DICKEY-john®
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CONTROL POINT®

CONTROL SYSTEM

Operator's Manual

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Keyboard Programming continued


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SAFETY NOTICES

Safety notices are one of the primary ways to call attention to potential hazards.

This Safety Alert Symbol identifies important safety messages in this manual. When you see this symbol, carefully read the message that follows. Be alert to the possibility of personal injury or death.

⚠WARNING

Use of the word WARNING indicates a potentially hazardous situation which, if not avoided, could result in death or serious injury.

⚠CAUTION

Use of the word CAUTION with the Safety Alert Symbol indicates a potentially hazardous situation which, if not avoided, may result in minor or moderate injury.

CAUTION

Use of the word CAUTION without the safety alert symbol indicates a potentially hazardous situation which, if not avoided, may result in equipment damage.

DISCLAIMER

DICKEY-john reserves the right to make engineering refinements or procedural changes that may not be reflected in this manual. Material included in this manual is for informational purposes and is subject to change without notice.


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INTRODUCTION

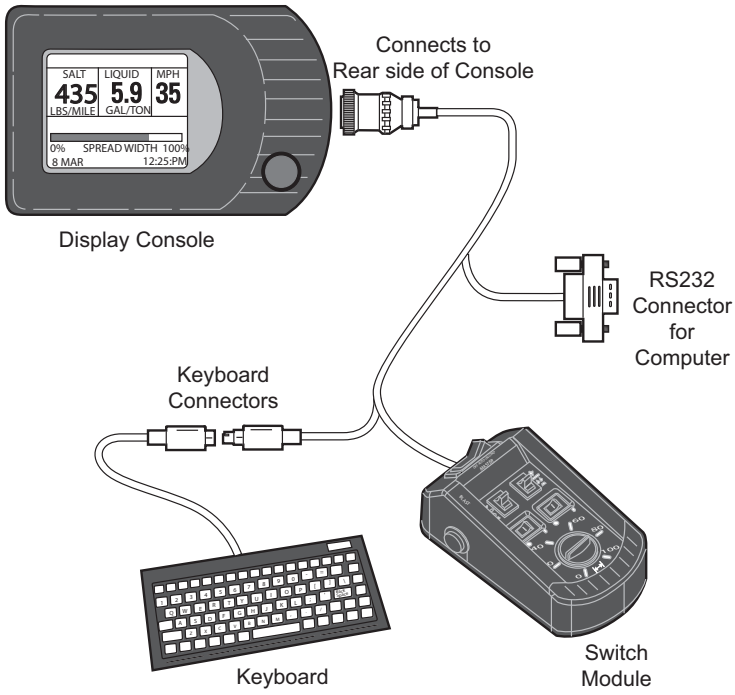
The DICKEY-john Control Point® system uses three-channels (three separate controlled servo loops) on spreader vehicles to simultaneously control the spreading of granular and liquid ice-control materials. Two channels control granular and liquid application rates and the third channel precisely controls spinner speed to maintain even material coverage over the desired spread width. The dispensing rate varies directly with ground speed to ensure accurate product application.

Material can also be spread at a preset "BLAST" application rate. This is normally a very large rate to instantly adjust the target APR (application rate) coverage for bridges and intersections with a much heavier amount of material.

Figure 1 illustrates the Console, Switch Module, and Keyboard.

Figure 1

System Components



GRANULAR CHANNEL CONFIGURATION

The granular channel controls the amount of material dumped onto the spinner plate(s). The Control Point® monitors a tachometer-style feedback sensor located on the V-box drag chain or tailgate auger. A resultant drive signal adjusts the conveyor mechanism speed to deliver the target application rate (APR) by regulating the hydraulic valve position.

LIQUID CHANNEL CONFIGURATION

The liquid channel controls the application rate of pre-wetting or de-icing materials. When pre-wetting, the Control Point® console monitors a flowmeter-style feedback sensor. Flowmeter feedback can be used when de-icing. Using feedback data, the pumping mechanism output adjusts the target application rate by either regulating pump speed or flow blocking.

De-icing systems use up to five boom inputs for applying material to more than one lane at a time.

SPINNER CHANNEL CONFIGURATION

The spinner channel controls the spinner plate(s) speed with either a closed-loop (precision) or an open-loop configuration. In the closed-loop configuration, a tachometer style feedback sensor, mounted on the spinner assembly, monitors spinner activity. Using the feedback data, the spinner mechanism speed adjusts for the target setting by controlling the hydraulic valve position. In open loop systems, the hydraulic valve position is relative to the width adjust knob setting on the Control Point® Switch Module.

The user must determine the spread-width accuracy needed. Technical assistance is available through DICKEY-john Technical Support at PH#1-800-637-2952.

PRODUCT APPLICATION MECHANISMS

The granular and spinner channels use, in addition to feedback (shaft rotation) sensors, proportional valves to control the product application and spinner speed. The liquid channel uses, in addition to feedback sensors (flowmeter), a liquid pump to control product application. The liquid pump output is controlled by either a 12 volt DC motor, servo valve actuator, or proportional valve.

Features:

1. Surface-mount console kit for ease of installation.
2. Flexible Switch Module design allows mounting anywhere in the cab for optimal operator use.
3. Large 160X128 dot-matrix LCD display with backlighting for nighttime viewing.
4. Single Console button for system power on/off and screen selection.
5. RS-232 port for PC uploading and downloading of data.
6. Detachable keyboard for easy supervisor programming and calibration using multilevel, menu-driven screens.
7. Custom programming available to minimize setup time.
8. Compatibility with a variety of sensors, servo valve actuators, and proportional valves available from DICKEY-john or other manufacturers.
9. Audible and visual alarms for system and operator errors.

SYSTEM COMPONENTS

A DICKEY-john Control Point® system consists of six basic components:

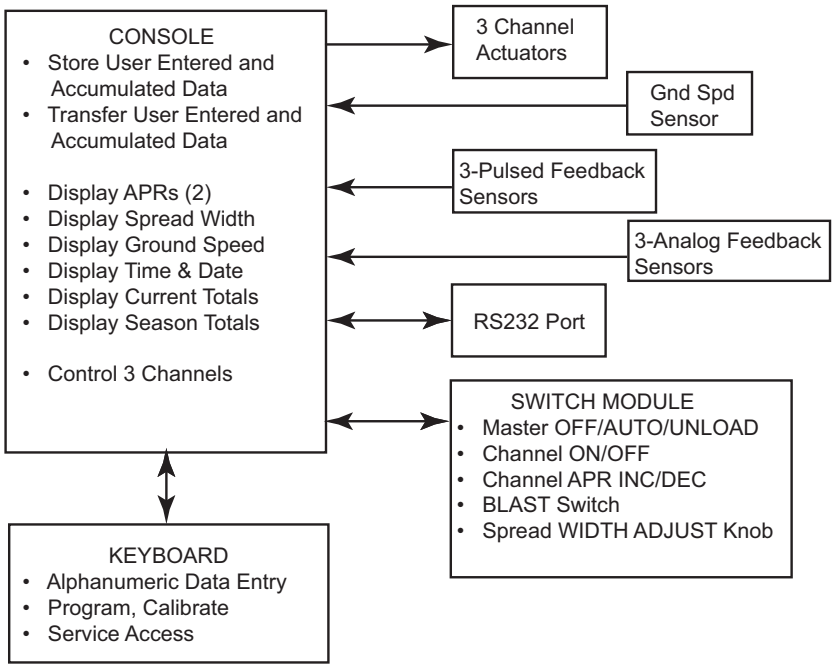
1. Console
2. Switch module
3. Ground speed sensor
4. Feedback devices to monitor material application
5. Valve control devices to regulate material application
6. Harnesses to interconnect all system devices

NOTE: The detachable keyboard (optional) and PC (not provided) are programming aids and are not part of a basic Control Point® system.

