Operation Manual

Power Tong Test Rig

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Revision History

Rev	Date	Description
A	05/23/2022	Original Release
B	05/24/2023	Page 9: Added Power Unit instructions & graphic (Figure 4)
C	06/16/2025	Added Mandrel & Brake Unit Details

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SAFETY

READ THIS MANUAL BEFORE USING EQUIPMENT

Equipment supplied by Texas International Oilfield Tools is intended for installation and use in controlled environments involving hazardous operations and situations.

Only authorized and trained personnel shall install, maintain, operate and/or repair equipment supplied by Texas International Oilfield Tools, LTD. Equipment shall be used only for the purpose for which it is intended.

The User is responsible for ensuring the equipment is in safe working order prior to use. Texas International Oilfield Tools, LTD is not responsible for injuries or equipment damage that arises from equipment neglect or misuse.

The User is responsible for ensuring the safety of all personnel within the vicinity of the equipment. Texas International Oilfield Tools recommends a hazard assessment be performed by qualified safety representatives prior to using equipment. All personnel shall possess and use Personal Protective Equipment (PPE) and must be trained at minimum on rig safety, rig procedures, and equipment operation.

Hazard Labels Used in this Manual

DANGER is represented by this hazard symbol and signifies the highest level of risk. Failure to observe and heed this information may result in serious bodily injury or death.

WARNING is represented by this hazard symbol and signifies potential hazards of medium risk. Failure to observe and heed this information may result in significant bodily injury, catastrophic equipment failure, and/or environmental contamination.

CAUTION is represented by this hazard symbol and signifies potential hazards of low risk. Failure to observe and heed this information may result in bodily injury and/or equipment damage.

NOTICE symbol denotes items of importance unrelated to personal injury which highlight additional information provided to aid the user during installation, commissioning, operating, and/or maintaining equipment.

Notes, cautions, warnings, explanations, and information are provided herein to advise readers to take deliberate action to protect personnel from potential injury or lethal conditions. Please pay close attention to these advisories.

INTRODUCTION

Texas International Oilfield Tools, LTD (TIOT) offers a free-standing Power Tong Test Rig used for testing hydraulic power tongs by resisting torque output.
Testing is accomplished with the power tong clamped on a mandrel (not shown) and the back of the power tong is secured to the back post through a load cell and tether. With the Power Tong running in the make or break direction, braking resistance is applied putting the power tong under load.

