CapstanAG™

Seed-Squirter™

Single Product

Liquid Application

Operator Manual

115700-003 Rev. C | Revised 02/2019 |

Thank you for your business!

At CapstanAG, our goal is to redefine the way people do their chemical application. Our PWM control systems have been setting the bar for maximum productivity for more than 20 years. Our focus on performance, support, and education have dramatically changed the landscape of agricultural chemical application.

CapstanAG specializes in creating proprietary systems for the agricultural industry, primarily focusing on chemical and fertilizer applications. Our inventive process involves research, engineering, design, and lab and field testing.

Service Contact Information

If a problem occurs with your system that cannot be corrected with the information in this manual, please contact your dealer for service and technical assistance. If further assistance is needed, contact CapstanAG.

System Purchased: _____

Dealer: _____

Contact: _____

Phone: _____

Address: _____

City,State/Province, Zip: _____

Factory Service/Repairs

CapstanAG
4225 S.W. Kirklawn Ave. | Topeka, KS 66609

Hours: 8:00 a.m. to 4:00 p.m. CST

Toll-free number: (855) 628-7722 | Fax: (785) 232-7799

E-mail: prodsupport@capstanag.com | Online: www.CapstanAG.com

Contents

Chapter 1: Safety

Signal Words

DANGER: Indicates an imminent hazard which, if not avoided, will result in death or serious injury. This signal word is limited to the most extreme situations, typically for machine components that, for functional purposes, cannot be guarded.

Warning: Indicates a potential hazard which, if not avoided, could result in death or serious injury, and includes hazards that are exposed when guards are removed. It may also be used to alert against unsafe practices.

CAUTION: Indicates a potential hazard which, if not avoided, may result in minor or moderate injury. It may also be used to alert against unsafe practices.

Important: This is used to draw attention to specific information that is necessary for the operation, setup, or service of the system.

Note: This is used for additional information that can help understand or operate the system.

Emergency Safety

Fire extinguishing systems must meet the applicable OSHA requirements, and all users of portable/fixed fire suppression equipment must know the types, limitations, and proper uses of this equipment; including hazards involved with incipient stage firefighting.

Keep emergency numbers for doctors, ambulance service, hospital, and fire department near your telephone.

Know the location of fire extinguishers and first aid kits and how to use them.

Inspect the fire extinguisher and service the fire extinguisher regularly.

Follow the recommendations on the instructions plate.

Very small fires can be put out (extinguished) with a fire extinguisher. Use an appropriate method to extinguish a fire (water for paper fires, and chemical extinguishers for electrical or chemical fires.

Pressurized Fluid Lines

Do not heat by welding, soldering, or using a torch near pressurized fluid lines or other flammable materials. Pressurized lines can accidentally burst when too much heat is present.

Personal Protective Equipment

Wear close-fitting clothing and the correct personal protective equipment (PPE) for the job. See the manufacturer's manual or other information for correct PPE.

Battery Safety

Use the procedure in the appropriate agricultural equipment manual for connecting, disconnecting, and jump-starting the machine's battery.

Keep sparks and flames away from the battery. Battery gas can explode and cause serious injury. Do not smoke in the battery charging area.

Remove jewelry, which might make electrical contact and create sparks.

Chemical Safety

Chemicals used in agricultural applications can be harmful to your health and/or the environment if not used correctly. Always follow all label directions for effective, safe, and legal use of agricultural chemicals.

Chapter 2: Warranty

Limited Warranty

What does the Limited Warranty cover?

The ultimate purchaser/user (“you”), by acceptance of seller Capstan Ag Systems, Inc.’s, (“our,” “we,” or “us”) product, assume all risk and liability of the consequences of any use or misuse by you, your employees, or others.

All replacement components furnished under this warranty, but shipped before the failed component is returned for evaluation, will be invoiced in the usual manner and warranty adjustments will be made after the component claimed to be defective has been returned to and inspected and deemed defective by us at our factory.

Upon determining that a component has failed under warranty, the repaired component or replacement component, furnished under this warranty, will be shipped at our expense, to your location. We will credit you an amount equal to the incoming freight you paid. We shall not be responsible for installation costs. (You shall be responsible for all customs and brokerage fees for all international transactions.)

If the component does not prove to be defective, you shall be liable for all freight, inspection and handling costs. In no event will any claim for labor or incidental or consequential damages be allowed for removing or replacing a defective product. Warranty will be denied on any component which has been subject to misuse, abuse, accidents, or alterations, or to improper or negligent use, maintenance, storage or transportation and handling.

Our liability under this warranty, or for any loss or damage to the components whether the claim is based on contract or negligence, shall not, in any case, exceed the purchase price of the components and upon the expiration of the warranty period all such liability shall terminate. The foregoing shall constitute your exclusive remedy and our exclusive liability.

The terms of this warranty do not in any way extend to any product which was not manufactured by us or one of our affiliates.

While necessary maintenance or repairs on your Capstan Ag Systems, Inc. product can be performed by any company, we recommend that you use only authorized Capstan Ag Systems, Inc. dealers. Improper or incorrectly performed maintenance or repair voids this warranty.

The foregoing warranty is exclusive and is in lieu of all other warranties expressed or implied. We shall not be liable for any incidental or consequential damages resulting from any breach of warranty.

Your exclusive remedy for breach of warranty shall be repair or replacement of defective component(s): Provided, if the component(s) are incapable of being repaired or replaced, your exclusive remedy shall be credit issued, but such credit shall not exceed the purchase price of the components.

On any claim of any kind, including negligence, our liability for any loss or damage arising out of, or from the design, manufacture, sale, delivery, resale, installation, technical direction of installation, inspection, repair, operation of use of any products shall in no case exceed the purchase price allocable to the components.

In no event, whether as a result of breach of contract or warranty or alleged negligence, shall we be liable for incidental or consequential damages, including, but not limited to: personal injury, loss of profits or revenue, loss of use of equipment or any associated equipment, cost of capital, cost of substitute equipment, facilities or services, downtime costs, environmental damage, crop losses, or claims of customers of you for such damages.

What is the period of coverage?

We warrant to you, that our products are free from defects in material and workmanship in normal use and service for a period of one year from date of purchase.

How do you get service?

Our obligation under this warranty shall be limited to the repairing or replacing at our option, the component which our inspection discloses to be defective, free of charge, return freight paid by us, provided you: (i) Notify us of defect within thirty (30) days of failure; (ii) Return the defective component to us, freight prepaid; (iii) Complete the Owner Registration Form and returned it to us; and (iv) Establish that the product has been properly installed, maintained and operated in accordance with our instructions or instructions contained in our operations or maintenance manuals and within the limits of normal usage.

Any claim for breach of our warranty must be in writing addressed to us and must set forth the alleged defect in sufficient detail to permit its easy identification by us. All breach of warranty claims must be made within thirty (30) days after expiration of the warranty period which is applicable to the defective product. Any breach of warranty claim not timely made will not be honored by us and will be of no force and effect. Any component that needs to be repaired or evaluated for warranty has to be authorized before return. Contact the factory (785-232-4477) to get a Return Materials Authorization (RMA #). This helps to track the part coming into the factory for repair or replacement.

Before returning any component to the factory, clean the component as well as possible to remove any dirt or chemical residue. Components received at the factory that are not clean, will be returned and warranty denied.

After receiving your RMA #, package the part, making sure to include the RMA #, your name, customer's name, your address and phone number and description of problems or failure. Then ship to:

Capstan Ag Systems, Inc.

Attn: Warranty/Repair

4225 SW Kirklawn Ave.

Topeka, KS 66609

Phone: (785) 232-4477

Fax: (785) 232-7799

Hours: 8 a.m. - 4:30 pm CST

How does state law relate to this Limited Warranty?

Some states do not allow limitations on how long an implied warranty lasts, so the above limitation may not apply to you.

Some states do not allow the exclusion or limitation of incidental or consequential damages, so the above limitation or exclusion may not apply to you.

This warranty gives you specific legal rights, and you may also have other rights which vary from state to state.[1]

[1] Rev. Date 7/15/2014

Chapter 3: Introduction

This Manual

This manual includes operation, maintenance, and installation information for the system you purchased.

Make sure that all personnel have read this manual and that they thoroughly understand the safe and correct operation and maintenance procedures. Failure to do so could result in personal injury or equipment damage.

This manual should be considered a permanent part of your system and should remain with the system at all times and when you sell it.

Right and left sides of the system are determined by facing the direction of forward travel of the machine on which the system is installed.

The information, screenshots, and other illustrations were correct at the time of publication. Changes can occur without notice.

This manual contains important information on how to safely and correctly install, operate, and maintain CapstanAG products. 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 Original Equipment Manufacturer (OEM) agricultural equipment manual(s).

Follow the instructions (in this manual) and in the OEM agricultural equipment manual(s) for each step, to make sure that work conditions in and around the OEM equipment are safe.

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 OEM agricultural equipment manual(s) for chemical safety information.

Read, understand, and review the procedures in this manual and OEM agricultural equipment manual(s). Use the Safety Data Sheets (SDS) and the required Personal Protective Equipment (PPE) for hazardous chemicals.

Please keep this manual and all enclosed documentation in an accessible location known to all operators, installation, and maintenance personnel.

If you do not understand the CapstanAG equipment after reading this manual, please obtain the proper training before working with equipment, to make sure that your own safety, as well as your co-workers' safety, is maintained.

Do not attempt to operate any equipment or system until you completely understand why, when, and how it operates. If you are uncertain after studying this manual, please contact CapstanAG.

System Identification

Write the system name, serial number, and other information down in the Service Contact Information on the inside cover of this manual. Your dealer will use these numbers when you order parts. File a copy of the identification numbers in a secure place off the machine.

If you are not the original owner of this machine, it is in your interest to contact your local CapstanAG dealer to inform them of this unit's serial number. Providing this information will help CapstanAG notify you of any issues or product improvements.

System Description

Seed-Squirter™ is a liquid delivery system designed to apply a specific amount of liquid product at a specific location relative to the location of each seed in the furrow.

The operator can decide how close to the seed to apply any liquid product, reducing seed burn and improving stand counts.

By concentrating the liquid product near the seed, the seed receives a better response from the liquid product while reducing the amount of liquid product used between the seeds.

Improved plant vigor and less liquid product used drives profit to the bottom line for the producer.

Seed-Squirter™ works when a seed passes the seed tube sensor. Once a seed is sensed, the correct amount of liquid is applied into the furrow using a CapstanAG nozzle valve.

Icon Descriptions

Icon	Description
	When the Seed-Squirter™ system is off the Seed-Squirter™ icon background will be red. Select this icon to activate the Seed-Squirter™ system.
	When the Seed-Squirter™ system is in any mode other than off, the Seed-Squirter™ icon will have a green background.
	The Alarm icon shows when there is an alarm in the system. Select this icon to view and silence current alarms.
	Select this icon to go to the ***HOME*** screen.
	Select this icon to go to the ***PLACEMENT SETTINGS*** screen.
	Select this icon to go to the ***TIP CALIBRATION*** screen.
	Select this icon to go to the ***DIAGNOSTICS*** screen.
	Select this icon to go to the ***TANK VOLUME*** screen.
	Select this icon to go to the ***ACTIVE SEED VALVE SENSOR*** screen.

Icon	Description
	Select this icon to go to the ***SENSOR SETTINGS*** screen.
	Select this icon to go to the ***PUMP SETTINGS*** screen.
	This icon only shows when there are two or more monitors on the same CAN, after unlocking the screen with the correct password. Select this icon to change the monitor that shows the Seed-Squirter™ screens.

Virtual Terminal Display

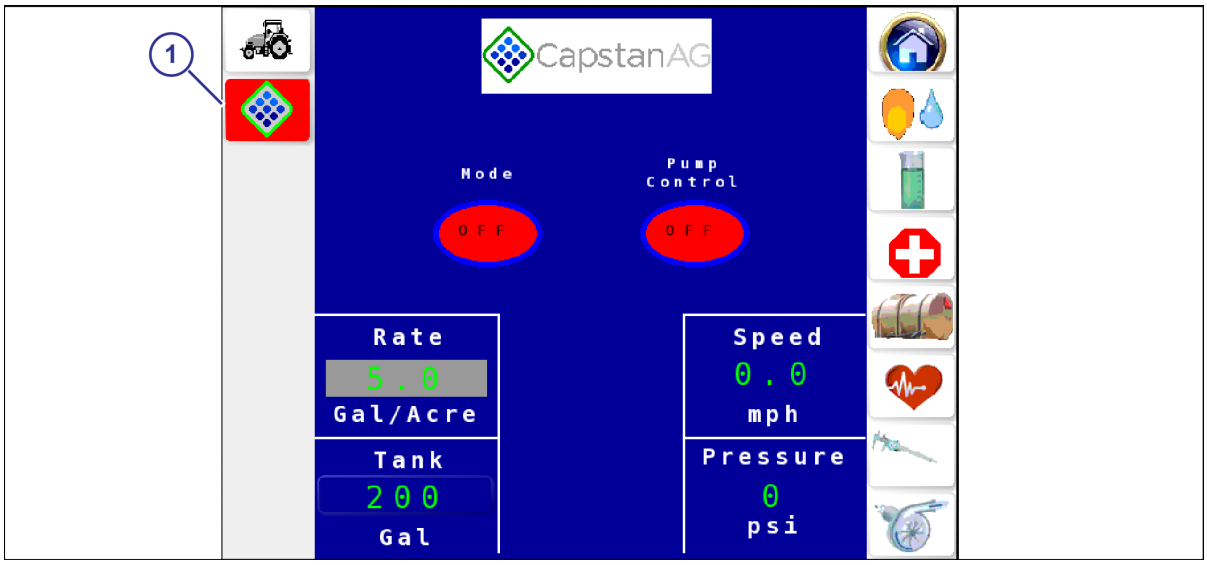


Fig. 1:

Seed-Squirter™ can be used with most touch-screen virtual terminal (VT) displays to give an all-in-one control for planting, spraying, and spreading applications. The VT display interacts with the GPS and electronic control devices centralizing the ability to communicate, record, store, and show data.

Select the CapstanAG icon *(1)* to open the Seed-Squirter™ system on the VT main screen.

Note: Each VT display is different, and the Seed-Squirter™ screens may be different from what is shown in this manual. Only the Seed-Squirter™ system screens will be shown in the rest of the manual.

How to Find the Software Version Information

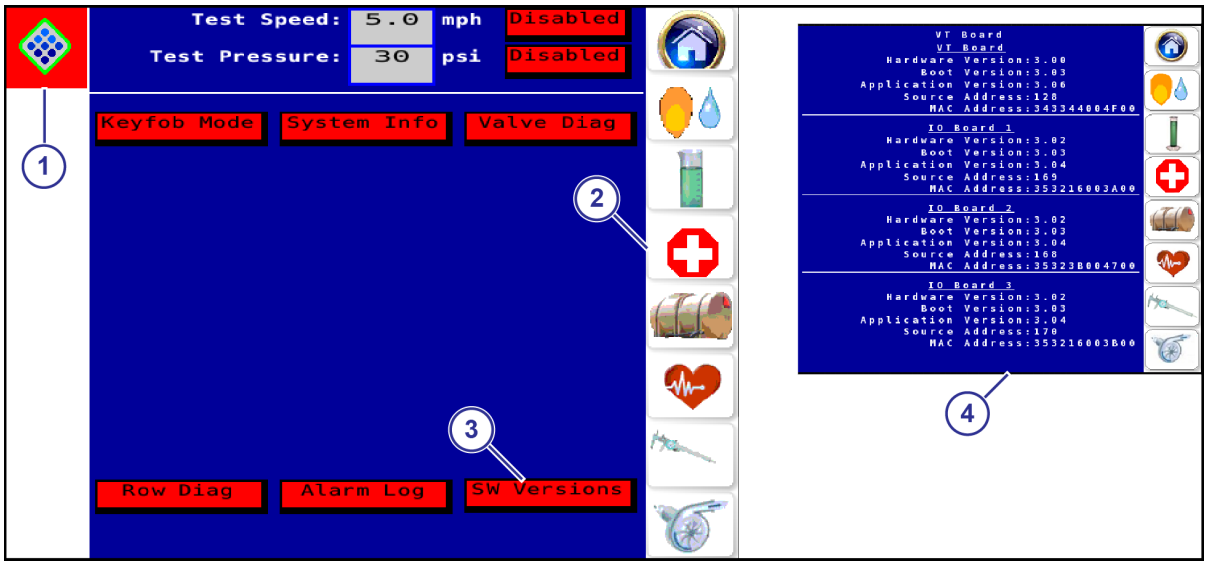


Fig. 2:

1. Select the **CapstanAG** icon *(1)*.
2. Select the **Diagnostics** icon *(2)*.
3. Select **SW Versions** *(3)*.
   The software version information for the system *(4)* will show on the screen.
4. Make sure to write down the current information in the Service Contact Information on the inside cover of this manual.

Select the Virtual Terminal to Show the Seed-Squirter™ Screens

If there is more than one VT display on the same CAN, select the desired display to view the Seed-Squirter™ information.

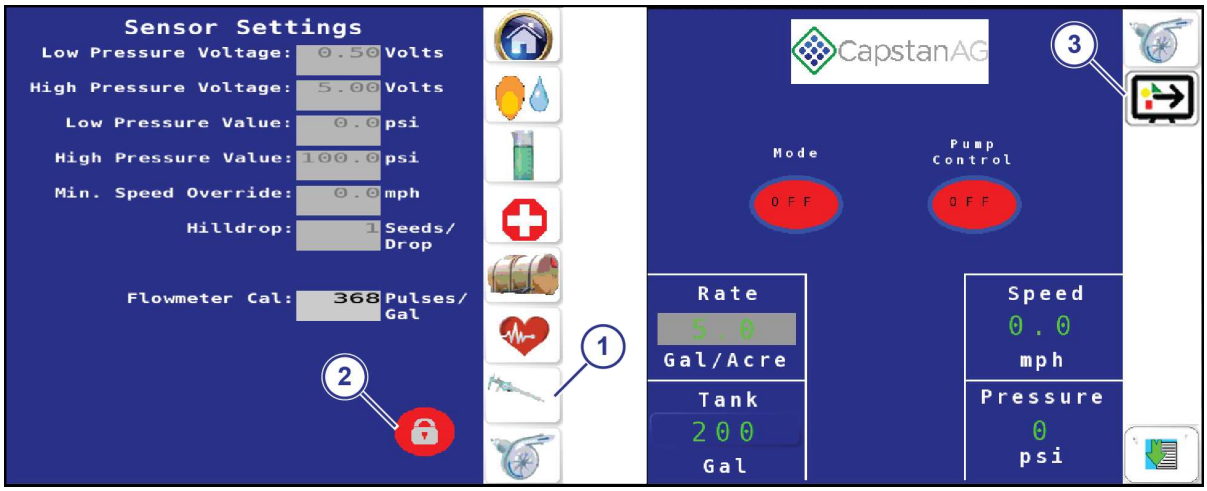


Fig. 3:

1. Select the **Sensor Settings** icon *(1)*.
2. Select the **Lock** icon *(2)*.
3. Use the keyboard to enter the password to unlock additional settings.
   If it is necessary, contact your dealer for password help.
4. Select the **Switch Display** icon *(3)*.
   A message screen will show.
5. Select **Accept** or **Cancel**.

Chapter 4: System Setup

Main/Home Screen

The main/home screen is the main user interface for control of the Seed-Squirter™ system.

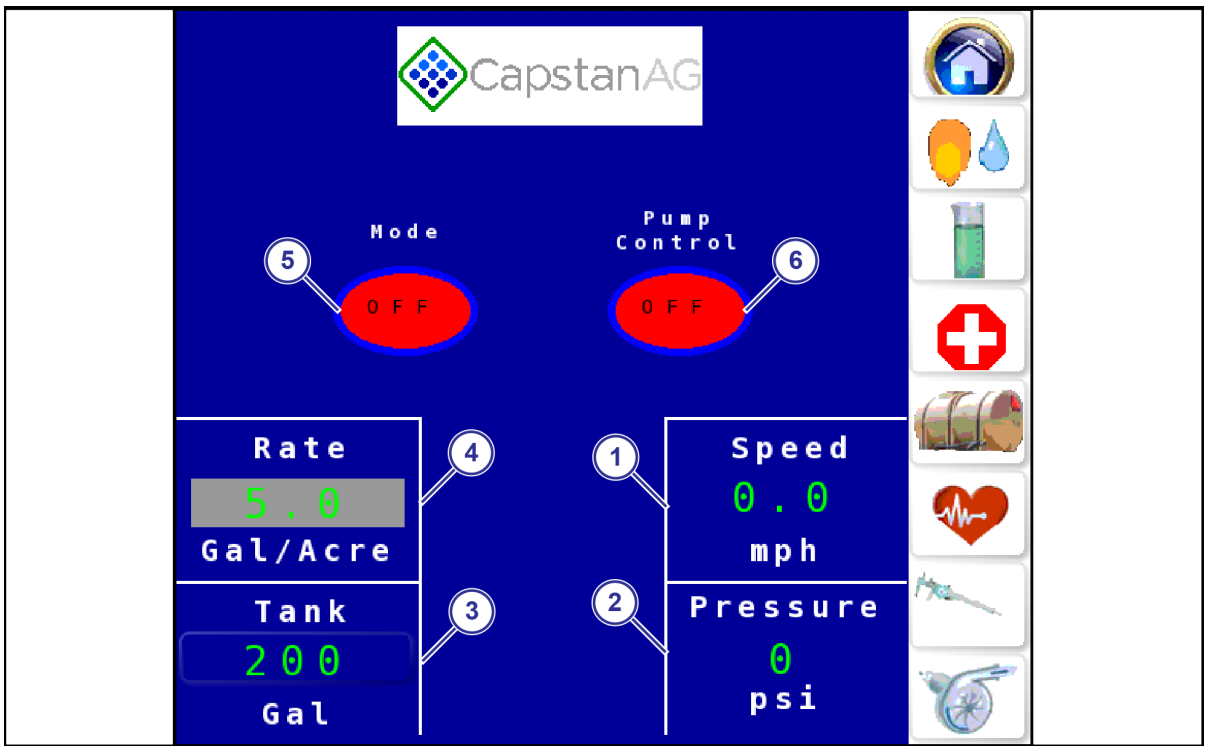


Fig. 4:

Information includes:

(1) Ground Speed

(2) System Pressure

(3) Tank Volume

(4) Application Rate

On the main/home screen, the **Mode** *(5)* can be changed:

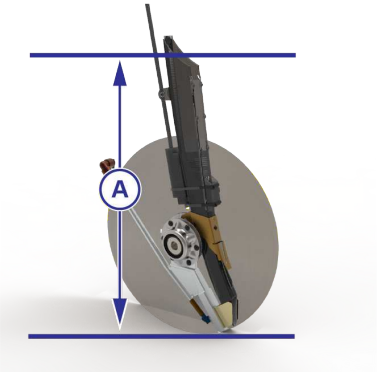
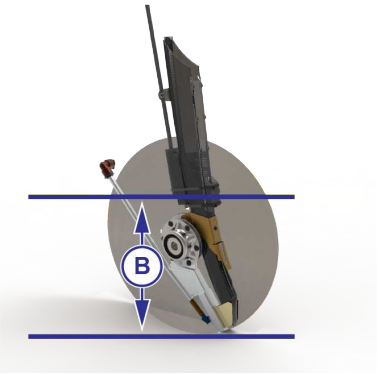
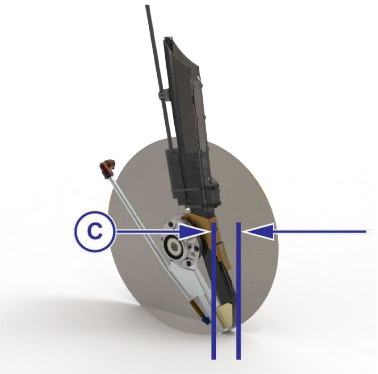
- Auto
- Manual
- Open
- Off

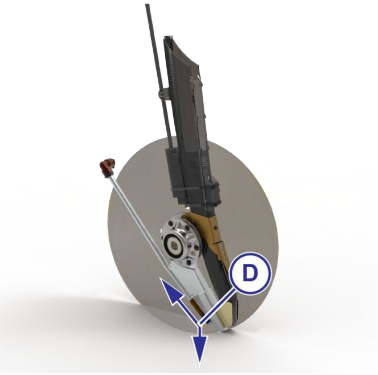
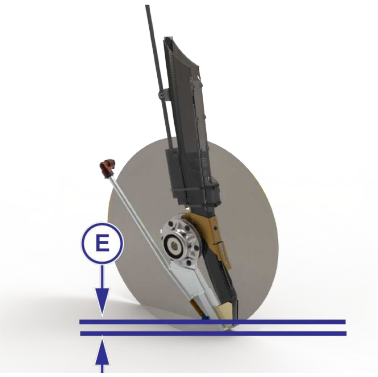
On the main/home screen, the **Pump Control** *(6)* can be changed:

- On
- Off

Liquid Product Tube Setup

While the liquid product tube, seed sensor, and seed tube locations can vary by planter model, five variables must be manually measured on the planter to make sure that there is accurate placement of the liquid product. These measurements, for each product, include:

Measurement Description	Default Value
Center line distance from the top of the seed tube to the bottom of the opener discs or furrow.	
Center line distance of the seed sensor to the bottom of the opener discs or furrow.	
Horizontal distance of the liquid product tube spray tip to the lowest point on the seed tube. • If the spray tip is ahead of the seed tube, enter a positive distance. • If the spray tip is behind the seed tube, enter a negative distance.	

Measurement Description	Default Value
Angle of liquid product tube relative to the ground. • If the spray tip on the liquid product tube is pointing toward the front of the planter, enter a positive angle. • If the spray tip of the liquid product tube is point toward the back of the planter, enter a negative angle.	
Vertical distance of the liquid product tube spray tip to the bottom of the opener discs or furrow.	

DANGER: To prevent personal injury, use the proper personal protective equipment around the sharp opener discs.

Recommendation: Record the measurement values in the Setup Record.

The measurements will be entered into the ***APPLICATION TUBE SETUP*** screen to help the Seed-Squirter™ controller to determine when to release the squirt of liquid product.

Note: A dealer should enter the five measurements during system installation.

Note: Locked settings on the ***SENSOR SETTINGS*** screen are intended for qualified service technician access. Contact your CapstanAG dealer for more assistance.

The seed tube and seed sensor are stationary, and both are non-adjustable. The liquid product tube position is mechanically adjustable.

Enter Information on the Application Tube Setup Screen

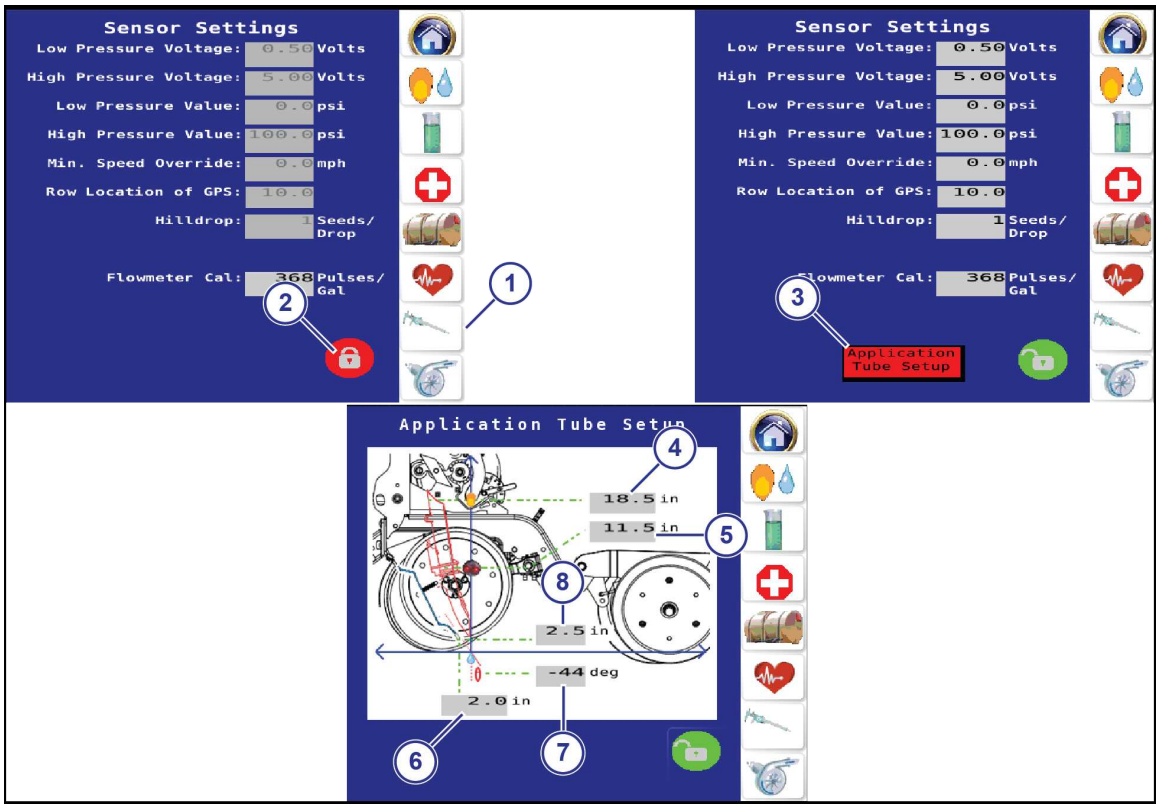


Fig. 5:

1. Select the **Sensor Settings** icon *(1)*.
2. Select the **Lock** icon *(2)*.
3. Use the keyboard to enter the password to unlock additional settings.
   If it is necessary, contact your dealer for password help.
4. Select the **Application Tube Setup** *(3)*.
5. Select a box to change each value.
   The measurements are:

   (4) Center line distance from the top of the seed tube to the bottom of the opener discs or furrow

   (5) Center line distance of the seed sensor to the bottom of the opener discs or furrow

   (6) Horizontal distance of the liquid product tube spray tip to the lowest point on the seed tube

   - If the spray tip is ahead of the seed tube, enter a positive distance.
   - If the spray tip is behind the seed tube, enter a negative distance.

