

RPP Series Service Manual



WARNING: This is a controlled document. It is your responsibility to deliver this information to the end user of the DESTACO CAMCO product. Failure to deliver this could result in your liability for injury to the user or damage to the machine. For copies of this manual, call your Customer Service Representative at 1-800-645-5207.

RPP SERIES

Service Manual

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RPP SERIES

Service Manual

INTRODUCTION

This service manual pertains to the disassembly and assembly of CAMCO's RPP Series Pick and Place Drive MODELS 150RPP, 300RPP, 500RPP, & 900RPP

The manual is to be used in conjunction with the General Service Manual which describes the lubrication and general maintenance of CAMCO Drives.

An exploded view of your specific Drive is included in this manual. Also included is a complete Bill of Materials for your convenience in identifying and ordering spare or replacement parts.

Some users of CAMCO Drives have the facilities and trained personnel to accomplish service repair. You must determine the extent to which intricate servicing should be done in your own facility. When in doubt, CAMCO recommends that CAMCO trained servicemen make the repairs.

WARNINGS AND CAUTIONS

Statements in this manual preceded by the words **WARNING** or **CAUTION** and printed in italics are very important. We recommend you take special notice of these during service or repair.

WARNING

Means there is the possibility of personal injury to yourself or others.

CAUTION

Means there is the possibility of damage to the CAMCO unit.

OIL SEAL REMOVAL

The only repair possible without disassembly of the indexer is replacement of oil seals. To remove oil seals, drill a number of holes into the case of the seal. The seal may then be removed with a pointed tool. Be sure to remove all metallic chips created during the drilling of removal holes. A new seal may be installed as outlined in the "Oil Seal Installation Recommendations" section of the "General Service Manual".

SPARE PARTS KIT

CAMCO offers a Spare Parts Kit for all CAMCO index drive models CAMCO builds. These kits include oil seals, bearings, shims and cam followers. These are components that will most likely require replacement during repair of your index drive. CAMCO recommends a Spare Parts Kit be purchased and kept on hand prior to any disassembly of your CAMCO drive.

A complete list of components supplied in the Spare Parts Kit can be found in the parts list located in the rear of this manual. The asterisk behind the item number indicates those parts supplied with the Spare Parts Kit.

BEFORE STARTING

Before starting disassembly of your CAMCO unit you should read and review the following instructions. These provide important information on parts and procedures necessary to successfully complete your repair.

Comply with all Warnings and Cautions.

Read the "Trouble Shooting Guide" section of your "General Service Manual" before disassembling CAMCO units. CAMCO recommends returning defective equipment for inspection and repair whenever possible.

CAMCO uses Loctite to secure all screws and setscrews. If you encounter a fastener that is difficult to remove, apply heat to the screw and remove while still warm

4. REPLACING GUIDE BEARINGS

Replacement of the center guide bearing can be done at this point without removal of the output follower wheel.

- A. Remove seals from both ends of the follower wheel center hole.
- B. Remove the retaining rings.
- C. Press or drive the bearings out using a round aluminum bar of sufficient length to permit both bearings to be removed from one side.



Fig. 3. Driving out center bearings

- D. Press in new bearings. Be sure to reinstall spacer between bearings if applicable on your model.
- E. Reinstall retaining rings and oil seals.
- F. Coat inside of bearings with NGLI #3 grease or equivalent prior to insertion of center shaft.

5. REMOVAL OF OUTPUT WHEEL

- A. Remove the output bearing retaining ring capscrews.

- B. Thread lifting eyes into the follower wheel output face. Use a hoist to lift the follower wheel free of the housing. Be sure to save the retaining ring shims since they will be required during reassembly.



Fig. 4. Removing output wheel

- C. Place the follower wheel assembly on a bench. At this time you may want to replace the main output bearing or check the followers for damage or radial looseness. Looseness should not exceed .001 inch. Do not confuse radial looseness with axial endplay. Endplay will be from .03 to .06 as a normal condition. If endplay exceeds .06 the follower may require replacement.

NOTE: Generally, followers are replaced as added insurance against eventual failure.



Fig. 5. Inspecting follower looseness

6. ROTARY FOLLOWER REPLACEMENT

- A. Remove the setscrews, apply heat to the setscrews holding the follower studs and remove while still warm.
- B. Threaded holes have been provided in the ends of the follower for ease of removal. Use a slide hammer or a simple self-made pull tool. The self made pull tool consists of a short piece of round tubing, large enough to clear the follower diameter and a small flat bar with a clearance hole large enough to insert a capscrew of equal thread size as the follower pull hole. Slip the tube over the follower, place the bar over the tube and thread a capscrew into the follower tightening the capscrew will remove the follower.



Fig. 6. Removing follower

- C. Check the follower holes for roundness. These holes may be worn out due to overloads, the holes should be round within .0005 to permit reuse of the follower wheel.
- D. Install new followers with an arbor press.

CAUTION! Be sure to press the followers in straight as damage to the follower and wheel could occur if improperly aligned during installation. Be sure the notches are aligned with the setscrew holes.



Fig. 7. Pressing in new followers

- E. Install the setscrews. The cone point setscrews lock into the "V" notch. The cup point setscrews lock against the flat. The oval point setscrews are used when only one flat is provided on the follower. Be sure to use Loctite thread locking liquid as recommended in the "General Service Manual".

