

STATIC SHAFT PULLEY (SSP®)

SECTION 1 – GREASING RECOMMENDATIONS

These recommendations are a guideline for typical conveyor applications. They do not overrule bearing or greasing manufacturer's recommendations.

PPI recommends a high-quality, #2 Lithium Complex based mineral oil grease with a viscosity of 200 to 250. Mobilgrease XHP222 is suggested to be used on conveyor pulley applications, including the SSP. When used with an automatic greasing system, a #1 Lithium Complex grease is recommended, such as Mobilgrease XHP221. This is compatible with the initial grease fill. For ambient temperatures from -40°F to 0°F (-40°C to -18°C), it is recommended that a Lithium Complex based synthetic oil grease is used, such as Mobilith SHC220. Suggested greasing intervals during initial use are as follows:

SUGGESTED GREASING INTERVALS

Conditions	up to 120°F (up to 50°C)	120° to 200°F (50° to 90° C)
Clean	2 to 6 months	1 to 2 months
Moderate	Monthly	1 to 4 weeks
Dirty	Weekly	1 to 7 days
Extremely Dirty	Daily	Every Shift
Turnover Pulleys	Daily to Weekly	Every Shift

Check the grease condition for excessive oiliness or dirt and adjust greasing frequency accordingly. For conditions and/or temperatures outside of this range, consult with a reputable lubricant supplier.

PPI grease fills conveyor pulley bearings 100% at the factory. This reduces the possibility of condensation in the housing. This is the preferred method for larger, slower speed bearings such as those used on pulleys. Therefore, some grease may be purged out during the first run of the pulley. This is considered normal. After 8 hours of initial use, all bearings should be re-greased with fresh grease.

Precision Pulley & Idler cannot be held responsible for performance of individual batches of grease. Changes in lubricant specifications, performance, and lubricant guarantees are the responsibility of the lubricant manufacturer.

Warranties shall not apply to any product that has been subject to misuse, misapplication, neglect (including but not limited to improper maintenance and storage), accident, improper installation, modification (including but not limited to use of unauthorized parts or attachments) adjustment, repair, or lubrication. Misuse also includes, without implied limitation, deterioration in the product or part caused by chemical action, wear caused by the presence of abrasive materials, and the improper lubrication. Identifiable items manufactured by others but installed in or affixed to our products are not warranted by us, but bear only those warranties, express or implied, given by the manufacturer of that item, if any.

Responsibility for system design to ensure proper use and application of Precision Pulley & Idler products within their published specifications and ratings rest solely with the customer. This includes without implied limitation analysis of loads created by vibrations within the entire system regardless of how induced.

SECTION 2 – GREASING PROCEDURE

The seal carrier has three holes in it. Two of these holes are setup for 1/4" UNC bolts, to aid in removal of the seal carrier. These are directly across from each other.

The other hole is threaded for 1/8" NPT pipe fitting. One is closer to the shaft and has a grease zerk installed. This is setup to grease the bearing and to purge the bearing grease out through the purgeable contact seal and the taconite seal.

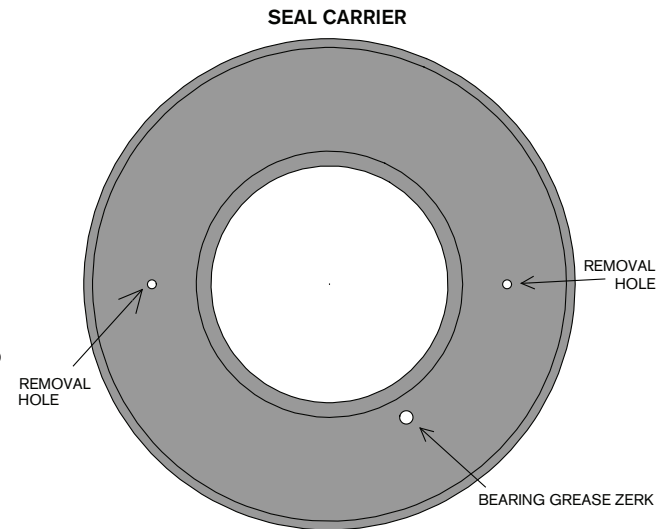
The seal is normally mounted so that the grease fittings are under and protected by the shaft.

