TORO Count on it.

TS120 Pop-up Impact Sprinkler

Operating Manual

Table of Contents

1. General

Use of this manual assumes that you are experienced in the field of irrigation. We have therefore kept these instructions brief and included only the information that it is imperative for you to have to use this product.

Any warranty claims can be accepted only if the sprinkler is used in accordance with these operating instructions and if any defect emerges within the warranty period.

We reserve the right to make changes in line with technological advances without prior notice.

2. Safety

These operating instructions contain some fundamental instructions that must be followed when installing, operating, servicing and maintaining the sprinkler. It is therefore imperative that these instructions are read by the installation contractor(s) and the relevant specialized staff / operators prior to installation and startup.

Attention must be paid not just to the general safety information set out in this 'Safety' section, but also to the special safety instructions included in the other sections.

2.1. Use of symbols in these operating instructions

Where failure to follow safety information can place individuals at risk, such information is specifically marked in these operating instructions with the following symbols:

General warning symbol (hazard)

Warning of potential hand injuries

Warning of potential automatic start-up

Where failure to follow this safety information can damage the sprinkler and/or impair its function, you will see the word: **WARNING!**

2.2 Proper use

The sprinkler is used for the even distribution of water onto lawns, green spaces and sports fields laid with natural or synthetic turf. Source water should be pre-filtered and free of any coarse or fibrous contamination. The water and ambient temperatures must be within the limits specified in the technical data (see Section 4).

2.3 Clearly improper use

- Operation of the pop-up sprinkler by unauthorized personnel.
- Operation of the sprinkler before the arc has been properly set, or when the arc has been altered without authorization (e.g., as a result of vandalism). This can result in the water being directed away from the target irrigation area.

2.4 Safety information

Read the operating instructions, especially the safety information, before starting any work on or with the sprinkler.

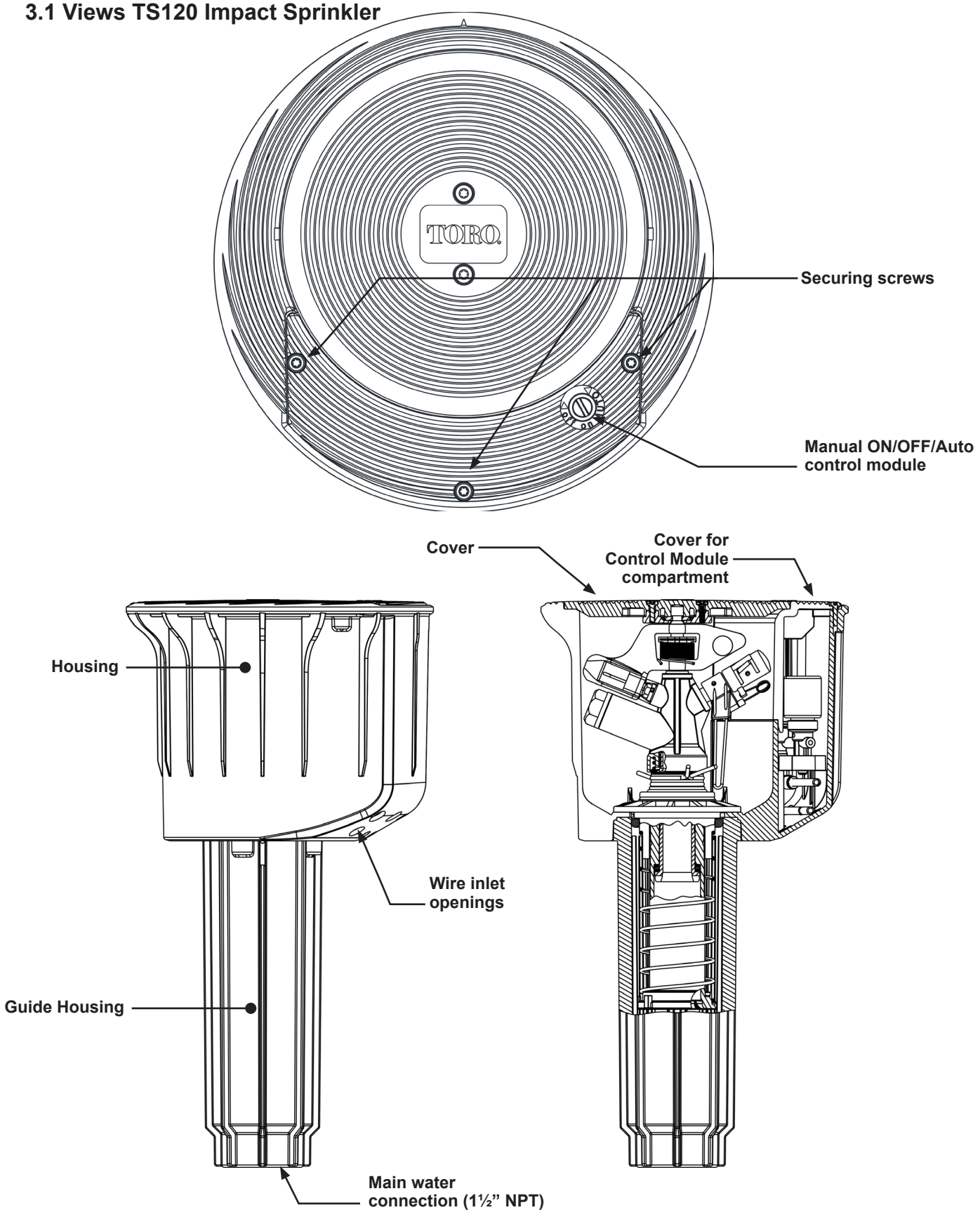
The specific safety instructions appear at the start of each section.

