

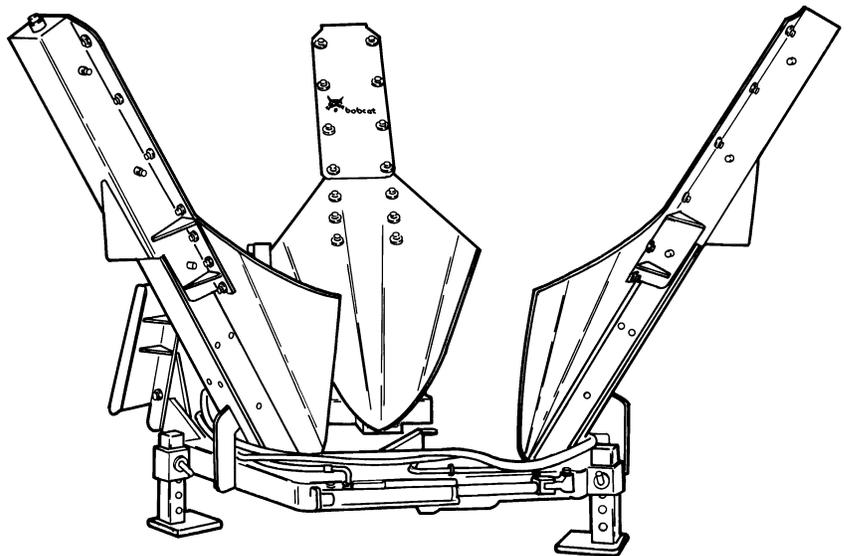


Bobcat®

Tree Spade

TS30C	(S/N 973000101 & Above)
	(S/N 973800101 & Above)
TS30C ACD	(S/N 944611101 & Above)
TS30M	(S/N 973100101 & Above)
	(S/N 973900101 & Above)
TS30M ACD	(S/N 944711101 & Above)
TS30T	(S/N 973200101 & Above)
	(S/N 974000101 & Above)
TS30T ACD	(S/N 944811101 & Above)
TS34C	(S/N 973300101 & Above)
	(S/N 974100101 & Above)
TS34C ACD	(S/N 944911101 & Above)
TS34T	(S/N 973400101 & Above)
	(S/N 974200101 & Above)
TS34T ACD	(S/N 945011101 & Above)
TS36M	(S/N 973500101 & Above)
	(S/N 974300101 & Above)
TS36M ACD	(S/N 945111101 & Above)
TS44C	(S/N 973600101 & Above)
	(S/N 974400101 & Above)
TS44M	(S/N 973700101 & Above)
	(S/N 974500101 & Above)

Service Manual



Product: 2006 Bobcat Model TS30,TS34,TS36,TS44 Tree Spade Service Repair Workshop Manual

Full Download: <https://www.arepairmanual.com/downloads/2006-bobcat-model-ts>

[30ts34ts36ts44-tree-spade-service-repair-workshop-manual/](https://www.arepairmanual.com/downloads/2006-bobcat-model-ts30ts34ts36ts44-tree-spade-service-repair-workshop-manual/)

Sample of manual. Download All 98 pages at:

<https://www.arepairmanual.com/downloads/2006-bobcat-model-ts30ts34ts36ts44-tree-spade-service-repair-workshop-manual/>

MAINTENANCE SAFETY



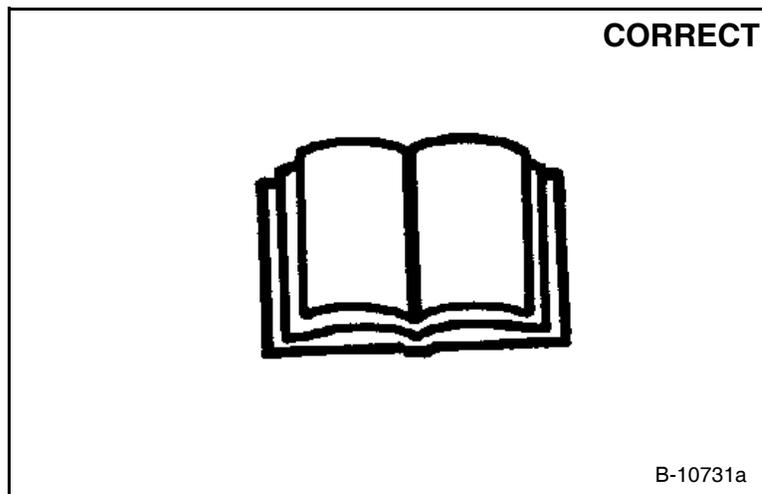
WARNING

Instructions are necessary before operating or servicing machine. Read and understand the Operation & Maintenance Manual, Operator's Handbook and signs (decals) on machine. Follow warnings and instructions in the manuals when making repairs, adjustments or servicing. Check for correct function after adjustments, repairs or service. Untrained operators and failure to follow instructions can cause injury or death.

W-2003-0903



Safety Alert Symbol: This symbol with a warning statement, means: "Warning, be alert! Your safety is involved!" Carefully read the message that follows.



-  Never service attachments without instructions. See Operation & Maintenance Manual and Attachment Service Manual.
-  Cleaning and maintenance are required daily.
-  Never service or adjust attachment with the engine running unless instructed to do so in manual.
-  Always lower the attachment to the ground before lubricating or servicing.
-  Avoid contact with leaking hydraulic fluid or diesel fuel under pressure. It can penetrate skin or eyes.
-  Stop, cool and clean engine of flammable materials before checking fluids.
-  Keep body, loose objects and clothing away from moving parts, electrical contacts, hot parts and exhaust.
-  Safety glasses are needed for eye protection from electrical arcs, battery acid, compressed springs, fluids under pressure and flying debris or when tools are used. Use eye protection approved for type of welding.



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**PREVENTIVE
MAINTENANCE**

**HYDRAULIC
SYSTEM**

**MAIN
FRAME**

**SPECIFICATIONS
AND
SCHEMATICS**

**CALIFORNIA
PROPOSITION 65 WARNING**
Diesel engine exhaust and some of its
constituents are known to the State of California
to cause cancer, birth defects and other
reproductive harm.



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SERIAL NUMBER LOCATION

Figure 1

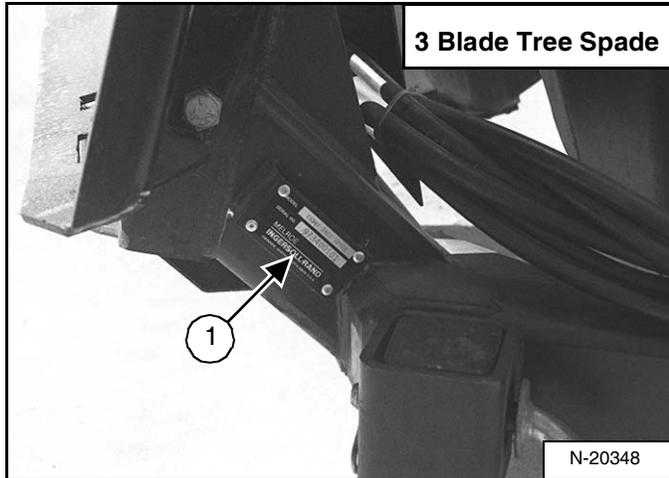
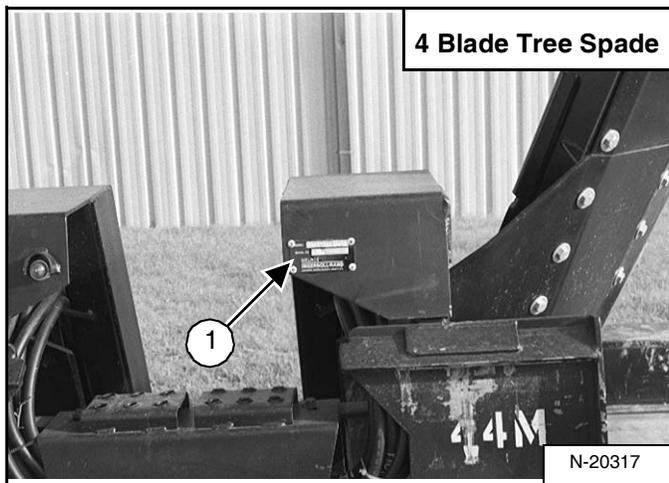


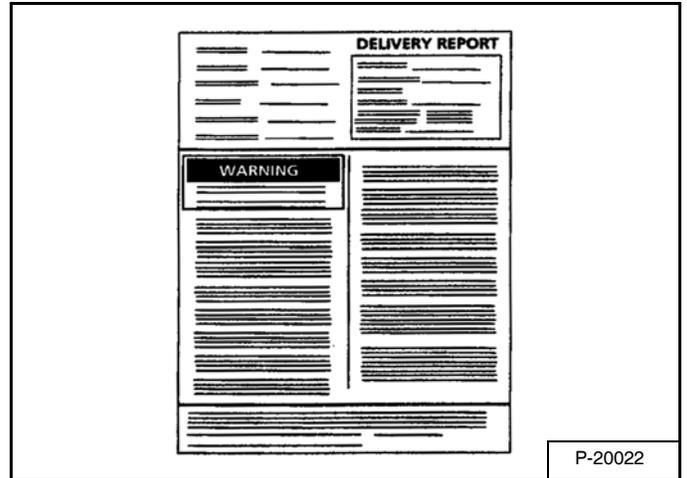
Figure 2



Always use the serial number of the Tree Spade when requesting service information or when ordering parts. Early or later models (identification made by serial number) may use different parts, or it may be necessary to use a different procedure in doing a specific service operation (Item 1) [Figure 1] & [Figure 2]

