

Compact Torsion Spring (CTS)

OPW Compact Torsion Spring (CTS) Bottom Loading Arms are ideal to replace loading arms in situations where tight clearances are required. The CTS Loader features a fully integrated internal torsion spring for a streamlined profile. Ideal for replacing existing FMC TL Loaders or any application where space is a premium.

The CTS has been engineered to be easier to adjust and maintain.



Features:

- Fully Integral Torsion Spring
- Integral Upward, Downward Travel Stops
- Carbon Steel/ Aluminum Construction
- Lo Temp Fluorocarbon Seals
- Braided Stainless Steel or Rackmaster Composite Hose
- Available in Left-Hand, Right-Hand, Upfeed, Downfeed Configurations
- 360° Rotation allows Loading on Both Sides of Loading Bay
- Removable End cap for Easy Maintenance

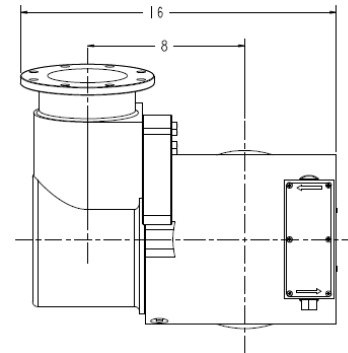
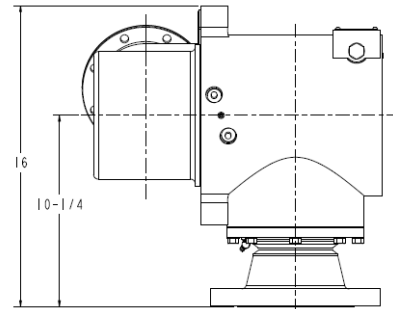
Benefits:

- Safe, Easy Spring Adjustment
- Ideal for Extremely Tight Riser Spacing
- Horizontal Bearing Module for Added Strength



Compact Torsion Spring (CTS) Swivel

Specifications		
Working Pressure	125 psi	862 kPa
Test Pressure	188 psi	1296 kPa
Operating Temp	-20F to 140F	-29C to 60C
Up/Down Angular Movement	+45° to -15°	From horizontal
Typical Horizontal Spacing	11"	
Typical Vertical Spacing	12"	
Inlet	ANSI 150#	
Outlet	Tank Truck (TTMA)	



Materials of Construction	
Base Swivel	1018 Carbon Steel
Swivel Body	A356-T6 Aluminum
Swivel Tail	A356-T6 Aluminum
Ball Bearings	Chrome Steel
Stop Block	1018 Carbon Steel
Spring	SAE 5160 Hot Rolled

Ordering Guide

CTS50 RH - 04 02

CTS

Compact Torsion Swivel
Style 50

Orientation

RH = Right Hand
LH = Left Hand

Seal Material

02 = Fluorocarbon

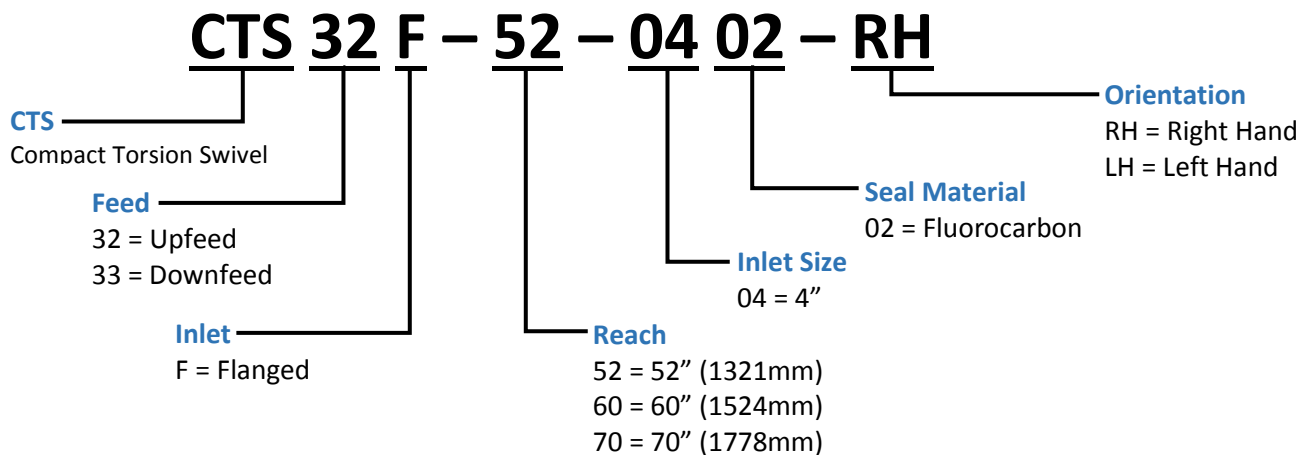
Inlet Size

04 = 4"

