

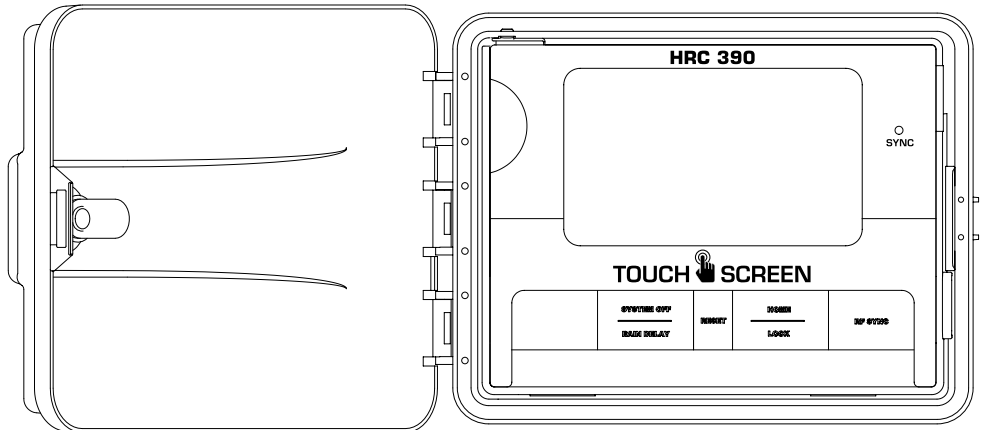
HYDRO-RAIN®

Built for Speed™

HRC-390 SERIES

Indoor/Outdoor Touch Screen Controller

INSTRUCTION MANUAL



Models:

HRC-390-06-NA

HRC-390-12-NA

Model 04040-24 Rev A

Table of Contents

Section 1: INTRODUCTION.....	02
Section 2: GETTING STARTED	04
Section 3: PROGRAMING YOUR CONTROLLER.....	05
Section 4: INSTALLATION.....	08
Section 5: DIAGNOSTICS CIRCUIT BREAKER	11
Section 6: GLOSSARY OF TERMS	12
Section 7: TROUBLE SHOOTING.....	14

Section 1: INTRODUCTION

Thank you for selecting the Hydro-Rain® HRC-390 Series sprinkler controller. Our designers have combined the simplicity of touch-screen programming with the flexibility and accuracy of digital electronics to give you a controller that is easy to program and extremely versatile. This convenient controller lets you run automatic or manual watering programs with a wide spectrum of features, including remote control and RF sensor operations.

Please read this manual completely before you begin programming and using the controller.

Important Features and Capabilities

Three Independent Programs

HRC 390 sprinkler controller's offer three independent programming functions – Programs A, B, and C offer watering flexibility across variable landscapes ie. Trees, Turf, Xeriscape, etc. Any of the watering stations can be assigned to individual or all programs. For example, stations that water your garden and flower beds could be assigned to Program A and watered daily starting at 8 a.m., while stations that water your lawn could be assigned to Program B and watered every third day starting at 5 a.m. Program C could be selected for drip or other low-flow stations.

Simultaneous C Program

The C program is specially designed for drip or other low-flow stations that need to run for longer durations or at more frequent intervals. The HRC 390 is able to run concurrently the C program with A or B programs. See "Stacking" Feature on the next page.

"Stacking" Feature

Occasionally you will inadvertently program one program to water prior to another program finishing its watering cycle. This could result in insufficient water flow necessary to operate the system. The HRC 390's unique logic will override human programming error and begin the next water cycle after completion of the first cycle for the A and B program. The C program will run concurrently with the A and B programs. In order to ensure sufficient available flow for the A and B programs, the C program should be reserved for low-flow zones such as drip zones.

Docking Port

Mounting your HRC 390 to the wall is easy and convenient. The HRC 390's "docking port" is affixed to the wall and all wires are connected to it. The controllers programming unit is then conveniently slid in to the docking station. This feature allows you to walk around the yard while programming each station to meet the needs of the landscape.

