CADDY CORPORATION

Food Service Equipment Air Systems

SH-W Series
Ventilation System

Operation and Maintenance Manual

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Introduction To The
SH-W Series Ventilation System

Using the latest technology in water-wash high velocity, low volume, centrifugal grease extractors, the "SH-W" Series Ventilation System provides unequaled performance in grease extraction efficiency, fire safety and ease of maintenance.

- Low air volume high velocity design provides energy savings.
- 95% centrifugal grease extraction efficiency.
- "Anti-Flame" fire protection using optional thermostatically activated electro-mechanical, spring-loaded fire damper.
- Automatic Washdown System, equipped with one full length wash manifold with spray nozzles for automatic detergent injected wash using 140 to 180 degrees F. hot water. All plumbing and electrical components for operation of the automatic wash system are housed in the CPE control cabinet.
- Standard 30" high construction or custom fabricated to suit conditions using 18 gauge or heavier Type 304 stainless steel.
- Available in exhaust only "Save Air" type or various modes of make-up air, including front face, perimeter and short-cycle designs.
- Pre-wired, U.L. listed fluorescent or incandescent lights
- U.L. listed with or without exhaust fire damper, listed by NSF, meets the requirements of NFPA #96, BOCA, ICBO, and SBCC.1.

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Electrical and Plumbing Characteristics

Electrical - 120 Volts A.C. The cabinet contains timing relays, blower/fan start switch, start wash/stop fan switch, water solenoid valve, detergent pump, Programmable Logic Controller, and programmable timer.

Detectors - 120 Volts A.C. (Rated at 10 amps) normally open.

Damper Solenoid - 120 Volts A.C. Class "A" coil.

Damper Relay - 120 Volts A.C. (Rated at 10 amps) Single pole double throw.

Water Solenoid - 120 Volts A.C. (Rated at 10.5 Watts) normally closed, Class "B" coil.

Magnetic Motor Starter - 120 Volts A.C. Coil to be supplied by others.

Plumbing - The cabinet contains detergent tank reservoir, back flow preventer (RP device), 1" RP drain, hot water inlet, hot water outlet.

Drains - Ventilators shall be supplied with a minimum 1 ½" stainless steel drain stubbed out 2" for field connection. Drains shall be located at the back, ends, or bottom of the ventilator. The connection between the ventilator drain and the building drain by others.

Hot Water Inlet and Outlet - Ventilator sections from 2'6" to 8'0" long shall have a ½" hot water connection stubbed out 1 ½" for field connection by others. Ventilator sections from 8'1" to 15'0" long shall have a ¾" hot water connection stubbed out 1 ½" for field connection by others.

Ventilator Lengths	Inlet and Outlet Size	*PSI Required
2'6" to 8'0"	½"	40 to 48
8'1" to 15'0"	¾"	42 to 48
15'1" to 35'0"	1"	40 to 50
35'1" to 52'0"	1 ¼"	45 to 54
52'1" to 60'0"	1 ½"	45 to 47

*Will yield approximately 35 PSI at outlet. Line pressure loss from plumbing enclosure panel to ventilator connection is to be computed by others. Line pressure must be added in, to arrive at total pressure required at plumbing enclosure inlet. (It is suggested that a pressure booster pump be provided by others if local service pressure is not adequate)

Optional Equipment

- Grease traps, if required by local code shall be furnished and installed by others.
- Pressure regulators may be needed to control flow pressure at inlets of the Control cabinet, and shall be furnished and installed by others.

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How to Operate the C-600 Pump

Adjusting the Pump Output

The C-600 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. The pump size must be selected to allow for these factors. Chosing a pump size that allows for settings in the midrange is preferred. Consult the factory for individual pump model output curve data.

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. The pump head may contain water used when the pump was tested before shipment.

Priming the Pump

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 discharge tube from the bottom valve fitting and fill completely with water.
2. While the pump is running, replace the tube (filled with water) over the bottom valve fitting.
3. When the pump starts, place the foot valve in the chemical to maintain prime.

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 Foot valve/Strainer is clean and working properly.
2. With the injector installed under normal operating conditions, place the Foot valve/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 Foot valve 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.

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Injection/Check Valve Fitting Installation

The Injection/Check valve fitting is designed to install directly into either 1/4" or female pipe threads. This fitting will require periodic cleaning, especially when injecting fluids that calcify such as sodium hypochlorite. Lime deposits and other buildups 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 Teflon 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.

