



DC Operated



**Microflush[®] Half
Gallon Toilets**

**Models LF-220,
LF-229 & LF-320**

**Installation/
Service Manual
P/N 24323**



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Thank You!

Thank you for purchasing a Microphor® product. Please read this manual completely prior to installation of your Microflush® toilet. Microphor General Terms and Conditions Covering Sales apply.

Customer Service

If you have any questions concerning your Microphor® product, please contact us:

8:AM-5:PM PST Monday-Friday
 Tel: (800) 358-8280 or (707) 459-5563
 Fax: (707) 459-6617, 24 hour
 Website: www.microphor.com

Patents

Microflush® toilets are covered by one or more of the following U.S. patents:
 5,245,710; 6,875,353 and related foreign patents.

Changes in Design

Continuing a policy of research and development, Microphor reserves the right of price, product or design change without notice or obligation.

Cautions

Do Not Use products containing petroleum distillates or formaldehyde on any rubber parts.

Use only Silicone Lubricants!

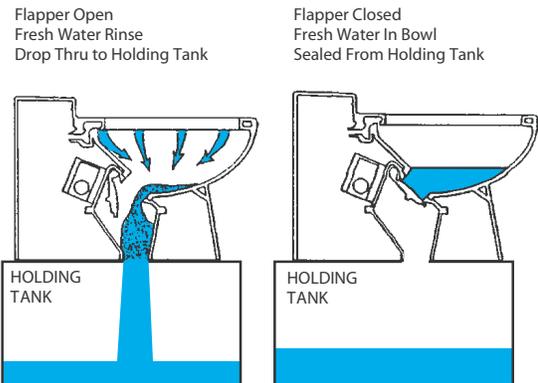
Do Not Use any "Loctite" brand adhesive on any plastic or Delrin components as fumes will cause damage to plastic parts. System vacuum breaker is not intended to be pressurized longer than a normal flushing cycle.

Flush Cycle Operation

The Model LF-220, LF-229 & LF-320 Microflush® Toilets are electrically operated drop-through type toilet using approximately two quarts of water per flush. Wastewater is flushed from the bowl through a Hopper and drops directly into a holding tank. A Flapper valve at the bottom of the bowl holds fresh water in the bowl and seals out odors from the holding tank.

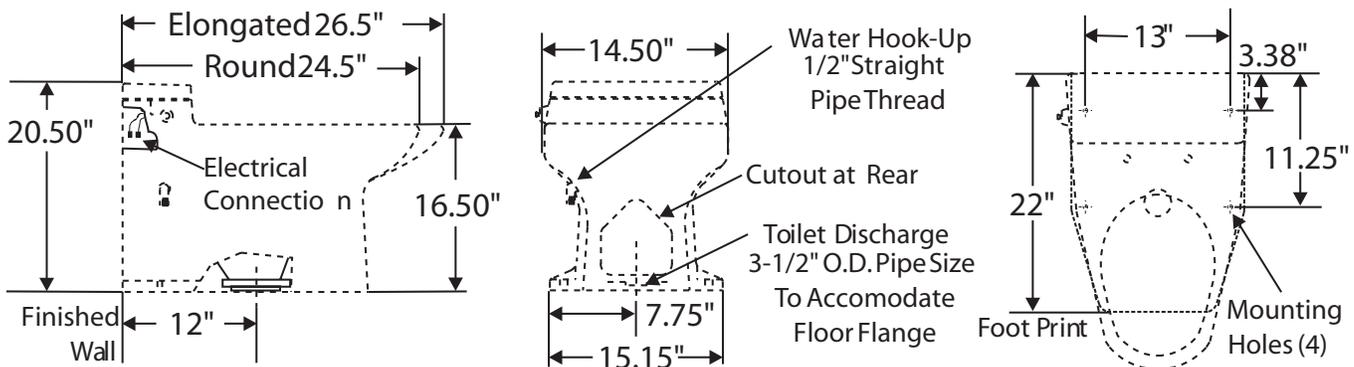
1. When the flush activator is operated, a motor-driven cam begins to turn which opens the Flapper valve at the bottom of the bowl, allowing the wastewater to flow down into a holding tank. Simultaneously, the water solenoid valve opens, allowing fresh water to flow from the rim and rinse the bowl. The cam continues to turn and the Flapper will close again after approximately 4-5 seconds.
2. After the Flapper has closed, fresh water continues to enter the bowl to a predetermined level until the Timer closes the solenoid valve. An adjustment on the Timer allows adjustment of the water level in the bowl to compensate for water pressure fluctuations. A vacuum breaker is provided as an anti-siphon device.

