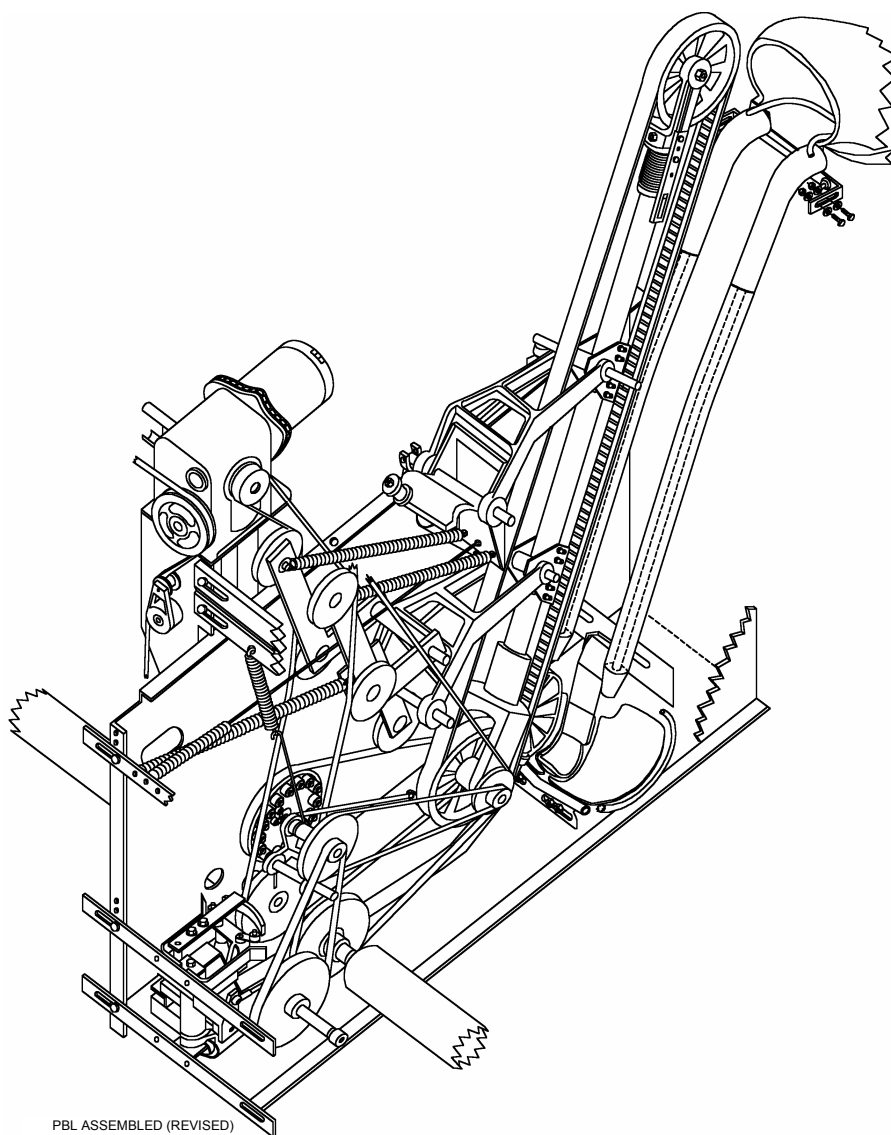




POSITIVE BALL LIFT (PBL)

AMF 90XL*i* Pinspotter Manual Supplement



PBL ASSEMBLED (REVISED)

400-088-011 Rev. A

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AMF

Positive Ball Lift (PBL) Manual, Rev. A

400-088-011

SUMMARY OF CHANGES

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List of Effective Pages

Page	Change No.	Effective Date
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SAFETY

General Safety Guidelines

AMF believes strongly in its commitment to safety. Proper service and repair are important to the safety of the mechanic as well as the safe, reliable operation of the pinspotters. Please read, understand, and follow all of the recommended safety procedures presented in this manual.

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

- Properly trained personnel should be present whenever maintenance is being performed on a pinspotter.
- No unauthorized personnel should be allowed in the pit area.
- Keep in mind that the pinspotter performs a series of mechanical motions and electrical actions during each cycle, and that bodily injury could result should personnel enter the machine when power is on. When working in a pinspotter, it is recommended that power also be turned off on adjacent machines.
- The belts and pulleys of the Positive Ball Lift can present a severe pinching hazard. Whenever possible, turn off both associated pinspotters before performing maintenance, and exercise caution when working around operating equipment.
- Remember that safety must remain your first priority at all times.
- Safety goggles, ear protection, and steel-toed shoes are recommended whenever any work is being performed on a pinspotter.
- Wearing loose clothing or jewelry is **NOT RECOMMENDED** when operating or maintaining the machinery.



AMF 90XLi PINSPOTTER

Safety Labels and Symbols

It is important to understand the safety labels and symbols used in this manual set. Three of these labels are used to show the relative risk associated with a particular activity or instruction. These labels are shown below in order of decreasing importance. Be aware that taking shortcuts or failing to heed applicable safety information can result in serious injury or damage and can render the pinspotter unsafe for you as well as for others who follow in your place.

⚠ DANGER

⚠ WARNING

⚠ CAUTION

⚠ DANGER

indicates a hazardous situation that presents a potentially crippling or life-threatening situation.

⚠ WARNING

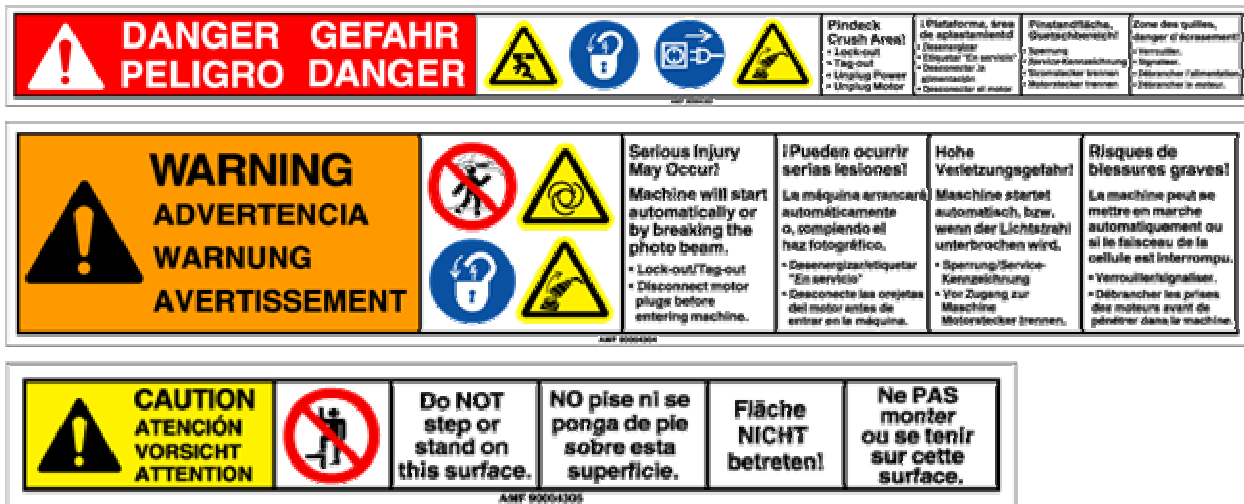
indicates a potentially hazardous situation that could result in serious injury or equipment damage.

⚠ CAUTION

indicates a potentially hazardous situation that could result in minor to moderate injury if not avoided. It may also be used to alert against potentially unsafe practices.

Other warning labels are conspicuously located on the pinspotter and are designed to warn against possible hazards. These labels, some of which are shown below, are there for your protection. Removing or disregarding these labels can result in serious injury.

<div> WARNING AVERTISSEMENT ADVERTENCIA WARNUNG</div>					
STOP. READ and UNDERSTAND TECHNICAL MANUAL Before Servicing Machine.	DETÉNASE. LEA y COMPRENDA el MANUAL TÉCNICO antes de iniciar las tareas de servicio.			HALT! Vor Arbeiten an der Maschine das TECHNISCHE HANDBUCH LESEN und VERSTEHEN.	ARRÊTER. LIRE et VOIRIE à BIEN COMPRENDRE les Instructions du MANUEL TECHNIQUE avant de travailler sur la machine.
LOCKOUT/TAGOUT. UNPLUG Main Power and UNPLUG Motor Before Servicing Machine. (See Lockout Safety Procedure.)	DESARMER/ETIQUETAR "EN SERVICIO" Desconectar la alimentación de la red y DESARMAR el motor antes de realizar las tareas de servicio. Consulte los procedimientos seguros para desarmar.			SPERRUNG/SERVICE- KENNZEICHNUNG Vor Arbeiten an der Maschine Stromstecker und Motorstecker TRENNEN. Siehe auch Sperrmaßnahmen- vorschriften.	VERROUILLER/PERSONALISER DÉBRANCHER l'alimentation principale et le moteur avant de travailler sur la machine. Consulter la procédure de verrouillage de sécurité.
DO NOT BREAK PHOTO BEAM. Machine will cycle. STARTS AUTOMATICALLY. CRUSH HAZARD. Pin Deck Area.	NO ROMPA EL LAZ FOTOGRAFICO o la máquina arranca. ARRANCA AUTOMÁTICAMENTE. PELIGRO DE APLASTAMIENTO. Área de la plataforma.			SICHTSTRahl NICHT UNTERBRECHEN, da sich sonst die Maschine einschaltet. STARTET AUTOMATISCH. DUSTSCHNEEFALL. Pinakendfläche.	NE PAS INTERROMPRE LE FASCEAU DE LA CELLULE, la machine se mettra en marche. DÉMARRAGE AUTOMATIQUE. DANGER D'ÉCRASLEMENT. Zone des poutres.
DO NOT OPERATE WITHOUT GUARDS Properly installed. BELT ENTANGLEMENT. GEAR ENGAGEMENT.	NO HAGA FUNCIONAR LA MÁQUINA SIN GUARDAS debidamente instalados. ATASCUE DE LAS CORREAS. ATASCUE DE LAS MARCHAS.			INBETRIEBNAHME OHNE einwandfrei angebrachte SCHUTZGÜTER VERBODEN. GURTVERWICKLUNG. GETRIEBEVERWICKLUNG.	NE PAS METTRE EN MARCHÉ SILS PROTECTIONS NE SONT PAS correctement installées. RAPPEMENT PAR LES COURROIES. RAPPEMENT PAR LES ENGRENAGES.
FALL / TRIP HAZARD. Do not use Front-End Platform Guards as a Scaffold to access other Pinspotter in Operation.	PELIGRO DE CAÍDA/VELOC. No use las guardas de la plataforma frontal como pasarelas para acceder otros Pinspotter en operación.			FALL- / STW. KIPPGEFÄHR Frontplattform-Schutzgitter nicht als Laufsteg zum Zugang zu anderen Pinpointern in Betrieb benutzen.	RISQUE D'ACCROCHAGE/ CHUTE Ne pas utiliser les protections de la plate-forme avant pour accéder aux autres repointeurs en fonctionnement.
EYE PROTECTION REQUIRED. HEARING PROTECTION REQUIRED.	SE NECESITA PROTECCIÓN OCULAR. SE NECESITA PROTECCIÓN AUDITIVA.			AUGENSCHUTZ ERFORDERLICH. OHRENSCHUTZ ERFORDERLICH.	PROTECTION OCULAIRE REQUISE. PROTECTION AUDITIVE REQUISE.
NO ACCESS FOR UNAUTHORIZED PERSONS. Service by Authorized Trained Personnel Only.	NO SE PERMITE LA ENTRADA a PERSONAL NO AUTORIZADO. Solo personal autorizado puede realizar tareas de servicio.			KEIN ZUGANG FÜR UNBEFUGTE. Service nur durch befugtes Fachpersonal!	ACCÈS INTERDIT AUX PERSONNES NON AUTORISÉES. Les entrées ne doivent être effectuées que par un personnel dûment formé et autorisé.



– Refer to the Service Manual before performing maintenance or repair.



– Caution! Severe pinching hazard - belts.

It is also important to understand that the use of these symbols and labels is not all-inclusive because it is impossible to warn of all the possible hazards and consequences that could result from failure to follow these instructions. Trained and competent bowling center mechanics are able to recognize and avoid potentially hazardous situations.



AMF 90XLⁱ PINSPOTTER

Guards and Safety Precautions

All safety guards must be in place before operating the machine. When maintenance is required, the following steps must be followed:

1. **Disconnect the power plug** before working on the pinspotter.
2. Remove guards only as required to perform the maintenance.
3. Once maintenance is complete, replace all guards.
4. Reconnect the power plug.

The Positive Ball Lift has two guards (see Figure 1) designed specifically to limit access to the ball lift's moving parts. These guards must remain in place during pinspotter operation.

- The Upper Ball Lift Upper Guard (item 1) limits access to the main lift belt and upper wheel and to bowling balls exiting the lift.
- The Rear Ball Lift Guard (item 2) limits access to the many belts, pulleys, and other moving parts of the ball lift mechanism.

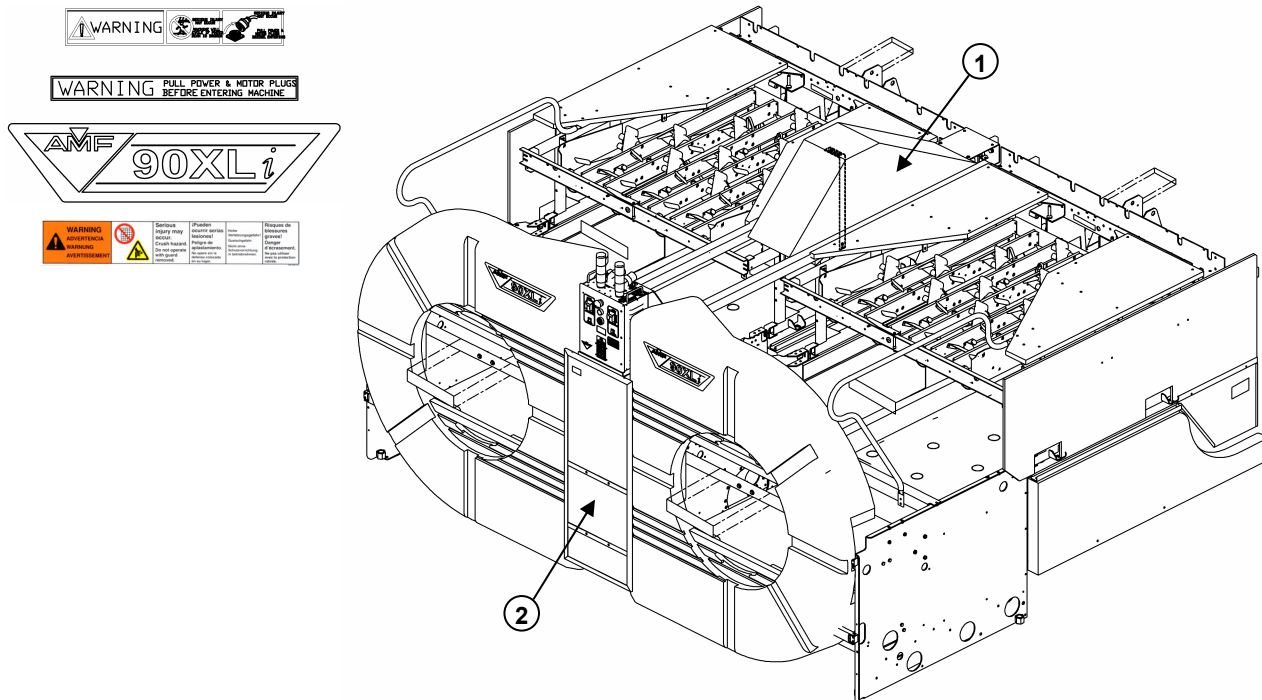


Figure 1

1.0 INTRODUCTION

1.1 How To Use This Manual

This manual is provided for use by trained and authorized bowling center mechanics in conjunction with the adjustment, operation, and maintenance of Positive Ball Lift units installed in AMF pinspotters. The purpose of this manual supplement is to consolidate all of the applicable PBL information into one easy-to-use document making finding the information you need simpler and faster when compared to having the information scattered throughout the pinspotter manual.

This manual does not cover the initial installation of the Positive Ball Lift, but does cover removal and reinstallation of the unit for maintenance and adjustment. Refer to the drawings at the back of this manual for detailed views of the Positive Ball Lift's construction.

There are six parts to this manual supplement: Safety, Introduction, Operation & Adjustments, Lubrication, Troubleshooting, and Drawings and Parts Lists.

- The Safety section provides information on precautions that should be taken when working in and around the Positive Ball Lift, including examples of safety labels and symbols used on the pinspotter to indicate potential hazards.
- The Introduction Section outlines the manual.
- The Operation and Adjustment Section gives step-by-step instructions for setting up and adjusting the PBL, as well as information related to the operation of the unit.
- The lubrication Section provides drawings and information concerning the proper lubrication of the PBL. Maintaining the PBL in accordance with this section can help attain maximum component life and trouble-free operation.
- The Drawings and Parts Lists Section is designed to be an invaluable tool for identifying parts and part numbers for maintenance and repair of the unit.

