

CHAPTER 15 WINCH MAINTENANCE

This chapter contains maintenance instructions for disassembly and repair of winch components at the Direct

15-1. INTRODUCTION

Support maintenance level. Some subassemblies and parts must be removed before winch components can be accessed. They are referenced to other paragraphs of this manual or TM 9-2320-280-20.

15-2. WINCH MAINTENANCE TASK SUMMARY

TASK PARA.	PROCEDURES	PAGE NO.
15-3.	6,000 Lb. Winch Repair	15-2
15-4.	9,000 Lb. Winch Repair	15-16

15 - 3. 6,000 LB. WINCH REPAIR

This task covers:

- | | |
|--|---|
| <p>a. Disassembly</p> <p>b. Cleaning</p> | <p>c. Inspection</p> <p>d. Assembly</p> |
|--|---|

INITIAL SETUP:

Applicable Models

M 1026, M 1026A1, M 1036, M 1038, M 1038A1, M1042, M1044, M1044AI, M1046, M1046A1

Materials/Parts

Coating compound (Appendix B, Item 11)
 Aircraft grease (Appendix B, Item 20)
 Bushing grease (Appendix B, Item 22)
 Anaerobic pipe sealant (Appendix B, Item 49)

Tools

General mechanic's tool kit:
 automotive (Appendix G, Item 1)

Manual References

TM 9-2320-280-20
 TM 9-2320-280-24P

Special Tools

Hex head driver, 5/32 in. (Appendix G, Item 117)

Equipment Condition

Winch removed (TM 9-2320-280-20).

Materials/Parts

O-ring seal (Appendix E, Item 102)
 Three gaskets (Appendix E, Item 20)
 Lockwasher (Appendix E, Item 81)
 Six locknuts (Appendix E, Item 48)

Maintenance Level

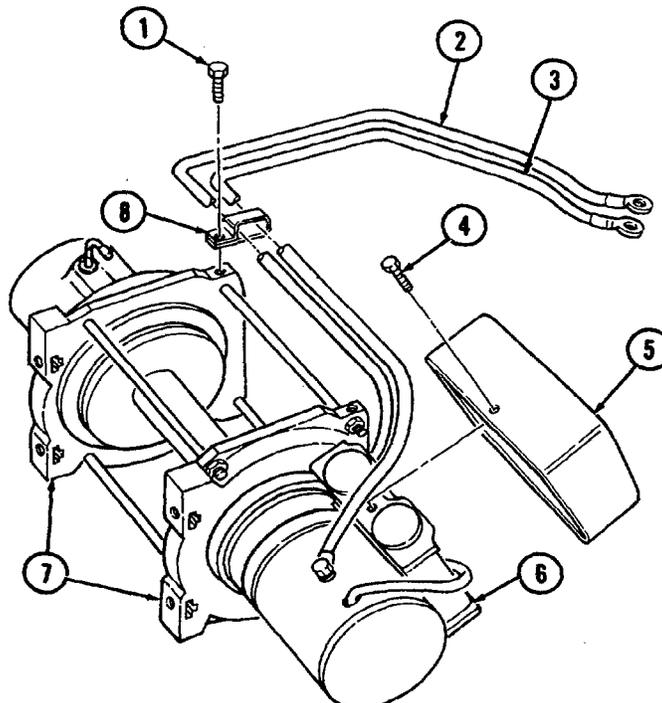
Direct support

a. Disassembly I

NOTE

Tag leads for assembly.

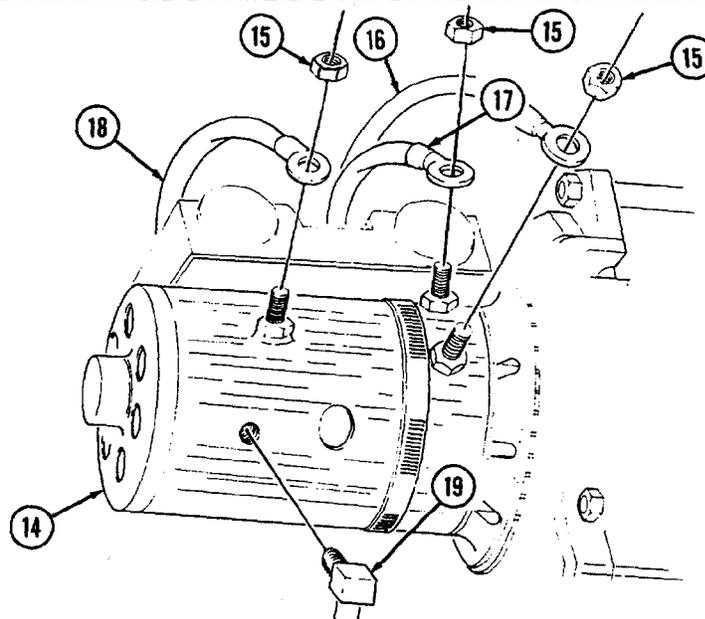
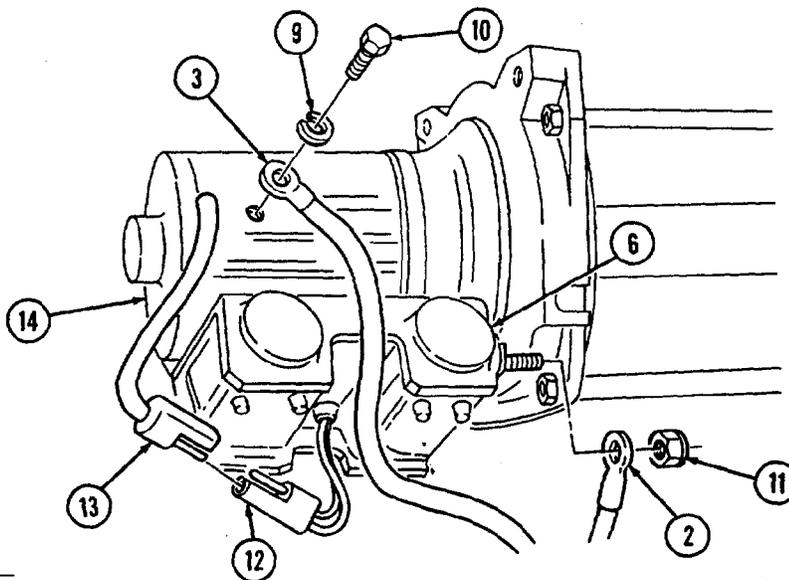
1. Remove two screws (1) clamps (8) and leads 6C (2) and 7C (3) from drum supports (7).
2. Remove three screws (4) and cover (5) from control (6).



NOTE

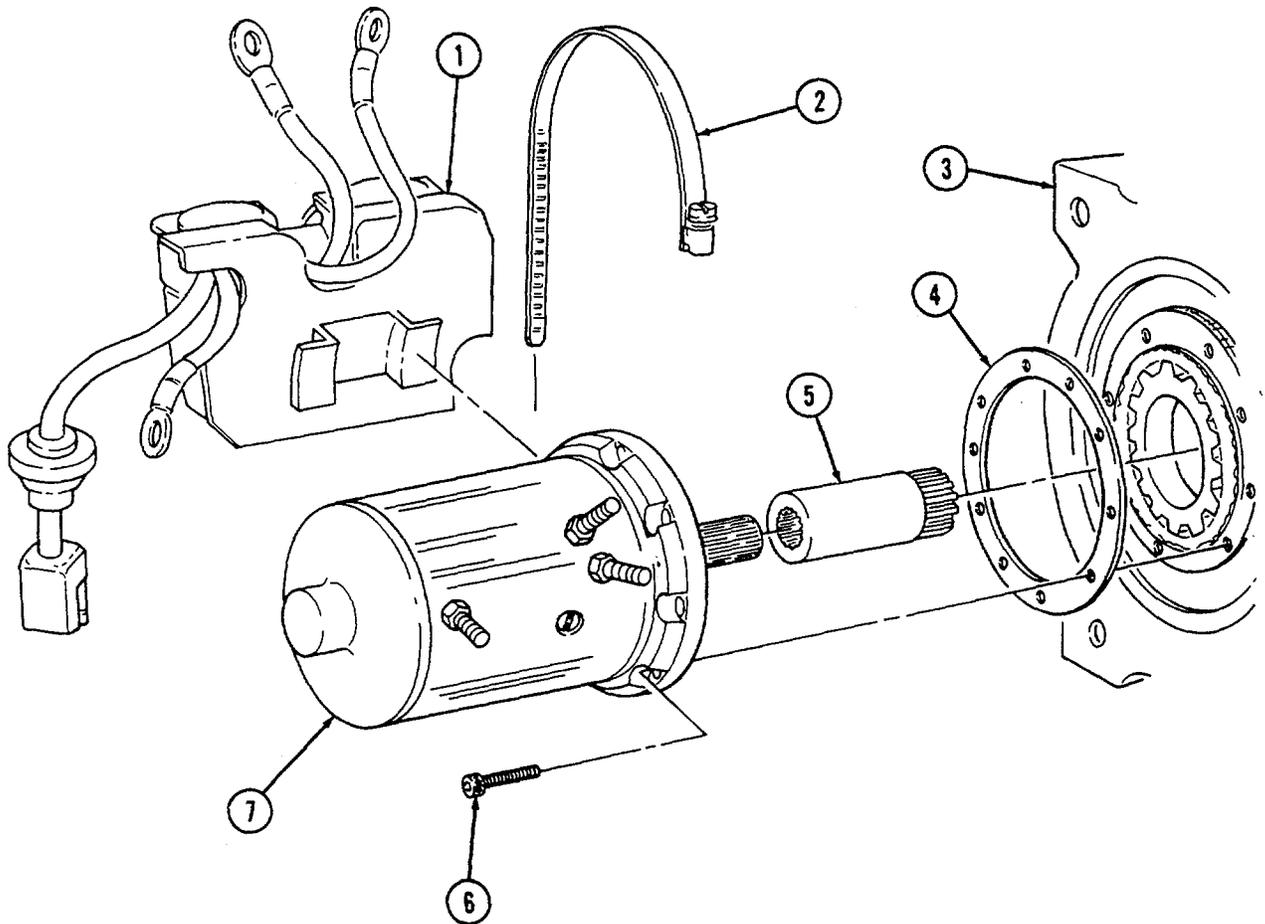
In order to perform steps 3 through 11, it may be necessary to remove plastic coating from winch.

3. Remove nut (11) and lead 6C (2) from control (6).
4. Remove capscrew (10), lockwasher (9), and lead 7C (3) from motor (14). Discard lockwasher (9).
5. Disconnect motor connector (13) from control connector (12).
6. Remove three nuts (15) and control leads (16), (17), and (18) from motor (14).
7. Remove vent tube fitting (19) from motor (14).