Compact Torsion Spring (CTS) Hose Loader

Accessories		
Drop Spool	4" Aluminum or Carbon Steel	As Required
Drop Hose	4" Rackmaster Composite 60" OAL, TTMA Flanged Ends	L19080
	4" Braided Stainless Steel, 60" OAL, TTMA Flanged Ends	L19081
Coupler Swivel	4" Style 30 (90°) Swivel Joint with Maneuvering Handle TTMA Flanged Ends, Aluminum/ Lo Temp Fluorocarbon	3635FTH-0402
Butterfly Valve	4" Full Flow, Position Locked Butterfly Valve	LBV450VGL
Spacer Spool	4" Loading Arm Coupler Spool, TTMA Flanged ends, Aluminum 6" OAL	VSS4
Sight Glass	4" Acrylic Sight Glass, Tempered, Cast Acrylic	BF4-SG-25
API Coupler	4" API Bottom Loading Coupler	
	Manual Version:	1004D3-0402
	Semi-Automatic Version:	Lynx852

Ordering Guide



Installation Instructions



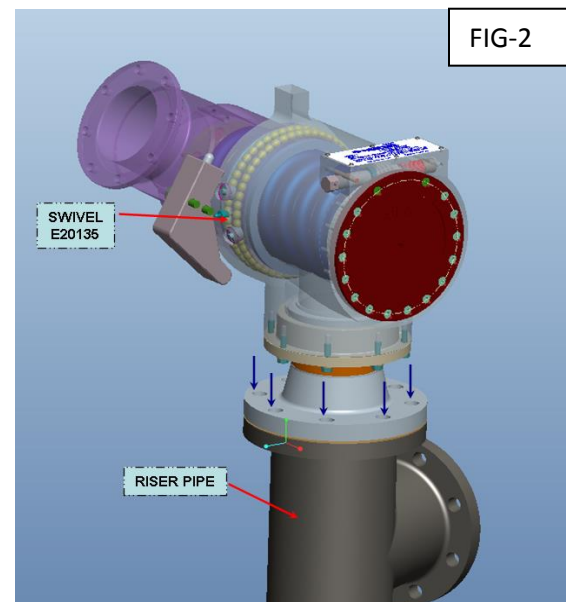
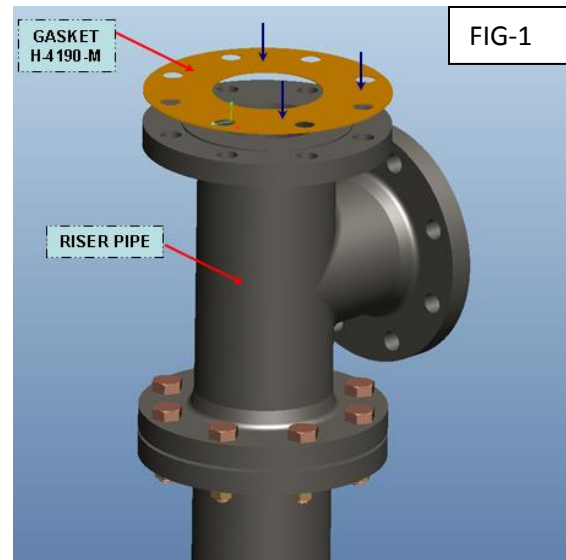
WARNING: Read and understand these instructions before starting installation:

- Swivel to be used for its designed purpose only
- Local regulations for operation and use must be followed at all times
- Although the swivel is designed for higher pressure, proper measures must be taken within the system to allow for thermal expansion
- OPW instructions must be followed for installation
- Make sure to use adequate personal protection at all times during installation and operation