Figure 2 shows components in a block diagram. The Console and Switch Module are to be mounted inside the truck cab either side-by-side or the Switch Module positioned elsewhere for operator convenience.

Figure 2

System Block Diagram



CONSOLE

The Console displays information on a dot-matrix LCD and uses a single push-button switch to control system power and to view several operator screens. Using an external keyboard for programming and placing operator controls on the Switch Module simplifies the Console.

An RS-232 port connector, located on the Switch Module harness, permits data transfer to and from the Console. This port interfaces to a PC for downloading accumulator and alarm information. Uploading and downloading configuration information through the port allows data transfer between consoles (replacing a console or when identical vehicles require programming/calibration). For multiple units, only one system needs to be programmed and then the constants can be transferred (downloaded) from that console, stored in a PC file, and uploaded to the other vehicle's console. **Note: This is only useful on identical vehicles. Transferring data does not fine-tune each system. It is recommended to run System Response (F11) if constants are uploaded from another console.**

SWITCH MODULE

Standard

The Standard Switch Module harness plugs into the Console and contains connectors for both keyboard and PC interface as described above. The operator controls the real-time functions of the Control Point® system from the seven switches on the Switch Module (refer to Figure 3).

Wireless

The Wireless Switch Module is similar to the Standard, however, it provides for data transfer to a PC via a wireless transmission to a base station.

KEYBOARD

The keyboard is used to program and calibrate the system. The 86-key, alphanumeric, PC-compatible keyboard has been environmentally hardened for use in the ice-control field. After programming and calibration are finished, the keyboard is usually disconnected and stored.

GROUND SPEED SENSOR

The ground speed sensor generates vehicle speed information for the console. Sensor electrical pulses proportional to the vehicle ground speed are vital to system operation because true vehicle ground speed is necessary for accurate product application. The system can function with a wide variety of electronic and mechanical speedometer sensors, including Hall-Effect and Reluctance sensors.

FEEDBACK SENSORS

The feedback sensors send product flow information to the console for accurate product application. Both granular and spinner channels require pulsed electrical sensors having an output proportional to the mechanism speed. The liquid channel accepts either electrical-pulsed sensors or analog sensors with outputs proportional to material flow (pulsed). A liquid prewetting system only accepts pulsed feedback while higher capacity anti-icing systems accept either pulsed or analog.

VALVE CONTROL DEVICES

Valve Control devices regulate material flow for accurate control of product application rates. Normally, granular and spinner channels regulate the hydraulic oil flow rate to a motor. Liquid channels use several different configurations.

HOPPER LEVEL SENSOR (OPTIONAL)

The optical light beam of this level sensor is blocked by the granular material in the spreader bed. When the material level falls beneath the sensor mounting level, a repetitive beep sounds and an appropriate message displays in the warning/alarm area of the Operate screen.

HARNESSES

Main Harness Assembly-Connects the Console to the ground speed sensor, feedback sensors, channel valve (or DC motor) actuators, vehicle battery, ignition, and additional optional connections (including two-speed axle, hopper level sensor, and boom sense inputs).

Retro Harness Assembly-Connects a Control Point console to an ICS2000 harness (refer to Figure 53 in Troubleshooting section).

Other extension harnesses-Other extension harnesses are available that allow for flexible sensor arrangement. Contact Technical Support for harnessing alternatives.

TECHNICAL SUPPORT

For technical assistance, call DICKEY-john Technical Support at (217) 438-3371 or Fax (217) 438-6012 or 438-6539. For toll-free calls in either the USA or Canada, dial 1-800-637-3302.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SYSTEM INSTALLATION

The Console mounts on the vehicle dashboard or other surface suitable for operator viewing using a U-bracket. The standard (combination) mounting plate secures the Switch Module immediately to the left of the Console. An optional mounting plate mounts the Console only.

The Switch Module cable, which plugs into the Console, is long enough to allow the Switch Module to be placed near the vehicle seat or elsewhere for operator convenience. If the combination mounting plate is used, the option remains to later remove the Switch Module from the mounting plate and to relocate it for convenience.

The system main harness is laid out and connections are made to the sensor and actuator cables, battery, ignition switch, and additional options (two-speed axle, hopper level sensor, and boom sense inputs), as required.

Verify all items in the appropriate hardware mounting kit are present:

HARDWARE KITS

STANDARD HARDWARE KIT (46649-0380) FOR CONSOLE AND SWITCH MODULE:

(1) Combination mounting plate (46649-0580)
(2) U-bracket (46649-0590)
(3) Two 1/4 - 20 x 1 inch hex bolts
(4) Five 1/4 inch split washers
(5) Two rubber washers (46390-0900)
(6) Two knob screws (20072-0022)
(7) Three 1/4 - 20 x 3/4 inch hex bolts
(8) Retaining clip (46649-0350)
(9) Two #6 self-locking hex nuts
(10) Three #6 plastite screws

OPTIONAL HARDWARE KIT (46649-0390) FOR CONSOLE ONLY:

(1) Console mounting plate (46649-0370)
(2) U-bracket (46649-0590)
(3) Two 1/4 - 20 x 1 inch hex bolts
(4) Five 1/4 inch split washers
(5) Two rubber washers (46390-0900)
(6) Two knob screws (20072-0022)
(7) Three 1/4 - 20 x 3/4 hex bolts
(8) Retaining clip (46649-0350)
(9) Two #6 self-locking hex nuts

CONSOLE PLACEMENT

The Console mounts inside the cab on any surface permitting easy readability of the display without obstructing the operator's view to the road while driving (See Figure 3). Be sure the opposite side of the mounting surface chosen has clearance for installing and tightening the mounting bolts. The combination mounting plate positions the Switch Module to the left of the Console.

U-BRACKET MOUNTING

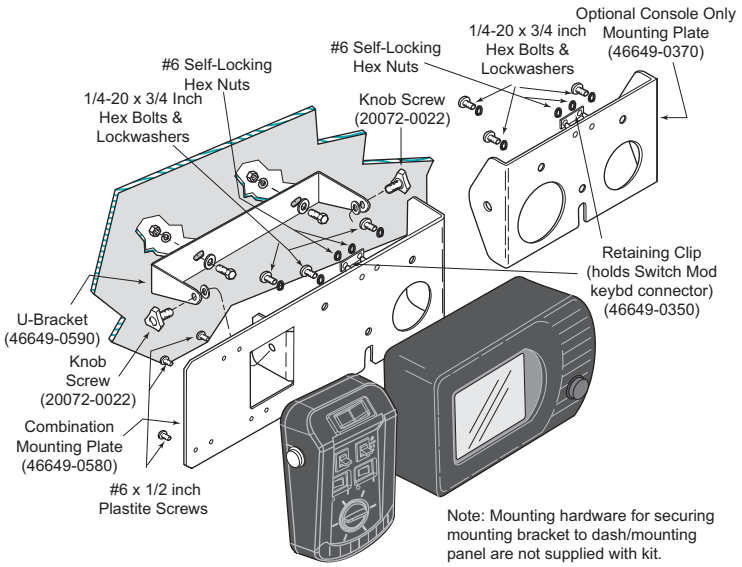
1. Place the U-bracket in the exact location for mounting and mark both drill holes with a pencil or scribe. If the Console is being mounted on the dash, move and secure wiring and other obstructions located beneath the dash.
2. Drill two 9/32 inch holes.
3. Position the U-bracket in place on the mounting surface and insert the two 1 inch bolts.
4. Install the lock washers and nuts and tighten them.

