Duff-Norton®

Actuators

Modular Actuators

Installation, Operation & Maintenance Instructions

Publication Part No. SK-2463-22

Translating Tube Actuators
Model Numbers M-2464 & M-2465

Rotating Screw Actuators
Model Numbers M-2462 & M-2463

⚠ CAUTION

This manual contains important information for the correct installation, operation and maintenance of the equipment described herein. All persons involved in such installation, operation, and maintenance should be thoroughly familiar with the contents. To safeguard against the possibility of personal injury or property damage, follow the recommendations and instructions of this manual and keep it for further reference.

⚠ WARNING

Improper use can result in personal injury. To avoid injury:

- **Do not use actuators to lift, support, or transport people or loads over people without written approval from Duff-Norton.**
- **Read all product warnings and operating instructions.**

Contents

Section I
Introduction

1-1. General

This manual provides instructions for the installation, operation, and maintenance of the Duff-Norton® Modular Actuator. It includes proper procedures for the disassembly, cleaning, inspection, rebuilding, lubrication, and assembly of the actuator. To ensure efficient and long, satisfactory use of this unit, read and understand the information herein, and follow the instructions closely.

1-2. Intended Use

The Duff-Norton® Modular Actuators described and illustrated in this manual are intended for industrial use only and should not be used to lift, transport, or otherwise support people.

1-3. Safety Considerations

1. Avoid touching exterior surfaces of the actuator. Surface temperatures may reach 230 ° F during prolonged use.
2. Make certain that the electric motor used conforms to the requirements of the actuator.

1-4. Unwarranted Applications

⚠ CAUTION

These actuators are not recommended or warranted for use in applications involving the following activities or conditions:

1. Lifting, supporting, or positioning of people where a malfunction might result in bodily injury.
2. Side loading or binding of the actuator. (See Paragraph 4-1, "Improper Loading".)

NOTE

If in doubt about the suitability of the actuator for you application, consult the Duff-Norton Engineering Department.

1-5. Warranty and Warranty Repair

Subject to the conditions stated herein, Duff-Norton will repair or replace, without charge, any parts proven to Duff-Norton's satisfaction to have been defective in material or workmanship. Claims must be made within one year after date of shipment. Duff-Norton will not repair or replace any parts that become inoperative because of improper maintenance, eccentric loading, overloading, chemical or abrasive action excessive heat, or other abuse

Equipment and accessories not of Duff-Norton's manufacture are warranted only to the extent that they are warranted by the manufacturer, and only if the claimed defect arose during normal use, applications and service. Equipment which has been altered or modified by anyone without Duff-Norton's authorization is not warranted by Duff-Norton. EXCEPT AS STATED HEREIN, DUFF-NORTON MAKES NO OTHER WARRANTIES, EXPRESS OR IMPLIED, INCLUDING WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE.

If you have any questions concerning warranty repair, please consult a Duff-Norton Warehouse and Customer Service Center for the name and address of your nearest Duff-Norton actuator warranty repair facility.

Authorization for return must be granted by the Duff-Norton Company before any equipment may be returned for inspection or warranty repair.

Section II
Installation

2-1. Motor Installation

The Modular Actuator is designed to accept a standard NEMA 56 frame electric motor with C-face mounting, to be supplied by the customer. For instructions on installing the motor on the actuator, see Paragraph 5-5, steps 19-21 (these steps apply to both Rotating Screw and Translating Tube actuators).

2-2. Installation of the Actuator

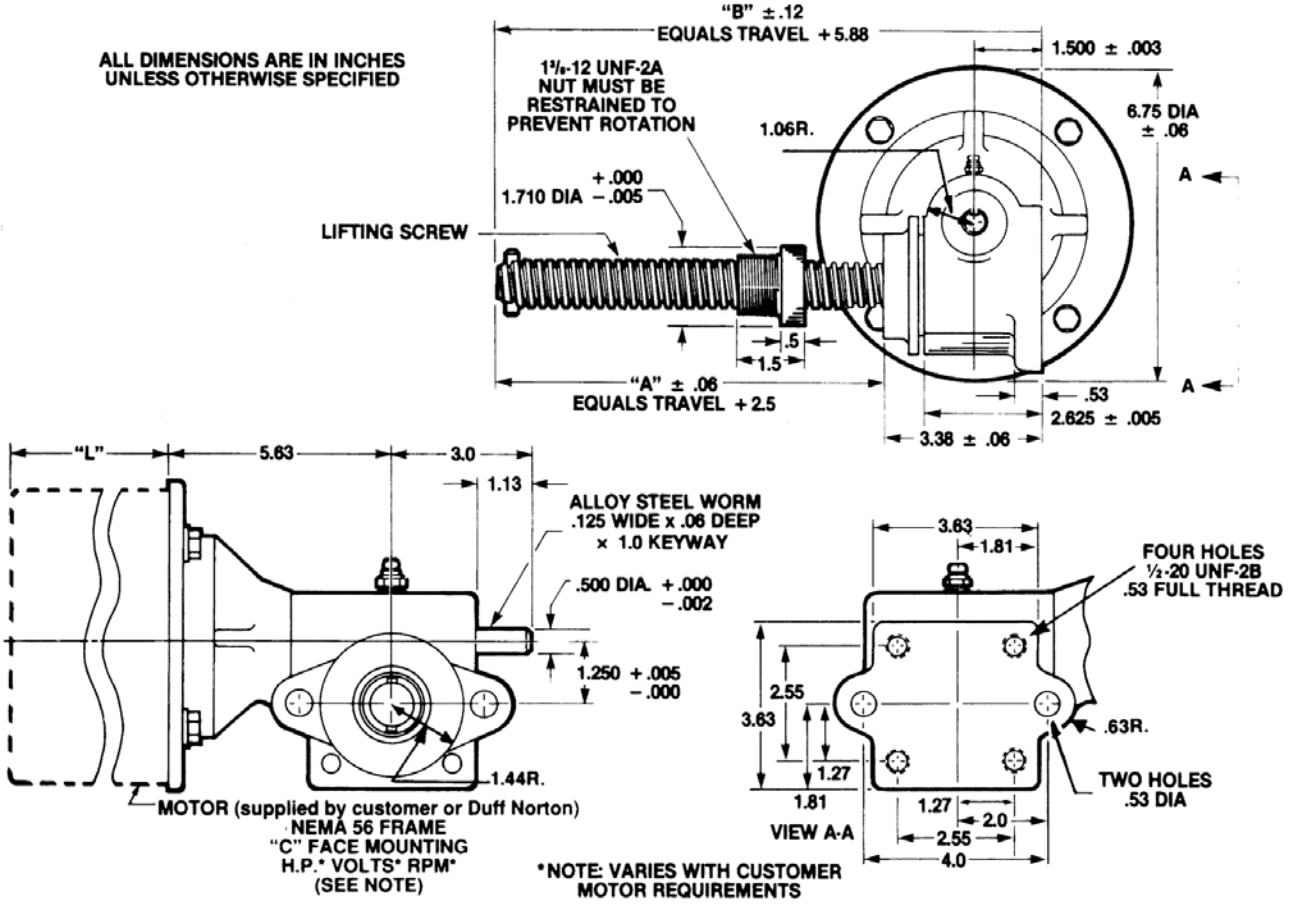
The actuator has two bolt patterns for convenient attachment of the actuator to the application: both the two-hole pattern (17/32-inch unthreaded holes 4 inches apart) and the four-hole pattern (1/2-20 threaded holes on a 2.55 inch square) can be used to bolt the actuator to a wide variety of mounting points; the four-hole pattern will also accept standard hydraulic type end fittings.

