
CATALOG FOR INSIDE BLOWOUT PREVENTERS.

Drilling floor back pressure valve, includes an assembly drawing, sizes available, how to use, how to maintain and how to repair.

TRADEMARK



REG. U.S. PATENT OFFICE

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WOODCO USA presents this catalog to gain your attention and secure your business

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1.0 General

This catalog, presented to provide information about the WOODCO USA Inside Blowout Preventer (IBOP), describes materials, quality requirements and other important features to assist customers in the selection, use and maintenance of this product.

Included tables and drawings simplify communication and provide a clear reference for ordering complete units or parts, and performing maintenance or repair.

1.1 Purpose

WOODCO USA intends this catalog to communicate the superior design and advantages of the WOODCO USA Inside Blowout Preventer.

1.2 Application

A WOODCO USA Inside Blowout Preventer provides a check valve for service in a drill pipe or tubing string.

During well drilling or completion operations, formation fluids can enter into the well bore when formation pressure exceeds the hydrostatic pressure of the column of drilling fluid. Operators may control returning formation pressure in the pipe annulus (that area between the inside of the casing and the outside of the drill pipe) by closing the “Drill Through” blowout preventers attached to the wellhead. This situation can occur when tripping pipe or when adding joints. In these cases the drill pipe or tubing string provides an open route for this backflow. WOODCO USA IBOP’s allow users to control any backflow that might occur.

The WOODCO USA IBOP comes standard with a release tool which holds its internal valve mechanism open. While open, operators can position and screw it into the drill string while the backflow passes through it. Once installed and tightened, loosening the release rod lockscrew will shut off backflow. While installed in the drill string, the WOODCO USA IBOP functions automatically to prevent any backflow while allowing circulation of drilling fluids downward through the drill pipe or tubing.

1.3 Specification

WOODCO USA IBOP’s give long service life. The internal parts, specifically designed to avoid fluid cutting, with elastomer seals selected to withstand repeated sealing at rated working pressure and resist the chemicals, fluids and temperatures found in well drilling environments, assure reliable performance.

The center connection utilizes a “tool joint” thread form and “limited travel” seat to assure repeated “make-up” and “break-out” reliability. The center connection also has an O-ring seal to prevent leakage at the joint.

End connections meet API or industry requirements for strength and interchangeability.

1.4 Reference Standards

API Spec 7

API RP 7G

1.5 Material

WOODCO USA manufactures IBOP’s from material which meets or exceeds the requirements of API Spec 7.

