CH&E

Operating and Maintenance Manual
Electric Motor Powered & Without Power
3” Diaphragm Pumps

Series
5500
6500

Operation Manual Contents:

- Serial Number/Model Number Information Pg.1
- Safety Information Pg. 2
- Equipment Specifications Pg. 3
- Operating Instructions Pg. 3
- Application Suggestions Pg. 3
- Application Suggestions Con't Pg. 4
- Maintenance Requirements Pg. 4
- Troubleshooting Guide Pg. 5

Serial Number / Model Number:

A nameplate listing the Model Number and Serial Number is located on each pump. **The Model Number and Serial Number are necessary for ordering parts or requesting service; it is important that you document these numbers.**

Record Model Number and Serial Number Here:

Serial Number

Model Number

Safety Information:

DANGER! INDICATES AN IMMENENTLY HAZARDOUS SITUATION, FAILURE TO ABIDE BY SAFETY PRECAUTIONS WILL RESULT IN DEATH OR SERIOUS INJURY.

Electric Power:

DO NOT: Operate with a frayed or damaged power cord.
DO NOT: Ground the pump to a gas line.

DO: Ground the pump.
DO: Realize there is a potential for electrocution whenever electricity is present.

WARNING! INDICATES A POTENTIALLY HAZARDOUS SITUATION; FAILURE TO FOLLOW INSTRUCTIONS MAY RESULT IN DEATH OR SERIOUS INJURY.

Electric Power:

DO NOT: Allow water to accumulate around the pump.
DO NOT: Reset a circuit breaker without first investigating the cause of the problem.

DO: Install pump in accordance with the National Electrical Code and all applicable local codes.
DO: Use watertight connections.
DO: Shutdown and lockout circuit breaker before performing maintenance.

Pump Safety:

DO NOT: Pump flammable liquids.
DO NOT: Pump corrosive liquids. Contact local authorities for assistance.
DO NOT: Remove hoses, drain plug, fill plug or any access covers if the pump has not primed in ten minutes. Water in the pump will be hot and could be under high pressure. Allow pump to cool completely before attempting maintenance.
DO NOT: Operate this equipment without understanding the operating procedures.

DO NOT: Attempt to clear blockages or clean the pump while the pump is operating; rotating parts can cause serious injury.
DO: Read, understand, and follow pump and operation manual procedures.
DO: Be sure pump is on a firm, level surface and will not tip, roll or fall while in operation.
DO: operate only when guards are in place.

CAUTION! INDICATES A POTENTIALLY HAZARDOUS SITUATION, WHICH, IF NOT AVOIDED, MAY RESULT IN PROPERTY DAMAGE.

DO NOT: Run pump against a closed discharge.
DO NOT: Run the pump dry.

DO: Drain the pump in freezing weather.
DO: Flush the pump with clean water after each use.
DO: Store equipment properly when it is not in use.

Equipment Specifications:

Pump Specifications:

Pump Model	5410	6410	5510	6510
Weight lbs. (kg)	120 (54)	150 (68)	140 (64)	185 (84)
Max. Static Suction Lift ft. (m)	25ft(7.5)		25ft(7.5)	
Max. Static Discharge Head ft. (m)	25ft(7.5)		25ft(7.5)	
Pump Speed (max)	41 Strokes/min		41 Strokes/min	
Gear Case Lubricant oz. (ml)	SAE 80/90 Gear Oil		SAE 80/90 Gear Oil	
Oil Capacity oz. (ml)	20(600)		20(600)	
Suction/Discharge Diameter in. (mm)	2(50)		3(75)	
Max. Solid Size In.	1.4		1.75	

Operating Instructions:

1. Read the “Pump Safety” pamphlet in its entirety before operating the pump and observe safe pump operating procedures at all times.
2. Make sure that the pump is installed in accordance with the applicable local and national electrical codes.
3. Examine the pump carefully and read all instructions thoroughly before beginning pump operation.
    a. Notify the transportation company at once of any damage or loss that may have occurred during transit.
4. When using a suction hose, make sure that the gasket is in place and in good shape.
    a. When using pipes, coat the threads with a sealing compound.
5. Use grease or thread sealer on threaded connections to make them airtight.
6. Make sure that the hose does not leak and that the hose lining is not loose or it will collapse under suction pressure and block the hose.
    a. A hose guard should be used on the end of the suction line to prevent pumping solids too large for the pump to handle.
7. On high suction lifts, or if the pump has been idle and the valves are dry, remove the cap on the suction chamber and fill the pump with water.
    a. This will help seal the valves and speed up priming time.
8. All gaskets and joints must be airtight.
9. Pump speed and flow can be regulated with a variable frequency drive or a mechanical speed drive.
    a. Limit the maximum speed to 65 strokes of the diaphragm.
    b. The volume flow should **NEVER** be controlled with a valve.