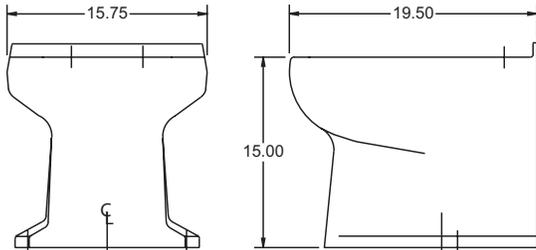
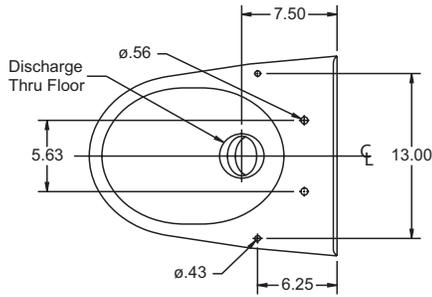
12 Volt DC Drop Thru Toilet Operation



Model LF-220 Downward Discharge (All dimensions +/- 0.5")

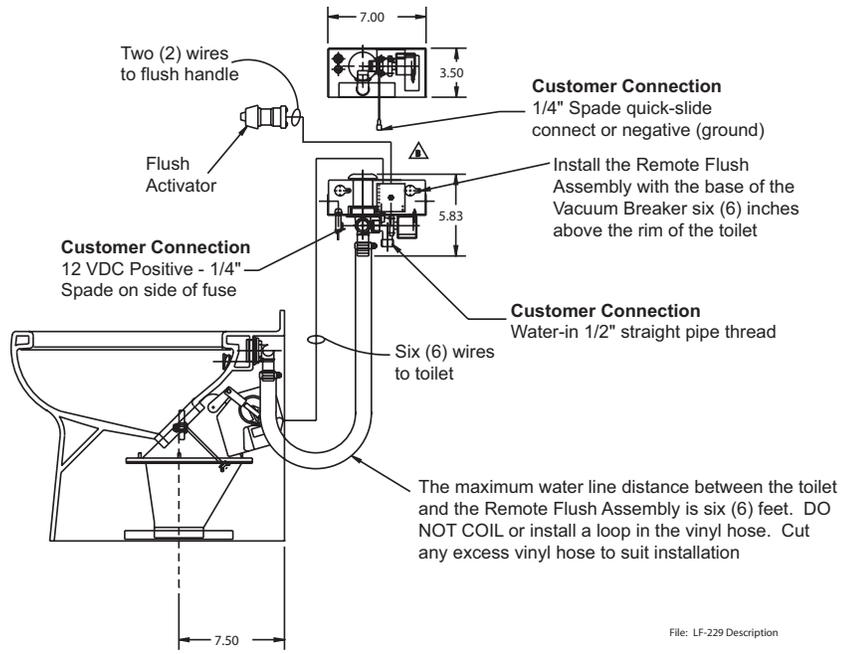
File: LF-220 SPEC



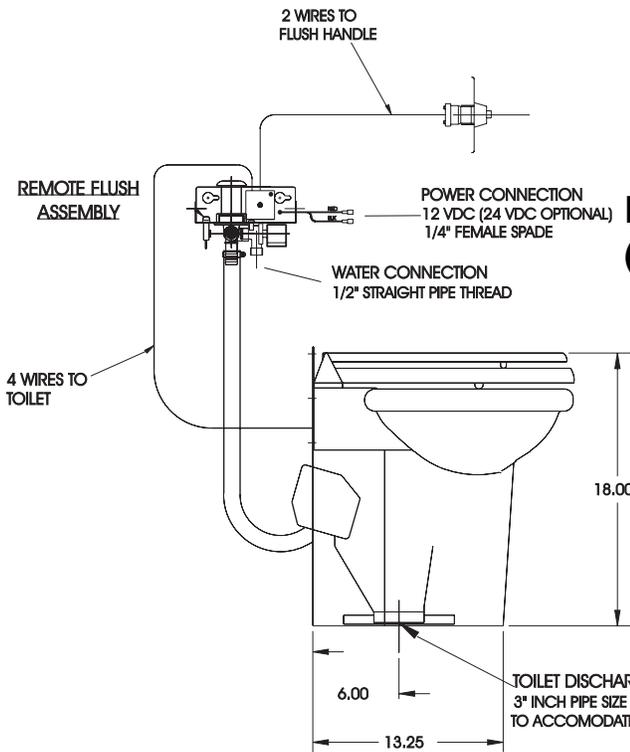


**LF-229 Rough-In Dimensions
(All dimensions +/- 0.5")**

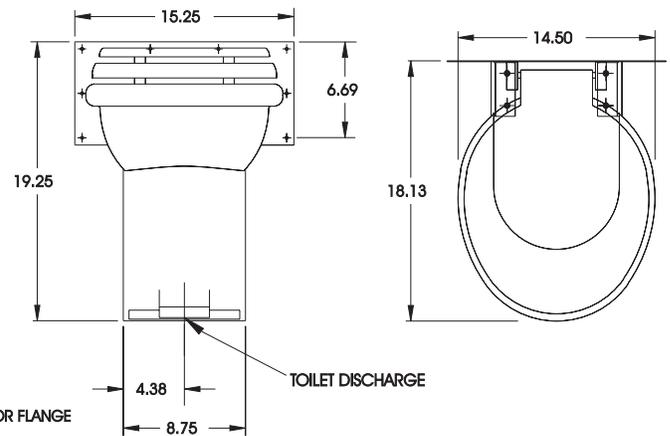
LF-229 Description



File: LF-229 Description



**LF-320 System Layout Rough-In Dimensions
(All dimensions +/- 0.5")**



Gh:IMG:BAE:Vhi .d

Installation - Ceramic

Refer to Rough-In Dimensions

Note: This toilet is a drop-thru unit. No horizontal waste line runs may be utilized. Contact the factory for specific application data.

Mounting Toilet - Ceramic Toilets

Turn toilet upside-down and place enclosed Wax Ring (P/N 27208), onto the bottom of mounting flange of the toilet hopper. Carefully turn toilet right-side up and place over the center of a standard floor discharge flange. Press toilet down firmly and evenly to form a seal between the wax ring and the floor flange. Mount the toilet to the floor.

Mounting Toilet - Stainless

Pre-Installation Set-Up:

1. Remove the two (2) toilet side panels.
2. Attach one end of the 3/4" vinyl hose to the water nozzle, located at the back of the bowl, using a hose clamp.

Toilet Installation - Stainless

1. Position the back of the toilet near the wall and run the 3/4" vinyl hose through the wall. Next, center the toilet over the discharge hole in the floor, aligning the hopper discharge port with the discharge hole in the floor. Secure the toilet to the floor at the hold down brackets (7/16" x 3/4" maximum). Mounting bolts are not provided.
2. Mount the remote solenoid valve assembly on the back of the wall near the toilet. Attach the other end of the 3/4" vinyl hose (72" length) from the water nozzle to the 90° elbow on the remote solenoid valve assembly. Secure the vinyl hose using a hose clamp.
