

TIPPER TIE®

A DOVER INDUSTRIES COMPANY

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APEX, N.C. 27502-0866
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1-800-331-2905
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MACHINE MODEL

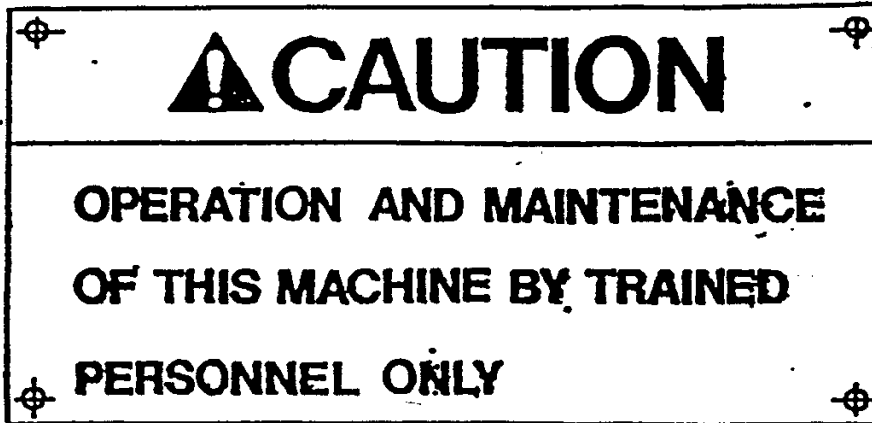
Z413.5

MANUAL

PLEASE READ THIS MANUAL BEFORE
USE AND KEEP IT ON HAND FOR
REFERENCE TO ENSURE OPTIMUM
PERFORMANCE.

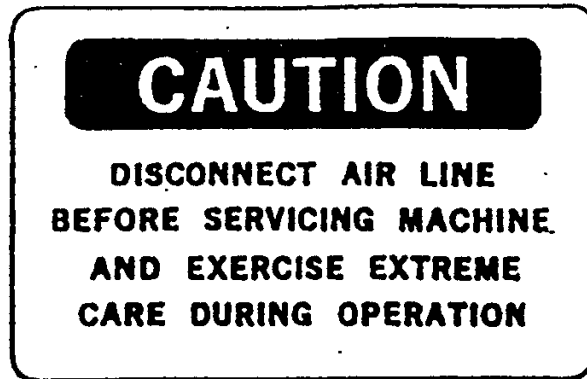
MANUAL NO. 80-0272

REVISION NO. 11



This machine is an industrial machine, not a public consumer product.

Operation, servicing and maintenance of this machine is to be done by trained and qualified personnel only who have read, know and understand all operating, service, maintenance, and safety instructions for this machine.



Before any maintenance, servicing operation, or clearing of jams is performed on this machine, the main air supply line must be disconnected from the machine.

During operation exercise extreme care and follow all operating and safety instructions.

Do not attempt to move or relocate this machine to a new position and/or location with the air supply line connected.

Do not operate, service or maintain this machine unless you are properly trained and know and understand all safety instructions.

Failure to adhere to this caution will or can result in bodily harm if personnel should become entangled in moving members of this machine or struck by explosive release of pneumatic parts and/or components propelled by the high pressure air contained in the system and system components.



Prior to applying an energy, or operating this machine inspect the machine for all guards. Do not attempt to apply energy or operate this machine unless all guards are in place and properly secured.

Operation of this machine by properly trained personnel only.

Failure to adhere to this warning will or can result in severe bodily harm if personnel should become entangled in moving members of this machine.

WARNING

THE FILTER, LUBRICATOR, AND REGULATOR SUPPLIED WITH THIS MACHINE ARE INTENDED FOR USE IN INDUSTRIAL COMPRESSED AIR SYSTEMS ONLY. THEY MUST NOT BE USED WHERE PRESSURE EXCEEDS 150 P.S.I.G. THESE UNITS MUST BE LOCATED IN AREAS WHERE THEY WILL NOT BE SUBJECTED TO AN IMPACT BLOW.

THE POLYCARBONATE PLASTIC BOWLS USED ON THE FILTER AND LUBRICATOR SHOULD NEVER BE USED ON AIR SUPPLIED BY A COMPRESSOR LUBRICATED WITH SYNTHETIC OILS OR OILS CONTAINING PHOSPHATE ESTERS OR CHLORINATED HYDROCARBONS. THEY CAN CARRY-OVER INTO THE AIR DISTRIBUTION SYSTEM AND CHEMICALLY ATTACK AND POSSIBLY RUPTURE THE BOWLS.

ALSO DO NOT EXPOSE THESE POLYCARBONATE PLASTIC BOWLS TO MATERIALS SUCH AS CARBON TETRACHLORIDE, TRICHLORETHYLENE, ACETONE, PAINT THINNER, CLEANING FLUIDS, OR OTHER HARMFUL MATERIALS, FOR THEY TOO WILL CRAZE AND/OR RUPTURE THE BOWLS.

IF MATERIALS HARMFUL TO POLYCARBONATE ARE PRESENT EITHER INSIDE OR OUTSIDE THE BOWLS, USE A METAL BOWL.

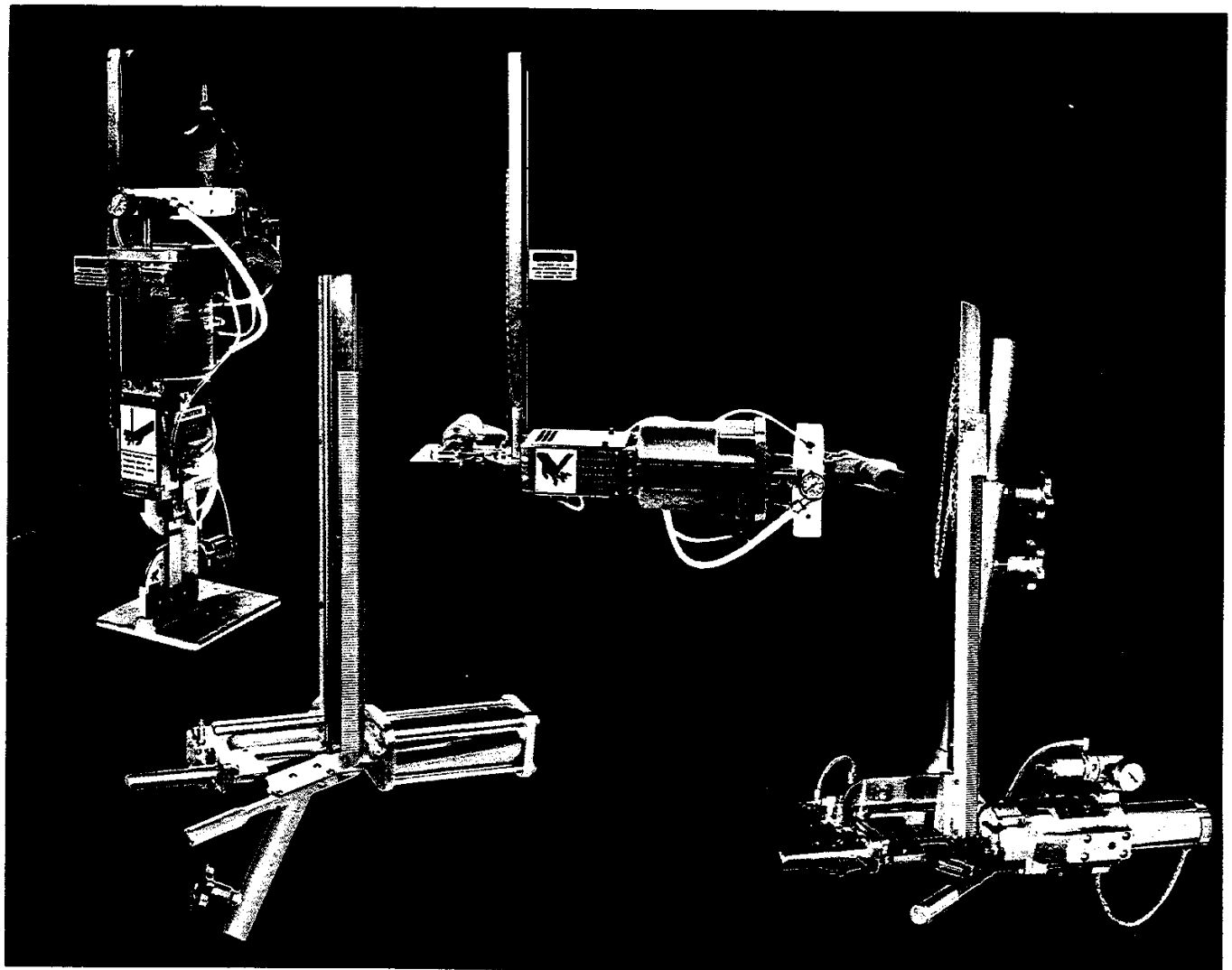
TIPPER CLIPPER[®]

AIR POWERED CLOSURE MACHINES

Versatile and reliable clip closure equipment offers a lasting positive seal for all types and sizes of bags.



TIPPER TIE[®]
A DOVER INDUSTRIES COMPANY



TIPPER CLIPPER AIR POWERED CLOSURE MACHINES

These rugged, dependable clippers offer a new standard of operating efficiency. TIPPER CLIPPER[®] Models F487L, F187L and F625L, are designed to perform where heat seals are either marginal or inadequate. They function equally well with all types of packaging material and in one quick, continuous operation gather the neck of large size bags and apply a Positive Seal that won't slip open or break even under extreme handling conditions. Whether explosives are being packaged in heavy gage poly, or burlap—fertilizers in mesh poly or multi-wall bags—liquid or powdered chemicals in drum liners, or plastic bags—or produce in netting. They fea-

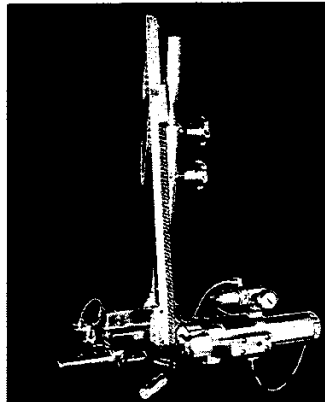
ture a unique closing mechanism which provides two extra benefits: First, it helps production output because it assists operators in gathering bag necks prior to clipping. And second, it provides a seal that remains air tight and water tight indefinitely under most conditions. Vital advantages for products that must be protected from humidity or kept at a uniform density after packaging. Equally important, either model can be easily integrated into any type of packaging procedure, and is easily installed. TIPPER CLIPPER[®] Models Z2115, Z2105, Z4136 and Z4135 are designed for use in vacuum bag operations. A re-designed gathering mechanism with

a larger throat insures proper neck gathering, as well as clip application for a lasting air-tight positive seal. It also minimizes bag "twisting" by operators. The mechanism includes rapid-fire valving for increased production, and incorporates a power cut-off knife to remove excess bag tails. Both machines offer Crimp Control, an adjustable pressure control that permits operators to select the precise degree they want to crimp the clip around the bag neck. Clip closing can be "tailored" to suit the specific characteristics of the packaging material being used. As a result, bag shearing during the clipping cycle is virtually eliminated.

TIPPER CLIPPER® AIR POWERED CLOSURE MACHINES



SPECIFICATIONS

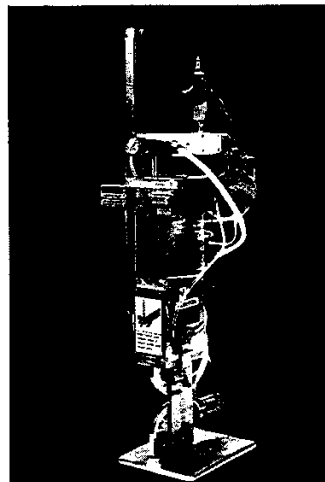
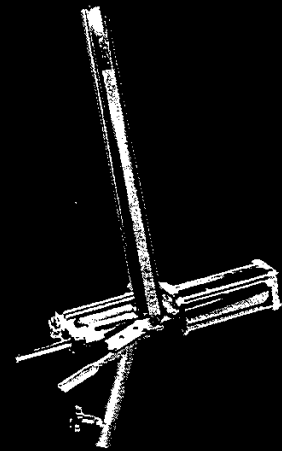


MACHINE SPECIFICATIONS

	Model F187L	Model F487L	Model F625L
Operation	Air Powered, Hand Actuated		
Accessories	Air Filter, Regulator, Lubricator, 8' Hose, Pipe Mount		
Air (@ 80 PS.I.)	20 Cycles Per Minute—2.1 C.F.M.		
Air Pressure	80 to 100 PS.I.		
Type of Lubrication	White Oil "A"		
Max. Cycle Speed	36 Cycles Per Minute @ 80 PS.I.		
Clip Magazine Load	275 Clips	200 Clips	150 Clips
Machine Materials	Stainless Steel, Chrome Plated, Burnished Aluminum		
Machine Height	30"	30"	28"
Machine Width (without support)	17"	22"	24"
Machine Weight (without support)	16 Lbs.	16 Lbs.	24 Lbs.
Shipping Weight	39 Lbs.	39 Lbs.	45 Lbs.