CONSOLE AND SWITCH MODULE INSTALLATION

1. Install the Console onto the mounting plate using three 3/4 inch bolts and lock washers.
2. When using the combination mounting plate, install the Switch Module onto the mounting plate using three plastite screws.
3. Two sets of holes exist in the mounting plate to allow for optional spacing between the Switch Module and Console. If only the Console mounting plate is used, install the Switch Module at the desired location. If placed on the vehicle seat, it must be secured in a suitable manner (possibly using Velcro™ strips) to ensure the control settings are not accidently changed or activated.

Figure 3

Console Mounting



SWITCH MODULE TO CONSOLE CONNECTION

1. Plug the circular connector of the Switch Module cable into the rear of the Console, rotating the connector collar fully-clockwise to lock it.
2. Place the keyboard mating connector (with its pins pointing upward) between the two studs on the rear of the mounting plate. Capture this connector with the retaining clip and two self-locking nuts. The 9-pin RS-232 connector can be secured to the Switch Module cable with a cable tie, if desired. Figure 1 shows how the Switch Module cable connects to the Console and keyboard.

CONSOLE MOUNTING

1. Secure the Console and mounting plate (and Switch Module if the combination mounting plate is being used) to the U-bracket using the two knob screws. The rubber washers fit between the U-bracket and the mounting plate tabs.
2. Pivot the Console for the best viewing angle and tighten the two knob screws.

HARNESS CONNECTION

1. Verify all required "exterior system cables" are installed on the spreader vehicle according to their separate, individual instructions. These are defined as the sensor, actuator, ground speed, boom sense, and hopper level cables.
2. Use dust caps provided on all unused connectors, both internal and external. This includes keyboard and RS-232 connectors.

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NOTE: Labels have been supplied in the dust cap kit to be placed on external extension cables routed to the flowmeter, granular and spinner sensors.

⚠CAUTION

Make the Control Point® battery connections last to ensure no accidental shorts occur during harness handling.

MAIN HARNESS CONNECTION

1. Plug the largest circular connector of the main harness into the Console, rotating the connector collar fully-clockwise to lock it.
2. Route the harness to a clean, safe area (inside the cab) suitable for connection to the exterior system cables (from the sensors and actuators). All connectors on the main harness are identified with labels to simplify hookup. If a suitable "punch-out" hole in the rear cab wall or floor is not available to bring in the exterior system cables, cut a hole approximately two and one-half ($2^1/_2$) inches in diameter. The edges of this hole should be covered with a piece of plastic or rubber U-channel material to protect the insulation of the cables passing through the hole. Anchor all cables suitable with nylon cable ties to prevent damage due to flexing and scraping. RTV or silicone caulk can be used to seal the hole.

CAUTION

Do not connect the RED ignition lead directly to the battery voltage. This will prevent the system from storing data properly!

3. Connect the RED ignition lead to the "switched" terminal of the ignition switch. The correct terminal is at 12 volts DC or higher only when the ignition switch is turned on.
4. If the vehicle has a two-speed axle, connect the terminal of the YELLOW 2-Speed Axle lead to the appropriate terminal on the axle-shifter switch.
5. If the vehicle does not have a two-speed axle, insulate the terminal with electrical tape and tie back this YELLOW lead with a cable tie.
6. Connect the hopper level sensor and boom sense inputs, if used. The Boom Sense 5 (gray wire) line can be connected to a pre-wet/anti-ice selector input switch.

CAUTION

Verify battery voltage is 12 volts, NOT 24 volts.

7. Connect both Control Point® main harness battery leads directly to the vehicle battery. Attach the RED wire to the positive battery terminal and the BLACK wire to the negative terminal.

IMPORTANT: Use dust caps provided on all unused connectors, both internal and external. This includes keyboard and RS-232 connectors.

CHECKING OPERATION

1. After completing the installation, turn on the ignition switch. The Console screen should power on displaying the DICKEY-john name, logo screen, software version, and then the OPERATE screen (refer to Figure 9).
2. Refer to the **Startup and Familiarization** section for additional testing.

Figure 4

Switch Module Cabling

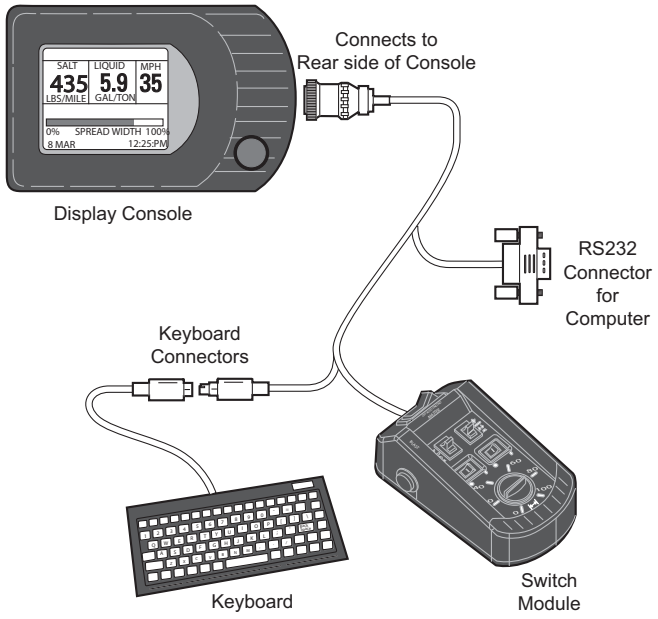
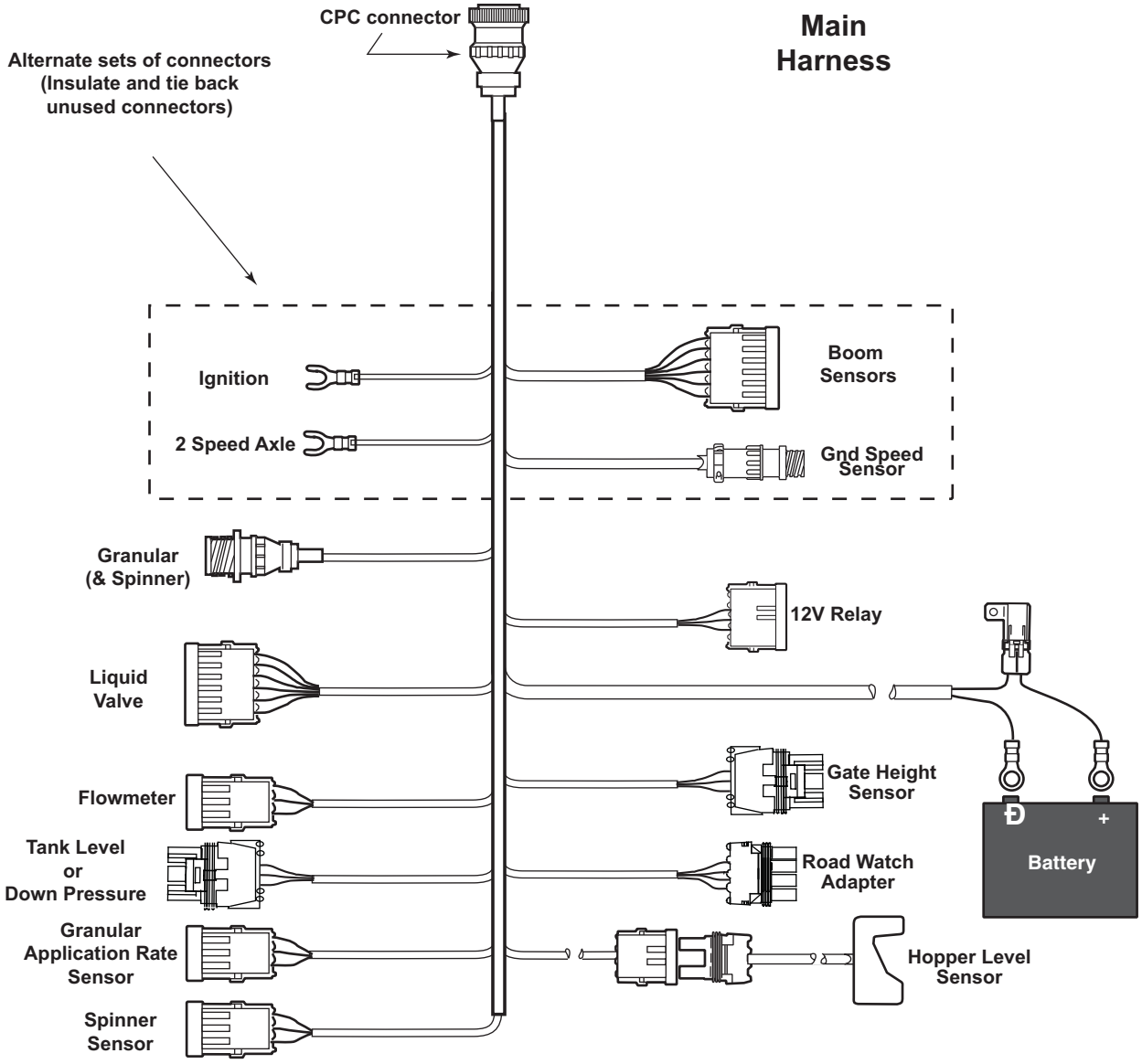