The lifting nut (on Rotating Screw actuators) and the clevis end (on Traslating Tube actuators) must be restrained against rotation in order for the actuator to lift its load.

2-3. Limit Switches

Duff-Norton recommends that limit switches be incorporated in the installation to prevent overtravel of the actuator in either direction and to protect the actuator against internal jamming. Duff-Norton limit switches to fit this actuator are available at an additional cost.

Section III
Dimensions and Specifications



⚠ WARNING

Use only replacement parts supplied by or approved by Duff Norton. Non-authorized parts may be inadequate, resulting in serious injury or death in event of failure.

Figure 3-1. Dimensions - Rotating Screw Actuators (Models M-2462 and M-2463)

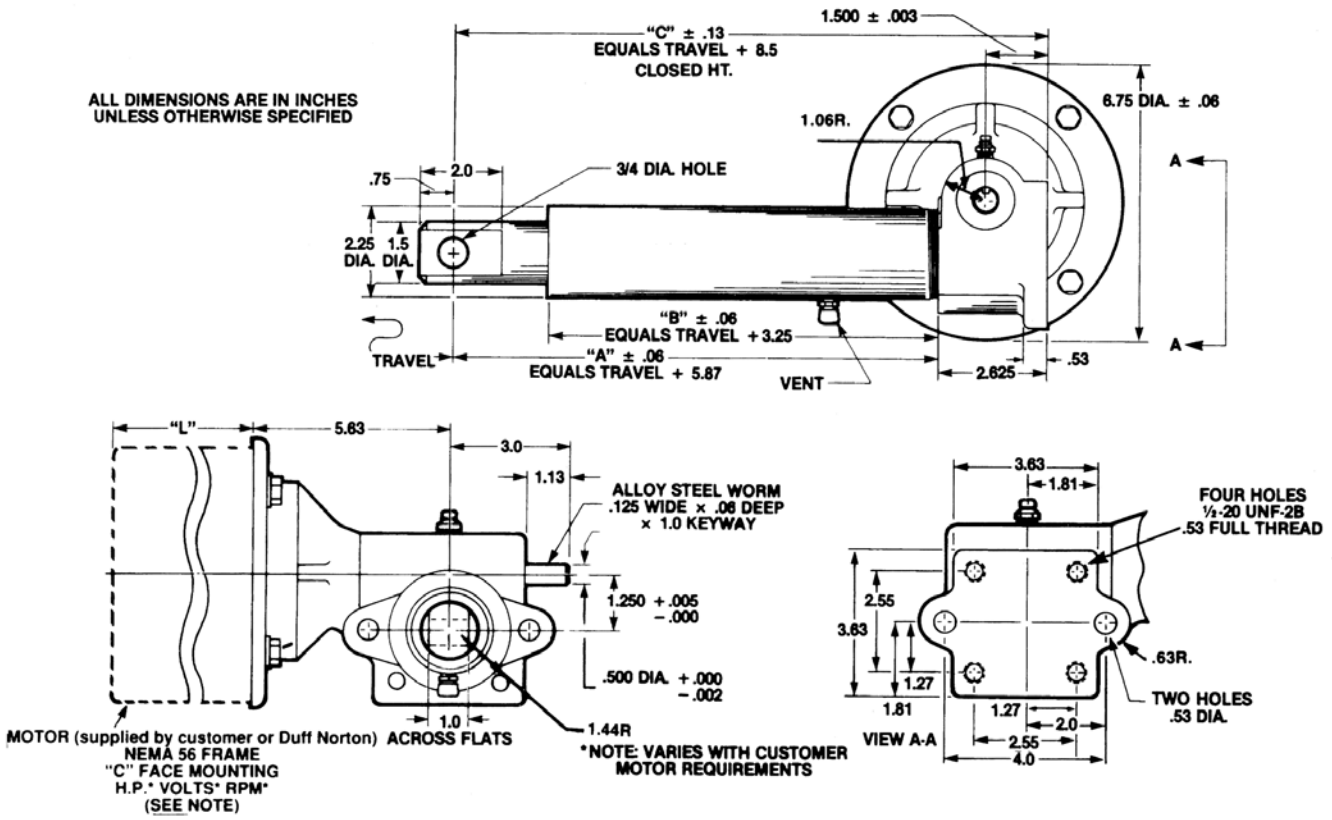


Figure 3-2. Dimensions - Translating Tube Actuators (Models M-2464 and M-2465)

