

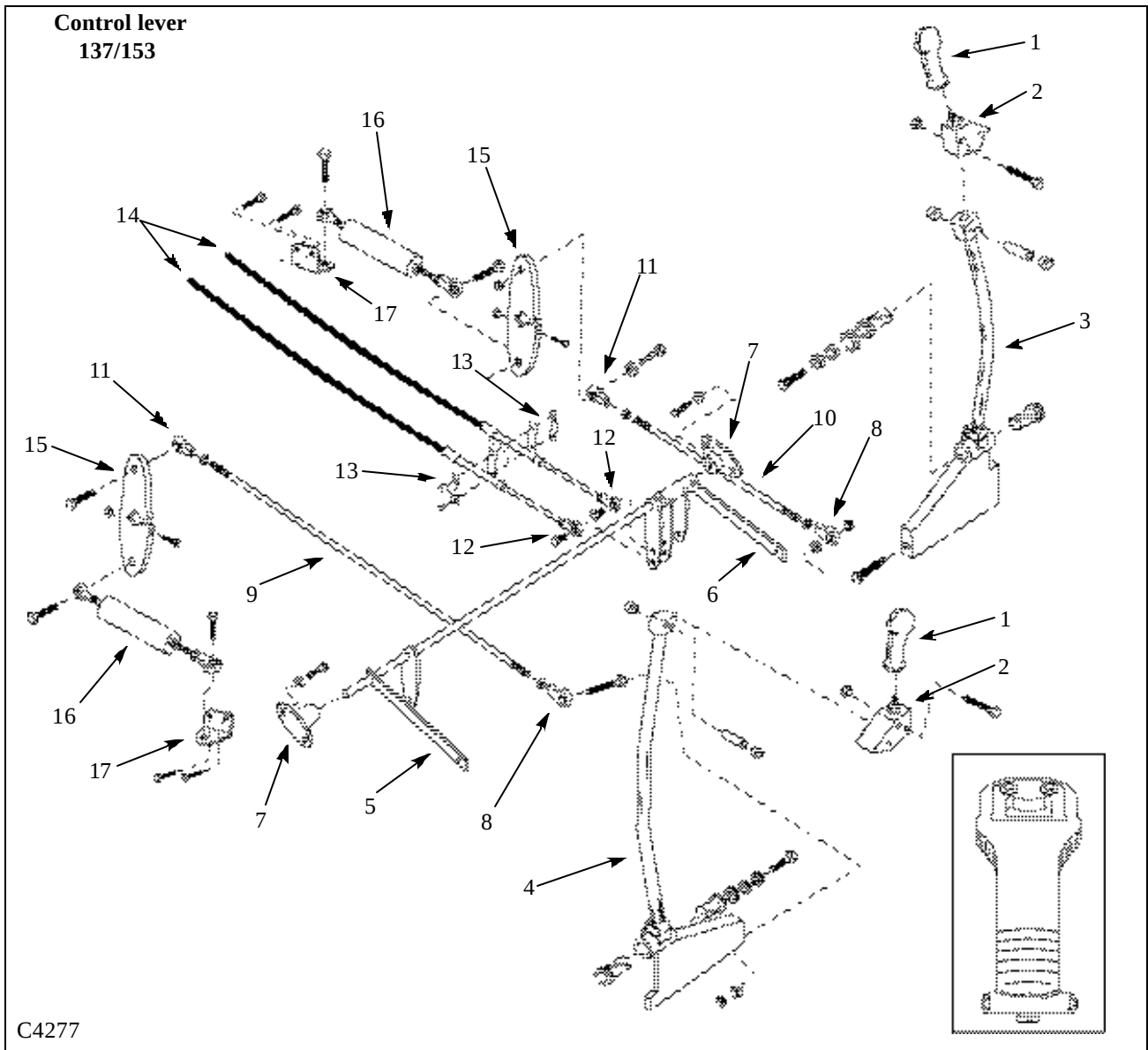
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STEERING 4.1

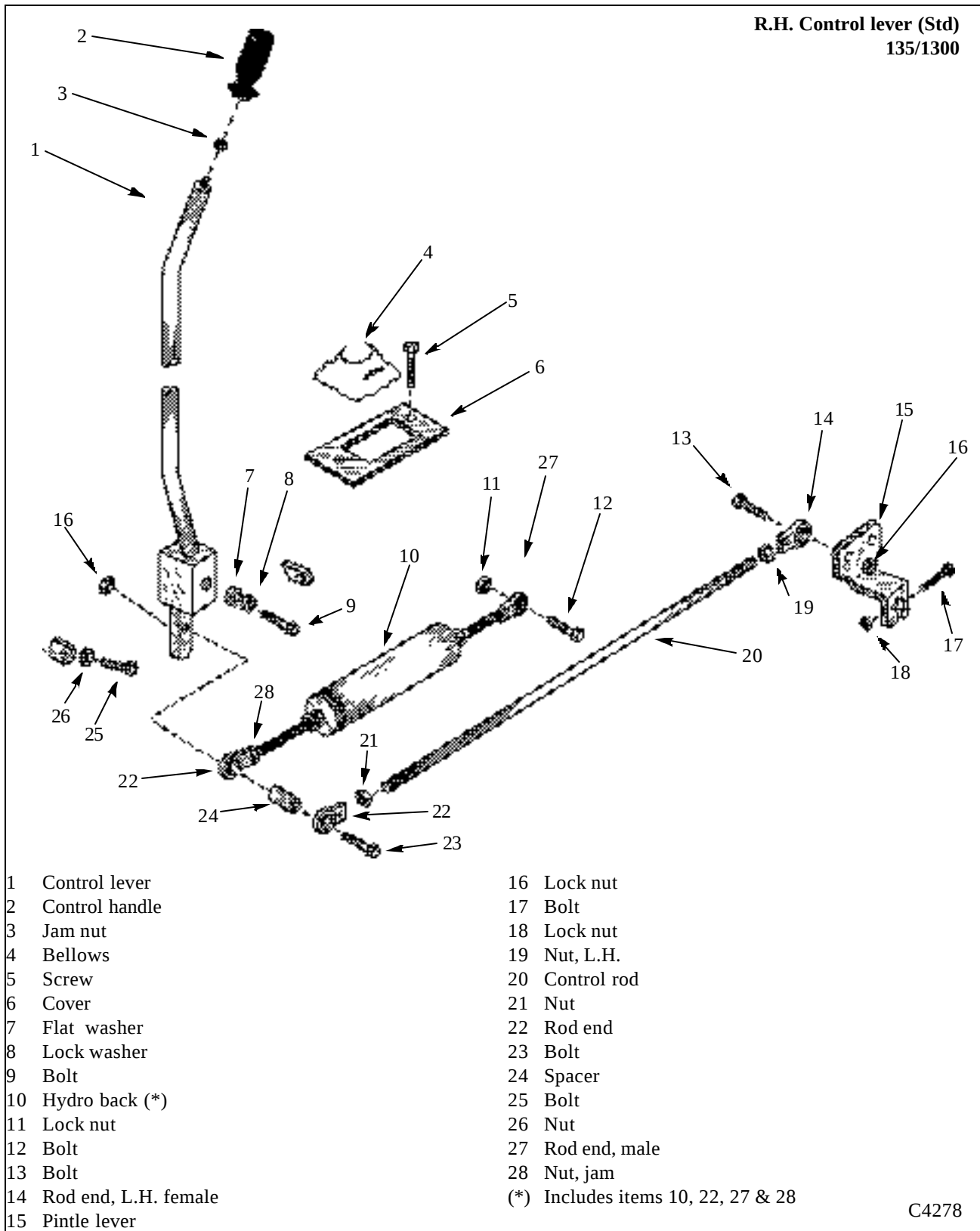
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1. Ergonomic Handle
2. Lever, Handle Base
3. LH Control Lever
4. RH Control Lever
5. Cross Shaft Assy.
6. LH Activator Assy
7. Flange Bearing
8. Rod End Assy, Female
9. Bar, CF RD Pintle Linkage RH
10. Bar, CF RD Pintle Linkage LH
11. Rod End Assy, Female
12. Rod End Assy
13. Clamp, Cable series 40
14. Cable, Push Pull
15. Pintle Lever Plate