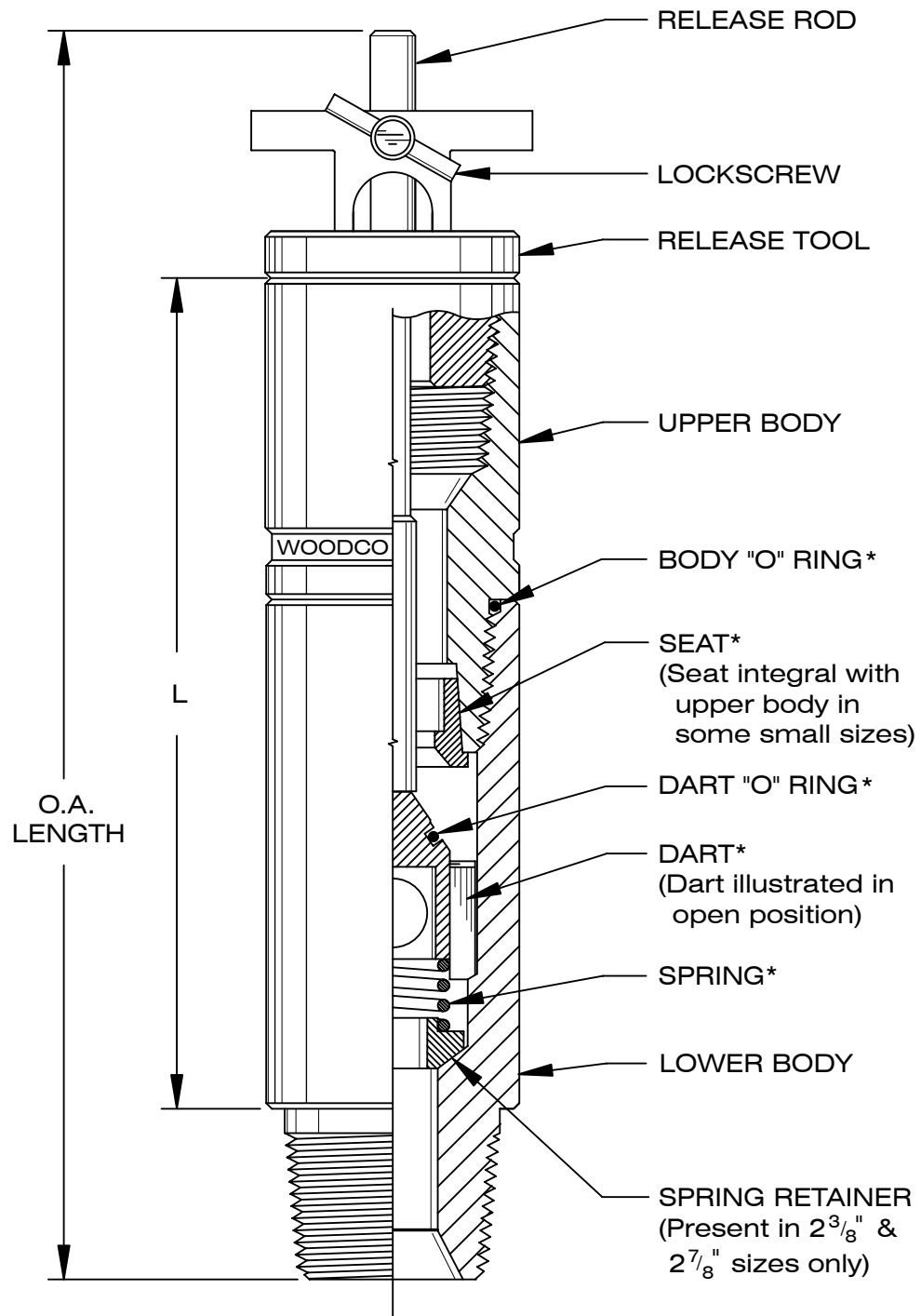
1.6 Quality

WOODCO USA defines “Product Quality” as conformance to specified requirements.

WOODCO USA selects suppliers based on their ability to provide materials, products and/or services which conform to WOODCO USA and API Specifications.

WOODCO USA personnel inspect IBOP’s during manufacturing and after final operations to assure compliance with WOODCO USA and API requirements. Each IBOP experiences testing twice at 10,000 psi and once at low pressure below the dart. WOODCO USA can provide any supplemental inspection or test that customers may require.

Figure 1
WOODCO USA Inside Blowout Preventer
Assembly Drawing



*Spare parts (1 each) recommended for 1-year service.
NOTE: Order parts by part name, and end connection thread.

2.0 WOODCO USA IBOP Features

Long-life internal parts (resulting in low maintenance costs).

Leak and gall resistant, interchangeable center connection.

Identification groove on O.D. for easy identification and provide space for customer inventory numbers that will not easily wear off.

Each unit comes complete with a release tool.

3.0 Available Sizes ⁽¹⁾

Table 1

Thread	O.D.	O.A.L. (2)	L ⁽³⁾	WT. (LBS.)
2 3/8" EUE	3 1/16"	28"	17 1/2"	35
2 3/8" PH-6	3 1/8"	28"	16 1/4"	40
2 3/8" IF	3 3/8"	28"	16 1/4"	45
2 7/8" PAC	3 1/8"	28"	16 7/8"	40
2 7/8" CS	3 7/32"	28"	17"	45
2 7/8" HT PAC	3 1/8"	36"	25 1/8"	50
2 7/8" EUE	3 43/64"	29 1/2"	21 1/4"	60
2 7/8" ROH or AOH	3 3/4"	29 1/2"	20 3/4"	65
2 7/8" PH-6	3 3/4"	29 1/2"	20 1/4"	65
2 7/8" IF	4 1/8"	29 1/2"	19 3/4"	75
3 1/2" CS	3 61/64"	29 1/2"	20 1/2"	75
3 1/2" PH-6	4 5/16"	30 1/4"	20 3/4"	75
3 1/2" EUE	4 1/2"	30 1/4"	21 3/4"	85
3 1/2" XH	4 3/4"	30 1/4"	20 1/2"	100
3 1/2" IF	4 3/4"	30 1/4"	20"	95
4" FH	5 1/4"	31 1/4"	20 1/2"	125
4 1/2" PH-6	5 3/8"	31 1/4"	21 3/4"	130
4 1/2" FH	5 3/4"	30 1/2"	21"	135
4 1/2" XH	6"	30 1/2"	20 1/2"	145

