CATERPILLAR®

Service Manual

Models
TL1055C
TL1255C

S/N KDE00150 & After
S/N DHW00150 & After
S/N MDD00150 & After
S/N SXM00150 & After

31200793

Revised
October 14, 2014

1.6 SAFETY INSTRUCTIONS

Following are general safety statements to consider ***before*** performing maintenance procedures on the machine. Additional statements related to specific tasks and procedures are located throughout this manual and are listed prior to any work instructions to provide safety information before the potential of a hazard occurs.

For all safety messages, carefully read, understand and follow the instructions ***before*** proceeding.

1.6.1 Personal Hazards

PERSONAL SAFETY GEAR: Wear all the protective clothing and personal safety gear necessary to perform the job safely. This might include heavy gloves, safety glasses or goggles, filter mask or respirator, safety shoes or a hard hat.

LIFTING: **NEVER** lift a heavy object without the help of at least one assistant or a suitable sling and hoist.

1.6.2 Equipment Hazards

LIFTING OF EQUIPMENT: Before using any lifting equipment (chains, slings, brackets, hooks, etc.), verify that it is of the proper capacity, in good working order, and is properly attached.

NEVER stand or otherwise become positioned under a suspended load or under raised equipment. The load or equipment could fall or tip.

DO NOT use a hoist, jack or jack stands only to support equipment. Always support equipment with the proper capacity blocks or stands properly rated for the load.

HAND TOOLS: Always use the proper tool for the job; keep tools clean and in good working order, and use special service tools only as recommended.

1.6.3 General Hazards

SOLVENTS: Only use approved solvents that are known to be safe for use.

HOUSEKEEPING: Keep the work area and operator cab clean, and remove all hazards (debris, oil, tools, etc.).

FIRST AID: Immediately clean, dress and report all injuries (cuts, abrasions, burns, etc.), no matter how minor the injury may seem. Know the location of a First Aid Kit, and know how to use it.

CLEANLINESS: Wear eye protection, and clean all components with a high pressure or steam cleaner before attempting service.

When removing hydraulic components, plug hose ends and connections to prevent excess leakage and contamination. Place a suitable catch basin beneath the machine to capture fluid run off.

It is good practice to avoid pressure-washing electrical/ electronic components. In the event pressure-washing the machine is needed, ensure the machine is shut down before pressure-washing. Should pressure-washing be utilized to wash areas containing electrical/electronic components, it is recommended a maximum pressure of 750 psi (52 bar) at a minimum distance of 12 in (30,5 cm) away from these components. If electrical/electronic components are sprayed, spraying must not be direct and for brief time periods to avoid heavy saturation,

Check and obey all Federal, State and/or Local regulations regarding waste storage, disposal and recycling.

2.3.2 Metric Fastener Torque Chart

Values for Zinc Yellow Chromate Fasteners (Ref 4150707)*							
CLASS 8.8 METRIC (HEX/SOCKET HEAD) BOLTS CLASS 8 METRIC NUTS							
Size	Pitch	Tensile Stress Area	Clamp Load See Note 4	Torque (Dry or Loctite® 263™)	Torque (Lube)	Torque (Loctite® 262™ or 271™ or Vibra-TITE™ 131)	Torque (Loctite® 242™ or 271™ or Vibra-TITE™ 111 or 141)
		Sq mm	KN	[N.m]		[N.m]	[N.m]
3	0.5	5.03	2.19	1.3	1.0	1.2	1.4
3.5	0.6	6.78	2.95	2.1	1.6	1.9	2.3
4	0.7	8.78	3.82	3.1	2.3	2.8	3.4
5	0.8	14.20	6.18	6.2	4.6	5.6	6.8
6	1	20.10	8.74	11	7.9	9.4	12
7	1	28.90	12.6	18	13	16	19
8	1.25	36.60	15.9	26	19	23	28
10	1.5	58.00	25.2	50	38	45	55
12	1.75	84.30	36.7	88	66	79	97
14	2	115	50.0	140	105	126	154
16	2	157	68.3	219	164	197	241
18	2.5	192	83.5	301	226	271	331
20	2.5	245	106.5	426	320	383	469
22	2.5	303	132.0	581	436	523	639
24	3	353	153.5	737	553	663	811
27	3	459	199.5	1080	810	970	1130
30	3.5	561	244.0	1460	1100	1320	1530
33	3.5	694	302.0	1990	1490	1790	2090
36	4	817	355.5	2560	1920	2300	2690
42	4.5	1120	487.0	4090	3070	3680	4290

NOTES: 1. THESE TORQUE VALUES DO NOT APPLY TO CADMIUM PLATED FASTENERS 5000059K

2. ALL TORQUE VALUES ARE STATIC TORQUE MEASURED PER STANDARD AUDIT METHODS TOLERANCE = ±10%

3. * ASSEMBLY USES HARDENED WASHER

4. CLAMP LOAD LISTED FOR SHCS IS SAME AS GRADE 8 OR CLASS 10.9 AND DOES NOT REPRESENT FULL STRENGTH CAPABILITY OF SHCS. IF HIGHER LOAD IS REQUIRED, ADDITIONAL TESTING IS REQUIRED.

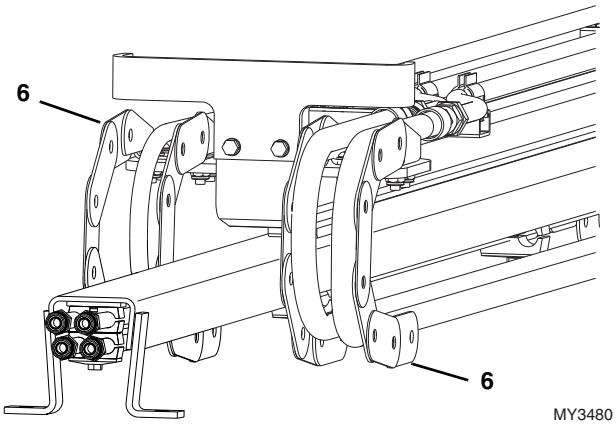
S/N MDD00150 & After
S/N SXM00150 & After