   (7) Angle of liquid product tube relative to the ground

   - If the spray tip on the liquid product tube is pointing toward the front of the planter, enter a positive angle.
   - If the spray tip of the liquid product tube is point toward the back of the planter, enter a negative angle.

(8) Vertical distance of the liquid product tube spray tip to the bottom of the opener discs or furrow

6. Use the number pad to enter the correct value.
7. When all the correct values have been entered, make sure that the image on the screen matches the layout of your planter.

Placement Settings

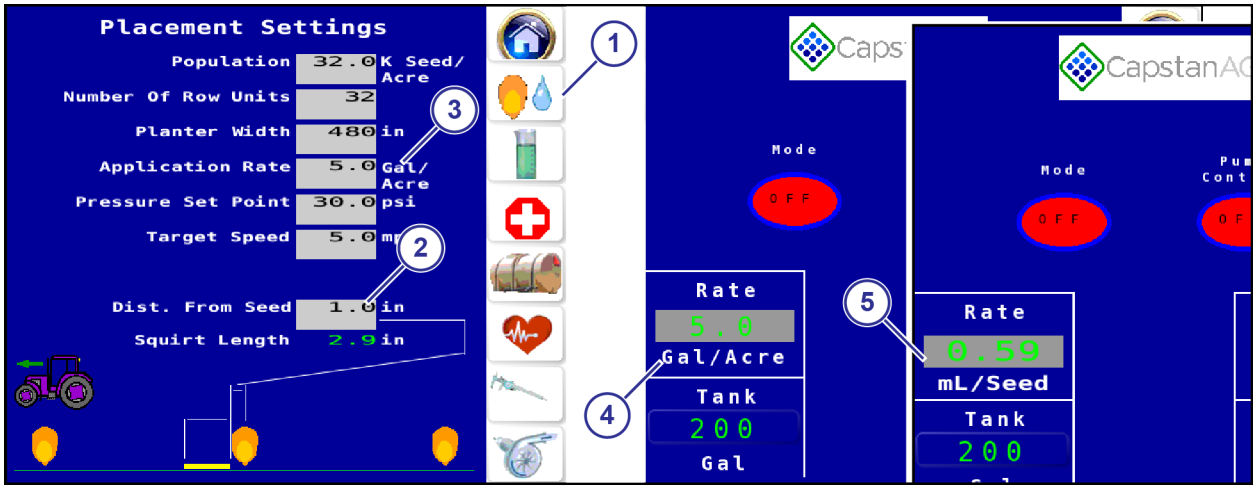


Fig. 6:

Use the ***PLACEMENT SETTINGS*** screen to enter/change the placement and location of the squirt in relation to the location of the seed.

Select the **Placement Settings** icon *(1)* to view or change the information on the screen.

Select the box *(2)* to change the value of each setting.

The Application Rate units of measure can be changed, by selecting the units of measure value *(3)*. The application rate will show on the main screen as either GPA *(4)* or mL per seed *(5)*.

The default values are shown in the setup record in this manual.

Note: A warning will show on the ***PLACEMENT SETTINGS*** screen when operator-entered values do not match or align with other settings. Read the warning and select **Accept** or **Cancel** to continue.

Liquid Bypass (Optional)

When the add-on hydraulically-driven centrifugal pump or electric pump must run at different operating points on the Seed-Squirter™ system, the liquid product bypass line(s) is (are) used to return some of the liquid to the liquid product tank(s). This lets the pump 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.

Seed-Squirter™ uses a main bypass valve near the product pump to manage different operating points. For hydraulically-driven systems, a total of up to 4.5 gal/min of hydraulic flow is needed to operate the Seed-Squirter™ system.

Note: Minor hydraulic pump adjustment may be necessary when planting.

Set the Liquid Bypass

1. Fill the liquid product tank(s).
2. Make sure that each tank supply valve is open.
3. Make sure that each tank bypass shutoff valve, used for Seed-Squirter™, is open on the liquid product tank(s).
4. Close the main bypass valve on the planter, near the liquid product pump.
5. Open the shutoff valve to the product line(s).
6. For hydraulically-driven systems, start the tractor and engage the Seed-Squirter™ hydraulics.

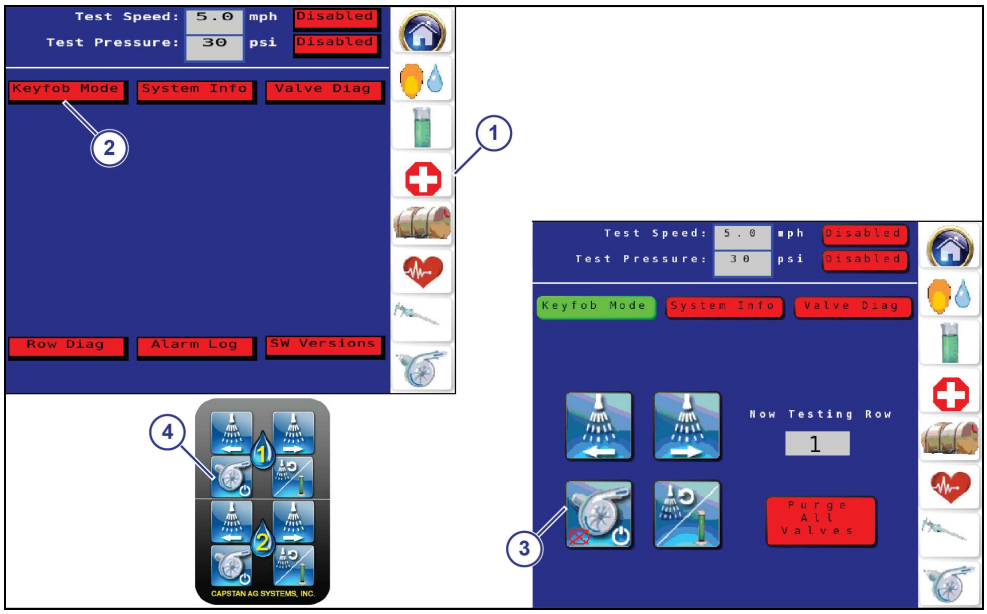


Fig. 7:

7. In the cab of the tractor, on the VT display, select the **Diagnostics** icon *(1)*.
8. Select **Keyfob Mode** *(2)*.
   The background of the icon will change to green, and additional icons will show.
9. Select the **Pump On/Off** icon to start the liquid product pump.

   (3) **Pump On/Off** on the VT screen

   (4) **Pump On/Off** on the key fob

10. Look at the manual pressure gauge at the liquid product pump.
11. Adjust the pressure relief valve to set the maximum system pressure.

    - Rotate the pressure relief valve counter-clockwise to decrease the pressure
    - Rotate the pressure relief valve clockwise to increase the pressure

    The maximum system pressure must be set at or below:

    - Hydraulic pump system—70 psi
    - Electric pump system—50 psi

12. If the pressure cannot reach the desired pressure, increase the hydraulic flow to the Seed-Squirter™ hydraulics until the pressure gauge shows the correct psi for the system.

    Some bypass is needed for better Seed-Squirter™ operation.

Important: If the pressure does not reach the desired pressure with the relief valve fully closed and hydraulic flow increased, the tractor hydraulic supply is not sufficient. Contact your tractor dealer for further assistance.

13. If the pressure is more than the maximum pressure, with the relief valve open fully, decrease the hydraulic flow to the Seed-Squirter™ hydraulics until the pressure gauge shows the maximum pressure.
14. When the pressure is set, use the locknut to lock the setting in place.
15. Look at the manual pressure gauge at the liquid product pump, and open the main bypass valve until the pressure is at 60 psi for hydraulic systems and 45 psi for electric systems.

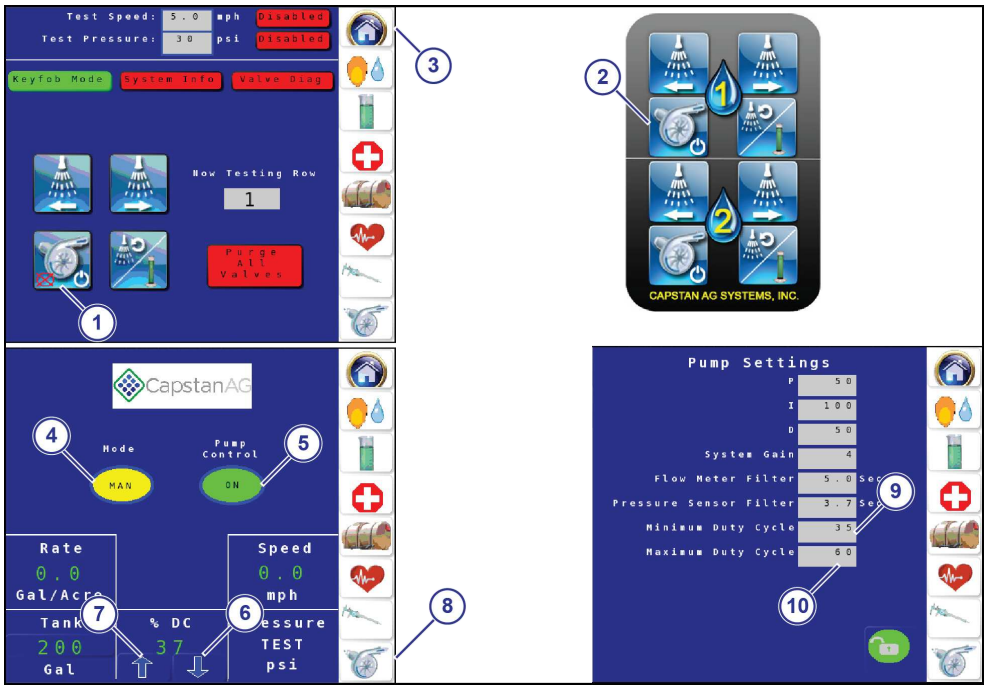


Fig. 8:

16. In the cab of the tractor, on the VT display, select the **Pump On/Off** icon to stop the liquid product pump.

    (1) **Pump On/Off** on the VT screen

    (2) **Pump On/Off** on the key fob

17. Select the **Home** icon *(3)*.
18. Select the **Mode** icon *(4)*.
19. Select **MAN** from the list.
20. Touch and release the **Pump Control** icon *(5)* until **ON** shows.

    With the Seed-Squirter™ hydraulics engaged, the liquid product pump will engage and raise the pressure.
21. Use the down arrow *(6)* to decrease the system pressure to about 15 psi.
22. Use the up arrow *(7)* to increase the system pressure to 65 psi or 70 psi.

    If you cannot get to the desired pressures, lower the minimum duty cycle or increase the maximum duty cycle on the ***Pump Settings*** screen.
23. When the minimum and maximum % DC are known, select the Pump icon *(8)*.
24. Enter the values into the boxes next to **Minimum Duty Cycle** *(9)* and **Maximum Duty Cycle** *(10)*.

    Note: You may need to unlock the screen to access and change the duty cycle values.

Diagnostics

Select the **Diagnostics** icon to go to the ***DIAGNOSTICS*** screen.

From this screen you can do:

- Enable a test speed and test pressure for diagnostics and troubleshooting
- Activate key fob operation
- See system information
- See software version
- Do valve diagnostics
- See the alarm logs
- See row-by-row diagnostics

Enable and Change the Test Speed or Pressure

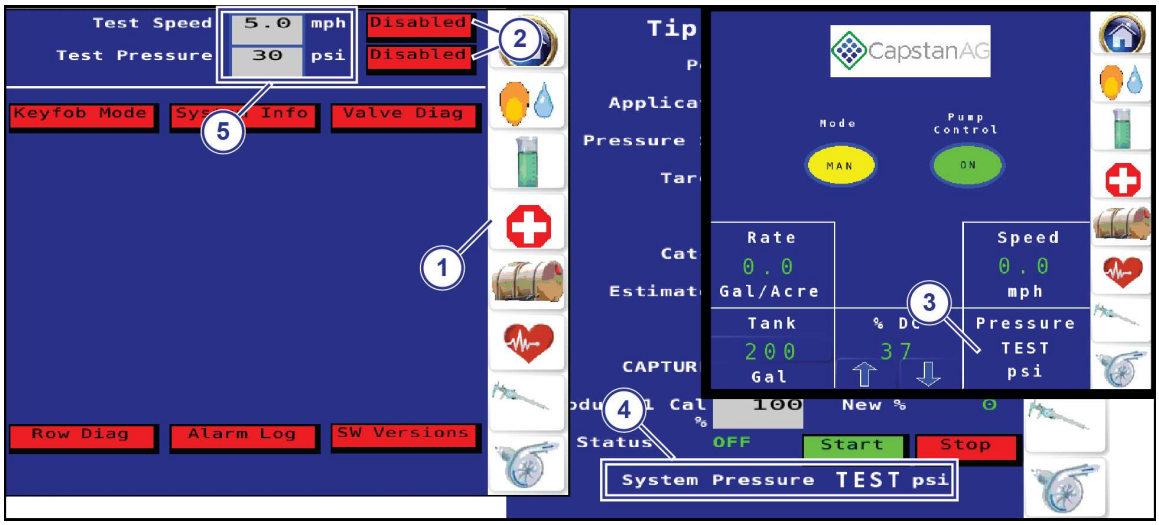


Fig. 9:

1. Select the **Diagnostics** icon *(1)*.
2. Select the desired **Disabled** icon *(2)* to enable the function.

   The background of the icon will change to green and show **Enabled**.

   When the test speed and/or test pressure procedure are enabled, **TEST** will blink on the ***HOME*** screen *(3)* and ***TIP CALIBRATION*** screen *(4)*.
3. Select the box *(5)* next to the desired function.
4. Enter the desired value on the number pad.

Use the Key Fob Controls

The key fob mode on the VT display or the key fob is used to clear any plugged rows, remove air from the system, and test row-by-row to make sure that all of the rows are working correctly.

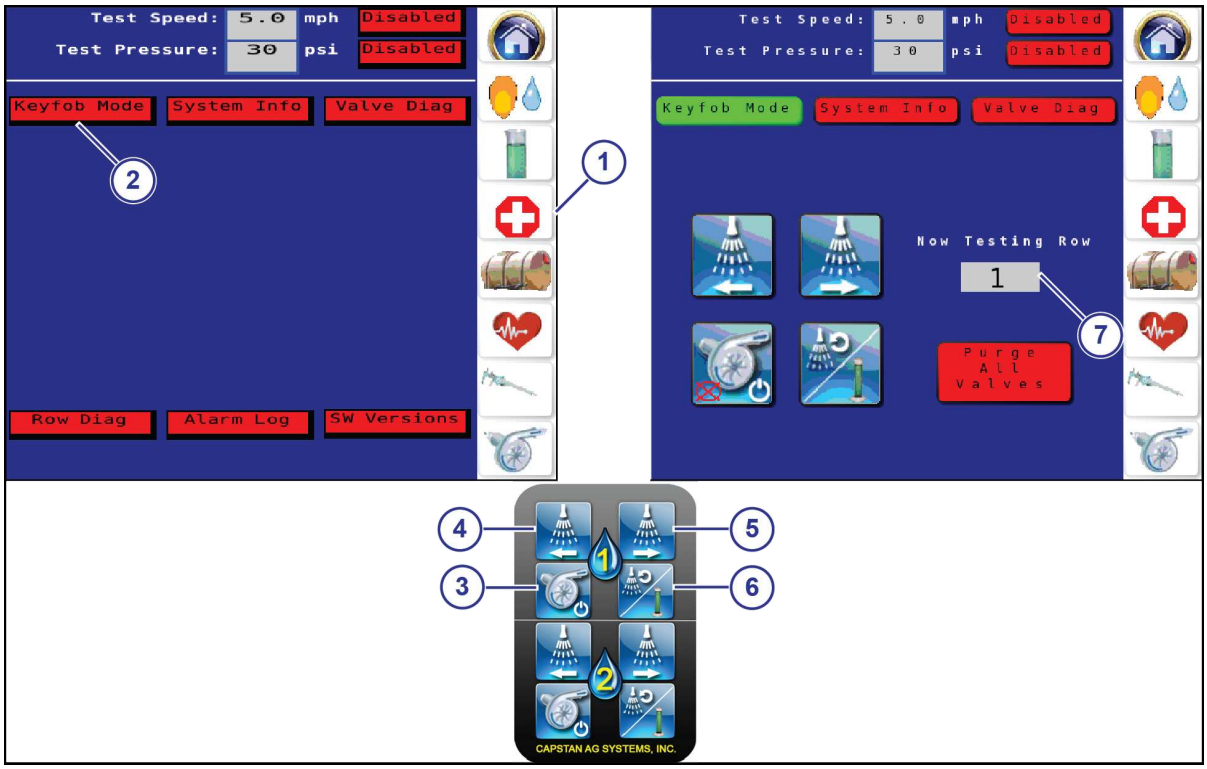


Fig. 10:

1. On the VT display, select the **Diagnostics** icon *(1)*.
2. Select **key fob Mode** *(2)*.

   Note: If the **MODE** is not set to **OFF** on the ***HOME*** screen, a warning message will show when enabling the key fob mode.

   The background of the icon will change to green, and additional icons will show.

The top four buttons on the key fob are for the first product.

(3) Pump On/Off

(4) Pulse Nozzles Right to Left

(5) Pulse Nozzles Left to Right

(6) This button has a dual function:

- Repeat Current Nozzle Pulse
- During the tip calibration procedure, press to start and stop the calibration catch test.

Note: The bottom four buttons on the key fob are used for a dual product system.

3. To change the current test row, without using the key fob, select the box *(7)* below **Now Testing Row**.
4. Enter the desired value on the number pad.

Do the Purge Operation

You can prime, purge the air, or flush the Seed-Squirter™ plumbing system from the ***DIAGNOSTIC*** screen with the key fob mode enabled.

Important: At the start of every planting day, an operator should (at the very least) do the purge all valves procedure to check the system for air or contamination.

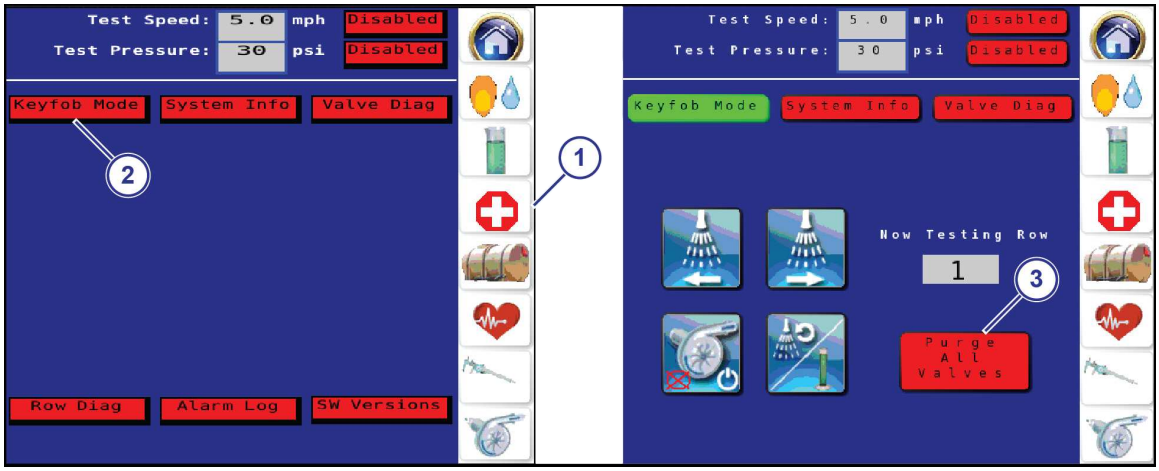


Fig. 11:

1. On the VT display, select the **Diagnostics** icon *(1)*.
2. Select **key fob Mode** *(2)*.
   The background of the icon will change to green, and additional icons will show.
3. Select **Purge All Valves** *(3)*.

   The background of the icon will change to green and **Purging All Valves** will show.

   All of the nozzle valves will open 100%, which allows a constant liquid flow from the product tank, through the plumbing system and discharging through the nozzle valves.

   The purge all valves procedure will end when:

   - Select the **Purging All Valves** icon
   - Select any of the top four buttons on the key fob
   - Select any of the key fob icons on the ***Key Fob Mode*** screen
   - Leave the ***Key Fob Mode*** screen.

System Info

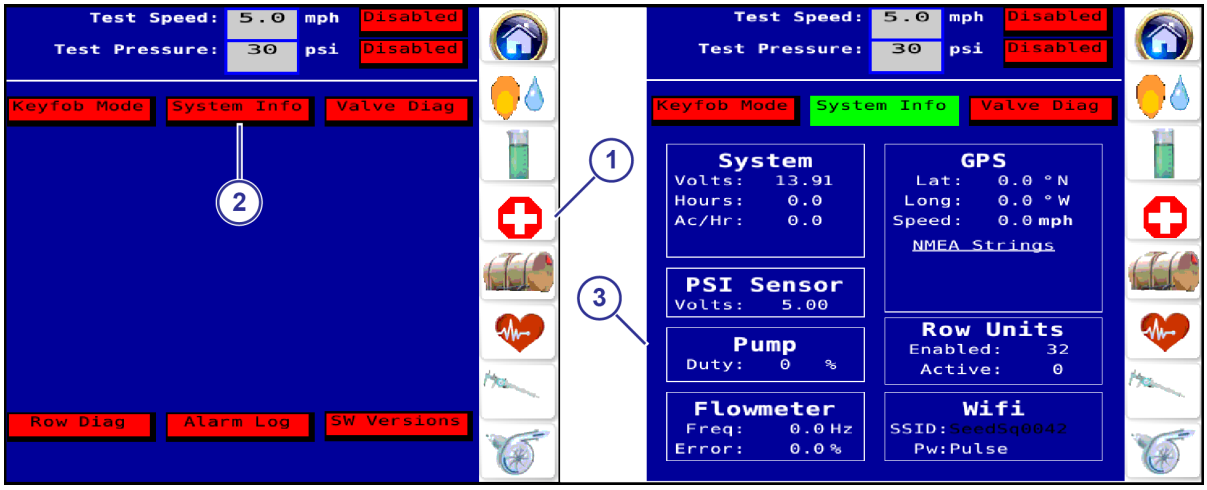


Fig. 12:

1. Select the **Diagnostics** icon *(1)*.
2. Select **System Info** *(2)*.

   The system information screen *(3)* will show.

Software Versions

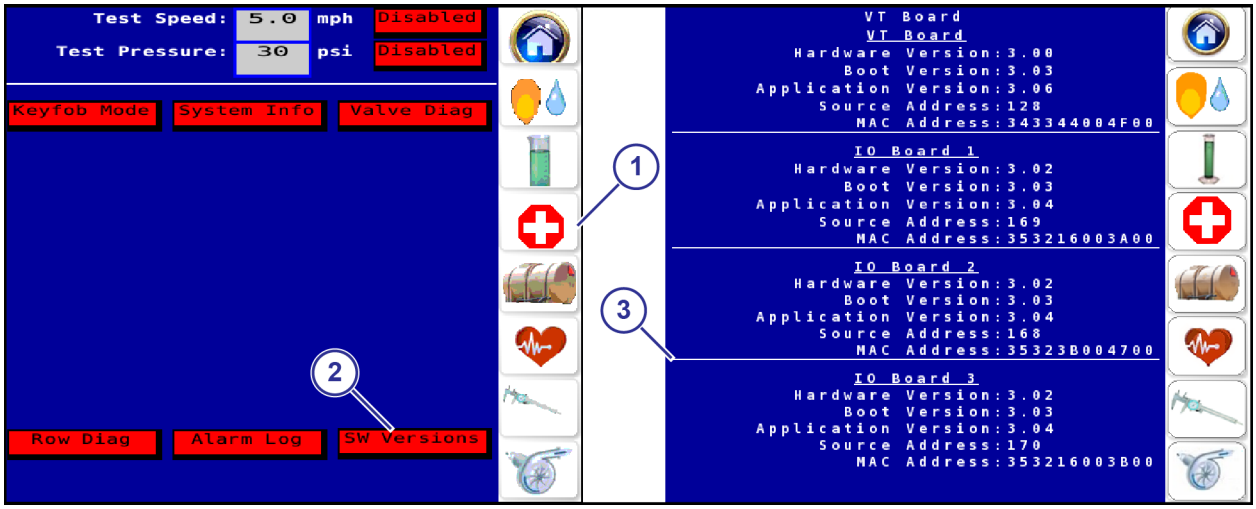


Fig. 13:

1. Select the **Diagnostics** icon *(1)*.
2. Select **SW Versions** *(2)*.

   The software version screen *(3)* will show.

Valve Diagnostics

When the ***DIAGNOSTICS*** screen shows the valve information, you can see if all nozzle valves and seed sensors are connected.

Note: If the Mode is not set to **OFF** on the ***HOME*** screen, a warning will show when enabling the valve diagnostics.

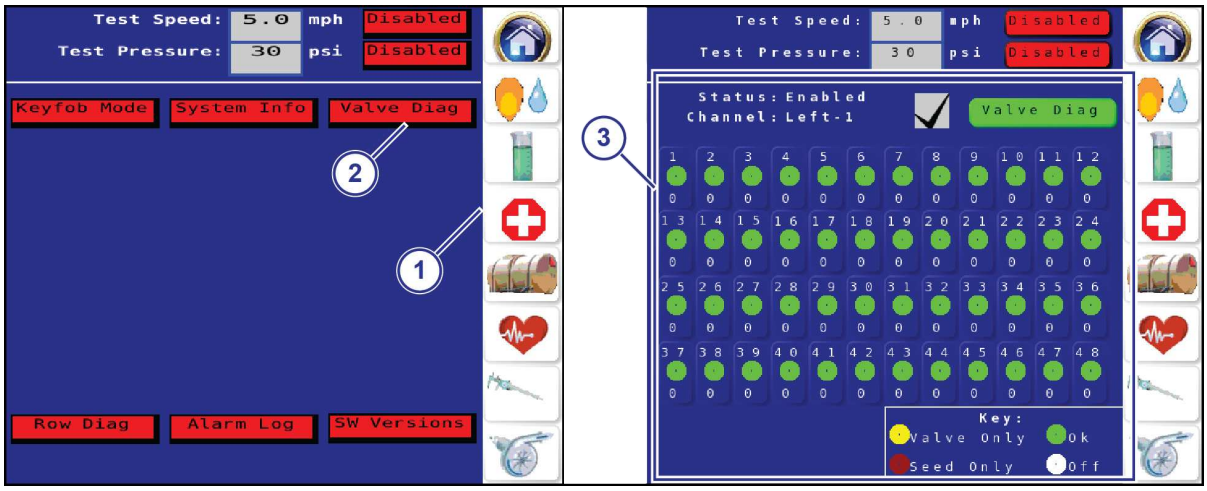


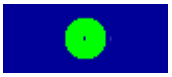
Fig. 14:

To view the valve diagnostics information:

1. Select the **Diagnostics** icon *(1)*.
2. Select **Valve Diag** *(2)*.

   The background of the icon will change to green, and additional information will show at the bottom of the screen.

   The information *(3)* on the screen will show all of the nozzle valves and seed sensor connection information.

Icon	Description
	Seed sensors and nozzle valves are connected.
	Nozzle valve is connected while the controller is not detecting the seed sensor.
	Seed sensor is connected while the controller is not detecting the nozzle valve.
	The rows are disabled or off. These rows will not operate. If it is necessary, go to the troubleshooting for more diagnostic help.

