

Preloos™

O&M
MANUAL

Start-Up
Operation & Maintenance
Troubleshooting

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About This Manual

Regular servicing of Prelos™ Processors optimizes performance, protects public health, and protects the environment. Please read this manual thoroughly for best-practice information on start-up, O&M, and troubleshooting of the Prelos Processor. This manual does not replace engineering plans or training. Depending on the model of Prelos Processor, not all components may be covered in this manual. For system components not described in this manual, contact the project engineer or the component’s manufacturer.

You will find *IMPORTANT information*, *Key Points*, and *Notes* in this manual, marked with easy-to-see visuals:



IMPORTANT — These point out hazards to people and products during and after start-up, O&M, and troubleshooting.



Key Points — These are critical for successful operation of the system.



Notes — These cover useful information and tips that can help make start-up, O&M, and troubleshooting easier. They may also provide information on variations in components or methods.

Standard Product Description

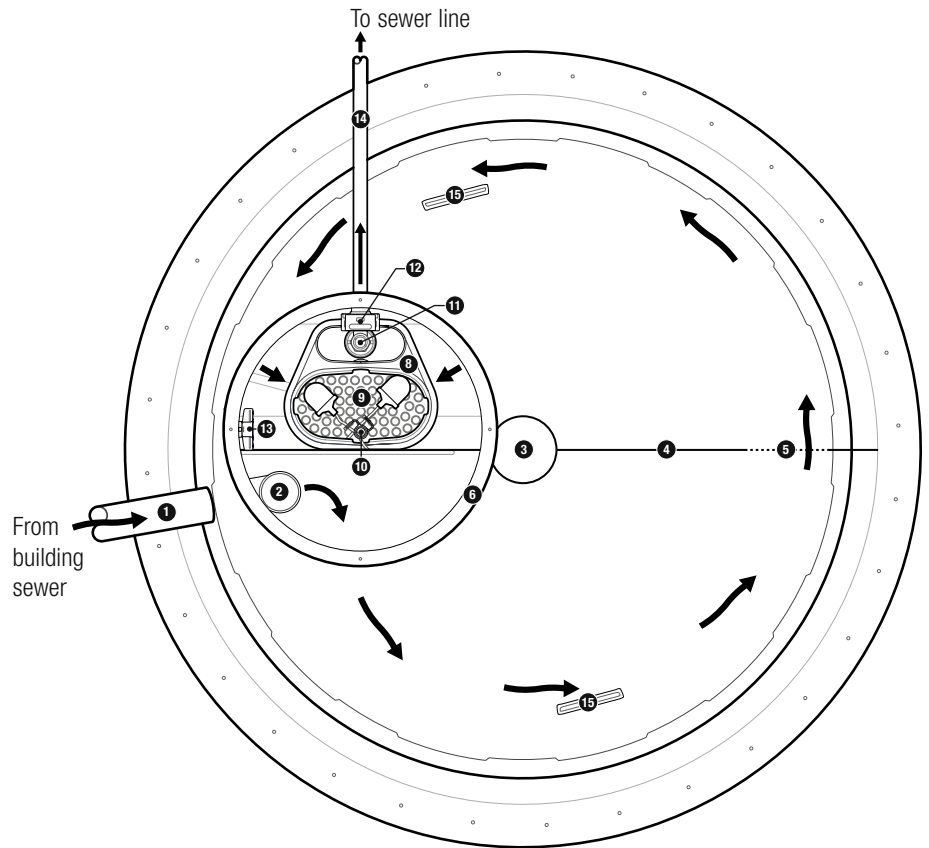
The Prelos Processor is the on-lot portion of a Prelos Sewer, a liquid-only (effluent) sewer. Pump-discharge models include an access lid, access riser, watertight tank, Prelos pump vault, passively self-cleaning Biotube® filter, float switch assembly, high-head effluent pump, hanging discharge assembly, and control panel. Gravity-discharge models do not use a high-head effluent pump or related pump control equipment.

In pump-discharge models, wastewater flows from the building sewer into the Processor’s meander tank, where it separates into a top scum layer, a bottom sludge layer, and a “clear” layer of liquid effluent between them. On the discharge side of the baffle wall, a pump draws liquid effluent from the clear layer into the pump vault and through the Biotube filter. The pump then transports the effluent to the liquid-only sewer.

