Operation and Installation Manual

Pulsar® Sunscreen 20 Feeder

Model PS-1SS

Rev. 0.1
01/2023

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1 Safety Precautions

Danger, Warning, Caution, and Note statements are used throughout this manual to emphasize important safety information. The statements are defined below.

1.1 Safety Conventions

Danger: Indicates a hazardous situation which, if not avoided, will result in death or severe injury.

Warning: Indicates a potentially hazardous situation which, if not avoided, can result in personal injury.

Caution: Indicates a potentially hazardous situation which, if not avoided, can result in minor personal injury or equipment damage.

Note: Information that may assist in completing a task correctly or for maintaining the machine in good operating condition.

1.2 Safety Statements for the Pulsar® Precision 30 System

Warning: For your protection, carefully and completely read the information provided in this manual before attempting to assemble, install, operate, or maintain this product. Retain these instructions for future reference. Failure to follow the instructions or information in this manual may result in injury and damage to the product and may affect warranty coverage.

Danger: Fire or explosion could result from contamination or use of any other chlorinating compound!

Danger: Due to the fact that the Pulsar® Sunscreen Feeder (and Cyanuric Acid) will be used in conjunction with our Pulsar® Calcium Hypochlorite feeder, it is important to not allow Pulsar® Sunscreen 20 Stabilizer to come into contact with calcium hypochlorite or any foreign matter or chemicals. Calcium hypochlorite is chemically reactive with many substances including, but not limited to water, water treatment products, pool treatment products, acids, organics, nitrogen-containing compounds, dry powder fire extinguishers (containing mono-ammonium phosphate), oxidizers, and corrosive, flammable, and combustible materials. Contamination or improper use of Pulsar® Sunscreen 20 Stabilizer may cause a violent reaction that produces heat, an explosion, a fire, and the release of toxic gases, and result in death or serious injury. Please refer to the Safety Data Sheet for additional information and precautions regarding the proper handling of calcium hypochlorite.

Danger: Store and use in a separate container or feeder from Calcium hypochlorite. Please refer to the Safety Data Sheet for additional information and precautions regarding the proper handling of Pulsar® Sunscreen 20 Stabilizer. If any part of this profile is unclear to you, please stop immediately and contact Solenis at (800) 478-5727.

Danger: This system contains liquid under pressure and water can be discharged unexpectedly. Operate and service all components and attached piping that contain liquid cautiously until you are certain that the system has been depressurized and drained. Failure to do so may result in serious injury.

Danger: Use suitable personal protective equipment (PPE) at all times to avoid physical contact with cyanuric acid solution or dust. Failure to do so may result in serious injury. Please refer to the Safety Data Sheet for additional information and precautions regarding the proper handling of cyanuric acid.

Warning: Clean up, without delay, any leakage or spillage of Pulsar® Sunscreen 20 Stabilizer. Please refer to the Safety Data Sheet for additional information and precautions regarding the proper disposal of cyanuric acid. Failure to do so may result in death or serious injury.

Warning: Always operate system components with safety guards in place. Failure to do so may result in injury.

Warning: Observe and follow all location-specific safety procedures. Failure to do so may result in injury.

Caution: Use only replacement parts identified in 10.2 Replacement Parts List and Views on page 17. Do not paint over or remove unit nameplates, labels, or tags so that proper replacement parts may be identified.

Caution: Use of any other chemicals other than the Pulsar® Sunscreen 20 Stabilizer designed for use with this feeder is hazardous, possibly causing fire and/or explosion and will void this warranty.

2 Introduction

The Pulsar® Sunscreen 20 feeder creates a cyanuric acid (CYA) solution used for adding chlorine stabilizer to the pool or spa water.

