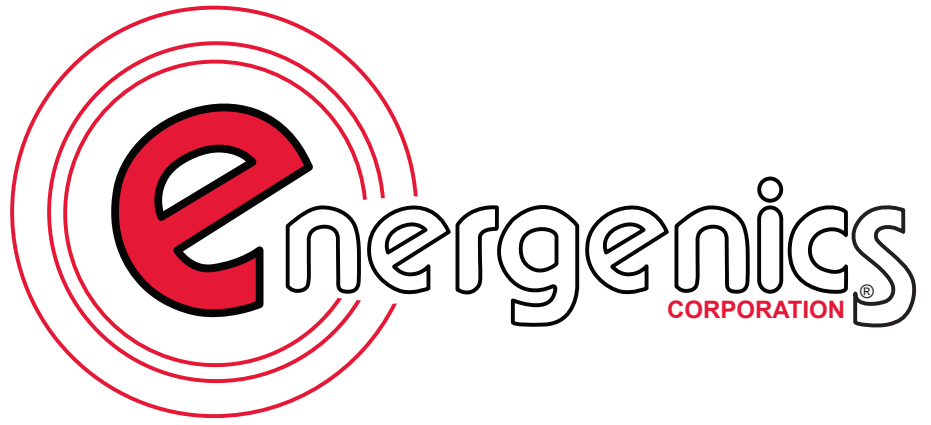


UV-CART (K1 & K2 MODELS) DISINFECTION SYSTEMS

Installation and Operation Manual



**ADVANCED ULTRAVIOLET
DISINFECTION TECHNOLOGY**

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1. PURPOSE

1.1 Manual Purpose

This manual provides installation requirements, operation instructions, maintenance procedures, troubleshooting guidance, and safety information for the Energenics K1 and K2 UV-C Cart Disinfection Chambers. This manual is intended for:

- Installation contractors
- Facility management
- Operators
- Maintenance personnel
- Safety personnel

All personnel responsible for installation, operation, or maintenance of this equipment should read and understand this manual before the system is placed into service.

1.2 System Purpose

The Energenics UV-C Cart Disinfection Chamber is engineered to provide consistent, repeatable ultraviolet germicidal irradiation (UVGI) treatment for linen carts and similar transport equipment used in industrial laundry facilities. The system is designed to support best practices for hygienically clean transport equipment and to assist facilities working toward hygienic accreditation and infection prevention protocols.

Proper installation, cart placement, and cycle time are critical to achieving the intended disinfection performance.

2. SYSTEM DESCRIPTION

2.1 General Description

The Energenics UV-C Cart Disinfection Chamber is a fully enclosed, factory-assembled ultraviolet disinfection system designed to treat the exterior and interior surfaces of linen carts and similar transport equipment using germicidal UV-C light.

The system is shipped fully assembled, wired, and tested prior to shipment. Installation consists of placing the chamber in its designated location, leveling the unit, installing ramps, and connecting electrical power and compressed air utilities. Final HMI wiring

connections, system startup, safety verification, and operator training are performed by Energenics during commissioning unless otherwise specified.

2.2 System Components

The system includes the following major components:

- Powder-coated, heavy-gauge aluminum enclosed disinfection chamber
- UV-C lamp fixtures mounted on chamber walls and ceiling
- Reflective interior surfaces to enhance UV coverage
- Automatic entry and exit doors
- Pneumatic door cylinders (compressed air operated)
- Door safety interlocks
- PIR motion safety sensor
- External in-use warning lights located on both sides of the chamber
- PLC control system
- Touchscreen HMI operator interface
- Emergency stop buttons
- Adjustable cycle timing controls
- Cycle counter and lamp hour meter

2.3 System Operation Summary

The chamber is designed to deliver a consistent UV-C dose to cart surfaces through controlled lamp placement, reflective interior surfaces, and a timed exposure cycle. The system provides a repeatable disinfection process that does not rely on operator chemical application and helps facilities maintain consistent cart disinfection procedures.

Basic operation sequence:

1. Load carts into chamber.
2. Exit chamber and check for all-clear.

3. Start system using HMI.
4. UV lamps operate for programmed cycle time.
5. Lamps shut off automatically at end of cycle.
6. Operator removes carts.
7. System is reset for next cycle.