Disable Planter Rows

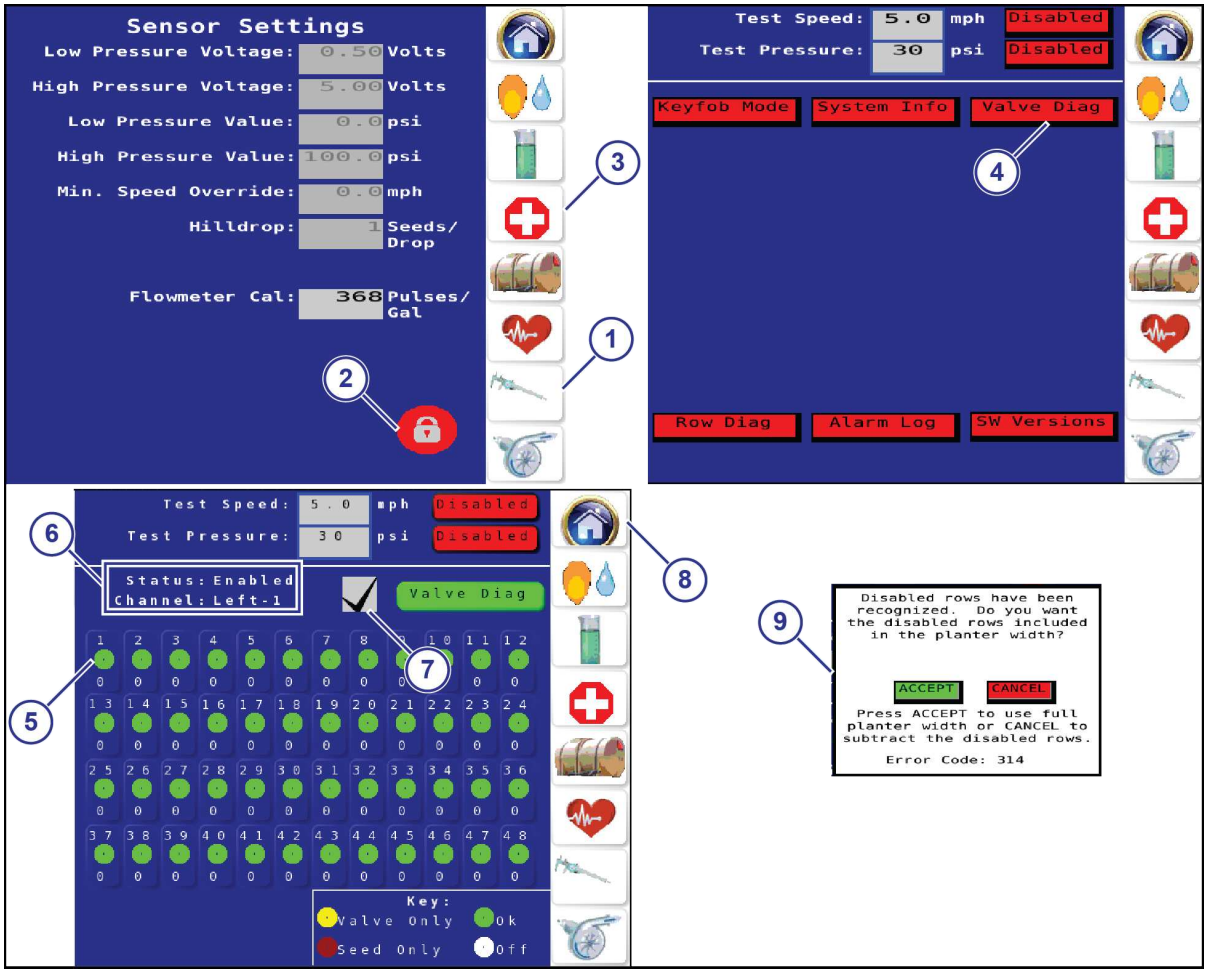


Fig. 15:

1. Select the **Sensor Settings** icon *(1)*.
2. Select the **Lock** icon *(2)*.
3. Use the keyboard to enter the password.

   If it is necessary, contact your dealer for password help.
4. Select the **Diagnostics** icon *(3)*.
5. Select **Valve Diag** *(4)*.

   The background of the icon will change to green, and additional information will show on the bottom of the screen.
6. Select the circle *(5)* below the desired row number.

   The **Status** and **Channel** information *(6)* will show when a row is selected.
7. To disable a row, remove the check mark *(7)*.

   The circle will change to white, and the status for that row will change to Disabled.
8. When you have disabled all the desired rows, select the **Home** icon *(8)*.

   A message box *(9)* will show on the main screen.

Re-enable Planter Rows

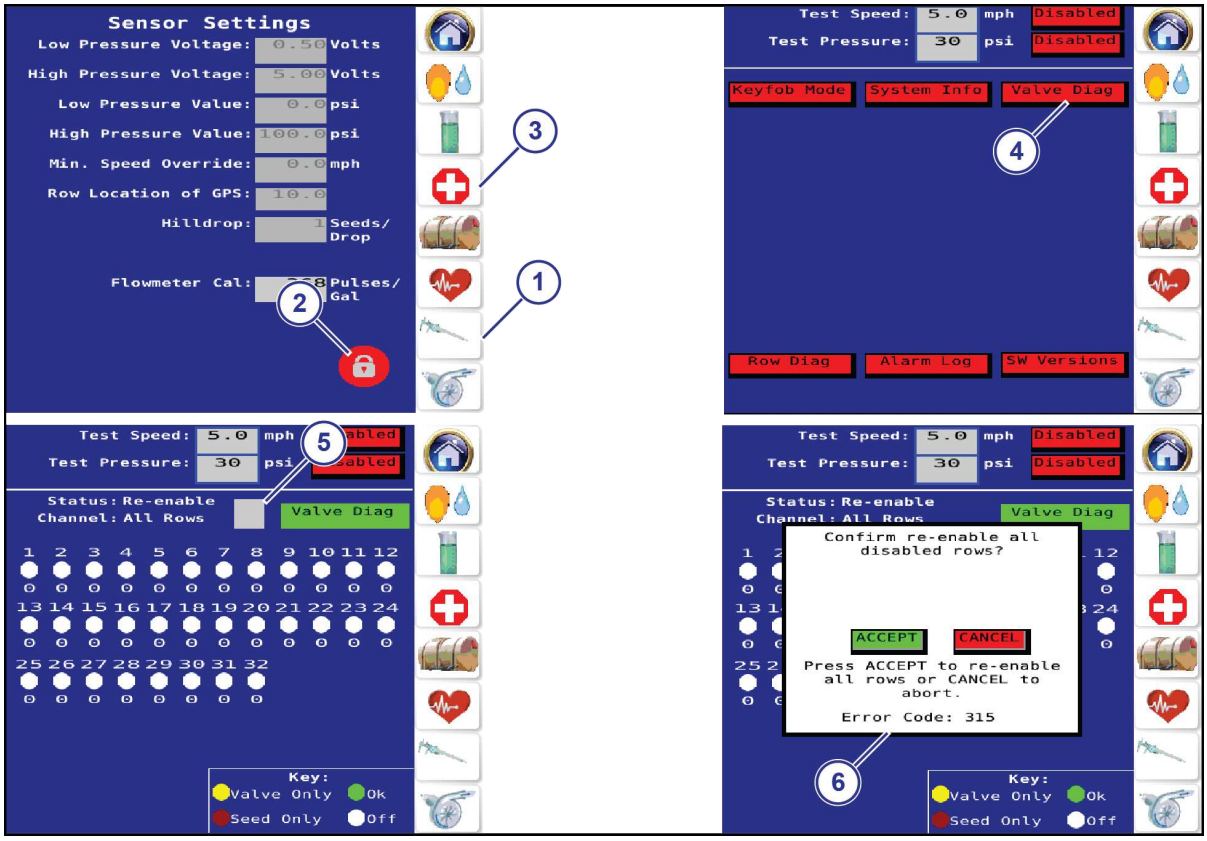


Fig. 16:

1. Select the **Sensor Settings** icon *(1)*.
2. Select the **Lock** icon *(2)*.
3. Use the keyboard to enter the password.
   If it is necessary, contact your dealer for password help.
4. Select the **Diagnostics** icon *(3)*.
5. Select **Valve Diag** *(4)*.
   At the top of the page, **Status** will show **Re-enable** and **Channel** will show **All Rows**.
6. To enable all of the rows, select the empty box *(5)* to insert a check mark into the box.
7. A message box *(6)* will show. Select **ACCEPT** to enable all of the disabled rows.
8. If you do not want to enable all of the disabled rows, select **CANCEL**.

Do the Tip Calibration Procedure

The information on the ***TIP CALIBRATION*** screen is used to compensate for different viscosities and fluid dynamics.

1. Make sure that the **Mode** is set to **OFF** on the ***HOME*** screen.

   If the **Mode** is not set to off, a warning will show when the **Tip Calibration** icon is selected.

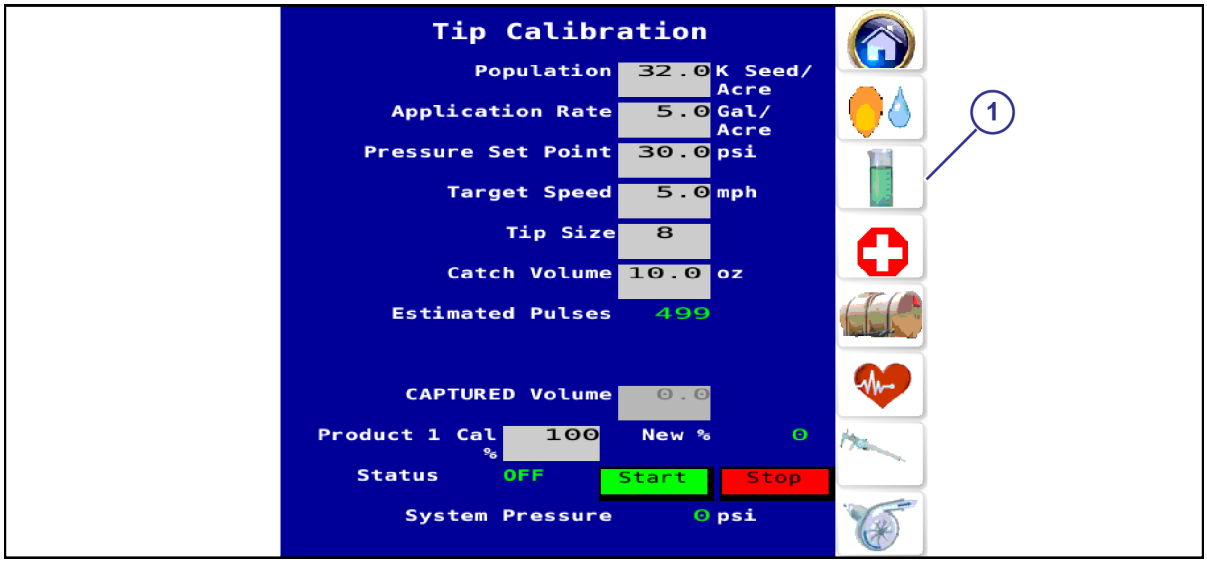


Fig. 17:

2. Select the **Tip Calibration** icon *(1)*.
3. Make sure that the information is correct on the ***TIP CALIBRATION*** screen.
4. If it is necessary, change the values on the screen.

   Note: Changing values on the ***TIP CALIBRATION*** screen will also change the same values on the ***PLACEMENT SETTINGS*** screen. Likewise, information changed on the ***PLACEMENT SETTINGS*** screen will automatically change the information on the ***TIP CALIBRATION*** screen.

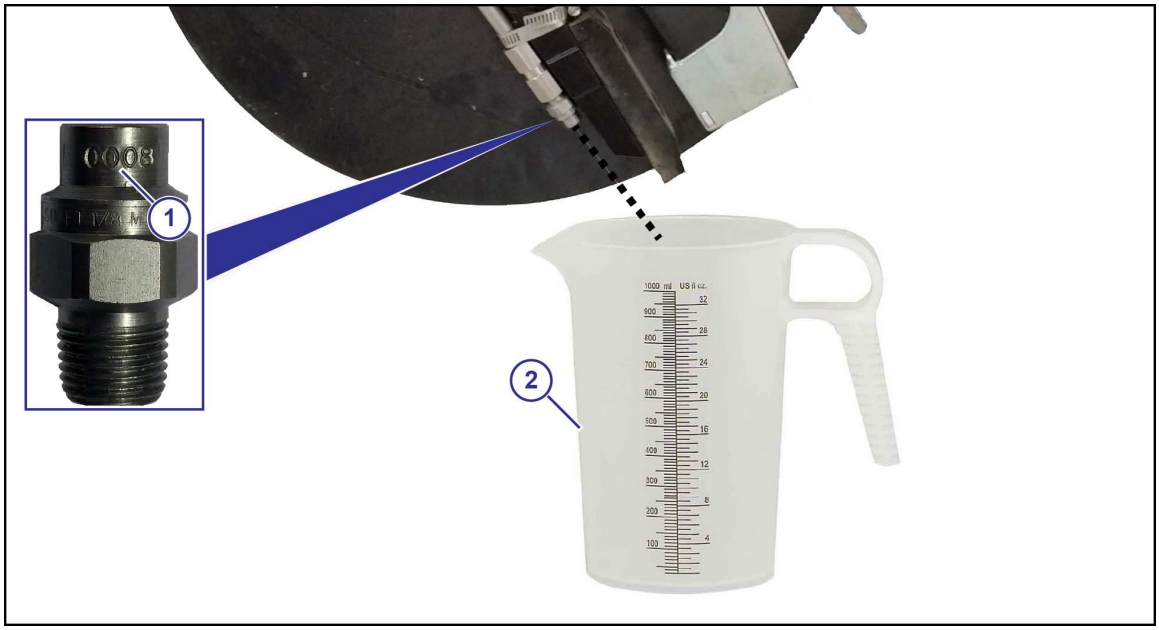


Fig. 18:

5. Make sure that the tip size is correct.

   The spray tip size is verified by looking at the outside surface *(1)* of the tip near the spray end.

6. Put the calibration pitcher *(2)* underneath the spray nozzle of row #1 of the planter.

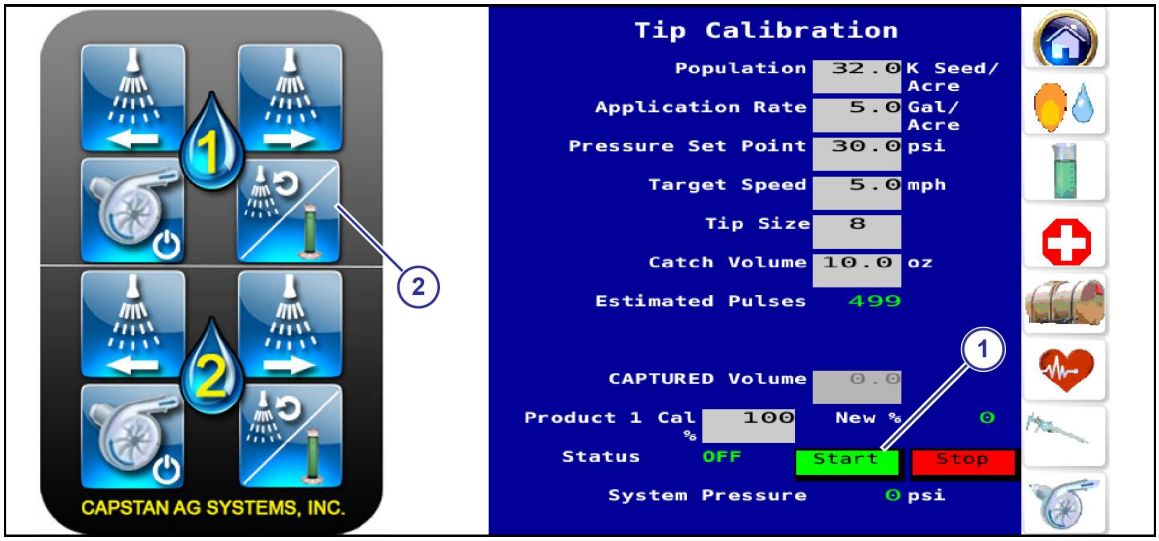


Fig. 19:

7. If equipped with a hydraulic pump, engage the Seed-Squirter™ hydraulics.
8. Start the test, in one of these ways:

   - Select the **Start** icon *(1)* on the ***TIP CALIBRATION*** screen.
   - Press the tip calibration button *(2)* on the key fob.

   The system will start pulsing when it gets to the desired system pressure. It will finish the test after the estimated pulses are done.

   Note: Pulses should be crisp, not weak and stringy.

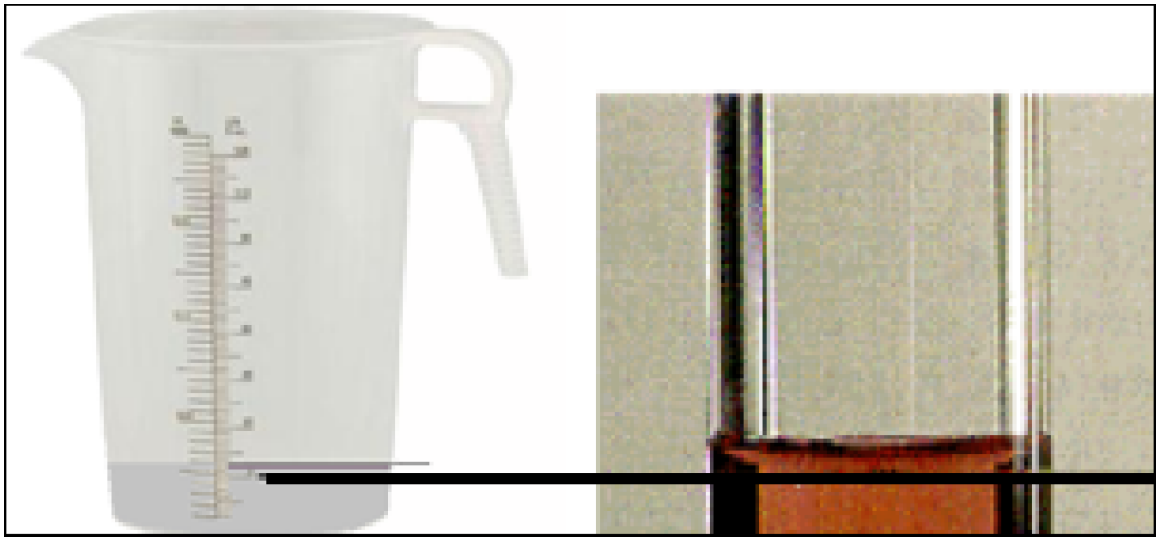


Fig. 20:

9. After the estimated pulses are done, read the calibration pitcher at the bottom of the meniscus.

The Meniscus is the curve in the upper surface of a liquid close to the surface of the container or another object, caused by surface tension. The curve can be either convex or concave, depending on the liquid and the surface.

Note: Reading the calibration pitcher at or above the meniscus will cause an inaccurate measurement.

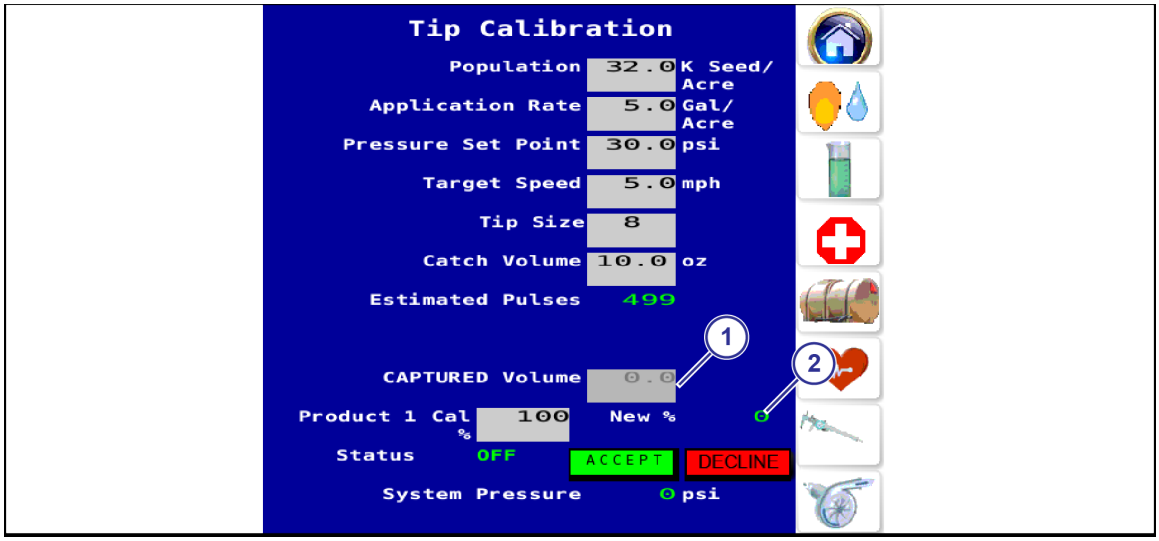


Fig. 21:

10. Select the box *(1)* next to **CAPTURED Volume**.

11. Use the number pad to enter the value.

A new Product 1 Cal *(2)* will be calculated.

Select **ACCEPT** to select the new value or **DECLINE** to use the previous Product 1 Cal% value.

12. Repeat the catch test until the correct catch volume is caught.

Tank Inventory

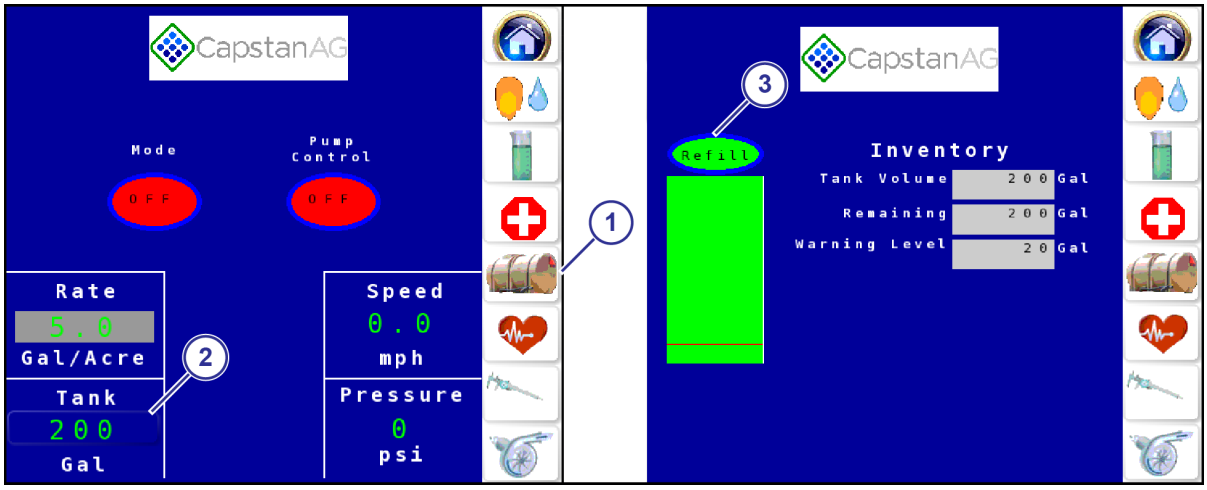


Fig. 22:

Select the **Tank** icon *(1)* on any screen or the box *(2)* below Tank on the ***HOME*** screen to go to the ***TANK INVENTORY*** screen to set the volume of the tank and a warning level.

After you refill the tank, select **Refill** *(3)* to let the system know that you have refilled the tank.

Sensor Settings

Note: The locked settings on the ***SENSOR SETTINGS*** screen are intended for qualified service technician access. Contact your dealer for further assistance.

The default sensor settings are set at the factory.

Setting	Default Value
Low Pressure Voltage	0.50 Volts
High Pressure Voltage	5.0 Volts
Low Pressure Value	0 psi
High Pressure Value	100.00 psi
Min. Speed Override	0.0 mph
Hilldrop	1 Seeds/Drop
Flow meter Cal	368 Pulses/gal

Without unlocking the screen, only the flow meter cal can be changed by the operator.

Setting the Flowmeter Cal

On the ***SENSOR SETTINGS*** screen, the flowmeter cal value must be entered by the operator. This value must match the flow meter label on the planter.

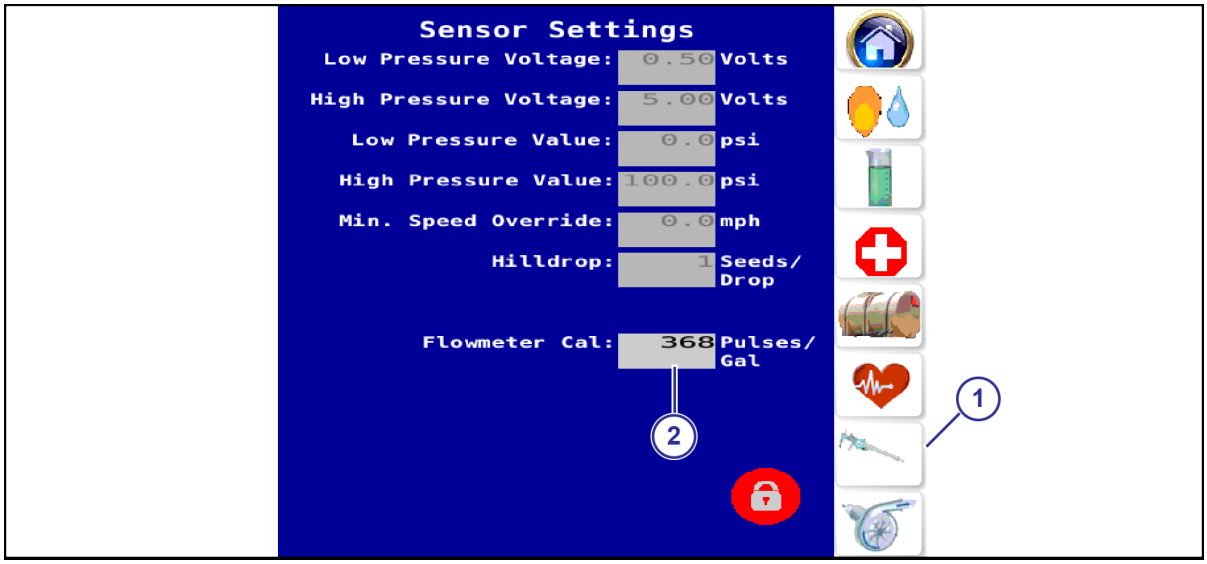


Fig. 23:

1. Select the **Sensor Settings** icon *(1)*.
2. Select the box *(2)* next to the **Flowmeter Cal**.
3. Use the number pad to enter the value.

   Important: The **Flowmeter Cal** value is in pulses per gallon.

Changing the Hilldrop Setting

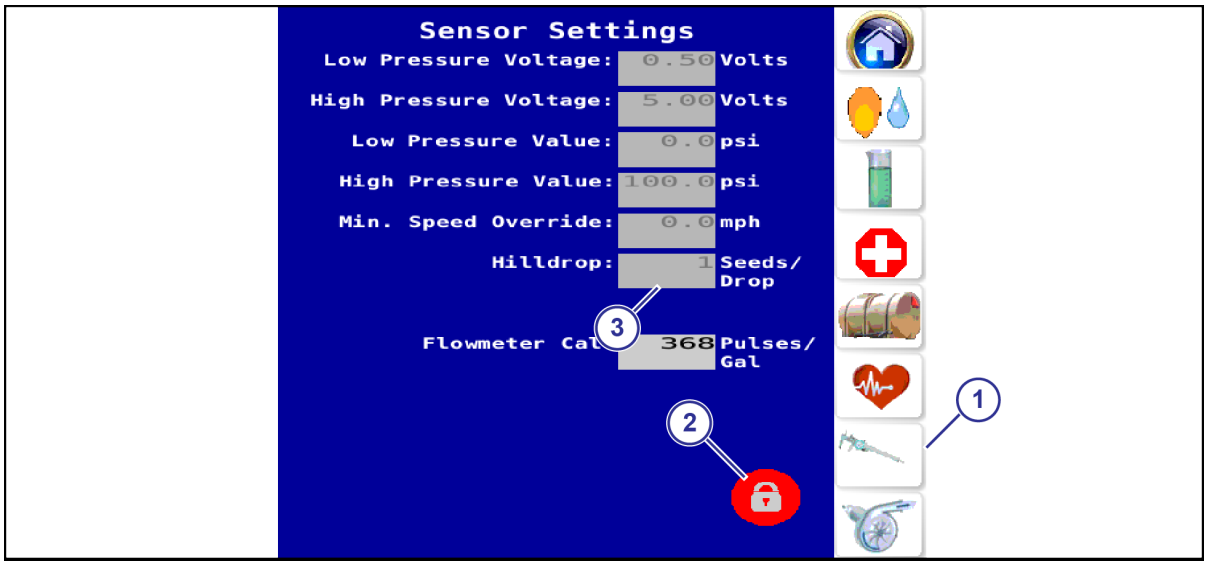


Fig. 24:

1. Select the **Sensor Settings** icon *(1)*.
2. Select the **Lock** icon *(2)*.
3. Use the keyboard to enter the password.

   If it is necessary, contact your dealer for password help.
4. Select the box *(3)* next to the **Hilldrop**.
5. Use the number pad to enter the number of seeds per drop.

   If using for hilldrop cotton, the value must match the number of seeds per drop.

Pump Settings

Note: All of the settings on the ***PUMP SETTINGS*** screen are locked. The locked settings are intended for qualified service technician access. Contact your dealer for further assistance.

The default pump settings are set at the factory.

