ACS

Advanced Control System

Contents

Course Objectives

Operations

The operator will be trained on the following:

- Identification of the ACS system components. How to power up the system along with location/troubleshooting of power relay/fuses for the system and output module in case of power up failure. Identify axis neutral fault in the event of joystick activation during the power up phase.
- Basic operations including setting application rates, spinner settings blast mode.
- The operator will also understand the different operating modes and materials available and which modes are to be used along with start and stop features utilizing the pause button. Tracking storm totals and clearing of storm totals.

Identification of Errors

The operator will be able to identify and correct common errors, messages and warnings including feeder sensor, liquid sensor, feed rate limited, liquid rate limited. Critical errors and warnings will include hot hydraulic oil, low hydraulic oil, and sensor short. Warnings include hydraulic filter change.

Liquid Operations

The ACS operator will be trained on the ACS liquid system including components/ location as well as liquid application modes available and the difference between pre-wet application vs anti-ice and stand alone liquid. Liquid systems flushing and winter-izing will also be covered.

Optional Configurations

The ACS operator will be aware of optional hydraulic configurations for tow plow, underbody plow, and wing plow configurations and use of float with front mounted plows. Some configurations are district specific and the operator must consult the district for proper operating instructions.

Overview

The Advanced Control System replaces the GL400 spreader systems starting with truck #8123 in 2009. The ACS system can be retrofitted to trucks older than #8123 as a “stand alone” unit and will utilize existing hydraulic controls.

Unlike the GL400 the ACS system controls/operates all hydraulic functions. These include:

- Spreader Control
- Hydraulic Control
- Hydraulic System Monitoring

Functions such as plow operation, bed up and down, along with accessory hydraulic functions are controlled by the ACS system. In addition the hydraulic pre-wet system is “stand alone” starting with truck # 8123. The hydraulic pre-wet system is similar to previous models with the exception of mounting location. With ACS the pre-wet is mounted to the frame of the truck and includes a nurse tank along with required plumbing to allow connection to the spreader pre-wet system. With this configuration the pre-wet system may be utilized for various operations that may require “non-oil based” products such as dust control for brooming operations. Prior to operating any equipment employees shall complete the appropriate required training.

ACS vs GL400

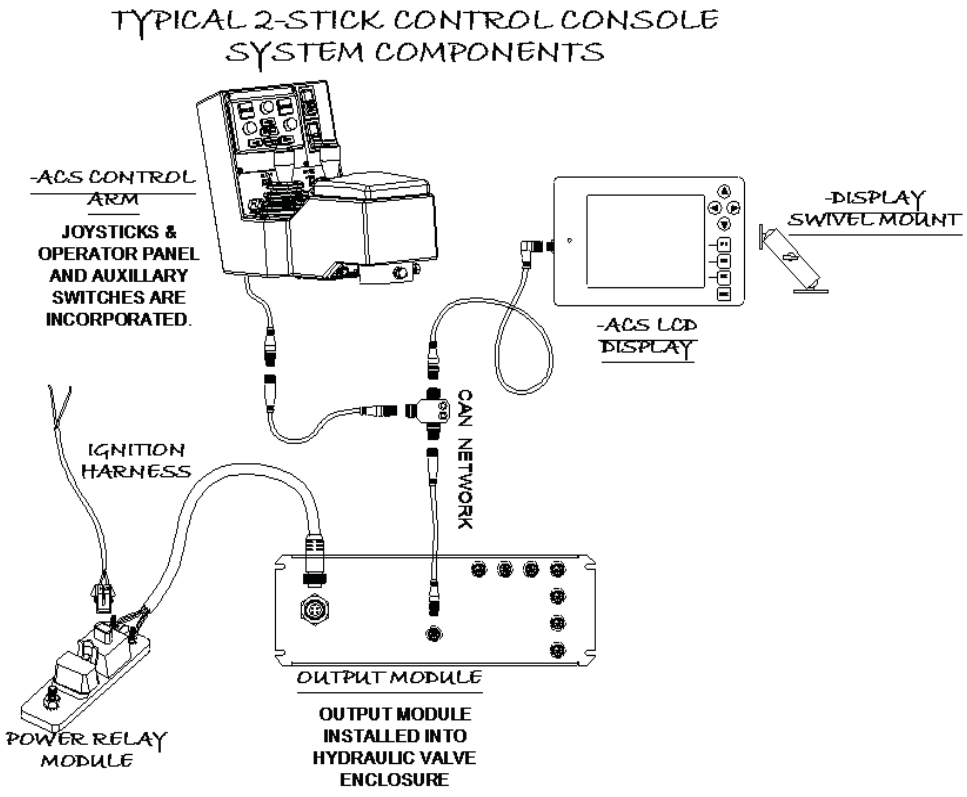
The basic function of the ACS system is the same as GL400 with improvements based on past experience with GL400. Below is a simple chart covering the most common differences between GL400 and the ACS system.

GL400	ACS
Sensor on feeder motor	Sensor or flow meter inside valve enclosure
Functions individually hard wired	Functions communicate over a common data link
Controls spreader only	Controls spreader and all hydraulic functions
Wire harness connected to spreader	No wire harness on spreader
Pre-wet mounted on spreader	Pre-wet mounted on truck
Spreader must be operating to use pre-wet	Pre-wet will operate stand-alone
Screen very hard to read	Screen very easy to read

The ACS can be configured based on operation requirements depending on district options and type of operations performed.

- Standard configuration
  - o Bed up/down
  - o Front plow
- Optional configuration
  - o Gate control
  - o Anti-Ice
  - o Wing plow
  - o Underbody plow
  - o Tow Plow
  - o Hook lift

System Overview



Basic Components

The ACS system is designed around 4 basic components:

- Operator Panel
- Display
- Joystick Control
- Output Module

Operator Panel

Allows for operator input to control the spreader settings.

Display

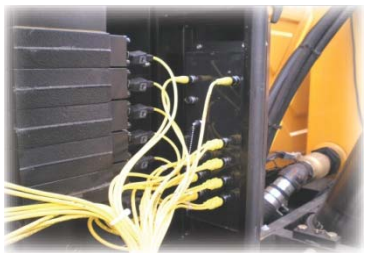
Displays various system operations and allows for inputs from the operator.

Joystick

Provides operator control of hydraulic functions.

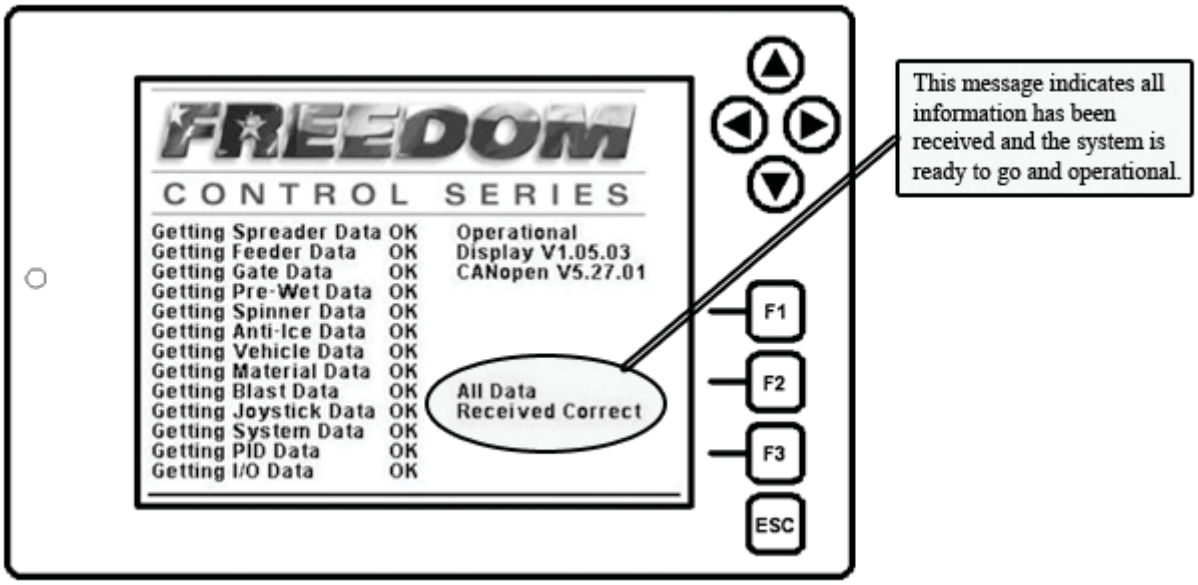
Output Module

(Located in the hydraulic valve enclosure)
Contains programming for the entire system and receives information from other components within the system and directly controls outputs. The output module is programmed based on configuration of the truck/ system and can be replaced based on specific truck configurations. Calibration values will have to be re-programmed if a new output module is installed.



System Power Up

Turning on the vehicle ignition switch will power the system on. There is not a separate power switch for the ACS. The LCD will display a list of data that is being transferred to the display from the output module located in the valve enclosure.



Power Up Failure

If the system fails to power-up a simple power check will need to be performed. The ACS system is fuse protected at (2) locations.

- Power relay
- Master output module

Location of the main power supply relay to ACS system is located within the truck battery enclosure and is fuse protected with (1) 20 amp fuse. Inspect fuse and replace if blown. Once replaced turn ignition switch on to restart power up phase of the ACS. If power failure occurs check the master output module fuse.

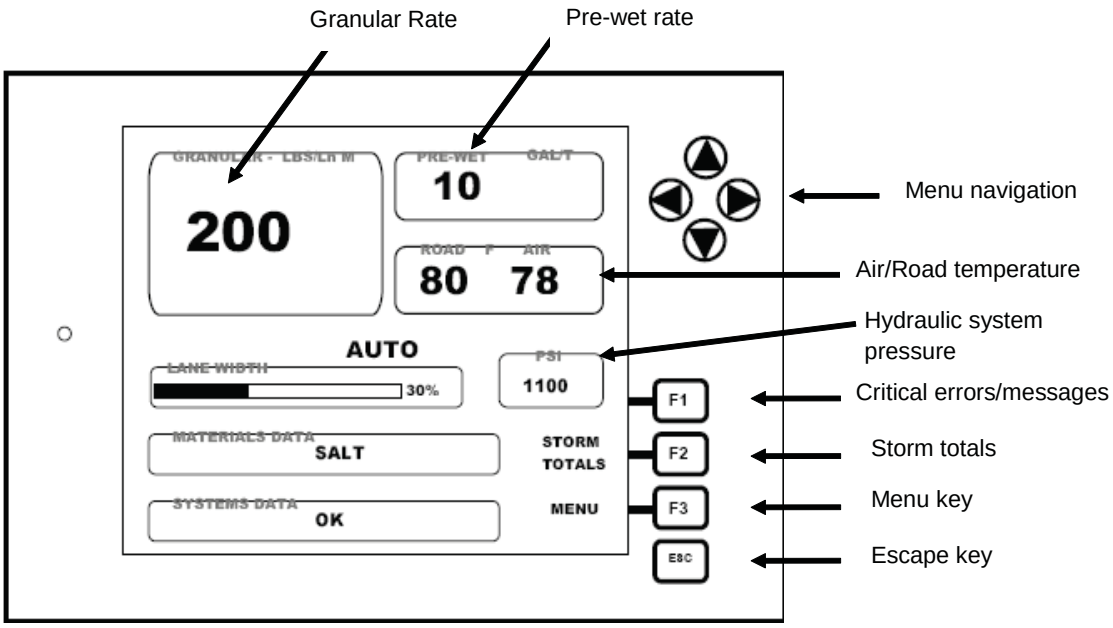

(Main power relay inside batter enclosure)

The master output module is fuse protected with (1) 5 amp fuse located at the center edge of the master output module. Inspect fuse and replace if blown. Once replaced turn ignition switch on to restart power up phase of the ACS.

The blinking LED light indicates normal conditions, if not lit/blinking will indicate a blown fuse in the power relay.


(Master output module fuse inside hydraulic valve enclosure)

Display



Arrow Keys – Used to navigate through the system menus.

F1 – View all current messages and errors if any are available to view.

F2 – View real-time storm totals.

F3 – Allows access to the main menu. (Log in/out – clear storm totals – view logs) **(F3 and will not be accessible and "MENU" will be replaced with speed input in MPH if a speed signal is detected)**

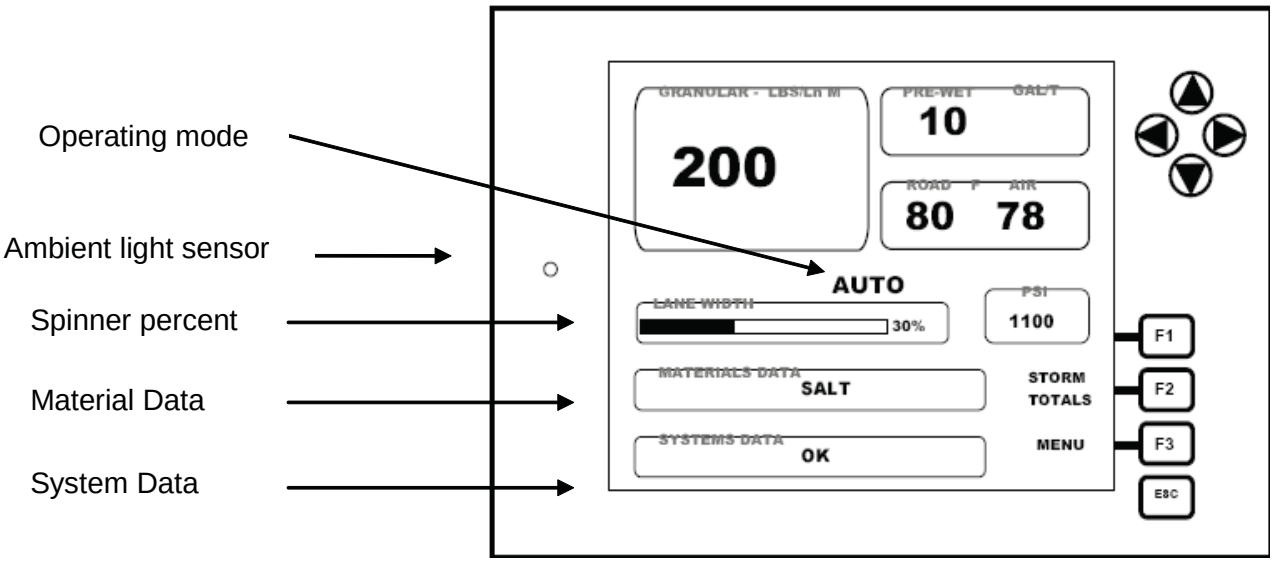
ESC – Escape key used to back out of current menu selection.

