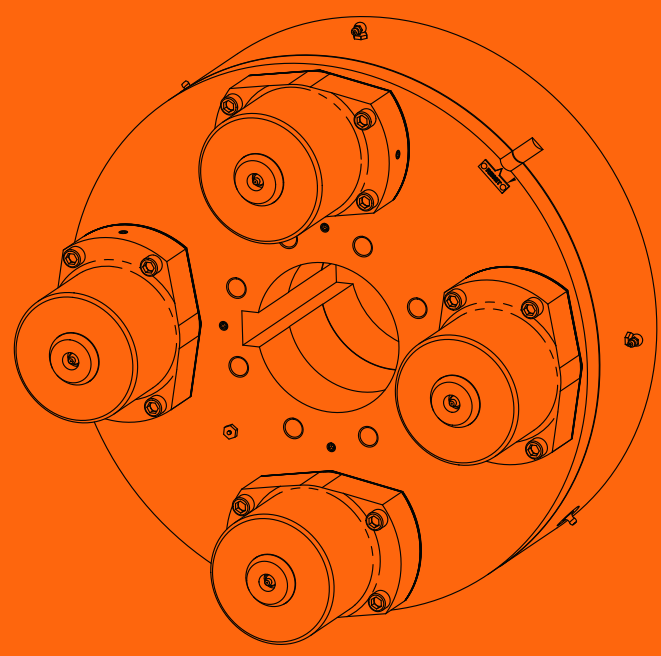




morbark hog torque limiter  
instruction manual JSE3-0121 series



brunel  
corporation



# Installation and Maintenance Instructions

## JSE3-0121

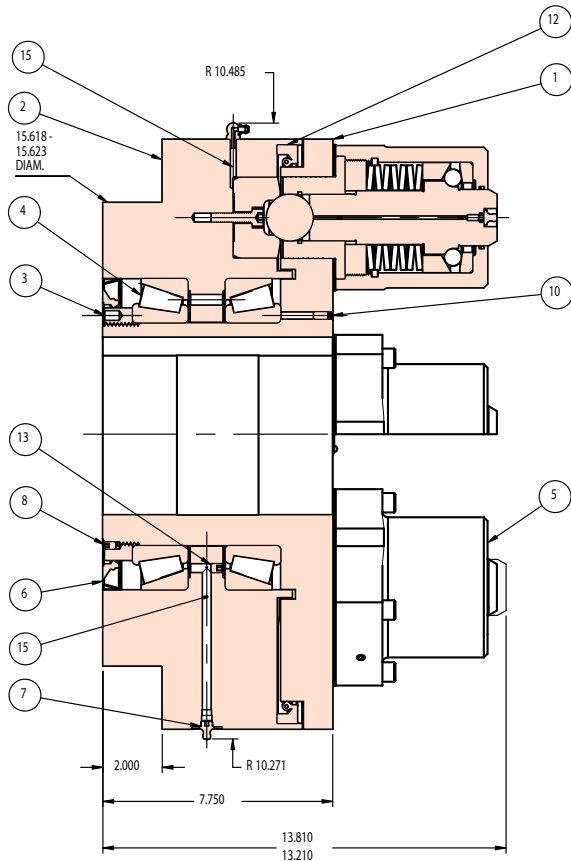


Figure 1  
JSE3-0121  
Section View

### 1. TORQUE ADJUSTMENT & INITIAL STARTUP

- These torque limiters were preset at the factory, no further adjustment is required at this time. If it is desired to adjust the torque at a later date, proceed as follows.
- To adjust torque at the job site:  
Refer to detailed setting instructions of Safety Element Torque Limiters with Through Hole Detents.

### 2. RESETTING

On overload, the safety element ball is displaced and the Module Carrier Plate disengages from the Detent Pocket Plate, allowing the Module Carrier Plate (1-1) to rotate freely. PTO should be disengaged immediately after the Torque Limiter has disengaged. With the drive at rest, the PTO disengaged and the Engine Off, Clear the jam. Then align the two reset arrows on the Detent Pocket Plate and Module Carrier Plate by rotating the clutch by hand or jogging the motor. After aligning the match marks strike the safety element plungers with a soft mallet and the plunger will move back into the safety element 5/16 inch signifying that the unit is engaged.

### 3. GENERAL MAINTENANCE

- For Safety Element Modules (1-5) grease 2-3 pumps from a grease gun into grease fitting (2-18) every 3 month, and after every disengagement. Recommended grease is Mobil XTC

For Bearing grease (1-7) one every 3 months until grease comes out grease relief valve.

