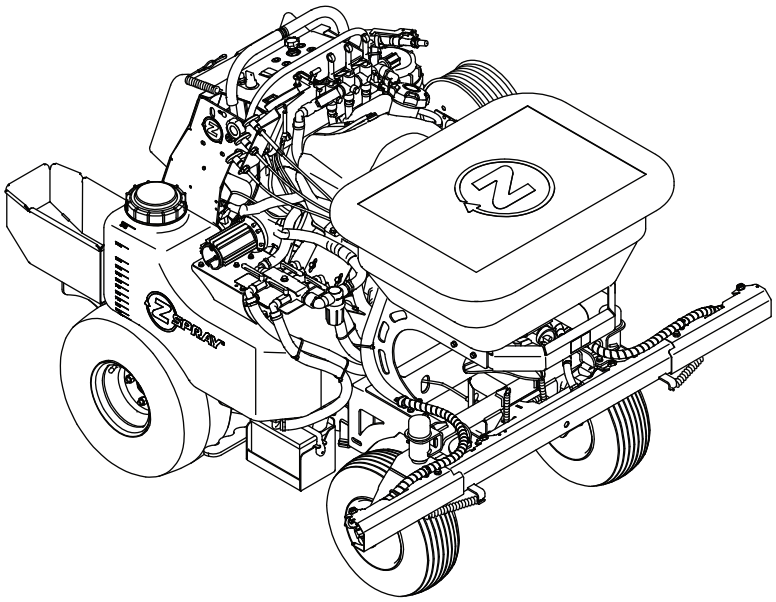
TURF EQUIPMENT™



Z-SPRAY®

Operator's Manual

For Serial Nos.
406,294,345 & Higher
Part No. 4504-922 Rev. A

⚠ WARNING

CALIFORNIA
Proposition 65 Warning

The engine exhaust from this product contains chemicals known to the State of California to cause cancer, birth defects, or other reproductive harm.

Battery posts, terminals, and related accessories contain lead and lead compounds, chemicals known to the State of California to cause cancer and reproductive harm. Wash hands after handling.

Use of this product may cause exposure to chemicals known to the State of California to cause cancer, birth defects, or other reproductive harm.

Important: It is a violation of California Public Resource Code Section 4442 or 4443 to use or operate the engine on any forest-covered, brush-covered, or grass-covered land unless the engine is equipped with a spark arrester, as defined in Section 4442, maintained in effective working order or the engine is constructed, equipped, and maintained for the prevention of fire.

To acquire a spark arrester for your machine, see your Engine Service Dealer.

Please refer to the engine manufacturer's information included with the machine.

The gross or net horsepower (or torque) of this engine was laboratory rated by the engine manufacturer in accordance with the Society of Automotive Engineers (SAE) J1940 or J2723. As configured to meet safety, emission, and operating requirements, the actual engine horsepower (or torque) on this class of machine will be significantly lower.

415 Industrial Row
Beatrice, NE 68310

Contact us at www.zturfequipment.com.
Printed in the USA

Introduction

CONGRATULATIONS on the purchase of your Z-Spray spreader-sprayer. This product has been carefully designed and manufactured to give you a maximum amount of dependability and years of trouble-free operation.

This manual contains operating, maintenance, adjustment, and safety instructions for your Z-Spray spreader-sprayer.

BEFORE OPERATING YOUR Z-SPRAY, CAREFULLY READ THIS MANUAL IN ITS ENTIRETY.

By following the operating, maintenance, and safety instructions, you will prolong the life of your Z-Spray, maintain its maximum efficiency, and promote safe operation.

Important: To maximize safety, performance, and proper operation of this machine, it is essential that all operators carefully read and fully understand the contents of the Operator's manual provided with the product. Safe operation of Z Turf Equipment is essential. Failure to comply with the operating instructions or receive proper training may result in injury.

Go to https://www.zturfequipment.com for additional safe operation information, such as safety tips, training materials, and Operator's manuals.

If additional information is needed, or should you require trained mechanic service, contact your authorized Z Turf Equipment dealer or distributor.

All Z Turf Equipment dealers and distributors are kept informed of the latest service methods. Many are equipped to provide prompt and efficient service in the field or at their service stations. They carry ample stock of service parts or can secure them promptly for you from the factory.

All Z-Spray parts are thoroughly tested and inspected before leaving the factory, however, attention is required on your part if you are to obtain the fullest measure of satisfaction and performance.

Whenever you need service, genuine Z-Spray parts, or additional information, contact an Authorized Service Dealer or Z Turf Equipment Customer Service and have the model and serial numbers of your product ready.

Figure 1 identifies the location of the model and serial numbers on the product. Write the numbers in the space provided.

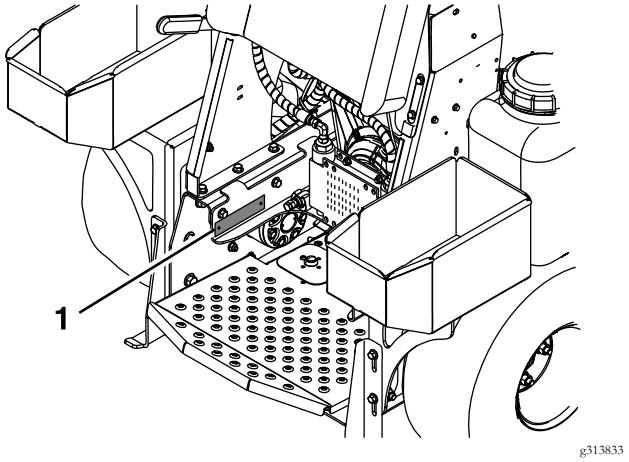


Figure 1

1. Model and serial number location

Model No. _____

Serial No. _____

For complete warranty details, see https://www.zturfequipment.com. You may also call us 402-223-6375 to request a written copy of the product's warranty.

Contents

Safety

The intended use of the spreader-sprayer is for lawn care.

Safety Alert Symbol

This Safety Alert Symbol (Figure 2) is used both in this manual and on the machine to identify important safety messages which must be followed to avoid accidents.

This symbol means: **ATTENTION! BECOME ALERT! YOUR SAFETY IS INVOLVED!**

g000502

Figure 2
Safety Alert Symbol

The safety alert symbol appears above information which alerts you to unsafe actions or situations and will be followed by the word **DANGER**, **WARNING**, or **CAUTION**.

DANGER: Indicates an imminently hazardous situation which, if 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.

This manual uses two other words to highlight information. **Important** calls attention to special mechanical information and **Note** emphasizes general information worthy of special attention.

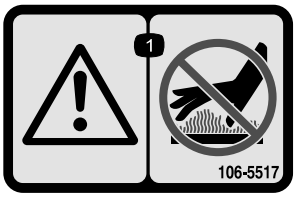
General Safety

This machine is capable of amputating hands and feet and of throwing objects. Z Turf Equipment designed and tested this machine to offer reasonably safe service; however, failure to comply with safety instructions may result in injury or death.

- Read, understand, and follow all instructions and warnings in the Operator's Manual and other training material, on the machine, engine, and attachments. All operators and mechanics should be trained. If the operator(s) or mechanic(s) can not read this manual, it is the owner's responsibility to explain this material to them; other languages may be available on our website.
- Only allow trained, responsible, and physically capable operators that are familiar with the safe operation, operator controls, and safety signs and instructions to operate the machine. Never let children or untrained people operate or service the equipment. Local regulations may restrict the age of the operator.
- Always use appropriate Personal Protective Equipment (PPE) to guard against contact with chemicals.
- Do Not operate the machine near drop-offs, ditches, embankments, water, or other hazards.
- Do Not put your hands or feet near moving components of the machine.
- Never operate the machine with damaged guards, shields, or covers. Always have safety shields, guards, switches and other devices in place and in proper working condition.
- Stop the machine, shut off the engine, and remove the key before servicing, fueling, or unclogging the machine.

Safety and Instructional Decals

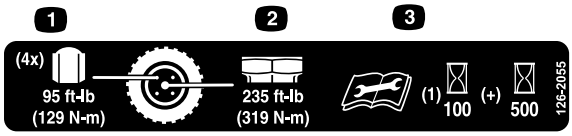
- Keep all safety signs legible. Remove all grease, dirt and debris from safety signs and instructional labels.
- Replace all worn, damaged, or missing safety signs.
- When replacement components are installed, be sure that current safety signs are affixed to the replaced components.
- If an attachment or accessory has been installed, make sure current safety signs are visible.
- New safety signs may be obtained from your authorized Z Turf Equipment dealer or distributor.
- Safety signs may be affixed by peeling off the backing to expose the adhesive surface. Apply only to a clean, dry surface. Smooth to remove any air bubbles.
- Familiarize yourself with the following safety signs and instruction labels. They are critical to the safe operation of your Z Turf Equipment commercial spreader-sprayer.



decal106-5517

106-5517

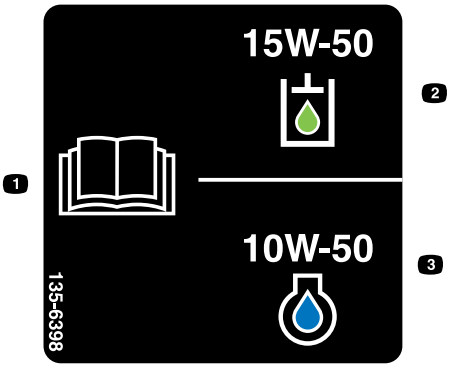
1. Warning—do not touch the hot surface.



decal126-2055

126-2055

1. Wheel lug nut torque 95 ft-lb (129 N-m) (4x)
2. Wheel hub nut torque 235 ft-lb (319 N-m)
3. Read and understand the Operator's manual before performing any maintenance, check torque after first 100 hours then every 500 hours thereafter.



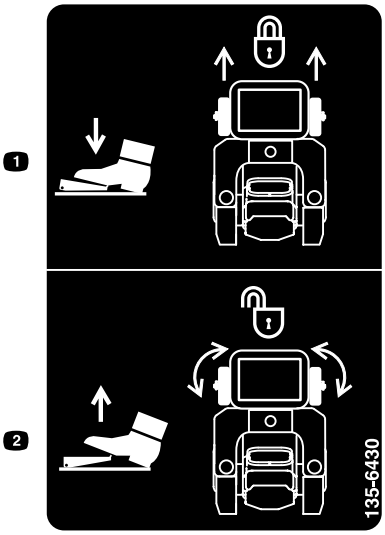
decal135-6398

135-6398

1. Read the *Operator's Manual*.
2. Only use green-colored 15W-50 hydraulic fluid.
3. Only use blue-colored 10W-50 engine oil.

decal135-6424

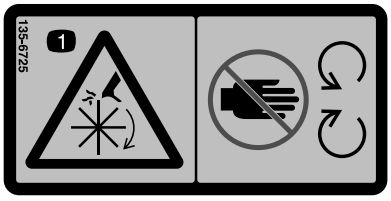
135-6424



decal135-6430

135-6430

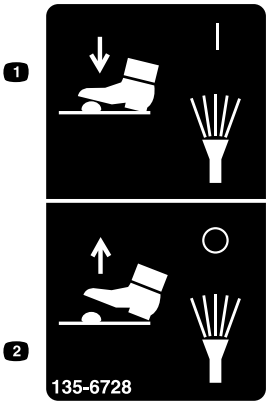
1. Press and hold the foot pedal to lock the caster wheels in the straight position.
2. Release the foot pedal to unlock the caster wheels to allow turning.



decal135-6725

135-6725

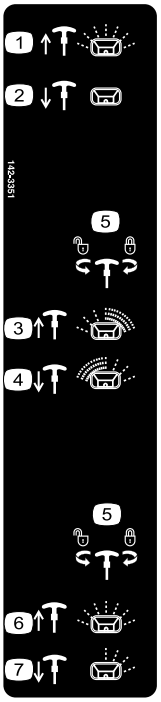
1. Cutting/dismemberment hazard—stay away from moving parts.



decal135-6728

135-6728

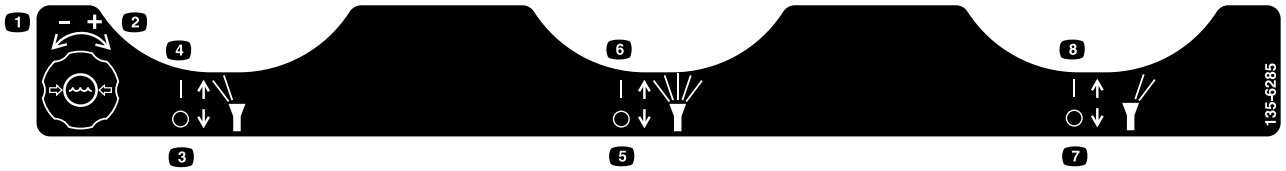
1. Press and hold foot button to turn on spray.
2. Release foot button to shut off spray.



decal142-3351

142-3351

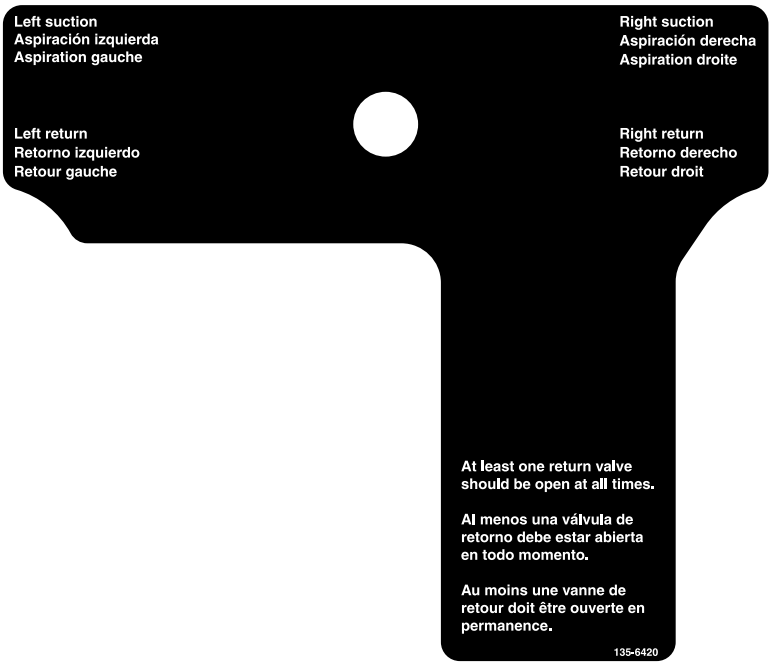
1. Spread On-Pull handle up.
2. Spread Off-Push handle down
3. Spread pattern control-Pull handle up if heavy on left side
4. Spread pattern control-Push handle down if heavy on right side
5. Spread Lock-Rotate counterclockwise to unlock; rotate clockwise to lock.
6. Deflector-Pull knob up to open
7. Deflector-Push knob down to close



decal135-6285

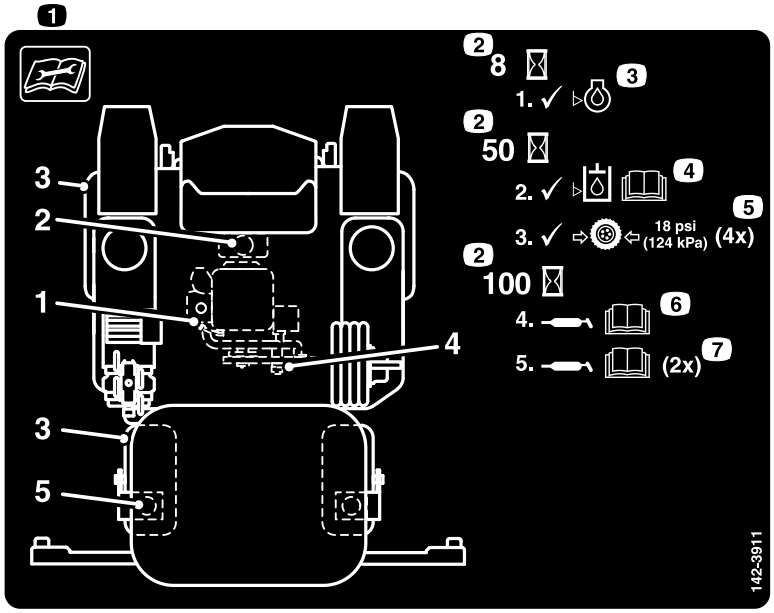
135-6285

1. Water pressure—decrease
2. Water pressure—increase
3. Left nozzle spray—off
4. Left nozzle spray—on
5. Center nozzle spray—off
6. Center nozzle spray—on
7. Right nozzle spray—off
8. Right nozzle spray—on



decal135-6420

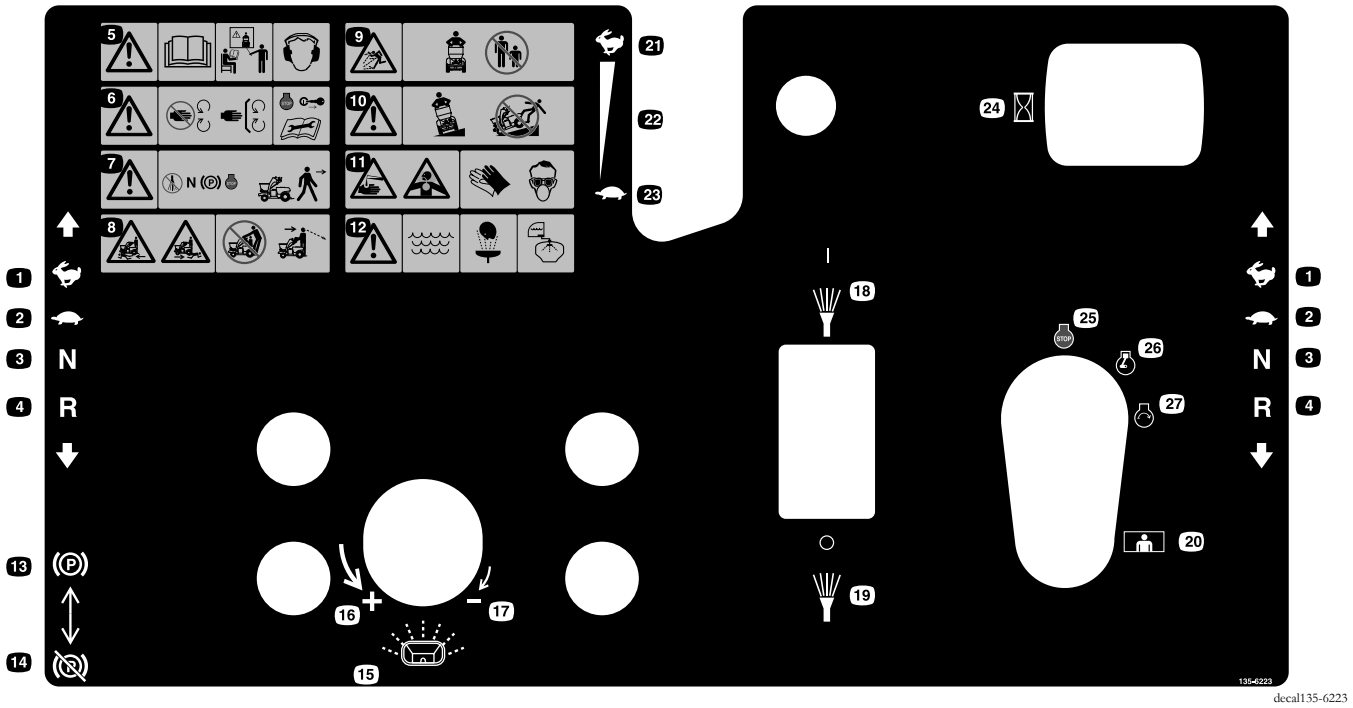
135-6420



decal142-3911

142-3911

1. Read the instructions before servicing or performing maintenance
2. Time interval
3. Check engine oil level
4. Check hydraulic oil level; refer to the Operator's manual for further instructions (3 locations)
5. Check tire and caster wheel pressure (4 locations)
6. Grease idler pivot; refer to the Operator's manual for further instructions
7. Grease caster pivots; refer to the Operator's manual for further instructions (2 locations)



decal135-6223

135-6223

1. Fast
2. Slow
3. Neutral
4. Reverse
5. Warning—Read the Operator's Manual. Do Not operate this machine unless you are trained. Wear hearing protection
6. Warning—Stay away from moving parts; keep all guards in place. Stop engine and remove key before adjusting, servicing, or cleaning..
7. Warning—Disengage sprayer controls, move drive lever to neutral position, engage parking brake, and stop engine before leaving the operator's position.
8. Crushing/dismemberment hazard of bystanders—Do Not carry passengers, look forward and down when operating the machine, look behind and down when reversing.
9. Thrown object hazard—keep bystanders away.
10. Warning—operate across slopes not up and down. Loads may shift on slopes or when turning. Do Not operate on wet slopes–use extreme caution when operating on slopes.
11. Caustic liquid/chemical burn and toxic gas inhalation hazard—wear hand, skin, eye, and respiratory protection.
12. Warning-Use fresh, clean water:
    - for first-aid washing
    - for rinsing the tank.
13. Park brake—On
14. Park brake—Off
15. Spreader speed
16. Spreader speed—increase
17. Spreader speed—decrease
18. Spray pump—On
19. Spray pump—Off
20. Operator Presence Control (OPC)
21. Throttle—fast
22. Continuous variable setting
23. Throttle—slow
24. Hour meter
25. Engine—Off
26. Engine—On
27. Engine—Start

