



FIELD CONTROL SYSTEMS
AURORA® (AUR)

INSTALLATION MANUAL

AURORA® Rotary Sprinkler Installation and Service Manual (D50-55 Series)

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Rotary Sprinkler Installation and Service Manual

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Safety Symbols

Important safety information and warning messages appear throughout this manual. To ensure correct operation and to avoid additional expense, read this manual thoroughly before you begin installation.

Become familiar with the safety symbols presented in this section. These symbols will alert you to safety hazards and conditions that may result in personal injury, death, or property and equipment damage. The following symbols are used in this document:



WARNING: Failure to observe this warning may result in personal injury or death.



CAUTION: Failure to observe this caution may result in property and equipment damage.



Note: Highlights important information or details.



Idea: Indicates a suggestion that helps you make better use of your system.

Personal Injury Warning



WARNING!

For your protection and the safety of the user, please abide by all Caution and Warning statements within this document. Assure all installation practices comply with all applicable electrical and construction codes for the area.

Operating this equipment in a residential area can cause interference to radio and television reception. The radio frequency energy emitted by this device complies with limits for a Class B computing device, described in FCC Rules Part 15, Subpart J.



WARNING!

ALL WIRING, CONNECTIONS AND REPAIRS TO THE SPRINKLER MODELS MUST BE PERFORMED BY A QUALIFIED TECHNICIAN TO PREVENT INJURY OR DAMAGE TO THE PRODUCT.

WARNING! ALL EARTH GROUNDING MUST BE INSTALLED AND CONNECTED IN ACCORDANCE WITH LOCAL AND NATIONAL CODES.



WARNING!

ALL ELECTRICAL COMPONENTS AND INSTALLATION PROCEDURES MUST COMPLY WITH ALL APPLICABLE LOCAL AND NATIONAL ELECTRICAL CODES. SOME CODES MAY REQUIRE A MEANS OF DISCONNECTION FROM THE AC POWER SOURCE, INSTALLED THE FIXED WIRING, HAVING A CONTACT SEPARATION OF AT LEAST 0.120" (3mm) IN THE LINE AND NEUTRAL POLES.

Rotary Sprinkler Installation and Service Manual

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Chapter 1 | Introduction

Introduction

This manual describes the installation and service procedures for D50-D55 Series Rotary Sprinkler models. The D50 Series is a dedicated Full-circle unit, and the D55 is an adjustable Part-to-Full circle unit; both are designed specifically for golf course Rotary Sprinkler applications.

Prior to installing any sprinkler, read through the recommended installation and start-up procedures. Please observe all **WARNINGS** and **CAUTIONS** when installing and servicing this equipment.

Model Features

Manufactured from durable, high-strength engineering plastic and stainless-steel components, the D50-D55 Series sprinklers incorporate many innovative and time-proven features for lasting, maintenance-free operation.

D50-55 Series Rotary Sprinklers

- The part-circle sprinklers have adjustable arc coverage of 35° to 360°.
- Arc adjustment can be performed without the need for any special tools and can be performed with the rotor in place.
- The part-circle rotor rotates through a 180° arc in two minutes or less. Rotation through 360° is two and a half minutes or less for the full circle rotor.
- The rotor is serviceable from the top with a Quicklock™ design. The Riser is stainless steel and self-flushing on both up and down action. The Retract Spring is stainless steel and of sufficient force for positive retraction.
- The rotor case is commercial-grade plastic and has a top diameter of 6.50", a pop-up height of 4.00" and an overall body height of 9.75". The rotor shall have 1" female ACME, NPT or BSP threaded inlet.
- The rotor have color-coded, interchangeable nozzles.

Optional Features

Electric Valve-in-Head [50E or 55E]

The rotor has a 24 VAC 50 or 60 cycle solenoid actuated normally closed control valve in the base of the case. The rotor shall have a top-serviceable manual selector that allows the rotor to be operated manually, shut off, or in fully automatic control mode.

Check Valve-in-Head [50C or 55C]

The rotor has an optional spring-loaded Check-O-Matic holdback device in the base of the case and shall be used with a pressure-regulating, in-line electrically actuated valve, or integrated electrically actuated valve.

Hydraulic [50H or 55H]

The rotor has a normally open (N.O) hydraulic control valve in the base of the case and shall be able to hold back at least 15' of elevation.

Tools and Supplies

Before you begin installation, you will need the following Tools:

1. Installation Manual
2. Sprinkler Head Tool
3. Valve Removal Tool
4. Phillips Head Screw Driver
5. Snap Ring Pliers

Supplies to repair swing/lateral joints:

- 2" to 4" PVC Tubing
- 2" to 4" Elbow joints (three)
- 4" Tri-joint (one)
- Teflon Tape

