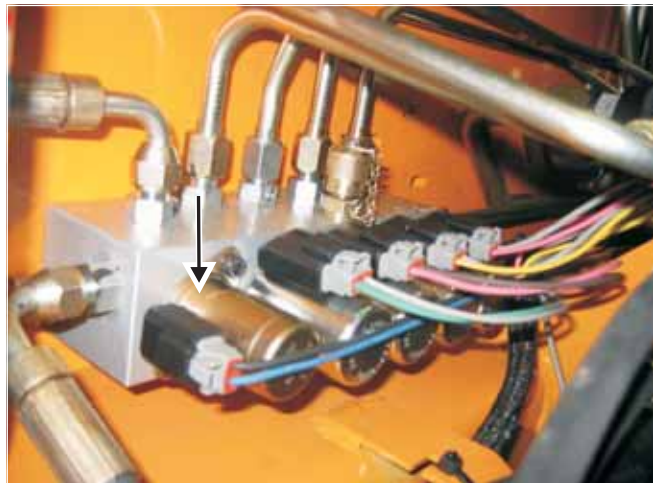


Fig. 9-32 Location of the pilot oil solenoid coil on the 5-bank proportional solenoid valve



Fig. 9-33 Location of the traction solenoid valve located in front of the battery

Control Handle Actuation Buttons - Two-Speed and Ride Control and Float Module

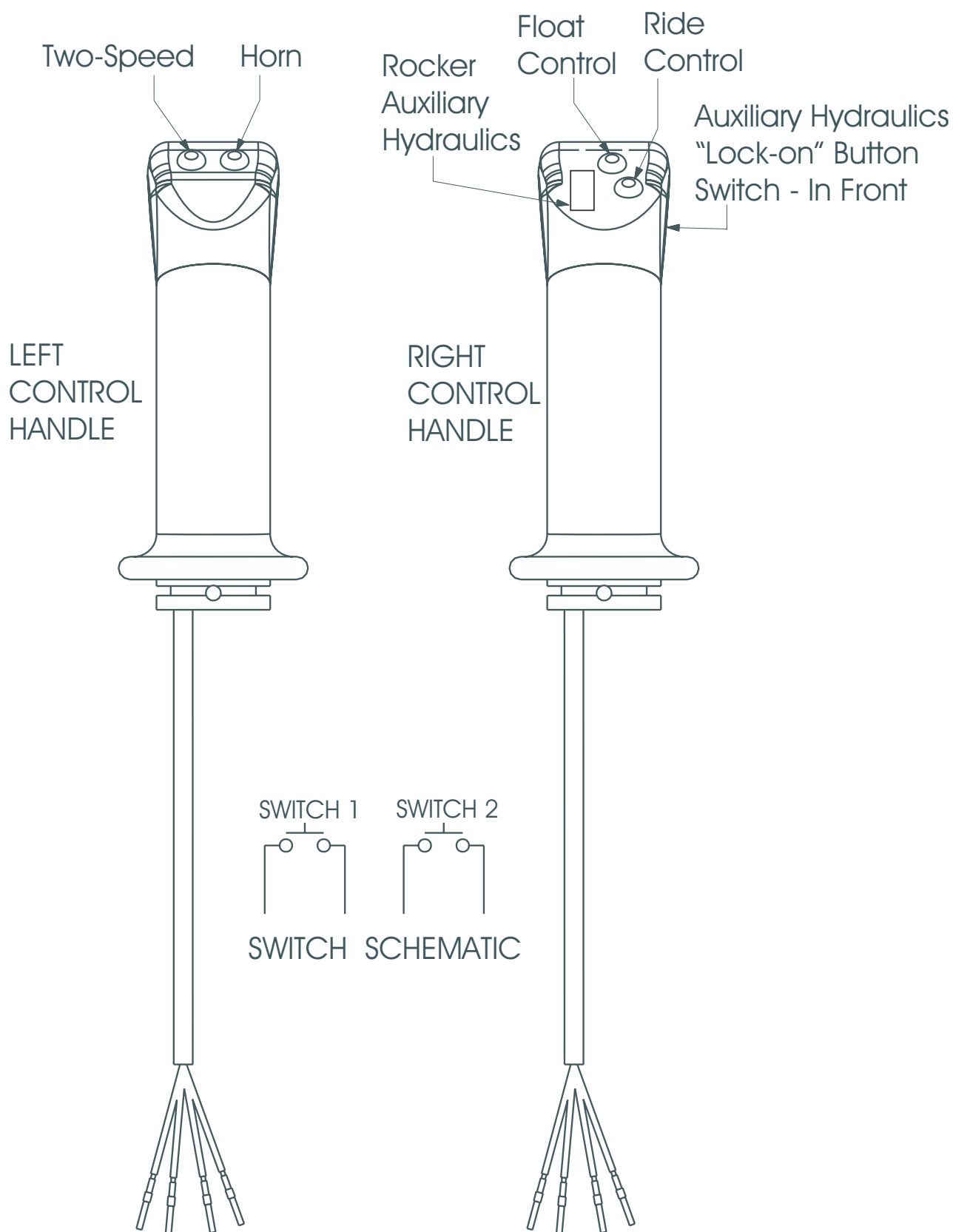
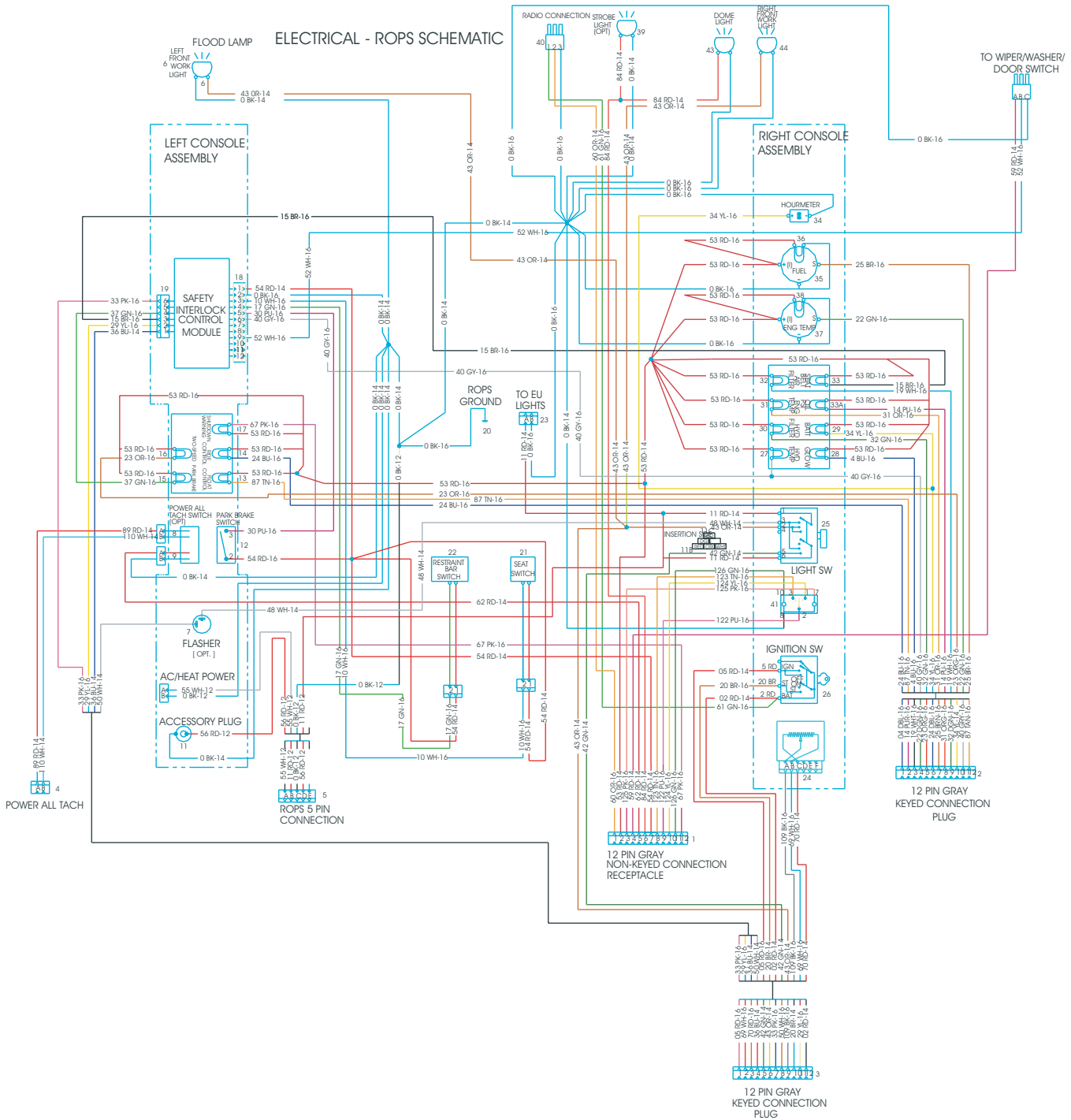
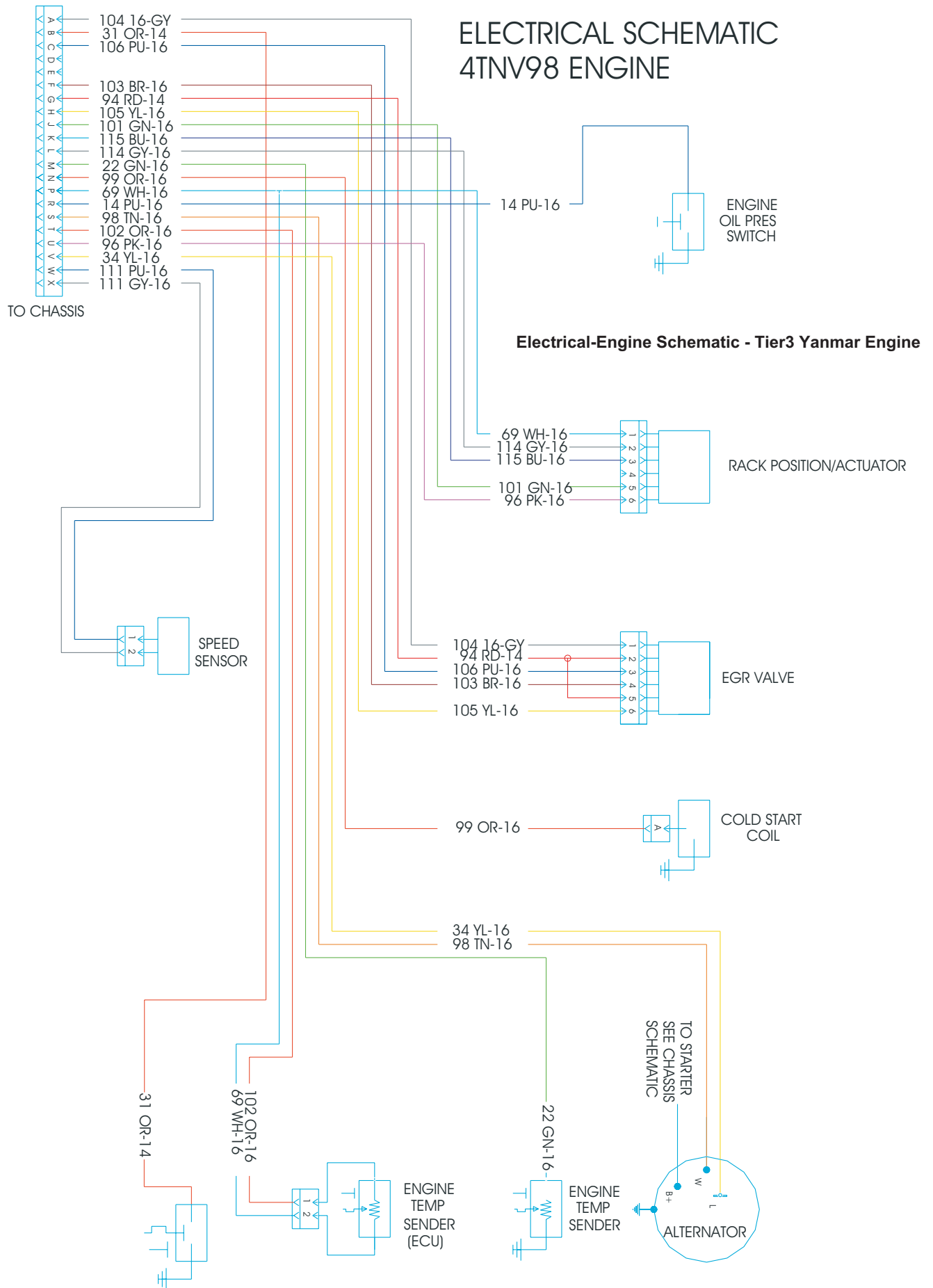


