FRUITLAND

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FRUITLAND VACUUM PUMP

Operation and Maintenance

RCF 1200

ATTENTION:

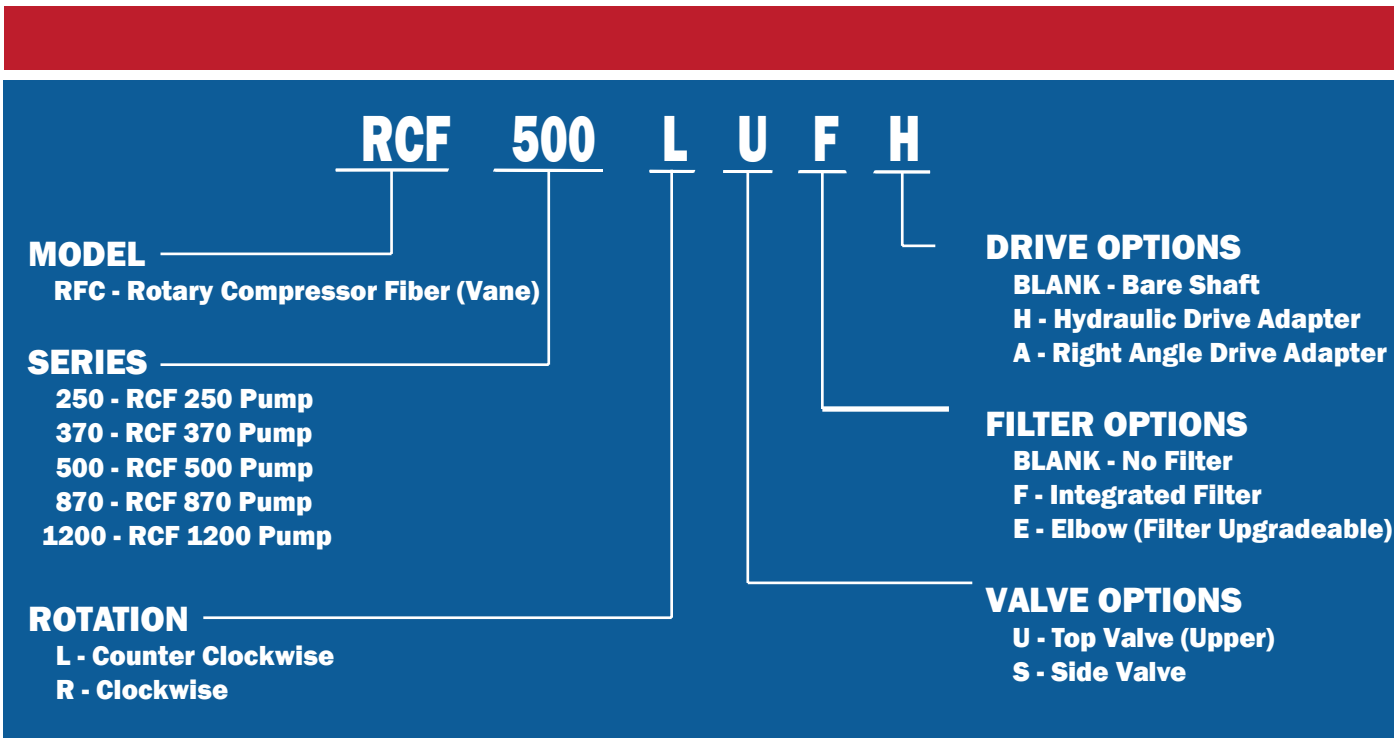
Read owner's manual fully before operating pump.
Failure to do so can result in severe pump damage and may void warranty.

FM-VPM-2020

CONTENT

FRUITLAND

RCF Model Nomenclature:



Ordering Information:

1. Choose Rotation L or R
2. Choose diverter value location U or S
3. Choose filtered or nonfiltered model
4. Choose drive line option A or H; OR specify belt drive or pulley

Sample Model Code:

RCF500LUFH – Rotary Compressor Fiber Vane Pump model 500 series pump with left hand rotation, four-way valve on top, Integrated filter, and Hydraulic Drive Adapter.

PUMP OPERATION & MAINTENANCE

FRUITLAND ROTARY VANE VACUUM PUMPS

MAIN SPECIFICATIONS

Type	RCF172	RCF 250	RCF344	RCF 370	RCF 500	RCF 870	RCF 1200
Size of Hoses	2″	2″	2″	3″	3″	4″	4″
Max. Operating Speed	1400 RPM	1400 RPM	1400 RPM	1400 RPM	1400 RPM	1400 RPM	1200 RPM
Lubrication (Oil Pump)	Auto	Auto	Auto	Auto	Auto	Auto	Auto
Vanes	4 (fibre)	4 (fibre)	4 (fibre)	8 (fibre)	8 (fibre)	8 (fibre)	8 (fibre)
Fan Cooling Cont. Duty	NO	YES	NO	YES	YES	YES	YES
Approx. Net Pump Weight	128 lbs	255 lbs	182 lbs	385 lbs	450 lbs	525 lbs	1400 lbs
Free Air Flow	127 CFM	166 CFM	218 CFM	272CFM	338 CFM	501 CFM	716 CFM

WARNING

Read Operations and Maintenance Manual fully before operating the vacuum pump. Failure to do so may result in severe system damage that may cause severe injury, death, and void the pumps warranty.

INSTALLATION & ADJUSTMENTS

Lifting

Lift pump by eye bolts, 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 lock washers, through holes in the base of the pump legs.

RPM

Fruitland Vacuum Pumps should never exceed the RPM stated on the plate tag (pump damage is possible). Pump may be run 20% slower than the stated RPM on the tag if required.

*Vacuum-Pressure Gauge:

Required to SAFELY operate and monitor the systems performance. Locate this gauge at an Operational location and or after the primary and secondary shut-offs/scrubbers to prevent failure due to foreign material.

*Pressure & Vacuum Relief Valves:

Regulates the operating Pressure & Vacuum levels within the system. There should be a minimum of two of each relief valve within your system. One set of reliefs upon the tank and one set of reliefs near the pump. All Relief Valves are rated per CFM (cubic feet per minute) and must be sized accordingly to your vacuum pump system and as recommended by the vacuum tank manufacturer.

WARNING

Always verify the correct Relief valve settings with the tank manufacturer. Failure to do so may cause catastrophic failure, injury and/or death.

Vacuum & Pressure Relief Adjustment

*Fruitland Pressure Relief - PART # PRV2”

Release the anti-rotation screw (1) - turn the upper ring (3) - rotate clockwise - CW - to increase pressure OR rotate counter clockwise - CCW - to decrease pressure in vessel.
When the desired pressure in the vessel is achieved, slightly turn the upper ring (3) until the flattened spot upon the wheel’s shaft is achieved. Tighten the anti-rotation screw and the pressure relief is now set.
Fruitland suggests this procedure and verification of your pressure reliefs operation within your system are re-checked and or set during your routine maintenance schedule for the tank and truck.

*Fruitland Vacuum Relief - PART # VB

Remove the setting screw cover (1) - insert a flat tip screwdriver into the incision and pry off the cover carefully. Loosen the stop set nut (3) - hold firm the vacuum relief bell (2) - Turn the bell clockwise - CW - to increase pressure and turn the bell counter clockwise - CCW - to reduce pressure in the vessel.
During this adjustment it is not necessary to hold the set nut stem (3) with a screwdriver.
When desired pressure in the vessel is achieved, tighten the stop set nut (3) - hold firm the vacuum relief bell (2). Install the setting screw cover (1) - and the vacuum relief is now set.
To eliminate tampering with the adjusted setting of the vacuum relief - insert wire through the screw cover (1) and then into bell (2) and connect wire with a permanent seal.
Fruitland suggests this procedure and verification of your pressure reliefs operation within your system to be re-checked and or re-set during your routine maintenance schedule for the tank and truck.

In addition to the incorporation of vacuum & pressure reliefs the outside of these valves, vacuum pump housing, pump shroud and pumps cooling fan blades should, at all times be kept clean of all debris to allow proper pump & system cooling.
Failure to allow air to be conveyed through your vacuum pump & system may result in severe system damage that may cause severe injury, death, and void the pumps warranty.

ATTENTION

All Fruitland Vacuum pumps should never run for a prolonged period of time without air passing through the pump & system itself.
Incorporating vacuum & pressure relief valves is highly recommended

SERVICE NOTE
USE GENUINE FRUITLAND PARTS ONLY!

If you have any questions, or require further information on installing, operating and or the maintenance of your vacuum pump contact:

1-800-663-9003 - info@fruitland-mfg.com - sales@fruitland-mfg.com

*** If you require these components, please contact your supplier or Fruitland Manufacturing (They may not be included in the pump or package you acquired)**

LUBRICATION & APPROVED OILS

Lubrication: If the suction temperature is >50°F (summer conditions), a SAE-40 non detergent motor oil or an ISO 150 compressor oil can be used. If the suction temperature is <50°F (Winter Conditions) a SAE-30 non detergent motor oil or an ISO 100 compressor oil is recommended. **Always check oil level before starting unit.**

NEVER ALLOW OIL RESERVOIR TO GET LOW!!!

