ACCUSHOT™

GIVE EVERY SEED ITS BEST SHOT

Quick Start Guide

Using the DICKEY-john AI-120 Monitor

CAPSTAN AG SYSTEMS, INC.
SINCE 1893
APPLICATION SYSTEMS FOR PROFESSIONALS

Great Plains
"Harvest Starts Here."

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1.0 INTRODUCTION

The AccuShot™ liquid delivery system is designed to apply a specific amount of liquid product at a specific location relative to each seed in the furrow. The correct amount of liquid product can now be delivered where the seed needs it...giving each seed a better shot at germination.

Application Based

To reduce seed burn and improve stand counts, the Operator supplies initial setup information via a VT Display so AccuShot can determine how close to the seed to apply the liquid product. By concentrating the liquid product where the seed needs it, AccuShot reduces wasted product between the seeds at wider seed spacings.

Results

Improved plant vigor and less wasted liquid product both drive more profit to the Producer's bottom line with AccuShot.

Other Manuals

The AccuShot Quick Start Guide is for use with the companion AccuShot Operator and Maintenance Manual.

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ACCUSHOT GIVE EVERY SEED ITS BEST SHOT is a trademark of Great Plains, Inc.

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2.0 SAFETY

This manual contains important information on how to safely, efficiently and correctly operate the **AccuShot System**. Following these instructions will help keep personnel safe, reduce downtime and increase the reliability and life of the equipment, its components and related systems.

- Review the Safety Information in the applicable tractor, planter and ancilliary equipment manual(s).
- Follow the instructions (in this manual) for each step thoroughly to ensure safe work conditions in and around the applicable tractor, planter and ancilliary equipment manual(s).
- It is important for all individuals working with chemicals to understand the potential risks, necessary safety precautions and proper response in the event of accidental contact.
- Review the applicable tractor, planter and ancilliary equipment manual(s) for chemical safety information.
- Review and understand procedures for obtaining and using Safety Data Sheets (SDS)and the required Personal Protective Equipment(PPE) for when working around hazardous chemicals and sharp edges and objects on applicable tractor, planter and ancillary equipment.
- Use the procedure in the appropriate Agricultural Equipment Manual for connecting, disconnecting and jump starting the machine's battery.
- Please keep this manual and all enclosed documentation in an accessible location known to all operator personnel. Keep sparks and flames away from the battery. Battery gas can explode and cause serious injury. **Do not smoke in battery charging area.**

Make certain that all personnel have read this manual and thoroughly understand safe operating procedures.

If you do not understand the AccuShot equipment after reading this manual, please obtain the proper training before working with the AccuShot system to ensure your own safety and well as your co-worker's safety.

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3.0 SETUP

AccuShot System – Screen ICON Description

Icon	Icon Descriptions - LH Side of Monitor
	Touch this icon to activate the AccuShot system.

Icon	Icon Descriptions - RH Side of Monitor
	The Alarm icon appears when there is an alarm in the system. Touch this icon to view and silence current alarms.
	Touch this icon to return to the Home Screen.
	Touch this icon to open the Placement Settings Screen.
	Touch this icon to open the Tip Calibration Screen.
	Touch this icon to open the Diagnostics Screen.
	Touch this icon to open the Tank Volume Screen.
	Touch this icon to open the Active Seed/Valve Sensor Screen.
	Touch this icon to “go to” the **Next Page** of icons.
	Touch this icon to open the Sensor Settings Screen.
	Touch this icon to open the Pump Settings Screen.

HOME Screen

The **HOME** Screen is the main user interface that provides central control of the AccuShot system.

Icon	Description
	Touch the <Home> icon to view ③ Ground Speed, ④ System Pressure, ⑤ Tank Volume and ⑥ Rate values on the **HOME** Screen. Touch and toggle ① *<Mode>* and ② *<System Control>* functions to operate the AccuShot system.
1	Mode *<Toggle>* **OFF | AUTO | MAN | ON** operating functions.
2	System Control *<Toggle>* **RUN | HOLD** operating functions.
3	Ground Speed display box
4	System Pressure display box
5	Tank Volume display box
6	Rate display box

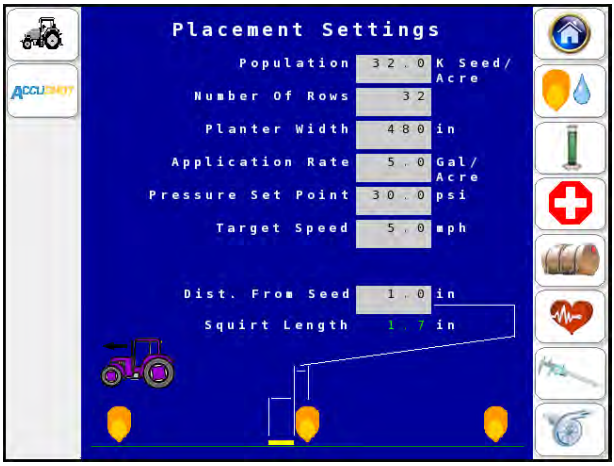
PLACEMENT Settings

Use the **PLACEMENT SETTINGS** Screen to enter / edit the placement and location of the shot in relation to the location of the seed.

Icon	Description
	Touch the <Seed Droplet> icon to set Population, number of Planter Rows, Planter Width, Application Rate, System Pressure, Target Speed, and shot Distance from the seed.