3. UV SAFETY WARNING

3.1 Ultraviolet Radiation Warning

Ultraviolet (UV-C) radiation is harmful to eyes and skin. Exposure to UV-C radiation can cause:

- Photokeratitis (eye injury similar to welder's flash)
- Erythema (skin burns similar to sunburn)
- Skin irritation and redness
- Long-term skin damage with repeated exposure

UV-C radiation is not visible and there are no immediate warning signs of exposure. Symptoms of overexposure may not appear until several hours after exposure.

3.2 Safety Design

The Energenics UV-C Cart Disinfection Chamber is designed as a fully enclosed system with multiple safety devices to prevent accidental exposure to UV-C radiation. These safety devices include door interlocks, motion sensors, emergency stop devices, and external warning lights and must always be operational when the system is in use.

The system is designed to operate only when the treatment space is unoccupied.

3.3 UV Safety Rules

The following safety rules must be followed at all times:

- Never enter the chamber while UV lamps are operating

- Never look directly at UV lamps
- Do not operate the system if safety devices are not functioning
- Do not bypass or disable safety interlocks or sensors
- Disconnect power before servicing UV fixtures
- Only trained personnel should operate or service this equipment

Failure to follow safety procedures may result in serious injury.

4. SAFETY & PERSONAL PROTECTIVE EQUIPMENT (PPE)

4.1 General Safety

Only trained personnel should operate or service the Energenics UV-C Cart Disinfection Chamber. Facility management is responsible for ensuring that operators and maintenance personnel are properly trained in the safe use of this equipment.

The employer is responsible for providing a safe workplace and ensuring that proper safety procedures are followed.

4.2 Recommended Personal Protective Equipment

Under normal operating conditions, personal protective equipment (PPE) is not required for operators because the UV-C Chamber is fully enclosed and designed to prevent UV exposure during operation.

However, PPE should be worn when performing maintenance or service work that may involve exposure to UV-C light or broken lamps.

Recommended PPE when servicing the system includes:

- Face shield or safety glasses
- Gloves
- Long sleeve clothing

UV-rated protective equipment should be used when exposure is possible. Before performing any maintenance inside the chamber, the system must be powered off and locked out in accordance with facility lockout/tagout procedures.

4.3 Electrical Safety

The UV system includes high-voltage electrical components. Electrical safety precautions must be followed:

- Only qualified electricians should perform electrical work
- Disconnect power before servicing fixtures or control panels
- Follow lockout/tagout procedures before servicing equipment
- Verify power is off before working on electrical components

5. ADVISORIES

5.1 Important Operating Advisories

The following advisories should be understood before operating the UV-C Cart Disinfection Chamber:

- The UV-C Chamber is a disinfection device, not a cleaning device. Carts should be cleaned prior to UV disinfection.
- Ultraviolet light requires direct line-of-sight to be effective. Cart positioning is important to ensure proper exposure.
- Do not overload carts in a manner that blocks UV light from reaching interior surfaces.
- Cart lids should be removed to allow UV light to enter the cart interior.
- Follow recommended cycle times. Do not reduce cycle times below recommended settings without consulting Energenics.
- Do not operate the system if safety devices are not functioning properly.
- Do not modify the equipment, controls, or safety devices without written authorization from Energenics.
- Routine cleaning and maintenance of UV lamps and interior chamber surfaces are required for proper system performance.

6. BEST PRACTICES FOR DISINFECTION

The Energenics UV-C Cart Disinfection Chamber is designed to provide consistent and repeatable disinfection of exposed surfaces when used as part of a facility's overall cart cleaning and handling process. UV-C disinfection is most effective when used as part of a complete hygiene process that includes a cleaning or washing step prior to UV treatment.

Best Practices for cleaning and disinfecting should be followed when utilizing UV-C disinfection systems. Best Practices include a two-step process consisting of:

1. A cleaning or washing step to remove soil, dust, organic matter, and other contaminants.
2. A UV-C disinfection step to reduce microbial contamination on exposed surfaces.

The cleaning or washing step is critical because UV-C light is a line-of-sight disinfection method and does not penetrate soil, debris, or heavy organic contamination. Surfaces that are soiled or covered by debris may not receive effective UV-C disinfection.

Methods of cleaning or washing may vary by facility and may include:

- Cart washing systems
- Pressure washing
- Manual cleaning
- Other facility cleaning procedures

Each facility is responsible for determining and implementing appropriate cleaning procedures prior to UV-C disinfection.

Failure to implement proper cleaning prior to UV-C treatment may reduce disinfection effectiveness.

