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FAST AG Solutions warrants to the buyer that the new machinery is free from defects in material and workmanship.

This warranty is only effective as to any new machinery which has not been altered, changed, repaired or treated since its delivery to the buyer, other than by FAST AG Solutions or its authorized dealers or employees, and does not apply to accessories, attachments, tools or parts, sold or operated with the new machinery, if they have not been manufactured by FAST AG Solutions.

FAST AG Solutions shall only be liable for defects in the materials or workmanship attributable to faulty material or bad workmanship that can be proved by the buyer, and specifically excludes liability for repairs arising as a result of normal wear and tear of the new machinery or in any other manner whatsoever, and without limiting the generality of the foregoing, excludes application or installation of parts not completed in accordance with this operator's manual, specifications, or printed instructions.

Written notice shall be given by registered mail, to the Manufacturer within seven (7) days after the defect shall have become apparent or the repairs shall have become necessary, addressed as follows:

FAST AG Solutions
4130 Commerce Boulevard
Windom, MN 56101

This warranty shall expire one (1) year after the date of delivery of the new machinery.

If these conditions are fulfilled, FAST AG Solutions shall at its own cost and at its own option either repair or replace any defective parts provided that the buyer shall be responsible for all expenses incurred as a result of repairs, labor, parts, transportation or any other work, unless FAST AG Solutions has authorized such expenses in advance.

The warranty shall not extend to any repairs, changes, alterations, or replacements made to the new equipment other than by FAST AG Solutions or its authorized dealers or employees.

This warranty extends only to the original owner of the new equipment.

Rubber parts (including tires, hoses, grommets) are not warranted.

This warranty is limited to the terms stated herein and is in lieu of any other warranties whether express or implied, and without limiting the generality of the foregoing, excluded all warranties, express or implied or conditions whether statutory or otherwise as to quality and fitness for any purpose of the new equipment. the Manufacturer disclaims all liability for incidental or consequential damages.

This Applicator is subject to design changes and FAST AG Solutions shall not be required to retrofit or exchange items on previously sold units except at its own option.

Warranty void if not registered.
Warranty Registration
This form must be filled out by the dealer and signed by both the dealer and the customer at the time of delivery.

<table>
<thead>
<tr>
<th>Customer Name</th>
<th>Address</th>
<th>City</th>
<th>State</th>
<th>Zip</th>
</tr>
</thead>
<tbody>
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<td></td>
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</table>

<table>
<thead>
<tr>
<th>Dealer Name</th>
<th>Address</th>
<th>City</th>
<th>State</th>
<th>Zip</th>
</tr>
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<tbody>
<tr>
<td></td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>Applicator Model</th>
<th>Serial Number</th>
<th>Delivery Date</th>
</tr>
</thead>
<tbody>
<tr>
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</tr>
</tbody>
</table>

DEALER INSPECTION REPORT

___ All Fasteners Tight
___ Wheel Bolts Torqued
___ Hydraulic Hoses and Fittings Free and Tight
___ Fertilizer Hoses and Fittings Free and Tight
___ Wheel Drive Turns Freely
___ Lubricate Machine
___ Check Tire Pressure
___ Frame and Wings Level
___ Monitors and Controllers Function
___ Wiring Harness Connected

I have thoroughly instructed the buyer on the above described equipment which review included the Operator’s Manual content, equipment care, adjustments, safe operation and applicable warranty policy.

Date_____________________
Dealer’s Rep. Signature___________________________________________________

SAFETY

___ Safety Chain Installed
___ All Guards Installed
___ All Safety Signs Installed
___ Reflectors, SMV and Lights Clean
___ Review Operating and Safety Instructions

The above equipment and Operator’s Manual have been received by me and I have been thoroughly instructed as to care, adjustments, safe operation and applicable warranty policy.

Date_____________________
Owner’s Signature________________________________________________________

White - FAST
Yellow - Dealer
Pink - Customer
WARRANTY REGISTRATION FORM

FAST 813P / 833P Applicator

APPLICATOR SERIAL NUMBER ________________________________

DATE PURCHASED _____________/_____/__________

NUMBER OF COULTERS______________________________

PUMP MANUFACTURER:

(CIRCLE ONE)

ACE 150-206F       ACE 205-304F       HYPRO 9306C-HMIC-MB
READ THIS MANUAL carefully to learn how to operate and service your machine correctly. Failure to do so could result in personal injury or equipment damage. This manual and safety signs on your machine may also be available in other languages.

THIS MANUAL SHOULD BE CONSIDERED a permanent part of your machine and should remain with the machine when you sell it.

MEASUREMENTS in this manual are given in both metric and customary U.S. unit equivalents. Use only correct replacement parts and fasteners. Metric and inch fasteners may require a specific metric or inch wrench.

RIGHT-HAND AND LEFT-HAND sides are determined by facing in direction implement will travel when going forward.

WRITE PRODUCT IDENTIFICATION NUMBERS (P.I.N.) in Specification section. Accurately record all numbers to help in tracing machine should it be stolen. Your dealer also needs these numbers when you order parts. File identification numbers in a safe place off machine.

BEFORE DELIVERING THIS MACHINE, your dealer performed a pre-delivery inspection.

THIS LIQUID APPLICATOR IS DESIGNED SOLELY for use in customary agricultural or similar operations for the purpose of side dressing row crops (“INTENDED USE”). Use in any other way is considered as contrary to the intended use. The manufacturer accepts no liability for damage or injury resulting from this misuse, and these risks must be borne solely by the user. Compliance with and strict adherence to the conditions of operation, service and repair as specified by the manufacturer also constitute essential elements for the intended use.
THIS LIQUID APPLICATOR SHOULD BE OPERATED, serviced and repaired only by persons familiar with all its particular characteristics and acquainted with the relevant safety rules (accident prevention). The accident prevention regulations, all other generally recognized regulations on safety and occupational medicine and the road traffic regulations must be observed at all times. Any arbitrary modifications carried out on this LIQUID APPLICATOR will relieve the manufacturer of all liability for any resulting damage or injury.

WARRANTY is provided as part of FAST's support program for customers who operate and maintain their equipment as described in this manual. Warranty is explained on warranty certificate which you should have received from your dealer.

This warranty provides you assurance that FAST will back its products where defects appear within warranty period. In some circumstances, by FAST also provides field improvements, often without charge to customer, even if product is out of warranty. Should equipment be abused, or modified to change its performance beyond original factory specifications, warranty will become void and field improvements may be denied. Setting fuel delivery above specifications or otherwise overpowering machines will result in such action.

TIRE MANUFACTURER'S warranty applicable to your machine may not apply outside U.S.

If you are not the original owner of this machine, it is in your interest to contact your local FAST dealer to inform them of this unit's serial number. This will help FAST notify you of any issues or product improvements.
After machine has been completely assembled, inspect to be sure it is in good running order before delivering to customer. The following checklist is a reminder of points to inspect. Check off each item as it is found satisfactory or after proper adjustment is made.

- SMV emblem installed; protective shipping tape removed from reflectors and lights are installed.
- All grease fittings have been lubricated. (See LUBRICATION AND MAINTENANCE section in this manual.)
- Inspect to be sure all nuts have been tightened to proper torque and all cotter pins spread.
- Tires are properly inflated. Tighten wheel bolts to specified torque.
- Make sure fertilizer coulters are properly adjusted.
- Warning lights are properly installed and operational.
- Make sure all customer-ordered attachments have been installed or are available for delivery.
- Any parts scratched in shipment have been touched up with paint.
- Remove all shipping decals.
- This machine has been thoroughly checked and to the best of my knowledge is ready for delivery to the customer.
- Verify transport pins are inserted in transport hole.

Signed: _________________________
Date: _________________________
At the time machine is delivered, following checklist is a reminder of information which should be conveyed directly to the customer. Check off each item as it is fully explained to customer.

☐ Tell customer to use proper tools.
☐ Explain to customer that life expectancy of this or any other machine depends on regular lubrication as directed in operator's manual.
☐ Give operator's manual to customer and explain all operating adjustments.
☐ Make customer aware of all safety precautions that must be followed while using this machine.
☐ When machine is transported on a road or highway at night or during day, accessory lights and devices should be used for adequate warning to operators of other vehicles. In this regard, tell customer to check local governmental regulations.
☐ To the best of my knowledge, this machine has been delivered ready for field use and customer has been fully informed as to proper care and operation.

Signed: _________________________
Date: _________________________
The following is a suggested list of items to be checked at a dealer-customer mutually agreeable time during the first operating season.

- Check with customer as to performance of machine. Make certain proper operating adjustments are understood.
- If possible, operate machine to see that it is functioning properly.
- Acquaint customer with any special attachment which will help do a better job.
- Go over entire machine for loose or missing hardware.
- Check for broken or damaged parts.
- Ask customer if recommended periodic lubrication has been performed.
- Review operator's manual with customer and stress importance of proper lubrication and safety precautions.