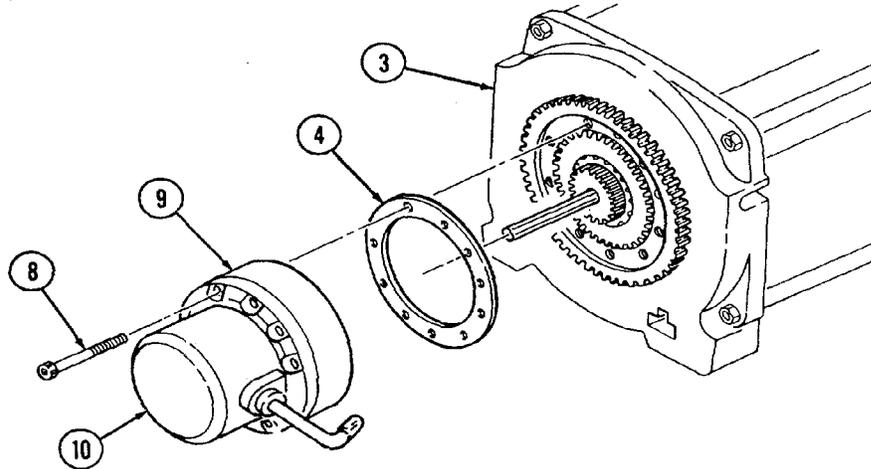
15 - 3 . 6,000 LB. WINCH REPAIR

8. Loosen clamp (2) and remove control (1) from motor (7).
9. Remove clamp (2) from motor (7).
10. Mark drum support (3) and motor (7) for assembly.
11. Remove ten socket head screws (6), motor (7), gasket (4), and coupling (5) from drum support (3). Discard gasket (4).

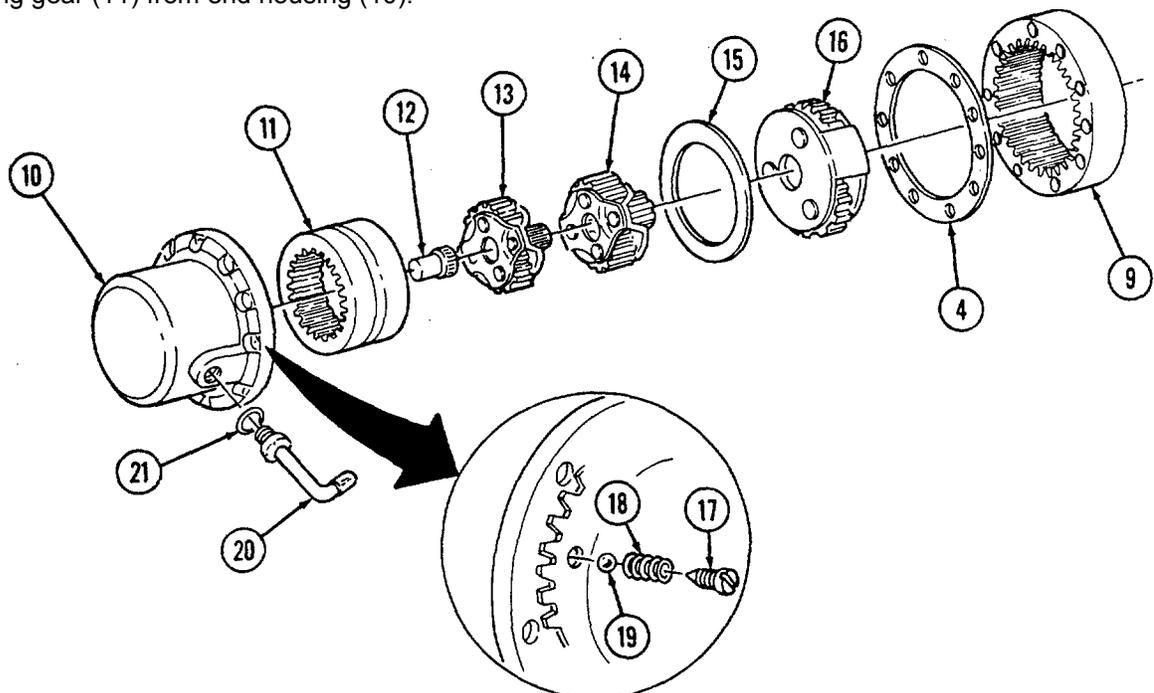


15 - 3 . 6,000 LB. WINCH REPAIR

12. Mark drum support (3), ring gear (9), and end housing (10) for assembly.
13. Remove ten socket head screws (8), end housing (10), ring gear (9), and gasket (4) from drum support (3). Discard gasket (4).



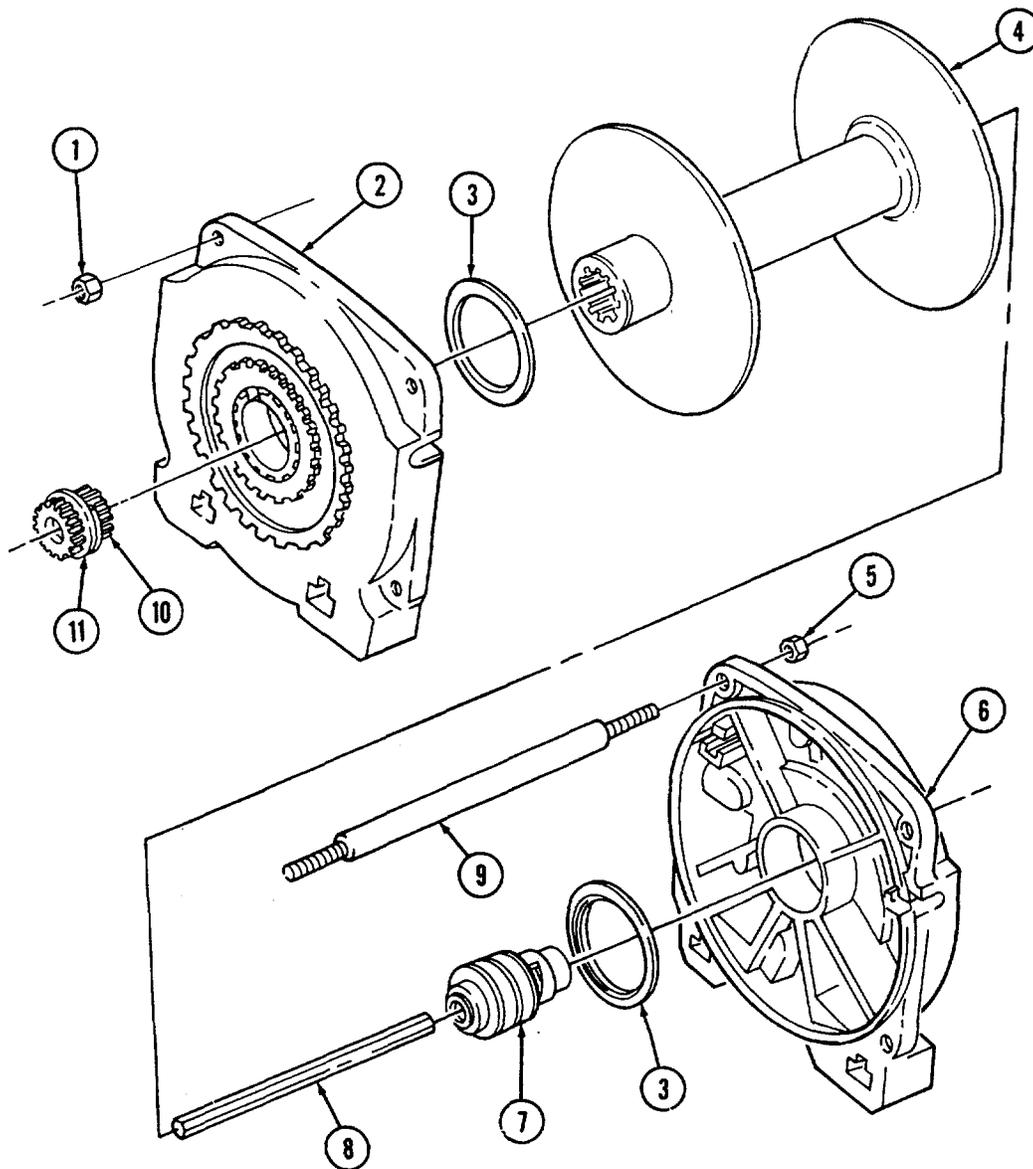
14. Remove ring gear (9) and gasket (4) from end housing (10). Discard gasket (4).
15. Remove stage three gear carrier (16) and thrust bushing (15) from end housing (10).
16. Remove set screw (17), spring (18), and ball (19) from end housing (10).
17. Remove clutch lever (20) and O-ring seal (21) from end housing (10). Discard O-ring seal (21).
18. Remove stage two gear carrier (14), stage one gear carrier (13), stage one sun gear (12), and clutch ring gear (11) from end housing (10).



15-5

15 - 3 . 6,000 LB. WINCH REPAIR

19. Remove splined drive (10) and retaining ring (11) from drive shaft (8). Remove retaining ring (11) from splined drive (10).
20. Remove three locknuts (1) and drum support (2) from tie rods (9). Remove thrust bushing (3) from drum (4). Discard locknuts (1).
21. Remove drum (4) and thrust bushing (3) from drum support (6).
22. Push drive shaft (8) and brake assembly (7) out of drum (4).
23. Remove three locknuts (5) and tie rods (9) from drum support (6). Discard locknuts.



b. Cleaning

CAUTION

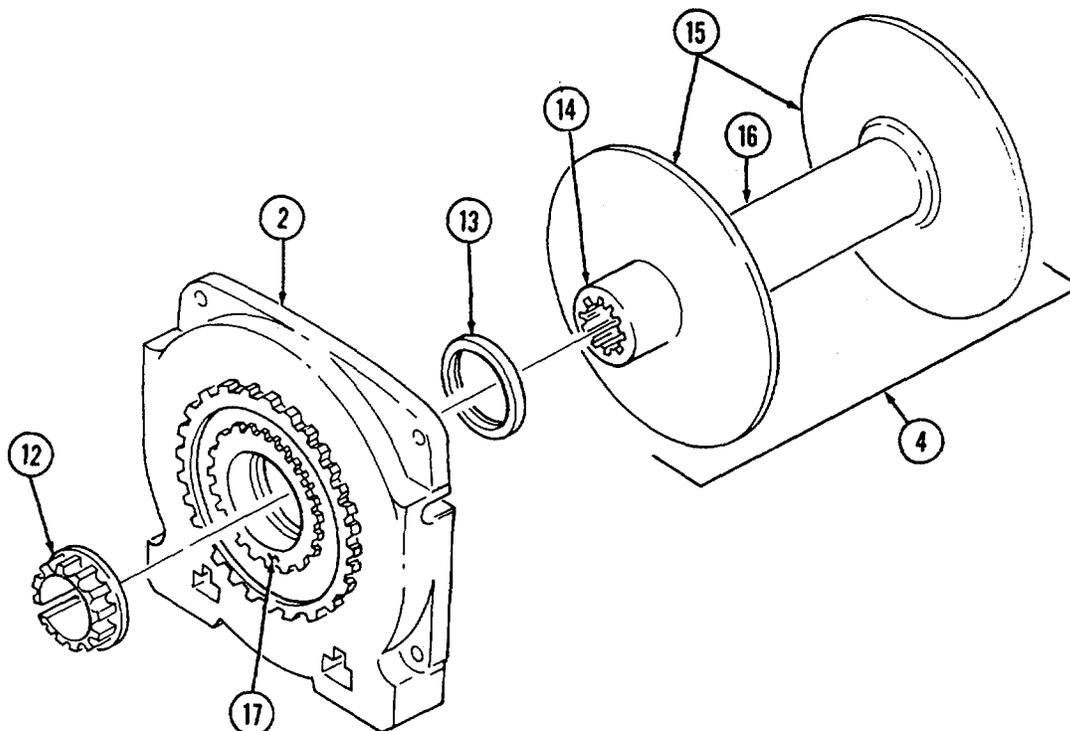
Do not clean brake assembly or damage to equipment may result.
Clean all winch components except brake assembly (7) in accordance with para. 2-13.