Available Sizes (cont'd) ⁽¹⁾

Thread	O.D.	O.A.L. (2)	L ⁽³⁾	WT. (LBS.)
4 1/2" IF	6 1/8"	30 1/2"	20 1/2"	155
5 1/2" FH	7 1/2"	37 1/2"	26"	300
5 1/2" DSTJFH	7 1/4"	36"	24 1/4"	275
6 5/8" FH	8 1/4"	37 1/2"	26"	380
HT-38	4 7/8"	42"	26 1/4"	155
HT-40	5 1/4"	42"	26 1/4"	180
HT55-375	7 1/8"	42"	28 7/8"	340
XT-M46	6 1/4"	41 1/2"	29 1/4"	275
XT-57	7"	42"	29"	350

- (1) Premium and special threads, and outside diameters to match existing connections, available by special order.
- (2) Overall length (inches) including release tool (See fig.1).
- (3) Length (inches) shoulder to shoulder without release tool (See Fig.1).

4.0 User Information

The WOODCO USA IBOP, actually a check valve compatible with all popular drill pipe and tubing, has the same standard O.D. as a tool joint or coupling.

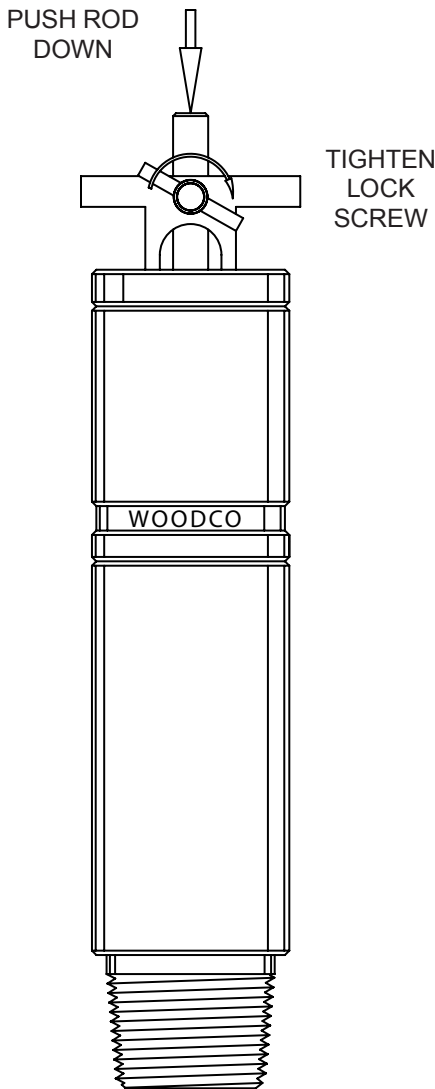
All drilling and work over rigs should have a well-maintained IBOP on the drilling floor. If backflow occurs while tripping or adding pipe, place the IBOP in service.

WOODCO USA ships all IBOP units assembled with heavy duty thread protectors. Buyers may obtain, as an additional cost accessory, a convenient floor stand to fit each specific IBOP size.

4.1 How To Use

To install the WOODCO USA IBOP during well backflow conditions: have the release tool in place and use the release rod to push the dart into full open position (dart pushed down as far as it will go, see Figure 2). Hold the dart in open position by tightening the lock screw (See Figure 1 for illustration of parts and their relationship to one another).

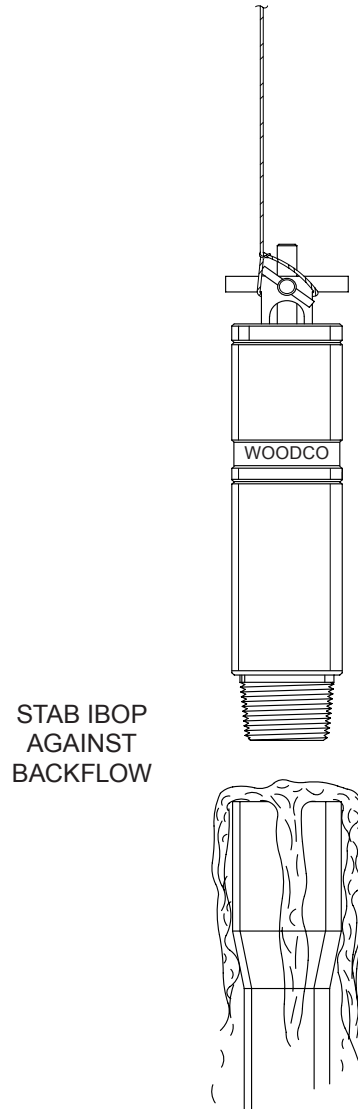
Figure 2



OPEN IBOP
FOR INSTALLATION
AGAINST BACKFLOW

With the dart held in the open position, stab the IBOP into the open pipe connection during backflow. (See Figure 3).

