

FRUITLAND

VACUUM PUMP

OPERATION AND MAINTENANCE

MANUAL

RCF 250*370*500*800 AND 1200
Models



ATTENTION

Read owners manual fully before operating pump.
Failure to do so can result in severe
pump damage and may void warranty.



FRUITLAND TOOL & MANUFACTURING

*Manufacturers of Rotary Vacuum Pumps
and Vacuum System Accessories*

324 LEASIDE AVE. STONEY CREEK, ONTARIO, CANADA L8E 2N7

TELEPHONE (905) 662-6552 * 1-800-663-9003

FAX (905) 662-5412

WEB SITE: <http://www.fruitland-mfg.com>

This is the
SERIAL NUMBER of YOUR PUMP

PREFACE

This Manual is given with your pump to help operators and owners to understand the working and maintenance of your newly acquired unit.

Please familiarize yourself and any operator with the contents of this booklet, and keep a record of the serial number handy, should you need any parts or information in the future.

We at **FRUITLAND** are committed to quality, reliability and guaranteed performance.

PURCHASED FROM:

(DEALER'S STAMP)

DATE:

.....
MM / DD / YY

Certificate of guarantee and inspection
Certificat de garantie et d'inspection

Model No.
N° modele`
Serial No.
N° serie'
Date Purchased
Date d'achat

Our Product is guaranteed for 2 years in accordance with the warranty provisions described on the reverse side.

To put this guarantee into effect the card at the back of this manual must be filled out immediately and returned to:

Fruitland Tool & Manufacturing,
324 Leaside Avenue,
Stoney Creek, Ontario,
Canada L8E 2N7

Telephone No. (905) 662-6552
1-800-663-9003
Fax No. (905) 662-5412

NOTICE - WARRANTY CLAIM

In the event of pump failure while pump is still under warranty, pumps are to be returned to factory without dismantling or other alterations for warranty assessment. Violation of this condition will void warranty. All shipping costs are the customer's responsibility.

Thank you for purchasing a Fruitland Rotary Vane Vacuum Pump. Our quality control program has been developed to ensure this vacuum pump and its components are free from defects in materials and workmanship. With proper maintenance and operation your Fruitland pump should give many years of trouble free use.

Please read owners manual completely before operating your new Fruitland pump.

WARRANTY

If during the 2 year period from the purchase date and the return of the warranty card, the pump is found to be not operating properly, we will repair the pump free of charge, providing the pump is returned without dismantling or altering it in any way to our plant or to one of our authorized distributors and the problem is determined to have been caused by defect(s) in the pump materials or workmanship.

Rotary vane vacuum pumps are designed to pump air only! A properly designed vacuum system will have filters and shutoffs installed; and a maintenance program implemented to ensure that liquids, solids or dirt are not allowed to enter the pump. If foreign material enters the pump severe wear and damage will occur.

This Warranty Does Not Cover

- A) Repairs as a result of misuse, accident, lack of required maintenance, or improper operation.
- B) Normal wear (eg.) vanes.
- C) Repairs as a result of an improperly designed vacuum system, improper installation or foreign material entering pump.

Disclaimer

To the extent the law permits, Fruitland disclaims any responsibility for loss of time or use of the product, transportation or any other indirect, incidental or consequential damage, inconvenience or commercial loss.

Fruitland Tool and Manufacturing customer service can be reached at

Telephone:(905) 662-6552 or

1-800-663-9003

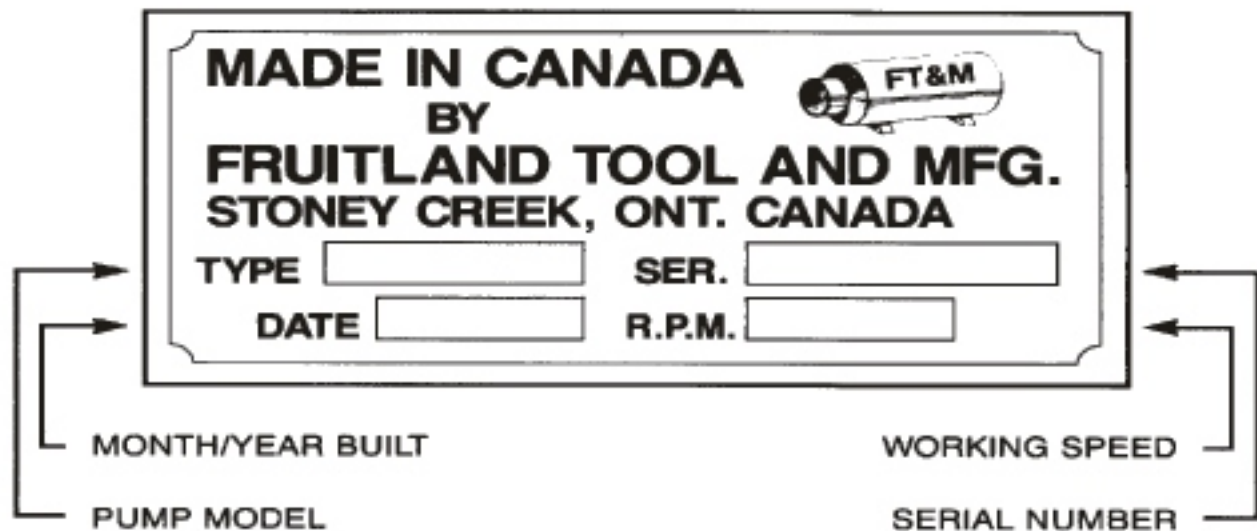
Facsimile: (905) 662-5412

E-mail: rbader@fruitland-mfg.com

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INSTALLATION

When installing a Fruitland vacuum pump that is to be driven by a hydraulic motor, or angle gear box - *special care must be given.*

The coupling between the pump and drive method should have sufficient clearance to allow the rotor in the pump to expand lengthwise due to heat. If sufficient clearance is not given, the rotor will not stay centered in the housing and severe pump damage may occur. Please consult your coupling manufacturer or Fruitland Tool for recommended clearances.

GENERAL INSTRUCTIONS

LIFTING: Lift pump by eyebolts, if provided, or with slings around body of pump close to legs.

MOUNTING: Secure pump unit to flat sturdy surface with four bolts, washers and lockwashers, through holes in legs.

LINE UP: Be sure pump is lined up properly to prevent strain on belts or couplings.

DRIVES:

BELTS: Proper tension of belts is achieved by pushing centrally with your finger. Each belt can be depressed by 1/64" for every inch of span distance.

CHAINS: Same as belts (but usually not recommended).
REASON: RPM and lubrication.

