

# HYDRO-GUARD®

## HG-3 Automatic Flushing System

### ⚠ WARNING:

Failure to read and follow the instructions contained within this manual could result in serious personal injury, and/or damage to the Hydro-Guard® Automatic Flushing Device.

1. Each person involved in the assembly, installation and/or maintenance of the Hydro-Guard Automatic Flushing Device must read this manual carefully and follow all instructions prior to performing any installation or maintenance procedures involving the Unit.
2. Verify the drainage path prior to installation to ensure that pedestrian and vehicular hazards will not be created by the installation and use of the Hydro-Guard Automatic Flushing Device (In areas in which freezing may occur, special attention should be given to this procedure).
3. Never assemble, disassemble, or perform Hydro-Guard maintenance unless the influent supply valve has been closed, verified and secured, and internal piping pressure has been relieved.
4. Always use all necessary safety equipment and follow all recommended procedures when installing, operating and maintaining the Hydro-Guard Automatic Flushing Device.
5. Perform annual safety inspections and replace worn or defective parts.
6. Operate the Hydro-Guard Automatic Flushing Device only when fully installed and correctly assembled.

### ⚠ CAUTION:

The recommended optimal operating pressure for a Hydro-Guard® Automatic Flushing System is between 20psi and 120psi. In the event pressure may exceed 120psi it is recommended that a Pressure Regulating Valve be installed ahead of the Hydro-Guard flushing system.

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# HYDRO-GUARD® HG-3 Flushing System

## Installation Instructions

### GENERAL

#### Overview

The Hydro-Guard® HG-3 Automatic Flushing System, the industry's premium patented, programmable flushing apparatus, is suitable for year-round use in moderate to severe cold climates. This Automatic Flushing System has been designed, engineered, and manufactured to provide outstanding dependability and performance. Please read and retain this manual.