For best purging action, it is recommended to install remote grease lines to safely regrease bearings while pulley is rotating.

DO NOT regrease SSP bearings with factory installed grease fittings while pulley is rotating.

Grease using the roller bearing fitting until purging around the seal carrier is noticed.

The following optional method for regreasing of the SSP may be used. Using the chart to the right, the SSP is greased with the volume of grease listed. This will purge all of the old grease out of the bearing, replacing it with fresh grease. The old grease is purged out through the two v-ring contact seals and is purged out through the seal carrier.



GREASE VOLUME FOR OPTIONAL METHOD

SSP SIZE	Bearing Diameter	Shaft Ext. Diameter	Grease Volume (Oz)
015	2.953	2 7/16	1.4
020	3.937	3 1/2	3.0
022	4.331	4	3.7
024	4.724	4 1/2	4.4
026	5.118	5	5.2
028	5.512	5	6.0
030	5.906	5 1/2	6.9
032	6.299	6	8.2
034	6.693	6 1/2	9.4
036	7.087	7	9.7
038	7.480	7	11
044	8.661	8	15
148	9.449	9	18
152	10.236	9	22
156	11.024	10	24
160	11.811	11	28
268	13.386	12	64
276	14.961	13	80
284	16.535	14	116

SECTION 3 – MAINTENANCE

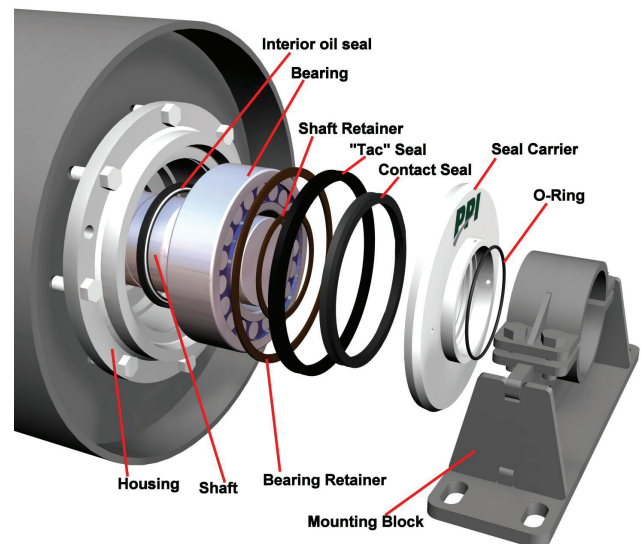
The first step in removal of the bearing from a SSP is to clean the exterior surface of the shaft and other surfaces that might contaminate the bearing housing and interfere with removal of the unit. Loosen or remove the locking bolts on the mounting block and remove the mounting block from the shaft.

There are several different types of mounting blocks, but all are straightforward on removal and are not covered here. If your block has a single locking bolt, you may need to drive a screwdriver in the split; to spread the clamp apart and release its hold on the shaft.

Start by loosening the setscrews that hold the seal carrier to the shaft. There are several ways to remove the seal carrier. The first method is to remove the plugs in the removal holes and thread in a 1/4" UNC bolt. This bolt is used to grab and wiggle the seal back and forth to slide the seal carrier off the shaft.

While this works well for most cases, there are alternatives. One is to use two large screwdrivers and insert them in between the seal carrier and housing to pry the seal carrier out and off the shaft.