3. Push one end of the 1/8" vinyl tube onto the 1/8" barb connector located on the side of the 90° elbow of the solenoid valve assembly. On the left side of the toilet, push the other end of the 1/8" vinyl tube onto the 1/8" barb connector located on top of the hopper elbow.

NOTE: Make sure to make a loop with the 1/8" vinyl tubing to form a water trap.

4. Timer Systems: Disconnect the two (2) yellow wires from the flush button. Cut a 1-1/2" (min.) Hole in the wall to allow the flush button switch to pass through the wall. Mount the plate to the wall with two (2) 3/8" diameter (max.) screws (not provided). Re-connect the two (2) yellow wires to the 3/16" spade connectors on the back of the flush button.
Pre-Set Systems: The two wires to the flush button are black and red.
5. Timer Systems: On the right side of the toilet, connect the two (2) violet colored wires from the timing assembly to the limit switch located on the right side of the hopper.
Pre-Set Systems: The two (2) wires to the limit switch are black and red.
6. Timer System: On the left side of the toilet, connect the red wire from the timing assembly to the positive (+) red spade (3/16") on the motor located on the right side of the hopper. Connect the negative (-) white wire from the timing assembly to the other 3/16" spade of the motor. Pre-Set System: The two (2) wires to the motor are black negative (-) and red positive (+).

Electrical Connection

See Rough-In Dimensions and Exploded View.

Connect 12 volt DC power source to the insulated .25" spade connector near the Timer and Thermal Circuit Breaker: red wire to positive (+), black wire to negative (-).

Pre-Set System: Connect your incoming positive (+) 12VDC wire to the 1/4" male spade connector on the red (+) wire from the thermal breaker. Connect your incoming negative (-) 12VDC wire to 1/4" male spade connector on the black wire from the thermal breaker/timing assembly.

Water Connection - Ceramic

See Rough-In Dimensions.