7. REMOVAL OF OUTPUT BEARINGS

- A. Gently tap on the bottom of the bearing retainer ring with a soft face hammer, alternating from side to side to prevent binding, until the retainer ring is free of the bearing/follower wheel assembly.
- B. Remove the bearing clamp washer capscrews from the underside of the follower wheel.
- C. Place a small diameter aluminum bar against the protruding edge of the bearing and gently tap with a hammer, alternating from side to side to prevent binding, until the bearing is free of the follower wheel.

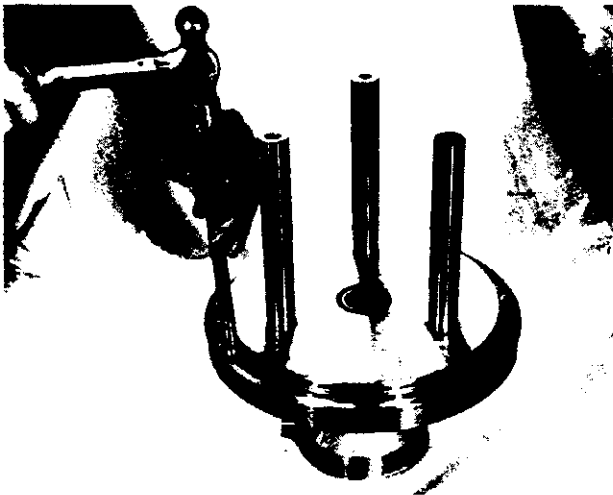


Fig. 8. Removing output bearing

8. LIFT FOLLOWER WHEEL REMOVAL

- A. Match mark the eccentric cartridges with the housing.
- B. Remove the cartridge capscrews. Remove the cartridges. If difficulty is encountered in removing the cartridges, a slight tapping on the inside lever arm should help to overcome this problem.
- C. Inspect the shim pack for damage and retain with their respective cartridges. If the shim packs are damaged replace with an exact thickness replacement as they not only establish bearing preload but also locate the followers with respect to the cams.
- D. At this point, the lift follower wheel can be removed through the bottom access opening.



Fig. 9. Removing lift follower shaft

- E. Check for follower condition and replace if required as previously described in Step 6.

9. INPUT SHAFT/CAM REMOVAL

NOTE: The output shaft must be removed prior to input shaft removal.

- A. Rotate the input shaft and inspect all parts for wear or damage. Endplay in the input shaft is not permissible.
- B. Match mark all input cartridges relative to the housing. These must be reinstalled in the same side and position.
- C. Remove all input bearing cartridge capscrews
- D. Tap on the end of the input shaft to drive the opposite cartridge from the housing. Then drive the shaft in the opposite direction for removal of other cartridge.

NOTE: Keep shims with their respective cartridges you will be asked to reinstall or replace with same shim thickness during assembly.

- F. Remove the input shaft and cam assembly through the large cartridge opening.



Fig. 10. Removing input shaft

- E. Use a wheel puller to remove the bearing cones from the input shaft.

- G. Remove the outer locknut from the cam to be removed.

- H. Place a block of wood on the floor, turn the shaft vertical with the cam to be removed facing downward. Gently lift and let drop repeatedly until the cam ships off the shaft. Repeat this procedure to remove the remaining cam.

WARNING! Be sure to keep feet clear of falling cam. Steel toe safety shoes are a must.

10. Remove the input bearing cups from the cartridges with a pulley puller, by prying or by drilling and tapping for jack screws.

ASSEMBLY OF CAMCO'S RPP SERIES DRIVE

PRIOR TO REASSEMBLY

Clean and deburr all parts before reassembly.

Follow tightening torque and Loctite recommendations as outlined in the "General Service Manual".

ASSEMBLY

1. Use an arbor to press the bearing cups into the cartridges. Coat the outside of the cup and the bore of the cartridge with an anti-sieze lubricant prior to pressing. Fill cavity of cartridges with bearing grease recommended in the "General Service Manual".

2. ASSEMBLING INPUT SHAFT

A. Use arbor to press the cams onto shaft. Be sure the key is installed into the shaft first. Apply anti-sieze lubricant to shaft and bore prior to pressing. The bore of the cam should be heated prior to pressing, if a heat gun is available.

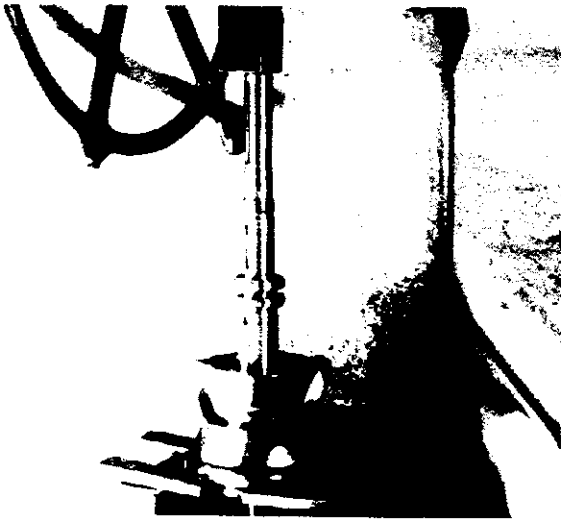


Fig. 11. Pressing cam onto shaft

B. Use a spanner wrench to install the cam locknuts. Adjust nuts to center cams on shaft.

C. Use an arbor to press the bearing cones onto the shaft. Coat the shaft and bearing bore with anti-sieze lubricant prior to pressing. The bore of the bearing should be heated prior to pressing if a heat gun is available.

D. Install the input cartridges. Be sure to install the same exact shims or equivalent height as was removed in disassembly.