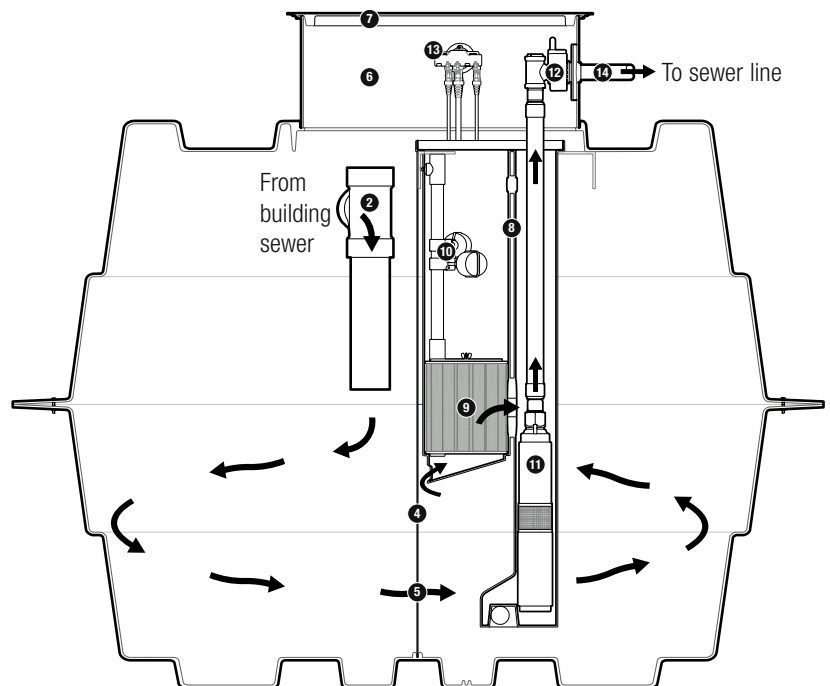
Standard Product Description, cont.

Standard Components, Pump-Discharge Models (Control Panel not Shown)

- ① Inlet
- ② Inlet tee
- ③ Support column
- ④ Baffle wall (full-length)
- ⑤ Baffle pass-through
- ⑥ Access riser
- ⑦ Access lid
- ⑧ Pump vault
- ⑨ Biotube® filter
- ⑩ Float switch stem and float switches
- ⑪ Pump
- ⑫ Discharge assembly
- ⑬ ClickTight™
- ⑭ Discharge
- ⑮ Lifting bracket



Top cutaway view



Side cutaway view

Tools and Equipment

Start-up, O&M, and troubleshooting can require a variety of tools, equipment, and spare parts. Before you begin, Orenco recommends the following tools and equipment:

Tools

- Cordless drill driver
- Flashlight
- Hand tools (common)
- Hanging discharge assembly removal tool (HDATOOL)
- Hex-head bit, 3/16-inch
- Portable water sprayer
- Hose and nozzle
- Scum measuring device (SMUG)
- Sludge measuring device (SLUDGE JUDGE ULTRA)
- Tape measure
- Wire stripping/crimping tool

Test Equipment

- Calculator
- Multimeter with amp clamp

Personal Protection and Cleanup

- Bleach/water solution
- Eye protection
- Hand cleanser/sanitizer
- Paper towels
- Protective clothing
- Rags
- Rubber gloves

Supplies and Spares

- Control panel parts (circuit breakers, motor contactors, relays)
- Effluent pump liquid ends
- Spare pump cord (ClickTight™-compatible)
- Float switches (ClickTight-compatible)
- Lid bolts
- Structural adhesive and sealant/adhesive
- PVC cement and primer
- PVC fittings, 3/4-inch to 2-inch (20-50 mm)
- PVC pipe, 3/4-inch to 2-inch (20-50 mm)
- Teflon™ tape/paste

Reference Material

- NFO-EPS-1, *Prelos Inspection/Start-Up Report*
- NIM-EPS-2, *Prelos Processor Installation Manual*
- NIN-CLK-1, *ClickTight and ClickTight Control Panel Installation Instructions*
- NIN-CLK-KIT-1, *ClickTight Pump Adapter Installation Instructions*
- NIN-HDA-1, *HDA-Style Discharge Assemblies Installation Instructions*
- NIN-TNK-7, *1000-gal. Meander Tank Assembly Instructions*

Part 1: Start-Up

Off-Site Preparations

Step 1: Confirm the following items with the contractor. When all are complete, the system is ready for you to perform the start-up.

