



Model: TM80/TM100/TM120

Oct. 13, 2021

Serial #: All

Product Bulletin # TM-030 Rev 3

Torq-Matic™ Wrench Die Setup Recommendations

Objective

The objective of this bulletin is to present the correct die configurations and wrench alignment procedure to maximize the make up and break out efficiency of the Canrig® Torq-Matic™ Automated Wrench (TM wrench). Following this guide will minimize cycle time, reduce wear and tear on the dies, and reduce residual forces that cause premature tong, jaw, and cylinder damage.

Outer Die Options

The TM Wrench dies have been redesigned to incorporate a long tooth pattern. These dies provide better engagement on the pipe and reduce slippage at higher torques. The larger teeth and stronger material greatly increase the shear strength of the teeth which result in a much longer die life than the previous die design.



Previous Die Design

Figure 1: Previous dies



New Die Design

Figure 2: New dies



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The dies come in two styles:

- Primary style, suitable for tubulars up to 8-5/8" outer diameter (OD) on the tool joint
- Full Range style, suitable for tubulars up to 11-1/2" outer diameter (OD) on the tool joint

Although the Full Range die can be used for all diameters, it is recommended to use the Primary die below 8-5/8" to be more efficient and increase die life. See Table 1.

Table 1: Outer Dies

PRIMARY	FULL RANGE
Recommended Tool Joint (TJ) Range	
TJ OD < 8-5/8"	TJ OD 8-5/8" – 11-1/2"
	
P/N: R10552	P/N: R10510

Center Die Options

With the introduction of higher torque double-shoulder pipe, an extended center die was introduced to increase the die penetration surface area on 6-5/8" diameter tool joints and larger by adding an extra point of contact. Extended center dies greatly increase the efficiency of making up and breaking out double-shoulder pipe, such as XT54 and Delta 544.

The standard center die is recommended to be used on all tool joints (TJ) with outer diameters (OD) less than 6-5/8". See Table 2 on page 3 and Figure 3 and Figure 4 on page 3.

Table 2: Center Dies

STANDARD	EXTENDED
Recommended Pipe Diameter	
TJ OD < 6-5/8"	TJ OD ≥ 6-5/8"
	
P/N: R10272	<ul style="list-style-type: none"> • TM80/100 – P/N: R10509 • TM120 – P/N: R10525

Standard Center Dies

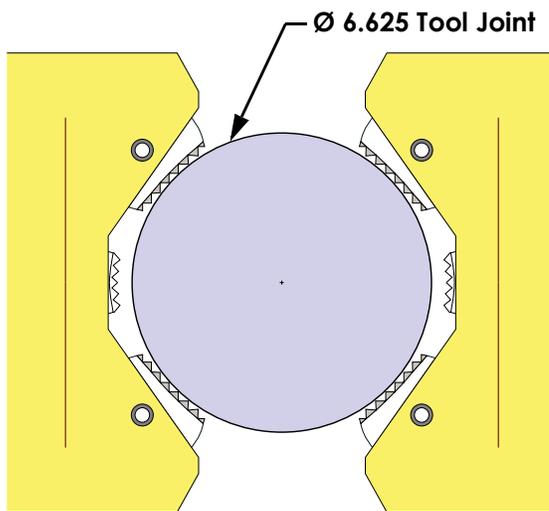


Figure 3: With Standard Center Dies

Extended Center Dies

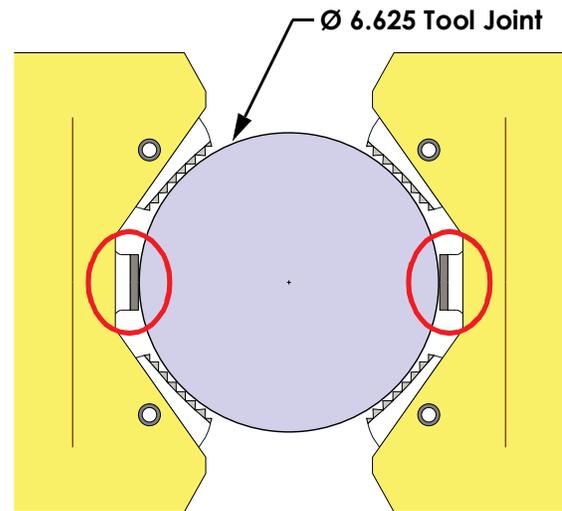


Figure 4: With Extended Center Dies

Die Guidelines

Proper die placement will prevent slippage and premature wear on the dies. It will also allow the TM wrench to properly make up and break out the tubular joints. The dies must clear the pipe hard banding to engage the surface of the pipe. To achieve this, use spacers to offset metal dies. See Figure 5.

