



**SHUR-LOK CORPORATION**  
**TECHNICAL SALES BULLETIN**

**TSB 0022**

**TITLE: SLAS1301 – PORT PREPARATION, INSTALLATION AND REMOVAL OF ADAPTER**

Rev: 1

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**1. SCOPE:**

1.1. This provides the minimum design, port preparation and installation and removal requirements for SLAS1299, SLF3003, SLAS1985, SLAS1986, SLAS4099 and SLAS5368 adapters and is applicable when specified on engineering drawings. These instructions are not intended to supersede or supplement any specific instructions that are provided by the Design Activity or Responsible Customer unless indicated as such.

**2. GENERAL DESIGN INFORMATION**

2.1. These adapters provide a semi-permanent male fitting for use in fluid systems per table 1:

TABLE 1 - PRESSURE SYSTEMS

<b>SYSTEM WORKING PRESSURE</b>			
<b>Sta-Lok Part Number Series</b>	<b>Operating psi</b>	<b>Burst psi</b>	<b>Sizes</b>
SLAS1299	3,000	12,000	All
SLF3003	3,000	12,000	All
SLAS1985	4,000	16,000	All
SLAS1986	4,000	16,000	2, 3, 5, 14, 20 and 24
SLAS1986	5,000	20,000	4, 6, 8, 10, 12 and 16
SLAS4099	4,000	16,000	All
SLAS5368	3,000	12,000	All

2.2. Adapters per SLAS1299, SLF3003, SLAS1985, SLAS1986, SLAS4099 and SLAS5368 installed per this document into ports per SLAS1300 shall have a stand-off per dimension “P” in figure 1 and table 2.

2.3. O-ring size per table 2 and per AS568 must be used. The O-ring compound shall be specified by the using design activity and shall be selected based on system fluid and temperature.

2.4. The lockring is driven into the mating port serrations after the adapter has been torqued. This prevents the adapter from rotating in the port during coupling nut assembly and disassembly and also eliminates the necessity of lock wiring the adapter. Only one wrench is required to install or to remove coupling nut.

2.5. Adapter removal is accomplished by lifting the lockring out of the port using a removal tool see table 4.





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### 3. DESIGN REQUIREMENTS:

#### 3.1. Minimum data to be specified on engineering drawing or specification.

3.1.1. Port diameter to be at least the minimum specified in SLAS1300.

3.1.2. Location of port.

3.1.3. Specify port size per SLAS1300. If tap drill depth is not through, then specify control dimensions.

3.1.4. Specify adapter size per SLAS1299, SLF3003, SLAS1985, SLAS1986, SLAS4099 or SLAS5368.

3.1.5. Specify O-ring size and compound (see section 2.3)

3.1.6. Install adapter per SLAS1301.

3.1.7. Corrosion protection is specified in 5.2.4. If materials or fluids require primer different from zinc chromate primer or if an additional sealant is required, so specify.

3.1.8. Pressure testing of individual unit is specified in section 6.0.

3.1.9. The boss material for a 3,000, 4,000 or 5,000 psi system must have minimum shear strength per table 6 to resist the axial load being generated from a respective burst pressure of 12,000, 16,000 or 20,000 psi (based on thread minimum shear engagement area shown).

### 4. PORT PREPARATION

4.1. Prepare boss and port dimensions per SLAS1300. Drill thru or to depth specified on applicable drawing. Use a drill with a diameter .015 - .030 smaller than that specified as the minor diameter on SLAS1300 standard. This will allow the McKinnon MPT porting tool to finish the minor diameter of the port thread to the sizes required for piloting of the broach tool (refer to port preparation tools in table 3).

