

CP-20 SUMP PUMP

UTICA ROCK DRILL 617

THIRD EDITION

MAY, 1984

Supersedes Second Edition January, 1979

Instruction and Parts Book for **PNEUMATIC SUMP PUMP**

CP-20 SUMP PUMP Model "B-V"

PROTECT YOUR INVESTMENT
IN THE WORLD'S FINEST AIR TOOLS
USE GENUINE CP REPLACEMENT PARTS

The purchase of replacement parts for your CP tools deserves the same good judgment that resulted in the purchase of the tools themselves. Each genuine CP part is made from carefully selected and inspected material, subjected to sophisticated machinery and finishing processes

and heat-treated to produce just the right combination of hardness, ductility and impact resistance for its intended use. Each part is identical to, and made concurrently with, parts used in production tools. The use of parts other than genuine CP replacement parts can lead to sub-standard performance, early failure, possible damage of other parts and, in some instances, unsafe conditions.

DANGER
DO NOT USE TO PUMP
FLAMMABLE LIQUIDS

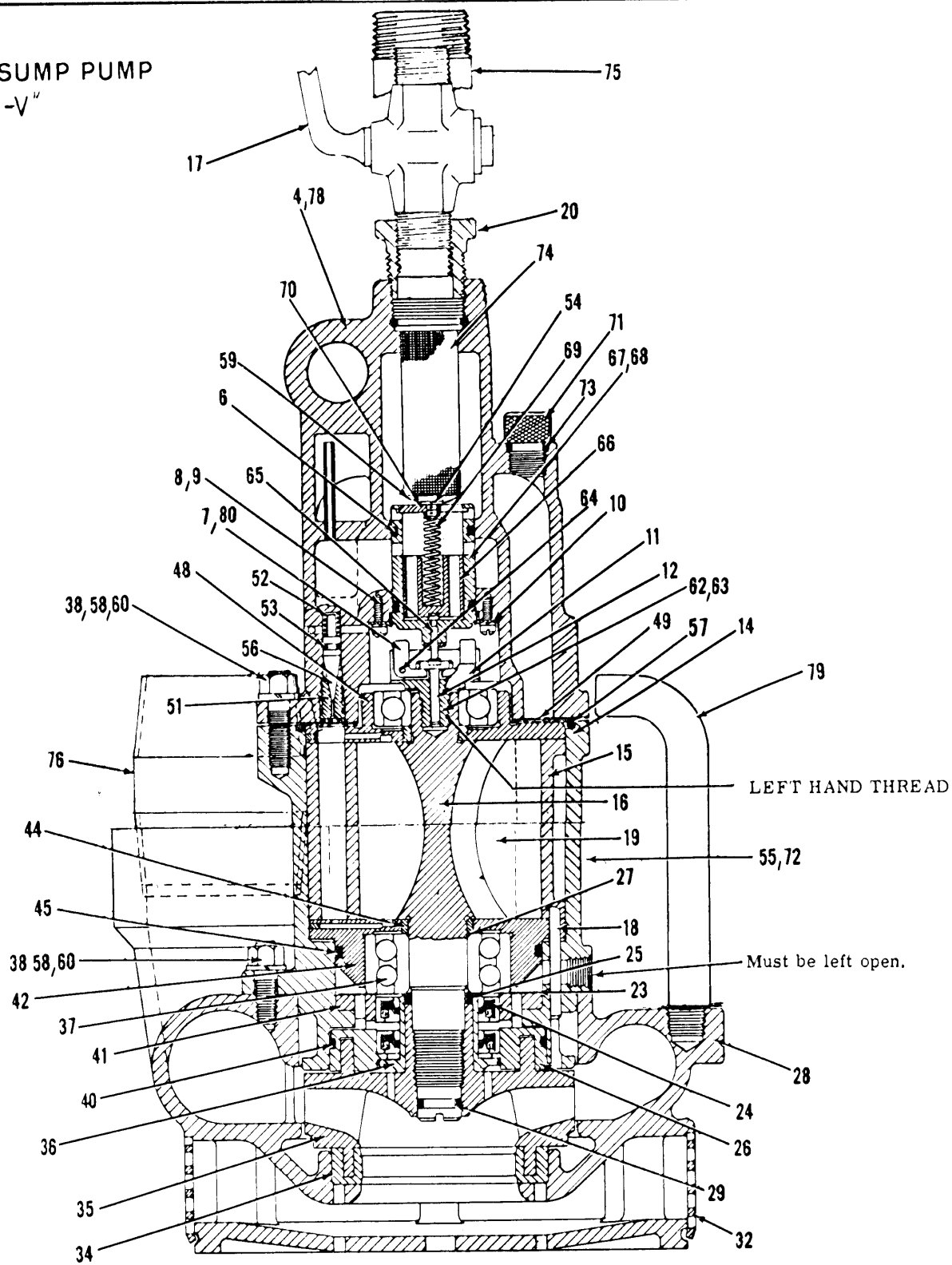


TOOL DIVISION
Chicago Pneumatic

UTICA, NEW YORK 13501

R-278157

CP - 20 SUMP PUMP
Model "B-V"



All Threads Are Right Hand Unless Otherwise Specified.

CP-20 SUMP PUMP Model "B-V"

DANGER
DO NOT USE TO PUMP
FLAMMABLE LIQUIDS

Index No.	CP Part No.	Description	No. Req'd	Index No.	Part No.	Description	No. Req'd
4	C-085366	Housing-Governor	1	46	C-085358	Spacer-Rotor Brg. (Upper)	1
5	C-084172	"O" Ring (-214)	1	47	C-085380	Plug-Oiler Filter	1
6	C-085385	"O" Ring (-216)	2	48	*C-085360	Plate-Upper End	1
7	C-090975	Weight-Governor	2	49	C-085363	Gasket-Governor Housing	1
8	S-008020	Lockwasher (#8)	4	50	P-083071	"O" Ring (-011)	1
9	S-007685	Screw (#8-32 x 3/8")	4	51	C-085379	Seat-Oiler Valve	1
10	C-085369	Disc-Gage Tension	1	52	S-017510	Spring	1