Recommended grease for Tapered Roller Bearing is Mobil SHC220

- Safety elements should be stripped, inspected and re-assembled at least once every 3 years, more frequently where frequent tripping occurs.

### 4. TROUBLE SHOOTING

- Continual releasing, further adjustment making no difference.
  - Detent Pocket (2-19) worn. Remove Safety Element (1-4) and Flange Plate (2-21) to remove Detent, & Rotate Detent 90° & reinstall. If badly worn replace with new detent pocket.
- Unable to screw Housing Nut (2-7) in any further.
  - Loosen Set Screw (2-15) and make sure that the threads on the Housing Nut and Housing are not damaged, if so clean & file burrs until usable or replace defective parts.
  - You have reached maximum torque capacity.
- Unable to reset. Reset arrows not aligned. Check reference marks on Module Carrier Plate (1-1) and Detent Pocket Plate (1-2).

Item	Description	Qty
1	Module Carrier Hub	1
2	Detent Pocket Plate	1
3	AN38 Locknut (revision one)	1
4	Timken Bearing 67885 / 67820	2
5	JSE3 Blind Hole Module	4
6	Seal, CR#85015, 10.508 OD, 8.500 Shaft, .625 Width	1
7	Grease Fitting, straight, 1/8 NPT	2
8	Set Screw, socket, 5/8-11 x 7/8" lg.	1
9	Reset Arrow Plate with rivets	1
10	Set Screw, socket, 5/16-18 x 5/8" lg.	4
11	Grease Fitting, right angle, 1/4-28 thd.	2
12	Seal, CR#1800240, 19.508 OD, 18.000 Shaft, .688 Width	1
13	Setscrew, socket, 3/8-16 x 3/8"	2
14	Grease Relief Vent, 7.5-15psi rating, 1/8 NPT	1
15	Grease, Mobil SHC220	2

## 5. SAFETY ELEMENT - METHOD OF ASSEMBLY

- a. Clean all components and coat all working surfaces with a suitable anti-seize compound.
- b. Grease & install "O" ring (2-17) into groove in Housing (2-16)
- c. Grease inside surfaces of the Housing and install Outer Thrust Race (2-2).
- d. Grease & install qty. 14-15mm balls (2-3).
- e. Install the Plunger (2-1) through the outer thrust race & the end of the Housing (2-16) ensuring that the "O" Ring.
- f. Grease and install the Inner Thrust Race (2-4).
- g. Install 7 springs (2-5) oriented as shown in cross section, and fully greased.
- h. Screw in the Housing Nut (2-7) into the Housing until there is contact with the springs.
- i. Insert the Locking Pellet (2-14) and Set Screw (2-15) into the side of the Housing to facilitate locking the Housing Nut. (Refer to #1 for Torque Adjustment)
- j. Grease and insert the "O" Ring (2-12) into the Bushing (2-8), insert the Detent Ball (2-9) after thoroughly greasing the Bushing ID. Grease the Plunger (2-1) and install the Bushing.