E. Line up match marks.

F. Tighten cartridge mounting screws.

G. If endplay exists remove an equal amount of shims from each side until there is a small amount of drag from preloading the bearings. In rare instances it may be necessary to remachine the cartridges if all shims have been removed and endplay still exists.

3. LIFT FOLLOWER WHEEL INSTALLATION

A. Use an arbor to press the bearing cones onto the shaft. Coat shaft and bearing bore with anti-sieze lubricant prior to pressing. The bore of the bearing should be heated prior to pressing if a heat gun is available.

B. Insert the shaft through the bottom access opening.

C. Place input shaft so that the lift cam is in dwell position.

D. Position followers in cam track.

E. Install the eccentric cartridges. Be sure to install the same exact shims or equivalent height as was removed in disassembly.

F. Line up match marks. (Cam repositioning may be required at this point. See "Setting of cams".)

G. Tighten cartridge mounting screws.

H. If endplay exists remove an equal amount of shims from each side until there is a small amount of drag from preloading the bearings. In rare instances it may be necessary to remachine the cartridges if all shims have been removed and endplay still exists.

I. Loosen cartridge capscrews for later cam setting.

4. SETTING LIFT CAM

CAUTION: This mechanism is designed to operate with adjacent followers in close contact along their entire width with the surface of the cam during the dwell period. Unless this condition is achieved by proper installation, the mechanism will not transmit its rated load, and furthermore, serious damage to the cam and output shaft will occur.

- A. Place the cams in dwell (keyway facing up).
- B. Rotate the tops of both eccentric cartridges toward the output shaft until the followers touch the cam.
- C. Shift the cam axially until two adjacent followers are in full contact with the cam rib. This will also require adjustment of the eccentric input cartridges along with axial adjustment of the cam.
 - 1) If there is a gap at the root of the follower the cam should be shifted toward that follower.
 - 2) If there is a gap at the tip of the follower the cam should be shifted away from that follower.

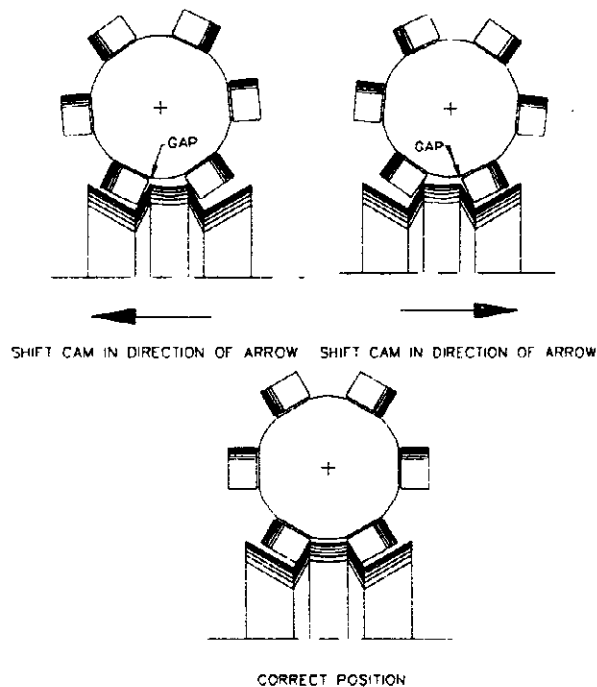


Fig. 12. Setting cam

D. Apply "Prussian Blue" to the entire cam track.

E. Rotate the camshaft slowly with a small handcrank to ensure that:

1. Both rollers are in contact with the cam rib in dwell. Look for uniform bluing pattern.
2. You do not encounter unusual resistance in motion. The bluing pattern should be fairly uniform from side to side during motion. If a patch of bluing is worn off the outside of the cam rib on one side of the cam and not the other, shift the cam a .002 to .005 inch in the direction of the worn side. Do not overshift the cam or knocking will occur.
3. The cam bluing should never be worn off the leading or exit edges of the cam ribs. If so this indicates that the cam is not adjusted properly.

4. There should be no looseness in any dwell. If there is adjust the eccentric cartridges to slightly preload the loosest dwell.

F. Tighten the locknuts and secure with Loctite #242 as specified in the "General Service Manual". If lock-washers are used on your model, bend the tangs over the nut to insure locking.

G. Tighten the eccentric cartridge capscrews.

H. Double check for endplay in output shaft. Endplay is not permissible in the output shaft.

I. Scribe a line on the housing and cartridges for later realignment.

J. Disassemble and remove the lift shaft for output shaft installation and cam setting.

4. ASSEMBLY OF OUTPUT SHAFT

A. Install new output bearing onto the output follower wheel. Tap into place alternating from side to side to prevent binding. Apply anti-sieze lubricant to the bore of the bearing prior to installation.

B. Replace bearing clamp washers and capscrews.

C. Place the input shaft so that the rotary cam is in dwell position.

D. Use a hoist to place the output follower wheel into the housing. Be sure to position the followers on the cam track as described in "Cam Setting" instructions. The bearing will rest on the housing flange.

E. Install the bearing retainer. Be sure to replace the exact shim thickness as removed in disassembly.

F. Install the retainer capscrews but leave loose for cam setting.

6. SETTING ROTARY CAM

NOTE: The lift shaft mechanism must be removed prior to setting the rotary cam.

A. Place the cams in dwell (keyway facing up).

B. While pivoting on one dowel pin, rotate the output towards the input shaft as much as the clearance holes in the bearing retainer will allow.

