Automatic Hot Melt Gun
Model AD-28

Part 106 992A

NORDSON CORPORATION • AMHERST, OHIO • USA

CONTENTS

ISSUED 1/77 SUPERSEDES LITHO U.S.A.

AUTOMATIC HOT MELT GUN
MODEL AD-28

Part Number 270 651

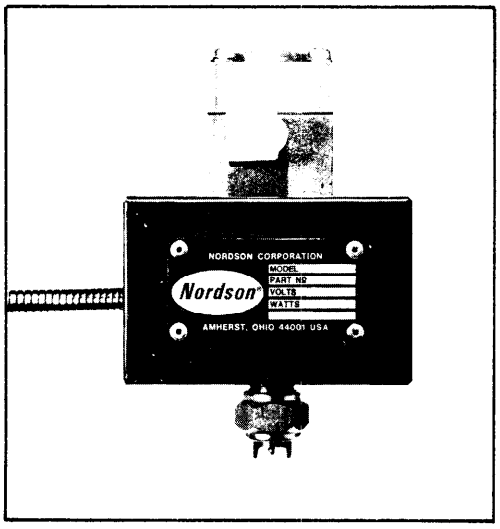

Figure 1 - Model AD-28 Auto Gun

DESCRIPTION

The Model AD-28 Automatic Hot Melt Extrusion Gun is designed to apply hot melt adhesives and some other thermoplastic materials at temperatures from 375°F (190°C) to 450°F (232°C). The gun is heated by two 170 Watt cartridge heaters and controlled by preset thermostats available in 25°F increments.

The AD-28 features a bellows in the extrusion head instead of a packing cartridge assembly.

The gun is actuated by an electro-pneumatic solenoid valve. Cycling speeds to 2,400 cycles per minute are possible when a rapid response solenoid is used.

8/78 - Corrected heater specs.

SPECIFICATIONS

Electrical (heater circuit)	230 VAC, 50/60 Hz, 340 Watts, 1.5 Amp
Operating Air Pressure	20 to 70 PSIG (1.4 to 4.9 kg/cm^2)
Weight	3.25 lbs. (1.47 kg)
Nozzles	231 0XX, 231 XXX, 220 0XX, 270 59X Series
Solenoid Valves	Refer to Pages 57-1-1 and 57-1-3
Hot Melt Hose	Refer to Applicator Service Manual