CLIP SPECIFICATIONS

Clip Sizes	*All 100T & G Series	*All 400T & G Series	*All 600 Series
Material	Aluminum		
Maximum Closure	1/4 to 5/16" dia.	7/16 to 1/2" dia.	5/8 to 7/8" dia.
Standard Order Qty.	25M	25M	20M
Shipping Point	Apex, North Carolina		
*See your sales engineer for the clip best suited for your needs.			

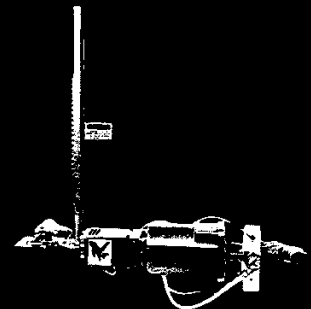


MACHINE SPECIFICATIONS

	Z2115/Z4136	Z2105/Z4135
Operation	Air Powered, Semi-Automatic	Air Powered, Semi-Automatic Pipe Mounted
Accessories	Air Filter, Regulator, Lubricator, 8' Hose	
Free Air Consumption	9.0 CFM for 20 Cycles Per Minute	
Air Supply Pressure	80-100 PSI	
Type of Lubrication	White Oil "A"	
Max. Cycle Speed	40 Cycles Per Minute	
Machine Materials	Stainless Steel, Chrome Plated, Burnished Aluminum	
Clip Magazine Load	200 Clips	
Machine Height	34"	24"
Machine Width	10"	30"
Machine Weight	35 Lbs.	34 Lbs.
Machine Shipping Weight	50 Lbs.	76 Lbs.
Shipping Point	Apex, North Carolina	

CLIP SPECIFICATIONS

Clip Sizes	Z201	Z401	Z411
Clip Material	Aluminum		
Maximum Closure	5/16"	7/16"	15/32"
Standard Order Qty.	25M		
Shipping Point	Apex, North Carolina		



TIPPER, TIPPER TIE, TIPPER CLIPPER, TIPPER-MATIC, PRESS TIE, CLIPPER VAC, and "Z" are registered U.S. trademarks. U.S. Patents 2697970, 2729263, 2880419, 2901068, 2742944, 2842919, 2879512, and others. Others pending. Foreign patents issued and pending. TM. "TIPPER" Reg. other T.M's pending.

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01140 Mexico D.F.
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FAX: 52-5-515-2740

GENERAL INSTRUCTIONS FOR TIPPER TIE AIR POWERED MACHINES

WARNING: Plastic bowl on air filter unit has a maximum operating pressure of 150 P.S.I.

The TIPPER TIE machines are equipped with a filter, regulator, and a lubricator unit. The air intake part has ports tapped for 1/4" and 3/8" pipe thread. The filter is equipped with an automatic drain, but it should be checked occasionally to ensure that it is draining off the moisture collected from the air lines. The lubricator must always have a supply of oil, otherwise the rubber "O" rings in the air valves and the cylinders will wear out quickly. Number 10 weight non-toxic oil or mineral oil can be used in the lubricator and is recommended by the meat inspection departments. Oil flow at one drop every other stroke of the piston should be sufficient for most machines. See sheet 48-0012 for more specific instructions concerning the air filter, regulator and lubricator.

If the TIPPER TIE machine is to be used in two or more locations, it is suggested that extra regulator units be installed at each location so that the TIPPER TIE machine can be moved quickly by detaching it at the "Quick-Coupler" provided on the air cylinder.

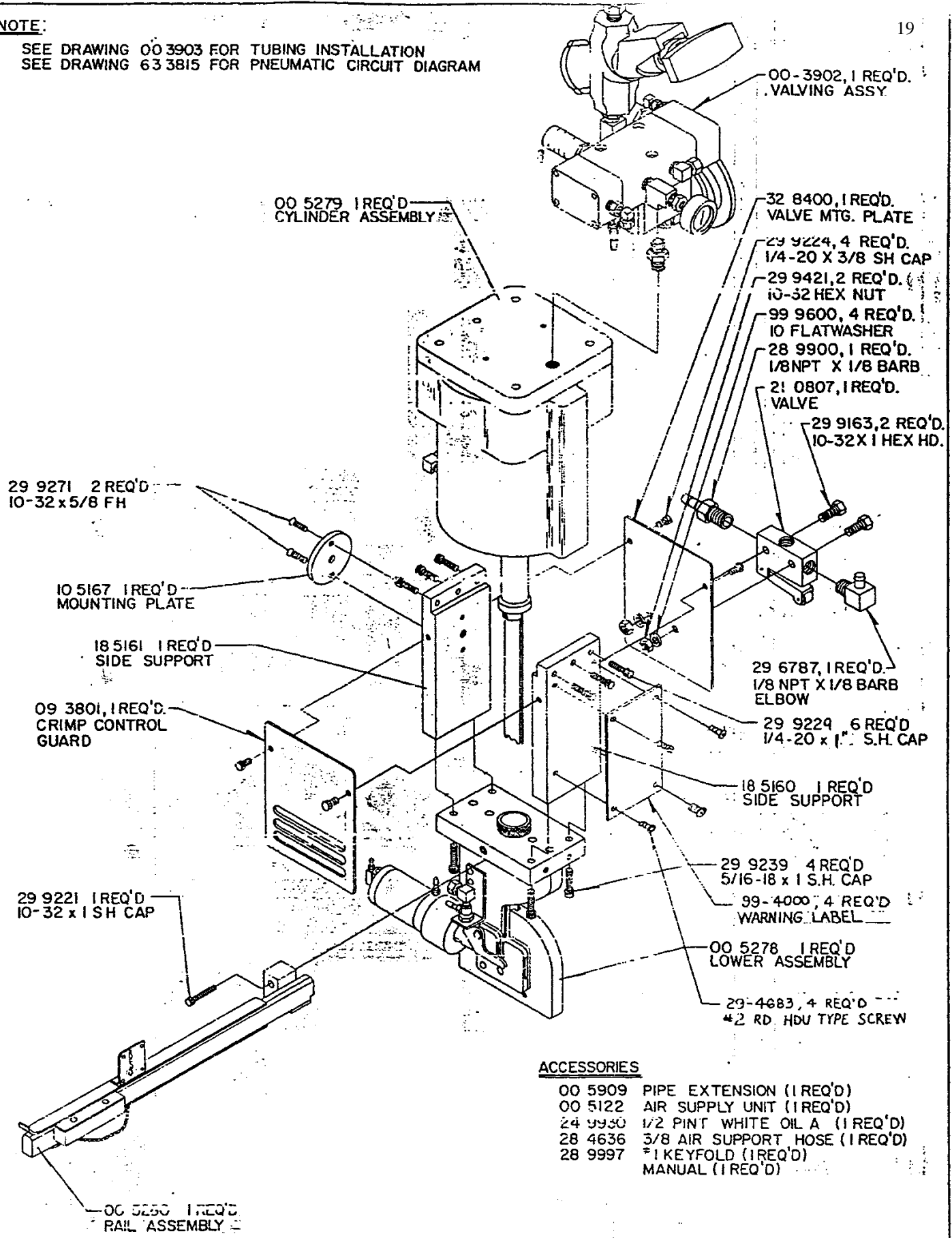
Do not mount the regulator unit in extremely wet area. The unit must be mounted vertically only. An increase in air line length between the regulator and the TIPPER machine will slow down operation slightly. Restriction of the air exhaust line will result in slower return of piston and punch and increase the total cycle time.

RECOMMENDED SPARE PARTS LIST FOR
CLIPPER MODELS Z2105, Z2115, Z4135 & Z4136

PART NUMBER	DESCRIPTION	QUANTITY			
		Z2105	Z2115	Z4135	Z4136
05 3664	Z200 SERIES DIE	1	1		
05 5157	Z400 SERIES DIE			1	1
11-2641	CUT-OFF KNIFE	1	1	1	1
12 0764	4 INCH PISTON	1	1		
12 2124	5 INCH PISTON			1	1
13 3671	Z200 SERIES PUNCH	1	1		
13 5158	Z400 SERIES PUNCH			1	1
17 0582	SPRING	1	1	1	1
21 1810	AIR VALVE	1	1	1	1
40 1262	4 INCH GASKET	1	1		
40-0012	PERMATEX			1	1
41 1726	"U" CUP	1	1	1	1
55 0002	REPAIR KIT FOR 21-0002 VALVE	1	1	1	1
55 3907	REPAIR KIT FOR 21-3907 VALVE	1	1	1	1
55 4553	REPAIR KIT FOR WABCO VALVE	1	1	1	1
55 5127	REPAIR KIT FOR ALTERNATE VALVE				
99 1725	SHAFT WIPER	1	1	1	1
99 4108	REPAIR KIT FOR LUBRICATOR CAP	1	1	1	1
99 4109	REPAIR KIT FOR FILTER BAFFLE	1	1	1	1
99 4147	REPAIR KIT FOR LUBRICATOR BOWL	1	1	1	1
99 4148	REPAIR KIT FOR FILTER ELEMENT	1	1	1	1
99 4149	REPAIR KIT FOR FILTER DRAIN	1	1	1	1
99 4150	REPAIR KIT FOR REGULATOR SCREW	1	1	1	1
99 4151	REPAIR KIT FOR REGULATOR DIAPHRAGM	1	1	1	1

NOTE:

SEE DRAWING 00 3903 FOR TUBING INSTALLATION
SEE DRAWING 63 3815 FOR PNEUMATIC CIRCUIT DIAGRAM



29 9271 2 REQ'D
10-32 x 5/8 FH

10 5167 1 REQ'D
MOUNTING PLATE

18 5161 1 REQ'D
SIDE SUPPORT

09 3801 1 REQ'D
CRIMP CONTROL
GUARD

29 9221 1 REQ'D
10-32 x 1 SH CAP

00 5250 1 REQ'D
RAIL ASSEMBLY

00 5279 1 REQ'D
CYLINDER ASSEMBLY

00-3902, 1 REQ'D
VALVING ASSY

32 8400, 1 REQ'D
VALVE MTG. PLATE

29 9224, 4 REQ'D
1/4-20 X 3/8 SH CAP

29 9421, 2 REQ'D
10-32 HEX NUT

99 9600, 4 REQ'D
10 FLATWASHER

28 9900, 1 REQ'D
1/8NPT X 1/8 BARB

21 0807, 1 REQ'D
VALVE

29 9163, 2 REQ'D
10-32 X 1 HEX HD.