Compartment or System	Type and Classification	Viscosities	Ambient Temperature Range			
			°F		°C	
			Min	Max	Min	Max
Engine Crankcase	API CI-4 Multigrade	SAE 0W-20	-40	50	-40	10
		SAE 0W-30	-40	86	-40	30
		SAE 0W-40	-40	104	-40	40
		SAE 5W-30	-22	86	-30	30
		SAE 5W-40	-22	122	-30	50
		SAE 10W-30	0	104	-18	40
		SAE 10W-40	0	122	-18	40
		SAE 15W-40	15	122	-9.5	50
Transmission and Transfer Case	CAT TDTO	SAE 10W	0	95	-18	35
		SAE 30	32	95	0	35
		SAE 50	50	122	10	50
		SAE 5W-30	-22	68	-30	20
		SAE 0W-20	-40	68	-40	20
Axle Differentials* and Wheel Ends	CAT Synthetic Gear Oil (GO)	SAE 75W-140	-22	113	-30	45
	CAT Gear Oil (GO)	SAE 80W-90	-10	120	-23	49
	CAT Gear Oil (GO)	SAE 85W-140	10	120	-12	59
	CAT TDTO-TMS	CAT TDTO-TMS	-4	122	-20	50
Hydraulic System	CAT TDTO CAT TDTO-TMS CAT Arctic TDTO SYN Commercial TO-4	SAE 0W-20	-40	104	-40	40
		SAE 0W-30	-40	104	-40	40
		SAE 5W-30	-22	104	-30	40
		SAE 5W-40	-22	104	-30	40
		SAE 10W	-4	104	-20	40
		SAE 30	50	122	10	50
		SAE 10W-30	-4	104	-20	40
		SAE 15W-40	5	122	-15	50
		CAT TDTO-TMS	-4	122	-20	50
Boom Wear Pad Grease	CAT Advanced 3Moly	NLGI Grade 2	-4	104	-20	40
Cylinder and Axle Grease	CAT Multipurpose	NLGI Grade 2	-22	104	-30	40
Boom Chain Lubricants	Schaffer 200S Silver Streak					

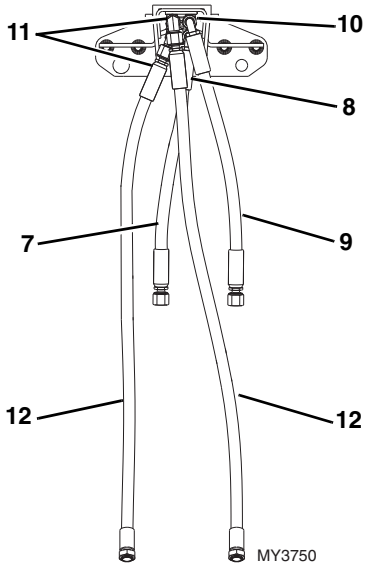
Section 3
Boom

Contents

3.5.6 Hose Carrier Installation

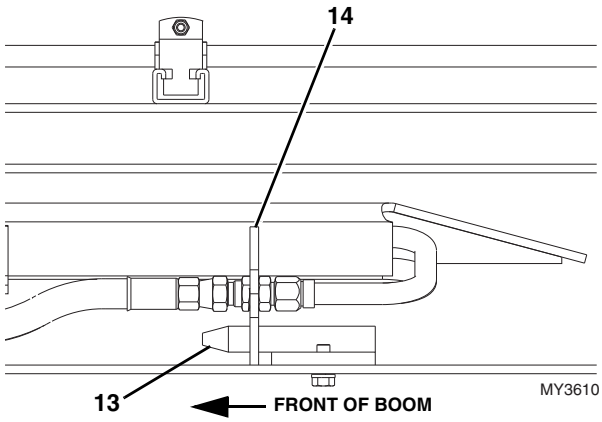


1. Inspect the hose carrier track (**6**) for any broken or missing clips. Repair or replace as needed.
2. Remove the caps from the tubes on the hose carrier.

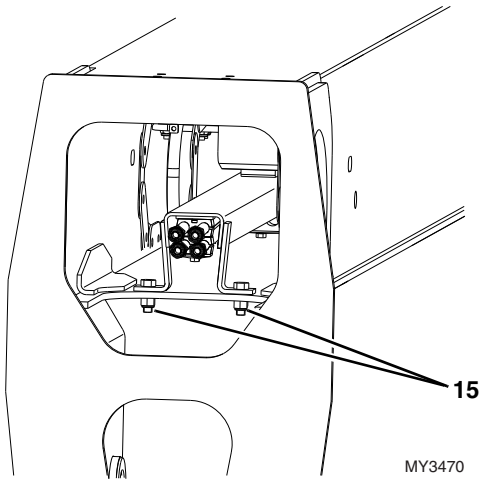


Note: *Connect the tilt cylinder hoses and the auxiliary hoses to the hose carrier bulkhead before installing the hose carrier in the fourth boom section.*

3. Install tilt cylinder hose (**7**) to the bottom left fitting on the hose carrier tube (**8**).
4. Install tilt cylinder hose (**9**) to the top left fitting on the hose carrier tube (**10**).
5. Install adaptors (**11**) to each auxiliary tube at the front right of the hose carrier.
6. Install auxiliary hoses (**12**) to each adaptor (**11**) on the auxiliary tubes at the front right of the hose carrier.
7. Orient each auxiliary hose (**12**) as shown above.
8. Torque each fitting and hose as required.



9. Install the previously removed hose carrier guide bracket (**13**). Torque as required.
10. Install the hose carrier (**14**) into the front of the fourth boom section. Remove each nylon tie or nylon strap as the hose carrier is installed.
11. Align the hose carrier (**14**) to the hose carrier guide bracket (**13**).



12. Align the hose carrier mounting bracket and install the previously removed hardware to mounting bracket at the front of the fourth boom section (**15**). Torque as required.

13. Cycle the auxiliary circuit and/or the tilt circuit, verifying the auxiliary hoses and the tilt hoses are NOT touching the bottom of the second boom section and the proper slack, 4 in (101,6 mm) is maintained.
14. Retract the boom and shut engine OFF.
15. Remove the Do Not Operate Tags from both the ignition key switch and the steering wheel.

3.8 QUICK COUPLER ASSEMBLY

3.8.1 Quick Coupler Removal

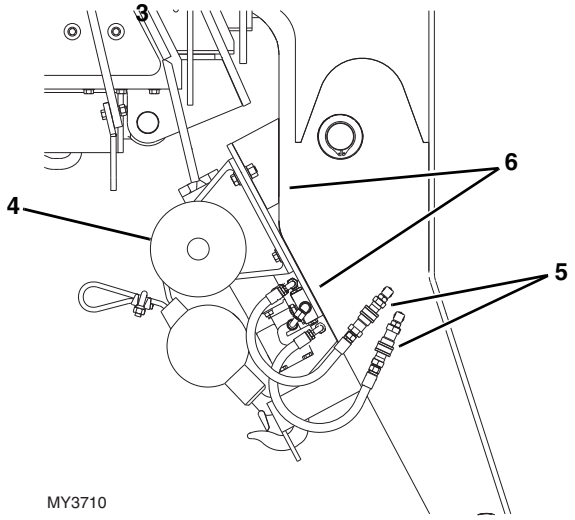
1. Remove the lock bolt holding the tilt cylinder rod end pin to the quick coupler assembly. Remove the Tilt Cylinder pin.
2. Support the quick coupler assembly. Remove the capscrew and locknut securing the head pin to the boom head.
3. Inspect the above pins for nicks or surface corrosion. Use fine emery cloth to fix minor nicks or corrosion. If damaged or if it cannot be repaired the pin must be replaced.

