



VANGUARD ENGINE MODEL



Force shown with additional options

Version 1.0.3

PLEASE READ FULLY AND UNDERSTAND PRIOR TO OPERATING THE ABI FORCE!!

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Contact Information –

To contact ABI's Customer Service Department for issue with the ABI Force, or to purchase parts for the ABI Force call: 855-211-0598 M-TH 8am-8pm and Friday 8am-5pm. Additional information on the ABI Force can be found on the ABI Support site at: www.abisupport.com

To contact ABI's Customer Service Department after hours go to the Help Desk on the ABI Support page at: www.abisupport.com and send our Customer Service Department an email regarding any issue you may be experiencing with the ABI Force.

Thank You,

On behalf of the ABI family we would like to thank you for your recent purchase of your ABI Force. Our Company's goal is to provide you, our customer; with innovative, quality tools as well as first rate customer service.

These instructions are designed to help you, the customer; get your new ABI Force off the delivery pallet and into use. Once you have put your ABI Force to work, if you have any questions, please feel free to call and talk with one of our friendly and knowledgeable Customer Service Department. To contact our Customer Service Department call 855-211-0598, M-TH 8am-8pm EST and Friday 8am-5pm EST.

To order parts for your ABI Force please contact our Customer Support Department by phone at:
855-211-0598 M-T 8am-8pm EST – Friday 8am – 5pm EST

To the Operator –

The information presented in this manual will prepare you to operate the ABI Force in a safe and knowledgeable manner. Operating the ABI Force in a proper manner will provide a safer working environment and create a more efficient result. Read this manual fully and understand the entire manual prior to setup, operation, adjusting, performing maintenance, or storing the ABI Force. This manual contains information that will allow you the operator to get years of dependable performance from the ABI Force.

This manual will provide you with information on safely operating and maintaining the ABI Force. Operating the ABI Force outside of the stated safety and operations guidelines may result in injury to operator and equipment, or void the warranty.

The information provided in this manual was current at the time of printing. Variations may be present as Absolute Innovations, Inc. continues to improve and upgrade the ABI Force for future use. Absolute Innovations, Inc. reserves the right to implement engineering and design changes to the ABI Force as may be necessary without prior notification.

ABI Force - Self-Propelled, Zero-Turn, Multi-Task Vehicle



The ABI Force is a self-propelled, zero-turn, multi-task vehicle that turns manual labor into mechanized efficiency. Leveraging ABI's proprietary technologies such as VibraFlex, Profile Blades, and fine-finishing attachments, the ABI Force ensures major-league performance on every infield no matter the soil's moisture, sand, silt, and clay ratio or top conditioner applied. The ABI Force may be additionally equipped with a hydraulic fertilizer & seed spreader, a hydraulic scarifier rake, and additional other options to extend its capabilities into commercial-grade aerating, fertilizing and seeding as well. With the ABI Force's selection of available attachments, giving one

machine so much versatility, this investment will quickly pay for itself by getting more work done with fewer machines to maintain and purchase. The ABI Force Depth-Lock and Speed-Lock controls enable predetermined settings for consistent results regardless of operator skill or experience.

Specifications-

ABI Force Base Unit:

Power	18 HP VANGUARD, V-Twin cylinder, air cooled, gasoline, electric start
Drive	Hydrostatic Zero-Turn, Hydro Gear variable displacement pumps; Parker Wheel Motors
Speed	Forward 0-8 mph; Reverse 0-4 mph
Braking	Dynamic breaking via hydrostatic transmission, Plus parking brake
Dimensions	90"L x 66" W x 55"T (w/ Rake & Scarifiers)
Base Unit Weight	1,100 lbs. (w/ Rake & Scarifiers)

Optional Attachment Specifications:

Mid-Mounted Attachments	
VibraFlex**	60" (5') / 83 lbs.
Profile Blades	60" (5') / 42 lbs.
Scarifier Teeth	48" (4') / Included in base unit weight
Multi-function Rake	66" (5.5') / Included in the base unit weight
Plug Aerator**	40" (3') / 400 lbs. w/ weights

Rear-Mounted Attachments**	
Finish Broom**	84" (7') / 76 lbs.
Rigid Drag Mat**	72" (6') / 68 lbs.
Coco Drag Mat**	72" (6') / 70 lbs.
EX Flexible Mat**	72" (6") / 75 lbs.
Cultipacker**	48" (4') / 272 lbs.

****Optional Attachments sold individually**

Features –

Zero-Turn & Stand-up Design - The ABI Force is a self-powered stand-on zero-turn machine enabling a new level of efficiency to the groundskeeper/contractor. From the stand-up position the operator has exceptional control and vision of ground engaging components, and 360°-degree control to maneuver the unit across most surfaces.

Commercial-Grade Engine - A 23-horsepower engine generates tremendous power to accomplish many tough jobs. An advanced debris management system ensures a clean-running engine, even in dusty environments. The V-Twin engine on the ABI Force offers a smoother and more powerful design. The ABI Force is built with enough power for daily infield maintenance, ripping & pushing dirt, pulling finishing attachments, carrying seed, fertilizer, and much more.

The Hydrostatic Drive System is powered by two commercial-grade Hydro-Gear brand pumps and 2 Parker brand wheel motors. Maneuvering tight spaces around home plate, bullpens, parking areas, and more is intuitive and efficient.

The Operator Platform offers an easy-on-and-off step-through design for operator freedom. For comfort, a compression spring floor, knee pad, adjustable back, and comfort grip controls are provided.

Quick-Swap Attachments enable the ABI Force to be configured for both dirt and turf management work. No matter the infield surface material or seasonal maintenance challenges, the ABI Force can be configured with both mid-mount and rear-mount attachments to suit the conditions. Most attachments can be fully swapped in just a couple of minutes with no tools required.

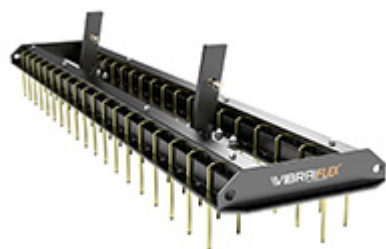
Mid-mount System (Hydraulic only):



The Force's primary ground-engaging attachments are placed in front of and below the operator. The Force's patent-pending hydraulically-operated mid-mount system has 2,000 pounds of lifting power and is spring-loaded to provide constant downward force. Hydraulic levers enable precision fingertip adjustment to raise and lower attachments, and adjust their pitch forward and backward. This feature ensures smooth tracking with the ground, and the spring-loaded design helps prevent damage if an immovable object is struck. Midpoint positioning provides the optimal ground plane for consistent, level operation, and a depth-lock with additional set collars enables predetermined grooming depth

control. This allows multiple operators to use the Force consistently the same.

Mid-mount Quick-swap Attachments:



The Vibraflex Groomer used for daily grooming, is a patent-pending attachment that re-imagines infield grooming. Evenly staggered U-pins transfer vibration and flex from front to back, moving along the infield to shatter surface tension and groom any engineered soil and surface conditioner. Two different models provide the best solution for different infield styles, uses, and levels of play. The 5800 model is for professional fields with four staggered rows creating 1/2" spacing with 1/8" or 1/4" U-shaped pins. The 3800 model is for recreational fields with four staggered rows creating 3/4" spacing with 1/4" or 3/8" U-shaped pins.



Profile Blades are a seasonal renovation attachment that decompacts without up-ending the surface profile. For light renovation work, the patent-pending Profile Blade attachment yields unparalleled de-compaction results by slicing the complete profile of the infield material from 1/2" up to 3 inches under the infield surface. Occasionally uncompacting the infield surface encourages a quick-draining and consistent-playing infield. Profile Blades can also cut weeds and grass at the root level to remove creeping grasses from infields, and warning tracks; to help eliminate build-up along the outfield edge.



The Scarifier Teeth make easy work of extreme hardpan and vegetation outside of the field. The rippers enable the ABI Force to be used to maintain gravel roads, parking lots, and even complete seedbed preparation jobs. These teeth temporarily replace the VibraFlex™ groomer or Profile Blades™ and are adjustable from 0 - 4" for optimum working depth. The bolt on tips are easily replaced as needed.



The Multi-function Rake is not typically used for daily grooming, but is invaluable during infield renovation and off-the-field work. Because the rake is mounted directly to the mid-mount hydraulic system, it may be pitched into a wide variety of positions to tackle a number of jobs. It pulverizes clumps of material during infield renovation work, can be pitched vertically to back blade material from high areas and fill into low areas, it can pull off loose vegetation and debris into piles, and it creates an ideal finish on gravel parking lots and for other heavy dirt work. The rake is constructed of 1/2" hardened steel for long life and is

replaceable in individual sections.

Rear-mount System (Manual or Hydraulic):



The rear-mount system allows for a variety of quick-swap finishing attachments to be pulled for grooming and then manually latched out-of-play for transport. However, if ultimate efficiency is of critical concern, our optional rear hydraulic lift allows fingertip control of these attachments. This optional rear-lift hydraulic system makes engaging and disengaging any finishing attachment for either grooming or transport quick and easy.

Rear-mount Quick-swap Attachments:



The Rigid Drag Mat with leveling bar is an all-purpose attachment to level, smooth, and finish. This drag mat is 6' wide and 1.5' long and is designed to float material from high areas into low areas without following small contours of the ground. The integrated leveling bar also serves as a nearly indestructible tow bar and allows the steel mesh to be replaced once worn.



The Fine Finish Broom creates the perfect finish in both high and low moisture conditions on well-maintained surfaces. This broom is 7' wide and offers 3 rows of bristles. The mounting arms are adjustable to set the exact working angle desired and the broom has an ideal weight for the perfect amount of down pressure needed for beautiful performance. The 3 ideally spaced rows of easily replaceable bristles will help to float a small amount of material into low areas and finish the infield in a pristine "game ready" manner.



drag bar is 1/8" thick angle iron to eliminate bending.

The Extreme-Duty Flexible Mat is designed to quickly break down small clay clods and reset a surface that is infrequently maintained or after light renovation work. This mat is 6' wide by 3' long and is the most extreme duty drag mat on the market. The steel mesh is made of extremely thick rust resistant galvanized steel. The rods are 6 Gauge wrie and the ends are welded to protect the edges from fraying as it hits bases, fencing and other obstacles. The



The Coco Mat is an ideal solution to get wet fields ready for games. This 6' wide and 2' long mat incorporates a leveling bar and allows the coco matting to be replaced once worn.

Aerating, Fertilizing, & Seeding:

By adding additional optional attachments, the ABI Force quickly transforms into a zero-turn commercial-grade seeding and fertilizing system, gravel and dirt-work scarifier rake, a plug aerator, and an overseeder. The ABI Force is also equipped with a rear hitch for towing equipment, such as a cultipacker, dump trailer, or ABI Water Trailer.



The Hydraulic Seed & Fertilizer Spreader can hold 120lbs of material and has an adjustable spread pattern from 4 to 25 feet, adjustable flow, and side deflector. This commercial-grade and independently-controlled hydraulic spreader is ideal for precisely broadcasting grass seed and fertilizer. Spread seed after plug aerating and pull a seed-drill cultipacker behind to overseed. **Spreader must be ordered at time of original purchase for factory installation.**



The 40" Plug Aerator is capable of working 80,000 square feet per hour and at 400 lbs. can produce core depths up to 3 1/2". With this option, the ABI Force is an efficient and maneuverable zero-turn plug aerator, with manual weight to ensure consistent penetration! Pull an XD drag mat or cultipacker behind to breakup aeration cores in the same pass! Plug Aerator may be added after original purchase.



The 48" Seed-drill Cultipacker weighs 272 lbs. and presses fresh-spread seed into the soil for superior germination. The packer wheels are 9.5" around with a solid 1 3/4" steel packer wheel shaft and agricultural-grade greaseable pillow block bearings. These units are also equipped with two pneumatic tires for easy flip-over transport.



The Hydraulic Scarifier Rake is designed for aggressive gravel and dirt work from removing potholes in parking lots to preparing the perfect seedbed. These hydraulically adjustable scarifiers and multi-function rake have the teeth for tough work. For a start to finish seeding solution, add the ripper teeth, the hydraulic seed spreader, and the rear seed-drill cultipacker. Easily seed tight areas near buildings, around irrigation heads, trees, landscape beds, between sidewalks, along curbs, and fences.

Safety Instructions –

Operational Safety Rules:

Please exercise caution at all times when setting up, operating, or performing maintenance on the ABI Force. Remember, any piece of equipment like the ABI Force can cause injury if operated improperly or if the user does not understand how to operate the equipment. Exercise caution at all times with using the ABI Force.