11	C-083360	Retainer-Pin	1	53	C-079489	"O" Ring (-008)	1
12	C-085365	Pin-Governor Push	1	54	C-056974	Screw (#5-40 x 3/8")	1
14	C-085348	Housing	1	55	R-136621	Plate-Name	1
15	*C-085361	Liner	1				
16	C-085359	Rotor	1	56	C-085378	Valve-Oiler	1
17	R-137313	Valve- (3/4" Male)	1	57	C-085386	"O" Ring (-245)	1
18	C-085355	Pin-Dowel	1	58	C-061078	Stud(3/8"-16 x 1 3/8")	8
19	C-085362	Blade-Rotor	4	59	C-056975	Lockwire	1
20	R-137314	Bushing-Air Inlet	1	60	C-085834	Nut-Brass (3/8"-16)	8
23	C-088457	Gasket-Seal Plate	1	61	C-013654	Bearing-Ball	1
24	C-088616	Seal-Oil	2	62	C-086467	Governor Body Comp. (Incl: Index No's 7, 11, 12, 63, 64 & 80)	1
25	C-084173	"O" Ring (-212)	1	63	C-085364	Body-Governor	1
26	C-088458	Plate-Upper Wear	1	64	C-083361	Pin-Governor Weight	2
27	C-103954 C-103955 C-103956	Shim (.001") Shim (.002") Shim (.003")	As Req'd	65	C-085371	Pin-Governor Valve	1
28	C-085341	Housing-Impeller	1	66	C-085370	Valve-Governor	1
29	C-084400	"O" Ring (-113)	1	67	C-086468	Gov. Cage Comp. (Incl: Index No's 6, 54, 59, 65, 66, 68, 69 & 70)	1
32	C-085342	Screen	1	68	C-085368	Cage-Governor	1
34	C-088459	Plate-Lower Wear	1	69	C-085372	Spring-Governor	1
35	C-088758	Impeller	1	70	C-089835	Retainer-Governor Spring	1
36	C-088455	Sleeve-Impeller	1	71	C-086130	Plug-Oil	1
37	C-085382	Bearing-Ball	1	72	S-015150	Screw-Name Plate	4
38	C-035166	Lockwasher (3/8")	8	73	P-083082	"O" Ring (-112)	1
40	H-083084	"O" Ring (-237)	1	74	C-085374	Strainer-Air	1
41	C-088456	Plate-Seal	1	75	C-086080	Pipe-Exhaust (NPT)	1
42	*C-085356	Plate-Lower End	1		R-137580	Pipe -Exhaust (BSP)	
44	C-085357	Spacer-Rotor Brg. (Lower)	1	76	R-137581	Nipple (2 1/2" BSP)	1
45	C-086699	"O" Ring (-235)	1	78	C-086466	Governor Housing Comp. (Incl: Index No's 4, 5, 71, 73 & 74)	1
				79	C-085347	Handle	1
				80	S-010279	Spacer-Governor Weight (Not Shown)	4