Fig. 9-34 Illustration of control handle buttons and their functions

Electrical-ROPS Schematic - Tier3 Yanmar Engine





Electrical Schematics - Wire Number and Color Legend - Tier3 Yanmar Engine

WIRE #	COLOR	FUNCTION	WIRE #	COLOR	FUNCTION	WIRE #	COLOR	FUNCTION	WIRE #	COLOR	FUNCTION
-	BLACK	GROUND	45	YELLOW	PULL COIL TIMER	89	RED	ALL-TACH POWER (LOCKING)	135	YELLOW	SEAT AIR COMPRESSOR PWR
1	RED	BATT POWER DIRECT	46	PURPLE	PULL COIL TIMER	90	RED	GLOW MODULE POWER	136	PURPLE	REAR WIPER WASH PWR
2	RED	BATT POWER FUSED	47	PURPLE	PULL COIL RELAY/FUEL SOL	91	RED	ELECTRIC AUXILIARY POWER	137	YELLOW	REAR WIPER SW PWR
3	BLUE	GLOW COIL	48	WHITE	LIGHT SW/FLASHER	92	PURPLE	START RELAY GRND TO ECU	138	ORANGE	REAR WIPER SW PWR
4	BLUE	GLOW CONTROL LAMP	49	GREEN	BACK UP ALARM	93	GREEN	ECU POWER RELAY GRND TO ECU	139	TAN	FRT WIPER PWR
5	RED	IGN SW/PWR RELAY	50	WHITE	FLASHER/CONNECTOR	94	RED	ECU/FEED POWER - KEYED	140	GRAY	FRT WIPER SW PWR
6	ORANGE	HORN BUTTON/RELAY	51	RED	FUEL SOL (HOLD)	95	YELLOW	FUEL RACK RELAY GRND TO ECU	141	PINK	STROBE SWITCH PWR
7	RED	PWR RELAY/CIRCUIT BREAKERS	52	WHITE	DOOR SWITCH/SAFETY MOD	96	PINK	FUEL RACK POWER - KEYED	142	BLUE	ROAD L/S/HI BEAM
8	ORANGE	HORN RELAY/HORN	53	RED	GAUGE POWER	97	PINK	GLOW RELAY CONTROL TO ECU	143	BROWN	FRONT WORKLIGHTS
9	NA	SEAT SW	54	RED	INTERLOCK POWER	98	TAN	ALTERNATOR SPEED OUTPUT	144	PURPLE	LICENSE PLT LIGHT
10	WHITE	SEAT SW	55	WHITE	ACH/EAT POWER	99	ORANGE	COLD START COIL TO ECU	145	YELLOW	ROADLIGHTS SW PWR
11	RED	IGN (KEY) PWR	56	RED	ACCESSORY POWER	100	BLUE	RACK POS SENSOR TO ECU	146	PINK	TAIL LIGHTS SW PWR
12	RED	IGN (KEY) PWR	57	BROWN	FAN CLUTCH	101	GREEN	FUEL RACK COIL GRND TO ECU	147	RED	STOP LIGHT
13	RED	CHASSIS POWER (KEYED)	58	YELLOW	GLOW RELAY SIGNAL	102	ORANGE	ENG TEMP SENSOR TO ECU	148	ORANGE	POSITION LIGHT SW PWR
14	PURPLE	OIL PRESSURE SW	59	RED	WIPER WASH POWER	103	BROWN	EGR1 TO ECU	149	BROWN	FLASHER POWER TO RELAY
15	BROWN	SEAT BELT LAMP	60	ORANGE	RADIO POWER	104	GRAY	EGR2 TO ECU	150		
16	RED	ROPS POWER (KEYED)	61	GREEN	RADIO MEMORY	105	YELLOW	EGR3 TO ECU	151	GREEN	RH TURN SIG./FLASHER
17	GREEN	RESTRAINT BAR SW	62	RED	ALL TACH POWER (SWITCH)	106	PURPLE	EGR4 TO ECU	152	YELLOW	LH TURN SIG./FLASHER
18	YELLOW	SAFETY RELAY/ALTERNATOR	63	WHITE	ALL TACH POWER	107	WHITE	THROTTLE SENSOR (2) GRND	153	ORANGE	TURN SIGNAL SW PWR
19	WHITE	AIR FILTER RESTRICTION SW	64	BLACK	GLOW RELAY GRND TO ECM	108	RED	THROTTLE SENSOR (2) POWER			
20	BROWN	IGN SW/START RELAY #1	65	BLUE	INJ PUMP RELAY GRND TO ECM	109	BLACK	THROTTLE SENSOR (2) SIGNAL			
21	GREEN	START RELAY/SAFETY RELAY	66	PURPLE	LIFT PUMP RELAY GRND TO ECM	110	WHITE	ALL-TACH POWER UNLOCK			
22	GREEN	ENG TEMP SENDER	67	PINK	STOP/HOLD DOWN INDICATOR - ECM	111	TAN	COLD START SWITCH			
23	ORANGE	2 SPEED LAMP	68	TAN	WARN/COLD INDICATOR - ECM	112	PURPLE	AUX INTERLOCK TO START			
24	BLUE	RIDE CONTROL LAMP	69	WHITE	THROTTLE SENSOR GRND	114					
25	BROWN	EJEL SENDER	70	RED	THROTTLE SENSOR POWER	115					
26	WHITE	2 SP SW/CONTROL MODULE	71	BLACK	THROTTLE SENSOR SIGNAL	116	RED	AUXILIARY CONTROL POWER			
27	GRAY	RIDE CONT SW/MODULE	72	BLUE	THROTTLE SWITCH SIGNAL	117	PINK	AUXILIARY COIL POWER - IF FORWARD			
28	GRAY	ENG TEMP SENDER/GLOW MODU	73	ORANGE	THROTTLE SWITCH POWER	118	YELLOW	AUXILIARY COIL POWER - IF REVERSE			
29	YELLOW	INTERLOCK MOD/RELAY 1 & 2	74	BLUE	SOLENOID LOCK POWER	119	GRAY	AUXILIARY COIL FEEDBACK			
30	PURPLE	BRAKE SW/INTERLOCK MOD	75	TAN	INJ PUMP POWER	120	PINK	AUXILIARY COIL POWER - IF FORWARD			
31	ORANGE	ENG TEMP SW	76	ORANGE	HORN POWER	121	GREEN	AUXILIARY COIL POWER - IF REVERSE			
32	GREEN	HYD FILTER SW	77	GRAY	LIFT PUMP POWER	122	PURPLE	AUXILIARY HE SWITCH POWER			
33	PINK	CONTROL MOD/START RELAY	78	GRAY	POWER TO LIFT PUMP	123	TAN	FORWARD SIG. FROM SWITCH TO IF MODULE			
34	YELLOW	ALTERNATOR/HOUR METER	79	PINK	RIDE/2 SPEED MODULE POWER	124	YELLOW	REVERSE SIG. FROM SWITCH TO IF MODULE			
35	BLUE	HYD SOLENOIDS	80	YELLOW	BACK UP ALARM POWER	125	PINK	POWER IND HE FORWARD			
36	BLUE	PARK BRAKE SOLENOID	81	RED	GLOW PLUG POWER	126	GREEN	POWER IND HE REVERSE			
37	GREEN	PARK BRAKE LITE	82	WHITE	START SOL	127	BRN	AUX COIL FEEDBACK HE FORWARD			
38	PURPLE	CONTROL MOD/2 SP SOL	83	TAN	FAN CLUTCH POWER	128	GRY	AUX COIL FEEDBACK HE REVERSE			
39	YELLOW	CONTROL MOD/RIDE CONT SOL	84	RED	DOVE/STROBE POWER	129	YELLOW	RIGHT TURN SIGNAL			
40	GRAY	HYD TEMP SW	85	PINK	FLOAT SW/CONT MOD	130	TAN	LEFT TURN SIGNAL			
41	YELLOW	START SIGNAL TO GLOW MOD	86	BROWN	CONT MOD/RIDE CONT SOL	131	GRAY	FRONT POSITION LIGHT			
42	GREEN	REAR WORK L/S	87	TAN	FLOAT LAMP	132	GRN	ROAD L/S LOW BEAM			
43	ORANGE	HEAD L/S & TAIL L/S	88	GRAY	EXTRA START FUEL SOL	133	ORANGE	LIGHTS POWER 2 (KEYED)			
44	PINK	GLOW MODULE	89	WHITE	SAFETY RELAY/STARTER	134	PINK	FLASHER/TURN SIG. POWER			

ELECTRICAL-CHASSIS SCHEMATIC



Introduction

This chapter covers troubleshooting, removal, installation and adjustment procedures for engine components on Gehl 5640E/6640E and Mustang 2066/76/86 skid-steer loaders. The primary engine system components are shown below and on following pages.

The skid-steer loaders are equipped with either a Yanmar 4TNV98 naturally-aspirated or turbocharged diesel engine. The four-cylinder engines are 202 cubic inch displacement (3,31 L) engines. The non-turbo engine compression ratio and the turbo engine compression ratio is 18.5:1. The four-cylinder engines are direct injection four-stroke engines with a firing order of 1, 2, 3, 4.

