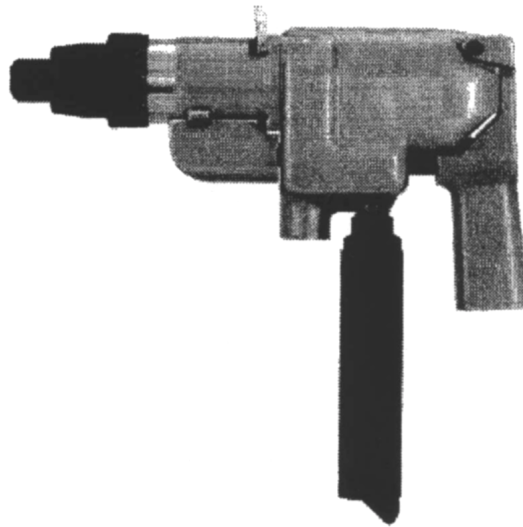


Airetool®

**Model 850-600A AIRETROL
(8405398)**



READ SAFETY RECOMMENDATIONS BEFORE OPERATING THIS TOOL

AIRETOOL OPERATION
302 South Center Street
Springfield, Ohio 45506

Airetool®



TOOL SPECIFICATIONS

MODEL 850-600-A (8405398)

Free Speed -----	500 r. p. m.
Maximum Torque -----	192 in. lbs. (21.7 Nm)
Minimum Torque -----	31 in. lbs. (3.5 Nm)
Sound Pressure Level Lpa -----	94.8 dBa
Sound Power Level Lwa -----	104.8 dBa
Length -----	12 1/4" (311 mm)
Weight -----	10.5 lb. (4.76 Kg)
Side To Center Distance -----	1 7/16" (36.5 mm)
Minimum Recommended Hose Diameter ---- (Maximum 25 Foot Length)	3/8" (9.5 mm)
Air Consumption -----	48 c.f.m.
Square Drive Male -----	3/8" (9.5 mm)
Chuck Size Square Female Quick Change --	3/8" (9.5 mm)

This product complies with the following European Community Directives : 89/392/EEC , 91/368/EEC , 93/44/EEC , 93/68/EEC .

The following Standards were used to verify compliance with the directives : ISO 8662-1 : 1988 ISO 3744 : 1981

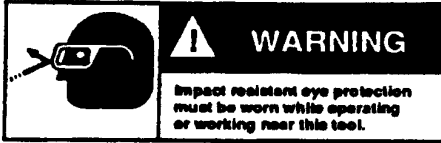
Airetool® Operation
302 South Center Street
Springfield, OH 45506
Phone 937-323-4981 - Fax 937-323-6524
International U S Fax 1-800-375-8906


COOPER Tools

Safety Recommendations

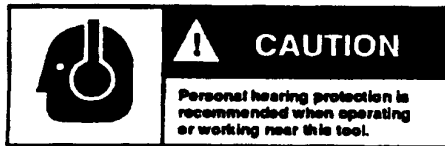
For your safety and the safety of others, read and understand the safety recommendations and operating instructions before operating this tool.

ALWAYS WEAR PROTECTIVE EQUIPMENT



EYE AND FACE PROTECTION

For additional information on eye and face protection, refer to Federal OSHA Regulations, 29 Code of Federal Regulations, Section 1910.133, Eye and Face Protection, and American National Standards Institute, ANSI A87.1, Occupational and Educational Eye and Face Protection. Z87.1 is available from the American National Standards Institute, Inc., 1430 Broadway, New York, NY 10018.



HEARING PROTECTION

Hearing protectors are required in high noise areas, 85 dBA or greater. The operation of other tools and equipment in the area, reflective surfaces, process noises and resonant structures, can substantially contribute to and increase the noise level in the area. For additional information on hearing protection, refer to Federal OSHA Regulations, 29 Code of Federal Regulations Section 1910.95, Occupational Noise Exposure, and American National Standard Institute, ANSI S12.6 Hearing Protectors.



