Installation Service and Parts Manual

6-N-1 Cable-Hose Reel

Serial Numbers 669658 through 669727

Manual Number 660089

cascade®

CONTENTS

INTRODUCTION

This booklet contains the complete PARTS, INSTALLATION, and SERVICE information for the 6-N-1 Cable-Hose Reel. The manual also includes a TROUBLESHOOTING GUIDE located on page 14. If you have additional questions, call the Cascade Service Department in Portland, Oregon Area Code (503) 666-1511.

To order replacement parts contact the Cascade Central Parts Depot at:

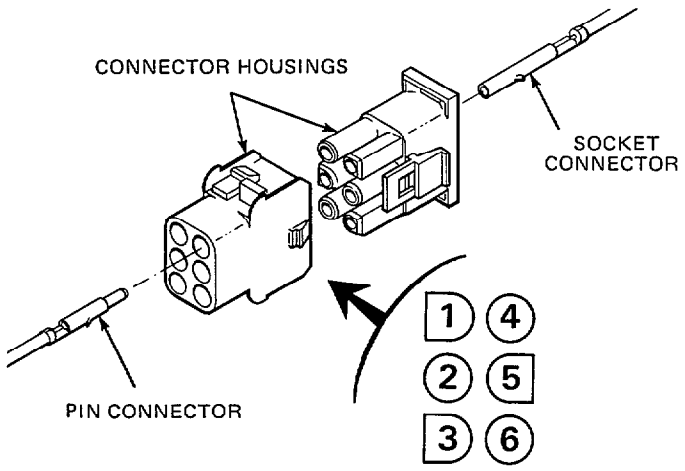
Cascade Corporation
P.O. Box 360
Springfield, Ohio 45505
(513) 322-1199

PRIOR TO INSTALLATION

To make the truck and attachment cables compatible with the reel cable connectors, attach the pin and socket connectors (included with the reel) to the truck and attachment cable ends according to the following procedures.

1. Crimp the pin connectors to the truck cable end (six pin connectors are supplied with the reel: however, use only one pin connector per function plus one additional pin connector as a ground).
2. Install the pin connector housing.

   CAUTION: To maintain a uniform electrical circuit and to prevent electrical shocks, establish a connection pattern to be used at all connector locations.
3. Crimp the socket connectors to the attachment cable end (six socket connectors are supplied with the reel; however, use only one socket connector per function plus one additional socket connector as a ground).
4. Install the socket connector housing using the established connection pattern.



NOTE: The following information is supplied for your convenience in establishing a connection pattern. The wire harness installed in the cable-hose reel is connected to the pins or sockets in the following pattern:

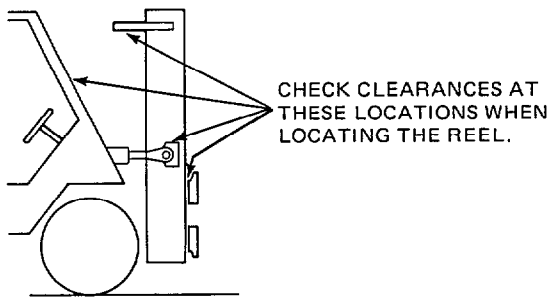
Pin/Socket No.
1 – Purple
2 – Green
3 – Black or Blue
4 – Yellow or Pink
5 – White
6 – Red

IMPORTANT: Do not allow the reel to rotate on its shaft at this time. Doing so will prewind the spring. The wire attaching the Caution Tag to the reel must stay in place until the reel is to be prewound and hoses connected to the junction block.

1. Determine a location for the mounting pad keeping in mind the following points:

   a. **Locate the mounting pad** on the mast channel or truck cowling. See Figure 1. **The cable reel flanges must not interfere with:**
   - the truck overhead guard when the mast is tilted all the way back (if the reel is mounted on the mast).
   - the truck carriage as it moves past the reel (if the reel is mounted on the mast).
   - the mast channel members when the mast is tilted all the way back (if the reel is mounted on the truck cowling).

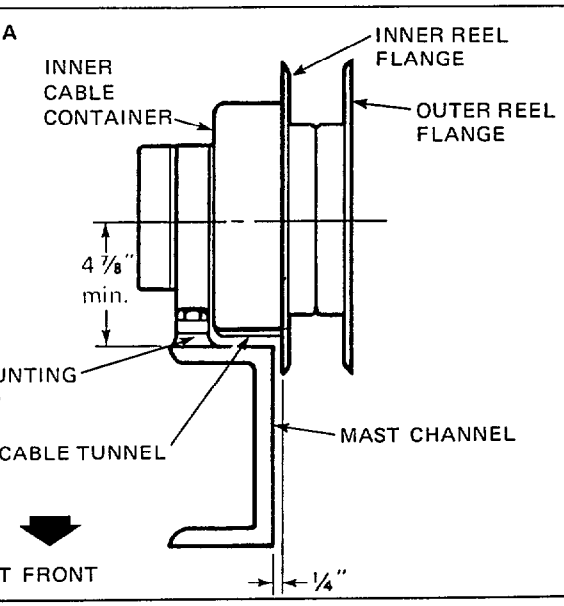
Figure 1



   b. The inner reel flange should be no more than 1/4" from the side of the mast, and should be placed behind the mast channel rather than along side it. See Figure 1A.

   c. The reel should not extend beyond the widest part of the truck to prevent possible damage to the reel during truck operation.

Figure 1A

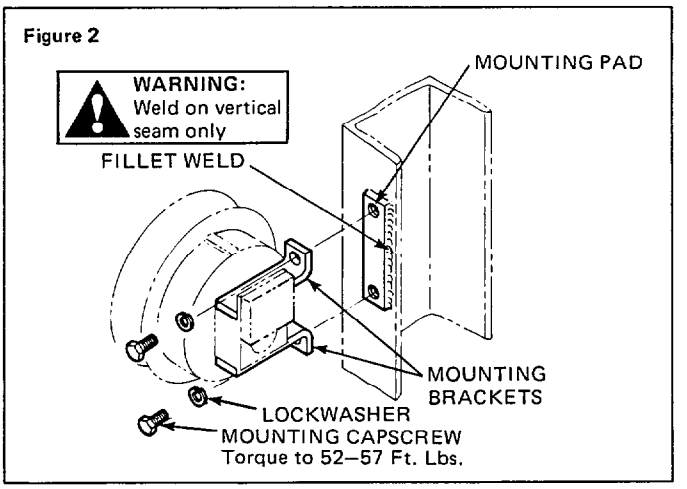


   d. If you are not using the Cascade Mounting Pad make sure that your pad has a thickness of at least 5/8 inch.

2. Weld the mounting pad in place using a 3/16" fillet weld (use E60XX rod with no preheat or postheat) along the vertical sides of the mounting pad. See Figure 2. Cover the hoist chains to shield from weld splatter.

3. Attach the reel mounting brackets to the mounting pad using the mounting capscrews and lockwashers supplied with the cable reel. See Figure 2.

Figure 2

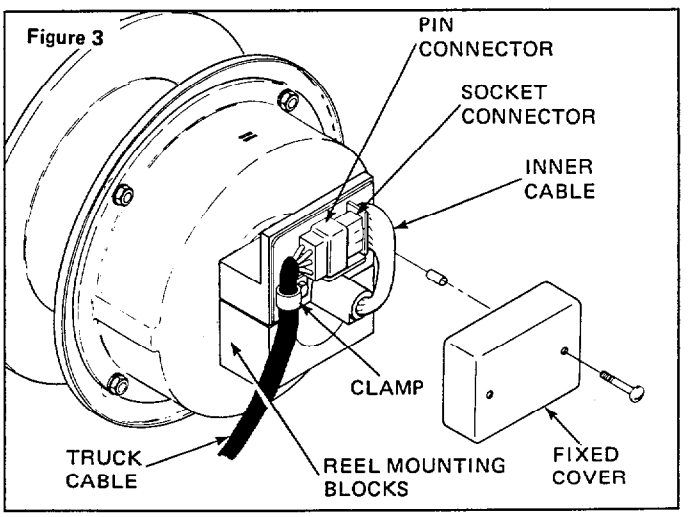


4. Remove the fixed cover from the mounting block on the backside of the reel. See Figure 3.

5. Join the socket connector of the inner cable to the pin connector of the truck cable using an established connection pattern for all cable ends. See Figure 3.

6. Remove the clamp from the mounting block and fit it around the truck cable. Reinstall the clamp on the reel mounting block. See Figure 3.

Figure 3



7. Install the fixed cover on the mounting block. Tighten the screws.

   CAUTION: Overtightening the screws will damage the fixed cover.

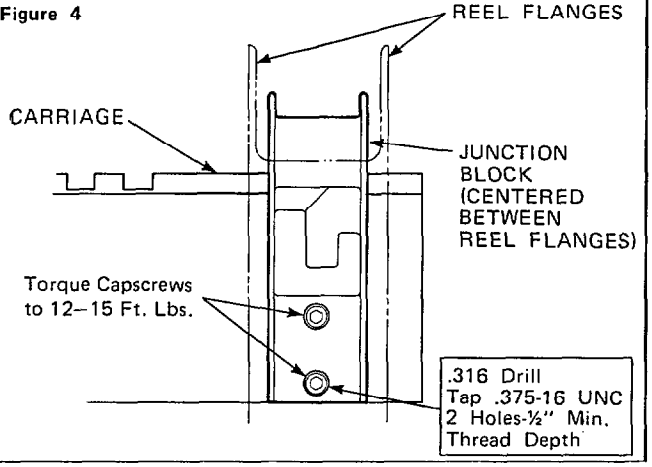
8. Connect the truck valve hoses to the reel shaft.

9. Raise the carriage to a position approximately even with the top of the cable reel to position the junction block. The junction block should be positioned so that it is centered between the reel flanges. See Figure 4. Using the junction block as a guide, mark the location of the junction block mounting holes on the back side of the carriage. Make sure the junction block is positioned vertically.

10. Lower the truck carriage to the floor.

11. Drill and tap both holes at the location marked on the carriage. Figure 4 shows the diameter and drilling information for the two holes. The thread depth should be drilled a minimum of 1/2 inch.

Figure 4

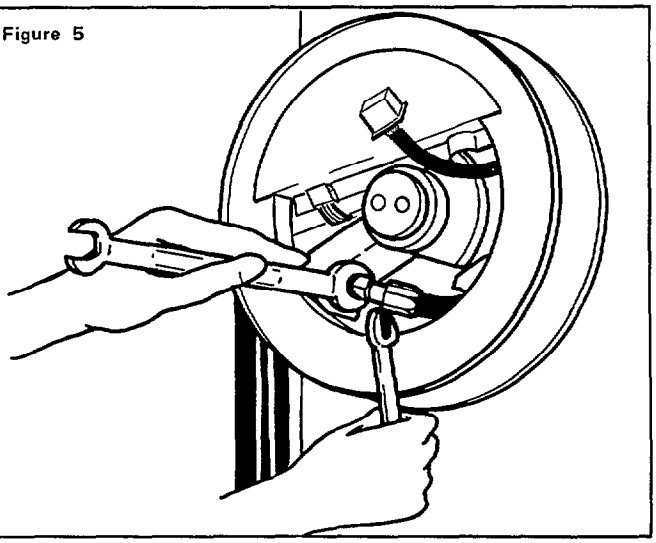


12. Install the junction block on the carriage using the capscrews and lockwashers supplied with the junction block. Tighten the capscrews.

13. Determine the cable-hose length required as shown in the Cable-Hose Length Calculations, see page 16.
Note: This step may be by-passed if you have been supplied with a pre-assembled cable-hose of the correct length.

14. Connect the hoses to the reel hub fittings. See Figure 5. Alignment of the hoses is simplified by the use of O-ring fittings that are easily repositioned. Put the end of the cable inside of the outer flange area.

