UV-CUSTOM DISINFECTION SYSTEM

Installation and Operation Manual

Energenics CORPORATION®

ADVANCED ULTRAVIOLET DISINFECTION TECHNOLOGY

energenics.com

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1. PURPOSE

1.1 Manual Purpose

This manual provides installation guidance, operating instructions, safety requirements, and maintenance procedures for the Energenics UV-CUSTOM Cart Disinfection System.

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 working with the system.

1.2 System Purpose

The Energenics UV-CUSTOM Cart Disinfection System is designed to provide targeted Ultraviolet (UV-C) disinfection exposure to carts and other equipment surfaces within a defined treatment space. The system is engineered to deliver a calculated UV dose to exposed surfaces to achieve microbial reduction.

Each Energenics UV-CUSTOM system is custom engineered for the specific installation. Fixture quantity, fixture placement, and cycle time are determined based on the treatment space layout and the farthest distance from the UV-C source to the surfaces being disinfected.

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-CUSTOM Cart Disinfection System uses high-output UV-C lamps arranged within a treatment space commonly referred to as the “chamber.” The system is

designed to disinfect the exposed surfaces of carts and equipment placed within this chamber.

The treatment space may be configured as:

- A fully enclosed room with interlocked doors
- A defined area utilizing interlocked safety curtains
- A room with roll-up doors and interlock sensors
- Other enclosed or controlled-access areas designed to prevent UV exposure outside the treatment space

Each system is designed specifically for the installation site and may vary in fixture quantity, fixture arrangement, and control configuration.

2.2 System Components

A typical Energenics UV-CUSTOM system may include the following components:

- UV-C light fixtures
- Fixture mounting hardware
- Control panel
- Human Machine Interface (HMI) touchscreen
- Door interlock sensors
- Curtain interlock sensors (if applicable)
- PIR motion sensors
- Visual alert lamps
- Audible alarm (if equipped)
- Emergency Stop buttons
- Electrical wiring diagrams
- Fixture layout drawings

Exact components supplied will vary by installation.

2.3 System Operation Summary

The Energenics UV-CUSTOM system operates by exposing carts and equipment surfaces to UV-C light for a specified treatment time. The system includes safety interlocks and sensors to prevent UV exposure to personnel.

Basic operation sequence:

1. Load carts into chamber.
2. Exit chamber and secure entry points.
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 Hazard

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-CUSTOM Cart Disinfection System is designed to operate only when the treatment space is unoccupied. The system includes safety devices to prevent accidental exposure, including:

- Door interlock sensors
- Curtain interlock sensors
- PIR motion sensors
- Emergency Stop buttons
- Visual alert lamps
- Audible alarms (if equipped)

These safety devices must always be operational when the system is in use.

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-CUSTOM system. 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

Personnel performing maintenance or servicing UV equipment should wear appropriate personal protective equipment.

Recommended PPE 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-CUSTOM 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 & BEST PRACTICES

5.1 Important Operating Advisories

The following advisories should be understood before operating the Energenics UV-CUSTOM system:

- The chamber must be clear of personnel before starting a cycle
- Carts must be placed in marked floor locations
- Carts must not touch each other
- Do not overload the chamber

- Doors, curtains, or barriers must be closed before starting cycle
- Alert lamps indicate UV cycle in progress
- Do not enter chamber when alert lamps are illuminated
- Follow all posted warning signage

5.2 Disinfection Performance Advisory

The Energenics UV-CUSTOM system disinfects surfaces using direct UV-C exposure. UV-C light only disinfects surfaces that are directly exposed to the light. Surfaces that are shaded or blocked from the UV light may not receive sufficient UV exposure.

For this reason:

- Proper cart spacing is required
- Carts must be staged per provided site specific drawing
- Chamber layout must not be modified
- Cycle time must not be reduced without approval from Energenics

Improper cart placement or reduced cycle time may result in reduced disinfection performance.

5.3 Custom System Advisory

Each Energenics UV-CUSTOM system is engineered specifically for the installation site. Fixture quantity, fixture placement, and cycle time are determined based on the specific layout and required UV dose.

Do not:

- Move fixtures
- Change cart layout
- Change cycle time
- Modify chamber layout

Without approval from Energenics.

Unauthorized modifications may result in reduced system performance and may void the system warranty.

