

Operation Manual

Model 442C - M ***208 Liter Preservative Applicator***



P.O. Box 63 • 2821 Harvey Street • Hudson, WI 54016
800-635-7468 • www.harvesttec.com

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Introduction

Thank you for purchasing a Harvest Tec Model 442C Hay Preservative Applicator. This applicator is designed to apply a buffered propionic acid on to the forage crop as it is being baled. The applicator is designed to allow the operator to adjust the rate of preservative on the go for changing moisture and baler throughput. This manual will take you through the steps of operation of the applicator and also point out all safety precautions that need to be made while using the applicator. Please read this manual carefully to learn the recommended operation of the equipment. Failure to do this can result in personal injury or equipment malfunction. If you are unsure about operating the system after consulting this manual, contact your local authorized dealership for additional assistance. If you are in need of parts for the system please see the parts breakdown in the back of this manual and contact your local authorized dealer to order the parts. This applicator is designed to apply Harvest Tec buffered propionic acid.

Right and Left sides are determined by facing in the direction of forward travel.

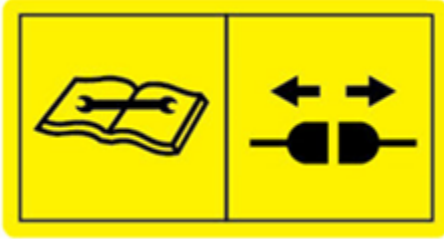
Safety

Carefully read all the safety signs in this manual and on the applicator before use. Keep signs clean and in good working order. Replace missing or damaged safety signs. Replacement signs are available from your local authorized dealer. See your installation manual for under the replacement parts section for the correct part numbers.

Keep your applicator in proper working condition. Unauthorized modifications to the applicator may impair the function and/or safety of the machine.

Carefully read and understand all of the baler safety signs before installing or servicing the baler. Always use the supplied safety equipment on the baler to service the applicator.

Safety Decals and Descriptions



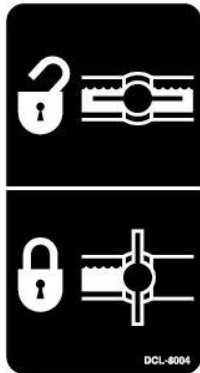
Number 1
Spraying hazard. Disconnect power before servicing the applicator
Part no. DCL-8003



Number 2
Use caution when working around chemicals. **Wear all protective equipment according to the label of the product.**
Part no. DCL-8001



Number 3
Read and understand the operator's manual before using or working around the equipment.
Part no. DCL-8000



Number 4
Open (unlocked) and closed (locked) position of the ball valve.
Part no. DCL-8004

Preparing the Applicator for Operation

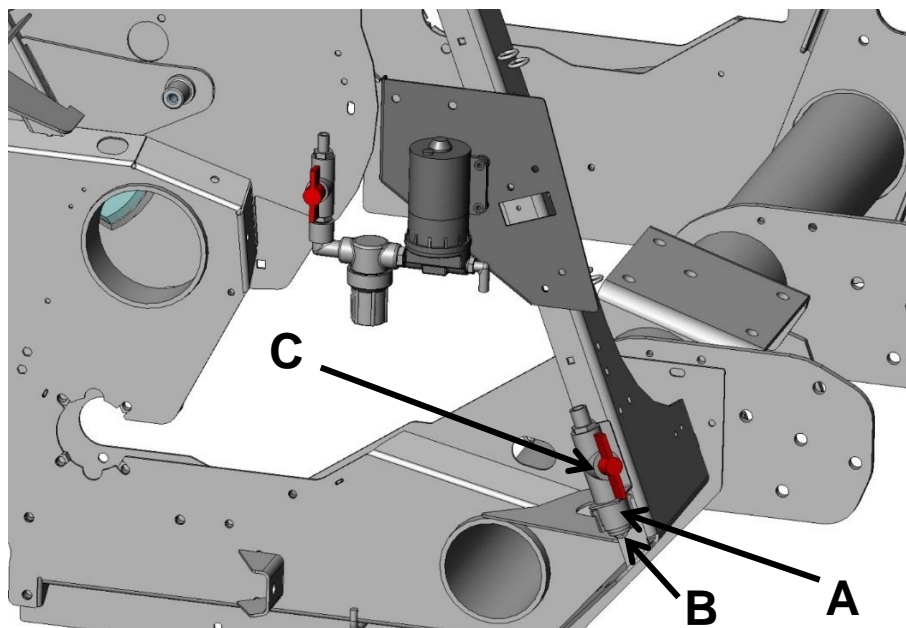
After the applicator has been installed on the baler, follow the below steps to prepare for operating the applicator both safely and correctly.

Filling the Tank:

Read the label of the preservative product selected to determine individual protective measures that should be followed. Locate the drain/fill line on the baler. Open the cam-couplers (A) and remove the protective plug (B). Insert the male coupler (found on transfer pump) into the female cam and close the cams (A). To open the ball valve (C) turn the handle so it is vertical. After the ball valve has been turned on switch the pump to the On position. Monitor the level on the tank visually and shut off the pump before over filling. Once the pump is turned off, close the ball valve and remove the male coupler. The handle of the ball valve (C) will be horizontal when closed. Reinstall the protective plug and close the cams. The Harvest Tec model 9212 transfer pump is recommended for this process.

