

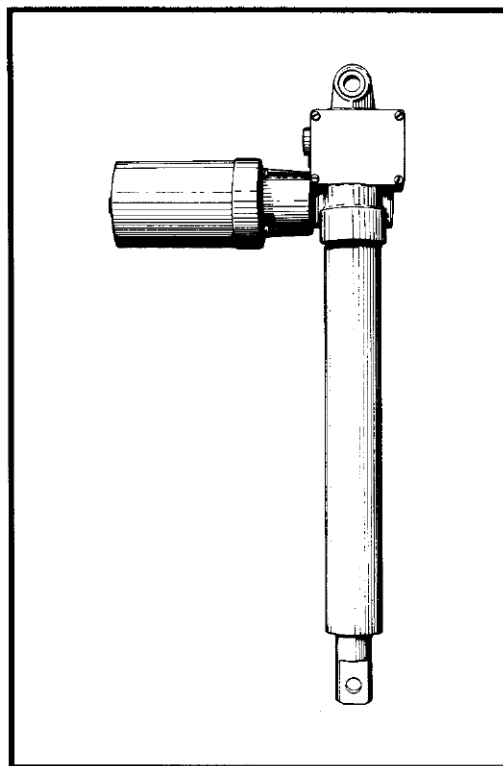
# Duff-Norton®

**INSTALLATION,  
OPERATING AND  
MAINTENANCE  
INSTRUCTIONS**

**WITH PARTS LIST**

**PUBLICATION PART NO. SK-7905-100**

**MINI-PAC™  
ELECTROMECHANICAL  
ACTUATORS  
WITH BUILT-IN LIMIT SWITCHES**



**7905 Series  
220 Volt AC, 50 Hz**

## **IMPORTANT – 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**

The equipment shown in this manual is intended for industrial use only and should not be used to lift, support, or otherwise transport people.

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## SECTION I GENERAL INFORMATION

### 1-1. General

This manual provides instructions for the installation, operation and maintenance of the Duff-Norton® 7905 Series AC Mini-Pac™ electromechanical actuator. It includes proper procedures for the disassembly, cleaning, inspection, rebuilding and assembly of the actuator. To ensure efficient, long, satisfactory use of this unit, these instructions should be followed closely.

### 1-2. Industrial Use Only

The 7905 Series Mini-Pac™ actuators described and illustrated in this manual are intended for industrial use only and should not be used to lift, support or otherwise transport people, unless you have a written statement from Duff-Norton which authorizes this unit, as used in your application, as suitable for moving people.

### 1-3. Factory Preparation

Each actuator is carefully assembled and tested at the factory to ensure that the motor and the mechanical components will function properly and that the actuator will lift its rated load.

The brake is preset at the factory and no further adjustment is required. With proper maintenance, this brake prevents the actuator from self-lowering.

The actuator is prelubricated at the factory and thus requires minimum maintenance.

Limit switches are checked at the factory for proper functioning.

The motor current draw is checked to make certain that it is within Duff-Norton standards.

Every effort has been made to deliver this unit in its factory-approved state. You should, however, carefully inspect the actuator for damage that may have occurred during transit.