### INSTALLATION

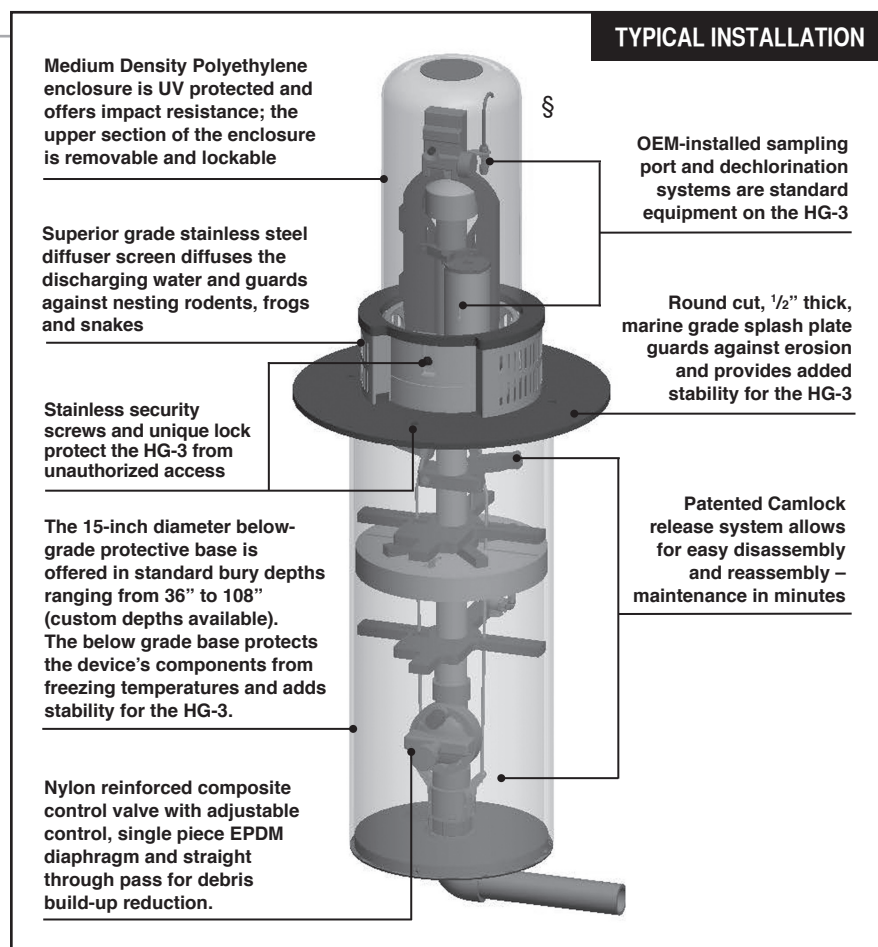
#### Hydro-Guard® HG-3 Unit

1. Remove the Hydro-Guard® Unit from its packaging and inspect for possible damage during shipping.
2. Excavate a suitably-sized ditch ensuring it is connected on one side to the utility's service line trench. Remove any debris that might create uneven pressure on the Unit. Compact the bottom of the hole in order to minimize settling after installation. Place #57 stone, then non-compacted clean bedding material within the bottom of the hole. Turn off service line feed.
3. Slowly lower the Hydro-Guard® Unit into place, pressing it firmly into the noncompacted bedding material until it is fully seated. Ensure that the Unit is level before beginning the backfilling operation (The bottom of the ground plate should be approximately 1" above the final grade).
4. Connect the utility's water system to the Hydro-Guard® Unit by means of the 2" threaded connection.
5. Backfill the hole around the Unit with clean fill and/or #57 stone. Backfilling should be accomplished in 6" compacted lifts. Check that the Unit is level.
6. After installation is complete, sod the area around the Hydro-Guard® Unit or take other steps in order to

#### Site Evaluation

Each Hydro-Guard® Flushing System installation is unique and will require a minimum of advance planning. Prior to the installation of the device, the drainage patterns for the intended installation location should be reviewed. The drainage pattern must permit discharged water to flow away from the Hydro-Guard® Flushing Unit or to be absorbed by the surrounding soil.

The Unit's ground-level weather seal is designed to prevent infiltration by rainwater and normal discharges when placed in areas with acceptable drainage. Some utilities have opted to increase the excavation-site size creating a small drain field, or to install their Units on concrete splash pads in order to direct runoff. In cold weather applications multiple nightly flushes are effective in managing discharge volumes and preventing the accumulation of ice.



prevent erosion. Inspect the area immediately around the Unit in order to ensure that the existing ground cover is not subject to severe erosion. You may opt to pour a concrete pad or create a custom installation to best suit your needs.

7. Disinfect the Hydro-Guard® Flushing Device in accordance with the utility's policy. DO NOT exceed the dosage and contact times recommended by the AWWA.

8. The Hydro-Guard® Automatic Flushing Device may now be programmed and placed into service.

### PROGRAMMING HYDRO-GUARD® UNIT FOR OPERATION

#### HG-3 (Requires Handheld)

##### TBOS-II Programming Instructions

The TBOS-II handheld uses on screen prompts for intuitive programming. It will control current programming interface (T-2: dark gray case), as well as the previous model of programming interface (T-1 modules programmed by the TBOS-US handheld).

##### Features

- 1 to 24 possible flushing events daily, or on selected days weekly, 365-day calendar
- Flush duration 1 minute to 12 hours (1 minute increments)
- Preprogram and store up to 3 different schedules
- Rechargeable battery (low battery indicator shows both handheld and controller battery conditions) with recharging adaptor (9-volt lithium battery can be used in the built-in programming interface)

**NOTE:** *In that the handheld was designed by its manufacturer to program flush systems, many displays use flush terminology. In the following instructions, in such cases the equivalent flushing terminology is shown in parentheses.*

**⚠ CAUTION:** Leaving the infra-red connector connected to the built-in programming interface can significantly reduce the battery life of the 9-volt batteries in the programming interface and the rechargeable battery in the TBOS-II handheld.

##### TBOS-II Handheld Keys

**HOME** – press three seconds to turn handheld on.

**ABC** – press to choose from three available programs (to store a program when preprogramming, or uploading a program to controller).

**LEFT and RIGHT ARROWS** – move cursor left or right, also go back or forward one screen.

**ON and OFF/+ and – /UP and DOWN ARROWS** – Used to set flushing events on or off, move selector up and down on screen, or increase or decrease duration and other values.