Water is recommended for first time and annual start up procedures.

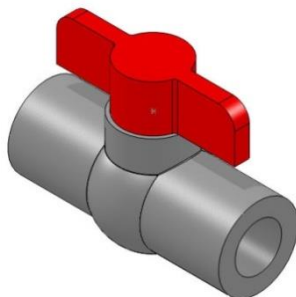
Below is an enlarged view of the drain / fill line valve and cam-coupler assembly:



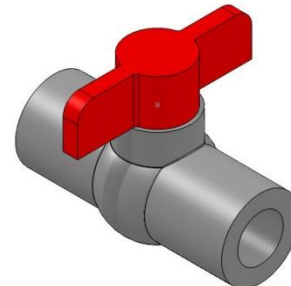
Operation of the Main Ball Valve

The ball valve should be closed at all times when the applicator is not being used. The valve should also be closed when any service work is being done to the baler or applicator.

The valve is located next to the pump and by the applicator tank. The arrow below points at the valve.



Valve open



Valve closed

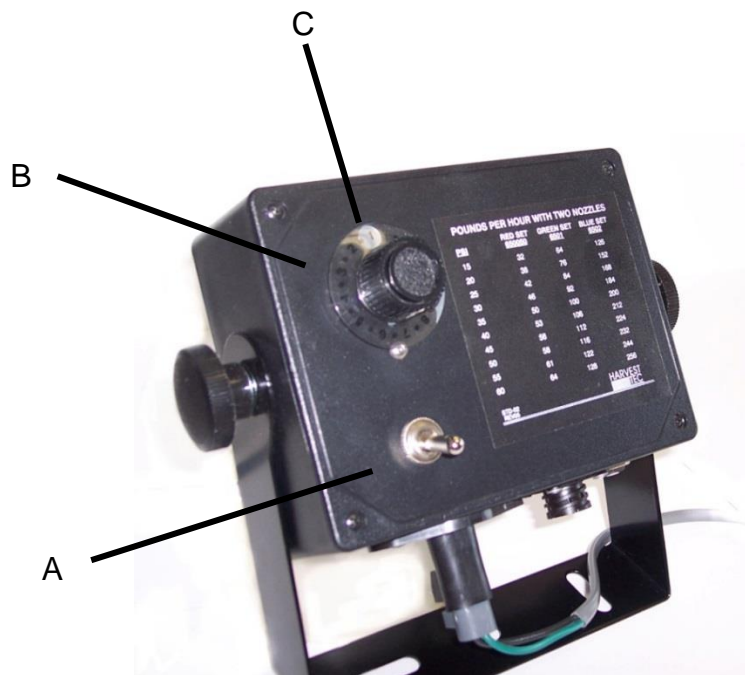
Connecting the Power Harness

The power harness that supplies power from the tractor battery to the applicator pump has a disconnect at the hitch. Connect the two together for operation. Always disconnect before servicing the applicator or baler.

Operation of the 457 Control Box

Understanding and Using the 457 Control Box

The model 457 control box is pictured below. The toggle switch (A) is used to supply and cut off power to the pump. With the toggle switch down as shown in the picture below the power is OFF. Lift the switch up to supply power turning the system ON. The dial (B) is used to adjust the pressure to the tips when power is applied. The numbers on the dial should be used only as a reference. The PSI on the gauge determines the actual flow. Apply the rate decal that comes with your manual to the front of the control box. The message light (C) will always be illuminated when the power is on. If the light blinks during operation please reference the following manual section "Message light."



Message Light

The LED under the speed dial will be constantly on / illuminated when the applicator is running under normal conditions. If the light blinks on and off, use the information noted below to decipher the message.

Slow steady on and off blink: The system is attached to hay indicators (474A) or a foot switch. This message means that the pump is paused. The light will come on constant once the baler is back in the windrow.

Two quick blinks: The pump motor or pump harness is shorted.

Three quick blinks: Pump motor is over the current limit (10 amps).

Four quick blinks: Power is under current from a bad connection.

The control box must have the ON/OFF switch toggled to clear the message after the fault has been fixed and cleared.

First Time and Annual Start Up

After becoming familiar with the model 457 control box, fill the tank with 20 liters of water. Turn the power to the pump ON by pushing the toggle switch up. By turning the dial clockwise the pressure will go up. By turning the dial counter clockwise the pressure will decrease. Slowly turn the dial on the control box until the pressure gauge starts to climb. With the applicator spraying at about 30 PSI, look for leaks at all the hose connections and fittings. When you are comfortable with the operation of the controls you can set the applicator to apply the amount of chemical you would like it to put on.

Field Operation

Calibration

There are three things that you need to know when calibrating your applicator. First you need know how many tons per hour you bale. Second you need to know the rate, or how many pounds of product to apply for a given tons per hour. Finally you need to know what tips to use and at what pressure to set the gauge.

Determining tons per hour for round balers

1. Time 3 bales and average the time it takes to make a bale.
2. Estimate the weight of the bale.
3. Use the bale rate chart below to determine the tons you are baling per hour.