Hard Banding

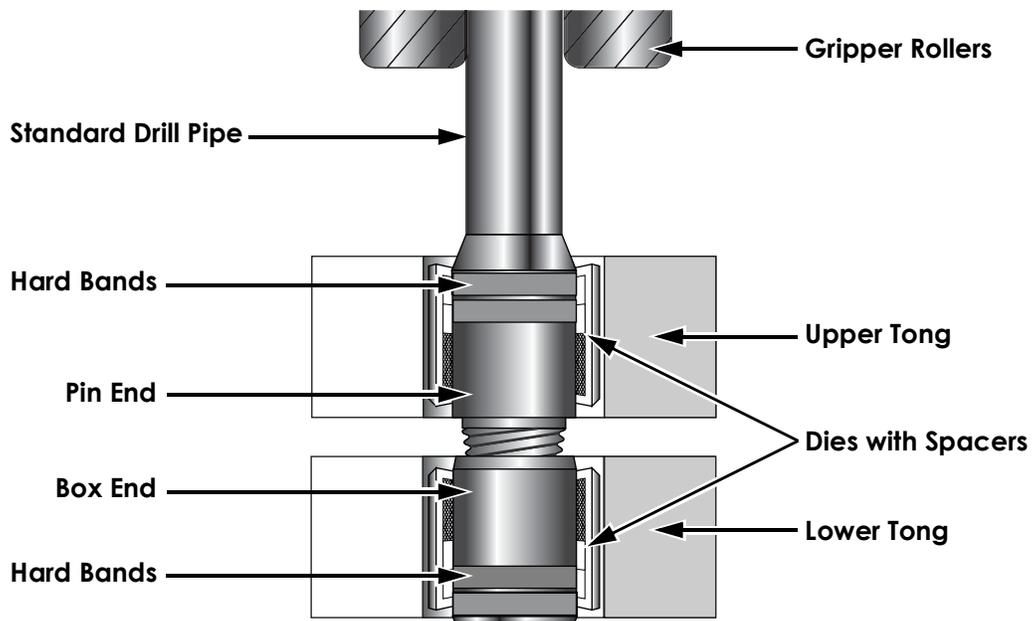


Figure 5: Using Spacers to Clear Hard Banding

Shoulder Placement

Die configurations depend upon the size of the pipe being utilized. Do not place dies in locations where the die will come into contact with the tubular hard bands. As a guideline, it is recommended dies engage at least 3 inches from the shoulder of double shoulder pipe to prevent pipe deformation; however, check with the pipe manufacturer for detailed instructions. Dies are recommended to be placed in a configuration in which dies clear hard banding and give shoulder clearance. See Figure 6.