Remote Control Capabilities

The HRC 390 has an RF receiver built into its circuit board. When used in coordination with the HRC 390-12-TR (RF Transmitter) the HRC 390 programming can be overridden. This feature allows you to turn stations on and off on the spot from anywhere within range. The 433 megahertz remote frequency is approved for use in the United States, Canada, Europe and Australia, and permits an effective line-of-sight range of 300 feet (reduced to 200 feet with obstructions).

Programming Information Stored Safely in Non-Volatile Memory

All programming information for Programs A,B, and C are stored indefinitely in the HRC 390's non-volatile memory. Non-volatile memory means your programming won't be lost or erased when or if both primary and battery power are suspended.

Convenient, Easy-to-Read Touch-Screen LCD Display

The HRC 390's back-lighted, touch-screen LCD display is convenient to program and easy to read under any lighting conditions. You may use either your finger or the built-in stylus to manipulate programming on the touch screen.

Choice of Five Languages

You can easily set the LCD display to read in any of five languages: English, Spanish, French, German or Italian.

Water Budgeting

This convenient feature provides a quick, easy way to increase or decrease the watering durations of all stations in both programs to match seasonal watering needs. You won't have to adjust each station's watering time individually.

Push Buttons

These push buttons on the controller are used for programming and other operations:

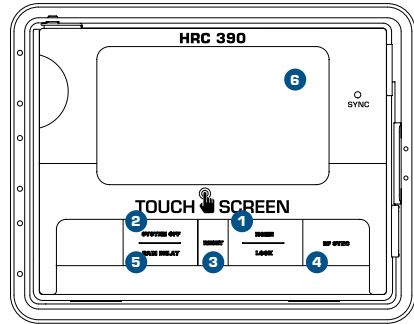


Figure 1: Front view of touch-screen controller

1 Home/Lock

Used to exit settings; to go into AUTO MODE, or to lock the touch screen.

2 System Off

A single push will open the Rain Delay screen. A second push of the button will place the entire system in OFF mode.

3 Reset (pin hole)

Resets the HRC 390 to factory default settings.

4 RF Sync

Allows the HRC 390 to synchronize with a remote transmitter or wireless rain sensor (HRC-300-12-RS) sensor.

5 Rain Sensor

In "Active" position the controller will monitor the rain sensor, in "Bypass" position the HRC 390 sprinkler controller will ignore the rain sensor. (This switch is for hard wired sensors only and does not effect wireless rain sensors. For wireless rain sensor bypass refer to section 4.)

6 Touch Screen

Use stylus or finger to set programming.

Section 2: GETTING STARTED

Set Language

- Press the **RESET** button. The controller will now take you through a step by step programming process.
- Press **▲** or **▼** on the touch screen to set the language of your choice (English, Spanish, French, German, Italian).
- Press **ENTER**.

Set Current Time and Date

- Press **▲** or **▼** to set the current time. Press **ENTER**.
- Press **▲** or **▼** to set the current year. Press **ENTER**.
- Press **▲** or **▼** to set the current month. Press **ENTER**.
- Press **▲** or **▼** to set the current day of the month. Press **ENTER**.

Determine a Watering Plan

See page 13 for instructions.

Section 3: PROGRAMMING YOUR CONTROLLER

Walk through programming is available after pressing the **RESET** button. (If you began the programming sequence with Section 1 do not press "reset" again.)

Program Toggle Feature

The Program Toggle Feature allows you to switch back and forth between Program A, Program B and Program C. Press **PROG. (A) (B) (C)** on the touch screen to select Program A ("A" is larger than "B") or Press **PROG. (A) (B) (C)** on the touch screen to select Program B ("B" is larger than "A" etc.). You can change the watering start times, watering days, and watering durations for each program.

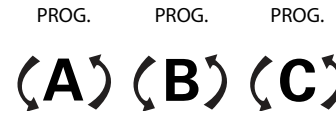


Figure 2: Program Toggle Feature

Set Start Times

- Press **▲** or **▼** to set the start time for the selected program. Press **ENTER**.