LITHO U.S.A.
ISSUED 8/78 SUPERSEDES 1/77

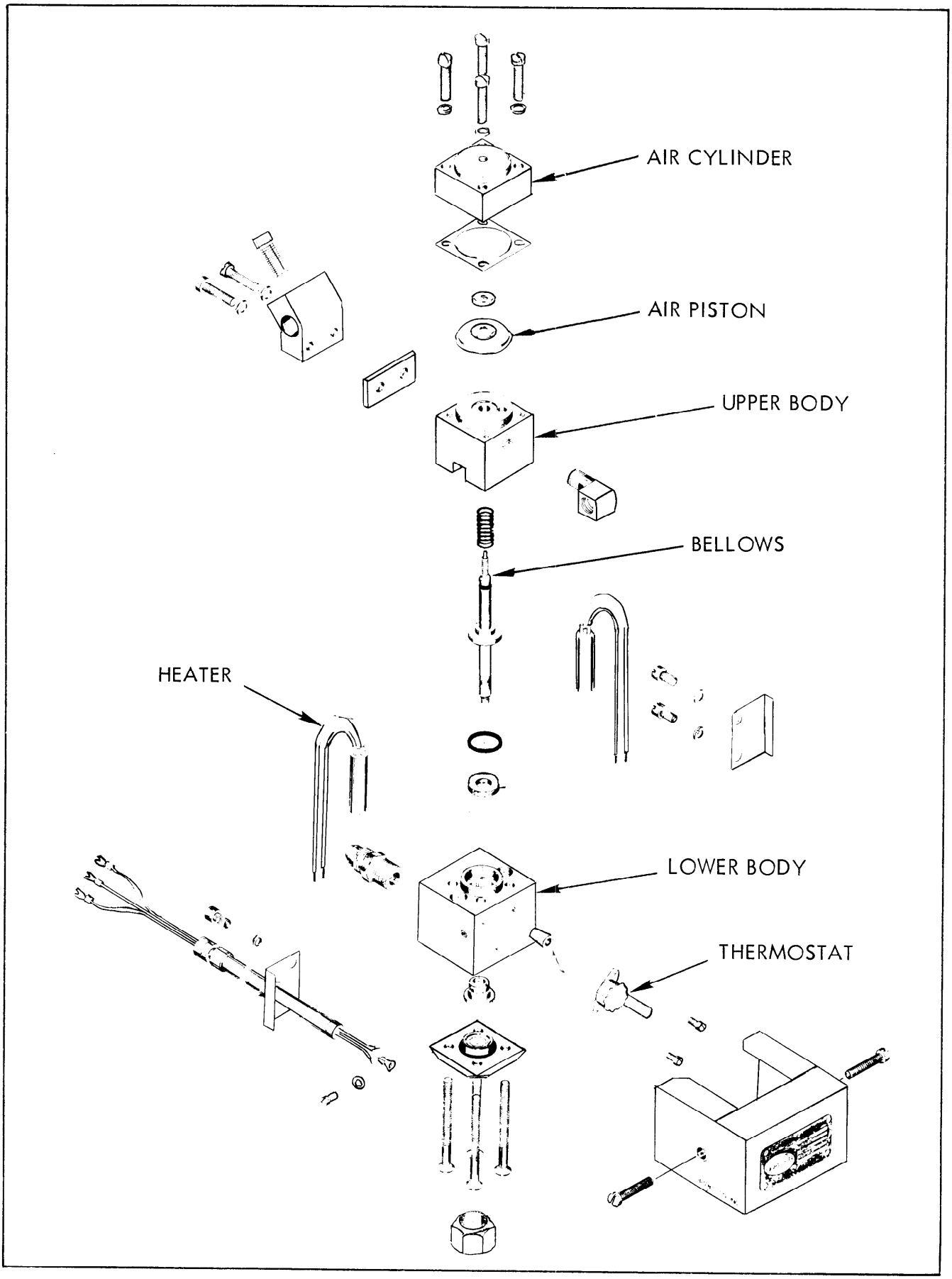

Figure 2 - AD-28 Automatic Gun Drawing

THEORY OF OPERATION

The AD-28 Automatic Gun is comprised of two machined bodies. The lower body houses the bellows assembly and two cartridge heaters. A preset thermostat is attached to the block for heat control.

The seat assembly is fastened to the underside of the lower body and makes contact with the bellows ball tip.

The upper body is secured to the lower body to hold the bellows in place. An air piston is fastened to the upper end of the bellows. The upper body functions as the air cylinder base; the air cylinder is secured to the top of the upper body.

Molten material is fed into heat exchanger passages in the lower body through an electrically heated hose. Two cartridge heaters maintain the application temperature in the gun. They are connected electrically to the hot melt hose through the armored cordset.

