Graymills

LKN-Series LIFTKLEEN® Parts Washer Aqueous and Solvent Models

Operations and Maintenance Instructions

Be sure anyone operating this unit reads and understands all warnings and instructions. Keep this manual available for reference/training.

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INTRODUCTION

The Graymills LKN Liftkleen is a heavy-duty, multi-function, commercial-type parts cleaner designed for both industrial and automotive applications. It is available for use with either heated aqueous or unheated solvent cleaning solutions.
Standard LKN features include, but are not limited to:

- PLC control
- Automated pneumatic lift platform with oscillation feature
- Automated pneumatic lid operation

A number of optional features are available:

- Roller conveyor platform (instead of standard grate)
- Loading and unloading conveyors

CONSTRUCTION FEATURES

TANK ASSEMBLY

The Liftkleen was designed to withstand the rugged demands of heavy-duty industrial and automotive parts cleaning. All tanks are leak-tested for 24 hours after welding. The bottom of the tank utilizes double wall construction and is supported by four channels. Openings are provided to facilitate moving the Liftkleen with a fork-lift truck. A drain is located in the bottom or rear of the tank to which permanent drain connections can be attached. On all models, the tank sides and cover are insulated with 1" thick polystyrene foam (equal to two-plus inches of fiberglass).

PLATFORM ASSEMBLY

The Platform is designed to handle loads specified for the particular model of Liftkleen. The platform consists of a welded steel frame which supports an open composite grate. The platform assembly is made up of a steel weldment, platform support weldment, support rollers with bearings, hardened steel roller axles, and one or two pneumatic cylinders (depending on the model). Rollers and bearings on all Liftkleen units are located outside the tank and are never immersed in the cleaning solution. This helps keep moving parts lubricated. The standard open composite grate of the platform assembly can be replaced with either a stainless steel grate or roller conveyor platform, both optional.

AUTOMATIC LID ASSEMBLY

On all LKN models, opening and closing the lid is accomplished automatically via pneumatic cylinder(s). Lids, as well as tanks, are insulated on all units. The internal face of the lid is made of stainless steel to eliminate corrosion caused by vapor condensation.

Unheated units contain a temperature sensitive automatic lid-closing feature. In the event of a fire in the tank, the platform assembly lowers and the lid closes automatically.

PNEUMATIC CONTROL

The LKN is furnished with a pneumatic system that raises and lowers the platform, a master on/off valve and a filter/regulator. The agitating lift platform contains air controls that agitate the platform up and down through a range of five inches with a variable frequency of strokes per minute. Stroke frequency depends on load and available air pressure and volume. When available, adjustments to the system should be made under operating load conditions.

All pneumatic tubing connections are made with Instant Fittings. These make it possible to connect and disconnect the tubing to the fittings without the use of a wrench. To disconnect a tube, simply push in the collet and pull the tube from the socket. To engage the tube, push it into the fitting until it hits the stop. Sealing of the connection is achieved with an O-Ring in the fitting.

The air cylinder for raising, lowering and oscillating (agitating) the work platform has pneumatic lines connected to both its "up" and "down" ports. This provides for smooth, positive, controlled motion in both travel directions with minimal dependence on the weight of the work load.

The "down" portion of the air cylinder is controlled by flow control valves and/or speed control mufflers. The speed will vary with the weight of the work load. However, the speed control muffler can be adjusted "in" to slow the downward movement and "out" to speed it up. The advantage of this method is a reduction of air consumption.

Pneumatic schematic included at rear of manual.

PLC CONTROL

PLC controls are standard on all LKN units. This control has been designed to provide the operator with an easy and consistent method of control.

SAFETY WARNINGS

You will find safety information on the following pages and on equipment. The following Safety Statements explain their meaning:

	This is the safety alert symbol. It is used to alert you to potential personal injury hazards. Obey all safety messages that follow this symbol to avoid personal injury or death.
	DANGER indicates a hazardous situation which, if not avoided, will result in death or serious injury.
	WARNING indicates a hazardous situation which, if not avoided, could result in death or serious injury.
	CAUTION, used with the safety alert symbol, indicates a hazardous situation which, if not avoided, could result in minor or moderate injury.
	CAUTION, without the safety alert symbol, is used to address practices not related to personal injury.