Granular rate - Lbs/LnM ***(LBS/ Lane Mile)*** Granular rate can be changed at anytime by turning the "RATE" knob.

Pre-wet rate - Amount of liquid chemical applied to granular material in gallons per ton.

Air/Road temperature – To be used with air/road temperature sensors.

Display (continued)



Operating Mode – Indicates mode of operation. Auto / Manual or Unload. Will display "PAUSE" which indicate the system is NOT spreading.

Ambient Light Sensor - Automatic adjustment of backlight on display.

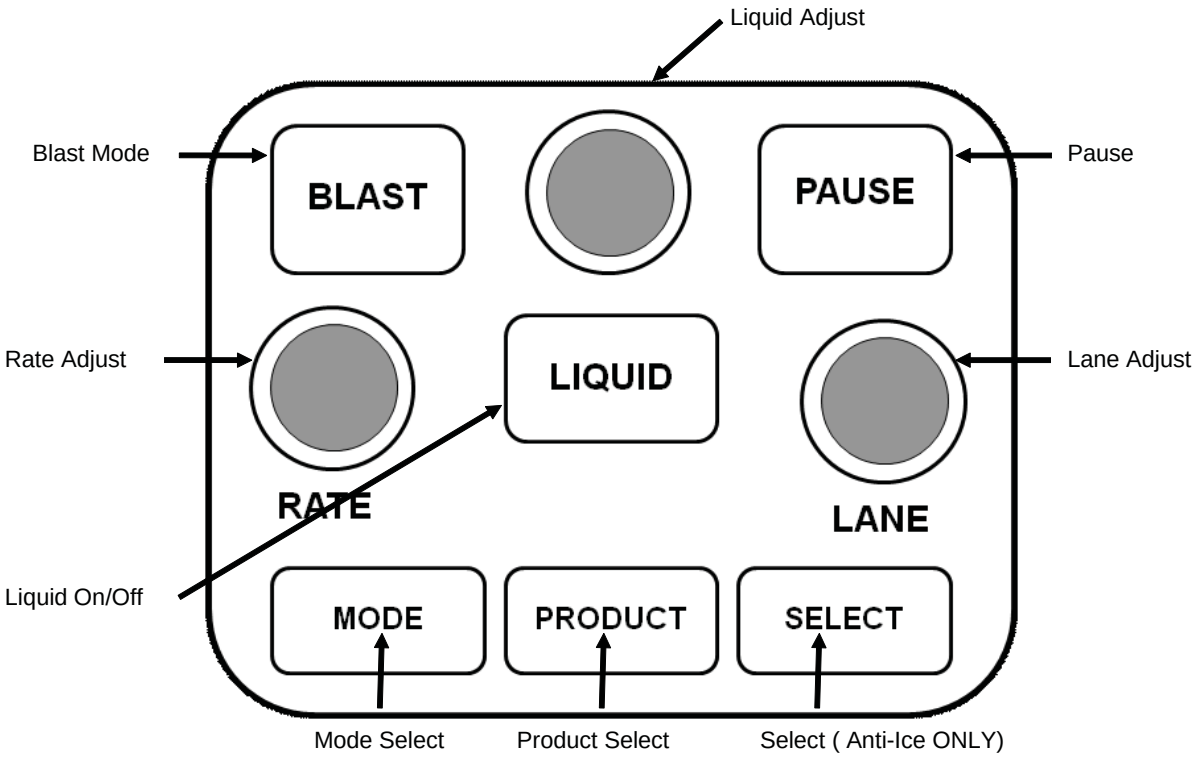
Spinner Percent – Indicates current percent of spinner motor percent of operations (speed of spinner).

Material Data - Displays current material selected.

System Data – Displays critical messages or errors.

Operator Panel

The operator panel allows for operator input of pause, granular rate, liquid on/off, liquid rate, lane percent, and product selection, mode of operation, blast function and select switch for anti-ice.



Pause – Used to start or stop the spreader.

Blast – Increased rate of granular and liquid material.

Rate Knob – Used to adjust Granular rate ***in LBS per MILE.*** Controls speed of spreader chain.

Lane Knob – Used to adjust speed of spinner. Allows for proper lane width of material application.

Liquid Switch – Turns on/off liquid application. With liquid application in the on mode, the pause switch will start or stop application of liquid.

Liquid Adjust – Adjust liquid rate in gallons per ton.

Mode Switch – Select between different operating modes. Auto/Manual/Unload.

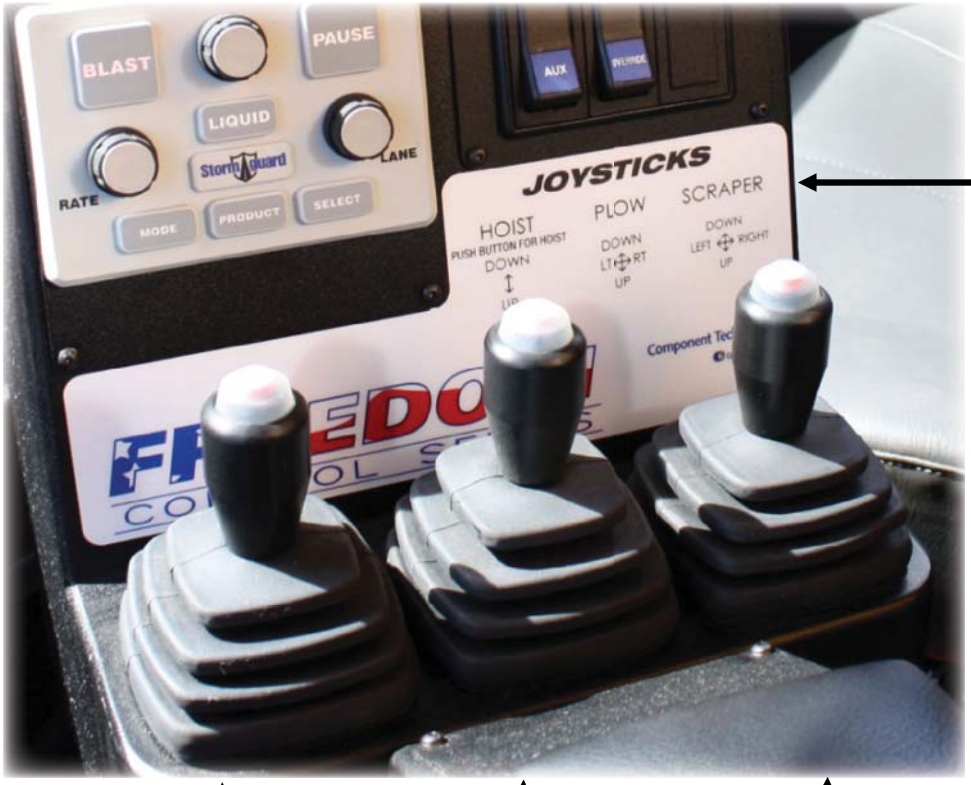
Product Switch – Changes material type

Select Switch – Toggles between Pre-Wet and Anti-Ice ***(only with anti-ice enabled)***

Joysticks

The ACS system incorporates electric/hydraulic control stick function based on the configuration of the truck when ordered. The specific configuration will be labeled on the operator table in front of the joysticks and will include additional information based on configuration and use of dead man or toggle buttons.

<u>The engine must be running for any joystick function to operate.</u>



Joystick Layout

Dump Body

Snow Plow Control

Underbody Plow

Wing Plow

Hoist Operation

Dead Man
Press and hold to operate hoist

To operate the dump body hoist up/down

Dead man button must be pressed and held down anytime the hoist is operated. Joystick control operates on 2 positions.

- Lever Forward = Hoist Down
- Lever Back = Hoist Up

Dump Body Props

Operators shall use dump body hoist props anytime maintenance or repair is performed with bed in the up position. Both props shall be used together.

Use extreme caution while lowering the dump body onto the props. Dump body hoist operates with pressure down. Slowly lower bed until props just touch frame of truck and release the joystick.

DO NOT POWER DUMP BODY HOIST DOWN ONTO BODY PROPS

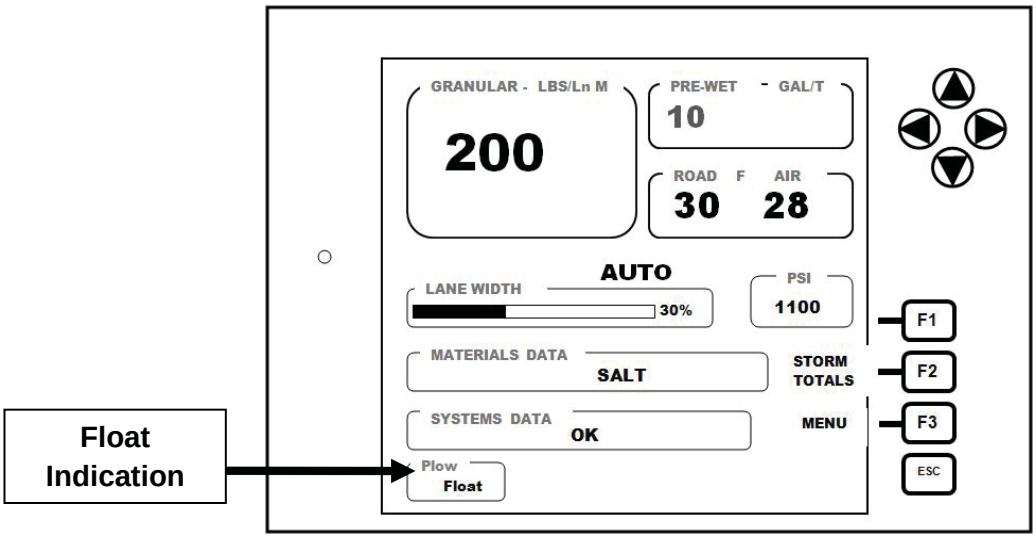
Snow Plow Control

Snow plow controls operate on 4 positions.

- Lever Forward = Plow Down
- Lever Back = Plow Up
- Lever Left = Plow Left
- Lever Right = Plow Right
  (Do not have to use button)

Snow Plow Float

The snow plow control joystick incorporates a float position.
To activate float hold stick forward for at least 3 seconds. Once activated the word “FLOAT” will appear on the display in the lower left corner. The plow will stay in the float mode until de-activated. To de-activate plow float pull plow control lever back and release.



Under Body Plow / Wing Control

- Lever Forward = Under Body Plow Down / Wing Down
- Lever Back = Under Body Plow Up / Wing Up
- Lever Left = Under Body Plow Left / Wing In
- Lever Right = Under Body Plow Right / Wing Out
  (Do not have to use button)

Operating Modes

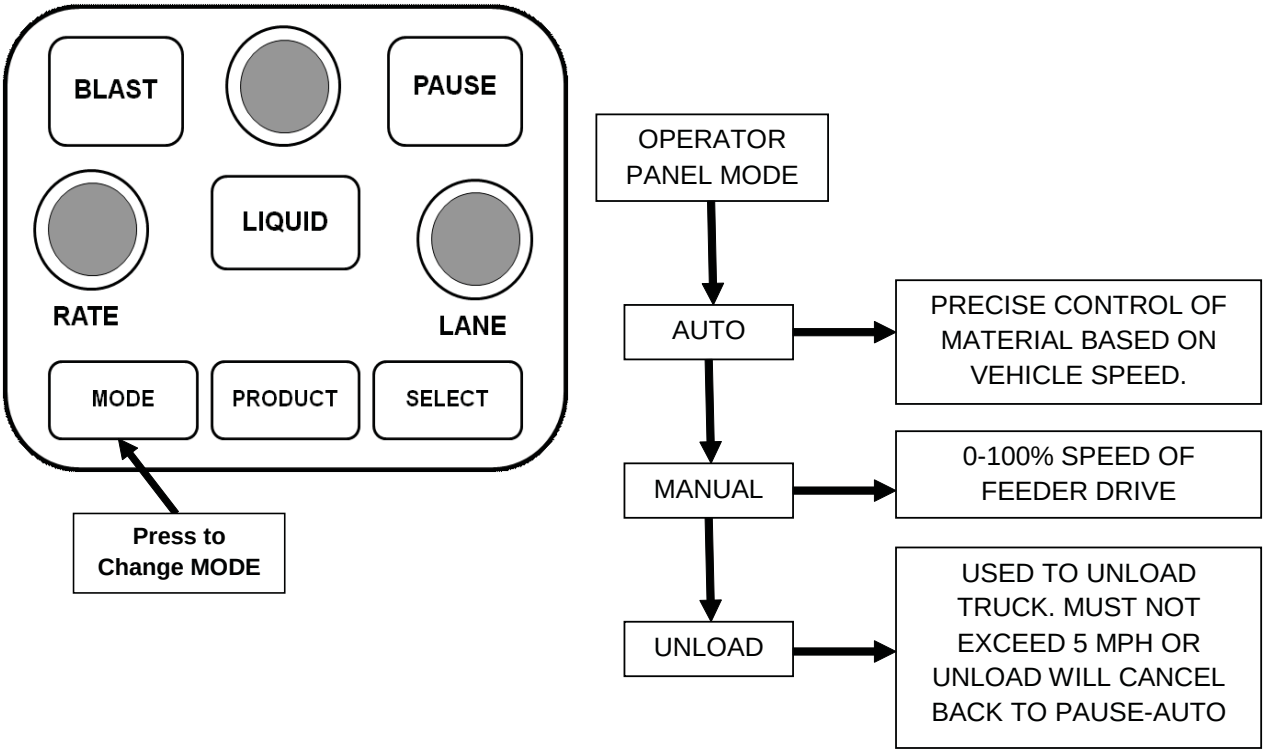
Pressing the “MODE” button allows the operator to select one of three modes depending on configuration.