Application Suggestions:

1. Do not reduce the discharge size.
2. Minimize the number of fittings in the system. A suction hose on the suction and discharge side is recommended.
3. If valves are used to isolate the pump, be sure to never run the pump against a closed valve in the discharge line.
4. Note that the maximum head figures given for the pump are 25 ft. suction lift; 25 ft. discharge head are static head. Calculating the total head in a diaphragm pump system is very difficult due to the pulsating nature of the flow. Mechanical diaphragm pumps are low head pumps and may only be used in

systems with low head requirements. A bulging diaphragm and loud flap valves are an indication of too high head conditions.
5. Adding a simple ½" light, spring-loaded check valve near the pump discharge to allow air into the line when the discharge flap valve closes will smooth out the pulsating flow and cushion the shock waves created by the inertia of the flow in the line. Pulsation dampers may be used successfully in some systems to damper the pulsating water.

Maintenance Requirements:

∗NOTE∗ Turn off and lockout power before performing ANY maintenance!

- Change the transmission oil after the first 40 hours of operation.
  - Use SAE 80/90 EP gear oil.
  - Capacity is 20 oz. (550 ml, 1 ¼ pints).
  - Fill with oil to the oil level plug located in the transmission cover.
  - Check the oil level daily before beginning pump operation.
- Change the transmission oil every 400 hours of operation after the initial (40 hour) oil change.
- Every 25 hours of operation, grease the pump connecting rod bearing by accessing it through the connecting rod guard.
- Keep the interior of the pump and the valves clean.
- Flush the pump out with clean water after each use.
- Remove the pump connecting rod bearing occasionally and clean the excess grease from the pump connecting rod bearing.

Changing a Diaphragm:

1. Rotate the pump connecting rod to the down position by rotating the crank arm with a large wrench.
2. Remove the four bolts that clamp the diaphragm between the pump frame and the water box.
3. Remove the three nuts from the bolts that clamp the diaphragm between the connecting rod and the diaphragm bottom plate.
4. Install the new diaphragm onto the bolts and diaphragm bottom plate.
5. Using a pipe spacer over the bolts, drive the diaphragm down into position on the diaphragm bottom plate.
6. Install the diaphragm and diaphragm bottom plate assembly onto the connecting rod.
7. Tighten the three nuts and torque:
   a. For 2" Pumps: 34-40N-m (25-30lb/ft)
   b. For 3" Pumps: 45-54N-m (35-40lb/ft)
8. Center the diaphragm carefully over the water box and clamp with four bolts to the pump frame.
9. Tighten the bolts in a crossing pattern and torque:
   a. For 2" Pumps: 25-30N-m (25-30lb/ft)
   b. For 3" Pumps: 35-40N-m (35-40lb/ft)

Changing Flap Valves:

1. Remove the suction connection, discharge connection, and flap valves.
2. Install the weight and binder plates on the new flap valve.
   a. Use a thread-sealing compound on the screws.
   b. Tighten the screws firmly but make sure they do not distort the rubber, which would cause poor seating.
3. Install the flap valves on the valve seat of the water box and suction connection with the binder (the smaller plate) facing down into the hole.
4. Locate the flap valves on the dowel pins in the suction connection and on the water box.
5. Reassemble the suction and discharge connections to the water box.
6. Tighten the bolts and torque:
   a. For 2" Pumps: 20-34N-m (15-20lb/ft)
   b. For 3" Pumps: 27-34N-m (20-25lb/ft)

Troubleshooting Guide:

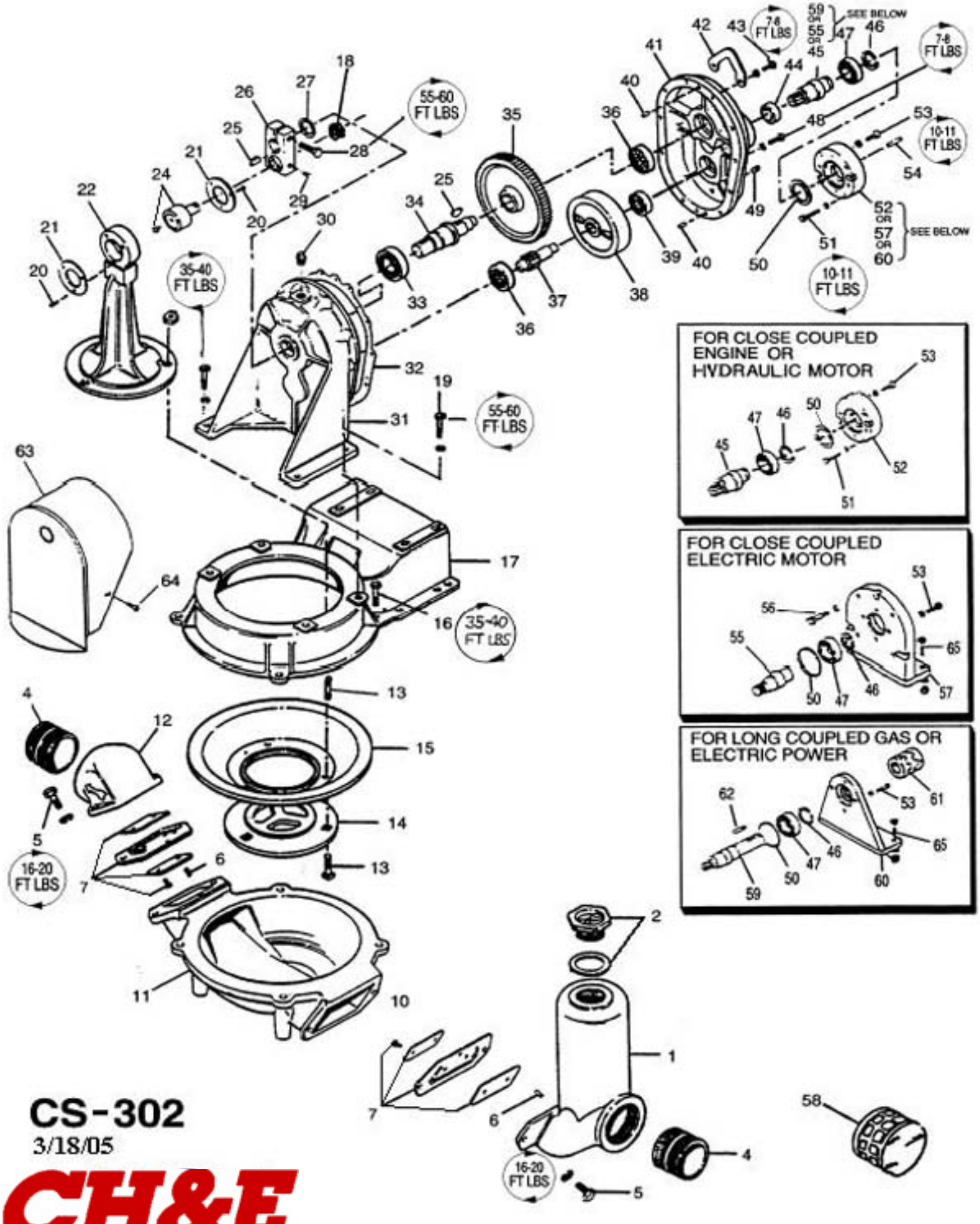
Problem	Possible Reason
Pump does not prime AND/OR Pump does not operate properly.	1. Pump may be too high above or too far away from the water source. 2. There may be leaks in the suction hose or hose connection. 3. Valves may not be sealing properly due to accumulation of residue. Pour water into the suction chamber to seal the valves. 4. Valves may not seal due to distortion. Adjust the tightness of the suction and discharge connection mounting bolts. 5. Check diaphragm for breaks and/or leaks. 6. Ensure that the end of the suction line is in position to allow water to enter. The suction line may be buried or blocked. 7. Do not allow any point of the suction hose to be higher than the suction connection on the pump. A trapped air pocket can form and prevent priming. 8. The pump will not operate properly under a positive suction head condition.
Reduced Capacity.	1. The discharge line may be too small, too high or too long causing: a. Excessive bulging of diaphragm on the down stroke. b. Valves closing with a loud snap. c. Overall rough operation. *Diaphragm pumps will handle fluids containing a considerable amount of solids, however, if the mixture is too heavy to be pumped, liquid must be added until the mixture becomes sufficiently fluid for pumping.