Table 3-1. Specifications

Model No.	Screw Dia.	Turns of Worm /1in Travel		Torque lb/in @ 1000 lb Load		1Motor RPM	Rated Load						Lifting Speed in/min	
							1/3 HP Motor		1/2 HP Motor		3/4 HP Motor			
		Ratio		Ratio			Ratio		Ratio		Ratio		Ratio	
		5:1	20:1	5:1	20:1		5:1	20:1	5:1	20:1	5:1	20:1	5:1	20:1
M-2462 M-2464	.875 Dia. Acme 25 Pitch R.H. Double	10	40	39	18	1725	300	700	500	1000	700	1500	170	43
						1140	450	1000	700	1500	1100	2000	114	28
M-2463 M-2465	1.0 Dia. Acme 25 Pitch R.H. Single	20	80	29	14	1725	400	900	600	1400	900	2000	85	21
						1140	600	1400	900	2000	1400	2000	57	14

NOTE:

1. Models M-2462 and M-2464 are self-lowering and a motor brake should be used.
2. Models M-2463 and M-2465 may drift 0.75 in (20:1 ratio) to 2.0 in (5:1 ratio) when the motor is shut off. If this is undesirable, a motor brake should be used.

Section IV
Operation, Maintenance, and Inspection

4-1. Improper Loading

⚠ WARNING

The actuator must NOT be subjected to side loading or binding (i.e., a bending moment across the actuator) at any point in its travel. It is the responsibility of the installer to ensure that the mounting points cannot transmit such loading to the actuator anywhere between full retraction and full extension. Failure to observe this warning will void the warranty on the actuator.

4-2. Clevis Pins

The axes of the clevis pins should be parallel so that the actuator can pivot without binding. A few drops of oil should be applied to the clevis pins on installation and periodically thereafter.

4-3. Lubrication

Unless otherwise specified, actuators are shipped packed with grease which should be sufficient for one onth of normal operation. For normal operation, the actuator should be lubricated once a month using Mobil XHP461 or XHP462 Extreme Pressure grease.

The actuator should be lubricated periodically (see NOTE under Paragraph 4-4, "Inspection"), using the grease fitting. On Rotating Screw actuators, the lifting screw and nut can be lubricated by painting a light coat of grease on the screw at a point that passes through the nut. To lubricate the lifting screw and nut on a Translating Tube actuator, first loosen the set screws and unscrew the outer tube from the housing to expose the lifting screw threads.

The actuator should be disassembled, cleaned, inspected, and relubricated after 500,000 inches of travel under normal conditions, or earlier if the need is indicated by inspection or by a squealing from the lifting screw and nut area. Follow the instructions in Section V to overhaul the actuator.

4-4. Inspection

The actuator should be inspected periodically (see NOTE below), with attention given to the following items:

1. Clevis ends for wear, cracks, distortion, or other degradation or damage.
2. Loose belts, screws, or other hardware on the actuator or its mounting points.
3. Limit switches (if so equipped) for proper setting and operation.
4. Lifting screw, lifting nut, and gear set for excessive wear or lack of lubrication (see instructions under Paragraph 4-3, "Lubrication").

Any of the above deficiencies should be corrected before the actuator is returned to service.

NOTE

Periodic Inspection and Lubrication: The exact periods for inspection and lubrication of the actuator cannot be predetermined because of the many variables involved, such as frequency of operation, type and magnitude of loading, and operational environment. Determination should be based on the user's experience. It is recommended that the user begin with a weekly inspection, extending the inspection period to monthly, quarterly, or annually, based on his weekly experience.

Section V
Disassembly and Assembly

5-1. Lubricant

When rebuilding this actuator, use only Mobile XHP461 or XHP462 Extreme Pressure grease.

5-2. Required Tools

A bearing puller and press, a soft jaw table clamp, and common hand tools are required for proper disassembly and assembly of the actuator.

5-3. General Procedures

Duff-Norton recommends following these procedures during disassembly and assembly of the actuator:

1. Tag critical parts to facilitate reassembly.
2. Mark mating surfaces to ensure proper meshing.
3. Clean and lubricate parts as required.
4. Replace all seals at time of rebuild.
5. Replace any screws, washers, and other small common parts that are damaged in any way.

5-4. Disassembly - Rotating Screw Actuators (Models M-2462 and M-2463)

Disassemble the Duff-Norton® Rotating Screw Modular Actuator as follows, referring to Figure 6-1 on page 11. Read the instructions thoroughly before disassembling the actuator.

NOTE
For disassembly procedures for Translating Tube actuators, see Paragraph 5-6.

NOTE
Disassembly should be undertaken on a clean cloth.

1. Remove the four cap screws (B) with lock washers (F) that attach the motor (A) to the shell (9) flange, and remove the motor from the shell. Half the flexible coupling (5a) will come with the motor shaft, and the other half (5a) will remain on the worm shaft (4). The flexible spider (5b) may stay with either half of the coupling.
2. Remove the set screw (5c) from the motor half of the coupling (5a), and remove the coupling half and the key (E) from the motor shaft.
3. Remove the pipe plug (7) and the grease fitting (8) from the shell (9).
4. Remove the set screw (5c) from the worm half of the coupling (5a) by inserting the set screw wrench through the pipe plug hole.
5. Remove the coupling half (5a) and the key (18) from the worm shaft (4).