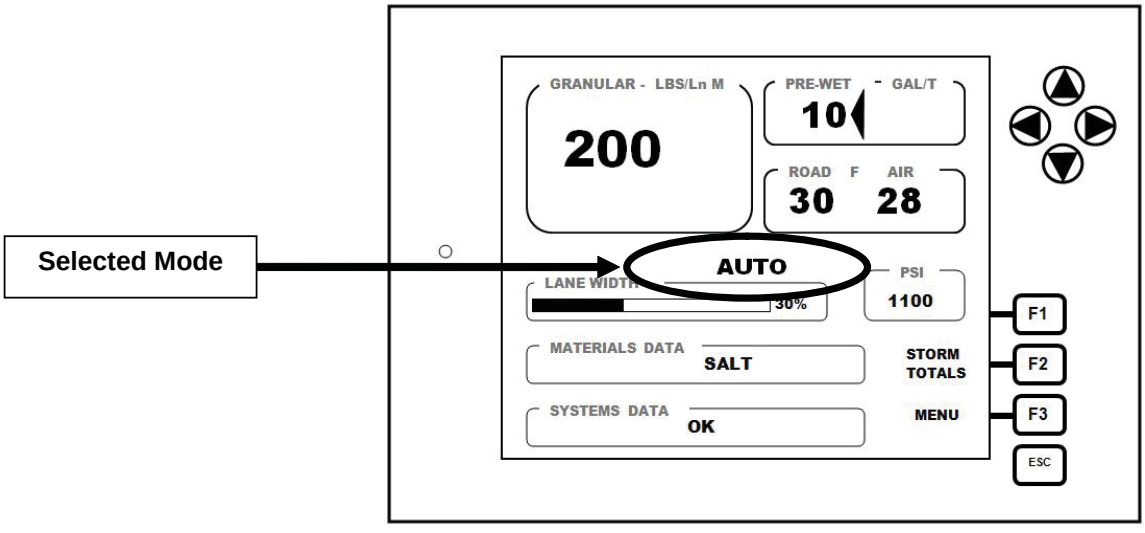
The ACS system will default to “PAUSE” during MODE selection

Typical available modes:

- Auto (Used for all spreading of material)
- Manual (Use **ONLY** in case of speed signal loss or auxiliary operations)
- Unload (Used to empty spreader) ***Will not work at speeds over 5 mph.***

(Each key press selects the next MODE in list)





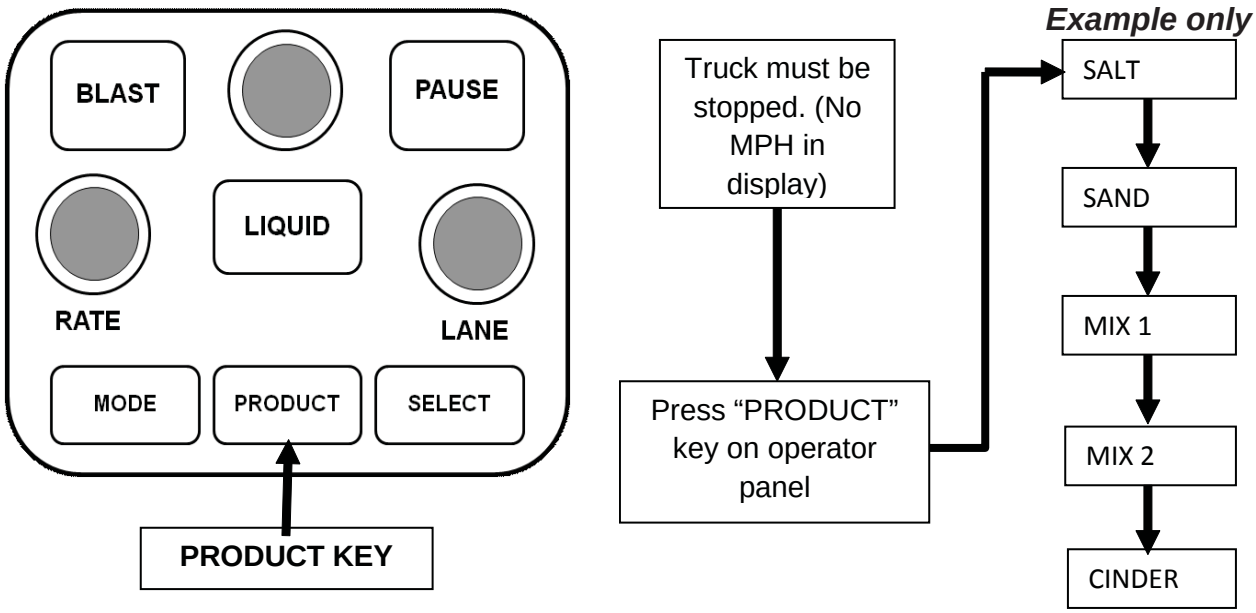
Material Type Selection (Granular)

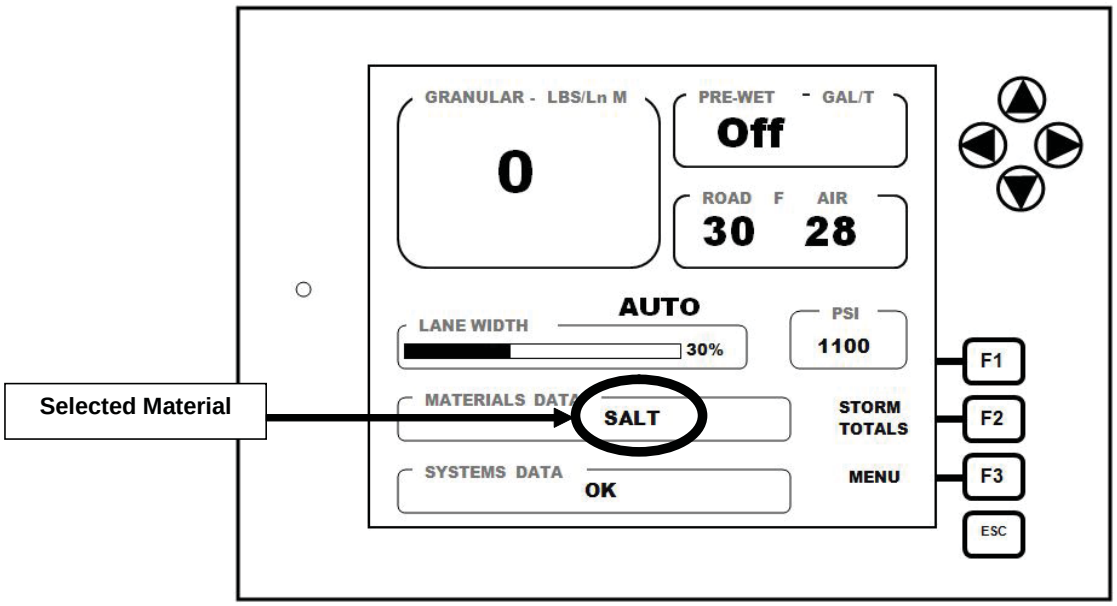
The ACS system can be programmed for use with various granular materials.
Material options are configured during the calibration process.
Pressing the product button on the operator panel will allow selection of the granular material to be spread. Press button until proper material is shown on the display.

To change material the truck must be stopped. Press/toggle the “PRODUCT” switch until proper material is shown on the display.

- Each key press selects the next material in list.
- Application rate (Lbs per lane mile) will default to (0) zero.

(Each key press selects the next material in list)



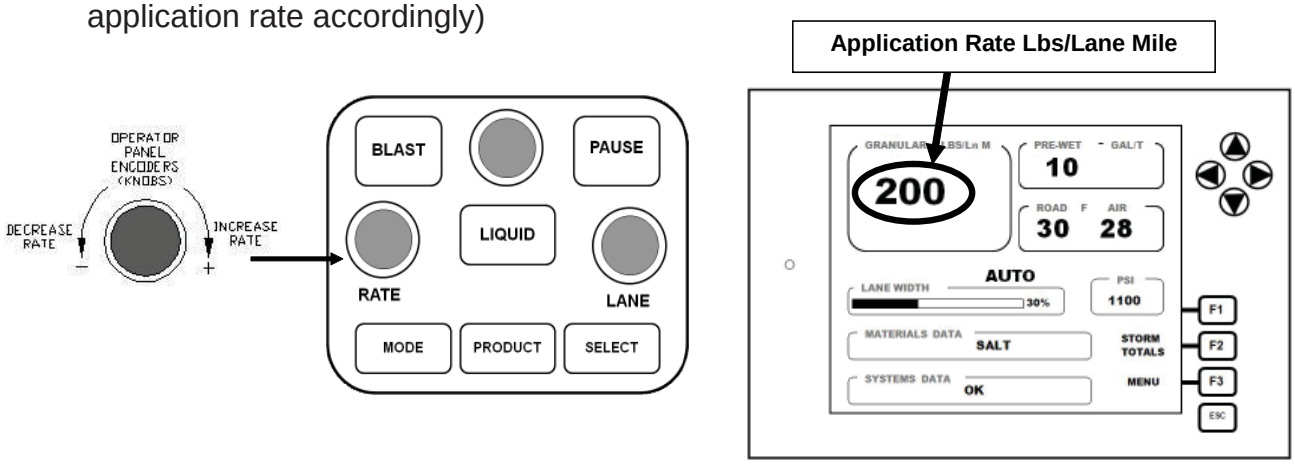


Set Granular Rate (AUTO MODE)

Adjustment of granular material rate is performed with the rate knob on the operator panel. Current granular rate will be indicated in the display top left corner and represents **Pounds per "Lane" Mile.**

(Rate adjustment steps/ increments can be set during calibration)

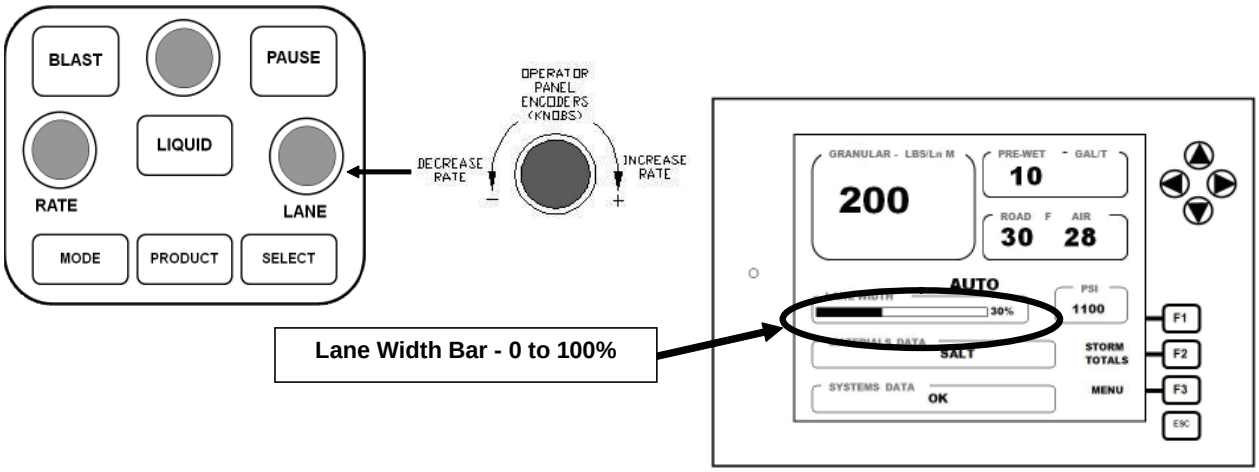
In automatic mode the rate will remain constant based on operator setting regardless of truck speed. (Application of multiple lanes requires the operator to increase the application rate accordingly)



Spinner Speed- percent operation

(See optional configurations for lane control spinner operation) Adjustment of the spinner speed is performed using the LANE knob. Adjustment is in percent. The operator has control of the spinner from 0 to 100% and must be adjusted depending on the desired width of material spread.
The ACS display indicates visually with a lane width bar and percent.