A “full-flow” oil filter is used in the lubrication system. As in any engine, clean oil, fuel and air are critical to satisfactory performance and long engine life. If properly maintained, this engine will 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 parts are required, they can be

ordered from the Gehl Company or Mustang Manufacturing Company.

Troubleshooting Guide

The following troubleshooting guide lists potential engine problems, as well as possible causes and remedies, for Gehl 5640E/6640E and Mustang 2066/76/86 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 engine components unless authorized to do so by your Gehl or Mustang dealer/distributor. Any unauthorized repair will void the warranty.

Problem	Possible Cause	Remedy
Engine turns over but will not start	Engine cranking speed too slow	Battery requires recharging or replacing, or, in cold temperatures, pre-warm the engine.
	Fuel tank empty or faulty fuel gauge sender	Refill fuel tank. Replace fuel gauge sender.
	Pre-heat module malfunctioning (below 81° F - (27°C))	Check connection and voltage. Replace as needed.
	Ambient temperature too low	Install a block heater.
	Fuel pump not working	Check electrical circuit. Contact Gehl/Mustang Service.
	Moisture in the fuel line.	Bleed water out of fuel filter and fuel tank.
	Fuel valves turned off	Open fuel valves.
	Engine fault codes displayed	Identify problem and correct.
	Fuel filter plugged	Replace fuel filter.

Problem	Possible Cause	Remedy
Starter will not crank engine	Battery terminals or cables corroded or loose	Clean battery terminals and cables and secure them tightly.
	Battery discharged or defective	Recharge or replace battery.
	Safety interlock malfunction	Troubleshoot/replace
	Starter solenoid not functioning	Troubleshoot circuit per wiring diagrams to locate trouble and repair or replace starter solenoid.
	Seat switch or restraint bar switch malfunctioning	Sit on seat and lower restraint bar; if engine still doesn't start, troubleshoot circuit. Replace faulty switch as needed.
	Wiring to and from ignition, seat switch, restraint bar switch, etc. loose or disconnected	Check wiring for poor connections or broken leads and repair wiring or connection.
	Starter or pinion faulty	Remove starter and repair or replace as needed.
	Engine ECU faulty	Record flash code and remedy problem.
Engine overheats.	Crankcase oil level too low or too high	Add or remove oil as required.
	Engine overloaded	Reduce operating load.
	Fan air circulation blocked or restricted	Turn engine OFF, wait for fan to stop, remove blockage or restriction.
	Grade of oil improper or excessively dirty	Drain and replace with clean oil of proper grade.
	Exhaust restricted	Allow exhaust to cool and remove the restriction.
	Air filter is restricted	Replace the filter(s).
	Low coolant level	Add coolant.
	Fan shroud improperly positioned	Contact your dealer.
	Fan belt loose	Tighten the fan belt.

NOTES

1. APPLY LOCTITE 242 OR EQUIVALENT
2. PIPE THREAD SEALANT
3. 80 FT-LBS
4. 47 FT-LBS
5. 28 FT-LBS
6. RE-USE WASHER SUPPLIED WITH ENGINE OIL DRAIN PLUG

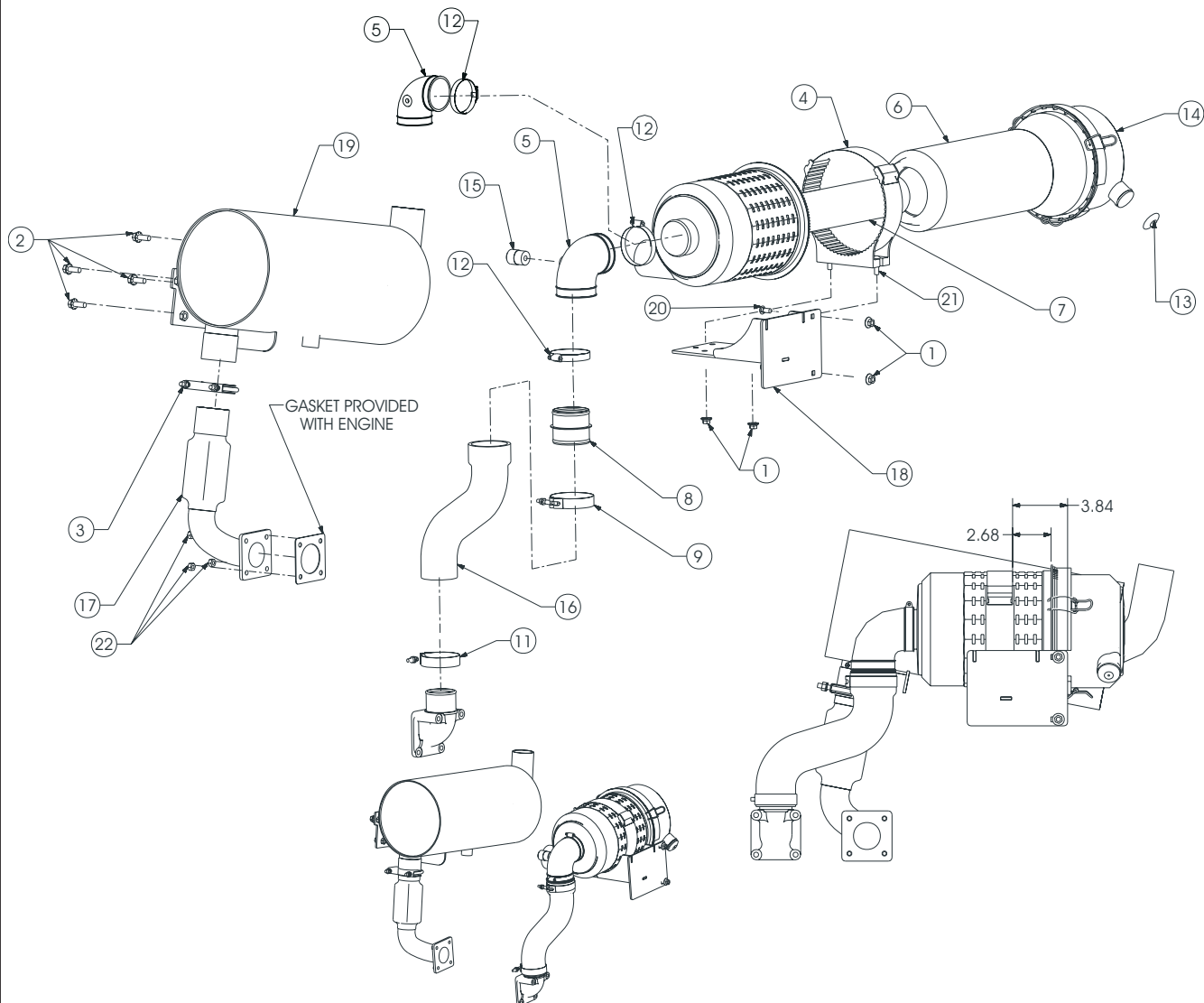
15 HP OUTBOARD MOTOR ASSEMBLY

1 FITTING/STRAIGHT
2 NUT/LOCK
3 NUT/LOCK
4 FITTING/STRAIGHT
5 NUT/SPIRALOCK™
6 WASHER/HARD
7 WASHER/SNUBBING
8 ISOLATOR
9 HOUSING/FLYWHEEL
10 CLAMP/TUBE
11 NUT/SPIRALOCK™
12 FITTING/90°
13 PUMP/FUEL
14 ISOLATOR
15 VALVE/SHUT OFF
16 ENGINE
17 COUPLER
18 FILTER/FUEL
19 MOUNT/ENGINE
20 ENGINE MOUNT
21 ENGINE MOUNT
22 MATING FILTER
23 BRACKET/ALT.
24 SPACER/ALT.
25 HOSE/FUEL
26 HOSE/FUEL
27 HOSE/FUEL
28 HOSE/FUEL
29 SPACER/ALT.
30 MOUNT/FILTER
31 ADAPTER/FILTER
32 ALTERNATOR
33 CLAMP/HOSE
34 CLAMP/HOSE
35 FILTER/OIL
36 STARTER
37 SEPARATOR/FUEL
38 BELT/ALT. FAN
39 HOSE/FILTER
40 HOSE/FILTER
41 HOSE OIL DRAIN
42 ASSY/DIPSTICK
43 BRACKET/DIPSTICK
44 WASHER/FLAT
45 SCREW/SET
46 SCREW/CAP
47 SCREW/CAP
48 SCREW/CAP
49 BOLT/CARRIAGE
50 SCREW/CAP
51 SCREW/CAP
52 SCREW/CAP
53 SCREW/CAP
54 SCREW/CAP
55 SCREW/CAP
56 NUT/HEX
57 SCREW/CAP
58 SCREW/CAP
59 SCREW/CAP

TO FUEL RETURN
FUEL SUPPLY

917292/AP1008

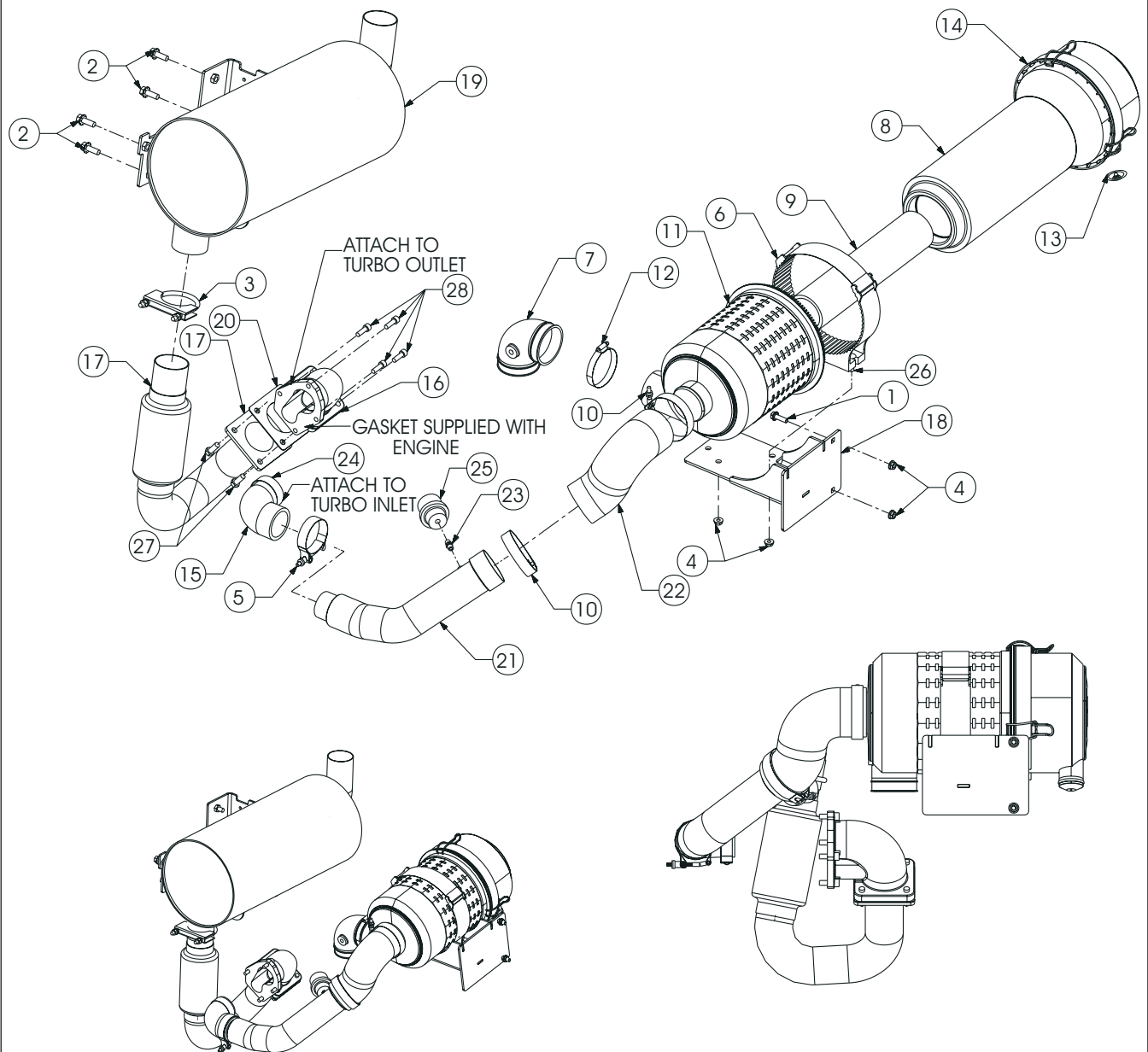
Air Cleaner and Exhaust Components - 2066 Models