- The control panel is connected to the home's electrical service. ~ Check for a separate circuit breaker in the service panel.
- Power to the service panel and to the control panel is turned on.
- The contractor has tested the control panel and it is functional.

Step 2: Arrange to meet the contractor at the site.

- Ask the contractor to bring the site's engineering plan.

Step 3: Get a copy of NFO-EPS-1, *Prelos Inspection/Start-Up Report*.

- Fill out the top of the form with the site information. Fill out the rest of the form on-site during the start-up procedure.

Physical Inspection



IMPORTANT:

- *Wear appropriate PPE while performing start-up or O&M work on the Prelos™ Processor.*
- *Don't enter the tank. Entering a tank without proper confined-space procedures and equipment can cause injury or death.*
- *Before leaving the area of the access riser at any point in this inspection, reinstall and re-secure the access lid.*

Step 1: Confirm with the contractor that the Processor has been watertightness tested per NIM-EPS-2, *Prelos Processor Installation Manual*.

Step 2: Confirm with the contractor whether or not anti-buoyancy measures are installed on the Processor.

Part 1: Start-Up

Physical Inspection, cont.

Step 3: Confirm the service lateral valve is accessible and open.

Step 4: Inspect the access riser and access lid.

- Confirm the final grade slopes away from the riser and lid.
- Confirm the riser is backfilled to within 3 in. (75 mm) of the lid.
- Confirm the riser and lid are level.
- Confirm the riser, grade ring adapter (if used), and lid are installed correctly.
- Note any discrepancies.

Step 5: Remove the access lid and set the lid bolts aside.

Step 6: Inspect the inlet tee.

- Confirm the inlet tee is firmly attached and plumb.
- Note any discrepancies.

Step 7: Remove the float switch/Biotube filter assembly.

- Confirm the assembly is easily accessible and removable for maintenance.
- Confirm the float switch setting heights match the settings on the engineering plans.
- Note any discrepancies.

Step 8: Inspect the pump vault.

- Confirm the vault is properly installed.
- Note any discrepancies.

Step 9: Inspect the pump and hanging discharge assembly (HDA).



IMPORTANT: *DON'T raise or lower the pump by the power cord! This can damage the pump and void the pump warranty.*

- Uncouple and remove the HDA, along with the hose and pump.
- Confirm the pump is properly installed on the HDA.
- Confirm the HDA's anti-siphon valve functions properly.
- Confirm the HDA's line check valve functions properly.
- Note any discrepancies.

Step 10: Inspect the ClickTight.

- Confirm the ClickTight is properly installed.
- Confirm the float switch cord plugs and pump cord plug are installed in the correct locations and fully seated.
- Confirm that excess lengths of the cords are secured with hook-and-loop fasteners to the ClickTight.
- Note any discrepancies.

Physical Inspection, cont.

Step 11: Reinstall all components removed during the inspection.

- Lower the pump into the vault and recouple the HDA.
- Confirm the HDA is properly installed and fully seated.
- Confirm the pump is not resting on the floor of the vault.
- Reinstall the float switch/Biotube filter assembly and confirm that it's fully seated in the vault.

Step 12: Turn off the power supply to the control panel.



IMPORTANT: *Do not physically inspect an energized panel.*

Step 13: Open the control panel's door.

Step 14: Inspect the control panel, its components, and its wiring.

- Confirm the panel operator's guide is located on the inside of the panel door.
- Confirm the panel is wired according to the diagram clipped inside the panel door.
- Confirm the float switch wires and pump wires are installed in the correct terminals.
- Confirm the float switch wires and pump wires are secure in their terminals by gently tugging on the individual wires.
- Note any discrepancies.

Step 15: Fill out the operator name/number on the "For Service Call" label inside the panel, if it isn't already filled out.

Step 16: Close and secure all access to the Prelos Processor if you are not going to perform the start-up tests immediately after physical inspection.

Start-Up Test



IMPORTANT:

- *Wear appropriate PPE while performing start-up or O&M work on the Prelos Processor.*
- *Before leaving the area of the access riser at any point in this inspection, reinstall and re-secure the access lid.*



Key Points:

- *The Processor must pass the physical inspection before testing begins.*
- *All tests involving pumping will require enough water in the tank to prevent the pump from running dry.*

Part 1: Start-Up, cont.