When disassembling an actuator equipped with limit switches, follow steps 6 and 7 below. If the actuator is not equipped with limit switches, proceed directly to step 8.

6. Remove the two socket head cap screws (28) and the one long hex head cap screw (26) from the limit switch adaptor (29), and remove the limit switch box (D) from the limit switch adapter.
7. Remove the two half dog point sets screws (30) from the shell (9) and remove the limit switch adapter (29) from the shell (see **NOTE** below).

NOTE
It may be necessary to use heat to overcome the adhesive in order to remove the limit switch adapter from the shell.

8. Remove the two set screws (10) from the shell (9), and unscrew the shell cap (19) from the shell.
9. Remove the shell cap, lifting screw, bearing, and gear assembly from the shell (9).
10. Remove the retaining ring (1) from the shell (9).
11. Remove the worm (4) by pressing on the motor end of the worm shaft. The worm bearing (2) next to the retaining ring (1) groove will be driven out by the worm. The other worm bearing (2) should remain in the shell until the load bearing cup (13) has been removed.
12. Press the worm bearing (2) off the worm (4).
13. Remove the load bearing cup (13) out of the shell (9).
14. Remove the remaining worm bearing (2) from the shell (9).
15. Clamp the lifting screw (17) in a vise, using soft jaws to prevent damage to the screw.
16. Remove the lock nut (12), and remove the gear (14), key (18), and spacer (15) from the lifting screw (17).
17. Remove the shell cap (19) and lifting nut (20) from the lifting screw (17).
18. Remove the stop pin (16) from the lifting screw (17) if necessary.
19. Remove the two load bearing cones (13) from the gear (14).

ACTUATOR DISASSEMBLY IS COMPLETE

5-5. Assembly - Rotating Screw Actuators (Models M-2462 and M-2463)

Assemble the Duff-Norton® Rotating Screw Modular Actuator as follows, referring to Figure 6-1 on page 11. Read the instructions thoroughly before assembling the actuator.

NOTE
For assembly procedures for Translating Tube actuators, see Paragraph 5-7.

NOTE
Be sure all parts are clean and dry before assembling the actuator.

1. Assemble one load bearing cup (13) into the shell (9), and the other load bearing cup into the shell cap (19).
2. Assemble one worm bearing (2) into the motor mounting flange end of the shell (9) (see **NOTE** below).

NOTE
The bearing must be installed from the opposite end of the shell.

3. Notice that one end of the worm (4) has a hole in the center of the shaft, and one end does not. Press the remaining worm bearing (2) on to the end of the shaft WITH the hole.
4. Assemble the worm (4) into the shell (9) and worm bearing (2), and then install the retaining ring (1) in the shell.
5. Grease the two load bearing cones (13) and install them on the worm gear (14) bearing journals.
6. Install the stop pin (16) in the end of the lifting screw (17), taking care to center the pin in the screw.
7. Screw the lifting nut (20) on to the lifting screw (5) with the flange end away from the stop pin (16).
8. Slide the shell cap and bearing cup assembly over the lifting screw threads, with the bearing cup (13) facing the turned end of the lifting screw.
9. Slip the spacer (15) over the end of the lifting screw (17), with the flange toward the screw thread.
10. Install the key (18) in the keyway in the lifting screw (17).
11. Slide the gear and load bearing cone assembly over the end of the lifting screw (17).
12. Thread the lock nut (12) on to the end of the lifting screw (17). Clamp the lifting screw between soft jaws in a vise, and tighten the lock nut to 30 ft-lb.
13. Install the lifting screw, shell cap, and gear assembly in the shell (9), taking care to mesh the gear teeth and the worm properly.
14. Pack the gear housing with Shell Albida LC EP#2 grease.
15. Coat the shell cap (19) threads with aluminum antiseize compound. Thread the shell cap into the shell (9), and torque it to 40 ft-lb. Spot drill the shell cap thread O.D. in two places, and install the two set screws (10). Tighten the set screws to hold the shell cap in place.
16. Install the key (6) in the end of the worm (4) shaft on the flange side of the shell (9), and slide a coupling half (5a) onto the worm shaft. The inside face of the coupling should be flush with the worm shaft end. Tighten the coupling set screw (5c) against the key by inserting the set screw wrench through the 1/8-inch pipe tap hole in the shell.
17. Install the pipe plug (7).
18. Install the grease fitting (8).
19. Install the key (E) in the motor shaft and slide the second coupling half (5a) on to the motor shaft, with the inside face of the coupling flush with the end of the motor shaft. Tighten the coupling set screw against the key to lock it in place.
20. Assemble the flexible spider (5b) on to the motor coupling half (5c).
21. Align the motor coupling half (5a) with the worm coupling half (5a) and assemble the motor (A) to the shell (9), aligning the holes in the flange with the tapped holes in the face of the motor. Make sure that the motor is centered in the counterbore, and then install and tighten the four 3/8-16 x 7/8 inch hex head cap screws (B) with lock washers (F) that attach the motor to the flange. Turn the worm shaft extension by hand to be certain that there is no binding of the motor and the actuator.

    This completes the assembly procedures for actuators not equipped with limit switches. When assembling an actuator equipped with limit switches, continue with the instructions below.

22. Apply two or three drops of Loc-Tite No. 35 Extra Strength Retaining Ring Compound to the shell bore.

    If a new (replacement) limit switch adapter is being installed, follow steps 23 and 24 below. If a used (previously spot drilled) adapter is being installed, proceed directly to step 25.