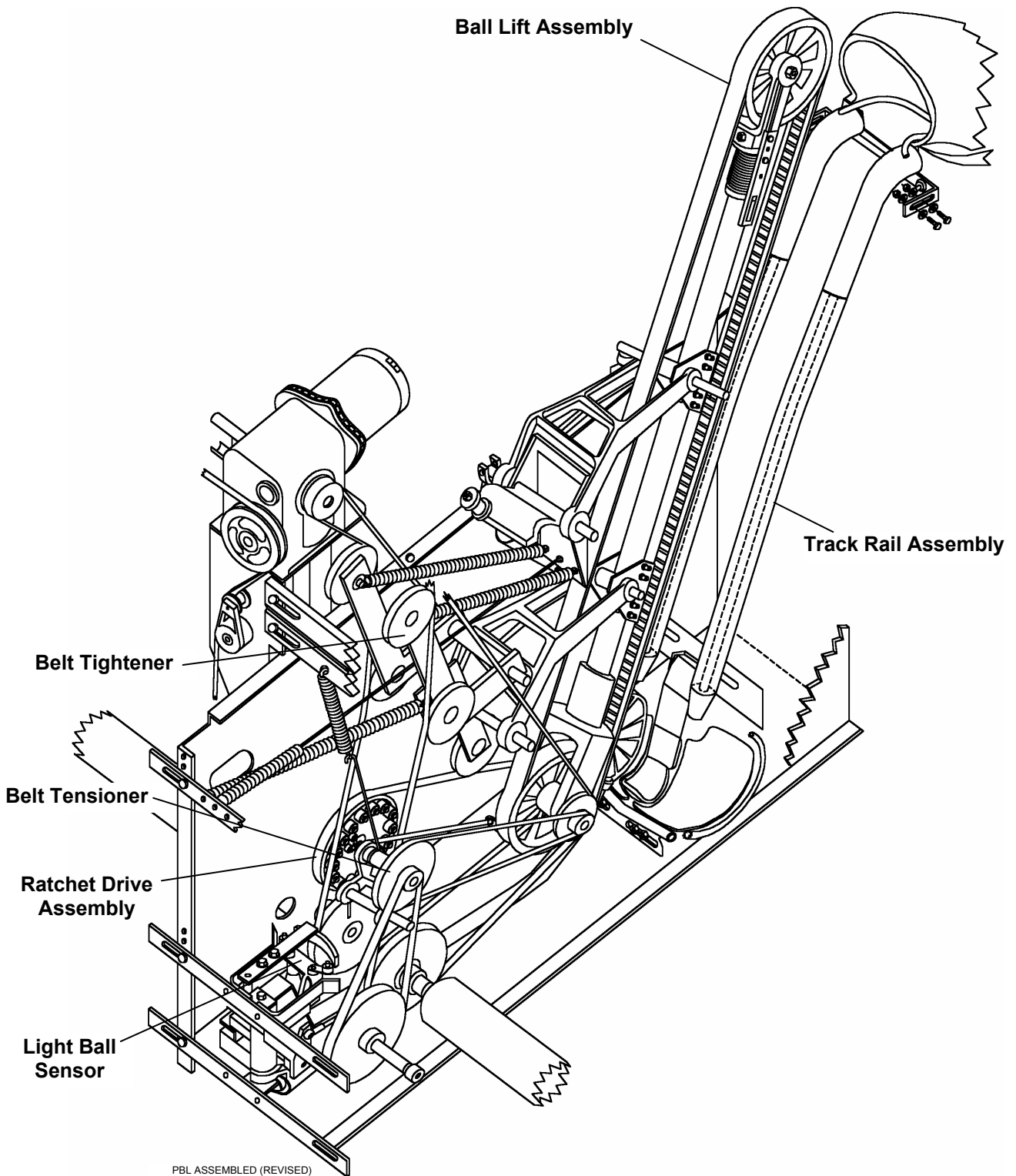
This manual is intended to be a supplement to, and is included with, the AMF 90XL*i* Pinspotter Manual Set.

**Refer to the Safety Section of this manual before
proceeding with Ball Lift maintenance.**



AMF 90XLi PINSPOTTER

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2.0 POSITIVE BALL LIFT OPERATION & ADJUSTMENT**Figure 2-1**



AMF 90XLi PINSPOTTER

2.1 Positive Ball Lift Description

The purpose of the ball lift is to raise the ball high enough to permit a gravity return to the bowler. The 90XLi Pinspotter's Positive Ball Lift is equipped with AMF's *Gripper* Ball Lift system ensuring reliable operation even with today's heavily oiled lanes. The ball lift consists of a number of separate assemblies that work together to achieve the desired result. These assemblies are (refer to Figure 2-1):

- Ball Lift Assembly
- Light Ball Sensor
- Ratchet Drive Assembly
- Track Rail Assembly
- Belt Tensioner
- Belt Tightener

2.2 Positive Ball Lift Removal

1. Turn off power to both pinspotters.
2. Remove the upper and rear ball lift guards.
3. Remove the two springs and extension rods, the two belt tightener springs, and the ratchet drive belt tensioner spring from between the pinspotters.
4. Remove the carpet drive belts, the ratchet drive belt, and the upper paddle drive belt from the PBL pulleys.
5. Remove the clamp studs from the upper and lower ball lift shaft mounting brackets, and lift the ball lift assembly out of pinspotter.

2.3 Positive Ball Lift Installation

1. Place the upper ball lift assembly shaft in the upper support brackets on the kickback plates.
2. Place all V-belts in position on the lift pulleys.
3. Put the lower ball lift shaft in the lower support brackets.
4. Install the clamp studs keeping the nuts loose.
5. Adjust the upper and lower shafts to center the lift with the track rails in accordance with Section 2.11
6. Verify that the ball lift is aligned with the track rails. Adjustment is required when the ball lift shaft support brackets on the kickback plates are not aligned directly across from each other or are not at the same height.

7. If the ball lift is not aligned with the track rails:
 - a. Rotate the ball lift support shafts so that the slots in the adjustable plates are in line with the direction of offset between the support brackets on the kickback plates (see Figure 2-2).

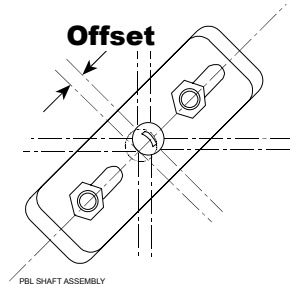


Figure 2-2

- b. Tighten the nuts on the clamp studs.
 - c. Loosen the nuts on the upper and lower adjustable shaft assemblies, and adjust the ball lift support shafts within the slots of the adjustable plates until the ball lift and track rails are in alignment.
 - d. Tighten the nuts on the upper and lower adjustable support shaft plates.
8. If an offset adjustment was made, or if a different ball lift is being installed, verify correct bumper height adjustment in accordance with Section 2.13.
9. Install all drive belts, springs, and spring extensions.
10. Reinstall the upper and rear guards.
11. Test the ball lift by running several balls through it to verify smooth operation, that the belt does not slip, and that the unit remains properly aligned.

2.4 Positive Ball Lift Belt Adjustment

1. If the lift belt rubs against the tube assembly when a ball is being elevated, adjustment is necessary. Use a spanner wrench and rotate the upper spring retainer until the length of the spring between the lower retainer and the upper washer is 4-1/8 inches (see Figure 2-3). This should result in the correct belt tension.

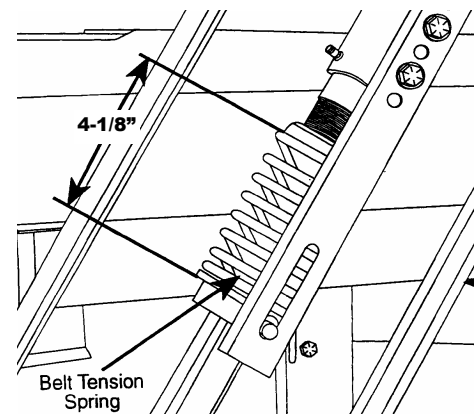


Figure 2-3



AMF 90XLi PINSPOTTER

2.5 Sensor Assembly Operation

The cam follower roller must be low enough so that it will slide under the rudder cams when paddle movement is blocked, but high enough so that the rudder cams will lock behind it in the power drive position (see Figure 2.4). Washers are included in the assembly for fine tuning the height of the cam follower roller.

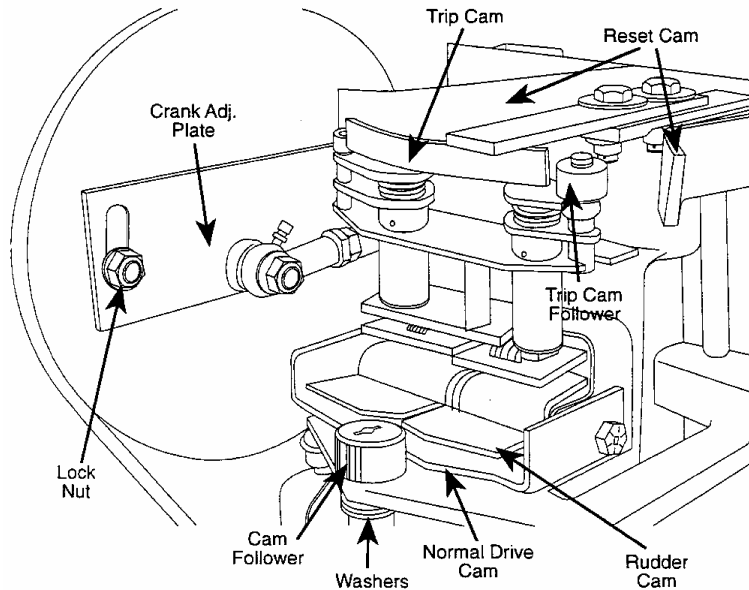


Figure 2-4

2.6 Sensor Adjustment

1. If the height of the cam follower must be adjusted:
 - a. Remove the light ball sensor from the machine.
 - b. Disconnect the support plate tension spring.
 - c. Add or remove washers, as needed, between the cam follower and the support plate.
 - d. Reconnect the support plate tension spring.
 - e. Reinstall the light ball sensor in the pinspotter.
2. The ball lift sensor support arm should be centered between the side plates. Measure with a ruler. Loosen the mounting bolts and adjust if necessary (see Figure 2-5).

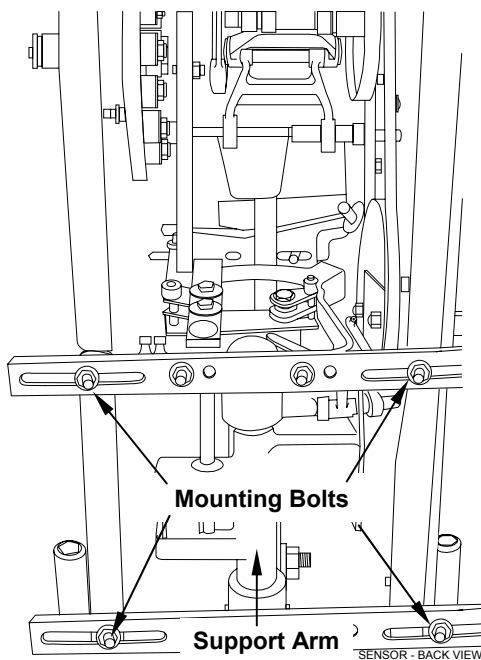


Figure 2-5

2.7 Rudder and Sensor Adjustment

1. Remove the retaining nut from the crank pin and save (see Figure 2-6).
2. Remove the rod assembly from the crank pin and swing it out of the way so that the sensor assembly can be moved manually.

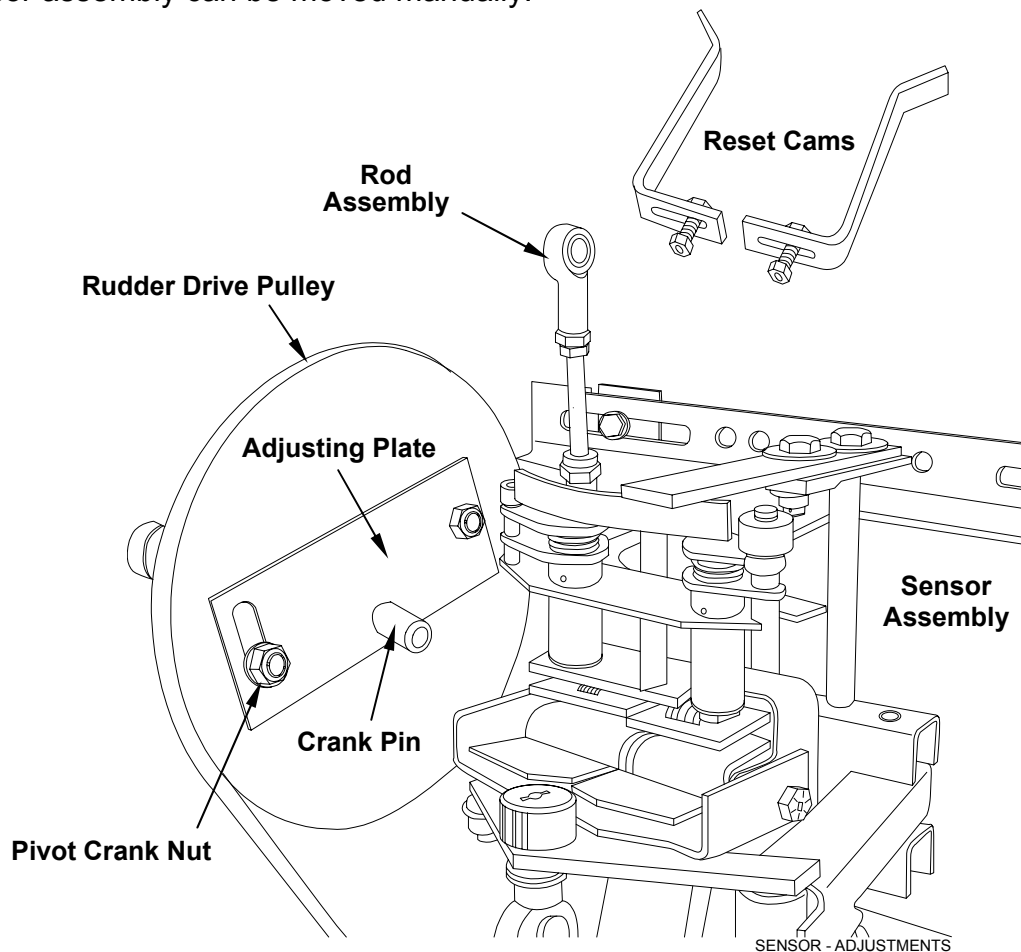


Figure 2-6

3. Remove both reset cams.
4. Loosen the pivot crank nut and turn the adjusting plate to the full clockwise position, then tighten the pivot crank nut to prevent the adjusting plate from moving.
5. Move the rudder arm back and forth, so that it touches the rubber bumper on each side plate. The arm should move freely with no interference. If the paddle is not centered in the door opening, it may be necessary to adjust the length of the rudder arm for front-to-back alignment and/or shim the rudder arm support bracket for vertical alignment as shown in Figure 2-7.



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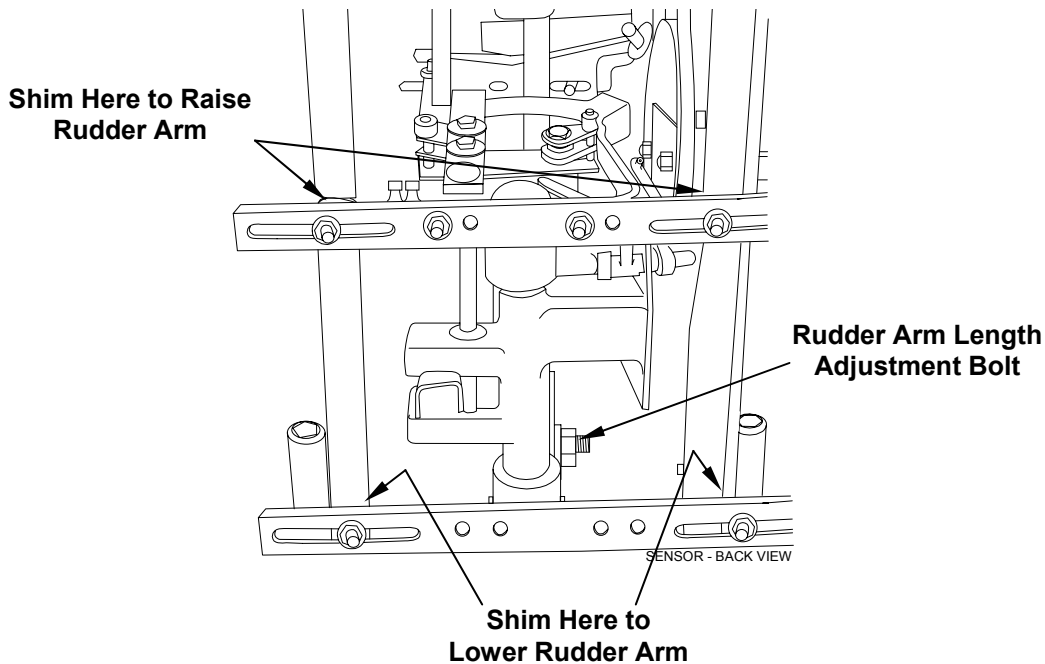


Figure 2-7

6. If not done previously, disconnect the spring from the belt tensioner and remove the belt from the rudder drive pulley.
7. Reattach the rod assembly to the crank pin and pivot the sensor assembly by manually rotating the rudder drive pulley to observe the travel of the rudder arm.
8. Adjust the length of the rod assembly so that the rudder arm swings equally to the left and right of the center position. Tighten the rod's jam nuts.

NOTE: Lengthening the rod provides more travel towards the odd machine while shortening the rod provides more travel towards the even machine. The rod assembly has right-hand threads on both ends, so the rod end must be removed from the crank pin to make adjustments.

9. Loosen the pivot crank nut on the crank plate and rotate the plate in a counterclockwise manner to increase the overall stroke of the rudder arm. The correct adjustment is achieved when the rudder arm touches each rubber bumper on the left and right side plates with equal force without actuating the trip cam follower when the drive pulley is rotated. There should be a little overtravel (1/8 inch) on each side. Tighten the pivot crank nut.
10. Rotate the rudder drive pulley to recheck travel. If the rudder hits one bumper and not the other, repeat Steps 8 & 9.

2.8 Trip Cam Adjustment

1. Turn the drive pulley to place the rudder in the center of its travel (center of ball lift).
2. Push the trip cam followers forward as far as they will go. There should be a 1/8-inch gap on each side between the trip cam and rollers (see Figure 2-8).

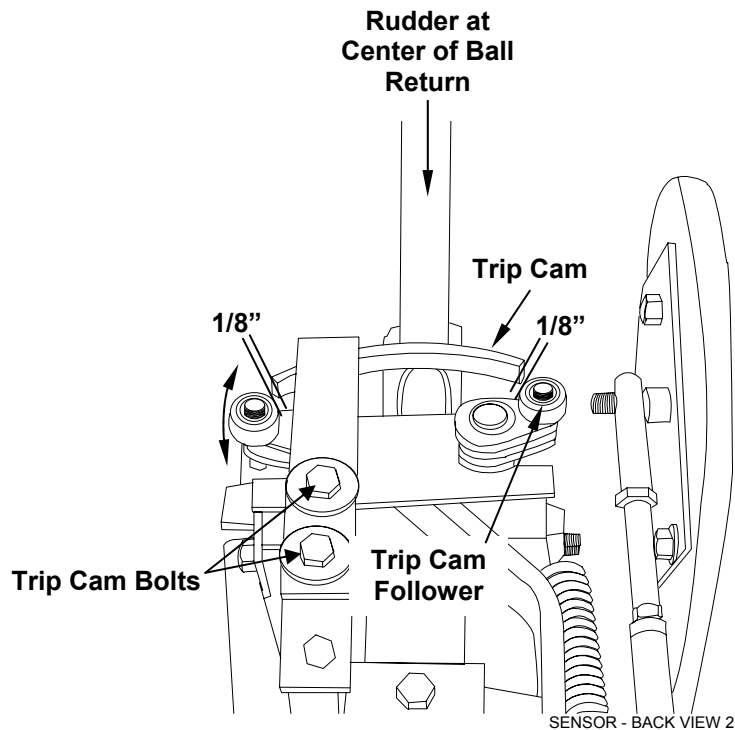


Figure 2-8

3. To adjust, loosen the trip cam bolts, reposition the cam, and retighten the bolts.
4. Recheck the clearance after tightening.

2.9 Reset Cam Adjustment

1. Rotate the drive pulley to place the rudder arm as far left as it will go, striking the bumper. Hold this position.
2. Install the left reset cam and move its angled surface to touch the trip cam follower. Tighten the cam's mounting bolt.
3. Repeat Steps 1 and 2 for the right side reset cam.