Note: Images depict Right Hand Swivel

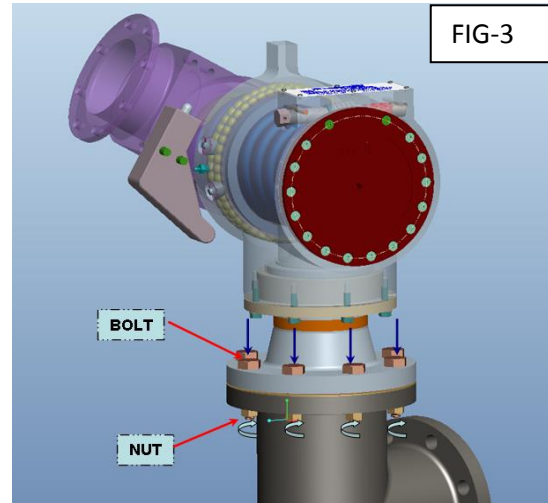
Step 1:

- fix an appropriate gasket on the riser pipe
- Install the 150# flange of the base swivel
Onto the riser pipe



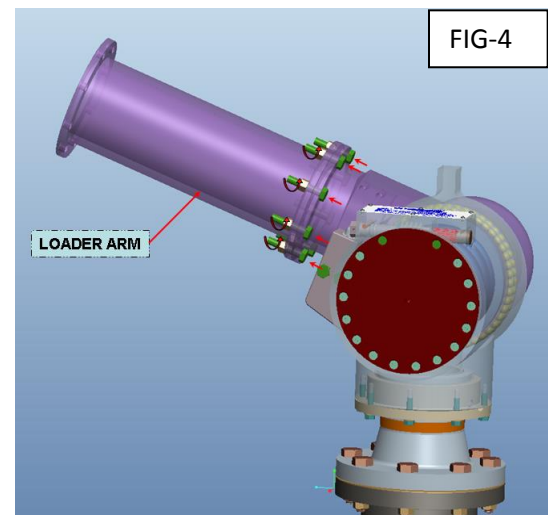
Step 2:

- Align the bolt holes
- Insert the bolts and tighten the nuts down on the riser flange





Step 3:

- Install the Loading Arm Pipe Spool
- Install desired accessories



Tension Adjustment Instructions



-  **WARNING:** Read and understand these instructions before starting adjustment:
- Local regulations for operation and use must be followed at all times
 - OPW instructions must be followed for adjustment
 - Make sure to use adequate personal protection at all times during operation
 -  Do not attempt to adjust the spring tension while the spring is being loaded by the arm. This can damage the tension shaft and gear

Note: Images depict Right Hand Swivel

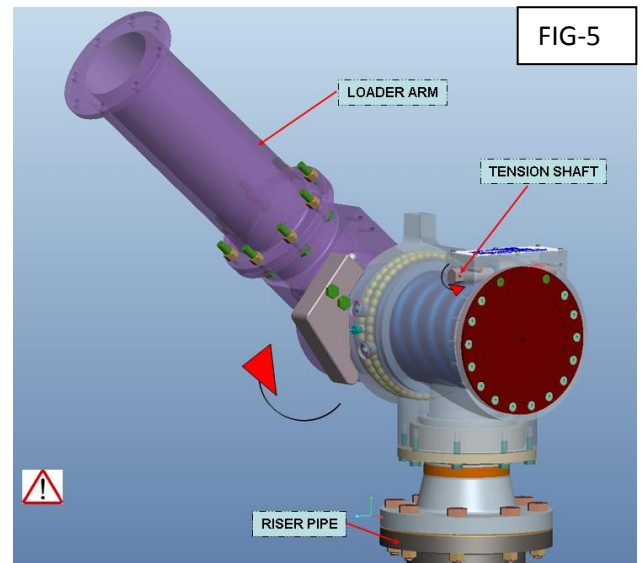
Tools needed: $\frac{3}{4}$ " socket or wrench

Step 1:

- Lift the arm so that there is little or no Tension on the spring
- Rotate the tension shaft in the direction Indicated on the swivel label to Increase the tension on the spring


Step 2:


- Drop the arm slowly and see if the desired Balance is achieved
- If not repeat step 1 until desired balance is achieved