Figure 3



Make up the IBOP like any tool joint connection and tighten with tongs.

Stop any backflow through the pipe by loosening the lock screw and allowing the dart to seat and close the IBOP.

After closure remove the complete release tool and connect another joint of pipe into the top of the IBOP.

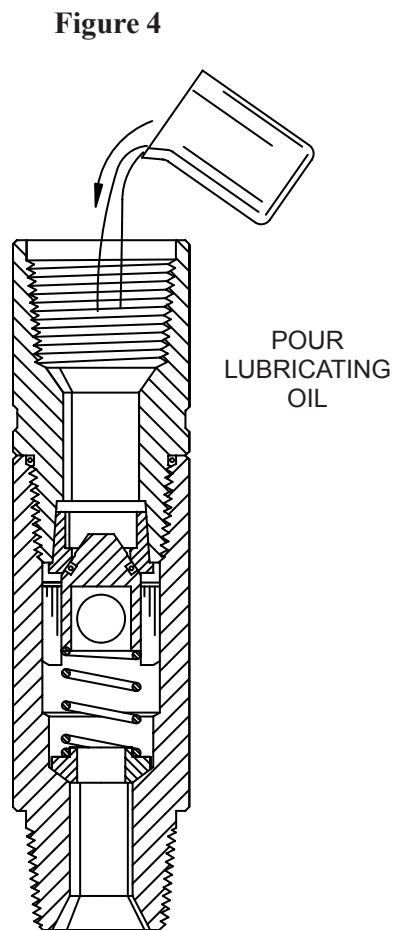
The IBOP can function as part of the pipe string as long as well conditions require.

4.2 How To Maintain

The WOODCO USA IBOP should give long, trouble-free service. To assure this, follow these steps:

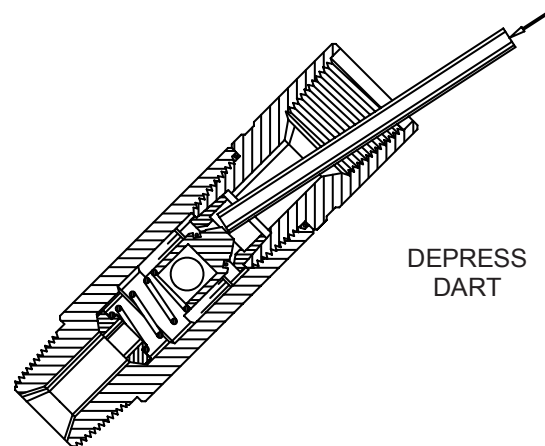
After each use flush the IBOP with clean water. Do this by removing the release tool assembly and using the release rod to depress the dart while washing from the box end with a pressure hose.

After removal of all traces of drilling mud, etc., stand the IBOP on its pin end and pour a cup of clean lubricating oil onto the closed dart (See Figure 4.)



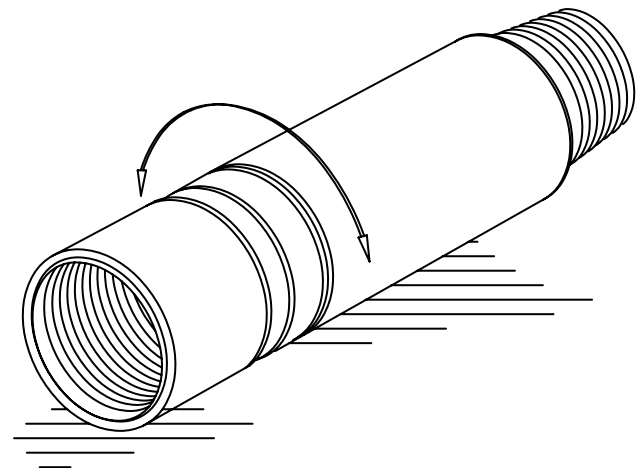
Then lean the IBOP over at a 45 degree angle and slightly depress the dart with the release rod, allowing the oil to run through the IBOP (See Figure 5).

