AUTOMATED CLEANING TECHNOLOGIES, INC.

ACT SUPER 4X SYSTEM

Model Number: Super 4X Washer

Serial Number: ACT471619 **Delivery: August 2019**

Line Volts/ Phase: 220V/3 Phase **Frequency: 60Hz**

Solvent Capacity: 318 Gals. **Service Capacity: 500 lbs.**

Super 4X Wash System (Unheated) – BEALE AFB

Thank you for selecting a quality system engineered and built to deliver superior parts processing from

AUTOMATED CLEANING TECHNOLOGIES, INC.

We are proud to manufacture systems with unique features and capabilities to perform exceptionally well while protecting the environment, the operators, and the parts.

Our staff is dedicated to making sure your ownership experience leaves you very satisfied and happy to recommend ACT, Inc. to your friends, your clients, and co-workers for years to come.

If there is anything, we can do to assist you with set-up, installation, start-up, training or any other issues regarding supplies and maintenance, please let us know immediately.

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Section 1.0 Safety Devices and Precautions

All personnel using the equipment should read this manual thoroughly and understand its contents before operating the equipment. Damage to equipment, components to be cleaned and/or personal injury could occur if the system is not operated as per this manual.

1. A safety guard is provided over the double cam valve.
2. Ensure safety precautions are followed for the chemical(s) to be used.
3. Consult with the chemical manufacturer and MSDS sheets provided.
4. Do not use flammable liquids in an ultrasonic or heated system.
5. Do not allow the cleaning solution to come in contact with the body. Wear gloves and eye protection.
6. Keep hands out of the cleaning tank.
7. Only use cleaning solutions that are compatible with the parts to be cleaned and the materials of construction of the tank. See Warranty.
8. Periodically analyze the solution to determine the level of contamination.
9. Never operate the cleaner in an ungrounded mode. Do not use “cheater plugs” or cut off the ground terminal of the electrical cord plug.
10. Ultrasonic generators are sensitive to voltage peaks (spikes). Ensure that the line voltage never exceeds 240/480 respectively. Verify the proper line voltage requirements by checking the serial nameplate located on the inside of the control panel door.
11. Follow all precautionary instructions pertaining to the usage and handling of chemicals used in the tank. If necessary, contact the chemical manufacturer for specific information.
12. On Dryers use gloves when opening cover and handling parts (parts could be 275°F).
13. External parts of Dryers are hot, don’t lean against.

Section 2.0 Introduction

Super Heavy-Duty Immersion Systems are rugged agitating parts washers designed for industrial applications. Each system includes a heavy gauge washing chamber with cover and a pneumatically powered oscillating elevator. Built-in thermostatically controlled heating systems are optional.

Platform oscillation is accomplished using a J.I.C. pneumatic cylinder located at the rear of the washer. The pneumatic system provides variable stroke lengths and variable stroke speeds. An infinite number of motion combinations can thereby be created to handle many different component configurations.

Part(s) or basket(s) of parts to be cleaned are positioned on the platform above the washing chamber. The operator uses a three-position lever valve (or a push button cycle timer on automatic systems) interconnected to the pneumatic circuit to control the washing cycle. The cover automatically opens and closes in sequence with the elevator.

Section 3.0 Reference Table of Drawings

Reference Drawings:

Electrical	Section 7.0
Pneumatic	Section 8.0

Section 4.0 Reference Table of Installation Particulars

	Super 3	Super 4	Super 6	Super 7	
Shipping Braces	no	no	yes	yes	
Water Lines					
fill	3/4″	3/4″	1″	1″	
overflow	2″	2″	2″	2″	
drain	1-1/2″	1-1/2″	2″	2″	
Steam Lines					
inlet	3/4″	3/4″	1″	1″	
outlet	1/2″	1/2	3/4″	3/4″	
Gas Lines					
inlet	1/2″	1/2	3/4″	3/4″	
flue	4-1/2″	4-1/2″	5-9/16″	6-5/8″	
Air Lines					
500 lb.	1/4″	1/4″	n/a	n/a	
1000 lb.	1/2″	1/2″	1/2″	1/2″	
2000 lb.	3/4″	3/4″	3/4″	3/4″	
Vent Collar	2-1/2″	2-1/2″	4-1/2″	4-1/2″	
Vent Duct					
mild steel	12″	12″	16″	18-1/2″	
stainless steel	12-7/8″	14-7/8″	14-7/8″	18-7/8″	
Exhaust System					
CFM	12″	12″	16″	18-1/2″	
steel blower	1695	2337	2895	4275	
stainless blower	1300	2100	2625	3675	

Section 5.0 Installation

Please read all of the instructions before starting the installation. If you have any further questions contact the ACT, Inc at 888-432-2288 or www.actclean.com (e-mail support@actclean.com)

1. Carefully remove the machine(s) from the crate. Ensure no damage to insulation panels, controls or connections.

2. Locate the machine(s) in the desired location. Add shims under the base and level in both directions. Bolt to the floor, allowing access space completely around the unit. Make certain the selected location will provide access to the required electrical, air and drainage facilities.

