# NPE INSTRUCTION MANUAL

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# I. INTRODUCTION

Your new Sani-Touch egg-processing machine is designed and engineered to provide many years of dependable service. It has been precision built and tested before shipment. If careful operation and maintenance is provided, it will give trouble-free service and long life.

Sani-Touch machines are unique in their method of egg processing. The eggs are candled before sanitizing to reduce the possibility of egg contamination. The gentle sanitizing system uses fresh, non-re-circulated, hot water mixed with a sanitizing detergent to further control egg contamination. Aquamagic pioneered this system.

The following installation and maintenance procedure will enable you to minimize possible problems in egg room operation. Study them and use suggestions to your advantage. Any part numbers shown refer to Sani-Touch parts list.

## A. MACHINE RECORD

The following information will provide ready reference when seeking operation help or ordering parts. When ordering parts, always provide the machine model number, serial number, and type of candler.

**Date Purchased: _____ Purchased From: _____**

**Distributor's Address: _____**

**Phone: _____ Salesman's Name: _____**

**Model No.: _____ Serial No.: _____**

**Cases /Hour _____Type of Candler_____**

## B. WARRANTY

The warranty for the equipment listed by Serial Numbers above is 120 days from date of purchase against defects in material. This warranty excludes all other warranties, expressed or implied, is not transferable and shall be limited to the part or parts necessary to repair or replace those acknowledged by us to be defective. It does not include labor, transportation, shipping, or miscellaneous costs.

This warranty shall not apply if our factory inspection reveals the machine was:

1. Damaged by misuse.
2. Damaged by causes beyond our control.
3. Installed or operated other than in accordance with installation and operation instructions.
4. Operated other than in accordance with periodic bulletins.

This warranty shall not apply if the equipment has been repaired or altered.

## C. SHIPPING

All goods are shipped F.O.B. factories at Marion, Iowa, U.S.A. All goods should be examined carefully by the buyer before the transportation receipt is signed. If material is received in bad condition, the buyer should require the agent of the Transportation Company to make a notation of delivery condition on freight bill and immediately file a damage claim with the carrier. National poultry equipment co. is not responsible for damage incurred during shipping.

### D. SAFETY

Installation, operation, and maintenance of a power-driven machine require certain rules of safety. Please see that they are known and followed by all personnel likely to operate the machine.

1. Follow all local electrical and safety codes.
2. Install and maintain a positive electrical ground wire to the machine.
3. Disconnect electrical power source before servicing or cleaning machine. If power sources disconnect is out of sight, lock it in the "off " position and attach warning tag to prevent accidental application of power.
4. Do not remove drive chain or belt guards or insert any object into moving parts while machine is running.
5. Do not touch any operating electric motors. Modern motors operating normally will be hot enough to cause burns.
6. Do not wear loose fitting clothing or jewelry, or lengthy hairstyles which might become caught in moving parts of machinery.

## II. INSTALLATION AND START-UP

### A. INSTALLATION

1. Uncrating
   a. Remove plywood cover and upper portion of shipping crate-leaving machine on skid.
   b. Move machine to approximate location.
   c. Remove machine from skid.
   d. Position machine permanently in exact location on solid concrete or wood floor.

2. Reinstall all parts removed at factory for shipping.

3. Level machine frames accurately to assure grader scale accuracy and eliminate vibration.
   a. Adjust leg bolts to level machine length wise and cross wise.
   b. Check that all leg bolts are firmly seated on floor.
   c. Tighten leg bolt lock nuts.

4. Attach all major sub-assemblies (i.e. Vac-Pak, Cross Loader)
5. Remove all tape and ties from parts tied down for shipping.
6. Tighten all fasteners, which may have vibrated loose during transportation.
7. Provide a protected main line power source to the circuit breaker panel on the machine. Sani-Touch machines are set up for appropriate local electrical requirements in your home country.

8. Provide incoming fresh water piping to all cleaners.
   a. Connect incoming water supply to ¼" female pipe thread connection in water heater.
   b. Provide shut off valve for incoming fresh water supply near machine.
   c. Insure an incoming water pressure to the heater of 60 P.S.I. or less. If over 60 P.S.I., a pressure-reducing valve may be required.
   d. Insure minimum incoming water flow of one gallon for each case per hour of machine speed.

   e. Water usage will vary with the amount of contamination on incoming eggs, however, approximate water requirements are as follows:

| Machine Speed | Water Requirements |
|---|---|
| 5 to 7- ½ cases per hour | 5 to 15 gallons per hour |
| 10 to 15 cases per hour | 10 to 30 gallons per hour |
| 20 to 24 cases per hour | 20 to 50 gallons per hour |

9. Provide outgoing drain piping from all cleaners.
   a. Connect drain pipe to 1-1/4" female pipe thread drain connection located at the bottom of the water drain channel at the center of the sanitizer chamber.
   b. Connect drain to trapped sewer in a manner to allow access for clean out.
10. Provide 5 or 10-gallon plastic container for detergent or sanitize pre-mixture.

**B. START-UP**

The following instructions are for start-up of a machine equipped with a cross loader, spool spinner candler, sanitizer, grader, and wire belt table or Vac-Pak packer. Disregard any instructions that pertain to optional equipment not included on your machine.

1. Lubricate all shaft bearings and roller chains with food grade lubrication or mineral oil. Be careful that excess oil does not get on any runway.
2. Open valve turning on water supply to machine.
3. Close main power source providing power to machine.
4. Check brush-bearing hold down brackets for tightness.
5. Check all belts and chains for proper tension.
6. Turn all circuit breakers to "on" position. The cross loader, belt feed candler spools, chem. feed, egg conveyor and brushes will operate, and water will pass through the spray tube, dry fan will also operate.
   a. If for any reason the machine binds: turn off, check cause, and unbind the machine before returning to operating procedure.
   b. Check grader kickers to see that none are stuck in the "on" position (extended as if to kick an egg).
   c. Allow water to run until all air is out of water system and water flow is constant.
   d. Check piping for leaks.
   e. Check spray tubes to see that all holes are open.
7. Insert suction tube and foot valve into pre-mixed sanitizer or detergent.
8. Turn "Vac-Pak" circuit breaker to "on" position and close toggle switch on Vac-Pak electrical panel.
9. Turn "water heater" switch to "on" position.

   **CAUTION: Never turn on heater until water is flowing visibly.**

10. Load one flat of eggs on candler spools or cross loader.
11. Check to be sure eggs are flowing smoothly through the machine. If problems arise, check machine for the cause before continuing operation.
12. Set machine in full operation.

**C. SHUT DOWN**

1. Turn all circuit breakers to "off" position.
2. Open main power source preventing power to machine for added safety.
3. Clean machine thoroughly
4. Close valve turning off water supply to machine.

## III. GENERAL OPERATION AND MAINTENANCE

Sani-Touch machines consist of several assemblies installed on or attached to the main machine frame. These instructions discuss installation, operation, maintenance and cleaning, and common problems of the components individually, including: hand loading or in-feed cross loader, main egg conveyor drive, candler and belt feed, egg conveyor, sanitizer, water system, grader, out-feed wire belt table and Vac-Pak packer, vacuum equipment, lubrication and cleaning. Any part numbers shown refer to Sani-Touch parts list.

### A. HAND LOADING OR IN-FEED CROSS LOADER

Eggs are loaded onto the machine by: placing eggs onto the chute loader candler or candler spools manually or, placing eggs onto candler spools or cross loader using a vacuum lifter.

1. Installation
   a. Place cross loader at 90-degree angle to belt feed unit on unguarded side.
   b. Bolt cross loader to bracket provided at side of belt feed. This may require drilling of two ¼" holes in mount bracket.
   c. Level cross loader
      (1) Adjust leg bolts to level machine lengthwise and crosswise.
      (2) Check that both leg bolts are firmly seated on floor.
      (3) Tighten leg bolt lock nuts.
   d. Insert cross loader electrical cord cap into receptacle on candler unit.

2. Operation
   The cross loader consists of a flat stainless wire belt. Eggs should be placed on the cross loader in rows of (6) six. Care must be taken not to load cross loader beyond the belt feeds capacity to transfer eggs to the candling spools.

3. Maintenance and Cleaning
   a. Oil all shaft bearings with food grade lubrication once each week.
   b. Clean machine after each use.

### B. CHUTE LOADER CANDLER

1. Operation
   a. Load eggs on runway wear strip manually by placing them crosswise on the runway wear strips. Chute loader should be kept loaded its entire length throughout operation.
   b. Eggs will roll smoothly the length of the candler and onto the in-feed rails to the conveyor chain.

2. Maintenance and Cleaning
   a. Clean candler runways daily.
   b. Prevent broken eggs and dirt from dripping on candler lamps.
   c. Be sure to wipe LED candling light free from any moisture daily.
   d. Clean candler lamps daily. Note: disconnect electric power source before servicing or cleaning machine.

## C. SPOOL SPINNER CANDLER AND BELT FEED

The spool spinner candler with belt feed is designed to provide efficient candling in higher capacity machinery and to allow attachment of automatic or semi-automatic loading equipment. This type of candler is equipped an LED Light Bar.

1. Operation

   Operation requires only that egg feed smoothly from belt feed to candler spools, oscillate across candler lights while being visually inspected, and roll smoothly to the lead-in rails of the egg conveyor chain.

2. Maintenance and Cleaning
   a. Check to see that stainless steel egg guards are pressed down in proper position beside spools.
   b. Lubricate chains daily after clean up with food grade lubrication.
   c. Lubricate flange bearings in candler side plates daily with food grade lubrication.
   d. Lubricate chains weekly with food grade lubrication.
      (1) Open candler door.
      (2) Brush food grade lubrication on bottom side of chain allowing excess oil to drip into drain trough. Lubricate one section of chain at a time. Do not oil chain while it is in motion.
   e. Lubricate weekly all oil-impregnated bushings with food grade lubrication.
   f. Wipe excess water off of LED light bar after each use!
   g. Clean Pyrex cover glass daily.
      (1) Disconnect electric power source.
      (2) Open candler door.
      (3) Slide Pyrex cover glass out of spring clip holding glass between LED light and spools.
      (4) Clean glass and replace.
   h. Clean accumulated dirt and dust from chains, sprockets, candler fan and all moving parts weekly.
   i. Clean belt feed belt runway periodically to minimize wear.
   j. Clean belt feed tail sheave assemblies (S-649 & S-649-1) weekly.
      **CAUTION: Do not indiscriminately use water to clean spool spinner and belt feed unit. It may cause chain to rust and seize.**
   k. Check take-up sprocket (S-639) on timing chain to maintain proper tension.
   l. Check take-up sprockets on oscillator drive chain to maintain proper tension.
   m. Check main drive belt to maintain proper tensions weekly.
   n. Check all setscrews for tightness weekly.
   o. Check spool chain periodically to see that spools are running in the center of the candler and are at 90 degrees to the direction of travel. Spool chains sometime jump a tooth on one side only.
   p. Inspect the belt feed neoprene chute (S-658) used to cushion eggs between belt feed and candler spools monthly and replace as needed.
   q. Inspect aluminum transfer (S-653) monthly and replace as needed.
      (1) Check to see that it is not bent or twisted.
      (2) Check rubber covers for wear.
      (3) Adjust location by:
         (a) Loosen mounting bolts.
         (b) Rotate transfer so that edge is 1/32” above front; top edge of lead-in rails. Be sure not to twist transfer.
         (c) Tighten mounting bolts.
   r. Inspect lead in rails (E-530-1) monthly and replace as needed. Be sure to check mounting screws for tightness.

s. Check tension of egg conveyor chain periodically. Tension should be continuously maintained by weighted take-up and the chain should mesh properly in the 5" plastic conveyor sprockets.
t. Check location of plastic triangle (S-652). It should be centered in the spool pocket with above 1/8" clearance from the rear spool. To adjust:
   (1) Remove main drive gear belt.
   (2) Loosen all three (3) set screws in triangle.
   (3) Move spool chain ahead until one spool is at top-dead center over shaft.
   (4) Locate triangle in center of spool (crosswise on drive shaft).
   (5) Rotate triangle back until it touches rear spool.
   (6) Rotate triangle forward about 1/32" away from rear spool.
   (7) Check location of triangle. Top corner should be 1/8" from spool.
   (8) Tighten all three (3) set screws in triangle.
   (9) Reinstall main drive gear belt.
u. Check Delrin slide blocks (under oscillator slide) for wear every six months.
v. Inspect all roller chains and sprockets including spool chains every six months and replace as needed.
w. Check timing of egg transfer periodically.
   (1) Eggs passing through the transfer point between candler spools and egg conveyor chain are first lifted from the candler pocket by the plastic triangle. They are then laid on the aluminum transfer and roll across it and onto the lead-in rails. Use the following procedure to set timing:
      (1) Disconnect electric power source
      (2) Remove chain guard.
      (3) Disconnect timing chain (S-602) at connecting link. Do not allow chain to slip out of contact with either drive or driven (timing) sprockets.
      (4) If eggs contact the back of the pushers, move-timing sprocket in the direction of the egg flow one tooth at a time.
      (5) If eggs are pushed before they are well onto the lead-in rails, move timing sprocket against the egg flow one tooth at a time.
      (6) When the timing is correctly set, the egg pusher will make contact with egg from behind without being hit hard enough to cause the egg to bounce or turn.
x. Check spool pins for missing snap rings monthly.

**<u>CAUTION:</u> Disconnect electric power sources before servicing or cleaning machine.**

3. <u>Common Problems</u>

a. LED light not bright enough.
   (1) Pyrex covers glass dirty.
b. Pyrex covers glass breakage.
   (1) Caused by broken egg accumulating and being baked on glass.
c. Candler spool chain and sprockets rusted, seized, or excessively worn.
   (1) Lack of proper lubrication.
   (2) Excessive use of water in candler/belt feed area.
d. LED Light Bar lights do not work when excess water is allows to stay pooled on the light bar.
e. Eggs checking, cracking, or jumping off runway.
   (1) Worn or damaged neoprene chute (S-657).
   (2) Worn or damaged aluminum transfer (S-653)
   (3) Worn or damaged lead-in rails (E-530 & E-531).
   (4) Timing out of adjustment.
   (5) Excessive wear in sprockets and chains causing inaccurate timing.
f. Eggs turning and rolling end over end through sanitizer.

(1) Worn or damaged aluminum transfer (S-653).
(2) Worn or damaged lead-in rails (E-530-1).
(3) Timing out of adjustment.
(4) Excessive wear in sprockets and chains causing inaccurate timing.
(5) Excessive wear in conveyor chain or sprockets causing chain to jump.

## D. EGG CONVEYOR SYSTEM

The white, plastic egg conveyor chain carries eggs through the sanitizer and grader portions of the machine. The chain, the runway channel, and the egg pushers on the chain, roll the egg along the micarta runway rails. Tension on the conveyor chain, is maintained by a weighted take-up assembly located on the lower chain return. The chain is driven and held in alignment by large (5" diameter) white plastic sprockets.

