The Automatic Ultrasonic Series

18 Gallon Automatic Ultrasonic Equipment

Completely closed, modular system incorporating integrated heated storage containment tanks with a self-contained, automatic ultra-sonic washer

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800-276-2466
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Features & Specs

Ultrasonic Cleaning Process:
(50—60 minutes)

1. Ultrasonic clean (alkaline)
2. Ultrasonic Rinse from Storage
3. Final Ultrasonic Rinse from Rinse Water Source
4. Dry

** User defined programming available

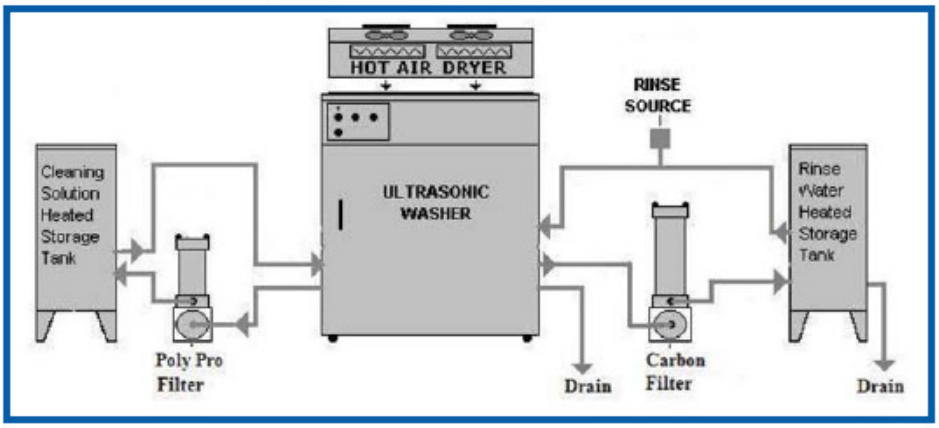
Our Model E992 automatic ultrasonic washer combined with 2 separate 30 gallon storage tanks creates a unique, completely closed and automatic ultrasonic cleaning system for critical parts. The system runs a series of timed, automatic cycles of cleaning, rinsing, final rinsing and drying, all at the push of a button.

An automated system provides labor savings as well as a reduction of risk as chemicals are housed in covered containment chambers and operators are not exposed to hazardous materials.

The components listed below would have the following ratings and dimensions:

- E992: 35″ x 25″ x 45″
  Tank: 24″ x 14″ x 12″ (18 gallons)
  Ultrasonic wattage: 1,800
  Dryer: 3,000 watts
- Storage Tanks: 19″ x 32″ x 30″
  Tank: 12″ x 24″ x 24″ (30 Gallons)
  1,400 watts, temperature controlled heat

System Flow Diagram



Esma brand chemistries which can be used in system

- Esma Metal Wash—Mildly alkaline cleaning detergent
- Esma General Purpose Cleaner—Alkaline clean-ing detergent
- Esma DeOx 964—Citric Acid Passivation Solution (meets ASTM 967-01 Standard)

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Instructions for Models E889 and E992

Ultrasonic Washers

Introduction

The E889 unit has one rinse solenoid (primary) for connection to a hot water source. The model E992 has two input solenoids (primary and secondary) for rinses from multiple sources.

The units automatically perform a cleaning cycle, the major steps of which are:

1 - Ultrasonic cleaning
2 - Ultrasonic rinsing (hot tap water)
2a - Ultrasonic rinsing (deionized water) - E992 unit only
3 - Hot Air Drying

The result: a finished product ready for the next step (sterilizing, packaging, assembly, storage).

The unit is housed in a 304 stainless steel (SS) console. The tank is manufactured from SS 316 with 36 double potting transducers mounted on the bottom. The tank is fitted with a SS hinged cover, which houses the fans and heaters for hot air-drying.

Inside the console are Power Relays with accessible fuses for the 115VAC and 230VAC lines, Power Module boxes 1 and 2, and pumps. The Power Modules contain self-tuning modular circuit boards, a programmable controller, high velocity fans to cool the electronics, and an RFI filters to eliminate any high frequency interference.

On the door of the console is mounted a Omron Programming Console which allows access to the Programmed Sequencer data and enables the monitoring of the “on-line” operation and the modifying of the times of the operation. The programmer is a hand held device and need not be mounted on door.