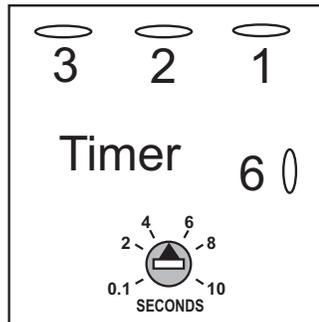
Connect fresh water from an angle stop to the 1/2" threaded water supply connection on the side of the bowl installing Filter Screen (P/N 29146). Take care not to cross the threads. **Incoming water pressure must be between 20-50 PSI, with a minimum flow rate of 2.5 GPM at the toilet. Ideal water pressure is 35 PSI at the toilet.** Be sure water lines are free of debris before connecting water supply to toilet. Water supply to the toilet is to be 1/2" OD plumbed directly to the toilet. Do not install filter(s) in the toilet water supply line.

Water Level

The normal water level is factory pre-set to the top of the Flapper.

Water Level Adjustment

Locate the timer on the bracket under the china lid. Turn Timer adjustment knob clockwise to increase water level, and counterclockwise to decrease. Do not turn past stops.



Seat Installation - Ceramic Toilets

Place the seat over the bowl opening, so that the mounting hinges on the seat align with the two holes in the bowl just behind the bowl opening. Insert the two seat mounting screws provided with the seat into the hinges' holes and mounting holes in the bowl, from the top. Install washers and mounting nuts provided with the seat, from underneath, and tighten firmly. Install screw head cover tabs or other hardware provided with the seat, per seat manufacturer's instructions.

Maintenance

If the toilet is to be out of service for a period of time, spray 100% silicone on the flapper seal when the flapper is open to prevent it from becoming dry.

Winterizing

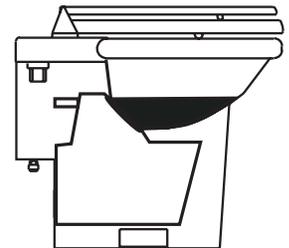
Shut OFF water to toilet. Flush toilet three times or until water no longer flows into the bowl. Unhook water supply at angle stop. Empty water in line into receptacle.

Water Connection - Stainless

Clean incoming water line of any debris prior to connecting to the toilet. Connect your incoming water supply line from the fresh water tank through an angle stop valve to the straight 3/4" hose barb located on the solenoid valve. Incoming water pressure must be between 20-50 psi, with a minimum flow rate of 2.5 GPM at the toilet for pressure systems. The ideal water pressure is 35 psi at the toilet. Be sure water lines are free of debris before connecting water supply to toilet. Do not install filter(s) in the toilet water supply line.

Water Level

The normal water level is factory pre-set to the top of the flapper.



File: 320 water level

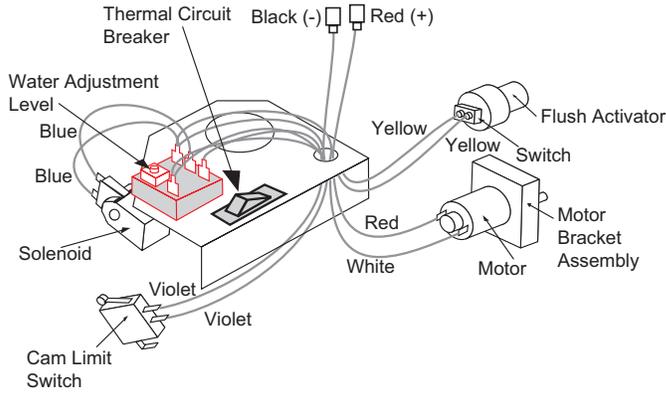
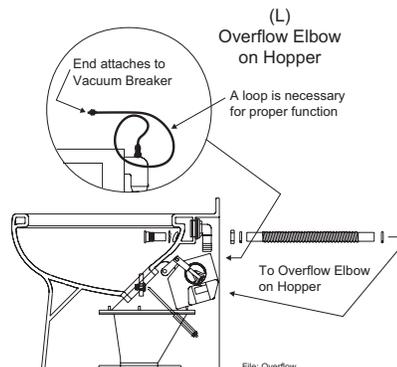
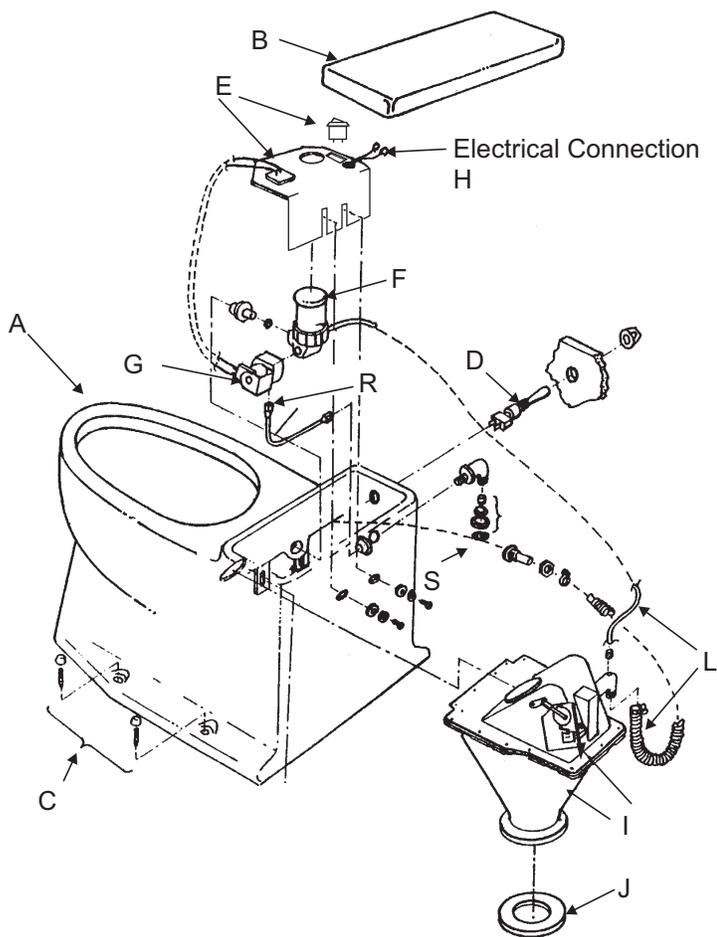
Water Level Adjustment