Figure 5



As soon as the oil passes below the dart, lay the IBOP on its side and roll it to coat the internal area and the dart with oil. (See Figure 6).

Figure 6



Then, clean and dope the connections, and replace the pin thread protector. Coat the release rod with oil and re-install it into the release tool assembly. Clean and dope the threads of the release tool. Remove, dope, and re-install the release rod lock screw (See Figure 1 for illustration of parts and their relationship to one another).

Install the release tool assembly into the box connection of the IBOP making the entire unit ready to test and place in service when necessary.

4.3 How To Repair

Repair procedures on WOODCO USA IBOP's become necessary if leakage occurs during testing or when service time indicates inspection as a good practice. Disassemble the unit and inspect the internal parts for wear (erosion from continued pumping through the IBOP) and/or corrosion.

Before performing any repair steps, you should study carefully the cutaway drawing (Fig.1). This drawing shows the relationship of all the parts.

Rarely does the release tool assembly require repair except for corrosion or abuse. Replace bent or broken lockscrews and release rods. Clean rusted threads (tool joint threads by wire brushing, lockscrew hole threads by chasing with a 5/8-11 hand tap).

Break out the center connection of the IBOP like any standard tool joint. On the rig do this by installing the IBOP into the drill string temporarily. Break the middle connection and then break the lower connection. Break the connection in a shop by any standard method.

With the center connection broken, unscrew the upper and lower bodies by hand and remove the dart and spring (smaller sizes also have a spring seat, see Figure 1).

Measure the spring to determine if it has become damaged or compressed (See Table 2 for spring lengths). Replace damaged or compressed springs.

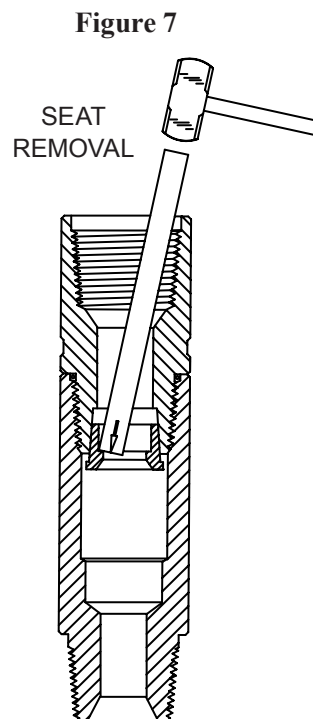
Table 2
Free Length of Springs

SPRING OUTSIDE DIAMETER	FREE LENGTH OF SPRING
1 $\frac{5}{8}$ "	3 $\frac{3}{4}$ "
2 $\frac{1}{4}$ "	4 $\frac{13}{16}$ "
2 $\frac{7}{8}$ "	5 $\frac{13}{16}$ "
3 $\frac{1}{2}$ "	6 $\frac{13}{16}$ "

Examine the dart and seat at the same time; these fit together to affect a seal. Should either the dart or the seat show damage, such as fluid cutting or corrosion sufficient to cause pitting, then replace the damaged parts. Use the following special steps to remove a damaged seat.

NOTE: Do not remove a damaged seat until you have a replacement on hand for immediate installation so that rust cannot occur in the seat pocket of the upper body. Some small sizes of WOODCO USA IBOP's do not have a replaceable seat because it would weaken the center connection. See special notes at the end of this section for repair details on a non-removable seat.

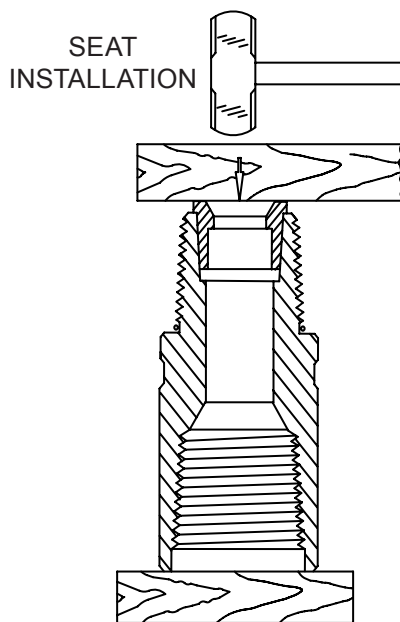
Without loose internal parts installed, screw the upper and lower bodies together, hand tight. Stand the unit on its pin and carefully knock out the removable seat (See Figure. 7). Use a 3/4" O.D. steel bar (with square cut ends) as a "driver." Use a bar long enough to hold and strike while extending through the upper body I.D. and resting against the shoulder made into the I.D. of the seat. Strike the bar with a medium hammer (approximately 4 lbs.) and "knock" the seat out of its pocket and into the empty cavity of the lower body.



