PRECISION LANDSCAPES PTY LTD
PHONE : 9940 4868
ABN: 20 092 702 746

13 December 2024

Landscape Management Plan

for the ongoing maintenance & management of landscaping at

Roseville College
27-29 Bancroft Ave, Roseville

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PRECISION LANDSCAPES PTY LTD
PHONE : 9940 4868

ABN: 20 092 702 746

13.12.2024

Principal Certifying Authority

Dear Sir or Madam,

Landscaping Works Completion Certificate for: Roseville College, 27-29 Bancroft Ave, Roseville

Certificate of Warranty

I, Martin Saunders acknowledge in good faith and to the best of my knowledge that, as of the Date of Completion, all landscape works including planting have been carried out generally in accordance with the approved landscape design documentation.

All imported landscape materials including soils, turf, plants, and mulch are certified as compliant with the specification, relevant Australian Standards and /or approved samples. All landscape works have been implemented in accordance with best practice industry standards.

We will continue to carry out a 13 Week establishment maintenance period in accordance with the landscape contract. Our warranty does not cover any damage caused to plants or turf by others.

Please find attached the following hand over information:

1. Maintenance Log
2. Maintenance Schedule
3. Operation & Maintenance Manuals

Kind Regards,

Martin Saunders

Managing Director

Precision Landscapes Pty Ltd.

PRECISION LANDSCAPES PTY LTD
PHONE : 9940 4868

- Landscape Establishment Maintenance Schedule-

Roseville College, 27-29 Bancroft Ave, Roseville

Item no	Activity	Frequency						Action – **D**aily, **W**eekly, **M**onthly
		D	W	2W	3W	M	3M	
1	Log book			♦				Complete a logbook entry for each site attendance. Min frequency 1 per month during winter period up to daily during Summer months for essential watering.
2	Plant Replacement						♦	Inspect and replace failed plants within 2 weeks of observation of failure. Re Plant appropriate plant material.
3	Mulch						♦	Inspect mulch for bare or thin areas.
4	Mowing			♦				Mow as necessary to ensure healthy plant development.
5	Weeding			♦				Hand weed large weeds close to plants and remove from site. Spray with 'Roundup' other smaller weeds in garden beds.
6	Pruning						♦	Prune as necessary to remove deadwood, improve plant shape and to promote healthy vigorous new growth.
7	Pest control			♦				Inspect plant material for pests/diseases. Identify problem and investigate non-chemical controls. Only spray for disease control if absolutely necessary.
8	Fertilising						♦	Fertilise gardens every 3 months or in accordance with manufacturer's directions.
9	Watering	♦	♦	♦	♦	♦	♦	Monitor & adjust irrigation as necessary.

PRECISION LANDSCAPES PTY LTD
PHONE : 9940 4868

Maintenance Log book - Roseville College	Duration – 13 weeks from PC

Employee Name:						Completed tasks to be ticked off and signed Make notes as necessary below.			
Date of visit	Photos taken	Plant replacements	Mulch	Mowing	Weeding	Pruning	Pest control	Fertilising	Staff Initials

Notes

Emergency Contact Information

Head Office

1/45 Leighton Place, Hornsby NSW 2077

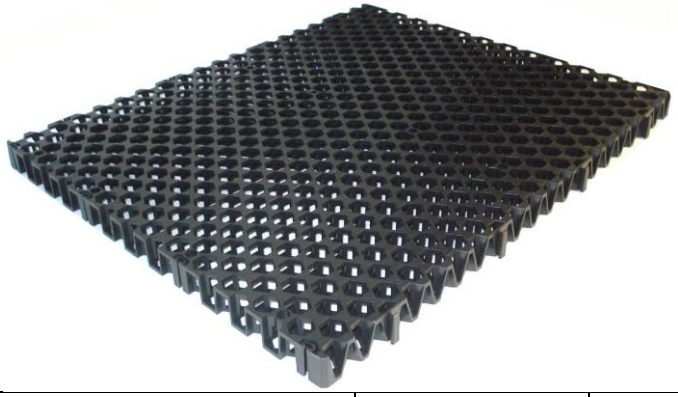
Contact: 02 9940 4868

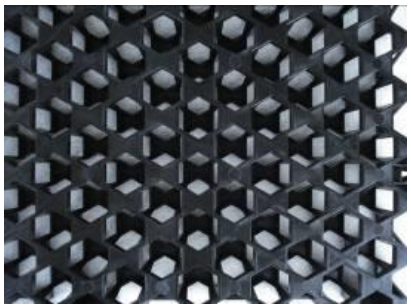
Email: martin@precisionlandscapes.biz

Const. Manager: Brad Naden 0412 210 438 brad@precisionlandscapes.biz

Director: Martin Saunders 0438 009 701 martin@precisionlandscapes.biz

Rainsmart 20mm (0.787”) DRAINAGE CELL
SPECIFICATION SHEET





	Standard Used	Metric	Imperial
Width		500mm	1,64’
Length		600mm	1,97’
Height		20mm	0.787”
Surface Void Area		>70% void	
Internal Void Area		95%	
Material		90% recycled polypropylene +10%Propriety Mix	
Colour		Black	
Biological & Chemical Resistance		Unaffected by moulds and algae, soil-borne chemicals, bacteria and bitumen, Oils & light Acid, Alkaline Solutions.	
Service Temperature		-10°C to 85°C	-14F to185 °F
Compressive Strength/ Ultimate Load	ASTM D1621	>150 t/m2	> 213.35 psi
Average Flow Rate	ASTM D4716	>1.43 (L/s)/m width @1%gradiant	> 0.377 (gals/s)/m width @1%gradiant

Special Features:

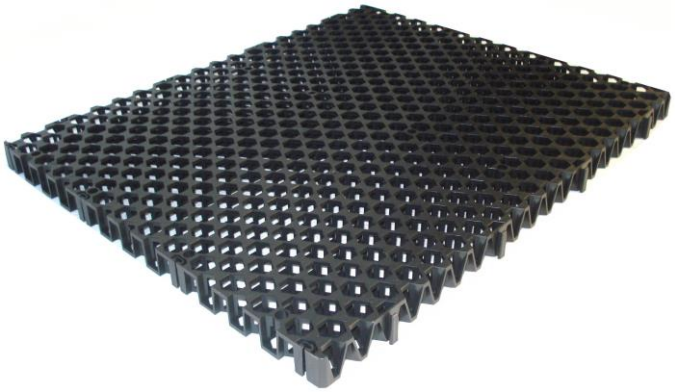
- ✓ Unique cup structures which provides passive irrigation during prolonged dry weather. And only removes excess water.
- ✓ Unique hexagon cut-out design for multi directional vortex flow to enhance oxygenation and improve water quality.
- ✓ Unique surface design to manage optimum vertical flow and create perch water table on the surface & in the above permeable soils.
- ✓ Largest pre-clipped size (1000mm x 1200mm) with clips for fast and easy installation.
- ✓ High Crush Strength to support Heavy loads.

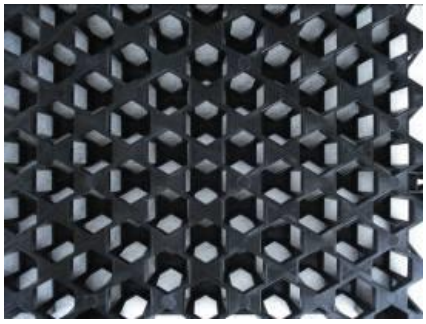
NOTE: ***All Rainsmart Products and Systems are Design Registered or Design Registration Pending.***

Rainsmart Solutions Pty Ltd. (ACN: 127 571 886 / ABN: 66 127 571 886)
25, Lidco Street, Arndell Park, NSW-2148
Sydney, Australia.
Tele: + 61 2 9678 9667 Fax: +61 2 9678 9670
Email: Info@rainsmartsolutions.com Web: www.Rainsmartsolutions.com

Rainsmart 30mm (1.18″) NERO DRAINAGE CELL- LD

SPECIFICATION SHEET





	Standard Used	Metric	Imperial
Width		500mm	1,64′
Length		600mm	1.97′
Height		30mm	1.18″
Surface Void Area		68% void	
Internal Void Area		95%	
Internal Storage Volume when used as Roof Attenuation System		27 Lts/ sqm based on 95% Internal void ratio.	
Material		90% recycled polypropylene +10%Propriety Mix	
Colour		Black	
Biological & Chemical Resistance		Unaffected by moulds and algae, soil-borne chemicals, bacteria and bitumen, Oils & light Acid, Alkaline Solutions.	
Service Temperature		-10°C to 85°C	-14F to185 °F
Compressive Strength/ Ultimate Load	ASTM D1621	>105 t/m2	> 149.34 psi
Flow Rate	ASTM D4716-14	>1.88 (L/s)/m width @1%gradiant	> 0.496 (gals/s)/m width @1%gradiant

Special Features:

- ✓ Unique cup structures which provides passive irrigation during prolonged dry weather. And only removes excess water.
- ✓ Unique hexagon cut-out design for multi directional vortex flow to enhance oxygenation and improve water quality.
- ✓ Unique surface design to manage optimum vertical flow and create perch water table on the surface & in the above permeable soils.
- ✓ Largest piece size (500mm x 600mm) with clips Supplied in 1m x 1.2m panels for fast and easy installation.
- ✓ High Crush Strength to support Heavy loads.

NOTE: ***All Rainsmart Products and Systems are Design Registered or Design Registration Pending.***

Safety Factors: Engineers, designers and geotechnical engineers should design and calculate safety factors to a serviceable limited state to suit specific project. In case of doubt, consult your nearest distributor or representative.

Rainsmart Solutions Pty Ltd. (ACN: 127 571 886 / ABN: 66 127 571 886)
25, Lidco Street, Arndell Park, NSW-2148
Sydney, Australia.
Tele: + 61 2 9678 9667 Fax: +61 2 9678 9670
Email: Info@rainsmartsolutions.com Web: www.Rainsmartsolutions.com

NEVERSTOP IRRIGATION PTY LTD

Roseville College

OPERATION & MAINTENANCE MANUALS

This manual complies with the specifications supplied at tender.

NEVERSTOP IRRIGATION PTY LTD

Contents

Scope of Work and System of Operation

Overview

To enable a more consistent approach to irrigation works. This document set outs the minimum standard for any irrigation works.

Scope of Work

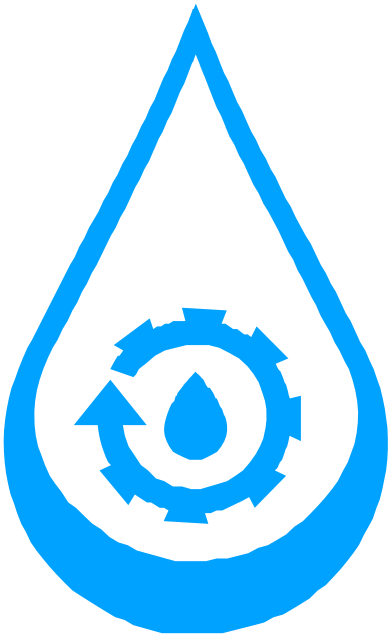
- Supply and installation of all irrigation components required to complete the design intent.
- Supply and operate machinery capable of fulfilling the design intent.
- Setout of works.
- Work As Executed documentation.
- Supply and control suitably qualified labour to complete the works.
- Undertake repairs and rectification as required during the defects and liability period.
- Coordinate works with other trades.
- Routine inspections of works.
- Witness of testing and commissioning.
- Technical advice during the construction period.

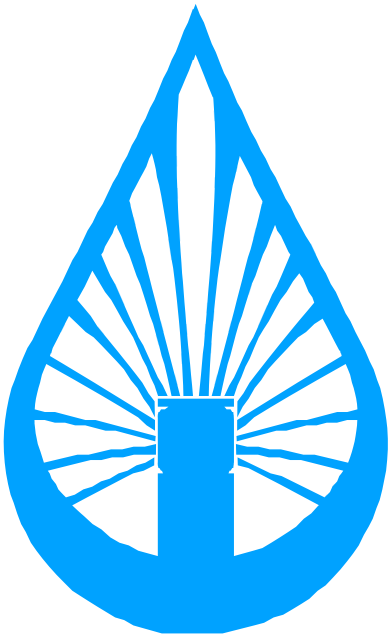
System of Operation

Irrigation Central System

- Landscaped areas outlined in as-built drawings are operated by an automatic irrigation control systems
- Wall mounted controller operated by pre programmed cycles 24hr/7days a week
- Irrigation Cable from controller is then linked up to the Solenoid Coils out in the field which then activate the Solenoid Valves (housed in valve box's) to turn on/off to landscaped 'zones'.

Irrigation Manuals





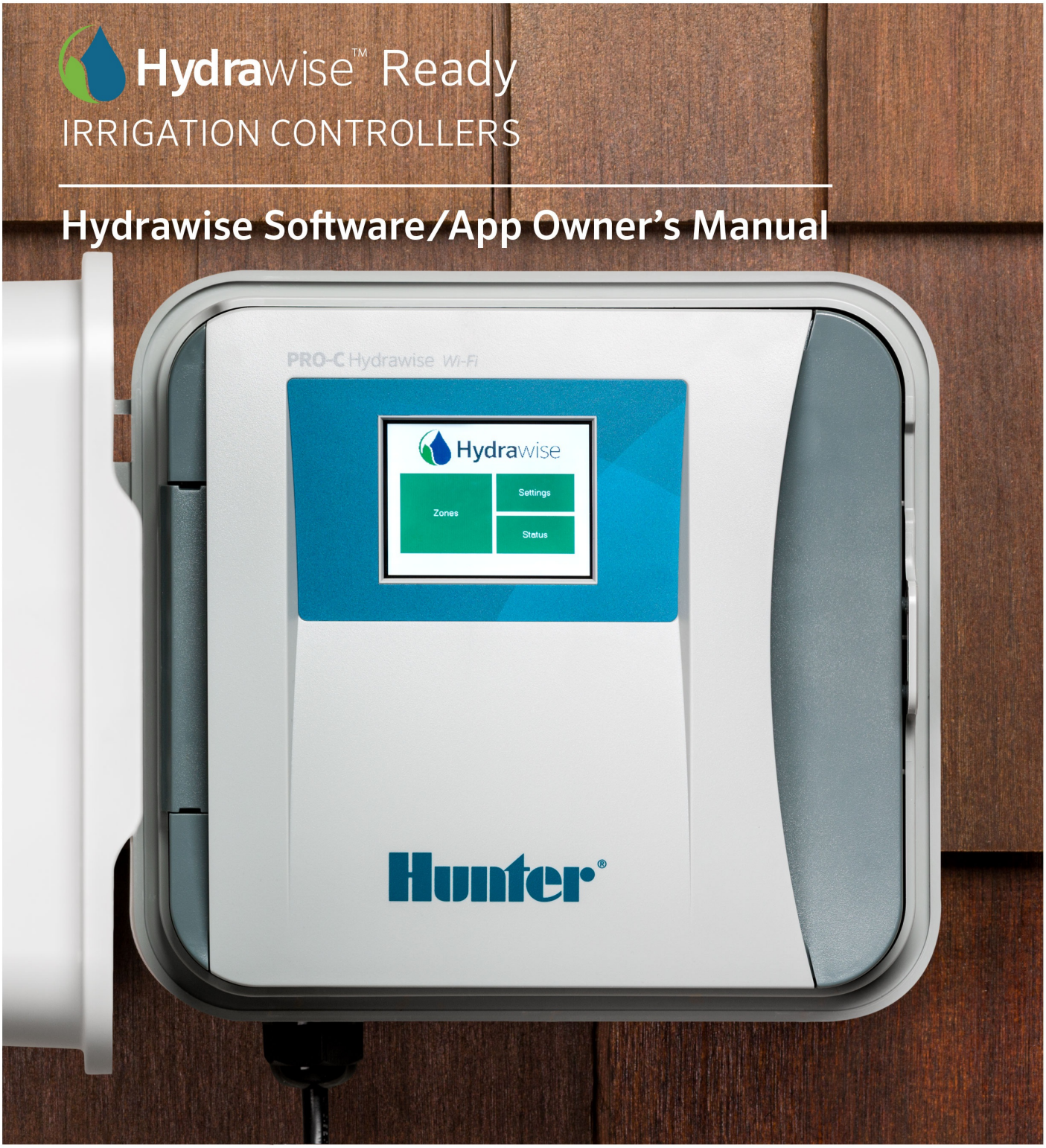
Section 1.1 Irrigation Controls

IRRIGATION

Hydrawise™ Ready

IRRIGATION CONTROLLERS

Hydrawise Software/App Owner's Manual



hydrawise.com

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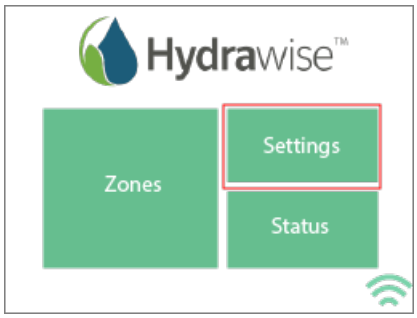
Controller - Reboot Controller

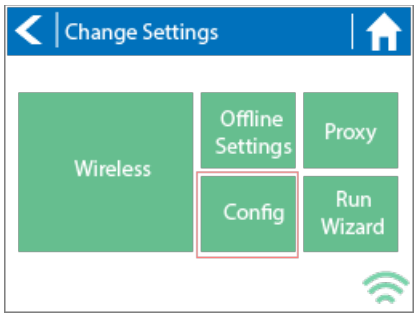
Please follow the steps below to perform a reboot on your controller. This can help reestablish WiFi if you are having communication issues. The reboot will not erase any settings in your controller.

1. From the home screen, tap on **Settings**.
2. Next, press **Config**.
3. Press **Reboot Controller**.

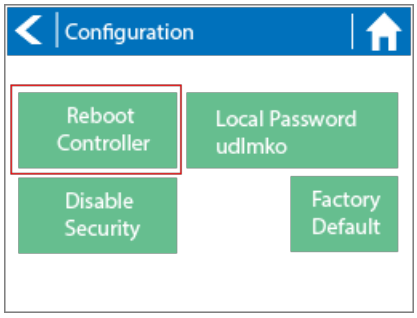
STEP 1



STEP 2



STEP 3



Controller - Navigating Screens

The controller features a full color touchscreen making navigation easy.

The Home screen, shown below, has 3 buttons allowing you to view and run your irrigation zones, change controller settings or view status information.

1 Touch to view all zones

2 Touch to change controller settings

3 Touch to view controller status information

Each screen (except for the home screen) has two buttons at the top of the page allow you to quickly navigate to the Home screen or the previous screen.

1 Go to previous screen (changes not saved)

2 Go to Home screen (changes not saved)

3 GREEN items indicate settings which can be changed

4 GREY items indicate status information

All items on each screen are color coded to indicate which screen elements are buttons and which screen elements indicate status information.

GREEN screen items indicate settings that can be changed. If you touch on the GREEN color item then you'll be able to change that setting.

GREY colored items indicate status information. Touching on these has no effect.

If you're entering information into the controller and use the Home or Back buttons then your changes on that screen will not be changed.

Wireless - Connection Status Messages

The controller will show different status messages while connecting to your wireless router.

Looking for Wireless	Controller is currently scanning for local wireless networks.
Connecting to	Controller is currently trying to connect to your wireless router.
Waiting for IP	Controller has connected to your wireless router and is waiting for your wireless router to give it an IP address. Your wireless router must be configured as a DHCP server.
Connected	Controller has successfully connected to your wireless router.
Local Connection Only	Controller is acting as a local wireless router.

Troubleshooting Wireless Connection Issues

After entering your wireless settings, the controller will connect to your access point. The connection process takes about 30 seconds.

Upon successful connection the wireless status will show **Connected**.

If your controller fails to connect to your wireless router check the following:

- Your password is entered It is case sensitive and must be at least 8 characters long.
- Check that the wireless security types match between the controller and your wireless Hydrawise recommends use of WPA2 security between the controller and your wireless router.
- We have WiFi specifications here: WiFi Specs [1]

Controller - Viewing Controller Status

From the Home screen, navigate to the Controller Status by pressing Status > Controller Status.

The controller status screen shows your controller's connection to Hydrawise servers for synchronizing schedule and weather information.

1 Status of Connection to Hydrawise Servers

2 Your Serial Number. Used to link your controller to your account

3 Connection to Hydrawise Success Rate

Server Status

A successful connection to the Hydrawise servers is indicated by **Sync'd** as the Server Status.

SERVER STATUS MESSAGES

Message	Description
OK - updated xxx seconds ago	The controller is connected to Hydrawise and last got a configuration update xxx seconds ago. This is the normal state.
Wireless Down	Wireless is not connected
OK - Updating certificates	The controller is doing an initial upgrade from version 2.x to 3.x software. You should only see this once, if the controller is continually showing this then there is a problem - please contact Anthony with a video of the problem.

OK - Downloading Software	The controller is doing a firmware upgrade. During this period no configuration changes will be processed by the controller.
Connecting in xxx seconds	The controller is not connected and is waiting xxx seconds before attempting to reconnect to the internet. When a connection fails we do not try to reconnect immediately - there is an escalating delay between 5 seconds the 60 minutes (worst case after 33 unsuccessful connections). There is a “Reconnect Now” button on the Controller Status screen to force a reconnection immediately if you’re in front of the controller.
Connecting to the Internet	The controller is attempting to connect to the internet
Connecting to Hydrawise	Controller has connected to the internet and is now connecting to the Hydrawise servers
OK - subscribing to updates	Controller has connected to Hydrawise and is getting its configuration
OK - processing cloud update	Controller is connected to Hydrawise and is processing a configuration change
Updating Wi-Fi firmware	The controller is updating the Wi-Fi firmware to 19.5.4. During this period no configuration changes will be processed by the controller.
Updating Pro-C adapter	The controller is updating the Pro-C adapter software. During this period no configuration changes will be processed by the controller.

Success

Success percentage - this is the percentage of time the controller has been connected to Hydrawise. We measure this over a 6-hour time frame. 100% means it was always connected, 80% means that for 20% of the time it was not connected.

A low success percentage will indicate a poor wireless connection between the controller and your access point.

To improve your wireless signal strength you could try the following –

- Move the controller closer to your wireless router.
- Remove any obstacles in a direct line of sight between the controller and your wireless router such as metal items (metal is an extremely good isolator for WiFi signals).
- Move your wireless router closer to the controller.
- Install a higher gain antenna on your wireless router.
- Use Ethernet to a location closer to the controller and install a new wireless router.
- Consider a WiFi repeater/extender between your wireless router and the Hydrawise controller to boost the signal strength.
- Consider moving the controller away from potential sources of interference, including microwave ovens, nearby base stations using adjacent channels or cordless telephones operating in the 2.4GHz range (you could also change the channel your phone uses).

Note that the Hydrawise unit is designed to work in poor wireless environments. However, if you wish to manually run or stop a zone and the wireless signal is down then these actions will fail.

Offline

If the controller loses internet for more than 24 hours you'll receive a notification email.

The controller will go into an offline mode. In offline mode, your controller won't be able to access local weather conditions such as rainfall or evaporation and will revert to a pre-defined program.

- For Smart Watering zones, the controller will adjust each zone's watering length based on your offline watering budget and will water at each zone's configured peak watering frequency.
- For Time Based Watering zones, the controller will adjust each zone's watering length based on your offline watering budget and will water at each zone's configured watering frequency.
- For more information on Smart and Time Based Watering, see "Configuring Irrigation Zones" [2].
- Note that Cycle & Soak is not supported in Offline Mode and each zone will water for its full watering length without pausing.

- The controller will only water at your configured Program Start Times.

Saving Settings

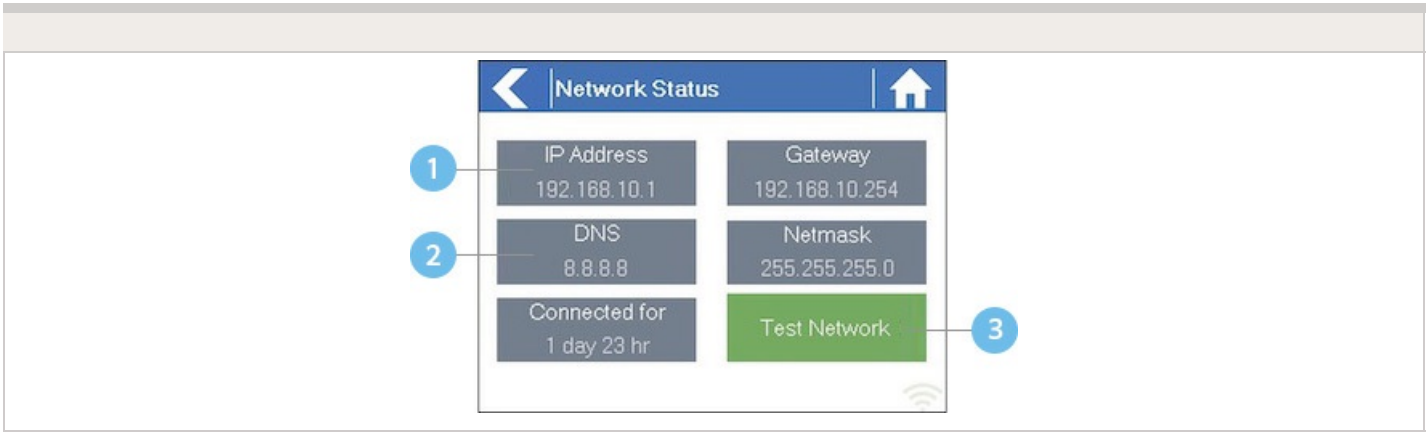
The controller does not need a battery, all settings are saved in a non-volatile RAM (memory).

Serial Number

The serial number is used to link your actual controller with your Hydrawise account. This number is also printed on the rear of the controller.

Controller - Viewing Network Information / Testing Internet Connectivity

From the Home screen navigate to the Network Status by pressing Status > Controller Status.



1 IP Address (set by your wireless router)

2 DNS Address (set by your wireless router)

3 Network Test Button

All settings on this page are provided to the controller by your wireless router when it first connects via a protocol, known as DHCP. If any of these settings appear incorrect please change them in your wireless router.

Once the controller has successfully connected to your wireless router the Test Network button can be used to test network connectivity for troubleshooting purposes. The network test will verify connectivity to 4 destinations –

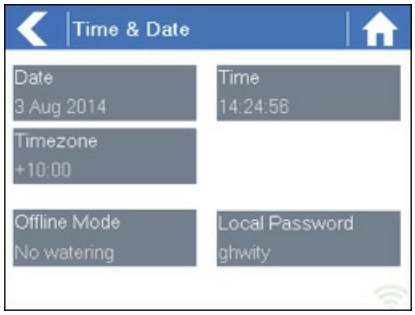
Test Network

Message Description **Checking WiFi** Performs a ping test to the Gateway address listed in the Network Status screen. If this test fails, check that you don't have MAC address filtering enabled on your router.**Checking DNS** Performs a ping test to the DNS address listed in the Network Status screen. If this test fails, check that the DNS address is correct – if it is wrong then correct the DNS address under DHCP Settings on your wireless router. It is possible that this test may fail if the DNS server doesn't accept ping requests which do not indicate an issue.**Checking Internet** Performs a ping test to the Google server at IP address 8.8.8.8. This is a well-known server which accepts ping requests on the internet. If this test fails then it indicates an issue with the internet configuration of your wireless router.**Checking Hydrawise** Performs a ping test to the Hydrawise servers. If this test fails then it may indicate an issue with the internet configuration of your wireless router.

Controller - Viewing Time and Date

Time and date settings are synchronized with the settings that you configure in the Hydrawise app. The timezone is set based on the location you entered during the app wizard.

Time and Date



If your controller is running as a stand-alone controller (WiFi is disabled) then the date, time and time zone will be shown on a GREEN background can be changed.

Controller - Installing and Wiring

You can also find the instructions included with the controller on our Quick start Guides [3] page.

For instructions on installing your residential controller, please visit our basic wiring setup page for PROHC and HC models here [4].

NOTE: Once you've wired and installed your controller, please see Configuring Your Controller [5] for instructions on how to connect to your Wi-Fi.

Controller - Function Paths

Below is a list of function paths for use with the controller interface in both online mode and

offline mode.

ONLINE MODE

Change Wi-Fi/Check Status: Home>Settings>Wireless>Select a Setting to Modify

Controller Status: Home>Status>Controller Status

Program Expander: Home>Status>Expansion Modules

Manually Run Zone(s): Home>Zones>Select Zone> Run>Enter Time>OK

Model: Home>Status>Controller Status

Network Status: Home>Status>Network

Reboot Controller: Home>Settings>Config>Reboot Controller

Reset Controller: Home>Settings>Config>Factory Default

Run Wizard: Home>Settings>Run Wizard

Sensor Status: Home>Status>Sensor

Serial Number: Home>Status>Controller Status

Server Status: Home>Status>Controller Status

Test Network: Home>Status>Network>Test Network

Test Zone: Home>Status>Zone Tester

Time and Date: Home>Status>Time

Version Number: Home>Status>Controller Status

Zone Status: Home>Zones>Select Zone

OFFLINE MODE (Versions 3.33 and below)

Note: Changes can be done in offline mode only when Wi-Fi is disabled.

Adjust Time: Home>Settings>Offline Settings>Time

Disable Wi-Fi: Home>Settings>Offline Settings>Disable Wi-Fi

Program Expander/Check Status: Home>Settings>Offline Settings>Expansion Modules

Program Sensor/Check Status: Home>Settings>Offline Settings>Sensors

Program Start Times: Home>Settings>Offline Settings>Program Start Times

Set Seasonal Adjust: Home>Settings>Offline Settings>Seasonal Adjust

OFFLINE MODE (Version 4.01 Standard Mode)

Note: Changes can be done in offline status only when Wi-Fi is disabled.

Adjust Time: Home>Settings>Offline Programs and Settings>Time

Disable Wi-Fi: Home>Settings>Offline Programs and Settings>Disable Wi-Fi

Program Sensor/Check Status: Home>Settings>Offline Programs and Settings>Sensors

Start Times: Home>Settings>Offline Programs and Settings>Offline Programs>Edit Start Times

Water Days: Home>Settings>Offline Programs and Settings>Offline Programs>Edit Water Days

Zones: Home>Settings>Offline Programs and Settings>Offline Programs>Edit Zones

Set Seasonal Adjust: Home>Settings>Offline Programs and Settings>Seasonal Adjust

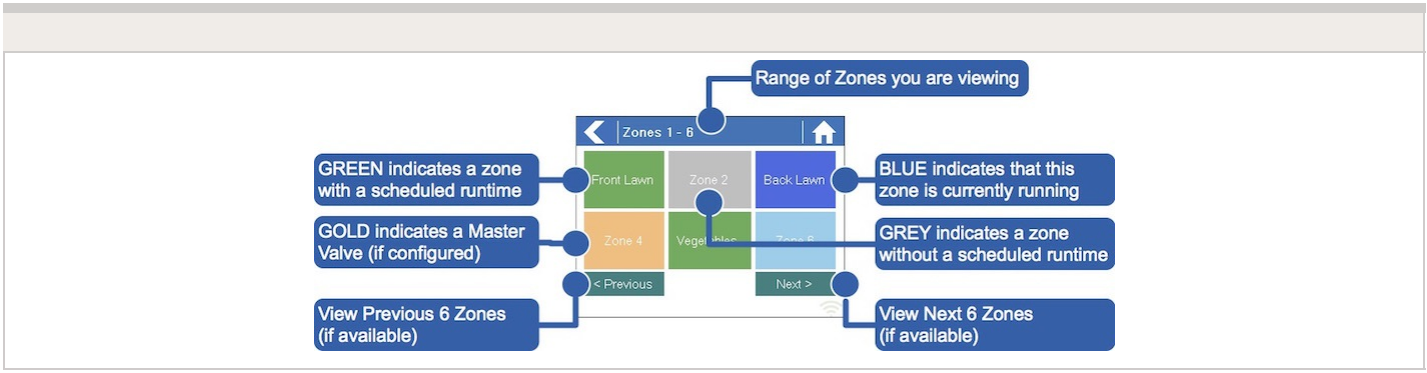
Controller - Manual Operation

You can run an irrigation zone on demand from the Hydrawise unit prior to having the

system connected to wifi.