Recommended for Grease Gun application:  
 Mobil XTC  
 Mobil (800) 662-4525

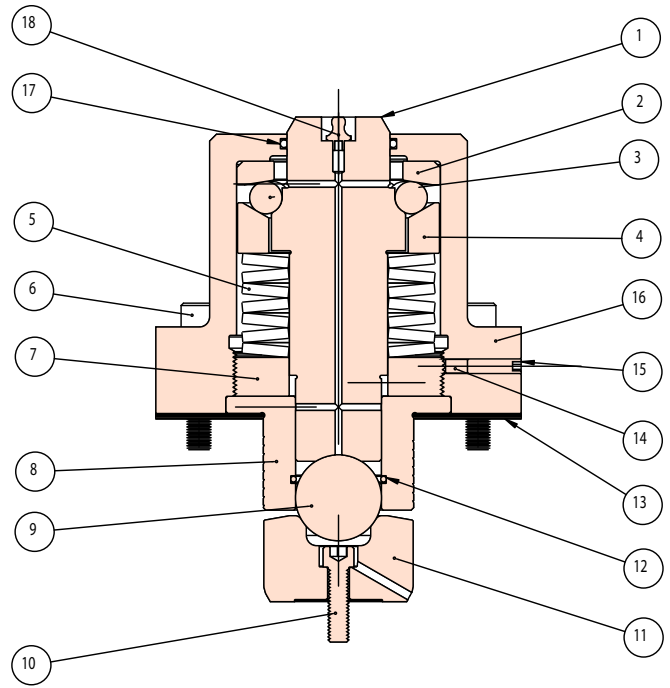
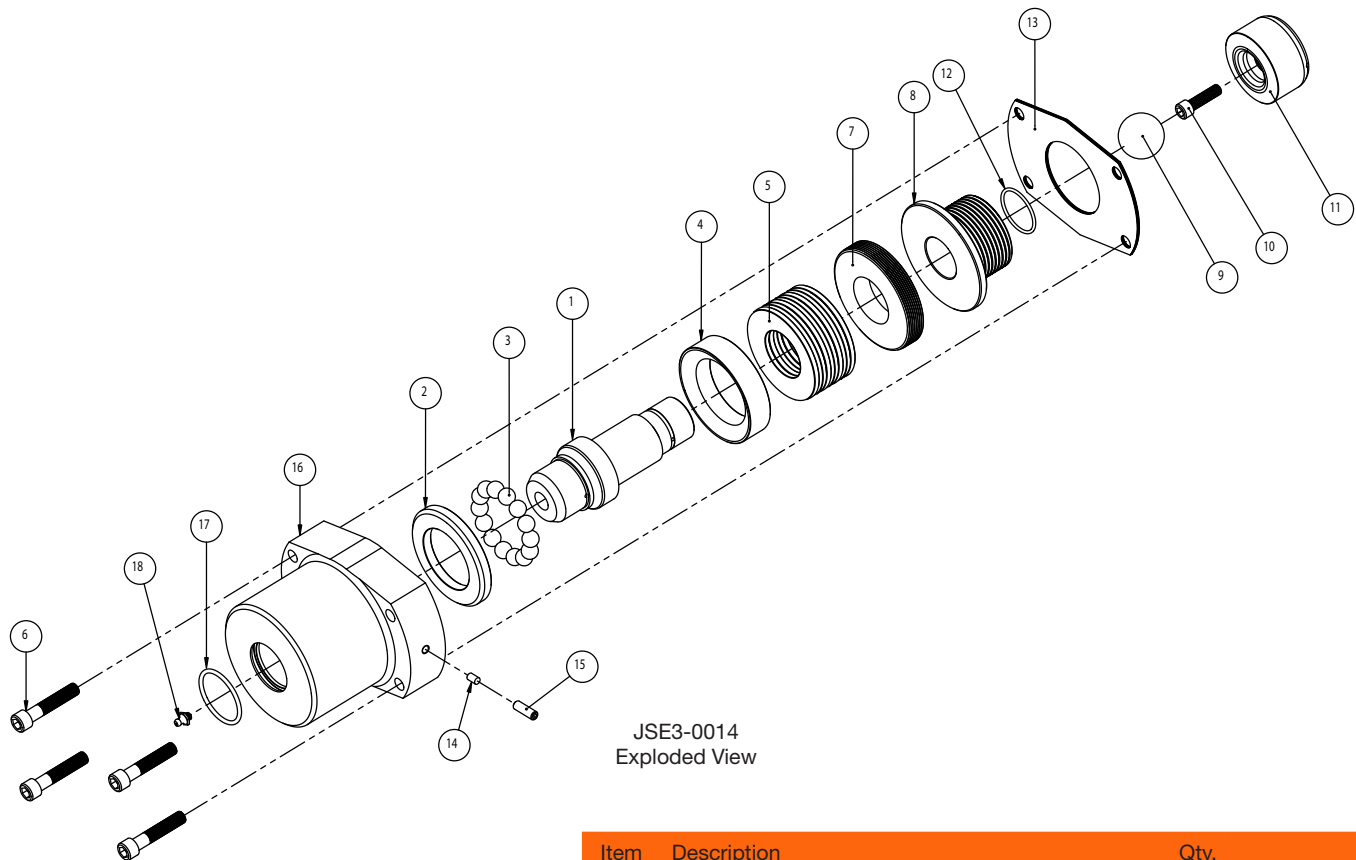