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2.10 Checking the Reset Cams

1. Manually rotate the rudder drive pulley. While the sensor is moving back and forth, move one of the trip cam follower rollers towards the rear of the machine. Continue rotating the drive pulley until the roller contacts the reset cam, returning the trip cam follower roller to its normal (forward) position.
2. Manually push the trip cam follower roller forward to check that it has fully returned to its forward position.
3. If the trip cam follower roller has fully returned to its forward position, the reset cam is properly adjusted. If the roller has not fully returned to its forward position, adjust the reset cam inward a small amount and repeat Steps 1 and 2.
4. Check and, as necessary, adjust the other trip cam follower roller in the same manner.
5. Install the belt on the rudder drive pulley.
6. Replace the spring on the belt tensioner.
7. On the chassis, turn the Back End switch ON.

▲ CAUTION

Keep your hands away from belts, pulleys, and other rotating equipment! Failure to do so can result in severe personal injury to the hands and arms.

8. Apply power to the machine.
9. Retest the operation of the trip cam follower rollers. Use a screwdriver or wooden stick in the open end of the rudder arm to cause the rudder to actuate each roller. If the roller does not return to its forward position properly during the subsequent sweep of the assembly, turn power to the machine OFF and readjust the reset cam.
10. Retest under power until both reset cam settings are correct.

2.11 Positive Ball Lift Assembly Adjustment

1. The Positive Ball lift assembly must be centered between the return rails (see Figure 2-9). To adjust, loosen the nuts on the four clamp studs in the upper and lower mounting brackets, adjust the lift from side to side as needed, and retighten the nuts.

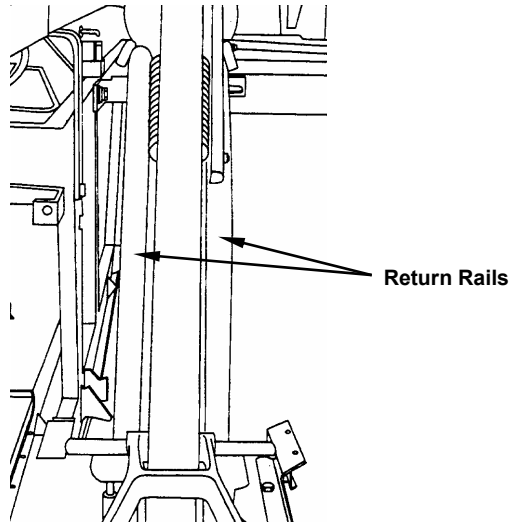


Figure 2-9

2. The Positive Ball Lift belt tension spring should be compressed to $4\text{-}1/8 \pm 1/8$ " for proper tension on the lift belt (see Figure 2-10). Take this measurement between the top edge of the spring and the upper edge of the lower spring retainer. Adjust by tightening or loosening the upper retaining ring using a spanner wrench.

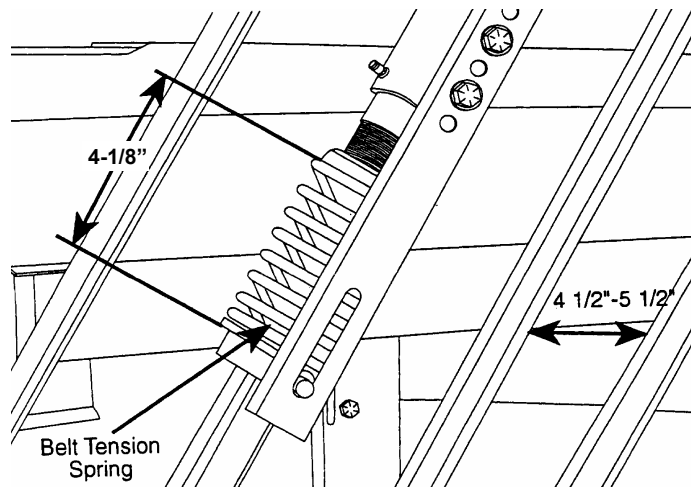


Figure 2-10



AMF 90XLi PINSPOTTER

2.12 Lift Arm Adjustment

1. Measure the height of the lift arm above the door weldment (see Figure 2-11). This distance should be no more than 1/8 inch. Adjust this gap by adjusting the length of the rod that connects between the lift arm and the ratchet drive assembly (see Figure 2-12). The rod has right hand threads on both ends, so one end of the rod must be disconnected in order to make the adjustment. Shortening the rod raises the lift arm, lengthening the rod lowers the lift arm. Tighten the jam nuts after completing the adjustment.

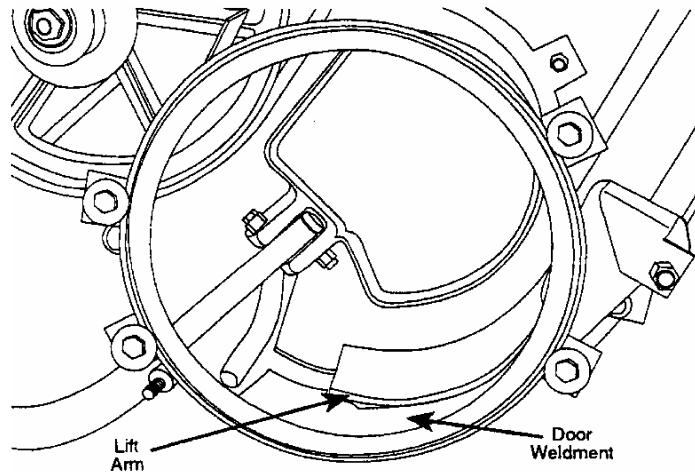


Figure 2-11

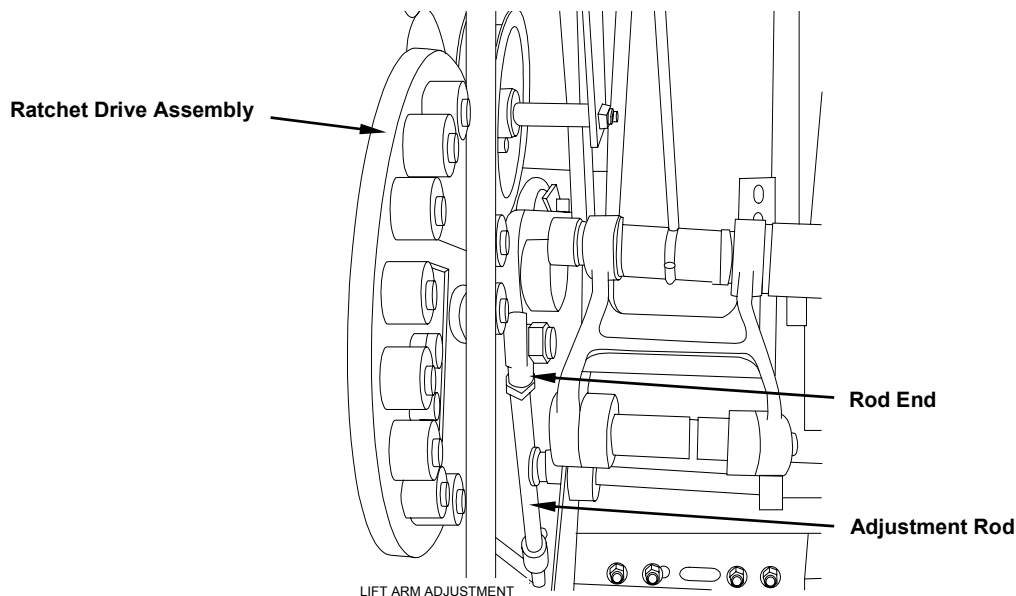


Figure 2-12

2.13 Rubber Bumper Adjustment

1. Place a bowling ball on the lift arm assembly (see Figure 2-13).
2. Measure the clearance between the ball and the ball lift belt. This clearance should be **between 3/8 and 1/2 inch**. The increase in clearance from earlier units is needed because of the thicker rail covers of the new *Gripper* ball return.

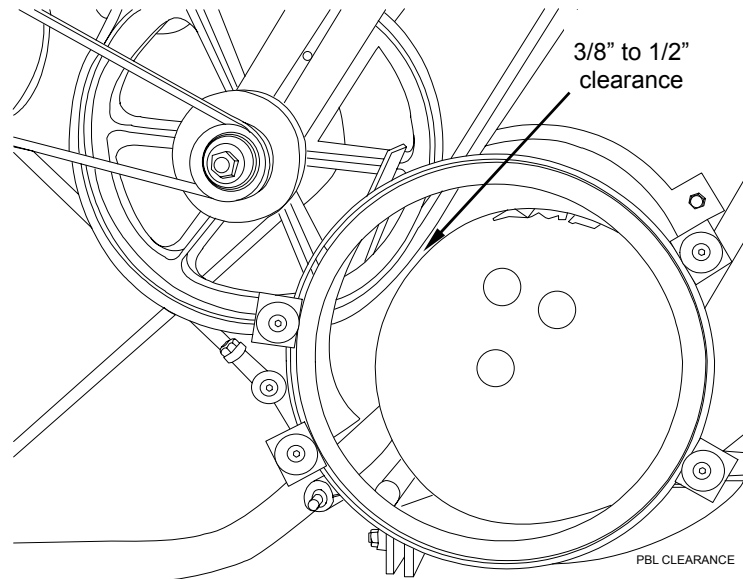


Figure 2-13

3. Adjust this clearance by adjusting the height of the rubber bumpers (see Figure 2-14). Following adjustment, tighten the jam nuts.

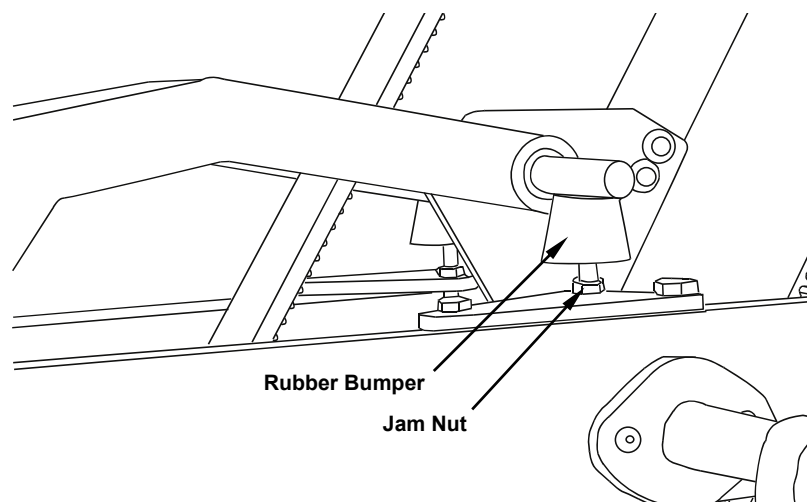


Figure 2-14



AMF 90XLi PINSPOTTER

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3.0 LUBRICATION INSTRUCTIONS

3.1 LUBRICATION

Lubrication is one of the most important items in the proper operation and maintenance of the Positive Ball Lift. Care must be taken to insure that lubricants are applied correctly. Avoid excessive lubrication to minimize the possibility of transmitting lubricants to the bowler. Before lubrication of exposed parts or surfaces, it is important that the old lubricant first be removed. It is also very important to clean the ball lift as you lubricate.

This section of the manual shows the points of lubrication, the correct lubricants to use, and the frequency of lubrication for each part of the ball lift.

3.2 LUBRICANT SYMBOLS



OILING: Items indicated by a number within a square 1 require oiling. Use SAE #10 oil as the lubricant.



GREASING: Items indicated by a number within a circle 1 require greasing. Use a multi-purpose grease (Bearing Guard #2) as the lubricant.



AMF 90XLi PINSPOTTER

3.3 LUBRICATION POINTS

3.3.1 POSITIVE BALL LIFT (PBL) - Figure 3-1



1 Rudder arm pivot points (2 places): apply 2 drops of oil every 3 months.



2 Paddle drive pulley shaft (2 places): apply 2 drops of oil every 3 months.



3 Pin wheel belt tensioner (2 places): apply 2 drops of oil every 3 months.



4 PBL lift arm flange bearing (2 places): apply 2 drops of oil every 3 months.



5 Carpet belt tensioner assembly (6 places): apply 2 drops of oil every 2 months.

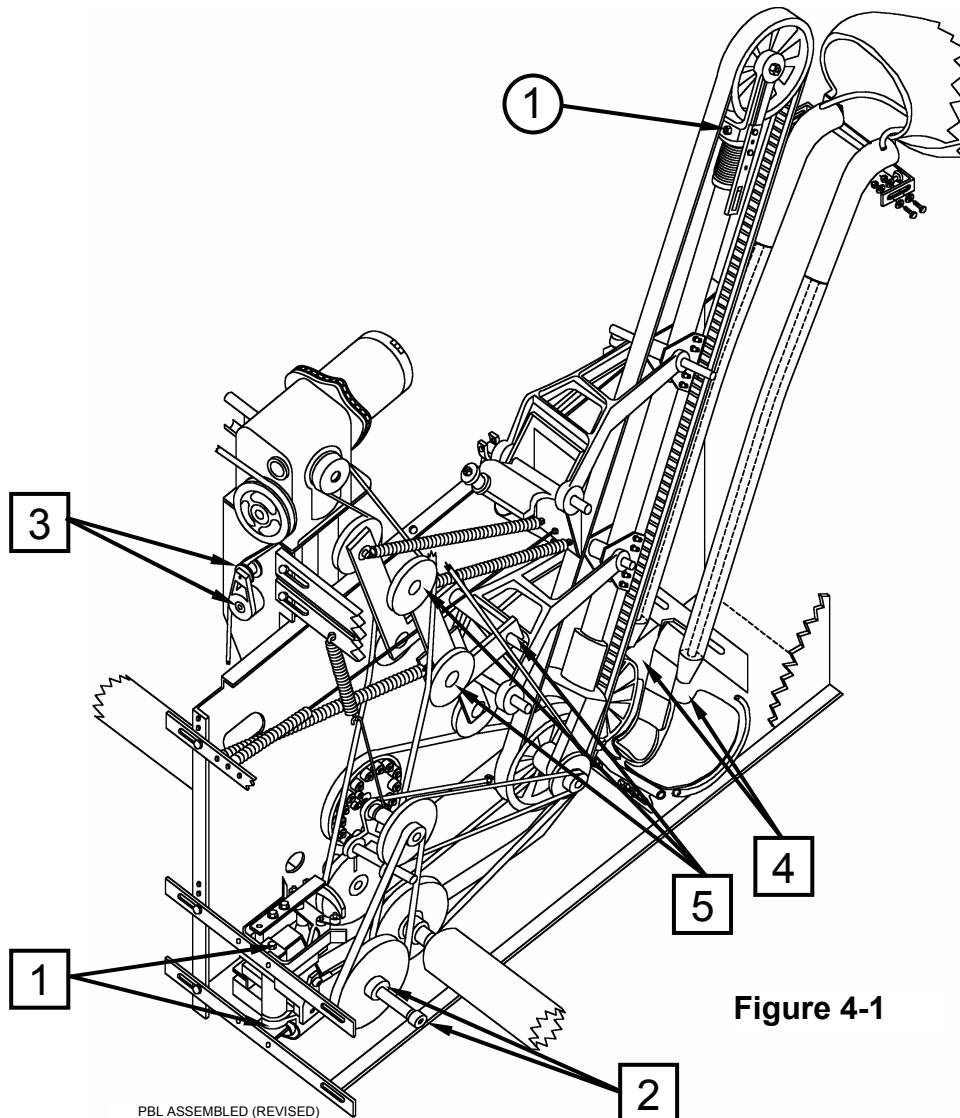


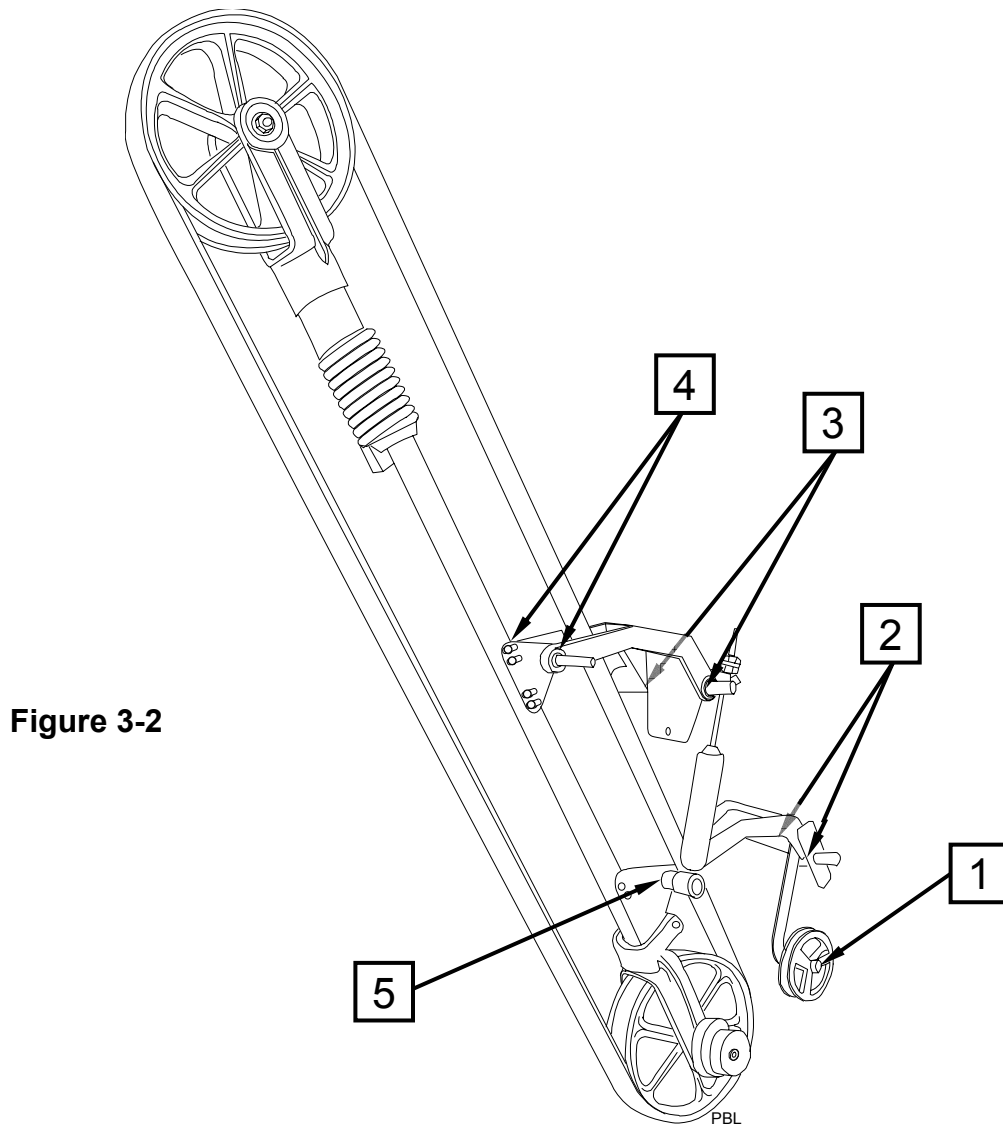
Figure 4-1



1 Apply grease (with Grease Gun) every 6 months.

3.3.2 POSITIVE BALL LIFT - Figure 3-2

- 1** Idler pulley (2 places): apply 2 drops of oil to each side every 3 months.
- 2** Lower yoke pivot points (4 places): apply 2 drops of oil every 3 months.
- 3** Upper yoke pivot points (4 places): apply 2 drops of oil every 3 months.
- 4** Upper yoke upper shaft (2 places): apply 2 drops of oil every 3 months.
- 5** Lower yoke upper shaft (2 places): apply 2 drops of oil every 3 months.