Setting	Default Value
P	50
I	100
D	50
System Gain	4
Flow Meter Filter	5.0 seconds
Pressure Sensor Filter	3.7 seconds
Minimum Duty Cycle	34
Maximum Duty Cycle	60

Change the Pump Settings

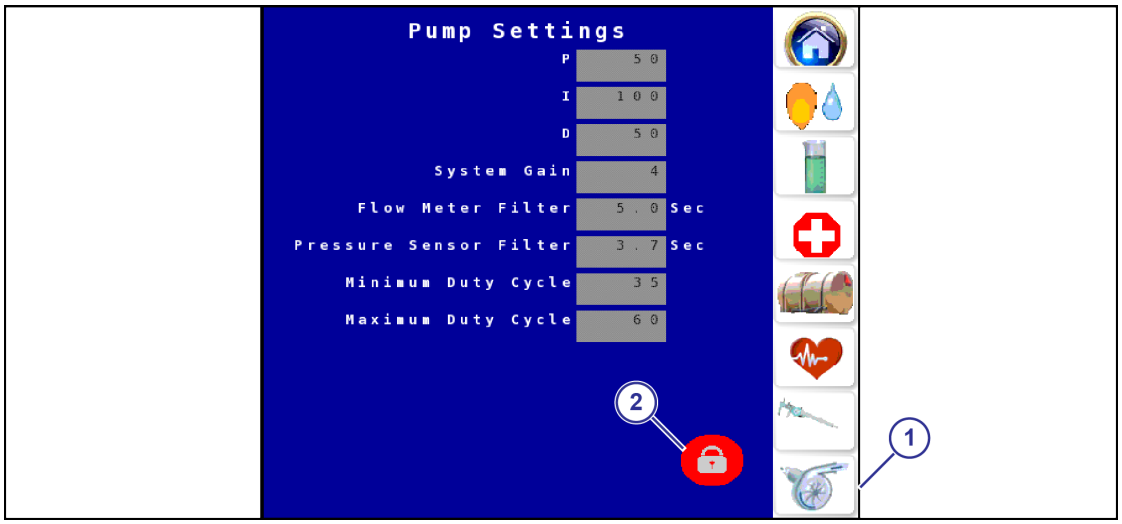


Fig. 25:

1. Select the **Pump** icon *(1)*.
2. Select the **Lock** icon *(2)*.
3. Use the on-screen keyboard to enter the password to unlock the screen.

   If necessary, contact your dealer for password help.
4. Adjust the pump settings by using the **System Gain** setting to tune the system where the pressure is oscillating or sluggish to respond.
   - Select a lower value to stabilize an oscillating system.
   - Select a higher value to speed up a sluggish system.

Chapter 5: Operation

Main/Home Screen

The main/home screen is the main user interface for control of the Seed-Squirter™ system.

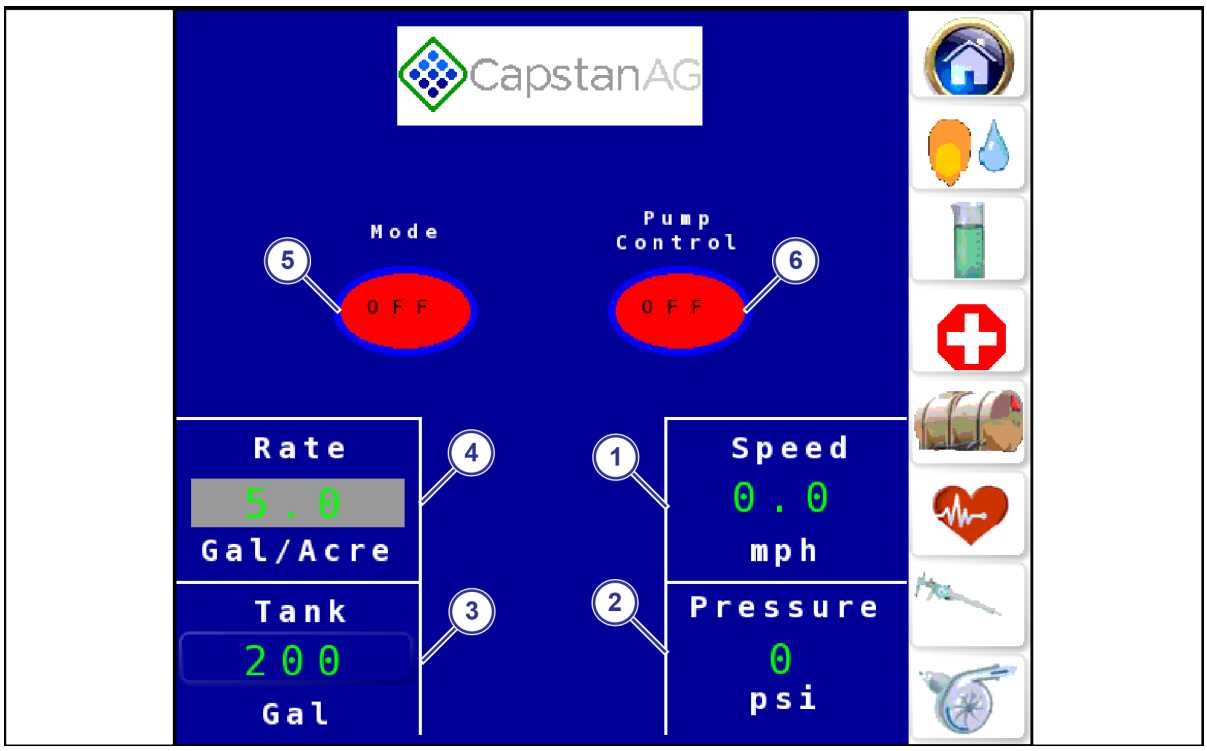


Fig. 26:

Information includes:

(1) Ground Speed

(2) System Pressure

(3) Tank Volume

(4) Application Rate

On the main/home screen, the **Mode** *(5)* can be changed:

- Auto
- Manual
- Open
- Off

On the main/home screen, the **Pump Control** *(6)* can be changed:

- On
- Off

Operate in Auto Mode

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.

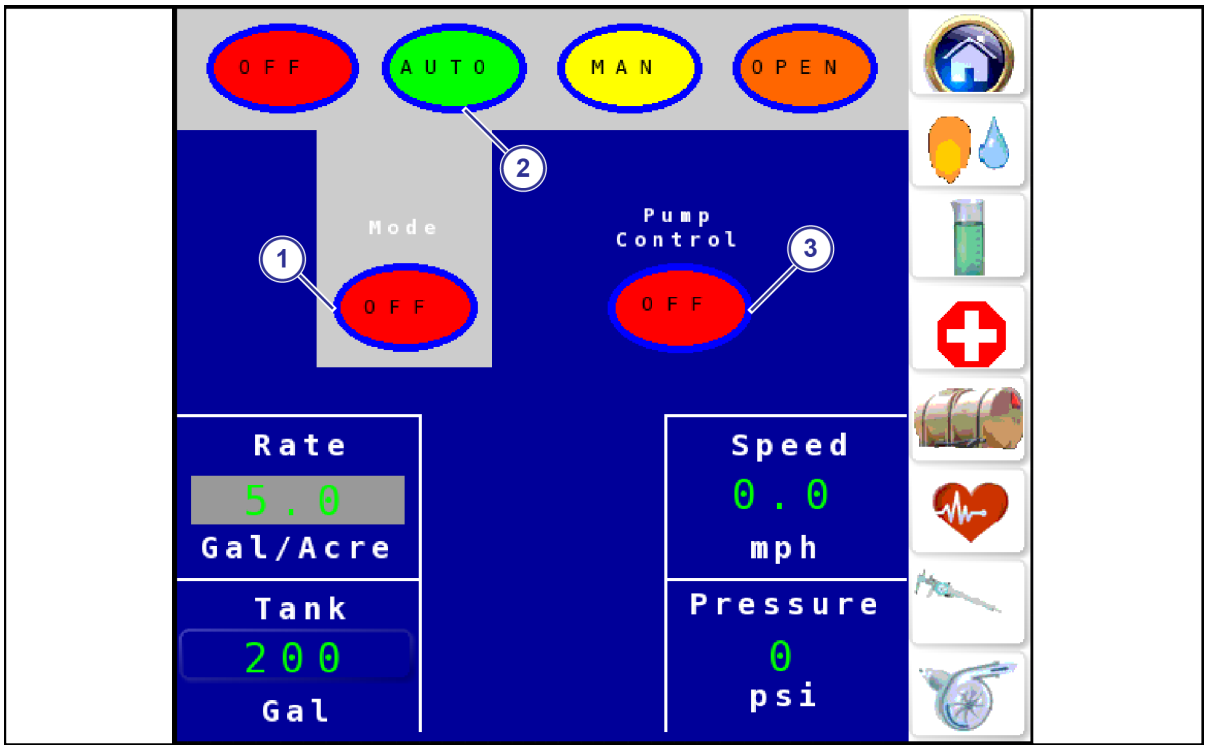


Fig. 27:

1. On the ***HOME*** screen, select the **Mode** icon *(1)*.
2. Select **AUTO** *(2)* from the list.
3. Touch and release the **Pump Control** icon *(3)* until **ON** shows.

   With the Seed-Squirter™ hydraulics engaged, the liquid product pump will engage and raise the pressure to the pressure set point.
4. Touch and release the **Pump Control** icon until **OFF** shows.

   The liquid product pump will disengage, and nozzle valves will not pulse.

   Recommendation: Set the **Pump Control** to **OFF** when stopping to fill the planter with seed or liquid product.

Do a Field Check of the Seed and Squirt Placement

A field check should be completed at the first trip to the field and again whenever the distance to the seed is changed.

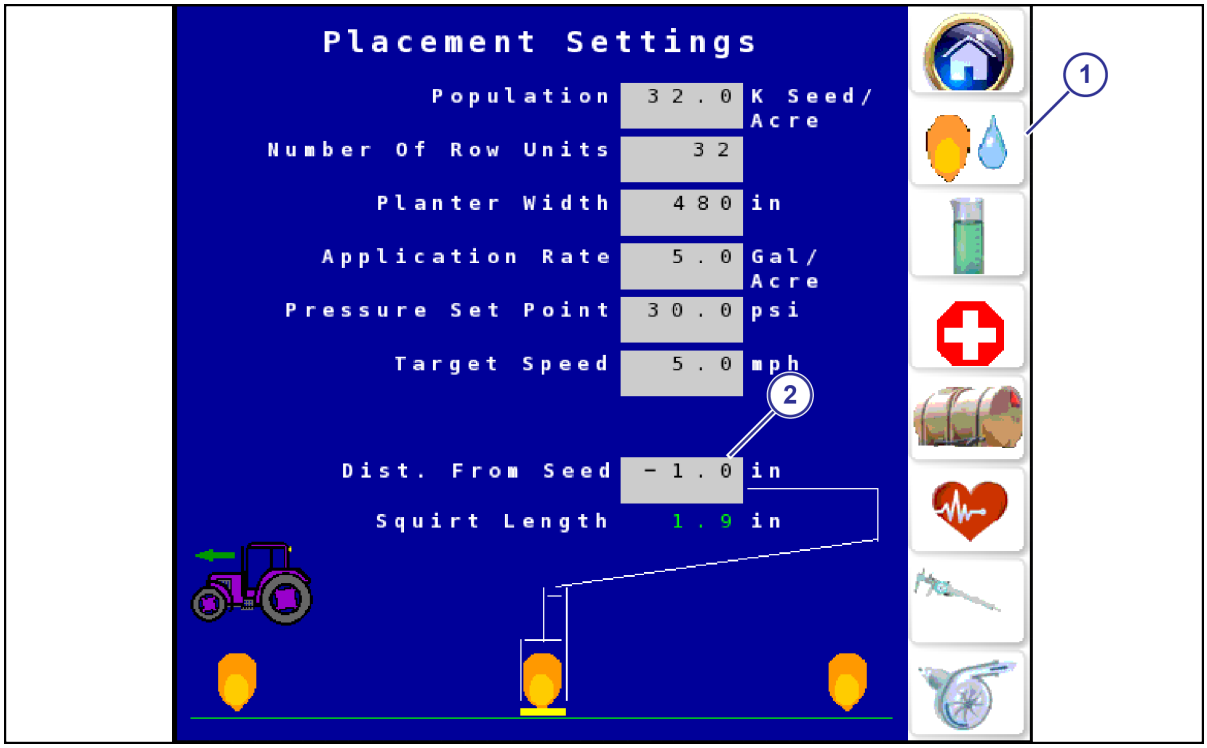


Fig. 28:

1. Select the **Placement Settings** icon *(1)*.
2. Select the box *(2)* next to **Dist. From Seed**.
3. Use the number pad to enter the desired distance from the seed value.

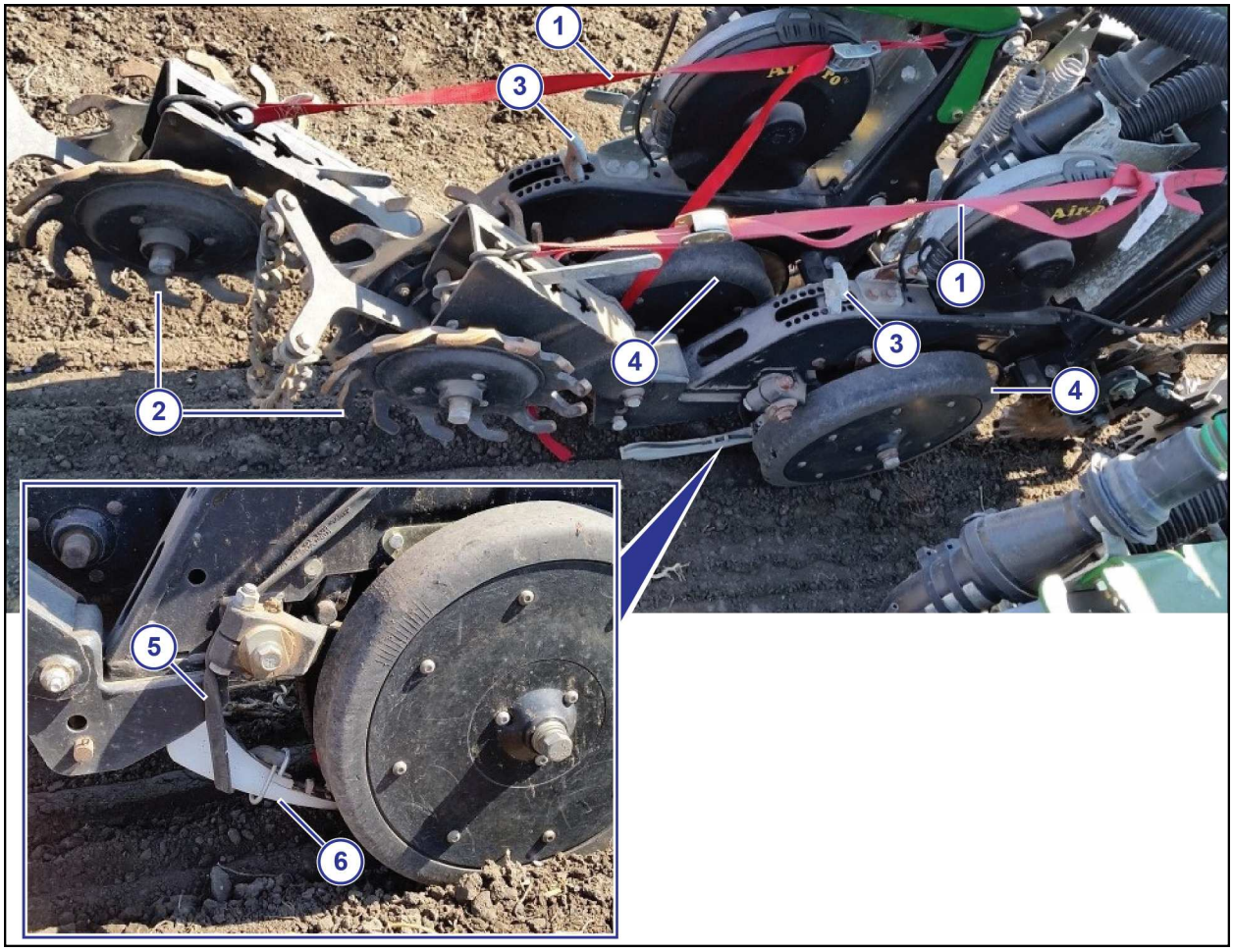


Fig. 29:

4. At the back of the planter, on the rows to be checked, use tie-down straps *(1)* to lift the closing wheels *(2)* up out of the furrow.
5. On the rows to be checked, use the side gauge wheel depth adjuster *(3)* to shallow up the side gauge wheels *(4)*.

   Recommendation: On a twin-row do a check procedure on rows that are next to each other. For example, rows one and two.
6. Use the excess from the tie-down strap, or a bungee strap *(5)* to lift the seed firmer *(6)* up and out of the furrow.
7. Once everything is out of the furrow and off the dirt, return to the tractor cab.

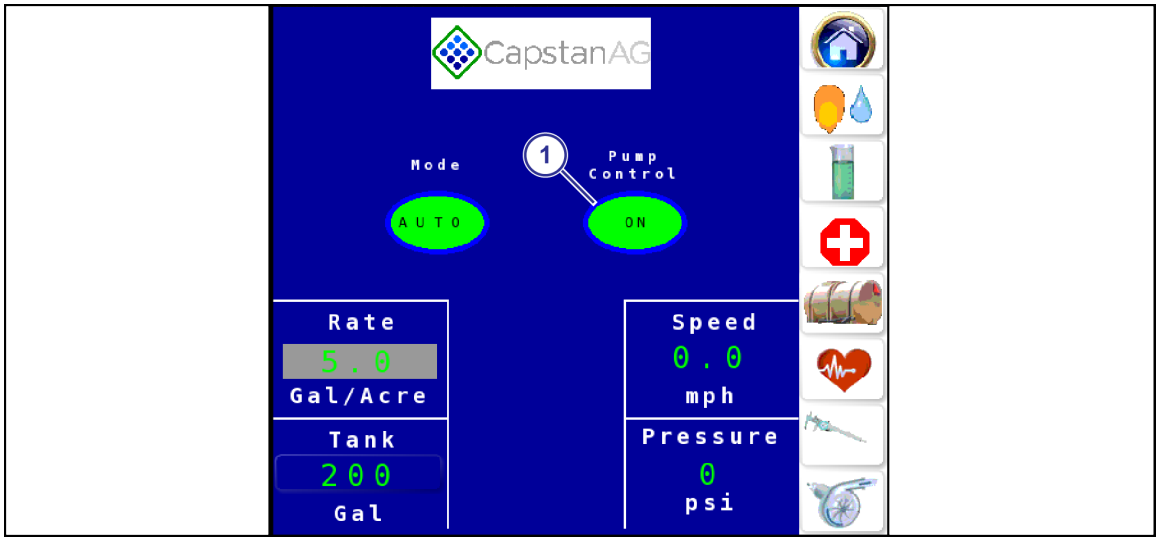


Fig. 30:

8. On the **HOME** screen, touch and release the **Pump Control** icon *(1)* until **ON** shows.
9. Start planting for the desired test distance, using the same settings and speeds as normal planting.
10. Stop planting and stop the tractor when the test distance is reached.

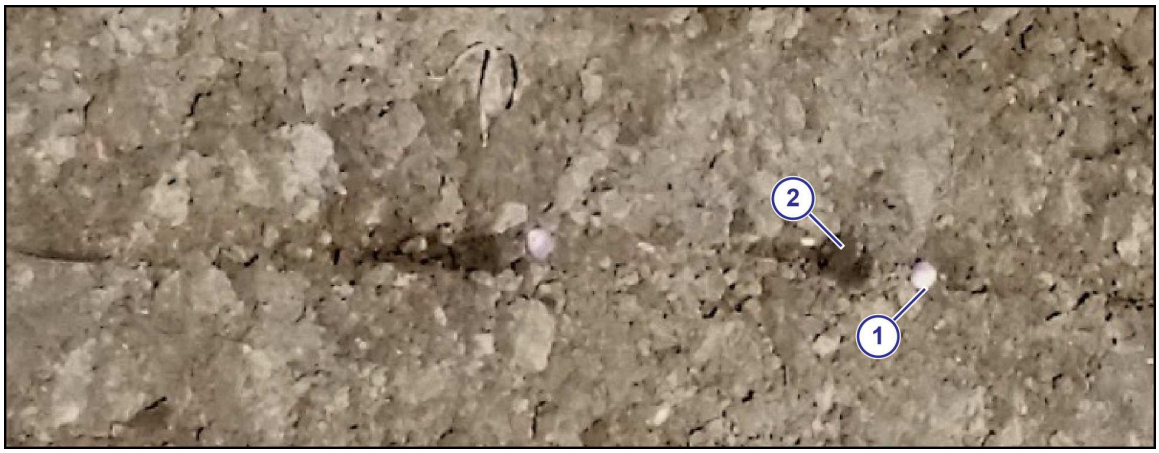


Fig. 31:

11. Visually do a check of the placement of the squirt relative to the seed in the furrow.

    (1) Seed placement

    (2) Squirt placement

12. If the placement needs adjustment, do one of these:
    a) Change the **Dist. From Seed** value on the ***PLACEMENT SETTINGS*** screen.
    b) Do the liquid product tube setup procedure again to adjust the measurements to get the squirt where desired.
13. When the placement is correct, remove all of the straps and adjust the side gauge wheel depth to the normal operating depth.

    Note: Do a field check periodically or when the rate and/or distance to the seed changes.

Operate in Manual Mode

Manual mode is used for troubleshooting or continuing to operate when the pressure sensor has failed.

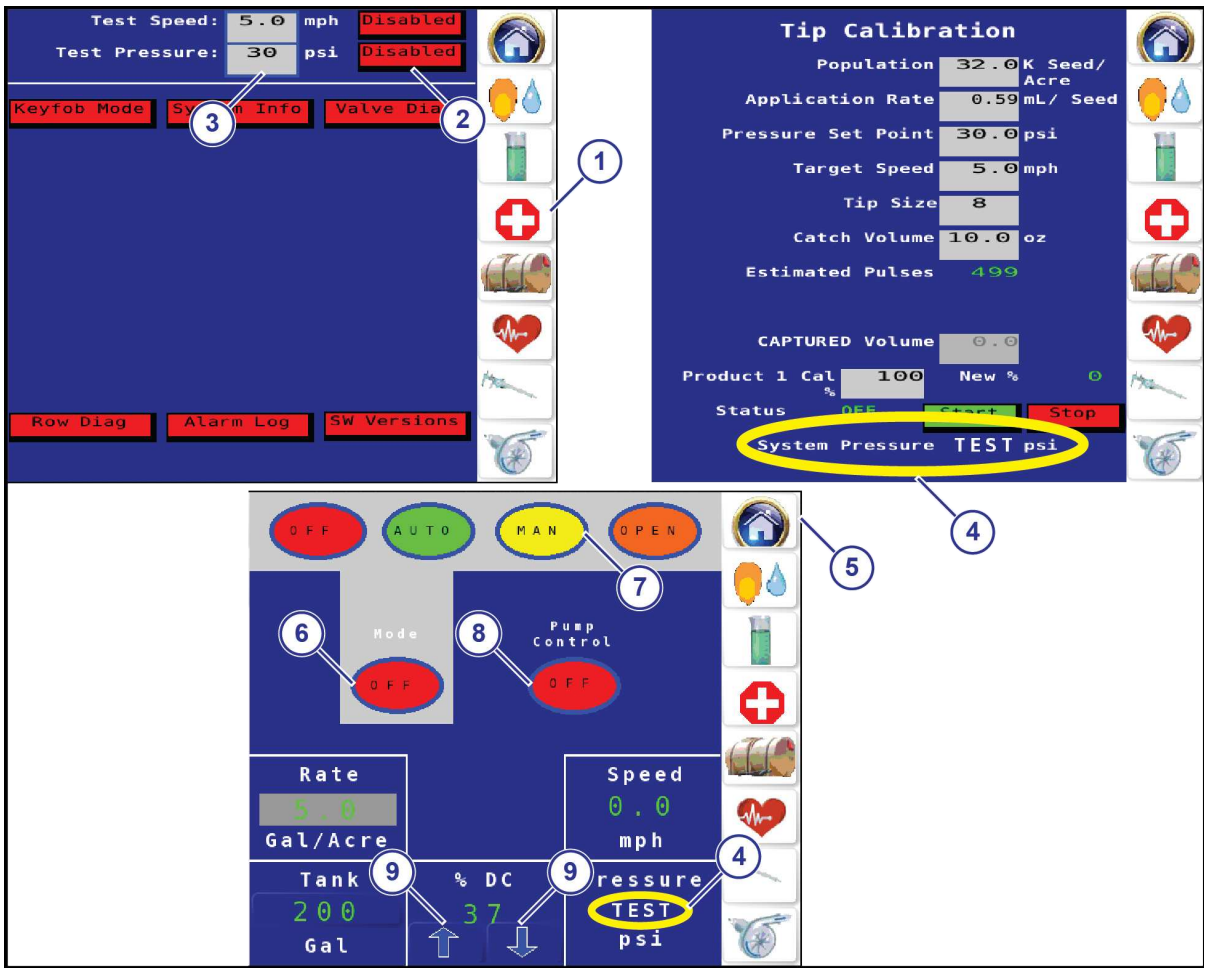


Fig. 32:

1. Select the **Diagnostics** icon *(1)*.
2. On the ***Diagnostics*** screen, select the **Disabled** icon *(2)* to enable the test pressure.
3. Make sure that the **Test Pressure** value *(3)* is the same as the desired system pressure.
4. If the **Test Pressure** value is not correct:
   a) Select the box next to **Test Pressure**.
   b) Use the number pad to enter the correct value
5. When the test pressure is enabled, **TEST** *(4)* will flash in the System Pressure box on the ***HOME*** screen and ***TIP CALIBRATION*** screen.
6. Select the **Home** icon *(5)*.
7. On the ***HOME*** screen, select the **Mode** icon *(6)*.
8. Select **MAN** *(7)* from the list.
9. Select and release the **Pump Control** icon *(8)* until **ON** shows.

10. Visually check the manual pressure gauge on the planter.
11. Select the arrows *(9)*, below the **% DC**, to change the pressure value on the manual pressure gauge to be the same as the desired system pressure.

    Note: Do a check of the planter during operation, and adjust as necessary.

    Recommendation: Set the **Pump Control** to **OFF** when stopping to fill the planter with seed or liquid product.

Operate in Open Mode

Attention: A WILGER metering orifice must be installed at the discharge of each CapstanAG pulsing valve to operate in Open Mode.

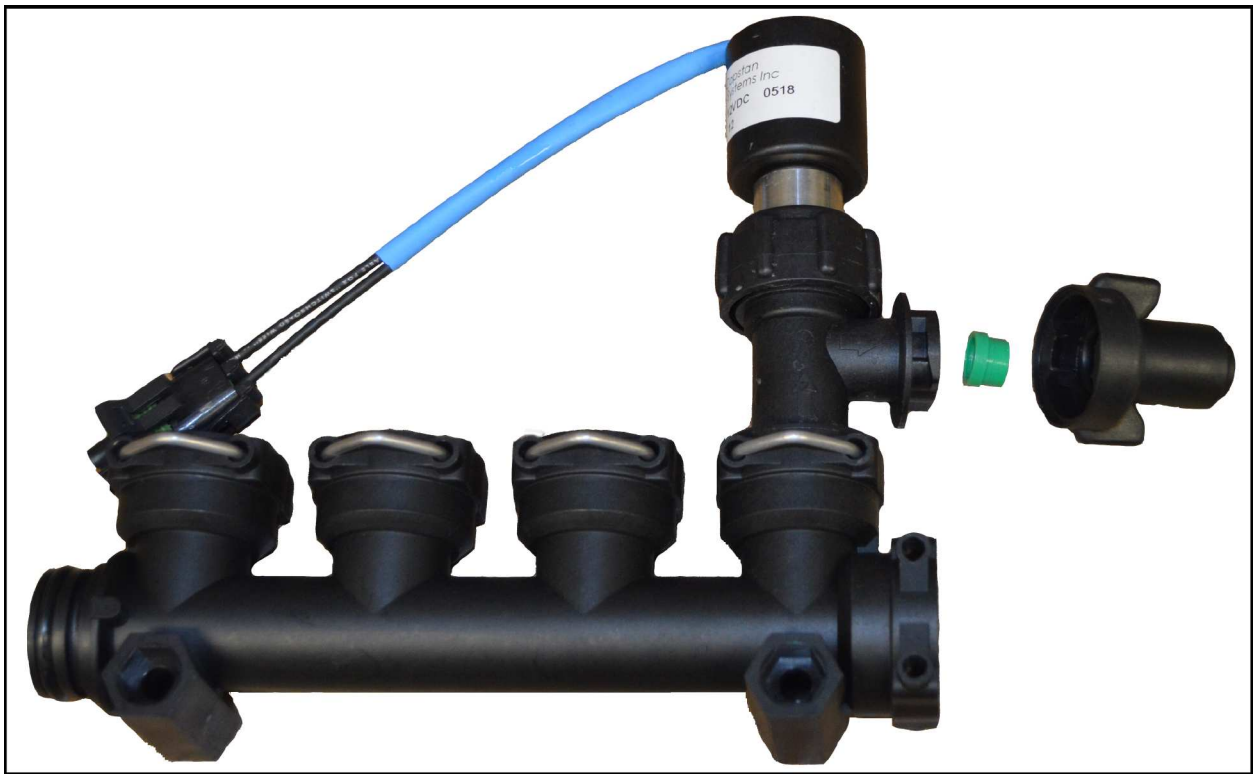


Fig. 33:

Use open mode to apply a constant stream of product. Orifice inserts are required to achieve the desired GPA.

The system pressure automatically adjusts to maintain the requested GPA, and each row shuts off independently if seeds are not sensed.

Important: Install the metering orifices when running in open mode only.

Remove the metering orifices if running in auto or manual mode.

Note: Use orifice rate charts to size the orifices correctly, or contact your local dealer.