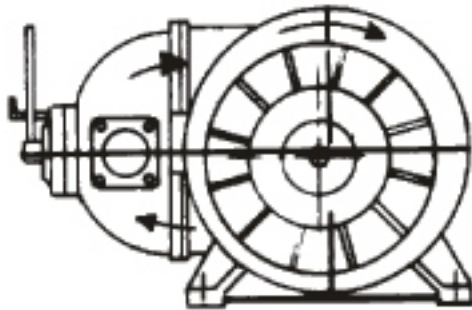
DIRECT: Flexible coupling.

RPM:

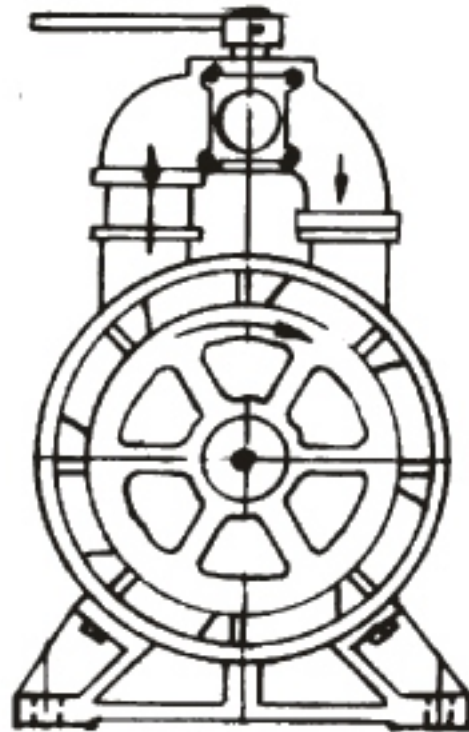
See name plate tag.
Hold within plus or minus 50 RPM set at 18" Hg.

DRIVE DIRECTION:

Pulley or drive end view of the pump.



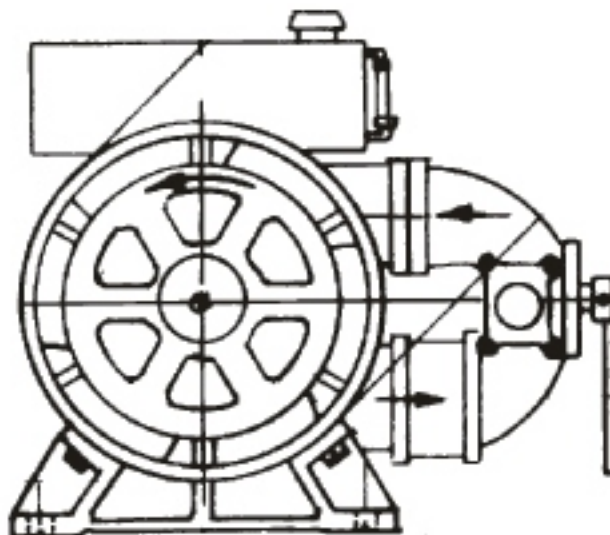
RCF 370, RCF 500
side Valve Model Shown



RCF 250, RCF 800
These pumps built
Top Valve style only.



CLOCKWISE (or righthand)



RCF 1200
(Side Valve shown)

COUNTERCLOCKWISE (or lefthand)



MAINTENANCE:

LUBRICATION:

In summer conditions a W40 non-detergent motor oil or an ISO 150 compressor oil can be used. **For winter** a W30 non-detergent motor oil or an ISO 100 compressor oil. In extremely hot climates a W50 motor oil or an ISO 200 compressor oil can be used.

Always check oil level before starting unit, top up if necessary.

NEVER RUN PUMP DRY!!!

ALL PUMP Models:

Oil Tank: **IMPORTANT!**
During freezing weather, drain possible condensation build-up in bottom of oil tank.

Danger: If water gets into oil pump, it could freeze and damage gears in pump.

Drain and clean inside of oil tank with diesel fuel periodically.



OIL PUMP IN MODEL
RCF 250
RCF 370
RCF 500
RCF 800

(Located inside Oil Tank)

OIL CONSUMPTION (approximate)

	<u>RCF 250</u>	<u>RCF370</u>	<u>RCD 500</u>	<u>RCF 800</u>	<u>RCF 1200</u>
1 Litre Approx.	12 hr.	4.4 hr.	4.4 hr.	6.0 hr.	4.2 hr.
1 Imp. Gal. Approx.	55 hr.	20 hr.	20 hr.	27 hr.	19 hr.
1 U.S. Gal. Approx.	45 hr.	16.6 hr.	16.6hr.	22.4 hr.	15.8 hr.

RCF 1200 Pump Models:

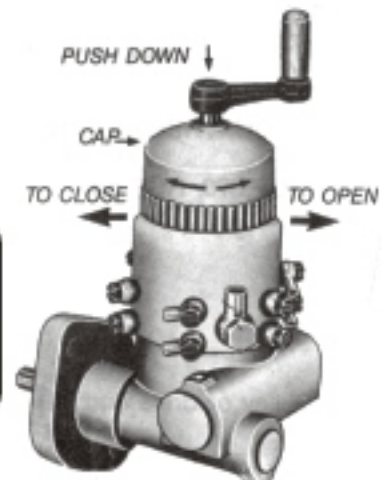
When pump has been inoperative for 48 hours or longer, push down and hold down the spring loaded crank on the oil pump, while rotating the handle about 20 - 30 turns either way, or until oil drops can be seen dripping in oil flow valve.

OIL PUMP (EXTERNAL) FOR MODEL RCF 1200

SERVICE NOTE!

If you have any questions regarding the service of your pump, contact your local Fruitland Dealer or **1-800-663-9003**.

IMPORTANT: Order Spare parts from correct Parts Drawing, e.g. "Hydraulic Model", "Standard Model", and provide serial number of your vacuum pump. To ensure proper pump operation, USE GENUINE FRUITLAND PARTS ONLY.



COOLING: NO Vacuum pump should run for a prolonged period of time without air passing through it.
(AT MAXIMUM VACUUM) Addition of vacuum relief valve is highly recommended. The outside of the pump housing and the fan blades should be kept clean to allow proper cooling airflow. Do not allow build-up of dirt pump shroud and housing.

Accessories

FILTERS: The vacuum system should have at least one filter between the vacuum tank and the pump so that only clean air is allowed to pass through the pump. These filters can be in the primary and/or secondary shut-offs, in-line (between secondary and pump) or at the pump. Fruitland secondary shut-offs are equipped with filters.

SHUT-OFF MOISTURE TRAPS: All vacuum tanks should be equipped with an adequate primary and a secondary shut-off moisture trap to prevent liquids or semi-solids from being drawn into the pump. Liquids or solid materials drawn into the pump can seriously damage the pump. Moisture traps should be drained often and always before shutting unit down when temperature is below freezing.

