

# OPERATORS MANUAL

**All SDI Sprayers**  
General Operation  
Maintenance  
Troubleshooting



**SDI**  
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## SDI Sprayer Operating

### Instructions

Read all instructions before spraying. When you complete these instructions, put them with the Operator's Manual in the information tube on the sprayer.

These instructions alert you to things you should do very carefully. If you don't, you could:

- Injure yourself or bystanders
- Injure the next person to operate the machine
- Damage the vehicle or attachments
- Damage the area you are spraying

To make sure you are fully aware of safety and service information, the following two symbols are used throughout this instruction manual.



*This symbol is a **Safety Warning** and appears next to information which may help keep you and others from being injured.*



*This symbol appears next to information or instructions which may help you setup, operate and maintain your equipment properly.*



## General Information

Your sprayer has been manufactured to provide the maximum in dependable and efficient use. Proper operation and maintenance will ensure long satisfactory service. Study this manual carefully to become familiar with the operation and maintenance instructions.

Spraying Devices builds sprayers for use in turf, industrial, pest control and agriculture. Typically, each sprayer is customized to fit the needs of the customer. The basic components of your sprayer can include:

- Tank
- Engine/Pump Units
- Mechanical or Jet Agitation System
- Control Assemblies
- Spray Boom
- Foam Marker

The **Tanks** are constructed from color impregnated commercial grade fiberglass or polyethylene and are available in many sizes for a variety of applications.

**Pumps** can be diaphragm, centrifugal, 12 volt or piston style. Each style of pump is capable of pumping a range of volumes at a variety of pressures. The pressure and volume are dependent upon the plumbing and the specific pump and engine combination.

**Agitation** can be mechanical (paddle) or jet agitation. Mechanical agitation is driven by a belt and pulley system off the engine. Jet agitation is controlled by the pressure of the spray solution returned to the tank



*Diaphragm Pump*



Centrifugal Pump

**Control Valves** can be manual, electric or computer controlled. They can be mounted on the sprayer, remotely mounted on the towing vehicle with trailer mounts, or remotely mounted near the driver on vehicle mounts.

**Spray Booms** are available in multiple widths. We use quality boom components from a variety of suppliers.

**Foam Markers** are used to mark the area sprayed and serve as a reference point for subsequent applications.



*All Function Controls*



*MicroTrak Computer*



***C160 With Hose Reel***



***Optimum Spray Boom***



***Electric Actuators/Boom Lifts***

## Determining Spray Volume

Determining how much spray material you will apply is the **MOST** important component of sprayer operation. Too much or too little can inadvertently damage what you are spraying.

We can help you determine how much liquid you will apply, but it is ***YOUR RESPONSIBILITY*** to mix the material in the tank and determine the final application rate. Contact your spray material supplier or advisor to help you determine the proper application rate.



### WARNING

Improper application of some chemicals can be harmful to your health and the health of others. Governmental regulations strictly govern the application rate of many chemicals.

There are five factors that govern application rate. You can control all five. They are:

1. Ground Speed
2. Spray Nozzle Size
3. Spraying Pressure
4. Ratio of Chemical Mix in Tank
5. Nozzle Spacing and Height

## Ground Speed

Your ground speed can vary greatly depending on the vehicle and the operator. We recommend that you use the procedure that follows to determine the actual ground speed of your vehicle. If the vehicle has a speedometer, you might mark the position of ground speeds on the face of the speedometer. You can also mark a tachometer (engine speed) in different gears to register ground speeds. Actual ground speed is extremely important.

### Check your actual ground speed as follows:

1. Measure off a distance—somewhere between 100 and 200 feet. The **longer** the distance, the more accurate your speed measurement will be. You might consider marking this distance permanently so you can check other vehicles in the future.
2. Drive the vehicle over the measured distance in each gear at a steady speed. Do this several times and use a stop watch to time each run. Get an accurate average of the time it takes to travel this distance in each gear. This will tell you what speeds are available.
3. Use this simple formula to determine your actual speed:

Distance x 60	=	(A) _____
Time (secs) x 88	=	(B) _____
Divide A by B	=	Speed _____
<b>Sample</b>		
200 feet x 60	=	12000
38 secs x 88	=	3344
12000/3844	=	3.59 MPT