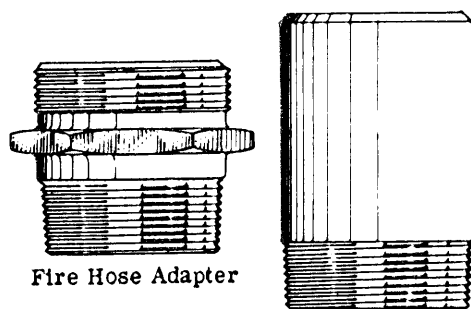
*C-048412 Shims may be required if parts are replaced. (See page 7, step 16)

C-101077 Tune-Up Kit (Incl: Index No's. 6, 19, 23, 24, 25, 29, 40, 45, 49, 50, 53, 57, 64, 65, and C-048412 Shim.
It is recommended that Tune-Up Kit parts be installed each time tool is disassembled.

NPT - NATIONAL PIPE TAPER
BSP - BRITISH STANDARD PIPE THREAD

CP-20 SUMP PUMP EXTRA EQUIPMENT

All Threads Are Right Hand Unless Otherwise Specified.



Fire Hose Adapter

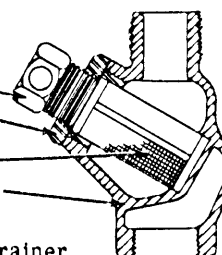
Hose Nipple



Reducing Bushing

- C-061460 Line Air Strainer
Comp. Consists of:
P-002293 Air Strainer Plug
C-061341 Air Strainer Gland
C-062965 Gasket
C-061340 Air Strainer Screen
C-061339 Air Strainer Housing

Line Air Strainer



NPT - NATIONAL PIPE TAPER

BSP - BRITISH STANDARD PIPE THREAD

Title	Part Number	Description
Water (NPT) Discharge Hose	C-079283	50 ft. - 2 1/2" single jacket rubber lined fire hose with 2 1/2" pipe thread coupling, one female and one male. Incl: C-080166 spanner wrench.
Fire Hose Adapter (NPT)	C-078992	Has 2 1/2" male pipe thread one end and 2 1/2" male Nat. Std. fire hose thread at other end.
Hose Nipples (NPT)	C-037469	2 1/2" male pipe thread one end. Other end unthreaded 3" O. D. to receive 3" I. D. hose.
	C-037863	3" male pipe thread one end. Other end unthreaded 3 1/2" O. D. to receive 3 1/2" I. D. hose.
Pipe Thread Reducing Bushings (NPT)	C-036452	Has 2 1/2" male and 2" female pipe thread.
	C-037468	Has 3" male and 2" female pipe thread.
FOR BSP		
HOSE COMPLETE WITH CONNECTIONS ONE END ONLY.		
Water Discharge Hose (BSP)	R-137989 (Ref: 33FPS2469)	10m (32.8ft) - 2 1/2" rayon reinforced flexible rubber hose capable of being wound flat for easy storage. A 2 1/2" BSP connection on one end
	R-137990 (Ref: 66FPS2469)	20m. (65.6 ft) - 2 1/2" rayon reinforced flexible rubber hose capable of being wound flat for easy storage. A 2 1/2" BSP connection on one end.

GENERAL INSTRUCTIONS

Preparing for Operation

Daily before putting pump in operation comply with Lubrication instructions.

Always blow out air line to clear it of all accumulated dirt or moisture before attaching it to pump.

Make sure exhaust pipe or hose is long enough to be above water level at all times. Do not allow dirt or moisture to enter exhaust while moving pump.

Keep pump level. If possible, set it on a board or flat stone above muck or settlings.

If liquid being pumped is extremely dirty, place pump in a wire basket or screened box.

Lubrication

Manufacturer	Lubricant Equivalents for Air Motors	Grease Equivalents for Bearings and Gearing
Esso	Nuto H40	Beacon 2
Mobiloil	Velocite 10	Mobilplex 47
Shell	Tellus 23	Alvania EP2
Texaco - Caltex	Spindura 22	Multifak EP2
BP Power Petroleum	Energol CS40	Energrease LS3
Burmah - Castrol	Hyspin AWS22	Spherol AP2

Lubrication

Daily before using and when putting a new or old pump into service, pour a small quantity of recommended oil into live air inlet.