UV-C disinfection is intended to be used as a disinfection step following cleaning and is not intended to replace standard cleaning practices.

When operated and maintained properly, the Energenics UV-C Cart Disinfection Chamber provides a consistent disinfection step that supports hygienically clean cart handling practices and can assist facilities in meeting internal infection prevention and accreditation program requirements.

Standards-Aligned Statement

Energenics UV-C disinfection systems are designed to support a structured, repeatable disinfection process as part of a facility's overall hygiene program. These systems are intended to be used in conjunction with established cleaning practices, recognizing that removal of soil and organic material is a critical step prior to disinfection.

When properly installed and operated as intended, Energenics systems provide consistent UV-C exposure under controlled conditions, supporting facilities in achieving repeatable disinfection outcomes and alignment with industry best practices and accreditation standards.

7. INSTALLATION

7.1 Receiving and Unloading the Chamber

The Energenics UV-C Cart Disinfection Chamber is shipped fully assembled and mounted on a shipping pallet. The chamber must be inspected for shipping damage before it is removed from the delivery truck and before the bill of lading is signed.

Do not sign the bill of lading until the equipment has been inspected for damage.

Unloading Procedure

1. The chamber should be unloaded using a forklift with forks a minimum of 60 inches in length.
2. Lift only from the designated base areas of the unit.
3. Use care to avoid puncturing or damaging the chamber floor or wall panels.
4. Remove all shipping wrap and packaging materials.
5. Inspect the chamber for shipping damage, including:
 - Exterior panels
 - Doors and door tracks
 - HMI screen and pedestal
 - Warning lights
 - Control panel(s)
 - Ramps and hardware

6. Report any shipping damage immediately to the freight carrier and Energenics.

After inspection, remove the lag bolts securing the chamber to the pallet and carefully remove the pallet. Lower the chamber into position on the floor.

7.2 Installation Responsibility

The Energenics UV-C Cart Disinfection Chamber is a factory assembled and factory wired system. The installing contractor or facility is responsible for site preparation, equipment placement, leveling, ramp installation, and utility connections.

The installing contractor or facility is responsible for:

- Equipment unloading and placement
- Leveling the chamber
- Installing entrance and exit ramps
- Providing electrical service to the equipment
- Installing electrical disconnects
- Providing compressed air connection
- Ensuring air pressure meets requirements
- Providing adequate operating space around the chamber
- Ensuring installation complies with local codes

Energenics is responsible for:

- Final HMI wiring connections
- System startup and commissioning
- Safety system verification
- Cycle setup and testing
- Operator training
- Maintenance training

Energenics is not responsible for improper installation, improper utility connections, inadequate air supply, inadequate electrical service, or installation that does not follow Energenics installation requirements.

7.3 Chamber Installation and Placement

The UV-C Chamber must be installed on a flat, level floor to ensure proper door operation and ramp alignment.

Installation Requirements

- Install the chamber in its predetermined location.
- Ensure adequate space is available for cart entry and exit.
- Ensure adequate clearance is available for control panels and service access.
- Level the chamber using the adjustable leveling feet.
- Install entrance and exit ramps using the factory-provided hardware.
- Ensure ramps are level and properly aligned with the chamber floor.
- Verify doors open and close freely without obstruction.
- Verify floor guide rails inside the chamber are secure and properly aligned.

The chamber must remain level to ensure proper operation of doors and safety interlocks.

7.4 Utility Requirements

7.4.1 Electrical Requirements

Electrical work must be performed by a qualified electrician and must comply with all applicable local and national electrical codes.

- Provide electrical service as specified on the equipment nameplate or electrical drawings.
- Install required electrical disconnects near the machine and within sight of the equipment.
- Incoming power must be supplied to the designated control panel(s).
- The UV-C Chamber is factory wired and tested prior to shipment.

- Final field wiring by Energenics (includes HMI pedestal connections) during startup.

Failure to provide proper electrical service may result in equipment damage and may void the equipment warranty.

7.4.2 Compressed Air Requirements

The UV-C Chamber uses compressed air to operate the automatic doors.

Compressed air requirements:

- 1/2-inch air supply line
- Clean, dry air required
- Air pressure must be maintained between 80 PSI and 100 PSI
- Install a shutoff valve near the machine
- Install a filter/regulator near the machine if not already present

Important: Loss of air pressure will prevent door operation and may stop the treatment cycle.