Use care not to damage the upper box shoulder during this process.

Unscrew the upper body from the lower body and turn it over to rest on its upper box (use care to set the box on something that will not damage the shoulder). Wipe out the seat pocket. Wipe off the new seat, fit the seat into the pocket (do not lubricate seat and seat pocket), lay a board over the face of seat and strike the board with the same hammer used to remove the old seat (See Figure 8).

Figure 8



Pull on the installed seat by hand, it must not pull free by hand.

NOTE: A WOODCO USA seat has a shoulder at its major O.D. to limit downward movement into the seat pocket. New seats installed in undamaged seat pockets should have a standoff (gap) between the pin end and the seat shoulder of 1/16" to 1/8" when installed by hand. Do not attempt to drive the seat until the shoulder and pin end meet. Test or service pressure will force the seat to its final tight position.

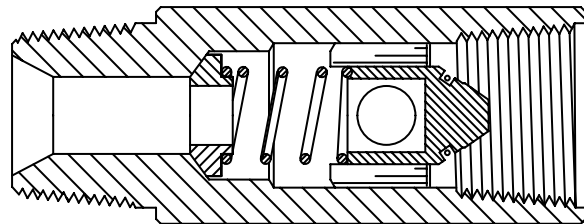
Replace both the dart O-ring and the body O-ring at every disassembly, whether they appear damaged or not.

NOTE: Obtain replacement O-rings from WOODCO USA to assure the O-ring will perform properly at rated temperatures and in hostile fluid environments.

Dope the center connection (box and pin) and then install the dart and spring together. IBOP's of 2-3/8" and 2-7/8" sizes have a spring retainer at the bottom of the spring. Make sure to install this retainer in these sizes with the retainer properly inserted into the spring end. You may find this most easily done with the lower body lying on its side (See Figure 9 for illustration).

Figure 9

**DART, SPRING AND
SPRING RETAINER INSTALLATION**



Then screw the upper body into the box of the lower body by hand as far as it will go. Occasionally, the body O-ring resists going into the box counterbore, generous doping and slow turning during the last 1/4" of make-up usually eases the O-ring into the counterbore. On rare occasions you may have to work the O-ring into the counterbore of the lower body by hand using a dull-edged screwdriver or similar instrument.

When made-up shoulder-to-shoulder, tighten center connection to the Torque values listed in Table 3.

Test the IBOP below the dart to 10,000 psi twice, and once at low pressure, with the box end left open to observe the seal of the dart.

NOTE: Do not look directly into the upper box during test. Use a mirror to visually observe and always wear safety glasses.

Re-install the assembled release tool into the cleaned and doped upper box to complete repairs.

Table 3
WOODCO IBOP Center
Connection Torque *

NOMINAL THREAD SIZE DESIGNATION	OUTSIDE DIAMETER	CTR. CONNECTION MAKE-UP TORQUE (Ft.-Lbs.)
2 3/8" EUE	3 1/16"	2,400
2 3/8" PH-6	3 1/8"	2,800
2 3/8" IF	3 3/8"	4,400
2 7/8" PAC	3 1/8"	2,800
2 7/8" CS	3 7/32"	3,400
2 7/8" HT PAC	3 1/8"	2,800
2 7/8" EUE	3 43/64"	4,000
2 7/8" ROH or AOH	3 3/4"	4,600
2 7/8" PH-6	3 3/4"	4,600
2 7/8" IF	4 1/8"	8,000
3 1/2" CS	3 61/64"	6,600
3 1/2" PH-6	4 5/16"	6,800
3 1/2" EUE	4 1/2"	9,000
3 1/2" XH	4 3/4"	11,500
3 1/2" IF	4 3/4"	11,500
4" FH	5 1/4"	11,500
4 1/2" PH-6	5 3/8"	12,000
4 1/2" FH	5 3/4"	15,500
4 1/2" XH	6"	21,500
4 1/2" IF or 5" XH	6 1/8"	24,000
5 1/2" FH	7 1/2"	46,500
5 1/2" DSTJFH	7 1/4"	60,600
6 5/8" FH	8 1/4"	65,000
HT-38	4 7/8"	17,700
HT-40	5 1/4"	20,100
HT55-375	7 1/8"	36,300
XT-M46	6 1/4"	38,600
XT-57	7"	49,900

* Consult with WOODCO USA for torque Ft.-Lbs on IBOP's with end connections not shown in this Table.