   Larger Super systems are "knocked down" to reduce the overall height and shipped with braces. These must be removed and the vertical guide channels and horizontal crossing channels installed. In this case refer to per drawing A-321. Secure the channel rail in the holders by tightening up on all bolts. Install the cross bar connecting the two channel rails by means of two bolts and washers supplied with the unit. Be sure the elevator runs freely and the internal guide rollers are properly aligned on their alignment angles.

3. On all electrically powered and/or **electrically heated systems** refer to the electrical diagram for amperage requirements. Install a main disconnect switch. Bring the proper service and wiring to the electrical control panel. Refer to Section 7.0.

4. Refer to the pneumatic diagram. Bring the proper size line to the pneumatic controls. Refer to Section 8.0. For pneumatic adjustments refer to Section 9.4.

5. Bring the water fill line to the machine.

6. Bring the drain line to the machine.

7. Bring the overflow line to the machine. On systems with offset oil removal tanks follow installation instructions as per Section 6.5.

8. On Super Heavy-Duty Immersion Systems designed to use **natural gas** the system cannot be used on LP (propane) without first consulting the factory.

9. Bring a regulated line (see Section 4.2 for all service connections) to the gas inlet fitting on the gas burner. Note: the gas should be regulated between 4 to 6 inches water column (W.C.)

10. On **steam heated** units bring a regulated line to the machine (see Section 4.2 for all service connections). The steam pressure should normally be no less than 15 and no greater than 45 pounds per square inch. Greater pressures are not recommended as they will exceed the operating range of the steam solenoid and could thereby cause a malfunction of the heating system.

11. A condensate connection is provided (see Section 4.2 for size). A bucket trap (by customer) is required. Connect the trap to the receiver part of the boiler. Bucket trap should be the same size as the condensate line.

Section 6.0 Preparation for Starting

1. Check that the drain valve is closed.

2. Check that the lubricators are 3/4 full with high quality SAE # 10 (S. U. V. 150-200 SEC @ 100°F) oil is recommended. See “WATTS 105 Series Instructions” sheet (in Section 9.3 “Lubrication”).

3. Ensure the air line is connected and set the regulator to 60 psi.

4. Ensure incoming voltage is in accordance with the electrical wiring diagram in Section 7.0 and the nameplate ID tag.

5. Ensure all selector switches are in the off position.

6. Turn Main Disconnect and panel power switch (SW-1) to the on position.

7. Open the cover. On unheated systems without timers this is accomplished by moving the three-position control valve to the up position. See pneumatic schematic. On systems with automatic cycle timers place the soak selector switch in the off position. On systems with automatic cycle timers and powered covers you must also press the red push button (PB-2). The cover will open and the elevator will rise to the loading position.

8. Fill tank to overflow level (approximately 7" from the top). Chemical mixing procedures and precautions should be strictly adhered to. Please consult the chemical supplier or manufacturer for start-up assistance (MSDS sheets, handling, mixing, dilution ratios, precautions, disposal, etc.).

9. On **gas heated units** the gas supplied to the main gas inlet valve provides fuel for the atmospheric burner. The main gas burner fires into the immersion tube which is located in the bottom of the tank. The burner is equipped with a Baso pilot safety valve which shuts down the main gas in the event the pilot flame goes out or the main burner flame goes out during operation. The unit is further equipped with a pilot burner and spark ignition for ease of lighting. A thermostat has been provided to maintain the solution at the desired temperature setting. Once the solution has reached the desired temperature setting the main burner will shut off. It will then cycle on and off as needed to maintain the temperature setting on the thermostat.

Section 7.0 Starting

1. On all electrically powered systems turn the Panel Power Switch SW-1 on. Pilot Light PL-1 will light.

2. On all heated systems set the Digital Indicating Temperature Controller to the desired temperature setting. See Section 6.3B

3. The cleaning solution should be within 7" from the top.

4. On **electrically or steam heated** systems turn the Heat Switch(es) on. The heating system will cycle off of the digital temperature controller via an electrical contractor or a steam solenoid respectively. It will take approximately three to four hours for the solution to heat up to approximately 170°-180°F.

