

MUELLER®

A-3™ Drilling and Tapping Machine

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⚠ WARNING:

1. Read and follow instructions carefully. Proper training and periodic review regarding the use of this equipment is essential to prevent possible serious injury and/or property damage. The instructions contained herein were developed for using this equipment on fittings manufactured by Mueller Co., and may not be applicable for any other use.
2. Do not exceed the pressure ratings of any components or equipment. Exceeding the rated pressure may result in serious injury and/or property damage.
3. Safety goggles and other appropriate protective gear should be used. Failure to do so could result in serious injury.
4. Pressure test, check for and repair leaks in all fittings and components each time one is installed or any joint or connection is broken. Failure to find and repair a leak from any source in the fittings, by-pass lines or equipment could result in an explosion and subsequent serious injury and/or property damage.
5. Mueller Drilling Machines and Equipment have been carefully designed and engineered to work together as a unit. The use of equipment manufactured by someone other than Mueller Co. may cause excessive wear or a malfunction of the Mueller machines.

Mueller Co.

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All warranties, expressed or implied, for Mueller Drilling Machines are rendered null and void if the machines are used with shell cutters or equipment manufactured by someone other than Mueller Co.

A-3™ Drilling and Tapping Machine

General Information

Equipment Furnished With Each Machine

- Wooden storage chest
- Ratchet handle
- Ratchet handle extension
- Small saddle gasket
- Large saddle gasket
- Flat link chain with eyebolt and nut for 6" – 16" pipe
- Chain hook, nut and washer
- Box end wrench for chain hook nut
- Allen wrench
- Open end corporation stop wrench
- Body cleaning chisel
- Cutting grease

Capacity and Use

The A-3 Machine is designed for hand or power operation and tools are fed automatically during the power drilling operation.

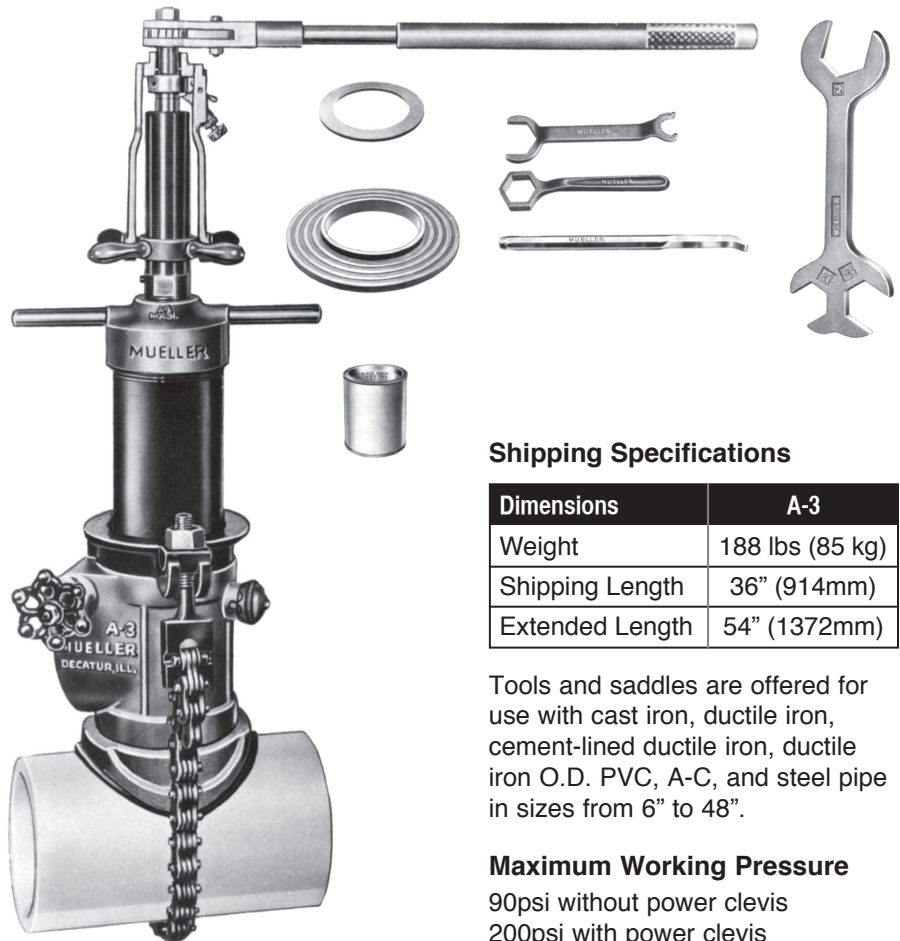
A special mechanism permits the boring bar to be locked to the feed nut and yoke to prevent the drill from spiraling into the hole before the hole is completely drilled. It also prevents the drill from dropping to the threaded section of the combined drill and tap. This design eliminates unnecessary tool damage and is recommended for low-pressure drillings.

