



# Crystal Clean®

## **OPERATIONAL & INSTRUCTION MANUAL**

**Model 2734-110  
(208V-240V, 3 Ø, 4 wires)**

Crystal Clean

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## SAFETY REQUIREMENTS

### PLEASE NOTE

All personnel must read this user guide before attempting to install, operate, maintain, or service this parts cleaner unit

## HAZARDS

- High voltages are present, **ALWAYS** disconnect unit from power source (lock out/tag out) before attempting any maintenance or service procedure.
- **DANGER: KEEP HANDS CLEAR WHEN EQUIPMENT IS RUNNING.** Never place hands in tank, around lift table or platform at any time, severe hazards are present.
- Hot water: use baskets with tongs or proper rubber gloves to insert or remove parts from basket or lift table.
- Read MSDS sheet for cleaning agents recommended for the system. Note the requirements for personal protection listed on the MSDS.
- Make sure equipment is properly installed in accordance with all electrical codes.
- Never operate this equipment in an ungrounded condition.
- Never attempt to perform maintenance when cleaning solution is hot.
- Never open equipment or attempt service/warranty related repairs without first contacting Crystal Clean for safe and proper procedures.

## SAFE OPERATION

- **DANGER: KEEP HANDS CLEAR WHEN EQUIPMENT IS RUNNING.** Never place hands in tank, around lift table or platform at any time, severe hazards are present.
- **CAUTION: LID MUST BE OPEN WHEN “CLEANING ON.** If parts/baskets are taller than 10 ½” the lid must remain open during the cleaning process. Use the chain on the right side to secure lid in the open position to prevent damage to the lid or parts being cleaned. **LIFT TABLE AUTOMATICALLY RETURNS TO THE UP POSITION AT THE END OF THE CLEANING CYCLE!**
- Do not immerse hands or other body parts in the ultrasonic tank. Cleaning agents and contaminants can cause skin irritation and exposure to high intensity ultrasonic energy should be avoided.
- Do not operate system using volatile, explosive, combustible, or acidic liquids (pH less than 7). Unauthorized cleaning agents, not approved by Crystal Clean, will invalidate warranty, and may cause damage to system.
- Do not rest parts on the bottom of tank. A basket that stands off the bottom of the tank is mandatory for all parts; noncompliance will result in severe tank erosion and void the warranty.
- Do not operate the system unless the tank is full. Operating at less than full capacity may result in damage and void the warranty.
- Do not open up machine, disassemble any part(s), move, or remove any components or electrical devices without contacting Crystal Clean and following all lock-out/tag out procedures for power supply and air supply.
- Do not connect the tank to any other power supply than what is specified on the serial tag of the tank or generator (208V-240V, 3Ø, 4 wires, 40 Amp).
- The generators contain high voltages and should be maintained in a clean, dry environment at all times.
- Do not move the cleaning system without draining the tank and disconnecting the unit from the power supply and air supply.
- Operating temperatures of the solution requires protective clothing and equipment to protect against the possibility of scalds following accidental spills.
- Make sure that the sound levels experienced in your environment are known, and wear hearing protection if necessary. Ultrasonic energy produced by the system is measurable by sound meters and OSHA sound restrictions may apply.

- Do not leave the ultrasound on or leave parts in the tank longer than necessary. This can result in erosion of the part surface and/or the bottom of the tank.
- Do not allow moisture to build up inside the unit, this can cause electrical shorts and corrosion of the ultrasonic transducers.