2.5 Dangers of failing to observe safety instructions

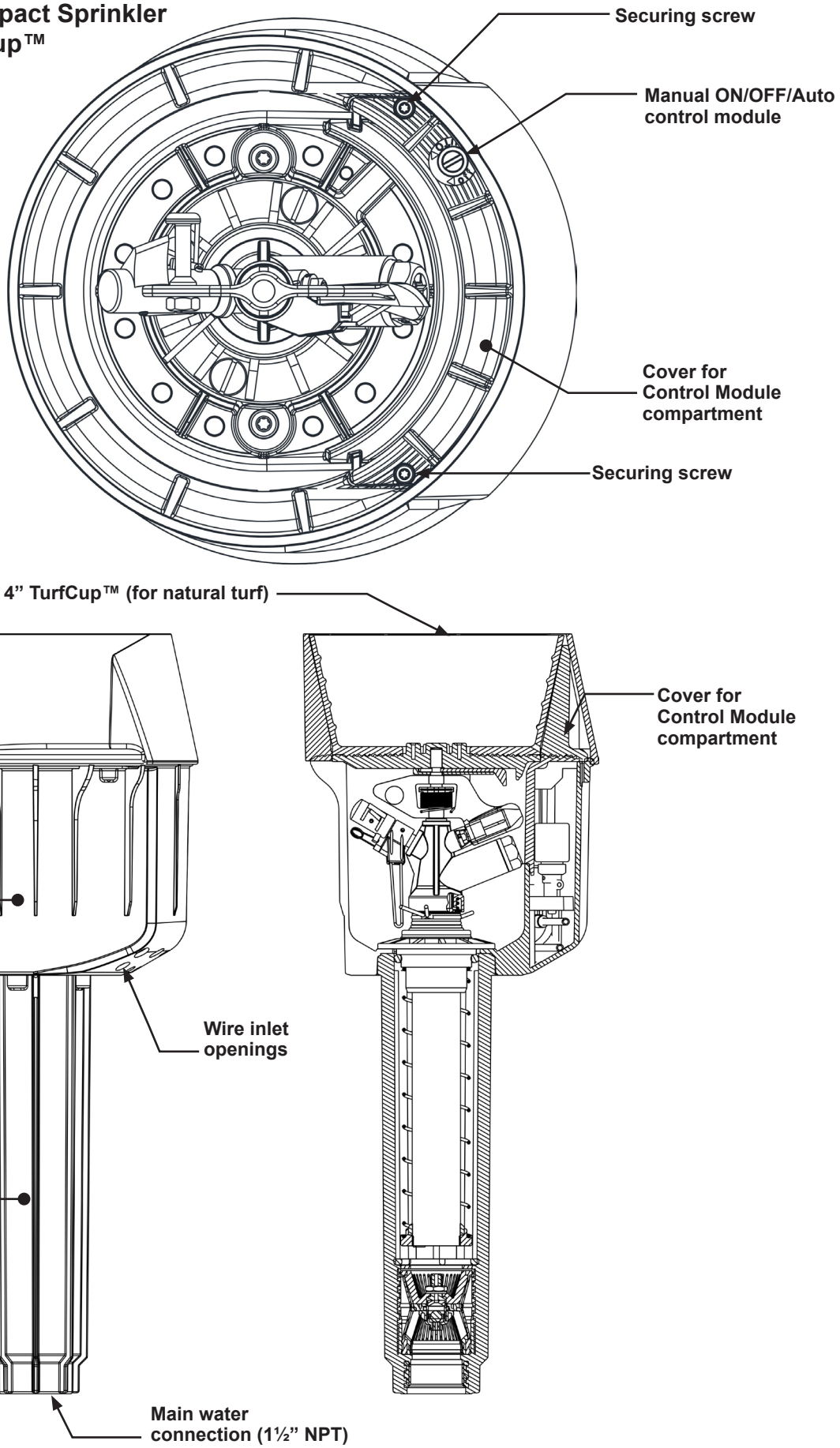
Failure to observe safety instructions can result in serious injury and/or damage to the sprinkler and surrounding environment. Failure to observe safety instructions can lead to the loss of warranty rights.