## Spray Nozzles

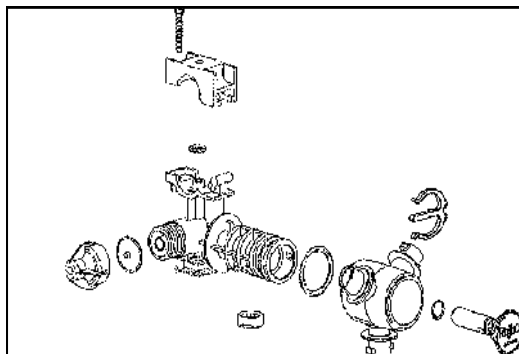
Pressure, nozzle size and nozzle spacing work together. The following principles apply. The **bigger** the nozzle, the more liquid will be applied. The **higher** the pressure, the more liquid will be applied. The **more nozzles** on the boom, the more liquid is applied. You have control over each of these items.

SDI Spray Booms are generally shipped with TeeJet TP11008VP spray tips which are white. The following charts on the next two pages are a convenient way to determine application rates for these nozzles.

Actual nozzle flow is the key to determining the application rate. Several things can affect flow rate.

- Nozzle size and wear**-Check all spray tips along the boom and note the tip size. They should all match. As the nozzle slowly wears, the orifice size changes. This affects the flow rate. If you spray abrasive materials, nozzle wear can be accelerated. As a general rule, change all spray tips at least once a year.
- Pressure**-Flow rate and pressure are closely linked, but pressure has less effect than you might think. Four times the pressure only equals twice the flow rate. Use pressure to make **minor** adjustments to flow rate.
- Nozzle types**-Nozzle types effect flow rates and dispersion of material. Check the nozzle manufacturer's catalog for the specific style you may need.
- Flow of the Carrier**-Nozzles are calibrated using water. Some spray materials are lighter or heavier than water. This will affect flow rates at the same pressure.

The only way to accurately insure the proper application rate, is to carefully monitor the flow rate at each tip. Use a calibration device and check frequently.



***SDI's Triple  
Nozzle Body***

### **Tee Jet Nozzle Tip Charts**

TeeJet TP11008VP (White)  
20" Spacing  
Gallons Per  
Acre @ MPH

PSI	GPM	2	3	4	5
15	0.49	74	48	36	29
20	0.57	83	57	42	34
30	0.69	100	70	51	41
40	0.80	118	78	59	48
50	0.89	131	87	66	53
60	0.98	144	96	73	58

TeeJet TP11008VP (White)  
20" Spacing  
Gallons Per  
1000 sq. ft. @ MPH

PSI	GPM	2	3	4	5
15	0.49	1.7	1.1	0.83	0.67
20	0.57	1.9	1.3	0.97	0.78
30	0.69	2.3	1.6	1.2	0.94
40	0.80	2.7	1.8	1.3	1.1
50	0.89	3.0	2.0	1.5	1.2
60	0.98	3.3	2.2	1.7	1.3

### Tee Jet Nozzle Tip Charts

TeeJet TP11008VP (White)  
10" Spacing  
Gallons Per Acre @ MPH

PSI	GPM	2	3	4	5
15	0.49	148	96	72	58
20	0.57	166	113	84	68
30	0.69	200	139	102	82
40	0.80	235	157	118	96
50	0.89	261	174	132	106
60	0.98	287	182	146	116

TeeJet TP11008VP (White)  
10" Spacing  
Gallons Per 1000 sq. ft. @ MPH

PSI	GPM	2	3	4	5
15	0.49	3.4	2.2	1.7	1.3
20	0.57	3.8	2.6	1.9	1.6
30	0.69	4.6	3.2	2.4	1.9
40	0.80	5.4	3.6	2.8	2.2
50	0.89	6.0	4.0	3.0	2.4
60	0.98	6.6	4.4	3.4	2.6

### Nozzle Spacing and Boom Height

SDI spray booms can have nozzles placed on 10" centers or 20" centers. Normally 10" centers require a boom height of 10" (1:1 Ratio) and 20" centers require a boom height of 20" (when using 110° tips). Use this only as a guide you can adjust the height if overlap occurs.

If you change your nozzle spacing, you will need to make a change in your boom height. This will insure proper coverage.