Signed: _________________________

Date: _________________________
<table>
<thead>
<tr>
<th>Name</th>
<th>Model Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Post Office</td>
<td>P.I.N. Number</td>
</tr>
<tr>
<td>County</td>
<td>State</td>
</tr>
<tr>
<td></td>
<td>Date Purchased</td>
</tr>
</tbody>
</table>
Recognize Safety Information

This is a safety-alert symbol. When you see this symbol on your machine or in this manual, be alert to the potential for personal injury.

Follow recommended precautions and safe operating practices.

Understand Signal Words

A signal word—DANGER, WARNING, or CAUTION—is used with the safety-alert symbol. DANGER identifies the most serious hazards.

DANGER or WARNING safety signs are located near specific hazards. General precautions are listed on CAUTION safety signs. CAUTION also calls attention to safety messages in this manual.

Follow Safety Instructions

Carefully read all safety messages in this manual and on your machine safety signs. Keep safety signs in good condition. Replace missing or damaged safety signs. Be sure new equipment components and repair parts include the current safety signs. Replacement safety signs are available from your FAST dealer.

There can be additional safety information contained on parts and components sourced from suppliers that is not reproduced in this operator's manual.

Learn how to operate the machine and how to use controls properly. Do not let anyone operate without instruction.

Keep your machine in proper working condition. Unauthorized modifications to the machine may impair the function and/or safety and affect machine life.

If you do not understand any part of this manual and need assistance, contact your FAST dealer.
Prepare for Emergencies

Be prepared if a fire starts.
Keep a first aid kit and fire extinguisher handy.
Keep emergency numbers for poison control center, doctors, ambulance service, hospital, and fire department near your telephone.

Wear Protective Clothing

Wear close fitting clothing and safety equipment appropriate to the job.
Operating equipment safely requires the full attention of the operator. Do not wear radio or music headphones while operating machine.

Protect Against Noise

Prolonged exposure to loud noise can cause impairment or loss of hearing.
Wear a suitable hearing protective device such as earmuffs or earplugs to protect against objectionable or uncomfortable loud noises.

Practice Safe Maintenance

Understand service procedure before doing work. Keep area clean and dry.
Never lubricate, service, or adjust machine while it is moving. Keep hands, feet, and clothing from power-driven parts. Disengage all power and operate controls to relieve pressure. Lower equipment to the...
ground. Stop the engine. Remove the key. Allow machine to cool.

Securely support any machine elements that must be raised for service work.

Keep all parts in good condition and properly installed. Fix damage immediately. Replace worn or broken parts. Remove any buildup of grease, oil, or debris.

On self-propelled equipment, disconnect battery ground cable (-) before making adjustments on electrical systems or welding on machine.

On towed implements, disconnect wiring harnesses from tractor before servicing electrical system components or welding on machine.

**Support Raised Equipment**

Avoid Heating Near Pressurized Fluid Lines

Flammable spray can be generated by heating near pressurized fluid lines, resulting in severe burns to yourself and bystanders. Do not heat by welding, soldering, or using a torch near pressurized fluid lines or other flammable materials. Pressurized lines can accidentally burst when heat goes beyond the immediate flame area.

Avoid High-Pressure Fluids

Inspect hydraulic hoses periodically – at least once per year – for leakage, kinking, cuts, cracks, abrasion, blisters, corrosion, exposed wire braid or any other signs of wear or damage.

Replace worn or damaged hose assemblies immediately with FAST approved replacement parts.

Escaping fluid under pressure can penetrate the skin causing serious injury.

Avoid the hazard by relieving pressure before disconnecting hydraulic or other
lines. Tighten all connections before applying pressure.

Search for leaks with a piece of cardboard. Protect hands and body from high-pressure fluids.

If an accident occurs, see a doctor immediately. Any fluid injected into the skin must be surgically removed within a few hours or gangrene may result. Doctors unfamiliar with this type of injury should reference a knowledgeable medical source.

**Inspect Lift Circuit Hoses**

Avoid serious injury or death while working under a raised implement.

Hydraulic hoses between the lift cylinders and hydraulic lock-up valves should be inspected frequently for leakage, kinking, cuts, cracks, abrasion, blisters, corrosion, exposed wire braid or any other signs of wear or damage. Worn or damaged hose assemblies can fail during use and should be replaced immediately. See your Fast dealer for replacement hoses.

**Store Attachments Safely**

Stored attachments such as dual wheels can fall and cause serious injury or death. Securely store attachments and implements to prevent falling. Keep playing children and bystanders away from storage area.

**Service Tires Safely**

CAUTION: Explosive separation of a tire and rim parts can cause serious injury or death.

Do not attempt to mount a tire unless you have the proper equipment and experience to perform the job.
Always maintain the correct tire pressure. Do not inflate the tires above the recommended pressure.

Never weld or heat a wheel and tire assembly. The heat can cause an increase in air pressure resulting in a tire explosion. Welding can structurally weaken or deform the wheel.

When inflating tires, use a clip-on chuck and extension hose long enough to allow you to stand to one side and NOT in front of or over the tire assembly. Use a safety cage if available.

Check wheels for low pressure, cuts, bubbles, damaged rims or missing lug bolts and nuts.

Dispose of Waste Properly

Improperly disposing of waste can threaten the environment and ecology. Potentially harmful waste used with equipment include such items as oil, fuel, coolant, brake fluid, filters, and batteries.

Use leakproof containers when draining fluids. Do not use food or beverage containers that may mislead someone into drinking from them.

Do not pour waste onto the ground, down a drain, or into any water source.

Air conditioning refrigerants escaping into the air can damage the Earth’s atmosphere. Government regulations may require a certified air conditioning service center to recover and recycle used air conditioning refrigerants.

Handle Agricultural Chemicals Safely

Chemicals used in agricultural applications such as fungicides, herbicides, insecticides, pesticides, rodenticides, and fertilizers can be harmful to your health or the environment if not used carefully.

Always follow all label directions for effective, safe, and legal use of agricultural chemicals.

Reduce risk of exposure and injury:
Wear appropriate personal protective equipment as recommended by the manufacturer. In the absence of manufacturer's instructions, follow these general guidelines:

Chemicals labeled 'Danger': Most toxic. Generally require use of goggles, respirator, gloves, and skin protection.

Chemicals labeled 'Warning': Less toxic. Generally require use of goggles, gloves, and skin protections.

Chemicals labeled 'Caution': Least toxic. Generally require use of gloves and skin protection.

Avoid inhaling vapor, aerosol or dust.
Always have soap, water, and towel available when working with chemicals. If chemical contacts skin, hands, or face, wash immediately with soap and water. If chemical gets into eyes, flush immediately with water.

Wash hands and face after using chemicals and before eating, drinking, smoking, or urination.

Do not smoke or eat while applying chemicals.

After handling chemicals, always bathe or shower and change clothes. Wash clothing before wearing again.

Seek medical attention immediately if illness occurs during or shortly after use of chemicals.

Keep chemicals in original containers. Do not transfer chemicals to unmarked containers or to containers used for food or drink.

Store chemicals in a secure, locked area away from human or livestock food. Keep children away.

Always dispose of containers properly. Triple rinse empty containers and puncture or crush containers and dispose of properly.

Direct exposure to hazardous chemicals can cause serious injury. Potentially hazardous chemicals used with FAST equipment include such items as lubricants, coolants, paints, and adhesives.

A Material Safety Data Sheet (M/SDS) provides specific details on chemical products: physical and health hazards, safety procedures, and emergency response techniques.

Check the M/SDS before you start any job using a hazardous chemical. That way you will know exactly what the risks are and how to do the job safely. Then follow procedures and recommended equipment.
Before operating, make sure air has been bled from wing-fold hydraulic system.

Be sure area around machine is clear before raising or lowering machine frame or wings.

Do not operate with wings folded.

Do not operate close to the edge of a ditch, creek, gully or steep embankment.

Avoid holes, ditches and obstructions which may cause tractor, machine, or towed equipment to roll over, especially on hillsides.

Avoid sharp turns on hillsides.

Slow down when turning or traveling over rough ground, and when turning on inclines.

Always shut off tractor and shift to PARK or set brakes when leaving tractor.

Remove key when leaving tractor unattended.

Always have tractor stopped on level ground when raising or lowering wings.

Operate machine from tractor seat only.

If chemicals are used, follow manufacturer’s recommendations for handling and storage.

Tow machine behind a properly equipped tractor only.

Prevent collisions between other road users, slow moving tractors with attachments or towed equipment, and self-propelled machines on public roads.

Frequently check for traffic from the rear, especially in turns, and use turn signal lights.

Use headlights, flashing warning lights, and turn signals day and night. Follow local regulations for equipment lighting and marking. Keep lighting and marking visible, clean, and in good working order. Replace or repair lighting and marking that has been damaged or lost.

Only allow the operator on the machine. Keep riders off.

Riders on machine are subject to injury such as being struck by foreign objects and being thrown off of the machine. Riders also obstruct the operator’s view resulting in the machine being operated in an unsafe manner.
CAUTION: Be sure all bystanders are clear of applicator.

