Automated Forklift Entryway Sanitizing System

Patented

INSTALLATION AND OPERATION MANUAL

11/8/2024

Installation & Operation Manual:
Automated Forklift Entryway Sanitizing System

Contents

READ ALL INSTRUCTIONS BEFORE ATTEMPTING TO INSTALL AND OPERATE THIS EQUIPMENT

WARNINGS

Read this manual completely before attempting to install or use this system.

- Always wear proper personal protective equipment (PPE's) when installing or servicing this unit.
- Always follow all chemical safety precautions and handling instructions provided by the chemical manufacturer or product Safety Data Sheet (SDS).
- If this unit is modified or serviced with parts not listed in this manual, the unit may not operate correctly and may void any warranty.
- **Chemical Spray Hazard:** Wear splash goggles or glasses when required by chemical manufacturer, SDS, or OSHA when installing or servicing this unit.
- **Magnet Warning (physical injury):**
    - This unit uses very strong magnets. Care must be taken when handling to prevent pinch and other personal injuries. Serious injury can occur to fingers if caught between large magnets. Small magnets can be a choking hazard and should never be swallowed or inserted into any part of the body. Small magnets are considered a choking hazard that can result in death and should be treated as such. Keep all magnets away from animals and children. If a magnet should break gather all small pieces and dispose of accordingly.
- **Magnet Warning (magnetic field):**

    - THIS UNIT CONTAINS MAGNETS THAT MAY BE HARMFUL TO THOSE WEARING A PACEMAKER OR OTHER DEVICE SENSITIVE TO MAGNETS.

INTRODUCTION:

This system is designed to aid in the sanitizing of wheels on forklifts prior to entering and exiting critical control areas, especially where reduced moisture is advantageous. This system has been designed to provide an uninterrupted uniform distribution of sanitizer solution onto the tire tread surface. The application of sanitizer is initiated manually by the operator or by automatic signaling from the controller circuitry, causing the pump to dispense approximately 1.0 ounce of sanitizer evenly split to all nozzles. Any modification or alteration of the system may result in poor performance which may include uneven spray patterns, interrupted spray, or excessive dripping of sanitizer. To avoid these issues, it is highly recommended that only authorized parts or components be used in this system.

SPECIFICATIONS:

Dimensions:	Shipping package size, approximately 12” x 16” x 12”
Shipping Weight:	without sanitizer, approximately 21 lbs.
Pump Capacity:	1 liter per minute @45-55 PSI

Materials of construction of wet components:

Nozzle Check Valve:	Polypropylene, stainless steel, Aflas
Anti-Siphon Valve:	Polypropylene, stainless steel, Silicone
Pump:	Stainless steel, PEEK, Teflon
Tubing:	Polyethylene, UV resistant
Nozzle Body:	Nylon
Nozzle Tip:	Stainless Steel, Brass
Push-Fit Fittings:	Polypropylene, EPDM
Gallon Jug Adapter:	Kynar, Viton
Dip Tubes:	Polyethylene

Serial Number _____ (located on underside of pump cover)