Figure 5

System Harness Layout



START-UP AND FAMILIARIZATION

This section defines how the operator (driver) of an ice-control vehicle uses the controls on the Switch Module and Console to perform standard operator functions.

NOTE: The detachable keyboard (optional) is required to program and calibrate the system as described in Keyboard Programming.

Programming during setup allows the operator to view three or four different screens of data. The Operate screen is the home screen for monitoring spreader operation and the remaining screens are supportive.

- Material Select/Manual Speed (accessible only when system is stationary; no ground speed)
- Current Totals
- Season Totals

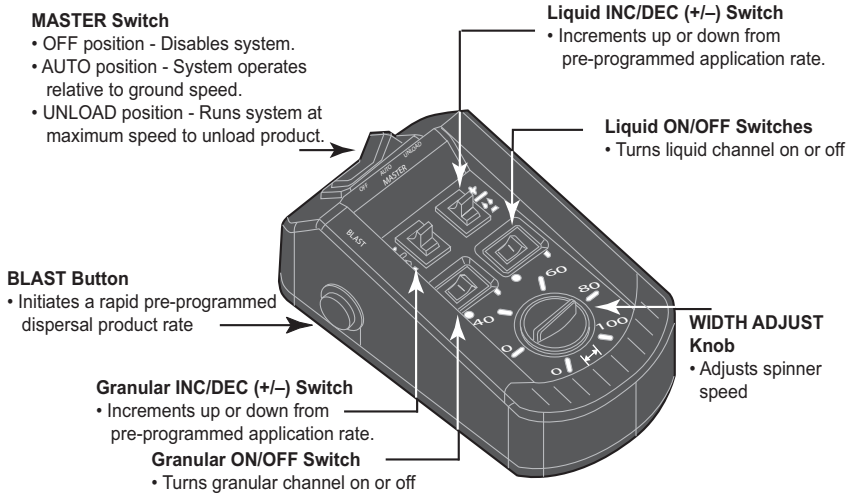
START-UP PREPARATION

The system must be installed, programmed, and calibrated before performing the following procedures.

IMPORTANT: Practice the following procedures with the vehicle stationary to gain familiarity with the operating controls and screens before applying product.

Figure 6

Switch Module Controls



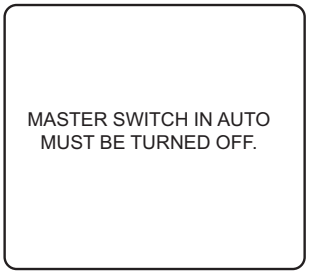
START-UP PROCEDURE

1. Verify the Switch Module Master Switch is in the OFF position as shown in Figure 6. If the Master Switch is in the AUTO position during

power up, a warning message with audible alarm occurs until the switch is turned OFF (refer to Figure 7).

Figure 7

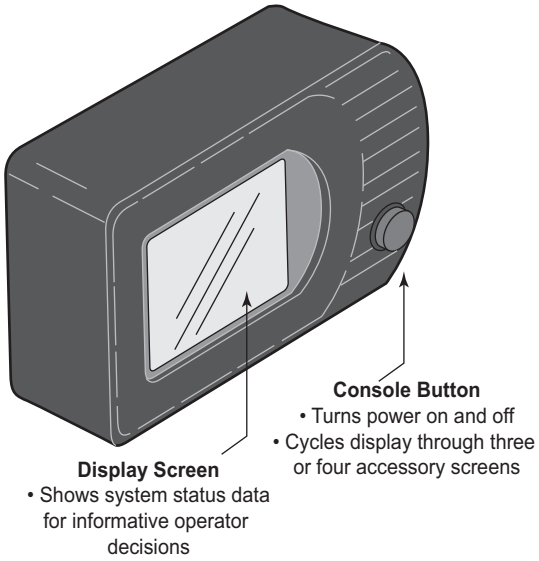
Master Switch Warning Message



2. Turn on the ignition switch. If the Console is kept ON when the truck ignition is turned off, the next power on cycle will automatically turn ON the Console display.
3. If the Console does not power on during truck startup, the console button was pressed and held until unit powered OFF before the truck was turned OFF.
4. Briefly press the Console button (less than a second) to apply power to the Console (refer to Figure 8). If the button is held too long, the Operate screen is skipped, a beep will sound, and the Accessory screen appears instead. If this occurs, continue pressing the Console button until the Operate screen appears or turn the console off and on again. Refer to step 2 or 3 and start again.