Example: You made 3 round bales and it took you an average of 2 minutes apiece to bale each of them. Your baler's operator manual tells you that an average bale made by your machine weighs 1000lbs. (Remember if the hay is dry it will weigh less and if the hay is wet it will weigh more). Using the chart below, cross-reference 2 minutes with 1000lbs. and you will come up with 15 ton per hour.

Average time to make a bale (min.)	Round Baler (Tons per Hour)								
	Weight per Baler								
	600	800	1000	1200	1400	1600	1800	2000	2200
0.5	36.0	48.0	60.0	72.0	84.0	96.0	108.0	120.0	132.0
1	18.0	24.0	30.0	36.0	42.0	48.0	54.0	60.0	66.0
1.5	12.0	16.0	20.0	24.0	28.0	32.0	36.0	40.0	44.0
2	9.0	12.0	15.0	18.0	21.0	24.0	27.0	30.0	33.0
2.5	7.2	9.6	12.0	14.4	16.8	19.2	21.6	24.0	26.4
3	6.0	8.0	10.0	12.0	14.0	16.0	18.0	20.0	22.0
3.5	5.1	6.9	8.6	10.3	12.0	13.7	15.4	17.1	18.9
4	4.5	6.0	7.5	9.0	10.5	12.0	13.5	15.0	16.5
4.5	4.0	5.3	6.7	8.0	9.3	10.7	12.0	13.3	14.7
5	3.6	4.8	6.0	7.2	8.4	9.6	10.8	12.0	13.2
5.5	3.3	4.4	5.5	6.5	7.6	8.7	9.8	10.9	12.0
6	3.0	4.0	5.0	6.0	7.0	8.0	9.0	10.0	11.0
6.5	2.8	3.7	4.6	5.5	6.5	7.4	8.3	9.2	10.2
7	2.6	3.4	4.3	5.1	6.0	6.9	7.7	8.6	9.4
7.5	2.4	3.2	4.0	4.8	5.6	6.4	7.2	8.0	8.8
8	2.3	3.0	3.8	4.5	5.3	6.0	6.8	7.5	8.3
8.5	2.1	2.8	3.5	4.2	4.9	5.6	6.4	7.1	7.8
9	2.0	2.7	3.3	4.0	4.7	5.3	6.0	6.7	7.3
9.5	1.9	2.5	3.2	3.8	4.4	5.1	5.7	6.3	6.9
10	1.8	2.4	3.0	3.6	4.2	4.8	5.4	6.0	6.6

Determining the Rate of Chemical

Determining the pounds of preservative required and desired for application per ton of hay depends on the moisture and the type of chemical used. The moisture of the hay is important in determining how much chemical to use. The wetter the hay the more product needed, the dryer the hay the less product needed. By knowing the moisture, you can make sure you are treating the hay correctly. Under applying will save money but spoilage is more likely to occur. Over applying increases the cost but insures more of the hay will be saved. Some chemicals require more or less to treat the same amount of hay. To find the prescribed number of pounds recommended for a given hay moisture, refer to the label on the drum or contact the manufacturer. Harvest Tec applicators come with low, medium, and high sets of tips. If your chemical recommendations and required rates are other than what these tips deliver you can purchase larger tips sizes through your local dealer.

Selecting Tips and Setting Pressure for Round Balers

Once you have determined your tons per hour and the amount of chemical needed for the moisture you are applying at, you can select your tips and determine your gauge settings.

1. Multiply the tons per hour by the amount of chemical required for the moisture you are applying at. This sum will give you the application rate.
2. Select the proper set of tips from the application rate chart (next page) and install them.
3. For the tips you have selected, you will need to keep the gauge at the recommended PSI to achieve the proper application rate.
4. Set the pressure by adjusting the dial on the control box and by reading the pressure of the gauge to match the desired rates. The numbers on the dial are for reference only. Rate is determined by watching the pressure gauge.

Example: You are baling at 22 tons per hour with your round baler. The moisture you are baling at requires you to apply 8 pounds per ton. Multiply the 22 tons x 8lbs = 176lbs. per hour. Using the chart, lbs/hr with two nozzles, found on the next page of manual, you will notice the green set of tips at 47 PSI will give you that output.

Calibration Reminders

- *Watch the pressure gauge, as the setting will vary with tractor's electrical output, temperature and other factors.
- *Check your application rate by measuring product used against actual tons baled.

ONLY THE OPERATOR CAN CONTROL HOW MUCH PRODUCT IS APPLIED

General Calibration Chart for Two Nozzles

Pounds Per Hour With Two Nozzles

	ORANGE SET TT11001VP 80001	GREEN SET TT10015VP 80015	BLUE SET TT11003VP 8003	BROWN SET TT11005VP 8005
PSI				
15	64	95	196	323
20	74	111	222	376
25	80	122	249	413
30	90	138	275	461
35	98	148	296	
40	106	159	317	
45	111	170	336	
50	117	180	354	
55	122	188	370	
60	127	196	386	

Gallons Per Hour With Two Nozzles

	ORANGE SET TT11001VP 8001	GREEN SET TT10015VP 80015	BLUE SET TT11003VP 8003	BROWN SET TT11005VP 8005
PSI				
15	7.3	10.7	22.0	31.9
20	8.4	12.7	24.1	42.2
25	9.5	14.1	28.3	47.3
30	10.3	15.5	31.0	52.2
35	11.3	16.6	33.5	
40	12.2	17.8	36.0	
45	12.6	19.2	38.3	
50	13.2	20.6	40.7	
55	13.8	21.3	42.5	
60	14.4	22.0	44.4	

ONLY THE OPERATOR CAN CONTROL HOW MUCH PRODUCT IS APPLIED

Maintenance

- If you are unsure how to perform any of the maintenance steps have your local authorized dealer perform the tasks.