5. On **gas heated** units open the main gas cock.

6. Open the pet cock to the pilot burner.

7. Check to see that the heat switch on the control panel is in the off position.

8. Press and hold the red button on top of the pilot safety valve for at least 30 second while simultaneously pressing the ignition spark push button located on the electrical control panel. Note: Once the pilot flame has been established it will be necessary to continue to hold the red pilot safety push button down for at least 30 seconds enabling the pilot flame to heat the thermocouple, which locks in the main gas valve. It should also be noted that initially it may take longer until the air is purged out of the line and gas actually reaches the pilot burner.

9. Turn the heat switch to the on position. The main gas burner should light at this time. Note: The main flame may not initially be drawn into the immersion tube due to the lack of warmth in the flue. Once the flue pipe begins to get warm it will provide a natural draft and draw the flame into the immersion tube. It will take approximately three to four hours for the solution to heat up to approximately 170°-180°F.

   CONSULT THE MANUFACTURER OF THE GAS EQUIPMENT FOR ADDITIONAL DATA. PLEASE SEE ENCLOSED DATA SHEETS AND FACTORY CAUTION.

Section 8.0 Operation

1. Move the 3-position control valve to "up" position. The cover will open as the platform rises to the load position.

   WARNING! STAND CLEAR - POWER OPERATED COVER!

   WARNING! GOGGLES AND PROTECTIVE CLOTHING SHOULD BE WORN WHEN WORKING THE MACHINE AREA.

2. Load part(s) or basket of parts onto the platform.

   Note: Do not exceed the maximum load rating of the machine (see Section 4.2)

3. Move the 3-position control valve to the center "agitate" position.

   Note: At this time the platform will start to lower and begin to agitate and the cover will close.

   WARNING! STAND CLEAR OF THE CLOSING COVER!

4. Check to see that the agitation platform is moving up and down at a uniform motion. If an adjustment is required refer to Section 9.4.

5. The length of the cleaning cycle will be determined by experimenting and becoming familiar with the machine. The amount of soil on the parts will affect the cycle time. Start by running the parts for 15 minutes. If they are clean the cycle time can be reduced. If they are dirty continue the cleaning cycle until the parts are acceptable.

6. To stop the cleaning cycle, move the 3-position control valve to the up position for unloading.

7. Remove the part(s) or basket(s) of parts from the machine and rinse as required.

Section 9.0 Operation with the Digital Cycle Timer

1. Setting the Digital Cycle Timer

   The digital cycle timer has been factory set in minutes(M) and seconds(S). There are four large LED digits across the face of the screen. The letter M appears after the first two digits and the letter S after the last two digits. There are four corresponding push buttons below the screen. These are used for programming in a preset time from 0 to 99 minutes and/or from 0 to 59 seconds.

   Gently press the push button(s) to advance the setting(s) to the desired cycle time. When the green start push button (see below) is activated the four large LED digits across the face of the screen will count down. A smaller LED readout in the lower sector of the screen will hold the preset cycle time. When the cycle times out or the red stop push button is pressed the timer will automatically reset.

2. Turn the Soak Switch to the off position. The cover will open as the platform rises to the load position. On systems with pneumatic power covers it is also necessary to press the red stop push button to reset the system.

   WARNING! STAND CLEAR - POWER OPERATED COVER!

   WARNING! GOGGLES AND PROTECTIVE CLOTHING SHOULD BE WORN WHEN WORKING THE MACHINE AREA.

3. Load part(s) or basket of parts onto the platform. Do not exceed the maximum work load rating of the machine (see Section 3.2).

4. On systems with the **long stroke option** (see note at the end of this section) select short or long stroke using the selector switch. **Do not change the selected stroke or move the selector switch mid cycle.**

5. Press the green start push button to begin the cycle. At this time the platform will start to lower and begin to agitate and the cover will close. **Do not change the selected stroke selector switch mid cycle.** If a different stroke is required terminate the cycle using the red stop push button.

   WARNING! STAND CLEAR OF THE CLOSING COVER!

6. Check to see that the agitation platform is moving up and down at a uniform motion. If an adjustment is required refer to Section 9.4.

7. The length of the cleaning cycle will be determined by experimenting and becoming familiar with the machine. The amount of soil on the parts will affect the cycle time. Start by running the parts for 30 minutes. If they are clean the cycle time can be reduced. If they are dirty continue the cleaning cycle until the parts are acceptable.

8. At the end of the timed cycle the cover will open and the load will ascend to the unload position.

9. Remove the part(s) or basket(s) of parts from the machine and rinse as required.

10. On systems with a pneumatic power cover a **lockout** switch can be provided as an option to operate with the cover in a locked out (open) position. **To take the system out of lockout make sure the cycle is complete and the cover is in the open position before putting the lockout selector switch in the off position**. Note - if the system is not properly reset the process cycle will not correctly sequence. If this should happen turn the panel power selector switch off and then on. This will reset the system.