C. Shift the cam axially until two adjacent followers are in full contact with the cam rib. This will also require adjustment of the bearing retainer along with axial adjustment of the cam.

1. If there is a gap at the root of the follower the cam should be shifted toward that follower(see fig.12).

2. If there is a gap at the tip of the follower the cam should be shifted away from that follower(see fig. 12).

D. Apply "Prussian Blue" to the entire cam track.

E. Rotate the camshaft slowly with a small handcrank to ensure that:

- 1) Both rollers are in contact with the cam rib in dwell. Look for uniform bluing pattern.

- 2) That at the center of the cross over track the follower is free.

- 3) You do not encounter unusual resistance in motion. The bluing pattern should be fairly uniform from side to side during motion. If a patch of bluing worn off the outside of the cam rib on one side of the cam and not the other, shift the cam a .002 to .005 inch in the direction of the worn side.

NOTE: Do not overshift the cam or knocking will occur

4) The cam bluing should never be worn off the lead-in or exit edges of the cam ribs. If so this indicates that the cam is not adjusted properly

5) There should be no looseness in any dwell. If there is adjust the retaining ring to slightly preload the loosest dwell.

F Tighten the locknuts and secure with Loctite #242 as specified in the "General Service Manual" If lock-washers are used on your model, bend the tangs over the nut to insure locking.

G. Tighten retainer capscrews.

H. Drill and ream the remaining hole in the output retaining ring to accept the next larger dowel pin. Install new dowel.

- 7 Reinstall the lift shaft and eccentric cartridges. Align the scribe lines, tighten the capscrews and dowel the cartridges in place.
8. Grease pack the main output bearing with lubricant specified in the "General Service Manual"

9. INSTALLING CENTER LIFT SHAFT

A. Insert the center guide shaft/arm mounting assembly into the center hole of the output shaft. Align the arm mounting assembly with the outer guide shafts and continue insertion.

B. Install the lift spool on the center shaft from the lower access opening. Install the flat head capscrew used to secure the spool to the shaft. Be sure the lift follower is engaged in the spool.

10. Reinstall the access covers with a new gasket, to insure against leakage. It is recommended you also apply "General Electric silicone rubber RTV-6" to the housing and cover

11 Install new oil seals as described in the "General Service Manual"

12. Fill the index drive with the recommended oil to the level indicator See "General Service Manual" Too high an oil level will cause no damage. Too low a level may result in unit failure.

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HOW TO ORDER PARTS

Please refer to parts list shown in this manual. This parts list is for a standard Index Drive. If you feel your drive is nonstandard or you are in doubt you should contact CAMCO Customer Service at (708) 459-5200 and request a Bill of Material for your specific unit based on serial number. CAMCO maintains records on all units for a period of ten years.

You may order parts per the standard Bill of Material even if your unit is nonstandard. CAMCO's order entry people will review the closed order file based on the following information and supply you with the correct part.

REQUIRED INFORMATION

1. Original purchase order number (if available)
2. Customer name (original purchaser of drive)
3. Model number (located on name plate)
4. Serial number (located on name plate)
5. Approximate date of purchase.

TO ORDER PARTS contact CAMCO "Order Entry Department" Wheeling, Illinois
Phone (708) 459-5200 or FAX #708-459-3064

A. Describe the parts required and the 14 digit part number as listed in the Standard Bill of Materials or a Special Bill of Materials pertaining to your unit. State if you are using a Standard or Special bill of material.

B. Give as much of the above required information as possible.

ON WARRANTY

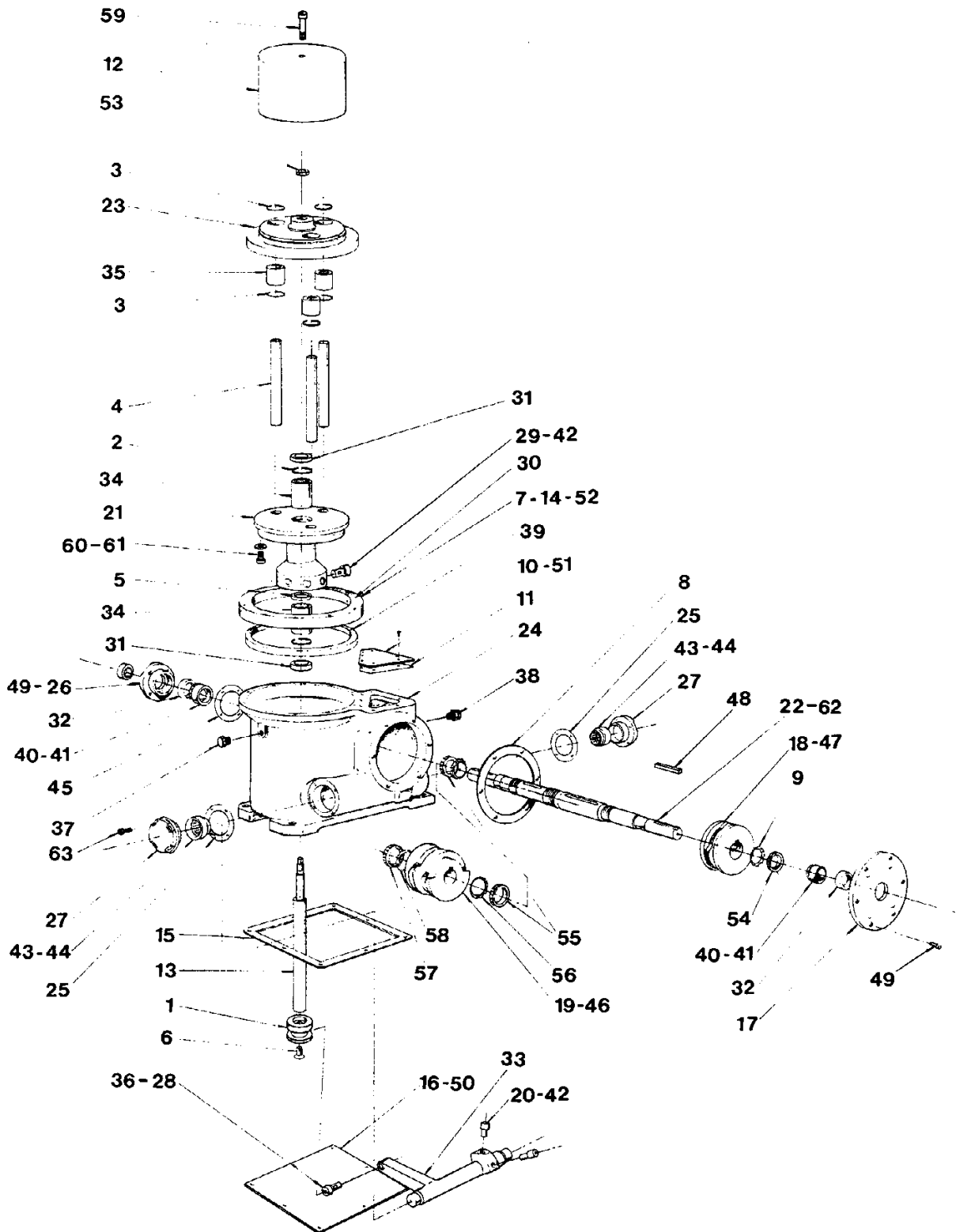
Replacement parts CAMCO will send freight prepaid via most practical means.

