TECHNICAL MANUAL

350 Ton Snubber Elevator/Spider

Operation Manual

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3035 Eastveld Dr • Houston, TX 77073
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Revision History

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A	6/6/19	Issued for Use
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Description of Change

Rev	Change
B	

TABLE OF CONTENTS

GENERAL

This modified 350 ton elevator/spider (known as a Snubber) can be mounted upright/normal or inverted/upside down. The inverted Snubber pushes the pipe and when upright, it holds the pipe.

Modified slip assemblies and interchangeable inserts allow the Snubber to handle different size API pipe. The 350 ton accommodates 4 1/2” to 13 5/8” diameter pipe. Inserts enable pipe handling with an OD up to 1” smaller than nominal slip size.

Figure 1: Snubber – shown ready for inversion

The Snubber was designed for the 10-3/4”slips ONLY. Any other slip size would require TIOT to modify Snubber to ensure correct fit and function.

When the slip assembly is in the open/up position, the pipe and couplings may move freely vertically. When slips are in the set/down position into the bowl, the pipe is held without inflicting damage. The tool is hydraulically operated.

Insert hinge pin before applying load. If door is open or not secured by pin, the Snubber will be damaged under load

CONVENTIONS

IMPORTANT SYMBOL IDENTIFICATION	
	WARNING to Operators / Users
	CAUTION to Operators / Users
NOTE	**NOTIFICATION** to Operators / Users

Table 1

SAFETY

Texas International's equipment is used and installed in controlled rig environments involving hazardous operations and situations.

All personnel performing installation, operations, repair or maintenance on this snubber must have knowledge of rig procedure. All crew in the vicinity of operations should be trained on rig safety and tool operation. Crew must be instructed for safe use of this snubber.

SPECIFICATIONS

Part Number	Capacity Short Tons	Pipe Range Inches	Operating Pressure PSI
T28503	350	4-1/2 To 13-5/8	150 - 200

Table 2

INSTALLATION

- Verify the inserts correspond to both the slip and tubular size. Make sure they are secured by the insert retaining plate
- The 10-3/4" slips have two (2) types of bi-directional inserts. The bevel go on the top and bottom
- 200 psi is maximum
- USE BI-DIRECTIONAL INSERTS ONLY

Elevator/Spider (Snubber)

- Ensure base/adapter plate is securely attached

Hydraulic

- Connect the hydraulic supply to the quick connect couplings at the rear of the tool WHEN IN USE to operate the cylinder, which raises and lowers the slips.
- Make sure the hydraulic supply range is within 150 - 200 PSI

Controls

- Requires positive pressure to hold slips. System should be active (not in neutral).
- Compatible to properly operate snubber/elevator (if not provided by TIOT).

OPERATION

Releasing the Pipe

- Top hose/port raises slips up to open

Gripping the Pipe

- Bottom hose/port pushes slips down, setting them

Inverted/Upside Down

When inverted (pushing pipe), ensure top links and 1-1/2” pins are installed to prevent the slips from opening too far (due to gravity). See Figures 2 & 3.

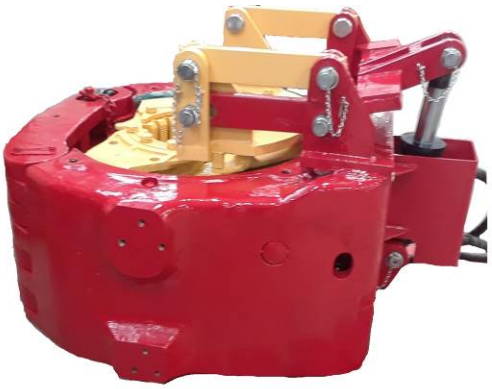


Figure 2: Ready for Inversion (side)

Figure 3: Ready for inversion (front)

If slips don’t open wide enough for pipe, set slips back into bowl/elevator, remove back 1-1/2” pins (see Figure 4) and replace temporarily with smaller 1-1/4” pins (p/n T28535-4). Once pipe is in slips, set slips back into bowl/elevator, remove smaller pins, and reinstall the 1-1/2” pins.