Follow good machine shop practices. Rotating shafts and

moving components can entangle and enwrap, and can result in serious injuries. Never wear long hair, loose fitting clothes, gloves, ties or jewelry when working with or near any power tool with an exposed rotating shaft or spindle



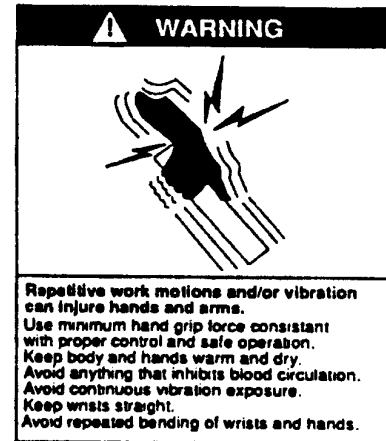
When using right angle Airetrols with lever type throttle be sure the throttle is positioned relative to the angle head so that the throttle will not become wedged against an adjacent object in the "ON" position due to the torque reaction. The angle head may be repositioned with the respect to the lever to accommodate proper location for the task. tool is to be reversed, locate the throttle lever in a neutral position that will prevent entrapment. Refer to operating instructions for additional information.



Tools with clutches can stall rather than shut-off if adjusted over the maximum power output of the tool, or there is a drop in air pressure. Operator must then resist the stall torque until the throttle is released.

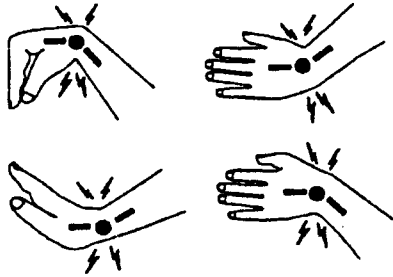
Higher torque Airetrols, inline and right angle, are supplied with a torque reaction bar designed to work with the torque of the tool it is specified for. These bars can be braced against the work or other suitable points to absorb and relieve the operator of the torque reaction transmitted by the tool. Tool balance arms are also available to absorb the torque reaction of the tool while balancing the weight of the tool for improved ergonomic applications.

Some individuals are susceptible to disorders of the hands and arms when exposed to tasks which involve highly



Safety Recommendations

repetitive motions and/or vibrations. Those individuals predisposed to vasculatory or circulatory problems may be particularly susceptible. Cumulative trauma disorders such as carpal tunnel syndrome and tendonitis can be caused or aggravated by repetitious, forceful exertions of the hands and arms. These disorders develop gradually over periods of weeks, months, and years.



TASKS SHOULD BE PERFORMED IN SUCH A MANNER THAT THE WRISTS ARE MAINTAINED IN A NEUTRAL POSITION WHICH IS NOT FLEXED, HYPEREXTENDED, OR TURNED SIDE TO SIDE.

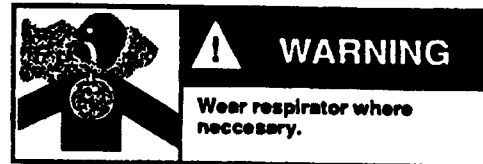
STRESSFUL POSTURES SHOULD BE AVOIDED AND CAN BE CONTROLLED THROUGH TOOL SELECTION AND WORK LOCATION.

Any user suffering from prolonged symptoms of tingling, numbness, blanching of the fingers, clumsiness or weakened grip, nocturnal pain in the hand, or any other disorder of the shoulders, arms, wrists, or fingers is advised to consult with a physician. If it is determined that the symptoms are job related or aggravated by movements and postures dictated by the job design, it may be necessary for the employer to take steps to prevent further occurrences. These steps might include, but are not limited to, repositioning the work piece or redesigning the workstation, reassigning workers to other jobs, rotating jobs, altering work pace, and/or changing the type of tool used so as to minimize stress on the operator. Some tasks may require more than one type of tool to obtain the optimum operator/tool/task relationship.

The following recommendations will help reduce or moderate the effects of repetitive work motions :

- Use a minimum hand grip force consistent with proper control and safe operation.
- Keep wrists as straight as possible.
- Keep body and hands warm and dry.

- Avoid anything that inhibits blood circulation
 - Smoking tobacco
 - Cold temperatures
 - Certain drugs
- Avoid highly repetitive movements of the hands and wrists, and continuous vibration exposure.



Use of this tool may produce hazardous fumes, particles, and/or dust. To avoid adverse health effects utilize adequate ventilation and/or a respirator. Read the material safety data sheet of any materials involved in the tube expansion process.



