

The TapMate™ Pipe Drilling Machine

PLEASE READ ALL INSTRUCTIONS CAREFULLY.

WARNING: DO NOT WET TAP PLASTIC PIPE WITH TAPMATE AS SHIPPED.

The spade bit will split the pipe. To wet tap plastic pipe you need to use the PVC Pilot included with your machine. You must remove the spade bit shaft nose to attach the PVC Pilot. Please see page 11 of this manual.

Table of Contents

General Description	1
TapMate™ Components	3
Using the TapMate™	5
Feeding Rates	8
Cleaning and Storage	10
Maintenance Suggestions	10
Attaching the PVC Pilot	11
Trouble Shooting	12

Conventions used in this manual:



means this is a **POINT OF INFORMATION**.



means **CAUTION** – damage to pipe or equipment is possible.



means **STOP** – this is a dangerous situation.

General Description

The TapMate™ Tapping Machine by Transmate features lightweight construction and a range of 3" - 12" lateral cuts in both pressurized and unpressurized mains.

Ease of use and machine flexibility were two of the key design parameters of the TapMate™. The light weight of the TapMate™ (approx. 65 lbs., plus adapters and cutters) aids in both set-up and break down at the job site. The TapMate's™ unique shell cutter design gives it all the flexibility to cut through cast iron, PVC, Ductile Iron and Asbestos Cement pipe at normal waterworks operating pressures.

The TapMate™ may be powered by electric, air or hydraulic power drives allowing you to choose the best power source for your needs. All power sources are interchangeable in use.

The TapMate™ uses a manual feed. While there is a travel chart included in the back of this manual, your best indication on the progress of the cut is the feed itself.



Is the cut complete?

There is a simple test for determining if you have completed the cut. You will not have to rely on the travel chart.

1. Shut the power drive off.
2. Try to advance the feed.
3. If the feed advances more than two full turns, the tap is complete.
4. Otherwise, turn the power back on and resume your feed.

All shell cutters are 1/2" undersized. Full sized cutters are available by special order. Please allow up to eight weeks for delivery. Contact your waterworks distributor for more information.



For Water ONLY!

The TapMate™ is designed for the waterworks industry. It is not for use with steam, organics, etc.. Contact your distributor or the factory if you need additional information.

We thank you for your purchase of the TapMate Drilling Machine™. Please read this manual before you make your first cuts. We would enjoy any feed back you may have on the machine or this documentation.

TapMate™ Components:

(Please refer to figure 1 at the end of this manual for the location of items described below.)

SHAFT:



The shaft is of 1-1/4" hardened steel. One end is a 1" square for power drive attachment. The other end has female threads to accept the shaft nose or shaft extension. The shaft is treated for corrosion resistance.

SHAFT NOSE:



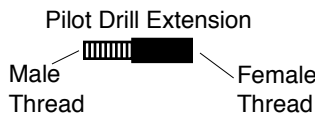
The shaft nose threads into the end of the shaft and is used to hold the pilot bit (we use a spade bit, see below). It is used for all cuts in the 3" - 8" range. The shaft nose has a spring loaded ball bearing to retain the coupon. It too is hardened and corrosion protected.

PVC PILOT:



The PVC Pilot threads into the end of the shaft. You must unthread the shaft nose with the Spade Bit first. There is a spring loaded ball bearing to retain the coupon. It is hardened and corrosion protected. You **MUST** use the PVC Pilot to cut plastic pipe.

PILOT DRILL EXTENSION:



Thread pilot drill extension firmly
onto the shaft nose



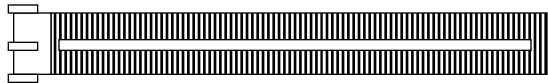
The Pilot Drill Extension lengthens either the shaft nose or PVC Pilot by 2" to accommodate the increased cutting depth of the 10" and 12" shell cutters. **The Pilot Drill Extension is used with the 10" and 12" shell cutters only!**

SPADE BIT:



The Spade bit attaches to the end of the Shaft Nose or Shaft Extension. This is the pilot bit for metal and A/C pipe. (There is a special PVC Pilot for Plastic Pipe). The spade bit must be securely tightened to the shaft. You will find that it seats naturally into the slot at the end of the Shaft Nose or Shaft Extension.