INSTALLATION

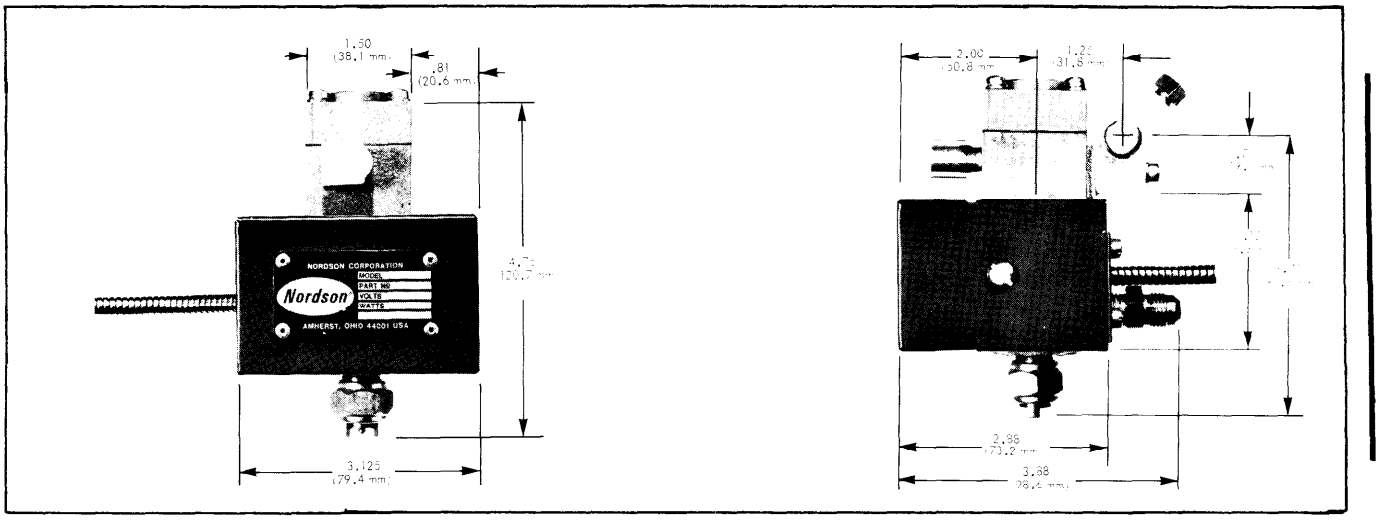

Figure 3 - AD-28 Mounting Dimensions

8/78 - Corrected dimensions.

The AD-28 Automatic Gun may be mounted to extrude material in any direction necessary for the application.

If the gun is mounted so that the extruded hot material could cause personnel injury, a deflector plate (shield) should be installed between the gun and the operator.

1. Secure the AD-28 to a 1/2" (12.7 mm) diameter mounting bar. The square head set screw in the retainer mounting allows the gun to be fastened securely to the mounting bar.

2. Attach a non-circulating hot melt hose to the male connector located in the gun's lower body. Wrap the hose - gun connection with an insulating cuff to prevent heat loss. Secure the insulating cuff with the cable tie supplied.

3. Connect the gun's armored cordset to the hose collar. The two white leads are the power connections; the green lead is the ground connection.

LITHO U.S.A.
ISSUED 8/78 SUPERSEDES 1/77

INSTALLATION, (Continued)

This is a 230 VAC power connection. Do not begin this installation procedure until all electrical power to the applicator has been shut off.

4. After the electrical connections at the hose collar have been completed secure the armored cordset to the hose collar with the cordset retainer supplied in the installation kit.

5. Install a solenoid valve on the gun using the nipple supplied. Wire the solenoid valve to the appropriate triggering device.

6. Attach a separately regulated and filtered air line to the solenoid valve.

   NOTE: The nipple and solenoid are attached to the 1/8 NPT street elbow located in the upper gun body.

   A separate air supply line to the guns is suggested since the guns may be actuated at an air pressure other than that driving the applicator pump.

7. When installation has been completed, refer to the applicator service manual for initial start-up instructions.

OPERATION

The Nordson Hot Melt system will not extrude adhesive unless the applicator, hoses and guns are heated to the appropriate application temperature.

The AD-28 self-relieves at 800 PSIG (56.25 kg/cm^2) hydraulic pressure. Do not exceed this maximum operating pressure to avoid injury to personnel or damage to equipment.

Gun actuating air pressure is dependent upon the following:

1) pressure within the hydraulic system
2) type of hydraulic system (piston pump, gear pump)
3) length of hot melt hose(s)
4) gun application temperature (as determined by gun thermostat)
5) nozzle size (orifice size and flow rate)
6) gun cycle (operating) speed
7) selection of gear pump valve (pressure relief, internal circulation)
8) adhesive viscosity

The gun's actuating air pressure may be determined and adjusted by installing a standard air regulator ahead of the gun in the air supply line.