- Only operate the ABI Force with all covers, shields, and safety devices installed and secured prior to operation.
- Never operate the ABI Force on an incline greater than 15%. Operating the ABI Force on an incline greater than 15% may result in severe bodily damage or severe damage to the ABI Force.
- Never permit any person other than the operator to ride or board the ABI Force at any time. **NEVER ALLOW RIDERS OTHER THAN OPERATOR ON THE ABI FORCE!**
- Use care and maintain minimum ground speed when operating the ABI Force on a hillside, or when operating close to ditches, fences, or water sources.
- Never place any body part under the ABI Force while engine is running, or while the ABI Force is in operation.
- Never allow anyone near the ABI Force while in operation.
- Operate the ABI Force in the daylight or under good artificial light. Operator should always be able to clearly see where they are going.
- Be alert for holes in the terrain, along with other hidden hazards. Always operate the ABI Force with caution over rough terrain.
- Stay well and clear of all moving parts. Keep all limbs clear of attachments when making adjustments with all hydraulically operated attachments.
- Use caution when operating the ABI Force in icy, wet, or snowy condition.
- Do not use the ABI Force on highways or public thoroughfares. The ABI Force is designed for off road use only.
- Use caution when using the ABI Force as a tow vehicle. Check to make sure that the Gross Vehicle Weight Rating (GVWR) does not exceed that of the ABI Force.
- Use caution when backing up with the ABI Force. Ensure that all pull behind attachments, hazardous objects, and people are clear of the ABI Force before backing up.

Safety Guards and Covers:

Safety is a primary concern in the design and manufacturing of all Absolute Innovations, Inc. products. Our extensive efforts to provide safe equipment can be negated by a single careless act by the operator. In addition to the design and configuration of the ABI Force, hazard control and accidents are also dependent upon the awareness and knowledge of the operator, along with proper maintenance of the ABI Force. The best safety device is an informed and careful operator.

Safety guards are mounted on the front of the engine, behind the operator, and on the backside of the Hydro-Gear pumps (at the shin level of the operator). These guards are designed to protect the operator, along with the ABI Force. Removing these guards could cause injury to an operator and could void the ABI Force warranty. Remove these guards **ONLY** when the unit is turned off, and the parking brake is applied; to perform preventative maintenance.

Maintenance Safety Rules:

- Never perform maintenance on the ABI Force when children are present
- Never allow anyone near the operation controls while performing service or maintenance to the ABI Force.
- Keep the engine area of the ABI Force free of accumulate debris, fuel, or excess grease and oil build up to prevent fire hazard.
- Periodically check all hardware on the ABI Force. Ensure that all hardware is properly installed to ensure the ABI Force is in safe operating condition. Replace any damaged hardware prior to operating the ABI Force.
- Never perform maintenance on the ABI Force while parking brake is disengaged.
- Never perform maintenance on the ABI Force while the unit is started.

Storage Safety Rules:

- Never store the ABI Force in an area accessible by children and remove the keys before storage.
- Never store the ABI Force with fuel inside the tank inside a building where fumes could reach an open flame or spark.
- Allow the ABI Force engine to cool before storing in an enclosed area.
- Lubricate all moving parts of the ABI Force to prevent rust during long periods of storage.
- Remove all accumulated debris from the ABI Force and all attachments before storing.

Operating the ABI Force:

This section is intended to help you the operator get the ABI Force off the shipping crate and ready for setup. Before removing the ABI Force from the shipping crate read and fully understand this manual. If there are any questions on the operation or setup of the ABI Force please contact ABI's Customer Support staff at: 855-211-0598 M-F 8am-8pm.

****Note to Operator – Never operate the ABI Force on an incline that is greater than 15%.**

Removing from Shipping Crate:

1. Remove any banding from around the Force and additional attachments.
2. If any of the optional attachments were purchased with the ABI Force, remove them from the shipping crate and place off to the side.
3. Remove all of the outside supports from around the shipping crate.
4. Before starting the ABI Force make sure to check the oil levels on the unit. The motor oil and the hydraulic oil will need to be checked to make sure that both are full prior to starting the ABI Force. The engine oil dip stick is located inside the chassis of the ABI Force. Refer to Figures 1.1 for reference or go to Maintenance



section Briggs and Stratton manual for information. To check the hydraulic fluid for the

ABI Force used the check gauge located below the control panel on the right side of the



Hydraulic level viewer / Fill plug – Figure 1.2 chassis. Refer to Figure 1.2 for reference. Both oils in the ABI Force should be full. If they are not fill them to the proper level before operation. ****Note to the operator: Always check fluid levels on a flat surface to ensure the level of the oil is properly read. ABI ships the ABI Force with oil prefilled in units.**

5. Next, locate the gas tank on the right side of the ABI Force. The unit does not ship with gas in the tank, so gas will need to be added prior to starting the ABI Force. Refer to the Briggs and Stratton owner's manual for information on octane level recommended. Use Figure 1.3 for reference to gas tank
6. Once all the oil levels have been checked, and



gas has been added to tank, the ABI Force is ready to be started.

7. Mount the ABI Force and locate the throttle lever and choke. Lift the choke fully to choke the

engine and the throttle lever will need to be moved forward fully . Refer to Figure 1.4 for reference.



Joy Sticks- Figure 1.8

8. Using the key sent with the ABI Force start the unit. Once the unit has run for about 30-60 seconds throttle back the unit some before further operation. ****Note to the operator: Before moving the ABI Force, once started; there are further steps that will need to be followed to ensure the ABI Force or attachments are not damaged while dismantling the shipping crate.**
9. With the ABI Force started, use the bent hydraulic control lever to raise the multi-function rake attachment clear of the shipping crate. The bent hydraulic control lever will be the lever furthest to the right of the hydraulic lever set. Refer to Figure 1.5 for reference.



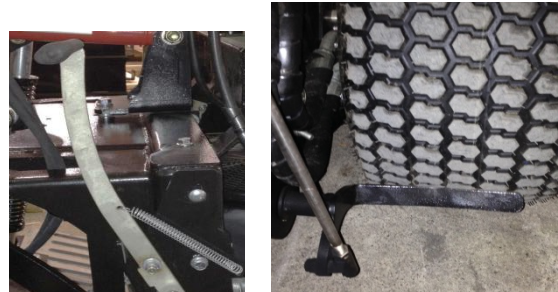
Hydraulic control levers – Figure 1.5

10. Next, using your right foot lock in the front wheels of the ABI Force using the foot pedal on the floor of the unit. Refer to figure 1.6 for reference.



Foot Pedal – Figure 1.6

11. With the wheels of the ABI Force locked in place, disengage the parking brake for the ABI Force. The parking brake lever can be located on the left side of the ABI Force. Pull the lever back and down to disengage the parking brake. Refer to Figure 1.7 for reference.



Parking Brake Lever/Brake Arm - Figure 1.7

12. Now using the grip controls, pull both joysticks back slowly and together; to back the ABI Force off of the shipping crate. Ensure that there are no obstacles or people behind the ABI Force, and that the multi-function rake is fully clear prior to backing off the shipping crate. Use Figure 1.8 for reference.



With the ABI Force clear of the shipping crate, you will now want to set up the ABI Force for use in your area. For use with the VibraFlex attachment for Infield grooming go to “Infield Setup” below on page 10 of this manual. For other areas of use go to “Additional ABI Force Attachments and Setups” on page 20.

For information on contacting ABI’s Customer Service department on the ABI Force setup go to the “Contact Us” section of this manual on page 2.

Infield Setup –

This section is designed to get the ABI Force setup and in use with the VibraFlex, Profile Blades, and other Infield attachments for use on Baseball Infields. The information provided is general setup and use information, and some setups may vary by condition of each individual Infield. For additional information on operating and setting up the ABI Force please contact ABI's Customer Service Department or go to the ABI Customer Service Support page. Information on contacting ABI Customer Service or for ABI's website go to the "Contact Us" section of this manual on page 2.

ABI recommends using caution when transporting/ attaching/disconnecting all attachments to the ABI Force. Always make sure to keep all limbs free of crush or pinch points while attaching any attachments to the ABI Force.

Setting the Joy Sticks Speed Control Bar:

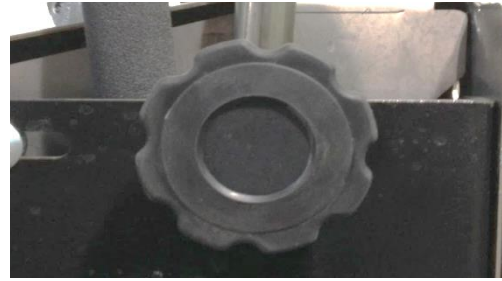
The ABI Force can be setup to limit speed of use by the operator(s). Using the speed control bar the operator can ensure that the ABI Force operates at the maximum efficient speed the operator desires for using the ABI Force. This adjustment can be changed as desired for different areas of use.

1. Mount and start the ABI Force.
2. Using the joysticks drive the ABI Force around to get a feel for how fast/slow the ABI Force moves while using the joysticks. Use different throttle speeds to understand how the ABI Force will move at different throttle speeds as well. Use figure 2.1 for reference.



Joysticks – Figure 2.1

3. Once a comfortable speed is determined by the operator, a comfortable speed is determined as a speed by which the operator can use the ABI Force around an area without having to constantly slow down the unit to maneuver around obstacles or other hazards; then stop the ABI Force.



Black Plastic Knob – Figure 2.2

4. Next, loosen the black plastic knobs located on the side of the control panel. Use Figure 2.2 for reference. With both black plastic knobs loosened, pull the speed control bar back to the point where the comfortable speed for the operator was determined and tighten both black plastic knobs back down.
5. Test to make sure the speed of the ABI Force is the desired speed the operator wants. If the speed is set too slow/fast repeat steps 4 until the proper speed is obtained.

Attaching the Vibraflex:

For information on assembly of the VibraFlex please refer to the VibraFlex assembly guide. This guide can be found on the ABI Customer Support web page.

1. To install the Vibraflex on the ABI Force, take the ABI Force to a location with a hard flat surface.
2. The multi-function rake will need to be raised fully prior to installing the Vibraflex. If the multi-function rake is not raised, use the bent hydraulic control lever to raise the multi-function rake.
3. Once the multi-function rake is raised, shut off the ABI Force, engage the parking brake and dismount the unit.
4. Slide the VibraFlex under the multi-function rake. The two uprights on the frame of the Vibraflex should be centered on the second receiver tube from the outside of the multi-function rake. Use Figure 2.3 for reference.



Figure 2.3

5. With the uprights centered on the second receiver tube, remove the bent pin from the receiver tube and set it off to the side. With the bent pin removed from the receiver slot, remount the ABI Force and start the unit. Do not disengage the parking brake at this time. See Figure 2.4 for reference.



Scarifier Tube – Figure 2.4

6. Using the bent hydraulic control lever slowly lower the multi-function rake assembly down onto the VibraFlex uprights. You may need to use the center hydraulic control lever to adjust the pitch of the multi-function rake in the process.
7. Once the uprights of the VibraFlex are inside the receiver tubes, shut off the ABI Force and dismount the unit.
8. Starting on either the left or the right side of the ABI Force, lift the Vibraflex up until the hole on the VibraFlex upright and the receiver tube line up. Once the holes on the VibraFlex upright and the receiver tube line up, reinsert the bent pin and secure with the provided lynch pin. See Figure 2.5 for reference.



Vibraflex attached to multi-function rake – Figure 2.5

9. The VibraFlex is now ready to be leveled for use on the Infield.

Leveling the VibraFlex for Infield use:

Once the VibraFlex is secured to the ABI Force it will need to be leveled prior to operation. It is important to make sure the VibraFlex is sitting level front to back on a hard flat surface prior to operations. If the

VibraFlex is not sitting level during operation the grooming results will not be consistent. Follow the proceeding steps to ensure the best grooming results with the VibraFlex.

1. Mount the ABI Force and start the unit.
2. Using the bent hydraulic control lever lower the VibraFlex down until the u-pins touch the surface.
3. Next, using the center hydraulic control lever tilt the VibraFlex forward or backward until all the u-pins are sitting flat to the surface. The VibraFlex may need to be raised some during this process to ensure proper movement of the multi-function rake.
4. Once all the u-pins are setting flat to the surface the VibraFlex is now level and ready for use.

****Note to Operator – If the Vibraflex begins to bounce in operation, lift the front of the VibraFlex around a 1/8" higher than the back, on a flat hard surface; to prevent the bounce effect.**

For information on setting the depth of the VibraFlex go to "Setting Depth of Attachments" section on page 20.

Disconnecting the VibraFlex:

1. With the ABI Force on a firm level surface, lower the VibraFlex to the surface using the bent hydraulic control lever. Make sure the VibraFlex is sitting level to the surface before attempting to remove the VibraFlex.
2. With the VibraFlex sitting level on the surface, shut off the ABI Force and set the parking brake, and dismount the unit.
3. Pull the bent pin from each of the upright arms on the VibraFlex, and set the bent pins off to the side, they will be replaced once the VibraFlex is removed.
4. Mount the ABI Force and start the unit.
5. Using the bent hydraulic control lever raise the multi-function rake free of VibraFlex.
6. With the VibraFlex free, shut off the ABI Force and engage the parking brake. Dismount the unit and remove the VibraFlex out from under the chassis of the ABI Force.