Spinner operates independent of the feeder chain. Granular FEED IS NOT ADJUSTED for changes in the spinner LANE WIDTH. (See optional configurations for lane control spinner operation)

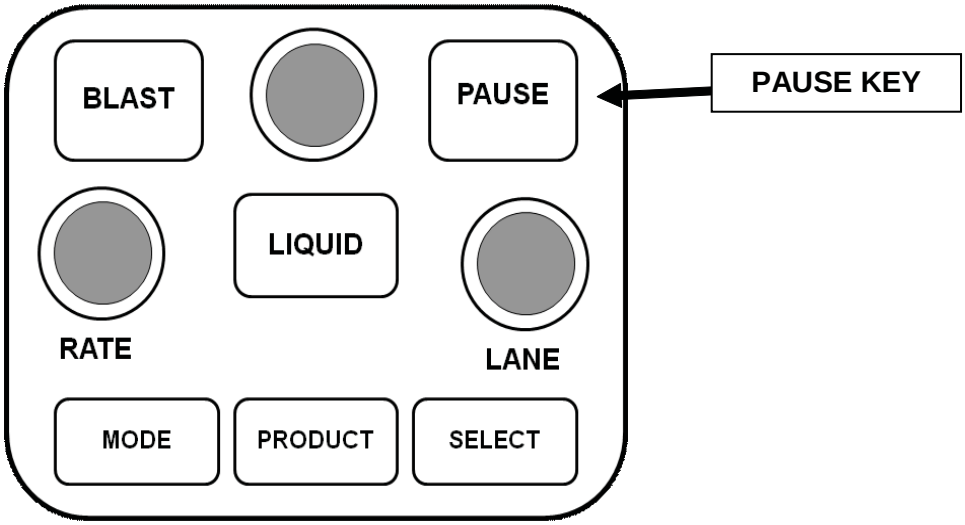


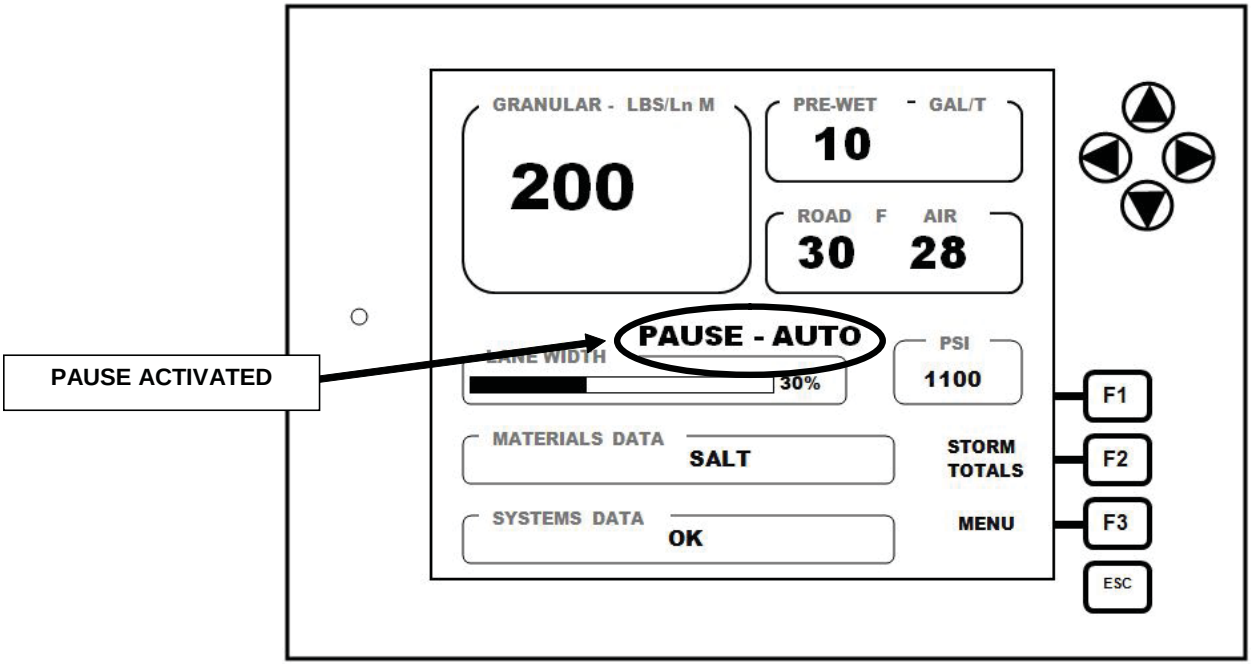
PAUSE

The PAUSE button when pressed will stop all normal spreader functions granular and liquid.

With PAUSE activated the display will indicate “PAUSE – AUTO” and the spreader will stop applying material. To apply materials press the PAUSE button to remove from PAUSE. Spreading of material will begin and only the current MODE will be shown in the display.

CAUTION – Spreader will turn on in UNLOAD and MANUAL MODE!





BLAST

Blast is used for Feeder and Pre-Wet only and applies a heavy application of granular. If pre-wet is turned on it will apply at a high volume as well.

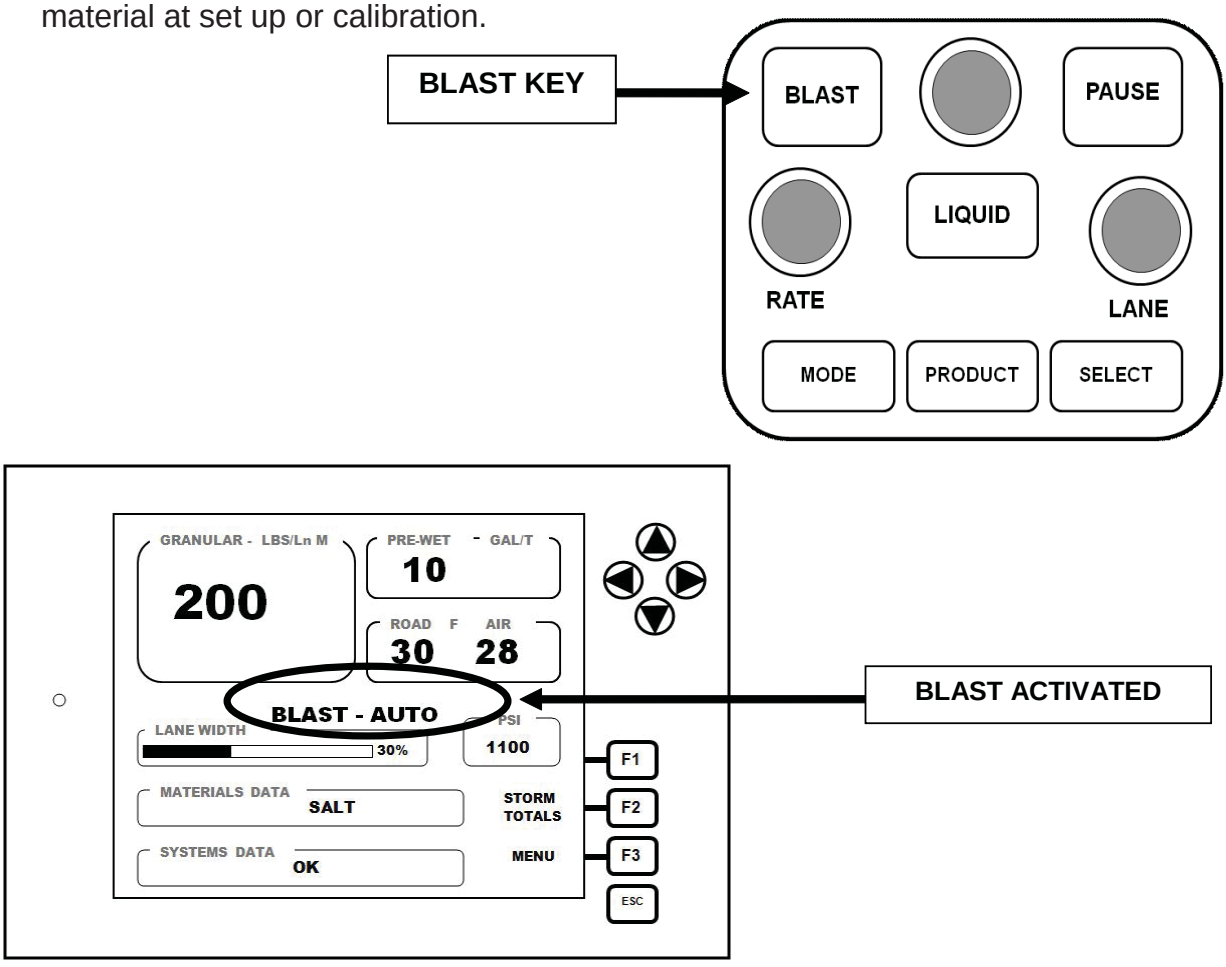
CAUTION – BLAST will override PAUSE and the spreader will turn on!

Blast mode typical set-up

- Timed application
  - Timer starts once button is pressed
  - Can be shut off by pressing the button during blast mode.
- Application rate during blast can be set by technician.
  - Max Trim (100% of Trim)
  - Max Rate (Maximum Rate Available)
  - Set Rate (Set at a specific Rate)

BLAST does not affect ANT-ICE mode.

Blast is generally used to output an increased amount of material over current spread rate for use in intersections and bridge decks or other places where ice/snow is detrimental. Ask your supervisor where and when to use Blast. Blast has no interaction with Anti-ice operation. All Blast settings are set up individually with each granular material at set up or calibration.

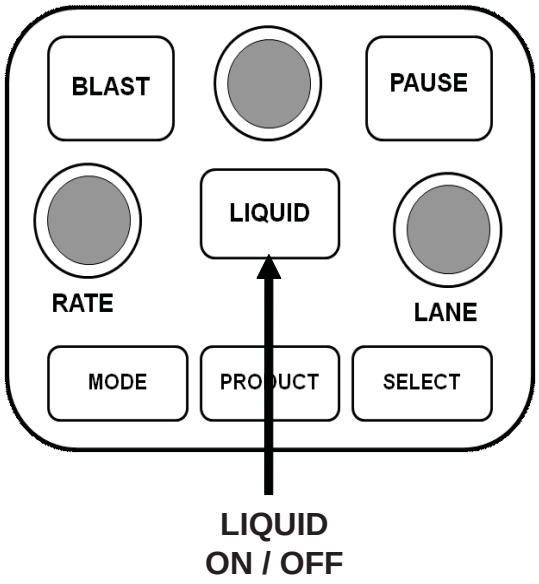


LIQUID APPLICATION (Pre-Wet)

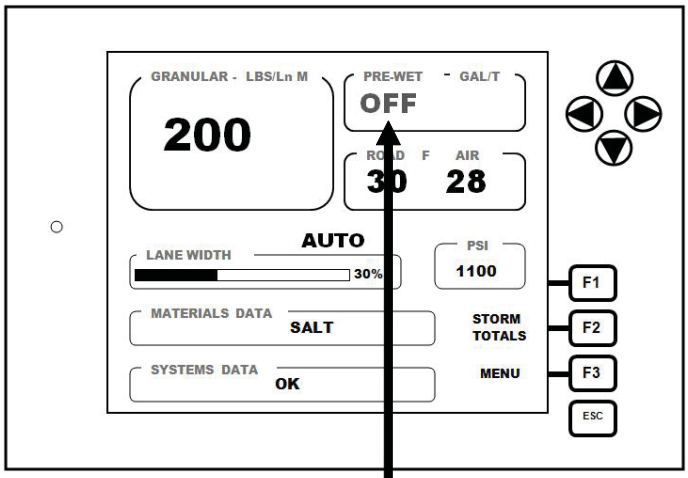
Pre-wet liquid application can be turned on/off at the operator control panel by pressing the LIQUID button. Liquid application is controlled by the PAUSE button once enabled.

Pre-wet liquid output rate is in **Gallons per Ton** of Granular material applied and can be adjusted by turning the liquid knob on the control panel.

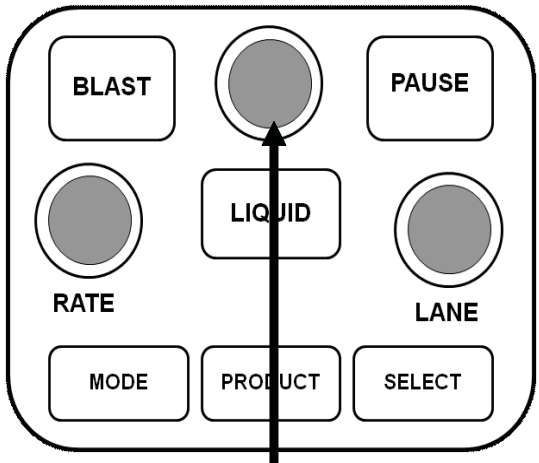
Adjustments to output rate can be done while liquid is turned off. Adjusting the liquid rate will momentarily display rate in gallons per ton and once set, OFF will return to the display. Adjusting liquid rate in the OFF mode does not turn on the liquid system at any time.



