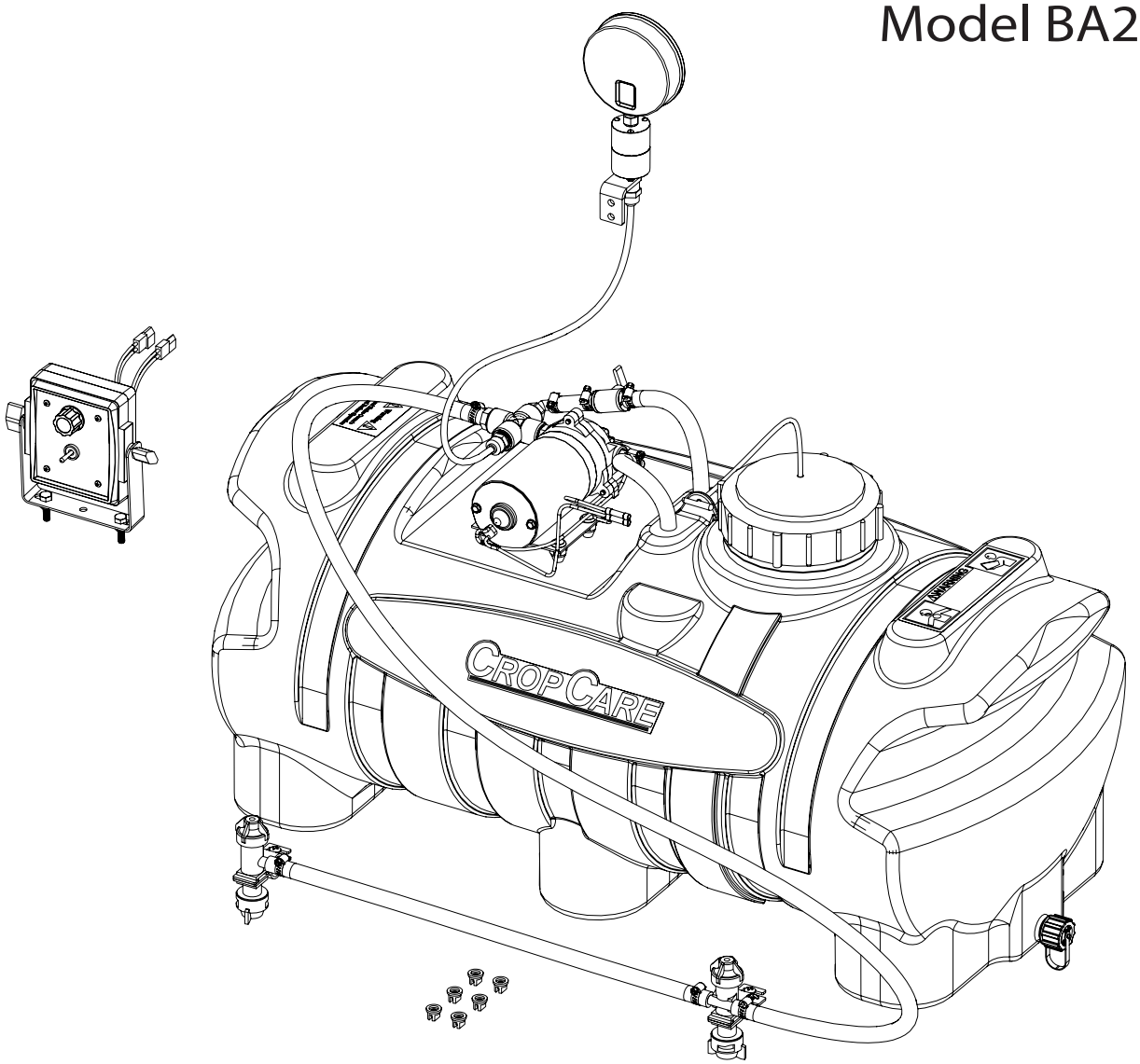
CROPCARE
by PBZ

Owner's Manual

25 Gallon Liquid Applicator

Model BA25E-S



Manufactured by PBZ LLC
A Paul B Zimmerman Inc. Company
www.CropCareEquipment.com

Form: BA25E-SOM
Rev. A.2 Date 04/19

Table Of Contents

Identification of Machine

- Model #'s: BA25E-S
- The model number and revision identification decal is located on top of the tank .

Specifications

25 gallon Liquid Applicator
Model #'s: BA25E-S

Tank capacity ..... 25 gal
Min power supply ..... 12 volt / 10 amp
Wiring harness length ..... 8'

Pump:
Type ..... Diaphragm pump
Manufacturer ..... Shurflo®
Max pressure ..... 60 psi
Open flow rate ..... 1.8 gpm

Sprayer:
Hose length ..... 15'

Weight:
Shipping weight 32lbs

Before You Begin

Please read and understand this manual and its instructions and warnings completely before operating the applicator.

- Be aware of all safety guidelines, warnings, and cautions including those of any piece of equipment that the applicator may be mounted on.
- Read and understand the chemical manufacturer's labels, warnings, and instructions.
- Familiarize yourself and other operators with the applicator's components and how all parts are operated.