7. The ABI Force is now ready for use with one of the many other grooming attachments.

Attaching the Profile Blades:

The profile blades are designed to penetrate the surface of the infield and groom the infield from the bottom up. The profile blades should only be used for light/moderate renovation work on the infield, or to assist in removing encroaching grass from the infield. The profile blades can be set to penetrate the surface the infield from 0"-3", allowing the operator to break up compacted material and redistribute the infield material more consistently. When used to remove encroaching grass from the infield, the profiles blades cut the root systems of the grass off, and clean up the lip between the infield and outfield.

1. To install the profile blades on the ABI Force, take the ABI Force to a location with a hard flat surface.
2. The multi-function rake will need to be raised fully and leveled prior to installing the profile blades. If it is not raised, use the bent hydraulic control lever to raise the multi-function rake, and use the center hydraulic lever control to level the multi-function rake. Once the multi-function rake is raised and level, shut off the ABI Force and engage the parking brake.
3. Next, slide the profile blades under the multi-function rake, one on each side of the multi-function rake. The two uprights on the profile blades should be centered on the first and third receiver tubes from the outside of the multi-function rake with the beveled edge of the profile blades pointed towards the front tires.
4. With the uprights centered on the first and third receiver tube, remove the bent pin from the receiver tube and set it off to the side.
5. Lift the profile blade up into the receiver tube until the hole in the profile blade upright and the hole in the receiver tube line up. With the holes lined up insert the bent pin into the hole and secure. Do this for each of the remaining uprights on both profile blades.
6. The profile blades are now ready to be leveled for use on the infield.

Leveling the Profile Blades for use:

1. Mount the ABI Force and start the unit.
2. Using the bent hydraulic control lever, lower the profile blades down until they touch the surface.
3. Next, using the center hydraulic control lever adjust the pitch of the profile blades forward or backward until they sit level to the surface. The profile blades may need raised or lowered some during this process to ensure proper movement of the multi-function rake.
4. Once the profile blades sit as level to the surface as possible, the profile blades are then ready to be used on the Infield.

For information on setting the depth of the VibraFlex go to "Setting Depth of Attachments" section on page 20.

Disconnecting the Profile Blades:

1. With the ABI Force on a firm level surface, lower the profile blades to the surface using the bent hydraulic control lever. Make sure the profile blades are sitting level to the surface before attempting to remove the profile blades.
2. With the profile blades sitting level on the surface, shut off the ABI Force and set the parking brake, and dismount the unit.
3. Pull the bent pin from each of the upright arms on the profile blades, and set the bent pins off to the side, they will be replaced once the profile blades are removed.
4. Mount the ABI Force and start the unit.
5. Using the bent hydraulic control lever raise the multi-function rake slowly until the profile blades are free of the multi-function rake.
6. With the profile blades free, shut off the ABI Force and engage the parking brake. Dismount the unit and remove the profile blades out from under the chassis of the ABI Force.
7. The ABI Force is now ready for use with one of the many other grooming attachments.

Using the Multi-function Rake:

The multi-function rake can be used to assist in many areas of renovation, or grooming; an Infield. The multi-function rake can be used to help move and distribute material throughout the infield to assist in leveling the surface, it can also be used to help remove debris from the infield, and can also work to help compact the infield surface in unison with other pull behind attachments. The multi-function rake is not designed to groom or break up the surface of an infield. For additional information beyond what is covered in this manual, please contact the ABI Customer Service department. Information on contacting the ABI Customer Service department can be found under the "Contact Us" section of this manual on page 2.

Moving Material on an Infield:

1. If the surface of the Infield is compacted, the multi-function rake may not be able to move and distribute material properly. Before using the multi-function rake on the Infield ensure that the surface of the Infield has been loosened using the VibraFlex/profile blades/Scarifiers to allow for easy distribution of material.
2. Next, remove any attachments, such as the VibraFlex, profile blades, or scarifiers; that may be secured to the multi-function rake.
3. With all attachments removed, or properly stored, mount the ABI Force and start the unit.
4. Using the center hydraulic control lever, adjust the pitch of the multi-function rake until the multi-function rake rests firmly on the surface. The multi-function rake may need to be lifted or lowered during the process to achieve the desired angle on the multi-function rake.
5. With the angle of the multi-function rake set, use the bent hydraulic control lever to raise the multi-function rake clear of the surface.
6. Drive to the area where material will need to be distributed from.
7. Starting in the area of the infield that material will be pulled from, lower the multi-function rake using the bent hydraulic control lever until the multi-function rake sits firmly to the surface. The angle of the multi-function rake to the surface will determine how much material will be moved.

8. Using both of the joysticks, push the material forward to the area that the material is needed.
9. As the ABI Force approaches the area that material will be distributed, use the bent hydraulic control lever to slowly raise the multi-function rake and allow the material to feather out over the area.
10. Continue this process until the desired amount of material has been re-distributed.
11. Once finished, the operator may want to go over the area with the VibraFlex again to help incorporate the new material into the area fully, or use one of the pull behind attachments to help lightly compact the material into the area.

****Note to Operator – use the same listed process as above to pull material backward using the ABI Force. If moving material backward using the ABI Force always be mindful to watch where the ABI Force is going, and how much material is being carried by the unit. Never back up the ABI Force with pull behind attachments.**

Debris Removal from Infield:

The multi-function rake can be used to help pull loose debris such as grass, weeds, and leaves from the infield; in the same manner as distributing material on the Infield. The information below will go over the easiest way to help gather the debris for easy removal from the Infield.

1. Using the same steps for setup as listed in the previous section, set the multi-function rake the same as would be needed for distributing material in the arena. Use steps 1-7 for setup of the multi-function rake. The multi-function rake will need to be set more at a 90 angle for moving loose debris, and should only skim the surface of the Infield. Adjustments can be made to move more or less debris as needed.
2. With the multi-function rake setup for use, push the loose debris into either small workable piles, or larger central piles.
3. With the debris pushed into the desired area, use the bent hydraulic control lever to raise the multi-function rake clear of the pile before backing away from the pile. This will help prevent back tracking of the debris back into the field.
4. Continue to move the debris into piles until all the debris is moved into workable piles. Once

the debris is into piles the debris can be removed by the operator, or an assistant.

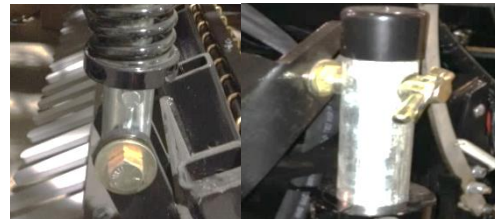
5. The operator may choose to groom the Infield after using the multi-function rake to remove the debris to help redistribute any excess material that may have been moved during the cleanup process.

Removing the Multi-function Rake from the ABI Force –

The multi-function rake can be removed from the ABI Force to allow the aerator to be attached to the unit. To allow for better support, remove the multi-function rake from the ABI Force with one of the mid-mount attachments inserted into the multi-function rake.

****Note to Operator – Ensure there is adequate space for the ABI Force to maneuver around the multi-function rake while removing the multi-function rake from the ABI Force. Ensure the area is free of dips, obstacles, and other hazards prior to attempting to remove the multi-function rake from the ABI Force.**

1. With the ABI Force started, level the multi-function rake with attachment using the center hydraulic control lever and lower the multi-function rake to the ground.
2. If the VibraFlex attachment is attached to the multi-function rake move on to step 3. Now, angle to multi-function rake so the finish rake and the scarifiers/profile blades rest firmly on the surface. The multi-function rake will need to be lowered to remove tension from the compression springs for easy removal of the compression springs.
3. Shut off the ABI Force, engage the parking brake and dismount the unit.
4. Start by removing the lynch pin securing the top of the compression springs from the securing pin. Apply some downward pressure and slide the compression spring free from the pin. Next, remove the pin from the bottom of the compression spring. Some models may have bolts at the bottom of the compression spring. If this is the case on your model use two crescent wrenches to remove the bolt. With the bottom pin removed, or bolt removed, set the compression spring off to the side. Repeat on the opposite side. Use Figure 3.1 for reference.



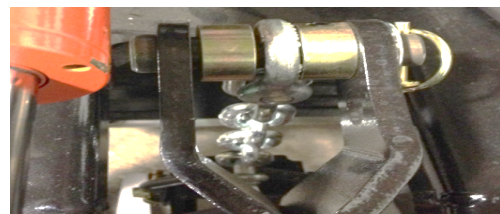
Compression Springs - Figure 3.1

5. Next, locate the movable brackets securing the support rod for the multi-function rake. This rod is held in place on both sides of the ABI Force by a movable bracket. Use Figure 3.2 for reference.
6. Pull the lynch pin from the center pin of the movable bracket.
7. Slide the bracket off of the pin and flip it back out of the way. Repeat this process on the opposite side of the ABI Force. Use figure 3.2 for reference.



Movable Bracket – Figure 3.2

8. With both securing brackets flipped out of the way, gently lift up and flip the support rod off of its support brackets. Once the support rod is removed, flip the movable bracket over and secure it back in place using the lynch pin that was previously removed.
9. With the support rod out of the way, disconnect the center lift chain for the multi-function rake from the lift arm. When removing the securing pin ensure the spacers are not lost. These will need to be put back on the bolt once the lift chain is removed from the lift ram. This chain is only used with the multi-function rake, and should stay attached to the unit for storage. Use figure 3.3 for reference.



Securing Pin – Figure 3.3

10. Now remove the multi-function hydraulic ram from the chassis of the ABI Force. To remove the hydraulic ram reach under the chassis of the ABI Force behind the front tires, and remove the pin

holding the multi-function rake hydraulic ram from the end of the hydraulic ram shaft. Use Figure 3.4 for reference.



Multi-function Rake Hydraulic Ram— Figure 3.4

11. With the hydraulic ram removed, the hydraulic hoses will need to be removed from the hydraulic block. The hose set that will be pulled will be the right side hydraulic hoses, looking at the hydraulic block directly. See Figure 3.5 for reference.



Hydraulic Block – Figure 3.5

12. With all connection points disconnected, mount the ABI Force and start the unit.
13. Slowly begin to turn the ABI Force off the unit, being careful to ensure that no part of the multi-function rake catches on the chassis of the ABI Force.
14. Once the ABI Force is clear of the multi-function rake reattach the compression springs back on the frame of the multi-function rake. This will ensure they are not damaged or misplaced.

The ABI Force is now ready for use with other mid-mount attachments.

Attaching the Multi-function rake to the ABI Force-

1. Make sure the area around the Multi-function rake is free of any obstacles or hazards.
2. Remove the compression springs from the frame of the multi-function rake and place clear of the multi-function rake.
3. Mount and start the ABI Force.
4. Back the ABI Force up so the center of the inside tire lines up the middle of the multi-function rake.

5. Slowly turn the ABI Force over the multi-function rake. Make sure to watch and ensure that no parts of the multi-function rake are caught on the chassis of the ABI Force while maneuvering over the attachment. Additionally watch to make sure the multi-function rake does not hit and damage the muffler of the ABI Force.
6. With the ABI Force centered over the multi-function rake, lower the lift arm of the ABI Force using the bent hydraulic control lever.
7. Once the lift arm is fully lowered, shut off the ABI Force, engage the parking brake and dismount the unit.
8. Connect the compression springs back to the frame of the multi-function rake. Start by connecting the bottom of the compression springs to one side of the multi-function rake, and then connect the top of the compression springs back to the chassis of the ABI Force. Repeat on the opposite side.
9. Connect the hydraulic ram back into the ears under the chassis of the ABI Force and secure with the pins. The multi-use frame may need to be shifted some to ensure the hydraulic ram will line back up properly.
10. Next, flip the movable brackets back on both sides of the ABI Force. Once both movable brackets have been moved, flip the support bar back over into the support brackets and secure the movable brackets over the support rod.
11. Now attach the center chain back to the lift arm, making sure that a spacer is on both sides of the connecting hardware.
12. With all attachment points connected, secure the hydraulic hoses for the multi-function rake back to the second set of hydraulic connectors.

The multi-function rake is now ready for use with the ABI Force.



Rear-Mounted Attachments –

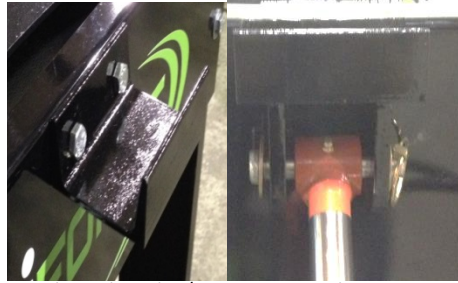
Rear-mounted attachments for the ABI Force include:

- Rigid Drag Mat and Leveling Bar
- Coco Mat and Leveling Bar
- Fine Finish Broom
- Extreme Duty Drag Mat
- Rear Hydraulic Lift (Optional)

These attachments give the operator an additional means to help groom and maintain the playable surface of the Infield. Each rear-mounted attachment is designed to work with a mid-mounted grooming attachment or independently for cleanup and finishing needs. This section of the ABI Force manual will cover setup for usage and of each of the rear-mounted attachments. Information on assembling the rear-mounted attachments can be found in each attachments assembly guide. For information on getting the assembly guides contact the ABI Customer Service department. Contact information for the ABI Customer Service department can be found in the “Contact Us” section of this manual on page 2.