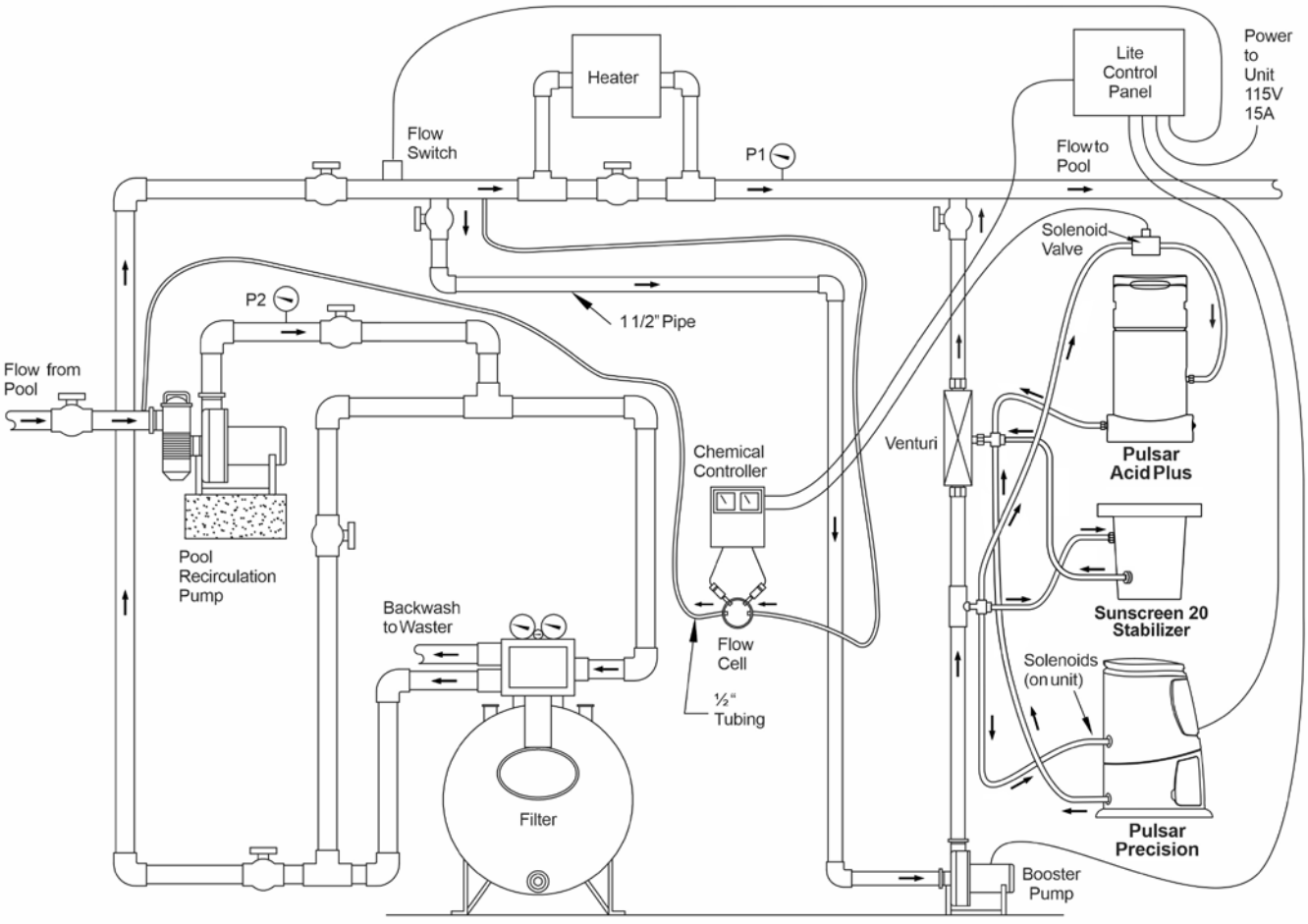
2.1 Overview of Operation

The Pulsar® Sunscreen 20 feeder operates as follows:

1. The feeder is installed on an existing Pulsar® booster pump and venturi loop and sits idle until needed.
2. Pulsar® Sunscreen 20 Stabilizer is poured into a tank.
3. Water flows into the tank and mixes with the CYA, starting the dissolution process.
4. Water fills up the tank until it reaches the upper mechanical float valve which then stops the inlet water.
5. After approximately 48 hours at above 77° F water, the CYA is fully dissolved.
6. When CYA needs to be added to the pool or spa, the outlet valve is manually opened allowing the venturi to draw the CYA solution out of the tank and into the pool recirculation system.
7. The process is repeated until the CYA is increased to the desired concentration.