23. Install the limit switch adapter (29) in the shell (9), making sure that the adapter bottoms out against

the retaining ring (1). Orient the four tapped holes in the limit switch adapter to line up with the four motor mounting holes in the housing flange.

24. Spot drill the limit switch adapter (29) in two places and install the two half dog point set screws (30). Proceed directly to step 27.
25. Install the limit switch adapter (29) in the shell (9), aligning the spot drilled holes in the adapter with the tapped holes in the shell.
26. Install the two half dog point set screws (30).
27. Aligning the slot in the limit switch worm shaft with the pin in the actuator worm, install the limit switch box on the adapter (29) in the desired position.

ASSEMBLY OF THE ACTUATOR IS NOW COMPLETE

5-6. Disassembly - Translating Tube Actuators (Models M-2464 and M-2465)

Disassemble the Duff-Norton® Translating Tube Modular Actuator as follows, referring to Figure 6-2 on page 12. Read the instructions thoroughly before disassembling the actuator.

NOTE
For disassembly procedures for the Rotating Screw actuators, see Paragraph 5-4.

NOTE
Disassembly should be undertaken on a clean cloth.

1. Remove the four cap screws (B) with lock washers (F) that attach the motor (A) to the shell (9) flange, and remove the motor from the shell. Half the flexible coupling (5a) will come with the motor shaft, and the other half (5a) will remain on the worm shaft (4). The flexible spider (5b) may stay with either half of the coupling.
2. Remove the set screw (5c) from the motor half of the coupling (5a), and remove the coupling half and the key (E) from the motor shaft.
3. Remove the pipe plug (7) and the grease fitting (8) from the shell (9).
4. Remove the set screw (5c) from the worm half of the coupling (5a) by inserting the set screw wrench through the pipe plug hole.
5. Remove the coupling half (5a) and the key (6) from the worm shaft (4).

When disassembling an actuator equipped with limit switches, follow steps 6 and 7 below. If the actuator is not equipped with limit switches, proceed directly to step 8.

6. Remove the two socket head cap screws (28) and the one long hex head cap screw (26) from the limit switch adapter (29), and remove the limit switch box (D) from the limit switch adapter.
7. Remove the two half dog point set screws (30) from the shell (9) and remove the limit switch adapter (29) from the shell (see **NOTE** below).

NOTE
It may be necessary to use heat to overcome the adhesive in order to remove the adapter from the shell.

8. Remove the two set screws (10) from the shell (9), and remove the outer tube (24) by first unscrewing it from the shell and then sliding it off over the translating tube.
9. Remove the translating tube, lifting screw, bearing, and gear assembly from the shell (9).
10. Remove the retaining ring (1) from the shell (9).
11. Remove the worm (4) by pressing on the motor end of the worm shaft. The worm bearing (2) next to the retaining ring (1) groove in the shell (9) will be driven out by the worm. The other worm bearing (2) should remain in the shell until the load bearing cup (13) has been removed.
12. Press the worm bearing (2) off the worm (4).
13. Remove the load bearing cup (13) out of the shell (9).
14. Remove the remaining worm bearing (2) from the shell (9).
15. Remove the remaining load bearing cup (13) from the outer tube (24).
16. Remove the wiper scraper seal (22) from the outer tube (24), and if necessary press the guide bushing (23) out of the outer tube.
17. Clamp the lifting screw (17) in a vise, using soft jaws to prevent damage to the screw.
18. Remove the lock nut (12), and remove the gear (14), key (18), and spacer (15) from the lifting screw (17).
19. Remove the two load bearing cones (13) from the gear (14).
20. Screw the lifting screw (17) into the translating tube until the screw bottoms out and cannot rotate farther, or until the screw thread becomes disengaged from the lifting nut (19) thread.
21. (M2464) Drive the four pins (20) just far enough into

the lifting nut (19) to clear the translating tube wall; then remove the translating tube from the nut.

(M2465) Remove the set screw (S7-94) from the translating tube; then remove the lifting nut from the translating tube.

22. Remove the lifting screw (17) from the lifting nut (19).
23. Remove the four pins (20) by pressing each one the rest of the way through the lifting nut wall.
24. Remove the stop pin (16) from the lifting screw (17) if necessary.

DISASSEMBLY OF THE ACTUATOR IS NOW COMPLETE

5-7. Assembly - Translating Tube Actuators (Models M-2464 and M-2465)

Assemble the Duff-Norton® Translating Tube Modular Actuator as follows, referring to Figure 6-2 on page 12. Read the instructions thoroughly before assembling the actuator.

NOTE

For assembly procedures for Rotating Screw actuators, see Paragraph 5-5.

NOTE

Be sure all parts are clean and dry before assembling the actuator.

1. Assemble a load bearing cup (13) into the shell (9).
2. Assemble one worm bearing (2) into the motor mounting flange end of the shell (9) (see **NOTE** below).

NOTE

The bearing must be installed from the opposite end of the shell.

3. Notice that one end of the worm (4) has a hole in the center of the shaft, and one end does not. Press the remaining worm bearing (2) on to the end of the shaft WITH the hole.
4. Assemble the worm (4) into the shell (9) and worm bearing (2), and then install the retaining ring (1) in the shell.
5. Install the guide bushing (23) and the wiper scraper seal (22) in the end of the outer tube (24) opposite the threaded end.
6. Install a load bearing cup (13) in the threaded end of the outer tube (24).
7. Grease the two load bearing cones (13) and install them on the worm gear (14) bearing journals.
8. Install the stop pin (16) in the end of the lifting screw (17), taking care to center the pin in the screw.
9. Screw the lifting nut (19) on to the lifting screw (17) with the flange end away from the stop pin (16).
10. Fill the translating tube (16) approximately half full of Shell Albida LC EP#2 grease.
11. (M2464 only) Slide the translating tube and clevis end assembly over the lifting screw (17) and on to the lifting nut (19), lining the four holes in the translating tube up with the four holes in the lifting nut (19).