Special notes:

Treat upper and lower connections as any tool joint connection and inspect and repair them in the same manner.

The center connection has a special thread designed for special service conditions, It should normally never need service due to infrequent make up and break out for inspection and maintenance. The center connections have a primary elastomer seal (O-ring). The shoulder of the connection serves to close any gap that might allow extrusion of the elastomer seal, and to provide a torque shoulder for the joint. A visual inspection should reveal no raised galling or groove across the contact shoulders. Inspect the threads of the connection in the same manner and to the same standard as used for the end connection threads. Verify center connection seal integrity by hydrotest after each teardown and reassembly. If the center connection ever needs rework, return it to WOODCO USA.

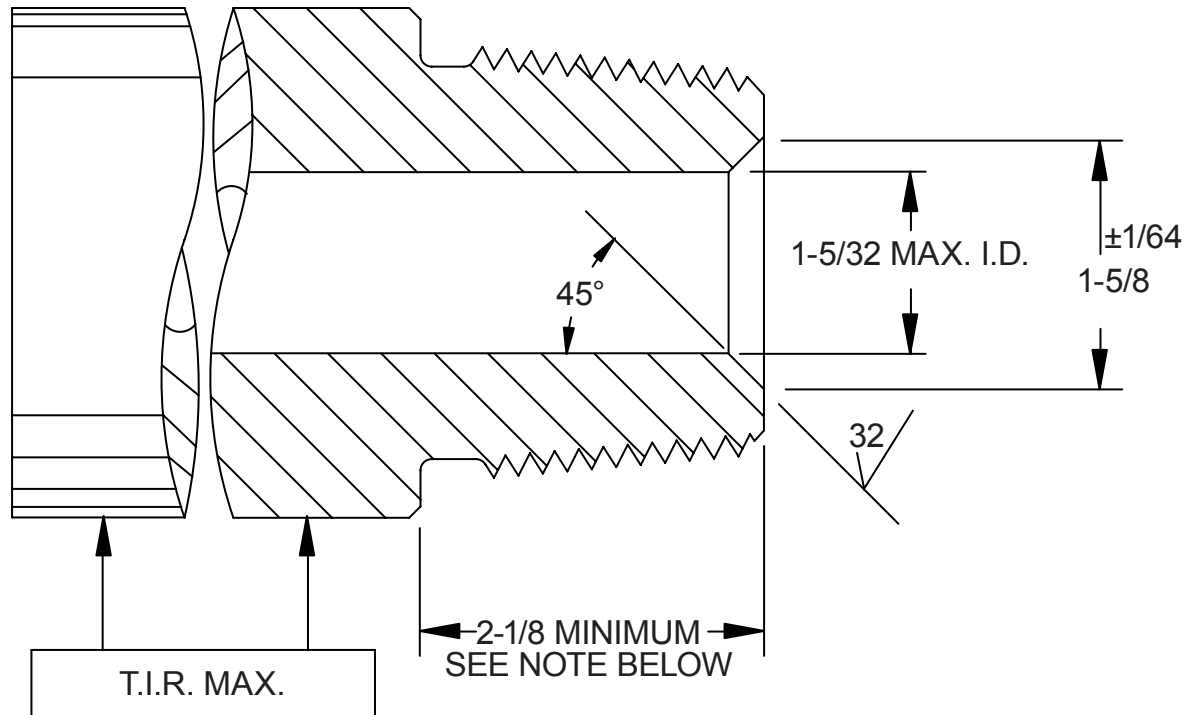
Certain small size WOODCO USA IBOP's do not have replaceable seats. If wear (fluid cutting) or rust pitting occurs on this integral seat, return it to WOODCO USA for refacing, or re-work it by referencing Figure 10 (see page 11).

Do not attempt to substitute parts manufactured by anyone other than WOODCO USA as malfunction or severe damage under pressure may result.

DO NOT WELD ON OR APPLY HEAT TO ANY PORTION OF THIS PRODUCT!

