

HYDRO-GUARD®

a **MUELLER** brand

OPERATING INSTRUCTIONS MANUAL

HG-2 High-Profile Direct Discharge Unit

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WARNING:

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. Replace worn or defective parts with OEM parts and check your battery twice a year.
6. Operate the Hydro-Guard Automatic Flushing Device only when fully installed and correctly assembled.
7. It is recommended that a pressure reducing valve be installed in front of the Hydro-Guard where pressure could exceed 120psi.

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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HG-2 HIGH-PROFILE DIRECT DISCHARGE UNIT

Installation Instructions

GENERAL

Overview

The Hydro-Guard® HG-2 High Profile Direct Discharge Unit, the industry's premium patented, programmable flushing apparatus, is suitable for year-round use in warm and moderate climates. This Automatic Flushing System has been designed, engineered, and manufactured to provide outstanding dependability and performance.

Please read and retain this manual. It will be helpful for future reference, training, troubleshooting, and maintenance.

Site Evaluation

Each Hydro-Guard® Unit 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® Unit in the case of a backflow situation. In cold-weather applications multiple nightly flushes are effective in managing discharge volumes and preventing the accumulation of ice.

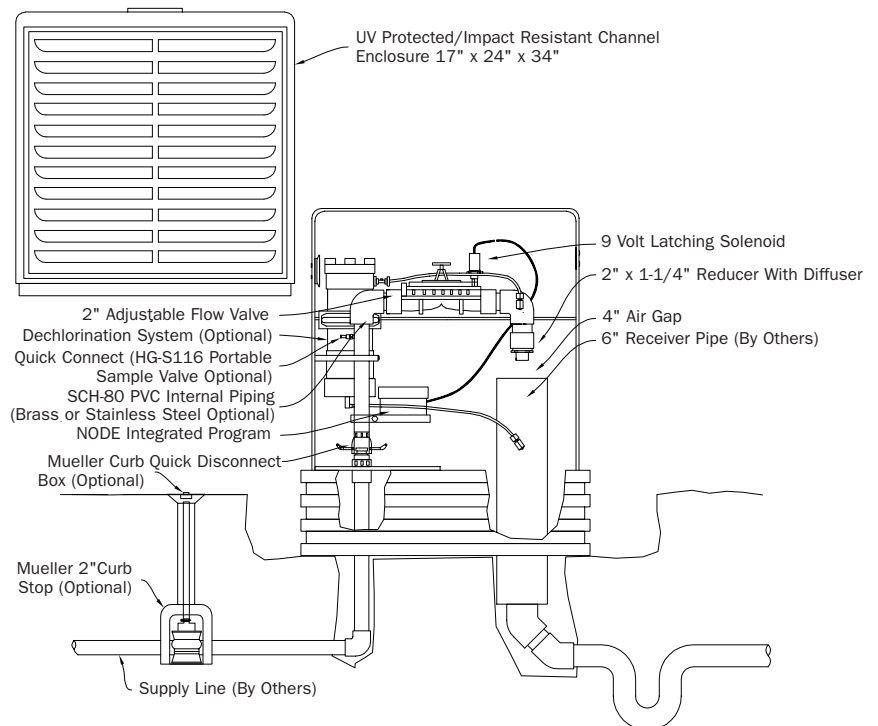
INSTALLATION

Hydro-Guard® HG-2 High-Profile Direct Discharge Air Gap 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 noncompacted clean bedding material within the bottom of the hole.
3. Slowly lower the Hydro-Guard® Unit into place, pressing it firmly into the noncompacted bedding material until it is fully seated.
4. Connect the utility's water system to the Hydro-Guard® Unit by means of the 2" threaded connection. Ensure that Unit is level before beginning the backfilling operation.

5. Backfill the hole around, under, and inside of the Unit with clean fill and/or #57 stone. Backfilling should be accomplished in 6" compacted lifts. Check that the Unit is level.

6. 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.