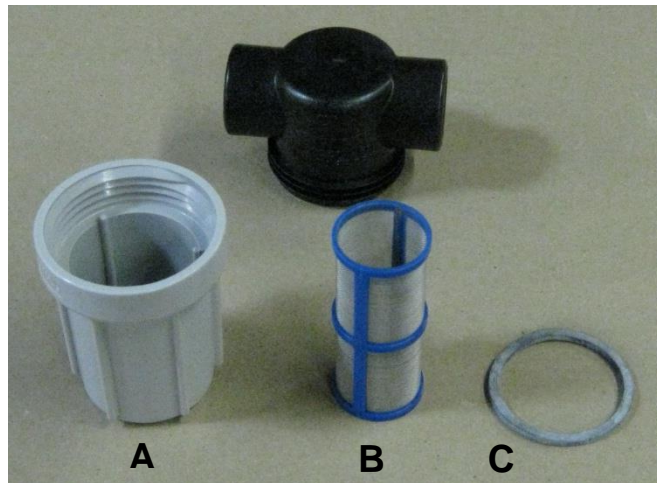
Maintenance Schedule

	Daily	10 hrs	400 hrs	Weekly	Monthly	Season
Filter bowl cleaning		X				X
Tips & tip screen cleaning		X				X
Tank lid cleaning		X				X
Dielectric grease connections					X	X
Rebuild pump			X			
Battery connections				X		X
Visually inspect hoses				X		X

Filter Bowl Cleaning

Before cleaning the filter bowl all personal protective equipment must be worn: Face shield or goggles, chemically resistant apron, boots, and gloves.

Verify that the ball valve located next to the pump is turned off. Locate the filter bowl on the side of the pump manifold (A). Unscrew the bottom section of the filter bowl and remove the strainer (B) and gasket (C). Clean off any debris and soak in warm water with a mild soap if necessary. Once the screen is clean reinstall by following the directions in reverse.



Tips and Tip Screen Cleaning:

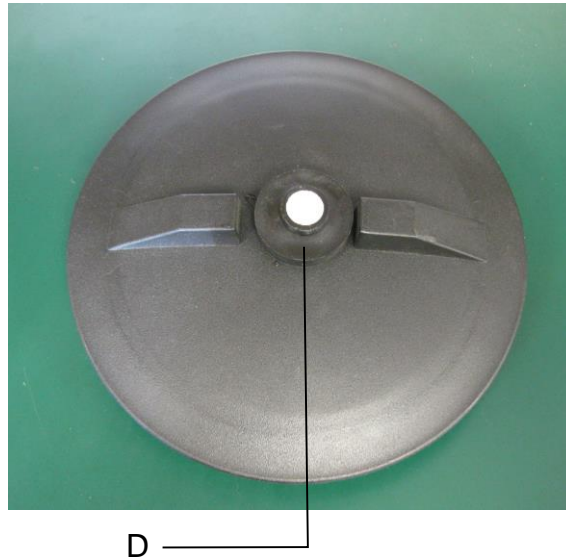
Before cleaning the tips and screens all personal protective equipment must be worn (Face shield or goggles, chemically resistant apron, boots, and gloves).

Verify that the ball valve located next to the pump is turned off. Disconnect spray shield from hangers if possible or remove tips in place. Remove the tip, and screen. Some models may require a wrench to remove. Clean off any debris and soak tip and screen in warm water with a mild soap if necessary. Once the tips and screens are cleaned reinstall by following the directions in reverse.

Tank Lid Cleaning

Before cleaning the tank lid all personal protective equipment must be worn (Face shield or goggles, chemically resistant apron, boots, and gloves).

The tank lid is located on the top of the tank. Use the supplied handle on the tank to secure your person and use the other hand to remove any debris from the top of the tank. Unscrew the tank lid and bring down ground level. Use compressed air clean out the tank screen (D). If the screen cannot be thoroughly cleaned with compressed air, replace fitting (005-9022B5). Once the screen is cleaned reinstall the cover.



Dielectric Grease Connections

Disconnect all harnesses on the applicator, clean the connections, and repack with dielectric grease.

Rebuild Pump

If the pump is not working up to specifications a pump rebuild kit may fix the problems.

Verify that the ball valve is turned off. Before working around the pump all personal protective equipment must be worn (Face shield or goggles, chemically resistant apron, boots, and gloves). Disconnect all pump fittings and remove pump from saddle. Follow rebuild instructions supplied with pump rebuild kit. Reinstall after rebuild is complete.

Battery Connections

Follow the batteries safety warnings and clean the battery connections. If the connections cannot be cleaned, replace harness.

