



L.T. Rich Products
(877) 482-2040
www.zspray.com

OWNERS MANUAL

Z-Plug (2017 to current)



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L. T. Rich Products Inc.

Warranty Registration Card

Serial #: <hr/>	Company Name: <hr/>
Company Address: <hr/>	City / State / Zip: <hr/>
Company Phone: <hr/>	Company Fax: <hr/>
Company Contact: <hr/>	Company Email: <hr/>

Please circle what most accurately describes your business

- | | | | |
|------------|----------------|--------|-----------|
| Commercial | Sports Complex | School | Municipal |
| Cemetery | Home Owner | Other | |

Dealer Name: <hr/>	Dealer Address: <hr/>
Dealer City / State: <hr/>	Dealer Phone: <hr/>
Dealer Salesman: <hr/>	Date of Purchase: <hr/>

L. T. Rich Products warrants its line of equipment to be free from defects in material and factory workmanship for a period of 12 months. Any exceptions to this will be explicitly stated in an individual warrant agreement in the operator's manual of that piece of equipment

Fax to: 765-680-0047 or email to sbell@z-spray.com

SECTION 1 TO THE OWNER

1.1 Read this manual entirely BEFORE operating the Z-Plug

The information presented herein will prepare you to operate the L.T. Rich Z-Plug in a safe and knowledgeable manner. Operating the Z-Plug in a proper manner will provide a safer working environment, create more efficient results and promote higher quality.

Keep this manual at hand always for ready reference. The tested safety and design(s) of the Z-Plug is dependent upon its operations within the guidelines and limitations outlined in this manual. Operating the Z-Plug outside of the stated safety guidelines presented in this manual run the risk of injury and a void in the warranty.

1.2 Product Registration

Immediately record the model and serial number of your Z-Plug in the spaces below. These numbers can be found affixed to the cross bar under the kneepad of the unit. Providing this information to departments within L.T. Rich products will help assure that you get the correct parts, inform you about any updates and/or given proper warranty.

1.3 L.T. Rich Products, Inc Warranty

L.T. Rich Products, Inc warrants its line of equipment to be free of defects in material and factory workmanship for a period of 12 months of purchase. Any exception to this will be explicitly stated in an individual warranty agreement in the operator's manual of that stated piece of equipment. This statement does not limit engine warranties in which the engine manufactures carry extended time periods beyond the 12 months.

Engine warranty claims will be subject to the engine manufacture's approval

Replacement parts that carry 90-day replacement warranty and are reimbursed to the dealer, net of prompt payment. All electrical and hydraulic parts are limited by this policy and will only be covered upon approval by L. T. Rich Products Service Department after inspection of part(s). The installation and removal of a part will automatically place the part under the replacement parts warranty.

This guarantee is limited exclusively to equipment manufactured or supplied by L.T. Rich Products and is subject to the inspection and analysis by the company to conclusively identify or confirm the nature and cause of the failure.

L.T. Rich Products, Inc reserves the right to incorporate improvements in the material and design of its products without notice and is not obligated to make the same improvements to equipment previously manufactured.

L.T. Rich Products, Inc is not obligated under any warranty different from the warranty as published above.

1.4 Component Manufactures' Warranty

Some of the component parts of the Z-Plug are warranted by their respective manufactures. These parts are:

Hydro-Gear Pumps/Motors (www.hydro-gear.com)

Parker Wheel Motors (www.parker.com)

Vanguard Commercial Engines (www.briggsandstratton.com)

The complete manufactures' warranty information for these components is located in the back of this manual. Contact L. T. Rich Products, Inc if you have any questions concerning warranties on these component parts.

1.5 Conditions Which Void Warranty

This warranty shall not apply to equipment which:

- Has had repairs or modifications not authorized by L. T. Rich Products, Inc
- Has been subject to abuse, improper maintenance, and/or improper applications
- Has had engine repair work done by **“unauthorized”** service dealer

1.6 Warranty Exceptions

This warranty shall not apply to the following items:

- Wear items including sparks plugs, points & condensers, fuses, batteries, belts, filters, bearings, tires, lubricants, fluids and hopper implements.
- Damages to engine/drive systems caused by a lack of/or improper lubricants and/or fluids.
- Damages to engine/drive system caused by improper operations and/or maintenance.

SECTION 2 SAFETY INFORMATION

2.1 About This Manual

The purpose of this manual is to assist you in properly and safely operating and maintaining the Z-Plug. Read and understand this entire manual before attempting to set-up, operate, adjust, perform maintenance on, or store the Z-Plug. This manual provides essential information and instructions, which will help you enjoy years of dependable performance from the Z-Plug

The designed and tested safety of the Z-Plug is dependent upon its operations within the parameters and limitations explained in this manual. Be familiar with and follow all safety rules in this manual as well all safety rules for any related equipment.

Although these instructions have been compiled through extensive field experience and engineering data, some information presented herein may be generated in the nature due to unknown and/or varying operating conditions. However, these instructions, combined with your increased experience with the Z-Plug, will enable you to develop procedures suitable to your particular application.

The illustrations and data used in the manual were current at the time of printing, but the Z-Plug may vary slightly due to ongoing engineering changes. L. T. Rich Products, Inc reserves the right to implement engineering and design changes to the Z-Plug as may be necessary without prior notification.

2.2 Safety Guards and Covers

Safety is a primary concern in the design and manufacturing of all L. T. Rich Products. Unfortunately, our extensive efforts to provide safe equipment can be negated by a single careless act of an operator. In addition to the design and configuration of the Z-Plug, hazard control and accidents prevention are also dependent upon the awareness, condition, maintenance, and storage of the Z-Plug. ***THE BEST SAFETY DEVISE IS AN INFORMED, CAREFUL OPERATOR!!***

Safety Guards are mounted on the backside of the Hydro-Gear Pumps (at the shin level of the operator). These guards are designed to cover the hydraulic belt under the base and protect the operator. Removing this guard could cause injury to an operator and could void the Z-Plug's warranty. Remove this guard ONLY when unit is turned off to do preventative maintenance.

2.3 Operational Safety Rules

Never operate the Z-Spray without all covers, shields, and safety devices installed and secured.

Never permit any person other than the operator to ride or board the Z-Spray at any time. ***NEVER ALLOW RIDERS!!!***

Use extreme care and maintain minimum ground speed when transporting on a hillside or over rough ground, and when operating close to ditches, fences, or water.

The owner/user can prevent and is responsible for accidents or injuries occurring to himself or herself, other people.

Operate only in daylight or good artificial light (min 200 lux).

Never allow anyone near the Z-Spray while in operation.

Only operate machine from the operator's platform (Foot Pan), ***never*** operate machine when standing on the ground.

Be alert for holes in the terrain as well as any other hidden hazards. Always drive slowly over rough ground.

Never operate this machine on slopes exceeding 15 degrees in any direction. **NOTE: To operate on terrain that exceeds these limits constitutes misuse of the equipment and as such, any and all injuries as a result of said use are expressly disclaimed.**

2.4 Maintenance Safety Rules

Never perform maintenance on the Z-Plug when children are present.

Never allow anyone near the operation controls while performing service or maintenance to the Z-Plug.

Periodically tighten all nuts, bolts and screws and check that all fasteners are properly installed to ensure that the Z-Plug is in safe operating condition.

Never perform maintenance on the Z-Plug while parking brake is *disengaged*.

****Refueling your Z-Spray****

Use only approved gasoline container.

Never remove the gas cap or add fuel with the engine running.

Extinguish all cigarettes, cigars, pipes, and other sources of ignition.

Never fuel the machine indoors.

Allow the engine to cool before refueling.

If fuel is spilled on clothing, change clothing immediately

If fuel is spilled, do not attempt to start the engine. Contain, remove and verify that all fuel has been removed before starting the machine.

Remove Fuel Tank Cap

Place a funnel in the Fuel Tank receptacle

Slowly pour the fuel from the container into the receptacle. Don not pour to fast causing a spill (funnel will allow only so much fuel to drain into Fuel Tank)

Replace Fuel Tank Cap and screw on tight.

2.5 Storage Safety Rules

Never store the Z-Plug in any area accessible by children.

Never store the Z-Plug with fuel in the tank inside a building where fumes could reach an open flame or spark.

Allow the Z-Plug engine to cool before storing in an enclosed area.

Lubricate all moving parts of the Z-Plug to prevent rust during storage.

Remove all accumulated debris from the Z-Plug and attachments before storing.