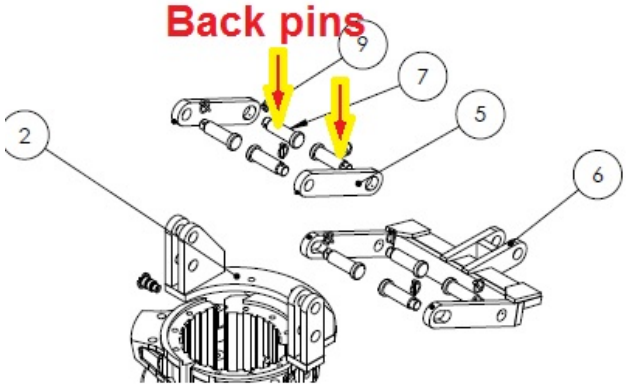


Figure 4: To widen slip opening

If smaller pins are left in during operation, the pipe will bind improperly.

Upright/Normal

When operating upright (holding pipe), remove upper links and pins as shown in Figures 5 & 6.

Figure 5: Normal operation

Figure 6: Normal operation (side view)

If upper links are not removed during upright operation, the tool may be damaged.

TI Body

The TI Body (labeled Upright) was shipped with a bump stop installed. The bump stop must be in place for upright operation (with the upper links removed) shown in Figure 7. The bump stop must be removed and upper links reinstalled when inverting. When inverted, if the slip opening is not wide enough, see Inverted/Upside Down section on page 6.

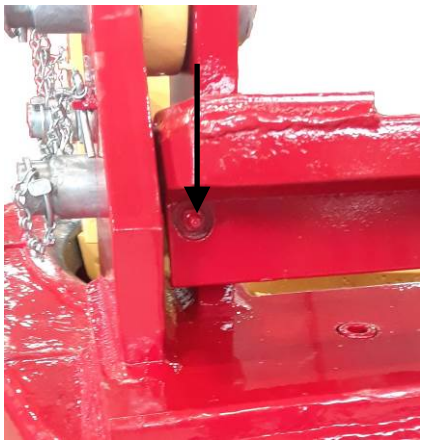
Figure 7: Bump stop installed

The Snubber was designed for the 10-3/4”slips ONLY. Any other slip size would require TIOT to modify Snubber to ensure correct fit and function.

MAINTENANCE

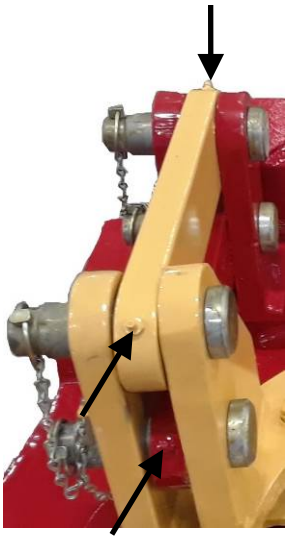
Lubrication

Recommend the use of Extreme Pressure (EP) Grease as indicated with arrows below:

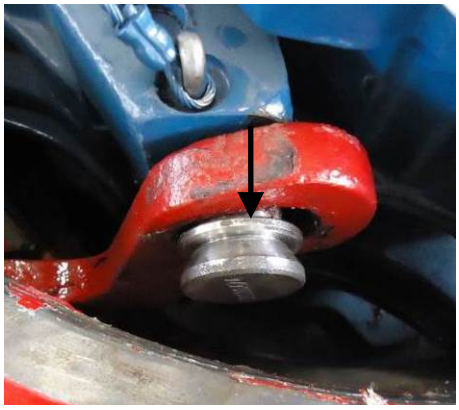


Pins on back side

Hinge pin



Pins at links and pivot arm



Yoke eye contact surface

Fill grease dispensers to lubricate the inside bore. The lighted areas indicate slip contact

Figure 8: Key lubrication points

- Make sure the hydraulic supply is disconnected before any maintenance is performed
- Use light machine oil on the inserts and its slot - do not apply grease or pipe dope as it could result in slip damage
- Lubricate all moving parts

The Snubber was designed to operate with specially modified 10-3/4” slips provided. Any other slip size would require TIOT to modify Snubber to ensure correct fit and function.

