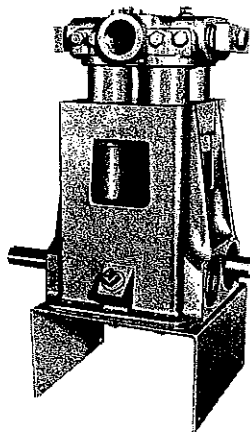


BEAN®

R 2020 pump



Royalette 2020 pumps are vertical, reciprocating, positive displacement, four piston pumps that deliver 20 gpm at up to 500 psi. The higher pressure in a 20 gpm pump gives finer spray droplet breakup for an enveloping type of spray coverage.

Royalette 2020 pumps have diamond-honed Sapphire cylinders for longer life and less abrasive wear. Heavy duty ball bearings . . . heavy duty direct drive crankshaft. Pump is completely enclosed with all working parts oil bath lubricated. Umbrella-type shield with O-ring seal keeps out dirt and harmful spray material from pump case. Positive-action, stainless steel, disc-type valves.

Royalette 2020 pumps are built for durable high performance and

trouble-free operation under the most adverse spraying conditions.

Sprayer pump speed

The speed at the pump drive shaft should be 580 rpm.

The engine governor on engine driven models is set at the factory to give 580 rpm and will seldom require attention.

The speed on PTO driven pumps is in direct ratio to the tractor engine speed.

Pump speed (rpm)	400	450	500	540	580
gpm	13.8	15.6	17.3	18.7	20

IMPORTANT - The oil has been drained

from the pump for shipment from the factory.

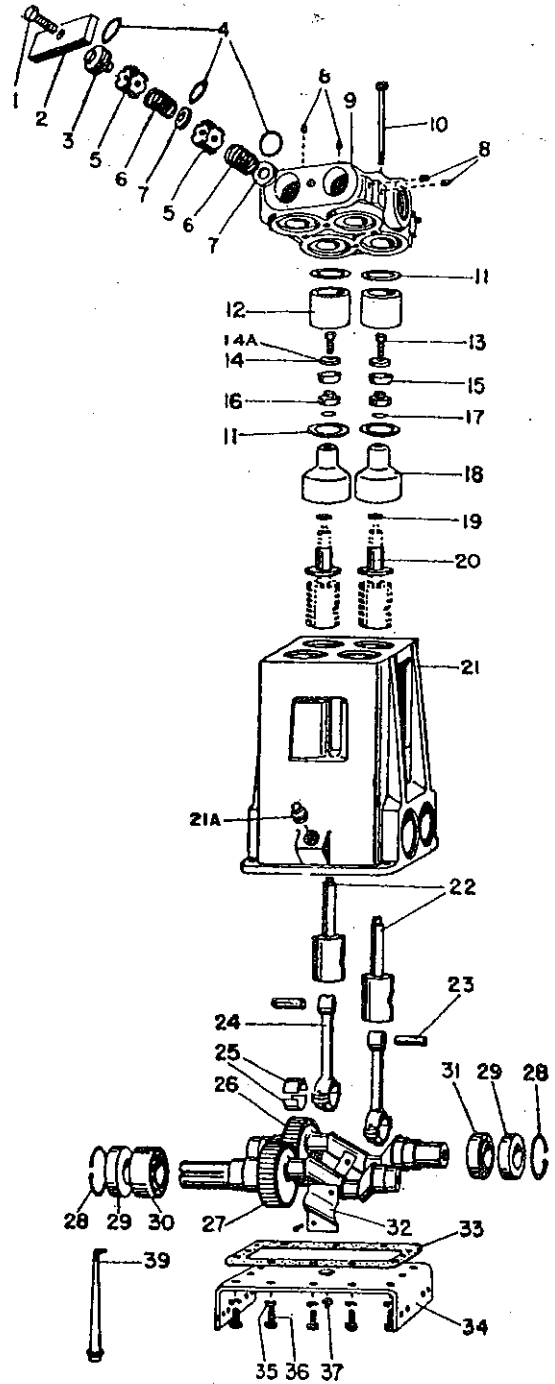
Fill the pump crankcase to the level of the Filler Plug using CLEAN, HIGH GRADE SAE 30 oil. (Approx. 1 1/4 quarts).

Drain and refill the pump crankcase with CLEAN SAE 30 at least each 100 operating hours or at least once each season to remove condensate.