LEAD TUBE:



The lead tube is threaded to provide a path of travel for the lead nut. The threads are 12 turns to one inch of travel. This means every quarter turn of the feed nut gives 1/48th of an inch of travel. You will have excellent control during the cut. Notice the scale cut into the threads on the lead tube. It reads in inches and will give a good indication of the progress of the cut.

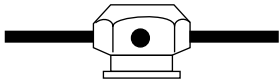


Lead tube
care.

While the Lead Tube has been hardened, it is recommended nothing be allowed to fall on the threads and dent them.

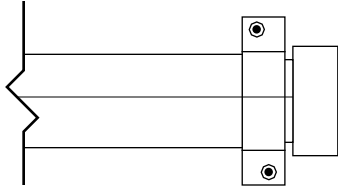
A number 12 thread file will clean up damaged threads in nearly every case. This has not been a problem. The symptom of thread damage is your inability to feed the TapMate™ into the cut. If you have feeding difficulty, the first place to check is the threads on the lead tube.

LEAD NUT:

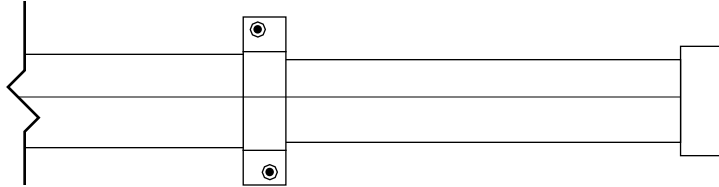


Made of ductile iron, the lead nut feeds the shell cutter into the pipe. Please do not use any cheater bars on the handles. If the machine is that hard to feed, there is something wrong and the stiff feeding is a warning from the TapMate™.

BRAKE TUBE AND THRUST TUBE:



Collapsed Position



Extended Position

These two square tubes slide together and apart to provide quick travel into and out of the tapping valve. The Brake Tube has a metal brake shoe that is tightened down to lock the two tubes together before the tap.

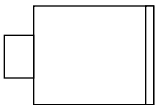


Use the nuts.

Use the hex nuts to tighten and release the brake shoe.

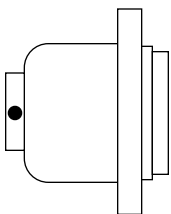
The socket head cap screws would require an allen wrench. They are also threaded into the opposing angle and set with Loctite. Always adjust the brake tension by manipulating the nuts, don't use an allen wrench on the socket head cap screws.

SHELL CUTTERS:



The shell cutters are 1/2" undersized and work with all types of water pipe. They thread on and off the shaft on 1-1/4" threads. Always use the jam nut behind the cutters to protect these threads. The carbide teeth are resharpenable. Contact your distributor or the factory for information.

ADAPTER BELLS:



Adapters are available in Mechanical Joint, Flange and Ringtite configurations in 3", 4", 6", 8", 10" and 12" sizes. The mechanical joint adapters use the MJ gasket from the MJ valve gland set.

Using The TapMate™:

Below is a step by step outline of the use of a TapMate™. The outline has been divided into five sections:

- A. Pre-Assembly of the machine
- B. Attachment to the Tapping Valve
- C. Feeding Rates
- D. Machine removal
- E. Cleaning and Storage

A. Pre-Assembly:

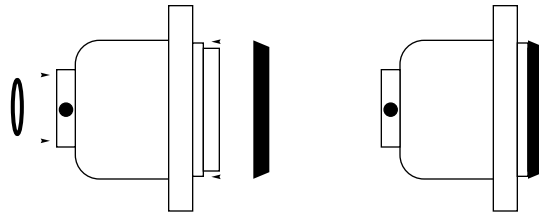
1. Be sure the spade bit and shell cutter are sharp and in good condition.