PLEASE READ THESE INSTRUCTIONS THOROUGHLY BEFORE INSTALLATION AND OPERATION. CALL (800) 276-2466 IF YOU HAVE ANY QUESTIONS.

Installation

When unit is removed from crate, the supplied casters must be installed on bottom of unit. Place casters with locking brakes on front corners of unit.

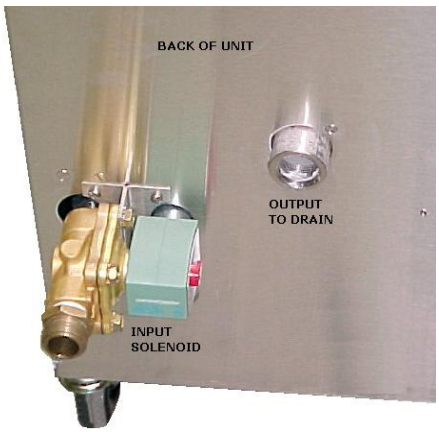
The unit has been thoroughly bench-tested and is shipped to the Customer ready to operate. Move the unit into position and lock Caster wheels. Once the position of the unit has been established, the electrical and plumbing requirements must be completed by the user.

The power modules inside the unit have been bolted to the bottom of chassis for shipping. They can remain bolted. However, if they have to be removed for any reason, the filter screen door on the back of the unit has to be opened. Once the filter is removed, the screws and bolts (2" in each bracket) in hold-down brackets can be removed. These need not be replaced for normal use and movement of unit. Leave hold-down bracket fixed to power modules.

1. Plumbing Hook-Up

A. Water Input

The primary solenoid should be connected to a hot water source. The hot water input solenoid (primary) has a ¾" NH male fitting (supplied) to be connected to the high-pressure hose and filter screen (supplied). Inside the unit there is a 5.0 GPM flow regulator. A valve for emergency shut off should be installed at the water source. This valve should not restrict the flow more than 5.0 GPM.



Also, depending on local regulations, a back flow regulator should be attached to your water source. The valve and back flow regulator are not supplied. On E992 units, deionized water is normally connected to the Secondary solenoid (not pictured) located below the Primary solenoid. The ¾" NH male fitting, high-pressure hose and filter are also supplied for this hookup.

CAUTION: MAKE SURE EXCESS TEFLON TAPE OR PIPE JOINT COMPOUND DOES NOT GET INTO SOLENOID.

B. Water Output

Two pumps have been installed in the unit. One pump is used for the normal draining of tank and the second pump is used with the overflow drain during the cascading rinse. On the outside of the console you will find a ¾" NPT bulkhead coupling which extends through the back of the cabinet. This fitting comes from the internal pumps and must be adapted to your drain plumbing using ¾" ID or larger tubing.

2. Electrical

The unit is wired for both 120VAC and 230VAC lines. The ratings are 1850 watts, 120VAC, 50/60 HZ, and 3000 watts, 230VAC, 60 HZ, single phase. The power cords are supplied for plugging in to your electricity source. The 230 volt line is supplied with an NEMA 6-20P plug. The 230V supply must utilize a third wire as a ground and not a current carrier. The 120V power cord must be connected to a three-way grounded outlet. DO NOT OPERATE UNIT WITHOUT PROPER GROUNDING. The 230V line is fused at 15 AMP and the 120 volt line at 20 AMP. These fuses are located inside unit on Power Relay enclosure.

3. Control Function

A) Main Switch: When unit is ready for operation, turn the main switch to ON, and the indicator light will be ON.
B) Run Stop Switch: Located below the main switch, it must be in the RUN position for the programmable controller to operate. If during the program cycle you want to stop the process, turn switch to STOP position ,and program will start over at the beginning of the cycle when START button is pushed. Use Run Stop switch only for emergency stopping of unit, or to STOP the program and begin at the beginning. Use the Main switch if you wish to stop the unit and have the program remain where it is.

4. Selector Switch

FILL - Push START button and tank will fill with warm water. Once the tank is filled, instruments or parts can be added to soak. During prolonged periods of soaking, DO NOT CLOSE COVER OF TANK.

CLEAN - When tank is filled with instruments or parts, close cover on tank, move switch to CLEAN, push START button, and the cleaning cycle will begin. The cleaning cycle can not be started if the fill cycle is not completed. This is a safety precaution so the ultrasonics will not operate without water in the tank.