This Airetool product is designed to operate on minimum 90 psig (6.2 bar), maximum 125 psig (8.6) air pressure. If the tool is properly sized and applied, higher air pressure is unnecessary. Excessive air pressure increases the loads and stresses on the tool parts, mandrels, rolls and cages and may result in premature wear and or breakage. Installation of a filter-regulator-lubricator in the air supply line ahead of the tool is required.

Before the tool is connected to the air supply, check the throttle for proper operation (i.e., the throttle moves freely and returns to the closed "OFF" position when released). Clear the air hose of accumulated dust and moisture. Be careful not to endanger adjacent personnel. Before removing a tool from service or changing sockets, make sure the air line is shut off and drained of air. This will prevent the tool from operating if the throttle is accidentally engaged.

It is essential for safe operation that any operator of an Airetool use good balance, sure footing, and proper posture in anticipation of a torque reaction. Ensure that the operator's hands will not be wedged or pinched between the work and the tool when operating.

NOTE : ANY USE OF THIS TOOL OTHER THAN IT'S INTENDED PURPOSE COULD CAUSE MAJOR DAMAGE TO THE TOOL AS WELL AS POSE A RISK TO THE OPERATOR.

OPERATING INSTRUCTIONS

FOR MODEL 850-600-A AIRETROL (8405398)

RECOMMENDED AIR PRESSURE

This tool is designed to operate on minimum 90 psi (6.2 bar) , maximum 125 psi (8.6 bar) air pressure. Using 100 psi to 125 psi will cause faster operation, but will also tend to cause premature wear and or breakage of the mandrel and rolls of the expander.

Air pressure fluctuation has no effect on the torque control unit, as the torque section of the control is independent of the motor section. A low air pressure supply will result in slower operation and a longer rolling cycle.

LUBRICATING THE AIRETROL

It is recommended that the Model ATL-3/4-16 (8566221) Airetool lubricator be used in the air supply line within 15ft. of the Airetrol.

A good grade of S. A. E. #10 lubricating oil is recommended. Set the lubricator to 5 to 10 drops of oil per minute.

The gear section of the Airetrol is equipped with a pressure type fitting , and approximately once every four (4) weeks, pump in two shots of grease from a hand type grease gun. **CAUTION: DO NOT OVER LUBRICATE THIS FITTING.** If excess grease is forced into the gear section, the grease will find its way into the motor section and cause sluggish operation.

TUBE ROLLING PROCEDURE

NOTE : ALWAYS CLEAN THE TUBE SHEET HOLES BEFORE INSERTING THE TUBES. CLEAN THE TUBE ENDS, INSIDE AND OUTSIDE. USE PROPER SIZE, AIRETOOL BALL BEARING THRUST EXPANDER POWERED BY THE PROPER SIZE AIRETROL TORQUE CONTROLLED ROLLING MOTOR TO ENSURE THAT ALL TUBES ARE EXPANDED TO THE SAME TIGHTNESS. THIS ELIMINATES THE POSSIBILITY OF OVER-ROLLING AND OR LEAKAGE.

Set the torque setting ring of the control to the correct torque setting for the type and size of tubes to be rolled. Refer to Airetool Tube Rolling Set Up Guide form # 80057, not included.

Insert the correct size Airetool ball bearing thrust type tube expander into the quick change chuck on the Airetrol.

The Airetrol is turned on or off by the means of a quick operating sleeve type valve. The direction of rotation of the spindle is controlled by the position of the lever handle at the rear of the tool. Pushing forward on the lever handle causes the spindle to turn in a clockwise direction, and pulling back on the lever handle causes it to run in reverse. The lever handle also acts as a torque reaction handle to assist in absorbing the torque of the tool.

An additional feature of this tool is that any time the operator releases the lever handle , the motor will stop operating.

Insert the expander into the tube , and start the rolling cycle by pushing forward on the lever handle. Hold in the forward position until the torque sensing unit shuts the motor off automatically. The tube should be properly rolled if the torque setting ring has been set to the proper torque setting.