Parts List

R2020 Pump (1273560)

Item No.	Part No.	Description	Qty.
1	1100064	Cap Screw, 1/2"-13x1-1/2	2
2	1255887	Clamp, Valve Retaining	2
3	1219614	Cover, Valve	4
4	1177394	O-Ring 1-13/16" OD	12
5	1219610	Cage, Valve	8
6	5253499	Disc and Spring Assembly, Valve	8
7	1219615	Seat, Valve	8
8	1105666	Pipe Plug, 1/4" Galv.	7
9	1247208	Valve Chamber	1
	*1247235	Valve Chamber Assembly	1
10	1101262	Cap Screw, 3/8"-16 x 5	4
11	A91684	Gasket, Cylinder	8
12	1241354	Cylinder (Ceramic)	4
13	1284516	Cap Screw, 5/16"-18 x 1-1/2	4
14	5257986	Washer, Packing	4
15	5257807	Packing (cup)	4
16	1282557	Holder, Packing	4
17	1101339	O-Ring 3/4" OD	4
18	1279148	Umbrella	4
19	1269388	Washer, Umbrella	4
20	1218743	Sleeve (plastic)	4
21	1273545	Case, 2020 Pump	1
21a	1105060	Plug, Oil Fill (3/4" Pipe)	2
22	1216823	Crosshead	4
23	1219650	Wrist Pin	4
24	1263906	Conn. Rod Assembly	4
	1278439	Cap Screw, Conn. Rod (Self Lock)	8
25	1280908	Bearing Insert (Pair)	4
26	1273547	Crankshaft Assembly, Driven	1
27	1273546	Crankshaft Assembly, Drive	1
28	1118553	Snap Ring	4
29	1101095	Seal, Oil	4
30	1104508	Bearing (Double-Fafnir)	1
31	1104444	Bearing (Single-Fafnir)	3
32	1273549	Oil Slinger	2
	320502	HHCS 10-24 x 3/4	4
	5261980	Bolt Strip	2
33	1273559	Gasket, Pump Base	1
34	1280633	Mounting Base, Pump	1
35	1177455	Wave Lock Washer, 3/8"	12
36	1100068	Cap Screw, 3/8"-16 x 3/4"	12
37	1101305	Magnetic Drain Plug, 1/4" Pipe	1
39	**1250638	Puller, Valve and Seat (Pump Tool)	1



* Valve Chamber Assembly consisting of items 1 thru 9.

** Not part of pump assembly.

Servicing the pump

Safety first - disconnect the power source before starting any servicing of the pump.

(1) Servicing the plunger packings

(a) Removing plunger packings

Release the valve chamber from the pump by removing three cap screws (10) using pump wrench (38).

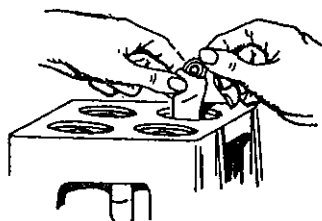
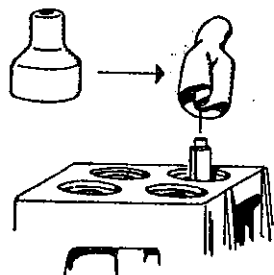
Lift valve chamber (9) from cylinders (12).

Lift cylinders from top of pump case (21).

Remove cap screws (13), packing washers (14), plunger packings (15) and packing holders (16).

Inspect 'O' rings (17), umbrella washers (19), umbrellas (18) and sleeves (20).

Clean all parts and place them on a clean surface, replacing any worn parts with **JBS** exact replacement parts.



Fold the plastic umbrellas, as shown to insert them through openings and over ends of crosshead rods.

Press tops of umbrellas to place washers (19) over ends of rods WITH GROOVE UP.

(b) Re-assembling plunger packings

Inspect bottom gaskets (11) and replace if necessary.

NOTE - If it is necessary to replace one gasket, at either top or bottom of cylinders, then both top and bottom gaskets should be replaced on the cylinder.

Place 'O' rings (17) and packer holders (16) in position on ends of crosshead rods.

Place gaskets (11) and cylinders (12) in position in recesses at top on pump case.

Turn the pump by hand, to raise each crosshead rod to the top as needed.

Oil the plunger packings (15) and place them in the open ends of the cylinders, with the cup UP.

Use the thumb to press the packings into each cylinder firmly and squarely on ends of each plunger rod.

Follow by placing the brass packing washers (14), with ribbed side down, inside each packing cup.

Secure packings, washers and holders to rods with cap screws (13), tightening them until washers and cups are firmly seated on the rod ends.

Inspect the top gaskets (11) and replace BOTH top and bottom gaskets if either shows defect, holding them in place in the valve chamber with oil or grease if necessary.

Return the valve chamber to position over the cylinders, making sure that gaskets (11) and cylinders (12) are properly positioned in recesses at the top and bottom.

Re-tighten cap screws (10) alternately and evenly until parts are snugly seated.

(2) Servicing the valves

(a) Removing valves from pump

Remove cap screw (1), clamp (2) and lift out valve covers (3) with 'O' rings (4) attached.

Remove the discharge valve

spring and disc assemblies (6) and valve cages (5).

Insert the round end of valve seat puller (39) in the opening at center of valve seats (7) and loosen seats from valve chamber by a 'rocking' motion of the tool.

Remove the valve seats from the valve chamber recesses using curved end of tool (39).

Repeat the above procedure to remove the suction (intake) valve parts which are identical to discharge valve parts and located back of them in the valve chamber.