3.8.2 Quick Coupler Installation

1. Assemble the quick coupler to the boom head. Line up the quick coupler between the mounts on the boom head. The quick coupler should be centered in the boom head.
2. Coat the quick coupler head pin with an anti-seize compound. Insert the quick coupler head pin through the quick coupler and boom head. Secure with the previous capscrew and locknut.
3. Align the quick coupler with the tilt cylinder rod end and insert the tilt cylinder pin. Align the tilt cylinder pin and screw in the locking bolt. Torque as required.

3.9 BOOM HEAD - MOUNTED WINCH

3.9.1 Boom Head-Mounted Winch Removal



1. Using a suitable lifting device, secure the winch assembly (**4**) with a nylon strap.
2. Disconnect the hydraulic hoses (**5**).
3. Loosen and remove the mounting bolts, washers and nuts (**6**)(not shown).
4. Lower the winch assembly (**4**) onto a suitable skid or table.

3.9.2 Boom Head-Mounted Winch Installation

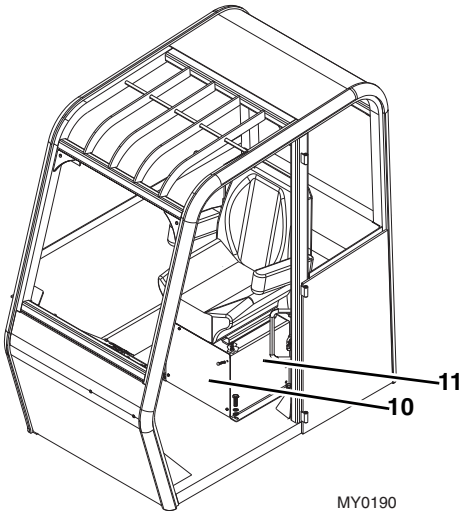
1. Using a suitable lifting device, secure the winch assembly (**4**) with a nylon strap.
2. Raise the winch assembly (**4**) into position behind the boom head.
3. Apply Loctite® 242™ to the previously removed mounting bolts.
4. Install the mounting bolts, washers and nuts (**6**)(not shown). Torque to 200 lb-ft (271Nm).
5. Connect the hydraulic hoses (**5**).

3.15 TROUBLESHOOTING

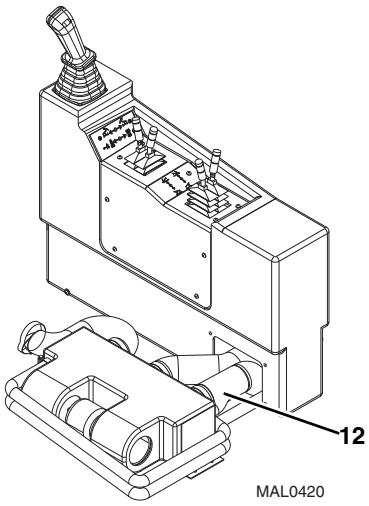
This section provides an easy reference guide covering the most common problems that occur during operation of the boom.

Problem	Cause	Remedy
1. Boom will not extend or retract	1. Broken hydraulic hose(s) or tube(s) and/or connections leaking.	1. Locate break, replace hose(s) or tube(s), tighten connections.
	2. Extend/retract hydraulic system not operating properly.	2. Refer to Section 8.4, “Hydraulic Circuits.”
	3. Faulty extend/retract cylinder.	3. Repair cylinder, Refer to Section 8.8.1, “General Cylinder Removal Instructions.”
2. Boom shifts to right or left when extending.	1. Boom side wear pads improperly shimmed or worn.	1. Shim wear pads to correct gap. Replace wear pads as needed. Refer to Section 3.10, “Boom Wear Pads.”
3. Excessive boom pivot pin noise and/or wear.	1. Insufficient lubrication.	1. Lubricate at regular intervals. Refer to Section 2.7, “Lubrication Schedules.” Replace worn pins as needed.
	2. Worn bearing(s).	2. Replace bearing(s) and lubricate at regular intervals. Refer to Section 2.7, “Lubrication Schedules.”
4. Excessive Compensation cylinder pivot pin noise and/or wear.	1. Insufficient lubrication.	1. Lubricate at regular intervals. Refer to Section 2.7, “Lubrication Schedules.” Replace worn pins as needed.
	2. Worn bushing(s).	2. Replace bushing(s) and lubricate at regular intervals.

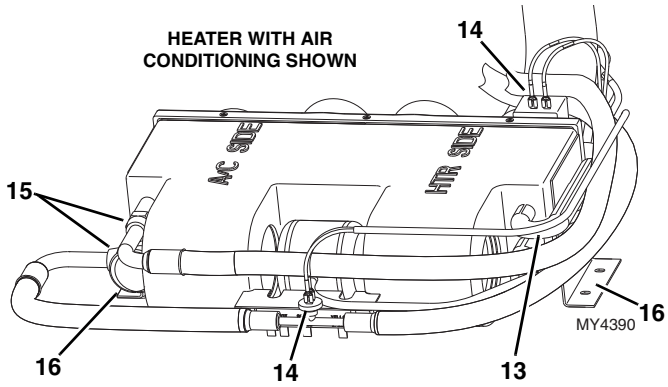
9. Remove the bolts that secure the seat to the cab. Remove the seat.



10. Remove the bolts securing the front plate (**10**) to the seat riser weldment (**11**).
11. Remove the bolts securing the seat riser weldment to the cab. Remove the riser weldment.



12. Loosen the hose and disconnect the heater air duct hoses (**12**).

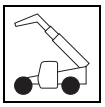


13. Loose the hose clamps securing the heater hoses (**13**).
14. Label and remove both heater hoses.
15. Label and disconnect any electrical connections (**14**).
16. Label and disconnect both air conditioning hoses (**15**).
17. Remove the bolts (**16**) securing the heater assembly to the cab. Remove the heater assembly.

b. Heater Assembly Installation

Note: *If machine is equipped with air conditioning, the air conditioning system must be charged by the local Caterpillar dealer or certified air conditioning service center*.

1. Position the heater assembly to its original orientation in the cab. Secure with the previous hardware.
2. Connect the previously labeled electrical connections.
3. Connect the previously labeled heater hoses to their appropriate locations.
4. Connect the previously labeled air conditioning hoses to their appropriate locations.
5. Install the seat riser weldment.
6. Install the front plate to the seat riser weldment.
7. Install the cab seat.
8. Fill the cooling system completely with coolant, allowing time for the coolant to fill the engine block. The cooling system capacity is listed in Section 2.5, “Fluids and Lubricant Capacities.”
9. Properly connect the battery.