Figure 5



15. To install the outer cable on the reel remove the three hub nuts securing the rotating cover to the outer flange. Remove the rotating cover. See Figure 6.

16. Join the socket connector of the outer cable to the pin connector on the inner cable using the established connection pattern. See Figure 6.

17. Fit the cable clamps to the outer cable and secure them on each side of the rotating cover. See Figure 6.

18. Install the rotating cover and hub nuts. The inner cable must be laying flat in the flange depression and not pinched. Tighten the nuts.

Figure 6

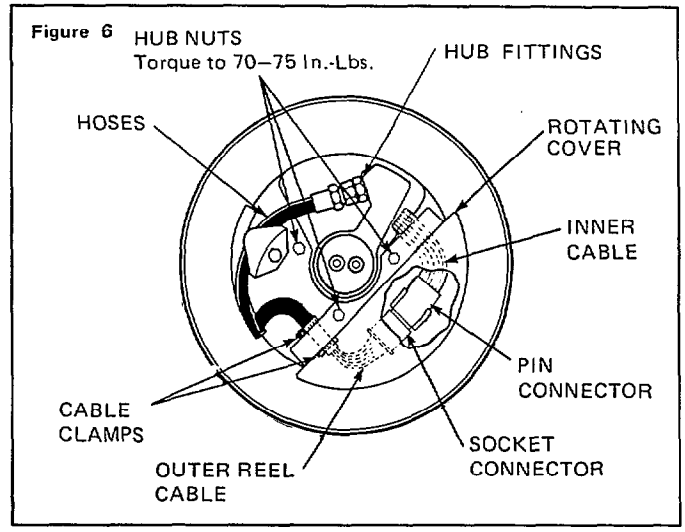
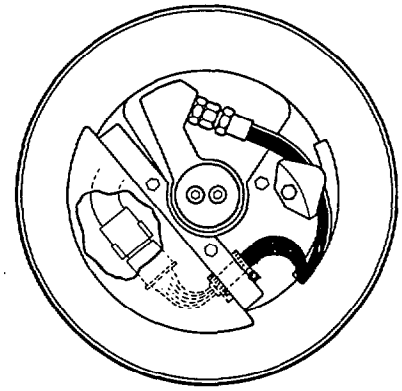
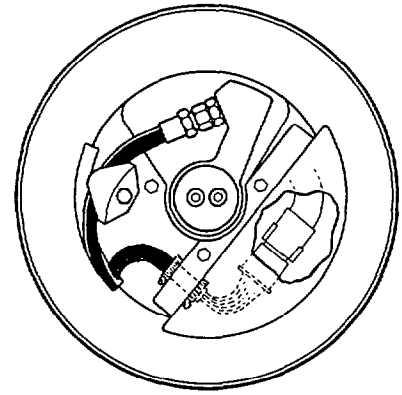


Figure 7

CABLE-HOSE REEL IDENTIFICATION
Viewed from the flange side of the reel.



RIGHT HAND REEL



LEFT HAND REEL

19. Wind the outer cable-hose completely onto the reel in the direction indicated (viewed from the flange side):

Right Hand Reel: Wind cable-hose clockwise.

Left Hand Reel: Wind cable-hose counterclockwise.

A Right or Left hand reel is determined as viewed from the flange side of the reel. See Figure 7.

20. Remove the caution tag and wire.

    Prewind the reel spring by grasping the end of the outer cable-hose and turning the reel a minimum of 3 turns in the direction indicated (viewed from the flange side):

    Right Hand Reel: Wind reel clockwise.
    Left Hand Reel: Wind reel counterclockwise.

    CAUTION: Rotation in a direction opposite than described will damage the inner cable and reel spring.

    If more tension is required the reel can be prewound additional turns. The maximum turn capacities are:

    Standard Reel: 16 total turns.
    Cold Storage Reel: 12 total turns.

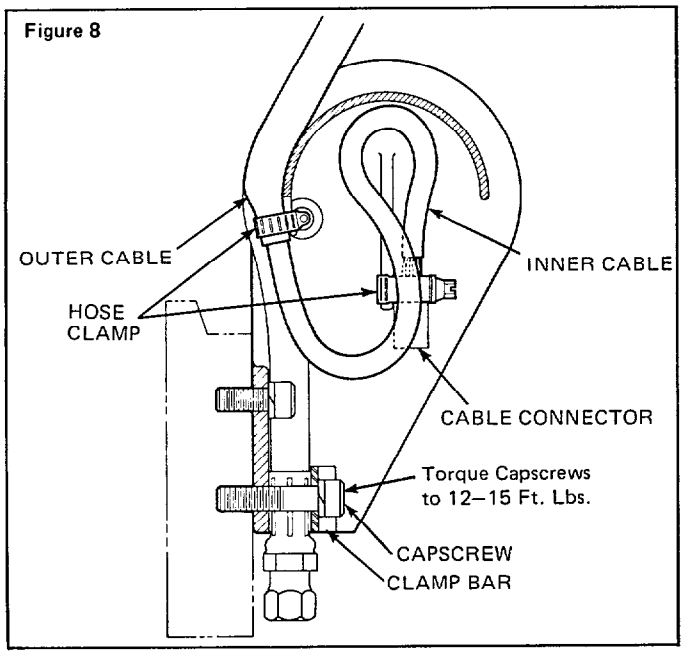
    Total turns = Prewind turns + Working turns.

    CAUTION: Exceeding turn capacity of the reel will damage the inner cable and reel spring.

22. With the reel prewound, pull the hose ends down to the junction block. Fasten the hoses with the clamp bar and capscrew. See Figure 8.

> **WARNING:** Do not let the reel unwind when connecting the cable-hose to the junction block.

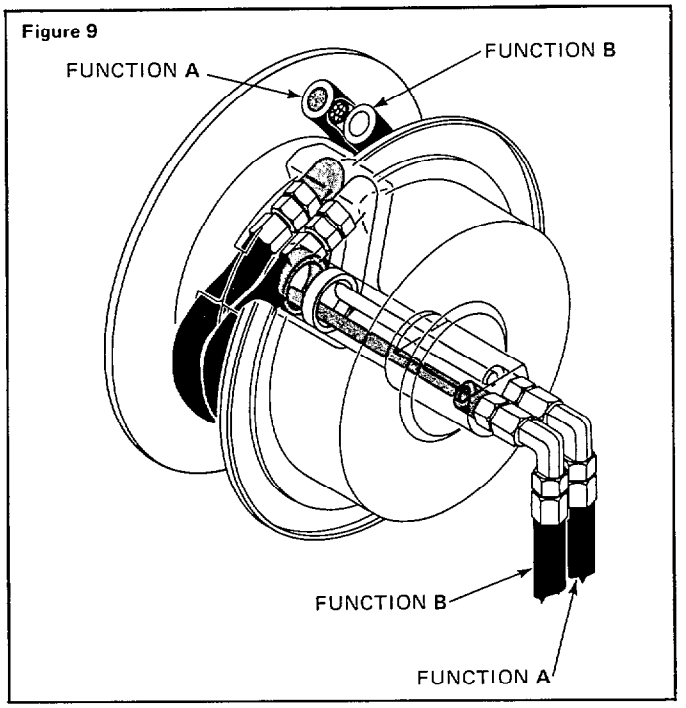
Figure 8



23. Connect the cable from the cable-hose to the junction block. Clamp the outer cable to the projection between the hoses with a hose clamp. See Figure 8. Position the hose clamp so it can be tightened through the hole in the side of the junction block. Route the inner cable through the junction block as shown. Fasten the male cable connector to the large projection with a hose clamp. Form the hose clamp around the connector. Do not overtighten the clamp. The female cable connector must fit in the male connector. Join the connectors.

24. Connect the attachment hoses to the junction block. Be sure the hoses and their functions do not become interchanged. See Figure 9.

Figure 9



25. Operate the carriage up and down a few times to make sure the cable-hose tracks smoothly and no interference exists.

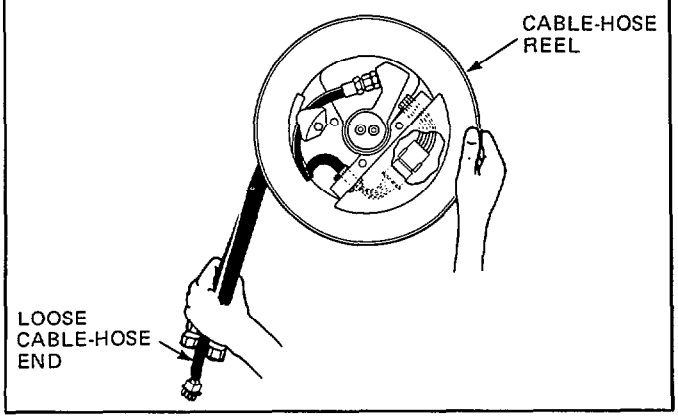
SEAL AND SPRING ASSEMBLY REPLACEMENT

DISCONNECTING THE REEL

1. Disconnect the pin and socket connectors at the junction block.
2. Remove the cable-hose from the junction block.

> **WARNING:** Hold hoses firmly while disconnecting cable-hose from the junction block. Allow the reel spring to unwind slowly while maintaining tension on the loose cable end. See Figure 10.

Figure 10



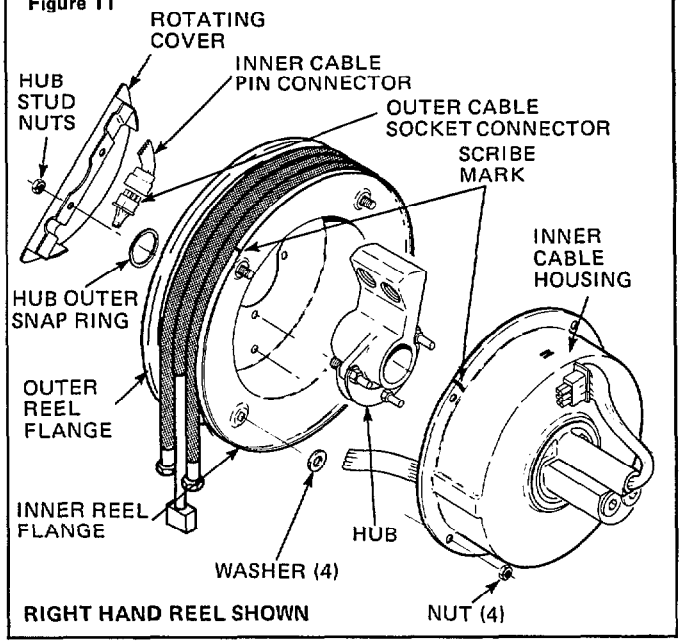
3. Remove the fixed cover from the mounting block and disconnect the socket connector of the inner reel cable from the pin connector of the truck cable. See Figure 3.
4. Disconnect the truck valve hoses from the shaft.
5. Remove the capscrews and lockwashers fastening the reel to the mounting pad. Remove the reel from the mast.

REEL DISASSEMBLY

1. Remove the nuts from the hub studs and lift off the rotating cover. See Figure 11.
2. Disconnect the reel outer cable socket connector from the pin connector of the inner cable. See Figure 11.
3. Disconnect the hoses from the reel hub fittings.
4. Remove the four nuts and washers attaching the inner cable container to the inner reel flange. See Figure 11.
5. Scribe a mark on the inner cable housing and the inner reel flange to aid in alignment during reassembly. See Figure 11.

6. **RIGHT HAND REEL** (See Figure 7.)
   a. Pull both flanges (with outer cable) off the hub studs. Rotate the flanges slightly to free the inner cable socket connector.
   b. Remove the hub outer snap ring.
   c. Pull the hub off the shaft.
   d. Leave the stud spacer and bracket on the hub. See Figure 12.

Figure 11



NOTE: Since the O-rings on the shaft produce friction, it may be necessary to tap gently on the end of the shaft with a rubber mallet or hammer handle while pulling on the hub.