	PSI	Drop Size	CAPACITY ONE NOZZLE IN GPM	CAPACITY ONE NOZZLE IN OZ./MIN	SPACING 20" GPA 4 MPH	GPA 5 MPH	GALLONS PER 1,000 SQ. FT. 3 MPH	4 MPH	5 MPH
142-3306	30	VC	0.13	17	9.7	7.7	0.29	0.22	0.18
	40	VC	0.15	19	11.1	8.9	0.34	0.26	0.20
	50	VC	0.17	22	12.6	10.1	0.39	0.29	0.23
	60	C	0.18	23	13.4	10.7	0.41	0.31	0.24
142-3307	30	VC	0.17	22	12.6	10.1	0.39	0.29	0.23
	40	VC	0.20	26	14.9	11.9	0.45	0.34	0.27
	50	VC	0.22	28	16.3	13.1	0.50	0.37	0.30
	60	VC	0.24	31	17.8	14.3	0.54	0.41	0.33
142-3308	30	VC	0.22	28	16.3	13.1	0.50	0.37	0.30
	40	VC	0.25	32	18.6	14.9	0.57	0.43	0.34
	50	VC	0.28	36	21	16.6	0.63	0.48	0.38
	60	VC	0.31	40	23	18.4	0.70	0.53	0.42
142-3309	30	XC	0.26	33	19.3	15.4	0.59	0.44	0.35
	40	VC	0.30	38	22	17.8	0.68	0.51	0.41
	50	VC	0.34	44	25	20	0.77	0.58	0.46
142-3310	30	XC	0.35	45	26	21	0.79	0.60	0.48
	40	XC	0.40	51	30	24	0.91	0.68	0.54
	50	VC	0.45	58	33	27	1.00	0.77	0.61
142-3311	30	XC	0.43	55	32	26	0.97	0.73	0.58
	40	XC	0.50	64	37	30	1.10	0.85	0.68
	50	VC	0.56	72	42	33	1.30	0.95	0.76
142-3312	30	XC	0.52	67	39	31	1.20	0.88	0.71
	40	XC	0.60	77	45	36	1.40	1.00	0.82
	50	VC	0.67	86	50	40	1.50	1.10	0.91

Grey tips are to be used ONLY the 4 tip booms

HIGH VOLUME SPRAY CHART (XRC TIPS)

	PSI	Drop Size	CAPACITY ONE NOZZLE IN GPM	CAPACITY ONE NOZZLE IN OZ./MIN	HIGH VOLUME SPRAYING (SPACING) 20" GPA 4 MPH	GPA 5 MPH	GALLONS PER 1,000 SQ. FT. 3 MPH	4 MPH	5 MPH
135-8413	15	VC	0.61	78	45	36	1.40	1.00	0.83
	20	VC	0.71	91	53	42	1.60	1.20	0.97
	30	C	0.87	111	65	52	2.00	1.50	1.20
	40	C	1.00	128	74	59	2.30	1.70	1.40
117-5839	15	XC	0.92	118	68	55	2.10	1.60	1.30
	20	XC	1.06	136	79	63	2.40	1.80	1.40
	30	VC	1.30	166	97	77	2.90	2.20	1.80
	40	C	1.50	192	111	89	3.40	2.60	2.00

*NOTE: Always double check your application rates.
Tabulations are based on spraying water at 70˚ F (21˚C)

Coarse Very Coarse Extremely Coarse

142-3313

Spreader / Sprayer Calibration:

Mixing of liquid or dry product should be in accordance to manufacturers labels. Remember this is designed for low volume spraying so the mix will be more concentrated.

Remember that your machine is factory set to put down 1/3 gallon of liquid per 1,000 sq. ft (at 5MPH and 40PSI). For instance, some products call for 1.1 to 1.5 oz per 1,000 sq. ft. We would recommend using 1.3 (median value of 1.1 to 1.5). Since you are using a 1/3 gallon tip, you need to multiply by 3, then multiply that amount by the number of gallons your put in your tank

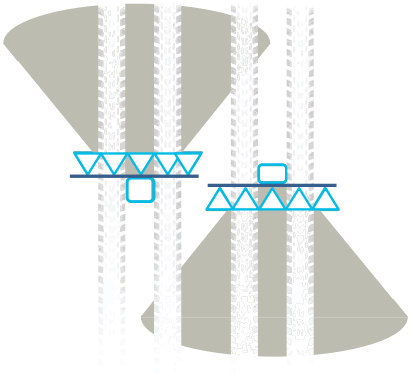
1.3 (median value of 1.1 to 1.5) X 3 (1.3 gallon tip) X gallons of water needed. If you were filling a 30 gallon tank your equation would look like this: 1.3 X 3 X 30 = 117 ounces in 30 gallons of water.

Approximate Granular Calibration

Product	Lbs. per 1,000 sq ft	Full Rate
Fine Pellets	1	4.75
	2	5.25
	3	5.5
Mixed Fine Pellets	2	5.0
	4	6.0
	6	6.5
Small Pellets	2	4.25
	4	5.5
	6	5.75
Nitrogen Pellets Med.	1	4.75
	2	5.5
	3	6.0
Med. Pellets & Granules	2	4.75
	4	5.5
	6	6.5
Large Heavy Pellets	2	5
	4	6.25
	6	7.25

*Calibrated at 5 MPH

Throw fertilizer back to the center of tire tracks



Accuway

Accuway balances the spread pattern, by shifting the product placement on the spinner. Placing the product on the impeller close to the shaft or the center will cause the spread pattern to be heavier to the right as it rides the impeller for a longer period. If the product is placed on the outer edge of the impeller, the spread pattern will be heavier to the left (because the spinner is turning clockwise).

1) Start with the Accuway control cable all the way forward or in (this is home base).
2) Begin to spread the product. As you are spreading you should be able to see the spread pattern in front of you. Generally, all spreaders will tend to throw fertilizer heavy to the right. As you continue to spread, pull the Accuway control towards you very slowly (small increments) until you begin to bring the spread pattern directly centered in front of you.
3) Once you have the spread pattern centered, lock the Accuway cable in place. There should be no reason to reset the Accuway for that product unless you see that the spread pattern has changed due to bumping the lever. If it has changed slightly, simply re-adjust the pattern while you're spreading.

Fine Mixed Fine Small Small/Med Medium Heavy

decal142-3313

142-3313

Specifications

Systems

Engine

- Engine Specifications: See your Engine Owner's Manual
- Engine Oil Type: 4-Cycle Premium Engine Oil
- RPM: Full Speed: 3600 ±100 RPM (No Load)

Fuel System

- Capacity: 5 gal. (18.9 L)
- Fuel Recommendations:
  - For best results, use only clean, fresh, unleaded gasoline with an octane rating of 87 or higher ((R+M)/2 rating method).
  - Oxygenated fuel with up to 10% ethanol or 15% MTBE by volume is acceptable.
  - **Do Not** use ethanol blends of gasoline (such as E15 or E85) with more than 10% ethanol by volume. Performance problems and/or engine damage may result which may not be covered under warranty.
  - **Do Not** use gasoline containing methanol.
  - **Do Not** store fuel either in the fuel tank or fuel containers over the winter unless a fuel stabilizer is used.
  - **Do Not** add oil to gasoline.
- Fuel Filter: In fuel tank

Electrical System (Electric Start)

- Charging System: Flywheel Alternator
- Charging Capacity: 20 amps
- Battery Type: BCI Group U1
- Battery Voltage: 12 Volt
- Polarity: Negative Ground
- Fuses:
  - 10 amp main fuse
  - 30 amp sprayer fuse
  - 1 amp speedometer fuse

Safety Interlock System

Engine will not start unless the interlock key is installed in the OPC switch.

Operator Controls

Steering and Motion Control:

- Moving the steering control from side to side controls right and left travel.
- One lever in the center of the steering control, controls both drive wheels for moving forward or reverse, stopping, and power turning.
- Motion control lever automatically returns to the neutral position if released.

Transmission

- Tandem hydro gear variable displacement high efficiency pumps coupled with two high efficiency Parker wheel drive motors.
- Hydraulic Oil: Use 15W-50.
- Hydraulic Oil Capacity: 2.5 qt (2.4 L)
- Hydraulic filter is replaceable, cartridge type
- Speeds:
  - 0-8.0 mph (12.9 km/hr) forward.
  - 0-4.0 mph (6 km/hr) reverse.
- Drive wheel release valve allows machine to be moved when engine is not running.

Wheel Drive System

Drive wheels are direct coupled to Parker wheel drive motors with 1.25 inch (31.75 mm) tapered shaft.

Tires & Wheels

Drive		
Pneumatic (Air-Filled)		
	42	46 & 52
Quantity	2	2
Tread	K358	K500
Size	20 x 8.00–8	20 x 10.50–8
Ply Rating	4	4
Pressure	16-20 psi (110-138 kPa)	16-20 psi (110-138 kPa)

Front Caster	
	Pneumatic (Air-Filled)
Quantity	2
Tread	Rib
Size	16 x 6.50–8
Ply Rating	4
Pressure	16-20 psi (110-138 kPa)

Sprayer System

52 Inch Models:

- Tank Capacity: 60 gallon (227 L) (Twin 30 gallon tanks)
- Center Nozzles Quantity: 3
- Spray Width:
  - Center Section and Both Booms: 10 ft (3 m)
  - Center Section Only: 6 ft (1.8 m)
  - Center Section and One Boom: 8 ft (2.4 m)
  - Only One Boom: 2 ft (0.6 m)

42 and 46 Inch Models:

- Tank Capacity: 30 gallon (113.5 L) (Twin 15 gallon tanks)
- Center Nozzles Quantity: 2
- Spray Width:
  - Center Section and Both Booms: 8 ft (2.4 m)
  - Center Section Only: 4 ft (1.2 m)
  - Center Section and One Boom: 6 ft (1.8 m)
  - Only One Boom: 2 ft (0.6 m)
- Spray Pump: Remco 5500 Series Diaphragm Pump-12VDC

Spray Nozzles

Hypro Air Injected Tips-Ceramic

Tip Color	MPH	Pressure	Gallons/ 1,000 sq. ft.
Yellow	5	40 psi	.27 (1/4) gallon
Lavender	5	40 psi	.34 (1/3) gallon
Red	5	40 psi	.54 (1/2) gallon
Brown	5	50 psi	.76 (3/4) gallon
Grey	4	40 psi	1 gallon

Spray Wand Nozzle

Adjustable flow rate and spray pattern.

Spreader System

- Maximum Hopper Capacity:
  - 46 and 52 Inch Models: 220 lb (98.8 kg)
  - 42 Inch Model: 150 lb (68 kg)
- Spreader Motor: Hydraulic motor
- Spreader Width: Adjustable from 3 ft (0.9 m) up to 25 ft (7.6 m).

Dimensions

Overall Width:

52 Inch Model	52 inches (132 cm)
46 Inch Model	46 inches (117 cm)
42 Inch Model	42 inches (107 cm)

Overall Length:

All Models: 73 inches (185 cm)

Overall Height:

All Models: 50 inches (127 cm)

Curb Weight:

	52 Inch Model	52 Inch XL Model
Dry Weight	950 lb (431 kg)	960 lb (435 kg)
Only Hopper Full	1170 lb (531 kg)	1180 lb (535 kg)
Only Sprayer Tanks Full	1450 lb (658 kg)	1460 lb (662 kg)
Spray and Hopper Full with Two Bags Granular	1770 lb (803 kg)	1780 lb (807 kg

	46 Inch Model	42 Inch Model
Dry Weight	900 lb (408 kg)	860 lb (390 kg)
Only Hopper Full	1120 lb (508 kg)	1010 lb (458 kg)
Only Sprayer Tanks Full	1150 lb (522 kg)	1110 lb (563 kg)
Spray and Hopper Full with Two Bags Granular	1470 lb (667 kg)	1360 lb (617 kg)

Maximum Machine Weight:

Operator + loaded machine

52 Inch Model	2000 lb (907 kg)
52 Inch XL Model	2010 lb (912 kg)
46 Inch Model	1700 lb (771 kg)
42 Inch Model	1590 lb (721 kg)

Note: Overloading the machine will shorten the life of the transmission and void the warranty.

Torque Requirements

Bolt Location	Torque
Wheel Hub	235 ft-lb (319 N-m)
Crankshaft Bolt	35 ft-lb (47 N-m)
Engine Mounting Bolts	132 in-lb (15 N-m)
Lug Nuts	95 ft-lb (129 N-m)
Wheel Motor Mounting Bolts	105 ft-lb (142 N-m)
Front Frame to Rear Frame Bolts	43 ft-lb (58 N-m)
Engine Plate to Rear Frame	236 in-lb (27 N-m)
Spray Nozzle Mounting Nuts	20 in-lb (2 N-m)
Tower to Rear Frame	263 in-lb (30 N-m)
Pulley Setscrews	156 in-lb (18 N-m)

Product Overview

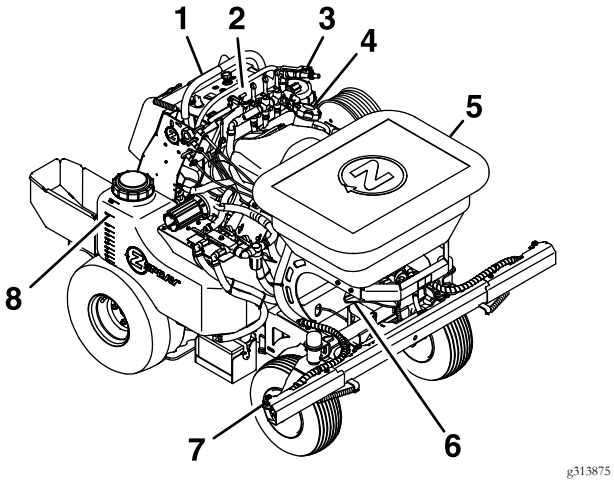


Figure 3

1. Motion control levers
2. Engine/Spreader–Sprayer Controls
3. Spray wand
4. Fuel cap
5. Hopper
6. Spreader impeller
7. Nozzles
8. Spray tank

Operation

Note: Determine the left and right sides of the machine from the normal operating position.

Controls

Become familiar with all the controls before starting the engine and operating the machine.

Motion Control Levers

The motion control levers, located on each side of the top console, control the forward and reverse motion of the machine.

Moving the levers forward or backward turns the wheel on the same side forward or reverse respectively. Wheel speed is proportional to the amount the lever is moved.

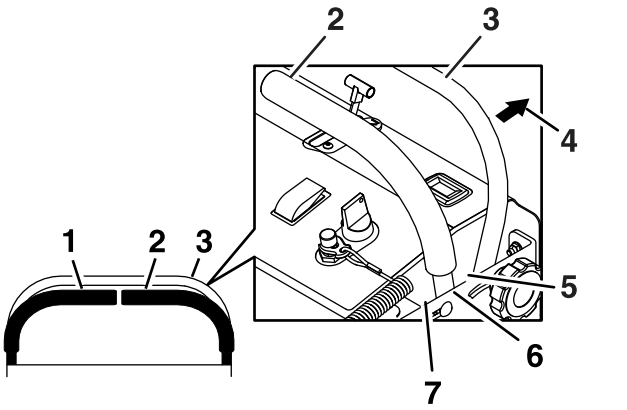


Figure 4

1. LH Motion control lever
2. RH Motion control lever
3. Front reference/Speed control bar
4. Front of the machine
5. Forward
6. Neutral
7. Reverse

Note: If the motion control lever does not return to the neutral position when released, contact an Authorized Service Dealer.

Choke Control

Located in the center of the control console (see Figure 5).

The choke is used to aid in starting a cold engine. Pulling up on the choke will put the choke in the "ON" position and pushing down on the choke will put the choke in the "OFF" position. Do Not run a warm engine with the choke in the "ON" position.

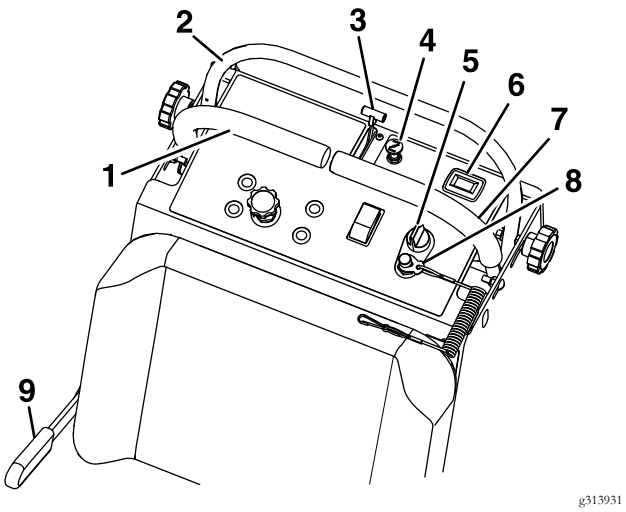


Figure 5

1. LH Motion control lever
2. Front reference/Speed control bar
3. Throttle
4. Choke
5. Ignition switch
6. Hour Meter
7. RH Motion control lever
8. Operator Presence Control (OPC) lanyard
9. Parking brake

Throttle Control

Located in the center of the control console (see Figure 5).

The throttle is used to control engine speed. Moving the throttle lever forward will increase engine speed and moving the throttle lever to the rear will decrease engine speed. Moving the throttle forward into the detent is full throttle.

Park Brake Lever

Located on the left side of the control tower (see Figure 5).

The brake lever engages a parking brake on to the drive tires.

To engage, pull the lever up and forward.

To disengage the brake, push the lever back and down.

When parking on a steep slope, the wheels must be chocked or blocked in addition to the brake being engaged. The machine must be tied down and brake engaged when transporting.

Ignition Switch

Located on the right side of the control console.

The ignition switch is used to start and stop the engine. The switch has three positions "OFF", "ON" and "START". Insert key into switch and rotate clockwise to the "ON" position. Rotate clockwise to the next position to engage the starter (key must be held against spring pressure in this position). Allow the key to return to the "ON" position immediately after the engine starts.

Operator Presence Control (OPC) Lanyard

Located below the ignition switch on the control console.

It is recommended to attach the Operator Presence Control (OPC) lanyard to the operator. If the lanyard claw disconnects from the stem, the engine will shutdown.

To make sure the lanyard is attached properly to the machine, pull up on the knob and then push the lanyard claw firmly onto the stem.

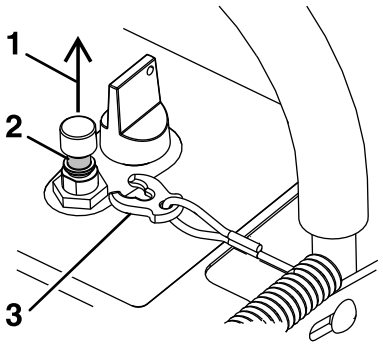


Figure 6

1. Pull up
2. Stem
3. Lanyard claw

Hour Meter

Located to the right of the throttle.

The hour meter is connected to a charge circuit installed in the engine block and it records the number of hours that the engine has run. If ignition switch is left on without engine running, hour meter will not run.

Granular Impeller Speed Control

Located on the left side of the control console (see Figure 7).

Rotate the knob counterclockwise to start the impeller and to increase the speed and pattern width. Rotate the knob clockwise to decrease speed, pattern width, and to turn the impeller off.

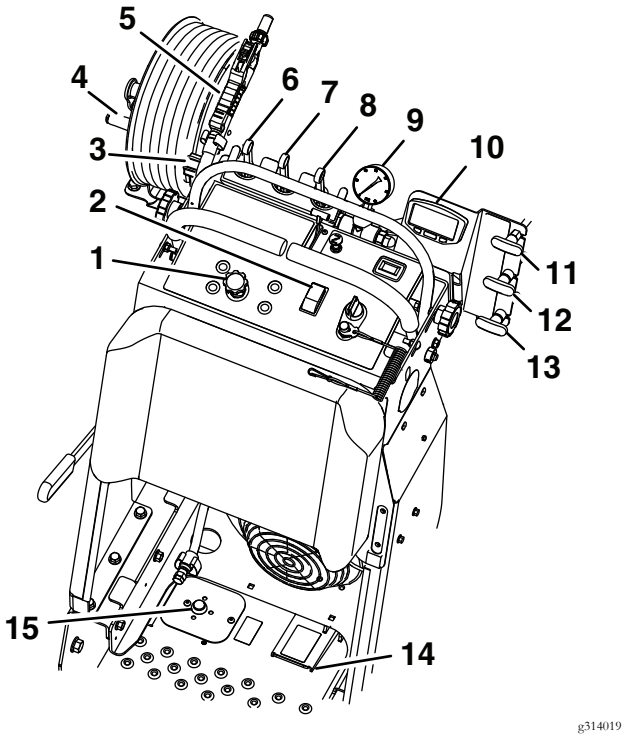


Figure 7

1. Granular impeller speed control
2. Spray system switch
3. Spray pressure control knob
4. Hose reel handle
5. Spray wand trigger and lock
6. Left nozzle spray lever
7. Center nozzle spray lever
8. Right nozzle spray lever
9. Spray pressure gauge
10. Digital display gauge
11. Spread On/Off
12. Spread pattern control
13. Spread deflector lock
14. Caster wheel lock foot pedal
15. Spray pump foot button

Spray System Switch

Located to the left of the ignition switch.