29 6787, 1 REQ'D
1/8 NPT X 1/8 BARB
ELBOW

29 9224 6 REQ'D
1/4-20 x 1/2 S.H. CAP

18 5160 1 REQ'D
SIDE SUPPORT

29 9239 4 REQ'D
5/16-18 x 1 S.H. CAP

99-4000, 4 REQ'D
WARNING LABEL

00 5278 1 REQ'D
LOWER ASSEMBLY

29-4683, 4 REQ'D
#2 RD. HDU TYPE SCREW

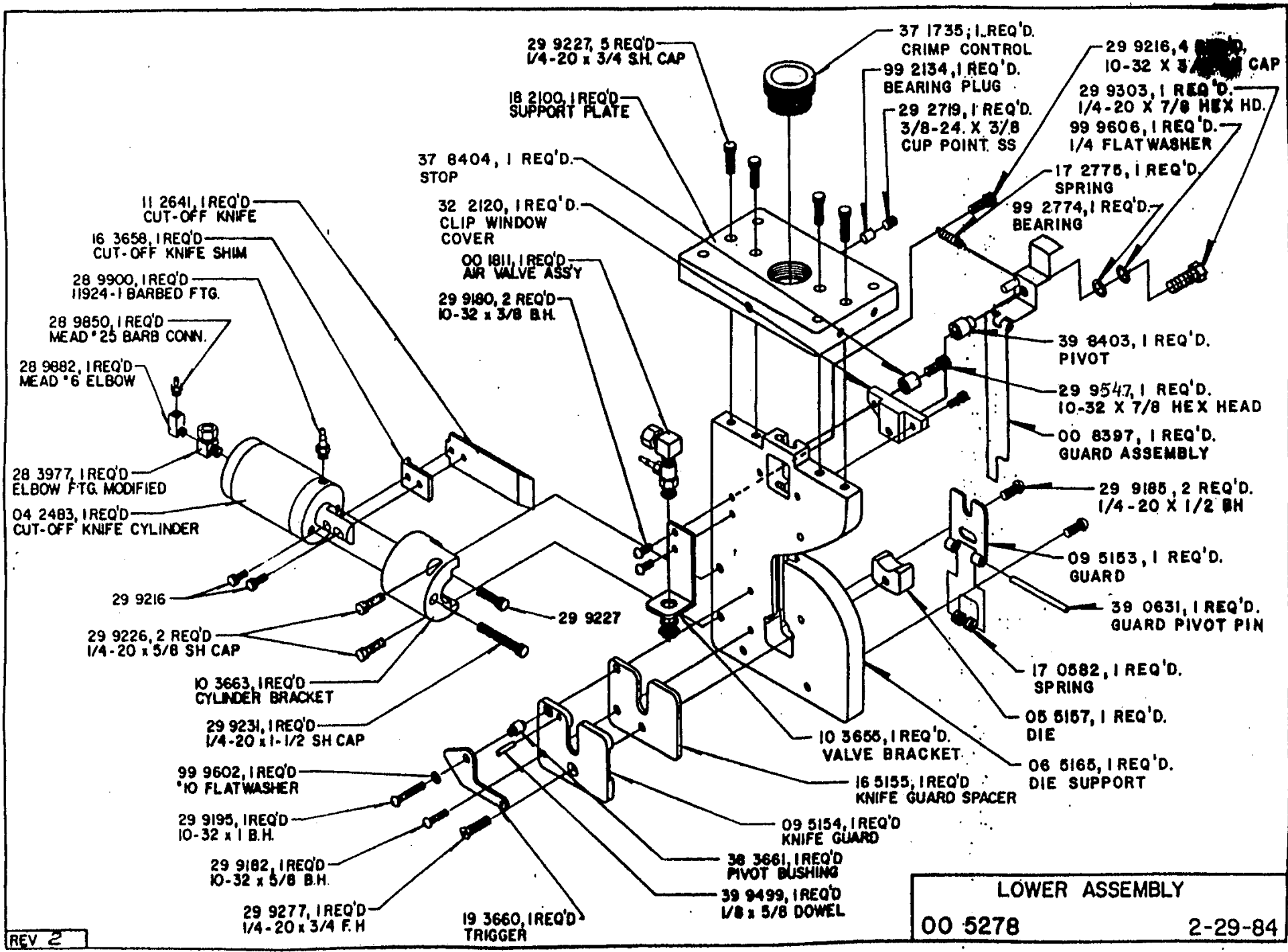
ACCESSORIES

- 00 5909 PIPE EXTENSION (1 REQ'D)
- 00 5122 AIR SUPPLY UNIT (1 REQ'D)
- 24 9930 1/2 PINT WHITE OIL A (1 REQ'D)
- 28 4636 3/8 AIR SUPPORT HOSE (1 REQ'D)
- 28 9997 #1 KEYFOLD (1 REQ'D)
- MANUAL (1 REQ'D)