PROGRAMMING HYDRO-GUARD® UNIT FOR OPERATION

Discharged water flushed from the Hydro-Guard® Unit must be routed away from the device. For Air Gap models it is recommended that a 6" catch pipe (by others) be installed inside of the HG-2's external cabinet. The catch pipe shall be mounted at least 3" under the discharge piping of the HG-2 (see Typical Installation illustration on page 2). The 6" pipe shall be installed a minimum of 24" below grade before a 90-degree bend or pipe size reduction. If desired, the 6" pipe can be reduced to a 3" or 4" pipe to continue the routing of the flow to a final discharge point. The recommended final discharge points may include a storm drain, drainage or retention pond, or a storm swale.

Technical Data

- Operating temperature range of 32° to 120° F
- Operating Pressure: 7 to 200psi

NOTE: Where sustained pressures may exceed 120psi the installation of a pressure reducing valve (PRV) is recommended.

Battery Life

Will vary based on number of cycles per year, operating pressure, and temperature. We recommend checking the battery every 6 months, but in many cases, you will get more life out of them.

HG-2 (Requires Controller)

The BL-KR battery powered irrigation module communicates with the K-Rain BL Application on a Smartphone or Tablet by using Bluetooth SMART 4.0, (low energy) on an iPhone with iOS version 7 minimum or an Android phone/tablet with Marshmallow version 6.0 or higher.




Important

⚠ CAUTION: For use only with 9V DC Latching Solenoids. As some solenoids will come from the manufacturer with the plunger

already magnetically latched open, some zones will default to OPEN. Follow the start-up procedure for systems with DC Latching Solenoids. (Page 09)

⚠ CAUTION: For every change to the program in the Mobile App, you must exit back to the home screen and tap the blue TRANSMIT button (bottom right corner). The Application aggregates changes and transmits them to the controller when you have finished programming.

⚠ CAUTION: Programs A, B, and C are independent programs, including start times, run times, watering days, and water budget.

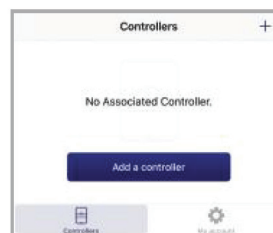
1. Install the App: – From the App Store  or Google Play  Install the free K-RainBL App: 

2. Install a 9 Volt Battery in the Controller: – Unscrew the cap, remove the seal and fasten the battery to the correct terminals. Replace the seal and cap and hand-tighten the cap to ensure it seals.

NOTE: Before you launch the App, you will need to enable location services on your phone/tablet in order for the App to geolocate your device during installation. On Android, location services must be enabled in order for the App to connect to the BL-KR device.

3. Launch the application on your Smartphone or Tablet.

4. Associate the controller with your phone by tapping the Add a Controller button.



5. The app will now ask what type of Bluetooth device you would like to add:

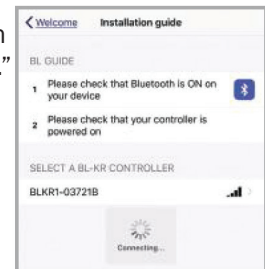
NOTE: The BL-KR V1.0 and BL-KR V2.0 have identical hardware and software configurations. The only distinction is the outside plastic housing.



6. The App will now search for devices in range.

7. Choose the Controller. The serial numbers that populate the device list can be found on the label located on the back of the controller housing with the designation "Default name."

The App will indicate that it is in the process of connecting.



8. Once the device is connected, it will appear on the home screen when you launch the Application.

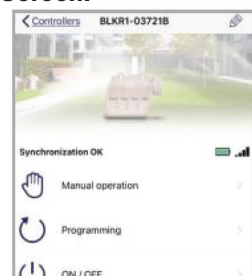
Application Home Screen:

To add another controller, tap the plus sign in the upper right hand corner of the home screen.



Device Home Screen:

NOTE: You can associate up to 400 devices with the K-Rain BL-KR App. The number of devices is limited to the internal memory on the Smartphone/Tablet.



HG-2 Built-In: (Integrated)

NODE Programming Instructions

Batteries

The NODE uses standard 9-volt alkaline batteries to operate the control valve and program the controller. The controller can operate with one or two batteries installed. Under normal conditions, potential life is 1 year for a single battery.