3. Description

3.1 Views TS120 Impact Sprinkler



3.2 Views TS120 Impact Sprinkler with VIH and TurfCup™



3.3 Special tools

Part Number	Description	Function	Image
RT19789	TS120 Assembly Key	Assembly and disassembly of sprinkler head	
RT15745	TS120 10mm Socket Wrench	Changing driving nozzle	
RT17623	TS120 Flushing Tool	Safely Flushing laterals	
RT17839	Snap Ring Removal Hook	Removing snap ring	
RT17843	TS120 Valve Insert Tool	Changing valve insert	
RT17844	Snap Ring Pliers	Installation of snap ring	
ZB98291	TS120 Split-Blade Screwdriver	Screw / unscrew flange and retain the screws.	
RT83226	TS121 Assembly Key	Disassembly of sprinkler head and pipe axle	
ZB98289	TORX-key T20	For compartment lid screws	
ZB98297	TORX-key T25	For guide housing screws	

4. Technical data

Recommended operating pressure	75 to 120 psi
Permitted operating pressure	45 to 145 psi

WARNING! ***Inlet pressure at the sprinkler must never exceed 145 psi.***

Inlet thread:	1½” NPT
Liquids:	Water only
Liquid temperature:	104° F max.
Ambient temperature:	140° F max.

For further data see separate data sheet.

5. Assembly, set-up and installation

5.1 Hazard warnings

If any debris get into the sprinkler, it is possible that the sprinkler could be damaged or destroyed. Flush out the line thoroughly before connecting the sprinkler to the water supply.

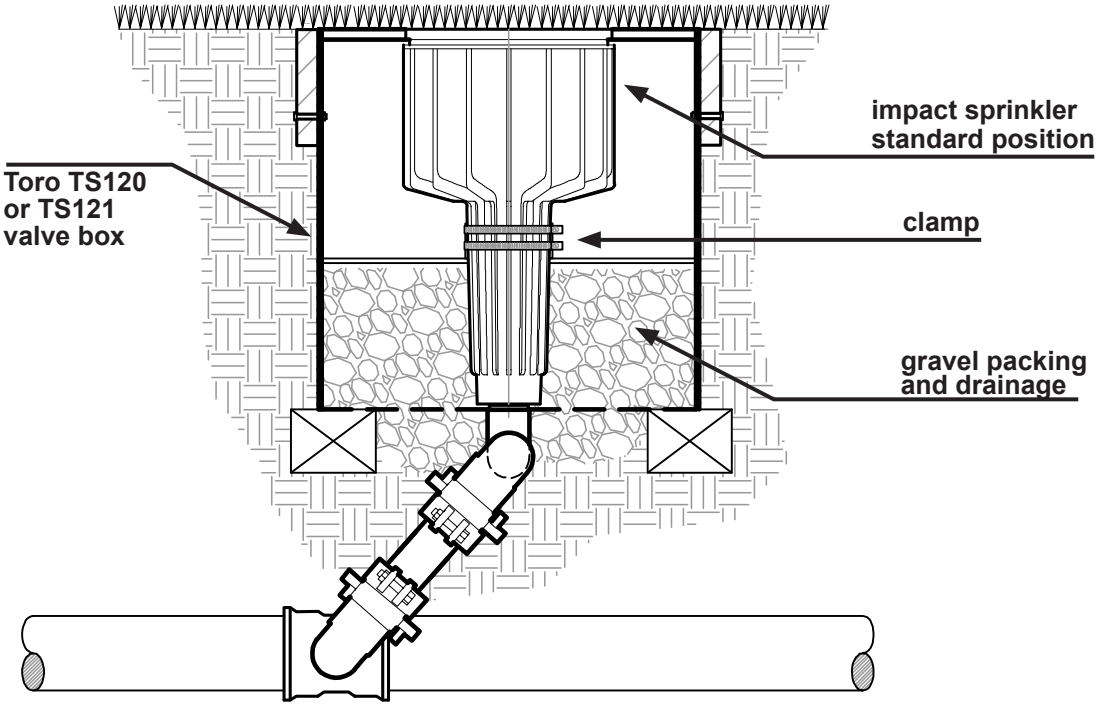
Any unexpected incidents at start-up can lead to serious injury from the jet of water. Make sure the installation has been completed before turning on the water supply.