Safety Precautions

General Guidelines

Every year many unnecessary accidents occur due to improper equipment handling and a disregard for safety precautions. You, the operator, can avoid accidents by observing the precautions listed in this section.

- The operator should be a responsible adult. Do not allow persons to operate this applicator until they have displayed a thorough understanding of safety precautions and operational use!
- Never attempt to operate this applicator when under the influence of alcohol or drugs.
- The best defense against accidents is a careful and responsible operator.
- A chemical warning decal and an owner's manual warning decal are located on the applicator's tank. (Figure 1, Figure 2). Be aware of their location. Always replace any warning or safety decals that are not legible or are missing.
- If there is any portion of this manual that you do not fully understand, please contact the original retailer.

Figure 1: Chemical Warning Decal (DEMT3980)

Figure 2: Owner's Manual Decal (DE39)

Safety Precautions

Before Operation

- Carefully study and understand this owner's manual.
- Read and follow chemical manufacturer's labels, warnings, and instructions! A material safety data sheet (MSDS) should be provided by the chemical manufacturer.
- To avoid injury from chemical hazards, wear the proper protective clothing. Each chemical manufacturer's clothing requirements are listed under the "Personal Protective Equipment (PPE) section in the chemical instructions.
- Do not wear loose-fitting clothing which may catch in moving parts.
- Never exceed the load rating for the piece of equipment on wich the applicator is mounted.
- Give the applicator a visual inspection for any worn parts, loose bolts, or other visible problems, and make the necessary repairs. See the maintenance section for instructions (page 11).
- Make sure the area is clear of any people or obstructions before using the applicator.
- Have all operators practice operating the appliactor using clean water only, until all persons are completely capable of safe operation.

During Operation

- Always be aware of bystanders, particularly children!
- Keep hands and body parts clear of all moving parts.
- Never leave running equipment unattended!
- Remember that accidents can even happen to seasoned operators. Always take your time and follow all safety instructions.

Following Operation

- Following operation, stop the equipment, shut off engine, and remove ignition key.
- Place the applicator on a hard level surface
- Do not permit children to play on or around applicator.
- Store the applicator away from human and livestock activity.

Pump Safety Precautions

- Never pump flammable or explosive fluids such as gasoline, fuel oil, kerosene, etc.
- Note: The pump may be run dry without resulting in damage.
- Always disconnect the power to the pump when working on the pump. Failure to do this could result in electrical shock.

Mounting the Applicator

This Liquid Applicator is designed to be mounted on a baler, forage harvester, bagger, blower, or any other applicable piece of equipment. Mounting the liquid applicator correctly and securely will ensure consistent and safe operation.

Base Unit

1. Mount the liquid applicator on the given equipment in a location that can withstand the weight of the applicator with a full tank. The 25 gallon liquid applicator weighs around 250 lbs with a full tank.
2. The chosen mounting location should also be easily accessible for filling the applicator's tank and for viewing the pressure gauge.
3. The location of the liquid applicator should not cause the liquid applicator to interfere with the operation of the given piece of equipment it is mounted on.
4. For optimal stability, mount the liquid applicator with bolts using the six holes in the sprayer's bottom. See Figure 3 on page 5. It is recommended that you measure the distance between the bottom mounting holes because tank measurements can vary up to 1/8". See figure 4 on page 5.
5. Lastly, the pressure gauge must be installed on the applicator unit. The pressure gauge is threaded into the 1/4" female inlet on the relief valve. Before installing the pressure gauge, wrap Teflon tape or liquid Teflon around the gauge's threads. Use a wrench on the gauge's brass nut to tighten the guage. DO NOT thread the gauge by hand or over-tighten it.

Note: If you are permanently mounting the sprayer in an outdoors location that isn't protected from the elements, it is important that you cover the pump to protect it.

Note: Do not tighten bolts past 1/2" in the six holes in the sprayer bottom.

