

RIGMASTER, INC.
807 Bohlmann Ave.
Schulenburg, Texas 78956

SERIES 80 INSTALLATION AND OPERATION MANUAL
CONVENTIONAL PUMPING UNIT

Your RigMaster Conventional Crank Balanced Pumping Unit is conventional in name only. Each individual component of the unit and the entire unit, represent the very best engineering design, production facilities, quality control and experience that RigMaster, Inc. can bring to you. The specialized design and manufacturing of oilfield pumping units is a RigMaster, Inc. speciality. With reasonable load application and adequate maintenance, your RigMaster Conventional Crank Balanced Pumping Unit will give you many years of dependable service.

CAUTION

All mechanical sucker rod pumping units have large and heavy rotating parts. It is essential that all personnel involved in the erection, operation and maintenance of pumping units use extreme care at all times when walking near these heavy rotating parts. Failure to do so can cause severe bodily injury or death.

WELL HEAD CLEARANCE AND FOUNDATION

Before the location of the unit foundation is laid out, a precautionary measure of checking the well head is highly desirable. The polish rod should be vertical to minimize stuffing box wear. Consider the well head height when establishing the grade height of the foundation. The pumping unit base has center marks on the bottom flanges of the front and rear crossmembers. The foundation must also have a centerline which aligns with the well head polish rod and a lateral line showing the distance between the polish rod and front crossmember on the unit base.

UNIT ERECTION AND DESCRIPTION

This section describes the recommended steps in the erection process of the unit.

- STEP 1. Install samson post on base making sure to properly tighten bolts. See ADDENDUM I.
- STEP 2. Attach ladder to post. Attach bolts at both upper and lower ends of post. See ADDENDUM I.
- STEP 3. Bolt saddle bearing to beam making sure arrow on saddle bearing is pointing toward well end. Assemble bolts snug tight only. Step 5 describes final tightening of the bolts.

- STEP 4. Assemble tailbearing to beam. Insert bolts in appropriate holes as shown. Assemble lockwasher and nuts snug tight only.
- DO NOT TORQUE
- STEP 5. Align saddle bearing to tailbearing. Compare shaft center distances on both sides. Shift saddle bearing as needed to equal measurements. Hammer tighten bolts, saddle bearing to beam. See ADDENDUM I for proper torque range.
- STEP 6. Attach pitmans to equalizer. Place pitman arms on equalizer with grease fittings pointed outward. Secure assembly by inserting pitman pin and tightening lower bolts on each connection.
- STEP 7. Grease upper pitman boxes, both sides.
- STEP 8. Lift beam, center bearing, tailbearing and pitmans. Check for parallelism of pitmans.
- STEP 9. Position saddle bearing over post. Install bolts, saddle bearing to post. Shim as needed to properly level bearing on water table. Snug tighten bolts only.
- STEP 10. Pitman ends onto cranks pins. Clean all bore and contact surfaces. Pitman ends fit easily on crank pin boxes. Install cap screws.
- CAUTION: Do not hammer pitman into box. Install wrist pin nut and hammer tighten with wrench supplied with unit. Install wrist pin locking device.
- STEP 11. Check spacings, shaft ends to pitman. If correction is needed, "rotate" center bearing on post. See ADDENDUM I for proper torque range.
- STEP 12. Attach wire rope to horsehead. Procedure involves forming loop beyond retainer ring, so that retainer can easily go into place. Tighten bolts, retainer plate to horsehead. Carrier bar is then pulled downward until loop in rope is against retainer plate.
- STEP 13. Move head onto beam. Secure head with bolts furnished with unit. See ADDENDUM I for proper torque range.
- STEP 14. Adjust head to vertical position. Plumb bob string against edge of arc plate on head. Use both adjusting screws as needed. See ADDENDUM I for proper torque range.

STEP 15. Check position of unit relative to polish rod. Shift position of entire unit as needed. Tighten foundation bolt nuts as needed. See ADDENDUM I for proper torque range.

STEP 16. Install prime mover. Space rails close enough to reducer such that belts will have slack to go around both sheaves easily. Lower prime mover onto slide rails and secure with bolts furnished with assembly. See ADDENDUM I for proper torque range.

STEP 17. Install and align "V" belts. Use grooves nearest bearing for minimum overhung load. Use matched set of belts. Align sheave faces with taunt string. Shift prime mover as necessary. Check belt tightness. Secure prime mover rails together. Hammer tighten all bolts furnished with assembly.

STEP 18. Install front belt cover.

STEP 19. Add recommended type and amount of oil to gearbox. Check with gearbox nameplate for recommended oil viscosity.

CAUTION: always verify oil level on tailboard and saddle bearing assemblies.

STEP 20. Grease both crank pin bearings. Crank pin bearings are factory packed with grease and are ready for operation.

STEP 21. Carrier bar installation to polish rod. Remove gate, place carrier on polish rod. Replace gate, and tighten rod clamp. Check with clamp manufacturer on recommended tightening bolt torque.