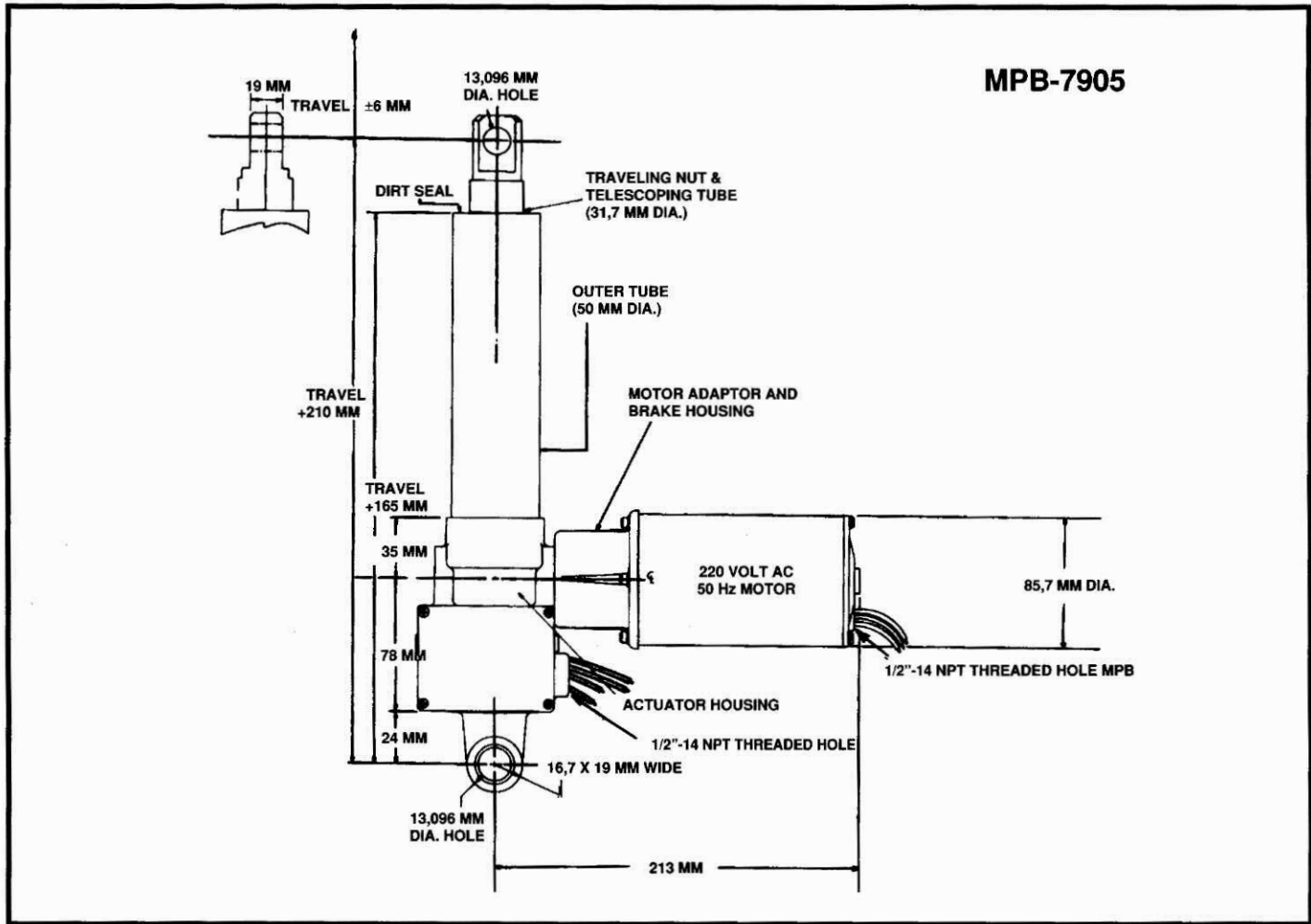
### 1-4. Warranty and Warranty Repair

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 and 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.

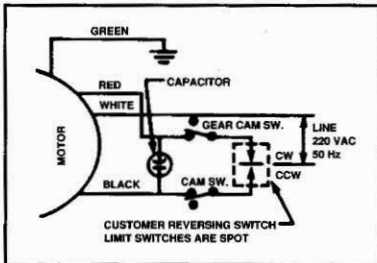
Equipment and accessories not of Duff-Norton's manufacture are warranted only to the extent that they are warranted by their manufacturer, and only if the claimed defect arose during normal use, applications and service. Equipment which has been altered or modified by anyone without Duff-Norton's authorization 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 contact Duff-Norton.

Authorization for return must be received from Duff-Norton before returning any equipment for inspection or warranty repair.



**220 V., 50 Hz, AC MOTOR**



Minimum Voltage: 198 Low Voltages Reduce Load Rating of the Actuator  
 CW = Retract CCW = Extend

220 VAC, 50 Hz Motor is enclosed, permanent split capacitor induction type. Load/no-load speeds are approximately equal. Equipped with thermal overload which opens and resets automatically. Requires 10 MFD 440 VAC, 60/50 Hz dry metalized polypropylene capacitor for loads up to 225 Kg. A capacitor box is available to provide an enclosure for electrical connections and to give a convenient conduit installation.

**FIGURE 1-5. DIMENSIONS AND SPECIFICATIONS**

**TABLE 1-1. WITH 220 V. 50 Hz AC MOTOR**

| Applied Load (kg) | Speed   |         | Amps |
|-------------------|---------|---------|------|
|                   | in./min | mm/min. |      |
| 45                | 35      | 889     | 0,95 |
| 90                | 34      | 864     | 0,95 |
| 135               | 33.5    | 851     | 1,00 |
| 180               | 33      | 838     | 1,05 |
| 225               | 32      | 813     | 1,05 |

**TABLE 1-2. DUTY CYCLE CHART**

| Applied Load (kg) | # Duty Cycles per Hour – 220 VAC, 50 Hz Motor |        |
|-------------------|---|--------|
|                   | in./hr.                                       | mm/hr. |
| 45                | 435   | 11049  |
| 90                | 435   | 11049  |
| 135               | 435   | 11049  |
| 150               | 435   | 11049  |
| 225               | 435   | 11049  |

# Total mm travel (up and down) per hour with equally timed intervals between cycles.

## SECTION II INSTALLATION

### 2-1. Installation Procedures

Use Figure 6-2 on page 10 as a guide to properly attach the 7905 AC Mini-Pac™ actuator to your power source.