The A-3 Drilling and Tapping Machine drills and taps a main and inserts a valve or plug into the tapped hole in the main under pressure.

Thickness of Pipe Wall

This chart (right) gives the minimum wall thickness of pipe that will provide the recommended four full threads of engagement with the corporation stop inlet thread. For pipe with thinner walls than specified here, use Mueller Service Clamps and Corporation Stops.

NOTE: Mueller cutting grease is available in pints (88366).



Shipping Specifications

Dimensions	A-3
Weight	188 lbs (85 kg)
Shipping Length	36" (914mm)
Extended Length	54" (1372mm)

Tools and saddles are offered for use with cast iron, ductile iron, cement-lined ductile iron, ductile iron O.D. PVC, A-C, and steel pipe in sizes from 6" to 48".

Maximum Working Pressure

90psi without power clevis
200psi with power clevis

Items Inserted with A-3 Drilling and Tapping Machine

ITEM	SIZE				OPERATION	METHOD	
Corp. Stops	1"	1 1/4"	1 1/2"	2"	Drill and tap main	Hand or power	
					Insert corporation stop	Hand	
					Extract corporation stop	Hand	
Pipe Plugs	1"	1 1/4"	1 1/2"	2"	2 1/2"	Drill and tap main	Hand or power
						Insert pipe plug	Hand
						Extract pipe plug	Hand

Thread Type	Tap Size	Thickness of various pipe diameter (In.)														
		3	4	6	8	10	12	14	16	18	20	24	30	36	42	48
AWWA Taper Thread	1"	.46	.44	.40	.39	.38	.37	.36	.36	.36	.35	.35	.35	.34	.34	.34
	1 1/4"	.57	.52	.47	.44	.42	.41	.49	.39	.39	.39	.38	.37	.37	.37	.37
	1 1/2"	.64	.58	.51	.47	.45	.43	.42	.41	.40	.40	.39	.38	.38	.37	.37
	2"	.86	.75	.61	.55	.51	.48	.46	.45	.44	.43	.42	.40	.40	.39	.38
AWWA I.P. Thread	1"	.459	.438	.411	.396	.387	.381	.376	.373	.370	.368	.365	.361	.359	.358	.356
	1 1/4"	.528	.493	.449	.425	.410	.400	.393	.388	.383	.380	.375	.370	.366	.363	.361
	1 1/2"	.588	.540	.481	.449	.430	.417	.407	.400	.394	.390	.383	.376	.372	.368	.366
	2"	.740	.657	.558	.508	.477	.456	.441	.430	.421	.414	.403	.392	.385	.380	.376
	2 1/2"	—	.968	.812	.736	.689	.658	.636	.620	.607	.596	.580	.565	.554	.546	.541
	3"	—	—	.975	.855	.784	.737	.704	.679	.659	.644	.620	.596	.580	.569	.560

A-3™ Drilling and Tapping Machine

Maintenance Instructions

Before Use

Clean and lubricate all wearing and bearing surfaces, particularly the boring bar, the boring bar collar, the cap sleeve threads, and the chain hook threads.

Inspect and clean all tools, particularly the shank ends, and remove any burrs or scale, which would prevent proper alignment with the boring bar.

Inspect and clean the socket in the end of the boring bar and remove any burrs or scale which would prevent the tool from seating properly.

After Use

Thoroughly clean the entire machine and all tools, and lubricate all machined surfaces.

Remove all chips from inside the body including the flop valve recess. A special body-cleaning chisel is furnished for this purpose. If chips are permitted to accumulate in the machine they could rust and become caked and interfere with the operation of the flop valve.

Flat link chain must be well lubricated and kept free from rust and dirt. It may be advisable to store flat link chain in a container of oil when not in use.

The machine and all tools and equipment should be stored in the machine box. Carefully place tools in their individual compartments to prevent damage to the cutting edges.

Bypass Valve (A.)

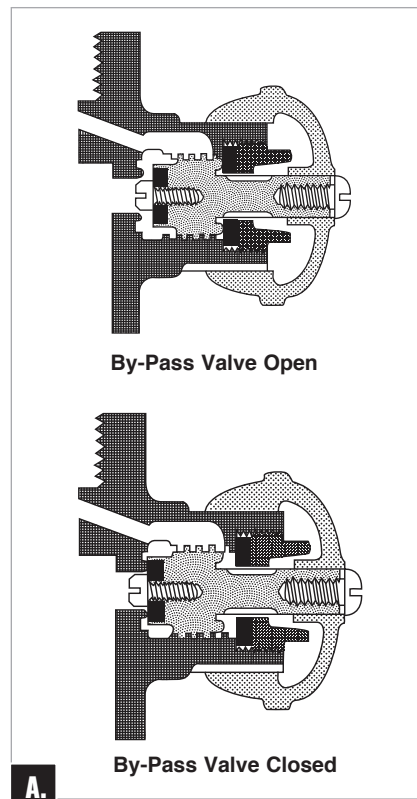
Clean the bypass valve frequently.