CLIPPER MODEL Z 4135

98 0272

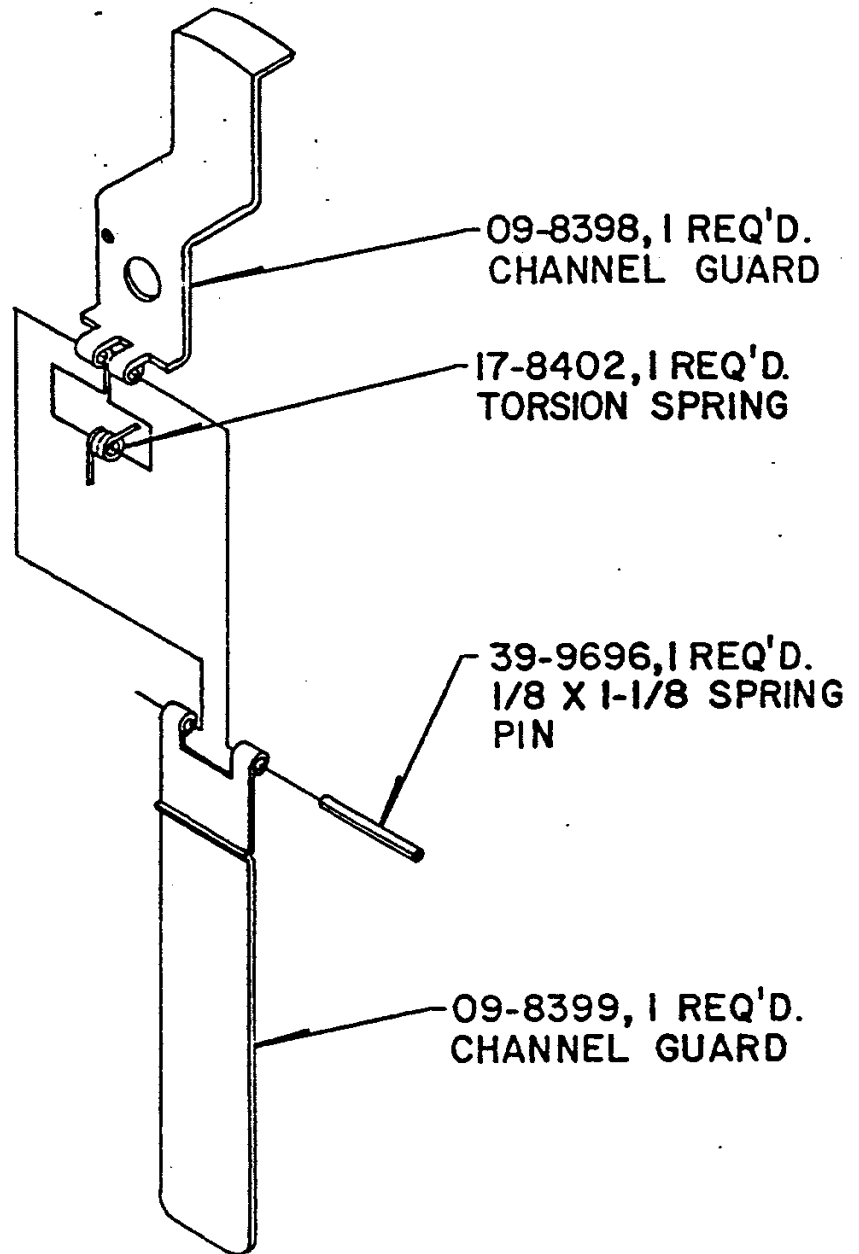
3-18-77



LOWER ASSEMBLY

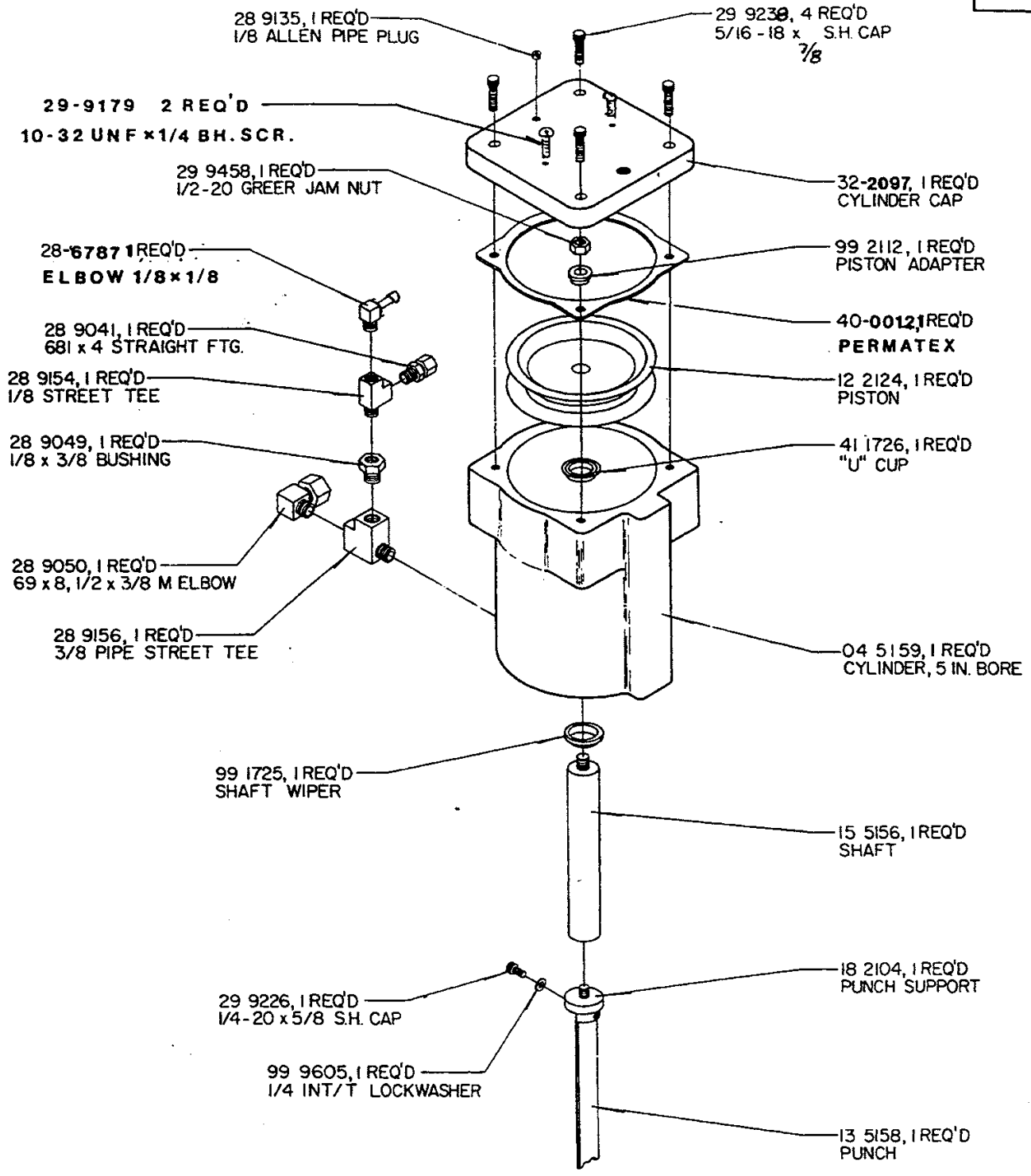
00 5278 2-29-84

REV 2



CHANNEL GUARD ASSEMBLY
00-8397 6-15-83

USED ON
Z4135
Z4136

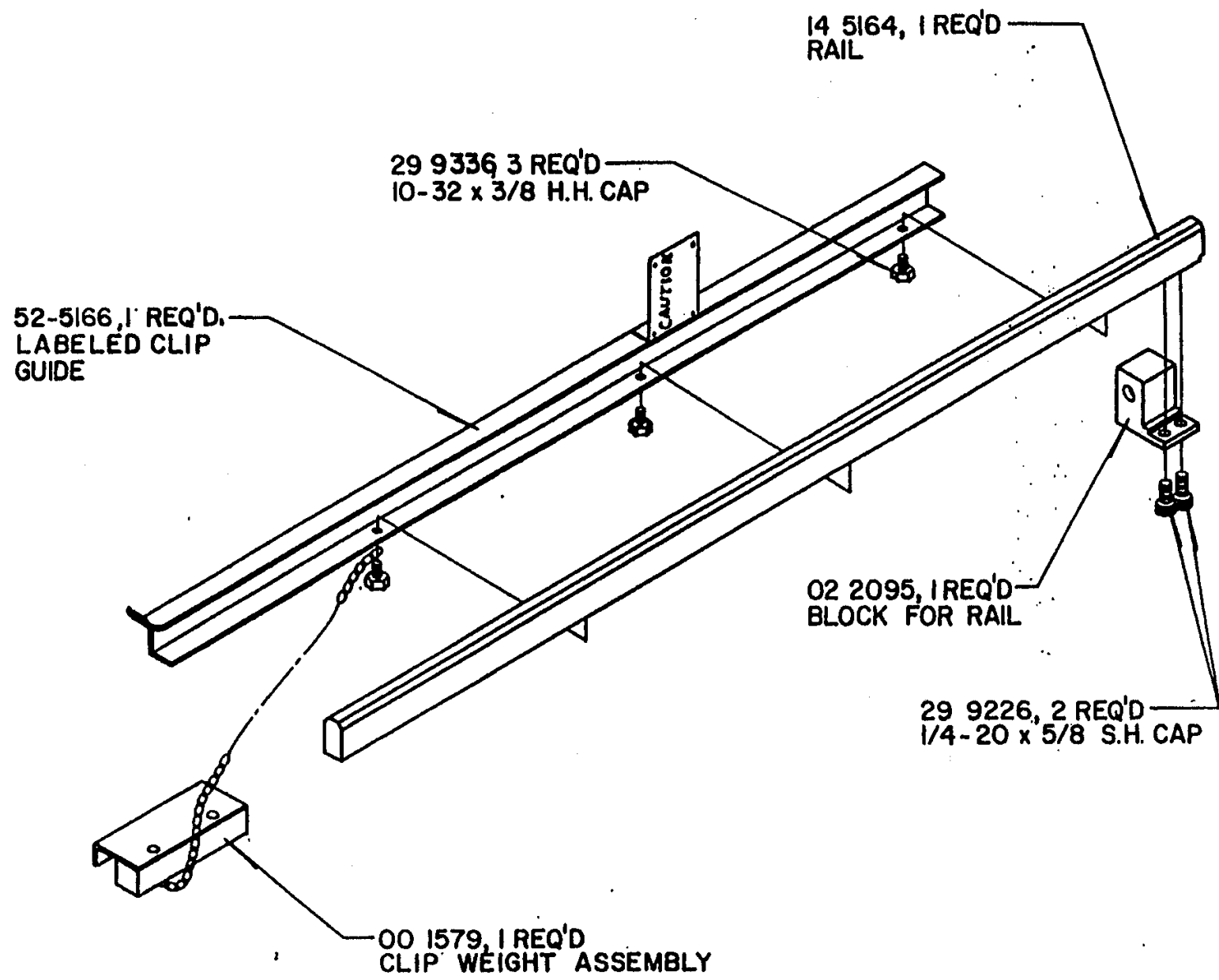


REV. 5

5" CYLINDER ASSEMBLY
00 5279 3-15-77

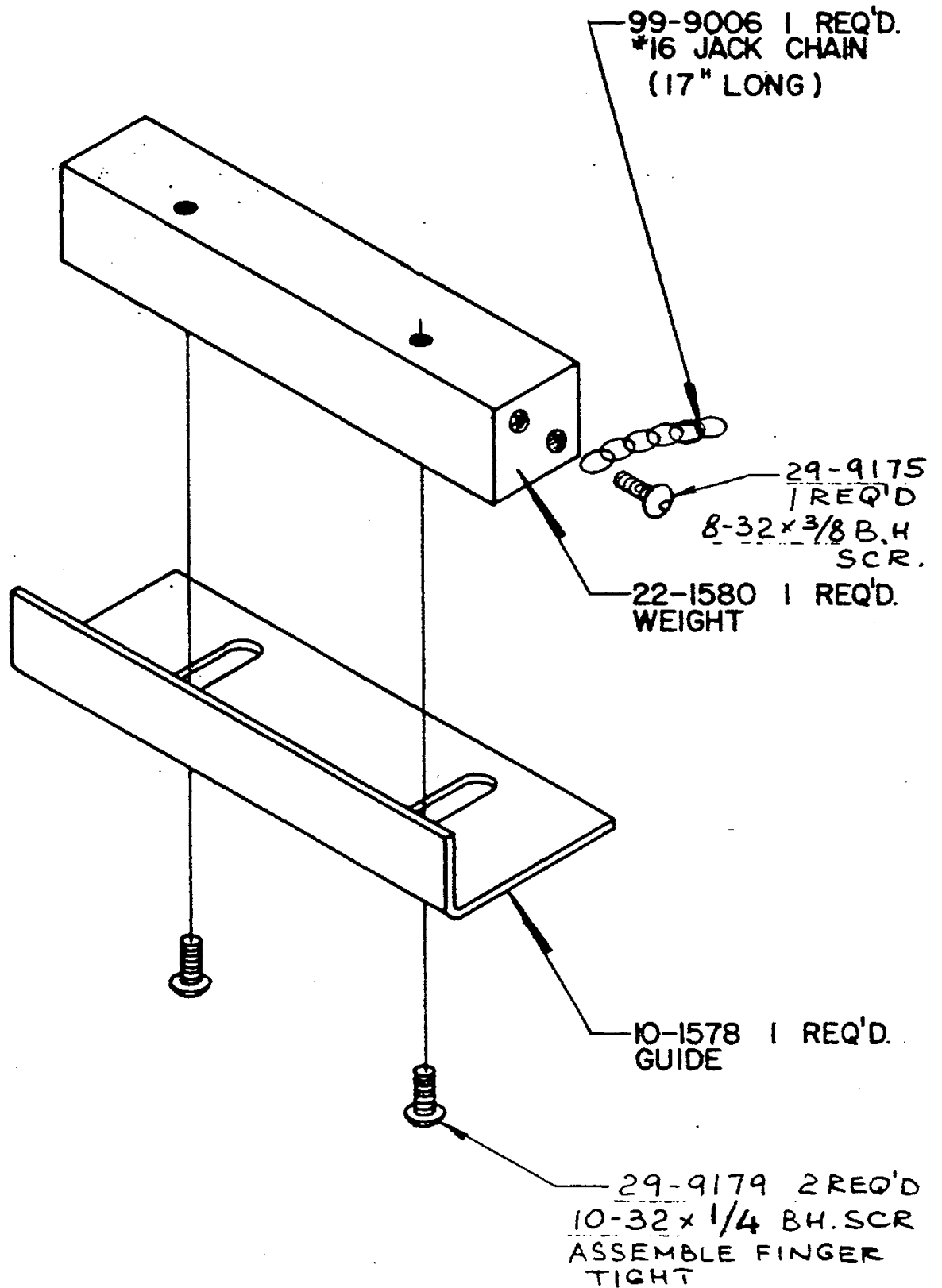
M89

USED ON
Z4135



REV. I

RAIL ASSEMBLY	27
00 5280	3-15-77



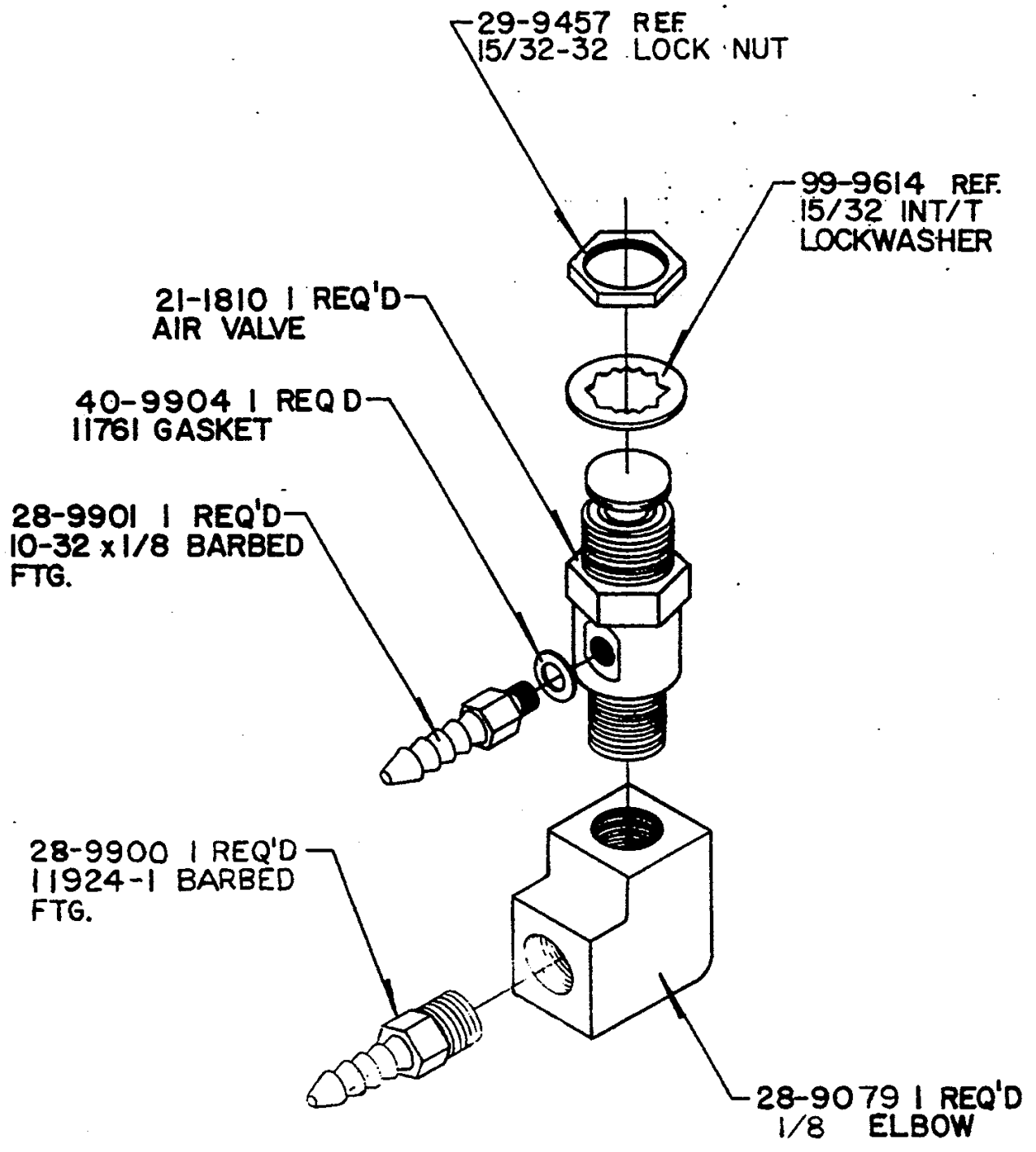