This is important to both the success and the labor involved in the cut. On any pipe material but plastic, use the regular shaft nose with the spade bit. Be sure the spade bit is securely tightened onto the shaft nose. Use the standard shaft nose for all cuts up to and including 8". **Use the Pilot Drill Extension for 10" and 12" cuts only.**

If you're cutting plastic pipe, use the PVC Pilot provided. Don't use the spade bit. The spade bit may cause plastic pipe to split.

2. Choose the proper size adapter bell.

The adapter size matches the tapping valve size in O.D. and configuration. If you are using the Mechanical Joint Adapter, use the M.J. Gasket included with the valve and slide it onto the Adapter. The Ringite and Flange adapters have ring gaskets included.



Be sure the O-ring is in the neck of the adapter and screw the adapter onto the lead tube. You should feel the O-ring compress as you finish threading the adapter on the lead tube.

There are set screw holes around the neck of the adapter. Continue to thread the adapter until one of the holes is over the ruler scale. Use a 3/16" hex wrench to tighten the set screw onto the FLAT of the scale.

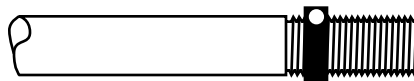
Do not tighten the set screw when it bears over the threads, you will damage your TapMate™



Not on the threads!

After you feel the O-ring compress, continue to turn the adapter until one of the set screw holes bears over the ruler scale on the lead tube. The set screw must bear entirely on the flat surface of the ruler scale. Otherwise, you will smash the threads under the set screw making the adapter very difficult to remove. You will also tear the threads out of the adapter neck.

3. Place the lock nut on the shaft about two (2) threads from the rear most position and lock it down. This provides some room to break the lock collar back to remove the shell cutter after the cut.



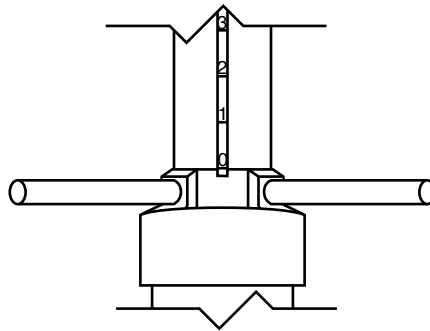
4. Examine the retaining ball on the shaft nose (or PVC Pilot). Test to see that it snaps back when depressed. If the ball is sticky, apply some of the Triflow lubricant included with your TapMate™.



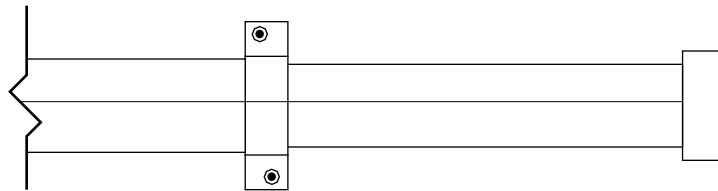
5. Tighten the shell cutter onto the shaft. Thread the shaft nose (or pilot drill extension and shaft nose combination) into the end of the shaft. Your machine is now set up and ready to make the cut.

B. Attachment to the Tapping Valve:

1. On completion of pre-assembly, the lead nut should be retracted to the zero (0) mark on the lead tube scale.



The Brake Tube / Thrust Tube combination should be in the extended position.



Extended Positon

2. Measure to be sure the valve gate will not interfere with the shaft when closing the valve at the end of the cut. If you are using a tapping valve, the distance is correct.
3. Prudent practices dictate a pressure test of the tapping assembly. Pressure test the assembly now and stop any leaks before you cut any holes in the pipe.