Start-Up Test, cont.

Step 1: Open the control panel; turn on the circuit breakers for panel power, float switches, and pump.

Step 2: Toggle the “AUTO/OFF/MAN” switch to “AUTO.”

Step 3: Check the function of the float switches.



Note: This test is best when performed with an assistant.

Step 3a: Remove the float switch/Biotube filter assembly from the Processor.

Step 3b: Lift the bottom float switch.

- The pump should activate.

Step 3c: Lower the bottom float switch.

- The pump should deactivate.

Step 3d: Lift the top float switch.

- The pump should activate.
- The audible and visible alarms should activate.

Step 3e: Lower the top float switch.

- The pump should deactivate.
- The audible and visible alarms should deactivate.

Step 3f: Reinstall the float switch/Biotube filter assembly back into the pump vault.

- Make sure the assembly is properly seated in the pump vault.

Step 3g: Neatly coil the float switch cords and secure them to the ClickTight with the hook-and-loop fasteners.

Step 4: Measure and record the pump’s static and dynamic voltage on the *Prelos Inspection/Start-Up Report*.

Step 4a: Measure the static voltage across the pump terminal while the pump is not running.

Step 4b: Toggle the control panel’s “AUTO/OFF/MAN” switch to “MAN.”

Step 4c: Measure the dynamic voltage across the pump terminal while the pump is running.

Step 4d: Toggle the “AUTO/OFF/MAN” switch to “AUTO.”

Step 4e: Record the pump’s static and dynamic voltages on the *Prelos Inspection/Start-Up Report*.

- There should be no more than 3% difference between static and dynamic voltages (3.6V for 120V systems and 7.2V for 240V systems).

Start-Up Test, cont.

Step 5: Measure and record the pump-run amperage on the *Prelos Inspection/Start-Up Report*.

Step 5a: Place an ammeter clamp around the wire to the pump’s circuit breaker.

Step 5b: Toggle the “AUTO/OFF/MAN” switch to “MAN,” while reading the pump amperage.

- Once the amperage stabilizes, record it on the *Prelos Inspection/Start-Up Report*.
- It should be no more than the pump’s maximum service factor amperage.

Step 6: Toggle the “AUTO/OFF/MAN” switch to “AUTO.”

Final On-Site Activities

Step 1: Be sure the *Prelos Inspection/Start-Up Report* is completed.

Step 2: Record all notes, remarks, and discrepancies for the site in the site’s maintenance diary.

Step 3: Make sure all of the wiring diagrams, schematics, and instructions for the control panel are placed back in the holder on the panel door.

Step 4: Make sure all of the control panel circuit breakers are “On.”

Step 5: Make sure the “AUTO/OFF/MAN” switch is in the “AUTO” position.

Step 6: Close and secure the control panel.

Step 7: Close and secure all access to the Prelos Processor.



IMPORTANT:

- Children or adults who enter open wastewater tanks are at risk for serious injury or death.
- Replace any missing lid bolts with spares.
- If you have no spare lid bolts, fasten the lid with a self-tapping screw and immediately call your engineer for replacement bolts.
- If the lid is unbolted or if the lid or riser are damaged, securely block access to the tank opening before leaving the site.

Part 2: Maintenance

Maintenance Cycle

Orenco strongly recommends developing a regular, consistent program of preventative maintenance for Prelos Processors used in Prelos Sewers or other liquid-only (effluent) sewers.

Typically, a Prelos Processor requires service only once every three to five years or sometimes longer, depending on conditions. Contact the design engineer for more information.

Routine Maintenance

Perform the following maintenance activities once during each regular maintenance cycle.



IMPORTANT:

- Wear appropriate PPE while performing start-up or O&M work on the Prelos Processor.
- Before leaving the area of the access riser at any point during routine maintenance, reinstall and re-secure the access lid.

Step 1: Measure the scum and sludge layers in the tank.

Step 1a: Unscrew the access lid bolts; remove the access lid.

Step 1b: Use a scum measurement tool to measure the scum layer's thickness on both sides of the baffle wall.

- See the measurement tool's instructions for proper use.
- Add the measurements from both sides and divide by two for the average thickness.

Step 1c: Use a sludge measurement tool to measure the sludge layer's thickness on both sides of the baffle wall.

- See the measurement tool's instructions for proper use.
- Add the measurements from both sides and divide by two for the average thickness.