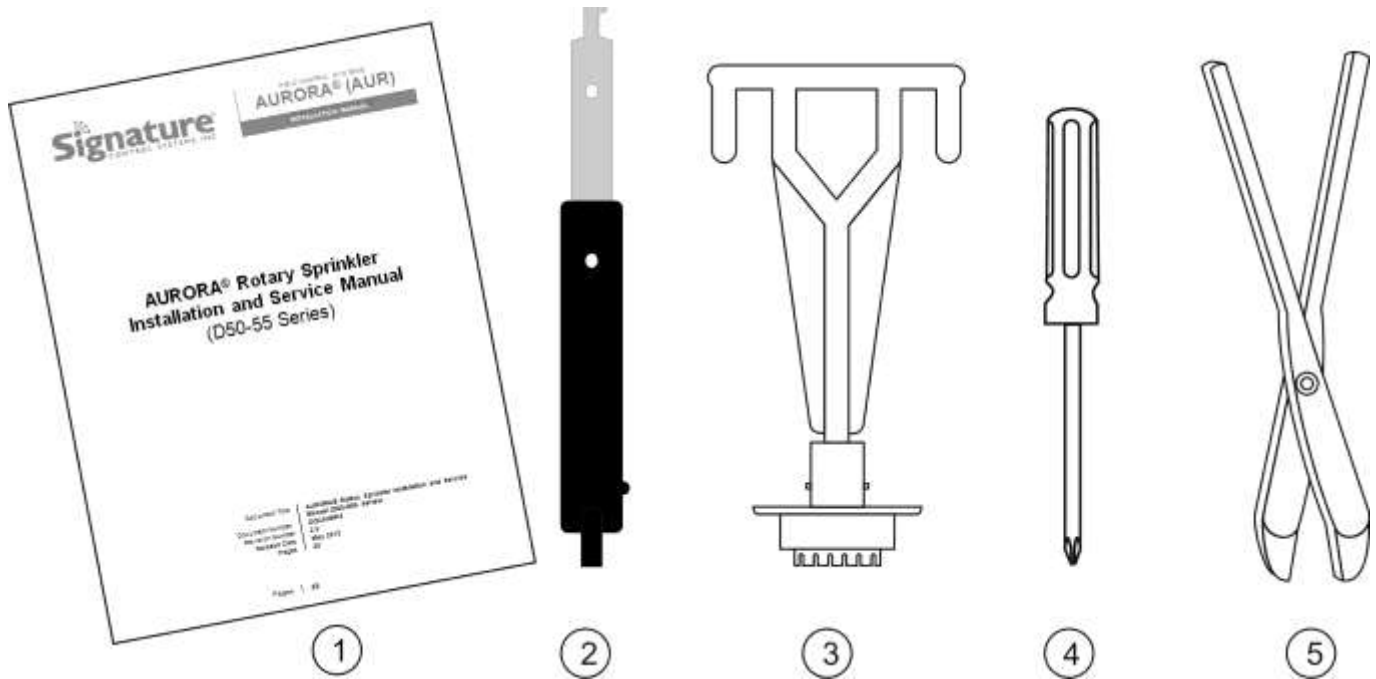


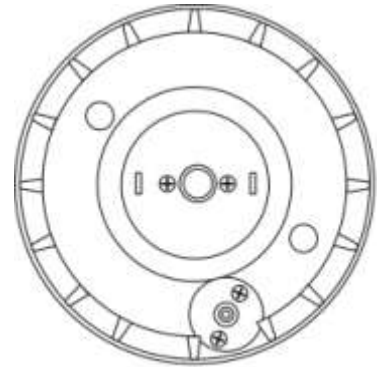
Figure 1 Installation Tools and Supplies.

D50-55 Series Rotary Sprinklers

Each model in the D50-D55 Series supply a unique service and functionality required in golf course applications; both models are designed for easy-to-install Rotary Sprinklers and quick-swap replacement service and maintenance procedures.

D50 Series (Top View)

Rotary Sprinkler D50 Series with a closed Riser cap offers a FULL circle flow operation where no arc adjustments are required to operate. This model is perfect for predictable weather systems where a **dedicated** Rotary Sprinkler provides year round watering cycle control.



D55 Series (Top View)

Rotary Sprinkler D55 Series offers **adjustable** PART and FULL circle operation via a removable cap on Riser to easily access the Adjustment Tab. Depending upon the arc needed, the Tab can be lifted out and flipped over to achieve either full or part-circle arc. This model type is especially convenient for unpredictable rainy or dry seasons that require fast changes to existing Rotary Sprinklers to adjust watering cycles for any weather conditions.

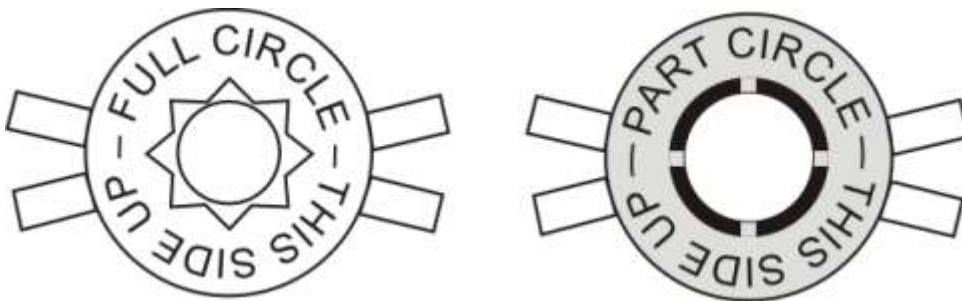


Figure 2 D50 Series and D55 Series two-sided Adjustment Disk.

Installation Procedures

To assure maximum performance from your D50-D55 Series sprinklers, read these instructions completely prior to installation or service.

Constructing Swing Joints

Construct a Swing Joint:

1. Construct or provide triple swing joints for each sprinkler as shown in Figure 3. Use PVC or ABS pipe nipple for the sprinkler connection.



Note: On sites where the possibility of heavy equipment rolling over a sprinkler exists, the swing joint will flex preventing damage to the lateral or main lines. On a new installation in raw ground where the sprinklers are to be initially installed above the finished grade and lowered when new turf is established, the swing joint allows sprinkler repositioning without changing risers. This is a common and practical procedure which eliminates the problem of dirt being accidentally introduced into the lateral lines when a riser is changed.

2. Flush lines thoroughly prior to installing sprinkler.
3. Apply Teflon[™] tape on riser threads (not required on ACME threads). Install sprinkler to the riser and tighten.



CAUTION!

Use only Teflon tape on riser threads. Use of pipe dope or other types of sealing cause deterioration of sprinkler body threads.