2.2 Process Flow Diagram

Figure 1. Pulsar® Sunscreen 20 feeder Installation



3 Pulsar® Sunscreen 20 Feeder Overview

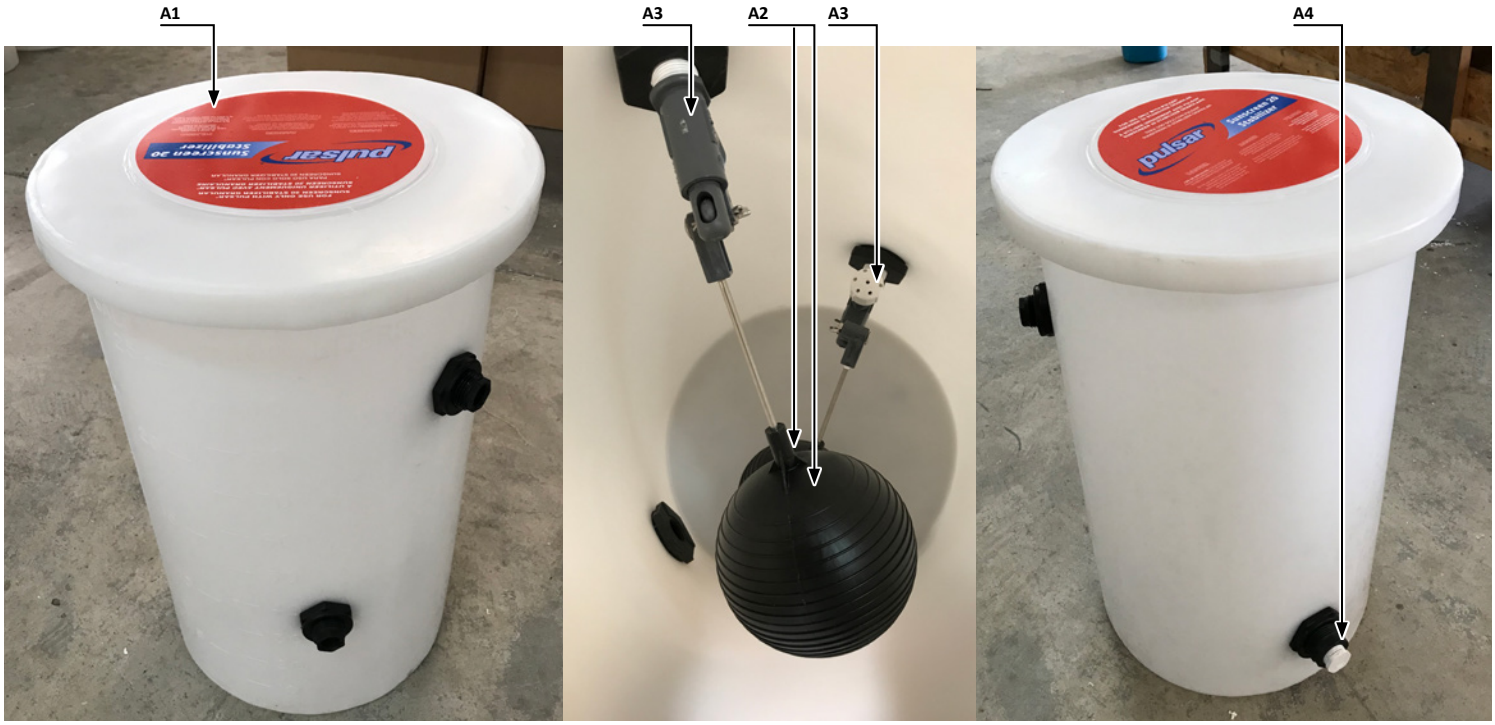
3.1 Major Components List

The Pulsar® Sunscreen 20 Feeder includes these components:

A Tank

- A1 Tank Lid
- A2 Floats
- A3 Kerick Valves
- A4 Drain
- A5 Reducing Bushings (not shown)

Figure 2. View of the Pulsar® Sunscreen 20 Feeder



4 Pre-installation Instructions

4.1 Prepare the Site

Before installing equipment ensure that the site meets criteria noted in Site Requirements below.

4.1.1 Site Requirements

- The feeder must fit in the selected room with enough clearance for maneuvering and servicing the equipment.
  - Recommended clearance for feeder installation is 42"Ø x 54" H [106.7 cm x 137.16 cm]
  - Minimum clearance for feeder installation is 36"Ø x 42" H [91.4 cm x 106.7 cm]
- Determine the distance of the feeder location from the existing booster pump and venturi bypass.

4.2 Gather Equipment for Feeder Installation

Assemble these products in preparation for installation:

4.2.1 Pulsar® Sunscreen 20 Components

See 3.1 Major Components List on page 7.

4.2.2 Essential Equipment Supplied by Others

- Plumber's tape

4.2.3 COTS (commercial off-the-shelf) Tools

- Pipe wrenches or gas pliers
- Tubing cutters

4.2.4 PPE

- Safety glasses
- Rubber gloves
- Apron

4.3 Pre-Installation Checklist

Table 1. Pre-installation Checklist

Item No	Check	Completed?
1	Is all PPE on Hand?	
2	Does the site meet all criteria noted in 4.1.1 Site Requirements?	
3	Has the location of the feeder and distance from the booster pump and venturi loop been identified?	
4	Are all Pulsar® Sunscreen 20 feeder components on hand?	
5	Is all essential equipment supplied by others on hand?	
6	Are all COTS tools and other equipment on hand?	