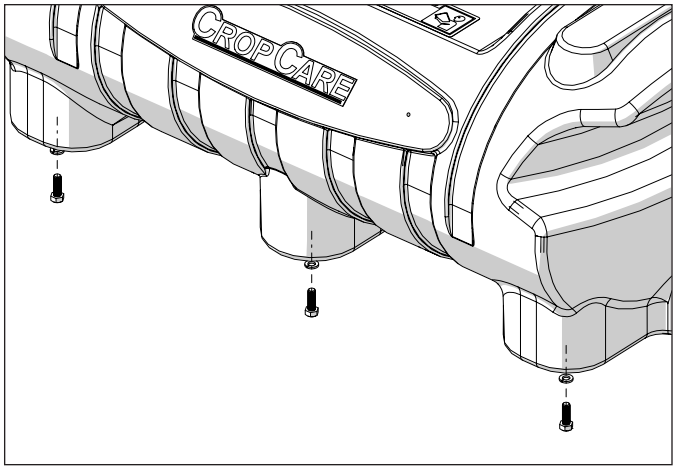


Figure 3: Mounting the applicator

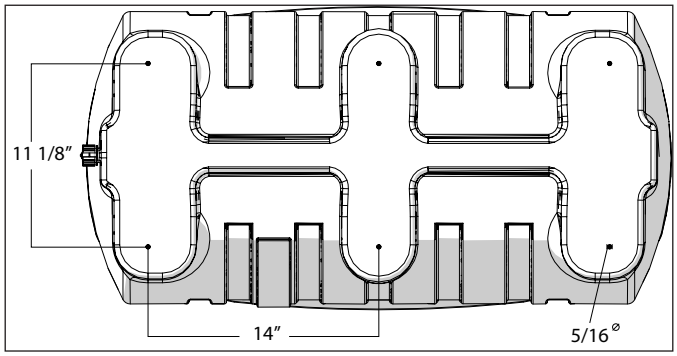


Figure 4: Bottom hole dimentions

Control Box

1. The control box must be assembled according to the included assembly and mounting instructions.
2. The control box should be mounted in a dry location that allows for convenient operation of the controls. In most cases the control box is mounted on the tractor where it can be easy accessed.
3. Mount the control box frame in the desired location using the included bolts.

Mounting the Applicator

Pressure Gauge

1. The pressure gauge should be mounted in a location where it can be easily seen by the operator.
2. Caution: The gauge should not be mounted in a location where a leaking gauge could endanger someone.
3. The recommended method of mounting is to mount the gauge (a) on the equipment using 1/4" bolts (b) (sold separately) as shown (Figure 5).
4. With the gauge mounted, you need to connect the 1/4" poly tubing (c) to the adapter on the applicator by inserting the tube into the adapter's inlet until it is firmly attached. Proceed to route the tubing to the adapter (d) on the gauge mount and connect it (Figure 5).

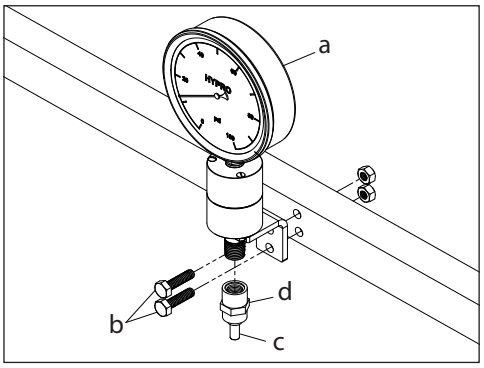


Figure 5: Mounting the pressure gauge

Wiring Harness

1. Connect the orange and blue pump wiring harness (a) to the correct plug on the control box (b) (Figure 6). The control box's wiring harnesses are color-coded for convenience.
2. The remaining black and red control box plug (c) needs to be connected to the corresponding power wiring harness (d) (Figure 6).
3. Route the power wiring harness to the tractor's battery or to an adequate power source with at least 10 amp capabilities.

Note: Use caution when routing the wiring harness to avoid areas where the wires can be pinched, rubbed, or exposed to excessive heat.

4. Connect the red wire to a positive power source either at the tractor's battery terminal or at a power access point with at least 10 amp capability. The black wire needs to be connected to the negative terminal of the battery or to a good ground source.
5. Ensure that the power source is adequate, an inadequate power source can cause numerous problems with your applicator.
6. If using a power access point, ensure that it has at least 10 amp capability.

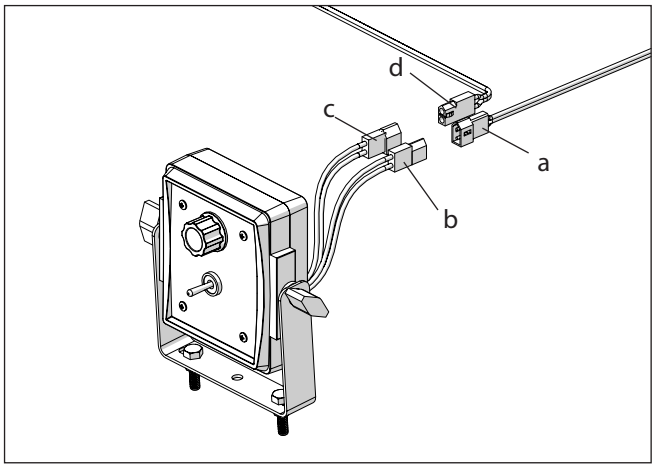


Figure 6: Wiring Harness

Applicator Spray Nozzles

With the liquid applicator securely mounted, you now need to properly mount the spray nozzle(s) in the desired location. Mounting technique may vary with the piece of equipment being used.

1. Determine the optimal location for applying the liquid inoculant or other chemicals. Ensure that this location will provide complete coverage and safe operation.
2. Attach the vinyl spray hose to the discharge barb with an included hose clamp. Route the vinyl hose to the desired application location on the piece of equipment. Ensure that the hose will not interfere with the operation of the equipment.
3. Connect the vinyl hose to the nozzle body(s) with an included hose clamp. The spray nozzles, nozzle body caps, and tip strainers are all installed into the nozzle body. See (Figure 7) for a breakdown of the complete nozzle body.
4. The recommended technique for mounting the nozzle body(s) is on a piece of round or square tubing with a boom clamp. Your applicator kit includes two 1/2" round boom clamps. See the Accessories section on page 17 for ordering different size round or square boom clamps. See (Figure 7) for a diagram of how the spray nozzle bodies are mounted on tubing.