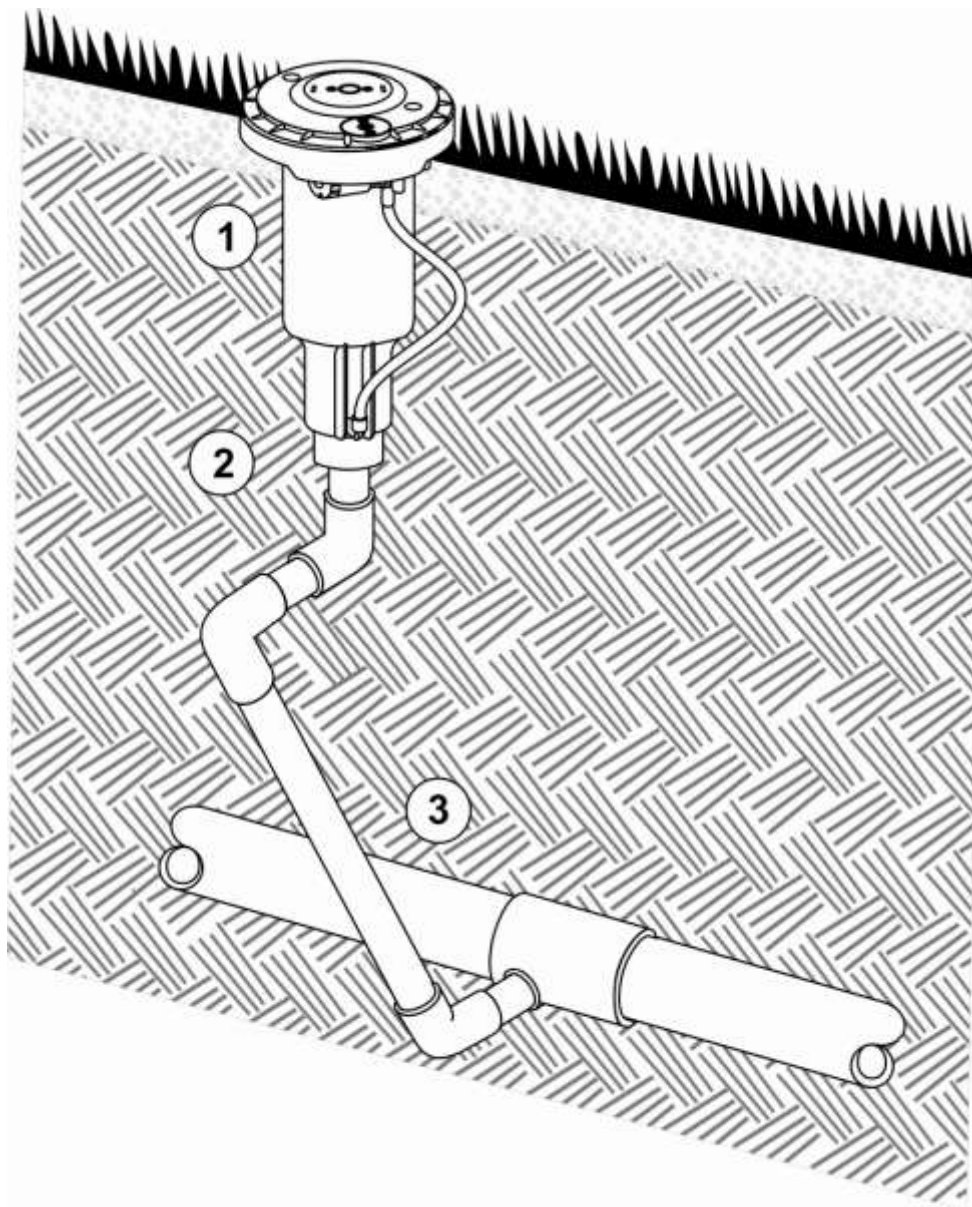


Figure 3 Swing Joint Configuration.

Arc Adjustment Procedure



WARNING!

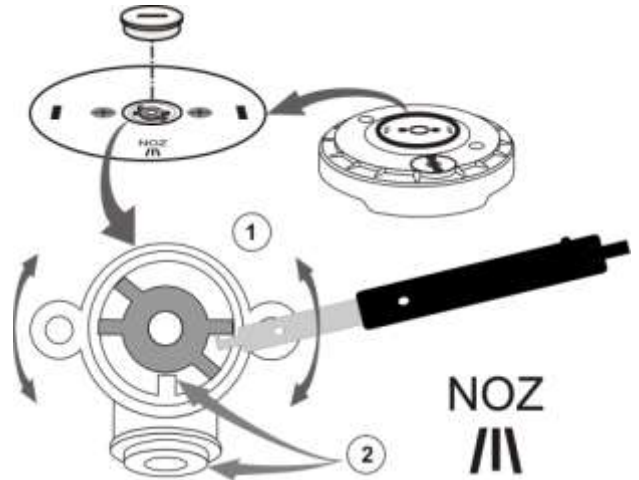
DUE TO THE HIGH OPERATING PRESSURE, NEVER STAND OR LEAN DIRECTLY OVER THE SPRINKLER OR COME IN CONTACT WITH THE SPRAY. FAILURE TO COMPLY MAY RESULT IN SERIOUS INJURY.

D55 Series Two-sided Adjustment Disk

The D55 Series Rotary Sprinkler model is adjustable to Full-circle or Part-circle operation. The Adjustment Disk is factory preset at 180° and can be adjusted to 90°, 180°, 270° or 360° arcs:

- In Part-circle operation, the sprinkler arc can be adjusted from 40° - 330°.
- In Full-circle (360 °) operation the sprinkler will rotate in a clockwise direction only.

1. Rotary Sprinkler must be OFF.
2. Using the Sprinkler Head Tool manually unscrew serrated Cap to expose the Adjustment Disk in Nozzle. Set Cap aside for reassembly.
3. Using the Sprinkler Head Tool (1) or a screwdriver, rotate the right or left Arc Tabs on each side of the disk (an audible clicking sound indicates degree segments).
4. The marker (2) indicates front Nozzle position.
5. Replace serrated Cap and make sure Nozzle faces area to be irrigated indicated by the “NOZ” directional lines on top.