Rear Hydraulic Lift Arm (Optional):

The rear hydraulic lift arm is an optional attachment that allows that operator to easily remove any of the rear mounted attachments from the surface without having to dismount the ABI Force. This attachment can be installed at the factory or as an aftermarket attachment.



C Channel Bracket/ Top Mount Bracket – Figure 4.1

Replace the ball hitch adapter with the bottom mount bracket and secure with the previously removed hardware. Use figure 4.2 for reference.

3. With both brackets attached, secure the lift arm to the bottom mount bracket using the provide



Ball Mount Bracket/Bottom mount Bracket – Figure 4.2

pin. Ensure the end of the lift arm with the eye bolt is facing away from the ABI Force.

4. Attach the hydraulic ram to the top mount bracket using the provided pin. Ensure the hydraulic hoses are facing up when the hydraulic ram is installed.
5. Now attach the hydraulic ram to the lift arm using the provided pin. Ram will connect to the connector ears in the center of the lift arm. Use Figure 4.3 for reference.



Figure 4.3

Aftermarket attachment:

1. Remove the C bracket from the back support of the ABI Force using two 9/16” combination wrenches. Replace the C bracket with the new top mount bracket with the connector ears. Use Figure 4.1 for reference.
2. Next, remove the ball hitch adapter from the tow bar using two 3/4” combination wrenches.

6. Next run the hydraulic hoses to the front of the ABI Force. Remember to keep the hoses clear of any smash points, moving parts, or high heat areas to prevent damage to the hydraulic hoses.
7. Connect the ends of the hydraulic hoses to the hydraulic block using the two free hydraulic connectors. If the optional seeder/fertilizer spreader is attached to the ABI Force the hydraulic hoses for the spreader will need to be

swapped out for the hydraulic lift arm hoses. See figure 4.4 for reference.



Hydraulic Block – Figure 4.4

8. Use the left side hydraulic lever to control the lift/lowering of the rear hydraulic lift arm.

Using the Rear Hydraulic Lift Arm:

1. Attach the rear attachment to the ABI Force. For information on attaching rear mounted attachments see sections below for the corresponding attachment.
2. Adjust the arm of the hydraulic lift arm, using one of the three pre-drilled holes; so the eye bolt sits in-line with the lift chain on the rear mounted attachment. For the fine finish broom the chain will need to be adjusted to allow the hydraulic lift arm to lift the broom. Use figure 4.5 for reference.



Lift Arm – Figure 4.5

3. Connect the lift chain for the rear attachment to the eye bolt using the provided quick connector.
4. Mount the ABI Force and start the unit.
5. Using the left side hydraulic control lever raise the rear mounted attachment clear of the ground.
6. The rear mounted attachment is now ready for use with the rear hydraulic lift arm.

Attaching/Transporting Rigid Drag Mat/Coco Mat Mat:

1. Set the rigid drag mat/coco mat on the ground behind the ABI Force, or in an area where the ABI Force can be backed up to the rigid drag mat.

2. Using the provided chains, connect the rigid drag mat/coco mat to the unit using the provided quick connectors. The quick connectors will attach to the ABI Force via the eye bolts on the tow bar on the back of the ABI Force. Use Figure 4.6 for reference.



Quick Connector/Eye Bolt – Figure 4.6

3. **To transport the rigid drag mat/coco mat to or from the infield:** lift the rigid drag mat/coco mat from the ground using the provided chain in the center of the rigid drag mat/coco mat leveling bar. The rigid drag mat/coco mat will then be suspended from the back of the ABI Force using this chain, and will rest on the C-channel bolted to the top of the adjustable back rest.

Use on the Infield:

The rigid drag mat/coco mat can be adjusted to distribute more or less material with the leveling bar by shortening the chain between the rigid drag mat/coco mat and the ABI Force. For optimum results the leveling bar should be set so that it carries a small amount of material at all times. If the leveling bar is carrying too much material or if material is spilling over the top of the leveling bar; shorten the connector chain as needed one link at a time.

Disconnecting the Rigid Drag Mat/Coco Mat:

1. Remove the rigid drag mat/coco mat from its tow position, and lay it on the ground.
2. Remove the securing chains from the ABI Force using the quick connectors.
3. The rigid drag mat/coco mat is now ready to be stored.

Attaching/Transporting the Extreme Duty Drag Mat:

****Note to Operator-** The extreme duty drag mat does not come with a lift chain. For normal use a bungee strap or chain can be secured to the middle of the mat for transport. For use with the optional rear hydraulic lift arm, attach a short section of chain to the center of the extreme duty drag mat.

1. Set the extreme duty drag mat on the ground behind the ABI Force, or in an area where the ABI Force can be backed up to the extreme duty drag mat.
2. Using the provided chains, attach the extreme duty drag mat to the eye bolts on the tow bar of the ABI Force.
3. To Transport the extreme duty drag mat to or from the infield: the extreme duty drag mat will need a bungee strap or chain attached to the center of the extreme duty drag mat. This will allow the extreme duty drag mat to be suspended from the C-channel bracket bolted to the top of the adjustable back rest. Ensure the bungee strap or chain used on the extreme duty drag mat is able to support the weight of the extreme duty drag mat before attaching it to the mat.

Disconnecting the Extreme Duty Drag Mat:

1. Remove the extreme duty drag mat from the tow position, and lay it on the ground.
2. Disconnect the extreme duty drag mat from the ABI Force by removing the quick connectors from the eye bolts on the tow bar of the ABI Force.
3. The extreme duty drag mat is now ready to be stored.

Use on the Infield:

The extreme duty drag mat should be setup for use with the drag bar lifted just off the surface of the infield. This will help prevent overflow of material over the top of the drag mat while grooming. For finishing a field, or to help compact the material on the infield; set the extreme duty drag mat so the drag bar touches the surface of the Infield. Adjust the height of the drag bar by shortening the length of the chain to the desired height.

Attaching/Transporting the Fine Finish Broom:

1. Set the fine finish broom behind the ABI Force, or in an area where the ABI Force can be backed up to the fine finish broom; with the arms of the broom facing forward.
2. Connect each arm of the fine finish broom to the ABI force via the eye bolts on the tow bar on the back of the ABI Force. The secure the arms

to the eye bolts, line up the holes of the arms to the eye bolts and insert the self-locking lynch pin that is provided.

4. To transport the fine finish broom to or from the infield: Using the provided chain for the fine finish broom, suspended the fine finish broom from the back of the ABI Force using this chain. The fine finish broom will rest on the C-channel bracket bolted to the top of the adjustable back rest.

Use on the Infield:

The fine finish broom will need to sit level to the surface of the Infield. If the fine finish broom is "hopping" on the surface or is carrying too much material it may need to be adjusted so the front of the broom is raised about 1/8" off the surface of the Infield. See below for information on adjusting the fine finish broom.

1. Using a ½" socket wrench and combination wrench, loosen the front bolt on the arm of the fine finish broom. This will need to be done to both sides. Do not remove the bolt, only loosen it.
2. With the bolt loose, adjust the frame of the broom to all 3 bristle brushes sit flat to the surface of the Infield.
3. Secure both bolts back using the ½" socket wrench and ½" combination wrench.

For additional information on usage or setup of the ABI Force or any of its attachment, please contact ABI Customer Service department. For information on contacting ABI's Customer Service Department go to the "Contact Us" section of this manual on page 2. For information on maintenance for the ABI Force go to the "Maintenance" section of this manual on page 28.

Additional ABI Force Attachments and Setups –

The ABI Force comes with a variety of attachments to help the operator perform multiple tasks around a Ball Field, as well as on a job site. Below you will find information on setting the depth of attachments for use, along with information on using the ABI Force for aerating, cultipacking, fertilizing, and much more.

Setting the Depth of the Attachments –

Each of the mid-mount attachments can have the working depth set either manually, or automatically using the depth lock and set collars. The ABI Force offers both means to be used on all the mid-mount attachments. Below is basic information on setting the depth for the mid-mount attachments. For additional information on using each attachment check the table of contents for the desired attachment on page 2 or contact ABI's Customer Service department. For information on contacting ABI's Customer Service department go to the "Contact Us" section of this manual on page 2.

Depth using Depth lock and set collars:

1. With the desired attachment connected to the multi-function rake, raise the multi-function rake fully.
2. With the multi-function rake raised fully, shut off the ABI Force, engage the parking brake, and dismount the unit.
3. Next, flip the depth lock over the shaft of the hydraulic lift ram. ****Note to Operator:** The depth lock should not be used by itself. Always use at least one of the set collars when using the depth lock for setting depth. Use Figure 5.1 for reference.



Depth Lock – Figure 5.1

4. Attach at least one of the set collars to the shaft of the hydraulic ram, all of the provided set collars can be added, set collars can be used

individually or as sets to allow for greater control over the operating depth. Use Figure 5.2 for reference.



Set Collars – Figure 5.2

5. To ensure that the depth lock and set collar setup is at the desired depth, take the ABI Force to the area it will be used on. ****Note to Operator:** It is better to add more set collars originally to allow for shallower depths and work toward deeper depths as need.
6. Lower the attachment to the surface, using the bent hydraulic control lever, then using the joysticks begin driving forward. Using the bent hydraulic control lever, continue lowering the hydraulic lift ram until it is sitting against the depth lock/set collars then release the control lever.
7. Continue to pull forward once the depth is set for an additional 3-5'.
8. Next, stop the ABI Force, shut off the unit, engage the parking brake and dismount.
9. Pull back some of the material that has been loosened with the desired attachments. Check to see how deep the attachment is penetrating into the material.
10. With the depth confirmed, the ABI Force will be ready for use. If additional adjustments will be needed, repeat steps 4-9 as needed, remembering to check the depth after each adjustment.

Depth using manual adjustments:

1. Drive the ABI Force with the desired attachment attached to the multi-function rake to the area the attachment will be used
2. Using the bent hydraulic control lever, lower the attachment to the surface. With the attachment lowered to the surface, begin driving forward using the joysticks.

3. While driving forward, use the bent hydraulic control lever to allow the attachment to begin penetrating deeper.
4. Once the depth desired is achieved, continue driving forward another 3-5'. Once the distance is covered at depth, stop the ABI Force, shut off the unit and dismount.
5. Pull back some of the material that has been loosened, and confirm the depth the attachment is working at.
6. With the depth confirmed the ABI Force is ready to be used. If additional adjustments are needed repeat steps 2-5 until the desired depth is reached. Once the actual work depth is achieved, do not make any additional changes to the tilt or depth of the attachment. If any adjustment is made to either depth or tilt make sure to confirm the depth by following steps 4-5.

Scarifier Attachments -

The scarifiers for the ABI Force are designed to work in sand, clay, soil, rock, and much more. The scarifiers are able to work in most materials up to depths of 3-4" for optimum results. Hydraulic depth control for the scarifiers can be preset to specific depths using the depth control lock and set collars that come standard with every ABI Force. The depth control lock and set collars allow all operators to use the ABI Force at consistent settings when more precision work is needed. Information on attaching the scarifiers to the ABI Force, and using the scarifiers is below.



Attaching the Scarifiers:

1. If any other attachments are secured to the multi-function rake; remove them before attaching the scarifiers to the ABI Force.

2. Next, raise the multi-function rake fully. This will allow for enough clearance for the scarifiers to be inserted to the multi-function rake.
3. With the multi-function rake raised, shut off the ABI Force, engage the parking brake, and dismount the unit.
4. Remove the bent pin from the scarifier rake tube and set it off to the side. With the bent pin removed insert the shank of the scarifier into the receiver tube. Use Figure 6.1 for reference.



Receiver Tube – Figure 6.1

5. Line up the hole on the scarifier shank with the hole in the receiver tube and secure the scarifier using the bent pin and lynch pin. Use Figure 6.2 for reference.

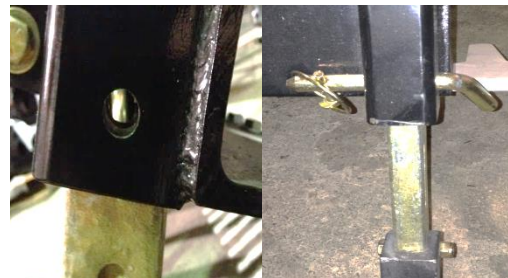


Figure 6.2

6. Repeat steps 4 and 5 for the remaining scarifiers.

Using the Scarifiers:

The scarifiers are designed to break up heavily compacted material like gravel, clay, high traffic area material. The scarifiers can be adjusted for use from 0-6" of penetration into the surface of the material to be worked. Below is some general information on using the scarifiers.

For heavily compacted material multiple passes may be needed to allow the scarifiers to penetrate to the desired depth, adjusting the depth of the scarifiers down with each pass. Adjusting the scarifiers down slowly will help break down material faster and finish the job quicker. The scarifiers can be used with the multi-function rake, or other pull behind

attachments to help cut the time it takes to finish a job.

For additional information on usage or setup of the scarifier's please contact ABI Customer Service department. For information on contacting ABI's Customer Service department go to the "Contact Us" section of this manual on page 2.