Settings	Defaults	Units of Measure
Population	32.0	Thousand (k) Seed per Acre
Number of Rows	32	
Planter Width	480	Inch
Application Rate	5.0	Gallon per Acre
Pressure Set Point	30.0	PSI
Target Speed	5.0	MPH
Dist. From Seed	1.0	Inch
Squirt Length	1.7	Inch

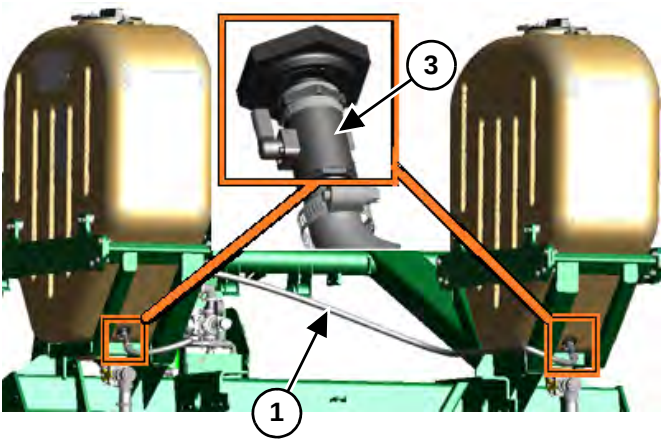
NOTICE A warning will appear on the **PLACEMENT SETTINGS** Screen when Operator-entered values may not match or align with other settings. Read the warning and touch <Accept>, <Cancel> or <OK> to continue.



Procedure for Setting Liquid Bypass for AccuShot

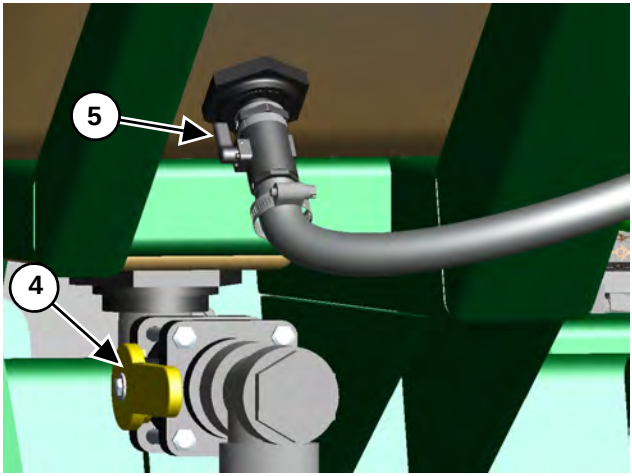
When the add-on hydraulically-driven centrifugal pump must run at different operating points on the AccuShot system, a ① liquid product bypass line(s) is (are) used to return some of the liquid back to the liquid product tank(s). This allows the pump to operate efficiently and reliably at its best efficiency point. If the pumped liquid product was returned through the suction line connections, turbulences at the pump suction would cause operational problems and even equipment damage.

AccuShot uses a Main Bypass Valve ② near the product pump and a Liquid Product Shutoff Valve ③ on the lower backside of each liquid product tank to manage different operating points. A total of up to 5.5 GPM of hydraulic flow is needed to operate the AccuShot system.



Initial Setup

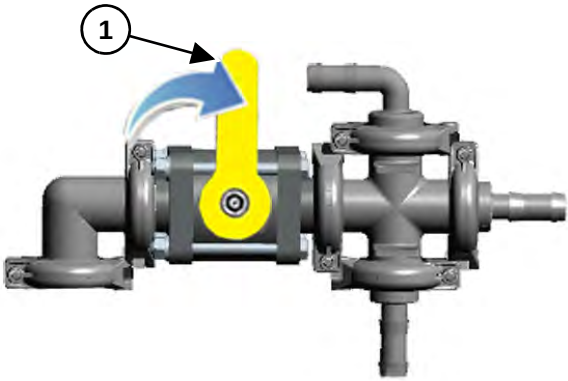
1. Fill liquid product tank(s).
2. Verify that the ④ Tank Supply Valve(s) is/are open.
3. Verify that the ⑤ Liquid Product Shutoff Valve(s), being used for Accu-Shot, is/are open on the back of the liquid product tank(s).



Close Main Bypass Valve

4. Close the ① main bypass valve (near the product pump) on the Planter.

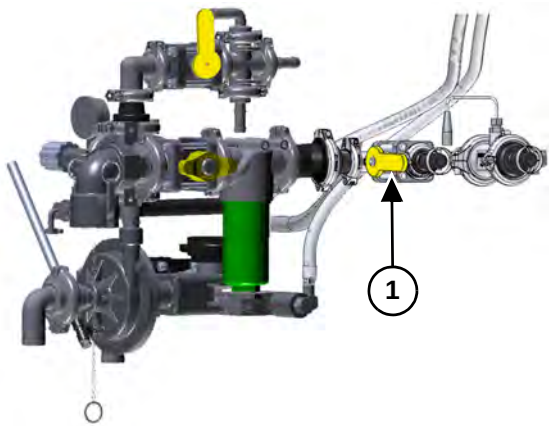
Closing Main Bypass Valve



Open Boom Shutoff Valve

5. Open ① shutoff valve to booms on the liquid product line.
6. Start the Tractor.
7. Engage the Planter Hydraulics

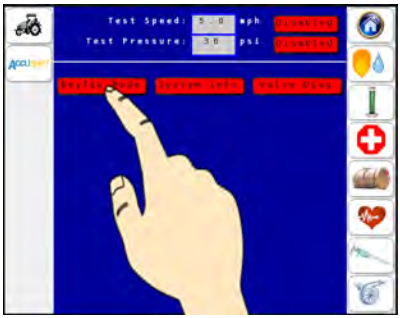
Opening Boom Shutoff Valve



Activate Pump

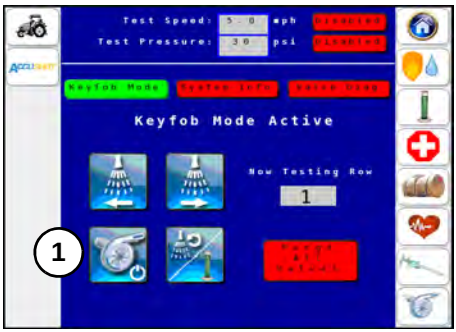
Icon	Description
	On the **HOME** Screen:
	Touch the red <Diagnostic> icon on the right hand side of the **HOME** Screen.

8. Touch the red Key FOB Mode button on the **DIAGNOSTIC** Screen (the button will turn green and the function buttons will appear).



9. Start the liquid product pump by touching the ① pump <ON/OFF> button on the **DIAGNOSTIC** Screen or by pressing the button on the Key FOB.