### **Final Reminders**

1. Know your actual speed
2. Know your nozzle spacing
3. Check spraying pressure
4. Use a calibration device to check individual nozzle output
5. Change nozzles that are out of spec more than 10%
6. Replace all nozzles at regular intervals (at least annually)



***Mechanical Agitation System***



***Jet Agitation System***

## Getting Ready to Spray

**Engine Starting:** Kohler and Honda engines are equipped with electronic ignition systems and are generally easy to start.

Start as follows:

1. Familiarize yourself with the owner's manual for your engine for specific safety and operation information
2. Make sure all guards are in place
3. Check engine oil level and fuel level
4. Move throttle to the choke position
5. Move the unloader handle on the relief valve (see picture) clockwise to the unload position
6. Use pull cord or ignition key to start engine
7. Allow a few minutes of warm-up, then move throttle to the full ON position



**Pressure Relief Valve/  
Unloader**



### Warning

Some spray materials can be hazardous to people and animals. **DO NOT** spray if it is windy or you may be in close proximity to people or animals.

### Before You Load Spray Materials:

- Look at the spray material label for safety instructions and application rates
- Check the label for the use of specific PPE (Personal Protective Equipment) recommendations. As a general rule, always wear:
  - Long sleeved shirt
  - Long pants
  - Sturdy footwear
  - Goggles or face shield
  - Chemical resistant gloves, apron or suit as required
  - A respirator if required
- Carry a fresh water supply
- Clean PPE with soap and water after each use
- Scrub your hands, arms and face with soap and water before eating, smoking or using the restroom
- Always wash PPE clothing separately
- **DO NOT** wear contaminated boots or hats

### Loading Spray Materials

**DO NOT** load any type of spray material without strainer in place.

**DO NOT** load spray material unless the agitation system is operating

#### NOTE

Operators will frequently remove the fill strainer to load powdered materials directly from the bag. This practice allows the heavier material to sink to the bottom of the tank where they are sucked into the pump and valve system. Once the spray valves are opened, the undissolved material is forced into the boom sections and clogs the strainers, screens and spray tips.

### Mixing Wettable Powders

The best way to avoid problems with wettable powders and other insoluble materials is to pre-mix the material at recommended rates, in a bucket until it forms a slurry and then add the slurry to the spray tank.

1. Open the fill lid and make sure the fill strainer is in place
2. Fill the tank at least 1/2 full with **WATER** first
3. Make sure all boom valves in are the **OFF** position or the Master Boom switch or valve is **OFF**
4. Move the unloading lever on the relief valve clockwise to the Unload position. Start the engine and set the engine speed. This should activate the agitation system. Look inside the tank to confirm the agitation is running.
5. Carefully add the spray materials in the fill strainer. If you are using insoluble materials, add them in small amounts and use the fill hose to wash them through the strainer. **DO NOT** remove the strainer to add insoluble materials.
6. Finish filling tank with the agitation system operating
7. Close and secure the lid.

8. Move to area to be sprayed and begin application as soon as possible. **DO NOT** allow the sprayer to sit while full of spray material without the agitation running. The spray materials may settle out and cause clogs and uneven application.

### Mixing Wettable Powders

#### Warning



Many spray materials are harmful if they contact the skin or are ingested. Wear PPE appropriate for the materials being applied. Follow all safety information and avoid inadvertent contact with the materials being sprayed.

### Operation

#### Controls:

SDI spray units can be equipped with three different types of controls:

- Manual
- Electric—(Pressure)
- Computer Controlled—(Flow)

The most common type is the standard SDI electric control. The following describes each type of control. Refer to the separate Operating Instructions included with your sprayer for specific operating information on the controls installed on your sprayer.

## SDI Electric Controls

SDI electric controls have a control console mounted near the operator. On the console is a pressure gauge that reads spraying pressure, a switch to control each spray boom, a master switch that controls all booms and a pressure regulating switch that controls spraying pressure. In addition, there are switches for the electric boom actuators and the foam marker.

*SDI's Electric Controls*



## Computer Controls

SDI sprayers are available with a computer controlled system. This system monitors vehicle speed, system pressure and system flow. The system also makes automatic adjustments for a uniform spray. This computer uses a variety of sensors and they must be calibrated properly for the unit to apply proper volumes.

### NOTE

*It is possible to program the computer to try and do the impossible based on your pump and nozzle combination. If you are having problems programming the control, make sure you are within the capabilities of your sprayer system.*



You should be aware of items that may change computer calibration.