1. With the scarifiers attached and secured to the scarifier assembly rake, take the ABI Force to the area it will be used on.
2. Using the center hydraulic control lever adjust the scarifier's to run vertical to the surface to be worked. This angle may change for heavily compacted material. For heavily compacted material the operator may want to adjust the scarifier's so that the tips point more directly forward, allowing the tip of the scarifier's to penetrate the surface much easier.
3. With the angle set, use the bent hydraulic control lever to lower the scarifiers down until they rest firmly on the surface.
4. Using the joysticks drive the force forward allowing the scarifier's to break into the surface. While moving forward, use the bent hydraulic control lever to allow the scarifiers to penetrate into the material deeper. Continue this until the desired depth is achieved.

If a predetermined depth has not been set using the depth control and set collars, then the operator will need to periodically check the material to ensure that the scarifiers are working at the desired depth. For information on setting the depth of the scarifiers go to "Setting Depth of Attachments" section on page 20.

The multi-function rake may touch the surface while the scarifiers are in operation. If the operator does not want the multi-function rake working with the scarifier's then the multi-function rake will need to be adjusted using the center hydraulic control lever.

Removing the Scarifiers:

1. Raise the multi-function rake fully. This will allow for enough clearance for the scarifiers to be removed from the multi-function rake.
2. With the multi-function rake raised, shut off the ABI Force, engage the parking brake, and dismount the unit.

3. Remove the bent pin from the scarifier rake tube and set it off to the side. Make sure to hold the scarifier firmly during the process. The scarifiers will fall out free from the receiver tube once the bent pin is removed.
4. With all the scarifiers removed from the multi-function rake, the ABI Force is ready for use with any of the other attachments.

Adjusting the Knee Pad:

The knee pad on the ABI Force VANGUARD Model can be adjusted for better comfort for the operator. Below are instructions on adjusting the knee pad for the operator.

1. Lift the knee pad from the bottom of the knee pad plate to remove it from the securing Velcro on the back of the plate.
2. Lift up and out on the knee pad plate to remove the tabs at the top of the knee plate from the tab slots. See Figure 6.3 for reference.



Knee Pad / Knee Pad removed – Figure 6.3

3. There will be two bolts on the back of the knee pad plate. Loosen these bolts to allow the knee pad to slide up and down freely. See Figure 6.4 for reference.



Figure 6.4

4. Adjust the pad to the desired height, and tighten back the bolts.
5. Replace the knee pad by inserting the tabs on top of the knee pad back into the tab slots and lower in a in and down motion. Repeat as needed.



Aerator Attachment –

The ABI Force aerator is able to cover up to 80,000 sq. ft. per hr. with up to 3-1/2" cores. The pivoting ball swivel tongue and ball swivel chains allow for up to 30 degrees of pivot for better maneuvering while the aerator is in operation. The pivoting ball swivel tongue also allows for easy installation and removal of the aerator.

The ABI Force Aerator comes with 3 adjustment weights to assist the aerator in penetrating the surface. Each weight weighs around 112 lbs. each. ABI suggest using all three weights while using the Aerator to assist in depth penetration. Each weight does come with tow easily accessed handles for removal or addition as the operator desires.

****Note to Operator: Due to the weight of each Aerator weight, use extreme caution when carrying, removing, or adding weights to the ABI Force Aerator.**

For further instructions on using the ABI Force Aerator contact ABI Customer Support department. For information on contacting ABI's Customer Service department go to the "Contact Us" section of this manual on page 2.

For maintenance on the aerator go to the page * of this manual.

Attaching the Aerator:

1. Position the aerator on a firm level surface that has room for the ABI Force to maneuver around the aerator without hitting any obstacles.
2. Mount and start the ABI Force.

3. Position the ABI Force behind the tines of the aerator so that the inside tire lines up with the center of the aerator. Use Figure 7.1 for reference.

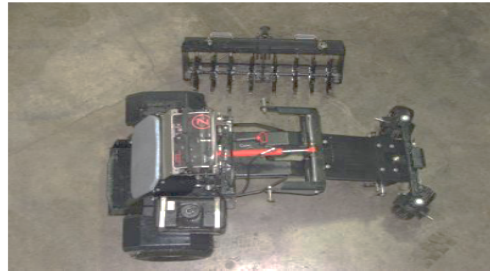


Figure 7.1

4. Slowly start turning the front of the ABI Force over the aerator. Use caution to make sure the unit does not hit the pivoting ball swivel tongue, and that the tines do not hit the muffler of the unit. Use Figure 7.2 for reference.



Figure 7.2

5. With the aerator centered under the chassis of the ABI Force, shut off the unit, engage the parking brake, and dismount the unit. Use Figure 7.3 for reference.

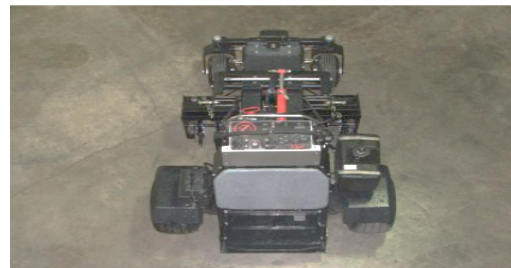


Figure 7.3

6. Connecting each of the ball swivel chains to the securing pins located on the sides of the ABI Force and secure using the provided lynch pins. See Figure 7.4 for reference.



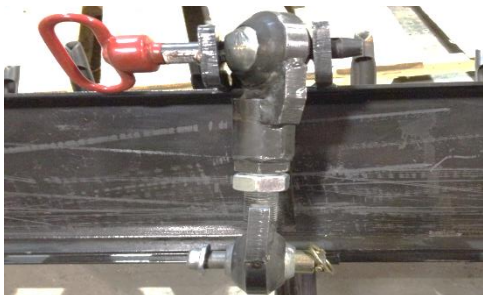
Ball Swivel Chains – Figure 7.4

7. With the ball swivel chains connected, connect the pivoting ball swivel tongue to the connecting pin under the chassis of the ABI Force. Securing the aerator in place using the provided pin. Use Figure 7.5 for reference.



Swivel Tongue/Connector Pin – Figure 7.5

8. Next, connect the center turn buckle in the center of the aerator to the lift arm at the end of the hydraulic cylinder using the provided clevis pin and lynch pin. Make sure the bushing for the bolt is inserted before securing the bolt in place. Use Figure 7.6 for reference.



Center Turn Buckle – Figure 7.6

9. With all the connecting points on the aerator secured, mount the ABI Force and start the unit.
10. Using the bent hydraulic control lever raise the aerator clear of the ground.
11. The aerator is now ready to be transported for use.

Adjusting/Using the Aerator:

The depth of the aerator is controlled by the hydraulic lift cylinder and center connecting chain. The depth of the aerator can be adjusted from 0'-3-1/2" as desired by the operator. Below are instructions on how to set the approximate depth of the ABI Force aerator, and how to ensure the desired depth.

1. Transport the aerator to the area that it will be used on.
2. Using the bent hydraulic control lever lower the aerator down until the tines touch the surface.

3. Using the joysticks, slowly drive forward at a comfortable speed a couple of feet, allowing the tines to start breaking into the surface.
4. Once the tines have fully engaged the surface, stop the ABI Force, shut off the unit, engage the parking brake, and dismount.
5. Check some of the plug holes to ensure the right depth for aerating the area has been reached.
6. If the depth is not accurate: remount the ABI Force and start the unit, remove the parking brake; and use the bent hydraulic control lever raise the aerator as need to reach the proper depth. Repeat steps 3-5 after every adjustment to ensure proper penetration depths.

****Note** – The depth of the aerator can be set to one consistent depth using the depth block and set collars. For information on using the depth lock and set collars go to the "Setting Depth of Attachments" section on page 20.

Removing the Aerator:

1. With the ABI Force on a firm level surface, lower the aerator down, using the bent hydraulic control lever; until the aerator sits firmly on the ground. Continue lowering the aerator until all the tension is removed from the connecting chain.
2. With the aerator resting on the surface, shut off the ABI Force, engage the parking brake, and dismount the unit.
3. Remove each of the ball swivel chains from both sides of the aerator.
4. Next, disconnect the pivoting ball swivel tongue from the mounting pin. ****Note: The aerator may shift forward once the pivoting ball swivel tongue is disconnected from its mounting pin. Keep all limbs free from in front of the aerator while disconnecting to prevent any bodily harm.**
5. With the pivoting ball swivel disconnected remove the center connecting turn buckle from the lift arm.
6. With all connecting points disconnected, remount the ABI Force and start the unit.
7. Using the control arms, slowly turn left or right to remove the aerator from under the ABI

Force. Use caution when moving the ABI Force around the aerator. Ensure that the ABI Force tires stay clear of the aerator, and that the aerator does not hit the muffler of the ABI Force as you turn.

8. The aerator can now be carefully moved to its storage location.

Seeder/Fertilizer Spreader –

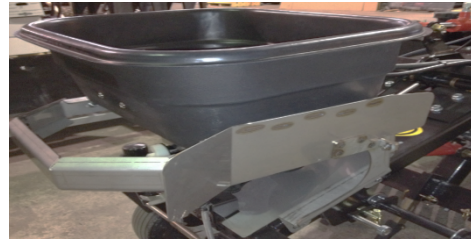
The ABI Force can come with an optional Seeder/Fertilizer Spreader. The spreader has controls from 0-9 for spread flow, and an adjustable spread pattern from 4'-25', along with side specific control, and a deflector shield for edging. The spreader works independent of the ABI Force and the range is hydraulically controlled, allowing the operator to control the spread range as needed.

Using the flow rate knob on the front of the spreader hopper the operator can adjust the flow rate from 0 to 9 with clearly defined markings for easy adjustment. The spreader additionally has two control handles positioned on the control panel for ease of access while using the spreader. The left handle, hopper control cable; controls the hopper door located at the base of the hopper, and the right handle, the diffuser control cable; controls the side adjustment of the spread. A control knob located on the control panel allows for quick adjustment of the range while spreading.

For further instructions on using the ABI Force Seeder/Fertilizer Spreader contact ABI Customer Support department. For information on contacting ABI's Customer Service department go to the "Contact Us" section of this manual on page 2.



interfere with the spreading process. Use Figure 8.1 for reference.



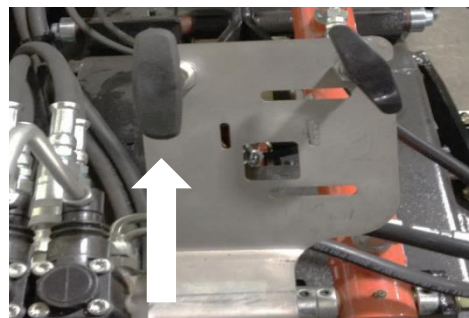
Spreader Hopper – Figure 8.1

2. Mount the ABI Force and start the unit.
3. Drive to the area that seed/fertilizer is needed.
4. Turn the control knob one full turn on the control console to activate the impeller below the hopper. The impeller should always be active prior to opening the hopper door, to prevent excess spillage of seed/fertilizer. Use Figure 8.2 for reference.



Control Knob – Figure 8.2

5. Once the impeller is turning, open the hopper door using the hopper control cable. Use Figure 8.3 for reference. The hopper door will only open as far as the flow rate knob is set for.



Hopper Control Knob – Figure 8.3

See the following sections for information on adjusting the seeder/fertilizer spreader for use.

Activating the Seeder/Fertilizer Spreader:

1. Raise the deflector guard located on the left side of the hopper. Lift it fully to ensure it will not

Adjusting the Seeder/Fertilizer Spreader –

Flow Rate Knob:

Under the front of the spreader hopper locate the white dial. This dial is numbered from 0-9. Turn this dial to the approximate amount desired for spreading the seed/fertilizer at. The numbering is used for reference only. Adjustments may need to be made to the flow rate depending on the particle size, rate of speed, weather conditions, volume/density of the seed or fertilizer pellets used. For concerns about over seeding or over fertilizing adjust the flow rate a half or a full number lower to minimize over flow.

Once the desired flow rate is set pull the hopper control cable, left hand knob on the control panel; to open the hopper door. The door will only open as far as the setting on the flow rate knob. See Figure 8.4 for reference.



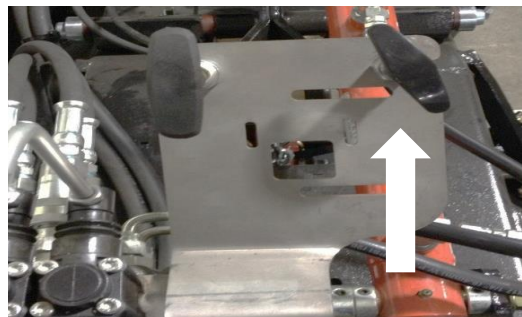
Flow Rate Knob – Figure 8.4

Approximate Granular Calibration:

Product	Lbs. Per 1000 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 and Granules	2	4.75
	4	5.5
	6	6.5
Med Pellets	2	4.75
	4	5.5
	6	6.5

Adjusting Discharge Side:

The diffuser control knob balances the spread pattern, by shifting the product placement on the impeller. Placing the product on the impeller closer to the shaft or 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. See figure 8.5 for reference to diffuser control knob.