Activate Pump



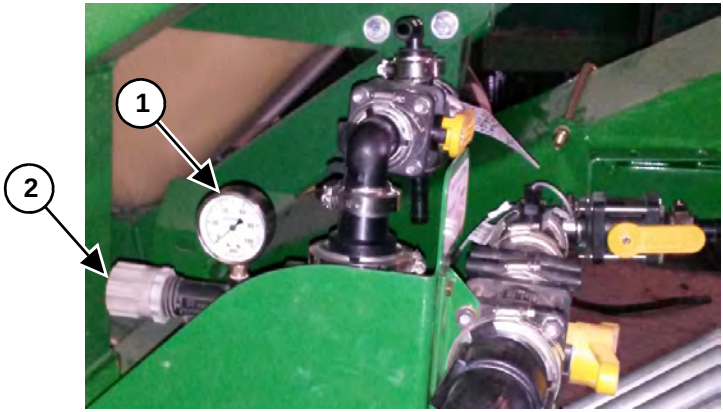
Pressure Relief Valve Adjustment

10. While viewing the ① manual pressure gauge at the liquid product pump, adjust the ② pressure relief valve to set the pressure at 70 PSI maximum.

    Rotate CCW to decrease pressure.

    Rotate CW to increase pressure.

11. Once pressure is set, use the locknut to lock the setting in place.



12. Open the main bypass valve (near the product pump) to the 10 o'clock position.

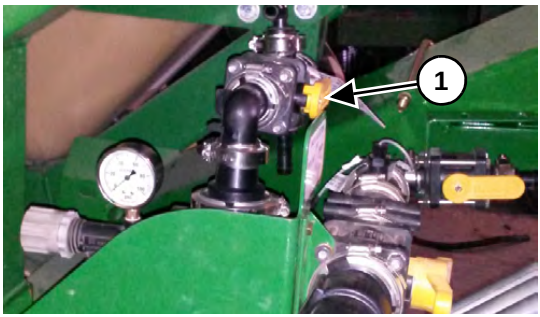
Pressure Gauge

13. While viewing the manual pressure gauge on planter, verify the pressure is 60 PSI. If not 60 PSI, do the following steps:

a. Under 60 PSI

i. **Increase** hydraulic flow to the planter hydraulics until 60 PSI is reached on the manual pressure gauge on the planter.

1. If hydraulics cannot get the pressure to 60 PSI, close ① main bypass valve till pressure reaches 60 PSI. (Some bypass is needed for better AccuShot operation.)



2. If pressure does not reach 60 PSI with main bypass fully closed, tractor hydraulic supply is not sufficient. Contact your Planter dealer for further assistance.

b. Above 60 PSI

i. **Decrease** hydraulic flow to the planter hydraulics until 60 PSI is reached on the manual pressure gauge on the planter.

14. Shut off the product pump by touching the pump on/off button on the screen or Key FOB.

15. The bypass valve should be set at the correct pressure and flow after performing the above steps. Recheck pressure gauge on planter to verify.

NOTICE Minor hydraulic pump adjustment might be required when planting. See PUMP Settings - Factory Set on page 32.

DIAGNOSTICS SYSTEM Screen

Icon	Description
	Touch the red Diagnostics icon to view the **DIAGNOSTIC** Screen.

Select and toggle any of the red buttons on the **Diagnostics** Screen. This screen allows Key FOB use, viewing System Info and running Valve Diagnostics. The selected button will turn green when activated. Make sure the <*Mode*> button on the **HOME** Screen reads **OFF** to use the Key FOB and view diagnostics.

Procedure

The Operator can perform the following functions on the **DIAGNOSTIC** Screen:

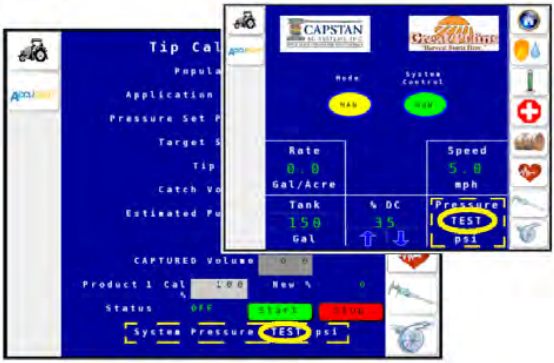
1. Enable Test Speed and/or Test Pressure for diagnostics and trouble-shooting.
2. Activate Key FOB operation.
3. View System Info.
4. Running valve diagnostics.

Procedure

Touch to toggle any of the red buttons on the **DIAGNOSTIC** screen. The toggled button will turn green when activated.

When a Test Speed and/or Test Pressure procedure is enabled for troubleshooting and diagnostics, “TEST” will blink on the following two menu screens:

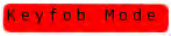
- **HOME** Screen in the center of the Speed and/or Pressure display boxes.
- **TIP CALIBRATION** Screen in the System Pressure box at the bottom of the screen.

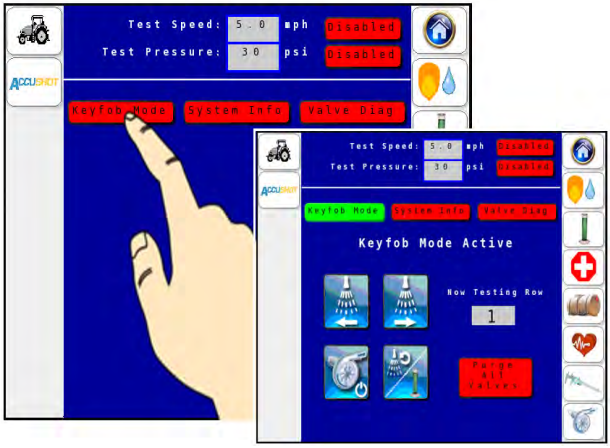


Both Test Speed and Test Pressure values can be edited (one at a time) from the **DIAGNOSTIC** Screen, by touching inside the value display box to activate the keypad. Once a number is selected, touch the ✓ key to enter the chosen number.

Activate the Key FOB Controls

Icon	Description
	Touch the red <Diagnostics> icon.