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How to Maintain the C-600 Pump

CAUTION Proper eye and skin protection must be worn when installing and servicing the C-600 Pump

Routine Inspection and Maintenance

The C-600 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 pump damage that has been caused by chemical attack.

How to Clean the C-600 Pump

The C-600 requires occasional cleaning, especially the Injection fitting, the Foot valve/Strainer, and the pump head valves. Frequency of cleaning depends 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. Lime deposits and other buildups can clog the fitting, which increases the back pressure and interferes 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.

Approved Detergents

Encompass, supplied by Eco Labs. Telephone: (800) 352-5326

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Preventive Maintenance for the C-600 Pump

CAUTION

When servicing a detergent pump, use great care removing the detergent line. Detergent back-pressure in the tubing can result in injury due to the highly caustic nature of the detergent.

As with any piece of equipment, a reasonable amount of care must be taken to keep it in good working order.

1. Do not spill detergent on the exterior of the pump.
2. Detergent tank and foot valve should be cleaned at least once a month.
3. A periodic check should be made of all fittings.
4. The detergent tank should be kept filled.
5. Keep cover on detergent tank.
6. Make sure all nuts are tight.

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Operating The SH-W Ventilation System

Fan/Wash Operation

Turn on exhaust blower before turning on any cooking equipment by pressing the “Start Fan Switch” button mounted on the CPE control panel door. This will start the exhaust blower which will pull the grease laden air through the Caddy Airsystems Grease Extractors.

The ventilators have a built-in water wash system which must be operated at least once a day. (Ventilators over heavy duty cooking equipment such as broilers may require washing more than once a day). This can be accomplished at the end of the day when all cooking equipment has been shut down by pressing the Red “Start Wash/Stop Fan” button mounted on the CPE control panel door. When the red button is depressed, the fan will shut off and the built-in wash system will operate for a preset time, which is controlled by the timing device in the CPE control cabinet.

The normal recommended wash cycle for light duty equipment such as ovens and steam equipment is three minutes. For equipment such as ranges and fryers, the recommended wash cycle is five minutes. For heavy duty equipment such as upright and char - broilers, the recommended wash cycle is approximately ten minutes.

The wash cycle is controlled by a timer in the CPE control cabinet. This timer is factory preset for a five minute wash cycle. This can be adjusted in the field by adjusting the left white potentiometer knob. This knob is located behind a small access door on the timer. The potentiometer is calibrated into two minute increments. Turning the knob clockwise will increase the length of the wash cycle.

In addition to the CPE control cabinet, a plumbing enclosure cabinet is also provided. This cabinet contains a manual gate valve, line strainer, water solenoid valve, pressure gauge, detergent pump, and detergent tank.

Fire or Overheat Operation

Should a fire or overheat occur, the temperature will rise causing the contacts in the detectors to close. When this occurs, the damper will close, the blower will shut down, and the wash system will turn on.

The wash will continue to run until the temperature reaches a safe limit, (below 250 degrees F) then the contacts in the detectors will open, shutting off the wash.

Once you are ready to go back into operation, make sure all the dampers are in the open position or replace all broken fusible links, and push the black Start Fan button on the CPE Control Panel.

Remote Fire Station

This pull station control is usually located at the main egress of the kitchen for emergency fire or overheats situations. Its signal activates the wash system and shuts down the exhaust blower/fan. Cooling water spray continues until switched to the “Normal” position. The fan is reactivated at the CPE Control panel.

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Continuous Cold Wash System

The continuous cold water mist spray is turned on automatically with the exhaust blower/fan, and spray continues until the blower/fan is turned off. Cold water consumption is 0.093 gpm per lineal foot of ventilator at 20 psi flow pressure. The exhaust blower/fan and mist automatically shut down for ventilator wash cycles. In the event the ventilator temperature close the fire damper, the exhaust blower/fan, and sprayer mist are turned off and wash system will turn on automatically to bathe the ventilator interior.

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Setting The Omron Time Switch - Type 1

Setting The Day And Time

1. Set the mode switch to RUN. (Located at the top right.)
2. Press the “SHIFT” key until the cursor is under the correct day.
3. Press the “SET” key and a bar will appear on that day.
4. Press the “h” key to set the hour. Note am or pm
5. Press the “m” key to set the correct minute. Be sure to correct for daylight savings time.
6. Press the “WRITE” key. The day and time are set.

Programming The Exhaust Fan Operation (P2)

1. Set the mode switch to P2
2. Be sure the “OUT 1” and “OUT 2” switches are set on AUTO.
3. Select every day that you want the exhaust fan to run. Bars should appear for each day.
4. Set the time you want the fan to start using the “h” and “m” keys. Note am or pm.
5. Press the “WRITE” key.
6. Set the time you want the fan to stop, using the “h” and “m” keys.
7. Press the “WRITE” key. The fan operation is now set.