4.2. Chip removal is required after broaching and prior to installing the adapter.



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**TABLE 3 – PORT PREPARATION TOOLING**

Port Number	Porting Tool	Broaching Tool (Select one)				Chip Removal
		Hand Held	Non-Impact	EDM	Wobble	
		[1] (Boss hardness up to 32 HRC)	[2] [3] [4] (Boss hardness up to 40 HRC)	[5] (Boss hardness above 40 HRC)	[6] (Boss hardness up to 40 HRC)	[7] [8]
02	MPT02*	MFOPB5002	MFOPB5002HDB	MFOPB5002ED3	MFOPB5002WBA	MF02CR
03	MPT03*	MFOPB5003	MFOPB5003HDB	MFOPB5003ED3	MFOPB5003WBA	MF03CR
04	MPT04*	MFOPB5004	MFOPB5004HDB	MFOPB5004ED3	MFOPB5004WBA	MF04CR
05	MPT05	MFOPB5005	MFOPB5005HDB	MFOPB5005ED3	MFOPB5005WBA	MF05CR
06	MPT06	MFOPB5006	MFOPB5006HDB	MFOPB5006ED3	MFOPB5006WBA	MF06CR
08	MPT08	MFOPB5008	MFOPB5008HDB	MFOPB5008ED3	MFOPB5008WBA	MF08CR
10	MPT10	MFOPB5010	MFOPB5010HDB	MFOPB5010ED3	MFOPB5010WBA	MF10CR
12	MPT12	MFOPB5012	MFOPB5012HDB	MFOPB5012ED3	MFOPB5012WBA	MF12CR
14	MPT14	MFOPB5014	MFOPB5014HDB	MFOPB5014ED4	MFOPB5014WBA	MF14CR
16	MPT16	MFOPB5016	MFOPB5016HDB	MFOPB5016ED3	MFOPB5016WBA	MF16CR
20	MPT20	MFOPB5020	MFOPB5020HDB	MFOPB5020ED3	MFOPB5020WBA	MF20CR
24	MPT24	MFOPB5024	MFOPB5024HDB	MFOPB5024ED3	MFOPB5024WBA	MF24CR
32	MPT32	MFOPB5032	MFOPB5032HDB	MFOPB5032ED3	MFOPB5032WBA	MF32CR

\* Solid Carbide Porting Tool all others have Carbide Tip

[1] Replacement cutters may be purchased individually MFOPB50( )-3

[2] 2 extra cutters are provided with each tool

[3] Replacement cutters may be purchased individually MFOPB50( )HDB5

[4] Replacement studs may be purchased individually MFOPB50( )HDB4

[5] MFOPB50XXED3 material Copper Tungsten. MFOPB50( )ED2 material is Poco Graphite

[6] Cutter and screw combination can be ordered separately for spares or replacements MFOPB50( )WBA23

[7] Cutter is replaceable and can be ordered separately for spares. One spare cutter is supplied with each tool assembly MF( )CRP-1

[8] MF( )CR can be replaced with MF( )CRP for CNC Machine vs manual operation

Tools are available from McKinnon Industries, a Shur-Lok Company. Tel (949) 655-9231 Fax (949) 655-9254

Note: These adapters require special tooling for proper installation.

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**TABLE 4 – INSTALLATION & REMOVAL TOOLING**

Port Number	Installation Tools					Lockring Removal Tool	Kit Part Numbers
	O-ring Tool	Combination Wrench & Drive Tool		Wrench Part Number [1]	Lockring Drive Tool Number [1]		
		[2]	SLAS1986				
02	MORT216	MF9802DW	MF5002DW	MF6902W	MF9802DEK	MF02LPDE	MKM35
03	MORT250	MF9803DW	MF5003DW	MF6903W	MF9803DEK	MF03LPDE	MKM36
04	MORT312	MF9804DW	MF5004DW	MF6904W	MF9804DEK	MF04LPDE	MKM18
05	MORT375	MF9805DW	MF5005DW	MF6905W	MF9805DEK	MF05LPDE	MKM29
06	MORT437	MF9806DW	MF5006DW	MF6906W	MF9806DEK	MF06LPDE	MKM30
08	MORT562	MF9808DW	MF5008DW	MF6908W	MF9808DEK	MF08LPDE	MKM13
10	MORT687	MF9810DW	MF5010DW	MF6910W	MF9810DEK	MF10LPDE	MKM19
12	MORT812	MF9812DW	MF5012DW	MF6912W	MF9812DEK	MF12LPDE	MKM31
14	MORT937	MF9814DW	MF5014DW	MF6914W	MF9814DEK	MF14LPDE	MKM32
16	MORT1125	MF9816DW	MF5016DW	MF6916W	MF9816DEK	MF16LPDE	MKM14
20	MORT1312	MF9820DW	MF5020DW	MF6920W	MF9820DEK	MF20LPDE	MKM15
24	MORT1625	MF9824DW	MF5024DW	MF6924W	MF9824DEK	MF24LPDE	MKM28
32	MORT2125	MF9832DW	MF5032DW	MF6932W	MF9832DEK	MF32LPDE	MKM33