Clean and inspect all parts - replacing all worn parts as needed.

NOTE - Valve seats (7) may be used either side up, thus if one side shows wear, the opposite side may be placed in the UP position to provide a new seat.

(b) Assembling valves to pump

With 'O' rings (4) in place on valve seats, place a few drops of oil on them and insert them squarely and firmly in place at bottom of recesses in valve chamber.

Place the valve cages (5) on the valve seats, placing the disc and spring assemblies inside the cages on the valve seats.

Repeat this procedure to assemble the top (discharge) valve parts.

With the 'O' rings (4) in the BOTTOM GROOVE on each valve cover (3), oil and place them in the openings over the valves.

Replace clamp bar (2) and cap screw (1) **ONLY SNUGLY**. Torque to 15-20 ft. lbs.

IMPORTANT - Excessive tightening on cap screw (1) can damage valve parts.

(3) Servicing the crankshafts

(a) Removing the crankshafts

Remove valve chamber and

cylinders as previously instructed.

Remove 1/4" pipe plug (37) to drain oil from pump crankcase.

Disconnect and remove pump from mounting.

Remove cap screws (36), and mounting base (34) carefully to protect the gasket (33).

Remove oil slingers (32) from crankshafts. Use a center punch or other suitable instrument to mark caps and connecting rods for EXACT re-matching when re-assembling. Remove the crossheads and the connecting rods from the pump case.

Remove snap rings (28) from groove in pump case at outside of bearings (30 and 31).

Use a suitable wood block and hammer to tap against gear ends (outside) of each crankshaft to remove oil seals and bearings at opposite side of pump case.

Crankshafts, with bearings at gear ends, may then be removed from bottom of case.

Clean all parts ready for re-assembly.

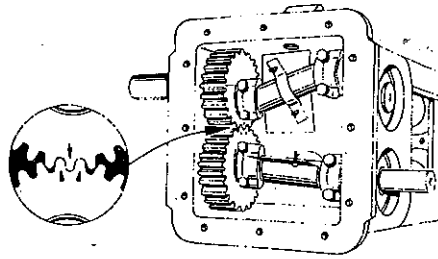
(b) Assembling the crankshafts in the pump

Inspect all parts carefully, replacing any worn parts with JBS exact replacement parts.

CAUTION - Never pound directly on bearings when removing or installing them on the crankshafts.

A wood block, with suitable opening, or proper block supports, in a press, to assure equal pressure on most or all of the bearing, is best for this operation.

Press the bearings against the shoulders on the crankshaft and place the assembly through openings into the pump case.



IMPORTANT-TIMING THE PUMP

Arrows on gears must be located EXACTLY as shown above to properly time the pump.

Assemble the oil seals (29) with the lip of the seal facing the inside of the pump case, being careful, when passing the seals over the crankshaft, to avoid damaging or folding the lip of the seal under.

Insert the snap rings (28) securely in the grooves in the openings, against the oil seals.

Tap the ends of the crankshaft lightly to position the bearings properly, allowing slight end play on the crankshaft.

Re-assemble the connecting rods and bearings and attach crosshead assemblies, being sure to match caps and rods exactly as marked when dis-assembled.

Complete the re-assembly by reversing procedure 3a, being sure to replace drain plug (37).

Remove pipe plug (21A) and fill crankcase to level of plug with the best grade SAE 20 clean motor oil.

Turn pump a few revolutions by hand, to be sure all parts are properly installed before operating pump.

(4) Servicing crossheads

(a) Removing crossheads

Remove the valve chamber, cylinders and the plunger packings as in procedure 1a.

Proceed as in paragraph 3a to remove mounting base (34),

gasket (33) and connecting rod caps (24) and bearings (25).

Turn the crankshaft by hand, to allow removal of crossheads (22) through the pump case opening.

Clean all parts thoroughly and replace any worn parts with JBS exact replacement parts.

(4) (b) Assembling crosshead in the pump

Reverse procedure 4a, taking care to assemble all parts in their exact former positions.

(5) General maintenance of the pump

Drain and refill the pump crankcase with SAE 30 oil after each 100 hours of use or at least once each season of use.

Maintain oil at filler plug level.

Keep all piping and mounting bolts tight.

Replace all worn parts promptly with FMC exact replacement parts.

Freezing weather care of the pump

IMPORTANT - Precautions should be taken to prevent damage to the pump from freezing.

Observe the following steps carefully to drain the pump when freezing temperatures are expected:

1. Run the pump a few minutes after the tank has been drained to evacuate all water possible from the pump.*
2. Remove drain plugs from low points in all connecting piping.
3. Remove four cap screws (10) and lift valve chamber from cylinders and tip it to drain water from within valve chamber.
4. Wipe the inside of cylinders dry with a clean cloth or sponge.

*NOTE -Feeding fuel oil or diesel fuel into the pumping system, until sure that the system is filled with oil, will protect the system from freezing and possible internal corrosion.