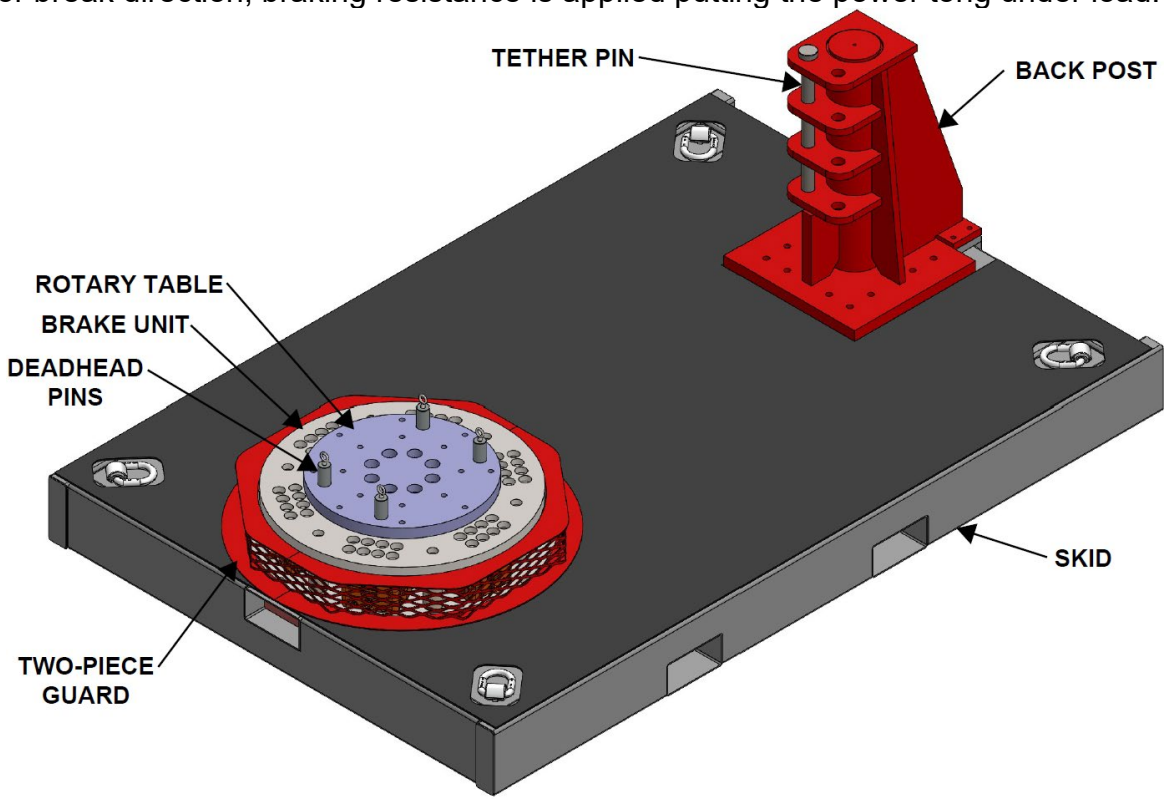


FIGURE 1

DANGER Substantial forces are involved in the Test Rig operation. Extreme caution is always recommended when working on or around this equipment.

WARNING ***DO NOT*** move or transport while any part of the equipment is under pressure.

WARNING Hydrostatic or hydrodynamic pressure must be bled off to 0 PSI (0 BAR) when the equipment is not in use or unattended.

WARNING The User is responsible for ensuring that all pins and components are secured prior to lifting, moving, or transporting the equipment.

CAUTION Use the forklift pockets under the skid to properly lift the test stand when moving or transporting.

SPECIFICATIONS

Brake Unit Capacity

Part Number	No. of Calipers	Max Braking Torque (ft/lbs)
T87000-4	4	80,000
T87000-6	6	120,000

DANGER Do not exceed torque ratings. Doing so will cause injury and test stand damage/failure.

CAUTION Actual testing capacity is dependent upon the type and size of mandrel used.

DIMENSIONS

Dimensions shown are for reference only and may vary. Shown without power unit and mandrel.