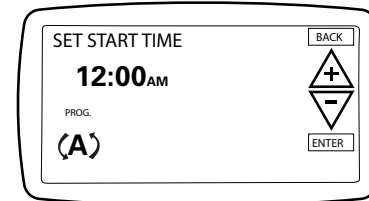


Figure 2: Set Start Times

Set Water Days

- Press **ODD**, **EVEN**, **INTERVAL** (1-32 days using **▲** or **▼**) or the specific days of the week (**Su**, **Mo**, **Tu**, **We**, **Th**, **Fr**, **Sa**) you want the selected program to water. Press **ENTER**.

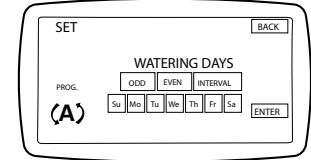


Figure 3: Set Watering Days

Set Station Watering Durations

- Select the first station to be watered by pressing the station number (1 should be flashing) on the bottom of the touch screen or press **ENTER** to advance to the desired station. **Note: The active station, being programmed, is flashing.**
- Set the watering duration for each station by either:
 - Selecting one of the preset watering duration minutes (**0**, **5**, **10**, **15**, **20**, **30** or **45**) on the bottom of the LCD.
 - Using the **▲** or **▼** to enter the desired minutes.

Note: a watering duration must be entered for each watering station or the station will not water.

- Follow the same procedure to set the watering durations for all other stations.
- Press **EXIT**.

At this point you will see the **PROGRAMMING COMPLETE** screen. If you wish to go back and change any of the set-

tings, press **BACK**. If not, press **ENTER**. This will accept the programming and take you to the HOME/AUTO screen.

To Set Watering Cycles:

A watering cycle consists of the activation of valves in sequence inside of a specified watering program (A, B, or C).

Using multiple watering cycles is ideal for reducing runoff and standing water. This sprinkler controller allows program A, B or C (or all) to be repeated on the days programmed.

When extra watering is needed, all programs can be set to repeat the set watering durations up to 10 times a day. In order to maximize absorption and prevent runoff, you may set a specific number of minutes or hours between the start of one cycle and the start of the following cycle. This is called the "cycle delay" and can be set from 0 minutes to 90 minutes in 10-minute increments, and from 2 hours to 23 hours in one-hour increments.

- From the HOME/AUTO screen, press **PROG.(A)(B)(C)** to enter the program review screen. Toggle to desired program.
- Press **CYCLES**.
- Press **▲** or **▼** to select the desired number of watering cycles. Press **ENTER**.
- Press **▲** or **▼** to select the desired number of minutes or hours (from 0 minutes to 23 hours) between the start time of one cycle and the start time of the following cycle. Press **ENTER**.
- Repeat this procedure for the other program, if desired.

To Change Settings From the HOME/AUTO Screen:

Hydro-Rain® has simplified the way to make modifications to your controller programming. Just tap the setting you want changed in the HOME/AUTO screen.

- Tap the date to change the current date
- Tap the time to change the time of day
- Tap the **NEXT START** to change the time of day you want to water
- Tap the station number to modify the watering durations
- Tap **PROG** to modify the Watering Days
- Tap **CYCLES** to modify the number of watering cycles
- Press the **HOME/LOCK** button at any time to return to the HOME/AUTO screen.

To Water in Manual Mode:

- To manually water one, some or all stations, press **MANUAL** at the top right of the HOME/AUTO screen.
- The first screen MANUAL - ALL will allow you to water all stations with the same duration (1 to 240 minutes). Select the desired duration, then press **ENTER**.
- Or, press **NEXT** for MANUAL - SELECT watering. This screen allows you to select any single station or a group of stations each with individual durations (1 to 240 minutes) using **▲** or **▼** the Quick Touch buttons. Select the desired stations and durations then press **ENTER**.
- Or, press **NEXT** again for MANUAL - PROG A watering.

This will allow you to water the stations in Program A for their pre-set durations. Press **ENTER** to begin watering.

- Or, press **NEXT** again for MANUAL - PROG B watering. This will allow you to water the stations in Program B for their pre-set durations. Press **ENTER** to begin watering.
- Or, press **NEXT** again for MANUAL - PROG C watering. This will allow you to water the stations in Program C for their pre-set durations. Press **ENTER** to begin watering.

To advance to the next station in manual mode, press **NEXT**.

Press **CANCEL** to stop the manual watering cycle.