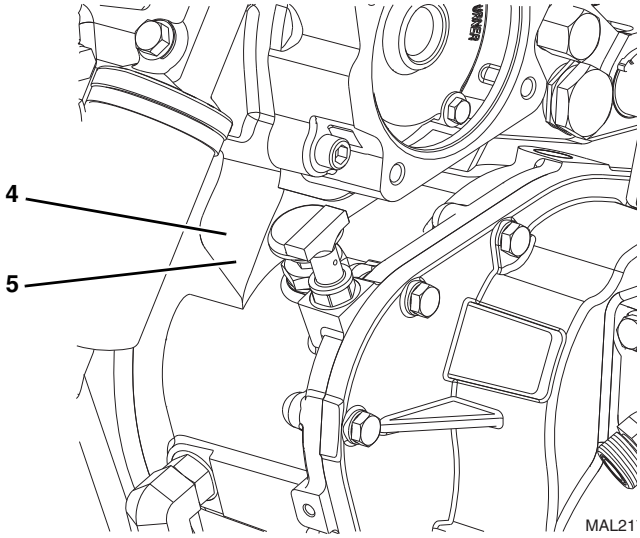


Problem	Cause	Remedy
4. Oil leaking from axle (differential housing and/or axle housings).	1. Drain and/or inspection plugs loose and/or o-rings damaged or missing.	1. Replace o-rings as needed and tighten plugs to 130 Nm (96 lb-ft).
	2. Hose fittings loose.	2. Tighten fittings.
	3. Axle shaft seal damaged or missing and/or worn or damaged shaft sealing surfaces.	3. Replace seal and/or joint coupling fork shaft (axle shaft).
	4. Input shaft multi-seal ring damaged or missing and/or worn or damaged pinion (input) shaft sealing surfaces.	4. Replace multi-seal ring and/or input shaft. Adjust ring and pinion alignment and bearing preload as described in the Engine Repair Manual.
	5. Axle casing to brake housing and/or brake housing to differential assembly o-rings and/or seals worn or damaged.	5. Replace o-rings and seals.
	6. Axle housing mounting nuts and capscrews loose.	6. Tighten housing nuts and capscrews to 390 Nm (288 lb-ft).
	7. Differential and/or axle housing(s) damaged.	7. Replace housing(s) as needed.
5. Oil leaking from wheel end housing (planet carrier).	1. Oil level plugs loose and/or o-rings damaged or missing.	1. Replace o-rings as needed and tighten plugs to 130 Nm (96 lb-ft).
	2. O-ring between hub and housing (planet carrier) damaged or missing.	2. Replace o-ring.
	3. Shaft seal damaged or missing and/or worn or damaged shaft sealing surfaces.	3. Replace seal and/or fork joint shaft.
	4. Housing capscrews loose.	4. Tighten housing capscrews to 55 Nm (41 lb-ft).
	5. Housing (planet carrier) damaged.	5. Replace housing (planet carrier).
6. Oil leaking from steering cylinder.	1. Hose fittings loose.	1. Tighten fittings.
	2. Steering cylinder o-rings and/or seals worn or damaged.	2. Replace o-rings and seals.
	3. Piston rod seal worn or damaged.	3. Replace piston rod seal.
	4. Cylinder tube damaged.	4. Replace cylinder tube.

6.4.4 After Transmission Service or Replacement

In general:

1. Check the transmission oil level and add oil as required.
2. Disconnect and clean all transmission cooler hoses. When possible, remove transmission lines from the machine for cleaning.
3. Drain and flush the entire transmission cooling system.
4. Thoroughly clean transmission filter screens and cases, and replace transmission filter elements.



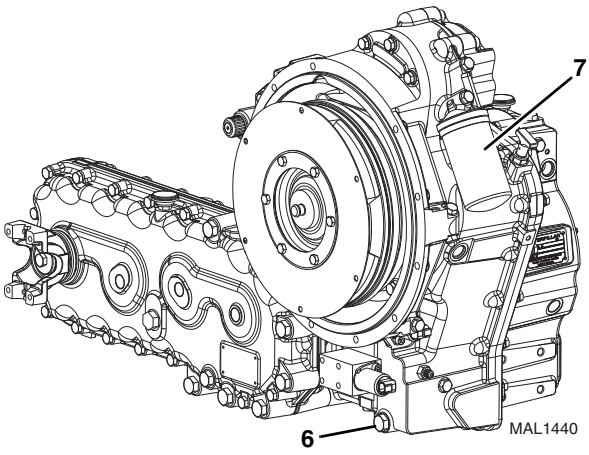
Note: *Check transmission oil level with engine at idle and transmission oil cold.*

5. Apply park brake, shift transmission control lever to the (N) NEUTRAL position and lower the forks or attachment to the ground.
6. Open engine cover.
7. Remove the transmission dipstick (**5**) and check the oil level. The oil level should be at the MAX line.
8. Replace the transmission dipstick.
9. If oil is low, Remove fill plug (**4**) and add oil as required.
10. Replace fill plug.
11. Close and secure engine cover.
12. Recheck all drain plugs, lines, connections, etc., for leaks, and tighten where necessary.

6.5 TRANSMISSION COOLER THERMAL BY- PASS VALVE

6.5.1 Thermal Bypass Valve Cartridge Removal

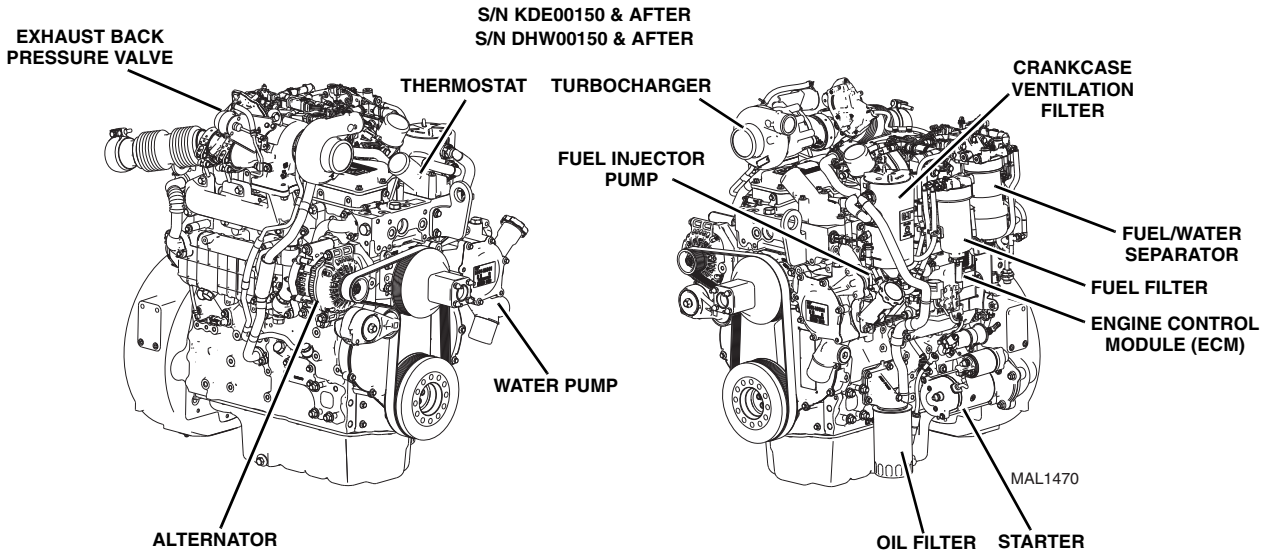
1. Park the machine on a firm, level surface, level the machine, fully retract the boom, lower the boom, place the transmission control lever in the (N) NEUTRAL position, engage the parking brake, and shut the engine OFF.
2. Place a Do Not Operate Tag on both the ignition key switch and steering wheel.
3. Open the engine cover. Allow the system fluids to cool.
4. Properly disconnect the battery.