1. Installation (of replacement chain)
   a. Remove lead in rail fasteners and lead in rails.
   b. Remove sanitizer splash panels.
   c. Insert chain in channel in direction shown in parts book page 16.
   d. Pull end of chain through channel and back toward candler under sanitizer. Be sure to mesh chain properly in all white, plastic sprockets.
   e. Connect chain under in-feed end of sanitizer.

2. Maintenance and Cleaning
   a. Lubricate two flange bearings at each end of the conveyor chain daily with food grade lubrication.
   b. Lubricate oil-impregnated bushings in idler sprockets on lower chain return weekly.
   c. Do not oil conveyor chain pins.
   d. Check set screws in sprocket hubs at each end of conveyor chain for tightness weekly.
   e. Insure weighted take-up is maintaining proper tension. If chain is dragging in drain channel or if the balance weight is down and not balancing, remove one chain link.
   f. Check white plastic sprockets for excessive wear monthly. Elongated slots will cause erratic movement in chain.
   g. Inspect each pin (E-522-1) in the conveyor chain monthly to be sure there is a snap ring (E-519) in both grooves.
   h. Inspect aluminum spacer (E-523) monthly for wear and replace as needed.
   i. Inspect conveyor chain links for wear monthly. Pinholes will wear and elongate to a point where the chain no longer meshes properly into the white, plastic sprockets causing erratic movement in chain. At this point chain must be replaced.

3. Common Problems
   a. Chain jumps, catches, or skips tooth in sprocket.
      (1) Snap rings missing in pins causing pin to slide out one side and catch.
      (2) Excessive wear in white, plastic sprockets.
      (3) Excessive wear in conveyor chain.
      (4) Obstruction in channel or runway.

## E. SANITIZER (Cleaner & Dryer)

Sani-Touch machines are furnished in three (3) models, each equipped with a combination of cleaning and drying brushes designed to thoroughly sanitize eggs. The brush shafts are flexed and the runway wear rips are tilted in a manner designed to achieve complete sanitizing of eggs.

1. Installation
   See II A.

2. Operation
   See II B.

3. Maintenance and Cleaning
   a. Brush Shaft Assemblies.
      (1) Lubricate brush shaft bearings (C-203) daily with food grade lubrication.
      (2) Clean brush shaft assemblies, runway rails, and inner surfaces of sanitizer chambers daily after operation.
         (a) Remove brush shaft assemblies
            (i) Disconnect main power source to machine.
            (ii) Remove brush drive gear belt by:
               a. Loosen hold down hand nuts on brush drive motor
               b. Remove belt guard.
               c. Slide motor mount plate to loosen belt.
               d. Remove belt
            (iii) Remove all brush shaft hold down brackets by:
               a. Loosen thumbnuts.
               b. Slide straight up and out of sanitizer tank.
            (iv) Identify brush shafts in such a manner that they can be replaced in the same location. (Right or left side) they were removed from. (Parts book page 14)
            (v) Lift the brush assemblies from the machine.
            **CAUTION: Use care to avoid bending shafts. Do not lay brush shaft assemblies on any flat surface-bristles** that **are flattened, may not return to original shape.**
         (b) Clean all rough surfaces thoroughly with a vinegar and water mixture applied with a stiff brush and scrubbed thoroughly.
         (c) Clean sooth surfaces with steel wool soap pad.
         (d) Rinse away all residues completely.
         (e) Reinstall brushes in reverse of removal order with the following exceptions:
            (i) Insure proper brush shims (C-203-3, -4, & -5) are in place under brush shaft bearings. These shims are to vary pressure of sanitizing (i.e. sanitizing turkey eggs, use of abrasive brushes, sanitizing thin-shelled eggs, etc.). Excessive pressure may cause egg to "turn" and roll end over end down runway.
            (ii) Check end clearance of shaft. Total clearance of each shaft should be 1/16". To adjust:
               a. Loosen setscrew in set collar (C-205)
               b. Slide brush shaft collar shaft to achieve correct end clearance.
               c. Tighten setscrew.

      (3) Replace worn brushes as needed. New brushes touch each other over the runway at the ends, towards the center of the sanitizer. As the brushes wear, a gap will form between the brushes. If, after removing shims, this gap measures ½" or greater, and eggs are not being cleaned satisfactorily, brushes must be replaced. Note: Brushes must be replaced in pairs.

(a) Order new brushes for your machine. When brushes arrive, they will be marked as to whether they are "Right" or "Left" and whether they are "wash" or "dry". Do not remove brushes from boxes until ready to install
(b) Remove brush shaft assemblies from machine.
(c) Remove brush shaft collar (C-205) from end of brush shaft as follows;
  (i) Loosen set screw.
  (ii) Slide set collar off end of shaft.
  (iii) File set screw burr from shaft.
(d) Remove brushes from shafts as follows:
  (i) Remove nut and threaded portion of brush clamps (C-204).
  (ii) Loosen set screw in brush clamp
  (iii) Slide brush clamp off end of shaft.
  (iv) File set screw burr from shaft.
  (v) Slide brushes, bearings, (C-203) and remaining clamps off end of shaft.
  **NOTE: If brushes or brush clamps are seized to brush shaft and cannot be knocked loose, it may require overnight soaking in hot water and detergent or penetrating oil.**
(e) Install new brushes on shafts.
  (i) Lay shaft on blocks side by side as they would be installed in machine.
  (ii) Slide components on brush shaft in following sequence:
    a. Bearing (C-203)
    b. Brush clamp (C-204) **NOTE: Flat side of brush clamp should face brush.**
    c. Correct brush (right or left – wash or dry)
    d. Brush clamp (C-204)
  (iii) Tighten brush clamp set screw in approximate location on shaft.
  (iv) Install and tighten nut and threaded portion of brush clamp.
  (v) Install brush shaft assemblies in washer.
  (vi) Loosen brush clamp set screw and adjust location on shaft so that clamp is 1" from bearing at each end of brush and re-tighten set screw. **NOTE: Ends of brush tapers should line up across machine. If they do not, readjustment may be required. (See Parts book page 14)**
  (vii) Oil brush shaft bearings with 2 or 3 drops of food grade lubrication.
  (viii) Rotate shafts by hand and inspect bristles. Trim with scissors any bristles that stick out beyond normal diameter of brush.

(4) Inspect brush bearings (C-203) periodically for wear and replace as necessary.

b. Conveyor Bar

Inspect runway micarta rails periodically and replace as necessary. They must be kept smooth with no sharp corners between rail sections. If cracked or broken they must be replaced as a pair with the opposite side rail section.

c. Brush Shaft Drives

Brush Shafts are rotated by a gear belt drive from a brush drive motor.
(1) Check brush-drive belts for tightness after each cleaning.
(2) Check all motor mount fasteners periodically for tightness.
(3) Insure brush drive pulleys are kept in line.
(4) Clean brush-drive belts and pulleys weekly to prevent build up of dirt. Be sure to clean teeth in belt and gear pulleys.
(5) Prevent oil from coming in contact with gear belts.
(6) Inspect gear belts periodically for wear and replace as necessary.

## F. WATER SYSTEM

The Sani-Touch water system consists of a digitally controlled water heater, and electric shut-off valve, chemicals feed unit, a fluid flow meter, and interconnecting pipes and hoses. (Dial thermometer for machines without a water heater.)
Also available, for customers whose temp range and chemical concentration is extremely critical, is a water temperature alarm/shut-off system with in-line injector system for more precise metering of sanitizing chemicals. This system also eliminates the need for the customer to premix chemicals.

1. Operation
   a. Heater
      (1) Turn on "Main" circuit breaker.
      (2) Turn "water heater" circuit breaker to "on" position.
      (3) Adjust water flow to constant point.
      (4) MAKE SURE WATER FLOW IS CONSTANT THROUGH MACHINE PRIOR TO TURNING ON THE ACTUAL WATER HEATER. HEATING ELEMENT WILL BURN UP IF THIS IS NOT FOLLOWED.
      (5) See separate instruction sheet on Digital Water Heater.
   b. Flowmeter
      (1) Located up near the top of the machine where eggs enter the wash chamber.
      (2) Use this to dial in the exact gallons per hour (gph) that flow through the machine.
      (3) Simply turn the knob right or left to adjust.
   c. Brass Pressure Regulator
      (1) Located just prior to the brass water heater assembly.
      (2) There is a slotted screw to move in or out to adjust the water pressure.
      (3) Use this to help control the water flow through your machine.
   d. Electric shut-off valve (W-103)-operates automatically with "Water Heater" circuit breaker.
   e. Chemical feed unit (W-102)-operates automatically with "Water Heater" circuit breaker.
      (1) Provide a 5 or 10-gallon plastic container for detergent-sanitizer solution. Detergent should be mixed well and bucket kept clean of any non-dissolved residue that might clog chem. feed unit. Liquid detergents are preferable to powders.
      (2) Set chem. Feed unit at desired capacity as listed on following table:

| CAM SETTING | GALLONS/HOUR |
|---|---|
| #1 | Approx. .30 |
| #2 | Approx. .83 |
| #3 | Approx. 1.25 |
| #4 | Approx. 1.52 |
| #5 | Approx. 1.67 |
| #6 | Approx. 1.75 |

         (a) Loosen cam assembly wing nut.
         (b) Hold motor drive shaft stationary by inserting an Allen wrench in extended set screw.
         (c) Turn cam scale so that desired setting number is aligned with extended set screw.
         (d) Tighten wing nut.
      (3) Attach foot valve and suction tubing to adapter on bottom of chem. feed head block.
      (4) Submerge foot valve in solution bucket so that it rests near, but not on, the bottom of the solution bucket.
      (5) Prime chem. feed pump (if it does not begin to prime itself in the first few minutes).
         (a) Remove suction tubing from adapter on bottom of chem. feed head block.
         (b) Fill suction tubing with water.

(c) Re-attach suction tubing (still filled with water).
(d) Raise foot valve above pump for several strokes while pump is running.
(e) Return foot valve to solution bucket when water begins to fill discharge tubing.
(f) If pump still does not prime, check for leaks in system and repeat above procedure.
**NOTE: Over tightening of plastic fittings can cause damage.**

2. Maintenance and Cleaning
   a. Chemical Feed Unit (W-102)
      (1) Clean accumulated detergent residue from foot valve, tubing and pump body weekly.
      (2) Check all hoses for cracks or leaks monthly.
   b. Clean water spray tube (W-109) monthly as follows:
      (1) Remove pipe plug from end of tube.
      (2) Scrape residue from inside of tube with ¼" diameter dowel or rod of appropriate length.
      (3) Clean orifice holes with small wire or #60 drill.
      (4) Flush system until water runs clear.
      (5) Replace pipe plug in tubes.
   c. Interconnecting Pipes and Hoses
      (1) Check system for leaks monthly. If found:
         (a) Disassemble joint.
         (b) Clean threads.
         (c) Apply sealant.
         (d) Reassemble and tighten.
      (2) Check hoses for kinks, cracks, or leaks monthly.

3. Common Problems
   a. Water does not flow when "Water Heater" circuit breaker is on.
      (1) Water source not turned on.
      (2) Electric shut-off valve (W-103) required replacement or repair.
   b. Water not heated.
      (1) Power not established to heater.
      (2) Heating element requires replacement.
      (3) Digital Water Heater not functioning properly.
   c. Water too hot as related to rheostat setting.
      (1) Digital Water Heater not functioning properly.
   d. Water flow varies greatly and is difficult to set.
      (1) Flow regulating valve (W-104) faulty or Flowmeter (W-132 or W-133) is faulty.
   e. Chem. feed unit does not run when machine is started.
      (1) Power not established to chem. feed.
      (2) Components damaged in gear head.
      (3) Motor requires repair or replacement.
   f. Chem. feed unit runs but solution does not flow smoothly.
      (1) Bullet Cartridges are dirty or need replacing.
   g. Chem. feed unit runs but solution does not flow at all.
      (1) Prime not established.
      (2) Clogged foot valve (C-340-6) or tubing.
      (3) Tubing or fittings cracked or broken allowing air to enter system.
      (4) Diaphragm (C-406) requires replacement.
   h. Chem. feed unit leaks solution on motor side of head block.
      (1) Diaphragm (C-406) requires replacement.

## G. GRADER

Sani-Touch graders consist of 5 grades with a factory setting as follows:
JUMBO – 70.8 grams (grade ranges from 70.8 to 83.9 grams)
EXTRA LARGE – 63.8 grams (grade ranges from 63.8 to 70.7 grams)
LARGE – 56.6 grams (grade ranges from 56.6 grams to 63.7 grams)
MEDIUM – 49.6 grams (grade ranges from 49.6 grams to 56.5 grams)
SMALL – 42.6 grams (grade ranges from 42.6 grams to 49.5 grams)
Reject – 84.0 grams (this captures all eggs from 0- 42.5 grams and 84.0 and greater)

1. Operation
   See separate digital scale manual for operation of digital scale unit.

2. Maintenance and Cleaning
   a. Check all fasteners and electrical connections in grader assemblies periodically for tightness.
   b. The grader unit must be maintained in a clean condition. There must never be broken eggs or calcium build-up on the grader system.
   c. DO NOT GET THE KICKER SOLENOIDS OR THE WEIGH MODULE WET. THIS WILL CAUSE FASTER DETERIORATION OF ELECTICAL CONNECTIONS AND CAUSE THE KICKERS AND SCALE TO MALFUNCTION.

3. Common Problems
   a. All grader solenoids fail to operate.
      (1) Solenoid may need replaced.
      (2) Check wires for proper connection
   b. Digital Scale is not weighing accurately
      (1) Weigh Module (where eggs roll over and are weighed) needs calibrated (see separate digital scale manual for calibration)
      (2) Weigh Module load cell is malfunctioning. (Contact NPE for replacement)

## H. OUTFEED CONVEYORS AND TRAYS

The out-feed apparatus for Sani-Touch machinery varies with the model designation. Many models have simple plastic receiving trays only and need not be discussed in this section. Sani-Touch machines equipped with graders have moving wire belt conveyors either used alone or as a part of Sani-Touch's Vac-Pak Semi-Automatic packing system. These two out-feed styles will be covered in this section.

1. Installation
   a. Wire Belt Table
      (1) Reinstall all parts removed at factory for shipping.
      (2) Level table surface and trays by adjusting supporting rods between Wire Belt Table frame and main machine frame.
   b. Vac-Pak
      (1) Place (3) three rubber vibration mount studs in 3/8" holes in grader base plate.
      (2) Install 3/8" nuts and lock-washers on studs and tighten.
      (3) Level Vac-Pak
         (a) Adjust leg bolts to level machine lengthwise and crosswise.
         (b) Check that both leg bolts are firmly seated on floor.
         (c) Tighten leg bolt lock nuts.
      (4) Reinstall all parts removed at factory for shipping.
         (a) Stainless steel transfer plates attach to grader at junction of grader and Vac-Pak.
         (b) Grader dividers attach to Vac-Pak and ½" posts on transfer plate.

(c) Drip trays slide-in supports under grid area.
(d) Raise carton shelf supports to upright position and fasten.
(e) Place wire carton shelf in brackets.

(5) Insert Vac-Pak electrical cord cap in outlet located on main machine frame or provide other outlet capable of supplying 9.0 amps.
(6) Tighten all fasteners, which may have vibrated loose during transportation.