- | | | |
|---------------------|--------------------------|----------------------|
| 1 NUT/HEX | 9 CLAMP/T BOLT | 17 COUPLER/FLEX |
| 2 SCREW/CAP | 10 ASSY/AIR CLEANER | 18 MOUNT/AIR CLEANER |
| 3 CLAMP/MUFFLER | 11 CLAMP/T-BOLT | 19 MUFFLER |
| 4 CLAMP/AIR CLEANER | 12 CLAMP/HOSE | 20 BOLT/CARRIAGE |
| 5 ELBOW/90° | 13 VALVE/VACUATOR | 21 BOLT/CARRIAGE |
| 6 ELEMENT/PRIMARY | 14 END CAP/AIR CLEANER | 22 NUT/HEX |
| 7 ELEMENT/SECONDARY | 15 INDICATOR/RESTRICTION | |
| 8 COUPLING/HOSE | 16 HOSE/MOLDED | |

Fig. 10-2 Exploded view of the naturally-aspirated engine air cleaner and exhaust components

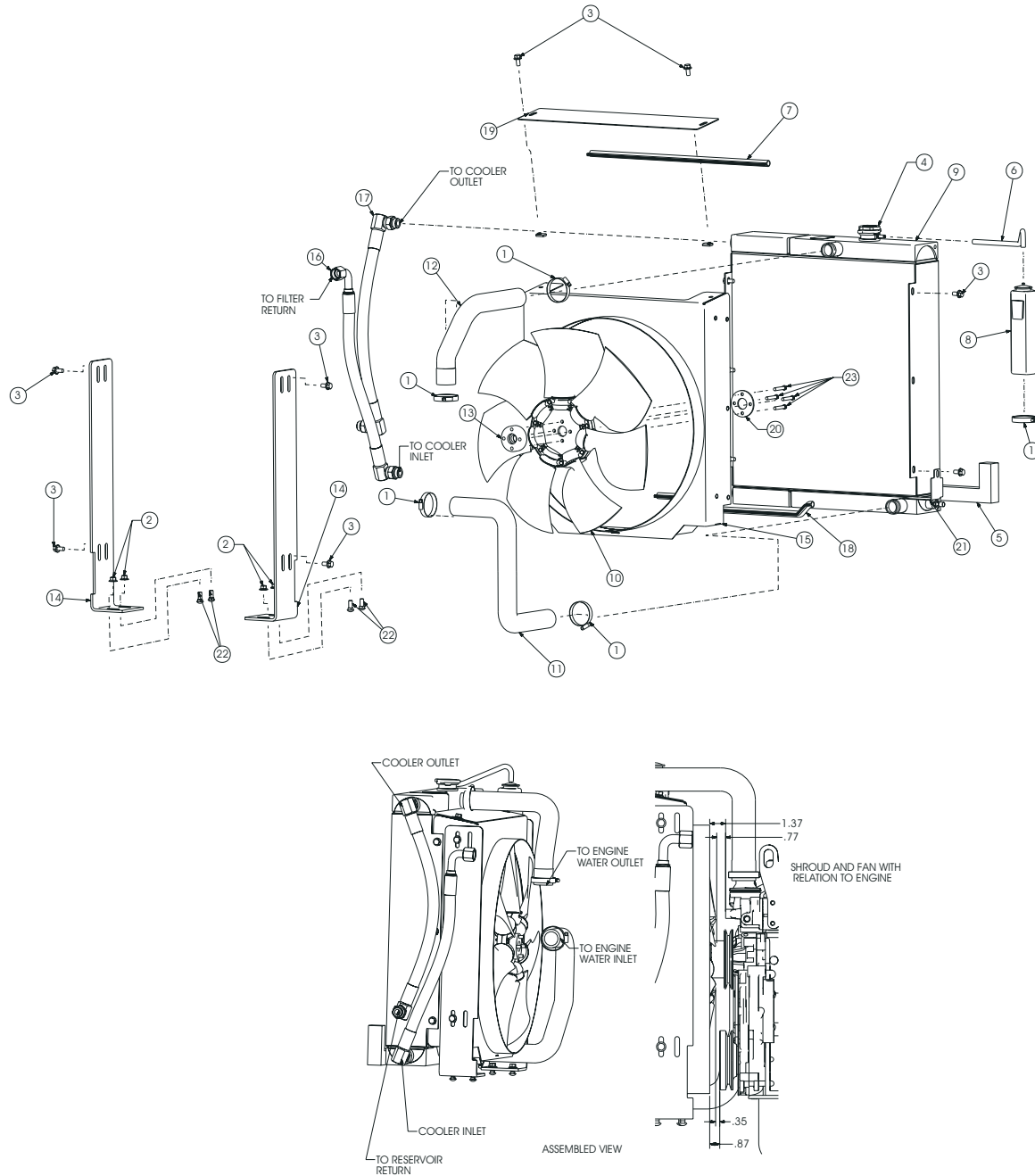
Air Cleaner and Exhaust Components - 56/6640 and 2076/86 Models



- | | | |
|---------------------|------------------------|--------------------------|
| 1 SCREW/CAP | 11 ASSY/AIR CLEANER | 21 TUBE/INTAKE |
| 2 SCREW/CAP | 12 CLAMP/HOSE | 22 HOSE/AIR INTAKE |
| 3 CLAMP/MUFFLER | 13 VALVE/VACUATOR | 23 ADAPTER/FILTER |
| 4 NUT/SPIRALOCK™ | 14 END CAP/AIR CLEANER | 24 CLAMP/T-BOLT |
| 5 CLAMP | 15 ELBOW/MOLDED | 25 INDICATOR/RESTRICTION |
| 6 CLAMP/AIR CLEANER | 16 OUTLET/EXHAUST | 26 BOLT/CARRIAGE |
| 7 ELBOW 90° | 17 COUPLER/FLEX | 27 SCREW/CAP |
| 8 ELEMENT/ PRIMARY | 18 MOUNT/AIR CLEANER | 28 SCREW/CAP |
| 9 ELEMENT/SECONDARY | 19 MUFFLER | |
| 10 CLAMP/T-BOLT | 20 GASKET/EXHAUST | |

Fig. 10-3 Exploded view of the turbocharged engine air cleaner and exhaust components

Radiator Cooler Components - 2066/76/86 Models



1 CLAMP/HOSE	9 EXCHANGER/HEAT	17 HOSE/OUTLET
2 NUT/HEX	10 FAN	18 SEAL/BULB
3 SCREW/FLANGE	11 HOSE/RADIATOR	19 COVER/COOLER
4 CAP/RADIATOR	12 HOSE/RADIATOR	20 WASHER/SPACER
5 PAD/COOLER	13 SPACER/FAN	21 COVER/SHROUD
6 HOSE/FUEL	14 PLATE/MOUNT	22 BOLT/CARRIAGE
7 SEAL/BULB	15 ASSY/FAN SHROUD	23 SCREW/CAP
8 BOTTLE/OVERFLOW	16 HOSE/INLET	