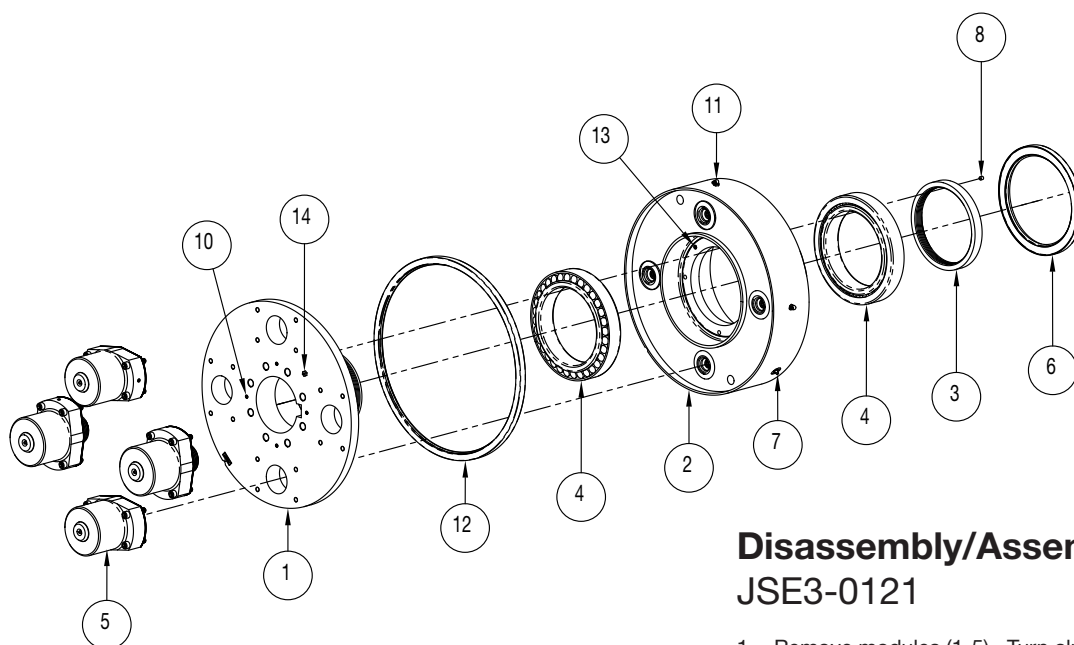
Figure 2  
 JSE3-0014  
 Section View

Item	Description	Qty.
1	Plunger	1
2	Outer Thrust Race	1
3	15mm Ball	14
4	Inner Thrust Race	1
5	Disc Springs	7
6	7/16-20 x 2.25" Socket Head Cap Screw	4
7	Adjusting Nut	1
8	Flanged Bushing - 70mm Diameter	1
9	Detent Ball - 40mm	1
10	3/8-16 x 1.25" Socket Head Cap Screw	1
11	Detent Pocket - Radial	1
12	O-ring - Bushing	1
13	Shim Pack ( 5-set )	5
14	Locking Pellet	1
15	M8-1.25 x 25mm Socket Set Screw	1
16	Housing	1
17	O-ring - Housing	1
18	Grease Fitting	1



JSE3-0014  
Exploded View

Item	Description	Qty.
1	Plunger	1
2	Outer Thrust Race	1
3	15mm Ball	14
4	Inner Thrust Race	1
5	Disc Springs	7
6	7/16-20 x 2.25" Socket Head Cap Screw	4
7	Adjusting Nut	1
8	Flanged Bushing - 70mm Diameter	1
9	Detent Ball - 40mm	1
10	3/8-16 x 1.25" Socket Head Cap Screw	1
11	Detent Pocket - Radial	1
12	O-ring - Bushing	1
13	Shim Pack ( 5-set )	5
14	Locking Pellet	1
15	M8-1.25 x 25mm Socket Set Screw	1
16	Housing	1
17	O-ring - Housing	1
18	Grease Fitting	1