Vacuum pumps dispose of and or consume oil during operation and do not have a return within the system. **All vacuum pumps will have an oil sight glass, tube or dipstick. If a remote reservoir is used, verify that this reservoir has oil. Always use the manufacturer's recommended oil. The oil level needs to be checked on a routine basis during the vacuum pumps operation.**

Oils Approved for use in Fruitland Vacuum Pumps

OIL TYPE	WINTER WEIGHT	SUMMER WEIGHT
FRUITLAND® GREEN™ OIL (100% Biodegradable)	SAME	SAME
[1] SHELL TURBO T OIL	32	68 or 100
[1] ISO COMPRESSOR OIL	100	150
MONOLEC COMPRESSOR OIL*	SAME	SAME
MOBIL SHC 525 (Synthesized Hydrocarbon)	SAME	SAME
[1] MOBIL DTE	LIGHT OR	HEAVY MEDIUM
ANDEROL 497	MEDIUM SAME	SAME
[1] CHEVRON GST	32	68
[1] PENNZOIL PENNZBELL TO OIL	32 or 46	68
[1] TEXACO REGAL R & O OIL	32	68
[1] SAE NON DETERGENT OIL	10 or 20	30 or 40
SHELL ROTELLA 15W-40 MOTOR OIL	SAME	SAME

All Pump Models

Oil Tank - Important! During routine cleaning & freezing weather, drain possible condensation build-up in the bottom of the oil tank. Water can enter oil tank and be ingested into the oil pump, this could cause the oil pump to freeze and damage the internal gears of the oil pump. If you suspect water is present within the oil tank reservoir, drain and clean the oil tank with diesel fuel.

These oils have been approved for use in Fruitland Vacuum Pumps. Use of these oils will maintain the vacuum pump warranty as well as extend the life of the vacuum pump and ensure proper performance and lubrication.

When operated properly, Fruitland vacuum pumps will run cooler, use less oil and provide much longer service than any other rotary vane vacuum pump.

***Monolec Compressor Oil is colored red and should not be confused with transmission fluid.**

[1] Recommended for the best performance and lubrication at all temperature levels.

Oils & Fluids That Are Not Approved For Use In Fruitland Vacuum Pumps

OIL TYPE	OIL TYPE	OIL TYPE
BRAKE FLUID	HYDRAULIC FLUID	TRANSMISSION FLUID
DEF FLUID	POWER STEERING	VEGETABLE OIL
GEAR OIL	FLUID SCENTED OIL	USED OIL

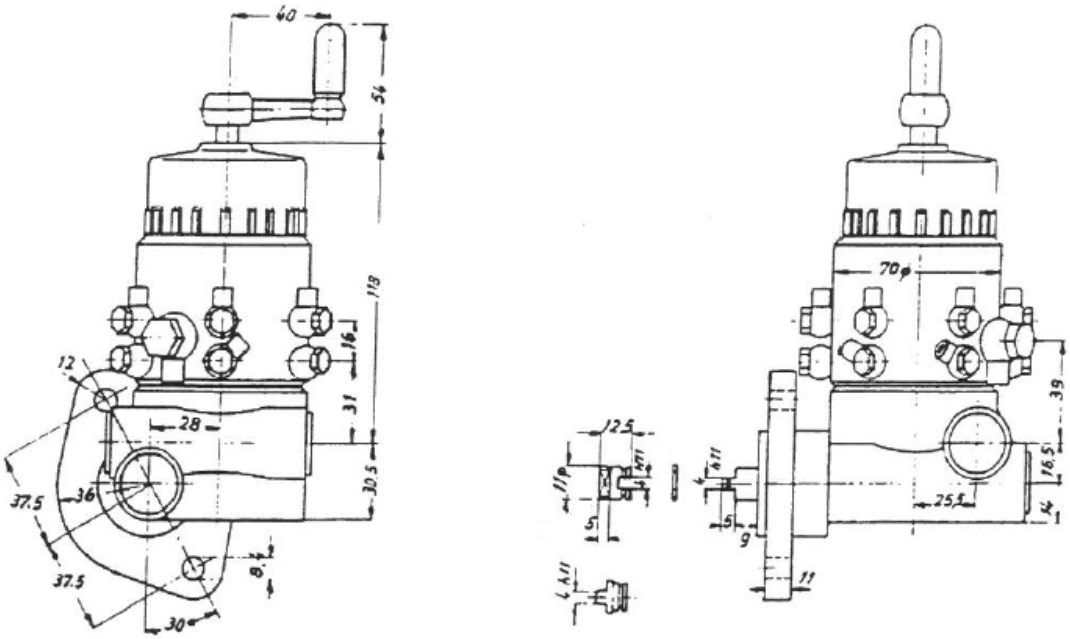
OIL PUMP ADJUSTMENT

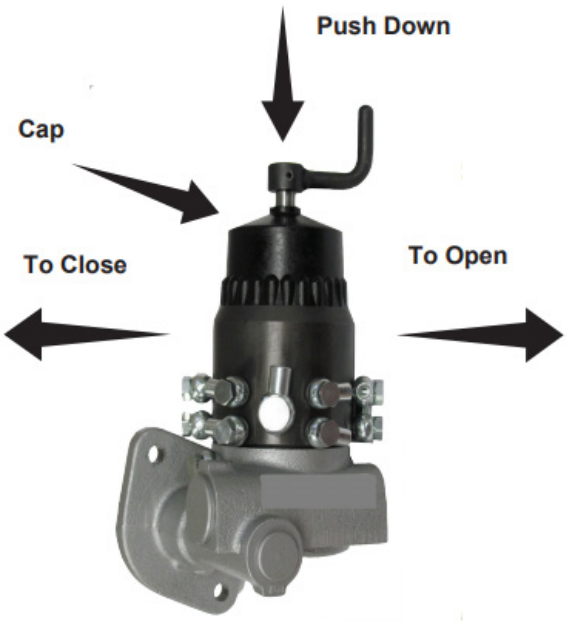
Oil Pump (external) for model RCF1200:

When the vacuum 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 valve.

WARNING

Always check oil level before starting pump. Fill if necessary. Operating your Fruitland vacuum pump with the incorrect oil can result in misuse of this product that may result in severe injury, death, severe system damage, and or void the pump's warranty.





WARNING

Check the Vacuum Pump's Oil Level –

Vacuum pumps dispose of and or consume oil during operation and do not have a return within the system. All vacuum pumps will have an oil sight glass, tube or dipstick. If a remote reservoir is used, verify that this reservoir has oil. Always use the manufacturer's recommended oil. The oil level needs to be checked on a routine basis during the vacuum pumps operation. During routine cleaning & freezing weather, drain possible condensation build-up in the bottom of the oil tank. Water can enter oil tank and be ingested into the oil pump, this could cause the oil pump to freeze and damage the internal gears of the oil pump. If you suspect water is

VACUUM PUMP FLUSHING PROCEDURE

Flush the Pump

During your routine scheduled service of your tank truck and vacuum system perform the manufactures suggested Pump Flushing Procedure. This will remove the caked oil and carbon build-up from within the vacuum pump and the oil catch muffler system expelling this carbon & debris build-up out of the oil catch muffler's drain valve. Flushing the system on a routine basis will also help in reducing smoke due to the fact of eliminating varnish and or carbon build-up from within the oil catch muffler and vacuum pump.

Pump Flushing Procedure

1. **Stop the pump and remove ¼ " npt plug located on the pump diverter valve.**
2. **Connect a brass fitting, rubber hose, ball valve and flushing fluid bottle to this port.**
3. **Run the Pump, switch to vacuum and slowly open the ball valve.**
4. **Pass approximately 2 to 3 liters of the flushing fluid through the pump while restricting/controlling the flushing fluid flow through the ball valve.**
5. **Close the ball valve and run the pump for an additional minute to remove all the flushing fluid from the pump.**
6. **Drain the oil catch muffler or oil separator.**
7. **If you remove the Pump flushing fittings from the pump, make sure to re-install the ¼ " NPT plug back into the port.**
8. **Resume pumping operation.**

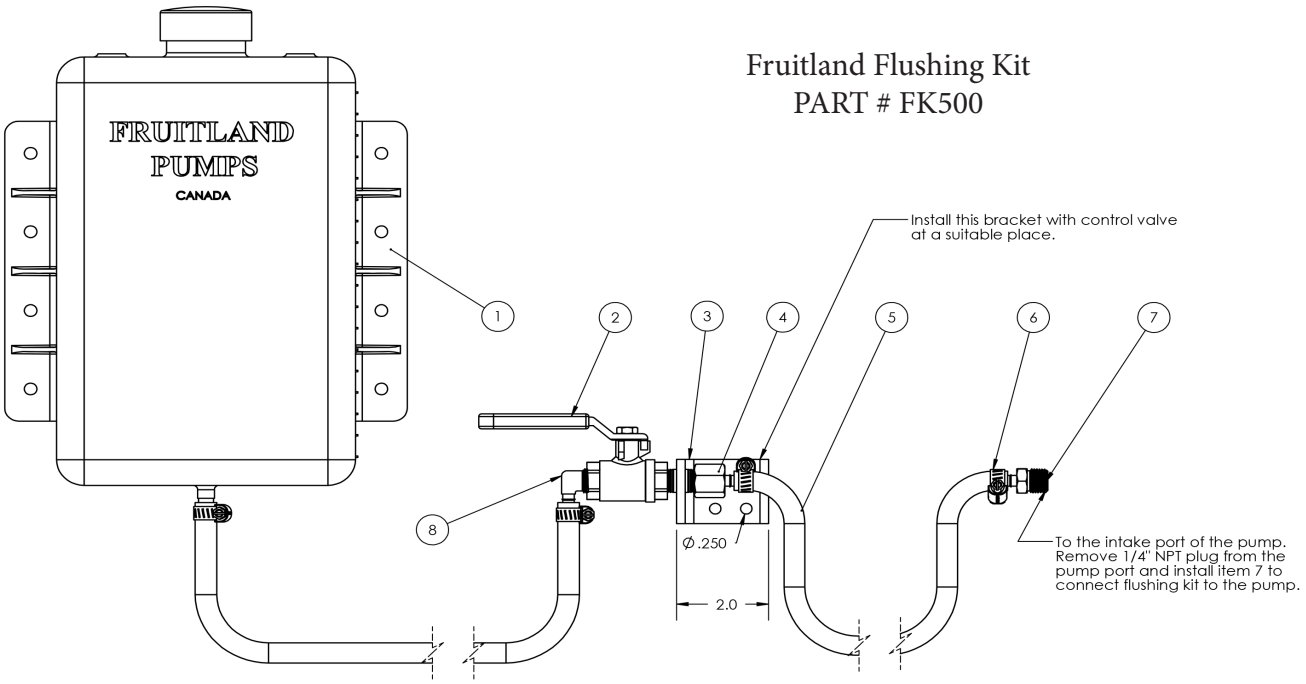
For ease of operation, Fruitland recommends installing our Pump Flushing Kit (Part #FK500) to assist in this procedure.