Figure 8

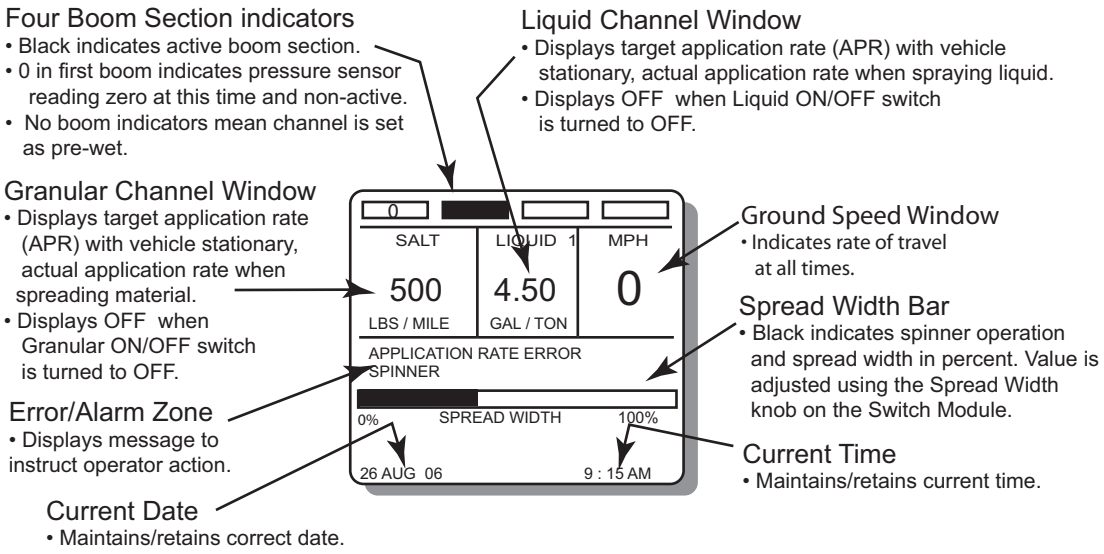
Console Showing Functional Items



5. The Console automatically closes all system actuators and performs self-tests, including system configuration and application data during start up. If an error occurs at power up or during operation, an appropriate error message displays with recovery information for approximately 4 seconds.
6. Turn the Console off by pressing and holding the Console button until a beep and text on the screen disappears (approx. 3 seconds); and then release. Power is removed when the screen goes dark. To restart, repeat step 2.

Figure 9

Operate Screen Display



OPERATE SCREEN DISPLAY FUNCTIONS

The upper display includes three windows for Granular, Liquid, and true (actual) Ground Speed data. Status of the booms graphically display at top. Below the windows, error messages appear briefly for system errors and an audible alarm. The display bottom shows the Spread Width Bar indicating percentage of spinner activity via a black bar. The current date and time is also displayed at the bottom of the screen.

1. If the Granular and Liquid ON/OFF switches are turned off and back on, the window for each product reads OFF and then returns to the material and target (APR) values again.

NOTE: Large font on the Operate screen indicates the control is active. Small font indicates the control is not active.

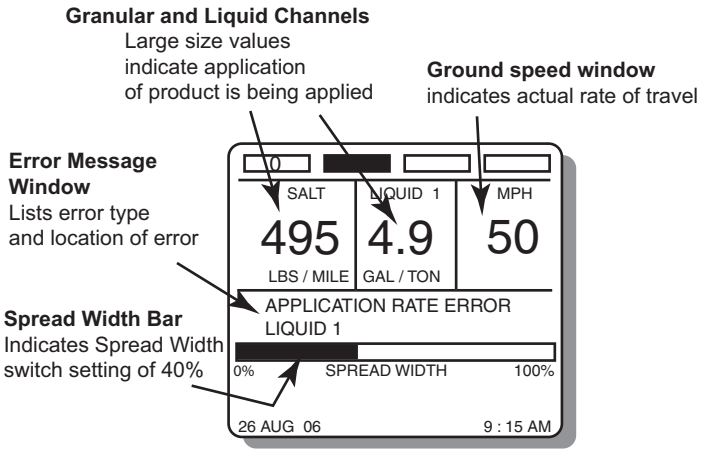
Ground speed is independent of product application and therefore displays only when the vehicle is moving. Product application begins with vehicle motion if the Master Switch is in the AUTO position. The actual APRs display almost twice the size of the target APRs (refer to Figure 7).

2. The target rate of either product channel can be changed by pressing the respective INC/DEC +/- switch on the Switch Module. The value increments or decrements with an audible beep for each step. If the

switch is held, the value repeats until reaching a preset limit. If changed while the vehicle is moving, the new target APR displays for approximately two seconds, then reverts to the actual APRs.

Figure 10

Operate Screen Showing Product Application



3. Rotating the width adjust knob on the Switch Module changes the rotational speed of the spinner and will show the percentage on the Spread Width Bar of the display. The horizontal bar graphically represents the position of the Spread Width knob. The bar is at the 100% position when the knob is fully clockwise corresponding to maximum spinner speed. The operator determines the correct setting by observing the spread pattern. The bar is hollow until the spinner is operating.
4. Date and time appears at screen bottom.
5. All boom sections appear as rectangle blocks during anti-ice operation with each section hollow until activated.
6. Alarm messages will flash in the middle of the screen above the Spread Width bar (Refer to Figure 10).

MATERIAL/MANUAL SPEED SELECT

NOTE: The Material Selection screen limits the display of prewet and anti-ice materials to only the active type when the Boom 5 input is configured for prewet/ anti-ice selection. (If materials 1 and 2 are prewet and 3 and 4 are anti-ice, and the Boom 5 switch is in prewet mode; only material 1 and 2 will appear. Changing the Boom 5 switch to anti-ice, only materials 3 and 4 will display.

This screen is divided into two major divisions. The upper portion of the screen is Material Select indicating products programmed for use. The lower portion is the Manual Speed display that allows selection of an artificial ground speed signal in the event the standard ground speed sensor fails. Without a ground speed signal, the system is inoperative unless manual speed operation is selected.

This screen can only be accessed if:

1. The vehicle is stationary (zero ground speed)
2. The Master Switch is in the OFF position
3. Manual ground speed has been enabled during programming.
4. More than 1 granular and 1 liquid material has been enabled.

Selecting a Different Dispersal Material:

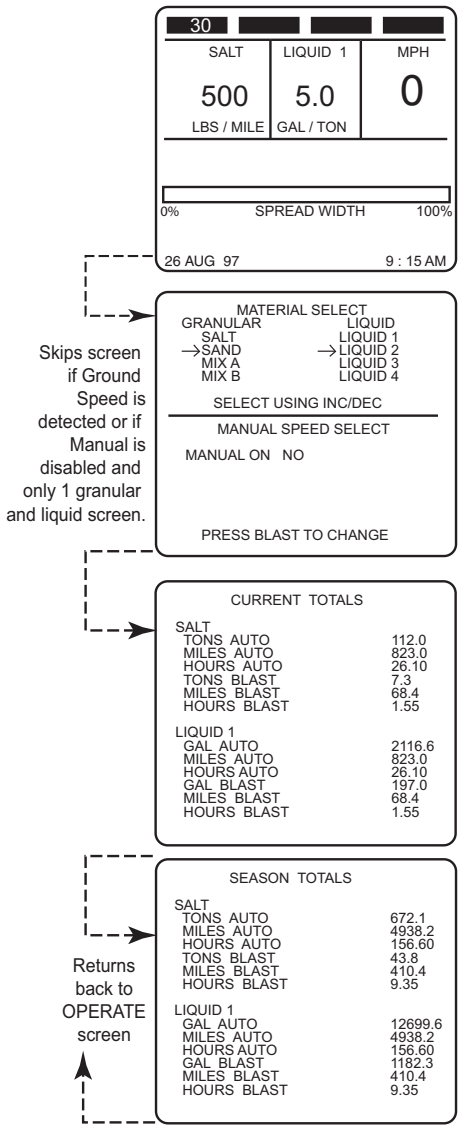
NOTE: When the Boom 5 input is configured for prewet/anti-ice, only the active prewet and anti-ice materials will display on the operate screen. (i.e., If materials 1 and 2 are prewet and 3 and 4 are anti-ice, and the Boom 5 switch is in the prewet mode, only materials 1 and 2 will appear.