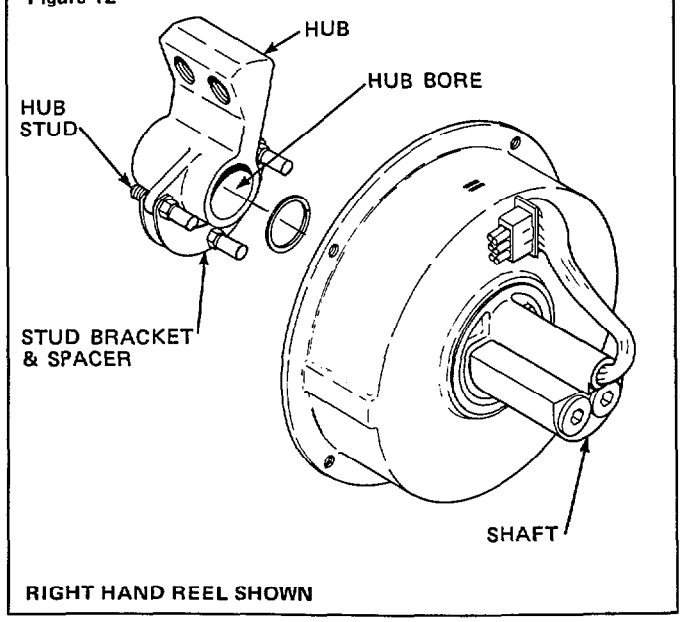
LEFT HAND REEL (See Figure 7.)

a. Remove the hub outer snap ring.
b. Pull the hub off the shaft.
c. Remove both flanges (with outer cable) and the stud bracket.

NOTE: Since the O-rings on the shaft produce friction, it may be necessary to tap gently on the end of the shaft with a rubber mallet or hammer handle while pulling on the hub.

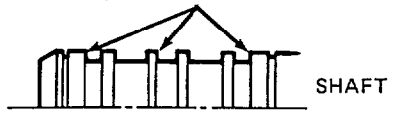
7. Remove the worn seals and inner snap ring from the shaft.

Figure 12



8. Inspect the seal grooves on the shaft. If sharp edges, nicks or projections are found use emery cloth (320 grit) to smooth up. See Figure 13. If imperfections cannot be removed from the critical sealing surfaces (metal surfaces O-rings seat against) shaft replacement may be necessary.

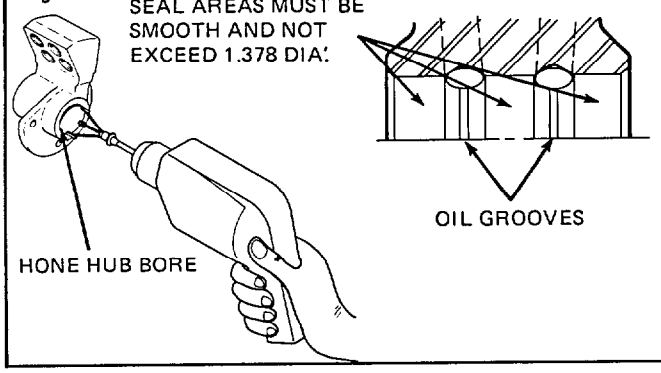
Figure 13.



9. Inspect the hub bore. Use a brake hone (1½" recommended stone length) or butterfly hone (320 grit) and a light lubricant to clean the hub bore of **ALL** wear marks and sharp edges in the critical O-ring sealing areas. See Figure 14.

   IMPORTANT: Do not drag the hone across the sealing surfaces in the hub bore.

Figure 14



10. After honing, measure the inside diameter of the hub. The I.D. must not exceed 1.378 inches. If the diameter exceeds this dimension, premature seal leakage will occur. Hub replacement is recommended. See Figure 14.

11. Rinse the shaft and hub in a noncorrosive solvent to remove all traces of grit. Blow dry with compressed air.

SPRING ASSEMBLY REPLACEMENT

NOTE: If the spring assembly does not require replacement delete this step and proceed to Reel Reassembly.

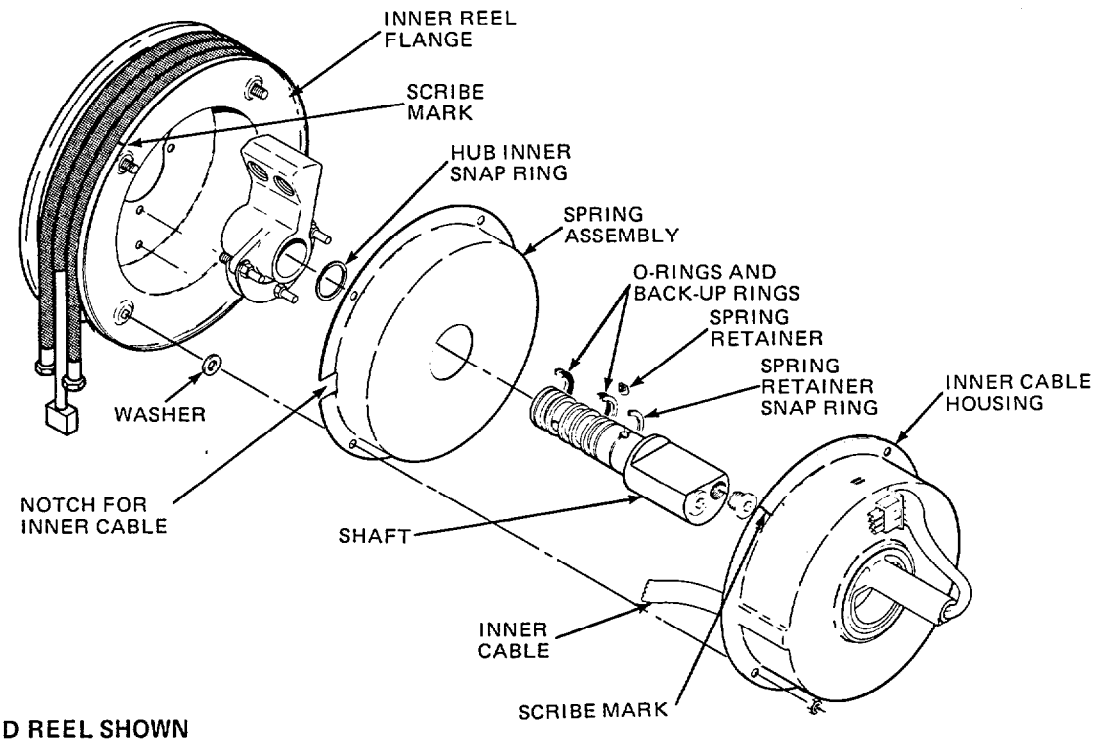
1. Remove the hub inner snap ring located on the shaft. See Figure 15.
2. With a screwdriver, disengage the spring from the spring retainer on the shaft. See Figure 15.

   CAUTION: Do not allow the inner cable housing to rotate independently of its hub. Damage to the inner cable will occur if they are rotated. Use tape or wire to hold both from rotating. **If either has been rotated** refer to the **Inner Cable Housing Timing** instructions on page 11.
3. Hold the reel assembly by the outside of the inner cable housing over a work bench with the shaft downward. Tap the shaft end on the bench. Slide the spring assembly out of the inner cable housing and off the shaft.
4. If the spring retainer has been damaged remove the spring retainer snap ring and install a new spring retainer. See Figure 15.
5. Slide the new spring assembly onto the shaft. Secure the spring end on the spring retainer. Make sure the notch in the spring assembly is aligned with the inner cable. See Figure 15.
6. Install the hub inner snap ring.

REEL REASSEMBLY

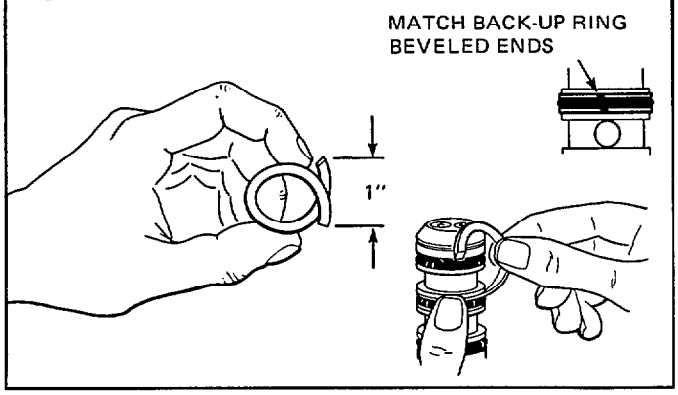
1. Lubricate the shaft, seals, and bore of the hub with petroleum jelly, STP, or hydraulic oil.
2. Preset the white spiral back-up rings for correct size. Squeeze until the ends overlap 1 inch and hold there for 3 seconds. See Figure 16.

Figure 15



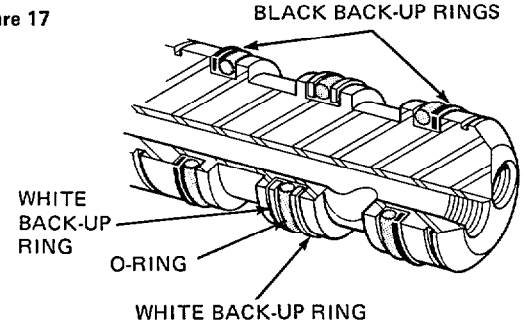
RIGHT HAND REEL SHOWN

Figure 16



3. The white spiral back-up rings install in the center groove of the shaft. Install them by placing one end in the groove and winding it around the shaft. Inspect the ends for properly matched beveled edges. See Figure 16. Proper back-up ring placement is shown in Figure 17.

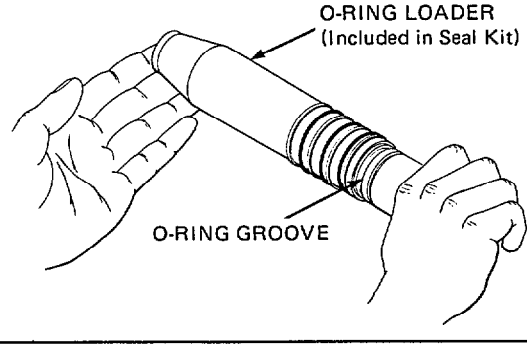
Figure 17



4. The black back-up rings install in the two outer shaft grooves. Apply lubricant to the seal loader. Install one back-up ring onto the seal loader and deposit into its respective groove. See Figures 17 and 18. Allow the back-up rings to set in the shaft grooves about 5 minutes.

   NOTE: It is important to load and deposit the black back-up rings individually and as quickly as possible.

Figure 18



5. Install the O-rings onto the seal loader and deposit the O-rings in their grooves. See Figures 17 and 18.
6. Slide the seal loader over the shaft to compress the seals. Lightly tap (do not rotate) the loader down the shaft to the inner snap ring. Leave on the shaft 10 minutes to thoroughly compress the seals.

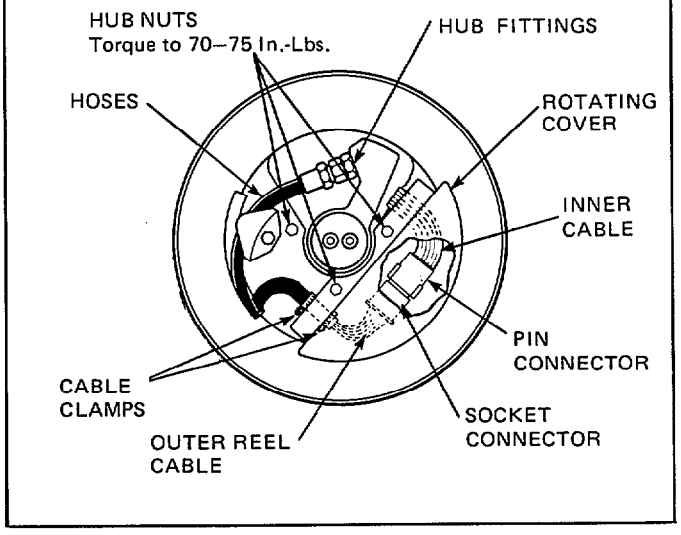
   NOTE: It is recommended, while servicing the inner cable housing or installing a new shaft seal kit, the cable harness (inside the inner cable housing) be lubricated with TRI-FLON spray lube, Cascade 669779. (See inner cable replacement section, page 10, for assembly instructions.)