TROUBLESHOOTING

CONDITION	PROBABLE CAUSE	SOLUTION
Molten material leaks around seat when nozzle is removed	Dirty or damaged ball tip and seat assembly.	Replace ball tip and seat assembly.
	Insufficient clearance between piston and upper gun body.	Back piston off bellows stem 1/4 to 1/2 turn.
Air leaks between air cylinder and upper gun body	Damaged air cylinder gasket.	Replace gasket.
	Air cylinder loose.	Tighten 4 screws.
	Damaged bellows O-ring.	Replace O-ring.
	Damaged bellows.	Replace bellows.
Gun fails to shut off	Dirt in nozzle or seat.	Clean or replace nozzle or seat.
	Damaged ball tip and seat assembly.	Replace ball tip and seat assembly.
	Insufficient clearance between air piston and upper gun body.	Back piston off bellows stem 1/4 to 1/2 turn.
	Too long air line between gun and solenoid.	Use 3" nipple to attach solenoid to gun.
	Faulty bellows spring.	Replace spring.
Gun fails to extrude adhesive	Adhesive not up to application temperature.	Allow additional warm-up time.
	Nozzle clogged.	Clean (check) nozzle.
	Insufficient air to gun solenoid.	Increase actuating air to gun solenoid.
	Gun not heating.	Check thermostat.
		Check gun heaters (2).
	Faulty solenoid valve.	Replace solenoid.
	Worn air piston.	Replace air piston.
	Air movement around gun causes cooling.	Eliminate cooling air flow.
	Insufficient clearance between air piston and air cylinder.	Tighten air piston on bellows stem 1/4 to 1/2 turn.

LITHO U.S.A.
ISSUED 1/77 SUPERSEDES

TROUBLE SHOOTING, (Continued)

CONDITION	PROBABLE CAUSE	SOLUTION
Gun fails to heat	Open gun circuit fuse.	Replace open fuse.
	Faulty thermostat.	Replace thermostat.
	Loose electrical connection.	Check electrical leads at hose collar.
	Defective heaters.	Replace gun heaters (2).
Gun overheats	Faulty thermostat.	Replace thermostat.

4/78 - Safety gloves, added p/n.

MAINTENANCE

To perform to optimum standards the AD-28 automatic gun should be kept clean and free from contaminants and charred adhesive. The gun should be cleaned on a regular basis.

Wear safety gloves (P/N 902 514) and eye protection when handling hot parts.

Cleaning solvents may be caustic, toxic, or a fire hazard. Use care when selecting a cleaning solvent other than Type R. Always follow the solvent's caution regarding safe use.

Do not use an open flame device to heat the gun or its components. Damage caused by extreme heat may result.

Do not use a drill or broach to clean a hot melt nozzle. Use a piano wire probe and a flameless heat gun to clean hot melt nozzles.

Electrical Repair

The AD-28 contains two electrical components: a preset thermostat (with a built-in heat limiter) and two cartridge heaters.

The thermostat may be checked and replaced quickly after removing the gun's electrical enclosure.

NOTE: When replacing the thermostat be certain to replace it with one of the same temperature rating.

The two cartridge heaters may be checked after removing the electrical enclosure. To replace the heaters, the gun lower body must be separated from the rest of the gun.

MAINTENANCE, (Continued)

NOTE: Before separating the lower body check the cartridge heaters to determine if they are faulty. This can be done by conducting a cold ohms resistance test on each heater.

The cold ohms resistance reading should be: 306-357 ohms.

Remember, the cartridge heaters are controlled by the thermostat w/heat limiter. If the thermostat or heat limiter has failed in the open mode the heaters will not function. Check across the thermostat leads for continuity before assuming the heaters are defective.

Check the gun's electrical connections at the hose collar before assuming the gun's electrical components are defective.

Also, be certain to check the gun circuit fuse (found in the applicator). If it is open (blown), replace it with a fuse of the same ampere rating.

DISASSEMBLY

Do not attempt to disassemble the AD-28 gun or disconnect the hot melt hose until the electrical and air supply to the applicator have been shut off and hydraulic pressure in the system has been relieved.