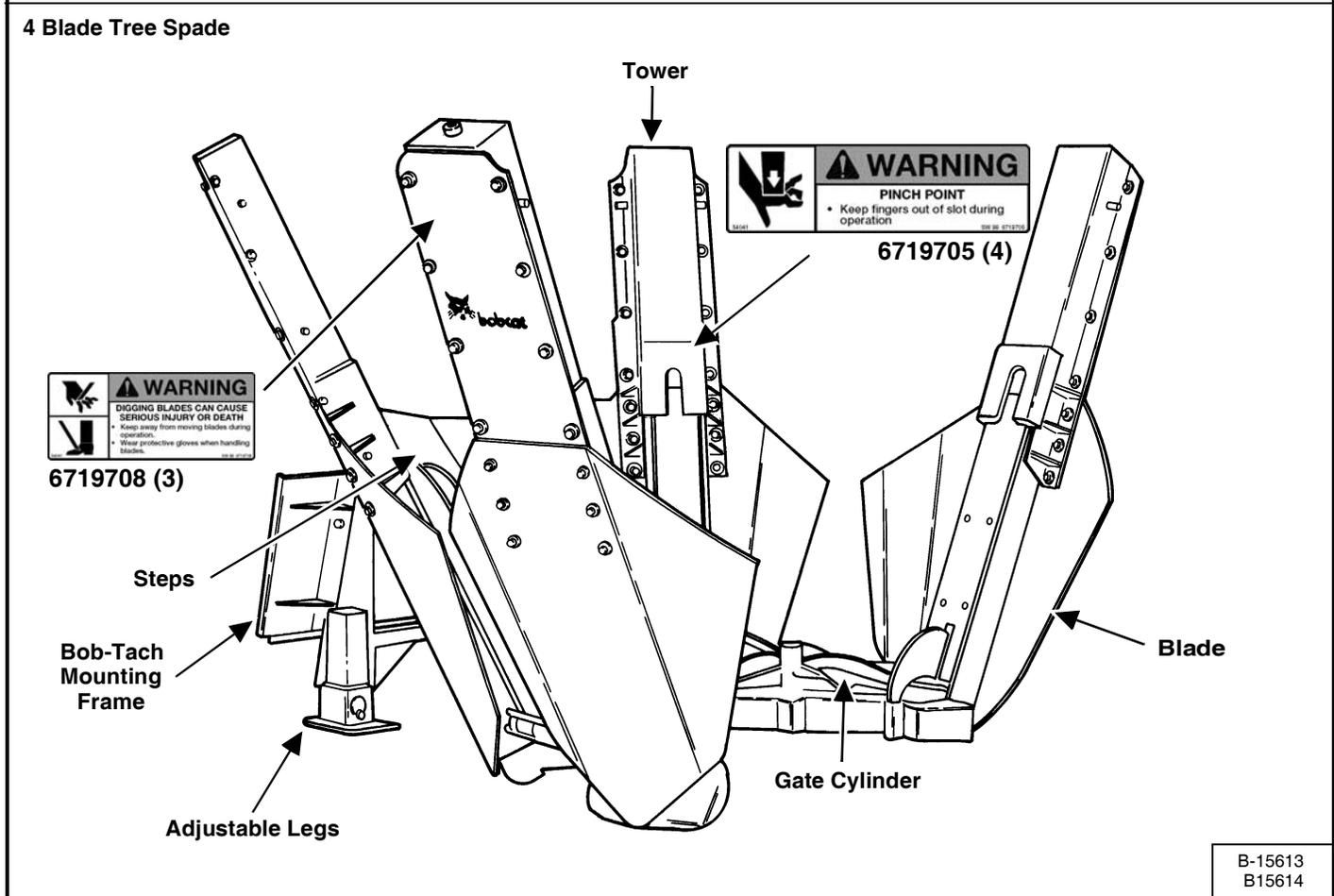
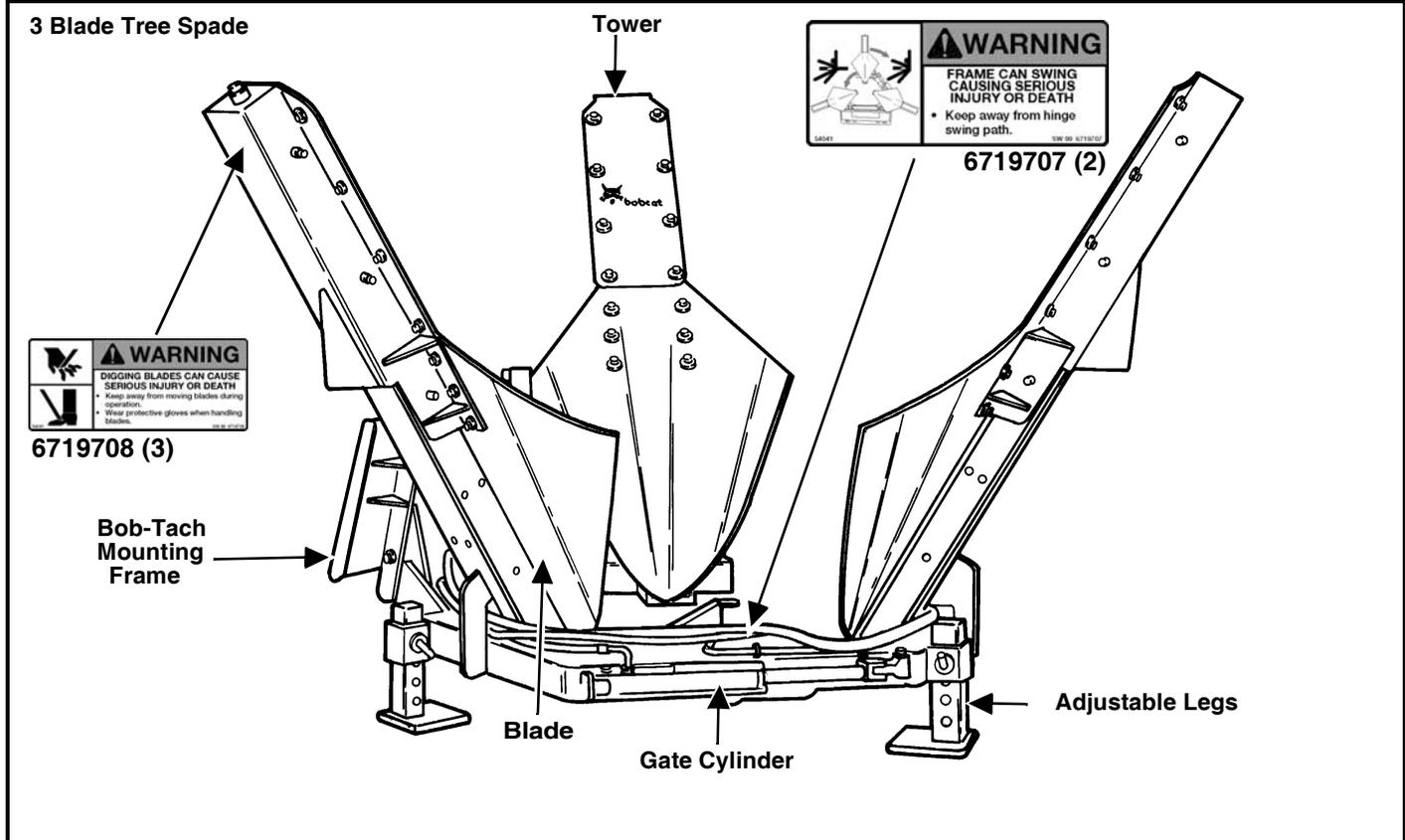
ATTACHMENT DELIVERY REPORT

Figure 3



The Attachment Delivery Report must be filled out by the dealer and signed by the owner or operator when the Seeder is delivered. An explanation of the form must be given to the owner. Make sure it is filled out completely [Figure 3].

IDENTIFICATION AND MACHINE SIGNS (DECALS)



B-15613
B15614

PREVENTIVE MAINTENANCE

PREVENTIVE MAINTENANCE

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TROUBLESHOOTING

PROBLEM	CAUSE	CORRECTION
Tree spade does not mount properly on the Bob-Tach	Bob-Tach wedges are not fully retracted.	Retract Bob-Tach wedges.
	Mud, dirt or stones are lodged between the Bob-Tach and the Tree Spade mount.	Remove debris between Bob-Tach and Tree Spade mount.
Tree Spade does not operate.	No hydraulic flow.	Activate loader front auxiliary hydraulics.
		Check quick couplers connection. Check for damaged hose ends and fittings.
		Check the Tree Spade couplers to make sure they are installed on the correct hoses. A check valve in the Tree Spade hydraulic system allows hydraulic flow in one direction only.
	No electrical contact.	Check electrical connections.
Check Tree Spade controller fuse (old version only).		
Check loader fuse.		
Check valve ground connection.		
Tree Spade gate cylinder opens or closes slowly.	Tree Spade control valve and/or solenoids.	Check electrical connections.
		Repair or replace solenoid valves.
		Check controller switches.
	Air in the Tree Spade hydraulic system.	Open and close the gate cylinder until air is purged from the Tree Spade.
More than one Tree Spade function moves when one controller switch is activated.	Tree Spade control valve and/or solenoids.	Check electrical connections.
		Repair or replace solenoid valves.
		Check controller switches.
	Tree Spade controller.	Check controller switches.
Blades are loose in uprights.	Worn nylon plates.	Adjust blade upright setscrews.
		Remove shims from under blade and front cover.
Tree Spade does not cut like new.	Worn and/or dull blades.	Sharpen blades.
Tree Spade will not penetrate soil.	Soil is too dry or hard for proper digging of Tree Spade.	Schedule digging when soil moisture is appropriate.
	Soil contains rocks or debris.	Reposition Tree Spade away from rocks and debris.
	Tree roots are too large for blades to cut.	Follow recommended tree size guidelines when operating Tree Spade.
	Inadequate down pressure on Tree Spade.	Rear stabilizers are required when using the Tree Spade.
	Blades are dull or worn.	Sharpen blades.