CLIP WEIGHT ASSEMBLY

00-1579

5-20-77

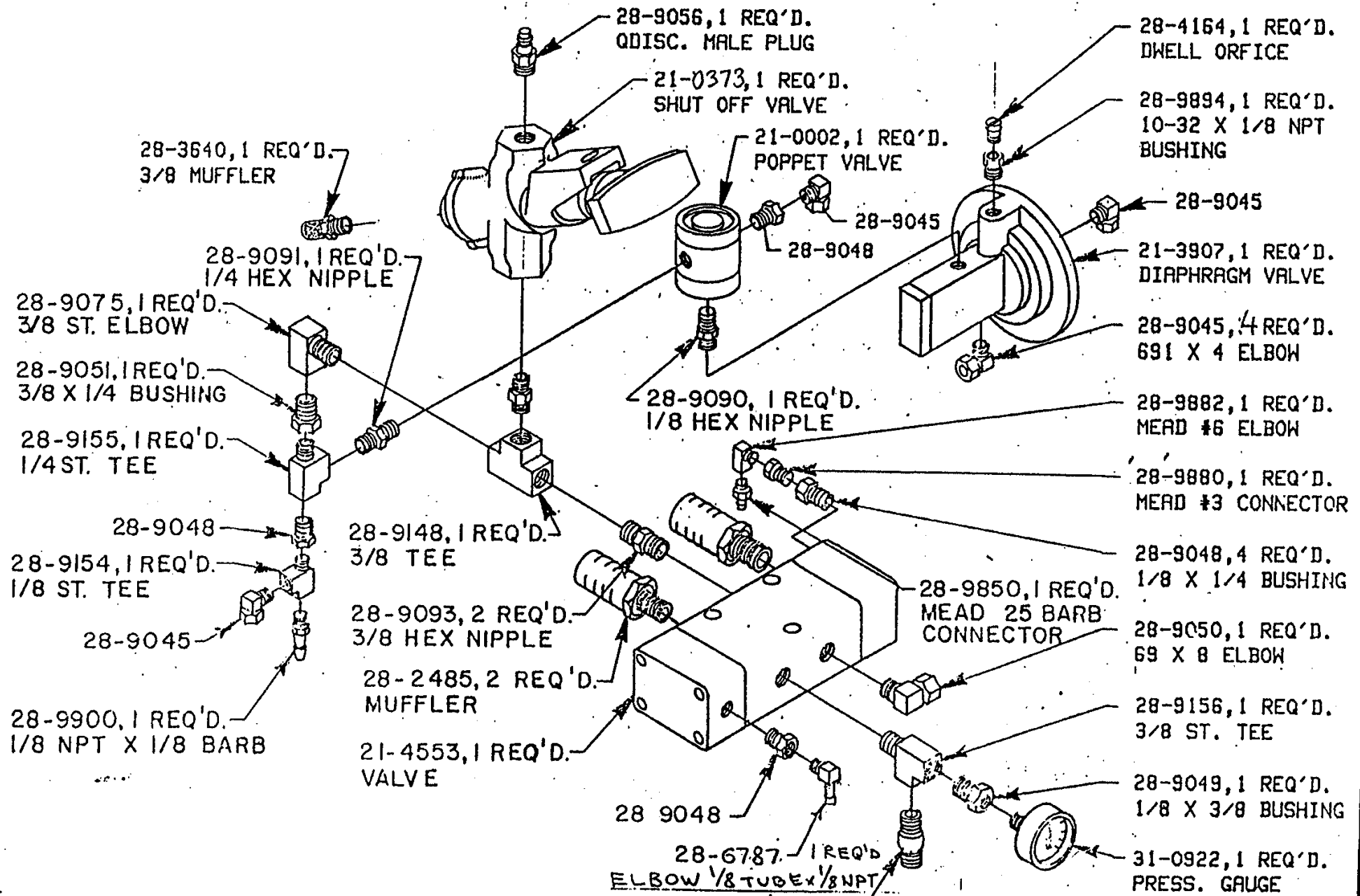
REV. 2

USED ON
FILE
F406L



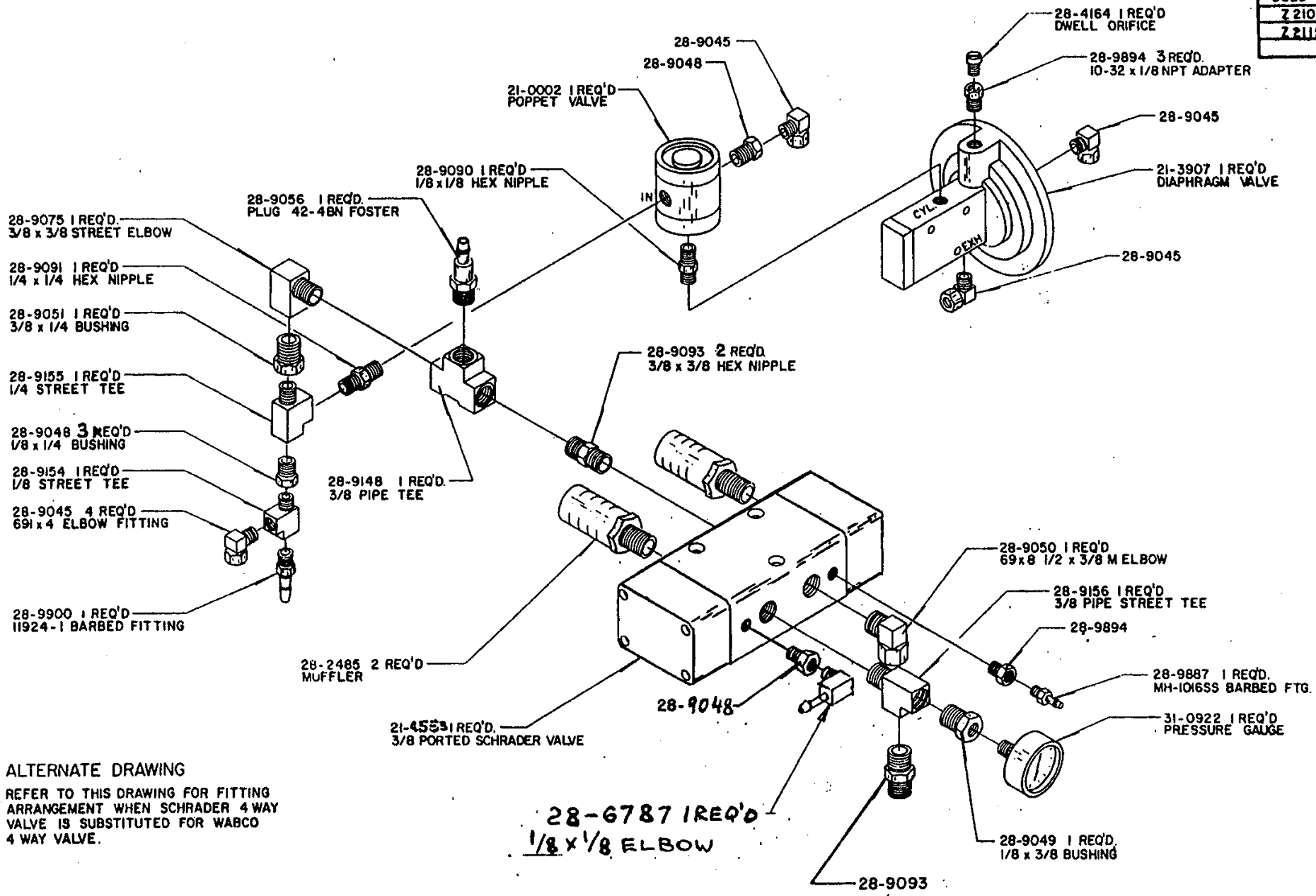
REV. 4

VALVE ASSEMBLY
00-1811 5-28-78



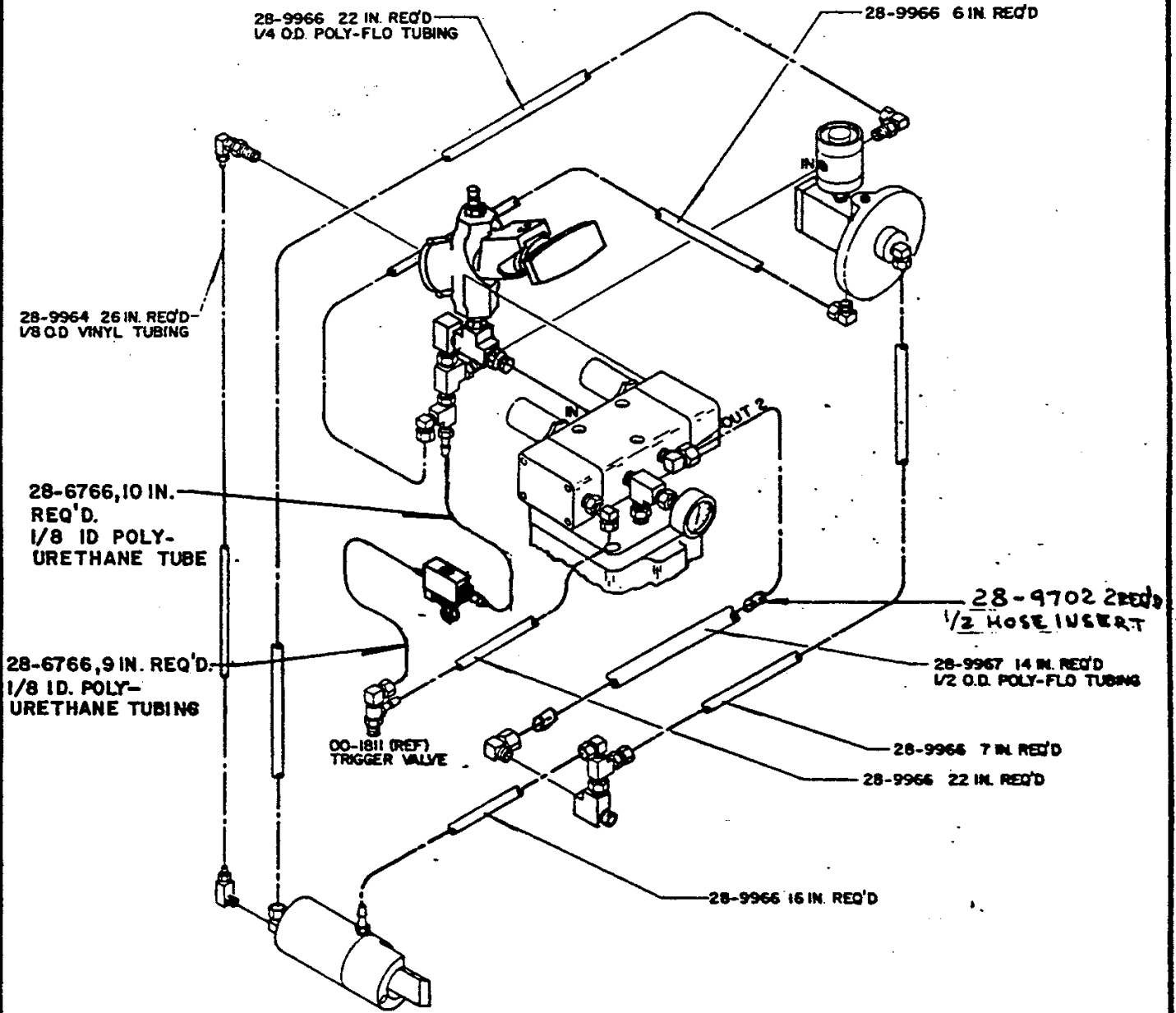
VALVING ASSEMBLY 3
 00-3902 11-28-84

USED ON
Z 2105
Z 2115



ALTERNATE DRAWING
REFER TO THIS DRAWING FOR FITTING
ARRANGEMENT WHEN SCHRADER 4 WAY
VALVE IS SUBSTITUTED FOR WABCO
4 WAY VALVE.