Diffuser Knob – Figure 8.5

Adjusting the Spread Pattern:

1. Start with the diffuser control knob all the way forward or in.
2. Begin to spread the product. As the product is spreading, watch to see how the product is being dispersed. Generally, all spreaders will throw product more heavily to the right. To adjust the pattern, begin to slowly pull the diffuser control knob out till the pattern is directly in front of the ABI Force.
3. Once the pattern is directly in front of the ABI Force, lock the diffuser control knob by turning it to the right to keep the same pattern for the remainder of spreading the material. If the pattern does change while spreading adjust the pattern by loosening the diffuser control knob and make the adjustment and re-tighten the diffuser control knob after.

Deflector Shield use:

The deflector shield is used to prevent seed/fertilizer from spreading into flower beds, on sidewalks, or to allow for a clean edge spreading when needed. See Figure 8.6 for reference.



Deflector Shield – Figure 8.6

To use the deflector shield the operator will only need to flip the deflector shield down, found on the left side of the hopper frame; fully to prevent seed from spreading to the left of the ABI Force. To help seed from building up on the inside of the deflector shield, and on the body of the ABI Force; set the diffuser to spread more to the right side of the hopper. For information on setting the diffuser see section “Adjusting Discharge Side”.

Adjusting the Spreader Range:

The range of the spread can only be adjusted while the spreader is in use. This allows you to see how far the seed/fertilizer is being cast, and to allow for more accurate adjustments to be made to the spreading range. Turn the control knob located on the control panel clock-wise to increase the distance the spreader will spread the seed/fertilizer. Turn the control knob counter-clockwise to decrease the distance of the spread. Use Figure 8.7 for reference.



Control Knob – Figure 8.7

Cultipacker –

The ABI Force can use the optional cultipacker to add an additional tool for completing seeding and fertilizing a project. This 272 lbs. attachment is able to help push seed into freshly prepped soil to allow for better germination of seed. To use the cultipacker any rear-mounted attachments will need to be removed and the ball hitch adapter bracket will need to be fitted to the back of the ABI Force.



Attaching the Cultipacker Transport/Use:

1. Move the cultipacker to an area where the ABI Force can back up to it.
2. Back the ABI Force up to the tongue of the cultipacker. Shut off the ABI Force, engage the parking brake and dismount the unit.
3. Attach the cultipacker to the ABI Force by placing the ball hitch adapter bracket between the ears of the tongue of the cultipacker. Secure using a 5/8" hitch pin and lynch pin. For transporting the cultipacker attach the cultipacker so the transport wheels are on the ground. To attach and use the cultipacker flip the tongue so the transport wheels are positioned over the top of the steel packer wheel shaft.
4. The cultipacker is now ready for transport/use.

Disconnecting the Cultipacker:

1. To disconnect the ABI Cultipacker, transport the cultipacker to the desired storage area.
2. Disconnect the cultipacker from the ABI Force by removing the securing hitch pin.
3. If the cultipacker was transported off the transport wheels, flip the tongue of the

cultipacker over allowing the transport wheels to touch the ground.

4. Move the cultipacker to the desired storage location.

****Note to Operator: ABI does not recommend transporting the cultipacker on the packer wheels. Use the attached transport wheels when transporting the cultipacker to and from a job site.**

ABI also does not recommend backing up with the cultipacker attached to the back of the ABI Force. Backing up with the cultipacker attached

to the ABI Force may result in damage to the cultipacker, property, the ABI Force, or may result in severe bodily damage.

For information on use of the ABI cultipacker, or any other ABI Force attachments, contact the ABI Customer Service Department. For information on contacting ABI Customer Service Department go to the "Contact" section of this manual on page 2.

Maintenance –

Maintaining the ABI Force is critical in ensuring the longevity of the ABI Force, and to always get the maximum performance out of the unit. The following section will cover all the basic maintenance that will need to be performed on the ABI Force. For additional information on maintaining the ABI Force contact ABI's Customer Support department. For information on contacting ABI's Customer Service department go to the "Contact Us" section of this manual on page 2.

Maintenance Safety Rules:

- Never perform maintenance on the ABI Forcer when children are present.
- Never perform service or maintenance on the engine of the ABI Force while it is hot.
- Never allow anyone near the operations controls while performing service or maintenance on the ABI Force.
- Always remove any accumulated debris, fuel, excess grease, or excess oil from within the chassis of the ABI Force to prevent a fire hazard.
- Never use the engine area of the ABI Force for storage of flammable substances or harmful chemicals.
- Never allow an open flame source inside the ABI Force chassis while performing service or maintenance on the ABI Force.
- Never perform service or maintenance on the ABI Force while the unit is started.
- Never perform service or maintenance on the ABI Force while the parking brake is disengaged.
- Always dispose of hazardous substances according to local and federal guidelines.

Daily maintenance:

Before Operation:

- Check hardware and fasteners and ensure they are properly fastened. If any hardware or fasteners are found to be damaged, replace them prior to operating the ABI Force.
- Check all engine and hydraulic fluid levels.
- Check all tires and ensure they are aired up to the proper Manufacturers suggest PSI.

- Check wear parts on attachments and ensure that they do not need replaced. If any of the wear parts are found to be damaged or badly worn replace them before operating the ABI Force. **Wear Parts are considered:** U-shaped Pins, Scarifier Tips, Multi-function rake sections, Aerator tines, Finish Broom bristles, and more. Contact ABI Customer Service for information on wear parts.
- Spray all springs and exposed cables with a Silicone spray grease.

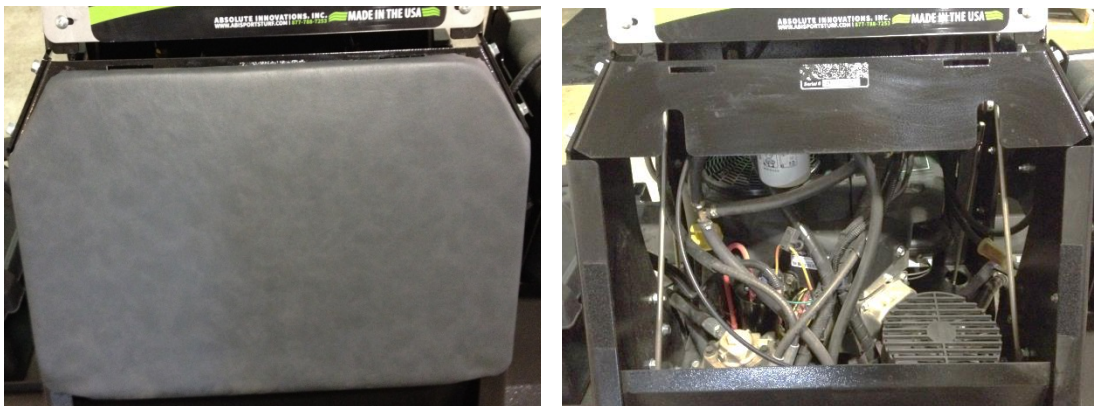
After Operation:

- Remove any build up or debris from under/around the chassis of the ABI Force.
- (With use of Optional Attachment)After using seeder/fertilizer spreader: spray any excess seed or fertilizer that may be on the chassis off with a water hose.
- (With use of Optional Attachment) Clean out seeder/fertilizer spreader hopper making sure to remove any build up around the hopper door.

General Maintenance:

Accessing the Engine Compartment:

To access the engine compartment of the ABI Force the knee pad will need to be removed from the unit. To remove the knee pad lift the knee pad from the bottom to remove the knee pad from the securing Velcro on the back of the knee pad plate. Lift the panel up and out to remove the securing tabs at the top of the knee pad panel from there slots. See figure 9.1 for reference.



Knee Pad / Knee Pad Removed – Figure 9.1

Engine Maintenance:

****ALWAYS REFER TO BRIGGS AND STRATTON OPERATOR MANUAL FOR INFORMATION ON SCHEDULED MAINTENANCE AND SERVICE ON THE BRIGGS AND STRATTON ENGINE.**

*Always use OEM replacement parts for the Briggs and Stratton engine. Non-OEM parts may not perform as well, may cause damage to the engine, and may result in injury!

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

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 the ABI Force.

The ABI Force is filled with 10W-30 oil at the factory, using other grades of oil will require draining of all fluids before replacing or topping off with new oil.

Briggs and Stratton fuel recommendations: Fuel must meet these requirements:

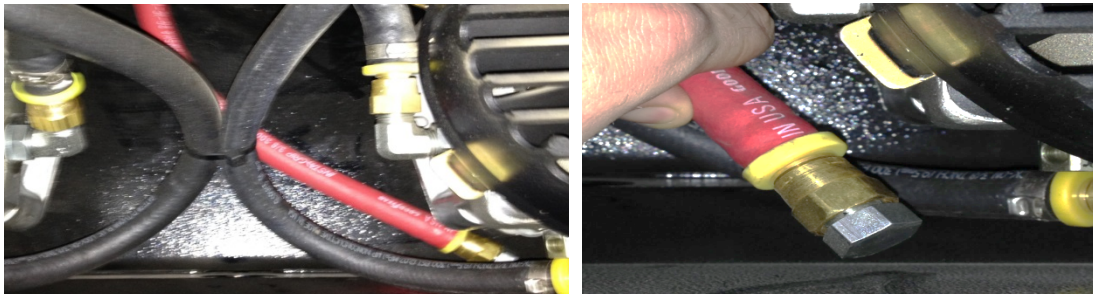
- Clean, fresh, unleaded gasoline
- A minimum of 87 octane/87 AKI (91 RON)
- Gasoline with up to 10% ethanol (gasohol) or up to 15% MTBE (methyl tertiary butyl ether) is acceptable

Check the Briggs and Stratton operators manual for additional information on recommended service times, parts, specifications, and operation instructions. For information on obtaining a Briggs and Stratton operators manual for the ABI Force contact ABI's Customer Service department. You can also go the Briggs and Stratton web site to obtain an operators manual also.

Draining the Oil from the ABI Force:

The following steps will provide the operator with information on changing the oil on the ABI Force.

1. Remove the knee pad from the operator area of the ABI Force to allow the operator access to the engine compartment of the ABI Force.
2. With the knee pad removed, locate the oil drain line inside the engine compartment. The oil drain line will be black or red and will have a brass fitting with a metal plug on the end of the hose. See Figure 9.2 for reference.



Oil Drain Line - Figure 9.2

3. Next, slide the end of the oil drain line through the hole of the deflector plate. See Figure 9.3 for reference.



Figure 9.3

4. With the drain hose placed through the hole in the deflector plate, remove the cap and drain the oil into an approved container only. Once all the oil is drained from the engine, secure the cap back to the end of the hose and push the hose back through the deflector plate hose.

Refer to the Briggs and Stratton Operator Manual for information on the type of oil to use for changing the oil in the engine, procedure for changing oil and filter, and for information on proper oil pressure before starting the ABI Force.

***DISPOSE OF USED OIL BASED ON FEDERAL OR LOCAL GUIDELINES**

Hydraulic System Maintenance:

THE ABI FORCE MUST HAVE 5W-40 SYNTHETIC OR EQUIVALENT OIL USED TO REPLACE/REPLENISH THE HYDRAULIC OIL ON THE ABI FORCE ONLY!! USING ANY OTHER OIL/FLUID MAY CAUSE DAMAGE TO THE HYDRAULIC 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 only.

The Hydro-Gear hydraulic system requires a 25 micron oil filter or equivalent to be used for the hydraulic system only.

Check for hydraulic leaks daily to ensure proper oil levels.

Traction Unit Maintenance:

The ABI Force has 9 grease fittings that will require periodic greasing. The locations of the grease fittings are:

- Front Wheel Assembly (each side)
- Front Wheel Caster Assembly (each side)
- Drive Belt Idler Arm
- Hydraulic lift rams (2 on each lift ram)

These fittings will need to be greased with at least 2-3 pumps of grease during any scheduled maintenance using a grease gun. ABI recommends using high temp grease to help prevent excess wear or damage to moving parts.

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

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

Aerator Maintenance (optional attachment):

Periodically check the Aerator to make sure that none of the tines are damaged. Make sure to check for any bends or cracks. If any tines are found to be damaged remove and replace them prior to using the Aerator.

Check to make sure that all nuts on the tines head assembly are tight and secure.

Check to ensure that the pillow block bearing assembly is secured and bearings are moving freely. If bearings are not moving freely grease them and test again. If bearings are found to be damaged, replace them prior to using the Aerator.

There are 4 pillow block bearings on the Aerator. These will need to be greased once a month with 2-3 pumps of grease.

Seed/Fertilizer Spreader Maintenance (optional attachment):

Lubricate the hopper and diffuser cables on a daily basis using Silicone spray grease.

Clean debris and product from hopper and around the base of the hopper daily to prevent buildup of material.

Check Hydraulic hose fittings and hoses to for leaks or loose fittings. Tighten fittings if loose, and replace if damage to the hoses is found.

Cultipacker Maintenance (Optional attachment):

Clean the cultipacker steel packer off after every use to help prevent excess build up.