GENERAL WARNINGS – READ BEFORE OPERATING

All Models

- **Do NOT use as a cleaning fluid or contaminate cleaning fluid with any flammable materials such as gasoline, mineral spirits or alcohol (under 100°F flashpoint).**
- **Drain parts to be cleaned of any flammable material or combustible material before placing inside cleaning tank. Even small quantities of such unauthorized materials can cause a health and safety hazard which might result in serious personal injury or death.**
- **Be sure to follow label instructions provided with any fluid used in this unit. See MACHINE INSTALLATION Section for recommended cleaning compounds.**

Heated Models

- **Never use a flammable or combustible fluid in this unit. Use only nonflammable, non-combustible, water-based, low foaming cleaning compounds in this machine.**

Unheated Models

- **Do NOT install near open flames or heat.**
- **Do NOT smoke near parts cleaner.**
- **Use only combustible fluids with a flash point of 104°F or higher.**

All Models

- **Never work with equipment you feel may be unsafe. Contact your supervisor immediately if you feel a piece of equipment is in an unsafe condition.**
- **Cleaning solutions may be irritating to skin and eyes. Always wear gloves, apron and safety glasses when using. If splashed in eyes, flush thoroughly with water and follow directions on cleaning solution MSDS.**
- **Install machine in a well ventilated area to avoid possible buildup of cleaning solution fumes.**
- **These units have moving parts, pinch-points and close tolerances. Always stand clear of lift platform and lid when operating as the lid could unexpectedly open or the platform operate. Keep hands and fingers away from tank when operating platform.**
- **DO NOT perform any maintenance work on Liftkleen without having the air shut-off valve in the "Off" position and main air lines to cylinders disconnected. Disconnect electrical power. Follow lock out procedures.**

Heated Models

- **Maximum operating temperature is 180°F. Higher temperatures will cause increased risk of personal injury and damage to the unit. Remember, any temperature above 115°F can cause severe burns.**

Heated Model Warnings Continued…

- **The operator and anyone working in or around the Liftkleen must be cautious of the hot tank contents (cleaning solution, platform, lid, parts, etc.) and of the steam which escapes when the lid opens. Be sure everyone who works in or around the Liftkleen reads and understands how to use the chemicals or compounds being used, as well as the machine.**

⚠CAUTION

All Models

- **When making an initial batch of cleaning solution or when adding compound, follow manufacturer's directions exactly. Wear appropriate safety equipment as recommended. Add only small amounts at one time to prevent a sudden boiling and/or eruption of liquid which will create a hazardous condition. NEVER dump in a large quantity at one time.**
- **If any cleaning solutions are splashed on clothing, change promptly and thoroughly wash any body areas which have been in contact with solution. Apply lotion. Do NOT permit saturated clothing to remain in contact with skin. Consult solution manufacturer's MSDS for further instruction.**
- **When turning air on or off or when operating the lift platform, stay clear of the lid, lift platform and operating mechanism as the lid could unexpectedly open or the platform operate.**

Heated Models

- **Pump intake is above heater coil. Turn heater (an optional feature) and pump (an optional feature) off immediately. Failure to keep heater coil immersed can cause heater to burn out.**
- **Tanks should be cleaned out on a regular basis to prevent sludge from building up around heaters. Failure to do so could result in damage to the heaters. Graymills is not responsible for such damage.**

Unheated Models

- **Unit is equipped with a fusible safety link mechanism. In the event of a fire, the fusible link will melt at 165°F. This will cause the control to lower the platform and close the lid, reducing oxygen supply to the fire. The unit will cease to function until the safety-link has been replaced**

CAUTION

All Models

- **If you have purchased a unit with a carbon steel tank, observe the following before using: Water-based cleaning materials will generate water vapors. Surfaces above the liquid level will be subject to rusting (this condition exists with any manufacturer's unit). This is primarily surface rust and does not appreciably affect the serviceability of the unit. However, if your cleaning requirements cannot tolerate any rust or contamination, please contact the factory for information on stainless steel models before putting the unit into service. Also, be sure your cleaning material contains a rust inhibitor. (Check with your cleaning fluid supplier.) The Graymills Warranty does not cover rusting of carbon steel units used with water-based material.**

Heated Models

- **Either turn heater off or use the 24/7 heater timer when unit is to be idle for extended periods (overnight or weekends). Over time, the cleaning solution could evaporate enough to damage heater coil.**

POWER SUPPLY, WIRING AND GROUNDING

⚠WARNING

- **Failure to permanently ground the unit and controls before connecting to electrical power can cause shock, burns or death. Install ground and wiring according to local and national electrical code requirements.**
- **Unit must be properly grounded to prevent electric shock hazard. Should connections become cracked, frayed or damaged in any way, they should be repaired/replaced immediately by a qualified electrician.**
- **Fill tank to recommended operating capacity range before connecting power to machine.**
- **Install a fused disconnect switch on all power legs connected to the unit.**
- **Disconnect and lockout electrical supply before installing or servicing unit.**

MACHINE INSTALLATION

All Liftkleen models are shipped pre-wired and need only be connected to the proper electrical supply (see nameplate for electrical requirements). This is the responsibility of the customer and should be done by qualified personnel. Graymills is not responsible for any damage caused by incorrect supply wiring.