5 Installation Instructions

5.1 Install the Inlet Tubing

1. Isolate the discharge and suction of the booster pump and venturi loop by either closing the ½" ball valves or the 1 ½" ball valves of the booster pump suction and venturi outlet.
2. Once isolated, disconnect the existing fittings providing the inlet connection to the Pulsar® chlorine feeder and the Pulsar® Acid plus feeder, if installed.
3. On the booster pump discharge feeding water into the connected feeders, install the threaded Tee to add an additional water path for the Pulsar® Sunscreen 20 feeder.
4. Complete the connection with the tubing connector.
5. Reconnect the preinstalled existing feeders to the feeder inlet.
6. Install the ¾" MNPT x ½" FNPT reducer to the top tank fitting, then install the ½" threaded nipple, ½" ball valve, and ½" NPT x OD tubing connector
7. Measure the distance from the feeder to the booster pump and venturi loop, cut the tubing to the desired length and complete the connection of the feeder to the booster pump loop.

5.2 Install the Discharge Assembly and Check Valve

1. With the system still isolated, disconnect the existing fittings providing the outlet connection from the Pulsar® chlorine feeder and the Pulsar® Acid plus feeder, if installed.
2. On the venturi suction, install the threaded Tee to add an additional suction path for the Pulsar® Sunscreen 20 feeder.
3. Complete the connection with the tubing connector.
4. Reconnect the preinstalled existing feeders to the venturi suction.
5. Install the ¾" MNPT x ½" FNPT to the bottom tank fitting.
6. Complete the tank discharge by Installing the ½" threaded nipple, ½" 45° elbow, ½" threaded nipple, ball check valve, ½" threaded nipple, ½" ball valve, and straight tubing connector.
7. Measure the distance from the feeder to the booster pump and venturi loop, cut the tubing to the desired length and complete the connection of the feeder outlet to the venturi suction.

6 Post-Installation Instructions

Before first-time startup of the feeder, check:

Table 2. Post-Installation Checklist

Item No	Check	Completed?
1.	Is the feeder installed in accordance with the general guidance of the Figure 1 installation schematic	
2.	Is there any residual debris (plastic shavings, screws, and so on) inside the solution tank?	
3.	Are all tubing, fittings, and valves to and from the feeder installed in accordance with Section 5?	
4.	Are all fittings and unions tightened to prevent leaks?	
5.	Are flow directional arrows pointed in the correct direction of flow on the check valve?	

6.1 System Startup

Note: Before starting up the equipment, ensure that the Post-Installation checklist has been completed.

6.1.1 Feeder Preparation

After completing the post-installation checklist:

1. Put on the appropriate PPE: long sleeved clothing, rubber gloves, apron, dust mask, and safety glasses.

Danger: Always use suitable personal protective equipment (PPE) to avoid physical contact with cyanuric acid solution or dust. Failure to do so may result in serious injury. Please refer to the chemical's Safety Data Sheet for additional information and precautions regarding the proper handling of cyanuric acid.

Danger: Fire or explosion could result from contamination or exposure to chlorinating compounds!

Caution: Use of any other chemicals other than the Pulsar® Sunscreen 20 Stabilizer designed for use with this feeder is hazardous, possibly causing fire and/or explosion and will void this warranty.

2. Open the ½" inlet valve to the feeder.
3. Remove the feeder tank lid.
4. Verify that there are no leaks at any of the fittings on the inlet and outlet tubing.
5. Allow the tank to complete fill with water and ensure that the upper float valve lifts and automatically shuts off the water flow.
6. Shut the inlet valve then open the outlet valve to the venturi suction and allow the water in the tank to siphon out lowering the water level.
7. As the water level reaches the bottom float, the float will lower and automatically shut the suction to prevent the tank from running dry and siphoning in air. This also allows a small volume of water to remain in the tank and continue to dissolve and residual CYA not yet dissolved.
8. Once both floats are confirmed operational, open both inlet and outlet valves, and allow water to flow in and out of the feeder freely, letting the upper and lower floats regulate the volume of water in the tank.
9. Replace and close the feeder tank lid.