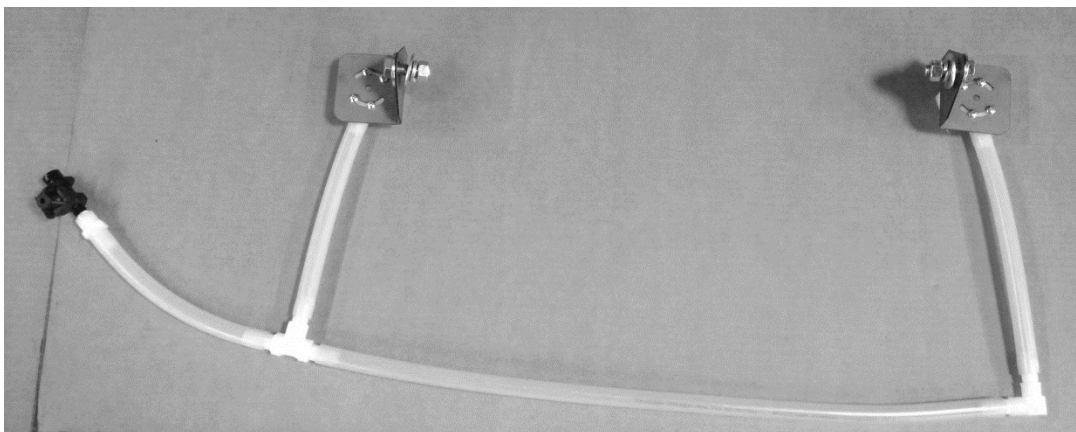
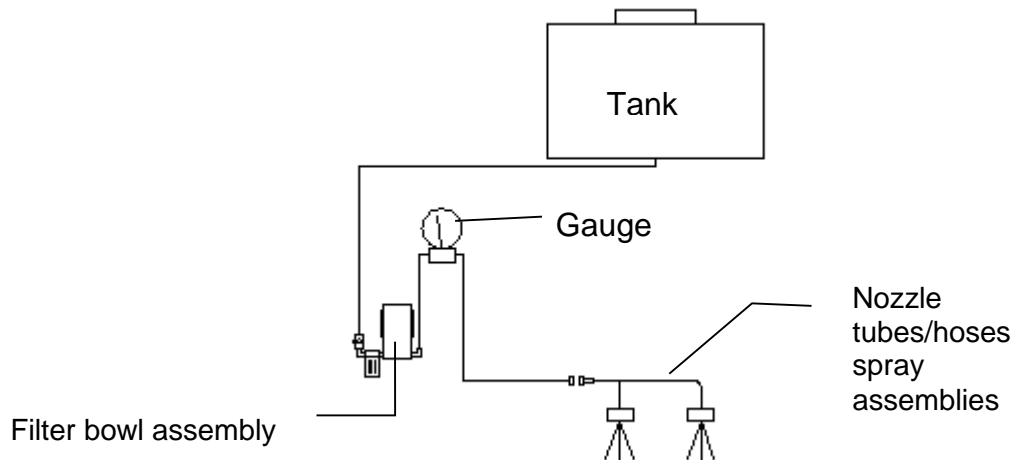
Miscellaneous Maintenance

1. Depending on the product being used, the system may need to be flushed with water at a regular interval (consult with manufacturer of the chemical). If Harvest Tec product is being used, flushing is not necessary.
2. Although the pump can run dry, extended operation of a dry pump will increase wear. Watch the preservative level in the tank.
3. If you are using bacterial inoculants, flush your system daily after every use.

Winter Storage

1. Thoroughly flush the system with water.
2. Remove the filter bowl and run dry until the water has cleared out of the intake side.
3. Remove the red plug from the bottom of the pump, drain, and run the pump for 30 seconds or until dry.
4. Drain all lines on the outlet side.
5. Never use oils or alcohol based anti-freeze in the system.
6. For spring start-up, if the pump is frozen, turn off the power immediately to avoid burning the motor out or blowing a fuse. The pump head can be disassembled and freed or rebuilt in most cases. Check the fuses after the pump has been freed.
7. Disconnect power from the Precision Information Processor.
8. Remove display from tractor and store in a warm, dry place.