7.5 Installation Verification Checklist (Pre-Startup)

Prior to Energenics arriving for startup and training, the following installation items must be completed and verified:

- Chamber installed in final position
- Chamber is level
- Entrance and exit ramps installed
- Electrical service supplied
- Electrical disconnects installed
- Compressed air connected and turned on
- Air pressure between 80–100 PSI
- Doors open and close properly
- HMI pedestal mounted

- Area around chamber is clear
- Adequate space provided for cart movement

Energenics will review this checklist prior to commissioning and startup.

7.6 Energenics Startup and Training

Energenics will perform system startup and training after installation is complete and utilities are connected.

Startup and commissioning services typically include:

- Final HMI wiring connections
- Verification of electrical connections
- Verification of compressed air connections
- Door operation testing
- Safety device testing (door interlocks, motion sensors, emergency stops)
- UV lamp operation verification
- Cycle timing verification
- Alarm and fault verification
- Test cycle operation
- Operator training
- Maintenance training

The system should not be placed into regular operation until startup and training have been completed.

8. OPERATION

8.1 General Operation Overview

The Energenics UV-C Cart Disinfection Chamber is designed to provide a consistent, repeatable UV-C disinfection cycle for linen carts using a fully enclosed treatment chamber and automated cycle operation.

The system operates using a timed sequence that includes:

- Cart loading
- Door closure
- Pre-cycle countdown
- UV-C disinfection cycle
- Cycle completion
- Door opening and cart removal

All system functions are controlled through the touchscreen HMI located on the operator pedestal. The HMI allows the operator to start the cycle, monitor cycle progress, view alarms, and adjust cycle settings (password protected).

External warning lights illuminate when a disinfection cycle is in progress to indicate the chamber is in operation.

Important: For best results, carts and equipment should be cleaned prior to UV-C disinfection. UV-C light disinfects exposed surfaces but does not penetrate soil or debris. UV-C treatment should be used as a disinfection step following a washing or cleaning process.

8.2 Pre-Operation Safety Check

Before starting a disinfection cycle, the operator should verify the following:

- Chamber interior is clear of personnel
- Carts are positioned properly inside the chamber
- Doors can close fully
- No alarms are present on the HMI screen
- Emergency stop buttons are reset
- Compressed air supply is on and within proper pressure range
- Warning lights are operational
- UV lamps are operational (no lamp fault alarms)

Failure to follow these steps may result in unsafe operation or reduced disinfection performance.

The system will not operate if a safety device or door interlock is not functioning properly.

8.3 Load Sequence

1. Ensure the exit (clean side) doors are fully closed.
2. Open the entry (soil side) doors.
3. Load cart(s) into the chamber and position carts using the factory-installed cart guide rails.
4. Ensure carts are positioned properly and do not obstruct door operation.
5. Exit the chamber area and ensure no personnel are inside the chamber.

The system is now ready to begin the disinfection cycle.

8.4 Start Sequence

1. Verify the chamber is clear of personnel.
2. Press the **START** button on the HMI screen.
3. Doors will automatically close.
4. The system will begin the pre-cycle countdown.
5. The external warning lights will illuminate.
6. The UV-C lamps will energize and the disinfection cycle will begin.

The HMI will display the cycle countdown timer during the treatment cycle.

The system will not start if:

- A door is open
- An emergency stop is engaged
- A safety sensor is triggered
- An alarm condition exists

8.5 Disinfection Cycle

During the disinfection cycle:

- UV-C lamps are energized for the programmed cycle time
- Doors remain closed
- External warning lights remain illuminated
- The HMI displays remaining cycle time
- Safety sensors remain active and will shut down the system if triggered

If a safety device is triggered during the cycle, the UV lamps will immediately shut off and the cycle will terminate.

8.6 Cycle Completion

At the end of the disinfection cycle:

- UV lamps turn off automatically
- External warning lights turn off
- Doors automatically open
- The HMI will display the cycle completion screen
- The operator may remove the carts from the chamber

After carts are removed, **CLOSE DOOR** (rear) on HMI to prepare for the next cycle.

8.7 Reset Sequence

If the system requires resetting after a completed cycle or alarm condition:

1. Press the **HOME** button on the HMI screen.
2. Ensure all door(s) are closed.
3. Ensure all emergency stop buttons are reset.
4. Press **START** to begin the next cycle.

8.8 Programming & Cycle Settings (HMI)

Cycle settings are adjustable through the HMI settings screen (password protected).