1. **Install in Well-Ventilated Area on Level Ground**
2. **Secure Floor Mounting**
   Four (4) mounting holes for anchoring the LKN models to the floor are located at the bottom of the base weldment assembly. These holes accommodate 1/2″ diameter bolts. The machine must be anchored to the floor at these points. Failure to adequately anchor the unit will affect its lifting capacity and/or cause structural damage to the machine.
3. **Attach Drain**
   An NPT drain is located on the bottom of the tank assembly. A plug is installed at the factory. To make connections to the drain, remove the plug and install appropriate plumbing. Installing a shut-off valve is recommended.
4. **Fill Tank to Recommended Level**
   Prior to making electrical and pneumatic connections, fill tank of LKN unit with cleaning solution to appropriate levels. **Unheated Units:** The acceptable low liquid level for unheated units is above the pump discharge.
   Heated Units: The acceptable minimum liquid level for a heated unit is a maximum of 15” from the lip of the tank.

   CAUTION

   Any level lower than 15” from the top of the tank will expose the “Hot End” of the heating element(s) and will damage the heater(s).

GRAYMILLS RECOMMENDS THE FOLLOWING CLEANING SOLUTIONS:

General purpose solvents for Unheated Units Only

Solution	Description
Super Agitene®	Flash point of 105°F. Ideal for cleaning of metal, plastics and painted surfaces. Grease, motor oil, cutting oil and water soluble oils are removed with ease. Gummy deposits unaffected by ordinary mineral spirits are readily softened or removed. Contains Hand Ease® a cosmetic-grade lanolin formulation, which replenishes some of the skin’s natural oils removed by solvents. It helps to reduce the chance of irritation and chapping and leaves a protective coating on parts to help retard corrosion, and is a low-odor solvent It should not be used on parts going into a plating or painting process.
Regular Agitene®	Flash point of 105°F. Same high quality cleaning action as Super Agitene, but leaves no film thus making it ideal for cleaning parts to be painted. It will not attack varnish, allowing it to be used on varnish-insulated electrical components.
Super Agitene® 141	Flash point of 141°F. Contains no ingredients listed as hazardous by the EPA’s RCRA. Meets OTC VOC regulations. Has the same attributes as Super Agitene but a higher flash point (141°F) which meets local regulations where use of High Flash Point Solvent is required.

Biodegradeable alkaline (Aqueous) Solutions for any use

Solution	Description
Aquatene® 330	A general purpose concentrated detergent in liquid form. Works most effectively when heated between 140 to 180°F. Ideal for use in free-standing manual systems and immersion type part washers. Removes soft carbon deposits, light coatings, grease, gummy residue, oils, latex paint, light varnishes, rust preventitives.
Super Aquatene® 360	A general purpose concentrated cleaner in liquid form can be used up to 180°F for faster cleaning. Ideal for use in free-standing manual systems and immersion type part washers. Removes all items listed for Aquatene® 330 but also effectively cuts buffing and lapping compounds, hard to remove coatings, water-based inks, oxidized oils and heavy or burned-on varnishes.
Super Aquatene® 390	A heavy-duty, low-foam concentrate. Ideal for steel, cast iron, and other ferrous metals (not for use on non-ferrous metals). Removes most greases, light oils, water soluble inks, hardened composites and loose metal chips. Contains a rust inhibitor. Heat to maximum of 150°F.
Aquatene® 571	Specially formulated for cleaning aluminum and non-ferrous metals. Use heated to 180°F.

5. **Pneumatic Supply**
   All LKN units are supplied with a Filter-Regulator (FR) with a master on/off valve. For optimal performance, connect the largest air supply line available to the inlet of the FR next to the master on/off valve.

   CAUTION

   When supplying air to the machine, do not use an air supply smaller than that of the machine’s FR. The FR of each machine is chosen with respect to the working requirements of the machine. Using a lesser air supply could cause the machine to underperform and/or malfunction.