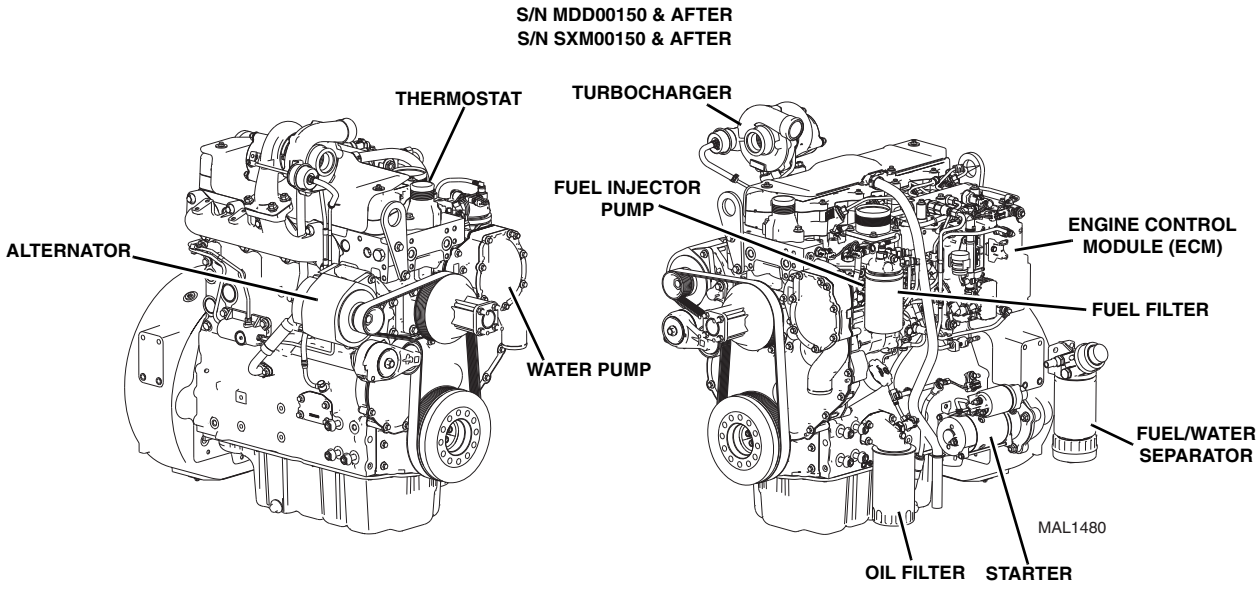


5. Place a suitable container under the transmission drain plug (**6**). Remove the transmission drain plug, and allow the transmission oil to drain into the receptacle.
6. Remove the transmission oil filter (**7**) and dispose of properly. Clean the filter mounting surface. Cover or cap the oil filter mount.
7. Transfer the used transmission oil into a suitable, covered container, and label the container as “Used Oil.” Dispose of used oil at an approved recycling facility. Clean and reinstall the transmission and drop box drain plugs.
8. Place a suitable container beneath the transmission cooler fittings on the hydraulic cooler. Transfer any transmission oil into a properly labeled container. Dispose of properly.

7.1.2 Component Terminology

To understand the safety, operation and maintenance information presented in this section, it is necessary that the operator/mechanic be familiar with the names and locations of the engine components. The following illustration identifies the components that are referred to throughout this section.





14. Loosen and remove the four bolts (**20**) securing the DPF muffler assembly (**21**) to the support bracket.

Note: *Do Not loosen or remove clamps (**22**) from the DPF muffler.*

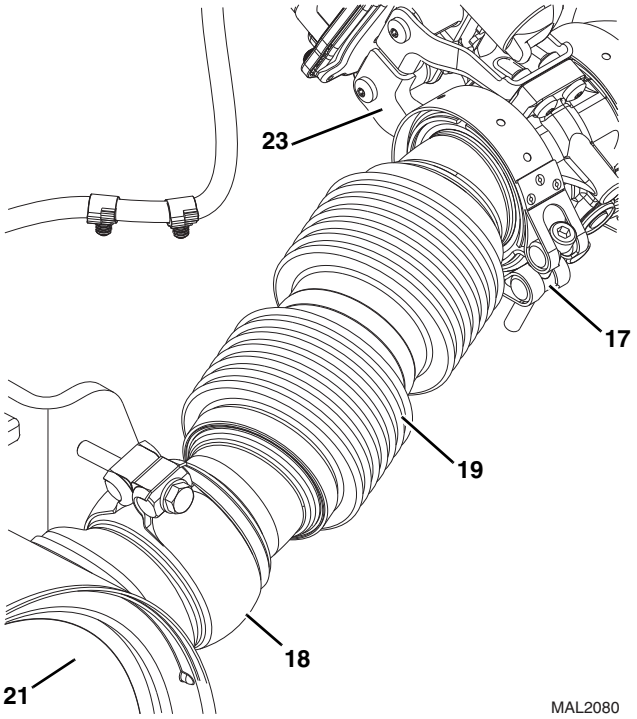
15. Remove the DPF muffler assembly (**21**).

