GROUND LOGIC

# PATHFINDER XC
# OPERATOR'S MANUAL

**Congratulations** on the purchase of your Ground Logic, Inc. machine. This product has been carefully designed and manufactured to be a dependable piece of equipment that will provide years of trouble-free operation.

**BEFORE OPERATING YOUR MACHINE, CAREFULLY READ AND UNDERSTAND THIS MANUAL IN ITS ENTIRETY.**

For future reference, place the serial number of the machine and date of purchase below:

Serial Number: _____
Date of Purchase: _____

**GROUND LOGIC, INC.**
**PAT-22016-1**

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## 1. SAFETY

### 1.1 MATERIAL SAFETY

The processes and procedures described in this manual may include actions that require the use of chemicals, solvents, herbicides, pesticides, and other compounds. The users of these products must obtain Material Safety Data Sheets (MSDS) and product labels from the manufacturers or suppliers of the materials to be used. Users must become completely familiar with the health and safety information and follow the procedures, recommendations, warnings, and cautions provided by the manufacturer or supplier for the safe use, handling, storage, application, and disposal of toxic or hazardous materials.

### 1.2 SAFETY DESCRIPTIONS

The safety labels provided in this manual and on the machine alert you to unsafe actions or situations and will be followed by the word **DANGER**, **WARNING**, or **CAUTION**.

**DANGER**: Indicates an imminently hazardous situation which, it not avoided, **WILL** result in death or serious injury.

**WARNING**: Indicates a potentially hazardous situation which, if not avoided, **COULD** result in death or serious injury.

**CAUTION**: Indicates a potentially hazardous situation which, if not avoided, **MAY** result in minor or moderate injury.

### 1.3 SAFETY ADVISORIES

**WARNING:** Before using any hazardous or toxic materials, be aware of all handling, storage, and disposal instructions provided by the manufacturer or supplier. Failure to follow the recommendations of the manufacturer or supplier can result in personal injury.

**WARNING:** Read and follow the product label and material safety data sheet precautions when handling materials to be added to the hopper and spray tank. Some materials may present health hazards and require protective breathing equipment and clothing.

**WARNING:** To avoid serious bodily injury and damage to the transmission or gear shift, the machine must come to a complete stop before shifting. Do not apply excessive force to the gear shift when changing gears. If the transmission is difficult to shift, roll the machine slightly to relieve pressure on the transmission gears.

**WARNING:** The machine has a high center of gravity. Always lean toward the center of turn when changing directions. Always lean into the slope of a hill when operating on sloping surfaces.

**WARNING:** To prevent injury, wear eye protection when using compressed air to clean the machine. Regulate the air pressure to below 30 PSI.

**WARNING:** To avoid personal injury, never perform machine maintenance with the engine running. If the engine has been running, make sure that it has cooled before performing any maintenance on the machine.

**WARNING:** To avoid serious bodily injury or property damage caused by unanticipated movement of the machine:

- Make sure that the transmission is centered in the neutral (N) gear position when starting.
- Do not operate the throttle when starting the engine.
- Do not attempt to start the machine if you or someone else could be trapped by the machine if it were to suddenly move.
- Do not operate the machine if the neutral safe start module is not working correctly.

**WARNING:** The materials dispensed from the machine may present a health hazard. Follow the disposal instructions on the product label and material safety data sheets for the materials dispensed. Follow any local or state regulations that may apply to these products.

### 1.4 TRAINING

- Regard the Ground Logic machine as a piece of power equipment and teach this regard to all who operate this unit.
- Read the instructions carefully. The operator should become familiar with the controls and the proper use of the equipment. If the operator cannot read English, it is the owner's responsibility to explain this material to them.
- Do not allow operation of this machine by untrained personnel. Never allow children, or people unfamiliar with these instructions to use the machine.

### 1.5 PREPARATION

- Evaluate the terrain that will be covered prior to operation of the machine. Clear the area of obstacles and debris and inspect the area for holes and severe grade changes.
- The use of personal protective equipment, such as (but not limited to) protection for the eyes, ears, feet, and head is recommended.
- While operating the machine, always wear substantial footwear and clothing. Do not operate the machine when barefoot or when wearing open sandals.