IMPORTANT: Transport applicator only with tank EMPTY to prevent applicator damage.

This applicator is not equipped with service or parking brakes.

The maximum transport speed for this implement is 20 mph (32 km/h).

Some tractors are capable of operating at speeds that exceed the maximum transport speed of this implement. Regardless of the maximum speed capability of the tractor being used to tow this implement, do not exceed the implement's maximum transport speed.

Exceeding the implement's maximum transport speed can result in:

Loss of control of the tractor/implement combination

Reduced or no ability to stop during braking

Implement tire failure

Damage to the implement structure or its components

Use additional caution and reduce speed when towing under adverse surface conditions, when turning, and when on inclines.

For transport, the weight of the EMPTY applicator must not be more than 1.5 times the weight of the tractor. Minimum towing tractor weight for the A-Series is 15,000 lbs (6804 kg).

Never tow this implement with a motor vehicle. Tow only with a properly ballasted tractor.

EC Compliance Notification

WARNING: Environmental transportation hazard. A loaded machine driven on public roads has a high risk of tire failure. Do not use the machine for transporting product on public roads.

Never transport with the tank filled with water or chemical.
Use a Signal Person

Use a signal person to direct movement of the tractor/fertilizer cart combination, whenever the tractor operator’s view is obstructed.

Designate one individual as THE signal person. Always have signal person stand in clear view. Be sure signal person stays a safe distance away from the machine when it is moving.

Prior to starting the tractor, discuss hand signals and what each signal means to avoid misunderstandings and confusion which could result in a serious injury or fatal accident for someone.

Keep all bystanders away whenever the machine is moved.

Tow Loads Safely

Stopping distance increases with speed and weight of towed loads, and on slopes. Towed loads with or without brakes that are too heavy for the tractor or are towed too fast can cause loss of control. Consider the total weight of the equipment and its load.

Avoid Overhead Power Lines

CAUTION: Keep away from overhead power lines. Serious injury or death may result. Proceed cautiously under overhead power lines and around utility poles. Know the transport height of your machine. Electrocution can occur without direct contact with overhead electrical lines.
Prepare for Transport

**CAUTION:** Avoid serious injury or death to your or others. Never tow machine behind a truck or other motor vehicle. This machine is designed only to be towed with a properly sized and ballasted tractor.

Use a tractor large enough to maintain control. Properly ballast tractor for towing your machine. Refer to tractor operator’s manual and this manual to ensure that machine can be safely transported with your tractor.

Be aware of height and width restrictions to avoid collision with overpasses or other road users.

Always fold wings fully. If wing fold cylinders are removed, chain wings together to prevent accidental lowering.

Fully raise frame, close hydraulic lock-up valve (if equipped) and install transport/service locks before transporting.

Latch the tractor brakes together.

Attach proper size safety chain for load being towed. Refer to USE A SAFETY CHAIN (in this section).

**IMPORTANT:** Do not transport on a roadway unless machine is equipped with proper functioning lights and reflective marking/emblems. Ensure that the lights and reflective marking/emblems are clean and visible. Contact your FAST dealer for lights and lighting harnesses.

Always follow local and national regulations for equipment size, lighting and marking before driving on public roadways. You are responsible for understanding and complying with all requirements regarding roadway transport. Refer to USE SAFETY LIGHTS AND DEVICES (in this section).

Transport Safely

**IMPORTANT:** When transporting, always travel at a reasonable and safe speed which permits adequate control of steering and stopping. Reduce speed considerably when traveling over rough ground. Be certain everyone is clear of machine.

Refer to OBSERVE MAXIMUM TRANSPORT SPEED (in this section).

Do not exceed weight and speed guidelines (in this section).

Towed loads can swerve, upset or cause loss of control. Refer to TOW LOADS SAFELY (in this section).

Shift tractor into a lower gear when transporting down steep slopes or hills; never coast. Stop slowly.

Wide turns may be required with machine in tow. Use caution in traffic and in congested areas.

To improve stability when traveling through the field, wings should be unfolded from transport position as soon as possible after leaving the roadway.

**IMPORTANT:** When transporting machine on a roadway, ALWAYS USE appropriate lamps and devices for adequate warning to operators of other vehicles.

Refer to USE SAFETY LIGHTS AND DEVICES (in this section).
Replace missing or damaged safety signs. Use this operator’s manual for correct safety sign placement.

There can be additional safety information contained on parts and components sourced from suppliers that is not reproduced in this operator’s manual.

**Wing**
A - Warning Lights
B - Reflectors

813P / 833P Liquid Applicator: In addition to the safety features shown here, other components, systems, safety signs on the machine, safety messages and instructions in the Operator’s Manual contribute to the safe operation of this machine when combined with the care and concern of a capable operator.

The construction of this implement may not meet all local or national requirements for transport on a public roadway. In regions or countries that have national certification requirements for roadway transport, it may be impossible for this implement to be approved for such roadway transport. The customer is responsible for understanding and complying with all local, regional, and national requirements regarding roadway transport.

SMV Emblem identifies slow-moving equipment and alerts traffic approaching from rear.

A and B—REFLECTORS and WARNING LIGHTS alert other drivers to presence and width of slow-moving machinery on roadways and signal turns.
PREPARING MACHINE

Use Tractor Operator's Manual

Always refer to tractor operator's manual for specific detailed information regarding operation of equipment.

Pre-Operation Checklist

Efficient and safe operation of the machine requires that each operator reads and understands operating procedures and all related safety precautions outlined in this section. A pre-operational checklist is provided for the operator. It is important for both personal safety and maintaining the good mechanical condition of the applicator that this checklist be followed.

Before operating applicator, check the following items:

1. Lubricate machine per schedule outlined in LUBRICATION AND MAINTENANCE section.
2. Use only a tractor of adequate power and weight to operate applicator. See SPECIFICATIONS section for recommendations.
3. Be sure that machine is properly attached to tractor.
4. Inspect all hydraulic lines, hoses, fittings and couplers for tightness.
5. Check tires and verify they are inflated to specified pressure.
6. Calibrate applicator if at start of season or a new applicator rate is being used.
7. Check condition and routing of all fluid hoses and lines. Be sure that all lines are routed in large arcs. Replace any that are damaged. Re-route those that are rubbing, pinched or crimped.
8. Check placement components. Remove and replace any that are worn.
9. Remove all entangled material. Raise tool bar and turn metering pump slightly. Check that there is liquid coming out of each nozzle. Unplug or connect lines as required. Replace any nozzles that are plugged.
SPECIFICATIONS

Tractor Horsepower, Size Recommendation

Use machine with tractors providing drawbar power in following ranges.

<table>
<thead>
<tr>
<th>Model #</th>
<th>Machine Size m (ft)</th>
<th>kW (hp.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>813P</td>
<td>18 (60)</td>
<td>112 (150)</td>
</tr>
<tr>
<td>833P</td>
<td>9 - 12 (30 - 40)</td>
<td>82 - 97 (110 - 130)</td>
</tr>
</tbody>
</table>

Hydraulic System Requirements

Tractor hydraulic system with ISO hydraulic couplers is required. Four tractor control valves at the listed flow and pressure rates are required for following:

<table>
<thead>
<tr>
<th>SCV Function</th>
<th>Flow Rate</th>
<th>Pressure</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chemical/Fertilizer Pump Drive Motor</td>
<td>30 lpm (8 gpm)</td>
<td>20,684 kPa (206.8 bar) (3000 psi)</td>
</tr>
<tr>
<td>Main Fold</td>
<td>45 lpm (12 gpm)</td>
<td>20,684 kPa (206.8 bar) (3000 psi)</td>
</tr>
<tr>
<td>Main Lift Wing Kick</td>
<td>19 lpm (5 gpm)</td>
<td>20,684 kPa (206.8 bar) (3000 psi)</td>
</tr>
<tr>
<td>Flip Fold</td>
<td>19 lpm (5 gpm)</td>
<td>20,684 kPa (206.8 bar) (3000 psi)</td>
</tr>
</tbody>
</table>
CHECKING TIRE PRESSURE

Check tire pressure and inflate as necessary. (See CHECKING TIRE PRESSURE in this section.)

Perform required lubrication. (See Lubrication section.)

Inspect for loose, damaged or missing parts. Repair or replace parts before entering field.

Make sure hydraulic hoses and harnesses do not interfere with moving parts. Relocate hoses and harnesses, and retain with clamps.

**Checking Tire Pressure**

⚠️ **CAUTION:** Avoid loss of vehicle control during transport from failure of overloaded tires, which could cause serious injury or death to you or others.

Equal pressure in all tires is necessary for even penetration. A low tire will cause deeper penetration on one side than other. Increased penetration on one side will result in side draft of machine. Inflate tires to shown specification.