Procedure	
	Touch the red <Keyfob Mode> button on the **DIAGNOSTIC** Screen to display the Key FOB function buttons.
	Key FOB Mode Active will blink on the **DIAGNOSTIC** Screen and the red button will turn green.



Operate the Key FOB Controls

Icon	Description
	① Pulse Nozzles Right to Left. ② Turn Pump ON/OFF. ③ Pulse Nozzles Left to Right. ④ Repeat Current Nozzle Pulse. **NOTE:** Button ④ has a dual function. During Tip Calibration, it is used to Start/Stop the Tip Calibration Catch Test.

Procedure

Operator can also use the Key FOB or the AccuShot **DIAGNOSTIC** Screen in the Cab to clear any plugged rows, remove air from the system, and test row-by-row to ensure that all rows are still working properly.

The row number being tested can be edited from the **DIAGNOSTIC** Screen with Key FOB Controls activated.

Touch the inside of the “Now Testing Row” display box to enable the keypad. Touch / edit the row number being tested. Touch the ✓ key to enter the value.

NOTICE If the <Mode> is not set to **OFF** on the **HOME** Screen, a warning will appear when enabling Key FOB Mode.

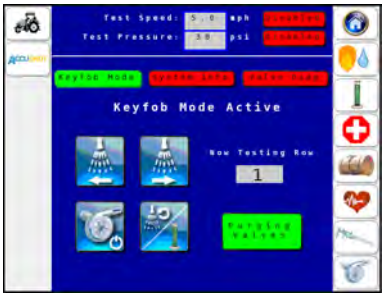
Purge Operation

The Operator can prime, purge the air or flush the AccuShot plumbing system from the **DIAGNOSTIC** Screen with the Key FOB Mode activated.

NOTICE At the start of every planting day, an Operator should (at the very least) run the Purge All Valves operation to check the system for air or contamination.

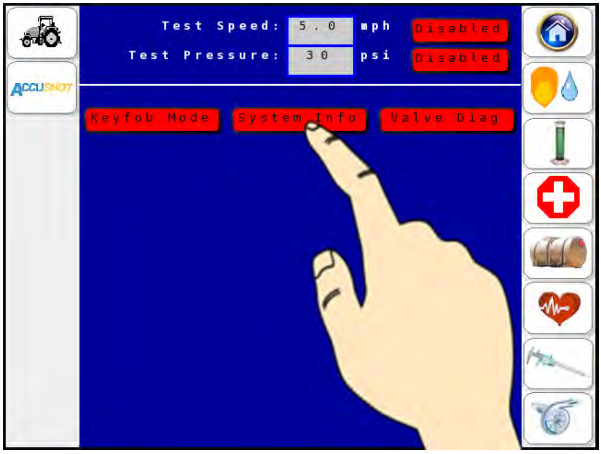
Icon	Description
	To perform the Purge Operation, the VT Display must be on the **DIAGNOSTIC** Screen with no active warnings. (Read / Review Section 3.4 in the AccuShot Operator and Maintenance Manual.
	Make sure the Key FOB Controls are activated and dis-plays a green <Keyfob Mode> button.
Procedure	
	Touch the red <Purge All Valves> button to start purge operation.
	The red <Purge All Valves> button will turn green and all nozzle valves will open 100%, allowing a constant liquid flow from the product tank, through the plumbing system and discharging through the nozzle valves.

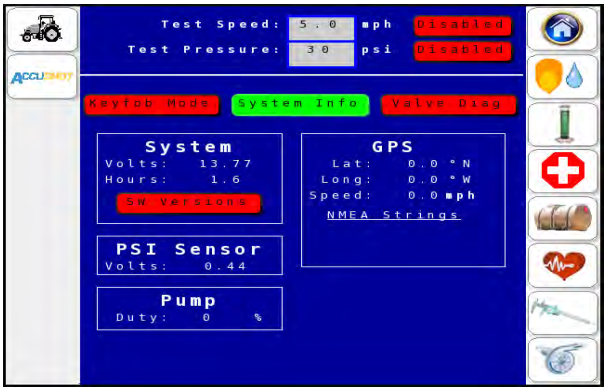
NOTICE Purge will end when touching the green <Purging Valves> button, pressing any of the top 4 Key FOB buttons or touch-ing the Key FOB buttons on the **DIAGNOSTIC** Screen, or leaving the **DIAGNOSTIC** Screen.



Operate the System Info Screen

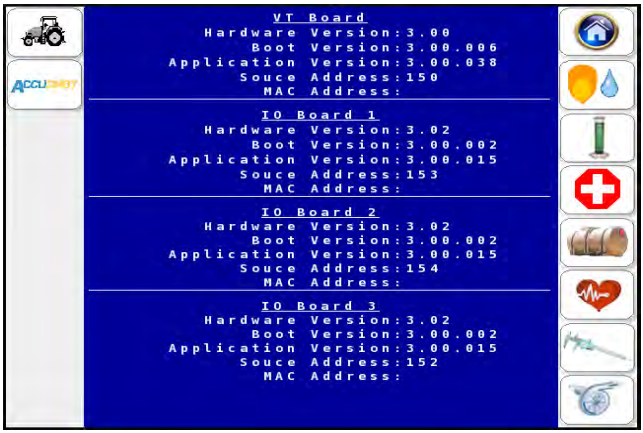
Icon	Description
System Info System Info	Touch the <System Info> button to display more information. The button will turn green when enabled. Operator can view System Voltage, Hour Meter, Pressure Sensor Voltage, Pump Duty Cycle, and GPS readouts.



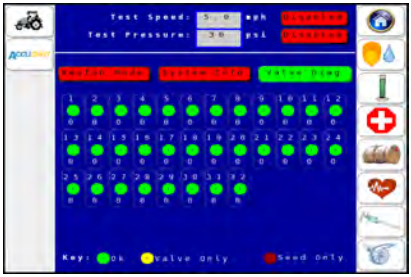


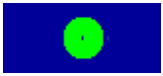
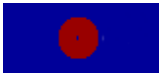
Touch the **SW Versions** button to view the AccuShot Controller's circuit board information.