To remove the tube expander from the expanded tube, reverse the motor by pulling back on the lever handle and hold back until the expander releases from the tube. Insert the expander into the next tube to be rolled with spindle still turning in reverse. It is not necessary to shut the motor off while moving to the next tube to be rolled as the expander will enter the tube while turning in the reverse direction. (You will speed up the rolling cycle considerably by allowing the motor to continue to run).

LUBRICATING THE TUBE EXPANDER

A light good quality lubricating oil of S. A. E. #10 grade is popular for tube rolling in normal average tube sizes. For severe rolling of heavy gauge tubes, a viscous heavy oil of approximately S. A. E. #60 grade lubricating oil is recommended.

If a water soluble lubricant is required, we recommend the Airetool "Lube-A-Tube KS" compound. Airetool number LAT-128 (2968805).

Please do not hesitate to call the factory for technical or engineering assistance on any unusual tube expanding problem. We have Customer Service Technicians throughout the country available for service at a call. See listing in the back of this manual for your nearest Airetool Sales Office & Service Centers.

SERVICE INSTRUCTIONS

FOR MODEL 850-600A AIRETROL (8405398)

To maintain efficient operation for continuous use, these tools should be adjusted and serviced periodically.

If accurate torque cannot be maintained, check the shut-off trip as follows:

Remove two screws (80) holding valve cover (79) in place. Remove cover to expose trip. (During forward rotation the trip abuts valve (5A). See page 10 for trip adjustment illustration.)

WARNING - REMOVE AIR SUPPLY FROM TOOL PRIOR TO ANY DISASSEMBLY

Remove entire torque section as follows: Remove 4 socket head cap screws (78). Using tru-arc pliers, remove lock ring (62). Carefully remove driving cam (61) and operating cam (55). Care should be taken to prevent loss of the balls contained in the units. Clean drive spindle (52) and inspect for wear in the ball spline grooves. If spline is worn or dimpled, it should be replaced. If spline and front bearing (47) show no sign of wear, further disassembly of this unit is unnecessary. Check follower (64) for excessive wear.

In reassembly, carefully position regulating spring item # 54 on spring guide item # 46. Place operating cam item # 55 on spindle, aligning grooves of the spindle and grooves in the cam. Check condition of guide springs item # 58, place a spring in each groove. Install five 5/32" balls in each groove. (Note: as these are extra precision balls, no substitution should be made.)

Place a small amount of grease on each angled face of the operating cam, install inner ball retainer (57) and ball retainer (56). On each angled face of the cam, place two of the larger balls (60). Install driving cam (61). Do not dislodge the balls from the helical faces. Install large lock ring (62). The unit can then be handled in a normal manner.