7 Operation Instructions

Note:	Before starting up the equipment, ensure that the feeder preparation steps have been completed and that water volume in the tank is up near the upper float. This ensures optimal dissolution of the CYA poured into the feeder

Note:	The feeder only doses dissolved CYA solution; therefore, the total CYA dosing time depends on the total dissolution time.

Note:	It takes a minimum of 48 hours and up to 5 days for half a pound of CYA to dissolve in a full tank. Any CYA more than a half-pound will remain undissolved in the tank until the dissolved solution is consumed.

Note:	Measure your pool CYA PPM every 48 hours when dosing until desired PPM is reached.

7.1 Feeder Operation

To operate the Pulsar® Sunscreen 20 Feeder:

1. Ensure that the inlet and outlet valves on the feeder and venturi suction lines are fully open.
2. Remove the feeder tank lid.
3. With water in the feeder, use a scoop to fill the feeder with the desired amount of Pulsar® Sunscreen 20 Stabilizer needed to reach your target CYA PPM. (Refer to Section 7.2 for CYA dosing calculations)
4. Replace and close the tank lid.
5. Repeat steps 1 through 5 when more CYA is needed.
6. CYA solution will be sucked out of the tank until the valve is shut or the solution level lowers to the bottom float and automatically shuts the flow.

Note:	The CYA poured into the feeder will continue to slowly dissolve and dose until it is completely consumed. The CYA in the pool will continue to increase until the calculated PPM from Section 7.2 has been reached.

Note:	If the desired CYA PPM is reached but an excess of CYA is poured into the feeder, shut the ½" outlet valve until another dosing is required.

7.2 CYA Dosing Calculation

Table 3. Pool CYA Dosing per 120,000 gallons

CYA Amount	Amount Increase PPM
1 lb	1 PPM

$$\frac{Actual\ Pool\ Volume,\ gallons}{120{,}000\ gallons} \times (Target\ CYA\ PPM - Current\ CYA\ PPM) = Amount\ CYA\ Needed,\ lbs$$

Example: You recently performed a manual test of your 250,000-gallon pool which resulted in a CYA level of 2 PPM. You want to increase the PPM level in the pool to 15 PPM.

Actual Pool Volume = 250,000 gallons
Target CYA PPM = 15 PPM
Current CYA PPM = 2 PPM

$$\frac{250{,}000\ gallons}{120{,}000\ gallons} \times (15\ PPM - 2\ PPM) = 27\ lbs$$

8 Preventative Maintenance

8.1 Preventative Maintenance Schedule

Complete each of the following tasks during the first week of each month.

Table 4. Monthly Maintenance

Action Needed	Maintenance Process	Time to Complete
Change/clean basket	See 8.2 Cleaning Procedures on page 12	
Inspect inlet and outlet plumbing fittings	Verify that there are no leaks at any of the inlet and outlet ½" feeder fittings and 1 ½" venturi piping and fittings and valves. ▪ Close all isolation ball valves and re-plumb / replace any leaking piping and fittings.	2 min
Inspect level float operation	1. With the feeder inlet and outlet valves fully open verify that the upper float prevents water from flowing into the feeder and causing an overflow condition. Adjust float orientation or replace if needed. 2. Close inlet ball valve. 3. As the water level lowers and reaches the lower float, verify the venturi suction automatically shuts and the water level stops decreasing. Adjust float orientation or replace if needed.	10 – 15 min
Inspect discharge check valve	1. Close the outlet ball valve. 2. Unscrew the check valve unions to remove the check valve body. 3. Disassemble the check valve and inspect for calcium build up and debris. Clean if necessary. 4. Visually check the seal for corrosion. If the seal is corroded, replace the check valve. 5. Reassemble the check valve body ensuring to put the seal on the side of the ball. 6. Replace the check valve body back onto the unions, ensure arrow points away from feeder.	10 min
Inspect feeder tank and level floats	Visually inspect the solution tank and ensure that there is no debris other than CYA in the solution as well on the level floats. ▪ Physically verify the operation and motion of the level floats by lifting them up and down and ensuring smooth motion	5 min

8.2 Cleaning Procedures

8.2.1 Equipment Needed

- PPE
  - Rubber gloves
  - Apron
  - Safety glasses
  - Long sleeved clothing
- Water hose

8.2.2 Chemical Free Cleaning

Danger: This system contains liquid under pressure and water can be discharged unexpectedly. Operate and service all components and attached piping that contain liquid cautiously until you are certain that the system has been depressurized and drained. Failure to do so may result in serious injury.

