RESIDENTIAL SPRINKLER SYSTEM

Design and Installation Guide

Hunter®

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INTRODUCTION

This booklet is intended to be used when designing and installing small, single-family residential sprinkler systems. It's set up in an easy-to-follow format with illustrations and helpful charts.

If this is the first irrigation system you've installed — or, if you've installed several systems but have never used this design guide before — we recommend you review the guide to become familiar with the design and installation process.

Detailed illustrations depict suggested installation methods for sprinkler heads and pipe and valve manifolds, as well as instructions on how to connect the sprinkler main line into the house water system. Installation tips have also been placed throughout the guide to assist you in planning a system. While developing the flow, working pressure, and pipe sizing charts, we considered reasonable friction loss and acceptable water velocity for a residential irrigation system. If you have any questions on the design or installation process, your best resource is your local Hunter distributor.

Hunter recommends contracting the services of a professional irrigation designer when planning large residential or commercial projects. Contractors and irrigation designers can receive additional information by contacting their local Hunter distributor.

For increased water savings, use highly efficient MP Rotator™ Nozzles with pressure-regulated bodies, like the Pro-Spray™ PRS40. Consider the additional use of a weather-based sensor for automatic, climate-based adjustments and maximum water savings.

Reference Hunter's residential/commercial catalogue for products and performance charts, and Hunter's support page for technical support at:

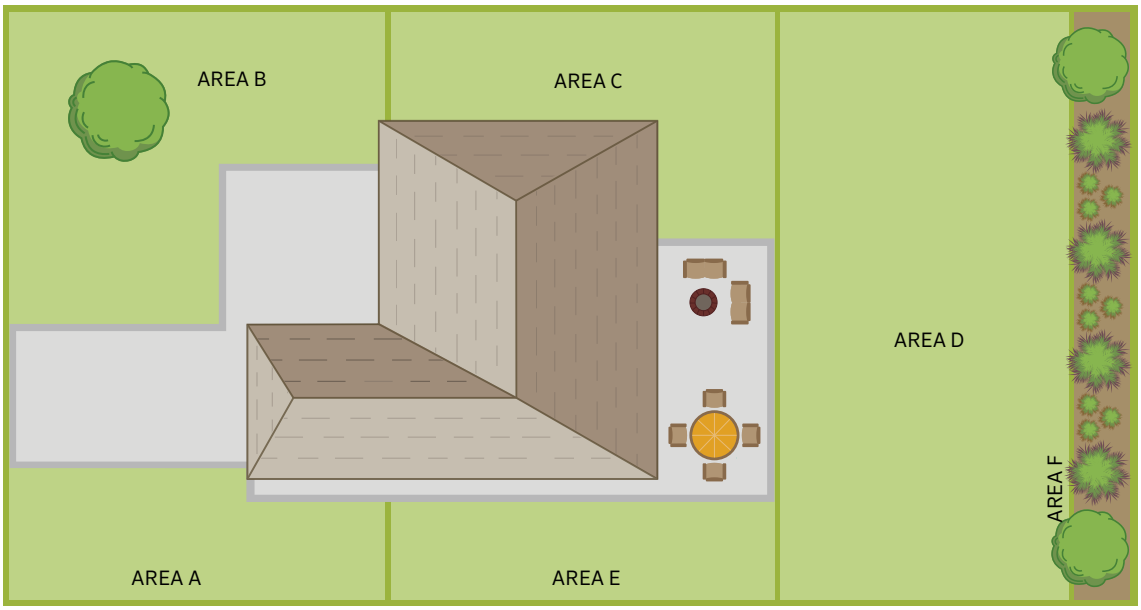
hunter.info/**Catalog**EM

hunterindustries.com/**en-metric/Support**

SPRINKLER SYSTEM PLANNING

Plot, Plan, and Design

1. The first step in designing a residential system is to measure the property and indicate the location of the house. On a separate piece of paper, sketch out your property and place your measurements on the sketch. Be sure to include all concrete or brick walks and patios, driveways, and fences. While you're measuring, locate any trees, shrubs, and lawns and draw them on the sketch.
2. Next, draw the plot plan to scale on graph paper. The scale can be 1:100, 1:200, or whatever you decide. Write your scale on the plan. Make sure to note lawn, shrub, ground cover, and large trees.
3. On the plot plan, divide the property into areas. Consider the information in Step 2 while dividing up the plot plan: front yard, back yard, side yard, lawn or shrub areas, and shady areas. Label your areas A, B, C, D, etc.
See the example plot plan below.



TOOLS AND SUPPLIES YOU MIGHT NEED	
Permit (as required by local/city laws)	Spray Marking Paint
Small Irrigation Flags	Tape Measure
Hacksaw	Trencher or Pipe-Puller
Hammer	Tunnel Kit or Hose Jetting Kit
Pipe Wrenches	Wire Cutters
Plastic Tarp	Insulated Wire Staples
Pliers	Rain Shutoff Device/Weather Sensor
Rags	Shutoff Valves
Rake	Valve Boxes, 15 cm and 30 cm
Screwdriver	Teflon™ Tape (used on all PVC or Poly thread-to-thread fittings)
Shovels: Trenching, Flat, Spade, or Round Point	Automatic Drain Valve (used in freezing climates to winterise system)

IF YOU USE PVC PIPE
Glue (Solvent)
Primer
PVC Pipe Cutters

IF YOU USE POLY PIPE
Pipe Clamps (for insert fittings only)

Call before you dig

SPRINKLER SYSTEM CAPACITY

Determine System Design Capacity

When planning an efficient automatic irrigation system, you must first determine the correct System Design Capacity — the amount of water available for residential irrigation. For installations using city water, follow the steps below. For installations using water from a lake or well, contact your Hunter dealer or pump installer for pressure and volume specifications.

1. **Water pressure (bar; kPa)**
   To check the static water pressure, attach a pressure gauge to the outside faucet closest to the water meter *(Figure 1)*. Make sure no other water is flowing at the residence. Turn on the faucet and record the number on the "Enter Static Pressure Here" line in the right-hand column. You can also check your pressure from the point-of-connection tee.

2. **Water volume (l/min)**
   To determine the volume of water available for the system, you'll need two pieces of information:

   A. **What size is the water meter?**
   Generally, the size will be stamped on the water meter's body. The most common sizes are 15 mm, 20 mm, and 25 mm. In some areas, the water is connected directly to the city main without a water meter. In this case, simply enter the service line size in the space provided at right.

   B. **What size is the service line?**
   Measure the outside circumference of the pipe that runs from the city main to the house. To do this, wrap a piece of string around the pipe, measure it, and use the table at right to convert the string length to pipe size.

   Another method for figuring water volume is the **bucket test** *(Figure 2)*. With this option, you'll fill a 20 l bucket from a hose bib near the point of connection and time the process with a stopwatch or phone. You may use any size bucket as long as you know its volume.

Bucket Test Equation:

$$\text{Flow rate (l/min)} = \frac{\text{[bucket size (L)]}}{\text{[fill time (sec)]} \times 60 \times 0.8}$$

60 = conversion unit to minutes
0.8 = 20% reduction in flow to allow for pressure loss in your system

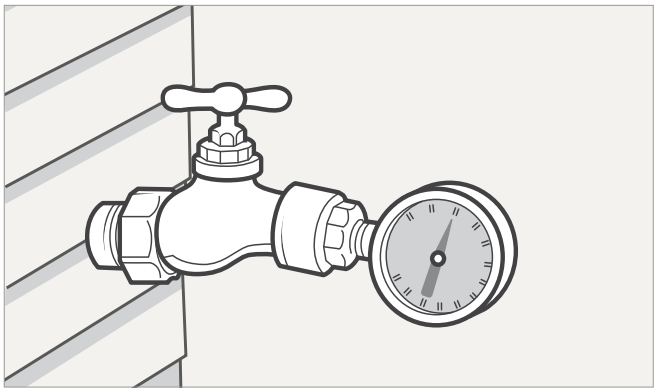


Figure 1: To check the water pressure, attach a pressure gauge to the outside faucet nearest the water meter. You can obtain a pressure gauge from your local Hunter dealer.

Enter Static Pressure Here: _____

Enter Meter Size Here: _____

Enter Service Line Size Here: _____

SERVICE LINE SIZE						
Approx. String Length	**7 cm**	**8.25 cm**	**9 cm**	**10.5 cm**	**11 cm**	**13.5 cm**
Copper Pipe	20 mm		25 mm		32 mm	
Galvanised Pipe		20 mm		25 mm		32 mm
PVC Pipe		20 mm		25 mm		32 mm

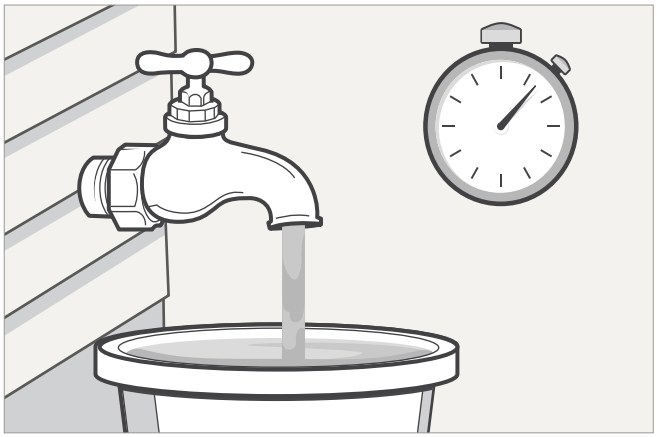


Figure 2: Place a bucket under the faucet and remove any flow restrictors or aerators that might obstruct the water flow. With a stopwatch in hand, ope the faucet fully and start the stopwatch. Stop the timer when the water reaches the bucket lip. Use the ***bucket test equation*** to calculate your system's maximum safe flow rate.

SPRINKLER SYSTEM CAPACITY

3. System Design Capacity

A. Using the System Design Capacity Chart to the right, locate the three numbers you just recorded to determine the Sprinkler System Design Capacity in litres per minute (l/min). Record this number in the l/min box below.

B. Next, locate your system's static pressure and move down that column to find the system's working pressure; record it in the bar; kPa box below. Working pressure will be used when choosing sprinkler heads and designing the system.

You have now established the sprinkler system design capacity and the approximate working pressure available for the sprinkler system. Exceeding these maximums may result in inefficient watering or a condition referred to as "water hammer," which could cause serious damage to the system. These two numbers will be used in the design process.

l/min	bar kPa
Design Capacity	**Working Pressure**

SYSTEM DESIGN CAPACITY EXAMPLE

- Water Meter: **15 mm**
- Service Line: **25 mm**
- Static Pressure: **4.8 bar; 480 kPa**

According to system design capacity:

49 l/min	**3.5 bar; 350 kPa**
Design Capacity	**Working Pressure**

SPRINKLER SYSTEM DESIGN CAPACITY

Static Pressure	bar kPa	2.0 200	2.8 280	3.5 350	4.0 400	4.8 480	5.5 550
WATER METER	**SERVICE LINE**	**MAX l/min**	**MAX l/min**	**MAX l/min**	**MAX l/min**	**MAX l/min**	**MAX l/min**
15 mm	13 mm	7.6	15	19	23	26	26
	20 mm	15	23	30	30	38	45
	25 mm	15	26	30	38	49	57
20 mm	20 mm	15	23	30	34	38	45
	25 mm	19	26	38	53	64	76
	32 mm	19	45	64	76	83	83
25 mm	20 mm	15	26	30	34	45	45
	25 mm	19	30	53	68	76	76
	32 mm	19	53	91	98	114	130
WORKING PRESSURE	bar	1.7	2.0	2.4	3.0	3.5	3.8
	kPa	170	200	240	300	350	380

Note: Service lines are based on 30 m of thick-walled PVC. Deduct 7.6 l/min for copper pipe. Deduct 19 l/min for new galvanised pipe.

Working pressure is the approximate working pressure at the head, and it should be used only as a guide when choosing the proper sprinkler heads and designing the system. The numbers in the Design Capacity Chart are based on generally accepted flow rates (velocity). In some cases, designers increase the velocity in copper pipe only from the accepted 2.3 mps to 2.75 mps. If you do not deduct the 7.6 l/min for copper pipe, the rate is approximately 2.7 mps. The friction loss is substantially increased at this velocity, and the working pressure will be affected. In order to use the numbers in the chart, the length of the copper service line should not exceed 15 m if you decide not to deduct the 7.6 l/min.