5.4 Cleaning and Best Practices Advisory

The Energenics UV-CUSTOM Cart Disinfection System is designed to provide disinfection using Ultraviolet (UV-C) light on exposed surfaces. 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 should be followed when ultilizing 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.

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.

6. INSTALLATION – ENERGENICS UV-CUSTOM SYSTEMS (FIELD INSTALLED)

6.1 Installation Responsibility

The Energenics UV-CUSTOM Cart Disinfection System is a field-installed system. Energenics supplies UV fixtures, control components, sensors, and system controls as part of a custom-engineered package. Unless otherwise specified in writing, installation is performed by the end user, the end user's contractor, or a licensed electrician.

Energenics will provide system layout drawings and electrical diagrams showing recommended fixture placement and wiring connections. The installation contractor is responsible for completing the installation in accordance with these drawings and all applicable local electrical and building codes.

The installer is responsible for:

- Mounting UV fixtures per Energenics layout drawings
- Installing the control panel(s)
- Installing the HMI and operator controls
- Installing door sensors, curtain sensors, and safety interlocks
- Installing PIR motion sensors
- Installing visual alert lamps and audible alarms (if supplied)
- Running all electrical conduit and field wiring
- Providing incoming electrical power to the control panel
- Proper grounding of all equipment
- Construction of treatment space walls, doors, or curtains
- Installing floor cart placement markings
- Installing UV warning signage

Energenics is not responsible for improper installation, improper wiring, improper fixture placement, disabled safety devices, or installations that do not follow Energenics drawings.

6.2 Electrical Installation Responsibility

The installing electrician or contractor is responsible for providing and installing all conduit, field wiring, and incoming power connections in accordance with the Energenics electrical drawings and all applicable local and national electrical codes.

Unless otherwise specified in writing, the installing electrician shall bring all branch circuits and control wiring to the designated connection points shown on the Energenics electrical drawings.

Energenics will make final electrical terminations at the UV fixtures and within the control panels unless otherwise specified in writing.

This includes:

- Final connections at UV fixtures
- Final connections within control panels
- Final connections at HMI terminals
- Final connections for sensors and safety devices

The installing electrician is responsible for:

- Running conduit and field wiring
- Providing correct wire type and size
- Labeling wires at both ends
- Providing incoming power connections
- Installing disconnects and overcurrent protection
- Verifying proper voltage prior to Energenics making final connections

Energenics is not responsible for field wiring, conduit installation, incoming power supply, or electrical work performed by others.

All field wiring must be completed prior to Energenics startup or commissioning.

Important: Improper incoming power, incorrect wiring, or failure to follow Energenics electrical drawings may result in equipment damage. Energenics is not responsible for damage caused by improper electrical installation.

6.3 Treatment Space (Chamber) Requirements

The UV treatment space, commonly referred to as the "chamber," must be constructed to prevent UV-C exposure to personnel outside the treatment area during operation.

The chamber may be constructed using:

- Fixed walls and doors
- Interlocked roll-up doors
- Safety curtains with interlock sensors
- Light barriers or other approved safety containment methods

Minimum chamber requirements:

- Entry points must be interlocked with the control system
- Motion sensors must be installed inside the chamber
- Visual alert lamps must be installed at all entry points
- UV hazard warning signage must be posted at all entry points
- The chamber must prevent direct UV light from escaping the treatment area

6.4 UV Fixture Installation

UV fixtures must be installed exactly as shown on the Energenics layout drawings. Fixture placement and orientation are critical to achieving the required UV dose and proper disinfection performance.

Installation guidelines:

- Fixtures shall be securely mounted to structural ceiling or wall supports
- Fixtures must be oriented in the direction shown on the layout drawing
- Maintain specified distances from walls and carts

- Protect fixtures from impact or damage from carts
- Do not install fixtures where exposed to water unless fixtures are rated for wet locations
- All fixtures must be properly grounded
- Do not relocate fixtures without approval from Energenics

Improper fixture placement may result in inadequate disinfection performance.

6.5 Control Panel and HMI Installation

The control panel and HMI serve as the primary operator interface and system control center.