Push on the top of the switch to turn on the spray system pump as well as the spot spray foot switch on the left side of the foot pan. Push the bottom of the switch to turn the sprayer "OFF". Once the pump is turned on, the spray pressure control knob is turned clockwise to increase pressure and/or counter-clockwise to release pressure (and create agitation if the pump is on). The pressure can be read on the spray pressure gauge (decreasing pressure from gauge will increase agitation in the tank).

Spray Pump Foot Button

Located on the left side of the operator platform.

Press and hold the foot button to turn the sprayer to "ON". Release the foot button to turn the sprayer "OFF".

Spray Pressure Control Knob

Located on the left side of the machine.

Rotate the knob clockwise to increase pressure and counterclockwise to decrease pressure.

The pressure will be displayed on the pressure gauge. Once the nozzles are opened, there will be a slight decrease in pressure (adjust accordingly).

Spray Pressure Gauge

Located to the right of the spray levers.

Displays the spray pressure when the machine is spraying.

Digital Display Gauge

Located on the right side of the boom manifold.

Refer to the digital display User's Manual for the display information.

Left Nozzle Spray Lever

Located to the right of the spray wand.

Push the lever forward to turn on the left nozzle spray. Pull the lever rearward to turn it off.

Center Nozzle Spray Lever

Located to the right of the left nozzle spray lever.

Push the lever forward to turn on the center nozzle spray. Pull the lever rearward to turn it off.

Right Nozzle Spray Lever

Located to the right of the center nozzle spray lever.

Push the lever forward to turn on the right nozzle spray. Pull the lever rearward to turn it off.

Hose Reel Handle

Located on the left spray tank.

Rotate the handle clockwise to reel the hose in. Rotate the handle counterclockwise to release the hose.

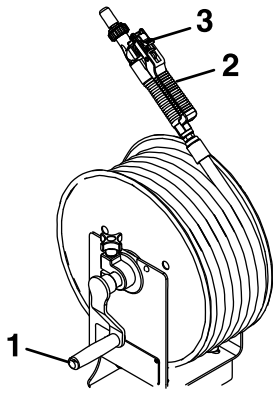


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Figure 8

1. Hose reel handle
2. Spray wand trigger
3. Spray wand trigger lock

Spray Wand Trigger

Located on the bottom of the spray wand handle.

Squeeze the trigger to the handle of the spray wand to allow spray; release the trigger to stop.

Spray Wand Trigger Lock

Located on the bottom of the spray wand handle.

Squeeze the trigger to the handle of the spray wand to allow spray. Push the lock trigger forward to keep it in the open flow position. Pull the lock back to release the trigger.

Spray Wand Flow Valve

Rotate the knob counterclockwise to increase the spray system flow or clockwise to decrease flow and shut it off.

Opening the valve allows liquid to the hose reel for spraying out of the hand spray wand. When hose reel is not in use, be sure to turn valve off to prevent boom tips from dripping.

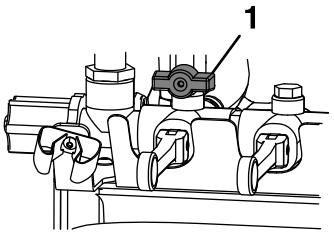

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Figure 9

1. Valve closed position

Spray Pump Valving

Located on the right tank.

The valving options allow product to be pulled from both tanks simultaneously or independently.

Rotate the left handles counterclockwise to turn on the valves and clockwise to turn it off.

Rotate the right handles clockwise to turn on the valves and counterclockwise to turn it off.

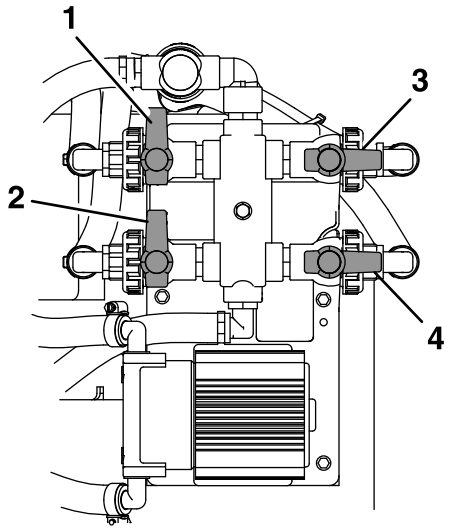

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Figure 10

Pull liquid from right tank only

1. Left suction valve off
2. Left return valve off
3. Right suction valve on
4. Right return valve on

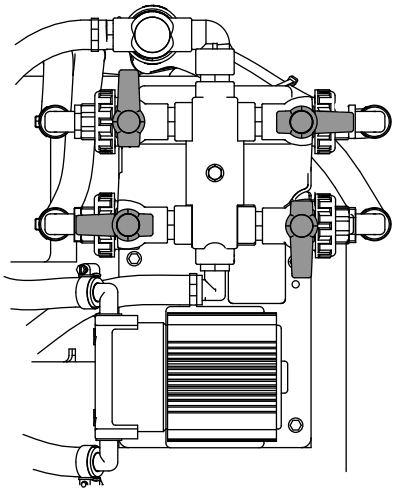

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Figure 11

Transferring product from right tank to left

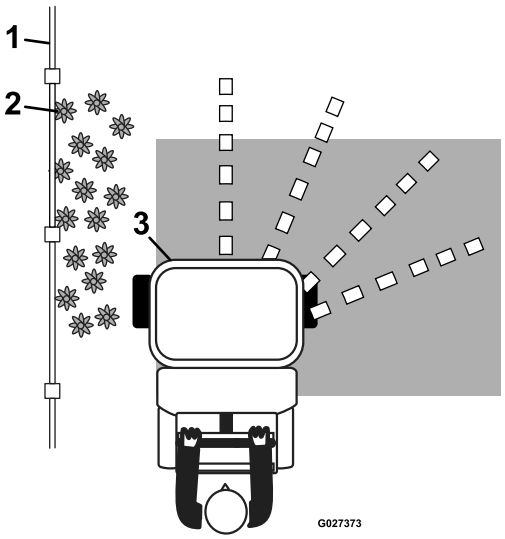

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Figure 12

1. Fence
2. Flowers
3. Side deflector lowered

Spread On/Off

Located on the right side of the control tower and is the top cable (see Figure 7)

Pull the handle up to turn on the spreader impeller. Push the handle down to shut off the spreader impeller.

Spread Pattern Control

Located on the right side of the control tower and is the middle cable.

This control is used if the spread pattern is skewed or dispensing too light/heavy to one side.

Rotate the handle counterclockwise 90 degrees to unlock. If pattern is heavy to the left; push the handle down; if heavy to the right, pull the handle up. Rotate the handle clockwise 90 degrees to lock.

Spread Deflector Lock

Located on the right side of the control tower and is the bottom cable.

Use the deflector control to temporarily stop or deflect granulars away from sidewalks, parking lots, patios, or anywhere granulars are not desired to be discharged from the left side of the spreader.

Push the knob down to lower the deflector and temporarily deflect the granulars.

Pull the knob up to raise the deflector.

Rate Gate Dial and Linkage

Located at the front of the machine below the spreader hopper.

The rate gate dial and linkage is used to set the amount of material to be dispensed from the granular gate (see Figure 13).

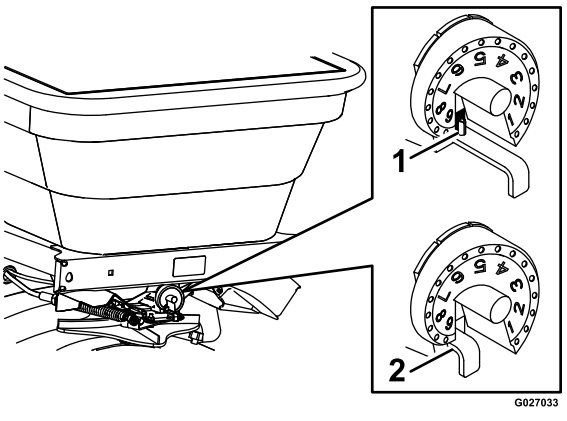

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Figure 13

1. Slot–maximum position
2. Linkage

With the granular gate lever in the closed position, turn the dial to the appropriate setting. When the granular gate lever is pulled to the open position, the granular gate will open to the set position.

Note: The slot, after setting 9 on the dial, allows the impeller gate to be opened to the maximum position.

This setting can be used for dry sand, ice melt, or other materials that are difficult to spread; it may also be used for hopper cleanout (see **Cleaning the Spreader** section).

Caster Wheel Lock Foot Pedal

Located on the right side of the operator platform (see Figure 7).

Press and hold the caster wheel lock foot pedal to lock the caster wheels in the straight position. Release the foot pedal to unlock the caster wheels and allow the machine to freely turn.

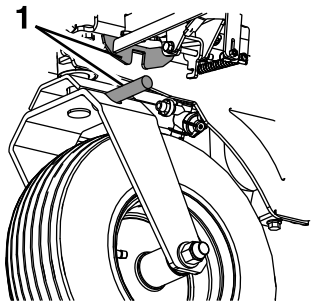

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Figure 14

1. Caster pin locking mechanism

Before Operation

Before Operation Safety

- Evaluate the terrain to determine what accessories and attachments are needed to properly and safely perform the job. Only use accessories and attachments approved by Z Turf Equipment.
- Inspect the area where the equipment is to be used and remove all rocks, toys, sticks, wires, bones, and other foreign objects which may be contaminated by chemicals and/or affect the stability of the machine.
- Wear appropriate clothing including safety glasses, substantial slip-resistant footwear, and hearing protection. Tie back long hair and avoid loose clothing or jewelry which may get tangled in moving parts.

⚠ CAUTION

This machine produces sound levels in excess of 85 dBA at the operator's ear and can cause hearing loss through extended periods of exposure.

Wear hearing protection when operating this machine.

- Do Not operate the machine when people, especially children, or pets are in the area. Stop the machine and attachment(s) if anyone enters the area.
- Do Not fill, calibrate, or clean the machine when people, especially children, or pets are in the area.
- Check all sprayer components for wear and leaks before applying pressure to the system. Do Not use if leaking or damaged.
- Make sure the operator platform is clean and free from chemical residue and debris buildup.
- Check that the operator presence controls, safety switches, and shields are attached and functioning properly. Do Not operate unless they are functioning properly. Frequently check for worn or deteriorating components and replace them with the manufacturer's recommended parts when necessary.

Chemical Safety

⚠ WARNING

Chemical substances used in the spreader-sprayer system may be hazardous and toxic to you, bystanders, animals, plants, soils or other property.

- **Carefully read and follow the chemical warning labels and Material Safety Data Sheets (MSDS) for all chemicals used and protect yourself according to the chemical manufacturer's recommendations. Ensure that as little skin as possible is exposed while using chemicals. Use appropriate Personal Protective Equipment (PPE) to guard against personal contact with chemicals, such as:**

  – safety glasses, goggles, and/or face shield

  – chemical resistant gloves

  – rubber boots or other substantial footwear

  – hearing protection

  – respirator or filter mask

  – clean change of clothes, soap, and disposable towels, to be kept on-hand, in the event of a chemical spill.
- **Keep in mind that there may be more than one chemical used, and information on each chemical should be assessed.**
- **Refuse to operate or work on the spreader-sprayer if this information is not available!**
- **Before working on a spreader-sprayer system, make sure that the system has been triple rinsed and neutralized according to the recommendations of the chemical manufacturer(s) and all of the valves have been cycled three times.**
- **Verify there is an adequate supply of clean water and soap nearby, and immediately wash off any chemicals that contact you.**

- Obtain proper training before using or handling chemicals.
- Use the correct chemical for the job.
- Follow the chemical manufacturer's instructions for the safe application of the chemical and Do Not exceed recommended system application pressure.
- Handle chemicals in a well ventilated area.
- Have clean water available especially when filling the spray tank.
- Do Not eat, drink, or smoke while working with chemicals.
- Do Not clean spray nozzles by blowing through them or placing in mouth.
- Always wash your hands and other exposed areas as soon as possible after finishing the work.
- Keep chemicals in their original packages and in a safe location.
- Properly dispose of unused chemicals and chemical containers as instructed by the chemical manufacturer and your local codes.
- Chemicals and fumes are dangerous; never enter the tank, hopper, or place your head over or in the opening.
- Follow all local/state/federal requirements for the spreading/spraying of chemicals.

Pre-Start

Fill fuel tank on level ground. See **Fuel Recommendations** in the Specifications section for additional gasoline information.

Do Not add oil to gasoline.

Do Not overfill fuel tank. Fill the fuel tank to the bottom of the filler neck. The empty space in the tank allows gasoline to expand. Overfilling may result in fuel leakage or damage to the engine or emission system.

Refer to the Maintenance section and perform all the necessary inspection and maintenance steps.

Fuel Safety

Use extreme care when handling fuel.

⚠ DANGER

In certain conditions gasoline is extremely flammable and vapors are explosive.

A fire or explosion from gasoline can burn you, others, and cause property damage.

- **Fill the fuel tank outdoors on level ground, in an open area, when the engine is cold. Wipe up any gasoline that spills.**
- **Never refill the fuel tank or drain the machine indoors or inside an enclosed trailer.**
- **Do Not fill the fuel tank completely full. Fill the fuel tank to the bottom of the filler neck. The empty space in the tank allows gasoline to expand. Overfilling may result in fuel leakage or damage to the engine or emission system.**
- **Never smoke when handling gasoline, and stay away from an open flame or where gasoline fumes may be ignited by spark.**
- **Store gasoline in an approved container and keep it out of the reach of children.**
- **Add fuel before starting the engine. Never remove the cap of the fuel tank or add fuel when engine is running or when the engine is hot.**
- **If fuel is spilled, Do Not attempt to start the engine. Move away from the area of the spill and avoid creating any source of ignition until fuel vapors have dissipated.**
- **Do Not operate without entire exhaust system in place and in proper working condition.**

⚠ DANGER

In certain conditions during fueling, static electricity can be released causing a spark which can ignite gasoline vapors. A fire or explosion from gasoline can burn you and others and cause property damage.

- **Always place gasoline containers on the ground away from your vehicle before filling.**
- **Do Not fill gasoline containers inside a vehicle or on a truck or trailer bed because interior carpets or plastic truck bed liners may insulate the container and slow the loss of any static charge.**
- **When practical, remove gas-powered equipment from the truck or trailer and refuel the equipment with its wheels on the ground.**
- **If this is not possible, then refuel such equipment on a truck or trailer from a portable container, rather than from a gasoline dispenser nozzle.**
- **If a gasoline dispenser nozzle must be used, keep the nozzle in contact with the rim of the fuel tank or container opening at all times until fueling is complete. Do Not use a nozzle lock open device.**

⚠ WARNING

Gasoline is harmful or fatal if swallowed. Long-term exposure to vapors has caused cancer in laboratory animals. Failure to use caution may cause serious injury or illness.

- **Avoid prolonged breathing of vapors.**
- **Keep face away from nozzle and gas tank/container opening.**
- **Keep away from eyes and skin.**
- **Never siphon by mouth.**

To help prevent fires:

- Keep engine and engine area free from accumulation of grass, leaves, excessive grease or oil, and other debris which can accumulate in these areas.
- Clean up oil and fuel spills and remove fuel soaked debris.
- Allow the machine to cool before storing the machine in any enclosure. Do Not store near

flame or any enclosed area where open pilot lights or heat appliances are present.

Operating Instructions

During Operation Safety

General Safety

The operator must use their full attention when operating the machine. **Do Not** engage in any activity that causes distractions; otherwise, injury or property damage may occur.

⚠ WARNING

Operating engine parts, especially the muffler, become extremely hot. Severe burns can occur on contact and debris, such as leaves, grass, brush, etc. can catch fire.

- **Allow engine parts, especially the muffler, to cool before touching.**
- **Remove accumulated debris from muffler and engine area.**

⚠ WARNING

Engine exhaust contains carbon monoxide, which is an odorless deadly poison that can kill you.

Do Not run engine indoors or in a small confined area where dangerous carbon monoxide fumes can collect.

⚠ CAUTION

Chemicals are hazardous and can cause personal injury.

- **Read the directions on the chemical labels before handling the chemicals and follow all manufacturer recommendations and precautions.**
- **Keep chemicals away from your skin. Should contact occur, wash the affected area thoroughly with soap and clean water.**
- **Wear goggles, gloves, and any other protective equipment recommended by the chemical manufacturer.**
- The owner/user can prevent and is responsible for accidents or injuries occurring to himself or herself, other people or property.
- This machine was designed for one operator only. Do not carry passengers and keep all others away from machine during operation.
- Do Not operate the machine under the influence of alcohol or drugs.
- Operate only in daylight or good artificial light.
- Lightning can cause severe injury or death. If lightning is seen or thunder is heard in the area, Do Not operate the machine; seek shelter.
- Be aware of weather conditions and check that spray nozzles, patterns, and volume are suitable.
- Keep away from holes, ruts, bumps, rocks, and other hidden hazards. Use care when approaching blind corners, shrubs, trees, tall grass or other objects that may hide obstacles or obscure vision. Uneven terrain could overturn the machine or cause the operator to lose their balance or footing.
- Never operate the machine with damaged guards, shields, or covers. Always have safety shields, guards, switches and other devices in place and in proper working condition.
- Keep clear of the discharge area at all times.
- Keep hands and feet away from moving parts. If possible, Do Not make adjustments with engine running.

⚠ WARNING

Hands, feet, hair, clothing, or accessories can become entangled in rotating parts. Contact with the rotating parts can cause traumatic amputation or severe lacerations.

- **Do Not operate the machine without guards, shields, and safety devices in place and working properly.**
- **Keep hands, feet, hair, jewelry, or clothing away from rotating parts.**

- Be aware of the spreading/spraying path and direct discharge away from others. Avoid discharging material against a wall or obstruction as the material may ricochet back toward the operator.
- Be alert, slow down and use caution when making turns. Look behind and to the side before

changing directions. Do Not spread/spray in reverse unless absolutely necessary.

- Stop spreading/spraying when making tight turns to minimize uneven distribution pattern, application rate, and chemical drift.
- Chemicals may drift and cause injury to people and animals; it may also damage plants, soil, or other property.
- Do Not change the engine governor setting or overspeed the engine.
- Be sure all drives are in neutral and parking brake is engaged before starting engine.
- Park machine on level ground. Stop engine, wait for all moving parts to stop, remove key and engage parking brake:
  - Before checking, cleaning or working on the machine.
  - Before clearing blockages.
  - Whenever you leave the machine. Do Not leave a running machine unattended.
- Stop engine, wait for all moving parts to stop, and engage parking brake:

  – Before refueling.
- Tragic accidents can occur if the operator is not alert to the presence of children. Children are often attracted to the machine and the spreader-spraying activity. Never assume that children will remain where you last saw them.
  - Keep children out of the working area and under the watchful care of another responsible adult, not the operator.
  - Be alert and turn the machine off if children enter the area.
  - Before and while backing or changing direction, look behind, down, and side-to-side for small children.
  - Never allow children to operate the machine.
  - Do Not carry children, even if the spreader or sprayer is not in use. Children could fall off and be seriously injured or interfere with the safe operation of the machine. Children that have been given rides in the past could suddenly appear in the working area for another ride and be run over or backed over by the machine.
- Reduce the weight of the load when operating on hills and rough terrain to avoid tipping or overturning of the machine.
- Liquid loads and granular materials can shift. This shifting happens most often while turning, going up or down hills, suddenly changing speeds, or while driving over rough surfaces. Shifting loads can cause the machine to tip over.
- When operating with a heavy load, reduce your speed and allow for sufficient stopping distance. Use extra caution on slopes.
- Reduce speed and load when operating on rough terrain, uneven ground, and near curbs, holes, and other sudden changes in terrain. Loads may shift, causing the sprayer to become unstable.

⚠ WARNING

Sudden changes in terrain may cause abrupt steering wheel movement, possibly resulting in hand and arm injuries.

Reduce speed when operating on rough terrain or near curbs.

- Safely relieve liquid from spray wand every time engine is turned off.

⚠ WARNING

Spray wand traps liquids under high pressure, even when engine is off. High pressure spray discharge could cause serious injury or death.