System Design Capacity Calculator

Scan to calculate the amount of water available for your irrigation system.

SELECTING SPRINKLERS

Select Sprinkler Heads

There are three basic types of sprinklers for residential use: **large-area rotors, rotating stream spray sprinklers, and small-area, fixed spray sprinklers.** Large-area rotors and rotating stream spray sprinklers should never be installed on the same zone as small-area, fixed spray sprinklers. High-efficiency spray nozzles, such as MP Rotator Nozzles with pressure-regulated Pro-Spray PRS40 Sprinkler Bodies, should be considered in place of traditional fixed nozzles.

1. Large-area rotors will cover areas that measure 8 m x 8 m and larger.
2. Small-area rotating stream or spray sprinklers are typically used in areas smaller than 8 m x 8 m.
3. Micro irrigation delivers water right at the base of the plant through a system of flexible irrigation tubing, drip emitters, and micro sprays.

Within these groups are pop-up sprinklers, which are installed evenly along the grade, and riser-mounted shrub heads, which are installed above the grade. This 8 m x 8 m measurement is not a rule; rather, it's a guideline. The only consideration restricting the size of the area in which spray heads (small-area sprinklers) can be used is economics. If a large-area rotor can be used, it usually means less pipe, fewer valves, and a smaller controller will be required to complete the job.

ROTORS	ECO-ROTATOR	PGJ	SRM	PGP-ADJ	PGP™ ULTRA	I-20	PGP ULTRA/ I-20 PRB
							
Radius (m)	1.8 to 9.1	4.3 to 11.6	4.0 to 10.7	6.4 to 15.8	4.9 to 14.0	4.9 to 14.0	4.9 to 14.0
Flow (l/min)	0.61 to 16.18	2.2 to 20.5	1.4 to 16.7	1.7 to 53.7	1.2 to 53.8	1.2 to 36.0	1.2 to 53.8
Inlet Size	½"	½"	½"	¾"	¾"	¾"	¾"

NOZZLES	STANDARD MP ROTATOR	MP ROTATOR MP800	PRO ADJUSTABLE	PRO FIXED	STRIPS	BUBBLERS	SHORT-RADIUS
							
Radius (m)	2.5 to 10.7 m	1.8 to 4.9 m	1.2 to 5.2 m	1.5 to 5.2 m	1.5 and 2.7 m	0.3 to 0.5 m	0.6 to 1.8 m

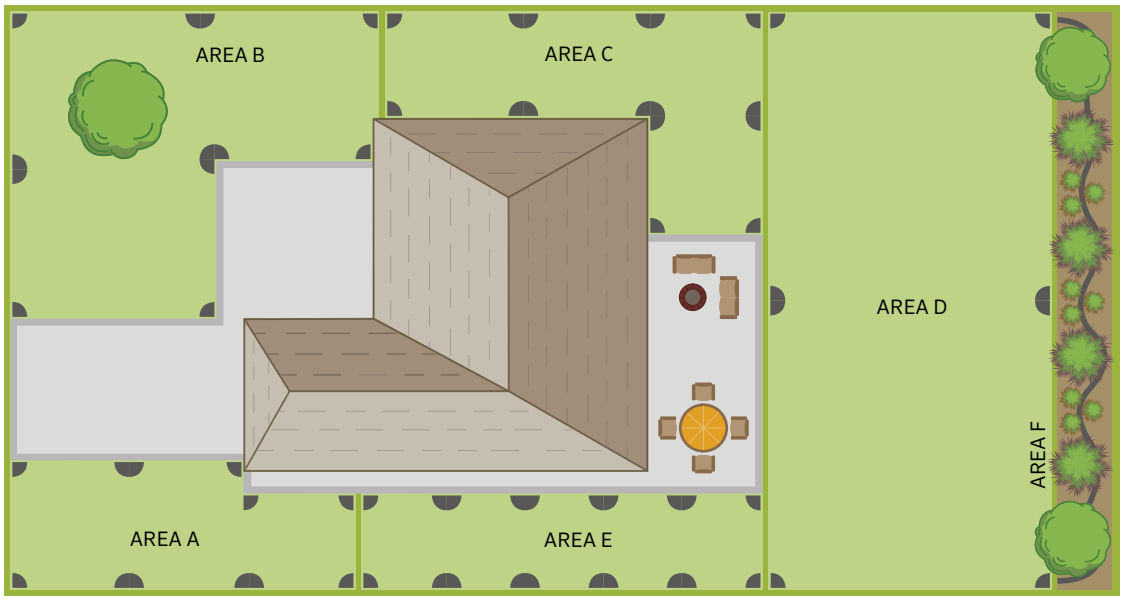
SPRAY BODIES	PS ULTRA	PRO-SPRAY	PRS30	PRS40
				
Models (cm)	5, 10, 15	Shrub, 5, 7.5, 10, 15, 30	Shrub, 7.5, 10, 15, 30	Shrub, 7.5, 10, 15, 30
Pressure Regulation	—	—	2.1 bar; 210 kPa	2.8 bar; 280 kPa

CONTROLLERS	X2™	PRO-HC
		
Stations	4, 6, 8, 14 (fixed)	6, 12, 24 (fixed)
Features	Wi-Fi capable for remote access and online weather	Wi-Fi enabled, touchscreen

SELECTING SPRINKLERS

Select the Right Product for the Right Area

The graphic below is an example of a layout using Hunter's irrigation products. Areas A, B, and C would use sprays and rotating nozzles. Area E would use sprays and specialty nozzles. Area D is a large area and would benefit from the use of the PGP Ultra Rotor. Area F should use micro irrigation products depending on plant type and density.



VALVES	PGV	PGV JAR-TOP	ICV
			
Flow (l/min)	0.7 to 570	0.7 to 150	0.4 to 1,135
Recommended Pressure Range	1.5 to 10 bar; 150 to 1,000 kPa	1.5 to 10 bar; 150 to 1,000 kPa	1.5 to 15 bar; 150 to 1,500 kPa

DRIP CONTROL ZONE KITS	PCZ	ICZ
		
Flow (l/min)	2 to 55	2 to 55
Recommended Pressure Range	1.4 to 8 bar; 140 to 800 kPa	1.4 to 8 bar; 140 to 800 kPa

MICRO IRRIGATION	ECO-MAT™	ECO-WRAP™	HDL	MLD	PSE	RZWS	MICRO SPRAYS
							
Application	Subsurface	Subsurface	On surface	On surface	Directly at plant	Directly at the root zone	Accurate area watering
Flow	2.2 l/hr	2.2 l/hr	1.5, 2.1, 3.4 l/hr	1.5 to 3.21 l/hr	2, 4, 8, 15, 23 l/hr	0.9, 1.9 l/min	0 to 119 l/hr
Throw Diameter	—	—	—	—	—	—	0 to 3.4 m
Inlet Type	16 mm/17 mm	16 mm/17 mm	16 mm/17 mm		Self-piercing barb, 10-32 threaded, ½" female-threaded	½" male-threaded	10-32 threaded/ barbed

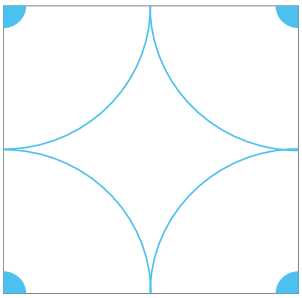
DRAW SPRINKLER HEAD LOCATION

Draw Sprinkler Head Locations

Decide where you'll be installing large-area and small-area sprinklers. Large-area sprinklers should be 8 m to 12 m apart. Small-area sprinklers should be 3 m to 5 m apart. This spacing will allow spray patterns to overlap and ensure even water distribution. Do not mix sprinkler types within one area. Do not place sprinkler heads too far apart; stay within the specifications listed on the Sprinkler Performance Charts, which can be found in the Hunter Product Catalogue. Spacing is determined by the size of the area the sprinkler is serving. Additionally, a sprinkler should be spaced so that it will spray both the head next to it and the head across from it. Working with one area at a time, start placing the sprinkler heads as shown in the following diagrams.

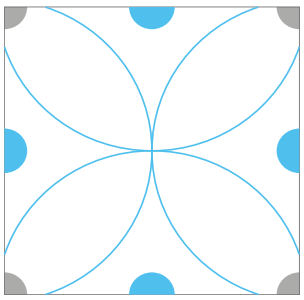
Step 1

The critical points on a plan are the corners. Draw a quarter-pattern sprinkler in each corner. Using a compass, draw an arc showing the sprinkler's watering pattern.



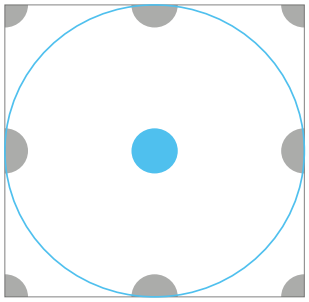
Step 2

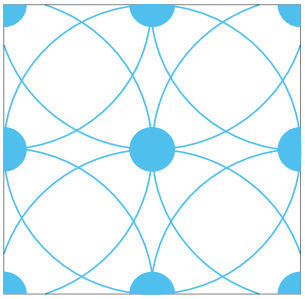
If the quarter heads won't spray each other (head-to-head spacing), place heads along the perimeters. Draw these sprinklers' watering patterns.



Step 3

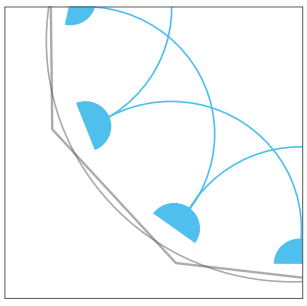
Now look to see if the perimeter heads will spray across the area to the heads on the other side. If they don't, add full-circle heads in the middle. An easy way to locate these heads is to draw perpendicular grid lines from one perimeter head to another. Again, using the compass, draw an arc showing the sprinkler's watering pattern to make sure there's complete coverage.

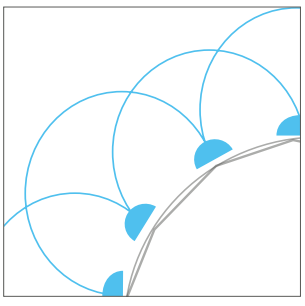




Curved Areas

Convert curved areas to a series of straight lines. Place the sprinklers the same way you would in square or rectangular areas. Adjustable arc nozzles on spray heads work very well in curved areas.





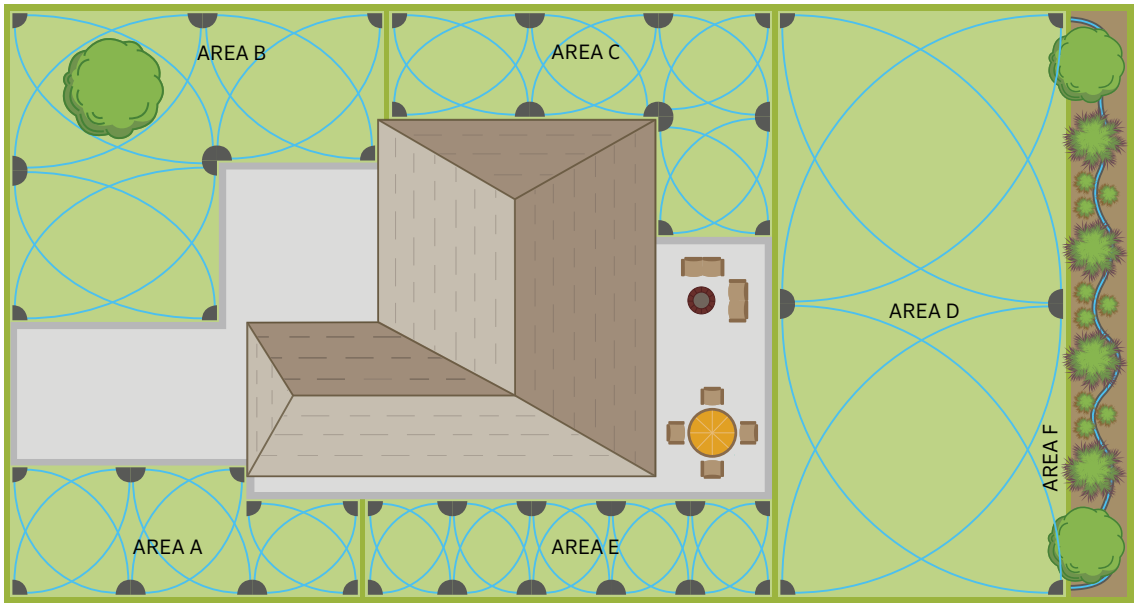
CHECK WITH LOCAL AGENCIES

- To find out if a permit is required before installing a sprinkler system
- To determine where gas, telephone, and/or other utility lines are buried
- To find out which type of backflow preventer is required in your area

SPRINKLER ZONES

Divide Sprinklers into Zones

Unless you have a very small yard, you probably do not have enough water capacity to irrigate the entire yard at once. Many areas will require more water than the residence has available (system design capacity). Consider the dividing lines based on sun exposure and plant type/watering needs to control the amount of water applied in each area or hydrozone.