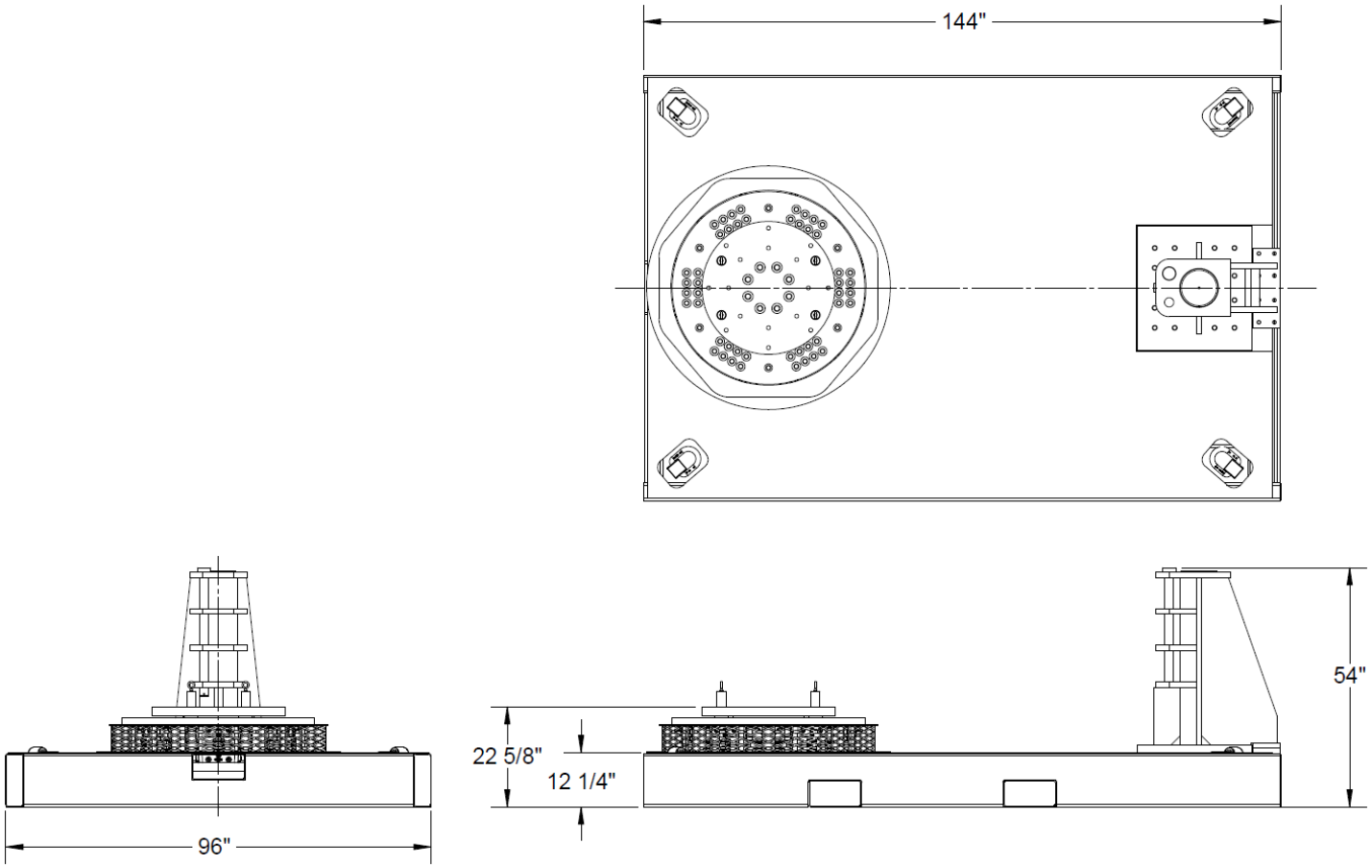


Figure 2

ACCESSORIES - MANDRELS

Four basic mandrel types are available and can accommodate numerous jaw sizes.
Custom design is also available. Contact Texas International Oilfield Tools for more info.

TWO WAY BACKUP MANDREL

Two-way backup mandrels are used to test power tongs without removing the backup. The backup is clamped on a fixed area of the mandrel while a central mandrel allows the power tong to be run. This setup allows the power tong to be tested independently or against the backup.

BACKUP MANDREL

The solid backup mandrel allows testing of the power tong but provides clearance so that the backup does not need to be removed from power tong/backup assembles during testing.

THREE SIZE MANDREL

Three (pipe) size mandrels allow testing of power tongs only but provide three grip areas to allow testing of three different jaw sizes.

TWO SIZE MANDREL

Two size mandrels allow testing of power tongs only but provide two grip areas to allow testing of two different jaw sizes.