- **Keep clear of nozzle and Do Not direct spray or stream at people, pets, or non-work area property.**
- **Do Not direct spray on or near electrical power components or source.**
- **Do Not repair spray wand, hoses, seals, nozzle, or other wand components; replace them.**
- **Do Not attach hoses or other components to the end of the spray wand nozzle.**
- **Do Not attempt to disconnect the spray wand from the machine while the system is pressurized.**
- **Do Not use spray wand if trigger lock is damaged or missing.**
- **Do Not keep spray wand in locked-open position when job is complete.**

- When draining or relieving system, Do Not let anyone stand in front of nozzles and Do Not drain on a person's feet.

Slope Safety

- Slopes are a major factor related to loss of control and rollover accidents, which can result in severe injury or death. The operator is responsible for safe slope operation. Operating the machine on any slope requires extra caution. Before using the machine on a slope, the operator must:
  - Review and understand the slope instructions in the manual and on the machine.
  - Evaluate the site conditions of the day to determine if the slope is safe for machine operation. Use common sense and good judgment when performing this evaluation. Changes in the terrain, such as moisture, can quickly affect the operation of the machine on a slope.
- Operate across slopes, never up and down. Avoid operation on excessively steep or wet slopes.
- Identify hazards at the base of the slope. Do not operate the machine near drop offs, ditches, embankments, water or other hazards. The machine could suddenly roll over if a wheel goes over the edge or the edge collapses. Keep a safe distance (twice the width of the machine) between the machine and any hazard. Use a walk behind machine or a hand held tool to operate in these areas.

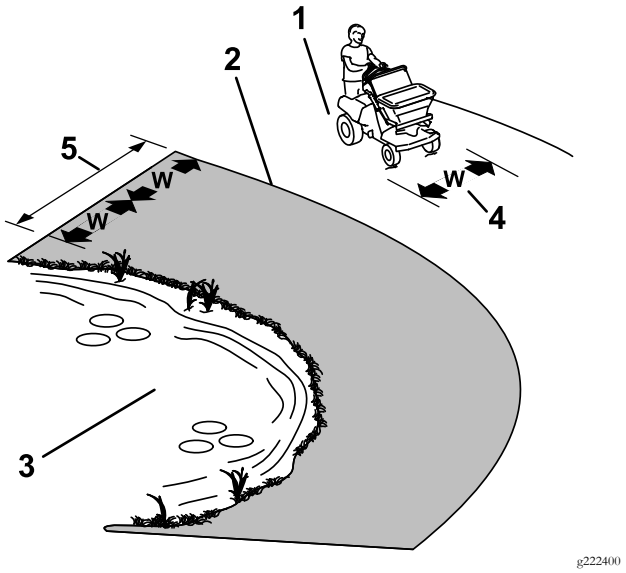

Figure 15

1. Safe Zone — Use the machine here
2. Danger Zone - Use a walk behind machine or a hand held tool near drop offs, ditches, embankments, water or other hazards.
3. Water
4. W=width of the machine
5. Keep a safe distance (twice the width of the machine) between the machine and any hazard.

- Avoid starting, stopping or turning the machine on slopes. Avoid making sudden changes in speed or direction; turn slowly and gradually.
- Do not operate a machine under any conditions where traction, steering or stability is in question. Be aware that operating the machine on wet grass, across slopes or downhill may cause the machine to lose traction. Loss of traction to the drive wheels may result in sliding and a loss of braking and steering. The machine can slide even if the drive wheels are stopped.
- Remove or mark obstacles such as ditches, holes, ruts, bumps, rocks or other hidden hazards. Tall grass can hide obstacles. Uneven terrain could overturn the machine.
- Use extra care while operating with accessories or attachments. These can change the stability of

the machine and cause a loss of control. Follow directions for counter weights.

- If you lose control of the machine, step off and away from the direction of travel of the machine.

Starting the Engine

1. Ensure the motion control lever is in the neutral position.
2. Push forward on the parking brake lever to engage the parking brake.
3. Place the throttle midway between the "SLOW" and "FAST" positions.
4. On a cold engine, pull the choke knob upward into the "ON" position.

   On a warm engine, leave the choke pushed down in the "OFF" position.
5. Turn ignition switch to the "START" position. Release the switch as soon as the engine starts.

   Important: Do Not crank the engine continuously for more than ten seconds at a time. If the engine does not start, allow a 60 second cool-down period between starting attempts. Failure to follow these guidelines can burn out the starter motor.
6. If the choke is in the "ON" position, gradually return choke to the "OFF" position as the engine warms up.

Driving the Machine

⚠ CAUTION

Machine can spin very rapidly by positioning one lever too much ahead of the other. Operator may lose control of the machine, which may cause damage to the machine or injury.

- **Use caution when making turns.**
- **Slow the machine down before making sharp turns.**

Important: To begin movement (forward or backward), the brake lever must be disengaged (pulled up) before the motion control lever can be moved.

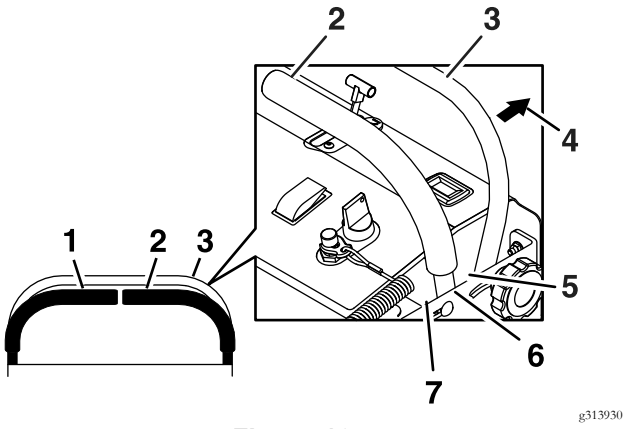

Figure 16

1. LH Motion control lever
2. RH Motion control lever
3. Front reference/Speed control bar
4. Front of the machine
5. Forward
6. Neutral
7. Reverse

Driving Forward

1. Make sure the motion control lever is in the neutral position.
2. Release the parking brake.
3. To move forward in a straight line, move both levers forward with equal pressure.

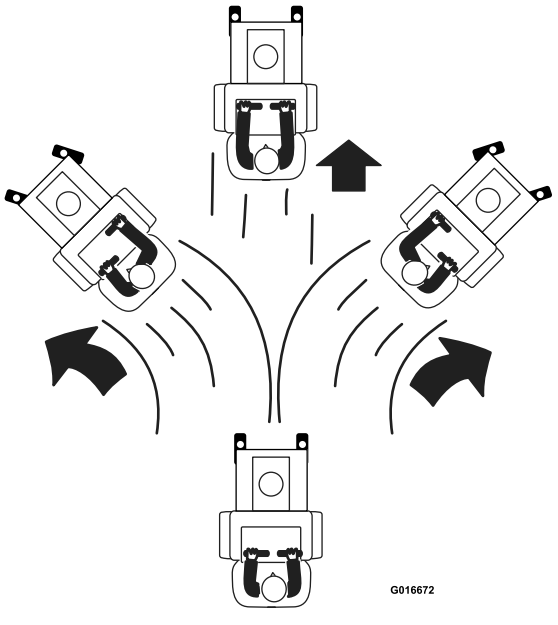

Figure 17

To turn left or right, pull the motion control lever back toward neutral in the desired turn direction.

The machine will move faster the farther the motion control lever is moved from the neutral position.

4. To stop, position both motion control levers in the neutral position; releasing the lever will automatically return it to neutral.

   Note: Stopping distance may vary depending on the spreader-sprayer load.

Driving in Reverse

1. Move the motion control lever to the neutral position.
2. To move rearward in a straight line, slowly move both levers rearward with equal pressure.

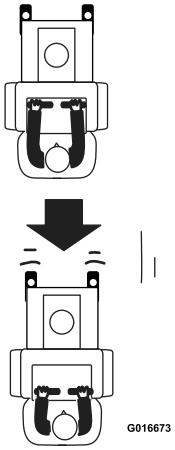

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Figure 18

To turn left or right, release pressure on the motion control lever toward the desired turn direction.

3. To stop, position both motion control levers in the neutral operate position.

   Note: Stopping distance may vary depending on the spreader-sprayer load.

Adjusting the Front Reference/Speed Control Bar

Adjust the front reference/speed control bar for desired maximum forward speed.

1. Stop the machine and move the motion control levers to the neutral position.
2. Loosen the knobs on both sides of the control tower.

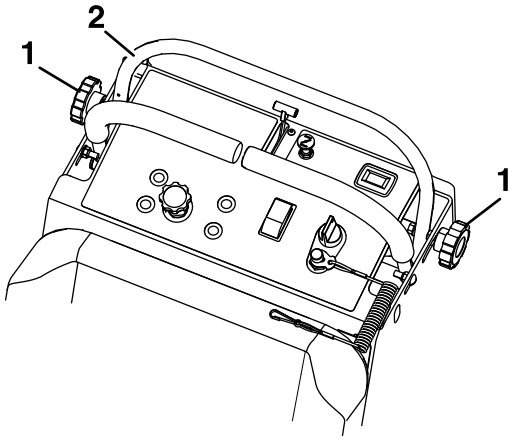

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Figure 19

1. Motion control levers
2. Adjustment knob

3. Move the bar forward to obtain the fastest speed.

   Move the bar backward to obtain the slowest speed.

4. On both sides, tighten the knobs.

Important: Make sure the knobs are tight so the front reference/speed control bar does not move during operation.

Stopping the Engine

1. Move the motion control levers back to the neutral position and bring the machine to a full stop.
2. Engage the parking brake.
3. Place the throttle midway between the "SLOW" and "FAST" positions.
4. Allow the engine to run for a minimum of 15 seconds, then turn the ignition switch to the "OFF" position to stop the engine.
5. Remove the key to prevent children or other unauthorized persons from starting the engine.

Operating the Sprayer

The sprayer disperses liquid substances. Before using the sprayer make sure it has been properly cleaned before adding any chemicals. When using the sprayer, first fill the spray tank, then apply the solution to the work area, and finally clean the tank. It is important to complete all three of these steps to avoid damaging the sprayer. For example, Do Not mix and add

chemicals in the spray tank at night and then spray in the morning. This would lead to separation of the chemicals and possible damage to the sprayer components.

Note: Clean your sprayer thoroughly after all applications.

Before Operating the Sprayer

Some chemicals are more aggressive than others and each chemical interacts differently with various materials. Some consistencies (e.g. wettable powders, charcoal) are more abrasive and lead to higher than normal wear rates. If a chemical is available in a formulation that would provide increased life to the sprayer, use this alternative formulation.

Make sure the sprayer has been calibrated before starting (see Calibrating the Sprayer section).

Filling the Spray Tank

Important: Ensure that the chemicals you will be using are compatible for use with Viton® (see the manufacturer's label; it should indicate if it is not compatible). Using a chemical that is not compatible with Viton® will degrade the O-rings in the sprayer, causing leaks.

Important: Verify that the proper application rate has been set prior to filling the tank with chemicals.

Important: The tank markings are for reference only and cannot be considered accurate for calibration.

1. Stop the machine on a level surface, move motion control lever to the neutral position, stop the engine, and set the parking brake.
2. Determine the amount of water needed to mix the amount of chemical needed as prescribed by the chemical manufacturer.
3. Open the tank cap on the spray tank.
4. Add 3/4 of the required water to the spray tank.

   Important: Always use fresh clean water in the spray tank. Do Not pour concentrate into an empty tank.
5. Start the engine and place the throttle midway between the "SLOW" and "FAST" positions.
6. Set the spray pump switch to the "ON" position.

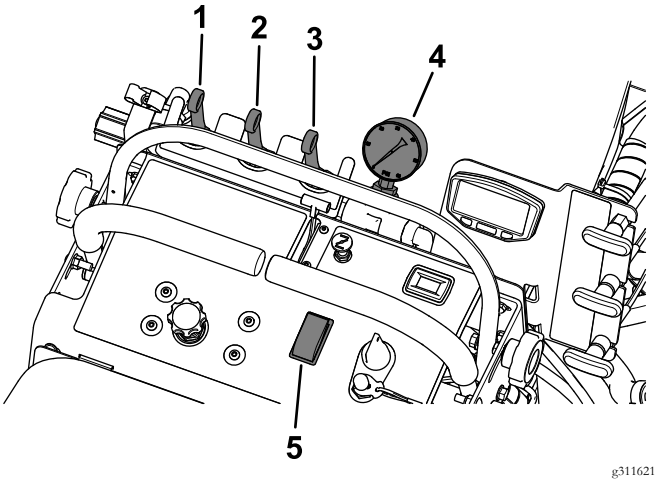

Figure 20

1. Left boom sprayer-control valve
2. Center boom sprayer-control valve
3. Right boom sprayer-control valve
4. Sprayer pressure gauge
5. Spray-pump switch

7. Move the throttle to the "FAST" position.

   Note: The water in the tank will circulate.
8. Make sure the valving is set for the tank that is being used (refer to the **Spray Pump Valving** in the Controls section).
9. Add the proper amount of chemical concentrate to the tank, as directed by the chemical manufacturer.

   Important: If using a wettable powder, mix the powder with a small amount of water to form a slurry before adding it to the tank.
10. Add remaining water to the tank and secure tank cap.

    Note: Anytime the tank has been run dry, repeat steps 5 through 10. This will reduce the time required to purge the system of air.

Extending and Folding the Outer Spray Booms

The outer spray booms can be rotated forward to extend the boom or rearward to fold the boom.

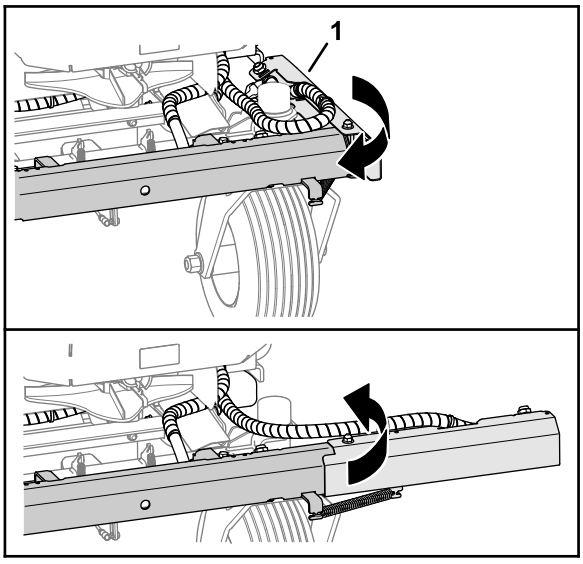

Figure 21

1. Outer spray boom

Using the Sprayer Tank Shutoff Valves

Selecting the Left Spray Tank

Rotate the valve handles as shown in Figure 22.

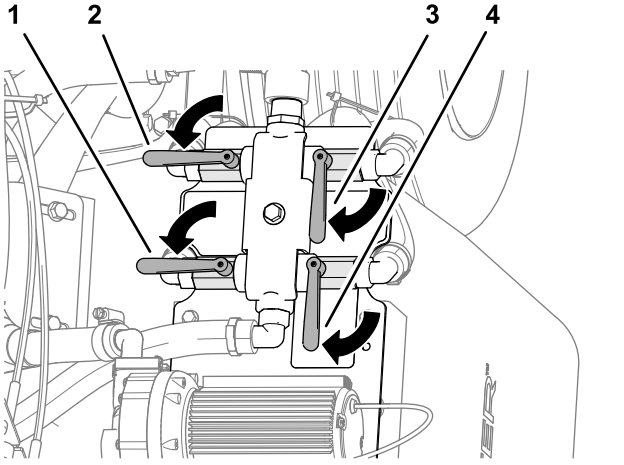

Figure 22

1. Left tank return valve (open position)
2. Left tank suction valve (open position)
3. Right tank suction valve (close position)
4. Right tank return valve (close position)

Selecting the Right Spray Tank

Rotate the valve handles as shown in Figure 22.

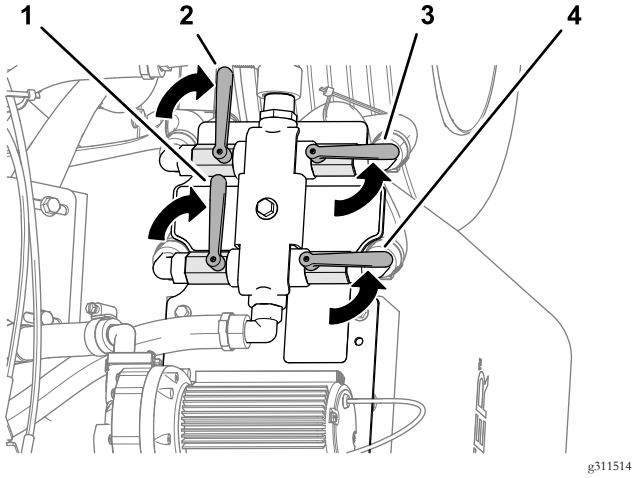

Figure 23

1. Left tank return valve (close position)
2. Left tank suction valve (close position)
3. Right tank suction valve (open position)
4. Right tank return valve (open position)

Selecting Both Spray Tanks

Rotate the valve handles as shown in Figure 24.

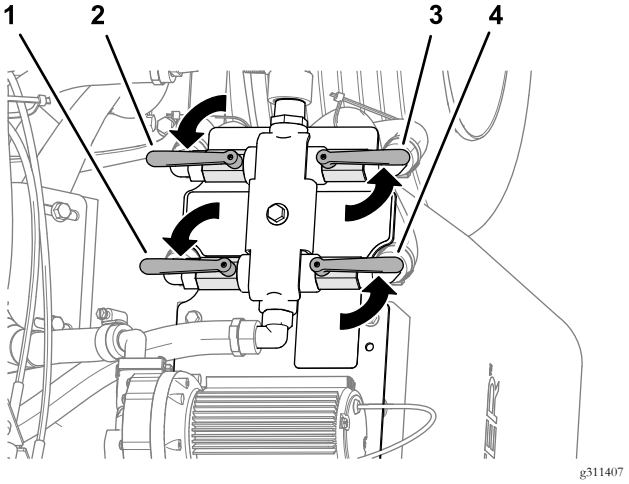

Figure 24

1. Left tank return valve (open position)
2. Left tank suction valve (open position)
3. Right tank suction valve (open position)
4. Right tank return valve (open position)

Spraying

Spraying Tips:

- Do Not overlap the effective spray area that was previously sprayed.

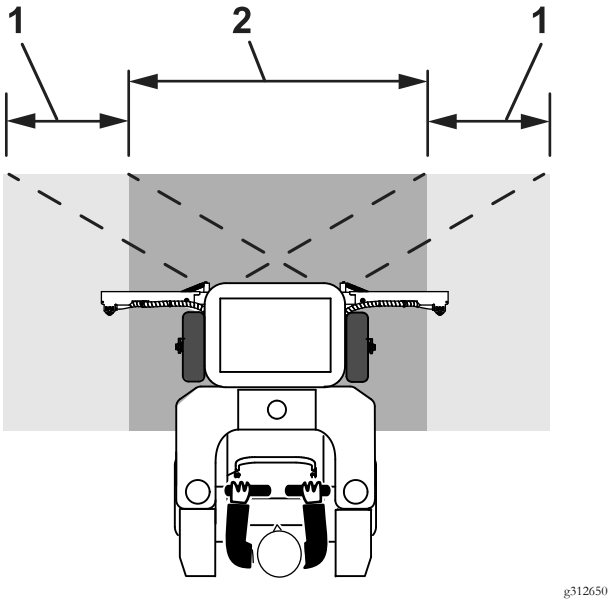

Figure 25

1. Overlap area
2. Effective spray area

- Watch for plugged nozzles.
- Disengage spray control levers to stop the spray flow before stopping the motion of the sprayer. Once stopped, leave the motion control lever in neutral and keep the pump running.
- Better results are obtained if the sprayer is moving when spray controls are turned on.
- Watch for changes in the application rate that may indicate that your speed has changed beyond the range of the nozzles or there is a problem with the spray system.

Note: Make sure the machine has been calibrated properly before starting spray application

1. Make sure the spray pump is on.
2. Drive to the work area to be sprayed.
3. Adjust the spray pressure to the appropriate setting.
4. Turn on the appropriate spray control:

   The sprayer and spreader can be operated either together or individually (spray liquid and spread granular at the same time or separately). Regardless of the situation, make sure that the machine is running at full throttle.

   When finished spraying, turn off the spray control lever and the spray pump switch.

   The spray pump switch can be left on for tank agitation.

To use the spray wand:

⚠ WARNING

Spray wand traps liquids under high pressure, even when engine is off. High pressure spray discharge could cause serious injury or death.