Circuit Board Information



Valve Diagnostics

Icon	Description
	Touch the red <Diagnostics> icon on the **HOME** Screen.
	Touch the <Valve Diag> button. The button will turn green. The Operator can see if all nozzle valves and seed sensors are connected. 

Icon	Indicator Color Key
	Indicates seed sensor and nozzle valves are connected.
	Indicates nozzle valve is connected while seed sensor is not being detected by controller.
	Indicates seed sensor is connected while the nozzle valve is not being detected by controller.

See the AccuShot Operator and Maintenance Manual for more diagnostic help, if needed.

NOTICE If the <Mode> is not set to **OFF** on the **HOME** Screen, a warning will appear when enabling Valve Diagnostics.

TIP CALIBRATION Catch Test

Icon	Description
	The **TIP CALIBRATION** Screen is used to compensate for different viscosities and fluid dynamics.

1. Touch the <Tip Calibration> icon on the **HOME** Screen.
2. Verify and edit Tip Calibration information as needed. Changing values on the **TIP CALIBRATION** Screen will also change the same values in the **PLACEMENT SETTINGS** Screen or vice versa.

NOTICE Verify that the Tip Size is correct.

Spray Tip size is verified by looking at the outside surface of the tip near the spray end.

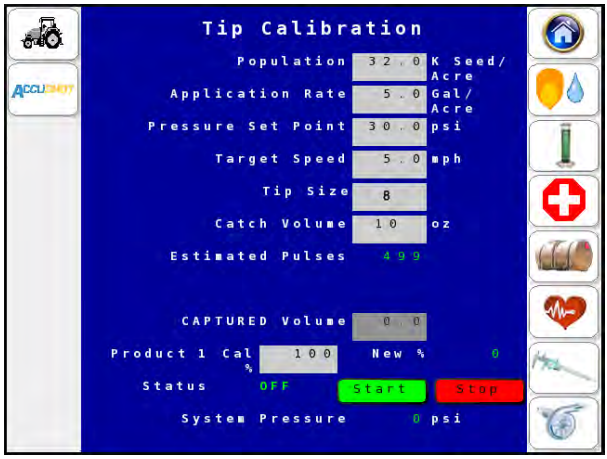
Procedure

3. Place the Calibration Pitcher directly underneath a spray nozzle on Row #1 of the Planter.

4. With the planter hydraulics engaged, touch the <START> button on the **TIP CALIBRATION** Screen or press button 4 on the Key FOB to begin the Tip Calibration Catch Test.

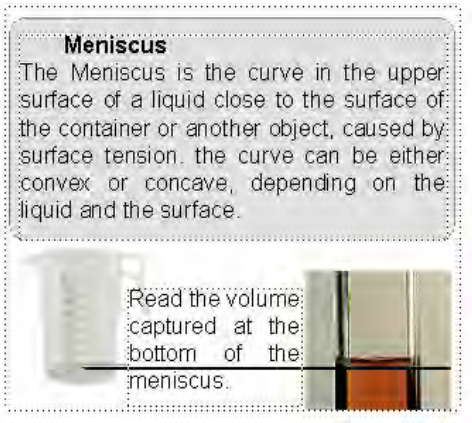
NOTICE You can START and STOP testing as needed using the **TIP CALIBRATION** Screen or Key FOB.

4



5. Once the test is complete and liquid product is captured:

    - Read the Calibration Pitcher at the bottom of the meniscus.



NOTICE Reading the Calibration Pitcher at or above the meniscus will cause an inaccurate GPA measurement.

6. Touch the inside of the <CAPTURED Volume> box. A keypad will appear. Enter amount of fluid caught. Touch the ✓ key to enter the amount.

7. Once a CAPTURED Volume is entered, Touch

or

- A new Product 1 Cal% will be calculated. Touch <Accept> to select new value or <Decline> to return to previous Product 1 Cac%.

8. Repeat Catch Test until the correct catch volume is caught.

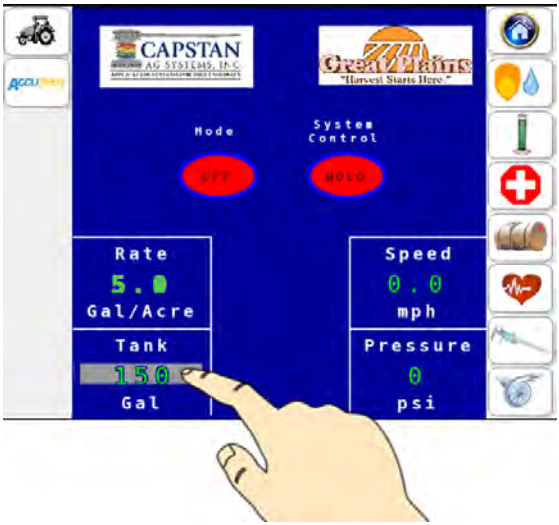
NOTICE If the <Mode> is not set to **OFF** on the **HOME** Screen, a warning will appear when accessing the **TIP CALIBRATION** Screen.

Tank Volume

The **TANK VOLUME** Screen can also be accessed by touching the <Tank> volume box on the **HOME** Screen.

Icon	Description
	Touch the *<Tank>* icon to view and set the Tank Volume and set the Warning Level.

Touching the <Tank> volume box on the **HOME** Screen opens the **TANK INVENTORY** Screen.



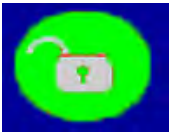
SENSOR SETTINGS - Factory Set

NOTICE

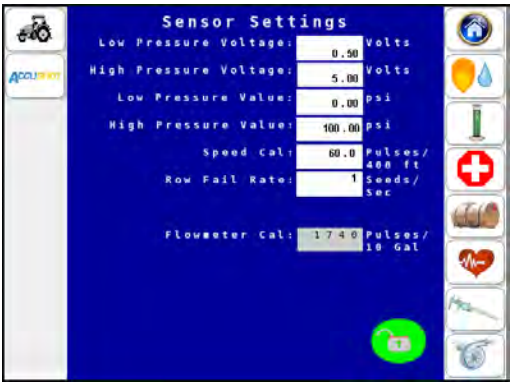
All settings are locked on this screen except the Flowmeter Cal. Locked screens are intended only for qualified Service Technician access and use.