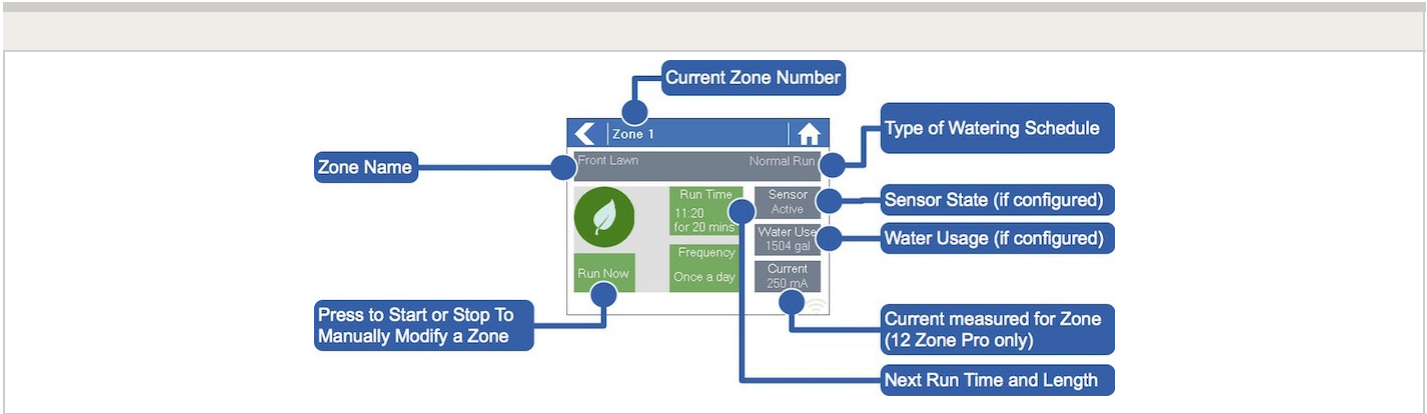
Running a zone manually from the controller

From the **Home** screen, navigate to the **Zone Summary** screen by pressing **Zones**.



The Zone Summary screen shows the status of six zones at a time. To view the next or previous group of zones, use the **Next** and **Previous** buttons. The current range of zones that you are viewing is indicated at the top of the screen.

From the Zone Summary screen, touch the zone you wish to view.



From the Zone Status screen, you can manually start a zone using the **Run Now** button. When started, the zone will run for the zone's default configured run length. This can be overridden by clicking on **Run Time** prior to manually starting the zone.

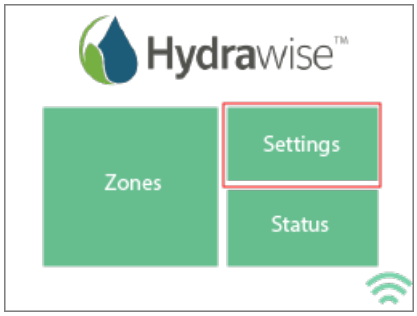
When a zone is running, the **Run Now** button will change to **Stop**. This allows you to stop a running zone.

Controller - Factory Default

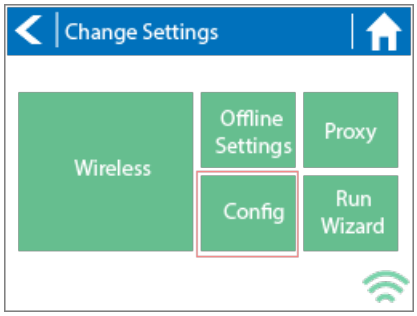
Please follow the steps below to perform a factory reset on your controller. When the controller goes back online, the settings in the software will sync back into controller.

1. From the home screen, tap on **Settings**.
2. Next, press **Config**.
3. Press **Factory Default**.
4. Finally, press the **Erase Config**.

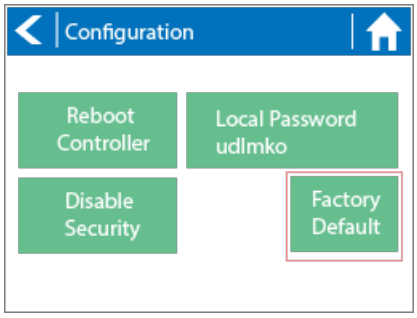
STEP 1



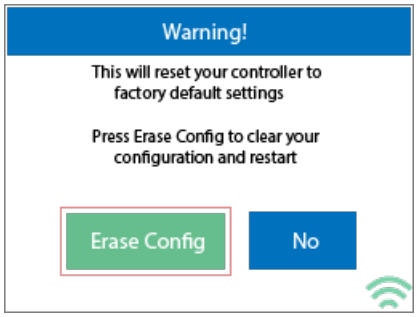
STEP 2



STEP 3



STEP 4



Congratulations, you have now successfully factory reset your controller. The controller is now ready for fresh configuration settings, either manually or automatically through synchronization with your Hydrawise account.

To link your controller to your account, refer to Linking Your Controller to Your Account [6].

Controller - Serial Number Location

Your controller's serial number is found on the rear of your controller or on the controller's touch screen.

Note: The serial number **A8000000** is a generic serial number assigned when the controller has not been registered (never connected to the internet to activate). This serial number will show on the touchscreen temporarily until the controller is connected to

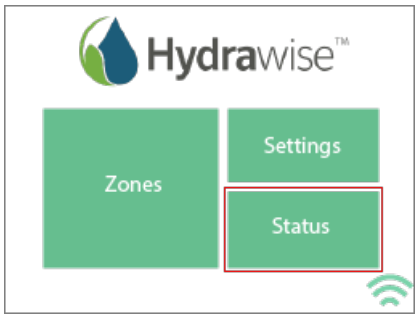
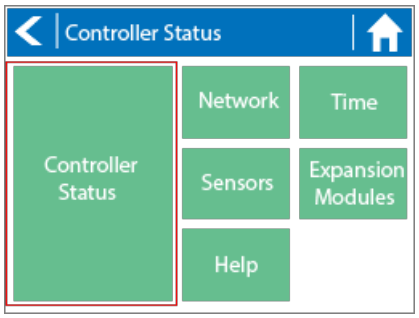
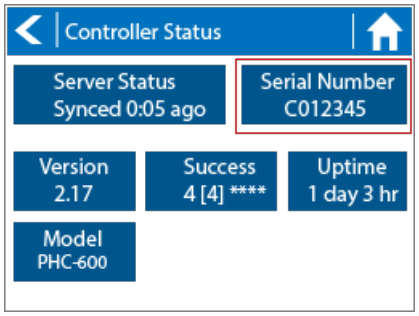
internet. To see the real serial number, either to refer to the sticker or put the controller online so it updates to the correct online serial number.

To access the serial number on the touch screen, follow these steps:

From the Home screen, click **Status >** click **Controller Status**.

The serial number is shown on this screen. Depending on the model, you may see it at the top or bottom.

Note: The serial number contains only letters **a through f** and numbers **0 through 9.**

Serial Number on Screen	
1. 	**2.** 
3. 	

Serial Number Sticker
HC Controller - Sticker located on the back of the controller

PROHC - Controller - Located inside wiring compartment above the 24 VAC terminals

HPC - Controller - Sticker located on the back of the front panel

HCC - Controller - Sticker located on the back of the front panel

To link your controller to your account, please refer to this article Linking a Controller to My Account [7].

Controller - Blank Display

First, make sure there is power to the controller's outlet. Use a test lamp or any other 110VAC device to determine if there is voltage at the outlet. If there isn't power, or if you have a controller that is hard wired, check the circuit breaker at the main breaker box.

Caution: High voltage testing on the transformers primary power side should only be done by a professional electrician or irrigation contractor.

Checking Transformer Voltage
If you have power at the outlet, the next thing to check is the transformer output. Use a voltmeter to check the voltage either on the two transformer wires or at the two AC screw terminals on the controller. The transformer should have an output in the range of 24VAC to 28VAC. If the wall outlet has 110VAC and the transformer has no voltage output, you need to replace the transformer.

Cycle Controller Power

If you have voltage at both the wall outlet and the transformer output and you still have a blank display, try cycling the power on the controller. To cycle the power on the controller:.

1. Remove power by unplugging the transformer from the wall outlet or by turning off the circuit at the breaker box.
2. Wait a few minutes.
3. Plug the controller transformer back into the electrical receptacle, or turn the breaker panel switch back on.

Note: If this doesn't restore the display, the controller will need to be replaced.

No Zones Running

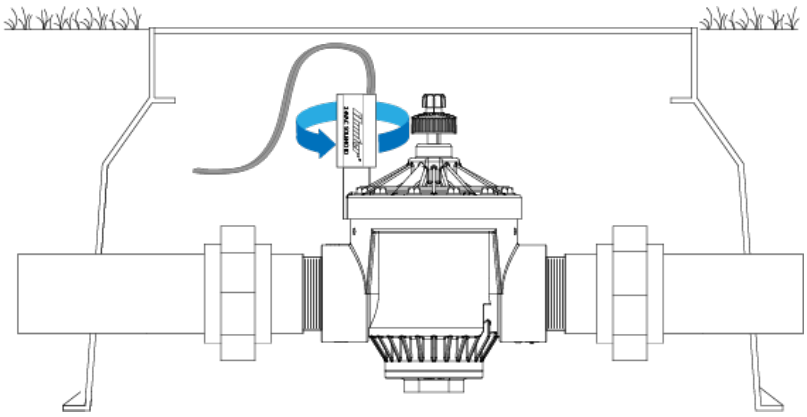
In this article, we will cover the most common reasons why your sprinklers are not running.

Topics include the following:

- Testing water supply
- Testing controller voltage
- Test Wi-Fi on the controller

Test Water Supply

The water could be been shut off to the zone valves. Go to the zone valve and give the solenoid (where the wires are connected) a ½-turn counterclockwise. If the valves have water, the sprinklers will come on even without the controller. See the illustration below for activating the valve solenoid manually:



If the sprinklers turn on by manually twisting the solenoid, follow the next step to check for proper voltage.

Test Controller Voltage

To confirm proper voltage is getting to the valves using a voltmeter, follow the steps below:

1. From the **Home** screen, navigate to the **Zone Summary** screen by pressing **Zones**.

   From the Zone Summary screen, touch the zone you wish to view. The Zone Summary screen shows the status of six zones at a time. To view the next or previous group of zones, use the **Next** and **Previous** buttons. The current range of zones that you are viewing is indicated at the top of the screen.

   From the Zone Status screen, you can manually start a zone using the **Run Now** button. When started, the zone will run for the zone's default configured run length. This can be overridden by clicking on **Run Time** prior to manually starting the zone. When a zone is running, the **Run Now** button will change to **Stop**. This allows you to stop a running zone.

2. Use a volt meter to confirm there is 25–28 VAC at the screw terminals marked "C" and the corresponding station screw terminal (e.g., "C" and "2").
3. Next, go to the valve in question and check the same two wires connected to the valve for the same voltage.
4. If there is no voltage or low voltage at the valve, you may have a damaged wire or bad connection from the controller.
5. If you have necessary voltage (25–28 VAC) at the valve then the solenoid may need to be replaced.

If you need a new solenoid for the valve, Hunter makes our products and replacement parts available through our network of authorized distributors. Click on the following link to find an Authorized Hunter Distributor in your area: Distributor Locator [8]

Test Wi-Fi on the Controller

If the irrigation system did not water on the scheduled day, you may have a cancellation caused by a sensor or a water trigger. Refer to this article [9] if this is the case.

If your controller loses internet connectivity for more than one day, we'll send you an email notification. During this time, your controller will run the **last synced schedule** in offline mode.

NOTE: Without internet connectivity, your controller won't be able to automatically modify its watering schedule based on weather forecasts.

If the last synced schedule was for the controller to remain off, follow the steps below to reestablish the Wi-Fi connection.

1. Check that your wireless router and controller are powered on.
2. **Signal Strength check:** Settings > Wireless > Wireless Name > Select Network > Read strength (High recommended for optimal functionality).
3. **Reboot Controller:** Settings > Config > Reboot Controller > Check Server Status
4. **Factory Default:** Settings > Config > Factory Default > Erase Config > Connection Wizard > Check Server Status
5. **Reset Modem/Router:** Unplug for 15–20 seconds. Then plug back ***three*** times > Check Server Status. This will refresh the connection to an extender if you have one installed.
6. **Reset Extender:** Reset the extender as well to refresh IP settings.
7. **Check Network Settings:** The following Wi-Fi requirements apply to your Hunter Hydrawise-ready controller.
    - Hunter HC controller is 802.11 b/g
    - Hunter Pro-HC controller is 802.11 b/g/n
    - Hunter HPC controller is 802.11 b/g/n
    - Bandwidth: 2.4 GHz only; not compatible with 5 GHz
    - Router channel: Set between 1–11
    - Guest networks/networks with portal page login: Not compatible
    - Mac address (if needed):
        - HC: Enter 001e followed by serial number (e.g., 001e05fb90ce)
        - HCC/HPC/PROHC: Enter f8f0 followed by serial number (e.g., f8f005fb90ce)
8. **Testing with hotspot:** Depending on your smartphone, use either guide below:

    Apple hotspot [10]

    Android hotspot [11]

Check server status: This test will tell you if the controller is working properly and if you need to install an extender for better connection.

Wi-Fi Extender Note: You can try to connect to the extender via hotspot. If you have connection issues here, you not getting an internet connection from the source.

If controller will not connect to the hotspot, email the Support Team:
Hydrawise Email Support [12]

Sprinklers Running with the Controller Off or Unplugged

There are two reasons why sprinklers would continue to run with the controller **Off** or **Unplugged**:

- It's possible your valves were opened manually. Locate your valve box(es) and turn the solenoid(s) clockwise until snug. The solenoid is located on top of the valve and looks like a cylinder with two wires protruding out of it.
- It's also possible that debris in the valve is causing the diaphragm to remain open.

To fix this problem:

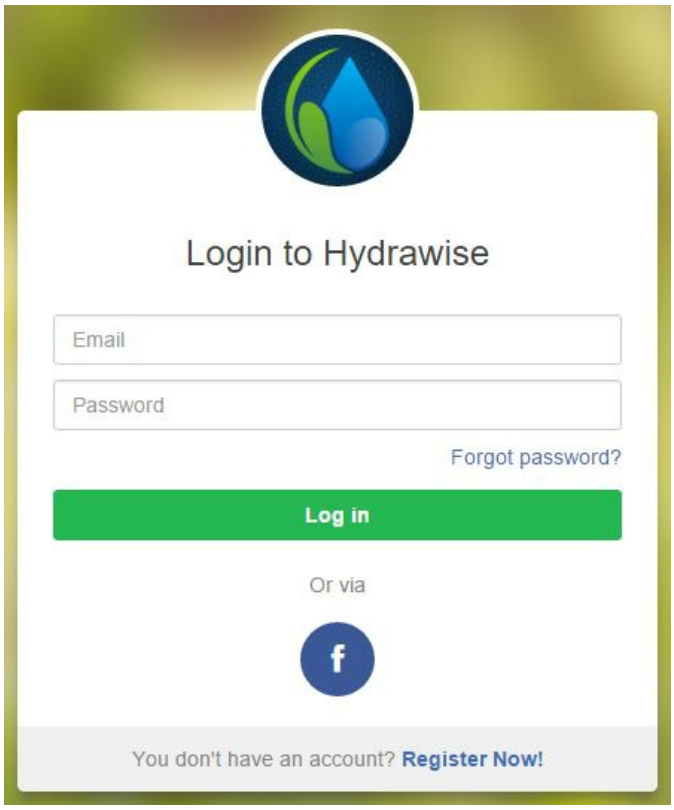
1. Disassemble the valve.
2. Rinse all parts with clean water.
3. Reassemble the valve.

If you cannot locate your valves, contact the contractor who installed the system.

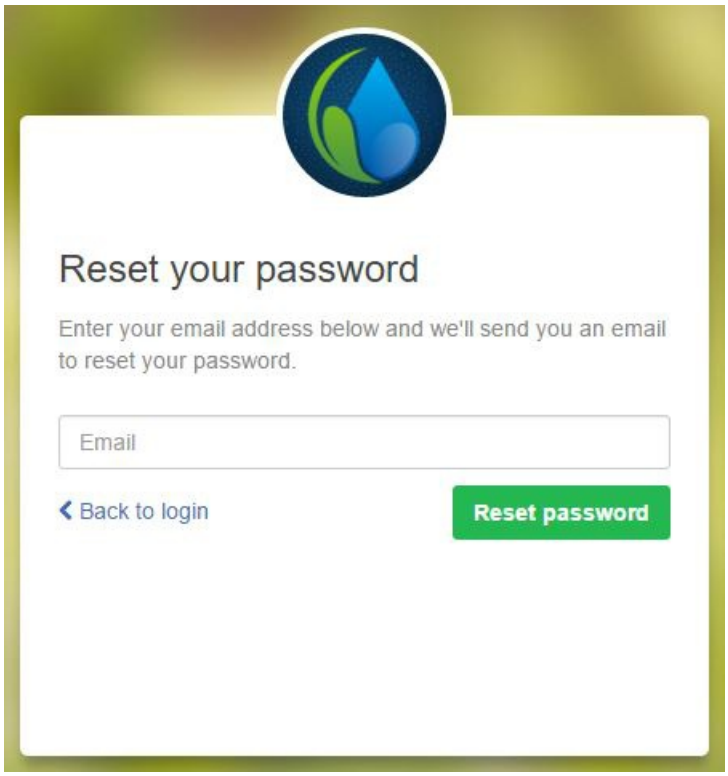
Cleaning the Diaphragm on a Hunter Valve

Account - Resetting Password

If you registered using your email address (i.e., not using the Facebook option), click on **Forgot password?** from the login [13] screen.



On the next screen, simply type in your registered email address and click **Reset Password.** You will then receive an email. Click the password reset link and enter in your new password. Confirm the password and you should be good to go again.



If you are having issues logging in to Facebook using the application, follow this guide to reset your password: Unable to Log In Using Facebook App [14]. Don't worry; you won't lose any settings.

Account - Not Receiving Hydrawise Activation Emails

We're sorry that you have not yet received an activation email from support@hydrawise.com [15]. We use a third-party company to ensure our email has the best chance of getting to you.

The following tips will help you verify if the email was delivered. First, check your deleted items to see if the email was inadvertently deleted. If it was, move the email back to your inbox.

Next, look in your spam, trash, or junk folders. The email may have been sent to one of these folders due to email filters. If the email is in one of these folders, right click on the email and select "trust sender" or "always allow email from sender."

We recommend that you add support@hydrawise.com [15] to your "safe senders," "allowed," or "trusted" email list. Depending on your email service provider, you can do this in several ways. Below are shortcuts to some popular providers:

Outlook [16]

Gmail [17]

Apple [18]

Hydrawise does not use your email address for marketing purposes. To view our terms and conditions and privacy policy, visit www.hydrawise.com [19]. Please contact us if you have questions.

Account - API Information

Thank you for your interest! The Hydrawise API is coming soon...

Please register your interest with Anthony.Long@hunterindustries.com [20]

Thank You

Technical Support

Smart Voice Device - Amazon Alexa

In this guide, we will explain how to link your Amazon Alexa account with your Hydrawise account. Once you have linked your Alexa account to your Hydrawise account, you will be able to start, stop, or suspend zones using voice commands to your Alexa device. For example, you can say, "Alexa, ask Hydrawise to start Zone 1."

NOTE: Alexa supports only one controller per account. If you have multiple controllers linked to your account, Alexa does not know which controller you are referring to and will not be compatible. We now have Amazon Alexa approved for the following countries USA, Canada, Germany, and India.

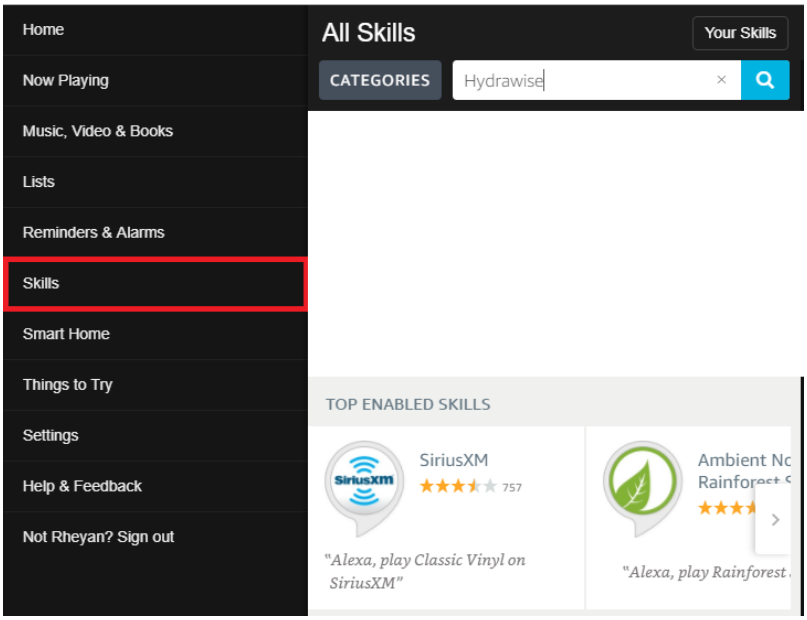
Adding the Hydrawise skill to Alexa

To get started, you will need to make sure you have a Hydrawise account and have your controller configured. If not, please register for a free account here. [21]Once you have your Hydrawise account ready, log in to your Alexa account (if you don't have one yet, you can register here [22]). The Alexa account and your Hydrawise account can have a different

email address without an issue.

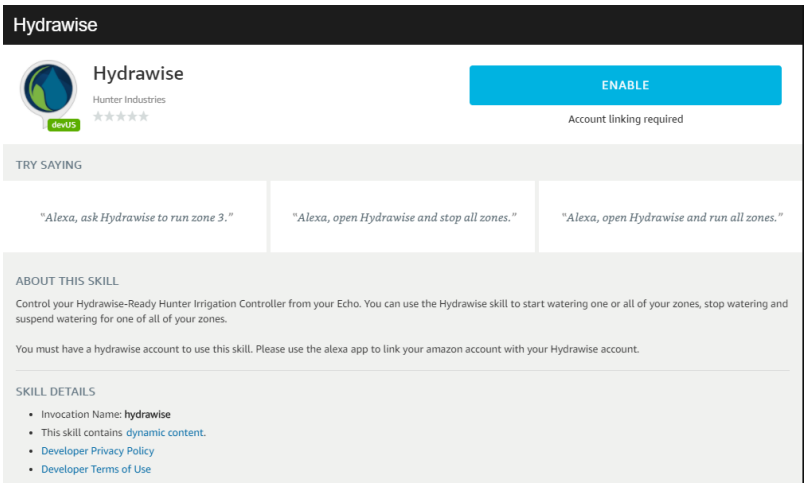
1. Go to the **Skills** section on your Alexa Dashboard.
2. Search for the **"Hydrawise skill,"** and select it.

SKILLS



1. Click **ENABLE**.

ENABLE SKILL

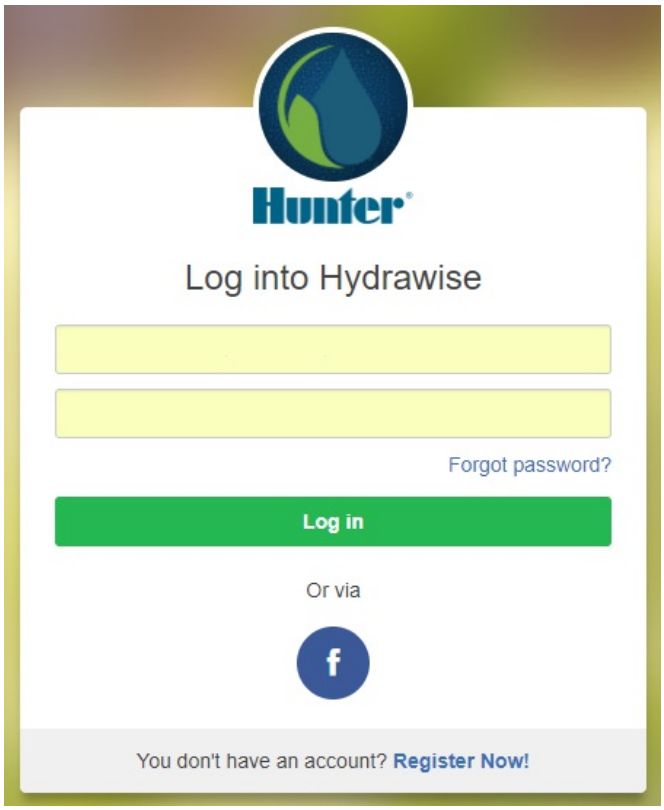


This will open a new window where you can log in to your Hydrawise account.

IMPORTANT: Please make sure you have pop-ups enabled for the Hydrawise log-in

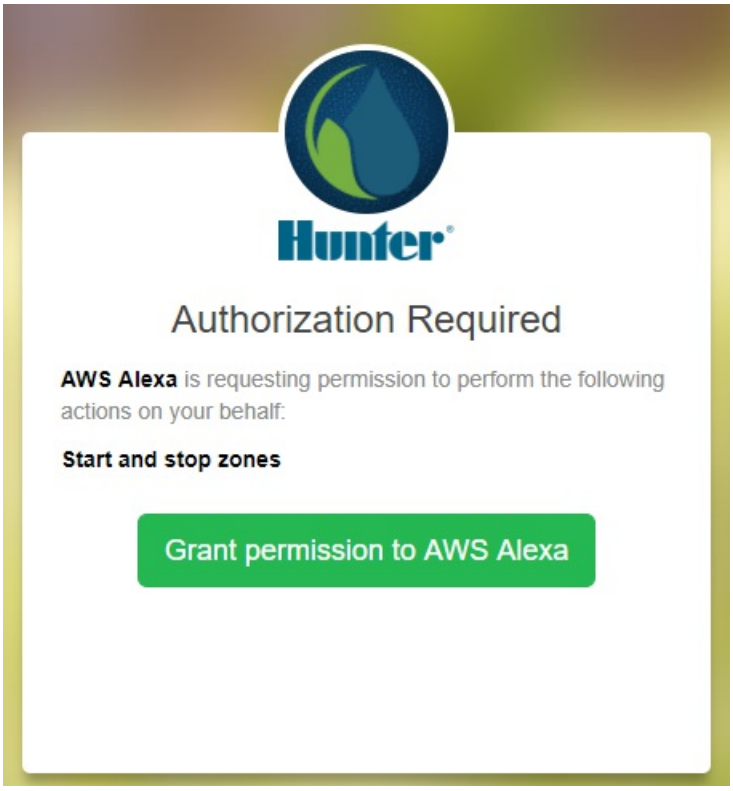
window. If pop-ups are blocked, you will not be able to log in and continue the linking process.

LOG INTO HYDRAWISE



If you are already logged in, you will see the next dialogue box appear.

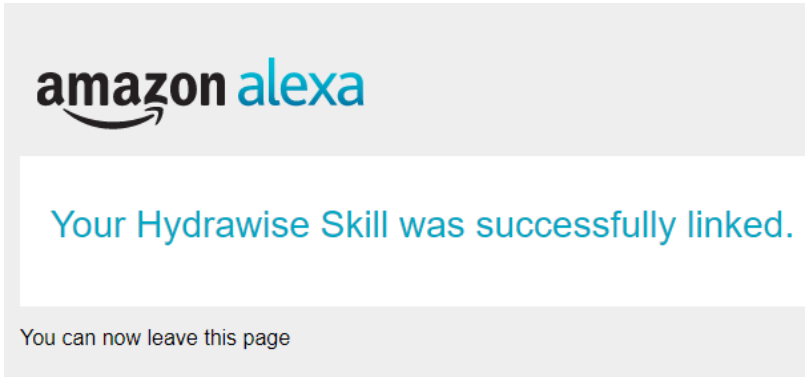
AUTHORIZATION REQUIRED



Click **Grant permission to AWS Alexa**.

You will then receive a confirmation that Hydrawise was successfully linked and you can close the window.

SUCCESSFULLY LINKED PAGE



Using Alexa to control your Hydrawise

Zones can be started or stopped by referencing the zone number (do not use the zone name). For example, if your Zone 1 is called “Front Garden” and you want to start it, you can say, “*Alexa, ask Hydrawise to start Zone 1.*”

Alexa supports the following key phrases:

- Alexa, ask Hydrawise to start/run zone {number}.
  - This command will start a single zone for its default irrigation time.
  - e.g., *Alexa, ask Hydrawise to start Zone 5.*
- Alexa, ask Hydrawise to start/run zone {number} for {x} minutes.
  - This command will start a single zone for a specific time
  - e.g., *Alexa, ask Hydrawise to run Zone 1 for 10 minutes.*
- Alexa, ask Hydrawise to start/run expander {expander number} zone {number}.
  - This command will start a single zone on controllers with expansion modules
  - e.g., *Alexa, ask Hydrawise to start Expander 1, Zone 1.*
- Alexa, ask Hydrawise to start/run all zones.
  - This command will start all zones for their default irrigation time.
- Alexa, ask Hydrawise to stop/finish zone {number}.
  - This command will stop a single zone if it is currently running.
- Alexa, ask Hydrawise to stop/finish expander {expander number} zone {number}.
  - This command will stop a single zone on an expansion module.
- Alexa, ask Hydrawise to suspend zone {number} until {time/date}.
  - This command will suspend all zones for a period of time.

Home Automation - Control4

Hydrawise is now compatible with Control4 home automation software.

Control4 installers can now download drivers to allow the integration.

From the Control4 app, you can access the following features:

- View icons and zone information
- View proposed watering
- Manually start a zone
- View active (watering) stations

NOTE: More details on Control4 integration can be found using this link: Control4 Details [23].

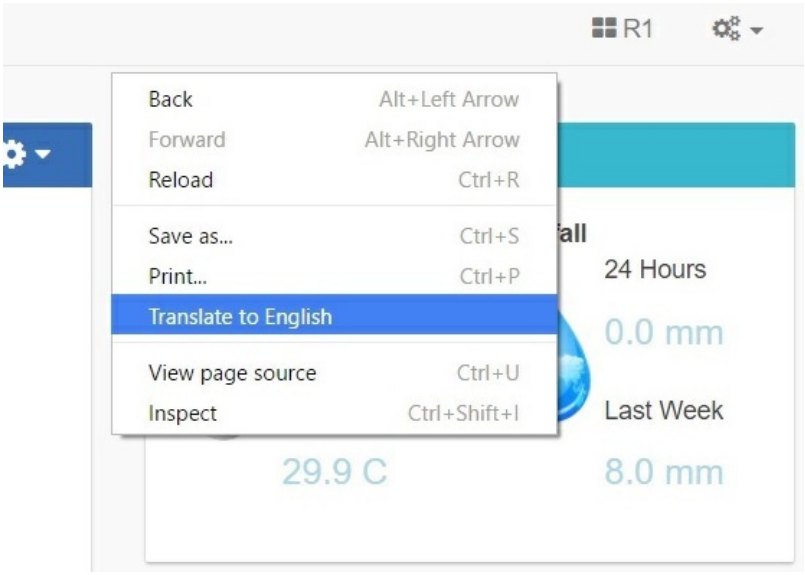
Account - Translation Options

Steps to take to change language via Google Chrome

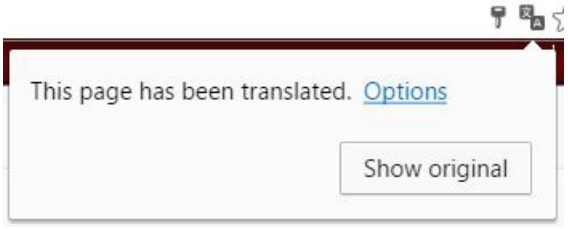
To change the language in google Chrome, please follow the steps below.

Once you have downloaded and installed Google Chrome [24], you can then change the language to your desired language.

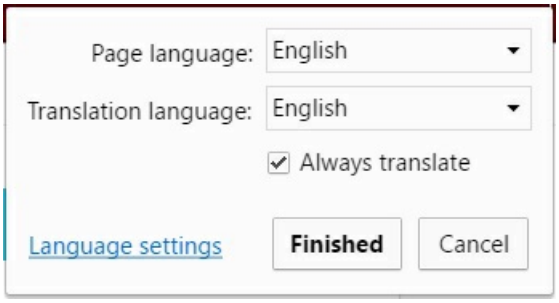
When you are logged in to your account, right-click anywhere along the top of the dashboard and select **Translate to English**.

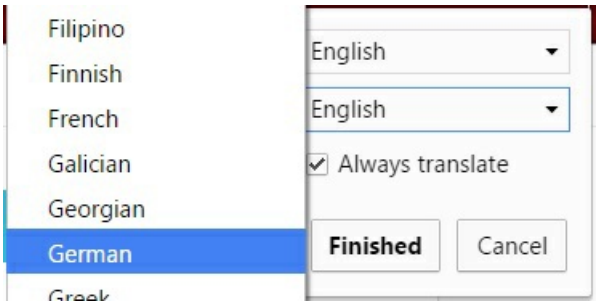


Once you have clicked **Translate to English**, the next dialogue box will appear. Click on **Options**.