There are 2 pillow block bearings located at the ends of the steel packer shaft. These should be greased after every 4-5 hours of use, or more frequently when using the cultipacker in high dust environments.

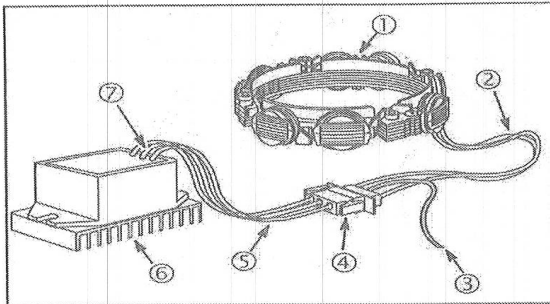
Charging Issues:

20 Amp Regulated Alternator

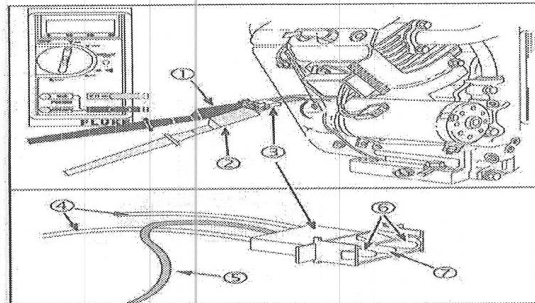
The 20 amp regulated alternator system provides AC current through two output leads to the regulator-rectifier. The regulator-rectifier converts the AC current to DC, and regulates current to the battery. The charging rate will vary with engine RPM and temperature.

1. Stator assembly (1) Figure 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:

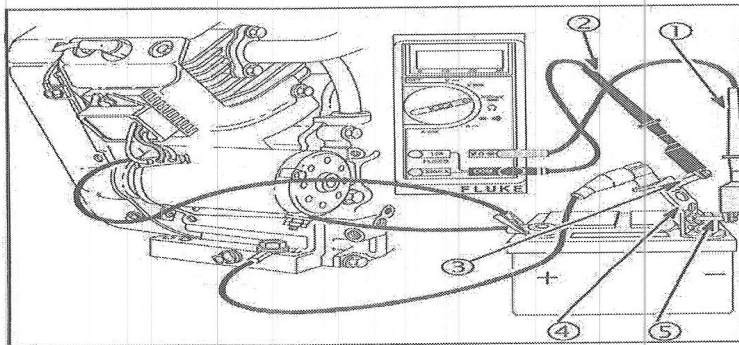
DC Shunt #19359

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 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 #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.



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



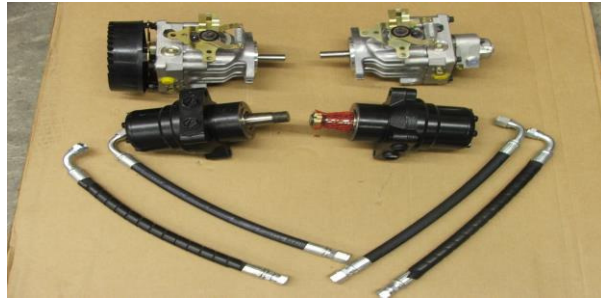
(Front tire assembly)



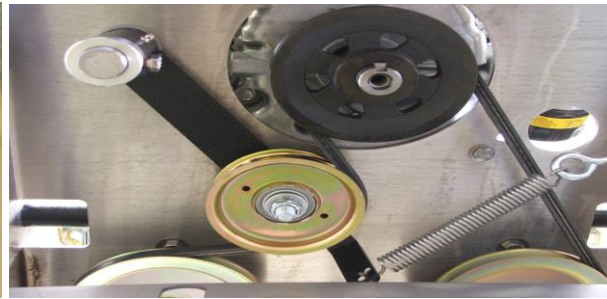
(Rear tire assembly)

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)

<i>Part #</i>	<i>Description</i>	<i>Qty</i>
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
HHCS5-38112	Bolt	10
FW-SAE-38	Flat Washer	20
NNC-38	Nylon Nut	10
HHCS8-516134	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

<i>Part #</i>	<i>Qty</i>	<i>Description</i>
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

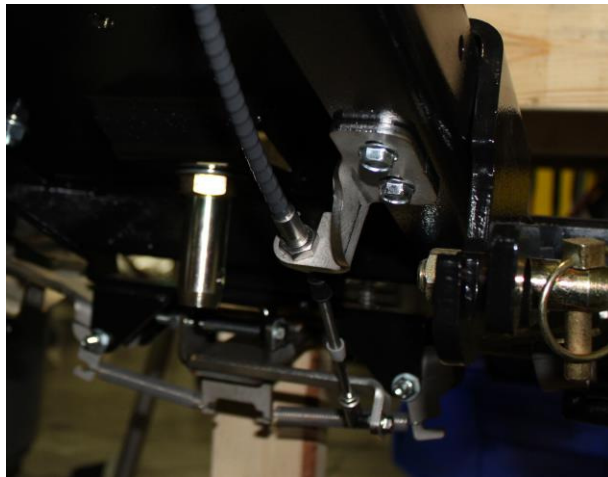


(*if parts needed for pivot point*)

<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

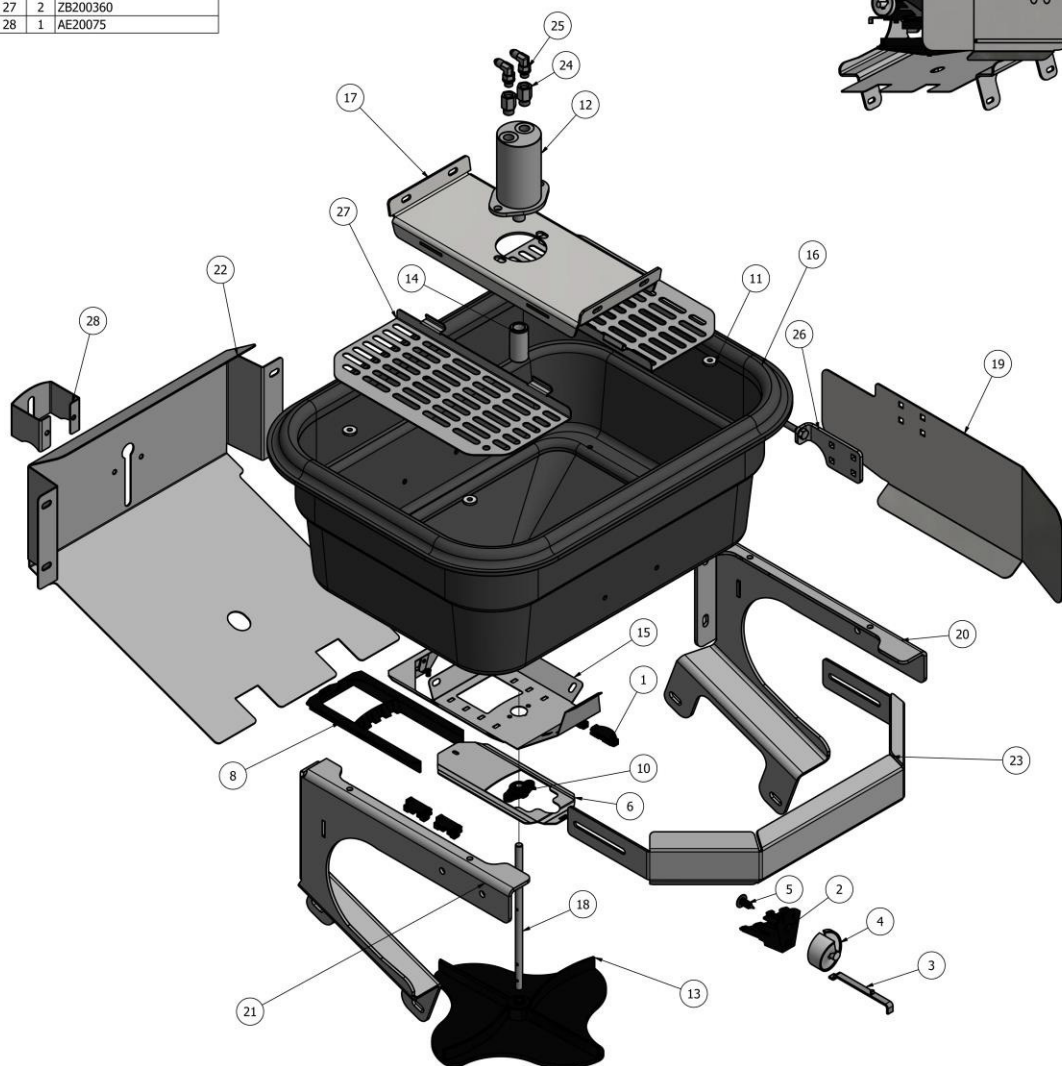
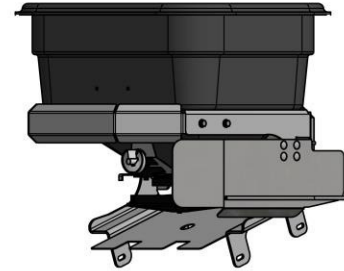
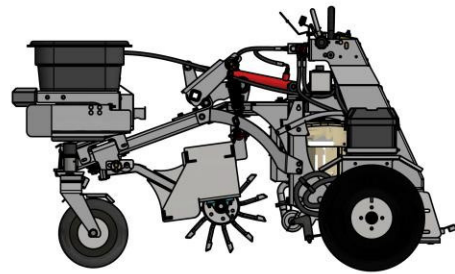


(current Locking Caster Cable/Bracket)

120 lb Hopper Parts (if applicable)