Installation guidelines:

- Control panel should be mounted outside the UV treatment space unless otherwise specified
- HMI should be installed in a location where the operator can start the system without entering the chamber
- Emergency Stop buttons should be located near chamber entry points
- Conduit routing should follow Energenics electrical drawings where possible

6.6 Safety Device Installation

Safety devices are critical to safe system operation and must be installed and tested prior to system startup.

Safety devices may include:

- Door interlock sensors
- Curtain interlock sensors
- PIR motion sensors
- Visual alert lamps
- Audible alarms

- Emergency Stop buttons

The system must not operate if any safety device is not functioning properly.

6.7 Electrical Requirements

All electrical work must be performed by a qualified electrician and must comply with:

- National Electrical Code (NEC)
- Local electrical codes
- Facility electrical standards

Installer responsibilities include:

- Incoming power connection
- Conduit and wiring between all devices
- Control wiring per Energenics electrical diagram
- Grounding of all fixtures and control panels
- Installation of disconnects and overcurrent protection

Refer to Energenics electrical drawings for voltage and amperage requirements.

6.8 Cart Placement Floor Markings

The floor of the treatment space must be marked to indicate cart placement locations as shown on the Energenics layout drawing.

Cart placement markings are required to:

- Maintain spacing between carts
- Prevent carts from touching
- Ensure proper UV exposure to all cart surfaces
- Ensure carts remain within the designed UV treatment footprint

Failure to place carts in the marked locations may result in reduced disinfection performance.

6.9 Installation Verification

After installation is complete, the system must be tested using the Installation & Commissioning Checklist provided in Appendix A of this manual.

The system must not be operated until:

- All components are installed
- All wiring is complete
- All safety devices are operational
- Startup testing has been completed

7. OPERATION – ENERGENICS UV-CUSTOM CART DISINFECTION SYSTEM

7.1 General Operation Overview

The Energenics UV-CUSTOM Cart Disinfection System is designed to disinfect carts and other equipment using Ultraviolet (UV-C) light within a defined treatment space (chamber). The chamber may be a fully enclosed room with interlocked doors or a defined area utilizing interlocked safety curtains or barriers.

The system is designed so that UV lamps cannot operate while personnel are inside the chamber. Safety interlocks, motion sensors, and emergency stop devices are provided to prevent accidental exposure to UV-C light.

The Energenics UV-CUSTOM system is engineered based on the specific layout provided for each installation. Fixture quantity, fixture placement, and cycle time are determined based on the farthest distance from the UV-C source and the required UV dose for the application. For this reason, carts must always be placed in the marked floor locations and the chamber layout must not be modified without approval from Energenics.

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.

7.2 Pre-Operation Safety Check

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

- Chamber is clear of all personnel
- Carts are properly positioned on marked floor locations
- Carts are not touching each other
- Doors, curtains, or barriers are closed and secured
- No alarms are present on the HMI screen
- Emergency Stop buttons are not engaged
- Alert lamps are operational

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

7.3 Load Sequence

To load carts into the UV chamber:

1. Ensure the chamber is ready to receive carts.
2. Open chamber door(s) or entry curtain.
3. Load carts into the chamber.
4. Place carts on the marked floor placement locations.
5. Maintain spacing between carts as shown on the layout drawing.
6. Do not allow carts to touch.
7. Do not overload the chamber beyond the designed cart capacity.
8. Exit the chamber and close doors or curtains.

Proper cart placement is critical to ensure adequate UV exposure to all surfaces.

7.4 Start Sequence

Once carts are loaded and the chamber is secured:

1. Verify chamber is clear of personnel.
2. Verify doors, curtains, or barriers are closed (or programmed with **START**).

3. Press the **START** button on the HMI touchscreen.
4. The system will begin the **Pre-Cycle Countdown Timer**.
5. Visual alert lamps will illuminate indicating the cycle is about to begin.
6. When the countdown reaches zero, the UV lamps will turn on and the disinfection cycle will begin.

Note:
The system will not start if:

- A door sensor is open
- A motion sensor is triggered
- An Emergency Stop is engaged
- A system fault is present

7.5 Disinfection Cycle

During the disinfection cycle:

- UV lamps will operate for the programmed cycle time.
- The remaining cycle time will be displayed on the HMI screen.
- Visual alert lamps will remain illuminated while UV lamps are operating.
- Entry into the chamber during operation will trigger safety interlocks and shut off the UV lamps.

Do not attempt to enter the chamber during the disinfection cycle.