You will then be brought to the next two dialogue boxes:

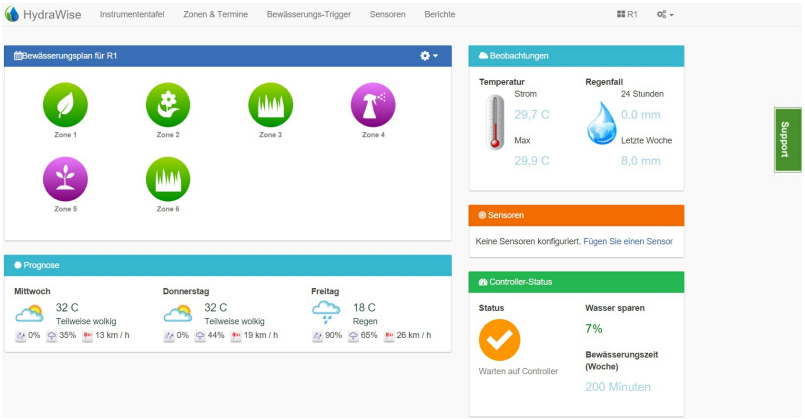




From here, you can select the language of choice. You also have the option to check **Always Translate**.

NOTE: Translation sometimes does not occur automatically when you click to navigate to another page. When this happens, press F5 or click **Refresh** to refresh the page. Follow the steps again from the top to translate the page to the language of choice.

This example shows the page translated in German:



IMPORTANT: Please keep in mind that because translations are performed by Google Chrome, there may be some inaccuracies.

This method can also be used when going through our Help Guides [25] here on Zendesk. If you need further assistance, email us at support@hydrawise.com.

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iOS and Android App Support Policy

The Hunter Hydrawise app's general policy is to support Android and iOS version for as long as the manufacturer (ie. Google or Apple) supports their operating system version.

It is important to use an Android or iOS version that is supported by Apple or Google to ensure you have the manufacturer's latest security updates to protect your data.

As of July 2019, Google officially supports Android 7.0 (Nougat) and above. Apple officially supports iOS versions 12.3 and above.

While we do our best to maintain support for older versions, changes in technology mean that sometimes it is not possible to add features to our apps whilst maintaining backward compatibility with unsupported versions of Android or iOS.

While not supported, we do have customers using older versions of Android (eg. Android 5.0) and iOS (eg. iOS 10.0) without issues.

If your app does not work with your unsupported version of Android or iOS, it may be possible to use your Hydrawise system via the web browser (www.hydrawise.com [19]) in the

older device.

Offline Programming - Standard

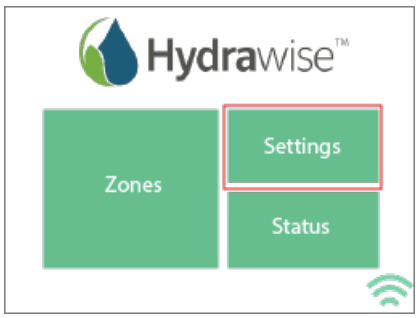
Standard programming will allow the controller to run like our traditional controllers the X-core and the Pro-C models. Each of the six programs (a-f) allows you to start each program up to four times a day, set run lengths and set specific days to water. The standard mode is on version **4.01** or higher. If your controller is not on this version and you have no internet connection, then you will need to connect to the internet via hotspot [26] and switch modes [27]. When you switch modes when on the hotspot [26], your controller will automatically upgrade to version 4.01.

To set your controller to **Standard Offline Mode** for manual configuration, please follow the steps below:

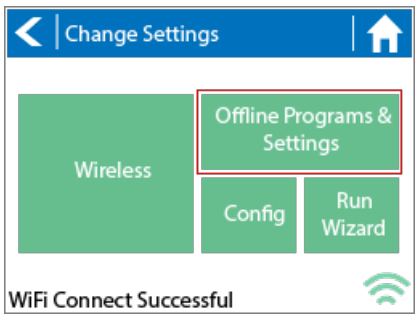
1. From the main menu, tap on **Settings**.
2. Select **Offline Programs & Settings**.
3. Select **Disable Wi-Fi**.
4. You will be presented with a warning dialogue. Please make sure you understand the warning before proceeding. If you're sure that you want to go offline, tap **Go Offline**.
5. Select **Offline Mode.**
6. Select the **Standard Mode** option and press **Confirm.**
7. Select **Offline Programs.**
8. Select the **Edit Water Days** option. The choices here would be specific days, odd/even or interval (e.i. interval 2 would water every other day). Select **OK**.
9. Select the **Edit Start Times** option. You can set up to four start times for each of the six programs. Remember, each start time will sequentially run through all the zones one after another. Select **OK**.
10. Finally, select the **Edit Zones** option. Select the zone, then check the box **Zone Enabled** to allow you to add run time for that zone. Select **OK**.

The basic program should be complete!

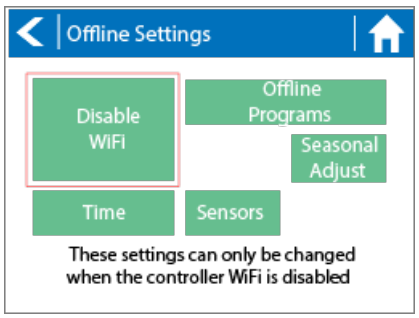
Step 1



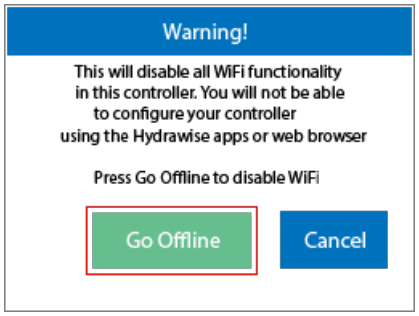
Step 2



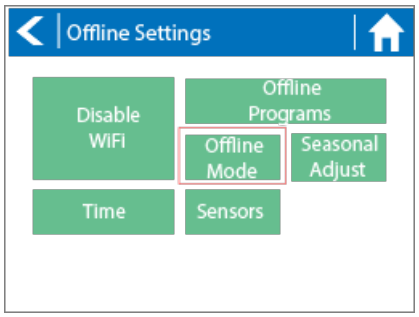
Step 3



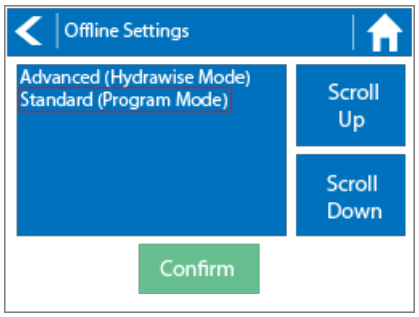
Step 4



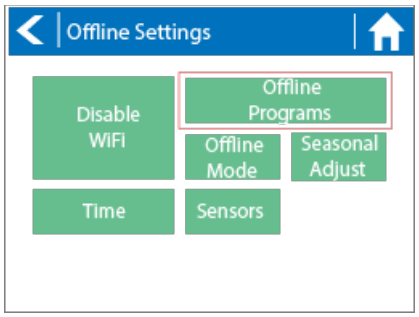
Step 5



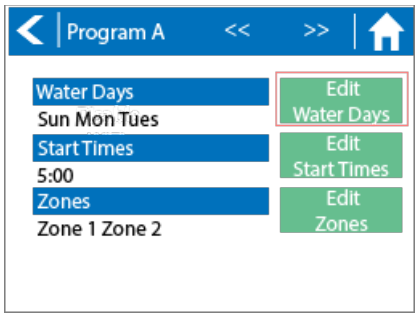
Step 6



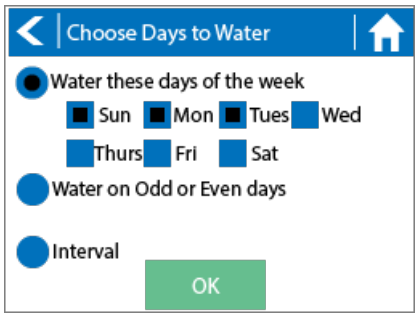
Step 7



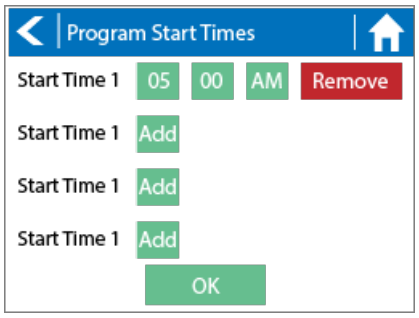
Step 8-A



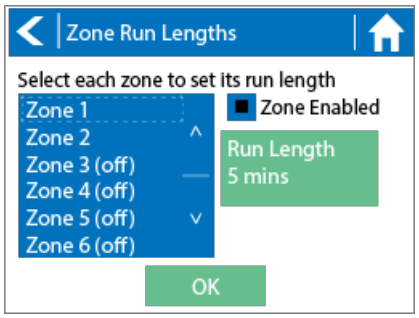
Step 8-B



Step 9



Step 10



Offline Mode - Accessing Offline Mode

Offline Mode

If the controller loses its internet connection for more than 24 hours, you'll receive a notification email. The controller will then go into offline mode. In offline mode, your controller won't be able to access local weather conditions such as rainfall or evaporation. As a result, it will revert to a predefined program.

- For **Smart Watering** zones, the controller will adjust each zone's watering length based on your offline watering budget and will water at each zone's configured peak watering frequency.
- For **Time-Based Watering** zones, the controller will adjust each zone's watering length based on your offline watering budget and will water at each zone's configured watering frequency.
- Note that **Cycle and Soak** is not supported in offline mode and each zone will water for its full watering length without pausing.
- The controller will only water at your configured **Program Start Times**.

To set your controller to **offline Mode** for manual configuration, please follow the steps below:

1. From the main menu, tap on **Settings**.
2. Tap on **Offline Settings**.
3. Tap on **Disable Wi-Fi**.

4. You will be presented with a warning dialogue. Please make sure you understand the warning before proceeding. If you're sure that you want to go offline, tap **Go Offline**.
5. Now that your controller is in Offline Mode, you can configure it manually by tapping on **Program Start Times**.
6. From this screen, you can manually configure each zone according to your desired schedule. Simply tap on **Add** to add a program start time and follow the steps below. You can toggle between zones by tapping on **Next**/**Previous** or you can leave the start time to **APPLY to ALL ZONES.**

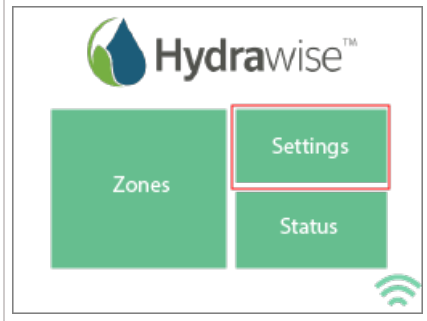
   Applying the start time to **ALL ZONES** will run through all zones with a single start time.

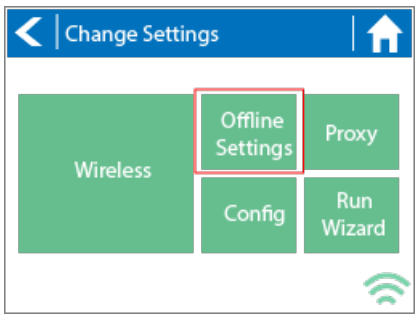
   - Tap **ADD** in the start times menu.
   - Select the green box upper in left to enter **PROGRAM START TIME (24 hr format)**
   - Tap the **DAYS** to be selected **after** finished with start time entry.
   - Tap **CONFIRM** to save the start time entry.
   - Add a second start time for all zones or single zone if desired.
   - Tap the **HOME** icon (upper right) to allow station run times setup.

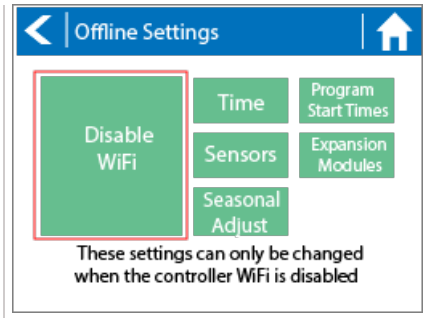
   NOTE: Each zone can have up to four program start times and an additional four start times under the **All Zones** section as shown below.

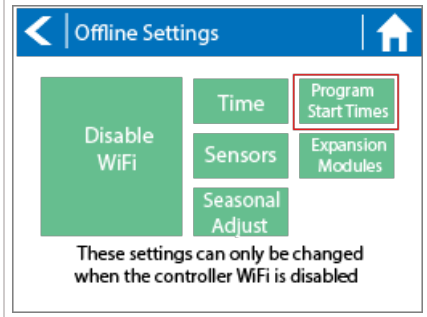
7. From the home screen, you can manually configure each zone run time. Simply tap on **ZONES** to add a zone run time and follow the steps below. You can toggle between zones by tapping on **each zone number.**

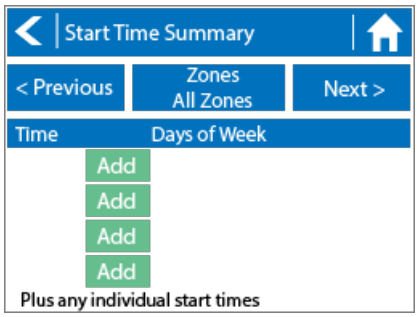
   - Tap **ZONES** in the home menu.
   - Tap the first zone to edit, **(For Example: ZONE 1).**
   - Tap on **RUN TIME** in the center of the screen.
   - Enter **RUN TIME (minutes:seconds format),** then press **OK** to save entry.
   - Repeat steps **1-4** for station run times.

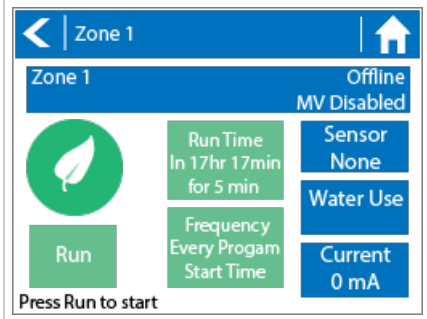








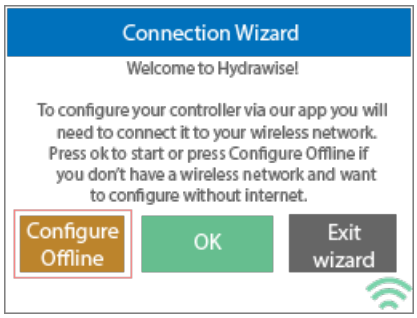




NOTE: To get your controller back in online mode, follow the above steps, enable Wi-Fi, reconnect to your SSID (Wi-Fi connection), and let the controller synchronize with your online Hydrawise account.

Offline Mode - Run the Setup Wizard

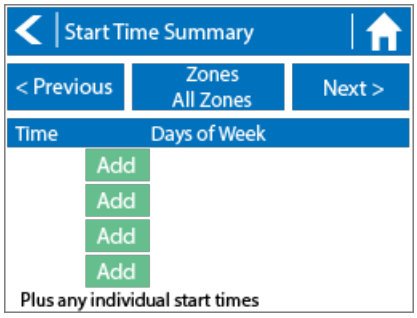
Please follow the steps below to run the setup wizard in offline mode. Refer to Setting Controller to Offline Mode [28] or How to Factory Reset Controller [29] before running the wizard.



1. From the **Connection Wizard screen**, tap on **Configure Offline.** If you select **OK**, you will proceed to the online setup wizard.
2. Tap **OK** to move on to the next step.
3. Enter in today's date if it hasn't already been set or if it is incorrect.
4. Enter today's time if it hasn't already been set or if it is incorrect.
5. From this screen, tap **OK**.
6. Please assign your **Master Valve** if you're running one as advised on the previous screen. Otherwise, keep **Not Assigned** selected and tap **Confirm**.
7. Tap **OK**.
8. You can now enter (in minutes) the run length you want for your **default zone run time**. Then tap **OK**.
9. Tap **OK** to proceed to the next screen.
10. Next, set how often each zone will run. As advised on the previous screen, you can set individual frequencies for each zone.
11. Tap on **OK** to proceed.
12. From this screen, you can manually configure each zone according to your desired schedule. Simply tap on **Add** to add a program start time and follow the steps below. You can toggle between zones by tapping on **Next**/**Previous** or you can leave the start time to **APPLY to ALL ZONES.**

Note: Each zone can have up to four program start times and an additional four start times under the All Zones section as shown below. Applying the start time to ALL ZONES will run through all zones with a single start time.

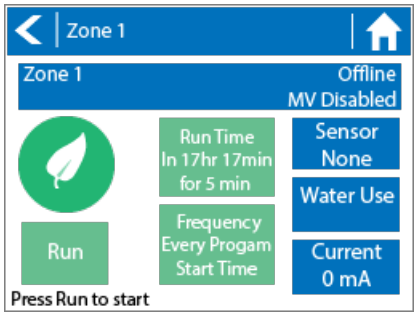
1. Tap **ADD** in the start times menu.
2. Select the green box upper in left to enter **PROGRAM START TIME (24 hr format)**
3. Tap the **DAYS** to be selected **after** finished with start time entry.
4. Tap **CONFIRM** to save the start time entry.
5. Add a second start time for all zones or single zone if desired.
6. Tap the **HOME** icon (upper right) to allow station run times setup.



From the home screen, you can manually configure each zone run time. Simply tap on **ZONES** to add a zone run time and follow the steps below. You can toggle between zones by tapping on **each zone number.**

Note: The default run time and default watering frequency are applied to all zones during the setup wizard. Setting individual run times and frequencies is done by going into each zone afterwards

1. Tap **ZONES** in the home menu.
2. Tap the first zone to edit, **(For Example: ZONE 1).**
3. Tap on **RUN TIME** in the center of the screen.
4. Enter **RUN TIME (minutes:seconds format),** then press **OK** to save entry.
5. Repeat steps **1-4** for station run times.



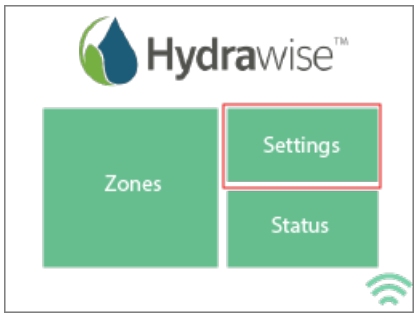
NOTE: To get your controller back in online mode, follow the above steps, enable Wi-Fi, reconnect to your SSID (Wi-Fi connection), and let the controller synchronize with your online Hydrawise account.

Offline Mode - Sensors

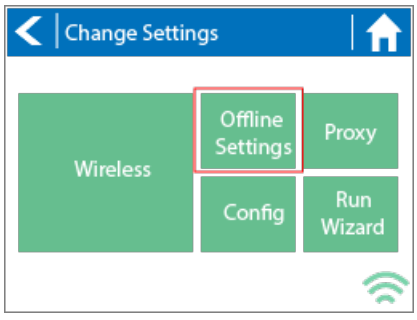
Please follow the steps below to add and configure your sensor or flow meter in **Offline Mode**. Please use the following link for Installation Instructions [30].

1. From the main menu, select **Settings**.
2. Next, select **Offline Settings**.
3. Select **Sensors**.
4. From this screen, you can now navigate between **Sensor 1** and **Sensor 2** by using the **Next** and **Previous** options. Just as you configure your sensors online, you can select the different options to make changes accordingly.

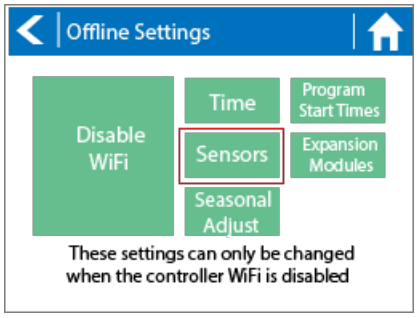
STEP 1



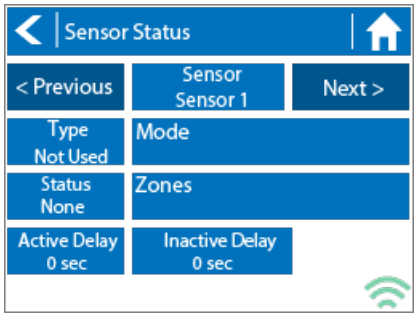
STEP 2



STEP 3



STEP 4



Sensor Status Options	
Type Options	Not Used, Level (Rain Sensor) or Flow Meter
Mode	Stop when open, Stop when closed, Start when open, or Start when closed.
Status	Open or Closed
Zones	Applies to all zones
Active Delay	Seconds
Inactive Delay	Seconds

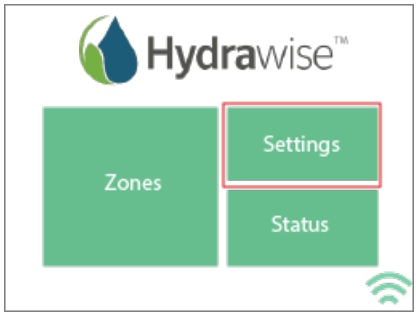
Offline Mode - Turning Off Start Times

From the controller, you can manually turn it off by removing the start time when the

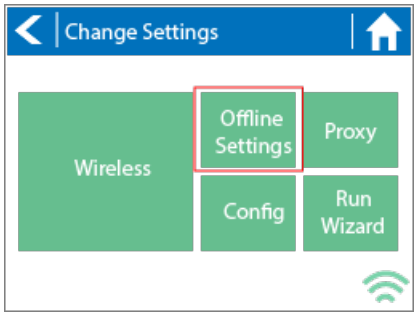
controller is NOT connected to Wi-Fi using offline mode. Please follow the steps and screenshots listed below:

1. Select **"Settings"** in the home menu at the controller.
2. Select **"Offline Settings."**
3. Select **"Program Start Times"** on the upper right side of the screen.
4. Select **"Modify"** which will allow you to edit you start times.
5. Finally, Select **"Delete"** button to no longer allow controller to run in offline mode.

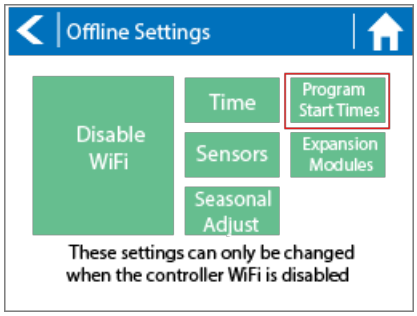
Step 1



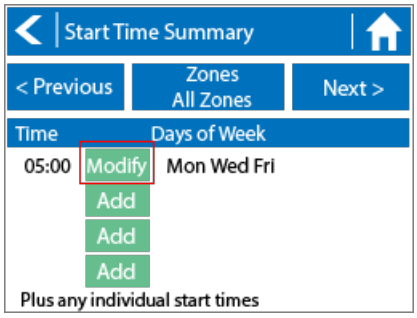
Step 2



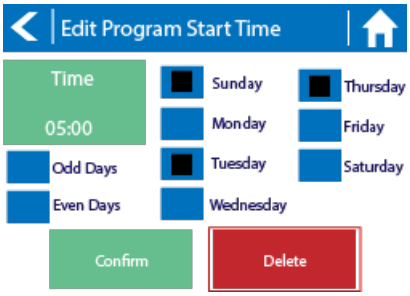
Step 3



Step 4



Step 5



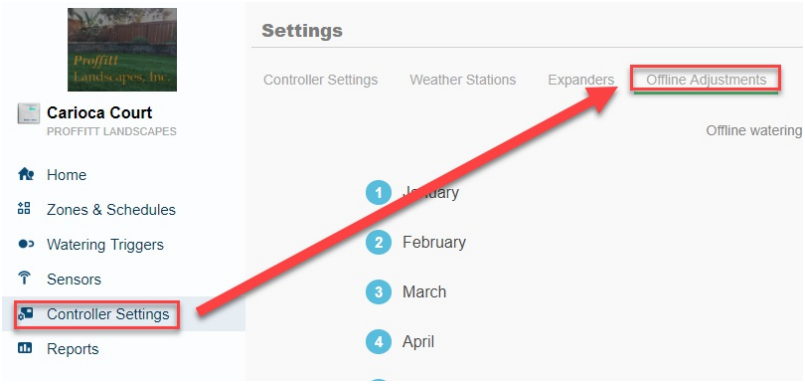
Offline Mode - Seasonal Adjust

Offline water adjustments allow the controller to automatically adjust the amount of watering on a month by month basis if the controller is in an Offline mode (ie. not connected to the internet). Steps below will cover both online and offline instructions on changing the seasonal adjust for when the controller enters offline mode.

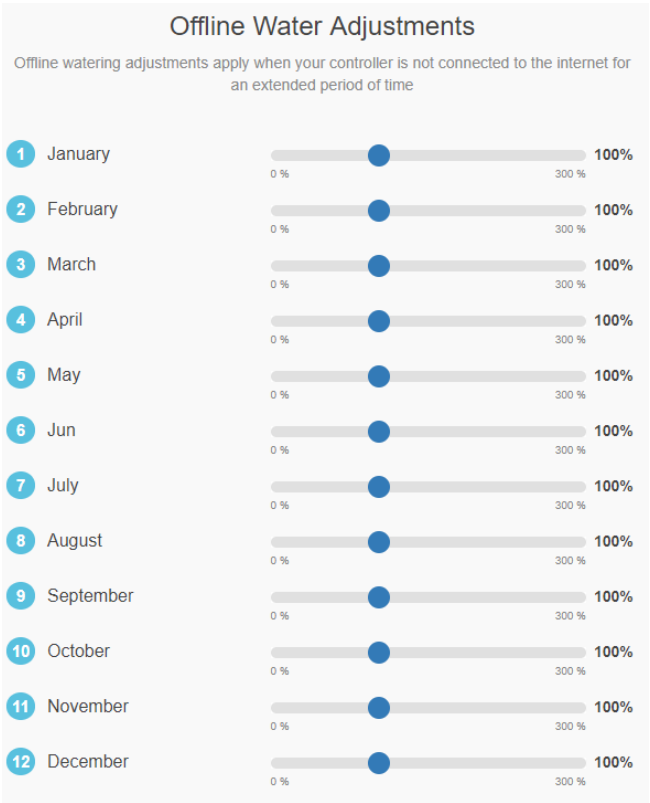
Online: Offline Water Adjustment

1. Select **Controller Settings** on the left hand side.
2. Select **Offline Adjustments.**
3. Sliders can be moved to adjust the offline watering from 0%-300%.

STEP 1-2



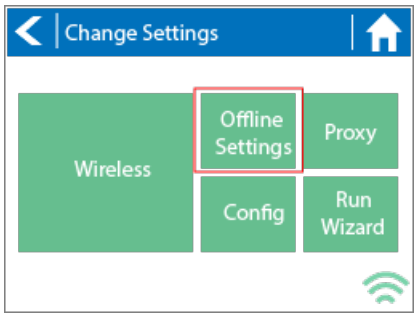
STEP 3

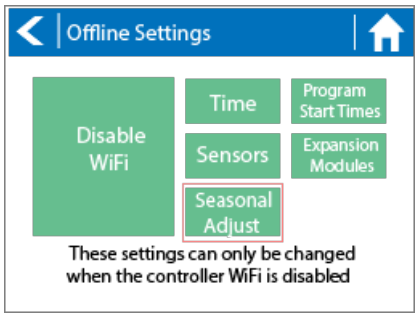


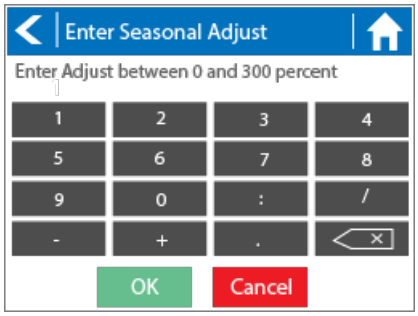
Offline: Offline Water Adjustment

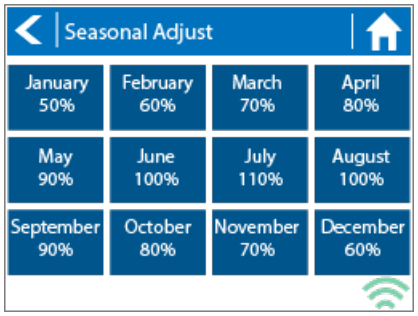
1. Select settings.
2. Next, select offline settings.
3. Select seasonal adjust.
4. Select a month to adjust.
5. Adjust each month by a percentage then select OK.

CONTROLLER SCREENSHOTS:









HPC - Upgrading Pro-C

The PROC model controller must be the NEWER 400 version with a date code of MARCH 2014 or newer. Ensure you have a strong Wi-Fi signal. Wi-Fi connectivity can be tested on the HPC panel itself (signal strength is shown when you select a wireless network). If you have any issues connecting the controller to the router, please verify all Wi-Fi specifications here [1].

Remove Pro-C Face Panel

1. Remove ribbon cable with power off.
2. Press down on white hinge release button.
3. Remove face panel.

Install HPC-FP Face Panel

1. Press blue hinges together and attach new HPC panel.
2. Reconnect ribbon cable
3. Close and turn power on

STEPS

For information on complete setup in the application,

please visit our "How To Guide [31]" section.

HPC/HCC - Using Hunter Remotes

The HPC face panel quickly and easily upgrades Pro-C® controllers (PC400 models manufactured since March 2014) to next-generation smart controllers via the Hydrawise platform. In addition, it lets contractors continue using their Roam and Roam XL remotes for quick on-site management. HCC is also compatible with Hunter's ROAM and ROAM XL remotes, allowing for fast and reliable manual operation in the field from long-range distances without the need for a smartphone. There is no need to remove the smart port adapter from the controllers when doing a facepack upgrade.

Compatible models include all Hunter remotes: **SRR, ICR, ROAM, and the ROAM-XL.**

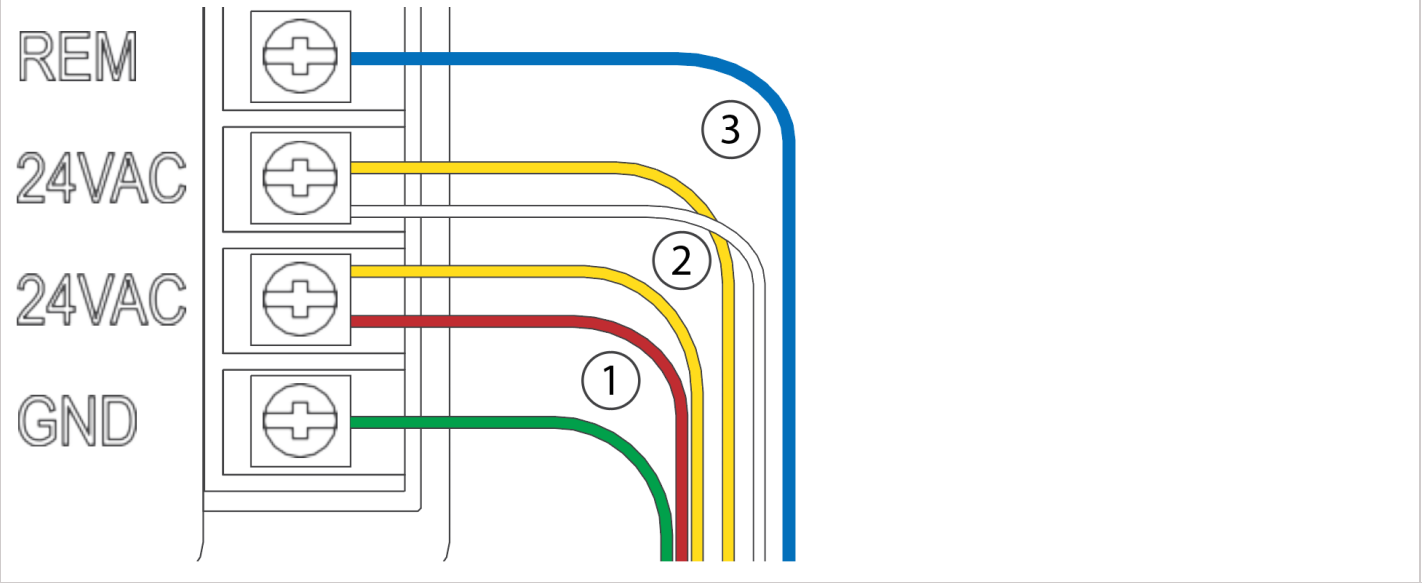
If the Smartport is not installed on the controller, see illustrations below for wiring instructions.

Note: Any extension of the wiring on the SmartPort may result in an error message in the controller display and possible malfunction of the remote unit due to radio interference. In some situations, lengthening of the harness may work fine, in others it may not work at all (it is site specific). In either case, extending the wiring harness should be done using shielded cable to minimize the possible effects of electrical noise. For easiest installation, order the Hunter SmartPort shielded cable wiring harness. (P/N ROAM-SCWH) with a full 25' (7.6 meters) of shielded cable.