**OK** – press to make selection final.

##### TBOS-II Handheld Home Screen Menu

1. **TBOS infra-red** – accessible only when connected to programming interface via the IR cable: select to connect handheld to programming interface via infrared cable and access programs on it, or to transfer programs from handheld to programming interface.
2. **Templates (TBOS-II)** – select to program handheld without connecting to programming interface.
3. **Settings** – select to access and set time, date, and various other available user settings.

##### First Time Use

1. Press **HOME** key for three seconds to turn on handheld.
2. Press **RIGHT ARROW** key or the **OK** key to access “Settings”
3. Use **DOWN ARROW** to select and set the following:
  - a) Date and Time
  - b) Contrast of the screen
  - c) Name of the handheld controller (can be assigned to a specific operator)
  - d) Language (English, French, Spanish, Italian, Dutch, Portuguese, Turkish, etc.)

**NOTE:** *Programming instructions for all available languages are available by contacting Mueller Co. at 800-423-1323.*

##### Programming Flushing Schedule

There are two ways to proceed:

- select “**TBOS-II infra-red**” if IR cable is connected to a TBOS-II programming interface to access, change or load programs there, or
- select “**Templates (TBOS-II)**” to create or change programs stored on the handheld to load onto a programming interface at a later time (IR cable not used).

**NOTE:** *The home screen for “TBOS-II infra-red” shows battery condition for programming interface and ON/OFF state of any current operation in progress.*

1. Press **HOME** key for three seconds to turn handheld on.
2. Press **RIGHT ARROW** key or the **OK** key to access “Settings”.
3. Use **DOWN ARROW** to select “Templates” and press **OK**.
4. Use **DOWN ARROW** to select “Programs” and press **OK**.
5. Use **DOWN ARROW** to select “Watering Days” (Days to Flush) and press **OK**.
6. Use **UP/DOWN ARROWS** to select one of the following:
  - a) **Custom Cycle (Week):** use **RIGHT/LEFT ARROWS** to move to days of the week, use **ON/OFF** keys to highlight days on which to flush, then press **OK** to confirm days when selections are complete.
  - b) **Even Days:** to Flush on even dates, press **OK** to set.
  - c) **Odd Days:** to Flush on odd dates including 31st, press **OK** to set.
  - d) **Odd Days 31:** to Flush on odd dated except 31st, press **OK** to set.
  - e) **Cyclical:** to Flush every “X” days, set “X” using **ON/OFF** keys (X=1 to 31), press **OK** to set; then set start date “dd/mm/yyyy” using **ON/OFF** keys, press **OK** to set.

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## Programming Unit

7. Use **LEFT ARROW** to navigate back to the program “**Settings**” menu.
8. Select “**Start times**”, press **OK** to set.
9. Use **ABC** to select program to be set up.
  - a) Set hours and minutes for each start time (up to 8 per program) using **ON/OFF** keys, press **OK** to set each (hours are indicated using 24 hour clock). [When exiting this screen, start times will automatically sort into chronological order.]
10. Use **LEFT ARROW** to navigate back to the program “**Settings**” menu.
  - a) Use **DOWN ARROW** to select “**Valve Run Times**” (Flush Duration), press **OK** to set.

**NOTE: Although six valves may be shown on screen, only Valve 1 is used to manage the Hydro-Guard® unit.**

- b) Use **ON/OFF** keys to select program A, B and/or C (one or more can be assigned).
- c) Then use **ON/OFF** keys to set Flush duration (hours and/or minutes) for program just set, use **LEFT/RIGHT ARROW** keys to move between hours and minutes and **+** or **-** keys to set times (1 minute to 12 hours), press **OK** to set.

### Transmitting Time, Date and Programs to Programming Interface, Clearing/Checking Programs, Manual Start

Connect handheld to programming interface using IR cable.

1. To transmit: from home screen, use **DOWN ARROW** to select “**TBOS-II infrared**” and press **OK**. TBOS-II handheld will receive data (settings) from built-in programming interface.

2. Once data receipt is complete press **RIGHT ARROW** to move to “**Settings**” menu.
3. From “**TBOS-II infra-red**” settings screen select “**Transmit**” and press **OK** again. When program to be transmitted appears, press **OK** to confirm.
4. To clear programs A, B, or C: from “**TBOS-II infra-red**” welcome screen, use **DOWN ARROW** to select “**Clear Programs**” and press **OK**, then select type of program to clear and follow prompts.
5. To check programs A, B, or C: from “**TBOS-II infra-red**” welcome screen, use **DOWN ARROW** to select “**Programs**” and press **OK**, then select what is to be checked and follow prompts.