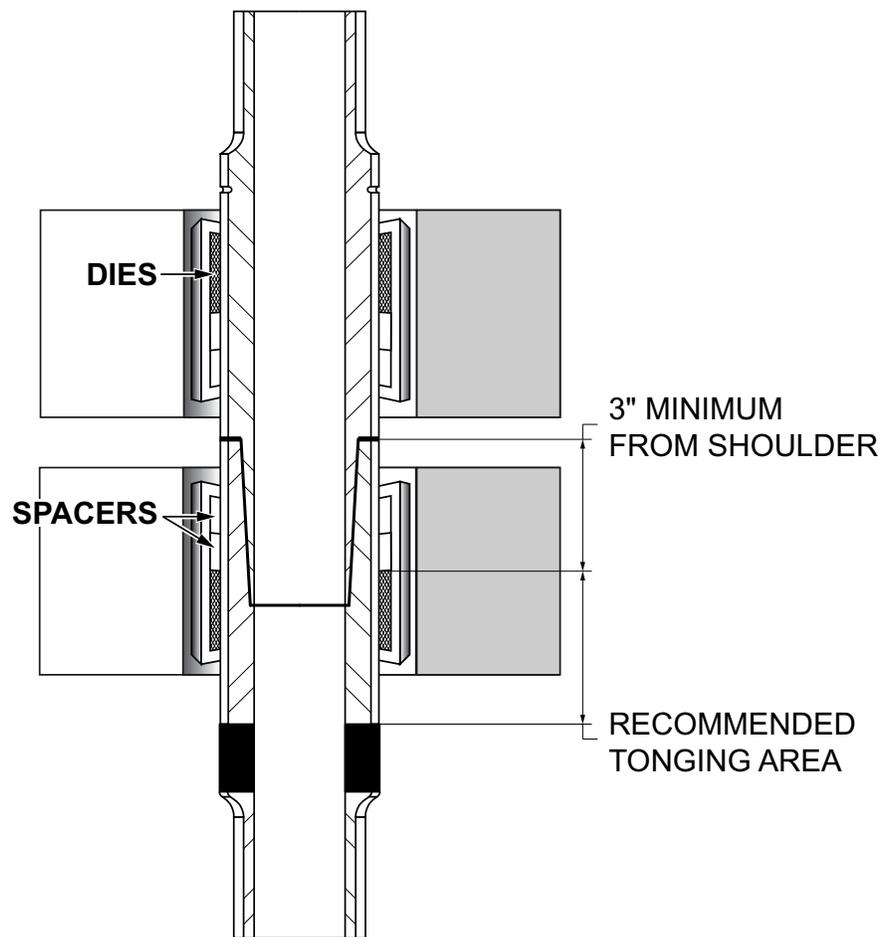


Figure 6: Lower Tong Shoulder Placement

Die Configurations

TM80/100 Die Configurations

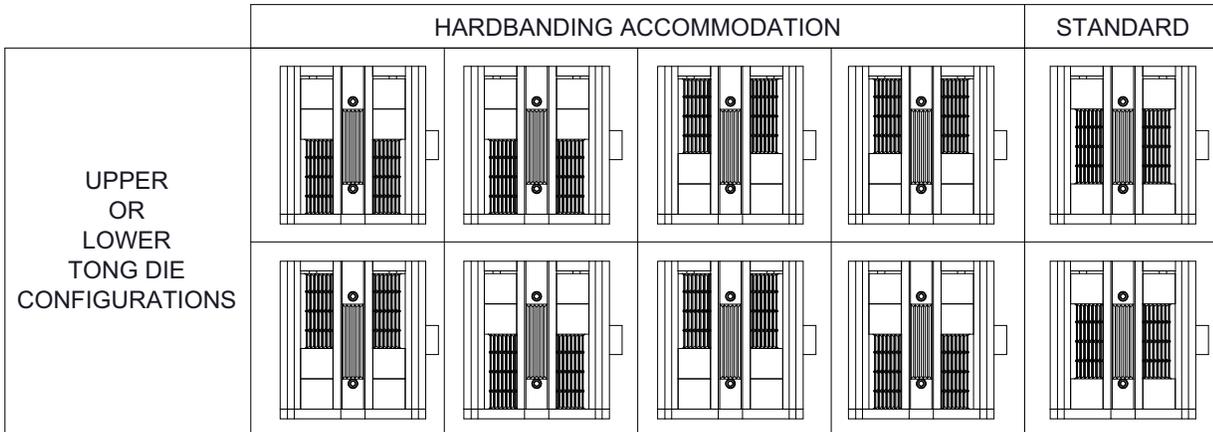


Figure 7: TM80/100 Die Configurations

TM120 Die Configurations

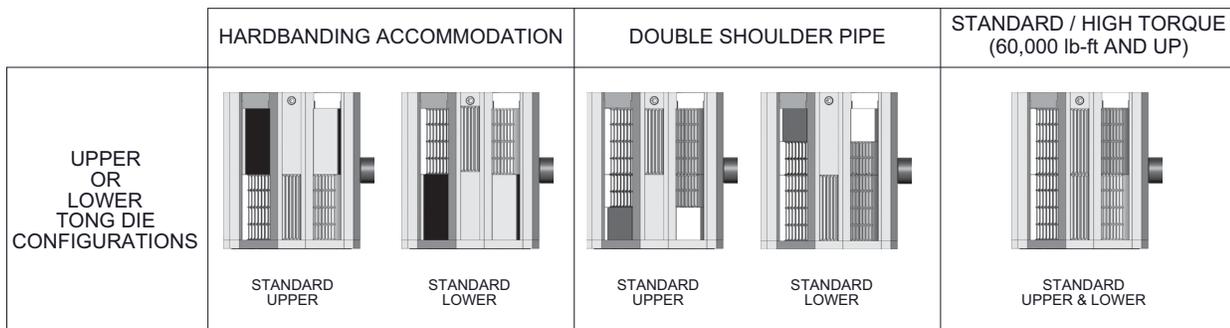


Figure 8: TM120 Die Configurations



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Dies and Spacers Part Numbers

Table 3: TM Wrench Dies and Spacers

Canrig P/N	Description	Notes
FULL DIES		
R10552	FULL DIE, PRIMARY, TM80/100/120	UP TO 8-5/8" TOOL JOINT
R10510	FULL DIE, FULL RANGE, TM80/100/120	UP TO 11-1/2" TOOL JOINT
CENTER DIES		
R10272	CENTER DIE, STANDARD, TM80/100/120	FOR LESS THAN 6-5/8" TOOL JOINT
R10509	CENTER DIE, EXTENDED, TM80/100	FOR GREATER THAN 6-5/8" TOOL JOINT
R10525	CENTER DIE, EXTENDED, TM120	FOR GREATER THAN 6-5/8" TOOL JOINT
HALF DIES		
R10553	HALF DIE, PRIMARY, TM120	UP TO 8-5/8" TOOL JOINT Note: Not offered on TM80/100.
R10521	HALF DIE, FULL RANGE, TM120	UP TO 11-1/2" TOOL JOINT Note: Not offered on TM80/100.
SPACERS		
141 500052	HALF DIE SPACER, TM80/100	
161 500005	FULL DIE SPACER, TM120	
DT51006	HALF DIE SPACER, TM120	
DT52490	CENTER DIE SPACER, TM120	

Wrench Alignment

If the wrench is not properly aligned before torqueing the tool joint, the wrench will shift into alignment during the make-up or break-out cycle. When the wrench shifts, the dies slip and the jaw cylinders may get pushed back, despite being under full pressure, if the opposing cylinders are offset as shown in Figure 9. Ensuring the wrench is aligned with the drill pipe