Fig. 10-4 Exploded view of the radiator cooler components

Radiator Cooler Components - 56/6640 Models

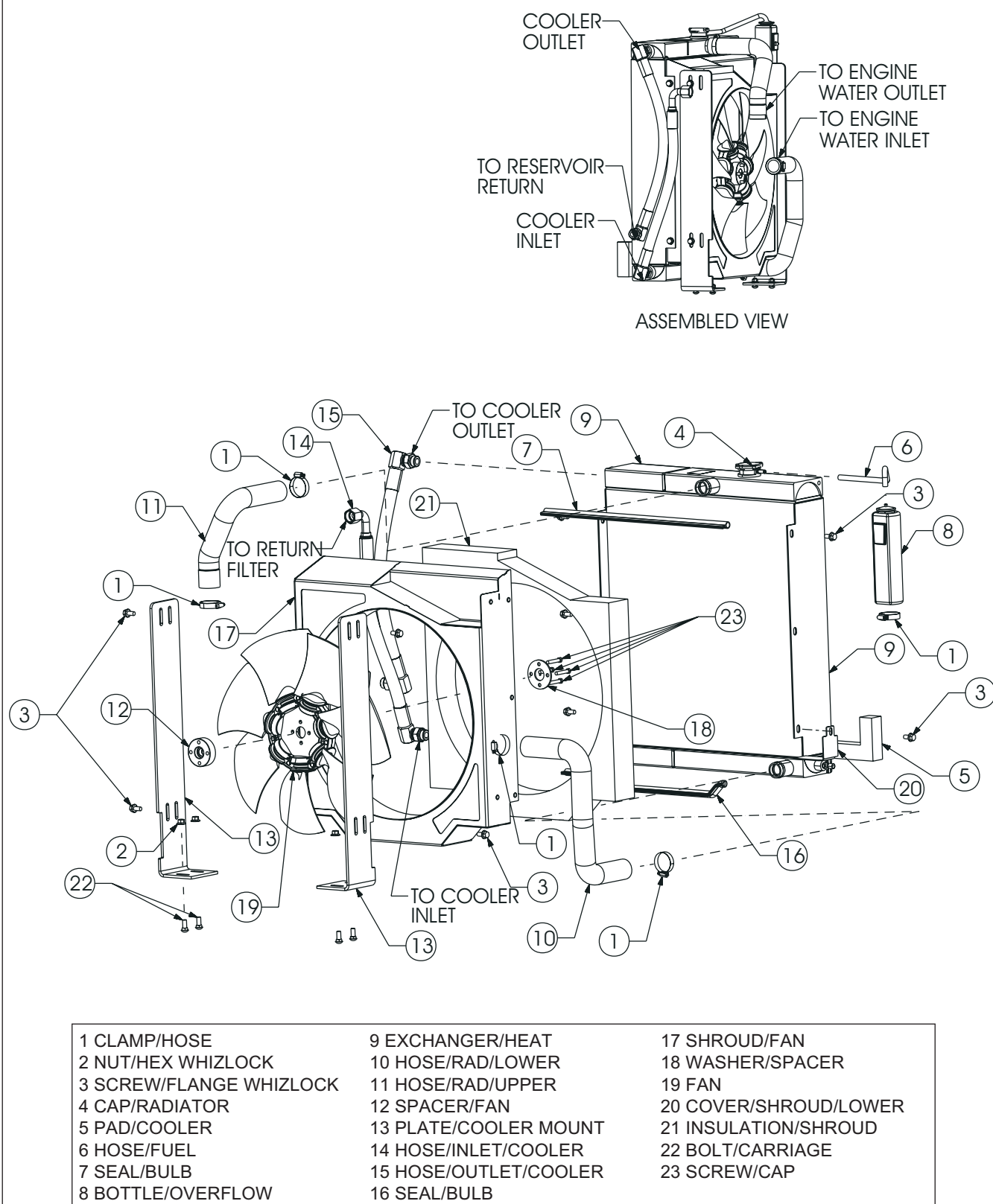


Fig. 10-5 Exploded view of the radiator cooler components

SECTION NOTES



Fig. 10-6 Remote engine oil filter access point on the left side of the radiator cooler



Fig. 10-7 Location of rear grille latch



Fig. 10-8 Top view looking at the remote oil filter

Remote Oil Filter Element Removal and Installation

The remote engine oil filter, left of the radiator cooler, is attached low to the left side of the engine compartment.



WARNING

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

- ☐ Shut off the engine and allow to cool.

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

Removal Procedure

1. Open the engine access cover and rear grille. Lock the grille open with the latch pin on the grille's lower pivot area. **Figs. 10-6, 10-7**
2. On left side of engine compartment find the oil filter element. **Fig. 10-7**
3. Clean area around oil filter element.
4. Place a suitable container beneath the oil drain weldment to catch any leaking oil. **Fig. 10-8**
5. Turning counterclockwise, loosen oil filter element with a filter wrench.
6. Turn filter element by hand until it is free of oil filter head.

Installation Procedure

1. Clean oil filter mating surface of any debris before installing new element.
2. Apply a thin film of oil to seal on filter element before installing.
3. Hand tighten filter element, turning it clockwise, until gasket contacts filter mating surface, then turn element another 3/4 turn to seat gasket.
4. If old oil has been removed also, fill crankcase with 9.5 qts. (9,0 L) of oil. (See *Lubrication* chapter.)
5. Start engine and check for leaks near oil filter. Shut off engine, recheck oil level, and fill as needed.

Air Cleaner Assembly Removal and Installation

Removal Procedure

WARNING

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



Shut off engine. Engine components may be extremely hot, particularly engine muffler and exhaust pipes. Serious injury can occur touching hot components.

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

1. Open the engine access cover and rear grille.
2. Clean area around the hose connections.
3. Loosen hose clamp securing the 90° elbow to air filter assembly. Pull elbow with air intake hose off end of air filter. Cover air cleaner hose opening to prevent contamination. **Fig. 10-10**
4. Release the air cleaner clamp to release the air cleaner canister. **Fig. 10-9**
5. Remove two capscrews and locknuts on filter clamp attached to filter bracket. **Fig. 10-11**

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



Fig. 10-9 View of air cleaner assembly from rear of skid-steer loader



Fig. 10-10 Location of hose clamp to loosen at the front of the air cleaner



Fig. 10-11 Unbolt two capscrews and locknuts securing air cleaner clamp to the chassis



Fig. 10-12 Disconnect the negative battery cable first, then, disconnect the positive battery cable

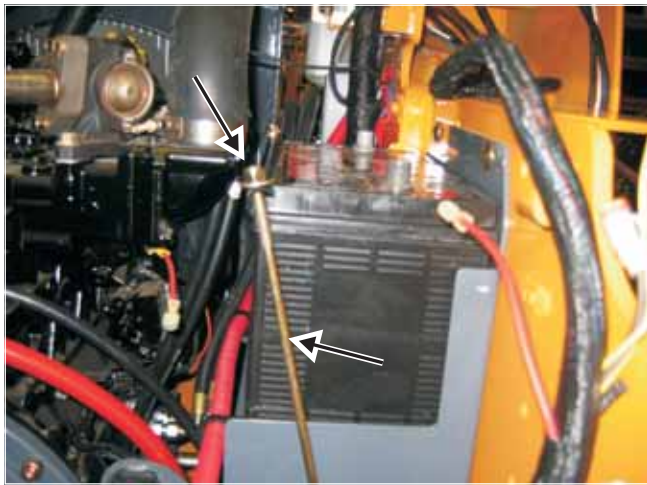


Fig. 10-13 Location of the battery holddown angle

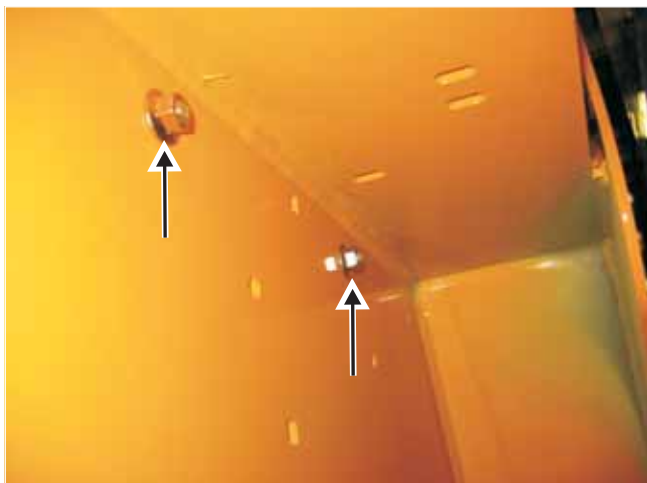


Fig. 10-14 Location of two capscrews securing the battery tray to the chassis

Battery and Battery Tray Removal and Installation

Removal Procedure

WARNING

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

- ☐ Tilt back ROPS/FOPS until lock engages.
- ☐ Shut off the engine.

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

WARNING

Review the following safety considerations before working on or around the battery:

- ☐ Keep sparks and flames away from battery. Gas given off by the battery's electrolyte solution is extremely explosive.
- ☐ Avoid contact with battery electrolyte; wash off any electrolyte immediately.
- ☐ Wear safety glasses when working near battery.
- ☐ Do not tip battery more than 45° to avoid spilling electrolyte solution.
- ☐ To avoid injury from spark or short circuit, disconnect negative (-) battery cable before servicing electrical system.

1. Disconnect and remove the negative (-) and then disconnect the positive (+) battery cable from the battery. **Fig. 10-12**
2. Remove two locknuts from the battery rods and the hold down battery angle. **Fig. 10-13**
3. Lift the battery forward and out of chassis.
4. Remove two capscrews on carriage bolts and a nut on the rear corner of the battery tray, securing the battery tray to the chassis. **Fig. 10-14**

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

Starter Removal and Installation

Removal Procedure



WARNING

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

- ☐ Raise lift arm; engage lift arm support device.
- ☐ Shut off the engine.
- ☐ Roll ROPS back until lock engages.

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

1. Disconnect and remove the negative (-) battery cable from the battery. **Fig. 10-12**
2. Remove the nut that secures the positive (+) battery cables and one smaller wire to the starter solenoid. **Fig. 10-15**
3. Remove the two capscrews securing the starter to the engine. **Fig. 10-16**
4. Remove the starter from the engine.

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

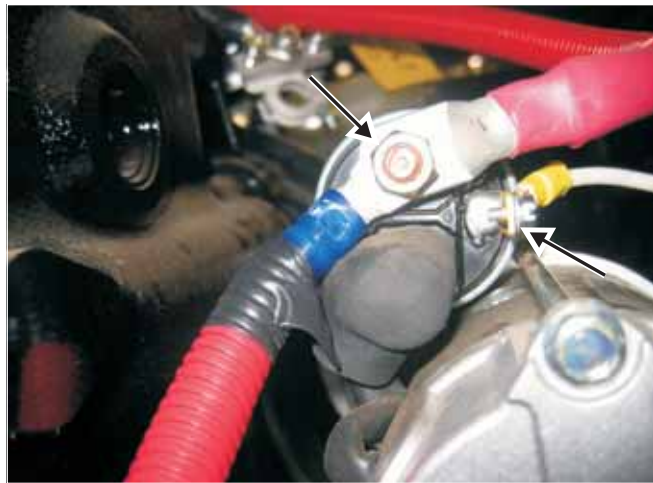


Fig. 10-15 Disconnect wires at the starter solenoid

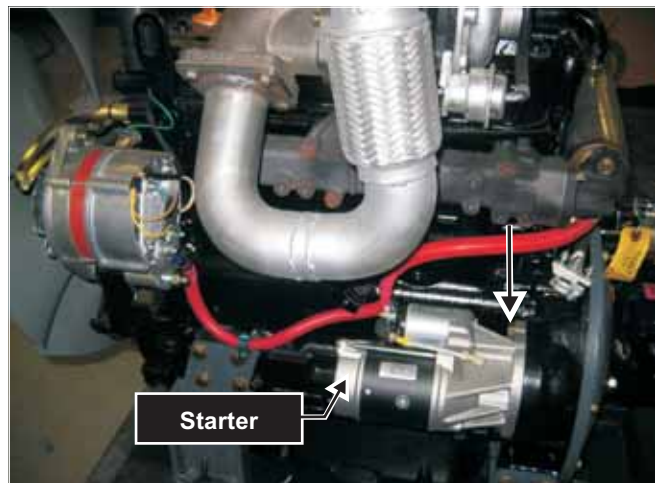


Fig. 10-16 Location of one of two capscrews securing the starter/solenoid to the engine



Fig. 10-17 Location of muffler in the engine compartment



Fig. 10-18 Location of muffler clamp securing muffler to flex coupler

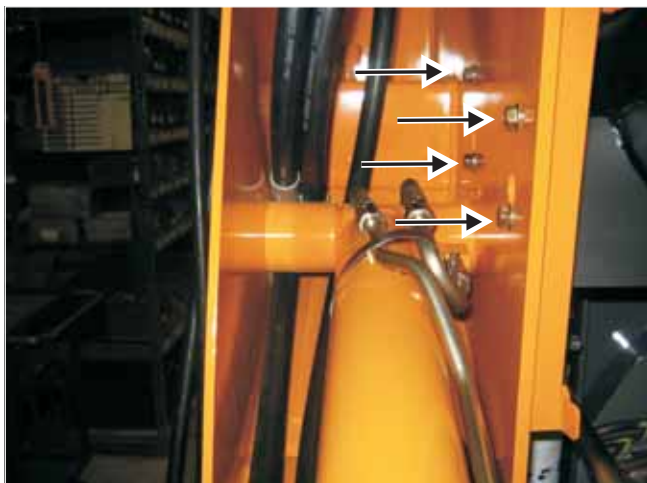


Fig. 10-19 Four capscrew securing the muffler to the right riser. Remove the top two capscrews and loosen the bottom two capscrews to remove the muffler.