2. Operation
   a. Wire belt table comes on with the "main conveyor" switch and conveys eggs to receiving tray to be packed by hand.
   b. Vac-Pak conveys eggs to a vibrating grid system, which orients the eggs so that they may be packed using a vacuum egg lifter.
      (1) Turn "Vac-Pak" circuit breaker on main electrical panel to "on" position.
      (2) Close toggle switch on Vac-Pak electrical panel.
      (3) Allow graded eggs to flow into grid system and be oriented.
         (a) Apply pressure with the finger to right any eggs, which may remain pointed side up in grid.
         (b) Remove checked or cracked eggs manually.
         (c) Push leakers down through the grid into drip tray below.
      (4) Pack eggs from each grid as soon as sufficient eggs are in the grid as follows:
         (a) Bring lifter down horizontally toward grid until cups touch eggs and vacuum takes hold, then lift.
         (b) Bring loaded lifter down <u>horizontally</u> toward carton or flat, when eggs just touch carton, release vacuum and allow eggs to settle in carton.
         (c) Pack from grade with most backed up eggs first. Try to keep an even reservoir of eggs in all grades.
         (d) Do not allow a small quantity of eggs to remain in grid for long periods of time while higher volume grades are packed.
         (e) Do not apply any downward pressure on eggs with vacuum lifter at any time.

3. Maintenance and Cleaning
   a. Wire Belt Table or wire belt conveyor portion of Vac-Pak.
      (1) Oil bearings on drive shaft (CT-102) with food grade lubrication.
      (2) Tighten set-screws in all drive sprockets and shaft collars periodically.
      (3) Adjust tension of drive chain and lubricate monthly.
      (4) Check wire belt support wear strips (CT-106, CT 106-1, or VP-42) periodically for wear. Replace if worn through.
      (5) Check wire-belt material periodically for wear or stretch. If wire belt must be shortened, refer to manufacturer's instructions in rear of this manual.
      (6) Clean wire belt material weekly with warm water and detergent. Avoid applying water directly to electric motors or connections.
   b. Oscillating grid system of Vac-Pak.
      (1) Lubricate oscillator shaft bearings (VP-9) twice daily with SAE-30.
      (2) Check set screw holding oscillating shaft bearing (VP-9) in place for tightness periodically.
      (3) Lubricate surface of cam (VP-19) with one or two drops of SAE-30 twice daily.
      (4) Check cam (VP-19) for excessive wear weekly and replace if necessary. Always install new cams with beveled end to left. When replacing cam it is usually best to replace cam follower (VP-17) also.
      (5) Check cam follower (VP-17) for worn or frozen bearing weekly. Always install new follower with bearing perpendicular to camshaft.
      (6) Check all fasteners in Vac-Pak for tightness periodically.
      (7) Check grid fingers monthly for wear. If pockets are visible in fingers they should be replaced. Refer to Illustration #11.

(8) Maintain proper adjustment of cam follower pressure against each cam.
(a) Loosen tension lock bolt.
(b) Adjust tension with tension adjusting set screw;
Clockwise to decrease pressure-counter-clockwise to increase pressure.
(c) Tighten tension lock bolt.
(d) Check for proper tension by applying a slight amount of pressure to the oscillating grid just above each cam. The cam should "rattle" when pressure is applied and returns to running quietly when pressure is released. In short, spring pressure should be <u>just tight enough</u> to prevent excessive noise. Too much pressure will quickly ruin both cam and cam followers.
(e) Clean fingers with warm water and detergent daily.
(f) Clean drip trays with warm water and detergent daily.

4. <u>Common Problems</u>
a. Wire belt table or wire belt conveyor portion of Vac-Pak
(1) Torn or damaged wire belt material.
(a) Replace damaged material.
(2) Wire belt jumps teeth on its drive sprockets.
(a) Shorten wire belt.
b. Oscillating grid system of Vac-Pak.
(1) Excessive noise.
(a) Cam follower tension requires adjustment.
(b) Cams and cam followers worn or damaged.
(2) Cams or cam followers wear out rapidly.
(a) Excessive or improper tension on cam.
(b) Lack of lubrication.

**I. VACUUM EQUIPMENT**

Refer to manufacturer's information.

IV. MAINTENCE SCHEDULE (MAY VARY BASED ON HOW OFTEN MACHINE IS USED)

**A. TWICE DAILY**

Lubricate Vac-Pak Oscillator shaft with SAE-30.
Lubricate Vac-Pak Cam surface with SAE-30.

**B. DAILY**

Lubricate candler chains with food grade lubrication.
Lubricate all oil-impregnated bushings with food grade lubrication.
Clean sanitizer chambers with brush shaft assemblies.
Clean cross loader and Vac-Pak drip trays.
Clean chute loader runway wear strips.
Clean Pyrex candler glass.
Clean all vacuum lifters.

**C. WEEKLY**

Lubricate candler chains with food grade lubrication.
Check all chain and belt drives for proper tension.
Check Vac-Pak cams and cam followers for wear.
Check scale weight settings.
Check all fasteners for tightness.
Clean all wire belt material.

Clean all gear belt pulleys and belts.
Clean chem. feed unit and foot valve.
Clean belt feed tail sheave assembly.
Clean grader scale assemblies.
Clean all interior and exterior surfaces of machine and provide thorough general clean up.

**D. MONTHLY**

Check main conveyor system for: missing snap rings, excessive wear in links, spacers, and sprockets.
Check candler spool pins for missing snap rings.
Check all hoses and plumbing connections for leaks.
Check all wire belt conveyors for proper tension.
Check Vac-Pak grid fingers for wear
Clean water spray tube.

**E. EVERY SIX (6) MONTHS**

Lubricate all Dayton fans with 10-20 drops food grade lubrication.
Clean vents of all electric motors.
Check Delrin slides for wear.
Check all roller chains and sprockets for wear.

# 210NP Digital Egg Weigh System

## INTRODUCTION

The 210NP Digital Egg Weighing unit includes the following features:

1. Six programmable grade weight ranges: 1, 2, 3, 4, 5 and Reject
2. Each egg grade range can be assigned to one or many kickers simultaneously.
3. Data storage for up to 10 Flocks:
    a. Egg counts per grade
    b. Accumulated egg weights per grade
    c. Average egg weights per grade.
4. Flock Accumulator Report output to USB or Thermal Tape Printer.

## SETUP AND CALIBRATION

Remove "Access Screw" in the rear of the indicator unit as shown here:

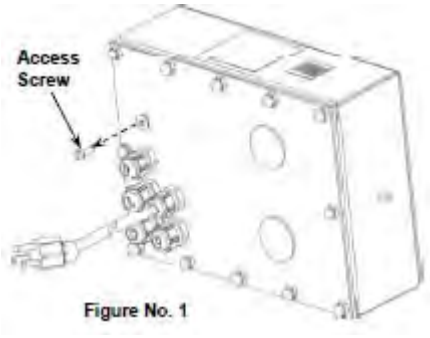


Figure No. 1

Use a NON-METALLIC item to press the calibration switch located inside where the access screw was just removed. To enter the setup mode press the calibration switch just one time and the display unit will read "SEtUp". Then press the "Enter" button and it will take you into each setting as indicated below. Note that you will press the "Enter" button each time you enter a setting in order to store and move onto the next setting.

**SEtUP:**

| | |
|---|---|
| USA: | 1 (YES) |
| LFt: | 0 (NO) |
| Unit1: | 2 = g (grams) |
| int: | 2 |
| dPP: | 1 |
| CAP: | 200.0 |
| Unit2: | 4 = oz (ounces) |
| trA: | 1.0 |
| trL: | 0 (NO) |
| PU0: | 0 (NO) |
| td: | 12 |
| SLEEP: | 0 (NO) |

A oFF: 0 (NO)
CLtAr: 0 (NO)
SCALE: 0 (NO)

After pressing “ENTER” for the “SCALE” setting, the display will read “A-d?”. Press “1 (Yes)” to enter into “A-d” menu. Follow the settings under “A-d” as indicated below:

**A-d:**
SerScl: 0 (NO)
dFLt: 3
F: 0
b: 3
h: 10
P: 2
Sr: 60
UnS: 3
SC: 3

After pressing “enter” for the “SC” setting, the display will read “CAL?”. Press “1 (Yes)” to enter into the “CAL” menu. Follow the settings under “CAL” as indicated below:

**CAL:**
CAL 1: 0 (after presssing “Enter” the unit will display a series of dashes until the unit reads “Cal 2”)
CAL 2: Place the 200 gram test weight on the scale and input 200.0 (again after hitting “Enter” the unit will display a series of dashes while calibrating)

Once the scale is done calibrating, the display unit will read “SSt?”. Press “0 (No)” to bypass this menu and then the display unit will read “tab?”. Press “1 (Yes) to enter into the “tab” menu. Follow the settings under “tab” as indicated below:

**tab:**
Loc 1: 4 (3 for short grader)
Length: 2 (1 for short grader)

**Kicker Test:**
After pressing “enter” for “Length” setting, the display unit will read “test?”. The “test” menu item is not a scale setting, but rather a diagnostic to test if each kicker is working. If you want to complete the Kicker Test press “1 (Yes)”. The display will now read “tst in G” and at this point you can press 1, 2, 3, 4, or 5 to test each individual kicker. Each kicker will kick 4 times for every kicker you select to test. To exit the Kicker Test Menu press “Enter” and this will take you back to “test?” where you can press “0 (No)” to exit. The display will then read “Sio?” Then press the “ * “ several times until the unit reads “busy”. Then after a few seconds the scale has returned back to weighing mode at which

time the unit will read 200.0 when the 200 gram test weight is on the scale or it will read 0.0 if there is no load on the scale.

**Access Screw:**
Once completed with the Setup and Calibration procedure as described above be sure to install the access screw back on to the rear of the scale unit. Failure to do so will allow water and other foreign items to get into the circuit board causing the scale unit to fail.

Once the access screw is back in place, the scale unit is ready for operation. At this point you may also want to check your grade weights and kicker locations to be sure they are at your desired settings. See "Setting Grade Weights and Kicker Locations" below.

## SETTING GRADE WEIGHTS AND KICKER LOCATIONS

The grade weights and kicker locations are preset as follows:

**Grade Weights:**
Grd 1 = 70.8 grams (Jumbo)
Grd 2 = 63.8 grams (XL)
Grd 3 = 56.6 grams (L)
Grd 4 = 49.6 grams (M)
Grd 5 = 42.6 grams (S)
rEJCt = 84.0 grams (Reject)

**Kicker Locations:**
LoC 1 = 1
LoC 2 = 2
LoC 3 = 3
LoC 4 = 4
LoC 5 = 5

These settings will sort all eggs ≥ 84.0 grams and < 42.6 grams to the reject grade.

In order to set your own Grade Weights and Kicker Locations follow these steps:

1. Press the "PRESET" key. The prompt "Grd 1 =" will appear.
2. Press "ENTER" to see the current weight. If the current weight is acceptable, simply press "ENTER" again to keep it. To change the weight, key in a numeric value and press "ENTER". For example, press "7" "0" "8" "ENTER" for 70.8 grams.
3. The next grade will automatically appear. Repeat step 2 for grades 2 through 5 and the reject grade. NOTE – The reject grade MUST be the highest weight setting otherwise ALL of your eggs will be sorted out as rejects.
4. After all grades are set the "LoC 1 =" prompt will appear.
5. Press "ENTER" to view the currently selected grade for location 1. This will be a value from 1 to 5. If the selected grade is acceptable simply press "ENTER". Otherwise, enter a new grade as a numeric value between 1 and 5 followed by the "ENTER" key.
6. Repeat step 5 for locations 2 through 5.
7. Once all of the grade weights and kicker locations are set, "MSG ?" will be displayed. You will now press enter a total of 10 times to get back out to the weighing mode. The following list of prompts and settings are displayed after pressing "ENTER" each time:

- MSG ?: 0
- StArt: 10
- End: 85
- AUto Z: 3
- USb P: 0

After pressing "ENTER" for the last "0" shown above the scale will return to normal weighing mode.

**Setting the Same Grade Weights Across Multiple Kicker Locations:**

A grade may be selected for multiple kicker locations. The eggs will alternate between kickers that have the same settings. Below is an example of how you could set the scale to sort just three different grade weights.

| **Grade Weights:** | **Kicker Locations:** |
|---|---|
| Grd 1 = 63.8 grams (XL) | LoC 1 = 1 |
| Grd 2 = 63.8 grams (XL) | LoC 2 = 1 |
| Grd 3 = 56.6 grams (L) | LoC 3 = 3 |
| Grd 4 = 56.6 grams (L) | LoC 4 = 3 |
| Grd 5 = 49.6 grams (M) | LoC 5 = 5 |
| rEJCt = 84.0 grams (Reject) | |

Note that if you have a Vac Pak, you are limited on how you can set your grade weights and kicker locations. The vibrating grids in each grade weight location are set specifically for J, XL, L, M, and S respectively in that order. You may be able to set your XL location up to J, but not down to a M when using a Vac Pak.

## UNITS

Grams and ounces are the only units enabled for this application. They can be toggled by pressing the **UNITS** key.

## FLOCK AND DATA COLLECTION

**Selecting a Flock**

1. You can store egg grading data for up to 10 flocks
2. Press *** (Asterisk Key)** followed by the **PRESET KEY.** The prompt "FLoCK=" will appear.
3. Press **ENTER** to see the currently selected flock. If the selected flock is acceptable, simply press **ENTER** again to keep it. To change the flock, key in a number from 1 to 10 and press **ENTER.**

## View and Edit Counts, Accumulated Weights and Average Weights per Grade

1. You can view the following data for each flock you currently have selected:
    a. Egg Counts per Grade (Cnt 1=, Cnt 2=, etc.)
    b. Accumulated Egg Weights per Grade (ACm 1=, ACm 2=, etc.)
    c. Average Egg Weights per Grade (AvG 1=, AvG 2=, etc.)
2. Press *** (Asterisk)** followed by the **Fn Key** to enter the accumulators menu. The prompt "Cnt 1=" will appear.
3. Press **ENTER** to view the count for grade 1. To keep the value, press **ENTER** or key in a new value at this time.
4. The next count will appear. Repeat step 2 for grade counts 2 through 5 and the reject count.
5. The "ACm 1=" prompt will appear. Press **ENTER** to see the current value. The value will be in the currently selected units.
6. To keep the value, press **ENTER** again or key in a new value followed by the **ENTER** key.
7. The "AvG 1=" prompt will appear. Press **ENTER** to see the current value. The value will be in the currently selected units.
8. To keep the value, press **ENTER** again or key in a new value followed by the **ENTER** key.
9. Repeat steps 5 through 8 for accumulators 2 through 5 and the reject accumulator.

## Zeroing Flocks

1. Press the *** (Asterisk)** key followed by the **ZERO** key. The prompt "FLoCK=" will appear.
2. To zero all flocks press **ENTER** or key in "0" followed by the **ENTER** key. The prompt "CL AC?" will appear. Press the **YES** key (1) followed by the ENTER key to clear all accumulated weights and counts for all flocks.
3. To zero a single flock, key in the flock number from 1 to 10 followed by the **ENTER** key. The prompt "CL AC?" will appear. Press the **YES** key (1) followed by the ENTER key. Counters and accumulators for that flock will be reset to 0.