7.6 Cycle Completion

At the end of the disinfection cycle:

1. UV lamps will shut off automatically.
2. The HMI will display the Cycle Complete screen.
3. Doors may automatically unlock or open (if equipped).
4. The operator may enter the chamber and remove carts.

5. After carts are removed, press **RETURN TO HOME SCREEN** on the HMI.

7.7 Reset Sequence

After carts are removed:

1. Press **RETURN TO HOME SCREEN** on the HMI.
2. The system will reset and return to the Home screen.
3. The system is now ready for the next load.

7.8 Treatment Cycle Interruption

If a cycle must be stopped before completion:

1. Press **RESTART CYCLE** on the HMI.
2. UV lamps will shut off immediately.
3. The system will return to the Cycle Completion screen.
4. Press **HOME** to return to the Home screen.
5. Press **START** to begin a new cycle.

8. PROGRAMMING & SYSTEM SETTINGS (HMI)

8.1 Accessing System Settings

To access system settings:

1. From the Home screen, press **SETTINGS**.
2. Enter the system password.
3. Press **ENT** to access the programming screen.

Only authorized personnel should modify system settings.

8.2 Adjustable Settings

The following settings may be adjusted:

- Pre-Cycle Countdown Time
- Disinfection Cycle Time
- Post-Cycle Countdown Time (if enabled)

These settings are adjusted using the up/down arrows on the HMI screen.

The programming screen also displays:

- Total System Hours
- Total Cycle Count
- Lamp Service Hours
- Reset Service Light Button

Important:
The Energenics UV-CUSTOM system is calibrated for optimal performance using factory settings. Modification of cycle times may reduce disinfection effectiveness and should only be done with Energenics approval.

9. ALARMS, SAFETY SHUTDOWNS, AND TROUBLESHOOTING

9.1 Door or Curtain Interlock Activation

If a door or curtain interlock is opened during operation:

- UV lamps shut off immediately
- Cycle is stopped
- Alarm message appears on HMI

To reset:

1. Close door or curtain.
2. Press **HOME** on the HMI.
3. Press **RESET**.
4. Restart cycle.

9.2 Motion Sensor Activation

If motion is detected inside the chamber:

- UV lamps shut off immediately
- Cycle stops
- Alarm message appears

To reset:

1. Ensure chamber is clear.
2. Press **HOME**.
3. Press **RESET**.
4. Restart cycle.

9.3 Emergency Stop (E-Stop)

If an Emergency Stop button is pressed:

- UV lamps shut off immediately
- Cycle terminates
- Doors may unlock (if equipped)

To reset:

1. Disengage Emergency Stop button.
2. Press **HOME**.
3. Press **RESET**.
4. Restart cycle.

9.4 Viewing Alarms

To view system alarms:

1. Press **SETTINGS** on HMI.
2. Navigate to **ALARMS** screen.
3. Active alarms will be displayed.

9.5 Clearing Alarms

After correcting the cause of the alarm:

1. Press **HOME** on alarm screen.
2. Press **RESET**.
3. Return to Home screen.
4. Restart cycle.

10. MAINTENANCE – ENERGENICS UV-CUSTOM SYSTEMS

10.1 General Maintenance Requirements

The Energenics UV-CUSTOM Cart Disinfection System is designed for long service life with minimal maintenance. However, routine inspection and maintenance are required to ensure proper UV output, safe operation, and long equipment life.

Maintenance should be performed by qualified personnel familiar with electrical equipment and UV systems.

Failure to properly maintain the system may result in reduced disinfection performance or unsafe operation.

10.2 Routine Monitoring

Operators and maintenance personnel should routinely monitor the system for the following conditions:

- Damaged or broken UV lamps
- Lamps that are not illuminated during operation (observed by lamp LED indicator)
- Excessive dirt, dust, or residue on lamps
- Damaged fixtures or loose mounting hardware
- Damaged conduit or wiring
- Misaligned or damaged door sensors or curtain interlocks
- Motion sensors not functioning properly

- Alert lamps not functioning
- UV light escaping from the chamber
- Alarm conditions displayed on the HMI

If any unsafe condition is observed, discontinue operation until the issue has been corrected.