Step 1d: If the average thickness of the scum layer is ± 10 in. (254 mm), or if the average thickness of the sludge layer is ± 20 in. (508 mm), pump the tank according to this manual's "Pumping the Tank" section before continuing with the remaining routine maintenance.

Step 2: Lay out a tarp next to the access opening.

Routine Maintenance, cont.

Step 3: Clean the Biotube filter.

Step 3a: Remove the float switch/Biotube filter assembly from the pump vault.

Step 3b: Remove the filter's cover plate and mounting hardware; set them on the tarp.

Step 3c: Hold the assembly on the inlet side of the access riser.

Step 3d: Use a hose and sprayer to clean off the filter and float switches.

- Allow debris and cleaning water to flow back into the inlet side of the tank.

Step 3e: Set the float switch/Biotube filter assembly on the tarp.

Step 4: Inspect and test the float switches.

Step 4a: Confirm the float switches are in good condition and properly secured to the float stem.

- Confirm there are no nicks in the float switch cords.
- Confirm there is no swelling in the float switch cords.

Step 4b: Test the function of the float switches.

- See Step 3 in the "Start-Up Test" section of this manual.

Step 4c: Perform any necessary repairs or replacements.

Step 4d: Reinstall the filter's cover plate and mounting hardware.

Step 4e: Reinstall the float switch/Biotube filter assembly into the pump vault.

Step 5: Inspect the HDA and pump.

Step 5a: Decouple the male side of the HDA (with hose and pump) from the female side of the HDA, mounted to the riser wall.

Step 5b: Remove the HDA, along with the hose and pump, from the tank and place them on the tarp.



IMPORTANT: DON'T raise or lower the pump by the power cord! This can damage the pump and void the pump warranty.

Part 2: Maintenance, cont.

Routine Maintenance, cont.

Step 5c: Clean out the pump screen and inspect the pump.

- If necessary, replace the pump screen.
- Confirm there are no nicks in the pump cord.
- Confirm there is no swelling in the pump cord.
- Confirm the pump is securely attached to the hose.

Step 5d: Confirm the hose is in good condition.

- Confirm the hose has not stretched.
- Confirm the hose is not torn or worn.

Step 5e: Confirm both sections of the HDA are in good condition.

- Confirm the HDA's line-check valve functions properly.
- Confirm the HDA's anti-siphon valve functions properly.

Step 5f: Perform any necessary preventative maintenance on the HDA, pump, and pump cord.

Step 5g: Lower the pump into the vault and recouple the HDA.

- Confirm the HDA is properly installed and fully seated.
- Confirm the pump is not resting on the floor of the vault.

Step 6: Wash the tarp off over the access riser.

Step 7: Close and secure all access to the Prelos Processor if you are not immediately going to perform a tank pump-out.

Pumping the Tank

If the tank requires pumping, follow the steps below to assure the best results.



IMPORTANT:

- Wear appropriate PPE while performing start-up or O&M work on the Prelos Processor.
- Without proper antibuoyancy measures in place, pumping the tank under conditions of high groundwater can result in the tank "floating" out of the ground.
- Don't pump the tank dry with extreme high groundwater present.
- For emergency situations during extreme high groundwater events, always consult with the pumper.

Step 1: Open the control panel's door.

Step 2: Turn off the circuit breakers for panel power, float switch/Biotube filter assembly, and pump.

Step 3: Lay out a tarp next to the access riser.

Pumping the Tank, cont.

Step 4: Remove the access lid and set the lid bolts aside.

- Don't lose the lid bolts.

Step 5: Remove the float switch/Biotube filter assembly and lay it on the tarp.

Step 6: Remove the filter's cover plate and mounting hardware and set them aside on the tarp.

Step 7: Hold the assembly on the inlet side of the access riser.

Step 8: Use a hose and sprayer to clean off the filter and float switches.

- Allow debris and cleaning water to flow back into the inlet side of the tank.

Step 9: Remove the cleaned filter from the Processor and lay it on the tarp.

Step 10: Reinstall the filter's cover plate and mounting hardware.

Step 11: Remove the HDA and pump.



IMPORTANT: DON'T raise or lower the pump by the power cord! This can damage the pump and void the pump warranty.

- Inspect the pump and clean the screen, if necessary.
- When finished, place them on the tarp.

Step 12: Remove the pump vault from the Processor.

- Inspect the pump vault and clean it, if necessary.
- When finished, place the vault on the tarp.