Exhaust Assembly Removal and Installation

Removal Procedure

WARNING

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

- ☐ Lower the lift arm completely.
- ☐ Tilt back ROPS/FOPS until lock engages.
- ☐ Shut off the engine.

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



WARNING

Shut off engine. Engine components may be extremely hot, particularly engine muffler and exhaust pipes. Serious injury can occur touching hot components.

1. Open engine access cover and lock open the rear grille.
2. Loosen muffler clamp securing muffler to flex coupler. **Fig. 10-18**
3. Inside the right riser, remove two top capscrews and loosen two bottom capscrews securing the muffler to the right riser. **Fig. 10-19**
4. Lift muffler up and pull the bottom capscrews out of the larger hole openings and remove the muffler.

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

*Tighten the mounting hardware only after checking alignment of exhaust assembly so tailpipe is centered in opening on engine cover when closed.

Fan Belt Adjustment

Adjustment Procedure



WARNING

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

- ☐ Shut off the engine.

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

1. Open the engine access cover and lock open the rear grille.
2. Test fan belt tension by pushing on the belt midway between the alternator and the engine crankshaft pulley. The belt should deflect about $\frac{1}{2}$ " (13 mm) under a load of 20 lbs. (90 N). If adjustment is needed, follow steps below. **Figs. 10-20, 10-21**
3. Loosen two bolts on alternator - one at low pivot area and one on top in slide bracket. Also, loosen the bolt where the bracket attaches to the engine. **Figs. 10-21, 10-22**
4. Rotate the alternator in a clockwise direction (viewed from engine end) until correct belt tension is achieved.
5. Retighten bolts.

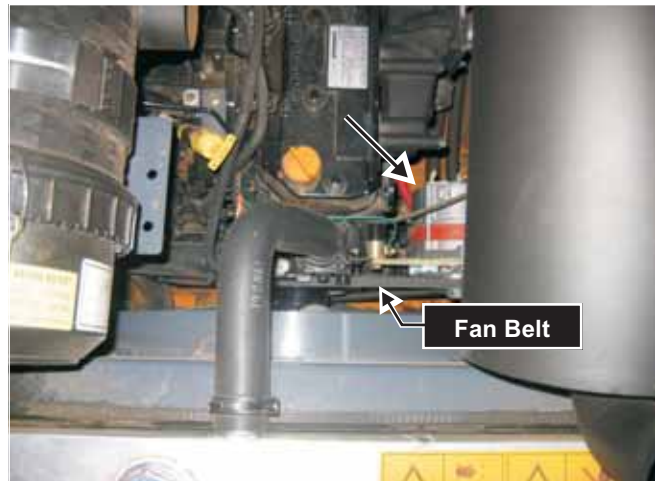


Fig. 10-20 Location of alternator in front of the fan shroud and engine fan blade



Fig. 10-21 Location to push on the belt. Also, the bolt on alternator bracket attached to the engine

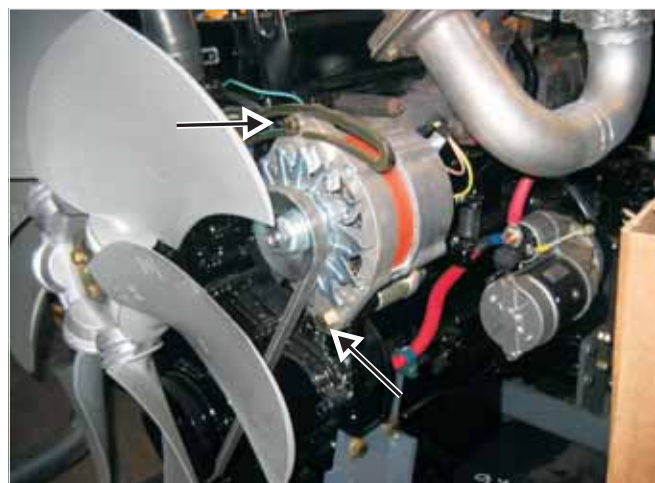


Fig. 10-22 Location of two capscrews to loosen prior to adjustment of the fan belt

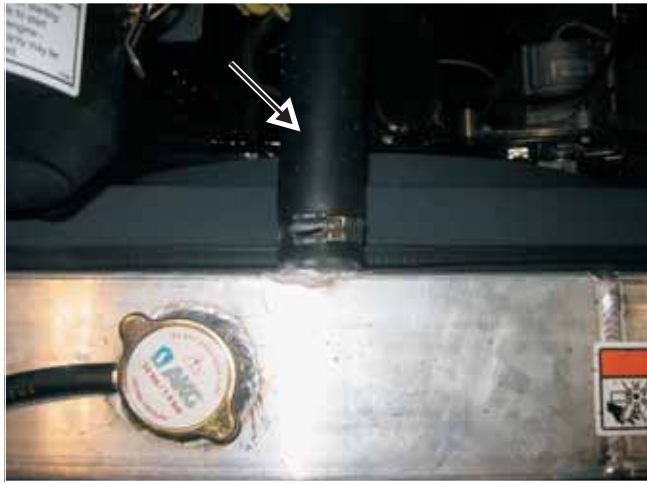


Fig. 10-23 Location the upper radiator hose at top center of the radiator cooler

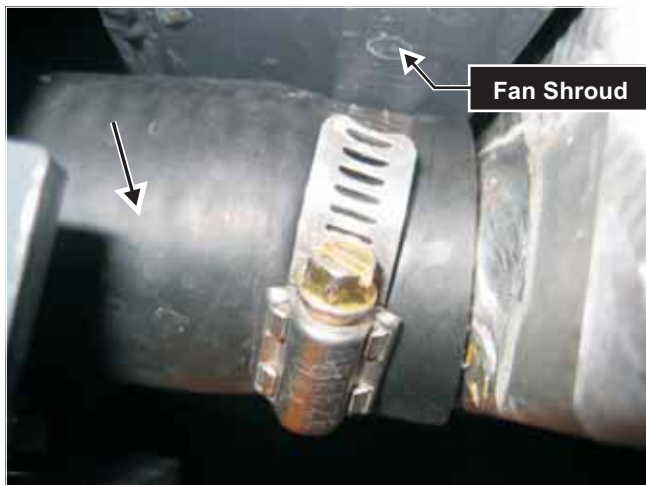


Fig. 10-24 Location the lower radiator hose at bottom left of the radiator cooler - access the hose clamp at a cut-out in the fan shroud weldment

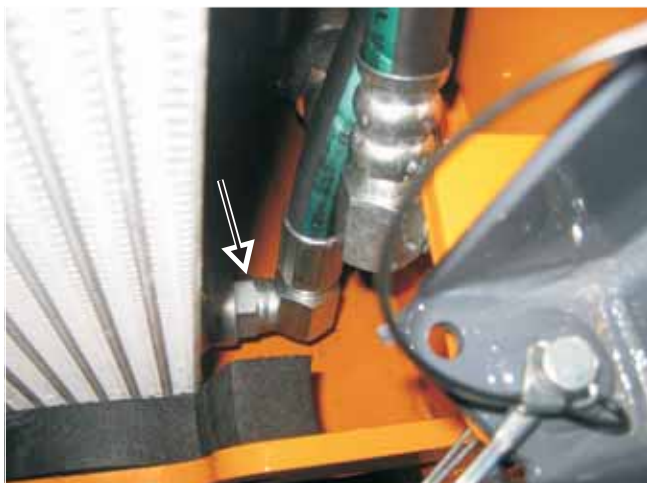


Fig. 10-25 Location one engine hydraulic hose at bottom right of radiator cooler

Radiator Cooler Removal and Installation

The radiator cooler is mounted on a shroud located just behind the engine.

Removal Procedure

! WARNING

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

- ☐ Shut off the engine.

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

1. Drain the oil from the hydraulic reservoir per the procedure in the *Lubrication* chapter.
2. Drain the engine coolant from the radiator per the procedure in the *Lubrication* chapter.
3. Open the engine access cover and lock open the rear grille.
4. Disconnect the hose clamps on two radiator hoses and the fittings on two hydraulic oil hoses from the inlets and outlets of the radiator cooler. **Figs. 10-23 – 10-26**

NOTE: Be sure to plug or cap the openings on the oil cooler and its disconnected hydraulic and coolant hoses to prevent contaminants from entering the hydraulic and coolant system.

5. Remove remote radiator overflow line at the top of the radiator. **Fig. 10-27**
6. Remove five flange screws securing the cooler to the shroud. **Figs. 10-28, 10-29**

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

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



WARNING



NEVER use your hands to search for hydraulic fluid leaks. Use a piece of paper or cardboard. 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.



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

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



Fig. 10-27 View of the radiator cooler overflow line connected to the overflow bottle

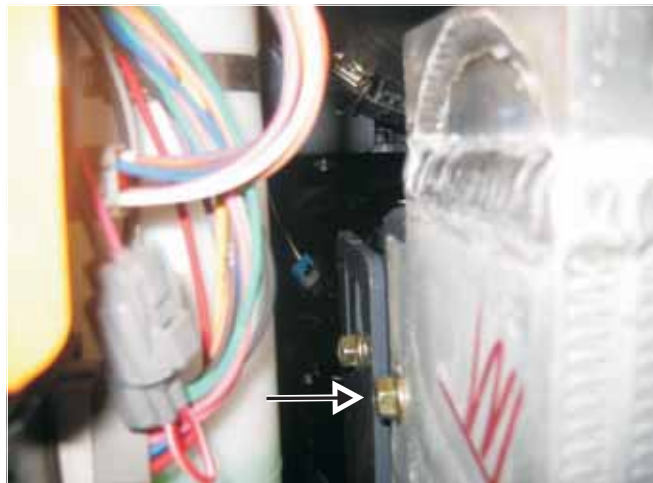


Fig. 10-28 Location of the top flange screw securing the cooler to the shroud, other side same