7. **RIGHT HAND REEL** (See Figure 7.)
   a. Rotate the hub slowly as you slide it onto the shaft.
   b. Install the hub outer snap ring. See Figure 11.
   c. Place the reel flanges onto the hub, aligning the scribe mark on the inner cable container to the scribe mark on the inner reel flange.

   LEFT HAND REEL (See Figure 7.)
   a. With the stud bracket and spacer on the inside of the reel flanges, slide the hub and reel flanges as one unit onto the shaft.
   b. Align the scribe mark on the inner cable container to the scribe mark on the reel flanges.
   c. Install the hub outer snap ring. See Figure 11.
8. Install the four capscrews, washers, and nuts as shown in Figure 11 and tighten the nuts.
9. Reconnect the socket connector of the outer cable to the pin connector of the inner cable. See Figure 19.
10. Connect the hoses to the reel hub fittings.
11. Install the rotating cover and hub nuts. The inner cable must be laying flat in the flange depression and not pinched. Tighten the nuts to a torque of 70—75 in.-lbs.
12. Remount the reel to the truck at this time.
    a. Reconnect the socket connector of the inner reel cable to the pin connector of the truck cable at the mounting block. See Figure 3.
    b. Attach the clamp to the truck cable and secure the clamp to the mounting block. See Figure 3.
    c. Install the fixed cover and tighten the capscrews.

    CAUTION: Overtightening the capscrews will damage the fixed cover.
13. Connect the truck valve hoses to the shaft.

Figure 19



14. Make sure the cable-hose is tightly wound on the reel in the direction indicated (viewed from the flange side):

    Right Hand Reel: Cable-Hose wound clockwise.

    Left Hand Reel: Cable-Hose wound counterclockwise.

    A Right or Left hand reel is determined as viewed from the flange side of the reel. See Figure 7.

15. Prewind the reel spring by grasping the end of the outer cable-hose and turning the reel a minimum of 3 turns in the direction indicated (viewed from the flange side);

Right Hand Reel: Wind reel clockwise.

Left Hand Reel: Wind reel counterclockwise.

CAUTION: Rotation in a direction opposite than described will damage the inner cable and reel spring.

If more tension is required the reel can be prewound additional turns. The maximum turn capacities are:

Standard Reel: 16 total turns.

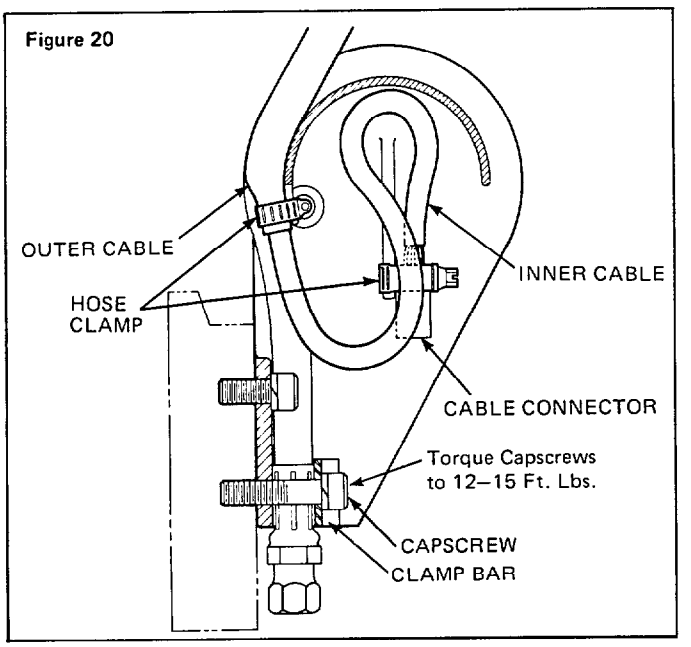
Cold Storage Reel: 12 total turns.

Total turns = Prewind turns + Working turns.

CAUTION: Exceeding turn capacity of the reel will damage the inner cable and reel spring.

16. With the reel prewound, pull the hose ends down to the junction block. Fasten the hoses with the clamp bar and capscrew. See Figure 20.

Figure 20



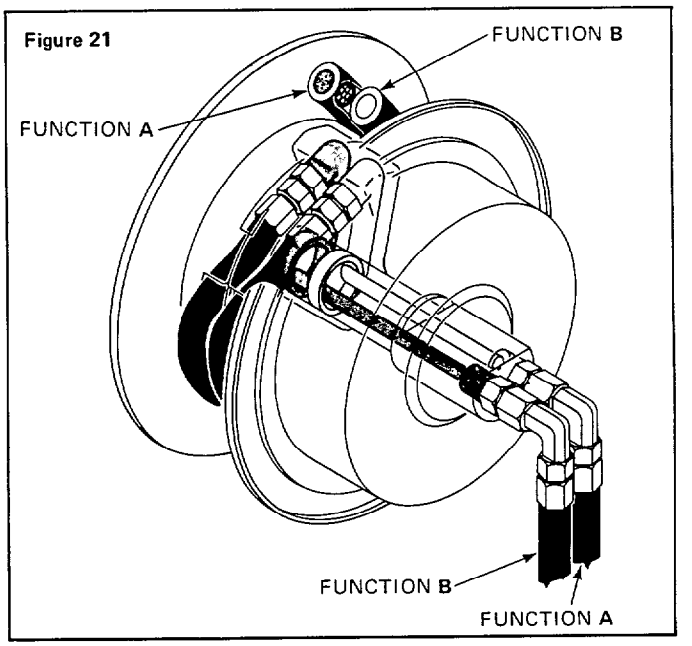
WARNING: Do not let the reel unwind when connecting the cable-hose to the junction block.

17. Connect the cable from the cable-hose to the junction block. Clamp the outer cable to the projection between the hoses with a hose clamp. See Figure 20. Position the hose clamp so it can be tightened through the hole in the side of the junction block. Route the inner cable through the junction block as shown. Fasten the male cable connector to the large projection with a hose clamp. Form the hose clamp around the connector. Do not overtighten the clamp. The female cable connector must fit in the male connector. Join the connectors.

18. Connect the attachment hoses to the junction block. Be sure the hoses and their functions do not become interchanged. See Figure 21.

19. Operate the carriage up and down a few times to make sure the cable-hose tracks smoothly and no interference exists.

Figure 21



INNER CABLE REPLACEMENT

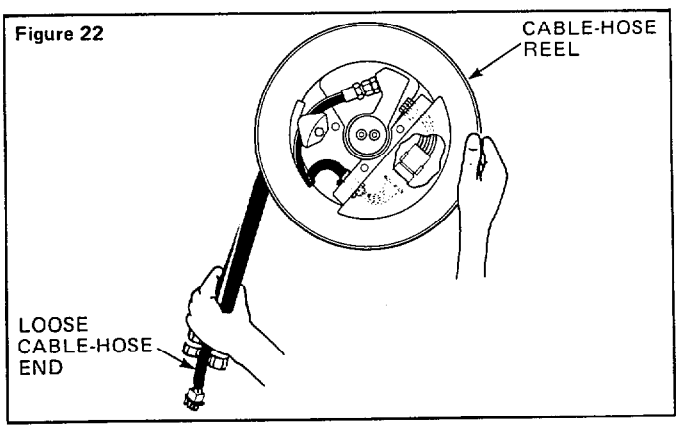
The wire inside the housing can be serviced separately or the complete Inner Cable Housing can be replaced.

DISCONNECTING THE REEL

1. Disconnect the pin and socket connectors at the junction block.
2. Remove the cable-hose from the junction block.

WARNING: Hold hoses firmly while disconnecting cable-hose from the junction block. Allow the reel spring to unwind slowly while maintaining tension on the loose cable-hose end. See Figure 22.

Figure 22



3. Remove the fixed cover from the mounting block and disconnect the socket connector of the inner reel cable from the pin connector of the truck cable. See Figure 3.
4. Disconnect the truck valve hoses from the shaft.
5. Remove the capscrews and lockwashers fastening the reel to the mounting pad. Remove the reel from the mast.

REEL DISASSEMBLY

1. Remove the nuts from the hub studs and lift off the rotating cover. See Figure 23.
2. Disconnect the reel outer cable socket connector from the pin connector of the inner cable. See Figure 23.
3. Disconnect the hoses from the reel hub fittings.
4. Remove the four nuts and washers attaching the inner cable housing to the inner reel flange. See Figure 23.
5. Pull the reel flanges off the hub studs. Rotate the flanges slightly to free the inner cable socket connector.
6. Remove the mounting brackets and split the mounting blocks from the shaft. See Figure 23.
7. Separate the spring assembly from the inner cable housing. Slide the inner cable housing off the shaft. See Figure 23.

CAUTION: Do not allow the inner cable housing to rotate independently of its hub. Damage to the inner cable will occur if they are rotated. Use tape or wire to hold both from rotating. **If either has been rotated** refer to the **Inner Cable Housing Timing** instructions on page 11.

INNER CABLE REPLACEMENT

NOTE: If a new Inner Cable Housing is being installed, delete this step and proceed to Reel Reassembly.

1. Insert a small diameter allen wrench under the lip of the divider plate. Grip the allen wrench with a pair of vise grips. Pull outward to remove the divider plate. See Figure 24.