Changing Slips

- Remove all 8 pins and top links (item 5 on page 15)
- Remove back guard. While holding cylinder, remove top pin and lower to ground. Be careful not to drop cylinder
- Remove pivot arm (item 6 on page 15)
- Raise or release the slips by inserting a bar into the yoke
- Suspend the slips using a line and pull safety cotter pins (2) and retainer pins (2) from the yoke
- Lift slip assembly from the tool's cone
- Replace with the properly sized and modified slips – verify inserts are correct. *See warning on page 5*
- Suspend replacement slips from a line
- Ensure the yoke eyes are in the up position
- Insert slips into the bowl/cone and reinstall retainer pins and safety cotter pins
- Replace other Snubber parts (pivot arm, cylinder, back guard, top links, and pins)

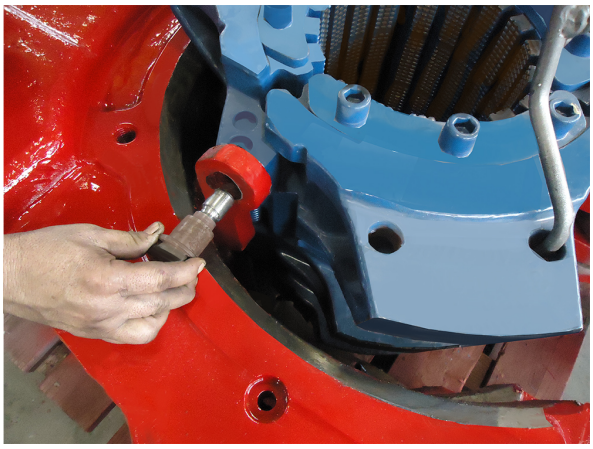


Figure 9: Slip Change – removing retainer pin

This snubber requires specially modified slips

Changing Inserts

- Remove slips per instructions above and place on a flat surface
- Unfasten and pull out the insert retaining screws
- Pull the inserts out of the slip slots - using a small pry bar and hammer, if needed

Make sure the insert slots are not damaged during insert removal process

- Remove all debris from the slots and add a thin layer of light machine oil
- Place new inserts into the slots with the teeth pointing up – see warning on page 5
- Install insert retainers and fasten insert retaining screws

Assessment and PM schedule

The end user is responsible to establish an inspection schedule and criteria subject to tool usage, wear and environmental conditions. TIOT recommends daily, semiannual and annual inspections as follows:

- Daily / Shift / Job Start Up
    1. Assess lubrication and replenish as needed
    2. Check fasteners - make sure there are no loose or missing components
    3. Verify ancillary equipment matches tubular size
    4. Actuate slips several times to check performance
    5. Visually check hoses for wear and tear- replace if leaks are found
    6. Inspect inserts and replace as needed
    7. Check slip retaining bottom sections (toes) for twisting and cracks

- Semiannual
    1. Verify lubrication - make sure all grease fittings are in place
    2. Inspect slip grip - review witness marks on the mandrel/pipe made by inserts. Apply paint on the mandrel/pipe and paper, if needed
    3. Remove coating and debris from critical areas
    4. Complete Magnetic Particle Inspection (MPI) - repair as needed

- Annual
    1. Performance Load Test according to API RP 8B
    2. Perform MPI twenty four (24) hours after load test according to ASTM E709 and use API 8C as criteria
    3. Repair cast as needed – recommend repairs be done by TIOT

Proof of load test and MPI are required after remanufacture or a major weld repair in a critical area