Note: If the desired mounting location lacks tubing for mounting, it may be possible to install a piece of tubing on your equipment for optimal mounting.

5. Depending on the size of the application area on the piece of equipment, you will need to use one or two spray nozzles. Begin by installing the nozzle body elbow and test to see if the spray pattern covers the entire application area. If two spray nozzle bodies are needed for complete coverage, install the nozzle body tee first and the nozzle body elbow secondly. See (Figure 7).

Note: Due to normal wear, Teejet® recommends that you replace your sprayer nozzles after every spraying season. Nozzle replacement will ensure accurate spraying performance.

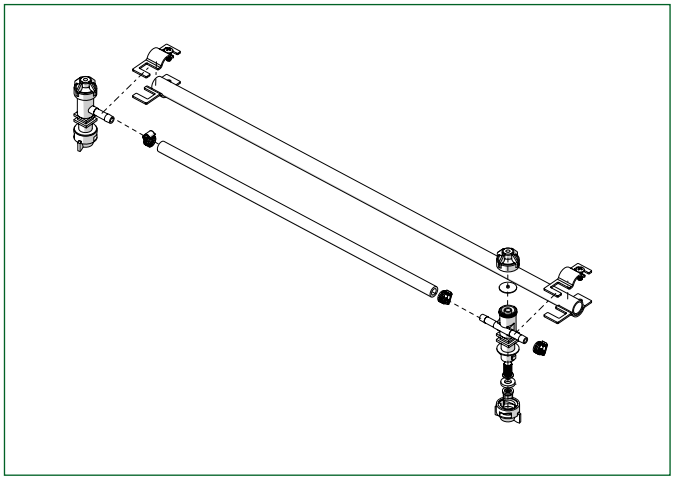


Figure 7: Nozzle body mounting

Note: If possible, it is recommended to use one large spray nozzle instead of two very small spray nozzles. Small spray nozzels are more likely to be hindered by spray drift.

Calibrating the Applicator

1. Determine the Gallons per Ton (GPT)

The inoculant, or chemcical, manufacturer should provide instructions that detail how many gallons per ton (GPT) should be applied to various crops. This amount will likely vary depending on the crop to which the innoculant, or chemical, will be applied.

Definition of Terms:

- GPT: gallons per ton
- MPT: minutes per ton
- GPM: gallons per minute
- PSI: pounds per square inch

Calibration Formula: GPM = GPT ÷ MPT

2. Determine the Minutes per Ton (MPT)

Calculate the minute per ton (MPT) rating, or, the number of minutes it takes for one ton of crop to be processed by the piece of equipment that is being utilized.

Example: You are using a baler that can bale at a rate of 15 tons in one hour. The minute per ton rating calculation would then be:

(60) ÷ (15 tons/hour) = 4 MPT

3. Determining Nozzle Size and Pressure Setting

1. Determine the necessary gallons per minute (GPM) per nozzle. Use the gallons per ton (GPT) and the minutes per ton (MPT) found in steps 1-2 to determine the gallons per minute using the calibration formula. The calibration formula is:

gallons per minute (GPM) = gallon per ton (GPT) / minute per ton (MPT)

Example: Assume the GPT recommendation is .50 gallons of inoculant per ton and your baler processes at a rate of 4 minutes per ton (MPT). The calculation would be:

(.50 GPT) ÷ (4 MPT) = .125 GPM

Note: If you are using two spray nozzles, you will need to divide the gallons per minute calculation by two. Example: If you have two nozzles and you calculated your gpm to be .125, you will actually need .063 gpm per spray nozzle.

2. Using the GPM calculation, use the calibration chart below to determine correct spray nozzle size and pressure setting.

Example: Suppose you calculated your necessary GPM to be .125, you should to use one green XR110015VP spray nozzle and set the pump's pressure at 30 psi using the pressure knob on the control box.

Calibrating the Applicator

Note: Due to normal wear, Teejet® recommends that you replace your sprayer nozzles after every spraying season. Nozzle replacement will ensure accurate spraying performance.

Calibrating Chart

Nozzle Size	Gallons per Minute(gpm) of One Nozzle at Given PSI Rating					
	15	20	30	40	50	60
TP650033SS	N/A	N/A	.029	.03	.04	.04
TP650050SS	N/A	N/A	.04	..05	.06	.06
XR8001VS*	.06	.07	.09	.10	.11	.12
XR110015VP*	.09	.11	.13	.15	.17	.18
XR11002VP*	.12	.14	.17	.20	.22	.24
XR11003VP*	.18	.21	.26	.30	.34	.37
XR11004VP	.24	.28	.35	.40	.45	.49
XR11005VP	.31	.35	.43	.50	.56	.61
XR11006VP	.37	.42	.52	.60	.67	.73
XR11008VP	.49	.57	.69	.80	.89	.98
XR11010SS	.61	.71	.87	1.00	1.12	1.22

* Denotes the spray nozzles included in the applicator kit. Additional nozzles are available, see the Contact Us section on page 18 for ordering information.