## Print Flock Accumulator Report

A flock accumulator report outputs the time and date followed by the counts and weight accumulators for each grade in the current flock. This report will always run for whichever flock is currently selected. The report may be output to a **USB** or **Thermal Tape Printer**.

To output the report, press *** (Asterisk)** followed by the **PRINT** key. See next page for example of the report.

## An Example Report

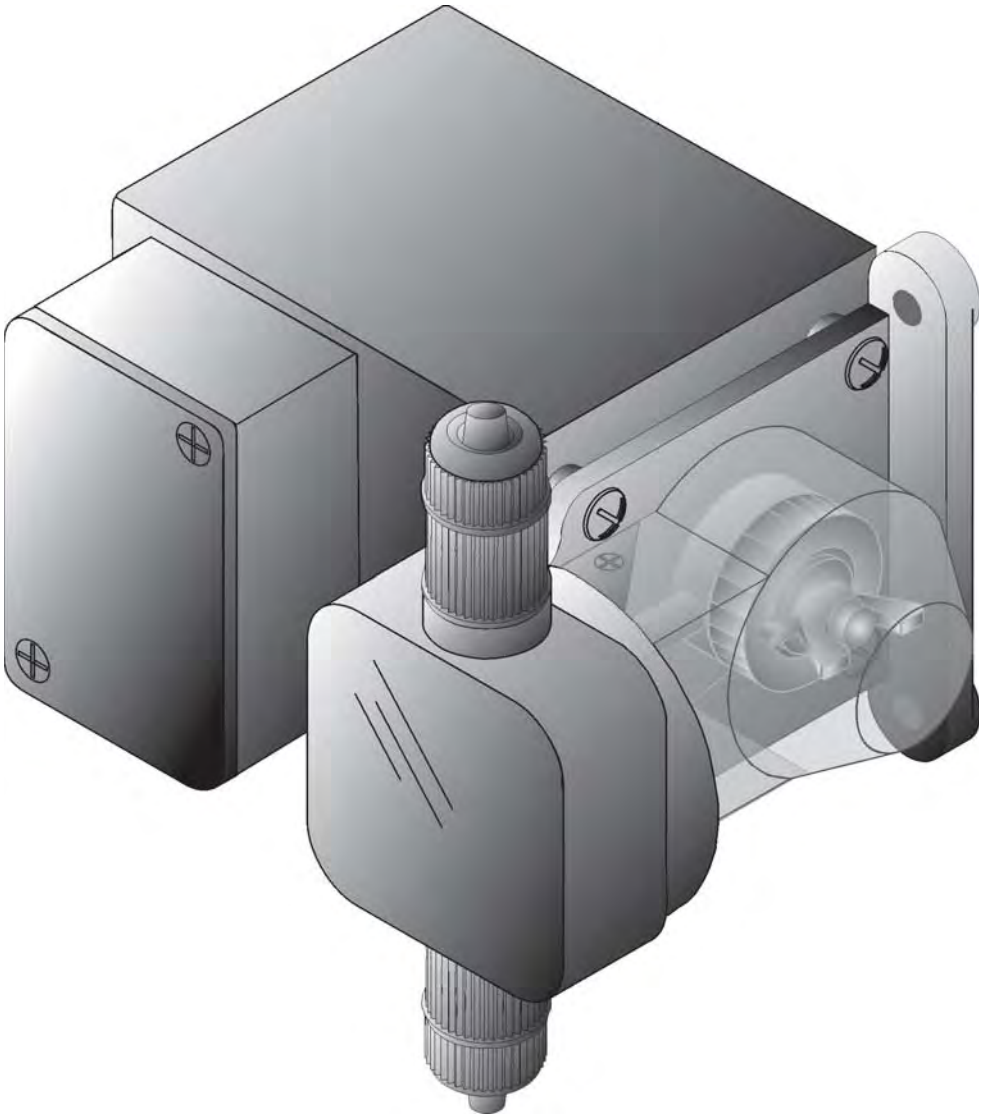
10:25  5/30/2014
FLOCK ACCUMULATOR REPORT
Flock #1

| | COUNT | TOTAL WT | AVG WT |
|---|---|---|---|
| Grade 1 | 0 | 0.0 | 0.0 g |
| Grade 2 | 2 | 130.5 | 65.3 g |
| Grade 3 | 65 | 3991.9 | 61.4 g |
| Grade 4 | 21 | 1133.0 | 51.5 g |
| Grade 5 | 82 | 3706.0 | 45.2 g |
| Rejects | 1 | 42.2 | 42.2 g |

Contact National Poultry Equipment to equip your scale with a USB or Thermal Tape Printer.

# Blue-White®
## Industries, Ltd.

# DIAPHRAGM INJECTOR
## MODEL C-600P & C-600HV

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### 1.0 Introduction

Congratulations on purchasing the C-600 positive displacement metering pump. The C-600 is designed to inject chemicals into piping systems. The pump has been tested by NSF International for use with 12 ½% Sodium Hypochlorite. All models are equipped with a top mounted mechanical flow rate adjustment knob. Optional on/off cycling timers are available.

### 2.0 Specifications

| | |
|---|---|
| **Maximum Working Pressure** | 125 psig / 8.6 bar* (C-600P) |
| 20 psig 1. 37 bar* (C-600HV) | |
| **Maximum Fluid Temperature** | 130° F / 54° C |
| **Output Accuracy** | +/- 10% of maximum |
| (water @ 70° F, 0 psig, and 5' suction lift) | |
| **Ambient Temperature Range** | 14 to 110° F / -10 to 43° C |
| **Enclosure** | Zinc - Metal |
| **Duty Cycle** | Continuous |
| **Maximum Viscosity** | 1,000 Centipoise |
| **Maximum Suction Lift** | up to 10 ft. water |
| **Power Requirements** | 115V60Hz 45 Watts |
| | 220V50Hz 45 Watts |
| | 230V60Hz 45 Watts |
| | 24V60Hz 45 Watts |
| **Dimensions** | 6-1/2" H x 6-1/2" W x 5-3/4" D (C-600P) |
| | 7"H x 6-3/4" W x 6-1/8" D (C-600HV) |
| **Weight** | 8 lb. |

*Depending on Model number

### 3.0 Features

- Double-ball ceramic check valves.
- PVDF (Kynar) valve assemblies.
- Viton o-rings.
- High outlet pressure capability of 125 PSIG.*
- Easy access, side mounted mechanical feed rate adjustment.
- Ball bearing supported motor drive shaft.
- Permanently lubricated ball bearing motor.
- 27:1 adjustment turn down ratio.
- Easy servicing.
- Includes suction tube foot valve & strainer, suction tube weight, suction tubing, discharge tubing and injection fitting with internal back-flow check valve and mounting hardware.

* Most C-600P Models. C-600HV has max pressure rating of 20 PSIG

### 4.0 How To Install the Metering Pump

**CAUTION: PROPER EYE AND SKIN PROTECTION MUST BE WORN WHEN INSTALLING AND SERVICING THE PUMP.**

**CAUTION - TO PREVENT CHEMICAL OVERDOSING WHEN USED AS A POOL OR SPA CHLORINATOR, POWER MUST BE REMOVED FROM THIS PUMP DURING THE BACKWASH CYCLE AND DURING PERIODS OF NO FLOW IN THE RECIRCULATION SYSTEM.**

***Note:*** *All diagrams are strictly for guideline purposes only. Always consult an expert before installing the metering pump into specialized systems. The metering pump should be* ***serviced by qualified persons only.***

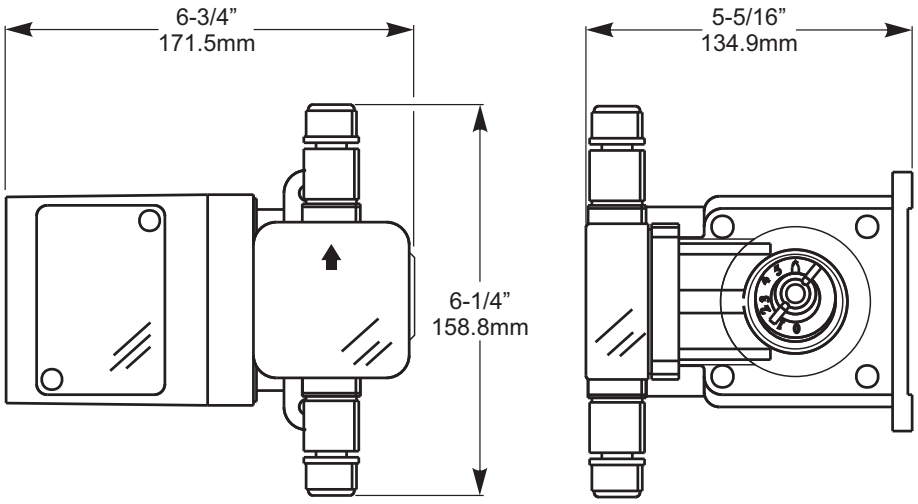
### 4.1 Mounting Location

- Choose an area located near the chemical supply tank, chemical injection point and electrical supply. Install the pump where it can be easily serviced.
- Mount the pump to a secure surface or wall using the enclosed hardware. Wall mount to a solid surface only. Mounting to drywall with anchors is not recommended.
- Keep the outlet (discharge) tubing as short as possible. Longer tubing increases the back pressure at the pump head.
- Do not mount the pump directly over your chemical container. Chemical fumes may damage the unit. Mount the pump off to the side or at a lower level than the chemical container.
- Mounting the pump lower than the chemical container will gravity feed the chemical into the pump. This “flooded suction” installation can reduce the time required to prime the pump. Install a shut-off valve, pinch clamp or other means to halt the gravity feed to the pump during servicing.

**CAUTION - TO ENSURE CHEMICAL DOES NOT SYPHON THROUGH THE PUMP, INSTALL THE INCLUDED SPRING-LOADED INJECTION CHECK-VALVE OR A SUITABLE ANTI-SYPHON VALVE.**

- Your solution tank should be sturdy. Keep the tank covered to reduce fumes.
- Be sure your installation does not constitute a cross connection with the drinking water supply. Check your local plumbing codes.

**C-600P**




**C-600HV**

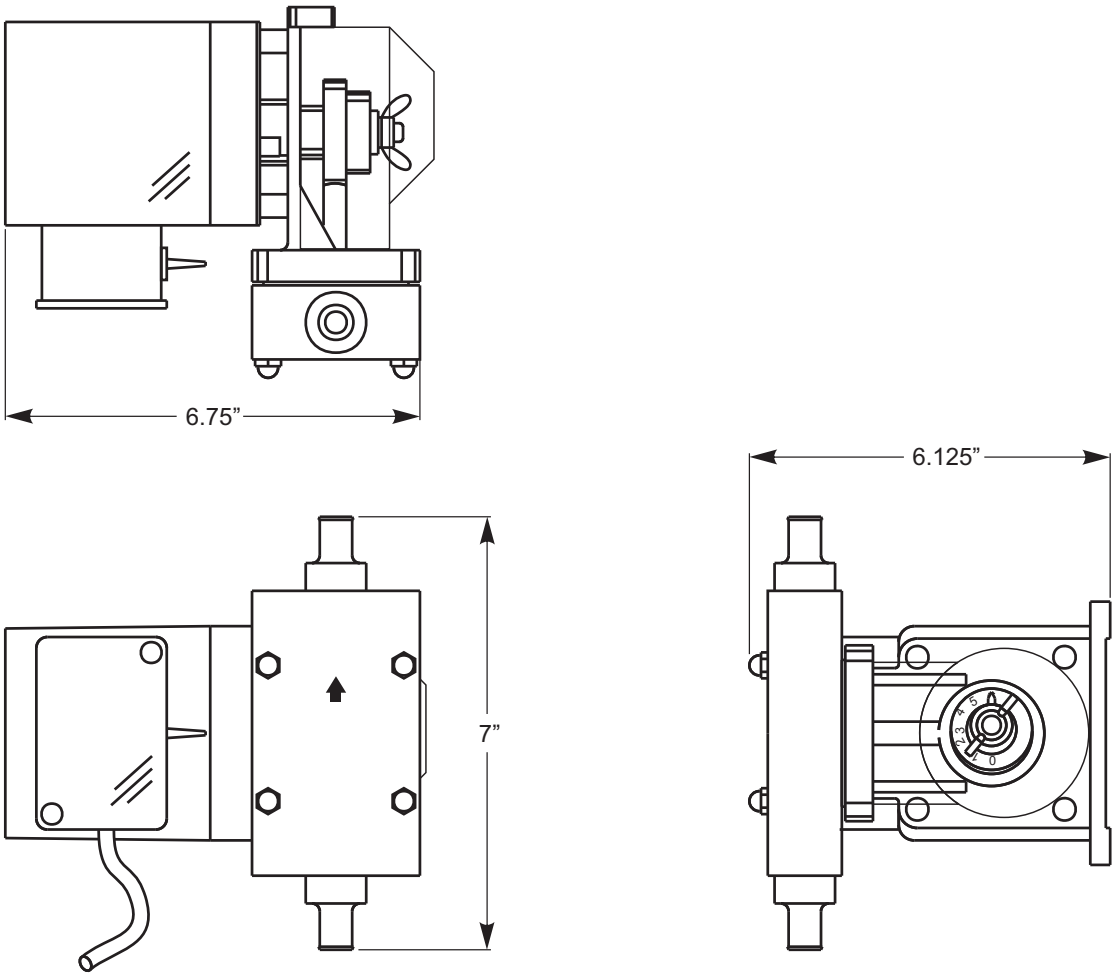
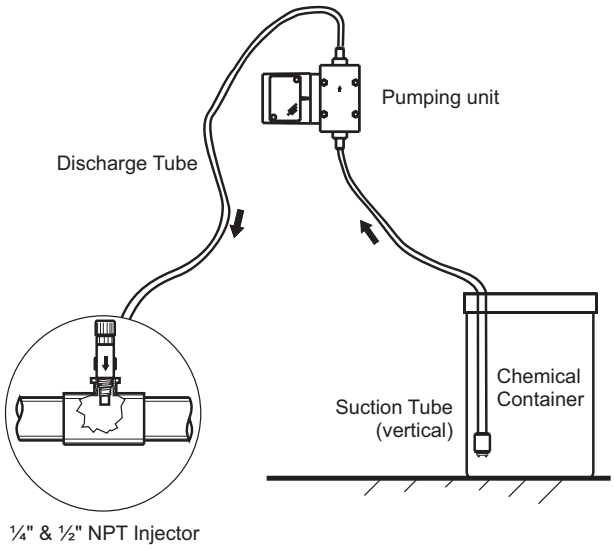
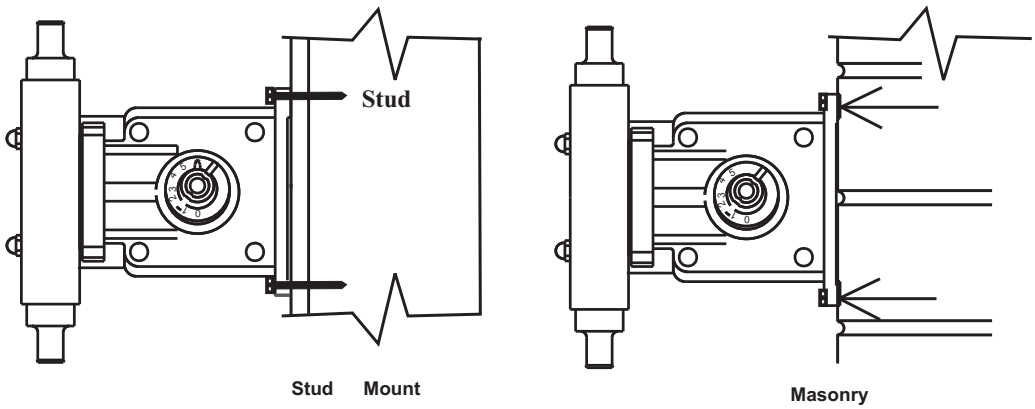



**FIG. 4.1 DIMENSIONAL DRAWING**




**TYPICAL INSTALLATION**




**WALL MOUNTING**

## 4.2 Electrical Connections

Be certain to connect the pump to the proper supply voltage. Using the incorrect voltage will damage the pump and may result in injury. The voltage requirement is printed on the pump serial label.