SECTION 3 MAINTENANCE

3.1 Engine Maintenance (18HP Vanguard)

****USE COMPRESSED AIR (NOT WATER) WHEN CLEANING ENGINE****

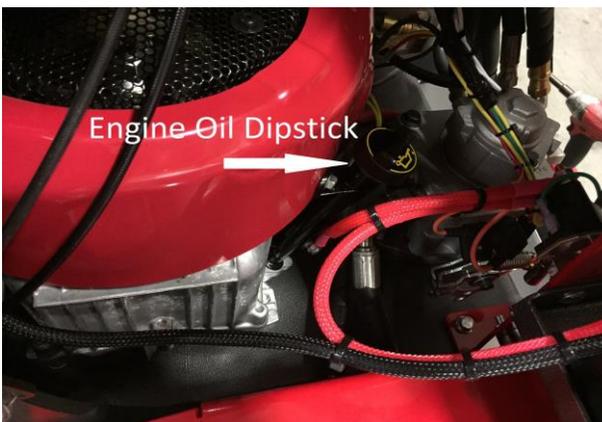
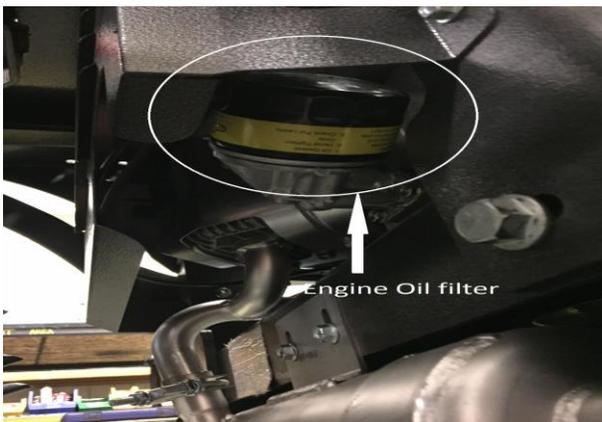
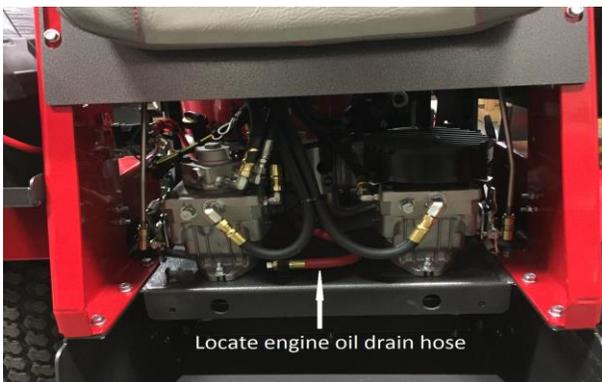
Use only original equipment replacement parts. Other parts may not perform as well, may damage unit, and may result in injury.

Oil Recommendations: Briggs & Stratton recommends the use of certified oils for best performance. Other high-quality detergent oil is acceptable if classified for service SF, SG, SH, SJ or higher. Do not use special additives.

Outdoor temperatures determine the proper oil viscosity for the engine. Use the chart to select the best viscosity for the outdoor temperature range expected.

If the oil level is below the ADD mark, add oil until it reaches the FULL mark. Start the engine and check for proper pressure before continuing to operate.

****Unit is filled with 5W 40 Synthetic oil out of the factory, using other grades may requiring draining of fluids before replacing/topping off** For recommended oil / oil filter change intervals, refer to Briggs & Stratton engine manual (page 7) or “Maintenance Chart” on page 25 of this Z-Plug Aerator Manual.**



Fuel Recommendations: Fuel must meet these requirements

- Clean, fresh, unleaded gasoline.
- A minimum of 87 octane/87 AKI (91 RON).
- Gasoline with up to 10% ethanol (gasohol) or up to 15% MTBE (methyl tertiary butyl ether) is acceptable

Full Maintenance Information Can Be Located In The Engine Manual Provided

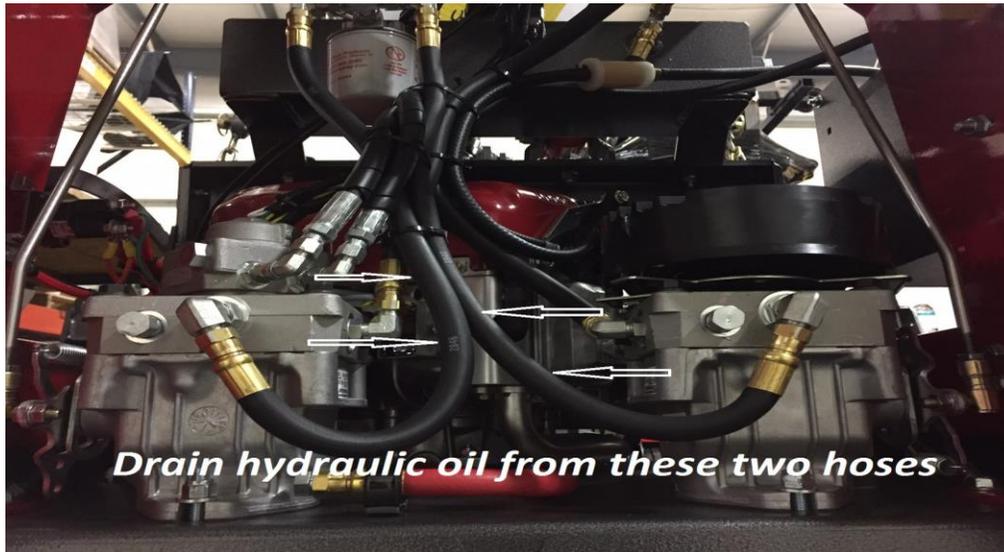
3.2 Hydraulic System Maintenance

****USE COMPRESSED AIR (NOT WATER) WHEN CLEANING SYSTEM****

Hydro-Gear recommends that the fluid and filter(s) be changed every 500 hours. Use any type of motor oil in a **5W-40 Synthetic or equivalent**.

Hydraulic system requires 25 micron oil filters or equivalent to be used

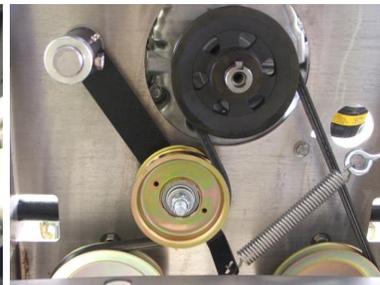
Check for hydraulic leaks daily to ensure proper fluid levels



*****Remove line coming from the filters (at hydro pump end) to drain fluids*****

3.3 Traction Unit Maintenance

The Z-Plug has 11 grease fittings that require periodic greasing. These locations can be found on the wheel assembly (1 on each front wheel assembly), on the caster assembly (1 on each front caster assembly), the drive belt idler (1 on idler arm), Pillow Block Bearings (4 each) and 2 on the Lift Cylinder.



Inspect wheel and caster assembly every 25 hours for bearing wear, damage, debris, and proper installation.

Inspect idler arm bushing every 50 hours for wear. These bushings are wear items and will have to be replaced periodically.

Inspect all bolts, washers, nuts, pins and other mounting hardware of Z-Plug once a week to ensure that hardware pieces are properly tightened.

3.4 Aerator Head/Tine Maintenance

The Aerator tine head is removable. Simply disconnect the 3 ball swivel mounts and pins (you may want to prop the front of the Aerator head for easy disconnect and re-attachment. Other attachments such as the Slice Seeder, De-thatch Rake, Spray System and Snow Plow use the same points). Disconnect the Ball Swivel Assembly Pull Pin connected to the cylinder bracket (bottom side) and head will be free from unit. Either pull the Aerator tine head away from unit or slowly turn the unit either left or right swinging the front of the Z-Plug in a circle motion (this will swing the front of the unit away from the tine head allowing the operator to drive unit around and away from tine head or other attachments).

Check all tines to ensure that there is no bends, cracks and/or damages to the tines (replace any bent, cracked and/or damaged tines).

Check to make sure that all nuts on tine head assembly are tight and secure

Check to ensure that pillow block bearing assembly is secured and bearings are moving freely

3.5 Attachment Maintenance

<Z-Plug Sprayer Attachment: The Z-Plug unit has the ability to mount a 30-gallon spray system to the frame. Just like our Z-Spray liquid systems, maintenance is a key requirement to allow successful applications. Here are a few things to maintain on this system.

Check 5 psi check ball screens daily.

Check spray system in-line filter daily (make sure rubber seal remains intact).

Check spray tips daily for any clogging of materials or foreign objects.

Clean out tank on daily basis for proper storing.

<Z-Plug Spreader Hopper Attachment: The Z-Plug unit has the ability to mount a 120 lb Hopper Spreader unit to the frame. Just like our Z-Spray spreader systems, maintenance is a key requirement to allow successful applications. Here are a few things to maintain on this system.

Lubricate (Silicone Spray) Hopper and Diffuser cables on a daily basis.

Clean debris and product from Hopper daily to eliminate build up.

Keep hydraulic hose fittings tight and free of leaks.

<Z-Plug Slice Seeder Attachment: The Z-Plug unit has the ability to mount a 36” Gandy Slice Seeder to the frame. Giving the Slice Seeder the proper maintenance will allow this attachment to operate successfully.

Clean and remove all products from the seeder box after each application

Grease Pillow Block bearings & Drive Chain weekly.

Lubricate adjustment handle weekly.

Check hardware weekly (tighten if needed).

Check that knives are free of chips, crack and bends before each use.

< Z-Plug De-thatch Rake Attachment: The Z-Plug unit has the ability to mount a 46” De-thatch Rake to the frame. Giving the De-thatch Rake the proper maintenance will allow this attachment to operate successfully.

Check to ensure that rakes are not bent, twisted or broke before each use.

Ensure that all collars are tight and adjusted properly.

< Z-Plug Snow Plow/Blade Attachment: The Z-Plug unit has the ability to mount a 52” Snow Plow/Blade to the frame. Giving the Snow Plow/Blade the proper maintenance will allow this attachment to operate successfully.

Keep angle pivot greased and clear of debris.

Check spring eye bolt nuts from coming loose.