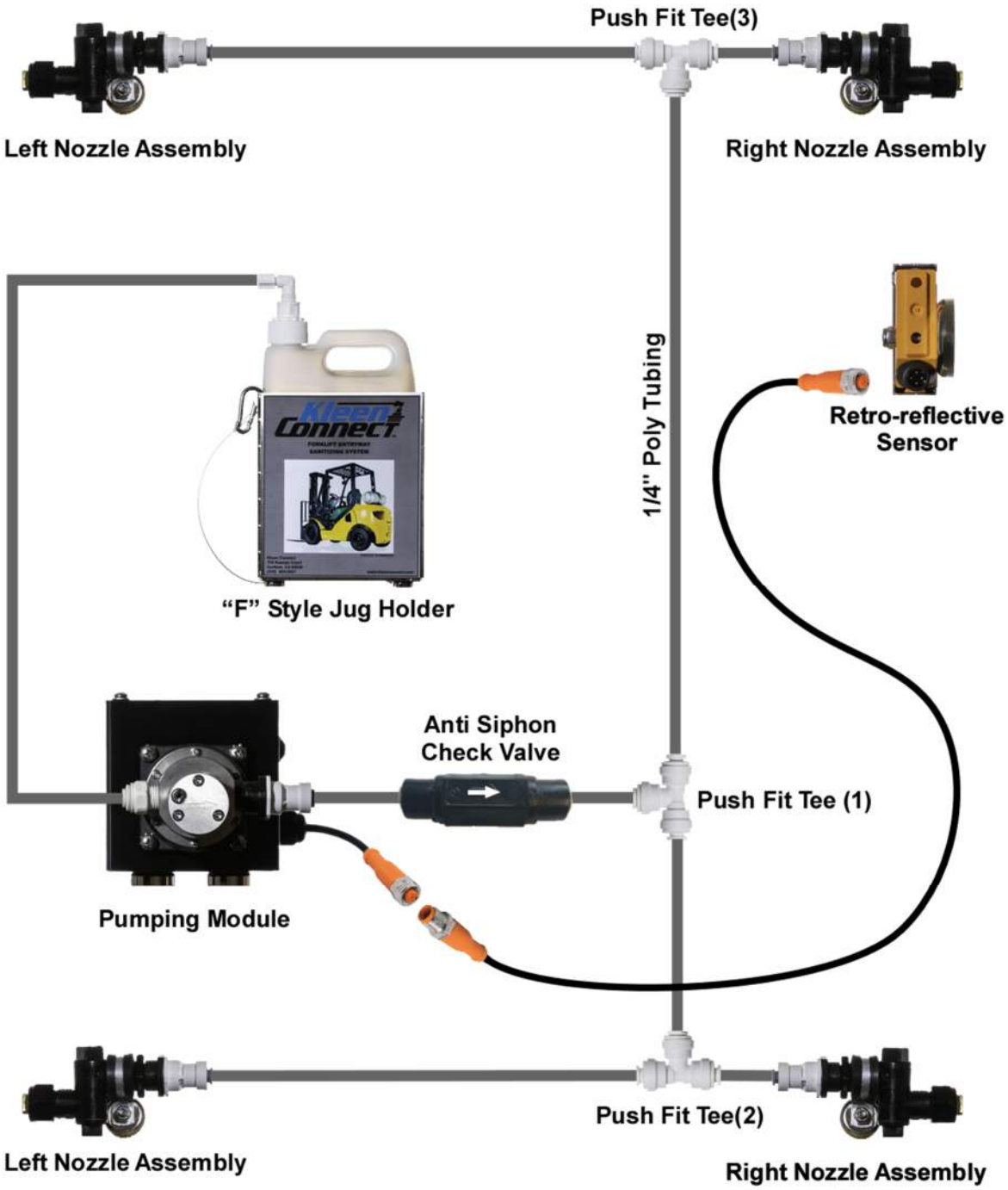
Date purchased / Installed _____

PACKAGE CONTENTS:

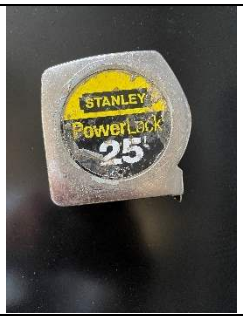
			
(4 ea) Fan Nozzles with Swivel Adapters, Screens, Check Valves, & Magnet Mounts	(3 ea) ¼" Push-Fit Tee Fittings	(1 ea) Gallon Jug Adapter Cap, Push-Fit Tubing Connector	(1 ea) Retro-Relflective Sensor Assembly With Magnet Mount
			
(20 ea) Magnetic Tie Mounts	(25 ea) Small Plastic Cable Ties	(1 ea) Tubing Cutter	(1 ea) Sensor Connector Cable