Figure 24

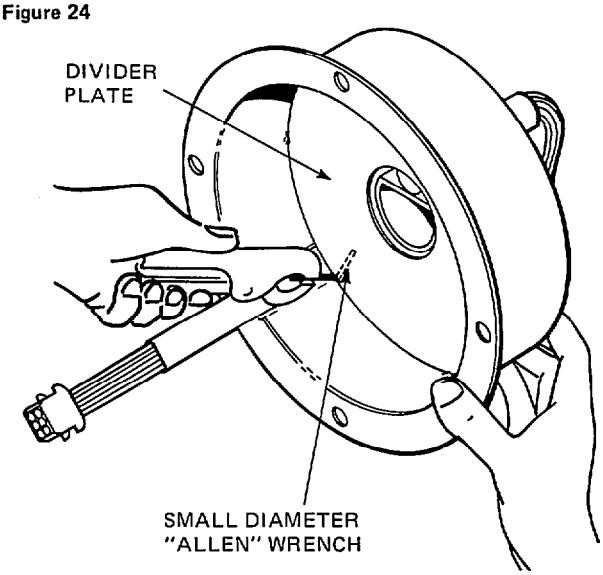
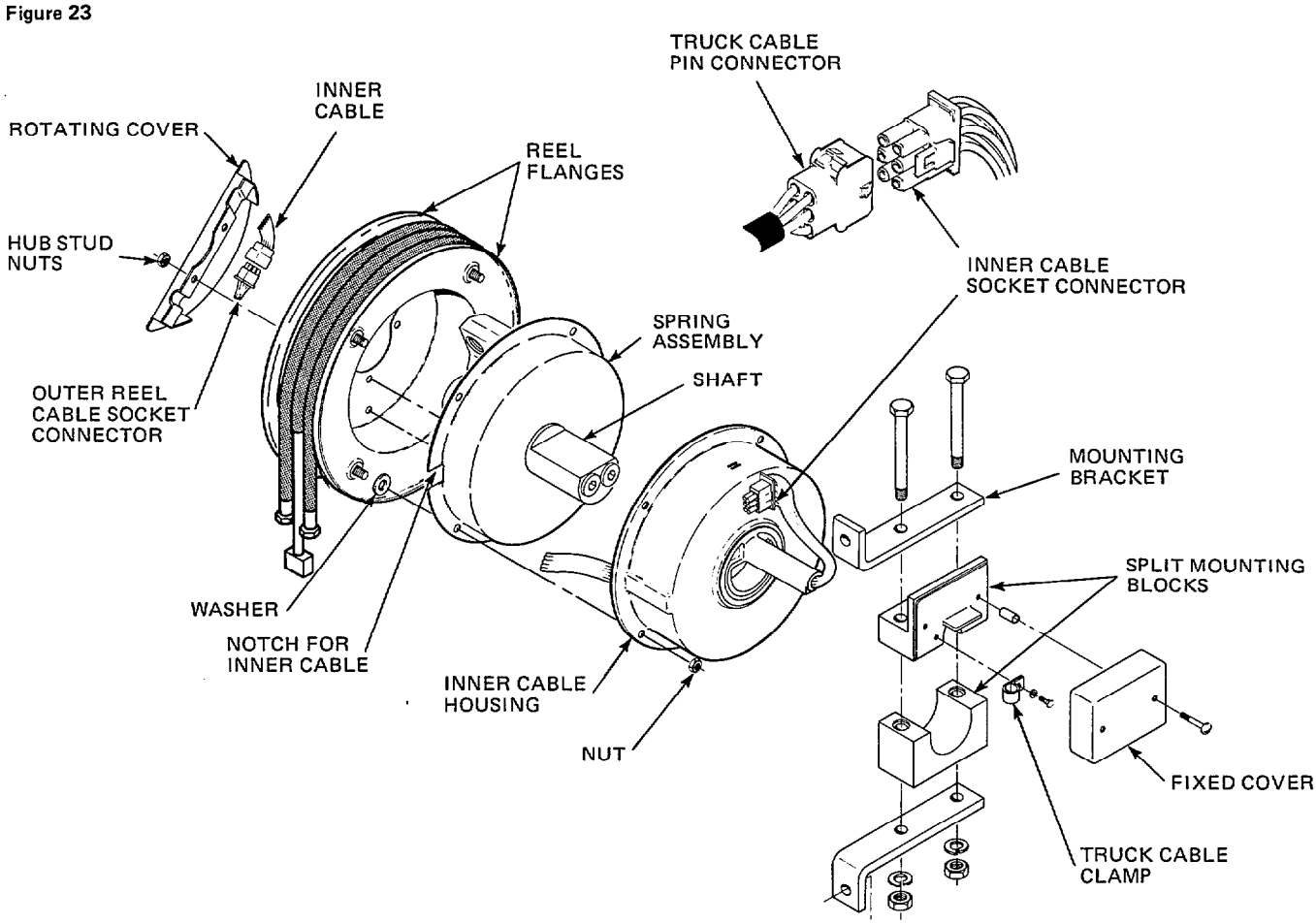


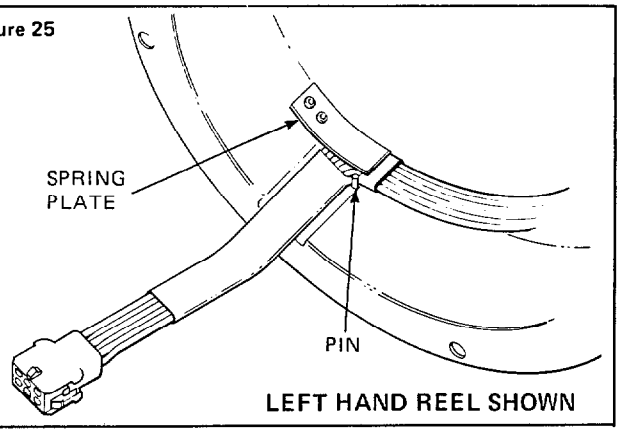
Figure 23



RIGHT HAND REEL SHOWN

2. Remove the cable harness.
3. Place the new cable harness in the housing. Fit the cable (at its 90° bend) under the spring plate and around the pin. See Figure 25.

Figure 25

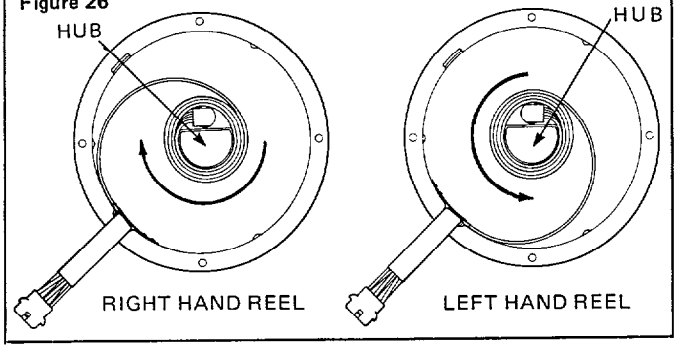


LEFT HAND REEL SHOWN

4. Wind the cable around the hub in the direction shown in Figure 26.

   A Right or Left hand reel is determined as viewed from the flange side of the reel. See Figure 7.

Figure 26



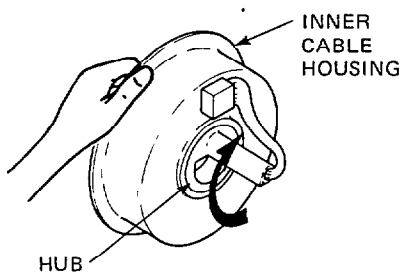
5. Place the divider plate inside the housing. Fasten the plate edge to the three housing indentations.

INNER CABLE HOUSING TIMING

1. Determine if the reel is a right hand or left hand model as viewed from the flange side of the reel. See Figure 7.
2. Position the cable container with the hub cable harness toward you. See Figure 27.
3. Hold the Housing from rotating. Wind the hub until tight:

   Right Hand Reel: Wind hub counterclockwise.
   Left Hand Reel: Wind hub clockwise.
4. Rotate the hub back 1 revolution. This provides one safety turn in the wiring to prevent internal damage.
5. Use tape or wire to secure the hub to the housing. This will prevent either from rotating. The Inner Cable Housing is ready for further reel assembly.

Figure 27



CLOCKWISE ROTATION SHOWN

REEL REASSEMBLY

1. Fit the new inner cable housing over the shaft (do not rotate) and over the spring assembly. Be sure to fit the inner cable into the notch in the spring assembly. See Figure 23.

   CAUTION: Do not allow the inner cable housing to rotate independently of its hub. Damage to the inner cable will occur if they are rotated. Use tape or wire to hold both from rotating. **If either has been rotated** refer to the **Inner Cable Housing Timing** instructions on page 14.

   IMPORTANT: The spring assembly must be in its neutral position when fitted into the inner cable housing.

2. Install the split mounting blocks and mounting brackets. See Figure 23.
3. Fit the reel flanges onto the hub studs. Install the capscrews, washers, and nuts to fasten the reel flanges to the inner cable housing.
4. Connect the pin connector of the inner cable to the socket connector of the outer cable.
5. Install the rotating cover and hub nuts. The inner cable must be laying flat in the flange depression and not pinched. Tighten the nuts.
6. Remount the reel on the truck.
7. Reconnect the socket connector of the inner reel cable to the pin connector of the truck cable at the mounting block. See Figure 23.
8. Attach the clamp to the truck cable and secure the clamp to the mounting block.
9. Install the fixed cover and tighten the capscrews.

   CAUTION: Overtightening the capscrews will damage the fixed cover.
10. Connect the truck valve hoses to the shaft.
11. Make sure the cable-hose is tightly wound on the reel in the direction indicated (viewed from the flange side):

    Right Hand Reel: Cable-Hose wound clockwise.
    Left Hand Reel: Cable-Hose wound counterclockwise.

    A Right or Left hand reel is determined as viewed from the flange side of the reel. See Figure 7.

12. Prewind the reel spring by grasping the end of the outer cable-hose and turning the reel a minimum of 3 turns in the direction indicated (viewed from the flange side):

    Right Hand Reel: Wind reel clockwise.
    Left Hand Reel: Wind reel counterclockwise.

    CAUTION: Rotation in a direction opposite than described will damge the inner cable and reel spring.

    If more tension is required the reel can be prewound additional turns. The maximum turn capacities are:

    Standard Reel: 16 total turns.
    Cold Storage Reel: 12 total turns.
    Total turns = Prewind turns + Working turns.

    CAUTION: Exceeding turn capacity of the reel will damage the inner cable and reel spring.

13. With the reel prewound, pull the hose ends down to the junction block. Fasten the hoses with the clamp bar and capscrew. See Figure 28.

> **WARNING:** Do not let the reel unwind when connecting the cable-hose to the junction block.

14. Connect the cable from the cable-hose to the junction block. Clamp the outer cable to the projection between the hoses with a hose clamp. See Figure 28. Position the hose clamp so it can be tightened through the hole in the side of the junction block. Route the inner cable through the junction block as shown. Fasten the male cable connector to the large projection with a hose clamp. Form the hose clamp around the connector. Do not overtighten the clamp. The female cable connector must fit in the male connector. Join the connectors.

15. Connect the attachment hoses to the junction block. Be sure the hoses and their functions do not become interchanged. See Figure 29.

16. Operate the carriage up and down a few times to make sure the cable-hose tracks smoothly and no interference exists.

Figure 28

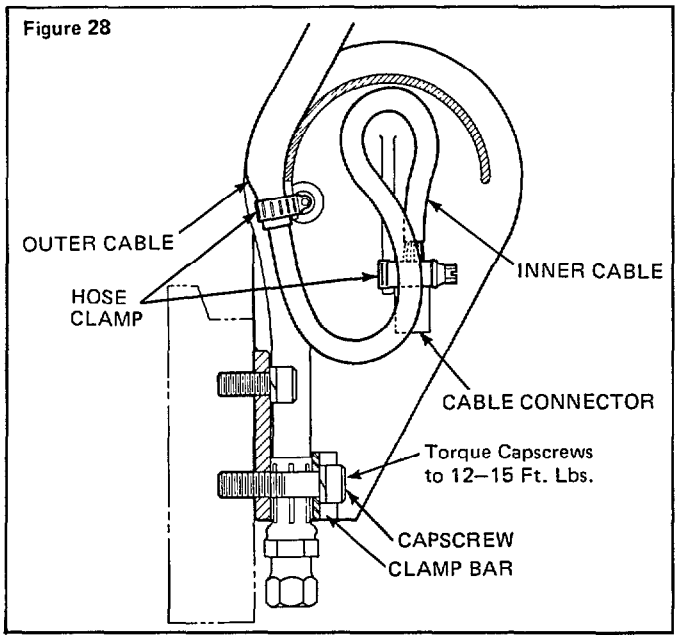
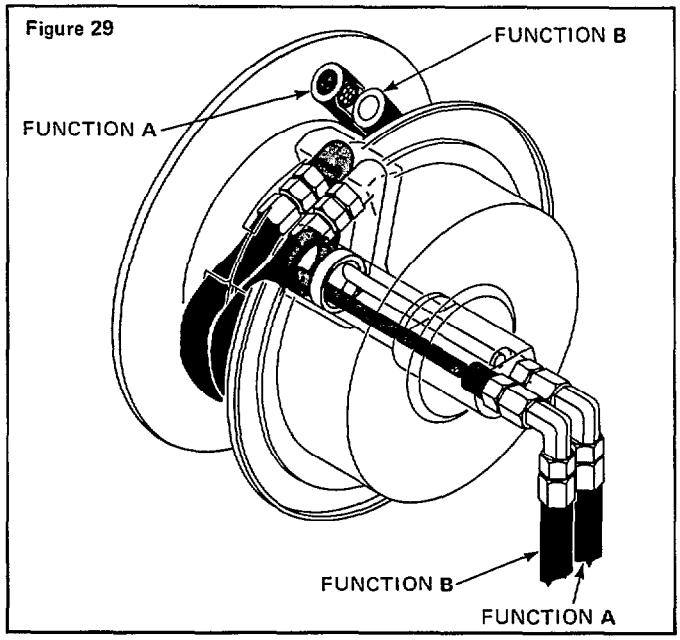