[1] Must select Combination Wrench/Drive Tool or both Wrench Tool and Lockring Drive Tool

[2] Combination tools are for SLAS1299, SLF3003, SLAS1985, SLAS4099 and SLAS5368 adapter series

Tools are available through McKinnon Industries, a Shur-Lok Company. Tel (949) 655-9231 Fax (949) 655-9254

**TABLE 5 – INSTALLATION TORQUE VALUES**

Port Number	Installation Torque lbf-in	
	Min	Max
02	16	21
03	38	45
04	60	100
05	100	120
06	180	245
08	430	510
10	600	680
12	855	945
14	995	1105
16	1140	1260
20	1520	1680
24	1900	2100
32	2660	2940



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**TABLE 6 – AXIAL LOAD AND BOSS Fsu MINIMUM**

Port Number	K [1] Total Thread Minimum Shear Engagement Area in <sup>2</sup>	L Port "D" Maximum Per SLAS1300 Ref in	M [2] Axial Load on Adapter			N [3] Boss Material Min Fsu (psi) Required to Resist Axial Load		
			Developed by 12,000 psi Burst Pressure lbf	Developed by 16,000 psi Burst Pressure lbf	Developed by 20,000 psi Burst Pressure lbf	3000 psi system	4000 psi system	5000 psi system
			3000 psi system	4000 psi system	5000 psi system	3000 psi system	4000 psi system	5000 psi system
02	0.0417	0.256	618	824	1029	14821	19760	24676
03	0.0802	0.288	782	1024	1303	9751	13005	16247
04	0.0989	0.341	1096	1461	1827	11082	14773	18473
05	0.1406	0.403	1531	2041	2551	10889	14517	18143
06	0.1734	0.466	2047	2729	3411	11805	15739	19671
08	0.2610	0.584	3214	4286	5357	12315	16422	20525
10	0.3807	0.727	4981	6642	8302	13084	17447	21807
12	0.4550	0.901	7651	10201	12752	16816	22420	28026
14	0.6132	1.032	10037	13384	16729	16369	21827	27281
16	0.7312	1.164	12770	17026	21283	17465	23285	29107
20	0.8559	1.389	18183	24245	--	21245	28327	--
24	1.2328	1.666	26159	34879	--	21220	28293	--
32	2.1634	2.204	45782	61043	--	21162	28216	--

[1] Minimum shear engagement area shown is the assembled dimensional value for the overall engaged area of mating port threads (port threads full depth of fitting). It does not represent a dimension of either of the members in an unassembled condition.

[2] Axial Load = Area X Burst Pressure =  $\frac{\pi L^2}{4} \times \text{Burst Pressure}$

[3] Fsu Min = Axial Load ÷ Area = M ÷ K

**5. INSTALLATION OF ADAPTERS SLAS1299, SLF3003, SLAS1985, SLAS1986, SLAS4099 or SLAS5368 INTO PORT SLAS1300:**

**5.1. O-ring installation**

5.1.1. Place the O-ring (per table 2) over the port thread of the adapter. Submerge the adapter, O-ring tool and O-ring in the fluid to be used in the working system, or a lubricant compatible with the system fluid and all components. Slide the O-ring over the O-ring tool and onto the adapter. Be sure that the O-ring is not twisted and is properly seated in the groove of the adapter. See figure 2.