			
(1 ea) 24 VDC Pumping Module & Controller	(1 ea) Battery Charger (2 ea) 4.0 Ah Batteries	(50 Ft) 1/4" Black PE Tubing	(1 ea) Sanitizer Jug Rack with Magnetic Mounts And Safety Cable Assembly
			
(4 ea) 24" Adhesive Backed Strips Reflective Tape	(1 ea) Large Plastic Cable Tie	(1 ea) Dip Tube Removal Tool (5 ea) Dip Tubes for 1 gallon jug	(1 ea) Anti-Siphon / Anti-Drip Check valve

SYSTEM LAYOUT:



TOOLS NEEDED TO INSTALL:

Adjustable Wrench Used to tighten nozzle bodies and adjust nozzles	
Pliers Used to tighten nozzle bodies and adjust nozzles	
Angle Cutters Used to cut plastic ties	
Tape Measure Used to measure sensor height	
Tubing Cutter (provided) Used to cut tubing	

NOTE
All components of this system are attached to the vehicle with magnets. The only tools needed for installation are an adjustable wrench, pliers, diagonal cutters, tape measure, and the tubing cutter supplied in this kit. The tubing connections are a push-fit style connection which when firmly pushed into the fitting will provide a tight, leak free connection. To release a push-fit style connection, press in on the fitting collar while pulling on the tubing.

INSTALLATION INSTRUCTIONS:

READ ALL INSTRUCTIONS BEFORE INSTALLING THIS EQUIPMENT

1. Unpack the entire contents and inspect to ensure all components shown on page 4 “Package Contents” are included. Open the battery and charger packaging. Place one battery on the charger to begin charging.

2. Review the vehicle this unit will be installed on and determine which location is desired for placement of the one-gallon sanitizer jug rack. The jug rack can be attached by either the bottom mount magnets or the side mount magnets. Keep in mind that the jug rack can be moved to facilitate inspections and maintenance. You may want to identify a location that is the best fit during use, such as inside the ROP upright and another during inspection, such as outside the ROP upright.

Figure 1

Figure 2

3. The jug rack includes a safety cable that prevents the unit from falling to the ground if it is accidentally knocked off the vehicle. This safety cable will need to be attached to the vehicle roughly 18 inches above the jug rack. This will allow about 5 inches of slack in the cable. The safety cable and clip are visible in figures 2 and 3. If you plan to use alternate locations for the jug rack, make sure there is enough slack in the cable to allow movement to each of the alternate locations.

   Attach the clip using the supplied large plastic cable tie. Route the cable tie through the small, closed end of the clip and secure it around the upright or other object (figure 4). Ensure the cable clip gate is easily accessible as the loop end of the cable will need to be removed from the clip each time the jug is replaced.

Figure 3


Figure 4

4. Determine the desired location for the pumping module. Usually behind the operator's seat. Attach the pump by setting the base mounted magnets on a suitable metal surface. Ensure the magnets hold the pump securely in place. Ensure the pumping module will not interfere with seat adjustment or daily/shift inspections. The magnets do allow repositioning for service, but it is advisable to not require repositioning for daily/shift inspections. (Figure 5)


Figure 5

*Note.
If the desired pump module location is non-metallic, a steel plate (not provided) can be attached to the forklift to mount the pump.

5. Determine the location of the photo-electric sensor. The sensor should be placed in a convenient location with the sensor glass pointing away from the forklift, perpendicular to the vehicle's travel path. It should be placed at a height that will be equal to the reflective

tape you will be installing at each entryway/doorway It is recommended to install the sensor on the A pillar (closest to the mast) pointed to the right hand side of the entryway. This will permit the sensor to see the reflective tape upon entry and not on exit. (Figure 6)

Figure 6

6. Connect the sensor cable to the sensor using the M12 connector. Hand tighten only. Do not use tools to tighten the connectors. (Figure 7)

Figure 7

7. Starting with the sensor cable at the sensor, route the sensor cable along the roll cage using the provided magnetic tie mounts and ties. When routing the cable, do not draw the ties up snug yet, as you may need to include the chemical tubing in these ties to attach to the nozzles at the front of the forklift. Once you have routed the sensor cable back to the

location of the pumping module, Lay the remaining cable next to the pumping module and advance to the nozzle locations.