***Note:*** *When in doubt regarding your electrical installation, contact a licensed electrician.*

The metering pump is supplied with a junction box for field wiring.

**JUNCTION BOX MODELS -**To reduce the risk of electric shock, be certain that a grounding conductor is connected to the green grounding screw located in the junction box.

# WARNING -RISK OF ELECTRICAL SHOCK

**CAUTION - TO PREVENT CHEMICAL OVERDOSING WHEN USED AS A POOL OR SPA CHLORINATOR, CONNECT THE PUMP'S AC MAIN POWER TO THE SAME CIRCUIT AS THE CIRCULATION PUMP.**

**MOTOR LEADWIRES**

| INPUT VOLTAGE | HOT LEADWIRE | NEUTRAL LEADWIRE | GROUND LEADWIRE |
|---|---|---|---|
| 115V 60Hz | BLACK or YELLOW* | BLUE | GREEN |
| 220V 50Hz | BLUE or YELLOW* | BROWN | GREEN |
| 230V 60Hz | BLACK or YELLOW* | RED | GREEN |
| 24V 60Hz | BLUE* | WHITE | GREEN |

* Yellow leadwire : thermally protected motor
Black or Blue leadwire: standard impedance protected motor

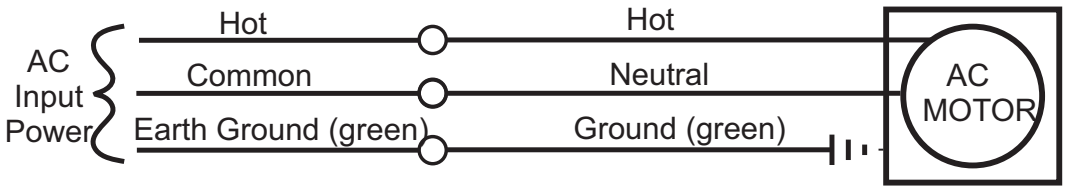



**FIG. 4.5 WIRING DIAGRAM - STANDARD MODELS**

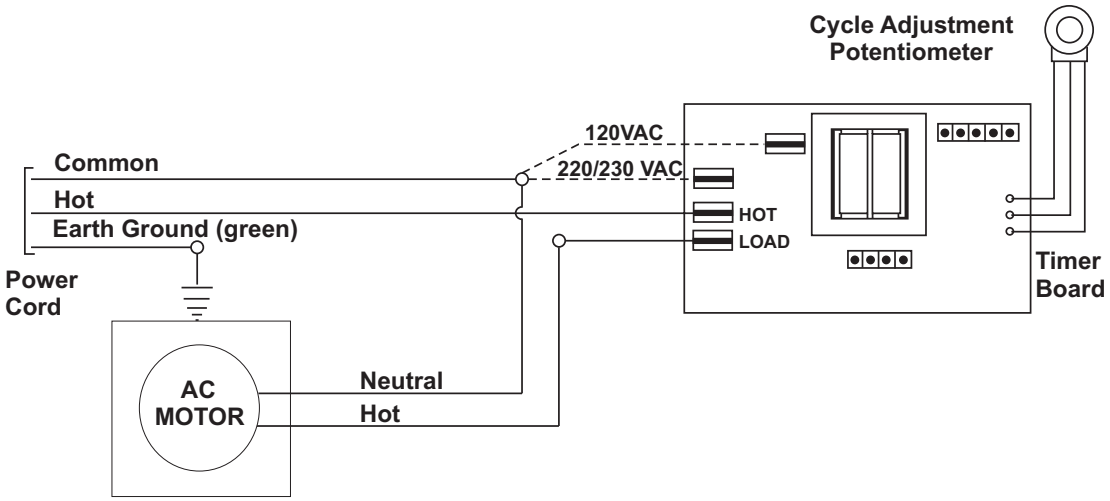



**FIG. 4.6 WIRING DIAGRAM - FIXED TIMERS**

## 4.3 How To Install the Tubing and Fittings

**CAUTION: PROPER EYE AND SKIN PROTECTION MUST BE WORN WHEN INSTALLING AND SERVICING THE PUMP**

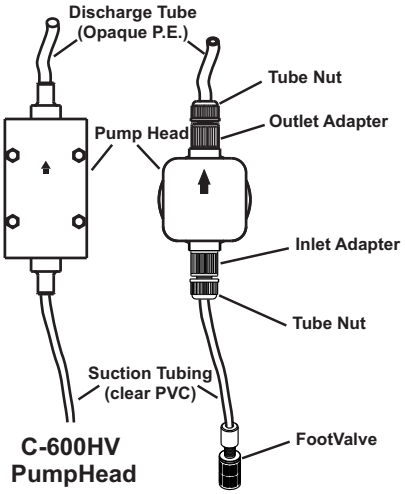
**Inlet Tubing -** Locate the inlet fitting of the pump head. Remove the tube nut. Push the clear PVC suction tubing onto the compression barb of the fitting. Use the tube nut to secure the tube. Hand tighten only.

**Footvalve/Strainer** -Trim the inlet end of the suction tubing so that the strainer will rest in a vertical position, approximately one inch from the bottom of the solution tank. This will prevent sediment from clogging the strainer. Loss of prime may occur if the footvalve is permitted to lay on the bottom of the solution tank in a horizontal position. Slip the ceramic weight over the end of the suction tube. Press the footvalve/strainer into the end of the tube. Secure the ceramic weight to the strainer. Drop the strainer into the solution tank.

**Outlet Tubing -** Locate the outlet fitting of the pump head, Remove the tube nut. Push the rigid outlet (discharge) tubing onto the compression barb of the fitting. Use the tube nut to secure the tube. Hand tighten only.

Trim the other end of the outlet tube leaving only enough slack to connect it to the Injection/Check valve Fitting . Increasing the length of the outlet tube increases the back pressure at the pump head, particularly when pumping viscous fluids.

**Keep the inlet and outlet tubes as short as possible.**



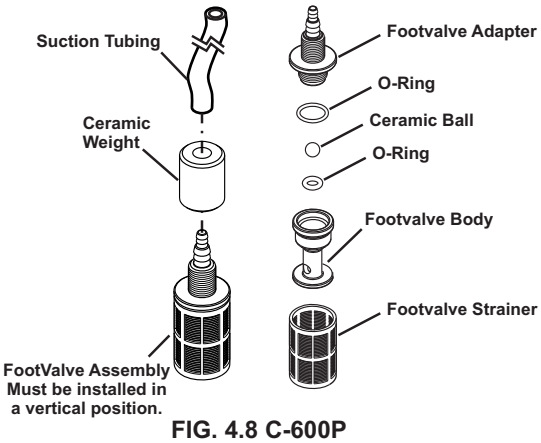
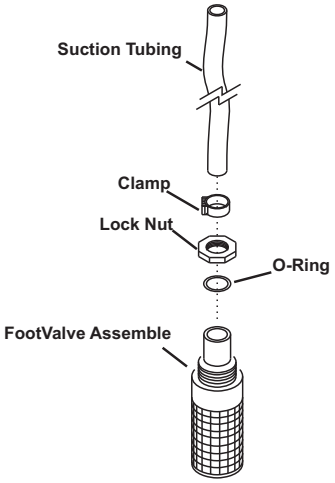




**FIG. 4.8 C-600P**
**FootValve Assy.**




**C-600HV**
**FootValve Assy.**

**4.3.4 Injection/Check Valve Fitting Installation** - The Injection/Check valve fitting is designed to install directly into either 1/4" or ½" female pipe threads. This fitting will require periodic cleaning, especially when injecting fluids that calcify such as sodium hypochlorite. These lime deposits and other build ups can clog the fitting increasing the back pressure and interfering with the check valve operation.

Install the Injection/Check valve directly into the tee fitting. Do not install the fitting into a pipe stud and then into the tee. The solution must inject directly into the flow stream.

Use PTFE thread sealing tape on the pipe threads. Push the opaque outlet (discharge) tubing onto the compression barb of the Injection/Check valve fitting. Use the tube nut to secure the tube. Hand tighten only.

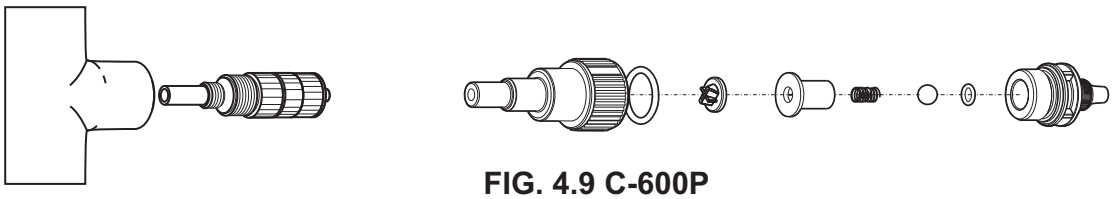


**FIG. 4.9 C-600P**
**INJECTION/CHECK VALVE**
**TEE INSTALLATION AND EXPLODED VIEW**

**CAUTION - TO ENSURE CHEMICAL DOES NOT SYPHON THROUGH THE PUMP, INSTALL THE INCLUDED SPRING-LOADED INJECTION CHECK-VALVE OR A SUITABLE ANTI-SYPHON VALVE.**

## 5.0 How To Operate The Pump

**5.1 Adjusting the Pump Output**- The flow rate can be adjusted within a range of approximately 10%-100% of maximum output (27:1 turndown ratio) by means of a mechanical, cam type mechanism. The mechanism adjusts the pump's stroke length to 1 of 27 settings within the flow range. The pump's output is affected by the pressure of the system , the amount of suction lift, and the viscosity of the fluid being injected into the pump must be over-sized to allow for these factors. Sizing the pump to allow adjustment within the midrange is preferred to maintain accuracy. Consult the factory for individual pump model output curve data.

**To adjust the pump output:**

**1.** Make sure the pump is off before adjusting.
**2.** Loosen the wing nut.
**3.** Turn adjusting knob so the pointer is on the desired setting. *Note:* pump less chemical at first, then re-adjust.
**4.** While holding the knob, tighten the wing nut to keep the knob at the desired setting. *Note:* wing nut must be tight.

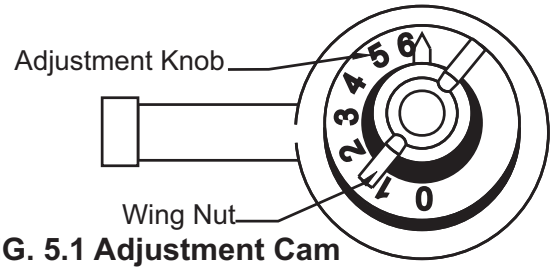



**FIG. 5.1 Adjustment Cam**

**Priming The Pump**

Each pump is factory tested with water. The test water is sealed in the pump head keeping the valves dry to aid in priming. If the valves have dried or priming is difficult due to back pressure, do the following:

**1.** Remove the opaque discharge tubing from the top valve fitting in the pumphead.
**2.** Remove the top and bottom valve fittings and immerse in water to wet the valves. Reinstall the fittings.
**3.** With the discharge tubing removed, start the pump. Stop the pump when the fluid enters the pumphead.
**4.** Attach the discharge tubing to the top valve fitting.
**5.** Be sure the footvalve/strainer is attached to the suction tubing and is installed in a vertical position.

If your installation is at high altitude, priming may be more difficult since the atmospheric pressure is decreased. When the suction line is dry, the diaphragm may not create enough pull. If this is the case, do the following:

**1.** Remove the clear suction tube from the bottom valve fitting and fill completely with water.
**2.** While the pump is running, attach the tube (filled with water) to the bottom valve fitting.
**3.** When the fluid enters the pumphead, place the foot valve in the solution tank.
**4.** Be sure the footvalve/strainer is attached to the suction tubing and is installed in a vertical position.

### 5.3 Measuring the Pump's Output - Volumetric Test.

This volumetric test will take into account individual installation factors such as line pressure, fluid viscosity, suction lift, etc. This test is the most accurate for measuring the injector's output in an individual installation.

**1.** Be sure the Injection Fitting and Footvalve/Strainer is clean and working properly.

**2.** With the injector installed under normal operating conditions, place the Footvalve/Strainer in a large graduated cylinder.

**3.** Fill the graduated cylinder with the solution to be injected and run the injector until all air is removed from the suction line and the solution enters the discharge tubing.

**4.** Refill the graduated cylinder, if necessary, and with the Footvalve completely submerged in the solution, note the amount of solution in the graduated cylinder.

**5.** Run the injector for a measured amount of time and note the amount of fluid injected. A longer testing time will produce more accurate results.