Ensure that pivot bolt and nut remain snug.

Check scrape bar nuts and bolts and keep tight.

Check scrape bar from time to time for wear, replace when needed.

< Z-Plug Spiker Attachment: The Z-Plug unit has the ability to mount a 40” Spiker to the frame. Giving the 40” Spiker the proper maintenance will allow this attachment to operate successfully.

Grease Pillow Block Bearings on a weekly basis

Check hardware weekly (tighten if needed)

Clean and remove any debris buildup between spikes

Ensure that outer chains are not bound up or twisted

SECTION 4

AERATOR OPERATIONS

4.1 Overview

The Z-Plug can cover 100,000 square feet per hour and produce up to 3 ½” cores. The full floating tine head can maneuver around trees and beds while engaged. The 2,000 lb hydraulic cylinder picks up the head in less than 2.5 seconds for turning around or getting head up in the transport position. Forced in the opposite direction, the hydraulic cylinder puts down force on the head adding weight to the tine head for deeper soil penetration. Ball Swivel and pin attach points allow 30 degrees of pivot left to right for better steering in the down position. The Ball Swivel and pin attach points also allow for easy attach and disassemble of the Aerator head (or any other attachment designed for the Z-Plug).

****Your unit may be equipped with other attachments such as the 120 lb Hopper, 30 gallon spray system, 36” Slice Seeder, 46” De-thatch Rake, 40” Spiker or the 52” Snow Plow/Blade. These attachments will be referenced in sections to come in this manual****

4.2 Operations

Upon turning the key on to start the unit, apply full choke. Once unit has started, release (push down or pull down) first the choke and then the brake lever. Bring unit up to a comfortable speed with the Control Lever. When you arrive to desired aerating area, use the Thumb Switch to lower aerator tines into the turf (aerator head can float up to 30 degrees and make gradual turns around beds and trees).

Once you have come to a designated turnaround location, use hydraulic the Thumb Switch to lift tine head in transport position. Make designated turn and repeat process of lowering tine head into turf and precede aeration.



If aerating on hillsides, the Z-Plug has been equipped with the Patent Pending Locking Caster System. This allows an operator to lock the front caster wheels straightforward giving the unit more side hill stability. This feature is applied by using the foot pedal located on the right side on the foot pan. To release Locking Caster System, simply take pressure off of foot pedal.

4.3 Aerator Tine Head Removal

The aerator tine head is removable for service, cleaning and removing from traction unit to install other attachments. To remove the tine head from the traction unit, first adjust the hydraulic cylinder so that the tine head starts to make contact with the ground (taking weight off of the head). Pull pin disconnecting the ball swivel linkage to the aerator head. Lower cylinder releasing tension on the chains and remove the 2 ball swivel chains connected to the outer frame section (welded to chain and spring supports).

Pull the pin from the aerator front frame neck (it will be attached to the front frame of the traction unit) and dismount the ball swivel from the pin (pull neck downward). Lower front neck of the aerator head and position yourself back on the traction unit. Drive away from the aerator head by turning either left or right (**turning to the right of the head pictured below**) by turning the front of the traction unit in either direction. To install head back on the unit, reverse the unit along the back of the tines. Once the rear inside tire lines up to the center of the aerator head, slowly start turning unit over the aerator head (make sure that you line up the ball swivel in the neck of the aerator and the pull pin beneath the nose of the traction unit to make it easy for mounting)



SECTION 5 SPRAY/SPREADER SYSTEM (if equipped)

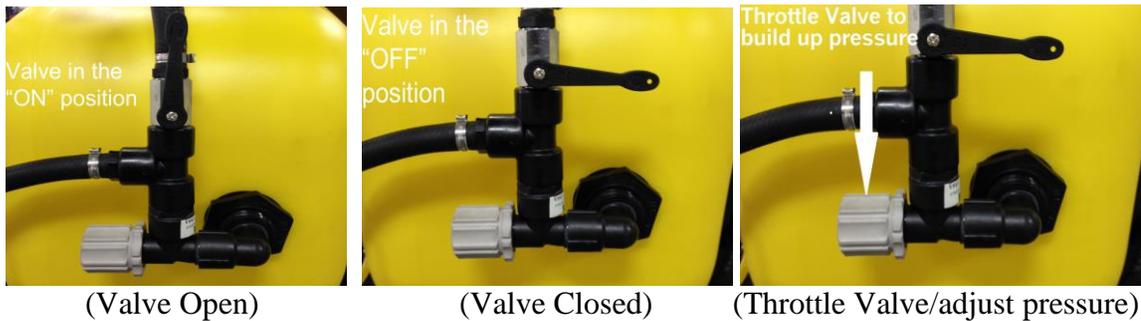
5.1 Valving

The Z-Plug can be equipped with a 30-gallon spray system with an 8' breakaway spray boom. If your unit has this attachment mounted on to your Z-Plug, here are some helpful instructions on operating this system.

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 rubber seal 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).

The pump switch located on the control panel turns on the spray system pump. Once the pump is turned on, the throttle valve is turned clockwise to increase pressure and/or counter-clockwise to release pressure. The pressure can be read on the gauge (decreasing pressure will increase agitation in the tank).

Opening the hose valve can operate 25' coil hose for spraying out of the hand spray gun. When coil hose not in use, be sure to turn valve off to prevent boom tips from dripping.



5.2 Spray Calibration/Tip Chart/Liquid Quantities

The Z-Plug spray system comes standard with lavender colored Air Injected tips which will apply liquid material @ .32 (1/3) gallons per 1,000 sq. ft. @ 5 m.p.h and 4—45 psi. Each tip has a 5 psi shut-off screen to prevent drip.

Your machine is capable of using tips from ¼ to 1 gallon in size. See chart for your desired drop rate.

The following are some general guidelines for sprayer calibration (Note: this chart only applies if using Air Injected tips. Using other tips will require different calculations). Please refer to the spray chart provided for complete calibration (spray charts are now located on the backside of the knee pad for quick in the field reference).

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

The throttle valve adjusts pressure. The throttle valve is located just before the return valves near the left side control panel. Turn clockwise to increase pressure, counter clockwise to decrease pressure. Pressure will be displayed on the gauge bear the control panel. Once the nozzles are opened, you will notice a slight decrease in pressure (adjust accordingly).

To determine liquid quantities per tank, understand what tips you have on your machine (factory set is 1/3 gallon per 1,000 sq. ft. through the Lavender tips). 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 number of gallons you need to put in your tank.

1.3 (median value of 1.1 to 1.5) X 3 (1/3 gallon tips) X gallons needed. If you were filling an 18-gallon tank your equation would look like this:

1.3 X 3 X 30 = 117 ounces of product in 30 gallons of water.

5.3 Spreader Calibration/Layout

The Spreader Motor Control determines the speed of the impeller in the front on the machine. The control is numbered 1-10; these numbers are used for points of reference. Your machine is capable of varying its spread pattern from 3 – 25 feet with this control. Being hydraulically driven, the spread pattern is independent of the ground speed.

The hopper control cable opens and closes the door inside the base of the hopper. The maximum size of the opening will be determined by the rate adjustment on the knob dial. This will set your rate gate linkage bar to limit and stop the rate the door can open.

The Diffuser adjustment allows the user to adjust the intensity of the spread pattern. A small turn shifts the product placement on the impeller. This in turn balances the spread pattern heavier to the left (back side ramp) or heavier to the right (front side ramp).

Adjustment is very sensitive, so multiple adjustments may be required.

FOR MORE DETAILED INFORMATION, GO TO WWW.SPYKER.COM



(Diffuser cable & Hopper cable)



(Hydraulic hopper motor)



(Knob adjusting dial)



(Diffuser shown on underside of opening)

Your machine is equipped with the 120 lb Spyker model spreader. The hydraulic spreader motor with the spreader motor control has the ability to vary spread widths from 4 to 25 feet. This depends on volume/density, particle size and rate of travel, and weather conditions. The pattern can be increased or decreased while spreading depending on needs. This allows you to spread and spray at the same time. A typical pattern is to overlap fertilizer pattern back to the tire tracks and the spray pattern boom to boom.

To spray and spread at the same time: Set the spread pattern to twice the width of the spray. For example, a junior and intermediate model has a spray width of 8 feet. Set the spreader width to 16 feet and spread back to the tire tracks. The spray pattern will match boom to boom.

The spread things and feathers at the outer edges, eliminating sharp “*edge to edge*” lines which cause stripes and streaks.

Determine a dial setting on the low side. If setting is too low, cover the area more than one time. A higher setting can be used when a proven dial setting is established. Travel at a constant speed.

Remember- Published dial settings are approximate only. Open the hopper door after the spreader is turned on at operating speed.

