

General Guide to Irrigation System Winterisation

TABLE OF CONTENTS

INTRODUCTION

Section 1 **MANUAL DRAIN VALVE DESIGN AND PROCEDURE – MAINLINE PIPEWORK**

Design

Procedure

Section 2 **AUTOMATIC DRAIN VALVE DESIGN AND PROCEDURE – LATERAL PIPEWORK**

Design

Procedure

Section 3 **HOW TO BLOW WATER OUT OF LINES USING COMPRESSED AIR**

Design

Procedure

Blow out procedure activating sprinkler control valves from the timer:

Blow out procedure activating valves manually

Section 4 **HOW TO WINTERISE SYSTEM COMPONENTS**

Valves

Sprinklers & Heads

Timers & Controllers

Backflow Preventers

Pumps

Introduction

In a freezing climate it is advisable to "winterise" the sprinkler system in order to avoid damage. Special attention should be given to removing water from the pipes, valves, and sprinkler heads, before freezing occurs. This may be accomplished using three techniques; the manual drain valve method, the automatic drain valve system, or the air blow-out practice.

In the UK winterisation using the air blow out method is generally used on larger commercial systems and golf course. Garden and small landscape winterisation can normally be achieved by auto or manual draining.

On all systems it is important that any pipework that is fed via mains water, ie. ball valves to storage tanks, stand pipes and bib taps is turned off and drained or insulated prior to winterisation.

LANDSCAPE WATERING SYSTEMS LIMITED

Bratch Lane Ľ Dinton Ľ Salisbury Ľ Wiltshire Ľ SP3 5EB Ľ Telephone: 0845 230 9697 Ľ Fax: 0845 230 9698
enquiries@lws.uk.com Ľ www.lws.uk.com

Registered in England No. 3480689

MANUAL DRAIN VALVE DESIGN AND PROCEDURE – MAINLINE PIPEWORK

Design

The manual drain valves should be installed on the sprinkler system mainline or within the valve manifold assemblies at the lowest point of the system. Additional manual drain valves must be installed if there are multiple low points along the run of pipe where water collection might occur. A ball valve, gate valve or a simple threaded pipe with a cap may be used to provide drainage. Piping should be sloped properly to allow water to drain out.

On heavy soils the valve can be installed over a "dry-well" (underground pit filled with gravel to drain water away from the piping) to allow the amount of water that is drained to percolate into the soil.

Procedure

Wear proper eye protection. The manual drain valve or drain cap may be pressurized at this time and could cause physical injury if opened before the pressure is first relieved. Please follow the steps below carefully.

1. Turn off the irrigation system mainline shut off valve.
2. Open one of the sprinkler system control valves, either manually, or electrically from the timer, to relieve pressure on the sprinkler system mainline.
3. **Slowly open** the manual drain valve.
4. Repeat this procedure for all manual drain valves on the sprinkler system mainline.

NB. Please refer to the **How to Winterize System Components** section to fully complete the winterization process for your system.

AUTOMATIC DRAIN VALVE DESIGN AND PROCEDURE – LATERAL PIPEWORK

NB. Please refer above to the Manual Drain Valve section for mainline winterization.

Caution! Do not install automatic drain valves on the sprinkler system mainline!

*The automatic drain valve, model **16A-FDV**, is a spring loaded device which is installed on the sprinkler pipes or heads. It is a convenient and efficient product for removing water from the lateral pipe network running from the sprinkler system control valves to the heads. Automatic drains should be installed **after or downstream** of the sprinkler control valves. They are not designed or engineered for use on mainlines.*

The drain valve will open every time the system is shut off. This will drain all the water out of the pipe providing the valve is installed at the proper location, which is the low point on the line. When the system is pressurized, the water shuts the valve off by pressing against the sealing mechanism, allowing water to flow through the pipe and on to the sprinklers in proper fashion.

Design

Install automatic drain valves at the low points in the sprinkler lines. Generally speaking, one or two drains per line are adequate to do the job. The drain valves have either ½” male pipe threads. Use two or three wraps of PTFE tape around the threads to ensure a proper seal. Simply screw the drain valve into a threaded fitting positioned downward. If you have a soil condition which drains poorly, we suggest digging a small hole directly beneath the drain and filling it with clean gravel to assist drainage.