To Set Water Budgeting:

Water Budgeting is a quick way to adjust your set durations (10 to 200%) based on seasonal requirements.

- Press **BUDGET**.
- Press **▲** or **▼** to select the desired budget percentage. Press **ENTER**.

Note: If your set duration is 10 minutes and you set the water budget to 150% the duration will be 15 minutes. If you set it to 50% the duration will be 5 minutes.

WIRELESS SENSOR ACTIVE/BYPASS

This controller communicates with the HRC-300-RS-RF wireless rain/freeze sensor.

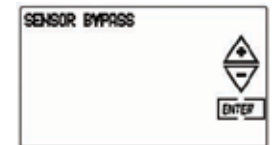
To change the communication status between the controller and the wireless sensor do the following:

- Press the **BUDGET** button on the Home/Auto Screen.
- Press the **SENSOR** button on the top right of the screen.
- Use the **▲** or **▼** to toggle the sensor communication status.

Sensor Active—controller will allow sensor to block watering.

Sensor Bypass—controller will ignore the sensor and will not allow watering to be blocked.

- Press **ENTER** when desired status is selected.



To Lock Programming Keys:

- Push the **HOME/LOCK** button once from the Home screen. The lock icon, **🔒**, will show on the screen. To unlock the touch screen press the **HOME** button again.

To Prevent Watering:

- To stop watering for a set period (1 to 99 days) press **RAIN DELAY** once and select the desired delay using **▲** or **▼** and then press **START**. To cancel the **RAIN DELAY** and return to **AUTO** mode press **CANCEL**.
- To stop all watering indefinitely, push the **RAIN DELAY/**

SYSTEM OFF button twice. The controller will be placed in OFF mode. To return to AUTO mode press the HOME/LOCK button.

Section 4: INSTALLATION

NOTE: Before installation, please have the following tools on hand:

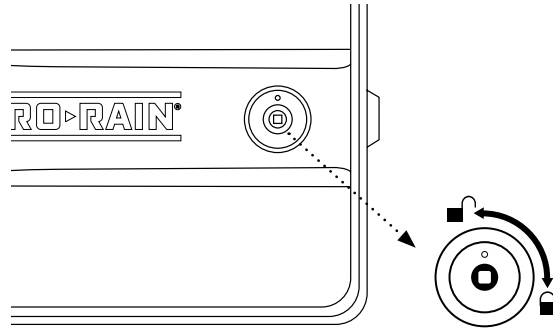
- Phillips screwdriver
- Wire strippers

Installing the Sprinkler Controller in Five Easy Steps

1. Select a Location

When choosing a location for your HRC 390, consider the following:

- Choose location near a power source (if hard wiring) or electrical outlet when using the supplied power cord.
- Ensure operating temperatures are not below 32° or above 158° Fahrenheit (below 0° Celsius or above 70° Celsius).
- Place it away from direct sunlight if possible.
- Ensure at least 9" of space to the left of the sprinkler controller box for the door to swing open after installation.
- Locate the controller where there is easy access to sprinkler wire (from valves). If mounted in an outdoor location, shut the compartment door to keep the controller safe from weather damage. To lock: insert the key and turn clockwise to the locked position.



NOTE: Sprinkler controllers are weather-resistant to UL-50 and ETL® Listings, but should not be placed in areas where continuous water could cause damage.

2. Mount the Controller

- Use the mounting template (included) to mark the mounting screw location on the wall. See **Figure 4**
- Install a No. 8 screw (included) into wall in the upper template location. Leave the screw head protruding 1/8" (3mm) from wall. Use expanding anchors (included) in plaster or masonry, if necessary, for a secure hold.
- Slip the HRC 390 over protruding screw (using keyhole slot in back). See **Figure 5**
- Drive a No. 8 screw through one of the two pre-formed holes located in lower back cabinet. See **Figure 5**

3. Connect Valve Wires to Controller

- Strip 1/2" (12 mm) of the plastic insulation off the end of each valve wire at the controller.