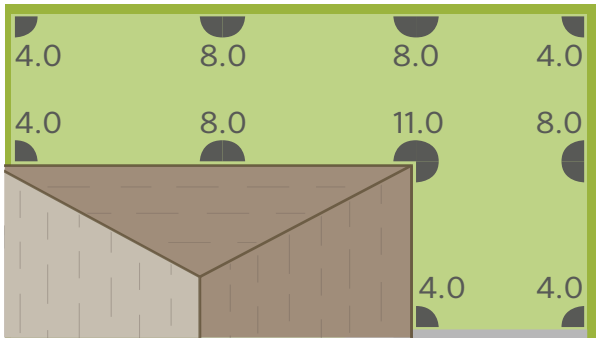


Indicate Zones

You will need to section the yard into "zones". Dividing the area into zones is an easy process. Beginning with Area A:

1. Refer back to the working pressure entered on page 4. This is the pressure you will need to use when determining sprinkler spacing and l/min requirements listed in the Sprinkler Performance Charts.
2. Write the individual sprinkler's l/min next to each sprinkler head in the area. Use the Sprinkler Performance Charts in the Hunter Product Catalogue.
3. Add up all of those numbers and divide the sum by the total l/min (system design capacity) available.
4. If the total number of zones is not a whole number, round the number up to establish how many zones there will be (1.2 zones becomes 2 zones). This is the total number of valves needed for the sprinklers in that area or hydrozone.
5. Now that you know how many zones the area will have, divide up the sprinklers so that each zone in the area will have approximately the same l/min. Do not place too many heads on the same zone; stay within the system's design capacity.
6. Draw and label the zone valves for this area (i.e., Zone 1, Zone 2, etc. — as seen on page 10).
7. Draw the sprinkler head locations and divide the sprinklers into zones for all areas.

	÷		=	
Total l/min of all heads in one area		Design capacity in l/min (from page 5)		Number of zones in this area



Area C = 68.7 l/min PGJ mid-range rotors

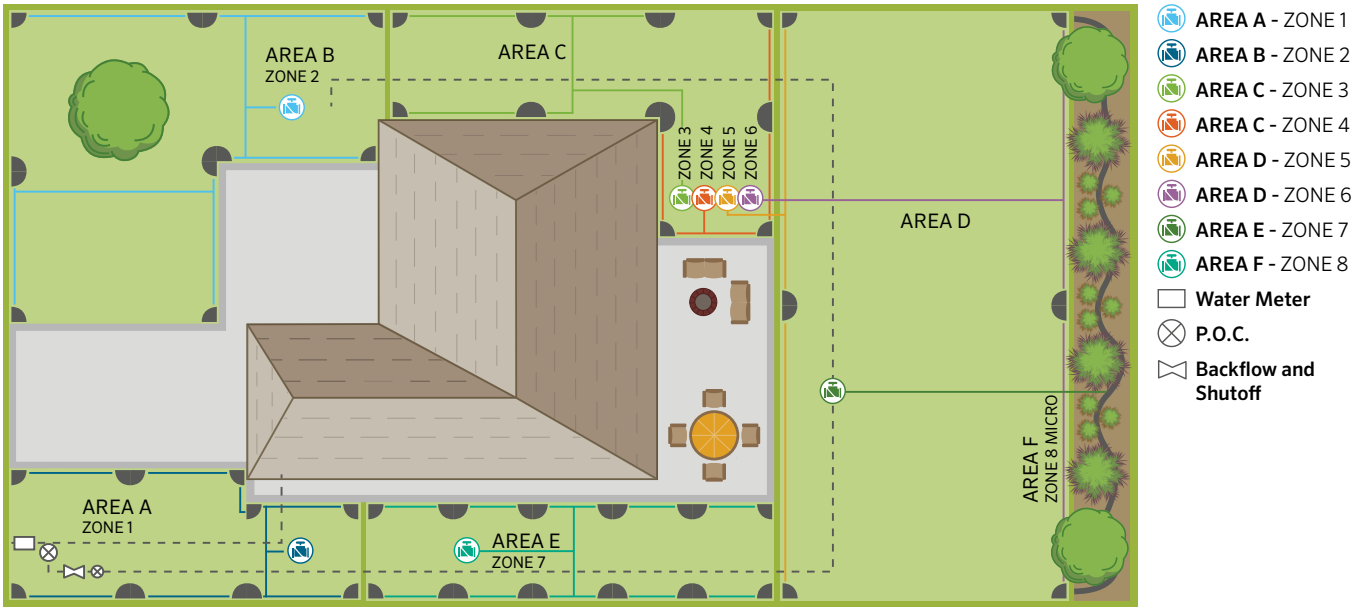
AREA CAPACITY EXAMPLE

Area	Area l/min	÷	Design Capacity	=	Round up for Number of Zones
A	32	÷	49	=	1
B	51	÷	49	=	1
C	69	÷	49	=	2
D	62	÷	49	=	2
E	39	÷	49	=	1

VALVES AND PIPES

Locate Valves – Lay Out and Size Pipes

Every zone on the plot plan must have its own valve. The valve controls the on/off flow of water to a sprinkler zone. Indicate one control valve for each zone and then group the valves together in an assembly called a valve manifold. Determine where you want the valve manifold for each area. You may want one manifold in the front yard and one in the backyard, or you may want to place them in multiple locations — the placement is entirely up to you. We recommend placing the manifold in an accessible spot for easy maintenance. Place the manifold close to the area the valves will serve, but where you will not be sprayed when activating the system manually.



Lateral Line

The two most common types of pipe used in sprinkler systems are polyvinyl chloride (PVC) and polyethylene (poly). Check with your local Hunter dealer to find out which type of pipe is used in your area.

1. Draw a line connecting all of the sprinkler heads in each separate zone. Follow the example in the illustration on this page and draw the most direct route with the fewest turns or changes of direction as possible.
2. Draw a line from the sprinkler line to the zone valve. This should be the most direct line possible.
3. Begin sizing the pipe. Start at the head farthest from the zone valve. The pipe connecting the last head to the second-to-last head should be 20 mm.
4. Add the l/min requirements of those two heads together to size the next pipe.
5. Add the l/min requirements of the next head to the previous total.
6. Continue to do this until you get to the zone valve.
7. Repeat Steps 1 through 6 for each zone.

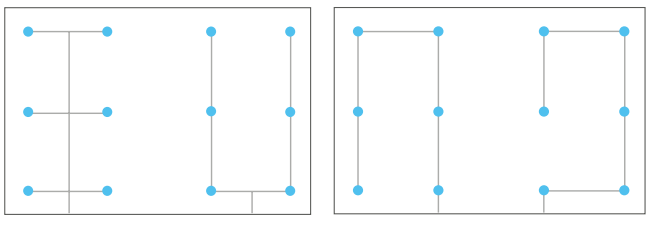
PIPE SIZING CHART

Maximum Flow Rates for Sprinkler Lines

Pipe Sizes	PVC Thick Wall	PVC Thin Wall	Polyethylene Pipe
20 mm	34 l/min	38 l/min	30 l/min
25 mm	57 l/min	60 l/min	50 l/min
32 mm	91 l/min	99 l/min	83 l/min

See pipe-sizing illustration on page 21

Connecting Sprinklers with PVC or Poly Pipe



RIGHT WRONG

POINT OF CONNECTION

Main Line

1. Determine the location for the system's point of connection (P.O.C.). It should be between the water meter and any pressure regulator on the structure.
2. Draw a line connecting all the manifolds together, and then draw a line connecting this line to the P.O.C.
3. The main line should generally be one pipe size larger than the largest lateral line.

Point of Connection

Non-Freezing Climates

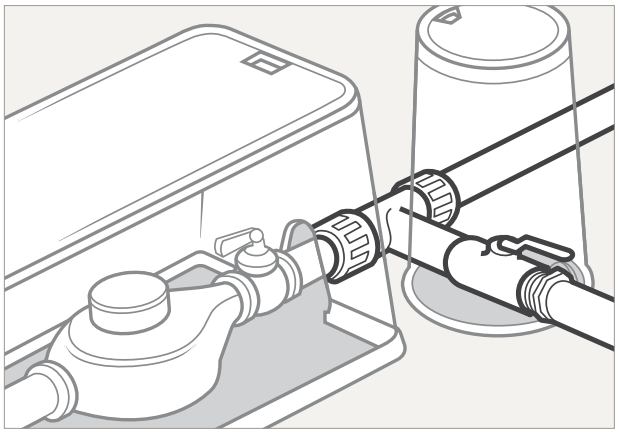
Use a brass compression tee to hook up your sprinkler system to the household water supply line. You may hook up to copper, PVC, or galvanised iron service lines without having to solder or thread any pipe. Most areas require some type of backflow preventer to protect drinking water. Copper pipe may be required between the P.O.C. and the backflow preventer. Always check the local building code or with the local permitting agency for the requirements in your area.

Freezing Climates

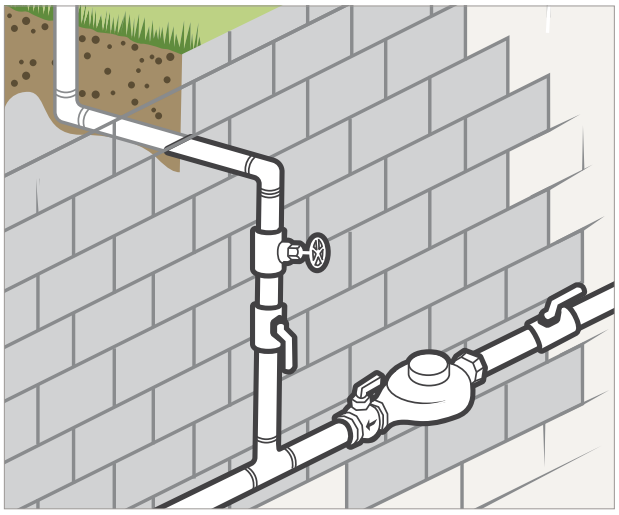
If the installation is in a freezing climate and the P.O.C. is in the basement, install a boiler drain immediately after the gate valve/ball valve to drain the water in the pipe between the P.O.C. and the backflow preventer in the winter. Install a tee with a riser and a threaded cap after the backflow preventer. This will be used when blowing out the system before the first deep freeze of winter.

Review Design

The design process is now complete. Check to make sure you have placed sprinklers in all areas. Also, review the pipe layout to be sure you have sized the pipe correctly. You are now ready to begin installing the system.



P.O.C. Non-Freezing Climate: Use a brass compression tee to connect your sprinkler system to the household water supply.

