DANA SPICER®
Off-Highway Products

Service Manual

25150 Posi-Stop Brake

ASM-0083
March 2006

NOTES

FOREWORD

This manual has been prepared to provide the customer and maintenance personnel with information and instructions on the maintenance and repair of Dana Products.

Extreme care has been exercised in the design and selection of materials and manufacturing of these units. The slight outlay in personal attention and cost required to provide regular and proper lubrication, inspection at stated intervals, and such adjustments as may be indicated will be reimbursed many times in low cost operation and trouble free service.

In order to become familiar with the various parts of the product, it's principle of operation, troubleshooting, and adjustments it is urged that mechanics study the instructions in this manual carefully and use it as a reference when performing maintenance and repair operations.

Whenever repair or replacement of component parts is required, only Dana approved parts as listed in the applicable parts manual should be used. Use of "will fit" or non-approved parts may endanger proper operation and performance of the equipment. Dana does not warrant repair, replacement parts or failures resulting from the use of parts which are not supplied or approved by Dana. Important: Always furnish serial and model numbers when ordering parts.

SAFETY PRECAUTIONS

To reduce the chance of personal injury and/or property damaged, the following instructions must be carefully observed.

Proper service and repair are important to the safety of the service technician and the safe, reliable operation of the machine. If replacement parts are required the part must be replaced with a Dana specified replacement part. Do not use a replacement part of lesser quality.

The service procedures recommended in this manual are effective methods of performing service and repair. Some of these procedures require the use of purpose designed tools.

Accordingly, anyone who intends to use a replacement part, service procedure or tool which is not recommended must first determine that neither his safety or the safe operation of the machine will be jeopardized by the replacement part, service procedure or tool selected.

It is important to note that this manual contains various "Cautions and Notices" that must be carefully observed in order to reduce the risk of personal injury during service or repair. Improper service or repair may damage the unit or render it unsafe. It is important to understand that these "Cautions and Notices' are not exhaustive. It is impossible to warn of all possible hazardous consequences that may result from following or failing to follow these instructions.

TABLE OF CONTENTS

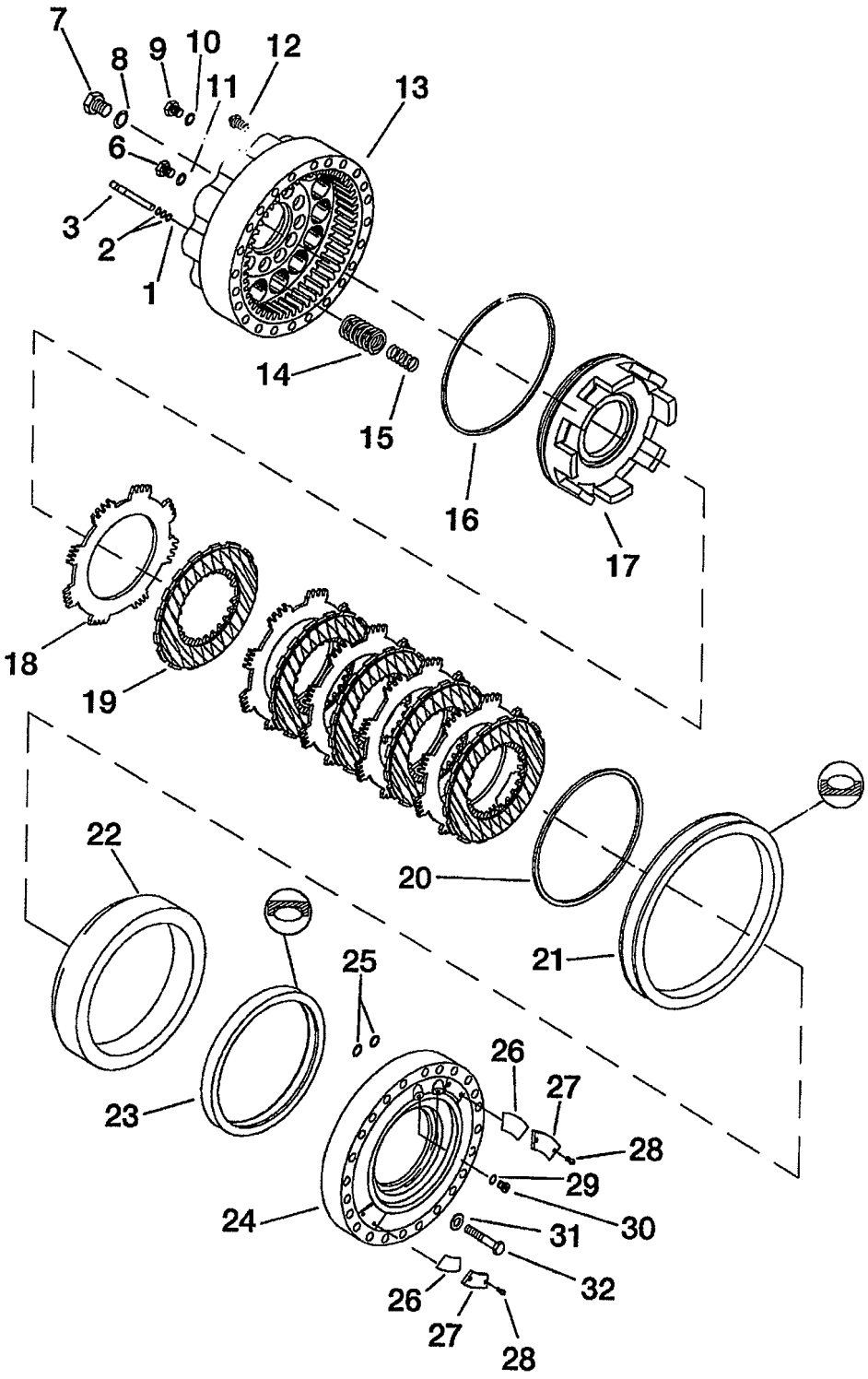
POSI-STOP (LCB) LIQUID COOLED BRAKE

The liquid cooled brake is ideal for use in contaminated or temperature sensitive environments and in machines where extra long maintenance intervals are required. Braking action of the Posi-Stop (LCB) is achieved through the application of the hydraulic piston and brake apply springs with the rotating friction surfaces which react with stationary stator plates. The stator plates are retained by scalloped tangs at the outside diameter, which in turn transfer the reaction torque to the rigid outside housing.

Hub splines are long enough to engage all friction discs before bearings or seals are set. This provides ease of service reassembly.

Wheel bearings are serviced as in any normal bearing service procedure.

POSI-STOP (LCB) EXPLODED VIEW



POSI-STOP (LCB) PARTS DESCRIPTION

ITEM	DESCRIPTION	QTY
1	Wear Indicator Pin Snap Ring	1
2	Wear Indicator Pin O-Ring	2
3	Wear Indicator Pin	1
6	Actuating Port Plug	1
7	Cooling Outlet Port Plug	1
8	Cooling Outlet Port Plug O-Ring	1
9	Cooling Outlet Port Plug	1
10	Cooling Outlet Port Plug O-Ring	1
11	Actuating Port Plug O-Ring	1
12	Bleeder Screw	1
13	Brake Housing	1
14	Brake Apply Outer Spring	15
15	Brake Apply Inner Spring	15
16	Pressure Ring Seal Ring	1
17	Piston Pressure Ring	1

ITEM	DESCRIPTION	QTY
18	Reaction Disc	5
19	Friction Disc	5
20	Brake Cover Seal	1
21	Piston Outer Seal Assembly	1
22	Brake Piston	1
23	Piston Inner Seal Assembly	1
24	Brake Outer Cover	1
25	Port Square Cut Seal Ring	2
26	Warning Sticker	2
27	Warning Sticker Cover	2
28	Sticker Cover Screw	4
29	Port Plug O-Ring	2
30	Port Plug	2
31	Outer Cover Screw Washer	24
32	Outer Cover Attaching Screw	24

RECOMMENDED LUBRICANTS

Recommendations: Extreme pressure gear lubricant is recommended for use in all drive-steer and rigid drive axles except where explicitly stated differently by Spicer Off-Highway Products Engineering.

Mineral Based: Acceptable lubricants must meet API GL-5/MT or MIL-PRF2105E qualifications. The highest viscosity grade must be used given the prevailing ambient temperatures from the chart below.