WARNING

Flushing your Fruitland vacuum pump with the incorrect fluid type can result in misuse of this product that may result in severe injury, death, severe system damage, and or void the pump's warranty. If you have any questions or require further information on installing, operating, and or flushing your vacuum pump contact:

1-800-663-9003 - info@fruitland-mfg.com - sales@fruitland-mfg.com

Fruitland Vacuum Pump Flushing Kit



PART # FK500

ITEM #	PART #	DESCRIPTION	QTY
1	OR11-A-01	6QT. PLASTIC TANK WITH BREATHER CAP	1
2	FK500-A-01	BALL VALVE, 1/4"	1
3	FK500-01	ANGLE BRACKET FOR REMOTE VALVE INSTL. SEE DWG. FK500-01	1
4	FK500-A-02	STRAIGHT BRASS FITTING, 1/4" NPT FEMALE TO 1/4" ID HOSE BARB	1
5	OR11-A-02	Ø1/4" ID FUEL LINE RUBBER HOSE	10 ft
6	OR11-A-03	HOSE CLAMP 7/32"-5/8" (SAE 4)	4
7	FK500-A-03	STRAIGHT BRASS FITTING 1/4" NPT MALE TO 1/4" ID HOSE BARB	1
8	OR11-A-04	ELBOW 1/4" NPT MALE TO 1/4" ID HOSE BARB FITTING BRASS	1

Flushing Fluid: ***¾ of diesel fuel mixed with ¼ of pump oil by volume***

SERVICE NOTE
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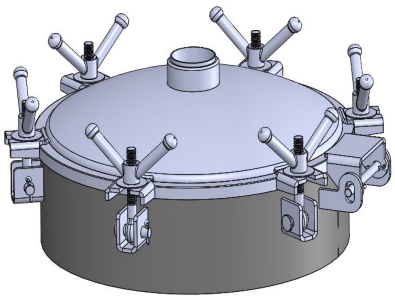
VACUUM PUMP & SYSTEM MAINTENANCE

Secondary Shutoff

Drain the secondary moisture trap Before Every Pump Operation!!

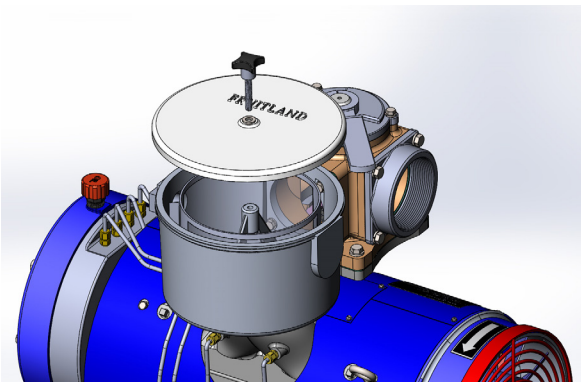
If the secondary moisture trap is full and or starts to fill, you will lose the ability to create pressure and or vacuum. Check the secondary shut-off before every use by opening the drain valve upon the bottom of this moisture trap. If the secondary trap has any substance within it, this could end up running through the vacuum pump and causing catastrophic pump failure. If any substance is within the secondary shut-off, this indicates the tank is full, over-filled and or the primary shutoff upon your vacuum system is not working correctly.



Primary Shutoff

Check the primary shutoff Daily

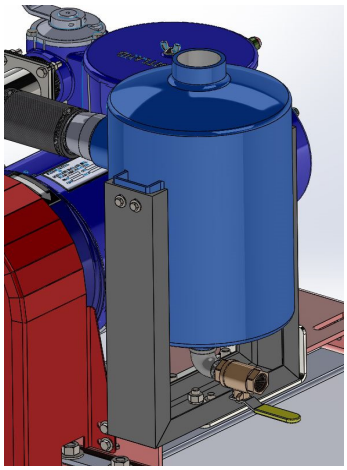
The primary shut-off is the first stopping point within the vacuum tank system for the product being loaded into your vacuum tank. This primary shut-off must work correctly every time or the pump & system will fail quickly, and you will certainly have a catastrophic pump failure. Verify each day, before starting, the rubber seat is in proper shape and form, the ball appears to be free of any debris, holes and is operational. The cage in which the ball rests, or sits within must be attached to the primary shut-off assembly correctly.



Pump Air Filter

Clean the Pump Air Filter Daily

Every vacuum pump system should contain a vacuum pump air filter somewhere between the primary shut-off and the vacuum pump. This filter will prevent any foreign objects from being sucked into the vacuum pump through the tank during normal operation. This air filter must be cleaned each day before the operation of the vacuum system. Remove the stainless-steel mesh filter daily from the air filter



Muffler

Drain the oil catch muffler Daily

If the oil catch exhaust muffler starts to expel oil, you will lose vacuum performance. This overflow of oil may backfill into the pump. When draining the muffler system, pay attention to the material being expelled from the muffler's drain valve, this is a good way to spot any water and/or debris that may have entered the vacuum pump system.

ATTENTION

Disconnect all hydraulic lines prior to any maintenance and do not bypass or inactivate any safety and or protective device. Lock out and tag the engine or main power supply to prevent unexpected application of power. Failure to do so can result in severe injury, death, severe system damage and or void the pumps warranty.

Vacuum Pump Storage

It is recommended to complete the Pump Flushing Procedure, upon page 12th, prior to the pump being put into storage and not operational for an extended amount of time (2 or more months).
Following the Pump Flushing Procedure when storing the vacuum pump for an extended amount of time will prolong the vacuum pumps life exponentially.

SERVICE NOTE
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VACUUM PUMP DRIVE SYSTEMS

Do not Over-speed or Under-speed the Vacuum Pump

The Drive System must be sized and calculated correctly. Either over and/or under speeding the vacuum pump drive shaft speed will cause catastrophic pump failure and possibly damage the entire vacuum pump & system.
The Power Take Off - PTO - must allow for the vacuum pump drive shaft to slowly engage. Incorrectly configured and or installed PTO's will deteriorate all drive system components prematurely and may cause damage to the vacuum pump.
The tank truck drive system must be set up or dialed into the correct optimal operational input rpm of the vacuum pump during system & pump installation.
Every vacuum pump model has a different optimum operational rpm. Contact the factory for the correct operational rpm for your vacuum pump model & system.

Fruitland Vacuum Pump RPM & Power Requirements

The table below provides the recommended input speeds and correlating power requirements for each Fruitland Vacuum Pump Model's optimal overall performance.

	HP Requirements													Torque ft-lbf											
	Pressure (psi)						Vacuum (inch Hg)							Pressure (psi)						Vacuum (inch Hg)					
RCF	25	20	15	10	5	0	5	10	15	20	25	28	Input	25	20	15	10	5	0	5	10	15	20	25	28
Pump Model	Engine BHP (30% uprated from actual)												RPM	Torque ft-lbf											
1200	85	77	68	59	52	43	43	45	47	50	53	55	1000	446	404	355	310	273	226	226	236	247	263	278	289
RCF	25	20	15	10	5	0	5	10	15	20	25	28	Input	25	20	15	10	5	0	5	10	15	20	25	28
Pump Model	Actual HP												RPM	Torque ft-lbf											
1200	65	59	52	45	40	33	33	35	36	38	41	42	1000	343	311	273	238	210	174	174	182	190	202	214	222

The largest contributing factor limiting a Fruitland Vacuum Pumps performance is continued heat generation due to operating the pump above and or below the recommended input speed. This additional heat produced due to incorrect RPM Input speed will negatively impact the overall life of your Fruitland pump.

ATTENTION

Fruitland Vacuum Pumps should never exceed the input RPM stated on the vacuum pump's plate tag - severe pump & system damage will occur & the pumps warranty will be void.

ATTENTION

Vacuum pump & drive system direction of rotation must be determined and verified prior to procurement of the vacuum pump and all correlating drive system components.

Check the Drive Components of the Vacuum Pump

If using a Fruitland right-angled gearbox verify the gear oil level within the gearbox and clean the vent cap upon the top of the gearbox case during your routine service.
If using a belt and pulley to operate the vacuum pump, check the belts for wear and verify the belt's tension during your routine service.
When incorporating hydraulics ensure the fluid is replaced on a routine basis as the viscosity deteriorates in the same fashion as your engine oil.