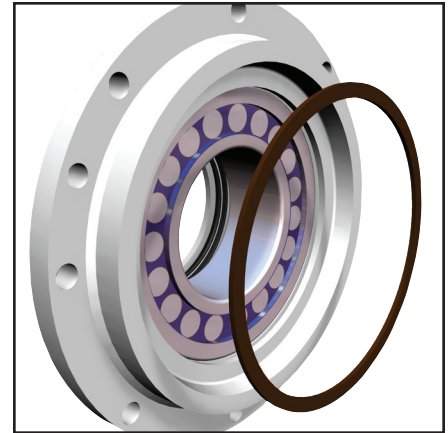
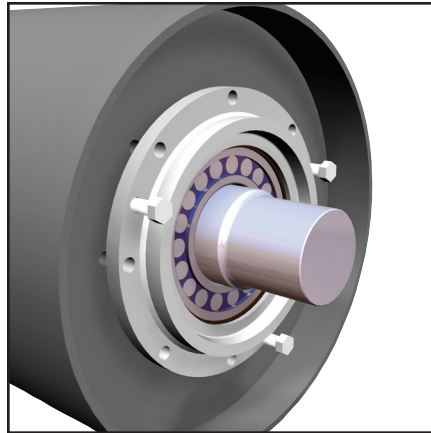
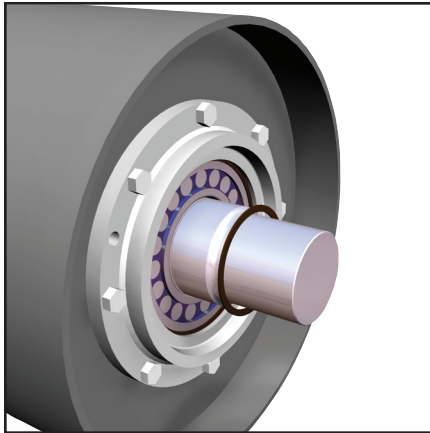
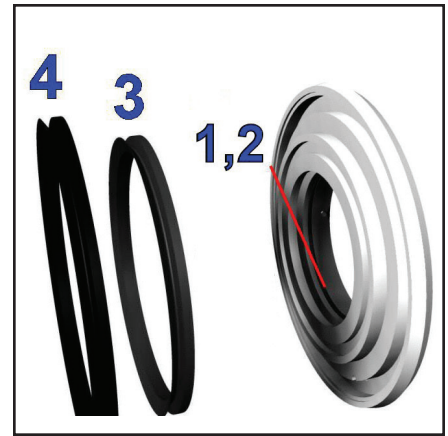
Another alternative is for a split block or one that has the removal holes. In this case, the mounting block would still be on the shaft or slid back into place up against the journal. Step 1 will be to cut a piece of threaded rod equal to the distance between the seal carrier and mounting block, plus the thickness of the mounting block and one inch. The threaded rod is to be inserted in the removal holes, which are level with the shaft centerline, and into the threaded holes in the seal carrier. Install a 1/4" flat washer,



1/2" flat washer, and a nut on each threaded rod. The second washer is required due to the oversize of the removal hole to make it easy to line up the rod with the seal threaded hole. Then working back and forth, tighten each nut, pulling evenly on the seal carrier. Slide it towards the mounting block until it is loose on the shaft. For the composite carrier, remove the assembly bolts and insert the 1/4" bolt or threaded roll in the bolt holes.

You will only have to pull the carrier by the length of the seal carrier. The shaft is stepped to fit each part for only the length of that item.

The seal carrier can be removed and inspected for damage. (Shown is the Rev 1 Carrier, for Rev 0, see Page 5) There are four contact seals in the seal carrier. Seal 4 is the taconite seal. Seal 3 is the standard contact seal. Seal 1 and 2 are a set of two contact seals for the shaft (O-rings).



The first step in rebuilding the seal carrier is to replace the two O-rings on the ID of the carrier, which is Seal 1. This is made from a 1/8" diameter O-ring cord. The cord should be slightly longer than what is needed to run around the inside O-ring groove. The slight extra length of 1/8" fills the juncture, preventing a break in the sealing by the O-ring. To facilitate the replacement of the seal carrier, it is recommended that caulking is placed in the grooves that the O-rings rest upon. The caulking helps hold the O-rings into place during installation ensuring proper installation of the seals.

Next, replace the V-ring seal, Seal 3. This goes onto a machine step in the seal carrier. The V-ring lip should face the bearing, not the seal carrier. (Check the appendix for part numbers.)

For the taconite seal, the outer V ring seal or Seal 4, will need to be replaced as in the previous step. Make sure the V-ring lip faces the bearing as in the illustrations.

Lay the seal carrier in a protected place until needed when re-installing the SSP.