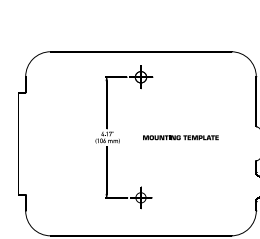


Figure 4: Use Mounting Template

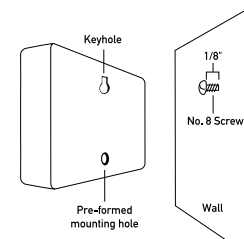


Figure 5: Hang timer on screw using keyhole

- Connect one wire from each valve (it doesn't matter which wire) to a single "Common" sprinkler wire (usually white).
- Connect the remaining wire from each valve to a separate colored sprinkler wire.
- See **Figure 6**

NOTE: The maximum loading for each station/pump is 250mA, the maximum loading for the controller is 500mA. If the distance between the sprinkler controller and valves is under 700' (210 m), use sprinkler wire or 20 gauge (AWG) plastic jacketed thermostat wire to connect the sprinkler controller to the valves. If the distance is over 700' (210 m), use 16 gauge (AWG) wire.

IMPORTANT: All wires should be joined together using wire nuts, solder, and/or vinyl tape. In wet environments like a valve box it is recommended to use grease caps to prevent corrosion of the connection and for protection from water infiltration.

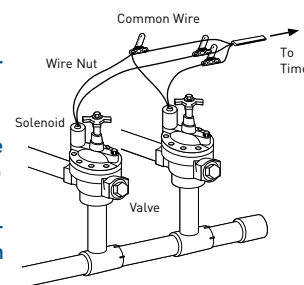


Figure 6

Wiring Electric Valves

Strip 1/2" (12 mm) of plastic insulation off the end of each individual wire. Each valve has two wires. One wire (it doesn't matter which one) is to be connected as the common. The other valve wire is to be connected to the specific station wire that will control that valve. The common wires for all the valves can be connected together to one common wire going to the controller. To avoid electrical hazards, only one valve should be connected to each station. See **Figure 7**

IMPORTANT: The wire can be buried in the ground; however, for more protection wires can be pulled through PVC pipe and buried underground. Be careful to avoid burying the wires in locations where they could be damaged by digging or trenching in the future.

Your controller is equipped with the simple "push-in" terminals for easy connection. Connect common wire to the common terminal. Connect remaining wires to corresponding terminal locations. Only connect one valve to each terminal (station).

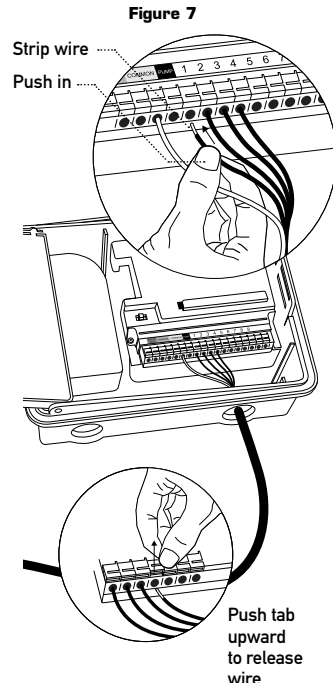


Figure 7

4. Connect Electrical Power

Indoor Locations—Insert the power cord into an 110V electrical outlet.

Outdoor Locations—If a covered Ground Fault Interrupter (GFI) outlet is available, insert the power cord into the 110 volt outlet. If no outlet is available, the controller must have the wiring permanently installed (Figure 8)

- Turn off the AC power at the AC circuit breaker and apply an appropriate safety lockout. Verify that the power has been turned off to the installation site using an AC voltmeter set for the correct measurement range.
- Use power feed wire of 14 gauge (AWG) minimum with a temperature rating of 155 degrees Fahrenheit (68 degrees Celsius) or higher.
- Install the conduit and associated fittings. Connect the AC electrical power wiring to the source by following all the right codes and local standards.
- Connect the junction box to the controller using a 1/2" nipple (Junction box and nipple not included). [See Figure 8] Connect the source power conduit to the entrance of the junction box, following all the appropriate codes.
- Take the cord (running from the controller to the junction box) from the junction box and cut it to length. Remove the outer insulation (from cord) to expose the three wires.
- Connect the source wires to the wires extending from the sprinkler controller.
- For USA: Take care to follow the correct color code. Connect the Green for Ground, Black for Live, and White

for Neutral. Often the source ground may be bare copper conductor rather than green wire.