Figure 29



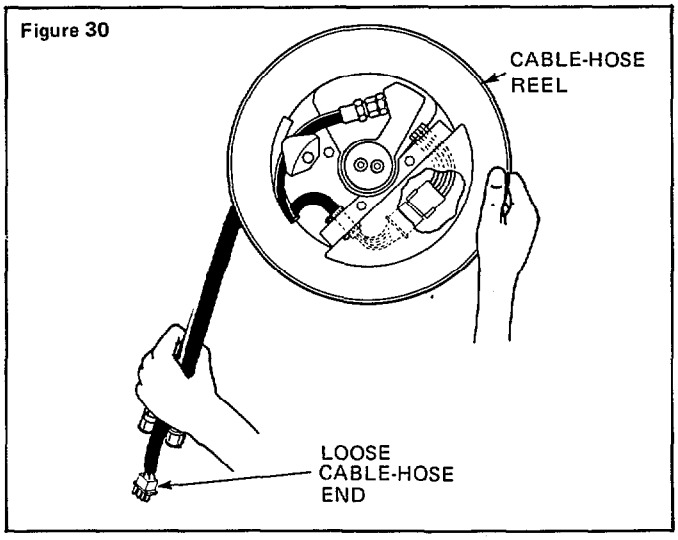
OUTER CABLE-HOSE REPLACEMENT

1. Disconnect the old outer cable-hose from the attachment cable at the junction block.

2. Remove the old cable-hose from the junction block.

> **WARNING:** Hold hoses firmly while disconnecting cable-hose from the junction block. Allow the reel spring to unwind slowly while maintaining tension on the loose cable-hose end. See Figure 30.

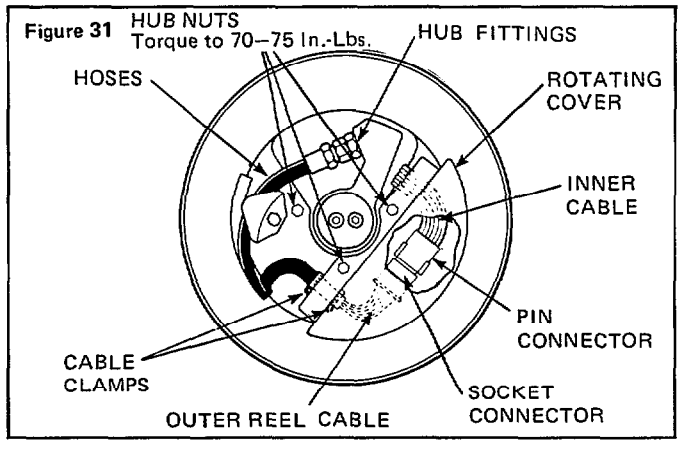
Figure 30



3. Disconnect the hoses from the reel hub fittings. See Figure 31.

4. Remove the two hub nuts securing the rotating cover to the outer flange. Remove the rotating cover. Disconnect the socket connector of the old outer reel cable from the pin connector of the inner cable. See Figure 31.

Figure 31 HUB NUTS Torque to 70–75 In.-Lbs.



5. Remove the cable guide and clamp and the cable clamp and discard the old outer reel cable-hose. See Figure 31.

6. Connect the new hoses to the reel hub fittings.

7. Join the socket connector of the new outer reel cable to the pin connector on the inner cable using the established connection pattern.

8. Fit the cable clamps to the outer cable and secure them on each side of the rotating cover. See Figure 31.

9. Install the rotating cover and the hub nuts. The inner cable must be laying flat in the flange depression and not pinched. Tighten the nuts to a torque of 70–75 in.-lbs. See Figure 31.

10. Wind the new cable-hose completely onto the reel in the direction indicated (viewed from the flange side):

    Right Hand Reel: Wind cable-hose clockwise.
    Left Hand Reel: Wind cable-hose counterclockwise.

    A Right or Left hand reel is determined as viewed from the flange side of the reel. See Figure 7.

11. Prewind the reel spring by grasping the end of the outer cable-hose and turning the reel a minimum of 3 turns in the direction indicated (viewed from the flange side):

    Right Hand Reel: Wind reel clockwise.
    Left Hand Reel: Wind reel counterclockwise.

    CAUTION: Rotation in a direction opposite than described will damage the inner cable and reel spring.

    If more tension is required the reel can be prewound additional turns. The maximum turn capacities are:

    Standard Reel: 16 total turns.
    Cold Storage Reel: 12 total turns.

    Total turns = Prewind turns + Working turns.

    CAUTION: Exceeding turn capacity of the reel will damage the inner cable and reel spring.

12. With the reel prewound, pull the hose ends down to the junction block. Fasten the hoses with the clamp bar and capscrew. See Figure 32.

WARNING: Do not let the reel unwind when connecting the cable-hose to the junction block.

13. Connect the cable from the cable-hose to the junction block. Clamp the outer cable to the projection between the hoses with a hose clamp. See Figure 32. Position the hose clamp so it can be tightened through the hole in the side of the junction block. Route the inner cable through the junction block as shown. Fasten the male cable connector to the large projection with a hose clamp. Form the hose clamp around the connector. Do not overtighten the clamp. The female cable connector must fit in the male connector. Join the connectors.

14. Connect the attachment hoses to the junction block. Be sure the hoses and their functions do not become interchanged. See Figure 33.

15. Operate the carriage up and down a few times to make sure the cable-hose tracks smoothly and no interference exists.

Figure 32

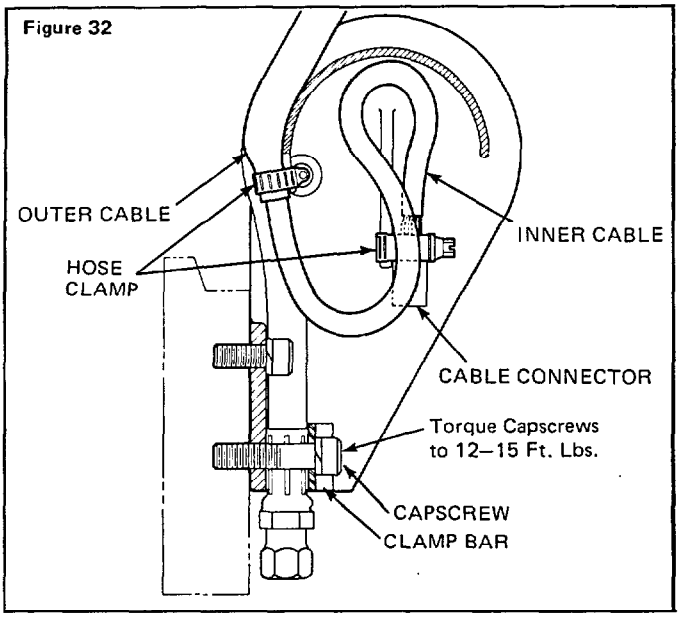
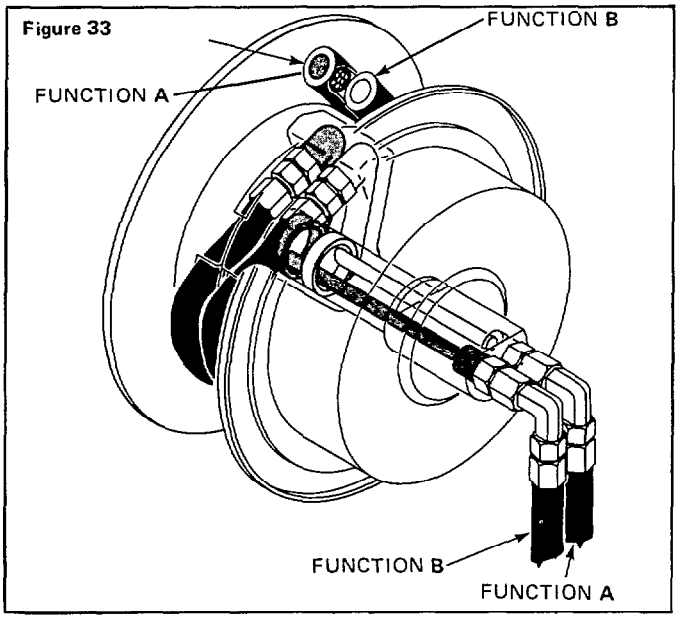


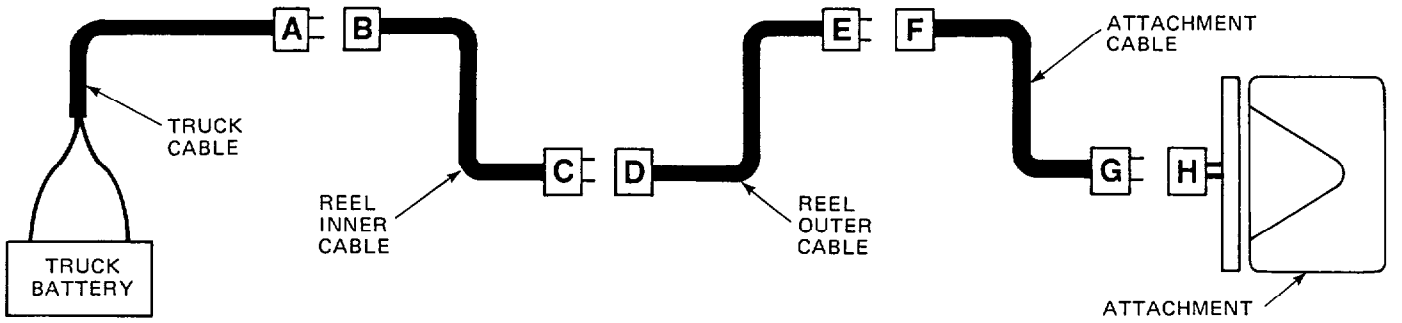
Figure 33



TROUBLESHOOTING GUIDE

PROBLEM	PROBABLE CAUSE	CORRECTIVE ACTION
Excessive wear on cable-hose.	Cable-Hose Reel and Junction block are not in proper alignment.	Align the junction block and cable-hose reel properly. They must be on the same center line and mounted squarely to each other. See Figure 4.
	Cable-Hose reel flanges damaged.	Repair or replace damaged parts.
Cable-hose jumps off reel during operation.	Incorrect prewind of spring.	Prewind spring, see page 5.
	Cable-Hose not aligned with junction block.	Align junction block with cable-hose reel. See Figure 4.
Cable-hose binds during operation.	Cable-Hose reel spring is broken.	Replace the spring.
	Back-up ring on hub shaft working between shaft and hub.	Replace the back-up rings.
	Scored seal areas.	Replace the damaged hub and/or use an emery cloth to remove the nicks from the shaft.
Electrical malfunction.	The same pattern for pin and socket connections has not been used at all locations.	Make sure pin and socket connectors use the same pattern at all locations.
	Electrical short in the reel cable, truck or attachment cable.	See Electrical Troubleshooting Guide.
Cable-Hose Reel leaks at hub.	Damaged O-ring seals in the rotating hub.	Replace all seals.When a cable-hose reel requires replacement of any one of the O-rings or back-up rings, it is important that all the seals be replaced. If all the O-rings and back-up rings are not replaced at the same time, the reel will only have to be disassembled again in a short period of time to replace the older seals. The seal kit offered by Cascade includes all of the O-rings and back-up rings necessary to rebuild one hose reel. Order appropriate Seal Kit.
	Loose or damaged fittings.	Tighten or replace damaged fittings.
	Scored seal areas.	Replace the damaged hub and/or use an emery cloth to remove the nicks from the shaft seal grooves.
Inner Cable Housing wire breaks inside housing.	Excessive mast height.	Cable-Hose reel cannot be used in this application. The maximum turn capacity is being exceeded.
	Cable-Hose Reel wound backwards.	Replace Inner Cable Housing. Wind reel in direction indicated in Inner Cable Housing Replacement Instructions.
	Service life of wire has been exceeded.	Replace Inner Cable Housing.
	Cold Storage reel is being used in a Standard reel application. The maximum turn capacity of the reel has been exceeded.	Determine if the reel is a Standard or Cold Storage reel. See page 5. Do not exceed reels turn capacity shown on page 5.