On one end of the SSP pulley there will be a retainer ring holding the bearing to the shaft. This is the fixed or held end. This retainer will need to be removed before removal of the bearing housing from the pulley. For this procedure, use a screwdriver and wedge it between the retainer and the shaft. The retaining ring is a spiral that wraps around the shaft twice. On the end of the retainer is a lip, which you can get a screwdriver tip underneath. Pry up and out on the end of the retainer, pulling the end out of the groove in the shaft until you can get a screwdriver between the start of the retainer and the rest of the retainer.

Once this has been accomplished, spiral the second screwdriver around the shaft keeping it between the spirals of the retainer and pulling on the end of the retainer. With a couple of spirals the retainer will be free and can be removed from the shaft.

Next, remove the mounting bolts and thread them into the backout holes. Tighten these bolts evenly, pulling the bearing housing out of the pulley.

With the bearing housing free, remove the retainer ring that holds the bearing in the housing. This retainer is very similar to the retainer that fit on the shaft in which you can use the same procedure. Use a screwdriver to pry inward and out on the end of the retainer so that you can spiral off the retainer.

The bearing is lightly pressed into the housing. Remove it as one would press out any bearing. Then the rear seal can be pressed out and replaced. The seal is lightly pressed into the housing.

Clean, inspect and/or replace the bearing and parts as needed. To clean, inspect and update the grease channel, follow the steps below.

The old grease channel should be removed and the grease cleaned out and inspected for any damage to the shaft. The new grease channel should be pressed into the same position.

There are two sizes of grease channels, one has a 3/8 x 3/8 cross section, while the other is 1/2 x 1/2. Use the appropriate size, that fits snug into your keyway. There is an 1/8" groove in the channel, this should face down or into the key slot. The channel is approximately the same length as the straight part of the keyway.

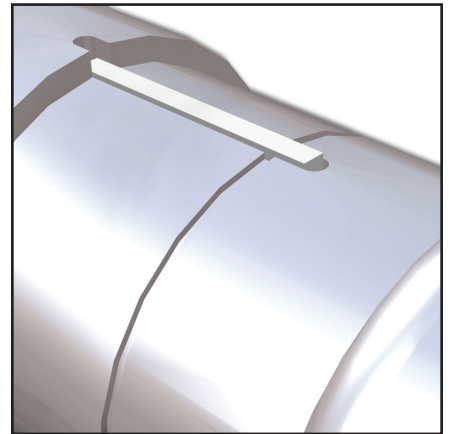
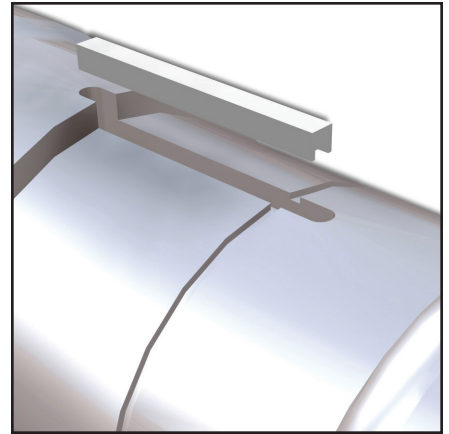
The channel is slightly taller than the keyway. This is done on purpose, so that the channel can be sanded to match the radius of the shaft to form a tight fit under the bearing. Once the grease channel is firmly seated in the keyway, sand the top of the plastic channel to match the shaft, and remove any dust created in the process.

If a retainer ring is used to hold the bearing to the shaft, a groove will need to be cut in the grease channel to match the retainer groove in the shaft. It is easiest to do this before re-installing the bearing.

When putting in the retainer rings it is best to spread the ring with a screwdriver. Push one end into the groove then run your finger around the diameter, pressing sideways on the retainer ring, nudging it into the groove, then spiral it around until it snaps into place.

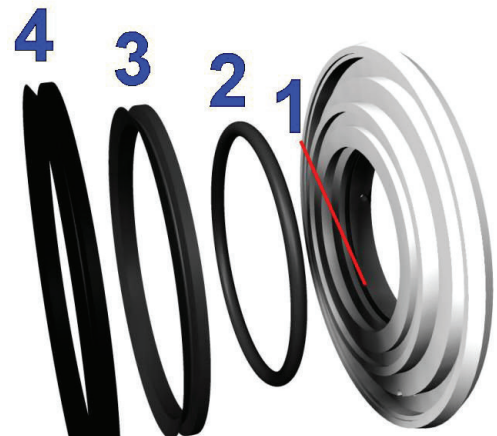
To reassemble the pulley, reverse the steps.