- Make sure all connections are made with code-approved insulated connectors.
- Be sure to place a weatherproof gasket and lid on the junction box.
- Turn AC power on at the AC circuit breaker.

IMPORTANT: INSTALLATION USING PERMANENT WIRING
The sprinkler controller has a built-in transformer that must be connected to an AC line voltage source. Check the back of the sprinkler controller box for power requirements. Local building and electrical codes usually require that an approved electrical conduit and electrical fittings be used to connect exterior wall-mounted equipment to AC power. Please check local codes. Any permanent connection should be made by a licensed electrical contractor in accordance with the requirements of the National Electrical Code and other state and local codes.

This sprinkler controller has two holes at the bottom for wire access. Use a 1/2" Nipple to connect the sprinkler controller to a standard electrical junction box. Both connector and junction box must be UL Listed or equivalent or comply with IEC or EN standards or equivalent.

The wire can be buried in the ground; however, for more protection wires should be pulled through electrical conduit and buried underground. Be careful to avoid burying the wires in locations where they could be damaged by digging or trenching in the future.

CAUTION: Do not connect the sprinkler controller to one phase of a three phase power system used by a pump or other electrical equipment.

NOTE: For outdoor applications it is recommended that a qualified electrician complete the installation in accordance with electrical codes and regulations. When used outdoors this sprinkler controller is intended for use with a Ground Fault Interrupter (GFI) protected circuit.

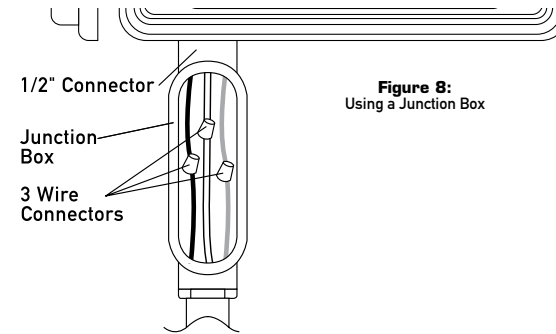


Figure 8:
Using a Junction Box

5. Activate Battery

One Lithium CR2032 battery (included) is required to retain the program in memory during power loss. Annual replacement is recommended.

Remove the plastic strip to activate the pre-installed battery.

NOTE: The battery alone will not operate the valves in your sprinkler system. The sprinkler controller has a built-in transformer that must be connected to an AC voltage source.

Section 5: DIAGNOSTICS CIRCUIT BREAKER

Smart-Scan® Diagnostic Fault Sensing

A diagnostic fault sensor will automatically scan for the presence of a faulty solenoid or wiring short in a valve during each watering sequence. If a faulty station is detected, the sprinkler controller will move to the next working station. Smart-Scan® also detects faulty wiring for the Pump or Master Valve. Upon detection watering of faulty station is discontinued.

Fault Notification

- Faulty Station: "FAULT" and "Station XX" is displayed. When multiple faulty stations are detected, only the last faulty station will be displayed.
- Faulty wiring for pump/master valve: "PUMP FAULT" is displayed.

Correcting the Fault

1. First, repair the short in the wiring or replace the faulty solenoid.
2. Test the station by operating a manual watering sequence.
3. If the short is not detected after a few seconds, the fault notification message will be terminated.
4. If the message continues, a short in the wiring still exists.

Internal Auto-Resetting Electronic Circuit Breaker

The sprinkler controller is equipped with an internal electronic self-resetting circuit breaker.

Possible causes of a circuit breaker tripping:

1. If lightning strikes nearby.
2. When the power supply has an electric spike.
3. If a station has a wiring short.

Whenever one of these conditions occurs, the electronic circuit breaker may trip, causing the station output from the sprinkler controller to be halted momentarily. The batteries will continue to activate the LCD. After a few moments, the sprinkler controller will automatically retest the circuit to see if the condition has stopped. If so, the circuit breaker will reset itself.