To disassemble the motor package, hold the end of the drive

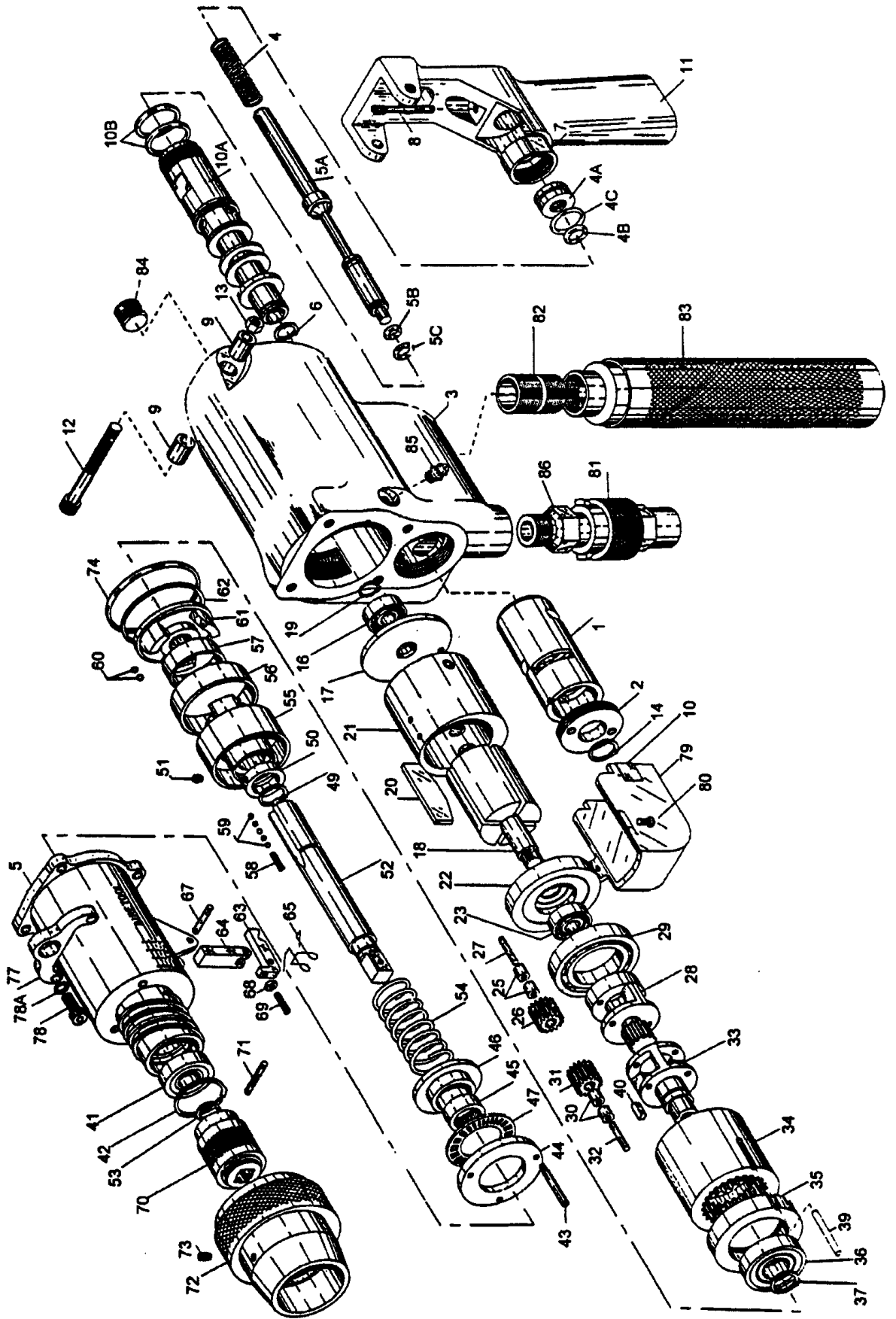
spider of the motor and pull gear section from machine. Slide the motor package from the unit. Disassemble the motor package to check for wear in the cylinder liner and to examine the motor blades. Install new blades if the old blades show excessive wear.

Install cylinder on the end plate; check blades (20) for proper placement; install the front bearing support (22). Slide the motor package in place, carefully dropping the dowel pin # 8010126 (assembled in the rear end of the cylinder) into the locating hole at the bottom of the case. The gear case of the 600 RPM tool is a standard two-stage planetary system and disassembly and reassembly of the unit is very simple. Slide the gears from the gear case, clean, inspect, re-grease and reinstall in the gear case. Slide the gear case into the housing and install dowel pin (39).

Reinstall the torque unit on the motor case. (When installing the cam section on the motor housing, be sure to depress the trip so the follower will not jam on the top side of the operating cam while aligning front case with the motor.) Once the torque case is aligned in the motor housing and the screws are installed, the trip can be released. Before reinstalling the valve cover, push forward on the operating lever (11), and manually depress the trip. In depressing the trip with the finger, the valve (5A) will slide forward, simulating the operation of the tool at shut-off. By pulling back on the lever (11), the outer valve that surrounds the valve (5A), should slide into the rearward position before valve (5A) moves within. If the outer valve is tight to the degree of sticking in the bushing (1,) the motor would run forward rather than in reverse, causing over-rolling of joints. It is therefore essential that the outer valve be free in the bushing.

After the above checks have been made, reinstall the valve cover. Ensure adequate lubrication of all parts during reassembly.