Locate the timer on the bracket under the china lid. Turn Timer adjustment knob clockwise to increase water level, and counterclockwise to decrease. Do not turn past stops.

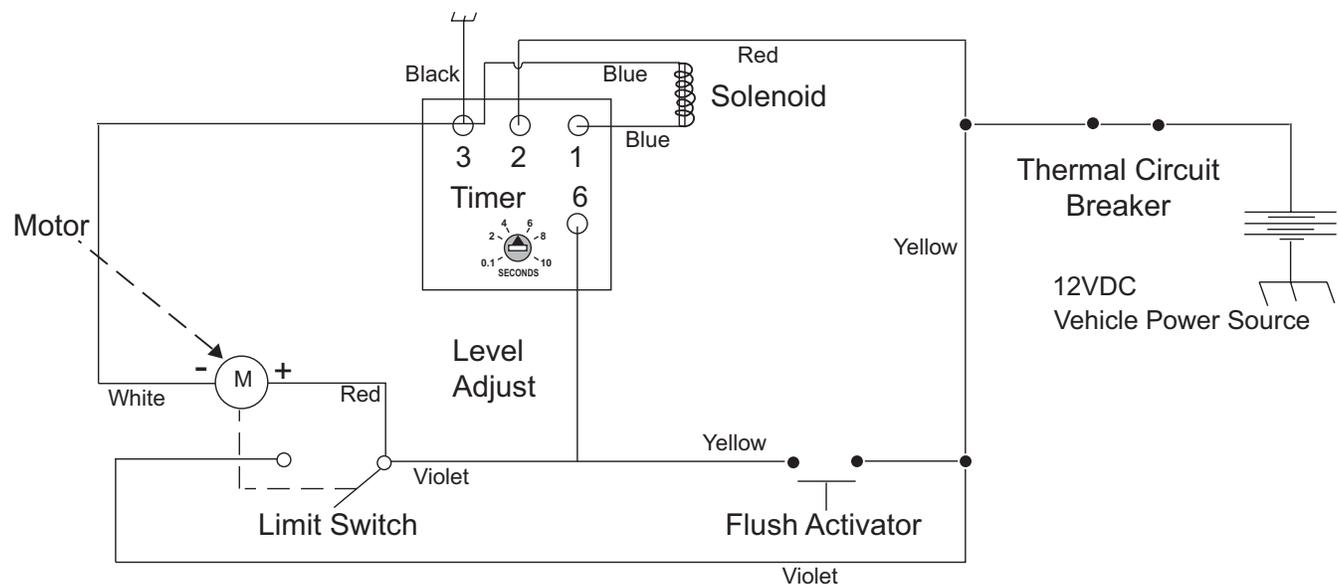
Circuit Breaker Switch allows power to be turned off to service toilet.