Section 6: GLOSSARY OF TERMS

TERM	DEFINITION
Budgeting	A feature used to increase or decrease all set durations according to seasonal demands
Manual Watering	An unscheduled watering cycle activated manually but controlled by the timer
Master Valve	A valve that prohibits water from reaching "Station Valves"
Program (A, B or C)	A schedule for a group of stations that determines the date and time for watering
Rain Delay	A feature that prevents the sprinkler controller from running it's scheduled watering program for a specific duration
Repeat Cycles	A feature that allows a program to be operated multiple times on the same day
Solenoid	The electrical part on a sprinkler (irrigation) valve that opens and closes the valve
Sprinkler Controller	A device that is responsible for turning an automatic irrigation system on and off
Start Time	The time the program begins watering the first station
Station (Watering Station)	An area where the watering (irrigation) is all controlled by a single control valve
Terminal	The connection point on the docking port where a wire is inserted
Watering Program	See "Program (A, B or C)"
Watering Valve (Irrigation Valve)	Used in conjunction with sprinkler controllers – a device used to control the delivery of water to lawns, plants and gardens

Determine a Watering Plan

1. For each watering station, write down the watering location, type of sprinkler head and types of plants to be watered.
2. Determine the best watering duration and frequency for each station.

3. Determine, based on step 2, the ideal watering option for each station.

4. Use this plan to program the controller.

Based on the preceding information, your watering program may look like this:

Station	Program	Watering Option	Days	Start Time	Duration Minutes	Location	Sprinkler	Plants
1	A	Days of Week	M, W, Sat	5:00 AM	15 min	Front Strip	Spray Heads	Grass
2	A	Days of Week	M, W, Sat		15 min	Front, North	Spray Heads	Grass
3	B	Odd/Even	Every other day	6:45 AM	30 min	Back, North	Gear Drive	Grass
4	C	Interval	Every day	8:00 AM	120 min	Garden	Drip	Flowers/Shrubs

Section 7: TROUBLE SHOOTING

Symptom	Cause
One or more stations do not turn on	1. Faulty Solenoid
	2. Wire broken or not connected
	3. Flow control stem screwed down, shutting valve off
	4. Programming is incorrect
Stations turn on when they are not supposed to	1. Water pressure is too high
	2. More than one cycle is programmed
	3. Stations are set to water with both programs
One station is stuck on and will not shut off	1. Faulty valve
	2. Particles of dirt or debris stuck in valve
	3. Valve diaphragm faulty
All stations do not turn on	1. Transformer is defective or is not connected correctly
	2. Programming is incorrect
	3. Timer is in OFF mode
Controller will not power up	1. Transformer is defective or is not connected correctly
	2. Transformer not plugged into an operational AC outlet
	3. Timer is not all the way down on the docking port.
Stations continue to turn on and off when they are not programmed to	1. Multiple cycles are programmed.
	2. Excessive pressure
	3. Stations are set to water with both programs.
	4. Water Budgeting is set to more than 100%
Persistent Fault	1. Short in wiring or solenoids

Help

Before returning this sprinkler controller to the store, contact Hydro-Rain® Technical Service at: 1-888-HYDRORAIN (1-888-493-7672).

Listings

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) This device must accept any interference received, including interference that may cause undesired operation. Warning: Changes or modifications to this unit not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment. NOTE: This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. This Class B digital apparatus complies with Canadian ICES-003. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.

- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

Hydro-Rain® Limited Three-Year Warranty

Hydro-Rain® warrants to its customers that its products will be free from defects in materials and workmanship for a period of three years from the date of purchase.

We will replace, free of charge, the defective part or parts found to be defective under normal use and service for a period of up to three years after purchase (proof of purchase required).

We reserve the right to inspect the defective part prior to replacement. Hydro-Rain® will not be responsible for consequential or incidental cost or damage caused by the product failure. Hydro-Rain® liability under this warranty is limited solely to the replacement or repair of defective parts.

To exercise your warranty, return the unit to your dealer with a copy of the sales receipt.

SAFETY OF CHILDREN: The controller is not intended for use by young children or infirm person without supervision. Young children should be supervised to ensure they do not play with the sprinkler controller.

HYDRO▶RAIN®

25 Union Avenue
North Salt Lake, UT 84054

1.888.HYDRORAIN
www.hydrorain.com