Wiring

1. Bottom 24 VAC terminal - Red wire
2. Second 24 VAC terminal - White wire
3. Remote terminal - Blue wire

Smart Port Wiring



Operation

The ROAM System will allow you to remotely turn on and off any station on your Hunter controller with the press of a button. Once on, the station will run for the run time you have designated in the remote. To remotely activate a **station,** follow the steps below:

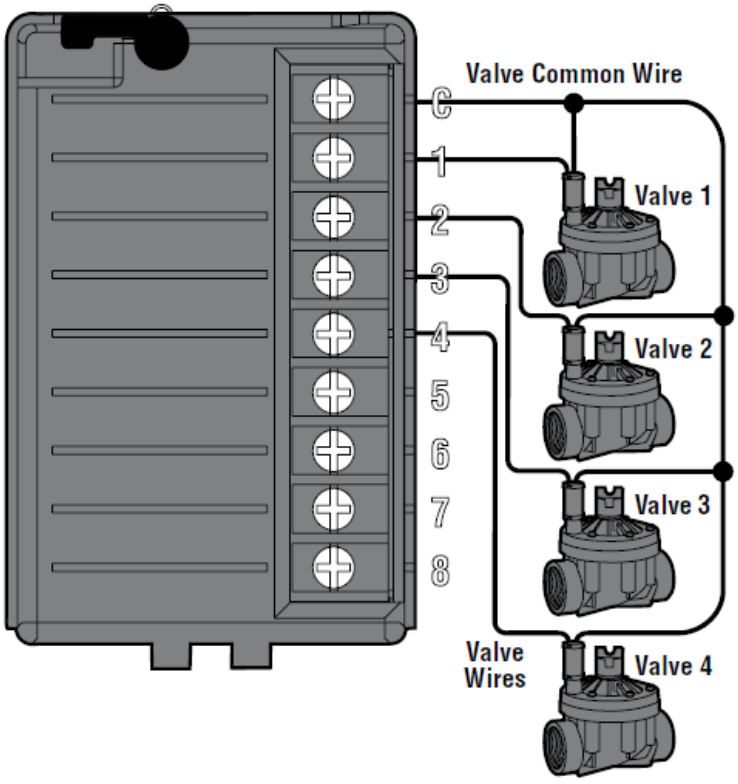
1. Plug the receiver into a SmartPort® that is connected to a powered controller. The receiver will beep 4 times followed by a 10-second pause and a single beep.
2. If your transmitter is not on (no display), wake it up by pressing and holding the **MODE** button for 5 seconds. The Transmitter will display the active station.
3. Use the **up** and **down** buttons to display the station you would like to start.
4. Press the **"Green Play Button"** to start the station. The Transmitter will display the Transmit icon . If you are near the receiver, you will hear it beep 2 times. This indicates that the Receiver has received the command.
5. Press the **"Red Stop Button"** to turn off any station that is on. The display will show the Transmit icon and receiver will beep again twice. The ROAM System is designed to turn on
   one station at a time (unless you activate a program). Therefore, turning a station on while another station is operating will cause the operating station to turn off.

NOTE: The ROAM remote can activate any station on the controller whether the controller dial is in the “SYSTEM OFF”, “RUN” or “RUN/BYPASS SENSOR” modes. If a sensor device has been wired to the controller, the ROAM remote will NOT override the sensor for manual operation. For more programming information, please see attached manuals for both the ROAM and ROAM XL remotes.

HCC - Valve Wiring

1. Route valve wires between control valve location and controller.
2. At valves, attach a common wire to either solenoid wire of all valves. The most commonly used color for the common wire is white. Attach a separate control wire to the remaining wire of each valve. All wire splice connections should be done using waterproof connectors.
3. Open hinged faceplate on the controller to access the terminal strip area.
4. Route valve wires through the conduit and attach conduit to the controller at the large conduit opening on the right side of the bottom of the cabinet. The conduit opening has a triple knockout to accommodate 1", 1¼", or 1½" (25, 32, or 40 mm) conduit. Each section can be easily removed using a knife.
5. Strip ½" (13 mm) of insulation from ends of all wires. Secure valve common wire to **C** (Common) terminal on any of the valve modules or power module. Then attach all individual valve control wires to appropriate station terminals.

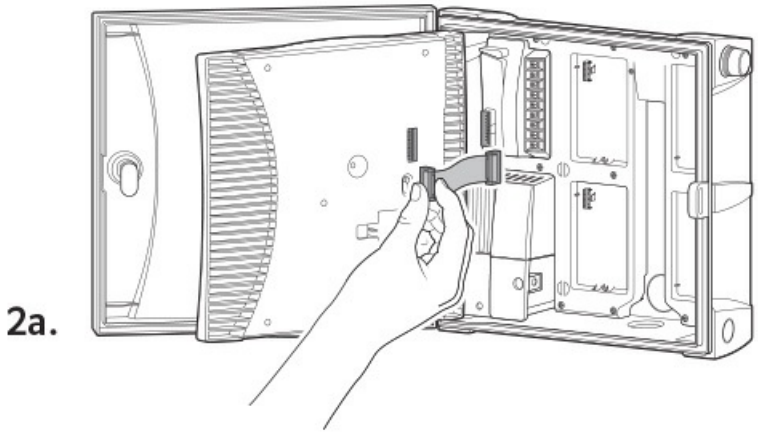
HCC CONTROLLER



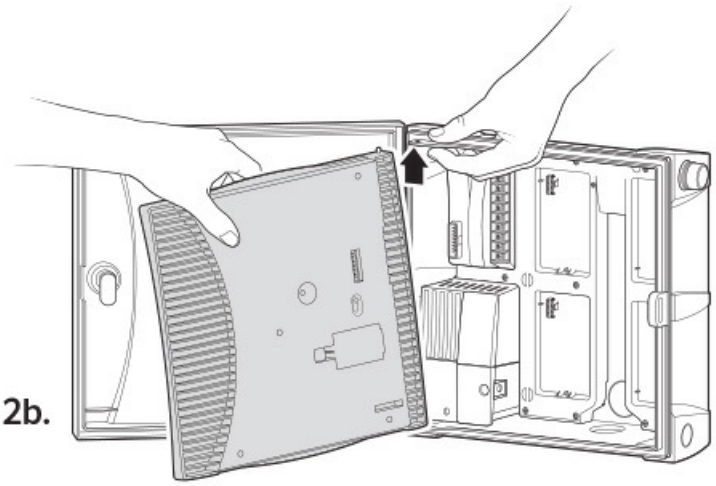
HCC - AC Wiring

Connecting the controller to primary AC power should be done by a licensed electrician following all local codes. Install in approved conduit and fittings. The controller can operate with either 120VAC or 230VAC power. Supply wires must be 14AWG/ 2 mm^2 or larger.

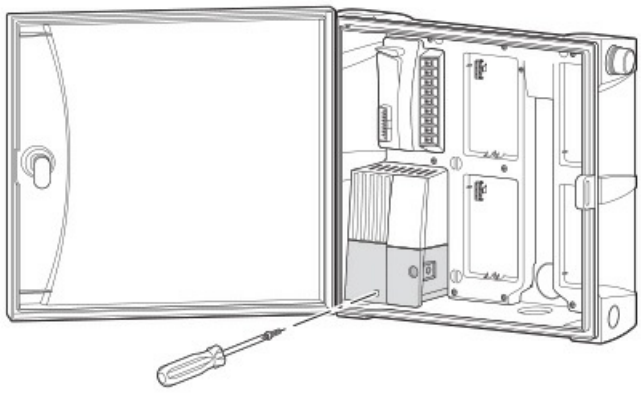
1. Turn AC power "**off"** at the source, and verify that it is off.
2. Disconnect the **"facepack"** ribbon cable.
3. Remove the **"facepack."**
4. Remove the **"cover"** from the junction box.
5. Strip about **0.5”** (13 mm) of insulation from the end of each AC power wire.
6. Route the wires through the **"conduit opening"** inside the junction box.
7. Connect AC wiring using supplied terminal block (or taped wire nuts where permissible).



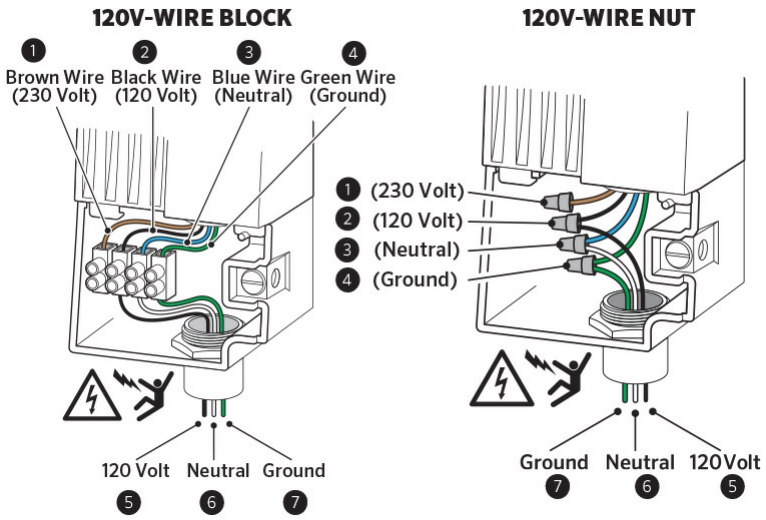
2b.



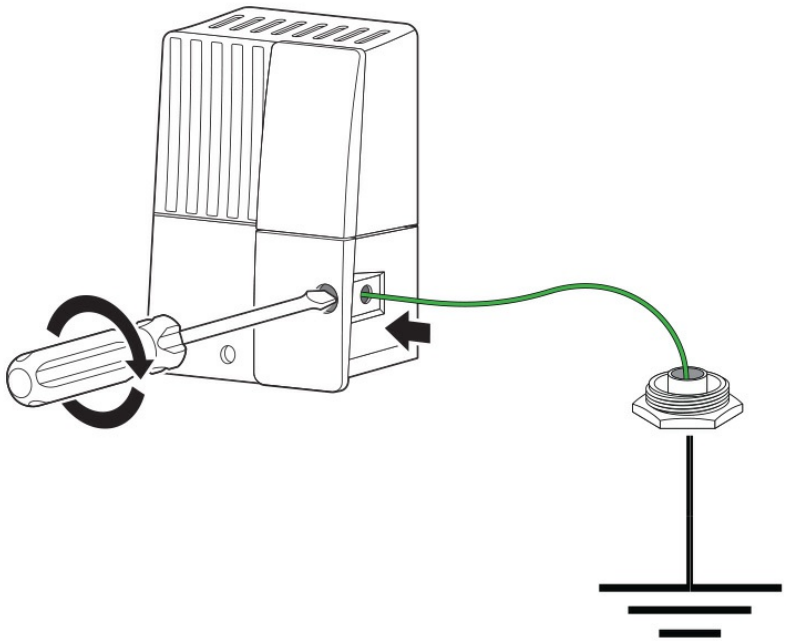
2c.



Wiring Block



Wiring Block



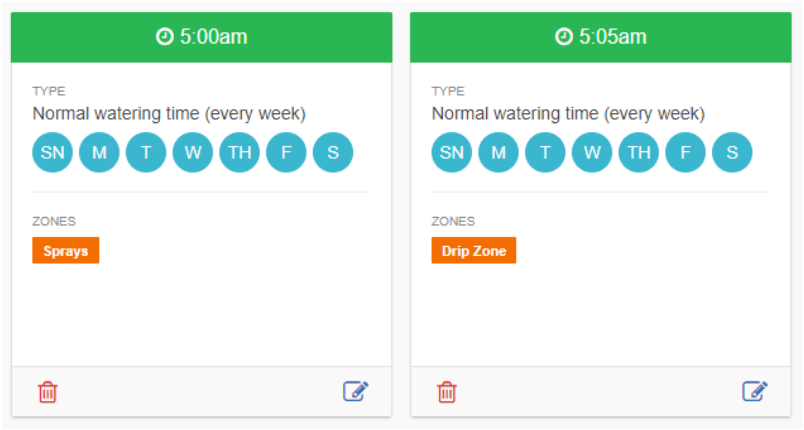
1. Insert copper wire from earth ground hardware, and tighten screw in front.
2. Minimum 10 AWG/5mm^2 wire to earth ground hardware.
3. Add copper-clad steel ground rods and/or plates sufficient to achieve 10Ω or less resistance at a minimum 8’/2.5 m away from controller.

HCC - Two Zones Simultaneously

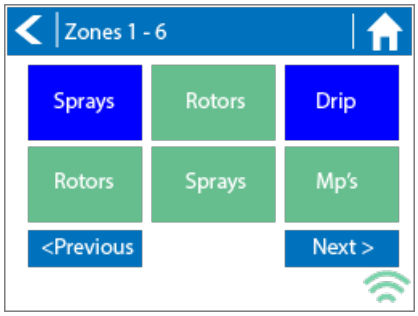
The HCC controller has the ability to operate two Hunter valves at one time therefore, allows for more than one program to run at the same time. Only two programs can be allowed to run concurrently. This is a great feature if you have a short water window and the available water to feed multiple stations; however, it could become an issue if the flow of your irrigation system cannot support operating multiple stations at the same time. If you do not have the available water to operate multiple stations at one time, you will need to consider and calculate when each program will finish, or review the total watering time for each program.

Note: It is important to stagger the start times a few minutes apart so the programs will run concurrently. Programs with the exact same start time will result in running only one of the programs. See example below of two:

Start Times



Controller Screen

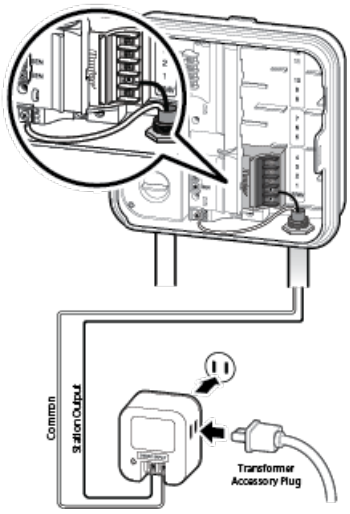


Lightning Transformers with Controllers

Hydrawise controllers are capable of operating lighting transformers equipped with the PXSYNC interface box. A commonly used transformer with the PXSYNC is the PX or EX Transformer. We also offer a DX Transformer that can be controlled from a irrigation controller via the 24 volt EXTERNAL connection built inside the controller.

Connect wires from the first **PXSYNC or external ports inside the DX** box to a station output number (and the Common) on the Hydrawise controller.

PRO-C with PX SYNC Example



Important Pump/Master Valve notes:

Controller	P/MV Terminal	Output
HC	If a pump or master valve is in use, the lighting transformer should not be used in conjunction with irrigation controller.	Single station output will operate one at a time. Irrigation must **not** be programmed for duration of the lighting schedule.
PRO-HC	If a pump or master valve is in use, the lighting transformer should not be used in conjunction with irrigation controller.	Single station output will operate at a time. Irrigation must **not** be programmed for duration of the lighting schedule.
HPC	If using PUMP or master valve, this station output must be set to **OFF** in the programming.	Single station output will operate at a time. Irrigation must **not** be programmed for duration of the lighting schedule.
HCC	If using PUMP or master valve, this station output must be set to **OFF** in the programming.	Two station outputs will operate at a time. Any two programs will run simultaneously (lighting program and irrigation program).

HPC- WRCLIK and HC Flow Meter

In the event you will need to install a flow meter and a rain sensor on the **HPC** controller, please use the following instructions. The **HPC** controller utilizes a single SEN output so these steps are necessary to make this work. For correct field wiring of the flow meter, please reference the article here. [32]

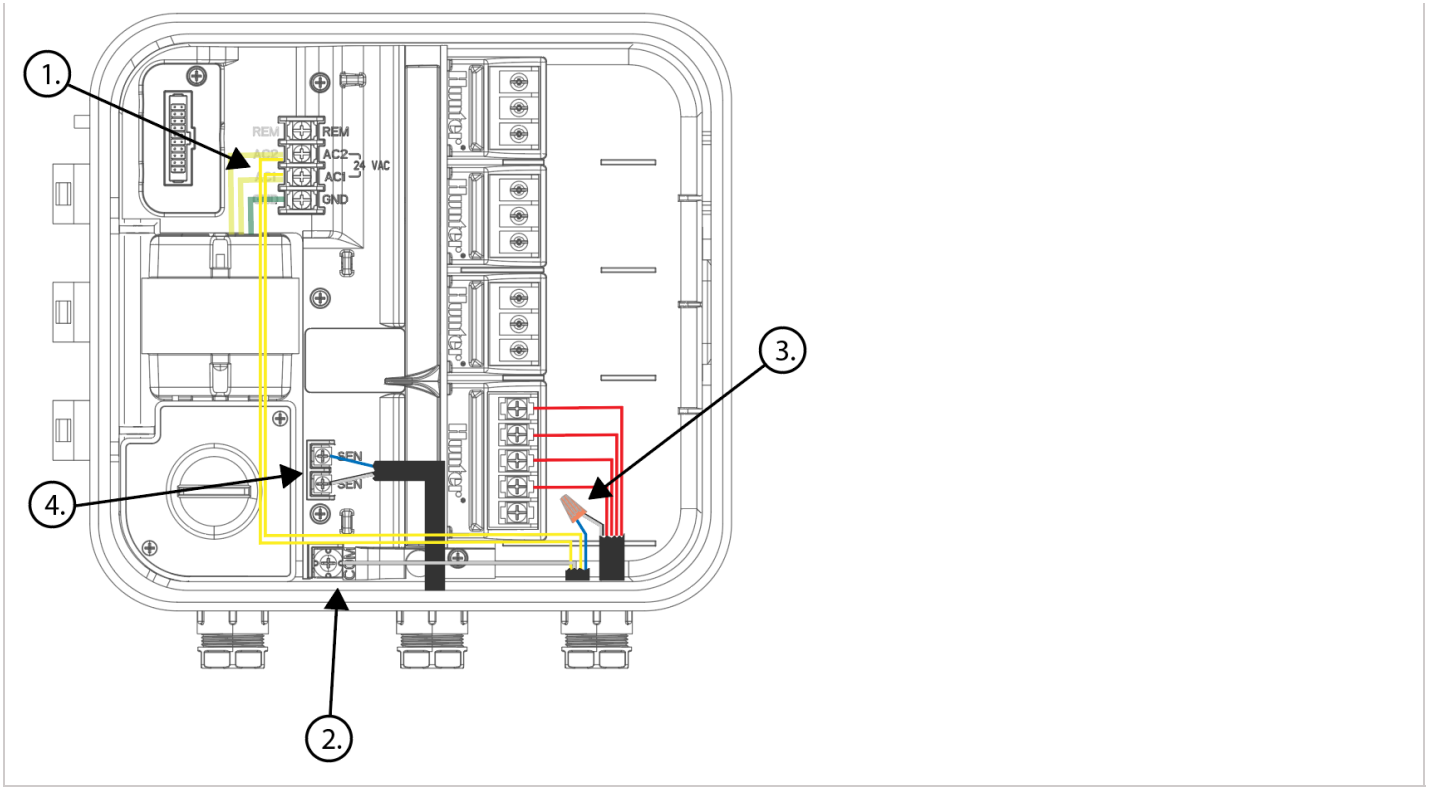
NOTE: The software will only recognize the flow meter for this type of installation. The Wireless Rain Clik will still shut down system after a rain event, but this will not reflect anywhere in the software. The reports will not show ANY data for the rain events.

IMPORTANT: You will see alerts for underflow from the flow meter since the system will continue to run even with the common circuit interrupted by the rain event. These alerts will have to be ignored for this type of application. For more details on alerts, please view this article here. [33]

Please reference chart and illustration below for controller wiring details.

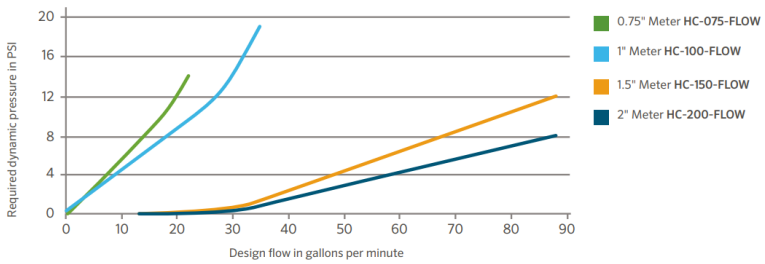
Illustration	Terminals	Wires
Figure 1.	AC 1/ AC 2	WRCLIK Yellow
Figure 2.	COMMON	WRCLIK White
Figure 3.	Valve Common	WRCLIK Blue
Figure 4.	Flow meter - Blue/White	METER Blue/White

Right Click to View Larger image



Flow Meter Pressure Loss Chart

HC FLOW METER PRESSURE LOSS CHART



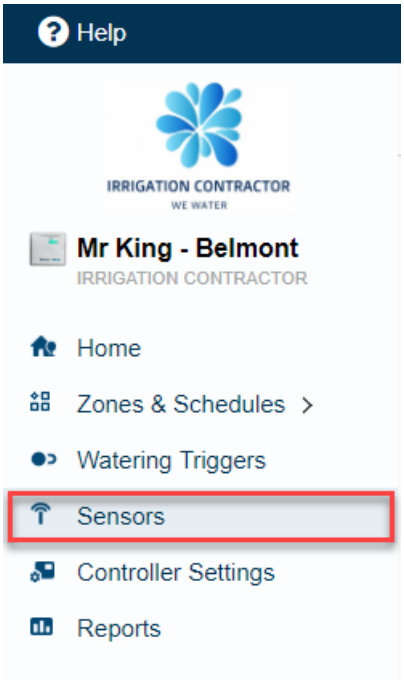
Flow Meter - Configuration

Assigning the Meter

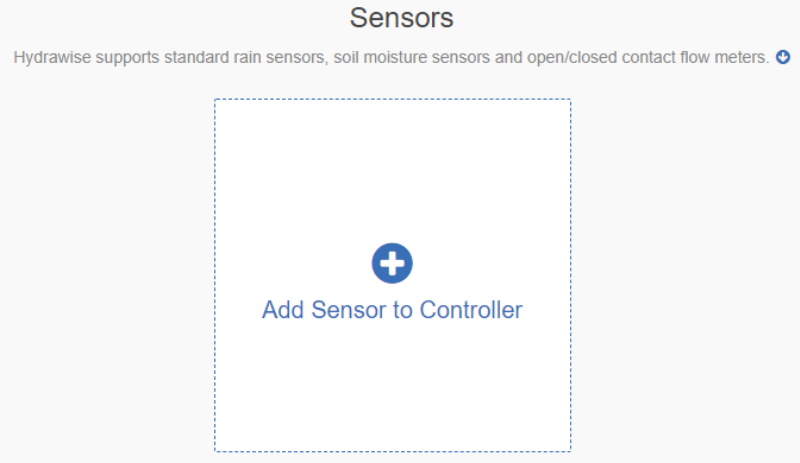
Please view the steps and screenshots to access this feature:

1. Click on **"Sensors"** from the home dashboard.
2. Add **"Sensor."**
3. Choose a **name**, **sensor type**, and **controller input** (flow related only).
4. Choose which **zones** should be linked to the sensor.
5. Click **ok** when finished.

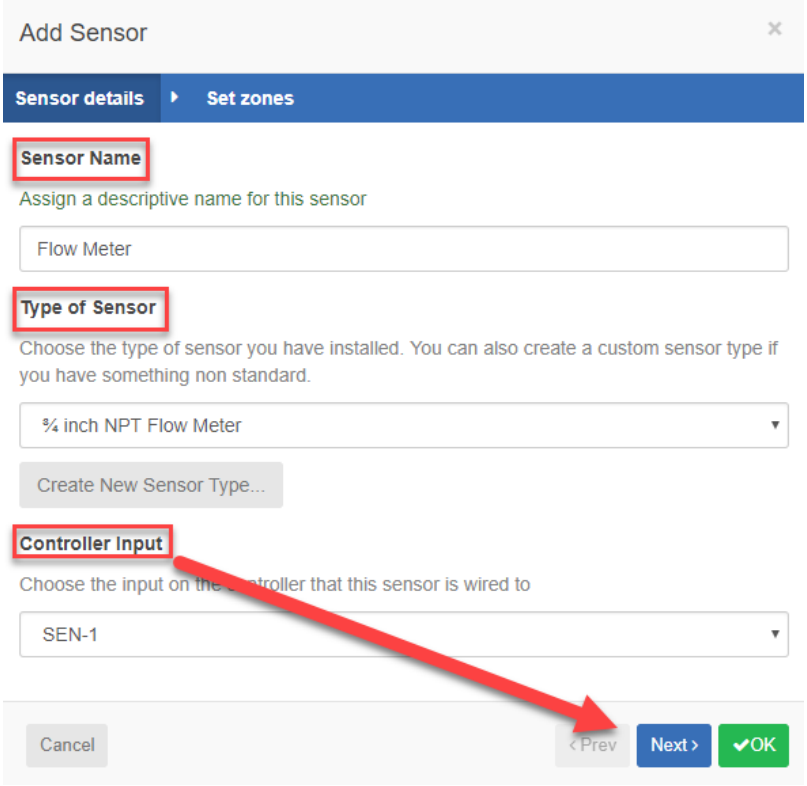
Step 1



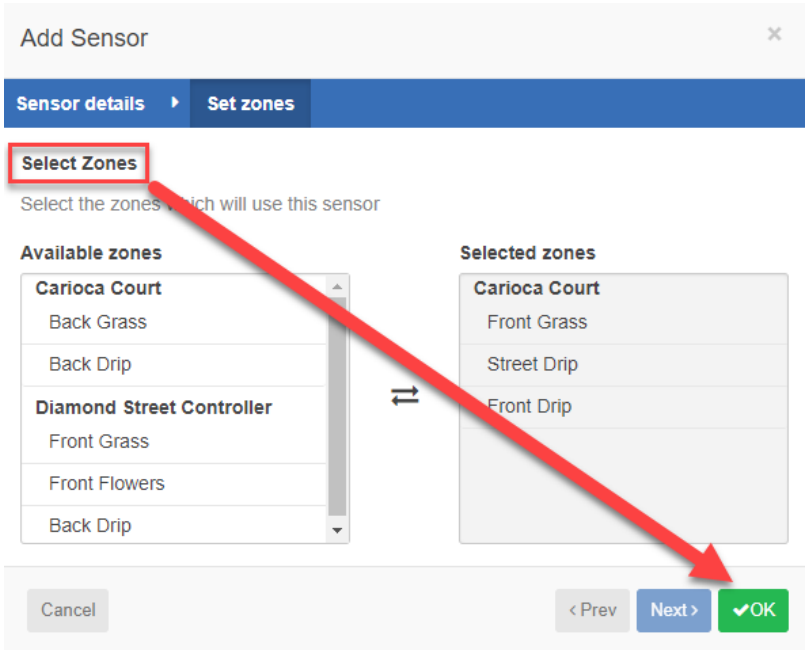
Step 2



Step 3



Step 4



Flow Meter - Quick Start Guide

Please click on the link below to download the flow meter connection guide.

Flow Meter - Installation Tips

Flow meters are supplied with detailed installation instructions [30].

The flow meter wires need to be cabled back to the controller and connected to the **Sensor** inputs on the controller. See chart below for wiring standard Hydrawise flow meters (Sizes include 3/4", 1", 1.5", 2")

FLOW METER WIRE	SCREW TERMINAL	CONTROLLER

BLUE	SEN 1, 2	HC
BLUE	SEN 1, 2	PRO-HC
BLUE	SEN	HPC-FP
WHITE	COM	HC
WHITE	SEN COM	PRO-HC
WHITE	SEN	HPC-FP
RED	Not Used, Cap off	N/A

The tips below include all the necessary key points of the install to avoid any false alerts or readings.

<table>
<tr><th>Installation Steps</th><th>Description</th></tr>
<tr><td>Flow Meter Body</td><td>Flow meters are designed to be installed horizontally only, with the dial facing up. Not vertically. Analog dial for manual readings in U.S. are shown in US gallons (Int. customers the dial reads in Cubic Meters). Units can be changed in App to gallons or liters.</td></tr>
<tr><td>Adapter</td><td>Brass unions included to fit your irrigation system.</td></tr>
<tr><td>Entry Location</td><td>Install between the master valve and zone valves. Meter should be installed 10 times pipe diameter before and 5 times after with straight pipe and no fittings. See example:
<table>
<tr><th>Pipe</th><th>10x-Before</th><th>5x-After</th></tr>
<tr><td>3/4"</td><td>7.5"</td><td>3.75"</td></tr>
<tr><td>1"</td><td>10"</td><td>5"</td></tr>
<tr><td>1.5"</td><td>15"</td><td>7.5"</td></tr>
<tr><td>2"</td><td>20"</td><td>10"</td></tr>
</table></td></tr>
<tr><td>Cable used (shielded cable only)</td><td>18 gauge - 1000 foot max Length. Shielded direct burial cable must be used. Cable should consist of two dedicated wires and must not be in the same conduit, cable bundle or trench as the solenoid wires. DO NOT share common wire. Shielded cable is commonly available, here are some manufacturers (Paige [34] & Regency [35]For</td></tr>
</table>

	additional information on avoiding electrical interference, see below:
Flow meter body	Arrow indicates direction of flow.
Wire Connection	Blue/White wire only, **red not used**. See sensor configuration [36] for more info based on model controller.
Log in to your account	Enter your login [13] information.
Create your flow sensor	App will show options for all HC meters.
Creating Alerts	See link here [37]
Reading Meter	See link here [38]
Testing Meter	See link here [39]

Avoid Electrical Interference

- Always use shielded cable, between the controller and the HC Flow Meter.
- At the controller end, using the shield (foil wrap) and the bare wire connect them to the controller GND terminal (not required for HC controllers).
- Do not connect the other end of the Shield or the bare wire to the Earth or a grounding stake
- Use Waterproof wire connectors at the flow meter, such as 3M 316IR [40] or 3M DBY [41]
- Shielded cable is commonly available, here are some manufacturers. Paige [34] & Regency [35]

In the event you continue to receive bad readings or false alerts, please contact us support@hydrawise.com [15]

Flow Meter - Specifications

HC FLOW METER SPECIFICATIONS

	HC-075-FLOW (¾")	HC-100-FLOW (1")	HC-150-FLOW (1½")	HC-200-FLOW (2")
Inlet/outlet connection size	¾" NPT body, male thread with 1" NPT male adapter	1" NPT body, male thread with 1.5" NPT male adapter	1½" NPT body, male thread with 2" NPT male adapter	2" NPT body, male thread with 3" NPT male adapter
Meter internal diameter	3/4"	1"	1.5"	2"
Minimum flow (GPM)	0.22	0.3	0.88	1.98
Maximum recommended flow (GPM)	15	30	66	105
Maximum flow rate (GPM)	21	34	88	132
Dial reading (US gal)	1 pulse per 0.1 U.S. gal	1 pulse per 1 U.S. gal	1 pulse per 1 U.S. gal	1 pulse per 1 U.S. gal
Maximum working pressure (PSI)	230	230	230	230

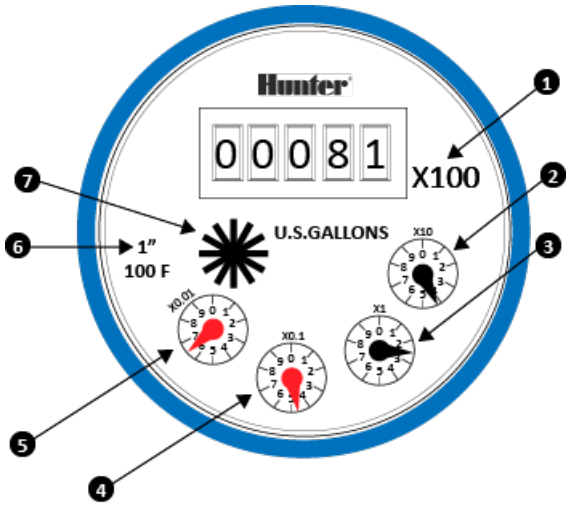
Flow Meter - Reading Meter

The Hydrawise flow meters come in a US Gallon reading for domestic and metric reading called M^3 (Meters Cubed 1000 Liters) for international. Conversion rate for metric meters is 3.78 Liters to 1 US Gallon if required.

See example of meter reading below in US gallons:

Fig. 1	X100	8100 Gallons
Fig. 2	X10	814X.XX Gallons
Fig. 3	X1	8142.XX Gallons
Fig. 4	X0.1	8142.4X Gallons
Fig. 5	X0.01	8142.46 Gallons Total
Fig. 6	Size meter	1"
Fig. 7	Flow Indicator	Wheel spins when water is flowing.