Ordering and Factory Assistance

For assistance with procedures not covered in this manual, or to order spare or replacement parts, please call toll free 800-358-8280, 8:00 a.m. to 5:00 p.m. PST, and ask for Commercial Products Division Customer Service.



File: 220-Exp



Parts Chart

		LF-220/LF-229	LF-320	
PART		P/N	P/N	
A	Bowl - state color	Call	Call	
B	Lid - state color	Call	Call	
C	Mounting Bolts - state color	Call	Call	
D	Flush Activator	Complete Assembly	95104	95104
		Switch	41983	41983
		Mounting Nut	00098	00098
		O-Ring	27232	27232
E	Timer Assembly	Timer	89142*	89142*
		Thermal Circuit Breaker Switch	42042	42042
F	Vacuum Breaker Assembly	see <i>Vacuum Breaker Service</i>	33540	
G	Solenoid Valve Assembly	see <i>Solenoid Valve Cleaning</i>	89134-3	48204 Gravity
				48277 Pressure
H	Mounting Bracket	91022		
I	Hopper Assembly see <i>Hopper</i> see <i>Flapper Adjustment</i>	Hopper Assembly without Motor	90073	
		Hopper Assembly with Motor Assembly	90069	
	Motor Assembly see <i>Flapper Adjustment</i> see <i>Clevis exploded view</i> see <i>Wiring Schematic</i>	Motor	41981	41981
		Cam with Set Screw	91865*	91865*
		Motor with Bracker Assembly	99086	99086
		Limit Switch	41982*	41982*
J	Floor Seal	Wax Ring	27208	27208
		Odor Shutter		40052-3
K	Water Supply Tube	Complete Assembly	96012	
		Elbow	96387	
L	Overflow Assembly	96385		
S	Water Filter Screen	92060	92060	
	Water Nozzle		33579	
K I T S	Flapper Replacement Kit	90066-3*	90066-3*	
	Hopper Adapter Kit	24770-3		
	Solenoid Valve Service Kit	40037*	40037*	
	Vacuum Breaker Service Kit	95037*	95037*	
	Silicone Lubricant	26856	26856	
	Master Service Kit	94175	94175	

*Items shown with asterisk are in Master Service Kit, P/N 94175

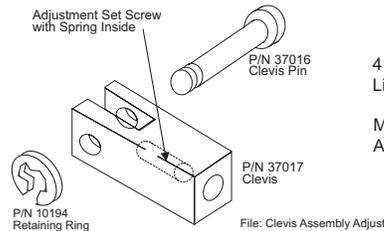
Service Procedures

Before performing any service procedures, turn off water and electrical power to

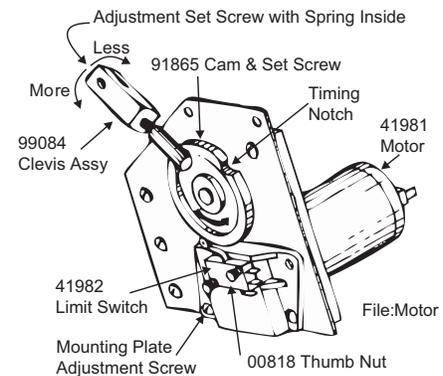
Flapper Adjustment

Flapper Replacement Kit, P/N 90066-3

1. Remove toilet from floor. Locate flapper operating linkage on the side of the hopper.
2. Remove the clevis pin retaining ring. Remove clevis pin.
3. Adjust as necessary by turning the 3/8" set screw inside the clevis as required, then replace the clevis pin and retaining ring. Turn clockwise to increase flapper seal tension, counterclockwise to decrease. Inspect the crank arm, clevis and clevis pin for wear; replace if required. Do not turn bolt more than three (3) complete turns.



Flapper Adjustment



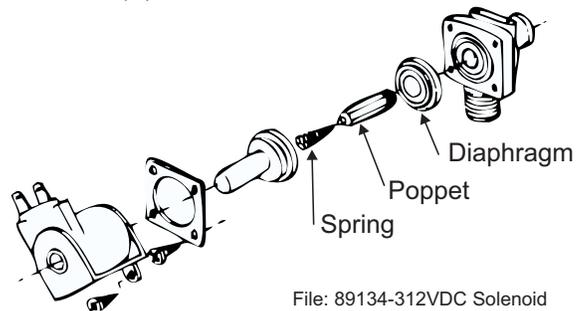
To Change Flapper Gasket

1. Turn water and air off.
2. Push flapper open.
3. Remove old gasket.
4. Remove paper from new gasket.
5. Place new gasket on face of flapper.
6. Turn air and water on.