WEAR DATA

Model	350 Ton
Total Clearance (in inches)	
Hinge Pin "A"	0.036
Min. Dia.	2.485

Table 3

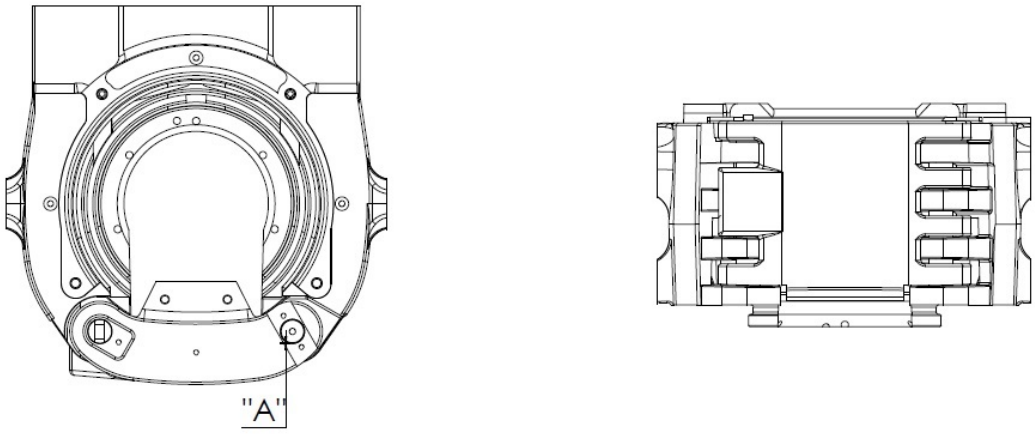


Figure 10

CRITICAL AREA MAP

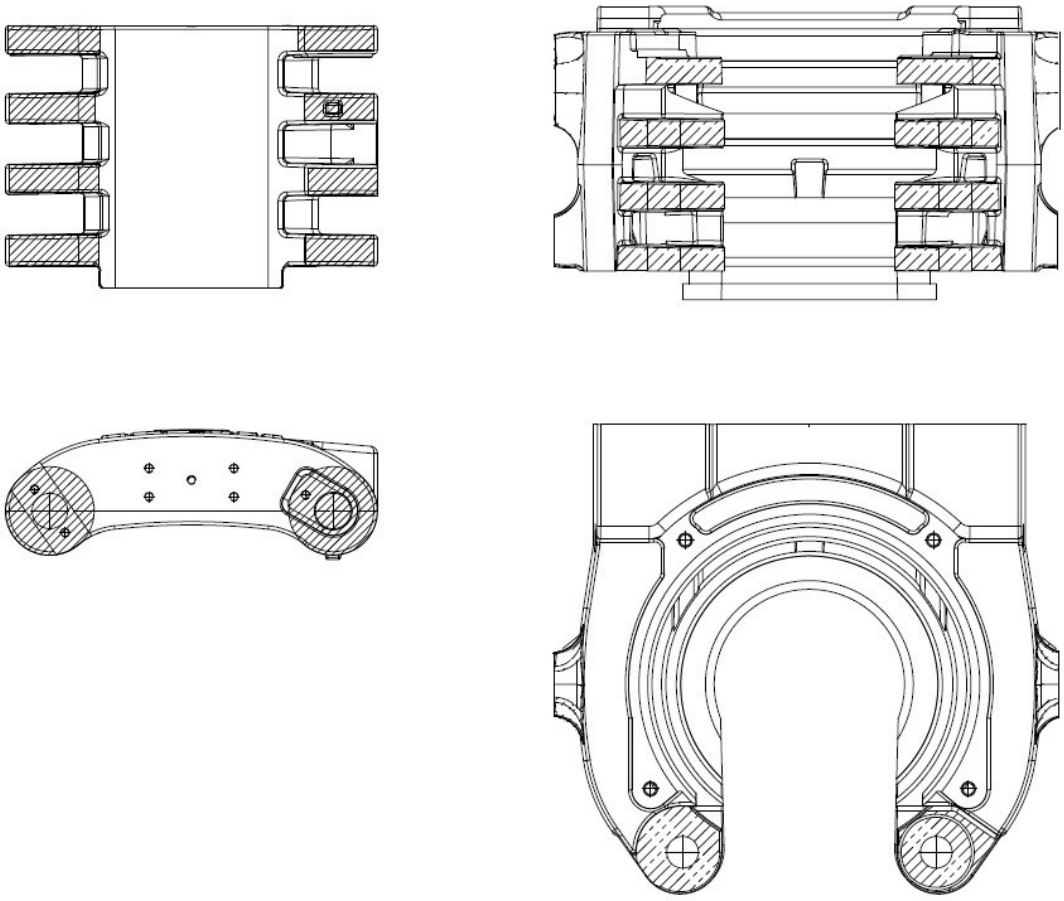


Figure 11

Hatched areas are load bearing and critical

STORAGE AND TRANSPORTATION

The Snubber assembled with the slips should never be thumped down against the floor.

During warehouse storage

- Unpainted surfaces should be coated with rust preventing agent
- Prevent excessive exposure to water and moisture
- Clean the tool after use - steam cleaning as needed; remove mud, debris and any other substances
- Transport the unit in a suitable container or on a pallet