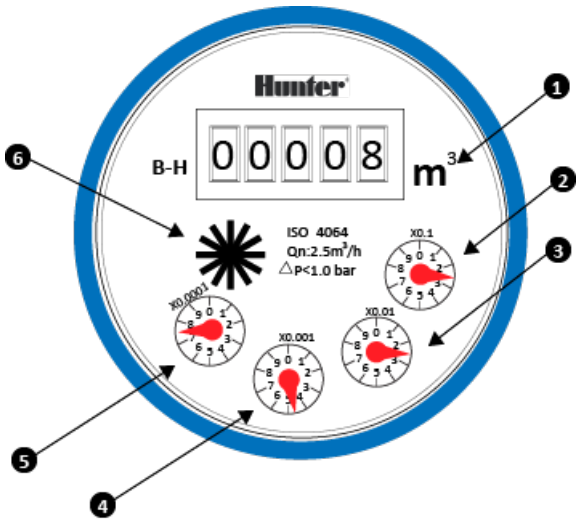
We have a flow that has gone through the meter of 8,142.46 gallons.



See example of meter reading below in Litres:

Fig. 1	8,000 Litres
Fig. 2	8,200 Litres

Fig. 3	8,220 Litres
Fig. 4	8,224 Litres
Fig. 5	8,224.7 Litres Total
Fig. 6	Wheel spins when water is flowing.



So we have a flow that has gone through the meter of 8,224.7 Litres. To calculate this into Gallons is easy 8,224.7 / 3.78 = 2175.84 gallons.

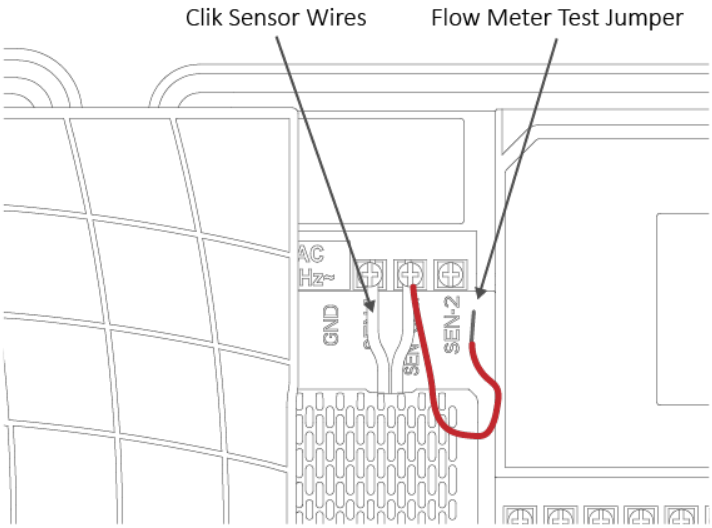
Flow Meter - Testing Meter

If your flow meter is working but is not recording data in your **Dashboard** or events, follow the steps here:

1. Make sure sensor is configured [42] in the software.
2. Make sure controller is online. If not, please use link [43] for Wi-Fi troubleshooting steps.
3. Remove the wire splices at the flow meter connection in the field. Tap the two wires

together that run to the controller 10 times, as each contact will record a pulse. Refresh the app to see if the flow usage was registered.

4. If app registered flow usage, your wiring and system are set up correctly. Reconnect to the flow meter and run a large flow (lots of sprinklers) zone. Did you get a flow on your app? If **YES**, all is OK. If **NO**, contact support@hydrawise.com [44].
5. If app did not register flow usage, test the sensor inputs on the controller. You can use the same method with a paper clip or wire to make contact between sensor 1 or 2 and the common terminal. Do this 10 times and then check for flow data usage at the home screen. If **YES,** there is a problem with the wire running to the flow meter. If **NO**, contact support@hydrawise.com [44].



IMPORTANT: Our controller is not polarity sensitive. There is no risk of electric shock when performing these tests. However, if you feel uncomfortable, please contact a qualified technician or irrigation specialist for further assistance.

NOTE: If it works at the controller end but not the flow-meter end, there is a wiring fault.

If it doesn't work at the controller end, contact support@hydrawise.com [44].

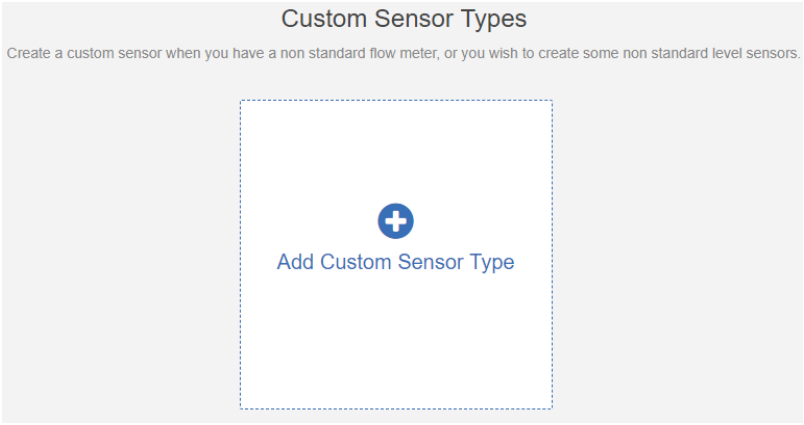
If it works at both ends, but still does not register flow on the app, contact support@hydrawise.com [44].

Flow Meter - Custom Flow Sensor Configuration

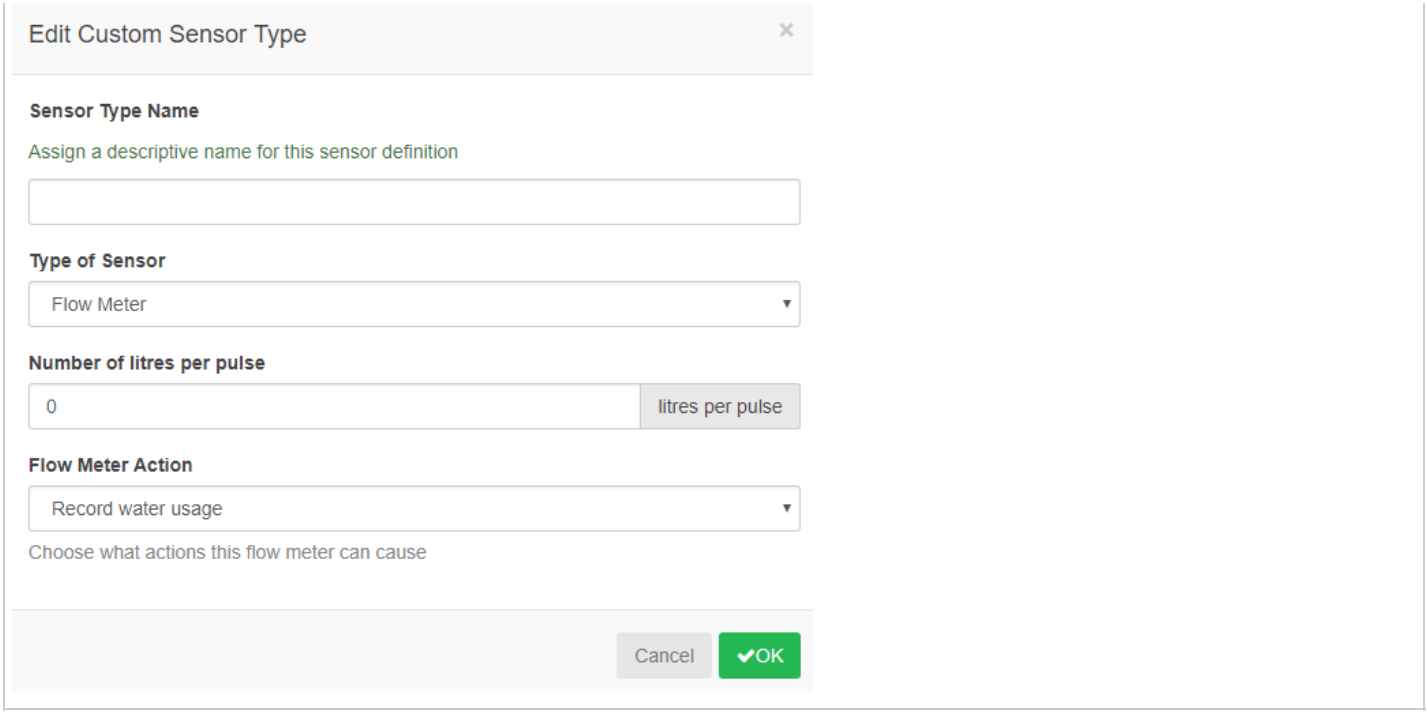
To add a custom flow sensor, go to Sensors [45] from your web browser or smartphone application.

1. Click **Add Custom Sensor Type**

STEP 1



A dialogue box will appear for you to enter your custom flow meter details. Make sure you enter the calibration details for your custom pulse-based flow meter. Please refer to the manufacturer specifications to find out the calibration. Otherwise, you will not get accurate readings to display on your flow data.



NOTE: For our system to detect the correct flow data and reflect it on your **Dashboard** reports, any third-party flow meter used must be a true pulse flow meter or have a reed switch. We aim for a minimum of 10 pulses per min and a maximum of 120 pulses per min. That means if the flow rate was 10 gal per min, 1 pulse per gallon needs to be set.

When using a third-party flow meter, please ensure it meets the specs above and is calibrated correctly. Otherwise, data will not reflect accurately in reports. Also, note that the wiring is not polarity sensitive. As long as you have one wire in a **Sensor Port** and a **Sensor Common**, the device will work correctly. For flow meters that use three wires and meet the specs above, configure the wiring until you find the two correct wires to use.

Single Flow Meter - Sharing Two Controllers

For this installation, we suggest a few tips to make sure you do not receive any unnecessary alerts.

When using multiple controllers on the same flow meter, there are two alerts we do not

recommend using.

1. **High Flow Leak** - High water usage with no zones running.
2. **Slow Leak** - Water usage over last hour with no zones running.

These alerts are controller specific so when the controller with the flow meter is not in operation, it does know about the other controller operation.

Tips:

1. The inter station delay [46] should be set for 10-30 seconds. We do not recommend any higher.
2. Change the gallons in the alert to be higher (e.g. alert from 5 gallons to 20 gallons).

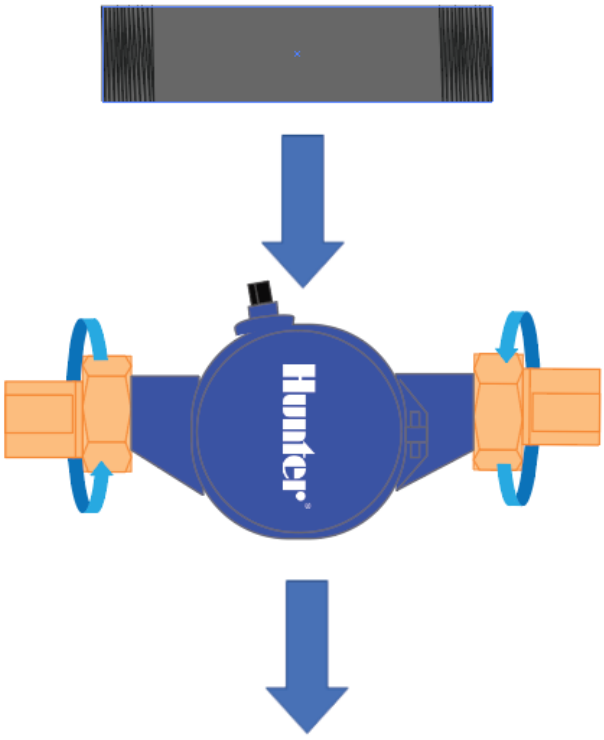
Following these parameters should allow the system to run normal when using one flow meter with multiple controllers.

Flow Meter - Winterization

We recommend that a qualified licensed contractor perform this type of winterization method. The blowout method utilizes an air compressor with a cubic foot per minute (CFM) rating of 80-100 for any mainline of 2" or less. The compressor is attached to the mainline via a quick coupler, hose bib, or other type connection, which is located beyond the backflow device. Compressed air should not be blown through any backflow or flow meter device. For additional winterization procedures, we highly recommend contacting the local dealer for the most common local practices. In the event you need to blow upstream from where the flow meter is located, we recommend bypassing the meter by temporarily using one of two options.

1. Installing a SCH 80 or galvanized nipple. See the size chart below:

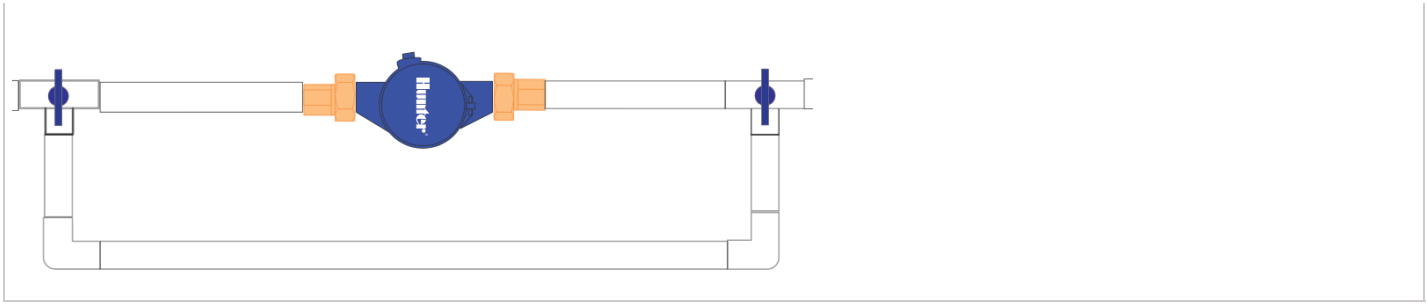
Winterizing Using PVC Nipple Bypass Option



Model	Description	Male-Thread NPT	Nipple Length
HC-075-FLOW	¾" NPT body, male thread with 1" NPT male adapter	1" NPT	5"
HC-100-FLOW	1" NPT body, male thread with 1.5" NPT male adapter	1 ¼"NPT	5"
HC-150-FLOW	1½" NPT body, male thread with 2" NPT male adapter	2"NPT	11 3/4"
HC-200-FLOW	2" NPT body, male thread with 3" NPT male adapter	2 1/2"BSP	11 3/4"

2. A second option would be to install PVC tee diverters but this is done more efficiently during NEW installation.

Winterizing Using PVC Diverter Option



Find a Hunter Distributor closest to you using our interactive lookup - Get Hunter [47]

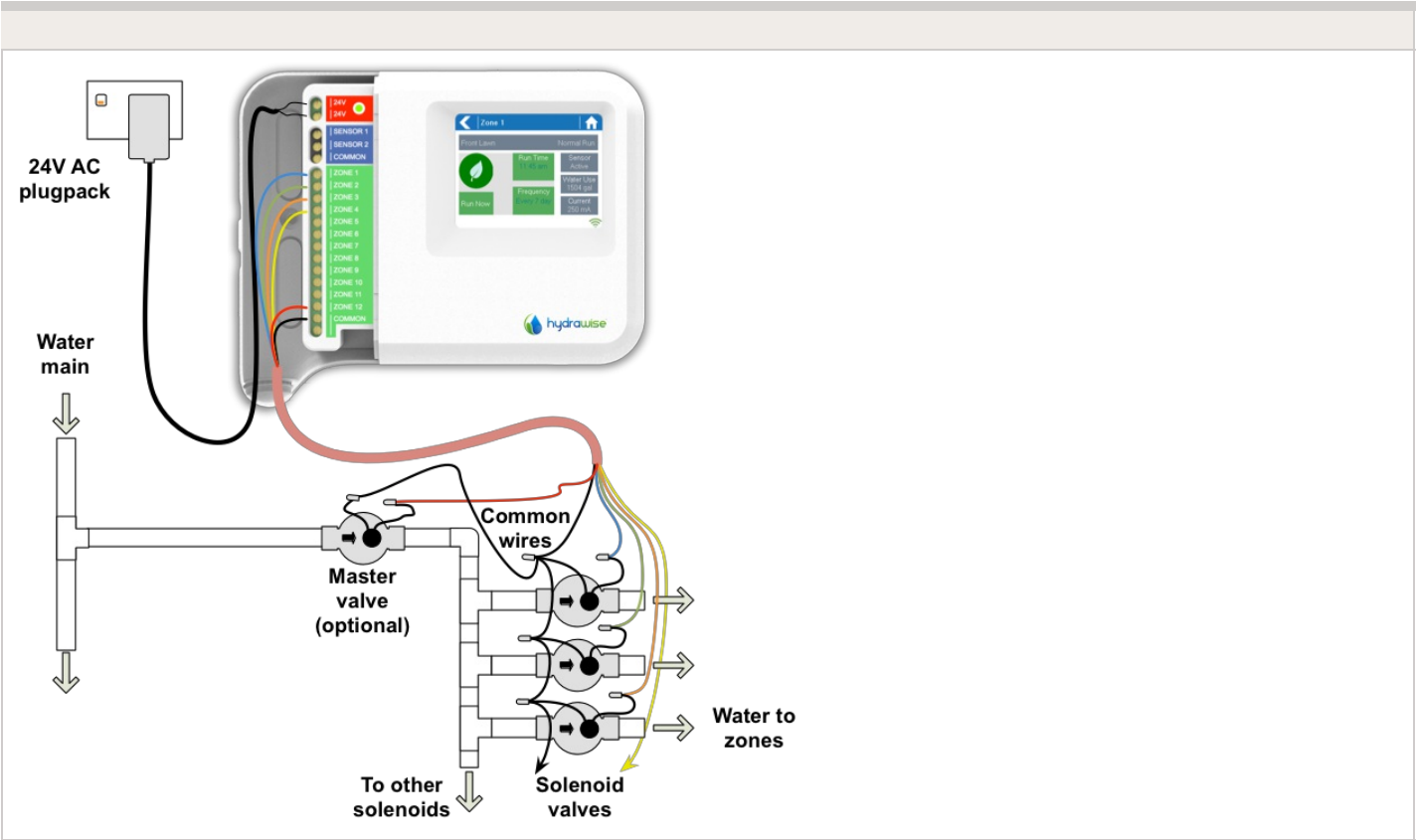
Master Valve - Configuration

A master valve is an automatic valve installed at the point where the irrigation system connects to the water supply. (Sometimes this circuit is called a “pump start circuit.” Both types work in a similar fashion, and can be used as a pump and/or a master valve.) The controller turns the master valve on and off.

How does it work?

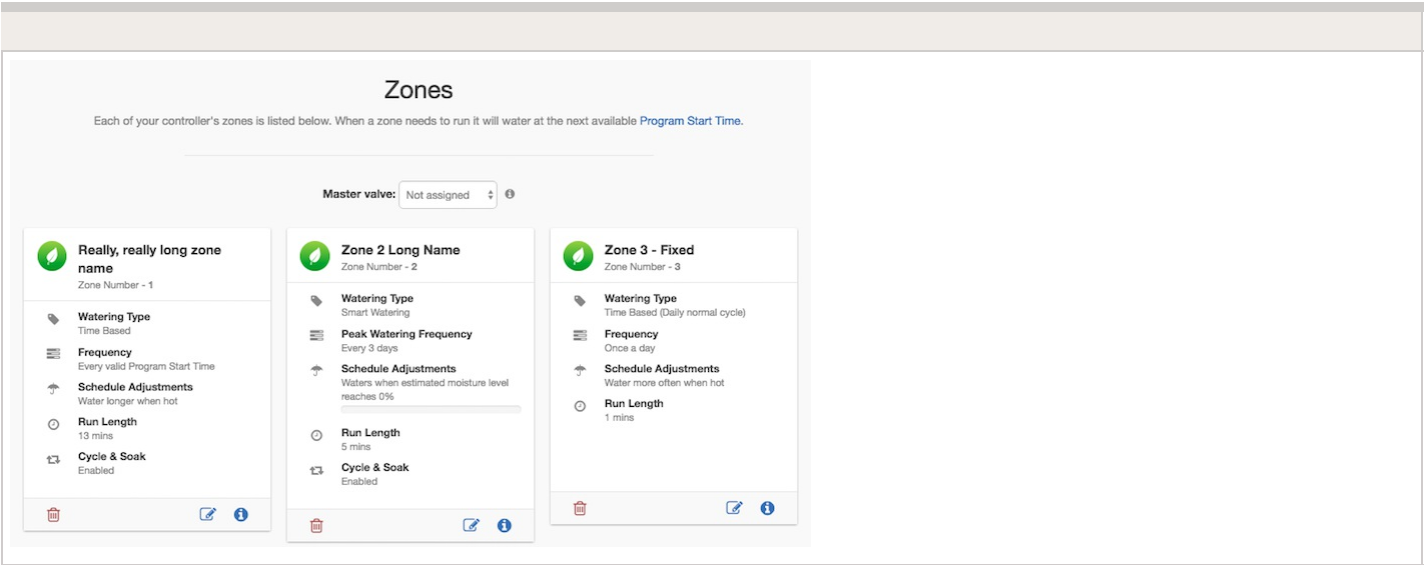
Zone valves are the individual valves that operate a group of sprinklers or drip emitters. A Hydrawise controller supports 6 or 12 zone valves, depending on the model. Typically, one zone valve is turned on at a time and controls the irrigation in a specific area of your landscape. Whenever one of the irrigation zone valves is told to open by the controller, the controller also signals the master valve to open. This means that the master valve acts somewhat like a backup valve or a fail-safe valve. The purpose of the master valve is to shut off the water

to the irrigation system when no zone valves are operating. The image below shows a master valve operating connected to Zone 12 on a Hydrawise controller.



Master Valve - HC

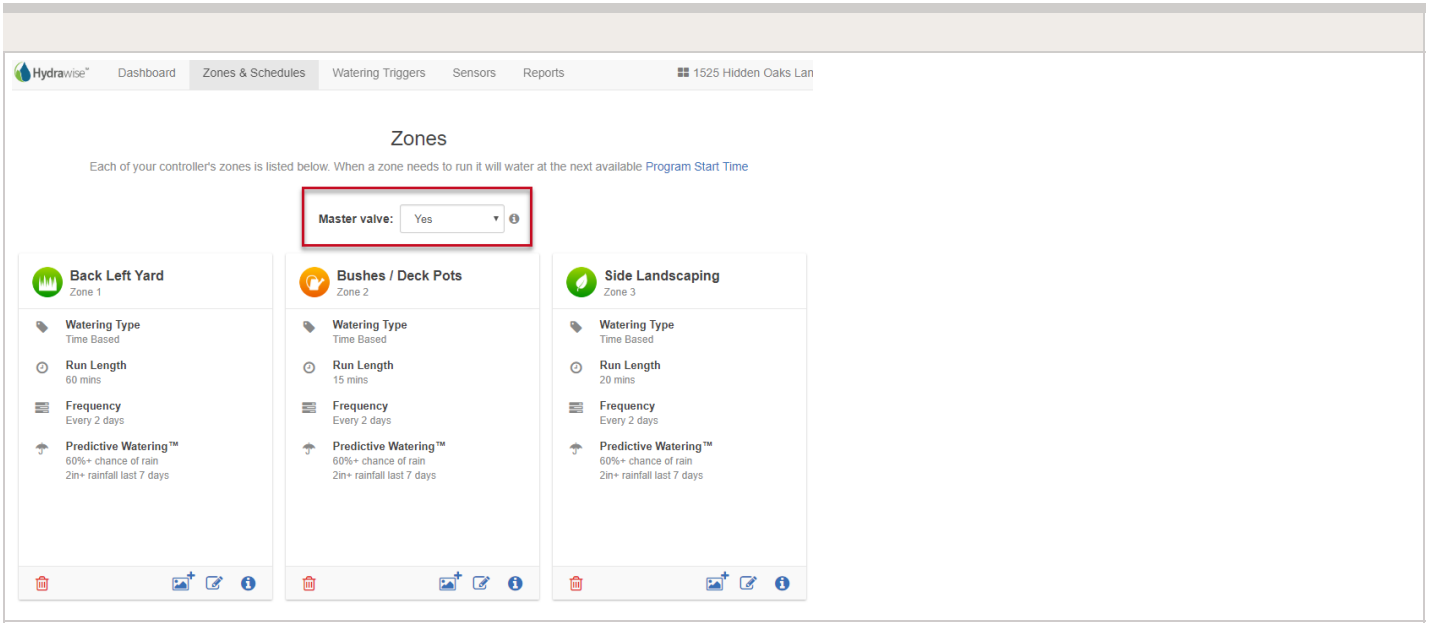
With a Hydrawise controller, any one of your 6 or 12 zones can be configured to act as a master valve. The master zone is configured on the Zones and Schedules [48] page above your list of irrigation zones.



Initially, no master valve is configured and all zones on the controller can be used as normal zone valves. To select a master valve, select the relevant zone from the list next to the text that says **Master valve**.

Master Valve - PRO-HC

With the Pro-HC controller, setting the master valve (MV) is similar. If this was not set correctly in the setup wizard, you can access this from the **Zones and Schedules** section easily.



You no longer have to select which zone the MV is connected to, as the option will be different depending on the controller you select when setting up your controller for the first time.

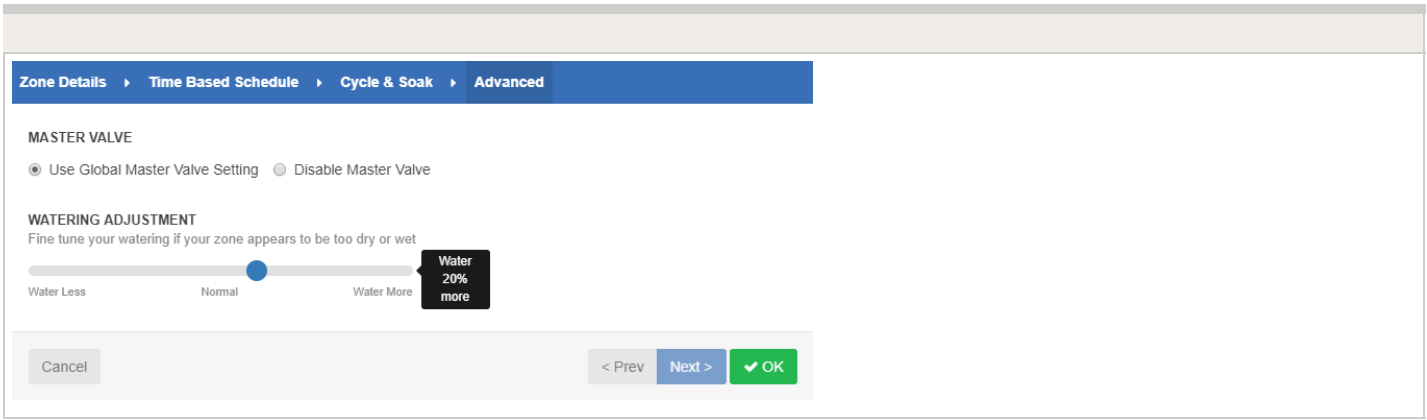
Master Valve - HPC-FP (Panel for PC-400 controller)

The default is for all stations to have the master valve/pump start circuit ON. The master valve/pump start can be set **ON** or **OFF** by station, regardless of which program the station is assigned.

First, make sure you have the master valve selected "YES" in the box below:

Next, follow the steps for initializing the P/MV for each zone.

1. Click the icon for the zone in "**zones and schedules**"
2. Click **Next** three times to enter the advanced section or programming.
3. You can now choose either of the following:
    1. Use **Global Master Valve Setting** (Turns the P/MV circuit ON)
    2. Use **Disable Master Valve** (Turns the P/MV circuit OFF)



Valve - Wire Distance

Below is a chart indicating the maximum wire run between the controller and the Hunter AC solenoid valves.

Valve Wire Sizing (Feet)							
Ground	**Control Wire**						
	18	**16**	**14**	**12**	**10**	**8**	**6**
18	850	1040	1210	1350	1460	1540	1590
16	1040	1340	1650	1920	2150	2330	2440
14	1210	1650	2150	2630	3080	3450	3700
12	1350	1920	2630	3390	4170	4880	5400
10	1460	2150	3080	4170	5400	6670	7650
8	1540	2330	3450	4880	6670	8700	10530
6	1590	2440	3700	54000	7690	10530	13330

Notes:
Maximum one-way distance in feet between controller and valve heavy-duty solenoid: 24 VAC, 350 mA inrush current, 190 mA holding current, 60 Hz; 370 mA inrush current, 210 mA holding current, 50 Hz

Valve Wire Sizing (Metric)						
Ground	**Control Wire**					
	0.5	**1**	**1.5**	**2.5**	**4**	**6**
0.5	140	190	210	235	250	260
1.0	190	290	335	415	465	495
1.5	208	335	397	515	595	647
2.5	235	415	515	730	900	1030
4.0	250	465	595	900	1175	1405
6.0	260	495	647	1030	1405	1745

Notes:
Maximum one-way distance in meters between controller and valve Heavy-duty solenoid: 24 VAC,
350 mA inrush current, 190 mA holding current, 60 Hz; 370 mA inrush current, 210 mA holding current, 50 Hz

IRRIGATION

Section 1.2 Solenoid Valves

ICV

Hunter®


1" Globe

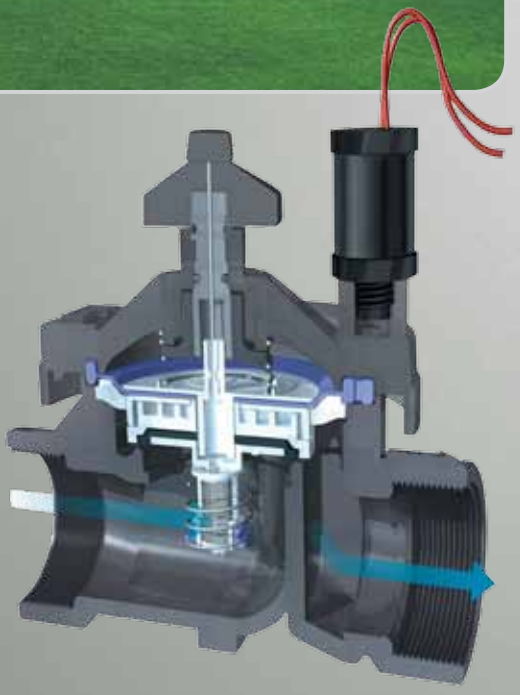

1½" Globe


2" Globe


3" Globe/Angle

The top-of-the-line valve you can count on for superior durability and reliability, even with exceptionally high pressure systems.

For a long-lasting valve that can deliver dependable performance at commercial sites, this is the heavy-duty workhorse you can count on. This valve includes both a fabric reinforced EPDM diaphragm, EPDM seat, and flow control as standard features, and can consistently withstand pressures of up to 220 PSI. The ICV also offers the added option of the Accu-Sync™ pressure regulator to maintain a safe, constant water pressure. Plus, it's exceptionally easy to service, with bonnet bolts that can be loosened and tightened using a variety of common contractor tools.



Features & Benefits

- **Glass-filled nylon construction** 220 PSI rated for maximum strength and sturdiness
- **Internal and external manual bleed** Two options for manual operation
- **Captive solenoid plunger** No more lost parts when servicing to resist wear
- **Optional AccuSync pressure regulator** Turns any ICV into a pressure regulating valve
- **Captive bonnet bolts with matching brass body inserts** Provides ease of service, eliminates lost parts
- **Fabric reinforced EPDM diaphragm and EPDM seat** Provides reliable operation up to 220 PSI in all water conditions
- **Optional reclaimed water identification handle** For field identification of non-potable water supply

Accu-Sync™: Fixed and Adjustable Pressure Regulation for Any Zone

Only Accu-Sync™ brings fixed or adjustable pressure regulation to any Hunter valve. The adjustable model enables the zone pressure to be customized from 20 to 100 PSI, while fixed models allow for easy installation at a set pressure.