Adjustable settings may include:

- Pre-cycle countdown time
- Disinfection cycle time
- Post-cycle delay (if applicable)

The system is factory programmed for optimal performance. Cycle times should not be reduced below recommended settings without consulting Energenics.

The HMI also displays:

- Total system hours
- Total cycle count
- Lamp service hours
- Alarm history

9. ALARMS AND INTERRUPTIONS

9.1 Treatment Cycle Interruption

If a cycle needs to be stopped before completion:

1. Press the **RESTART CYCLE** or **STOP** button on the HMI.
2. The UV lamps will immediately turn off.
3. The system will return to the cycle completion screen.
4. Press **HOME** to return to the main screen.
5. Restart the cycle when ready.

9.2 Door Sensors and Safety Interlocks

The UV-C Chamber is equipped with door safety interlocks that prevent the system from operating if doors are open or not fully closed.

If a door is opened during operation:

- UV lamps will immediately turn off
- The cycle will stop
- Doors will open
- The system must be reset before restarting

The system will not start if door sensors are not properly aligned or functioning.

Door sensor status can be viewed on the HMI diagnostic screen.

9.3 Motion Sensor (PIR) Safety System

The chamber is equipped with a PIR heat/motion safety sensor designed to detect movement inside the chamber.

If motion is detected during a cycle:

- UV lamps will immediately turn off
- The cycle will terminate
- An alarm condition may be displayed
- The system must be reset before restarting

This safety system is designed to prevent accidental UV exposure.

9.4 Emergency Stop (E-Stop)

Emergency stop buttons are located on the system to immediately shut down the UV-C Chamber in the event of an emergency.

When an E-Stop is pressed:

- UV lamps turn off immediately
- Doors open
- The treatment cycle stops
- The system will display an E-Stop alarm

To Reset After an E-Stop:

1. Reset all E-Stop buttons.

2. Press **HOME** on the HMI.
3. Close all doors.
4. Press **START** to resume operation.

The system will not operate until all E-Stops are reset.

9.5 Alarms and Alarm Reset Procedures

The system monitors multiple safety and operational conditions. If a fault occurs, the system will stop and display an alarm on the HMI.

Common alarm conditions may include:

- Door sensor fault
- Motion sensor fault
- Emergency stop activated
- Lamp service indicator

Clearing Alarms:

1. Identify and correct the cause of the alarm.
2. Press **HOME** on the HMI.
3. Follow on-screen instructions to reset the system.
4. Close all doors.
5. Restart the cycle.

Alarm history can be viewed on the Alarm Log screen in the HMI.

9. MAINTENANCE

9.1 Maintenance Overview

The Energenics UV-C Cart Disinfection System is designed for long service life with minimal maintenance; however, routine inspection and maintenance are required to ensure proper operation. The UV-C Chamber contains UV lamps, electrical components, safety devices,

and pneumatic door components that must be inspected and maintained on a regular basis.

Maintenance should be performed by trained maintenance personnel.

Failure to perform routine maintenance may result in reduced disinfection performance, equipment malfunction, or shortened lamp life.

9.2 Routine Monitoring

The following items should be visually checked on a regular basis (daily or weekly):

- Verify UV lamps are operating (no lamp fault alarms)
- Check that external warning lights are functioning
- Verify doors open and close properly
- Verify compressed air supply is appropriate
- Check for unusual noises during door operation
- Verify no damage to lamps or fixtures
- Verify chamber interior is clean and free of debris
- Check HMI for alarms or service notifications

Any issues should be corrected before operating the system.

9.3 Cleaning UV Lamps and Fixtures

UV lamp output can be reduced by dust, lint, and residue buildup on lamps and reflective surfaces. Regular cleaning is required to maintain proper UV performance.

Cleaning Procedure

1. Turn off power to the system.
2. Follow lockout/tagout procedures.
3. Allow lamps to cool before cleaning.
4. Gently wipe lamps with soft lint-free cloth.
5. Use isopropyl alcohol if needed to remove residue.

6. Wipe reflective surfaces inside the chamber.
7. Do not use abrasive cleaners.
8. Do not use water directly on lamps or electrical components.
9. Restore power after cleaning is complete.