will significantly increase the efficiency of the wrench and greatly reduce premature damage to the dies, tong, jaw, and cylinder. Adding a jaw synchronizing kit will center the wrench side-side reducing much of the residual forces, however the wrench must still be centered front-back.

The TM wrench tongs must be parallel to the rig floor to properly align to pipe. The TM wrench's center of gravity can be adjusted to achieve this. A Canrig technician can perform these mechanical adjustments to the center of gravity.

Ensure clamps are closing at the same speed and distance (centered side-to-side) if a jaw synchronizing kit is not installed. A jaw synchronizing kit can be ordered and installed on wrenches experiencing this issue.

Contact RIGLINE 24/7™ Support to purchase a kit and request for a Canrig technician to perform the clamp jaw synchronizing hydraulic system upgrade. See Table 4 on page 9.



Offset Clamps



Aligned Clamps

Figure 9: TM Wrench Clamps

Jaw Synchronizing Kits

Table 4: Jaw Synchronizing Kits

Canrig P/N	Description
TM80	
AY51461	KIT, JAW SYNCHRONIZING, TM80
TM120	
AY51790	KIT, JAW SYNCHRONIZING, TM-120, V1.3
AY51793	KIT, JAW SYNCHRONIZING, TM-120, V1.2

Damaged or worn dies must be replaced to prevent slippage and to properly align the wrench.



Figure 10: Dies Within Proper Wear

Alignment Procedure



Warning!

Ensure that only trained personnel conducts the following procedure and are wearing appropriate PPE. Use proper precautions and ensure that proper communication with the TM operator are established and followed.