Figure 8

8. Find the positions on the body of the vehicle that will allow the nozzles to point to the tire tread with at least a 2 to 3 inch spacing. If the nozzle is located too close to the tire it will not cover the entire tread surface area. If it is located too far away from the tire it will spray wider than the tire tread surface area and waste sanitizer. Affix the nozzles for all three or four tires, depending on the lift. Have an assistant turn the steering through the complete range of motion while you observe and ensure clearance with the nozzles. Pay attention to anything that might contact the nozzles. Relocate the nozzles if necessary.

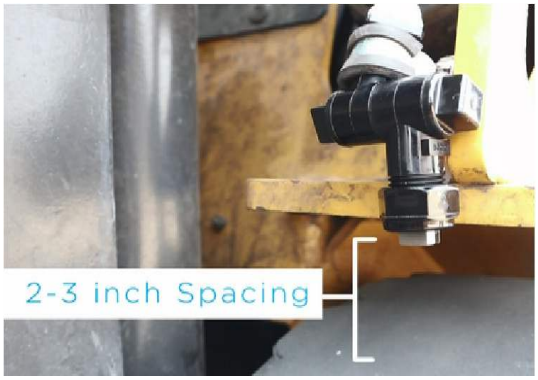


Figure 9

NOTE: The kit comes with nozzle assemblies set for each side of the forklift, (2) left and (2) right. If required, you may remove the clamp from the nozzle assembly and reverse if

needed to properly locate the nozzles. Determine which locations and configurations work best for your installation. (Figures 10 & 11)

Figure 10

Figure 11

Final positions and angles can be adjusted after installation to achieve optimum coverage. The nozzle bodies also provide tilt and swivel adjustment to fine tune the spray location. (Figure 12)

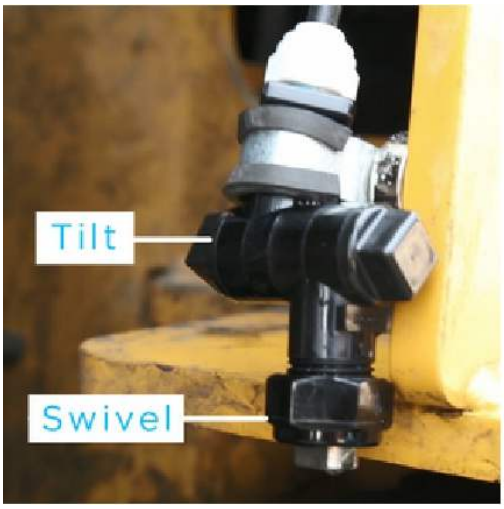


Figure 12

9. With the jug rack, pumping module, and nozzles located, you may now install the chemical tubing. Start by placing a one-gallon container of sanitizer in the jug rack. Unclip the safety cable from the cable clip and route the cable through the handle of the jug and then reattach to the clip. (Figure 13)

Figure 13

Remove the cap from the sanitizer jug and attach the one-gallon adapter cap assembly by pushing down firmly as you turn the adapter clockwise. Insert the ¼" PE tubing into the push-fit fitting on the adapter cap and press firmly until the tubing is fully seated into the fitting. * Note. It is important that the tubing end be cut square and to press it in straight. Do not force the tubing or press at an angle. The tubing should insert approximately 1/2". (Figure 13)

Route the tubing from the one-gallon container to the pumping module and mark the cut location using a piece of tape**.** (The tape from the tubing wrap works well for this) **DO NOT CUT THE TUBING AT THIS POINT.** Lift the engine inspection cover and or seat, depending on your lift design, and ensure that the tubing does not get in the way or become pinched. If this requires temporarily moving the jug rack to an alternate location for inspection, you may move it. Be sure to leave enough extra tubing to allow both locations. (Figure 14)

Figure 14

Now pull the jug rack loose from the vehicle and allow it to be suspended by the safety cable. Ensure that the tubing from the jug to the pump does not get pulled tight or placed under any strain. Allow extra tubing if necessary.