Programming The Water Wash Operation (P1)

1. Set the mode switch to P1.
2. Press the day keys for the same days that the exhaust fan is set to run. A bar should appear for each day.
3. Use the “h”, “m” and “WRITE” keys to set the time for the P1 to begin. This should be for one (1) minute after the P2 completes.
4. Set the time for the P1 to end. This should be one (1) minute after you had it begin. Use the “h”, “m”, and “WRITE” keys. The water wash will begin after the P1 cycle has ended.
5. The length of time that the water wash lasts is determined by setting the correct potentiometer on the TSX Nano PLC. Two white potentiometer knobs are located behind the small access door. The one on the left determines the length of the wash cycle. The “10 o’clock” position is approximately five minutes. The knob on the right determines the amount of time between washes, if there is more than one solenoid.
6. Set the mode switch to RUN.

DO NOT TOUCH THE TOP BLUE POTENTIOMETER

If you have any questions, please call the Service Department at Caddy Corporation at (856) 467-4222.

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Setting The Omron Time Switch - Type 2

Setting The Day And Time

1. Set the mode switch to RUN. (Located at the top right.)
2. Select the correct day.
3. Press the “h” key to set the hour. Note am or pm
4. Press the “min” key to set the correct minute. Be sure to correct for daylight savings time.
5. Press the “WRITE” key. The day and time are now set.

Programming The Exhaust Fan Operation (P2)

1. Set the mode switch to P2
2. Be sure the “Out 1” and “OUT 2” switches are set on AUTO.
3. Select the days that you want the exhaust fan to run. A bar should appear for each day you set.
4. Set the time you want the fan to start, using the “h” and “min” keys. Note am or pm.
5. Press the “WRITE” key.
6. Set the time you want the fan to stop, using the “h” and “min” keys.
7. Press the “WRITE” key. The fan operation is now set.
8. Set the mode switch to RUN.

Programming The Water Wash Operation (P1)

1. Set the mode switch to P1.
2. Select the same days the exhaust fan is scheduled to run. A bar appears for each day you set.
3. Set the starting time for the P1 operation, using the “h”, “min” and “WRITE” keys. Time should be set to one (1) minute after P2 completes.
4. Set the time for the P1 to end, using the “h”, “min”, and “WRITE” keys. The ending time should be one (1) minute after the starting time. The water wash will begin after the P1 cycle has ended.
5. The length of time the water wash lasts is determined by setting the correct potentiometer on the TSX Nano PLC. Two white potentiometer knobs are located behind the small access door. The one on the left determines the length of the wash cycle. The “10 o’clock” position is approximately five minutes. The one on the right determines the amount of time between washes, if you have more than one solenoid.
6. Set the mode switch to RUN.

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Troubleshooting Guide

Symptom	Probable Cause	Solution
Exhaust Fan will not turn on	Incorrect field wiring or breaker.	Verify Fan field wiring to PLC control. Check breaker.
Exhaust Fan will not shut off	Incorrect field wiring	Verify Fan field wiring to PLC control.
Water wash will not turn on	Incorrect field wiring	Verify Fan field wiring to PLC control.
Fire Alarm activated	Incorrect field wiring	Verify field damper wiring.
Timer program not working	Incorrect programming	Check to make sure the Timer is properly programmed.

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Care and Cleaning of Stainless Steel Equipment

Contrary to popular belief, stainless steels ARE susceptible to rusting and pitting.

Corrosion on metals is everywhere. It is recognized quickly on iron and steel as unsightly yellow/orange rust. Such metals are called “active” because they actively corrode when their atoms combine with oxygen to form rust.

Stainless steels are passive metals because they contain other metals, like chromium, nickel and manganese that stabilize the atoms.

Chromium provides an invisible passive film that covers the steel’s surface acting as a shield against corrosion. As long as the film is intact and not broken or contaminated, the metal is passive and stainless. If the passive film of stainless steel has been broken, equipment starts to corrode. At its end, it rusts.

The Enemies of Stainless Steel

There are three basic things which can break down stainless steel’s passivity layer and allow corrosion to occur.