Before using and after each eight hours service, remove oil plug and fill reservoir with recommended oil.

Whenever pump is disassembled, clean out ball bearings and clean old grease from all other parts.

Using recommended grease, repack bearings, fill governor chamber in bottom of governor housing three-quarters full and coat all parts between lower end plate and impeller. Be sure terminal threads on impeller and threads on end of rotor are well coated.

NOTE: Automotive water pump grease is designed for use with hot water and is too hard for use in pump operating in cold water.

When pump is taken out of service, if only for overnight, drain out all water, disconnect all hoses, pour a small amount of oil into live air inlet, connect air hose and idle pump until a coating of oil has reached all internal parts (about one minute).

Recommended Lubricants

OIL

Chicago Pneumatic Airoilene Oil which contains a rust inhibitor and will not separate while tool is idle, is recommended for use in the motor and may be purchased under the following symbols:

1 pt. ----- P-137646
 1 gal. ----- P-089507
 5 gal. ----- P-089508

If recommended oil is not available, use a turbine or spindle grade oil having a viscosity of 100-150 SUS at 100°F., which contains a rust inhibitor.

GREASE

Lubriplate #110 (Fisk Bros. Refining Co., Newark, New Jersey - Toledo, Ohio) or equivalent is recommended for use in the governor cage chamber.

Chicago Pneumatic bearing grease is recommended for use in the ball bearings and may be purchased under the following symbol:

1 lb. can ----- S-087658

If recommended grease is not available, use a good grade grease such as Humble Oil Co's. Andok C grease or equivalent.

Oiler Adjustment

The oiler valve is factory set to deliver approximately six ounces of oil in each eight hours service. If readjustment is necessary, proceed as follows:

1. Remove oil plug and drain all oil out of reservoir.
2. Unscrew and remove four nuts with lockwashers holding governor housing to motor housing and remove governor housing.
3. Remove oiler filter washer from governor housing and rotate oiler valve seat to adjust oil flow.

Clockwise rotation reduces flow.

Counter clockwise rotation increases flow.

NOTE: Normal flow of oil is approximately 2 drops per minute. Do not restrict flow entirely as lack of lubrication will result in rapid pump failure.

NOTE: The oiler valve may stick to the oiler valve seat when the seat is screwed in. Check by inserting a small pin through hole in seat. It should be possible to feel the valve move against oiler valve spring.

4. Reassemble and check by holding a piece of clean paper in front of air exhaust while operating pump. A fine oil film will appear on paper when valve is properly adjusted.

Loss of Power/ Motor Failure

Loss of power and motor failure may be caused by conditions outside the Pump. Check for:

1. Low air pressure at the Pump. 90 psi (6.2 bar) air pressure is required at the Pump, with motor running wide open.
2. Lowered compressor output.
3. Excessive drain on supply line.
4. Use of hose or connections of insufficient size.

If the above conditions are found to be in order, check in sequence the following:

1. Air strainer: remove, clean and replace.
2. Motor lubrication: Fill oil reservoir, disconnect hose and pour a small amount of recommended oil in live air inlet. Check oil in exhaust air as outlined under "Oiler Adjustment."
3. Impeller: Grit may be lodged under impeller or between impeller and wear ring, stalling Pump. To correct:
 - A. Raise Pump just out of water permitting water in discharge hose to flush back through Pump which may dislodge particles.
 - B. With motor shut off, insert screwdriver through hole in center of bottom of impeller housing, engage it with slot in end of rotor and attempt to turn rotor.
 - C. Unscrew and remove four nuts with lockwashers holding impeller housing to motor housing, remove impeller housing from pump and clean wear ring and impeller.
4. Motor: While impeller housing is removed try turning impeller by hand. If it turns freely, turn on air and check motor operation. If impeller will not turn, or if motor operates sluggishly, remove governor housing and upper end plate. (See Disassembly and Assembly.) Check for worn or damaged rotor blades, dirt in motor, bearing lubrication, governor wear. If necessary, disassemble motor, clean all parts and replace worn or damaged parts.