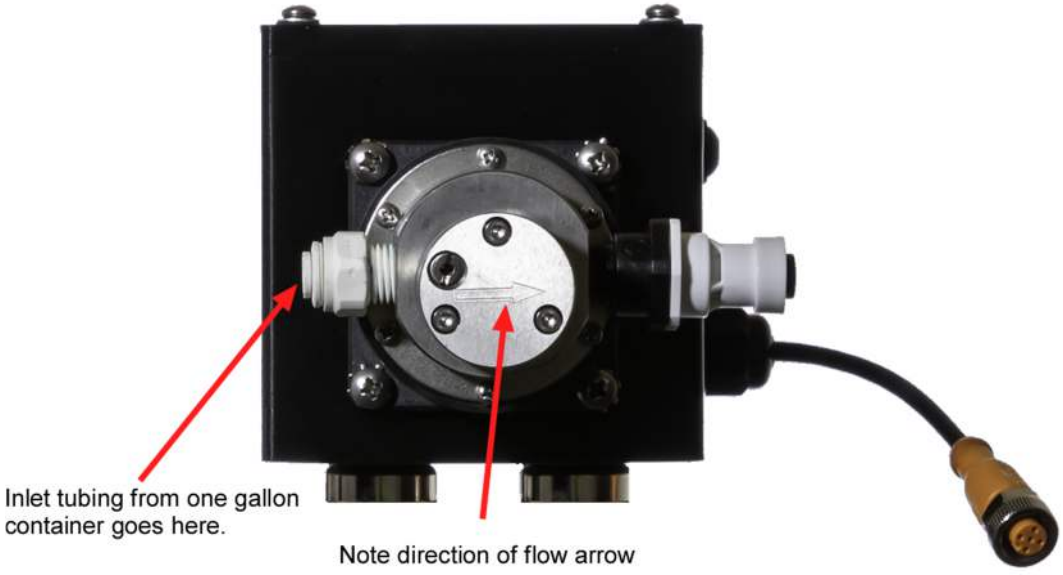

Figure 15

Once you have determined the desired routing for the tubing from the one-gallon jug to the inlet of the pump, you may attach the tubing using several of the magnetic mounts and plastic ties.

SAFE TUBING INSTALLATION QUICK CHECK: Tubing is not kinked, pulled, or pinched…

	With the jug rack in the normal operating position
	With the jug rack in the alternate / maintenance / inspection position.
	When the inspection cover or seat are lifted for maintenance or inspection
	When the one-gallon container is lifted from the jug rack
	When the jug rack and one gallon container are suspended by the safety cable

10. With the tubing properly routed, establish the final correct length from the one-gallon jug to the pumping module inlet push-fit fitting and cut the tubing with the supplied tubing cutter.
Note: The inlet tubing should be connected to the inlet side of the pump as shown below



Install the end of the tubing into the pumping module inlet fitting by pushing in until the tubing is fully seated, just as in step 9. *Note, in all of these push-fit connections, you should feel some resistance when pressing the tubing into the fitting, followed by the tubing engaging into the fitting an additional ½".

11. Install one end of the ¼" tubing roll into the discharge push lock fitting on the pump. (See diagram above). Roll out enough of this tubing to reach the counterweight behind the operator's seat. Cut the tubing with approximately 6" additional tubing. Now position the first of the three push fit tees in a convenient location, typically in the middle of the counterweight area.