## 6.0 How to Maintain the Pump

**CAUTION: PROPER EYE AND SKIN PROTECTION MUST BE WORN WHEN INSTALLING AND SERVICING THE METERING PUMP**

### 6.1 Routine Inspection and Maintenance

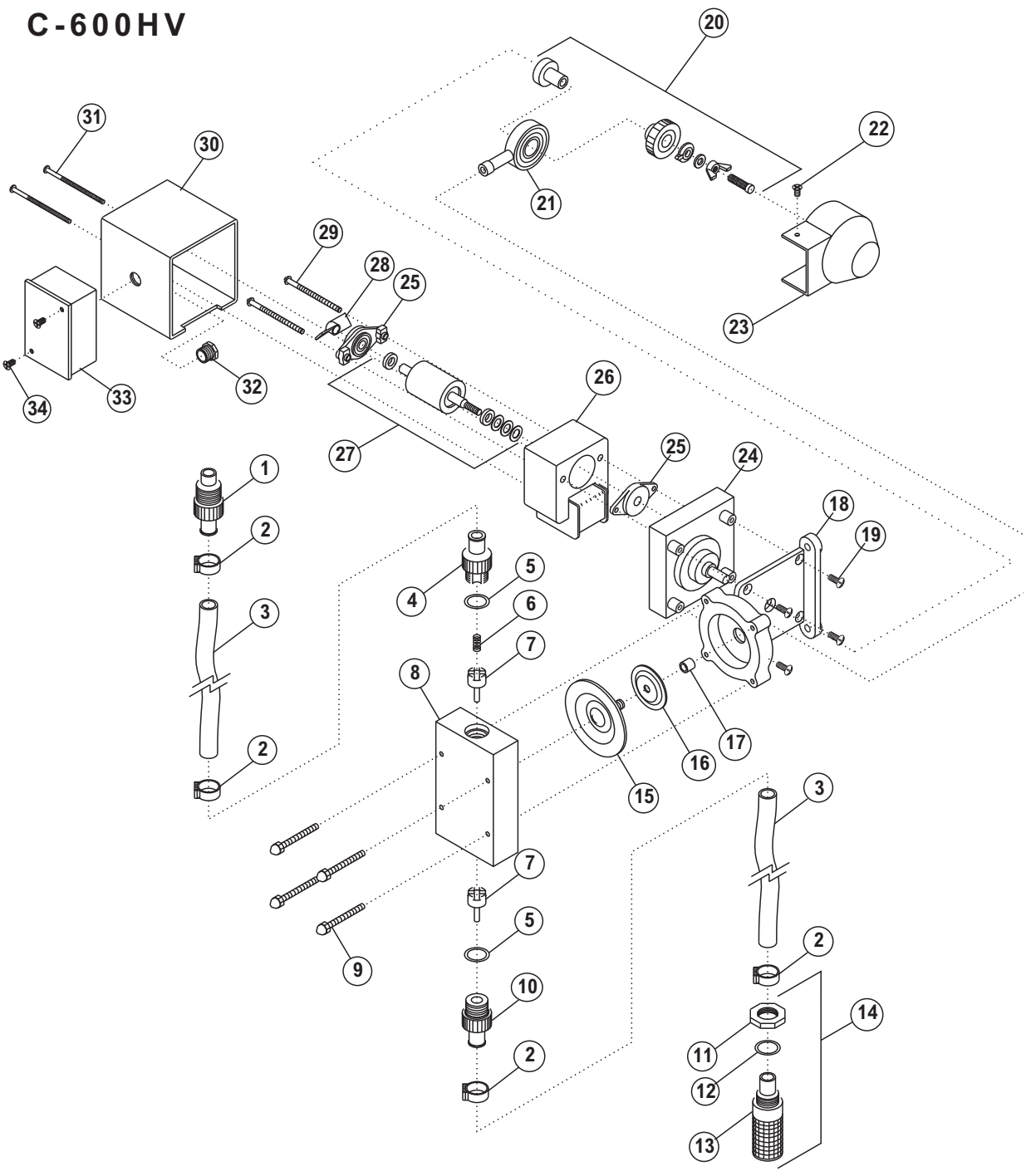
The Pump requires very little maintenance. However, the pump and all accessories should be checked regularly. This is especially important when pumping chemicals. Inspect all components for signs of leaking, swelling, cracking, discoloration or corrosion. Replace worn or damaged components immediately.
Cracking, crazing, discoloration and the like during the first week of operation are signs of severe chemical attack. If this occurs, immediately remove the chemical from the pump. Determine which parts are being attacked and replace them with parts that have been manufactured using more suitable materials. The manufacturer does not assume responsibility for damage to the pump that has been caused by chemical attack.

### 6.2 How to Clean the Pump

The Pump will require occasional cleaning, especially the Injection fitting, the Footvalve/Strainer, and the pump head valves. The frequency will depend on the type and severity of service
When changing the diaphragm, the pump head chamber and pump head cover should be wiped free of any dirt and debris.
Periodically clean the injection/check valve assembly, especially when injecting fluids that calcify such as sodium hypochlorite. These lime deposits and other build ups can clog the fitting, increase the back pressure and interfere with the check valve operation.
Periodically clean the suction strainer.
Periodically inspect the air vents located on the back of the motor compartment and under the pump head. Clean if necessary.

# Exploded View

## C-600HV

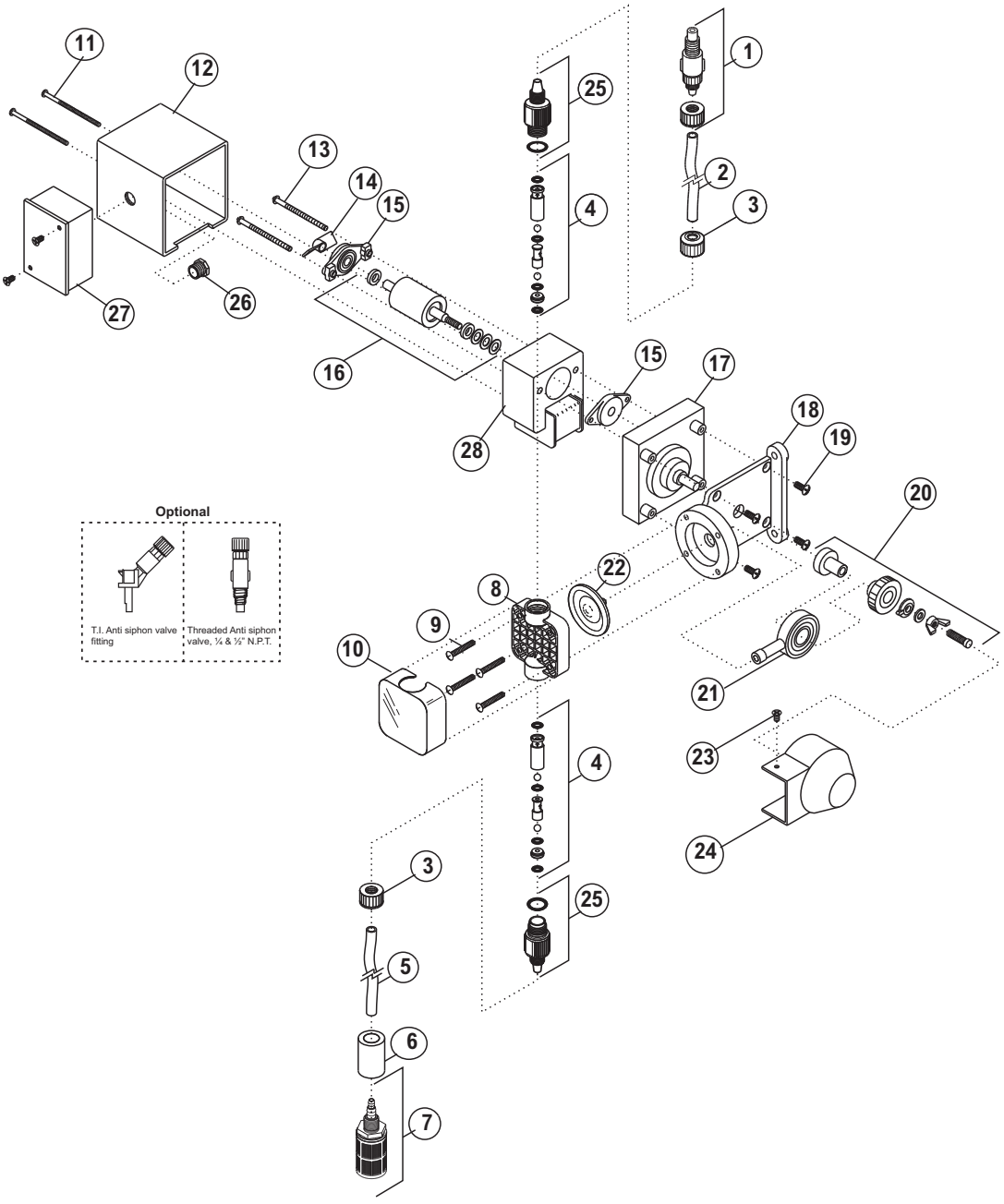


# C-600HV Parts List

| | Catalog No. | Description | Amount Reqd. |
|---|---|---|---|
| **1.** | C-3391-10 | Injection Fitting | 1 |
| **2.** | C-3330 | Clamp | 4 |
| **3.** | C-334-10 | Tubing 5/8" O.D. , 5FT | 2 |
| | **4.**C-428-10 | Top Adaptor, 5/8" Tube | 1 |
| **5.** | 90003-033 | O-ring (EP) (Viton) | 1 |
| **6.** | C-354-2 | Spring | 1 |
| **7.** | C-926E | Check Valve (Hypalon) | 1 |
| | C-926V | Check Valve (Viton) | 1 |
| **8.** | C-3203 | Headblock (Clear) (Polyethylene) | 1 |
| **9.** | C-3504 | Screw, (Headblock) #8-32X1 1/2 | 4 |
| **10.** | C427-10 | Bottom Adaptor, 5/8" Tube | 1 |
| **11.** | C-3345C | Lock Nut | 1 |
| **12.** | C-3345C | O-ring | 1 |
| **13.** | C-3373-10 | Foot Strainer | 1 |
| **14.** | C-3393-10 | Combination Foot Strainer Bulkhead | 1 |
| **15.** | C-3106NH | Diaphragm (Hypalon) | 1 |
| | C-3106NV | Diaphragm (Viton) | 1 |
| **16.** | 90006-526 | Aluminum Backup Washer | 1 |
| **17.** | 76000-514 | H.V. Aluminum Spacer | 1 |
| **18.** | C-3301 | Motor Mount | 2 |
| **19**. | C-624 | Screw 10-32X1/2 | 4 |
| **20.** | C-3325 | Cam Set | 1 |
| **21.** | C-3304 | Yoke and Bearing | 1 |
| **22.** | 90011-155 | Screw 6-32X3/8" | 1 |
| **23.** | 90002-201 | Cam Cover | 1 |
| **24.** | C-618P-60 | Gearbox Assembly(60 RPM) | 1 |
| | C-618P-125 | Gearbox Assembly(125 RPM) | 1 |
| | C-618P-250 | Gearbox Assembly(250 RPM) | 1 |
| **25.** | C-612PB | Armature Bearing | 2 |
| **26.** | C-615P1 | Motor Winding (115V-60hz) | 1 |
| | C-615P2 | Motor Winding (230V-60hz) | 1 |
| | C-615P3 | Motor Winding (220V-50hz) | 1 |
| **27.** | 70000-027 | Rotor w/ Spacers | 1 |
| **28.** | C-612F | Armature Fan | 1 |
| **29.** | C-625 | Motor Screw 8-32X2 3/4 | 2 |
| **30.** | C-608P | Motor Cover (Zinc) | 1 |
| | C-608P(AL) | Motor Cover (Aluminum) | 1 |
| **31.** | C-628 | Cover Screw 6-32 X 2 3/4 | 2 |
| **32.** | 90007-515 | 1/2" Aluminum Chase Nipple | 1 |
| **33.** | C-308J | Junction Box | 1 |
| **34.** | 90011-129 | Junction Box screw 8-32 X 5/16 | 2 |

# Exploded View

## C-600P



## C- 600P Parts List

| | Catalog No. | Description | Amount Reqd. |
|---|---|---|---|
| 1. | C-395-6V | Injection valve 6 PSI, Viton | 1 |
| | C-395-6E | Injection valve 6 PSI, EP (optional) | 1 |
| 2. | C-335-6 | Discharge Tubing 3/8 OD, 5ft. Opaque Poly-E | 1 |
| 3. | C-330-6 | Tube Nut | 2 |
| 4. | K-568V-4 | Bullet valve (double ball), Viton, 4 pack set | 2 |
| | K-568V-10 | bullet valve (double ball), Viton, 10 pack set | 2 |
| | K-569E-4 | Bullet valve (double ball), EP, 4 pack set (optional) | 2 |
| | K-569E-10 | Bullet valve (double ball), EP, 10pack set(optional) | 2 |
| 5. | C-334-6 | Suction tubing 3/8' OD, 5ft. Clear PVC w/ indicator | 1 |
| 6. | C-346 | Ceramic weight | 1 |
| 7. | C-345V | Foot valve / strainer Poly-Pro, Viton | 1 |
| | C-345E | Foot valve / strainer Poly Pro, EP (optional) | 1 |
| 8. | C-535 | Heavy duty molded pump head | 1 |
| 9. | C-504HD | Screw, HD Pump head 10-32 x 1-1/4' | 4 |
| 10. | C-535FC | Pump head cover, Chem feed logo | 1 |
| 11. | C-628 | Cover screw 6-32 x 2-3/4' Steel | 2 |
| 12. | C-608P | Motor Cover | 1 |
| 13. | C-625 | Motor screw 8-32 x 2-1/2' | 2 |
| 14. | C-612F | Rotor Fan | 1 |
| 15. | C-612PB | Rotor Bearing | 2 |
| 16. | C-616PN | Rotor w/ Spacer | 1 |
| 17. | C-618P-14 | Gearbox Assembly, 14 RPM | 1 |
| | C-618P-30 | Gearbox Assembly, 30 RPM | 1 |
| | C-618P-45 | Gearbox Assembly, 45 RPM | 1 |
| | C-618P-60 | Gearbox Assembly, 60 RPM | 1 |
| | C-618P-125 | Gearbox Assembly, 125 RPM | 1 |
| | C-618P-250 | Gearbox Assembly, 250 RPM | 1 |
| 18. | C-301 | Motor Mount | 1 |
| 19. | C-624 | Motor Mount Screw 10-32 x ½' | 4 |
| 20. | C-325 | Cam S/A C-600 | 1 |
| 21. | C-304 | Yoke w/Bearings | 1 |
| 22. | C-406T | Diaphragm PTFE coated, EP | 1 |
| 23. | 90011-155 | Screw 6-332 x 3/8' | 1 |
| 24. | 90002-201 | Cam Cover | 1 |
| 25. | C-550-6V | Bullet Valve Adapter, Viton O-ring | 2 |
| | C-560-6E | Bullet Valve Adapter, EP O-ring | 2 |
| 26. | 90007-515 | ½" Aluminum Chase Nipple | 1 |
| 27. | C-308J | Junction Box Complete w/Cover and Gasket | 1 |
| 28. | C-615P-1 | Stator S/A 115V/60Hz, blue-black (lead wires) | 1 |
| | C-615P-2 | Stator S/A 230V/60Hz, red-black (lead wires) | 1 |
| | C-615P-3 | Stator S/A 220V/50Hz, brown-blue (lead wires) | 1 |
| | C-615P-4 | Stator S/A 24V/60Hz, blue-white (lead wires) | 1 |
| | C-615P-6 | Stator S/A 230V/60Hz, red-yellow (lead wires) | 1 |
| | C-615P-8 | Stator S/A 220V/50Hz, brown-yellow (lead wires) | 1 |
| | C-615P-9 | Stator S/A 115V/60Hz, blue-yellow (lead wires) | 1 |

## LIMITED WARRANTY

Your new pump is a quality product and is warranted to be free of defects as set down in this policy. All parts, including rubberized goods, and labor are covered under warranty for 90 days from the date of purchase. Used peristaltic pump tube assemblies are not warranted. Parts, excluding rubberized goods, are covered under warranty for 12 months from the date of purchase.