FILL-CLEAN - In this position the cleaning cycle automatically follows the fill cycle for a full cycle operation. Instruments, parts, and any cleaning materials are to be added to an empty tank. Close tank cover and push START for full cycle operation.

5. Start Switch

With main switch ON and RUN STOP SWITCH set at RUN, push start button and the process will begin.

6. Programming Console

The Programming Console (C200H-PR027-E), manufactured by Omron, is mounted on the front door of cabinet. The programmer is on whenever the main power is on. The programmer when set properly will indicate the times of the various processes during the cycle.

Leave the programmer in the run mode and clear the viewing screen by pressing the monitor, clear, and monitor buttons in succession. Now press the clear, time, 1 and monitor keys and the timing of each programming step can be monitored.

If a certain function within the program needs to be changed a key (provided) is inserted into programmer and switched to the program made and changes can be made in cleaning cycle. ESMA should be notified and a step by step procedure will be given to simplify any necessary changes.

7. Preliminary Start-Up

After plumbing is completed, conduct the following test to determine if there are any leaks in the system.
CAUTION: On the E992 unit deionized or regular water must be connected to the secondary solenoid or damage will result to the unit if no water enters the tank during the second rinse cycle.

A) Turn main power ON
B) RUN-STOP switch must be ON
C) Close cover
D) Turn selector switch to FILL

Push START button and hot water should enter the tank. The unit has a flow control valve, which allows 5.0 GPM, so it is important that the shutoff valve does not restrict the flow to less than 5.0 GPM or the fill time will have to be increased.

After 150 seconds (or other programmed fill time), the fill solenoid will close, and the water will be up to the overflow drain opening. At this time, shut main power off, disconnect electrical plugs from outlets, open cabinet, and check for leaks.

Leave selector switch in FILL position, push START, and hot water will enter the already full tank and begin to cascade through the overflow drain. After 150 seconds, the FILL solenoid will close.

If no leaks are detected, connect power, turn main switch ON, move selector switch to CLEAN, push START, and the cleaning cycle will begin.

After the ultrasonic cleaning step, the tank will drain (with pump). When the tank is empty (after 150 seconds) shut main off, disconnect power, and check for leaks in drain-pump line.

If no leaks are detected, connect power, turn main ON, and program will complete to finish. Check at each fill stage that water is coming into tank.

8. Operation

The basic principle of operation is the enhancement and acceleration of the cleaning action through ultrasonic cavitations. Instruments or parts to be cleaned are placed in the basket (or cassette racks) and lowered into the tank.
NEVER PLACE PARTS DIRECTLY ON THE BOTTOM OF THE TANK.

The baskets and cassette racks, that can be purchased from ESMA Inc., have rubber supports to keep parts off bottom of tank.

9. Procedure

-Turn main power ON.
-Turn RUN-STOP switch to RUN. (RUN-STOP Switch Should remain in RUN position at all times).
-Set selector switch to either FILL or FILL-CLEAN positions.
-Add cleaning agent to empty tank (see section on cleaning agents).
-Lower basket with instruments or parts on support rack.
-Close cover.
-Push START button and the selected cleaning program will automatically proceed.

(Details on selected program are given in Figure 1, depending on setting of selector switch)

10. Water Consumption

In the progress for E889, 12.5 gallons are used on the initial fill cycle, with an additional 22.5 gallons used in the subsequent fill or rinse—for a total of 35 gallons of hot water used per cycle.

In the program for E992, an additional 22 gallons of deionized water is used in the secondary rinse.

11. Drying

In the drying portion of the programs, the incoming air is heated in the tank cover to 160-180 degrees F. and forced by the fan through the tank cover. CAUTION: Do not touch the cover during the drying cycle because some areas of the cover will be hot.

NEVER place any towel or obstruction over the fan intake on cover. After 7 minutes of hot air drying, a buzzer sounds the end of the program. The air temperature, during the Hot Air Drying, can be increased or decreased by adjusting two thermoswitches located in cover at hot air exit.

12. Cleaning Agent

It is recommended to use a liquid cleaning agent because some powders take too long to go into solution. ESMA Inc. has liquid cleaners, E589, E882, E484, etc., where it is recommended to use 2 to 4 cups per tank load. Some general-purpose detergents may be all that is required to clean your items. Depending on types of parts and debris to be removed, some experimentation will be required with type of cleaners and concentrations. Remember: Adding too much cleaning agent can cause a problem with final rinsing of parts.