Remove the hand knob screw, hand knob, seat nut, seat washer, and stem.

Clean out the valve ports and passages with a piece of wire. A Bypass Clean Out Tap is available (part 500529) which effectively cleans chips or foreign material from the threaded area of the bypass valve.

If necessary, replace the seat washer and seat nut washer with new Mueller® washers only. Ordinary washers will not work satisfactorily.

IMPORTANT: Clean the recess below the stem threads and the bottom inside stem thread in the body. Chips may lodge at this location and prevent complete closure of the bypass valve.



A-3™ Drilling and Tapping Machine

Installation and Operating Instructions

Select the Equipment Required

The following equipment must be selected from the latest Water Distribution Products catalog.

1. Select the proper combined drill (or shell cutter) and tap according to:
 - a) Size and type of inlet thread on valve or plug to be inserted.
 - b) Material from which the pipe to be tapped is made.
 - c) Size and class of pipe to be tapped.
2. Select the proper saddle according to the size and type of pipe to be tapped.
3. Select the proper inserting tool.
 - a) For corporation valves according to the size and type of outlet.
 - b) For plugs according to the size.
4. Select proper extracting tool.
 - a) For corporation valves according to the size and type of outlet.
 - b) For plugs according to the size.
5. Select the items of special equipment which may be required because of special operating conditions.

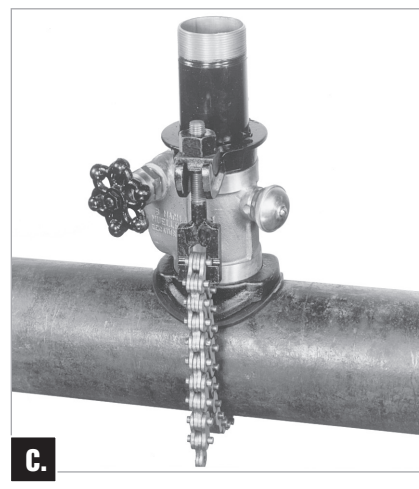
Attach the Machine to the Pipe

1. Thoroughly clean the pipe at the location for the tap; include an area greater than the large saddle gasket.
2. Place the large saddle gasket on top of the pipe even with the location for the tap, with the raised projection up away from the pipe.
3. Place the saddle on the large saddle gasket.
4. Place the small saddle gasket in the recess in the top of the saddle. **(B.)**



5. Unscrew the brass feed cap (containing the boring bar assembly) from the cylinder of the machine.
6. Place the body and cylinder of the machine on top of the small saddle gasket. Position the machine so the word "TOP" cast on the body is up if the machine is to be operated in any position other than vertical.
7. Unscrew nuts on chain hook and eye bolt until they are flush with the end of the threaded section.
8. Hang chain hook and washer over one side of the chain yoke.
9. Hang eyebolt and washer (with chain) over the other side of the chain yoke.

10. Bring the chain under the pipe and connect it with the chain hook. Be sure the chain is not twisted. The flat link chain hook is attached to the chain between two of the chain link pins and always with the notch in the hook on the outside (the side away from the body of the machine). **(C.)**



11. Tighten chain hook nuts hand tight.
12. Slide the machine around the pipe to the desired angle.
13. Tighten the chain hook nuts evenly. Hammer the chain around the pipe to remove any twist in the chain and continue tightening both chain hook nuts until the machine is solidly bearing against the pipe.

IMPORTANT – DO NOT tighten the chain hook nuts after starting to drill as it will throw the machine out of alignment.

Use Web Belt (part no. 88693) when tapping wrapped and coated steel pipe. This web belt does not damage the exterior covering of the pipe. A-3 Machine chain is for use on pipe up to 16" in size. Use the proper length and type of extension chain when tapping pipe in larger sizes.

A-3™ Drilling and Tapping Machine

Installation and Operating Instructions

Attach Tool To Boring Bar

1. Slide drift pin in boring bar socket so that head end is exposed.

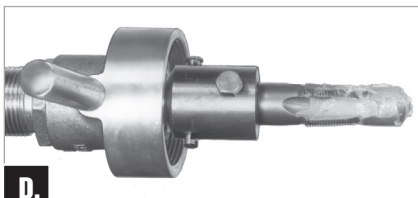
2. Insert the proper combined drill (or shell cutter) and tap into the socket of the boring bar. Align the keyway in the tool shank with the key inside the socket of the boring bar.

NOTE: The point of the tool retaining screw purposely contacts the upper side of the countersunk hole in the tool to maintain pressure on the shank of the tool to help retain it tightly in the socket of the boring bar.

3. Strike tool on end with a block of hard wood to make it fit tightly in socket.

4. Tighten tool-retaining screw in boring bar.

5. Thoroughly coat the tool with Mueller® Cutting Grease. (D.)



D.