Fig. 10-26 Location of one hydraulic oil hose at top right of the cooler

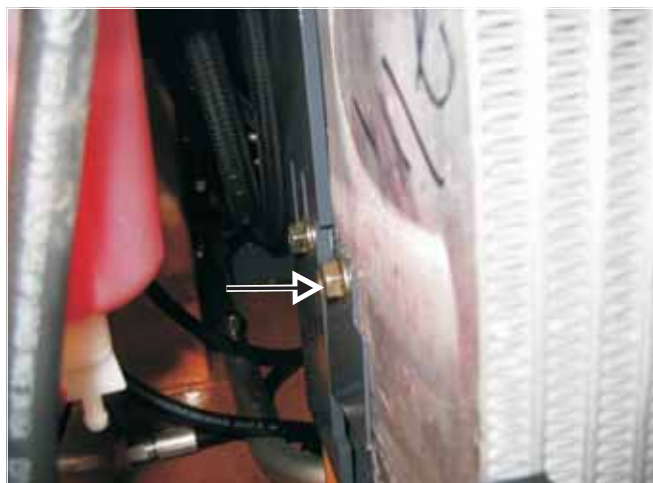


Fig. 10-29 Location the bottom flange screw securing the cooler to the shroud, other side same



Fig. 10-30 Location of one of five flange screws securing the shroud assembly to the cooler mount plates, other side same

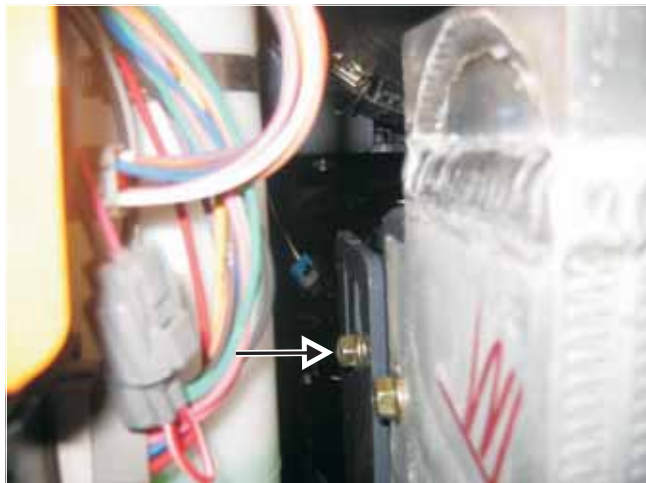


Fig. 10-31 Location of one of five flange screws securing the shroud assembly to the cooler mount plates, other side same

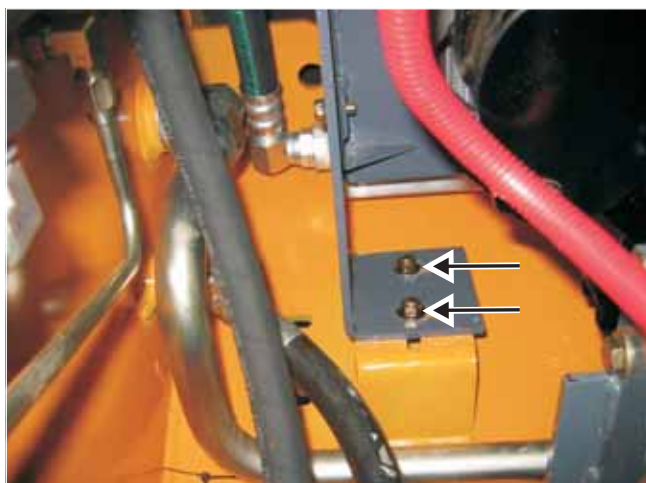


Fig. 10-32 Location of two carriage bolts securing the cooler mount plates to the floor of the chassis, other side same

Fan Shroud and Cooler Mount Plates Removal and Installation

Removal Procedure

! WARNING

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

- ☐ Shut off the engine.

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

! WARNING

DO NOT attempt to service any part of radiator cooler system until engine has been allowed to cool down. Serious injury may result from high temperature of oil and water or high pressure.

1. Remove the hydraulic reservoir drain plug and drain the hydraulic oil into a suitable container. Refer to the procedure in the *Lubrication* chapter.

NOTE: If the hydraulic hoses are plugged after disconnecting to prevent leakage, it should not be necessary to drain the hydraulic reservoir. Hoses should be plugged after disconnecting to prevent contaminants from entering the hydraulic system.

2. Remove the radiator cooler per the procedure in this chapter.
3. Remove five flange screws securing the shroud assembly to cooler mounting plates that are secured to the floor of the chassis. **Figs. 10-30, 10-31**
4. Remove the fan shroud assembly.
5. Unbolt two carriage bolts securing the cooler mounting plates to the floor of the chassis, one on each side of the skid-steer loader. **Fig. 10-32**
6. Remove both of the cooler mounting plates.

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

* BE SURE and uncap/unplug the hydraulic hoses prior to reconnecting them to the oil cooler.

Engine Removal and Installation

The following procedure allows removal of diesel engine without removing hydrostatic pump assembly. Some hydraulic hoses need disconnecting in this procedure, and if they cannot be capped/plugged to prevent fluid loss, the hydraulic reservoir should be drained **BEFORE** disconnecting hydraulic hoses.

Removal Procedure

WARNING

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

- ☐ Raise lift arm; engage lift arm support device.
- ☐ Shut off the engine.

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

1. Drain the hydraulic oil reservoir (as required) and the engine oil.
2. Remove engine access covers per the procedure in the *Mainframe* chapter.
3. Remove rear grille per the procedure in the *Mainframe* chapter.

NOTE: The following step is not required, but it is recommended.

4. Remove the ROPS per the procedure found in the *Mainframe* chapter.
5. Remove the battery and battery tray per the procedure in this chapter.
6. Remove the air cleaner assembly per the procedure in this chapter.

WARNING

DO NOT PROCEED with the following steps unless engine has completely cooled and is safe to touch.

7. Remove exhaust assembly per the procedure in this chapter.
8. Remove oil cooler per the procedure in this chapter.

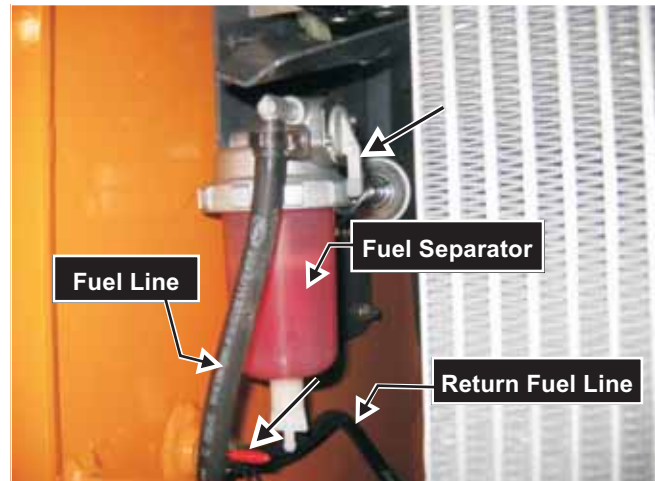


Fig. 10-33 Location of the fuel separator petcock and the return fuel line petcock

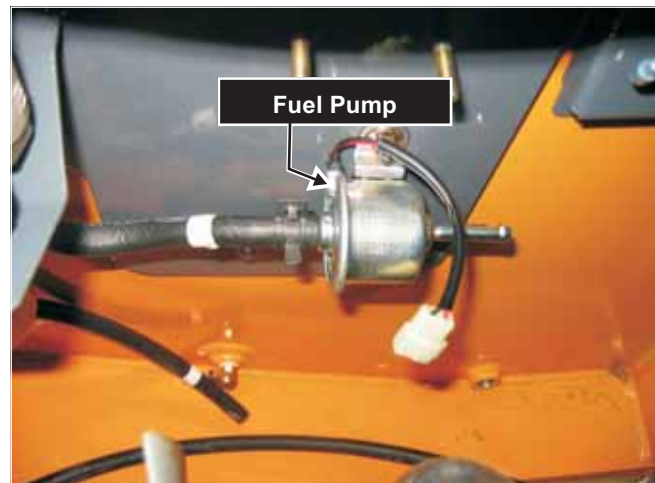


Fig. 10-34 View of fuel pump with its electrical connector and the forward fuel line disconnected prior to removal of the engine from the chassis

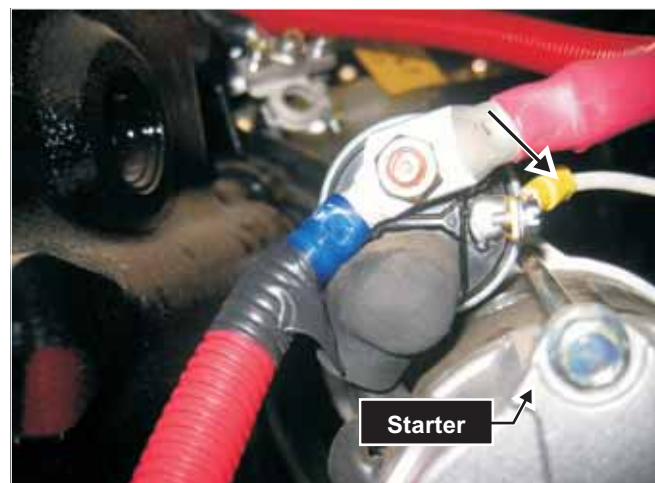


Fig. 10-35 Disconnect the white wire on the starter solenoid

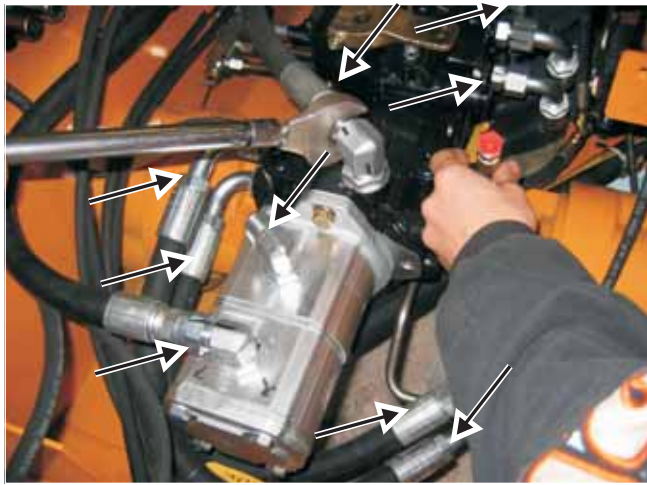


Fig. 10-36 View of hydraulic hoses attached at the hydrostatic and gear pump. Remove the hoses at their fittings prior to removing the engine from the chassis.