- **Keep clear of nozzle and Do Not direct spray or stream at people, pets, or non-work area property.**
- **Do Not direct spray on or near electrical power components or source.**
- **Do Not repair spray wand, hoses, seals, nozzle, or other wand components; replace them.**
- **Do Not attach hoses or other components to the end of the spray wand nozzle.**
- **Do Not attempt to disconnect the spray wand from the unit while the system is pressurized.**
- **Do Not use spray wand if trigger lock is damaged or missing.**
- **Do Not keep spray wand in locked-open position when job is complete.**

A. Remove the wand from the holder on the left side of the machine.

B. Turn the spray wand flow valve on.

C. Firmly grip and hold the spray wand. Point it in the direction to be sprayed.

Note: Wand may kickback; make sure to hold the wand securely.

D. Adjust the spray wand flow using the wand flow control.

E. Squeeze the trigger to the spray wand handle to begin spraying; lock the trigger in place if desired.

5. When finished spraying:
   - From the front spray nozzles:

     Turn the three section valves off.
   - From the spray wand:

     A. Release the trigger and its lock (if applicable).

     B. Turn the spray wand flow valve off

C. Return the wand back to its holder.

Important: Contact an Authorized Service Dealer if the spreader-sprayer fails to operate properly.

Cleaning the Sprayer

Clean the spray system after **each** spraying session.

Important: Always empty and clean the sprayer immediately after each use. Failure to do so may cause the chemicals to dry or thicken in the lines, clogging the pump and other components.

To properly clean the spray system:

- Use three separate rinses.
- Use a minimum of 5 gallons (19 L) for each rinse.
- Use the cleaners and neutralizers as recommended by the chemical manufacturers.
- Use pure clean water (no cleaners or neutralizers) for the **last** rinse.

⚠ WARNING

Do Not clean spray nozzles by mouth or blowing through them. Swallowing or inhaling chemicals could cause serious injury or death.

Replace all worn and damaged nozzles.

Make sure nozzles are installed correctly.

1. Drive the machine to a designated cleaning area.
2. Stop the spreader-sprayer on a level surface, leave the motion control lever in the neutral position, and turn off the engine. Engage the parking brake.
3. Fill the tank with clean fresh water and close the cover.
4. Start the engine.
5. With the motion control lever in neutral position, engage the pump, and set the engine throttle to "FAST".
6. Set the three spray valves to "ON".
7. Allow the water in the tank to spray out through the nozzles.
8. Check the nozzles to ensure that they are all spraying correctly.
9. Remove the wand from its holder and point it in a safe direction.
10. Squeeze the spray wand trigger to release the pressure.
11. Return the wand to its holder.
12. Set the spray control levers to the "OFF" position, disengage the pump, and stop the engine.
13. Clean the strainer located in front of the right tank. Close the tank supply valve. When removing the canister, drain any unused chemical from the line and dispose of it according to local codes and the chemical manufacturer's instructions.

Important: If you used wetable powder chemicals, clean the strainer after each tank rinse.

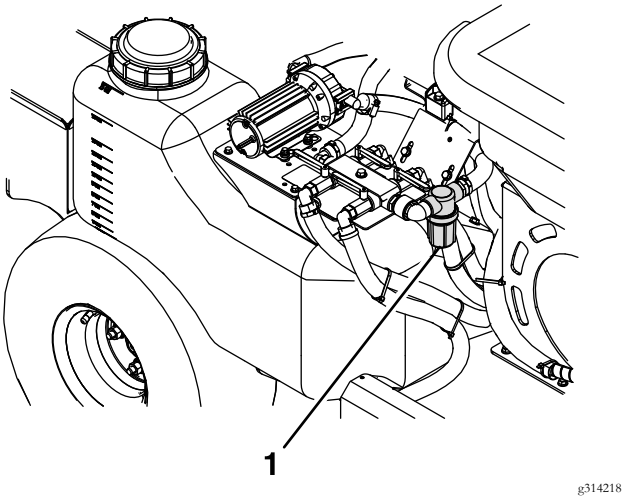

Figure 26

1. Strainer

14. Repeat steps 3 through 13.
15. Using a garden hose, spray off the outside of the sprayer tank with clean water.

    Note: Do Not use a power washer to clean the machine. The high pressure water may force residual corrosive materials into spreader-spreader components.
16. Remove the nozzles and clean them by hand. Replace damaged or worn nozzles.
17. Allow the spreader-sprayer to completely dry before the next use.

Calibrating the Sprayer Flow

Note: Before using the sprayer for the first time, change nozzles, or as needed–calibrate the sprayer flow and speed.

Note: Refer to the chemical product label for application rate recommendations.

The lavender colored air injected tips come standard on the machine. These tips will apply liquid material at .34 (1/3) gallons per 1,000 sq. ft. at 5 mph and 40 psi. Each tip has a 5-psi shut-off screen to prevent drip.

The machine is capable of using tips from 1/4 to 1 gallon in size. See the chart below for the desired drop rate.

Note: This chart only applies if using air injected tips. Using other tips will require different calculations.

Tip Color	MPH	Pressure	Gallons/ 1,000 sq. ft.
Yellow	5	40 psi	.27 (1/4) gallon
Lavender	5	40 psi	.34 (1/3) gallon
Red	5	40 psi	.54 (1/2) gallon
Brown	5	50 psi	.76 (3/4) gallon
Grey	4	40 psi	1 gallon

Note: Please refer to the spray chart, located on the backside of the knee pad, for complete calibration.

To determine liquid quantities per tank, verify the tips installed on the machine (factory set is 1/3 gallon per 1,000 sq. ft. through the Lavender tips).

For example, if the product calls for 1.1 to 1.5 oz per 1,000 sq. ft., use the median value of 1.3. The lavender tip is a 1/3 gallon tip, multiply by 3, and then multiply that number by the gallons added to the tank. If the tank is 30 gallons the equation would look like this:

1.3 X 3 X gallons needed.

1.3 median value X 3 X 30 gallons = 117 ounces used in 30 gallons of water.

Operating the Spreader

The spreader disperses free-flowing granular substances such as grass seed, fertilizer, ice melt, etc. When using the spreader, first fill the granular hopper, then apply to the work area, and finally clean the hopper. It is important to complete all three of these steps to avoid damaging the spreader.

Note: Clean your spreader thoroughly after all applications.

Before Operating the Spreader

Make sure the spreader has been calibrated for the material to be spread before starting (see **Calibrating the Spreader** section).

Important: Verify that the proper application rate has been set prior to filling the hopper.

Filling the Spreader Hopper

1. Stop the machine on a level surface, move motion control lever to the neutral position, stop the engine, and set the parking brake.
2. Use the Spreading Chart on the following pages to determine the rate gate dial and linkage.

   Note: If the setting is not listed for the type of material being used, place the setting at a lower value then adjust as needed.
3. Drive to the work area.
4. Stop the spreader-sprayer on a level surface, leave motion control lever in the neutral position, stop the engine, and set the parking brake.
5. Ensure that the granular gate is closed.
6. Remove the cover from the hopper, add the material to be spread, and replace the cover.

   Note: Do Not overload the hopper (refer to the Maximum Hopper Capacity in **Specifications** section).

   Note: One extra bag of granular product may be placed on in each fertilizer box; however, Do Not exceed the Maximum Machine Weight as stated in the **Specifications** section. Overloading the machine will shorten the life of the transmission and void the warranty

Spreading

Spreading Tips:

- To ensure uniform application, be sure to overlap the material distribution. The highest amount of material will dispense from the front of the hopper and less material from each side. Adjust the distribution pattern to achieve desired results.
- Watch for changes in the distribution pattern; unequal distribution may lead to striping.

Note: Make sure the machine has been calibrated properly before starting the spreading application.

1. Start the engine and place the throttle midway between the "SLOW" and "FAST" positions.
2. Set the impeller speed to appropriate broadcast rate setting and turn on the spray system switch.
3. Move the throttle to the "FAST" position and drive forward.
4. Open the granular gate and begin spreading.

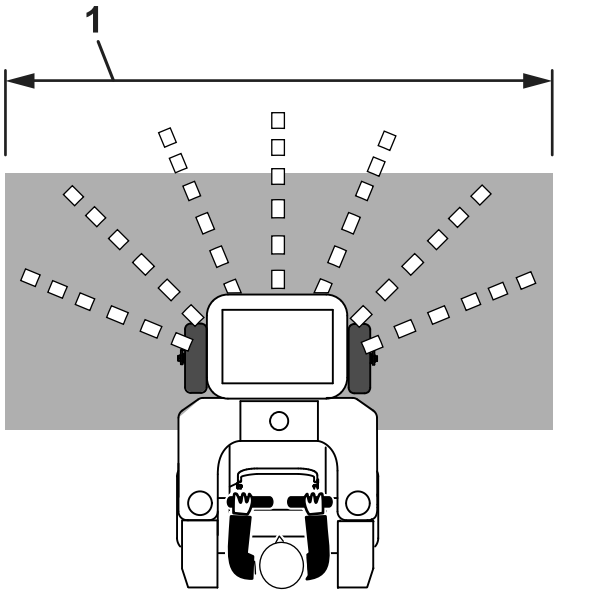

Figure 27

1. Effective spreading width—variable 3-25 ft (0.9-7.6 m)

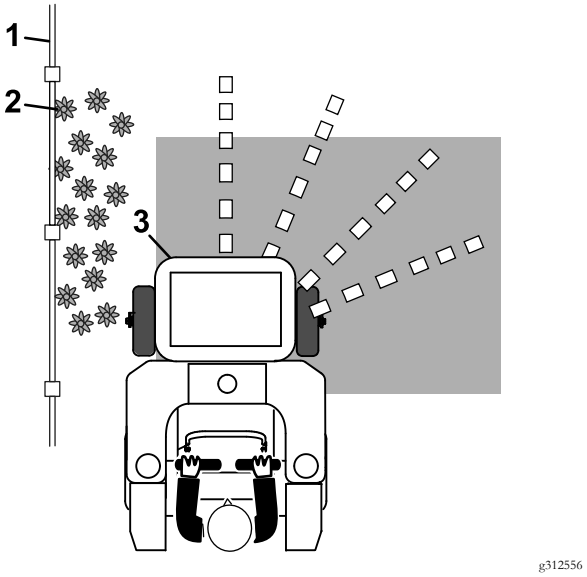

Figure 28

1. Fence
2. Flowers
3. Side deflector lowered

5. Evaluate the spread pattern. If adjustments are needed see the **Spreader Calibration/Pattern Adjustment** section.
6. When finished spreading, close the granular gate.
7. Clean the hopper after **each** spreading session.

Important: Always empty and clean the spreader immediately after each use. Failure to do so may cause the chemicals to corrode the spreader and other components.

Cleaning the Spreader

1. Drive the machine to a designated cleaning area.
2. Stop the spreader-sprayer on a level surface, leave the motion control lever in the neutral position, and turn off the engine. Engage the parking brake.

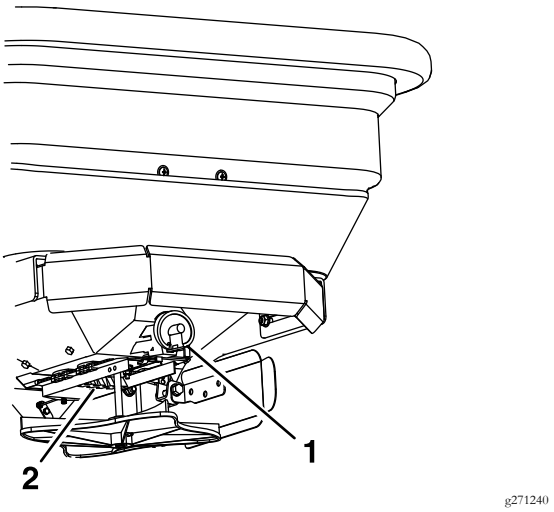

Figure 29

1. Dial
2. Diffuser

3. Open the hopper gate to the maximum position by pulling outward on the rate gate linkage. Rotate the dial past the "9" position to the slot opening and push in the linkage.
4. Using a garden hose, spray the inside and outside of the entire spreader with clean water.

   Note: Do Not use a power washer to clean the machine. The high pressure water may force residual corrosive materials into spreader-spreader components.
5. When the hopper has been thoroughly rinsed and drained, close the gate.
6. Place the rate gate dial to a setting lower than the maximum open position.
7. Allow the spreader-sprayer to completely dry before the next use.
8. Lightly oil spreader components to help reduce corrosion.

Spreader Calibration

The spreader should be calibrated each time a new material is used. The spread width ranges from 3-25 ft (0.9-7.6 m) and depends on the material particle size, volume/density, and rate of travel.

Refer to the spreading charts along with **Determining the Distribution Pattern, Determining the Effective Spreading Width,** and **Calculating the Application Rate** sections to calibrate the machine.

Determining the Distribution Pattern

Operator supplied equipment: 15 shallow collection pans and 15 graduated measuring cylinders

The most accurate method to measure the distribution is to use shallow collection pans and graduated measuring cylinders. In the example below, 15 shallow collection pans approximately 30 cm (12 inches) wide, 91 cm (36 inches) long, and 5 cm (2 inches) tall are used.

1. Make sure to allow ample driving distance before setting up the pans to ensure the machine is traveling at the desired spreading speed before reaching the pans.
2. Place one pan in the center of the drive path. Arrange the next two pans, one on each side, far enough apart to allow ample room for the spreader drive tires to pass over the center pan.
3. Place the remaining pans in a straight line as shown in Figure 30 or Figure 31.

   - For larger granule materials:

     Space six additional pans, on each side, 12 inches (30 cm) apart (see Figure 30).

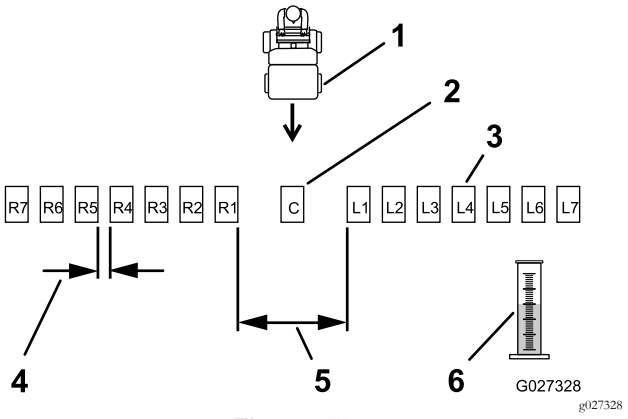

Figure 30

1. Spreader moving towards pans
2. Center pan
3. Collection pans (gap between each)
4. 12 inch (30 cm) gap
5. L1 and R1 collection pan gap (spread apart to allow machine to pass through)
6. Graduated measuring cylinder

   - For smaller granule materials:

     Place six additional pans, on each side, with no gap in between each pan (Figure 31).

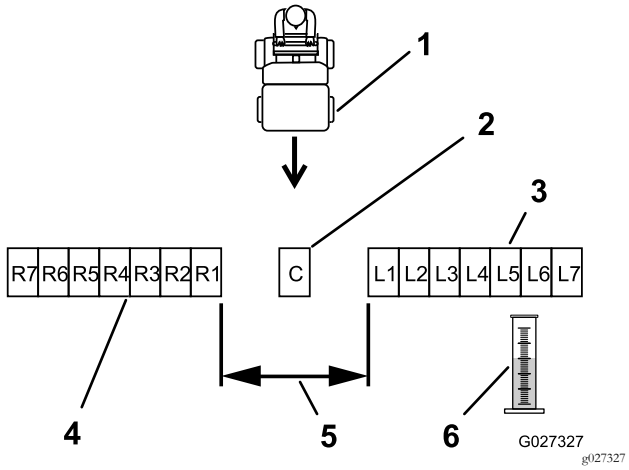

Figure 31

1. Spreader moving towards pans
2. Center collection pan
3. Left collection pans (no gap between each)
4. Right collection pans (no gap between each)
5. L1 and R1 collection pan gap (spread apart to allow machine to pass through)
6. Graduated measuring cylinder

4. Reference the **Spreading Charts** section to determine the appropriate rate dial setting (see Figure 13).
5. Fill the hopper approximately half-full with the desired material.
6. Set the impeller speed to the appropriate broadcasting rate.
7. Pull the granular gate control to the open position and drive the spreader, at the appropriate speed, over the center pan. Repeat this several times, moving in the same direction each time, until enough material is dispensed to fill the center graduated measuring cylinder half full.
8. Label each graduated measuring cylinder to correspond with the distribution pans (i.e. ...L2, L1, Center, R1, R2....) (reference Figure 30 and Figure 31).
9. One at a time, take a collection pan and dump the contents into the corresponding graduated measuring cylinder. Record the amount of material collected and return the pan to its location. Repeat this until all pan contents have been emptied.
10. With the graduated measuring cylinder in the same straight line as the pans, evaluate the volume of material in each cylinder to determine the quality of the distribution from the spreader.
11. To adjust the spreader pattern, refer to the **Spreader Pattern Adjustment** section.
12. Repeat steps 5 through 11 until an uniform pattern is achieved.

Determining the Effective Spreading Width

The effective width is used to determine the uniform distribution of the material.

Note: The spreading width range is 3 ft (0.9 m) up to 25 ft (7.6 m).

1. After the spreader pattern is correctly adjusted, evaluate the amount of material in the center graduated measuring cylinder.
2. Locate the two tubes, one each side of center, that contain 1/2 the measured amount of the material that you observed in the center graduated cylinder.
3. Go to the two corresponding pans. Starting from the outer edge, measure and record the distance between left pan, through the center pan, to the outer edge of the right pan.

   Note: This measurement is the effective spreading width.

Calculating the Application Rate

1. Determine the amount of product to be applied.
2. Determine the calibration course
   A. Determine the amount of product to be spread per 1,000 ft² (93 m²). Use the recommended rate from the **Spreading Charts** section or the product manufacturer's label as a guide.
   B. Determine a course length by dividing 1,000 ft² (93 m²) by the effective spread width.

      For example, if the effective width is 6 feet (1.8 meters), then the calibration course length equals 167 ft (51 m).

Course Length

$$\frac{1{,}000\ \text{ft}^2\ (93\ \text{m}^2)}{6\ \text{ft}\ (1.8\ \text{m})} = \textbf{167 ft (51 m)}$$

   C. The calibration course is 6 ft (1.8 m) by 167 ft (51 m).
   D. Measure and visibly mark the course length. Make sure to allow ample distance before the

starting marker to ensure the spreader is at full speed when crossing the first mark of the course.

3. Set the appropriate gate dial setting (reference the **Spreading Charts** section as a starting point).
4. Add material to the hopper (for example, 25 lb (11.3 kg) was added).
5. Drive the spreader over the calibration course while applying the material.
6. Empty the remaining material of the hopper into a clean bucket.
7. Weigh the bucket containing the material and record the weight. Pour the contents back into the hopper and then weigh the empty bucket. Subtract these two amounts to determine the amount of material remaining in the hopper (for example, 20 pounds (9 kg) remains.)
8. Subtract the amount remaining in the hopper (step 7) from the amount originally added (step 4); the result is the amount applied to the course.

Amount Applied

25 lb (11.3 kg) – 20 lb (9 kg) = **5 lb (2.3 kg)**

For this example, 5 lb (2.3 kg) was applied to 1,000 ft^2 (93 m^2).

9. If necessary, adjust the rate dial to achieve the recommended amount to be applied and repeat the procedure. Once the correct application rate is achieved, repeat this procedure an additional time to verify the results.

Note: Designate a new calibration course each time, so the turf is not damaged.

Spreader Pattern Adjustment

If the spread pattern is skewed or dispensing too light/heavy to one side (see Figure 32 and Figure 33), adjust the gate as follows:

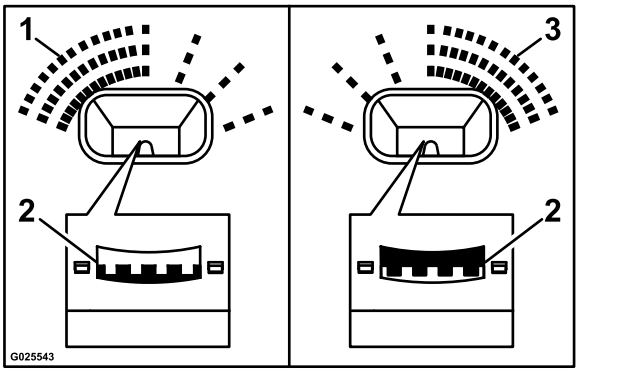

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Figure 32

1. Heavy to left side
2. Move ramp pattern to shaded position
3. Heavy to right side

Note: Do Not adjust the ramps to split product flow. Use only the front or rear ramp positions as shown.

1. Unlock the spreader pattern control by turning the handle counterclockwise 90 degrees (see Figure 33).

   To adjust when the material pattern is heavy:

   - to the left side, slightly push the handle down.
   - to the right side, slightly pull the handle up.