**Figure 3-2**



AMF 90XLi PINSPOTTER

3.3.3 BELT TENSIONER - Figure 3-3



1 Pulley (2 places): apply 1 drop of oil to each side every 3 months.



2 Hanger arm center pivot points (6 places): apply 1 drop of oil every 3 months.



3 Lower shaft sleeve bearings (4 places): apply 1 drop of oil every 3 months.

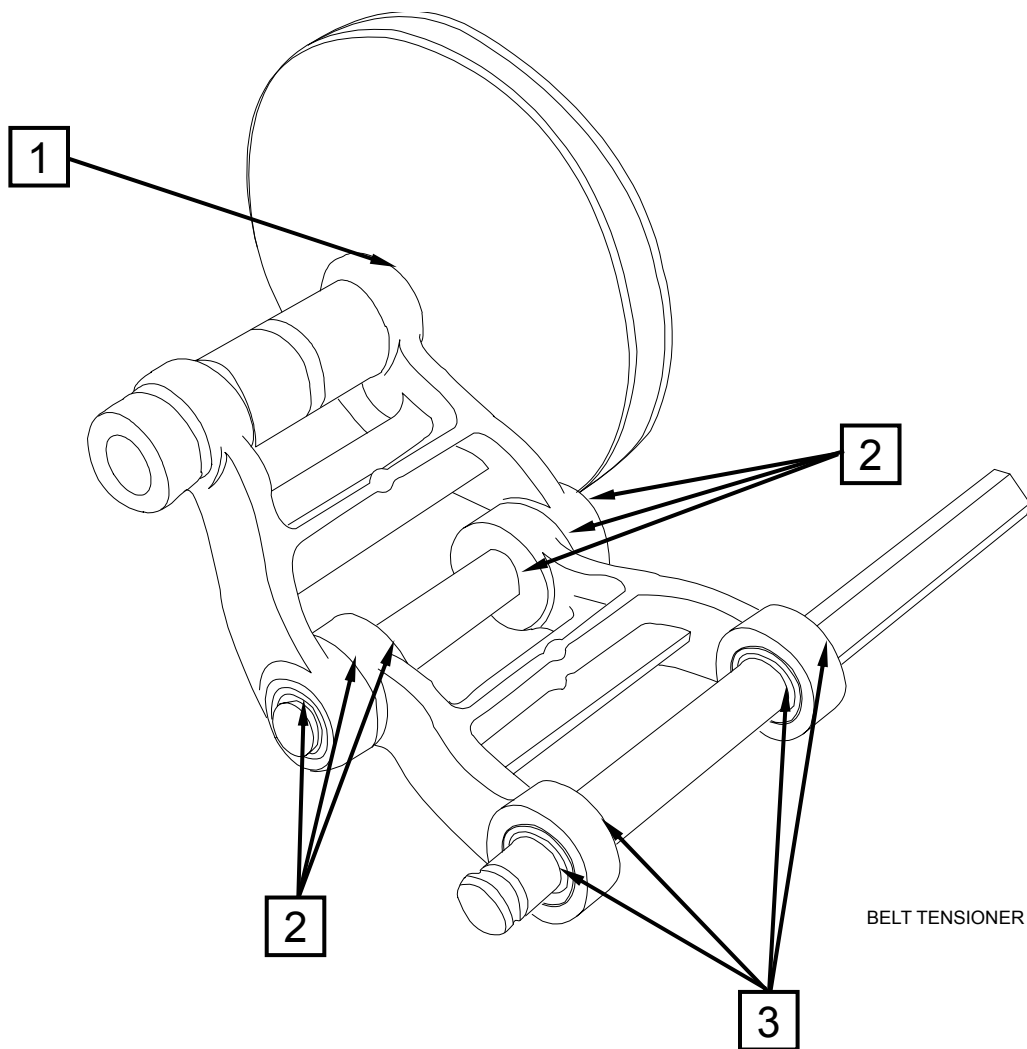
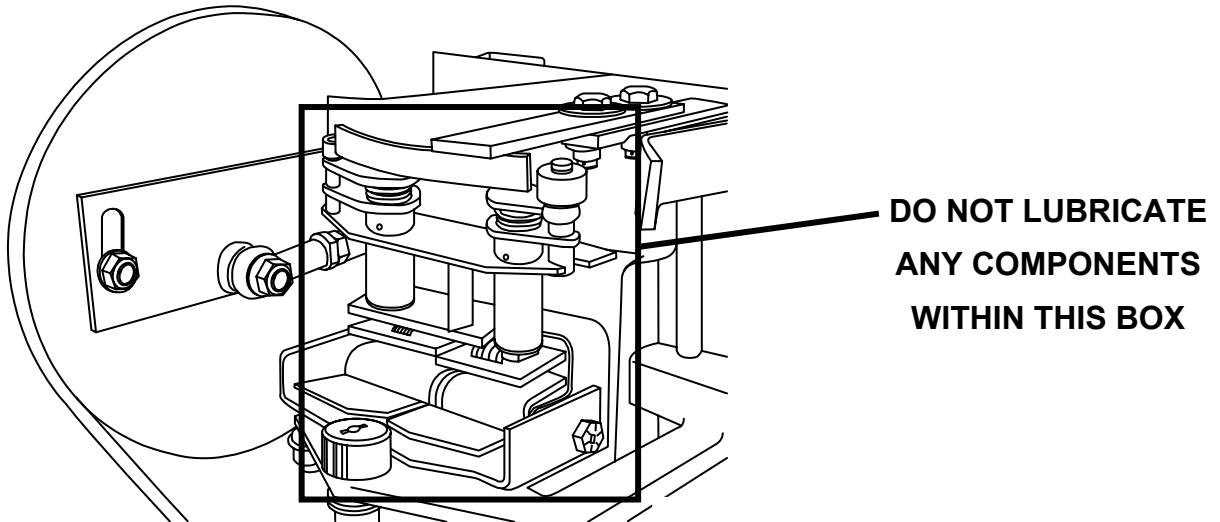


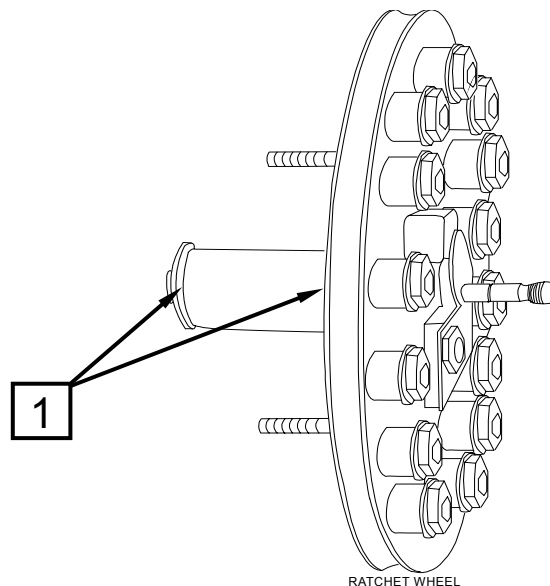
Figure 3-3

3.3.4 LIGHT BALL SENSOR - Figure 3-4

DO NOT LUBRICATE component parts of the trip cam and rudder cam assembly, outlined within the square below. Friction is required in this area to allow the sensor to operate properly.

**Figure 3-4****3.3.5 RATCHET WHEEL - Figure 3-5**

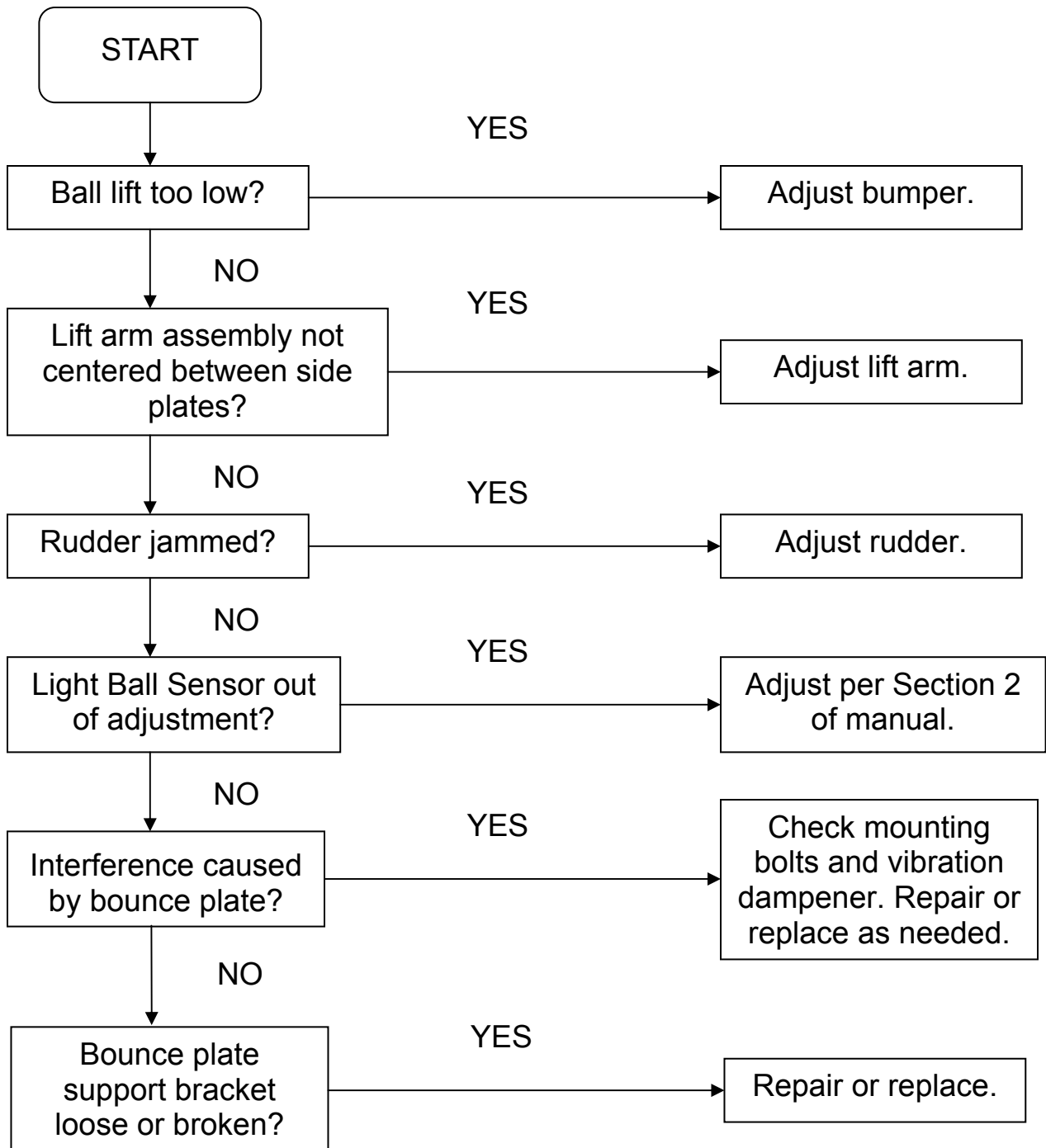
- 1** Ratchet wheel shaft flange bearings (2 places): apply 2 drops of oil every 3 months.

**Figure 3-5**



AMF 90XLi PINSPOTTER

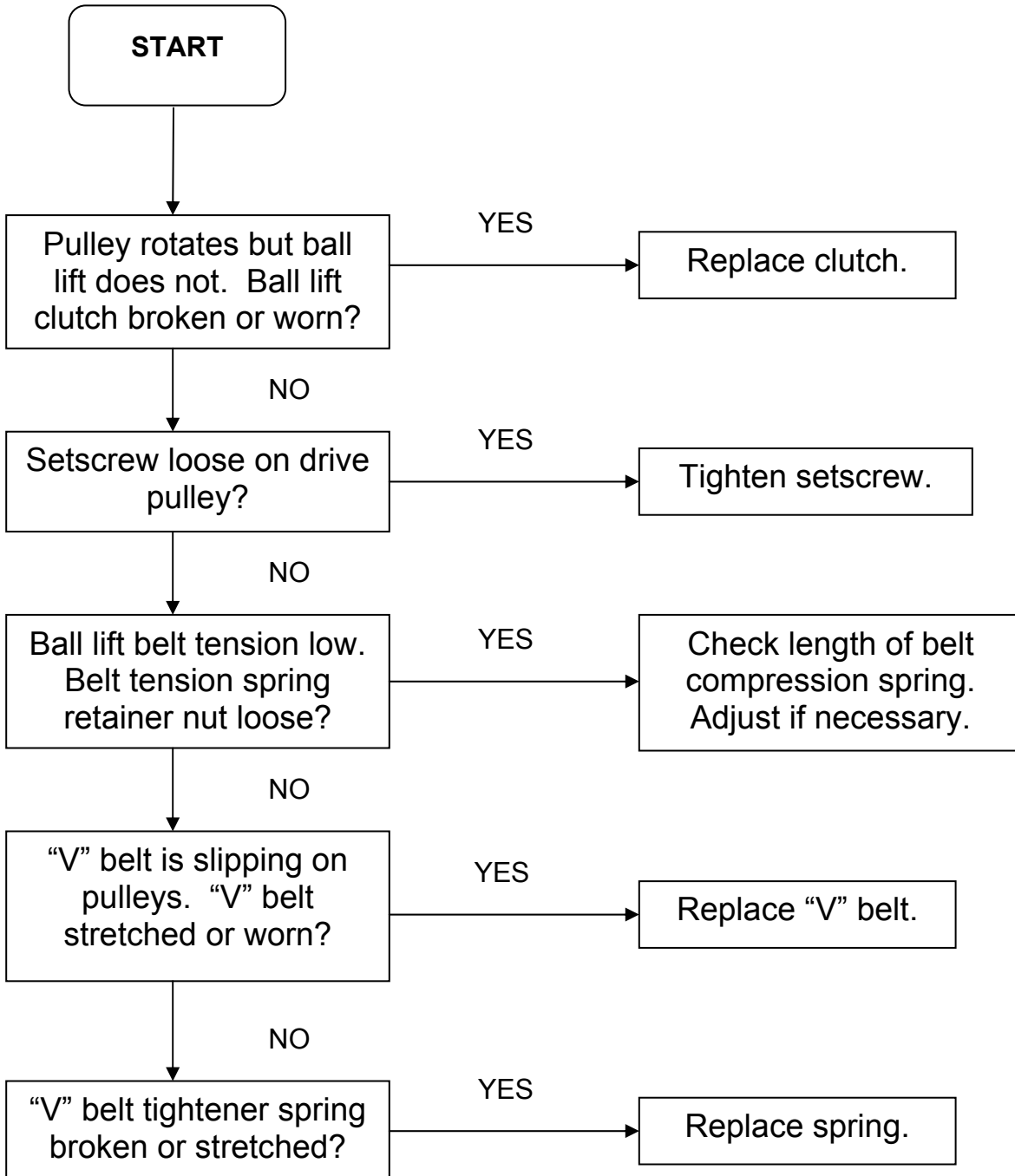
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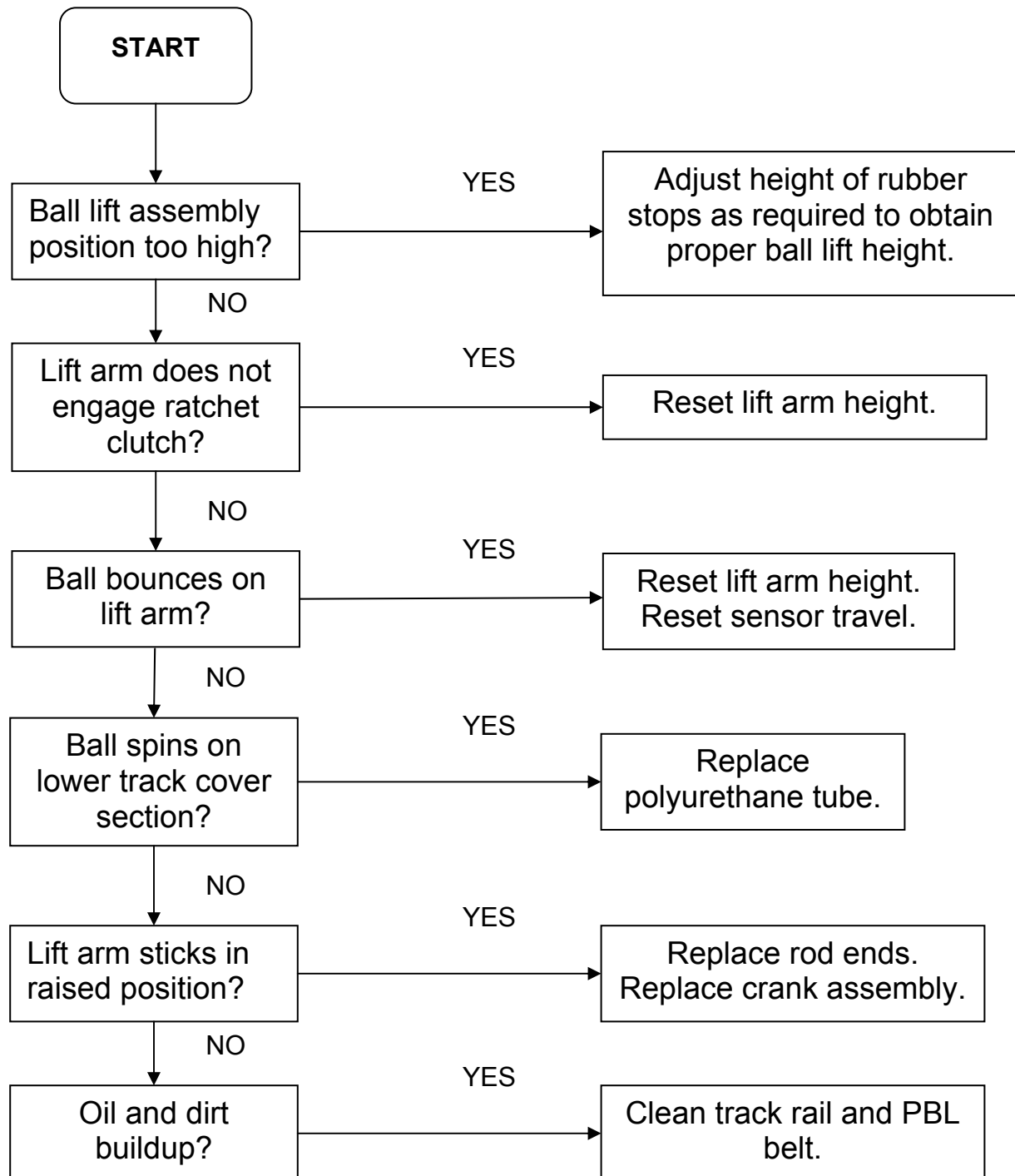
4.0 TROUBLESHOOTING**4.1 PROBLEM: Ball idles at exit – will not enter lift.**