The seal carrier should be set so that the edge of the bevel is flush with the bearing housing, see Appendix C for details.



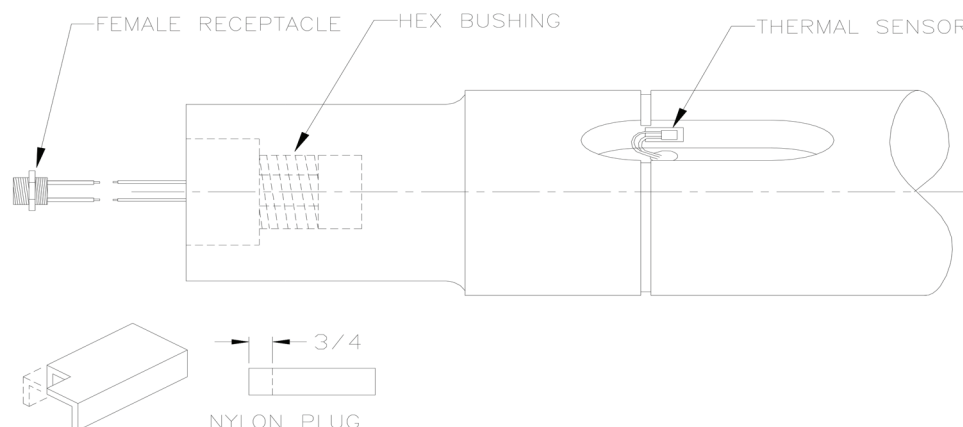
Rev 0 Seal Carrier

The Rev 0 seal carrier used a 3/8" diameter sponge rubber cord between the bearing and the seal carrier instead of a second o-ring. This is Seal 2 in the figure to the right. This will need to be replaced instead of the 2nd O-Ring on the ID of the seal carrier.



Optional temperature sensor for the bearings on the SSP design

Using an ohmmeter, the resistance can be measured from the leadwires, and can be translated to a temperature reading. A transmitter can also be attached to the wires to customize output readings.

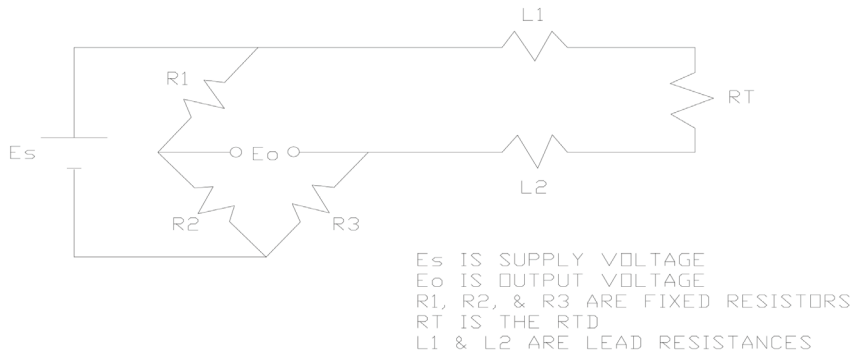


When using long lead wires, errors in readings occur due to resistance in the wires. Approximate errors can be calculated using the following equations:

$R = L \times N$ WHERE: L = LENGTH OF WIRE (FT)
 N = RESISTANCE OF WIRE (OHMS/FT)

$E = R / T$ WHERE: E = ERROR (°C)
 T = TCR OF SENSOR X ELEMENT RESISTANCE (OHM/°C)

Another method to reduce lead wire error is to connect the 2-wire rtd to a wheatstone bridge circuit.