The pressure regulator is adjustable between 60-110 PSI. The recommended operating air pressure for LKN units is between 90-100 PSI for optimal performance. Operating below the recommended pressure greatly reduces machine functionality. Do not use air pressure greater than 110 PSI. A pressure gauge is provided on the FR.

6. **Electric Supply**

All electrical connections to LKN units are made to the main control box located on the right side of the machine (from the front) and are clearly marked. Regardless of voltage, all connections must be made to the rotary disconnect on the rear of the control box. Voltage requirements will be displayed above the rotary disconnect on the outside of the enclosure as well as on the machine nameplate.

Check the electrical specifications on the nameplate to assure proper connections.

On 3-phase models equipped with a Superflo pump, make sure that the motor rotation is correct; counter clockwise when viewed from the top. To reverse rotation, switch any two of the 3 phase leads.

MACHINE STARTUP

On Start-up: All Units

If there is insufficient pressure in the pneumatic system of the Liftkleen parts washer, the "Reset" button must be used to recover the unit to the "Ready" position. Press and hold the button until the lid begins to open. The lid will open, the rack will rise to the top of its travel, and the "Ready" light will illuminate.

Fault recovery: All Units

The "Reset" button is also used to recover from a fault condition (i.e. the activation of the emergency stop button). If you find that the up/down lift controls are unresponsive, check that that emergency stop button is pulled out, and press the reset button. If the machine does not begin to move to the "Ready" position, further troubleshooting is required. (No timed fault timers)

Up/Down: All Units

Hold the Up/Down switch to command the rack to move in the corresponding direction.

Down: As the rack descends past the upper cylinder sensor, the lid will automatically close. If the switch is released at this point, the rack will continue descending until it reaches the lower cylinder sensor, at which point it will reverse direction and begin oscillating. If instead the down switch is held until the rack is past the lower cylinder sensor, the rack will remain stationary at the bottom of its travel for "soak" functionality.

Up: from either the oscillating or stationary rack position, holding up will command the rack to rise. At the upper cylinder sensor, the rack will pause as the lid opens. Once the lid has fully opened, the rack will continue to rise to the top of its travel provided the Up switch is still being held.

Pump Operation: Optional

If this unit was purchased with an optional pump, pressing the green "ON" button will turn on the pump, agitating the fluid in the tank. To turn pump off, press the red "OFF" button.

Heat: Heated Units Only

To enable temperature control via the control inside the control box, press the green "ON" button to enable heat. Pressing the "ON" button will not turn the heaters on continuously. It will allow power to be applied to the heaters only when the temperature control allows. To disable machine heat, press the red "OFF" button.

Temperature Control Setting: Heated Units Only

To avoid tampering, the temperature control is located inside the main electrical control enclosure.

Exercise caution when setting the temperature control as control voltage will be on.

1. **Push Emergency Stop** to turn off the MCR. With the MCR off, only control voltage will be available to the control.
2. Open control enclosure and look for the temperature control, located in the lower-left corner. The control is blue and gray with 3 buttons and an LED screen.
3. To start programming, press the **SET** key once to access the Farenheit/Celcius mode. Graymills recommends leaving the control in Farenheit mode.
4. Press the **SET** key again to access the setpoint. The LCD will display the current setpoint and the **S1** annunciator will be blinking on and off to indicate that the control is in the setpoint mode. Use the arrow keys to increase or decrease the setpoint to the desired temperature. **DO NOT EXCEED A SETPOINT OF 180°F – This will void the warranty of the LKN.**

5. Press the **SET** key again to access the differential. The LCD will display the current differential and the **DIF 1** annunciator will be blinking on and off to indicate that the control is in the differential mode. Use the arrow keys to increase or decrease the differential to the desired temperature. Graymills recommends a differential setting of 10 degrees.
6. Press the **SET** key again to access cooling or heating mode. The LCD should display **H1** for heating mode. If not, use the arrow keys to set the mode to **H1**. Press the **SET** key again to finish programming.
7. Close control enclosure and pull out Emergency Stop button.
8. Press RESET twice to return machine to "READY" status.