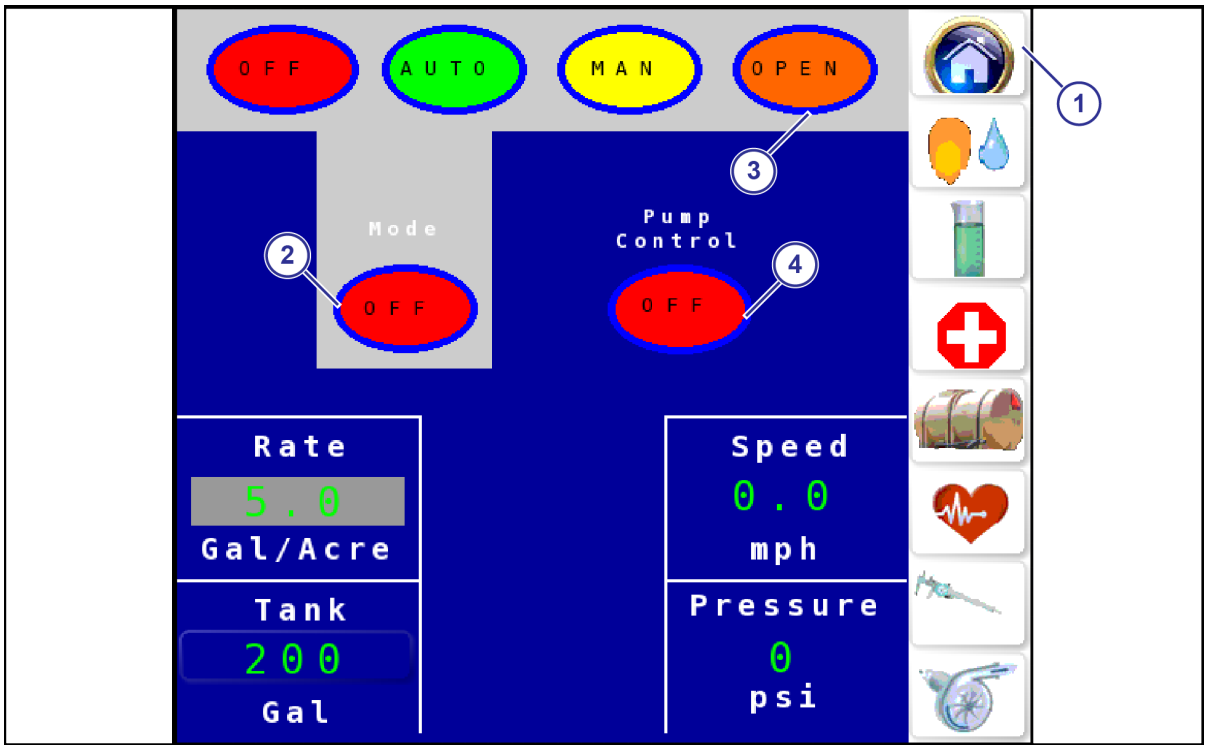


Fig. 34:

1. Select the **Home** icon *(1)*.
2. On the ***HOME*** screen, select **Mode** icon *(2)*.
3. Select **OPEN** *(3)* from the list.
4. Select and release the **Pump Control** icon *(4)* until **ON** shows.

   With the Seed-Squirter™ hydraulics engaged, the liquid product pump will engage and raise the pressure to the pressure set point.
5. Select and release the **Pump Control** icon until **OFF** shows.

   The liquid product pump will disengage, and the nozzle valves will not open.

   Recommendation: Set the **Pump Control** to **OFF** when stopping to fill the planter with seed or liquid product.

Active Seed/Valve Sensor Indicators Screen

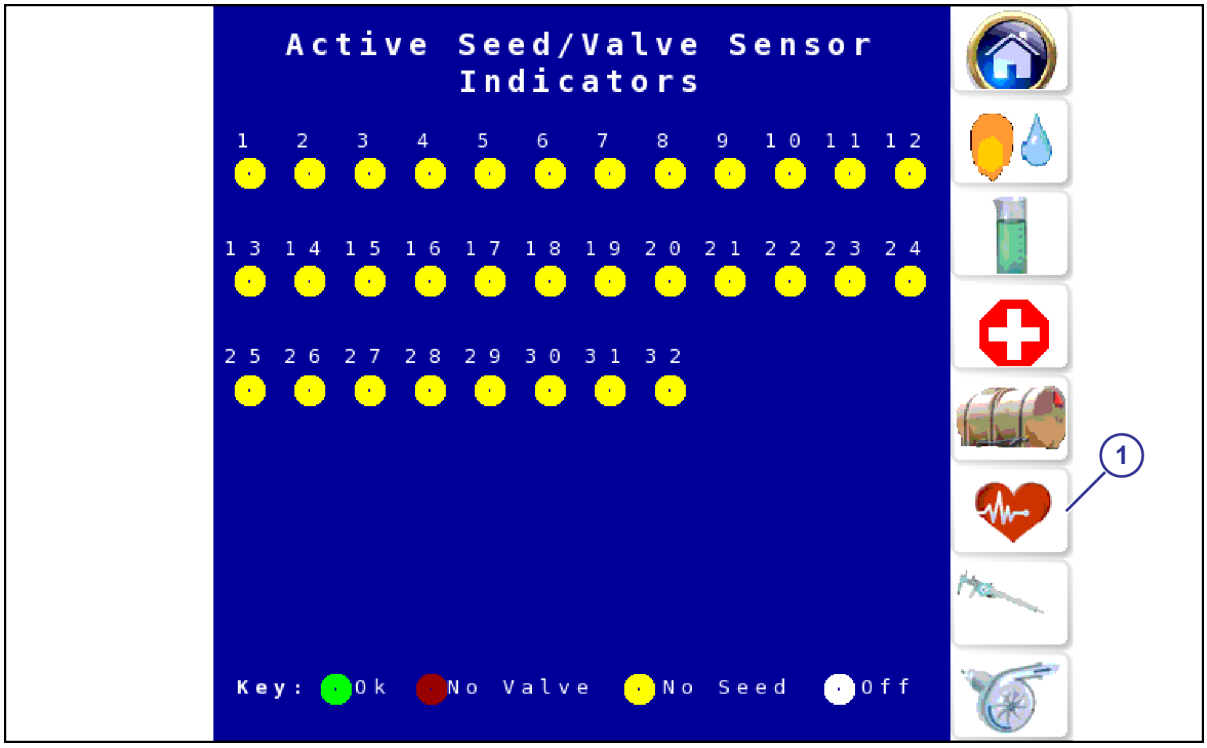
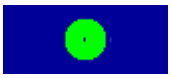


Fig. 35:

To see the ***ACTIVE SEED/VALVE SENSOR INDICATORS*** screen, select the **Sensor Indicator** icon *(1)*. Use the information on this screen to make sure that the nozzle valves and seed sensors are working correctly while the planter is operating.

Icon	Description
	Indicates seed sensor and nozzle valves are connected and operational.
	Indicates nozzle valve is not being detected by the Seed-Squirter™ controller, while the seed sensor is operational.
	Indicates seeds are not being detected by the Seed-Squirter™ controller, while the nozzle valve is operational.
	Indicates that rows are disabled or off. These rows will not operate.

Note: Go to the troubleshooting charts for more information about failed rows.

Set the Pump Control to ON/OFF

Pump Control lets the operator change between **ON** and **OFF** to engage and disengage the liquid product pump.

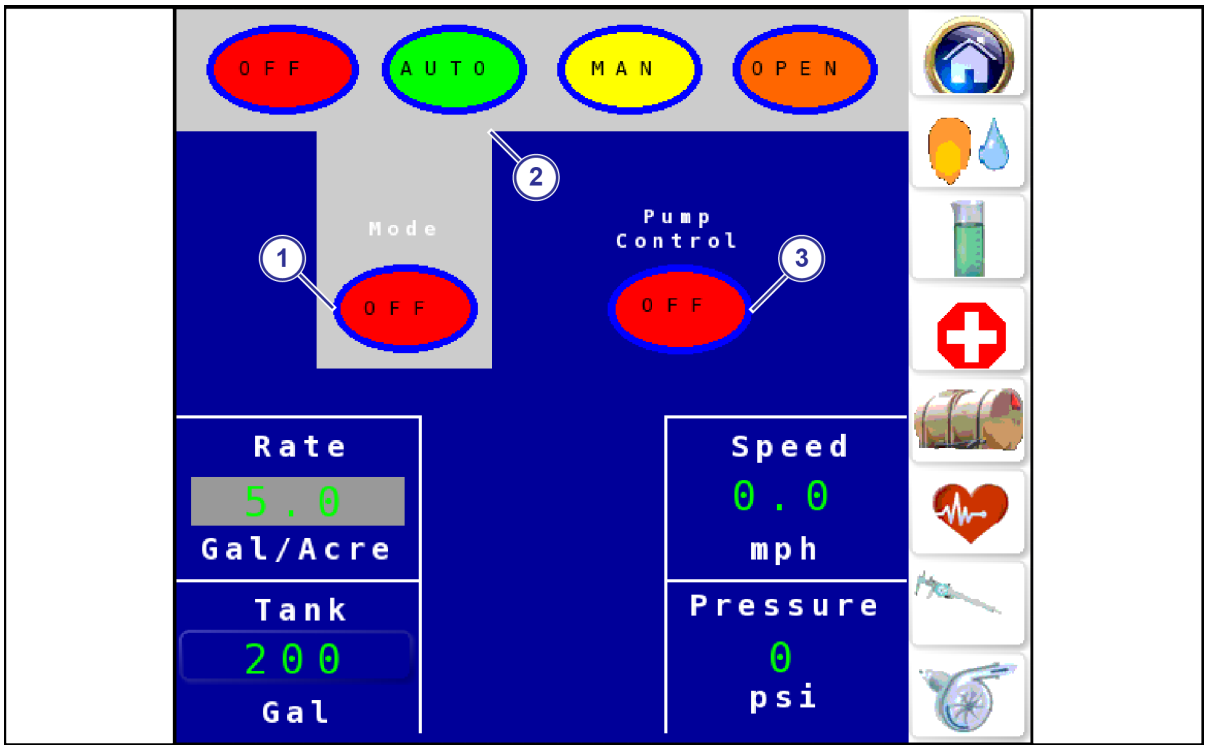


Fig. 36:

1. Engage the Seed-Squirter™ hydraulics.
2. On the **HOME** screen, select the **Mode** icon *(1)*.
3. Select the desired operation mode from the list *(2)*.
4. Select and release the **Pump Control** icon *(3)* until **ON** shows.

   The liquid product pump will engage and raise the pressure to the pressure set point.
5. Select and release the **Pump Control** icon until **OFF** shows.

   The liquid product pump will disengage, and the nozzle valves will not pulse.

   Recommendation: Set the **Pump Control** to **OFF** when stopping to fill the planter with seed or liquid product.

Set the Operation Mode to OFF

When the **Mode** is set to **OFF**, the system disengages (pump and nozzle valves), and all alarms are deactivated. Set the **Mode** to **OFF** when the Seed-Squirter™ system is not in use.

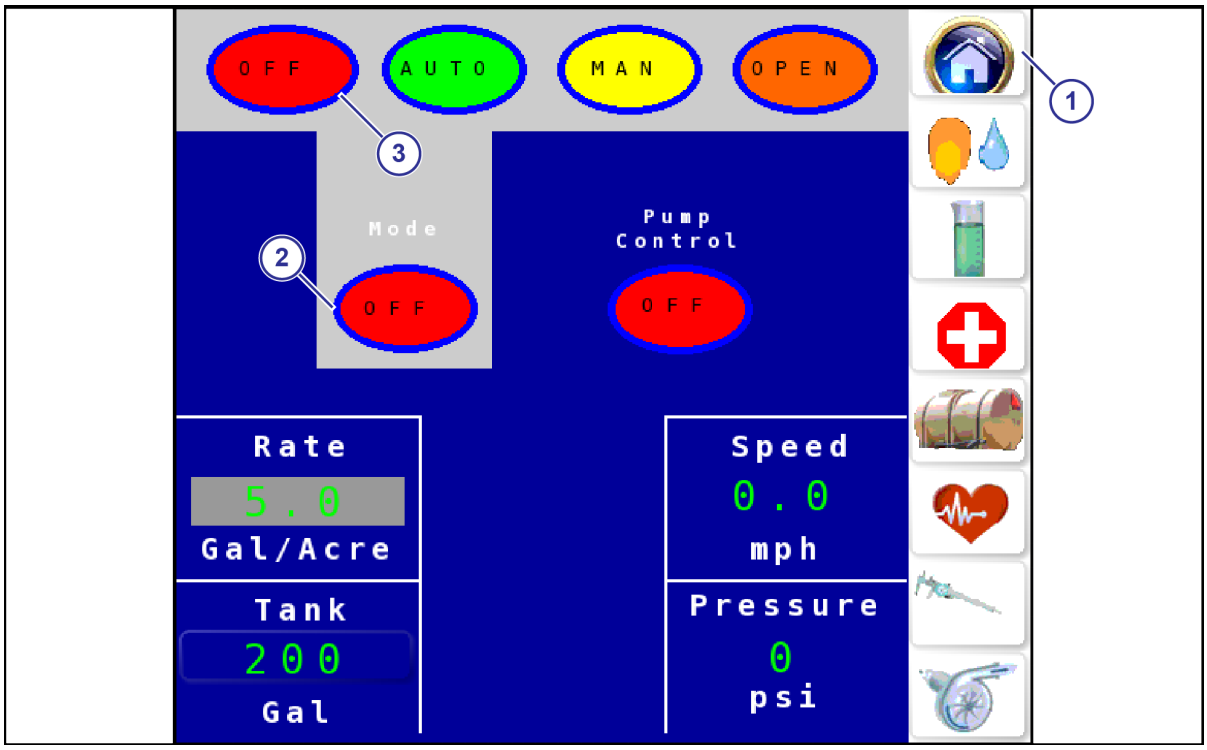


Fig. 37:

1. Select the **Home** icon *(1)*.
2. On the ***HOME*** screen, select **Mode** icon *(2)*.
3. Select **OFF** *(3)* from the list.

   The liquid product pump will disengage, and the nozzle valves will not pulse.

Tank Inventory

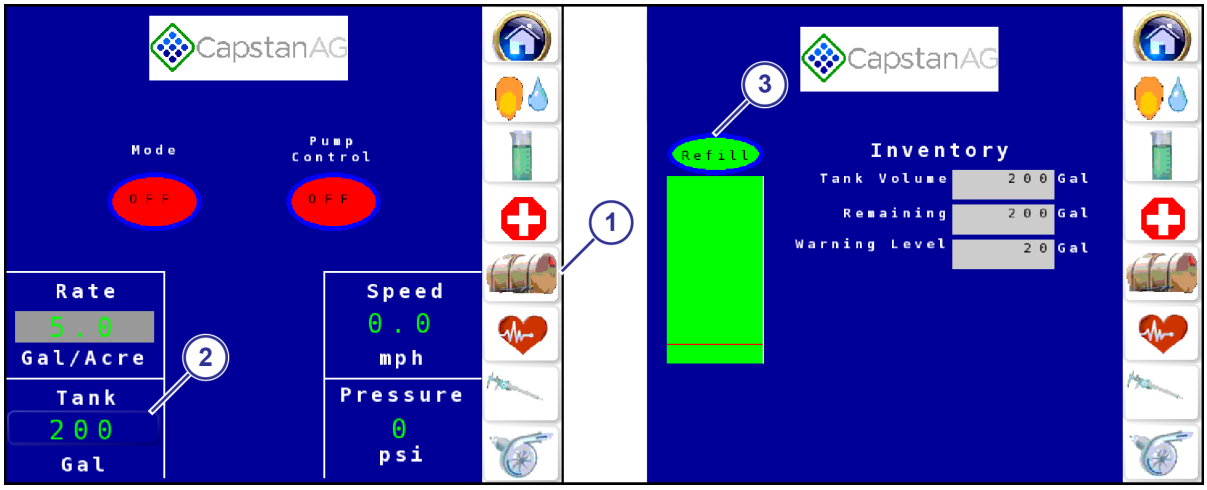


Fig. 38:

Select the **Tank** icon *(1)* on any screen or the box *(2)* below Tank on the ***HOME*** screen to go to the ***TANK INVENTORY*** screen to set the volume of the tank and a warning level.

After you refill the tank, select **Refill** *(3)* to let the system know that you have refilled the tank.

Alarm Screens

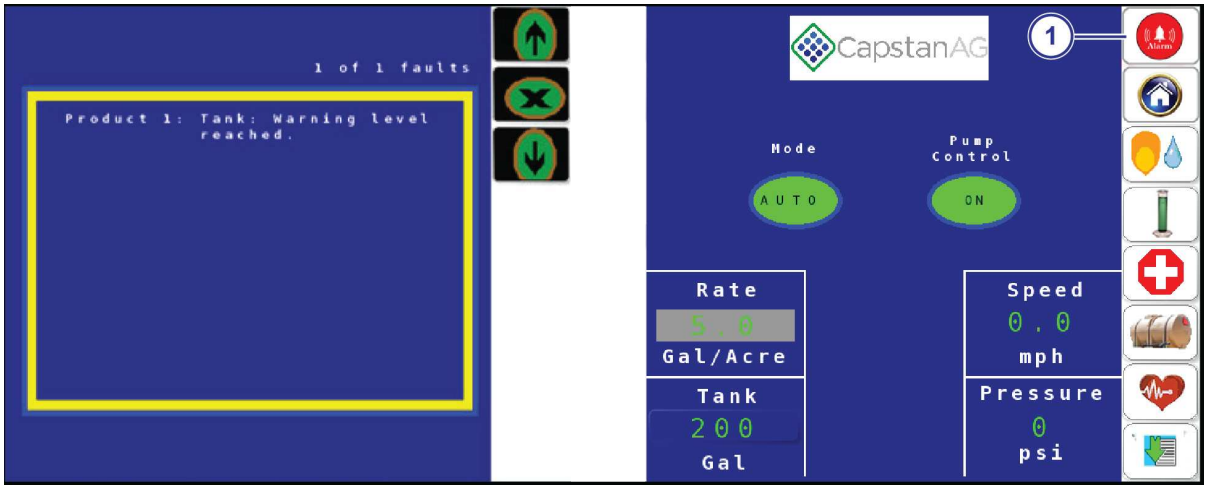


Fig. 39:

An alarm will sound as an ***ALARM*** screen shows over the entire system screen on the VT.

This happens when a setting is beyond the default setting or programmed value anywhere in the system. The alarm will show what default setting or programmed value is not at the correct value.

Go to troubleshooting for a complete list of alarms.

Icon	Description
	Select this icon to silence the alarm and leave the alarm screen. **Note:** The alarm faults must be corrected, including the replacement of faulty components, to clear the alarms from the system.
	Select the up or down arrow icon to move through the alarm screens when there is more than one alarm in the system.
	

On the ***HOME*** screen, an icon *(1)* will show in the icon menu until the alarm has been cleared from the system.

See the Alarm Log

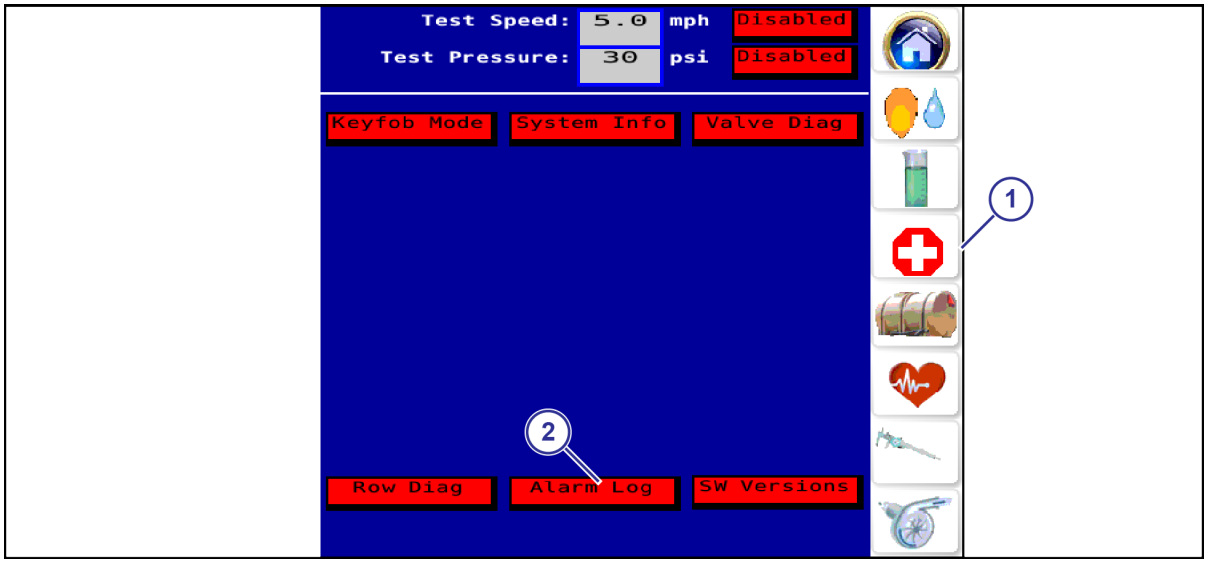


Fig. 40:

1. Select the **Diagnostics** icon *(1)* to go to the ***DIAGNOSTICS*** screen.
2. Select **Alarm Log** *(2)*.
   A list of any alarms that have occurred will show.

Warning Message Screens

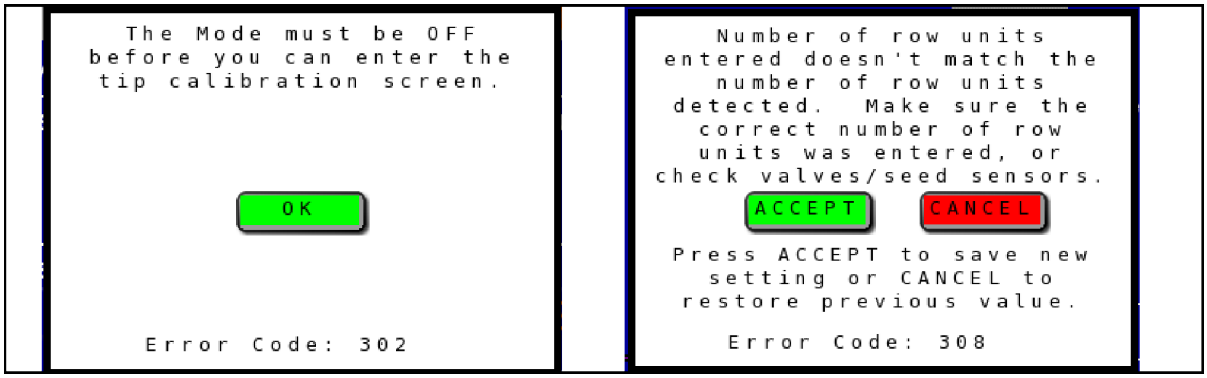


Fig. 41:

When the operator performs an action that cannot be completed or could cause a malfunction or misapplication, a warning message box will show in front of the current screen. The message has to be acknowledged and the fault corrected before the action can be completed or dismissed.

There are two types of warning message boxes:

- The operator can select **OK**, then does the requested action.
- The operator can select **ACCEPT** or **CANCEL**.

Go to the troubleshooting section for a complete list of warning messages.

Chapter 6: Maintenance

Service the System

CAUTION: Before operation or service to the system, read and understand the machine's operator manual and the Seed-Squirter™ operator manual. Follow the warnings and instructions in the manuals when making repairs, adjustments, or servicing. Make sure that the machine is operating correctly after adjustments, repairs or service. Failure to follow instructions can cause personal injury or equipment damage.

Before servicing the system or plumbing components, release the pressure and empty any product from the system and liquid delivery lines.

Jump Start, Weld On, or Charge the Machine

If jump starting the machine, make sure that you trip the circuit breaker to prevent damage to the system.

If charging the machine's batteries or welding on the machine, trip the circuit breaker.

Inspect the System

- Inspect the hoses for cuts, nicks, or abrasions before each use. Replace any damaged hoses immediately.
- Make sure that the strainers are clean.
- Make sure that all hoses and wiring are secure.
- Do a check for loose hoses, mounting hardware, and other components. Tighten if necessary.
- Do a check for damaged or missing decals. Replace if necessary.

Clean the System

- Thoroughly clean the system after each use.
- Avoid high-pressure spray when cleaning the spray system components, valves, and wiring connectors.

Winterize for Storage

Do not use fertilizer to winterize! The use of fertilizer to winterize will cause internal damage to the nozzle valves.

Thoroughly clean the spray system before winter storage.

Flush the spray system with clean water.

Winterize the spray system with RV antifreeze for winter storage. Proper winterizing of the machine with a CapstanAG system installed on it is essential. Make sure that the booms are completely full of antifreeze at 100% strength and that the solenoids are pulsed (sprayed) for a few minutes to make sure that the antifreeze remaining in the solenoids is at full strength.

Recommended Guidelines for Maintenance/Service

When servicing a system, CapstanAG recommends doing these:

- Do the baseline service checks and verify the original setup values in this manual.
- Identify individual performance problems. Evaluate possible causes and corrections for performance issues.
- Troubleshoot individual components and replace if needed.

Important: The primary service tool will be a multimeter that can measure voltage and resistance (ohms).

Baseline Evaluation Process

1. Make sure that the voltage readings are correct.
2. Do a visual check of all wire connections, harnesses, and connectors. Make sure that there are no loose, broken, or damaged parts.
3. Make sure that the correct tip size is used for the application.
4. Make sure that the liquid product plumbing and the strainer(s) are clean.
5. Do a like component swap test to see if the failure follows the component.
6. Repair or replace any damaged components.
7. Do the system tests.

   See the system testing information in this manual.

Nozzle Valves

Plugged nozzle valves can be classified into two categories:

- Plunger blockage
- Plunger stuck

Plunger blockage results when larger debris catches between the orifice and plunger seal. This is the smallest flow passage within the nozzle valve.

Stuck plungers result when smaller debris collects around the barrel of the plunger and binds the plunger in place. Symptoms of a blocked or stuck plunger are:

- Constant application
- Leaking when the nozzle is shut off
- No application

Note: Pinched or split O-rings will also cause nozzles to drip when shutoff.

Note: Operating a plugged nozzle valve for extended periods of time may result in a nozzle valve coil failure. Immediately clean any plugged nozzle valves.

Note: Before removal of the nozzle valves, make sure that the pressure has been released from the boom tubes.

If plugged nozzles are a frequent problem in a particular boom section, inspect the boom filter screens for plugged or damaged screens.

Recommendation: Use an 80-mesh screen to prevent the nozzles from plugging.

Do a check of the mesh size of the strainers and replace strainers if they are too coarse.

Clean the Nozzle Valve(s)

Warning: Chemical residues may be present in the agricultural equipment. Always use the proper personal equipment to avoid personal injury.

1. Release pressure from the system before servicing.
2. Clean the system before installation or service of the fittings, hoses, valves, or nozzles.

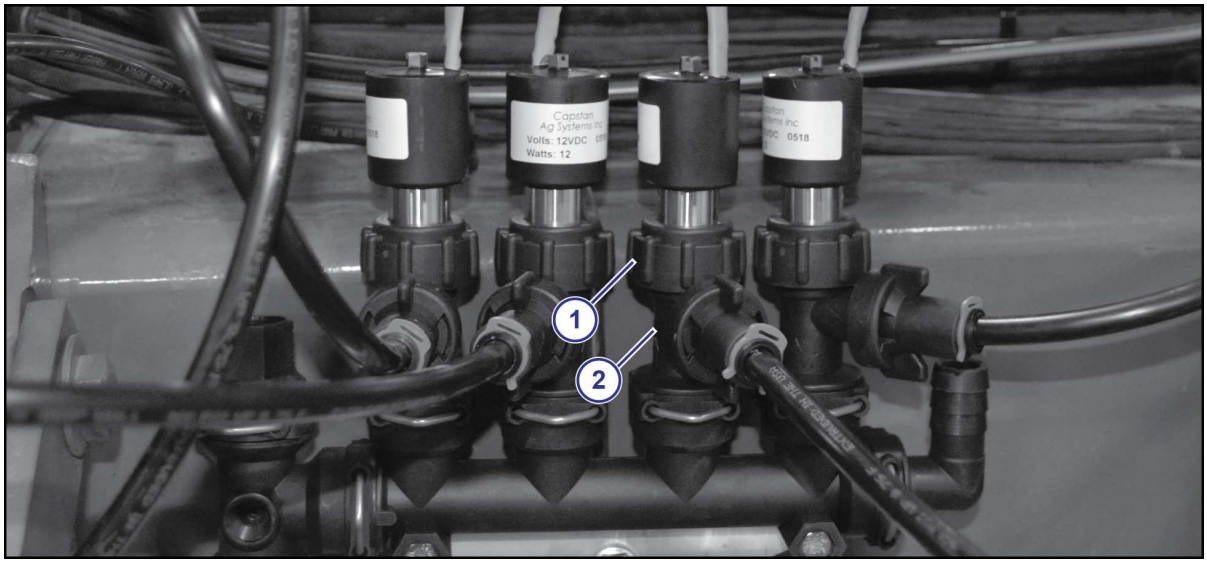


Fig. 42:

3. Unscrew the fly nut *(1)* counter-clockwise to remove the nozzle valve assembly from the nozzle body *(2)*.

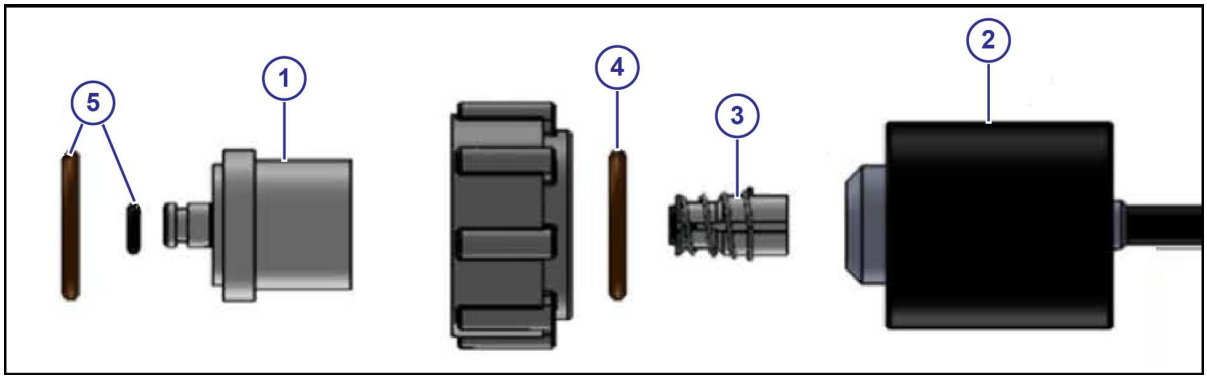


Fig. 43:

4. Use pliers around the valve body *(1)* to hold the assembly with the coil harness facing the ground.
5. Rotate the coil *(2)* counter-clockwise to remove the coil from the valve body.
6. Remove the plunger *(3)* from the coil.
7. Inspect the O-ring *(4)* on the coil.
8. Inspect the O-rings *(5)* on the valve body.
9. Wash the nozzle valve components to remove any debris.