Danger: Use suitable personal protective equipment (PPE) at all times to avoid physical contact with cyanuric acid solution or dust. Failure to do so may result in serious injury. Please refer to the Safety Data Sheet for additional information and precautions regarding the proper handling of cyanuric acid.

Warning: Clean up, without delay, any leakage or spillage of Pulsar® Sunscreen 20 Stabilizer. Please refer to the Safety Data Sheet for additional information and precautions regarding the proper disposal of cyanuric acid. Failure to do so may result in death or serious injury.

Perform this chemical free cleaning when a feeder failure is suspected.

1. Put on the appropriate PPE: long sleeved clothing, rubber gloves, apron, and safety glasses.
2. Shut the ½" ball valve on the feeder inlet.
3. Remove the feeder lid.
4. If possible, allow the tank to run completely out of Pulsar® Sunscreen 20 Stabilizer. If time does not allow full consumption of all the CYA, use a scooper to remove any remaining CYA granules from the tank.

Danger: Do not use a scoop that was used for any other chemical other than CYA or Pulsar® Sunscreen 20 Stabilizer. Exceptional consideration must be given when operating in conjunction with a Pulsar® calcium hypochlorite feeder. Any trace or residue of other chemicals, even if not visible, can cause a dangerous chemical reaction that may result in serious injury and damage to equipment.

5. Spray the inside of the feeder with water from the hose. Be sure to rinse off all solid residue visible on the tank walls and fittings. Solids and debris small and light enough should flow down to the solution and get siphoned out through the outlet. If water in the tank rises above the top float, pause spraying until the venturi catches up. Repeat the spray and pause pattern until the tank walls, floats and components are free of solids or debris.
6. Bigger and heavier debris may not get siphoned out of the tank and fall to the bottom.
    a. If the feeder is clean of debris and operational, open the inlet ½" valve and resume normal operation.
    b. If debris is noticed at the bottom of the tank, continue to the remaining steps.
7. Remove the threaded drain plug from the lowest port in the tank and empty the feeder of all remaining water.
8. Inspect the base for solids and debris. Spray inside the tank to remove any remaining debris and flush them out of the drain port.
9. Once the tank is free from all debris and solids, re-install the drain plug.
10. Open the inlet ½" ball valve and allow the feeder to completely fill with water. Check the drain plug for leaks.

9 Troubleshooting Guide

Table 5. Troubleshooting Guide

Symptom	Probable Cause	Solution
No/low inlet water flow	Improper Inlet float operation	▪ Check float orientation and verify position. As the float rises, inlet water flow is stopped ▪ Check for free float movement up and down. ▪ In case of complete valve failure, replace kerick valve. Contact your dealer for details.
	½" Inlet ball valve closed	Open the inlet ball valve.
	Booster pump is off	Verify booster pump is powered on
Insufficient CYA in pool	Feeder empty	Refill feeder tank with Pulsar® Sunscreen 20 Stabilizer.
	No/low inlet water flow	See No/low inlet water flow section above.
	Clogged outlet line	Debris stuck in outlet tubing or fittings. Inspect, Clean or replace discharge tubing and fittings. Refer to 8.2 Cleaning Procedures on page 12.
	Clogged check valve	Remove, inspect, and clean the check valve.
	Insufficient venturi suction	Inspect booster pump and venturi installation. Refer to Pulsar® feeder manual for detailed troubleshooting steps to improve venturi operation.
	Improper outlet float operation	▪ Check float orientation and verify position. As the float lowers, outlet water flow is stopped ▪ Check for free float movement up and down. ▪ In case of complete valve failure, replace kerick valve. Contact your dealer for details.
	CYA not yet fully dissolved	▪ It takes a minimum of 2 days and up to 5 days for complete dissolution of CYA in the tank ▪ The feeder will slowly dose until all CYA is dissolved. ▪ CYA PPM in the pool will increase until all dissolved CYA is dosed.
Feeder overflow	Clogged outlet line	Debris stuck in outlet tubing or fittings. Inspect, Clean or replace discharge tubing and fittings. Refer to 8.2 Cleaning Procedures on page 12.
	Clogged check valve	Remove, inspect, and clean the check valve.
	Insufficient venturi suction	Inspect booster pump and venturi installation. Refer to Pulsar® feeder manual for detailed troubleshooting steps to improve venturi operation.