CAMCO will issue a "Returned Material Authorization Number" (RMA#) for the return of defective parts for inspection. CAMCO will bill customer for repair parts. When inspection of returned parts has been completed and determined to be a warranty problem, CAMCO will issue a credit to the customer for the repair parts and freight charges.

ON NON-WARRANTY

Replacement or spare parts, with approved credit, are sent F.O.B. our plant Wheeling, Illinois.

150RPP, 300RPP, 500RPP, & 900RPP



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PARTS LIST FOR 150RPP CAMBOT (STANDARD CONFIGURATION)

<u>ITEM NO.</u>	<u>PART NUMBER</u>	<u>DESCRIPTION</u>
1	07B36357009999	LIFT SPOOL
2	95A33029210000	RETAINING RING N5000-112
3	-----	NOT USED ON 150RPP (USE BUTTON HEAD CAPSCREWS #8-32 X 1/4 LG TO SECURE GUIDE BEARINGS)
4	07A44467009999	GUIDE SHAFT
5	07A36383009000	SPACER
6	95A36462000000	FLAT HEAD SCREW, SELF LOCKING
7*	07A36375018800	SHIM, OUTPUT .002 THK
*	07A36375028800	SHIM, OUTPUT .005 THK
*	07A36375038800	SHIM, OUTPUT .010 THK
8*	07A36376018800	SHIM, INPUT .002 THK
*	07A36376028800	SHIM, INPUT .005 THK
*	07A36376038800	SHIM, INPUT .010 THK
9	95A26010050000	LOCKWASHER W 05
10	07A39456000000	COVER, LOCKNUT
11*	07A39434000000	GASKET, LOCKNUT COVER
12	07B44480009999	TOP COVER
13	07B44479009999	GUIDE SHAFT, CENTER
14	07B36326009999	BEARING RETAINER
15*	07B36378000000	GASKET, BOTTOM COVER
16	07B36377009600	BOTTOM COVER
17	07C36380003021	CARTRIDGE, OPEN INPUT
18	-----	LIFT CAM (CONTACT CAMCO FOR ASSISTANCE IN CAM SELECTION)
19	-----	ROTARY CAM (CONTACT CAMCO FOR ASSISTANCE IN CAM SELECTION)
20*	82C33150010003	CAM FOLLOWER CFH 285-3
21	07C44481014006	FOLLOWER WHEEL (FOR ALL EXCEPT 4 STOP)
	07C44481024008	FOLLOWER WHEEL (4 STOP ONLY)
22	07C37781007002	INPUT SHAFT (W/OR W/O REDUCER)
23	07B36346009999	DIAL MOUNTING PLATE
24	07G36277001002	HOUSING
25*	24A17674018800	SHIM, .002 THK
*	24A17674028800	SHIM, .005 THK
*	24A17674038800	SHIM, .010 THK
26	07C36380003021	CARTRIDGE, OPEN INPUT
27	24B28402003012	CARTRIDGE, CLOSED ECC
28	42C07311210001	CAM FOLLOWER CFH 34 5
29	82C33150010003	CAM FOLLOWER CFH 285-3
30*	84A36360000000	OIL SEAL C/R 33645
31*	84D07329050000	OIL SEAL C/R 6204
32*	84A36361000000	OIL SEAL C/R 7513
33	07C36324004002	FOLLOWER WHEEL LIFT SHAFT
34*	86J30726000000	BEARING, LINEAR THOM SUPER 10
35*	86A42714030000	LINEAR BEARING FL-8
36	95A26008010000	LOCKNUT, ESNA NTE 5/16-24