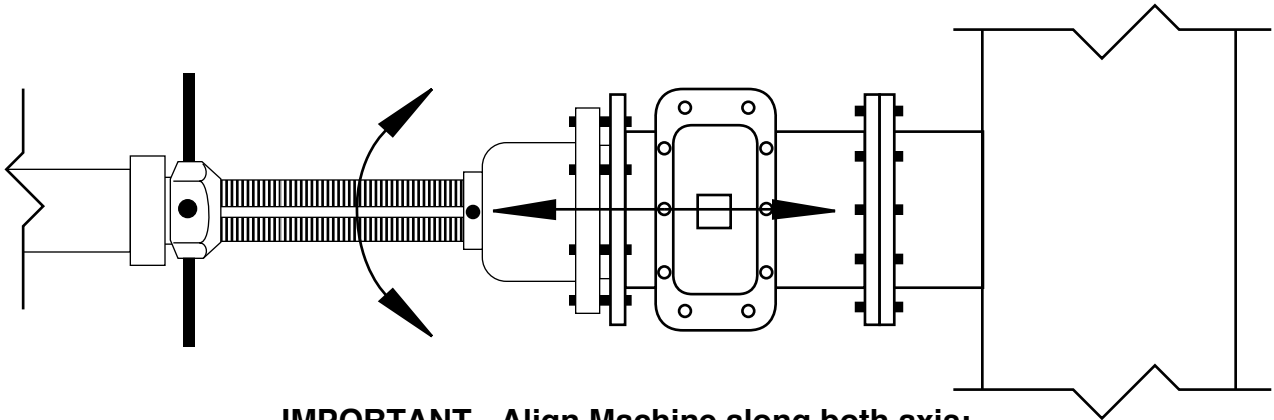


**Do the
Pressure Test**

Transmate strongly recommends a pressure test before beginning the tap.

There are many reasons why the tapping sleeve and valve combination might fail a pressure test. These might include improper installation, wrong O.D. ranges, or a faulty seat on the tapping valve. Spending about fifteen minutes now may save you many hours of work and associated water loss.

4. Release pressure and completely open the tapping valve. Now securely bolt the TapMate™ onto the face of the tapping valve. If you are using the M.J. Adapter, take care to align the TapMate™ perpendicular to the pipe in both the horizontal and vertical planes.



**IMPORTANT - Align Machine along both axis:
Side to side and up and down**



**Align the
MJ Adapter
carefully.**

The MJ Adapters do not butt up flush with the flange of the tapping valve. You must be sure the gap between the flanges is even on the sides and on the top and bottom.

If the TapMate™ is misaligned you may cut into the side of the tapping sleeve or the pipe wall. Use your fingers or the head of a T-Head bolt to make the gap even around the entire circumference of the two flanges.

5. Now slowly collapse the Thrust Tube / Brake Tube combination to slide the shaft through the tapping assembly so that the spade bit (or PVC Pilot) rests against the main. If contact is made with any part of the tapping assembly (i.e., the sleeve or the valve), then realignment is necessary. Do this step gently to avoid a sharp contact with the main. **Securely tighten the nuts on the brake shoe to lock the Thrust Tube / Brake Tube combination together.**

On some sizes, you will not contact the main when the Thrust Tube / Brake Tube combination is fully collapsed. Just advance the Lead Nut forward until contact is made.

6. Start the power. The shaft must turn **CLOCKWISE** when looking from the rear of the TapMate™ toward the tapping assembly and pipe. Otherwise the teeth on the shell cutter will be broken or damaged during the cut.



**Clockwise
cutter
rotation.**

The shell cutters must always rotate clockwise when viewed from the rear of the machine looking toward the pipe. Never reverse the rotation of the shell cutters when tapping the pipe.

There is never any need to reverse the rotational direction of the shell cutters when cutting. This will destroy your shell cutters! The direction of rotation has nothing to do with the feeding mechanism on the TapMate™

C. Feeding Rates:

1. There are two separate cutting tools incorporated into the TapMate™, the SPADE BIT (or PVC Pilot on plastic pipe), and the CARBIDE SHELL CUTTERS. The spade bit drills the pilot hole and the carbide shell cutter cuts a coupon from the pipe wall. When using the TapMate™ these "cuts" are easily identified by the user as two separate events.