JSE3-0121  
Exploded View

## Disassembly/Assembly Procedure JSE3-0121

1. Remove modules (1-5). Turn clutch over.
2. Locate locking set screw (1-8) holding lock nut (1-3) in place. Remove locking set screw. Now remove nut using spanner wrench. Remove seal (1-6) and discard.
3. Place a 3/4" diameter x 3" long piece of stock into the two 1" – 8 holes that are drilled through. Using quantity two 1" – 8 bolts screwed in against stock, jack the clutch apart. Set detent pocket plate (1-2) aside. Discard bearing cone (1-4b).
4. To remove bearing cone from modular carrier (1-1), turn over with threaded side down (module side up). Locate four threaded 5/16" holes with set screws (1-10) in them. Remove set screws (1-10). Using a 1/4" drive pin (as a drift) in the four threaded holes, drive bearing cone down until you get clearance for a puller. Use puller and remove and discard bearing cone (1-4a).
5. Inspect modular carrier (1-1) for wear on bearing journal. If bearing journal is worn or undersize, discard and replace with new module carrier hub. If module carrier (1-1) checks OK then free piece of burrs and clean up. Set aside.
6. Place detent pocket plate (1-2) on bench. Using a 1/4" drive pin and four 5/16" drilled through holes, remove bearing cup (1-4b). Turn piece over and repeat process. Remove other cup (1-4b). Inspect and clean removing burrs. Inspect inner seal (1-12) & inspect detent pockets (2-11). Replace if necessary.
7. Once detent pocket plate (1-2) is to spec, install new bearing cups (1-4b). Set aside with detent side down.
8. Heat quantity two bearing cones (1-4a) to 250° for no longer than 1 hour. With modular carrier (1-1) on bench with module side down, install bearing cone (1-4a). Grease Bearing cone (1-4a) and Seal diameter liberally with SHC220 Mobil Synthetic Grease. Lift detent pocket plate (1-2) in air using hoist and detent side down. Grease cup and seal (1-12) liberally. Place detent pocket plate (1-2) on modular carrier (1-1). Spin clutch

Item	Description	Qty
1	Module Carrier Hub	1
2	Detent Pocket Plate	1
3	AN38 Locknut (revision one)	1
4	Timken Bearing 67885 / 67820	2
5	JSE3 Blind Hole Module	4
6	Seal, CR#85015, 10.508 OD, 8.500 Shaft, .625 Width	1
7	Grease Fitting, straight, 1/8 NPT	2
8	Set Screw, socket, 5/8-11 x 7/8" lg.	1
9	Reset Arrow Plate with rivets	1
10	Set Screw, socket, 5/16-18 x 5/8" lg.	4
11	Grease Fitting, right angle, 1/4-28 thd.	2
12	Seal, CR#1800240, 19.508 OD, 18.000 Shaft, .688 Width	1
13	Setscrew, socket, 3/8-16 x 3/8"	2
14	Grease Relief Vent, 7.5-15psi rating, 1/8 NPT	1
15	Grease, Mobil SHC220	2

working grease into bearing. Now grease exposed bearing cup (1-4b). Install second bearing cone (1-4a). Press down on cone insuring it is seated. Screw on nut (1-3). Using spanner wrench and hammer, tighten nut and spin clutch until all rollers of bearing cone are turning. Wait at least two hours for bearings to cool.

9. Once unit has cooled it is time to set preload of bearings. Rollers probably will not turn now that the part has cooled. Check drag with a scale. Torque should be around 10 lb-ft. Using a punch and hammer, strike bearing race in four equal places and tighten nut. Repeat until all rollers start to turn. Check drag again. Repeat process until you have 4 – 6 lb-ft of preload. Example: Started at 10 lb-ft Should finish at 14 – 16 lb-ft Remove nut (1-3). Using a grease gun with SHC 220 grease, grease bearing between rollers (1-4). Install new seal (1-6). Seal should be around 5/16" below face of detent pocket plate (1-2). Grease rubber seal surface. Remove any burrs or flaws on O.D. of lock nut (1-3). Grease O.D. of nut. Install nut. Tighten using spanner wrench. Spin clutch working grease into bearings and forming a seal of grease on nut. Drill and tap 5/16 – 18 x 3/4" deep for new lock nut set screw (1-8). Install new locking set screw with loctite 262. Turn clutch over.
10. Replace the four 5/16" – 18 set screws (1-11) removed at disassembly.
11. Install rebuilt or new modules (1-5) shimming each one with .003 - .008 preload per Preload instruction on Page 7 . Assembly is now complete.

## Detailed Setting Instructions JSE3-0121

Prior to setting Safety Elements which are new or which have been disassembled, the required tangential force (Fu) must be calculated from the desired release torque of the drive.

Perform the following calculation and proceed with setting each Safety Element to the same tangential force. Note that the dimension "X" as measured in Figure 1, will vary from element to element. However, the "depth setting from zero spring compression" from the graph must be the same and added to "X" for each element.

### CALCULATION:

$$F_t = T / ((N) \times (R)) \quad F_t = \text{Tangential force (pounds)}$$

$$F_a = F_t \times (.65) \quad T = \text{Required release torque of drive (lb-in)}$$

$$\quad N = \text{Total quantity of Safety Elements on Torque Limiter.}$$

$$\quad R = \text{Mounting radius of Safety Elements on Torque Limiter (in.)}$$

$$\quad F_a = \text{Axial force (pounds)}$$

### Example Calculation:

This Torque Limiter has four JSE3-0014 Safety Elements mounted on a 7.3" radius.