Warranty coverage does not include damage to the pump that results from misuse, carelessness, abuse or alteration. Only the repair or the replacement of the pump is covered. Blue-White Industries does not assume responsibility for any other loss or damage.

Warranty status is determined by the pump's serial label and the sales invoice or receipt. The serial label must be on the pump and the pump must be accompanied by the sales invoice or receipt to obtain warranty coverage. The warranty status of the pump will be verified by Blue-White or a factory authorized service center.

Please be advised; injection and metering devices are not intended as a means of treating water to render it suitable for human consumption. When used as hypochlorinators, they are meant to destroy bacteria and algae contamination, before it's removal by filtration. Acid and soda injectors are used for PH control (balance). Blue-White injectors are factory tested with water only for pressure and performance. ***Installers and operators of these devices must be well informed and aware of the precautions to be taken when injecting various chemicals -especially those considered hazardous or dangerous.***

Should it become necessary to return an injector for repair or service, you must attach information regarding the chemical used as some residue may be present within the unit which could be a hazard to service personnel.

Blue-White Industries will not be liable for any damage that may result by the use of chemicals with their injectors and it's components. Thank you.

## PROCEDURE FOR IN WARRANTY REPAIR

Carefully pack the pump to be repaired, include the foot strainer and injection/check valve fitting. Enclose a brief description of the problem as well as the original invoice or sales receipt showing the date of purchase. The receipt will be returned with the unit. Prepay all shipping costs. COD shipments will not be accepted. Warranty service must be performed by the factory or an authorized service center. Damage caused by improper packaging is the responsibility of the sender.

## AUTHORIZED SERVICE CENTERS

**ARKANSAS**
**BT Environmental, Inc**
Bill Thomason
225 Castleberry Street
Hot Springs, AR 71901
501-624-3837

**CALIFORNIA (NORTHERN)**
***Howard E. Hutching company***
***(Repair Center)***
7190 Penryn Plaza
Penryn, CA 95663
800-568-3958

**Swimco Electric Co.**
753 Camden Avenue
Campbell, CA 95008
408-378-2607

**CALIFORNIA (SOUTHERN)**
***Blue-White Industries***
***(Repair Center)***
5300 Business Drive
Huntington Bch. CA 92649
714-893-8529

**COLORADO**
**Denver Winpump**
5754 Lamer ave
.Arvada, CO 80002
303-424-3551

**CONNECTICUT**
**Cronin-Cook & Associates**
24 West Road
Vernon, CT 06029
860-875-0544

**Rice Pump & Motor Repair**
5740 Powerline Road
Ft. Lauderdale FL 33309
954-776-6049

**American Pump**
7580-A W. Tennessee St.
Tallahassee, FL 32304
850-575-9618

**Jerry Lee Chemical Co.**
3407 W. Old Fairfield Drive
Pensacola, FL 32505
904-432-9929

**Picard Chemical**
1670 S. Congress Avenue
W. Palm Beach, FL 33406
561-965-3434

**ILLINOIS**
***Mullarkey Associates***
***(Repair Center)***
12346 S. Keeler Ave.
Alsip, IL 60658
708-597-5558

**MARYLAND**
**Century Pool Service, Inc**
5020 Nicholson Court, #201
Kensington, MD 20895
301-231-8999

**NEW YORK**
**Sherwood Specialties, Inc.**
875 Atlantic Ave. 'B'
Rochester, NY 14609
585-546-1211

**NORTH CAROLINA**
**Southern Industrial Sales**
1903 Herring Avenue
Wilson, NC 27893
800-872-7665

**SOUTH DAKOTA**
**Son-Aqua Distributing**
Jim Robinson
2447 W. Main Street
Rapid City, SD 57702
605-343-7716

**TENNESSEE**
**Rock City Machine**
307 3rd Avenue South
Nashville, TN 37201
615-244-1371

**TEXAS**
**Alamo Water Refiners**
13700 Hwy. 90 West
San Antonio, TX 78245
210-677-8400

**Shelter's Water Refining**
Robert Shelton
2708 E. Randol Mill Rd.
Arlington, TX 76011
817-640-6188

Users of electrical and electronic equipment (EEE) with the WEEE marking per Annex IV of the WEEE Directive must not dispose of end of life EEE as unsorted municipal waste, but use the collection framework available to them for the return, recycle, recovery of WEEE and minimize any potential effects of EEE on the environment and human health due to the presence of hazardous substances. The WEEE marking applies only to countries within the European Union (EU) and Norway. Appliances are labeled in accordance with European Directive 2002/96/EC.
Contact your local waste recovery agency for a *Designated Collection Facility* in your area.

PART NO. 70 - 290 G375PL (REV-K)

# 23 SERIES OIL-LESS VACUUM PUMPS & COMPRESSORS

## OPERATION & MAINTENANCE MANUAL

Model #0523-101 Shown

Model #1023-V103 Shown

Model #1023-101Q Shown

Thank you for purchasing this Gast product. It is manufactured to the highest standards using quality materials. Please follow all recommended maintenance, operational and safety instructions and you will receive years of trouble free service.

**⚠ WARNING**

**PLEASE READ THIS MANUAL COMPLETELY BEFORE INSTALLING AND USING THIS PRODUCT. SAVE THIS MANUAL FOR FUTURE REFERENCE AND KEEP IN THE VICINITY OF THE PRODUCT.**

**General information**

- **Model numbers ending in "X"** have automatic thermal protectors which protect the motor by shutting the motor off if it overheats. The motor will automatically restart once the motor has cooled.

**Product Use Criteria:**

- Pump only clean, dry air.
- Operate at 32ºF - 104ºF (0ºC - 40ºC).
- Protect unit from dirt & moisture.
- Do not pump flammable or explosive gases or use in an atmosphere that contains such gases.
- Protect all surrounding items from exhaust air. This exhaust air can become very hot.
- Corrosive gases and particulate material will damage unit. Water vapor, oil-based contaminants or other liquids must be filtered out.
- Consult your Gast Distributor before using at high altitudes.
- Oil-Less rotary-vanes require NO lubrication.
- Sealed bearings are grease packed.
- Use of petroleum or hydrocarbon products will reduce carbon-vane service life.

GAST

*A UNIT OF IDEX CORPORATION*

**www.gastmfg.com**



**ISO 9001 CERTIFIED**

**Your safety and the safety of others is extremely important.**

**We have provided many important safety messages in this manual and on your product. Always read and obey all safety messages.**

**This is the safety alert symbol. This symbol alerts you to hazards that can kill or hurt you and others. The safety alert symbol and the words "DANGER" and "WARNING" will precede all safety messages. These words mean:**

## DANGER

**You will be killed or seriously injured if you don't follow instructions.**

## WARNING

**You can be killed or seriously injured if you don't follow instructions.**

**All safety messages will identify the hazard, tell you how to reduce the chance of injury, and tell you what can happen if the safety instructions are not followed.**

## INSTALLATION

## WARNING

**Electrical Shock Hazard**

**Disconnect electrical power at the circuit breaker or fuse box before installing this product.**

**Install this product where it will not come into contact with water or other liquids.**

**Install this product where it will be weather protected.**

**Electrically ground this product.**

**Failure to follow these instructions can result in death, fire or electrical shock.**

**Correct installation is your responsibility.** Make sure you have the proper installation conditions and that installation clearances do not block air flow.

**Blocking air flow over the product in any way can cause the product to overheat.**

**Mounting**
This product can be installed in any orientation. Mounting the product to a stable, rigid operating surface and using shock mounts will reduce noise and vibration.

**Plumbing**
Remove plugs from the IN and OUT ports. Connect with pipe and fittings that are the same size or larger than the product's threaded ports.

**Accessories**
The product's intake and exhaust filters will provide adequate filtration in most applications. Consult your Gast representative for additional filter recommendations. Install relief valves and gauges at inlet or outlet, or both, to monitor performance. Check valves are required to prevent back streaming through the pump.

**Motor Control**
It is your responsibility to contact a qualified electrician and assure that the electrical installation is adequate and in conformance with all national and local codes and ordinances.

Determine the correct overload setting required to protect the motor (see motor starter manufacturer's recommendations). Select fuses, motor protective switches or thermal protective switches to provide protection. Fuses act as short circuit protection for the motor, not as protection against overload. Incoming line fuses help to withstand the motor's starting current. Motor starters with thermal magnetic overload or circuit breakers protect motor from overload or reduced voltage conditions.

The wiring diagram attached to the product provides required electrical information. Check that power source is correct to properly operate the dual-voltage motor.

## OPERATION

## WARNING

**Injury Hazard**

**Product surfaces become very hot during operation,**
**allow product surfaces to cool before handling.**

**Air stream from product may contain solid or liquid material that can result in eye or skin damage, wear proper eye protection.**

**Failure to follow these instructions can result in burns, eye injury or other serious injury.**

**It is your responsibility to operate this product at recommended pressures or vacuum duties and room ambient temperatures.**

**Model numbers ending in "X" have automatic thermal protectors which protect the motor by shutting the motor off if it overheats. The motor will automatically restart once the motor has cooled.**

**Start Up**
If motor fails to start or slows down significantly under load, shut off and disconnect from power supply. Check that the voltage is correct for motor and that motor is turning in the proper direction. Vane life will be drastically reduced if motor is not operating properly. Vanes can break or be damaged if motor/pump runs in the wrong direction.

## MAINTENANCE

**WARNING**

**Electrical Shock Hazard**

**Disconnect electrical power supply cord before performing maintenance on this product.**

**If product is hard wired into system, disconnect electrical power at the circuit breaker or fuse box**
**before performing maintenance on this product.**

**Failure to follow these instructions can result in death, fire or electrical shock.**

**WARNING**

**Injury Hazard**

**Product surfaces become very hot during operation,**
**allow product surfaces to cool before handling.**

**Air stream from product may contain solid or liquid**
**material that can result in eye or skin damage, wear proper eye protection.**

**Flush this product in a well ventilated area.**

**Failure to follow these instructions can result in burns, eye injury or other serious injury.**

### General Maintenance

1. Remove end cap and filters. Inspect filters for rips,tears, cuts, brittleness and excessive foreign material.
2. Clean filters if in good condition with compressed air. Re-inspect for wear conditions. Set filters aside.
3. Check filter/muffler (#11) for compacted debris. If debris is present, replace filter/muffler.
4. Check condition of O-ring. It should be soft and flexible. Replace if it is not.
5. Remove and inspect muffler box. Clean box. Set box aside. (Not all models have a muffler box.)
6. Check gasket for cracks or tears. Install new gasket
   if any cracks or tears appear. Replace gasket.
7. Replace muffler box.
8. Reinstall filters or install new filters if required. Reinstall end cap.

### Flushing

Flushing this product to remove excessive dirt, foreign particles, moisture or oil that occurs in the operating environment will help to maintain proper vane performance. There are 2 options for this operation. If Option 1 does not remedy your problem, go on to Option 2.

**Use only Gast recommended flushing solvent or other non-petroleum based flushing solvent. Do Not use kerosene or ANY other combustible solvents to flush product.**

**Option 1**
You will need 2 pipe nipples at least 4 inches long with 1/4" NPT for 0323 and 0523 products, or 3/8" NPT on one end for 0823 and 1023 products. No nipples are needed if the unit does not have a muffler box.

1. Remove filter and muffler cap (#9).
2. Remove 5 bolts. Use a small hammer to tap on muffler box to remove it. Attach pipe nipples where muffler caps were removed.
3. Start product and add flushing solvent to the inlet port. If using liquid solvent, pour several tablespoons directly into the inlet port. If using Gast recommended spray solvent, spray for 5-10 seconds into inlet port. Place towel over exhaust to clean up solvent.
4. Plug inlet port for 20-30 seconds. Listen for changes in the sound of the pump. If pump sounds smooth, go to next step. If pump does not sound like it is running smoothly, installing a Service Kit will be required (See Service).
5. Release vacuum.
6. Repeat steps 3-5 three or four times.

**If Option 1 is not successful, remove the end plate and examine.**

**Option 2**

1. Remove six end plate bolts. (See exploded view.)
2. Use a small hammer to carefully tap on end plate to remove. Do not use a screwdriver to pry off.
3. Check that vanes are moving freely in and out of vane slots. Replace vanes if more than 50% of the vane extends past the vane slot.
4. Remove vanes and clean both sides with fine emery cloth. Clean end-plate with fine emery cloth.
5. Flush vanes with Gast recommended solvent and remove all solvent from vanes.
6. Flush body, rotor and end plate with Gast recommended solvent, then remove all solvent from each part.
7. Check body, rotor and end plate for scoring. If each part is clean and shows no signs of scoring, re-install parts. If scoring appears, send unit to factory or replace with new part(s).

**Check that all external accessories such as relief valves and gauges are attached to cover and are not damaged before re-operating product.**

## SHUTDOWN PROCEDURES

**It is your responsibility to follow proper shutdown procedures to prevent product damage.**
**NEVER ADD OIL TO THIS OIL-LESS PUMP.**

1. Disconnect plumbing.
2. Operate product for at least five minutes without plumbing.
3. Run at maximum vacuum for 10-15 minutes.
4. Repeat step 2.
5. Disconnect power supply.
6. Plug open ports to prevent dirt or other contaminants from entering product.

## SERVICE KIT INSTALLATION

**WARNING**

**Electrical Shock Hazard**

**Disconnect electrical power supply cord before installing service kit.**

**If product is hard wired into system, disconnect electrical power at the circuit breaker or fuse box before installing service kit.**

**Vent all air lines to release pressure or vacuum.**

**Failure to follow these instructions can result in death, fire or electrical shock.**

**Gast will NOT guarantee field-rebuilt product performance. For performance guarantee, the product must be returned to a Gast-authorized facility.**

Service Kit contents vary. Most contain vanes, gaskets and filter parts.

1. Remove filter/muffler parts from front of muffler box.
2. Remove the 5 muffler box bolts.
3. Use a small hammer to tap on box to remove. Do not use a screwdriver.
4. Remove the 6 end plate bolts.
5. Remove end plate. Check direction of bevel edges of vanes then remove vanes.
6. Clean body and rotor slots.
7. Check end plate, rotor and body for scoring. Severe scoring or worn bearings will require service at a Gast-authorized facility.