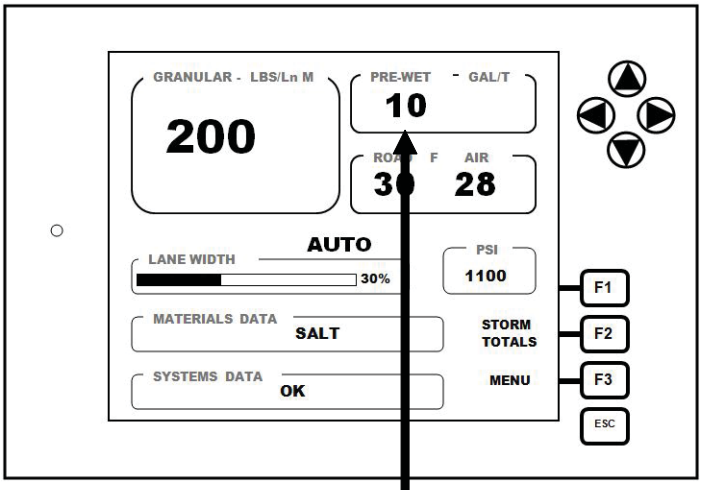
LIQUID
ON / OFF



LIQUID
OFF



LIQUID
RATE KNOB



LIQUID ON
GAL/TON

UNLOAD MODE

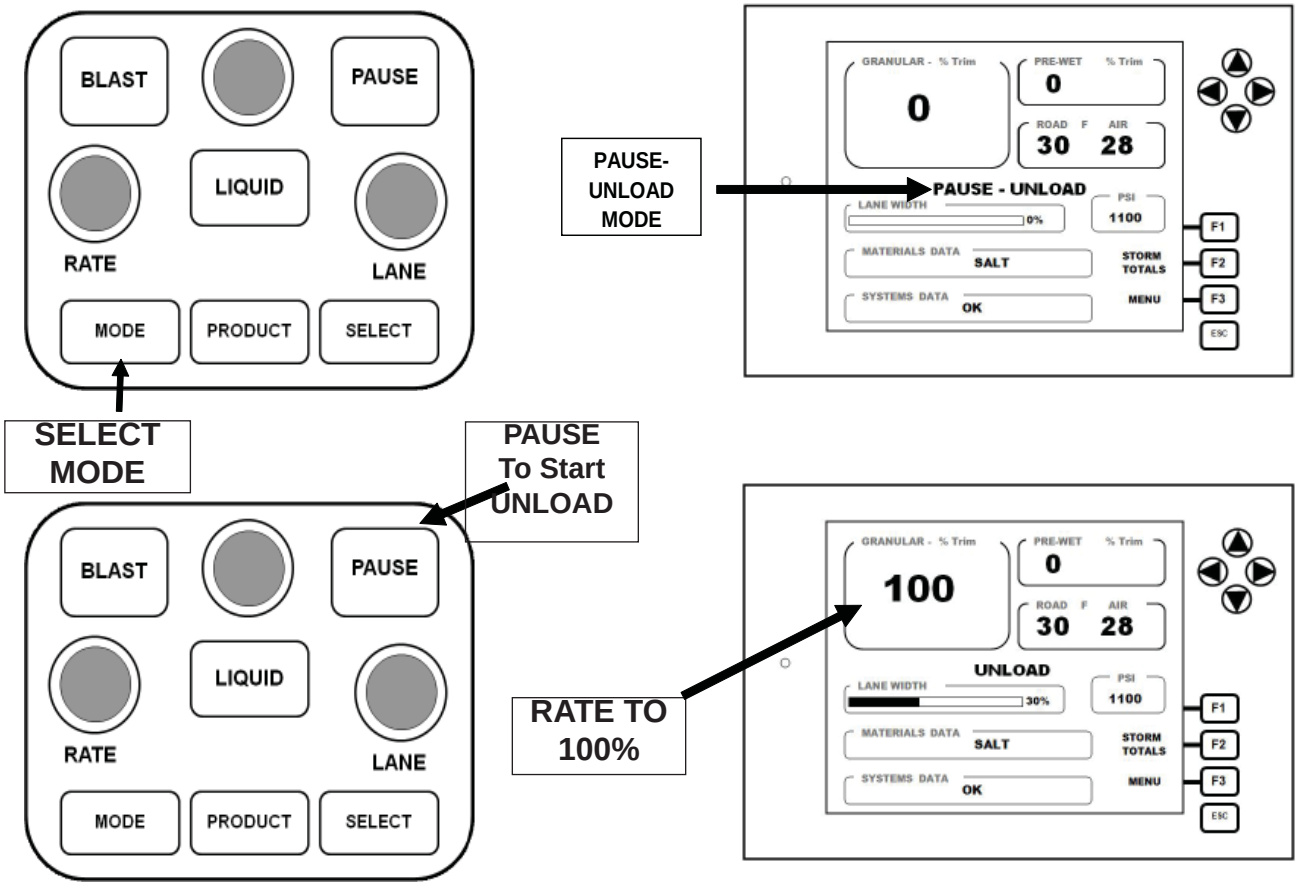
Unload mode has identical functionality as Manual Mode except it does not write material data into logs.

Use “unload mode” instead of manual mode to *UNLOAD* the vehicle at the yard. This will keep the Storm and Annual Totals from being mistakenly written into, generating false Granular and Liquid spread data.

- The controller limits the vehicle speed while unloading to less than 5 mph or the controller will be kicked back into Auto mode/pause.

To use the unload mode, open spreader gate to maximum.

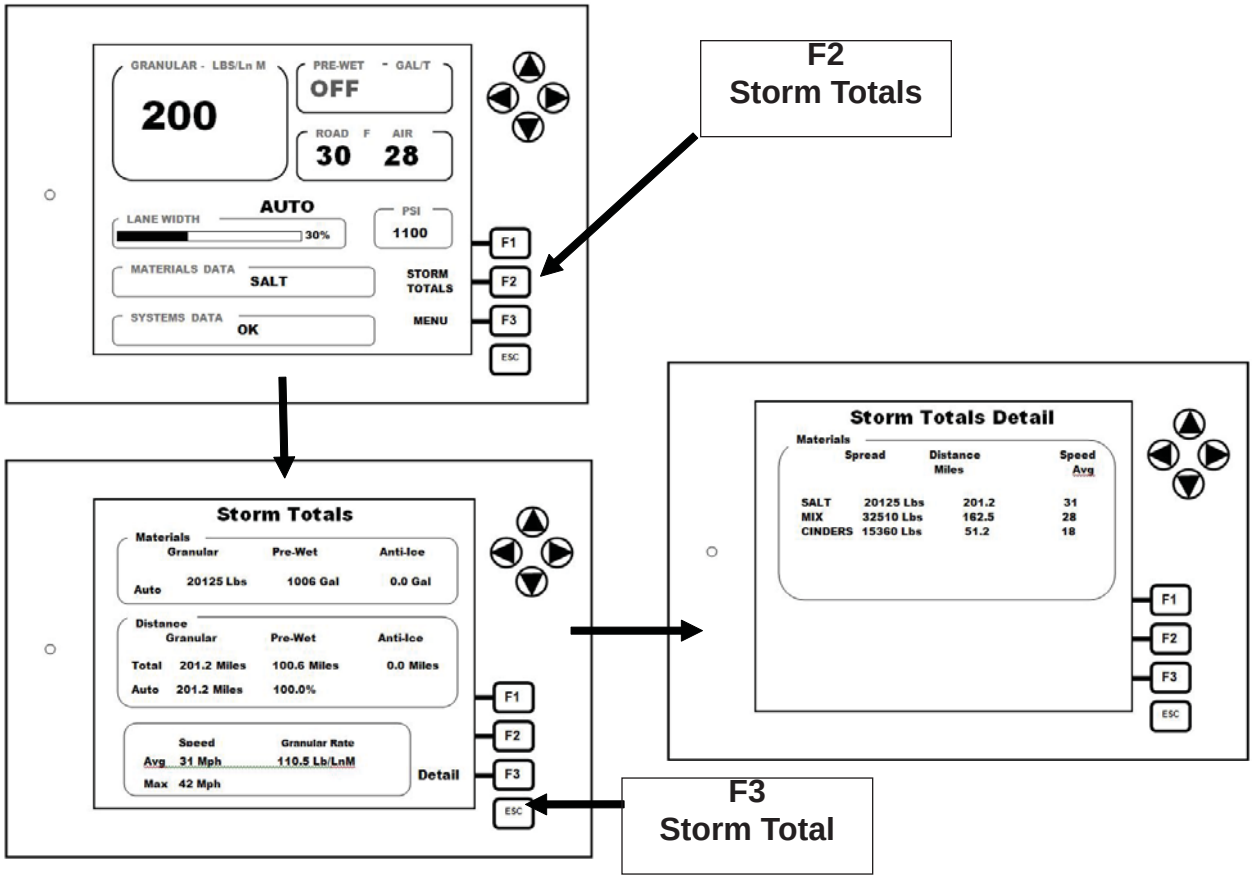
- Press mode button until Pause-Unload appears on display.
- All rates will default to (0) Zero once unload is selected.
  - Feeder
  - Spinner
  - Pre-Wet
- Rates are in percent
  - Set Feeder to 100%
  - Adjust spinner to desired speed to prevent salt from clogging chute.
  - Leave pre-wet at (0) Zero otherwise pre-wet will turn on.
- Press PAUSE button to start the unloading process.



STORM TOTALS

Storm totals may be viewed at any time by pressing F2 (Storm Totals) on the display. Once in storm totals press F3 for detail totals per material spread.
Information displayed in storm totals:

- Materials
  - o Granular lbs spread
  - o Pre-Wet gallons used
  - o Anti-ice gallons used
- Distance
  - o Granular miles traveled
  - o Pre-Wet miles traveled
  - o Anti-ice miles traveled
- Average speed
- Maximum speed
- Average granular rate
- Percent of time operated in automatic mode
- Miles operated in automatic mode



Errors and Messages

Axis Neutral Fault

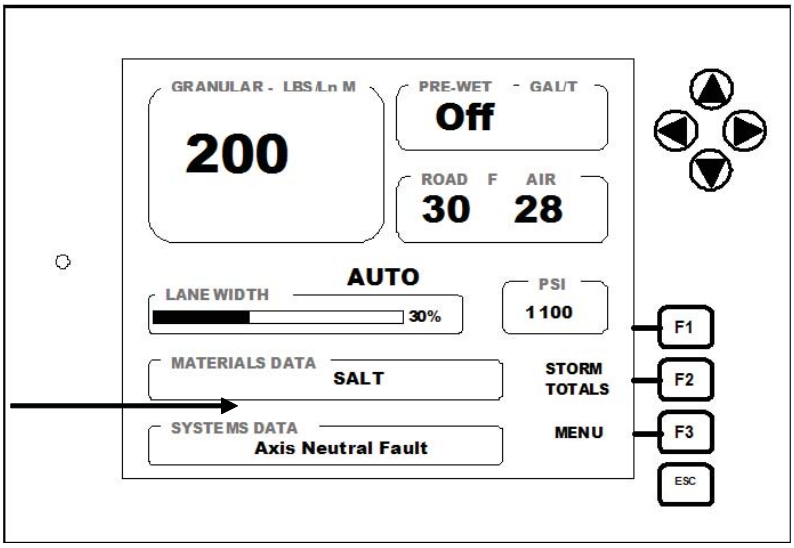
Power on Error

Activation of any joystick during the “power up phase” will result in an **Axis Neutral Fault Error** in the systems data menu. The ACS system will operate normal with the exception of the activated joystick. The joystick that was activated during the power up phase will be deactivated (will not work). The ACS system operates all hydraulic functions and this error is designed as a safety to prevent accidental activation of a joystick function at start up.

To correct and Axis Neutral Fault, shut off the truck (power off ACS) and verify that no joystick functions are activated. Restart truck (power on ACS) to clear error. If error does not clear during restart and none of the joystick functions are activated contact your mechanic.

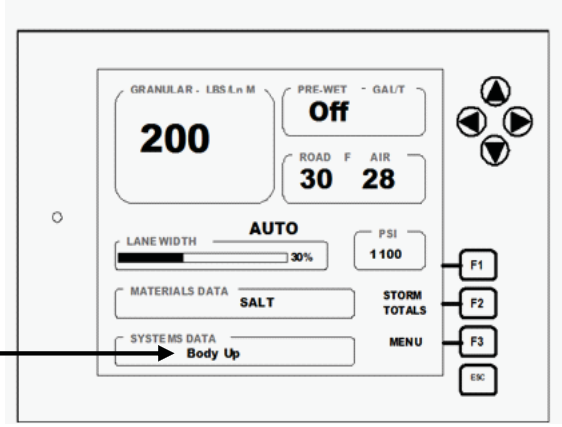
(Do “NOT” activate any controls during the power up phase)

Axis Neutral Fault



Body Up Message

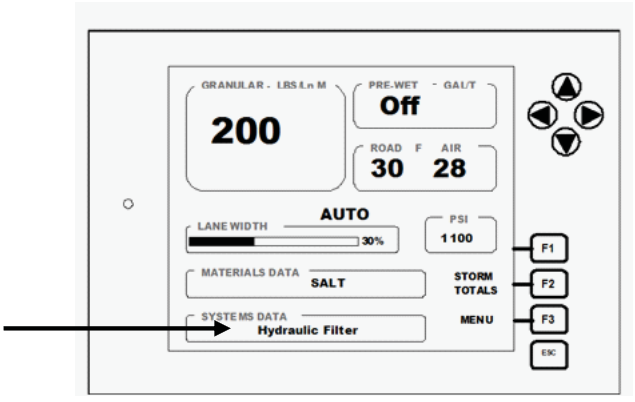
The body up message only indicates to the operator that the dump body sensor does not detect the dump body in the down position. This will be shown in the display as **“Body Up”** in the Systems Data menu and does not disable any functions of the ACS system.



Hydraulic Filter Message

A hydraulic filter message indicates that hydraulic fluid is restricted at the inlet side of the filter and does not disable any functions of the ACS system. **To correct message replace the hydraulic filter.**

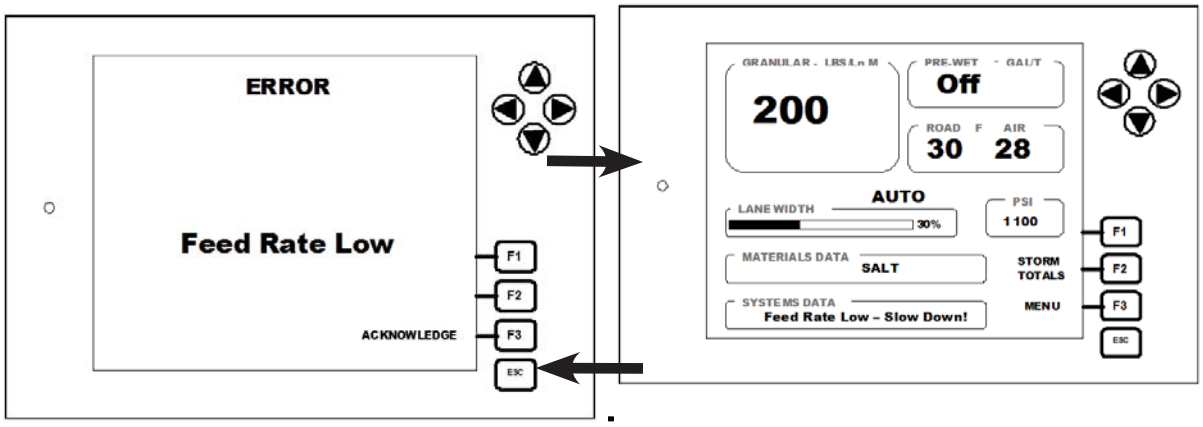
(This message could appear in extremely cold weather as well. Allow hydraulics to warm up and confirm message)



Feed Rate Low

The speed of truck is going faster than the system can apply granular material.
The feed rate is limited at current speed.
Error is displayed in the Systems Data Menu.
Operator must press Acknowledge “F3” to return to main operating screen.