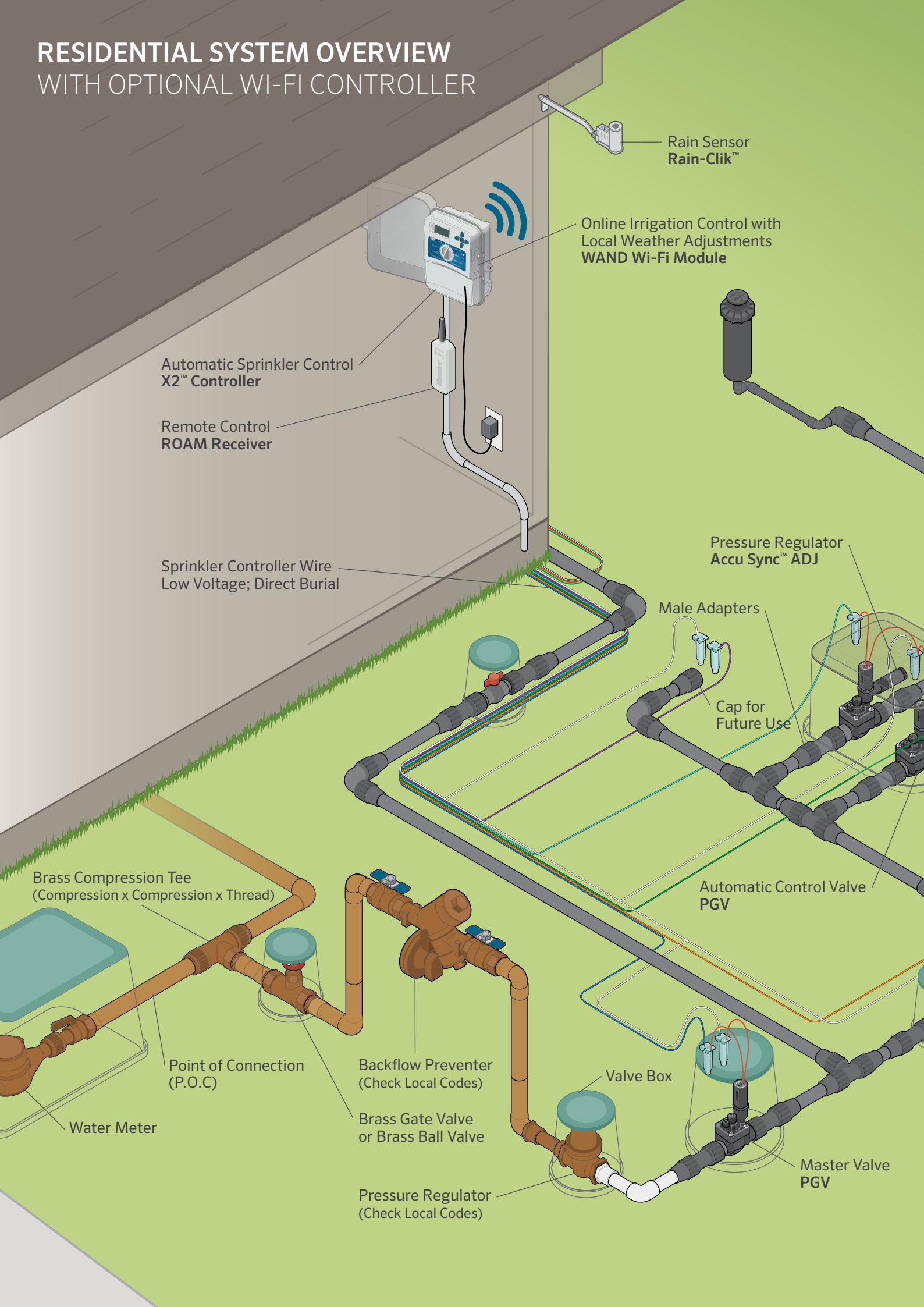


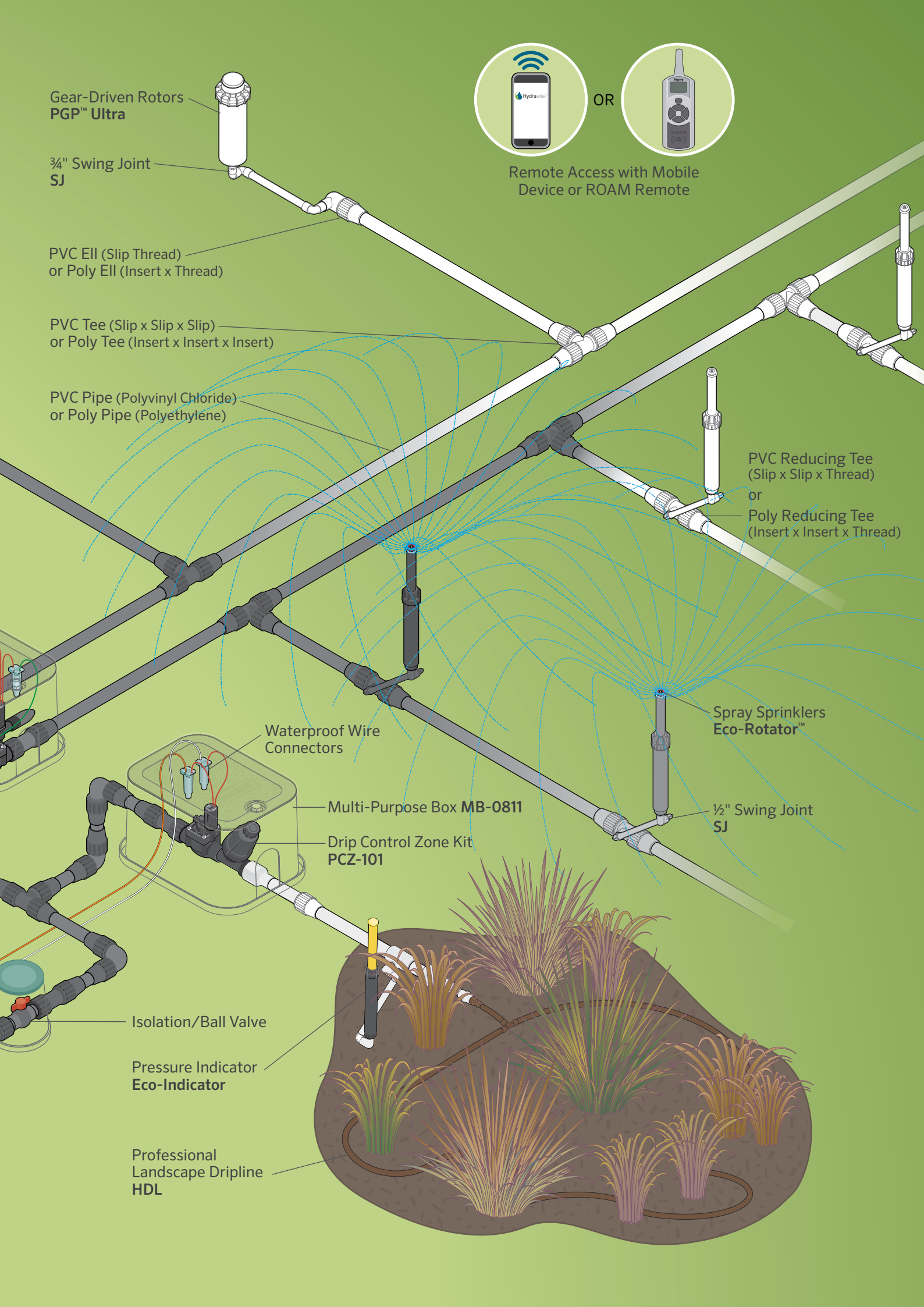
P.O.C. Freezing Climate: If the P.O.C. is in the basement, install a boiler drain immediately after the gate valve to drain the system before the first big freeze.

CHECK LOCAL ORDINANCES

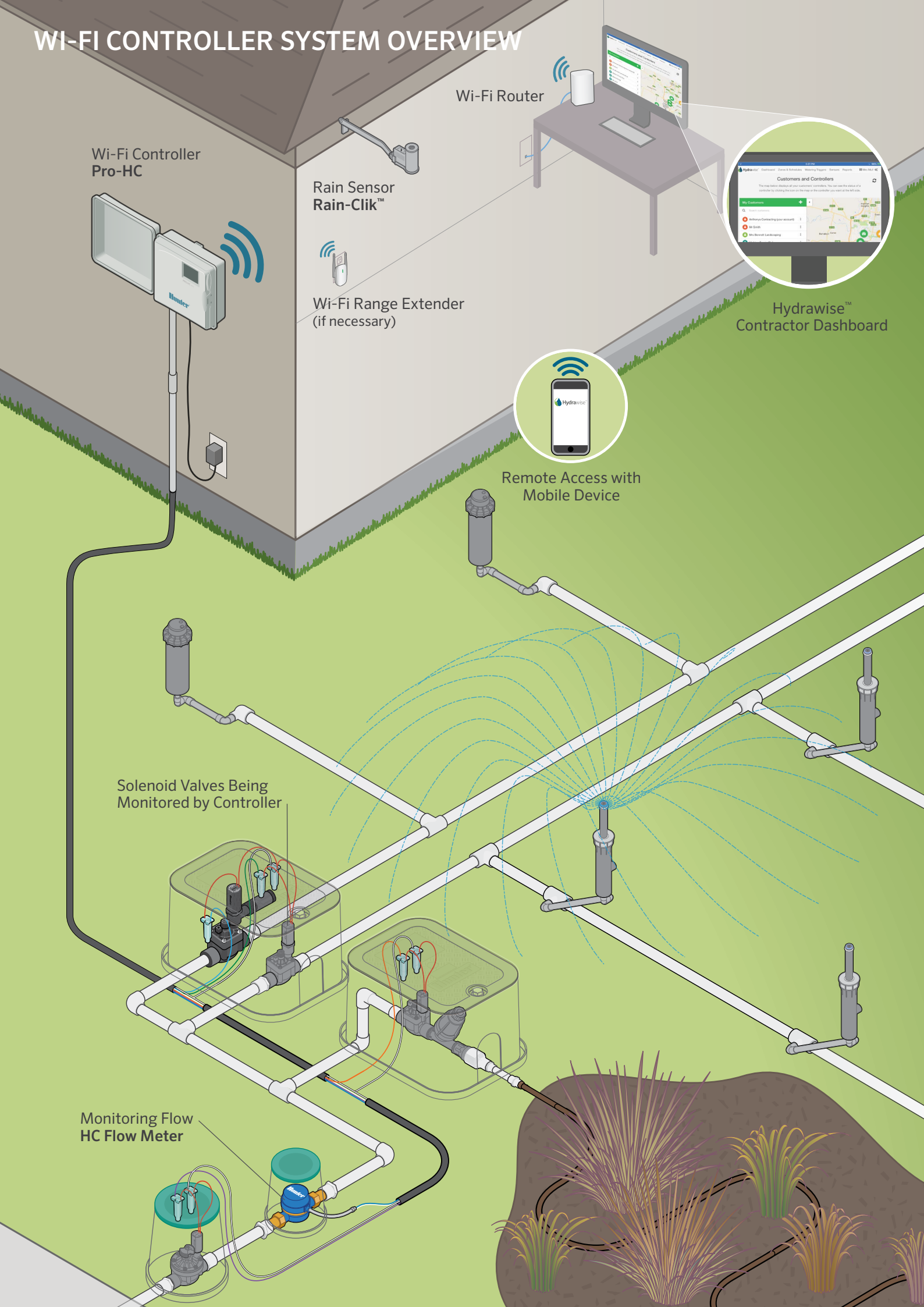
Most professional installers recommend PVC pipe for the constant pressure line from the backflow preventer to the zone control valves. However, some communities require copper. Check local ordinances before laying out your system.

RESIDENTIAL SYSTEM OVERVIEW
WITH OPTIONAL WI-FI CONTROLLER




Gear-Driven Rotors
PGP™ Ultra
¾" Swing Joint
SJ
PVC Ell (Slip Thread)
or Poly Ell (Insert x Thread)
PVC Tee (Slip x Slip x Slip)
or Poly Tee (Insert x Insert x Insert)
PVC Pipe (Polyvinyl Chloride)
or Poly Pipe (Polyethylene)
OR
Remote Access with Mobile
Device or ROAM Remote
PVC Reducing Tee
(Slip x Slip x Thread)
or
Poly Reducing Tee
(Insert x Insert x Thread)
Spray Sprinklers
Eco-Rotator™
½" Swing Joint
SJ
Waterproof Wire
Connectors
Multi-Purpose Box MB-0811
Drip Control Zone Kit
PCZ-101
Isolation/Ball Valve
Pressure Indicator
Eco-Indicator
Professional
Landscape Dripline
HDL

WI-FI CONTROLLER SYSTEM OVERVIEW



SYSTEM INSTALLATION

Making the Point of Connection

1. Refer to the Point of Connection (P.O.C.) detail on the Residential System Overview. *See pages 12 and 13.*
2. Turn off the water supply to the residence.
3. Dig a hole to expose the supply line.
4. Cut an appropriate piece out of the supply line, slip the compression tee onto the pipe, and tighten the compression nuts.
5. Install the brass nipple and shutoff valve.
6. Install the valve box for easy access to the shutoff valve.
7. Turn the water back on to the residence.