PARTS LIST FOR 150RPP CONTINUED

37	95A3300010000	AIR VENT (BREATHER)
38	95A33001010000	SIGHT GLASS
39*	86A36362000000	BEARING KAYDON KB035XPOL
40*	86A36363000021	BEARING CONE 07079
41*	86D07328170022	BEARING CUP 07196
42	95A26012070000	SSS OVL PT 10-24 X 3/8
43*	86D07328060021	BEARING CONE A5069
44*	86D07328060022	BEARING CUP A5144
45*	07A36376018800	SHIM, INPUT .002 THK
*	07A36376028800	SHIM, INPUT .005 THK
*	07A36376038800	SHIM, INPUT .010 THK
46	025K225	KEY 1/4 SQ X 2 1/4 LG
47	025K150	KEY 1/4 SQ X 1 1/2 LG
48	M06K187	KEY 6MM SQ X 1 7/8 LG
49	95A08089000000	SPECIAL LARGE HEAD CAPSCREW
50	95A26003150000	BHCS 10-24 X 1/2
51	95A26003140000	BHCS 10-24 X 3/8
52	95A26000320000	SHCS 10-24 X 1
53	99J22413080000	LOCKNUT BH01
54	95A26009050000	LOCKNUT PN-05
55	95A26009060000	LOCKNUT PN-06
56	95A26010060000	LOCKWASHER W 06
57	95A26009050000	LOCKNUT PN-05
58	95A26010050000	LOCKWASHER W 05
59	95A26003150000	BHCS 10-24 X 1/2
60	95A26000270000	SHCS 10-24 X 3/8
61	95A26021210000	FLATWASHER 6018
62	-----	NOT USED ON 150RPP
63	95A26003150000	BHCS 10-24 X 1/2

* Indicates parts supplied with Spare Parts Kit #150RPP SPK

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PARTS LIST FOR 300RPP CAMBOT (STANDARD CONFIGURATION)

<u>ITEM NO.</u>	<u>PART NUMBER</u>	<u>DESCRIPTION</u>
1	05B37127000000	LIFT SPOOL
2	95A33030150000	RETAINING RING N5008-156
3	95A33032170000	RETAINING RING 5108-125
4	05J32192009999	GUIDE SHAFT
5	-----	NOT USED ON 300RPP
6	95A37134000000	FLAT HEAD SCREW, SELF LOCKING
7*	05B23863018800	SHIM, OUTPUT .002 THK
*	05B23863028800	SHIM, OUTPUT .005 THK
*	05B23863038800	SHIM, OUTPUT .010 THK
8*	05B23875000000	GASKET, CART LARGE
9	-----	NOT USED ON 300RPP
10	05B23866009600	COVER, LOCKNUT
11*	05B23867000000	GASKET, LOCKNUT COVER
12	05B35875009999	COVER, TOP
13	05B37128000000	GUIDE SHAFT, CENTER
14	05C23852008915	BEARING RETAINER
15*	05C23865000000	GASKET, BOTTOM COVER
16	05C23864009500	BOTTOM COVER
17	05B23874003121	CART, OPEN INPUT
18	-----	LIFT CAM (CONTACT CAMCO FOR ASSISTANCE IN CAM SELECTION)
19	-----	ROTARY CAM (CONTACT CAMCO FOR ASSISTANCE IN CAM SELECTION)
20*	82C33150020003	CAM FOLLOWER CFH 286-3
21	05D35472014006	FOLLOWER WHEEL (FOR BUT 4 STOP)
	05D25472024008	FOLLOWER WHEEL (4 STOP ONLY)
22	05C39438007002	INPUT SHAFT (W/OR W/O 2" REDUCER)
	05C35491007002	INPUT SHAFT 2" REDUCER & 15 DHL SIDE 1
	05C35492007002	INPUT SHAFT 2" REDUCER & 15 DHL SIDE 2
23	05C35476009999	DIAL MOUNTING PLATE
24	05G23856001004	HOUSING
25*	24A17961018800	SHIM, .002 THK
*	24A17961028800	SHIM, .005 THK
*	24A17961038800	SHIM, .010 THK
26	03B22858003121	CART, OPEN INPUT
27	24B17670003112	CART, CLOSED ECC
28	82C33150020003	CAM FOLLOWER CFH 286-3
29	82C33150020003	CAM FOLLOWER CFH 286-3
30*	84D07329780000	OIL SEAL C/R 64993
31*	84D07329170000	OIL SEAL C/R 9900
32*	84D07329190000	OIL SEAL C/R 12350
33	05C37126000000	FOLLOWER WHEEL LIFT SHAFT
34*	86A22875020000	BEARING, LINEAR THOM SUPER 16
35*	99J23842010000	LINEAR BEARING L-12-MM
36	95A26012060000	SSS OVL PT 10-32 X 1/4
37	99A24032000000	AIR VENT (BREATHER)
38	95A33001010000	SIGHT GLASS