d. Inspection

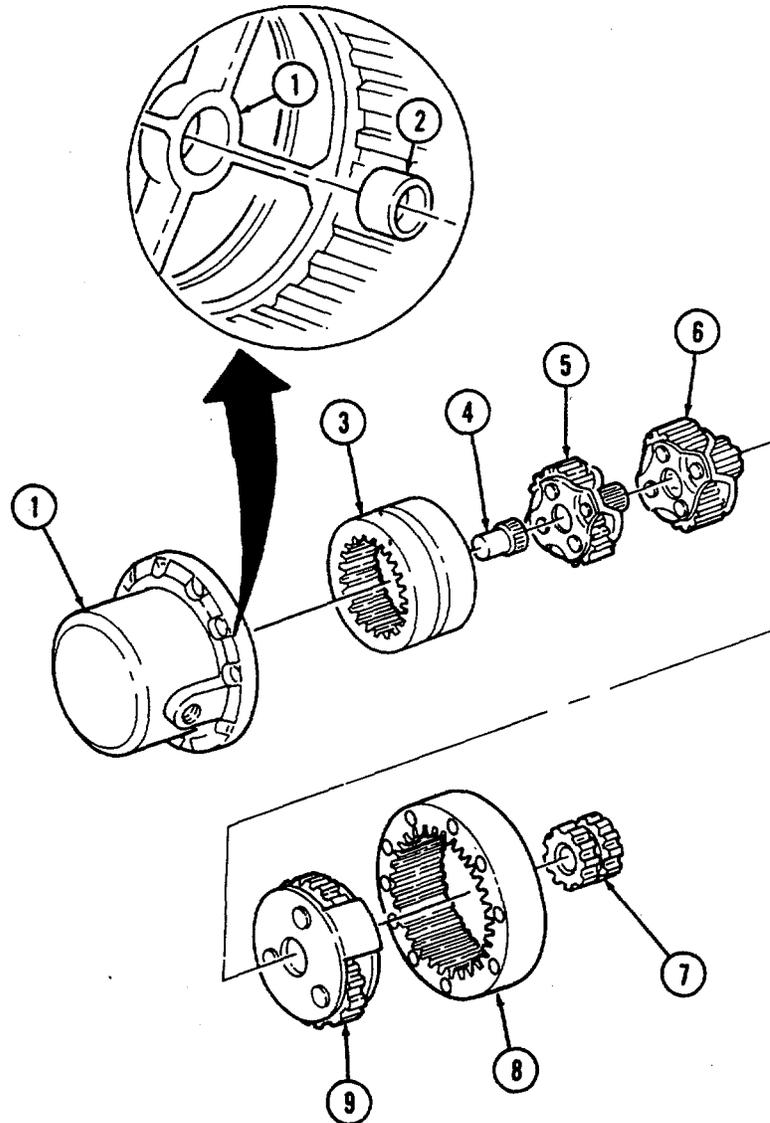
NOTE

For general inspection instructions, refer to para. 2-14.

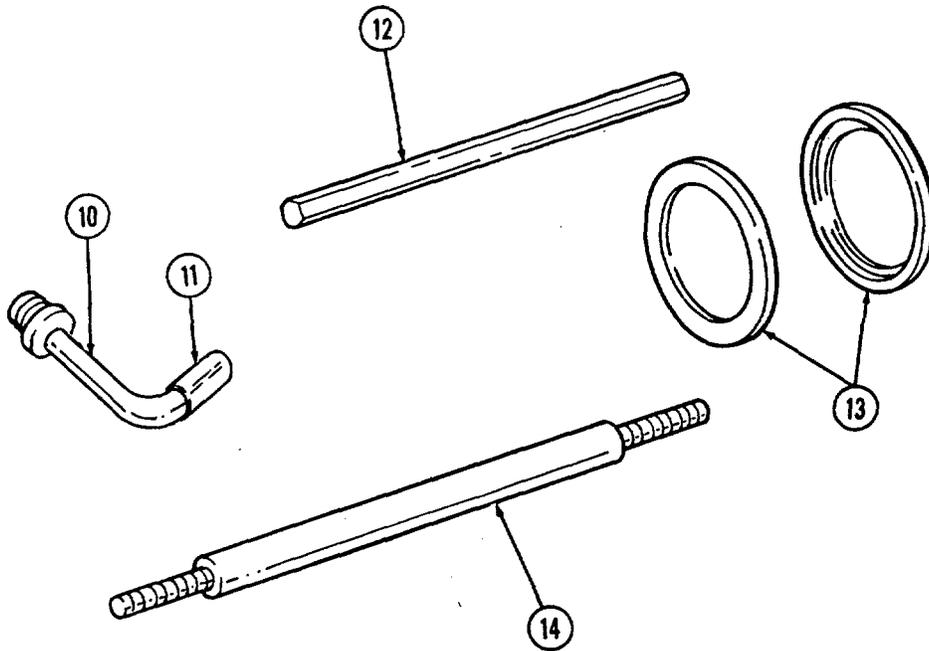
1. Inspect drum (4) for damage to splined end (14), flanges (15), and tube (16). Replace winch if damaged.
2. Inspect drum supports (2) for damage. Replace winch if damaged.
3. Remove bushing (12) from drum support (2).
4. Inspect oil seal (13) for damage. Perform steps 5 through 7 if seal (13) is damaged, if not, go to step 8.
5. Remove seal (13) from drum support (2).
6. Inspect sealing surface (17) of drum support (2) for damage. Replace winch if damaged.
7. Install seal (13) into drum support (2).
8. Inspect bushing (12) for damage. Replace if damaged. Install bushing (12) in drum support (2).
9. Repeat steps 3 through 8 for other drum support.



10. Inspect end housing (1) for damage. Replace if damaged.
11. Inspect end housing bushing (2) for damage or wear. Replace if damaged or worn. If bushing (2) is to be reused, lubricate with bushing grease.
12. Inspect gear teeth, splines, and machined surfaces of clutch ring gear (3), stage one sun gear (4), stage one gear carrier (5), stage two gear carrier (6), stage three gear carrier (9), ring gear (8), and splined drive (7) for damage. Replace any damaged parts.



13. Inspect drive shaft (12) for damage. Replace if damaged.
14. Inspect tie rods (14) for damage. Replace if damaged.
15. Inspect clutch lever (10) and plastic cap (11) for damage. Replace either if damaged.
16. Inspect thrust bushings (13) for damage. Replace if damaged.

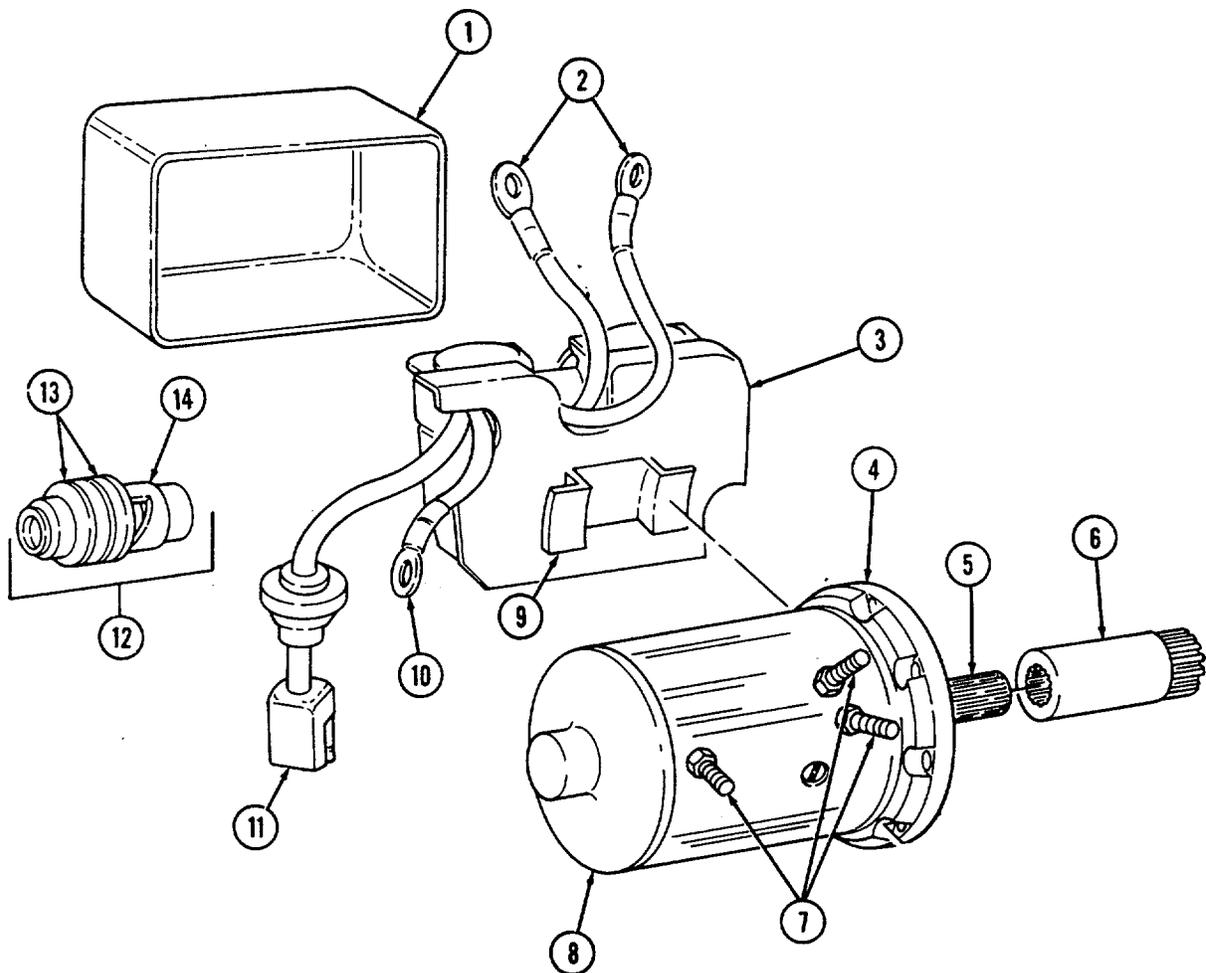


15-3. 6,000 LB. WINCH REPAIR

CAUTION

The gaps of both friction rings must be aligned or winch may malfunction causing damage to equipment.