Solenoid Valve Cleaning

Solenoid Service Kit, P/N 40037

1. Disconnect the power by removing the two (2) blue wires from the solenoid.
2. Disconnect the water supply line.
3. Remove two (2) screws securing the solenoid to the mounting bracket.
4. Pull solenoid away from the Vacuum Breaker.
5. Remove water supply line.
6. Remove four (4) screws from Solenoid Valve Body and remove spring and diaphragm.
7. Clean holes in the diaphragm if clogged. Inspect solenoid for debris and clean. Reassemble in reverse order.



Hopper Removal and Resealing - Ceramic

Hopper Replacement Kit, P/N 24770-3

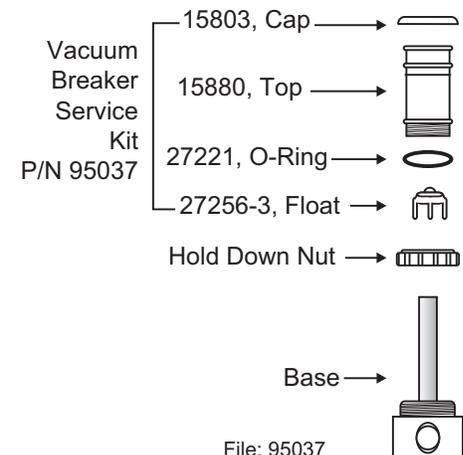
1. Remove toilet from the floor. Place toilet upside down on a sheet of cardboard or other padded material.
2. Remove J-Bolts nuts from hopper sides - lift the hopper off.
3. Remove quad ring between hopper and seal adaptor. Check that the quad ring is not damaged, replace quad ring if necessary.

Vacuum Breaker Service

Vacuum Breaker Service Kit, P/N 95037

1. If water is visible at the top of the vacuum breaker during operation, apply some silicone lubricant to the underside of the white float and to the O-Ring located at the upper end of the body.
2. To disassemble the vacuum breaker, remove the snap-on cap and unscrew body from the bracket. The white float inside can now be removed.
3. No service procedures are required for the lower portion of the vacuum breaker.

Vacuum Breaker Service Kit



File: 95037

File: 24323

Rev: 01/07

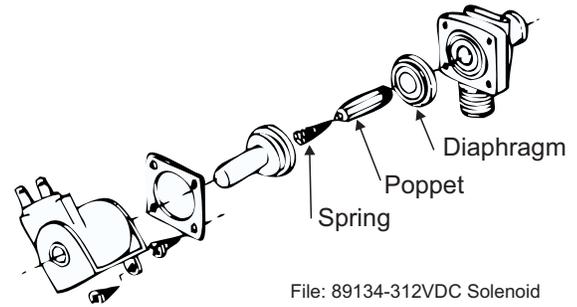
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Stainless

Solenoid Valve Cleaning

Solenoid Service Kit, P/N 40037

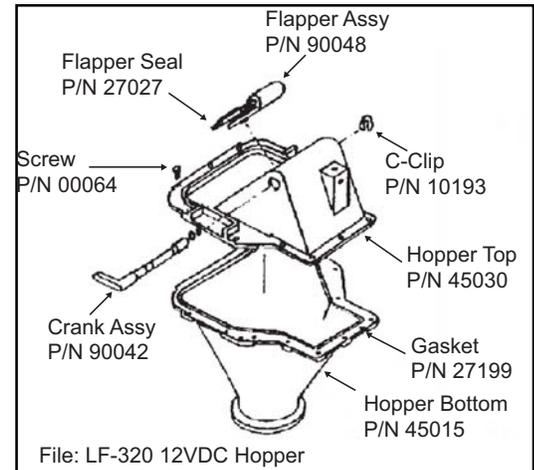
1. Disconnect the power by removing the two blue wires from the solenoid.
2. Disconnect the water supply line at china end.
3. Remove two screws securing the solenoid to the mounting bracket.
4. Pull solenoid away from the Vacuum Breaker.
5. Remove water supply tube.
6. Remove four (4) screws from Solenoid Valve Body and remove spring and diaphragm.
7. Clean holes in the diaphragm if clogged. Inspect solenoid for debris and clean. Reassemble in reverse order.