Battery Installation

1. Unscrew rear body of the NODE to gain access to battery compartment.
2. Insert battery/batteries into battery tray and connect the battery connector to controller.
3. Make sure no water is inside battery compartment.
4. Screw the NODE rear body back onto front half.

NOTE: Make sure that seal marker on rear half of the NODE lines up with front half, ensuring a proper seal is created. Also, The NODE has non-volatile memory, which allows battery replacement without losing program information.

Idle Mode - Waking Up

Normally the NODE display shows time and day, day of week, and battery life Indicator. During a short period of inactivity the display will shut off to retain battery power. Pressing any key will wake up the NODE to the Idle Mode.

Run Mode

When controller is operating a program, items shown on display will include station number (always "1 "), program letter (A, B, or C), remaining runtime, and a blinking Rotor icon.

Programming

The NODE has the capability to hold 3 programs (A, B, C) and 4 start times per program. When programming, flashing portion of display can be changed by pressing + or - keys. To change something not flashing, press **LEFT** or **RIGHT ARROWS** until desired item is flashing.

Setting Date/Time

1. Press **RETURN/ENTER** key until **CLOCK** icon is displayed.
2. All 4 digits will be displayed representing the year. Use + or - keys to change year. Press **RIGHT ARROW** key to proceed to setting month.
3. All 4 digits will be displayed with two digits on left flashing representing the MONTH. Use + or - key to change month. Press **RIGHT ARROW** key to proceed to setting **DAY**.
4. Only two digits on right will be flashing, representing the **DAY**. Press + or - key to change day. Press **RIGHT ARROW** key to proceed to changing **TIME**.
5. The **AM/PM/24** time setting is shown flashing. Press + or - key to change to AM, PM, or 24:hour time. Press **RIGHT ARROW** key to proceed to setting the **HOURLASS**.
6. All 4 numbers are shown with two numbers on the left flashing, representing the **HOURLASS**. Press + or - key to change the hour. Press **RIGHT ARROW** key to proceed to setting **MINUTES**.
7. All 4 numbers are shown with two numbers on right flashing, representing **MINUTES**. Press + or - key to change minutes. (Pressing **RIGHT ARROW** key will return to **YEAR** setting at step #2.)
8. Press **RETURN/ENTER** key to proceed to next programming function, or allow controller to return to idle mode.

Setting Flush Sequence Start Times

1. Press **RETURN/ENTER** key until **CLOCK** icon is displayed.
2. The **START TIME** will be displayed flashing, along with the program letter (A, B, or C) and start time number (1, 2, 3, or 4) in the upper left of the display. Up to 4 different start times can be set for each program.
3. Use + or - key to change **START TIME** for program displayed. Each press of key will change start time in 15-minute increments.
4. Press **RIGHT ARROW** key to add an additional **START TIME** to program displayed. The start time number is shown in upper left corner of display.
5. Press **PRG** key to add **START TIME** to a different program.
6. Press **RETURN/ENTER** key to proceed to next programming function, or allow controller to return to Idle mode.

Setting Flush Duration Times

1. Press **RETURN/ENTER** key until **HOURLASS** icon is displayed. **RUN TIME** will be displayed flashing. Also shown is program letter (A, B, or C) and active station# (always #1- all other stations not used) on lower left side of display.
2. Press + or - key to change station **RUN TIME** from 1 minute to 6 hours.
3. Press **PRG** key to add a **RUN TIME** to another program.
4. Press **RETURN/ENTER** key to proceed to next programming function, or allow controller to return to Idle mode.

Setting Flushing Days

1. Press **RETURN/ENTER** key until **CALENDAR** icon is displayed. The program letter (A, B, or C) will be displayed. Arrows point at specific days of week in which flushing will occur.
2. Press **LEFT** or **RIGHT ARROW** to scroll through days.
3. Press **+** key to activate that day for program displayed, or **-** key to cancel watering for that day. The arrow will show on flushing days for active program.
4. Press **PRG** key to set days to flush for a different program, if desired.
5. Press **RETURN/ENTER** key to proceed to next programming function, or allow controller to return to Idle mode.