17. Inspect friction rings (13) and drive cam (14) on brake assembly (12) for damage. Replace brake assembly (12) if damaged.
18. Inspect brake assembly (12) for other damage. Replace if damaged.
19. Inspect motor (8), splines (5), mating surface (4), and terminals (7) for damage. Replace motor (8) if damaged.
20. Inspect coupling (6) for damage. Replace if damaged.
21. Inspect cover (1) for damage. Replace if damaged.
22. Inspect control (3) for damaged leads (2), (10), and (11), breaks in plastic coating, and damaged mounting base (9). Replace control (3) if damaged or repair plastic coating.
23. Inspect all other items in accordance with para. 2-14.



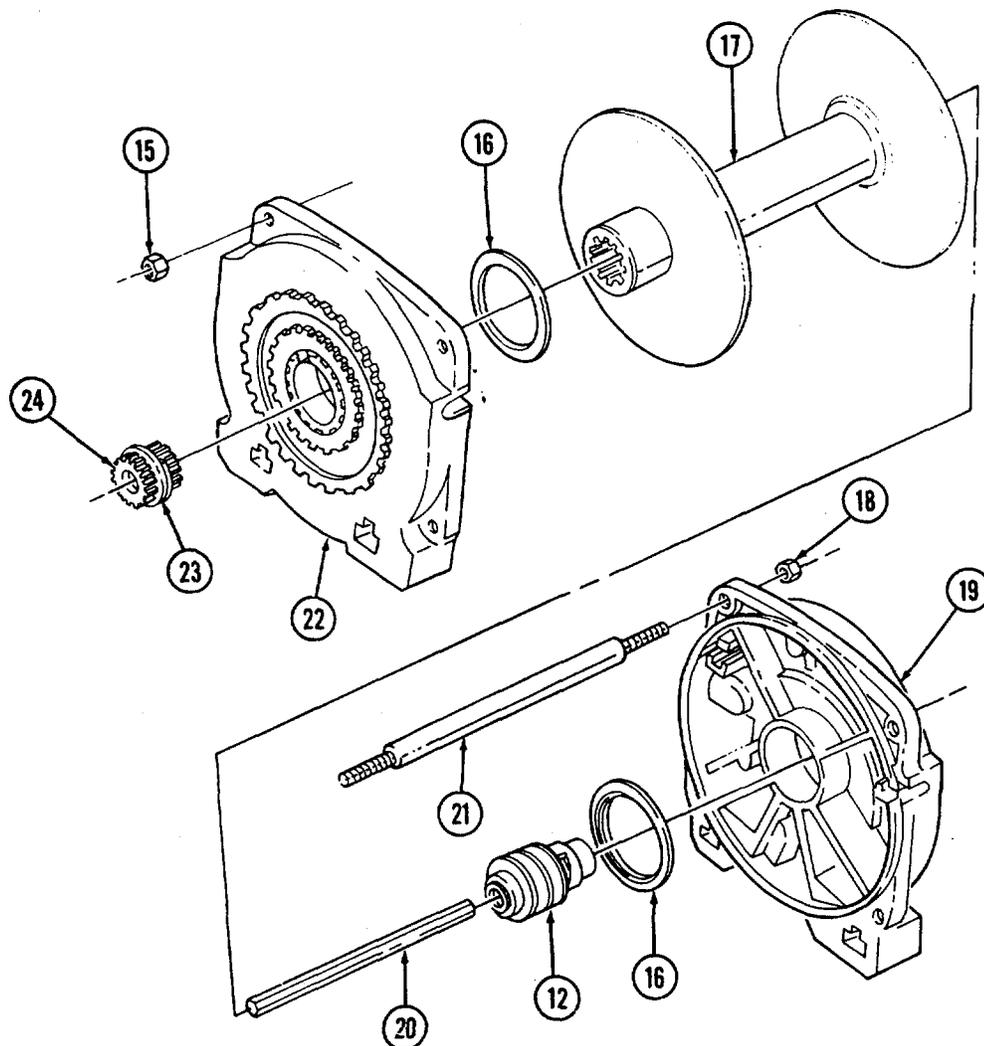
15-3. 6,000 LB. WINCH REPAIR

d. Assembly

NOTE

For general inspection instructions, refer to para. 2-16.

1. Install three tie rods (21) into drum support (19) with three locknuts (18).
2. Install drive shaft (20) in brake assembly (12) and apply aircraft grease to brake assembly (12).
3. While holding drive shaft (20), rotate brake assembly (12) to compress for installation, and install in drum (17).
4. Apply aircraft grease to thrust bushing (16) and install thrust bushing (16) and drum (17) on drum support (19).
5. Install retaining ring (23) on spline drive (24) and install both in drum (17).
6. Apply aircraft grease to thrust bushing (16). Install thrust bushing (16) and drum support (22) on drum (17) and tie rods (21) with three locknuts (15). Tighten locknuts (15) and (18) to 18 lb-ft (25 N.m).



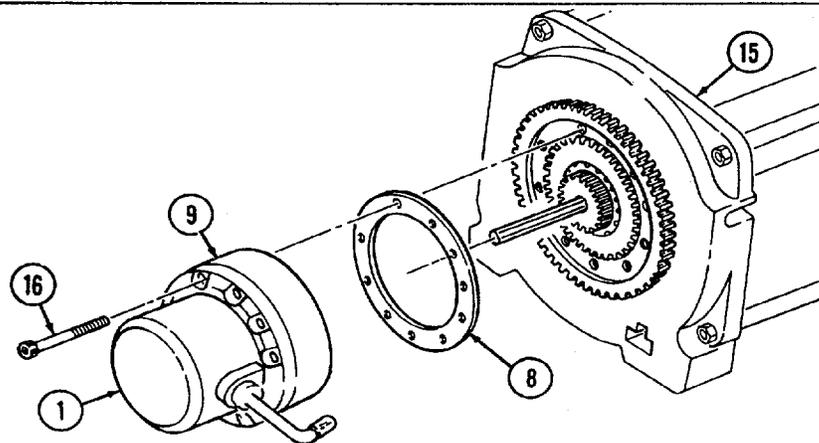
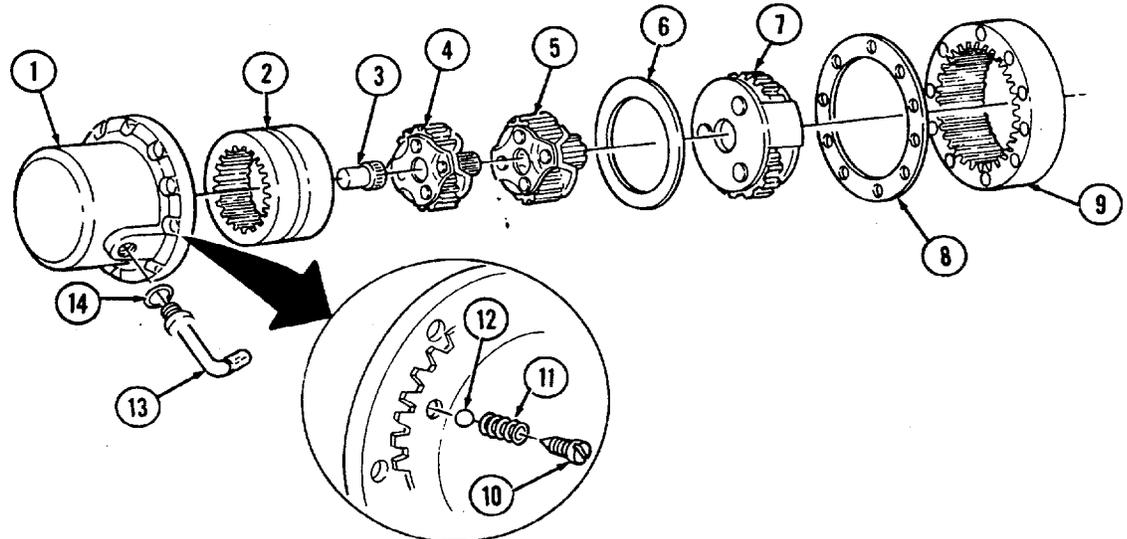
15-3. 6,000 LB. WINCH REPAIR

7. Install clutch ring gear (2) into end housing (1) with pointed ends of gear teeth facing in.
8. Install O-ring seal (14) on clutch lever (13) and apply aircraft grease to unpainted surface of clutch lever (13).
9. Align groove in clutch ring gear (2) with hole in end housing (1) and install clutch lever (13) in end housing (1).

CAUTION

Do not tighten set screw past flush with housing or damage to winch may result.

10. Install ball (12), spring (11), and set screw (10) in end housing (1).
11. Apply aircraft grease to stage one sun gear (3), stage one gear carrier (4), and stage two gear carrier (5) and install in end housing (1).
12. Apply aircraft grease to thrust bushing (6) and stage three gear carrier (7) and install in end housing (1).
13. Install gasket (8) and ring gear (9) on end housing (1).
14. Install end housing (1), ring gear (9), and gasket (8) on drum support (15), ensuring to align reference marks with ten socket head screws (16). Using a hex head driver, tighten screws (16) to 35 lb-in. (4 N.m).