<table>
<thead>
<tr>
<th>Tire Size</th>
<th>Pressure</th>
</tr>
</thead>
<tbody>
<tr>
<td>20.5 x 8-10</td>
<td>621 kPa (6.21 bar) (90 psi)</td>
</tr>
<tr>
<td>6.7R15</td>
<td>303 kPa (3.03 bar) (44 psi)</td>
</tr>
</tbody>
</table>

**CHECKING WHEEL NUTS**

A - Gauge Wheel Nut

Check tightness of all wheel nuts during first week of operation and periodically after that.

Tighten all wheel bolts to specification.

<table>
<thead>
<tr>
<th>Item</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>(A) Gauge Wheel Nut</td>
<td>95 N-m (70 ft-lbs)</td>
</tr>
</tbody>
</table>
ATTACHING and DETACHING

Attach Machine Safely

CAUTION: Prevent personal injury caused by unexpected movement of machine. Engage parking brake and/or place transmission in PARK, shut off engine, and remove key before working around hitch.

Making Proper Hose Connections

CAUTION: Escaping fluid under pressure can penetrate skin causing serious injury. Avoid hazard by relieving pressure before disconnecting hydraulic or other lines. Tighten all connections before applying pressure. Search for leaks with a piece of cardboard. Protect hands and body from high-pressure fluids.

If an accident occurs, see a doctor immediately. Any fluid injected in skin must be surgically removed within a few hours or gangrene may result. Doctors unfamiliar with this type of injury should reference a knowledgeable medical source. Such information is available from Deere & Company Medical Department in Moline, Illinois, U.S.A.

CAUTION: Hydraulic hoses can fail due to physical damage, kinks, age and exposure. Check hoses regularly. Replace damaged hoses.

IMPORTANT: All hydraulic couplers must be clear of debris, dust, and sand. Use protective caps on fluid openings until ready to make connection. Foreign material can damage hydraulic system.

Identify SCV marker color (A), then use the hose key chart (B) to connect to correct SCV outlet. (See SCV Identification chart.)
Attach Machine to Tractor

CAUTION: Make sure that all bystanders are clear of working area.

1. Make sure there is enough room and clearance to safely back up to machine.
2. Slowly back tractor until holes on hitch and 3 point hitch arms are aligned.
3. Install 3 point pins and retainers.
4. Check that applicator hydraulic system is compatible with tractor hydraulics. Change applicator if required. Do not operate unless tractor and applicator hydraulics are compatible.

5. Connect Hydraulics

CAUTION: Prevent serious injury or death. Relieve hydraulic system pressure before connecting hydraulic hoses.

- Use a clean rag or paper towel to clean dirt from couplers on hose ends and tractor couplers.
- Relieve pressure in hydraulic system.
- Route hoses over hitch and connect hoses to tractor couplers. Verify couplers are securely seated. Be sure to provide slack for turning.
- Route electrical lines over hitch and connect to tractor electrical connectors. Be sure to provide slack for turning.
ATTACH WARNING LIGHT PLUG

CAUTION: When transporting machine on a road or highway at night or during day, use warning lights and devices for adequate warning to operators of other vehicles. In this regard, check local governmental regulations. Various safety lights and devices are available from your FAST dealer.

A - 7-Pin Connector Warning Light Plug

Attach warning light plug (A) to tractor outlet socket.
Be sure warning lights, reflectors, and SMV emblem are clean.

Connect Rate Controller or Nutrient Applicator System Wiring
See manufacturer's manuals for connecting controller cables to tractor.
### Legend

<table>
<thead>
<tr>
<th>Legend</th>
<th>SCV Identifier</th>
<th>Tractor Flow Type</th>
<th>Hose Color</th>
<th>SCV Usage</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>I</td>
<td>Pressure</td>
<td>Gray</td>
<td>Wing Kick Pressure (Lower)</td>
</tr>
<tr>
<td>B</td>
<td>I</td>
<td>Return</td>
<td>Orange</td>
<td>Wing Kick Return (Raise)</td>
</tr>
<tr>
<td>E</td>
<td>II</td>
<td>Pressure</td>
<td>Blue</td>
<td>Main Fold Pressure (Lower) - run in constant flow</td>
</tr>
<tr>
<td>F</td>
<td>II</td>
<td>Return</td>
<td>Green</td>
<td>Main Fold Return</td>
</tr>
<tr>
<td>C</td>
<td>III</td>
<td>Pressure</td>
<td>Purple</td>
<td>Flip Fold Pressure</td>
</tr>
<tr>
<td>D</td>
<td>III</td>
<td>Return</td>
<td>Brown</td>
<td>Flip Fold Return</td>
</tr>
<tr>
<td>G</td>
<td>IV</td>
<td>Pressure</td>
<td>Red</td>
<td>Pump Pressure</td>
</tr>
<tr>
<td>H</td>
<td>IV</td>
<td>Return</td>
<td>Yellow</td>
<td>Pump Return</td>
</tr>
</tbody>
</table>

**IMPORTANT:** Hose colors do not match SCV color
Hydraulic System Requirements

Tractor hydraulic system with ISO hydraulic couplers is required.
Four tractor control valves at the listed flow and pressure rates are required for following:

<table>
<thead>
<tr>
<th>SCV Function</th>
<th>Flow Rate</th>
<th>Pressure</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chemical/Fertilizer Pump Drive Motor</td>
<td>30 lpm (8 gpm)</td>
<td>20,684 kPa (206.8 bar) (3000 psi)</td>
</tr>
<tr>
<td>Main Fold</td>
<td>45 lpm (12 gpm)</td>
<td>20,684 kPa (206.8 bar) (3000 psi)</td>
</tr>
<tr>
<td>Main Lift Wing Kick</td>
<td>19 lpm (5 gpm)</td>
<td>20,684 kPa (206.8 bar) (3000 psi)</td>
</tr>
<tr>
<td>Flip Fold</td>
<td>19 lpm (5 gpm)</td>
<td>20,684 kPa (206.8 bar) (3000 psi)</td>
</tr>
</tbody>
</table>

HYDRAULIC HOSE KEY

<table>
<thead>
<tr>
<th>COLOR</th>
<th>DESCRIPTION OF USE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Red</td>
<td>Pump Pressure</td>
</tr>
<tr>
<td>Yellow</td>
<td>Pump Return</td>
</tr>
<tr>
<td>Blue</td>
<td>Main Fold Pressure (Lower) - run in constant flow</td>
</tr>
<tr>
<td>Green</td>
<td>Main Fold Return (Raise)</td>
</tr>
<tr>
<td>Gray</td>
<td>Main Lift Wing Kick Pressure (Lower)</td>
</tr>
<tr>
<td>Orange</td>
<td>Main Lift Wing Kick Return (Raise)</td>
</tr>
<tr>
<td>Purple</td>
<td>Flip Fold Pressure (Lower)</td>
</tr>
<tr>
<td>Brown</td>
<td>Flip Fold Return (Raise)</td>
</tr>
</tbody>
</table>
REGULATING HYDRAULIC FLOW TO THE SPRAYER PUMP

Locate your tractor model and follow the appropriate setup instructions.

WARNING: FAILURE TO REGULATE OIL FLOW WILL CAUSE MOTOR FAILURE.
WARNING: NOT SUITABLE FOR PUMPING FLAMMABLE LIQUIDS.

**LOAD SENSING CLOSED CENTER SYSTEM (LS CLOSED)**

Regulate oil flow with tractor's FLOW CONTROL and FLOW LIMITER.
(Do not use restrictor orifice.)

Setup Instructions:
1. (Optional) Remove adapter and install flow limiter in motor inlet port (marked I).
2. Close motor needle valve: loosen jam nut, screw needle valve clockwise until seated, and lock jam nut. (factory setting)
3. Shut off sprayer boom and agitation valves.
4. Adjust tractor flow control to minimum flow setting (turtle).
5. Move hydraulic lever to “Lower/Retract” position to start pump.
6. Adjust tractor flow control until sprayer shut-off pressure is below maximum shown in table on page 3.
   - Note: If the flow limiter stops oil flow to the motor:
     6a) Move hydraulic lever to “Float” or “Neutral” to remove oil pressure from the flow limiter.
     6b) Adjust tractor flow control to a lower flow position.
     6c) Repeat steps 5 and 6.
7. Open the sprayer agitation valve to get desired spraying pressure.

**PRESSURE COMPENSATING CLOSED CENTER SYSTEM (PC CLOSED)**

Regulate oil flow by using a RESTRICTOR ORIFICE.
(Do not use restrictor orifice.)

Setup Instructions:
1. Install restrictor orifice insert inside the adapter/restrictor body in the motor inlet port (marked I).
2. Close motor needle valve: loosen jam nut, screw needle valve clockwise until seated, and lock jam nut. (factory setting)
3. Set “Rabbit/Turtle” flow control to “Turtle”.
4. Move hydraulic lever to the “Lower/Retract” position to start pump.
5. Adjust “Rabbit/Turtle” flow control and sprayer agitation valve to get desired spraying pressure.