Installing the Main Line

1. Using marking spray paint and small flags, indicate the pipe lines from the P.O.C. to the valve manifold locations. Mark the layout of the irrigation system *(Figure 1)*.
2. On existing lawns, lay down a plastic tarp alongside the marked trench about 60 cm away from where the pipe will be placed.
3. Remove the sod by cutting a strip about 30 cm wide and 4 cm to 5 cm deep using a flat shovel. Roll up the sod and place the sod and dirt on the plastic tarp.
4. Trenching: Check local codes. If there are no established local codes for sprinkler main line depth in your area, trench 25 cm to 30 cm deep. Trench 15 to 20 cm for lateral lines. Trenching can be done by hand or with a trencher. Trenchers are available at most equipment rental yards *(Figure 2)*.
5. Installing pipe under a walkway or driveway: Jetting method: Using a pipe-to-hose threaded adapter, connect one end of the pipe to a garden hose and attach a small stream-hose nozzle to the other end. Turn the water on and jet under the concrete *(Figure 3)*.
6. Install the backflow preventer according to local codes.
7. Installing pipe: Lay out pipe and fittings near the trenches according to how they will be installed. Be careful not to get dirt or debris in the pipe.
8. Beginning with the P.O.C. (or backflow preventer if applicable), measure, cut, and install the pipe, working your way to the last manifold or stub-out. *See Residential System Overview on pages 12 and 13.*

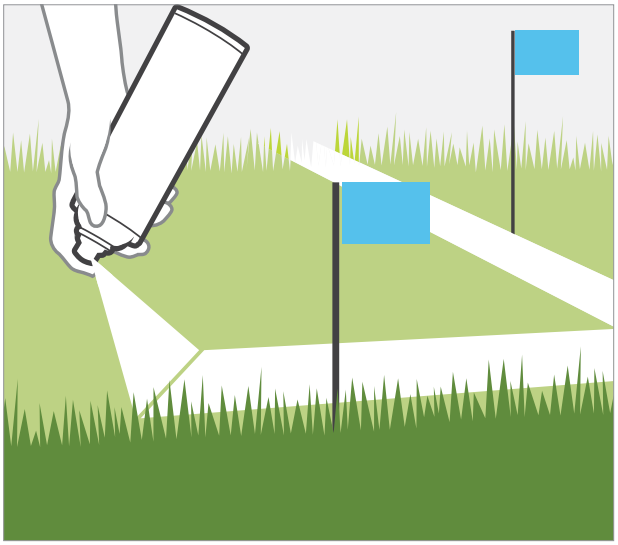


Figure 1

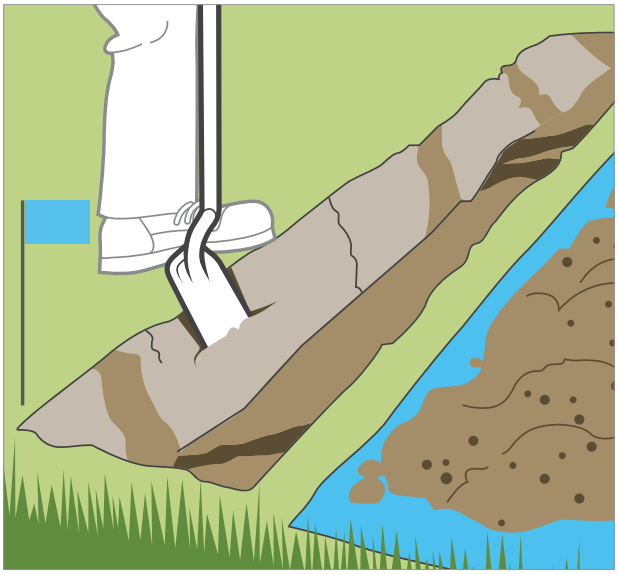


Figure 2

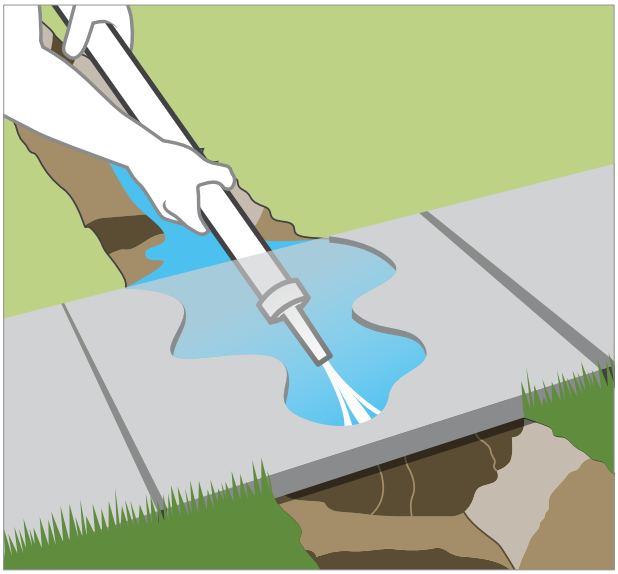


Figure 3

SYSTEM INSTALLATION

Installing the Valve Manifolds

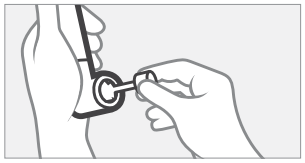
1. Refer to the valve manifold detail on the Residential System Overview.
2. Maintain at least a 15 cm clearance between valves for future maintenance.
3. Provide an 8 cm long or longer capped stub-out for future additions.
4. Install the valve manifolds onto the main line.

Installing the Lateral Lines

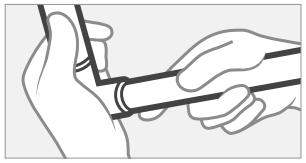
If you can only devote a day or two at a time to installing this system, and the installation is in an area that is currently landscaped, lay out all zones and install one zone at a time using the following steps:

1. Lay out the system: Using the plot plan and small sprinkler flags, mark the location of the sprinklers and their zone valve. Make adjustments as necessary for complete head-to-head coverage. If it appears that you will need to revise the plan (add a head), recheck the l/min numbers to make sure you are within the system's design capacity. *See page 5.*
2. Using marking spray paint, mark the locations for the lateral lines.
3. Trenching: Check local codes. If there are no established codes for sprinkler lateral line depth in your area, dig the trenches 15 cm to 20 cm deep. If you are installing poly pipe, you may want to use a pipe puller, which may be available at your local rental yard.
4. Installing pipe: Lay out pipe and fittings at the side of the trenches according to how they will be installed. Be careful not to get dirt and debris inside the pipe.

Assembling PVC:

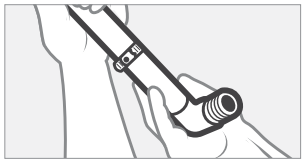


1. Place solvent on inside of fitting and outside of pipe.

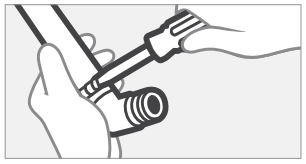


2. Slip pipe into fitting and wipe off excess solvent.

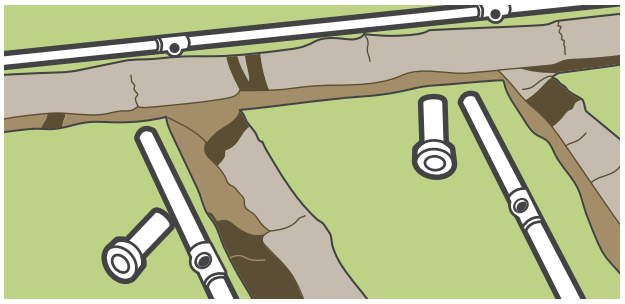
Assembling Poly Pipe:



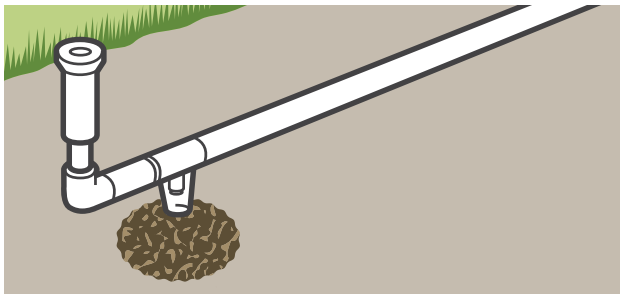
1. Place clamp over pipe, then insert barb fitting.



2. Tighten clamp around pipe and fitting.



Lay out the pipes and sprinklers near the trenches where they will be installed.



Automatic drain valve installation for freezing climates: Locate the drain valves at the low points in each zone.

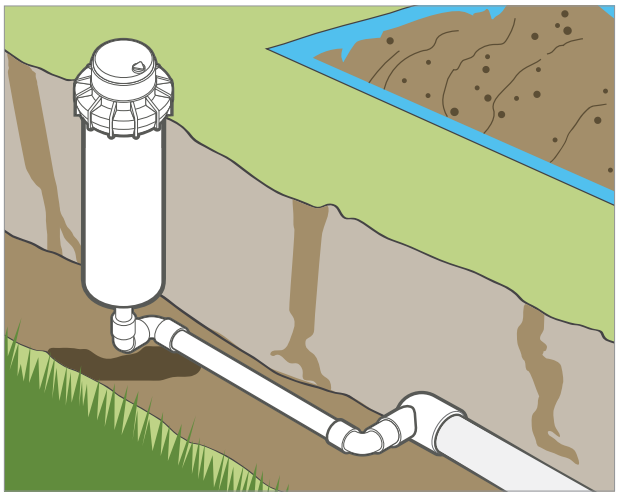
PREVENT CLOGS IN YOUR SYSTEM

Use pipe cutters to cut your PVC sprinkler pipe. Any plastic burrs left behind when using a hacksaw can clog up your sprinkler heads. When using pipe cutters, turn the PVC pipe 3 to 6 mm while applying pressure with the cutters. This reduces the risk of breaking the PVC.

SYSTEM INSTALLATION

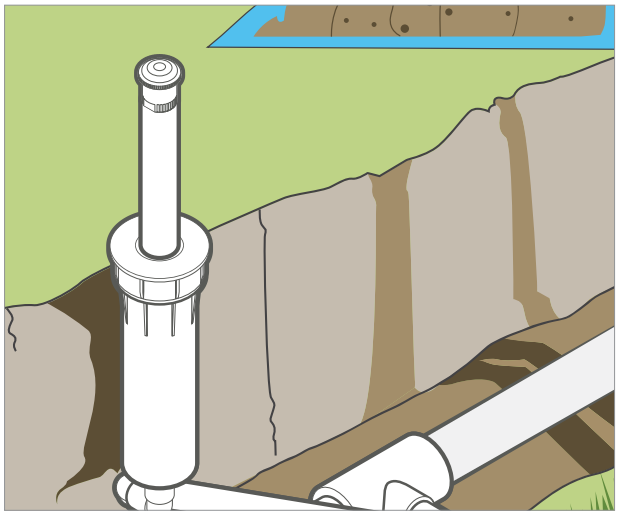
Installing Sprinkler Heads

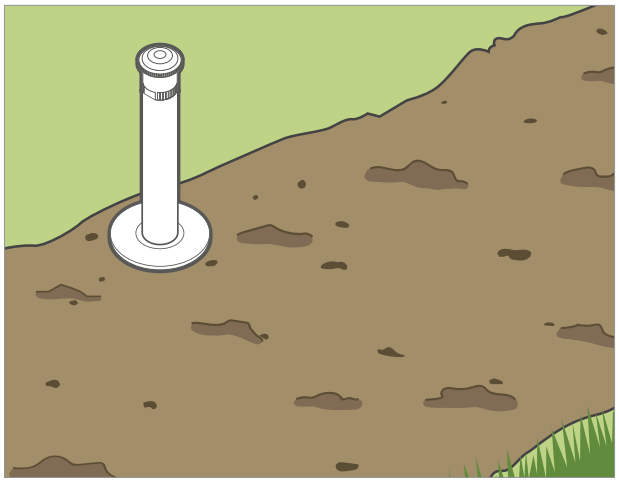
1. Install all the heads except for the last head on a run. Leave the last one(s) off for proper flushing.
2. Flushing the system: Turn on the zone manually at the valve. Allow the water to flush out any dirt that may have entered the system. Flush the system even if you are sure nothing got in during installation. When you are certain that the water is clean, turn the zone valve off and install the remaining heads.
3. Checking for proper coverage: Turn the zone on at the controller. By activating the controller, you are making sure that the wire and wire connectors are operating properly. Adjust the sprinklers and check for coverage.