3" Diaphragm Pumps, Electric Motor Powered & Without Power

Ref. #	5500 Aluminum	6500 Cast Iron	Qty.	Description
1	P3309-A1	P3309-C2	1	Suction Connection.
2	P3322-P3323	P3322-P3323	1	Plug with Gasket Assy.
4	P3041	P3041	2	Nipple
5	A010.050.0175	A010.050.0175	4	Hex Screw & L.W.
6	18-051	18-051	2	1/8" x 3/8" Spring Pin
7	SA-10001N	SA-10001N	1	Flap Valve Assy.
10	DF205.P19.0050Z	DF205.P19.0050Z	4	#10-32 x 1/2" Pan Phillips Head Screw
11	P3308-A1	P3308-C2	1	Water Box
11	P3308A-A1	P3308-A-C2	1	Cage Mtg.
12	P3310-A1	P3310-C2	1	Discharge Connection
13	A020.050.0200ZC	A020.050.0200ZC	3	½" – 13 X 2" Carriage Bolt, HN
14	P3306-A1	P3306-C2	1	Diaphragm Bottom
15	P2726	P2726	1	Diaphragm
16	A010.050.0225	A010.050.0225	6	Hex Screw & H.N. – Wheel Mtg.
17	P4771	P4771	1	Pump Frame
18	OEBX	OEBX	1	¾ "-16UNF Jam Lock Nut
19	A010.050.0175	A010.050.0175	6	Hex Screw & L.W. – Cage & Skid Mtg.
19A	A010.050.0250	A010.050.0250	2	Hex Screw & L.W. – Wheel Mtg.
20	DF200.R19.0050Z	DF200.R19.0050Z	6	#10-32 x 1/2" Flat Phillips Head Screw
21	P3317	P3317	2	Retaining Washer
22	P3305	P3305	1	Connecting Rod
24	P5581	P5581	1	Conn. Rod Brg w/W33-3/16 Grease Ftg
25	W70-807	W70-807	2	Woodruff Key
26	P5583	P5583	1	Crank Arm
27	W35-C12329CRW1	W35-C12329CRW1	1	Lip Seal
28	A010.050.0150	A010.050.0150	1	Hex Screw
29	BC090.C031.031	BC090.C031.031	1	5/16"-18 x 5/16" Socket Set Screw
30	R454A	R454A	1	3/8" Vented Pipe Plug
31	P4850	P4850	1	Case
32	P4858	P4858	1	Gasket
33	W16-6307	W16-6307	1	Ball Bearing
34	P4853	P4853	1	Gear Shaft
35	P5058	P5058	1	79 Tooth Gear
36	W16-6304	W16-6304	2	Ball Bearing
37	P4852	P4852	1	11 Tooth Pinion
38	P3417	P3417	1	85 Tooth Internal Gear
39	W16-6302	W16-6302	1	Ball Bearing
40	H705.025.0075	H705.025.0075	2	1/4" x 3/4" Dowel Pin
41	P4851	P4851	1	Cover
42	P4945	P4945	1	Lifting Hook
43	A010.025.0125	A010.025.0125	2	Hex Screw & L.W. & F.W.
44	W19-TB188	W19-TB188	1	Needle Bearing
46	W63-5100-118	W63-5100-118	1	Retaining Ring
47	W16-6006LLU	W16-6006LLU	1	Ball Bearing
48	A010.025.0100	A010.025.0100	9	Hex Screw & L.W.
49	0002-1603	0002-1603	2	1/8" Sq Hd Pipe Plug
50	P4859	P4859	1	"O" Ring
53	BC070.031.0100	BC070.031.0100	4	5/16" x 1" Soc Screw & LKI.W.
54	P5601	P5601	1	3/16" SQ x 1" Key
55	P4855	P4855	1	14 Tooth Pinion (5/8" Bore) – 56C Motor
55	P5175	P5175	1	14 Tooth Pinion (7/8" Bore) – 143TC/145 TC Motor
56	A010.037.0125	A010.037.0125	4	Hex Screw & L.W.
57	P4857	P4857	1	Electric Motor Adapter
63	P3691	P3691	1	Crank Arm Guard
64	DC290.X19.050FZ	DC290.X19.050FZ	2	#10-24 x 1/2" Wh Hd Self Tap Screw
65	A010.031.0175	A010.031.0175	2	Hex Screw & H.N. & L.W. & F.W.

Flap Valve Assemblies Available
SA-10001B – Buna N.
SA-10001N – Neoprene
SA-10001V – Viton
SA-10002N – Neoprene w/ Cloth Insert

Diaphragm Pump Rebuild Kits Available
W103-030.0T – TPE
W103-030.0R – Rubber
W103-030.0N – Neoprene
W103-030.0B – Buna-N
W103-030.0V – Viton



CS-302

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