SECTION 6 PARTS

6.1 Part Number / Pictorial

Electric Parts

<i>Part #</i>	<i>Description</i>	<i>Qty</i>
80202	Pump on-off switch	1
80205	Wiring Harness (<i>shown below</i>)	1
80206	30 AMP Fuse	1
691656	Starter Solenoid	1
80208	Battery Box	1
80214-A	Tach/Hour Meter	1
80215	Key Switch	1



Wheel Parts (front and rear)

<i>Part #</i>	<i>Description</i>	<i>Qty</i>
AE30002-WL	Front Left Caster	1
AE30002-WR	Front Right Caster	1
AE30006	Front Caster Fender	2
80019-MM	Front 13" Wheel Assembly	1
80019-B	Front Wheel Spacers	2
80309	Front Wheel Cone Bearings	2
80311	Front Wheel Bearing Cup (for replacement only)	2
HHCS5-3410	Front Wheel Bolt	1
NNC-34	Front Wheel Nut	1
FW-SAE-34	Front Wheel Washer	1
80021	Rear Wheel Assembly	1
80310	Rim Seal	2



(Front tire assembly)



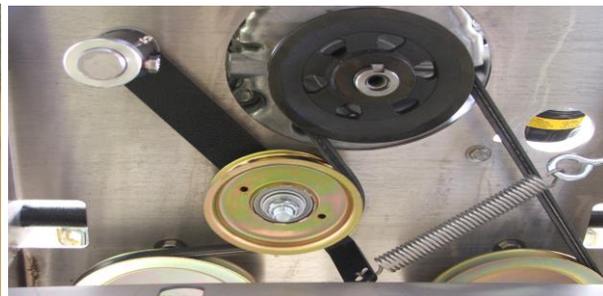
(Rear tire assembly)

Hydraulic Parts/Idler Bracket Parts

<i>Part #</i>	<i>Description</i>	<i>Qty</i>
80003	Idler Pulley	1
80004	Idler Pulley Bracket Weldment	1
80304	Idler Pulley Bracket Bushings	2
80112	Idler Spring	1
80413-B54	Drive Belt	1
HHESC5-12221	Idler Bracket Bolt	1
FW-SAE-12	Idler Bracket Washer	2
NNC-12	Idler Bracket Nylon Nut	1
80400-B	Hydro Pump (left) 16cc Z-Plug	1
80400-C	Hydro Pump (right) w/fan 16cc Z-Plug	1
80402-B	Wheel Motor Large (left)	1
80402-C	Wheel Motor Large (right)	1
80407	Pump to Wheel Motor Hose (21")	2
80408	Pump to Wheel Motor Hose (15")	2
80404	Hydraulic Filter (25 micron)	1



(hydraulic motors, pumps and hoses)



(idler bracket, idler pulley and drive belt)

Caster Parts

<i>Part #</i>	<i>Description</i>	<i>Qty</i>
AE30007-WL	Front Caster Left	1
AE30007-WR	Front Caster Right	1
AE300006	Front Caster Fender	2
80306	Dust Cap	1
80308	Caster Bearing	2
80009	Castle Nut	1
80302	Caster Bearing Seal	2



Aerator Head Parts (36" Head)

Part #	Description	Qty
80701	Aerator Tine	60
80709	Pillow Block Bearing	4
80714-B	Aerator ½ Disk Plate	20
80913	Rear Tray Weights	3
80703	Lift Collar	2
80704-B	Aerator Lift Pin Small	1
80705	Aerator and Trailer Draw Pin	1
80706	Lynch Pin	1
80716	RH Lift Arm Pin	1
80721	Reel	2
HHCSC5-38112	Bolt	10
FW-SAE-38	Flat Washer	20
NNC-38	Nylon Nut	10
HHCSC8-516134	Zinc Plated Bolt	60
TNUT51618	Top Lock Nut	60



(pillow block bearing, tine, ½ disk, hardware)



(Ball Swivel, lift pin, shaft collar & hardware)

Spot Spray Gun

Part #	Qty	Description
60040	1 ea	Spot Spray Gun
60041	1 ea	Spot Spray Tip
60029	1 ea	¼" MPT X 3/8" Barb



Foot Plate Parts

<i>Part #</i>	<i>Description</i>	<i>Qty</i>
83067	Compression Springs	3
HHCSC5-38114	Bolt	5
NNC-38	Nut	5
FW-SAE-38	Flat Washer	10
80805-A	Foot Plate (Mild Steel)	1

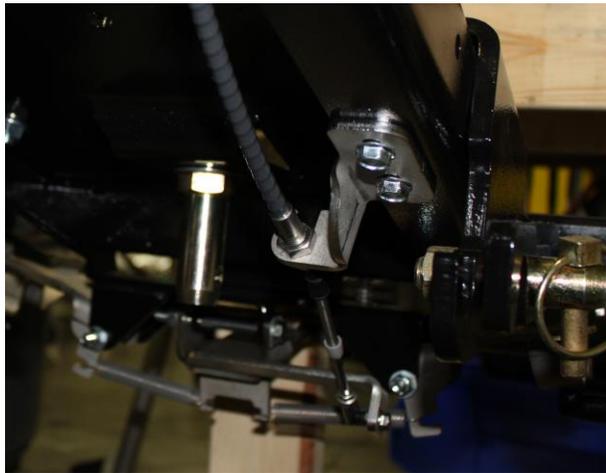


(*if parts needed for pivot point*)

<i>Part #</i>	<i>Description</i>	<i>Qty</i>
FW-SAE-38	Flat Washer	6
HHCSC5-38112	Bolt	2
HNC8-38	Nut	2
NNC-38	Nut	2

Locking Caster System Parts

<i>Part #</i>	<i>Description</i>	<i>Qty</i>
80023	Ball Joint	2
NNC-516	Nylon Nut	4
FW-SAE-516	Flat Washer	8
HHCCSC5-38112	Stop Bolt	1
83049	Spring	4
LWSS-516	Lock Washer	6
ZHNFSS-516	Hex Nut	6
Collar516	5/16" Collar	2
8022-16	16" Linkage Rod	1
FCP	Foot Control Pedal	1
HCSSC-5163	3" X 5/16" Bolt S/S	2
HHCCSC5-5164	4" X 5/16 Bolt	1
SSNNF-38	Hex Flanged Nut	2
80746-L	Lock Arm (left)	1
80746-R	Lock arm (right)	1
80023-aerator	Locking Caster Cable	1
80952	Locking Caster Cable Mount	1

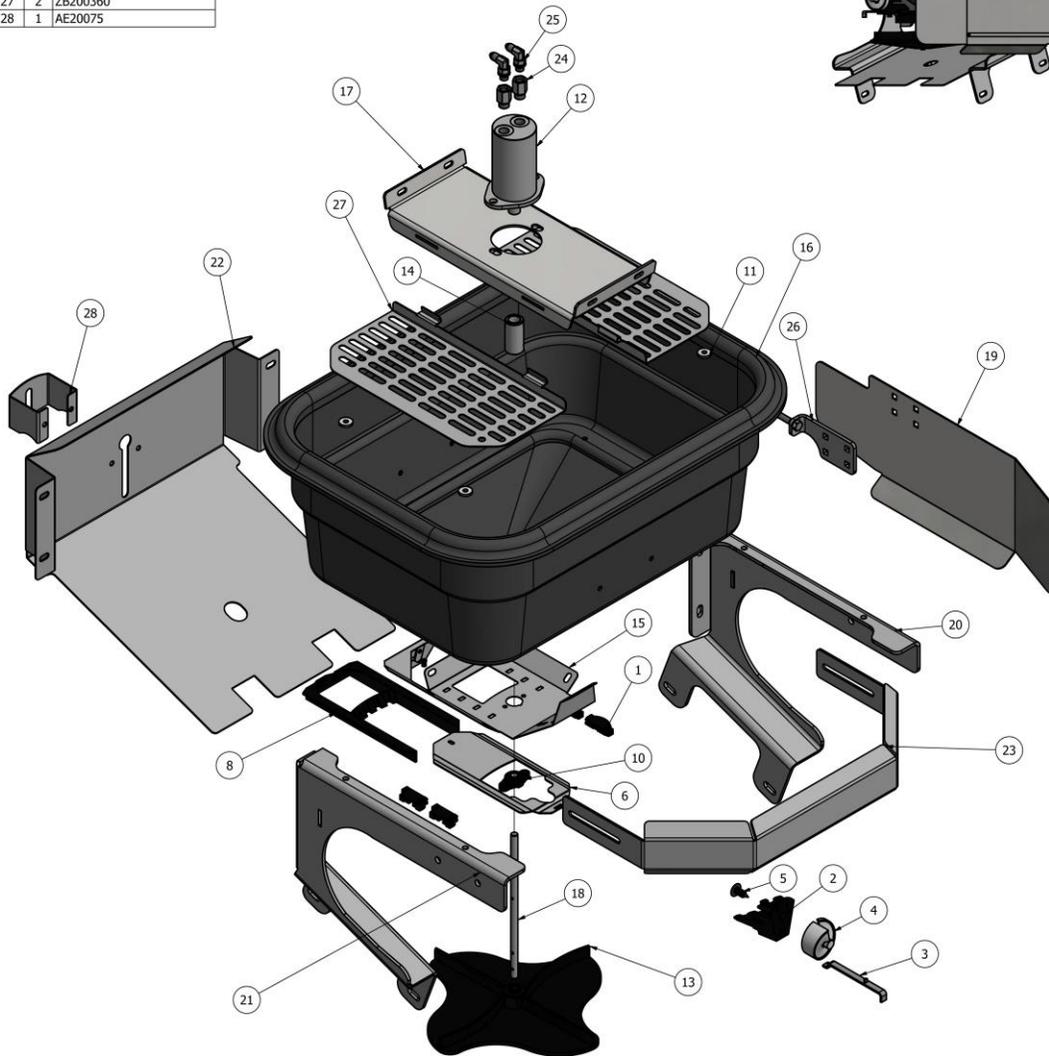
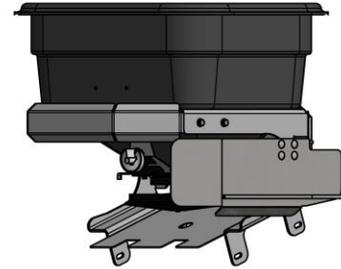
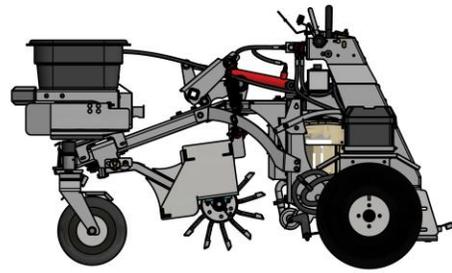