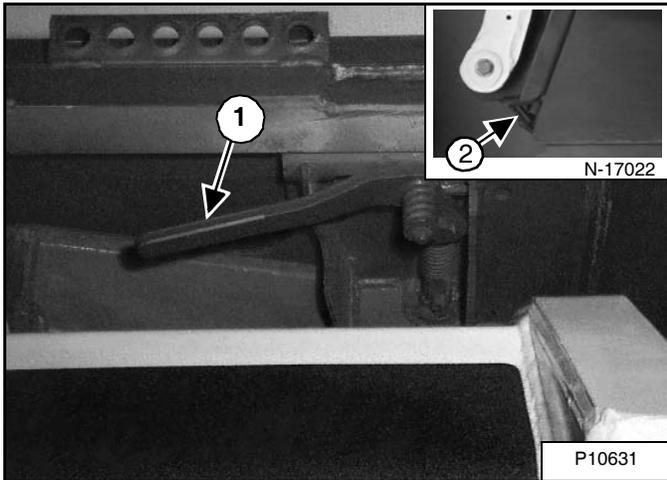
TROUBLESHOOTING (Cont'd)

PROBLEM	CAUSE	CORRECTION
Soil sticks to blades.	New paint surface on Tree Spade.	Scour or remove paint from digging portion of blades.
	Soil conditions are too wet.	Schedule digging when soil conditions are appropriate.
Root ball of tree crumbles or breaks when digging.	Dull or worn blades will not cut tree roots.	Sharpen blades.
	Soil conditions are too dry.	Schedule digging when soil conditions are appropriate.
	Digging too large of tree for Tree Spade size.	Follow recommended tree size guidelines when operating Tree Spade.
Root ball falls out bottom of Tree Spade.	Soil conditions are too dry.	Schedule digging when soil conditions are appropriate.
	Improper model choice of Tree Spade.	Choose a Bobcat Tree Spade model with more blade closure.
Excessive wear or damage to the poly slide plates.	Improper adjustment of the setscrews on the slide uprights.	Double check setscrew adjustment and do not over-tighten.
	Uneven down pressure on blades of Tree Spade when digging.	Position the loader so it is level side to side when digging, then use the loader tilt function to level the Tree Spade until the level indicator illuminates.
	Loose or exposed screw fasteners on poly slide plates.	Tighten or replace poly screw fasteners if needed.
	Burr at the rear of tower.	Remove burr by grinding inner edge of tower.
Tree Spade will not dig root ball sizes as specified.	Soil conditions are too hard.	Schedule digging when soil conditions are appropriate.
	Operator not relieving down pressure of blades when digging.	Keep frame in contact with the ground. Retract blade to remove down pressure from tip prior to extending the next blade.
	Inadequate down pressure on Tree Spade.	Rear stabilizers are required when using the Tree Spade.

INPSECTION

Hand Lever Bob-Tach Inpsection

Figure 10-10-1



Move the Bob-Tach levers (Item 1) [Figure 10-10-1] to engage the wedges (Item 2) [Figure 10-10-1]. The levers and wedges must move freely.

The wedges must extend through the holes in the attachment mounting frame (Insert) [Figure 10-10-1].



Bob-Tach wedges must extend through the holes in attachment. Levers must be fully down and locked. Failure to secure wedges can allow attachment to come off and cause injury or death.

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Figure 10-10-2

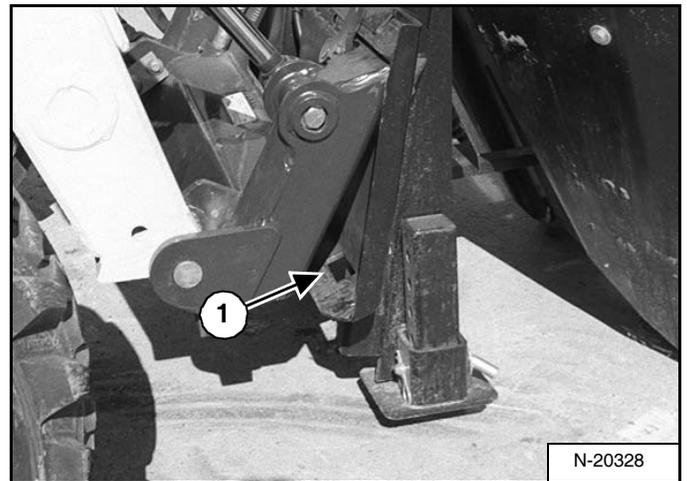
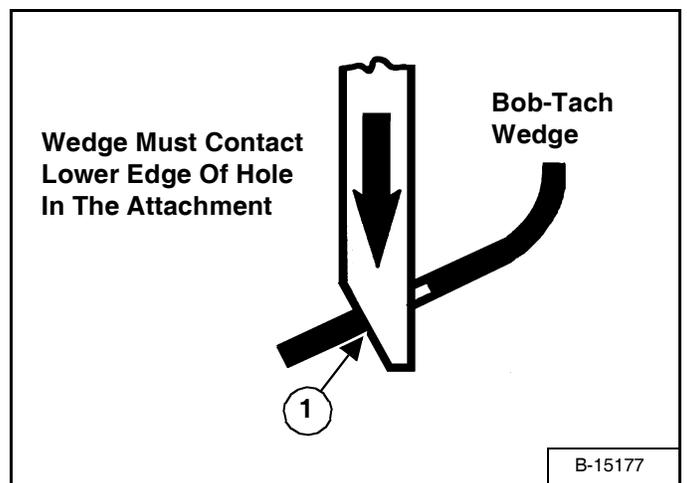


Figure 10-10-3



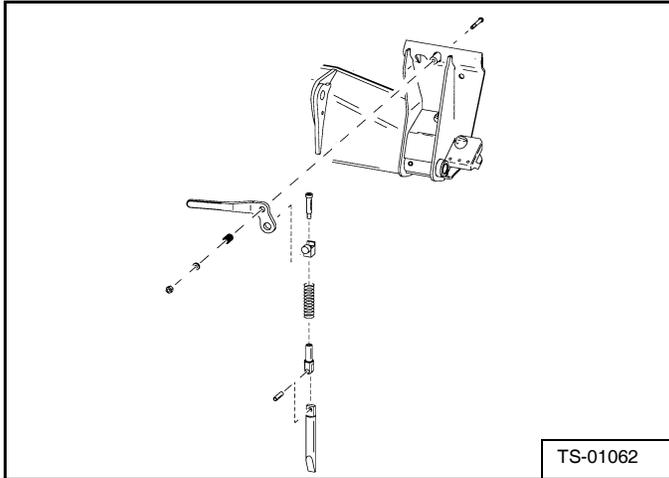
The spring loaded wedge (Item 2) [Figure 10-10-1] must contact the lower edge of the hole in the attachment (Item 1) [Figure 10-10-2] and [Figure 10-10-3].

If the wedge does not contact the lower edge of the hole [Figure 10-10-2] and [Figure 10-10-3], the attachment will be loose and can come off the Bob-Tach.

INSPECTION (CONT'D)

Hand Lever Bob-Tach Inspection (Cont'd)

Figure 10-10-4



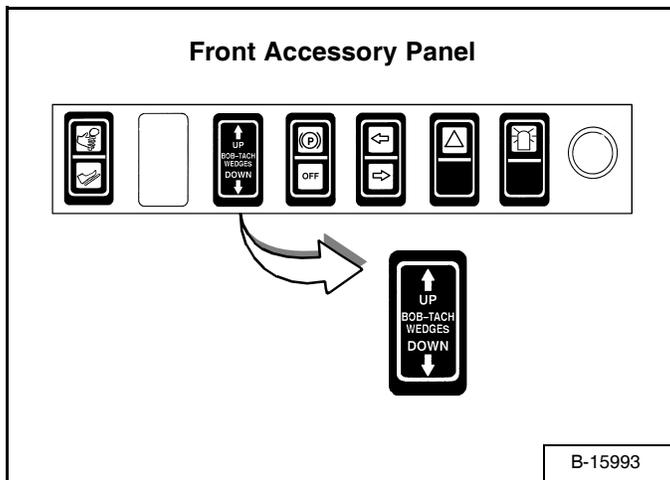
Inspect the mounting frame on the attachment and the Bob-Tach, linkages and wedges for excessive wear or damage [Figure 10-10-4]. Replace any parts that are damaged, bent, or missing. Keep all fasteners tight.

Look for cracked welds. Contact your Bobcat dealer for repair or replacement parts.

Lubricate the wedges. (See the correct loader Operation & Maintenance Manual for *LUBRICATION OF THE BOBCAT LOADER.*)

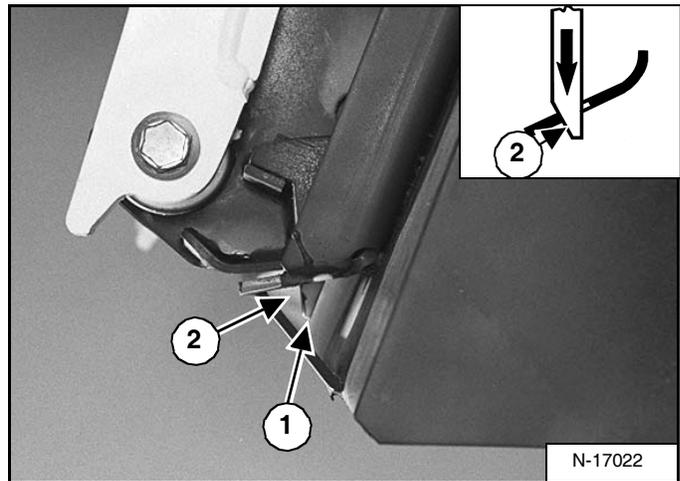
Power Bob-Tach Inspection

Figure 10-10-5



Push and hold the BOB-TACH WEDGES UP switch [Figure 10-10-5] until wedges are fully raised. Push and hold the BOB-TACH WEDGES DOWN switch [Figure 10-10-5] until the wedges are fully down. The wedges must move freely.

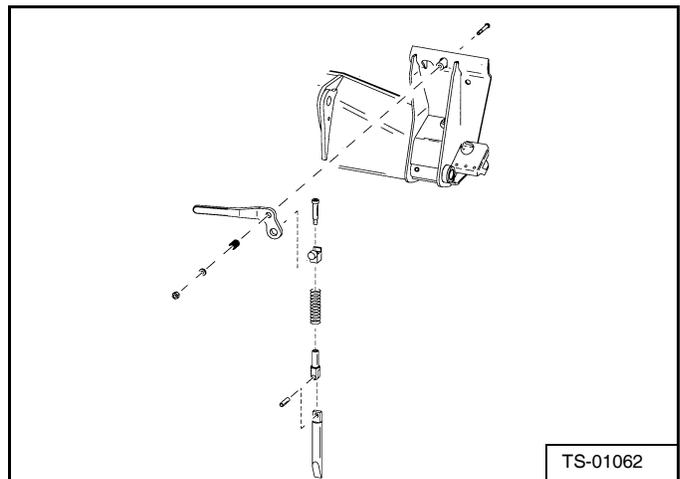
Figure 10-10-6



The wedges must extend through the holes in the attachment mounting frame (Item 1) [Figure 10-10-6] and must contact the lower edge of the hole in the attachment (Item 2) [Figure 10-10-6].

If the wedges do not contact the lower edge of the hole (Item 2) [Figure 10-10-6], the attachment will be loose and can come off the Bob-Tach.