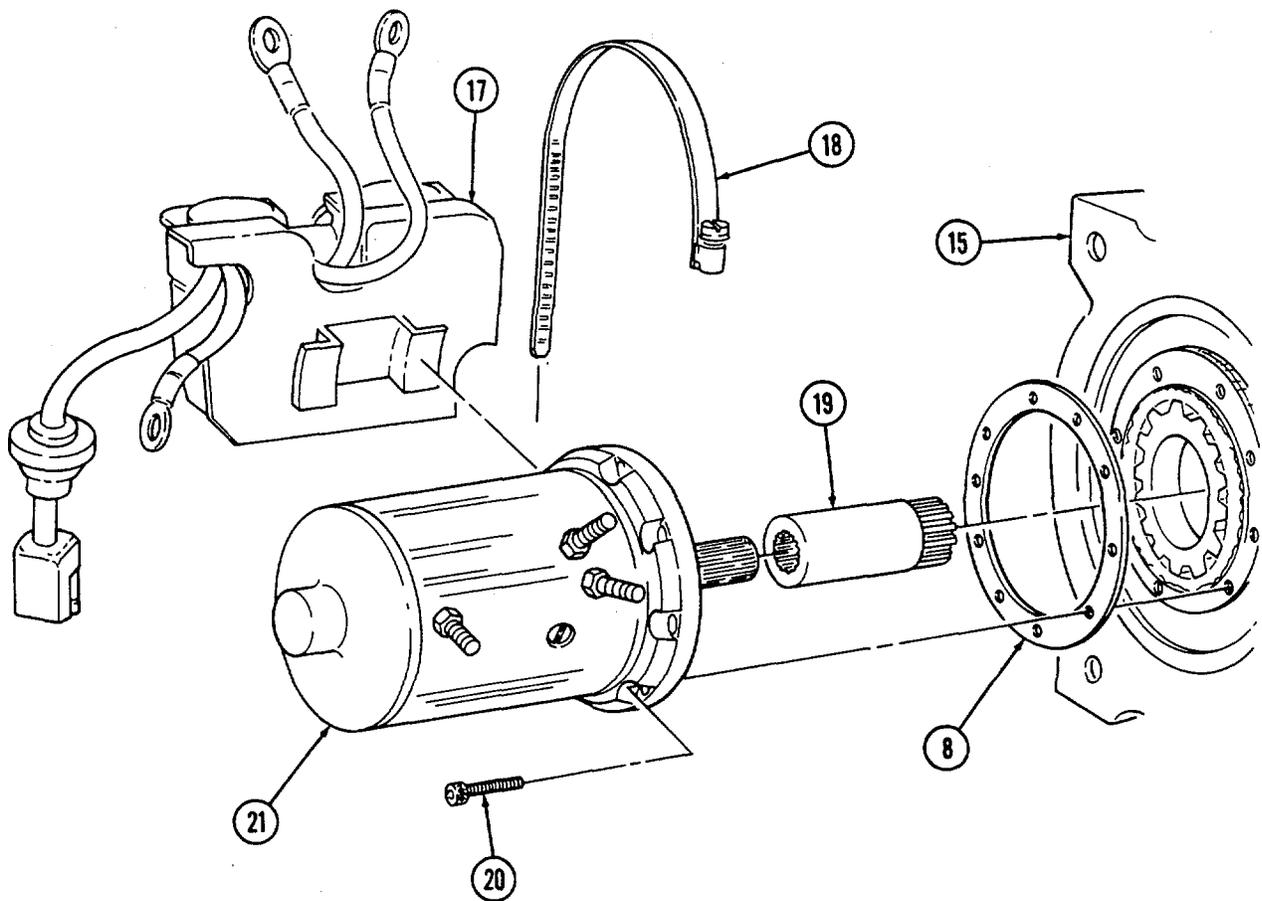
15-3. 6,000 LB. WINCH REPAIR

15. Assemble gasket (8) and coupling (19) on motor (21) and install on drum support (15), ensuring to align reference marks.
16. Install motor (21) on drum support (15) with ten socket head screws (20). Using hex head driver, tighten screws (20) to 35 lb-in. (4 N.m).

NOTE

If motor or control have been pre-coated with sealing compound, remove compound from between motor case and control mounting gear contact area. Failure to do so may cause improper grounding of control.

17. Install clamp (18) on motor (21).
18. Install control (17) on motor (21).



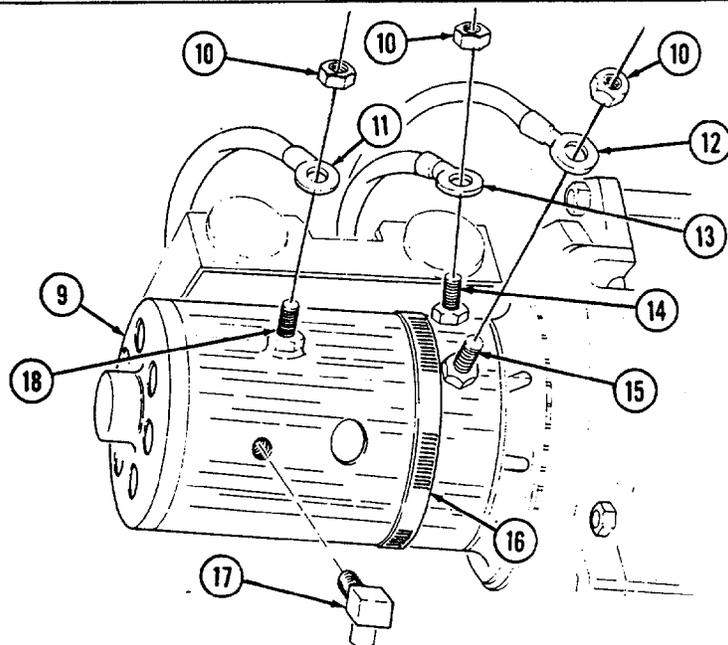
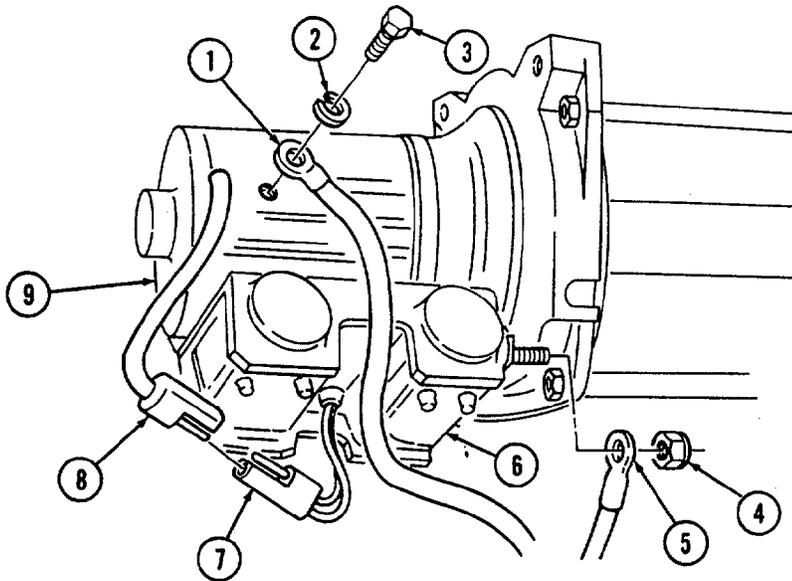
15-3. 6,000 LB. WINCH REPAIR

19. Connect leads (11), (12), and (13) to terminals (18), (15), and (14) with three nuts (10).
20. Apply pipe sealant to threads of vent tube fitting (17).
21. Install vent tube fitting (17) as shown.
22. Install control (6) on motor (9) with clamp (16).
23. Connect control connector (7) to motor connector (8).

NOTE

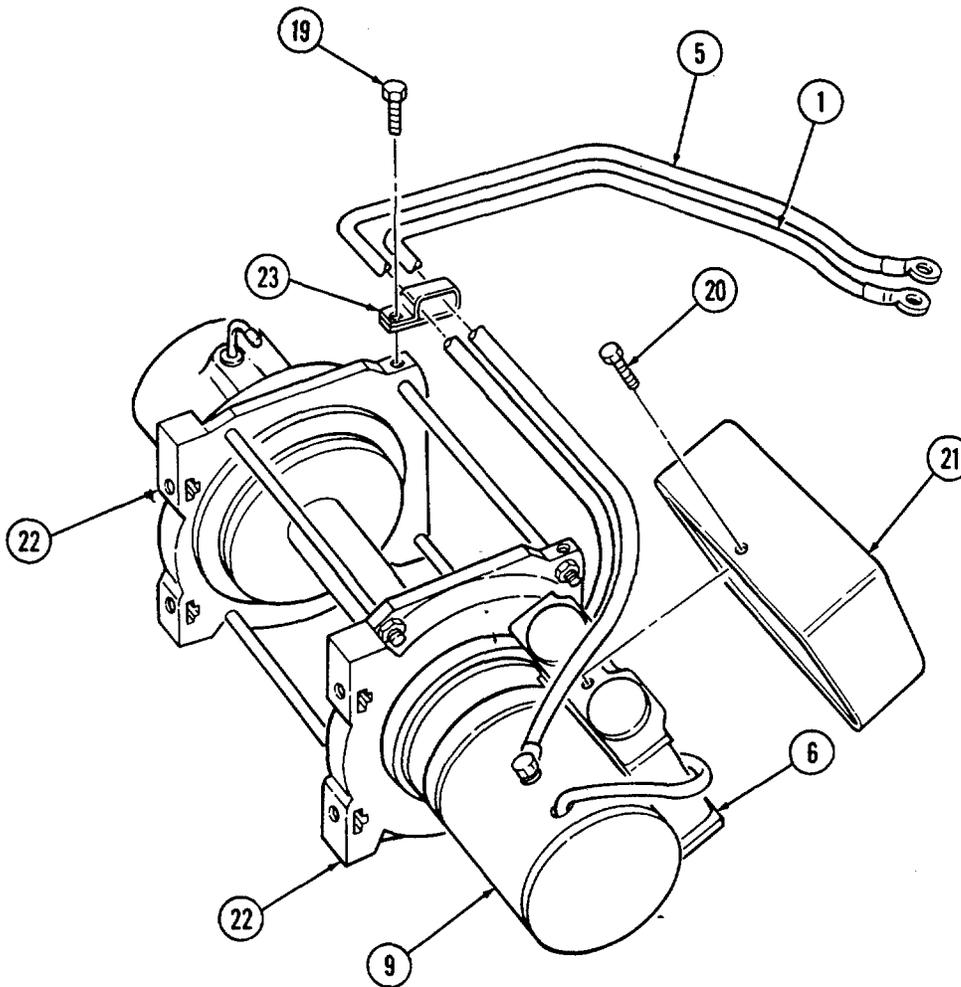
Lead 6C must be positioned to align with opening in cover.

24. Connect lead 6C (5) to control (6) with nut (4).
25. Connect lead 7C (1) to motor (9) with lockwasher (2) and capscrew (3).



15-3. 6,000 LB. WINCH REPAIR

26. Coat motor (9) end of winch up to drum support (22) with coating compound.
27. Install leads 6C (5) and 7C (1) on drum supports (22) with two clamps (23) and screw (19).
28. Install cover (21) on control (6) with three screws (20).



15-4. 9,000 LB. WINCH REPAIR

TM 9-2320-280-34

This task covers:

a. Disassembly

c. Inspection

b. Cleaning INITIAL SETUP:

d. Assembly

Applicable Models

M997A2, M 1025A2, M 1035A2, M 1043A2
M1045A2, M1097A2

Materials/Parts

Coating compound (Appendix B, Item 11)
Lubricating oil (Appendix B, Item 28)
Aircraft grease (Appendix B, Item 20)
Bushing grease (Appendix B, Item 22)
Anaerobic pipe sealant (Appendix B, Item 49)

Tools

General mechanic's tool kit:
automotive (Appendix G, Item 1)

Manual References

TM 9-2320-280-20
TM 9-2320-280-24P

Special Tools

Hex head driver, 5/32 in. (Appendix G, Item 117)

Equipment Condition

Winch removed (TM 9-2320-280-20).