5.2 Installation instructions

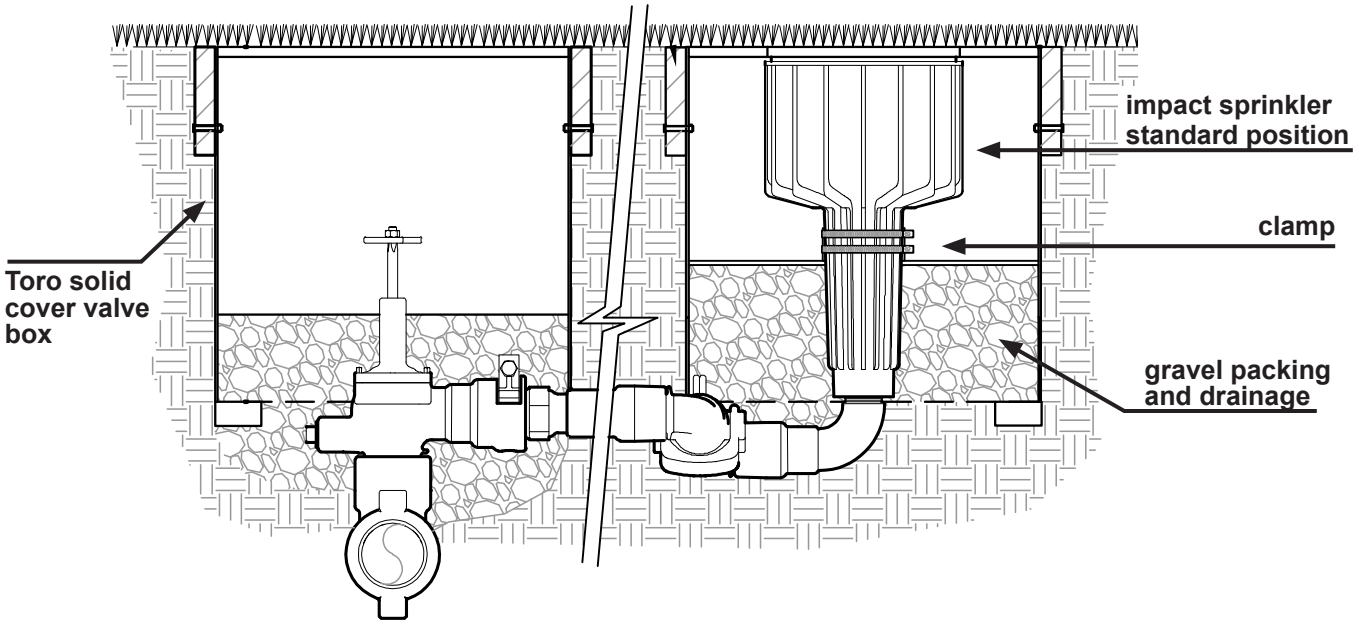
- The inlet thread connection on the TS120 pop-up sprinkler is 1½" NPT.
- For the thread seal, use a sealing compound and/or material (e.g., Teflon tape). Please be sure your sealing compound of choice is compatible with all materials at the point of connection.
- The pop-up sprinkler should be installed in accordance with the TS120 sprinkler installation diagram (see next page). In order to avoid any load pressure on the main line, use a recommended Toro adjustable swing joint or other pressure compatible flexible connection.
- Providing a drainage pit directly connected to the drainage, as shown in the installation diagram, is strongly recommended.
- For screwing in the connection joint, the housing or housing edge of the pop-up sprinkler can be firmly held or clamped.

5.3 TS120 / TS121 Impact Sprinkler Installation Diagram

Installation with Tee Connection:



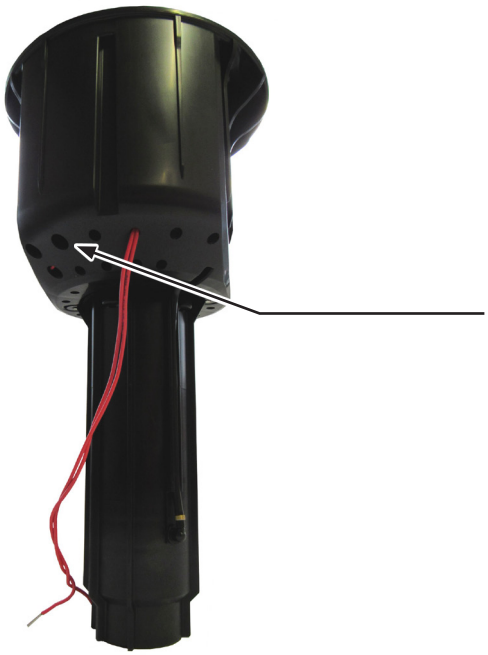
Installation with Isolation Valve:

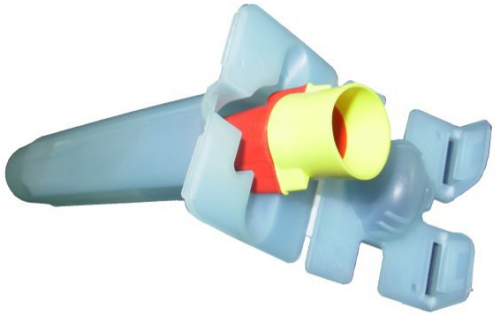


5.5 Wiring

The laid 2-core wire is installed for the electrical connection of the TS120 Impact Sprinkler.

The wire is pulled through the right or left opening on the bottom of the housing into the solenoid compartment.





Use a Direct Bury Splice Kits (Toro part number DBRY-100) to connect the control wire to the solenoid fitted inside the sprinkler.

Open the cover of the control module compartment and connect the solenoid wire. Use a waterproof connector kit for the connection.