Procedure

Automatic drain valves remove water from the system every time it is shut off. No manual intervention should be required. Check for excessive puddling on the soil surface should one of the drains become stuck open during sprinkler operation.

NB. Please refer to the **How to Winterize System Components** section to fully complete the winterization process for your system.

HOW TO BLOW WATER OUT OF LINES USING COMPRESSED AIR

CAUTION! WEAR PROPER EYE PROTECTION! Extreme care must be taken when blowing out the system to avoid excessive pressure which can damage valves or sprinkler pipe or cause physical injury due to flying debris. Do not stand over any irrigation components (pipes, sprinklers, and valves) during air blow out. Air pressure must not exceed 50 pounds per square inch (psi).

LWS would recommend that this method is only undertaken by an experienced irrigation engineer.

Local irrigation contractors usually offer this service for a reasonable fee which may also include start-up in the Spring. Depending on how extensive your system is and what type of equipment you have installed, you may want to choose a professional who is fully equipped to provide this service.

Compressed air is used to force water through all of the irrigation system components including the mainline pipe, sprinkler control valves, lateral pipes, and out through the sprinkler heads. To obtain proper air volume, you will need to rent or buy a compressor capable of providing **10 to 25 cubic feet per minute (CFM) of air volume.**

Air pressure must not exceed 50 pounds per square inch (psi) during the blow out procedure.

A pressure regulating valve must be used to avoid over pressurization of the system. Air volume should be high and air pressure low. This combination of high volume and low pressure will minimize the damage that can occur during the winterization process. It is very important to select the right air compressor for the job. Some small shop compressors (2 hp) may not be adequate to complete the winterization procedure properly. If the appropriate air compressor is not available, please call an irrigation contractor.

Do not try to use an air compressor with high pressure (120 psi) and low volume to evacuate water from the system. It is not an acceptable practice to allow the compressor to fill the holding tank of the compressor and the closed mainline with high pressure air, hoping the surge of excess pressure will compensate for the lack of compressor size and blow the line clean upon opening the sprinkler control valve.

This is a dangerous practice that places very severe stresses on all of the components of the system. ***Do not run the compressor without at least one sprinkler control valve open.*** This lessens the chance that the system could over pressurise.

It is a common misbelief that if the system can withstand 120 psi of water pressure, similar air pressure will not damage the system. This is not true! The viscosity of air is much lower than water, generating much higher stresses that can cause severe damage to the system.

Design

There should be a separate provision on the sprinkler system mainline for connecting up the air hose. This could be a quick connect fitting, a manual gate valve, a plugged "tee", or simply a capped pipe in the line. This adapter should be located as close to the water source as possible.

Check with your air compressor manufacturer for the correct procedure and equipment to hook up to the sprinkler system.

Procedure

Wear Proper Eye Protection! Do not stand over any irrigation components (pipe, valves, or sprinklers) during air blow out. Do not run the air compressor without a sprinkler zone control valve being open first, from start up to compressor shut down. Air pressure must not exceed 50 pounds per square inch (psi).

Blow out procedure activating sprinkler control valves from the timer:

1. Close mainline sprinkler shutoff valve.
2. Relieve the water pressure on the mainline by activating a circuit, or zone, from your timer. **Activate the zone that is furthest from the air connection before introducing air into the piping.**
3. Attach the compressor hose to the blow out adapter.
4. Set the pressure regulating valve on the compressor to 50 psi.
5. Turn on the compressor. Gradually increase the flow of air until the sprinkler heads pop up. The amount of flow or volume required will be dependent upon the length of the pipe run and the number of heads.
6. *Sustained heat from the compressed air may damage pipe and other components.*
Do not blow any circuit more than 2 minutes at a time. Switch to another station, or zone, by advancing the timer to the next circuit. **Do not turn the timer off at any time during this operation until the compressor is first shut off.**
7. In order to ensure adequate drainage of lines, repeat the cycle two or more times, activating each zone from the timer, until nothing more than a fine mist appears from the heads. Many sprinklers that use plastic gears in their drive mechanisms also use water for lubrication and cooling. If a circuit is allowed to run with nothing but air for extended periods there is a significant risk of damaging the drive mechanism of the sprinkler.
8. After blowing out all the zones, leave one zone on while shutting down the compressor. Turn the compressor off at this time.
9. Unhook the compressor from the adapter to the sprinkler system mainline.
10. Turn the timer to "Off".