AMF 90XLi PINSPOTTER

4.2 PROBLEM: Ball lift fails to elevate ball.

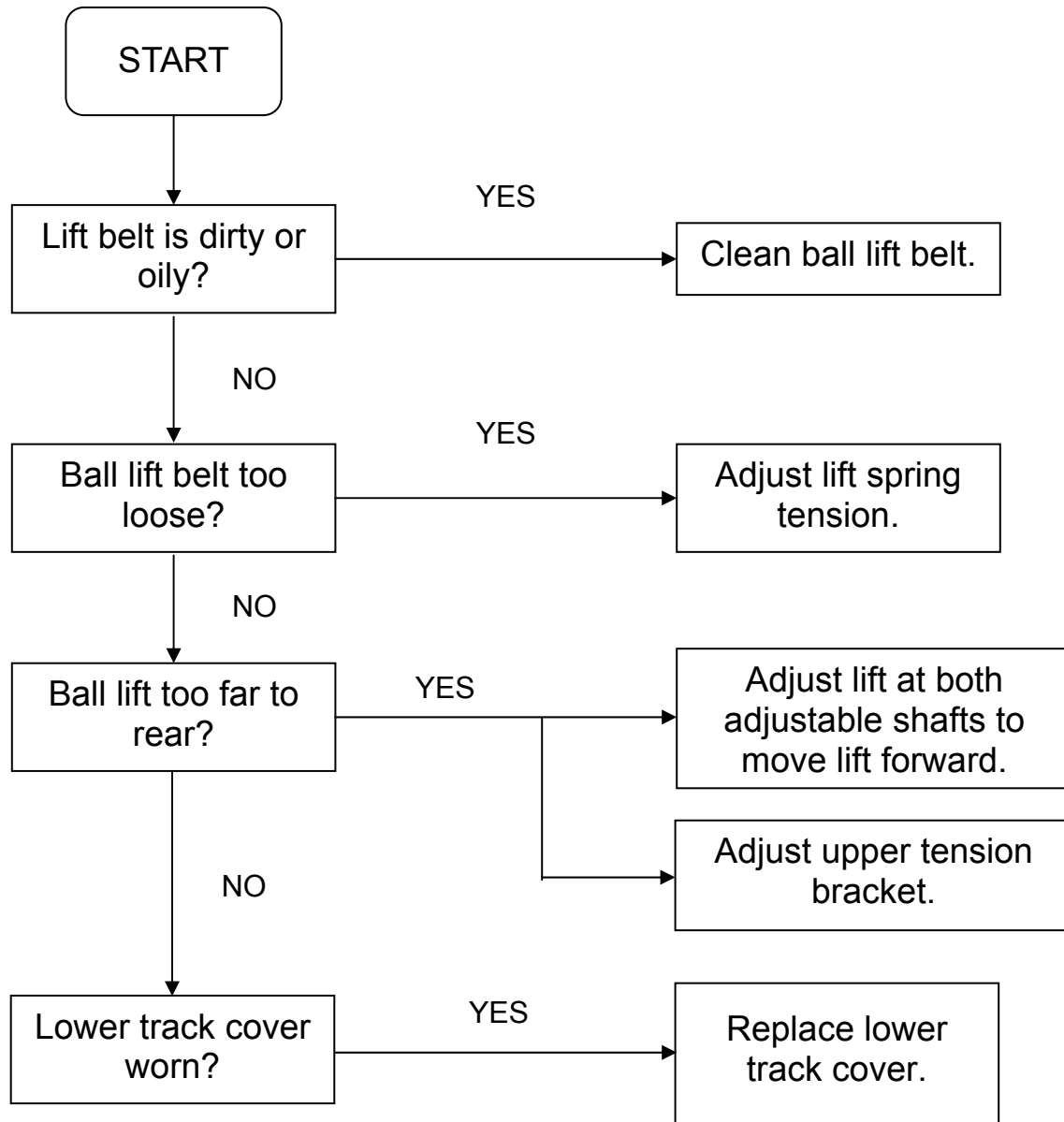


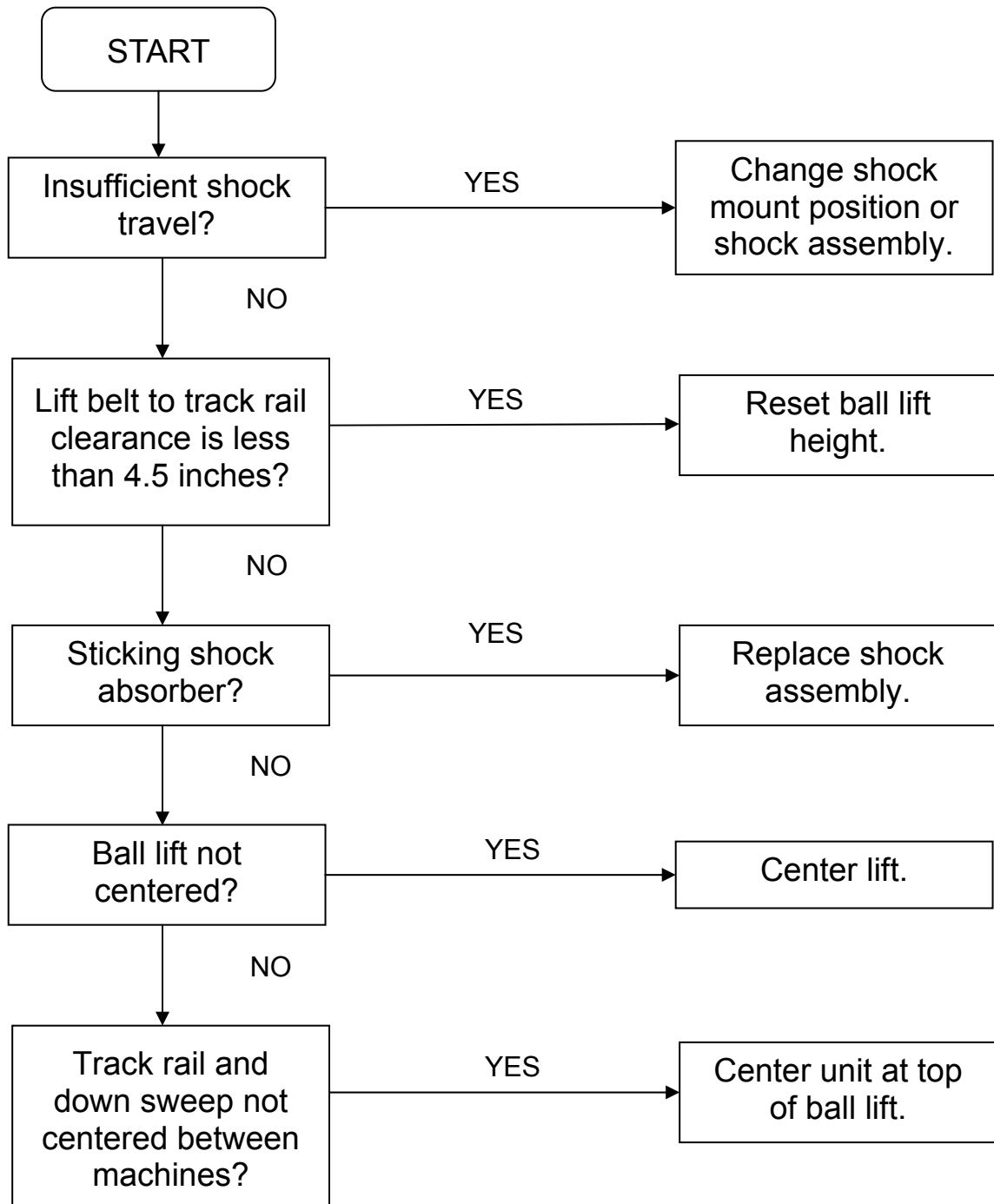
4.3 PROBLEM: Ball fails to roll up track rails.



AMF 90XLi PINSPOTTER

4.4 PROBLEM: Ball fails to continue to top of lift assembly and stops or slides back to the lift arm.

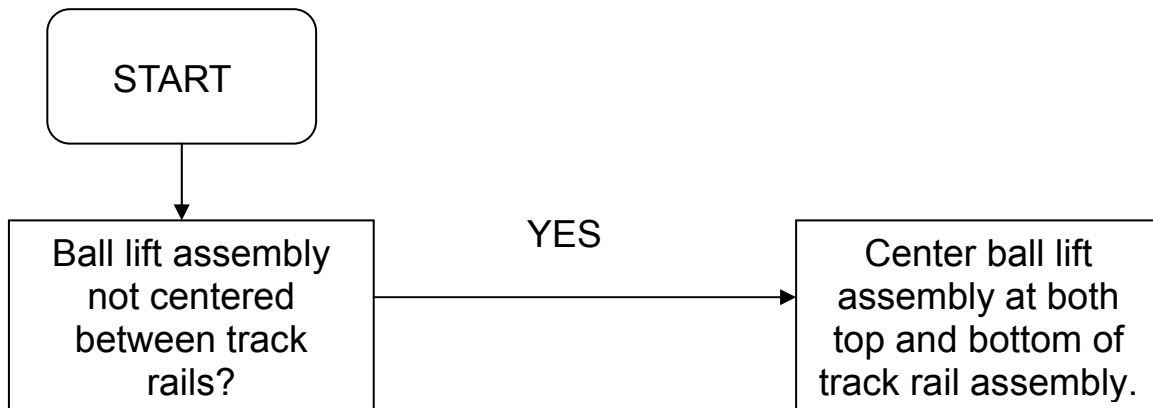


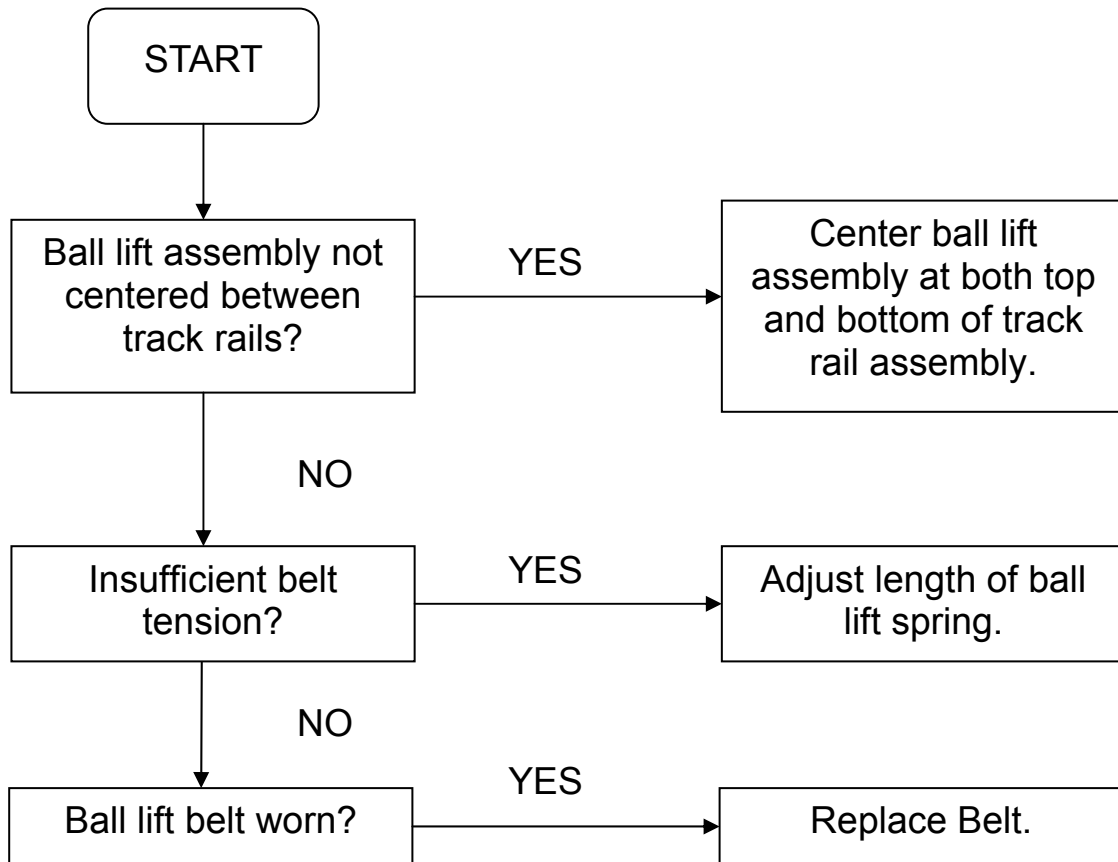
4.5 PROBLEM: Ball becomes airborne at top of track rail assembly.



AMF 90XLi PINSPOTTER

4.6 PROBLEM: Ball wobbles on track rail assembly.

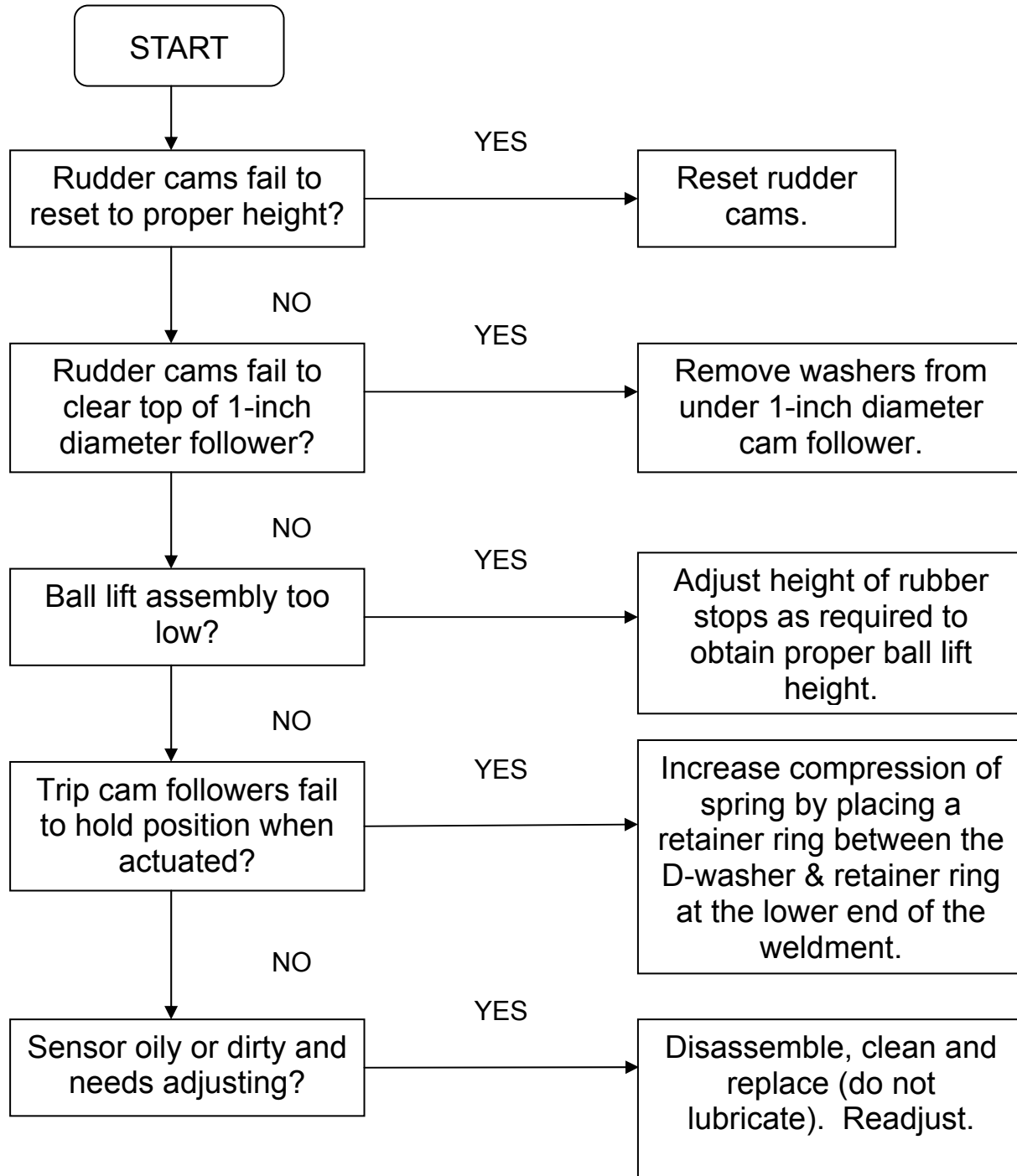


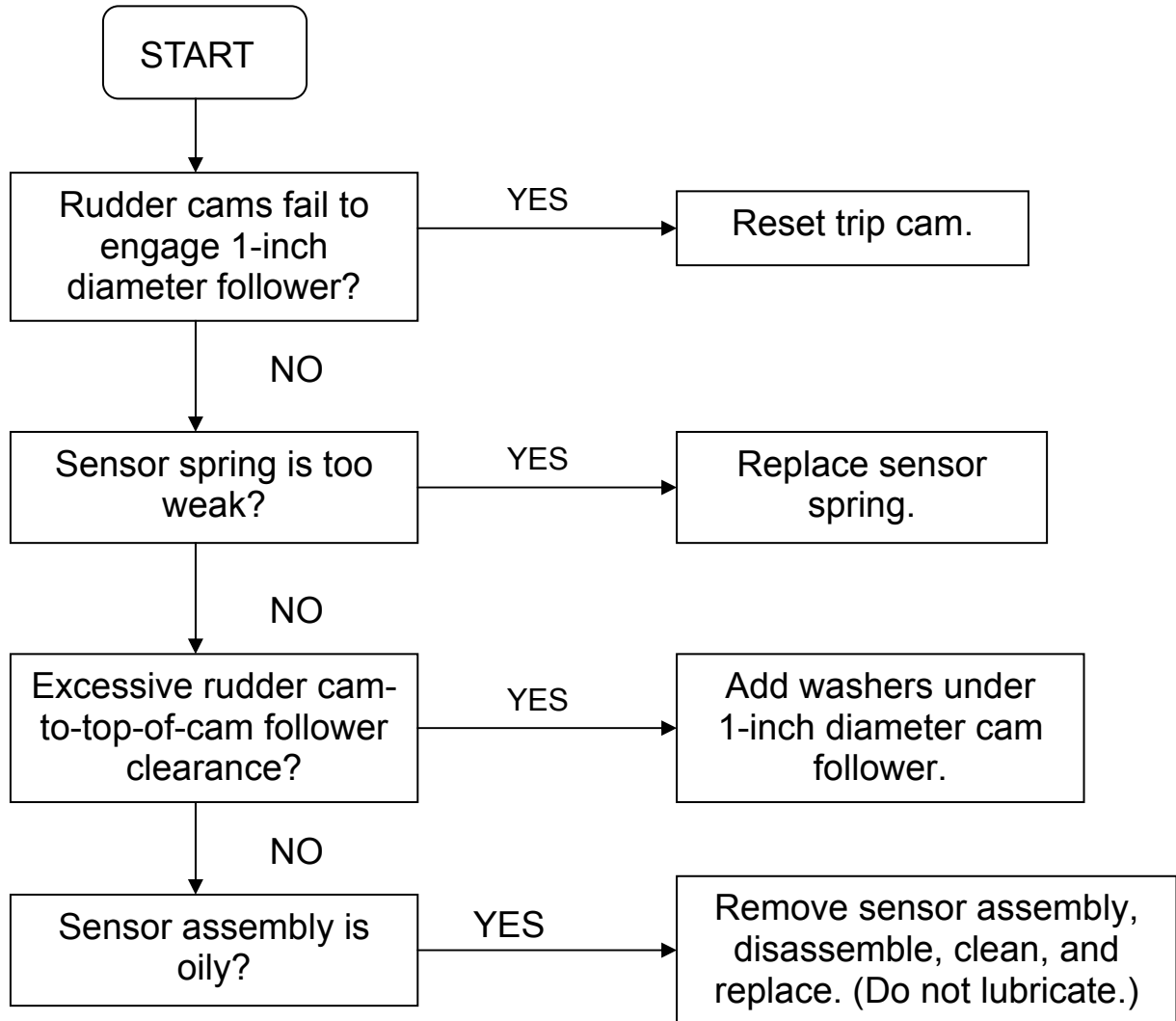
4.7 PROBLEM: Ball lift belt leaves V-groove of sheaves.