### 1.6 OPERATION

- Give complete, undivided attention to the job at hand.
- Operate the machine only in daylight or good artificial light, keeping away from holes and hazards.
- Never carry passengers.
- Do not operate the machine when children or others are in the area.
- Use extreme caution when operating the machine on slopes as loss of traction and/or tip-over could occur. The operator is responsible for safe operation on slopes.
- Do not operate the machine near drop-offs, ditches, steep banks, or water. These areas can be dangerous.
- Watch for ditches, holes, rocks, dips, and rises that change the operating angle as rough and/or steep terrain could overturn the machine.
- Avoid sudden starting or stopping on a slope.
- Use extreme caution when backing up. LOOK BEHIND YOU!
- Never operate the machine with defective or missing guards, shields, or covers.
- Do not change the engine governor settings or overspeed the engine. Operating an engine at excessive speed may increase the risk of personal injury.
- Keep hands, feet, and clothing away from rotating parts while the machine is being operated.
- Stop the engine and wait for all moving parts to stop:
    - Before checking, cleaning or working on the machine.
    - Before clearing blockages in the hopper or spray system.
    - Before refueling.
    - Whenever leaving the machine.
- The engine is provided with a fuel shut-off valve. This valve should be used:
    - When the machine will not be used for several days.
    - During transport to and from a job.
    - When the machine is parked inside a building.
- DO NOT operate the machine under the influence of alcohol or drugs.

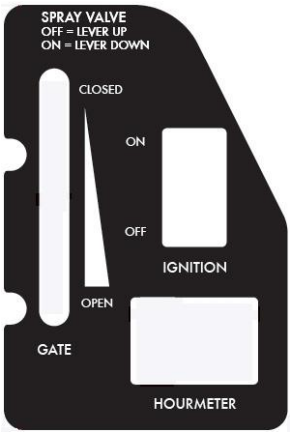
## 1.7 MAINTENANCE AND STORAGE

- For engine maintenance, follow the engine manufacturer's recommendations as stated in the engine manual.
- Do not store the machine in an area where temperatures are below 0 degrees Fahrenheit for extended periods.
- Keep the engine area free from accumulation of grass leaves, excessive grease or oil, and other debris. These materials can become combustible and may result in a fire.
- Store fuel in a container specifically designed for this purpose and keep in a cool, dry place.
- Keep the machine and fuel containers in locked storage to prevent children from playing or tampering with them.
- Gasoline powered equipment or fuel containers should not be stored in a basement or any enclosed area where open pilot lights or heat appliances are present.
- Check all bolts frequently to maintain proper tightness.
- Keep all guards, shields, and all safety devices in place and in safe working condition.
- Frequently check for worn or deteriorating components that could create a hazard.
- All replacement parts must be the same as or equivalent to the parts supplied as original equipment.

## 1.8 SAFETY SIGNS

- Keep all safety signs legible. Remove all grease, dirt, and debris from safety signs and instruction labels.
- Safety signs must be replaced if they are missing or illegible.
- When new components are installed, be sure that current safety signs are affixed to the replaced components.
- New safety signs may be obtained from Ground Logic, Inc.
- Safety signs may be affixed by peeling off the backing to expose the adhesive surface. Apply only to a clean dry surface. Smooth the sign to remove any air bubbles.
- Operators should familiarize themselves with the following safety signs and instruction labels. They are critical to the safe operation of the machine.

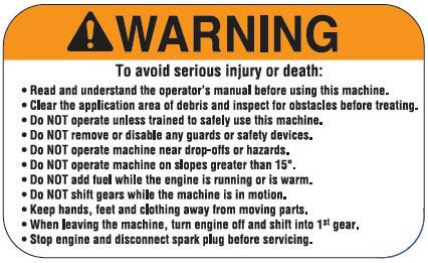

PART NO. H0100
LOCATION: Below gear selector lever




PART NO. H0101
LOCATION: Left side of console


PART NO. H0102
LOCATION: Right side of console


PART NO. H0103
LOCATION: Front of hopper




PART NO. H0104
LOCATION: Rear side of spray tank

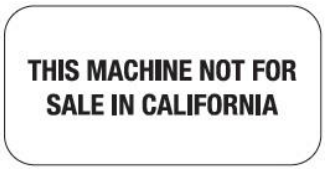

PART NO. H0105
LOCATION: Top of pulley guard


PART NO. H0106
LOCATION: LH side of engine platform


PART NO. H0107
LOCATION: Top of fuel tank hold-down


PART NO. H0108
LOCATION: Left of gear selector lever


PART NO. H0109
LOCATION: Rear side of spray tank plate




PART NO. H0111
LOCATION: Rear side of engine air cleaner

## 2. SPECIFICATIONS

### 2.1 MODEL NUMBER

This manual is for serial numbers AP0001 and higher.