5. Icing: Icing in the exhaust chamber and pipe is caused by entry of moisture in the motor or exhaust chamber. Check air inlet and exhaust connections for water tightness. Be sure end of exhaust pipe or hose is well above water. Carefully check grease seals and gaskets and replace if leakage is indicated.

Maintenance

CHICAGO PNEUMATIC Sump Pumps are designed to meet conditions which subject them to severe wear and to the presence of corrosive liquids. Reasonable care and a regular inspection and repair program will prolong the life and maintain the efficiency of the units. The immediate correction of minor faults will prevent later extensive overhaul and reconditioning.

1. Follow "Lubrication" instructions carefully.
2. Follow above routine in "Preparing for Operation."
3. Keep nuts on housing tight.
4. Be sure air inlet and exhaust connections are water tight.
5. After each 400 hours of service completely disassemble pump, clean all parts and check for damage or wear. Replace worn or damaged parts, lubricate as recommended and reassemble.

Storage

When storing Pump for any length of time precautions should be taken to prevent corrosion and to maintain Pump in a servicable condition.

1. Remove discharge and exhaust hose or pipe and run Pump out of water to blow out all moisture.
2. Remove air line and pour a small amount of rust resisting oil in live air inlet. Reconnect hose and idle motor a few minutes to carry oil to all internal parts.
3. Remove air hose and plug live air inlet and air exhaust port with corks.
4. Wipe outside of Pump with rust resisting oil, wrap Pump in oiled paper and pack in covered box.
5. Store Pump in dry place.

Disassembly/Assembly Cautions

CHICAGO PNEUMATIC Sump Pumps are constructed of precision built parts designed to operate at close clearances and in perfect alignment. Reasonable care must be taken during disassembly and assembly to avoid damage such as scoring or distortion of parts.

Care must be taken to avoid damage to seals and gaskets since it is essential to the operation of the Sump Pump that it remain water tight.

Before starting disassembly, remove Oil Plug and drain all oil out of Oil Reservoir.

I. To Disassemble Sump Pump

1. Unscrew exhaust pipe from motor housing.
2. Remove four hex nuts from studs in impeller housing. Lift pump unit out of impeller housing.
3. If necessary to replace, drive lower wear plate out of impeller housing.

II. To Assemble Sump Pump

1. Use arbor press to press new lower wear plate into impeller housing.
2. Fasten pump unit to impeller housing with four hex nuts.
3. Be sure vent hole is left open.

III. To Disassemble Governor Housing

1. Unscrew and remove four nuts with lock-washers from studs in motor housing, lift governor housing off motor housing.
2. Remove oiler filter washer from governor housing.
3. Unscrew and remove oiler valve seat from governor housing and remove "O" ring from oiler valve seat.

NOTE: Count number of turns necessary to remove oiler valve seat. Seat position controls oil flow and it must be adjusted on reassembly to give approximately 2 drops of oil per minute. See oiler adjustment, Page 5.

4. If necessary to replace, remove oiler valve and oiler valve spring by tapping governor housing on wood block to jar parts loose.
5. Remove "O" ring from oiler valve.
6. Unscrew and remove four screws and lock-washers from cage tension disc.
7. Remove cage tension disc and governor cage complete from governor housing.
8. Remove "O" ring packing from air inlet of governor housing and remove air strainer.

IV. To Assemble Governor Housing

1. Place governor cage complete and cage tension disc in governor housing.
2. Screw four screws with lockwashers through cage tension disc into governor housing.
3. Place air strainer and "O" ring in air inlet of governor housing.
4. Place "O" ring on oiler valve.
5. Place oiler valve spring and oiler valve in governor housing.
6. Place "O" ring on oiler valve seat.
7. Screw oiler valve seat into governor housing. See oiler adjustment Page 5.
8. Place oiler filter washer on governor housing.
9. Place governor housing on studs in motor housing and fasten with four nuts with lockwashers.

V. To Disassemble Governor Valve Cage

1. Remove governor cage complete from governor housing. See Section III.
2. Turn lock wire to remove screw from spring retainer. Depress retainer to disengage arms from slots in cage.
3. Remove governor valve spring, governor valve and valve pin from cage.
4. Remove two "O" rings from governor valve cage.

VI. To Assemble Governor Valve Cage

1. Place two "O" rings in grooves around governor cage.
2. Place governor valve pin and governor valve in governor valve cage.
3. Place spring in governor valve, engage boss on retainer in end of spring and work arms of retainer into slots in cage.
4. Insert lock wire in hole in screw and thread tightly into retainer.
5. Assemble governor valve cage with governor housing. See Section IV.