Materials/Parts

O-ring seal (Appendix E, Item 102)
Gasket (Appendix E, Item 20)
Two gaskets (Appendix E, Item 21)

Maintenance Level

a.
Disassembly

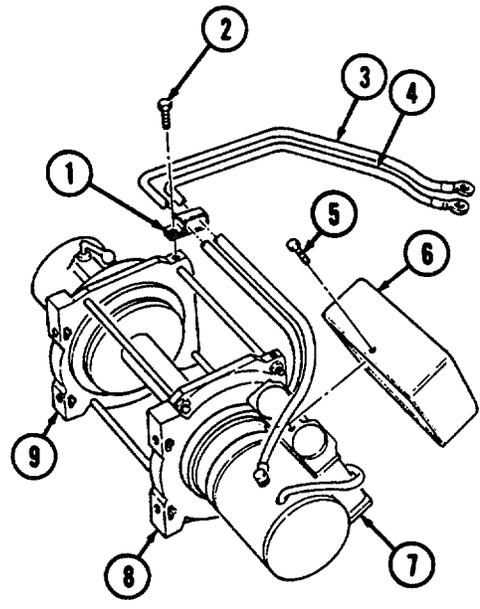
Lockwasher (Appendix E, Item 81)

Direct support

NOTE

Tag leads for assembly.

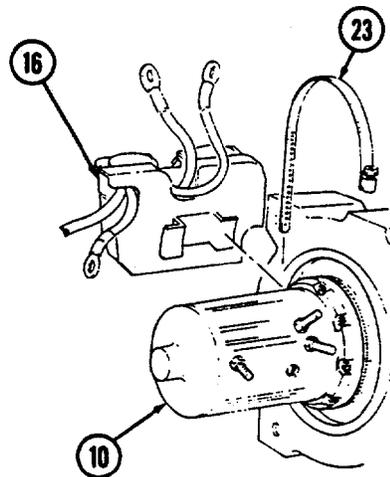
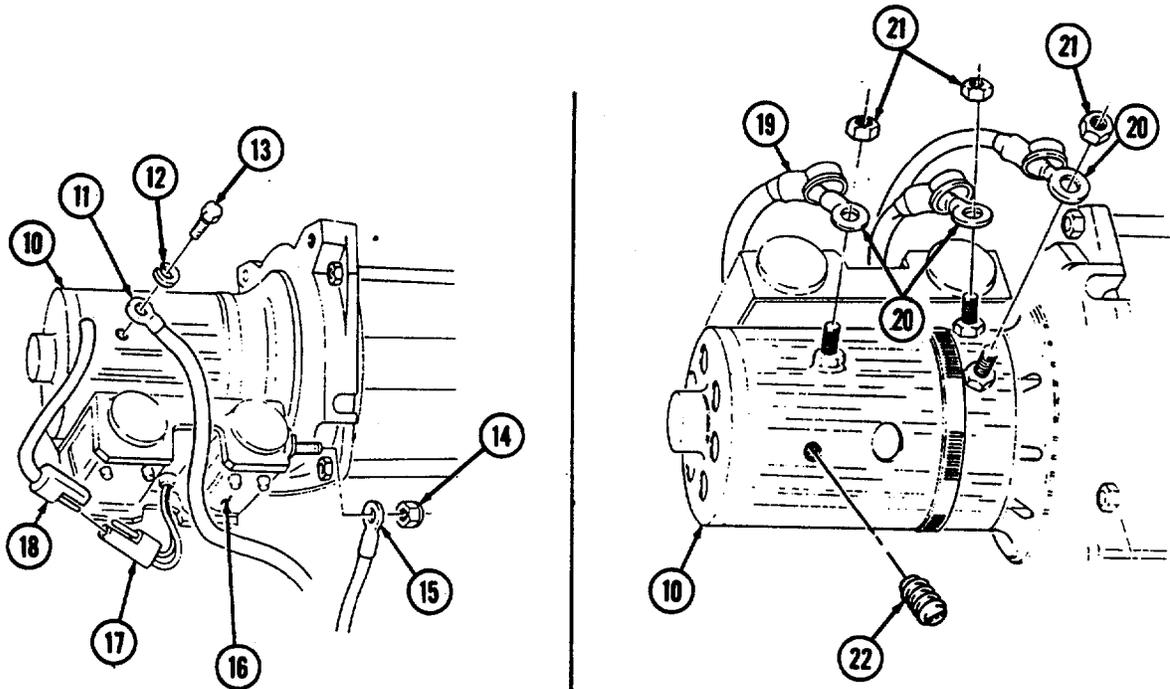
1. Remove two screws (2), clamps (1), and leads 6Sc (3) and 7C (4) from motor end drum support (8) and , gear end drum support (9).
2. Remove three screws (5) and motor control cover (6) from control (7).



NOTE

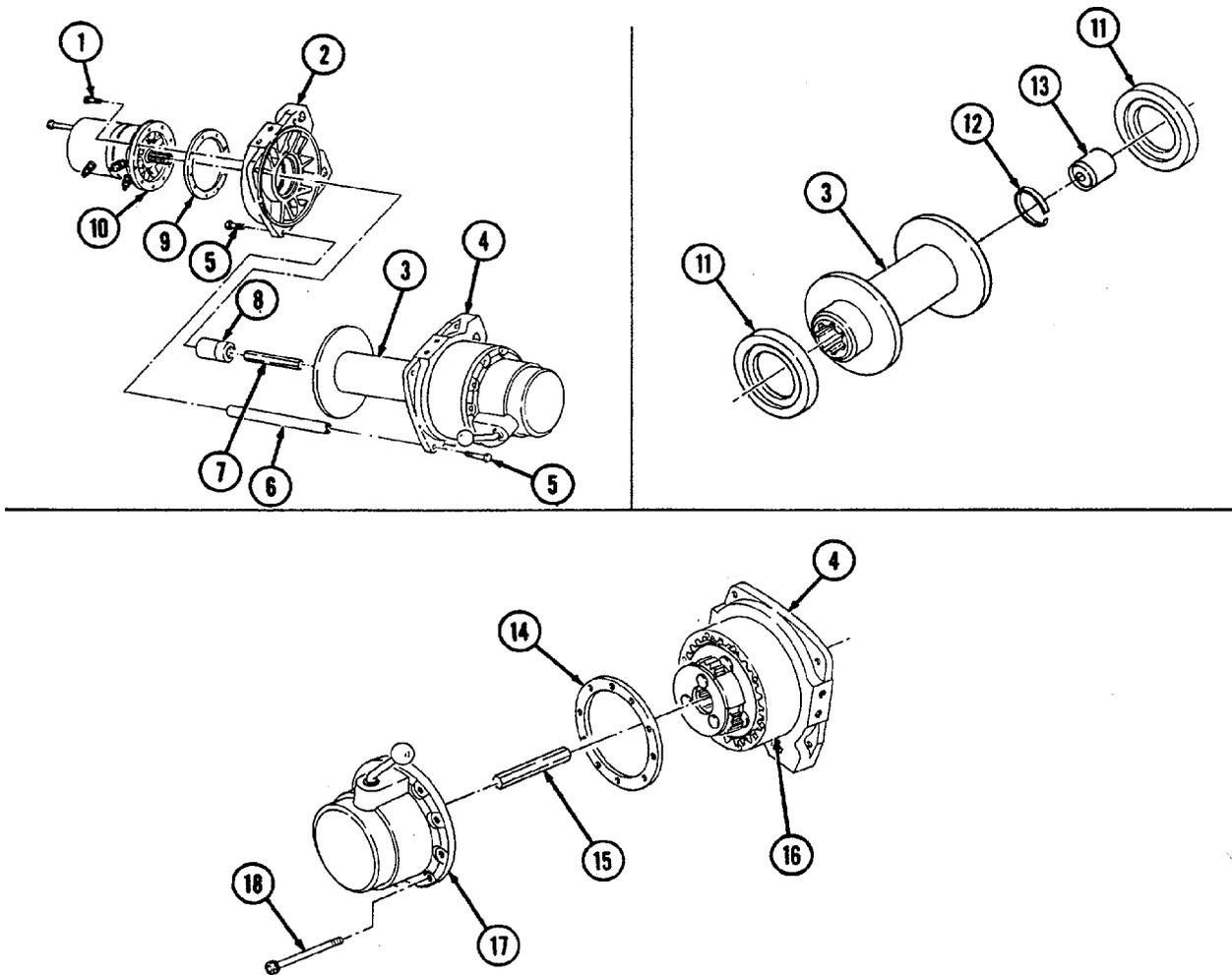
In order to perform steps 3 through 9, it may be necessary to remove plastic coating from winch.

3. Remove nut (14) and lead 6 (15) from control (16).
4. Remove capscrew (13), lockwasher (12), and lead 7 (11) from motor (10). Discard lockwasher (12).
5. Disconnect motor connector (18) from control connector (17).
6. Slide back three rubber boots (19) and remove nuts (21) and control leads (20) from motor (10).
7. Remove set screw (22) from motor (10).
8. Loosen two clamps (23) and remove control (16) from motor (10).
9. Remove clamps (23) from motor (10).



15-4. 9,000 LB. WINCH REPAIR

10. Mark motor end drum support (2) and gear end drum support (4) for assembly.
11. Remove six capscrews (5) and three tie rods (6) from motor end drum support (2) and gear end drum support (4).
12. Place winch on end with motor end up and remove ten hex head screws (1) and motor (10) from motor end drum support (2).
13. Remove gasket (9) and motor end drum support (2) from drum assembly (3). Discard gasket (8).
14. Remove motor shaft coupling (8) and input shaft (7) from drum assembly (3).
15. Remove drum assembly (3) from gear end drum support (4).
16. Remove two nylon thrust washers (11) from drum assembly (3).
17. Push brake (13) through open end of drum assembly (3) and remove thrust washer (12).
18. Remove drive shaft (15) from gear housing (17).
- 19 Turn gear housing (17) over with gear end drum support (4) down and remove ten hex head screws (18) and gear housing (17) from output ring gear (16). 20. Remove gasket (14) from output ring gear (16). Discard gasket (14).