### Manual Flushing

Using TBOS-II handheld on the T-2 built-in programming interface (dark gray in color).

**NOTE: Manual start cannot be initiated if there is no program in the programming interface.**

1. To start manual flushing from “**TBOS-II infra-red**” welcome screen.
  - a) Use **DOWN ARROW** to select “**Manual Watering**” (Manual Flush) and press **OK**,
  - b) Select “**Start Valve**” (Open Control Valve) then using **ON/OFF** keys select “**Valve 1**” and press **OK**,
  - c) Use **ON/OFF** keys to set the manual Flush Time (1 minute to 12 hours) and press **OK** to confirm. Flushing will start after a four (4) second delay.

### Stop Manual Flush Sequence

1. Reconnect **IR** cable to built-in interface, then hold down **HOME** key on handheld.
2. Use **RIGHT ARROW** to select “**TBOS-II infra-red**” menu and select “**Manual Watering**.”
3. Select “**Cancel Flush**” to cease the manual flush sequence.

### Communication Failure:

#### Possible Causes /Solutions

1. The programming pod’s battery is low or out of power or the Handheld Programmer is low or out of power; replace battery.
2. You may have an incorrect actuator and/or program code. Connect the handheld programmer via the cord, and set a new actuator code.
3. There might be a problem with a connection or solenoid. Perform an electrical system check.


**NOTES: The Pod’s internal memory lasts only 3 minutes. Any time the battery within the Programming Pod dies, it is necessary to plug the Handheld Programmer directly into the Pod and re-assign the Actuator ID and reprogram the Unit. While repeating the programming steps is only a minor inconvenience, a proactive approach to battery maintenance will serve to alleviate the frequency with which these steps must be completed.**

For all other programming questions, please refer to the Hydro-Guard® Programming Guide. If the information you require is not available therein, please contact Hydro-Guard® Customer Service at 877.864.8500.

# HYDRO-GUARD® HG-3 Flushing System

## Assembly, Disassembly & Maintenance Instructions

### HG-3 DISASSEMBLY AND REASSEMBLY INSTRUCTIONS

 **TOOLS NEEDED:** HG-A104 Security Wrench, HG-A2023 Security Tool, Philips screwdriver, flat-head screwdriver

Although the Hydro-Guard® Unit was delivered completely assembled, it may be necessary or desirable to disassemble portions of the Unit, or the Unit in its entirety, in order to allow for required service and maintenance. If disassembly is necessary, please follow the directions below. Always close the curb stop before working on the unit making sure the supply line is shut off and secured.

#### HG-3 Battery Replacement

1. Shut off water supply to unit.
2. Use HG-A2023 Security Tool to unlock and remove protective Exterior Housing Cover.
3. Unscrew protective cap from gray Programming Interface, which is located at top of unit.
4. Extract battery harness and remove old battery (dispose of battery appropriately).
5. Connect fresh industrial grade 9-volt lithium or alkaline battery and reinsert it with harness into Programmer.
6. Screw protective cap back into place and hand tighten securely.
7. Use Handheld Controller to reset all programs and assure flushing sequence is correct prior to returning the HG-3 Unit to service.
8. Reinstall Exterior Housing Cover and restore water supply to unit.


#### Disassembly

1. Shut off water supply to unit.
2. Use HG-A2023 Security Tool to unlock and remove protective Exterior Housing Cover.
3. Loosen, DO NOT remove, two stainless steel nuts in Bracket holding Dechlorination Chamber Covers in place.

4. Remove Black Knob from Push Rod that is part of Sampling Valve assembly and observe hole where rod passes through Erosion Controlling Ground Plate so that rod can be properly guided through hole when reassembling unit.
5. Use HG-A104 Security Wrench to remove four security bolts from Erosion Controlling Ground Plate.
6. Lift upper assembly up and off pipe leading down into lower in-ground part of unit, taking care not to stretch wiring and poly-tube sampling line.
7. Rotate downward two handles of Cam-Lock Release mechanism to disengage and remove internal assembly.