Figure 10-10-7



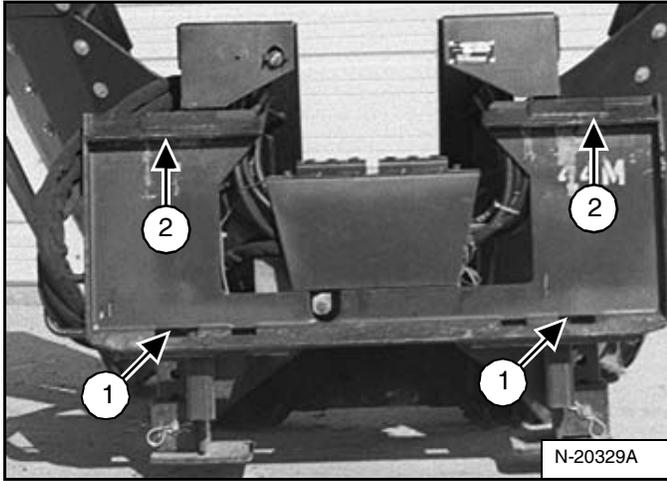
Inspect the mounting frame on the attachment and the Bob-Tach, linkages and wedges for excessive wear or damage [Figure 10-10-7]. Replace any parts that are damaged, bent, or missing. Keep all fasteners tight. Inspect the hoses and fittings for leaks.

Look for cracked welds. Contact your Bobcat dealer for repair or replacement parts.

INSPECTION (CONT'D)

Mount Inspection

Figure 10-10-8



Inspect the Bob-Tach wedge mounts (Item 1) [Figure 10-10-8], mounting flange (Item 2) [Figure 10-10-8] and all welds on the Tree Spade mount for wear and damage each time the attachment is removed from the loader.

LUBRICATION

Daily Lubrication

Figure 10-10-9

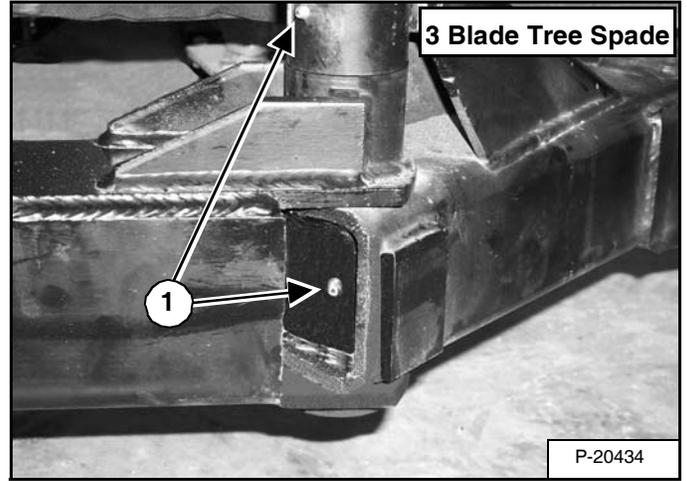
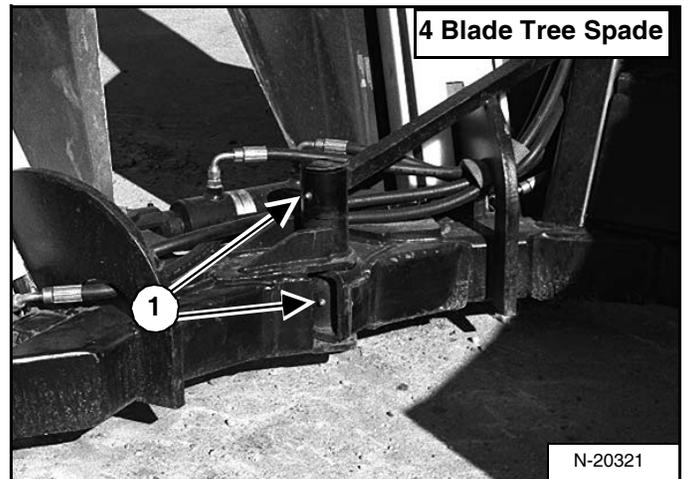


Figure 10-10-10



Lubricate the grease fittings every 8-10 hours.

Open the gates fully before attempting to grease the Tree Spade. The bottom grease fitting can only be accessed with the gates open.

Grease the gate pivot pin (Item 1) [Figure 10-10-9] & [Figure 10-10-10]. The 4 blade Tree Spade has 2 lubrication points for each of its two gates.

BLADE ADJUSTMENT

Figure 10-10-11



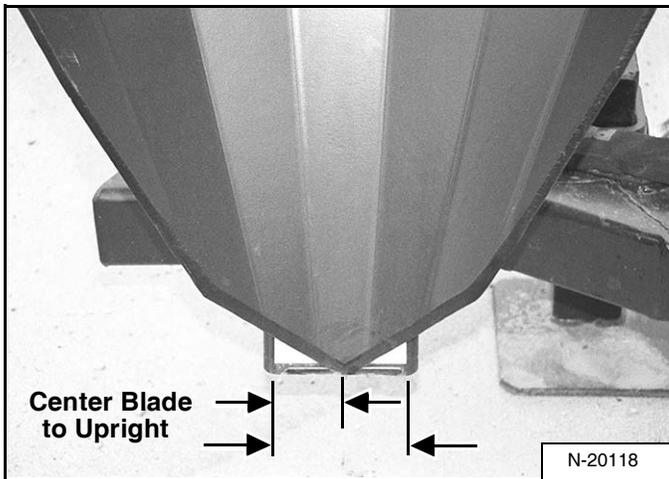
When the blade slides become worn, the side to side movement can be adjusted by tightening the six setscrews on the side of the uprights (3 setscrews on each side of the blade).

The forward and backward movement is adjusted by removing shims from the blade and cover plate.

All adjustments will be made with the blades fully retracted and with the loader engine off [Figure 10-10-11]. **Do not** make any of these adjustments with the loader engine running.

Side to Side Adjustments

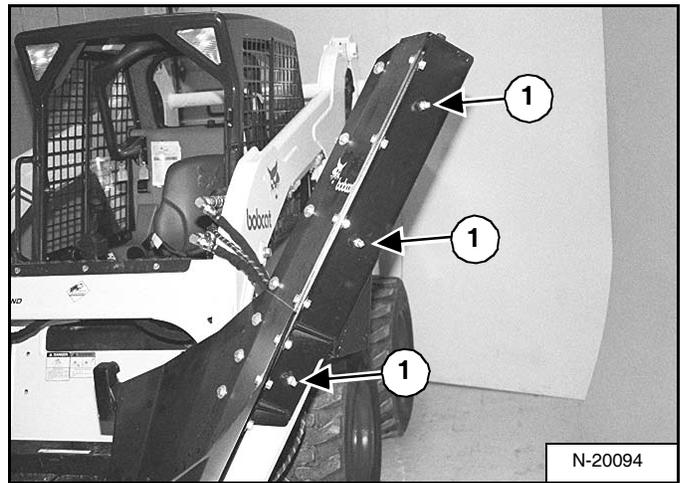
Figure 10-10-12



The blade point must be centered on the blade uprights [Figure 10-10-12].

Mark the center of the blade to the upright [Figure 10-10-12].

Figure 10-10-13



Loosen the six jam nuts from the setscrews (Item 1) [Figure 10-10-13].

If the blade is to the left of center, tighten the lowest setscrew on the left side of the blade upright until the point of the blade is aligned to the center mark.

When the blade is centered, tighten all 6 setscrews lightly.

Double check to make sure the blade is centered. If the blade has moved, loosen and tighten setscrews as needed to center the blade.

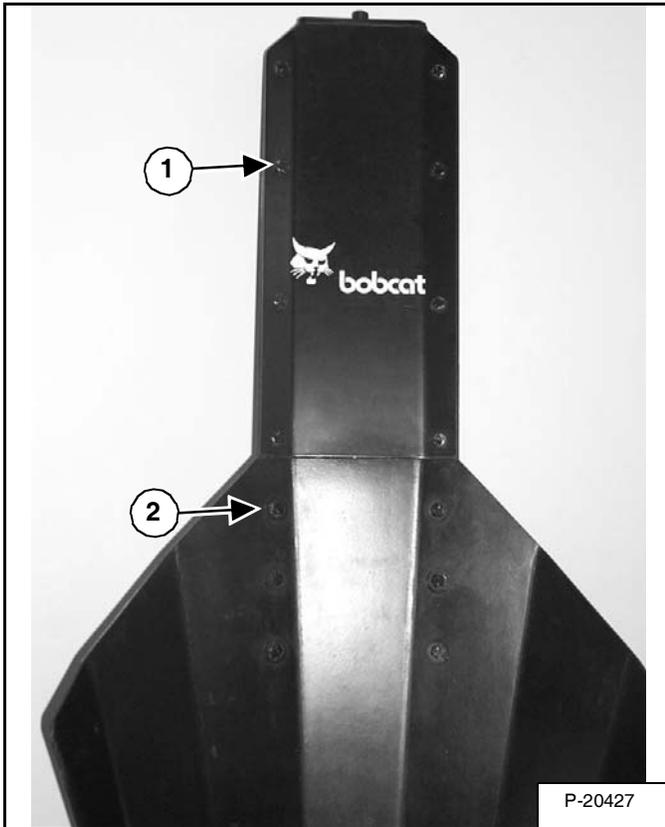
With all setscrews snug, turn each setscrew back out 1/2 turn and then tighten the jam nuts to the setscrews.

NOTE: Do not over tighten the jam nuts or damage to the setscrew and/or the polyethylene slides could result.

BLADE ADJUSTMENT (Cont'd)

Front to Back Adjustment

Figure 10-10-14



Remove the cover (Item 1) [Figure 10-10-15] and the two shims (Item 2) [Figure 10-10-15], one shim is located on each side of the cover.

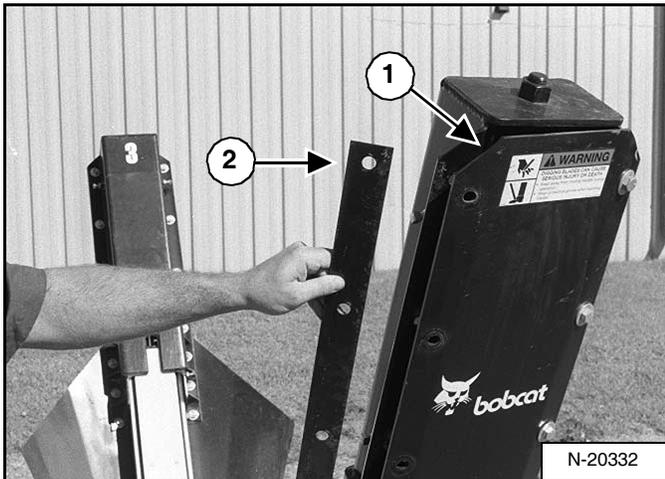
Remove the six bolts (Item 2) [Figure 10-10-14] from the blade and remove the two shims, one shim is located on each side of the blade.