Contact the factory for the optimum hydraulic circuit, gearbox and belt specifications for your vacuum pump system.

Fruitland pumps may be run up to 20% slower than the stated RPM on the tag if required.

ATTENTION

Do not attempt to install nor service any type of rotating shaft when engine is running or operational. You can snag clothes, skin, hair, hands, etc. This can cause serious injury and or death!

- **Do not go under the vehicle when the engine is running**
- **Do not work near an exposed rotating shaft when the engine is running**
- **Never work alone while under a vehicle.**

DRIVE SHAFT INSTALLATION & PHASING

If your vacuum pump's drive system utilizes a drive-shaft between the PTO and your vacuum pump it is extremely important to verify your angularity and phasing of your drive-line and yokes. Check your drive-shaft angularity and ensure the drive-shaft falls within all the recommendations on the chart below.

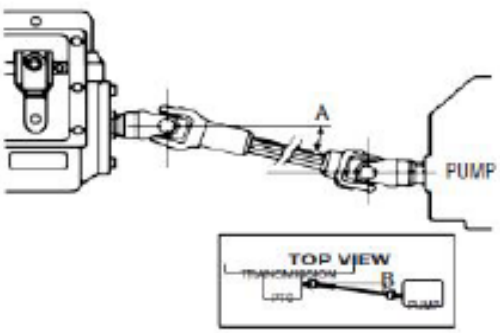
It is imperative the PTO shaft is parallel within 1.5 degrees of the pump shaft and or auxiliary drive shaft or driven unit. Drive-lines must be in phase, that is, the yoke ears on the PTO and the pump shafts must be in alignment as illustrated below.

Maximum Operating Speed - By Tube Size & Solid Shaft Size

(For Speeds below 500 RPM or over 2500 RPM, contact your PTO Manufacturer)

WARNING - Always verify below specifications with your PTO Manufacturer					
Tubing Dia. & Wall Thickness Joint & Shaft (W-Welded S-Seamless)	Max. Installed Length in Inches for Given RPM Centerline to Centerline of Joints for a Two Joint Assembly or Centerline of Joint to Centerline of Center Bearing for a Joint & Shaft RPM - Revolutions per Minute				
	500 RPM	**1000 RPM**	**1500 RPM**	**2000 RPM**	**2500 RPM**
1750"x.065"W	117"	82"	67"	58"	52"
1250"x.095"S	91"	64"	52"	45"	40"
2500"x.083"W	122"	87"	70"	62"	55"
3000"x.083"W	-	-	-	85"	76"
Solid Shaft Diameter					
0.750"	60"	42"	35"	30"	27"
0.812"	62"	44"	36"	31"	28"
0.875"	65"	46"	37"	32"	29"
1.000"	69"	49"	40"	35"	31"
1.250"	77"	55"	45"	39"	35"

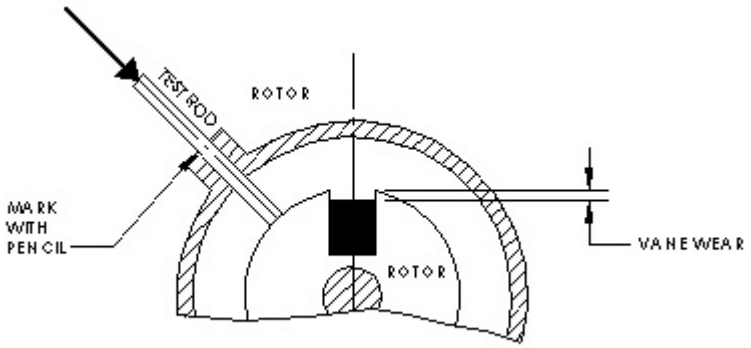
Max. Speed (RPM)	Max. TJA "A"
3500*	5°
3000*	5°
2500	7°
2000	8°
1500	11°
1000	12°



TJA = True Joint Angle - Incorporate this formula to calculate your drive-lines True Joint Angle TJA = Square Root of A Squared + B Squared

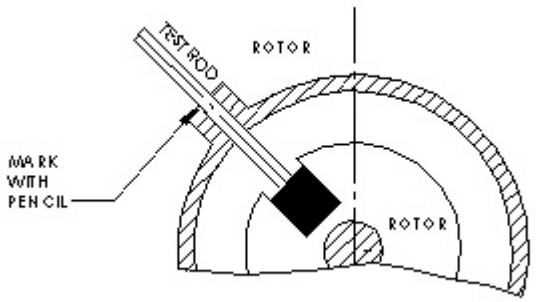
VANE WEAR MEASUREMENT

FIG.1



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

FIG.2



Vane wear (see diagram above) should not exceed 3/8”in models RCF1200. 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. A 3/16” diameter test rod is supplied with the pump. We recommend checking the vanes on both ends, as they can wear in a tapered fashion because of excess heat or contamination.

To measure vane wear, remove the plug from the office 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 the 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 26.

The Recommended first check of vane wear is 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.

Vane Wear

Life expectancy of Fruitland 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 particles) will shorten their life expectancy. It is the owner's responsibility to keep contamination out of the pump. Keep filters clean.

Many factors can contribute to rapid or premature vane wear:

1. Overheating of the pump (check overheating in trouble shooting page 27.)
2. Contamination entering the pump, or anything that can affect the action of the oil such as abrasives, fumes and or chemicals.
3. Running the pump too fast (over and or under speeding) (check rpm of pump drive shaft)
4. Wrong oil or no oil.
5. Oil pump failure.
6. Pump housing damage.
7. Rotor slots worn. If contamination has gotten into the pump and has caused the rotor slots to wear unevenly, extra force is required to return the vanes into the slots as the rotor turns. This extra load can cause housing wear, vane wear and increase the pump temperature.

Vane Replacement

Refer to pump rebuild video at: **www.fruitlandmanufacturing.com**

- Disconnect drive/power source from pump - Turn engine off !! Put Keys in your pocket !!
- Drain oil from oil tank - inspect for debris & water
- Remove oil tank cover by removing the 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 coupling
- Remove the seal housing by removing hex bolts and aluminum sealing washers
- Remove the hex bolts and lock washers from the housing end cap
- Slide the end cap off the rotor shaft.
- The rotor bearing, shims, wave spring, & seals should be kept in order.
- Note their positioning if you remove the bevel springs/washers for replacement
- Remove old vanes and replace with new vanes that have been dipped/soaked in oil
- Inspect housing bore, interior finish & bearings
- We recommend replacing all seals and all related gaskets during this process
- Reassemble in reverse order
- The housing end cap bolts should be tightened evenly to 22 ft./lbs. torque
- Fill oil tank with correct oil & hook up drive/power source
- Resume Operations

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.

**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.*

SERVICE NOTE
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TROUBLE SHOOTING PUMP & SYSTEM MALFUNCTIONS

Verify Before Starting:

Visually Inspect the entire system – Each day before use, make a visual inspection and verify your vacuum pump system has no kinked hoses and or loose connections. Verify all components appear to be in safe operating condition. Verify all drive components appear to be free of any visual defects and or debris. Clean all debris from the vacuum pump, drive system, air filter, and vacuum system shut-off tank components within the tank truck and or tank trailer prior to any operation.

Vacuum Pump does not vacuum:

- Verify vacuum tank and ALL tank components are sealed.
- Verify ALL Hose connections and or Hose collapsed and or clogged.
- Vacuum pump back up valve assembly has debris within assembly, also causes pump to rotate backwards after stopping.

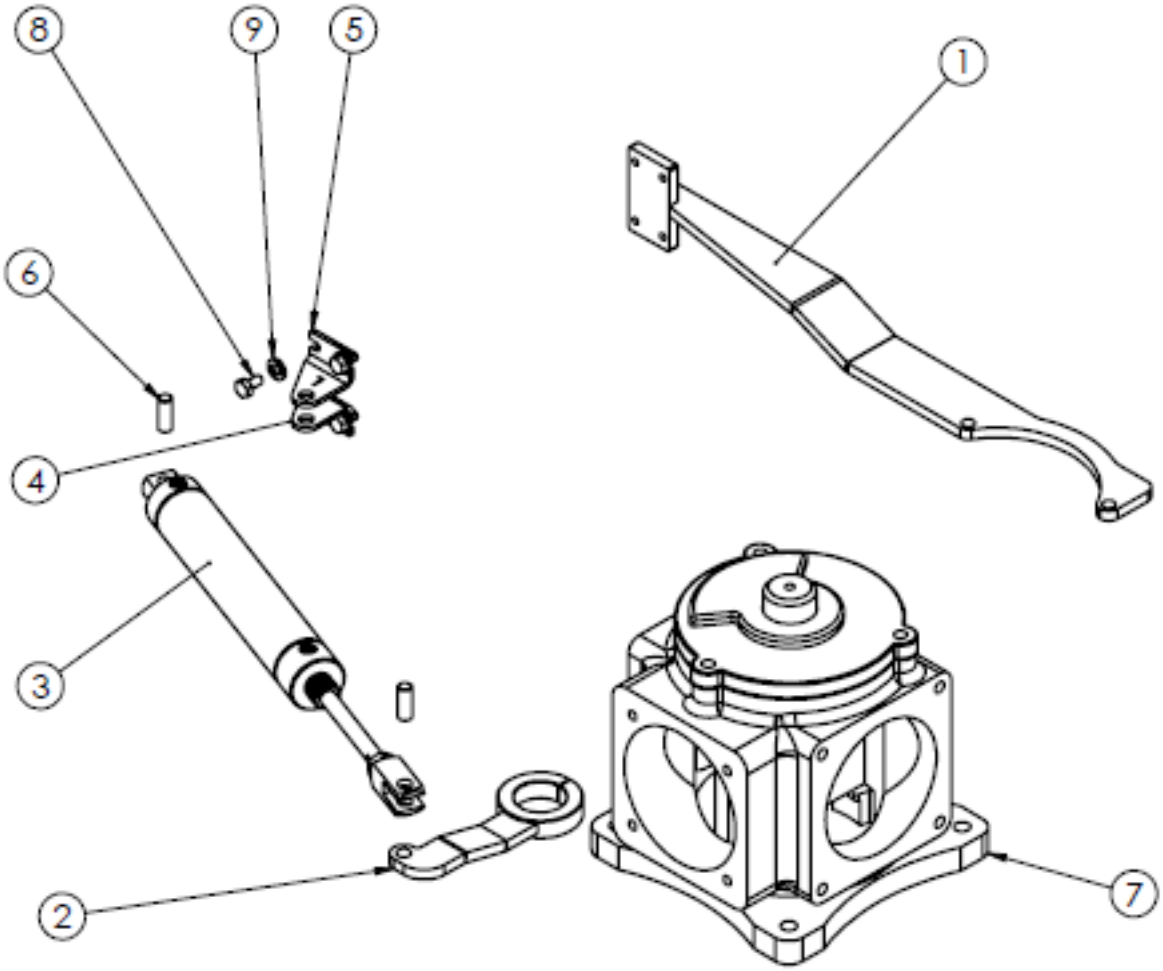
Pump not turning:

- Damaged/Broken Vane.
- Drive System Failure - Inspect all pump drive system components.
- Foreign material in vacuum pump.
- Pump is FROZEN - Winter Conditions - Avoid vacuum pump FREEZING Problems by dispensing a small amount of diesel fuel into the pump after completion of daily operations.

Vacuum Pump Overheating:

- Lack of Oil and or incorrect type of oil - Also - verify oil pump operation.
- Input speed - verify pump shaft speed during operation - To High and or To Low.
- Clean all exterior surfaces & air filter of vacuum pump.
- Exhaust Outlet Reduction or Blockage.
- Overall air flow system plumbing sized incorrectly.
- Collapsed or Clogged hose.
- Filter body needs to be cleaned
- Empty the Oil Catch Muffler.
- Empty the Secondary Scrubber/Shut-off.
- Worn vacuum pump vanes.

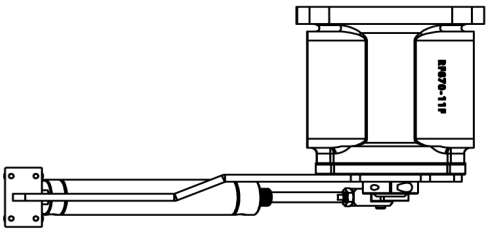
CYLINDER MOUNTING ARM & LEVEL (BOM)
(FOR 6” STROKE 1.5” CYLINDER)

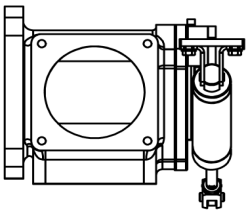


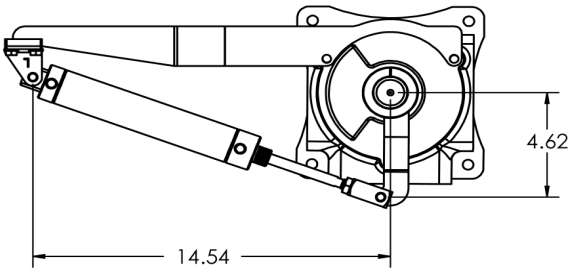
ITEM#	PART #	DESCRIPTION	QTY
1	RF870-CMA	Cyl. Mounting Arm for RF870, Dwg# RF870-PDA	1
2	RF500-13M	Lever Arm Assy, , Dwg# RF870-PDA	1
3	CYL1.5-6	1-1/2" Bore 6" Stroke Cyl. C/W Pivot Bracket, Clevis & Nut	1
4		Pivot Bracket D-229 (Right)	1
5		Pivot Bracket D-229 (Left)	1
6		Pin .0375 Dia. X 1.00	2
7	RF870-11F	RF870 Diverter Housing	1
8		1/4"-NC x 1/2" Hex Bolt	4
9		1/4" Lock Washer	4

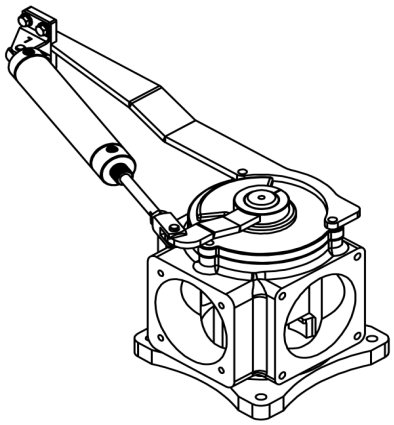
CYLINDER MOUNTING ARM & LEVEL (DIMENSIONS)