1. Mechanical Abrasion - Steel pads, wire brushes and scrapers are prime examples of things that will scratch a steel surface.
2. Water and Deposits - Water has varying degrees of hardness. Depending on the area you live in, you may have hard or soft water. Hard water may leave spots, and when heated, leave deposits that will break down the passive layer and rust stainless steel. Other deposits from food preparation and service must be properly removed.
3. Chlorides - Chlorides are found nearly everywhere. They are in water, food and table salt. Some of the worst chloride perpetrators come from household and industrial cleaners.

Here are a few steps that can help prevent stainless steel rust and pitting.

1. Use the proper tools.

   When cleaning stainless steel products, use non-abrasive tools. Soft cloths and plastic scouring pads will not harm steel’s passive layer. Stainless steel pads also can be used but the scrubbing motion *must* be in the direction of the manufacturers’ polishing marks.

2. Clean with the polish lines

   Some stainless steel comes with visible polishing lines or “grain”. When visible lines are present, always scrub in a motion parallel to the lines. When the grain cannot be seen, play it safe and use a soft cloth or plastic scouring pad.

3. Use alkaline, alkaline chlorinated or non-chloride containing cleaners.

   While many traditional cleaners are loaded with chlorides, the industry is providing an ever-increasing choice of non-chloride cleaners. If you are not sure of chloride content in the cleaner used, contact your cleaner supplier. If your present cleaner contains chlorides, ask your supplier if they have an alternative. Avoid cleaners containing quaternary salts; they can attack stainless steel and cause pitting and rusting.

4. Treat your water.

   Though this is not always practical, softening hard water can do much to reduce deposits. There are certain filters that can be installed to remove distasteful and corrosive elements. To insure proper water treatment, call a treatment specialist.

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5. Keep your food equipment clean.

   Use alkaline, alkaline chlorinated or non-chloride cleaners at recommended strength. Clean frequently to avoid build-up of hard, stubborn stains. If you boil water in stainless steel equipment, remember the single most likely cause of damage is chlorides in the water. Heating cleaners that contain chlorides have a similar effect.

6. Rinse, rinse, rinse.

   If chlorinated cleaners are used, rinse and wipe equipment and supplies dry immediately. The sooner you wipe off standing water, especially when it contains cleaning agents, the better. After wiping equipment down, allow it to air dry; oxygen helps maintain the stainless steel's passivity film.

7. Never use hydrochloric acid (muriatic acid) on stainless steel.

Review

- Stainless steels rust when passivity (film-shield) breaks down as a result of scrapes, scratches, deposits and chlorides.
- Stainless steel rust starts with pits and cracks.
- Use the proper tools. Do not use steel pads, wire brushes or scrapers to clean stainless steel.
- Use non-chlorinated cleaners at recommended concentrations. Use only chloride-free cleaners.
- Soften your water. Use filters and softeners whenever possible.
- Wipe off cleaning agents and standing water as soon as possible. Prolonged contact eventually causes problems.

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Product Warranty

Products manufactured by Caddy Corporation are warranted to the original purchaser as follows:

Mechanical components are warranted to be free from defects in material and workmanship under normal use, storage and service for a period of one year from the date of shipment.

Electrical components are warranted to the original purchaser to be free from defects in material and workmanship under normal use, storage and service for a period of ninety days from the date of shipment.

Caddy Corporation shall repair or replace, at its option, without charge any part or product, which our examination discloses to be thus defective during the warranty period.

Under no circumstances will Caddy Corporation honor any repair or back charges by any party regardless of whether such equipment is, within the warranty period, unless the Service Department of Caddy Corporation has authorized such work in writing.

If the equipment is repaired or altered in any way whatsoever by any person without prior written consent by Caddy Corporation, this warranty shall not apply.

Normal wear parts, such as pilot bulbs, gaskets, etc., are not covered by this warranty.

This warranty shall not apply to the defects or damages resulting from accidents, alterations, abuse or misuse of equipment and/or any of its component pans, nor shall it apply to damage of electric components resulting from connecting the equipment to any power supply other than specified on the nameplate or resulting from unauthorized altering any of the equipment, or from water conditions causing malfunction of electric components and/or control equipment nor traceable to component defects, nor use of materials containing components harmful to materials used in the manufacture of Caddy products. There is no other express warranty.

Any and all implied warranties are excluded to the extent permitted by law. Implied warranties, when included by law, including those merchantability and fitness for a particular purpose, are limited to one year from the date of shipment.

Liability for consequential damages under any and all warranties is excluded. This warranty is the buyer's exclusive remedy.

It is Caddy's policy to constantly improve the design and manufacture of our products. Accordingly, all equipment is subject to change consistent with such policy without prior notice and some items may be discontinued without obligation.

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