The Flowmeter Cal value entered must match the Flowmeter (label) on the Planter. The Flowmeter Cal Value IS NOT locked and must be set by operator.

Icon	Description
	The default **Sensor Settings** are set at the factory.
	Touch the **LOCK** icon to open the on-screen keyboard.



Type in the password and touch the key to enter the password and **UNLOCK** the screen.



Defaults

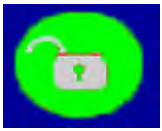
1. Pressure Sensor Voltage Low = 0.5 VDC
2. Pressure Sensor Voltage High = 5.0 VDC
3. Pressure Sensor Low = 0.0 PSI
4. Pressure Sensor High = 100.0 PSI
5. Radar Cal = 60.0 Pulse per 400 ft.
6. Row Fail Rate = 1 Seeds per sec.
7. Flowmeter Cal = 1740 Pulse per 10 Gals.

PUMP Settings - Factory Set

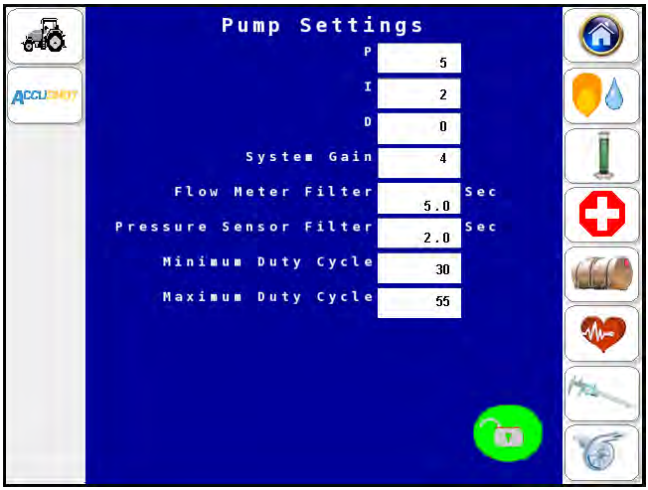
NOTICE

All settings are locked on this screen. Locked screens are intended only for qualified Service Technician access and use.

Procedure After UNLOCK
Adjust Hydraulic pump settings by using the System Gain setting to tune a system where the pressure is oscillating or sluggish to respond. • Select a lower number **to stabilize** an oscillating system. • Select a higher number **to speed up** a sluggish system.

Icon	Description
	The default **Pump Settings** are set at the factory.
	Touch the **LOCK** icon to open the on-screen keyboard. Type in the password and touch the key to enter the password and **UNLOCK** the screen.
	

Settings	Default	Units of Measure
P	5	N/A
I	2	N/A
D	0	N/A
System Gain	4	N/A
Flow Meter Filter	5.0	Sec.
Pressure Sensor Filter	2.0	Sec.
Min Duty Cycle	20	N/A
Max Duty Cycle	55	N/A



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4.0 FIELD OPERATION

AUTO Mode

Icon	Description
	On the **HOME** Screen:
	Press <*Mode*> button and toggle to **AUTO**. In <Auto> mode, the system automatically adjusts the pressure, and activates the nozzle valves when seeds are sensed. This mode should be used for normal field operation.
	Press <*System Control*> button and toggle to **RUN**. With the planter hydraulics engaged, the liquid product pump will turn on and raise the pressure to the pressure set point.
	Touch and toggle <*System Control*> button to **HOLD**. Pump will shut **OFF** and nozzle valves will not pulse.

Field Verify Seed and Shot Placement

A field check should be completed at the initial trip to the field and again whenever the distance to the seed is changed. See Chapter 4.0 in the AccuShot Operator and Maintenance Guide for detail images of this procedure.

To perform the seed and shot placement check, complete the following steps:

1. On the AccuShot **HOME** Screen, touch and toggle <System Control> button to select **HOLD**.

2. At the back of the planter, using tie-down straps, secure up the closing wheels and shallow up the Side Gauge Wheel depth on the rows to be checked. (Recommend on a twin row to perform check procedures on rows next to each other. i.e. row 1 and 2).

3. Using the excess from the tie-down strap, or using a bungee strap, hold the seed firmer out of the furrow.

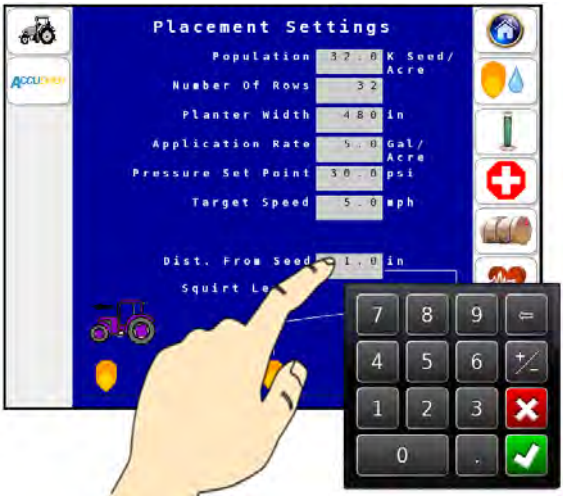
4. Once everything is out of the furrow and off the dirt and secured, return to the tractor cab. On the AccuShot **HOME** Screen, touch and toggle <System Control> button to select **RUN**. Resume planting for the desired test distance, using the same settings and speeds as normal planting.

5. Stop the tractor once test distance is reached. On the AccuShot **HOME** Screen, touch and toggle <System Control> button to select **HOLD**. Visually verify placement of shot relative to seed in the furrow.

6. When placement of the shot relative to the seed is correct, remove all straps and readjust the Side Gauge Wheel depth back to normal operating depth. (See the manufacturer's specific planter manual for assistance.

NOTICE Repeat field check periodically or when Rate and/or Distance to Seed is modified.