Fig. 10-37 View of the engine ground cable attached to the engine

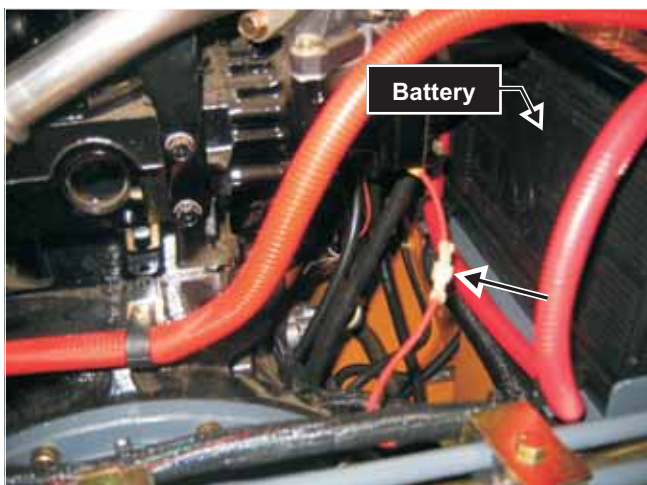


Fig. 10-38 Location of the red wire grid heater electrical connector that needs disconnecting prior to removing the engine from the chassis

9. Remove fan shroud and cooler mounting plates per the procedure in this chapter.
10. Turn fuel return line petcock (small red petcock) to its OFF position and disconnect line from the engine. **Fig. 10-33**
11. Turn fuel separator petcock to its OFF position. **Fig. 10-33**
12. Disconnect the fuel line in front of the fuel pump and unplug the electrical connector on the fuel pump. **Fig. 10-34**

NOTE: The following step includes disconnection of hydraulic hoses. If hoses cannot be capped/plugged to prevent fluid loss, the hydraulic reservoir should be drained **BEFORE** disconnecting hoses. Refer to the *Hydraulic System* chapter for the procedure.

NOTE: ALWAYS clean area around hydraulic fittings **BEFORE** disconnecting any hydraulic hose or tube.

13. Disconnect the following:
 - a. Remote Oil Drain hose **Fig. 10-40**
 - b. Small White Wire on the Starter **Fig. 10-35**
 - c. Ground Cable from Engine to Chassis **Fig. 10-37**
 - d. Positive Battery Cable from Engine
 - e. Grid Heater Electrical Connector **Fig. 10-38**
 - f. Unplug Engine Harness **Fig. 10-39**
 - g. Unbolt Remote Oil Filter from Plate **Fig. 10-41**
14. Disconnect all hydraulic hoses at the hydrostatic pump and the gear pump from their fittings. **Fig. 10-36**
15. Attach lift hooks to engine located on front and rear of head cylinder. **Fig. 10-43**
16. Remove one carriage bolt, lock nut (80 ft-lbs) (109 N•m) and two washer on four engine mounts. **Fig. 10-42**
17. With hoist attached to engine, lift slightly and pull engine rearward. Continue pulling engine rearward until pump is free from drive coupling. Then remove engine from chassis.

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

* Bleed the electric fuel pump. Also check engine oil and hydraulic oil levels prior to starting the skid-steer loader.



Fig. 10-39 Unplug the engine harness at this location



Fig. 10-42 View of one of four engine mounts



Fig. 10-40 Location of the remote oil drain hose on the bottom of the left riser



Fig. 10-43 Lift hooks on lift eyes on the engine are ready to pull the engine out of the skid-steer loader

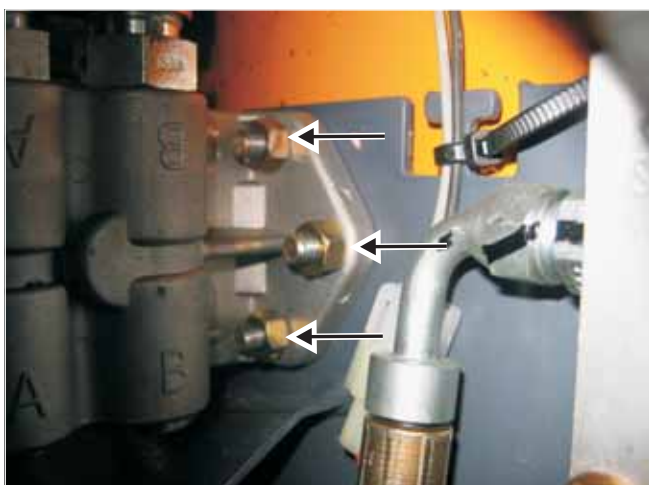


Fig. 10-41 View of three nuts securing the remote oil filter to the left side of the chassis

Yanmar 4TNV98-ZNMS Engine ECU Fault Codes**CONTROL SYSTEM****Diagnostic list**

No.	Item	Failure detection conditions	Operation when failure occurs	Action/condition for recovery	Category	Number of flashes
1	Coolant temperature sensor failure	Sensor voltage is 4.8 V or more, or 0.2 V or less.	Engine runs with a coolant temperature of 30°C.	Correct failure.	Always enable	4
2	Accelerator sensor failure	Sensor voltage is 4.6 V or more, or 0.2 V or less.	[Without optional backup accelerator sensor] Engine runs at 1500 min ⁻¹ . (Option can change) [With optional backup accelerator sensor] Select backup accelerator sensor; No limitation Backup accelerator sensor failure; Engine runs at 1500 min ⁻¹ . (Option can change)	Correct failure.	Default to disable	5
3	Speed sensor failure	Engine start signal (E8) is on, but the engine speed is zero. Engine speed decreases by 480 min ⁻¹ or more in 40 ms.	[With optional backup speed sensor] Backup speed sensor becomes active; speed is limited to 1800 min ⁻¹ . (Option can change) Backup speed sensor failed: Engine stops. [Without optional backup speed sensor] Engine stops.	Turn key off.	Always enable	6
4	Rack position sensor failure	Correlation between rack actuator output and rack position exceeds threshold upper limit by 0.32 sec. or more. Correlation between rack actuator output and rack position exceeds threshold lower limit by 0.16 sec. or more.	Engine runs with limited output and speed. (Rack position control is inactive and speed control is active).	Turn key off.	Always enable	7
5	Rack actuator failure	Rack actuator current is too high. Rack actuator current is too low. Engine accelerates with minimum rack actuator output. Engine stalls while rack position sensor is failed.	Engine stops.	Turn key off.	Always enable	8
6	Overspeed	Idling engine speed exceeds high idling speed plus 600 min ⁻¹ .	Engine stops.	Turn key off.	Always enable	9

Yanmar 4TNV98-ZNMS Engine ECU Fault Codes

CONTROL SYSTEM

Diagnostic list

No.	Item	Failure detection conditions	Operation when failure occurs	Action/condition for recovery	Category	Number of flashes
7	Backup speed sensor failure	Engine start signal (E8) is on, but the engine speed is zero.	Engine continues to run while main speed sensor is used. Backup speed sensor failed: Engine stops.	Turn key off.	Default to disable	1-1
		Engine speed decreases by 480 min ⁻¹ or more in 40 ms.				
8	CAN communication failure	CAN communication packets cannot be received.	Last value is retained. Backup sensor becomes active.	Correct failure.	Default to enable	1-2
9	EGR valve failure	Low status is detected even through port is off.	Engine runs with limited output(92%) and speed(1800min ⁻¹).	Turn key off.	Default to disable	1-3
		High status is detected even through port is on.				
10	CSD solenoid valve failure	High status is detected even through port is off.	Engine continues to run with port being off.	Turn key off.	Always enable	1-4
		Low status is detected even through port is on.				
11	Air heater relay failure	High status is detected even through port is off.	Engine runs with air heater relay being off.	Turn key off.	Default to enable	1-5
		Low status is detected even through port is on.				
12	Main relay failure	Power is not shut off even though main relay is off.	Engine runs normally.	Correct failure. Or turn key off.	Default to disable	1-6
13	Rack actuator relay failure	Low status is detected even through port is off.	Engine stops.	Turn key off.	Always enable	1-7
		High status is detected even through port is on.				
14	Backup accelerator sensor failure	Sensor voltage is 4.6 V or more, or 0.2 V or less.	Engine continues to run while main accelerator sensor is used. Main accelerator sensor failure: Engine runs at 1500 min ⁻¹ . (Option can change)	Correct failure.	Default to enable	1-8
15	Atmospheric pressure sensor failure		Atmospheric pressure compensation is canceled.	Turn key off.	Default to enable	1-9
16	Oil pressure switch failure	Oil pressure switch fails to turn on when engine is off.	Engine runs normally. (Option can change)	Turn key off.	Default to enable	2-1
17	Charge switch failure	Charge switch fails to turn on when engine is off.	Engine runs normally.	Turn key off.	Default to enable	2-2
18	Power supply voltage abnormal	E-ECU supply voltage exceeds 10.0 V.	Engine runs normally.	Correct failure.	Always enable	2-3
		E-ECU supply voltage exceeds 16.0 V.				

Yanmar 4TNV98-ZNMS Engine ECU Fault Codes**CONTROL SYSTEM****Diagnostic list**

No.	Item	Failure detection conditions	Operation when failure occurs	Action/condition for recovery	Category	Number of flashes
19	Sensor 5V failure	Monitoring voltage is approx. 0 V. Monitoring voltage is 4.5 V or less. Monitoring voltage is 5.5 V or more.	Engine runs normally.	Turn key off.	Always enable	2-4
20	E-ECU overheat alarm	E-ECU temperature exceeds 105°C. Alarm is canceled when E-ECU temperature decreases to 100°C. (Option can change)	Engine runs normally. (Option can change)	Correct failure.	Default to enable	2-5
21	Oil pressure low	Oil pressure switch fails to turn off when engine is running.	Engine runs normally. (Option can change)	Correct failure.	Default to enable	3-1
22	Charge failure	Charge switch fails to turn off when engine is running.	Engine runs normally.	Turn key off.	Default to enable	3-2
23	Coolant temperature abnormal	Coolant temperature switch turns on.	Engine runs normally. (Option can change)	Turn key off.	Default to enable	3-3
24	Air cleaner blockage alarm	Air cleaner switch turns on.	Engine runs normally. (Option can change)	Turn key off.	Default to enable	3-4
25	Oily water separator alarm	Oily water separator switch turns on.	Engine runs normally. (Option can change)	Turn key off.	Default to enable	3-5
26	Coolant temperature high alarm	Coolant temperature is 115°C or higher. Alarm is canceled when Coolant temperature decreases to 110°C. (Option can change)	Engine runs normally.	Correct failure.	Default to enable	3-6
27	E-ECU failure [ROM error]	FlashROM suffers checksum error.	Engine stops.	Turn key off.	Always enable	4-1
28	E-ECU failure [EEPROM error]	Reading/Writing fails. EEPROM suffers checksum error.	Engine runs normally.	Turn key off.	Always enable	4-1
29	E-ECU failure [Sub CPU failure]	E-ECU fails to communicate with sub CPU.	Engine runs normally.	Turn key off.	Always enable	4-1
30	E-ECU failure [Mapping error]	Map format is invalid.	Engine stops.	Turn key off.	Always enable	4-1
31	E-ECU failure [E-ECU temperature sensor failure]	Sensor voltage is 4.6 V or more, or 1.0 V or less.	Engine runs normally.	Correct failure.	Always enable	4-1

When detecting these failures, the E-ECU flashes the failure lamp to alert the operator to the occurrence of failure conditions. The failure lamp will illuminate for 2 sec. when the E-ECU is power on. This allows checking if the E-ECU is supplied with power normally. (The failure lamp is an essential means for checking or diagnosing the E-ECU).

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