Drive Torque Calculation:  $1000\text{HP} \times 63024 \text{ constant} / 825 \text{ RPM} = 76,393 \text{ lb-in}$

$76,393 \times 5 \text{ service factor} = 381,964 \text{ lb-in}$

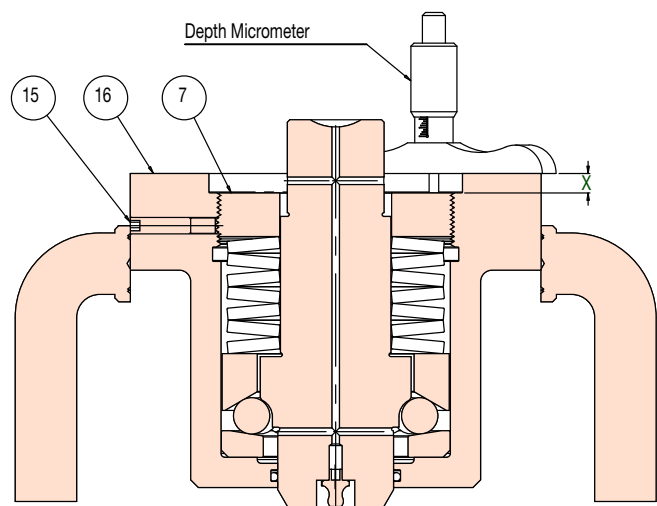
We want the drive to release at 381,964 lb-in

1. Determine tangential force, Ft  
 $F_t = 381,964 \text{ lb-in} / ((4 \text{ elements}) \times (7.3" \text{ radius})) = 13,080 \text{ pounds.}$

2. Read from graph for JSE3-0014, the required depth setting from zero compression and add to the depth measured in step 5.
3. Set the elements in accordance with instructions to follow.