TROUBLESHOOTING

Area	Issue	Failure Mode	Probable Solution
Slips	Not locking in the set (down) or release position (up)	Insufficient hydraulic supply	Verify source and adjust pressure as needed
	When released, slips do not swing wide open when inverted		Replace 1-1/2” pins with smaller 1-1/4” pins.
	Slips in TI Body (labeled Upright) do not swing wide open when upright	Bump stock not installed	Install Bump Stock (remove when inverting)
	They are uneven when placed at the release pipe position	Bent yoke	Remove and straighten yoke if possible or replace
	Slips move slow in either direction (Hydraulic)	Insufficient hydraulic supply	Verify source and adjust pressure as needed
		Fluid Leak	Replace worn/damaged hoses
		Cylinder Seal leak	Replace
	Slips sticking	Insufficient lubrication	Remove slips. Clean the cone and slip backs. Apply light machine oil and reinstall
	Pipe slides through the slips when in the down position or pipe surface is damaged or distorted	Incorrect slip / insert combination. Slip set up is not correct size for the tubular used	Pull slips and make changes to match the tubular
Yoke	Bent	Guide plates do not match the tubular size.	Remove and straighten yoke if possible or replace as needed

Table 4

PARTS

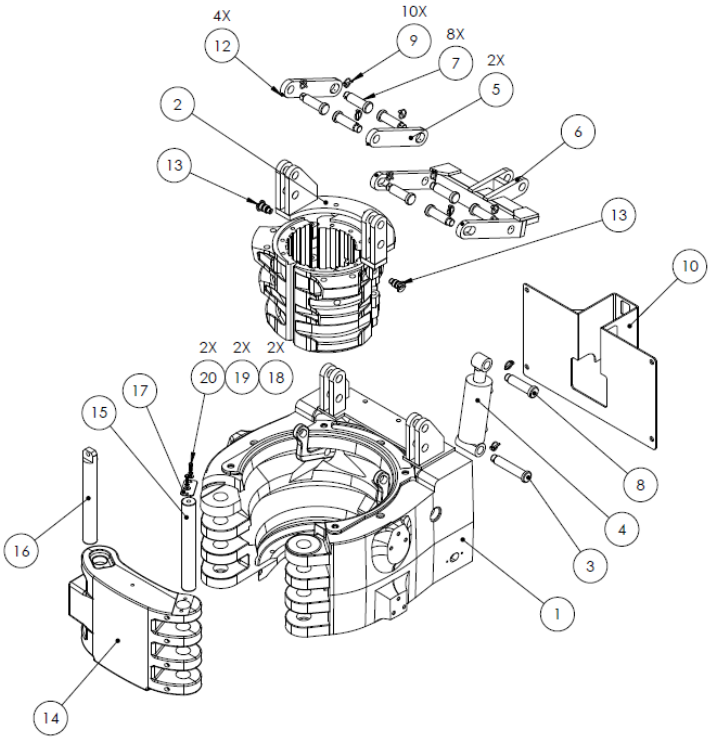


Figure 12; Snubber

Item #	Part No	Description	Qty
1	T28503-1	BODY TI OR BJ MODIFIED	1
2	T28530	TOP PLATE ASSY FOR SLIPS	1
3	T28535-3	PIN, CLEVIS FOR CYLINDER	1
4	060203	CYLINDER	1
5	T28533	UPPER LINK	2
6	T28532	PIVOT ARM	1
7	T28535-1	PIN, CLEVIS 1-1/2" DIAMETER	8
8	T28535-2	PIN, CLEVIS FOR CYLINDER	1
9	080113	PIN, LOCKING	10
10	T28503-2	BACK GUARD FOR TI BODY	1
	T28503-3*	BACK GUARD FOR BJ BODY	1
12	080013	GREASE FITTING	4
13	T26335-1	SLIP RETAINER PIN	2
14	T28503-DOOR	DOOR	1
15	T28503-S-PIN	STATIONARY DOOR PIN	1
16	T28503-L-PIN	LATCH PIN	1
17	T28503-4	DOOR PIN RETAINER	1
18	040017	WASHER, FLAT	2
19	040002	WASHER, LOCK	2
20	040016-D	SCREW, CAP, HEX DRILLED	2
21	T28535-4*	PIN, CLEVIS 1-1/4" DIAMETER	2

*not shown

Table 5

RECOMMENDED SPARES		
Part No	**Description**	**Qty**
060203	CYLINDER	1
T28535-3	LOWER PIN FOR CYLINDER	1
T28503-05	HOSES (SET OF 2)	1
T28535-1	PIN 1-1/2” DIAMETER	8
T28535-2	UPPER PIN FOR CYLINDER	1
T28535-4	PIN 1-1/4” DIAMETER	2
080113	LOCKING PIN	5
T26335-1	SLIP RETAINER PIN	2

Table 6

Every Company has to have a Toolbox.

At Texas International Oilfield Tools,

we provide the tools to fuel the world!