PRESSURE RELIEF VALVE(S): A MUST. Test periodically to ensure proper setting is maintained. The Fruitland secondary is equipped with a pressure relief valve.

VACUUM RELIEF VALVE: If pump is run for long periods of time at high **vacuum**, a vacuum relief valve is recommended to protect against overheating.

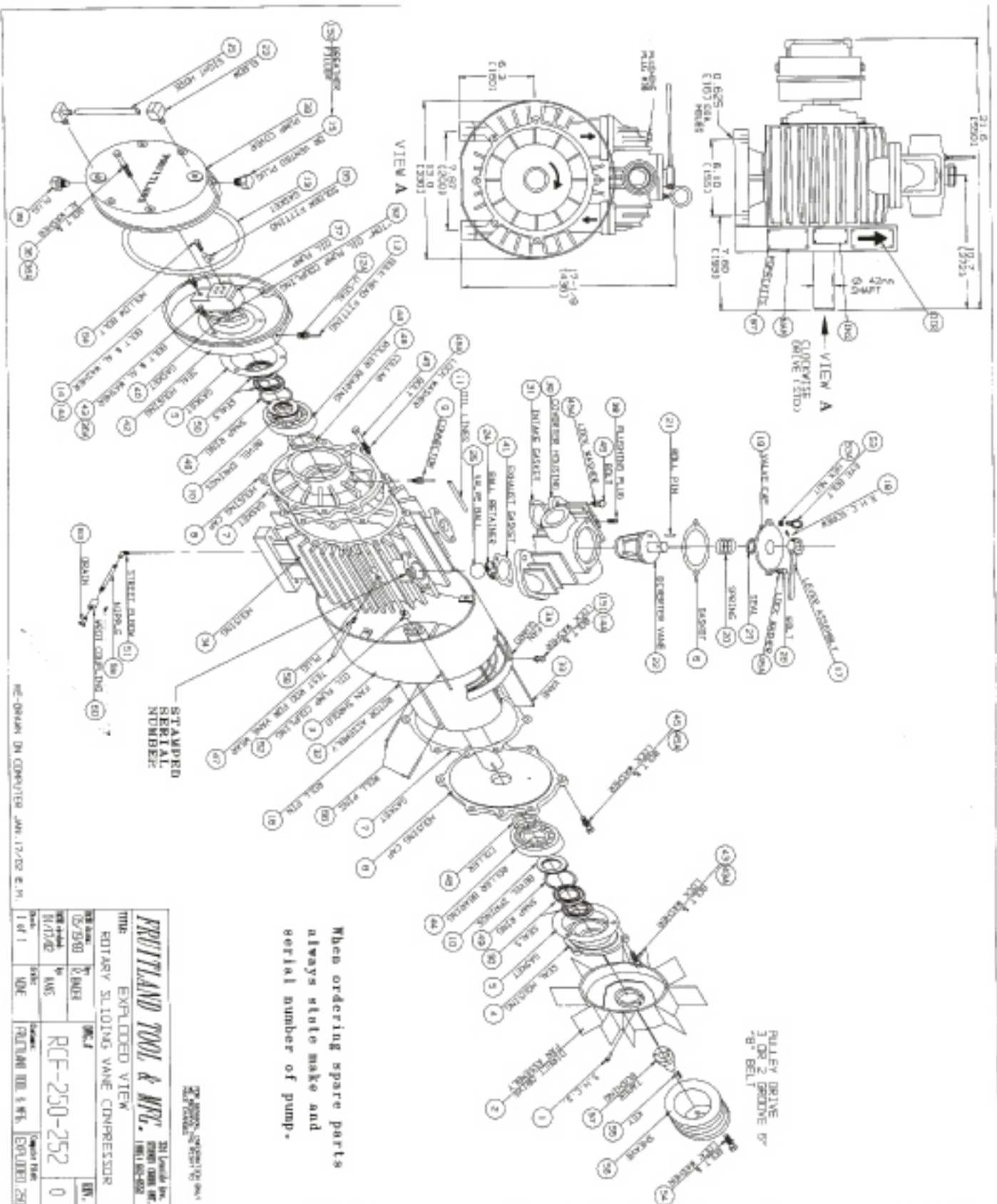
PRESSURE VACUUM GAGE: Recommended

OIL TRAP MUFFLER: Strongly recommended.(Noise Pollution)
*Available at Fruitland for all pumps

INTAKE PIPING: Pipes used must be free of corrosion or rust. Welding beads, slag or splatter must be removed.

NON-RETURN VALVE: (*Back-up valve*)
A standard installation in all our models. Its function is to close automatically when the pump is stopped to prevent air back flow and reverse running of the pump.