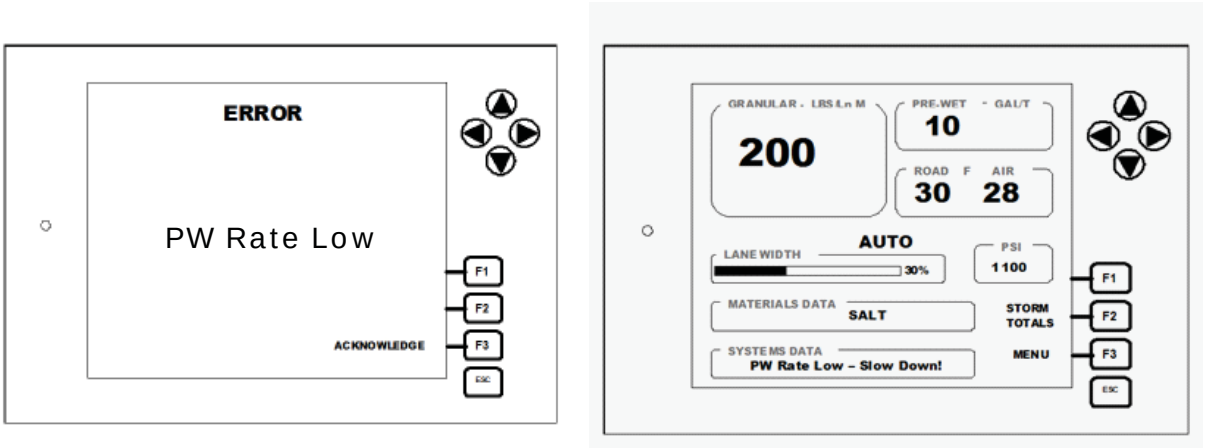
To correct (SLOW DOWN)



Pre-Wet Rate Low

The speed of truck is going faster than the system can apply liquid chemicals.
The liquid rate is limited at current speed.
Error is displayed in the Systems Data Menu.
Operator must press Acknowledge “F3” to return to main operating screen.

To correct (SLOW DOWN)



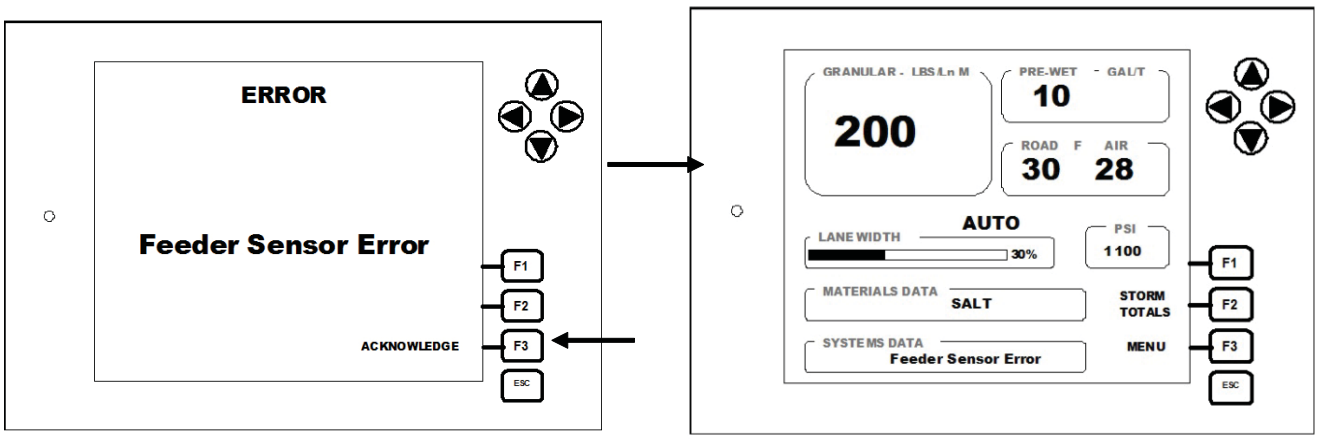
Feeder Sensor Error

Feeder sensor error indicates there **is no signal from the sensor.**
Error is displayed in the Systems Data Menu.

The system will automatically operate in open loop and will require no further action from the operator.

Operator must press Acknowledge “F3” to return to main operating screen.
After pressing acknowledge operator main screen will return Feeder sensor error will continue to display in the system data menu.

Visually confirm that the spreader is operating. If the spreader is not operating stop at a safe area and inspect for mechanical failure. If no mechanical failure is found contact mechanic.



Liquid Sensor Error

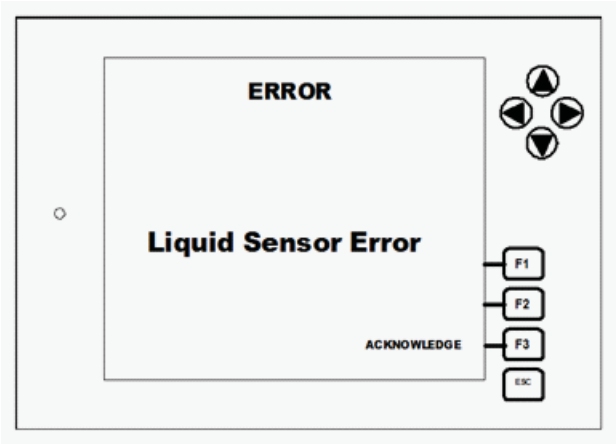
Liquid sensor error indicates there **is no signal from the sensor.**
Error is displayed in the Systems Data Menu.

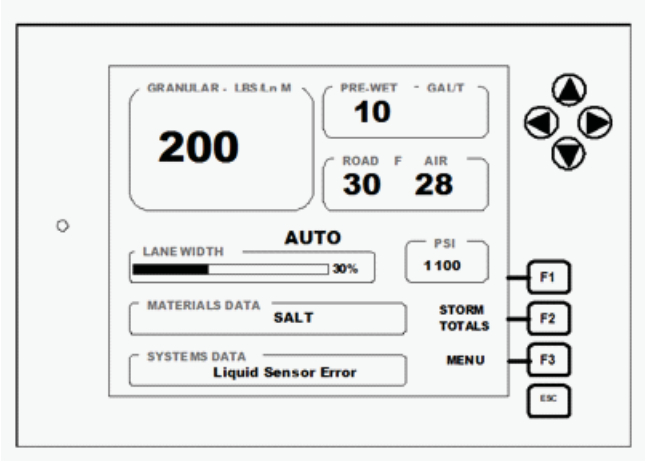
Operator must press Acknowledge “F3” to return to main operating screen.

After pressing acknowledge operator main screen will return. The system will operate in open loop and will require no further action from the operator.

Liquid sensor error will continue to display in the system data menu.

Visually confirm that the pre-wet system is operating. If the pre-wet system is not operating stop at a safe area and inspect for mechanical failure. If no mechanical failure is found contact mechanic





Critical Error

Critical Errors Include:

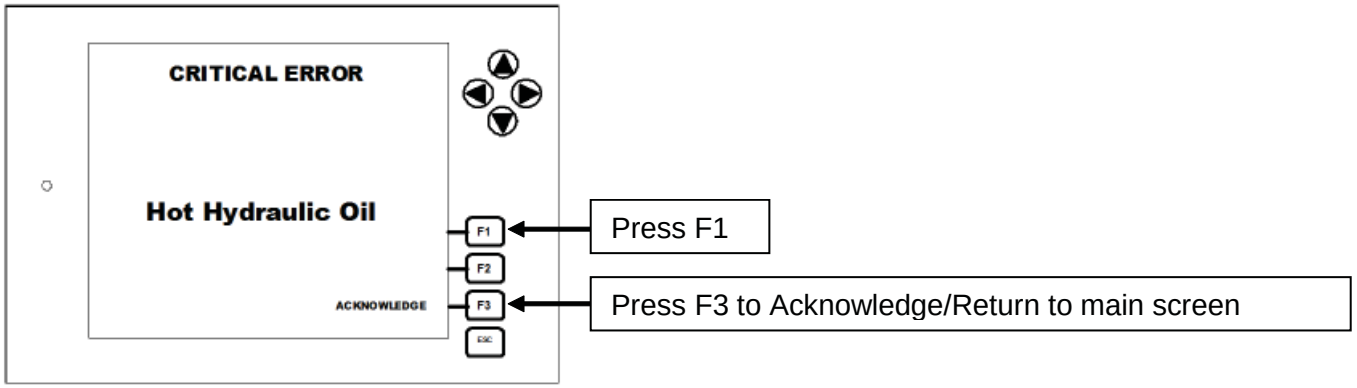
- Hot Hydraulic Oil
- Sensor Short

Critical errors will display two ways:

- Press F1 as soon as alarm/error is displayed
- Automatically after a pre-set timer (15 seconds)

Press F3 to return to main screen. The critical error will be displayed in the systems data menu.

Critical errors must be acknowledged to return to the main screen and will keep repeating if not acknowledged

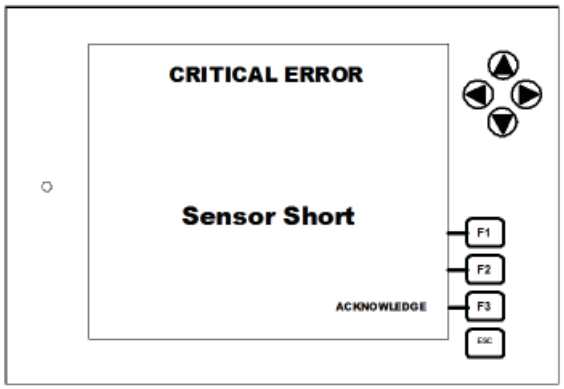


Sensor Short

Sensor short indicates that the sensor has shorted to ground.
Hydraulic functions will operate normally.
Spreader functions will operate in open loop.

Notify mechanic in the event of a sensor short.

Sensor short error/alarm will continue until the operator presses F3 acknowledge in order to return to main operating screen.
Sensor short will be displayed in the system data menu on the main screen

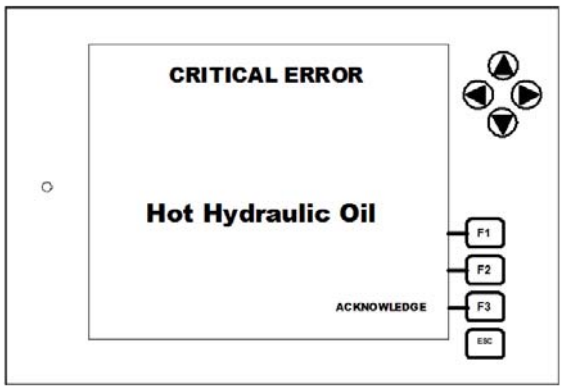


Hot Hydraulic Oil

Indicates that the hydraulic oil has become too hot (over 170º F)
Hot Hydraulic Oil critical error will result in a loss of all hydraulic functions.
(Loss will continue as long as error is present.

Hot hydraulic oil error/alarm will continue until the operator presses F3 acknowledge in order to return to main operating screen. HOT hydraulic oil will be displayed in the system data menu on the main screen.

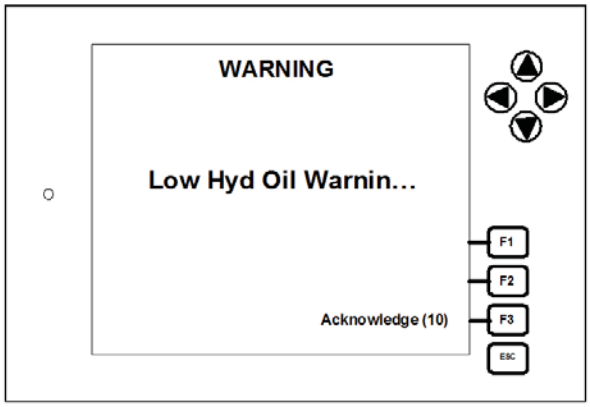
Hydraulic functions can be restored temporarily by **pressing and holding the momentary OVERRIDE switch** located on the ACS console while operating the hydraulic function needed. Move truck off of road and allow the hydraulic oil to cool in order to clear error.



Low Hydraulic Oil (Warning)

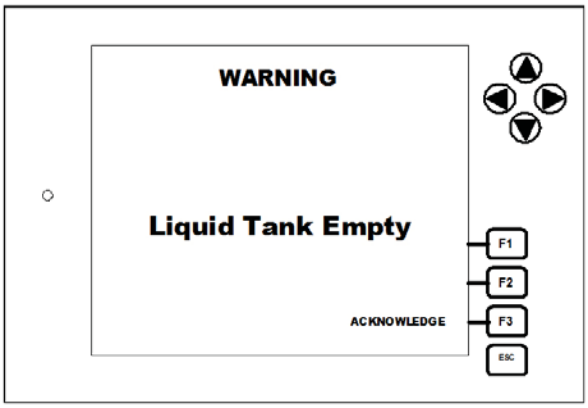
Hydraulic Oil sensor does not detect hydraulic oil in the reservoir.
Will cause a Loss of all hydraulic functions
(Loss will continue as long as error is present.)

Pull truck off road as soon as safely possible and inspect sight gauge on hydraulic reservoir. Consult mechanic before continuing.



Liquid Tank Empty

Sensor in liquid nurse tank does not detect liquid. Liquid tank empty will display as a warning and will stop all liquid functions. This sensor/warning stops the liquid pump as precaution to prevent liquid pump damage.