16. Hydroback
17. Plate, Hydroback Mount

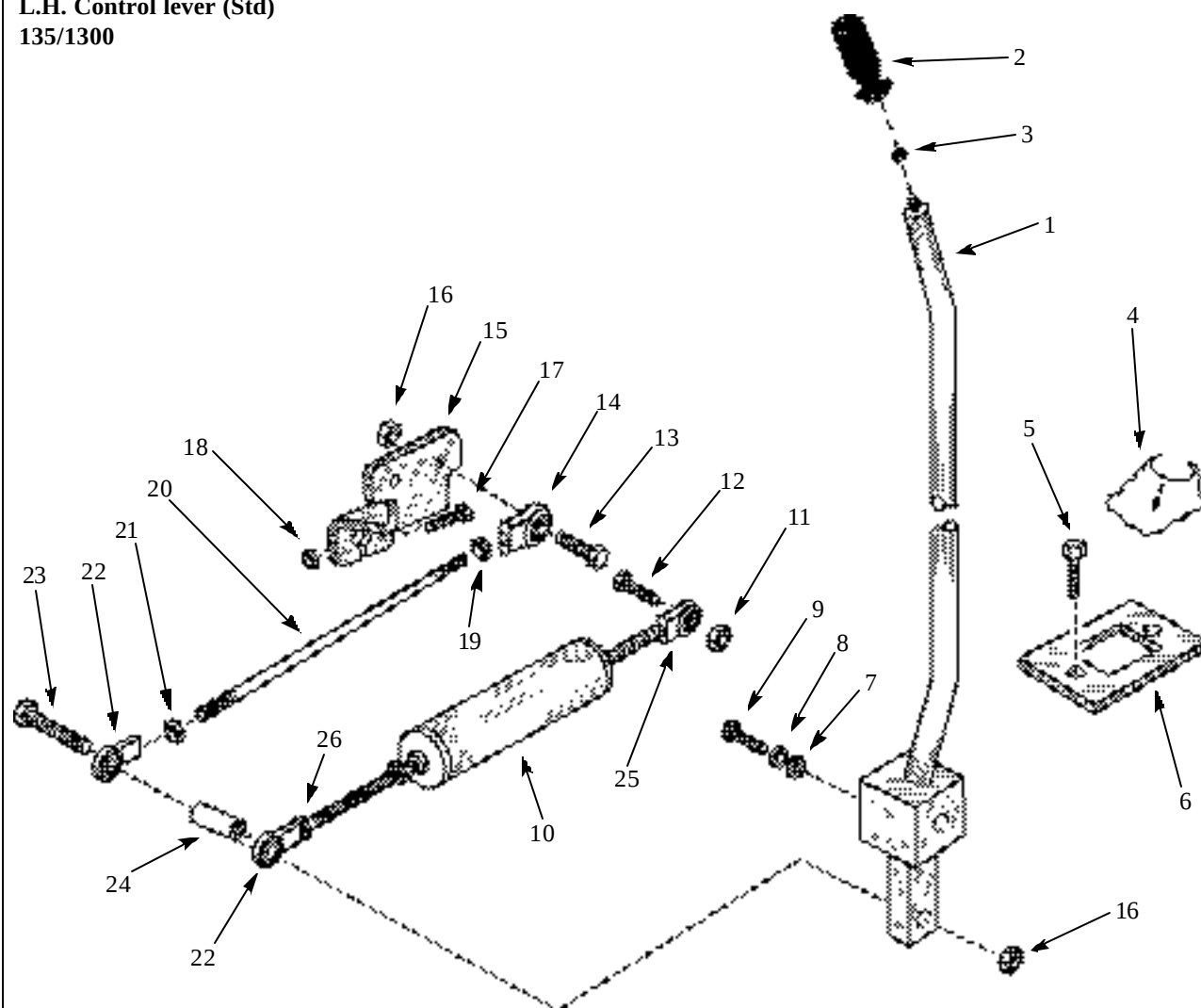
STEERING 4.1



STEERING 4.1

4

L.H. Control lever (Std)
135/1300



- | | |
|-------------------------|------------------------------------|
| 1 Control lever | 16 Lock nut |
| 2 Control handle | 17 Bolt |
| 3 Jam nut | 18 Lock nut |
| 4 Bellows | 19 Nut, L.H. |
| 5 Screw | 20 Control rod |
| 6 Cover | 21 Nut |
| 7 Flat washer | 22 Rod end |
| 8 Lock washer | 23 Bolt |
| 9 Bolt | 24 Spacer |
| 10 Hydro back (*) | 25 Rod end, male |
| 11 Lock nut | 26 Nut, jam |
| 12 Bolt | (*) Includes items 10, 22, 25 & 26 |
| 13 Bolt | |
| 14 Rod end, L.H. female | |
| 15 Pintle lever | |

C4279

STEERING 4.1

Neutral Adjustment

IMPORTANT

If you are unfamiliar with the control operations of the loader, read the Owner's / Operator's Manual beforehand.

The steering levers are equipped with a spring centering device called a hydroback. The hydroback returns the steering lever to neutral position when the steering levers are not being operated.

This feature automatically keeps the loader in neutral whenever the engine is started, or when the control levers are released.

If the loader creeps (not in neutral) when the engine is started or when the steering lever is released from forward or reverse position, the hydroback device may need to be adjusted, repaired or replaced.

1 Raise the boom arms, engage the boom support pins and shut off the engine. Raise and block the loader securely off the ground.



WARNING

Never work under the boom arms without the boom supports engaged.

2 Remove the seat (fig. C4280) and hydrostatic shield.(fig. C4281) Note the location of the hydroback. (fig. C2025)

3 Cycle the control lever while watching the hydroback action. The hydroback should have a positive feel to it as the lever is in the neutral position.

4 Check the rod ends on each end of the hydroback. They must be free of any play. Replace the rod ends if any play or slack is noticed. (fig. C1638)

5 If the control lever is able to move slightly without spring tension returning it to neutral, the hydroback needs adjustment.

IMPORTANT

Repairs or adjustment to the control lever system may change the loader neutral position. Make sure the loader is raised securely off the ground before restarting the engine.

Remove seat assembly



C4280

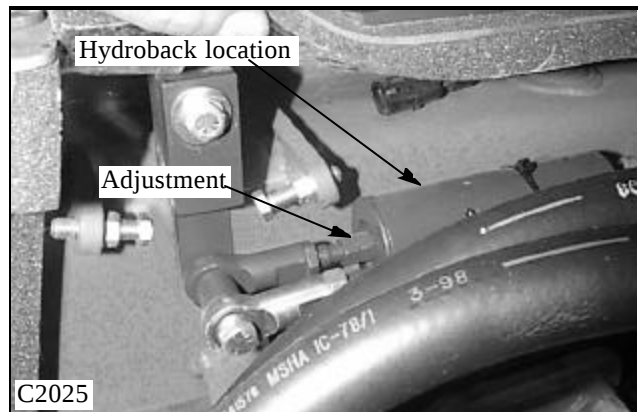
Hydrostatic shield



C4281

Hydroback location

Adjustment



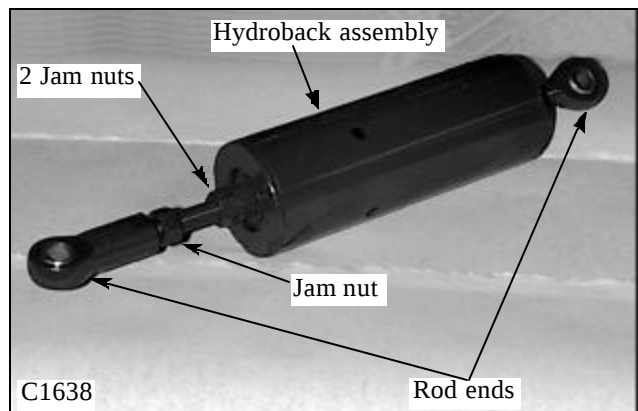
C2025

Hydroback assembly

2 Jam nuts

Jam nut

Rod ends



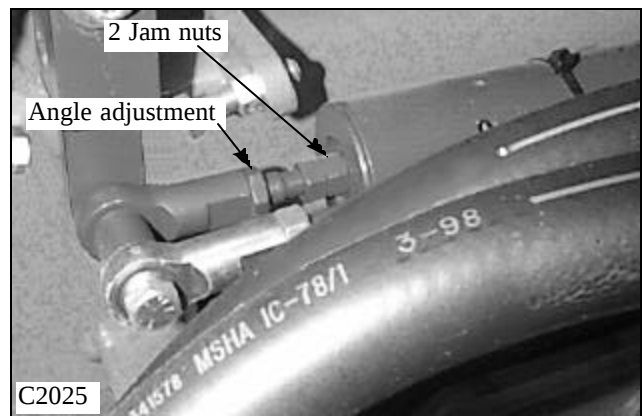
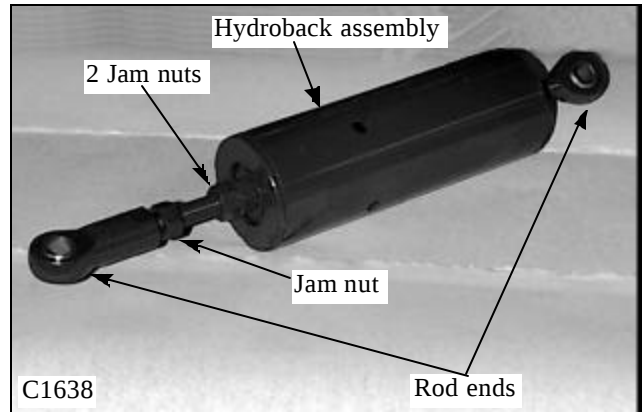
C1638

4

STEERING 4.1

Neutral Adjustment (con't.)

- 6 Loosen the 2 jam nuts next to the main body. (fig. C1638, 2025)
- 7 Turn the 2 nuts away from the main body of the hydroback.
- 8 Cycle the control lever several times.
- 9 Push the control lever rearward until you feel resistance. Stop.
- 10 Turn the 2 jam nuts back toward the main body of the hydroback until the nut just touches the flat washer.
- 11 Cycle the control lever again checking for a positive feel. If you now have a positive neutral, tighten the 2 jam nuts together. If the hydroback still does not center, the hydroback has internal damage or wear. Replace the hydroback assembly with a new one.



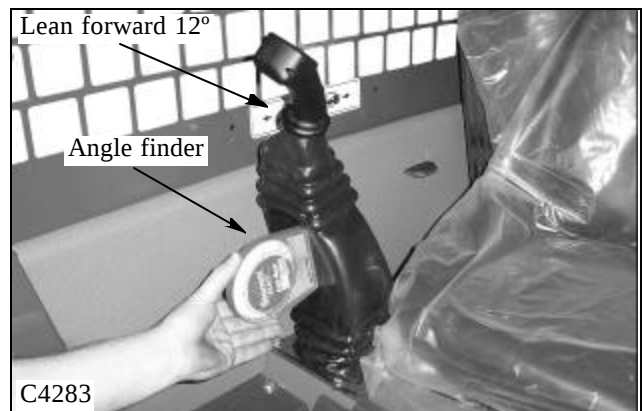
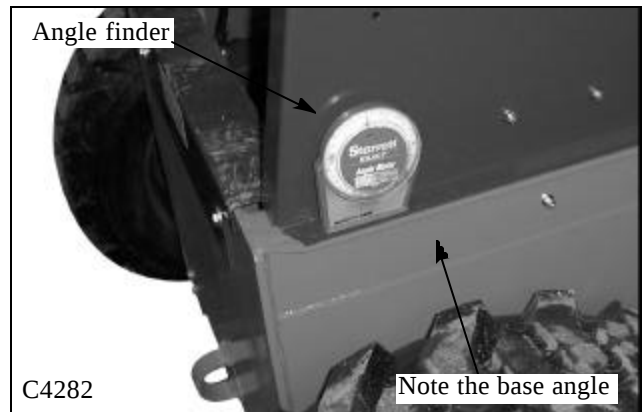
IMPORTANT

Repairs or adjustment to the control lever system may change the loader neutral position. Make sure the loader is raised securely off the ground before restarting the engine.