Discard the shims.

Reinstall the cover and the blade.

Tighten the bolts to 70 ft.-lbs. (95 Nm) torque.

Figure 10-10-15



To adjust the forward and back movement on the blade, the blade and the front cover (on 3 blade Tree Spade) or the rear cover (on 4 blade Tree Spade) must be removed.

Remove the eight bolts (Item 1) [Figure 10-10-14], from the front or the rear cover.

BLADE SHARPENING

The blades are manufactured using high temperature steel so that they maintain a good edge and do not damage easily.

The blades need to be kept sharp at all times to assure optimum digging performance. Frequency of sharpening will be dependent on soil conditions and types of trees being dug. When the blade edges start to become rounded or when the operator notices that it takes more effort to extract a tree, **SHARPEN THE BLADES!**

Sharpening The Blade



Eye and body protection is required when welding or grinding. Wear approved goggles, helmet and clothing. Failure to wear eye and body protection can result in serious injury.

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Figure 10-10-16

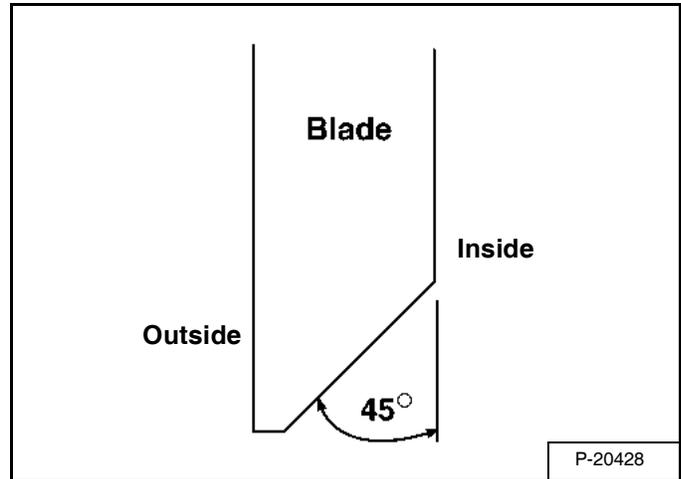


Sharpen the blades with the blade fully retracted, the gates fully open and with the loader engine off [Figure 10-10-16]. **Do not** sharpen the blades with the loader engine running.

NOTE: When sharpening the 4 blade Tree Spade, it may be easier to remove the two blades closest to the loader. The Bob-Tach mount will interfere with access to these two blades for sharpening.

Tree Spade blades need to be sharp enough to easily cut tree roots and penetrate hard soils. Concentrate sharpening of the blade to the lower half of the blade and the blade point. Do not get the metal too hot while sharpening or you will take some of the temper out of the blade.

Figure 10-10-17



Sharpen the blades lightly at a 45° angle [Figure 10-10-17].

To sharpen the blade point, it may be necessary to slightly raise and block the Tree Spade up to better access the blade point.

HYDRAULIC SYSTEM

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Removal and Installation (3 Blade ACD Version Shown) .	10-20-3
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Assembly (S/N 944600101 & Above, S/N 944700101 & Above, S/ N 944800101 & Above, S/N 944900101 & Above, S/N 945000101 & Above, S/N 945100101 & Above).	10-20-10
Disassembly (S/N 973000113 & Above, S/N 9731000107 & Above, S/N 973200107 & Above, S/N 973300114 & Above, S/N 973400106 & Above, S/N 973500121 & Above)	10-20-15
Assembly (S/N 973000113 & Above, S/N 9731000107 & Above, S/N 973200107 & Above, S/N 973300114 & Above, S/N 973400106 & Above, S/N 973500121 & Above)	10-20-21
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HYDRAULIC SYSTEM



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HYDRAULIC CONTROL VALVE

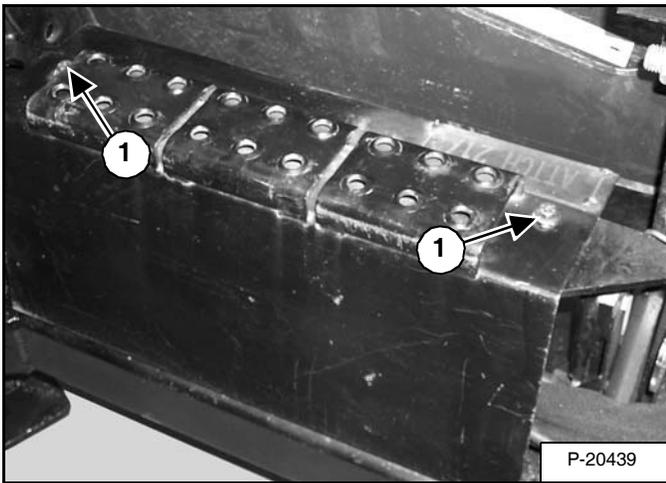
Removal and Installation (3 Blade ACD Version Shown)

IMPORTANT

When repairing hydrostatic and hydraulic systems, clean the work area before disassembly and keep all parts clean. Always use caps and plugs on hoses, tubelines and ports to keep dirt out. Dirt can quickly damage the system.

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Figure 10-20-1



Position the Tree Spade flat on the ground.

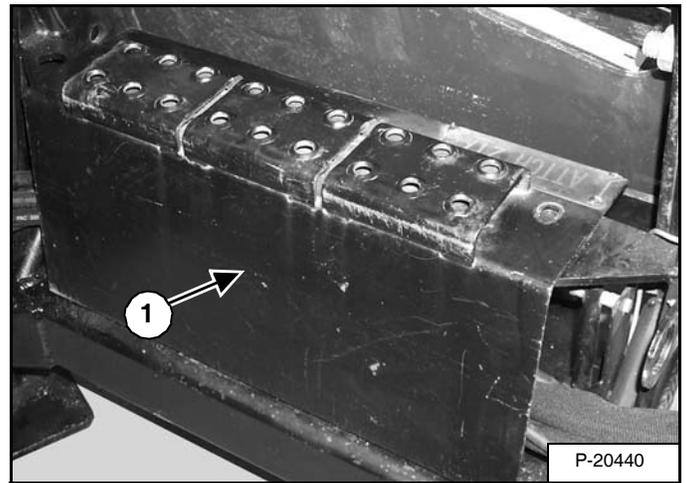
Thoroughly clean the area around the control valve.

Mark all hydraulic hoses for ease of installation.

Remove the two bolts (Item 1) [Figure 10-20-1] from the cover.

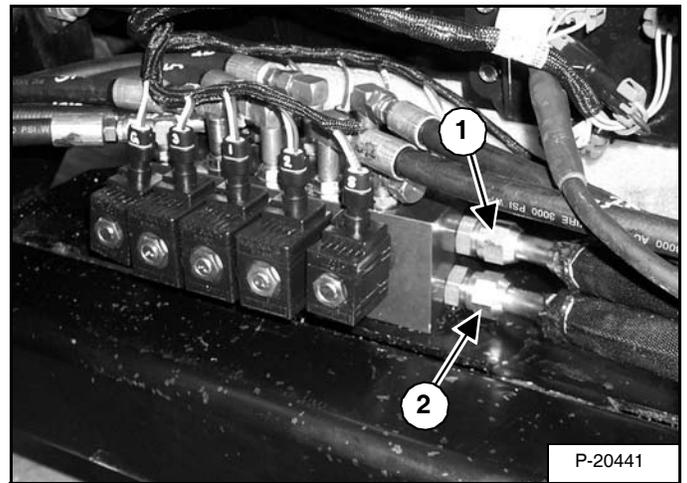
Installation: Tighten bolts to 28 ft.-lbs. (38 Nm) torque.

Figure 10-20-2



Remove the cover (Item 1) [Figure 10-20-2].

Figure 10-20-3



Remove the two loader to control valve hoses (Item 1 & 2) [Figure 10-20-3].

HYDRAULIC CONTROL VALVE (CONT'D)

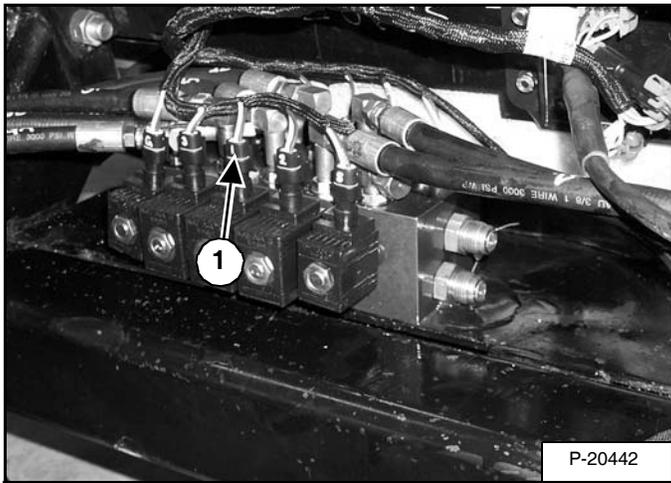
Removal and Installation (3 Blade ACD Version Shown) (Cont'd)

IMPORTANT

Contain and dispose of any oil leakage in an environmentally safe manner.

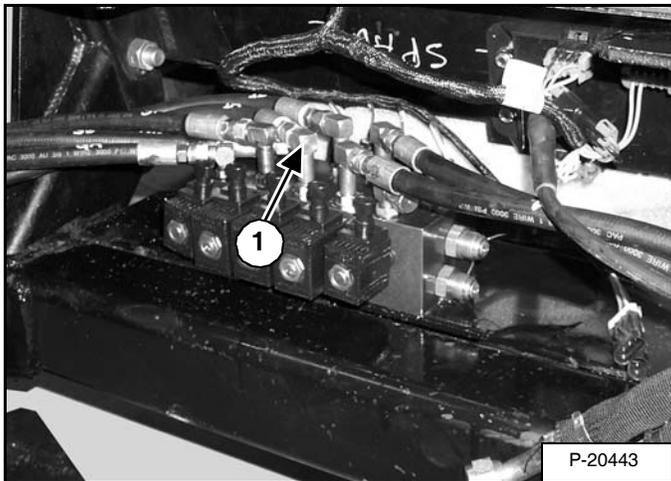
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Figure 10-20-4



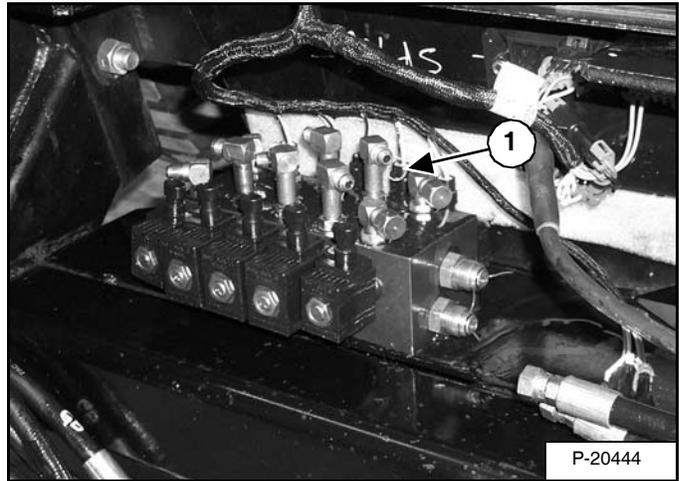
Remove the connectors (Item 1) [Figure 10-20-4] from the solenoid coils.