AMF 90XLi PINSPOTTER

4.8 PROBLEM: Rudder slaps ball back onto carpet.



4.9 PROBLEM: Sensor fails to clear pin jams.

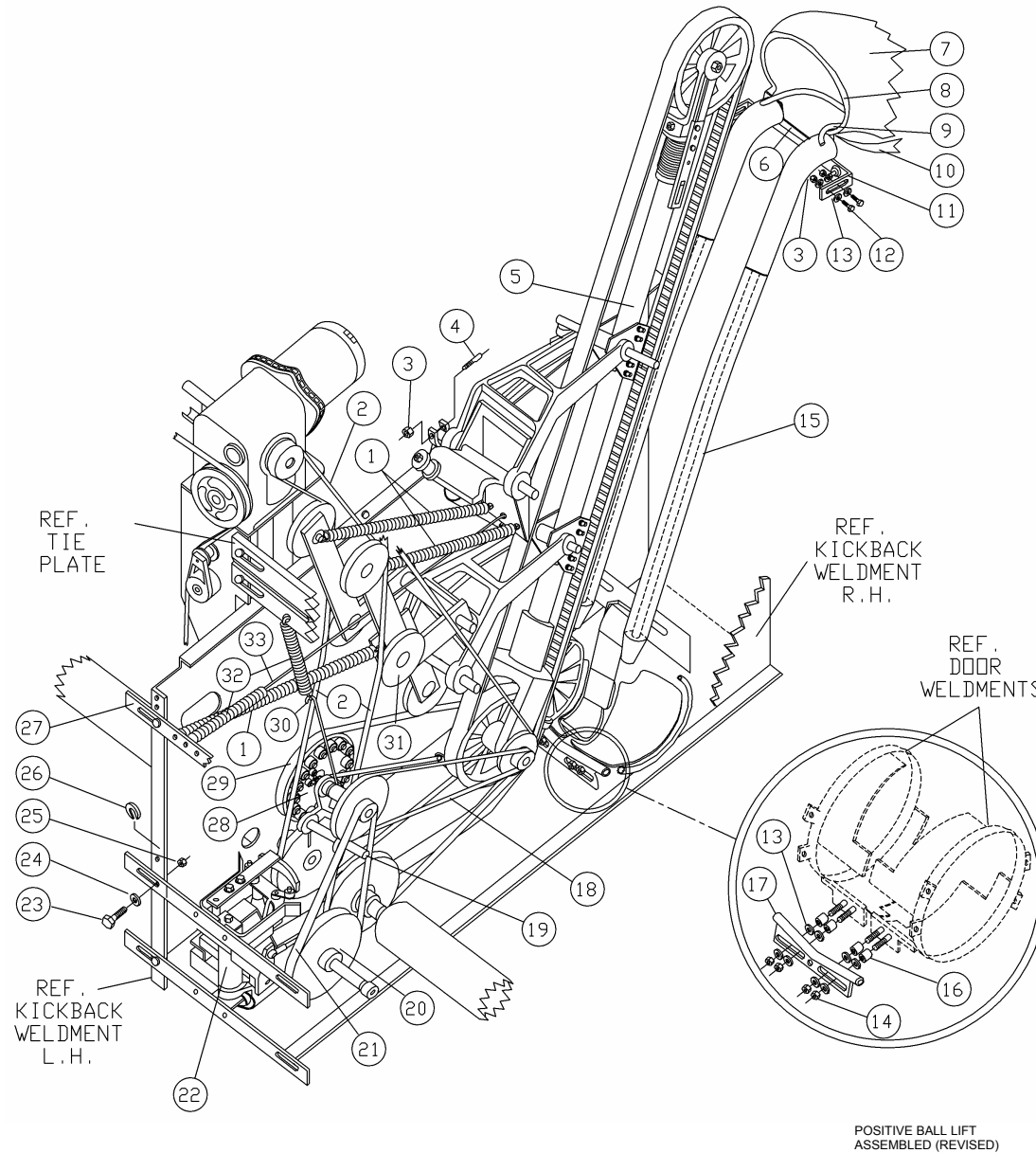


AMF 90XLi PINSPOTTER

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DRAWINGS & PARTS LISTS





POSITIVE BALL LIFT (PBL) - ASSEMBLED

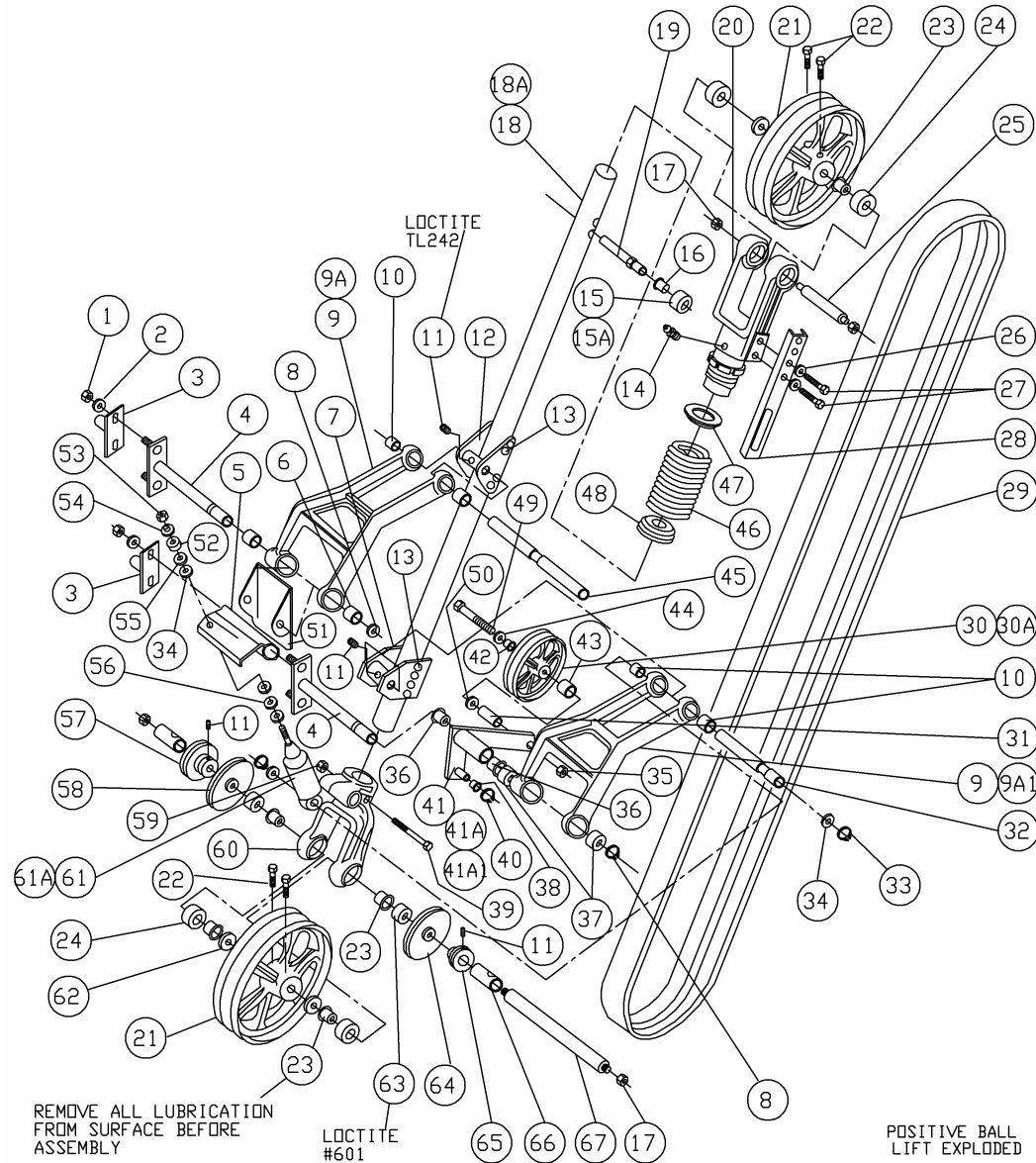
AMF 90XL*i* PINSPOTTER

ITEM	QTY	PART #	DESCRIPTION	ITEM	QTY	PART #	DESCRIPTION
1	3	000-024-673	SPRING	27	1	070-011-035	STRAP
2	2	090-004-520	V- BELT, CARPET DRIVE	28	1	070-011-039	RATCHET ASSEMBLY
3	6	831-565-002	NUT, HEX, 3/8 - 16	29	1	070-011-064	V- BELT, RATCHET DRIVE
4	6	000-024-610	CLAMP STUD	30	1	090-002-016	SPRING EXTENSION
5	1	070-011-052	BALL LIFT ASSEMBLY (see next illustration)	31	1	070-011-810	BELT TIGHTENER
6	1	000-021-813	WIPER SUPPORT	32	2	000-026-031	SPRING
7	1	070-004-669	BALL WIPER CLOTH	33	1	070-011-034	EXTENSION ROD
8	2	000-021-814	WIPER CLOTH RING				
9	1	000-029-629	DOWN SWEEP WELDMENT				
10	1	070-004-670	DUST TRAP				
11	4	070-004-654	TRACK SUPPORT BRACKET				
12	8	809-865-285	SCREW, HEX, 3/8 - 16 X 1-3/4				
13	74	948-767-132	WASHER, 13/32 X 13/16 X 1/16				
14	20	844-065-002	NUT, STOVER LOCK, 3/8 - 16				
15	1	088-001-235	TRACK RAIL ASSEMBLY				
16	4	070-008-212	SPACER				
17	1	070-008-207	RAIL WELDMENT				
18	1	070-011-148	V- BELT, PADDLE DRIVE, UPPER				
19	1	090-002-015	BELT TENSIONER ASSEMBLY				
20	1	070-011-178	CRANK ASSEMBLY				
21	1	070-011-147	V- BELT, PADDLE DRIVE, LOWER				
22	1	070-011-120	LIGHT BALL SENSOR ASSEMBLY				
23	12	809-857-165	SCREW, HEX, 5/16 - 18 X 1				
24	8	948-761-112	WASHER, 11/32 X 11/16 X 1/16				
25	12	844-057-002	NUT, STOVER LOCK, 5/16 - 18				
26	14	000-029-910	SHIM				

POSITIVE BALL LIFT (PBL) – EXPLODED VIEW

SECTION 5.0

Drawings & Parts Lists



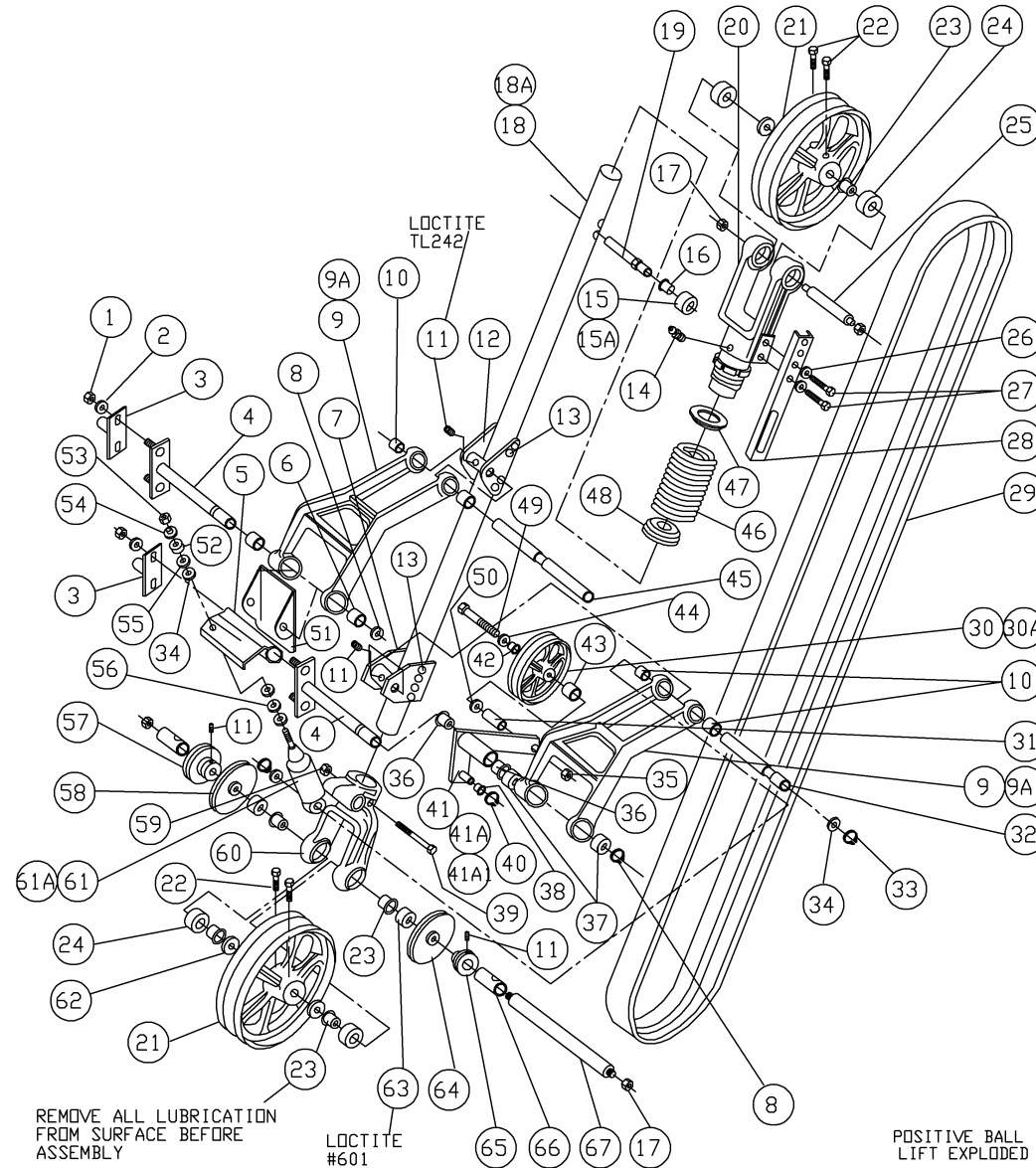


POSITIVE BALL LIFT (PBL) – EXPLODED VIEW

AMF 90XLi PINSPOTTER

ITEM	QTY	PART #	DESCRIPTION	ITEM	QTY	PART #	DESCRIPTION
1	4	840-057-002	NUT, STOVER LOCK, 5/16	20	1	070-001-995	UPPER YOKE w/NUT
2	4	948-761-112	WASHER, FLAT, 11/32 X 11/16 X 1/16	21	2	000-024-661	PULLEY
*3	2	070-006-320	SHAFT ASSY. ADJ. 9 ½" - 11" SPACING	22	4	806-265-160	SETSCREW, 3/8 - 16 X 1
	2	070-006-329	SHAFT ASSY ADJ. 11" - "12-5/8" SPACING	23	4	070-006-748	SPACER
	2	070-006-333	SHAFT ASSY. ADJ. 12-5/8" - 14" SPACING	24	4	610-905-704	BALL BEARING
*4	2	070-005-325	SHAFT ASSY. FXD. 9 ½" - 11" SPACING	25	1	610-900-711	UPPER SHAFT
	2	070-006-328	SHAFT ASSY. FXD. 11" - "12-5/8" SPACING	26	4	951-164-002	WASHER, SPLIT LOCK, 3/8
	2	070-006-330	SHAFT ASSY. FXD. 12-5/8" - 14" SPACING	27	2	809-865-165	SCREW, HEX, 3/8 -16 X 1
5	1	070-011-289	SHOCK ABSORBER BRACKET	28	1	000-029-613	RAIL
6	2	900-112-203	SLEEVE BEARING, .753 X 1-1/4	29	1	088-001-233	BELT, NO-SLIP, V-GUIDE, FLAT
7	1	070-011-002	LOWER SUPPORT	30	1	see 30A	IDLER PULLEY
8	2	919-005-800	RETAINING RING	30A	1	000-021-408	IDLER PULLEY ASSY (includes 30 & 43)
9	2	see 9A & 9A1	LINK	31	1	070-008-218	SPACER, LONG
9A	1	000-024-720	LINK ASSY, UPPER (includes 6, 9, 10, & 51)	32	1	000-029-660	SHAFT
9A1	1	000-024-651	LINK ASSY, LOWER (includes: 9, 10 & 37)	33	2	919-005-600	RETAINING RING
10	4	900-110-121	SLEEVE BEARING, .628 X 3/4	34	2	948-983-212	WASHER, FLAT, 1-5/16 X 21/32 X .093
11	4	807-265-060	SETSCREW, 3/8 - 16 X 3/8	35	1	839-549-002	NUT, FLEX LOCK, ¼ - 20
12	1	000-024-606	UPPER SUPPORT	36	2	900-212-161	FLANGED BEARING, .753 X 1.003 X 1
13	16	937-000-000	RIVET, STEEL, 1/4 X 11/32	37	2	900-112-161	SLEEVE BEARING, .753 X 1
14	1	710-501-007	GREASE FITTING	38	1	070-011-040	RATCHET ROLLER
15	1	000-024-647	ROLLER	39	1	809-865-445	SCREW, HEX, 3/8 - 16 X 2¾
15A	1	000-024-650	ROLLER ASSEMBLY (includes 15 & 16)	40	1	919-005-200	RETAINING RING
16	1	900-206-081	FLANGED BEARING, .378 X .688 X 1/2	41	1	070-008-215	BELT TIGHTENER WELDMENT
17	4	856-070-002	NUT, FLANGED, 7/16 - 20	41A	1	070-011-041	BELT TIGHTENER WELDMENT ASSEMBLY (includes 36 & 41)
18	1	000-024-607	TUBE				
18A	1	070-011-004	TUBE & SUPPORT ASSY (incl. 7, 12, 13, & 18)	41A1	1	070-011-042	BELT TIGHTENER ASSEMBLY (includes 30A, 31, 35, 38, 40, 41A, 42, 44, 49, & 50)
19	1	000-024-648	PIVOT PIN				

* Items 3 & 4 vary in length according to the space between the right and left pinspotters.