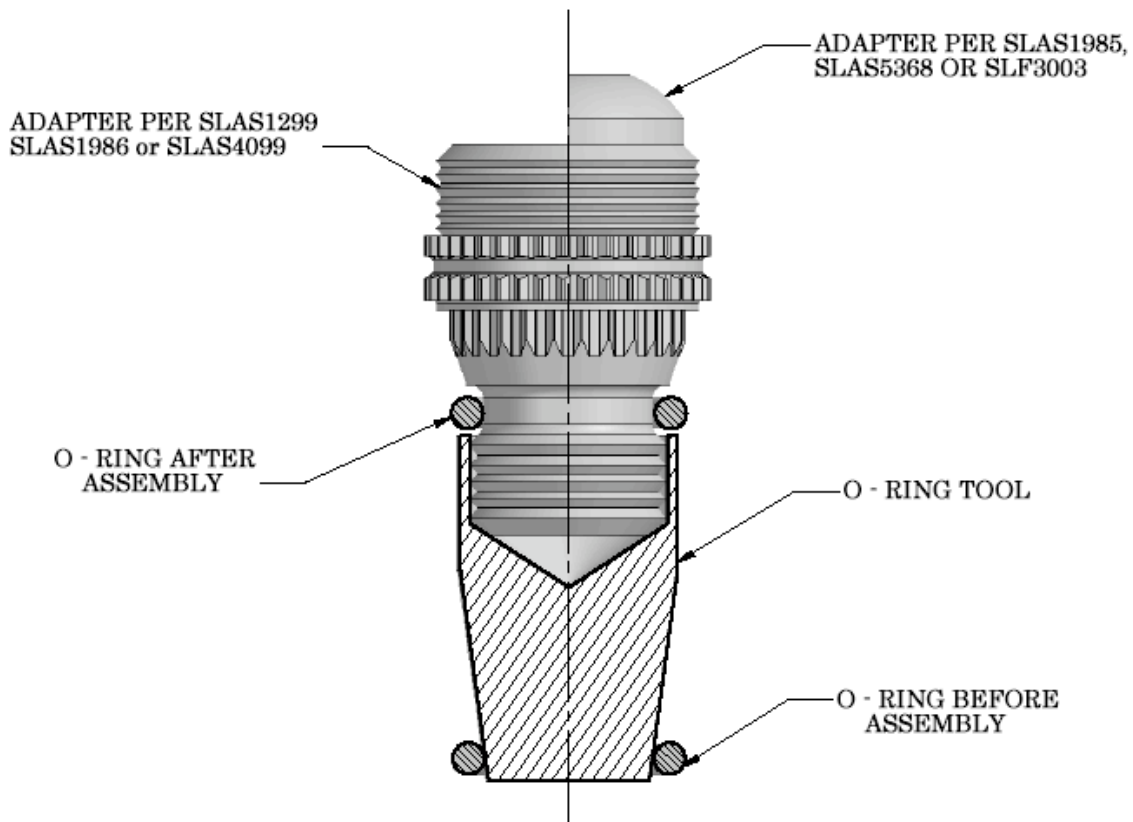


FIGURE - 2 - O - RING INSTALLATION

5.1.2. Remove the O-ring tool.

5.2. Install adapter assembly into port:

- 5.2.1. Lubricate the internal surfaces of the port and the entire adapter assembly using the same fluid or lubricant as specified in 5.1.1. Scratches, dings or rough spots are not allowed in O-ring contact area on the adapter or in the port.
- 5.2.2. Insert the smaller thread of the adapter into port by hand using a clockwise rotation until the adapter is seated. To avoid O-ring damage, the adapter should not be rotated in a counterclockwise direction.
- 5.2.3. Using the applicable combination wrench and drive tool in table 4, engage the serrations of the tool with the external serrations of the adapter locking per figure 3. Place a torque



wrench of the proper size over the hex of the wrench and apply a torque equal to the minimum value specified in table 5. Note the relationship of the locking serrations with respect to the prebroached serrations in the port. If they match, proceed to 5.2.4. If the locking serrations do not match the prebroached serrations in the port, continue to slowly torque the adapter toward the maximum value allowed in table 5 until the serrations match. This will normally take between 3° and 8° of turning, the maximum value need to be reached if the serrations align themselves prior to that value. Do not exceed maximum torque values.