1. Manually extend the TM wrench to hole center or mouse hole.
 - 1.1. Move the wrench using "Maintenance Mode" screens on wrenches with Allen-Bradley (A/B) controller, or "Device Test" screens on wrenches with OMRON controller.
 - 1.2. Move the TM wrench forward to grab the pipe. Extend or retract the TM wrench as required.
 - 1.3. Acknowledge that the TM wrench is aligned at the center to the pipe. Rotate left or right as required.
2. Align the tongs to the joint.



Figure 11: Tongs Aligned to Pipe Joint

3. Slightly close the lower clamps.
 - 3.1. With precaution, slightly close the lower clamps and activate the TM wrench's E-Stop. (Verify that the TM wrench is immobile). Looking from above, check to see if the back dies are in line to grab the pipe.



Figure 12: Clamps Slightly Closed

- 3.1.1. Extend or retract the TM as required.
- 3.2. If all dies will equally grab the pipe, disengage the TM wrench's E-Stop and fully close clamps on to the pipe. Activate the TM wrench's E-Stop and double check that all dies are seated on the pipe equally.



Figure 13: Left Hand Side Seated Dies



Figure 14: Right Hand Side Seated Dies

- Once proper alignment has been acquired, navigate to the **Horizontal Settings** screen and set **Hole Center** or **Mouse Hole**.

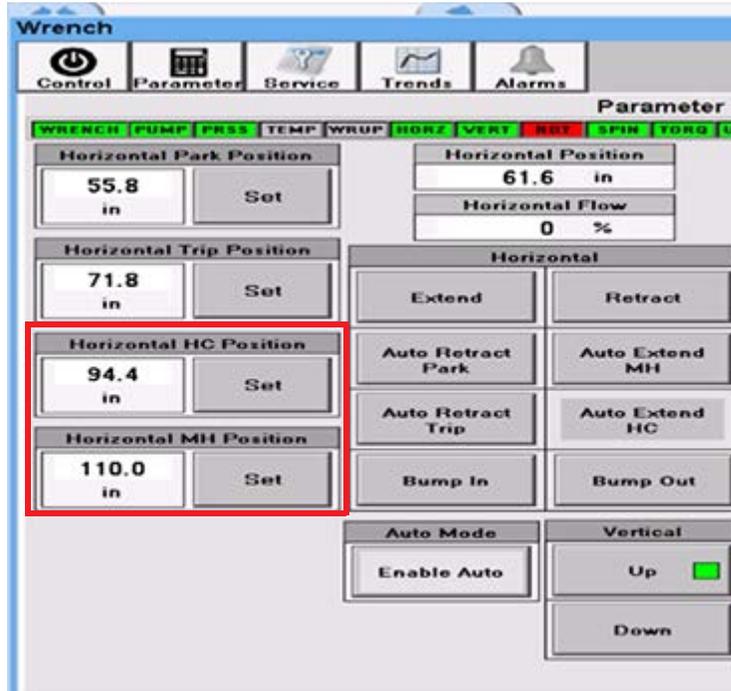


Figure 15: A/B Horizontal Vertical Screen

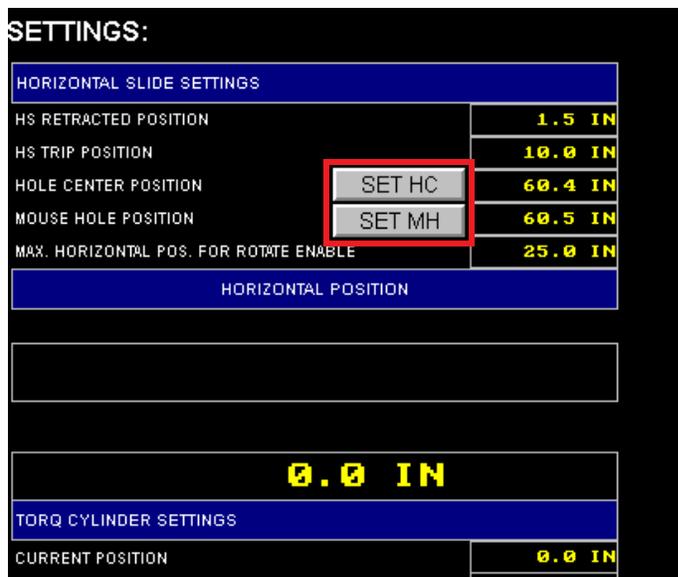


Figure 16: OMRON Settings Screen

Wrench Centered Study

Slipping case studies demonstrate that slippage occurs when the pipe is not centered properly with the wrench. The wrench center is the optimal position for the dies as this allows the dies to make full contact with the pipe while in make up and break out. Off-centered piping yielded with 2,044 ft/hr while centered pipe yielded 3,242 ft/hr. See Figure 17.