## INSTALLATION & INITIAL SETUP

- Receiving- Inspect packaging and unit carefully to ensure there has been no damage in shipping. If there is damage, contact the carrier immediately to process a claim.
- Place the unit in a well-ventilated area on a flat level surface.
- Make sure drain valves (2) are closed (located on the left side of unit) and then add water and cleaning agent to the main tank. When the main tank is full (60 gallons) the water will cascade over the weir into the side overflow tank (5 gallons); continue adding solution until the level in the overflow tank is 3" below the top of the weir.
- Use only Crystal Clean approved cleaning agents and be sure you use the proper, recommended concentrations (6 gallons for general purpose cleaning)
- **CHECK YOUR POWER SUPPLY BEFORE CONNECTING TO UNIT (record readings on Warranty Registration - page 15).** The system is designed to operate with 208V – 240V, 3 phase, 4 wires, 40 amps, and 60 Hz power supply. Colored wires (3) = hot wires & Yellow/Green wire = ground.
  - **DO NOT CONNECT MACHINE TO 3 PHASE POWER SUPPLY THAT DOES NOT HAVE 3 EQUAL LEGS (Y). IF YOU HAVE A “HIGH LEG” CONTACT CRYSTAL CLEAN FOR PROPER WIRING CONNECTIONS.**
- Connect air supply to regulator located on left side of unit. Pressure should be 0.5 MPa (70 PSI). Adjust pressure using black knob on top of regulator.
- Make sure oil in air regulator oil canister #2 (if equipped) is between Min and Max level indications on canister (use Turbine Oil ISO VG32)
- Fill out WARRANTY REGISTRATION form, page 15 (serial # plate located on side of unit) and send back to Crystal Clean to ensure activation of your warranty.
- Unit is now ready to clean parts, see NORMAL OPERATION procedures.

## SYSTEM OPERATION - CONTROL PANEL

- **Power ON:** Green button controls the main power into the unit; this button must be ON to operate any other functions of the unit.
- **Power OFF:** Red button turns power off to the unit and shuts off all functions.
- **Main Power/Control Power:** Green lights illuminate when the **Power ON** button is pushed indicating power to all functions.
- **Cleaning ON:** Green button turns cleaning program on
- **Cleaning Off: Red** button turns cleaning program off; lift table returns to up position.
- **Temperature Controller:** Controls the temperature of the solution operating temperature, should be 140°F - 160°F. Factory set @ 160°F, this setting is thermostatically maintained and should only need to be re-set if process or materials being cleaned change. To change the temperature, use the  $\uparrow\downarrow$  to set.
- **Touch Screen:** The cleaning program and functions are set and adjusted using this screen.
- **Buzzer:** This light illuminates red and has an audible alarm when the liquid level in the main tank or overflow tank is low and water needs to be added to the tank. When the **Buzzer** light is illuminated it shuts off power to the heater, filtration, ultrasonics, and lift table until water is added to the proper level. \*Note: You must go to the alarm screen to reset the alarm, /Alarm Reset.

## INITIAL SET UP

- Press **Power ON** green button (main power light, control power light, touch screen, temperature controller and cleaning off light are on)
- **Welcome Screen**, touch.
- **Home Screen**
  - **Parameters**, set/change up your cleaning program:
    - **User**, 1
    - **Enter Password**, 1 enter.
    - Agitation Time – time that lift table agitates before and after ultrasonics, (e.g., 0M 30S = 30 seconds)
    - Ultrasonic Time – Ultrasonic cleaning time; (e.g., 5M 0S = 5 minutes)
    - Filtration Time – After ultrasonic cleaning time ends, filtration turns on to remove surface contaminants and remove particles from cleaning solution before lift table automatically raises. (e.g., 0M 30S = 30 seconds)
    - Warm-up Time – For automatic heating, allows you to program your heat cycle based upon your work schedule so unit is at operating temperature when needed and shuts down at the end of the workday (normal heat up time is typically 2 hours).
      - Starting: enter time (military time, e.g., 5 pm = 1700) to start heating
      - Ending: enter time to stop heating
      - Day: touch day(s) you want auto heat (illuminates green)
    - Change Time: NOTE: User 3 (password: 3) is the only user that can change the date and time.
      - Allows you to set date (Y year, M month, D Day, W week of the month) and time (military time, e.g., 5:00 pm = 17:00). You must press CONFIRM when completed.

- **Home Screen**

- Normally Open: U/S and Heater must be in the ON position for AUTO operation (illuminates green).
  - U/S ON
  - Heater MAN (If working outside Warm-Up time parameters).
  - Oil Skimmer (if equipped)
- **Alarm:** Allows you to see cause of alarm, reset alarm and turn off audible buzzer
- **I/O-Parameter:** Used for PLC programming only, consult Crystal Clean before use.
  - **Auto/Manual:** Select automatic operation based upon set parameters or manual operation for individual functions.
    - **Auto:** automatically starts and completes cleaning program when **Cleaning ON** button is pressed
    - **Manual:** manually control functions when **Cleaning ON** button is pressed
      - Up – lift table manually up
      - Down – lift table manually down
      - Filtration – manually turns on filtration/skimming, operates only when lift table is in the down position.
      - U/S, ultrasonics on
      - Heater, heater man
      - Oil Skimmer, use with optional oil skimmer.