This tee splits the flow into two directions, one for the front and one for the rear. Depending on your lift, these outlets will need to be split again to each nozzle previously mounted near each tire. You can shorten the tubing later if desired.

With the first tee in position, determine a convenient location for the anti-siphon check valve somewhere between the pump discharge and the first tee. Install the check valve by cutting the tubing and inserting the ends into the check valve using the same push-fit method. Make sure the direction of flow arrow is pointing away from the pump and toward the first tee.

With the anti-siphon check valve and the first tee installed, install another piece of tubing to one of the open ends of the first tee and plan where the additional tee will be installed to split the spray to each rear wheel. Cut the tubing and install the second tee.

*Note, Reference the System Layout on page 5 for the suggested tee configuration.

Figure 16

12. Next, starting at one of the rear wheel nozzles located on either side of the lift, attach the black ¼" tubing to the spray nozzle push-fit fitting. Route the tubing up the body of the forklift to the location of the second tee installed in the previous step. Be sure to route the tubing so that it is least likely to be damaged, kinked or smashed. Leave a couple inches of extra tubing near the nozzle to allow minor adjustments to the nozzle location. Secure the tubing with the magnetic tie holders and ties (figure 16) and cut the tubing to length. Connect it to either side of the second tee.

Repeat for the rear wheel on the other side and connect to the other end of the second Tee. At this point, the installation of the rear spray nozzles and tubing is complete, and you can now install the tubing for the front nozzles.

13. Starting at the front of the lift, follow the direction you used to install the sensor cable and thread the tubing through the plastic ties that where loosely tied when installing the sensor cable in step 7. Continue to route the tubing and connect it to the remaining open end of the first tee. This should complete the plumbing on the rear of the lift. At this point it is a good idea to again check for interference with inspection covers and/or seat movement. Once you have ensured that the cable and tubing are correctly routed you may tighten the plastic ties to secure both the sensor cable and the tubing. Connect the sensor cable to the pump system using the M12 connector. Hand tighten only. Coil excess cable and tie out of harm's way using the magnet mounts and ties

14. At the front of the forklift, find a location to install the third Tee. Usually between the mast and the front of the forklift body. (Figure 17)

Figure 17

Cut the tubing and install the tee, then use the tubing and the magnetic mounts and plastic ties to route each end of the tee to the front spray nozzles. Connect the front spray nozzles just as you connected the rear nozzles, leaving some slack, if possible, to allow adjustment of the nozzles.

15. Install a fully charged battery pack.

16. Once the installation is complete, walk around and check to make sure all tubing is routed and secured properly. Open and close any engine compartment doors or access covers, slide the seat fully forward and backward, and make sure there are no interferences with tubing or components. (Figure 18) (Figure 19-showing temp relocation of jug rack)

Figure 18

Figure 19

PRIMING THE SYSTEM:

The system is now ready for priming and use. Actuate the pumping module by pushing in on the Prime Button and releasing. Each time the button is pushed the unit will run until it times out. When the nozzles have achieved a spray pattern the priming is complete. Check to make sure there are no leaks at connection points. Make sure all tubing connections have been fully inserted into the push fit style fittings.

***Note,** if the prime button fails to actuate the pump, it is most likely that the photo electric sensor has been inadvertently switched into the wrong mode. To correct this condition, See the section below on setting the photo sensor.

***Note,** if the pump fails to prime after 3 or 4 actuations, disconnect the pump discharge tubing from one of the nozzles or branch tee fittings and place in/over a suitable container. Reattempt to prime the system again until some fluid exits through the disconnected fitting. Once the pump has been primed you may reconnect the tubing to the fitting. This method should only be required upon initial startup with a dry pump or following an extended shutdown where the pump was allowed to completely dry out.