Switching between Full or Part Circle Operation

Switching the D55 Series Adjustment Disk between Full circle (white side) and Part circle (gray side) operation is simple:

1. Unscrew the serrated Cap (1) to access the Adjustment Disk Arc Tabs (2).
2. Flip the disk to either Full or Part circle side UP.
 - Part Circle: Leave gray colored tab UP for part circle arc.
 - Full Circle: Flip disk over to show white side UP or remove the disk completely to achieve full circle operation.

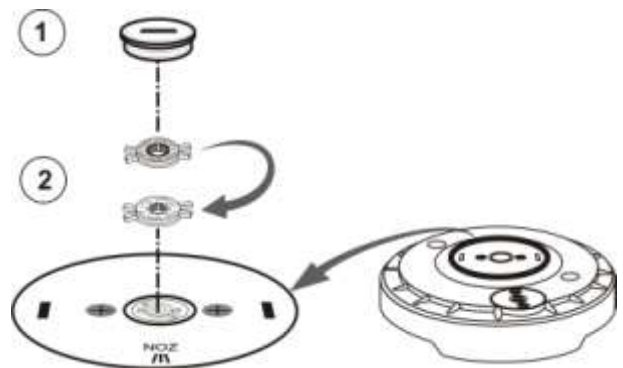


Figure 4 D55 Series two-sided Adjustment Disk with Arc Tabs.

Sprinkler Troubleshooting

Condition	Description	Action/Solution
Sprinkler Mechanism		
Sprinkler will not turn ON	No 24 VAC to solenoid assembly. (electric models)	Measure voltage with a Digital Volt Meter (DVM). Check wiring and controller program. Refer to Controller Operating Manual for instructions.
	Selector cam in "OFF" position	Set to "AUTO" position.
	Debris in pilot valve assembly	Disassemble and remove all debris.
	Insufficient pressure in controller supply line and/or sprinkler control tube.	Check pressure.
Sprinkler will not shut off	Constant 24VAC from controller	Check for voltage using the DVM. If voltage is present, disconnect wire. If sprinkler closes, service controller. Refer to Controller Operation Manual.
	Selector cam in manual "ON" position	Set to "AUTO" or "OFF" position.
	Debris in pilot valve assembly	Disassemble and remove all debris.
	Constant pressure from controller.	Check pilot valve at controller for constant flow. Check elevation differential. Valve elevation should not exceed 0' above controller elevation or 70' (21.3m) below controller elevation.
Sprinkler won't rotate	Debris wedged between stator and turbine.	Remove obstruction.
Head sticks up	Drive assembly defective.	Replace drive assembly.

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Condition	Description	Action/Solution
Sprinkler Mechanism		
Poor distribution pattern	Nozzle base assembly defective.	Replace nozzle base assembly.
	Dirt in riser assembly	Flush out. (See Flushing Procedure on page 11.)
	Damaged or missing return spring.	Replace
	Damaged riser	Replace.
	Nozzle plugged with debris	Clean or replace nozzle.
	Nozzle orifice damaged.	Replace nozzle
Main Valve		
Valve won't close (Electric)	Continuous 24 VAC to sprinkler.	Check controller for voltage source.
	Leak in pilot valve assembly:	<ul style="list-style-type: none"> ▪ Replace pilot valve assembly. ▪ Plugged supply screen on piston. ▪ Clean or replace screen.
	Manual control selector on pilot valve assembly turned to "ON" position.	Turn to "AUTO" position.
	Plunger movement restricted.	Inspect and clean or replace.
	Valve cylinder misaligned with sprinkler body communication tube.	Remove valve assembly and install correctly.
	Foreign object keeping valve from seating.	Remove, clean and check valve for damage. Replace if necessary.
	Damaged piston seal or piston assembly.	Replace valve assembly.

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Condition	Description	Action/Solution
Valve won't close (Hydraulic)	Leak in control tubing.	Isolate and repair.
	Pilot valve leak in controller.	Confirm by observing constant dripping from discharge line of controller. Refer to Controller Service Manual.
	Foreign object keeping valve from seating.	Remove, clean and check valve for damage. Replace if necessary.
	Damaged piston seal or piston assembly.	Replace valve assembly.
Main Valve		
Valve won't open (Electric)	(a) Control (field) wires severed.	Isolate and repair.
	(b) No power to controller.	Establish controller power.
	(c) No power from controller to solenoid.	Check for blown fuse and replace.
	Manual control selector on pilot valve assembly turned to "OFF" position.	Turn to "AUTO" position.
	Pilot valve solenoid inoperative.	Remove and replace.
	Pilot valve plunger movement restricted.	Inspect, clean and/or replace.
	No supply from main valve. Debris in control tube, main valve assembly and/or communication passages in body.	Flush thoroughly.
Valve won't open (Hydraulic)	Plugged controller discharge line or discharge port in pilot valve.	Verify by checking for discharge at discharge line when station is activated. If no discharge, refer to Controller Service Manual.

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Condition	Description	Action/Solution
Sprinkler Weeping	Damaged or blocked valve seat. (Slow leak in valve)	Remove blockage and, if necessary, replace valve assembly.
	Damaged piston seal or piston assembly.	Replace valve assembly.
	Low pressure on supply line.	Check for low pressure reason and correct.
	Elevation of normally closed sprinkler exceeds 75' (22.9 m) differential.	
Several valves on different (Hydraulic)	Control tubing leak which lowers supply pressure to other stations. stations fail to close	Turn controller from station to station until a station is reached where only valves on that station stay open. The leak would be in the tubing on that station. Isolate and repair.
	Leak in supply line to controller.	Verify by checking pressure in all control lines.
	Leak in controller pilot valve.	Verify by constant discharge from controller.
	Plugged supply line filter.	Replace filter if more than 3 psi (0.21 bar) differential exists

Chapter 2 | Service Procedures

Service Procedures

The section describes important procedures for service maintenance and parts replacement for installed Rotary Sprinkler mechanisms.