10.3 Cleaning UV Lamps and Fixtures

UV lamps must be kept clean to maintain proper UV output. Dust and debris can significantly reduce UV intensity and reduce disinfection effectiveness.

Cleaning Procedure:

1. Turn off system power at the disconnect.
2. Allow lamps to cool before handling.
3. Wipe lamps gently using a soft lint-free cloth.
4. If necessary, use isopropyl alcohol (70%) to remove residue.
5. Do not use abrasive cleaners or rough materials.
6. Do not apply pressure that could break the lamp.
7. Ensure lamps are dry before restoring power.

Lamp cleaning frequency will depend on the environment but should be performed at least monthly or more frequently in dusty environments.

10.4 Quarterly Maintenance

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

- Clean UV lamps and fixtures
- Inspect all fixtures for secure mounting
- Inspect wiring and conduit for damage
- Test door interlock sensors
- Test curtain interlock sensors (if installed)

- Test PIR motion sensors
- Test Emergency Stop buttons
- Verify alert lamps are functioning
- Inspect chamber walls/curtains for UV light leaks
- Clean chamber interior

Maintain a maintenance log documenting inspection dates and any repairs performed.

10.5 Additional Service and Inspection

In addition to routine maintenance, the following components should be inspected periodically and replaced as needed:

- Door safety sensors
- Curtain interlock sensors
- PIR motion sensors
- Ballasts / lamp drivers
- Alert lamps
- Emergency stop buttons
- Wiring connections
- HMI and control components

Contact Energenics for replacement parts and service support.

11. LAMP REPLACEMENT – ENERGENICS UV-CUSTOM SYSTEMS

11.1 UV Lamp Service Life

UV lamps gradually lose UV output over time even though they may still illuminate. For this reason, lamps must be replaced based on service hours rather than lamp failure.

Lamp Replacement Interval:

- Replace lamps at **12,000 service hours** or **7 years**, whichever occurs first.

The HMI displays total lamp service hours and will indicate when lamp service is required.

11.2 Lamp Replacement Safety

UV lamps contain mercury and are fragile. Lamp replacement should be performed by qualified maintenance personnel.

Before replacing lamps:

- Turn off power to the system
- Disconnect power at the main disconnect
- Allow lamps to cool
- Wear gloves and eye protection

11.3 Lamp Replacement Procedure

1. Turn off system power and lock out/tag out power source.
2. Allow lamps to cool completely.
3. Open fixture access cover and unscrew lamp fasteners (if applicable).
4. Carefully remove from lamp holder.
5. Install new lamp of the same type and rating.
6. Avoid touching the glass portion of the lamp with bare hands.
7. Secure lamp fasteners and close fixture access cover (if applicable).
8. Ensure lamp is properly wired.
9. Restore power to the system.
10. Check lamp operation via lamp LED indicator.
11. Reset the **Lamp Service Timer** on the HMI under User Settings.

Only Energenics-approved lamps should be used. Use of non-approved lamps may result in improper system performance and may void the warranty.

11.4 Lamp Disposal

UV lamps contain small amounts of mercury and must be disposed of properly.

- Dispose of lamps at a local recycling center
- Dispose of lamps in accordance with local regulations for fluorescent or CFL lamps
- Do not dispose of lamps in general trash where prohibited

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 mis-applied, 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 RESPONSIBILITY (CUSTOM SYSTEMS)

Installation Responsibility Statement

The Energenics UV-CUSTOM Cart Disinfection System is a field-installed system. Energenics provides UV fixtures, control systems, and layout drawings for installation. Unless otherwise specified in writing, installation is performed by others.

The installing contractor or facility is responsible for:

- Installation of UV fixtures per Energenics layout drawings
- Installation of control panels and HMI
- Installation of safety interlocks and sensors
- Electrical wiring and conduit between all components
- Incoming power supply and disconnects
- Compliance with all local electrical and building codes
- Construction of treatment space (walls, doors, curtains)
- Installation of floor cart placement markings
- Installation of UV warning signage
- Verification of safe operation before use

Energenics is not responsible for system performance or safety issues resulting from improper installation, improper wiring, improper fixture placement, disabled safety devices, or failure to follow installation instructions.

Electrical Termination Responsibility

Energenics may provide final electrical terminations at UV fixtures and within control panels as part of system startup or commissioning. The installing electrician or contractor is responsible for running all conduit and wiring to the designated connection points per Energenics electrical drawings.