Step 13: Pump out both sides of the tank.

Step 14: Reinstall the pump vault into the Processor.

Step 15: Lower the pump into the vault and recouple the HDA.



IMPORTANT: DON'T raise or lower the pump by the power cord! This can damage the pump and void the pump warranty.

- Confirm the HDA is properly installed and fully seated.
- Confirm the pump is not resting on the floor of the vault.

Step 16: Reinstall the float switch/Biotube filter assembly into the pump vault.

- Make sure the filter seats properly in the pump vault.

Step 17: Check that the ClickTight connections are all secure.

Step 18: Close and secure all access to the Prelos Processor.

Part 2: Maintenance, cont.

Final On-Site Maintenance Activities

Step 1: Record all notes, remarks, and discrepancies for the site in the site's maintenance diary.

Step 2: Make sure all of the wiring diagrams, schematics, and instructions for the control panel are placed back in the holder on the panel door.

Step 3: Make sure all of the control panel circuit breakers are "On."

Step 4: Make sure the "AUTO/OFF/MAN" switch is in the "AUTO" position.

Step 5: Close and secure the control panel.

Step 6: Make sure that the access lid is installed and secure.



IMPORTANT:

- *Children or adults who enter open wastewater tanks are at risk for serious injury or death.*
- *Replace any missing lid bolts with spares.*
- *If you have no spare lid bolts, fasten the lid with a self-tapping screw and immediately call your engineer for replacement bolts.*
- *If the lid is unbolted or if the lid or riser are damaged, securely block access to the tank opening before leaving the site.*

Part 3: Troubleshooting, cont.

General Troubleshooting

This troubleshooting chart is intended to help diagnose and address issues with Prelos Processors.

To use this chart ...

- Look for the symptom or symptoms you are experiencing in the left-hand column.
- Check the row to the right of the symptom for causes. Causes are numbered simplest to most complex, with “1” being the simplest correction.
- Address each cause in order, beginning with “1,” until the causes have been corrected and the symptom is gone.