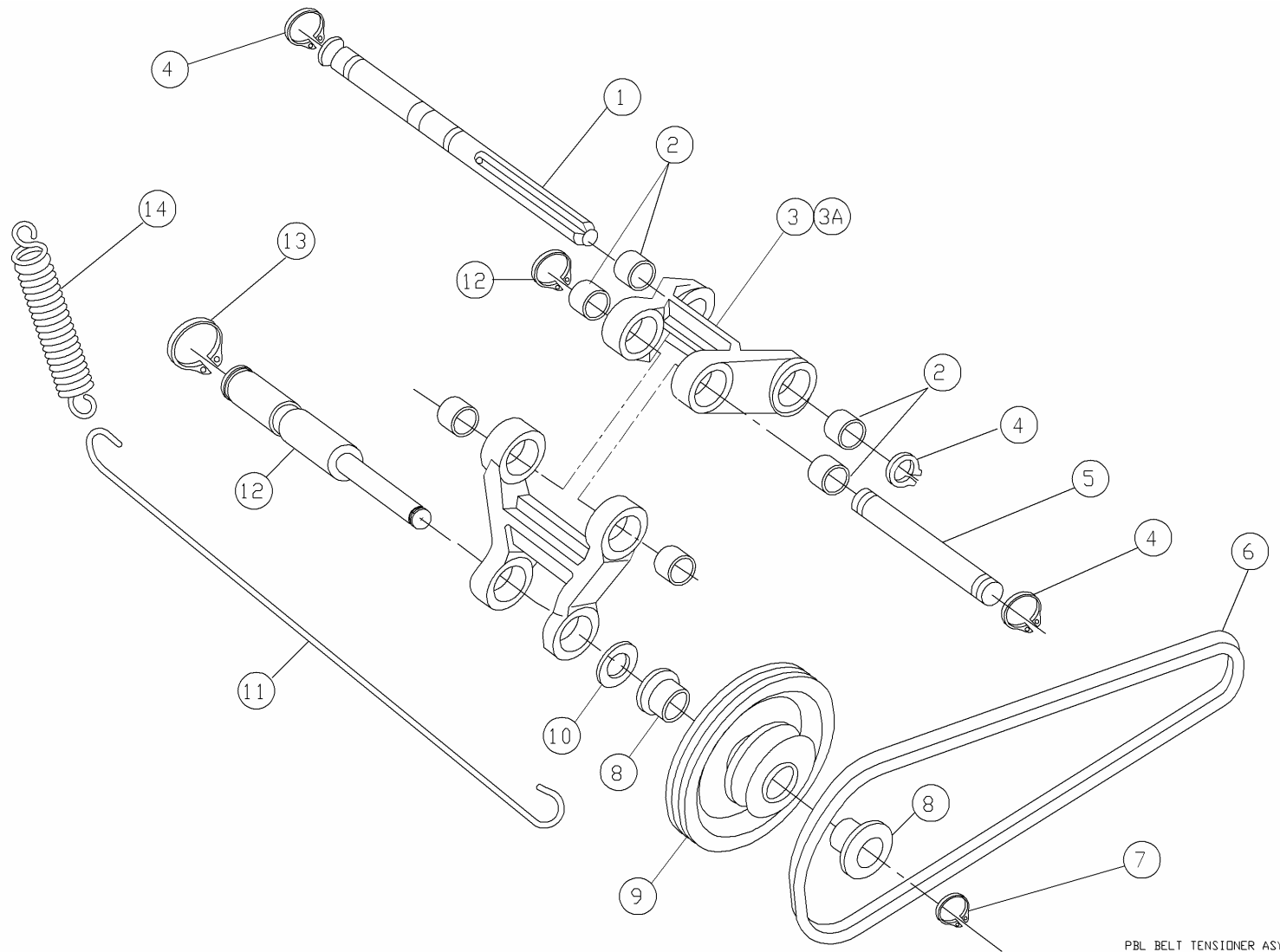




POSITIVE BALL LIFT (PBL) – EXPLODED VIEW (continued)

AMF 90XL*i* PINSPOTTER

ITEM	QTY	PART #	DESCRIPTION	ITEM	QTY	PART #	DESCRIPTION
42	1	070-008-217	SHORT SPACER	66	2	090-003-401	CLUTCH RACE, LONG
43	1	900-208-161	FLANGED BEARING, .503 x .875 x 1	67	1	070-011-796	LOWER SHAFT
44	1	146-005-277	WASHER, COUNTERSUNK, 9/32 x 7/8 x 1/8	N/A		700-107-170	LOCTITE #601 (applied to item 63)
45	1	000-028-737	SHAFT	N/A		700-107-146	ADHESIVE, LOCTITE TL242 (apply to item 11)
46	1	000-024-603	SPRING				
47	1	000-024-608	UPPER RETAINER				
48	1	000-024-605	LOWER RETAINER				
49	1	808-849-565	SCREW, FLAT HEAD, ¼ - 20 X 3-1/2				
50	1	070-007-192	WASHER				
51	1	000-024-716	SPRING HOLDER				
52	2	000-027-996	RUBBER CUSHION				
53	1	831-566-002	NUT, HEX, 3/8 - 24				
54	2	000-027-998	RETAINER				
55	2	000-028-057	RETAINER				
56	2	070-008-212	SPACER				
57	1	070-008-211	SHEAVE				
58	1	000-024-811	PULLEY ASSEMBLY, R.H.				
59	1	839-665-002	NUT, FLEX LOCK, 3/8 - 16				
60	1	000-024-659	LOWER YOKE				
61	1	000-029-661	SHOCK ABSORBER				
61A	1	070-011-323	SHOCK ABSORBER ASSEMBLY (includes 5, 32, 33, 34, 52, 53, 54, 55, 56, & 61)				
62	6	000-027-642	WASHER				
63	2	070-007-291	CLUTCH BEARING				
64	1	000-024-812	PULLEY ASSEMBLY, L.H.				
65	1	070-008-210	SHEAVE				

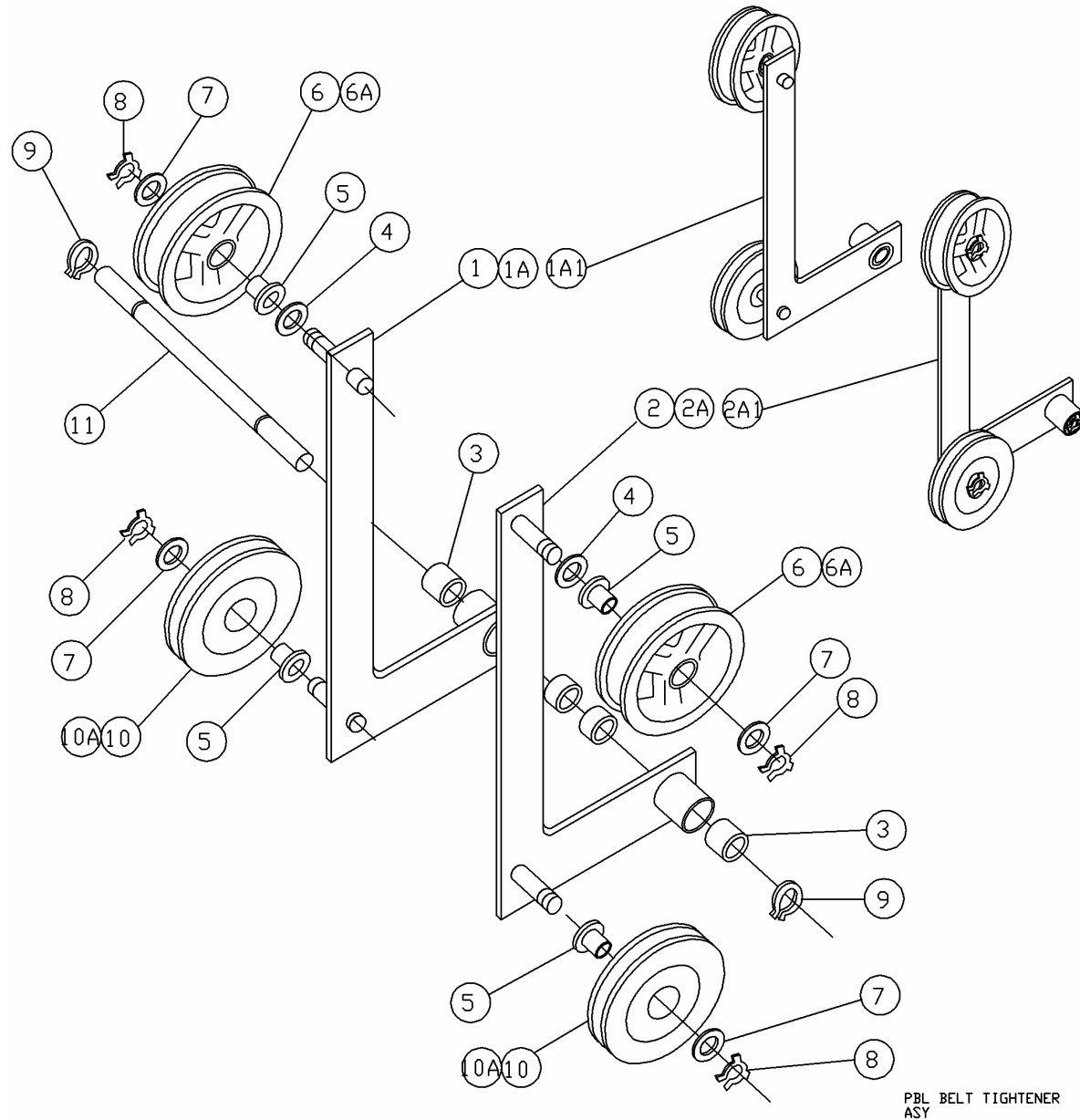




PBL BELT TENSIONER ASSEMBLY

AMF 90XLi PINSPOTTER

ITEM	QTY	PART #	DESCRIPTION	ITEM	QTY	PART #	DESCRIPTION
1	1	000-029-605	PIVOT SHAFT				
2	6	900-110-081	SLEEVE BEARING, .628 X .878 X .5				
3	2	see 3A	HANGER ARM				
3A	2	000-029-659	HANGER ARM ASSY (includes items 2 & 3)				
4	4	919-005-600	RETAINING RING				
5	1	000-029-606	PIVOT SHAFT, SHORT				
6	1	070-011-147	V-BELT, PADDLE DRIVE, LOWER				
7	1	919-005-500	RETAINING RING				
8	2	900-208-120	BEARING				
9	1	070-011-131	PULLEY WELDMENT				
10	1	000-027-264	SPACER				
11	1	090-002-016	SPRING EXTENSION				
12	1	090-002-014	SHAFT				
13	1	919-005-900	RETAINING RING				
14	1	000-026-031	SPRING				

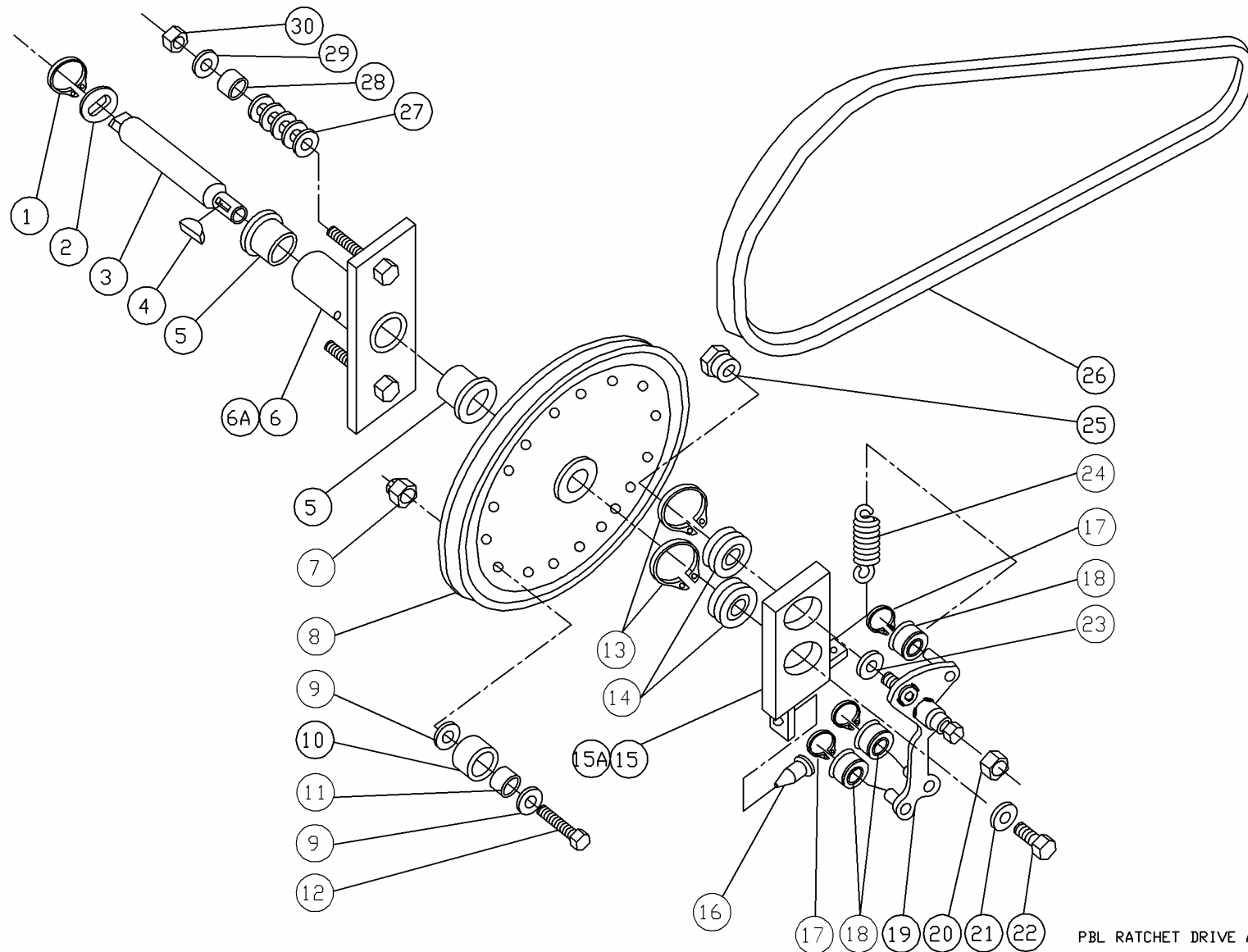




PBL BELT TIGHTENER ASSEMBLY

AMF 90XLi PINSPOTTER

ITEM	QTY	PART #	DESCRIPTION	ITEM	QTY	PART #	DESCRIPTION
1	1	see 1A & 1A1	ARM ASSY WELDMENT, L.H. MACHINE				
1A	1	070-011-530	ARM ASSY, L.H. MACHINE (includes 1 & 3)				
1A1	1	070-011-524	BELT TIGHTENER, L.H. MACHINE (includes 1, 3, 4, 5, 6, 7, 8, & 10)				
2	1	see 2A & 2A1	ARM ASSY WELDMENT, R.H. MACHINE				
2A	1	070-011-527	ARM ASSY, R.H. MACHINE (includes 2 & 3)				
2A1	1	070-011-523	BELT TIGHTENER, R.H. MACHINE (includes 2, 3, 4, 5, 6, 7, 8, & 10)				
3	4	900-112-121	SLEEVE BEARING, .753 X .75				
4	2	701-316-041	THRUST BEARING, .51 X 1 X 1/16				
5	4	900-208-161	FLANGED BEARING, .503 X .875				
6	2	see 6A	IDLER PULLEY				
6A	2	000-021-408	IDLER PULLEY ASSY (includes 5 & 6)				
7	4	948-975-172	WASHER, FLAT, 1-1/16 X 17/32 X 3/32				
8	4	963-600-002	X-WASHER, 1/4				
9	2	919-005-800	RETAINING RING				
10	2	070-011-526	IDLER SHEAVE				
10A	2	070-011-525	IDLER SHEAVE ASSY (includes 5 & 10)				
11	1	000-029-603	SHAFT				