Spreader Installation

Hydraulic Hoses

In order to prevent the hydraulic hoses from becoming pressurized or locked: Installing the return line **FIRST** followed by the remaining hoses will open the return line and should let any hydraulic pressure relieve through the return line.

Installation of hydraulic hoses:

- System Off
- Attach Return Line (largest hydraulic hose)
- Attach Remaining hoses

To prevent the hydraulic hoses from becoming pressurized or locked during spreader removal:

Remove the hydraulic hoses leaving the return line **LAST** to be removed. Leave the return line on until last will keep the return open and should prevent hydraulic pressure lock on the hoses.

Removal of hydraulic hoses:

- System off
- Remove feeder and spinner hose first
- Remove return line last (largest hydraulic hose)

-

Pre Wet Hook Up

There are two hoses that allow for connection of the pre-we system on the truck to the spreader. This allows for a liquid chemical connection between the pre-wet nurse tank and the pre-wet system/tanks on the spreader.

There are two pre-wet connections:

- White = Suction
- Black = Pressure

Pre-Wet Nurse Tank

The pre-wet nurse tank mounted on frame of the truck must have the tank lid inspected to insure that the seal is in place with no damage. The seal must be seated in the lid and clean. The sealing surface of the tank must be clean and smooth. Improper seated or missing seal can result in liquid nurse tank leaks.

3 Way Valve

On most new spreaders there will be a 3 way valve installed on spreader saddle tanks. This valve allows the operator to shut off the liquid tanks on the spreader or to choose a supply source. Typically the two most common positions are off and supply from saddle tanks. An arrow with the word “flow” is displayed on the handle. The arrow points to the source.

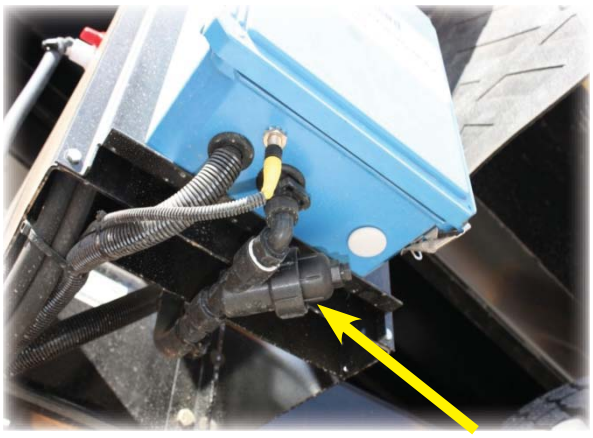
Nurse Tank Fill/Air Bleeding

To fill the nurse tank via the saddle tanks on spreader and ensure no air is trapped in the system, perform the following:

- Open 3 Way Valve to source (arrow towards tank)
- Open nurse tank bleed valve
- Close bleed valve once a full stream of liquid is observed

Nurse Tank Screen / Drain

The nurse tank bowl/screen is located under the pre-wet enclosure. To access screen or to drain the nurse tank remove strainer bowl.



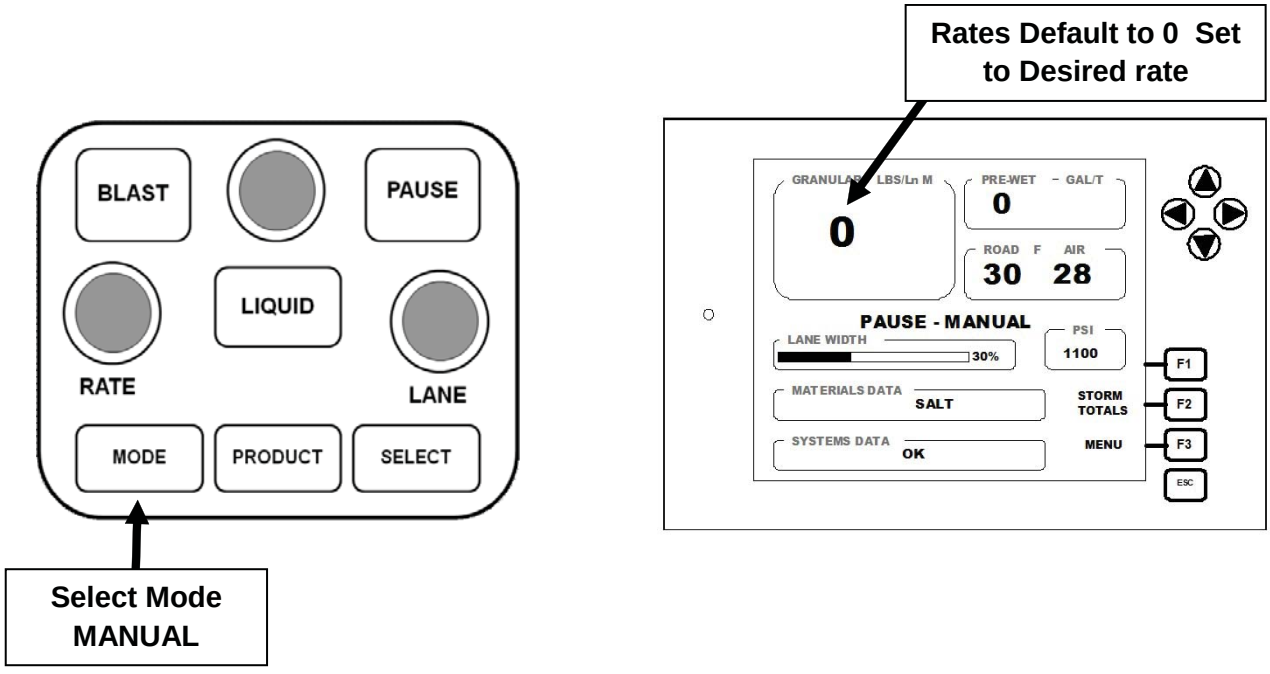
Maintenance Operations

The ACS system can operate hydraulically operated accessories which can include but are not limited to the following examples:

- Brooms
- Trailers
- Flusher pumps
- Sprayers
- Edge rut conveyors
- Other hydraulic operated equipment

To operate hydraulic accessories:

- Select Manual Mode
- Rates default to 0 automatically
- Entire system goes to “PAUSE”
- Set feeder and or spinner drive (rate knobs) to desired percentage
- Remove from “PAUSE” to activate function



Auxiliary Hydraulic Switch

The ACS system is equipped with an auxiliary hydraulic switch located on the ACS console.

The purpose of this switch is to provide the operator with additional hydraulic flow for accessories and tools that require more oil flow to operate.
(Example: Brooms and Trailers)

This circuit is capable of delivering an **additional** 15 gpm of hydraulic oil to the accessory. The hydraulic system can be operated utilizing the AUX switch by itself. Used alone it will provide 15 gpm .

The AUXILIARY Switch operates in two positions, ON and OFF and is not controlled by the PAUSE button.

If used in conjunction with the ACS spreader controls, the operator can deliver an additional 15 gpm from the ACS system giving a total output up to approximately 30 gpm hydraulic oil flow depend on the Rate setting of the ACS.

DO NOT USE WHILE SPREADING MATERIAL WITH A V-BOX SPREADER!

Material spreader hydraulic motor will be damaged from over speed.

Liquid Operations for Maintenance

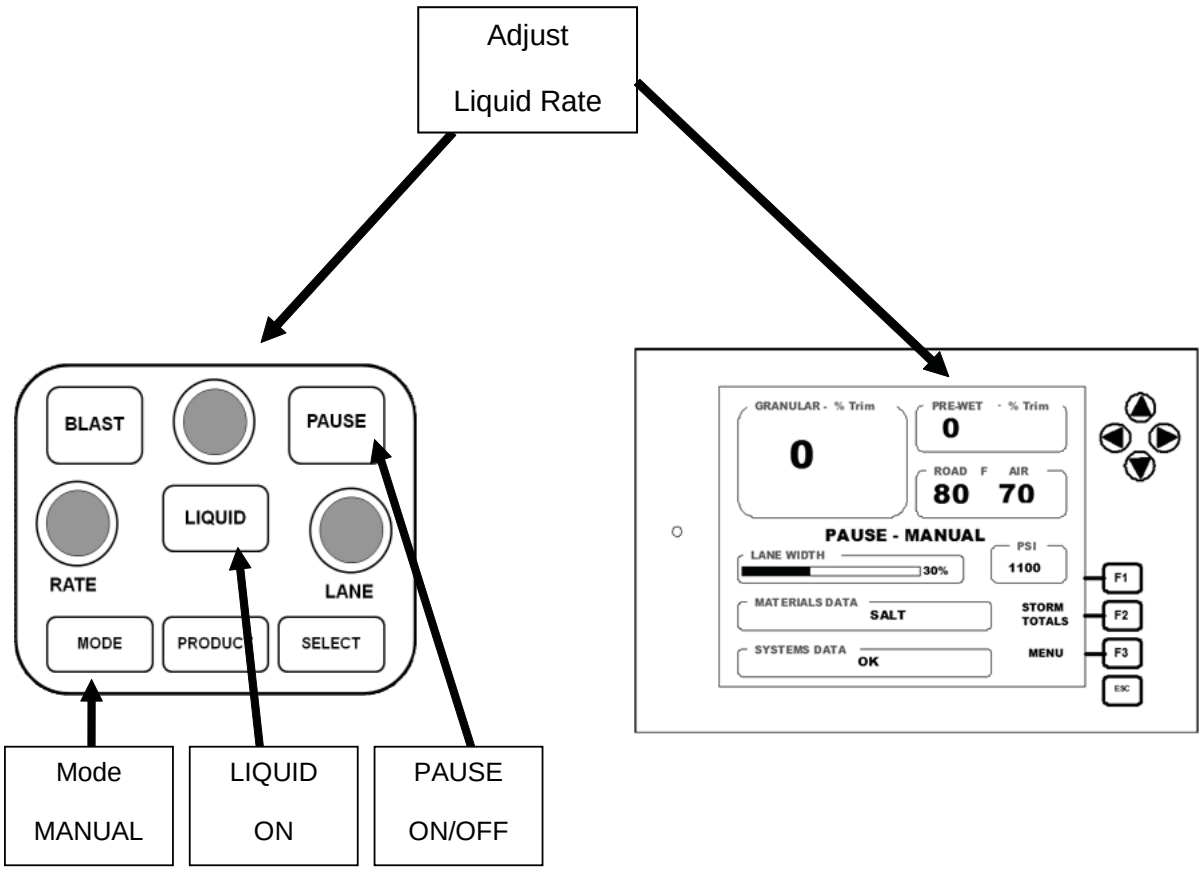
Liquid pre-wet pump may used “stand alone” if desired.

Non-petroleum products may be used in the liquid pre-wet system.
A few examples that the liquid system could be used for maintenance operations include but are not limited to:

- Spray bar on broom or roller
- Spraying around sign post
- Filling rollers with water

To use liquid for maintenance operations set controller mode to MANUAL. Turn liquid on by pressing the LIQUID button. Adjust liquid flow with liquid rate knob to desired setting. Use PAUSE button to start or stop liquid operations.

<u>All settings are 0-100 % of trim in MANUAL mode.</u>



Pre-Wet Winterizing/Flushing

To extend the life of the pre-wet system, it is recommended to flush chemicals and protect against freezing when not in use during winter months.

Shut off tank valve on spreader tanks. Disconnect the liquid couplers (suction and pressure) and drain the nurse tank via screen bowl under pre-wet enclosure.
Once bowl has been removed remove nurse tank lid to speed up the draining process.

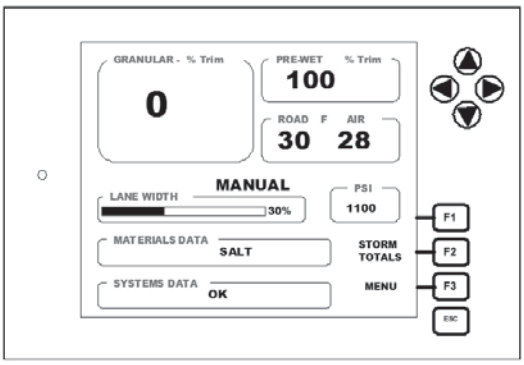
Once the nurse tank has been drained install screen/ bowl flush system with fresh water. Fresh water may be supplied 3 ways:

- Through the nurse tank opening
    - Insert garden hose into tank (use care – do not damage float/sensor inside nurse tank
    - Turn on hose and leave on during flushing process.

- White cam lock coupler
    - Remove nurse tank lid
    - Use cam lock adapter to attach hose to cam lock
    - Attach hose to white cam lock
    - Turn on hose and leave on during flushing process.

- Rear of 3 way valve “if equipped” (remove nurse tank lid)

Once fresh water is supplied to the nurse tank/system, operate liquid pump in manual mode for several minutes discharging water from black cam-lock coupler to flush contaminates from system.



Winterizing

Winterize the liquid system with an environmentally friendly freeze protection product such as rv-antifreeze or windshield washer fluid.

Drain nurse tank. Once drained install strainer/bowl. Fill nurse tank with rv-antifreeze or washer fluid. (Approximately 3 gallons to fill)

Install a jumper hose to both cam lock couplers to create a loop from the suction to the pressure side of the liquid system on the truck.

Operate pump in MANUAL mode for several minutes and distribute the antifreeze throughout the system lines, pump and sensor.

Once completed, disconnect the jumper hose and replace cam lock caps. Ensure nurse tank lid is on.