### 2.2 ENGINE

- Engine Model: GX200-URH2
- Engine specifications: See your Honda engine owner's manual.
- RPM: Full speed: 3750 rpm (no load) Idle: 1400 rpm.
- 2:1 gear reduction with wet clutch.

**2.3 FUEL SYSTEM**

- Capacity: 2.5 gal (9.5 L).
- Type of fuel: Regular unleaded gasoline, 87 octane or higher.
- Fuel shut-off valves: Located on engine and below tank.

**2.4 TRANSMISSION**

- Transmission Model: Peerless 855 Series.
- Gear selections: 2 forward, 1 reverse, neutral.
- Speed: 3.5 mph (5.6 km/hour) low gear, 5.5 mph (8.9 km/hour) high gear.

**2.5 TIRES AND WHEELS**

- Front tires: 18 x 950 – 8, RV antifreeze added for ballast and traction.
- Rear tires: 13 x 650 – 6

**2.6 SPREADER**

- Spreader model: Spyker 120 Series.
- Capacity: 120 lb.

**2.7 SPRAYING SYSTEM**

- Spray Pump: 2.0 GPM mechanically driven diaphragm pump.
- Tank: 12.0 gallon (45.4 L) capacity.
- Nozzles: Turbo FloodJet TF-VS5 (broadcast), Turbo TeeJet TT11004VP (trim).
- Spray Patterns: 11' wide pattern for general spraying, 3' narrow pattern for trim spraying.
- Spray Pressure: Regulated to 25 psi (172 kPa) to match ground speed with tip output.

**2.8 DIMENSIONS**

- Overall length: 54.0" (137 cm).
- Overall width: 35.5" (90 cm).
- Overall height: 49.0" (124 cm).
- Weight: 375 lb. (170 kg) dry, 600 lb. (272 kg) full, 800 lb. (363 kg) full with 200 lb. (91 kg) rider.

**2.9 ELECTRICAL SYSTEM**

- Charging system: N/A
- Charging capacity: N/A
- Safety interlock system: This machine is equipped with a neutral safety start module. To start the engine, the transmission must be in the neutral (N) position.

**2.10 OPERATOR CONTROLS**

- The handlebars provide access to most of the machine controls.
- Turning the handlebars while standing on the operator platform provides steering control.
- Squeezing the throttle lever on the right side of the handlebars provides speed control.
- Depressing the brake pedal on the operator platform provides braking control.
- The spray control lever controls liquid flow from the tank to the nozzles.
- The gate lever controls the flow of granular product out of the hopper.
- The engine ignition switch controls the operation or shutdown of the engine.
- The spray control knob controls liquid flow between the trim and broadcast spray nozzles.
- The spread control lever controls the center of the spread pattern of granular product.
- The gate stop on the front of the hopper controls the maximum gate opening for granular product.