### 2-2. Limit Switch Cam Adjustment

#### IMPORTANT

**Before attempting to set limit switch cams by these instructions, be certain that the red and black motor leads and the “Cam” and “Gear Cam” switch leads are connected to the proper capacitor terminals per Figure 6-2. Unless leads are connected exactly as shown, the following steps will be meaningless.**

#### 1. Set Retract Position

- a. Do not connect translating tube to work piece at this time.
- b. Energize and retract actuator until gear cam opens limit switch.

#### NOTE

**Translating tube may have to jam and spin prior to switch activation.**

- c. Unscrew the translating tube until the measured distance between the housing clevis hole centerline and the translating tube clevis hole centerline equals

the desired closed height. If the mating clevis holes are not aligned, manually rotate the translating tube to align the clevises, this will be less than 180° rotation and the closed height of the actuator will then be within 6 mm of the desired retracted dimension.

- d. Pin the translating tube clevis in place and energize the actuator to check the drift.

#### 2. Set Extend Position

- a. Restrain the translating tube from turning, operate actuator and extend to desired position.
- b. Adjust steel switch cam until switch is activated, allowing for drift. (This is accomplished by loosening socket head set screw until cam rotates with a slight drag on the shaft when the allen wrench is used as a lever.)
- c. Check travel and readjust if necessary.
- d. Socket head set screw on cam should be tightened after final adjustment is made. Do not strip threads by overtightening.

At maximum load, repeatability is 3 mm in either direction including drift and normal wear of parts.

## SECTION III OPERATIONAL PROCEDURES

### 3-1. AC Motor

This motor is an intermittent duty type motor having a five minute rating. Since the motor draws almost the same amperage at no load as a full rated load, it only takes 5 minutes of continuous running, regardless of how light the load may be, before the thermal overload relay cuts out. It then takes about 10 minutes before the motor cools sufficiently for the thermal relay to close. Make sure that the duty cycle to which the actuator is subjected is not too severe for the motor. The rear end bell of the motor has a rubber grommet, which when removed, exposes a hole threaded for 1/2”-14 NPT.

### 3-2. Voltage Supply

Avoid using a low voltage supply for the 220 VAC, 50 Hz motor. All wiring, switches, etc. must be of sufficient capacity to carry the required current. (Actuator capacity may be reduced at low voltages.)

### 3-3. Clevis Pins

The axis of the clevis pins should be parallel so that the actuator can pivot without binding. A few drops of oil should be used on the clevis pins.

#### WARNING

**The actuator is not recommended for use in applications where it can be jammed. Examples of jamming include overtraveling the limit switches and thus jamming the nut and screw internally at the extreme ends of the stroke, and driving the actuator against an immovable object and thus overloading the actuator severely. The actuator can jam a limited number of times without damage. Therefore, consult Duff-Norton Engineering if jamming is expected.**

**Do not operate actuator before setting limit switches.**

**Some actuator external surface temperatures may reach 110°C at or near maximum allowable duty cycle.**

## SECTION IV MAINTENANCE

### 4-1. Lubrication

Duff-Norton recommends the use of the following lubricant in conjunction with proper maintenance procedures of this unit: Mobil XHP461 or XHP462.

### 4-2. Required Tools

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

### 4-3. General Procedures

Duff-Norton recommends following these procedures during disassembly and assembly.

1. Tag critical parts to facilitate reassembly.
2. Mark mating surfaces to ensure proper meshing.
3. Clean and lubricate parts as required.
4. All seals must be replaced at time of rebuild.
5. All screws, washers and other small common parts must be replaced if mutilated in any way.

### 4-4. Disassembly

Disassembly the 7905 Series AC Mini-Pac™ actuator as follows while referring to Figure 5-1. Read instructions thoroughly before disassembling.

#### NOTE

**Disassembly should be accomplished on a clean cloth.**

1. Clamp actuator housing (22) in vice (use soft jaws). Unit should be in horizontal position with switch cover (2) up.
2. Remove screws (1) from cover (2) housing (22), limit switch box and remove switch cover (2) and gasket (3).
3. Remove socket head cap screws (33) and lockwashers (32) from motor (23) and remove motor (23) from motor adaptor (31).
4. Remove screws (30) from housing (22) and remove motor adaptor (31).
5. Remove pinion (36) and bearing (35) from housing (22).
6. Remove retaining ring (34) from pinion (36) and remove bearing (35) from pinion (36).
7. Clamp housing (22) clevis end in vice (use soft jaws), remove set screw (39) from housing (22).
8. Unscrew outer tube (45) from housing (22) and remove translating tube (54) screw (50), gear (41) and outer tube (45) from housing (22).
9. Remove translating tube (54) from outer tube (45) by slipping outer tube (45) over translating tube (54) toward clevis end.
10. Remove seal (47) from outer tube (45) and press guide bushing (46) from outer tube (45). Seal and guide bushing need not be removed unless damaged.