1. Tire size—if tires have been changed or inflation pressure is incorrect.
2. If the electrical current to the computer has been disconnected (unplugged or battery cables disconnected), it must be completely re-calibrated unless the auxiliary battery is installed and operating.
3. Boom length, number and size of nozzles.



***Micro Trak  
Controls***

Refer to the separate *MicroTrak Set Up Manual* included with your sprayer for specific operating information.

**NOTE**

***The use of corrosive or highly abrasive materials with the Raven computerized controls could cause the flow meter to malfunction.***

**Additional/Miscellaneous Notes:**

[illegible]

## **Raising/Lowering Booms**

The spray boom “wings” can be raised or lowered to change spray width or raised for transport or storage.

If you have manually operated booms, simply lift the boom and place it in the boom retaining bracket. Be sure to insert the retaining pin.



***Optimum Spray Boom***



***Electric Actuators/  
Boom Lifts***

If you have the optional Electric Boom Lifts, you can raise or lower the boom by manipulating the boom lift switches. Release the switch before the actuator begins to ratchet to prevent damage to the actuators.

## Spraying Turf

*This section **does not** apply to sprayers with computer controls.*

At this point, it is assumed that you have completed the following:

- Are knowledgeable about the operation of your sprayer
  - Have calibrated your nozzles, speed and nozzle spacing
  - Have determined the proper application and dilution rate for your spray material
1. Start the engine on the sprayer and allow a few minutes of warm up and agitation.
  2. Set the proper spraying pressure. Open all boom valves. Observe the pressure gauge on the boom or relief valve. Use the pressure regulating valve/switch to set appropriate pressure.
  3. Once set, close all boom valves and immediately proceed to the area to be sprayed. **DO NOT** allow the sprayer to sit while full of spray material without the agitation running.
  4. As you spray, check the pressure gauge to make sure your spraying pressure remains constant. If you shut off a boom, you may need to readjust the pressure.
  5. Keep your ground speed constant, ground speed directly affects your application rate.
  6. Once the tank is empty, use the foam marking system or other method to make the spot where you stopped spraying so that you can easily start spraying again.

## Spraying Trees

Many SDI sprayers can easily provide a vertical reach of over 50 feet for spraying tall trees. To spray trees, your sprayer should be equipped with a hose reel kit and a spray gun.

It is extremely important that you **DO NOT** switch from gun spraying to boom spraying without lowering the spraying pressure. Gun spraying can be done at pressures up to 300 PSI. Switching back to boom spraying at high pressure will damage your boom components.

Proceed with gun spraying as follows:

1. Make sure all controls to the boom are **OFF**.
2. Open ball valve to hose reel.
3. Use relief valve to set desired spraying pressure. Note that lower gun spraying pressures will frequently result in more vertical reach because of less spray atomization.
4. When gun spraying is completed, immediately lower spraying pressure to under 100 PSI. This will prevent damage of the boom components.



*Tree Spraying Gun*

### Clean-Up

When you have completed spraying, the sprayer should be rinsed with clean water and visually checked. Pay particular attention after applying insoluble spray materials because those materials can leave residues that could cause clogging or misapplication.

1. Fill the tank with at least 25 gallons of clean water. Clean the fill strainer at this time. When filling, be sure to rinse the inside of the tank completely.
2. Start the engine and set engine speed.
3. Open all boom valves and set pressure to at least 40 PSI.
4. Flush until the tank is empty.
5. Remove suction line strainer and clean.

**Remember—your sprayer will have residues of the spray materials you have just applied. Be sure to follow regulations regarding the disposal of unused spray materials. We also suggest using a tank neutralizer to effectively neutralize any residues left in the tank, pump and boom.**

### Operating Tips

Your spray material supplier should know proper application and dilution rates. Contact them with your spray material questions. Watch for obstacles in the path of the spray booms. SDI booms are equipped with “breakaway” hinges that will pivot if they hit an obstacle. However, you can still damage other boom components.

Spray in a pattern that will minimize uneven spray tip height. Traveling up and down a hill may be better than across it. When tips get close to the ground, the area between the tips will get no spray coverage. This is especially critical when use a 10" boom height.

Use common sense when spraying. Casual bystanders can become upset if they become victims of your inadvertent overspray. **DO NOT** do elevated spraying (trees and bushes) when it is windy. Spray mist can drift long distances in a light wind.