NOTE: (Figure 11) If a switch module with wireless communication capability is connected, a download screen will display.

1. Press the Console button and immediately release after beep. Figure 11 illustrates the Material/Manual Speed select screen showing four materials for each product channel enabled.
2. Verify that the Granular ON/OFF and/or Liquid ON/OFF switches on the Switch Module are ON. The channel ON/OFF switch must be ON to select a different material.
3. Press the INC/DEC +/- switch of the appropriate channel (granular or liquid), in either direction, to move the pointer up or down on the left side of either list.

Figure 11

Operator Screens Available by Cycling



Substituting Manual Speed for Standard Speed Sensor

If the ground speed signal is lost, the system ceases to function. A lost signal can occur due to a loss of a sensor, cabling problems, etc. An artificial ground speed signal can be substituted to continue limited operation. The fixed ground speed must be previously programmed and then can be selected from the Material/Manual Speed Select screen (refer to Figure 11).

1. Stop the vehicle and turn the Master Switch OFF. After beep, press and release the Console button on the Operate Screen until the Material Select screen displays.
2. Press the Blast button to change the selection as prompted at the bottom of the screen. MANUAL ON will display. As the Blast button is pressed, NO changes to YES. Releasing the button reverts to the Operate screen. The ground speed window at display bottom now reads MANUAL with a speed that has been programmed.
3. Continue spreading material, maintaining displayed speed as closely as possible, to ensure accurate application. The system spreads material but no accumulators are updated since system accuracy cannot be assured. The related sensor and harness should be inspected and repaired as soon as possible to restore normal operation.

Returning to the Operate Screen

1. To cycle back to the Operate screen, press the Console button three times, waiting for the beep before releasing. The Operate screen will show the material name(s) selected along with the correct (programmed) target APR.

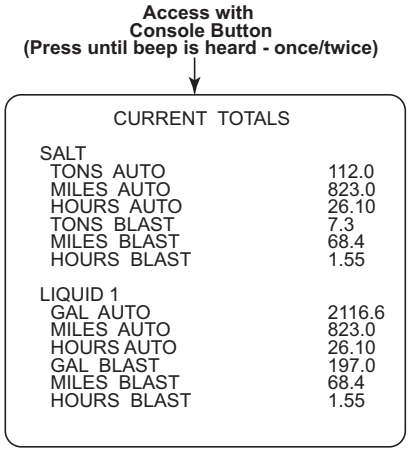
ACCESSING THE CURRENT TOTALS SCREEN

If Manual Speed operation has been selected, this must first be de-selected before the Current Totals screen can be cleared.

1. From the Operate screen, press and release the Console button after the beep until the Current Totals screen displays (refer to Figure 12). The Master Switch must be in the OFF position before the Current Totals screen appears showing totals accumulated for the current product selected.To see other totals, return to the Material/Manual Select screen and select those products.

Figure 12

Current Totals Screen



CLEARING THE CURRENT TOTALS

The ability to clear the Current Totals screen is programmable in the Programming mode explained in the Keyboard Programming section. If programmed, all totals on this screen should be recorded before clearing, then proceed as follows.

1. With the Granular Switch ON, (upper screen), press the Granular +/- (left) switch up and release when the beep sounds. A message "PRESS DEC TO CONFIRM CLEAR (product) ACCUMS (accumulators)" appears.
2. Press the same switch down (decrement) and the totals reset to zero as shown in Figure 13. To clear the bottom half, repeat the steps for the liquid channel with the Liquid +/- (right) switch (refer to Figure 14). Press the console button to stop the clear operation.

Figure 13

Clearing Top Half of Current Totals Screen

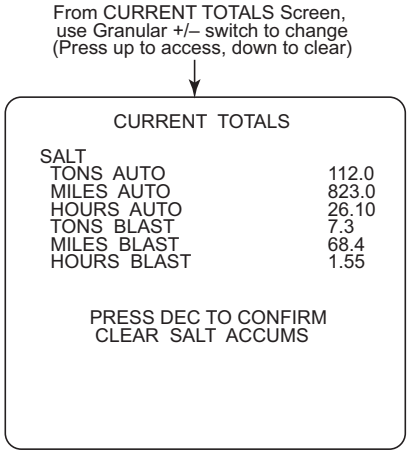
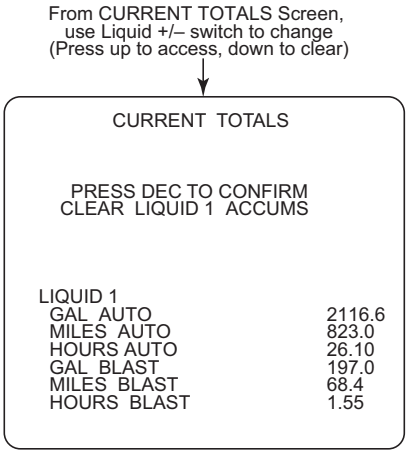


Figure 14

Clearing Bottom Half of Current Totals Screen

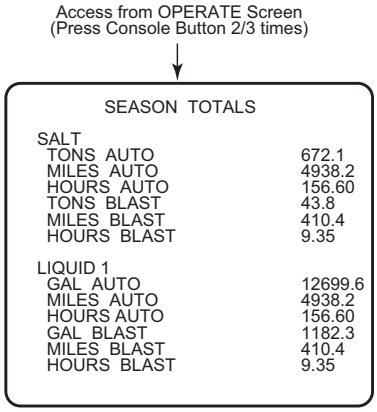


ACCESSING THE SEASON TOTALS SCREEN

1. From the Operate screen, press the Console button and release after the beep. Repeat until the Seasons Total screen appears (refer to Figure 15). This screen shows the amount of material applied, miles traveled during application, and hours elapsed this season for each product in both the Auto and Blast modes. The totals can only be cleared in the Program Mode (keyboard).

Figure 15

Season Total Screen



USING THE BLAST BUTTON

Pressing the red Blast button (on the left side of the Switch Module) causes material to dispense at a higher, programmed rate. The BLAST button performs several functions, depending upon programming options.

1. With the Operate screen displaying, press the Blast button on the side of the Switch Module.When the Blast button is pressed, the Operate screen displays BLAST ON above the Spread Width bar.This either initiates a timed blast cycle (programmed length) or momentary (blasts

only with the button pressed). A timed blast period can be terminated early by activating the Blast button a second time. Blasting can be initiated with the master switch in AUTO or OFF.With a timed blast cycle, a programmed minimum ground speed establishes the material flow rate until that speed is exceeded by the actual ground speed.

MASTER SWITCH IN THE UNLOAD POSITION

The Unload position of the master switch is used to quickly remove material from the truck. There must be no ground speed for the Unload function to operate. If ground speed is dedicated, the Unload feature will not work.

⚠CAUTION

If the spinner is programmed to operate during UNLOAD, be sure that no one is in the vicinity before performing this procedure to avoid possible injury!