7.7.2 Exhaust System Installation

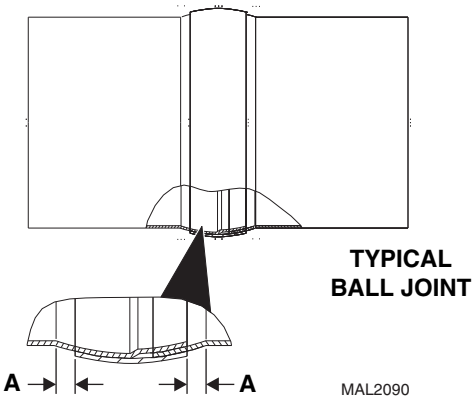
Note: *Keep all clamps AFTER the DPF muffler assembly loose until entire exhaust system is in place.*

Note: *The following exhaust parts MUST be replaced if the DPF muffler assembly is removed from the machine. Flex Pipe (**13**), Clamps (**17** & **18**) and Bellows Assembly (**19**).*

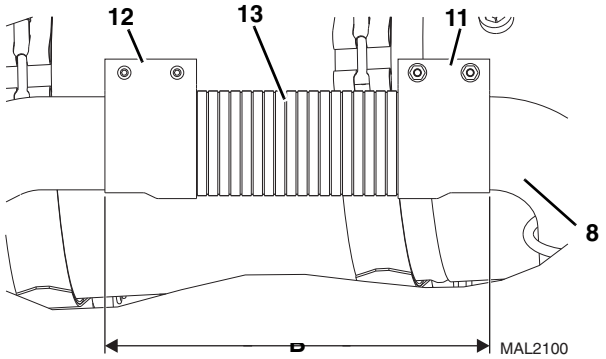
1. Install the DPF muffler assembly (**21**) and secure with the four previously removed bolts (**20**).



2. Install the new bellows assembly (**19**) between the DPF muffler assembly (**21**) and the exhaust back pressure valve (**23**).
3. Install new clamp as shown (**17**) securing the bellows assembly (**19**) to the exhaust back pressure valve (**23**). Torque clamp to 9 lb-ft (12,2 Nm).
4. Install new ball clamp as shown (**18**) securing the bellows assembly (**19**) to the DPF muffler (**21**). Do Not Tighten.

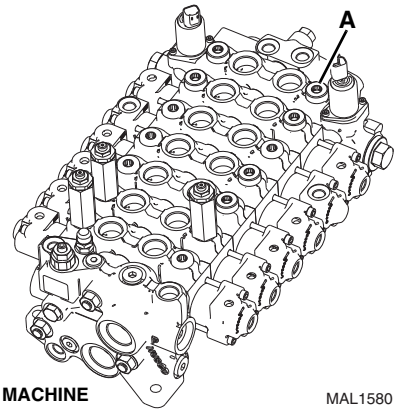


5. Center the ball clamp (**18**) on the joint between the bellows assembly (**19**) to the DPF muffler (**21**) with dimension “A” being within ± 0.08 in (2,03 mm) around the circumference of the bellows assembly. Torque to 23.5-26.5 lb-ft (31,8-49,5 Nm).
6. Connect the DPF muffler sensor connections (**16**).
7. Install exhaust pipe (**15**) and install clamp (**14**).

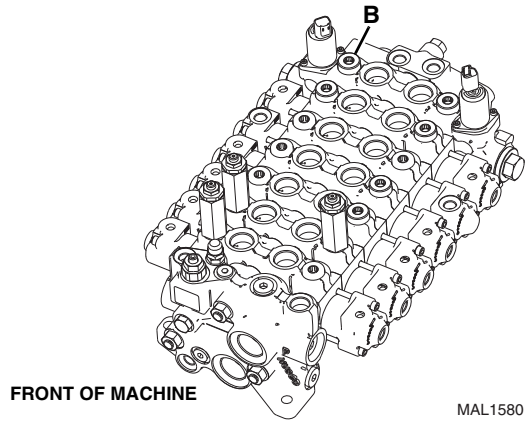


8. Install new flex pipe (**13**) and install new clamp (**12**).
9. Install exhaust pipe (**8**) and new install clamp (**11**).
10. Verify that the flex pipe (**13**) has not been compressed or stretched and dimension “B” is 12.40 in (315,0 mm).
11. Install exhaust pipe (**7**) and install clamp (**10**).
12. Install exhaust pipe (**6**) and install clamp (**9**).
13. Install clamps (**2, 3, 4 & 5**) securing the exhaust pipe sections (**6, 7 & 8**) to the frame mounted brackets.
14. Adjust the muffler and exhaust pipes for proper clearance then tighten all clamps.
15. Install the exhaust heat shield (**1**).
16. Properly connect the battery.
17. Start engine and check for exhaust leaks at all exhaust connections. Adjust as needed.
18. Close and secure the engine cover.

7. Install a digital or a 5000 psi (345 bar) gauge to the retract (**1**) port tee fitting on the compensation cylinder.
8. Start the machine and warm the hydraulic system to operating temperature.
9. Tilt the forks down to allow the tilt cylinder to fully retract.
10. Monitor the gauge and slowly raise the boom. The gauge should read 4100 psi (282 bar).
11. If pressure is correct, proceed to step 14.



12. The relief on the (**A**) port of the main control valve is non-adjustable and must be replaced. Replace and repeat steps 9 and 10.
13. Verify pressure is correct.
14. Shut engine OFF.
15. Remove the digital or the 5000 psi (345 bar) gauge from the retract (**1**) port tee fitting on the compensation cylinder and cap the open port.
16. Remove the cap and install a digital or a 5000 psi (345 bar) gauge to the extend (**2**) port tee fitting on the compensation cylinder.
17. Start the machine and if needed, warm the hydraulic system to operating temperature.
18. Tilt the forks up to allow the tilt cylinder to fully extend.
19. Monitor the gauge and slowly lower the boom. The gauge should read 4100 psi (282 bar).
20. If pressure is correct, proceed to step 23.



21. The relief on the (**B**) port of the main control valve is non-adjustable and must be replaced. Replace and repeat steps 17 and 18.
22. Verify pressure is correct.
23. Shut engine OFF.
24. Slowly remove the gauge, line and tee fitting from the compensation cylinder (**1** & **2**). Reinstall each hose and torque as required.
25. Install any previously removed attachment.

b. Service Brake Valve Installation

1. Install the service brake valve (**4**) with the four capscrews, four lockwashers and four nuts (**3**) onto the service brake bracket (**5**).
2. Install the service brake pedal. Refer to Section 4.3.2, “Service Brake Pedal.”

Note: *ALWAYS replace seals, o-rings, gaskets, etc., with new parts to help ensure proper sealing and operation. Lubricate seals and o-rings with clean hydraulic oil.*

3. Use new oiled o-rings as required. Uncap and connect the previously labeled hoses to the service brake valve.
4. Check the routing of all hoses, and tubing for sharp bends or interference with any rotating members, and install tie wraps and/or protective conduit as required. Tighten all tube and hose clamps.
5. Properly connect the battery.
6. Start the engine and run at approximately one-third to one-half throttle for about one minute, without moving the machine or operating any hydraulic functions.
7. Inspect the service brake valve and connections for leaks, and check the level of the hydraulic fluid in the reservoir. Shut the engine OFF.