ELECTRICAL TROUBLESHOOTING GUIDE



Using the accompanying electrical diagram and the following instructions, locate an electrical short. When using an ohmmeter to check for continuity, follow the instructions with your meter. Make sure that electrical power is disconnected when checking continuity.

1. Connect pin connector A to socket connector F (to isolate the entire cable reel). Operate the attachment.

   NOTE: Do not operate the mast.

   a. If the attachment does not operate at all:

      i. disconnect pin connector A from socket connector F.

      ii. with an ohmmeter, check the continuity of the attachment cable (between connectors F and G). If the cable checks OK, the truck cable is faulty and should be replaced. Refer to your truck Service Manual.

   b. If some attachment functions respond and others do not, the pins and/or sockets in the connectors are at fault and should be replaced. Recheck attachment operation after repair.

   c. If all attachment functions operate correctly, reconnect the cables as shown in the diagram and proceed to Step 2.

2. Connect pin connector A to socket connector D (to isolate the reel inner cable). Operate the attachment.

   NOTE: Do not operate the mast.

   a. If the attachment does not operate at all, the reel outer cable is faulty and should be replaced. For replacement instructions, refer to page 12.

   b. If some attachment functions respond and others do not, the pins and/or sockets in the connectors are at fault and should be replaced. Recheck attachment operation after repair.

   c. If all attachment functions operate correctly, reconnect the cables as shown in the diagram and proceed to Step 3.

3. Connect pin connector C to socket connector F (to isolate the reel outer cable). Operate the attachment.

   NOTE: Do not operate the mast.

   a. If the attachment does not operate at all, the reel inner cable is faulty and should be replaced. For replacement instructions, refer to page 9.

   b. If some attachment functions respond and others do not, the pins and/or sockets in the connectors are at fault and should be replaced. Recheck attachment operation after repair.

CABLE - HOSE LENGTHS

CABLE-HOSE LENGTH CALCULATIONS

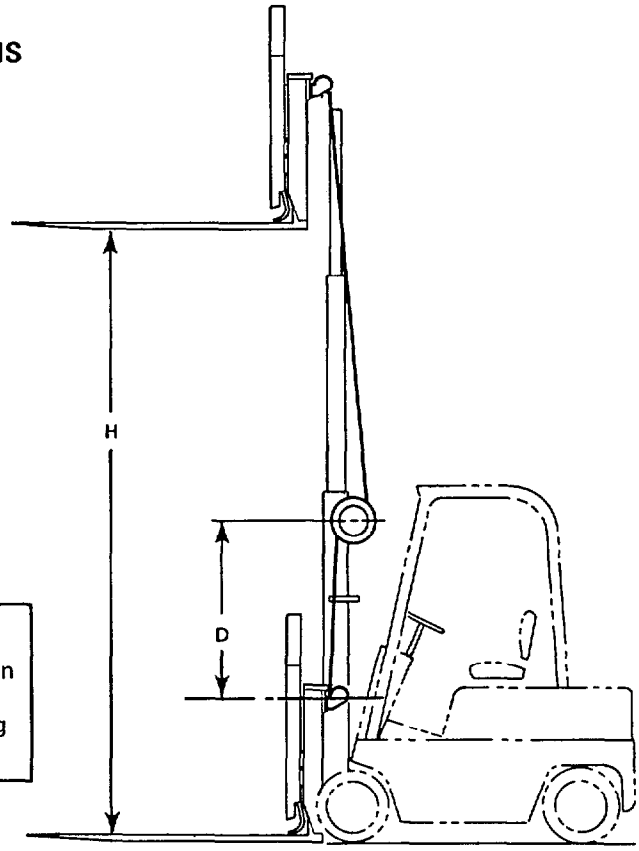
H = Total lift height
D = Distance from centerline of reel to junction block.

1. When "H" is equal to, or greater than 2 X "D" the correct cable-hose length is:
   "H" – "D" + 38 inches
2. When "H" is less than 2 X "D" the correct cable-hose length is:
   "D" + 38 inches

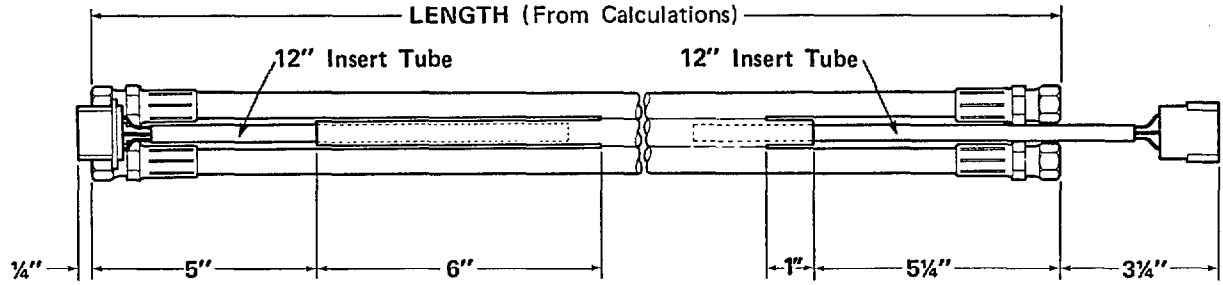
Example

"H" = 286"
"D" = 96"
286" – 96" = 190" + 38" = 228"
correct cable-hose length

NOTE: It is essential that 28" of cable-hose be pre-wound on the reel, and 10" be pre-wound on the junction block at all times. This amount is included when using this formula for calculating the cable-hose length.



CABLE-HOSE PREPARATION DETAIL



WORKSHEET

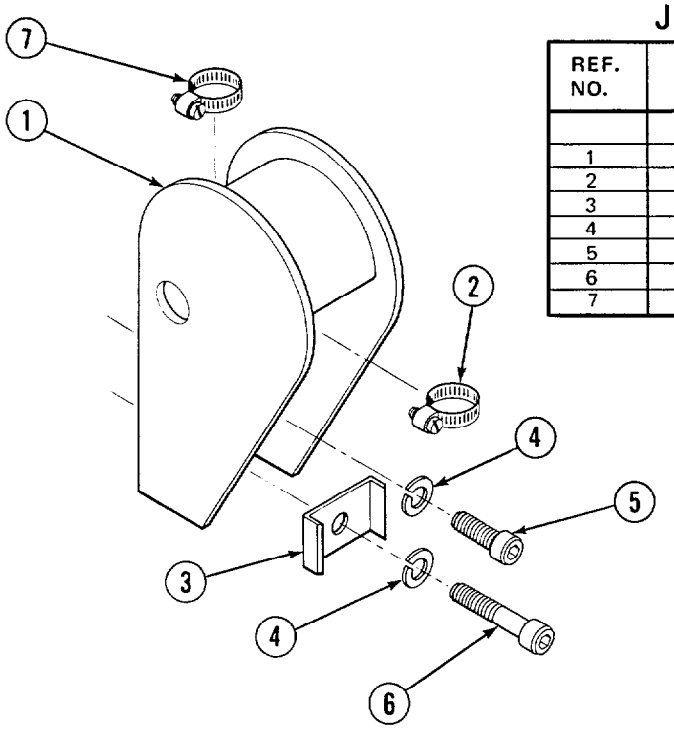
1. H = (enter mast's lift height here) _____
2. D = (enter distance between junction block and center of reel with carriage completely lowered) _____
3. Multiply "D" by 2 _____
4. If line 1. is less than line 3., the cable-hose length should be

   D (line 2.) _____
   + 28 inches 38"
   Cable-Hose Length = _____

If line 1. is equal to or larger than line 3., the cable-hose length should be

H (line 1.) _____
– D (line 2.) _____
= _____
+ 38 inches 38"
Cable-Hose Length = _____

JUNCTION BLOCK GROUP



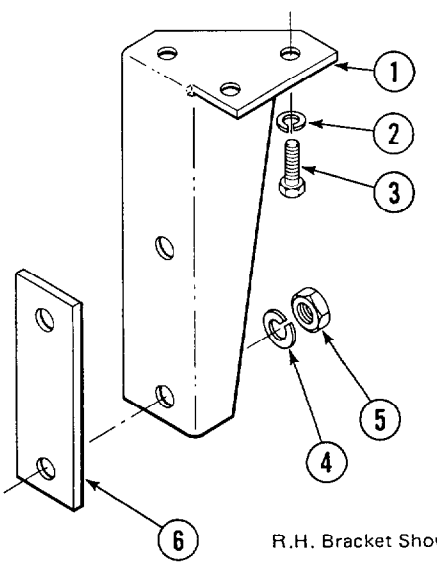
REF. NO.	QTY.	PART NO.	DESCRIPTION
		659859	Junction Block Assembly
1	1	659828	Junction Block
2	1	662139	Clamp
3	1	659851	Bar
4	2	6372	Lockwasher
5	1	4472	Capscrew
6	1	4468	Capscrew
7	1	662138	Clamp

MOUNTING GROUP

REF. NO.	QTY.	RIGHT HAND PART NO.	LEFT HAND PART NO.	DESCRIPTION
		665330	665331	Mounting Group
1	1	664084	664085	Mounting Bracket
2	3	6288	6288	Lockwasher
3	3	3601	3601	Capscrew
4	2	6290	6290	Lockwasher
5	2	5904	5904	Nut
6	1	662293	662293	Bar

These mounting groups designed for Cascade roller triple lift masts.

For Cascade Quad masts and masts other than Cascade, use Mounting Group 661031.