PARTS LIST FOR 300RPP CONTINUED

39*	86A23862000003	BRG KAYDON KF060XPOL
40*	86A22882000021	BEARING CONE 4T-LM67049A
41*	86A22882000022	BEARING CUP 4T-LM67010
42	95A26012070000	SSS OVL PT 10-24 X 3/8
43*	86D07328070021	BEARING CONE A6075
44*	86D07328070022	BEARING CUP A6157
45*	48A06080018800	SHIM, INPUT .002 THK
*	48A06080028800	SHIM, INPUT .005 THK
*	48A06080038800	SHIM, INPUT .010 THK
46	037K238	KEY 3/8 SQ X 2 3/8 LG
47	031K131	KEY 3/16 SQ X 1 3/16 LG
48	-----	NOT SUPPLIED WITH 300RPP
49	95A26000380000	SHCS 1/4-20 X 1/2
50	99A18874020000	HHCS 1/4-20 X 1/2
51	95A26003220000	BHCS 10-32 X 1/2
52	95A26000440000	SHCS 1/4-20 X 1 1/2
53	95A26009040000	LOCKNUT PN-04
54	95A26009070000	LOCKNUT PN-07
55	95A26009080000	LOCKNUT PN-08
56	-----	NOT USED ON 300RPP
57	95A26009080000	LOCKNUT PN-08
58	-----	NOT USED ON 300RPP
59	95A26000470000	SHCS 1/4-20 X 2 1/4
60	95A26000390000	SHCS 1/4-20 X 5/8
61	05A23858000000	FLATWASHER FW 1
62	95A33032170000	RETAINING RING 5108-125
63	95A26003210000	BHCS 10-32 X 3/8

* Indicates parts supplies with Spare Parts Kit #300RPP SPK

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PARTS LIST FOR 500RPP CAMBOT (STANDARD CONFIGURATION)

<u>ITEM NO.</u>	<u>PART NUMBER</u>	<u>DESCRIPTION</u>
1	03B37187000000	LIFT SPOOL
2	95A33030210000	RETAINING RING N5008-200
3	95A33031420000	RETAINING RING 5100-156
4	03A33568009999	GUIDE SHAFT
5	03A23411009000	SPACER
6	95A37189000000	FLAT HEAD SCREW, SELF LOCKING
7*	56B26168018800	SHIM, OUTPUT .002 THK
*	56B26168028800	SHIM, OUTPUT .005 THK
*	56B26168038800	SHIM, OUTPUT .010 THK
8*	03B23298000000	GASKET, CART LARGE
9	-----	NOT USED ON 500RPP
10	03B22887009600	COVER, LOCKNUT
11*	03B22888000000	GASKET, LOCKNUT COVER
12	03B30862009999	COVER, TOP
13	03B37188000000	GUIDE SHAFT, CENTER
14	56C23495009300	BEARING RETAINER
15*	03C22879000000	GASKET, BOTTOM COVER
16	03C22878009600	BOTTOM COVER
17	03C23297003121	CART, OPEN INPUT
18	-----	LIFT CAM (CONTACT CAMCO FOR ASSISTANCE IN CAM SELECTION)
19	-----	ROTARY CAM (CONTACT CAMCO FOR ASSISTANCE IN CAM SELECTION)
20*	82C33150040003	CAM FOLLOWER CFH 288-3
21	03C33566014006	FOLLOWER WHEEL (FOR BUT 4 STOP)
	03C33566024008	FOLLOWER WHEEL (4 STOP ONLY)
22	03D39437007002	INPUT SHAFT (W/OR W/O 2.5 REDUCER)
	03D33562007002	INPUT SHAFT, 2.5" RED. & 15 DHL SIDE 1
	03D33563007002	INPUT SHAFT, 2.5" RED. & 15 DHL SIDE 2
23	03C33570009999	DIAL MOUNTING PLATE
24	03G27869001004	HOUSING
25*	48A06080018800	SHIM, .002 THK
*	48A06080028800	SHIM, .005 THK
*	48A06080038800	SHIM, .010 THK
26	03B22858003121	CART, OPEN INPUT
27	03B22859003112	CART, CLOSED ECC
28	82C33150040003	CAM FOLLOWER CFH 288-3
29	82C33150040003	CAM FOLLOWER CFH 288-3
30*	84D07329860000	OIL SEAL C/R 95052
31*	84D07329200000	OIL SEAL C/R 12481
32*	84D07329190000	OIL SEAL C/R 12350
33	03C37186000000	FOLLOWER WHEEL LIFT SHAFT
34*	86A22875010000	BEARING, LINEAR THOM SUPER 20
35*	86A26463000000	LINEAR BEARING L-16-MM
36	95A26012110000	SSS OVL PT 1/4-20 X 1/4
37	99A24032000000	AIR VENT (BREATHING)

PARTS LIST FOR 500RPP CONTINUED

38	95A33001010000	SIGHT GLASS
39	86A24320000000	BRG KAYDON KG090XPOL
40*	86A22882000021	BEARING CONE 4T-LM67049A
41*	86A22882000022	BEARING CUP 4T-LM67010
42	95A26012110000	SSS OLV PT 1/4-20 X 1/4
43*	86A22882000021	BEARING CONE 4T-LM67049A
44*	86A22882000022	BEARING CUP 4T-LM67010
45*	48A06080018800	SHIM, .002 THK
*	48A06080028800	SHIM, .005 THK
*	48A06080038800	SHIM, .010 THK
46	037K350	KEY 3/8 SQ X 3 1/2 LG
47	031K175	KEY 3/16 SQ X 1 3/4 LG
48	-----	NOT SUPPLIED WITH 500RPP
49	95A26000380000	SHCS 1/4-20 X 1/2
50	99A18874020000	HHCS 1/4-20 X 1/2
51	95A26003220000	BHCS 10-32 X 1/2
52	95A26000580000	SHCS 5/16-18 X 1 1/2
53	95A26009040000	LOCKNUT PN-04
54	95A26009070000	LOCKNUT PN-07
55	95A26009080000	LOCKNUT PN-08
56	-----	NOT USED ON 500RPP
57	95A26009080000	LOCKNUT PN-08
58	-----	NOT USED ON 500RPP
59	95A26000660000	SHCS 5/16-18 X 3 1/2
60	95A26000690000	SHCS 3/8-16 X 3/4
61	99A24322000000	FLATWASHER FW 3
62	95A33032170000	RETAINING RING 5108-125
63	95A08089000000	SPECIAL LARGE HEAD CAPSCREWS

