

Foremost Industries
Model 306130
Floating Cushion Sub



Foremost Industries Model 306130 Floating Cushion Sub

Table of Contents

Model 306130 Features and Benefits	Pg. 2
Model 306130 Assembly Schematic	Pg. 3
Model 306130 Specifications / Parts List	Pg. 4
Model 306130 Maintenance Schedule	Pg. 5
Model 306130 Operating Parameters	Pg. 6
Model 306130 Rebuilding Procedure	Pg. 7

Floating Cushion Sub Model 306130

The Foremost Floating Cushion Sub is designed to be installed on Rotary Drilling Rigs below the gear box and into the drive spindle by means of a threaded connection. The Cushion Sub will reduce vertical shock transmitted by the bit while drilling using either DTH Hammer or Rotary Drilling methods. The two and one half inches (2 1/2") of free - floating travel of the Piston allows the drill operator to make-up and break-out threaded connections with minimal flank loading on the threads of the drill pipe or casing. This float within the housing enables the drill operators to make-up casing threads with little or no thread damage when stabbing the connections together or taking them apart. The sub can be used in vertical and or slant drilling applications.

The Foremost Floating Cushion Sub is available with all popular thread configurations up to a pin or box shoulder diameter of 7" at the top end and a 6" shoulder diameter pin or box on the lower end. Generally the extended length of 32.5" shoulder to shoulder and housing diameter of 10" do not interfere with drilling or pipe handling operations

Function

The pin / box connection on the Upper Cap assembly is made up directly to the drive spindle, while the box / pin connection on the Piston is free to move axially within the Body cavity. A stationary wash pipe and seal arrangement isolate drilling fluids / air from the inner components of the body. The piston will either extend or retract within the cushion sub body if the drill string is held stationary and the drive spindle rotated to breakout or makeup the threads in the drill string. Raising or lowering of the rotary drive is not necessary until full engagement or disengagement of the threads is complete. In tension or compression, the shock transmitted by the bit is minimized by cushions within the body cavity. The configuration of the cushion sub allows for pullback of 200,000 lbs. with a three to one safety margin and working torque capacity of 20,000 ft.lbs.

Features

- Stainless steel, colmonoy and chrome are utilized on components exposed to corrosive fluids.
- No restriction of air or drilling fluids.
- Rotary torque transfer through splined components and drive pin arrangement.
- Standard seals, wipers and wear rings are utilized to isolate drilling fluids.
- Three inches of piston movement within the body cavity.
- Field re-buildable with a seal and cushion kit.
- Additional material stock is built into the threaded components to allow for thread repairs.

Benefits

- Wear life is extended on valuable components.
- The telescopic action reduces thread damage during multi-pass drilling operations.
- Hydraulic dampening combined with upper and lower cushions reduce axial transmission of DTH hammer and rotary bit vibrations between the drill pipe and the rotary drive.
- 100% torque transfer between the rotary drive and the drill string.
- Replacement seal and cushion kits are available for easy field replacement of components.
- Thread repairs on casing and drill pipe are drastically reduced.
- Reduced maintenance to the rotary drive gears and bearings.
- Allows the operators to makeup and breakout threaded connections more rapidly which decreases drilling cost.