ALTERNATE VALVING ASS'Y.
00-5133 10-13-76



TUBING INSTALLATION

00-3803

11-28-84

KEY J

USED ON
Z2105
Z2115

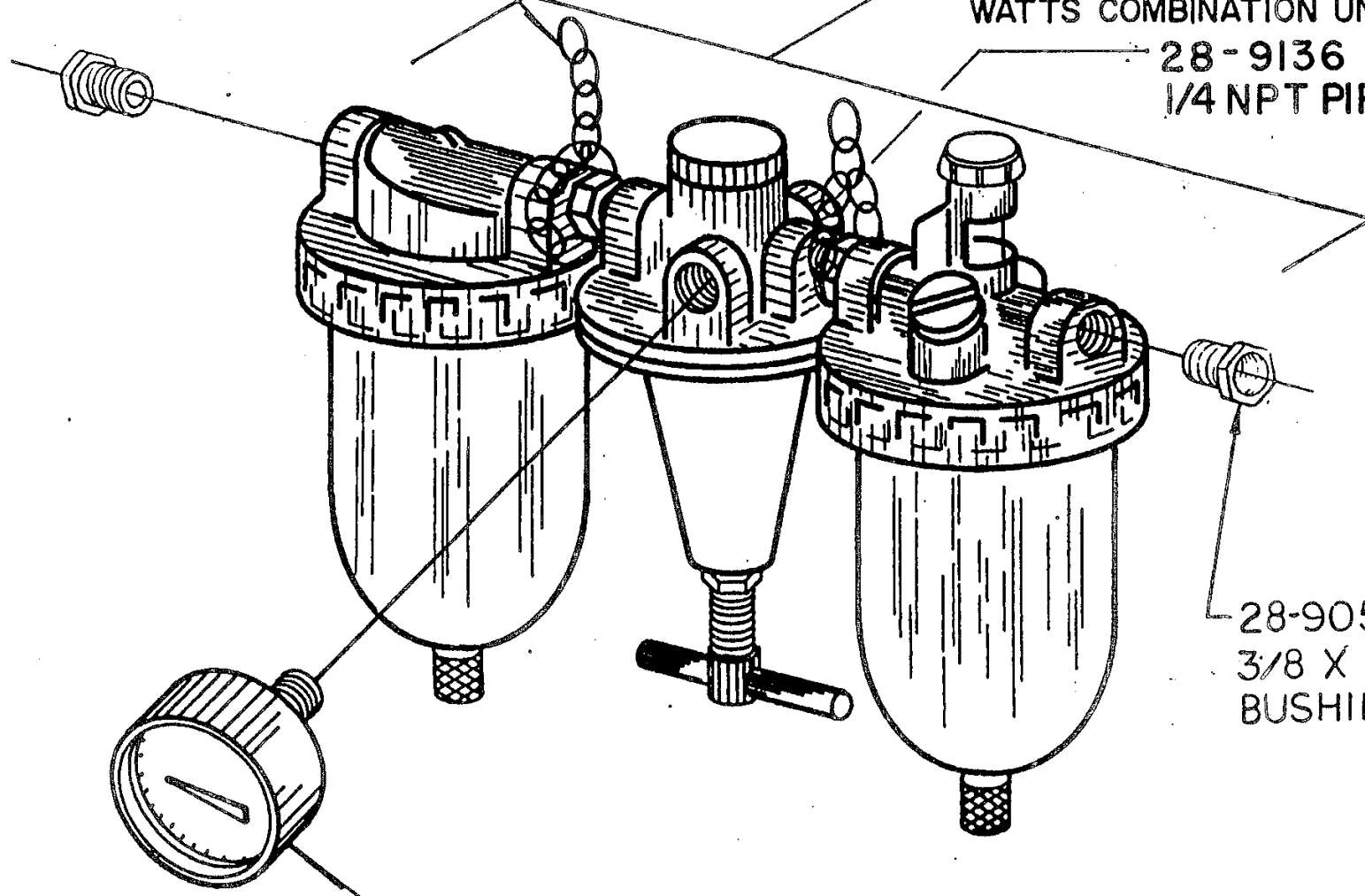
99-9006 2FT. REQ.
#16 JACK CHAIN

00-0916 1 REQ'D.
WATTS COMBINATION UNIT

28-9136 1 REQ'D
1/4 NPT PIPE PLUG

28-9051 2 REQ'D
3/8 X 1/4
BUSHING

31-1159 1 REQ'D.
AIR GAUGE



REV. 2

AIR SUPPLY UNIT
00-5122 4-3-87 39

USED ON₄₁

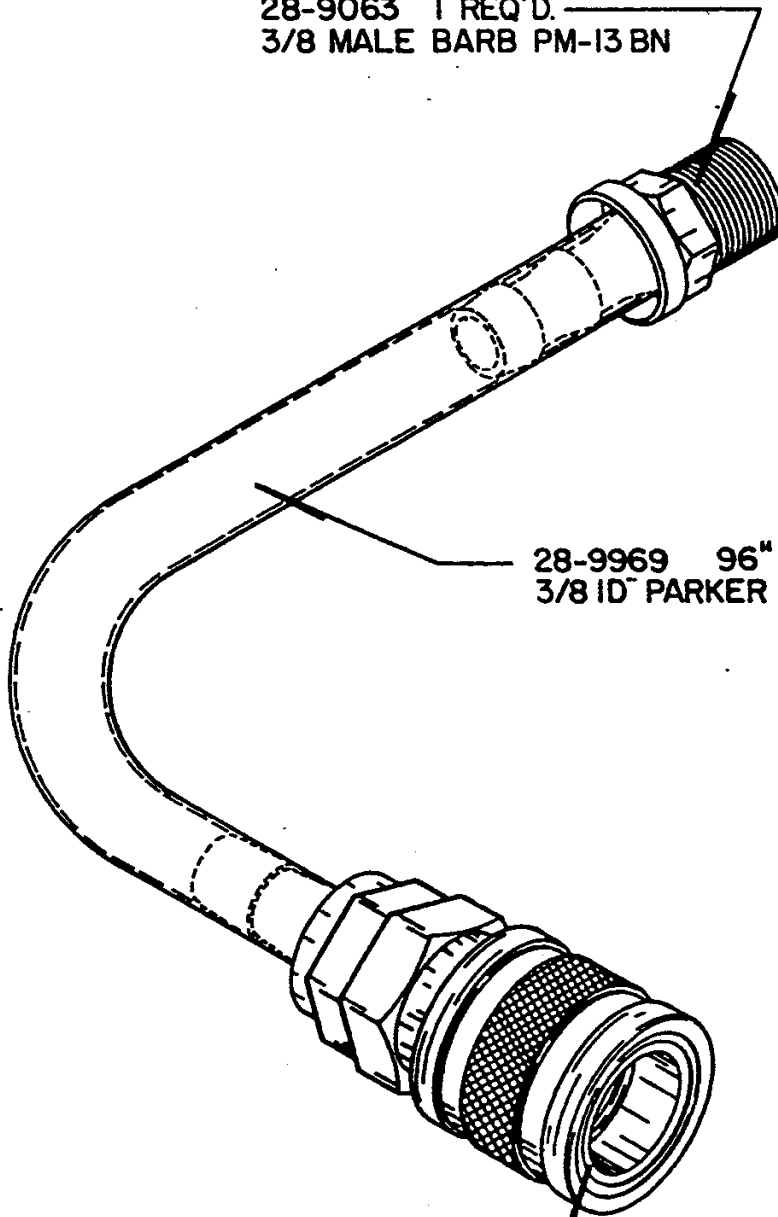
Z2105

Z2115

Z4135

Z4136

28-9063 1 REQ'D.
3/8 MALE BARB PM-13 BN



28-9969 96" ± 2" REQ'D.
3/8 ID PARKER 801 HOSE

28-9066 1 REQ'D.
3/8 BARB SOCKET 1714 BN

M89

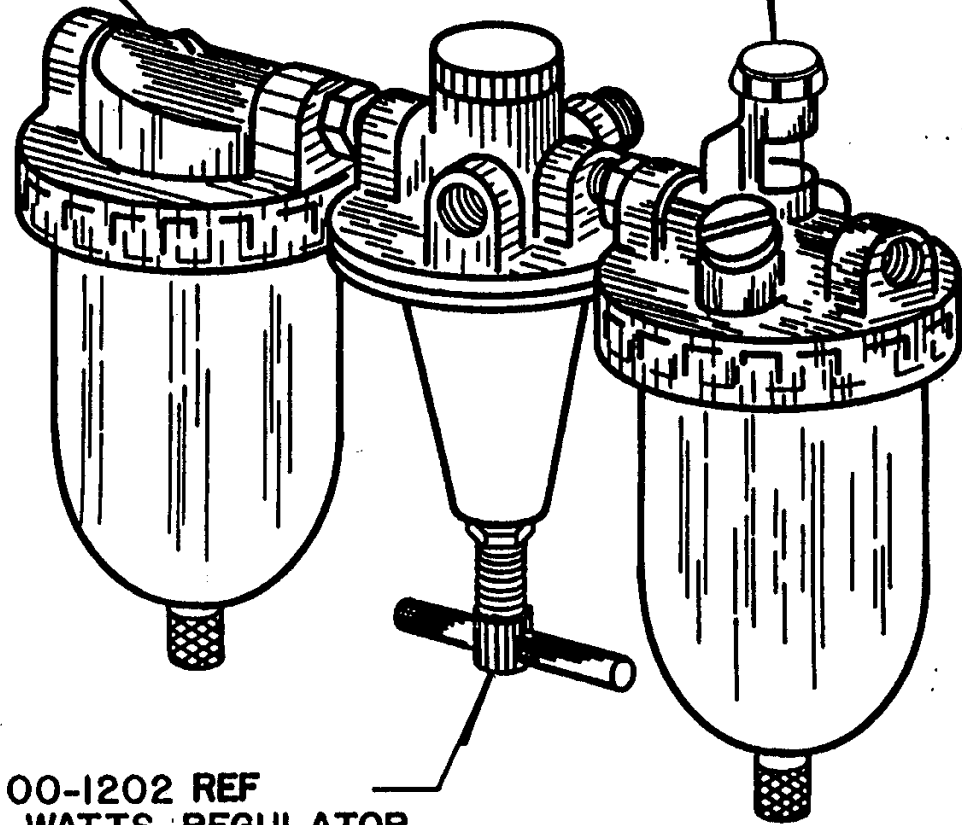
REV. 1

3/8 SUPPLY HOSE x 8 FT.
28-4636 5-26-77

502181221

00-1187 REF
WATTS FILTER

00-1188 REF
WATTS LUBRICATOR

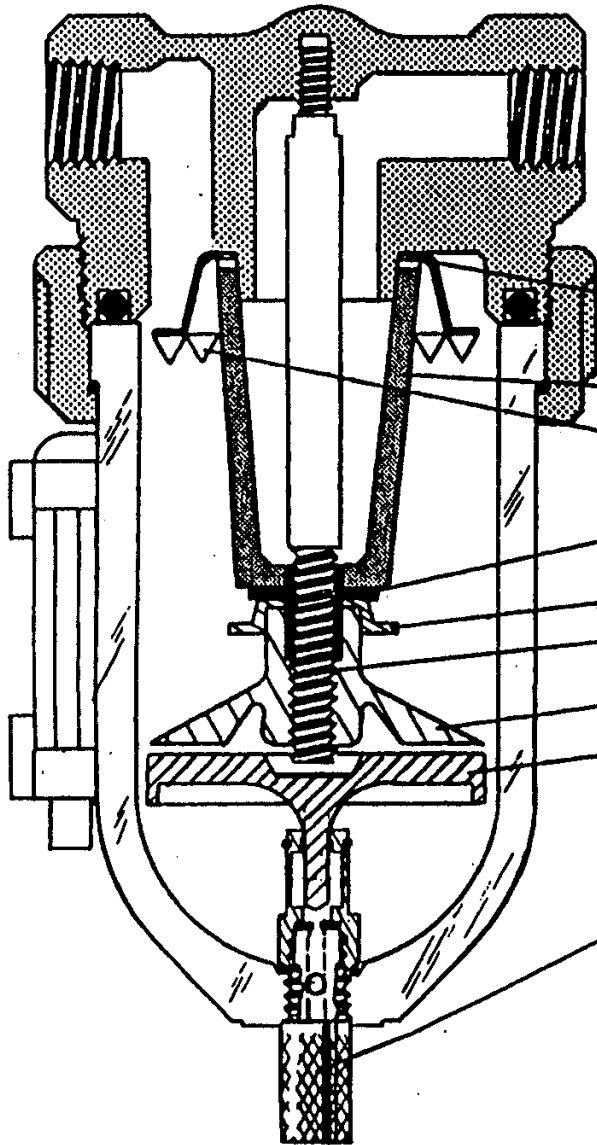


00-1202 REF
WATTS REGULATOR

REV. 2

(REF. SCD NO. 99-0916)

WATTS COMBINATION UNIT
00-0916 8-19-75

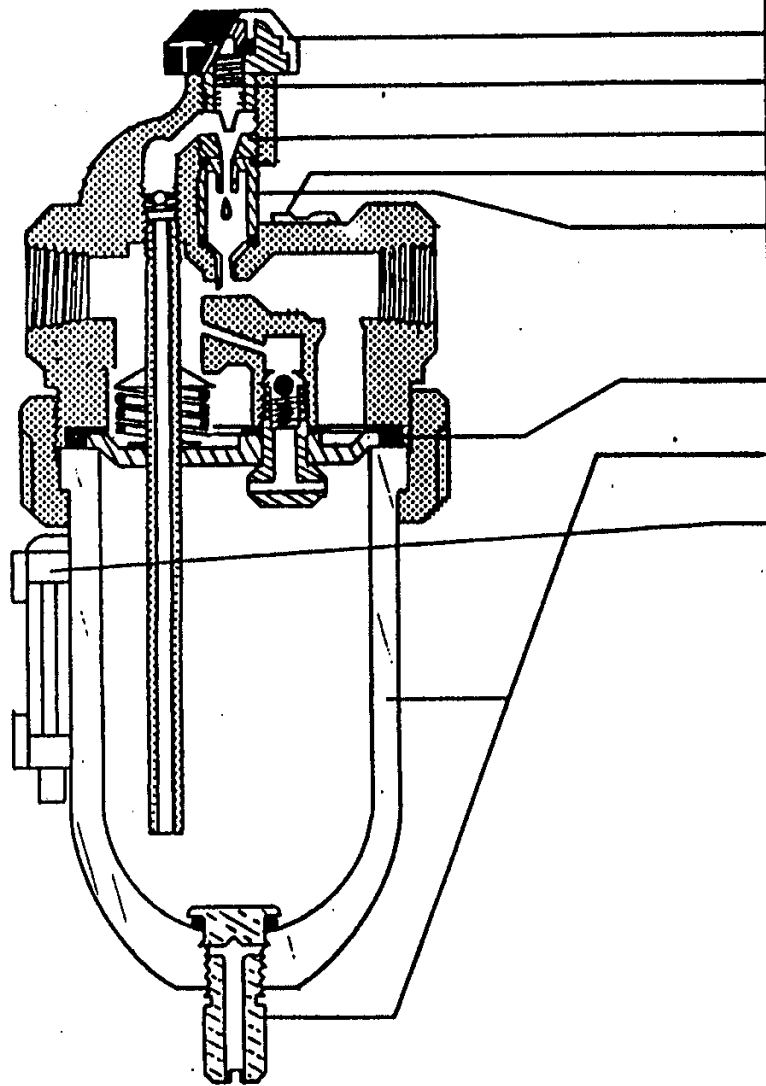


PART NAME	KIT NAME	PART NO.
Top Gasket	Repair Kit	99-4148
Filter Element		
Base Gasket		
Deflector	Baffle Repair Kit	99-4109
Secondary Baffle		
Retaining Rod		
Primary Baffle	PISTON DRAIN KIT	99-4149
Piston		
DRAIN COCK	BOWL KIT	99-4147
BOWL GASKET		
BOWL W/SIGHT GLASS DRAINCOCK	SIGHT GLASS REPAIR KIT	99-6975
SIGHT GLASS ASS'Y		
"O" RINGS		