11. On systems with **long stroke** the pneumatic power cover is automatically locked out when long stroke is selected. **Do not change the selected stroke mid cycle.** Follow the above procedure. To change the selected stroke, terminate the cycle by pressing the red stop push button and allow the cover to fully open and the cycle to complete. The stroke can now be changed.

Section 10.0 Turbulator

ACT turbulating systems use high volume pumps and closed looped manifolds with multiple solution injectors directed at the work zone. They provide an even flow of turbulence over, under, around and through components. This accelerates the cleaning time and improves overall effectiveness in washing and/or rinsing.

1. Check to see that the valve in the pump suction line is wide open. Ensure that there is adequate cleaning solution in the tank (a minimum of 2/3 full).

2. Adjust the (metering) ball valve in the pump discharge line to half open.

3. Check the rotation of the pump (three phase system only) as follows:
   Place pump three position selector switch to the manual position and to the off position as quickly as possible. Have another person observe the rotation of the pump. It should be turning in the direction of the arrow on the pump. If it's turning in the opposite direction have a trained electrician switch any two wires on the pump starter.

4. Place the turbo three position selector switch in the automatic position. It will now automatically cycle the turbo system off of the timer. In the auto mode the turbo system is interlocked with a limit switch to operate only if the cover is closed.

5. Adjust the metering valve so that the flow discharging into the tank is maximum without causing foaming.

6. If excessive foaming occurs check with the chemical manufacturer. An additive to the chemical can be prescribed to control or eliminate the problem.

Section 11.0 Oil Removal Systems

ACT Oil Removal Systems are ancillary item used in conjunction with Super Heavy-Duty Immersion Systems. There are several systems available depending on the application. The Oil Removal Systems are high capacity system that include Surface Sweep™ feature. It prevents surface oil from redepositing onto cleaned parts. Oils that rise are swept from the surface of the primary tank and routed into an offset quiet tank. There the oil is collected and removed while the clarified solution is pumped back to the cleaning chamber on a continuous closed loop.

Oil Removal System

This system consists of:

A. The primary washing chamber with Surface Sweep™ header and dam.
B. A quiet tank with oil skimming unit.
C. A recirculation pump with suction and discharge piping.
D. A solution low level control.
E. On/off switches and control box.

Installation

1. Position the unit behind the washing tank so that the primary tank discharge and the oil system inlet are aligned.
2. Connect the rubber union and tighten the clamps.
3. Align and tighten the union for the sweep header line.
4. Connect the emergency overflow fitting on the quiet tank to a proper drain.
5. Install the rubber hose onto the pipe coming out of the back of the oil skimming unit. Put the end of the hose in a 5-gallon pail.
6. Connect the wiring harness to the junction box on the cleaning tank by matching the wire numbers with the ones in the junction box.

Installation of the Skimmer

Caution: Be extremely careful with the stainless steel belt. The edges are sharp and injury could be sustained. Gloves must be worn at all times when working with the belt.

The numbers in parentheses refer to exploded diagram (see installation sheet).

A. Slip tail pulley stabilizer bar (15) into slotted channel at the base of the skimmer unit (16) and hand tighten nuts (17).

B. Slip tail pulley axle (21) through washer (20).

C. Slide tail pulley axle (21) through tail pulley (18) and screw into stabilizer (15).

D. Unroll belt (22) and place it around the head pulley (13), slipping one side of belt between the two wiper blades (10 & 12) and over tail pulley (18).

E. Note: The tail pulley (18) is supposed to be "floppy" and have plenty of play on axle (21).

F. Pull stabilizer bar down until belt is just barely taught and then raise until tail pulley (18) is centered on axle (20) and tighten lock nuts (17).

Centering the Belt

a. Maneuver belt so it is in the center of the top pulley.
b. Start skimmer. If belt rides towards the front of head pulley (13) adjust bolt (8) in or out.
c. If belt travels towards the rear of the head pulley (13) adjust bolt (8) in the opposite direction.
d. Repeat steps "b" and "c" until belt stays in the center of the head pulley. Your skimmer is ready to operate.

Operation

The quiet tank with oil skimming unit is positioned behind the washing chamber. The washing tank has an overflow fitting from the dam that is field connected to the quiet tank. The system includes a centrifugal pump. It draws clarified liquid from the bottom of the quiet tank and discharges it back to the washing chamber. A push header in the washing chamber takes the discharge flow and creates a lateral sweep across the surface of the solution directing tramp oil into the dam. It is a closed loop system.

1. Ensure that sufficient liquid is in the washing chamber and the quiet tank.

2. Turn on the pump and oil removal unit. On machines with three position selector switches turn the switch to the hand position.