RCF 250

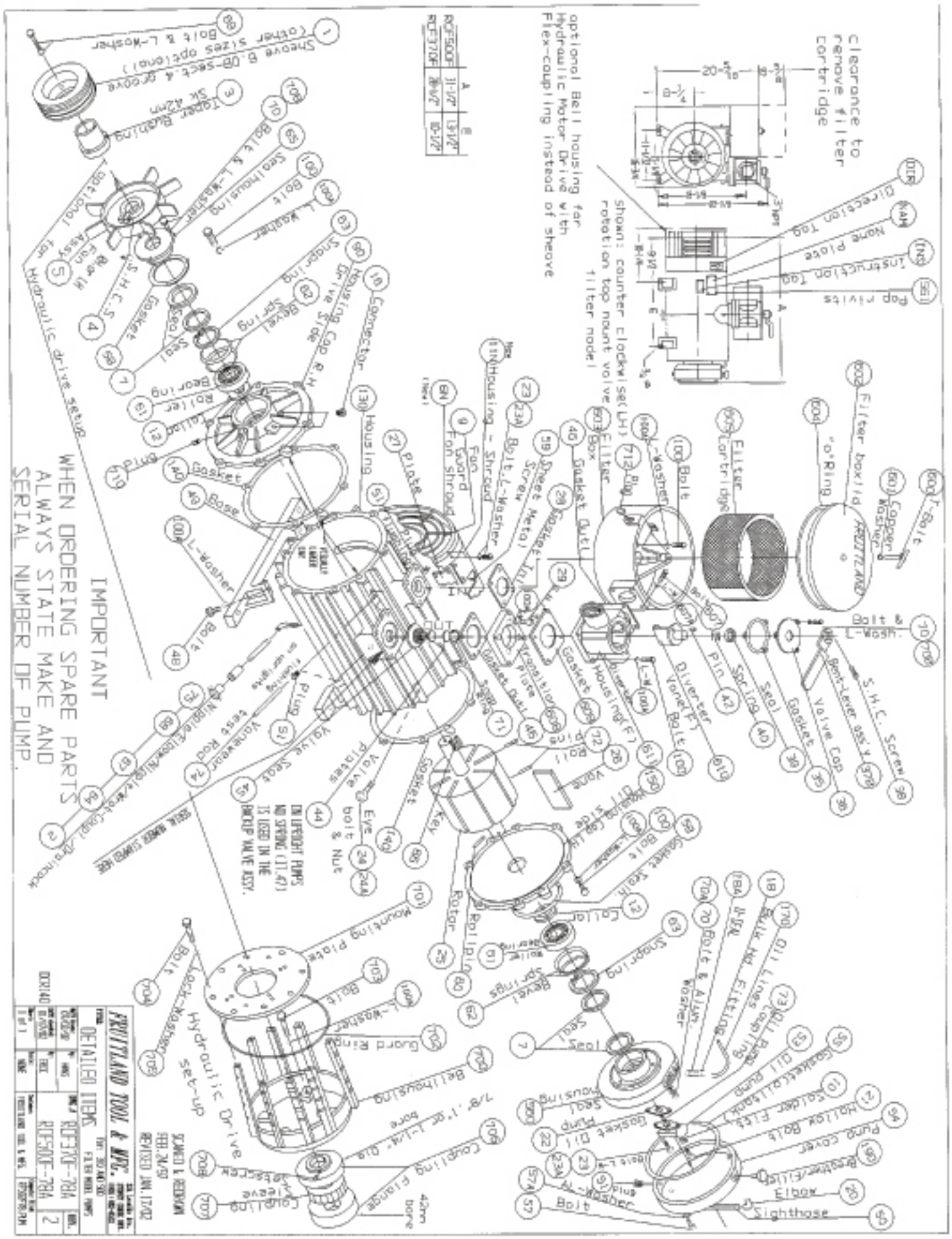


RCF-DRAWN ON COMPUTER JAN. 17/82 E.M.

FRUITLAND TOOL & MFG.		201 Lincoln Ave. Riverside, CA 92504	
EXPLODED VIEW			
ROTARY SLIDING VANE COMPRESSOR			
DATE	BY	CHKD	REV.
05/29/82	WAS	WAS	0
11/17/82	WAS	WAS	0
1/1/83	WAS	WAS	0
1/1/83	WAS	WAS	0
1/1/83	WAS	WAS	0
1/1/83	WAS	WAS	0
1/1/83	WAS	WAS	0

201 Lincoln Ave.
Riverside, CA 92504

RCF 370F & 500F (RCF 370H & 500H)

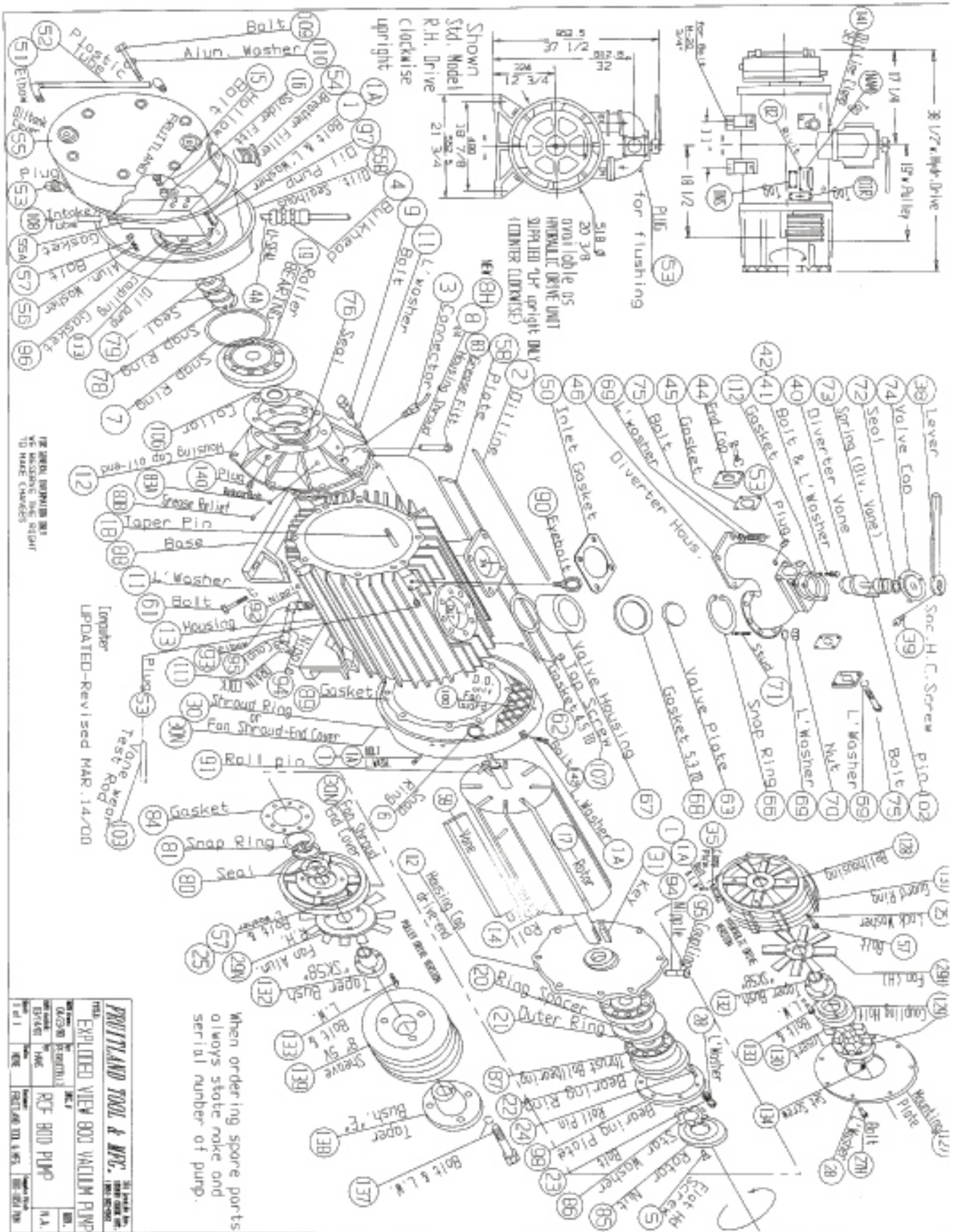


IMPORTANT
 WHEN ORDERING SPARE PARTS
 ALWAYS STATE MAKE AND
 SERIAL NUMBER OF PUMP.

FRUITLAND TOOL & MFG. CO.