NOTE: DO NOT use cutting grease when drilling and tapping A-C pipe.

6. Retract boring bar to its rearmost position.

Assemble The Machine

1. Open the flop valve as far as it will go by turning the hand wheel **clockwise**.

2. Screw feed cap and boring bar assembly onto the cylinder of the machine.

3. Push boring bar down by hand until the tool contacts the main.

4. Adjust the feed nut and yoke on cap sleeve so that the yoke is engaged with the collar on the boring bar. Raise the pivot arm of locking mechanism on side of yoke so that it is positioned under

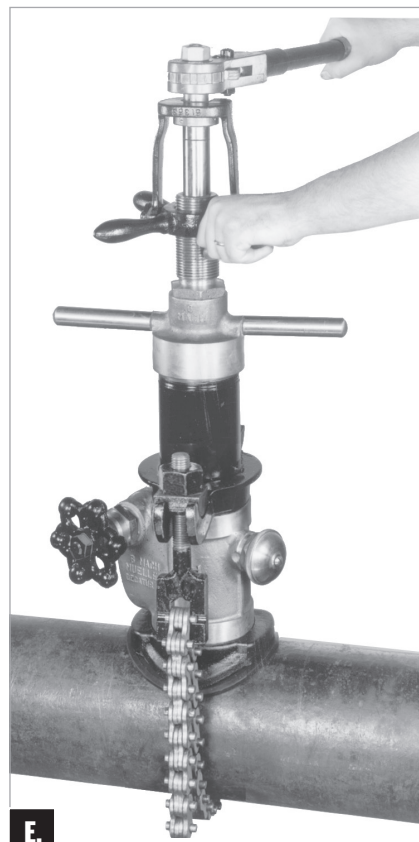
the collar, then lock in place with operating screw.

5. Turn bypass valve hand knob **counter-clockwise** as far as possible. This is the bypass position for this valve.

DRILL AND TAP – Hand Operated Method

1. Adjust mechanism in handle so the boring bar will rotate **clockwise**.

2. Drill the hole by operating the ratchet handle **clockwise** and turning the feed yoke **clockwise** a little at a time. Use a light even feed at the start. If possible, pull the ratchet handle in an arc parallel to the axis of the pipe thereby reducing the tendency of the machine to slip on the pipe. (E.)



E.

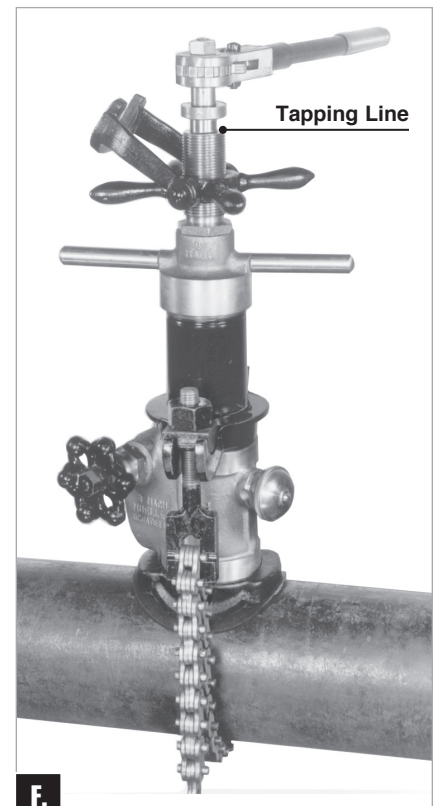
3. Continue the drilling operation until the boring bar feeds easily and rotates easily, indicating the drill is through the pipe.

4. Rotate the feed yoke **clockwise** without rotating the boring bar until the tap part of the tool contacts the pipe.

5. Apply a downward pressure with the feed yoke and at the same time rotate the boring bar **clockwise** until the tap takes hold after which the feed yoke may be dropped off and the tool allowed to feed itself.

NOTE: The feed yoke should remain in contact with the boring bar collar and should follow the feed of the tool when tapping under high pressure or when tapping thin wall or asbestos-cement pipe. DO NOT overfeed faster than the tool is cutting as this will strip the threads in the pipe.

6. Continue the tapping operation until the tapping line on the boring bar, just under the collar, is flush with the top thread on the feed cap sleeve. When tapping asbestos-cement pipe, it may be advisable to tap 1/8" beyond the line. (F.)



F.

A-3™ Drilling and Tapping Machine

Installation and Operating Instructions

DRILL AND TAP – Power Operated Method

Using Mueller® H-603 Electric Power Operator, H-604 Air Power Operator or H-705 Hydraulic Operator

The A-3 Drilling and Tapping Machine has been designed to permit the use of a power operator. The power operator will drive the combined drill (or shell cutter) and tap and provide automatic feed during the drilling operation.