APPENDIX A – SSP SEALS V-RING CONTACT SEALS (with reference dimensions)

Nominal Description	Max. Dia.	Min. Dia.	SSP Size	SSP Tac Size	Weight (lbs)	PPI Part #
Contact Seal V-110A	4.528	4.134	015		0.1	29760
Contact Seal V-120A	4.921	4.528		015	0.1	29761
Contact Seal V-160A	6.496	6.102	020		0.1	29755
Contact Seal V-170A	6.890	6.496	022	020	0.1	29756
Contact Seal V-180A	7.283	6.890	024		0.1	29757
Contact Seal V-190A	7.677	7.283	026	022	0.1	29758
Contact Seal V-199A	8.268	7.677		024	0.2	29759
Contact Seal V-200A	8.268	7.480	028		0.5	29762
Contact Seal VL220	9.173	8.267		026	0.1	29788
Contact Seal V-220A	9.252	8.268	030, 032		0.6	29763
Contact Seal V-250A	10.433	9.252	034, 036	028, 030	0.6	29764
Contact Seal V-275A	11.417	10.433	038	032	0.7	29765
Contact Seal V-300A	12.205	11.417		034, 036	0.7	29766
Contact Seal V-325A	13.189	12.205	044, 148	038	0.8	29767
Contact Seal V-375A	15.354	14.370	152		0.9	29769
Contact Seal V-400A	16.929	15.354	156	044, 148	0.9	29772
Contact Seal V-450A	18.898	16.929	160	152, 156	0.9	29775
Contact Seal V-500A	20.866	18.898		160	0.9	29773
Contact Seal V-550A	22.835	20.866	268, 276		1.2	29777
Contact Seal V-600A	24.803	22.835		268	1.2	29778
Contact Seal V-650A	26.181	24.803	284	276	1.1	29779
Contact Seal V-725A	29.331	27.756		284	1.4	29787

SSP INTERIOR CONTACT SEAL (with reference dimensions)

Nominal Description	OD	ID	PPI #	SSP Size
Oil Seal 34454TA-H	4.50	3.44	510118	015
Oil Seal 110x130x12TC	5.12	4.33	510100	020
Oil Seal 120x145x12TC	5.71	4.72	510102	022
Oil Seal 130x160x12SC	6.30	5.12	510103	024
Oil Seal 145x180x12SC	7.09	5.71	510104	026
Oil Seal 155x190x15TC	7.48	6.10	510105	028
Oil Seal 165x195x15TC	7.68	6.50	510106	030
Oil Seal 175x200x15TC	7.87	6.89	510107	032
Oil Seal 190x225x15TC	8.86	7.48	510108	034
Oil Seal 200x235x15TC	9.25	7.87	510109	036
Oil Seal 210x240x15SC	9.45	8.27	510110	038
Oil Seal 230x260x15SC	10.24	9.06	510111	044
Oil Seal 250x280x15TC	11.02	9.84	510112	148
Oil Seal 280x320x20TC	12.59	11.02	510114	152
Oil Seal 300x340x16TC	13.39	11.81	510115	156
Oil Seal 320x360x20TC	14.17	12.59	510113	160
Oil Seal 360x400x20TC	15.75	14.17	510123	268
Oil Seal 410x460x15SA	18.11	16.14	510117	276
Oil Seal 460x500x20SA	19.68	18.11	510126	284
O Ring Seals	Diameter		PPI #	SSP #
O Ring Cord	1/8		500171	ALL
Sponge Rubber Cord for Rev 0 Housings only	3/8		500180	020-026
Sponge Rubber Cord for Rev 0 Housings only	1/2		500181	028-148