File: 89134-312VDC Solenoid

Hopper Removal and Resealing

1. Turn off water supply. Flush toilet twice to remove water from solenoid valve. Disconnect electrical supply. Disconnect water supply. Remove toilet from floor.
2. Place toilet upside-down on a sheet of cardboard or other padded surface. Remove four bolts holding hopper in position. Gently move hopper back and forth until seal breaks loose.
3. Using a putty knife and razor blade, remove all old adhesive and hopper O-ring from around the hopper opening and the stainless steel bowl. Mineral spirits is a good cleaner.
4. All surfaces should be clean and dry. Check O-ring for wear, replace if necessary. Reinstall hopper O-ring on hopper. Apply a 1/2" bead of silicone adhesive around the horn of the toilet bowl where the hopper connects.
5. Carefully replace the hopper, with the opening against the bowl. Press firmly for a good seal. Position to align openings in bowl and hopper. Make sure silicone is level with the top of the horn, but does not go over. Press hopper on.
6. Replace the four bolts and tighten evenly in a criss-cross pattern. Be sure hopper bottom is centered and flat against the bowl. NOTE: The flapper tension (clevis assembly) should be checked for adjustment whenever the toilet is removed for service.
7. Turn the toilet right side up. With a paper towel, clean away the excess adhesive between the bowl and the hopper. Smooth the surface with a wet finger. Do not get adhesive on the flapper seal. Be careful not to stress the resealed joint.
8. Remount the toilet to the floor. Reconnect water supply. Reconnect electrical supply.
9. Flush toilet and check for leaks.

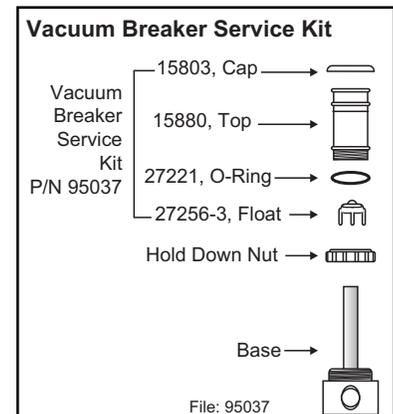


File: LF-320 12VDC Hopper

Vacuum Breaker Service

Vacuum Breaker Service Kit, P/N 95037

1. If water is visible at the top of the vacuum breaker during operation, apply some silicone lubricant to the underside of the white float and to the O-Ring located at the upper end of the body.
2. To disassemble the vacuum breaker, remove the snap-on cap and unscrew body from the bracket. The white float inside can now be removed.
3. No service procedures are required for the lower portion of the vacuum breaker.



File: 95037

File: 24323

Rev: 01/07

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Troubleshooting Guide

Problems	Cause	Remedy
Water drains from bowl	Nicks or obstructions on Flapper seat	Replace Flapper, Service Kit P/N 90066-3
	Insufficient Flapper tension	See Flapper Adjustment
	Flapper seal worn or damaged	Replace Flapper - Kit P/N 90066-3
Water level too high	Water level control out of adjustment	Turn Level Adjustment 1/8 turn at a time to raise or lower water level; Clockwise to raise, counterclockwise to lower.
	Fluctuating water pressure	Regulate water pressure
	Timer malfunction	Replace Timer - Reference Timer drawing
Water continues to run	Obstruction in water Solenoid Valve	Remove and inspect Solenoid Valve -see Solenoid Valve Cleaning
Toilet continues to cycle after initial flush cycle is complete - or only partially cycles	A cracked cam	Replace cam -reference Flapper Adjustment Drawing
	Defective Cam Switch; switch out of adjustment	Adjust or replace Cam Switch -reference Flapper Adjustment Drawing
	Defective Timer	Disconnect either purple wire at limit switch. If toilet continues to cycle, the timer is defective. If the toilet stops cycling, the limit switch either is not adjusted properly or is faulty.
Water leaking on floor	The hopper has been jarred loose from the bowl	Reseal Hopper -see Hopper Removal/Reseal
	Defective wax ring at toilet to floor connection	Replace the wax ring
	Loose water supply connection at toilet	Disconnect water line to toilet, add Teflon tape to threads, reconnect
No water	Water turned off	Turn water on
	Water inlet filter screen clogged	Clean water inlet filter screen
	No power to valve	Check for DC power at Solenoid Valve during flush cycle
	Defective Timer	Check Timer operation - replace if necessary
Toilet doesn't activate	No power	Restore power
	Tripped Circuit Breaker	Reset Circuit Breaker Switch. Determine cause of tripped breaker if possible before operating toilet
	Disconnected wires	Check all wiring connections
Water is visible at Vacuum Breaker when flushed	Insufficient lubrication; Worn vacuum breaker seal	Service Vacuum Breaker Kit, P/N 95037

If you have any questions or need assistance, call 800.358.8280

Changes in Design: Continuing a policy of research and development, Microphor reserves the right of price, product, or design change without notice or obligation.

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