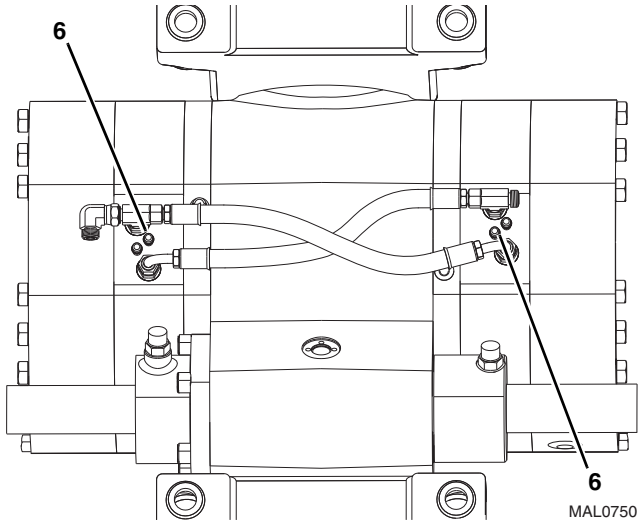
Note: *Check for leaks, and repair as required before continuing. Add hydraulic fluid to the reservoir as needed.*

8. Wipe up any hydraulic fluid spillage in, on, near and around the machine, work area and tools.
9. Close and secure the engine cover.
10. Remove the Do Not Operate Tags from both the ignition key switch and the steering wheel.

8.7.4 Service Brake Bleeding

Carefully bleed the brake lines as soon as the brake valve is installed in the machine. Air in the system will not allow the brakes to apply properly. There are four brake bleeder located on the front axle (two inner service brake bleeders and two outer park brake bleeders) and two service brake bleeders on the rear axle). Work with an assistant to perform this procedure.

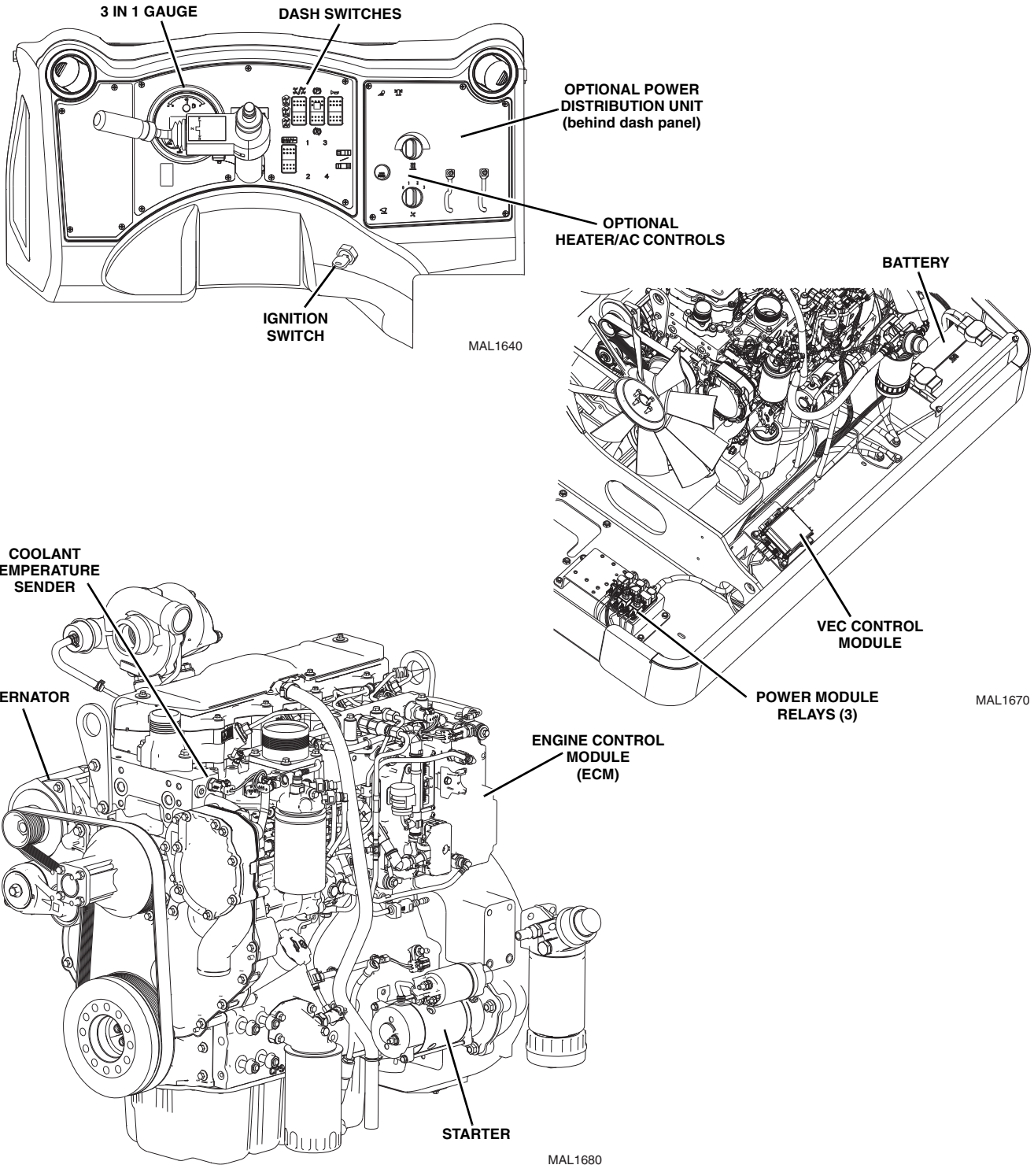
1. Place the travel select lever in (N) NEUTRAL, engage the park brake, and start the engine.