PBL RATCHET DRIVE ASY

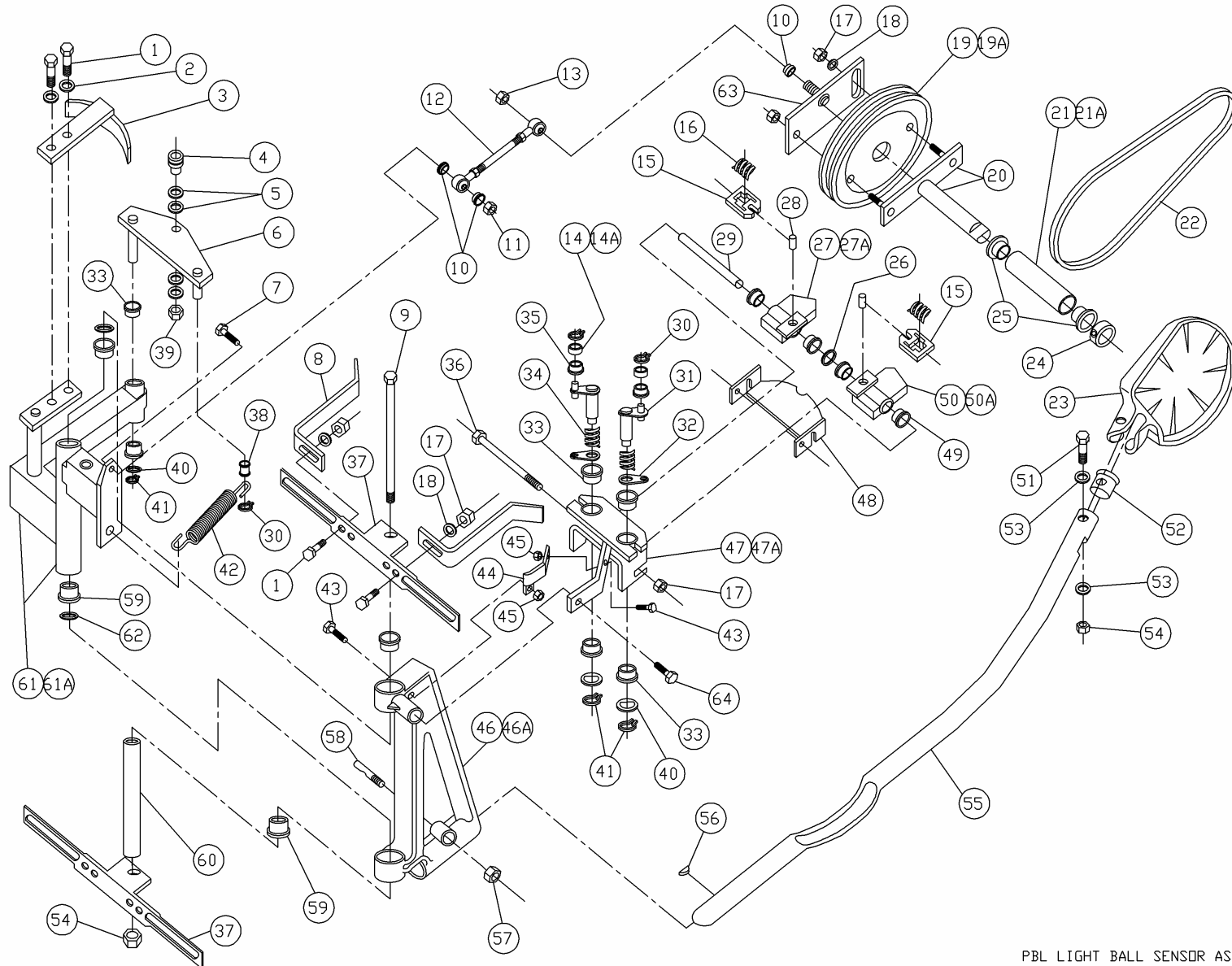


PBL RATCHET DRIVE ASSEMBLY

AMF 90XLi PINSPOTTER

ITEM	QTY	PART #	DESCRIPTION	ITEM	QTY	PART #	DESCRIPTION
1	1	919-005-600	RETAINING RING	25	1	070-011-029	NUT
2	1	070-011-028	WASHER	26	1	070-011-064	V-BELT, RATCHET DRIVE
3	1	070-011-027	SHAFT	27	0-26*	948-767-132	WASHER, FLAT, 13/32 X 13/16 X 1/16
4	1	907-000-200	KEY	28	2	070-008-212	SPACER
5	2	900-212-161	FLANGED BEARING, .753 X 1.003 X 1	29	2	948-761-112	WASHER, FLAT, 11/32 X 11/16 X 1/16
6	1	070-011-009	BEARING HOUSING WELDMENT	30	2	844-057-002	NUT, STOVER LOCK, 5/16 - 18
6A	1	070-011-036	BEARING & HOUSING ASSY (includes 5 & 6)				
7	16	839-549-002	NUT, FLEX LOCK, 1/4 - 20				
8	1	070-011-033	PULLEY				
9	32	000-026-865	WASHER				
10	16	070-011-030	ROLLER				
11	16	070-011-031	ROLLER SPACER				
12	16	809-849-205	SCREW, HEX, 1/4 - 20 X 1 1/4				
13	2	919-000-600	RETAINING RING				
14	2	000-024-679	BALL BEARING, .625 X 1.375				
15	1	070-011-013	CRANK WELDMENT				
15A	1	070-011-037	CRANK ASSY (includes 13, 14, 15, & 16)				
16	1	070-006-142	BUMPER				
17	3	919-005-200	RETAINING RING				
18	3	070-011-040	RATCHET ROLLER				
19	1	070-011-217	RATCHET ARM WELDMENT				
20	1	838-866-002	NUT, HEX LOCK, 3/8 - 24, THIN				
21	1	947-356-617	WASHER, 5/16				
22	1	809-965-125	SCREW, HEX, 3/8 - 16 X 3/4				
23	1	948-964-142	WASHER, FLAT, .375 X .875 X .094				
24	1	070-011-032	SPRING				

* The number of washers used depends on the spacing between the left and right machines' kickplates. See installation drawing 610-007-043.



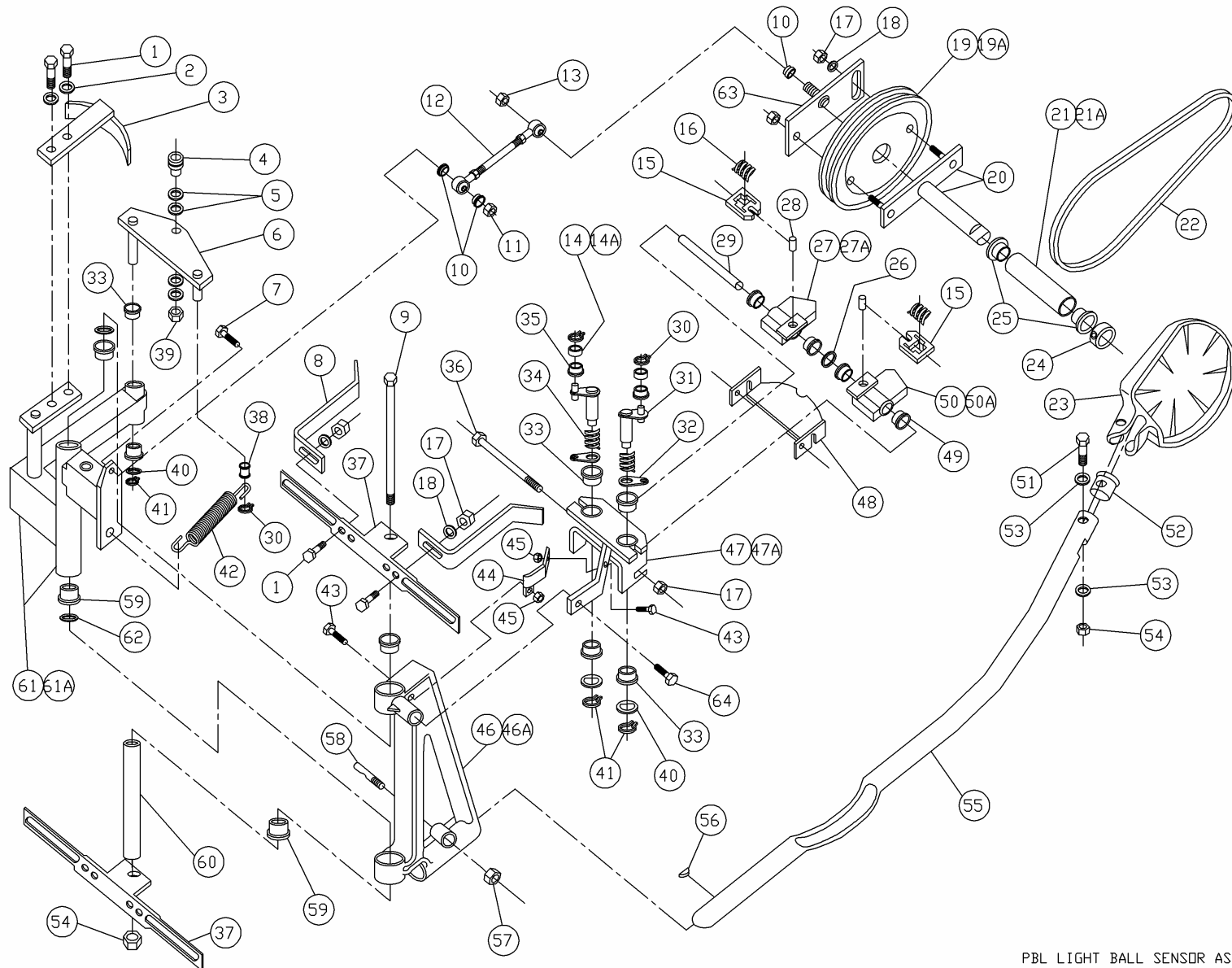
PBL LIGHT BALL SENSOR ASY



PBL LIGHT BALL SENSOR ASSEMBLY

AMF 90XLi PINSPOTTER

ITEM	QTY	PART #	DESCRIPTION	ITEM	QTY	PART #	DESCRIPTION
1	4	809-857-165	SCREW, HEX, 5/16 - 18 X 1	23	1	070-011-146	PADDLE
2	2	000-022-869	WASHER	24	2	000-021-423	COLLAR WITH SETSCREW
3	1	070-011-418	TRIP CAM	25	2	000-021-427	FLANGED BEARING, .629 X .878 X 1/8
4	1	070-006-728	CAM FOLLOWER	26	1	000-027-264	SPACER
5	4	949-100-002	WASHER, FLAT, 59/64 X 13/32 X 1/16	27	1	see 27A	RUDDER CAM, R.H.
6	1	070-011-068	LINK WELDMENT	27A	1	070-011-406	RUDDER CAM ASSY, R.H. (incl. 27, 28 & 49)
7	1	809-865-205	SCREW, HEX, 3/8 - 16 X 1 1/4	28	2	913-448-120	SPRING PIN, 1/4 X 3/4
8	2	070-011-107	TRIP ARM (RESET CAM)	29	1	070-011-098	SLEEVE
9	1	802-865-996	SCREW, HEX, 3/8 - 16 X 9 1/2	30	3	919-005-200	RETAINING RING
10	3	000-029-611	WASHER, UNIBALL BEARING	31	2	070-011-626	TRIP ARM ASSEMBLY
11	1	840-065-002	NUT, FLEX LOCK, 3/8 -16, THIN	32	2	070-011-273	TAB
12	1	090-005-258	ROD ASSEMBLY	33	6	900-208-091	FLANGED BEARING, .503 X .690 X 9/16
13	1	838-866-002	NUT, HEX LOCK, 3/8 - 24	34	2	722-985-512	COMPRESSION SPRING
14	2	070-011-096	ROLLER	35	2	900-205-081	FLANGED BEARING, .315 X .44 X 1/2
14A	2	070-011-105	ROLLER ASSEMBLY (includes 14 & 35)	36	1	809-857-880	SCREW, HEX, 5/16 - 18 X 5-1/2
15	2	070-011-077	TRIP FINGER	37	2	090-007-276	BRACKET
16	2	722-971-522	COMPRESSION SPRING	38	1	070-011-040	RATCHET ROLLER
17	4	844-057-002	NUT, STOVER LOCK, 5/16 - 18	39	1	844-070-002	NUT, STOVER LOCK, 7/16 - 20
18	3	948-761-112	WASHER, 11/16 X 11/32 X 1/16	40	3	070-011-108	WASHER
19	1	070-011-097	CRANK PULLEY	41	3	919-005-500	RETAINING RING
19A	1	070-011-178	RUDDER DRIVE CRANK ASSY (includes 13, 17, 18, 19, 20 & 63)	42	1	000-026-031	SPRING
20	1	070-011-092	CRANK SHAFT WELDMENT	43	2	809-849-125	SCREW, HEX, 1/4 - 20 x 3/4
21	1	000-029-697	ADJUSTMENT TUBE	44	1	070-011-299	SENSOR BRACE
21A	1	000-029-696	ADJUSTMENT TUBE ASSY (includes 21 & 25)	45	2	844-049-002	NUT, STOVER LOCK, 1/4 - 20
22	1	070-011-148	V-BELT, PADDLE DRIVE, UPPER	46	1	070-011-067	RUDDER ARM SUPPORT
				46A	1	070-011-066	RUDDER ARM SUPPORT ASSY (incl. 46 & 59)



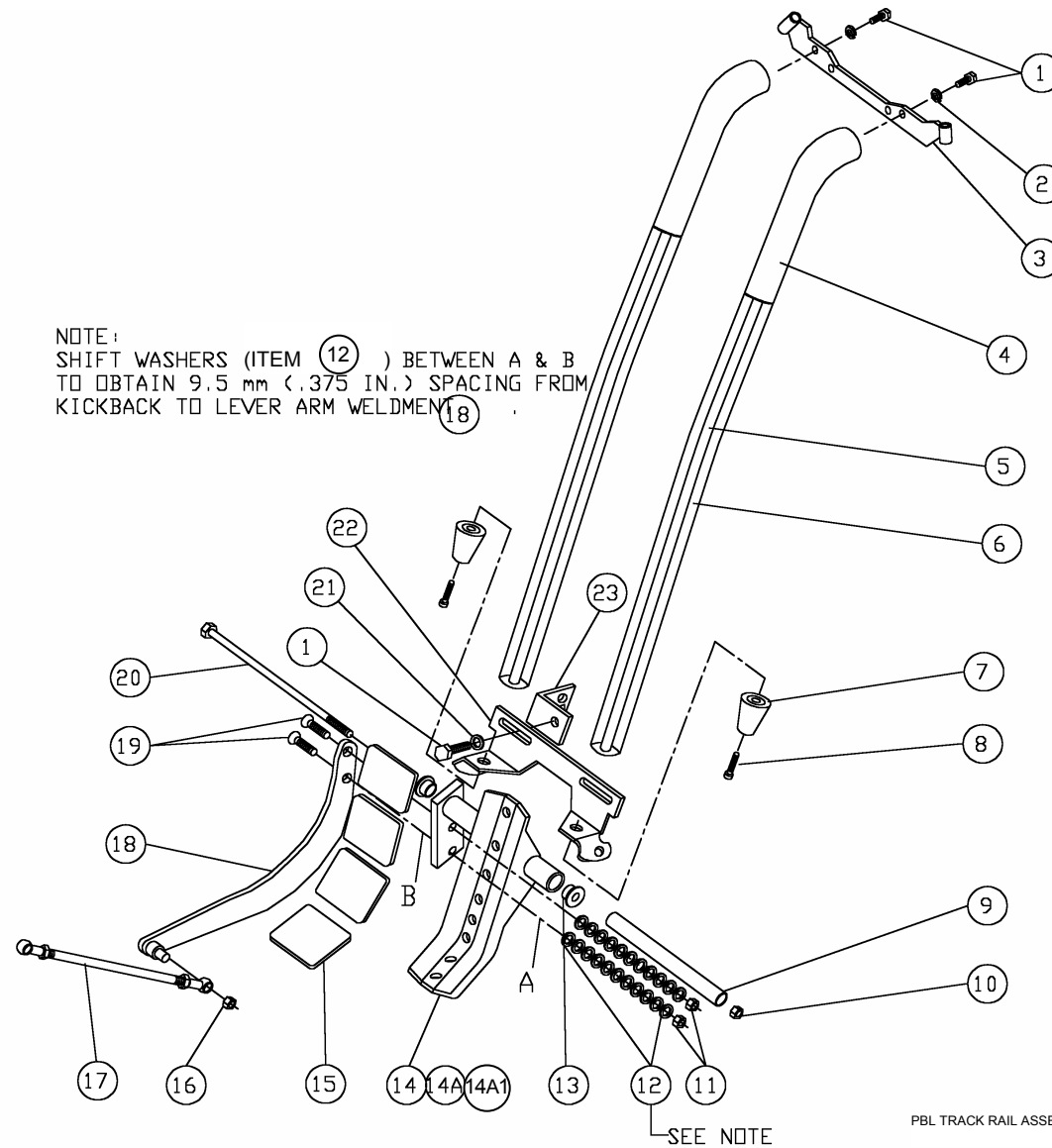
PBL LIGHT BALL SENSOR ASY



PBL LIGHT BALL SENSOR ASSEMBLY (continued)

AMF 90XLi PINSPOTTER

ITEM	QTY	PART #	DESCRIPTION	ITEM	QTY	PART #	DESCRIPTION
47	1	070-011-100	CAM SENSOR WELDMENT				
47A	1	070-011-110	CAM SENSOR ASSY (includes 33 & 47)				
48	1	070-011-099	CAM				
49	4	900-208-161	FLANGED BEARING, .503 X .875				
50	1	see 50A	RUDDER CAM, L.H.				
50A	1	070-011-407	RUDDER CAM ASSY, L.H. (incl. 28, 49 & 50)				
51	1	809-865-405	SCREW, HEX, 3/8 - 16 X 2½				
52	1	070-011-121	PLUG				
53	2	948-767-132	WASHER, FLAT, 13/16 X 13/32 X 1/16				
54	1	844-065-002	NUT, FLEX LOCK, 3/8 - 16				
55	1	070-011-122	RUDDER ARM				
56	1	907-000-900	KEY				
57	1	831-573-002	NUT, HEX, 1/2 - 13				
58	1	000-024-616	CLAMP STUD				
59	4	900-212-201	FLANGED BEARING, .753 X 1 X 1.25				
60	1	000-024-615	SHAFT				
61	1	070-011-079	RUDDER DRIVE WELDMENT				
61A	1	070-011-080	RUDDER DRIVE ASSY (incl. 33, 59 & 61)				
62	2	070-011-151	SPACER				
63	1	070-011-225	CRANK ADJUSTMENT PLATE WELDMENT				
64	1	809-865-165	SCREW, HEX, 3/8 - 16 X 1				





PBL TRACK RAIL ASSEMBLY

AMF 90XLi PINSPOTTER

ITEM	QTY	PART #	DESCRIPTION	ITEM	QTY	PART #	DESCRIPTION
1	2	809-865-165	SCREW, HEX, 3/8 - 16 X 1				
2	2	951-164-002	WASHER, SPLIT LOCK, 3/8				
3	1	000-021-813	WIPER SUPPORT				
4	2	088-001-232	RAIL COVER, BLACK				
5	2	000-024-666	TRACK RAIL WELDMENT				
6	2	088-001-231	RAIL COVER, CLEAR				
7	2	088-001-230	THIMBLE				
8	2	810-365-401	SCREW, SOCKET HEAD CAP, 3/8 - 16 X 2-1/2				
9	1	070-011-063	SHAFT				
10	2	844-065-002	NUT, STOVER LOCK, 3/8 - 16				
11	2	844-057-002	NUT, STOVER LOCK, 5/16 - 18				
12	0-22***	948-767-132	WASHER, FLAT, 13/32 X 13/16 X 1/16				
13	2	900-210-161	FLANGED BEARING, .628 x 1				
14	1	070-011-411	LIFT ARM WELDMENT				
14A	1	070-011-412	LIFT ARM ASSEMBLY (includes 13 & 14)				
14A1	1	070-011-413	LIFT ASSEMBLY (incl. 9, 10, 14A, 15, 20 & 22)				
15	4	090-002-024	CRADLE LINER				
16	1	838-866-002	NUT, HEX, 3/8 - 24				
17	1	090-005-259	ROD ASSEMBLY				
18	1	070-011-218	LEVER ARM WELDMENT				
19	2	808-857-280	SCREW, FLAT HEAD, 5/16 - 18 x 1-3/4				
20	1	809-865-992	SCREW, HEX, 3/8 - 16 X 9				
21	1	958-584-002	WASHER, LOCK, 3/8				
22	1	070-008-191	BALL LIFT BRACKET				
23	1	000-024-668	TRACK SUPPORT BRACKET WELDMENT				

***From 0 to 22 washers may be needed for spacing. See installation drawing 610-007-043.