## 3. OPERATING INSTRUCTIONS

### 3.1 CONTROLS

- The user should become familiar with all controls before operating the machine.
  - **Handlebars:** The handlebars provide steering control of the machine and should be grasped with the hands at the location of the foam grips.
  - **Throttle lever:** The throttle lever is located at the end of the right hand side of the handlebars. Squeezing the throttle lever increases the speed of the engine. Releasing the throttle lever allows the engine to return to idle speed. When the transmission is engaged in any position other than neutral, squeezing the throttle will cause the machine to move relative to the gear that has been selected. The more the lever is squeezed, the greater the speed of the machine.
  - **Brake pedal:** The brake pedal is located in the middle of the operator platform. Depressing the brake pedal engages the band brakes on the rear wheels and slows the motion of the machine.
  - **Spray control lever:** The spray control lever is located near the left side of the handlebars and controls the flow of liquid from the tank to the spray nozzles. When the lever is in the vertical position, the valve is closed. When the lever is in the horizontal position (the lever can be either pushed forward or pulled backward), the valve is open.
  - **Gate lever:** The gate lever is located on the left side of the console and controls the opening at the bottom of the hopper. Pushing forward on the gate lever causes the gate to close so that no granular product will flow out of the bottom of the hopper. Pulling backward on the gate lever causes the gate to open so that granular product will flow.
  - **Engine ignition switch:** The engine ignition switch is located on the left side of the console and controls the ignition circuit of the engine. The engine will only start and run when the switch is in the "ON" position. The engine will not start or will shut down if the switch is in the "OFF" position.
  - **Spray control knob:** The spray control knob is located on the right side of the console and controls which nozzle the liquid in the spray system is directed towards. When the knob is positioned in the wide spray position, liquid is directed toward the broadcast nozzle. This nozzle will create a maximum spray width of 11'. When the knob is positioned in the narrow spray position, liquid is directed toward the trim nozzle. This nozzle will create a maximum spray width of 3'.
  - **Spread control lever:** The spread control lever is located on the right side of the console and controls the center of the granular spread. The lever controls the position of a baffle located below the gate of the hopper. As this baffle is moved relative to the gate opening, the center of the dispensed material changes. To operate, the lever is first unlocked by rotating counterclockwise. The handle can then be moved up and down to change the position of the baffle. Once the correct position is found, the handle is rotated clockwise to lock the lever in place.
  - **Gate stop:** The gate stop controls the maximum opening of the hopper gate and is located on the front of the hopper. The knob is rotated one direction or the other until the desired maximum gate opening is obtained.

### 3.2 PRE-START

- Fill the fuel tank. For best results use only fresh, clean regular grade unleaded gasoline with an octane rating of 87 or higher. Do not add oil to the gasoline.

- Do not overfill the fuel tank. Never fill the fuel tank so that the fuel level rises above a level that is ½" below the bottom of the filler neck. This will allow for fuel expansion and will help to prevent fuel spillage.
- Understand the controls, their locations, their functions, and their safety requirements.
- Refer to Maintenance, Section 5, and perform all the necessary inspection and maintenance steps.

**3.3 STARTING THE MACHINE**

- Position the machine on a flat and level surface.
- Ensure that the transmission is in the neutral (N) position and that the engine ignition switch is in the "ON" position.
- Open the fuel shut-off valves located on the engine and below the fuel tank.
- If the engine is cold, activate the choke lever located on the engine. If the engine is warm, it may not be necessary to activate the choke lever.
- Firmly grasp the handle of the start cord and pull the handle toward the rear of the machine. Do not squeeze the throttle lever when starting the machine.
- Once the engine has started, gradually deactivate the choke lever.
- Carefully step onto the operator platform.
- Move the transmission lever to the desired location.
- Slowly squeeze the throttle lever to start the machine moving.

**3.4 SHUTTING DOWN THE MACHINE**

- Position the machine on a flat and level surface.
- Completely release the throttle lever.
- Move the transmission lever to the neutral (N) position.
- Move the engine ignition switch to the "OFF" position.

**3.5 TRANSPORTING THE MACHINE**

- Use a heavy-duty trailer or hitch-mounted rack to transport the machine. Securely fasten the machine to the trailer or rack with straps, chains, cable, or ropes. Make sure that the trailer or rack has all of the necessary lighting and markings that are required by law. If using a trailer, make sure that the safety chains are secured.
- Use extreme caution when loading the machine on a trailer or rack. The ramps should be long enough so that the angle between the ramp and the ground does not exceed 15°. A steeper angle may cause the machine to lose traction and slide out of control.
- Always load the machine with the machine driving forward.
- Only use first gear (1) when loading the machine.
- Keep the machine in gear once it has been properly loaded and shut off. This will help to minimize movement of the machine on the trailer or rack during transportation.

**3.6 OPERATING THE SPREADER**

- The spreader has a pattern width of approximately 14 feet. By using passes with an approximate 7 foot width, the granular product will be evenly distributed with the proper amount of overlap. Note that the sprayer also requires passes with an approximate 7 foot width. Sprayer operation details are noted in the next section.
- Adjust the gate stop to the desired setting.
- Completely close the hopper gate and add fertilizer to the hopper.
- Install the hopper shower cap if necessary.
- Carefully step onto the operator platform.
- Place the gear selector in second gear (2).