**OPEN CENTER SYSTEM (OPEN)**

Select motor size closest to tractor’s hydraulic system capacity. Regulate oil flow with motor NEEDLE VALVE.
(Do not use restrictor orifice or flow limiter.)

Setup Instructions:
1. Shut off sprayer boom and agitation valves.
2. Loosen jam nut on motor and back out needle valve 3 or 4 turns counter clockwise.
3. Set tractor throttle to sprayer operating speed.
4. Move hydraulic lever to “Lower/Retract” position to start pump.
5. Screw needle valve clockwise until sprayer shut-off pressure is below maximum shown in table on page 3 and lock jam nut.
6. Open the sprayer agitation valve to get desired spraying pressure.
813P AND 833P DOUBLE BAR TRACTOR REMOTE FUNCTIONS
Quick Reference Sheet

1) Lowers the main wing kick function

1) Unfolds main wings down from transport to field position
2) This remote must be left in the float position during field application to allow the main wings to flex up and down. Not the centered (neutral) position.

1) Unfolds flip wings down into field position

1) Kicks the main wings up

1) Folds main wings up into transport position

1) Folds flips wings up into transport position
Quick Reference for Tractor SCV Functions

**SCV I Pushed Forward**
When tractor SCV I is pushed forward, the following functions are enabled:
1. Lowers main wing kick.

**SCV I Pulled Backward**
When tractor SCV I is pulled backward, the following functions are enabled:
1. Kicks the main wing up.

**SCV II Pushed Forward**
When tractor SCV II is pushed forward, the following functions are enabled:
1. Unfolds main wings down from transport to field position.
2. This remote must be left in the **FLOAT** position during field application to allow the main wings to flex up and down. Not the centered (neutral) position.

**SCV II Pulled Backward**
When tractor SCV II is pulled backward, the following functions are enabled:
1. Fold flip wings up into transport position.
When tractor SCV III is pushed forward, the following functions are enabled:

1. Unfolds flip wings down into field position.

When tractor SCV III is pushed all the way forward into FLOAT mode, the following functions are enabled:

1. Folds main wings up into transport position.

When tractor SCV IV is pushed forward, the following functions are enabled:

1. Engages solution pump when applying.

When tractor SCV IV is pulled backward, the following functions are enabled:

1. Disengages solution pump for transport.
Hydraulic Operating Instructions

Tractor Remote SCV:

SCV1: Connected to Main Wing Kick Cylinders
SCV2: Connected to Main Wing Fold Cylinders
SCV3: Connected to Outer Flip Wing Cylinders

Unfolding the Toolbar from Transport Position to Field Position:

First remove any main wing lock pin that was installed to secure the main wing in the transport position (833P only). Next engage the tractor remote #1 to ensure that the main lift and main wing kick cylinders are in the fully raised position. With the tractor 3 point in the fully raised position, engage the tractor remote #2 to unfold the main wings from the saddled transport position. Once the main wing unfolding cylinders have fully extended, latch the tractor remote #2 in the "float" position. When the main wings are fully unfolded they will remained "kicked" up until the tractor remote #1 is activated to lower them during field operation. Next using the tractor remote #3, engage the hydraulic function to unfold the outer flip wings from the saddled transport position into the field position. Once the outer flip wings have unfolded into the field position they may be manually secured with the pins provided at each outer flip wing hinge point. The toolbar is now in the proper position to begin field application.

Field Operation of the Toolbar:

With the main wings and the flip wings completely unfolded in the field position be sure that the tractor remote #2 is correctly secured in the float position. The "float" position allows the main wing cylinders to freely retract and extend as needed for varying ground contours. Failure to allow the main wing cylinders to extend and retract may apply undue stress on the toolbar structure and folding mechanism. Next use the tractors 3 point hitch remote to lower the toolbar for field application and while also activating the tractor remote #1 to lower the main wings. The timing of lowering the wing kick feature on the tractor remote #1 should be coordinated in conjunction with the 3 point motion so that the coulters on the outside of the wings contact the ground at the same time as the coulters on the center section. This will permit the coulters on the wings to enter the soil in a near vertical position. To raise the toolbar from the ground, reverse the direction of the 3 point tractor remote and activate the tractor remote #1 to "kick" the wings into the slightly raised position. Similar to lowering the toolbar, raising the wings into the "kicked" position should be timed appropriately with the center section so the outside wing coulters will exit the soil in a near vertical position.
Folding the Toolbar from the Field Position to the Transport Position:

When the fertilizer application is completed or the toolbar needs to be transported, the pins securing the outer flip wings must first be manually removed from the hinge area. Once the pins are removed, raise the 3 point hitch and engage the tractor remote #1 until the wings are fully "kicked" up. With all the coulters now off the ground, engage the tractor remote #3 to fold up the outer flip wings into the transport position. Once the outer flip wings are completely folded up into the transport position remove remote #2 from the "float" position and activate the remote to fold the main wings into the transport position. Secure the main wing into the transport position by manually placing the transport lock pin through the appropriate holes near the main wing hinge (833P only).

Storage:

With the toolbar fully raised and the wings folded in the transport position, secure the (4) parking stands into the toolbar's center section stake pockets. Next, momentarily float the tractor remotes #1, # 2, and # 3 to release any residual pressure that may be present in the system. Lower the center section with the 3 point hitch onto the parking stands. Disconnect the hydraulic hoses from the tractor ports and uncouple the toolbar from the 3 point hitch.
TRANSPORTING

Following Safe Transport Procedures

A - Lights
B - SMV Emblem
C - Reflector Tape
D - Reflectors

CAUTION: When transporting machine on a road or highway at night or during day, use warning lights and devices for adequate warning to operators of other vehicles.

IMPORTANT: Transport applicator only with tank EMPTY to prevent applicator damage.

Check local governmental regulations. Various safety devices are available from your FAST dealer. Keep safety items in good condition. Replace missing or damaged items.

Upward force on hitch may cause instability when transporting. Add ballast to tractor as required.

BEWARE of overhead wires and narrow gates. KNOW transport height and width of your machine. (See SPECIFICATIONS section.)

Travel at a reasonable and safe speed; REDUCE speed over rough or uneven terrain, slopes, and when turning.

BE SURE SMV emblem, reflectors, and warning lights are clean, visible, and in good condition.

IMPORTANT: Gauge wheels may need to be reversed to meet transport width requirements.

Depending on machine configuration, wheels may need to be moved in, inverted or duals removed to reduce machine transport width to 12 feet or less.
Using Warning Lights

CAUTION: When transporting machine on a road or highway at night or during day, use accessory lights and devices for adequate warning to operators of other vehicles. Check local governmental regulations. Various safety lights and devices are available from FAST dealer. Keep safety items in good condition. Replace missing or damaged items.

During periods of limited visibility, use pilot vehicles and use extra lights on machine.

During normal transport, both amber warning lights will flash in unison at high intensity and both red lamps will illuminate steady at low intensity.

When a turn is signaled, red and amber tail lamps in direction of turn will flash at high intensity and in unison. Opposite side amber and red lamps will illuminate steady at high intensity.

Keep Riders Off Machine

CAUTION: Keep riders off. Riders are subject to injury such as being struck by foreign objects and being thrown off machine. Riders obstruct operator's view resulting in machine being operated in an unsafe manner.
TRANSPORTING

Transporting Machine

CAUTION: ALL MACHINES —When transporting machine on a smooth surface road, do not exceed maximum transport speed of 20 mph (32 km/h). Reduce speed considerably when traveling over rough ground.

Reduce speed when turning. Do not uncouple tractor brake pedals and apply individually in an attempt to make a tighter turn.

Serious injury or death can result from contact with electric lines. Use care when moving or operating this machine near electric lines to avoid contact. Know transport height and width of machine. Check local regulations before transporting. (See SPECIFICATION section for transport height and width of machine.)

Transport with wings fully folded. Never raise or lower center section or wings when moving. After folding, ALWAYS place the fold valve SCV (SCV II) in the neutral position for transport.

If wing-fold cylinders are removed, chain wings together to prevent injury or death caused by accidental falling of wings on you or others.
ADJUST DEPTH CONTROL

Adjust Application Depth

Depth of material placement can vary depending on type of application. Check with fertilizer or chemical manufacturer for information regarding application depth. Set tool bar, coulter or nozzle to required depth.

Check amount of down pressure applied to main wings by engaging remote #2 continuously and lowering coulters into the ground while remaining stationary with unit. Hydraulic down pressure gauge should read between 700 and 1500 psi. Down pressure may be adjusted by turning socket head screw on down pressure valve located on toolbar near wing fold manifold.

Use only as much down pressure as needed to get coulters to proper depth. Excess pressure could cause damage to toolbar. Turn socket head screw clockwise to increase pressure and turn counter clockwise to decrease down pressure. To change pressure, loosen jam nut, turn adjustment stem a 1/4 turn at a time. Do not exceed 1500 PSI.

Reverse the tractor remote #1 to fully raise toolbar and kick wings up. Toolbar is now ready for field application.