(current Locking Caster Cable/Bracket)

120 lb Hopper Parts (if applicable)

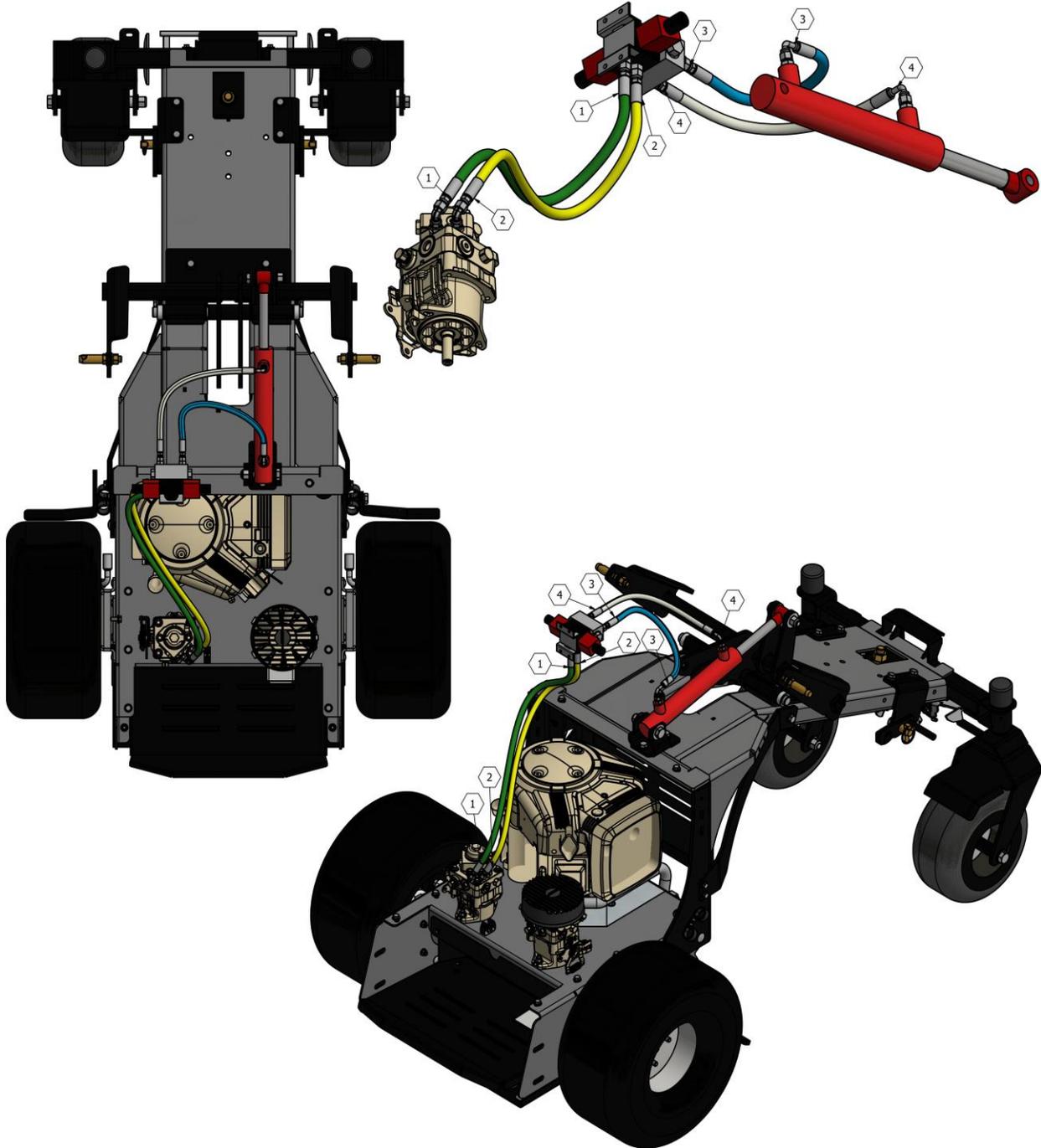
Z-Plug Hopper Kit

PARTS LIST		
ITEM	QTY	PART NUMBER
1	4	70040
2	1	70022
3	1	70041
4	1	70019
5	1	70019-A
6	1	80155-2014
7	1	80152
8	1	70027
10	1	80316
11	4	.250 spacer
12	1	80440-Rev2
13	1	70014-B
14	1	ZB200338
15	1	ZB200350
16	1	70042
17	1	ZB200344
18	1	70023-D
19	1	80049-W
20	1	80882rev1-LW
21	1	80882rev1-RW
22	1	80883-2012-02
23	1	ZB200203
24	2	80430-B
25	2	JCM04-OBM04-90
26	1	80048-W
27	2	ZB200360
28	1	AE20075



Z-PLUG Cylinder Routing

PARTS LIST			
ITEM	QTY	DESCRIPTION	LENGTH
1	1	Aux Pump left fitting to DC Valve rear under fitting	31 in.
2	1	Aux Pump right fitting to DC Valve front under fitting	31 in.
3	1	DC Valve front right fitting to Cylinder rear fitting	15 in.
4	1	DC Valve front left fitting to Cylinder front fitting	15 in.

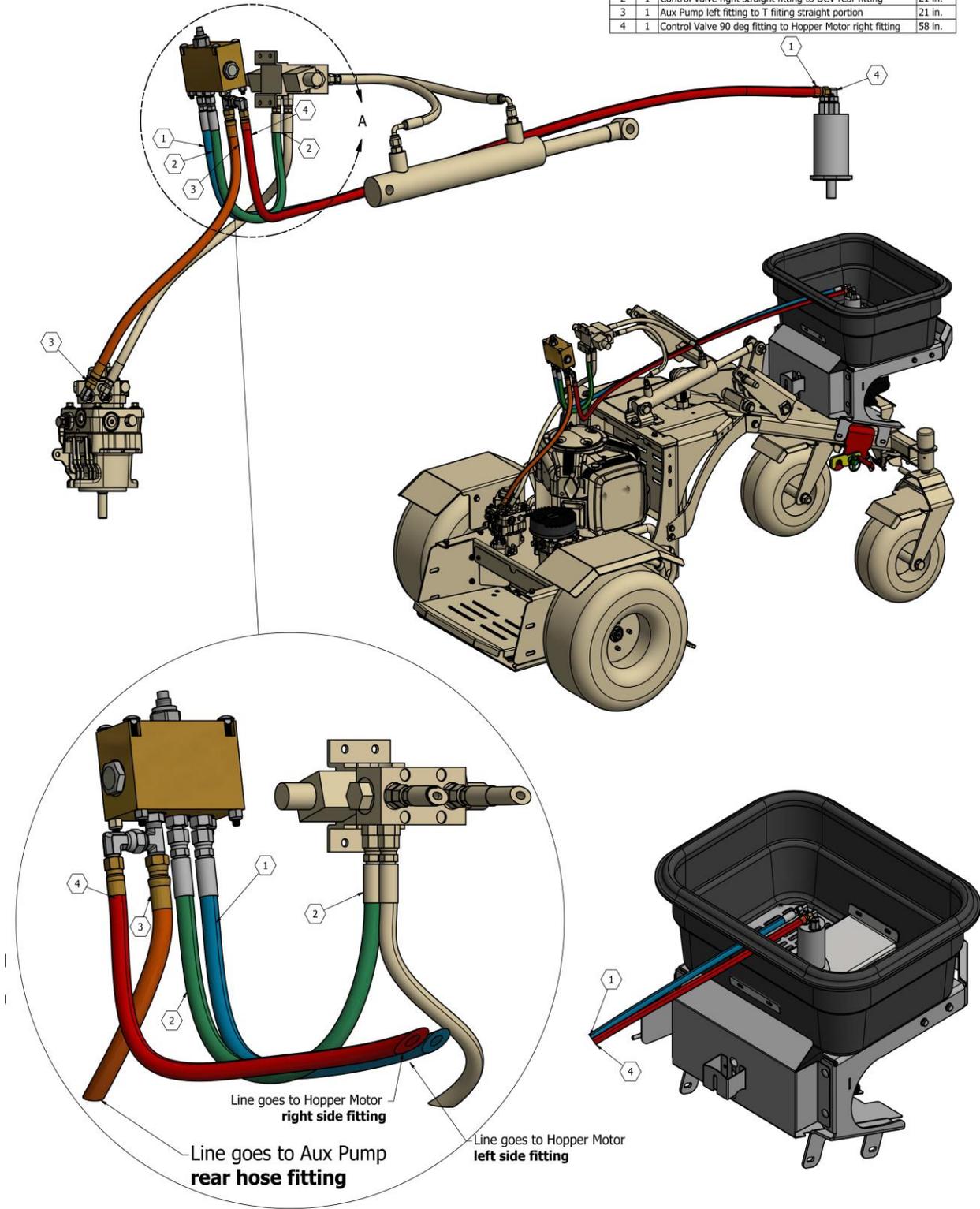


Difference from Standard Unit hydraulics.