11. Support screw (50) end taking care not to damage gear (41) teeth. With a 4 mm diameter punch, drive pin (42) from screw (50) and remove gear (41), bearing (43) and washer (44) from screw.
12. Thread screw (50) part way out of nut (52) and check screw (50) and nut (52) for wear. There should not be excessive play between screw and nut thread. If screw or nut are not excessively worn, the disassembly of screw (50), nut (52) and translating tube (54) will not be necessary.
13. Pins (53) should be approximately .8 mm above translating tube (54) OD. Grind pins (53) flush with OD of translating tube (54).
14. Using 4 mm diameter punch, drive pins (53) far enough into the lifting nut (52) to just clear the translating tube (54) wall. Do not drive pins against OD of screw (50). Remove nut (52) with screw (50) from translating tube (54).
15. Remove screw (50) from nut (52).
16. Remove pins (53) from nut (52) by driving pins (53) remaining distance into I.D. of nut (52).
17. Remove stop pin (51) from screw (50).
18. If worm (48) or pin (49) must be replaced, remove worm (48) from pin (49) by closing pliers loosely around pin (49) behind worm and lightly tap up with a plastic or wood hammer. To remove pin (49) from screw (50) clamp pin (49) in vise and rotate and pull on screw (50). Pin will come out.
19. **Ball brake disassembly.** Remove set screws (29) from ball housing (26) and remove springs (28) and balls (27). Remove ball housing (26) from coupling (24).
20. Drive pin (25) from motor (23) shaft and remove coupling (24) and remove damper (55) from I.D. of coupling.

#### NOTE

**If coupling is not damaged, it need not be removed.**

21. If bushing (40) in housing (22) is worn, remove it.
22. If bushing (37) in housing (22) clevis is worn, press bushing (37) out.

#### NOTE

**If switches (16), switch gear cam (13), switch cam (11), or gear cam shaft (10) do not have to be replaced, do not remove. Disassembly of actuator is complete. If these parts must be removed, proceed as follows:**

23. Remove set screws (14) from switch gear cam (13) and set screw (12) from switch cam (11). With 4 mm diameter punch and hammer, tap on bearing (9) driving bearings and gear cam shaft (10) out. [Bearings (9) will be damaged and must be replaced.]

- Remove screws (15), switches (16) with terminal wires (17, 18, 19 and 20) and insulation (8 and 21) from housing (22). Remove terminal wires (17, 18, 19 and 20) from switches (16).

#### 4-5. Assembly

- Install damper (55) in I.D. coupling (24) and assemble drive coupling (24) on motor (23) shaft. Align hole in coupling (24) with hole in motor (23) shaft and install pin (25).
- Assemble ball housing (26) on drive coupling (24) and line up ball cavities with groove in coupling.
- Fill cavities with Shell Darina EP2 grease.
- Assemble balls (27), spring (28) and set screw (29) into ball housing (26).

#### NOTE

**Adjust set screws (29) until torque required to turn motor (23) shaft and coupling is .15-.2 NM while restraining ball housing (26) from rotating. Set screws (29) will be approximately flush with OD of ball housing.**

- Assemble bearing (35) on pinion (36) and install retaining ring (34) on pinion (36).
- Apply Loctite retaining compound grade AV (or equal) to OD of bushing (38) and install in housing (22). Assemble into housing (22) end opposite side of housing with 4 holes for mounting motor adaptor (31).
- Press bushing (37) in housing (22) clevis.
- Press bushing (40) in housing (22).
- Install red jumper wires (17 and 18) on limit switch (16) (jumper wire 18 with flag terminal on N.C. spade of switch 16). See Figure 6-2.

#### NOTE

**COM. and N.C. markings on terminal wires.**

- Install black jumper wires (19 and 20) on opposite switch (16).

#### NOTE

**Terminal wires with COM. and N.C. markings must be connected to identically marked switch terminals.**

**Assembly of limit switch components in housing. Refer to Figure 5-1 and Figure 6-2.**

#### NOTE

**Housing should be in a soft-jaw vice with housing limit switch box up.**

- Place insulation (21) in housing (22) limit switch box. Install switches (16) with screws (15). (N.O. and N.C. terminals should be facing to top of box. Common contact should face toward sides of box away from center.)

**Feed terminal wires through 1/2-14 NPT tapped hole to outside of housing.**

- Install bushing (9) in left side of housing (22) switch box only.
- Insert gear cam shaft (10) into switch box from right side of box assembling switch cam (11) and switch gear cam (13) on shaft. Position cams between switches with switch gear cam on left and switch cam on right. Insert left end of gear cam shaft (10) in bearing (9) and install right side bearing (9) on gear cam shaft (10) and into right side of housing (22) switch box. [Stake around bearings (9) to prevent axial movement of gear cam shaft (10)].

#### NOTE

**Check to ensure that gear cam shaft rotates freely.**

- Thread set screws (14) in switch gear cam (13) and tighten against gear cam shaft (10) (care should be taken not to strip threads).