Plumbing Diagram

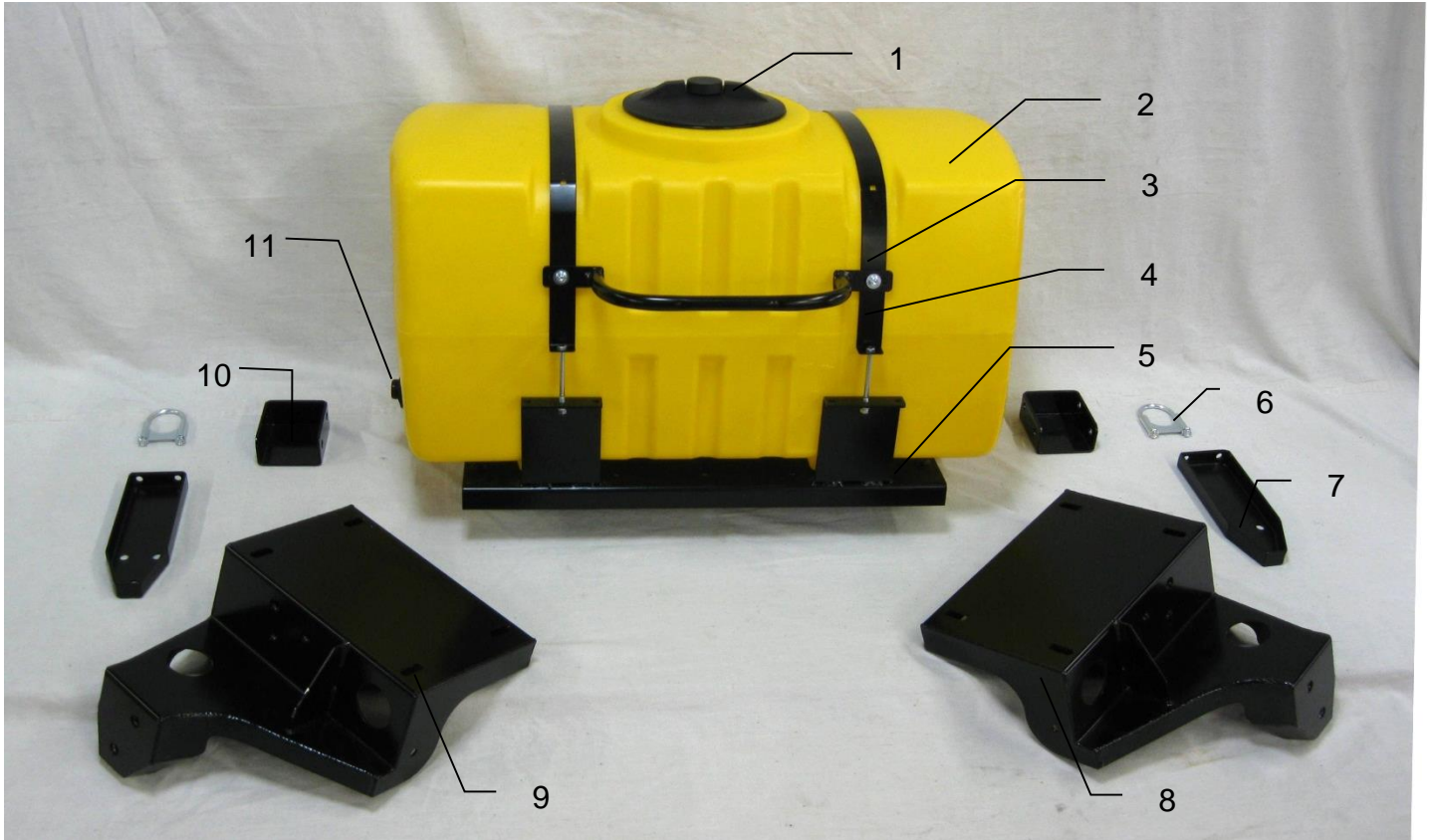


Troubleshooting

Problem	Possible cause	Solution
Pump will not run.	1. Circuit breaker tripped on electronic unit.	1. Check for short, low voltage, and reset breaker.
	2. Pump locked up.	2. Clean or rebuild pump if motor is OK.
	3. Damaged wire.	3. Repair damaged wire.
Pump runs but will not prime.	1. Air leak in intake.	1. Tighten fittings on intake side.
	2. Clogged intake.	2. Clean.
	3. Restricted outlet.	3. Check and clean tips.
	4. Check valve on outlet stuck closed.	4. Clean or repair check valve.
	5. Dirt inside pump.	5. Replace pump check valve.
	6. Vapor locked.	6. Loosen hose by check valve at gauge and bleed air.
Pump does not develop enough output during operation	1. Air leaks or clogs on inlet side of pump.	1. Tighten or clean filter bowl assembly.
	2. Electronic box out of adjustment.	2. Refer to box adjustment page.
	3. Pump worn or dirty.	3. Rebuild pump.
	4. Low supply voltage. (Pump requires 12v minimum)	4. Check voltage at connection with voltmeter.
	5. Bad gauge.	5. Gauge should read less than 10 PSI when not in use. Also tips should lose spray pattern below 10 PSI. Check accuracy.
Pump output varies.	1. Clogged or restricted inlet.	1. Clean
	2. Worn pump parts.	2. Rebuild pump.
Message light blinks two times	1. Pump or wire harness shorted.	1. Check harness running to pump and verify no shorts or problems. 2. Check to see if pump motor is locked up. Repair or replace.
Message light blinks three times	1. Pump is drawing greater than 10 amps.	1. Check to see if motor is running correctly. Repair or replace.
Message light blinks four times	1. Undercurrent coming to control box.	1. Check all battery connections and connections running up to control box.