WARNING!

NEVER STAND OR LEAN OVER THE SPRINKLER WHILE THE IRRIGATION SYSTEM IS BEING FILLED, DURING MANUAL OR AUTOMATIC OPERATION OR WHEN PERFORMING SPRINKLER SERVICE PROCEDURES. DIRECT CONTACT WITH IRRIGATION SPRAY, A FAILED OR IMPROPERLY INSTALLED SPRINKLER CONNECTION OR SPRINKLER COMPONENTS FORCIBLY EJECTED UPWARD UNDER PRESSURE CAN CAUSE SERIOUS INJURY.

Servicing Sprinkler Mechanism

Remove the Riser Unit from Sprinkler Body

The D50-D55 Series Risers are installed and replaced as one unit with no parts to assemble. Installation and maintenance is simple with quick-swap capabilities.

Remove the Snap Ring and Seal Retainer

1. Unscrew the Nozzle Cap's two screws (1), and pull the Nozzle out, set aside for reassembly.
2. Insert the hooked end of the Sprinkler Head Tool into the Snap Ring slot (2), firmly gripping the Seal Retainer, carefully pull out (allow the Retainer Ring and Retract Spring to decompress properly); set aside for reassembly.

**CAUTION!**

The Seal Retainer will eject when the decompressing Retract Spring clears the Riser Unit.

3. Remove the Retract Spring from the Sprinkler well (3) to access the Nozzle tip.
4. Rotate and pull the Riser Unit upward to extract it from the Sprinkler body (4); be careful not to displace the loose Adjustment Disk inside the Nozzle. Set the disk aside for reassembly with new Riser unit. Refer to Figure 4.

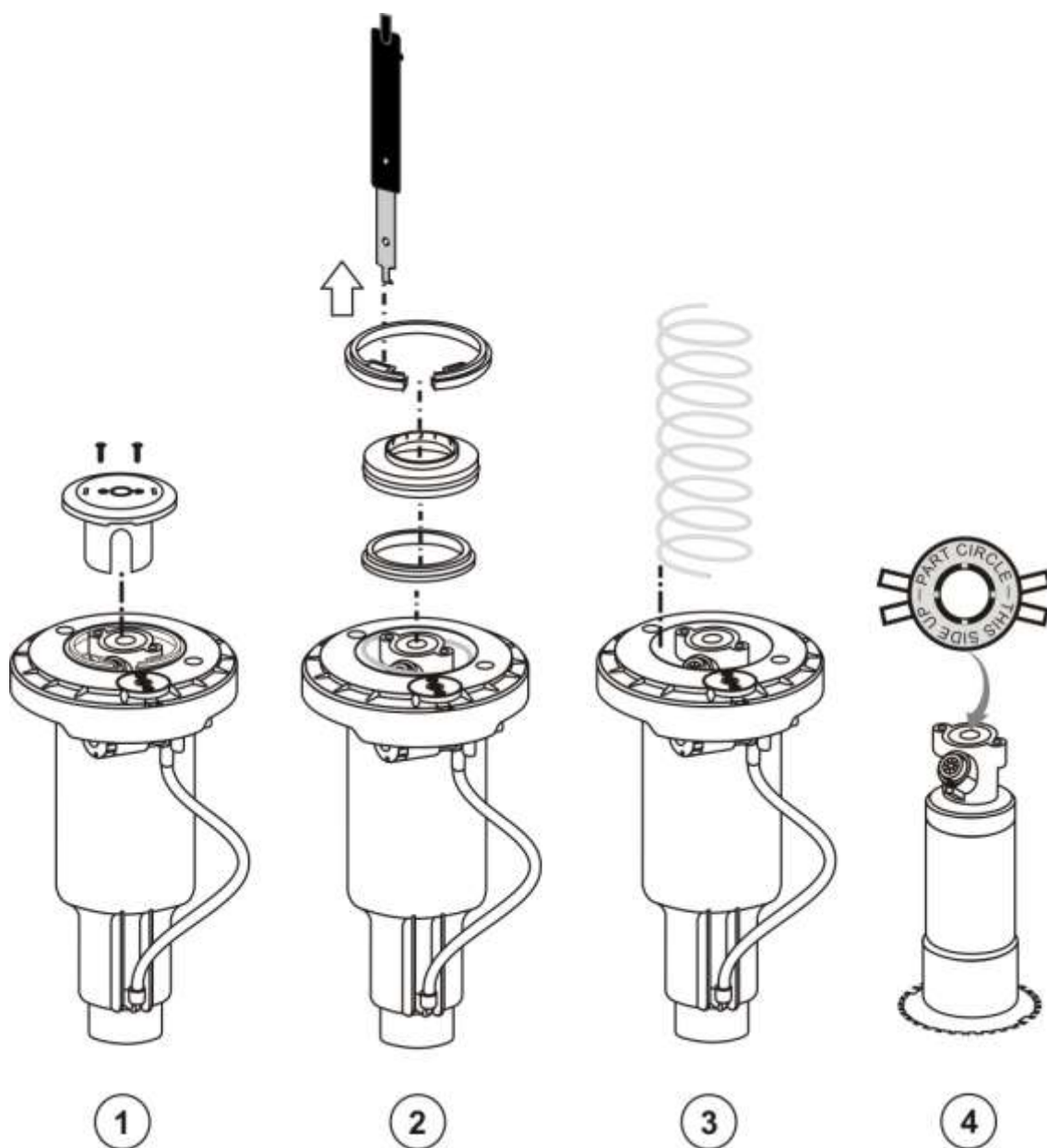


Figure 5 Procedures to Remove Nozzle Cap, Snap Ring/Retainers, Retract Spring and Riser Unit.