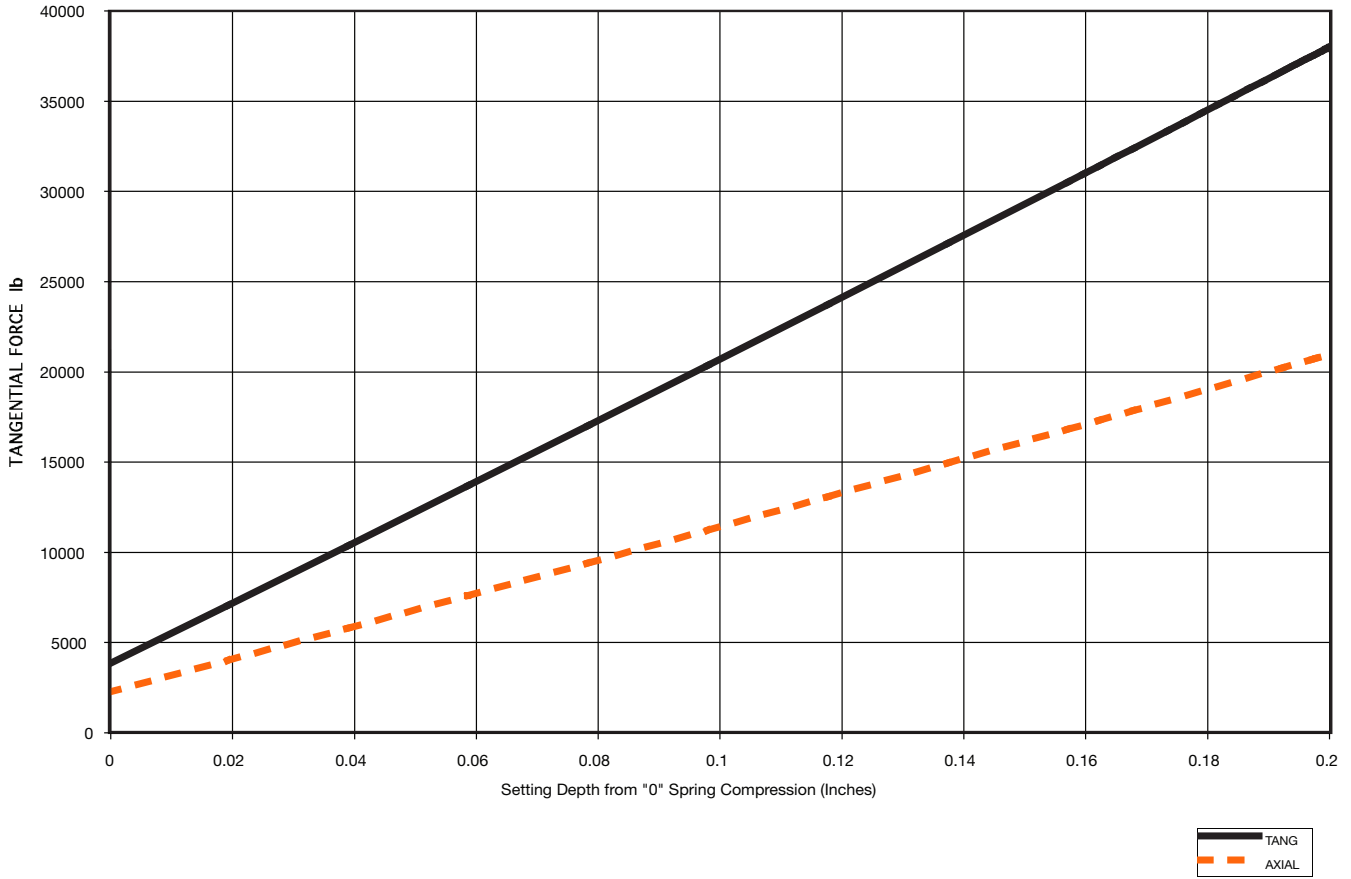
### JSE3-0014 Setting Instructions

1. Ensure Set Screw (2-15) is not locking the Adjusting Nut (2-7).
2. Hold safety element in soft jaws in a bench vice, as shown in drawing below.
3. Tighten Adjusting Nut (2-7) by turning clockwise with adjusting tool, then loosen by turning counterclockwise until all spring load is removed.
4. With with adjusting tool, slowly tighten the Adjusting Nut (2-7) until it just touches the disc springs - you will note a large increase in resistance when the nut comes up against the disc springs. At this point the Adjusting Nut is bearing on the Disc Springs with no pre-load.
5. Arrange depth micrometer as shown in drawing (Figure 1). Measure the distance "X" from the safety element Housing (2-16) base, to the face of the Adjusting Nut (2-7). This is equivalent to the ZERO SETTING on the Load / Depth setting graph. Make a scribe mark on the adjusting nut face to note the position of this measurement and make all future measurements to this same position.
6. Read off the graph, the depth setting for the required load, and add this to dimension "X".
7. Using the dial indicator or micrometer depth gauge, measure depth and slowly tighten Nut until the required depth is reached. This safety element is now set to the required load setting.
8. Tighten Set Screw (15) to lock Nut (7).