10 Requirements & Specifications

10.1 Requirements for Product Installation and Operations

Table 6. Site Requirements

Recommended Clearance	Feeder: 43" D x 54" H [109cm x 137cm]
Minimum Clearance	Feeder: 31" D x 42" H [79cm x 107cm]
Recommended installation	Install on existing Pulsar® feeder Booster pump and venturi
Electrical	120/230 VAC for booster pump

Table 7. Accessory Requirements

Chemical	Pulsar® Sunscreen 20 Stabilizer
Outlet Tubing	½" [1.27 cm] OD Polyethylene flexible tubing
Water Inlet Tubing	½" [1.27 cm] OD Polyethylene flexible tubing
Isolation Valves	½" ball valve (non-metal) (2)
Tubing Fittings	½" NPT x ½" OD tubing fittings (4)

10.1.1 Product Specifications

Table 8. Operational Specifications

Max Fill Volume	23 gal [87 L]
Operating Volume	13.5 gal [51.1 L] Volume between upper and lower floats
Water Inlet Size	½" [1.3 cm] OD
Solution Outlet	½" [1.3 cm] OD
Shipping Weight	Approximately 23lbs [10.4 kg]
Operating Weight Empty	Approximately 17lbs [7.7 kg]
Operating Weight Full	209lbs [94.8kg]
Operating Temperature	40 °F – 120 °F [4.4 °C – 40.6 °C]
Feeder Tank Dimensions (without installation fittings)	20 ¼" OD x 30 ⅛" H [51.4cm x 76.5cm]

Table 9. Chemical Feed Rate Specifications

CYA Solubility in water @ 77°F	0.0225 lbs/gal [0.0027 kg/L]
Max CYA saturation in tank	0.55 lbs [0.25 kg] max fully dissolved CYA available for dosing
CYA Delivery Rate (Pools)	0.067 lbs/min [0.03 kg/min]
Max CYA dosing time at full saturation	8 min 30 sec **Note:** Assuming 100% saturation (0.55 lbs [0.25kg], this is the time it takes to dose all dissolved CYA. Typical dosing will not occur with 100% saturation and may take hours or days to complete
Venturi Discharge Rate	3 gpm [11.3 lpm] average
Recommended Application (For guidance only, see notes)	For use on small, medium, or large swimming pools. Do not use on spas.

Note:	Use Section 7.2 to calculate desired dosing amount for your pool

Note:	Follow local health codes to determine CYA PPM target

Note:	It takes a minimum of 48 hours and up to 5 days for half a pound of CYA to dissolve in a full tank. Any CYA more than a half-pound will remain undissolved in the tank until the dissolved solution is consumed.

Note:	Measure your pool CYA PPM every 48 hours when dosing until desired PPM is reached.