10. Inspect the plunger for wear or damage.
11. If there is wear or damage to the plunger, replace the plunger.
12. Inspect the valve body.

    Make sure that the orifice is not plugged with debris, worn, or damaged.
13. If there is wear or damage to the orifice, replace the valve body.
14. Wash the nozzle body components to remove any debris.

    Important: Do not use brake cleaner. Brake cleaner can damage the seal.

    Important: During installation, apply 40 lbf in of torque to the coil when it threads into the valve body to properly seat the O-ring.

Plunger Seal Inspection

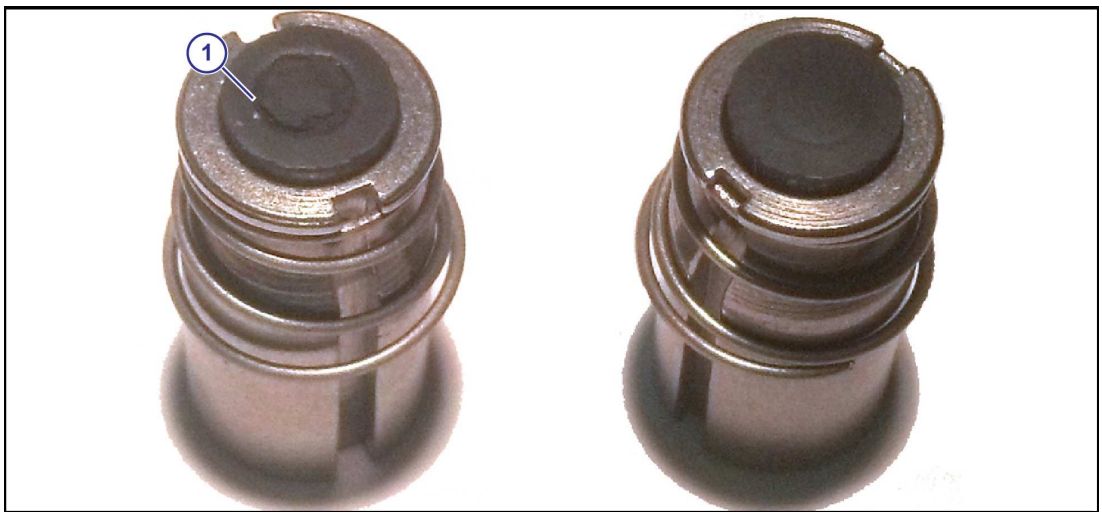


Fig. 44:

After extended use, the plunger seal will wear a groove *(1)* where the seal impacts the hard orifice seat. Replace the plunger if worn or damaged. As the groove deepens the pressure capacity of the valve will decrease until the pressure capacity interferes with the operating pressure of the system. The result is erratic pulsing, often described as “flickering.” The system will operate normally at lower pressures until replacement parts can be installed. High operating pressures and abrasive chemicals will accelerate the wear of the plunger seal material.

- Clean the connector terminals
- Replace the coil

When replacement of the plunger is necessary, make sure that you have the correct plunger.

- Heavy Spring—4 slots on the outside and a 0.160 inch hole in the back of the plunger.

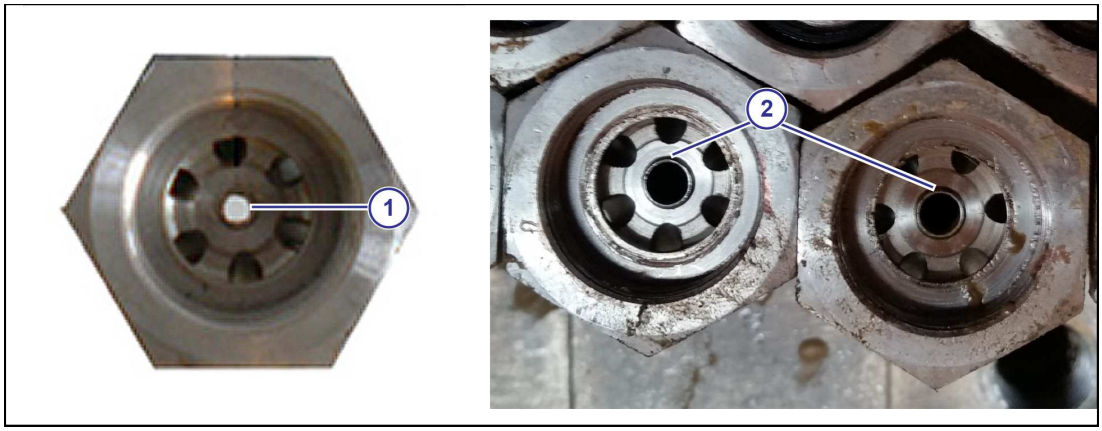


Fig. 45:

Make sure that the plunger seats are still smooth and not pitted.

(1) A plunger seat on a new valve body

(2) Examples of a worn plunger seat on a valve body

Liquid Product Tube and Spray Tips

DANGER: Handle the sharp opener discs with gloved hands to prevent personal injury.

See the planter manual for more service information.

Remove the Side Gauge Wheels and Opener Discs

Planters vary by make and model. For specific part locations and information, see your planter manual for more information about removal and installation of planter parts.

1. Raise the planter and install the lift cylinder locks.
2. Remove the side gauge wheel on the row unit with the spray tip that needs service.

   Important: Do not lose the spacer washers between the wheel and the hub. The spacer washers are needed during reassembly.
3. On one side of the row unit, remove the bolt on the opener discs.
4. Carefully remove the opener discs.

   Do not lose the spacer washers between the opener disc and the hub.

   Important: The spacer washers are needed during reassembly.

Spray Tip Alignment

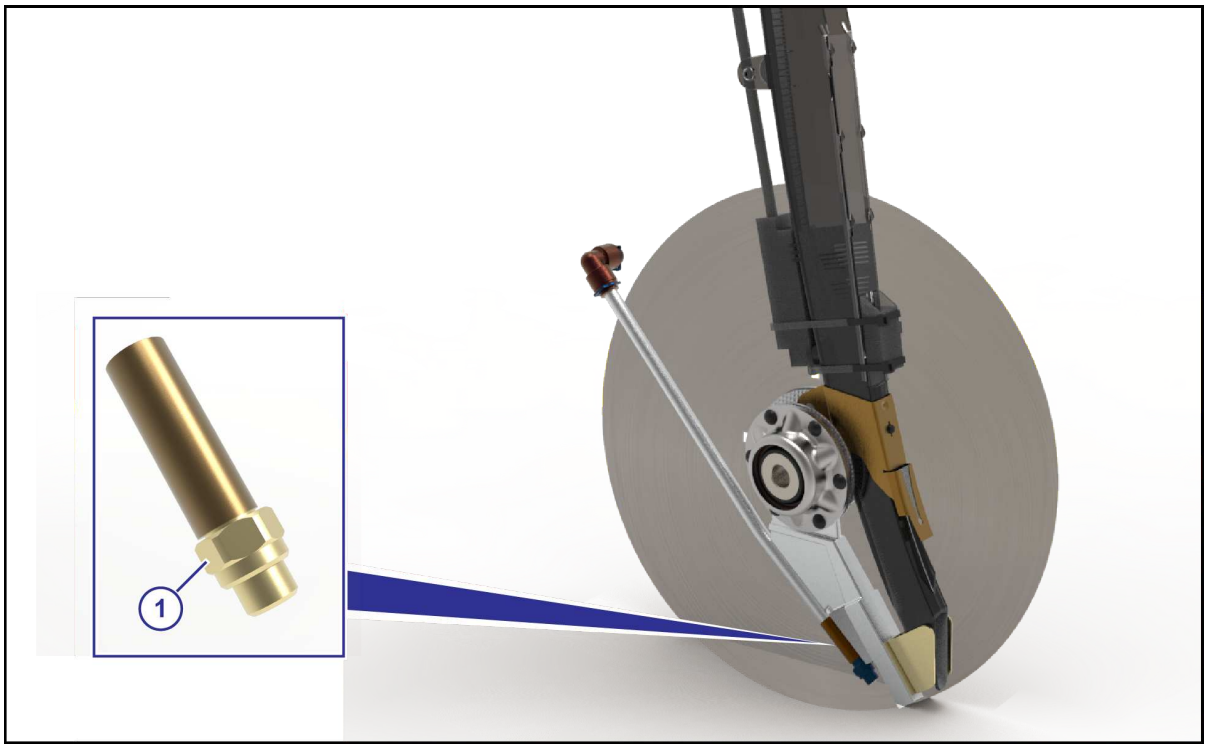


Fig. 46:

Make sure that the machined flat sides *(1)* of the spray tip are aligned with the flat surfaces on the opener disc. Failure to do this will cause damage to the spray tip.

All flat surfaced tips must be installed so that the flats are parallel to the opener discs to prevent rubbing against the discs.

Several tip sizes are available. See your CapstanAG dealer for assistance in selecting the correct tip for your application.

Install the Side Gauge Wheels and Opener Discs

Planters vary by make and model. For specific part locations and information, see your planter manual for more information about removal and installation of planter parts.

1. Assemble the row unit.
2. Measure the opener disc contact spacing and adjust, if necessary.
   See the planter manual for correct contact spacing.

Check and Maintain the Application Rate

If you change the spray tips, rates, pressure, or liquid product do the tip calibration procedure.

Screens and Strainers

Fig. 47:

Seed-Squirter™ uses at least one strainer in the plumbing to filter out contamination and protect the nozzle valves from becoming plugged and causing potential damage.

Always use an 80-mesh screen.

Important: Clean the strainers on a regular basis.

Plugged strainers will cause a reduction in the system operating pressure.

Recommendation: Use strainers on all nurse tanks and transfer equipment.

Note: Screen and strainer colors may vary by manufacturer.

Chapter 7: Troubleshooting

Troubleshooting Charts

Table: System Errors

Problem	Cause	Correction
Seed-Squirter™ will not load on VT display	Power harness is not connected at the hitch	Connect the power harness at the hitch
	Power harness is not connected to the controller	Connect the power harness to the controller
	60A breaker at tripped at the battery	Reset the breaker
	5A fuse is blown on VT harness	Replace the 5A fuse
	VT harness is not connector to the controller	Connect the VT harness to the controller
	CAN connector not connected on the planter	Connect the CAN connector
	Two VT displays are on the same CAN.	Make sure the UT setup has different numbers for each display.
System pressure cannot reach the desired pressure	**Maximum Pump Duty Cycle** is set too low on the ***Pump Settings*** screen	Run the system in **MAN Mode** and increase the **% DC** until the pump quits building pressure. This value should be the **Maximum Duty Cycle** setting in the ***Pump Settings*** screen
	Low hydraulic flow	Increase the hydraulic flow
	Liquid product strainer is plugged	Examine and clean the liquid product strainer
	Bypass valve is open too far	Close the bypass valve until the desired pressure is reached
System pressure will not drop low enough to get to the desired pressure	**Minimum Pump Duty Cycle** is set too high on the ***Pump Settings*** screen	Run system in **MAN Mode** and decrease the **% DC** until the pressure reads 12 to 15 psi. This value should be the **Minimum Pump Duty Cycle** setting in the ***Pump Settings*** screen
System pressure is oscillating while operating	Bypass valve is open too far	Close the bypass valve slightly until desired pressure is reached
	Bypass valve is closed too much	Increase the bypass until the problem is resolved
		Open the valves on the back of the product tank(s)
	Liquid product strainer is plugged	Examine and clean the liquid product strainer

Problem	Cause	Correction
System pressure is oscillating while operating	Pump settings need to be adjusted	System Gain needs a lower value
Pump is taking to long to build pressure	Pump settings need to be adjusted	System Gain needs a higher value
Tip Calibration inconsistent	Wrong plunger inside the valve	Change the plunger to the heavy spring plungers
	7-watt coil is installed instead of a 12-watt coil	Change the 7-watt coil to a 12-watt coil
When field verifying seed and shot placement, shot is not where wanting it placed.	**Distance from Seed** setting in ***Placement Setting*** screen not correct	Change the **Distance from Seed** setting
	Measurements for the application tube setup are not correct	Measure the five inputs again and make sure that the values match. Make changes as necessary
	Liquid product tube is bent	Bend the liquid product tube back into place, or replace the liquid product tube.
Single row will not shut off	Check valve is lodged open	Clean or replace the check valve
	Nozzle valve plunger is lodged with debris	Clean the nozzle valve
	O-ring at nozzle valve is pinched or broken	Replace the O-ring
Single row drips when planter is lifted	Check valve is lodged open	Clean or replace the check valve
Mud buildup on seed tube or seed firmer	System pressure is too high	Lower the system pressure
	Liquid product tube is not squirting in the center of the furrow	Bend the liquid product tube to the center of the furrow
A lot of air is in the lines when running the key fob	Check valve is lodged open or worn out	Clean or replace the check valve
	Tubing from the nozzle valve to the row unit is not seated fully into push-to-connect	Push the tubing into the push-to-connect (There is a lock that can be installed to hold the tubing from coming out)
Under Application	Tips are plugged	Run the key fob and clean the tips
	Filter is plugged	Clean or replace the filter
	Filter is not installed correctly	Install the filter correctly
	Hoses/tubing are plugged, kinked, or collapsed	Examine the hoses/tubing and replace as necessary
	Incorrect rate settings	Do a check of the rate settings and adjust as necessary

Problem	Cause	Correction
Under Application	Standpipes on ends of booms are full of liquid	Remove the standpipes and drain the liquid
	Incorrect Product Cal #	Do the tip calibration procedure
Over Application	Incorrect Rate settings	Adjust the rate settings
	Incorrect Product Cal #	Do the tip calibration procedure
KeyFob Not working	Faulty battery	Replace the battery
	Broken antenna on the controller	Replace the antenna
	Switch #1 set to OFF (down)	Set #1 switch to OFF
Rate on monitor is low but has been running right	Tips, check valves, or row tubes are plugged	Use the key fob to unplug the tips, check valves, or row tubes
System pressure drops when starting to plant	Low hydraulic pressure	Raise the engine rpm, try to keep the engine rpm when lowering the planter to the ground
	System is oversized for an electric pump	Install a hydraulic pump
	To much flow for electric pump to handle	Reduce the GPA rate
		Install a hydraulic pump
	Filter is plugged	Clean or replace the filter
	Solution hose is kinked	Make sure that the solution hose is routed correctly

Alarm List

Alarm Number	Name	Cause	Correction
100	VT Board: Communications Error	The VT board has stopped communicating	Turn off the system, then turn on the system
101	Product 1: Module 1: Communications have stopped	The #1 IO board has stopped working	Turn off the system, then turn on the system
102	Product 1: Module 2: Communications have stopped	The #2 IO board has stopped working	Turn off the system, then turn on the system
103	Product 1: Module 3: Communications have stopped	The #3 IO board has stopped working	Turn off the system, then turn on the system

Alarm Number	Name	Cause	Correction
104	Product 1: Row ? - Coil circuit is open	The coil wire is pinched, cut, broken, or disconnected	Examine the coil connection and lead wires for damage. Repair, if necessary
		Failed coil	Do a check of the coil resistance using a multimeter. Resistance should be 10 to 12 ohm. Remove/ replace if the coil is outside the specified readings
105	Product 1: Row ? - Coil circuit is shorted	The coil wire is pinched, cut, broken, or experiencing an internal coil short. (This will continue to show an alarm every 2 minutes until the problem is resolved.)	Do a check of the coil resistance using a multimeter. Resistance should be 10 to 12 ohm. Remove/ replace if the coil is outside the specified readings
106	Product 1: Row ? - Nozzle valve plunger is lodged open	Debris in the valve	Clean the debris from the valve
107	Product 1: Row ? - Nozzle valve plunger is lodged closed.	Debris in the valve	Clean the debris from the valve
108	Product 1: Row ? - The nozzle valve is missing a plunger.	No plunger in the nozzle valve	Install the plunger
109	Product 1: Row ? - Seed Sensor Error. Check seed sensor connection	Seed sensor not being sensed	Examine the connection to the seed sensor tee failed seed sensor
110	Product 1: Check Pressure sensor - pressure sensor not at zero. Cycle key power to clear the alarm.	Pressure sensor is damaged or unplugged.	Examine the connection of the pressure sensor. Replace pressure sensor, if necessary
		VT harness to pressure sensor is damaged.	Examine the VT harness from controller to pressure sensor, replace if damaged. (After performing above steps, turn off the system, then turn on the system)
111	Product 1: Tank: Warning Level Reached	Product in the tank is below the warning level	Fill tank with liquid product, then reset the tank volume
112	Low system pressure - Check tank level, tank shutoff valves or pressure sensor.	System pressure has either reached 10 psi, or dropped below 10 psi. Once this alarm sounds, the pump will shut down in 10 seconds.	Do a check of the tank level, tank shutoff valves, or pressure sensor

Alarm Number	Name	Cause	Correction
113	Product 1: Low Pressure, System Shutoff	System pressure has been under 10 psi for too long, pump has shut down.	Do a check of the tank level, tank shutoff valves, or pressure sensor
114	Product 1: Pump Control is "OFF", and seeds are being sensed. 1. Change Pump Control to "ON". Or 2. Change Mode to "OFF" to disable the system.	The Pump Control is still OFF, and planter is dropping seeds.	Change the **Pump Control** to **ON** or change the **Mode** to **OFF** to stop system operation.
115	Product 1: System is not functioning due to lack of ground speed. Check that the GPS receiver on the planter is plugged in and working correctly.	No Speed Input (Minimum 500 seeds before alarm displays.)	Make sure that you have GPS signal from the **System Info** in the ***Diagnostics*** screen. Examine the VT harness from the controller to GPS receiver. For more information, see information about bypassing GPS receiver.
116	Product 1: Pump has reached maximum duty cycle. Check for: 1. Hydraulic Flow 2. Plugged Strainer 3. Pump connections	Hydraulics are not turned on.	Turn the hydraulics on.
		Strainer is plugged.	Clean debris from the strainer.
		Electrical connections to the pump are unhooked.	Make sure that the electrical connections to pump are connected.
		Maximum duty cycle setting is set to low.	Increase the **Maximum Duty Cycle** setting.
		Hydraulic flow is set too low.	Increase the hydraulic flow rate.
117	Product 1: Shorted Circuit has been detected on pressure sensor 1. Check pressure sensor, connections, and wiring	A short on the pressure sensor circuit has been detected.	Check the pressure sensor and make sure no wires are broken, pinched or bare. Check the wiring harness from the Controller to the pressure sensor for bare, pinched, or broken wires.
118	Product 1: Shorted Circuit has been detected on flow meter 1. Check pressure flow meter, connections, and wiring	A short on the flow meter circuit has been detected.	Check the flow meter and make sure no wires are broken, pinched or bare. Check the wiring harness from the Controller to the flow meter for bare, pinched, or broken wires.
119	Product 1: Shorted Circuit has been detected on product pump. Check pressure product pump, connections, and wiring	A short on the product pump circuit has been detected.	Examine the product pump and make sure that no wires are broken, pinched, or bare. Examine the wiring harness from the controller to the product pump for bare, pinched, or broken wires.

Alarm Number	Name	Cause	Correction
120	Product 1: Shorted Circuit has been detected on GPS. Check GPS, connections, and wiring	A short on the GPS circuit has been detected.	Do a check of the GPS and make sure no wires are broken, pinched, or bare. Examine the wiring harness from the controller to the GPS for bare, pinched, or broken wires.
121	Product 1: Squirt position exceeds operational range. Seeds are being sensed but valves CANNOT open. Planter travel speed is too slow for valves to open.	The actual planting speed is too slow for valves to physically open.	Set the **Distance from the Seed** setting closer to the seed or increase the travel speed.
122	Product 1: Row ? - Maximum squirt length reached. Slow down to prevent squirt overlap with next seed.	The sqiurt length has increase which will cause the squirt to hit the next seed, due to planting speed increasing.	Slow down so squirt length gets shorter.

Attention Messages

Attention Number	Name	Cause	Correction
200	Continuous GPS ground speed has been detected while using a test speed. Select "GPS Speed" or "Test Speed" from the soft key list.	The test speed is enabled, and the system senses a continuous GPS speed.	Select **GPS Speed** or **Test Speed** to either continue running with the test speed or to switch to GPS speed.
201	Seeds are being detected on disabled row(s). Select 'Ignore' or 'Enable All Rows' from the soft key list.	Rows are disabled, but seeds are still being sensed on those rows.	Select **Ignore** or **Enable All Rows** to either continue planting with disabled rows, or to enable all rows.

Warning Messages

Warning Number	Name	Cause	Correction
300	The Mode must be OFF before you can activate the valve diagnostic screen.	Trying to run diagnostics with the Mode in another state other than OFF	Select the **OFF Mode**.
301	The Mode must be OFF before you can activate key fob Mode.	Trying to access Key fob Screen with the Mode in another state other than OFF	Select the **OFF Mode**.

Warning Number	Name	Cause	Correction
302	The Mode must be OFF before you can enter the tip calibration screen.	Trying to access Tip Calibration screen with the Mode in another state other than OFF	Select the **OFF Mode**.
303	Valves may not fully open because squirt length is too short. Check the population, application rate or pressure setpoint.	Placement Settings are outside the parameters that let the valves open completely.	Decrease the population, increase the application rate or, decrease the pressure set-point.
304	Squirt position overlaps seed position.	Selected to place the product so it touches the seed	Select **Accept** or **Cancel** for chosen action.
306	The pump has been turned off due to low system pressure. Check tank level, tank shutoff valves or pressure sensor.	System pressure has either reached 10 psi, or dropped below 10 psi.	Do a check of the tank level, tank shutoff valves, strainer, or pressure sensor.
307	Squirt position exceeds operational range. Valves will not open at low speed. Previous squirt distance will be restored.	Squirt distance from the seed has been set so far in front of the seed that the system cannot physically act fast enough to open the valve.	Set the **Distance from the Seed** setting closer to the seed.
308	Number of row units entered does not match the number of row units detected. Make sure the correct number of row units were entered, or check valves/seed sensors.	The system has sensed that the number of row units that have been entered in the Placement Settings screen is not the same number of row units that the system is sensing.	Make sure that the correct number of row units have been entered in the **Number of Row Units** box in the ***Placement Settings*** screen. Make sure that all nozzle valves and seed sensors are working correctly.
310	Are you sure you want to stop displaying on this monitor and switch to the next monitor?	Operator has pressed the **Switch Display** icon.	Select **Accept** or **Cancel** for chosen action.
311	Application tube setup is invalid. Press OK to proceed to application tube setup.	***Application Tube Setup*** screen has not been set up, or measurements are invalid.	Input correct application tube measurements on the screen.
312	Alarm log deletion password has been entered.	Operator has entered the password to delete the alarm logs	Select **Accept** or **Cancel** for chosen action.
313	Are you sure you want to clear the diagnostic counters for all rows?	Operator has pressed **Reset** on the ***Row Diagnostics*** screen	Select **Accept** or **Cancel** for chosen action.
314	Disabled rows have been recognized. Do you want the disabled rows included in the planter width?	Operator has disabled rows.	Select **Accept** to use the full width or **Cancel** to subtract disabled rows from the width.

Warning Number	Name	Cause	Correction
315	Confirm re-enable all disabled rows?	Operator has selected to re-enable all disabled rows.	Select **Accept** to enable all rows or **Cancel** to abort.
316	A positive nozzle angle was entered. Are you sure you want to setup the nozzles pointing forward?	Operator has inputted a positive nozzle angle in the ***Application Tube Setup*** screen.	Select **Accept** if the nozzle is pointing forward or **Cancel** if the nozzle is pointing backward.

Coil Test

Coil failures are often the result of two factors:

- Extended valve use with a plugged nozzle
- Extended use in corrosive environments

Recommendation: Clean any plugged nozzle valves immediately.

Recommendation: Rinse the inside of the booms, and wash the outside of the coils with clean water as often as practical.

Use a voltmeter to measure the ohms of resistance across pins A and B on the coil connector.

Notice:

Correct resistance is:

- **12-watt coils resistance—10 ohms to 11.5 ohms**

If correct resistance is not found:

- Clean the connector terminals and retest
- Replace the coil

Pressure Sensor

Seed-Squirter™ uses a 100 psi/0.5 V to 5 V pressure sensor.

Note: Pressure sensors should always be mounted vertically to prevent liquid product from potentially plugging the sensor assembly.

To view the sensor voltage, go to the ***System Info*** within the ***DIAGNOSTICS*** screen.

When the pump is shut off, and the system pressure is at 0 psi, the sensor voltage should read 0.5 V (+/- 0.15 V). When the pump is engaged, and pressure starts to build, the pressure sensor voltage will also increase. At 30 psi, the pressure sensor voltage will be approximately 1.80 V.

Voltages outside of these ranges indicate a problem:

- A damaged pressure sensor that must be replaced
- A damaged wiring harness
- An unplugged pressure sensor

When replacing or repairing the pressure sensor, the machine key switch power must be turned off and then turned on.

Circuit Breaker

Fig. 48:

The circuit breaker has an automatic/manual trip button *(1)* and a manual reset lever *(2)*.

A tripped circuit breaker is an indicator of a short or overload condition.

Do not reset the circuit breaker without looking into the cause of the tripped circuit breaker.

Note: The circuit breaker is usually located near the battery or in the battery compartment. The 60A or 80A circuit breaker is equipped with a manual trip. To reset the breaker, rotate the tripped lever back into the reset position.

Important: When disconnecting the battery terminals, remove the negative (-) cable first, then remove the positive (+) cable. When connecting cables, connect the positive (+) cable first, then connect the negative (-) cable.

Fuses

Blown fuses are indicators of a short or overload condition. Do not replace a blown fuse with a larger fuse. Larger fuses may result in component failures.

This fuse is located in the accessory harness for the Seed-Squirter™ controller.

Fuse Location	Rating	Type	Color
Accessory Harness	5 A	ATO/ATC (inline)	Tan or Orange

Spray Tip Alignment

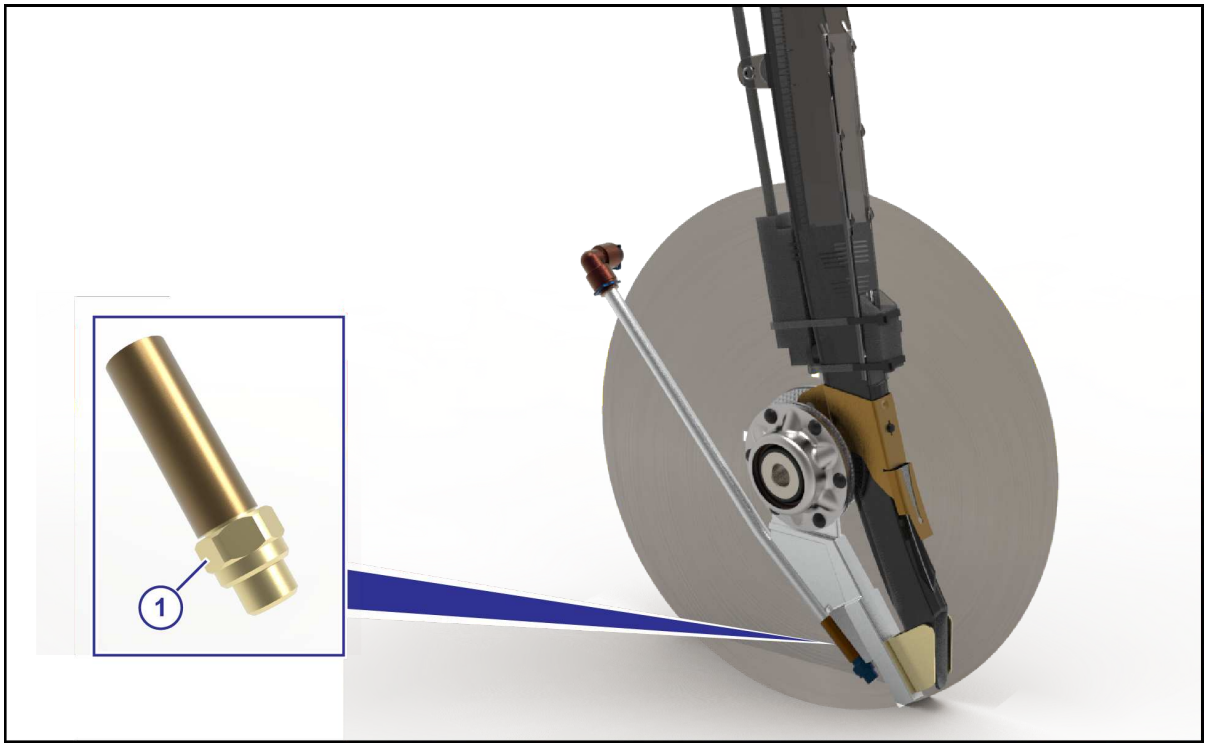


Fig. 49:

Make sure that the machined flat sides *(1)* of the spray tip are aligned with the flat surfaces on the opener disc. Failure to do this will cause damage to the spray tip.