Outer Wing Valve - 40 Ft Machines:
Chemical lines to outer wings have a valve to shut off flow to nozzles on flip wing. Turn valves (E) off to get a 30 ft. application width. Open valves when 30 ft. requirements are finished. Right wing valve illustrated.

Application Depth:

• Depth of material placement can vary depending on type of application. Check with fertilizer or chemical manufacturer for information regarding application depth. Set tool bar, coulter or nozzle to required depth.

Once desired field location of application is reached, center section and main wing kick may be lowered by engaging the tractor remote #1. Even after coulters are in ground, tractor remote #1 must be constantly engaged providing oil supply to and from down pressure circuit.
Failure to keep tractor remote #1 engaged and supply a constant oil flow to down pressure system will result in coulter riding out of the ground, and could result in structural failure of the toolbar and/or hydraulic cylinder components.
Each inner wing and outer wing is equipped with a gauge wheel that helps to maintain application depth. Lower gauge wheels if soil conditions are soft and raise if hard to obtain the same application depth.

1. Remove pin (A) and adjust gauge wheel height as desired.
2. Install pin and lock pin.
3. Repeat for other side.
ADJUST GROUND SPEED

It will be necessary to establish travel speed and then set flow to give desired application rate. Always run at established travel speed.

However, best results are obtained ground speed is 8 - 13 kph (5 - 8 mph). Ground speed variations in the field will automatically be compensated.

Always operate at a comfortable speed. Do not operate so fast that tool bar or tank bounce while going through field.

Effective results require that liquid be applied at a consistent depth in a consistent manner. Machine bouncing will prevent this required consistency.

Inspect Coulters

Coulter with Knife

Coulters are used to cut crop residue on surface, penetrate ground and part the soil to accept liquid from nozzle. Coulter depth is controlled by spacers on lift cylinder ram and gauge wheel position.

Inspect coulters frequently if operating in rocky conditions. Bent, chipped or broken coulters will not penetrate soil properly. Always remove entangled material from any component.

Adjust Knives

The gap between the knife tip and the blade should be .26” (6.6mm). After the knife is properly adjusted, spin the blade to ensure the knife misses the blade, adjust as necessary.
ADJUST NOZZLES

A - Setscrew
B - Setscrew

1. Extend wings and raise tool bar to its fully up position.
2. Place safety stands under center tool bar or install cylinder transport locks on lift cylinders.
3. To adjust nozzle angle:
   • The best results are obtained when nozzle directs liquid approximately 1 inch (25 mm) behind coulter.
   • Loosen setscrew (A) to set nozzle at required angle and centered behind coulter.
4. To adjust nozzle spray pattern:
   • Sight along nozzle and coulter. Nozzle should direct liquid directly behind coulter.
   • Loosen setscrew (B) to adjust nozzle spray parallel with furrow.
   • As a general guideline, tip of nozzle should be slightly above ground as unit moves over the field. This will insure that liquid enters soil via furrow and is retained in soil as the furrow closes.

Clean Filter

CAUTION: Prevent serious injury or death.

Check chemical or fertilizer M/SDS for proper handling instructions.
Toxic chemicals can enter the body by breathing spray or contact with bare skin.
Do not take a chance with your health and safety.

Clean the filter at the start of each day when tank is empty or dirt is detected in system.
1. Clear area of bystanders.
2. Close sump valve (A) if there is liquid in tank.
3. Relieve pressure in liquid circuit.
4. Remove cap (B) to access screen.
5. Use clear water to clean screen.
6. Install screen in canister and tighten by hand.
7. Open sump valve if there is liquid in tank.
Clean System Screen

CAUTION: Prevent serious injury or death.
Check chemical or fertilizer M/SDS for proper handling instructions.
Toxic chemicals can enter the body by breathing, spray or contact with bare skin.
Do not take a chance with your health and safety.

CAUTION: Do not run pump dry, damage may occur.

NOTE: Always turn sump valve off whenever working on liquid circuit components to isolate the liquid in tank.

The liquid system is equipped with a screen (A) in suction line to remove dirt and impurities.
Close valve, remove screen and wash with clear water daily. Clean liquid is required to prevent nozzle plugging.
CAUTION: Only allow operator on machine. Keep riders off. Riders are subject to serious injury or death such as being struck by foreign objects and being thrown off machine. Riders obstruct operator's view resulting in machine being operated in an unsafe manner.
CAUTION: To help prevent serious injury or death to you or others caused by unexpected movement, be sure to service machine on a level surface. If machine is connected to tractor, engage parking brake and place transmission in PARK, shut off engine and remove key. If machine is detached from tractor, block wheels and use safety stands to prevent movement.

Grease

Greases for Air Temperature Ranges

Use grease based on NLGI consistency numbers and the expected air temperature range during the service interval.

IMPORTANT: Some types of grease thickeners are not compatible with others. Consult your grease supplier before mixing different types of grease.

Alternative and Synthetic Lubricants

Conditions in certain geographical areas may require lubricant recommendations different from those printed in this manual.

Synthetic lubricants may be used if they meet the performance requirements as shown in this manual.

The temperature limits and service intervals shown in this manual apply to both conventional and synthetic lubricants.

Re-refined base stock products may be used if the finished lubricant meets the performance requirements.
Lubricant Storage

Equipment can operate at top efficiency only when clean lubricants are used.

Use clean containers to handle all lubricants.

Whenever possible, store lubricants and containers in an area protected from dust, moisture, and other contamination. Store containers on their side to avoid water and dirt accumulation.

Make certain all containers are properly marked to identify their contents.

Properly dispose of all old containers and any residual lubricant they may contain.

Lubrication and Maintenance Intervals

Beginning and End of Season

Perform each lubrication and service illustrated in this section.

10 Hours - Daily

- Clean Strainer
- Inner Wing Lift Cylinder
- Inner Wing Lift Pins
- Coulter
- Gauge Wheel

50 Hours - Weekly

- Inner Wing Fold Pins
- Wheel pivot
- Flip Wing Fold Hinge

Before and After Each Season

- Wheel Bearings
Lubrication and Maintenance Intervals

**Strainer**

Remove and wash the fertilizer strainer screen using clean water every 8 hours.

**Main Wing Fold Hinge**

Grease Main Wing Fold Hinge daily.

**Flip Wing Fold Hinge**

Grease flip wing fold hinges weekly.

**Coulter**

Grease Coulters daily.

**Gauge Wheel**

Grease Coulter Wheel Daily.
Practice Safe Maintenance

Understand service procedure before doing work. Keep area clean and dry.

Never lubricate, service, or adjust machine while it is moving. Keep hands, feet, and clothing from power-driven parts. Disengage all power and operate controls to relieve pressure. Lower equipment to the ground. Stop the engine. Remove the key. Allow machine to cool.

Securely support any machine elements that must be raised for service work.

Keep all parts in good condition and properly installed. Fix damage immediately. Replace worn or broken parts. Remove any buildup of grease, oil, or debris.

On self-propelled equipment, disconnect battery ground cable (-) before making adjustments on electrical systems or welding on machine.

On towed implements, disconnect wiring harnesses from tractor before servicing electrical system components or welding on machine.

Work in Clean Area

Before starting a job:
- Clean work area and machine.
- Make sure you have all necessary tools to do your job.
- Have the right parts on hand.
- Read all instructions thoroughly; do not attempt shortcuts.

Service Machines Safely

Tie long hair behind your head. Do not wear a necktie, scarf, loose clothing, or necklace when you work near machine tools or moving parts. If these items were to get caught, severe injury could result.

Remove rings and other jewelry to prevent electrical shorts and entanglement in moving parts.
Support Machine Properly

Always lower the attachment or implement to the ground before you work on the machine. If the work requires that the machine or attachment be lifted, provide secure support for them. If left in a raised position, hydraulically supported devices can settle or leak down.

Do not support the machine on cinder blocks, hollow tiles, or props that may crumble under continuous load. Do not work under a machine that is supported solely by a jack. Follow recommended procedures in this manual.

When implements or attachments are used with a machine, always follow safety precautions listed in the implement or attachment operator's manual.

Avoid High-Pressure Fluids

Inspect hydraulic hoses periodically – at least once per year – for leakage, kinking, cuts, cracks, abrasion, blisters, corrosion, exposed wire braid or any other signs of wear or damage.

Replace worn or damaged hose assemblies immediately with FAST approved replacement parts.

Escaping fluid under pressure can penetrate the skin causing serious injury.

Avoid the hazard by relieving pressure before disconnecting hydraulic or other lines. Tighten all connections before applying pressure.

Search for leaks with a piece of cardboard. Protect hands and body from high-pressure fluids.

If an accident occurs, see a doctor immediately. Any fluid injected into the skin must be surgically removed within a few hours or gangrene may result. Doctors unfamiliar with this type of injury should reference a knowledgeable medical source.
CAUTION: Avoid hazards due to escaping fluid under pressure. See AVOID HIGH PRESSURE FLUIDS in this manual.