Nozzle Tip Installation Procedure

1. Remove two screws on top of Nozzle cap (1).
Carefully pull the Nozzle Cap off to allow the Snap Ring/Retainer and Retract Spring to decompress properly.
2. Pull the Riser unit half way up and hold in place, then remove old nozzle and replace with same type new Nozzle.
3. Place the Sprinkler Head Tool (or screwdriver) behind the Nozzle (2) top lip, and twist the wrist to pull the nozzle up and out.
4. Insert new Nozzle using the nozzle guides to snap into place (3).

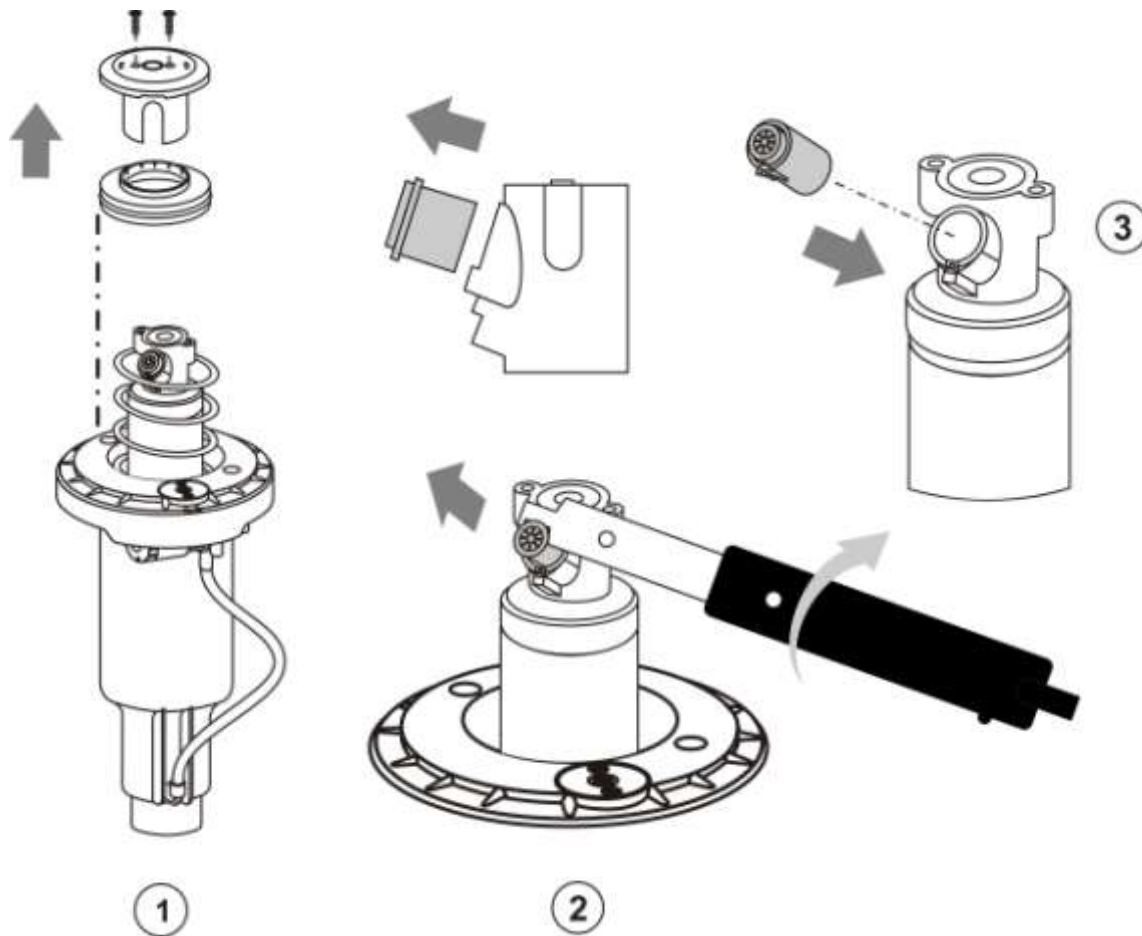



Figure 6 Nozzle Tip Installation Procedure.

Signature Control Nozzle Types 		Base Pressure (PSI)				
		60*	70	80	90	100*
29 Yellow	Radius/GPM	66/25.1	69/27.0	72/28.8	74/30.6	76/32.1
32 Gray	Radius/GPM	68/25.9	71/29.7	74/31.7	76/33.5	78/35.3
37 Red	Radius/GPM	74/34.0	75/35.5	76/37.0	78/38.5	78/40.0
40 Brown	Radius/GPM	78/38.0	79/39.0	70/40.0	82/41.5	84/43.0
45 Green	Radius/GPM	80/41.5	82/43.0	84/45.0	86/47.0	87/49.0
50 Black	Radius/GPM	-/-	85/47.5	87/50.0	89/53.0	91/57.0
57 Blue	Radius/GPM	-/-	85/57.0	87/55.0	90/58.5	100/66.0

*Shaded areas represent pressure not recommended for optimal nozzle performance.

Servicing Main Valve



WARNING!

IF THE VALVE SNAP RING IS DIFFICULT TO REMOVE, RESIDUAL WATER PRESSURE MAY BE REMAINING IN THE SYSTEM. TO PREVENT POSSIBLE SERIOUS INJURY DUE TO VALVE BEING EJECTED UPWARD UNDER PRESSURE, CONFIRM THE FOLLOWING CONDITIONS EXIST PRIOR TO REMOVING THE SNAP RING AND VALVE.

- A. WATER SUPPLY TO SPRINKLER IS SHUT OFF AT SOURCE.
- B. ALL PRESSURE IS BLED FROM SYSTEM, INCLUDING CONTROL TUBES.
AC POWER IS DISCONNECTED AT SOURCE.

Remove Main Valve

The Main Valve is only accessible from inside the Riser. Refer to Figure 7.