#### Reassembly

1. Return internal assembly to proper location and lock the Cam-Lock handles in place on the female side of the Cam-Lock.
2. Pull up on internal assembly to be sure it is locked in place (recommendation: use a zip-tie to hold two Cam-Lock handles in position to assure they remain locked in place during operation of the unit).
3. Gently lift upper section, making certain to not stretch wires or poly-tube, and place it over pipe and lower it onto top of in-ground section of unit.
4. Line up four holes of Ground Plate with brackets of in-ground Protective Sleeve.

 **CAUTION: DO NOT rotate the plate more than 90° in either direction, which could stretch wiring or poly-tube.**

5. Reinstall four Security Screws and use HG-A104 Security Wrench to tighten them securely.
6. Lower Dechlorination Chamber Bracket to original position and retighten two nuts securely.
7. Reinstall Knob onto Sampling Valve Push Rod.
8. Check battery life of Battery in Programming Interface or on-board Programmer (according to model of unit), replace and restore programming if necessary.
9. Align Lock on Exterior Housing Cover with Locking Bracket on lower assembly of unit and reinstall Exterior Housing Cover (lock will engage when cover is properly seated).
10. Restore water supply to unit.

#### Reloading Dechlorination Chambers

1. Follow instructions “HG-3 Machine Disassembly, steps 1–3.
2. Slide Bracket upward as far as possible and remove Dechlorination Chamber Covers.
3. Check for partially dissolved chlorine tablets or residues and clean the chamber as needed.
4. Insert up to four 3” chlorine tables in each chamber.
5. Reinstall chamber covers, lower bracket to secure them and retighten two nuts securely.
6. Follow instruction #9 above to reinstall Exterior Housing Cover, and restore water supply to unit.

# HYDRO-GUARD® HG-3 Flushing System

## Troubleshooting

### TROUBLESHOOTING THE CONTROLLER

PROBLEM	CAUSE	SOLUTION
Controller does not flush as desired	Water at main water supply is shut off	Check main supply valve
	Battery dead	Replace battery
	Controller set to OFF	Set controller to desired program
	Controller improperly programmed	Check program and clock settings
Blank display	Battery dead	Replace battery
Water does not turn off	Overlapping programming	Review all programming and edit any program that is in conflict with desired off schedule  Clear all programming in memory and reset
	Programmer not communicating	Check Programming  Run Manual On/Off with solenoid removed from valve (hold finger or object over solenoid plunger to prevent plunger from dislodging from solenoid body)  Check wiring for damage and connectors to ensure proper connection (red to red & black to black)

### TROUBLESHOOTING THE UNIT

#### If your Hydro-Guard® Unit does not activate:

##### **Possible Causes**

- Water pressure off or low.
- Batteries weak or dead.
- Connection loss from controller to solenoid.
- Solenoid not working properly.
- Obstruction in flow of water.

##### **Try this Correction**

- Check if curb stop is open.
- Change batteries.
- Check connections for corrosion, breaks, or lack of connection.
- Run a manual flush and confirm the solenoid plunger is kicking out and pulling back in by listening for a click.

- Check to make sure the flow control knob is open on the valve OR Check the pipes for obstructions OR Check the valve.