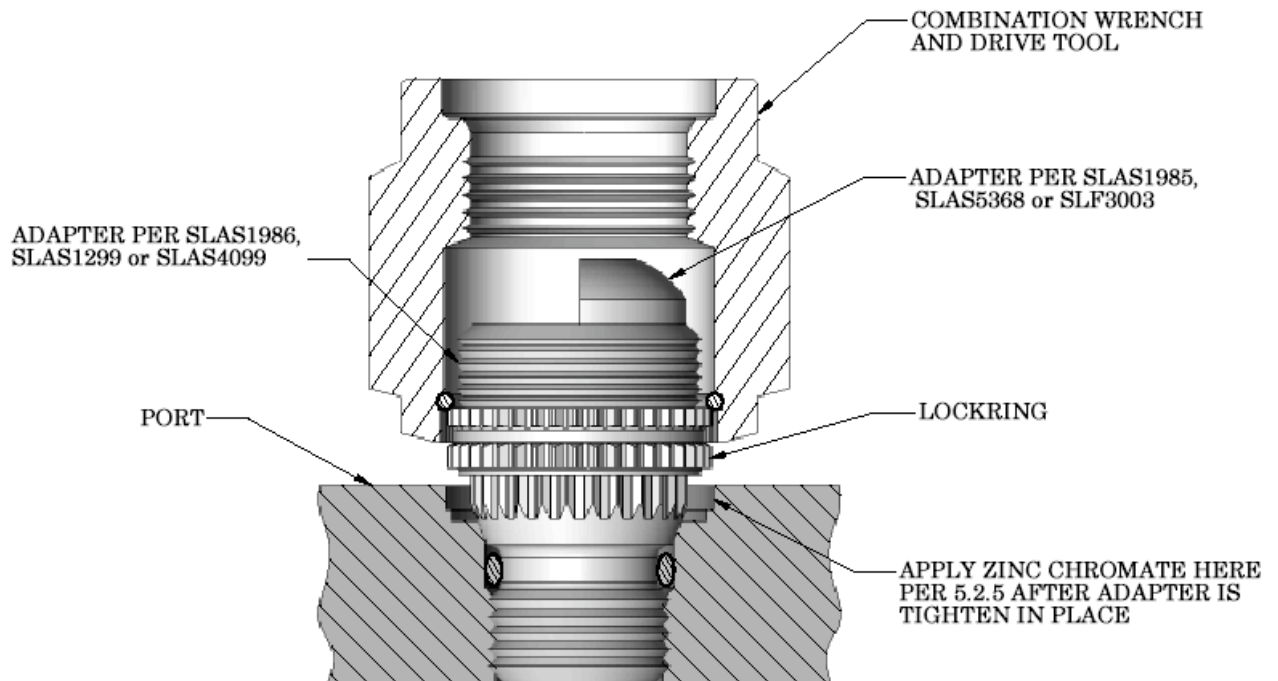


FIGURE - 3 TORQUE ADAPTER ASSEMBLY

5.2.4. Apply enough zinc chromate primer (TT-P-1757) with a brush or small syringe to the counterbore area of the port and below the adapter lockring so primer will be extruded out between external serrations of the lockring and serrations in the port when lockring is installed.

Note: Using design activity may specify another primer in place of, or in addition to, zinc chromate (see 3.1.7).