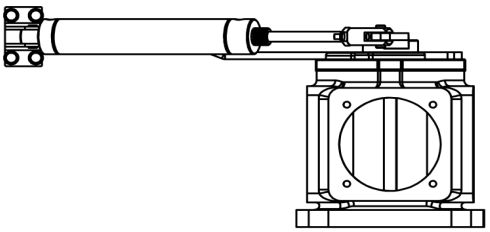
ASSEMBLY PART #
RF870-PDA FOR RCF870 PUMP
RF500-PDA FOR RCF500 PUMP





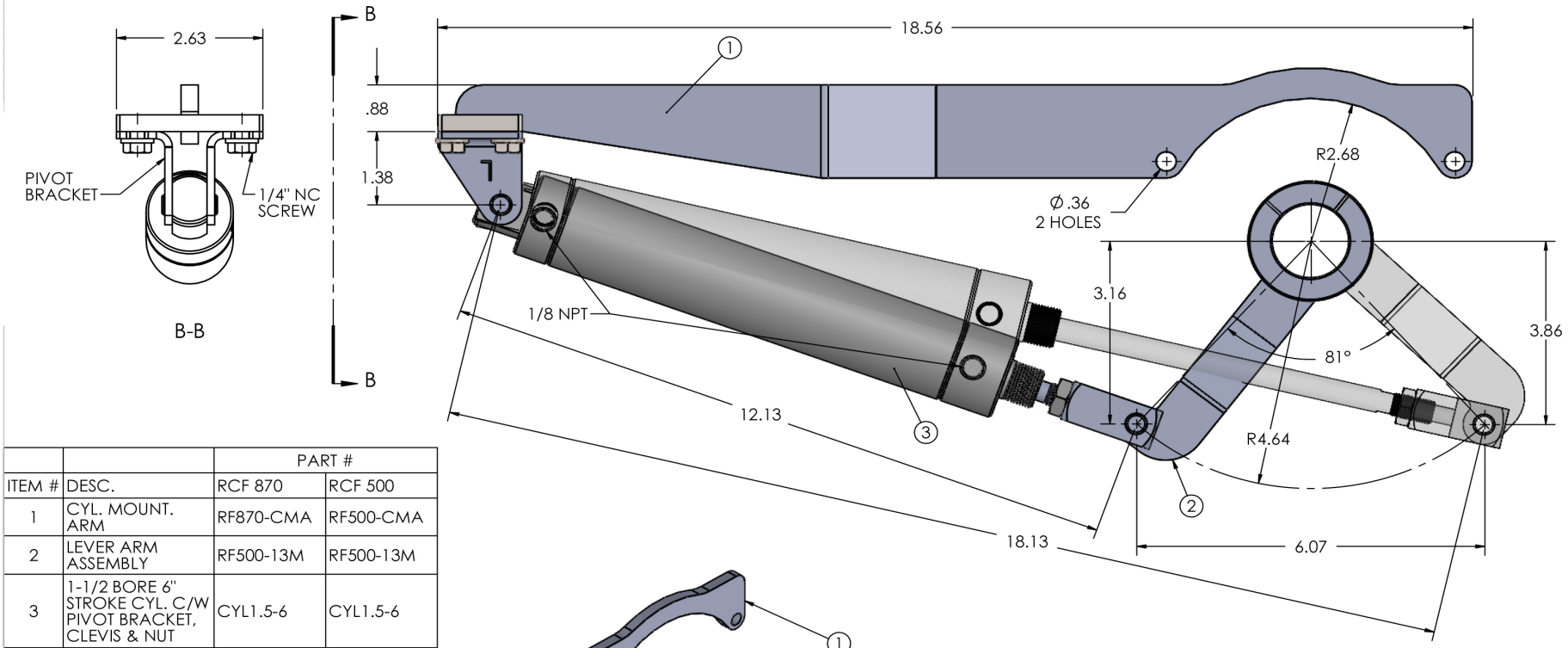






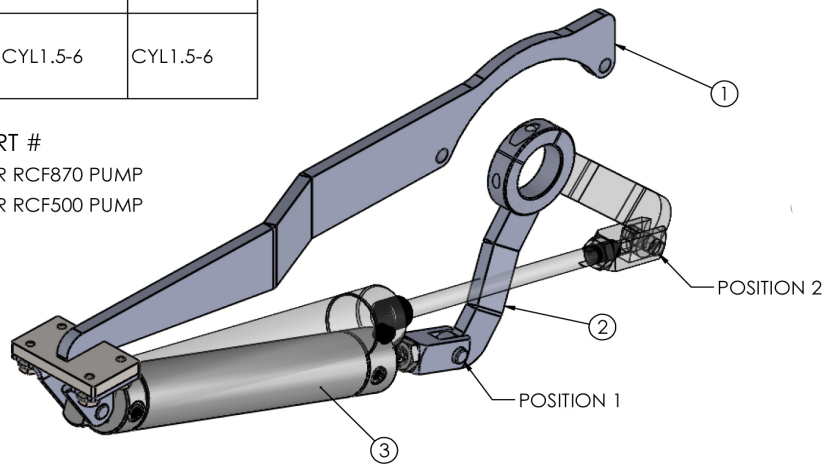
NOTE:
RCF870 DIVERTER SHOWN

PNEUMATIC DIVERTER HANDLE ASSEMBLY FOR RCF 870 AND RCF 500 PUMPS



		PART #	
ITEM #	DESC.	RCF 870	RCF 500
1	CYL. MOUNT. ARM	RF870-CMA	RF500-CMA
2	LEVER ARM ASSEMBLY	RF500-13M	RF500-13M
3	1-1/2 BORE 6" STROKE CYL. C/W PIVOT BRACKET, CLEVIS & NUT	CYL1.5-6	CYL1.5-6

ASSEMBLY PART #
RF870-PDA FOR RCF870 PUMP
RF500-PDA FOR RCF500 PUMP

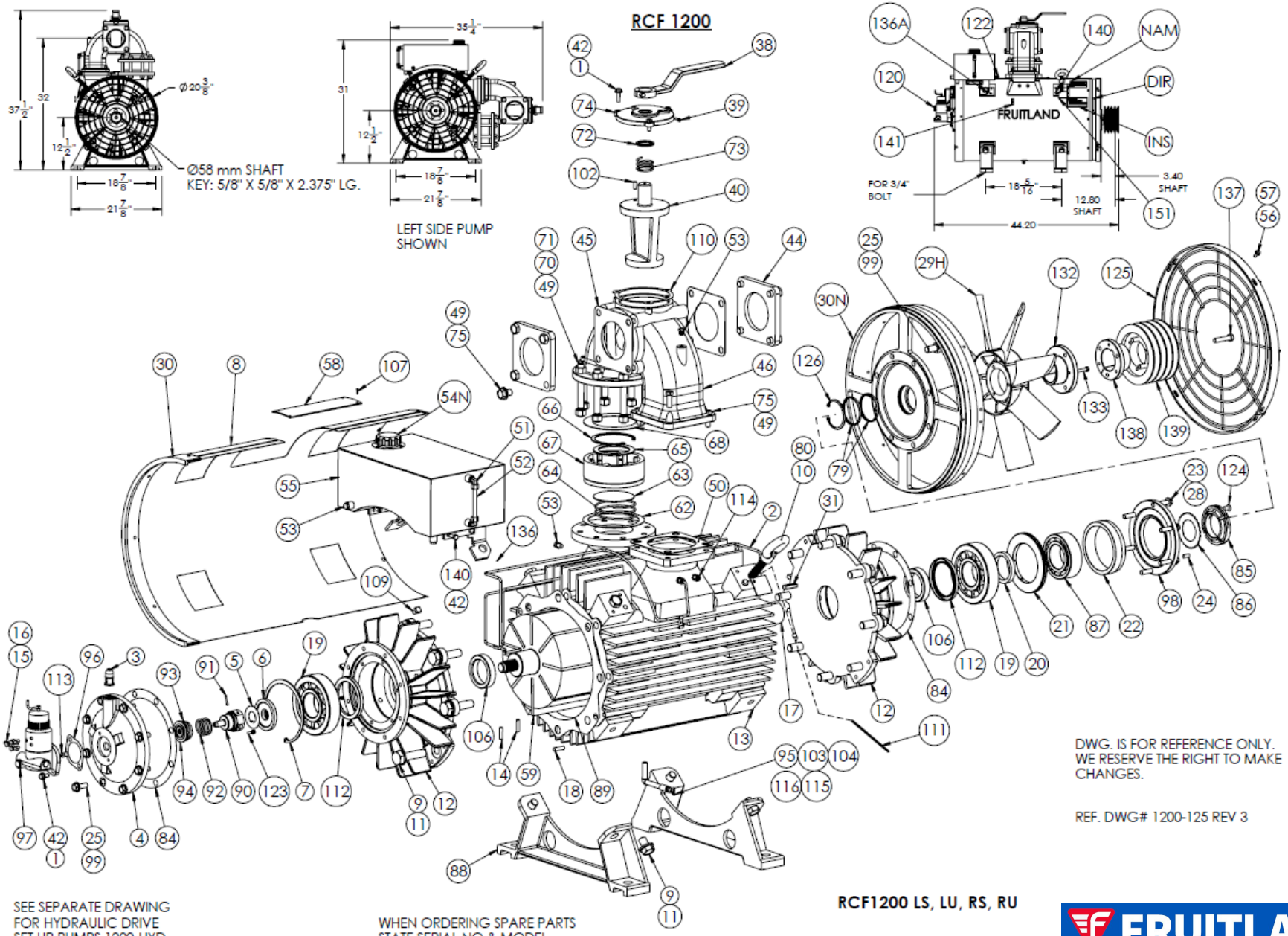


DWG IS FOR REFERENCE ONLY
WE RESERVE THE RIGHTS TO MAKE CHANGES

REF. DWG# RF870-PDA

FRUITLAND

RCF 1200 LU-LS-RS-RU PUMP PARTS & DIMENSIONS


RCF 1200
Ø58 mm SHAFT
KEY: 5/8" X 5/8" X 2.375" LG.
LEFT SIDE PUMP
SHOWN
FRUITLAND
FOR 3/4" BOLT
3.40 SHAFT
12.80 SHAFT
44.20
DWG. IS FOR REFERENCE ONLY.
WE RESERVE THE RIGHT TO MAKE CHANGES.
REF. DWG# 1200-125 REV 3
SEE SEPARATE DRAWING
FOR HYDRAULIC DRIVE
SET UP PUMPS 1200-HYD.
WHEN ORDERING SPARE PARTS
STATE SERIAL NO & MODEL.
RCF1200 LS, LU, RS, RU

RCF 1200 LU-LS Parts List

ITEM#	PART #	DESCRIPTION	QTY PER PUMP
	1200RU	RCF 1200 VACUUM PUMP	1
	RF120-KIT	RCF1200 REBUILD KIT	1
13	RF120-1	1200 HOUSING	1
40	RF120-10	DIVERTER VANE	1
54N	RF120-100N	CAP\BREATHER ASSEMBLY	1
57	RF120-102A	HEX BOLT M6 x 10 mm	10
65	RF120-104	VALVE RING	1
66	RF120-105A	SNAP RING (INTR RING 4-1/4)	1
67	RF120-106	VALVE HOUSING	1
71	RF120-107A	STUD M16 x 120mm	8
75	RF120-108A	HEX BOLT M16 x 40mm - PLAIN	12
46	RF120-11	DIVERTER HOUSING	1
85	RF120-114L	M65x2 ROTOR NUT - RH PUMP	1
86	RF120-115A	STAR WASHER - W13	1
87	RF120-116A	BALL BEARING #5213 C3	1
90	RF120-117	OIL PUMP ADAPTOR	1
92	RF120-118A	SPRING	1
93	RF120-119A	''O'' RING #113	1
74	RF120-12	DIVERTER VALVE CAP	1
94	RF120-120	CUP	1
98	RF120-122	BEARING PLATE	1
58	RF120-124	PLATE	1
110	RF120-127	GASKET VALVE CAP	1
123	RF120-128A	S.H.C.S. M6 x 25mm	2
124	RF120-129A	FLAT HEAD SCREW 3/8 NC x 5/8	1