APPENDIX B - SSP RETAINERS

SHAFT RETAINERS

Nominal Description	ID	OD	PPI #	Vendor #	SSP Size
Ext. Retain Ring - 2.952	2.86	3.19	04283	WS-295	015
Ext. Retain Ring - 4.000	3.79	4.33	04245	WSM-400	020
Ext. Retain Ring - 4.375	4.19	4.73	04246	WSM-437	022
Ext. Retain Ring - 4.750	4.55	5.09	04247	WSM-475	024
Ext. Retain Ring - 5.125	4.98	5.48	04248	WS-512	026
Ext. Retain Ring - 5.500	5.35	5.85	04249	WS-550	028
Ext. Retain Ring - 6.000	5.75	6.50	04251	WST-600	030
Ext. Retain Ring - 6.299	6.13	6.75	04252	WS-629	032
Ext. Retain Ring - 6.750	6.47	7.30	04253	WSM-675	034
Ext. Retain Ring - 7.000	6.71	7.54	04254	WSM-700	036
Ext. Retain Ring - 7.500	7.18	8.05	04260	WSM-750	038
Ext. Retain Ring - 8.750	8.38	9.25	04266	WSM-875	044
Ext. Retain Ring - 9.500	9.10	10.10	04267	WSM-950	148
Ext. Retain Ring - 10.25	9.81	10.81	04272	WSM-1025	152
Ext. Retain Ring - 11.00	10.55	11.55	04274	WSM-1100	156
Ext. Retain Ring - 12.00	11.49	12.61	04278	WSM-1200	160
Ext. Retain Ring - 13.50	12.93	14.25	04287	WSM-1350	268
Ext. Retain Ring - 15.00	14.36	15.86	04282	WSM-1500	276
Ext. Retain Ring - 16.535	15.86	17.36	04289	16.535-SD	284

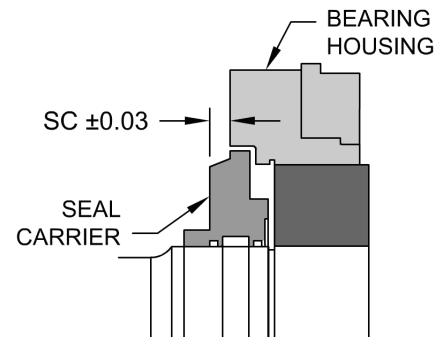
BEARING RETAINERS

Nominal Description	OD	ID	PPI #	Vendor #	SSP Size
Internal Retain Ring - 5.250	5.39	4.89	04285	WH-525	015
Internal Retain Ring - 7.086	7.28	6.65	04255	WH-708	020
Internal Retain Ring - 7.875	8.08	7.45	04256	WH-787	022
Internal Retain Ring - 8.464	8.68	7.93	04257	WH-846	024
Internal Retain Ring - 9.055	9.29	8.54	04258	WH-905	026
Internal Retain Ring - 9.750	9.99	9.24	04259	WH-975	028
Internal Retain Ring - 10.50	10.75	10.00	04261	WH-1050	030
Internal Retain Ring - 11.50	12.02	10.89	04262	WHM-1150	032
Internal Retain Ring - 12.25	12.80	11.68	04263	WHM-1225	034
Internal Retain Ring - 12.50	13.06	11.94	04264	WHM-1250	036
Internal Retain Ring - 13.50	14.11	12.98	04265	WHM-1350	038
Internal Retain Ring - 15.75	16.25	14.93	04268	WHL-1637	044, 148
Internal Retain Ring - 17.375	18.07	16.77	04273	WHM-1737	152
Internal Retain Ring - 18.25	18.95	17.50	04277	WHM-1825	156
Internal Retain Ring - 19.875	20.37	19.12	04279	WHL-2052	160
Internal Retain Ring - 620	24.91	23.41	04286	423486	268
Internal Retain Ring - 26.875	27.37	25.87	04284	WHL-2758	276
Internal Retain Ring - 29.921	30.42	28.92	04288	29.921-BD	284

APPENDIX C SSP SEAL LOCATION & BOLT TORQUE CHART

SSP SIZE	Shaft Diameter at Bearing	Shaft Diameter at Ext.	Capscrew & Washer		SC
			(Qty: Size)	ft-lbs	
015	2.953	2 7/16	4 @ 5/8-11 UNRC x 2 1/2	150	0.25
020	3.937	3 1/2	4 @ 3/4-10 UNRC x 3	250	0.39
022	4.331	4	6 @ 3/4-10 UNRC x 3		0.41
024	4.724	4 1/2			0.45
026	5.118	5	6 @ 7/8-9 UNRC x 3 1/2	400	0.63
028	5.512	5			0.53
030	5.906	5 1/2			0.63
032	6.299	6			0.56
034	6.693	6 1/2	8 @ 7/8-9 UNRC x 6	400	0.40
036	7.087	7			0.24
038	7.480	7			0.32
044	8.661	8	16 @ 7/8-9 UNRC x 6	1,000	0.60
148	9.449	9	16 @ 7/8-9 UNRC x 6		0.60
152	10.236	9			0.60
156	11.024	10			0.60
160	11.811	11			0.60
268	13.386	12	24 @ 7/8-9 UNRC x 6		0.60
276	14.961	13	20 @ 1-1/4-6 UNC x 6	1,000	0.45
284	16.535	14	24 @ 1-1/4-6 UNC x 6		0.45