Hydro Back Replacement

Replacing the hydroback changes the steering control lever angle and the neutral position. To correctly set the angle after the hydro back has been installed:

- 1 Replace the hydroback by removing the 2 bolts located at either end of the hydro back assembly.
- 2 Install the hydroback in the reverse order. Check the steering control rod ends and replace them now if they are worn.
- 3 Use an angle finder to check the base measurement angle the loader is sitting at. (fig. C4282) Note the angle the loader is sitting at. This measurement will have to be added or subtracted to the next measurement to give the most accurate adjustment.
- 4 Attach an angle finder to the most vertical part of the control lever. (fig. C4283)
- 5 Turn the hydroback threaded rod (fig. C2025) in or out of the female rod end to move the control lever to a reading of 12° leaning forward. Be sure to allow for angle the loader is sitting at. (Base angle) Jam the nut against the rod end when completed. Make sure there is a minimum of 3/8" (6mm) of thread holding the female rod end to the threaded rod.
- 6 Proceed to neutral adjustments



STEERING 4.1

Neutral Adjustment

Before performing the neutral adjustment make sure the hydro back is functioning and adjusted properly. Refer to page 4-5.

IMPORTANT

If you are unfamiliar with the control operations of the loader, read the Owner's / Operator's Manual beforehand.

1 Raise the boom arms, engage the boom support pins and shut off the engine. Raise and block the loader securely off the ground.



WARNING

Never work under the boom arms without the boom supports engaged.

2 Remove the seat and hydrostatic shield. Note the location of the steering control linkage. (fig. C2028, 2030a)

3 Check the control rod end bushings for wear. If any play is present between the bushings and the bolts replace the rod ends.

4 Check the pintle lever for tightness on the swash plate shaft. Tighten the clamping bolt or replace the pintle lever if required. (fig. C1885)

5 If and when all rod bushings and pivot points have been check for wear or binding, proceed with the neutral adjustment.

6 Loosen the jam nuts on the control rod linkage. (fig. C2030b) One end of the control rod is RH threads, the opposite end has LH threads.

7 Start the engine and release the parking brake.

8 Turn the control rod linkage and visually watch the wheels as they turn. Stop turning the control rod linkage when the wheels are in neutral. Tighten the jam nuts against the rod ends and recheck the neutral adjustment.

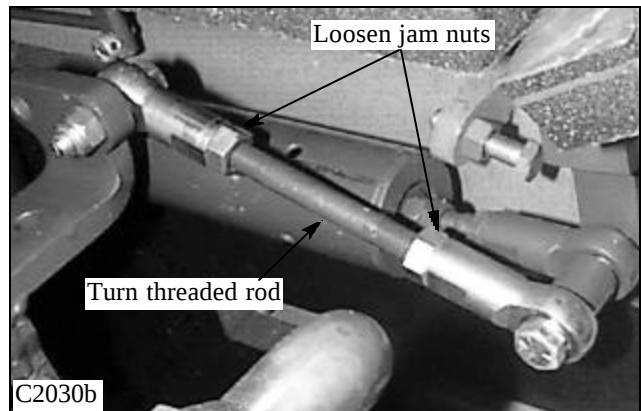
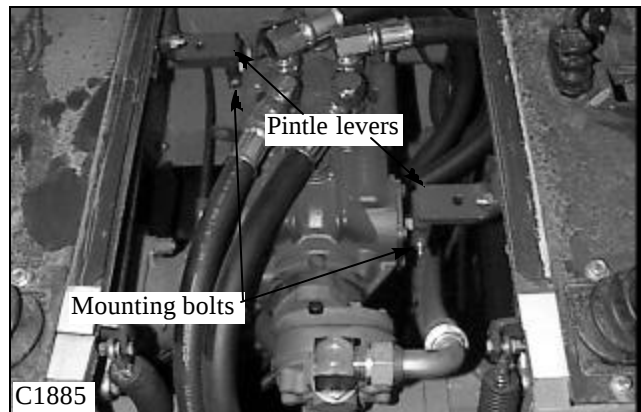
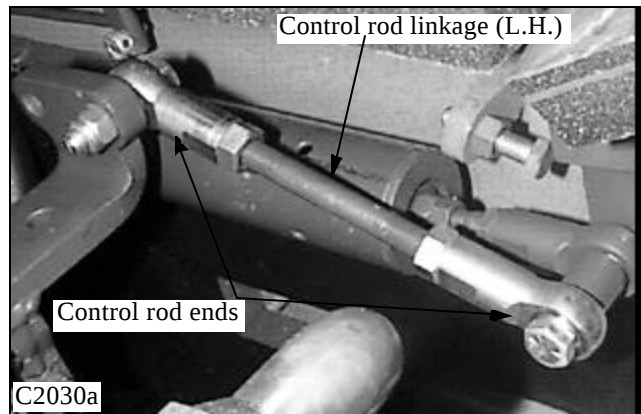
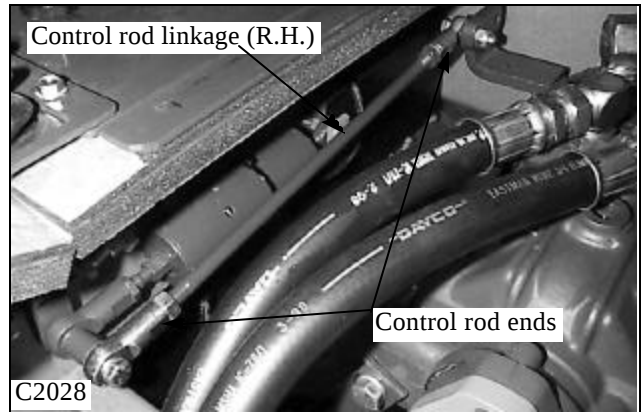
9 Very fine adjustment can be made at the hydro back threaded rod. Adjustment here affects the control lever angle. **Only make minor adjustments using this method.**

10 Replace the seat and hydrostatic shield.



WARNING

Repairs or adjustment to the control lever system may change the loader neutral position. Make sure the loader is raised securely off the ground before restarting the engine.



4

STEERING 4.1

Tracking Adjustment (Speed)

Tracking adjustment, or wheel speed, is set individually for LH and RH sides. If the operator complains the loader does not go in a straight line when the levers are pushed clear forward the limiter stops may need adjustment.

- 1 Raise the boom arms, engage the boom support pins and shut off the engine. Raise and block the loader securely off the ground.
- 2 Remove the seat and hydrostatic shield. Note the



WARNING

Never work under the boom arms without the boom supports engaged.

location of the steering control limiter bolts located front and rear of each steering control lever, just below the pivot point.. (fig. C2025)

- 3 Make sure the neutral adjustment are adjusted correctly. Refer to pages 4- 5 ~ 4-7.
- 4 If and when all rod bushings and pivot points have been check for wear or binding, proceed with the wheel speed adjustment.
- 5 Start the engine and release the parking brake. Adjust

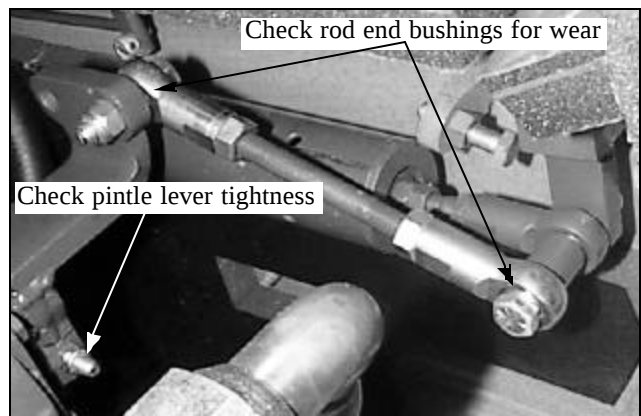
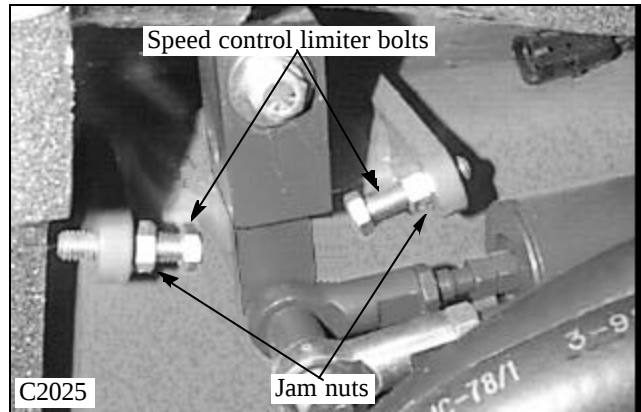


WARNING

Raise the loader securely off the ground before starting the engine.