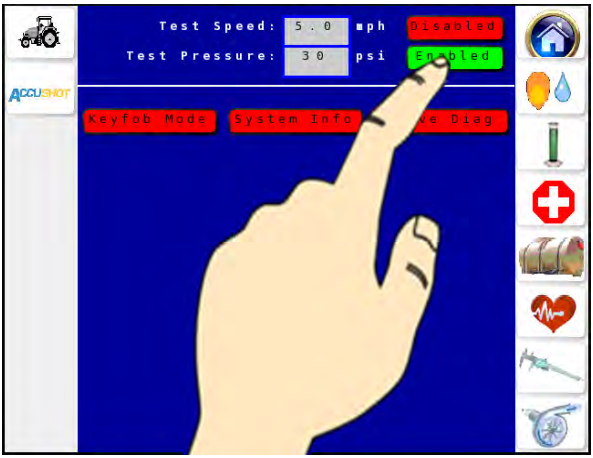
a. If placement needs adjustment, change Distance to the Seed value on the **PLACEMENT SETTINGS** Screen.



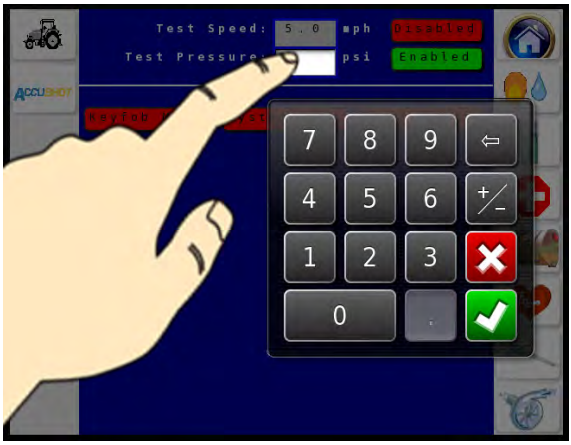
b. Repeat field test to verify correct placement of shot relative to seed.

MANUAL Mode

Manual Mode is used for troubleshooting or continuing to run when a pressure sensor has failed.

Icon	Description
	Touch the red **Diagnostic** icon to view the **DIAGNOSTIC** Screen.
	Touch to toggle the <Test Pressure> button to **ENABLE** the Test Pressure. Verify Test Pressure value is correct. 

To edit the <Test Pressure> value if not correct, touch the pressure value box to enable the key-pad.



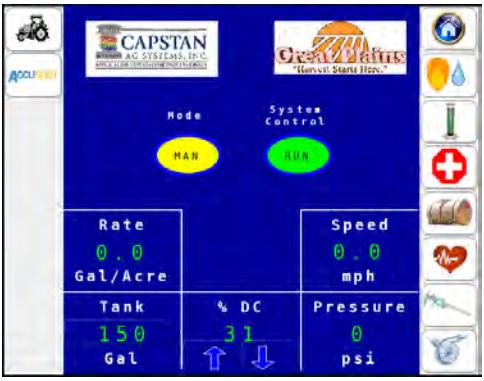
NOTICE

Upon enabling a <Test Pressure>, “TEST” will blink in the System Pressure box on the **HOME** and T**IP CALIBRATION** Screens.

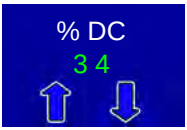
On the **HOME** Screen:

Touch and toggle <*Mode*> button to select **MAN**.

Touch and toggle <*System Control*> button to **RUN**.



Visually monitor the manual pressure gauge on the Planter.



Touch the “% DC” <*Arrows*> to **INCREASE** or **DECREASE** until the desired pressure is reached on the manual pressure gauge.

Touch and toggle <*System Control*> button to **HOLD**. Pump will shut **OFF** and nozzle valves will not pulse.

Pressure should be checked and readjusted once the planter is operating.

ON Mode

Use ON mode to apply a constant stream of product. Orifice inserts will be required to achieve the desired GPA. (Use orifice rate charts to size the orifices correctly, or contact your local dealer.) The system automatically adjusts to maintain the pressure set-point. This pressure Set Point can be changed on the **Placement Settings** Screen.

Icon	Description
NOTICE	Install Orifice Plates when running in ON Mode only. Remove orifice plates if wanting to run in Auto or Manual Mode.
	On the **HOME** Screen:
ON	Touch and toggle <*Mode*> button to select **ON**.
RUN	Touch and toggle <*System Control*> button to select **RUN**.

Touch and toggle <*System Control*> button to **HOLD**. Pump will shut **OFF** and nozzle valves will not pulse.

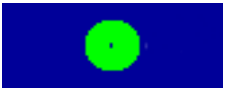
Place <System Control> in **HOLD** Mode when picking up the planter on turns to prevent liquid product waste.

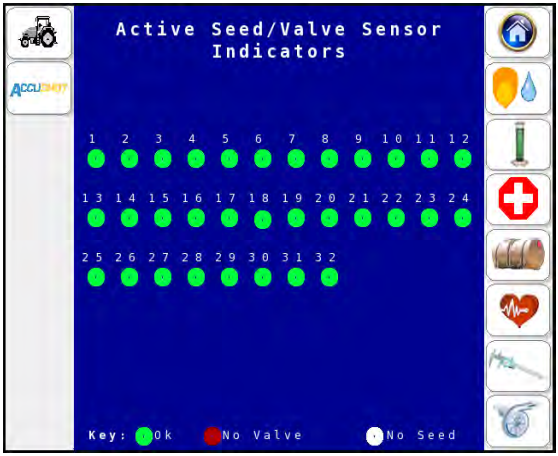
Pressure Set Point can be changed from the **HOME** Screen by touching inside the Pressure box to enable the keypad. Once a number is entered, touch the ✓ key to accept the value.

Active Seed / Valve Sensor Indicators

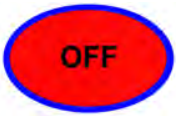
Use this screen to verify the nozzle valves and seed sensors are working correctly while the planter is operating.