#### NOTE

**Rotate gear cam shaft to make sure that switch gear cam is properly located and activates switch.**

- Thread set screw (12) in switch cam (11). Tighten lightly against shaft to prevent movement.
- Install pinion (36) and pinion bearing (35) into housing (22).
- Assemble motor adaptor (31) onto housing (22) holding in place with screws (30).
- Press bushing (46) into outer tube (45). Press seal (47) in outer tube (45). Seal lip should be facing inward.
- Assemble nut (52) on screw (50). Flange of nut (52) must face towards turned end of screw (50).
- Install stop pin (51) into screw (50) taking care to center pin.
- Fill translating tube (54) approximately half full with Shell Darina EP2 grease.
- Assemble nut (52) into translating tube (54) and align holes in translating tube with holes in nut. Install pins (53). Pins should be .8 mm above OD tube.
- Assemble washer (44) on screw (50).
- Assemble bearing (43) on gear (41) and assemble on screw (50). Align slot in gear (41) with hole in screw (50) and install pin (42). Pin should be centered when assembled. Take care not to damage gear teeth.
- Assemble worm (48) and pin (49) assembly in screw (50) using Loctite Primer T or equal (DN #H-9017) [and Loctite Adhesive Grade 680 or equal (DN #H-9018)]. Apply primer and adhesive to pin (48) end away from worm.
- Assemble worm (48) on pin (49). Worm end with hex I.D. must be flush with end of pin.

#### NOTE

**Pin dia. and hole in end of screw must be clean and free of dirt, oil and grease.**

27. Clamp housing (22) in vice (use soft jaws gear cavity up). Fill cavity approximately to centerline of pinion (36) with Shell Darina EP2 grease.
28. Assemble translating tube (54), bearing (43) and gear (41) assembly into housing. Take care not to damage gear (41) teeth. Rotate pinion (36) while assembling to be sure of proper mesh of gear (41) teeth with pinion (36) thread.

**NOTE**

**Also check mesh of worm (48) with switch gear cam (13).**

29. Grease OD of translating tube (54) with Shell Darina EP2 grease.
30. With translating tube (54) extended approximately 89 to 100 mm from washer (44), assemble outer tube (45) on translating tube (54) and thread outer tube (45) into

housing (22) against bearing (43). Torque in place at 55 ±13 Newton meters.

31. Spot drill outer tube (45) through set screw hole (use drill slightly smaller than I.D. of thread). Remove chips and install set screw (39) and lock in place against outer tube (45).

**32. Assembly of Motor:**

Align keyway in ball housing (26) and coupling (24) flats with key in motor adaptor (31) and flats of pinion (35), assemble motor (23) on motor adaptors (31) and secure in place with socket head cap screws (33) and lockwasher (32).

33. Adjust limit switches per Paragraph 2-2.
34. Assemble gasket (3) and cover (1) on housing (22) and hold in place with screws (1).

Assembly is now complete.

**SECTION V  
ILLUSTRATED PARTS LIST**

**5-1. Parts List**

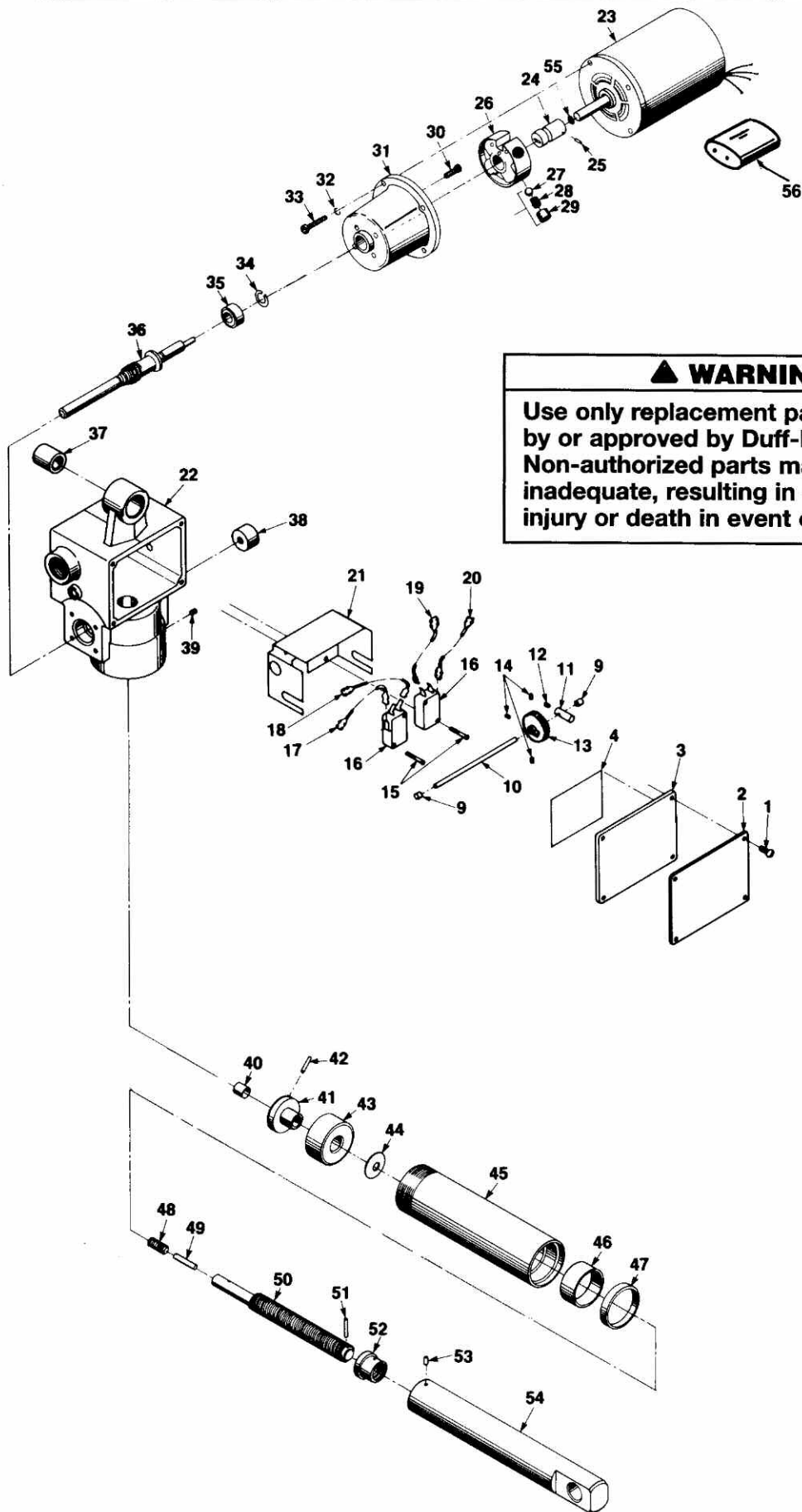
**Parts List for Duff-Norton Mini-Pac™ Actuator 7905 Series, 220 VAC, 50 Hz with Limit Switch**