Disassembly Instructions



 **WARNING:** Read and understand these instructions before starting adjustment:

- Local regulations for operation and use must be followed at all times
- OPW instructions must be followed for disassembly
- Make sure to use adequate personal protection at all times during operation
-  The swivel contains a very strong spring under torsion. Uncontrolled release of the spring can cause personal injury and damage the swivel. The avoid risk follow the instruction sequence

Tools Needed:

Open End Wrenches – 13mm, 17mm, 9/16", 3/4"

Allen Wrench – 4mm

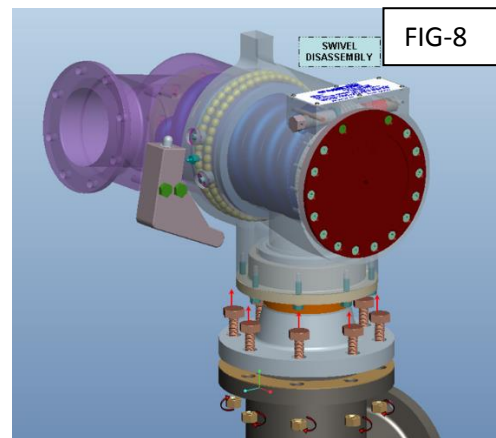
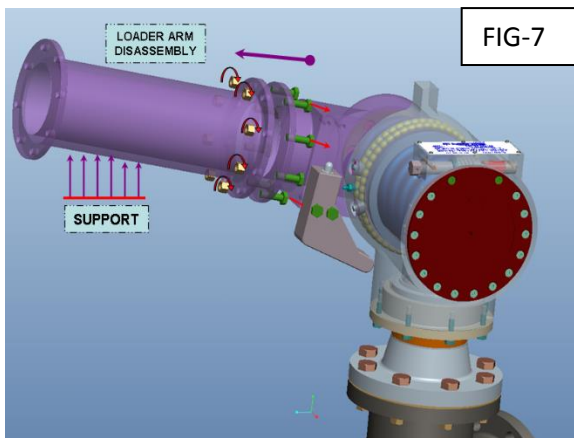
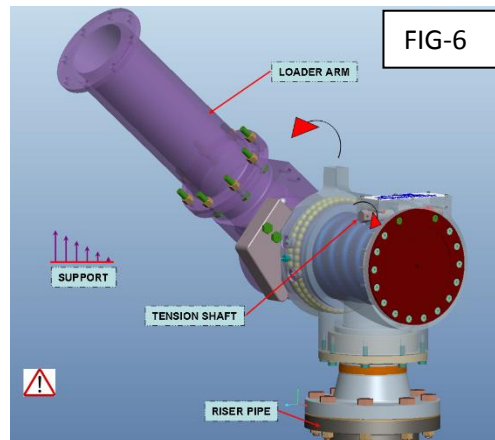
Pliers – Internal retaining ring

Step 1:

- Drain the loading arm and swivel
- Remove the tension from the spring using the 3/4" wrench while providing support for the arm

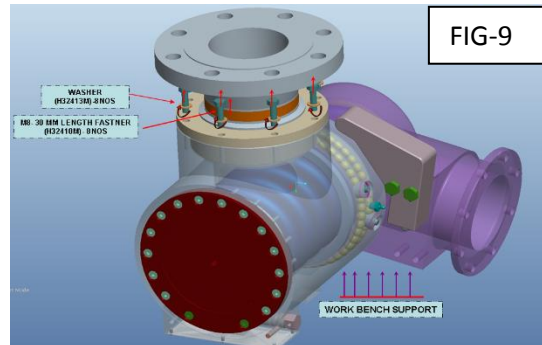
 Make sure the tension has been relieved 

- Remove the loading arm and remove The swivel from the riser pipe using the 9/16" wrenches



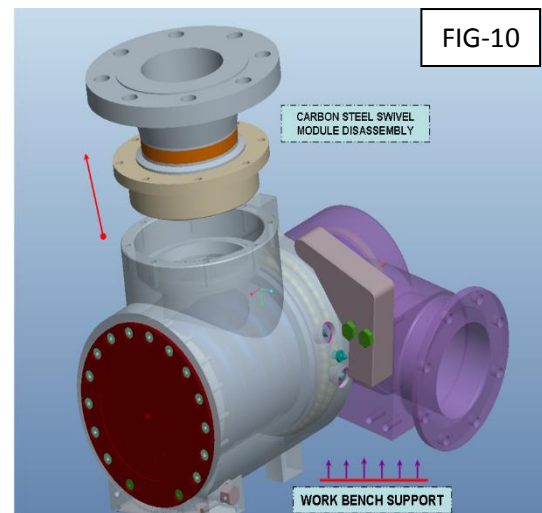
Step 2:

- Remove the 4" diameter CST base swivel module using the 13mm wrench
- Remove the PTFE H-block and the two O-ring seals

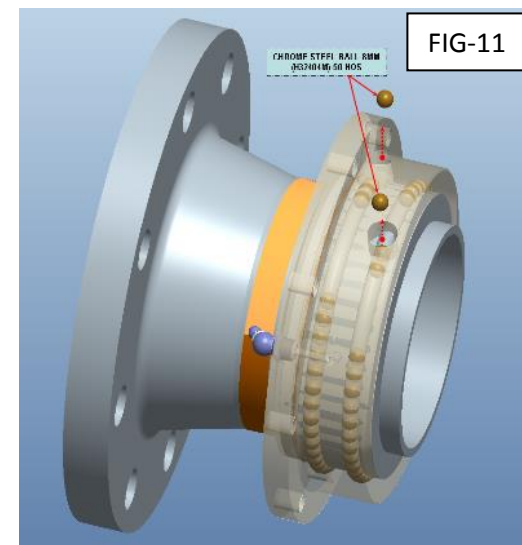


Step 3:

- Remove the ball plugs
- Turn the swivel and let the balls fall into a container. A magnet may be necessary to retrieve all of the ball bearings

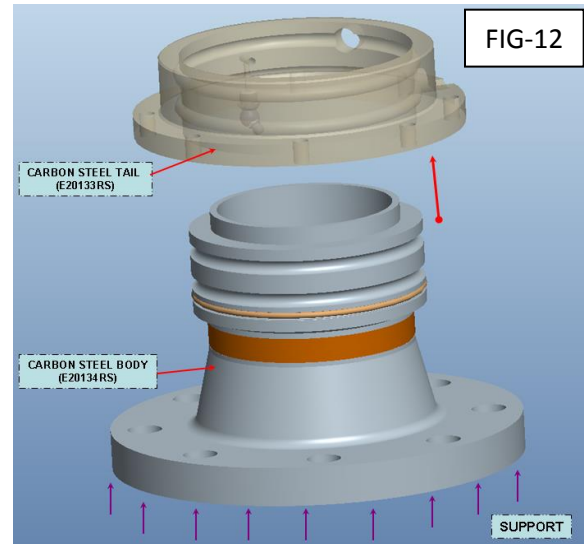


Note: non-flammable solvent may be used to help loosen the grease and allow easier ball removal



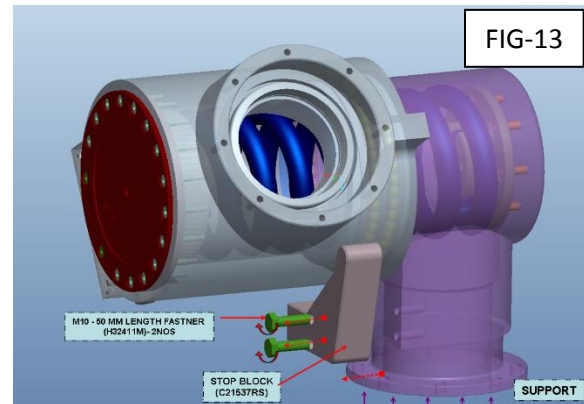
Step 4:

- Remove the tail from the body
- Remove the environmental seal
- Clean the body, tail, and ball bearings while inspecting for any unusual wear or damage



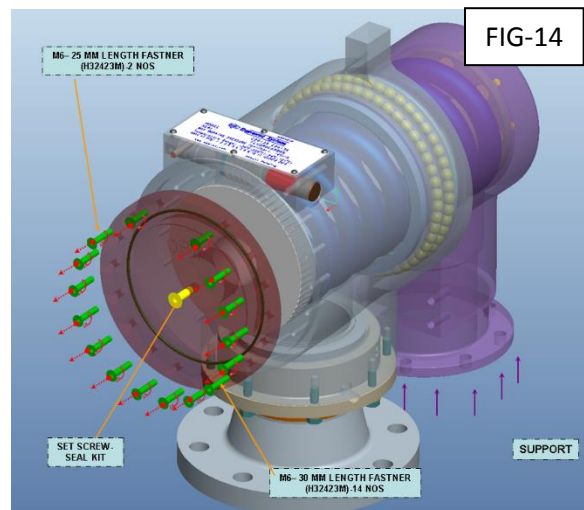
Step 5:

- If possible secure the aluminum TTMA flange securely to your work area
- Remove the stop block using the 17mm wrench



Step 6:

- Hand thread a 3/8-16 bolt into the center of the end plate to use as a temporary handle
- Unscrew end plate fasteners using a 4mm Allen wrench or Allen socket

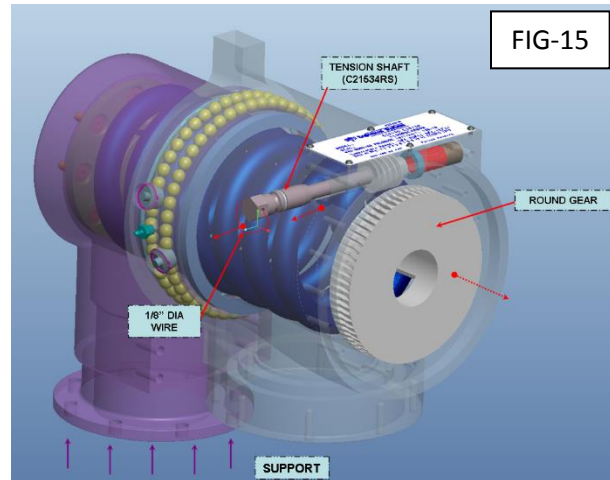


Note: the two screws closest to the tension shaft are a shorter length. Make sure to keep these isolated from the other ones.

Step 7:

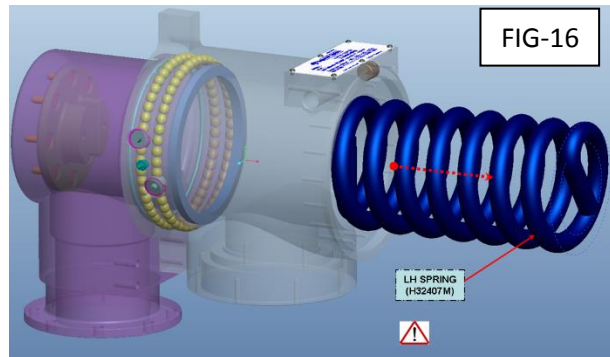
- Remove the round sector gear

Note: this action may require some minor adjusting to find the correct position to let the round gear slide out past the worm gear



Step 8:

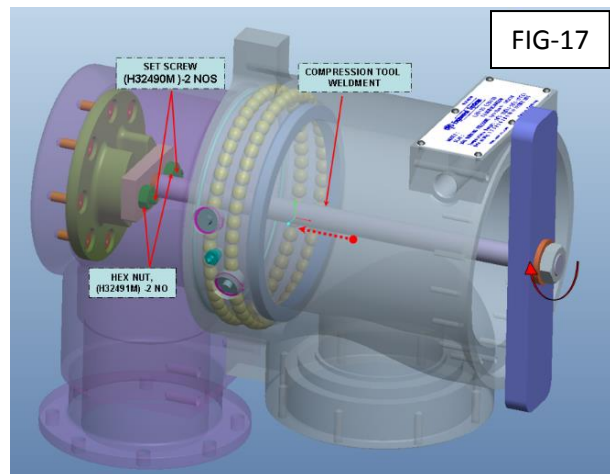
- Remove the spring



Step 9:

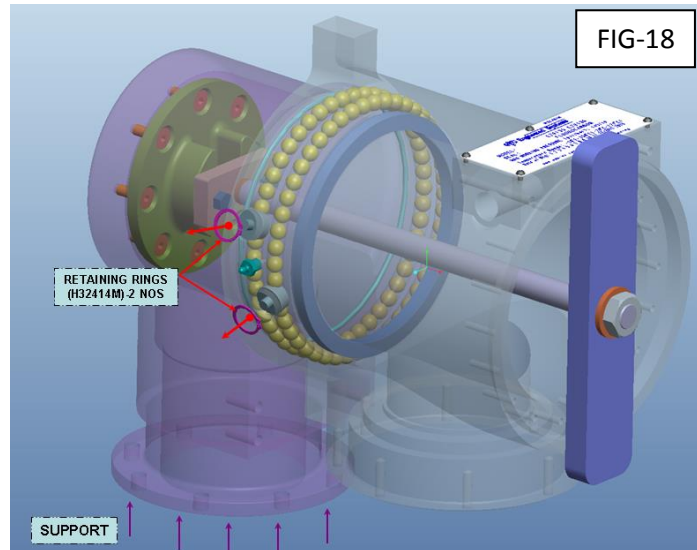
- Compress the body and tail together

Note: OPW has designed a tool to help with compression which can be seen depicted in the image. If more information on the compression tool is desired please contact OPW engineering



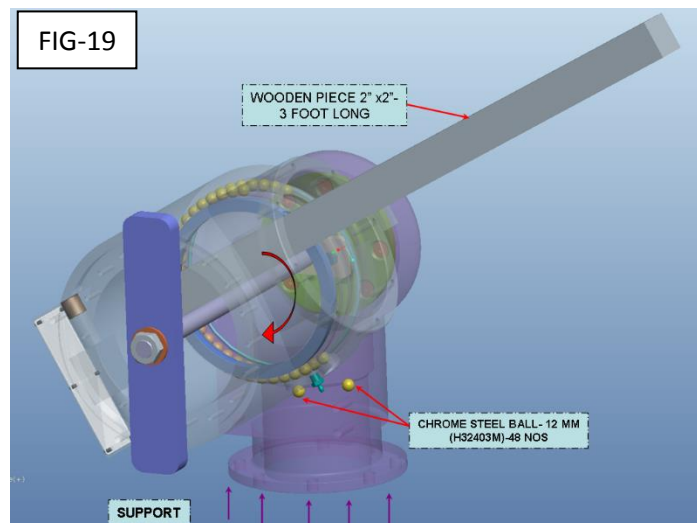
Step 10:

- Remove the ball plug retaining rings
- Remove the ball plugs



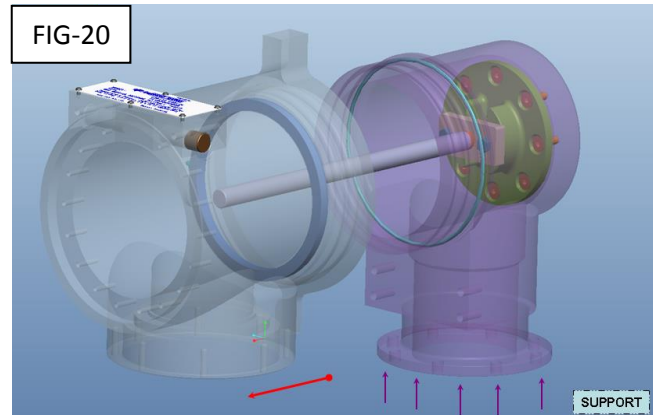
Step 11:

- Remove the balls by rotating the swivel body and adjusting the swivel compression
- A magnet may be necessary to remove all of the ball bearings



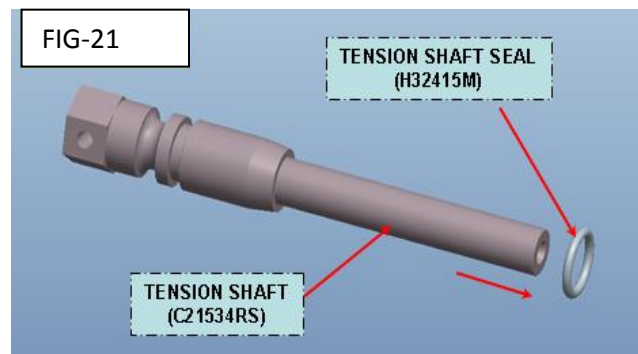
Step 12:

- Remove the body from the tail
- Remove the PTFE H-block and both main O-ring seals



Step 13:

- Remove the tension shaft spirol pins
- Remove the tension shaft
- Remove the two shaft seals, one from the shaft itself and the other from the shaft plug



Note: for reassembly instructions can be followed in reverse order. Please contact OPW Engineering with any additions questions.