Install seal carrier until the edge of the bevel is even with the bearing housing face as shown below



APPENDIX D SSP BEARING ASSEMBLY

SSP SERIES	BEARING PART #	BEARING SIZE	BEARING BORE (mm)	BEARING BORE (in)	SHAFT DIA. at EXT.	HUB KIT PART NUMBER	BEARING KIT PART NUMBER	SEAL KIT PART NUMBER
SSP015	22215	15	75	2.953	2 7/16	SSP015HUBKIT	SSP015BRGKIT	SSP015SEALKIT
SSP020	22220	20	100	3.937	3 1/2	SSP020HUBKIT	SSP020BRGKIT	SSP020SEALKIT
SSP022	22222	22	110	4.331	4	SSP022HUBKIT	SSP022BRGKIT	SSP022SEALKIT
SSP024	22224	24	120	4.724	4 1/2	SSP024HUBKIT	SSP024BRGKIT	SSP024SEALKIT
SSP026	22226	26	130	5.118	5	SSP026HUBKIT	SSP026BRGKIT	SSP026SEALKIT
SSP028	22228	28	140	5.512	5	SSP028HUBKIT	SSP028BRGKIT	SSP028SEALKIT
SSP030	22230	30	150	5.906	5 1/2	SSP030HUBKIT	SSP030BRGKIT	SSP030SEALKIT
SSP032	22232	32	160	6.299	6	SSP032HUBKIT	SSP032BRGKIT	SSP032SEALKIT
SSP034	22234	34	170	6.693	6 1/2	SSP034HUBKIT	SSP034BRGKIT	SSP034SEALKIT
SSP036	22236	36	180	7.087	7	SSP036HUBKIT	SSP036BRGKIT	SSP036SEALKIT
SSP038	22238	38	190	7.480	7	SSP038HUBKIT	SSP038BRGKIT	SSP038SEALKIT
SSP044	22244	44	220	8.661	8	SSP044HUBKIT	SSP044BRGKIT	SSP044SEALKIT
SSP148	23148	48	240	9.449	9	SSP148HUBKIT	SSP148BRGKIT	SSP148SEALKIT
SSP152	23152	52	260	10.236	9	SSP152HUBKIT	SSP152BRGKIT	SSP152SEALKIT
SSP156	23156	56	280	11.024	10	SSP156HUBKIT	SSP156BRGKIT	SSP156SEALKIT
SSP160	23160	60	300	11.811	11	SSP160HUBKIT	SSP160BRGKIT	SSP160SEALKIT
SSP268	23268	68	340	13.386	12	SSP268HUBKIT	SSP268BRGKIT	SSP268SEALKIT
SSP276	23276	76	380	14.961	13	SSP276HUBKIT	SSP276BRGKIT	SSP276SEALKIT
SSP284	23284	84	420	16.535	14	SSP284HUBKIT	SSP284BRGKIT	SSP284SEALKIT

Hub Kit includes the following:

BEARING HOUSING
MOUNTING BOLTS with LOCK WASHERS
GREASE CHANNEL
GREASE FITTINGS
BEARING INSERT
SPONGE CORD for Rev 0 housings

INTERNAL RETAINING RING
EXTERNAL RETAINING RING
SEAL CARRIER
OIL SEAL
CONTACT SEALS
O-RING

BRG Kit includes the following:

BEARING INSERT
INTERNAL RETAINING RING
EXTERNAL RETAINING RING
OIL SEAL
2 CONTACT SEALS
O-RING

SEAL Kit includes the following:

OIL SEAL
2 CONTACT SEALS
O-RING

All kits include standard and taconite contact seals. Hub and bearing kits include fixed and free retainer setups.



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