3. The centrifugal pump will pump fluid into the primary tank causing it to overflow.

4. A surface sweeping flow pattern will send surface oil over a dam and into the remote holding tank.

5. It is important to balance the flow for a smooth surface sweeping action. If the push header discharge velocity is too rapid it will break up the flow pattern and/or flood the overflow dam. In either case reduce the header flow by throttling back on the header metering valve located behind the primary wash tank on the pump discharge line.

6. Continuous recirculation causes the surface oil to migrate towards the weir and clears the solution.

7. Oil is removed from the holding tank via an oleophilic belt.

8. It is deposited in an oil collection can or drum (supplied by customer).

9. On machines with sequenced operation turn the selector switch to the auto position. Note on ultrasonic systems the OR-8 will be locked out during the ultrasonic cycle. This allows the ultrasonic process to function at maximum effectiveness.

Section 12.0 Seven Day Programmable Timer

Module,Timer,1 Pole

815 Series (Delay-on-Make with Memory)

Function	Connection	Supply Voltage	Nominal Rating
Delay-on-Make	11-Pin	12/48 VACDC	2x8A SPDT
Delay-on-Make	11-Pin	24VACDC/110VAC	2x8A SPDT
Delay-on-Make	11-Pin	24VACDC/220VAC	2x8A SPDT

TECHNICAL SPECIFICATIONS

Contact Form	SPST
Number of Poles	1
Max. Time Setting	23 3/4 Hr.
Contact HP @ 120V	1/2
Length (In.)	2 3/8
Width (In.)	2 3/8
Depth (In.)	1 1/4
Min. Time Setting	15 Min.
Amps Inductive	8/6
Type	Electromechanical Module
Amps Tungsten	8.3/4.1
Amps Resistive	20/15
Mount	Panel
Includes	Up to 48 On-Off Settings Per Day/Up to 42 On-Off Settings Per Week-6 Settings Per Day, Nickel Cadmium Battery

Section 13.0 Dryer (Optional)

ACT Hot Air Knife Blow-Off Dryers uses high velocity forced hot air and the standard transport elevator to gently oscillate the work throughout the cycle. This enhances the process by jogging droplets off and constantly changing air flow patterns.

Installation

1. Carefully remove the machine from the crate making sure that no damage has been caused to insulation panels, controls or connections.

2. Locate the machine in the desired location. Add shims under the base and level in both directions. Bolt the unit to the floor, allowing access space completely around the unit. Make certain that the selected location provides sufficient access to electrical, air and drainage facilities.

   Super Heavy-Duty Immersion Systems are "knocked down" to reduce the overall height and shipped with braces. These must be removed and the vertical guide channels and horizontal crossing channels installed. Secure the vertical guide channel rails in the holders by tightening up on all bolts. Install the horizontal crossing bar connecting the two channel rails by means of two bolts and washers supplied with the unit. Be sure the elevator runs freely and the internal guide rollers are properly aligned on their alignment angles.

3. On all electrically powered and/or **electrically heated systems** refer to the electrical diagram for amperage requirements. Install a main disconnect switch. Bring the proper service and wiring to the electrical control panel. Refer to Section 6.0.

4. Refer to the pneumatic diagram. Bring the properly sized line to the pneumatic controls (see Section 7.0). For adjustments see Section 8.4.

Preparation for Starting

1. Check that the drain valve is closed.

2. Check that the lubricator is 3/4 full with Coilhouse Pneumatics Air Tool Lubricant #ATL016 or as an alternate SAE 10WT oil may be used.

3. Connect the air line and set the regulator to 60 psi.

Startup

1. Turn the Stand Power Switch SW-1 on. Pilot Light PL-1 will light.

2. Set the Digital Indicating Temperature Controller to the desired temperature setting. See the separate instruction sheet on setting the controller. The system is factory set for 275° F maximum.

3. Turn heat selector switches SW3 and SW4 to the off position.

4. Turn the run/soak selector switch SW2 to the run position. Note: At this time the cover will open and the platform will rise to the up position.

5. Check the blower motor rotation by pressing the green cycle start push button PB1 and observe the rotation of the blower. It should be turning in the direction of the arrow. If it is turning in the opposite direction, have a qualified electrician switch any two wires on the blower motor starter.

Setting the Digital Cycle Timer

1. The digital cycle timer has been factory set in minutes(M) and seconds(S). There are four large LED digits across the face of the screen. The letter M appears after the first two digits and the letter S after the last two digits. There are four corresponding push buttons below the screen. These are used for programming in a preset time from 0 to 99 minutes and/or from 0 to 59 seconds.

2. Gently press the push button(s) to advance the setting(s) to the desired cycle time. When the green start push button (see below) is activated the four large LED digits across the face of the screen will count down. A smaller LED readout in the lower sector of the screen will hold the preset cycle time. When the cycle times out or the red stop push button is pressed the timer will automatically reset.