1. Back up to the appropriate location and momentarily press Unload.The actuators open fully for those channels turned on from the Switch Module.
2. To stop the unload operation, move the master switch to the OFF position.
3. If ground speed exceeds longer than 10 seconds, unload will be terminated. To clear, move the master switch to OFF.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KEYBOARD PROGRAMMING

Programming allows the operator to enter rates, limits, and other parameters into the Control Point® memory for regulating system product application. These parameters are entered through a detachable keyboard.

Programmable parameters include:

1. Calibration Constants
2. Configuration Parameters (sensor and actuator specifications)
3. Granular and Liquid Material Information
4. Product Application Rates (APRs)

Resetting System Accumulators for vehicle mileage, material usage, and time totals is also available.

NOTE: 6.3 and older configuration files cannot be loaded into a Control Point® programmed with 6.40 and newer software versions. Contact Dickey-john Technical Support for additional information.

Programming must be performed before attempting system calibration. Accurate system calibration constants are determined through regular calibration routines. However, known constants at the time of programming can be entered reducing the calibration procedures required. Calibration corrections can be revised anytime to fine tune accuracy.

LOGGING CONFIGURATION DATA

In the event of Console damage, lost data, upgrading software, or replacement, all calibration constants and other system parameters should be recorded.

For Control Point's® using software versions older than 7.27, Calibration Data Sheets are provided at the rear of this manual.

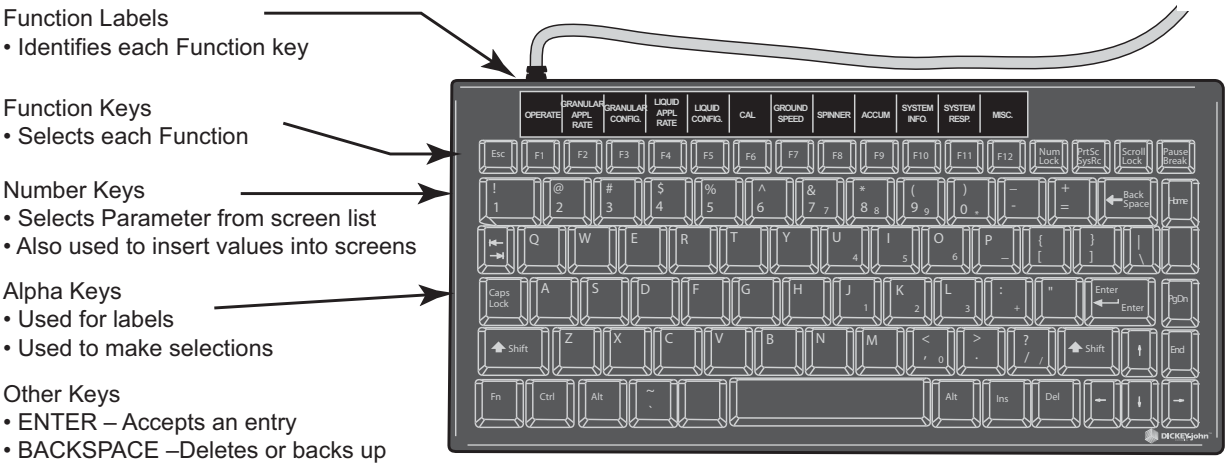
Control Points® with 7.27 or higher versions can download Control Point configurations to the computer's hard drive via wireless transfer and reload back to the Control Point® without using the keyboard.

PRE-PROGRAMMING

Each Control Point® system is shipped from DICKEY-john pre-programmed. Specific parameters can be custom pre-programmed by DICKEY-john to minimize customer programming. This simplifies calibration but final System Response must be performed after installation on every truck (see System Calibration section).

Figure 16

Keyboard Layout and Functions



USING THE KEYBOARD AND SCREENS

Programming and calibration is accomplished using the keyboard and on-screen, menu-driven instructions. The keyboard detaches and can be stored after programming and calibration is complete. To use the keyboard, proceed as follows:

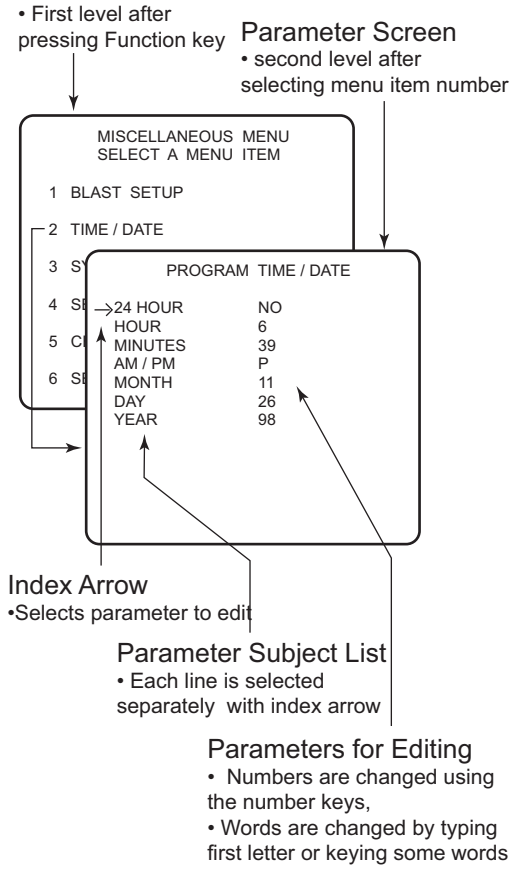
1. If the Control Point® is on, turn the power off and then connect the keyboard to the console harness connector (refer to Figure 1).
2. Place the Master Switch on the Switch Module in the OFF position and turn the power back ON. Each time power is applied, the Operate Mode (F1) comes up and normal system operation can be performed. However, the remaining functions (F2 through F12) cannot be selected unless the master dwitch is in the OFF position.
3. The decal immediately above the function keys, F1 through F12, identifies each function. Pressing any F-key immediately enters and displays that function. Transferring to another function can be done by pressing another F-key.
4. Basic screen layout includes:

   Function screen (top level) – Each screen lists items with numbers to the left side (except F8). Pressing the indicated key number displays that screen, usually one with parameters for editing.

   Parameter screens (second level) – An index arrow appears to the left of the first item and an underscore beneath the first digit of that parameter.

Figure 17

Basic Screens Layout



Note: In some cases, a Sub-Function screen appears between the Function and Parameter screens with additional selections.

Editing a parameter – The up and down arrow keys move the index arrow to other parameters for editing. To change the selected parameter, key in the desired value. When finished, press the Enter key to accept the new value and advance the index arrow to the next line. Failing to use the Enter key (except for YES/NO and serial port configurations) loses the new value.

Other keys – The Backspace key erases incorrectly keyed numbers or text. To restore previous values after keying in a new number, press either arrow key instead of Enter. Invalid keystrokes are not accepted for entry and cause an audible warning.

Pressing the Escape key returns to the previous screen. Pressing any function key (F1 through F12) transfers directly to that function.

Screen prompts – If "MORE..." appears on a screen, additional parameters are on an extended screen. Access this screen by moving the index arrow to the "MORE..." line (refer to Figure 18).

5. All programming steps should be performed in the order outlined in this manual to ensure proper entries for all parameters. The master switch must be OFF before functions can be selected with the keyboard.