Operating Instructions

Before operating your liquid applicator, it is important that you read this entire manual and know all safety precautions. Always take your time and be alert when operating your applicator. This will allow you to safely operate the unit without accident or interruption.

Before Operation

1. Before operation it is important to give the applicator unit a thorough inspection. Check the hoses, wiring harness, and other applicator components for any wear or damage. Ensure that the suction strainer and the tank have been thoroughly rinsed.
2. Calibrate the liquid applicator for the given conditions following the directions listed in the "Calibrating the Applicator" section (page 8).
3. Before using any inoculant or chemical ensure that it is not a petroleum-based product or a non-compatible chemical for the pump.
4. Connect the control box according to the "Mounting the Applicator" section (page 6).

Note: Using a petroleum-based product or a non-compatible chemical will void the manufacturer's warranty. Contact the original retailer if you are unsure as to whether or not a chemical or substance is acceptable for the pump.

Setting the Bypass Valve

The bypass valve is a small inline valve that can be set to bypass some liquid flow back into the tank. This is important if spray nozzles smaller than XR11002 will be used. If the bypass valve is not set properly, the full range of pressure adjustment will not be attainable with the control box.

1. Put several gallons of water into the tank and prepare the applicator to spray using the nozzle(s) that were chosen when the applicator was calibrated.
2. Open the bypass valve (a) completely (Figure 9). The handle should be parallel to the valve (shown in closed position).
3. Start the pump and then turn the control box knob to the highest setting. The pump should be running full speed.
4. Slowly close the bypass valve until the pressure gauge reads 55-60 psi. If the pump starts to cycle on an off, open the bypass valve slightly to lower the pressure.
5. After the valve is set, it should not need to be changed unless another size spray nozzle is installed.

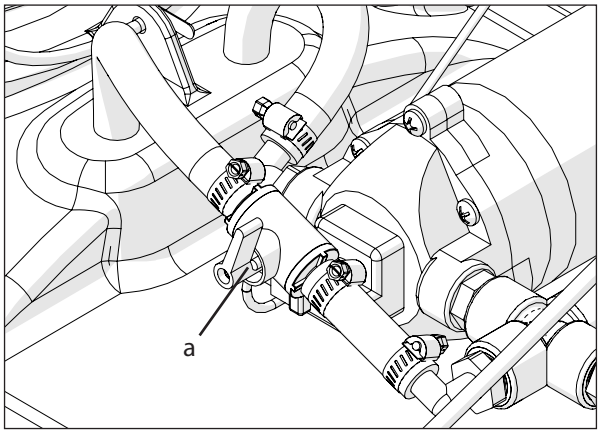


Figure 9: Setting the Bypass valve

During Operation

1. Fill the applicator tank with the correct amount of water and chemical or inoculant as instructed by the manufacturer of the chemical or inoculant being used.
2. Turn on the pump using the on-off (a) switch on the control box and set the pressure by turning the pressure knob (b) on the control box (Figure 10). The pressure should be set to the optimal rate found when you calibrated the liquid applicator.
3. When you are finished using the applicator, turn the control switch to off. If the applicator's tank becomes empty, remember to turn the control switch to off.

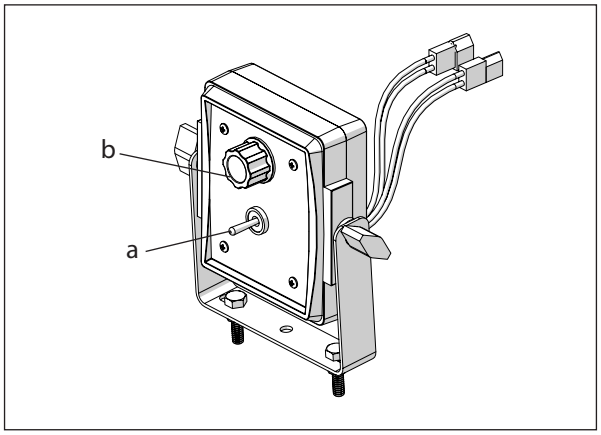


Figure 10: Control box operation

Following Operation

1. Thoroughly rinsing the applicator of any chemical residue is an important activity. It is recommended to fill the tank with fresh water and engage the pump until the system is entirely free of chemical residue. It is important not to rinse the applicator in an area where humans, animals, or sensitive plants could come in contact with chemical residue.
2. Store the applicator in a location where it will be away from human or animal activity. Do not allow children to play on or near the applicator.

Maintenance Instructions

Routine Maintenance

It is very important to perform routine maintenance on the applicator before and after each use. Good maintenance practices will help to guard against any unnecessary breakdowns or accidents.