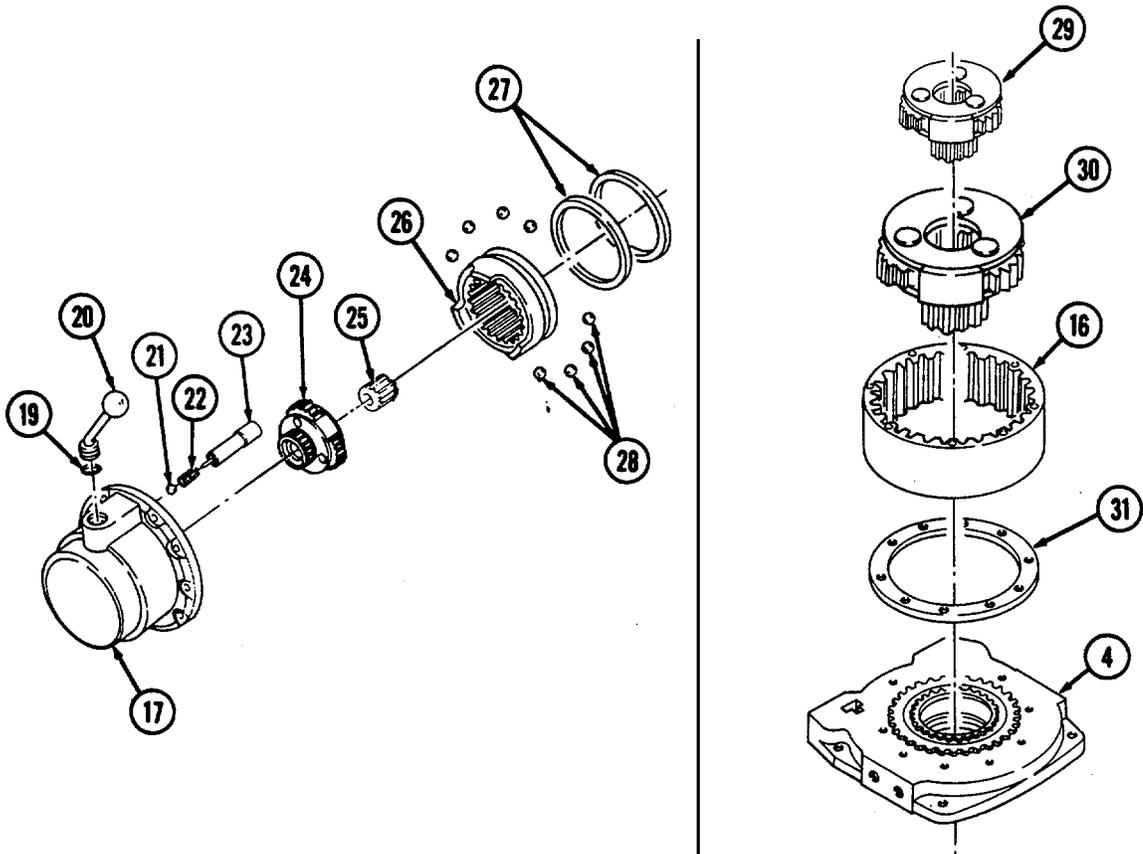
15-4. 9,000 LB. WINCH REPAIR

21. Remove detent spacer (23), spring (22), and detent ball (21) from gear housing (17).
22. Remove clutch lever (20) and O-ring seal (19) from gear housing (17). Discard O-ring seal (19).
23. Remove two retaining rings (27) from gear housing (17).

NOTE

Intermediate ring gear will come out with 85-87 steel balls. Be careful to catch all 85-87 steel balls.

24. Remove intermediate ring gear (26) and 85-87 steel balls (28) from gear housing (17).
25. Remove input sun gear (25) and input gear carrier (24) from gear housing (17).
26. Remove intermediate gear carrier (29), output gear carrier (30), and output ring gear (16) from gear end drum support (4).
27. Remove gasket (31) from gear end drum support (4). Discard gasket (31).



b. Cleaning

CAUTION

Do not clean brake assembly or damage to equipment may result. Clean all winch components in accordance with para. 2-13.

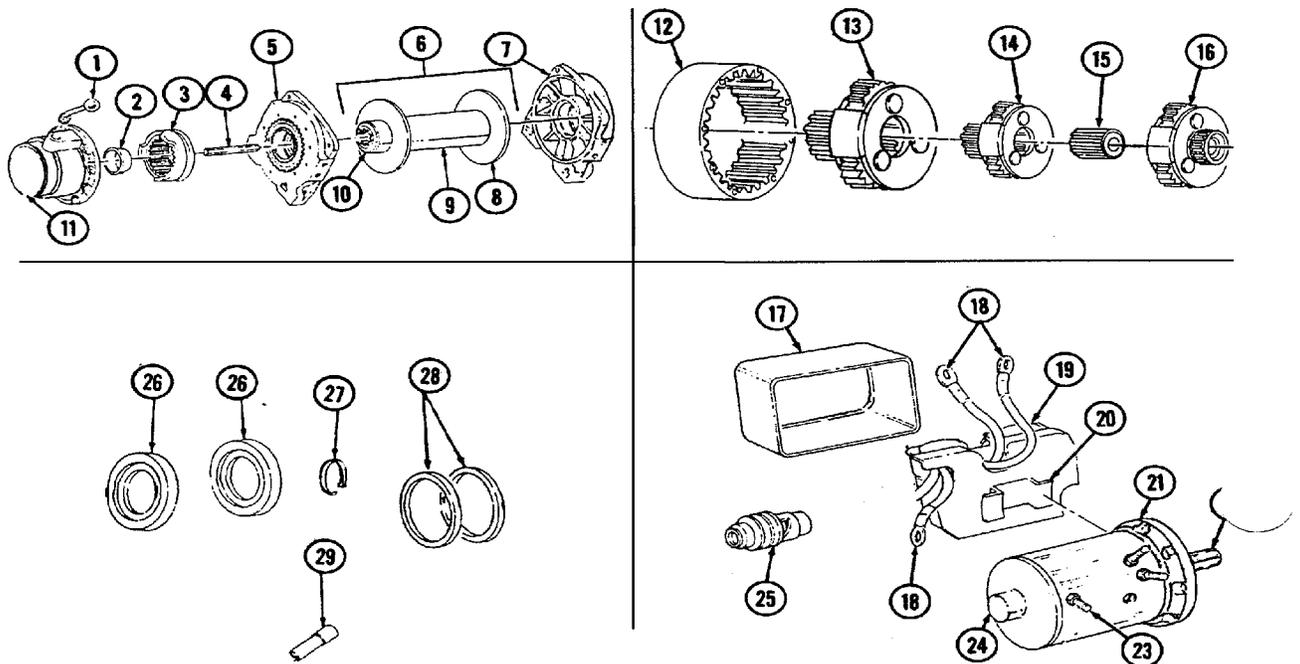
15-4. 9,000 LB. WINCH REPAIR

c. Inspection

NOTE

For general inspection instructions, refer to para. 2-14.

1. Inspect drum (6) for damage to splined end (10), flanges (8), and tube (9). Replace if damaged.
2. Inspect gear end drum support (5) and motor end drum support (7) for damage. Replace if damaged.
3. Inspect gear housing (11) for damage. Replace if damaged.
4. Inspect thrust plate (2) for damage or wear. Replace if damaged or worn. Apply grease on thrust plate (2) for assembly.
5. Inspect gear teeth and machined surfaces of intermediate ring gear (3) for damage. Replace if damaged.
6. Inspect clutch lever (1) and drive shaft (4) for damage. Replace if damaged.
7. Inspect gear teeth, splines, and machined surfaces of output ring gear (12), output gear carrier (13), intermediate gear carrier (14), input gear carrier (16), and input sun gear (15) for damage. Replace any damaged parts.
8. Inspect brake assembly (25) for damage. Replace if damaged.
9. Inspect motor (24), spline (22), mating surface (21), and terminals (23) for damage. Replace if damaged.
10. Inspect cover (17) for damage. Replace if damaged.
11. Inspect control (19) for damaged leads (18), breaks in plastic coating, and damaged mounting base (20).
Replace control (19) if damaged or repair plastic coating.
12. Inspect three thrust washers (26) and (27), two retaining rings (28) and detent spacer (29) for damage.



Replace if damaged.

d.
Assembly

15-4. 9,000 LB. WINCH REPAIR

1. Position 85-87 steel balls (34) in groove of intermediate ring gear (3) and install intermediate ring gear (3) in gear housing (11).

NOTE

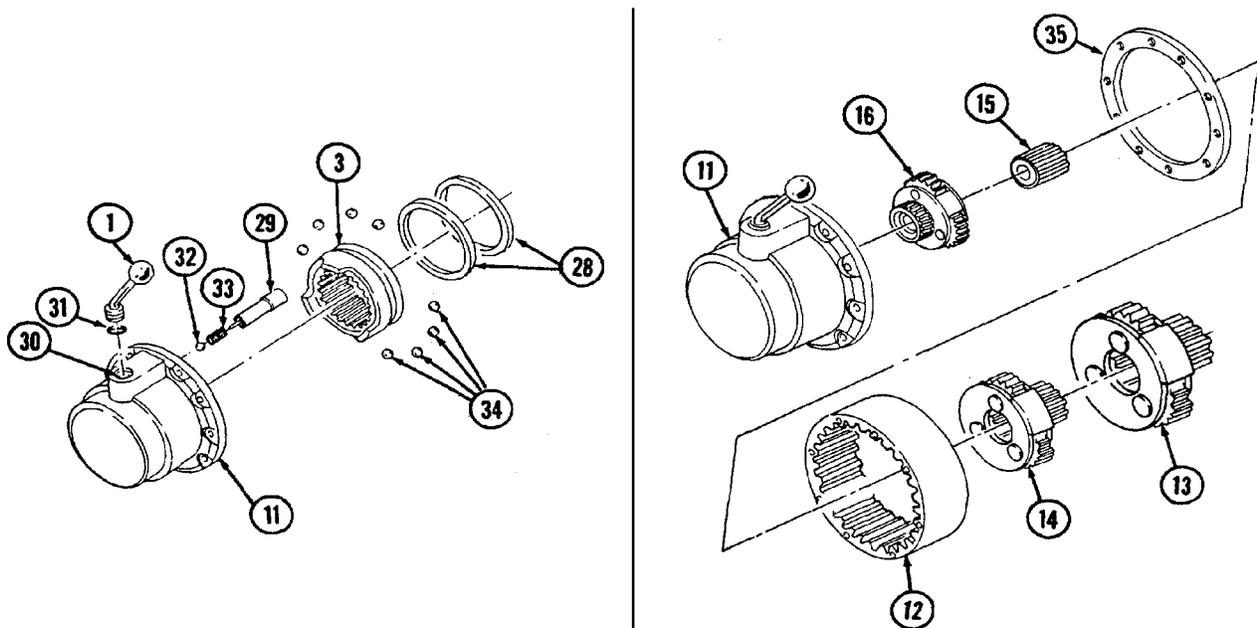
Openings in retaining rings should be opposite of each other and 90 degrees from clutch lever.

2. Install two retaining rings (28) in gear housing (11).
3. Apply light oil to steel balls (34) through the clutch lever hole (30).
4. Apply grease to clutch lever hole (30) and install O-ring seal (31) and clutch lever (1) in gear housing (11).
5. Install detent ball (32), spring (33), and detent spacer (29) in gear housing (11).
6. Apply aircraft grease to output ring gear (12), intermediate gear carrier (14), and output gear carrier (13) and input gear carrier (16).
7. Install input sun gear (15) and input gear carrier (16) in gear housing (11).

NOTE

Be sure ring gear engages in gear housing.

8. Install gasket (35) and output ring gear (12) on gear housing (11).
9. Install intermediate gear carrier (14) on gear housing (1).