Backfilling

1. Do not directly bury the valves. Install a valve box for easy access to the valves. Wait until you are backfilling the trench to set the valve box.
2. Once you have the heads in the desired locations, it's time to set the head for backfilling. Start by setting the top of the sprinkler level with grade, making sure the head is straight up and down. Some installers will use a bullseye bubble level to ensure that the head is standing straight. Once you have the head in the proper setting, backfill and compact dirt around the base of the head so that the sprinkler stays put during the trench backfill process.
3. Make sure there are no rocks directly next to the pipe. Backfill one-third to one-half of the depth of the trench at a time, compacting the dirt as you go. Make sure to allow space for the extra dirt on the sod when setting the sprinkler heads and valve boxes.





BUILD FOR EXPANSION

When deciding how many sprinkler wires you need, add at least two extra wires for each valve manifold for future expansion. It is much easier to install them now than later after the landscape has grown in.

SYSTEM INSTALLATION

Installing the Controller

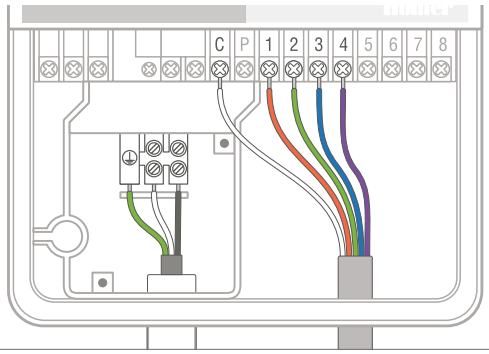
1. Decide where you would like to install the controller. Some residential controllers should be installed indoors (e.g., the garage). Follow the installation instructions that come with the controller. You will need a 220 to 240 V or 115 V electrical outlet to plug in the low-voltage transformer.
2. Use colour-coded irrigation wire to connect the valves to the controller. The total number of wires you'll need is one for each of the valves, plus one common wire. If you are wiring a 5-zone system, purchase a combination of wires with at least six total wires long enough to reach from your controller to the farthest valve.
3. Installing Wire: Lay the wire in the trench from the controller to the valve manifolds. It is best to protect the wire from future digging by installing it directly beneath the pipe where possible. Leave an expansion loop of wire at each change of direction. The loop will ensure that the wires will not be installed too tightly and will reduce the possibility of stretching.
4. Connect the wires to the valves with waterproof connectors *(Figure 1)*. You will need one wire for each valve, plus one common wire that will be connected to one of the wires on all of the valves.

Wi-Fi Considerations

1. Place the controller in range of your Wi-Fi network. If the Wi-Fi signal is low, consider moving the controller and the wireless router closer to each other. There is also an option for a Wi-Fi network extender to improve the signal if needed.
2. Be sure that the security type matches the wireless router network settings. The router must support 802.11 b/g/n wireless networks.

Please refer to the quick start guide included with your Wi-Fi controller for detailed installation instructions, or visit the support page at **support.hydrawise.com** for more information.

See Wi-Fi Controller System Overview on page 14.



Use colour-coded irrigation wire to connect the valves to the controller. You will need one wire for each valve, plus one common wire.

The Hunter ROAM Remote Control Kit saves time during installation and routine system maintenance. The receiver (right) plugs into the controller SmartPort™, and the transmitter (left) activates the sprinklers within a 300 m range. The user can manually run any zone without resetting the controller. Compatible with X-Core™, X2, Pro-C™, ICC2, HCC, and HPC Controllers.

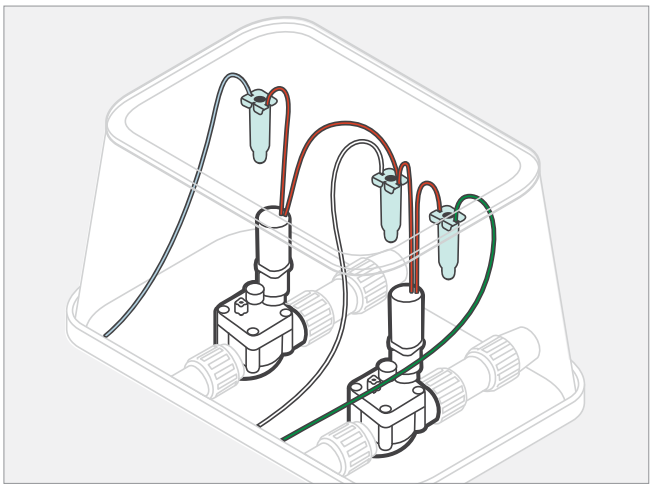


Figure 1

SYSTEM INSTALLATION

Installing Sensors

Rain and freeze sensors simply stop or prevent irrigation in the event of rainfall or freeze conditions. ET sensors calculate the amount of water needed by the plant material and adjust run times automatically based on current weather conditions.

Mounting Suggestions

1. Rain sensors should be installed where they can receive direct rainfall, such as on the edge of a roof, a rain gutter, or on a fence post. Make sure they are not located under trees or other plant material and are not getting wet within the sprinkler spray pattern.
2. Freeze sensors will stop or prevent irrigation at or below 3°C. The sensor will reactivate the system when temperatures are between 3 to 7°C.
3. Weather-based ET sensors should receive as many hours of direct sunlight during the day and throughout the year as possible.

Communication Options

1. Wired communication: Sensors are attached to the controller sensor inputs directly with two wires from the sensor. Care should be taken to carefully install and attach the wire path without damaging the wire.
2. Wireless communication: Sensors have a battery-operated transmitter within the sensor that sends data to the receiver attached to the controller. Wireless communication affords more options for mounting the sensor, but ensure you have reception from the proposed mounting location. Also, be aware of high-voltage sources of interference that may cause difficulty in reception. Ensure you test the sensor/transmitter at the mounting location for proper reception to the receiver to avoid connectivity difficulties in the future.
3. Flow meter communication: Flow meters are attached to the controller sensor inputs directly with two wires (Shielded Cable) from the sensor. Flow meters are installed between the water supply and the master valve. To avoid false alerts, there should be no water taps or other uncontrolled water use on the downstream side of the flow meter. Where all the solenoids connected to the controller are not grouped together, it may be necessary to install more than one flow meter. Where the flow meter is installed, do not have 90° bends within approximately 30 cm of either side of the flow meter.

Rain-Clik™
Shuts down irrigation during a rain or freeze event

Mini-Clik™
Shuts down irrigation at desired rainfall amount

Soil-Clik™
Responds as a shutoff device when the user-selected soil moisture threshold is surpassed

HC Flow Meter
Monitor your water use and the state of your piping system with the optional flow meter. Receive automatic alerts when a pipe is broken or a leak has occurred before it becomes a problem.

Wireless Mini-Clik™
Shuts off irrigation automatically after detecting rainfall from 3 mm to 19 mm to prevent water waste

MATERIALS LIST

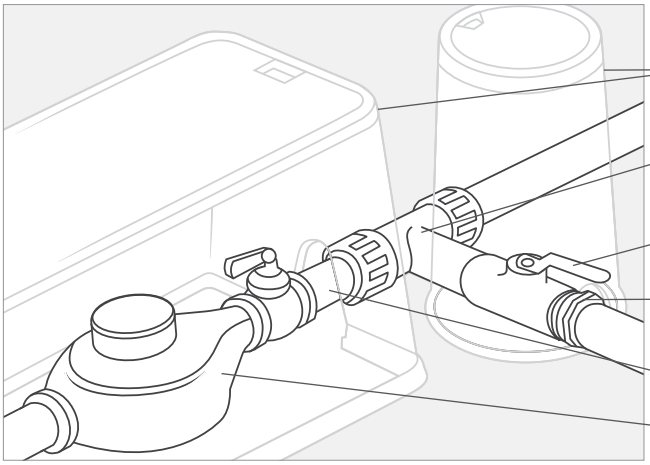
Point of Connection

Using your plot plan and the checklists below, do a take-off to determine your Materials List. If you are unsure what a part is called, check the Residential System Overview. Use coloured pencils and, as you count or measure each component, mark the plan and write the item down here on this Materials List. Make sure to list everything on your plan.

POINT OF CONNECTION	
List all the items needed for the system's point of connection.	
Brass Compression Tee (compression x compression x thread)	
Brass Gate Valve or Brass Ball Valve	
Valve Box	

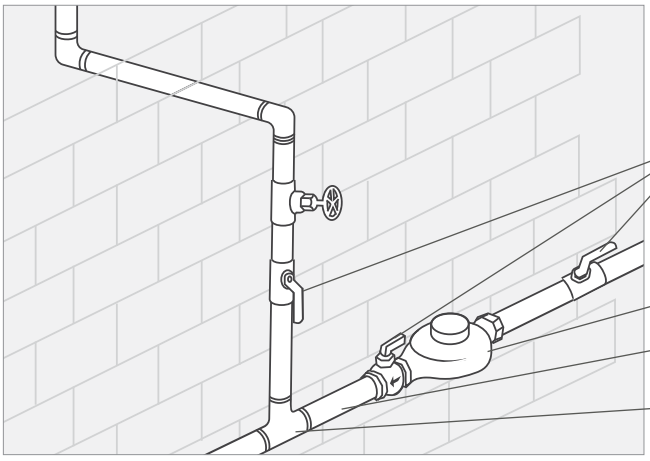
IMPORTANT

Reach out to your local government agency for backflow prevention regulations and installation requirements.



Exterior Point of Connection: Non-Freezing Climates

- Valve box square **or** round
- Brass compression tee (compression x compression x thread)
- Brass gate valve **or** brass ball valve
- Male adapter
- Point of connection (P.O.C.)
- Water meter



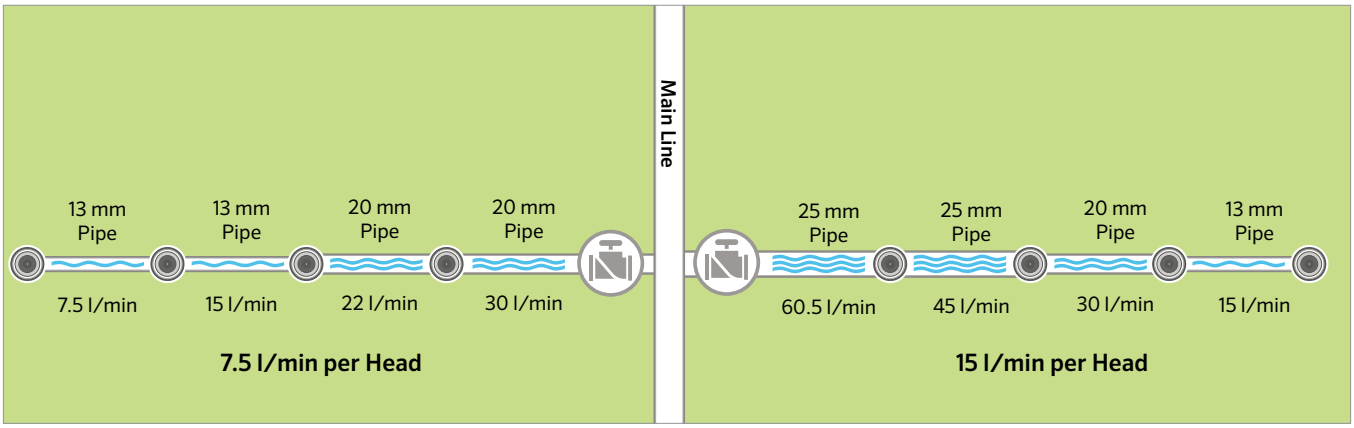
Interior Point of Connection: Freezing Climates

- Brass gate valve **or** brass ball valve
- Water meter
- Point of connection (P.O.C.)
- Brass compression tee (compression x compression x thread)

MATERIALS LIST

Pipes

Measure and list the pipe by size. Be sure to add a little additional pipe for waste. Count and list the number of main line and lateral line fittings by size and type.