- Squeeze the throttle lever to start the machine rolling forward.
- Slide the gate lever to the **OPEN** position.
- To stop the spreading operation, slide the gate lever to the **CLOSED** position, release the throttle lever, and depress the brake pedal.

### 3.7 OPERATING THE SPRAYER

- The sprayer has a pattern width of approximately 11 feet with the broadcast tip. The effective pattern width is approximately 7 feet wide which allows the same pass width as the spreader. For this reason, the spreader and spraying systems may be operated at the same time.
- Add the required materials to the spray tank.
- Note the direction of the wind and plan an application path that allows the spraying to occur downwind.
- Avoid spraying in windy conditions as the spray may carry to non-target areas.
- Carefully step onto the operator platform.
- Rotate the spray width knob to the desired setting.
- Place the gear selector in second gear (2).
- Squeeze the throttle lever to start the machine rolling forward.
- Activate the spray control lever (horizontal position).
- To stop the spraying operation, deactivate the spray control lever (vertical position), release the throttle lever, and depress the brake pedal.

## 4. CALIBRATION

### 4.1 SPREADER FLOW RATE CALIBRATION

- The following instructions provide a method for adjusting the flow of fertilizer from the hopper so that the correct amount of fertilizer is applied to a 1000 $ft^2$ area. The machine is designed to apply fertilizer evenly by overlapping each pass by 50 percent. The spread width for most products is approximately 14 feet. This means that the center of each pass should be approximately 7 feet from the center of the previous pass. The effective material spread width is 7 feet and is the basis for calibration.

- Measure a distance of 143 feet on a flat paved surface. Using a paved surface will allow the fertilizer to be recollected and will prevent burning the turf if the application rate is largely different from what is intended. Traveling 143 feet with the machine equates to covering approximately 1000 $ft^2$ with fertilizer (7 ft x 143 ft = 1001 $ft^2$).

- Set the gate stop to a setting of 5. This will be used as the starting setting for dialing in the correct gate stop setting for the particular material that is being used. Note that the spreader will have to be recalibrated for each different type of material that is spread. Make sure to record the final gate stop setting once the correct application rate has been achieved.

- Place the spreader gate lever in the CLOSED position. Place enough material in the hopper to cover 1000 $ft^2$.

- Begin the spreading operation while moving toward the 143 foot marker. With the machine moving at full speed, the hopper should just empty out as the machine passes the marker. If the hopper empties before the marker is reached, turn the gate stop dial to a slightly lower setting and repeat the process. If the hopper empties after the marker is reached, turn the gate stop dial to a slightly higher setting and repeat the process. Continue this process until the proper dispensing rate is achieved.

- When the calibration is complete, collect the fertilizer that has been dispensed for reuse. Never leave the fertilizer on the pavement where it can wash away in runoff.

### 4.2 CENTERING THE SPREAD PATTERN

- The following instructions provide a method for adjusting the center of the spread pattern so that fertilizer is evenly distributed over the width of the spread area.
- Obtain the following items:
    - Eleven collection pans, 3 to 4 inches tall and 12 inches square (e.g. aluminum roasting pans).
    - Clear tube, ½" internal diameter, 4 inches tall. Use a permanent marker to mark the tube at ¼" increments all of the way up the tube. This will act as a measuring device for the collected fertilizer prills.
    - A ruler or tape measure.
    - A method of recording the collection amounts.
- Set the gate stop to a setting of 5.
- Move the gate lever to the OPEN position (the hopper must initially be empty).
- Turn the spread control lever counterclockwise to release the lock and move the lever in or out so that the baffle can be seen centered just below the opening of the gate in the bottom of the hopper. Turn the spread control lever clockwise to lock into position.
- Move the gate lever to the CLOSED position.
- Load the hopper with the fertilizer to be used for calibration.
- Place the eleven collection pans on a flat paved surface in a straight line on two-foot centers. Using a paved surface will allow the fertilizer to be recollected and will prevent burning the turf if the application pattern is largely different from what is intended.
- Make at least three passes traveling directly over the center pan in a path perpendicular to the row of pans. NOTE: All of the passes must be made in the same direction.
- Pour the contents of the first pan on the left into the graduated tube and record the amount of material that is in the tube. Repeat this measurement for each of the eleven collection pans.
- Add together all of the eleven numbers to find the total material that was dispensed.
- Divide the amount caught in each pan by the total amount. This is the percentage that was caught in each pan.
- The distribution should increase towards the center pan and decrease toward the outside pans. The distribution should also be approximately the same on each side. If it appears that the left side is receiving more material, pull the spread control lever out slightly and repeat the process. If it appears that the right side is receiving more material, push the spread control lever in slightly and repeat the process. Only slight adjustments are needed to make spread pattern changes.
- Once the correct distribution is achieved, measure the distance from the console surface to the top of the spread control lever. Record this measurement as the setting to be used for the particular fertilizer being evaluated. Note that the spreader will have to be recalibrated for each different type of material that is spread.
- When the calibration is complete, collect the fertilizer that has been dispensed for reuse. Never leave the fertilizer on the pavement where it can wash away in runoff.