R.H. Bracket Shown

FITTING GROUP

HC2R, HC2L, HC6R, HC6L, HC8R, HC8L Models	
CATALOG ORDER NO.	FITTING SIZE
646062	No. 6

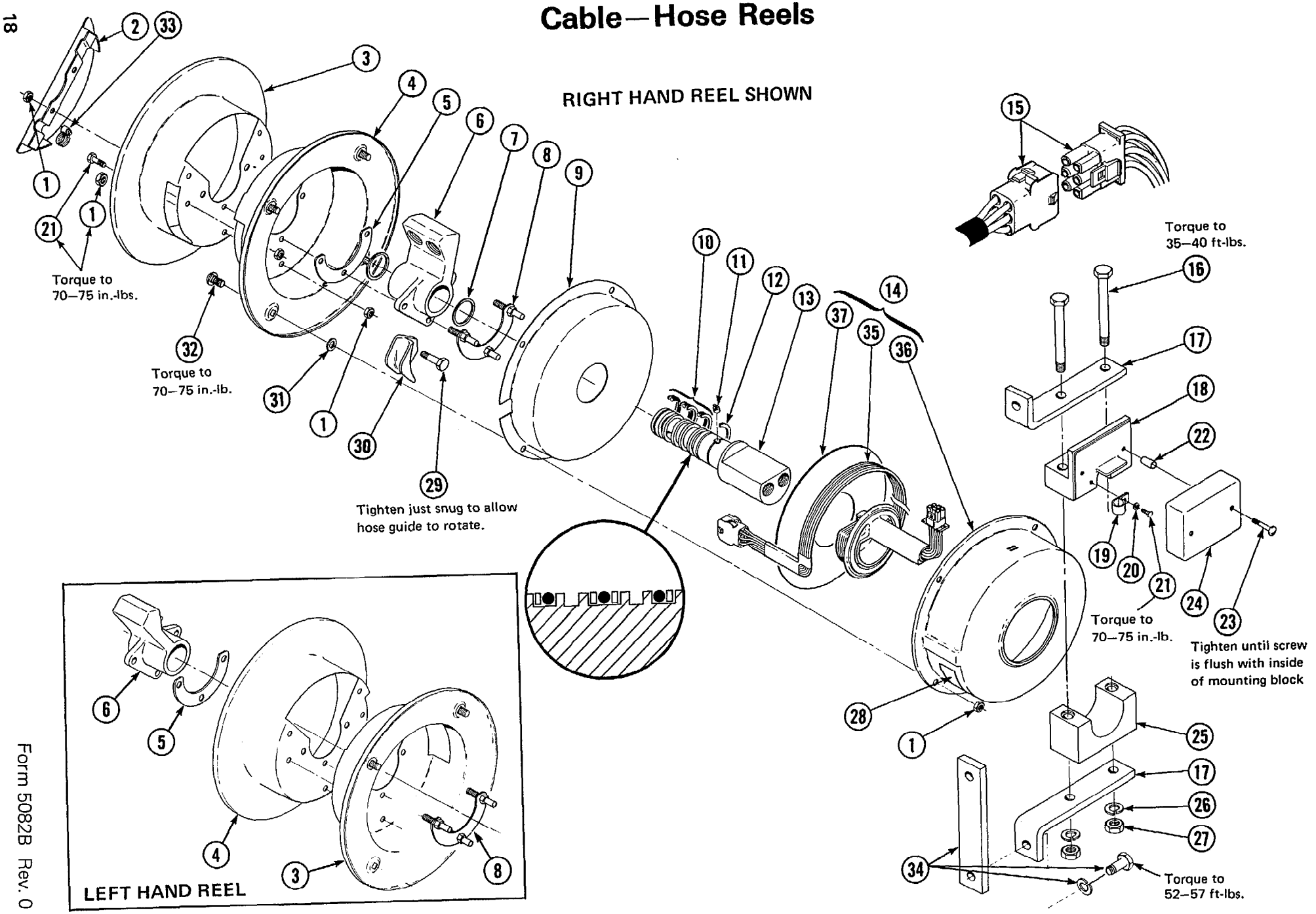
The group includes four straight O-Ring connectors and two Swivel 90° Elbows. This permits hose connections into and out of the reel. All necessary electrical connectors are included with the reel.

CABLE-HOSE GROUPS

CATALOG ORDER NO.	HOSE LENGTH (TOTAL) STANDARD	HOSE LENGTH (TOTAL) COLD STRG.	HOSE SIZE (No. 6 Fittings)
665678	128"	128"	No. 5
665679	231"	231"	
665680	316"		
660431	118"	118"	No. 6
665681	212"	212"	
665682	284"		
665683		239"	

The cable is constructed of 18 ga., six conductor wire with six electrical connectors.

Cable—Hose Reels



Cable—Hose Reels

Items that vary according to model

REF. NO.	Qty.	11.5" Diameter		14.5" Diameter		16.5" Diameter		DESCRIPTION
		HC2R	HC2L	HC8R	HC8L	HC6R	HC6L	
		669658	669659	669660	669661	669662	669663	Cable-Hose Reel Assy.
3	1	645979	645990	645988	646067	646070	646071	Flange
4	1	645990	645979	646067	645988	646071	646070	Flange
28	1	669664	669665	669666	669667	669668	-669669	Nameplate

Items common to all models

REF. NO.	QTY.	PART NO.	DESCRIPTION	REF. NO.	QTY.	PART NO.	DESCRIPTION
1	11	645986	Locking Nut	17	2	659888	Mounting Bracket
2	1	659898	Rotating Cover – Left hand	18	1	659885	Upper Mounting Block
	1	659876	Rotating Cover – Right hand	19	1	659890	Clip
5	1	659880	Spacer	20	1	6286	Lockwasher
6	1	646064	Hub	21	4	3551	Capscrew
7	2	7194	Snap Ring	22	2	663886	Tube
8	1	659881	Bracket	23	2	659887	Machine Screw
9	1	664886	Spring Assembly – Right hand	24	1	659886	Fixed Cover
	1	664885	Spring Assembly – Left hand	25	1	659884	Lower Mounting Block
•10	1	646339	Shaft Seal Kit	26	2	6290	Lockwasher
11	1	659917	Spring Retainer	27	2	5904	Nut
12	1	653314	Snap Ring	29	1	3556	Capscrew
13	1	659879	Shaft	30	2	646075	Hose Guide
14	1	669651	Cable Service Kit - Right hand	■ 31	4	6228	Washer
	1	669652	Cable Service Kit - Left hand	32	4	659889	Capscrew
••15	1	660414	Connector Kit	33	2	659875	Clamp
16	2	3667	Capscrew	34	1	661031	Mounting Kit
				■ 35	1	669654	Cable Harness
				■ 36	1	669647	Cable Housing Assy., R.H.
					1	669648	Cable Housing Assy., L.H.
				■ 37	1	659882	Divider Plate

•Shaft Seal Kit includes 4 Back-Up Rings, 3 O-Rings, 2 Snap Rings, and an O-Ring Loader.

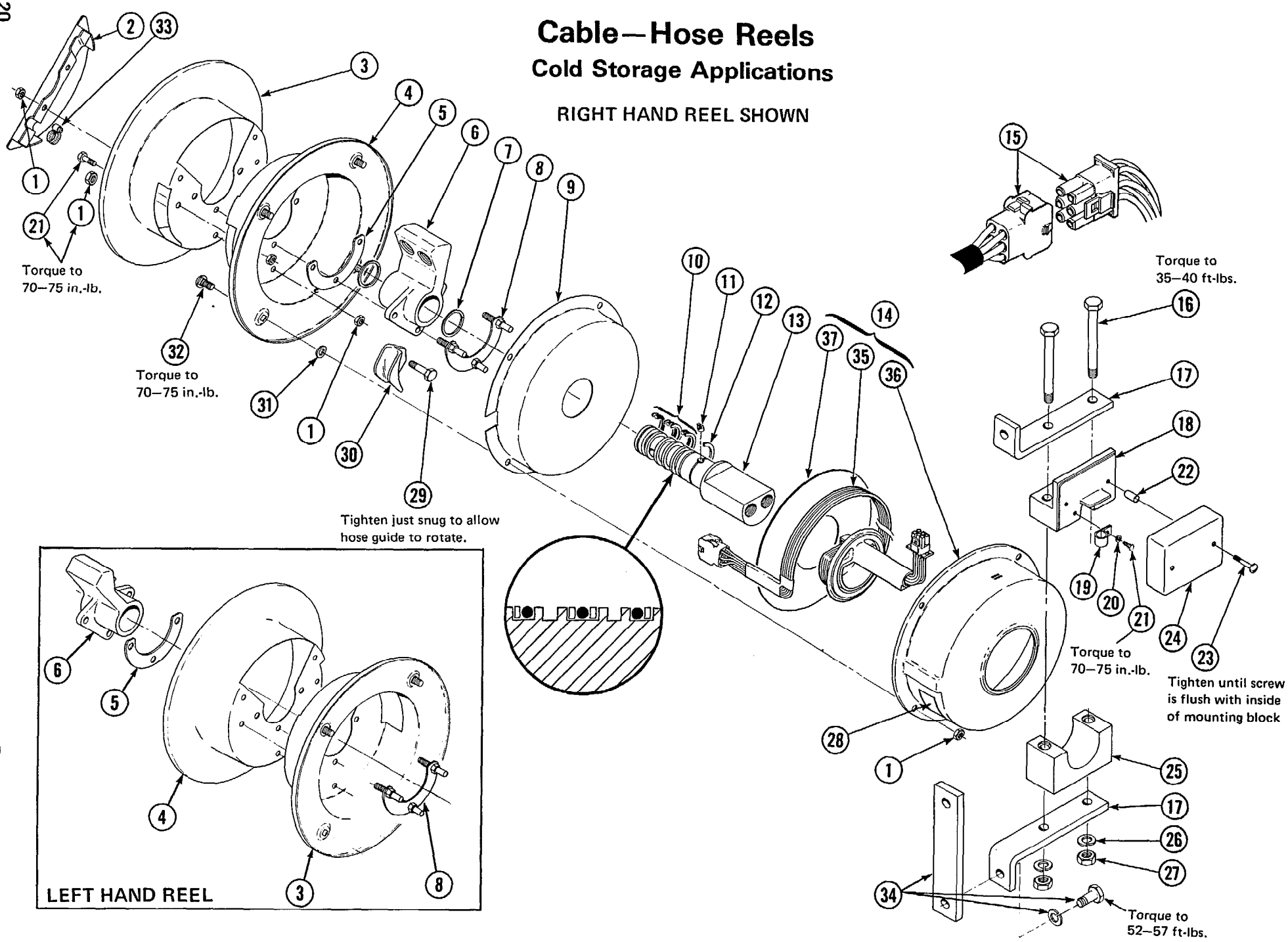
••Connector Kit includes 1 Socket Connector Housing (661680) and 6 Socket Connectors (661681); 1 Pin Connector Housing 661678) and 6 Pin Connectors (661679).

■Included in Cable Service Kit.

Cable—Hose Reels

Cold Storage Applications

RIGHT HAND REEL SHOWN



Cable—Hose Reels
Cold Storage Applications

Items that vary according to model

REF. NO.	Qty.	11.5" Diameter		14.5" Diameter		16.5" Diameter		DESCRIPTION
		HC2R	HC2L	HC8R	HC8L	HC6R	HC6L	
		669722	669723	669724	669725	669726	669727	Cable-Hose Reel Assy.
3	1	645979	645990	645988	646067	646070	646071	Flange
4	1	645990	645979	646067	645988	646071	646070	Flange
28	1	669728	669729	669730	669731	669732	669733	Nameplate

Items common to all models

REF. NO.	QTY.	PART NO.	DESCRIPTION	REF. NO.	QTY.	PART NO.	DESCRIPTION
1	11	645986	Locking Nut	17	2	659888	Mounting Bracket
2	1	659898	Rotating Cover – Left hand	18	1	659885	Upper Mounting Block
	1	659876	Rotating Cover – Right hand	19	1	659890	Clip
5	1	659880	Spacer	20	1	6286	Lockwasher
6	1	646064	Hub	21	4	3551	Capscrew
7	2	7194	Snap Ring	22	2	663886	Tube
8	1	659881	Bracket	23	2	659887	Machine Screw
9	1	664886	Spring Assembly – Right hand	24	1	659886	Fixed Cover
	1	664885	Spring Assembly – Left hand	25	1	659884	Lower Mounting Block
•10	1	646339	Shaft Seal Kit	26	2	6290	Lockwasher
11	1	659917	Spring Retainer	27	2	5904	Nut
12	1	653314	Snap Ring	29	1	3556	Capscrew
13	1	659879	Shaft	30	2	646075	Hose Guide
14	1	669718	Cable Service Kit - Right hand	■ 31	4	6228	Washer
	1	669719	Cable Service Kit - Left hand	32	4	659889	Capscrew
••15	1	660414	Connector Kit	33	2	659875	Clamp
16	2	3667	Capscrew	34	1	661031	Mounting Kit
				■ 35	1	665539	Cable Harness
				■ 36	1	669647	Cable Housing Assy., R.H.
					1	669648	Cable Housing Assy., L.H.
				■ 37	1	659882	Divider Plate

• Shaft Seal Kit includes 4 Back-Up Rings, 3 O-Rings, 2 Snap Rings, and an O-Ring Loader.

•• Connector Kit includes 1 Socket Ckonnector Housing (661680) and 6 Socket Connectors (661681); 1 Pin Connector Housing (661678) and 6 Pin Connectors (661679).

■ Included in Cable Service Kit.

Do you have questions you need answered right now? Call your nearest Cascade Service Department.

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