13. Power Modules 1 and 2

The Power Modules contain the six circuit boards, programmable controller, fans, relays, RFI filters, etc. There are six lights, one per circuit board (two on PM1 and four on PM2), to indicate if circuit boards are operating. To check if all circuit boards are operating, open door slightly when unit is ultrasonically cleaning: all indicator lights must be ON. If a light is out, the corresponding circuit board will have to be repaired.

14. Programmable Controller

An Omron CPM 1 programmable controller is used to control the process. The unit has a flash memory backup without a battery.

The controller has indicator lights for inputs and outputs, which are lit during process. The outputs are as follows:

Output	Controls
00	Primary solenoid
01	Ultrasonics
02	Drain solenoid
03	Dryer
04	Overflow Pump
05	Buzzer
06	Drain Pump
07	Secondary Solenoid

The Programming Console on cabinet door can be used to monitor these outputs or change their values. To change their values ESMA should be notified.

15. Maintenance

Periodically the drain screen in tank will have to be removed and cleaned. Accumulated lint and debris could slow down the draining, resulting in the incomplete removal of cleaning solution before the rinse cycle starts.

The tank and modules are manufactured of 316 and 304 stainless steel. Clean with a commercially available cleaner for stainless kitchen appliances.

Cleaning of Solenoids

A periodic cleaning of all solenoid valves is desirable. The time between cleanings will vary, depending on media and service conditions. In general, if the voltage to the coil is correct, sluggish valve operation, excessive leakage, or noise indicates that cleaning is required. A bulletin with maintenance instructions is enclosed.

FOR ASSISTANCE CALL: 800-276-2466
WARRANTY: Unit has one-year guarantee, circuit boards two years and transducer bonds and tank weld seams a lifetime guarantee.

Figure 1 - Program times for E889 unit

Select switch: FILL Select switch: CLEAN
Time: 150 seconds

STEP	FUNCTION	TIME (SECONDS)
1	Ultrasonic cleaning	600
2	Drain	150
3	Fill (hot water)	150
4	Ultrasonic rinsing	60
5	Ultrasonic rinsing (cascade)	60
6	Ultrasonic rinsing	60
7	Ultrasonic rinsing (cascade)	60
8	Ultrasonic rinsing	60
9	Drain	150
10	Dryer, Fan, Drain	420
11	Buzzer	5
	TOTAL: 1775	(29 minutes, 35 seconds)

Select switch: FILL-CLEAN

STEP	FUNCTION	TIME (SECONDS)
1	Fill (hot water)	150
2	Ultrasonic cleaning	600
3	Drain	150
4	Fill (hot water)	150
5	Ultrasonic rinsing	60
6	Ultrasonic rinsing (cascade)	60
7	Ultrasonic rinsing	60
8	Ultrasonic rinsing (cascade)	60
9	Ultrasonic rinsing	60
10	Drain	150
11	Dryer, Fan, Drain	420
13	Buzzer	5
	TOTAL: 1925	(32 minutes, 5 seconds)

Figure 2 - Program times for E992 unit

Select switch: FILL Select switch: CLEAN
Time: 150 seconds

STEP	FUNCTION	TIME (SECONDS)
1	Ultrasonic cleaning	600
2	Drain	150
3	Fill (hot water)	150
4	Ultrasonic rinsing	60
5	Ultrasonic rinsing (cascade)	60
6	Ultrasonic rinsing	60
7	Ultrasonic rinsing (cascade)	60
8	Ultrasonic rinsing	60
9	Drain	150
10	Fill (secondary)	150
11	Ultrasonic Rinsing	120
12	Drain	150
13	Dryer, Fan Drain	420
14	Buzzer	5
	TOTAL: 2195	(36 minutes, 35 seconds)

Select switch: FILL-CLEAN

STEP	FUNCTION	TIME (SECONDS)
1	Fill (hot water)	150
2	Ultrasonic cleaning	600
3	Drain	150
4	Fill (hot water)	150
5	Ultrasonic rinsing	60
6	Ultrasonic rinsing (cascade)	60
7	Ultrasonic rinsing	60
8	Ultrasonic rinsing (cascade)	60
9	Ultrasonic rinsing	60
10	Drain	150
11	Fill (secondary)	150
12	Ultrasonic rinsing	120
13	Drain	150
14	Dryer, Fan, Drain	420
15	Buzzer	5
	TOTAL: 2345	(39 minutes, 5 seconds)