FRUITLAND TOOL & MFG. CO.
 28 YEARS OF SERVICE
 1000 W. 17th St.
 ST. LOUIS, MO. 63103
 TEL. 314-241-3000
 FAX 314-241-3000
 REVISED JAN. 17/02

RCF 800



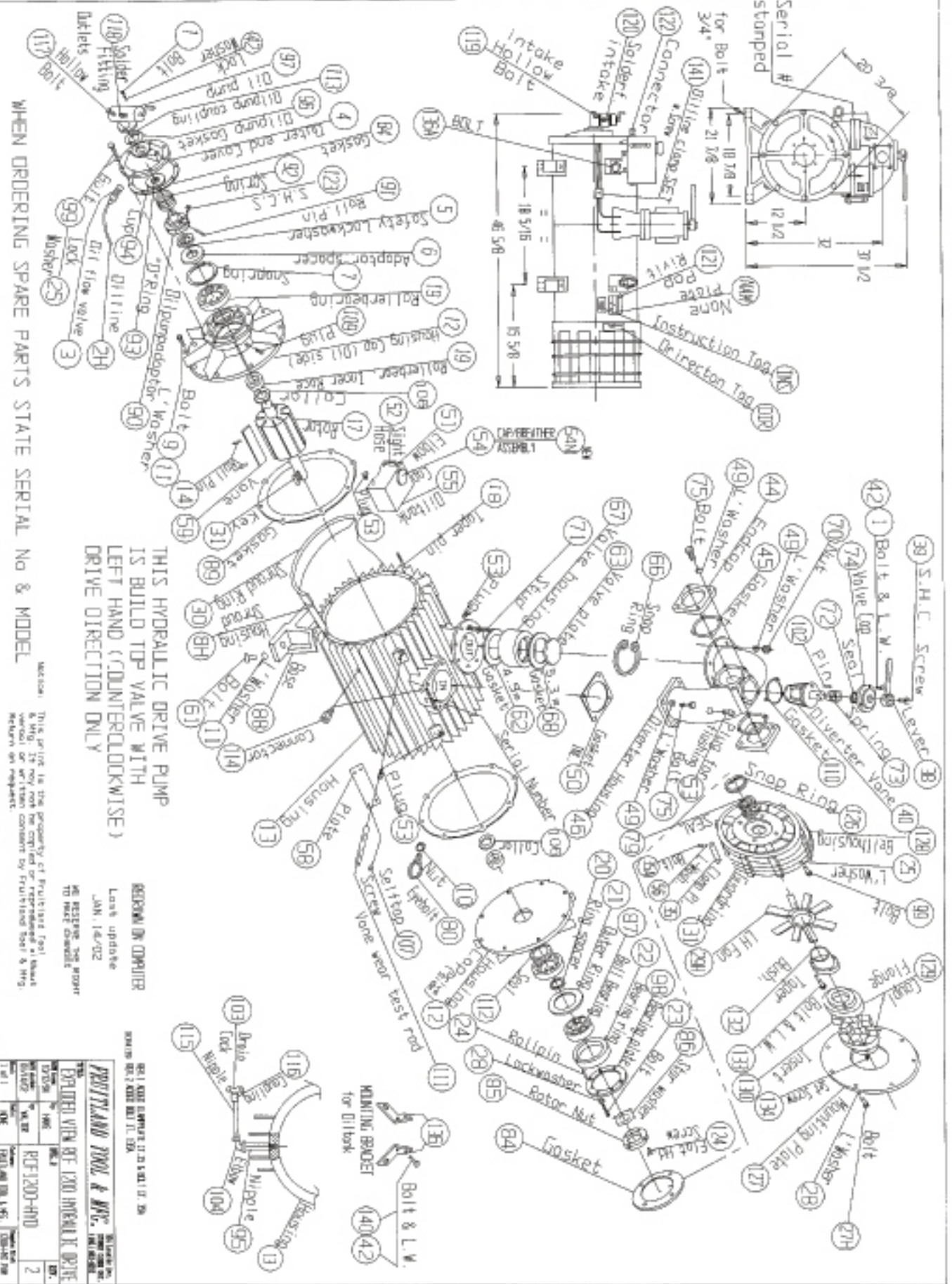
FOR GENERAL INFORMATION SEE
WE ASSUME THE RIGHT
TO MAKE CHANGES

Longer
UPDATED- Revised MAR. 14/00

When ordering spare parts
always state make and
serial number of pump.

PORTLAND TOOL & MFG. CO.		3140 1/2 ST. N.E.	
EXPLDED VIEW 800 WALLUM PUMP			
DATE	REVISED	BY	CHKD.
03-28-80	03-28-80	W.M.	W.M.
PART NO. RCF 800 PUMP		M.A.	
1 of 1	REV.	PRELIM. DR. 1.875	REV. 801 PUMP

RCF 1200



WHEN ORDERING SPARE PARTS STATE SERIAL NO & MODEL

THIS HYDRAULIC DRIVE PUMP IS BUILT TOP VALVE WITH LEFT HAND (COUNTERCLOCKWISE) DRIVE DIRECTION ONLY

NOTE: This print is the property of Frutiger Tool & Mfg. Co. If not returned to the originator, it shall be destroyed. If not returned, it shall be destroyed.

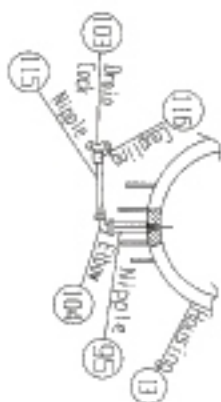
REVISION OR CHANGE
Last update
JAN. 14/02
DO NOT REUSE THIS DRAWING FOR ANY OTHER PURPOSE