Setting the Humidity Controls

1. *Air Makeup Damper.* This is a half-moon shaped damper located on the air return duct at the rear of the machine. Its primary function is to allow fresh air into the dryer to control humidity. When fully opened, the maximum amount of fresh air is brought into the drying chamber.

2. *Air Discharge Shutter.* This device is located directly behind the cover hinge. It is used in conjunction with the air make-up damper to allow humid air to exit the drying chamber. It is generally set in proportion to the air make up damper.

Hot Air Knife

The Hot Air Knife is located along the inside front wall of the drying chamber. The slot is adjustable from 1/4" to 3". It is factory set at 3/4". If adjustment is required follow the steps below:

Adjusting the Hot Air Knife:

1. Loosen (3) 1/4" bolts on each Air Knife and adjust to desired opening.
2. Tighten the bolts to secure in place.
   a. Smaller openings produce higher velocity but lower volumes.
   b. Wider openings produce higher volumes but lower velocity.
   c. As a guideline use volume over velocity.

Adjusting the Main Air Knife Mounting Plate:

The purpose of the mounting plate is to raise or lower the hot air knife. Loosen the (4) 1/4" bolts and move up or down to the desired height. It can be moved approximately 3-1/2" up or down. It should also be noted that the rectangular opening is not in the center of the mounting plate. As such the plate can

be rotated 180 degrees to get the air knife into a lower position. It is factory set with the opening in the higher position.

Operation

1. Be sure the run/soak switch SW2 is in the run position.

2. Turn the heat selector switches SW3 and SW4 to the on position. Load parts or basket of parts onto the platform.

   Note: do not exceed maximum load rating of the machine.

3. Press the cycle start push button PB1. The platform will lower and begin to oscillate and the cover will close. The blower and heaters will also be activated.

   WARNING: Stand clear of the closing cover.

4. Check to see that the agitation platform is moving up and down at a uniform motion. If adjustment is required, refer to Section 9.4.

5. The length of the drying cycle will be determined by experimenting and becoming familiar with the machine. Start with a six-minute cycle. If the parts are completely dry within the cycle time you can experiment with a lower time cycle *or a lower operating temperature*. If moisture is still present the time or temperature will have to be increased until an acceptable cycle is achieved. At the end of the timed cycle the cover will open and the platform will rise to the original loading position.

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WARNING: PARTS MAY BE HOT. Gloves and adequate clothing should be worn when removing parts or basket from the machine.

Notes

If the digital temperature controller (which has a max. temp. setting of 275°) malfunctions, a high limit thermostat will shut the heating system off at 325°F. The high limit thermostat is located in the U-shaped duct at the rear of the dryer. It is of the manual reset type. If it trips out wait until the temperature in the dryer lowers and press the white reset button located on its cover. To get the dryer to cool down rapidly, open the cover by pressing the cycle stop push button PB-2.

Section 14.0 Digital Temperature Control

DIGITAL TEMPERATURE CONTROLLER

1/16th DIN Autotune PID temperature controller - 9900

Key features of the 9900 are:

- **Autotune PID for easy set-up**
- **Dual-output: 5A relay plus SSR drive or**
- **Dual-output: 5A relay plus 2A relay**
- **IP54 sealed fascia**
- **4 bright LEDs to 1° or 0.1° in °C or °**
- **Positive feel buttons**
- **Comprehensive alarm modes**
- **9 thermocouples, RTD/PT100 inputs**
- **115VAC or 230VAC options**

Section 15.0 Overnight Shut Down

1. On systems with the long stroke / cover lockout option place the selector switch in the short stroke position.

2. Place the Run/Soak switch in the soak position.

3. If the system has a manual Turbo position turn the selector switch to the off or auto position.

4. If the system has a seven-day heat cycle timer keep the heat switch in the on position. If it does not it is advised to turn the heat switch off.

Section 16.0 Draining

Refer to Section 9.2

Section 17.0 Electrical Wiring Diagram(s)

Section 18.0 Pneumatic Diagram

Section 19.0 Inspection and Operations Check

[weekly unless otherwise stated]

1. Check all conduits and cables for breaks. Replace if they show signs of undue wear.

2. Check the indicator bulbs and make certain they are not discolored and ready to burn out. Remove and replace if defective.

3. Check the fuses in the control boxes. Replace hot or color tinted fuses with ones of the same rating.

4. When the tank is empty check the drain valve to see that it is operating properly. Check for freedom of action, cleanliness and tightness of the shut-off.

5. Drain water from the air filter on a daily basis.

6. Lubrication -- maintain proper oil level in the lubricator. See lubrication section.

7. Lubricate zerk fittings on elevator. See lubrication section.

8. It is recommended that the heavy-duty vee wheels be inspected for wear each time the tank is drained. They should be replaced once a year. Wear will vary with frequency of usage, aggressiveness of the cleaning agent, types and quantities of particulate in suspension and average weight load.