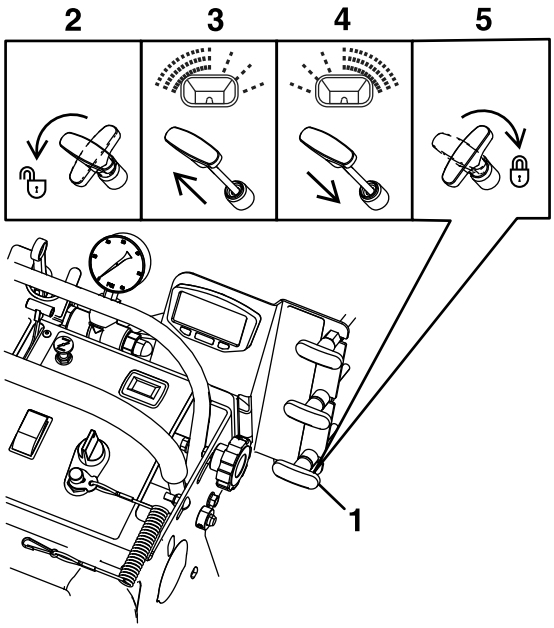


Figure 33

1. Spreader pattern control
2. Rotate counterclockwise to unlock
3. Start notch if pattern is heavy to left side
4. Start notch if pattern is heavy to right side
5. Rotate clockwise to lock

2. Lock the spreader pattern control by turning the handle clockwise 90 degrees.

Spreading Charts

Note: The Dial Settings chart and the Grass Seed Spreading chart are provided with permission from the Brinly-Hardy Company; reference the Brinly-Hardy Company website for more information.

These charts are to be used as an approximate guideline only. Other factors, such as weather conditions, spreader operation, and condition of materials, will affect the results.

Approximate Dial Settings			
Type	**1,000 ft² (93 m²)**	**Dial Setting — One Pass**	**Dial Setting — Two Passes**
Fine Pellets	1 lb (.45 kg)	3.6	3.1
	2 lb (.91 kg)	4.0	3.5
	3 lb (1.36 kg)	4.2	3.7
Mixed Fine Pellets	2 lb (.91 kg)	3.7	3.2
	4 lb (1.81 kg)	4.7	4.1
	6 lb (2.72 kg)	5.2	4.5
Small Pellets	2 lb (.91 kg)	3	2.2
	4 lb (1.81 kg)	4.2	3.7
	6 lb (2.72 kg)	4.5	4
Nitrogen Pellets Medium Size	1 lb (.45 kg)	3.5	3
	2 lb (.91 kg)	4.2	3.7
	3 lb (1.36 kg)	4.7	4
Medium Pellets and Granules	2 lb (.91 kg)	3.5	3
	4 lb (1.81 kg)	4.2	3.8
	6 lb (2.72 kg)	5.2	4.5
Large Heavy Pellets	2 lb (.91 kg)	3.8	3.3
	4 lb (1.81 kg)	4.9	4.1
	6 lb (2.72 kg)	5.9	4.9

The chart below is for reference only. When spraying and spreading at the same time, set the spread pattern to twice the width of the spray; this will help avoid striping and streaking. For example, standard spray width = 9 ft (2.7 m) and spread width = 18 ft (5.4 m).

Grass Seed Application (Coverage 1,000 ft² (93 m²))				
Type	**Bag Weight**	**Dial Setting – Full Rate**	**Dial Setting – Half Rate**	**Spread Width**
Blue Grass or Red Top	.5 lb	1.25		4 ft (1.2 m)
	1 lb	2.0		4 ft (1.2 m)
	2 lb	2.5		4 ft (1.2 m)
Park, Merion, Delta, or Kentucky Bluegrass	.5 lb	2.5		4 ft (1.2 m)
	1 lb	3.0		4 ft (1.2 m)
	2 lb	3.5		4 ft (1.2 m)
Hulled Bermuda	2 lb	2.75	2.25	6 ft (1.8 m)
	3 lb	3.0	2.5	6 ft (1.8 m)
	4 lb	3.25	2.75	6 ft (1.8 m)
Mixtures Including Coarse Seeds	2 lb	6.0		6 ft (1.8 m)
	4 lb	7.0		6 ft (1.8 m)
	6 lb	7.0		6 ft (1.8 m)
Rye Grasses or Tall Fescue	2 lb	6.0		6 ft (1.8 m)
	4 lb	7.0		6 ft (1.8 m)
	6 lb	7.75		6 ft (1.8 m)
Dichondra	4 oz	1.9		8 ft (2.4 m)
	8 oz	2.1		8 ft (2.4 m)
	12 oz	2.5		8 ft (2.4 m)
Pensacola Bahia	4 lb	4.5	3.75	7 ft (2.1 m)
	5 lb	4.75	4.0	7 ft (2.1 m)
	6 lb	5.0	4.25	7 ft (2.1 m)

After Operation

General Safety

- Park machine on level ground and allow the machine to cool. Never allow untrained personnel to service machine.
- Disengage the spray or close the spreader gate, set the parking brake, stop engine and remove key or disconnect spark plug wire. Wait for all movement to stop before adjusting, cleaning or repairing.
- Clean the machine as stated in the Maintenance section.
- Frequently check for worn or deteriorating components that could create a hazard. Tighten loose hardware.
- Shut off fuel while storing or transporting. Do Not store fuel near flames or drain indoors.

Transporting

Note: Refer to the chemical warning product label(s) before transporting the machine and follow all local/state/federal requirements for transporting chemicals.

Note: Make sure the spreader hopper cover and the spray wand are secure before transporting.

Transporting the Machine

Use a heavy-duty trailer or truck to transport the machine. Ensure that the trailer or truck has all necessary lighting and marking as required by law. Thoroughly read all of the safety instructions. Knowing this information could help you, your family, pets, or bystanders avoid injury.

To transport the machine:

- Lock the brake and block the wheels.
- Securely fasten the machine to the trailer or truck with straps, chains, cable, or ropes. When securing the front of the machine, only use the tie down locations shown in Figure 34 and Figure 35. If possible, both front and rear straps should be directed down and outward from the machine. Using non-designated locations may cause damage to the machine and/or attachment.

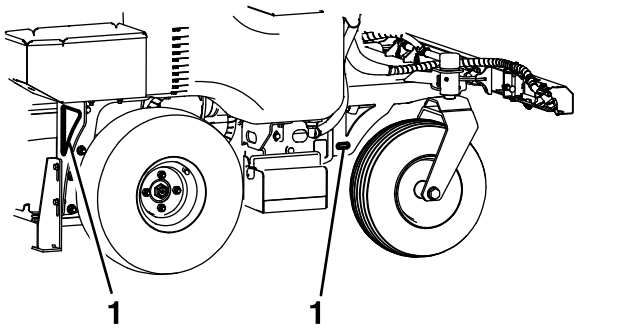


Figure 34
42 and 46 Inch Models

1. Tie down location

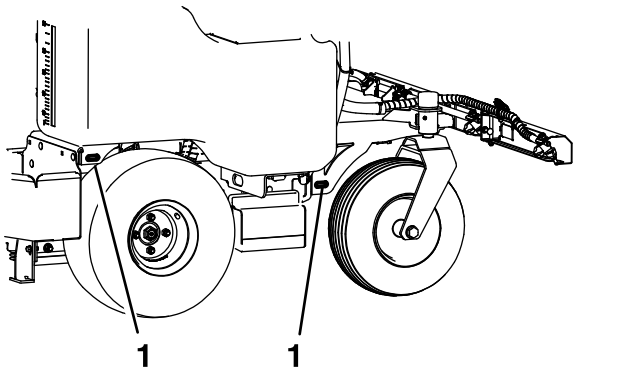


Figure 35
52 Inch Models

1. Tie down location

⚠ WARNING

Securing the machine on any upper frame location will cause the parking brake to not function properly, which could cause serious injury or death.

Only use the front tie down locations on the lower frame to secure the machine.

- Secure a trailer to the towing vehicle with safety chains.

⚠ WARNING

Driving on the street or roadway without turn signals, lights, reflective markings, or a slow moving vehicle emblem is dangerous and can lead to accidents causing personal injury.

Do not drive machine on a public street or roadway.

Loading the Machine

Use extreme caution when loading machines on trailers or trucks. One full width ramp that is wide enough to extend beyond the rear tires is recommended instead of individual ramps for each side of the machine. A full width ramp provides a surface to walk on behind the machine. If it is not possible to use one full width ramp, use enough individual ramps to simulate a full width continuous ramp.

A steep ramp angle may cause components to get caught as the machine moves from ramp to trailer or truck. Steeper angles may also cause the machine to tip backward. If loading on or near a slope, position the trailer or truck so it is on the down side of the slope and the ramps extends up the slope. This will minimize the ramp angle. The trailer or truck should be as level as possible.

Important: Do Not attempt to turn the machine while on the ramp, you may lose control and drive off the side.

Avoid sudden acceleration when driving up a ramp and sudden deceleration when backing down a ramp. Both maneuvers can cause the machine to tip backward.

⚠ WARNING

Loading a machine on a trailer or truck increases the possibility of backward tip-over. Backward tip-over could cause serious injury or death.

- **Use extreme caution when operating a machine on a ramp.**
- **Use only a single, full width ramp; Do Not use individual ramps for each side of the machine.**
- **If individual ramps must be used, use enough ramps to create an unbroken ramp surface wider than the machine.**
- **Avoid sudden acceleration while driving machine up a ramp to avoid tipping backward.**
- **Avoid sudden deceleration while backing machine down a ramp to avoid tipping backward.**

Maintenance

Note: Determine the left and right sides of the machine from the normal operating position.

Maintenance Safety

⚠ WARNING

While maintenance or adjustments are being made, someone could start the engine. Accidental starting of the engine could seriously injure you or other bystanders.

Remove the key from the ignition switch, engage parking brake, and pull the wire(s) off the spark plug(s) before you do any maintenance. Also push the wire(s) aside so it does not accidentally contact the spark plug(s).

⚠ WARNING

The engine can become very hot. Touching a hot engine can cause severe burns.

Allow the engine to cool completely before service or making repairs around the engine area.

- Park machine on level ground and allow the machine to cool. Never allow untrained personnel to service machine.
- Disengage the spray or close the spreader gate, set the parking brake, stop engine and remove key or disconnect spark plug wire. Wait for all movement to stop before adjusting, cleaning or repairing.
- Disconnect battery or remove spark plug wire before making any repairs. Disconnect the negative terminal first and the positive last. Reconnect positive first and negative last.
- Relieve the spray pressure from the system before servicing.
- Empty the tank and/or hopper before tilting the machine for maintenance and before storing.
- Keep the machine, guards, shields and all safety devices in place and in safe working condition. Frequently check for worn or deteriorating components and replace them with the manufacturer's recommended parts when necessary.

⚠ WARNING

Removal or modification of original equipment, parts and/or accessories may alter the warranty, controllability, and safety of the machine. Unauthorized modifications to the original equipment or failure to use original Z Turf Equipment parts could lead to serious injury or death. Unauthorized changes to the machine, engine, fuel or venting system, may violate applicable safety standards such as: ANSI, OSHA and NFPA and/or government regulations such as EPA and CARB.

⚠ WARNING

Hydraulic fluid escaping under pressure can penetrate skin and cause injury. Fluid accidentally injected into the skin must be surgically removed within a few hours by a doctor familiar with this form of injury or gangrene may result.

- **If equipped, make sure all hydraulic fluid hoses and lines are in good condition and all hydraulic connections and fittings are tight before applying pressure to hydraulic system.**
- **Keep body and hands away from pinhole leaks or nozzles that eject high pressure hydraulic fluid.**
- **Use cardboard or paper, not your hands, to find hydraulic leaks.**
- **Safely relieve all pressure in the hydraulic system by placing the motion control levers in neutral and shutting off the engine before performing any work on the hydraulic system.**

- Use jack stands to support components when required.

⚠ CAUTION

Raising the machine for service or maintenance relying solely on mechanical or hydraulic jacks could be dangerous. The mechanical or hydraulic jacks may not be enough support or may malfunction allowing the machine to fall, which could cause injury.

Do not rely solely on mechanical or hydraulic jacks for support. Use adequate jack stands or equivalent support.

- Carefully release pressure from components with stored energy.
- Keep hands and feet away from moving parts. If possible, Do Not make adjustments with the engine running. If the maintenance or adjustment procedure require the engine to be running and components moving, use extreme caution.

⚠ WARNING

Contact with moving parts or hot surfaces may cause personal injury.

Keep your fingers, hands, and clothing clear of rotating components and hot surfaces.

- Check all bolts frequently to maintain proper tightness.

Recommended Maintenance Schedule(s)

Maintenance Service Interval	Maintenance Procedure
After the first 5 hours	• Change the engine oil.
After the first 100 hours	• Change hydraulic system filter and fluid • Check the wheel mount screw torque specification.
Before each use or daily	• Check the engine oil level. • Check the safety interlock system. • Check for loose hardware. • Check air cleaner; replace if dirty. (May need more often under severe conditions.) • Check fuel strainer, filter, and tank. • Clean the engine and exhaust system area. • Clean the debris build-up from the machine.
Every 40 hours	• Check the hydraulic system fittings. • Check the condition of belt.
Every 50 hours	• Check the tire pressures. • Check spreader system. • Check sprayer system.
Every 80 hours	• Remove engine shrouds and clean cooling fins.
Every 100 hours	• Replace the dual element air cleaner element. • Change the engine oil. (May need more often under severe conditions.) • Grease caster pivots (2x). • Grease idler pivot. • Check the spark plugs.
Every 500 hours	• Change hydraulic system filter and fluid (Every 250 hours/Yearly if using Mobil 1 15W50) • Check the wheel mount screw torque specification.
Monthly	• Check the battery charge.

Periodic Maintenance

Check Engine Oil Level

Service Interval: Before each use or daily

1. Stop engine and wait for all moving parts to stop. Make sure unit is on a level surface.
2. Check with engine cold.
3. Clean area around dipstick. Remove dipstick and wipe oil off. Reinsert the dipstick according to the engine manufacturer's recommendations. Remove the dipstick and read the oil level.
4. If the oil level is low, wipe off the area around the oil fill cap, remove cap and fill to the "FULL" mark on the dipstick. 4-Cycle Engine Oil is recommended; refer to the Engine Owner's manual for an appropriate API rating and viscosity. **Do Not** overfill.

Important: Do Not operate the engine with the oil level below the "LOW" (or "ADD") mark on the dipstick, or over the "FULL" mark.

Check Battery Charge

Service Interval: Monthly

Allowing batteries to stand for an extended period of time without recharging them will result in reduced performance and service life. To preserve optimum battery performance and life, recharge batteries in storage when the open circuit voltage drops to 12.4 volts.

Note: To prevent damage due to freezing, battery should be fully charged before putting away for winter storage.

Charge batteries in an open well ventilated area, away from spark and flames. Unplug charger before connecting or disconnecting from battery. Wear protective clothing and use insulated tools.

⚠ DANGER

Charging or jump starting the battery may produce explosive gases. Battery gases can explode causing serious injury.

- **Keep sparks, flames, or cigarettes away from battery.**
- **Ventilate when charging or using battery in an enclosed space.**
- **Make sure venting path of battery is always open once battery is filled with acid.**
- **Always shield eyes and face from battery.**

⚠ DANGER

Battery electrolyte contains sulfuric acid, which is poisonous and can cause severe burns. Swallowing electrolyte can be fatal or if it touches skin can cause severe burns.

- **Wear safety glasses to shield eyes, and rubber gloves to protect skin and clothing when handling electrolyte.**
- **Do Not swallow electrolyte.**
- **In the event of an accident, flush with water and call a doctor immediately.**

⚠ CAUTION

If the ignition is in the "ON" position there is potential for sparks and engagement of components. Sparks could cause an explosion or moving parts could accidentally engage causing personal injury.

Be sure ignition switch is in the "OFF" position before charging the battery.

Check the voltage of the battery with a digital voltmeter. Locate the voltage reading of the battery in the table and charge the battery for the recommended time interval to bring the charge up to a full charge of 12.6 volts or greater.

Important: Make sure the negative battery cable is disconnected and the battery charger used for charging the battery has an output of 16 volts and 7 amps or less to avoid damaging the battery (see chart for recommended charger settings).

Voltage Reading	Percent Charge	Maximum Charger Settings	Charging Interval
12.6 or greater	100%	16 volts/7 amps	No Charging Required
12.4 – 12.6	75–100%	16 volts/7 amps	30 Minutes
12.2 – 12.4	50–75%	16 volts/7 amps	1 Hour
12.0–12.2	25–50%	14.4 volts/4 amps	2 Hours
11.7–12.0	0–25%	14.4 volts/4 amps	3 Hours
11.7 or less	0%	14.4 volts/2 amps	6 Hours or More

Recommended Jump Starting Procedure

Service Interval: As required

1. Check the weak battery for terminal corrosion (white, green, or blue "snow"), it must be cleaned off prior to jump starting. Clean and tighten connections as necessary.

⚠ CAUTION

Corrosion or loose connections can cause unwanted electrical voltage spikes at anytime during the jump starting procedure.

Do Not attempt to jump start with loose or corroded battery terminals or damage to the engine may occur.

⚠ DANGER

Jump starting a weak battery that is cracked, frozen, has low electrolyte level, or an open/shorted battery cell, can cause an explosion resulting in serious personal injury.

Do Not jump start a weak battery if these conditions exist.

2. Make sure the booster is a good and fully charged lead acid battery at 12.6 volts or greater. Use properly sized jumper cables (4 to 6 AWG) with short lengths to reduce voltage drop between systems. Make sure the cables are color coded or labeled for the correct polarity.

⚠ CAUTION

Connecting the jumper cables incorrectly (wrong polarity) can immediately damage the electrical system.

Be certain of battery terminal polarity and jumper cable polarity when hooking up batteries.

Note: The following instructions are adapted from the SAE J1494 Rev. Dec. 2001 – Battery Booster Cables – Surface Vehicle Recommended Practice (SAE – Society of Automotive Engineers).

⚠ WARNING

Batteries contain acid and produce explosive gases.

- **Shield the eyes and face from the batteries at all times.**
- **Do Not lean over the batteries.**

Note: Be sure the vent caps are tight and level. Place a damp cloth, if available, over any vent caps on both batteries. Be sure the vehicles do not touch and that both electrical systems are off and at the same rated system voltage. These instructions are for negative ground systems only.

3. Connect the positive (+) cable to the positive (+) terminal of the discharged battery that is wired to the starter or solenoid as shown in Figure 36.

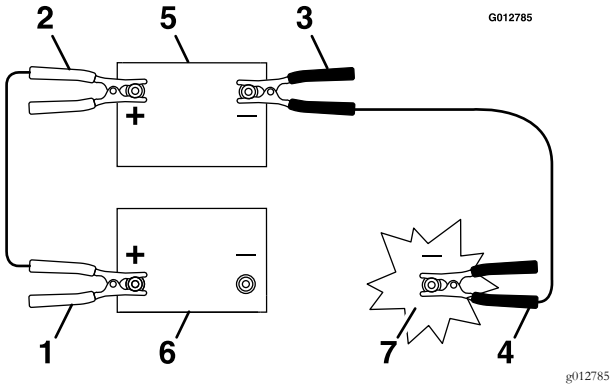


Figure 36

1. Positive (+) cable on discharged battery
2. Positive (+) cable on booster battery
3. Negative (–) cable on the booster battery
4. Negative (–) cable on the engine block
5. Booster battery
6. Discharged battery
7. Engine block

4. Connect the other end of the positive cable to the positive terminal of the booster battery.
5. Connect the black negative (–) cable to the other terminal (negative) of the booster battery.
6. MAKE THE FINAL CONNECTION ON THE ENGINE BLOCK OF THE STALLED VEHICLE (NOT TO THE NEGATIVE POST) AWAY FROM THE BATTERY. STAND BACK.
7. Start the vehicle and remove the cables in the reverse order of connection (the engine block (black) connection is the first to disconnect).

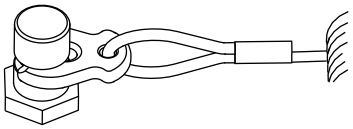
Check Safety Interlock System

Service Interval: Before each use or daily

Important: It is essential that the operator safety mechanisms be connected and in proper operating condition prior to use.

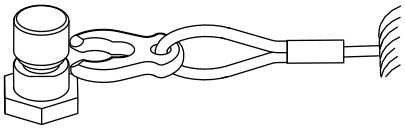
Note: If the machine does not pass this test, do not operate. Contact your authorized **Z Turf Equipment Service Dealer.**

Check the Normal Engine Starting Circuit

	System	
	Operator Presence Control (OPC) Lanyard	**Outcome**
State of System	Engaged 	Starter should crank 

Check Engine Starting Circuit Chart

Note: In the **Check Engine Starting Circuit Chart**, the state of system item that is bold is being checked.

	System	
	Operator Presence Control (OPC) Lanyard	**Outcome**
State of System	**Disengaged** 	Starter should not crank 

Check for Loose Hardware

Service Interval: Before each use or daily

1. Stop engine, wait for all moving parts to stop, and remove key. Engage parking brake.
2. Visually inspect machine for any loose hardware or any other possible problem. Tighten hardware or correct the problem before operating.