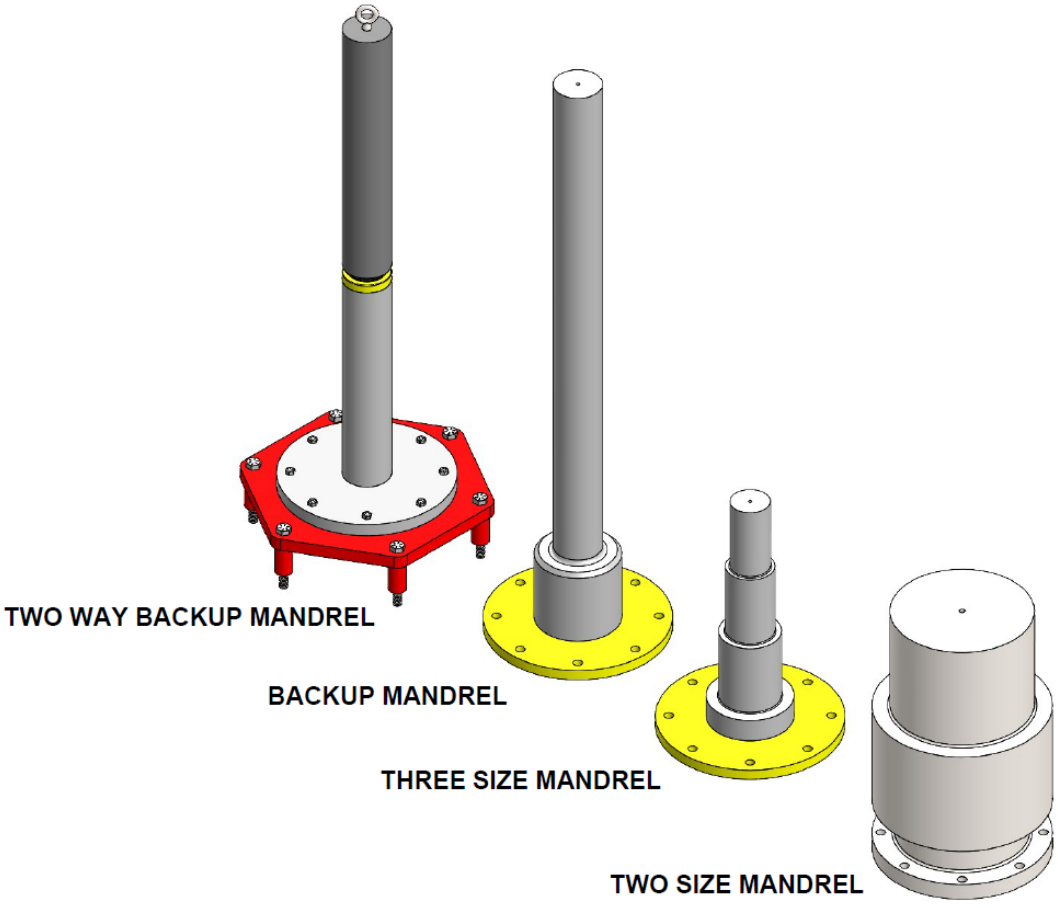


Figure 3

ACCESSORIES – MANDRELS (CONT.)

Two-way back-up mandrel components:

ITEM	DESCRIPTION	ITEM	DESCRIPTION
1	ROTARY TABLE	6	LOCKING RING
2	BACK-UP TABLE	7	CAPSCREW – LOCKING RING
3	TONG MANDREL	8	LIFTING EYE
4	BACK-UP POST	9	CAPSCREW – BACK-UP TABLE
5	MANDREL BUSHING	10	CAPSCREW – BACK-UP POST