### 4.3 CALIBRATING THE SPRAY FLOW RATE

- The following instructions provide a method for adjusting the amount of flow being dispensed from the spray nozzles.
- Fill the spray tank with water.
- Place a container in a position near the spray nozzles so that all of the spray being dispensed by the nozzles can be captured in the container.
- Move the spray control knob to the desired spray width setting. The spray will flow through the broadcast tip (TF-VS5) on the wide spray setting. The spray will flow through the trim tip (TT11004VP) on the narrow spray setting.
- Place the machine in neutral (N), squeeze the throttle lever to run the engine at full throttle, and adjust the pressure relief valve so that the reading on the pressure gauge is 25 psi.
- Move the spray control lever to ON (horizontal position). Operate the spray system in the ON position for exactly one minute.
- Measure the collected water. The amount collected for each tip should approximately be as follows:
    - Broadcast tip (TF-VS5) = 100 ounces ± 10 ounces
    - Trim tip (TT11004VP) = 40 ounces ± 4 ounces
- If the output from the nozzles is slightly different from the values listed above, adjust the pressure relief valve slightly. Unscrewing the valve knob will decrease the system pressure and will decrease the output from the tips. Screwing the valve knob in will increase the system pressure and will increase the output from the tips.
- If the output from the nozzles is drastically different from the values listed above, there may be other problems with the system. Refer to section 6, FAULT ISOLATION.

## 5. MAINTENANCE

The maintenance interval periods listed below are based on machine operating hours. For machines that experience low yearly hours of operation, some engine maintenance tasks are recommended at different intervals than would occur under the operating hours guidelines. See the Engine Owner's Manual for more information.

### 5.1 PERIODIC MAINTENANCE

**Daily Inspections:**

- Check engine oil level. See the Engine Owner's Manual.
- Check the reduction case oil level. See the Engine Owner's Manual.
- Check the air filter. See the Engine Owner's Manual.
- Spray the shaft bushing in the bottom of the hopper with a light oil lubricant such as WD-40.
- Check the entire machine for loose hardware or other problems. Resolve any issues before operating the machine.

**One Month or 20 Hour Maintenance Period:**

- Change the engine oil the first month or after 20 hours, whichever comes first. Change the engine oil every 100 hours after that. See the Engine Owner's Manual.
- Change the reduction case oil the first month or after 20 hours, whichever comes first. Change the reduction case oil every 100 hours after that. See the Engine Owner's Manual.

**25 Hour Maintenance Intervals:**

- Check the tire pressure in all four tires. Inflate the front drive tires to 10 psi. Inflate the rear operator platform tires to 15 psi.
- Clean debris from the engine and muffler.
- Inspect the spray system filter located right below the tank.
- Grease the wheel bearings on the operator platform.
- Grease the jackshaft pillow block bearings.
- Wash the machine with low pressure water.
- Apply a light oil lubricant such as WD-40 to all moving parts except for belts and pulleys.

**50 Hour Maintenance Intervals:**

- Clean the air filter. When operating in dusty conditions, the air filter may require more frequent cleaning.
- Check the brakes. Adjust if necessary.
- Grease the operator platform pivot hub.