| Index No. | Part Name                | Qty. Req. | Part No.     |
|-----------|--------------------------|-----------|--------------|
| 1         | Screws                   | 4         | H-2979       |
| 2         | Switch Cover             | 1         | SK-6905-2    |
| 3         | Switch Cover Gasket      | 1         | SK-6905-14   |
| 4         | Instruction Decal        | 1         | SK-6905-15   |
| 9         | Bushing                  | 2         | SK-6905-9    |
| 10        | Gear Cam Shaft           | 1         | SK-6905-5    |
| 11        | Switch Cam               | 1         | SK-6905-6    |
| 12        | Set Screw                | 1         | S-7-117      |
| 13        | Switch Gear Cam          | 1         | SK-6905-4    |
| 14        | Set Screw                | 3         | S-7-1        |
| 15        | Screws                   | 4         | H-2984       |
| 16        | Switch                   | 2         | SK-6905-13   |
| 17        | Jumper Wire (Red COM.)   | 1         | SK-6905-19-2 |
| 18        | Jumper Wire (Red N.C.)   | 1         | SK-6905-19-1 |
| 19        | Jumper Wire (Black N.C.) | 1         | SK-6905-20   |
| 20        | Jumper Wire (Black COM.) | 1         | SK-6905-19   |
| 21        | Insulation               | 1         | SK-6905-7    |
| 22        | Housing                  | 1         | SK-6905-1    |
| 23        | Motor 220 VAC, 50 Hz     | 1         | SK-6405-45   |
| 24        | Drive Coupling           | 1         | SK-6505-150  |
| 25        | Pin                      | 1         | H-5249       |
| 26        | Ball Housing             | 1         | SK-6405-26   |
| 27        | Roller Bearing           | 4         | SK-6405-20   |
| 28        | Spring                   | 4         | SK-6505-39   |
| 29        | Set Screw                | 4         | S-7-121      |
| 30        | Tap Tite Screw           | 4         | SK-2374-25   |
| 31        | Motor Adaptor            | 1         | SK-6505-149  |

| Index No. | Part Name                          | Qty. Req. | Part No.     |
|-----------|------------------------------------|-----------|--------------|
| 32        | Lockwasher                         | 4         | H-4081P      |
| 33        | Socket HD. Cap Screw               | 4         | H-2235       |
| 34        | Retaining Ring                     | 1         | SK-2374-8    |
| 35        | Pinion Bearing                     | 1         | SK-2374-5    |
| 36        | Pinion                             | 1         | SK-2374-3    |
| 37        | Bushing (Housing Clevis)           | 1         | SK-6405-4    |
| 38        | Bushing                            | 1         | SK-2374-10   |
| 39        | Set Screw                          | 1         | S-7-94       |
| 40        | Bushing                            | 1         | SK-2374-11   |
| 41        | Gear                               | 1         | SK-2374-4    |
| 42        | Pin                                | 1         | H-5167       |
| 43        | Load Bearing                       | 1         | SK-2374-6    |
| 44        | Washer                             | 1         | SK-2374-9    |
| 45        | Outer Tube                         | 1         | SK-6405-12*  |
| 46        | Guide Bushing                      | 1         | SK-2374-26   |
| 47        | Seal                               | 1         | SK-2374-16   |
| 48        | Worm                               | 1         | SK-6905-3    |
| 49        | Pin                                | 1         | SK-6905-26   |
| 50        | Screw                              | 1         | SK-2374-12*  |
| 51        | Pin (Stop)                         | 1         | H-5159       |
| 52        | Nut                                | 1         | SK-2374-13   |
| 53        | Pin                                | 2         | H-5160       |
| 54        | Translating Tube & Clevis Assembly | 1         | SK-6405-25*B |
| 55        | Damper                             | 1         | SK-6505-152  |
| 56        | Capacitor                          | 1         | SK-6405-7-10 |