NB. Please refer to the **How to Winterize System Components** section to fully complete the winterization process for your system.

Blow out procedure activating valves manually

Wear Proper Eye Protection! Do not stand over any irrigation components during air blow out. Do not run the air compressor without an irrigation control zone valve being open first, from start up to compressor shut down.

Please refer to *Blow Out Procedure Activating Valves from Timer* section before considering this alternative. Activating the valves from the timer offers an additional margin of safety to the procedure since you would not be placed in close proximity to the irrigation components during the blow out. Use this section only if your system does not have electric remote control valves.

1. Close main sprinkler shutoff valve.
2. Relieve the water pressure on the mainline by slowly opening the manual shutoff handle on one of your irrigation zone control valves.
3. Attach the compressor hose to the blow out adapter.
4. Set the pressure regulating valve on the compressor to 50 psi.
5. Turn on the irrigation station you want to blow out.
6. Turn on the compressor. Gradually increase the flow of air from the compressor flow valve (*not from the sprinkler control valve*) until the sprinkler heads pop up. The amount of flow or volume required will be dependent upon the length of the pipe run and the number of heads.
7. Sustained heat from the compressed air may damage pipe and other components.
Do not blow any circuit more than 2 minutes at a time.
8. After 2 minutes, **turn the compressor off**, and allow all of the air to completely purge from the compressor tank and the sprinkler system.
9. Turn on the **next** irrigation control valve you wish to winterize.
10. Turn **off** the **last** irrigation control valve you have just blown out.
11. Repeat Steps 5 through 10 until you have completed 2 or more blow out cycles per zone. There should only be a fine mist blowing from each station if the winterisation procedure was successful. Cycle again as needed.
12. Turn the compressor off. Allow any air in the storage tank or irrigation components to disperse before approaching the air hose or valves.
13. Unhook the compressor from the adapter to the sprinkler mainline.

NB Please refer to the **How to Winterize System Components** section to fully complete the winterization process for your system.

HOW TO WINTERISE SYSTEM COMPONENTS

Valves

Gravity draining of the system will not always remove water captured inside the valves. *Activating the valves manually or electrically from the timer is not an effective way to drain them. Valves that are not blown out with air must follow this procedure:* Any diaphragm style such as the DV and PGA Series should ideally be disassembled and drained. Remove the bonnet, solenoid, and diaphragm assembly and drain or sponge any standing water, then reassemble. Leave solenoid in open position for winter.

Actuator type valves require removal of the stem and solenoid assembly, check for any standing water in the pipe. Valves that are winterized using the blow out method with compressed air do not require disassembly to remove standing water. Leave the valves in the manual open position to prevent possible re-pressurisation during the Winter. This is accomplished by turning the bleed screw or solenoid counter clockwise, to the open position.

Sprinkler Heads

If your system uses automatic drain valves (Model 16A-FDV) installed properly at the low point of the system, the sprinkler lines will drain automatically each time the system is shut off. This should drain the water from the sprinkler heads also. Some sprinklers have both side and bottom pipe inlets. If you use the side inlet, install a drain valve on the bottom inlet to prevent the case from freezing. Sprinkler heads containing built in check valves to prevent low head drainage require disassembly, or must be blown out with air to achieve proper winterization. Sprinklers that have been blown out with air generally do not require and additional treatment.

Timers & Controllers

Several methods for winterising controllers are available. Some may be more appropriate for your particular application, depending on the model you own, systems utilizing booster pumps require special attention. Read the entire section before deciding which method is correct for you.

1. If your sprinkler system does not have a booster pump and your timer is a tap mounted battery powered unit:

As these units are generally very exposed they are best removed and stored in a dry, frost free environment, try to drain out as much water as possible, the batteries should also be removed.

Examples of this type of Rain Bird timer are the WTD1900 and WTA1875.