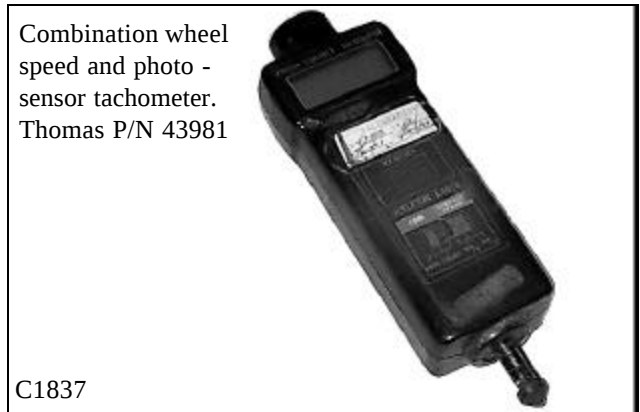
the engine rpm to the full high idle position. Refer to Section 7 to verify engine rpm.

- 6 Using an rpm surface speed measuring tool (fig. C1837 Thomas P/N 43981) check each wheel speed in the forward and reverse direction. Repeat for opposite side. (fig. C4284)
 - 7 Correct wheel speed is set evenly at 72 rpm forward and reverse for both sides on the 137/153 modes. 1300/135 are set at 70 rpms forward and reverse for both sides.
 - 8 If adjustment is necessary, loosen the jam nut (fig. C2025) and turn the limiter bolt in to increase wheel speed or out to slow it down.
 - 9 Tighten the jam nut and retest the speed adjustment. Repeat if necessary.
 - 10 Replace the seat and hydrostatic shield.
- Note:** If the wheel speed does not meet the above specification, check the engine rpm. Refer to Section 7. If the engine rpm check out good you may need to check for hydrostatic problems such as drive motor seal leakage etc. Refer to Section 2 for testing procedures.



Combination wheel speed and photo - sensor tachometer. Thomas P/N 43981

C1837



STEERING 4.1

Control Lever Replacement

1 Raise the boom arms, engage the boom supports and shut off the engine. Raise the loader securely off the ground to prevent accidental engagement of the drive functions upon restarting the engine.



WARNING

Never work under the boom arms without the boom supports engaged.

- 2 Remove the seat and hydrostatic shield.
- 3 Remove the control lever base by removing the mounting bolt in control lever. (fig. C4285)
- 4 Remove the screws holding the bellows cover down. (fig. C4286)
- 5 Remove the bolt going through the control rod and hydro back linkage. (fig. C4287)
- 6 Remove the bolt and washers mounting the control lever to it's pivot point. (fig.C4288) The control lever is now free to be removed.
- 7 Replace the control lever in the reverse order. Lightly lubricate the pivot shaft with white grease when assembling the control lever to the pivot shaft.

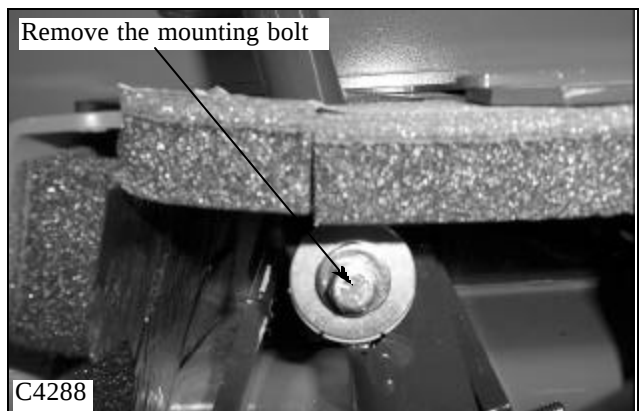
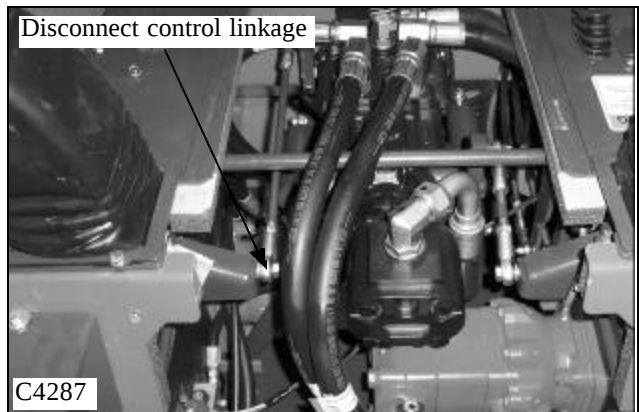
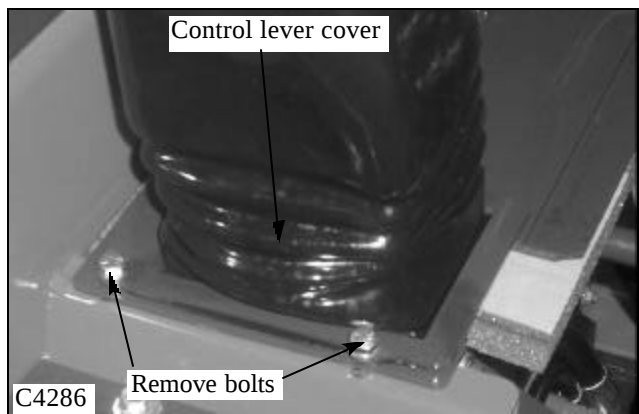
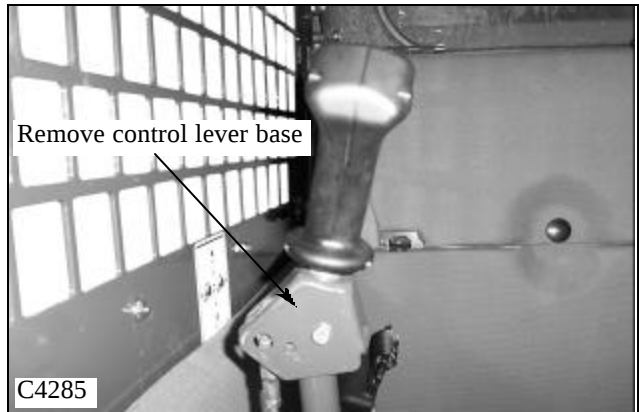


WARNING

Repairs or adjustment to the control lever system may change the loader neutral position. Make sure the loader is raised securely off the ground before restarting the engine.

- 8 If necessary, make adjustments to the neutral centering and wheel speed as required. Refer to pages 4 - 5 ~ 4 - 8.

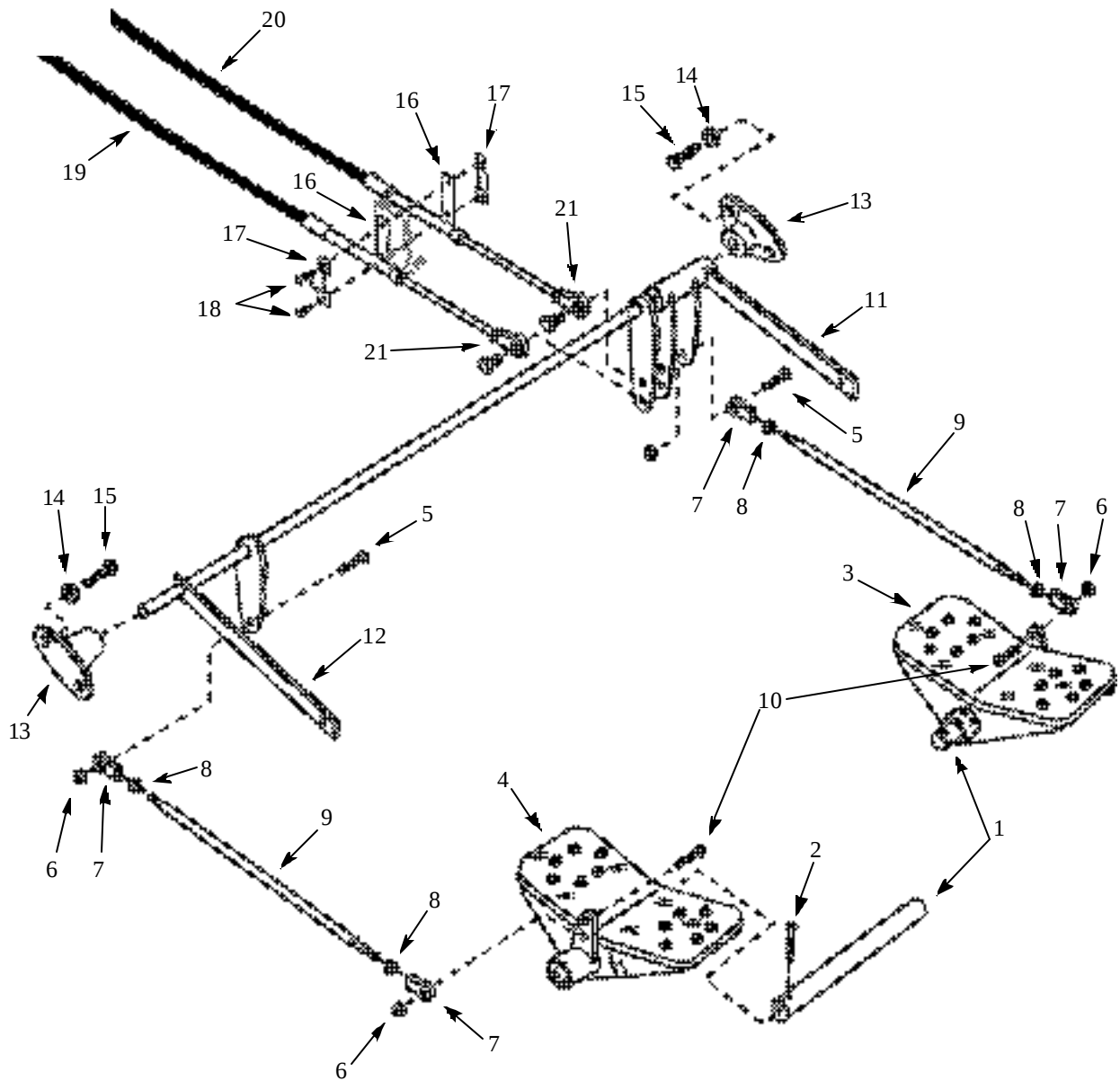
Note: If the loader is equipped with optional electrical accessories operated by control handle mounted switches, the control handle switch wiring will need to be disconnected and transferred to the new steering lever.