941 000 000 000 000 000 000

REV.	DATE	DESCRIPTION	BY	CHK.
1	10/01/00	REVISION FOR SERIAL NO. 1200		
2	10/01/00	REVISION FOR SERIAL NO. 1200		

FRUITIGER TOOL & MFG. CO.
500 WEST 10TH AVENUE
DENVER, CO. 80202
TEL: 303.733.1000
FAX: 303.733.1001
WWW.FRUITIGER.COM

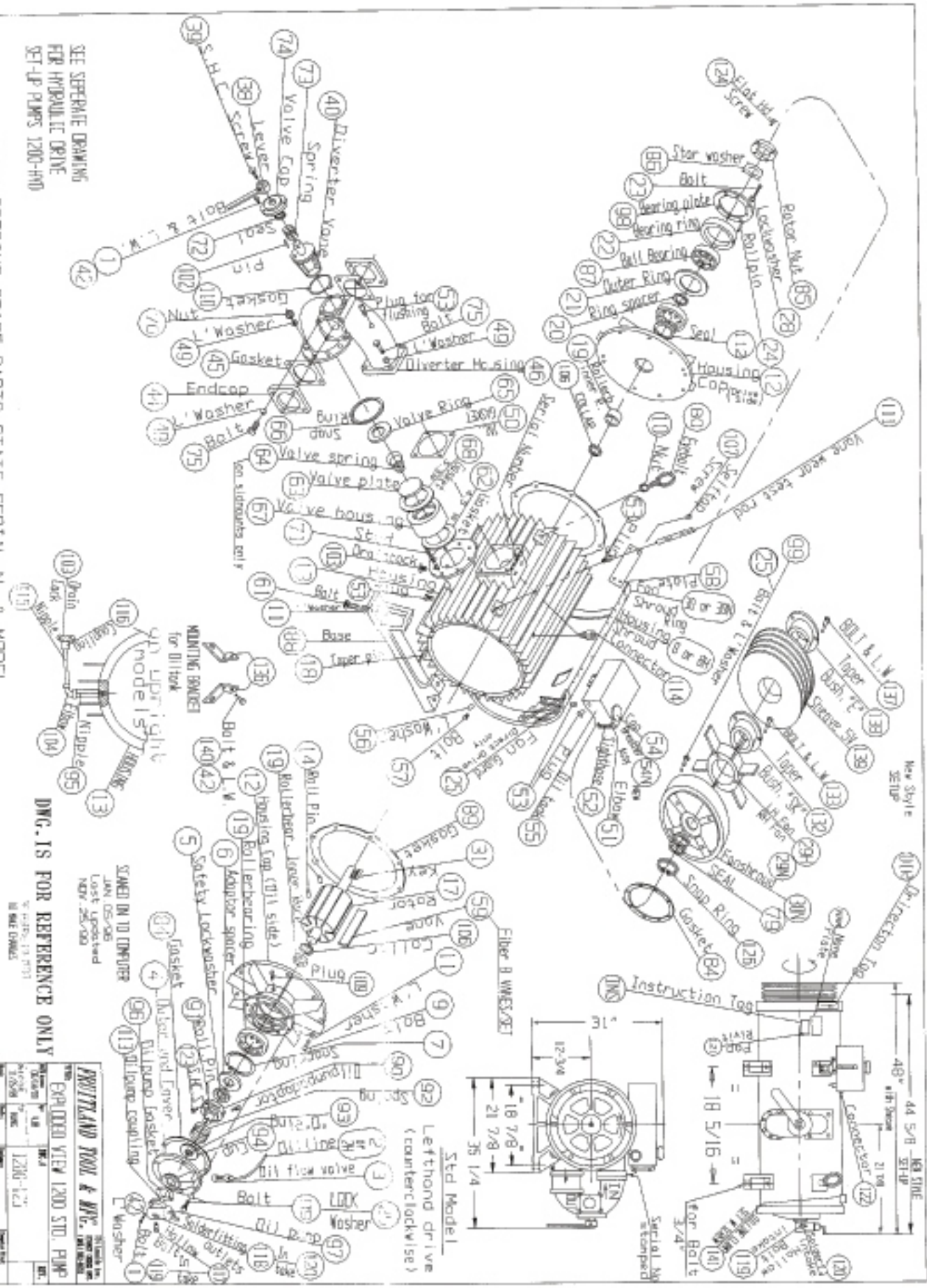
MAINTENANCE BRACKET
for Oilback
Bolt & L.V. (140/42)



RCF 1200

SEE SEPARATE DRAWING
FOR HYDRAULIC DRIVE
SET-UP PLUMBS 1200-H10

WHEN ORDERING SPARE PARTS STATE SERIAL NO & MODEL



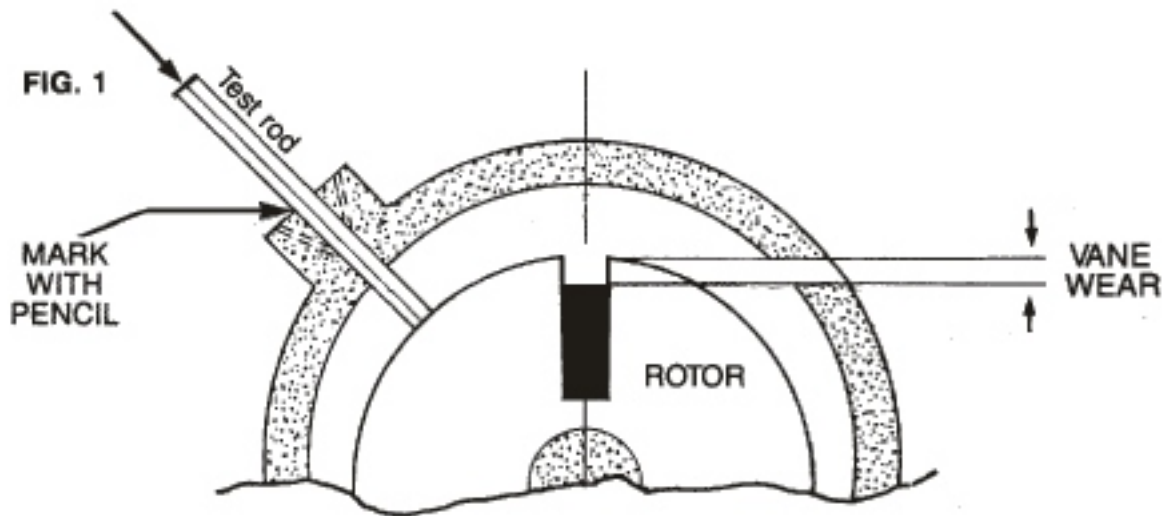
DWG. IS FOR REFERENCE ONLY

MAINTENANCE
MANUAL
FOR
MODELS 1200
SERIES 1200

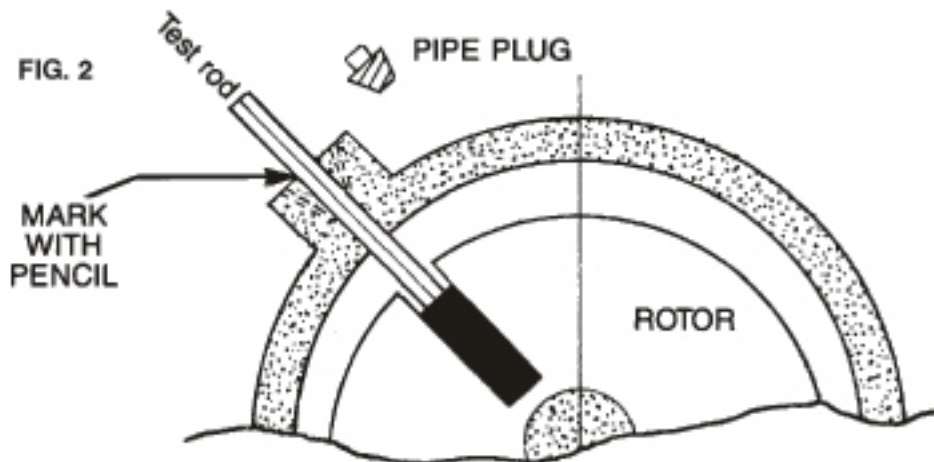
SCANNED IN TO COMPUTER
JUN 05/08
Last Updated
MAY 26/00
BY: RCF DWA