Service Air Cleaner

Service Interval: Before each use or daily—Check air cleaner; replace if dirty. (May need more often under severe conditions.)

Every 100 hours—Replace the dual element air cleaner element.

1. Stop engine, wait for all moving parts to stop, and remove key. Engage parking brake.
2. See the Engine Owner's Manual for maintenance instructions.

Change Engine Oil

Service Interval: After the first 5 hours

Every 100 hours (May need more often under severe conditions.)

1. Stop engine, wait for all moving parts to stop, and remove key. Engage parking brake.
2. Drain oil while engine is warm from operation.
3. The oil drain plug is located on the left side of the engine.

   Place pan under machine to catch oil. Remove drail oil plug to open and allow oil to drain and reinstall valve when complete.
4. Clean around oil fill cap and remove cap. Fill to specified capacity and replace cap.
5. Use oil recommended in the **Check Engine Oil Level** section. **Do Not** overfill. Start the engine and check for leaks. Stop engine and recheck oil level.
6. Wipe up any spilled oil from engine deck mounting surfaces.

Check Hydraulic Oil and Tank Level

Service Interval: Every 40 hours

1. Stop engine and wait for all moving parts to stop, and remove key. Engage parking brake.
2. Remove the knee pad.
3. Clean area around oil overflow tank and remove cap. Oil level should be between the "add" and "full" marks on the tank bracket (see Figure 37); if not, add hydraulic oil. Replace tank cap and tighten until snug. Do Not overtighten.

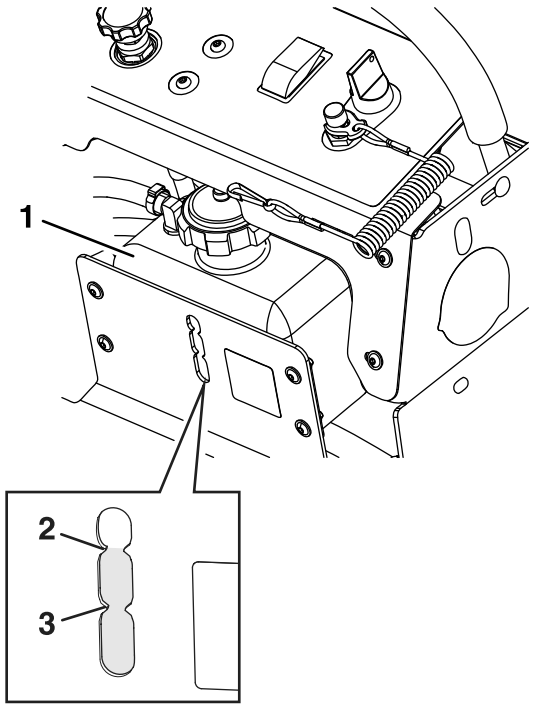


Figure 37

1. Tank
2. Full
3. Add

Change Hydraulic System Filter and Fluid

Service Interval: After the first 100 hours

Every 500 hours/Yearly (whichever comes first) thereafter (Every 250 hours/Yearly if using Mobil 1 15W50 thereafter)

1. Stop engine, wait for all moving parts to stop, and remove key. Engage parking brake.
2. Carefully clean area around filter. It is important that no dirt or contamination enter hydraulic system.
3. Place a catch pan under the hydro filter.
4. Unscrew filter to remove and allow oil to drain from filter head.

   Important: Before reinstalling new filter, fill it with hydraulic oil and apply a thin coat of oil on the surface of the rubber seal.

   Turn filter clockwise until rubber seal contacts the filter adapter, then tighten the filter an additional 2/3 to 3/4 turn.
5. Fill reservoir as stated in **Check Hydraulic Oil and Tank Level.**

Hydro Oil	Service Interval
Mobil 1 15W50	After first 250 hours *Every 250 hours/Yearly thereafter

   *May need more often under severe conditions.
6. Loosen filter 1/2 turn and allow a small amount of oil to leak from the oil filter (this allows air to be purged from the oil filter and supply hose from the hydraulic reservoir). Turn filter clockwise until rubber seal contacts the filter adapter. Then tighten the filter an additional 2/3 to 3/4 turn.
7. Remove the catch pan and properly dispose of hydro oil and filter according to local codes.
8. Raise the rear of machine up and support with jack stands (or equivalent support) just high enough to allow drive wheels to turn freely.
9. Start engine and move throttle control ahead to full throttle position. Move the speed control levers to the full speed and run for one minute. Shut down the machine, allow the hydros to cool and recheck oil level.

   If either drive wheel does not rotate, they may have lost their "prime". Refer to **Hydraulic System Air Purge** section.
10. Remove the jack stands.

Note: Do Not change hydraulic system oil (except for what can be drained when changing filter), unless it is felt the oil has been contaminated or been extremely hot.

Changing oil unnecessarily could damage hydraulic system by introducing contaminates into the system.

Hydraulic System Air Purge

Service Interval: As required

Air must be purged from the hydraulic system when any hydraulic components, including oil filter, are removed or any of the hydraulic lines are disconnected.

1. Stop engine and wait for all moving parts to stop. Raise the rear of the machine up onto jack stands high enough to raise the drive wheels off the ground.
2. Check oil level as stated in **Check Hydraulic Oil Level** section.
3. Start engine and move throttle control ahead to full throttle position. Move the speed control lever to the middle speed position and place the drive levers in the "drive" position.
4. Open the drive wheel release on each pump.
5. With the machine running, stroke the drive levers from forward to reverse several time, slowly. Then, retighten the drive wheel release valves.

   Note: If either drive wheel does not rotate, it is possible to assist the purging of the charge pump by carefully rotating the tire in the forward position.
6. If either drive wheel still does not rotate, stop and repeat steps 4 and 5 above for the respective pump. If wheels rotate slowly, the system may prime after additional running. Check oil level as stated in **Check Hydraulic Oil and Tank Level** section.
7. Allow the machine to run several minutes after the charge pumps are "primed" with drive system in the full speed position. Check oil level as stated in **Check the Hydraulic Oil Level** section.
8. Check hydro drive linkage adjustment as stated in **Hydro Drive Linkage Adjustment** section in Adjustments.

Check Tire Pressures

Service Interval: Every 50 hours

1. Stop engine, wait for all moving parts to stop, and remove key. Engage parking brake.

2. Check tire pressure in drive tires.
3. Inflate all tires to 18 psi (124 kPa).

Check Spreader System

Service Interval: Every 50 hours

Spray the hopper cables, accuway cable, and the deflector shield cable with silicone spray if needed.

Clean the bottom of the hopper with a wire brush and clean off any fertilizer if needed.

Change out the hopper bottom bushing or the impeller if needed.

Check Sprayer System

Service Interval: Every 50 hours

1. Stop engine, wait for all moving parts to stop, and remove key. Engage parking brake.
2. Check all hoses, nozzles, and fittings for leaks.
3. Check nozzle strainers and in-line strainers.
4. Replace as needed.

Check In-line Filter

Service Interval: As required

Periodically check the in-line filter for any debris in the screen. If debris is present, this can create erratic pressure spikes and/or not allow the proper flow through system. After clearing any debris, ensure that gasket remains intact and tighten in-line filter cap (if not installed properly, this will allow air to get in the system and system will lose or not create pressure).

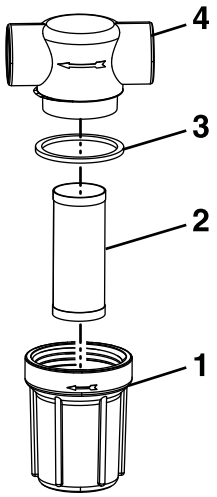


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Figure 38

1. Cap
2. Filter
3. Gasket
4. In-line filter housing

Check Fuel Filter and Tank

Service Interval: Before each use or daily

1. Stop engine, wait for all moving parts to stop, and remove key. Engage parking brake.
2. Check the fuel filter and tank for leaks. See Engine Owner's Manual.

Lubricate Grease Fittings

Service Interval: Every 100 hours—Grease caster pivots (2x).

Every 100 hours—Grease idler pivot.

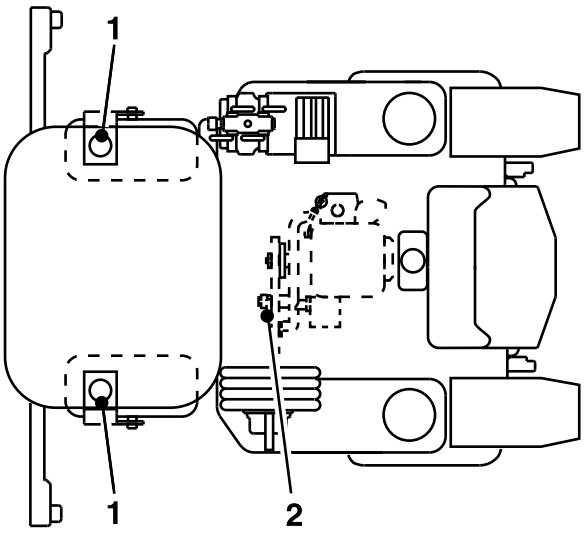
Note: See chart for service intervals.

1. Stop engine, wait for all moving parts to stop, and remove key. Engage parking brake.
2. Lubricate fittings with NLGI grade #2 multi-purpose gun grease.

   Refer to the maintenance chart for fitting locations and lubrication schedule.

Lubrication Chart

Fitting Locations	Initial Pumps	Number of Places	Service Interval
1. Front Caster Pivots	*0	2	Yearly
2. Idler Pivot	1	1	Yearly



Check Condition of Belt

Service Interval: Every 40 hours

1. Stop engine, wait for all moving parts to stop, and remove key. Engage parking brake.
2. Check the belt condition and tension.

Check Spark Plugs

Service Interval: Every 100 hours

Remove spark plugs, check condition and reset gaps, or replace with new plugs. See Engine Owner's Manual.

Wheel Mount Screw Torque Specification

Service Interval: After the first 100 hours

Every 500 hours thereafter

Torque the lug nuts on the wheel hub to 95 ft-lb (129 N-m).

Check Alternator

Service Interval: As required

20 Amp Regulated Alternator

The 20 amp regulated alternator system provides AC current through two output leads to the regulator-rectifier. The regulator-rectifier converts the AC current to DC, and regulates current to the battery. The charging rate will vary with engine RPM and temperature.

1. Stator assembly (1) (Figure 39)
2. Two YELLOW leads (2) from Stator.
3. RED DC output lead (3) from connector.
4. Connector (4)
5. Two YELLOW AC input leads (5)
6. Regulator-rectifier (6)
7. RED DC output lead (7) to connector

Note: Stator (1), regulator-rectifier (6) and fly-wheel are NOT INTERCHANGEABLE with any other charging system.

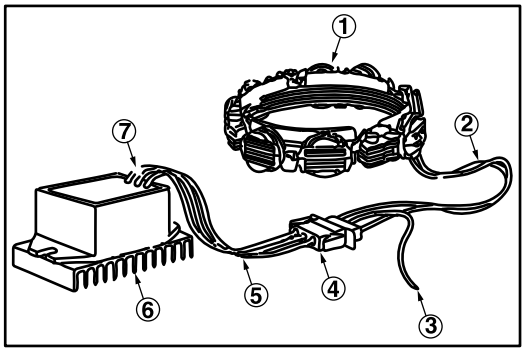


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Figure 39

Output Test

WHEN CHECKING THE ALTERNATOR COMPONENTS, PERFORM THE TEST IN THE FOLLOWING SEQUENCE:

Temporarily disconnect stator wire harness from regulator-rectifier.

1. Insert RED test lead into VΩ receptacle in meter.
2. Insert BLACK test lead into COM receptacle.
3. Rotate selector to V~ (AC VOLTS) position.

⚠ CAUTION

Attach meter test leads to the AC output terminals (YELLOW wires) in the connector BEFORE starting the engine. If the stator is grounded (defective) and the meter test leads contact the center DC output pin (RED wire) in the connector, arcing could occur, damaging the wiring.

4. Attach RED (2) and BLACK (1) test lead probes to the YELLOW wire (4) AC output terminals (6), of the connector (3), as shown in Figure 40. (Meter test clip leads may be attached to either AC output terminal).

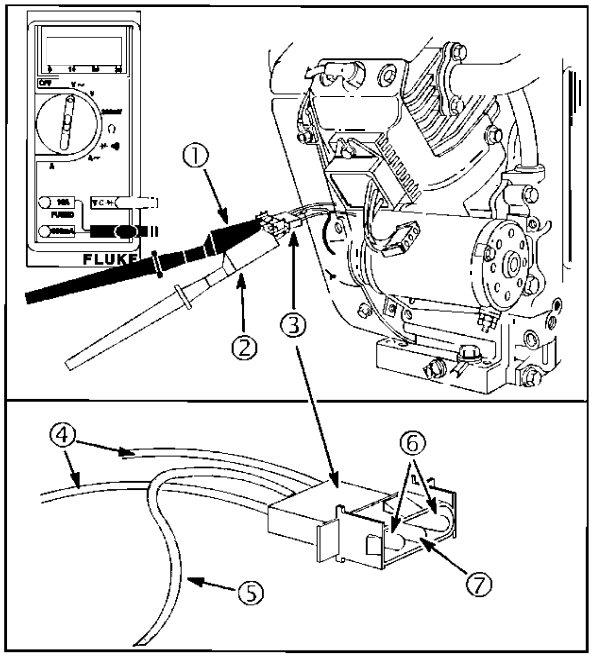

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Figure 40

5. If NO or LOW output is found check for bare wires or other defects. If shorted leads are not visible, replace the stator.
6. With the engine running at 3600 RPM output should be no less than 26 Volts.

DC Output Charging Wire Test

A simple test can be used to test the DC output charging wire circuit. If a wiring problem exists it can be corrected before testing regulator-rectifier.

Leave stator wire harness disconnected from regulator-rectifier. Equipment key switch must be in OFF position.

1. Insert RED test lead into VΩ receptacle in meter.
2. Insert BLACK test lead into COM receptacle.
3. Rotate selector to V= = (DC volts) position.
4. Attach RED test lead probe (2) to the RED wire (5) DC output terminal (7), of the connector (Figure 40).
5. Attach BLACK test lead probe (1) to negative battery terminal.
6. Turn equipment key switch to ON position. Meter should display BATTERY VOLTAGE.
7. If meter does not display voltage, check for blown fuse or broken or shorted wire.

Regulator-Rectifier Test

The DC Shunt MUST be installed on the NEGATIVE (-) terminal of the battery, (Figure 41) to avoid blowing the fuse in the meter when testing the output of the 20 amp system. All connections must be clean and tight for correct readings.

1. Connect stator wire harness to regulator-rectifier.
2. Install DC Shunt (4) on NEGATIVE battery terminal.
3. Insert RED test lead into VΩ receptacle in meter and connect to RED post terminal on shunt (5), Figure 41.

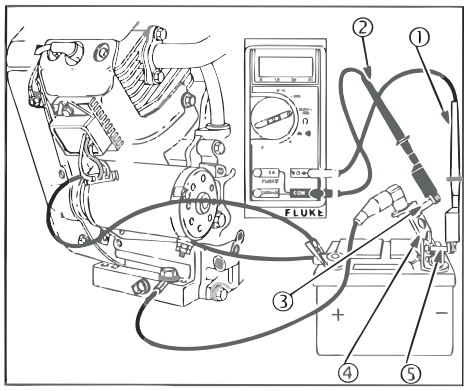

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Figure 41

4. Insert BLACK test lead in COM receptacle in meter. Connect to BLACK post terminal on shunt (3).
5. Rotate selector to 300 mV position.
6. With the engine running at 3600 RPM, the output should be 3-20 Amps.

Note: Depending on battery voltage and/or current draw on system

If NO or LOW output is found, be sure that regulator-rectifier is grounded properly and all equipment connections are clean and secure. If there is still NO or LOW output, replace the regulator-rectifier.

Adjustments

Note: Shut off engine, wait for all moving parts to stop, engage parking brake, and remove key before servicing, cleaning, or making any adjustments to the machine.

Pump Drive Belt Tension

1. Stop engine, wait for all moving parts to stop, and remove key. Engage parking brake.
2. Adjust tension by loosening or tightening the eye bolt nut. To increase the tension tighten the nut. To decrease the tension, loosen the nut.

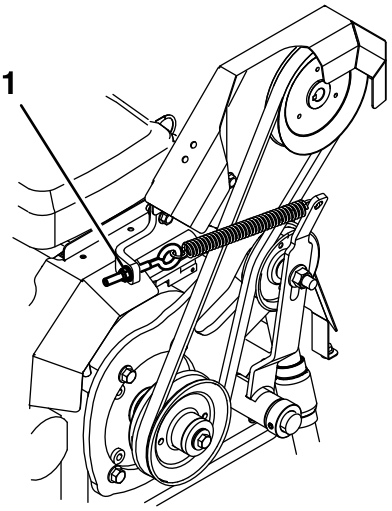

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Figure 42

1. Eye bolt nut

Adjusting the Parking Brake

If the parking brake does not hold securely, an adjustment is required.

1. Park the machine on a level surface.
2. Shut off engine and wait for all moving parts to stop.
3. Check the air pressure in the drive tires. If needed, adjust to the recommended inflation; refer to **Check Tire Pressure** section.
4. Disengage the park brake.
5. Loosen the two jam nuts on the brake linkage on the left side of the unit.
6. To increase the brake force, turn the linkage counterclockwise 1–2 turns.

7. Engage the park brake and check. If more adjustment is needed, repeat Step 6.
8. Retighten the jam nuts.
9. Check the park brake; repeat steps 5 through 6 if necessary.

Motion Control Linkage Adjustment

1. Park the machine on a level surface.
2. Stop engine, wait for all moving parts to stop, and remove key. Engage parking brake.
3. Loosen the two knobs that secure the front reference/speed control bar and push it all the way forward. Slightly tighten the knobs.
4. With the motion control levers in the neutral position, the gap between the front reference/speed control bar should measure 4 inches (102 mm).

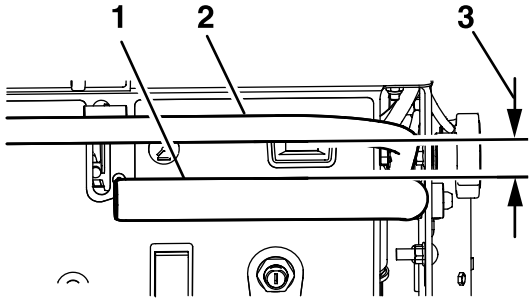


Figure 43

1. Right hand motion control lever
2. Front reference/speed control bar
3. 4 inches (102 mm)

5. If an adjustment is needed, remove the knee pad.
6. Loosen the two jam nuts at the upper and lower ends of the ball joints as shown in Figure 44. To increase the gap, turn the control linkage counterclockwise. To decrease the gap, turn the control linkage clockwise.

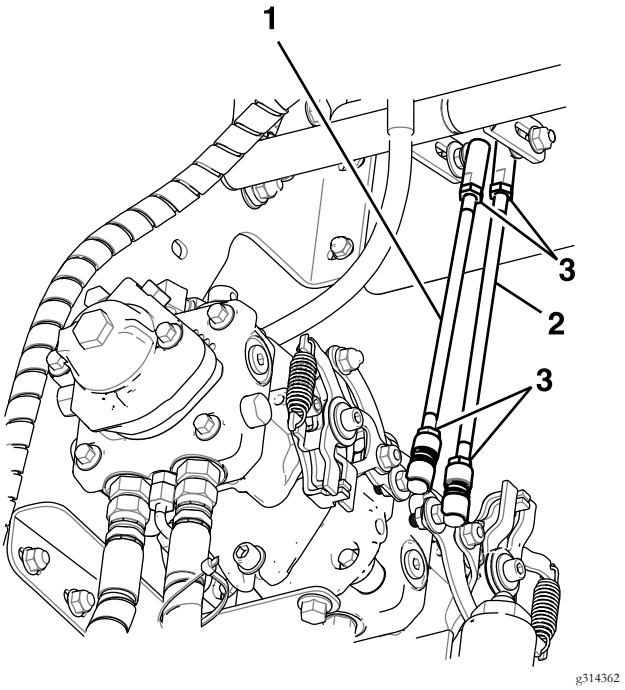


Figure 44

1. Left motion control linkage
2. Right motion control linkage
3. Jam nuts

7. Retighten the jam nuts on the control linkage.
8. Replace the knee pad.

Motion Control Tracking Adjustment

If the machine travels or pulls to one side when the motion control levers are in the full forward position, adjust the tracking.

1. Park the machine on a level surface.
2. Stop engine, wait for all moving parts to stop, and remove key. Engage parking brake.
3. Make sure there is a 4 inch (102 mm) gap between the motion control levers and the front reference/speed control bar (reference **Motion Control Linkage Adjustment**).
4. Remove the knee pad.
5. Loosen the two jam nuts at the upper and lower ends of the ball joints on the lever that needs to be adjusted (reference Figure 44).
6. To increase the speed, turn the control linkage counterclockwise in quarter turn increments.