    Press the four pins (20) into place (see **CAUTION** below).

⚠ CAUTION

The pins should end up extending 1/32 inch beyond the O.D. of the translating tube, and must NOT jam against the O.D. of the lifting screw thread. If the pins are pressed too far into the lifting nut, they will bind against the lifting screw thread, perhaps damaging the screw surface.

NOTE

The lifting nut should now rotate freely on the lifting screw. If the nut does not rotate freely on the screw, follow steps 21-24 under Paragraph 5-6, "Disassembly", and then resume "Assembly" at step 9.

12. (M2465 only) Clean any grease from the external threads on lifting nut (SK2465-29) and from the internal threads on the translating tube and clevis end assembly. Apply thread locker (Loctite 242) to the external threads on the lifting nut. Screw the translating tube and clevis assembly onto the lifting nut. Use a drill bit to "spot" the lifting nut and install the set screw (S7-94).
13. Slip the spacer (15) over the end of the lifting screw (17), with the flange toward the lifting screw shoulder.
14. Install the key (18) in the keyway in the lifting screw (17).
15. Slide the gear and load bearing cone assembly over the end of the lifting screw (17).
16. Thread the lock nut (12) on to the end of the lifting screw (17). Clamp the lifting screw between soft jaws in a vise, and tighten the lock nut to 30 ft-lb.
17. Install the lifting screw, translating tube, and gear assembly in the shell (9), taking care to mesh the gear teeth and the worm properly.

18. Pack the gear housing with Shell Albida LC EP#2 grease.
19. Make sure that a load bearing cup (13) has been installed in the end of the outer tube (24) (see step 6). Lightly grease the O.D. of the translating tube assembly, and slide the outer tube over the translating tube, threaded end first.
20. Thread the outer tube (24) into the shell (9), and tighten it to 40 ft-lb. Spot drill the outer tube thread in two places, and install and tighten the two set screws (10) to hold the outer tube in place.
21. Install the key (6) in the end of the worm (4) shaft on the flange side of the shell, and slide a coupling half (5a) on to the worm shaft. The inside face of the coupling should be flush with the worm shaft end. Tighten the coupling set screw (5c) against the key by inserting the set screw wrench through the 1/8-inch pipe tap hole in the shell.
22. Install the pipe plug (7).
23. Install the grease fitting (8).
24. Install the key (E) in the motor shaft and slide the second coupling half (5a) on to the motor shaft, with the inside face of the coupling flush with the end of the motor shaft. Tighten the coupling set screw against the key to lock it in place.
25. Assemble the flexible spider (5b) on to the motor coupling half (5c).
26. Align the motor coupling half (5a) with the worm coupling half (5a) and assemble the motor to the shell (9), aligning the holes of the flange with the tapped holes in the face of the motor. Make sure that the motor is centered in the counterbore, and then install and tighten the four 3/8-16 x 7/8 inch hex head cap screws (B) with lock washers (F) that attach the motor to the flange. Turn the worm shaft extension by hand to be certain that there is no binding of the motor and the actuator.

This completes the assembly procedures for actuators not equipped with limit switches. When assembling an actuator equipped with limit switches, continue with the instructions below.

27. Apply two or three drops of Loc-Tite No. 35 Extra Strength Retaining Ring Compound to the shell bore.

    If a new (replacement) limit switch adapter is being installed, follow steps 28 and 29 below. If a used (previously spot drilled) adapter is being installed, proceed directly to step 30.
28. Install the limit switch adapter (29) in the shell (9), making sure that the adapter bottoms out against the retaining ring (1). Orient the four tapped holes in the limit switch adapter to line up with the four motor mounting holes in the housing flange.
29. Spot drill the adapter (29) in two places and install the two half dog point set screws (30). Proceed directly to step 32.
30. Install the limit switch adapter (29) in the shell, aligning the spot drilled holes in the adapter with the tapped holes in the shell.
31. Install the two half dog point set screws (30).
32. Aligning the slot in the limit switch worm shaft with the pin in the actuator worm, install the limit switch box on the adapter (29) in the desired position.

ASSEMBLY OF THE ACTUATOR IS NOW COMPLETE.

Section VI
Parts List and Technical Illustration

6-1. General

This section contains exploded illustrations of Duff-Norton® Rotating Screw and Translating Tube Modular Actuators. The numbers adjacent to each of the parts on the illustrations is the index number. On the parts listed below, these numbers are keyed to the individual part names.