All electrical work must comply with local electrical codes. Energenics assumes that all field wiring has been installed correctly and to code prior to making final terminations.

Energenics is not responsible for damage to equipment caused by improper incoming power, incorrect wiring, or failure to follow electrical drawings.

APPENDIX B – INSTALLATION & COMMISSIONING CHECKLIST

Installation Verification Checklist

This checklist should be completed after installation and prior to placing the system into operation.

Verify the following:

- UV fixtures installed per Energenics layout drawing
- Fixtures securely mounted and properly oriented
- Control panel installed and powered
- HMI installed and operational
- Door interlock sensors installed and functioning
- Curtain interlock sensors installed (if applicable)
- PIR motion sensors installed and functioning
- Visual alert lamps installed at entry points
- Emergency Stop buttons installed and functioning
- Electrical wiring completed per Energenics electrical diagram
- Incoming power connected and correct voltage verified
- All components properly grounded
- Floor cart placement markings installed
- UV hazard warning signage installed
- Chamber prevents UV light from escaping treatment area

Startup / Commissioning Test Procedure

Perform the following tests before placing system into operation:

1. Power on system.
2. Verify HMI powers on.
3. Verify alert lamps illuminate during cycle start.
4. Verify system will not start with door or curtain open.

5. Verify motion sensors stop system when triggered.
6. Start test cycle.
7. Verify UV lamps turn on.
8. Open door or trigger sensor to confirm lamps shut off immediately.
9. Reset system.
10. Run full cycle and verify cycle completes properly.
11. Verify countdown timers function correctly.
12. Verify system resets and returns to Home screen.

System is ready for operation after successful completion of all tests.

APPENDIX C – TROUBLESHOOTING 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 and reset system
System will not start	Curtain interlock open	Close curtain and reset system
System will not start	Motion sensor triggered	Ensure chamber is empty and reset
System will not start	Emergency Stop engaged	Reset Emergency Stop
System will not start	Active alarm	Clear alarm on HMI
System will not start	No power to control panel	Check incoming power
UV lamps do not turn on	Cycle not started	Press START on HMI
UV lamps do not turn on	Door or curtain open	Close and reset
UV lamps do not turn on	Motion sensor active	Reset system
UV lamps do not turn on	Ballast failure	Replace ballast
UV lamps do not turn on	Lamp failure	Replace lamp
UV lamps cycle off during operation	Door opened	Close door and restart
UV lamps cycle off during operation	Motion detected	Reset and restart
UV lamps cycle off during operation	Over-temperature (if applicable)	Allow system to cool

Problem	Possible Cause	Corrective Action
HMI screen is blank	No power to HMI	Check control panel power
HMI not responding	System fault	Cycle power to control panel
Alert lamps not working	Bulb burned out	Replace bulb
Alert lamps not working	Wiring issue	Check wiring
Cycle time incorrect	Settings changed	Check programming settings
Poor disinfection results	Lamps dirty	Clean lamps
Poor disinfection results	Lamps old	Replace lamps
Poor disinfection results	Carts not positioned correctly	Use floor markings
Poor disinfection results	Cycle time too short	Increase cycle time
Poor disinfection results	Lacking wash element	Spray/wipe down cart 1st

When to Contact Energenics

Contact Energenics if any of the following occur:

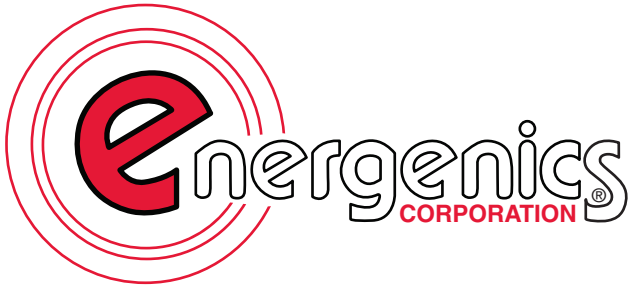
- Repeated lamp failures
- Ballast failures
- Control panel faults
- HMI faults
- Programming issues
- System will not reset
- Safety devices not functioning

Replacement Parts

Use only Energenics-approved replacement parts, including:

- UV lamps
- Ballasts
- Sensors / Switches
- HMI components
- Control components

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



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