4

FOOT PEDALS 4.2

137/153



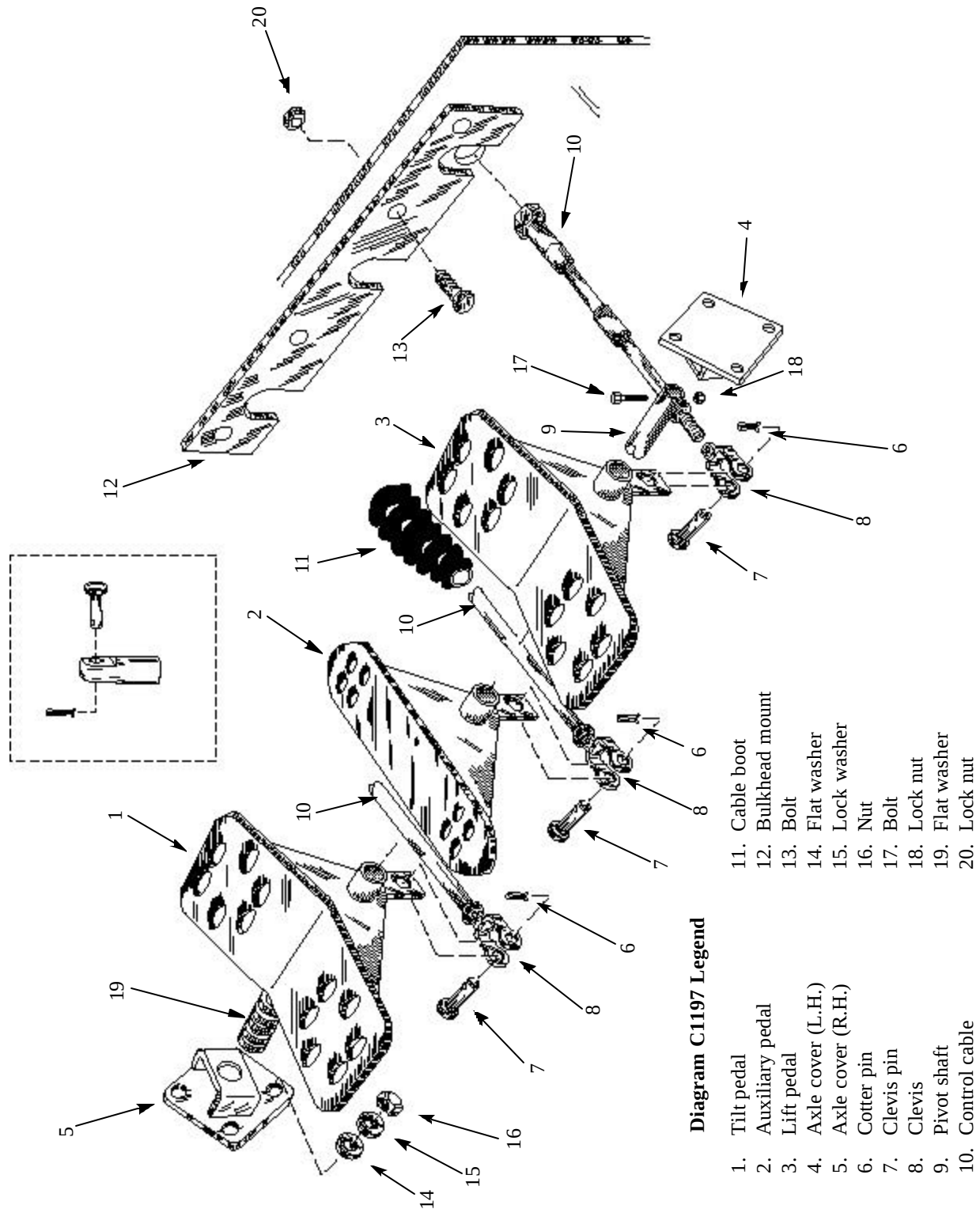
C3144

- | | |
|---------------------------|----------------------------|
| 1. Shaft, Pedal | 12. Cross Shaft Assy |
| 2. Bolt | 13. Flange Bearing |
| 3. Pedal, Lift | 14. Washer, Lock |
| 4. Pedal, Tilt | 15. Bolt |
| 5. Bolt | 16. Shim, Cable Series 40 |
| 6. Lock Nut | 17. Clamp, Cable Series 40 |
| 7. Rod End | 18. Screw, Cap |
| 8. Nut | 19. Cable, Push 49.5" |
| 9. Bar, Front Control Rod | 20. Cable, Push 53" |
| 10. Carriage Bolt | 21. Rod End Assy |
| 11. LH Activator Assy | |

FOOT PEDALS 4.2

1300/135

C1197



FOOT PEDALS 4.2

Cable Replacement 137/153

Check cable ends, eyelets or rod ends, and mounting pins for wear before removing the cable. Replace worn parts when replacing new cables. Cable ends should be inspected every 150 hours of operation.

1 Raise the boom arms, engage the boom supports and shut off the engine.



WARNING

Never work under the boom arms without the boom supports engaged.

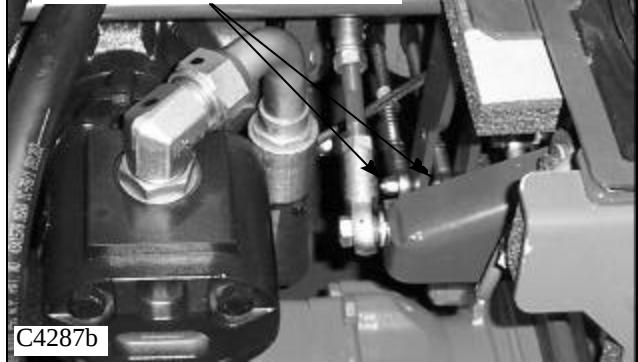
- 4**
- 2 Remove the seat and hydrostatic shield.
 - 3 Remove the bolts connecting the cable to the cross shaft Assy. (fig. C4287b)
 - 4 Remove the screws retaining the cable clamp to the frame. (fig. C4289)
 - 5 Remove the screws retaining the cable clamps to the valve mount (fig.C4290)
 - 6 Remove the cotter pins from the valve end of the cables and remove the clevis pins. (fig. C4290)
 - 7 Remove the cable.
 - 8 Remove the clevis and eyelet ends of the cable and reuse them if still serviceable.
 - 9 Install the new cable in the reverse order above. There must be a minimum of 3/8'' (6mm) of thread engagement into the cable clevis and eyelet ends.

Note: After installation of a new cable, the foot pedal angle will need to be verified and adjusted if necessary. Refer to page 4-14 ~4-15.

Remove seat and Hydrostatic shield



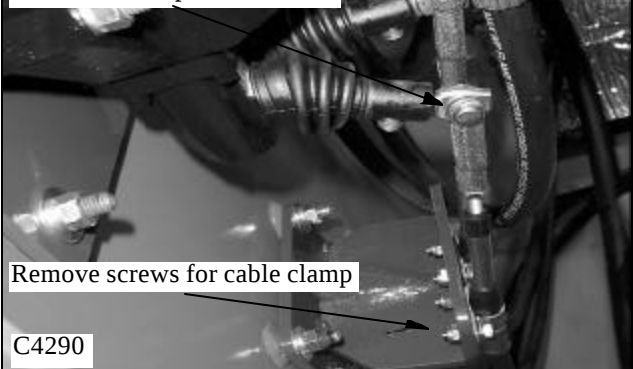
Remove bolts on cross shaft assy.



Remove screws for cable clamp



Remove cotter pins and clevis



FOOT PEDALS 4.2

Cable Replacement 1300/135

Check cable ends, eyelets or rod ends, and mounting pins for wear before removing the cable. Replace worn parts when replacing new cables. Cable ends should be inspected every 150 hours of operation.