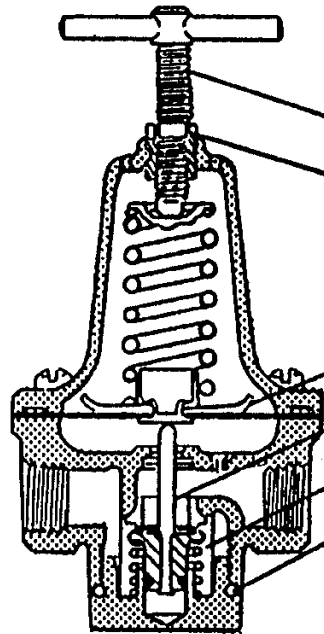
F602-03WJS WATTS FILTER

00-1187-22

3-4-74



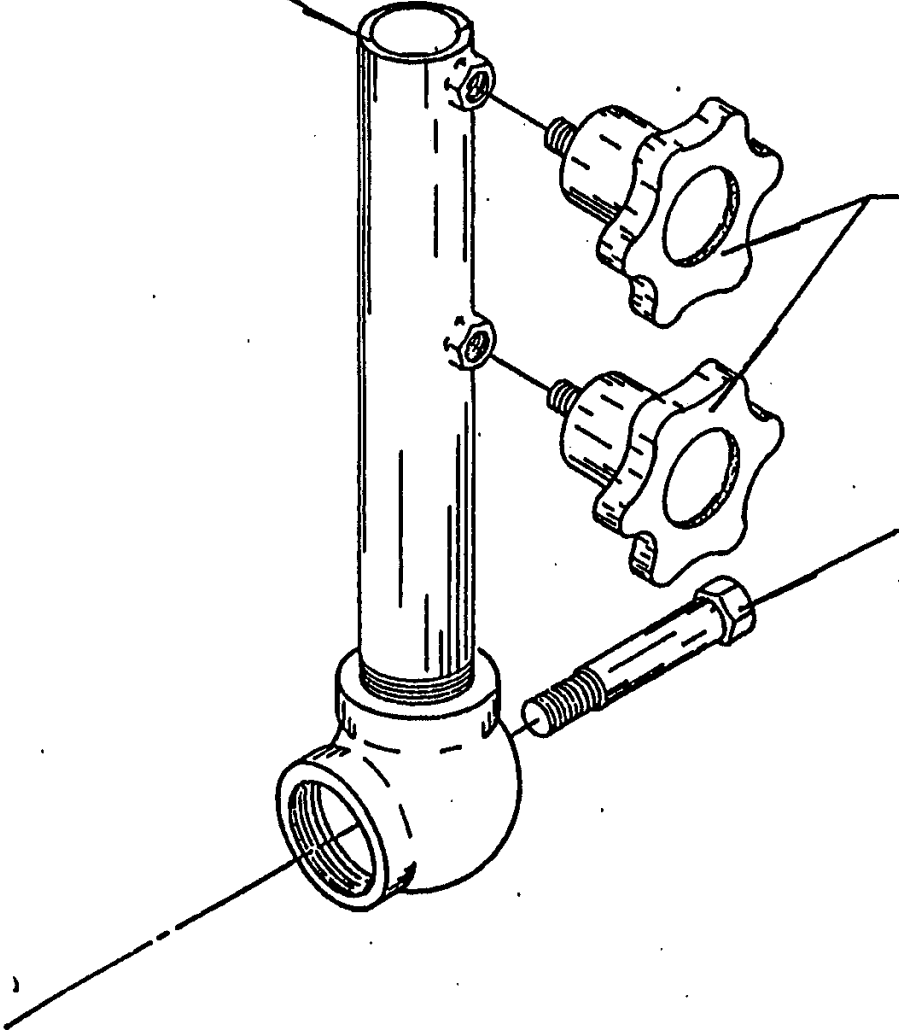
PART NAME	KIT NAME	PART NO.
Adjusting Cap Needle Valve Ass'y Needle Valve Seat FILLER PLUG	REPAIR KIT	99-4108
SIGHT GLASS "O" RINGS -TOP & BOTTOM	REPAIR KIT	99-7252
Bowl Gasket BOWL WITH SIGHT- GLASS DRAINCOCK	BOWL KIT	99-4147
SIGHT GLASS ASS'Y "O" RINGS	SIGHT GLASS REPAIR KIT	99-6975



PART NAME	KIT NAME	PART NO.
Adjusting Screw	Tee Handle Assembly	99-4150
Check Nut		
Diaphragm Ass'y	Repair Kit Non-Relieving	99-4151
Disc Ass'y		
Strainer		
Bottom Plug Gasket		

USED ON
Z4135

52-4581 1 REQ'D
EXTENTION PIPE WELDMENT



20-0196 2 REQ'D.
KNOB

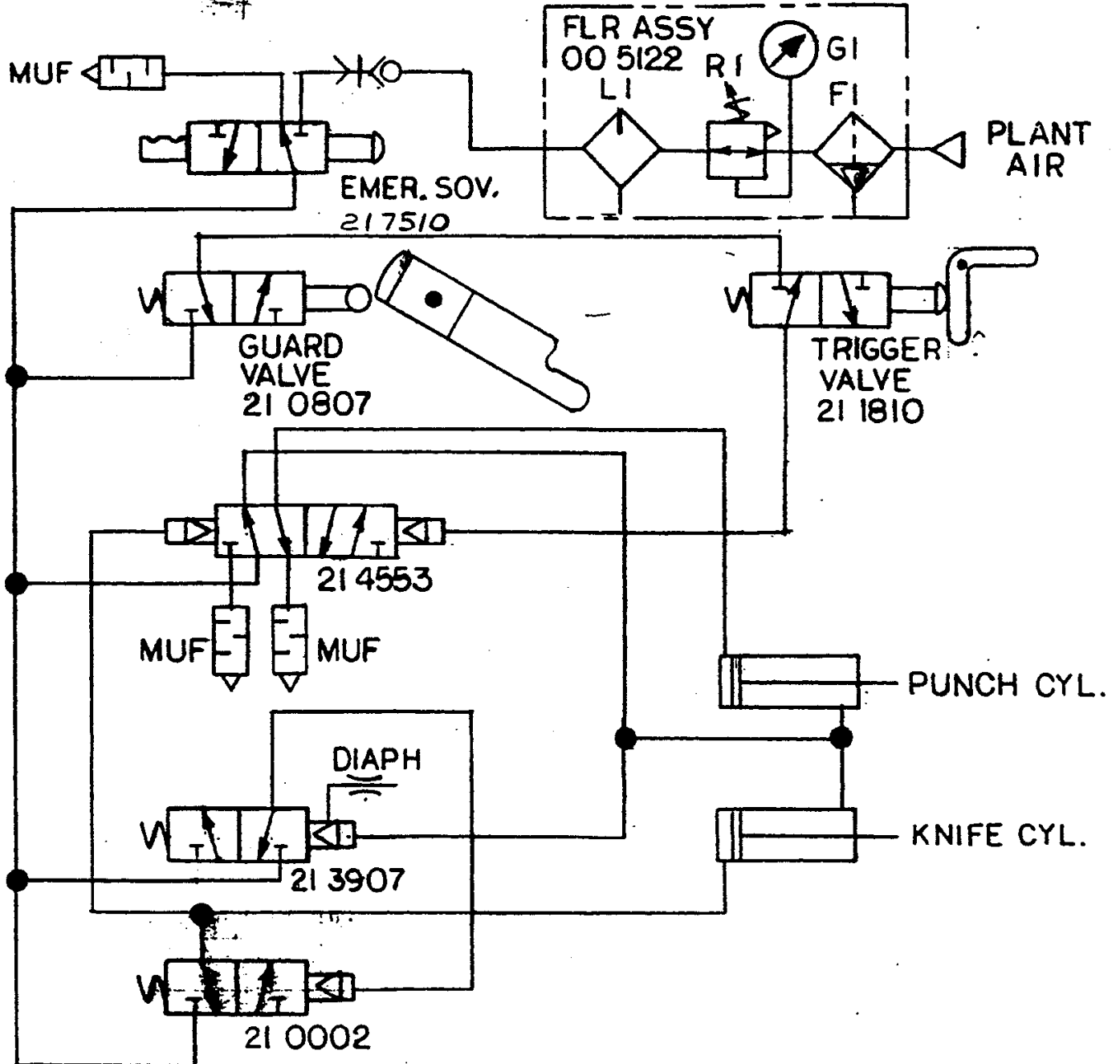
29-9636 1 REQ'D.
1/2-13 x 3-3/4 HH

REV.

ADJ. EXTENSION ASS'Y
00-5909 3-7-79

REVISIONS

DESCRIPTION	DATE	APPROVED	NO.	DESCRIPTION	DATE	APPROVED
ADD NOTE	2-24-88	V.G.				



NOTE:
SEE 48-1041 FOR CIRCUIT OPERATION

	CHECKED BY <i>[Signature]</i>	DATE 11/20/84	<h1>PNEUMATIC CIRCUIT DIAGRAM</h1>		
	APPROVED BY <i>[Signature]</i>	DATE 11/20/84			
DRAWN BY <i>[Signature]</i>	DATE 11-20-84	RELEASED BY <i>[Signature]</i>	DATE 11/20/84	SIZE A	PART NO. 63-3815-01
SCALE		DO NOT SCALE DRAWING		SHEET 1 of 1	

OPERATION OF CIRCUIT 63-3815-01

1. Air passes from the plant air supply through the FRL assembly.
2. The FRL assembly is used to filter, regulate and lubricate the air.
3. Once the air is filtered, regulated and lubricated, it is passed to a quick disconnect which provides a means of disconnecting the air supply from the clipper for servicing, and clean-up. The quick disconnect must be connected with the check valve half (female half) connected to the supply side of the circuit (FRL side). This will block off the line coming from the FRL assembly when the quick disconnect is disconnected.
4. From the quick disconnect assembly the air passes to the emergency SOV. This is the emergency shut-off valve.

Anytime the clipper fails to function correctly you should immediately push the red handle in. This action will block the air supply to the clipper and at the same time vent all pressure contained within the clipper and clipper circuit to atmosphere.

In the event of a clip jam, the emergency shut-off valve must be depressed and the quick disconnect disconnected before attempting to remove the jammed clip.

The emergency shut-off valve also has provisions for locking the valve in its OFF (pushed in) position thus preventing operation of the machine by anyone. The valve may be locked off using a padlock commonly carried by maintenance persons involved in machine repair. Whenever maintenance is to be performed on the clipper, the valve must be pushed in, locked, and the quick disconnect assembly disconnected.

The muffler on the emergency shut-off valve is to reduce the noise level of the exhausting air as it passes from the valve to atmosphere. This muffler must be kept clean so as to not restrict the flow of exhaust air.

5. From the emergency shut-off valve air is supplied to the following valves:

Guard Valve	21-0807
Punch Power Valve	21-4553
Diaph Valve	21-3907
Knife Valve	21-0002

At this time the air supplied to the guard valve is blocked.

Air supplied to the punch power valve, 21-4553, passes to the rod end of both the punch cylinder and knife, holding both cylinder pistons in the retracted position.

Air supplied to the diaph valve 21-3907 and knife valve 21-0002 is blocked.

6. When the taut packaging material to be clipped is pushed into the slot of the clipper die support and pushed toward the trigger valve, this action will cause the guard assembly 00-8397 to rotate about its pivot which in turn causes the cam surface of the guard assembly to make contact with the roller lever arm of the guard valve.

Continuing motion of the taut packaging material toward the trigger causes continuing motion of the guard assembly which in turn continues to displace the roller lever arm of the guard valve which causes the guard valve to shift internally from a normally nonpassing condition to a held passing condition.

7. Once the guard valve has shifted to a held passing condition, air will now pass through the guard valve and on to the trigger valve which is in nonpassing condition at this time.

As the taut packaging material continues to be pushed toward the trigger, it will at some point contact the trigger arm.

Continuing motion of the taut packaging material toward the trigger will cause the trigger arm to rotate about its pivot, which in turn causes contact with the button operator of the trigger valve. Continuing motion of the taut packaging material causes the trigger valve to shift internally from nonpassing to a held passing condition.

Once the trigger valve is in the held passing condition, air is passed to an air pilot port of the punch power valve. When the air pressure on this pilot port reaches the pressure at which the valve will shift internally, the valve shifts.

Shifting of this valve now causes air pressure to be directed to the blind end of the punch cylinder piston. At the same time the air pressure to the rod end of the punch cylinder piston is disconnected from the air supply pressure, and the air pressure contained in the circuit from the punch power valve to the rod end of the punch cylinder piston is vented to atmosphere via an exhaust port and muffler of the punch power valve.

The taut packaging material will be blocked by further movement when it reaches the die at the end of the slot in the die support.

Because the rod end of the knife cylinder piston is also connected via a tee fitting to this now venting circuit, the air pressure of the portion of the circuit is also vented.