IMPORTANT: When using H-604 air motor power operator install an in-line lubricator as close to the unit as practical and adjust for slight oil mist from exhaust – maintain pressure of 90psig. We recommend the use of a gage at the throttle to determine the actual pressure of AIR AT THE AIR MOTOR.

NOTE: Units are suitable for:

• Power drilling with automatic feed 1" through 1" inclusive with combined drill and tap.

• Power drilling with automatic feed 1¼" through 2½" inclusive with shell cutter and tap.

• Power drilling with hand feed 1¼" through 2" inclusive with combined drill and tap.

The gear case attaches to the machine by the means of two sockets. The inner or small socket drives the boring bar. The outer or large socket drives the feed yoke through a gear reduction as the boring bar is rotated. The resulting feed on the drill is .010" per revolution of the boring bar. The motors are equipped with a squeeze type trigger throttle. If for some reason a drill should stick, the motor can be shut off quickly.

1. Place the gear case and motor on the drilling and tapping machine aligning the sockets with the square shanks on the boring bar and feed yoke. Socket which contacts feed yoke should be closed and wing nut tightened securely.

2. Set position of motor switch to give **clockwise** rotation of boring bar.

3. Start drilling operation and continue drilling until the operation is completed. Completion of drilling operation can be easily detected by torque required to resist power unit and sound of power unit

NOTE: The tapping line is located just below the thrust collar on the boring bar. A distance of 1¼" below the tapping line is limit for use of automatic feed. Actual drilling is always completed before this distance is reached.

4. Loosen wing nut on feed yoke drive socket and swing socket open.

5. Start motor and rotate feed yoke **clockwise** by hand to engage tap part of tool into main. Continue to rotate feed yoke until tap is securely started into the main. At this point, turn operating screw on locking mechanism **counter-clockwise** to unlock the pivot arm and remove the feed yoke from contact with the thrust collar. The boring bar will move downward allowing the tool to feed itself.

NOTE: Feed yoke should remain in contact with the boring bar thrust collar and follow the thrust collar down when machine is being used on high pressure mains, thin wall steel pipe or asbestos-cement pipe. DO NOT overfeed faster than the tap is cutting as this will strip the threads being tapped in the main.

6. Continue tapping operation until tapping line on boring bar is flush with the top of the feed sleeve part of the cap.

IMPORTANT – WHEN TAPPING A/C PIPE: Only hand operation of the A-3 machine is recommended when working on A/C pipe, especially if it is not under pressure. If a power operator is used, its extra weight on the boring bar can cause overfeeding of the tap and result in striped threads. When tapping A/C pipe with one-piece CEM-RES® Combined Drills and Taps, it is advisable to exceed the tapping line enough to allow corporation valves to be inserted with only one to three threads exposed. The exact amount may be determined by making a "shop tap" ahead of time.

A-3™ Drilling and Tapping Machine

Installation and Operating Instructions

Remove The Tool

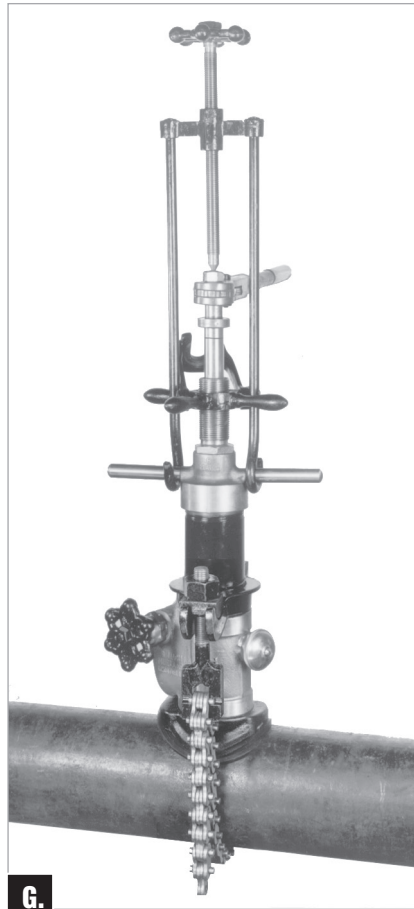
1. If hand ratchet was used, reverse the ratchet handle by adjusting it for **counter-clockwise** rotation. Rotate the ratchet handle **counter-clockwise** carefully and back out the tool. DO NOT force the tool when removing it, as this may cause breakage of the tap teeth.

⚠ CAUTION: When this machine is under pressure, water pressure from the main will create a piston action against the boring bar and it will tend to rise force-fully. Keep head and body clear of ratchet handle and end of boring bar. To avoid possible bodily injury or damage to the machine that could result if the boring bar is allowed to move upward without constraint, **MAINTAIN CONTROL OF THE BORING BAR AT ALL TIMES** with firm downward force on the ratchet handle or power operator.