STEP 22. Counterbalance change. Rotate unit, then apply brake so that crank is slightly angled downhill in the direction weight is to be moved.

CAUTION: Place heavy timbers under the cranks to prevent rotation of unit. Loosen bolts on each set of weights enough to free dovetail clamping arrangement on crank. Jacking screw arrangement is used to move counterweights to desired position. Hammer tighten bolts, clamping counterweights on crank.

STEP 23. Final tightening of tailboard bearings. Unit must now be rotated one complete revolution to insure proper alignment of tailboard. Hammer tighten bolts.

STEP 24. Re-tighten all significant bolting. Check oil level in reducer. Inspect unit for abnormal leaking at reducer.

OPERATION AFTER ONE WEEK

1. Re-tighten all significant bolting. Check oil in reducer. Inspect unit for abnormal leaking at reducer. Check for proper "V" belt tightness.
2. Check structural bearings for lubricant leakage.
3. Bronze structural bearings should be relubricated as required to maintain oil level by moving fill plug and adding oil until reservoir is full.

ADDENDUM I.

Proper tightening torque nuts and cap screws with "Metal-to-Metal" grip.

<u>SIZE</u>	<u>TORQUE RANGE</u>
3/8-16NC	15 to 24 ft. lb
1/2-13NC	32 to 44 ft. lb
5/8-11 NC	59 to 74 ft. lb
3/4-10NC	99 to 116 ft. lb
7/8-9NC	153 to 175 ft. lb
1-8NC	225 to 256 ft. lb
1-1/8-7NC	320 to 360 ft. lb
1-1/4-7NC	452 to 510 ft. lb
1-1/2-6NC	780 to 880 ft. lb

The grip surfaces beneath the bolt and the nut base must be flat, clean and free of burrs so that the grip will be "Metal-to-Metal".

RIGMASTER SERVICE

RigMaster has capable sales and service men available, who are competent and experienced not only in the proper sizing of surface pumping units, but also in any service that may be needed. Contact the RigMaster office nearest you to inquire about the availability of RigMaster service.

REPAIR AND REPLACEMENT PARTS SERVICE

A complete line of repair and replacement parts are available from warehouse locations in Schulenburg, Texas. Please order replacement parts from a parts list which is available for each pumping unit assembly. For the parts needed; furnish the part number and name, unit model number and serial number and RigMaster sales order number.

GEARBOX MFG. AND SERIAL NO. _____

UNIT SERIAL NO. _____

UNIT MODEL NO. _____

DATE SHIPPED. _____

SERIES 80 PUMPING UNITS
ASSEMBLY INSPECTION PROCEDURES
ALL CONVENTIONAL UNITS

- _____1. Check bolted connections of high prime to sub-base, and high prime to skid.
- _____2. Check fit-up of Samson Post: all bolts are lined up and shear-bar is placed and welded to skid
- _____3. Check walking beam for straightness, camber, and alignment.
- _____4. Check alignment of gear reducer, measurement from shaft to samson post bolt holes on skid should be within 1/8", 1/16" to each side, measurement from end of shaft to sub-base should be within 1/8" also, measurement from bottom of shaft to center of beam on skid should be within 1/8" also. Double check measurements after Reducer is torqued down to assure it did not pull out of tolerance.
- _____5. Check and make sure bench mark on front of skid is centered and stamped.
- _____6. Cranks are assembled to edge of shaft, crank castings will vary but should be fairly even. Check crank position after tightening also. Crank keys should be easy fit.
- _____7. Make sure counterweight screwlocks are locked into place.
- _____8. Counterweights are assembled in customers specified position on crank. Weights should pull together fairly flush and even. All-thread rod should be loose to assure weights are tight on cranks.
- _____9. Check tightness of nuts and set screws on all-thread rod. Nut on bottom of all-thread is welded to all-thread for field adjustment.
- _____10. Check alignment of sheaves on motor and reducer, check tightness of belts, make sure set screws in hubs are tight. Check that shafts of motor and reducer will not extend past belt guard to avoid rub on belt guard cover.
- _____11. Check that brake after installed will have enough pull to tighten down on brake drum. Can be adjusted.
- _____12. Check that Reducers have oil in them.

- _____13. Double check that saddle bearing and tailboard bearing are full of oil.
- _____14. Check assembly of wire line retainer and wire line guide on horsehead. Make sure wireline is the right length per current parts list.
- _____15. Check lubrication system on Samson Post, walking beams and pitman arms. Open ends of lubrication lines should be taped shut to keep dust and dirt out during shipment.
- _____16. Check that nameplate (logo) is installed on walking beam.
- _____17. Double check that equalizer is right size, per parts list.
- _____18. Check that nameplate is installed on Samson Post and make rubbing of nameplate.
- _____19. Check that warning tags and adjusting tags are on cranks.
- _____20. Check that all parts crated are in crate and painted if needed.
- _____21. Make sure horsehead properly fits walking beam and adjustment bolts screw in connections and contact pads on beam.
- _____22. Double check all bolts and bolted connections.
- _____23. Document assembly, reducer serial number, motor serial number, motor model number, unit serial number.
- _____24. Double check that all customer specifications are met, weights, position of weights, sheaves, hubs, belts, paint, motor and wrenches.
- _____25. When loading check that all parts are shipped, and the handling of parts are properly loaded.