Table 6-1. Parts List for Rotating Screw Actuators

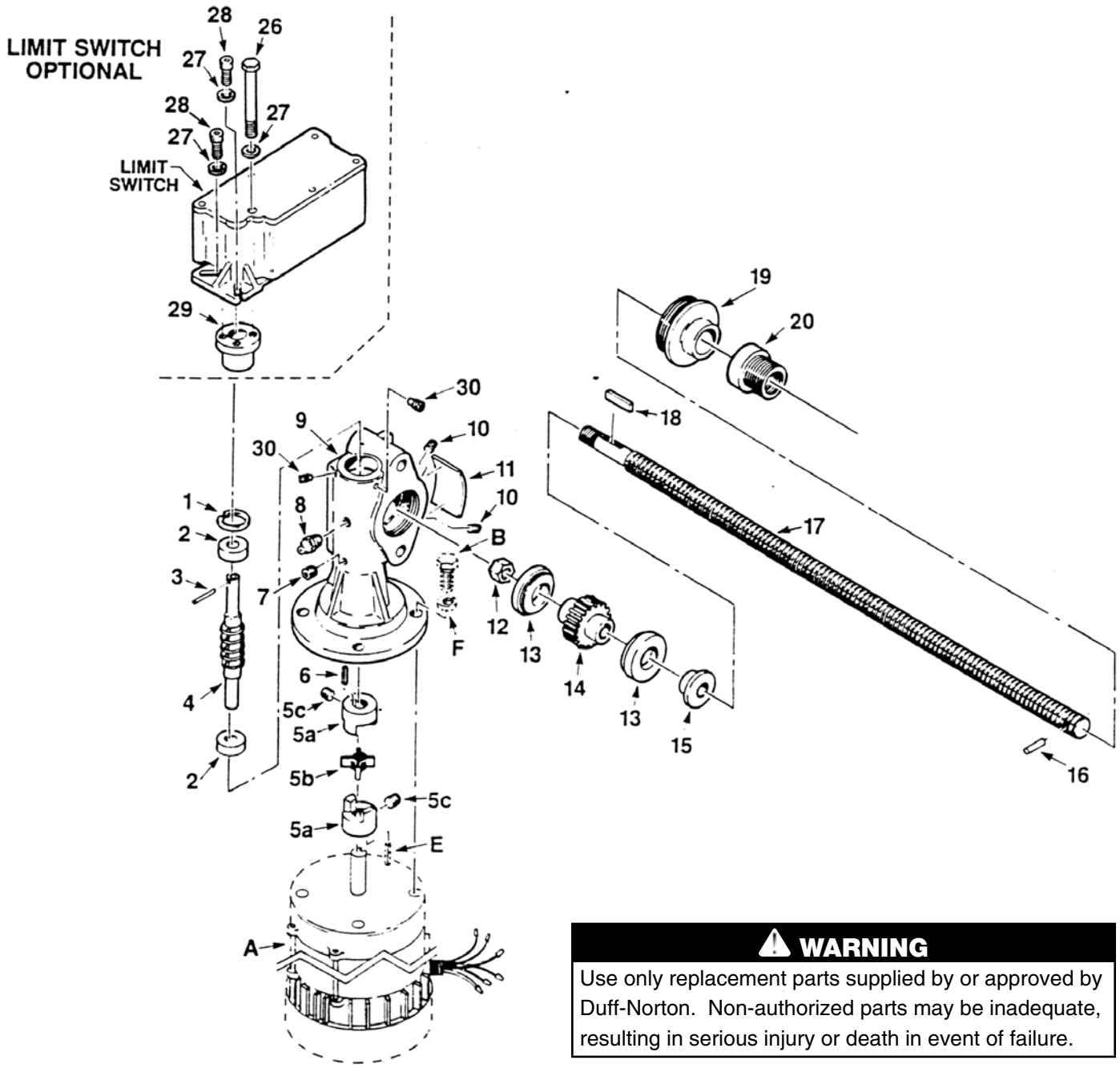
Index No.	Part Name	Qty. Req.	Part Number
1	Retaining Ring	1	SK-2501-11
2	Worm Bearing	2	SK-2501-10
3	Spring Pin (Worm)	1	S-50-26
4	Worm 5:1 Ratio	1	SK-2465-43
4	Worm 20:1 Ratio	1	SK-2465-53
5	Flexible Coupling	1	SK-2465-21
6	Key	1	S-10-2
7	Pipe Plug	1	S-25-13
8	Grease Fitting	1	SK-974-32
9	Shell	1	SK-2465-1
10	Set Screw	2	S-7-10
11	Decal	1	SK-2433-19
12	Lock Nut	1	H-3966-P
13	Load Bearing	2	SK-2501-9
14	Worm Gear 5:1 Ratio	1	SK-3502-4
	Worm Gear 20:1 Ratio	1	SK-2502-14
15	Spacer	1	SK-2465-17
16	Pin (Stop)	1	H-5122-P
17	Screw (M2463)	1	SK-2465-5-*
	Screw (M2462)	1	SK-2464-5-*
18	Key (Screw)	1	S-10-72
19	Shell Cap (M2463)	1	SK-2463-2
	Shell Cap (M2462)	1	SK-2462-2
20	Lifting Nut (M-2463)	1	SK-2463-6
	Lifting Nut (M-2462)	1	SK-2462-6
26	Hex Hd Cap Screw	1	SK-44-157
27	Lock Washer	3	H-4084-P
28	Soc Hd. Cap Screw	2	H-2201
29	Limit Switch Adapter	1	SK-2465-11
30	Set Screws	2	S-52-1

* This No. is equal to travel plus 1.

** 5a - coupling body

5b - spider

5c - set screw



⚠ WARNING

Use only replacement parts supplied by or approved by Duff-Norton. Non-authorized parts may be inadequate, resulting in serious injury or death in event of failure.