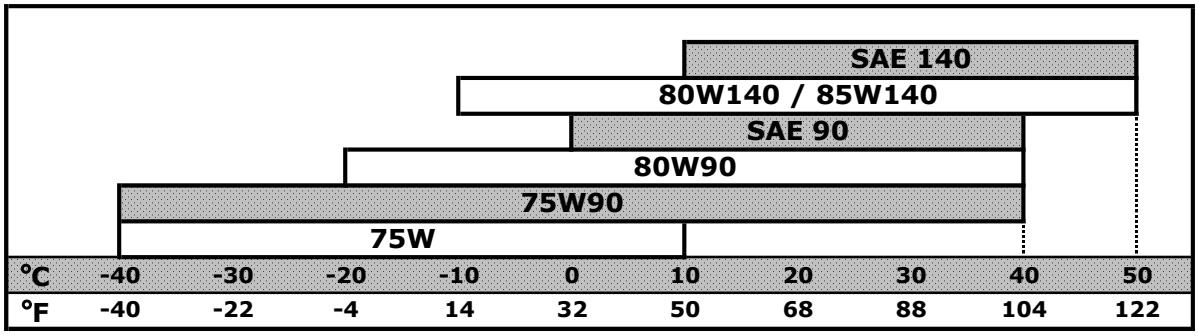
Synthetics: Synthetic lubricants are recommended providing they meet API GL-5/MT-1 qualifications. The highest viscosity grade must be used given the prevailing ambient temperatures from the chart below. In general synthetic oils have a lower pressure viscosity response than mineral oil lubricants as the contact pressure between the gears increases. This produces a thickening of the mineral oil at the contact point. This increase in viscosity helps to maintain lubricant film thickness reducing the possibility of surface and spalling fatigue. Synthetic lubricants do not thicken as much under pressure unless specifically formulated to do so. Before using a synthetic lubricant in heavy applications, the customer must check with the lubricant supplier on the issue of high-pressure lubricant applications.

Normal Oil Change Intervals: Oil change intervals for mineral based lubricants in normal environmental and duty cycle conditions is 1000 hours in all off-highway applications and 10,000 miles in on-highway applications. Severe or sustained high operating temperature or very dusty atmospheric conditions will result in accelerated deterioration or contamination. Judgment must be used to determine the required change intervals for extreme conditions.

Extended Oil Change Interval: Extended oil service may result when using synthetic lubricants. Appropriate change intervals must be determined for each application by measuring oxidation and wear metals over time to determine a baseline. Wear metal analysis can provide useful information, but an axle should not be removed from service based solely on this analysis. Vehicles, which are prone to high levels of ingested water in the axle, or water as a result of condensation, should not use extended drain intervals.

Friction Modifiers: Friction modifiers may be used with the lubricant to reduce Posi-Torq (limited slip) differential noise or liquid cooled brake noise. If friction modifiers re used, follow instructions on **TSB 278E**.

The use of aftermarket lubricant additives other than those specified is not recommended and may reduce the life of the axle and void the warranty!



Recommended Viscosity Grade Based on Prevailing Ambient Temperature

CLEANING AND INSPECTION

CLEANING

Clean all parts thoroughly using solvent type cleaning fluid. It is recommended that parts be immersed in cleaning fluid and agitated slowly until parts are thoroughly cleaned of all old lubricants and foreign materials.

CAUTION: Care should be exercised to avoid skin rashes, fire hazards and inhalation of vapors when using solvent type cleaners.

BEARINGS

Remove bearings from cleaning fluid and strike larger side of cone flat against a block of wood to dislodge solidified particles of lubricant. Immerse again in cleaning fluid to flush out particles. Repeat above operation until bearings are thoroughly clean. Dry bearings using moisture free compressed air. Be careful to direct air stream across bearings to avoid spinning. Bearings may be rotated slowly by hand to facilitate the drying process.

HOUSINGS, COVERS AND CAPS

Clean interior and exterior of housings, bearing caps, etc., thoroughly. Cast parts may be cleaned in hot solution tanks with mild alkali solutions, providing these parts do not have ground or polished surfaces. Parts should remain in solution long enough to be thoroughly cleaned and heated. This will aid the evaporation of the cleaning solution and rinse water. Parts cleaned in solution tanks must be thoroughly rinsed with clean water to remove all traces of alkali. Cast parts may also be cleaned with steam cleaner.

CAUTION: Care should be exercised to avoid skin rashes and inhalation of vapors when using alkali cleaners. Thoroughly dry all parts cleaned immediately by using moisture-free compressed air or soft lintless absorbent wiping rags free of abrasive materials such as metal filings, contaminated oil or lapping compound.

INSPECTION

The importance of careful and thorough inspection of all parts cannot be overstressed. Replacement of all parts showing indication of wear or stress will eliminate costly and avoidable failures at a later date.

BEARINGS

Carefully inspect all rollers, cages and cups for wear, chipping or nicks to determine fitness of bearings for further use. Do not replace a bearing without replacing the mating cup or cone at the same time. After inspection, dip bearings in clean light oil and wrap in clean lint free cloth or paper to protect them until installed.

OIL SEALS, GASKETS AND RETAINING RINGS

Replacement of spring loaded oil seals, gaskets, and snap rings is more economical when unit is disassembled than to risk premature overhaul to replace these parts at a future time. Loss of lubricant through a worn seal may result in failure of other more expensive parts of the assembly. Sealing member should be handled carefully, particularly when being installed. Cutting, scratching or curling under lip of seal seriously impairs its efficiency. At reassembly, lubricate lips of oil seals with Multipurpose Lithium grease "Grade 2".

CLEANING AND INSPECTION - CONT.

GEARS AND SHAFTS

If Magna-Flux or a dye penetrant process is available use process to check parts. Examine teeth and the ground/polished surfaces of all gears and shafts carefully for wear, pitting, chipping, nicks, cracks, or scoring. If gear teeth are cracked or show spots where case hardening is worn through, replace with new gear. Small nicks may be removed with suitable hone stone. Inspect shafts to make certain they are not sprung, bent or have twisted splines.

HOUSINGS, COVERS AND CAPS

Inspect housings and covers to be certain they are thoroughly cleaned and that mating surfaces, bearing bores, etc. are free from nicks or burrs. Check all parts carefully for evidence of cracks or conditions which can cause oil leaks or failures.

POSI-STOP (LCB) PRESSURE TEST INSTRUCTIONS

1. **Air Pressure Decay Test and Criteria**
   A. After completing assembly and with bleeder plugged, apply 12 PSI [83 kPa] air pressure to the brake fluid actuation port. Shut off air at inlet to hold pressure on brake.
   B. Let pressure stabilize for 30 seconds. This is to compensate for temperature change, piston movement and seating of seal lips.
   C. Re-pressure to 12 PSI [83 kPa] if required and hold for 15 seconds with no pressure drop.
   D. Repeat re-pressuring until 12 PSI [83 kPa] holds for 15 seconds minimum, but not over 3 repressurings.
   E. If after 3 re-pressurings brake will still not hold pressure, tear down and determine cause of leak, rebuild and retest.
2. **Air and Hydraulic Pressure Test**
   A. After completing assembly, with bleeder plugged apply 100 PSI [689 kPa] air pressure to the brake fluid actuation port. Shut off air at inlet to hold pressure on brake. Brake should maintain pressure for 30 seconds without drop.

   B. Apply 1500 +50/-00 PSI [10342 +344/-000 kPa] hydraulic pressure using mineral oil to brake actuation port, shut off pressure at inlet to hold pressure on brake. Inspect to insure that pressure plate has moved against housing stop and that friction discs are released and free. Maintain pressure for 30 seconds minimum without drop. Repeat twice. If brake will not maintain pressure, tear down and determine cause of leak, rebuild and retest.