VII. To Disassemble Motor Housing

1. Remove impeller housing from motor housing. See Section I.
2. Remove governor housing from motor housing. See Section III.
3. Remove "O" Ring and governor housing gasket from motor housing.
4. Wedge impeller to prevent turning, and, with heavy screwdriver turn rotor clockwise to remove impeller.
5. Remove impeller sleeve and "O" rings from rotor shaft.
6. Push assembled motor out of motor housing.
7. Remove seal plate gasket and seal plate from motor housing.
8. If necessary to replace, remove oil seal from seal plate.

CAUTION: Note position of oil seal carefully. New oil seal must face toward impeller. See Figure 1.

9. Press upper wear plate out of motor housing.
10. Remove "O" ring from upper wear plate.
11. If necessary to replace, remove oil seal from upper wear plate.

CAUTION: Note position of oil seal carefully. New oil seal must face toward impeller. See Figure 1.

VIII. To Assemble Motor Housing

1. Press new oil seals into upper wear plate and seal plate.

NOTE: It is important that soft face of oil seal face toward impeller as shown in Figure 1.

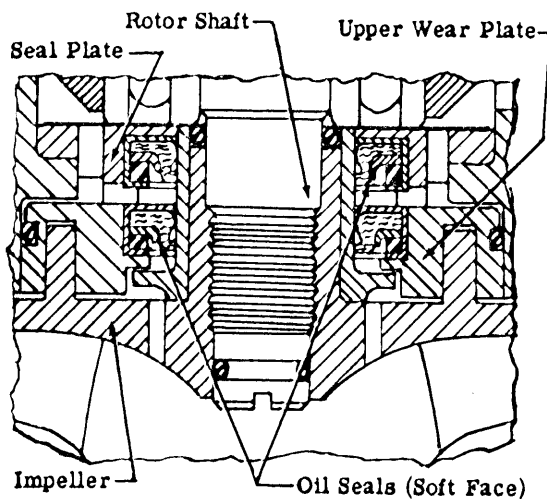


Fig. 1

2. Place "O" ring in groove around upper wear plate.
3. Press upper wear plate into motor housing flush with face of motor housing.
4. Place seal plate and seal plate gasket in motor housing.
5. Pack Lubriplate #110 between and on lips of oil seals, place motor in motor housing as outlined in Section X and place "O" rings on threaded end of rotor shaft.
6. Place impeller sleeve on rotor shaft.
7. Hold impeller on rotor shaft and turn rotor counter-clockwise with screwdriver.

8. Place "O" ring and governor housing gasket in motor housing.
9. Place governor housing on four studs in motor housing.
10. Fasten governor housing to motor housing with four nuts and lockwashers.

IX. To Disassemble Motor

1. Remove assembled motor from motor housing. See Section VII.
2. Remove dowel pin from motor housing.
3. Unscrew and remove governor body complete from rotor.

CAUTION: Left Hand Thread

4. Remove pin retainer from governor body.
5. Remove governor weight pins, governor weights and governor push pin from governor body.
6. Remove upper end plate and upper rotor bearing spacer from rotor.
7. Remove liner and four rotor blades from rotor.
8. Remove lower end plate and lower rotor bearing spacer from rotor.
9. Remove "O" ring from lower end plate.
10. Remove ball bearings from upper and lower end plates.

X. To Assemble Motor

1. Place ball bearings in upper and lower end plates.
2. Place "O" ring in groove around lower end plate.
3. Place lower rotor bearing spacer on rotor and slide lower end plate on rotor.
4. Check clearance between faces of rotor and end plate and use C-103954, C-103955 or C-103956 shim or shims as required to secure .002/.003 clearance.
5. Place liner over rotor.

NOTE: Flanged end of liner having two drilled holes must be away from lower end plate.

6. Place four lightly oiled rotor blades in rotor.
7. Place upper rotor bearing spacer and upper end plate on rotor.
8. Place governor weights in governor body.
9. Insert governor weight pins through governor body.
10. Place pin retainer over governor body.
11. Place governor push pin in governor body.
12. Screw governor body complete into rotor.