FITTINGS (Calculate the length of pipe and number of fittings required)

PVC (slip x slip x slip)		20 mm	25 mm	32 mm	Poly (compression or barbed insert fittings)	
TEE	S x S x S				i x i x i	TEE
	S x S x ½" (13 mm) T				i x i x ½" (13 mm) T	
	S x S x ¾" (20 mm) T				i x i x ¾" (20 mm) T	
ELBOW	90° x S x S				90° x i x i	ELBOW
	90° S x ¾" (20 mm) T				90° i x ¾" (20 mm) T	
	90° S x 1" (25 mm) T				90° i x 1" (25 mm) T	
	45° x S x S				45° x i x i	
REDUCER BUSHING	25 mm S x ¾" (20 mm) S				1" (25 mm) i x ¾" (20 mm) i	REDUCER COUPLING
	32 mm S x 1" (25 mm) S				1¼" (32 mm) i x 1" (25 mm) i	
REDUCING TEE	S x S x S				i x i x i	REDUCING TEE
MALE ADAPTERS	S x T				i x T	MALE ADAPTERS
COUPLING	S x S				i x i	COUPLING

S = Slip Fitting T = Threaded Fitting i = Compression or Insert Connection

WATCH OUT FOR HAIRLINE CRACKS

Never drop a PVC pipe. If it is dropped and hits a rock or concrete, the pipe could shatter and send tiny sharp pieces flying. Even if the pipe does not break, it could get a hairline crack and later burst under normal water pressure. This can also happen if the pipes are allowed to slap together while being carried.

MATERIALS LIST

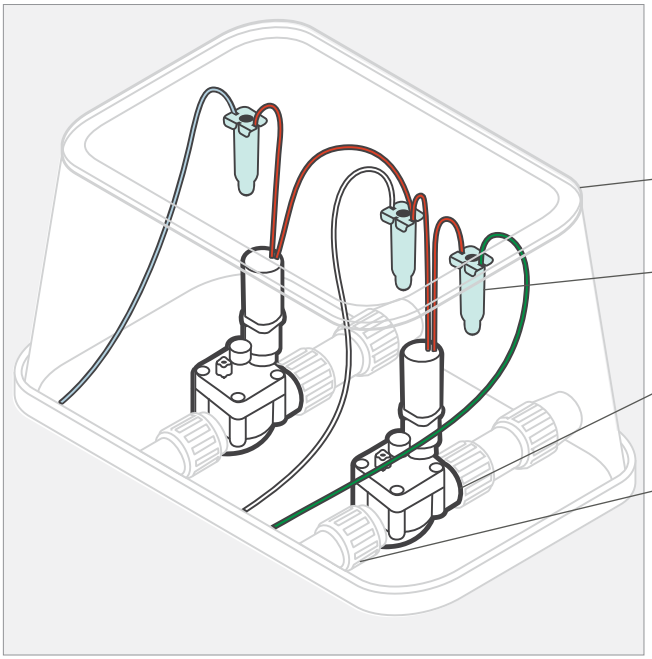
Control Valves

Count the number of valves by size. Using the valve detail, list the materials needed.

Accessories

Waterproof wire connectors ensure a safe and durable connection of electrical equipment.

AUTOMATIC CONTROL VALVES		
List all the items needed to build the valve manifolds.		
	Size	Quantity
Valve Box		
Waterproof Wire Connectors		
PGV Valves	1" (25 mm)	
Male Adapters		



MATERIALS LIST

Controller

The number of valves will determine the size of the controller required. You will need one controller station for each valve. Measure the wire run from the controller to the farthest valve.

Note: Use colour-coded, multi-conductor, low-voltage wire. You will need one wire for each valve, plus one common wire that will be connected to all of the valves. An automatic controller stores information on what days to water, what time to start watering, and how long each zone will run.

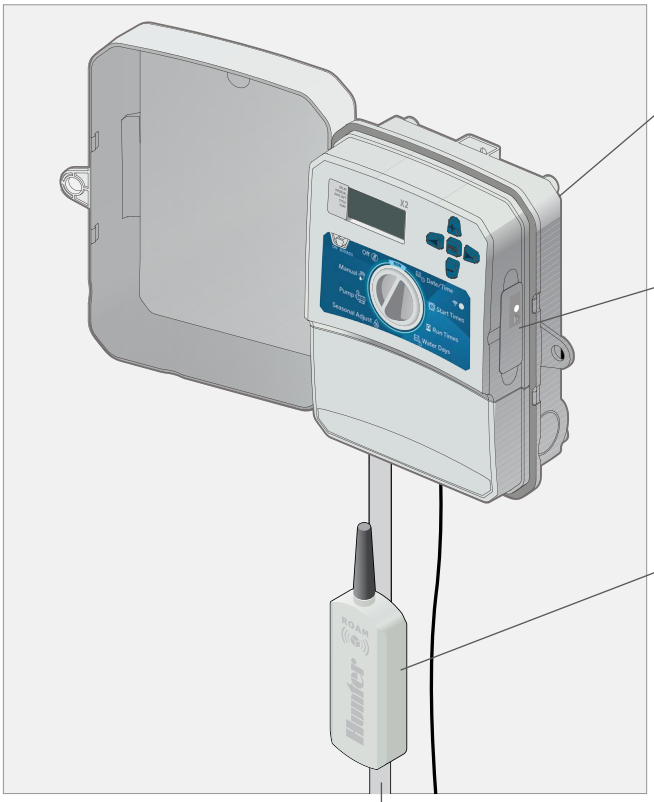
Example:
On your plot plan, if you need 20 cm of wire and your scale is 1:100 (1 cm = 1 m), then you will need 200 m of wire (20 x 100 = 2000). Don't forget to add a little extra wire at the valve to make it easier to work on the wire connectors and ensure that you have enough wire to go up the wall to connect to the controller.

Sensors

Select the sensor that best suits your needs based on your site conditions.

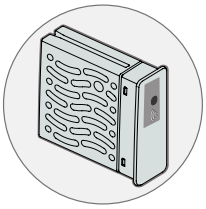
CONTROLLER	
X2 or Pro-HC	_____ Stations
ROAM Remote Control (X2 only)	
1 mm² dia. (18 AWG) Direct-Burial Wire with Number of Strands _____	_____ Meters

SENSORS	
Select the weather sensor that best suits your needs based on your site conditions.	
Mini-Clik™ Rain Sensor	
Rain-Clik™ Rain Sensor	
Soil-Clik™ Soil Sensor	
HC Flow Meter (Pro-HC only)	
Wireless Mini-Clik™	

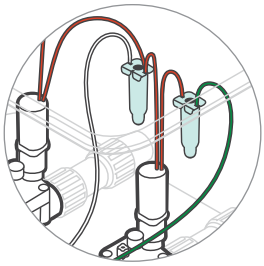


X2
Automatic sprinkler controller

WAND
Enables smart irrigation management with Hydrawise Software for remote access and programming



ROAM
Remote control



Low-voltage sprinkler controller wire and PVC conduit for low-voltage wire (optional)

MATERIALS LIST

SPRINKLERS: GEAR-DRIVEN ROTORS

Count all of the sprinklers on your plan and list here:

POP-UP, LAWN	Quantity
PGJ ½" (13 mm) inlet	
PGP™ ¾" (20 mm) inlet	
I-20 ¾" (20 mm) inlet	
SHRUB: RISER-MOUNTED OR HIGH POP-UP	
PGJ ½" (13 mm) inlet	
PGP ¾" (20 mm) inlet	
I-20 ¾" (20 mm) inlet	

SPRAY SPRINKLERS WITH ADJUSTABLE ARC NOZZLES

POP-UP, LAWN	Quantity
Pro-Spray™/PRS30/PRS40 ½" (13 mm) inlet	
PS Ultra ½" (13 mm) inlet	
SHRUB: RISER-MOUNTED OR HIGH POP-UP	
Pro-Spray ½" (13 mm) inlet	
Eco-Rotator ½" (13 mm) inlet	

HUNTER SWING JOINTS, PREASSEMBLED

SJ SERIES	Quantity
SJ-506 ½" (13 mm) x 15 cm	
SJ-512 ½" (13 mm) x 30 cm	
SJ-7506 ½" (13 mm) x ¾" (20 mm) x 15 cm	
SJ-7512 ½" (13 mm) x ¾" (20 mm) x 30 cm	
SJ-712 ¾" (20 mm) x 30 cm	

SWING JOINT ASSEMBLIES

Count the number of sprinklers required, then determine the quantity of parts needed:

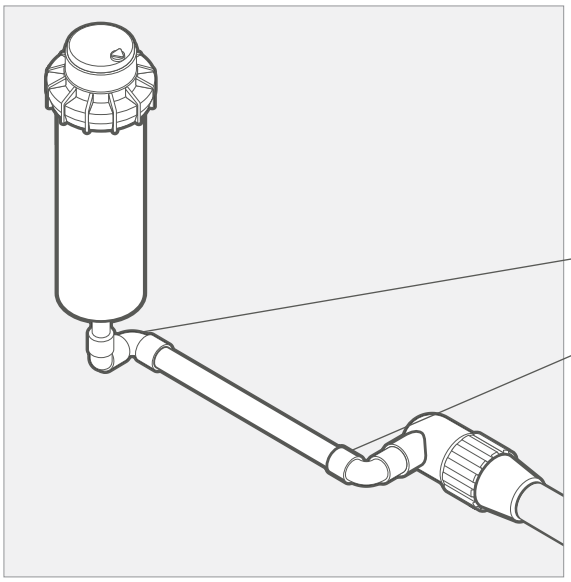
	½" (13 mm) Inlet Sprinkler	Total
½" (13 mm) Marlex Street Ell	x 3	=
½" (13 mm) x 20 cm schedule 80 nipple for Pop-Up	x 1	=
½" (13 mm) x 36 cm (or ___") nipple for Shrub	x 1	=
	¾" (20 mm) Inlet Sprinkler	Total
¾" (20 mm) Marlex Street Ell	x 3	=
¾" (20 mm) x 20 cm schedule 80 nipple for Pop-Up	x 1	=
¾" (20 mm) x 36 cm (or ___") nipple for Shrub	x 1	=

NOZZLES

Select the type of nozzles and the quantity needed:

	Quantity
MP Rotator™	
MP Rotator 800	
Pro Adjustable	
Pro Fixed	
Specialty	
Bubblers	

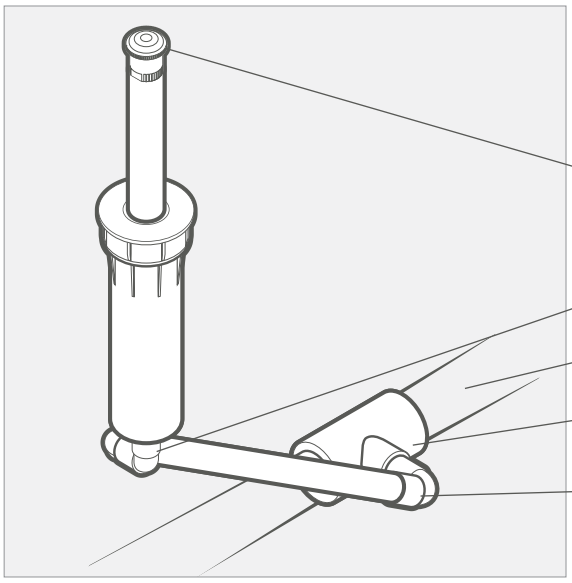
MATERIALS LIST



PGP™ Ultra

Use preassembled Hunter SJ Swing Joints or assemble these components.