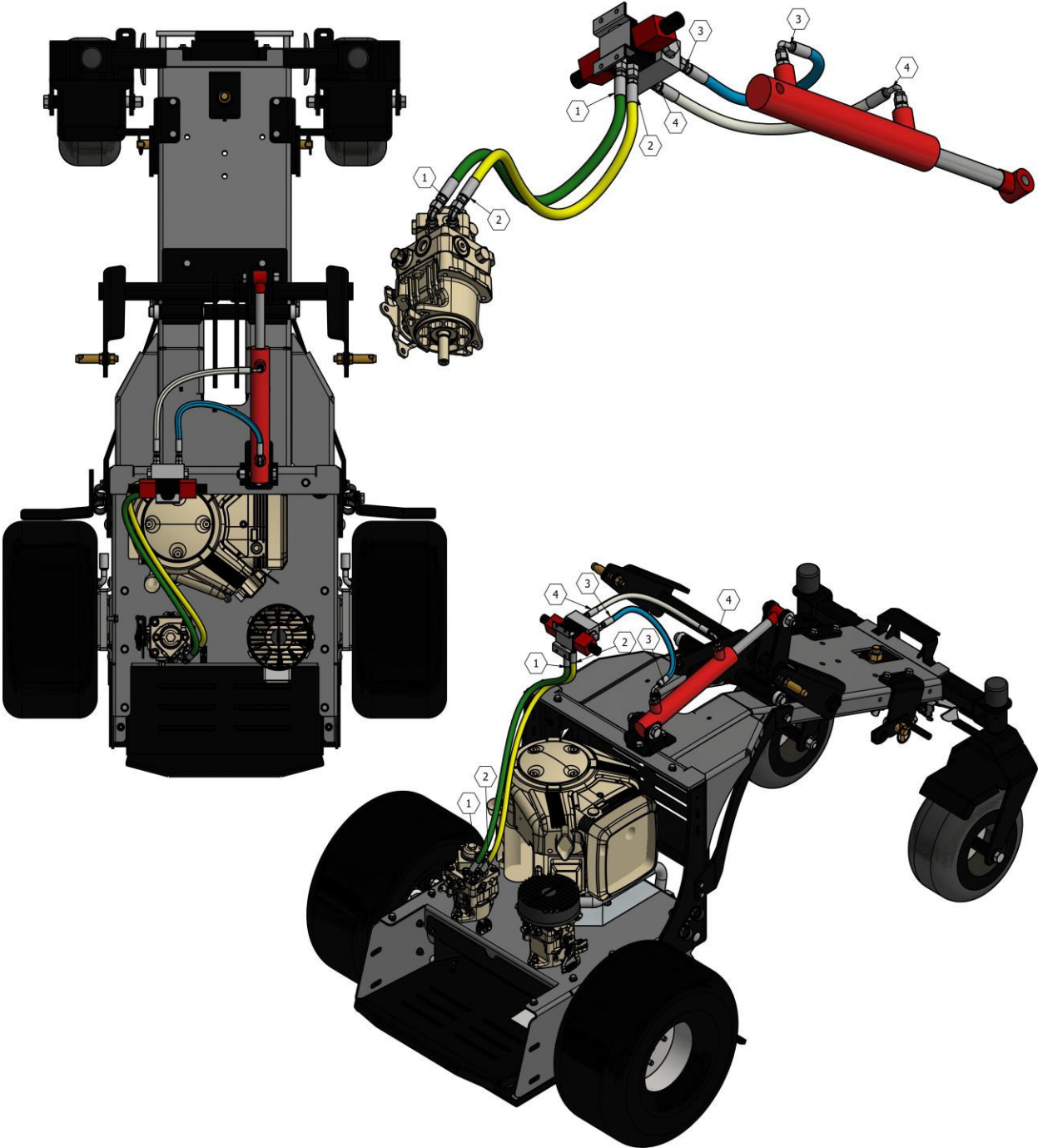
Hopper Kit

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



Cylinder Routing

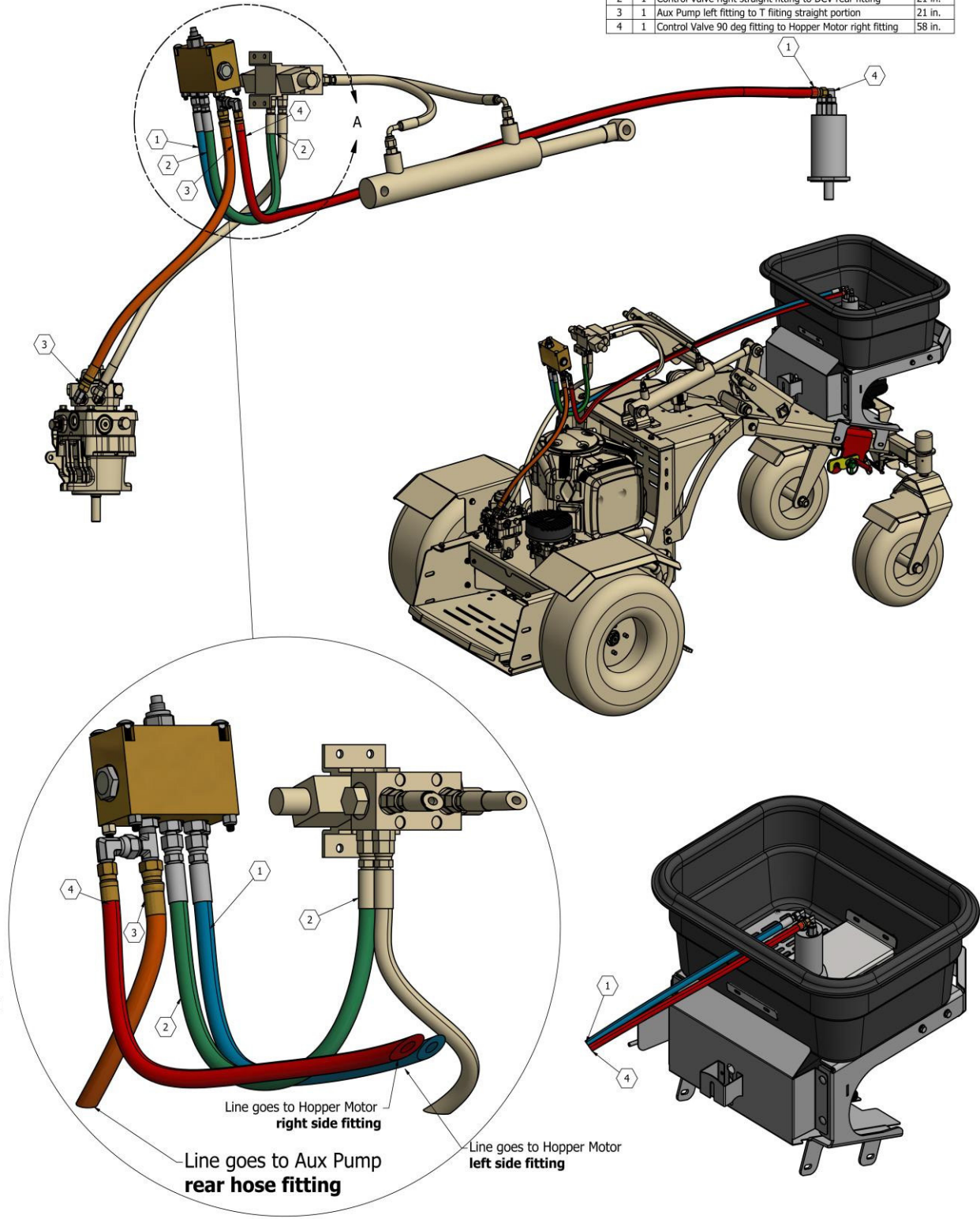
PARTS LIST			
ITEM	QTY	DESCRIPTION	LENGTH
1	1	Aux Pump left fitting to DC Valve rear under fitting	31 in.
2	1	Aux Pump right fitting to DC Valve front under fitting	31 in.
3	1	DC Valve front right fitting to Cylinder rear fitting	15 in.
4	1	DC Valve front left fitting to Cylinder front fitting	15 in.



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**.

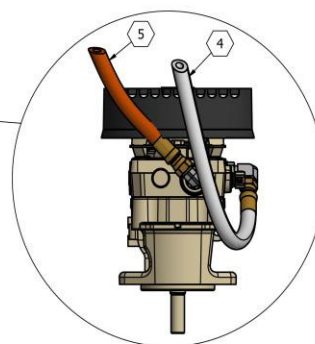
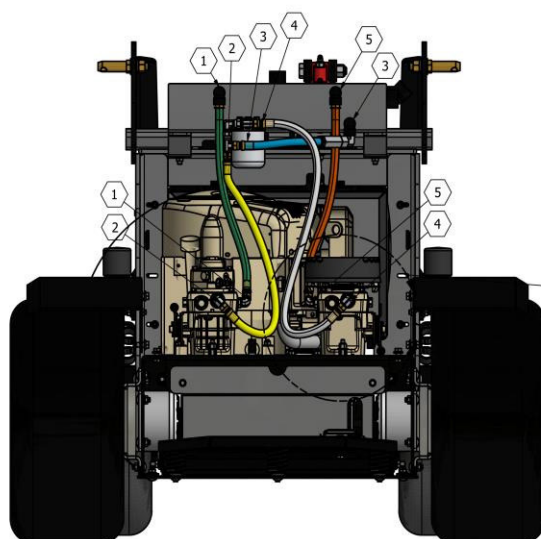
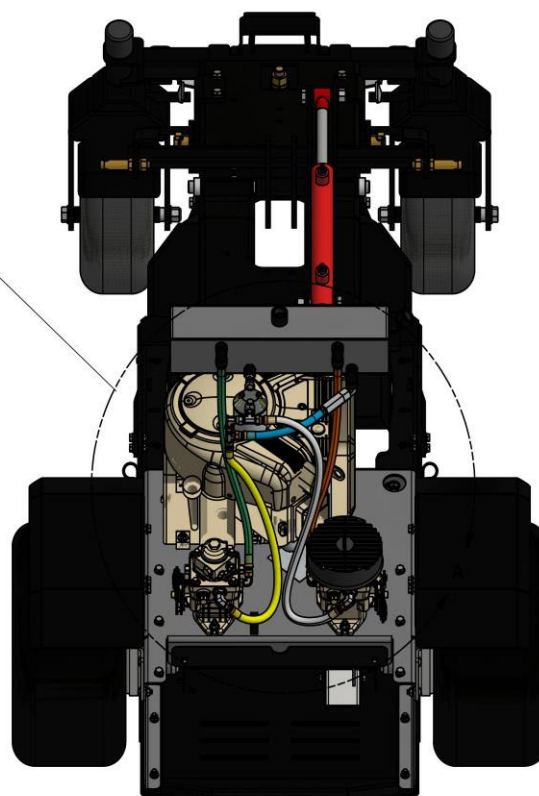
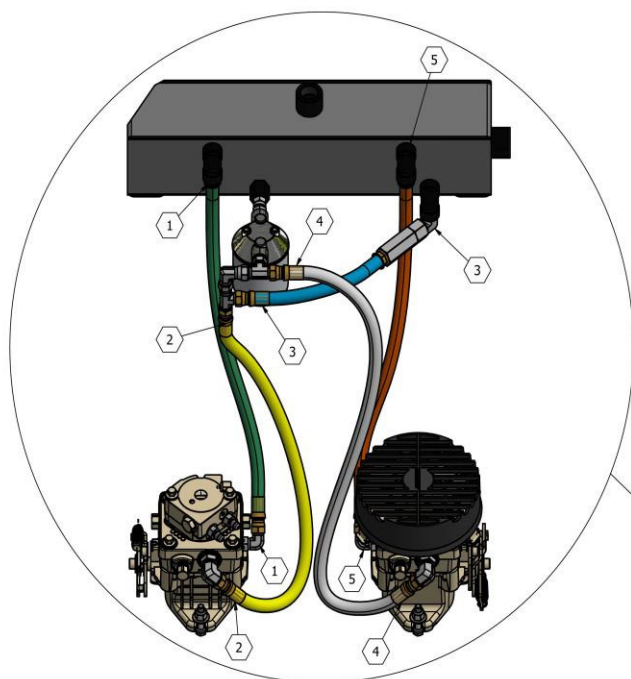
Hopper Routing

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.



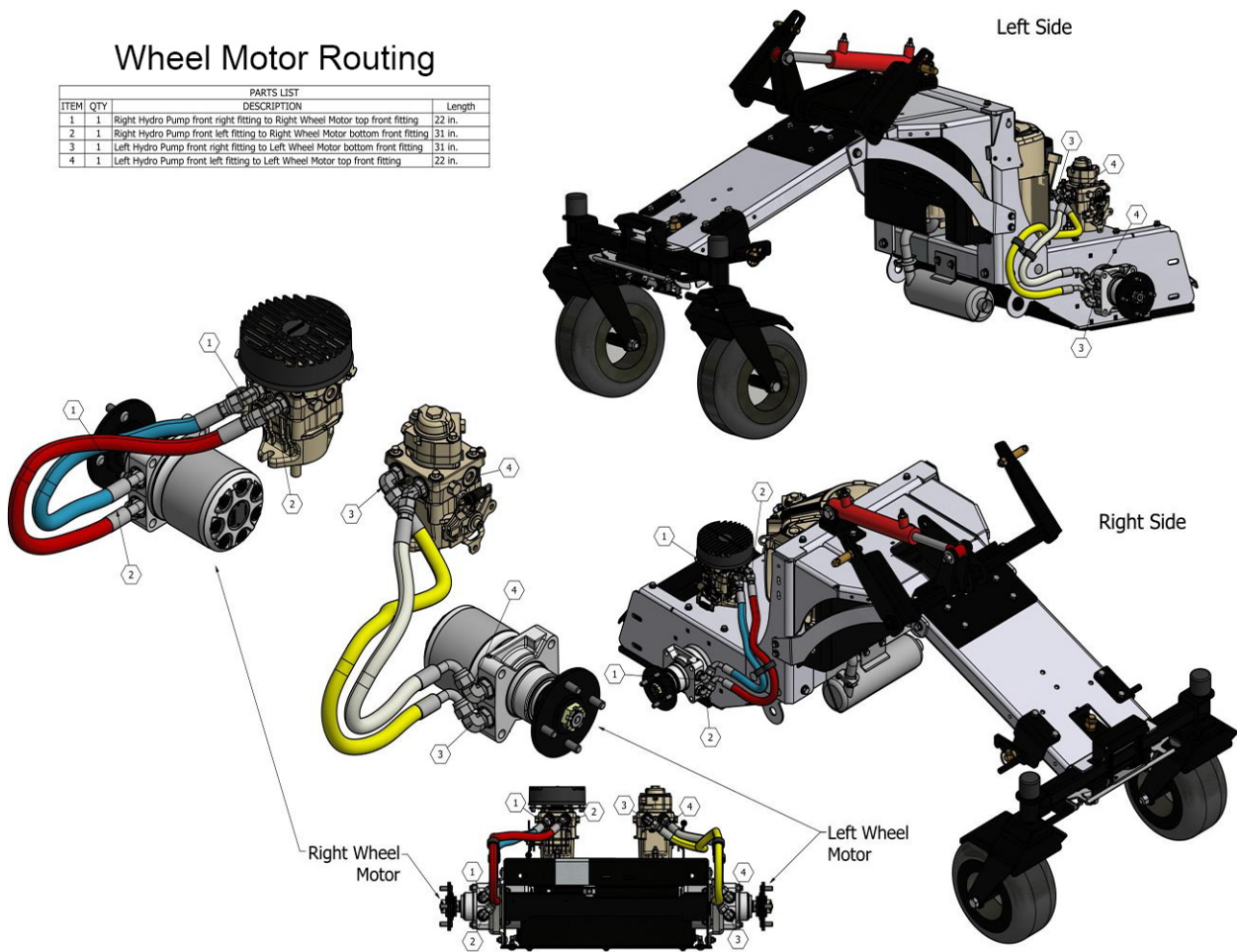
Tank Routing

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.



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

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
HHSC5-3410	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\ ZPLUG\nPR-1HBB-PB1X-XXXX\nLARGE	1

80400-C	R-HYD. PUMP W/ FAN Z-PLUG\PR-2KBB-GAIC-XXXX\LARGE	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

After reading the ABI Force Manual if there are additional questions regarding the use, maintenance, setup, operation, or to purchase additional attachments or parts for the ABI Force, or any of the many attachments; please contact ABI's Customer Service Department. For information on contacting the ABI Customer Service Department turn to page 2.



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