10. Install output gear carrier (13) on input gear carrier (16).

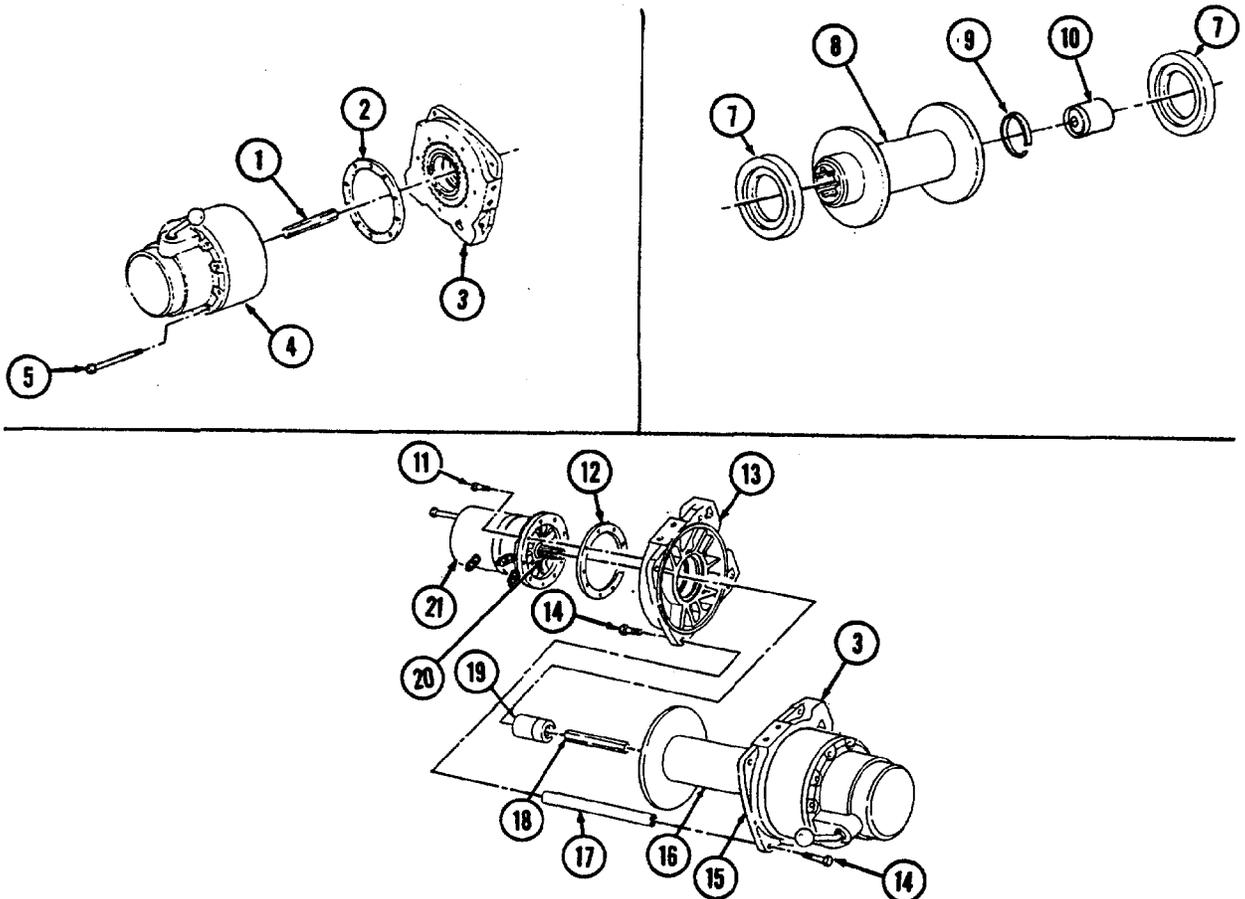
15-4. 9,000 LB. WINCH REPAIR

11. Install gasket (2) on output ring gear (4).

NOTE

Ensure spline on drum support engages in output ring gear.

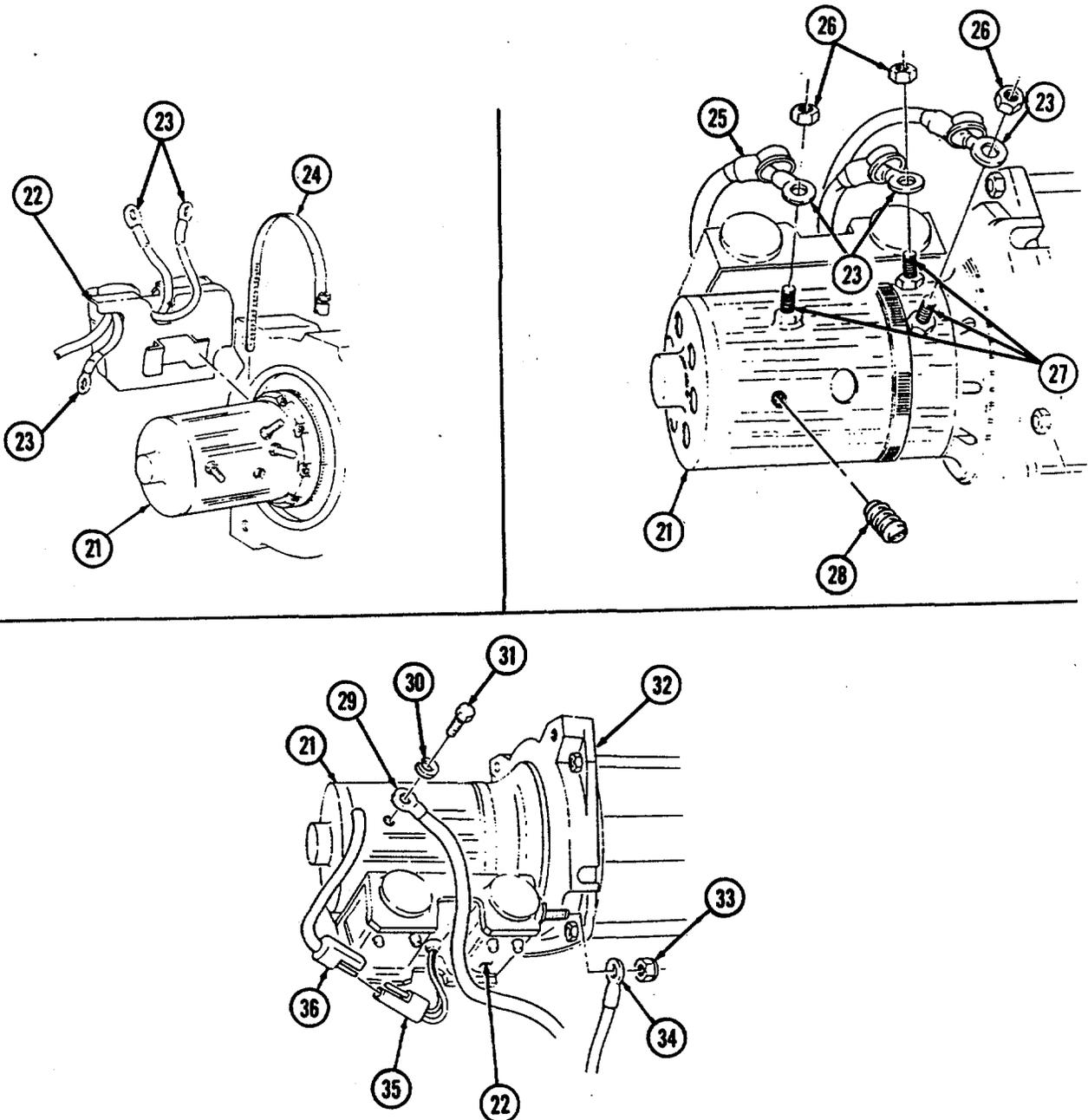
12. Install gear end drum support (3) on output ring gear (4).
 13. Install gear housing (6) on gear end drum support (3) with ten hex head screws (5). Tighten hex head screws (5) to 100 lb-in. (11.3 N-m).
 14. Turn gear housing (6) over with gear end drum support (3) facing up.
 15. Install drive shaft (1) in output ring gear (4).
 16. Apply grease to drum (8) and brake (10) and install thrust washer (9).
 17. With drum horizontal, install brake (10) into drum (8).
 18. Install two nylon thrust washers (7) on drum (8).
 19. Install drum assembly (16) on gear end drum support (3). Rotate drum assembly (16) as needed to engage drive shaft (1) and brake (10).
 20. Install input shaft (18) and motor shaft coupling (19) in drum assembly (16).
 21. Install motor end drum support (13) on drum assembly (16).
 22. Install gasket (12) on motor (21) and motor end drum support (13) ensuring to engage motor shaft (20) into motor shaft coupling (19).
 23. Install ten hex head screws (11) on motor (21) and motor end drum support (13). Tighten hex head screws (11) to 35 lb in. (47 N m).
 24. Install three tie rods (17) between motor end drum supports (13) and gear end drum support (3) with six capscrews (14). Tighten capscrews (14) to 18 lb-ft (24 N.m).



NOTE

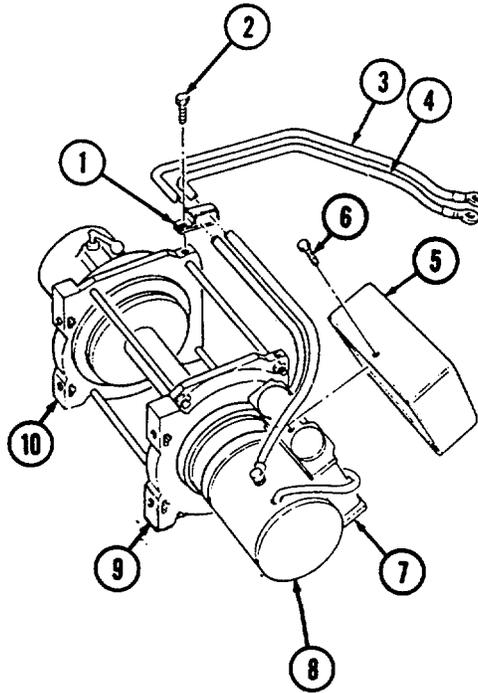
If motor or control have been pre-coated with sealing compound, remove compound from between motor case and control mounting gear contact area. Failure to do so may cause improper grounding of control.

25. Install two clamps (24) on motor (21).
26. Install control (22) on motor (21) and tighten two clamps (24).
27. Connect three leads (23) to terminals (27) with nuts (26) and slide rubber boots (25) over nuts (26).
28. Apply pipe sealant to threads of set screw (28) and install on motor (21).
29. Connect control connector (35) to motor connector (36).
30. Connect lead 6 (34) to control (22) with nut (33).
31. Connect lead 7 (29) to motor (21) with lockwasher (30) and capscrew (31).



15-4. 9,000 LB. WINCH REPAIR

32. Coat motor end of winch (8) up to motor end drum support (9) with coating compound.
33. Install leads 6 (3) and 7 (4) on motor end drum support (9) and gear end drum support (10) with two clamps (1) and screws (2).
34. Install motor control cover (5) on control (7) with three screws (6).



FOLLOW-ON TASK: Install winch (TM 9-2320-280-20). 15-