ICV Valve

Models

ICV-101G: 1" plastic globe valve
ICV-151G: 1½" plastic globe valve
ICV-201G: 2" plastic globe valve
ICV-301: 3" plastic globe/angle valve
Accu-Set™ Pressure Regulator

Dimensions

- ICV-101G: 5½" H x 4¾" L x 4" W (14 cm H x 12 cm L x 10.2 cm W)
- ICV-151G: 7⅛" H x 6⅞" L x 5½" W (18 cm H x 17.5 cm L x 14 cm W)
- ICV-201G: 7⅛" H x 6⅞" L x 5½" W (18 cm H x 17.5 cm L x 14 cm W)
- ICV-301: 10¾" H x 9¼" L x 7⅜" W (27.3 cm H x 23.5 cm L x 18.7 cm W)
- Female inlet/outlet: 1", 1½", 2" & 3" NPT or BSP

Operating Specifications

- Flow: 0.10 to 300 GPM (0.06 to 68.10 m^3/hr; 0.9 to 1,135.5 l/min)
- Pressure: 20 to 220 PSI (1.4 to 15.0 bars; 138 to 1500 kPa)
- Temperature: up to 150˚F (66˚C)
- Heavy-duty solenoid: 24 VAC, 370 mA inrush current, 190 mA holding current, 60 cycles; 475 mA inrush current, 230 mA holding current, 50 cycles

Options Available

- Accu-Sync™ pressure regulator
- Reclaimed water ID handle (part # 561205 - 1", 1½" & 2") (part # 515005 - 3")
- DC latching solenoid (part # 458200)
- Solenoid conduit cover (part # 464322)
- Drip Irrigation Valve Kit (part # ICZ10125 or ICZ10140, and ICZ15140)

Filter Sentry™: A Superior Self-cleaning System

Many traditional valve filters can become clogged by large amounts of small debris commonly found in reclaimed water, wells, or lakes and ponds. But with Filter Sentry, the filter is scoured clean by a wiper that slides up and strokes the full length of the filter when the valve opens. The wiper continues to provide scrubbing action on the upper part of the filter during valve operation. For your convenience, Filter Sentry can be added easily after the valve is installed.

Hunter Filter Sentry valves installed

The factory-installed, reversible Filter Sentry™ tag indicates that the ICV valve can handle the rigors of reclaimed (purple side) or secondary water (yellow side).

ICV Pressure Loss in PSI

GPM	1"	1½"	2"	3" Globe	3" Angle
0.1	2				
0.5	2				
1	2				
5	2.5				
10	3				
15	3				
20	3	1.5			
30	4	1.5			
40	7	1.7	0.8		
50		2.2	1.2		
60		3	1.7		
75		3.9	2.4		
90		5.5	3.2		
100		7	4.2		
120		10.9	6.5		
135		12.7	7.9		
150		16.2	9.8	2.5	1.9
175			13.3	3	2.4
200			17.7	4.1	3.3
225				5.3	4.3
250				6.7	5.5
275				8.3	6.9
300				10.1	8.5

Charts based on full-open flow control position

MODELS	INLET/OUTLET	OPTIONS FACTORY INSTALLED	OPTIONS USER INSTALLED
ICV-101G = 1" globe valve	(blank) = NPT threads B = BSP threads	(blank) = No option FS = Filter Sentry DC = DC latching solenoid	(blank) = No option R = Reclaimed water ID tag CC = Solenoid conduit cover DC = DC latching solenoid AS-ADJ = Accu-Sync adjustable pressure regulator AS-20 = Accu-Sync 20 PSI pressure regulator AS-30 = Accu-Sync 30 PSI pressure regulator AS-40 = Accu-Sync 40 PSI pressure regulator AS-50 = Accu-Sync 50 PSI pressure regulator AS-70 = Accu-Sync 70 PSI pressure regulator
ICV-151G = 1½" globe valve			
ICV-201G = 2" globe valve			
ICV-301 = 3" globe/angle valve			

EXAMPLES

ICV-101G	1" globe valve, NPT threads
ICV-151G - FS - R	1½" globe valve, NPT threads, Filter Sentry, and reclaimed water ID Handle

Hunter® THE IRRIGATION INNOVATORS
Hunter Industries Incorporated
1940 Diamond Street, San Marcos, California 92078
www.hunterindustries.com

Section 1.3 Sprinkler Heads

IRRIGATION

MP ROTATOR®

Design Guide

High-Efficiency, Multi-Stream Nozzle

Hunter®

Product Introduction

Reliable Operation

Patented double-pop nozzle keeps the sprinkler free of external debris.

Efficient Application

Multiple rotating streams provide even coverage and wind resistance, eliminating dry spots.

Accurate Adjustments

Arc and radius can be adjusted while maintaining matched precipitation. Radius can be reduced up to 25%.

Durable

Removable inlet filter keeps sprinkler free of internal debris.

Easy Installation

Compatible with all Hunter spray bodies—perfect for retrofits. Use the MP-HT for female-threaded spray bodies.

Pressure Regulation

For best results, use the pressure-regulated Pro-Spray® PRS40.

MATCHED PRECIPITATION

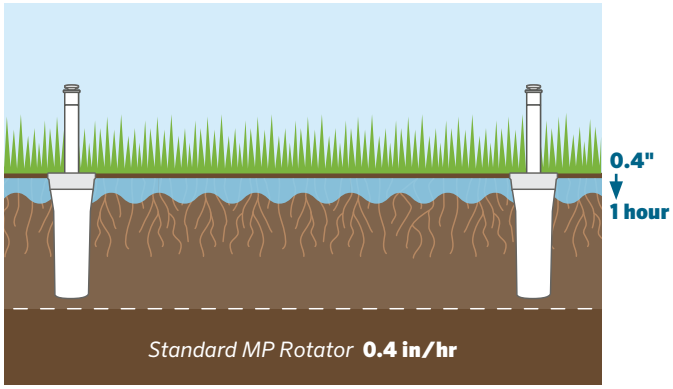
MP Rotators now come in two precipitation rate options to provide maximum flexibility for your irrigation design.

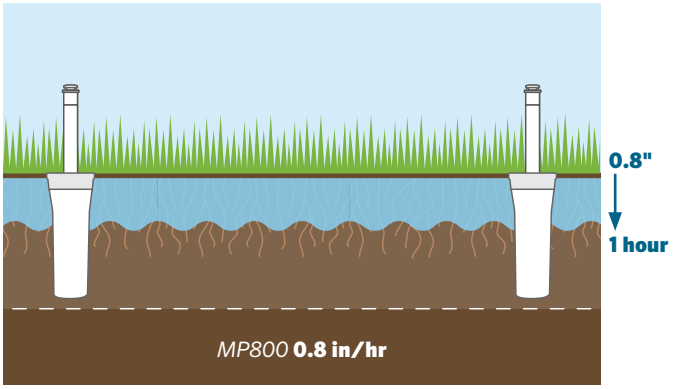
Standard MP Rotator Precipitation Rate

The Standard MP Rotator has the slowest precipitation rate in the industry at approximately 0.4 in/hr, preventing runoff in the majority of soil applications, and allowing for gentle hydration of the landscape.

MP800 Precipitation Rate

The MP800 has a precipitation rate of approximately 0.8 in/hr, allowing for high-efficiency irrigation of small spaces and medium-grade soils.





Matching Soil Intake Rates

Matching your precipitation rate to your soil intake rate will eliminate the hazards of runoff and help conserve water. With two different precipitation rate options with the MP Rotator, you can now choose the best high-efficiency rotary nozzle for your plant material, soil type, and slope.

- Standard MP Rotators deliver water slowly, at a rate that most soils and slopes can effectively absorb.
- The MP800 delivers water at half the rate of a spray nozzle, better matching typical soil intake rates.
- Standard sprays apply water at a rate much higher than most soils can absorb, causing runoff in most soil types.

INFILTRATION RATES BY SOIL TYPE

	SLOPE PERCENTAGE			
	0-5%	5-8%	8-12%	>12%
COARSE SAND	●●	●●	●●	●
FINE SAND	●●	●●	●	–
SANDY LOAM	●●	●	●	–
FINE SANDY LOAM	●●	●	–	–
LOAM/SILT LOAM	●	●	–	–
CLAY/CLAY LOAM	●	–	–	–

Water infiltration into the soil is less than:
■ 1.5 in/hr ■ 1 in/hr □ 0.5 in/hr
– Cycle and Soak required to avoid runoff

Application

1 MP Rotator Application

Specify the MP Rotator as the desired nozzle in a spray head body.

Retrofit spray systems by installing the MP Rotator onto any conventional spray head or shrub adapter.

2 Radius Adjustment

All models of the MP Rotator allow for easy radius adjustment of up to 25% while maintaining automatic matched precipitation.

Turn the nozzle adjustment screw clockwise to reduce the radius or counterclockwise to increase the radius. Four full rotations will maximize the effect. Additional rotations will not affect the performance of the nozzle.

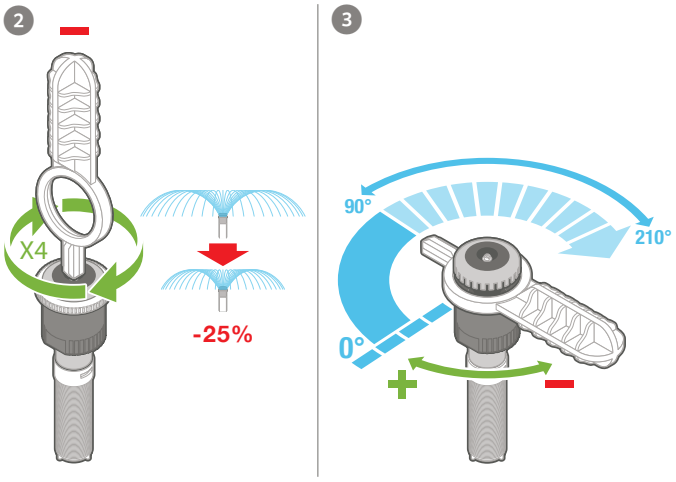
3 Arc Setting

The MP Rotator has a fixed left edge on all 90°–210° models and 210°–270° models. Turn the adjustment ring clockwise to increase the arc, and turn the adjustment ring counterclockwise to decrease the arc.

4 Pressure

Optimal performance and uniformity are reached at 40 PSI operating pressure. Use the Pro-Spray PRS40 to achieve pressure regulation of 40 PSI.

To reach the minimum radius, use the Pro-Spray PRS30 for pressure regulation to 30 PSI. To achieve maximum radius, increase the pressure over 40 PSI.



MP ROTATOR FACTORY SETTINGS

New MP Rotators are shipped from the factory at the maximum radius setting and with the following arc settings:

MP MODEL	FACTORY SET ARC
90°–210°	180°
210°–270°	210°
360°	Full-circle
MP Corner	45°
MP Side Strip	180°
MP Left Corner Strip	90°
MP Right Corner Strip	90°

MP ROTATOR NOZZLE HEIGHT AND TRAJECTORY

Nozzle No.	Pressure (PSI)	Degrees of Trajectory	Max. Height of Spray
MP815	40	15°	12"
MP800SR	40	18°	18"
MP1000	40	20°	20"
MP2000	40	26°	45"
MP3000	40	26°	79"
MP3500	40	26°	79"
MP Corner	40	14°	14"
MP Side Strip	40	16°	19"
MP Left Corner Strip	40	16°	18"
MP Right Corner Strip	40	16°	18"

Layout and Placement

Run Times

Because the MP Rotator applies less water with increased uniformity, simply doubling the run time used for traditional spray nozzles may supply sufficient water to the landscape while using less water overall.

You can also calculate the run time based on the lower precipitation rate.

Visit **www.hunterindustries.com/tools/runtime** for more information on run time calculations.

Precipitation Rate Calculations

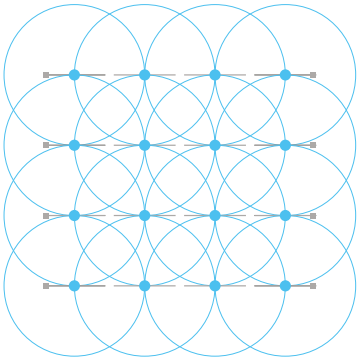
MP Rotators are recommended for use with head-to-head coverage in either square or triangular layouts.

Square Spacing Application Rate

$$\frac{96.25 \times GPM\ of\ 360^{\circ}\ sprinkler}{(Head\ spacing \times Row\ spacing)}$$

Example:

$$\frac{96.25 \times 1.48\ GPM}{(19' \times 19')} = \frac{142.45}{361} = 0.39\ in/hr$$



19' Square Spacing

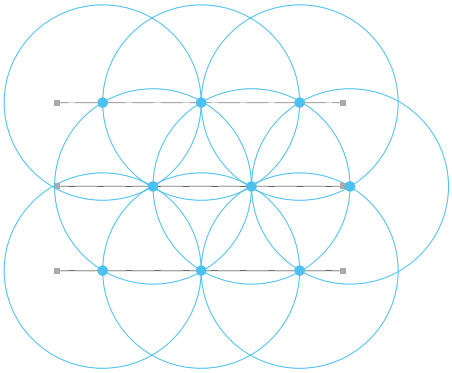
MP2000-360
40 PSI
19' Radius
1.48 GPM
19' Head x 19' Row,
Square Spacing

Equilateral Triangular Spacing Application Rate

$$\frac{96.25 \times GPM\ of\ 360^{\circ}\ sprinkler}{(Head\ spacing \times Head\ spacing)0.866}$$

Example:

$$\frac{96.25 \times 3.64\ GPM}{(30' \times 30')0.866} = \frac{350.35}{(900)0.866} = \frac{350.35}{779.4} = 0.45\ in/hr$$



30' Triangular Spacing

MP3000-360
40 PSI
30' Radius
3.64 GPM
30' Head x 26' Row,
Triangular Spacing

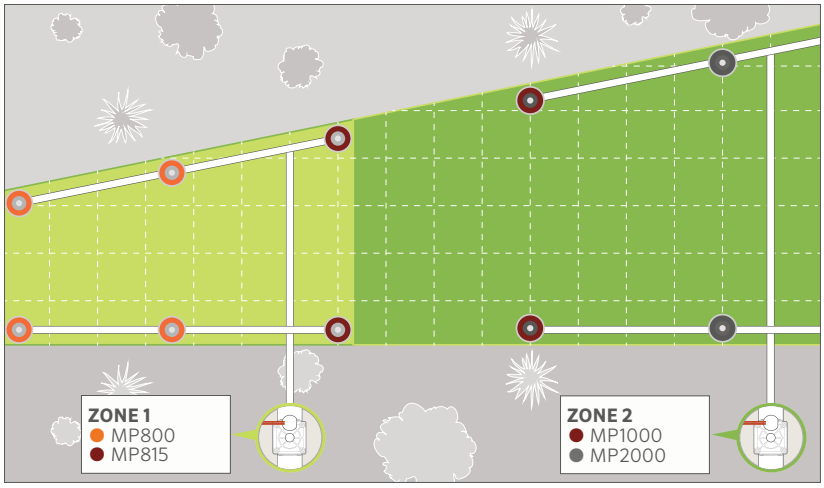
Note: Equilateral triangular spacing has a higher application rate than square spacing due to less area per sprinkler.

Zoning with the MP Rotator

The standard MP Rotators have a matched precipitation rate of approximately 0.4 in/hr. This means any standard MP Rotator at any arc or radius can be placed on the same zone.

The MP800SR can be configured to work well in head-to-head coverage in either square or triangular layouts. When square spacing is used, the resulting precipitation rate will be approximately 0.8 in/hr.

Since this precipitation rate differs from the standard line of MP Rotators, you should zone the MP800 family separately to maintain matched precipitation within each zone.

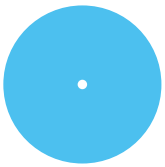
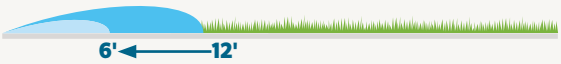
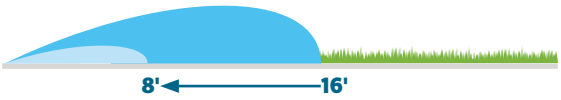


MP ROTATOR DESIGN GUIDE

MP800

Matched Precipitation

Maximize water savings for tight spaces with the MP800. The MP800 offers the benefits of multi-stream, multi-trajectory technology in smaller areas than ever before. The MP800 delivers water to distances as short as 6' at a matched precipitation rate of approximately **0.8 in/hr**, less than half that of traditional spray nozzles.

Radius	Arc		
	 90° to 210°	 210° to 270°	 360°
MP800SR  6' 12'	 MP800SR-90		 MP800SR-360
MP815  8' 16'	 MP815-90	 MP815-210	 MP815-360

Pressure Ratings

The MP800, just like its larger family of MP Rotators, prefers 40 PSI for optimal performance. This pressure yields optimal results for coverage and distribution uniformity. **However, to achieve the lowest radius setting of 6', you must regulate the inlet pressure to 30 PSI.** Use a Pro-Spray PRS30 to achieve a consistent inlet pressure of 30 PSI.

Pro-Spray PRS30
Pair the MP Rotator with a Pro-Spray PRS30 to achieve the minimum radius.

Pro-Spray PRS40
Pair the MP Rotator with a Pro-Spray PRS40 for peak performance.

MP ROTATOR DESIGN GUIDE

MP1000, MP2000, MP3000, MP3500

0.4 in/hr

Matched Precipitation

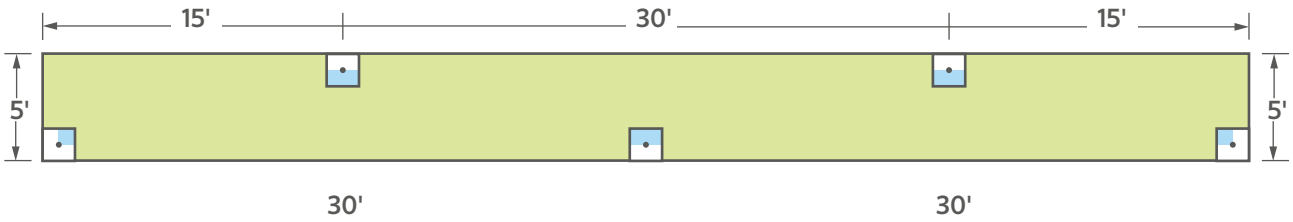
All standard MP Rotator nozzles have a matched precipitation rate of approximately **0.4 in/hr** across the radius range of 8' to 35'.

Radius	Arc		
	90° to 210°	210° to 270°	360°
MP1000 8' ◄——► 15'	 MP1000-90	 MP1000-210	 MP1000-360
MP2000 13' ◄——► 21'	 MP2000-90	 MP2000-210	 MP2000-360
MP3000 22' ◄——► 30'	 MP3000-90	 MP3000-210	 MP3000-360
MP3500 31' ◄——► 35'	 MP3500-90		

Side Strip and Corner Models

Side Strip Precipitation Example

The precipitation rate of the MP Strips is dependent on the layout of the system. The following is an example of a potential design and associated precipitation rate:



Precipitation Rate Using Total Area Method

$$P = \frac{96.25 \times Total\ Flow\ (GPM)}{Total\ Area\ (ft)}$$

$$P = \frac{96.25 \times (0.22 + 0.44 + 0.44 + 0.44 + 0.22)}{5' \times 60'}$$

$$P = 0.56\ in/hr$$

MPLCS515
(Left Strip)

MPSS530
(Side Strip)

MPRCS515
(Right Strip)

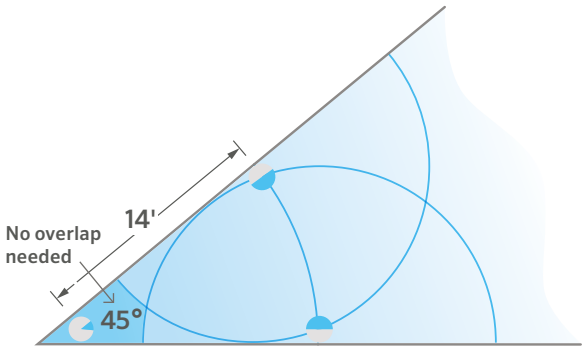
MP Corner

The MP Corner is specially designed to provide extra coverage in tight corners so that neighboring heads do not need to reach into the corner to provide head-to-head coverage, avoiding unnecessary overspray onto non-target areas.

MPCorner

0.4 in/hr

45°–105°



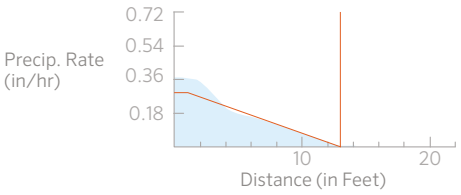
Uniformity

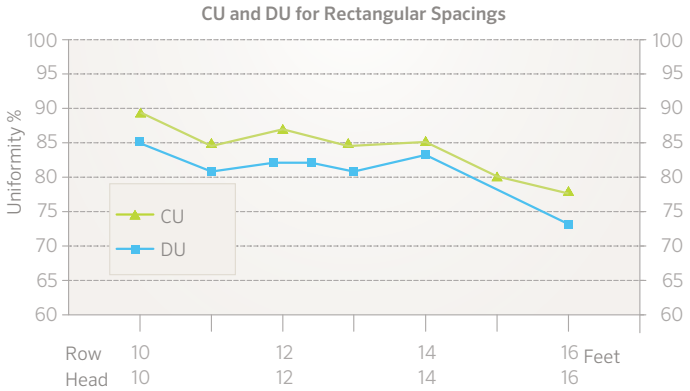
Uniformity Samples

The various streams of the MP Rotator allow it to target all areas of the landscape evenly when properly installed, yielding superior uniformity over traditional spray nozzles. Several independent studies demonstrate this difference and other efficiency benefits of the MP Rotator. Read more at **hunterindustries.com/site-studies**.

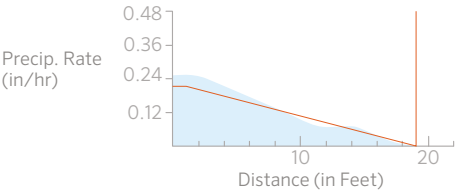
Below is a sampling of MP Rotator profiles and associated uniformities. These uniformity examples result from tests performed indoors in controlled conditions. On-site conditions will affect actual uniformity, and the uniformity data may change due to continuing product development.

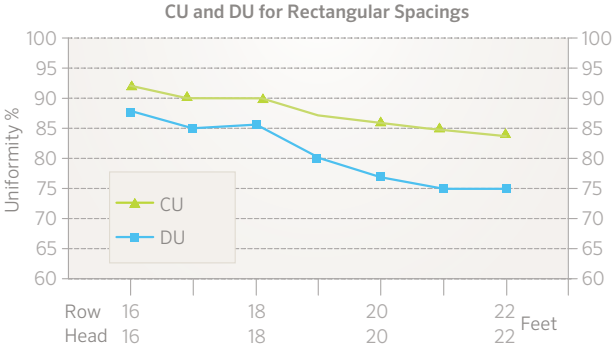
MP1000 90-210 180° at 40 PSI



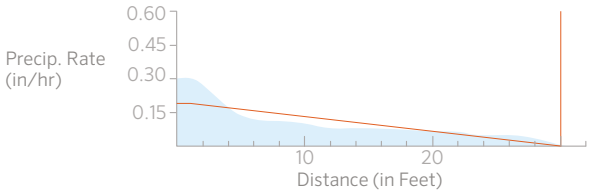


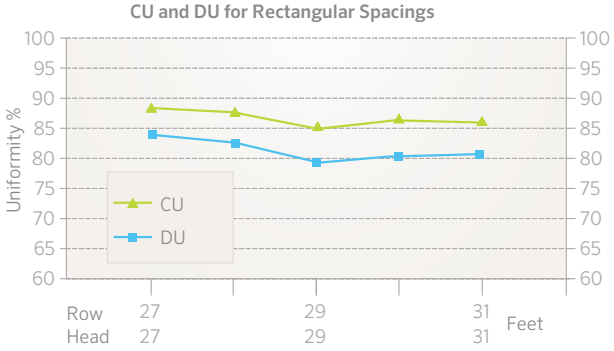
MP2000 90-210 180° at 40 PSI





MP3000 90-210 180° at 40 PSI





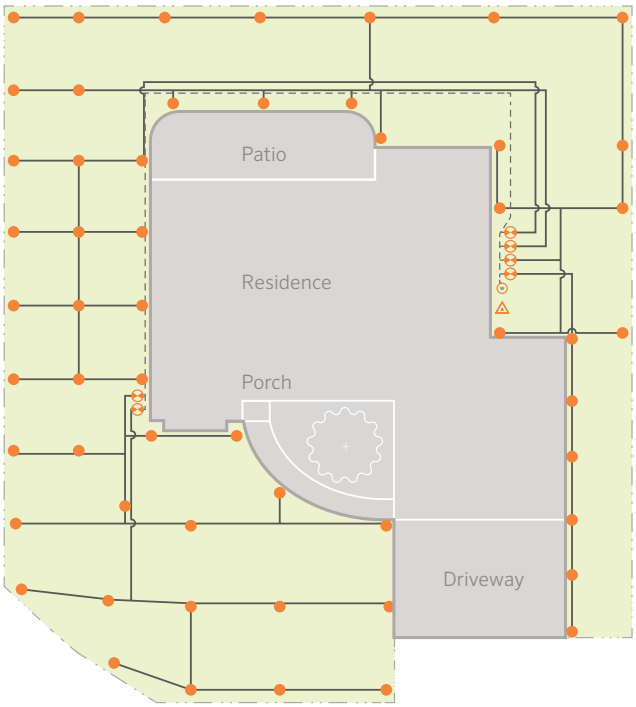
Cost and Water Savings

Lower System Cost

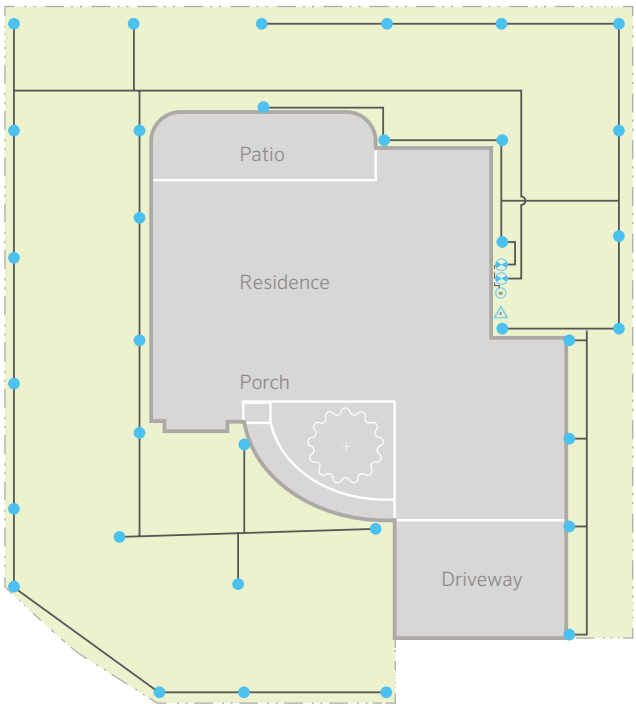
A design with MP Rotator nozzles uses far less material and equipment than a traditional spray design, resulting in an overall reduced project cost. Due to the lower flow rates, more heads can be run at once, reducing the number of valves needed.

Learn more about how the MP Rotator provides material and labor savings in this residential site study: **http://hunter.direct/mprotatorss**.

Design Using Traditional Sprays



Design Using MP Rotators



IRRIGATION SYSTEM COST COMPARISON

Materials Needed	With Sprays
Valves	6
Mainline	150'
Laterals	800'
Sprinklers	55
Controller	6-Station
Wire	175'
SPRAY COST	**$$$$**

IRRIGATION SYSTEM COST COMPARISON

Materials Needed	With MP Rotators
Valves	2
Mainline	15'
Laterals	600'
Sprinklers	34
Controller	4-Station
Wire	20'
MP ROTATOR COST	**$$**

Filtration Recommendations and Wastewater Applications

Filtration Guidelines

You should use primary filtration when operating with dirty water.

A general rule is to use primary filtration that is five times the mesh rating of the nozzle filter. For example, if the nozzle filter is 20 mesh, the primary filter should be 100 mesh.

Field testing has shown that the MP800SR runs well in dirty water conditions with the use of a 120-mesh primary filtration system.

HY-100, HY-100-75, HY-075
Height: 6"
Width: 3"
Depth: 5"

Hunter's HY filters with 150-mesh size are a great solution for zone-specific MP800SR arrangements.

NOZZLE FILTER SIZES	
Nozzle	**Screen Size (mesh)**
MP1000	40
MP2000	40
MP3000	20
MP3500	20
MP Strips and Corner	40
MP800SR-90	60
MP800SR-360	40
MP815	40

Reclaimed Wastewater

The MP Rotator is an excellent choice when using reclaimed wastewater. The materials used in the MP Rotator are chemical-resistant polypropylene, polyurethane, acetal plastics, stainless steel, and EPDM rubber. These materials are designed to withstand the chemicals and conditions commonly used in wastewater irrigation.

MP ROTATOR DESIGN GUIDE

MP800

0.8 in/hr

MP ROTATOR PERFORMANCE DATA

MP800SR
Radius: 6' to 12'
Adjustable Arc and Full-Circle
- Orange and Gray: 90° to 210°
- Lime Green and Gray: 360°

Arc	Pressure PSI	MAX RADIUS Radius ft.	Flow GPM	Flow GPH	Precip in/hr ■	Precip in/hr ▲	MIN RADIUS Radius ft.	Flow GPM
90°	30	8	0.17	9.6	0.90	1.04	6	0.13
	35	9	0.21	11.4	0.89	1.03	7	0.15
	40	**10**	**0.23**	**13.8**	**0.83**	**0.96**	**8**	**0.16**
	45	11	0.25	15.0	0.80	0.92	8	0.18
	50	11	0.27	16.2	0.79	0.92	9	0.19
	55	12	0.28	16.8	0.80	0.93	10	0.20
180°	30	8	0.33	19.2	0.88	1.02	6	0.26
	35	9	0.38	22.2	0.85	0.99	7	0.29
	40	**10**	**0.42**	**25.2**	**0.81**	**0.93**	**8**	**0.32**
	45	11	0.46	27.6	0.77	0.88	8	0.36
	50	11	0.48	28.8	0.76	0.88	9	0.38
	55	12	0.50	30.0	0.73	0.84	10	0.40
210°	30	8	0.35	22.2	0.80	0.93	6	0.30
	35	9	0.38	26.4	0.77	0.89	7	0.34
	40	**10**	**0.43**	**29.4**	**0.81**	**0.91**	**8**	**0.37**
	45	10	0.45	31.8	0.82	0.95	8	0.42
	50	11	0.49	33.6	0.73	0.85	9	0.44
	55	12	0.56	34.8	0.70	0.81	10	0.47
360°	30	8	0.66	37.8	0.89	1.03	6	0.47
	35	9	0.71	42.0	0.80	0.92	7	0.52
	40	**10**	**0.78**	**46.8**	**0.79**	**0.91**	**8**	**0.56**
	45	10	0.85	51.0	0.78	0.90	8	0.59
	50	11	0.88	52.8	0.73	0.85	9	0.63
	55	12	0.98	58.8	0.70	0.81	10	0.70

Due to its precipitation rate of approximately 0.8 in/hr, we strongly recommend zoning the MP800 separately from the Standard MP Rotator.

MP ROTATOR PERFORMANCE DATA

MP815
Radius: 8' to 16'
Adjustable Arc and Full-Circle
- Maroon and Gray: 90° to 210°
- Lt. Blue and Gray: 210° to 270°
- Olive and Gray: 360°

Arc	Pressure PSI	Radius ft.	Flow GPM	Flow GPH	Precip in/hr ■	Precip in/hr ▲
90°	30	14	0.42	25.2	0.83	0.95
	35	15	0.46	27.6	0.79	0.91
	40	**15**	**0.49**	**29.4**	**0.84**	**0.97**
	45	16	0.52	31.2	0.78	0.90
	50	16	0.55	33.0	0.83	0.96
	55	16	0.58	34.8	0.87	1.01
180°	30	13	0.75	45.0	0.85	0.99
	35	14	0.86	51.6	0.84	0.98
	40	**15**	**0.93**	**55.8**	**0.80**	**0.92**
	45	15	0.96	57.6	0.82	0.95
	50	16	1.06	63.6	0.80	0.92
	55	16	1.11	66.6	0.83	0.96
210°	30	13	0.88	52.8	0.86	0.99
	35	14	0.96	57.6	0.81	0.93
	40	**15**	**1.10**	**66.0**	**0.81**	**0.93**
	45	15	1.16	69.6	0.85	0.98
	50	16	1.24	74.4	0.80	0.92
	55	16	1.30	78.0	0.84	0.97
270°	30	13	1.14	68.4	0.87	1.00
	35	14	1.24	74.4	0.81	0.94
	40	**15**	**1.40**	**84.0**	**0.80**	**0.92**
	45	15	1.47	88.2	0.84	0.97
	50	16	1.54	92.4	0.77	0.89
	55	16	1.61	96.6	0.81	0.93
360°	30	13	1.52	91.2	0.87	1.00
	35	14	1.70	102.0	0.83	0.96
	40	**15**	**1.87**	**112.2**	**0.80**	**0.92**
	45	15	2.00	120.0	0.86	0.99
	50	16	2.13	127.8	0.80	0.92
	55	16	2.26	135.6	0.85	0.98

PERFORMANCE DATA NOTE FOR ALL CHARTS:

Bold = Recommended Pressure.
The MP Rotator is designed to maintain matched precipitation after radius adjustment. Optimal pressure for the MP Rotator is 40 PSI. This can be achieved easily by using the MP Rotator with the Pro-Spray PRS40 Spray Body, pressure regulated at 40 PSI.