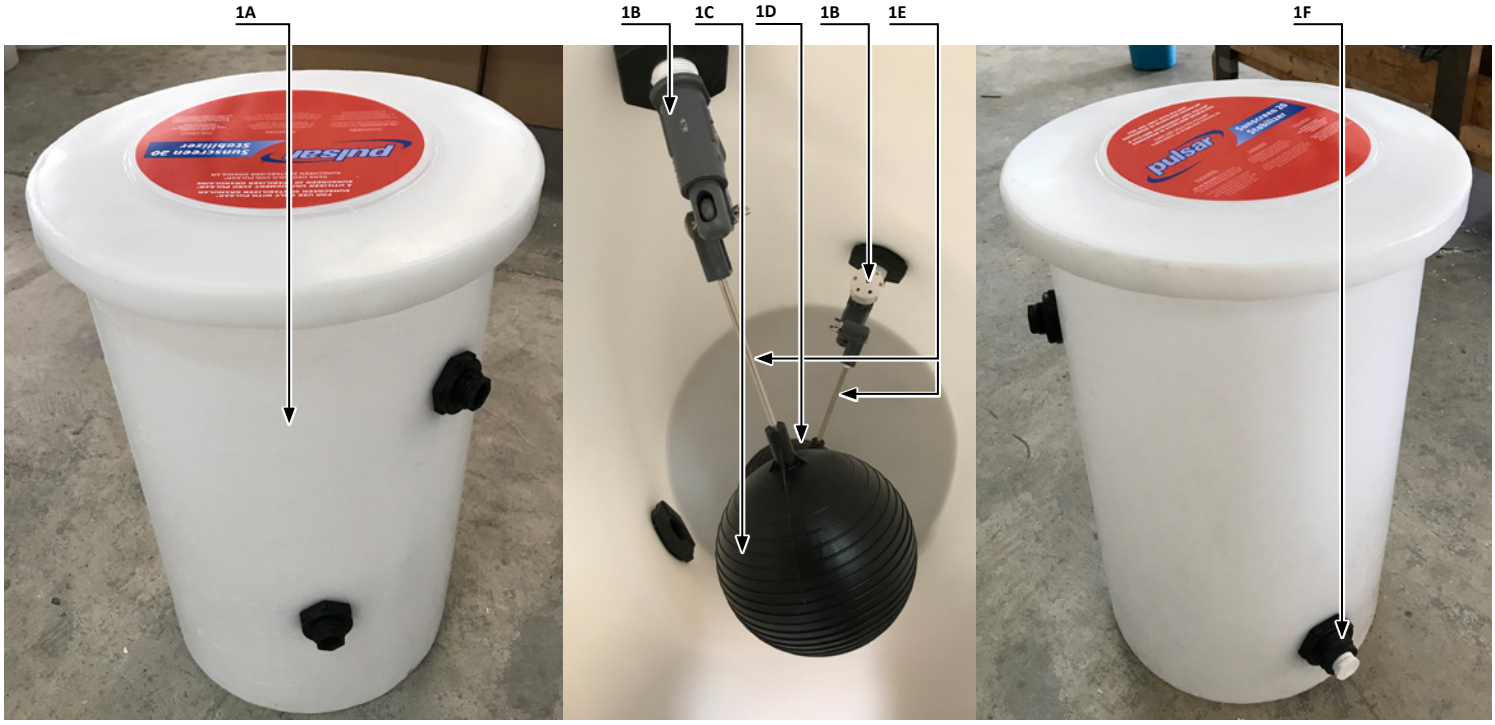
10.2 Replacement Parts List and Views

Note: Manufacturing part numbers are provided for sourcing flexibility

Part	Description	Mfg / Brand	Part No.
1	**FEEDER COMPONENTS**		
1A	Pulsar® Sunscreen 20 Feeder	Solenis	887181
1B	Kerick Valve ¾"	Kerick	PT 75 LS
1C	Kerick valve Float Ball 6"	Kerick	PF06
1D	Kerick valve Float Ball 4"	Kerick	PF04
1E	Kerick valve Rod, 12" SS	Kerick	23068
1F	SCH 40 PVC drain plug, 1" NPT	Spears	450-005

Part	Description	Mfg / Brand	Part No.
2	**INSTALLATION FITTINGS (not shown)**		
2A	45° PVC ½" FNPT Threaded Elbow	Solenis	205963
2B	½ threaded PVC Nipple, closed	Solenis	205480
2C	½" FNPT PVC True Union Check Valve	Solenis	205959
2D	1/2" FNPT X 1/2" FNPT PVC Ball Valve	Solenis	205605

Figure 3. View of the Pulsar® Sunscreen 20 Feeder



Limited Warranty

The Pulsar® Sunscreen 20 Feeder is warranted against any manufacturing defects in material or workmanship for a period of 12 months after installation or 18 months after shipping from Solenis, whichever is earlier. This warranty applies only to the original end-user.

To register your feeder please visit www.pulsarsystems.net

Service

For warranty service, contact the authorized Pulsar® Dealer in your area. Any defective part(s) covered by this warranty will be repaired or replaced, at the discretion of Solenis. Replacement may be with either new or reconditioned parts.

Exclusions

This warranty does not cover damage or failure due to accidents, fire, flood, or other acts of God. Nor does it cover damage or failure due to abuse, misuse, abnormal or improper use, neglect, improper maintenance, alterations, or modifications by anyone other than Solenis (unless specifically approved in writing by Solenis), repairs by anyone other than an authorized Dealer, or ordinary wear and tear.

Use of any other chemicals other than the Pulsar® Plus Briquettes designed for use with this chlorinator shall void this warranty.

Any transportation to and from an authorized Pulsar® Dealer is your responsibility.

Neither Solenis nor its Dealers are responsible or liable for indirect, special, or consequential damages arising out of or in connection with the use or performance of the product or other damages with respect to loss of property, loss of revenues or profit by the owner. EXCEPT AS PROVIDED ABOVE, Solenis MAKES NO WARRANTIES. ANY IMPLIED WARRANTY OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE IS SPECIFICALLY EXCLUDED.

Note:	No modifications may be made to the feeder without prior written approval from Solenis. Unauthorized modifications void any warranty. This Pulsar® Precision 30 Feeder is subject to one or more patents owned by Solenis, and all rights in any modifications or improvements, including but not limited to any patents, copyrights, trademarks or trade secrets, belong exclusively to Solenis.

For information, contact Innovative Water Care at (800) 478-5727.

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