The TapMate™ is designed so that resistance to feeding tells the operator about the progress of the tap. Resistance is greatest when cutting and virtually absent once the tap is complete. This is the reason you do not need to rely on the travel chart at the end of this manual.

When using the TapMate™, a break in resistance will be encountered twice, once when the spade bit has completed the pilot hole and once when the shell cutter has fully penetrated the main. When these "breaks" occur, the lead nut will turn freely on the threaded lead tube.

This design feature ensures the operator will know, by the feel of the feed, when the pilot hole and when the tap are complete.

2a. Feeding the Spade Bit:

The spade bit likes a continuous heavy feed into the pipe. A continuous feed will make the spade bit last longer between resharpening. Don't let the spade bit sit and turn in the pilot hole. There is no water in the assembly yet and the heat build up will wear away the cutting edges.

2b. Feeding the PVC Pilot:

The PVC Pilot replaces the Shaft Nose when making a cut into Plastic Pipe. When feeding the PVC Pilot, remember that you are cutting plastic pipe. Feed slowly and gently. Sharp shell cutters are a requirement when cutting PVC Pipe.

3. Feeding the Carbide Shell Cutter:

The feeding rate of the shell cutter is determined by the pipe being cut, the sharpness of the carbide shell cutter and amount of scale on the main. You will find that the TapMate™ will assume a rhythm during the cut as the carbide shell cutter alternately cuts then flushes chips from the kerf it is creating in the pipe wall.

Once the spade bit has broached the main, slowly advance the feed to bring the teeth of the carbide shell cutter to the pipe wall. Take care not to jam the cutter into the pipe for the first bite. Once the cutter has contacted the main, we suggest you begin with...

One-Quarter turn of the lead nut for every two shaft revolutions.

Let the shell cutter cut a path through the pipe rather than forcing the cutter into the main. Generally, about 15 to 20 minutes are required to feed the shell cutter into cast iron or ductile iron, let this be your guide for the first few taps you make.

4. Feeding Summary:

Use a continuous heavy feed for the spade bit. (If you're cutting plastic pipe, use the PVC Pilot and feed gently, remembering that you're cutting plastic pipe.) Let the shell cutter assume a rhythm of "cut and flush" by feeding about one-quarter turn for every two revolutions of the shaft. You will find that with sharp tools, a quick tap is attained without frantic feeding rates.



**No Cheater
Bars!**

Never use any type of Cheater Bar when feeding the TapMate.

A stiff feed indicates dull tools. Make sure your spade bit and shell cutter are sharp before beginning the cut. Don't use a cheater bar on the TapMate™.

D. Removal from the Tapping Valve:

1. When cutting is completed, retract the Lead Nut back to ZERO (0) on the scale. If the lead nut is not retracted to zero, the shell cutter and shaft will not fully retract and the cutter will get caught by the valve gate.
2. Now, standing to the side of the machine, slowly loosen one or both of the brake nuts until the brake tube begins to slide. Once the initial movement has stopped, loosen the brake nuts completely if the Brake Tube is not in the fully retracted position.



**Never
Stand
Behind!**

Don't stand behind the machine!

Water pressure will push the shell cutter back into the fully retracted position. The shaft end presents about 1.23 sq. In. to the water pressure. At 100 PSI there is 123 pounds of force pushing back on the shaft.

3. This is a two step process...
First wind the lead nut back to zero on the scale.
Second release the brake tube back to the fully extended position.

Make sure both of these steps are complete before closing the valve! The TapMate can now be removed from the valve and the tap is complete.

E. Cleaning and Storage:

1. The TapMate™ should be cleaned and lightly oiled after each use. The threads of the lead tube should be cleaned to remove any mud or dirt. The recommended procedure is to clean them with running water and a brush if necessary. Now spray the threads with a penetrating oil like Triflow or WD - 40.
2. Examine the spade bit and shell cutter, if they are dull or damaged contact your distributor for replacement or repair. Broken teeth on your shell cutters can be replaced and the cutter can be resharpened at the factory. Spade bits are resharpenable as well. The cutter should be dried to prevent rust.