Hydraulic hoses between the lift cylinders and hydraulic lock-up valve should be inspected frequently for leakage, kinking, cuts, cracks, abrasion, blisters, corrosion, exposed wire braid or any other signs of wear or damage.

Worn or damaged hose assemblies can fail during use and should be replaced immediately.

See your FAST Dealer for replacement hoses.

CAUTION: If incorrectly rated hose is used, machine damage, injury or death could occur.

If hoses are to be fabricated, ensure hoses are rated at no less than 82,737 kPa (827 bar) (12,000 psi) burst pressure according to SAE standard J517, 100R17 hose specification.

Incorrect hose length or routing can increase chance of hose wear or damage. Use old hose as guide for length and hose routing.

Incorrect fittings can damage mating parts or cause leaks. Make sure to use steel fittings approved for use with hose manufacturer. Use correct size and thread type as replaced hose.

Tightening Hardware

Check tightness of ALL BOLTS, U-BOLTS and CAP SCREWS after first 10-15 hours of operation and again at end of first week (50 hours) of operation.

Tighten all bolts to torques specified in Service section unless otherwise noted.

Check tightness of hardware periodically.
Preventing Hydraulic System Contamination

IMPORTANT: Cleanliness is very important when working on hydraulic system. Prevent contamination by assembling cylinders, hoses, couplers, and valves in a clean area of shop.

Leave protective caps on fluid openings until ready to make connection. When charging system, use a tractor or other source that contains clean oil, free of abrasive materials. Keep couplers clean. Abrasive particles, like sand or metal fragments, can damage seals, barrels, and pistons causing internal leakage.

NOTE: In order to help keep couplers clean, always place in storage position when not attached to tractor.

IMPORTANT: To prevent contaminants from entering hydraulic system, filters must be installed at tip of supply hose (cylinder depth stop systems). Additional filters are not recommended as they will restrict oil flow and adversely affect lift time due to pressure drop.

Without filter, large dirt particles can enter cylinder and settle against top side of piston (A) where they can cut piston seal as cylinder retracts.

No filter is needed on rod end port because dirt particles entering cylinder from here will settle harmlessly against rod guide (B), away from piston seal.
PREPARING FOR STORAGE

**CAUTION:** Store unit in an area away from human activity. Do not permit children to play on or around stored applicator.

At end of season, thoroughly inspect and prepare applicator for storage. Repair or replace any worn or damaged components to prevent any unnecessary down time at beginning of next season.

1. Empty remaining liquid from tank. Flush system with water.
2. Open all liquid line connections, end cap screen canister and pump. Drain all fluids out of system.
3. Add approximately 38 L (10 gal) of RV antifreeze per 3 m (10 ft.) of toolbar.
4. Remove 90° elbow and recap valve block end.
5. Flush the system, then pump through screens, valve, nozzles/check valves and orifices/tips.
6. Thoroughly wash machine using a pressure washer to remove all dirt, mud, debris or residue to protect against corrosion.
7. Lubricate all grease points. Make sure all grease cavities have been filled with grease to remove any water residue from washing.
8. Inspect all hydraulic hoses, couplers and fittings. Tighten any loose fittings. Replace any hose that is damaged or separating from crimped end of a fitting.
9. Inspect all liquid lines and connections. Tighten any loose fittings. Replace any line that is cut, nicked or abraded.
10. Touch up all paint nicks and scratches to prevent rusting.
11. Fold inner and outer wings to transport configuration.
12. Install spacers on lift cylinder rams.
13. Move machine to a storage position.

14. Select an area that is dry, level and free of debris.
15. Place planks under jack for added support if required.
16. Unhook applicator from tractor.

**Removing from Storage**

1. Clear area of bystanders, especially small children, and remove foreign objects from machine and working area.
2. Attach tractor to applicator.
3. Check:
   - Attach and secure all liquid lines.
   - Coulters and Nozzles.
   - All hardware. Tighten as required.
   - Tire pressure.
   - All hydraulic lines, fittings and connections. Tighten as required
4. Lubricate all grease fittings.
5. Replace any defective parts.
6. Add a small amount of liquid to tank. Turn metering pump on momentarily and check that liquid comes out of each nozzle.
7. Follow pre-operation checklist before using.
TIGHTENING HARDWARE

Check tightness of ALL BOLTS, U-BOLTS and CAP SCREWS after first 10-15 hours of operation and again at end of first week (50 hours) of operation. Tighten all bolts to torques specified in Service section unless otherwise noted. Check tightness of hardware periodically.
### Metric Bolt and Screw Torque Values

<table>
<thead>
<tr>
<th>Bolt or Screw Size</th>
<th>Class 4.8 Lubricated&lt;sup&gt;1&lt;/sup&gt;</th>
<th>Dry&lt;sup&gt;2&lt;/sup&gt;</th>
<th>Class 8.8 or 9.8 Lubricated&lt;sup&gt;1&lt;/sup&gt;</th>
<th>Dry&lt;sup&gt;2&lt;/sup&gt;</th>
<th>Class 10.9 Lubricated&lt;sup&gt;1&lt;/sup&gt;</th>
<th>Dry&lt;sup&gt;3&lt;/sup&gt;</th>
<th>Class 12.9 Lubricated&lt;sup&gt;1&lt;/sup&gt;</th>
<th>Dry&lt;sup&gt;2&lt;/sup&gt;</th>
</tr>
</thead>
<tbody>
<tr>
<td>M6</td>
<td>4.7</td>
<td>42</td>
<td>6</td>
<td>53</td>
<td>8.9</td>
<td>79</td>
<td>11.3</td>
<td>100</td>
</tr>
<tr>
<td>M8</td>
<td>11.5</td>
<td>102</td>
<td>14.5</td>
<td>128</td>
<td>22</td>
<td>194</td>
<td>27.5</td>
<td>243</td>
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<tr>
<td>M10</td>
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<td>40</td>
</tr>
<tr>
<td>M12</td>
<td>40</td>
<td>29.5</td>
<td>50</td>
<td>37</td>
<td>75</td>
<td>55</td>
<td>95</td>
<td>70</td>
</tr>
<tr>
<td>M14</td>
<td>63</td>
<td>46</td>
<td>80</td>
<td>59</td>
<td>120</td>
<td>88</td>
<td>150</td>
<td>110</td>
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<tr>
<td>M16</td>
<td>100</td>
<td>74</td>
<td>125</td>
<td>92</td>
<td>190</td>
<td>140</td>
<td>240</td>
<td>175</td>
</tr>
<tr>
<td>M18</td>
<td>135</td>
<td>100</td>
<td>170</td>
<td>125</td>
<td>265</td>
<td>195</td>
<td>330</td>
<td>245</td>
</tr>
<tr>
<td>M20</td>
<td>190</td>
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<td>245</td>
<td>180</td>
<td>375</td>
<td>275</td>
<td>475</td>
<td>350</td>
</tr>
<tr>
<td>M22</td>
<td>265</td>
<td>195</td>
<td>330</td>
<td>245</td>
<td>510</td>
<td>375</td>
<td>650</td>
<td>480</td>
</tr>
<tr>
<td>M24</td>
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<td>245</td>
<td>425</td>
<td>315</td>
<td>650</td>
<td>480</td>
<td>820</td>
<td>600</td>
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<tr>
<td>M27</td>
<td>490</td>
<td>360</td>
<td>625</td>
<td>460</td>
<td>950</td>
<td>700</td>
<td>1200</td>
<td>885</td>
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<tr>
<td>M30</td>
<td>660</td>
<td>490</td>
<td>850</td>
<td>625</td>
<td>1290</td>
<td>950</td>
<td>1630</td>
<td>1200</td>
</tr>
<tr>
<td>M33</td>
<td>900</td>
<td>665</td>
<td>1150</td>
<td>850</td>
<td>1750</td>
<td>1300</td>
<td>2200</td>
<td>1625</td>
</tr>
<tr>
<td>M36</td>
<td>1150</td>
<td>850</td>
<td>1450</td>
<td>1075</td>
<td>2250</td>
<td>1650</td>
<td>2850</td>
<td>2100</td>
</tr>
</tbody>
</table>

Torque values listed are for general use only, based on the strength of the bolt or screw. DO NOT use these values if a different torque value or tightening procedure is given for a specific application. For stainless steel fasteners or for nuts on U-bolts, see the tightening instructions for the specific application. Tighten plastic insert or crimped steel type lock nuts by turning the nut to the dry torque shown in the chart, unless different instructions are given for the specific application.

1 “Lubricated” means coated with a lubricant such as engine oil, fasteners with phosphate and oil coatings, or M20 and larger fasteners with JDM F13C, F13F or F13J zinc flake coating.

2 “Dry” means plain or zinc plated without any lubrication, or M6 to M18 fasteners with JDM F13B, F13E or F13H zinc flake coating.