Figure 10-20-5



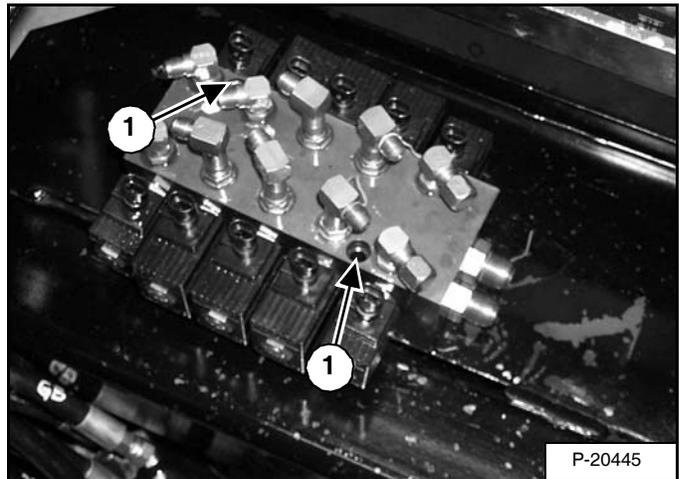
Remove the cylinder to control valve hoses (Item 1) [Figure 10-20-5].

Figure 10-20-6



Remove the remaining connectors (Item 1) [Figure 10-20-6] from the coils.

Figure 10-20-7



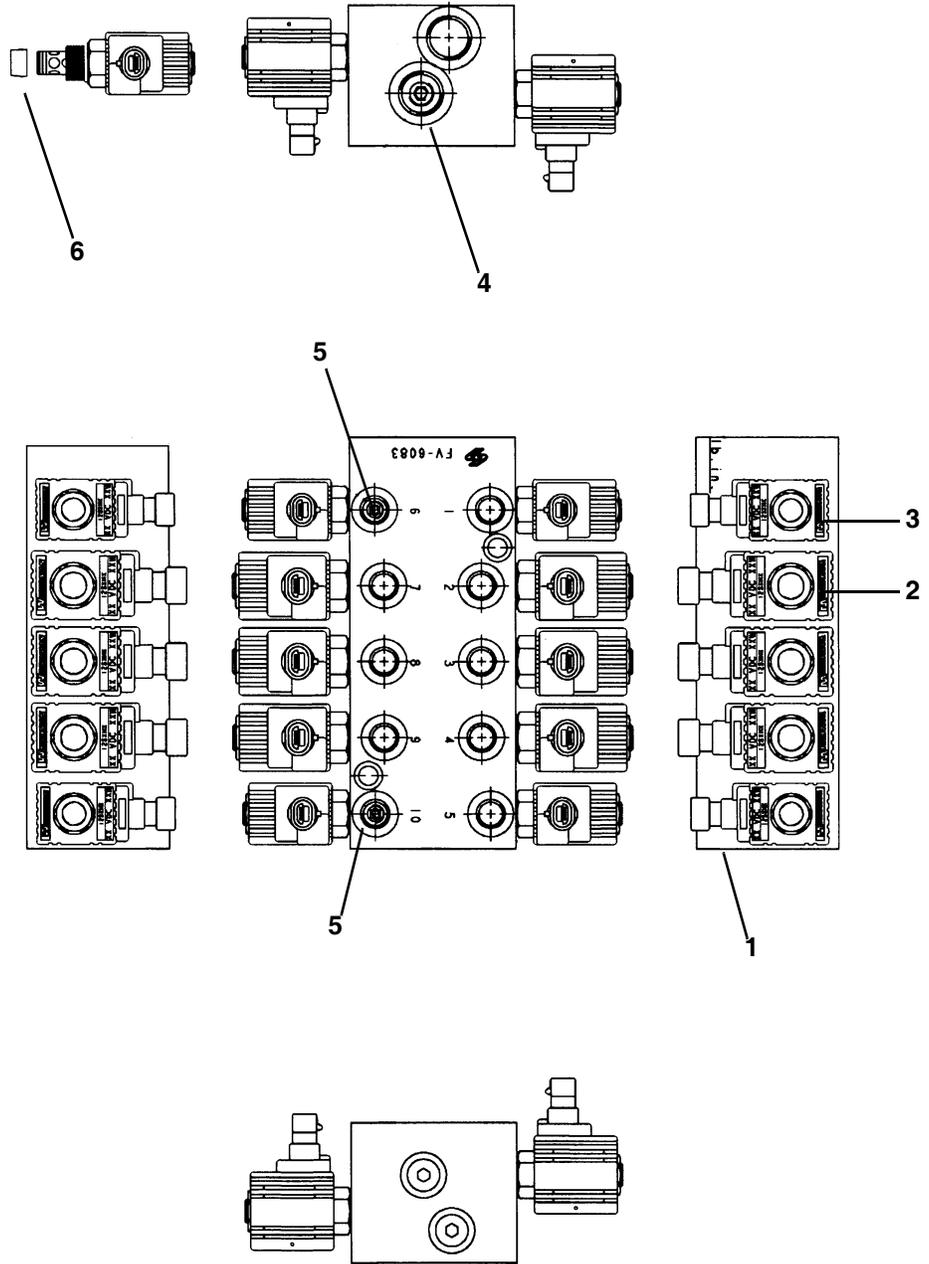
Remove the two bolts (Item 1) [Figure 10-20-7] from the control valve.

Installation: Tighten bolts to 28 ft.-lbs. (38 Nm) torque.

HYDRAULIC CONTROL VALVE (CONT'D)

Parts Identification (S/N 944600101 & Above, S/N 944700101 & Above, S/N 944800101 & Above, S/N 944900101 & Above, S/N 945000101 & Above, S/N 945100101 & Above)

- 1. Valve Assy
- 2. Coil
- 3. Spool
- 4. Seal Kit
- 5. Coil
- 6. Spool
- 7. Seal Kit
- 8. Orifice Plug
- 9. Orifice Plug
- 10. Screen

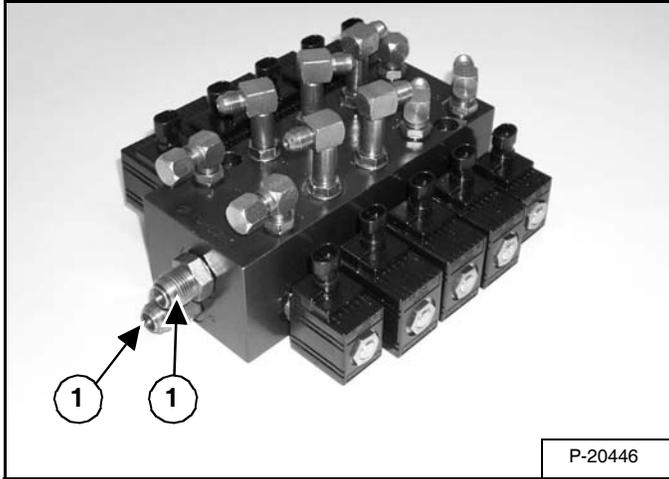


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HYDRAULIC CONTROL VALVE (CONT'D)

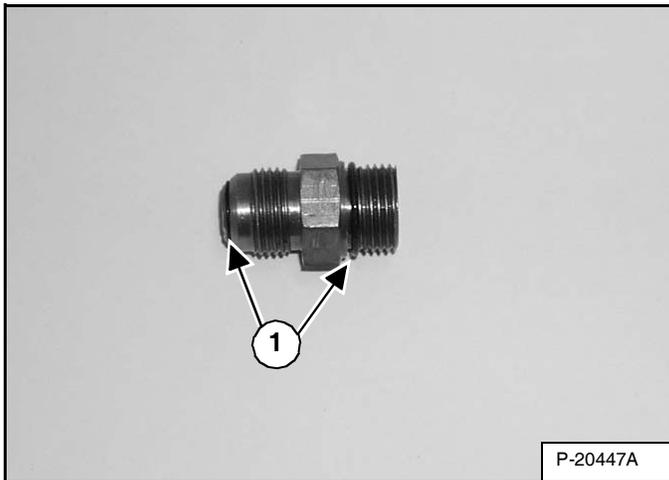
Disassembly (S/N 944600101 & Above, S/N 944700101 & Above, S/N 944800101 & Above, S/N 944900101 & Above, S/N 945000101 & Above, S/N 945100101 & Above)

Figure 10-20-8



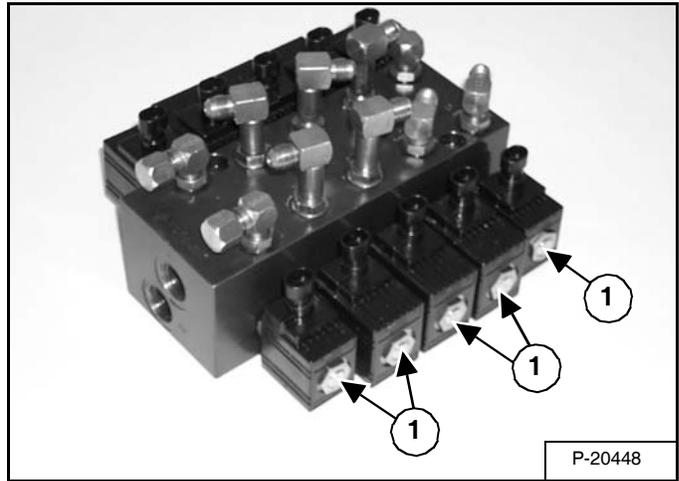
Remove the two end fittings (Item 1) [Figure 10-20-8] from the control valve.