## **GENERATORS** (located behind lower cabinet doors)

- **Main Power ON/OFF switch (black):** Controls generator power ON/OFF. Switch should be in “ON” position for ultrasonics to run.
- **Power, P+ P-:** Ultrasonic output power, can be adjusted to suit cleaning objectives.
- **Power Level (red LED display):** Direct visual reference of ultrasonic power output
- **Time, T+ T-:** Not applicable, time controlled by digital timer set in Parameters.
- **On/Off Ultrasonic:** Turns ultrasonic generator on/off.
- **On/Off Sweep:** Sweep Mode provides a slight ± variation in ultrasonic frequency.

## NORMAL OPERATION

- **CAUTION: LID MUST BE OPEN WHEN “CLEANING ON.** If parts/baskets are taller than 10 ½” the lid must remain open during the cleaning process. Use the chain on the right side to secure lid in the open position to prevent damage to the lid or parts being cleaned. **LIFT TABLE AUTOMATICALLY RETURNS TO THE UP POSITION AT THE END OF THE CLEANING CYCLE!**
- **DANGER: KEEP HANDS CLEAR WHEN EQUIPMENT IS RUNNING.**  
Never place hands in tank, around lift table or platform at any time, severe hazards are present.
- Press Power ON green button (main power light, control power light, touch screen, and temperature controller are on)
- Make sure solution is at operating temperature (preset @ 160°F, to change operating temperature see page 5, Temperature Controller)
- Open lid and leave open while operating the machine unless equipped with auto lid opening/ closing feature and parts/baskets are less than 10 ½” tall.
- Never operate the filtration manually ON with lift table in the UP position
- Never operate the filtration manually ON with the ultrasonics ON
- Press Cleaning ON green button (cleaning cycle begins based on your parameter settings – lift table lowers, agitation, ultrasonic cleaning, filtration/skimming, lift table raises)
- Complete one cleaning cycle to make sure parameters are correct and to “Degas” the tank. This is a process that eliminates the existing bubbles from the solution and can cause some squeaking noises, which is normal. This process of degassing should be done each time you change your solution and before you start cleaning parts.
- Now you are ready to start cleaning parts, arrange parts in basket or on lift table platform.
- NOTE: Lift Table capacity is 500 lbs., do not exceed
- Press Cleaning ON green button (cleaning cycle begins based on your parameter settings – lift table lowers, agitation, ultrasonic cleaning, filtration/skimming, lift table raises)
- Remove basket or large parts from platform.

**NOTE: Parts** are hot, use proper protective equipment to prevent exposure.

- Close lid at end of day to conserve heat and reduce water loss due to evaporation.  
**\* If equipped with the auto opening/closing lid – use touch screen to go to Home Screen, Manual, Lift Table DOWN button.**
- **OPTIONAL COOL FLUSH SYSTEM**
  - Attached hose to end of cooler flush valve (3/4") and attach other end of hose to cooler.
  - Submerge cooler in main tank.
  - Close spray bar valve and open cooler flush valve
  - Turn on ultrasonics and filtration at the same time (there may be some squeaky noises, this is normal)

## MAINTENANCE

- Preventative - There is a minimum of preventive maintenance required.
  - The overall environment around the unit needs to be kept clean, dry and dust free.
  - Heating elements (2) and Low-Level Sensors (2) need to be checked quarterly to ensure no leakage:
    - Disconnect machine from power source, Lock-Out/Tag-Out
    - Remove upper side panels and check for leakage around heating elements (one of each side) and LLS (one in each tank).
    - If necessary, tighten bolts to snug, do not overtighten.
- Daily:
  - Water level needs to be checked in both tanks (main and overflow tanks) daily due to evaporation. Maintain proper water levels (main tank full to weir level, overflow tank 3" below weir level)
  - Visually inspect air regulator assembly.
    - Canister #1, drain any water in separator canister using valve on bottom of canister.
    - Canister #2 (if equipped), maintain oil level between Min and Max level indications on canister (use Turbine Oil ISO VG32)
- Routine:
  - Both *Filter Elements* should be replaced when the pressure gauge indicates an increase in pressure or the flow from the spray bar located on the side of the main tank is slowed. Most users regularly replace their filters each month to avoid any decrease of flow. Crystal Clean will replace filters during service.  
Note: Normal pressure gauge reading is between 10-15 psi. (middle of gauge), 0.1MPa.
  - If equipped with auto lid, secure lid open with chain before working or reaching inside of the tank.
  - Solution should be replaced regularly to avoid a drop in cleaning performance that will result from too many contaminants in the solution.