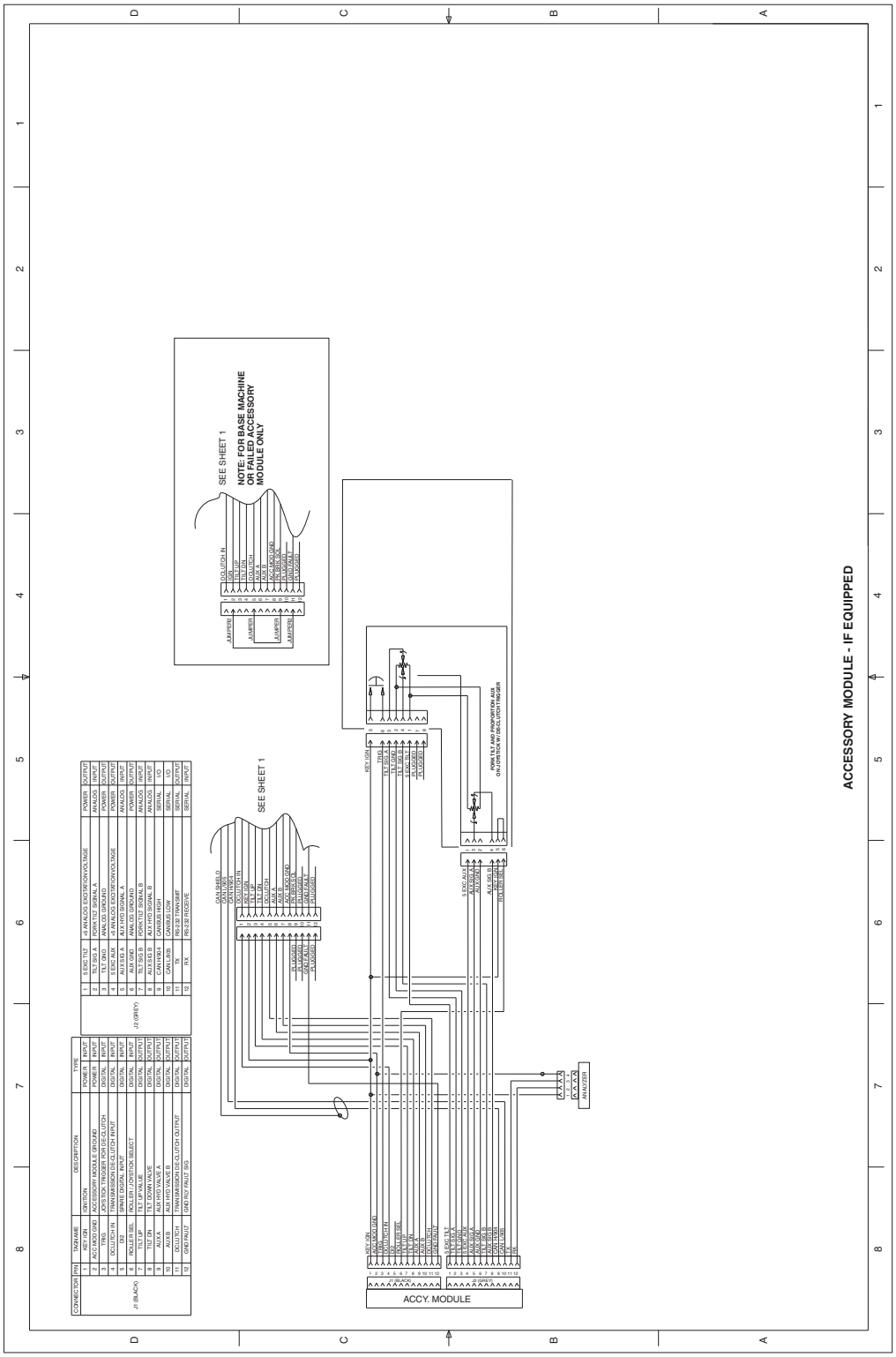
2. Remove the plastic cap from one service brake bleeder (**6**). Attach one end of a length of transparent tubing over the brake bleeder. Place the other end of this tubing in a suitable transparent container that is partially filled with hydraulic oil. The end of the tubing must be below the oil level in the container.
3. Have the assistant depress the brake pedal. **DO NOT** open the service brake bleeder without holding the tubing firmly on the bleeder. There is pressure at the brakes. Carefully open the bleeder with a 12 mm wrench. Close the service brake bleeder when air bubbles no longer appear in the oil. Release the brake pedal. Remove the tubing from the service brake bleeder.
4. Repeat Steps 2 and 3 for the remaining service brake bleeders.
5. Check hydraulic oil level and add if necessary.
6. Conduct a pressure and function check of the service brake. Refer to Section 8.4.1, “ Hydraulic Pressures.”

9.1.2 General Overview

S/N MDD00150 & After
S/N SXM00150 & After



c. Accessory Module Schematic



MAL1761C

c. Installation and Testing

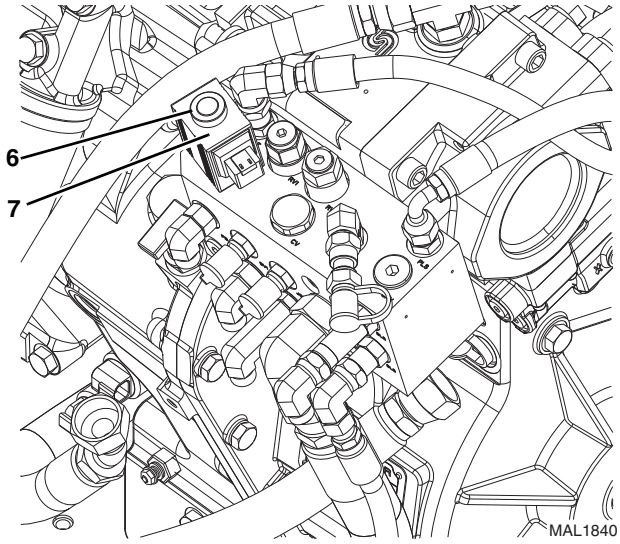
1. Check that the variable speed fan control is in the OFF position.
2. Install the heater controls to the dash panel with the previously used hardware.
3. Connect the cab electrical harness connector to the controls.
4. Install the control knobs.
5. Install the screws securing the dash panel to the cab.
6. Properly connect the battery
7. Turn the ignition key to the ON position and check the fan speeds. If further repair is needed, refer to Section 9.5, “Electrical System Schematics.”
8. Start the machine and allow engine to warm to operating temperature. Check heat control at different levels.
9. Close and secure the engine cover.
10. Remove the Do Not Operate Tags from both the ignition key switch and the steering wheel.

9.11 SOLENOIDS, SENSORS AND SENDERS

9.11.1 Park Brake Solenoid Valve

a. Park Brake Solenoid Valve Removal

1. Park the machine on a firm, level surface, level the machine, fully retract the boom, lower the boom, place the transmission control lever in (N) NEUTRAL, engage the park brake and shut the engine OFF.
2. Place a Do Not Operate Tag on both the ignition key switch and the steering wheel.
3. Open the engine cover. Allow the system fluids to cool.
4. Properly disconnect the battery
5. Disconnect the wiring connector at the park brake solenoid lead.



6. Remove the nut on the end of the park brake coil (**6**).
7. Remove the park brake coil.
8. Remove the park brake solenoid (**7**). (Remove only if the electrical coil is found to not be faulty.)

b. Disassembly

DO NOT disassemble the solenoid. The solenoid is not serviceable. Replace solenoid if found to be defective.

c. Park Brake Solenoid Valve Installation

Note: *ALWAYS replace seals, o-rings, gaskets, etc., with new parts to help ensure proper sealing and operation. Lubricate seals and o-rings with clean hydraulic oil.*

1. If necessary, install the park brake solenoid in its original orientation.
2. Slide the park brake coil over the solenoid. Tighten the nut to secure the solenoid. DO NOT overtighten.
3. Connect the wiring connector to the park brake coil lead.
4. Properly connect the battery
5. Close and secure the engine cover.
6. Remove the Do Not Operate Tags from both the ignition key switch and the steering wheel.