All flat surfaced tips must be installed so that the flats are parallel to the opener discs to prevent rubbing against the discs.

Several tip sizes are available. See your CapstanAG dealer for assistance in selecting the correct tip for your application.

GPS Receiver/Test Speed

Fig. 50:

The system requires a GPS receiver, separate from the tractor GPS receiver, connected for ground speed, location, and time stamp. It is essential for this GPS receiver to work correctly. Periodically inspect the GPS harness for pinches and cut wires. Clean the area surrounding the magnet of any material that may have been attracted to the magnetic mounting base.

Set the Test Speed Manually

If the GPS receiver for the system loses signal, application can continue without the use of the GPS.

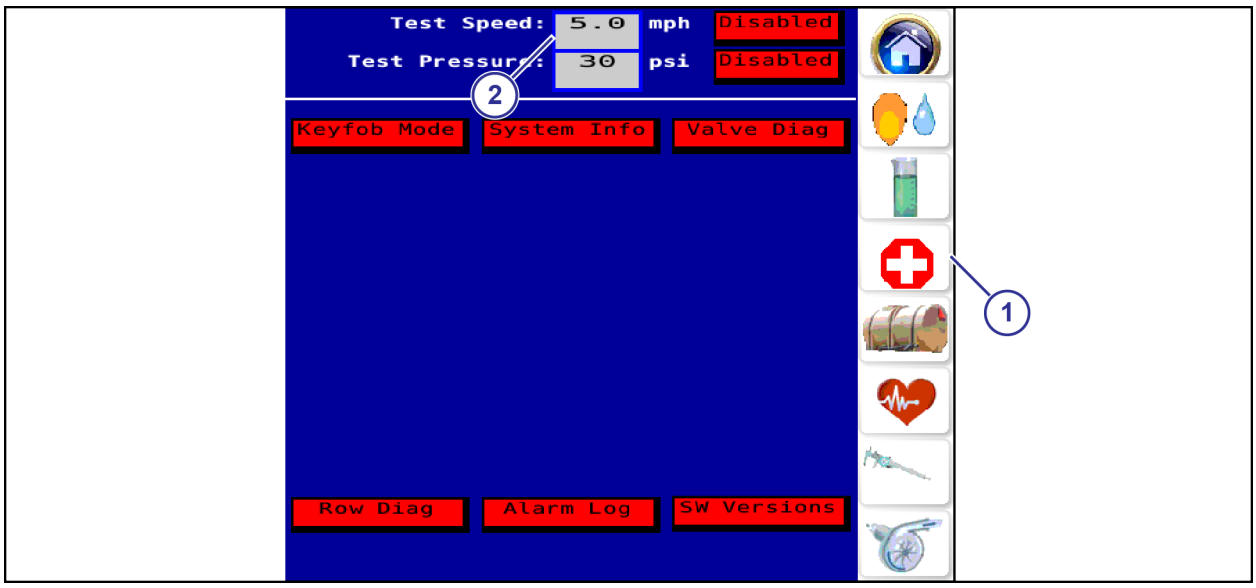


Fig. 51:

1. Select the **Diagnostics** icon *(1)*.
2. Select the box *(2)* next to the **Test Speed**.
3. Use the number pad to manually enter the test speed to match the tractor ground speed.
4. Select the **check mark** to keep the new test speed.
5. Continue operation until the GPS is restored.
   When GPS is restored, an attention message will show on the display.

Setup Record

Application Tube Setup Defaults		
Description	**Default Value**	**Actual Value**
Centerline distance from the top of the Seed Tube to the bottom of the opener discs or furrow.	0.0 in (0.0 cm)	
Centerline distance of the Seed Sensor to the bottom of the opener discs or furrow.6 PLACEMENT Settings	0.0 in (0.0 cm)	
Horizontal distance of the Liquid Product Tube Spray Tip to the lowest point on the Seed Tube.	0.0 in (0.0 cm)	
Angle of Product Tube relative to the ground.	0 deg	
Vertical distance of the Liquid Product Tube Spray Tip to the bottom of the opener discs or furrow.	0.0 in (0.0 cm)	

Placement Settings		
Description	**Default Value**	**Actual Value**
Population (No. of seeds/ac)	32.0 K seed/acre (79.1 K seed/ hectare)	
Number of Row Units	32	
Planter Width	480 in (1219 cm)	
Application Rate	5 GPA (32.7 liter/hectare)	
Pressure Set Point	30 psi (206.8 kPa)	
Target Speed	5 mph (8 km/h)	
Dist. From Seed	1.0 in (2.5 cm)	
Squirt Length	2.9 in (7.4 cm)	

Tip Calibration Settings		
Description	**Default Value**	**Actual Value**
Tip Size	8	
Product 1 Cal (%)	100	

Tank Volume Settings		
Description	**Default Value**	**Actual Value**
Tank Volume	200 gal (757 L)	
Warning Level	20 gal (76 L)	

Sensor Settings		
Description	**Default Value**	**Actual Value**
Low Pressure Voltage	0.5 VDC	
High Pressure Voltage	5.0 VDC	
Low Pressure Value	0.0 psi (0 kPa)	
High Pressure Value	100 psi (689 kPa)	
Min. Speed Override	0.0 mph (0.0 km/h)	
Hilldrop	1 seeds/drop	
Flow meter Cal	368 pulses/gal (97 pulses/liter)	

Pump Settings		
Description	**Default Value**	**Actual Value**
P	50	
I	100	
D	50	
System Gain	4	
Flow Meter Filter	5.0 sec.	
Pressure Sensor Filter	3.7 sec.	
Minimum Duty Cycle	34	
Maximum Duty Cycle	60	

Chapter 8: Schematics

Electrical Components Diagram

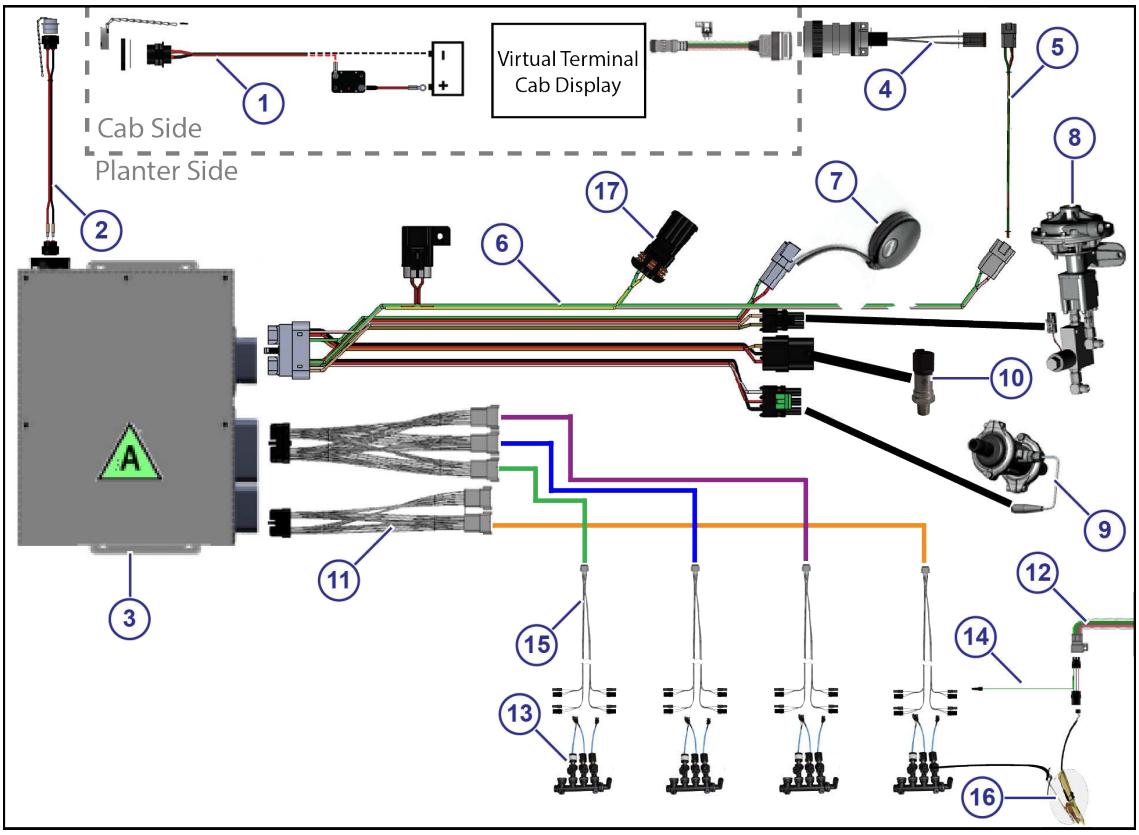


Fig. 52:

Note: This is an example diagram. The parts are the same, but length, part number, and quantity of parts can be different with each planter type and model.

Callout	Description		Callout	Description
1	Tractor Power Harness		9	Flow Meter
2	Planter Power Harness		10	Pressure Sensor
3	Controller		11	Wilger Pigtail Harness
4	VT Communication Adapter Harness or VT Tractor Communication Harness		12	Existing Planter Harness
			13	Nozzle Valve Assembly
5	Communications Cable		14	Seed Sensor Tee Harness
6	Accessory Harness		15	Planter Harness
7	GPS Sensor		16	Fertilizer Tube
8	Hydraulic Pump or Electric Pump		17	Diagnostic Port

Tractor Power Cable

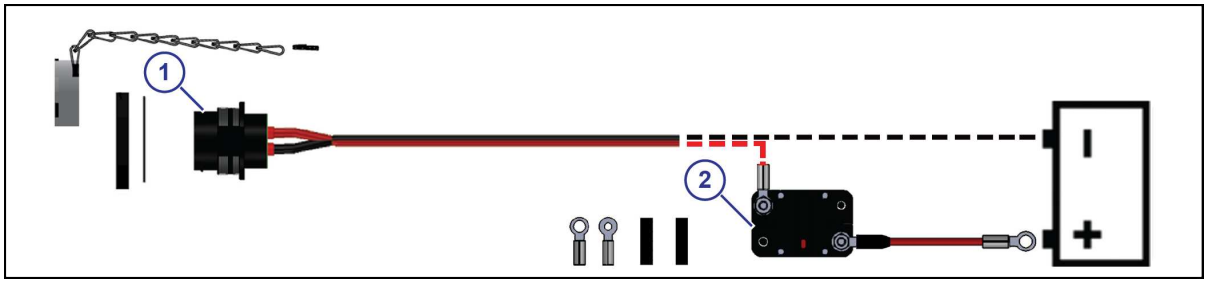


Fig. 53:

The connector *(1)* connects to the planter power harness.

The positive (red) wire, continues through a circuit breaker *(2)* before connecting to the tractor battery. The negative (black) wire connects directly from the planter power harness to the battery.

Planter Power Harness

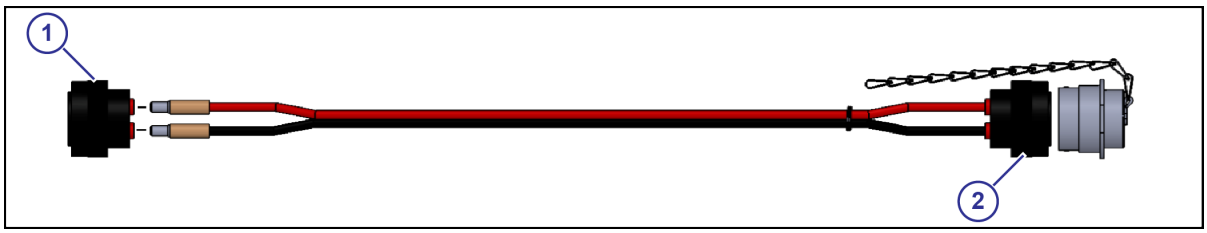


Fig. 54:

The connector *(1)* connects to the controller. The connector *(2)* connects to the tractor power harness. The red wire is positive, and the black wire is negative.

Communication Cable

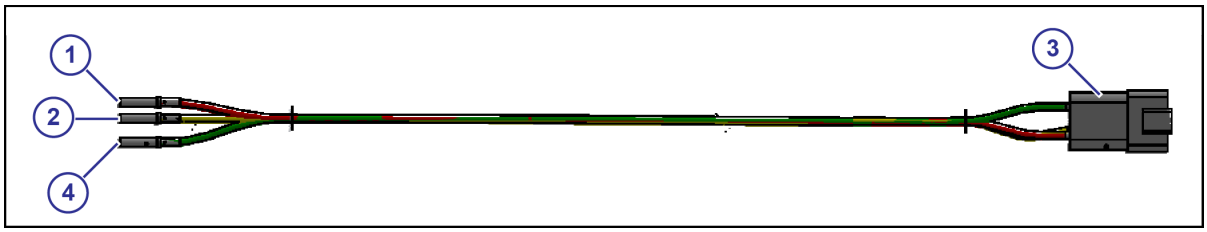


Fig. 55:

The terminal ends *(1)*, *(2)*, and *(4)* of the communication cable connect to the CAN switched Power connector on the accessory harness. The 4-pin connector *(3)* on the cable connects to the communication adapter harness or the ISO plug on the back of the tractor.

4-pin Communication Adapter/ISO Harness Connector Pinout

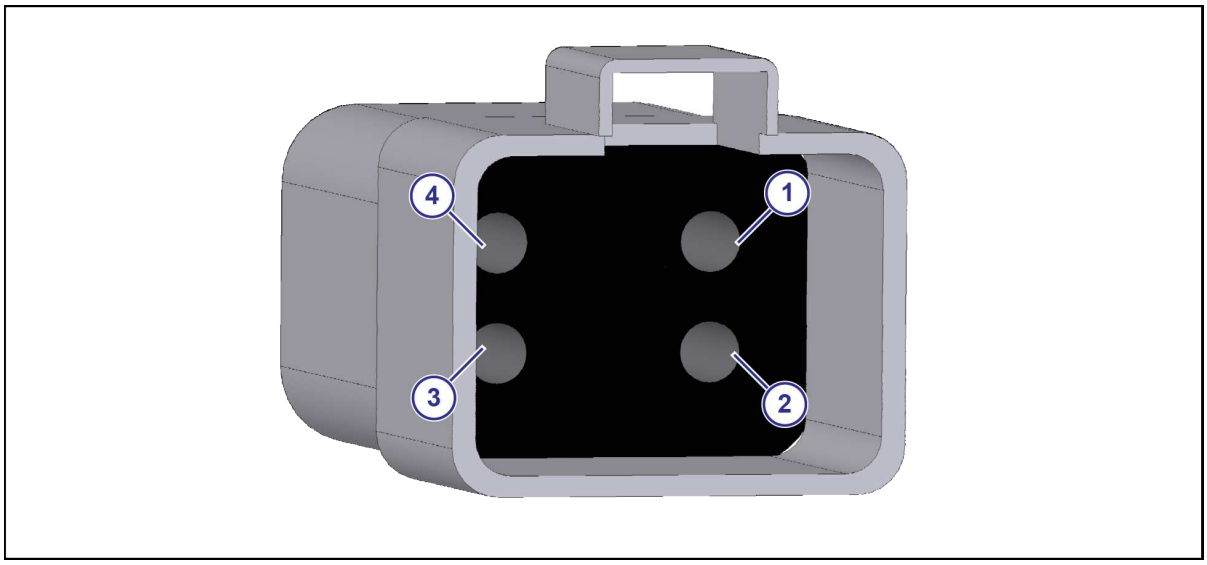


Fig. 56:

Pinout	Color	Description
1	Red	Key Switched Power
2	Yellow	ISO CAN High
3	Plug	Not Used
4	Green	ISO CAN Low

Communication Adapter Harness

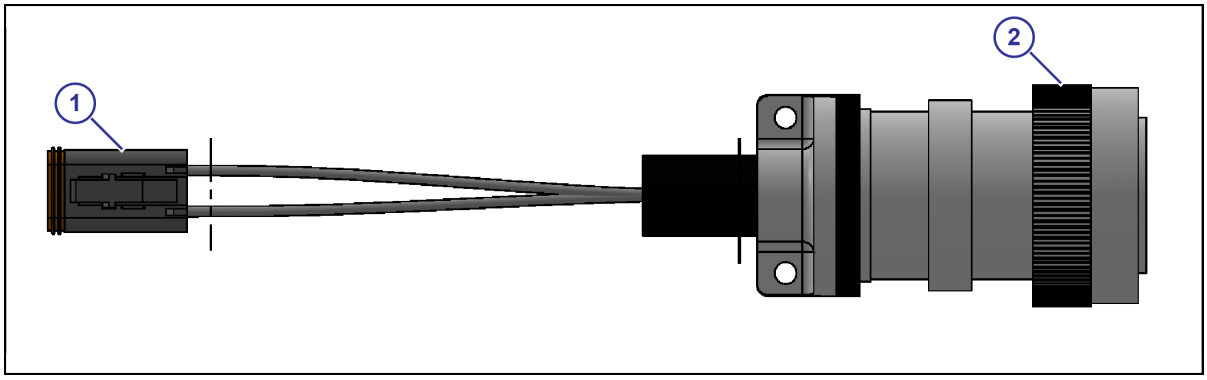


Fig. 57:

The 4-pin Deutsch connector *(1)* connects to the communication cable. The 9-pin plug *(2)* connects to the Y-CAN communication cable.

4-pin Deutsch Connector Pinout for the Communication Adapter Harness Pinout

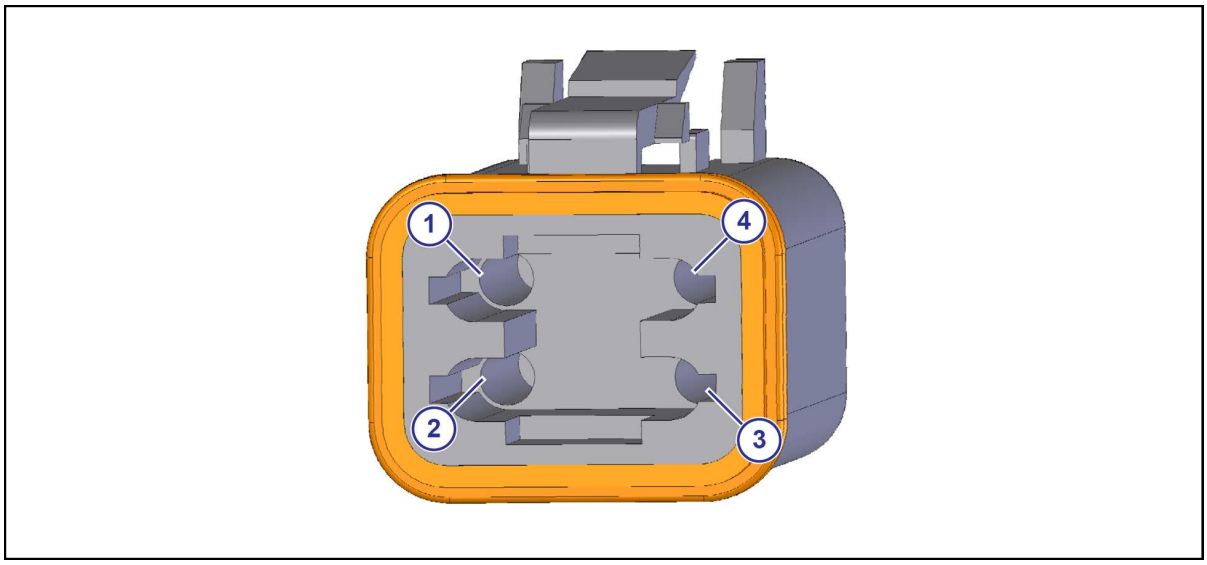


Fig. 58:

Pinout	Color	Description
1	Red	Key Switched Power
2	Yellow	ISO CAN High
3	Plug	Not Used
4	Green	ISO CAN Low

9-pin Plug Pinout for the Communication Adapter Harness Pinout

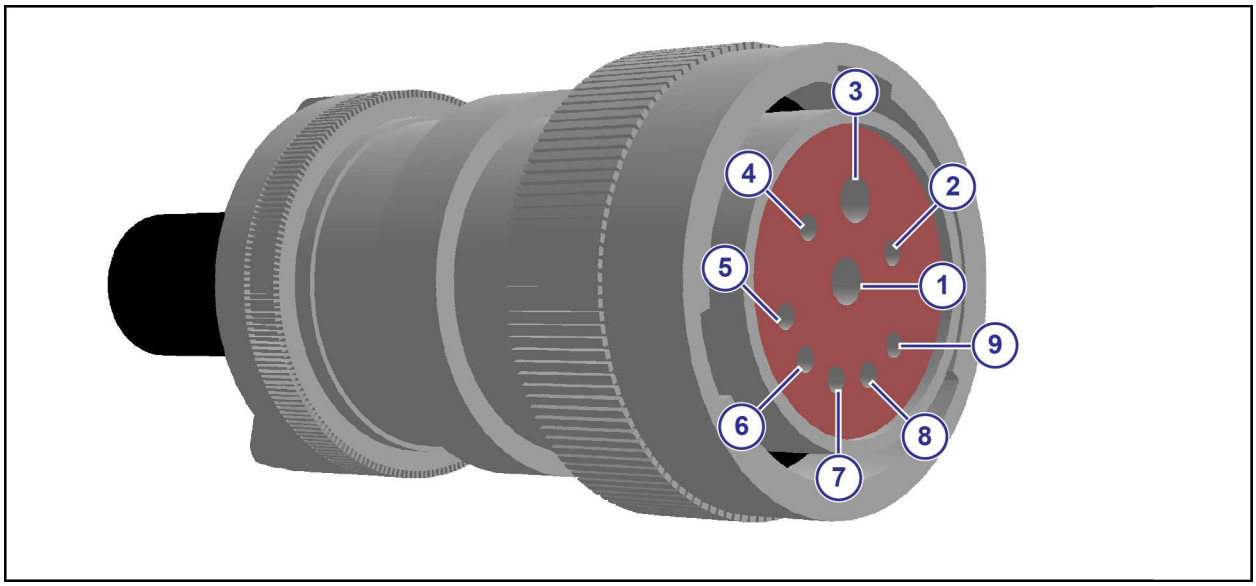


Fig. 59:

Pinout	Color	Description		Pinout	Color	Description
1	Plug	Not Used		6	Plug	Not Used
2	Plug	Not Used		7	Plug	Not Used
3	Plug	Not Used		8	Yellow	CAN High
4	Red	Key Switched Power		9	Green	CAN Low
5	Plug	Not Used				

Communication Cable

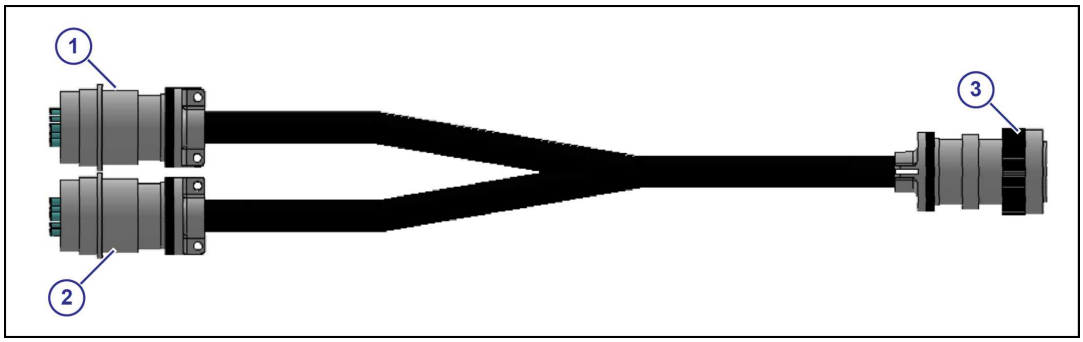


Fig. 60:

One of the 9-pin connectors *(1)* on the Y-end of the harness connects to the communication adapter harness. The other 9-pin connector *(2)* on the Y-end of the harness connects to the existing planter harness. The single 9-pin connector *(3)* end connects to the ISO plug on the back of the tractor.

9-pin Male Receptacles on the Communication Cable Pinout

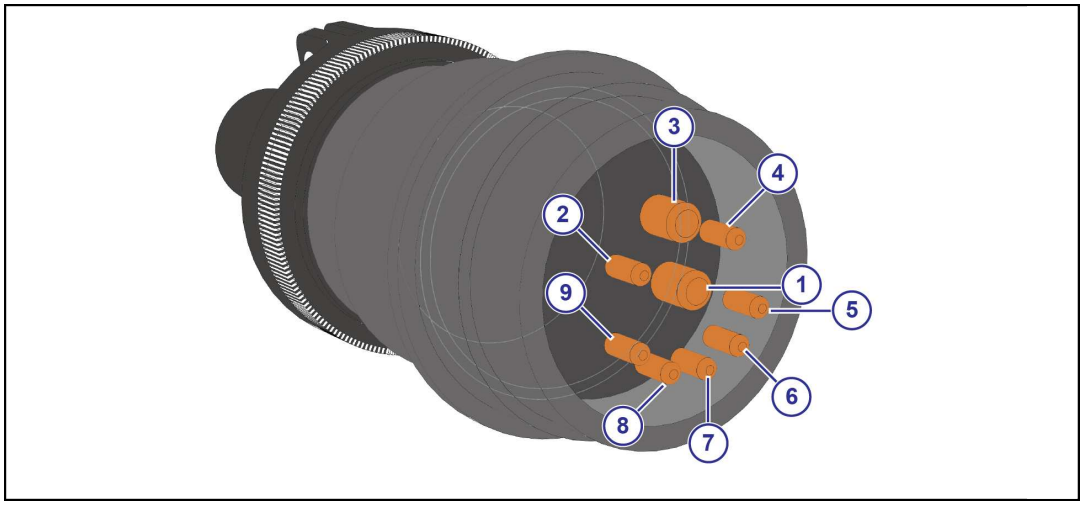


Fig. 61:

Pinou	Color	Description	Pinou	Color	Description
1	Black	Pass Through Ground	6	Red	TBC Power (6 to 16 Vdc)
2	Black	ECU Ground	7	Black	TBC Return
3	Red	Pass Through Power	8	Yellow	CAN High
4	Red	ECU Power (6 to 16 Vdc)	9	Green	CAN Low
5	Plug	Not Used			

9-pin Female Receptacle on the Communication Cable Pinout

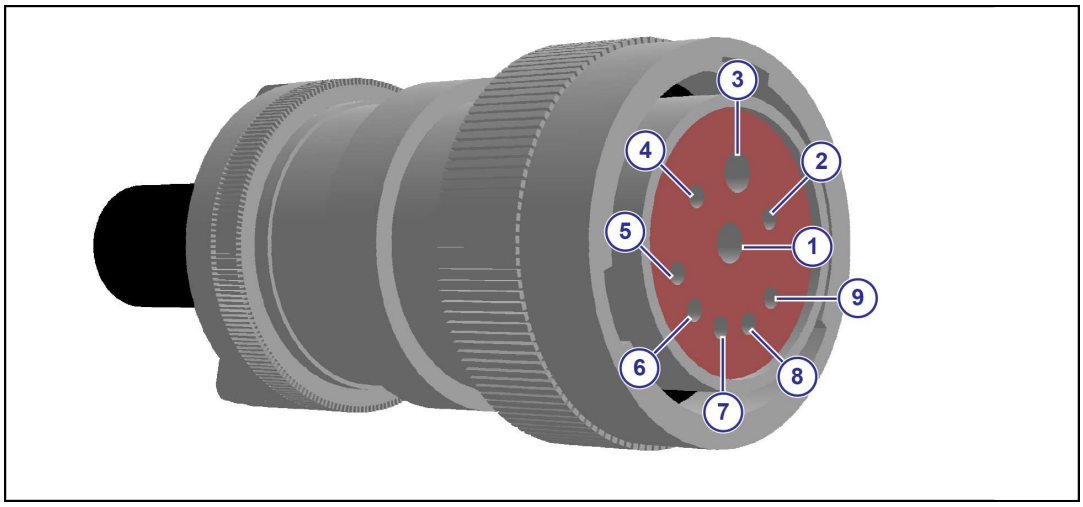


Fig. 62:

Pinout	Color	Description		Pinout	Color	Description
1	Black	Pass Through Ground		6	Red	TBC Power (6 to 16 Vdc)
2	Black	ECU Ground		7	Black	TBC Return
3	Red	Pass Through Power		8	Yellow	CAN High
4	Red	ECU Power (6 to 16 Vdc)		9	Green	CAN Low
5	Plug	Not Used				