NEVER store the shell cutters TEETH DOWN on a HARD SURFACE!

Maintenance of the TapMate

The TapMate™, if kept clean after each use, will provide a long, maintenance free life. Since all the moving parts are exposed, by following the recommended cleaning procedures, you should have few, if any, maintenance problems. In the case of component failure, contact the factory for replacement parts and instructions.

The critical areas of maintenance are the THREADS of the LEAD TUBE, and cutting tool integrity:

- A. The threads of the lead tube must be kept clean and oiled after each use. If you damage any of the threads, a number 12 thread file can be used to file off any spot where the threads are bent over. Any bent threads will cause a great difficulty in feeding the machine during a tap.
- B. The shell cutters should be oiled after each use to prevent rust. In addition, they should never be stored teeth down on a hard surface.

Attaching the PVC Pilot:

1. Remove the regular shaft nose from the machine.
2. Tighten on the PVC Pilot in its' place with a wrench.

The PVC Pilot will retain a small coupon and acts as a shell cutter rather than a drill bit. **ALWAYS USE THE PVC Pilot WHEN TAPPING INTO PLASTIC MAINS.** The cutting action of a drill bit or a spade bit can cause plastic pipe to split.

Tapping Plastic Pipe:

The composition and construction of plastic pipe requires the use of additional tapping techniques and pilots. Any standard pilot drill (the TapMate™ uses a spade bit) can split plastic pipe. For this reason, you must use the PVC pilot when tapping into plastic.

Tapping plastic pipe uses the same techniques as any other tap. However, the Unibell Handbook of PVC Pipe Design and Construction lists these additional precautions:

- * Tapping sleeves should be well supported independently from the pipe during tapping. The support should be left in place after tapping.
- * When drilling or tapping any pressurized pipe, basic safety precautions are advised to assure personal safety to the workmen in the event of a sudden and unexpected pipe failure. Although such failures are extremely infrequent, nevertheless, the following precautions are recommended:
- * A second workman or supervisor should be present in the immediate vicinity.
- * In addition to normal protective clothing, goggles or face shields should be worn.
- * Ladders should be provided for quick exit availability.
- * A heavy protective blanket with a hole in the center to permit installation and operation of the tapping and drilling machine should be provided to cover the exposed area of the pipe.

Transmate advises you to follow all the above precautions. **BE SURE YOU USE THE PVC PILOT ON ALL PLASTIC PIPE CUTS.** Make sure your tools are sharp as well.

Trouble Shooting

FEEDING IS VERY SLOW:

1. Check the sharpness of your cutting tools. We've found it is best to use a spade bit just for A/C pipe only. This is because A/C will sand away the sharpness of the spade bit. You won't know that until you try to use the same bit on metal pipe. Then, the machine will be very difficult to feed.
2. If you are using an electric or air drive, you may not have enough power in the generator or compressor. If you can slow the drive when feeding the spade bit, then this is your most likely problem.
The Electric Drive REQUIRES a 3 kW Generator or better.
The Air Drive REQUIRES at least 50 cfm at 90 psi.
3. If the spade bit has not yet penetrated the main then the spade bit may not have been tightened onto the shaft. Check that the spade bit has not 'cocked' of one side or the other.
4. If you are drilling thick wall pipe, the chips created by the pilot bit may be causing the problem. The solution is to back the Lead Nut off about two (2) inches with the shaft turning to pull the chips out of the hole. This symptom has been seen on some classes of A/C pipe.
5. There may be a bent thread on your lead tube. Back the Lead Nut off about two inches and examine the Lead tube threads. A number 12 thread file will clean up any bent threads.

Remember, if feeding is slow, this is an indication from the TapMate™ that something may be wrong. The solution is never to overfeed the machine. Check the above items first.

The Shell Cutter is Binding In the Pipe:

This is the primary symptom of overfeeding. Slow your feed rate. Try 1/4 turn of the lead nut for every 2 revolutions of the shaft.

Your shell cutter may be dull, have it resharpened before the next cut.