After removing the electrical enclosure disassemble the AD-28 in this manner (refer to Figure 6 for key numbers):

1. Loosen and remove the four screws and lockwashers that secure the air cylinder (3) to the upper body (8). This frees the air cylinder gasket (4) and permits access to the air piston assembly (5).

2. To remove the air piston assembly loosen the locknut (6) while holding the air piston assembly nut. Then thread the air piston assembly off the bellows stem.

3. To free the bellows or the cartridge heaters remove the four oval head screws from the lower end of the gun. Doing this will free the ball seat (19), the lower body (17), and the sleeve (18), from the upper body (8).

4. Now the spring (12), bellows (13), O-ring (15) and support washer (16) are free.

5. The ball tip (21) that is attached to the bellows (13) is removed by threading it off the bellows.

   Be certain to hold the bellows by the flats on the upper end when removing the ball tip. Following this procedure will eliminate damage to the bellows or threads.

NOTE: The ball tip (21) and seat (19) must be replaced as a set. Use P/N 241 109.

DISASSEMBLY, (Continued)

6. The thermostat is attached to the lower body by two fillister head screws. When replacing the thermostat (26) be certain to replace it with the correct temperature-rated thermostat. (Refer to the Parts List for temperature-ratings and part numbers).

REASSEMBLY

1. (See Figure 6) insert the cartridge heaters (25) in the lower body (17). Attach the thermostat (26) to the block with two screws.

2. Place the bellows support washer (16) and O-ring (15) in the upper end of the lower body.

3. Thread the ball tip (21) on the bellows using Locktite #40 on the threads. Hold the bellows by the flats on the upper end when threading the ball tip on to avoid damage to the bellows.

4. Insert the bellows (13) with its O-ring (14) through the upper end of the lower body until the tip appears at the lower end of the body.

5. Place the spring (12) over the bellows and position the upper body (8) on the lower body (17).

   NOTE: Be certain to orient the upper body on the lower body properly. The street elbow (7) where the solenoid valve is attached should be directly above the gun thermostat.

6. Insert the sleeve (18) in the lower end of the lower body, be certain the O-ring is in position on the ball seat (19), and secure the ball seat, lower body and upper body together with four oval head screws. Torque each screw to 25-30 inch-pounds.

7. Thread the air piston assembly (5) on the bellows until the air piston rests against the top of the upper body. Then back the air piston off 1/4 to 1/2 turn. Use the locknut (6) to secure the assembly on the bellows stem.

8. Place the air cylinder gasket (4) on the upper body, position the air cylinder (3) over the gasket and secure the air cylinder to the upper body with four screws and lockwashers. Torque each screw to 25-30 inch-pounds.

9. Attach the bracket and armored cordset with bracket to the rear of the lower body. Make the electrical connections (refer to Figure 4). Attach the electrical enclosure to the gun body with two screws.