Cleaning Frequency

- Monthly under normal conditions
- More frequently in high lint environments

9.4 Quarterly Maintenance

The following maintenance should be performed at minimum every three (3) months:

- Clean UV lamps and fixtures
- Inspect lamps for darkening or damage
- Inspect door interlock switches
- Test emergency stop buttons
- Test motion sensor
- Verify warning lights operate
- Inspect door cylinders and air lines
- Check air pressure regulator
- Inspect wiring for damage
- Clean chamber interior surfaces

Record maintenance in a Maintenance Log.

9.5 Annual Maintenance

The following maintenance should be performed annually:

- Inspect all electrical connections
- Inspect ballasts/drivers

- Inspect door seals
- Inspect door alignment
- Inspect chamber structure and panels
- Verify lamp hour meter
- Replace UV lamps if they have reached recommended service life

9.6 Lamp Service Life

UV lamps gradually lose output over time even if they continue to illuminate. For this reason, lamps must be replaced at recommended intervals to maintain proper UV output.

Typical lamp service life:

- Approximately 12,000 operating hours
- Approximately 5–7 years under normal operating conditions

Lamp replacement should be based on lamp hours or calendar time, whichever occurs first.

The HMI displays lamp hours to assist with maintenance scheduling.

9.7 Lamp Replacement Safety

UV lamps contain a small amount of mercury and must be handled carefully.

Before replacing lamps:

- Turn off power to the system
- Follow lockout/tagout procedures
- Allow lamps to cool
- Wear gloves and safety glasses
- Handle lamps carefully to avoid breakage

9.8 Lamp Replacement Procedure

1. Turn off power and lock out the system.

2. Allow lamps to cool.
3. Open access panels.
4. Carefully remove the lamp from the fixture.
5. Install the new lamp and avoid touching the glass with bare hands.
6. Ensure lamp is properly seated and wired.
7. Close access panels.
8. Restore power to the system.
9. Verify lamp operation.
10. Reset lamp hour counter on HMI if applicable.

9.9 Lamp Disposal

UV lamps contain a small amount of mercury and must be disposed of in accordance with local, state, and federal regulations. Do not dispose of UV lamps in regular trash.

Contact local waste management authorities for proper disposal procedures.

LIMITED WARRANTY & DISCLAIMER

STANDARD CONDITIONS OF SALES

Energenics Corporation (herein called Energenics) warrants to the original purchaser, & to the original purchaser alone, its products to be free from defects in material and workmanship under normal use & service for a period of twelve (12) months from the date of shipment. Energenics' obligations under this warranty shall be limited solely to the repair or replacement of such parts, which Energenics examination shall disclose to Energenics satisfaction to have been thus defective & to the shipment of the repaired or replacement part or parts to the original purchaser F.O.B. point of shipment. In no event shall Energenics be liable for any consequential, incidental, or special damage of any kind caused by the defect. The Warranty set forth shall not apply to & Energenics shall not be responsible for any equipment or part, which has been repaired or altered in any way, regardless of how or why the part was altered or repaired nor for any equipment or part, which has been subjected to the negligence or accident, improper use or care, nor for equipment or part with respect to which Energenics instructions relating to installation, maintenance, or use have not been followed. This limited warranty is expressly made in lieu of all other warranties, expressed or implied, and in lieu of all other obligations or liabilities on the part of Energenics.

The purchaser by acceptance of the delivery of any part or product from Energenics agrees to indemnify Energenics & to hold it harmless against any liability, which may arise if the part or product received is misapplied, improperly installed, improperly maintained, misused, or abused, altered or rendered partially or totally inoperative due to any cause.

RETURNS: Merchandise may not be returned unless an RMA is obtained from Energenics. A copy of the RMA must accompany the returned item as the packing Slip. Energenics will assume no responsibility for merchandise returned neither without such prior approval nor for any charges or expenses incurred therewith.

CANCELLATIONS: Any order may be cancelled by the purchaser only upon written notice & upon payment to Energenics of reasonable & proper cancellation charges.

SALES & SIMILAR TAXES: Energenics prices do not include sales, use, gross receipts, excise or similar taxes, license fees & export or import duties. All taxes or other charges assessed to Energenics by reason of a transaction with the Purchaser must be paid by the Purchaser.

PRICE POLICY: All sales are made F.O.B. point of shipment and all prices are subject to change without notice.

DESIGN CHANGES: Energenics reserves the right to make changes to the design and changes or improvements to its products without notice or without imposing any obligation upon Energenics to install the same upon products heretofore manufactured.