**100 Hour Maintenance Intervals:**

- Change the engine oil. See the Engine Owner's Manual.
- Change the reduction case oil. See the Engine Owner's Manual.
- Clean the sediment cup on the engine. See the Engine Owner's Manual.
- Check and adjust the spark plug. See the Engine Owner's Manual.
- Clean the spark arrester on the engine. See the Engine Owner's Manual.
- Inspect the fuel tank for debris. Clean if necessary.
- Inspect the fuel filter. Clean or replace as necessary.
- Inspect the belts. Replace if necessary.
- Flush and clean the spray tank.
- Check the spray system output rate. Replace spray tips and/or adjust pressure setting as necessary.

**300 Hour Maintenance Intervals:**

- Replace the air filter. See the Engine Owner's Manual.
- Replace the spark plug. See the Engine Owner's Manual.
- Check the idle speed and adjust if necessary.*
- Check the valve clearance and adjust if necessary.*
- Check the gear oil level in the spinner right angle gearbox.

**500 Hour Maintenance Intervals:**

- Clean the combustion chamber.*

*These items should be serviced by your Honda servicing dealer, unless you have the proper tools and are mechanically proficient. Refer to the Honda shop manual for service procedures.

## 6. FAULT ISOLATION

This section provides a method for troubleshooting machine problems. Before utilizing the following procedures, check the machine for obvious signs of damage or failure. This includes missing or loose components, components that have failed, or physical damage. Do not attempt to operate the machine until the machine has been repaired.

### 6.1 MACHINE DOES NOT START

| FAILURE MODE | CAUSE OF PROBLEM | CORRECTIVE ACTION |
|---|---|---|
| Machine does not start. | The fuel level in the tank is low. | Add fuel to the fuel tank. |
| | The fuel shutoff valves are in the closed position. | Make sure that the fuel shut off valves are open. One valve is located below the tank and the other valve is located on the engine. |
| | The fuel line is clogged. | Clean the fuel line. |
| | The fuel tank has contamination. | Clean out the fuel tank and install fresh fuel. |
| | The choke setting is incorrect. | Ensure that the choke setting is correct for the starting conditions. Cold starts will require the choke to be activated while warm starts may not require the choke. |
| | The shift lever is not in the neutral (N) position. | Center the shift lever in the neutral (N) position. The transmission must be in the neutral position to start. |
| | The ignition switch is in the "OFF" position. | Move the ignition switch to the "ON" position. |

### 6.2 SPREADING SYSTEM OPERATES INCORRECTLY

| FAILURE MODE | CAUSE OF PROBLEM | CORRECTIVE ACTION |
|---|---|---|
| Spreader pattern is uneven or spreader does not operate. | The gate opening in the bottom of the hopper is blocked. | Remove the material from the hopper and dislodge any clumps around the gate opening. Inspect the agitator wire and make sure that it is not worn, damaged, or missing. |
| | The spread control baffle is positioned incorrectly. | Follow the procedure outlined in Section 4.2 for centering the spread pattern. |
| | The input shaft of the spinner gearbox is not turning. | Inspect the tension of the drive belts. Make sure that the idler pulleys are maintaining pressure on the belts. Inspect the belts for severe wear or damage. |
| | The shaft coupler is loose. | Make sure that the coupler connecting the spinner shaft to the spinner gearbox is tightened correctly. |
| | The spinner is dirty, worn or damaged. | Inspect the spinner and clean or replace if necessary. |
| | The spinner clip is damaged or missing. | Inspect the spinner clip on the bottom of the spinner. If it is damaged or missing, the spinner may not spin even though the spinner shaft is rotating. Replace the spinner clip if necessary. |