10. Place the nozzle in the retaining nut and secure the retaining nut to the lower end of the gun.

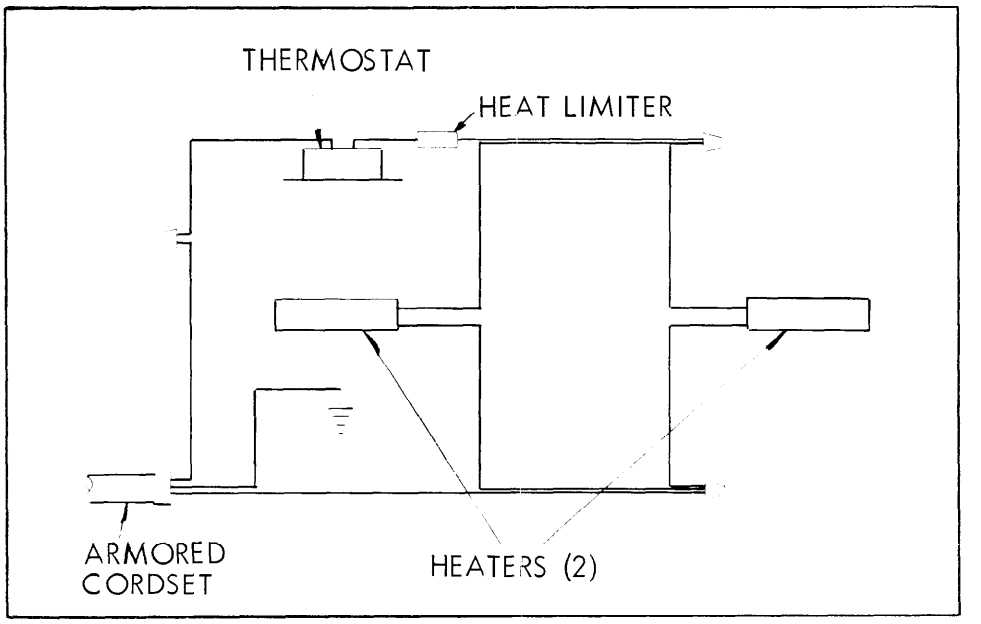

Figure 4 - Wiring Diagram

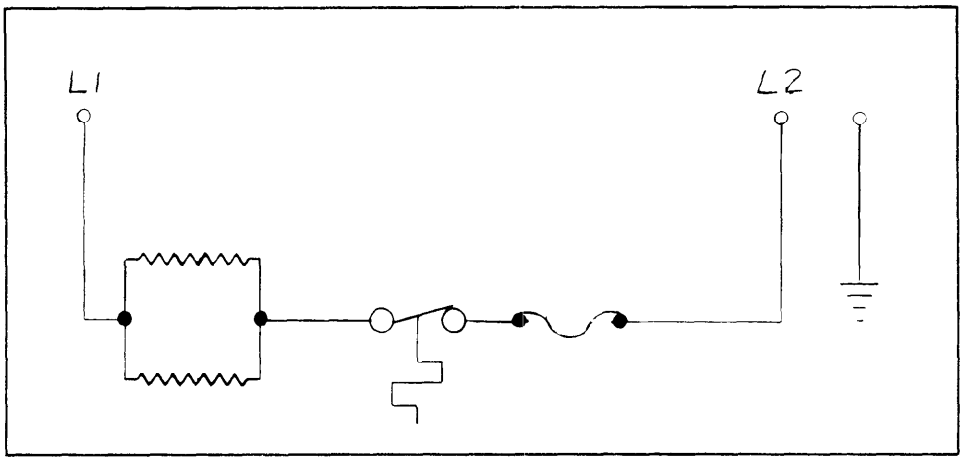

Figure 5 - Electrical Schematic

ELECTRICAL PARTS LIST

Part No.	Description	Req'd.
938 066	Heater, Cartridge, 240 VAC, 170 Watts	2
270 653	Thermostat w/Heat Limiter, 375°F (190°C)	1
270 654	Thermostat w/Heat Limiter, 400°F (204°C)	1
270 655	Thermostat w/Heat Limiter, 425°F (218°C)	1
270 656*	Thermostat w/Heat Limiter, 450°F (232°C)	1

* Shipped with unless otherwise specified.