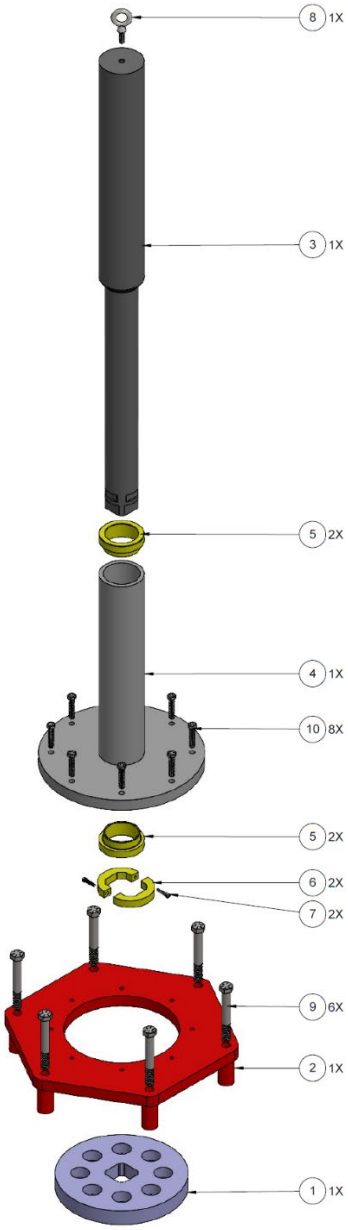


Figure 4

NOTE: Item 1 replaces the main rotary table when installing the two-way back-up mandrel.

OPERATION: PRE-TEST SETUP

The following steps are to be followed to prepare the test stand for operation:

A. The test stand should be positioned on firm ground and leveled both horizontally and vertically. Check all bolted connections, pressure installations, hydraulic components, etc. Ensure that the test stand is defect free and ready for testing.

B. Install an appropriate size mandrel on the rotary table.

DANGER Never operate equipment without pressure gauges and load cells. Gauges and load cells must be functional and in good operating condition.

WARNING Never operate the equipment without all fasteners, pins, tethers, etc. installed and secured.

C. Using a crane or other appropriate lifting device, open the power tong door and position the power tong around the mandrel. Close the power tong door.

D. Attach a load cell in an appropriate location on the back of the power tong where torque readings can be monitored by the operator.

E. Attach a tether to the load cell and the other end to the back post; pin in place using the back post pin.

NOTICE Once attached, the tether should be 90 degrees from the power unit centerline. Use a suitable length tether. See Figure 5.

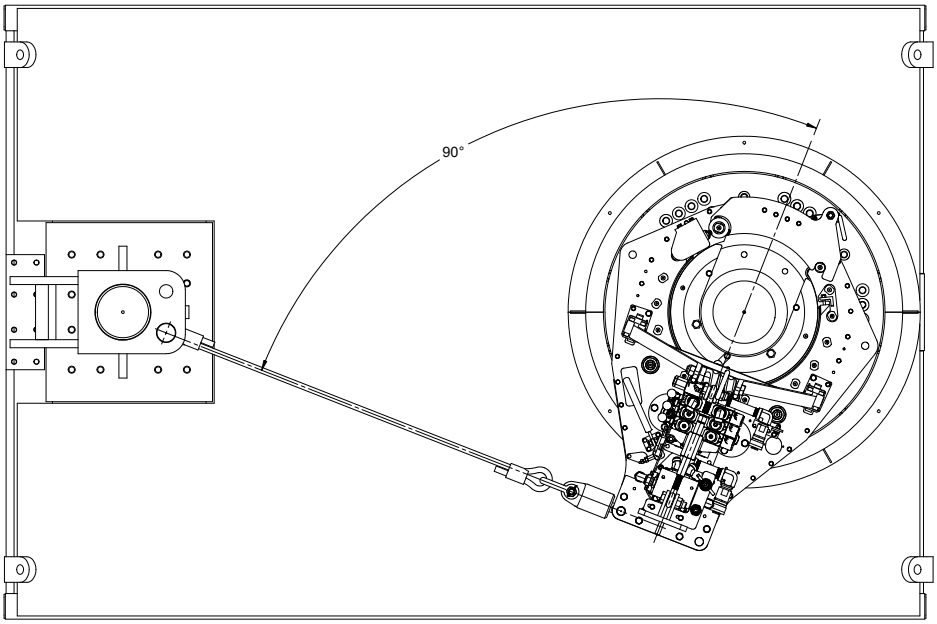


Figure 5

OPERATION: PRE-TEST SETUP – CONT.

NOTICE Testing can be performed from either direction depending upon make-up or break-out testing.

DANGER Ensure that the operator is out of the way of tethers and machinery when shifting direction from make-up to break-out or vice versa.