**DO NOT remove rotor or motor bolts.**

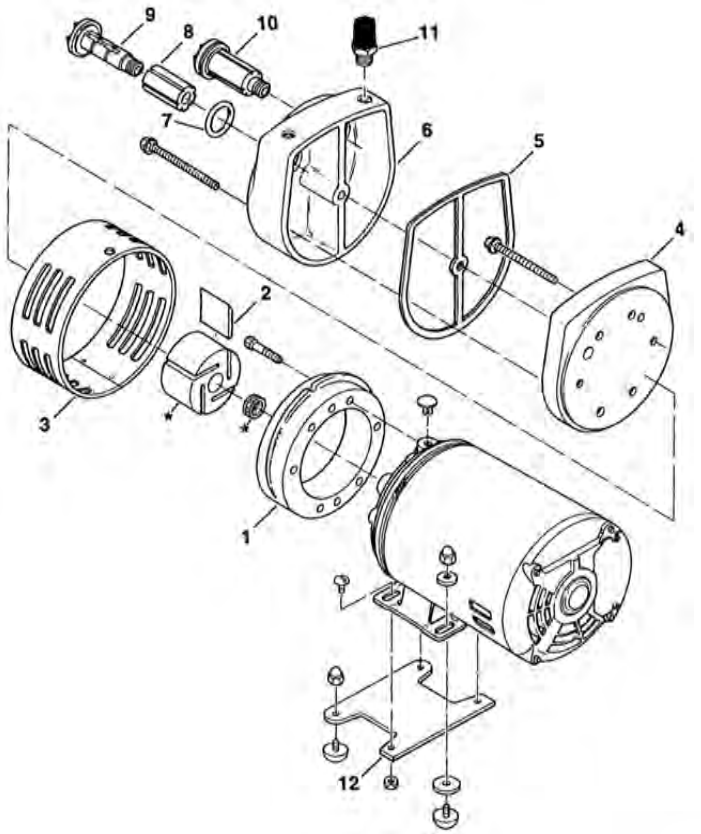
8. Insert vanes, checking that the bevel edges are in the correct direction.
9. Replace end plate. Torque bolts to 90-120 in. lb.
10. Check gasket for damage.
11. Reinstall muffler box. Torque bolts to 90-120 in. lb.

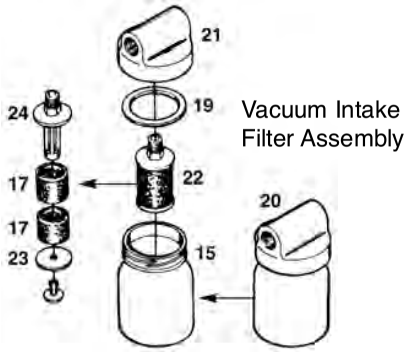
**Check that all external accessories such as relief valves and gauges are attached and are not damaged before re-operating product.**

## EXPLODED PRODUCT VIEW, PARTS & ORDERING INFORMATION

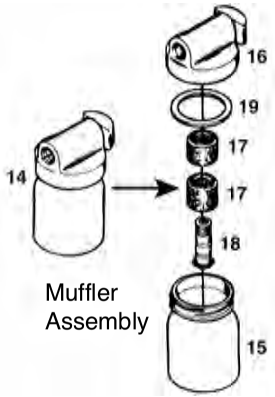
| REF | DESCRIPTION | QTY | 0323-101 | 0323-101Q | 0523-101 | 0523-101Q | 0523-V103 |
|---|---|---|---|---|---|---|---|
| 1 | BODY | 1 | AK503 | AK503 | AK505 | AK505 | AK505 |
| 2 * | VANE | 4 | AH850A | AH850A | AH850A | AH850A | AH850A |
| 3 | SHROUD | 1 | AK502 | AK502 | AK502 | AK502 | AK502 |
| 4 | END PLATE | 1 | AK516A | AK501 | AK516A | AK501 | AK516A |
| 5 * | GASKET | 1 | | AK521 | | AK521 | |
| 6 | MUFFLER BOX | 1 | | AK519 | | AK519 | |
| 7 * | O-RING | 2 | | AK473 | | AK473 | |
| 8 * | FELT | 2 | | AK524 | | AK524 | |
| 9 | END CAP | 2 | | AK510 | | AK510 | |
| 10 | END CAP ASSEMBLY | 2 | | AK526 | | AK526 | |
| 11 | FILTER / MUFFLER | 1 | | AK840A | | AK840A | |
| 12 | FOOT SUPPORT | 1 | | AC136 | | AC136 | |
| 13 | ELBOW *** | 2 | | | | | AD997 |
| 14 | MUFFLER ASSEMBLY | 1 | | | | | V425L |
| 15 | JAR | 2 | | | | | AA125A |
| 16 | COVER | 1 | | | | | AV427A |
| 17 | FELT FILTER | 4 | | | | | B344A |
| 18 | SUPPORT | 1 | | | | | B345A |
| 19 | COVER GASKET | 2 | | | | | B62A |
| 20 | FILTER ASSEMBLY | 1 | | | | | V400G |
| 21 | COVER | 1 | | | | | AV402C |
| 22 | FILTER ASSEMBLY | 1 | | | | | B343B |
| 23 | SCREEN CAP | 1 | | | | | AJ571 |
| 24 | FELT SUPPORT | 1 | | | | | B347 |
| | SERVICE KIT | 1 | K478A | K478 | K478A | K478 | K559 |

* Denotes parts included in the Service Kit. Parts listed are for stock models.
** No Service Kit available, order parts separately. *** Not shown.
For specific OEM models, please consult the factory.
When corresponding or ordering parts, please give complete model and serial numbers.




Vacuum Intake Filter Assembly

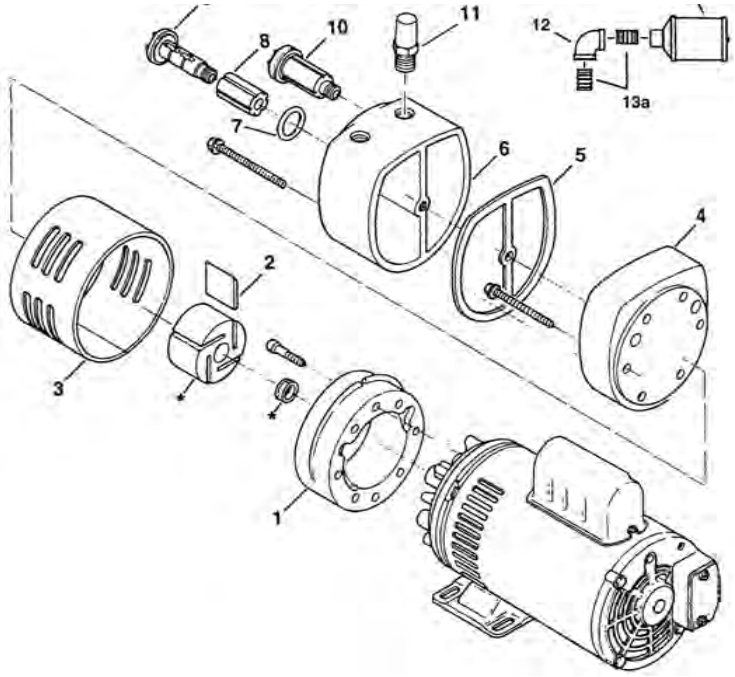



Muffler Assembly

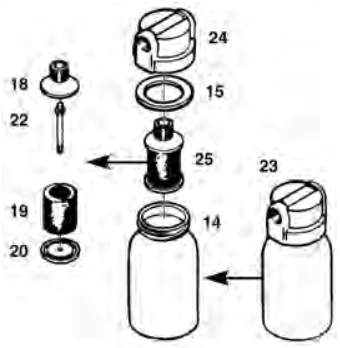
## EXPLODED PRODUCT VIEW, PARTS & ORDERING INFORMATION

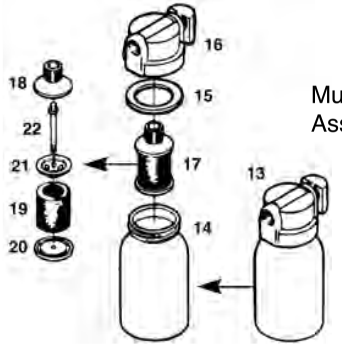
| REF | DESCRIPTION | QTY | 0823-101 | 0823-101Q | 1023-101 | 1023-101Q | 1023-V103 | 1423-101Q |
|---|---|---|---|---|---|---|---|---|
| 1 | BODY | 1 | AK517 | AK517 | AK518 | AK518 | AK518 | AL283 |
| 2 * | VANE | 4 | AK513 | AK513 | AK513 | AK513 | AK513 | AL284 |
| 3 | SHROUD | 1 | AK511 | AK511 | AK511 | AK511 | AK511 | AL281 |
| 4 | END PLATE | 1 | AK515A | AK514 | AK515A | AK514 | AK515A | AK514 |
| 5 * | GASKET | 1 | | AK522 | | AK522 | | AK522 |
| 6 | MUFFLER BOX | 1 | | AK520 | | AK520 | | AK520 |
| 7 * | O-RING | 2 | | AK473 | | AK473 | | AK473 |
| 8 * | FELT | 2 | | AK524 | | AK524 | | AK524 |
| 9 | END CAP | 2 | | AK510 | | AK510 | | AK510 |
| 10 | END CAP ASSEMBLY | 2 | | AK526 | | AK526 | | AK526 |
| 11 | FILTER / MUFFLER | 1 | | AK840 | | AK840 | | AC432 |
| 12 | ELBOW | 1 | | | | | | BA206 |
| 12 | ELBOW *** | 2 | | | | | AF272 | |
| 13 | MUFFLER ASSEMBLY | 1 | | | | | AB599B | |
| 13 a | NIPPLE | 2 | | | | | | BA714 |
| 14 | JAR | 2 | | | | | AA805 | |
| 15 | COVER GASKET | 2 | | | | | AA405 | |
| 16 | COVER ASSEMBLY | 1 | | | | | AV805B | |
| 17 | MUFFLER ASSEMBLY | 1 | | | | | AC434-1 | |
| 18 | COUPLING | 2 | | | | | AC391 | |
| 19 | CARTRIDGE | 2 | | | | | AC393 | |
| 20 | END CAP ASSEMBLY | 2 | | | | | AC394 | |
| 21 | MUFFLER PLATE | 1 | | | | | AC395 | |
| 22 | STUD | 2 | | | | | AC396 | |
| 23 | FILTER ASSEMBLY | 1 | | | | | AB599 | |
| 24 | COVER ASSEMBLY | 1 | | | | | AV805APC | |
| 25 | FILTER ASSEMBLY | 1 | | | | | AC433-1 | |
| | SERVICE KIT | 1 | K479A | K479 | K479A | K479 | K479A | K575A |

For 1423 Models only.
(Shipped unattached)




Vacuum Intake
Filter Assembly




Muffler
Assembly

* Denotes parts included in the Service Kit. Parts listed are for stock models.

** No Service Kit available, order parts separately. *** Not shown.

For specific OEM models, please consult the factory. When corresponding or ordering parts, please give complete model and serial numbers.

## WARRANTY

Gast finished products, when properly installed and operated under normal conditions of use, are warranted by Gast to be free from defects in material and workmanship for a period of twelve (12) months from the date of purchase from Gast or an authorized Gast Representative or Distributor. In order to obtain performance under this warranty, the buyer must promptly (in no event later than thirty (30) days after discovery of the defect) give written notice of the defect to Gast Manufacturing Incorporated, PO Box 97, Benton Harbor Michigan USA 49023-0097 or an authorized Service Center (unless specifically agreed upon in writing signed by both parties or specified in writing as part of a Gast OEM Quotation). Buyer is responsible for freight charges both to and from Gast in all cases.

This warranty does not apply to electric motors, electrical controls, and gasoline engines not supplied by Gast. Gast's warranties also do not extend to any goods or parts which have been subjected to misuse, lack of maintenance, neglect, damage by accident or transit damage.

THIS EXPRESS WARRANTY EXCLUDES ALL OTHER WARRANTIES OR REPRESENTATIONS EXPRESSED OR IMPLIED BY ANY LITERATURE, DATA, OR PERSON. GAST'S MAXIMUM LIABILITY UNDER THIS EXCLUSIVE REMEDY SHALL NEVER EXCEED THE COST OF THE SUBJECT PRODUCT AND GAST RESERVES THE RIGHT, AT ITS SOLE DISCRETION, TO REFUND THE PURCHASE PRICE IN LIEU OF REPAIR OR REPLACEMENT.

GAST WILL NOT BE RESPONSIBLE OR LIABLE FOR INDIRECT OR CONSEQUENTIAL DAMAGES OF ANY KIND, however arising, including but not limited to those for use of any products, loss of time, inconvenience, lost profit, labor charges, or other incidental or consequential damages with respect to persons, business, or property, whether as a result of breach of warranty, negligence or otherwise. Notwithstanding any other provision of this warranty, BUYER'S REMEDY AGAINST GAST FOR GOODS SUPPLIED OR FOR NON-DELIVERED GOODS OR FAILURE TO FURNISH GOODS, WHETHER OR NOT BASED ON NEGLIGENCE, STRICT LIABILITY OR BREACH OF EXPRESS OR IMPLIED WARRANTY IS LIMITED SOLELY, AT GAST'S OPTION, TO REPLACEMENT OF OR CURE OF SUCH NONCONFORMING OR NON-DELIVERED GOODS OR RETURN OF THE PURCHASE PRICE FOR SUCH GOODS AND IN NO EVENT SHALL EXCEED THE PRICE OR CHARGE FOR SUCH GOODS. GAST EXPRESSLY DISCLAIMS ANY WARRANTY OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR USE OR PURPOSE WITH RESPECT TO THE GOODS SOLD. THERE ARE NO WARRANTIES WHICH EXTEND BEYOND THE DESCRIPTIONS SET FORTH IN THIS WARRANTY, notwithstanding any knowledge of Gast regarding the use or uses intended to be made of goods, proposed changes or additions to goods, or any assistance or suggestions that may have been made by Gast personnel.

Unauthorized extensions of warranties by the customer shall remain the customer's responsibility.

CUSTOMER IS RESPONSIBLE FOR DETERMINING THE SUITABILITY OF GAST PRODUCTS FOR CUSTOMER'S USE OR RESALE, OR FOR INCORPORATING THEM INTO OBJECTS OR APPLICATIONS WHICH CUSTOMER DESIGNS, ASSEMBLES, CONSTRUCTS OR MANUFACTURES.

This warranty can be modified only by authorized Gast personnel by signing a specific, written description of any modifications.

## MAINTENANCE RECORD

| DATE | PROCEDURE PERFORMED |
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## TROUBLESHOOTING CHART

| Low | | High | | Pump | Motor | Reason and remedy |
|---|---|---|---|---|---|---|
| Vacuum | Pressure | Vacuum | Pressure | Overheat | Overload | for problem. |
| • | • | At pump | | • | • | Filter dirty.<br>Clean or replace. |
| | • | | At pump | • | • | Muffler dirty.<br>Clean or replace. |
| • | | At pump | | • | • | Vacuum line collapsed.<br>Repair or replace. |
| | | | • | • | • | Relief valve set too high.<br>Inspect and adjust. |
| • | • | | | | | Relief valve set too low.<br>Inspect and adjust. |
| • | • | At pump | At pump | • | • | Plugged vacuum/pressure line.<br>Inspect and repair. |
| • | • | | | | | Vanes sticking.<br>Clean or replace. |
| • | • | | | | | Vanes worn.<br>Replace. |
| • | • | | | | | Shaft seal worn.<br>Replace. |
| • | • | | | • | • | Dust or offset powder in pump.<br>Inspect and clean. |
| • | • | | | • | • | Motor not wired correctly.<br>Check wiring diagram and line voltage. |

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