FASTENER TORQUE CHART

STANDARD FASTENERS Lubricated and Plated Bolts, CapScrews, and Studs				
	Grade 5		Grade 8	
	3 Radial Dashes On Bolt Head		6 Radial Dashes On Bolt Head	
Size	LBF/FT	[Nm]	LBF/FT	[Nm]
1/4-20	10	14	11	15
1/4-28	11	15	13	18
5/16-18	16	22	30	41
5/16-24	20	27	32	43
3/8-16	25	34	36	49
3/8-24	29	39	41	56
7/16-14	41	56	57	77
7/16-20	45	61	64	87
1/2-13	63	85	88	119
1/2-20	70	95	99	134
9/16-12	90	122	127	172
9/16-18	100	136	141	191
5/8-11	124	168	175	237
5/8-18	141	191	198	268
3/4-10	220	298	310	420
3/4-16	245	332	347	470

METRIC FASTENERS Lubricated and Plated Bolts, CapScrews, and Studs						
	Class 8.8		Class 10.9		Class 12.9	
	8.8 on Bolt Head		10.9 on Bolt Head		12.9 on Bolt Head	
Size	LBF/FT	[Nm]	LBF/FT	[Nm]	LBF/FT	[Nm]
M4	2.2	3	3.2	4.4	7.4	10
M5	4.4	5.9	6.4	8.7	7.4	10
M6	7.4	10	11	15	13	18
M8	18	25	26	36	32	43
M10	36	49	51	72	62	84
M12	63	85	92	125	107	145
M14	100	135	147	200	173	235
M16	155	210	229	310	269	365
M18	221	300	317	430	369	500
M20	313	425	450	610	524	710
M22	428	580	605	820	708	960
M24	538	730	774	1050	900	1220

PLUG AND ELASTIC STOP NUT TORQUE CHARTS

O-RING PLUGS			
Size	**P/N**	**LBF/FT**	**[Nm]**
5/16-24	24K-1	5	7
3/8-24	24K-2	8	11
7/16-20	24K-3	10	14
1/2-20	24K-4	13	18
9/16-18	24K-5	15	20
3/4-16	24K-6	25	34
7/8-14	24K-7	35	47
1 1/16-12	24K-8	50	68
1 3/16-12	24K-9	60	81
1 5/16-12	24K-10	75	102
1 5/8-12	24K-11	85	115
1 7/8-12	24K-12	85	115

PIPE PLUGS		
Size (NPTF)	**LBF/FT**	**[Nm]**
1/16-27	7	9
1/8-27	10	14
1/4-18	20	27
3/8-18	30	41
1/2-14	35	47
3/4-14	45	61
1-11 1/2	55	75
1 1/4-11 1/2	65	88

ELASTIC STOP NUTS		
Size	**LBF/FT**	**[Nm]**
1-20	200	270
1 1/4-18	250	340
1 1/2-18	350	475
1 3/4-12	450	610

Posi-Stop (LCB) Disassembly

Figure 1
Remove (4) warning sticker cover screws.

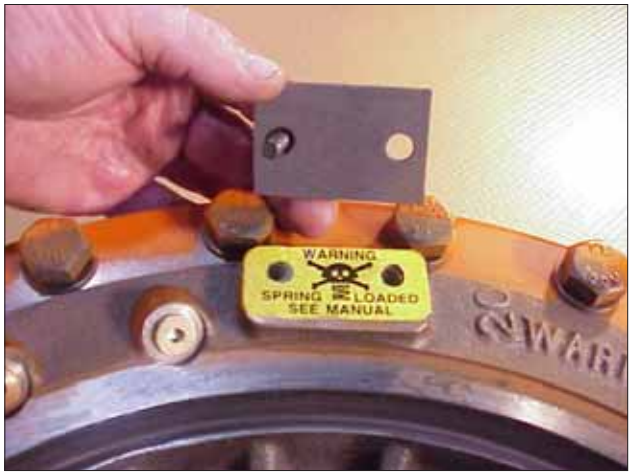


Figure 2
Remove (2) warning sticker covers. **Note Warning!**

Figure 3
Note warning cast into brake cover.

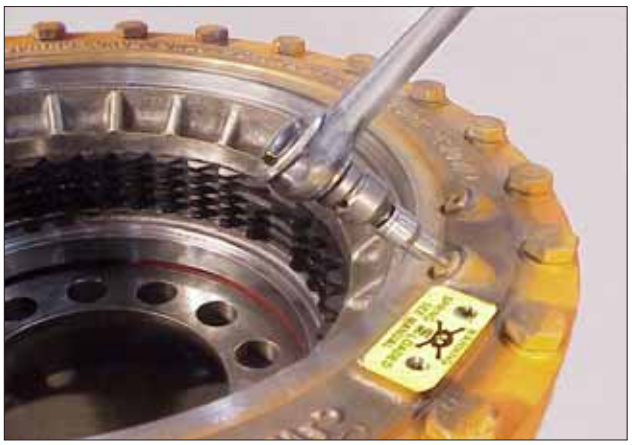


Figure 4
Remove (2) pressure port plugs.

Brake Cover Removal

Figure 5

This disassembly procedure is tedious and time consuming. Due to the potential for injury and damage any shortcuts should be avoided. A spring compression tool drawing and instructions are included on page 23. It is recommended the compression tool be used to disassemble and reassemble the brake. **IMPORTANT!!** If the brake spring compression tool is not going to be used, the following procedure must be followed to avoid personal injury and component damage.

CAUTION: The brake cover is under 72,000 psi (pounds/square inch) of pressure created by the brake apply springs.

It is recommended that the capscrew heads be numbered to assist in following the loosening/ tightening sequence. Refer to ***figure 48***. In a crossing or star pattern loosen the (24) brake cover capscrews turning no more than one quarter (1/4) turn at a time in sequence. Continue this process until all pressure on the cover has been relieved.

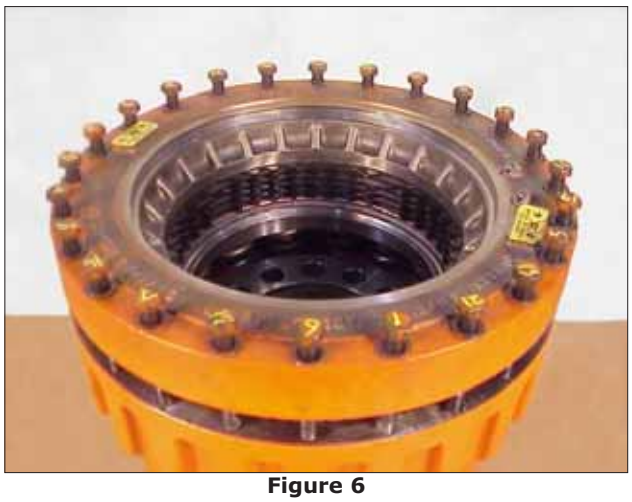


Figure 6
After all spring force has been relieved from cover remove the (24) cover screws and washers.

Figure 7
Install (2) eye bolts to assist in handling the brake cover in opposite warning plate holes.

Figure 8
Remove brake cover.

Discs, Pressure Ring and Spring Removal

Figure 9
Remove brake friction and reaction discs. **NOTE:** If discs are to be reused they need to be reinstalled in the exact order and direction in which they were removed.

Figure 10
Remove brake piston pressure ring.

Figure 11
Remove brake springs. **NOTE:** Inner and outer springs are matched sets and must remain together. As each set is removed it is recommended that they be wired together to prevent mixing sets.

Figure 12
Remove brake cover seal ring.

Wear Indicator Pin Removal

Figure 13
Tap out brake wear indicator pin.

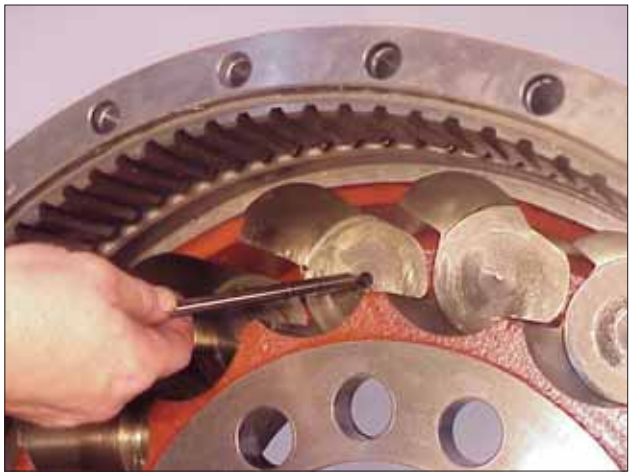


Figure 14
Remove brake wear indicator pin.

Brake Piston Removal

Figure 15
Place brake cover on flat surface face down. Install (3) screws and flat washers in the brake piston puller holes.
CAUTION: Brake cover is heavy and can cause injury and damage.