A. Attach the Power Unit hose to the Power Unit and the connection at the end of the skid (Figure 5).

B. Position the Power Unit on the side of the test stand within the operator's view and reach.

C. Attach the power cord to a protected electrical outlet.

D. Ensure that the stop (Red) button is off (down position).

E. Turn on the Power Unit and pull up on the stop button.

F. When the operator is ready to test the Power Tong, run the tong and slowly adjust the needle valve on the top of the console (Black Knob). As the needle valve increases the pressure to the brake calipers, the Power Tong torque will increase.

G. Turning the needle valve knob in the opposite direction will release the pressure to the brake calipers and decreases the Power Tong torque.

Power Unit
Figure 6

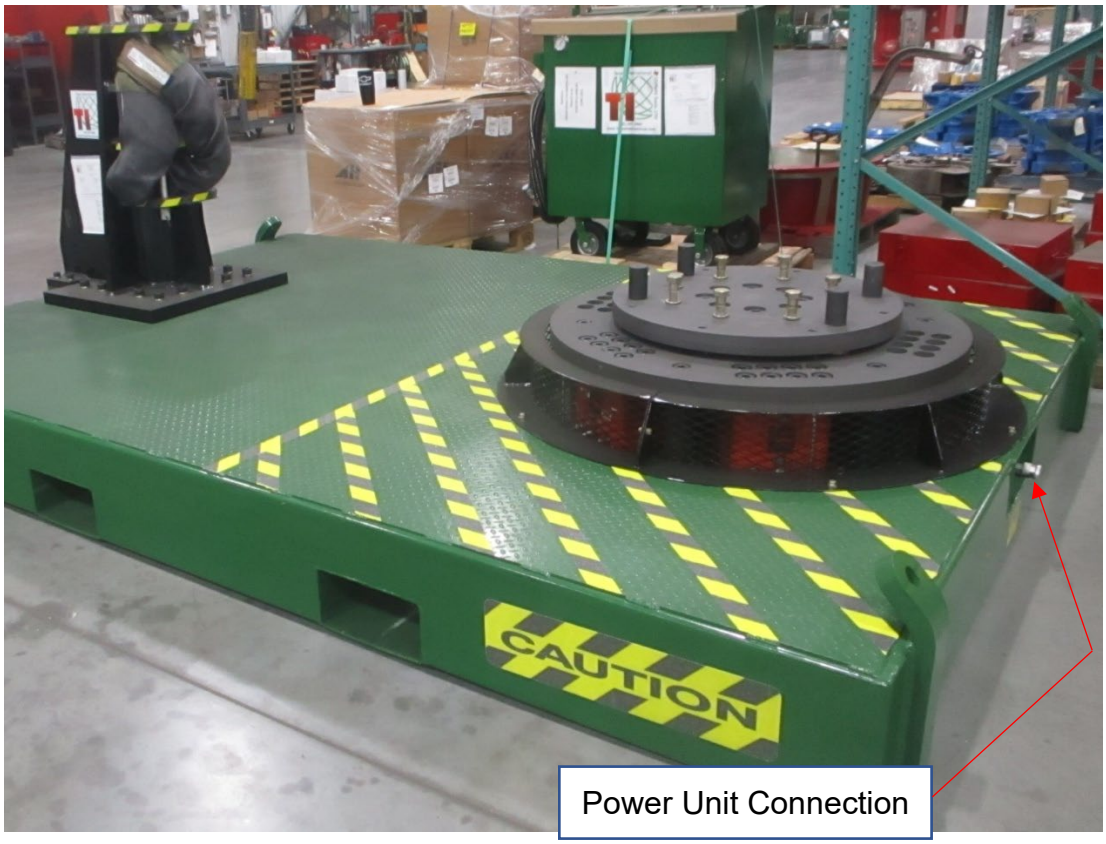


Figure 7

TROUBLESHOOTING

Failure Mode	Possible Cause(s)	Possible Solution(s)
Deformed pin holes	Overload	MPI Welds, Replace Deformed/Damaged Components, Scrap
	Wear	Pull Test Assembly from service and repair or replace.
Bent pins	Overload	Replace pins
Leakage	Worn seals, loose fittings	Tighten fittings as needed. If leakage persists, check the area between the caliper bottom and top halves for seal leakage.
Slow braking time or insufficient braking force.	Speed too high	Check tong settings
	Oil, paint, or grease on the brake pads or rotor.	Clean Rotor
		Clean or replace brake pads
		Check for leaks
Motor will not operate	No pressure from power unit	Ensure that power unit is in proper operating condition.
		Check electrical and connections.

