SERVICE INSTRUCTIONS
Irrigation System Start-Up and Winterization Procedures

Introduction

Each winter, in many parts of the world, irrigation systems must be completely drained and shut down to prevent damage due to freezing water in the system components. Then, in the spring, the irrigation system must be filled and started. This is also true for new installations and after repairs requiring system drainage. Serious damage can occur to system components and/or personal injury may result if improper start-up and winterization methods are used. This document contains the procedures recommended for start-up and winterization of irrigation systems utilizing components manufactured by The Toro Company, Irrigation Division.

Please read the entire contents of this document before attempting either of these procedures. If you have questions regarding the application of these procedures in your area, please contact a Toro distributor or call 1-800-367-8676 for assistance.

Start-Up Procedure

The following is a recommended procedure that will protect system components during system start-up. The procedure is based on a velocity fill rate of less than two feet (.61 meters) per second. See Table 1 below.

WARNING

TO PREVENT PERSONAL INJURY DO NOT STAND DIRECTLY OVER ANY COMMERCIAL OR LARGE TURF SPRINKLER WHEN FILLING SYSTEM OR WHEN ACTIVATING MANUALLY AT THE SPRINKLER.

1. Use jockey pump only to fill system at a velocity fill rate of less than two feet (.61 meters) per second.
2. Use quick coupler keys at all tees and greens with quick coupler valves to bleed air from system lines during filling process. Do not compress air and then relieve; bleed air while filling system.
3. After water has filled all lines and all air is removed, remove quick coupler keys.

CAUTION

Failure to comply with recommended fill rate will increase line pressure resulting in a water hammer effect that could damage sprinklers.

Table 1: Recommended System Fill Rate

Pipe Size				Velocity		Pipe				Velocity	
in.	cm	GPM	LPM	F/S	M/S	in.	cm	GPM	LPM	F/S	M/S
1/2	1.27	2	7.57	1.60	.49	3	7.6	45	170.34	1.86	.57
3/4	1.90	3	11.36	1.92	.59	4	10.2	75	283.91	1.87	.57
1	2.5	5	18.93	1.50	.46	6	15.2	150	567.81	1.73	.53
1-1/4	3.18	10	37.85	1.86	.57	8	20.3	250	946.25	1.70	.52
1-1/2	3.81	10	37.85	1.41	.43	10	25.4	450	1703.25	1.97	.60
2	5.0	20	75.71	1.80	.55	12	30.5	500	1892.50	1.55	.47
2-1/2	6.4	30	113.56	1.84	.56						

Winterization By Draining

Manual Drain Valves

1. Close the main water supply valve.
2. Open all manual drain valves downstream of the automatic valves to allow drainage of the lines.
3. Open all manual drain valves upstream of the automatic valves to allow drainage of the mainline and valve manifold.
4. Follow recommended winterizing instructions for your specific controller.

Automatic Drain Valves

Note: *If the system is installed with automatic drain valves, the lines downstream of the automatic control valves will drain automatically when the automatic control valve closes.*

1. Close the main water supply valve.
2. Open all manual drain valves upstream of the automatic valves to allow drainage of the mainline and valve manifold.
3. Follow recommended winterizing instructions for your specific controller.

Controller - Residential, Hydraulic Normally Open and Normally Closed

1. Turn off the hydraulic supply line to the controller.
2. Disconnect the ¼ inch (1.27 cm) tube from the supply line filter and let drain. The new style filter is serviceable and should be disassembled to drain.

CAUTION

The hydraulic selector valve can be damaged if the controller selector knob is rotated while the selector valve is frozen.

3. Activate each automatic valve manually from the controller. Allow the controller approximately 10 seconds on each station to relieve the tubing and valve pressure.
4. Remove AC power from the controller.

Automatic Control Valves

Note: *This procedure should be followed if adequate control valve drainage cannot be achieved through the use of manual or automatic drain valves.*

1. Close water supply valve.
2. Complete manual drain valve, automatic drain valve and controller winterization procedures.
3. Disassemble the automatic control valve and drain all water.
4. Reassemble the automatic control valve.

Winterization with Compressed Air

WARNING

TO PREVENT PERSONAL INJURY, DO NOT ATTEMPT TO DISASSEMBLE SYSTEM WHILE UNDER PRESSURE.

CAUTION

Do not exceed 50 PSI (3.52 kg/cm^2) of air pressure in any system (residential, commercial or golf). Exceeding 50 PSI can result in severe equipment damage.