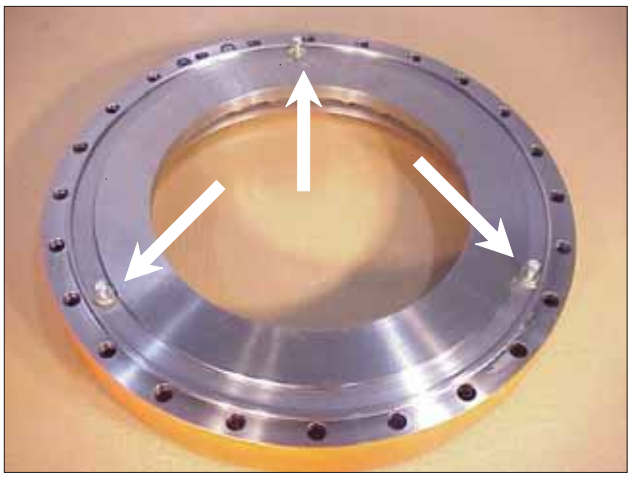


Figure 16
Piston with puller screws and washers installed.

Figure 17
Using a pry bar, evenly pry piston out of the brake cover until it is no longer in contact with the piston seals.

Figure 18
Piston pulled out of seals.
Piston can be removed by hand at this point.

Figure 19
Remove brake piston.

Figure 20
Remove outer piston seal assembly.

Figure 21
Remove inner piston seal assembly.

Figure 22
Remove (2) pressure port sealing rings.

Figure 23
Remove pressure ring seal ring.

Figure 24
Remove (2) brake wear indicator pin o-rings.

Figure 25
Remove brake wear indicator pin retaining ring.
NOTE: Not necessary to remove
unless replacement is required.

Clean and inspect all components.
Repair or replace components as required.

Posi-Stop (LCB) Reassembly

Figure 26
Clean cured thread locking compound from holes with a .625-11 UNRC-2A tap. Use compressed air to remove residue from holes. Use appropriate eye protection when using compressed air.

Figure 27
Position brake housing on blocks as shown to allow clearance for the wear indicator pin. Pin will protrude through bottom of housing.

Wear Indicator Pin Installation

Figure 28
Install wear indicator pin retaining ring.

Figure 29
Install (2) wear indicator pin o-rings and lubricate.

Figure 30
Install wear indicator pin in housing.

Pressure Ring and Spring Installation

Figure 31
Lubricate pressure ring o-ring sealing surface with grease.

Figure 32
Install brake spring sets.

Figure 33
Lubricate brake cover seal ring with grease and install.

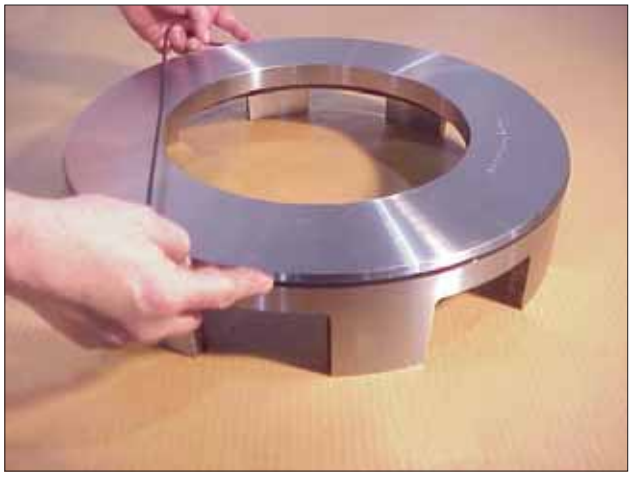


Figure 34
Lubricate seal ring with grease and install on pressure ring.

Figure 35
Set pressure ring into position. A lifting device similar to the one shown can ease installation.
Refer to tool drawing on page 30.

Brake Disc Installation

Figure 36
Install reaction disc.

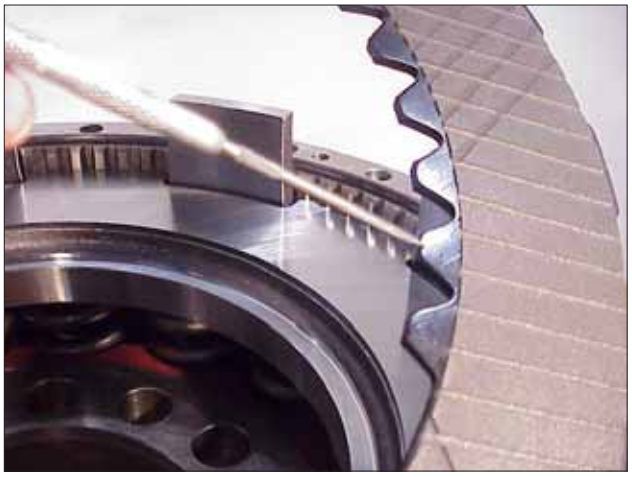


Figure 37
Identify the rounded edges on teeth of friction discs. Rounded edges should be installed facing "UP".

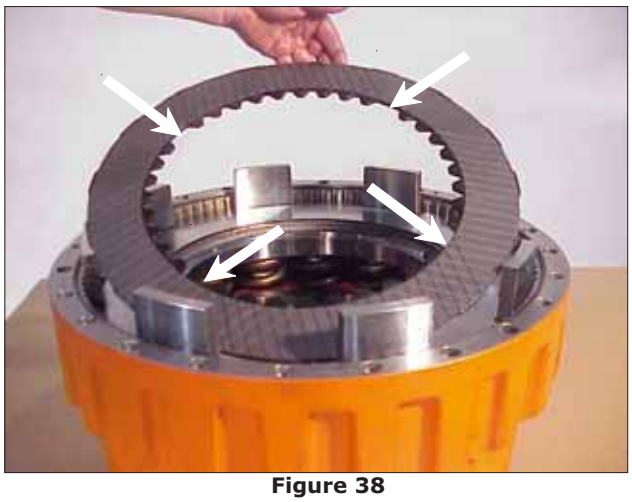


Figure 38
Install friction disc. Alternately install the remaining reaction and friction discs. **NOTE:** Align the friction disc oil grooves (missing teeth) with the previously installed friction disc. Alignment of friction disc teeth at this time will ease spline engagement during hub installation.

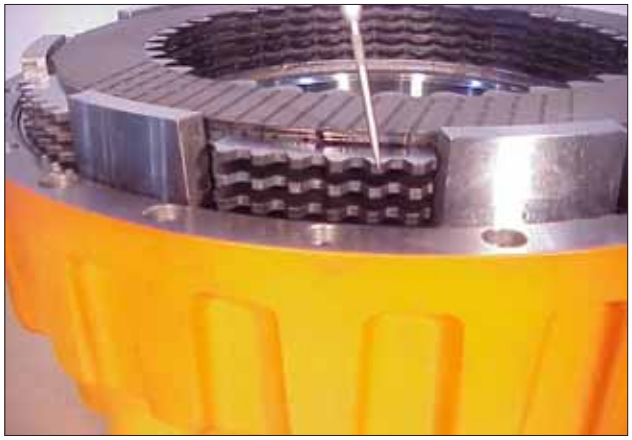


Figure 39
Line up the reaction disc teeth with the internal teeth in brake housing.

Figure 40
Install (2) alignment pins in brake housing 180° apart. **NOTE:** Alignment pins can be made by using bolts with heads cut off.

Brake Piston Installation

Figure 41
Install outer piston seal assembly.

Figure 42
Install inner piston seal assembly. **NOTE:** Use caution not to over stretch the inner o-ring and seal ring.

Figure 43
Lightly lubricate inner and outer piston seals and piston with grease, install piston in brake cover.

Figure 44
Evenly press piston into brake cover until it bottoms out. "C" clamps can be used, as shown, to ease this process.