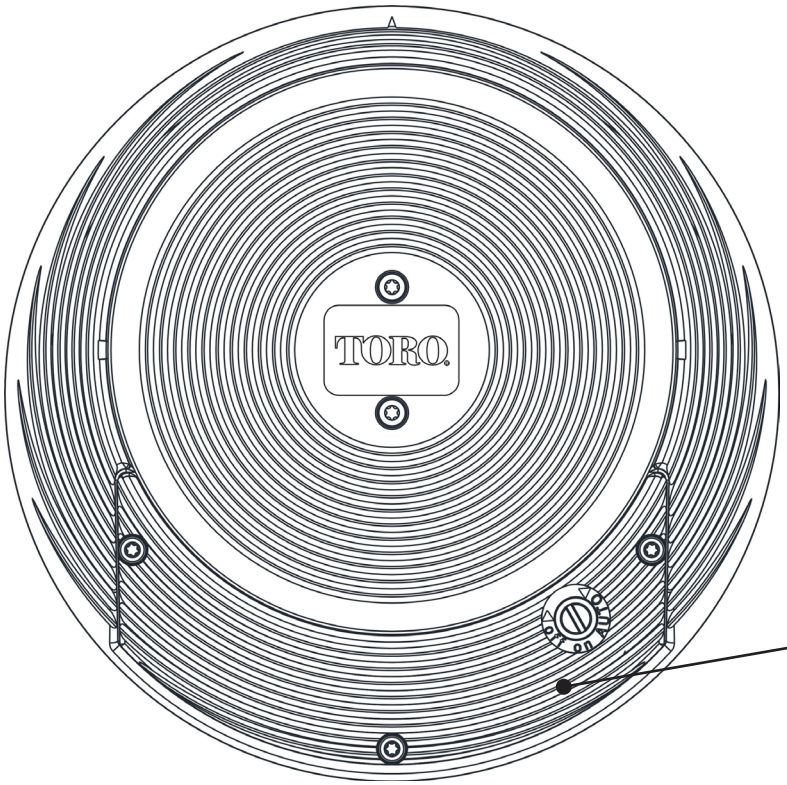
Return the wires into the solenoid compartment and close the cover.

In this installation, the electrical connection is not exposed to the soil, but is protected inside the sprinkler and readily top-accessible. This simplifies any search for faults and any maintenance work can be carried out at any time without digging.

6. Start-Up and Operation

6.1 Potential danger

At start up, the impact sprinkler rises up out of the housing and builds up full pressure within about 5 seconds. The jet of water emitted can cause injury. For this reason, it is critical that all personnel and bystanders are clear of the irrigation area and are not in the path of the sprinkler's nozzle opening.



If the sprinkler is not installed flush to the ground, it may pose a trip hazard. Prior to startup, and as a part of regular maintenance checks, ensure the sprinkler cover closes flush with the sprinkler body.

The sprinkler must not be operated without first closing the cover for the control compartment. The control compartment cover is an integral component to the proper operation and rotation of the sprinkler.

6.2 Start-Up Procedure

Be sure to follow the start-up procedure in order, a) to h).

Steps

a) Check electrical function:
Before any water supply to the sprinkler is opened, activate the solenoid by means of the controller. An audible 'clicking' sound from the solenoid is indicative of its functioning properly.
(The click is produced by movement of the plunger.)

b) Ensure the manual control switch (located along the top cover of the rotor) is set to AUTO.
This setting ensures that the sprinkler will retract after the irrigation cycle.

c) Slowly open supply of water to the valve until operating pressure is built up.
It is possible that the sprinkler will briefly open, but should then automatically close after at most 30 seconds.

d) Once the water supply has been opened and the operating pressure has been reached, check sprinkler and connection for leaks.

e) Confirm the sprinkler solenoid is operating properly by toggling the manual control switch between AUTO and OFF. In between toggles is the ON position--the sprinkler should rise and begin rotating.

Do not stand in front of the nozzle opening!

f) Check that the manual control switch is set to AUTO and deactivate solenoid (see point 6.2b). Sprinkler will stop water flow within 30 seconds.

h) Check once again that it works correctly when activated electrically from the controller.

For Winterization process, see Section 7.

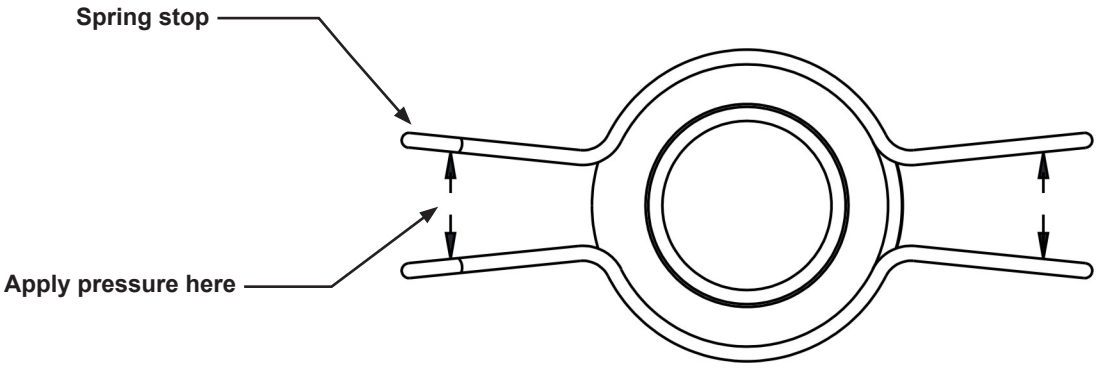
6.3 Arc Setting

- With this impact sprinkler the arc setting is infinitely adjustable between 30° and 330° and capable of a full circle 360°.
- You can adjust the area to be watered by pulling or pressing on the relevant end of the top or bottom spring stop.