Table 1

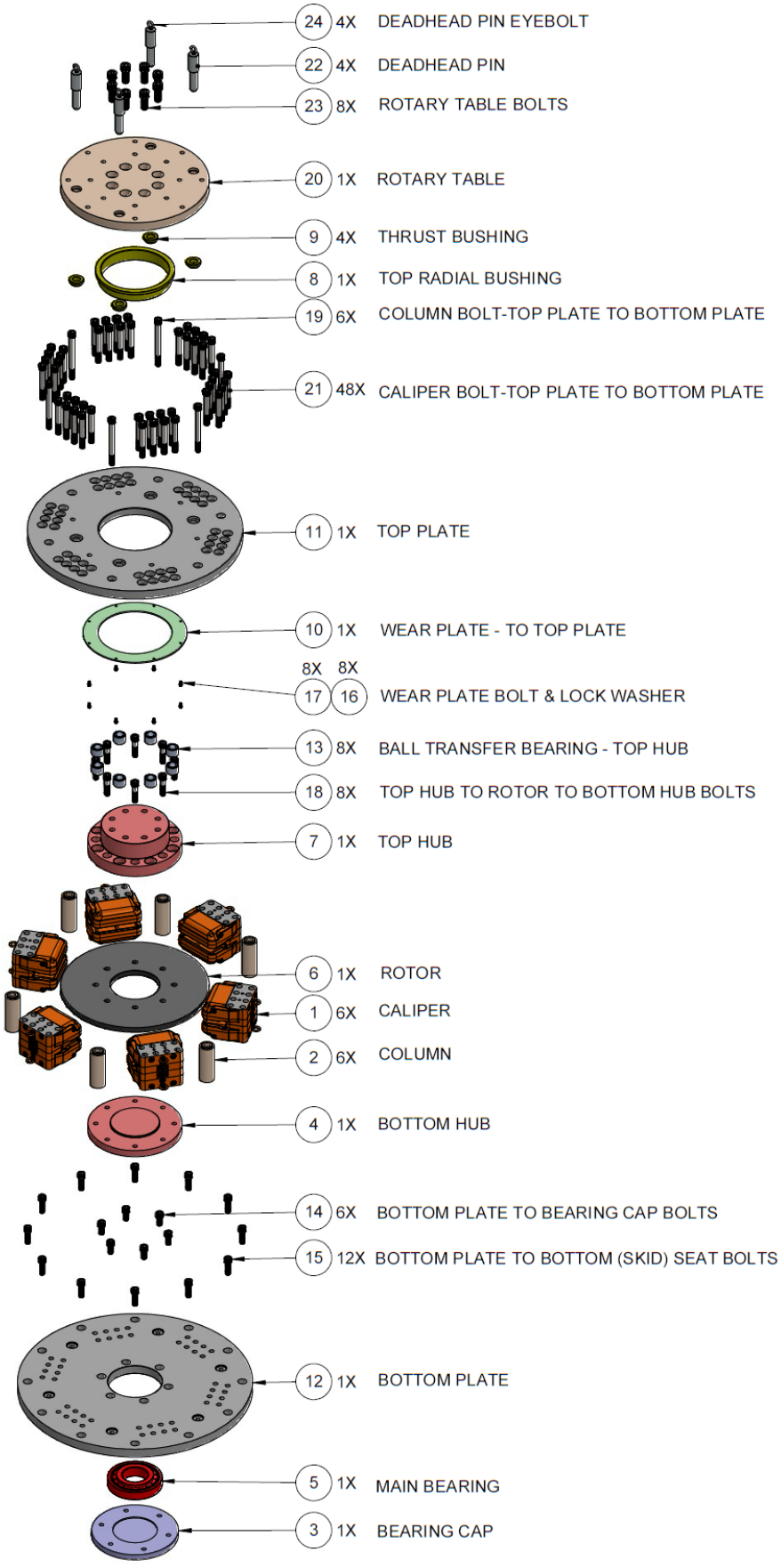
Contact TIOT for troubleshooting assistance, replacement parts, and/or repairs.