1. It is recommended to perform a visual and physical inspection for any worn parts, loose bolts, or other visible problems. Make all necessary repairs before operation. Contact the original retailer to order parts and for technical help.
2. After each use it is important to rinse the pump and all components by running clean water through the system. Fill the tank with a sufficient amount of fresh water and engage the pump. Rinsing the pump with fresh water will greatly improve the life of the pump.
3. Do not allow the pump or the control box to get wet or to be exposed to the elements. Contact with liquids could cause damage to both the pump and the control box and will void the manufacturer's warranty.
4. The suction strainer (ref. BA25E-S Breakdown, page 12) should be taken out and rinsed regularly.
5. Always follow all pump safety precautions and warnings (Page 4). Following these guidelines will help to ensure many years of smooth and trouble-free operation.

Winterizing the Applicator

It is essential that you winterize the applicator to avoid damage and to allow for optimal performance. The winterization process should be undertaken before freezing conditions and/or after each season of use. Failure to winterize the applicator will void the manufacturer's warranty.

1. Verify that the tank is rinsed out and empty. Pour a 1/2 gallon of RV nontoxic antifreeze into the tank. It is not recommended to use engine antifreeze. Engine antifreeze can be harmful to humans, animals, crops, and the environment.
2. Engage the pump for several minutes. Make sure that the antifreeze has been pumped through the entire system.
3. Store the applicator in a dry location away from the elements.
4. Before spraying in the spring it is recommended to flush the applicator with clean water to cleanse it of the antifreeze and any other buildup. It would also be beneficial to do a thorough inspection of all applicator components before operation.

Troubleshooting

As you use your Liquid Applicator, it is possible that you will encounter minor problems that can be easily fixed. The following problems and respective causes and solutions should cover most of the potential problems that you may face. If you are having problems please attempt to use this troubleshooting section to solve the problem. If you are unable to fix the problem please contact the original retailer for service.

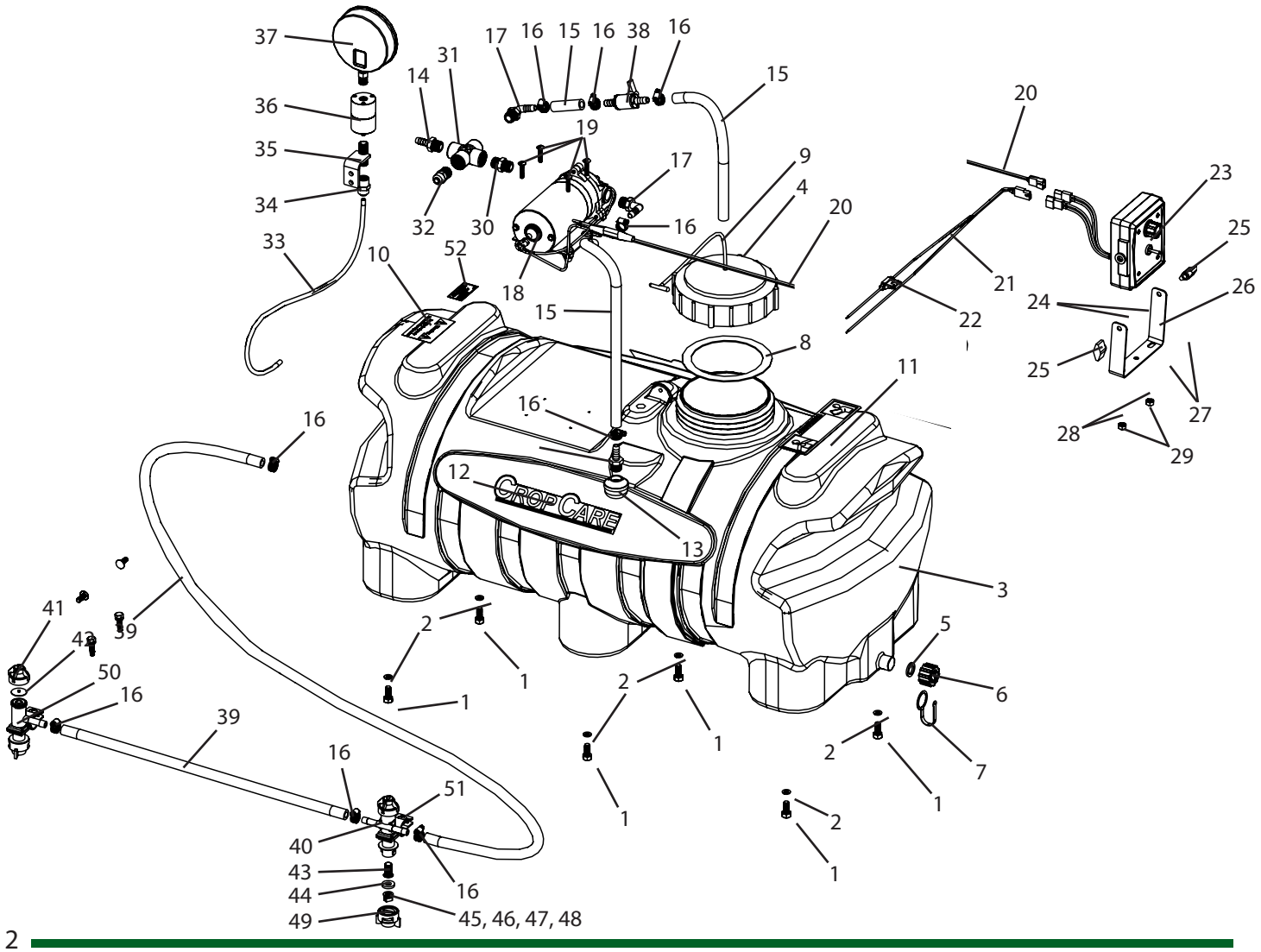
Problems/Symptoms	Possible Causes	Solutions
Low Rate of Flow	Suction Strainer is partially clogged	Remove the suction strainer and rinse
	Pump valves are damaged/bad	Replace the valves or contact the original retailer for service and/or repairs
	Low voltage	Use a power source rated at 10 amps and 12 volts
Pump Will Not Prime	Suction line is clogged	Inspect the suction line for debris
	Suction strainer is clogged	Remove the suction strainer and rinse
	Pump is damaged from chemicals not being properly rinsed out	Contact the original retailer for service and/or pump repairs
Pump Will Not Run	Fuse is blown	Replace the fuse on the wiring harness
	Incorrect voltage	Use a power source rated at 10 amps and 12 volts