LITHO U.S.A.
ISSUED 1/77 SUPERSEDES

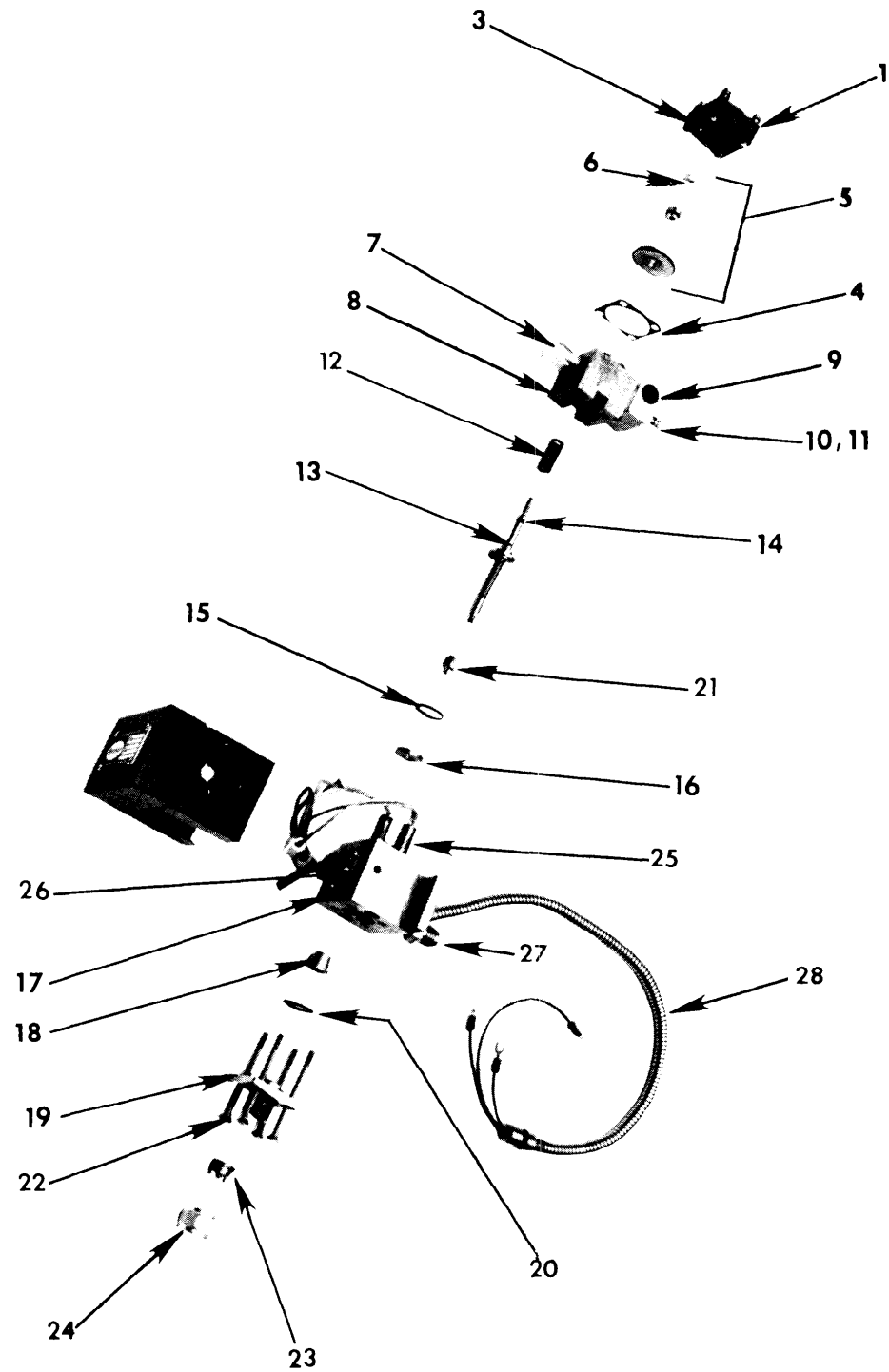

Figure 6 - AD-28 Exploded View

PARTS LIST

Fig. 6 Key	Part No.	Description	Req'd.
-	270 651	Gun, Automatic, AD-28	Ref.
1	981 140	. Screw, Fil. Hd., 10-32 x 1	4
2	983 120	. Lockwasher, #10	4
3	153 028	. Cylinder, Air	1
4	153 031	. Gasket, Air Cylinder	1
5	153 022	. Piston Assembly, Air	1
6	984 539	. . Nut, 10-32 (3/8" Flats)	1
-	240 274	. . Nut, Seal Lock, 10-32 (7/16" Flats)	1
-	940 090	. . O-ring, 7/32 x 11/32	1
7	973 125	. Elbow, Street, 1/8 NPT	1
8	270 263	. Body, Upper Gun	1
9	270 157	. Mounting, Retainer	1
-	270 607	. Insulator	1
10	981 148	. Screw, Fil. Hd., 10-32 x 1-1/4	2
11	983 120	. Lockwasher, #10	2
-	981 405	. Screw, Set, Sq. Hd., 3/8-16 x 3/4	1
12	152 934	. Spring	1
13	270 617	. Bellows	1
14	940 060	. . O-ring, Viton, 1/8 x 1/4	1
-	-	. . Rod, Bellows	1
-	-	. . Bellows	1
15	940 161	. O-ring, Viton, 5/8 x 3/4	1
16	270 616	. Washer, Bellows Support	1
17	270 626	. Body w/Sleeve, Lower	1
18	270 615	. . Sleeve, Lower Body	1
-	241 109	. Ball Tip and Seat Assembly	1
19	-	. . Seat (Items 19 and 21 are matched set)	1
20	940 181	. . O-ring, Viton, 3/4 x 7/8	1
21	-	. . Tip (Items 19 and 21 are matched set)	1
22	981 197	. Screw, Oval Hd., 10-32 x 2-1/4	4
23	231 312*	. Nozzle	1
24	152 290	. Nut, Nozzle Retaining	1
25	938 066	. Cartridge, Heater, 240 VAC, 170 Watts	2
26	270 656*	. Thermostat w/Heat Limiter, 450°F	1
-	981 000	. Screw, Fil. Hd., 5-40 x 1/4	2
-	933 056	. Connector, Porcelain	3
27	972 050	. Connector, Male, 9/16-18 x 1/4 NPT	1
-	270 602	. Enclosure, Electrical w/Plate	1