1 Raise the boom arms, engage the boom supports and shut off the engine.

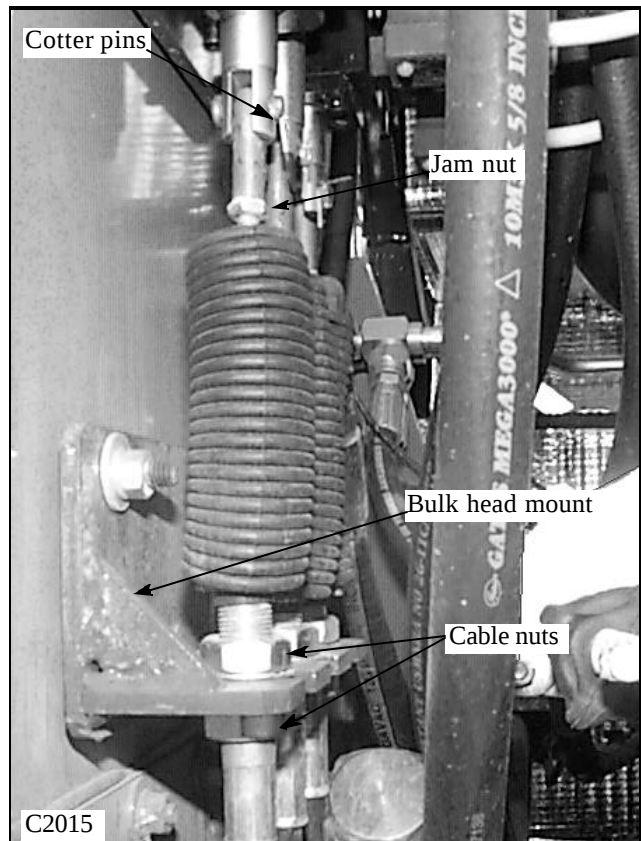
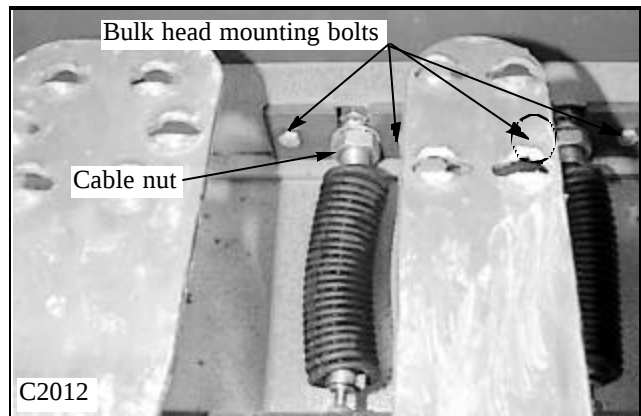
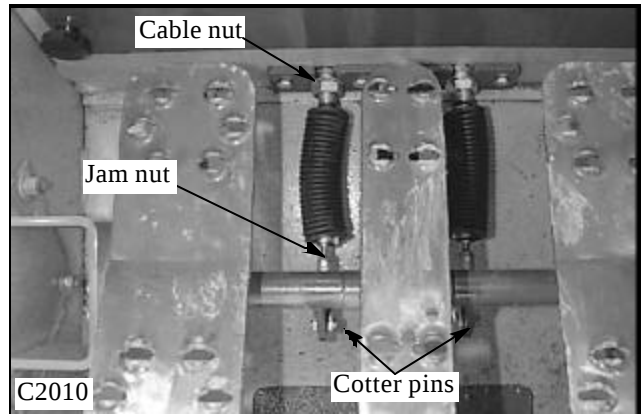


WARNING

Never work under the boom arms without the boom supports engaged.

- 2 Remove the seat and hydrostatic shield.
- 3 Loosen the jam nuts on the cable clevis ends. (fig. C2010, C2015)
- 4 Loosen the cable nuts. (fig. C2012, C2015)
- 5 Remove the bolts retaining the bulk head mount to the frame plate. (fig. C2012)
- 6 Remove the cotter pins from both ends of the cables and remove the clevis pins. (fig. C2010, C2015)
- 7 Remove the cable.
- 8 Remove the clevis and eyelet ends of the cable and reuse them if still serviceable.
- 9 Install the new cable in the reverse order above. There must be a minimum of 3/8" (6mm) of thread engagement into the cable clevis and eyelet ends.

Note: After installation of a new cable, the foot pedal angle will need to be verified and adjusted if necessary. Refer to page 4-14 ~ 4-15.



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FOOT PEDALS 4.2

Angle Adjustment 137/153

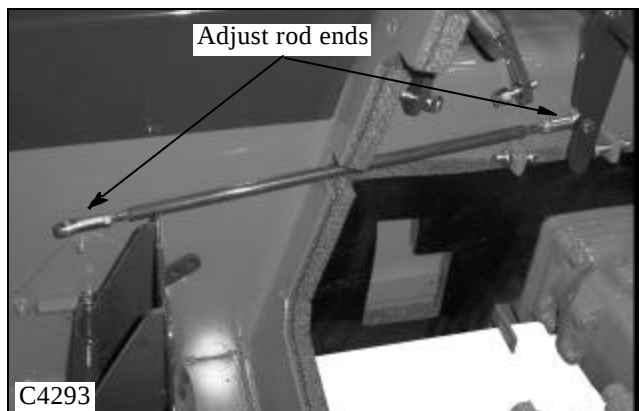
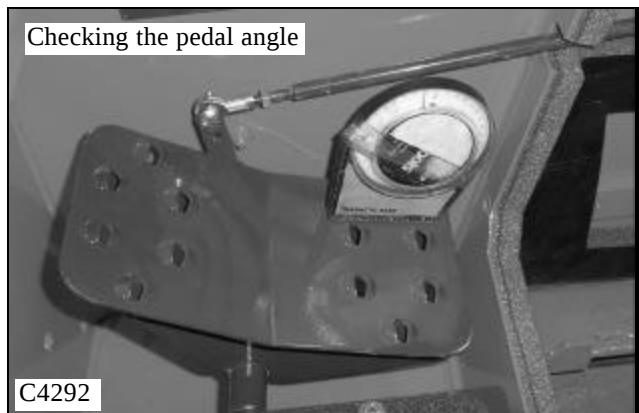
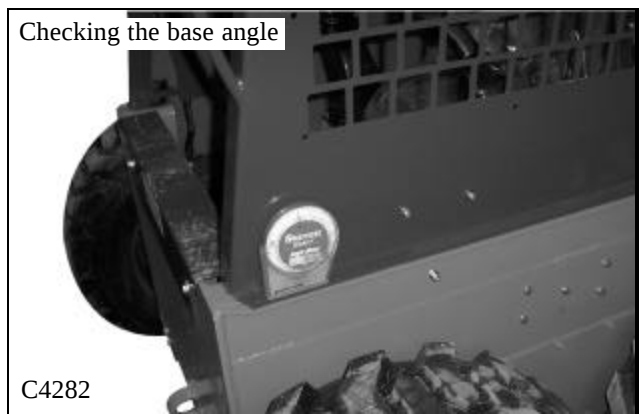
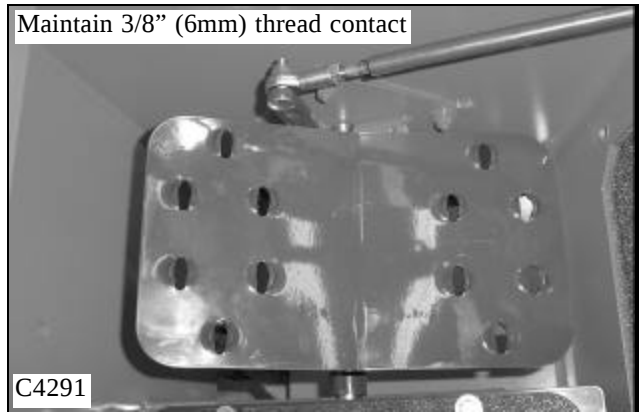
After changing the control cable the foot pedal angle will need to be verified and / or adjusted to provide operator comfort and proper pedal travel clearance.

Note: If the operator feels discomfort due to current pedal angles, they may be adjusted to their preference. Be sure to check for pedal travel clearance afterward. Always maintain a minimum of 3/8" (6mm) of thread into the eyelet ends. (fig. C4291)

- 1 Make sure the eyelet ends are screwed into the front control rod threads a minimum of 3/8" (6mm). (fig. C617)
- 2 Place an angle finder on the inner fender of the loader to find the base measurement. Note the reading. (fig. C4282)

- 3 Place the angle finder on the heel of the pedal to be checked or adjusted. (fig. C4292) Note the reading.

- 4 Adjust the pedal angles by turning the rod ends on either side of the front control rod (fig. C4293). Adjust the lift and tilt pedal angle to 15°. Be sure to allow for the base angle measurement taken previously. Example: If the base angle measured 3°, add or subtract that angle from the angle measured on the pedal.
- 5 Check the operation by cycling the pedals. Operation should be smooth and the pedal should have unrestricted travel when heeled and toed. If binding is occurring the control valve spools or electric lock system may need servicing.



FOOT PEDALS 4.2

Angle Adjustment 1300/135

After changing the control cable the foot pedal angle will need to be verified and / or adjusted to provide operator comfort and proper pedal travel clearance.

Note: If the operator feels discomfort due to current pedal angles, they may be adjusted to their preference. Be sure to check for pedal travel clearance afterward. Always maintain a minimum of 3/8" (6mm) of thread into the cable clevis and eyelet cable ends. (fig. C617)