GENERAL: No alteration, modification or extension of the foregoing conditions shall be binding upon Energenics unless made in writing & signed by an officer of Energenics.

APPENDIX A – INSTALLATION AND COMMISSIONING CHECKLIST

Installation Verification Checklist (To Be Completed Prior to Energenics Startup)

The following items must be completed prior to Energenics arriving on site for startup and training.

Item	Verified
Chamber installed in final location	<input type="checkbox"/>
Chamber is level	<input type="checkbox"/>
Entrance ramp installed	<input type="checkbox"/>
Exit ramp installed	<input type="checkbox"/>
Electrical service connected	<input type="checkbox"/>
Electrical disconnect installed	<input type="checkbox"/>
Compressed air connected	<input type="checkbox"/>
Air pressure 80–100 PSI	<input type="checkbox"/>
Doors open and close properly	<input type="checkbox"/>
HMI pedestal installed	<input type="checkbox"/>
Warning lights installed and visible	<input type="checkbox"/>
Area around chamber clear	<input type="checkbox"/>
Installation meets local codes	<input type="checkbox"/>

Startup and training cannot be carried out until the above items are complete.

Commissioning Checklist (Energenics Use)

Item	Verified
Incoming voltage verified	<input type="checkbox"/>
Control voltage verified	<input type="checkbox"/>
HMI connected and operational	<input type="checkbox"/>
Doors operating properly	<input type="checkbox"/>
Door interlocks functioning	<input type="checkbox"/>
Motion sensor functioning	<input type="checkbox"/>
Emergency stops functioning	<input type="checkbox"/>
Warning lights functioning	<input type="checkbox"/>
UV lamps operating	<input type="checkbox"/>
Cycle timer verified	<input type="checkbox"/>
Alarm functions verified	<input type="checkbox"/>
Test cycle completed	<input type="checkbox"/>
Operator training completed	<input type="checkbox"/>
Maintenance training completed	<input type="checkbox"/>

APPENDIX B – TROUBLESHOOTING GUIDE AND REPLACEMENT PARTS

The following table provides guidance for common system issues, possible causes, and recommended corrective actions.

Problem	Possible Cause	Corrective Action
System will not start	Door open	Close door
System will not start	Emergency stop engaged	Reset E-Stop
System will not start	Motion detected	Ensure chamber is empty and reset
System will not start	Alarm active	Clear alarm on HMI
System will not start	No power	Check disconnect and power supply
Doors will not open/close	No air pressure	Check air supply
Doors will not open/close	Air valve issue	Check solenoid valve
Doors will not open/close	Door obstruction	Remove obstruction
UV lamps do not turn on	Lamp failure	Replace lamp
UV lamps do not turn on	Ballast failure	Replace ballast
UV lamps shut off during cycle	Door opened	Close door and restart
UV lamps shut off during cycle	Motion detected	Reset and restart
HMI screen blank	No power	Check control power
HMI not responding	System fault	Cycle power to control panel
Warning lights not working	Bulb burned out	Replace bulb
Poor disinfection results	Lamps dirty	Clean lamps

Problem	Possible Cause	Corrective Action
Poor disinfection results	Lamps old	Replace lamps
Poor disinfection results	Lacking wash element	Spray/wipe down cart 1st

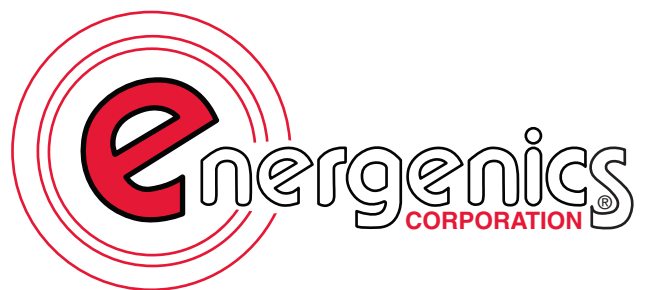
If problems persist, contact Energenics service.

Recommended Replacement/Spare Parts

Energenics recommends the following spare parts be kept on site to minimize downtime:

Part	Recommended Quantity
UV Lamps	2-4
Ballast / Driver	1
Door Interlock Switch	1
PIR Motion Sensor	1
Door Cylinder	1
Solenoid Valve	1
Fuse	2
Warning Light	1
Emergency Stop	1

Use only Energenics-approved replacement parts. Use of non-approved parts may result in improper system operation and may void the system warranty.



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