Manual Flushing

Manual flushing allows user to test the Hydro-Guard® unit or a program for a specified run time.

Make sure controller is in Idle Mode.

1. Press and hold **RIGHT ARROW** until **HAND** icon is displayed. The station number (always #1) will be displayed in lower left side of display along with **RUN TIME**.
2. Use the **LEFT** or **RIGHT ARROW** to select #1 station if not already displayed, and **+** or **-** key to set manual flushing time.
3. To manually activate a program, press **PRG** key. Program letter (A, B, or C) will show on screen. If a different program is needed, press **PRG** key until desired program is displayed.
4. To stop **MANUAL FLUSHING** cycle press **-** key until time is reduced to zero.
5. Press **RETURN/ENTER** key to proceed to next programming function, or allow controller to return to idle mode.

NOTE:

- Pressing + or - key when running in MANUAL FLUSH mode will modify FLUSH TIME for that station.

- Pressing the button when a station is running in manual watering will stop flush on the current station and advance to the next station.

- Pressing the button when a station is running in manual watering will stop the flush on the current station and revert to the previous station.

Turn System Off

To turn off controller, press **RETURN/ENTER** key button until icon resembling water spray and **OFF** is displayed on screen. To return controller to auto programming mode, press **RETURN/ENTER** key. The controller will immediately return to auto programming mode and will display time and battery life indicator.

NODE Quick Check

This circuit diagnostic procedure can quickly identify "shorts" commonly caused by faulty solenoids or when bare common wire touches a bare station control wire. To initiate **NODE Quick Check** procedure:

1. From Idle Mode, press and hold **+, -, LEFT ARROW, and RIGHT ARROW** keys.
2. Display will show all segments. Release keys.
3. Press **+** key to initiate **NODE Quick Check** test.
4. Controller will then activate flushing unit for 1 second to verify operation.

Battery Life Indicator

Remaining battery life can be estimated from the battery life indicator shown on display. The NODE can operate using either a single 9-volt battery or using two

9-volt batteries. Using two nine volt batteries will yield approximately twice the battery life of a single 9-volt battery. The battery life indicator chart below shows an estimate of remaining battery life.

Full: 100-60% remaining battery life
Med: 60-25% remaining battery life
Low: 25-0% remaining battery life
Replace battery immediately!

Resetting Controller

Resetting controller will erase current program data and restart controller. A reset does not, however, delete a program saved to permanent memory using the Easy Retrieve Memory feature to save a preferred program.

1. From Idle Mode, press and hold **-, RIGHT ARROW**, and **PRG** keys.
2. After two seconds screen will go blank. Continue to hold keys.
3. 12:00 will flash on display. Release keys.
4. The controller may show a countdown from 10 to 1 on display, and then 12:00 am will be shown flashing when reset is complete. The controller can now be reprogrammed.

HYDRO-GUARD® FEATURES, OPTIONS AND UPGRADES

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

Sample Station (Included)

A standard feature on the HG-2 High Profile Direct Discharge Unit is the sample port, which allows Hydro-Guard's Portable Sample Valve (Part# HG-S 1167) to attach to the sample port to obtain a sample. Slip off the sanitary blue cap, attach the quick-connect adaptor, open the valve and collect your sample. You may wish to run a brief manual-mode flush prior to the collection in order to ensure water indicative of the main-line water quality is being sampled. Generally a two-minute flush is sufficient. Track your residual levels and alter flushing frequency and/or duration in order to maximize water conservation.

Freeze Protection (Brass Only)

The Hydro-Guard® Direct Discharge Unit (HG-2) can be upgraded to include freeze protection via a thermal control valve to help prevent the unit from freezing at colder temperatures.

Dechlorination (included)

All Hydro-Guard® Units are equipped with a dechlorination system. Dechlorination takes place as a portion of the discharged water passes through a housing containing either sodium sulfite or ascorbic acid tablets. This action creates a concentrated dechlorination solution that then mixes with the non-directly treated portion of the discharge to effectively dechlorinate the entire discharge volume. This option is available for the HG-2 Direct Discharge Unit.