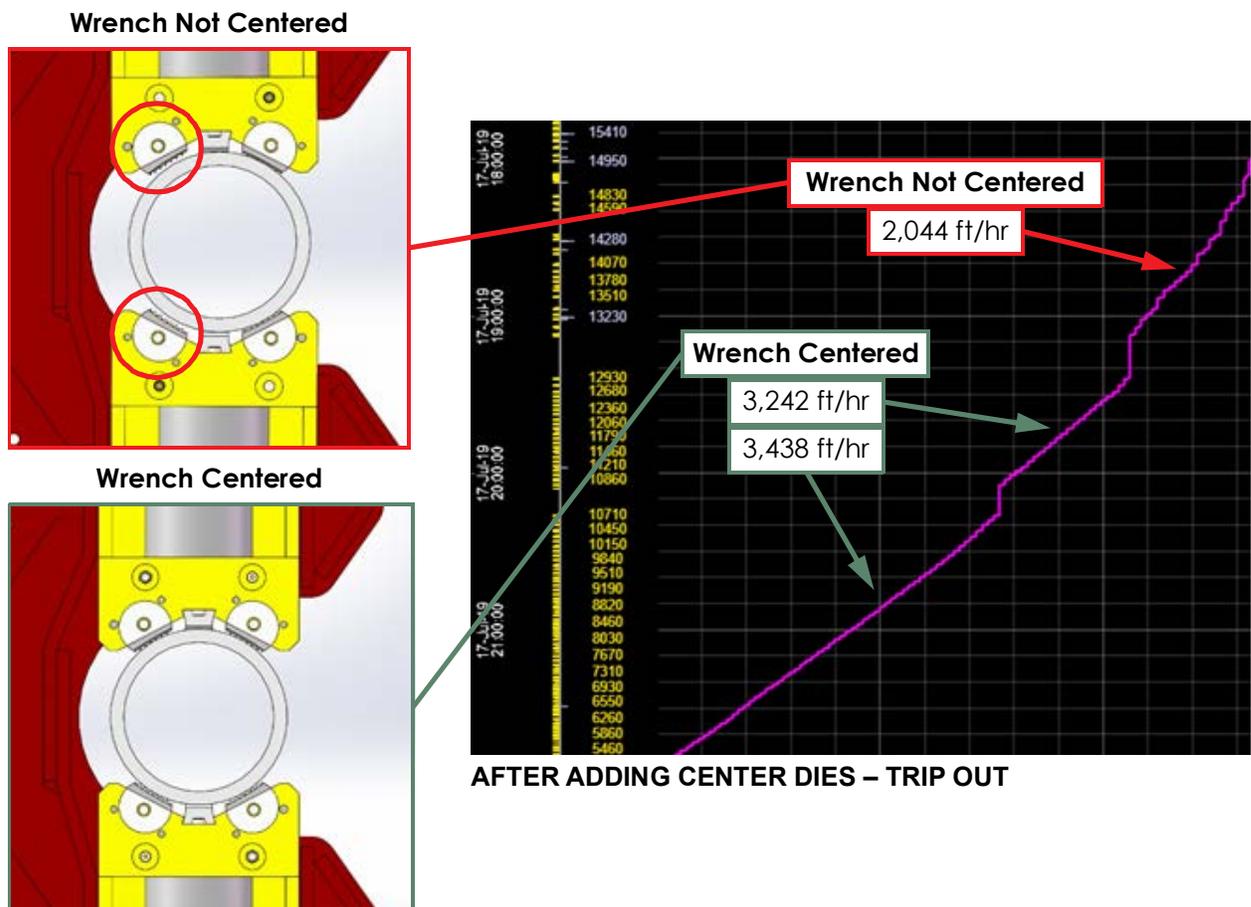


Figure 17: Wrench Centered Study