* Line that goes from Aux Pump **rear hose fitting** to DCV **rear hose fitting** is replaced with a line that goes from the Aux Pump **rear fitting** to the PCV **T fitting straight position**.

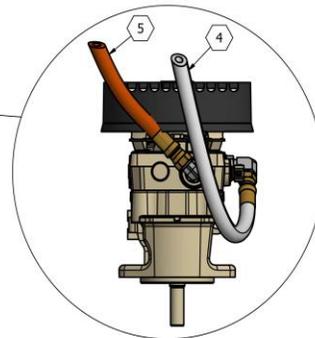
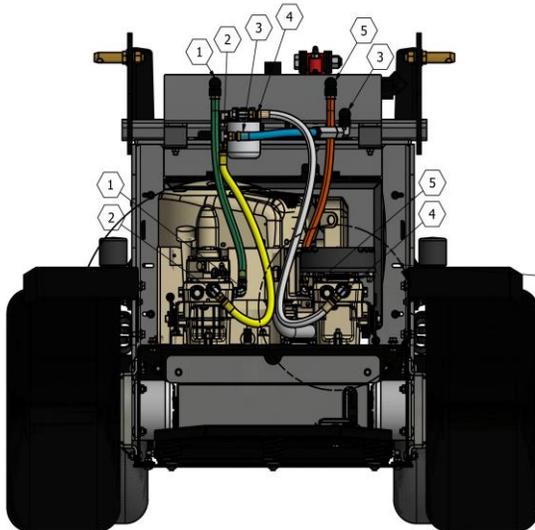
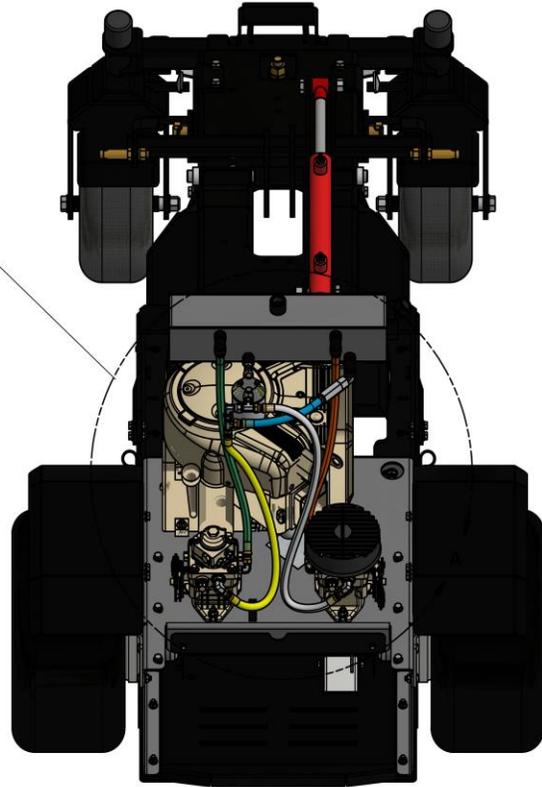
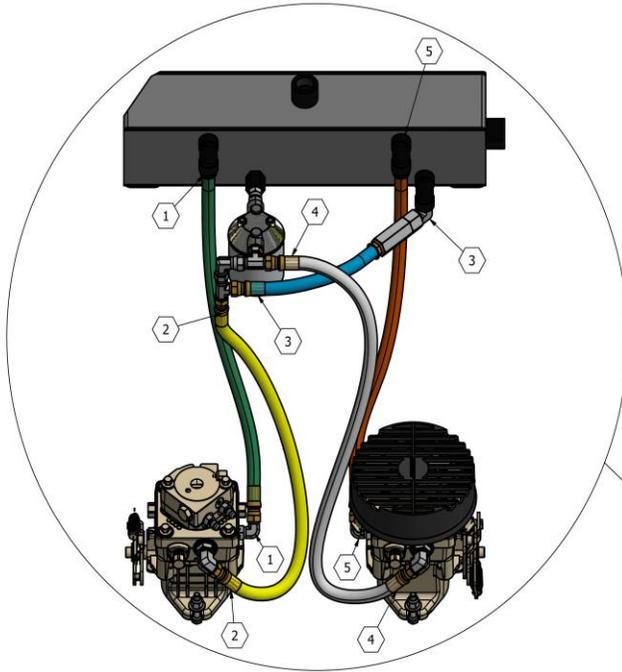
Z-PLUG Hopper Routing

PARTS LIST			
ITEM	QTY	DESCRIPTION	LENGTH
1	1	Control Valve left straight fitting to Hopper Motor left fitting	59 in.
2	1	Control Valve right straight fitting to DCV rear fitting	21 in.
3	1	Aux Pump left fitting to T fitting straight portion	21 in.
4	1	Control Valve 90 deg fitting to Hopper Motor right fitting	58 in.



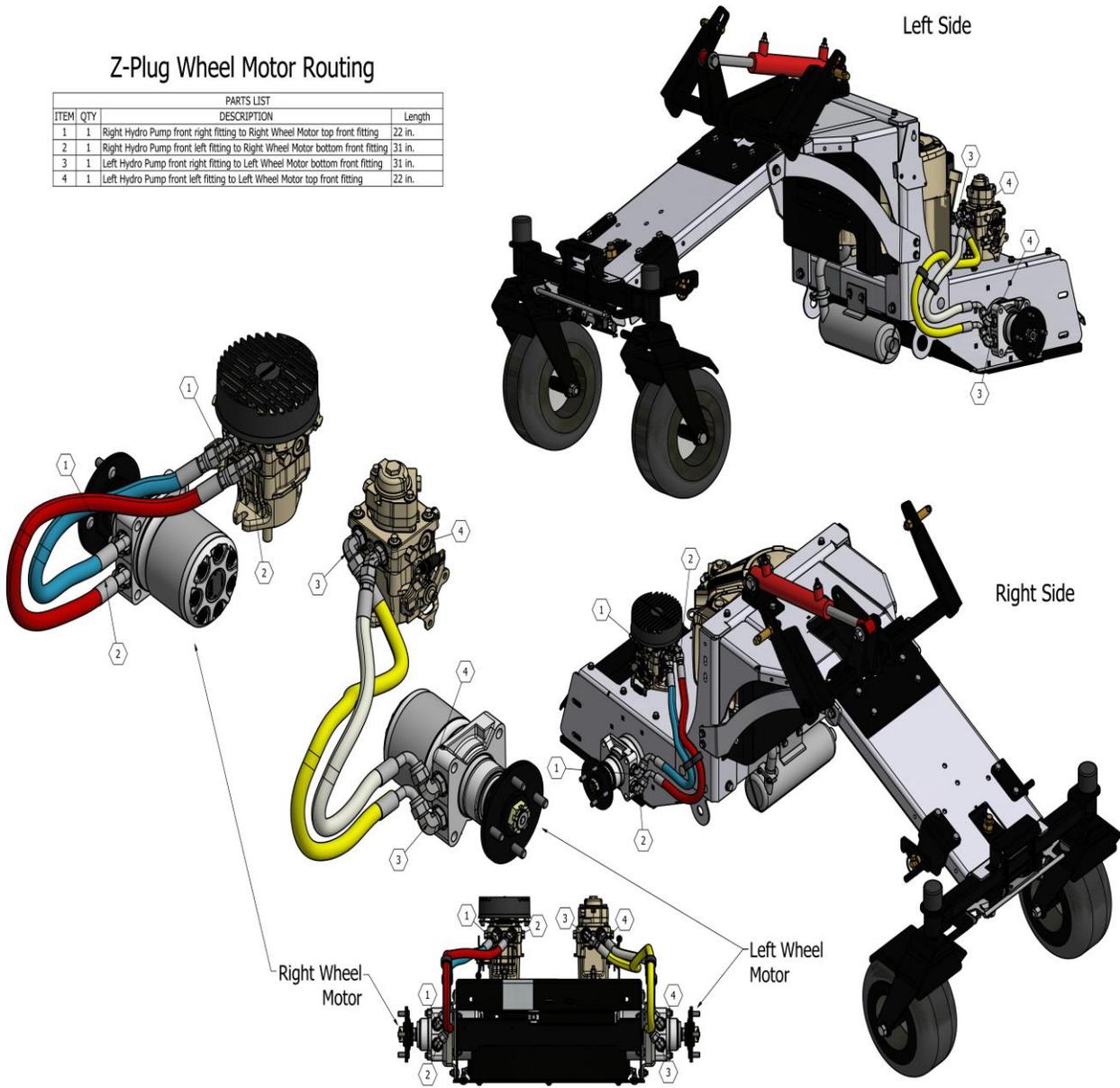
Z-Plug Tank Routing

PARTS LIST			
ITEM	QTY	DESCRIPTION	LENGTH
1	1	Left Pump right side fitting to Tank left fitting	17.5 in.
2	1	Left Pump front fitting to Filter left T fitting straight	22 in.
3	1	Filter T fitting side to Tank right bottom fitting	7 in.
4	1	Right Pump front fitting to filter T fitting straight	27 in.
5	1	Right Pump left side fitting to Tank Right top fitting	20 in.