LKN DIMENSIONS AND SPECIFICATIONS*

		Standard Models**				
		Series LKN36	**Series LKN48**	**Series LKN60**	**Series LKDN60**	**Series LKDN72**
Maximum Load Capacity	**Standard**	550 lbs.	450 lbs.	700 lbs.	700 lbs.	700 lbs.
	Heavy-Duty* **	980 lbs.	880 lbs.	1,850 lbs.	1,850 lbs	1,750 lbs.
Overall Machine	**Left to Right (W)**	54 ½"	66 ½"	78 ½"	78 ½"	88"
	Front to Back (L)	45"	57"	57"	57"	63"
	Height	76"	76"	76"	96"	96"
Tank Outside	**Left to Right (W)**	42 ½"	54 ½"	66 ½"	66 ½"	78 ½"
	Front to Back (L)	45"	57"	57"	57"	63"
	Top to Floor	51"	41"	41"	51"	51"
Tank Inside	**Left to Right (W)**	40"	52"	64"	64"	76"
	Front to Back (L)	34 ½"	46 ½"	46 ½"	46 ½"	52 ½"
	Total Depth	35"	35"	35"	45"	45"
	Liquid Depth	27"	27"	27"	37"	37"
	Volume	170 Gallons	290 Gallons	355 Gallons	491 Gallons	667 Gallons
Lift Platform	**Left to Right (W)**	36"	48"	60"	60"	72"
	Front to Back (L)	24"	36"	36"	36"	42"
	Maximum Part Height	20"	20"	20"	30"	30"

* Dimensions and specifications are approximate and are subject to change
** Custom units available. Contact Graymills for more information
*** Greater capacity units available. Contact Graymills for more information

MAINTENANCE

⚠ DANGER

Follow all Lock Out procedures before performing any service or maintenance.

Lock-Out Procedures

- When performing any maintenance tasks on the Liftkleen be sure that the master on/off air line valve is in the "Off" position.
- Disconnect the main air supply to the rack and/or lid cylinders to remove residual air pressure.
- Turn electric power to machine "Off" at main disconnect.

Lubrication

- Lubricate the lift channels or roller track with machinery grade grease. It is recommended that this lubrication be done at least every month.
- Lubricate the lid hinges by oiling with light machinery oil (SAE 30W or equivalent). This should be done every month. This includes the lid hinges and the lid opening mechanism. Entire lid mechanism should be inspected for wear, especially hinges and bolt attaching lift to cover.

Pneumatic System

- The FR unit on the side of LKN must be checked at least weekly. The moisture in the filter bowl is drained by opening the drain valve at the bottom of the unit. This is especially important during hot weather and may require more frequent attention.
- The pressure regulator is adjustable between 60-110 PSI. Remember, the unit's lifting capacity changes as the air pressure goes up and down. Recommended pressure is 90 - 100 PSI.

Note: The cylinder design is self-lubricating. A Filter-Regulator-Lubricator is not required; a Filter-Regulator is sufficient.

WARRANTY

Graymills Corporation warrants that equipment manufactured and delivered hereunder when properly installed and maintained shall be free from defects in workmanship.

This warranty does not apply to damages or defects caused by operator carelessness, misuse, abuse, improper application, or abnormal use; the use of add-on parts or equipment which damages or impairs the proper function of the unit and modifications made by Buyer.

Graymills' obligation under this warranty shall be limited to:

1. Replacing or repairing tank and structural parts within one year from the date of installation or 13 months from the date of shipment whichever occurs first. The decision to replace rather than repair shall be made by **Graymills Corporation;**
2. Replacing or repairing components supplied by but not manufactured by **Graymills,** such as pneumatic cylinders, controls, pneumatic systems, motors, heater controls and heaters to the extent such components are warranted by the original manufacturer's warranty, provided that Buyer gives **Graymills** prompt notice of any defect or failure and satisfactory proof thereof.

Before **Graymills** can repair or replace a defective part under warranty, call **Graymills** for a Return Merchandise Authorization number (RMA number must appear on outside of package or it will be refused and returned). Upon prepaid return to **Graymills'** factory, **Graymills'** examination must disclose such part to be defective.

This warranty does **not** apply to expendable parts such as rollers, bearings, cylinder packings and any other parts which need replacement periodically due to normal wear nor to rusting of a mild steel heated unit used with aqueous (water) based cleaning solutions. A new warranty period shall not be established for repaired or replaced materials, or products. Such items shall remain under warranty for only the remainder of the warranty period of the original materials or products. **Graymills** warrants that the equipment will function mechanically as quoted in the published specification. **Graymills** does not warrant process performance nor does **Graymills** assume liability for equipment selection, adaption or installation.

The foregoing warranties are in lieu of all other warranties whether oral, written, expressed, implied or statutory. Implied warranties of fitness for a particular purpose and merchantability shall not apply. **Graymills'** warranty obligations and Buyer's remedies thereunder (except as to title) are solely and exclusively as stated herein. In no case will **Graymills** be liable for consequential damages, loss of production or any other loss incurred because of interruption of service.