As the air in the blind end of the punch cylinder builds pressure, a point will be reached in pressure known as the breakaway pressure.

This breakaway pressure is the pressure required to overcome the static friction of the piston and internal surface of the cylinder in contact with the piston.

This static friction is the result of the rubber particles at the surface of the piston in contact with the internal surface of the cylinder conforming to the surface texture of the cylinder.

The surface texture is the microscopic roughness of a surface.

When the piston is static, not moving, the particles of rubber on the piston surface, in contact with the cylinder ID, flow into the microscopic roughness features. When pressure is applied to the piston to cause it to move, a point will be reached where the rubber particles which have flowed into the surface of the cylinder will yield (deflect) and allow the piston to move. As a result of this repeated yielding of the rubber particles, some of the particles will begin to fail and shear (break) off and this is what causes piston wear, in addition to the sliding of the piston during movement over the surface texture of the cylinder I.D. Proper lubrication of the pneumatic circuit aids in reducing this wear.

8. Once the breakaway pressure is reached, the punch piston advances, being driven by the flow of pressurized air.

As the punch piston advances, it advances the clip punch, which is connected to it via additional hardware, toward the die. As the punch advances it past in front of the end of the clip rail, it will detach a single clip from a strand of clips which had been located previously in the clip window/clip channel area, by the clip weight.

The piston, punch and clip continue to advance and force the open end of the clip about the taut packaging material. At this time the clip legs will contact the grooves of the die.

9. Continuing to advance the piston, punch and clip causes the legs of the clip to deflect and begin gliding along the path defined by the grooves of the die.

All advancement of the piston, punch and clip will cease (stop) when the punch support contacts the crimp control. Pressure will continue to build within the blind end of the punch cylinder, approaching the regulated setting.

The crimp control and regulated air pressure control the tightness of the clip seal.

10. While all of the piston movements are taking place, air pressure at the air pilot port of the diaph. valve is also being exhausted along with the punch and knife air via the punch power valve.

This exhausting pilot pressure allows the spring return of the diaph. valve to shift the valve from a held nonpassing condition to a passing condition.

The rate (time) at which the diaph. valve can change from held nonpassing to passing is controlled by an orifice fitting on the valve side of the diaphragm, (this side of the diaphragm is opposite that to which the pilot air is applied).

As the air pilot of the diaph. valve is removed, the spring in the valve will apply a force to the valve spool which via hardware is connected to the diaphragm. This spring force tends to drive the diaphragm to a

neutral (relaxed) state. The side of the diaphragm connected to the spool is also vented to atmosphere. As the diaphragm which had been deflected by the pilot pressure begins to return to its neutral state, the volume on the spool side is increasing. As the volume increases, the pressure on the spool side of the diaphragm is also lowered. This lowered air pressure causes atmospheric pressure, which is now higher than the internal pressure, to begin to flow into the area under the diaphragm on the spool side in an attempt to equalize the pressure both inside and outside this area. Normally without an orifice fitting in the vent port this flow of atmospheric pressure is instantaneous. However, with the orifice fitting restricting this flow to a controlled amount the speed (time) at which the valve can shift is also controlled, thus providing a time delay.

11. Once the diaphragm valve shifts from the held nonpassing condition to the passing condition, air pressure is ported to the pilot port of knife valve 21-0002. This pilot air pressure causes the valve to shift from the nonpassing to the held passing condition.

Once in the passing condition, air pressure is ported to the blind end of the piston of the knife cylinder, which causes the piston with the knife blade connected to advance, after reaching breakaway pressure.

This advancement of the knife will cause the knife blade to sever the tail of the packaging material after the clip seal.

12. At the same time as air pressure is being ported to the blind end of the knife cylinder, air is also ported to the air pilot port on the punch power valve which is opposite the air pilot being applied by the trigger valve.

With the same air pilot pressure thus on both air pilots of the punch power valve nothing will happen to the punch power valve until the cutoff knife severs the packaging material tail.

With the operator holding the packaging material taut, and when the cutoff knife severs the tail of the packaging material, both the tail and the clip sealed package are pulled clear of the clipper.

The tail is pulled clear from the knife side of the clipper by the operator's hand holding that portion, and the clip sealed portion is pulled clear by the operator's other hand through the spring controlled guard 09-5153.

13. Once the clip sealed package has been pulled clear of the die and guard area, the trigger is released and the spring in the trigger valve resets the trigger valve back to a nonpassing condition from the held passing condition.

Likewise the packaging tail being pulled clear from the slot in the die support now allows the guard and guard valve to reset by spring pressure. The guard valve returns to a nonpassing condition from the held passing condition.

14. The action of the guard valve returning to the nonpassing condition causes the air pressure in the circuit between the guard valve and trigger valve to be vented to atmosphere through the guard valve.
15. The action of the trigger valve returning to the nonpassing condition causes the air pressure in the circuit between the trigger valve and the punch power valve to be vented to atmosphere through the trigger valve.
16. Venting of the pilot pressure between the trigger valve and the punch power valve allows the pilot pressure already in the circuit between the knife valve and the second pilot port on the punch power valve to cause the punch power valve to shift back to its original condition.

This action passes air pressure from the supply port of the punch power valve to the rod end of both the punch cylinder piston and the knife cylinder piston, thus resetting both cylinders.

At the same time the air pressure in the circuit between the punch power valve and the blind end of the punch cylinder piston is vented to atmosphere via the exhaust port of the punch power valve.

17. In addition to the air pressure being ported from the punch power valve and the rod end of the punch cylinder piston and this knife cylinder piston, this air is also directed to the diaphragm pilot of the diaph. valve.

This pilot pressure forces the diaph. valve to now shift to the held nonpassing condition. Thus shifted, the air pressure in the circuit between the diaph. valve and the air pilot port of the knife valve is vented to atmosphere via the exhaust port of the diaph. valve.

18. Venting of the pilot air on the knife valve allows the spring return portion of that valve to reset the knife valve to a nonpassing condition.

This then allows the air pressure in the circuit between the knife valve and the second pilot port on the punch power valve, as well as the air pressure to the blind end of the knife cylinder piston, to be vented to atmosphere via the exhaust port of the knife valve.

19. Thus all actions having taken place as described have allowed the clipper to make one complete cycle and reset the circuit for the start of another.

INSTALLATION AND OPERATING INSTRUCTIONS
FOR: AIR SUPPLY UNIT

CAUTION INSTALLATION (FILTER, REGULATOR, AND LUBRICATOR)

In piping up, always be sure the pipe ends are reamed clean to assure a smooth flow. Before installing the units, always blow out the line to remove scale or other foreign matter. Apply pipe compound to male threads only, and only enough to make tight joints. On the top of each unit body, the piping connections are marked on each port; the units should be installed in the line so that air flow is from IN to OUT.

LUBRICANT (LUBRICATION)

For all normal conditions, the use of a high quality SAE #10 (S.U.V. 150-200 SEC, @ 100 degrees F) oil is recommended. Other lubricating oils should not be used.

ADJUSTMENT (LUBRICATOR)

With air supply shut off, remove filler plug and fill with oil to level mark, replace and tighten plug. Turn needle valve clockwise as far as possible. Turn on the air supply and turn the needle valve counterclockwise until the desired number of drops per minute is obtained. As a start, 3 to 5 drops per minute is sufficient. Correct lubrication is a matter of experience. Clockwise rotation of the needle valve decreases the oil feed rate of lubrication.

To check lubrication of the equipment, hold the thumbnail or mirror near the exhaust port; a slight oil film should be deposited at each exhaust cycle. A heavy film indicates over-lubrication, and the drops per minute should be reduced by turning the needle valve clockwise.

ADJUSTMENT (REGULATOR)

A regulator ordered with a specific reduced pressure setting may require slight adjustment. Open the supply valve and bleed the reduced pressure to the lowest gauge reading. Then, to increase pressure, turn the screw counterclockwise.

A regulator not ordered with a specific reduced pressure setting will require adjustment as follows. Turn the adjusting screw counterclockwise to release tension. Bleed the reduced pressure to the lowest gauge reading and open the supply valve. Slowly turn the adjusting screw clockwise until the desired reduced pressure is obtained. Note: Bleeding is not necessary on relieving-type regulators.

MAINTENANCE (REGULATOR)

To obtain the best efficiency and the longest periods of trouble-free service, the fluid supply must be kept clean. Use a filter periodically.

Inspection: the condition of the regulator may be indicated by the reduced pressure.

Reduced Pressure: unsteady reduced pressure or deviation in excess of normal setting usually indicates:

- a. Diaphragm swollen or stiffened. Replace diaphragm assembly.
- b. Valve disc dirty or worn, or seat is scored. Clean or replace.
- c. Be sure strainer is clean and the supply valve is wide open.
- d. Air leakage through vent in cage (relieving types only) - this is a normal relieving function indicating an excess reduced pressure over that for which the regulator is set. If constant relief is noted, it may be caused by dirty or worn diaphragm assembly requiring cleaning or replacement.

LUBRICATOR

The oil level must never be allowed below the end of the dip tube. To replenish oil, shut off the air supply, remove the slotted filler plug and fill to oil level mark. Replace and tighten plug. If no oil drips through sight glass with needle valve open, proceed as follows:

- a. Make sure there is sufficient oil in the bowl.
- b. Check to determine whether there is air pressure ahead of the lubricator.
- c. Check the air flow from the lubricator.

If no oil drips through the sight glass, an accumulation of dirt in the lubricator is indicated and cleaning is necessary. If clean oil is used and the air supply is kept clean by a filter, the lubricator should require only occasional cleaning.

WARNING CLEANING INSTRUCTIONS

- a. Shut off the air supply.
- b. Unscrew the flange ring and remove the bowl.
- c. Unscrew and remove the dip tube, making sure a small ball check is not dropped or lost.
- d. Hold by-pass plate in position with thumb and remove baffle.

- e. Let down by-pass plate and spring, and disc will drop out.
- f. Remove valve retainer.
- g. Wash removed part in any cleaning solvent and blow with compressed air. Clean the plastic bowl and sight glass only with household type soap; never use alcohol, carbon tetrachloride, trichlorethylene, thinner, acetone, or similar solvents.
- h. Clean the body and blow out parts with compressed air.
- i. Replace the valve retainer, tighten, and turn needle valve clockwise as far as possible.
- j. Drop by-pass plate on dip tube with gasket uppermost. Place spring on dip tube with turned-in end next to gasket. Place disc on dip tube making sure beveled seat is uppermost. Place ball check in the top end of the dip tube and screw the tube into the body, making sure the by-pass plate is in the proper position before tightening the tube. Replace and tighten the baffle.
- k. Replace the bowl and tighten the flange ring.
- l. Fill with oil, turn on oil supply, and adjust needle valve as instructed under ADJUSTMENT (LUBRICATOR).

WARNING FILTER

To maintain maximum filtering efficiency and to avoid excessive pressure drop, the filter must be kept clean. Bowl drainage is automatic in the filter; however, manual draining can also be done by turning the drain cock clockwise. A visible coating of dirt or condensation in the filter element surface or an excessive pressure drop is an indication that cleaning is necessary. To clean, it is not necessary to remove the filter from the line.

To clean the filter cone:

- a. Shut off the air supply.
- b. Unscrew the flange ring and remove the bowl.
- c. Hold the filter cone, unscrew and remove the primary baffle. Remove the cone, its two gaskets and deflector.
- d. Wash all parts in methanol alcohol and blow out with compressed air (see below for instructions for cleaning the bowl).
- e. Replace parts in the order shown on the drawing of the Air Supply Unit. Tighten the baffle securely by hand.
- f. Replace the bowl and tighten the flange ring.

To clean the bowl:

- a. Shut off the air supply.
- b. Unscrew the flange ring and remove the bowl.
- c. Unscrew the drain cock assembly from the bowl.
- d. Wash the drain cock assembly in methanol alcohol and blow out with compressed air.
- e. Wash the bowl with household soap only; never use alcohol, carbon tetrachloride, chlorethylene, gasoline, thinner, acetone, or similar solvents.
- f. Replace the drain cock assembly in the bowl.
- g. Replace the bowl and tighten the flange ring.

PISTON DRAIN OPERATION

In the piston drain filter the automatic drain mechanism is operated by the pressure drop created as air flow is initiated or as the air line is depressurized. However, (to conserve air), the drain will not function over normal operating air flow range unless liquids are present to form a fluid seal between the piston and inside wall of the bowl. On low air flow applications (below 5 SCFM at 100 PSI or .5 SCFM at 25 PSI), "Piston Drain" must be close-coupled to the control valve, otherwise there may be insufficient dynamic pressure drop to trigger the drain mechanism.