\* Denotes dash number is equal to travel. In inches —  
 3" = 75 mm  
 6" = 150 mm  
 12" = 300 mm  
 18" = 450 mm

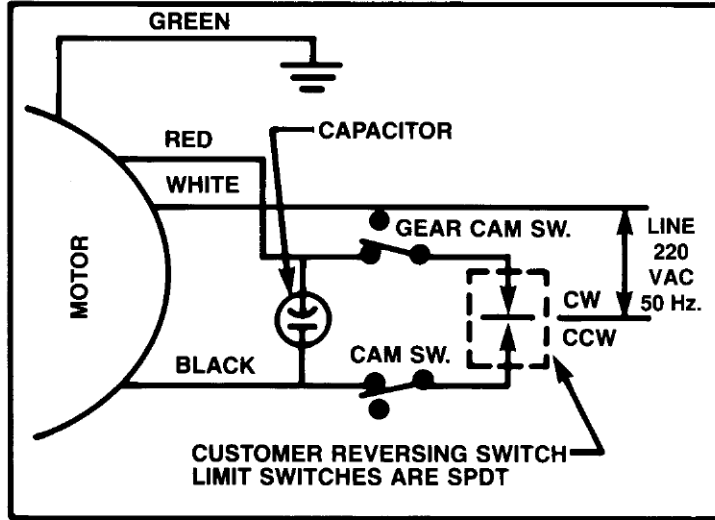




**FIGURE 5-1. EXPLODED ILLUSTRATION  
7905 SERIES AC MINI-PAC™ ACTUATOR**

SECTION VI  
TECHNICAL ILLUSTRATIONS

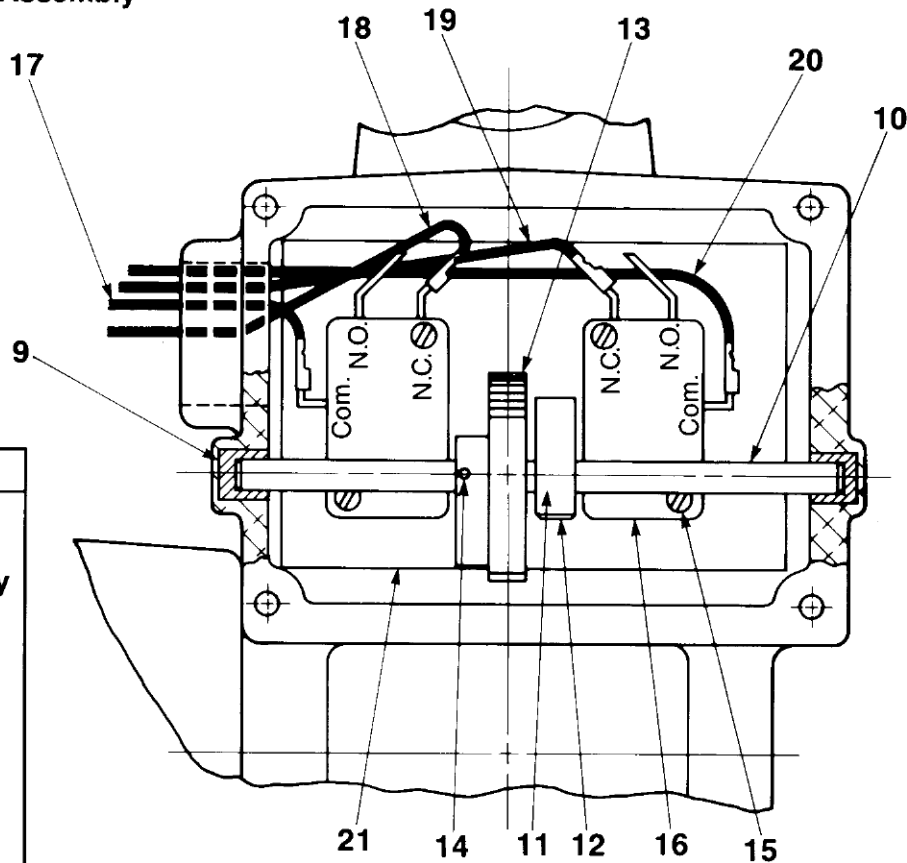
6-1. Limit Switch Wiring Diagram



Minimum Voltage: 198 Low Voltages Reduce Load Rating of the Actuator  
CW = Retract CCW = Extend