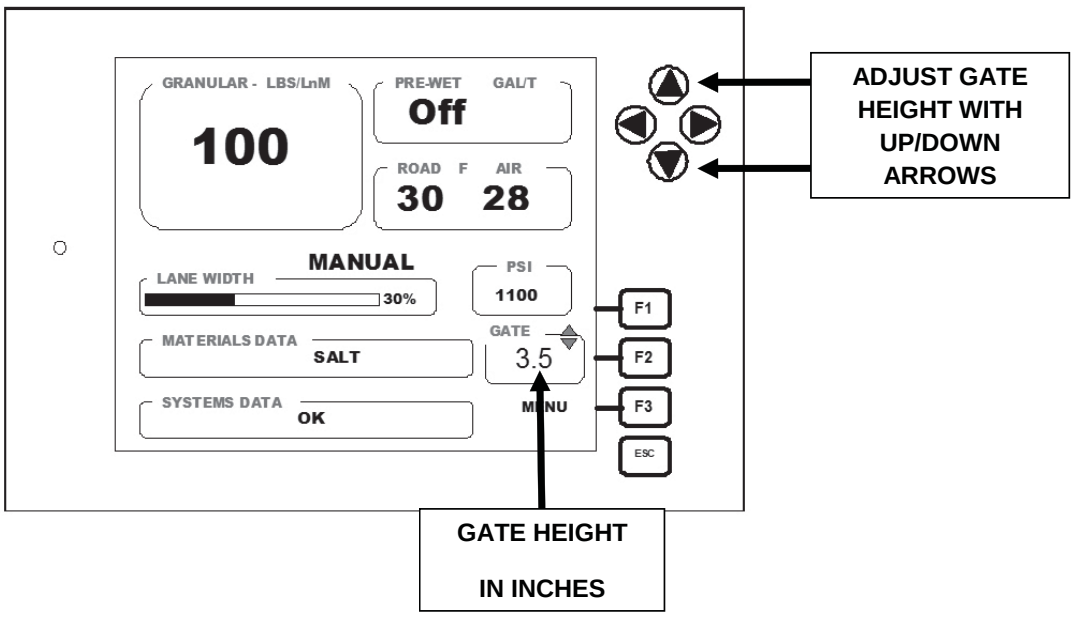
Optional Configurations

Gate Control

If the gate control feature is “enabled” and calibrated to be used, adjust the gate height using the menu navigation up or down arrows.

Storm totals is replaced on the display with the gate height indicator and displays the gate height in inches.

Storm totals are still accessible by pressing F2 in this configuration.



Lane Control Spinner

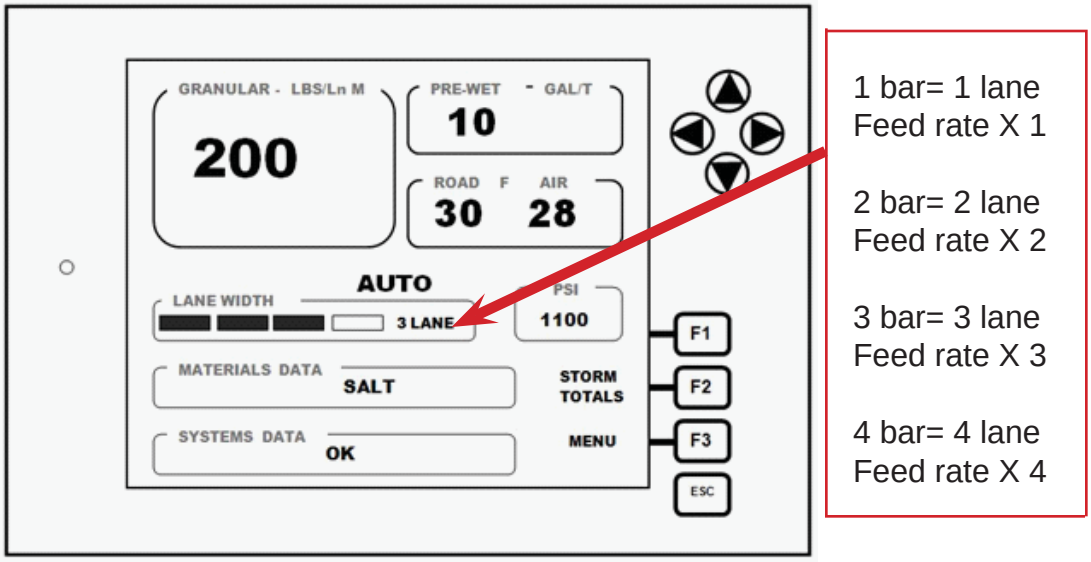
Lane Control Spinner is an option that can be configured by the technician during system set up and calibration.

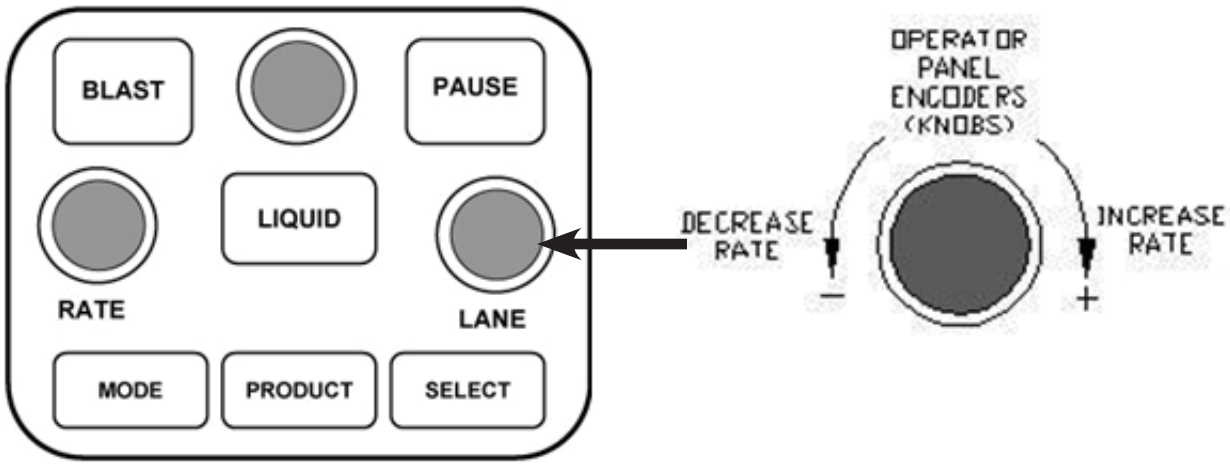
Lane Control Spinner allows the operator to spread material onto multiple lanes without adjusting the rate.

Operator may choose 1, 2, 3 or 4 lanes (maximum lanes set by technician).

The feeder is controlled by the spinner in “Lane” mode and is pre-calibrated for the operator.

Granular feed rate (pounds per lane mile) is automatically adjusted for selected lane width to maintain uniform coverage.



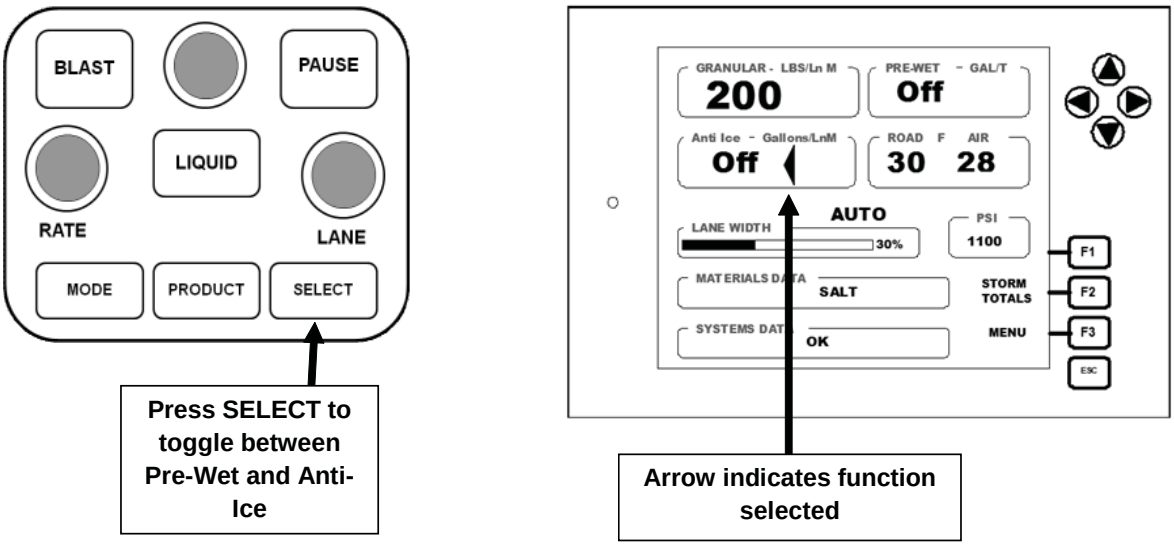


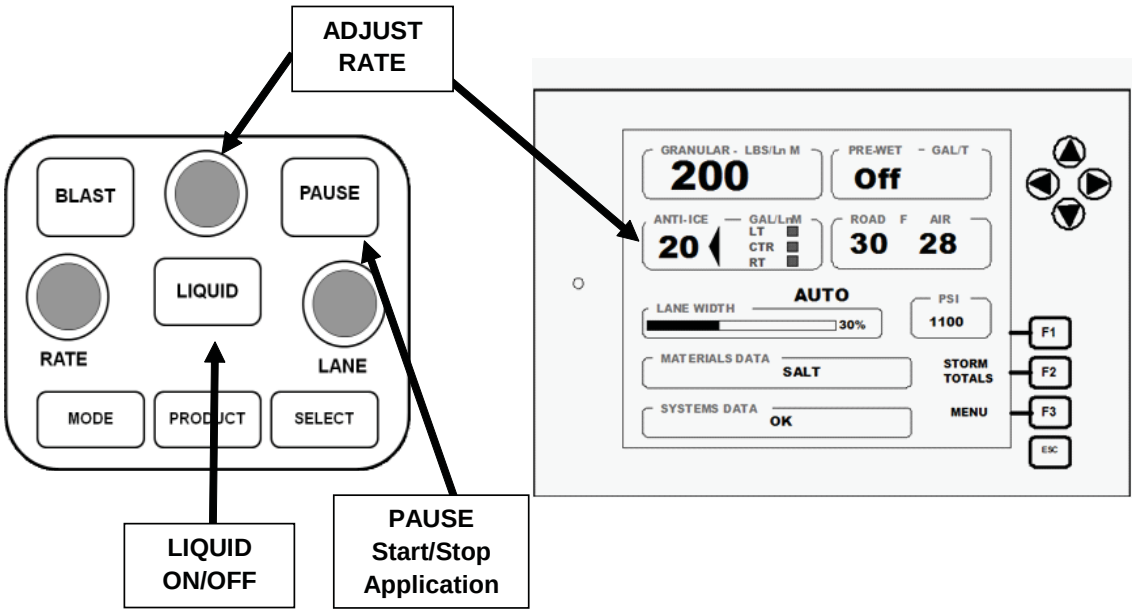
Anti-Ice

The ACS system can be configured to operate in Anti-Ice mode as well as pre-wet. The Anti-Ice mode can be used in situations where a liquid chemical is applied directly to the road surface such as pre-treatment with salt brine

(Anti-Ice operates liquid in Gallons per Lane Mile)
Adjust rates according to number of lanes liquid is applied

To switch from Anti-Ice to Pre-Wet press the **SELECT** button on the operator panel. An arrow will appear in the liquid display that has been selected.





Tow Plow Configuration

There are numerous configurations for operating Tow Plows. Consult the layout decal located on the ACS console for more information on specific configurations.

In a “Typical Configuration” the third lever (farthest to right) is dedicated for operating the tow plow.

Joystick operation:

- Left = IN
- Right = OUT
- Forward = Plow Down
- Back = Plow UP

LAYOUT DECAL
Consult for specific tow plow configuration

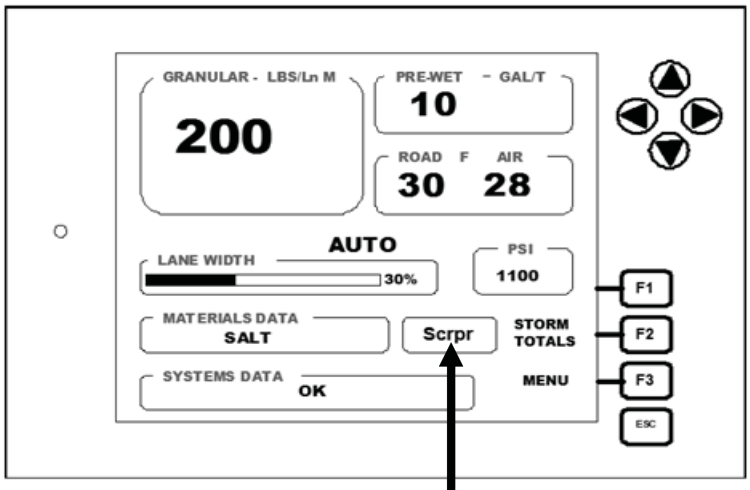
Tow Plow
“Typical Configuration”

Tow Plow with Wing or Scraper Configurations

In some configurations with the Tow Plow also may include a Wing or Underbody plow option as well. In this configuration the optional plow (wing or underbody) will be controlled with the front plow control joystick.

To operate the wing or underbody plow the operator will have **to press and hold the dead man button** on top of the front plow joystick to activate and use the optional plow.
Releasing the button returns control back to the front plow. Current plow in use will be indicated in the plow window on right/center of display.

Hold red button down to use scraper or wing



Plow Window
“Indicates plow in use”

Clear Storm Totals

If turned on, the clearing of storm totals can be performed in a couple of ways.
Operator can clear only the recent data collected from storm totals.
Annual data can only be cleared by log on as technician or administrator.

To clear storm totals under operator:
From the main screen press the MENU key (F3) to access Main Menu.
Storm Totals will be first and highlighted.

- Arrow down to highlight CLEAR STORM TOTALS.
- Arrow right arrow key to highlight NO.
- Arrow UP to change to YES
- Press F3 to Accept.

Recent storm totals will be cleared.