Section 20.0 Cleaning

WHEN IT BECOMES NECESSARY TO DRAIN THE TANK FIRST CONSULT WITH THE CHEMICAL SUPPLIER FOR THE PROPER METHOD OF DISPOSAL.

1. The tank can be drained by opening the drain valve at the rear.
2. Next hose down the inside tank walls.
3. Lift out any debris that may be left in the bottom of the tank.
4. Inspect the heavy-duty vee wheels. Under heavy usage it is recommended that these be changed once every 6-12 months.
5. Close the drain valve.
6. Refill tank and charge with chemicals.
7. If a carbon steel tanks is to be shut down for an extended period it is imperative that the tank walls are treated with a suitable rust inhibitor.

Section 21.0 Lubrication

Pneumatic System Assembly -- The air cylinder and valves require no additional lubrication other than that supplied in the air system by the lubricator. The lubricator should be kept approximately three quarters full at all times.

A. *Air Supply* -- Air Shut Off Valve by Customer.

B. *Filter* -- Drain daily, do not allow water to fill up.

C. *Pressure Regulator* -- Rotate to increase or decrease pressure. Set gauge at 80 PSI.

D. *Lubricator* -- Fill lubricator approximately 3/4 full with high quality SAE # 10 (S. U. V. 150-200 SEC. @ 100°F) oil is recommended.

E. See instruction sheet on lubricator for 1 drop per minute adjustment.

F. Lubricate the Zerk fittings every 40 hours using general purpose grease using grease gun.

Section 22.0 Adjustments

[refer to the Pneumatic Diagram]

1. With the properly sized air line connected set the regulator to 60 PSI.

2. Set the lubricator for 1 drop every two minutes. Refer to lubrication data sheet.

3. Valve 18 controls up speed. Clockwise slower - counter clockwise faster.

4. Cam "G" (the long cam) is adjustable. Loosen the bolt and move it downward to increase stroke. Cam "G" is factory set to a 2”-3" stroke.

5. Cam "L" (the short cam) is the fixed. It is factory set.

Raising the Work Platform to the Up Position (for load/unloading)

1. On manual systems with a three-position control place the lever in the up position. On systems with an auto cycle timer place the Run/Soak switch in the Run position.

   WARNING: Stand clear of the automatic cover.

2. If the platform does not raise start opening Valve 18 by turning it counter clockwise until the platform raises to the up position.

3. If the platform still does not move it could be due to the double cam valve being out of position caused by shipping. To correct this turn valve 18 clockwise until it is fully closed. Then with a pencil or screwdriver (being careful not to get fingers caught) shift Cam "L" inward until Cam "G" is fully extended. Now repeat #2 above.

Adjusting Platform for Agitation

1. Regulate Valve 18 by either opening or closing it to achieve a smooth up and down agitating stroke. It should sound like an even tempo. Too much air pressure will cause the platform to lurch or jerk. Too little pressure will cause it to bog down or stop oscillating. The platform should rise and descend at approximately the same rate.

   NOTE: Heavier loads will slow down agitation. Adjust the air pressure regulator by turning clockwise to increase air pressure (between 80-120 psi) this will speed up agitation.

Section 23.0 Repair and Overhaul

Changing the Pneumatic Cylinder

1. Turn off both the electrical power and the air.
2. Block the elevator back beam with a wooden block (approximately 3").
3. Remove the jam nut from the top of the cylinder.
4. Remove the air line from the bottom port of the cylinder.
5. Remove the cotter pin from the bottom mounting pin of the cylinder.
6. Support the cylinder and remove the bottom pin.
7. Remove the cylinder.
8. Remove the bottom fitting from the cylinder.
9. Remove the top orifice plug.
10. Remove the remaining jam nut from the shaft.

Installation of Pneumatic Cylinder

1. Reverse the above procedure.

Changing a Burnt Out Fuse

1. Turn off main power disconnect.
2. With a fuse puller remove the burnt fuse.
3. Reinstall a new fuse.
4. Turn main power back on.

Changing a Spool Valve, Double Cam Valve or 3 Position Control Valve

1. Turn off both electrical power and air.
2. Remove the pneumatic lines from the valve being changed.
   Note: Mark the lines before removing.
3. Remove the mounting bolts holding the valve in place.