CAUTION: Left Hand Thread

13. Place dowel pin through upper end plate, liner and lower end plate.
14. Draw assembled motor into motor housing, aligning dowel pin with dowel pin hole in bottom of motor housing.
15. Place "O" ring on threaded end of rotor.
16. If new end plates or liner have been used, check distance from top of motor housing to top of upper end plate. If this dimension is between .001" and .006" add one C-048412 shim. If the dimension is from .006" to .009", use two shims. If an old seal plate gasket is being used, assume a set of .003", subtract that amount from measured depth and add a shim or shims as directed, between upper end plate and gasket.
17. Assemble governor housing and governor housing gasket with motor housing.

SPARE PARTS SERVICE CHART

THIS SERVICE CHART IS PUBLISHED AS A GUIDE TO EXPECTANT LIFE OF COMPONENT PARTS. THE REPLACEMENT LEVELS ARE BASED ON AVERAGE TOOL USAGE OVER A ONE YEAR PERIOD

EXAMPLE: For 10 tools in use: 10 high wear items will be required per year, 7 medium wear items, etc.

NOTE: Quantities must be increased where tools subjected to more severe and/or continuous usage.

LEGEND

X—Type of wear, if no other comments apply.

D—Easily damaged during disassembly and assembly.

R1—Replace each time tool is disassembled.

Index No.	CP Part No.	Description	No. Req'd	High Wear	100% Medium Wear	70% Low Wear	30% Non-Wear	10% Subject To External Damage
4	C-085366	Housing-Governor	1					X
5	C-084172	"O" Ring	1	R1				
6	C-085385	"O" Ring	2	R1				
7	C-090975	Weight-Governor	2			X		
8	S-008020	Lockwasher	4	X				
9	S-007685	Screw	4				X	
10	C-085369	Disc-Cage Tension	1			X		
11	C-083360	Retainer-Pin	1			X		
12	C-085385	Pip-Governor Push	1			X		
14	C-085348	Housing-Motor	1					X
15	C-085361	Liner	1	X				
16	C-085359	Rotor	1	X				
17	C-058879	Valve	1			X		
18	C-085355	Pin-Dowel	1				X	
19	C-085362	Blade-Rotor	4	X				
22	C-071451	Nipple-Close	1					X
23	C-088457	Gasket-Seal Plate	1	R1				
24	C-088616	Seal-Oil	2	R1				
25	C-084173	"O" Ring	1	R1				
26	C-088458	Plate-Upper Wear	1	X				
27		Shims	As Req'd					D
28	C-085341	Housing-Impeller	1					X
29	C-084400	"O" Ring	1	R1				
32	C-085342	Screen	1					X
34	C-088459	Plate-Lower Wear	1	X				
	C-088758	Impeller (Bronze)	1	X				
36	C-088455	Sleeve-Impeller	1	X				
37	C-085382	Bearing-Ball	1	X				
38	C-035188	Lockwasher	8	X				
40	H-083084	"O" Ring	1	R1				
41	C-088456	Plate-Seal	1					D
42	C-085356	Plate-Lower End	1		X			
44	C-085357	Spacer-Rotor Brg.	1			X		
45	C-088699	"O" Ring	1	R1				
46	C-085358	Spacer-Rotor Brg. (Upper)	1			X		
47	C-085380	Plug-Oiler Filter	1				X	
48	C-085360	Plate-Upper End	1		X			
49	C-085363	Gasket-Governor Housing	1	R1				
50	P-083071	"O" Ring	1	R1				
51	C-085379	Seat-Oiler Valve	1				X	
52	S-017510	Spring	1				X	
53	C-079489	"O" Ring	1	R1				
54	C-056974	Screw	1				X	
56	C-085378	Valve-Oiler	1				X	
57	C-085386	"O" Ring	1	R1				
58	C-061078	Stud	8					D
59	C-056975	Lockwire	1					X
60	C-085834	Nut-Brass	8					D
61	C-013654	Bearing-Ball	1	X				
63	C-085364	Body-Governor	1			X		
64	C-083361	Pin-Governor Weight	2	X				
65	C-085371	Pin-Governor Valve	1	X				
66	C-085370	Valve-Governor	1			X		
68	C-085368	Cage-Governor	1			X		
69	C-085372	Spring-Governor	1				X	
70	C-089835	Retainer-Governor Spring	1				X	
71	C-086130	Plug-Oil	1				X	
73	P-083082	"O" Ring	1	R1				
74	C-085374	Strainer-Air	1		X			
75	C-086080	Pipe-Exhaust	1					X
79	C-085347	Handle	1					X