3” MODELS
MAINTENANCE MANUAL

CHECK VALVE AND O-RING MAINTENANCE

1. Flush and neutralize the pump to be certain all corrosives or hazardous materials are removed prior to any maintenance. This procedure should always be followed when returning pumps for factory service also.
2. Remove the suction and discharge manifolds fasteners (16, 17, 18). The check valve seats (26) and check balls (27) are located inside the bottom of the Outer Chamber (28) or inside the Discharge Manifold (22). Remove the seat and balls and inspect for excessive wear, pitting, or other signs of degradation. On models using nylon check valve seats (25) and o-rings (24), check the seats, balls, for excessive wear, pitting, or other signs of degradation.
   NOTE: when using pumps built with Teflon o-rings, always replace with new Teflon o-rings since the original o-rings will not reseal the pump.

DIAPHRAGM AND PILOT SLEEVE ASSEMBLY MAINTENANCE

3. To inspect the diaphragms, remove the eight (8) fasteners (9, 16,17, 33) from the outer chamber. If replacement is necessary due to abrasion or rupture, remove the outer diaphragm plates (52) by turning counter-clockwise. Models built with Teflon elastomers will have Teflon overlays (30) that face the outer chamber (28) and back-up diaphragms (31) on the air side of the pump. Pumps without Teflon will contain only the back-up diaphragms (31).
4. If diaphragm replacement is required, remove the inner diaphragm plate by removing fasteners (56, 55).
5. If a diaphragm has been ruptured and corrosive or viscous fluid has entered the air side of the pump, the complete air system should be cleaned and inspected.
6. After removing the diaphragm-plate assemblies, bumpers (3), & flat washers (47) the pilot sleeve assembly (13, 14,15, 42, 45, & 48) and diaphragm rod assembly (34, 49) may be removed after removing the retaining plate (46) fasteners (38) and pushing the entire unit out through the bore in the intermediate (41). The diaphragm rod assembly must be unscrewed to remove the pilot sleeve (13).
   NOTE: To aid in reassembly apply a non-synthetic petroleum based lubricating grease without EP additives on all the o-rings and the intermediate bore. Carleton-Stuart MagnaLube is recommended.
7. Clean or replace any components that have excessive wear, dirt build-up, or chemical attack. Lube all components prior to reassembling. Reassemble pilot sleeve spacers, o-rings (42) and lip seals (14) within bore of intermediate. Make sure that the open side of the lip seals is facing outward toward the diaphragms. Also make sure that the end pilot spacers (45) are at the end on either side of the pilot sleeve assembly and all inner spacers (48) are separated by o-rings.
   Next carefully insert the diaphragm rod assembly with pilot sleeve inside the assembly in the bore. Reattach retaining plates. Do not overtighten self-tapping screws (38).
   NOTE: To aid in reassembly of the diaphragms apply a non-synthetic petroleum based lubricating grease without EP additives to the diaphragm’s outside diameter sealing bead. Carleton-Stuart MagnaLube is recommended.
8. Reassemble the diaphragms (31) by placing the “liquid side” on the outer diaphragm plate (52), place the **inner diaphragm plate** on the opposite side of the diaphragm, insert fasteners (56) with washers (55) and **tighten fasteners to 12.5 ft-lbs (17.0 NM) of torque.**
   NOTE: For models with Teflon overlays (30), position the overlay between the outer diaphragm plate (52) and the diaphragm (31) before attaching the inner diaphragm plate (51).
9. Screw stud (35) into the end of the diaphragm rod, place washer (47) onto stud (35) and bumper (3) onto diaphragm rod. Screw the diaphragm assembly to one end of the diaphragm rod and **tighten to 10 ft-lbs (13.56 NM).** Position the outer chamber (28) and lightly tighten fasteners (16,17,18,33).
   Insert a pry bar into the chamber’s suction opening until it touches the hex boss of the outer diaphragm plate (52). Move the diaphragm rod toward the open chamber. Wedge a block of wood between the pry bar and the side of the suction opening to hold the diaphragm rod in position.
   Invert the second diaphragm assembly, place washer (47) onto stud (35) and bumper (3) onto diaphragm rod. Screw the diaphragm assembly to the end of the diaphragm rod, and **tighten to 10 ft-lbs (13.56 NM) of torque.** Roll the outside bead of the diaphragm toward the outer chamber. Position the outer chamber (28) and **tighten fasteners (16,17,18, 33) to 20 ft-lbs (27.12 NM) of torque.**
   Return to the first outer chamber, align the suction opening flanges until they are level and on the same plane, tighten fasteners (16,17,18, 33) to 20 ft-lbs (27.12 NM) of torque.
10. Place the check balls (27) and check valve seats (26) in the discharge manifold (22), position on the outer chamber and reassemble using fasteners (16,17, 18). Place the check balls (27) and check vale seats (26) in the outer chambers (28), position the suction manifold (23) and reassemble using fasteners (16,17, 18). **Torque all manifold fasteners to 37 ft-lbs (50.17 NM).**

10a. For models using Teflon elastomers, check valve seats (25), and o-rings (24), make sure that the o-rings (24) are facing the machined flanges of the suction manifold (23) and/or discharge manifold (22). Also make sure that the o-rings do not shift from their grooves during reassembly.