-	981 178	. Screw, Pan Hd., 10-24 x 7/8	2
-	270 608	. Bracket	1
28	270 609	. Cordset, Armored	1
-	-	. . Wire Group	1
-	933 006	. . Terminal, Ring Tongue	1
-	270 610	. . Conduit, Electrical Cordset	1
-	-	. . . Bracket, Conduit	1
-	-	. . . Conduit, Flexible Electric	1
-	-	. . . Fitting, Conduit	1
-	-	. . . Fitting, Electrical Conduit	1
-	981 113	. Screw, Fil. Hd., 10-23 x 3/8	4
-	983 120	. Lockwasher, #10	4

10/78 - Revised fitting P/N.

* Shipped with unless otherwise specified.

LITHO U.S.A.

ISSUED 10/78 SUPERSEDES 8/77

SERVICE PARTS

Fig/Key	Part No.	Description	Req'd.
-	270 624	Kit, Seal AD-28	Ref.
6/20	940 181	. O-ring, Viton, 3/4 x 7/8	1
6/14	940 060	. O-ring, Viton, 1/8 x 1/4	1
6/15	940 161	. O-ring, Viton, 5/8 x 3/4	1
6/5	153 022	. Piston Assembly, Air	1
6/4	153 031	. Gasket, Air Piston	1
-	270 625	Kit, Bellows, AD-28	Ref.
6/13	270 617	. Bellows	1
6/20	940 181	. O-ring, Viton, 3/4 x 7/8	1
6/15	940 161	. O-ring, Viton, 5/8 x 3/4	1
-	270 626	Body w/Sleeve, Lower	Ref.
6/17	-	. Body, Lower Gun	1
6/18	270 615	. Sleeve, Lower Gun	1
-	241 109	Ball Tip and Seat Assembly	Ref.
6/19		. Seat	1
6/20	940 181	. O-ring, Viton, 3/4 x 7/8	1
6/21	-	. Tip	1

4/78 - Revised o-ring size, P/N.

OPTIONAL THERMOSTATS

Part No.	Description
270 653	Thermostat w/Heat Limiter, 375°F (190°C)
270 654	Thermostat w/Heat Limiter, 400°F (204°C)
270 655	Thermostat w/Heat Limiter, 425°F (218°C)

ANCILLARY EQUIPMENT

Long Engagement Nozzles . . .	231 0XX Series
Optional Engagement Nozzles . .	231 XXX Series
Dual Orifice Nozzles	220 0XX Series
Extended Nozzles	270 59X Series

LITHO U.S.A.