HG-2 DISASSEMBLY AND REASSEMBLY INSTRUCTIONS

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

Although the Hydro-Guard® HG-2 Direct Discharge with Air Gap was delivered completely assembled, it may be necessary and/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.

HG-2 Removal of Internal Components (FOR AIR GAP MODEL)

1. Shut off water supply and secure isolation valve.
2. Remove the housing cover by tilting the housing upward while tilting slightly on its end. Once the retaining pin, located in the opposite end of the housing, is clear of the cover, lift upward to remove the cover.
3. Use the sample port connection to bleed residual pressure within the line.
4. If you have dechlorination, remove from piping by loosening the nut and disconnect, 'Skip to #5, if no dechlorination.
5. Loosen the union and remove piping and control valve.

Electrical System Check

1. Unscrew Solenoid from control valve.
2. Make sure controller is attached to solenoid via connectors (remove adaptor if present).
3. Position thumb or other object in front of plunger, leaving a slight gap ($1/8$ "), to prevent plunger and spring from ejecting away from work space.
4. Run manual flush for 2 minutes.

NOTE: Plunger inside solenoid should be down when running and up when off.

5. If everything checks out, reinstall solenoid in valve.

6. Avoid cross threading. Any resistance means solenoid is not going in correctly and cross threading may occur. Do not overtighten. Tighten until snug.

If everything checks out, the electrical system is in working order.

Disassembly and Check

For units manufactured from August 2004 to present, use the following directions. If you have an older model with a different valve and lost the manual, please call us at (800) 423-1323 option #9 to get the manual for that model.

1. Remove six (6) bolts from top cover.
2. Slowly pull cover off the valve.
3. Remove rubber diaphragm and inspect for holes or worn areas.
4. Inspect valve screen plug to be certain it is not damaged and clear of debris.
5. Remove valve screen plug and inspect valve screen for debris. Clean with water if necessary.
6. Replace the top cover back onto the diaphragm - make sure to line up the openings in both.
7. Match up the top cover of the valve with the bottom portion. The arrows have to align on both portions.
8. Replace the bolts and tighten down.

Reassembly (FOR AIR GAP MODEL)

1. Before reinstalling the working components, check all union surfaces for wear or damage. Reinstall the working components and tighten the union.
2. If you have dechlorination, reattach to piping by tightening the nut.
*Skip to 3 if no dechlorination.
3. Turn the water supply to the unit back on and check for leaks.
4. Run a 2-minute manual flush. Replace the batteries in the controller if needed. Now program the flushing schedule.

TROUBLESHOOTING THE PROGRAMMER

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.
- The water pressure is too high and the solenoid will not open.

Try this Correction

- Check if curb stop is open.
- Change batteries.
- Check connections for corrosion, breaks, or lack of connection.
- Run an electrical systems check.
- Check to make sure the flow

control knob is open on the valve OR Check the pipes for obstructions OR Check the valve.

- Check the water pressure at the unit. The pressure must be in the operating range of the solenoid and programmer (150 psi maximum). If too high a PRV might need to be installed.

The Hydro-Guard Unit will not shut off:

Possible Causes

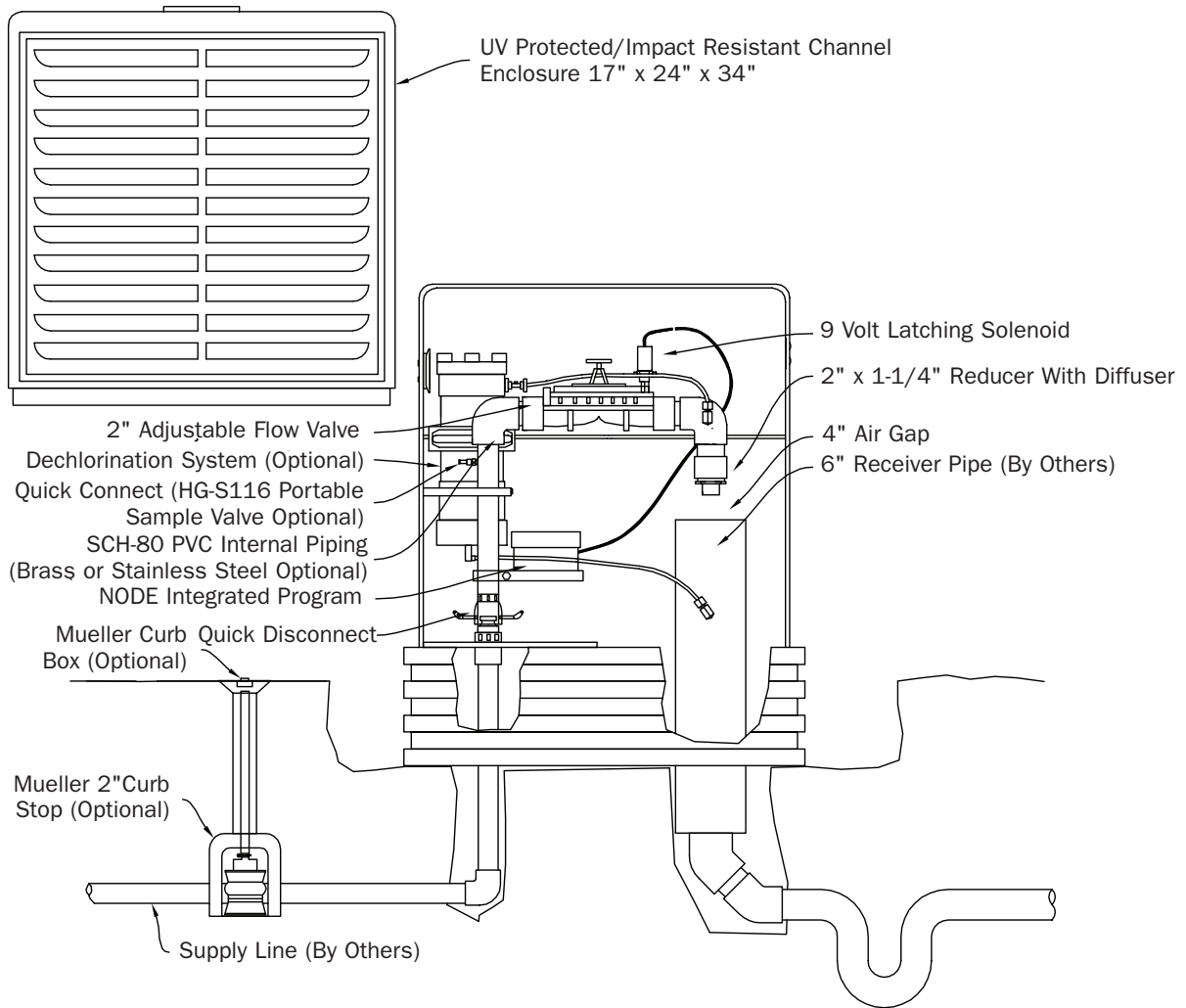
- The solenoid is stuck in the open position.
- Batteries weak or dead.
- Connection loss from controller to solenoid.
- The solenoid is loose or there is debris in the adapter.
- There is a hole in or debris around the diaphragm.

- The water pressure is too high and the solenoid will not close.

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.
- Check the water pressure at the unit. The pressure must be in the operating range of the solenoid and programmer (150 psi maximum). If too high a PRV might need to be installed.

HG-2 HIGH-PROFILE DIRECT DISCHARGE UNIT



NOTES





LIMITED WARRANTY

This Hydro-Guard™ Automatic Flushing Device Is warranted for one year from the date of delivery. Mueller Co. will repair or replace any defective part or component as long as the Unit is installed and operated in accordance with the procedures described within this manual. Damage or failure caused by the Improper installation, assembly, disassembly, maintenance or operation of the Hydro-Guard Automatic Flushing Device Is not covered by the terms of this warranty. Call Mueller Co. at 877.864.8500 during regular business hours, or contact HydrowGuard at www.HydroMGuard.com for details on warranty service.

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