Brake Cover Installation

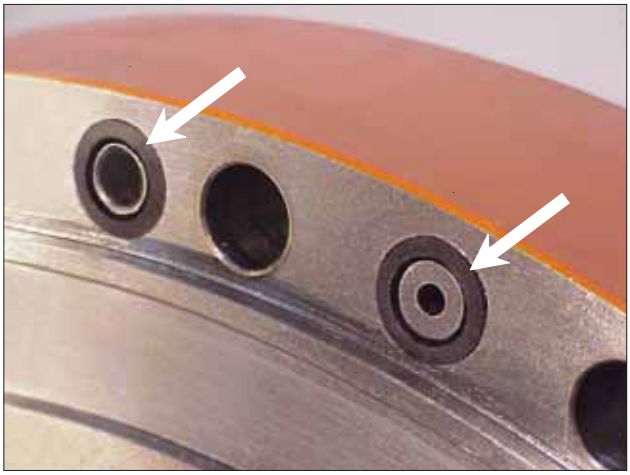


Figure 45
Install (2) pressure port seal rings. **NOTE:** Use grease to retain seal rings in grooves during handling and assembly.

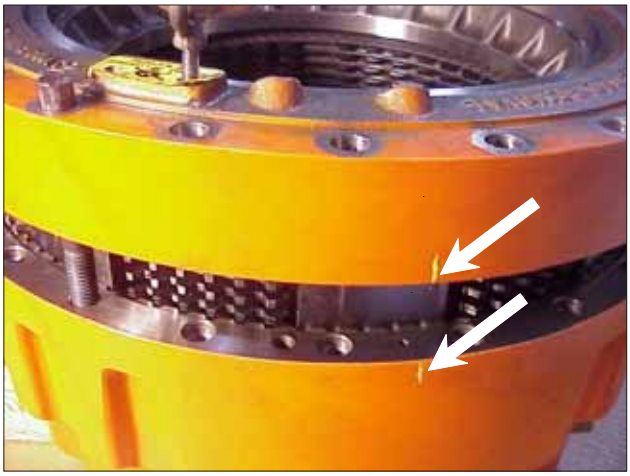


Figure 46
Mark location of pressure ports on brake cover and housing. Align ports and install cover on alignment pins.

Figure 47
Remove (2) alignment pins and install (24) brake cover screws and washers.
NOTE: Run screws down only "Finger Tight".

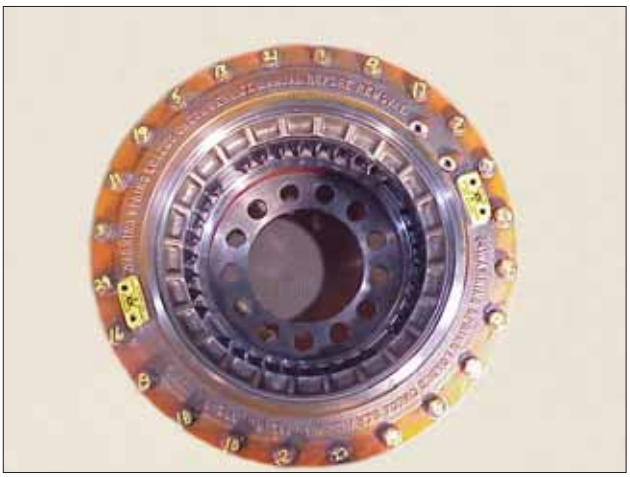


Figure 48
Mark screws with numbers from 1-24 in a criss crossing pattern.

Figure 49
Carefully recheck alignment of reaction disc teeth and teeth in the brake housing.
IMPORTANT: This is a critical step. If the teeth are not properly aligned they will not enter the brake housing without damage as the springs are compressed.

Figure 50
Tighten the (24) brake outlet cover screws in a criss crossing pattern by turning each screw ***NO MORE THAN 1/4 TURN.*** As springs are compressed check alignment of reaction disc teeth as they enter the brake housing. When cover contacts brake housing the screws should be tightened to 175-190 LBF/FT [240-260 Nm].

Figure 51
Install (2) pressure port plugs.
Tighten to 84-120 LBF/IN [10-14 Nm].

Figure 52
Air pressure test.
Refer to pressure test instructions on page 10.

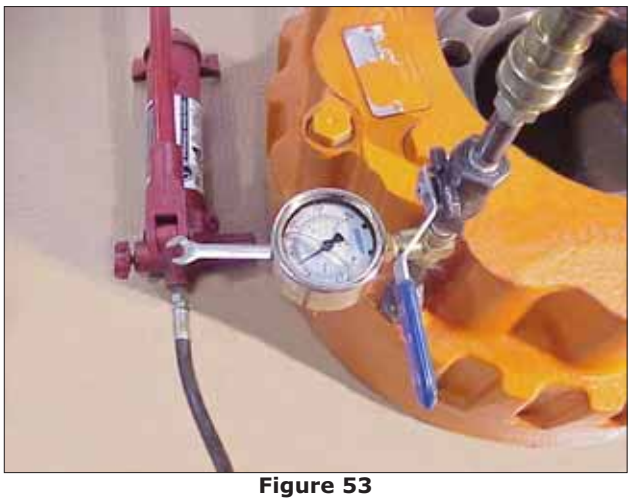


Figure 53
Hydraulic pressure test brake.
Refer to pressure test instructions on page 10.

Figure 54
One at a time remove the (24) brake cover screws. Apply Loctite 262 or equivalent to the threads, reinstall and tighten to 175-190 LBF/FT [240-260 Nm].
IMPORTANT: Do not remove more than one screw at a time.

Figure 55
Install (2) warning sticker covers with (4) screws and tighten to 215-240 LBF/IN [24-27 Nm].

BRAKE SPRING COMPRESSION TOOL INSTRUCTIONS

WARNING: DO NOT ATTEMPT TO MAKE ANY REPAIRS ON THE BRAKE UNTIL THIS TEXT IS COMPLETELY READ AND UNDERSTOOD AND ALL SAFETY PRECAUTIONS COMPLIED TO.

1. Disassemble wheel end from spindle up to and including the removal of the wheel hub from the brake discs. **NOTE:** If axle spindle or axle housing is to be replaced, remove brake as an assembly by removing brake to spindle screws and washers. Remove brake assembly from spindle.

   It is imperative that a special disassembly and reassembly spring compression tool be fabricated before disassembling any part of this brake; a drawing of the tool is included.

2. Install spring compression tool main section over axle spindle, through brake discs and against the piston pressure ring.

3. Install the bolt plate and bolts over the spindle. Back the bolts out far enough so they do not contact the cylinder face.

4. Install spindle nut and tighten securely against compression tool.

5. Tighten the four (4) compression tool bolts against compression tool cylinder. This will hold the springs in position while removing the brake cover and brake discs.

   WARNING: OUTER BRAKE HOUSING COVER IS UNDER 72,000 LBS. COMPRESSED SPRING PRESSURE AND EXTREME CAUTION MUST BE TAKEN IN REMOVING THIS COVER. BRAKE COVER BOLTS MUST BE REMOVED CAUTIOUSLY AND EVENLY. DO NOT REMOVE BRAKE COVER BOLTS ONE (1) AT A TIME.

6. With the spring compression tool securely in place, remove the brake cover bolts evenly. Do not remove bolts one at a time.

7. Remove brake cover and piston from brake housing.

8. Remove the friction and reaction discs.

9. Cautiously and evenly turn out a thread at a time, the compression tool bolts. The compression springs will push the piston pressure ring out of the brake housing.

   WARNING: BEFORE REMOVING COMPRESSION TOOL FROM SPINDLE, MAKE SURE ALL SPRING FORCE IS OFF OF PRESSURE RING AND RING MOVES FREELY IN BRAKE HOUSING.

10. Remove spindle nut and remove two piece compression tool.

Refer to pages 15 & 20 for detailed disassembly and reassembly instructions for servicing the internal components of the brake housing and cover.

BRAKE SPRING COMPRESSION TOOL INSTRUCTIONS - CONT.

REASSEMBLY

1. Install brake housing on axle.

2. Install all spring sets.

3. Position piston pressure ring in brake housing.

4. Install spring compression tool main section over axle spindle and centered in pressure ring.

5. Install the bolt plate and bolts over the spindle. Back the bolts out far enough so they do not contact the cylinder face.

6. Install spindle nut and tighten securely against round compression tool.

7. Turn the four (4) compression tool bolts in against compression tool cylinder.

8. Cautiously and evenly in a criss crossing manner, tighten compression tool bolts a thread or two at a time to compress spring sets and push pressure ring into brake housing. Springs are compressed far enough when the tangs on the pressure ring are approximately 1/8 of an inch from being flush with face of brake housing.