2. If your sprinkler system does not have a booster pump and your controller is a battery powered multi zone unit:

Press the "SYSTEM/OFF" or "AUTO/OFF" key. This will turn the system off, leaving the program in the memory. A single digit flashing in the display indicates the system is interrupted, giving visual confirmation. The batteries are OK left in until spring, when they will require replacing. The latching solenoids should be left in the manual open position as outlined in the previous valve section.

LANDSCAPE WATERING SYSTEMS LIMITED

Bratch Lane • Dinton • Salisbury • Wiltshire • SP3 5EB • Telephone: 0845 230 9697 • Fax: 0845 230 9698
enquiries@lws.uk.com • www.lws.uk.com

Registered in England No. 3480689

Examples of this type of Rain Bird controller are the 9V Series, WP series, Easyrain and TBOS module system.

3. If your sprinkler system has a booster pump and your timer is an indoor mains powered controller:

On these types of system you need to consider that you have mains power to the controller and mains power to the booster pump. It is recommended that power to both is isolated to prevent accidental dry running of the pump over the winter period. This maybe as simple as unplugging the transformer or turning off a simple isolation switch. Remove the backup battery (digital models) to prevent it from discharging over the winter. Be advised that this method causes the program to disappear on digital models. If the controller could be subject to condensation or you would prefer to retain your programming, mains power can be left on to the unit.

However, Turning the controller off from the keypad does not guarantee complete security from the controller coming on again in case of a power surge or power failure, therefore power to the pump unit should be switched off or isolated. If in any doubt the common and MV terminals could also be disconnected from the controller. If in any doubt you should consult an irrigation engineer.

Examples of this type of Rain Bird controller are the Image, ITC and Ec series.

4. If your sprinkler system has a booster pump and your controller is an outdoor digital, electronic or mechanical model:

Turning the controller off from the keypad does not guarantee complete security from the unit coming on again in case of a power surge or power failure. To correctly winterize these types of controllers, the common wire(s) running to the pump start relay and the valves must be disconnected from the timer. Turn the power source to the controller off at the main isolation switch first.

These controllers are "hard wired" directly into the high voltage circuit of your electrical system. The power wires run directly through conduit pipe to the terminals inside the controller. **Warning! Touching high voltage wires can cause electrical shock and burns. Do not attempt to disconnect these wires to de-power the timer. If in doubt please contact an irrigation engineer.**

The power may only be turned off at the main isolation switch. Verify that the power is completely off by removing the backup battery. Wait for 2 minutes. If the digital display on the timer has not gone blank, please call an irrigation contractor to assist you. If you have verified that the power is off to the timer, proceed to disconnect the wire or wires marked "Common", "Com", or "C", on the controller terminal strip. This is the location in the unit where the valve wires connect. Usually there is a row of screws that are labelled and numbered. In some cases there may be 2 terminals marked for the common wire. Disconnect all of the wires from the common terminal. Place a piece of electrical tape over any loose wire ends to prevent the wire(s) from touching and causing a short circuit. Reconnect the backup battery on digital models.

Examples of this type of Rain Bird controller are the Super Image, SI-RR, E Series, ESP, HP and Dialog.

Backflow Preventers

Please check with the manufacturer or supplier for specific winterization techniques.

LANDSCAPE WATERING SYSTEMS LIMITED

Bratch Lane • Dinton • Salisbury • Wiltshire • SP3 5EB • Telephone: 0845 230 9697 • Fax: 0845 230 9698
enquiries@lws.uk.com • www.lws.uk.com

Registered in England No. 3480689

Pumps

Please check the pump manufacturer's or suppliers instructions for winterization. Generally submersible pumps are pulled clear of the water level in the tank after draining (*ensure power is isolated and never use power flex/cable to lift pump*). Discharge pipe work and fittings should be thoroughly checked to ensure all water has drained and that the pump remains dry.

Surface pumps will require draining to protect from freeze damage. This will require the use of drain points within the suction and discharge pipework and also a drain plug on the casing of the pump itself. Due to the diversity of pumps available you should refer to the manufacturers instructions.

*Mains power supplies to pumps and associated controls should remain isolated. **Pumps should never be operated when dry.***

This information regarding system winterisation is provided in good faith by LWS.

We cannot be held responsible for any errors or omissions.

If in doubt about any point please check with an irrigation engineer.