SETTING THE PHOTO SENSOR:

The photo electric sensor should be pre-programmed when received. However, in the event the sensor is not performing properly, ensure it is programmed properly by performing the following:

- Align the sensor so there is no light reflected from the reflective tape.
- First press [OUT off], then [OUT on] on the photo electric sensor.

This will set the sensor in the proper mode and adjust for maximum sensitivity.

Electronic Lock: The photo sensor does have the ability to be electronically locked to prevent unauthorized setting. On delivery, the unit is not locked. To lock or unlock, follow these steps:

- Press [OUT on] **and** [OUT off] simultaneously for 10 seconds. Acknowledgement is indicated by a change of the LED status.

ADJUSTING THE NOZZLES:

Have an assistant press the pump prime button while you observe the spray pattern at each wheel. The goal is to achieve a flat fan spray that covers the entire width of the wheel. (Figure 20) Adjust as required by placing the magnet mount in an alternate location, adjusting the nozzle swivels, or turning the nozzle itself to align with the wheel. Make sure to tighten the nozzle swivel assemblies as well as the caps. You may also trim any excess tubing at this point. If you relocated the nozzles, be sure to re-check for clearance when turning the wheels.

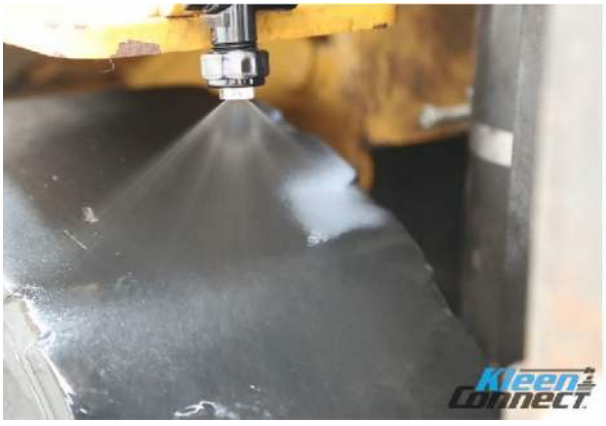


Figure 20

SETTING THE REFLECTIVE STRIPS:

Take the forklift to a location, door opening or entryway area where you want the unit to spray the tires. Note the height and angle of the photo sensor and the desired direction of travel in relation to the sensor. Most installations will call for the reflective tape to be installed on the right side of the entryway to permit operation when entering and not when exiting.

Confirm that this height and angle will work for all desired entryways, then measure and record the centerline height of the sensor. Using this measurement, apply one of the adhesive-backed reflective strips at the appropriate height, such that when the forklift passes the tape, the sensor will receive a reflected beam and activate the pump system. Each provided strip is 24" in length. When installed correctly, the beam height should be near the center of the 24" strip. This will allow some variability between lifts and installations. For optimum beam reflection, the reflective tape and beam should pass at 90° angles relative to each other.

Install additional reflective strips at the same height at each desired door or entryway.

Photo Electric Beam Height _____

Reflective Tape Mounting Height_____ to bottom_____to top of strip.

SETTING THE SPRAY (RUN) TIME:

To check the wheel coverage, have an assistant drive the forklift in a straight line at normal operating speeds, through a doorway fitted with the reflective tape. Observe the spray patterns and coverage on each wheel and determine if the run time will be adequate for your tire size and ensure full coverage of all tread areas.

The spray time (pump run time) is preset on the pumping unit to 3 seconds, providing approximately 1.5oz/application, split between the four nozzles. The speed you are traveling, and the tire size will determine the overall tire coverage. In most cases the average solid tired forklift traveling at moderate speeds of 2-4 mph will not require any adjustment to cover the entire wheel surface. If your condition requires a longer or shorter application, you can adjust the run time of the pumping module in the following manner: remove the battery and the pump cover, then re install the battery. Depress the button displayed below (Figure 22) on the control board and watch the LED readout as it counts up from 1 to your desired setting. Each time the button is depressed it will increase the run time up until it reaches 10 seconds. After 10 seconds it will start again at 1 second.