MP ROTATOR DESIGN GUIDE

MP1000, MP2000, MP3000, MP3500

0.4 in/hr

MP ROTATOR PERFORMANCE DATA

MP1000
Radius: 8' to 15'
Adjustable Arc and Full-Circle
- Maroon: 90° to 210°
- Lt. Blue: 210° to 270°
- Olive: 360°

MP2000
Radius: 13' to 21'
Adjustable Arc and Full-Circle
- Black: 90° to 210°
- Green: 210° to 270°
- Red: 360°

MP3000
Radius: 22' to 30'
Adjustable Arc and Full-Circle
- Blue: 90° to 210°
- Yellow: 210° to 270°
- Gray: 360°

Arc	Pressure PSI	MP1000 Radius ft.	MP1000 Flow GPM	MP1000 Flow GPH	MP1000 Precip in/hr ■	MP1000 Precip in/hr ▲	MP2000 Radius ft.	MP2000 Flow GPM	MP2000 Flow GPH	MP2000 Precip in/hr ■	MP2000 Precip in/hr ▲	MP3000 Radius ft.	MP3000 Flow GPM	MP3000 Flow GPH	MP3000 Precip in/hr ■	MP3000 Precip in/hr ▲
90°	25	--	--	--	--	--	17	0.34	20.4	0.45	0.52	25	0.71	42.6	0.44	0.51
	30	12	0.17	10.2	0.45	0.52	18	0.38	22.8	0.45	0.52	27	0.76	45.6	0.40	0.46
	35	13	0.19	11.4	0.43	0.50	19	0.40	24.0	0.43	0.49	28	0.82	49.2	0.40	0.46
	40	**14**	**0.21**	**12.6**	**0.41**	**0.48**	**20**	**0.43**	**25.8**	**0.41**	**0.48**	**30**	**0.86**	**51.6**	**0.37**	**0.42**
	45	14	0.23	13.8	0.45	0.52	21	0.46	27.6	0.40	0.46	30	0.90	54.0	0.39	0.44
	50	15	0.25	15.0	0.43	0.49	21	0.47	28.2	0.41	0.47	30	0.95	57.0	0.41	0.47
	55	15	0.27	16.2	0.46	0.53	21	0.48	28.8	0.42	0.48	30	1.01	60.6	0.43	0.50
180°	25	--	--	--	--	--	16	0.6	36.0	0.45	0.52	25	1.44	86.4	0.44	0.51
	30	12	0.34	20.4	0.45	0.52	17	0.64	38.4	0.43	0.49	27	1.58	94.8	0.42	0.48
	35	13	0.38	22.8	0.43	0.50	18	0.71	42.6	0.42	0.49	28	1.70	102.0	0.42	0.48
	40	**14**	**0.42**	**25.2**	**0.41**	**0.48**	**19**	**0.77**	**46.2**	**0.41**	**0.47**	**30**	**1.82**	**109.2**	**0.39**	**0.45**
	45	14	0.44	26.4	0.43	0.50	20	0.85	51.0	0.41	0.47	30	1.93	115.8	0.41	0.48
	50	15	0.50	30.0	0.43	0.49	21	0.91	54.6	0.40	0.46	30	2.04	122.4	0.44	0.50
	55	15	0.51	30.6	0.44	0.50	21	0.95	57.0	0.41	0.48	30	2.13	127.8	0.46	0.53
210°	25	--	--	--	--	--	16	0.72	43.2	0.46	0.54	25	1.68	100.8	0.44	0.51
	30	12	0.40	24.0	0.46	0.53	17	0.75	45.0	0.43	0.49	27	1.84	110.4	0.42	0.48
	35	13	0.45	27.0	0.44	0.51	18	0.81	48.6	0.41	0.48	28	1.99	119.4	0.42	0.48
	40	**14**	**0.49**	**29.4**	**0.41**	**0.48**	**19**	**0.86**	**51.6**	**0.39**	**0.45**	**30**	**2.12**	**127.2**	**0.39**	**0.45**
	45	14	0.51	30.6	0.43	0.50	20	0.91	54.6	0.38	0.43	30	2.25	135.0	0.41	0.48
	50	15	0.57	34.2	0.42	0.48	21	0.98	58.8	0.37	0.42	30	2.37	142.2	0.43	0.50
	55	15	0.59	35.4	0.43	0.50	21	1.01	60.6	0.38	0.44	30	2.49	149.4	0.46	0.53
270°	25	--	--	--	--	--	16	0.87	52.2	0.44	0.50	25	2.19	131.4	0.45	0.52
	30	12	0.48	28.8	0.43	0.49	17	0.95	57.0	0.42	0.49	27	2.37	142.2	0.42	0.48
	35	13	0.53	31.8	0.40	0.46	18	1.03	61.8	0.41	0.47	28	2.55	153.0	0.42	0.48
	40	**14**	**0.63**	**37.8**	**0.41**	**0.48**	**19**	**1.10**	**66.0**	**0.39**	**0.45**	**30**	**2.73**	**163.8**	**0.39**	**0.45**
	45	14	0.67	40.2	0.44	0.51	20	1.17	70.2	0.38	0.43	30	2.89	173.4	0.41	0.48
	50	15	0.72	43.2	0.41	0.47	21	1.23	73.8	0.36	0.41	30	3.06	183.6	0.44	0.50
	55	15	0.75	45.0	0.43	0.49	21	1.30	78.0	0.38	0.44	30	3.22	193.2	0.46	0.53
360°	25	--	--	--	--	--	16	1.20	72.0	0.45	0.52	25	2.88	172.8	0.44	0.51
	30	12	0.69	41.4	0.46	0.53	17	1.28	76.8	0.43	0.49	27	3.15	189.0	0.42	0.48
	35	13	0.77	46.2	0.44	0.51	18	1.37	82.2	0.41	0.47	28	3.40	204.0	0.42	0.48
	40	**14**	**0.84**	**50.4**	**0.41**	**0.48**	**19**	**1.48**	**88.8**	**0.39**	**0.46**	**30**	**3.64**	**218.4**	**0.39**	**0.45**
	45	14	0.88	52.8	0.43	0.50	20	1.57	94.2	0.38	0.44	30	3.86	231.6	0.41	0.48
	50	15	0.98	58.8	0.42	0.48	21	1.68	100.8	0.37	0.42	30	4.07	244.2	0.44	0.50
	55	15	1.01	60.6	0.43	0.50	21	1.74	104.4	0.38	0.44	30	4.27	256.2	0.46	0.53

MP3500 90°
Radius: 31' to 35'
Adjustable Arc
- Light Brown: 90°

MP3500 180°
Radius: 31' to 35'
Adjustable Arc
- Light Brown: 180°

MP3500 210°
Radius: 31' to 35'
Adjustable Arc
- Light Brown: 210°

Pressure PSI	MP3500 90° Radius ft.	MP3500 90° Flow GPM	MP3500 90° Flow GPH	MP3500 90° Precip in/hr ■	MP3500 90° Precip in/hr ▲	MP3500 180° Radius ft.	MP3500 180° Flow GPM	MP3500 180° Flow GPH	MP3500 180° Precip in/hr ■	MP3500 180° Precip in/hr ▲	MP3500 210° Radius ft.	MP3500 210° Flow GPM	MP3500 210° Flow GPH	MP3500 210° Precip in/hr ■	MP3500 210° Precip in/hr ▲
25	33	1.04	62.4	0.37	0.42	33	2.21	132.6	0.39	0.45	33	2.59	155.4	0.39	0.45
30	34	1.13	67.8	0.38	0.43	34	2.24	134.4	0.37	0.43	34	2.84	170.4	0.41	0.47
35	34	1.21	72.6	0.40	0.47	34	2.65	159.0	0.44	0.51	34	3.08	184.8	0.44	0.51
40	**35**	**1.28**	**76.8**	**0.40**	**0.46**	**35**	**2.86**	**171.6**	**0.45**	**0.52**	**35**	**3.29**	**197.4**	**0.44**	**0.51**
45	35	1.38	82.8	0.43	0.50	35	3.10	186.0	0.49	0.56	35	3.54	212.4	0.48	0.55
50	35	1.43	85.8	0.45	0.52	35	3.21	192.6	0.50	0.58	35	3.76	225.6	0.51	0.59
55	35	1.50	90.0	0.47	0.54	35	3.28	196.8	0.52	0.60	35	3.94	236.4	0.53	0.61

MP Specialty

MP ROTATOR PERFORMANCE DATA

0.4 in/hr

MP Corner
Radius: 8' to 15'
Adjustable Arc
Turquoise: 45° to 105°

Arc	Pressure PSI	Radius ft.	Flow GPM	Flow GPH
45°	25	--	--	--
	30	12	0.17	10.2
	35	13	0.18	10.8
	40	**14**	**0.19**	**11.4**
	45	14	0.21	12.6
	50	14	0.22	13.2
	55	15	0.23	13.8
90°	25	11	0.31	18.6
	30	12	0.34	20.4
	35	13	0.36	21.6
	40	**14**	**0.39**	**23.4**
	45	14	0.41	24.6
	50	15	0.43	25.8
	55	15	0.46	27.6
105°	25	11	0.36	21.6
	30	12	0.39	23.4
	35	13	0.42	25.2
	40	**14**	**0.45**	**27.0**
	45	14	0.48	28.8
	50	15	0.51	30.6
	55	15	0.53	31.8

MP ROTATOR PERFORMANCE DATA

- **MPLCS515:** Ivory, MP Left Corner Strip
- **MPRCS515:** Copper, MP Right Corner Strip
- **MPSS530:** Brown, MP Side Strip

	Pressure PSI	Radius ft.	Flow GPM	Flow GPH
MP Left Corner Strip	30	4 x 14	0.19	11.4
	35	5 x 15	0.21	12.6
	40	**5 x 15**	**0.22**	**13.2**
	45	5 x 15	0.23	13.8
	50	6 x 16	0.25	15.0
	55	6 x 16	0.26	15.6
MP Right Corner Strip	30	4 x 14	0.19	11.4
	35	5 x 15	0.21	12.6
	40	**5 x 15**	**0.22**	**13.2**
	45	5 x 15	0.23	13.8
	50	6 x 16	0.25	15.0
	55	6 x 16	0.26	15.6
MP Side Strip	30	4 x 28	0.38	22.8
	35	5 x 30	0.41	24.6
	40	**5 x 30**	**0.44**	**26.4**
	45	5 x 30	0.47	28.2
	50	6 x 32	0.49	29.4
	55	6 x 32	0.51	30.6

Strip pattern radius can be adjusted by 25%.
MP Strips can be used with both the Standard MP Rotator and the MP800 depending on the layout.

PERFORMANCE DATA NOTE FOR ALL CHARTS:

Bold = Recommended Pressure.
The MP Rotator is designed to maintain matched precipitation after radius adjustment. Optimal pressure for the MP Rotator is 40 PSI. This can be achieved easily by using the MP Rotator with the Pro-Spray PRS40, pressure regulated at 40 PSI.

MP ROTATOR DESIGN GUIDE

Field Identification

MP Rotator models are color-coded for easy field identification.

Standard MP Rotator

0.4 in/hr

Radius	8' to 15'	13' to 21'	22' to 30'	31' to 35'
Arc				
90° to 210°	 **MP1000-90**	 **MP2000-90**	 **MP3000-90**	 **MP3500-90**
210° to 270°	 **MP1000-210**	 **MP2000-210**	 **MP3000-210**	
360°	 **MP1000-360**	 **MP2000-360**	 **MP3000-360**	

MP800

0.8 in/hr

Radius	6' to 12'	8' to 16'
Arc		
90° to 210°	 **MP800SR-90** Short Radius	 **MP815-90**
210° to 270°		 **MP815-210**
360°	 **MP800SR-360** Short Radius	 **MP815-360**

MP *Strip*

Shape	
	 **MPLCS515** 5' x 15' Left Corner
	 **MPRCS515** 5' x 15' Right Corner
	 **MPSS530** 5' x 30' Side Strip

MP *Corner*

0.4 in/hr

Arc	
45° to 105°	 **MPCORNER** 8' x 15'

MP *Male Threaded*

Available in all MP Rotator models, except MP1000-210, MP3500-90, and MP800 models

MP-HT
Male-Threaded

Helping our customers succeed is what drives us. While our passion for innovation and engineering is built into everything we do, it is our commitment to exceptional support that we hope will keep you in the Hunter family of customers for years to come.

Gregory R. Hunter, CEO of Hunter Industries

Gene Smith, President, Landscape Irrigation and Outdoor Lighting

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LIT-461-DG-US E 7/20

Section 1.4 Pipe

IRRIGATION

PE-100

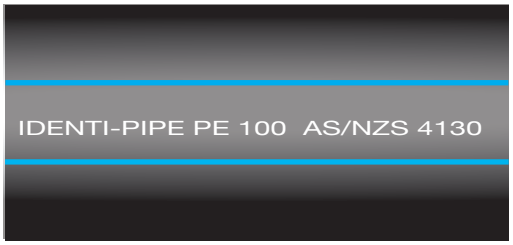
We are proudly Australian owned and operated, manufactured in our plant in Moss Vale NSW, our PE-100 range of pipes represent years of ongoing product development, testing and research.

Designed specifically for Australian conditions, Government regulations and work practises, we produce a full range of specialist Pipe.

PE-100

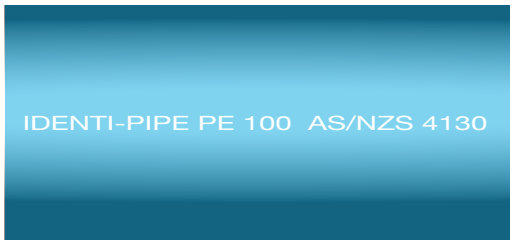
High Density Polyethylene PIPE RANGE

Identi-pipe system

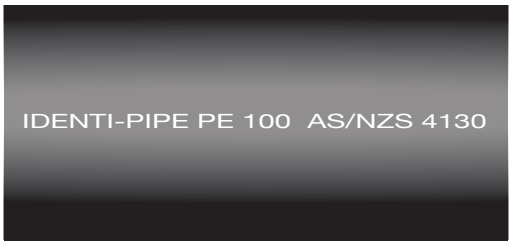


Drinking/Potable Water

Pressurised Sewer



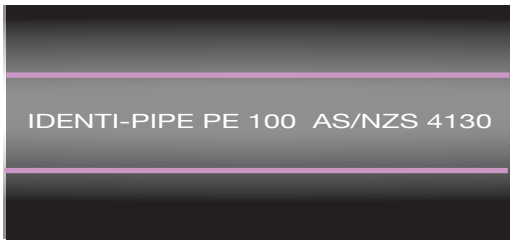
Drinking/Potable Water



Water/Sewer

Recycled Water

Fire Service



Recycled Water

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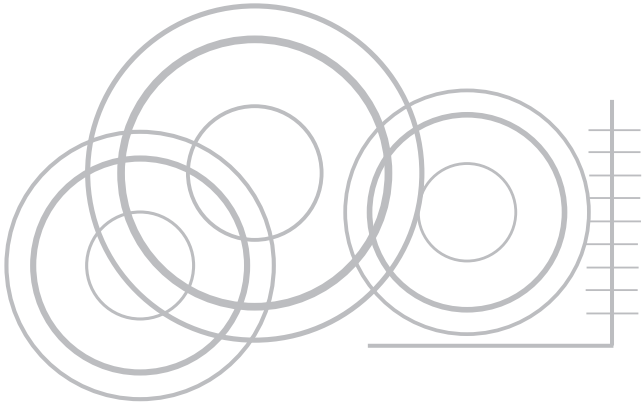

PE-100

High Density Polyethylene

WEIGHTS & Dimensions

PN 10 SDR 17				PN 12.5 SDR 13.6			PN 16 SDR 11				PN 20 SDR 9		
OD		ID	Av Mass		ID	Av Mass	OD		ID	Av Mass		ID	Av Mass
20				1.6	16.7	0.10	20	1.9	16.1	0.11	2.3	15.2	0.13
25				1.9	21.1	0.14	25	2.3	20.2	0.17	2.8	19.2	0.20
32	1.9	28.1	0.18	2.4	27.0	0.23	32	2.9	26.0	0.27	3.6	24.5	0.32
40	2.4	35.0	0.29	3.6	33.8	0.35	40	3.7	32.3	0.42	4.5	30.6	0.50
50	3.0	43.8	0.45	3.7	42.3	0.54	50	4.6	40.4	0.66	5.6	38.3	0.78
63	3.8	55.1	0.71	4.7	53.2	0.86	63	5.8	50.9	1.04	7.1	48.1	1.25
75	4.5	65.7	1.00	5.5	63.6	1.20	75	6.8	60.9	1.45	8.4	57.5	1.75
90	5.4	78.8	1.44	6.6	76.3	1.73	90	8.2	72.9	2.10	10.1	68.6	2.55
110	6.6	96.4	2.14	8.1	93.2	2.59	110	10.0	89.3	3.12	12.3	84.4	3.75
125	7.4	109.8	2.74	9.2	106.0	3.34	125	11.4	101.4	4.05	14.0	96.0	4.84
140	8.3	123.0	3.44	10.3	118.8	4.19	140	12.7	113.8	5.05	15.7	107.5	6.08
160	9.5	140.6	4.48	11.8	135.8	5.47	160	14.6	129.9	6.63	17.9	123.0	7.92
180	10.7	158.2	5.67	13.3	152.7	6.94	180	16.4	146.2	8.38	20.1	138.4	10.02
200	11.9	175.7	7.00	14.7	169.7	8.51	200	18.2	162.4	10.33	22.4	153.6	12.39
225	13.4	197.6	8.88	16.6	190.6	10.8	225	20.5	182.7	13.07	25.1	173.0	15.63
250	14.8	219.8	10.88	18.4	212.2	13.31	250	22.7	203.2	16.08	27.9	192.3	19.27
280	16.6	246.2	13.67	20.6	237.8	16.68	280	25.4	227.7	20.16	31.3	215.3	24.23
315	18.7	276.9	17.31	23.2	267.4	24.14	315	28.6	256.1	25.52	35.2	242.2	30.65
355	21.1	312.0	22.03	26.1	301.5	26.8	355	32.2	288.7	32.39	39.6	273.2	38.84
400	23.7	351.7	27.84	29.4	339.7	33.98	400	36.3	325.2	41.12	44.7	307.6	49.37
450	26.7	395.6	35.27	33.1	382.1	43.05	450	40.9	365.8	52.08	50.2	346.0	62.51
500	29.6	439.7	43.45	36.8	424.6	53.12	500	45.4	406.5	64.26	55.8	384.7	77.03

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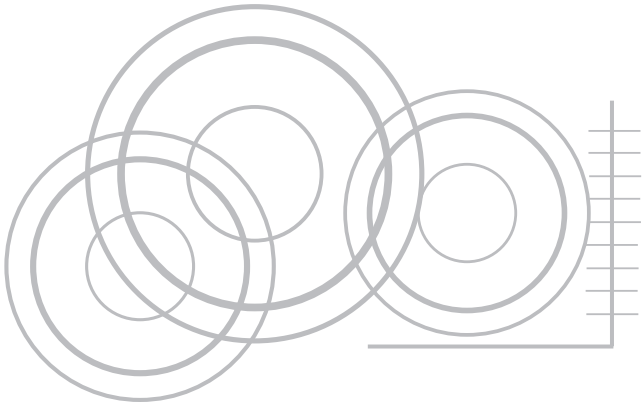

PE-100

High Density Polyethylene

WEIGHTS & Dimensions

PN 4 SDR 41

OD		ID	Av Mass
20	1.6	16.7	0.10
25	1.6	21.7	0.12
32	1.6	28.7	0.16
40	1.6	36.7	0.20
50	1.6	46.7	0.25
63	1.6	59.7	0.32
75	1.9	71.2	0.45
90	2.2	85.5	0.63
110	2.7	104.6	0.92
125	3.1	118.9	1.20
140	3.5	133.1	1.58
160	4.0	152.2	1.97
180	4.4	171.4	2.45
200	4.9	190.4	3.01
225	5.5	214.2	3.81
250	6.2	237.8	4.78
280	6.9	266.7	5.92
315	7.7	300.0	7.44
355	8.7	338.1	9.46
400	9.8	380.9	12.0
450	11.0	428.6	15.13
500	12.3	476.0	18.83

PN 6.3 SDR 26

OD		ID	Av Mass
20	1.6	16.7	0.10
25	1.6	21.7	0.12
32	1.6	28.7	0.16
40	1.6	36.1	0.20
50	2.0	45.9	0.31
63	2.4	58.0	0.47
75	2.9	69.1	0.67
90	3.5	82.8	0.97
110	4.3	101.2	1.46
125	4.8	115.3	1.84
140	5.4	129.1	2.33
160	6.2	147.5	3.05
180	6.9	166.2	3.80
200	7.7	184.5	4.71
225	8.6	207.7	5.92
250	9.6	230.7	7.33
280	10.7	258.6	9.15
315	12.1	290.7	11.66
355	13.6	327.8	14.73
400	15.3	369.3	18.68
450	17.2	415.5	23.61
500	19.1	461.7	29.13

PN 8 SDR 21

OD		ID	Av Mass
20	1.6	16.7	0.10
25	1.6	21.7	0.12
32	1.6	28.7	0.16
40	1.9	36.1	0.23
50	2.4	45.0	0.37
63	3.0	56.8	0.57
75	3.6	67.6	0.81
90	4.3	81.1	1.17
110	5.3	99.1	1.75
125	6.0	112.8	2.24
140	6.7	126.4	2.81
160	7.7	144.4	3.68
180	8.6	162.6	4.63
200	9.6	180.5	5.73
225	10.8	203.1	7.24
250	11.9	225.9	8.87
280	13.4	252.9	11.19
315	15.0	284.7	14.07
355	16.9	320.9	17.86
400	19.1	361.3	22.77
450	21.5	406.5	28.80
500	23.9	451.7	35.53

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High Density Polyethylene

FACT SHEET

Coils (cont)

OD 20mm to 140mm - 25m / 50m / 100m / 150m / 200m lengths

Available in PN 8 / PN 10 / PN 12.5 / PN 16 / PN 20

OD	Length m	Width mm	ID mm	OD mm
50	50	210	1400	1690
	100	210	1400	1975
	150	368	1400	1880
	200	420	1400	1975
	300	420	1400	2165
75	50	236	1900	2335
	100	473	1900	2335
	140	473	1900	2478
	200	551	1900	2620
	300	551	1900	2905
110	50	347	2000	2638
	100	462	2000	2847
140	60	441	2160	2972
	75	551	2160	2972
	100	551	2600	3678

OD	Length m	Width mm	ID mm	OD mm
63	50	265	1650	2015
	100	265	1650	2255
	150	397	1650	2255
	200	397	1650	2375
	320	529	2450	3055
90	50	284	2000	2522
	100	378	2000	2847
125	50	394	2100	2825
	100	525	2100	3063

PE PIPES
LDPE

Low density polyethylene pipes and tubes for use in agricultural irrigation systems, water delivery systems, assembly sets, and automation applications.

- Contains Recycled Plastic
- High Durability & ISO 8779 Certified
- Backed by Netafim 5 Year Warranty

Benefits & Features

→ Multiple diameters & coil lengths

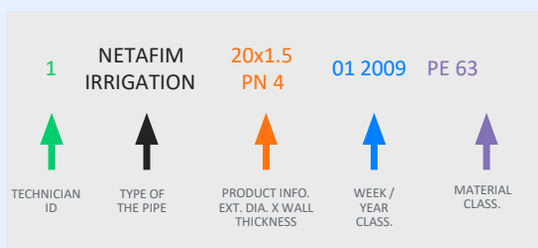
- All pipes are manufactured with UV and oxidation protection, making them durable to solar radiation without significant damage for many years
- Micro-organisms or fungi do not attack PE pipes, either internally or externally
- PE pipes are resistant to saline water, acid or alkaline solutions (excluding highly concentrated solutions) and to most substances employed in agricultural applications
- Available in standard coil lengths, large diameter reels or pipe rods, to meet specific requirements

→ Available in black, bright white or purple

- Made with quality low or medium density polyethylene resin, especially formulated to resist cracking and kinking, and to ensure long-term reliability
- Precision manufacturing to ensure the uniformity of internal diameter and wall thickness
- Contains recycled material that contributes to achieving a circular economy and helps growers reach their ESG targets.
- 5 Year Warranty, provides best in-class reassurance on all blank polyethylene tubing 1.0mm and upwards.

Specifications & Recommendations

- → Standard irrigation pipes, produced according to Israeli Standard SI 8779 that fits the International Standard ISO 8779
- → Tubes 13/3, 19/3, 25/3, 32/3, 20/4 and 25/4, produced according to Netafim™ quality standards
- → Each pipe can be identified by its outer diameter and by its class (3 or 4 bar). On each 1 meter of the pipe there is a mark that represents the following:



Product Range

- Bright white and purple co-extruded options
- Pre-punched Black and White co-extruded options available
- ISO/EURO 4 bar specification

- ISO 8779 vs. AS 2698
  Nominal diameter of ISO 8779 refers to outer diameter (OD) whilst AS 2698 nominal diameter refers to internal diameter (ID).
- Please ensure that you are utilizing the relevant standards when ordering from our LDPE range.

Low Density Polyethylene Pipe (LDPE)

BLACK LDPE

MODEL	PIPE ID (MM)	PIPE OD (MM)	WALL THICK-NESS* (MM)	PN (CLASS)	MAX. WORKING PRES-SURE (BAR)	MATERIAL CLASS	TIE COIL LENGTH					
							1.0 METER	25 METERS	50 METERS	100 METERS	200 METERS	300 METERS
13/3	12.9	15.4	1.25	3	3	TYPE 30	-	19961-013025	19961-013050	19961-013100	-	19961-013300
19/3	19.2	21.9	1.35	3	3	TYPE 30	19961-091910	19961-019025	19961-019050	19961-019100	19961-019200	-
25/3	25.4	28.5	1.55	3	3	TYPE 30	-	-	19961-025050	19961-025100	19961-025200	-
32/3	31.7	35.8	2.05	3	3	TYPE 30	-	-	-	19961-032100	19961-032200	-

Co-Extruded LDPE

BRIGHT WHITE LDPE

TYPE	MODEL	PIPE ID (MM)	PIPE OD (MM)	WALL THICKNESS* (MM)	PN (CLASS)	MAX. WORKING PRESSURE (BAR)	MATERIAL CLASS	TIE COILS LENGTH	
								100 METERS	200 METERS
AUS STANDARD 3 BAR RATING	19/3	19.2	21.9	1.35	3	3	TYPE 30	-	19961-119200
	25/3	25.4	28.5	1.55	3	3	TYPE 30	-	19961-125200
	32/3	31.7	35.8	2.05	3	3	TYPE 30	-	19961-132200
EUROPEAN STANDARD 4 BAR RATING	20/4	17.6	20 .0	1.2	4	4	PE40	19950-715050	19950-715150
	25/4	22.0	25 .0	1.5	4	4	PE40	19950-715720	19950-715920

PURPLE LDPE

MODEL	PIPE ID (MM)	PIPE OD (MM)	WALL-THICKNESS* (MM)	PN (CLASS)	MAX. WORKING PRESSURE (BAR)	MATERIAL CLASS	TIE COILS LENGTH		
							50 METERS	100 METERS	200 METERS
13/3	12.9	15.4	1.25	3	3	TYPE 30	-	19961-213100	-
19/3	19.2	21.9	1.35	3	3	TYPE 30	-	19961-219100	-
25/3	25.4	28.5	1.55	3	3	TYPE 30	19961-225050	19961-225100	19961-225200
32/3	31.7	35.8	2.05	3	3	TYPE 30	-	19961-232100	19961-232200

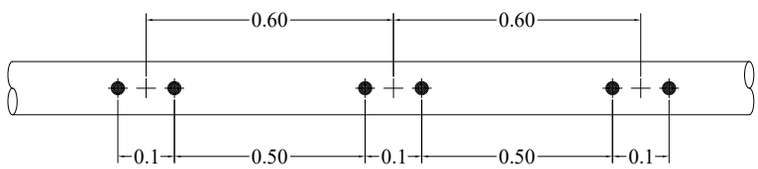
/ Pre-Punched

It is available in both black and white generally supplied as a 19/3. Other definable characteristics are outlined in the product code as follows:

CODE	DESCRIPTION
19960-132150	PRP 19013 2H 0.10M^0.50M 200M W AU 19/3

/ DESCRIPTION

PRP	PRE-PUNCHED
19013	NOMINAL 19MM DIAMETER WITH NOMINAL 1.3MM WALL THICKNESS
2H	TWO PUNCHED HOLES IN THE CLUSTER
0.10M^	0.10M SPACING BETWEEN THE HOLES IN THE CLUSTER
0.50M	0.50M FROM THE LAST HOLE IN THE PREVIOUS CLUSTER TO THE FIRST HOLE IN THE NEXT CLUSTER
200M	COIL LENGTH 200M TOTAL
W AU	CO-EXTRUDED WHITE OVER BLACK TUBE (AUSTRALIA/NEW ZEALAND STANDARD LDPE)
19/3	NOMINAL 19MM DIAMETER PN3 (BAR)



The centre-to-centre of cluster dimension 0.60M is not part of the description. Netafim offers 3- and 4-hole clusters, with a minimum distance between holes of 0.10M and a minimum order quantity of 5000m.

MODEL	PUNCHED HOLES	HOLE SPACING IN CLUSTER (METER)	HOLE SPACING (METER)	CO-EX-TRUDED COLOUR	ID (MM)	PIPE OD (MM)	WALL THICKNESS* (MM)	PN (CLASS)	MAX. WORKING PRESSURE (BAR)	MATERIAL CLASS	TIE COILS LENGTH (M)
											200 METERS
19/3	1	-	0.125	W AU	19.2	21.9	1.35	3	3	TYPE 30	19960-131901
19/3	1	-	0.15	W AU	19.2	21.9	1.35	3	3	TYPE 30	19960-131015
19/3	1	-	0.20	W AU	19.2	21.9	1.35	3	3	TYPE 30	19960-131020
19/3	1	-	0.23	W AU	19.2	21.9	1.35	3	3	TYPE 30	19960-131023
19/3	1	-	0.30	W AU	19.2	21.9	1.35	3	3	TYPE 30	19960-131030
19/3	1	-	0.33	W AU	19.2	21.9	1.35	3	3	TYPE 30	19960-131033
19/3	1	-	0.40	W AU	19.2	21.9	1.35	3	3	TYPE 30	19960-131040
19/3	1	-	0.40	AU	19.2	21.9	1.35	3	3	TYPE 30	19960-031040
19/3	1	-	0.50	W AU	19.2	21.9	1.35	3	3	TYPE 30	19960-131050
19/3	1	-	0.80	W AU	19.2	21.9	1.35	3	3	TYPE 30	19960-131080
19/3	2	0.1	0.30	W AU	19.2	21.9	1.35	3	3	TYPE 30	19960-132130
19/3	2	0.1	0.40	W AU	19.2	21.9	1.35	3	3	TYPE 30	19960-132140
19/3	2	0.1	0.50	W AU	19.2	21.9	1.35	3	3	TYPE 30	19960-132150
19/3	2	0.1	0.56	W AU	19.2	21.9	1.35	3	3	TYPE 30	19960-132156
19/3	2	0.1	0.60	W AU	19.2	21.9	1.35	3	3	TYPE 30	19960-132160
19/3	2	0.1	0.65	W AU	19.2	21.9	1.35	3	3	TYPE 30	19960-132165
19/3	2	0.1	0.70	W AU	19.2	21.9	1.35	3	3	TYPE 30	19960-132170
19/3	2	0.1	0.90	W AU	19.2	21.9	1.35	3	3	TYPE 30	19960-132190
19/3	2	0.1	1.00	W AU	19.2	21.9	1.35	3	3	TYPE 30	19960-132110
19/3	2	0.15	0.85	W AU	19.2	21.9	1.35	3	3	TYPE 30	19960-132904
19/3	2	0.2	0.46	W AU	19.2	21.9	1.35	3	3	TYPE 30	19960-132246
19/3	2	0.3	0.36	W AU	19.2	21.9	1.35	3	3	TYPE 30	19960-132336
19/3	2	0.35	0.40	W AU	19.2	21.9	1.35	3	3	TYPE 30	19960-132901
19/3	2	0.4	0.50	W AU	19.2	21.9	1.35	3	3	TYPE 30	19960-132450
19/3	3	0.1	0.70	W AU	19.2	21.9	1.35	3	3	TYPE 30	19960-133170
19/3	3	0.1	0.80	W AU	19.2	21.9	1.35	3	3	TYPE 30	19960-133180
19/3	4	0.1	0.35	W AU	19.2	21.9	1.35	3	3	TYPE 30	19960-134135
25/3	1	-	0.25	W AU	25.4	28.5	1.55	3	3	TYPE 30	19960-141025

*AS2698 UP TO 25 C. ISO/EU STANDARD UP TO 35 C.