- (2) 20 mm street ells (thread x thread)
- 20 mm nipple



Pro-Spray™

Use preassembled Hunter SJ Swing Joints or assemble these components.

- **Nozzles**
  Pro Adjustable Nozzles
  or MP Rotator™
- 13 mm nipple
- PVC or Poly pipe
- Reducing tee
- (3) 13 mm street ells
  (thread x thread)

WATERING GUIDELINES

Application Rates

Watering application rates should vary with different types of plants, soils, and climates. New lawns must be kept moist, and newly transplanted shrubs must be watered every day or two. Established plants will need deeper, less frequent watering. The following guidelines will get you started.

Watering Guidelines

1. Do not operate more than one valve at a time.
2. Water early in the morning when it is least windy and pressure is the greatest. Early morning watering will also reduce water evaporation. Watering in the early evening is not recommended. A lawn is more likely to get diseases when wet for a long duration, especially overnight during the summer. Watering on a hot summer day may also burn the plants.
3. In most areas, lawns require 40 mm to 50 mm of water per week in the hottest months. Hot and arid areas may require more.
4. Manually activate your system at regular intervals to make sure everything is operating correctly. Check and clean the sprinklers to ensure proper functioning.

Freezing Areas

In freezing climates, it is important to winterise your irrigation system. During freezing climates, turn off the controller, close the main sprinkler shutoff valve, drain all the water from the system, and blow any remaining water out of the system before the first freeze. If you are unfamiliar with the correct procedure for blowing out a sprinkler system, contact your local Hunter dealer for advice or a referral. Consider using a weather-based sensor with freeze shutoff capabilities.

Choosing Rotary Sprinkler Nozzles

When designing an irrigation system, it is important to ensure that the precipitation rate (rate at which water is applied) is even over each zone of coverage. "Matched precipitation" is accomplished by selecting the appropriate nozzles, or zoning together sprinklers with the same precipitation rate. The two criteria to consider are a sprinkler's flow rate and arc of coverage. The illustration (to the right) depicts three different sprinkler heads with matched precipitation rates. In each case, 5 litres per minute (l/min) is applied to each quarter circle and precipitation is therefore matched.

WATERING GUIDELINES

Cool, non-arid climates – Apply 25 mm of water per week.
Hot, arid climates – Apply 50 mm of water per week.

Clay soils, fine particles, absorbs water slowly	Program the controller with shorter run times; increase the number of start time cycles per day; ***decrease*** the number of water days per week.
Loam soils, medium-sized particles, average absorption rate	Program the controller with longer run times and fewer start time cycles per week.
Sandy soils, larger particles, absorbs water quite rapidly	Program the controller with longer run times; decrease the number of cycles per day; ***increase*** the number of water days per week.

SPRINKLER RUN TIME SCHEDULE SPREAD OVER 7 DAYS

Water to Apply Each **Week**	Spray Sprinklers	PGJ Rotors	PGP® Rotors	I-20 Rotors
25 mm	40 min.	130 min.	150 min.	150 min.
50 mm	80 min.	260 min.	300 min.	300 min.

ROTARY SPRINKLER NOZZLES

Arc of Coverage	Pattern	Flow Rate
90°		5 l/min
180°		10 l/min
360°		20 l/min

PARTS ORDERING LIST

NOZZLES	
Select the type of nozzles and the quantity needed:	
	Quantity
MP Rotator™	
MP Rotator 800	
Pro Adjustable	
Pro Fixed	
Specialty	
Bubblers	

POINT OF CONNECTION	
List all the items needed for the system's point of connection.	
Brass Compression Tee (compression x compression x thread)	
Brass Gate Valve or Brass Ball Valve	
Valve Box	

FITTINGS (Calculate the length of pipe and number of fittings required)

PVC (slip x slip x slip)		20 mm	25 mm	32 mm	Poly (compression or barbed insert fittings)	
TEE 	S x S x S				i x i x i	TEE 
	S x S x ½" (13 mm) T				i x i x ½" (13 mm) T	
	S x S x ¾" (20 mm) T				i x i x ¾" (20 mm) T	
ELBOW 	90° x S x S				90° x i x i	ELBOW 
	90° S x ¾" (20 mm) T				90° i x ¾" (20 mm) T	
	90° S x 1" (25 mm) T				90° i x 1" (25 mm) T	
	45° x S x S				45° x i x i	
REDUCER BUSHING 	25 mm S x ¾" (20 mm) S				1" (25 mm) i x ¾" (20 mm) i	REDUCER COUPLING 
	32 mm S x 1" (25 mm) S				1¼" (32 mm) i x 1" (25 mm) i	
REDUCING TEE 	S x S x S				i x i x i	REDUCING TEE 
MALE ADAPTERS 	S x T				i x T	MALE ADAPTERS 
COUPLING 	S x S				i x i	COUPLING 

S = Slip Fitting T = Threaded Fitting i = Compression or Insert Connection

PARTS ORDERING LIST

SPRINKLERS – GEAR-DRIVEN ROTORS	
Count all of the sprinklers on your plan and list here:	
POP-UP, LAWN	Quantity
PGJ ½" (13 mm) inlet	
PGP™ ¾" (20 mm) inlet	
I-20 ¾" (20 mm) inlet	
SHRUB – RISER-MOUNTED OR HIGH POP-UP	
PGJ ½" (13 mm) inlet	
PGP ¾" (20 mm) inlet	
I-20 ¾" (20 mm) inlet	

SPRAY SPRINKLERS WITH ADJUSTABLE ARC NOZZLES	
POP-UP, LAWN	Quantity
Pro-Spray™/PRS30/PRS40 ½" (13 mm) inlet	
PS Ultra ½" (13 mm) inlet	
SHRUB – RISER-MOUNTED OR HIGH POP-UP	
Pro-Spray ½" (13 mm) inlet	
Eco-Rotator ½" (13 mm) inlet	

HUNTER SWING JOINTS, PREASSEMBLED	
SJ SERIES	Quantity
SJ-506 ½" (13 mm) x 15 cm	
SJ-512 ½" (13 mm) x 30 cm	
SJ-7506 ½" (13 mm) x ¾" (20 mm) x 15 cm	
SJ-7512 ½" (13 mm) x ¾" (20 mm) x 30 cm	
SJ-712 ¾" (20 mm) x 30 cm	

SWING JOINT ASSEMBLIES

Transfer the number of sprinklers required from Step 5 to the area provided below, then determine the quantity of parts needed:

	½" (13 mm) Inlet Sprinkler	Total
½" (13 mm) Marlex Street Ell	x 3	=
½" (13 mm) x 20 cm sch 80 nipple for Pop-Up	x 1	=
½" (13 mm) x 36 cm (or ___") nipple for Shrub	x 1	=
	¾" (20 mm) Inlet Sprinkler	Total
¾" (20 mm) Marlex Street Ell	x 3	=
¾" (20 mm) x 20 cm sch 80 nipple for Pop-Up	x 1	=
¾" (20 mm) x 36 cm (or___") nipple for Shrub	x 1	=

AUTOMATIC CONTROL VALVES		
List all the items needed to build the valve manifolds.		
	Size	Quantity
PGV Valve	1" (25 mm)	
Valve Box		
Male Adapters		
Waterproof Wire Connectors		

CONTROLLER	
X2 or Pro-HC	_____ Stations
ROAM Remote Control	
1 mm^2 dia. (18 AWG) Direct-Burial Wire with Number of Strands _____	_____ Meters

SENSORS	
Select the weather sensor that best suits your needs based on your site conditions.	
Mini-Clik™ Rain Sensor	
Rain-Clik™ Rain Sensor	
Soil-Clik™ Soil Sensor	
HC Flow Meter (Pro-HC only)	
Wireless Mini-Clik™	

MICRO IRRIGATION	
	Quantity
Eco-Mat	
Eco-Wrap	
Professional Landscape Dripline (HDL)	
Point-Source Emitters	
Root Zone Watering System	
Micro Sprays	
Eco-Indicator	
Multi-Purpose Box	

GLOSSARY OF TERMS

Arc: The circular pattern a sprinkler will rotate or spray.

Backflow Preventer: A device installed between the P.O.C. and the control valves that prevents the backflow of contaminated water into the drinking water. Check with your Hunter dealer or local permitting agency for the device(s) approved for your area.

Check Valve: A small device often installed in the base of a sprinkler that allows water to flow in one direction only and does not open until a preset pressure is reached. Usually is used to prevent low-head drainage and pooling of water at the bottom of a slope or low areas.

Control Valves: Automatic sprinkler control valves that are activated with a low-voltage output from the controller and are connected to the controller by direct-burial, low-voltage wire. A group of control valves located together is called a manifold.

Controller (Timer): A device that uses low voltage connected via wiring to activate automatic control valves that open and allow water to flow to sprinklers for irrigation. The user sets the individual programs that consist of program start times, stations (zones or valves), run times, and watering days.

Drip Control Zone Kit: A kit that includes a control valve, a filter, and a pressure regulator for drip zones.

Friction Loss: Water flowing through the meter, pipe, valves, and fittings will have considerable drag or friction. When the velocity of water increases, the friction loss increases. When the diameter of the pipe increases, friction loss decreases. Friction loss reduces the available dynamic pressure.

Head-to-Head: This phrase describes the correct placement of spray heads or stream rotors. One sprinkler must be placed so that it will spray another sprinkler (or 50% of the adjusted diameter). This provides complete coverage and prevents dry spots.

MP Rotator: A high-efficiency, low-precipitation-rate, rotating stream spray nozzle that can be used in place of traditional spray nozzles.

P.O.C. (Point of Connection): Sprinkler main line tie-in point. A manual shutoff valve is usually installed at this point to shut off the irrigation in the event of a pipe break or to perform maintenance on the system.

Poly Pipe: Polyethylene pipe is black, flexible pipe popular in areas that are susceptible to long winter freezes. Insert or compressions fittings are used to connect the pipe.

Precipitation Rate: Expressed in mm/hr, the precipitation rate is the rate at which water is applied. Matched precipitation means all of the sprinklers are placing about the same amount of water in a given area. Different types of sprinklers should not be installed in the same zone. Large- and small-area sprinklers may have similar mm/hr, but their coverage and precipitation rates would be very different.

Pressure: Measured with a pressure gauge and expressed in bar or kPa. Static pressure is the pressure when no water is flowing through a closed system. Dynamic pressure is when the system is open and water is flowing though the pipes.

PVC Pipe: The most common type of pipe in areas with warmer climates. Generally white in colour, PVC (polyvinyl chloride) pipe is more rigid than poly pipe and uses PVC solvents to glue the pipe together.

Radius: Distance that the water sprays from the sprinkler.

Rotors: Gear-driven sprinklers that deliver a solid stream of water and rotate slowly in a circular pattern, from 5.2 m to 23 m or more. Rotors fit into the “large-area sprinklers” category.

Sensor: Weather-activated shutoff device.

Shutoff Valves: Valves used to isolate the irrigation system from the water supply or to isolate sections of the irrigation system for maintenance. The valve may be either a brass gate valve or a brass or plastic ball valve. Care should be used to slowly turn ball valves on or off, as they only require a ¼-turn to open or close and could cause damage if operated too rapidly.

Spray Heads: Sprinklers that emit a fan-type spray of small droplets of water. The heads have a radius of 5.2 m or less. Spray heads fit into the “small-area sprinklers” category.

Volume: Expressed in litres per minute (l/min). Volume is used to describe either the amount of water available or the amount of water used. The available l/min must be known before a sprinkler design can be completed. The total l/min of all the sprinkler heads on one zone should not exceed the available l/min.

Water Hammer: The surging of pressure that occurs when a control valve is suddenly closed. In extreme conditions, this surging will cause pipes to vibrate or create a pounding noise. Water hammer is most commonly caused by fast-closing valves or pipes that have been sized too small, causing high-velocity water flow.

Wire: In an automatic sprinkler system, low-voltage, direct-burial wire is used to connect the automatic control valves to the controller. Colour-coded, multi-strand sprinkler wire is the most common and has several coated wires together in one protective jacket.

NOTES

NOTES

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.

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