Troubleshooting

Problems/Symptoms	Possible Causes	Solutions
Pump Will Not Run	Pump pressure switch is malfunctioning	Replace the pressure switch or contact the original retailer for repairs
No Spray Flow	Spray tip is clogged	Remove the spray tip and rinse out
	Suction strainer is clogged	Remove the suction strainer and rinse (ref# 45
Control Box Doesn't Work	Polarity is incorrect	Hook the correct plugs together.
	Inadequate source of power	Use a power source with sufficent voltage.
	Fuse is blown	Change the fuse (ref# 19)
	Control box is damaged /faulty	Replace the control box (ref# 20) or contact the original retailer for service.
Pressure Gauge Doesn't Work	Tubing leading to gauge damaged	Replace the tubing (ref# 31) before operation.
	Gauge is damaged/faulty	Replace the gauge (ref# 38) or contact original retailer for repairs

Breakdowns & Parts Lists

BA25E-S Breakdown



Breakdowns & Parts Lists

Ref #	Qty.	Part Number		Description
1	6	H5C516*12		Hex cap screw, 5/16" x 1/2", grade 5
2	6	LW516		Lock washer, 5/16"
3	1	T248		Tank, 25 gal liquid applicator, BA25K, BA25E-S
4	1	10035	***	Tank lid, poly, black
5	1	10960	***	Gasket for outlet cap 3/4"
6	1	19024	***	Outlet cap 3/4"
7	1	19025	***	Tank outlet cap tether for Den Hartog Applicator Tank
8	1	11042	***	EPDM gasket for 5' likd
9	1	10873	***	Lanyard 12" long
10	1	DE39	***	Owner's manual warning decal
11	1	DEMT3980	***	Chemical warning decal
12	2	DE46	***	Crop Care® logo decal
13	1	10416D		Suction strainer, 3/8" fpt, 40 mesh
14	2	3A3838		Hose adapter, 3/8" mpt x 3/8" barb, poly
15	3.2'	1206		EPDM rubber hose, 3/8", 200 psi
16	9	62604		Hose clamp, 1/4" - 5/8", stainless steel
17	2	3EL3838		Hose adapter elbow, 3/8" barb x 3/8" mpt
18	1	8000-543-936	**	SHURflo® pump, 1.8 gpm, 12 volt
19	4	SBT316*1		Stove bolt, truss head, 10-24 x 1"
20	1	10-40		Output wiring, ESC control, 40'
21	1	10-8-IN		Input wiring harness w/ fuse, 8', black-red
22	1	AGC-10	*	Buss fuse, 10 amp
23	1	JDS-10		JDS electronic control, 10 amp
24	2	CB14*34	*	Carriage bolt, 1/4" x 3/4"
25	2	KB3085	*	Knob, 1/4", black, poly
26	1	13181	*	Electronic control mounting bracket
27	2	H5C14*1	*	Hex cap screw, 1/4" x 1", grade 5
28	2	LW14	*	Lock washer, 1/4"
29	2	NC14	*	Nut, coarse thread, 1/4"
30	1	8M38		Nipple, 3/8" mpt, poly, schedule 80
31	1	CR38S		Cross, 304 SS, 3/8" FPT
32	1	A4MC6		Trueseal adapter, 3/8" mpt x 1/4" tube
33	15'	5156N		Tubing, Nylon 1/4" OD Black
34	1	A4FC4		Trueseal adapter, 1/4" fpt x 1/4" tube
35	1	T533		Gauge mount nipple, 1/4" mpt
36	1	BAAF		Gauge isolator, 1/4" fpt
37	1	GG1004		Pressure gauge, 4" display, 1/4" mpt, 100 psi
38	1	9432		3/8" poly barbed valve
39	15'	1206	+	EPDM rubber hose, 3/8", 200 psi
40	1	22252312375NYB	+	Nozzle body tee, 3/8"
41	1	2195010NYB	* +	Chemsaver end cap assembly
42	1	CP21953EPR	* +	EPDM rubber diaphragm
43	2	8079PP100	+	Tip strainer, 100 mesh, stainless steel, green
44	2	CP19438EPR	+	Seat washer, rubber
45	2	XR8001VS	+	Teejet® spray nozzle, stainless steel, 80 degrees, 1.0, orange
46	2	XR110015VP	+	Teejet® spray nozzle, polymer, 110 degrees, 1.5, blue
47	2	XR11002VP	+	Teejet® spray nozzle, polymer, 110 degrees, 2.0, yellow
48	2	XR11003VP	+	Teejet® spray nozzle, polymer, 110 degrees, 3.0, green
49	2	CP256076NY	+	Nozzle body cap, round, yellow
50	1	22251311375NYB	+	Nozzle body elbow, 3/8"
51	2	QJ11112	+	Boom clamp, 1/2", round
52	1	DE178		Decal, Model BA25E-S, Rev. A.2