HydroCalc 3.0

- Netafim HydroCalc, the irrigation hydraulic calculator of choice for thousands of professionals around the world, brings you absolute confidence in your hydraulic decisions.
- Lateral. Submain, Manifold and Mainline calculations.
- Flexibility - HydroCalc 3.0 is smart enough to let you make calculations with the information you have. For example, you can enter either outlet or inlet pressure, and you can define elevation change in meters/feet or percentage
- Valve, Flushing Manifold, Shift and Energy calculations Coming Soon!

Recycled Materials

- Netafim uses the highest quality raw materials in the production of our LDPE pipes and dripperlines, including the use of virgin raw materials and recycled materials. We are the only irrigation manufacturer to offer a completely closed loop recycling program. We call it Netafim Recoil. Recoil recycles used drip lines and removes agricultural plastic waste from the field to minimize the environmental impact. We process that field waste material and use it in our manufacturing process, creating a closed loop circular economy. Products that contain recycled material are still backed by our industry leading warranty, so it's good for our customers and for the planet!

  For more information on Netafim Recoil, contact us on recoil@netafim.com or call our office on +61-(0)3-8331-6500

LDPE AU VERSION 1.23.12.21

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KEMBLA

Copper Tube

Certified System
Quality
ISO 9001
SAI GLOBAL

SEAMLESS COPPER TUBE

TO AUSTRALIAN STANDARD AS1432

- Plumbing
- Gas Fittings
- Drainage

www.kembla.com.au

MM KEMBLA
QUALITY
RELIABILITY
SERVICE
EST. 1916

KEMBLA

Copper Tube TO AS 1432

MM Kembla has been providing our customers with the highest quality and most reliable products and services for over 100 years. Established in 1916, MM Kembla is Australia's only copper tube manufacturer. Still operating from its original site at Port Kembla, NSW Australia, MM Kembla remains the most highly regarded supplier of copper products including tube, fittings and accessories. Extensive technical knowledge combined with stringent in-house quality controls and testing with an ISO 9001 certified quality management system, MM Kembla has developed a renowned reputation for quality, reliability and service.

KEMBLA® COPPER TUBE

Kembla copper tube manufactured to Australian Standard AS1432 is suitable for use in pressure and non-pressure plumbing, gas fitting and drainage applications.

Seamless copper tube is available in sizes 6.35mm up to 254mm. The Kembla range of copper tube is available as "Hard Drawn" straight lengths, "Bendable Quality" (BQ) straight lengths and annealed coils. Tubes are available and in a variety of wall thickness to meet the safe working pressure requirements for varying applications.

Kembla copper tube to AS1432 is also available in pre-lagged straights and coils suitable for a variety of end-use applications.

All Kembla tubes are lead-free, Watermark Certified and meet the stringent testing requirements of AS 4020: Materials in Contact with Drinking Water.

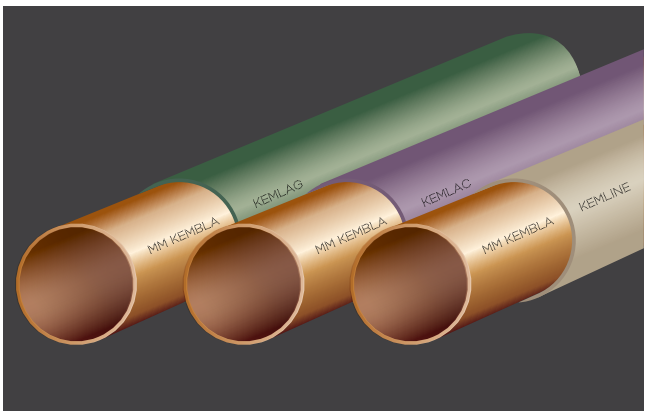
PRE-LAGGED COPPER TUBE

Kembla copper tubes are available in 3 different types of pre-insulated polyethylene covered copper tube for a variety of applications.

KEMLAG pre-insulated copper tube is available with a UV resistant green plastic sheathing for use in short un domestic hot water lines, burying in corrosive soils and laying under floors and concrete slabs (where approved)

KEMLAG RECYCLED WATER pre-lagged tubes are available in a lilac coloured lagging for the purpose of differentiating between drinking water pipes and those used for recycled water.

KEMLINE biscuit colour pre-insulated annealed copper tube coils are used in LP gas pipelines for vehicle engines and satisfies the requirements of AS1425.



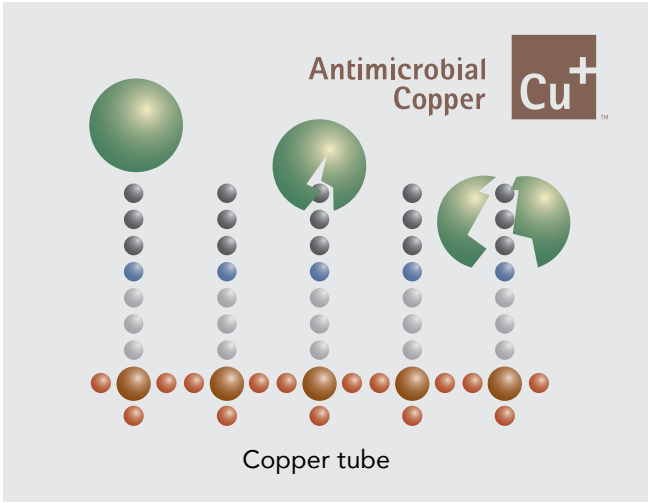
KEMBLA

Copper Tube TO AS 1432

BENEFITS OF USING COPPER TUBE FOR PLUMBING APPLICATIONS

OPTIMAL PERFORMANCE & DESIGN

- Ability to handle high working pressures
- Suitable for extreme high and low temperatures - Max service temperature of 200°C
- Superior flow rates due to low surface roughness and full flow fittings that don't reduce the bore of the tube
- Minimal linear expansion and space requirements
- Less bracketing/support required
- Excellent thermal conductivity – perfect for exchanging heat or cold fluids and energy efficiency



HYGIENIC

Copper fights and inhibits the proliferation of harmful bacteria and pathogens, ensuring your drinking water is free from nasties that could lead to illness.

Tube is made of 99.90% copper and contains no additives, volatile organic compounds (VOC's) or pigments or synthetic compounds inside it, providing the safest and cleanest drinking water to Australian homes, hospitals and offices for decades.

STRONG & RELIABLE

The inherent strength of copper tube provides protection to external damage, puncture, abrasion, vibration and excellent corrosion resistance meaning you reduce the risk of a costly system failure.

Copper has a tensile strength of 220MPa on annealed tube and up to 380MPa on hard drawn tube, making it up to 10 times stronger than plastic piping materials. In addition copper does not harden or soften with age and is UV resistant meaning it's suitable for use in direct sunlight.

EASY TO USE

Copper tube is easy to install and many quick and easy connection methods are available for joining copper tube:

- Press fittings
- Compression
- Push fittings
- Swaging & Flaring
- Brazing
- Roll grooving
- Threaded
- Branch forming

SAFE & FIRE RESISTANT

Copper is the safest material to use in plumbing system, providing the following benefits:

- Copper is not permeable to gases or air, meaning no leakage or contamination from outside is possible
- Does not leech dangerous metals or toxins into drinking water
- Copper tube does not burn or support combustion, spread flame or emit toxic fumes during fire
- Resistant to vermin attack

PROVEN TRACK RECORD

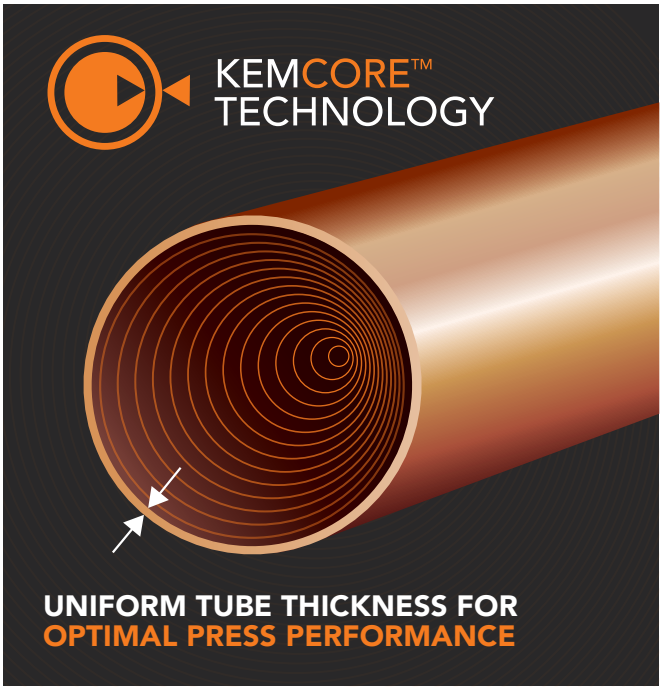
Copper has been used to convey water all over the world for thousands of years. The first known installation was laid in an ancient Egyptian temple almost 5,000 years so. Copper tube has a proven track record in plumbing and a design life of 50 years.

KEMBLA

Copper Tube TO AS 1432

WHY USE KEMBLA® COPPER TUBE? IT'S THE KEMBLA DIFFERENCE

All copper tube may look the same, but the rich history and manufacturing know-how of MM Kembla developed over 100 years means when you use a length of Kembla copper tube there's a difference. That's the Kembla Difference.



KEMCORE™ – ECCENTRICITY CONTROL

Eccentricity is the variation of tube wall thickness that occurs during the manufacture of tube. The higher the eccentricity found in a length of tube, the more likely it will cause you an issue when installing, particularly when using press fittings as uneven wall thickness can lead to weak points on the tube.

Kembla's unique KEMCORE™ Technology ensures the final product is concentric with superior wall thickness control for long term tube performance and optimal press conditions when used with press fittings.

25 YEAR WARRANTY

Kembla Copper Tube is supported by a trusted local 25 year warranty.

AUSTRALIA'S ONLY COPPER TUBE MANUFACTURER

MM Kembla is Australia's only seamless copper tube manufacturer, operating out of its original site in Port Kembla, NSW since 1916.

For over 100 years MM Kembla has been manufacturing and supplying copper tube that has been the lifeblood of Australian homes, offices, hospitals and buildings delivering essential services to generations of Australians.

Kembla Copper Tube is stocked across Australia as part of MM Kembla's vast national distribution network and sold by Australia's largest plumbing distributors.

STRICT QUALITY MANAGEMENT SYSTEMS

Certified System™
Quality
ISO 9001
SAI GLOBAL

- ISO9001 certified quality management system
- Kembla internal quality controls that go above and beyond standard requirements
- World's best practice and commitment to process control in ensuring product quality
- Comprehensive system to track and resolve quality issues and continuous improvement

LOCAL TECHNICAL SUPPORT

MM Kembla has a dedicated technical support team and laboratory to assist you with the following:

- Technical assistance & enquiries
- Design advice and product support
- Investigative analysis and reporting
- On-site training and inspection

KEMBLA

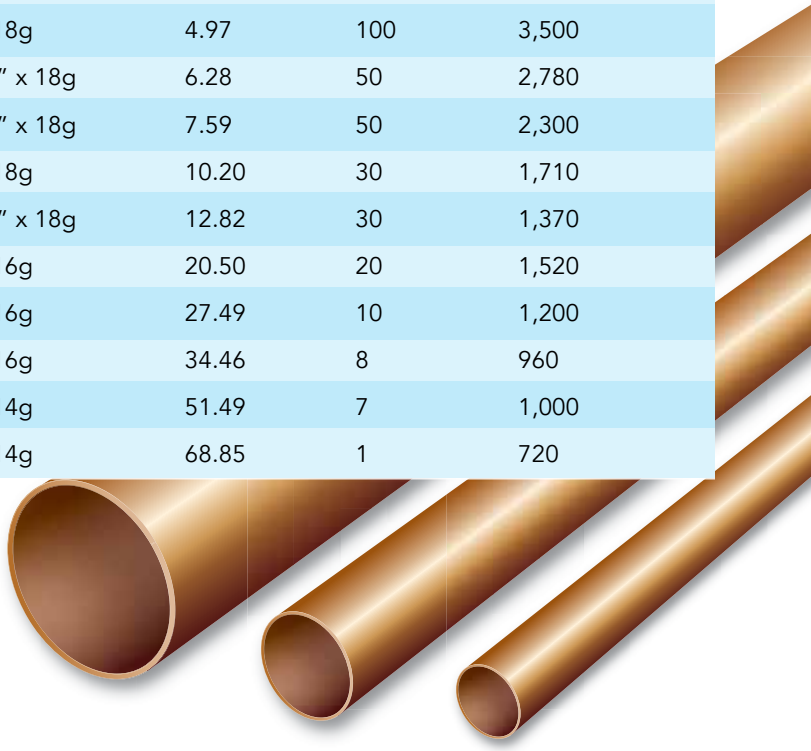
Copper Tube TO AS 1432

TYPE A

Item Code	Nom. Size	Actual Tube Size (Metric)	Actual Tube Size (Imperial)	kg per 6m length	Pack Qty.	*Safe Working Pressure (kPa)
T10472	DN6	6.35 x 0.91	1/4" x 20g	0.83	200	11,320
T89630	DN15	•12.70 x 1.02	1/2" x 19g	2.01	100	6,100
T79928	DN18	•15.88 x 1.22	5/8" x 18g	3.00	100	5,750
T67512	DN20	•19.05 x 1.42	3/4" x 17g	4.22	100	5,560
T79847	DN25	25.40 x 1.63	1" x 16g	6.53	100	4,750
T79812	DN32	31.75 x 1.63	1 1/4" x 16g	8.28	50	3,750
T79782	DN40	38.10 x 1.63	1 1/2" x 16g	10.03	50	3,100
T79715	DN50	50.80 x 1.63	2" x 16g	13.52	30	2,310
T89958	DN65	63.50 x 1.63	2 1/2" x 16g	17.01	30	1,840
T89931	DN80	76.20 x 2.03	3" x 14g	25.39	20	1,900
T89851	DN100	101.60 x 2.03	4" x 14g	34.09	10	1,500
T19151	DN125	127.00 x 2.03	5" x 14g	42.79	8	1,200
T19542	DN150	152.40 x 2.64	6" x 12g	66.68	7	1,300
T20078	DN200	203.20 x 2.64	8" x 12g	89.27	1	910

TYPE B

Item Code	Nom. Size	Actual Tube Size (Metric)	Actual Tube Size (Imperial)	kg per 6m length	Pack Qty.	*Safe Working Pressure (kPa)
T79987	DN10	9.52 x 0.91	3/8" x 20g	1.32	200	7,220
T89621	DN15	•12.70 x 0.91	1/2" x 20g	1.81	100	5,290
T58769	DN18	•15.88 x 1.02	5/8" x 19g	2.56	100	4,810
T83356	DN20	•19.05 x 1.02	3/4" x 19g	3.10	100	3,970
T79839	DN25	25.40 x 1.22	1" x 18g	4.97	100	3,500
T79804	DN32	31.75 x 1.22	1 1/4" x 18g	6.28	50	2,780
T79774	DN40	38.10 x 1.22	1 1/2" x 18g	7.59	50	2,300
T79707	DN50	50.80 x 1.22	2" x 18g	10.20	30	1,710
T89940	DN65	63.50 x 1.22	2 1/2" x 18g	12.82	30	1,370
T89923	DN80	76.20 x 1.63	3" x 16g	20.50	20	1,520
T89842	DN100	101.60 x 1.63	4" x 16g	27.49	10	1,200
T19208	DN125	127.00 x 1.63	5" x 16g	34.46	8	960
T19607	DN150	152.40 x 2.03	6" x 14g	51.49	7	1,000
T20094	DN200	203.20 x 2.03	8" x 14g	68.85	1	720



KEMBLA

Copper Tube TO AS 1432

TYPE C

Item Code	Nom. Size	Actual Tube Size (Metric)	Actual Tube Size (Imperial)	kg per 6m length	Pack Qty.	*Safe Working Pressure (kPa)
T79031	DN10	9.52 x 0.71	3/8" x 22g	1.06	200	5,520
T89460	DN15	•12.70 x 0.71	1/2" x 22g	1.43	100	4,070
T22438	DN18	•15.88 x 0.91	5/8" x 20g	2.30	100	4,180
T81434	DN20	•19.05 x 0.91	3/4" x 20g	2.78	100	3,450
T79456	DN25	25.40 x 0.91	1" x 20g	3.76	100	2,560

TYPE D

Item Code	Nom. Size	Actual Tube Size (Metric)	Actual Tube Size (Imperial)	kg per 6m length	Pack Qty.	*Safe Working Pressure (kPa)
T89672	DN32	31.75 x 0.91	1 1/4" x 20g	4.73	50	2,040
T79766	DN40	38.10 x 0.91	1 1/2" x 20g	5.71	50	1,690
T79693	DN50	50.80 x 0.91	2" x 20g	7.66	30	1,260
T89761	DN65	63.50 x 0.91	2 1/2" x 20g	9.61	30	1,010
T89915	DN80	76.20 x 1.22	3" x 18g	15.43	20	1,130
T89834	DN100	101.60 x 1.22	4" x 18g	20.65	10	890
T19658	DN150	152.40 x 1.63	6" x 16g	41.45	7	800

OTHER STRAIGHT LENGTHS

Item Code	Actual Tube Size (Metric)	Actual Tube Size (Imperial	Length	Pack Qty
T79880	19.05 x 1.22	3/4" x 18g	6m	100
T74964	19.05 x 1.63	3/4" x 16g	6m	100
T89745	101.60 x 0.91	4" x 20g	6m	10
T19691	152.40 x 0.91	6" x 20g	6m	5
T20418	254.00 x 2.64	10" x 12g	6m	1

LAGGED COILS FOR GAS

Item Code	Actual Tube Size (Metric)	Actual Tube Size (Imperial	Length	Pack Qty.
T68631	6.35 x 0.91	1/4" x 20g	18m	1
T24447	7.94 x 0.91	5/16" x 20g	30m	1
T90548	9.52 x 0.91	3/8" x 20g	18m	1

KEMLAG STRAIGHTS

Item Code	Actual Tube Size (Metric)	Actual Tube Size (Imperial	Length	Pack Qty.
TYPE A				
T70459	•12.70 x 1.02	1/2" x 19g	6m	25
T10642	•19.05 x 1.42	3/4" x 17g	6m	25
TYPE B				
T70475	•12.70 x 0.91	1/2" x 20g	6m	25
T70531	•15.88 x 1.02	5/8" x 19g	6m	25
T70581	•19.05 x 1.02	3/4" x 19g	6m	25
T70696	25.40 x 1.22	1" x 18g	6m	25
T58556	31.75 x 1.22	1 1/4" x 18g	6m	150
T20991	38.10 x 1.22	1 1/2" x 18g	6m	100
T63312	50.80 x 1.22	2" x 18g	6m	75
T09938	101.60 x 1.63	4" x 16g	6m	15
TYPE C				
T70572	•15.88 x 0.91	5/8" x 20g	6m	25
T70688	•19.05 x 0.91	3/4" x 20g	6m	25
T70718	25.40 x 0.91	1" x 20g	6m	25

LAGGED TUBES FOR REYCLED WATER

Item Code	Actual Tube Size (Metric)	Actual Tube Size (Imperial	Length	Pack Qty.
T12467	12.70 x 0.91	1/2" x 20g	6m	25
T12408	19.05 x 1.02	3/4" x 19g	6m	25
T12425	25.40 x 1.22	1" x 18g	6m	25
T78336	31.75 x 1.22	1 1/4" x 18g	6m	150
T58785	38.10 x 1.22	1 1/2" x 18g	6m	100
T15900	50.80 x 1.22	2" x 18g	6m	75
T15905	63.50 x 1.22	2 1/2" x 18g	6m	60
T15910	76.20 x 1.63	3" x 16g	6m	40
T90093	101.60 x 1.63	4" x16g	6m	15

KEMLAG ANNEALED COILS

Item Code	Actual Tube Size (Metric)	Actual Tube Size (Imperial	Length	Pack Qty.
TYPE A				
T44466	12.70 x 1.02	1/2" x 19g	18m	1
TYPE B				
T47171	12.70 x 0.91	1/2" x 20g	18m	1
T70271	15.88 x 1.02	5/8" x 19g	18m	1
T70327	19.05 x 1.02	3/4" x 19g	18m	1
TYPE C				
T70301	19.05 x 0.91	3/4" x 20g	18m	1

ANNEALED COILS

Item Code	Actual Tube Size (Metric)	Actual Tube Size (Imperial	Length	Pack Qty.
TYPE A				
T32328	6.35 x 0.91	1/4" x 20g	30m	5
T89770	7.94 x 0.91	5/16" x 20g	30m	5
T79651	12.70 x 1.02	1/2" x 19g	18m	4
T79618	19.05 x 1.42	3/4" x 17g	18m	2
T79570	25.40 x 1.63	1" x 16g	18m	1
TYPE B				
T79677	9.52 x 0.91	3/8" x 20g	18m	6
T79642	12.70 x 0.91	1/2" x 20g	18m	4
T79626	15.88 x 1.02	5/8" x 19g	18m	3
T79596	19.05 x 1.02	3/4" x 19g	18m	3
T79561	25.40 x 1.22	1" x 18g	18m	2
TYPE C				
T79049	15.88 x 0.91	5/8" x 20g	18m	3
T79588	19.05 x 0.91	3/4" x 20g	18m	3

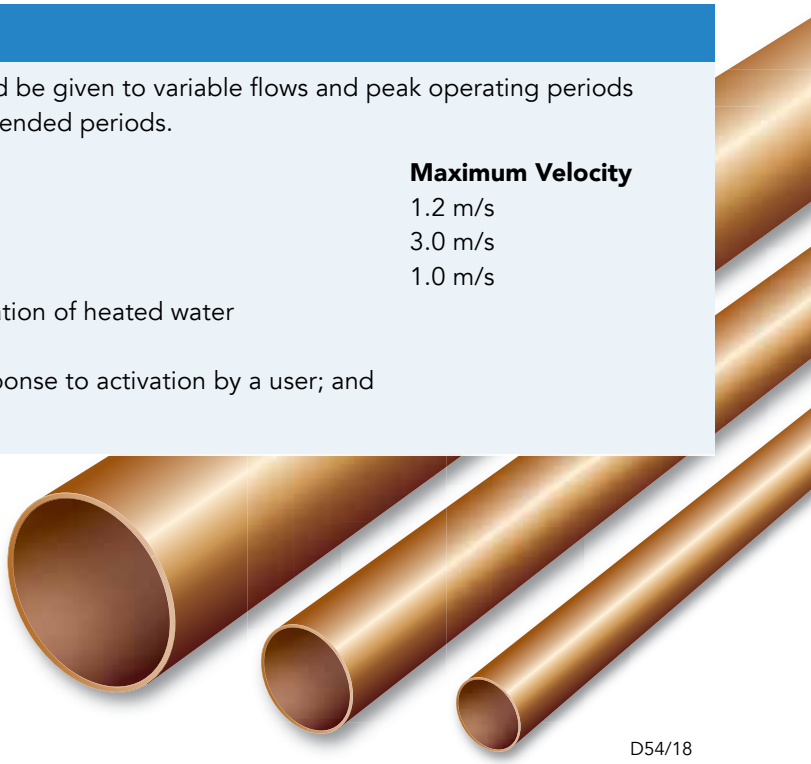
* Safe Working Pressures applicable up to 50°C.
• Generally supplied as "BQ" – bendable quality.

MAXIMUM ALLOWABLE VELOCITIES

The below are maximum velocities, consideration should be given to variable flows and peak operating periods during design to not exceed maximum velocities for extended periods.

Piping	Maximum Velocity
Circulatory (flow)	1.2 m/s
Non-circulatory (flow)	3.0 m/s
Circulatory return line	1.0 m/s

1. Circulatory means piping where there is forced circulation of heated water
2. Circulatory piping does not include -
(a) systems where the circulatory flow only occurs in response to activation by a user; and
(b) primary circulation in a solar water heater



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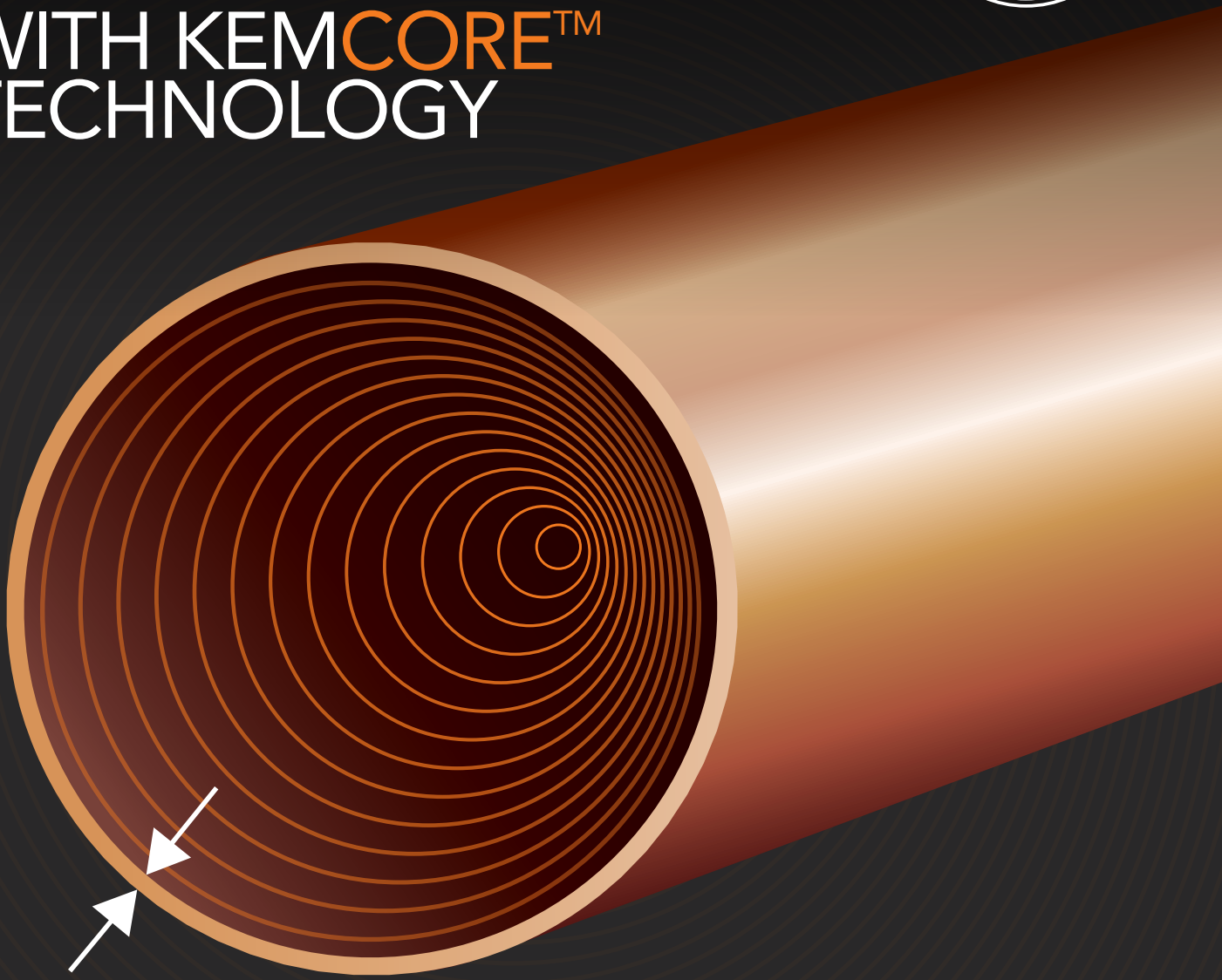

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KEMBLA
Copper Tube

WITH KEMCORE™ TECHNOLOGY

Section 1.5 Drip Tube

IRRIGATION

ENKi Dripline

ENKi 13mm Dripline is a tough and versatile product manufactured from high-grade, UV stable low-density polyethylene.

Features a large flow path, reducing the possibility of clogging. Available in 50 & 200 metre coils, ENKi Dripline is perfect for all landscape and turf irrigation situations. Available in pressure compensated as standard, ENKi can be used over long distances as well as on recycled water applications.

FEATURES

- 2 litres per hour
- Large 13mm flow path – less likely to clog
- 50 and 200 metre coils
- Pressure compensated and Anti Siphon
- 30cm and 40cm spacing available
- Compatible with all standard 13mm micro fittings

ENKi Dripline Brown

Code	Description	Size
1542487	ENKi Dripline Brown	30cm x 50m
1542488	ENKi Dripline Brown	30cm x 200m
1542498	ENKi Dripline Brown	40cm x 50m
1542499	ENKi Dripline Brown	40cm x 200m

ENKi Dripline Purple

Code	Description	Size
1521501	ENKi Dripline Purple	30cm x 50m
1521502	ENKi Dripline Purple	30cm x 200m
1521503	ENKi Dripline Purple	40cm x 50m
1521504	ENKi Dripline Purple	40cm x 200m

Flow Rate LPH	Emitter Spacing (m)	75kPa	100kPa	150kPa	200kPa	250kPa
2.0L/Hr	0.3	49	62	78	90	100
2.0L/Hr	0.4	62	79	100	116	128

Internal Diameter	Outside Diameter	Wall Thickness	Pressure Range
12.9mm	15.3mm	1.2mm	4-35m

• Manufactured from UV-Stabilized low-density polyethylene • Operating pressure: 40–350kPa • Compatible with all standard 13mm micro fittings
• Pressure compensated and Anti Siphon * Maximum run length of single lateral on flat ground (based on 5m residual pressure at the end of the lateral)

Maintenance Procedures

Item	Routined Maintenance frequency
Controller	Quaterly
Controller Schedule	Quaterly
Solenoid Valves	Quaterly
Sprinkler Heads	Quaterly
Pump Control Panels	Quaterly
Pumps	Half Yearly

Preventative Maintenance Checklist

Task	Checklist
System Functionality	
Check that the Irrigation system is running via controller and manual operation	☐
Check program times are adjusted to correct seasonal mode	☐
Other Items	
Check Ball valves	☐
Check Solenoid Valves	☐
Check air/flush valves (if any)	☐
Sprinklers	
Inspect sprinkler height	☐
Inspect Nozzle of any blockages	☐
Inspect sprinkler spray and spray radius	☐

Warranty Documentation

Warranty Type	Length	Conditions	Other notes
Extended Warranties	+3 years	Subject to annual maintenance	
Manufacturer Warranty	5 years*	Faulty Product only	Subject to weather
Equipment Warranty	5 years*	Faulty Product only	Subject to weather
Service Warranty	2 years**	Repair and damage to property caused by Never Stop	
*Subject to manufacturers conditions **Works Included, as per works specification and programme			

NEVERSTOP IRRIGATION PTY LTD

13 December 2024

QUALITY ASSURANCE COMPLIANCE

PROJECT- Roseville College

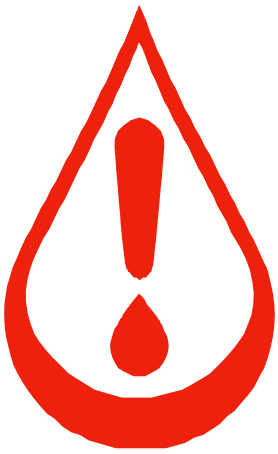
I *Blair Taylor* being duly authorised by *Neverstop Irrigation P/L* the sub contractor for the above described works hereby certify that all works have been carried out and materials supplied for this contract in strict accordance with the consultants specification, drawings and revisions provided by as authorised and approved including written approval/acceptance of changes and amendments to the scope during construction. All works have been commissioned and tested as per the specification.

Sincerely,

Blair Taylor

DIRECTOR
Neverstop Irrigation P/L

Help & Contact Details



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Website:	www.nswater.com

Irrigation Works

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Project Manager:	Adam Dennis	0405 737 547	adam@nswater.com.au

Hydraulic Works

Managing Director:	Blair Taylor	0403 133 077	blair@nswater.com.au
Project Manager:	Adam Dennis	0405 737 547	adam@nswater.com.au

Standards

- Supply and Install an automated Irrigation System as per specification provided at tender.
- Certification of the design and construction to relevant NCC and Australian Standards including but not limited to: AS4902:2000
- Landscape construction works to relevant NCC and Australian Standards including but not limited to: AS2601, AS2303:2015, AS4419:2003 and AS/NZS 3500.1.