9. Install first steel reaction plate in pressure ring.

10. Install first friction disc and lining assembly in pressure ring and against first steel plate.

11. Install second steel reaction plate.

12. Install second friction disc, aligning the four (4) oil grooves in the second disc with the oil grooves in the first friction disc.

13. Alternate steel plates and friction discs until five (5) plates and five (5) discs are installed. First plate installed is steel and last disc installed is friction. **NOTE:** Always align friction disc oil grooves and careful alignment of friction disc teeth at this time will facilitate wheel hub spline alignment in discs at wheel hub assembly in brake.

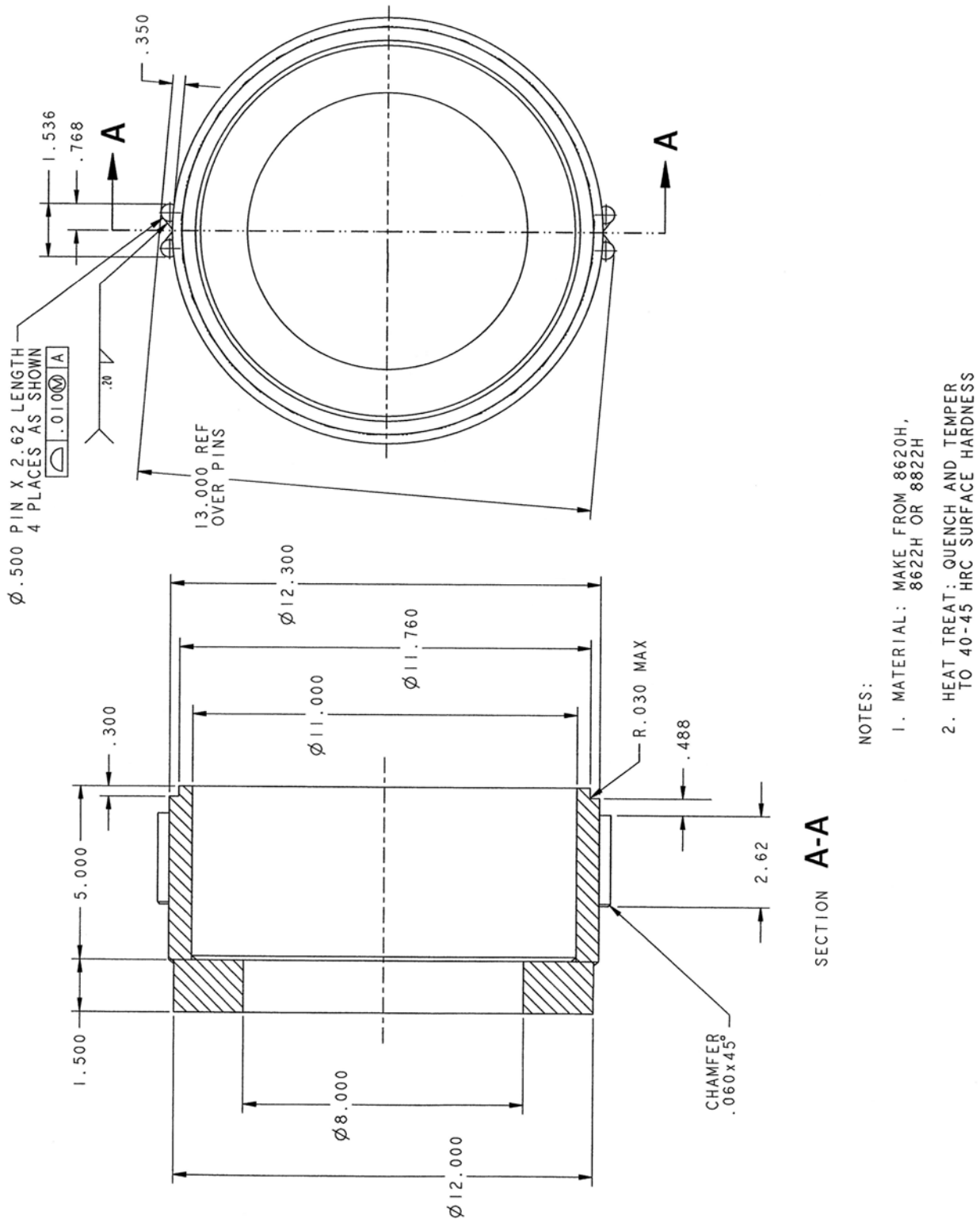
14. Install a new square cut sealing ring in groove in brake housing.

15. Position brake cover on brake housing, aligning fluid hole marks on cover with holes in housing. Refer to Posi-Stop brake reassembly on page 21.

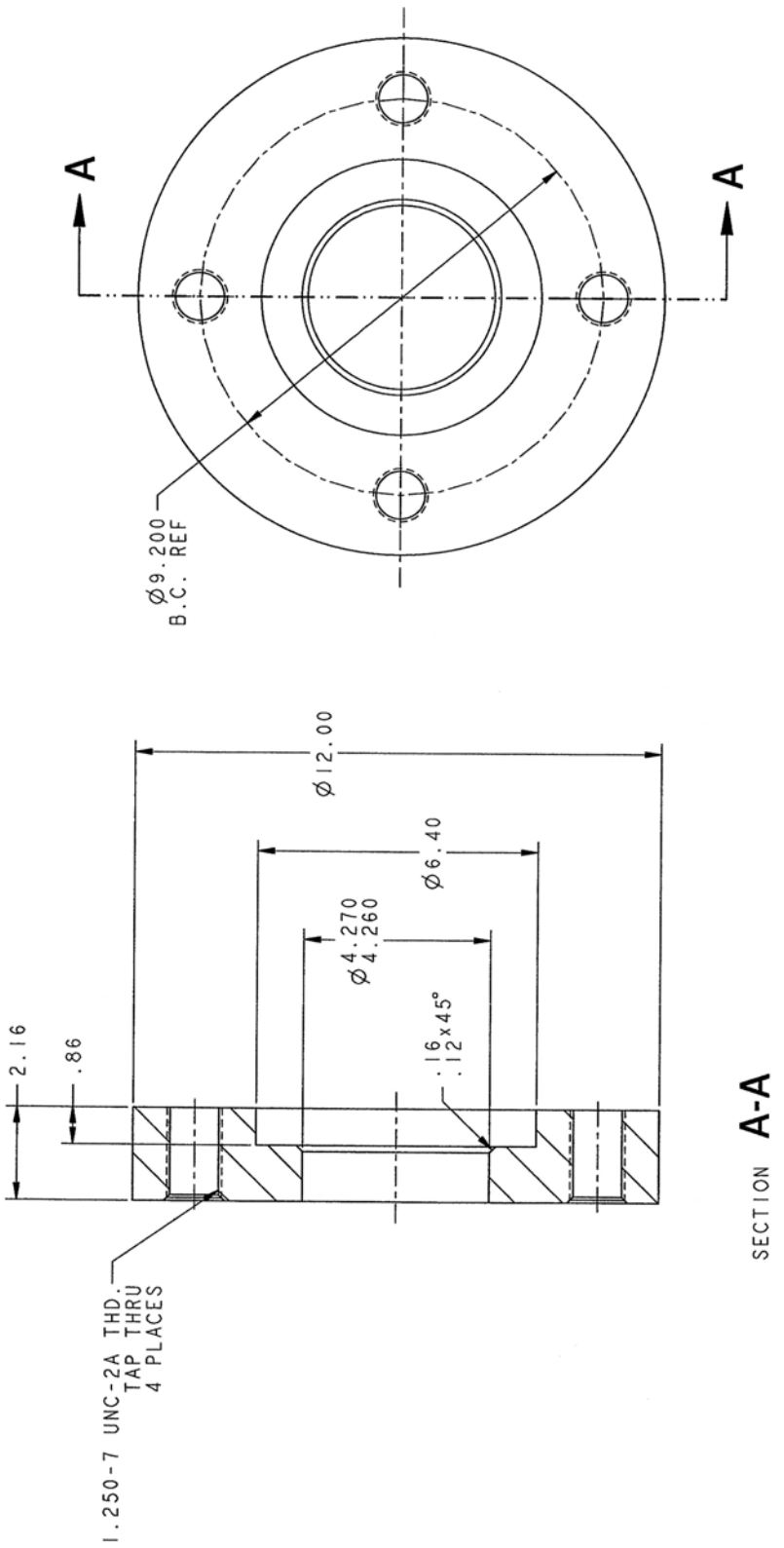
16 Install cover to housing bolts and washers. If there is a slight gap between cover and housing, carefully and evenly tighten bolts to specified torque.