* Indicates parts supplies with Spare Parts Kit #500RPP SPK

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PARTS LIST FOR 900RPP CAMBOT (STANDARD CONFIGURATION)

<u>ITEM NO.</u>	<u>PART NUMBER</u>	<u>DESCRIPTION</u>
1	09B37221000000	LIFT SPOOL
2	95A33030350000	RETAINING RING N5008-300
3	95A33031500000	RETAINING RING 5100-200
4	09A30404009999	GUIDE SHAFT
5	09A32465009000	SPACER
6	95A37223300000	FLAT HEAD SCREW, SELF LOCKING
7*	09B29064018800	SHIM, OUTPUT .002 THK
*	09B29064028800	SHIM, OUTPUT .005 THK
*	09B29064038800	SHIM, OUTPUT .010 THK
8*	09B29068000000	GASKET, CART LARGE
9	95A26010120000	LOCKWASHER W 12
10	09B32175000000	COVER, LOCKNUT
11*	09B32176000000	GASKET, LOCKNUT COVER
12	09B32405002000	COVER, TOP
13	09B37222000000	GUIDE SHAFT, CENTER
14	09C29030009300	BEARING RETAINER
15*	09C29057009600	GASKET, BOTTOM COVER
16	09C29058000000	BOTTOM COVER
17	09C29066003011	CART, OPEN INPUT
18	-----	LIFT CAM (CONTACT CAMCO FOR ASSISTANCE IN CAM SELECTION)
19	-----	ROTARY CAM (CONTACT CAMCO FOR ASSISTANCE IN CAM SELECTION)
20*	82C10457060003	CAM FOLLOWER CFH 290-1
21	09D32462044006	FOLLOWER WHEEL (FOR BUT 4 STOP)
	09D32462054008	FOLLOWER WHEEL (4 STOP ONLY)
22	09D39516007002	INPUT SHAFT (W/OR W/O 3.5 REDUCER)
	09D33675007002	INP. SHAFT, 3.5" RED. & 35 DHL SIDE 1
	09D33676007002	INP. SHAFT, 3.5" RED. & 35 DHL SIDE 2
23	09D33301009999	DIAL MOUNTING PLATE
24	09G28935001002	HOUSING
25*	30B02669018800	SHIM, .002 THK
*	30B02669028800	SHIM, .005 THK
*	30B02669038800	SHIM, .010 THK
26	30B07728003121	CART, OPEN INPUT
27	30B07731003112	CART, CLOSED ECC
28	82C10457060003	CAM FOLLOWER CFH 290-1
29	82C10457060003	CAM FOLLOWER CFH 290-1
30*	84A29060000000	OIL SEAL C/R 1150113
31*	84A29061000000	OIL SEAL C/R 20006
32*	84D07329370000	OIL SEAL C/R 19832
33	09D37220000000	FOLLOWER WHEEL LIFT SHAFT
34*	86A22875070000	BEARING, LINEAR THOM SUPER 32
35*	86A24061000000	LINEAR BEARING L-20-MM

PARTS LIST FOR 900RPP CONTINUED

36A	95A26005440000	SSS CUP PT 1/4-20 X 3/8
36B	95A26006200000	SSS CONE PT 1/4-20 X 3/8
37	99A24032000000	AIR VENT (BREATHER)
38	95A33001020000	SIGHT GLASS
39	86A29059000000	BRG KAYDON KG110XP0L
40*	86D07328340022	BEARING CUP 3720
41*	86D07328440021	BEARING CONE 3767
42	95A26005440000	SSS CUP PT 1/4-20 X 3/8
	95A26006200000	SSS CONE PT 1/4-20 X 3/8
43*	86D07328340022	BEARING CUP 3720
44*	86D07328440021	BEARING CONE 3767
45*	30B02669018800	SHIM, .002 THK
*	30B02669028800	SHIM, .005 THK
*	30B02669038800	SHIM, .010 THK
46	062K475	KEY 5/8 SQ X 4 3/4 LG
47	062K375	KEY 5/8 SQ X 3 3/4 LG
48	-----	NOT SUPPLIED WITH 900RPP
49	95A26000710000	SHCS 3/8-16 X 1
50	95A26002010000	HHCS 1/4-20 X 1/2
51	95A26003280000	BHCS 1/4-20 X 1/2
52	95A26000750000	SHCS 3/8-16 X 2
53	95A26009070000	LOCKNUT PN-07
54	95A26009120000	LOCKNUT PN-12
55	95A26009140000	LOCKNUT PN-14
56	95A26010140000	LOCKWASHER W 14
57	95A26009140000	LOCKNUT PN-14
58	95A26010140000	LOCKWASHER W 14
59	95A26000660000	SHCS 5/16-18 X 3 1/2
60	95A26000710000	SHCS 3/8-16 X 1
61	99A24322000000	FLATWASHER FW 3
62	-----	NOT USED ON 900RPP
63	95A08116000000	SPECIAL LARGE HEAD CAPSCREWS

* Indicates parts supplies with Spare Parts Kit #900RPP SPK



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