Installation of Spool Valve, Double Cam Valve or 3 Position Control Valve

1. Reverse the above procedure.

Section 24.0 Trouble Shooting

PROBLEM	PROBABLE CAUSE	CORRECTIVE ACTION
Tank won't heat	Main disconnect turned off	Turn on
	Switch SW-1 turned off.	Turn on
	Heat Switch off	Turn on
	Thermostat set too low	Set higher
	Seven Day Timer off	Turn on
Tank overheats	Thermostat set too high	Lower setting
	Defective thermostat	Replace thermostat
Elevator agitates slowly	Air pressure regulator set too low	Increase air pressure
	Up speed control valve is set too low.	Open calve by turning C.C.W.
Elevator agitates too fast	Air pressure regulator set too high.	Decrease air pressure
	Up speed control valve is set too high.	Close valve by turning C.W.

Elevator not tracking	Load not centered on platform	Center load on platform
	The wheels off tracks.	Put back on tracks
Excessive foaming	Improper chemical.	Change to low foaming or try adding anti-foaming agent.
No pressure reading on gauge with air line connected and unit doesn't function	Regulator is set too low.	Turn knob on regulator C.W. to increase pressure to approx. 40 psi.
	Problem still exists.	Replace regulator.
No pressure reading on gauge with air line connected.	Pressure gauge defective.	Replace gage.
Power cover opens too slowly.	Air pressure too low.	Increase air pressure to 60 psi.
	Speed controls on cover cylinder are not opened enough.	Turn screws clockwise on both speed controls until they stop then open both speed controls one full turn.
Power cover opens too fast.	Air pressure too high.	Low cover regulator to 60 psi.
	Speed controls on cover cylinder are opened too wide.	Turn screws C.W. on both speed controls until they stop then open both speed controls one full turn.

Platform lowers but power cover won't close.	Limit switch out of adjustment.	Adjust limit switch.
	If condition still exists.	Replace limit switch.
	If condition still exists.	Problem is with cover solenoid. Replace solenoid.
When cycle is complete power cover opens but platform won't raise.	Cover open limit switch is out of adjustment.	Readjust.
Pump motor running but pump not pumping.	Check pump rotation.	Reverse phases to change rotation.
	Valve(s) to pump closed.	Open valve(s).
	Filter bag clogged.	Replace bag.
Pump motor not running.	Limit switch or prox sensor out of adjustment.	Readjust.
	Limit switch or prox sensor defective.	Replace unit switch or prox sensor.
	Starter overload tripped.	Reset overload.
	Pump motor burnt out.	Replace motor.
Pump is leaking.	Worn out seal.	Replace seal.

Filter bag clogs too quickly.	Micron rating too low.	Replace with higher micron rated filter.
	Filter too small.	Replace with larger filter.
Filter doesn't pick up contaminants.	Micron rating too high.	Replace with lower micron rated filter.
Oil removal unit oleophilic belt does not pick up surface oil.	Solution is emulsifying the oil.	Check the detergent and/or the water. Change or modify accordingly.

Section 25.0 Warranty Policy and Return Procedure

Warranty

There are no guarantees or warranties as to performance standards of fitness of use or purpose.

The materials of construction including heaters, immersion coils, pumps and any other wetted components are not warranted for compatibility with any particular chemical(s) or chemical solution(s). Unless as otherwise stated by ACT in writing, the determination of such suitability of materials of construction with the chemical(s) to be used is the sole responsibility of the customer in conjunction with the customers chemical supplier.

Should any of the material manufactured by the ACT Inc. show defects of manufacture under normal use and service within one year from the date of shipment new parts to replace such defective material will be furnished FOB our plant. The liability for such guarantee shall be limited to the replacement of the parts only and shall not include labor or changing parts or consequential damages in any form.

Warranty Return of Equipment

Although your equipment has been designed for reliable, trouble-free performance, it is possible that after prolonged usage, a failure may occur. In case of failure, ACT suggests that the unit and/or ultrasonic components be returned to the factory for repair. All requests for repairs should be directed to ACT. In order to receive prompt service, always contact ACT before returning the unit. Include date of purchase, model and serial number with all requests for service. Provide adequate packing to insure against possible damage in shipment. Equipment should be sent with all transportation charges prepaid and the return method of shipment indicated.

Return Procedure

1. All replacement parts for material claimed defective must be issued a return authorization (JA) number by ACT.

2. All replacement parts for material claimed defective must be ordered by the customer with a written purchase order.

3. All replacement parts for material claimed defective will be invoiced.

4. After the alleged defective material has been returned to the factory and inspected such invoice(s) will be adjusted.

5. All replacement parts will be shipped to ACT freight prepaid. Collect shipments will be not be accepted.

6. If the alleged defective material is not returned within 30 days full payment will be due.

7. Should any of the components not manufactured by ACT (such as thermostats, heaters, pumps, electrical components, etc.) show defects of manufacturing under normal use the same sequence of steps above will apply. ACT will return such defective material to its supplier. Credit will be issued subject to their inspection and handling.

8. Express deliveries (to customer) will be shipped out freight collect.