PARTS LIST
TABLE 14000-0

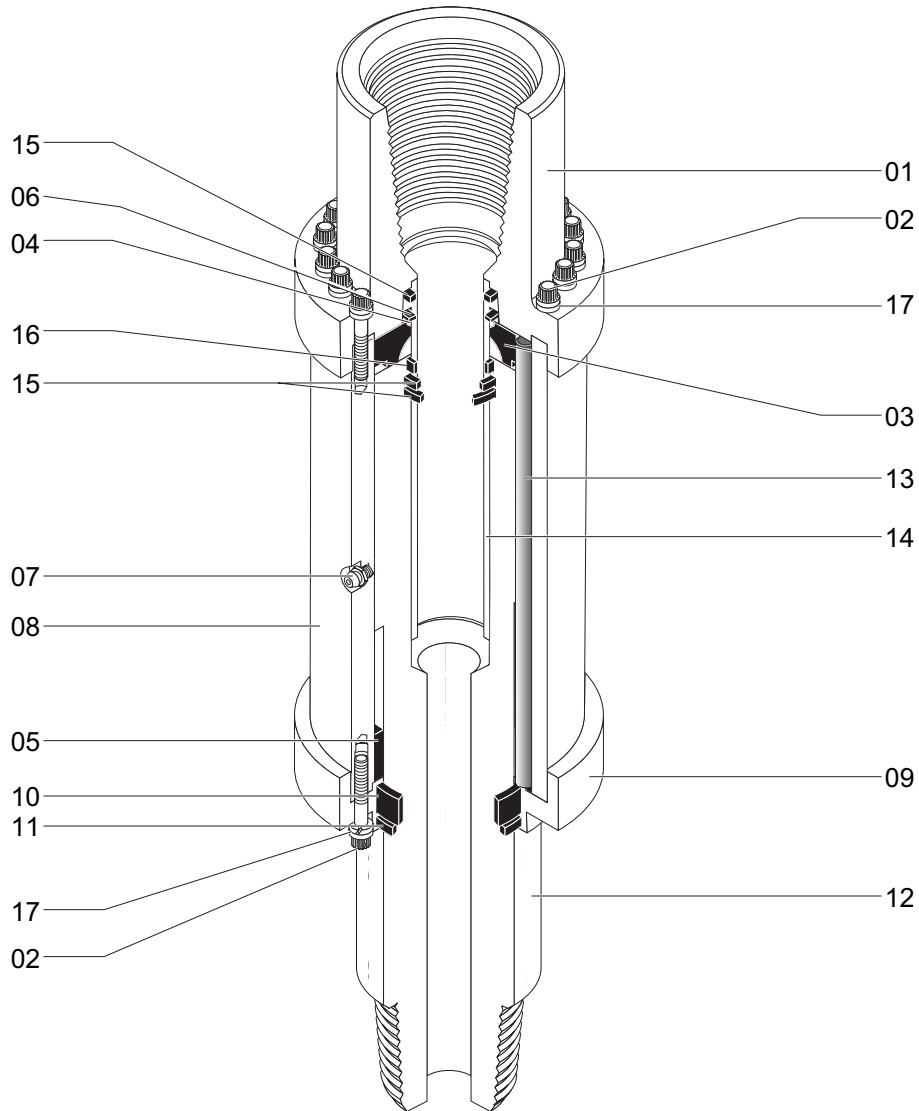


Table 1:

Item #	Part #	Description	Item #	Part #	Description
01	309550	Upper Cap	13	20-29-291823	Drive Pins
02	310422	Cap Screw	14	20-29-291824	Washpipe
03	PD6-2-3	Upper Cushion	15	PD6-2-16	Seals
04	PD6-2-4	Spacer Ring	16	PD6-2-17	Wear Ring
05	PD6-2-5	Lower Cushion	17	9678-00-0280	Lock Washers
06	PD6-2-6	Retaining Ring	18	5410-00-0200	Locating Pin (not shown in illustration)
07	9285-00-0610	Grease Fitting	Pt. No.	306130-30	Seal Kit (04,06,10,11,15, 16,18)
08	309549	Body	Pt. No.	306130-31	Seal Kit & Cushion Kit (03,04,05,06,10,11,15, 16,18)
09	309551	Lower Cap			
10	313026	Wear Ring			
11	PD6-2-11	Scraper Ring			
12	306132	Piston			

Model 306130 Floating Cushion Sub General Specifications

Hoist	200,000 lbs. Proof load
Pulldown	200,000 lbs. Std. Cushion
Torque	20,000 lbs. / ft.
Extension	S - S Length extended 32.50 inches
Retracted	S - S Length retracted 30.00 inches
Weight	250 lbs.

Model 306130 Floating Cushion Sub Parts List

Item No.	Part No.	No. Req'd	Description
1	309550	1	Upper Cap
1A	337657	1	Ext. Upper Cap
2	310422	40	Cap Screws
3	PD6-2-3	1	Upper Cushion
4	PD6-2-4	1	Spacer Ring
5	PD6-2-5	1	Lower Cushion
6	PD6-2-6	1	Retaining Ring
7	9285-00-0610	1	Grease Fitting
8	309549	1	Body
9	309551	1	Lower Cap
10	313026	1	Wear Ring
11	PD6-2-11	1	Scraper Ring
12	306132	1	Piston
13	20-29-291823	10	Drive Pins
14	20-29-291824	1	Washpipe
15	PD6-2-16	3	Seals
16	PD6-2-17	1	Wear Ring
17	9678-00-0280	40	Lockwashers
18	5410-00-0200	1	Locating Pin
Pt. No.	306130-30	1	Seal Kit (4,6,10,11,15,16,18)
Pt. No.	306130-31	1	Seal & Cushion Kit (3,4,5,6,10,11,15,16,18)

Foremost Floating Cushion Sub Model 306130 Maintenance Schedule

During the final assembly process at the factory, the Floating Cushion Sub had one (1) cartridge or approximately 400 grams of grease installed into the housing for lubrication of the internal components. This initial lubrication, under average operating conditions will last approximately two (2) weeks.

After this period, the cushion sub should be lubricated on a daily basis. The lubricant can be a general purpose grease of the same type used to lubricate bearings or other drill components.

The grease fitting is located in the approximate center position of the main body. Grease should be installed when the sliding spindle is in the retracted or up position. The operator should pump in five to ten strokes of the handle to maintain lubrication of the components.