Always flush the sprayer when you are done. If you wait an extended period of time, spray residues may impact your next application. Also, you may not be able to remember what material was used last.

### **Routine Maintenance**

#### **Daily**

- Check oil level in pump
- If you have sprayed, flush your sprayer with clean water
- Visually check hoses, valves and fittings for leaks
- Clean the suction line strainer. A clogged strainer could damage your pump.

#### **Weekly**

- Grease boom pivots
- Check for residue inside tank
- Visually check pump and hydraulic hoses
- Clean spray tip strainers

## **Routine Maintenance**

### **Monthly**

- Check and adjust agitation, pump belts and pulleys
- Randomly check flow rate of spray tips
- Apply a light coat of wax to tank
- Check fill strainer for breaks or openings
- Check belts, pulleys and set screws after every 50 hours of machine use

### **Agitation Shaft Packing**

The agitation shaft passes through a nylon gland which contains a nut and packing. Normally this gland should not leak, but as the packing wears you may notice dripping of fluid around the shaft.

If a leak is detected, tighten the packing gland in 1/4 turn increments until the leak stops.

### **Breakaway Boom Hinges**

The breakaway hinge mechanism has a grease fitting. Occasional lubrication of this fitting will insure continued breakaway action.

### **Electric Boom Actuators**

Boom wing sections are raised and lowered by electric actuators. These actuators are sensitive to low voltage conditions. This can be caused by low voltage at the vehicle battery, faulty connections or undersized wire. The actuators are thermally protected and will shut off if they get hot as the result of a low voltage condition.

If you spray corrosive mixtures, it is possible that over a period of time, corrosion will attack the wires supplying current to the actuator. If you encounter actuator problems, carefully in-



spect all wires and connections to the actuator. Also check the vehicle battery voltage (13.5 VDC minimum) and check voltage at the actuator when it is extended. Generally, 9.5 VDC is the minimum acceptable voltage, although a spike below 9.5 VDC may be seen when starting from the full down position.

### **Motorized Control Valves**

Motorized control valves are operator controlled and generally require no routine maintenance. Do not use a pressure washer on the control box or valves.

### **Winterizing**

If your sprayer is stored during the winter and is subject to freezing conditions, a few precautionary steps should be taken:

- Drain all liquid from tank
- Drain all liquid from hoses, pump, suction line and boom sections or add a 50/50 mix of antifreeze and water.

### **Agitation System**

- Check jet tips for excessive wear
- Check paddles on mechanical agitation for wear and alignment

### **Trouble Shooting**

- Check belt tension on mechanical systems—**DO NOT OVERTIGHTEN**

### **Cannot get enough pressure:**

- Settings exceed pump capacity
- Engine running too slow
- Spray tips are too large
- Tank is empty
- Check pressure regulator
- Check hydraulic system output on vehicle

## **Trouble Shooting**

### **One boom section will not start or stop:**

- Motorized valve not activated
- No current to motorized valve
- Spray tips or screens are plugged
- Check plunger in motorized valves

### **Nozzle drips when off:**

- Nozzle check valve bad or plugged—remove and replace

### **Several nozzles do not spray:**

- Low spray pressure, needs about 10 PSI to open check valves
- Nozzle or filter is plugged—remove and clean

### **Electric boom actuators do not work:**

- Bad switch or connector in circuit
- Thermal overload in actuator has tripped—check for binding in boom hinge

### **Agitation is slow or not working:**

- On jet systems—check the pressure of the spray solution returned to the tank
- On mechanical systems—check the condition of the belts and pulleys for slippage
- Check the position of the unloading valve

[illegible]

**Thank You . . . .**

*For purchasing your **SDI** Sprayer . **SDI** has been  
manufacturing a full line of sprayers  
since 1982.*

*Each sprayer is assembled and tested prior to shipment.  
Sprayers are then broken down into several components for  
ease of shipment. Reassembly is completed by your dealer  
or in some cases, the end user makes the final assembly.*

*We take pride in our products and we make sure our sprayers  
work properly when they leave the factory. We make every  
effort to insure that reassembly in the field is done properly.*

*If you have any problems with the assembly or the operation of  
the sprayer, please call your Dealer or the SDI Customer Service  
Department At **559-734-5555** between the hours  
of 7:00 AM and 4:00 PM  
Pacific Time.*

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