17. Carefully and evenly loosen bolts in compression tool. When bolts are away from compression cylinder, remove spindle nut. Remove compression tool and cylinder from spindle and brake.

BRAKE SPRING COMPRESSION TOOL WELDMENT



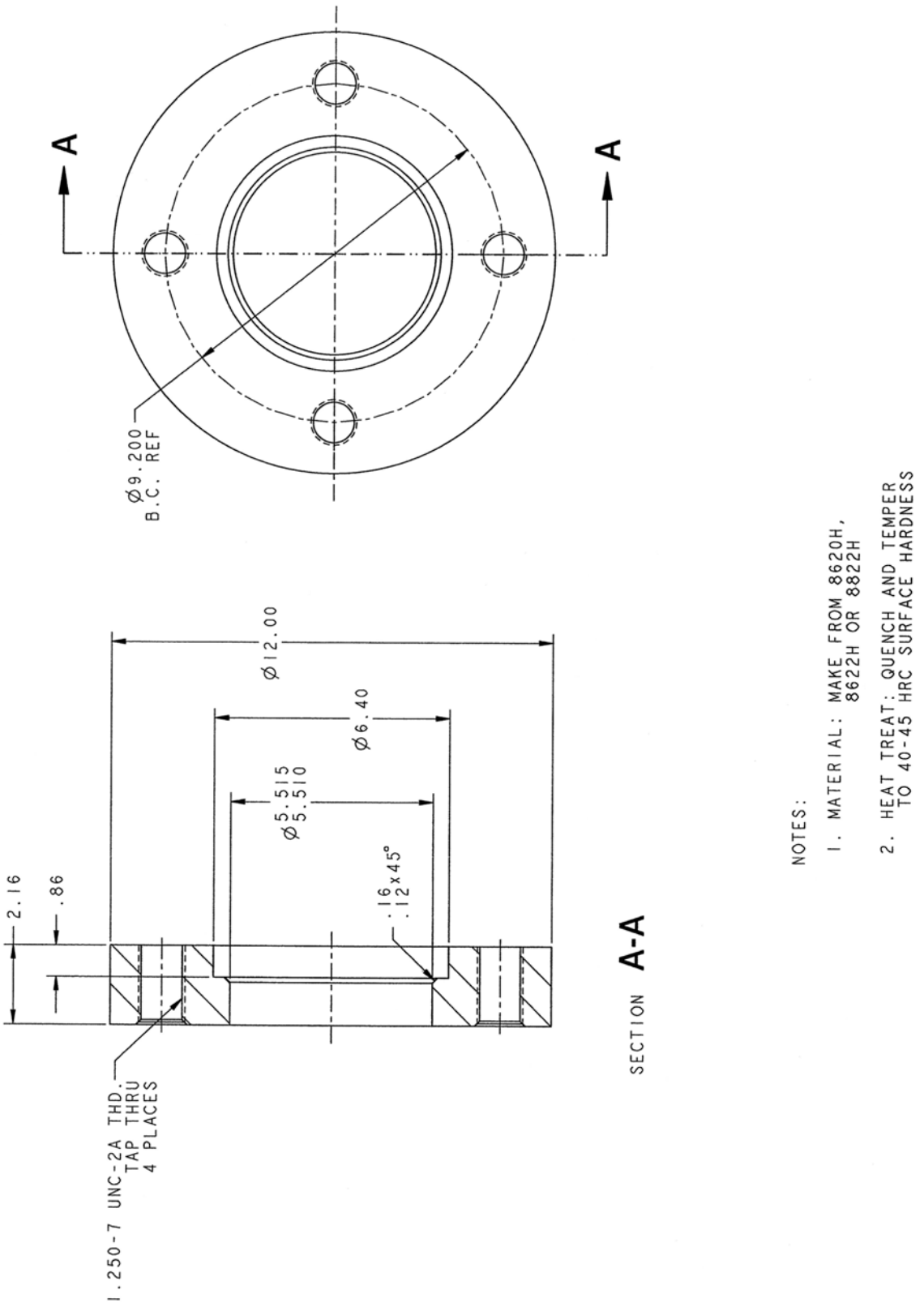
BRAKE SPRING COMPRESSION TOOL BOLT PLATE
Axle Model 21D



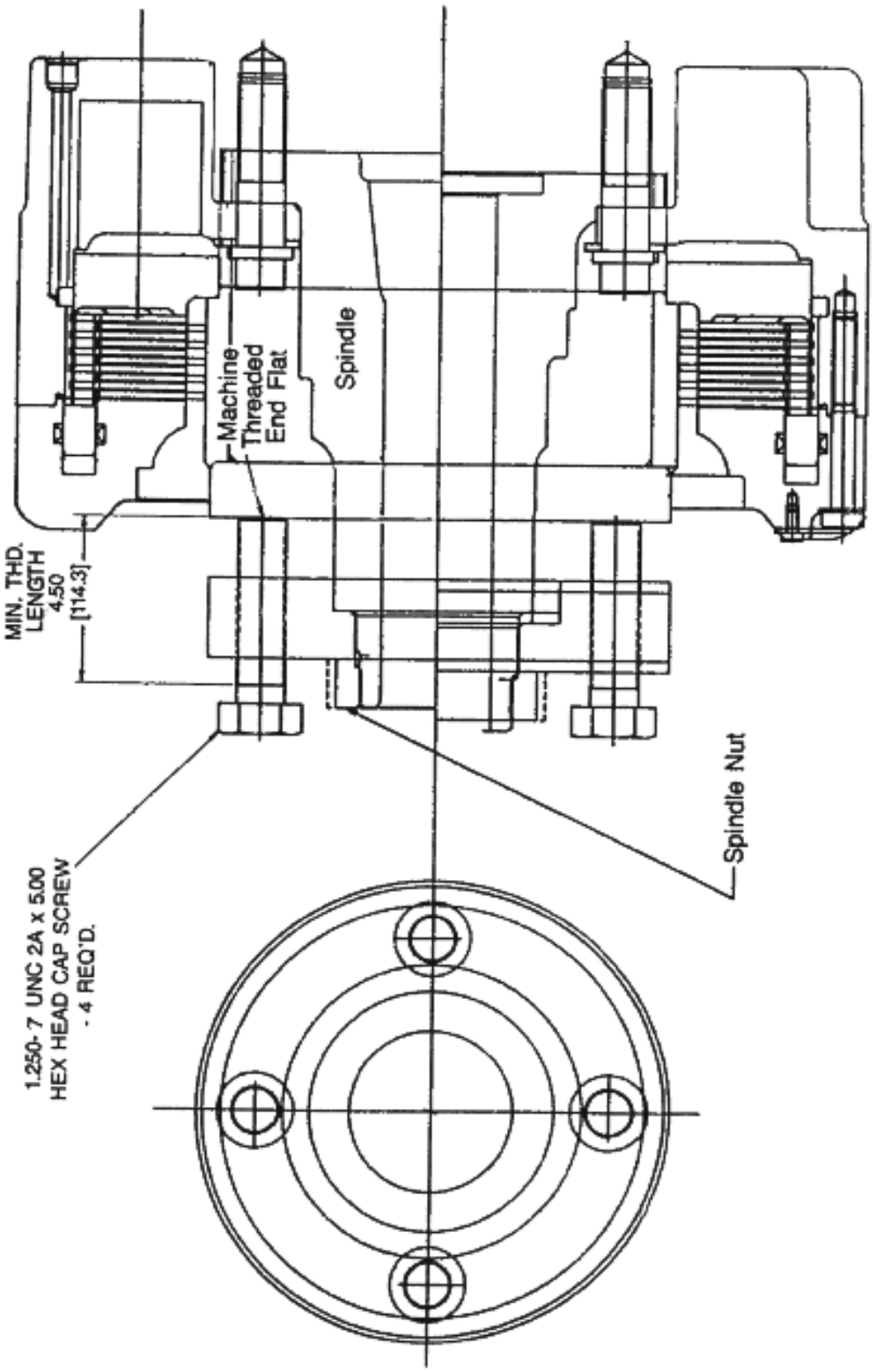
NOTES:

1. MATERIAL: MAKE FROM 8620H, 8622H OR 8822H
2. HEAT TREAT: QUENCH AND TEMPER TO 40-45 HRC SURFACE HARDNESS

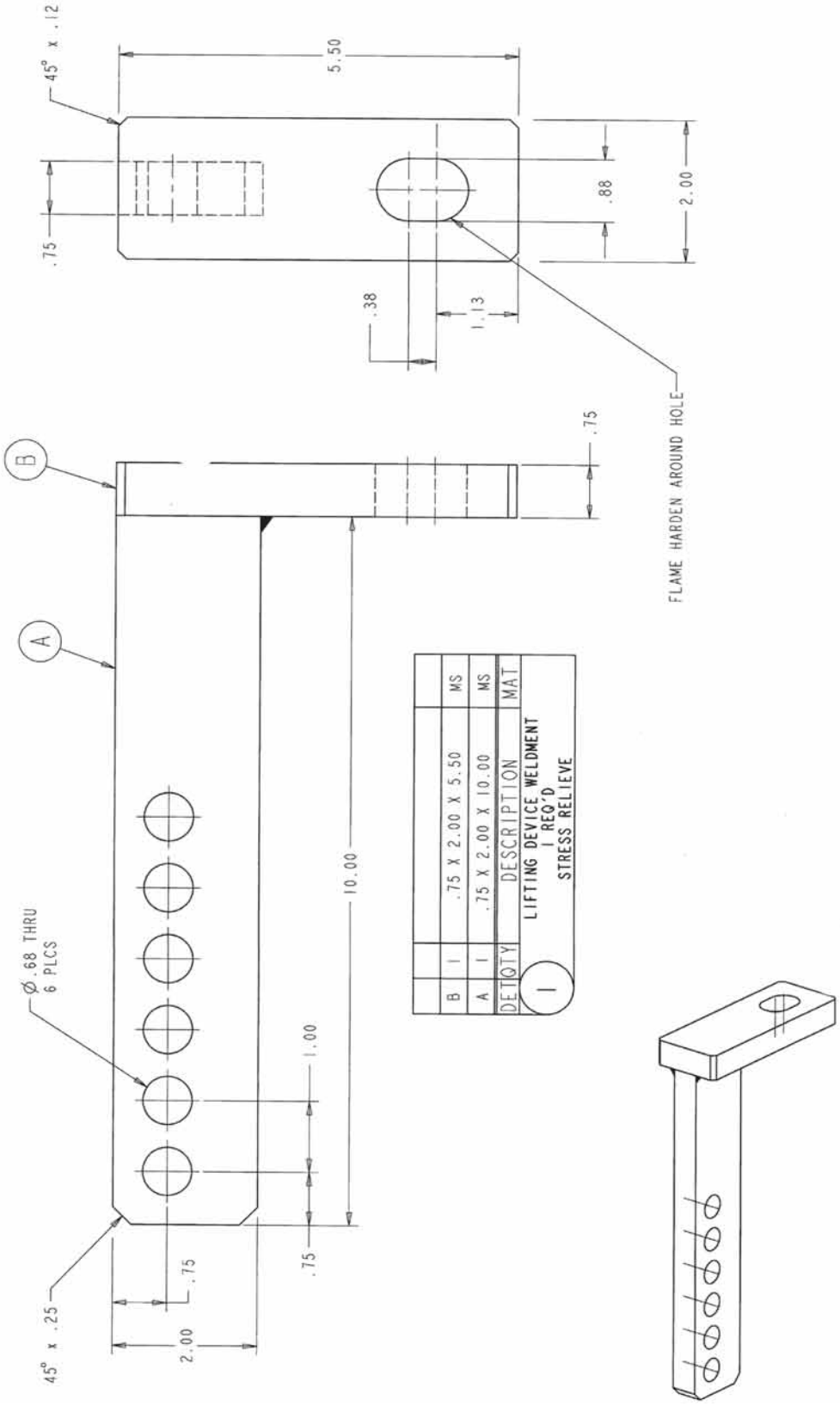
BRAKE SPRING COMPRESSION TOOL BOLT PLATE
Axle Models 53R & 48T



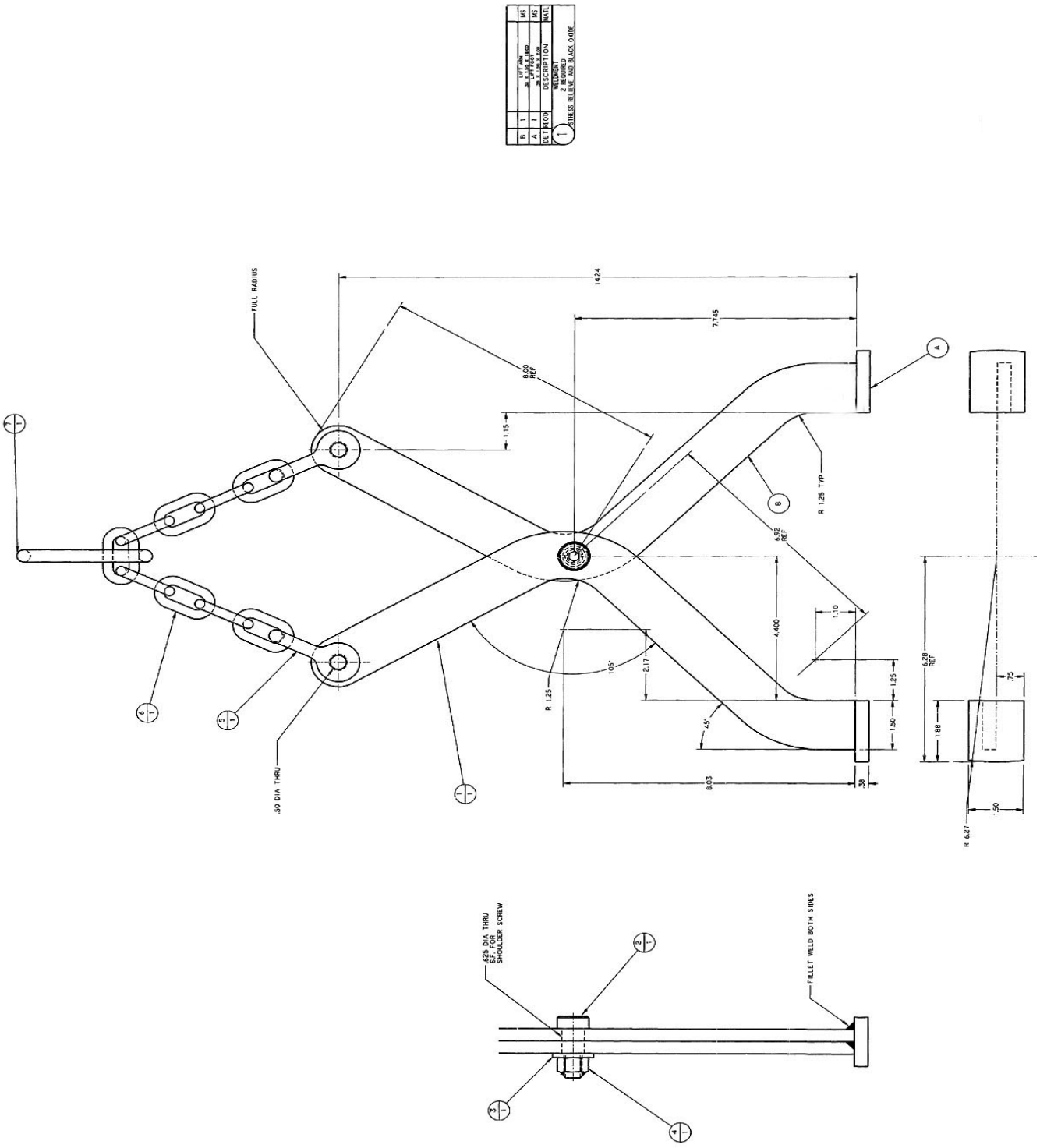
BRAKE SPRING COMPRESSION TOOL INSTALLATION



BRAKE ASSEMBLY LIFTING TOOL



BRAKE PISTON LIFTING TOOL



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