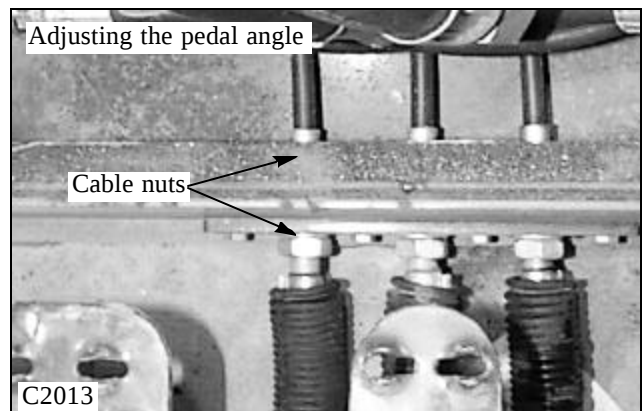
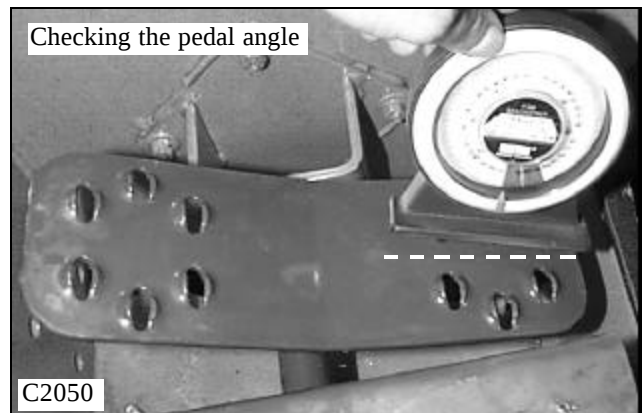
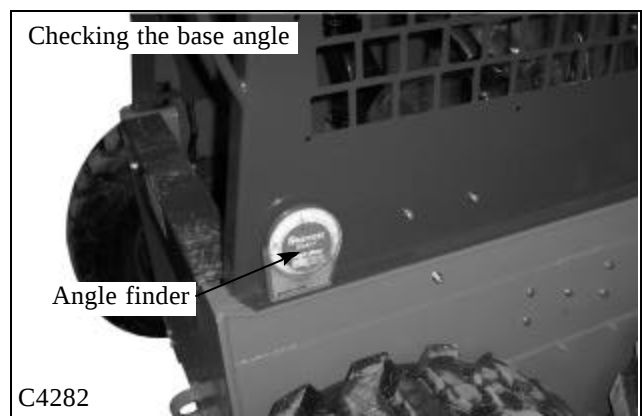
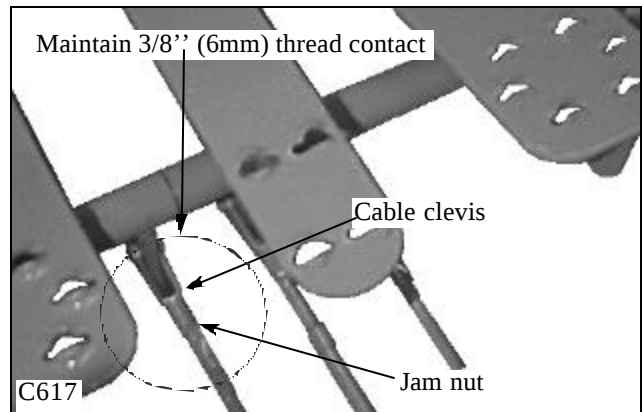
1 Make sure the cable ends are screwed onto the cable threads a minimum of 3/8" (6mm). (fig. C617)

2 Place an angle finder on the inner fender of the loader to find the base measurement. Note the reading. (fig. C4282)

3 Place the angle finder on the heel of the pedal to be checked or adjusted. (fig. C2050) Note the reading.

4 Adjust the pedal angles by turning the cable nuts on either side of the bulk heads, front and / or rear. Adjust the lift and tilt pedal angle to 15°. The auxiliary pedal angle is factory set at 20°. Be sure to allow for the base angle measurement taken previously. Example: If the base angle measured 3°, add or subtract that angle from the angle measured on the pedal.

5 Tighten the cable nuts against the bulk heads, front and rear. tighten the jam nuts on the cable ends if not already done. Check the control cable operation by cycling the pedals. Operation should be smooth and the pedal should have unrestricted travel when heeled and toed. If binding is occurring the control valve spools or electric lock system may need servicing.



4

FOOT PEDALS 4.2

Foot Pedal Replacement 137/153

If the foot pedals or shaft need replacement due to damage or wear:

1 Raise the boom arms, engage the boom supports and shut off the engine.



WARNING

Never work under the boom arms without the boom supports engaged.

2 Remove the seat and hydrostatic shield.

3 Remove the carriage head bolt retaining the front control rod to the foot pedal. (fig.C4291)

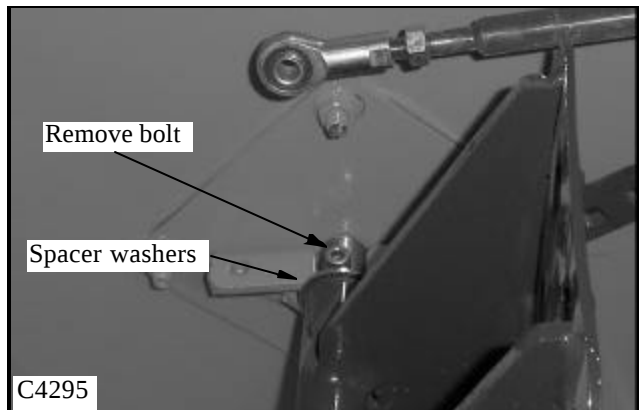
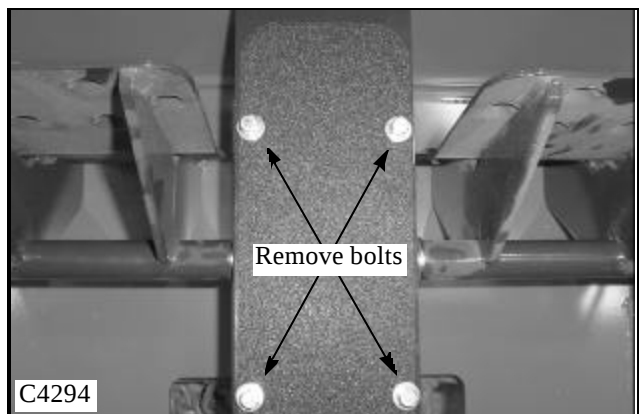
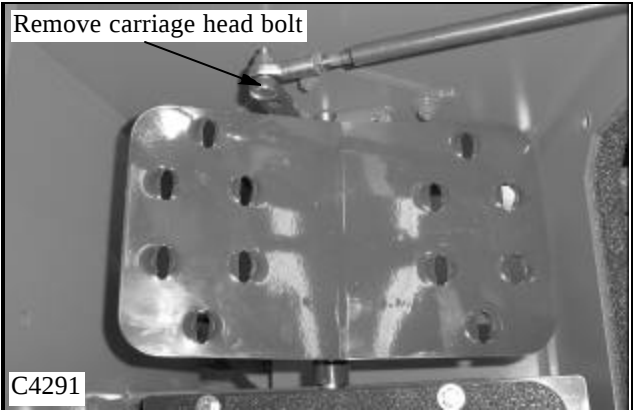
4 Remove the 4 bolts retaining the foot shield to the mount. (fig. C4294) Remove the shield.

5 Remove the bolt retaining the foot pedal shaft. (fig. C4295) Keep count of the spacer washer used if present. They are used to align the pedals with the linkage.

6 Save any spacer washer if present. Remove the complete pedal and shaft assembly together. (fig. 4296)

7 Replace worn parts as required. The foot pedals are equipped with bronze oillite bushings that are pressed into place and machined to size afterward. They are not serviceable separately. The complete pedal must be replaced.

8 Reinstall pedals in the reverse order. Be sure to add spacer washers as required to either end of the foot pedal shaft to align the pedals with the linkages. Failure to align the pedal and linkages properly will cause stiffness, binding and / or premature wear. Total pedal movement side to side, end play, should not exceed 1 / 8".



FOOT PEDALS 4.2

Foot Pedal Replacement 1300/135

If the foot pedals or shaft need replacement due to damage or wear:

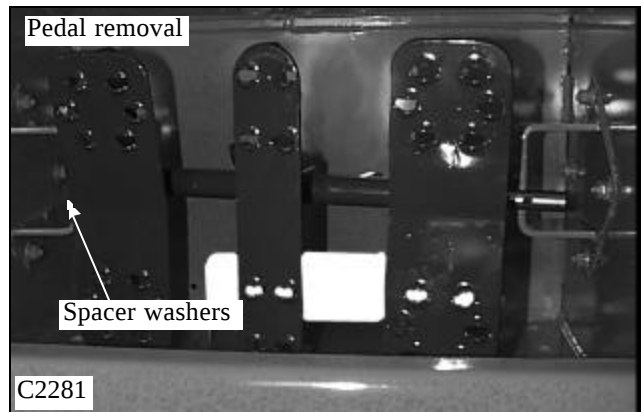
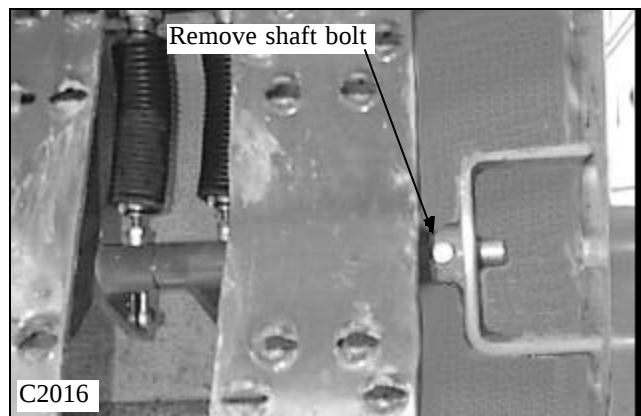
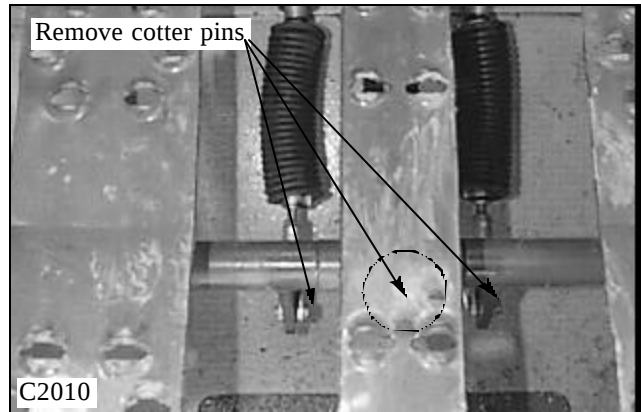
- 1 Raise the boom arms, engage the boom supports and shut off the engine.



WARNING

Never work under the boom arms without the boom supports engaged.