PARTS & RECOMMENDED SPARES - BRAKE UNIT

Item No.	Part Number	Description	Qty T87000-B-4	Qty T87000-B-6
1	BSAB90-S-407	Brake Caliper	4	6
2	T87000-B-01	Column	6	6
3	T87000-B-02	Bearing Retainer Cap	1	1
4	T87000-B-03	Bottom Hub	1	1
5	T4B014	Tapered Roller Bearing	1	1
6	T87000-B-04	Brake Rotor	1	1
7	T87000-B-05	Top Hub	1	1
8	T87000-B-06	Top Radial Bushing	1	1
9	T87000-B-07	Thrust Bushing	4	4
10	T87000-B-08	Wear Plate	1	1
11	T87000-B-09	Top Plate	1	1
12	T87000-B-10	Bottom Plate	1	1
13	080121	Ball Transfer Bearing	8	8
14	040359	Screw, Cap, Socket Head 1”-8 x 2”	6	8
15	040360	Screw, Cap, Socket Head 1”-8 x 3”	12	12
16	09-5106	Washer, Lock, Split 3/8”	8	8
17	040354	Screw, Cap, Hex Head 3/8”-16 x 7/8”	8	8
18	040361	Screw, Cap, Socket Head 1”-8 x 4”	8	8
19	040362	Screw, Cap, Socket Head 1”-8 x 10-1/2”	6	6
20	T87000-R	Rotary Table	1	1
21	040410	Screw, Cap, Socket Head M27 x 3.0 x 270mm	32	48
22	T87000-D-01	Deadhead Pin	4	4
23	040363	Screw, Cap, Socket Head 1-1/4”-7 x 3”	8	8
24	080122	Eyebolt, 3/8”-16 UNC x 5/8”, 1” Eye x 2-3/4”	4	4
25**	*	Brake Pad	8	12

*Recommended Spare Part
**Not Shown

Table 2



Brake Unit (T87000-B-6 Shown)
Figure 8

PREVENTIVE MAINTENANCE

This is a suggested PM schedule. The tool owner has the responsibility to adjust the program according to actual tool usage.

When there is suspicion that the test assembly has been ***overloaded***, it should be pulled from operation for overall damage and wear inspection.

Normal wear during use will eventually reduce the test assembly's capability. Check all mechanical components including bolts, nuts, pins, and clips for damage and/or wear. Inspect all welds regularly. Cracks or the appearance of damage can indicate disrepair and potential failure and requires prompt attention. The test assembly must be immediately pulled from operation and repaired.

<u>Daily – While in use and after each test run:</u>

- Check for leakage, cracks, deformation, wear, or other signs of operation issues.
- Inspect pins, bolts, and other mechanical components after each test. If components are worn, damaged, loose, or missing replace or secure as needed.
- Inspect visible welds for cracks or separation. If found, remove test assembly from service and repair damage or replace components.

STORAGE AND TRANSPORTATION

- Unpainted surfaces should be coated with rust preventing agent.
- Prevent excessive exposure to water and moisture.
- Use the forklift pockets under the skid to lift or move the test stand.

Never move or transport the equipment without all secondary retention clips installed and/or without adequate tie-downs, etc. securely in place.

Every Company has to have a Toolbox.

At Texas International Oilfield Tools,

We provide the tools to fuel the World!