To Remove the Main Valve Unit:

1. Pull the Riser and Retract Spring out of Sprinkler body and set aside for reassembly.
2. Using the Snap Ring Pliers, squeeze snap ring ears together (1) maintain pressure on snap ears and remove snap ring from sprinkler body. Set aside for reassembly.
3. Insert Valve Removal Tool straight down into sprinkler body aligning bosses on T-handle with holes on sprinkler body flange (2).
4. Remove Main Valve from base of Sprinkler body by inserting through Main Valve ribs (3), and with a slight twist catch tool under ribs enabling valve removal by pulling straight up and out.



Note: If valve removal tool is not available, use snap ring pliers to grasp rib of valve cylinder assembly and pull up and out of Sprinkler body.

Install the new Main Valve Unit

1. Insert the new Main Valve onto the T-Handle tool flanges and Insert tool straight down into sprinkler body aligning bosses on t-handle with holes on sprinkler body flange (2).
2. When Main Valve clears vertical side wall ribs inside body, press Main Valve into position.
3. While holding Snap Ring in compressed position with Snap Ring Pliers slide Retainer Clip into Snap Ring Ears (1) and insert the Snap Ring; which will lock into groove when properly installed.
4. Remove Snap Ring Pliers tool and check snap ring to confirm that it is fully seated in groove.
5. Reinstall the Riser and Retract Spring inside Sprinkler body.
6. Reinstall the nozzle's Snap Ring and Retainer Clip.
7. Reinstall the Nozzle Cap and secure with the two screws.

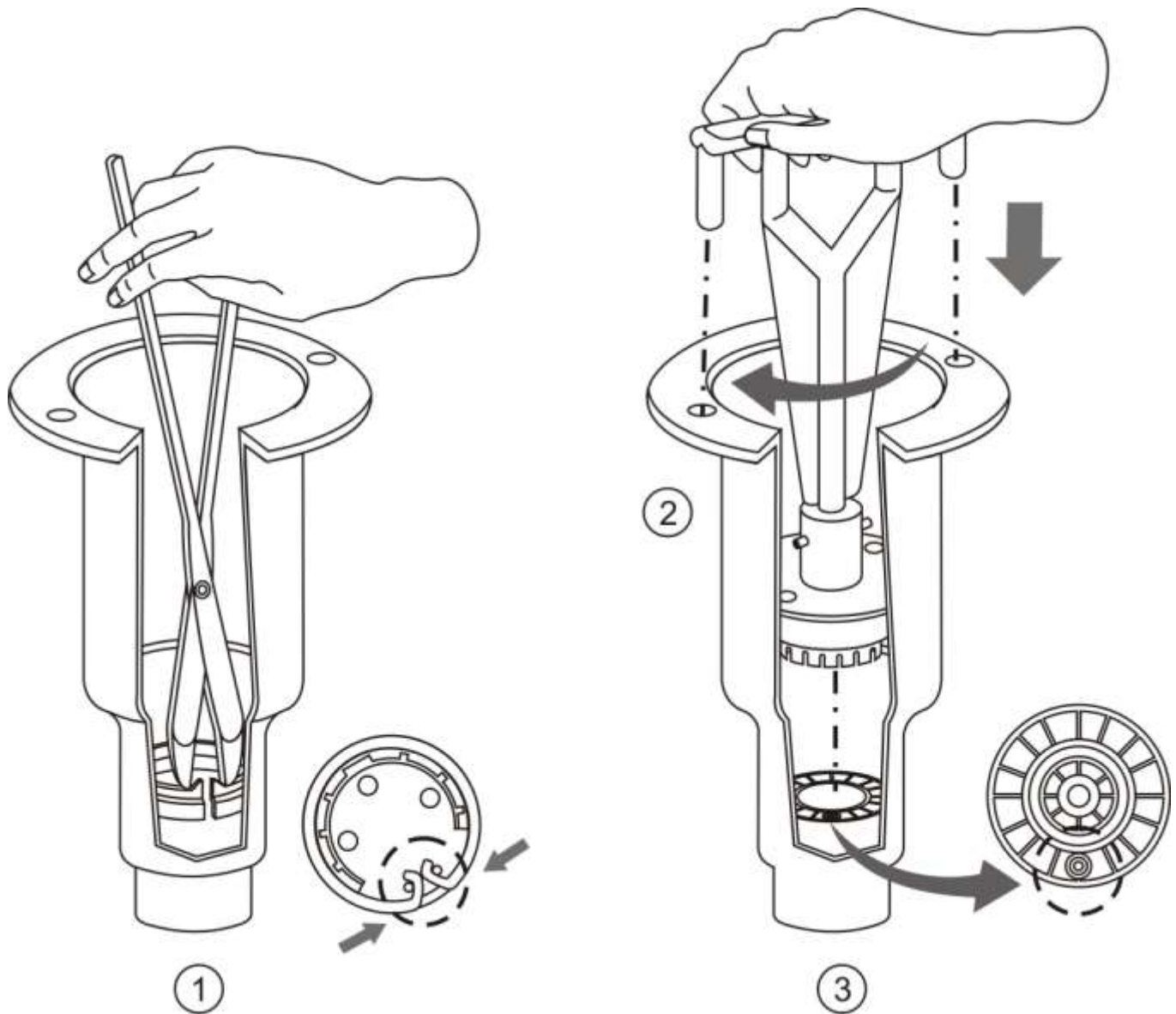


Figure 7 Service Main Valve Assembly Procedures.

Servicing Pilot Valve



WARNING!

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Service the Pilot Valve and Solenoid: Refer to Figure 8.