Part No.	Part Name	QTY
1	Bolt & L.W.	1
2	Washer	1
3	Bit flow valve	1
4	Ball pin	1
5	Safety Lockwasher	1
6	Roller spacer	1
7	Bolt	1
8	Washer	1
9	Ball pin	1
10	Washer	1
11	Collar	1
12	Housing, (op (OIL side))	1
13	Nipple	1
14	Ball Pin	1
15	Key	1
16	Rotor	1
17	Yoke	1
18	Plug	1
19	Roller bearing	1
20	Ring spacer	1
21	Outer Ring	1
22	Ball Bearing	1
23	Bearing plate	1
24	Flat Hd. Screw	1
25	Bolt & L.W. Washer	1
26	Washer	1
27	Taper Bush	1
28	Roller	1
29	Washer	1
30	Washer	1
31	Gasket	1
32	Washer	1
33	Taper Bush	1
34	Gasket	1
35	Soap Ring	1
36	Washer	1
37	Taper Bush	1
38	Washer	1
39	Washer	1
40	Valve Spring	1
41	Washer	1
42	Pin	1
43	Washer	1
44	Endcap	1
45	Gasket	1
46	Washer	1
47	Washer	1
48	Washer	1
49	Washer	1
50	Valve Ring	1
51	Elbow	1
52	Washer	1
53	Washer	1
54	Washer	1
55	Washer	1
56	Washer	1
57	Washer	1
58	Washer	1
59	Filter & WMS/GE	1
60	Washer	1
61	Washer	1
62	Washer	1
63	Washer	1
64	Washer	1
65	Washer	1
66	Washer	1
67	Washer	1
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117	Washer	1
118	Washer	1
119	Washer	1
120	Washer	1
121	Washer	1
122	Washer	1
123	Washer	1
124	Washer	1
125	Washer	1

MEASURING VANE WEAR



NOTE: Be extra careful not to bend the checking rod.



Vane wear (see diagrams above) should not exceed 3/8" in models RCF 800 and 1200, and 1/4" in pump models 250, 370, and 500. Fruitland pumps have at least two orifices for checking vane wear, some models have four. These orifices are located on the housing at both ends of the vacuum pump, and are marked with red. 3/16" diameter test rod is supplied with the pump. We recommend checking the vanes on both ends, as they sometimes wear in a tapered fashion because of excess heat or contamination.

To measure vane wear, remove the plug from the orifice and insert the test rod until the rod touches the rotor. Mark the rod with pencil as shown in diagram (fig.1). Turn the pump shaft until rod drops into the vane slot in the rotor. Mark with pencil again (fig. 2). Distance between the pencil marks is the amount of wear you have on the vane. If the vane is tapered from end to end, take the largest measurement as the amount the vane is worn.

Replace the complete set of vanes when worn to the maximum recommended amount for your pump model.

Failure to replace the vanes at the recommended time can result in pump failure. **Vane wear and subsequent damage are not covered under Warranty.** Instructions for replacing vanes are given on page 6 & 7.

Recommended first check after approximately 10 hours of operation; next check after 50 hours of operation; thereafter, check every 200 hours or once a month if no significant wear has been detected on the 2 initial checks (see first paragraph of page 6).

TYPE	RCF 250	RCF 370	RCF 500	RCF 800	RCF 1200
Aprox. Air flow	150 CFM	259 CFM	320 CFM	420 CFM	630 CFM
Maximum Vacuum	27" Hg	28.5" Hg	28.5" Hg	28.5" Hg	28.5" Hg
Power Required @ 27" Hg	7 BHP	11BHP	14 BHP	14 BHP	20 BHP
Pressures to	30 psi	35 psi	35 psi	35 psi	35 psi
Power required @ Max. Pressure	18 BHP	36 BHP	44 BHP	55 BHP	85 BHP
Power required @ 0" Hg	10 BHP	16 BHP	19 BHP	18 BHP	26 BHP
Size of Hoses	2"	3"	3"	4"	4"
Operating Speed	1400 RPM	1400 RPM	1400 RPM	1000 RPM	1000 RPM
Lubrication (oil pump)	automatic	automatic	automatic	automatic	automatic
Vanes	4(fibre)	8(fibre)	8(fibre)	8(fibre)	8(fibre)
Fan cooling continuous duty	YES	YES	YES	YES	YES
Approx. net Pump weight	255 lbs.	385 lbs.	450 lbs.	1100lbs.	1400 lbs.

*Data and capacities not binding
 *We reserve the right to make changes

Vanes (fiber)

Life expectancy of fiber vanes is hundreds of working hours. It greatly depends on the cleanliness of the intake air. Any contamination that enters your pump (e.g. sand, rust, or soil dust particles) will shorten their life expectancy. It is the owner's responsibility to keep contamination out of the pump. **Keep Your Filters Clean.**

Vane Wear

Many factors can contribute to rapid or premature vane wear.

- 1 - Overheating of pump (check overheating in trouble shooting on page 10)
- 2 - Contamination entering pump. - Abrasives, or anything that can affect the action of the oil. (eg) chemicals
- 3 - Running pump too fast (overspeeding) (creep up governor)
- 4 - Wrong oil, or no oil.
- 5 - Oil pump failure.
- 6 - Pump housing damage.
- 7 - Rotor slots worn - If contamination getting into pump has caused the rotor slots to wear unevenly on the vanes thrust side, extra force is required to return the vanes into the slots as the rotor turns. This extra load causes housing wear, vane wear and raises pump temperature.

Since there are many factors that cause rapid vane wear, we do not warranty vanes or any related damage from vanes worn beyond the recommended amount, unless a defect in material or workmanship caused the vanes to wear prematurely.

VANE REPLACEMENT: All RCF 250, 370, and 500 models

- Disconnect drive source from pump.
- Drain oil from oil tank and remove oil tank cover by removing the four hex bolts and aluminum sealing washers.
- Disconnect all oil lines and remove oil pump. (held on by two bolts and lock washers).
Do not lose the oil pump to Rotor coupling.
- Remove the seal housing by removing three hex bolts and aluminum sealing washers.
- Remove the eight hex bolts and lock washers from the housing end cap and then slide the end cap off the rotor shaft. The rotor bearing and two bevel springs should be kept in the end cap. Please note their positioning if you remove them for replacement.
- Remove old vanes and replace with new vanes that have been dipped in oil.
- Inspect housing bore and bearings. We recommend replacing the seals and all related gaskets.
- Reassemble in reverse order.
- The eight housing end cap bolts should be tightened evenly to 20ft./lbs. torque.
- **NOTE:** Special attention is to be given that the oil pump coupling is engaging the roll pin in the rotor shaft. Turn rotor by hand. It should turn freely.
- Hook up drive source to pump, fill oil tank with correct oil.
- Resume operation.