### 6.3 SPRAYING SYSTEM OPERATES INCORRECTLY

| FAILURE MODE | CAUSE OF PROBLEM | CORRECTIVE ACTION |
|---|---|---|
| Spraying pattern is uneven or spraying system does not operate. | The spray nozzle tips are out of position. | Rotate the spray nozzle tips so that the tip orifice is directed straight in front of the machine. |
| | The spray nozzles are out of position. | Verify that the lower nozzle (broadcast nozzle) is positioned straight up and down and the upper nozzle (trim nozzle) is rotated forward approximately 30 degrees. |
| | The spray valve is not in the correct position. | Verify that the spray valve is in the horizontal position when spraying. The valve lever can be moved either forward or backward to the horizontal position to operate. The valve is "OFF" in the vertical position. |
| | The pressure relief valve is set incorrectly. | Verify that the pressure gauge reads approximately 25 psi at full engine speed. Adjust the pressure relief knob in or out to obtain this pressure. Tighten the locking nut against the pressure relief knob. |
| | The strainer or tip is clogged. | Remove the spray nozzle tip and inspect the tip orifice and the strainer to make sure they are not clogged. Clean or replace these components as necessary. |
| | The filter is clogged. | Remove the sediment bowl from the filter housing and inspect the filter screen. Clean or replace the screen as necessary. |
| | The spray pattern knob is incorrectly set. | Move the spray pattern knob all the way to side of the desired pattern setting. |

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| | The spray tank volume is low. | Refill the spray tank. Note that in very rough or hilly conditions, the liquid in the spray tank may slosh around and the tank discharge tube may starve when the tank level is low. This can cause poor spraying performance. |
| | The engine speed is too low. | Operate the machine at full engine speed. The spray system is designed to operate most efficiently at full engine speed. |
| | The pump is worn or damaged. | Loosen the suction fitting on the pump to verify that there is liquid flow to the pump. Tighten the suction fitting and loosen the discharge fitting to verify that the pump is operating correctly. If there is no flow, replace the pump. |
| | The pump input shaft is not spinning. | Verify that all of the belts are in good condition and are tensioned properly. Verify that the pump pulley is securely fastened to the pump shaft with a setscrew. |

## 7. WARRANTY

Ground Logic, Inc. hereby warrants to the original purchaser that the Pathfinder fertilizer spreader and spraying machine manufactured by Ground Logic, Inc. will be free from defects in material and workmanship for a period of one year from the date of delivery or the first 500 operating hours, whichever comes first. Exceptions to this policy are noted below.

This warranty is subject to the following exceptions and limitations:

**PURCHASER RESPONSIBILITIES**

In order for warranty repairs to be covered under the warranty plan, a number of provisions must be satisfied by the purchaser of the machine and these include:

Timely maintenance, adjustment, and record keeping per the machine owner's manual and engine manual.

Prior notification of Ground Logic, Inc. of the need for warranty service.

Transportation to and from the place of warranty repair.

Return of a warranty claim form, the parts in question, and copies of warranty maintenance logs within 30 days of warranty repair to Ground Logic, Inc. for examination and warranty approval as described in the warranty policy.

**EXCLUSIONS**

No warranty is extended to any equipment or parts that have been altered, misused, improperly adjusted, neglected, or damaged by accident, disasters, or normal wear and tear.

No warranty is extended on any parts that are not original equipment as produced by Ground Logic, Inc.

No warranty is extended to the engine which is covered by the manufacturer's warranty.

No warranty is extended to expendable maintenance items after the machine's first scheduled check. These items include normal maintenance items that are typically replaced during routine service. Such items include belts, filters, spark plugs, and other items.

Ground Logic, Inc. reserves the right to incorporate changes into the design of its products without obligation to make such changes on previously manufactured products.

**LIMITATION OF REMEDIES**

UNDER NO CIRCUMSTANCES, EXCEPT TO THE EXTENT PRESCRIBED BY APPLICABLE LAW, SHALL GROUND LOGIC, INC. BE LIABLE FOR ANY LOSS OR DAMAGE, DIRECT OR INDIRECT, SPECIAL OR CONSEQUENTIAL ARRISING OUT OF THE USE OF OR INABILITY TO USE THIS EQUIPMENT, INCLUDING BUT NOT LIMITED TO ANY CLAIM FOR LOSS OF PROFITS, LOSS OF SAVINGS OR REVENUE, LOSS OF USE OF EQUIPMENT OR ANY ASSOCIATED EQUIPMENT, FACILITIES OR SERVICE, DOWN TIME, THE CLAIMS OR COSTS OF THIRD PARTIES INCLUDING CUSTOMERS, AND INJURY TO PROPERTY.

Some states do not allow limitation on how long an implied warranty lasts or the exclusion or limitation of incidental or consequential damages, so the limitations or exclusions may not apply to you. This warranty gives you specific legal rights, and you may also have rights that vary from state to state.