* Individual part is included in a complete assembly

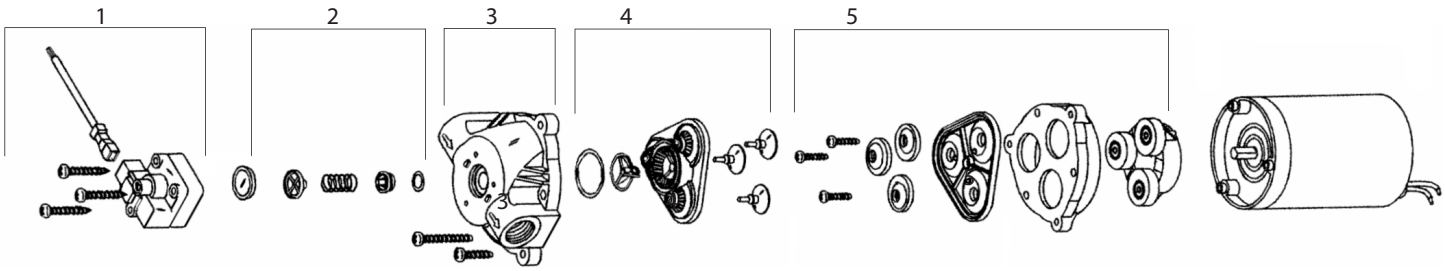
** Pump breakdown is listed on page 14

*** Included with tank

\+ Included in Liquid Applicator Parts Kit BAKIT

Shurflo® Pump Breakdown

Model: 8000-543-936



Shurflo® Pump Parts List

Ref #	Qty.	Part Number	Description
1	1	9437505	Switch kit, vition, 60 psi
2	1	9437405	Check valve kit
3	1	9437900	Upper housing kit
4	1	9439005	Valve kit, viton
5	1	9438532	Diaphragm and drive kit, santoprene
6	1	1111100	SHURflo® motor.12 volt

CropCare® Limited Warranty

Liquid Applicator: Model BA25E-S

Warranty Coverage

CropCare® hereby provides a Limited One (1) Year Warranty on Liquid Applicators, manufactured by CropCare®. Liquid Applicators manufactured by CropCare® are warrantied against any manufacturer's defects in any of the applicator's components in the 12 months following the original date of purchase.

Defective components will be repaired or replaced at the discretion of the manufacturer. It is the responsibility of the purchaser to return warranted components to the manufacturer. This warranty is limited to the repair or replacement of applicator components only. CropCare® is not to be held liable for incidental or consequential damages of any kind. This warranty covers the purchaser of this Liquid Applicator and any other owners who own it during the one year warranty period.

To retain the warranty, the applicator must be operated and maintained as ascribed by its owner's manual. For warranty service, please have a copy of the purchase invoice available.

Warranty Is Void if:

1. The applicator has been subjected to, in the opinion of CropCare®, negligent handling, misuse, an accident or if the instructions in the owner's manual were not completely followed.
2. The applicator's components have been altered in any manner or repairs have taken place with unapproved parts.
3. The applicator and its components were subject to freezing or freezing conditions. The applicator must have been winterized as per the maintenance instructions to retain the warranty.
4. A non-compatible chemical was used and/or if the applicator operator failed to rinse all chemical residue out of the applicator's components after use.
5. A petroleum-based, oil-based, or flammable product was used and caused damage to the pump, tank, hoses, or any other component.

Getting Warranty Service

All Liquid Applicator warranty claims must be made through the original retailer. All warranty claims must be submitted with an invoice or a proof of purchase that denotes the purchase date and place of purchase. If you have any questions or comments concerning this warranty, please contact the original retailer.

Ordering Parts

Please contact the original retailer to order replacement parts for your product.

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