RCF 1200 LU-LS Parts List Continued

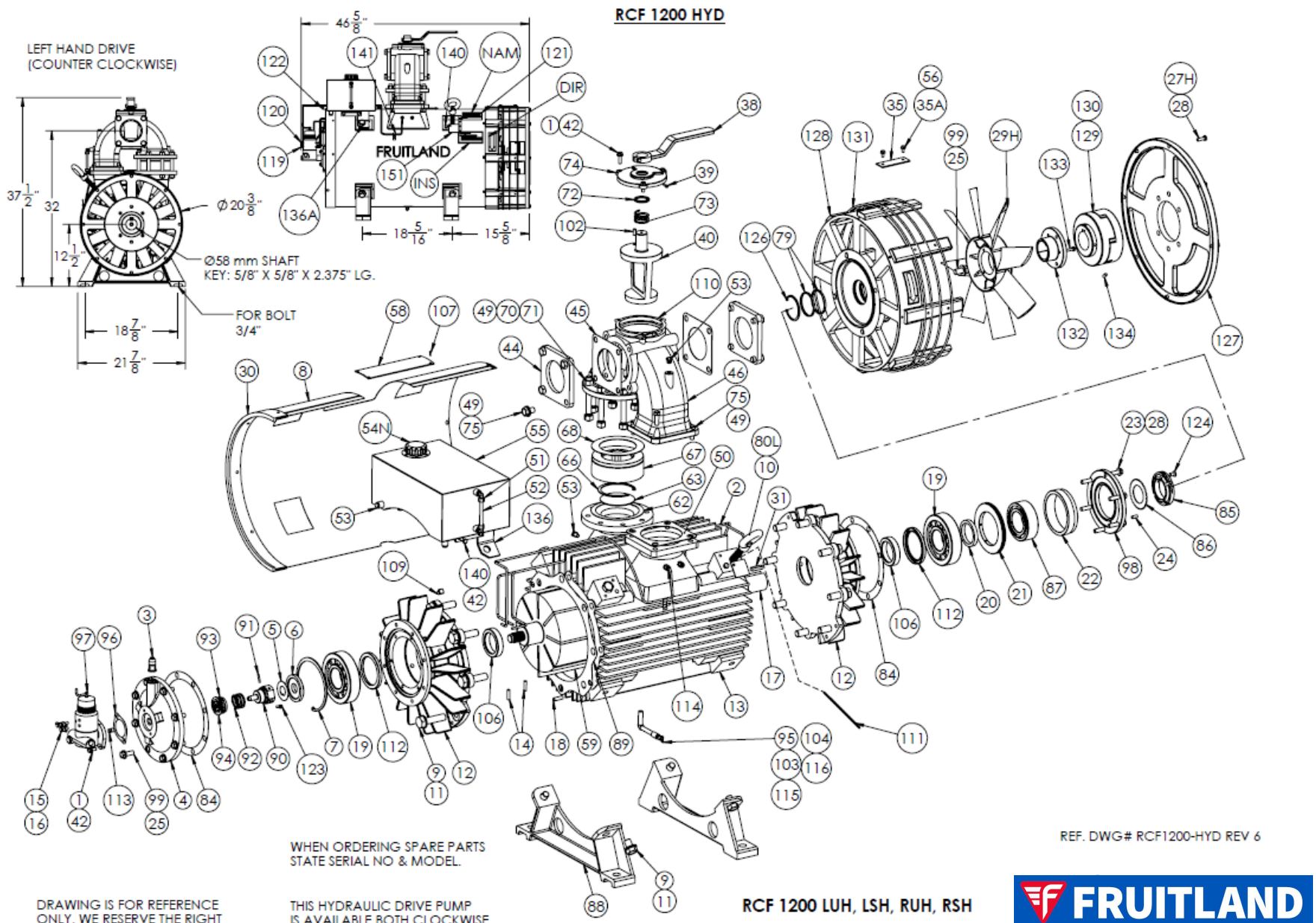
ITEM#	PART #	DESCRIPTION	QTY PER PUMP
62	RF120-65	GASKET - OUTLET	1
68	RF120-65A	GASKET BACK-UP VALVE	1
61	RF120-67A	HEXBOLT M20x 50	20
99	RF120-69A	HEX BOLT M12 x 30mm - PLAIN	12
59	RF120-6A	VANES	8
89	RF120-7	GASKET - HOUSING CAP	2
10	RF120-71A	HEX NUT M20	2
91	RF120-72A	ROLL PIN (5/32 X 3/4)	2
31	RF120-74	KEY	1
3	RF120-78A	OIL FLOW VALVE	1
106	RF120-8	COLLAR	2
5	RF120-80A	SAFETY LOCKWASHER	1
6	RF120-81	ADAPTOR SPACER	1
11	RF120-82A	M20 LOCKWASHER	22
18	RF120-86A	TAPERPIN M10	4
20	RF120-87	RING SPACER	1
22	RF120-89	BEARING RING	1
88	RF120-9	BASE	2
24	RF120-91A	ROLL PIN (1/4x1-1/4)	1
25	RF120-92A	M12 LOCKWASHER	12
28	RF120-94A	10mm Lock Washer - Z.P.	8
42	RF120-96A	M8 LOCKWASHER	13
70	RF120-97A	HEX NUT M16 - PLAIN	8
29N	RF160-33	FAN - RIGHT HAND TAPER (ALUM)	1
115	RF250-30A	NIPPLE 1/4'' NPT x 4-1/2	1
109	RF250-69A	PIPE PLUG 1/8'' NPT BLK SQ.HD.	2

RCF 1200 LU-LS Parts List Continued

ITEM#	PART #	DESCRIPTION	QTY PER PUMP
116	RF250-73A	BLK. MAL. PIPE COUPLING - 1/4'' NPT	1
38	RF500-13	LEVER ASSEMBLY	1
73	RF500-14A	DIVERTER VANE SPRING	1
56	RF500-280A	LOCKWASHER M6	10
51	RF500-32A	ELBOW FITTING (TT469-6B)	2
1	RF500-48A	HEX BOLT M8 x 25	5
114	RF500-50A	CONNECTOR (FOR 1/4'' TUBE) (TT68-4A)	7
23	RF500-59A	HEX BOLT M10 x 25mm - PLAIN	6
72	RF500-62A	SEAL { 35 X 47 X 7 BUNA N }	1
102	RF500-64A	SPLIT PIN 5/16''x1-1/4''	1
53	RF500-69A	PIPE PLUG 1/4'' NPT BLK SQ.HD.	8
107	RF500-71A	SELF DRILLING SCREW # 6	9
103	RF500-82A	DRAIN COCK - 1/4'' (TT242-8)	1
121	RF800-002	ALUMINUM POPRIVETS 1/8x1/8	50
112	RF800-3A	SEAL - END COVER	2
21	RF800-88	Outer Ring	1
132	SK60	TAPER BUSHING SK60MM NO KEY	1
12A	U-SEAL	U-SEAL (OILTANK BULKHEAD)	1

*** SPECIFY PUMP ROTATION "L" OR "R" AND MOUNTING DIRECTION SIDE OR UPRIGHT.**

RCF 1200 LUH-LSH-RUH-RSH PUMP PARTS & DIMENSIONS


RCF 1200 HYD
LEFT HAND DRIVE
(COUNTER CLOCKWISE)
FRUITLAND
Ø58 mm SHAFT
KEY: 5/8" X 5/8" X 2.375" LG.
FOR BOLT
3/4"
WHEN ORDERING SPARE PARTS
STATE SERIAL NO & MODEL.
DRAWING IS FOR REFERENCE
ONLY. WE RESERVE THE RIGHT
TO MAKE CHANGES.
THIS HYDRAULIC DRIVE PUMP
IS AVAILABLE BOTH CLOCKWISE
AND COUNTERCLOCKWISE.
REF. DWG# RCF1200-HYD REV 6
RCF 1200 LUH, LSH, RUH, RSH
FRUITLAND

RCF 1200 LUH-LSH-RUH-RSH Parts List

ITEM#	PART #	DESCRIPTION	QTY PER PUMP
	1200RU	RCF 1200 VACUUM PUMP	1
	RF120-KIT	RCF1200 REBUILD KIT	1
13	RF120-1	1200 HOUSING	1
40	RF120-10	DIVERTER VANE	1
54N	RF120-100N	CAP\BREATHER ASSEMBLY	1
57	RF120-102A	HEX BOLT M6 x 10 mm	10
65	RF120-104	VALVE RING	1
66	RF120-105A	SNAP RING (INTR RING 4-1/4)	1
67	RF120-106	VALVE HOUSING	1
71	RF120-107A	STUD M16 x 120mm	8
75	RF120-108A	HEX BOLT M16 x 40mm - PLAIN	12
46	RF120-11	DIVERTER HOUSING	1
85	RF120-114L	M65x2 ROTOR NUT - RH PUMP	1
86	RF120-115A	STAR WASHER - W13	1
87	RF120-116A	BALL BEARING #5213 C3	1
90	RF120-117	OIL PUMP ADAPTOR	1
92	RF120-118A	SPRING	1
93	RF120-119A	''O'' RING #113	1
74	RF120-12	DIVERTER VALVE CAP	1
94	RF120-120	CUP	1
98	RF120-122	BEARING PLATE	1
58	RF120-124	PLATE	1
110	RF120-127	GASKET VALVE CAP	1
123	RF120-128A	S.H.C.S. M6 x 25mm	2
124	RF120-129A	FLAT HEAD SCREW 3/8 NC x 5/8	1

RCF 1200 LUH-LSH-RUH-RSH Parts Continued

ITEM#	PART #	DESCRIPTION	QTY PER PUMP
136A	RF120-136A	BOLT M-20 X 30 mm LG	2
14	RF120-14	ROLL PIN 1/4'' DIA x 3-1/2'' LONG	2
140	RF120-140	HEX BOLT M8 x 20mm	6
79	RF120-16A	SEAL { 60 X 75 X 8 BUNA N }	2
63	RF120-17	VALVE PLATE	1
44	RF120-18	END CAP	2
19	RF120-19A	ROLLER BEARING NU 413	2
55	RF120-23	OIL TANK ASSEMBLY	1
52	RF120-25A	SIGHT HOSE(1/4' x 5)	1
96	RF120-27	OIL PUMP GASKET	1
97	RF120-29	OIL PUMP	1
12	RF120-3	END COVER	2
113	RF120-30	OIL PUMP COUPLING (DFG)	1
30	RF120-34	SHROUD RING	1
7	RF120-35A	SNAP RING (INTR RING 6-1/4)	1
17	RF120-4	ROTOR ASSEMBLY	1
8H	RF120-46H	HOUSING SHROUD - SHORT STYLE	1
4	RF120-5	OUTER END COVER	1
122	RF120-50A	CONNECTOR FOR 5/16 TUBE	1
2	RF120-51A	SET OIL LINES - LESS FITTINGS	1
50	RF120-55	GASKET - INLET	1
45	RF120-57	GASKET - END PLATE	2
84	RF120-58	GASKET-OUTER END COVERS	2
49	RF120-59A	M16 LOCKWASHER	20
62	RF120-65	GASKET - OUTLET	1
68	RF120-65A	GASKET BACK-UP VALVE	1