2. If power operation has been used to make the tap, stop power operator momentarily, then reverse the motor and back out the tool. Control upward movement of the boring bar by maintaining a firm hold on the gear case and motor as stated in previous caution note.

3. When the tap is entirely free from the pipe, withdraw the boring bar to the uppermost position again applying some downward force to prevent uncontrolled withdrawal of the boring bar. When the pressure in the pipe is greater than 90psi, use the power clevis to control the withdrawal of the boring bar.

- a) Hook the bent end of the power clevis over the feed cap handles.
- b) Adjust the screw so that the point on the end is in the center hole in the end of the boring bar.
- c) Turn the screw to move the boring bar as required.



4. With the tool completely in the cylinder close flop valve by turning hand wheel as far as it will go **counter-clockwise** and hold momentarily.

5. With the other hand quickly close the bypass valve by turning the hand knob **clockwise**. This relieves the pressure in the cylinder and holds the flop valve closed.

6. Unscrew the feed cap and boring bar assembly.

7. Loosen the tool retaining screw on boring bar, but don't remove.

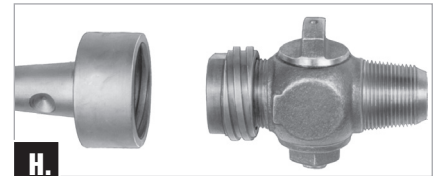
8. Strike the drift pin on the head to loosen the combined drill (or shell cutter) and tap.

9. Remove the combined drill (or shell cutter) and tap.

Attach Valve Or Plug To Boring Bar

1. **IMPORTANT – Check to be sure that the valve is fully closed.**

2. Screw together the proper inserting tool and the valve or plug to be inserted. Lubricate these threads and check to be sure these threads screw together freely without binding. When using an E-Z Release® inserting tool, also lubricate and check the acme threads between the two parts of the inserting tool. (H.)



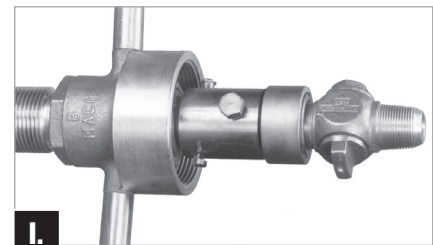
3. Slide drift pin in boring bar socket so that the head end is exposed.

4. Insert the shank of the inserting tool into the socket of the boring bar. Align the keyway in the tool shank with the key inside the socket of the boring bar.

5. Tighten tool-retaining screw.

6. Pull boring bar to the rearmost position in the feed cap.

7. Coat the inlet threads with non-hardening pipe thread sealant or Teflon® tape (L.)



8. Replace the feed cap with the complete boring bar assembly onto the cylinder of the machine and tighten.

A-3™ Drilling and Tapping Machine

Installation and Operating Instructions

Insert The Valve Or Plug

1. Hold boring bar in uppermost position and turn bypass valve hand knob **counter-clockwise**, which will equalize the pressure above the flop valve.
2. Open the flop valve by turning the hand wheel **clockwise**.
3. Assemble ratchet handle onto boring bar and set mechanism for **clockwise** rotation.
4. Push the boring bar down until the inlet threads of the valve or plug contact the threads in the pipe. For pressure greater than 90 psi use a power clevis to force the boring bar down. See Instructions "F-3" for power clevis assembly instructions.
5. Adjust the feed nut and yoke and place feed yoke over the collar on the boring bar.
6. Insert the valve or plug into the tapped hole by rotating the boring bar **clockwise** and carefully feeding downward with the feed yoke by turning the feed yoke **clockwise**. After the threads have taken hold in the pipe, the yoke may be permitted to drop off the collar except when inserting in thin wall or asbestos-cement pipe, or under high pressure.
7. Screw the valve or plug into the tapped hole until it feels solid.

IMPORTANT: DO NOT attempt to force it to its permanent tightness by means of the machine.

Release The Inserting Tool

1. Turn the bypass valve hand knob **clockwise** which will release the pressure from the machine and indicate the tightness of the connection between the valve or plug and the pipe.
2. Reverse the mechanism so that the ratchet handle will operate in a **counter-clockwise** direction.

3. Turn the ratchet handle **counter-clockwise** to take out the play and strike the end of the hand a sharp blow **counter-clockwise** with the palm of the other hand. (**J.**) This will release the threaded connection between the inserting tool and the valve or plug. If using on E-Z Release® inserting tool, this will release the threaded connection between the two parts of the inserting tool.

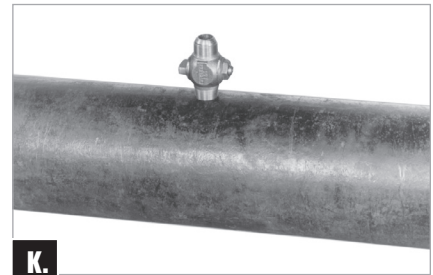
4. Rotate ratchet handle **counter-clockwise** until inserting tool is completely free.