Figure 6-1. Exploded Illusration Rotating Screw Modular Actuators (Models M-2464 and M-2465)

Table 6-2. Parts List For Translating Tube Actuators (Models M-2464 and M-2465)

Index No.	Part Name	Qty. Req.	Part Number
1	Retaining Ring	1	SK-2501-11
2	Worm Bearing	2	SK-2501-10
3	Spring Pin (Worm)	1	S-50-2G
4	Worm 5:1 Ratio	1	SK-2465-43
	Worm 20:1 Ratio	1	SK-2465-53
5	Flexible Coupling	1	SK-2465-21
6	Key	1	S-10-2
7	Pipe Plug	1	S-25-13
8	Grease Fitting	1	SK-974-32
9	Shell	1	SK-2465-1
10	Set Screw	2	S-7-10
11	Decal	1	SK-2433-19
12	Lock Nut	1	H-3866-P
13	Load Bearing	2	SK-2501-9
14	Worm Gear 5:1 Ratio	1	SK-3502-4
	Worm Gear 20:1 Ratio	1	SK-2503-14
15	Spacer	1	SK-2465-17

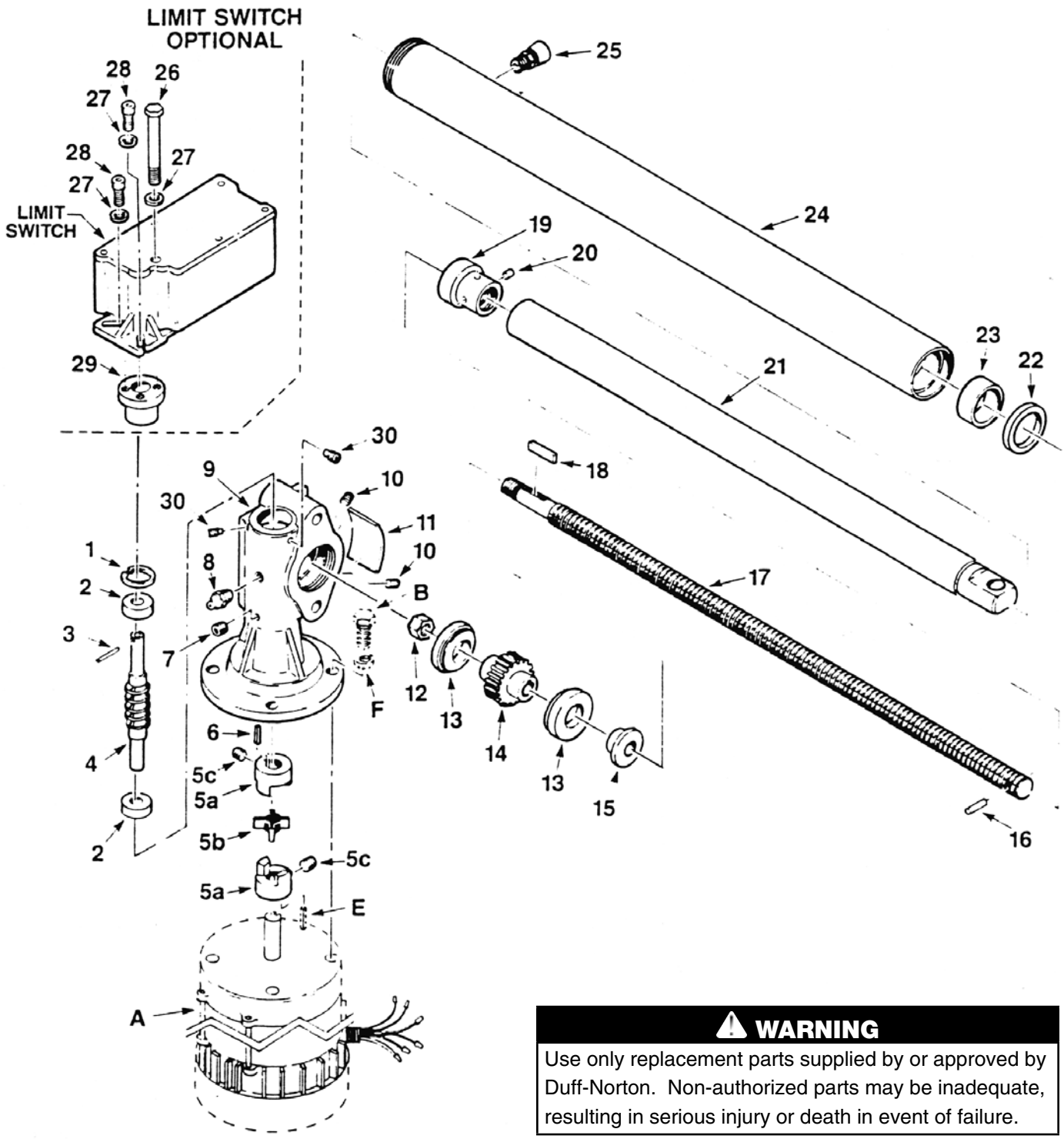
* This No. is equal to travel.

** 5a - coupling body

5b - spider

5c - set screw

Index No.	Part Name	Qty. Req.	Part Number
16	Pin (Stop)	1	H-5122-P
17	Screw (M-2465)	1	SK-2465-5-*
	Screw (M-2464)	1	SK-2464-5-*
18	Key (Screw)	1	S-10-72
19	Lifting Nut (M-2465)	1	SK-2465-29
	Lifting Nut (M-2464)	1	SK-2415-15
20	Pin (Nut)	4	H-5164
	Screw (M-2465)	1	S7-94
21	Tube & Clevis Sub-Assembly (M-2464)	1	SK-6415-109-*A
	Tube & Clevis Sub-Assembly (M-2465)	1	SK-2465-31-*A
22	Wiper-Scraper Seal	1	SK-6415-16
23	Guide Bushing	1	SK-6415-23
24	Outer Tube	1	SK-6415-111-*
25	Air Vent	1	SK-2405-218
26	Hex Hd. Cap Screw	1	S-44-157
27	Lock Washer	3	H-4084-P
28	Soc. Hd. Cap Screw	2	H-2201
29	Limit Switch Adapter	1	SK-2465-11
30	Set Screws	2	S-52-1



⚠ WARNING

Use only replacement parts supplied by or approved by Duff-Norton. Non-authorized parts may be inadequate, resulting in serious injury or death in event of failure.

Figure 6-2. Exploded Illustration Translating Tube Modular Actuators (Models M-2464 and M-2465)

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