- Confirm that the water supply to sprinkler is shut off, and any residual pressure has been bled off.
 - If the sprinkler is pressurized, the main valve will open when the pilot valve is disconnected from control tube.
 - Carefully remove turf and soil from the side of the sprinkler to expose pilot valve and control tubing.
1. Remove the two retaining screws from the Sprinkler Pilot Valve housing (1).
 2. Pull the Pilot Valve Assembly away from the Sprinkler body (2).
 3. Unscrew the Pilot Valve's rear cap (3) and retain the small spring and internal valve washer fitting for reassembly.
 4. Cut the control tubing just below the Solenoid connection (4). Unless pilot valve has been previously removed, control tubing length will be sufficient for re-connection.
 5. Remove the Pilot Valve Assembly from Rotary Sprinkler.

Thoroughly clean and inspect all parts. Replace damaged parts as necessary and reassemble in reverse order.

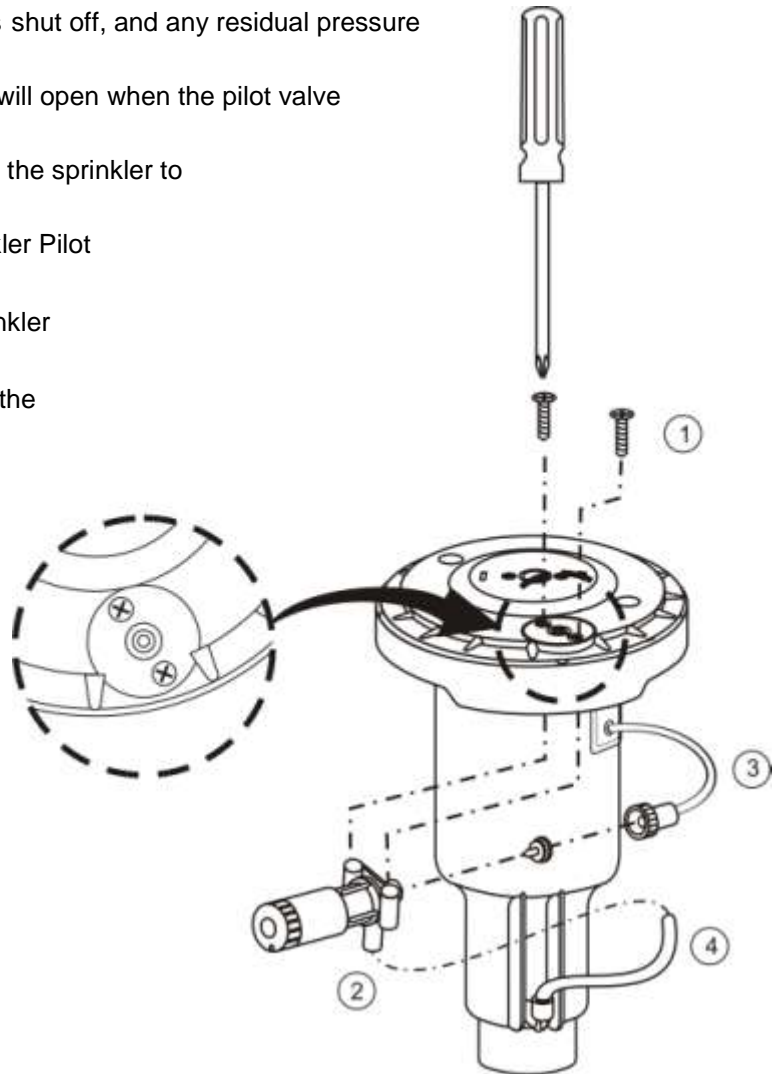


Figure 8 Service Pilot Valve Assembly Procedures.

Flushing Sprinkler



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1. With Sprinkler operating, carefully step down on center of cap several times.
Water will flow around riser and flush out debris.
2. Cycle sprinkler ON and OFF several times to check for proper retraction.
Cap should be even with top of body flange when fully retracted.
3. If riser sticks in up position, check for debris lodged between riser and body. Flush out all debris. Remove sprinkler mechanism if necessary.

Functional Specifications

Model D50-D55 Series Rotary Sprinklers	
<ul style="list-style-type: none"> ▪ Full Circle 50E: Electric Valve-in-Head 50C: Check Valve-in-Head 50H: Hydraulic (N.O.) ▪ Part Circle: 55E: Electric Valve-in-Head 55C: Check Valve-in-Head 55H: Hydraulic (N.O.) 	<ul style="list-style-type: none"> ▪ Inlet Threads: 1" ACME female threaded 1" NPT female threaded 1" BSP female threaded ▪ Standard Factory Threads: 1" ACME female threaded
<ul style="list-style-type: none"> ▪ Arc: 50-Series: Full-Circle, 360° 55-Series: Part-Circle, 35° to 360° 	<ul style="list-style-type: none"> ▪ Holdback: 50C and 55C Series: 15' (4,6 m) elevation ▪ Nozzle Trajectory: 25°
<ul style="list-style-type: none"> ▪ Maximum Inlet Pressure: 50E and 55E: 150 psi (10,3 bars) 50C and 55C: 150 psi (10,3 bars) 50H and 55H: 150 psi (10,3 bars) 	<ul style="list-style-type: none"> ▪ Dimensions: Body Height: 9.75" (x,x cm) Top Diameter: 6.50" (x,x cm) Pop-Up Height: 4.00" (x,x cm)
<ul style="list-style-type: none"> ▪ Pressure Regulation Range: 60 to 80 psi (4,1 to x.x bars) ▪ Factory Pressure Settings: 50E and 55E available in 60, 70, 80 psi Standard Factory Setting: 70 psi (x.x bars) 	<ul style="list-style-type: none"> ▪ Riser: Stainless Steel ▪ Solenoid: 24 VAC 50/60 Hz Inrush Amps: 0.30 Holding Amps: 0.20
<ul style="list-style-type: none"> ▪ Rotation Time: 50-Series: 360° in 150 seconds (nominally) 55-Series: 180° in 75 seconds (nominally) 	

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