Figure 10-20-9



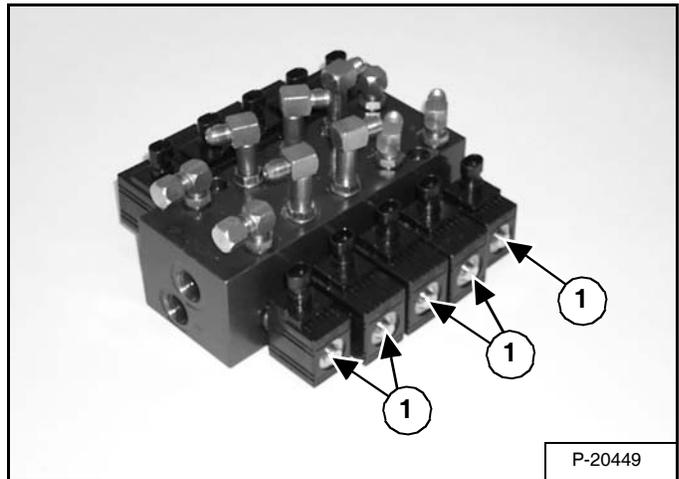
Remove the O-rings (Item 1) [Figure 10-20-9] from the fittings.

Figure 10-20-10



Remove the nuts (Item 1) [Figure 10-20-10] from the coils.

Figure 10-20-11

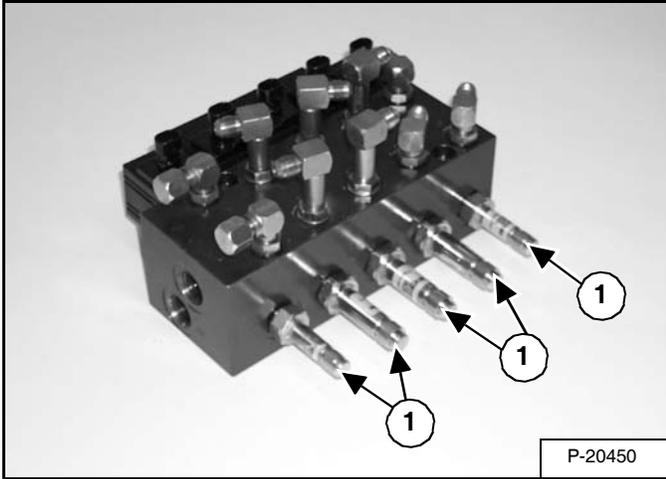


Remove the coils (Item 1) [Figure 10-20-11] from the spools.

HYDRAULIC CONTROL VALVE (CONT'D)

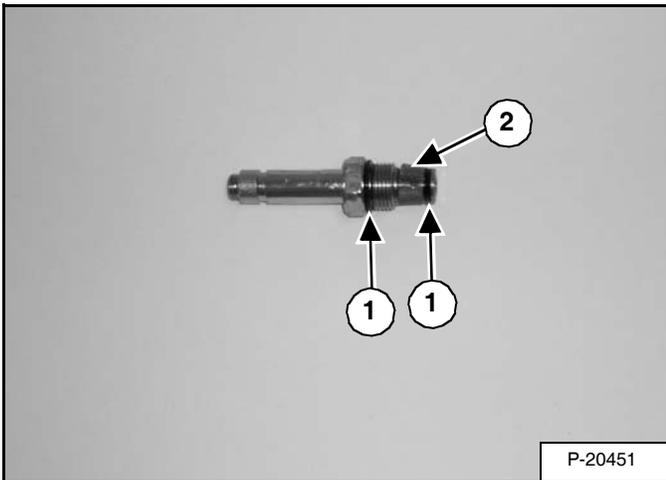
Disassembly (S/N 944600101 & Above, S/N 944700101 & Above, S/N 944800101 & Above, S/N 944900101 & Above, S/N 945000101 & Above, S/N 945100101 & Above) (Cont'd)

Figure 10-20-12



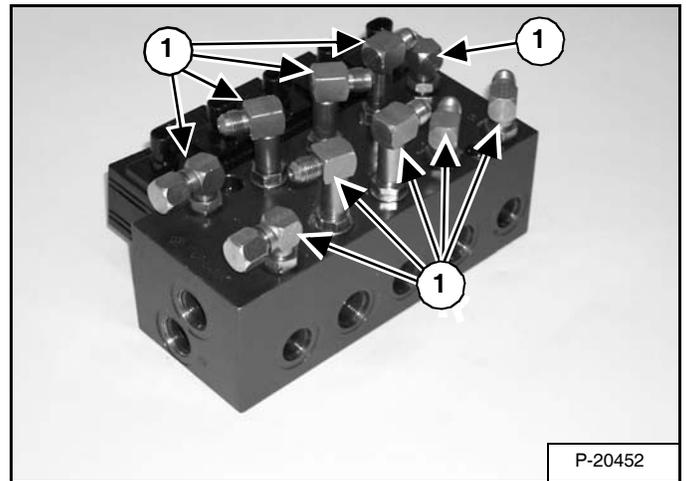
Remove the spools (Item 1) [Figure 10-20-12] from the control valve.

Figure 10-20-13



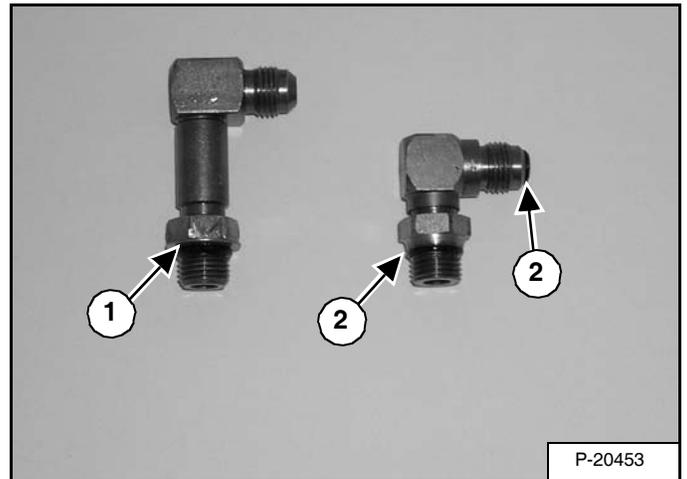
Remove the O-rings (Item 1) [Figure 10-20-13] and the screens (Item 2) [Figure 10-20-13] from the spools.

Figure 10-20-14



Remove the top fittings (Item 1) [Figure 10-20-14] from the control valve.

Figure 10-20-15

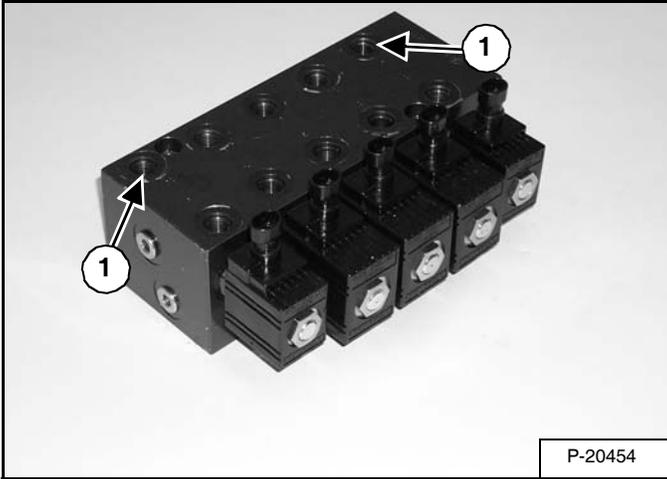


Remove the O-rings (Items 1 & 2) [Figure 10-20-15] from the fittings.

HYDRAULIC CONTROL VALVE (CONT'D)

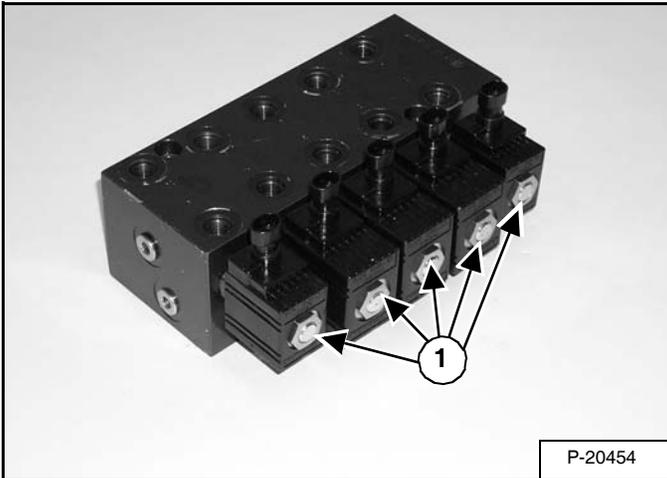
Disassembly (S/N 944600101 & Above, S/N 944700101 & Above, S/N 944800101 & Above, S/N 944900101 & Above, S/N 945000101 & Above, S/N 945100101 & Above) (Cont'd)

Figure 10-20-16



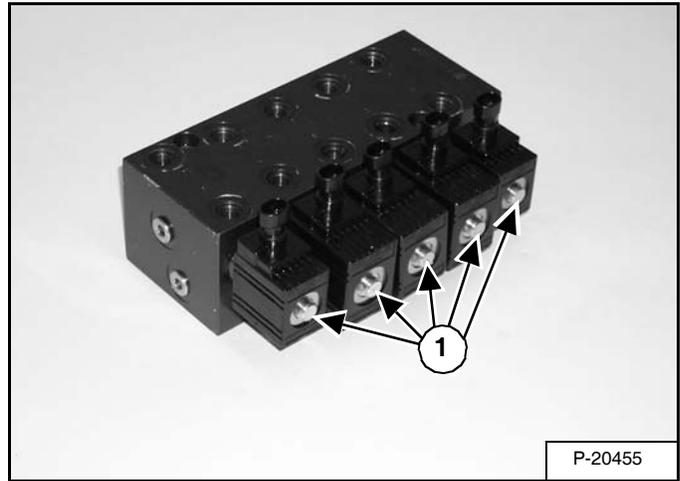
Remove the orifice plugs (0.078) (Item 1) [Figure 10-20-16] from the control valve.