VANE REPLACEMENT: RCF 800 Models

Disengage drive source to pump.

- Drain oil from oil tank (plug #53). Remove six hex bolts #109/110 and oil tank cover #55.
- Disconnect all oil lines.
- Remove four hex bolts #57/56 and oil tank - seal housing #55B.
- Remove eight hex bolts #9/11 and slightly tap end cover LH #12 loose from housing #13 and slide it off the rotor shaft. The two taper pins #18 stay in the end cover #12.
- Remove the old vanes and replace with new ones that have been dipped in oil.
- Inspect housing bore, roller bearing #19, seals #79 and #76 while having the pump apart. Replace any torn gaskets.
- Reassemble in reverse order.
- Tighten bolts evenly.-75 ft./lbs. torque (on 8 hex bolts #g)

VANE REPLACEMENT: RCF 1200

- Disengage drive source to pump.
- Slightly loosen supply oil line connector # 122 on oil tank, then remove the same line on the oil pump and swing the line up and secure to prevent draining of oil tank.
- Remove all other oil lines from oil pump.
- Remove oil pump, two bolts #1.
- Remove outer end cover #4, eight hex bolts #99.
- Remove housing cap - RH #12 by taking eight hex bolts #9/11 out and lightly tapping it loose from the housing #13. The two taper pins #18 stay in the housing cap #12.
- Remove old vanes and replace with new ones that have been dipped in oil.
- Inspect housing bore, roller bearing #19 and O-ring #93 in cup #94 while having pump apart. Replace any torque gaskets.
- Reassemble in reverse order.
- Tighten bolts evenly - 75ft./lbs. torque.(on 8 hexbolts #g)

NOTE: Special attention is to be given that the oil pump coupling #113 is engaged in the slot of the oil pump adapter #90 attached to the rotor shaft.

- Turn rotor by hand, it should turn freely.
- Crank handle of oil pump to prelubricate.
- Hook up drive source to pump.
- Resume operation.

VANES CHECKED

Year	20	20	20	20	20
Jan.					
Feb.					
Mar.					
Apr.					
May					
June					
July					
Aug.					
Sept.					
Oct.					
Nov.					
Dec.					

First 10 hrs check

50 hrs check

PUMP FLUSHING PROCEDURE

RCF 250

Mix one (1) quart of diesel fuel with 5 fl. oz. of oil.

Stop the pump.

Place the lever of the pump on vacuum mode.

Remove the plug #38 on Diverter Housing #30, pour half (1/2) of the diesel-oil mixture slowly into the hole.

Turn pump rotor by manually pulling belts to distribute liquid.

Run pump for 30 seconds on working speed.

Repeat with second half of diesel-oil mixture.

Run pump for one minute. Stop. Pour in one (1) pint of oil, drain liquid from muffler/oil trap.

Screw plug #38 back into place.

Resume operation.

RCF 370 and RCF 500 Models

1. Pumps equipped with top mounted four way valve (uprights), mix one-half (1/2) gallon of diesel fuel with one-half (1/2) pint of oil.
2. Pumps equipped with side mounted four way valve (sidemounts), mix one (1) gallon of diesel fuel with one (1) pint of oil.

Stop the pump.

Place the #37 of the pump on vacuum mode.

Remove the plug #51 on Housing #130, pour half (1/2) of the diesel-oil mixture slowly into the hole.

Turn pump rotor manually pulling belts or turning coupling to distribute liquid.

Run pump for 30 seconds on working speed.

Repeat with second half of diesel-oil mixture.

Run pump for one minute. Stop. Pour in one (1) pint of oil, drain liquid from muffler/ oil trap.

Screw plug #51 back into place.

Resume operation.

RCF 800 & RCF 1200 Models

Mix one gallon of diesel fuel with one pint of oil.

Stop the pump.

Place the lever of the pump on vacuum mode.

Remove the plug #53 on Diverter Housing #46, pour half (1/2) of the diesel-oil mixture slowly into the hole.

Turn pump rotor by manually pulling belts or turning coupling to distribute liquid.

Run pump for 30 seconds on working speed.

Repeat with second half of diesel-oil mixture.

Run pump for one minute. Stop. Pour in one (1) pint of oil, drain liquid from muffler/oil trap.

Screw plug #53 back into place.

Resume operation.

PUMP OUT OF USE FOR PROLONGED PERIOD(S):

Should the pump not be operated for 2 months or more (before new installation or sitting idle), the above flushing procedure should be performed every 2 months.

PLEASE DETACH AND MAIL



PLACE
STAMP
HERE



Fruitland Tool & Manufacturing,
324 Leaside Avenue,
Stoney Creek, Ontario,
Canada
L8E 2N7

To put this guarantee into effect this card must be filled out immediately and returned to:

Pour que cette garantie entre en vigueur, remplir immédiatement cette carte et retourner à:

Fruitland Tool & Manufacturing,
324 Leaside Avenue,
Stoney Creek, Ontario,
Canada L8E 2N7

From:
De:

Owner's Name:
Nom de propriétaire

Street
Rue

City
Ville

State or Province
État ou province

Zip or Postal Code
Zip ou code postal

Telephone No.
N° téléphone (area code) (code régional)

Purchased from
Acheté de
.....

Serial Number
N° série
.....

Date Purchased
Date d'achat
____/____/____
D M Y
J M A

PLEASE DETACH AND MAIL

TROUBLE SHOOTING

LACK OF VACUUM IN TANK:

Tank not closed or leaking.

Collapsed Hose: Check where, and replace.

Stuck automatic floating shut-off: Put pump on

pressure for a moment. Pump running backward after stopping:

Stuck or broken non-return valve (*Back-up valve*)

OVERHEATING:

Lack of oil.

Wrong type of oil. (*See: Lubrication - page 3*)

Cooling fins of casing plugged with dirt.

Pump run too long WITHOUT air passing through inside of pump. (*See: Cooling - page 4*)

RPM too high.

Broken oil pump.

Clogged oil line.

Collapsed hose.

Clogged filter or muffler.

PUMP NOT TURNING:

Foreign material lodged in pump.

Pump frozen up (winter conditions).

Vane or housing broken.

Overheated.

On RFC 370, RFC 500, RFC 800, RFC 1200 only

NOTE: A slight metallic noise at high vacuum (above) 23-24 Hg. is normal.

The expanded air is too weak to hold the non-return valve (back-up valve) completely open and consequently causes the closing disk to flutter.