

Purpose:

- The Mechanical Tubing Punch is a method of punching holes in downhole tubing.
- It is used to aid in the draining of fluid from the tubing when the tubing needs to be removed from the well.
- It can be used as a method to allow communication between the tubing and casing for injection of chemicals or to circulate kill fluid.
- It can also be used to allow additional productive zones to be introduced to the production string when permitted.

Operation:

- Set a Collar stop or Tubing stop at the desired depth that you would like the tubing punched.
- Run the Mechanical Tubing Punch in the well and set down onto the Collar stop or Tubing stop.
- Open the Spang jars and jar down 1 or 2 times to shear the 3/16" brass shear pins in the Main Body and Sliding Rod. (Do not jar down excessively as you risk shearing the steel shear pin that is meant as a safety mechanism.)
- Once the brass shear pins have been sheared, pull up on the tool string and open the Spang jars. This will allow the Sliding Rod to move upward and move the punch outwards to make contact with the tubing i.d.
- The punch will force the slips on the back side of the Main Body into the opposite side of the tubing wall and stop upward travel. A 200-300 pound overpull is recommended.
- Once the over pull has been done, do not close the Spangs completely. Close them about 1/2 to 3/4 of full stroke and then jar upward. Continue jarring upwards until the punch passed through the tubing and is allowed to retract back into the Positioning Rod and the Button locks into place. (It is recommended to have a pressure overbalance on the tubing higher than the pressure on the casing side when punching the hole to avoid being kicked up the well.)
- Once the hole is punched and the tool is locked in the open position retrieve it to surface and service it immediately and inspect it for damage.
- If desired, a shear up pulling tool can be ran on the bottom of the Mechanical Tubing Punch so that the Collar stop or Tubing stop can be retrieved after the hole has been punched. We do not recommend running the Collar stop or Tubing stop in the same run as the punch run.

Precautions:

- Always inspect the tool for damage before and after running it to avoid misruns.
- The tool should be serviced after every run and properly lubricated before storage.
- If the tool is being stored for a long period of time between uses, it should be function tested to make sure that it is in good working order on a regular basis.
- It is recommended to service the tool every 6 months if it is not in use.
- If after shearing the brass pins and prior to punching the hole, it is decided that you do not want to punch a hole then the steel shear pin can be sheared and the tool locked into the closed position for retrieval from the well. This is why it is particularly important not to jar down excessively when shearing the brass pins to activate the tool.
- If it is not possible to have a pressure overbalance on the tubing at the time of punching the hole, it is advised to have a pressure gauge installed in the lubricator and someone monitoring it for pressure changes as each upward jar is completed. This can minimize the risk of being kicked up the well from a pressure underbalance.
- Caution should always be used when working around the wellhead with wireline operations.

Assembly:

- Clamp the Main Body in a vice so that the hole where the Retainer Pin goes is accessible.
- Install the Punch into the Sliding Rod ensuring it is facing the right direction. If it is not in correctly, it will not be at a 90 degree angle to the Positioning Rod as it slides and the rest of the assembly will not be possible.
- Slide the Punch 6-8 inches down the Sliding Rod and set the parts to the side.
- Install the Bushing into the Positioning Rod tapping it in gently with a brass hammer or soft hammer if available. Make sure the edges of the Bushing are flush with the edges of the hole in the Positioning Rod. If it is not flush, it will effect the maximum o.d. of the tool with the Punch retracted. The Bushing should have a tight friction fit and not move after installation.
- Now position the Positioning Rod over the Sliding Rod so that the Punch passes through the Bushing and the ridges on the Positioning Rod are inside the slot of the Sliding Rod.
- Slide the 2 parts together so that the bottom of the Sliding Rod is stopped against the bottom recess of the Positioning Rod.
- Grasp both parts and hold them together and slide them into the top of the Main Body.
- Push the Rods into the Main Body just far enough that the round recess for the Button Spring are not inside.
- Install the Spring into the back side of the Button.
- Rotate the Rods so that the round recess is facing 90 degrees from the back side of the slip (this will allow the Button to be passed by the locking hole in the Main Body) area and install the Button and Spring into the recess.
- Press the Button in and collapse the Spring and push the Rods into the Main Body.
- Once the Button has passed the upper locking hole on the Main Body, the Rods can be turned and pushed in the rest of the way. When the Rods are pushed in as far as they will go, the Button will lock into the lower locking hole. We recommend using a pin punch to depress the Button so you don't pinch your fingers.
- Depress the Button and move the Positioning Rod up in the Main Body slightly to align the 1/4" shear pin holes on the Main Body and the Positioning Rod and install the 1/4" steel pin. You can reach in the bottom end of the Main Body and push the Rods up using your finger.
- Install the retainer pin through the Main Body and the Positioning Rod and lock it in place with the set screw.
- Install the Bottom Sub and tighten placing an Open End adjustable wrench on the flats of the Bottom Sub.
- Align the 3/16" shear pin holes in the Sliding Rod and the Main Body and install 2 – 3/16" Brass shear pins.

Video also available on Youtube <https://youtu.be/KNmZE-tINPo>

Disassembly:

- Clamp the Main Body in a vice so that the retainer pin set screw is accessible for removal. (Ensure when clamping that you do not crush the Main Body.)
- Remove the set screw and slide the Retainer Pin out of the tool.
- Using a ¼” pin punch and hammer, remove the ¼” steel shear pin from the tool.
- Hold the Sliding Rod and Positioning Rod together firmly, start to pull it out the top of the Main Body.
- When it is halfway out, rotate the Sliding Rod and Positioning Rod 90 degrees and continue to move it upwards.
- Place your hand over the tool at the top of the recess on the opposite side of the slip area of the Main Body to catch the Button and Spring as they come out. (There will be spring tension behind the button and if you do not take precautions to cover it as it is being removed, it could be lost).
- Once you have the Button and Spring removed, continue to remove the 2 rods the rest of the way.
- Separate the Positioning Rod from the Sliding Rod by lifting it straight up and off of the Punch.
- Slide the Punch to the top of the Sliding Rod and remove it out from the recess in the bottom.
- Use a pin punch that has a larger o.d. on the main hex area than the hole in the Bushing, drop the punch into the Bushing from the inside of the Positioning Rod and gently tap the Bushing out of the Positioning Rod.
- Remove the Bottom Sub from the Main Body using an Open End adjustable wrench.
- There should never be a need to use a pipe wrench to disassemble the tool as long as a vice is available for clamping.
- Remove spent 3/16” brass shear pins from the Main Body and Sliding Rod and discard.
- Inspect all parts for damage and replace with new parts as required.

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