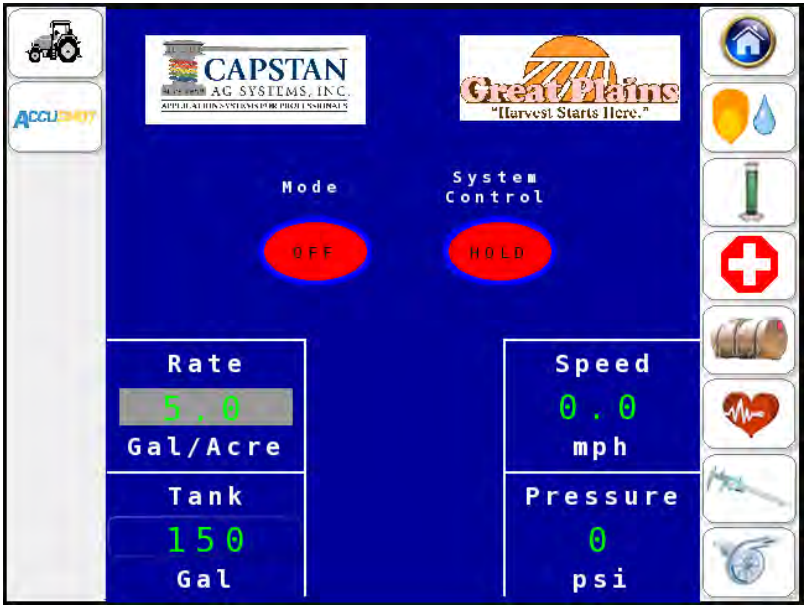
Icon	Description
	Touch the <Heart> icon to verify all rows are working in the **Active Seed/Valve Sensor** Screen. See troubleshooting for help with failed rows.

Icon	Key to Indicator Colors
	Indicates seed sensor and nozzle valves are connected.
	Indicates seed sensor is not being detected by the AccuShot controller, while the nozzle valve is operational.
	Indicates nozzle valve is not being detected by the AccuShot controller while the seed sensor is operational.



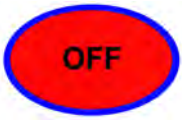
OFF Mode

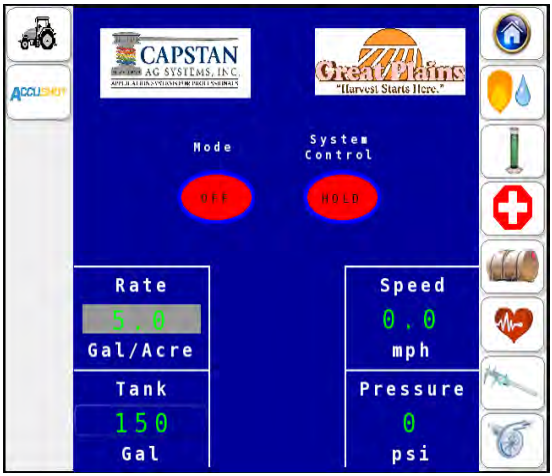
Icon	Description
	When the Mode is switched to OFF, the system shuts down (pump and nozzle valves), and all alarms are deactivated. Choose the OFF Mode when the liquid product system is not being used.
	Touch and toggle <*Mode*> button to select **OFF**.
	System Control defaults to HOLD when the <Mode> button is toggled.



System Control - Run / Hold

Manual Mode is used for troubleshooting or continuing to run when a pressure sensor has failed.

Icon	Description
	On the **HOME** Screen:
	With hydraulics engaged, touch and toggle <*System Control*> button to select **RUN**. The liquid product pump will turn on and raise the pressure to the pressure set point.
	Touch and toggle <*System Control*> button to **HOLD**. Pump will shut **OFF** and nozzle valves will not pulse.



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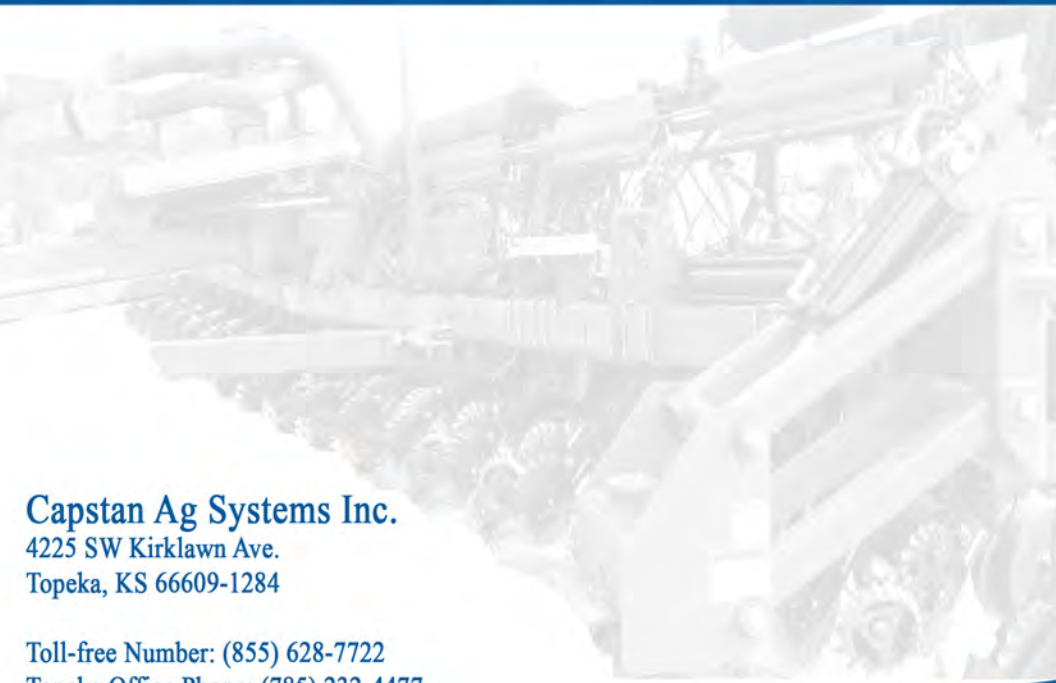

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