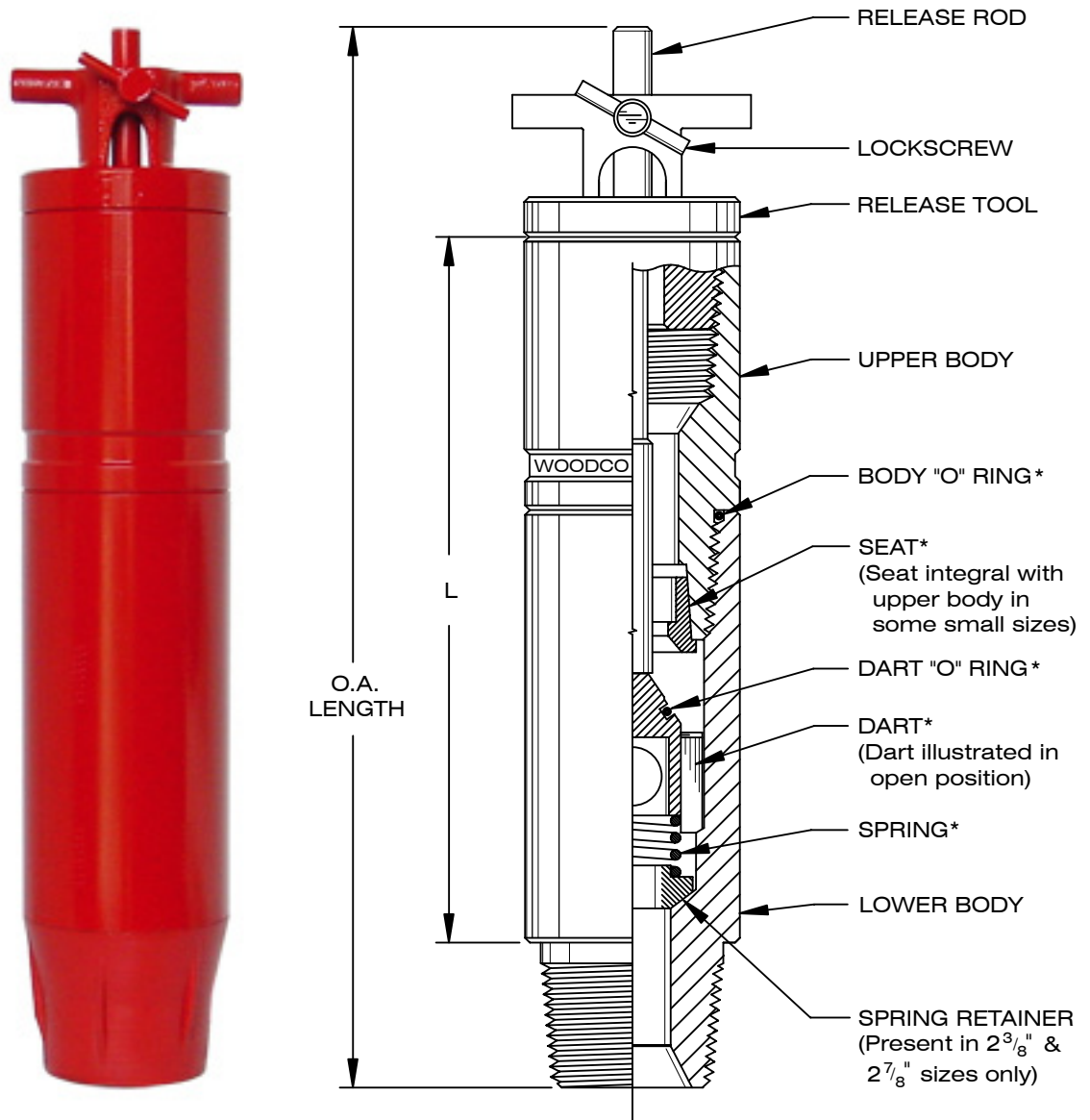
Figure 10

Machining detail for seats of small WOODCO USA IBOP's that do not have removable seats



Line up O.D. of upper body in lathe: T.I.R. both ends not to exceed .002 inches. Original pin length has stock for rework. Reface pin end only enough to allow recutting of the 45° taper to the dimension shown. I.D. dimension shown only for inspection purposes, do not machine I.D. during rework.

WOODCO USA Inside Blowout Preventer



WOODCO USA IBOPs' feature long-life internal parts (resulting in low maintenance costs) and leak and gall resistant, interchangeable center connection. An identification groove on the O.D. allows easy identification and provides space for customer inventory numbers that will not easily wear off. Each unit comes complete with a release tool.

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