Setting the Arc Angle

WARNING!

Infinitely variable setting is possible by pulling (not pressing) on the relevant end of the top or bottom spring stop.



7. Shut-Down and Preparing for winter

- For winter shut-down, turn off the water supply and electricity supply of the pump.
- During times of possible frost, ensure there is no standing water in the sprinkler.
- The TS120 Impact Sprinkler has an automatic drainage system.
- The sprinkler has a discharge valve and will drain by gravity as long as water drains from the main pipe. The sprinkler should empty itself.
- Any water that fails to drain from the sprinkler is inconsequential and will not affect the sprinkler in the event it freezes.

Electrically activate the solenoid several times so that any residual water is pushed out of the solenoid cavity.
During the winter we recommend activating the solenoid for approx. 1 minute twice a week.

For Start-up, see section 6.2.

8 Maintenance and Repair Work

An unexpected jet of water can cause serious injury. Prior to any maintenance or repair work ensure that the water supply is securely turned off.

8.1 Maintenance

- Clean out the inside of the sprinkler housing using an industrial wet/dry vacuum cleaner or similar (as necessary).
- Cut sprinkler housing free of any overgrowing grass. It is recommended this is completed prior to spring startup.
- Regularly check that the sprinkler is flush with the surface, especially in the case of natural grass.

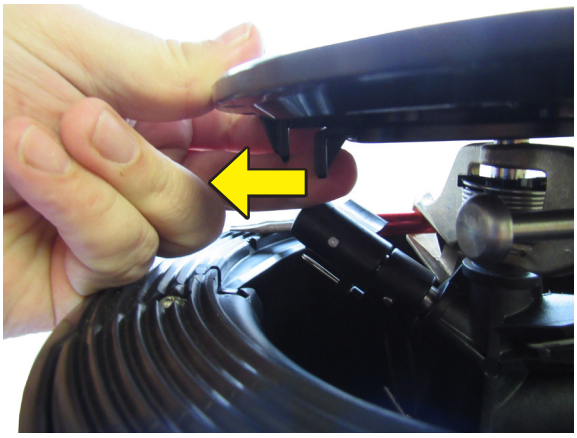
8.2 Changing the Nozzles

It is recommended that the tools listed in Section 3.3 are used for changing the nozzles.

Use 10mm socket wrench (RT15745) for the driving nozzle and 1" (26mm) socket wrench for the main nozzle.

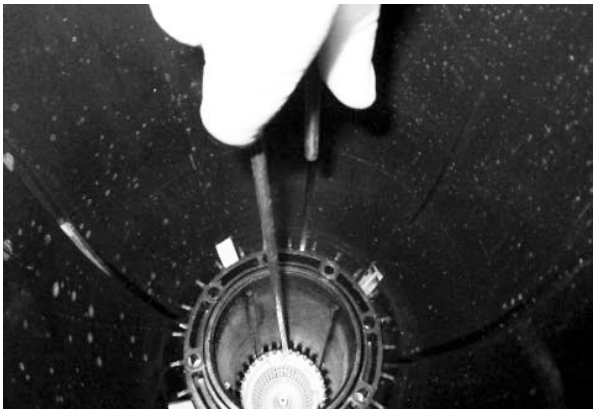
8.3 Cleaning or Changing the Valve Insert

The sprinkler module needs to be taken out of the housing in order to carry out the repairs described in section 8.4.

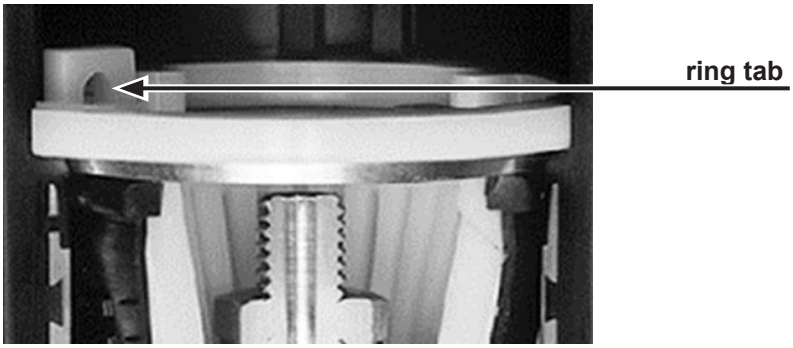


- Lift the cover and secure the sprinkler module against snapping back (using a screwdriver or other brace). Locate the cover clip (see photo) and pull the clip to release. Remove cover.

- Use a long shank screwdriver to unscrew the four flange screws at the base of the riser assembly. (Retain screws.)
  Pull sprinkler module out of the housing.