NOTE: If there is full pressure flow from the bypass release valve, the inserting tool has not released and the valve or plug should be screwed in again a little tighter than before and another attempt be made to release the inserting tool.



Remove The Machine

1. Loosen the chain nuts.
2. Unhook the chain.
3. Remove the machine, saddle and gaskets.
4. Tighten the valve or plug into the pipe permanently with a flat wrench on the valve body. (**K.**)



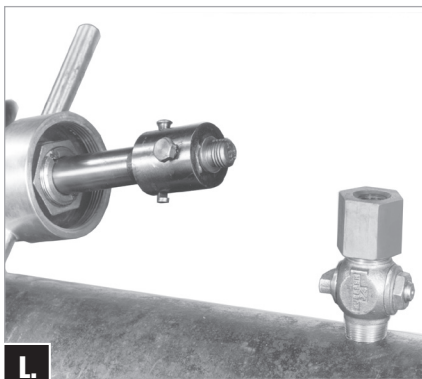
5. If using an E-Z Release® inserting tool, remove the nut part from the valve.

A-3™ Drilling and Tapping Machine

Installation and Operating Instructions

To Remove A Valve Or Plug Installed In A Pipe Under Pressure

1. Shut off the valve.
2. Disconnect service line piping.
3. Slightly loosen the valve using a wrench on the inlet side.
4. Separate the two parts of the extracting tool.
5. When using an extracting tool having inside threads, screw the nut onto the outside threads of valve very securely using the right hand thread. (L.) When using an extracting tool having outside threads, screw the plug into the inside threads of valve or plug very securely using the right hand threads.
6. Unscrew the feed cap containing the boring bar assembly from the cylinder on the machine.
7. Open the flop valve by turning the hand wheel **clockwise**.
8. Assemble the large saddle gasket, saddle, small saddle gasket and the body and cylinder of the machine centrally over the installed valve or plug. Chain hook nuts should be only hand tight. See instructions "Attach The Machine to The Pipe" section on page 5.
9. Insert the shank part of the extracting tool into the socket of the boring bar. Align the keyway in the tool shank with the key inside the socket of the boring bar. (L.)