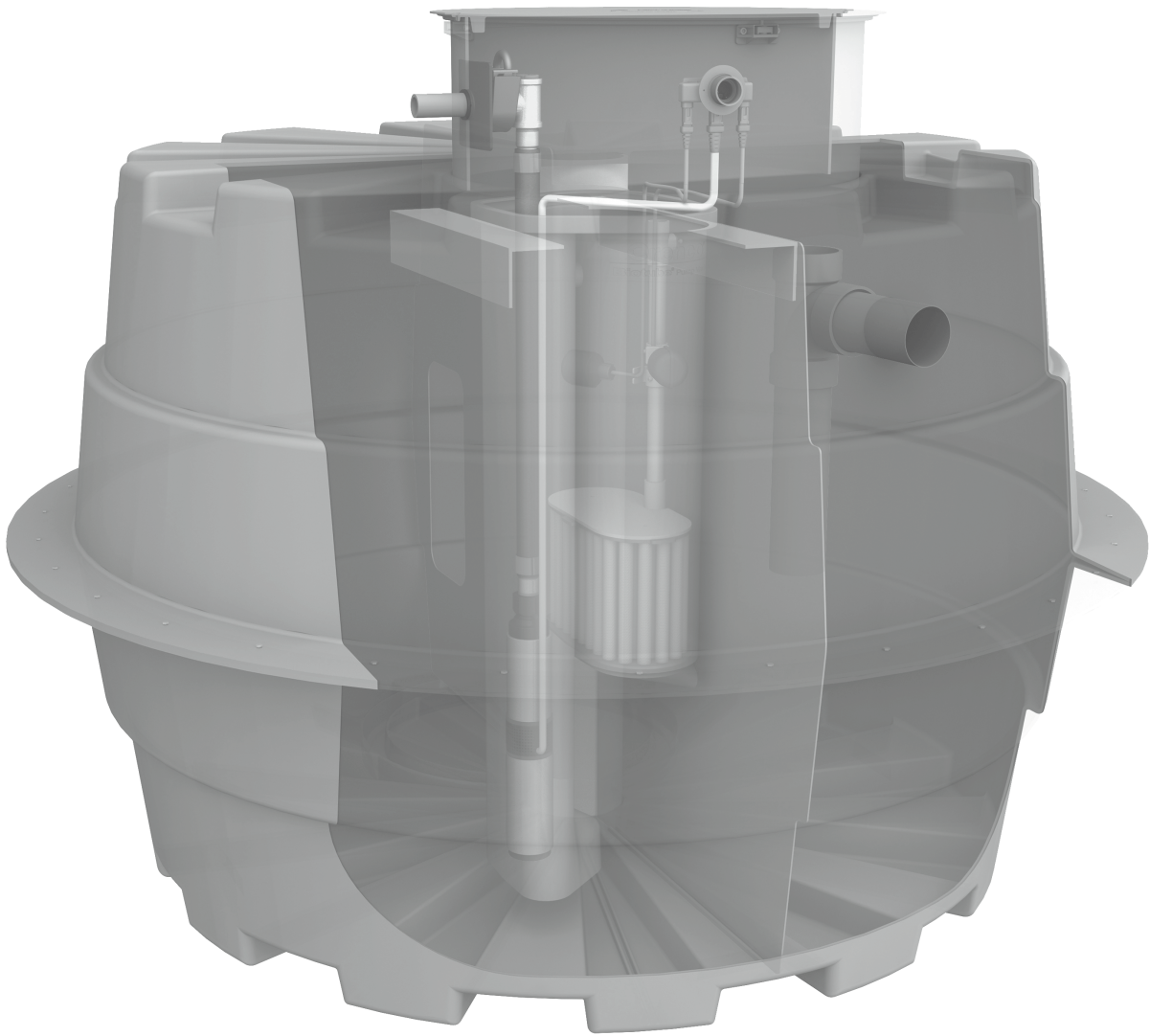
Symptom	Common Causes																						
	Main Circuit Breaker Tripped Off	MOA Switch OFF	Pump Circuit Breaker OFF	Poor Electrical Connections	Tangled or Inoperative Floats	Duty (Lower) Float Failed	Improper Wiring/Loose ClickTight™ Connections	Inoperative Pump	Broken Discharge Plumbing	Pump Inlet Fouled	Improper Float Settings	Worn Pump Impellers	Service Connection Valve Shut Off	Mainline Valve Closed	Biotube® Filter Dirty	Mainline Pressure Exceeds Pump Capability	Infiltration and Inflow (I&I)	Check Valve Installed Backwards	Inlet Tee Plugged	House Plumbing Plugged	Pump Air Locked	Discharge Valve Closed	
Sewage backed up into home	1							5	4				6	7		8			2	3			
Alarm light on (High-Level)		1	2	9	5		8	10	4	6		13	11	12		14	15					7	3
Alarm sounds intermittently				2	3	1	4				5	6											
Pump does not run	3	1	2	4	5		7	6															
Pump runs, does not pump									2	3		5	6	7		8						4	1
Short pump cycles				2							3				1								
Excessive pump counts										2	4				3		1						
Control panel breaker trips				1			3	2															

Part 3: Troubleshooting, cont.

Control Panel Troubleshooting

This troubleshooting chart is intended to help diagnose and address issues with Prelos control panels.

Symptom	Common Causes
Pump does not operate with control panel toggle switch in "MAN" or "AUTO" position	<ul style="list-style-type: none"> • Pump circuit breaker off/fuse blown • Inadequate power supply to control panel • Incorrect float switch wiring • Incorrect pump wiring • Faulty ClickTight™ connectors • Failed connection in the pump wiring circuit • Failed motor contactor
Pump operates with control panel toggle switch in "MAN" position; does not operate with switch in "AUTO" position	<ul style="list-style-type: none"> • Incorrect float switch wiring • Incorrect float switch model • Failed float switch • Faulty ClickTight connectors
Audible alarm activated	<ul style="list-style-type: none"> • Control panel toggle switch in "Off" position • Pump circuit breaker in "Off" position • Closed service connection valve • Failed pump • Clogged pump • Incorrect float switch settings • Incorrect float switch wiring • Incorrect model of float switch • Failed float switch • Power outage
Circuit breaker trips repeatedly or fuse blows repeatedly	<ul style="list-style-type: none"> • Inadequate power supply to circuit breaker • Loose wiring connections • Corroded wires or wiring connections • Bound pump • Incorrect pump wiring • Incorrect float switch wiring
Motor contactor "chatters"	<ul style="list-style-type: none"> • Corroded contacts • Inadequate voltage to motor contactor • Failed float switch • Incorrect float switch model



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