3 “Dry” means plain or zinc plated without any lubrication, or M6 to M18 fasteners with JDM F13B, F13E or F13H zinc flake coating.
### Unified Inch Bolt and Screw Torque Values

**Bolt or Screw Size**

<table>
<thead>
<tr>
<th>SAE Grade 1</th>
<th>SAE Grade 2(^1)</th>
<th>SAE Grade 5, 5.1 or 5.2</th>
<th>SAE Grade 8 or 8.2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lubricated(^2)</td>
<td>Dry(^3)</td>
<td>Lubricated(^4)</td>
<td>Dry(^3)</td>
</tr>
<tr>
<td>N·m</td>
<td>lb.-in.</td>
<td>N·m</td>
<td>lb.-in.</td>
</tr>
<tr>
<td>N·m</td>
<td>lb.-ft.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

| 1/4 | 3.7 | 33 | 4.7 | 42 | 6 | 53 | 7.5 | 66 | 9.5 | 84 | 12 | 106 | 13.5 | 120 | 17 | 150 |
| 5/16 | 7.7 | 68 | 9.8 | 86 | 12 | 106 | 15.5 | 137 | 19.5 | 172 | 25 | 221 | 28 | 20.5 | 35 | 26 |
| 3/8 | 13.5 | 120 | 17.5 | 155 | 22 | 194 | 27 | 240 | 35 | 26 | 44 | 32.5 | 49 | 36 | 63 | 46 |
| 7/16 | 22 | 194 | 28 | 20.5 | 35 | 26 | 44 | 32.5 | 56 | 41 | 70 | 52 | 80 | 59 | 100 | 74 |
| 1/2 | 34 | 25 | 42 | 31 | 53 | 39 | 67 | 49 | 85 | 63 | 110 | 80 | 120 | 88 | 155 | 115 |
| 9/16 | 48 | 35.5 | 60 | 45 | 76 | 56 | 95 | 70 | 125 | 92 | 155 | 115 | 175 | 130 | 220 | 165 |
| 5/8 | 67 | 49 | 85 | 63 | 105 | 77 | 135 | 100 | 170 | 125 | 215 | 160 | 240 | 175 | 305 | 225 |
| 3/4 | 120 | 88 | 150 | 110 | 190 | 140 | 240 | 175 | 300 | 220 | 380 | 280 | 425 | 315 | 540 | 400 |
| 7/8 | 190 | 140 | 240 | 175 | 190 | 140 | 240 | 175 | 490 | 360 | 615 | 455 | 690 | 510 | 870 | 640 |
| 1 | 285 | 210 | 360 | 265 | 285 | 210 | 360 | 265 | 730 | 540 | 920 | 680 | 1030 | 760 | 1300 | 960 |
| 1-1/8 | 400 | 300 | 510 | 375 | 400 | 300 | 510 | 375 | 910 | 670 | 1150 | 850 | 1450 | 1075 | 1850 | 1350 |
| 1-1/4 | 570 | 420 | 725 | 535 | 570 | 420 | 725 | 535 | 1280 | 945 | 1630 | 1200 | 2050 | 1500 | 2600 | 1920 |
| 1-3/8 | 750 | 550 | 950 | 700 | 750 | 550 | 950 | 700 | 1700 | 1250 | 2140 | 1580 | 2700 | 2000 | 3400 | 2500 |
| 1-1/2 | 990 | 730 | 1250 | 930 | 990 | 730 | 1250 | 930 | 2250 | 1650 | 2850 | 2100 | 3600 | 2650 | 4550 | 3350 |

Torque values listed are for general use only, based on the strength of the bolt or screw. DO NOT use these values if a different torque value or tightening procedure is given for a specific application. For plastic insert or crimped steel type lock nuts, for stainless steel fasteners, or for nuts on U-bolts, see the tightening instructions for the specific application. Shear bolts are designed to fail under predetermined loads. Always replace shear bolts with identical grade.

Replace fasteners with the same or higher grade. If higher grade fasteners are used, tighten these to the strength of the original. Make sure fastener threads are clean and that you properly start thread engagement. When possible, lubricate plain or zinc plated fasteners other than lock nuts, wheel bolts or wheel nuts, unless different instructions are given for the specific application.

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1 Grade 2 applies for hex cap screws (not hex bolts) up to 6 in. (152 mm) long. Grade 1 applies for hex cap screws over 6 in. (152 mm) long, and for all other types of bolts and screws of any length.

2 "Lubricated" means coated with a lubricant such as engine oil, fasteners with phosphate and oil coatings, or 7/8 in. and larger fasteners with JDM F13C, F13F or F13J zinc flake coating.

3 "Dry" means plain or zinc plated without any lubrication, or 1/4 to 3/4 in. fasteners with JDM F13B, F13E or F13H zinc flake coating.

4 "Lubricated" means coated with a lubricant such as engine oil, fasteners with phosphate and oil coatings, or 7/8 in. and larger fasteners with JDM F13C, F13F or F13J zinc flake coating.
Face Seal Fittings Assembly and Installation—All Pressure Applications

Face Seal O-Ring to Stud End Installation
1. Inspect the fitting surfaces. They must be free of dirt and/or defects.
2. Inspect the O-ring. It must be free of damage and/or defects.
3. Lubricate O-rings and install into groove using petroleum jelly to hold in place.
4. Push O-ring into groove with petroleum jelly so O-ring is not displaced during assembly.
5. Index angle fittings and tighten by hand pressing joint together to insure O-ring remains in place.
6. Tighten fitting or nut to torque value shown on the chart per dash size stamped on the fitting. DO NOT allow hoses to twist when tightening fittings.

Face Seal Adjustable Stud End O-Ring Installation
1. Back off lock nut (jam nut) and washer to full exposed turned down section of the fitting.
2. Install a thimble over the fitting threads to protect the O-ring from nicks.
3. Slide the O-ring over the thimble into the turned down section of the fitting.
4. Remove thimble.

Face Seal Straight Stud End O-Ring Installation
1. Install a thimble over the fitting threads to protect the O-ring from nicks.
2. Slide the O-ring over the thimble into the turned down section of the fitting.
3. Remove thimble.

Fitting Installation
1. Install fitting by hand until snug.
2. Position adjustable fittings by unscrewing the fitting no more than one turn.
3. Apply assembly torque per table.

Assembly Torque
1. Use one wrench to hold the connector body and one wrench to tighten nut.
2. For a hydraulic hose, it may be necessary to use three wrenches to prevent twist; one on the connector body, one on the nut, and one on the body of the hose fitting.

SAE Face Seal and O-Ring Stud End Fitting Torque Chart—Standard Pressures
### SAE Face Seal and O-Ring Stud End Fitting Torque Chart—Standard Pressure—Below 27.6 MPA (4,000 PSI)

<table>
<thead>
<tr>
<th>Nominal Tube OD</th>
<th>O-Ring Face Seal/Tube Swivel Nut</th>
<th>Bulkhead Jam Nut Torque(^a)</th>
<th>O-Ring Straight, Adjustable, and External Port Plug Stud Ends(^a)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Metric Tube OD</td>
<td>Inch Tube OD</td>
<td>Thread Size</td>
<td>Swivel Nut Hex Size</td>
</tr>
<tr>
<td>mm Dash Size</td>
<td>in.</td>
<td>mm</td>
<td>in.</td>
</tr>
<tr>
<td>5 -3</td>
<td>0.188</td>
<td>4.78</td>
<td>—</td>
</tr>
<tr>
<td>6 -4</td>
<td>0.250</td>
<td>6.35</td>
<td>9/16-18</td>
</tr>
<tr>
<td>8 -5</td>
<td>0.312</td>
<td>7.92</td>
<td>—</td>
</tr>
<tr>
<td>10 -6</td>
<td>0.375</td>
<td>9.53</td>
<td>11/16-16</td>
</tr>
<tr>
<td>12 -8</td>
<td>0.500</td>
<td>12.70</td>
<td>13/16-16</td>
</tr>
<tr>
<td>16 -10</td>
<td>0.625</td>
<td>15.88</td>
<td>1-14</td>
</tr>
<tr>
<td>20 -12</td>
<td>0.750</td>
<td>19.05</td>
<td>3-16-12</td>
</tr>
<tr>
<td>22 -14</td>
<td>0.875</td>
<td>22.23</td>
<td>3-16-12</td>
</tr>
<tr>
<td>25 -16</td>
<td>1.000</td>
<td>25.40</td>
<td>1-7-16-12</td>
</tr>
<tr>
<td>32 -20</td>
<td>1.25</td>
<td>31.75</td>
<td>1-11-16-12</td>
</tr>
<tr>
<td>50.8 -32</td>
<td>2.000</td>
<td>50.80</td>
<td>—</td>
</tr>
</tbody>
</table>

\(^a\) Tolerance is +15%, minus 20% of mean tightening torque unless otherwise specified.

\(^b\) The straight hex wrench sizes listed apply to connectors only and may not be the same as the corresponding plug of the same thread size.

\(^c\) These torques were established using steel plated connectors in aluminum and brass.
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