#### **The Hydro-Guard® Unit will not shut off:**

##### **Possible Causes**

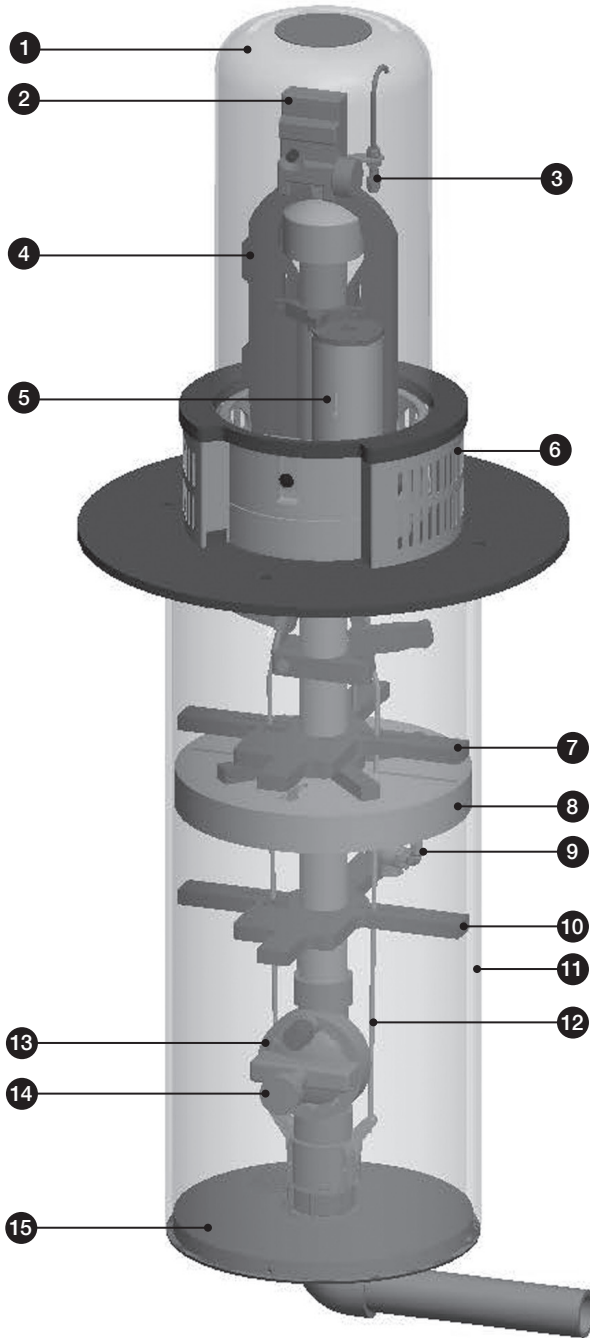
- The solenoid is stuck in the open position or debris is interfering with operation of plunger.
- Batteries weak or dead.
- Connection loss from battery box to solenoid.
- The solenoid is loose or there is debris in the plunger.
- There is a hole in or debris around the diaphragm or in the valve screen.

##### **Try this Correction**

- Run a manual flush for 1 minute.
- Change batteries.
- Check connections for corrosion, breaks, or lack of connection.
- Check the adapters and solenoid for debris– Run the electrical systems check.
- Refer to valve troubleshooting for possible corrective measures.

# HYDRO-GUARD® HG-3 Flushing System

## Parts



### REPLACEMENT PARTS

ID	PART #	DESCRIPTION
1	546284	UV Protective Housing
2	HG-S295	TBOS-II Controller Assembly
3	546521	Sample Valve Assembly
4	546329	Riser Assembly
5	546519	Dechlorination System
6	HG-S316	Stainless Steel Housing Bracket
7	545729	Centering Star
8	HG-S126	Insulation Star Sub-Assembly
9	HG-S128	Freeze Protection System Sub-Assembly
10	545729	Centering Star
11	545738	Splash Pad
12	HG-13105	Latching Rods 1/4" x 26"
13	HG-S124	Latching Solenoid Sub-Assembly
14	HG-S325	Control Valve Sub-Assembly
15	546330	Bottom Plate Sub-Assembly

# HYDRO-GUARD® HG-3 Flushing System

## Options and Upgrades

### HYDRO-GUARD® OPTIONS AND UPGRADES

The following is a brief overview and introduction to Hydro-Guard® Options.

#### LOW LEAD BRASS INTERNAL COMPONENTS AND PIPING

#### S.M.A.R.T. Monitoring and Flush Management

The Hydro-Guard HG-3 can be upgraded to include a S.M.A.R.T. controller and a variety of water quality sensors. The S.M.A.R.T.

equipped HG-3 will allow a utility to remotely monitor, in real-time, the water quality at a specific flush point and automatically initiate a flush event when water quality conditions warrant.

#### The Hydro-Guard® S.M.A.R.T. flushing system:

- Monitors chlorine levels (total or free).

- Flushes distribution line when residual disinfectant drops below acceptable levels.
- Monitoring of pH, flow, temperature or turbidity available.
- Two-way real-time communication via cellular, wifi, ethernet or Bluetooth®.



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