5.2.5. While the zinc chromate (or other primer) applied per 5.2.4 is still wet, install the locking by rotating the threaded end of the combination wrench and drive tool clockwise onto the adapter assembly until it touches the lockring. Using an open end or socket wrench on the





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tool, turn the tool in a clockwise direction until it bottoms on the port surface as shown in figure 4 visually observe that the tool has bottomed.

Caution: Any sudden increase in torque prior to bottoming may indicate that the locking serrations and the port serrations are not aligned. If this occurs, remove wrench and drive tool by turning counterclockwise. Lift the locking per 7.2. Tighten adapter clockwise per 5.2.3 until serrations in port and the external serrations on the locking are aligned. Reinstall locking and remove excess primer from surface of port and locking.

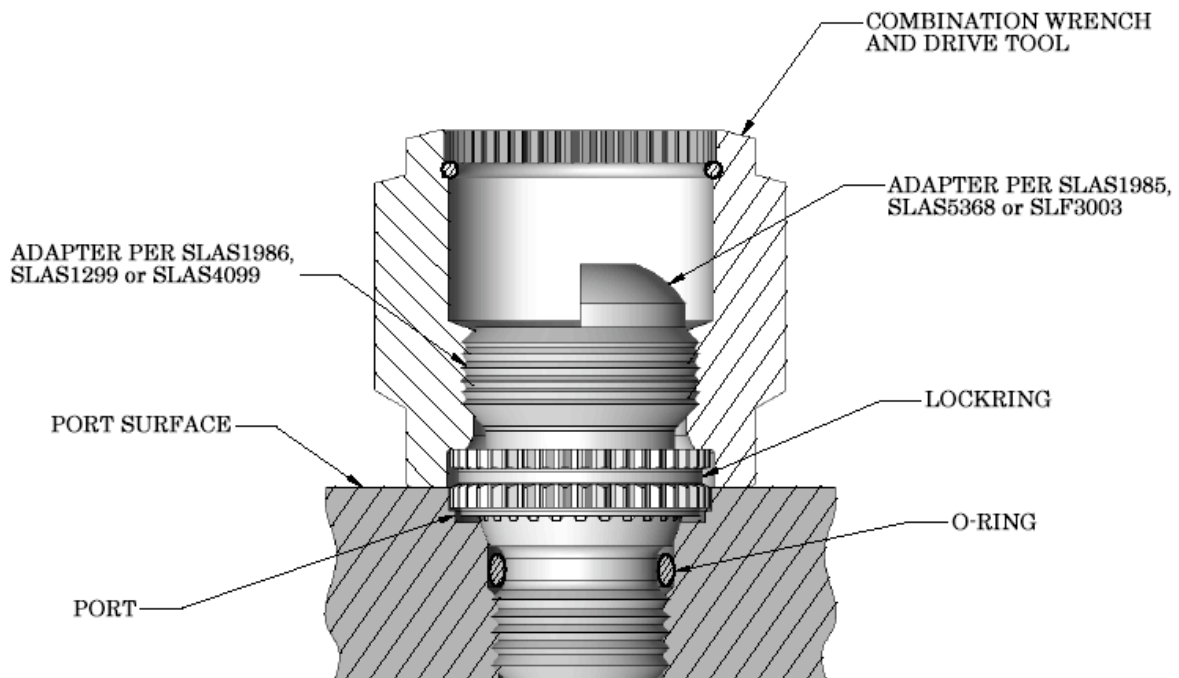


FIGURE - 4 LOCKRING INSTALLATION

## 6. PRESSURE TESTING:

- 6.1. A pressure test of unit may be conducted at this point. Place a pressure cap on the adapter. Pressurize the unit to 1.5 times the operating pressure for 3 minutes. There shall be zero leakage.

Note that the using design activity may require testing other than that shown. See 3.1.8.

## 7. REMOVAL OF ADAPTER

- 7.1. If an additional sealant has been used to cover the lockring, carefully remove sealant to expose lockring.