**NOTE: Consult** your Crystal Clean representative for recommended schedule for filter and solution changes based on your application.

## EQUIPMENT CLEANING

- Manually lower Lift-Table to the bottom of tank. If equipped with auto lid secure the lid in the open position using the chain on right side.
- Push **Power OFF** button (all control lights should be OFF, except **Main Power**)
- **DISCONNECT UNIT FROM POWER SUPPLY (LOCK-OUT/TAG-OUT)**, all lights should be off.
- **DISCONNECT UNIT FROM AIR SUPPLY (LOCK-OUT/TAG-OUT)**
- Wait a minimum of 15 minutes before draining contaminated solution from the tanks (this enables heating element to cool and prevent damage)
- Drain both tanks, **NOTE:** Solution is hot and may be contaminated; protective clothing and equipment should be used to prevent any exposure.
- Remove and clean metal pre-filter located in overflow tank.
- Rinse the inside of the tanks with clean, clear water.
- Clean Low-Level Sensors (one in each tank) and ensure proper operation (donut slides up and down easily on shaft)

### **Caution: Never enter tank area or place hands, arms, or any body parts inside the tank area.**

- Wipe work surfaces and outside surfaces with a dry, clean, soft cloth.
- Remove filter canisters located on the side of the unit using the special tool to loosen the collar and remove canisters. Insert filter elements (size is stamped on side of filter, typically 125 microns & 50 microns) into the correct canister (larger filter in rear canister, smaller filter in front canister). Carefully reattach canisters to housings (be careful not to damage O-rings), hand tighten the collar while holding the canister in place to ensure a tight fit, use tool to snug canister, do not over tighten.  
**NOTE: Canisters** and solution are hot and may be contaminated; protective clothing and equipment should be used to prevent any exposure.
- When discarding contaminated solution and filters follow all local, state, and federal environmental and regulatory requirements.
- Follow installation instructions listed earlier for refilling and start up procedures.

## MAXIMIZING ULTRASONIC PERFORMANCE

- Temperature - Temperature has a dramatic effect on the cleaning performance and time needed to clean a part. The recommended temperature range is 140°F to 160°F. Temperatures below or above can decrease the ultrasonic action. Consideration needs to be given to the cleaning agent used when determining the proper temperature.  
**NOTE: Always** check the MSDS for the cleaning agent and note its boiling point or flash point. Operation near or above the boiling point/flash point is hazardous and can cause noxious fumes.
- Cleaning Agent - Cleaning agents can enhance or decrease the performance of the ultrasonic action and speed of cleaning. Always use Crystal Clean recommended cleaning agents at their proper concentrations.
- Degassing - Liquids containing air and dissolved gases can interfere with the formation of cavitation bubbles necessary for ultrasonic cleaning. Follow the procedure in the installation section to ensure liquid is ready for cleaning.
- Filtration - Never operate filtration at the same time as the ultrasonic cleaning cycle, this will decrease the cleaning action in the tank.
- Part Exposure - In order for a surface to be cleaned, it must be exposed to the liquid. This requires proper placement of the parts in the basket. Do not overload baskets with small parts that prevent the middle layers from getting proper exposure to the liquid. Also, improper placement of parts with blind holes or cavities can result in air pockets, where no cleaning action occurs. In general, clean large numbers of parts a few at a time using shorter cleaning cycles.
- Contaminated Solution - As contaminants build up in the solution the ultrasonic performance drops. The cavitation bubbles waste their energy imploding on the contaminants and not on the part surface. It is important that you change the solution on a regular basis.
- Parts Materials and Contamination - Certain materials absorb ultrasonic energy, generally these are soft materials like rubber, fabric, gaskets, and heavy grease. Ultrasonics is extremely effective with a hard surface to impact against. Therefore, parts contaminated with heavy amounts of grease or soft materials should be pre-cleaned prior to exposure to the ultrasonic tank.