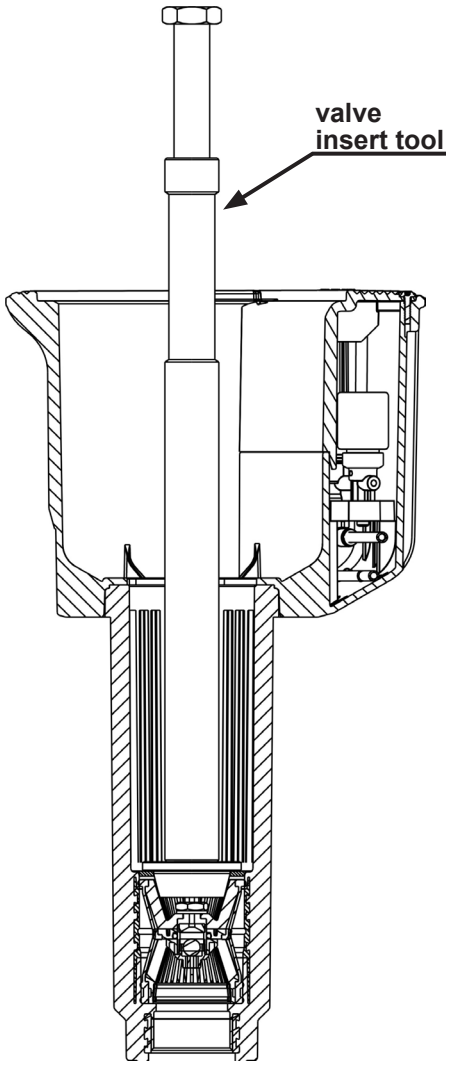


- Remove retaining ring in the housing bottom using removal hook tool (RT17839).
- Engage hook into retaining ring tab and use a gentle twisting action to compress ring and remove. Retain ring for later.

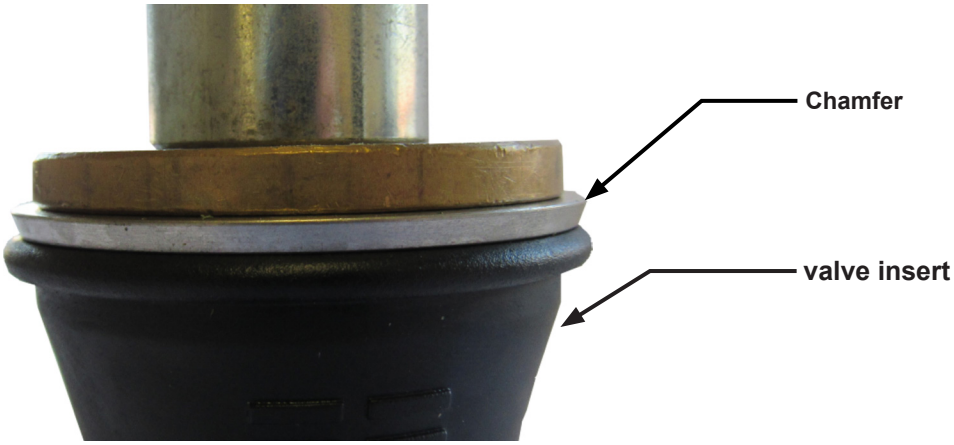


8.4 Removing & Replacing the Valve Insert

1. Prior to removal, check housing for damage, debris, or dirt. If any, clear it away.
2. Once the retaining ring is removed from the inlet housing (see 8.3), thread the valve insert tool onto the top of the valve. Thrust tool upwards. (A few gentle taps may be necessary to dislodge the valve assembly.)
3. Thoroughly clean the valve insert before replacing, making sure to remove rocks and debris that may be caught in the filter screen.



4. To replace, screw the valve insert with the stainless steel disc onto the valve insertion tool. The chamfered surface of the stainless steel disc must point to the valve insert (as in, the larger surface facing up, the smaller surface down).



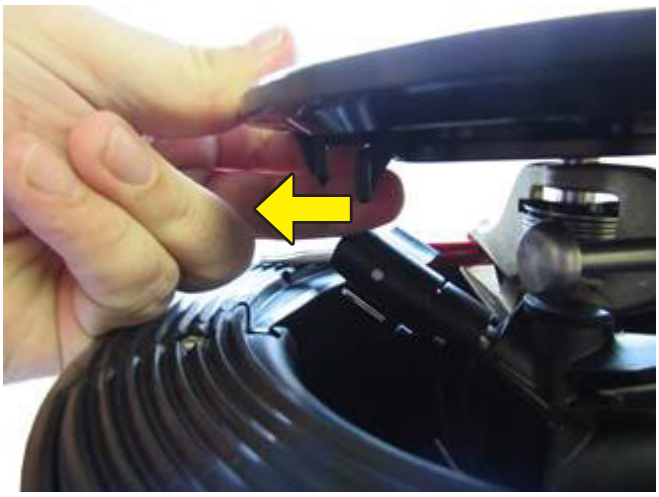
5. To make it easier, the valve insert can be slightly lubricated with standard household lubricating oil.
6. Insert the valve down into the guide housing until it stops. Apply gentle taps to reseat.
7. Using pliers RT17844, replace the retaining ring into the groove above the stainless steel disc.