FIGURE 6-1. LIMIT SWITCH WIRING DIAGRAM  
7905 SERIES AC MINI-PAC™ ACTUATOR

6-2. Limit Switch Assembly



**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.

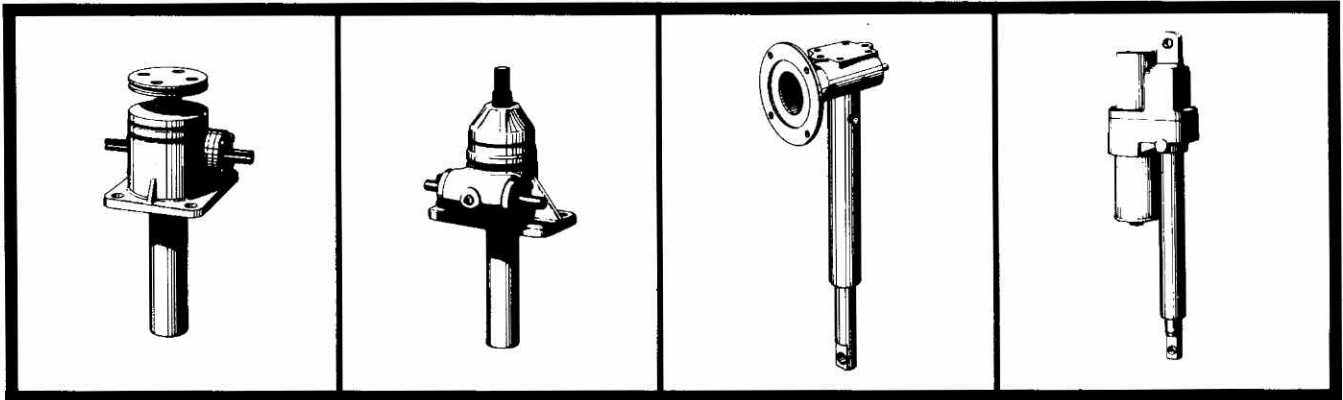
FIGURE 6-2. LIMIT SWITCH ASSEMBLY  
7905 SERIES AC MINI-PAC™ ACTUATOR

## NOTES

# DUFF-NORTON OFFERS A COMPLETE LINE OF MECHANICAL AND ELECTROMECHANICAL ACTUATORS FOR PRECISE POSITIONING OF LOADS UP TO 227270 KG.

For reliable motion — in-line or through an arc — Duff-Norton has the right actuator to put your designs in motion. You can select from a comprehensive line of machine screw, ball screw, high-duty cycle, electro-mechanical and modular models to solve your design and production problems.

Duff-Norton® actuators are easy to specify, install and operate. Compact and self-contained, they do not require bothersome selection of individual components nor the attendant maintenance of leaky hydraulic hoses, valves or couplings. They provide many options in meeting a wide range of lifting, pushing, pulling and tensioning requirements.



**Machine Screw Actuators.**  
Capacities from 225 to 227270 Kg. Worm gear ratios from 5:1 to 50:1. More than 200 standard combinations to choose. Can be operated manually or by gear motor. Used to push, pull, apply pressure, or as linear actuators. Hold loads indefinitely without creep, when not subject to vibration.

**Ball Screw Actuator.**  
Capacities from 450 to 45455 Kg. Ball bearing screw and nut design reduces friction, increases efficiency as much as 70%. Permits linear motion up to 7620 mm/min @ 1800 rpm worm shaft speed. Available in 40 standard models. Multiple units may be synchronized for uniform raises to 3050 mm.

**Modular Actuators.**  
Capacities to 960 Kg. depending on actuator gear ratio and motor horsepower. Engineered for NEMA 56 frame motor, C-face mounting. Choice of 5:1 or 20:1 gear ratios in rotating screw or translating tube models. Travel lengths to 610 mm. Lift speeds to 4320 mm per minute.

**Electromechanical Actuators.**  
Capacities to 680 Kg. Choice of 115 VAC or 12 VDC motors for indoor or outdoor applications. Standard raises from 75 to 610 mm. Speeds to 3685 mm/min. All components sealed in a corrosion-resistant, aluminum alloy die-cast housing. Fully adjustable limit switches available on some models.

**For more information on these or other Duff-Norton® actuators, ask your local distributor or Duff-Norton District Sales Manager for Catalog 172. Or write factory.**

**WARNING: The equipment shown in this manual is intended for industrial use only and should not be used to lift, support, or otherwise transport people unless you have a written statement from Duff-Norton which authorizes the specific actuator unit, as used in your application, as suitable for moving people.**

 **Duff-Norton**

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Duff-Norton Manufactures:

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