RCF 1200 LUH-LSH-RUH-RSH Parts Continued

ITEM#	PART #	DESCRIPTION	QTY PER PUMP
61	RF120-67A	HEXBOLT M20x 50	20
99	RF120-69A	HEX BOLT M12 x 30mm - PLAIN	12
59	RF120-6A	VANES	8
89	RF120-7	GASKET - HOUSING CAP	2
10	RF120-71A	HEX NUT M20	2
91	RF120-72A	ROLL PIN (5/32 X 3/4)	2
31	RF120-74	KEY	1
3	RF120-78A	OIL FLOW VALVE	1
106	RF120-8	COLLAR	2
5	RF120-80A	SAFETY LOCKWASHER	1
6	RF120-81	ADAPTOR SPACER	1
11	RF120-82A	M20 LOCKWASHER	22
18	RF120-86A	TAPERPIN M10	4
20	RF120-87	RING SPACER	1
22	RF120-89	BEARING RING	1
88	RF120-9	BASE	2
24	RF120-91A	ROLL PIN (1/4x1-1/4)	1
25	RF120-92A	M12 LOCKWASHER	12
28	RF120-94A	10mm Lock Washer - Z.P.	14
42	RF120-96A	M8 LOCKWASHER	13
70	RF120-97A	HEX NUT M16 - PLAIN	8
29N	RF160-33	FAN - RIGHT HAND TAPER (ALUM)	1
115	RF250-30A	NIPPLE 1/4'' NPT x 4-1/2	1
109	RF250-69A	PIPE PLUG 1/8'' NPT BLK SQ.HD.	2
116	RF250-73A	BLK. MAL. PIPE COUPLING - 1/4'' NPT	1

RCF 1200 LUH-LSH-RUH-RSH Parts Continued

ITEM#	PART #	DESCRIPTION	QTY PER PUMP
38	RF500-13	LEVER ASSEMBLY	1
73	RF500-14A	DIVERTER VANE SPRING	1
56	RF500-280A	LOCKWASHER M6	10
51	RF500-32A	ELBOW FITTING (TT469-6B)	2
1	RF500-48A	HEX BOLT M8 x 25	5
114	RF500-50A	CONNECTOR (FOR 1/4'' TUBE) (TT68-4A)	7
23	RF500-59A	HEX BOLT M10 x 25mm - PLAIN	6
72	RF500-62A	SEAL { 35 X 47 X 7 BUNA N }	1
102	RF500-64A	SPLIT PIN 5/16''x1-1/4''	1
53	RF500-69A	PIPE PLUG 1/4'' NPT BLK SQ.HD.	8
107	RF500-71A	SELF DRILLING SCREW # 6	9
103	RF500-82A	DRAIN COCK - 1/4'' (TT242-8)	1
121	RF800-002	ALUMINUM POPRIVETS 1/8x1/8	50
112	RF800-3A	SEAL - END COVER	2
21	RF800-88	Outer Ring	1
132	SK60	TAPER BUSHING SK60MM NO KEY	1

SERVICE NOTE
USE GENUINE FRUITLAND PARTS ONLY!

If you have any questions, or require further information on installing, operating and or the maintenance of your vacuum pump contact:

1-800-663-9003 - info@fruitland-mfg.com - sales@fruitland-mfg.com

PUMP WARRANTY

1. **WARRANTY POLICY — WHAT WE COVER:** Subject to the terms of this warranty (the "WARRANTY"), vacuum pumps (the "PRODUCT") manufactured by R.T. Hamilton and Associates Ltd. (FRUITLAND MANUFACTURING) are warranted to be free from defects in material and workmanship for a maximum period of two (2) years from the date of shipment to Buyer. THIS IS THE SOLE AND EXCLUSIVE PRODUCT WARRANTY GIVEN BY FRUITLAND MANUFACTURING TO BUYER AND IS IN LIEU OF, AND EXCLUDES, ALL OTHER WARRANTIES, EXPRESS OR IMPLIED, ARISING BY OPERATION OF LAW OR OTHERWISE, INCLUDING, BUT NOT LIMITED TO, ANY IMPLIED WARRANTIES OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE. COMPONENTS WHICH MAY BE SUPPLIED AS PART OF AN ASSEMBLY, OR SPARE PART(S), AND NOT MANUFACTURED BY FRUITLAND MANUFACTURING ARE LIMITED ONLY TO THE WARRANTY EXTENDED BY THE MANUFACTURER(S) OF THE COMPONENT(S).

2. **WARRANTY CLAIMS — HOW WE RESPOND TO WARRANTY ISSUES:** In the event of a defect in a PRODUCT covered by this WARRANTY, FRUITLAND MANUFACTURING shall repair or replace the affected PRODUCT, or components of the affected PRODUCT, at its sole discretion. This is the BUYER'S sole and exclusive remedy. BUYER shall comply with FRUITLAND MANUFACTURING's WARRANTY Claims Process in order to enforce this WARRANTY.

3. **WARRANTY EXCLUSIONS — THINGS THAT WILL RESULT IN LOSS OF WARRANTY COVERAGE OR WHICH ARE NOT COVERED:**

    a. This WARRANTY shall be void if:

        i. BUYER fails to maintain the PRODUCT through proper care and maintenance procedures;
        ii. BUYER fails to operate and/or use the PRODUCT in the manner in which it was intended, and in accordance with the PRODUCT manual(s), or otherwise misuses or abuses the PRODUCT;
        iii. BUYER fails to notify FRUITLAND MANUFACTURING of a PRODUCT defect covered under this WARRANTY within 72 hours of discovery of the defect, or fails to cooperate with FRUITLAND MANUFACTURING in investigating the PRODUCT defect;
        iv. Personnel who have not been approved by FRUITLAND MANUFACTURING make repairs or modifications to the PRODUCT;
        v. Replacement parts that have not been approved by FRUITLAND MANUFACTURING are used in the PRODUCT; or
        vi. BUYER fails to pay for the PRODUCT in full.

    b. Damage to the PRODUCT arising from extreme weather conditions or affixing equipment or materials to the PRODUCT that have not been approved by FRUITLAND MANUFACTURING, is not covered by this WARRANTY. LIMITATION OF DAMAGES: FRUITLAND MANUFACTURING SHALL HAVE NO LIABILITY TO BUYER OR OTHERWISE ARISING FROM, OR IN ANY WAY CONNECTED TO, THE PRODUCT, INCLUDING ITS SALE, USE OR OPERATION, EXCEPT AS EXPRESSLY SET OUT HEREIN. IN NO EVENT SHALL FRUITLAND MANUFACTURING BE LIABLE FOR LOST PROFITS OR FOR SPECIAL, CONSEQUENTIAL, EXEMPLARY OR INCIDENTAL DAMAGES OF ANY KIND WHETHER ARISING IN, CONTRACT, TORT, PRODUCT LIABILITY, NEGLIGENCE, STRICT LIABILITY OR OTHERWISE, EVEN IF FRUITLAND MANUFACTURING WAS ADVISED OF THE POSSIBILITY OF SUCH LOST PROFITS OR DAMAGES. IN NO EVENT SHALL FRUITLAND MANUFACTURING BE LIABLE TO BUYER FOR ANY DAMAGES WHATSOEVER IN EXCESS OF THE TOTAL PRICE PAID BY BUYER FOR THE PRODUCT. BUYER HEREBY WAIVES ANY CLAIM THAT THE EXCLUSIONS OR LIMITATIONS IDENTIFIED HEREIN DEPRIVE IT OF AN ADEQUATE REMEDY OR CAUSE THIS OR ANY OTHER AGREEMENT WITH FRUITLAND MANUFACTURING TO FAIL OF ITS ESSENTIAL PURPOSE.

NOTICE - WARRANTY CLAIM

In the event of pump failure while the 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.

Model Number

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 the owner's manual completely before operating your new Fruitland pump.

SERVICE NOTE
USE GENUINE FRUITLAND PARTS ONLY!

If you have any questions, or require further information on installing, operating and or the maintenance of your vacuum pump contact:

1-800-663-9003 - info@fruitland-mfg.com - sales@fruitland-mfg.com

Warranty Registration

Please fill out this page, make a copy and send to the factory at *sales@fruitland-mfg.com* to register this pump for warranty.

This is the Serial Number of your Pump:

Preface

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

Please familiarize yourself and any operator with the contents of this booklet. Keep a record of the serial number handy, in case 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

Notes

FRUITLAND

ASACERT ASSESSMENT & CERTIFICATION
ISO 9001 QUALITY MANAGEMENT SYSTEM
UKAS MANAGEMENT SYSTEMS
8185

291_17_Q

MEMBER OF CAGI Compressed Air & Gas Institute

Attention: Read owner's manual fully before operating pump. Failure to do so can result in personal injury, severe pump damage and may void warranty.

Fruitland Manufacturing
324 Leaside Ave, Stoney Creek Ontario. Canada L8E 2N7
905-662-6552 • Toll Free: 1-800-663-9003
www.fruitlandmanufacturing.com