AIR VALVE MAINTENANCE

11. To evaluate the air valve components, remove the eight cap screws (11), washers (8,10) from the air body (7). Inspect the gasket (4), valve plate (5) and shuttle (6) for scratches, surface irregularities, and excessive wear. Replace if necessary.
    Remove one of the end plugs (1) by inserting two of the cap screws (11) back into one end of the air valve body, point the other end of the air valve body safely away from people, and apply compressed air through one of the holes located on the gasket surface of the air valve body and the end plug will shoot out. Remove the two cap screws and push the air valve spool (2) toward the remaining end plug until both the end plug and air valve spool are removed being careful not to damage the machined bore in the air valve body.
    Gently reach in and pull the lip seal (43) and o-rings (44) out of inside bore of the air valve body. Check the air valve spool, lip seal and o-rings for cracks, splitting, scratches, and wear. Replace and/or clean items as necessary.
12. Lubricate lip seals (43) and o-rings (44) Reinstall the o-rings and lip seals making sure that the lips of the seals are facing each other.
    Lubricate and insert the air valve spool (2) with the chamfered end entering the air valve body’s inside bore through the end that has the spool image. Press the end plugs into position. Lubricate and reinstall the shuttle valve (6) and valve plate (5). Place the gasket (4) with the words “THIS SIDE UP” facing the valve plat. Reassemble to the intermediate using cap screws (11) and washers (8, 10). Flat washers should be touching the plastic air valve body. **Tighten cap screws to 40 in-lbs (4.52 NM).**

EXTERNAL FASTENER TORQUE REQUIREMENTS

NOTE: When reassembling, loosely tighten external fasteners, adjusting and aligning and gradually, in a an alternating fashion, tighten torque requirements listed below:

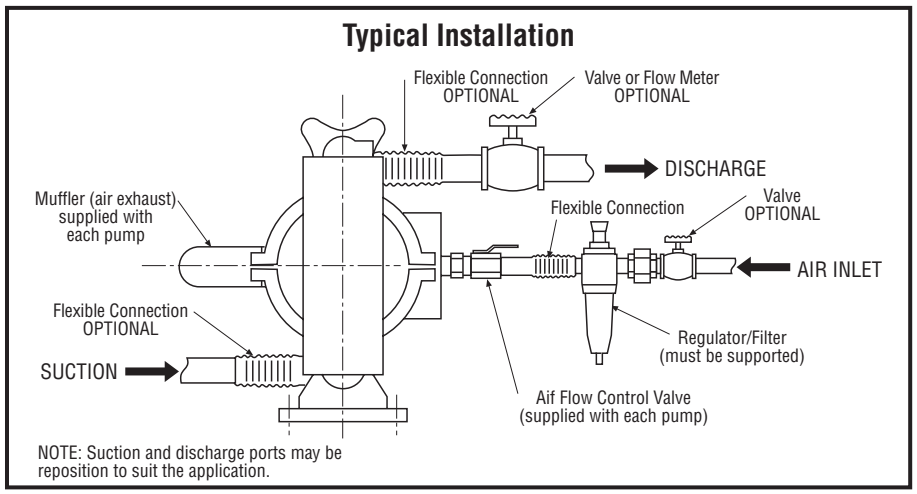
Diaphragm Plates	12.5 ft-lbs	(17.0 NM)
Diaphragm/Rod	10.0 ft-lbs	(13.56 NM)
Chambers	20.0 ft-lbs	(27.12 NM)
Manifolds/Chamber	37.0 ft-lbs	(50.17 NM)
Air Valve Body	40.0 in-lbs	(4.52 NM)

SPECIFICATIONS

CAPACITY:
Adjustable 0-255 GPM (965 LPM)
MAXIMUM TEMP:
3" Metallic - 200°F (93°C)
MAXIMUM AIR PRESSURE:
125 psi (8,5 bars)
MINIMUM AIR PRESSURE:
20 psi (1,4 bars)
DRY LIFT CAPACITY
@ 100 psi (6,8 bars):
Models with Teflon balls - 10 feet (3 meters)
Other Models - 15 feet (4,5 meters)

WEIGHT:
130 pounds (29 kg)
MAXIMUM SOLIDS:
7/16" (11,1 mm)
AIR SUPPLY:
Inlet - 3/4" NPT Female (BSP compatible)
Outlet - 3/4" NPT Female
FLUID INLET/DISCHARGE:
3" NPT Female
BSP Available

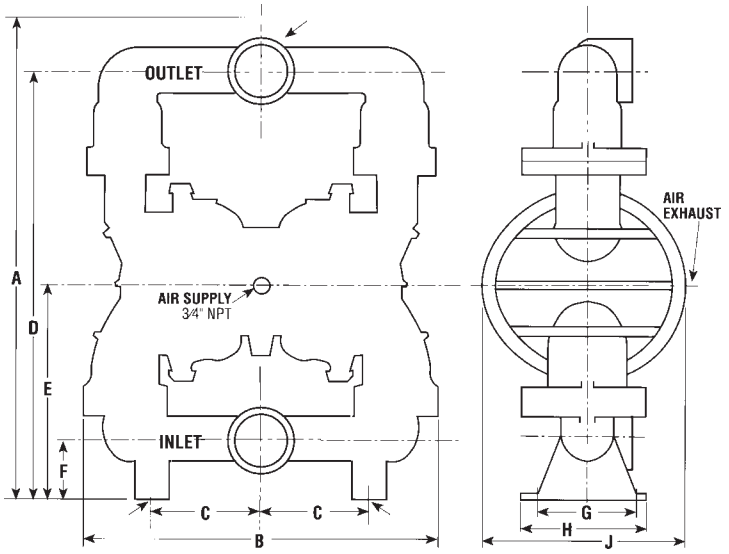
DO NOT USE AIR LINE LUBRICATION



DIMENSIONS

Dimensions in inches and (mm)

	3" Metallic
A	32.25 (819)
B	24.5 (622)
C	5.07 (129)
D	29.97 (761)
E	16.06 (408)
F	2.40 (61)
G	10.15 (258)
H	11.18 (284)
J	16.76 (426)



PERFORMANCE CURVE

(Based on water-flooded suction)