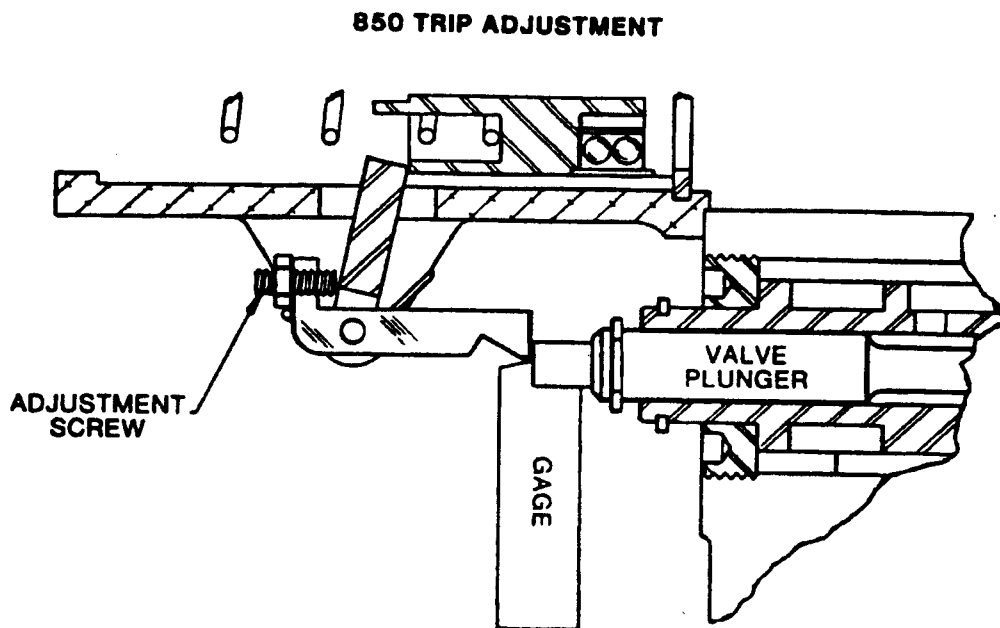
MODEL 850-600-A AIRETROL (8405398)