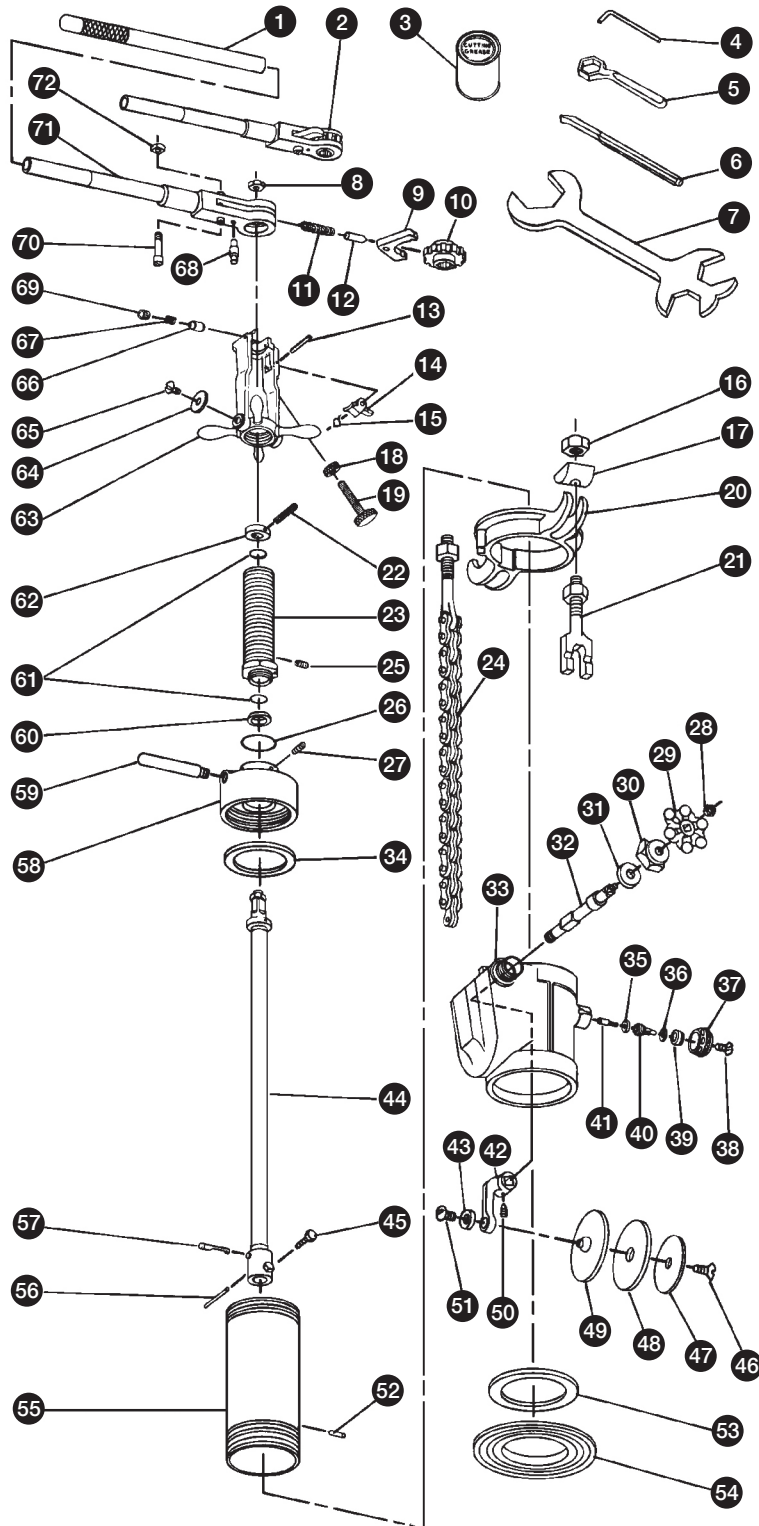


10. Tighten tool-retaining screw.
11. Pull boring bar to the rearmost position in the feed cap.
12. Replace the feed cap with the complete boring bar assembly onto the cylinder of the machine and tighten.
13. Turn bypass valve hand knob **counter-clockwise**.
14. Push the boring bar down and engage the two parts of the extracting tool by rotating the boring bar **counter-clockwise**.
15. Carefully align the machine and tighten the chain nuts without binding the boring bar.
16. Again rotate the ratchet handle **counter-clockwise** which will fully engage the two parts of the extracting tool and continued rotation will unscrew the valve or plug from the pipe.
17. Slowly raise boring bar, close flop valve by turning the hand wheel **counter-clockwise**, and close the bypass valve by turning the hand knob **clockwise**.
18. Proceed with the use of the machine following previous instructions.

⚠ CAUTION: Once the valve or plug threads separate from the pipe and the machine is under pressure, water pressure from the main will create a piston action against the boring bar and it will tend to rise forcefully. Keep head and body clear of ratchet handle and end of boring bar. To avoid possible bodily injury or damage to the machine that could result if the boring bar is allowed to move upward without constraint, MAINTAIN CONTROL OF THE BORING BAR AT ALL TIMES with firm downward force on the ratchet handle.

A-3™ Drilling and Tapping Machine

Parts Information



ID	PART #	DESCRIPTION
1	86391	Handle extension
2	85308	Ratchethandlecomplete
3	88366	Cuttinggrease
4	90322	Allen wrench
5	40028	Chain nutwrench
6	40205	Chisel
7	75409	Wrench
8	46029	Boring bar nut
9	40004	Ratchetdog
10	40137	Ratchetwheel
11	40007	Spring
12	40006	Spring pin
13	502027	Rollpin
14	502025	Pivot arm
15	502026	Pivot arm spring
16	40211	Chain hooknut
17	40212	Chain hookwasher
18	502029	Lock nut
19	502028	Operatingscrew
20	40213	Chain yoke
21	89099	Chain hook
22	48130	Friction collar rollpin
23	5031	49 Feed sleeve
24	85318	Chain for 6"-16" mains
25	41435	Oil plug
26	45374	Feed sleeve O-ring
27	98430	Set screw
28	58849	Handwheelnut
29	58519	Handwheel
30	40193	Stem packingnut
31	58461	Stem packingwasher
32	40194	Valve stem
33	503147	Valve body
34	40189	Cap gasket
35	42042	Seat washer
36	40049	Seat nutwasher
37	40043	Hand knob
38	40044	Hand knobscrew
39	40048	Seat nut
40	40045	Stem
41	40047	Screw
42	40195	Gate arm
43	40203	Gate screw washer
44	580967	Boring bar assembly
45	62501	Tool retainingscrew
46	40200	Seat washerscrew
47	40197	Gate washer
48	40198	Seat washer
49	40196	Gate
50	40013	Stem set screw
51	40202	Gate-to-armscrew
52	40023	Yoke retainingscrew
53	40229	Small saddle gasket
54	40230	Large saddle gasket
55	58093	Cylinder
56	56694	Retaining pin
57	40015	Drift pin
58	503148	Cap
59	40020	Handle
60	501273	Boring bar wiper ring
61	51458	Boring bar O-ring
62	580610	Friction collar
63	580898	Feed yoke
64	50133	Washer
65	79745	Retaining screw
66	500851	Detent
67	59810	Detent spring
68	40139	Stud
69	305006	Detent screw
70	40138	Bolt*
71	80111	Handle bar
72	46255	Nut*

*Order both parts when replacing either one.

A-3™ Drilling and Tapping Machine

Notes



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Water (U.S.)

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