- 2 Remove the seat and hydrostatic shield.
- 3 Remove the cable clevis cotter pins. (fig. C2010)
- 4 Remove the bolt retaining the foot pedal shaft to the side mount. (fig. C2016)
- 5 Slide the shaft clear over to right hand side and remove and save any spacer washer if present.
- 6 Tip the loose end of the shaft up and remove the complete pedal and shaft assembly together. Keep count of the spacer washer used if present. They are used to align the pedals with the cables.
- 7 Replace worn parts as required. The foot pedals are equipped with bronze oillite bushings that are pressed into place and machined to size afterward. They are not serviceable separately. The complete pedal must be replaced.
- 8 Reinstall pedals in the reverse order. Be sure to add spacer washers as required to either end of the foot pedal shaft to align the pedals with the cables. Failure to align the pedal and cables properly will cause stiffness, binding and / or premature cable wear. Total pedal movement side to side, end play, should not exceed 1 / 8".

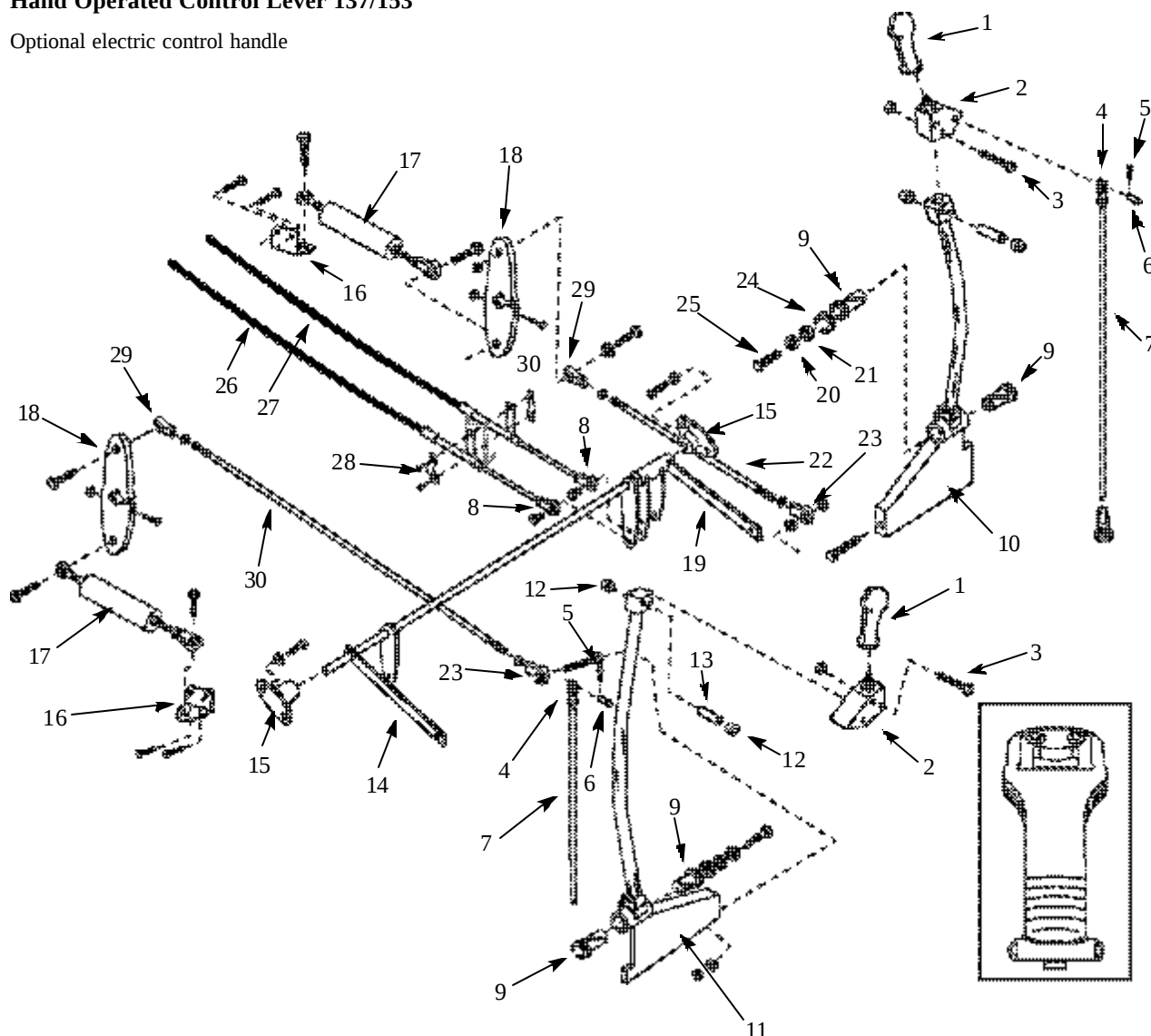


4

HAND CONTROLS 4.3

Hand Operated Control Lever 137/153

Optional electric control handle



- | | | |
|------------------------|----------------------------|--------------------------|
| 1. Handle grip | 15. Flange Bearing | 29. Rod End Assy, Female |
| 2. Lever Handle Base | 16. Hydroback mount | 30. RH Pintle Linkage |
| 3. Bolt | 17. Hydroback | |
| 4. Clevis | 18. Pintle Lever Plate | |
| 5. Cotter Pin | 19. LH Activator Assy | |
| 6. Clevis Pin | 20. Lock Washer | |
| 7. Handle Transfer Bar | 21. Flat Washer | |
| 8. Rod End Assy | 22. LH Pintle Linkage | |
| 9. Flange Bushing | 23. Rod End Assy, Female | |
| 10. LH Control Lever | 24. Fender Washer | |
| 11. RH Control Lever | 25. Bolt | |
| 12. Brass Bushing | 26. Cable, Push-Pull 49.5" | |
| 13. Handle Spacer Tube | 27. Cable, Push-Pull 53" | |
| 14. Cross Shaft Assy | 28. Cable Clamp | |

C3134

Skid Steer Loader HSL600T/680T Service Manual

FOREWORD

☐ **SECTION 1**

HYDRAULIC SYSTEM

☐ **SECTION 2**

HYDROSTATIC DRIVE SYSTEM

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FINAL DRIVE

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CONTROLS

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ELECTRICAL

☐ **SECTION 6**

MAIN FRAME

☐ **SECTION 7**

ENGINE

☐ **SECTION 8**

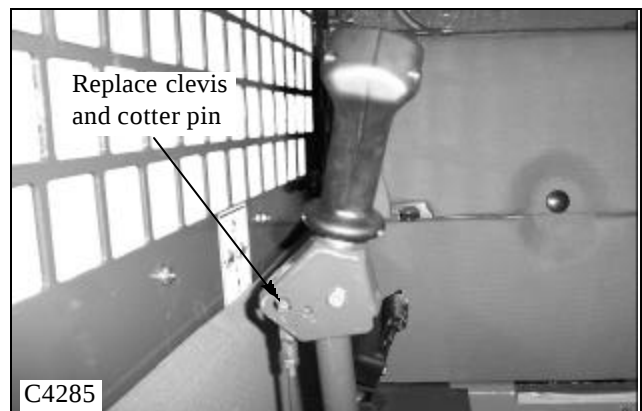
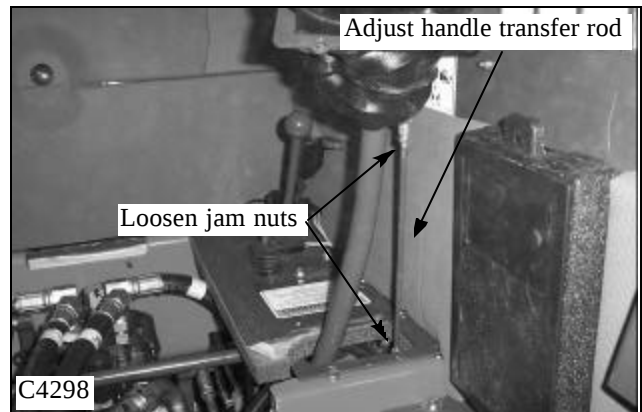
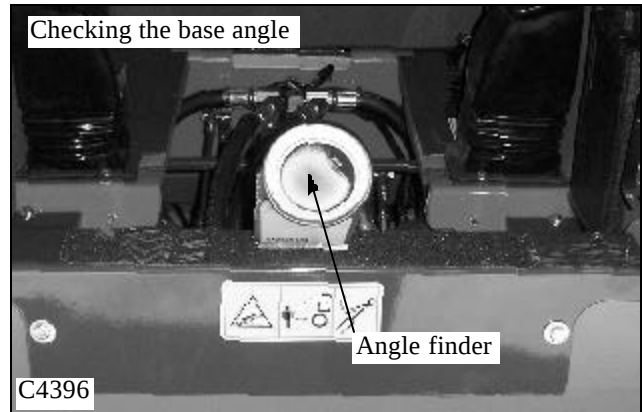
MAINTENANCE & SPECIFICATIONS

HAND CONTROLS 4.3

Angle Adjustment

After changing the control cable the control lever angle will need to be verified and / or adjusted to provide operator comfort and proper travel clearance.

- 1 Make sure the rod ends are screwed onto the rod threads a minimum of 3/8" (6mm).
- 2 Place an angle finder on the front shield of the loader to find the base measurement. Note the reading. (fig. C4396)
- 3 Place the angle finder on the control lever as shown in (fig. C4297). Note the reading. The correct angle is $8^{\circ} + / - 1^{\circ}$.
- 4 Adjust the angle by moving the handle transfer rod ends up or down on their mount. (fig. C4298) Be sure to allow for the base angle, the angle the loader may be leaning at while measuring. Add or subtract this measurement as necessary. Remove the cotter and clevis pin from the lever handle base. Loosen the jam nuts for the rod end on the handle transfer rod. Adjust the angle as required.
- 5 Tighten all jam nuts on the handle transfer ends. (fig. C4298, C4285) Reconnect clevis and cotter pins to the handle base.
- 6 Cycle the control levers to check for travel clearance.
- 7 Replace the seat and hydrostatic shields.



4

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