## 7.2. Lockring Retraction:

7.2.1. Select the proper size removal tool from table 4.

7.2.2. Spread the puller halves apart by retracting the sleeve from the tool until the pin bottoms in the groove of the sleeve per figure 5. Holding the puller halves apart, place tool over protruding adapter so that the nylon pad rests on the top surface of the adapter. Release the puller halves and locate in the groove of the lockring. Adjustment up or down is achieved by rotating the bolt head. Slide the sleeve over the puller halves and check for proper engagement of the puller halves in the lockring groove.

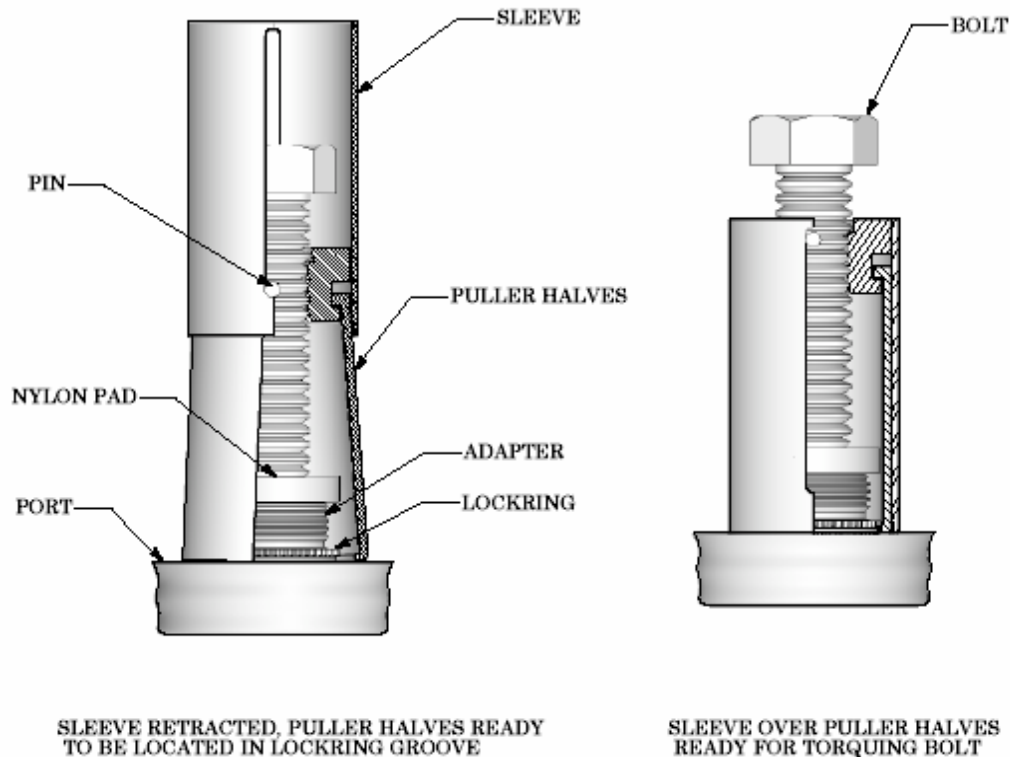


FIGURE 5 - LOCKRING RETRACTION

7.2.3. Place wrench on the bolt head of the removal tool and turn in a clockwise direction while holding the sleeve with the other hand. This action will cause the lockring to be jacked out of the port counterbore. When the external serrations of the lockring are clear of the boss surface, the turning may be stopped. Remove the tool from the adapter by loosening the bolt and lifting the sleeve to free the puller halves.



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7.3. Remove the adapter from Port:

- 7.3.1. Select the proper size combination wrench and drive tool from table 4. Engage the serrations of the wrench with those of the lockring. Using an open end or socket wrench over hex on wrench, turn in a counterclockwise direction to disengage the adapter from the port. Plug the port minor diameter when cleaning out the cavity to avoid contamination of the fluid system.

8. REINSTALLATION OF ADAPTER:

- 8.1. Reinstall the adapter per section 5 using a new O-ring per table 2 section 2.3