Item	Description	Qty.
7	Adjusting Nut	1
15	Socket Set Screw	1
16	Housing	1

# JSE3-0014 Torque Setting Graph



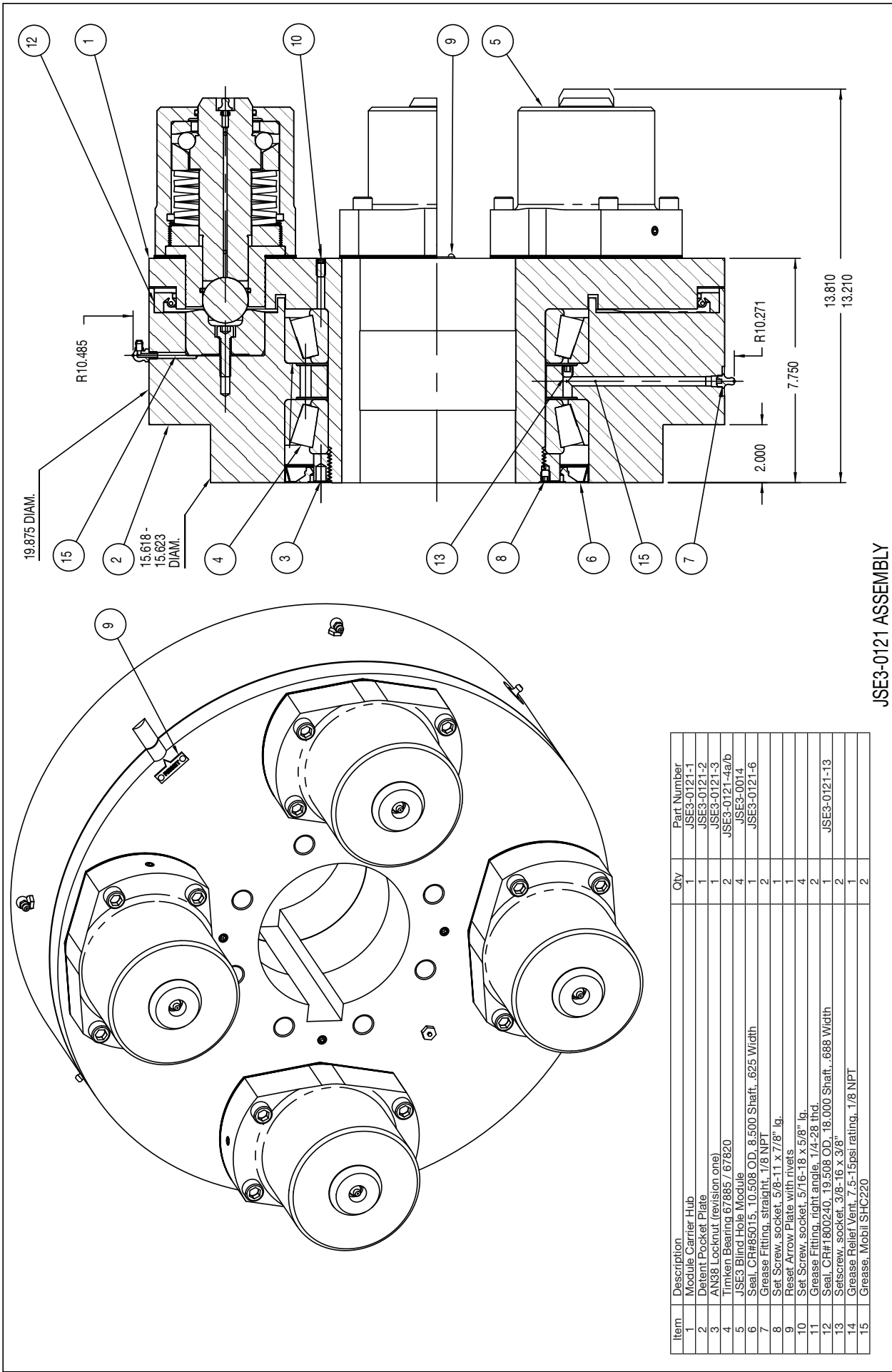
## Preload Instruction

### JSE3-0014 Safety Element Module (Blind Hole detent)

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1. Grease the Detent Pocket (2-11) and press into position, install the Cap Screw (2-10) treated with Loctite or similar.
2. Place the Detent Ball (2-9) on top of the Detent Pocket (2-11) then insert the Bushing (8) into the hole in the Module Carrier Hub (1-1) over the Detent Ball (2-9) until the flange of the Bushing (2-8) bottoms.
3. Insert the assembled Safety Elements (1-5) (ensuring that the modules are in the engaged position) through the Bushing (2-8) until the Plunger (2-1) comes in contact with the Detent Ball (2-9).
4. With either a suitable height gauge or feeler gauge, measure the resultant gap between the inner face of the Housing (2-16) and the Module Carrier Hub (1-1), deduct .003 - .008" for pre-load and select a suitable sized laminated Shim Pack (2-13) to accommodate the gap. Then place the Shim Pack (2-13) onto the Module Carrier Hub (1-1), grease and insert the Bushing (2-8) into the Carrier Hub (1-1) and securely fix with the qty 4 socket head cap screws (2-6).



JSE3-0121 ASSEMBLY

Item	Description	Qty	Part Number
1	Module Carrier Hub	1	JSE3-0121-1
2	Detent Pocket Plate	1	JSE3-0121-2
3	AN38 Locknut (revision one)	1	JSE3-0121-3
4	Timken Bearing 678857 67820	2	JSE3-0121-4a/b
5	JSE3 Blind Hole Module	4	JSE3-0014
6	Seal, CR#85015, 10.508 OD, 8.500 Shaft, .625 Width	1	JSE3-0121-6
7	Grease Fitting, straight, 1/8 NPT	2	
8	Set Screw, socket, 5/8-11 x 7/8" lg.	1	
9	Reset Arrow Plate with rivets	1	
10	Set Screw, socket, 5/16-18 x 5/8" lg.	4	
11	Grease Fitting, right angle, 1/4-28 thd	2	
12	Seal, CR#1800240, 19.508 OD, 18.000 Shaft, .688 Width	1	JSE3-0121-13
13	Seal, CR#1800240, 19.508 OD, 18.000 Shaft, .688 Width	2	
14	Grease Fitting, Vent., 7.5-15psi rating, 1/8 NPT	1	
15	Grease, Mobil SHC220	2	



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Publication: JSE30106

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