Parts Breakdown for the Tank and Saddle

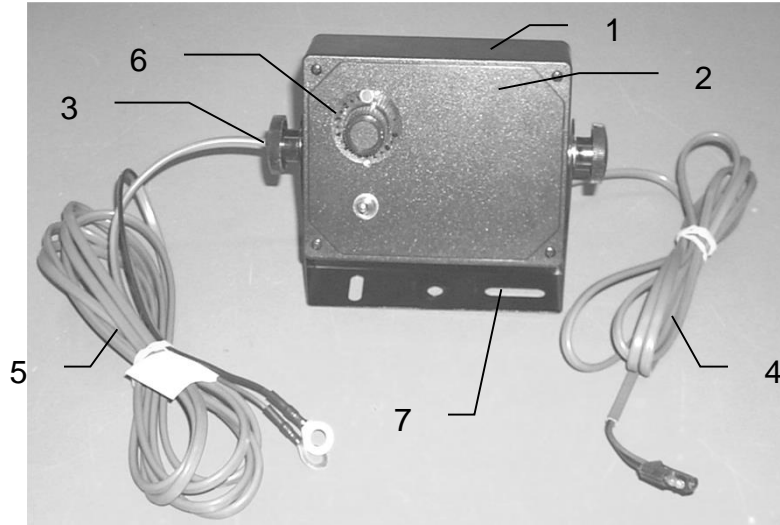
Harvest Tec Model 442C Base Kit



<u>Ref #</u>	<u>Description</u>	<u>Part #</u>	<u>Qty</u>	<u>Ref #</u>	<u>Description</u>	<u>Part #</u>	<u>Qty</u>
1	Tank lid	005-9022H	1	7	Anchor Bracket	001-4703XA	2
2	208 Liter tank	005-9203SQ	1	8	Left Leg Rollbelt	001-4703XL	1
3	Tank strap	001-4402	2	9	Right Leg Rollbelt	001-4703XR	1
4	Hand Rail	001-6707HRS	1	10	Anchor Bracket Ext.	001-4703XAX	2
5	Tank Saddle	001-4703X	1	11	Tank Fitting	005-9100	1
6	U-Bolt Rollbelt	001-4703XAB	2				

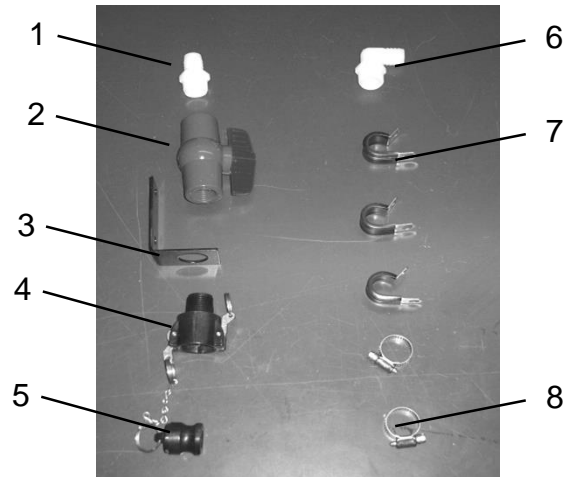
Parts Breakdown for Control Box and Drain Fill Kit

Model 457 Control Box



<u>Ref #</u>	<u>Description</u>	<u>Part #</u>	<u>Qty</u>	<u>Ref #</u>	<u>Description</u>	<u>Part #</u>	<u>Qty</u>
1	Control box enclosure	006-2015A	1	5	Power lead	006-4580C	1
2	Control box cover	006-2015B	1	6	Speed dial	006-2022A	1
3	Control box knob	008-0923	2	7	U-bracket	001-2012E	1
4	Pump lead	006-4583	1				