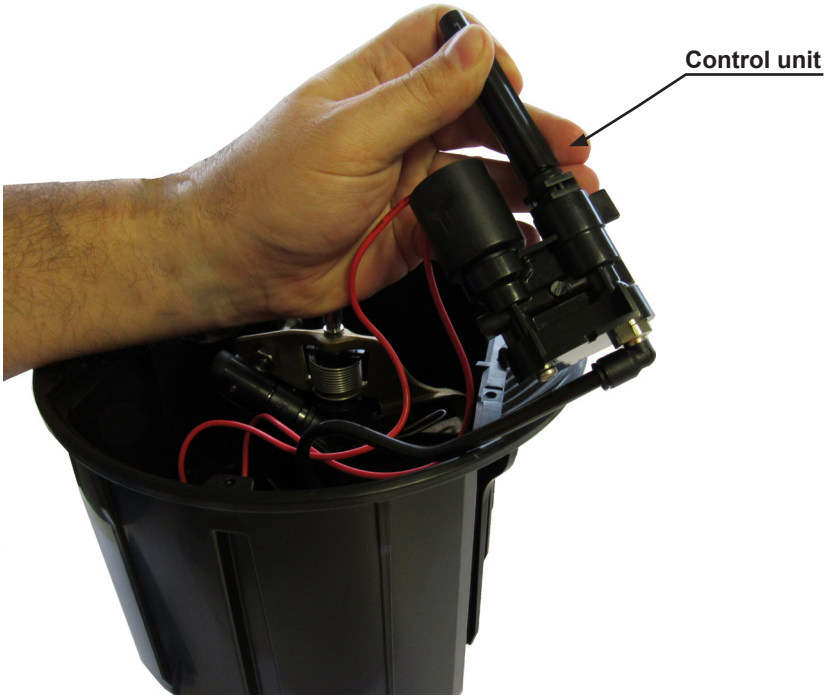
8.5 Removal / installation of the control unit

Ensure sprinkler is not under pressure.

Removing the control unit

- Lift the cover and secure the insert with a screw driver against snapping back. Locate the cover clip and pull clip to release. Remove cover.
- Unscrew all three locking screws (two screws for the TurfCup version) and remove control unit cover.
- Unclip control unit from protective casing and lift up and out.
- To remove vent hose, push back mounting ring and pull out hose.
- Clean, repair, or replace as needed.





Replacing the control unit

- A replacement control unit is supplied with plug-and-socket connections. Push hose into plug-in sockets as far as it will go and ensure that the mounting ring springs back.
- Clip control unit into protective casing.
- Secure housing cover using all three screws (two screws for TurfCup version).
- Check sprinkler is working properly per Start-Up procedure (6.2).

9. Troubleshooting

Observed Issue	Cause	Remedy
Sprinkler not rotating, or rotating very slowly. Sprinkler not rotating at all.	Sealing disc worn out.	Change sealing disc.
	Driving nozzle clogged.	Unscrew driving nozzle and clean.
	Minimum pressure of 45 psi not reached.	Increase pressure.
Sprinkler has poor stream strength.	Nozzle is blocked / clogged.	Unscrew nozzle, remove and clean.
Arc increases during operation.	Spring stop is loose. Spring force has slackened. Spring stop has been overextended.	Replace spring stop.
Valve opens/closes only with manual opening, but not on any electric signal.	Manual control switch is set to OFF.	Turn manual control switch all the way to the left to AUTO.
	Plunger is lodged in the solenoid.	Remove solenoid and clean plunger.
	No / inadequate power supply	Establish 24V AC power supply.
	Defective solenoid	Check solenoid resistance. (It should be approx. 35 ohms.) Replace if necessary.
	Vent port for solenoid blocked.	Clean vent port.
	Control hose to the solenoid clogged or bent / kinked.	Replace control hose.
Valve fails to open even with manual opening.	Control water vent or relief vent blocked.	Clean control water / relief vent.
	Supply line under no / insufficient pressure	Establish pressure supply.
Valve fails to close.	Solenoid seat dirty	Clean solenoid seat.
	Bits of dirt between valve seat and sealing plate	Clean valve seat and sealing plate.
	Defective valve insert	Remove valve. Replace or clean.
	Valve insert filter dirty	Clean valve insert filter.
	Control hose defect	Change control hose.
Output pressure at sprinkler nozzle too low or radius too short.	Nozzle clogged.	Clean nozzle and flush sprinkler.
	Valve insert is blocked.	Clean valve insert (see Section 8.3).

We reserve the right to make changes in line with technological advances without prior notification.

Notes

TORO®

Count on it.

Patent: www.ttcopats.com

WARNING: Cancer and Reproductive harm – www.P65Warnings.ca.gov.
For more information, please visit www.toro.com/CAProp65.

  Part Number 373-0947 Rev. C