Residential and Small Commercial Systems

1. Close the main water supply valve.

   Note: *For normally open hydraulic systems you must retain water pressure to the controller so the valves can be activated from the controller.*

2. Connect the air compressor (25 CFM or larger with pressure regulator adjusted to **50 PSI or less**) to fitting downstream of the main water supply valve.
3. Activate each automatic valve manually from the controller, allowing each valve to remain open until all water has been expelled from the zone.

CAUTION

The hydraulic selector valve can be damaged if the controller selector knob is rotated while the selector valve is frozen.

4. After all valves have been activated and all water has been expelled, disconnect the air compressor.
5. Normally Open/Normally Closed Systems Only:
   A. Turn off the hydraulic supply line to the controller.
   B. (For systems using PVC Hydraulic Supply Lines)
   Connect air pressure to the PVC hydraulic supply system at the source. Open the drain valve at the last group or groups of controllers. Blow until all water has been expelled.
   C. Disconnect the ¼ inch (1.27 cm) tube from the supply line filter and let drain. The new style filter is serviceable and should be disassembled to drain.
   D. Activate each automatic valve manually from the controller, allowing the controller approximately ten (10) seconds on each station to relieve the tubing and valve pressure.
6. Remove AC power from the controller.

Winterization of Golf Course and Large Commercial Systems

WARNING

TO PREVENT PERSONAL INJURY DO NOT STAND DIRECTLY OVER ANY COMMERCIAL OR LARGE TURF SPRINKLER WHEN ACTIVATING MANUALLY AT THE SPRINKLER.

CAUTION

Do not exceed 50 PSI (3.52 kg/cm^2) of air pressure in any system (residential, commercial or golf). Exceeding 50 PSI can result in severe equipment damage.

1. Close the main water supply valve.
2. Connect the air compressor (600 CFM or larger with pressure regulator adjusted to the lowest possible pressure) which will adequately remove water from the system.

   Note: *Golf course and large commercial systems require a high volume air compressor. Excessive heat will be generated at the point of air connections to the system. To avoid damage to PVC piping systems, use a length of 1½ or 2 inch (3.18 or 5.1 cm) galvanized pipe to dissipate the compressor heat prior to entering the irrigation piping system.*
3. Open drain valves and/or quick coupler valves at the far end of the system, maintaining air pressure on the system.

   Note: *Air connection points made at the highest locations on main lines will permit water removal from the system with minimum air pressure. The key to successful water removal is air volume (CFM), not pressure.*
4. When all water has been drained, close drain valves and/or remove quick coupler.
5. Activate each automatic valve manually from the controller allowing each valve to remain on until all water has been expelled from the sprinkler head or heads.
6. Electric valve-in-head and hydraulic normally closed systems require a minimum air pressure of 35 PSI (2.46 kg/cm^2) at the head to activate the valve and may require additional time to open.

Winterizing Electro-Mechanical Controllers

Toro controllers are equipped with a heater resistor designed to generate heat within the timing mechanism compartment. In most areas of the country, this heat will prevent condensation and rust formation during the winter shutdown. In these areas, we recommend that AC power remain on at the controller while disabling the timing mechanism by placing the manual/automatic switch into the manual position.

Controller Winterization Recommendations

1. We recommend that the 115 VAC power be left on for all satellites. This will provide a small amount of heat to reduce condensation that may build up inside the cabinet as well as prolong the life of the Lithium battery in the TM (Network LTC and Network 8000 only).
2. Remove the signal wire plug from the modem PCB (Network LTC and Network 8000 only).
3. Remove the fuse on the common 24V to separate field wiring from the controller.

   For Network 8000 only: disable field power by placing 24 VAC circuit breaker in OFF position.
4. Fill the wire sleeve with foam insulation to prevent small rodents from nesting in the controller cabinet.
5. Remove the field communication cable from the surge box (Network LTC and Network 8000 only).
6. Remove the tube from the pressure transducer at each satellite (Network 8000 only).
7. In areas subject to drifting snow, satellites can be protected with canvas or plastic covers.

   Note: *If a Weather Station is installed, you should leave it connected/operating. This will allow the computer to summarize temperature patterns to predict the proper time to spray preemergent chemicals on the golf course.*

Moisture can present a very costly problem to solid state control systems. Due to the varying climatic conditions; please contact your Toro distributor for additional winterization recommendations.

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