Z-Plug Wheel Motor Routing

PARTS LIST			
ITEM	QTY	DESCRIPTION	Length
1	1	Right Hydro Pump front right fitting to Right Wheel Motor top front fitting	22 in.
2	1	Right Hydro Pump front left fitting to Right Wheel Motor bottom front fitting	31 in.
3	1	Left Hydro Pump front right fitting to Left Wheel Motor bottom front fitting	31 in.
4	1	Left Hydro Pump front left fitting to Left Wheel Motor top front fitting	22 in.



Parts List

30675	JOY STICK GRIP	2
30678	SPEED BAR KNOB	2
30700	DASH PANEL DECAL	1
80021	ZMAX/INT/ZPLUG REAR WHEEL ASSEMBLY 20X10.5X8	2
80308	L44649 BEARING CONE	4
80301	RACE, BEARING	4
80302	CASTER BEARING SEAL\nSL-122	2
80303	JOY STICK BUSHING\nKAMAN# EF 0812-12	4
80352-A	WHEEL HUB 2008 Z-MAX\n501053BP	2
80510	Throttle Cable	1
80704-A	BEARING, SWIVEL, 7/8"	2
80709	PILLOW BLOCK BEARING	4
80402-B	Left (Horz) Z-Plug Wheel Motor TG0280US081AAAF	1
80402-C	Right (Horz)Z-Plug Wheel Motor TG0280US080AAAF	1
80404	HYDRAULIC FILTER	1
80405	HYDRAULIC FILTER HOUSING	1
80406	HYDRAULIC TANK VENT CAP	1
80417	FLUID SITE WINDOW	1
80418	SPACER, HYDRAULIC OIL TANK, AE	1
80423	3/8 OIL FILTER SWIVEL ADAPTER (2)\n6402-06-06	1
80425	3/8 PIPE TO 3/8 PUSH-ON BRASS	3
80428	COUPLING, HALF, THREADED, AE	1
80450-B	RV VALVE\n451-071	1
80205	WIRING HARNESS	1
80208	BATTERY BOX \nPART#03188	1
80210	12 VOLT BATTERY\nSS11U1L CCA350	1
80214-A	TACH/HOUR METER	1
80215	KEY SWITCH\n4F463	1
80112	BOOM SPRING/BELT TENSION	1
80019-B	SPACER HSS-34	4
80427	ELBOW, 45 DEG, AE	1
80432	AUX PUMP FITTING (2)\n6400-04-04	2
80419	WHEEL MOTOR FITTING (4)\n6801-08-10-4	4
80420	1/2' PUMP FITTING (4)\n6802-08-08-4	4
80704-B	7/8 x 4-1/2 LIFT PIN\n21212	2
80705	1-1/8 x 5-1/4 Lift Arm Pin (21230)	1
80304	BUSHING, IDLER PULLEY BRACKET	8
30676	BRAKE HANDLE GRIP	1
80511	CHOKE CABLE	1
	Page 23	

83067	Compression Foot Plate Spring W/HDWR	3
80704	BEARING, SWIVEL, 1 1/8"	1
80742	7/8 x 4 Hitch Pin Red Handle	1
80428-B	3/4' HEX HEAD PIPE PLUG 5406P-12	1
80424	ELBOW, 90 DEG , AE	3
80426	ADAPTER, AE	2
80411-A	PULLEY, DRIVE, 5-5/8" 17MM BORE	2
80413-B54	B54 BELT 2011+ ZPLUG (16C1445)	1
80019-MM	FRONT ZPLUG WHEEL ASSY. 13X6.5X6	2
80220-VENTED	5 GALLON EPA FUEL TANK	1
HHCS5-3410	3/4-10 X 10 GR5 HCS	2
80412	ENGINE DRIVE PULLEY(w/hdwr) 650492zyl	1
80704-C	7/8 x 3-1/8 Anchor Pin (21283)	2
80707	Z-PLUG DRAWBAR SPRING	2
80457	STRAIGHT THREAD ELBOW FORGED\n6801-06-08-4	2
80003-Premium	Idler Pulley w/premium bearing	1
80743	Adjustable lift pin Bushing cat. 1-2	2
80527	EXHAUST CLAMP\nU125 ZINC	1
30706	SERIAL NUMBER DECAL	1
S-C4-3BN	3/16 X 1/4 BARB (FUEL)	1
80701	AERATOR TINE	60
80449-Electric	Parker Electric Actuated Valve	1
80204-THUMB KIT	HARNESS, KIT, THUMB SWITCH, ZP, 36R	1
80306-R	DUST CAP, RUBBER	2
30711	DECAL, HYDRO OIL	1
80736	LIFT ARM SHAFT	1
80915	112LBS WEIGHT\n45.25	3
80704-7/8	Lift Ball Socket 7/8 hole	2
80500-C	18HP BRIGGS VANGUARD TWIN VERTICAL ENGINE	1
80513-V	18 hp exhaust manifold 4 wheel aero	1
80523-M	23HP BRIGGS MUFFLER(18HP AERO 4 WHEEL ALSO)	1
30677-Sprayer	PAD	1
86046	17.5" ZPlug Return Hose 3/8"	1
86047	20" Zplug Return Hose 3/8"	1
86045	27" ZPlug Return 3/8"	1
80023-aerator	Zplug Locking Caster Cable	1
80202-Cover	Rocker Switch Cover	1
60034	Adhesive Back Heat Barrier	72
80461-AERO	14" ZPLUG DRAIN HOSE	1
80400-B	L-HYD. PUMP W/ AUX\ ZPLUGnPR-1HBB-PB1X-XXXX\nLARGE	1
	Page 24	

80400-C	R-HYD. PUMP W/ FAN Z-PLUG\nPR-2KBB-GAIC-XXXX\nLARGE	1
83049	Locking Caster/Brake Spring\n80706S	5
80450	LIFT CYLINDER NEW STYLE 8" STROKE	1
80024-14.5	BRAKE ROD 14.5"	1
LTBC-11R	11" RED BATTERYCABLE .250 EYE	1
LTBC-28R	28" RED BATTERY CABLE	1
LTBC-19B	19" BLACK BATTERY CABLE	1
100119-A	3/4" RD 304 SS	12
70023-D	SHAFT, HOPPER, 120	1
80706	LYNCH PIN \n21940	5
70014-B	10-32 SS BALL JOINT\n367-SSE-187	2
80207-BRIGGS	BRIGGS STARTER SOLENOID	1
80023-B	UPPER LINKAGE ROD END\n# 367-2-ES312	2
80605	JIC MALE TEE Z60	1
80433-3/8	3/8 AUX PUMP FTG	1
70100-BLACK	TOOL HOLDER CLIP - BLACK VINYL COATED	2
80023	LOWER LINKAGE ROD END\n367-QI312	2
30727	ENGINE OIL DECAL	1
30726	TAG, WARNING, ENGINE OIL	1
AE20060	TUBE, CASTER, MILD	2
3E4511	UMBRELLA KEY	1
A83020	KEY SWITCH NUT A83020	1
90120	1/4" GREENBAR 700 LOW PERM CARB LEV 11 FULE LINE 400'/R	3.75
80305-6.5	Spindle 6-1/2 long	2
30729	DECAL, EPA (RED)	1
86032-WRAPPED	ZPLUG AUX HOSE 31" WRAPPED	2
86101	6.5" ZPLUG WHEEL MOTOR HOSE	2
86102	9" ZPLUG WHEEL MOTOR HOSE	2
86103	14" ZPLUG CYLINDER HOSE	1
86104	17" ZPLUG CYLINDER HOSE	1
86105	31" ZPLUG HOSE	2
80022-22.875	ROD, JOYSTICK, ZPLUG, 22.875"	2
AE30002-WL	2017 Z-PLUG LEFT UPRIGHT	1
AE30002-WR	2017 Z-PLUG RIGHT UPRIGHT	1
AE30007-WL	2017 Z-PLUG LEFT CASTER	1
AE30007-WR	2017 Z-PLUG RIGHT CASTER	1
AE30006	2017 Z-PLUG CASTER FENDR	2
AE300018-W	2017 Z-PLUG FOOT PAN	1
AE30001-W	2017 Z-PLUG ENGINE BASE	1



L. T. Rich Products Inc.

Warranty Registration Card

Serial #: <hr/>	Company Name: <hr/>
Company Address: <hr/>	City / State / Zip: <hr/>
Company Phone: <hr/>	Company Fax: <hr/>
Company Contact: <hr/>	Company Email: <hr/>

Please circle what most accurately describes your business

- | | | | |
|------------|----------------|--------|-----------|
| Commercial | Sports Complex | School | Municipal |
| Cemetery | Home Owner | Other | |

Dealer Name: <hr/>	Dealer Address: <hr/>
Dealer City / State: <hr/>	Dealer Phone: <hr/>
Dealer Salesman: <hr/>	Date of Purchase: <hr/>

L. T. Rich Products warrants its line of equipment to be free from defects in material and factory workmanship for a period of 12 months. Any exceptions to this will be explicitly stated in an individual warrant agreement in the operator's manual of that piece of equipment

Fax to: 765-680-0047 or email to sbell@z-spray.com

Troubleshooting

Engine:

- Not starting. There are a few reasons as to why your engine fails to start. If the engine does not turn over, then the battery could be dead, bad connection to the battery wires, key switch may be bad, 30 AMP fuse on the wiring harness (orange wire) may be blown or the starter solenoid may be bad (you will hear the starter solenoid trying to click on, but nothing is happening). Another common reason for a unit not starting is after unit has been washed. Water gets into the spark plug boot and gets the spark plug wet. Pull spark plug boot and dry (spray WD-40).
- Engine turns over but doesn't start. There are a few reasons as to why your engine will turn over but not start. If the fuel valve is turned off (under fuel tank), loose or bad spark plug, water in fuel, choke partially closed or wet and/or foul plugs.
- Engine won't stay running. Few things to look for if your engine does not stay running are clogged fuel filter, clogged and/or dirty air filter, fuel valve partially closed or water in fuel.