Accessory Harness

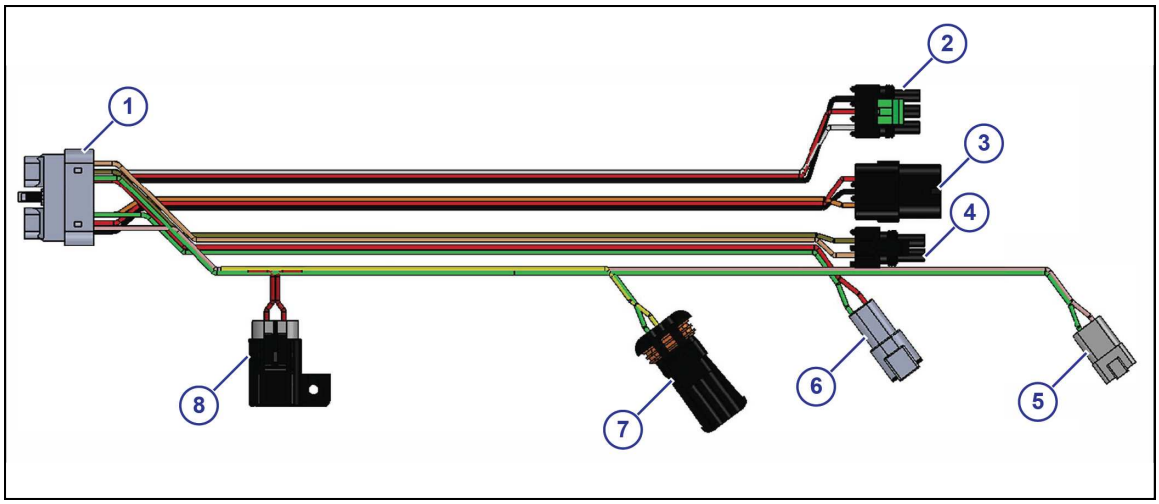


Fig. 63:

Callout	Connector Type	Description		Callout	Connector Type	Description
1	24-Pin Connector	Controller		5	4-Pin DT Receptacle	Communication Cable Connection
2	3-Pin WP Tower	Pressure Sensor		6	4-Pin DTM Receptacle	GPS
3	3-Pin WP Shroud	Flow Meter		7	6-Pin WP Receptacle	Diagnostics Port
4	2-Pin WP Tower	Hydraulic Pump Valve or Electric Pump Driver		8	Fuse	5 A Fuse

24-pin Connector for the Accessory Harness Pinout

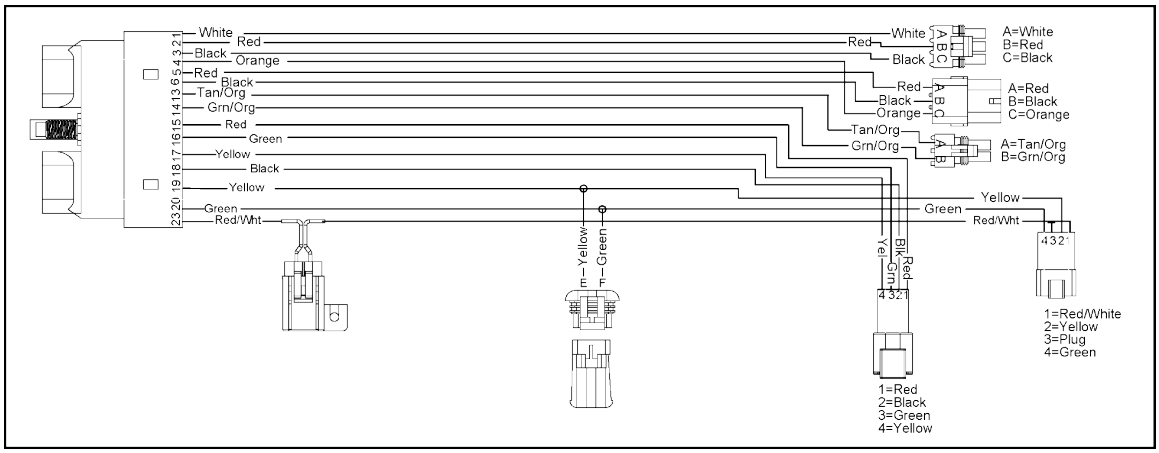


Fig. 64:

Pinout	Color	Description	Connector
1	White	Signal (0.5-5 V/ 0-100 psi)	Pressure Sensor
2	Red	Power (12 V)	
3	Black	Ground	
4	Orange	Signal (Hz)	Flow Meter
5	Red	Power (12 V)	
6	Black	Ground	
7	Red	Power (5 V)	GPS2
8	Green	RS232 TX	
9	Yellow	RS232 RX	
10	Not Used	Not Used	Not Used
11			
12			
13	Tan/Orange	12 V PWM	Hydraulic Pump Valve/ Electric Pump Driver
14	Green/Orange	Ground	
15	Red	Power (5 V)	GPS
16	Green	RS232 TX	
17	Yellow	RS232 RX	
18	Black	Ground	
19	Yellow	ISO CAN High	CAN
20	Green	ISO CAN Low	
21	Not Used	Not Used	Not Used
22	Red/White	Power (12 V) **Note:** For dual product controller	Key Switched Power
23	Red/White	Power (12 V) **Note:** For single and dual product controllers	Key Switched Power
24	Black	Ground	GPS2

Planter Harness Pinout

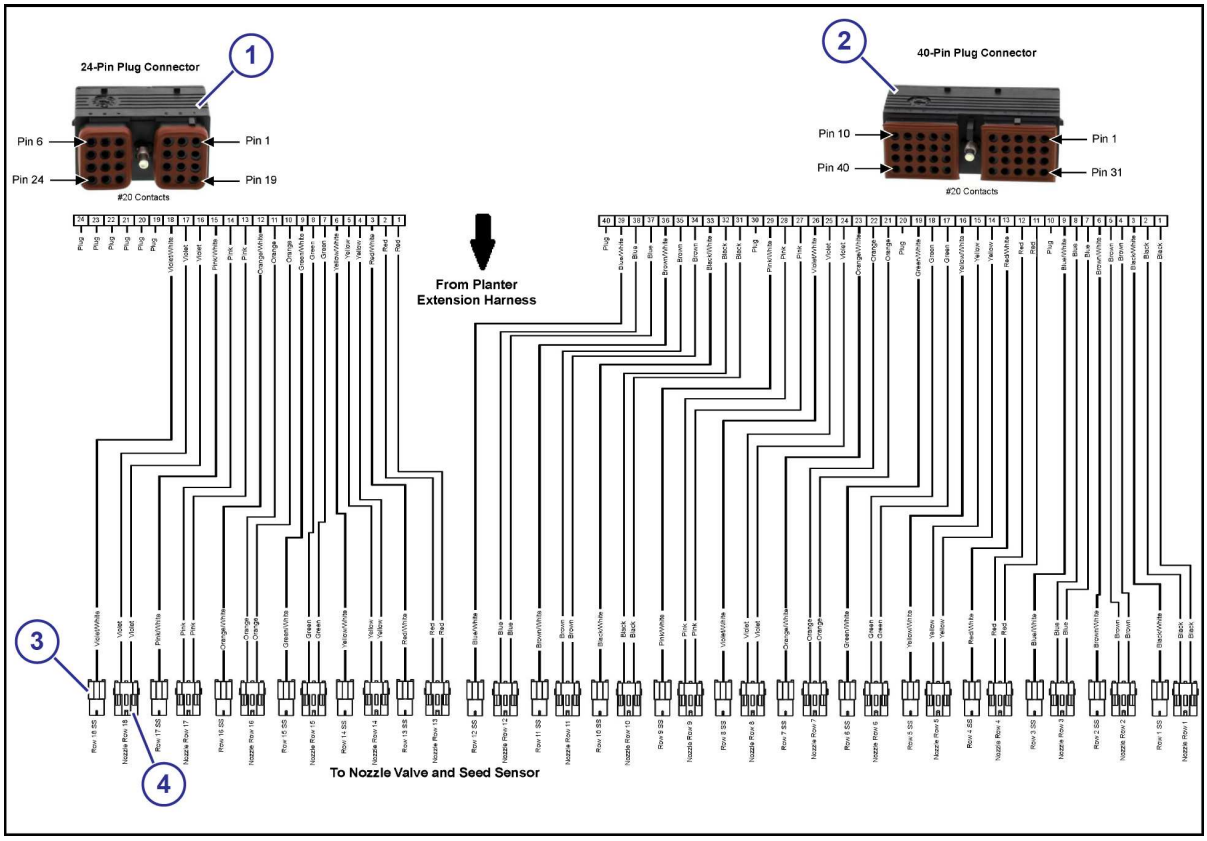


Fig. 65:

The 24-pin plug *(1)* and 40-pin plug *(2)* connect to the planter extension harness. The 1-pin shroud connector *(3)* seed sensor tee harness. The 2-pin shroud connector *(4)* the nozzle valve assembly.

Seed Sensor Tee Harness

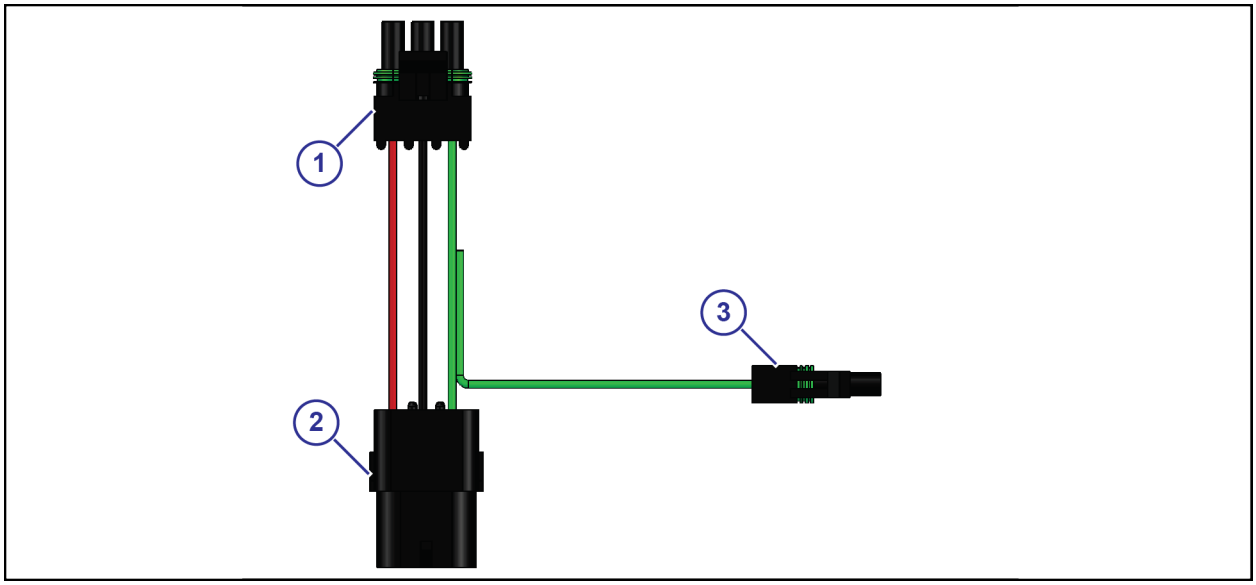


Fig. 66:

The 3-pin tower connector *(1)* connects to the existing planter harness. The 3-pin shroud connector *(2)* connects to the seed sensor. The 1-pin tower connector *(3)* connects to the CapstanAG planter harness.

WILGER Harnesses

Use the WILGER harnesses only if you installed WILGER manifolds.

WILGER 6-row Pigtail Harness

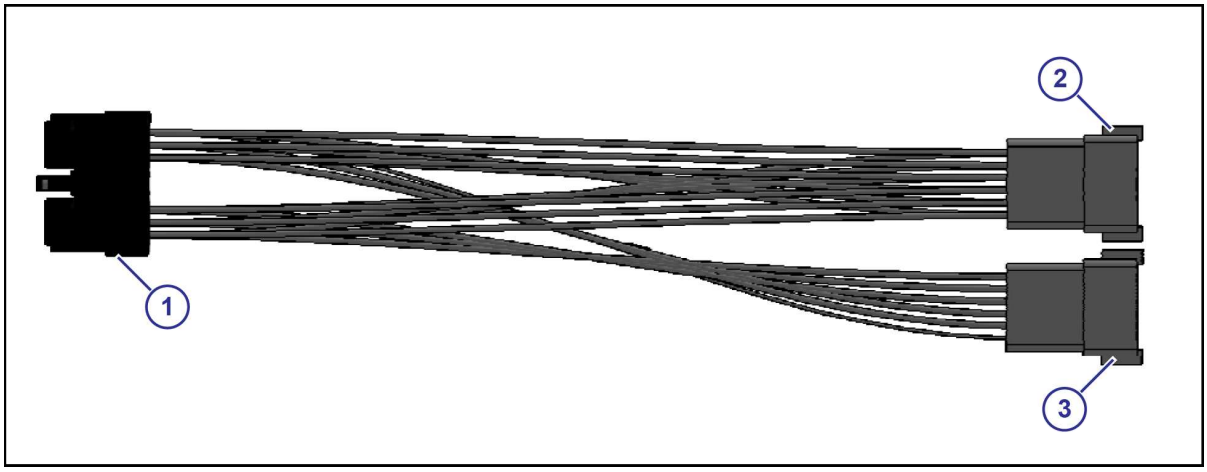


Fig. 67:

The connector *(1)* connects to the controller. The connector *(2)* connects to the left WILGER harness and the connector *(3)* connects to the right WILGER harness.

WILGER 6-row Pigtail Harness Pinout

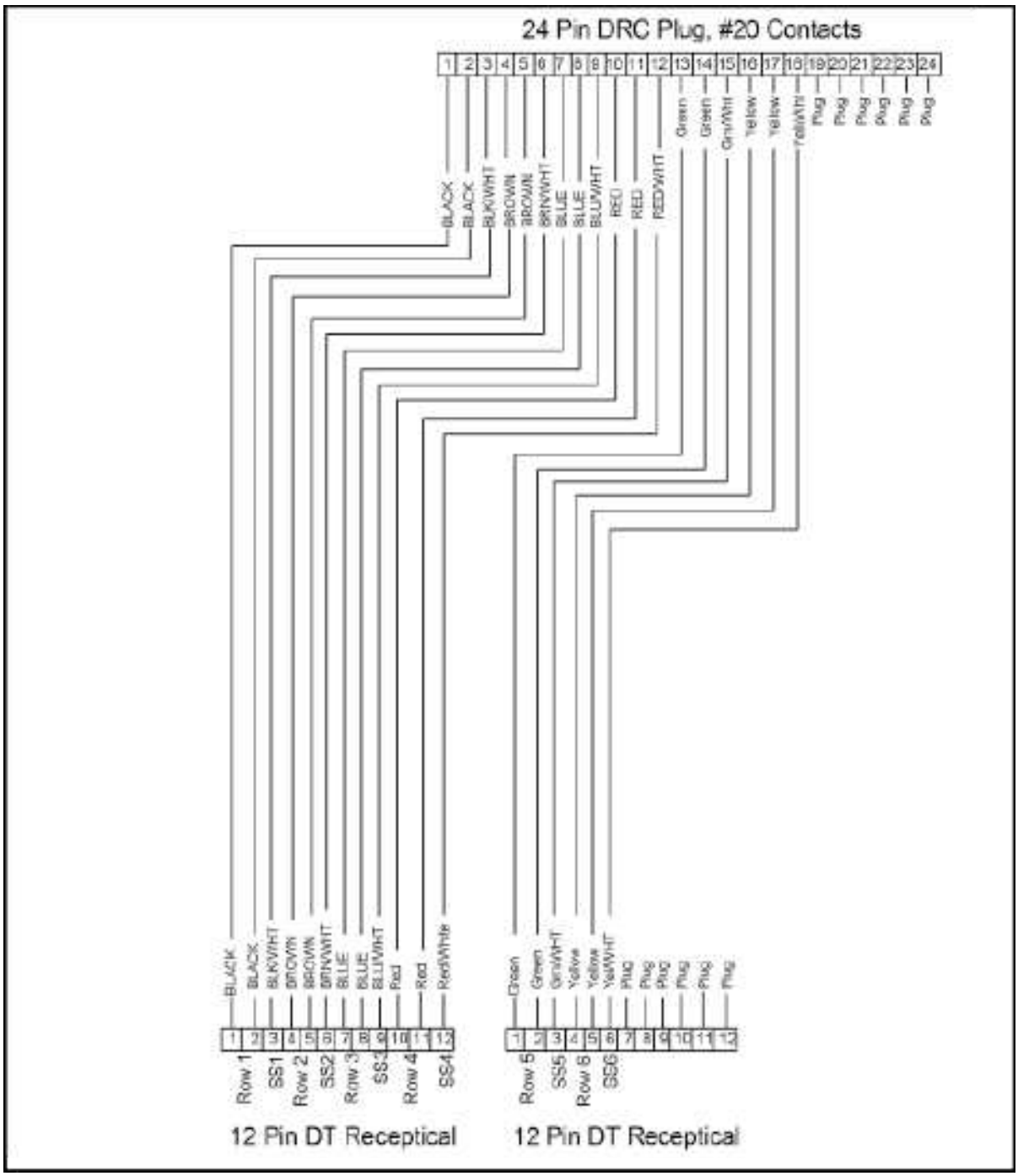


Fig. 68:

Table: 24-Pin DCR Plug Pinout

Pinout	Color	Description		Pinout	Color	Description
1	Black	Row 1		13	Green	Row 5
2	Black			14	Green	
3	Black/White	Seed Sensor 1		15	Green/White	Seed Sensor 5
4	Brown	Row 2		16	Yellow	Row 6
5	Brown			17	Yellow	
6	Brown/White	Seed Sensor 2		18	Yellow/White	Seed Sensor 6
7	Blue	Row 3		19	Plug	Not Used
8	Blue			20	Plug	Not Used
9	Blue/White	Seed Sensor 3		21	Plug	Not Used
10	Red	Row 4		22	Plug	Not Used
11	Red			23	Plug	Not Used
12	Red/White	Seed Sensor 4		24	Plug	Not Used

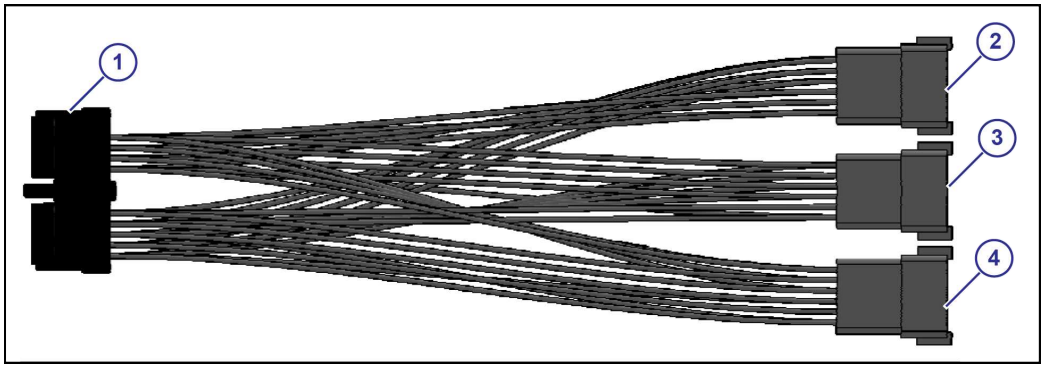
Table: 12-Pin DT Receptacle Pinout

Pinout	Color	Description		Pinout	Color	Description
1	Black	Row 1		7	Blue	Row 3
2	Black			8	Blue	
3	Black/White	Seed Sensor 1		9	Blue/White	Seed Sensor 3
4	Brown	Row 2		10	Red	Row 4
5	Brown			11	Red	
6	Brown/White	Seed Sensor 2		12	Red/White	Seed Sensor 4

Table: 12-Pin DT Receptacle

Pinout	Color	Description		Pinout	Color	Description
1	Green	Row 5		7	Plug	Not Used
2	Green			8	Plug	Not Used
3	Green/White	Seed Sensor 5		9	Plug	Not Used
4	Yellow	Row 6		10	Plug	Not Used
5	Yellow			11	Plug	Not Used
6	Yellow/White	Seed Sensor 6		12	Plug	Not Used

WILGER 12-Row Pigtail Harness



The connector *(1)* connects to the controller. The connector *(2)* connects to the left WILGER harness, the connector *(3)* connects to the center WILGER harness, and the connector *(4)* connects to the right WILGER harness.

WILGER 12-Row Pigtail Harness Pinout

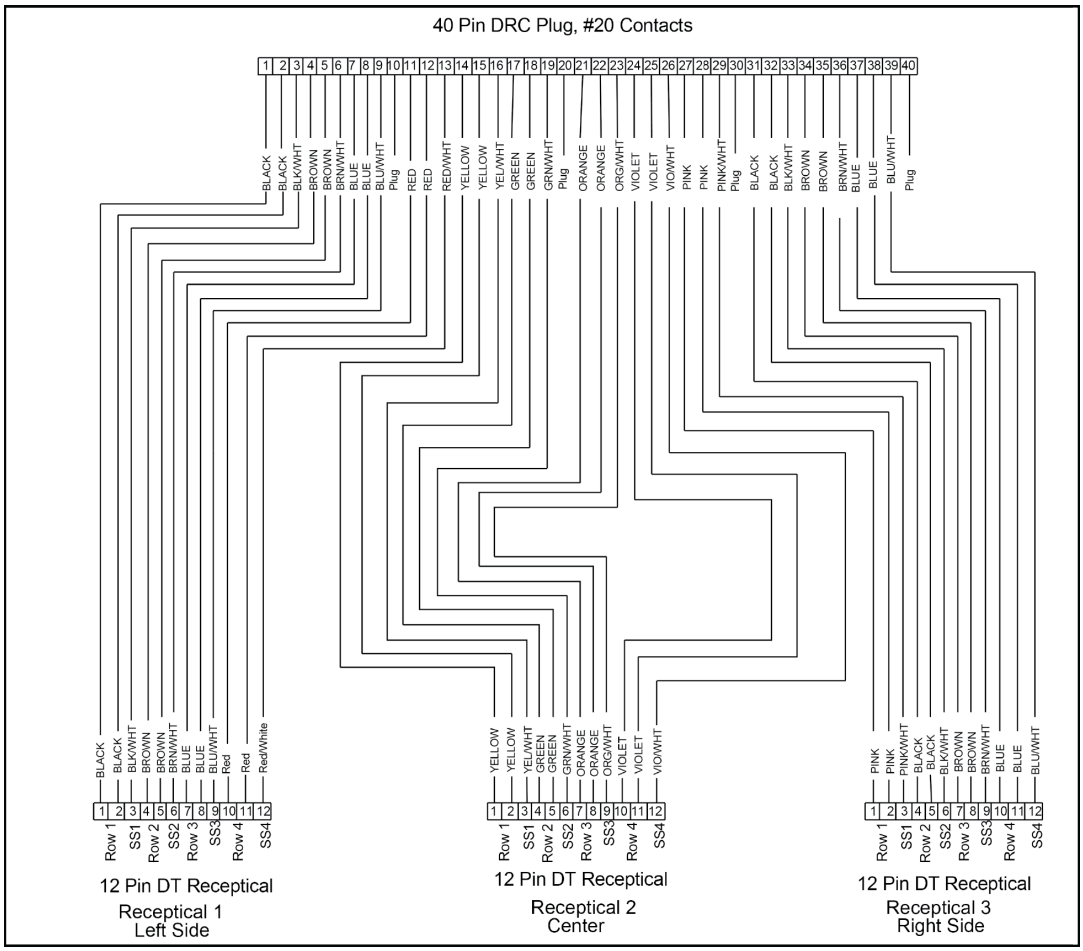


Fig. 69:

Table: 40-Pin DCR Plug Pinout

Pinout	Color	Description		Pinout	Color	Description
1	Black	Row 1		21	Orange	Row 7
2	Black			22	Orange	
3	Black/White	Sensor 1		23	Orange/White	Sensor 7
4	Brown	Row 2		24	Violet	Row 8
5	Brown			25	Violet	
6	Brown/White	Sensor 2		26	Violet/White	Sensor 8
7	Blue	Row 3		27	Pink	Row 9
8	Blue			28	Pink	
9	Blue/White	Sensor 3		29	Pink/White	Sensor 9
10	Plug	Not Used		30	Plug	Not Used
11	Red	Row 4		31	Black	Row 10
12	Red			32	Black	
13	Red/White	Sensor 4		33	Black/White	Sensor 10
14	Yellow	Row 5		34	Brown	Row 11
15	Yellow			35	Brown	
16	Yellow/White	Sensor 5		36	Brown/White	Sensor 11
17	Green	Row 6		37	Blue	Row 12
18	Green			38	Blue	
19	Green/White	Sensor 6		39	Blue/White	Sensor 12
20	Plug	Not Used		40	Plug	Not Used

Table: 12-Pin DT Receptacle 1 - Left Side Pinout

Pinout	Color	Description		Pinout	Color	Description
1	Black	Row 1		7	Blue	Row 3
2	Black			8	Blue	
3	Black/White	Seed Sensor 1		9	Blue/White	Seed Sensor 3
4	Brown	Row 2		10	Red	Row 4
5	Brown			11	Red	
6	Brown/White	Seed Sensor 2		12	Red/White	Seed Sensor 4

Table: 12-Pin DT Receptacle 2 - Center

Pinout	Color	Description		Pinout	Color	Description
1	Yellow	Row 1		7	Orange	Row 3
2	Yellow			8	Orange	
3	Yellow/White	Seed Sensor 1		9	Orange/ White	Seed Sensor 3
4	Green	Row 2		10	Violet	Row 4
5	Green			11	Violet	
6	Green/White	Seed Sensor 2		12	Violet/ White	Seed Sensor 4

Table: 12-Pin DT Receptacle 3 - Right Side Pinout

Pinout	Color	Description		Pinout	Color	Description
1	Pink	Row 1		7	Brown	Row 3
2	Pink			8	Brown	
3	Pink/White	Seed Sensor 1		9	Brown/White	Seed Sensor 3
4	Black	Row 2		10	Blue	Row 4
5	Black			11	Blue	
6	Black/White	Seed Sensor 2		12	Blue/White	Seed Sensor 4

WILGER Planter Harness

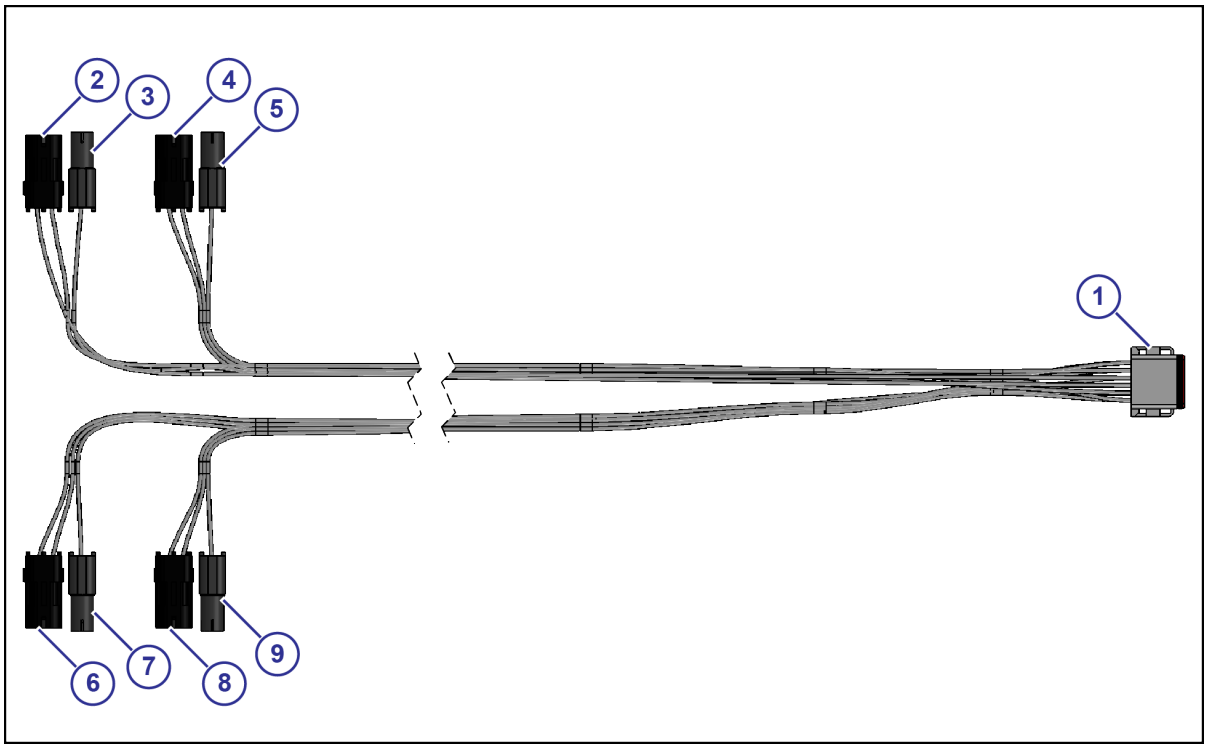


Fig. 70:

The 12-Pin DT connector *(1)* connects to the WILGER pigtail harness. The connectors *(2)* and *(3)* connect to row 1. The connectors *(4)* and *(5)* connect to row 2. The connectors *(6)* and *(7)* connect to row 3. The connectors *(8)* and *(9)* connect to row 4.

Index

P

R

S

T

V

W

CapstanAG™

Application Systems for Professionals™

prodsupport@capstanag.com | 855-628-7722 | www.capstanag.com