Figure 22

OPERATING THE SYSTEM:

TO OPERATE THE SYSTEM, PERFORM THE FOLLOWING:

As the operator travels through a door or entryway the sensor signal is reflected back from the reflective tape and the pumping module sprays to cover the surface of the rotating tires with sanitizer. To ensure adequate coverage on steer wheels, all effort should be made to install the system in a location that provides a straight direction of travel during application.

Refill or replace the sanitizer solution as necessary, making sure the container has the appropriate Safety Feed insert installed.

REFILLING THE SANITIZER:

If refilling the sanitizer container, you must remove and replace the safety feed insert. Follow the steps below to remove and replace the insert.

1. Disconnect the Safety Feed adapter cap from the empty sanitizer container.
2. Disconnect the safety cable from the cable clip and remove the F style container from the jug rack.
3. Using the special Safety Feed removal tool, remove the Safety Feed dip tube from the empty container. Center the tee handle tool over the Safety Feed dip tube and turn in a clockwise direction while pushing down on the dip tube. As the tool bites into the dip tube, it will begin to turn. Pull up on the tee handle to remove the Safety Feed dip tube.

The dip tube can be damaged when removed and is typically designed to be disposed of after a few uses. Reusing the dip tube will eventually result in improper pump operation and should be replaced if it begins to cavitate the pump.

4. Refill the one gallon F style container with sanitizer. Sanidate RTU is recommended as it has shown to be compatible with the materials of construction.
5. Reinstall a new Safety Feed dip tube in the container after refilling if required. Simply press a new dip tube assembly into the jug opening until it snaps into place. The disposable dip tubes can be purchased in bags of 25 each.

WARRANTY:

Thank you for your purchase of a Kleen Connect Forklift Entryway Sanitizing System. We have carefully chosen materials to be compatible with most sanitizers and hope this system gives you years of service with minimal maintenance. Your purchase is covered by a limited warranty and replacement parts are available directly from Kleen Connect.

For replacement parts call (530) 895-0521

LIMITED WARRANTY:

This Limited Warranty applies to the physical components, and only for physical components purchased through an authorized Kleen Connect Distributor. This Limited Warranty covers any defects in material or workmanship under normal use during the Warranty Period.

During the Warranty Period, Kleen Connect will repair or replace, at no charge, products or parts of a product that prove defective because of improper material or workmanship, under normal use and maintenance.

The Warranty Period for the Forklift Entryway Sanitizing System purchased from an Authorized Distributor is **12 Months from the date of purchase**. A replacement system or component assumes the remaining warranty of the original Forklift Entryway Sanitizing System.

This Limited Warranty does not cover any problem that is caused by conditions, malfunctions, or damage not resulting from defect in material or workmanship. This includes but is not limited to problems caused by:

- Physical damage, dropping, crushing, or other abuse outside normal operating conditions.
- Improper installation, maintenance, or modifications to the system.
- Contact with wheels or other moving objects such as masts, chains, etc.
- Damage caused by chemical incompatibility.

To obtain warranty service, contact Kleen Connect at (530) 895-0521 to determine the problem and the most appropriate solution for you. Please have the Serial Number of your system available. The Serial Number can be found on the underside of the pumping system lid.

BATTERY USER GUIDE:

The battery pack provided with this system is manufactured by Kobalt. The batteries, charger, and all Kobalt designs & logos are products and registered Trademarks of Kobalt. Kobalt is merely a provider of the battery pack and in no way liable or responsible for the operation of this unit, other than those liabilities and obligations that may come with the purchase of their Kobalt 24 VDC battery and charger. The user guide for the Kobalt 24VDC battery has been reprinted and attached at the end of this manual for reference only. Refer to the complete guide included with the battery pack and/or charger.

This page intentionally left blank……Use it for taking notes during your installation.

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