Figure 10-20-17



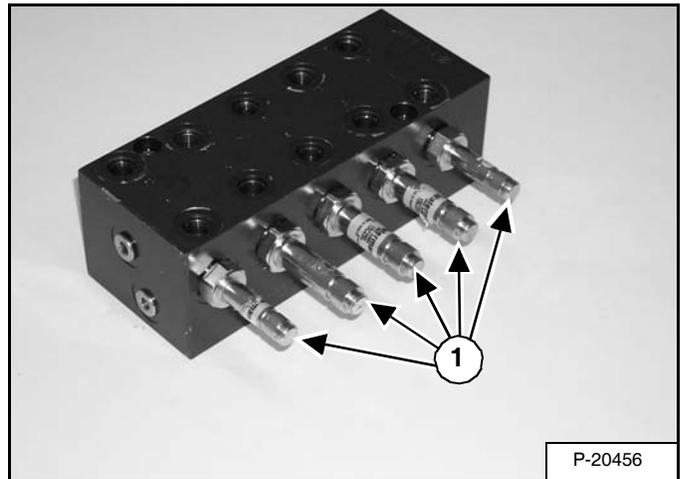
Remove the nuts (Item 1) [Figure 10-20-17] from the coils.

Figure 10-20-18



Remove the coils (Item 1) [Figure 10-20-18] from the spools.

Figure 10-20-19

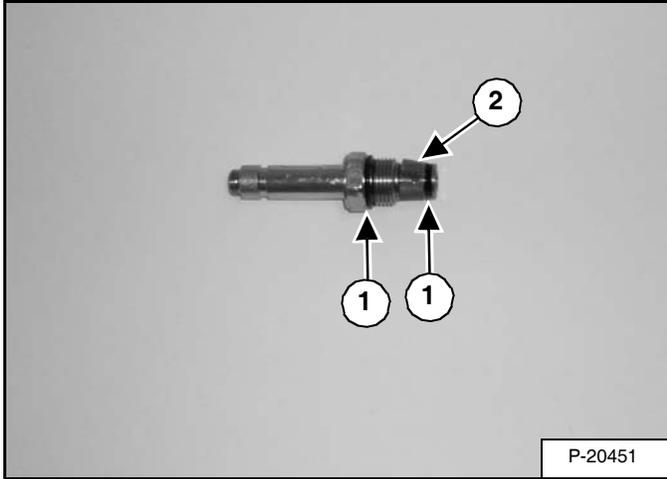


Remove the spools (Item 1) [Figure 10-20-19] from the control valve.

HYDRAULIC CONTROL VALVE (CONT'D)

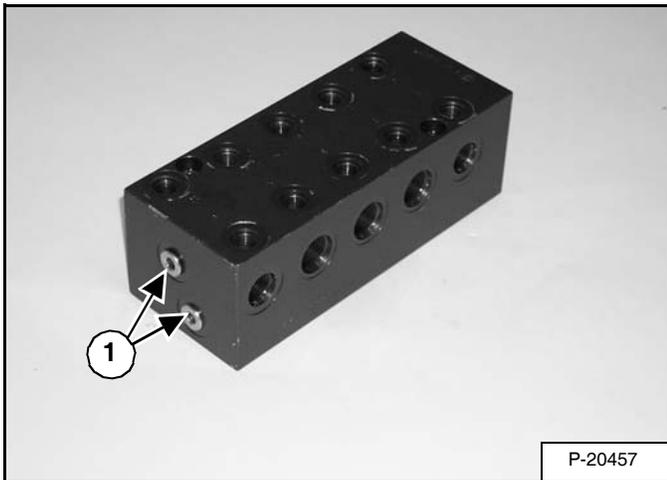
Disassembly (S/N 944600101 & Above, S/N 944700101 & Above, S/N 944800101 & Above, S/N 944900101 & Above, S/N 945000101 & Above, S/N 945100101 & Above) (Cont'd)

Figure 10-20-20



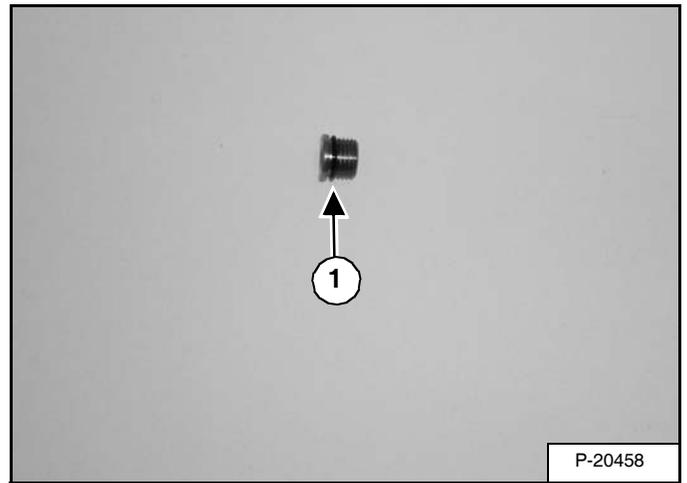
Remove the O-rings (Item 1) [Figure 10-20-20] and the screens (Item 2) [Figure 10-20-20] from the spools.

Figure 10-20-21



Remove the plugs (Item 1) [Figure 10-20-21] from the control valve.

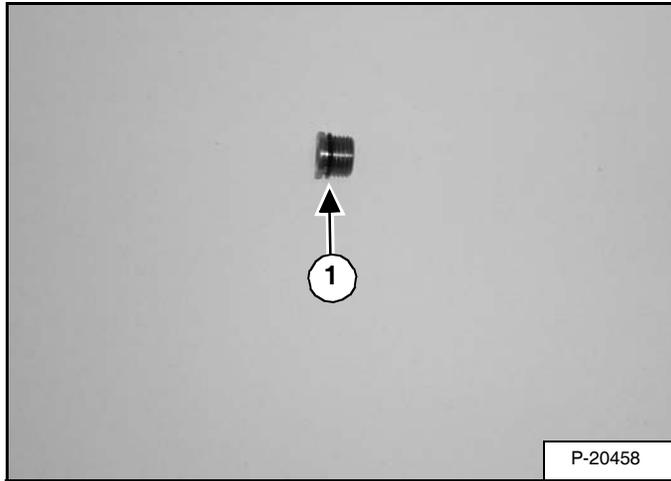
Figure 10-20-22



Remove the O-rings (Item 1) [Figure 10-20-22] from the plug.

Assembly (S/N 944600101 & Above, S/N 944700101 & Above, S/N 944800101 & Above, S/N 944900101 & Above, S/N 945000101 & Above, S/N 945100101 & Above)

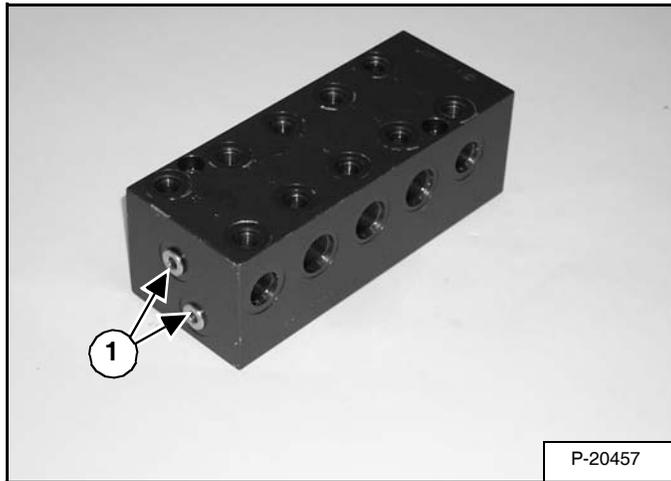
Figure 10-20-23



NOTE: Always use new O-rings and seals when assembling the Hydraulic Control Valve. Put a small amount of grease on all the O-rings and seals for easier assembly.

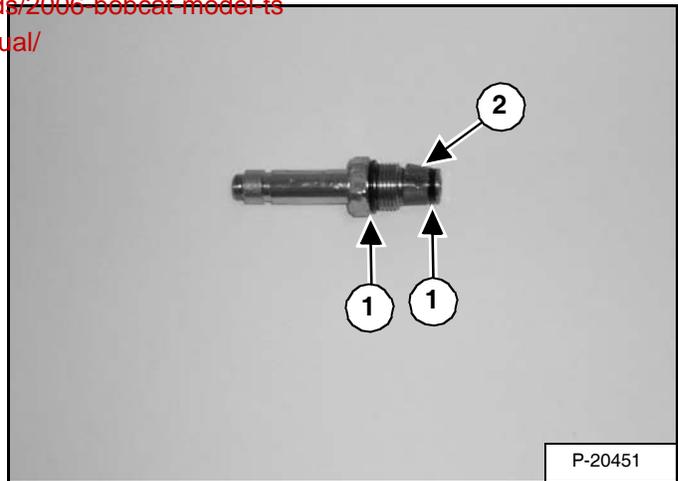
Install the O-rings (Item 1) [Figure 10-20-23] on all plugs.

Figure 10-20-24



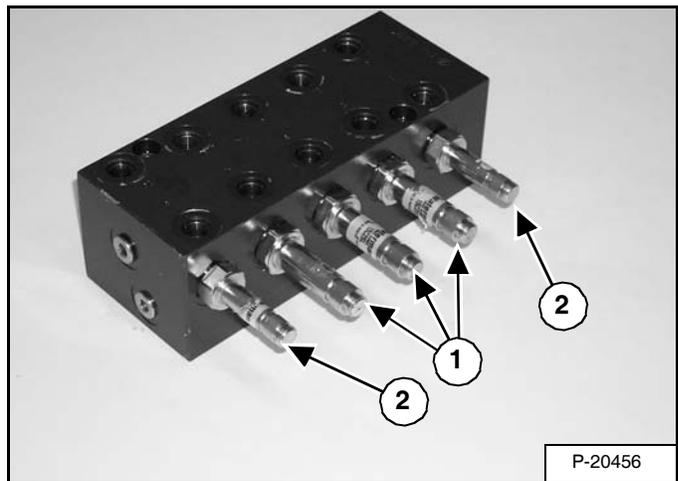
Install the plugs (Item 1) [Figure 10-20-24]. Tighten plugs to 225 in.-lbs. (25 Nm) torque.

Figure 10-20-25



Install the O-rings (Item 1) [Figure 10-20-25] and the screens (Item 2) [Figure 10-20-25] on all spools.

Figure 10-20-26



Install the spools. Tighten spools (Item 1) [Figure 10-20-26] to 190 in.-lbs. (21 Nm) torque. Tighten spools (Item 2) [Figure 10-20-26] to 180 in.-lbs. (20 Nm) torque.