To decrease the speed, turn the control linkage clockwise in quarter turn increments.

7. Retighten the jam nuts on the control linkage.
8. Drive the machine and check the full forward tracking.
9. Replace the knee pad.
10. Repeat steps 5 through 8 until desired tracking is obtained.

Cleaning

Clean Engine and Exhaust System Area

Service Interval: Before each use or daily (May be required more often in dry or dirty conditions.)

⚠ CAUTION

Excessive debris around engine cooling air intake and exhaust system area can cause engine, exhaust area, and hydraulic system to overheat which can create a fire hazard.

Clean all debris from engine and exhaust system area.

1. Stop engine, wait for all moving parts to stop, and remove key. Engage parking brake.
2. Clean all debris from rotating engine air intake screen, around engine shrouding, and exhaust system area.
3. Wipe up any excessive grease or oil around the engine and exhaust system area.
4. Clean muffler heat shields of all debris, dirt, and oil.

Remove Engine Shrouds and Clean Cooling Fins

Service Interval: Every 80 hours

1. Stop engine, wait for all moving parts to stop, and remove key. Engage parking brake.
2. Remove cooling shrouds from engine and clean cooling fins. Also clean dust, dirt, and oil from external surfaces of engine which can cause improper cooling.
3. Make sure cooling shrouds are properly reinstalled. Operating the engine without cooling shrouds will cause engine damage due to overheating.

Clean Debris From Machine

Service Interval: Before each use or daily

1. Stop engine, wait for all moving parts to stop, and remove key. Engage parking brake.
2. Clean off any oil, debris, or build-up on the machine, especially the nozzles, tank opening, impeller, spray wand and its holder, around engine and exhaust area.

Important: You can wash the machine with mild detergent and water. Do not pressure wash the machine. Avoid excessive use of water, especially near the control panel, under the cushion, around the engine, hydraulic pumps, motors, and drive axle seals.

Waste Disposal

Chemical Disposal

Improper chemical disposal can pollute the environment and cause health issues.

Follow the disposal directions on the chemical manufacturer's label. Dispose of chemicals and containers in accordance to local/state/federal laws.

Motor Oil Disposal

Engine oil and hydraulic oil are both pollutants to the environment. Dispose of used oil at a certified recycling center or according to your state and local regulations.

Battery Disposal

⚠ DANGER

Battery electrolyte contains sulfuric acid, which is poisonous and can cause severe burns. Swallowing electrolyte can be fatal or if it touches skin can cause severe burns.

- **Wear safety glasses to shield eyes, and rubber gloves to protect skin and clothing when handling electrolyte.**
- **Do Not swallow electrolyte.**
- **In the event of an accident, flush with water and call a doctor immediately.**

Federal law states that batteries should not be placed in the garbage. Management and disposal practices must be within relevant federal, state, or local laws.

If a battery is being replaced or if the unit containing the battery is no longer operating and is being scrapped, take the battery to a local certified recycling center. If no local recycling is available return the battery to any certified battery reseller.

Storage

Extended or Winter Storage

To help protect the pumps from freezing temperatures make sure the unit is free of all caustic chemicals and residue.

Spreader Cleaning

Perform all the steps in **Cleaning the Spreader** in the Operation section.

Sprayer Cleaning

1. Perform all the steps in **Cleaning the Sprayer** in the Operation section.
2. Add a rust inhibiting, non-alcohol based, RV antifreeze solution to the system. See label to ensure the product will provide appropriate protection for the climate.
   A. Make sure the sprayer is empty and let the pump run until the nozzles are spraying air.
   B. Pour 2 gallons (7.6 L) of RV anti-freeze into each of the sprayer tanks.
   C. Run the pump to distribute the anti-freeze mix throughout the system.
   D. Set the spray levers position to begin spraying. Allow the antifreeze to circulate through sprayer and nozzles. Remove the wand from its holder, point it in a safe direction, and squeeze the spray wand trigger. Return the wand to its holder.

      Note: Do Not allow all the mix to spray out of the tank. Keeping some antifreeze in the pump, valves, and hoses will help prevent rusting and damage caused by moist air that may be trapped in the system.

   E. Turn off the spray control lever and the spray pump switch.

General Cleaning

Follow all instructions in the **Maintenance** and **Cleaning** sections.

Refer to the Engine Owner's manual for proper storage of the engine.

Battery Storage

Disconnect the battery and place on a trickle charger for a few hours once per month.

Troubleshooting

Important: It is essential that all operator safety mechanisms be connected and in proper operating condition prior to use.

When a problem occurs, do not overlook the simple causes. For example: starting problems could be caused by an empty fuel tank.

The following table lists some of the common causes of trouble. Do Not attempt to service or replace major items or any items that call for special timing of adjustments procedures (such as valves, governor, etc.). Have this work done by your **Engine Service Dealer**.

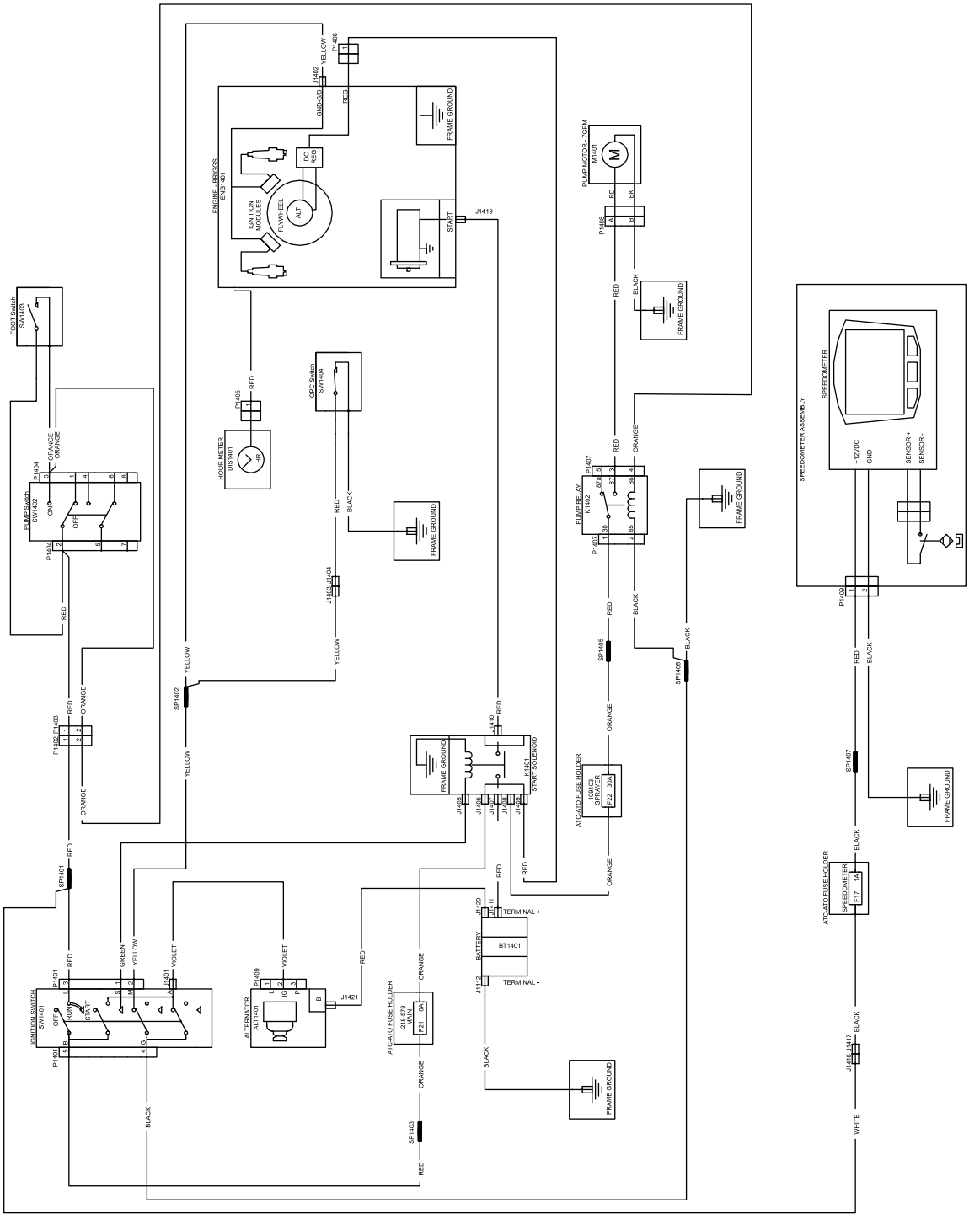
Note: When disconnecting electrical connectors Do Not pull on the wires to separate the connectors.

Problem	Possible Cause	Corrective Action
Starter does not crank.	1. Interlock key removed from OPC	1. Reinstall interlock key.
	2. Battery does not have a full charge.	2. Charge the battery. See **Check Battery Charge** and **Recommended Jump Starting Procedure** sections in Maintenance.
	3. Electrical connections are corroded, loose or faulty.	3. Check the electrical connections for good contact. Clean connector terminals thoroughly with electrical contact cleaner, apply dielectric grease and reconnect.
	4. Fuse is blown.	4. Replace the blown fuse.
	5. Relay or switch is defective.	5. Contact an Authorized Service Dealer.
Engine will not start, starts hard, or fails to keep running	1. Fuel tank is empty.	1. Fill the fuel tank.
	2. The throttle and choke are not in the correct position.	2. Be sure the throttle control is midway between the "SLOW" and "FAST" positions, and the choke is in the "ON" position for a cold engine or the "OFF" position for a warm engine.
	3. Dirt in fuel filter.	3. Replace the fuel filter (bottom of fuel tank).
	4. Dirt, water, or stale fuel is in the fuel system.	4. Contact an Authorized Service Dealer.
	5. Air cleaner is dirty.	5. Clean or replace the air cleaner element.
	6. Electrical connections are corroded, loose or faulty.	6. Check the electrical connections for good contact. Clean connector terminals thoroughly with electrical contact cleaner, apply dielectric grease and reconnect.
	7. Relay or switch is defective.	7. Contact an Authorized Service Dealer.
	8. Faulty spark plug.	8. Clean, adjust or replace spark plug.
	9. Spark plug wire is not connected.	9. Check the spark plug wire connection.
Engine loses power	1. Engine load is excessive	1. Reduce the ground speed.
	2. Air cleaner is dirty.	2. Clean or replace the air cleaner element.
	3. Oil level in the crankcase is low.	3. Add oil to the crankcase.
	4. Cooling fins and air passages for the engine are plugged.	4. Remove the obstructions from the cooling fins and air passages.
	5. Dirt in fuel filter.	5. Replace the fuel filter (bottom of fuel tank).
	6. Dirt, water, or stale fuel is in the fuel system.	6. Contact an Authorized Service Dealer.

Problem	Possible Cause	Corrective Action
Engine overheats	1. Engine load is excessive 2. Oil level in the crankcase is low. 3. Cooling fins and air passages for the engine are plugged.	1. Reduce the ground speed. 2. Add oil to the crankcase. 3. Remove the obstructions from the cooling fins and air passages.
Machine pulls left or right (with lever fully forward).	1. Tire pressure in drive tires not correct. 2. Damaged control linkage. 3. Tracking not set.	1. Adjust tire pressure in the drive tires. 2. Replace control linkage. 3. Adjust tracking.
Machine does not drive.	1. Bypass valve is not closed tight.	1. Tighten the bypass valve.
Abnormal vibration	1. Engine mounting bolts are loose.	1. Tighten the engine mounting bolts.
Impeller does not rotate.	1. Debris buildup. 2. Hopper screen is plugged. 3. Spreader motor is loose or damaged. 4. Spreader motor hydro failure. 5. Spreader controller turned off or down. 6. Shaft pin is missing. 7. Impeller motor bearing failure.	1. Clean impeller. 2. Clean hopper screen. 3. Repair or replace motor. 4. Check connections. 5. Check controller knob positions. 6. Replace shaft pin. 7. Replace bearing or entire motor.
Uneven spread/spray pattern.	1. Impeller is dirty or damaged. 2. Gate not adjusted properly. 3. Nozzles are clogged. 4. Hopper screen is plugged. 5. Material clumps over gate. 6. Diffuser ramp setting incorrect.	1. Clean, repair, or replace impeller. 2. Adjust the gate. See **Spreader Pattern Adjustment** section in Operation. 3. Unclog or replace nozzles. 4. Clean hopper screen. 5. Check motor shaft agitator pin presence. 6. Adjust control cable position.
No front spray or poor output.	1. Tank is empty. 2. Strainer is clogged or damaged. 3. Pump is clogged or damaged. 4. Nozzles are clogged. 5. Hoses are clogged, kinked, or damaged. 6. Spray control not on. 7. Spray pressure and speed incorrect. 8. Spray mixture is incorrect. 9. Spray system is leaking or sucking air.	1. Fill tank. 2. Clean, repair, or replace strainer. 3. Clean, repair, or replace pump. 4. Unclog or replace nozzles. 5. Clean, repair, or replace hoses. 6. Turn on spray. 7. Adjust pressure and speed. 8. Follow chemical manufacturer's recommendation. 9. Inspect system and clean, repair, or replace components as needed.
No material dispensed from hopper.	1. Hopper screen is plugged. 2. Gate not adjusted properly.	1. Clean hopper screen. 2. Adjust the gate. See **Spreader Pattern Adjustment** section in Operation.
Spray wand does not work.	1. Tank is empty. 2. Control valve in wrong position. 3. Wand is clogged or damaged. 4. Nozzle is clogged. 5. Trigger is not pressed. 6. Hoses are clogged or damaged. 7. Hose is not connected to wand 8. Hose is kinked.	1. Fill tank. 2. Place in "open" position. 3. Clean, repair, or replace wand. 4. Unclog or replace nozzle. 5. Press trigger. 6. Clean, repair, or replace hoses. 7. Reconnect hose. 8. Unkink hose.

Schematics

Electrical Schematic-XL Models



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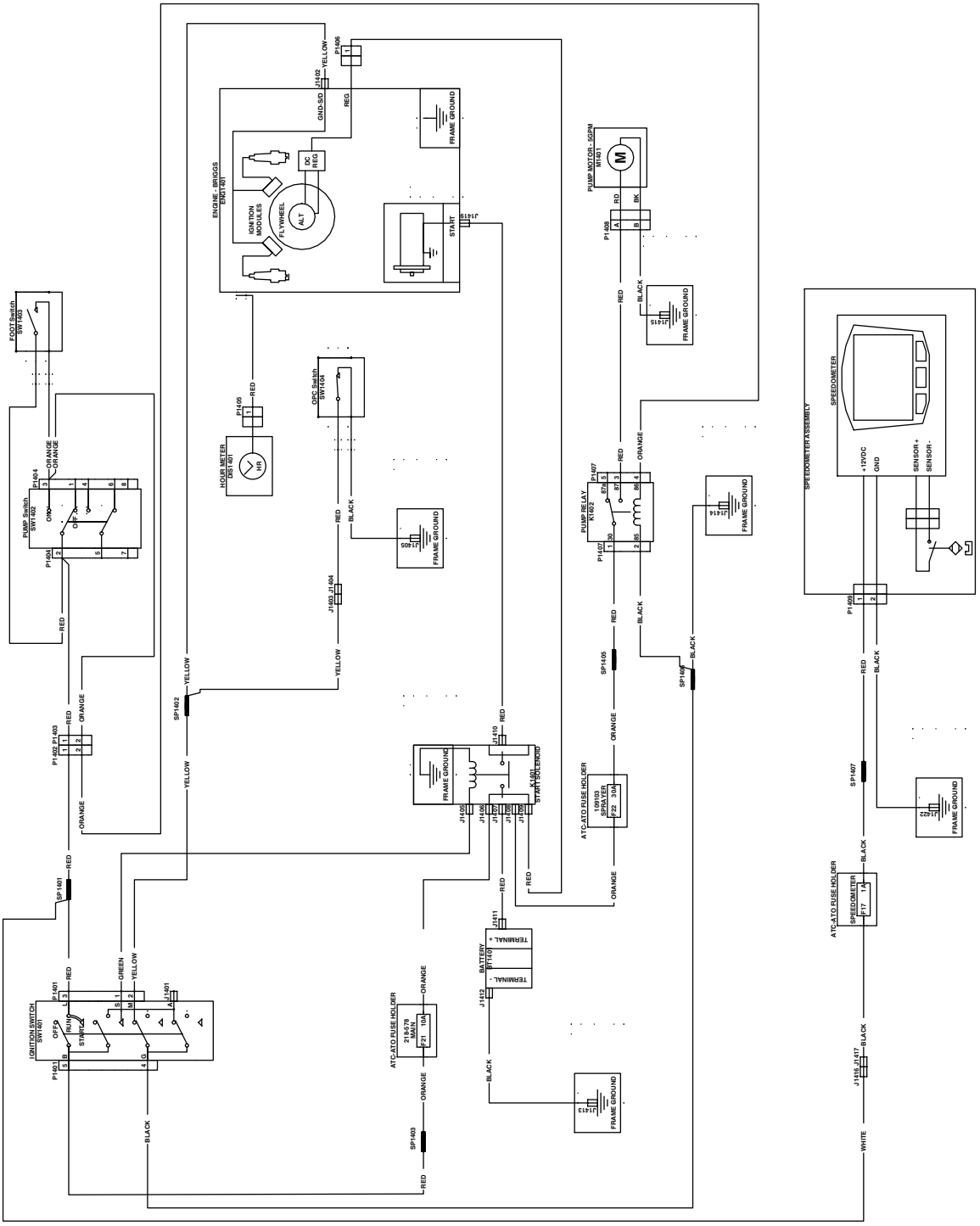
Electrical Schematic-All Models Except XL



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California Proposition 65 Warning Information

What is this warning?

You may see a product for sale that has a warning label like the following:

WARNING: Cancer and Reproductive Harm—www.p65Warnings.ca.gov.

What is Prop 65?

Prop 65 applies to any company operating in California, selling products in California, or manufacturing products that may be sold in or brought into California. It mandates that the Governor of California maintain and publish a list of chemicals known to cause cancer, birth defects, and/or other reproductive harm. The list, which is updated annually, includes hundreds of chemicals found in many everyday items. The purpose of Prop 65 is to inform the public about exposure to these chemicals.

Prop 65 does not ban the sale of products containing these chemicals but instead requires warnings on any product, product packaging, or literature with the product. Moreover, a Prop 65 warning does not mean that a product is in violation of any product safety standards or requirements. In fact, the California government has clarified that a Prop 65 warning "is not the same as a regulatory decision that a product is 'safe' or 'unsafe.'" Many of these chemicals have been used in everyday products for years without documented harm. For more information, go to https://oag.ca.gov/prop65/faqs-view-all.

A Prop 65 warning means that a company has either (1) evaluated the exposure and has concluded that it exceeds the "no significant risk level"; or (2) has chosen to provide a warning based on its understanding about the presence of a listed chemical without attempting to evaluate the exposure.

Does this law apply everywhere?

Prop 65 warnings are required under California law only. These warnings are seen throughout California in a wide range of settings, including but not limited to restaurants, grocery stores, hotels, schools, and hospitals, and on a wide variety of products. Additionally, some online and mail order retailers provide Prop 65 warnings on their websites or in catalogs.

How do the California warnings compare to federal limits?

Prop 65 standards are often more stringent than federal and international standards. There are various substances that require a Prop 65 warning at levels that are far lower than federal action limits. For example, the Prop 65 standard for warnings for lead is 0.5 µg/day, which is well below the federal and international standards.

Why don't all similar products carry the warning?

- Products sold in California require Prop 65 labelling while similar products sold elsewhere do not.
- A company involved in a Prop 65 lawsuit reaching a settlement may be required to use Prop 65 warnings for its products, but other companies making similar products may have no such requirement.
- The enforcement of Prop 65 is inconsistent.
- Companies may elect not to provide warnings because they conclude that they are not required to do so under Prop 65; a lack of warnings for a product does not mean that the product is free of listed chemicals at similar levels.

Why does Z Turf Equipment include this warning?

Z Turf Equipment has chosen to provide consumers with as much information as possible so that they can make informed decisions about the products they buy and use. Z Turf Equipment provides warnings in certain cases based on its knowledge of the presence of one or more listed chemicals without evaluating the level of exposure, as not all the listed chemicals provide exposure limit requirements. While the exposure from Z Turf Equipment products may be negligible or well within the "no significant risk" range, out of an abundance of caution, Z Turf Equipment has elected to provide the Prop 65 warnings. Moreover, if Z Turf Equipment does not provide these warnings, it could be sued by the State of California or by private parties seeking to enforce Prop 65 and subject to substantial penalties.

Service Record

Date:	Description of Work Done:	Service Done By:

Place Model No. and Serial No. Label Here (Included in the Literature Pack) or Fill in Below

Model No. _____

Serial No. _____

Date Purchased _____

Engine Model No. and Spec. No. _____

Engine Serial No. (E/No) _____

Z TURF EQUIPMENT™

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