MODEL 850-600A (8405398) AIRETROL PARTS LIST

ITEM #	PART #	DESCRIPTION	QUAN.	ITEM #	PART #	DESCRIPTION	QUAN.
	8405398	850-600A AIRETROL		47	3215800	900-14 FRONT BEARING	1
				49	3215900	900-15 TRU-ARC RING	1
	8405397	850-28-AA VALVE ASBLY CONSISTS OF ALL ITEMS WITH *		50	3218700	900-45 LOCK RING	1
* 1	3214480	850-27 BUSHING	1	51	8009700	8-32 x 1/8" SOC SET SCREW	1
2	3214465	850-19 LOCK NUT	1	52	3214800	900-4 SPINDLE	1
3	8565820	850-1-RE CASE	1	53	3215000	900-5 TRU-ARC RING	1
* 4	3214471	850-22 SPRING	1	54	3214498	850-44 SPRING	1
* 4A	8567185	850-70 SHAFT SEAL	1	55	3219100	900-49 OPERATING CAM	1
* 4B	3167600	500-31 "O" RING	1	56	3227600	1000-52 RETAINER	1
* 4C	3094500	RTV-65 "O" RING	1	57	3219400	900-52 BALL RETAINER	1
5	3214600	900-2-A CAM CASE	1	58	3218900	900-47 GUIDE SPRING	3
* 5A	8567183	850-21-A VALVE	1	59	3219000	900-48 STEEL BALL	15
* 5B	3106200	200-16 "O" RING	1	60	3227200	1000-48 STEEL BALL	6
* 5C	3138510	2-011 "O" RING	1	61	3219600	900-54 CAM	1
* 6	3154600	402-S-24 LOCK RING	1	62	3216800	900-24 TRU-ARC RING	1
* 7	3214477	850-26 CAP	1	63	3214462	850-18 TRIP	1
8	3214486	850-34 PIN	1	64	3216100	900-17 FOLLOWER	1
9	3214454	850-1-B BUSHING	2	65	3223500	1000-16 SPRING	1
10	3415282	850-15 TRIP GAUGE	1	67	3226000	1000-37 PIN	1
* 10A	8567184	850-28-A DIRECTIONAL VALVE	1	68	8010079	6-32 HEX NUT	1
* 10B	8010499	2-020 "O" RING	2	69	8010058	6-32 x 1/2" SOC SET SCREW	1
11	3214459	850-1-L LEVER	1	70	8400100	850-375 QUICK CHANGE CHUCK CONSISTS OF ITEMS WITH **	1
12	3214489	850-35 LEVER PIN	1	**	3214502	850-375-1 CHUCK BODY	1
13	8010177	1/4" - 28 SELF LOCK NUT	1	**	3235400	3/32" DIA CLS 25 CHROME BALL	1
14	3154400	402-23 TRU-ARC RING	1	**	8501225	866-375-2 CHUCK SLEEVE	1
16	3114600	300-G-29 BEARING	1	**	8501250	866-375-3 SPRING	1
17	3230600	1000-74 REAR THRUST	1	**	8503500	5108-81 LOCK RING	1
18	3230400	1000-73-700-S ROTOR	1	71	8010158	1/8" x 7/8" SPLIT PIN	1
19	3165900	500-24 TRU-ARC RING	1	72	3218400	900-43 ADJUSTING NUT	1
20	3230200	1000-72-S BLADES	4	73	8010134	8-32x3/16" NYLON TIP SET SCREW	1
21	3230100	1000-71-S CYLINDER	1	74	8566706	2-033 "O" RING	1
22	3215300	900-7-45 FRONT THRUST	1	77	3219700	900-56 BRACKET	1
23	3126500	400-13 BEARING	1	78	8007300	10-32x7/8" BUTTON HD CAP SCREW	2
25	3127700	400-16 BEARING	4	78	8010057	10-32x5/8" BUTTON HD CAP SCREW	2
26	3164100	500-12-30 PLANET GEAR	2	78A	8008500	10 MED LOCK WASHER	4
27	3165200	500-18 PLANET PIN	2	79	3214456	850-1-C COVER	1
28	3217100	900-25-45-1 SPIDER	1	80	8010215	6-32 x 3/8" BUTTON HD CAP SCREW	2
29	3231800	1000-88 BEARING	1	80	8010193	6 EX TYPE LOCK WASHER	2
30	3127700	400-16 BEARING	6	81	8566989	HOF QC NIPPLE	1
31	3164200	500-12-40 PLANET GEAR	3	82	1716200	1/2" CLOSE NIPPLE	1
32	3165200	500-18 PLANET PIN	3	83	8404450	A-850-61-MF MUFFLER COMPLETE CONSISTS OF ITEMS WITH ***	1
33	3217000	900-25-45 GEAR SPIDER	1	***	8566038	850-61-A MUFFLER CASE	1
34	3216500	900-20-45 GEAR HOUSING	1	***	3229250	1000-61-G BAFFLE ASSEMBLY	1
35	3219900	900-58-45 BEARING SUPPORT	1	***	3232500	1000-95 DEFLECTOR	1
36	3202000	700-9 REAR BEARING	1	***	3232600	1000-96 SNAP RING	1
37	3215900	900-15 TRU-ARC RING	1	84	3226200	1000-42 PLUG	1
39	3216300	900-19 PIN	1	85	8009300	1/4" - 28 ZERK	1
40	3219500	900-53 CAM KEY	1	86	8566990	EZ-308F-8L QC COUPLER	1
41	3164400	500-13 BEARING	1	NS	4105085	3/8" x 10 FT HOSE ASSEMBLY	1
42	3215100	900-6 TRU-ARC RING	1	NS	8566244	STD NAME PLATE	1
43	3215400	900-10 PRESSURE PIN	3	NS	8566880	1650-CT-P CAUTION TAG	1
44	3215500	900-11 PRESSURE PAD	1	NS	8010318	#2 x 1/8" DRIVE SCREW	4
45	3229300	1000-64 BEARING	1				
46	3215700	900-13 SPRING GUIDE	1				

MODEL 850-600A TRIP ADJUSTMENT



The trip on the model 850-600-A Airetrol has a total confined movement of $1/8"$. For proper operation, the trip should be set at a maximum engagement of $.062"$ with the abutting valve plunger. With the adjustment made at $.062"$. This allows shut-off of the valve to occur at approximately mid-point of the total trip movement. This adjustment should be made with the tool running in the forward direction with the dial set at 5 and no load being exerted on the tool. Our gage can be used to facilitate the adjustment of the trip (see illustration). Set the trip at this location for satisfactory performance.