INSPECTORS SIGNATURE: _____

COMMENTS: _____

PUMPING UNITS INVENTORY #1130257

A.P.I. GEAR BOXES

~~9-30-88~~

RIGMASTER

(1)	160	Gear Box	S/N 160A-003-0013	\$3,776.25
(1)	228	Gear Box	S/N 03-0030	2,963.34
(1)	320	Gear Box	S/N 03-0027	3,566.34
(1)	320	Gear Box	S/N 03-0029	3,566.34
(1)	320	Gear Box	S/N 03-0031	3,566.34
(1)	320	Gear Box	S/N 03-0032	3,566.34
				<u>\$21,004.95</u>

Used

- ① 320 Rigmaster (Broken foot) S/N 00-0073
good gears
- ① 228 " (Broken foot) S/N 00-0042
good gears
- ① 114 Mission S/N 65806
- ① 320 Rigmaster (Good Gear) S/N 00-0018

BILL OF MATERIAL

ITEM	DESCRIPTION	MATERIAL		REQ'D PER SET	REMARKS
		ASTM, AISI or SAE	JIS MARK		
1	TAPERED ROLLER BEARING	-	-	2	TIMKEN Type
2	ROLLER BEARING	-	-	2	HYATT Type
3	ROLLER BEARING	-	-	2	HYATT Type
4	SNAP RING	-	-	2	
5	SNAP RING	-	-	2	
6	BREATHER	-	-	1	
7	HEX. BOLT	SAE Gr. 5	8T	12	
8	HEX. BOLT	SAE Gr. 5	8T	4	
9	HEX. BOLT	SAE Gr. 5	8T	2	
10	HEX. BOLT	SAE Gr. 2	6T	18	
11	HEX. BOLT	SAE Gr. 2	6T	36	
12	TAPPING SCREW	-	-	16	
13	HEX. BOLT	SAE Gr. 2	6T	10	
14	HEX. NUT	AISI 1020	4	18	
15	HEX. NUT	AISI 1020	4	18	

ITEM	DESCRIPTION	MATERIAL		REQ'D PER SET	REMARKS
		ASTM, AISI or SAE	JIS MARK		
17	LOCK WASHER	AISI 1075	SWRH	18	
18	LOCK WASHER	AISI 1075	SWRH	18	
19	SQ.HEAD PLUG	ASTM A47	FCMB28	1	
20	MAGNET PLUG	AISI 1020	SS41	1	with magnet
21	PLUG	AISI 4130	SCM	6	
22	PIN	AISI 1020	SS41	2	
23	TAPPING SCREW	AISI 304	SUS304	4	
26	UPPER HOUSING	ASTM A48	FC25	1	
27.	LOWER HOUSING	ASTM A48	FC25	1	
28	SLOW SPEED SHAFT	AISI 4140	SCM440	1	
29	INTERMEDIATE PINION	AISI 4140	SCM440	1	
30	HIGH SPEED PINION	AISI 4140	SCM440	1	
31	SLOW SPEED GEAR	ASTM A536 (100-70-03)	FCD70	1	
32	INTERMEDIATE GEAR	ASTM A536 (100-70-03)	FCD70	1	
33	S.S.BRG.CARRIER	ASTM A48	FC25	2	
34	INTER.BRG. CARRIER (IT)	ASTM A48	FC25	1	

ITEM	DESCRIPTION	MATERIAL		REQ'D PER SET	REMARKS
		ASTM, AISI OR SAE	JIS MARK		
35	INTER. BRG. CARRIER (RT)	ASTM A48	FC25	1	
36	H.S. BRG. CARRIER	ASTM A48	FC25	2	
37	COVER PLATE	ASTM A48	FC25	1	
38	S.S. SHAFT OIL SEAL	ASTM C903	BC2	2	
39	H.S. SHAFT OIL SEAL	ASTM C903	BC2	2	
40	S.S. OIL SLINGER	ASTM A36	SS41	4	
41	H.S. OIL SLINGER	ASTM A36	SS41	4	
42	KEY	AISI 1045	S45C	1	
43	KEY	AISI 1045	S45C	1	
44	GASKET	ASBESTOS	ASBESTOS	1	
45	SHIM	-	-	1	
46	SHIM	-	-	1	
47	SIDE PLATE	ASTM A36	SS41	2	
48	NAME PLATE	AISI 304	SUS304	1	
49	OIL WIPER ASS'Y	-	-	1	
50	OIL WIPER ASS'Y	-	-	1	