If at any time the sliding spindle will not retract or extend from the housing, there could be too much grease in the housing cavity. If this happens, remove the grease fitting and cycle the spindle up and down a couple of times to remove the excess grease and then reinstall the fitting into the lower cover plate. Wait a couple of days before beginning the lubrication cycle over again.

It will be necessary to periodically change the seals and wear rings in the assembly. The frequency of this maintenance will depend upon the drilling application and the amount of lubrication the unit receives during its operating cycle. If at any time during the drilling operation air or fluids are being blown out the lower end past the seals and spindle, the cushion sub should be removed immediately from the drill to have a new seal kit installed.

Under average drilling conditions a preventative maintenance inspection should be performed at six month intervals or approximately every 2500 hrs.

Under no circumstances should any welding or wrenching be done on the chrome surface of the spindle.

Floating Cushion Sub Operating Parameters Model 306130

Function

The Floating Cushion Sub was developed primarily to allow a limited amount of axial movement between the drill string and the rotary drive while making up and breaking out threaded connections and also to reduce shock and vibration induced by the rotary bit or DTH hammer bit. Typically the pin by box threaded configuration machined into the upper cap and the piston will suit most drills and drill string combinations without any modifications to the drill.

The spline drive system that transfers the torque from the rotary spindle by means of drive pins provides 100% displacement to the drill string and the bit. Located within the housing cavity are upper and lower cushions which absorb the shock displaced into the piston from the drill string when the piston is at either the upper or lower limits of its stroke within the housing. Drilling fluids and or air are isolated from the housing by means of a washpipe and seal arrangement which prevent corrosion from taking place on the internal components.

The severity of the drilling application will determine the cycle time in which the cushion sub will be required to have a rebuild performed. The following are some visual indicators as to when the cushion sub should be removed from service and a rebuild performed:

1. If air or drilling fluid is being blown out around the wiper seal at the lower end of the assembly around the piston. (cause - leaking seal at the washpipe)
2. If the piston seems to have more extension than when it the cushion sub was originally installed on the drill.
(when new, the piston will have approximately 2 1/2 inches of travel from the fully extended position to the closed position -- if this length exceeds 3 inches - the lower cushion should be replaced as soon as possible)
3. Backlash in the piston and housing between the time the rotary spindle starts to rotate and the drill collars start to rotate.
(the splines in the piston and the housing will eventually start to wear due to the torsional pressure being applied during the drilling process from the bit and also from making up and breaking out of threads - when the free play exceeds 1/2" (.500) - the piston and or body may need to be replaced) To check this, mark a position on the piston and the lower cap parallel with each other, rotate the drive in the opposite direction and measure the distance now between the lines.

Procedure for Rebuilding Model 306130 Floating Cushion Sub

Disassembly

1. Clamp the Cushion Sub in a horizontal position.
2. Remove Cap Screws (20) from the Lower Cap. (Item #9)
3. Remove Lower Cap from the Body. (Item #8)
4. Remove Lower Cushion (Item #5) from the Body.
5. Using a lift nubbin, pull the Piston (Item #12) out of the Body.
6. Remove Upper Cushion (Item #3) from the Body.
7. To remove the Washpipe, (Item #14), first remove Spacer. (Item #4)
8. Using Snap Ring pliers, remove Retaining Ring .(Item #6)
9. Remove Washpipe from the Upper Cap.
10. Remove Seal from the Upper Cap.
11. Remove Seals and Guide Rings from Piston and Lower Cap
12. Clean all parts with cleaning fluid and inspect for wear - deburr any parts and remove sharp edges prior to assembly.
13. Seals, Guide Rings and Cushions can be replaced by purchasing a Seal and Cushion Kit Part # 306130 - 31 (Item #3,4,5,6,10,11,15,16)

Assembly

1. Place one Seal (Item#15) in the seal location fit of the Upper Cap (Item #1)
The o-ring of the seal against the shoulder of the fit.
2. Insert the Washpipe (Item #14) in the location fit.
3. Install the Retaining Ring into the groove. (be sure it is properly seated)
4. Install Spacer over the Washpipe to seat in the location fit.
5. Install the Upper Cushion over the Washpipe.
6. Install the Piston after replacing the seals and guide ring.
7. Lubricate the drive pins and body (recommend Unirex Moly H grease or equivalent)
8. Install Lower Cushion (Item #5) into the Body until it is seated on the Drive Pins.
9. Install the Lower Cap (Item #9) into the location fit of the Body (line up bolt holes)
10. Install Hi-Collar Lockwashers on the cap screws and install into the Lower Cap.
The cap screws provided can be brought up to a torque of 210 ft. lbs.

Note: The Upper Cap (Item #1) need not be removed to rebuild the Cushion Sub, however, it would be advisable to re-torque the cap screws to 210 ft. lbs for safety reasons.