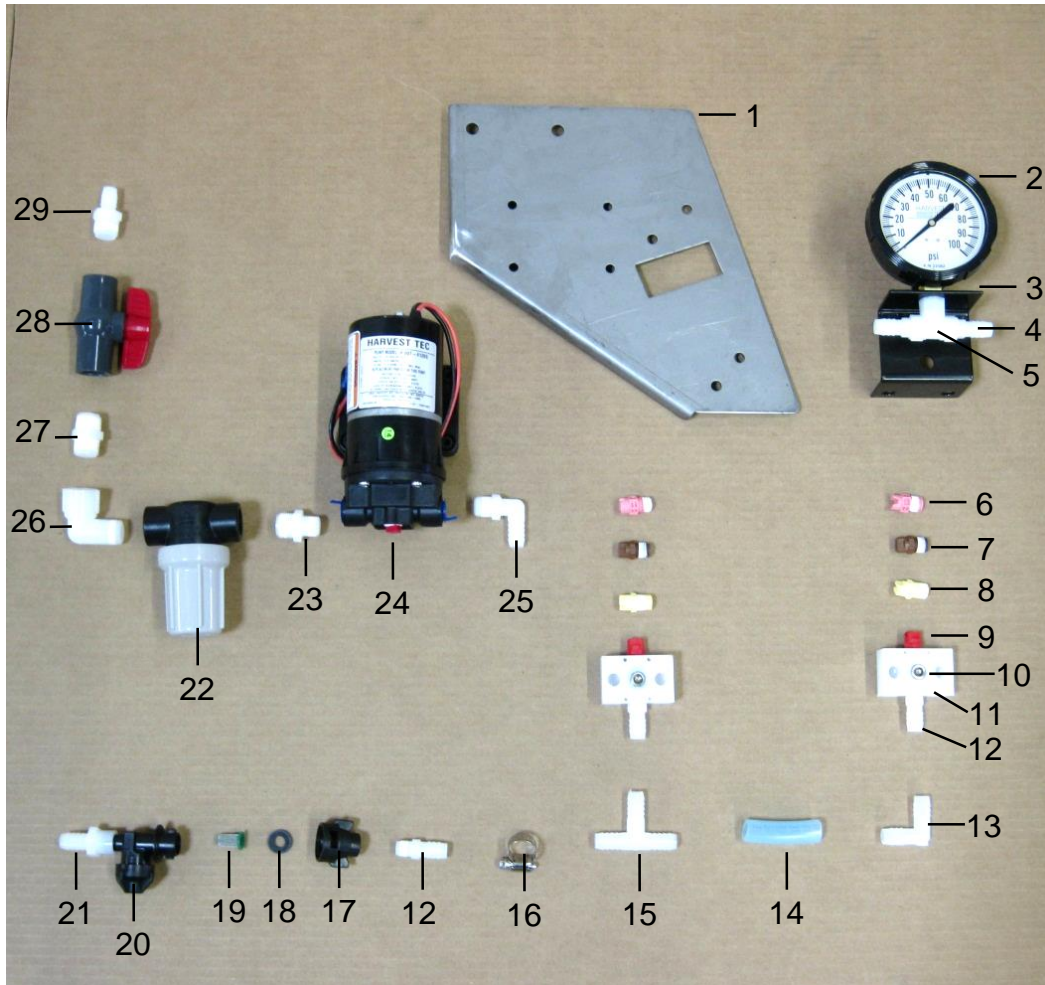
Parts Breakdown for Drain Fill Line



<u>Ref #</u>	<u>Description</u>	<u>Part #</u>	<u>Qty</u>	<u>Ref #</u>	<u>Description</u>	<u>Part #</u>	<u>Qty</u>
1	Straight fitting	003-A3434	1	5	Male coupler	002-2205G	1
2	Ball valve	002-2200	1	6	Elbow	003-EL3434	1
3	Valve holder	001-6702H	1	7	Jiffy clip	008-9010	3
4	Female coupler	002-2204A	1	8	Hose clamp	003-9004	2
				NP	19mm Hose	002-9002	3M

Parts Breakdown Model Specific Installation Kits

Harvest Tec Model 442C Installation Kit



<u>Ref #</u>	<u>Description</u>	<u>Part #</u>	<u>Qty</u>	<u>Ref #</u>	<u>Description</u>	<u>Part #</u>	<u>Qty</u>
1	Valve Mount	001-4703XE	1	17	Female Disconnect 1/4"	004-1207H	1
2	Gauge-4"	002-2208Z	1	18	Washer	004-1207W	1
3	Gauge Holder	001-4717	1	19	Tip Strainer	004-1203-100	1
4	Fitting 1/4" x 1/2"	003-EL1412	2	20	Diaphragm Check Valve	004-1207V	1
5	Tee 1/4"	003-TT14	1	21	Fitting	003-A1412F	1
6	Tip-Pink	004-T8001-PT	2	22	Filter Bowl Assembly	002-4315	1
7	Tip-Brown	004-T80015-PT	2	23	Nipple	003-M1238	1
8	Tip-Yellow	004-T8005-PT	2	24	Pump 12V	007-4120SE	1
9	Tip-Red	004-T8003-PT	2	25	Elbow	003-EL3812	1
10	Plug Allen	003-F14A	2	26	Elbow	003-SE12	1
11	Manifold Block	001-4435NSB	2	27	Fitting	003-M1212	1
12	Fitting 1/4" x 1/2"	003-A1412	2	28	Ball Valve	002-2212	1
13	1/2" HB Elbow	003-EL12	1	29	Fitting	003-A1212	1
14	EVA Tubing 1/2"	002-9002	8M	NP	Spray Block Holder	001-4703XD	2
15	Barb Tee 1/2"	003-T1212	1				
16	Hose Clamps	003-9003	14				

Notes:

WARRANTY AND LIABILITY AGREEMENT

Harvest Tec, Inc. will repair or replace components that are found to be defective within 12 months from the date of manufacture. Under no circumstances does this warranty cover any components which in the opinion of Harvest Tec, Inc. have been subjected to negligent use, misuse, alteration, accident, or if repairs have been made with parts other than those manufactured and obtainable from Harvest Tec, Inc.

Our obligation under this warranty is limited to repairing or replacing free of charge to the original purchaser any part that in our judgment shows evidence of defective or improper workmanship, provided the part is returned to Harvest Tec, Inc. within 30 days of the failure. Parts must be returned through the selling dealer and distributor, transportation charges prepaid.

This warranty shall not be interpreted to render Harvest Tec, Inc. liable for injury or damages of any kind, direct, consequential, or contingent, to persons or property. Furthermore, this warranty does not extend to loss of crop, losses caused by delays or any expense prospective profits or for any other reason. Harvest Tec, Inc. shall not be liable for any recovery greater in amount than the cost or repair of defects in workmanship.

There are no warranties, either expressed or implied, of merchantability or fitness for particular purpose intended or fitness for any other reason.

This warranty cannot guarantee that existing conditions beyond the control of Harvest Tec, Inc. will not affect our ability to obtain materials or manufacture necessary replacement parts.

Harvest Tec, Inc. reserves the right to make design changes, improve design, or change specifications, at any time without any contingent obligation to purchasers of machines and parts previously sold.

Revised 01/03/06

HARVEST TEC, INC.
P.O. BOX 63
2821 HARVEY STREET
HUDSON, WI 54016 USA
PHONE: 715-386-9100
1-800-635-7468
FAX: 715-381-1792
Email: info@harvesttec.com