Hydraulics:

- Hydraulic system making loud noise when running. This could be caused by a couple of things. The most common is if there is air in the system. This can be caused when changing out a hydro pump, replacing a hydraulic hose or having a loose fitting on the intake lines. If air is not present, check for low levels in the system. This happens when there is a leak in the hydraulic system somewhere or hydraulic fluids were just changed and did not get back to the proper fill level.
- Need to tow my unit; what do I need to do in order to not ruin my hydro pumps?? There are tow valves on each of the hydro pumps (hex head with hole running through it on the left side rear of the hydraulic pump) that needs to be turn at least 1 ½ revolutions counter-clockwise to open the hydraulic system. Once the unit is brought to a desired location, remember to tighten the tow valves back tight (clockwise).

Tracking:

- Unit not tracking straight when pushing both control arms to the speed bar. This is caused when the linkage to the hydraulic pump is not even or a hydraulic pump is going bad. Traditionally the linkage needs to be adjusted so that they both have the same amount of pull. If it is pulling to the left, the left hydraulic pump linkage is longer than the right; you can either adjust the right to a longer linkage, or adjust the left to a shorter linkage to match the right.

Granular:

- There are numerous potential challenges that can happen on the granular side due to the amount of use this portion of the unit sees. If product is not spreading evenly or consistently, then look for a few things with your hopper impeller or hopper diffuser. If there is build up at the end of the Impeller tips or the tips are worn, this will cause an un-even and/or inconsistent spread pattern. Another factor in the spread pattern not being even is if your diffuser is not at factor position (in front of the hopper door opening so that the pattern is spreading evenly left to right).
- If granular product is leaking out from the hopper, determine where it is coming from and look at this repair options. If the granular product is leaking through the hopper shaft area, then your hopper bushing is worn. This will allow product to get in between the shaft and the hopper bushing. If granular product is leaking through the hopper door area, then door guides are loose or worn allowing a gap between the door and the hopper base. Also a potential factor is if the hopper cable is not completely closing the hopper door.
- When your hopper door cannot open, there are typically 3 things to look at. One is that your hopper cable may be frozen and locked up, the ball joint end may have broken off or there may be product jammed between the hopper door and the base (due to loose door guides).

Spray System:

- Liquid is dribbling from the tips. This affect is potentially caused by a few things. If the nozzle body O-Ring is missing, the gasket in the In-line filter is missing, In-line filter housing not tight or the hose reel valve is open.
- Pressure not staying consistent. This is normally caused due to air being introduced to the system. Air is introduced in a few ways through the system. Air can come through one of the hose connections, the In-line filter housing not being tight or not having a gasket to seal housing, sucking air from an auxiliary tank or liquid level is too low.

Wiring Harness:

- Wire Colors and Description
 - Green Wire (Starter Solenoid)
 - Yellow Wire (Engine Shut Off)
 - White Wire (Fuel Solenoid / Accessories)
 - Black Wire (Ground)
 - Orange Wire (Key Switch Power)

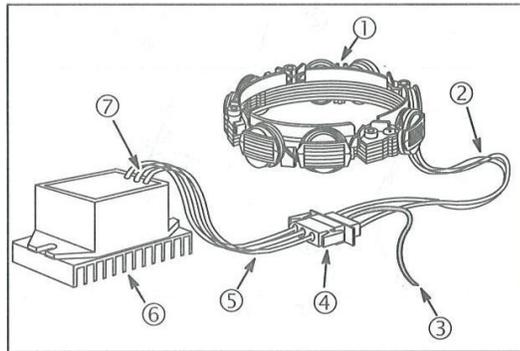
Charging Issues:

16 Amp Regulated Alternator

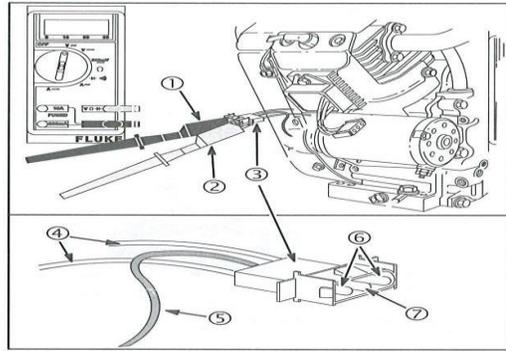
The 16 amp regulated alternator system provides AC current through two output leads to the regulator-rectifier. The regulator-rectifier converts the AC current to DC, and regulates current to the battery. The charging rate will vary with engine RPM and temperature.

1. Stator assembly (1) Figure 30.
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.



(Figure 30)



(Figure 31)

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 31. (Meter test clip leads may be attached to either AC output terminal).
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 **3600RPM** 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 $V\Omega$ 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 31).
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

Tools Required:

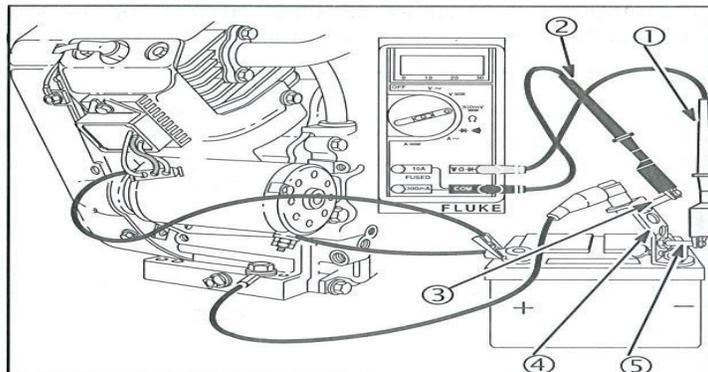
DC Shunt #19359

The DC Shunt **MUST** be installed on the **NEGATIVE (-)** terminal of the battery, Figure 32 to avoid blowing the fuse in the meter when testing the output of the 16 amp system. All connections must be clean and tight for correct readings.

1. Connect stator wire harness to regulator-rectifier.
2. Install DC Shunt #19359 (4) on **NEGATIVE** battery terminal.
3. Insert RED test lead into $V\Omega$ receptacle in meter and connect to RED post terminal on shunt (5), Figure 32.
4. Insert BLACK test lead in COM receptacle in meter. Connect to BLACK post terminal on shunt (3).
5. Rotate selector to **300mV** position.
6. With the engine running at **3600RPM**, 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.



Maintenance Chart

SERVICE ACTION(S)	Daily	Weekly	Bi-Weekly	Monthly	Yearly	Hours
Front Caster Wheels (grease)			X			
Front Caster Yokes (grease)			X			
Front Tire Pressure (22 PSI)		X				
Rear Tire Pressure (18 PSI)		X				
Rear Rim Nut Torque (75lbs)				X		
Rear Hub Castle Nut (check cotter pin)				X		
Idler Pulley Arm (grease)				X		
Belt Tension (1/2" deflection at 15lbs)			X			
Belt Wear (cracks, tears or missing material)			X			
Engine Oil (check)	X					
Engine Oil Change/Oil Filter	(8-10 hour break-in oil change)					50 hrs
Engine Air Filter Check (change if needed)			X		replace	
Engine Air Pre-Filter Check (change if needed)						25 hrs
Engine Fuel Filter Check (change if needed)				X	replace	
Engine Spark Plugs						100 hrs
Hydraulic Oil (change)						500 hrs
Hydraulic Oil Filter (change)						500 hrs
Hydraulic Oil Level (check)	X					
Hydro System Fittings (check for leaks)		X				
Pillow Block Bearings			X			
Aerator Tine Inspection	X					
Aerator Tine Hardware (Nut & Bolt)			X			
Ball Swivel Inspection				X		
Spray System (if applicable)						
Spray Nozzles (tip) (check)			X			
Spray Nozzle (tip) Screens (check)		X				
Spray Nozzle Gasket (check)			X			
In-Line Filter & Gasket (check)		X				
Spot Spray Gun & Tip (check)			X			
Hopper Cables & Accuway Cable (lubricate w/ Silicone Spray)		X				
Deflector Shield Cable (if applicable) (lubricate w/ Silicone Spray)		X				
Bottom of Hopper Tub (wire brush cleaning)			X			
Hopper Bottom Bushing (change if needed)				X	replace	
Impeller (change if needed)			X			
Blow debris off of machine DAILY	X					