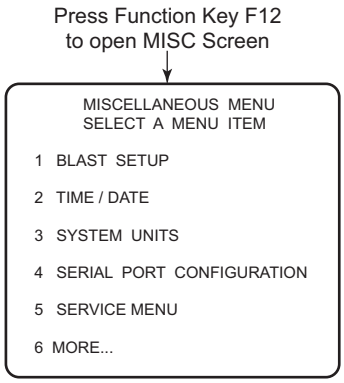
MISCELLANEOUS MENU (F12)

Before channel programming begins, a few basic settings require attention. With the system ON and the keyboard connected, proceed as follows:

1. Press F12 function key to view the MISC Menu (refer to Figure 18). Each item can be accessed by pressing the corresponding number key on the keyboard.

Figure 18

Miscellaneous Main Menu



BLAST SETUP

2. From MISC MENU, press 1 on keyboard to select BLAST SETUP (refer to Figure 19). Length of blast time and minimum ground speed requires an entry.

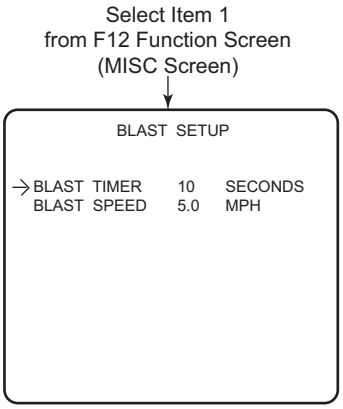
   BLAST TIMER – Determines the length of the BLAST cycle (0 to 99 seconds). When set to zero (0), the blast cycle lasts only as long as the BLAST button is pressed.

   BLAST SPEED – Establishes an artificial vehicle ground speed when vehicle is at a standstill or moving slow that computes the rate material dispenses during blasting. For speeds faster than this value, the actual vehicle ground speed determines the spread rate. If Blast is set to zero, the screen will show a BLAST, but no material will fall.

IMPORTANT: When the BLAST SPEED is set to zero, blasting cannot be initiated with the vehicle stopped. The blast APR is programmed from the material application rate functions (F1, F4).

Figure 19

Verifying Blast Setup Menu Adjustments



TIME/DATE SETUP

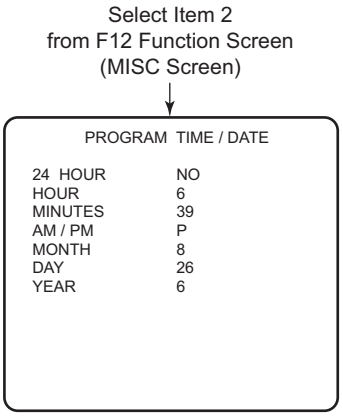
3. Press F12 function key to return to the Misc Menu and select Time/ Date (2), refer to Figure 20.

Verify or correct the following settings:

- **24 HOUR –** Press (Y) YES for 24 hour time; (N) NO for standard 12 hour time.
- **HOUR** – Enter the correct hour.
- **MINUTES** – Enter the correct minutes.
- **AM/PM** – Enter A for AM or P for PM (This selection does not appear for 24 hour time).
- **MONTH** –Enter the correct numerical month.
- **DAY** – Enter the correct day of the month.
- **YEAR** – Enter the last two digits of the year.

Figure 20

Setting Time and Date



SYSTEM UNITS

4. Select F12 to return to the Misc Menu and select System Units (3) (refer to Figure 21).The System Units screen allows either English or

Metric units. Parameter values will change on all screens immediately and convert to the equivalent numerical values.

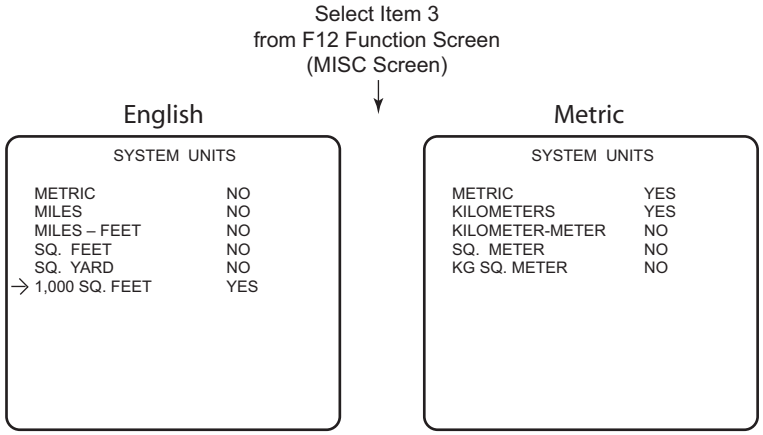
– Select either Y(YES) or N(NO). Y changes units to metric; N retains the units in English.
– After selecting English or Metric, select units of measure from the remaining list.

English choices available are miles, miles-feet, square feet, or square yards and 1000/ft^2.

Metric choices are kilometers, kilometers-meter, square meter and kg square meter. This list allows only one selection. Pressing the Enter key is not necessary to accept the choice.

Figure 21

Setting System Units

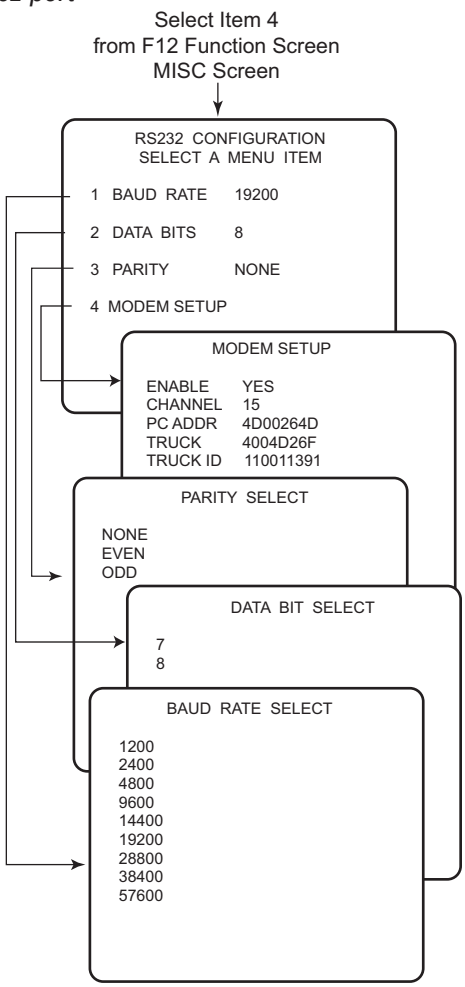


SERIAL PORT CONFIGURATION

5. Select F12 to return to the Misc Menu and select Serial Port Configuration (4). (Refer to Figure 22). This menu allows setting of the serial port for communicating with other devices. Values must match the serial data format of the other serial devices. The Esc key accepts the values instead of the Enter key. The pre-programmed values are appropriate for use with other DICKEY-john equipment and software.
   – Press 1 for the Baud Rate Select screen. Use the Up/Down arrow keys to change the baud rate. Press Esc key when finished.
   – Press 2 for the Data Bit Select screen. Use the Up/Down arrow keys to change the data bits to be used. Press Esc key when finished.
   – Press 3 for the Parity Select screen. Use the Up/Down arrow keys to change the data bits to be used. Press Esc key when finished.
   – Press 4 for Modem Setup screen (wireless users refer to CP Tools Software Manual for wireless communication hardware). Channel, PC address, Truck address and Truck ID are required entries for wireless transmission. Press Esc key when finished.

Figure 22

Configuring RS-232 port

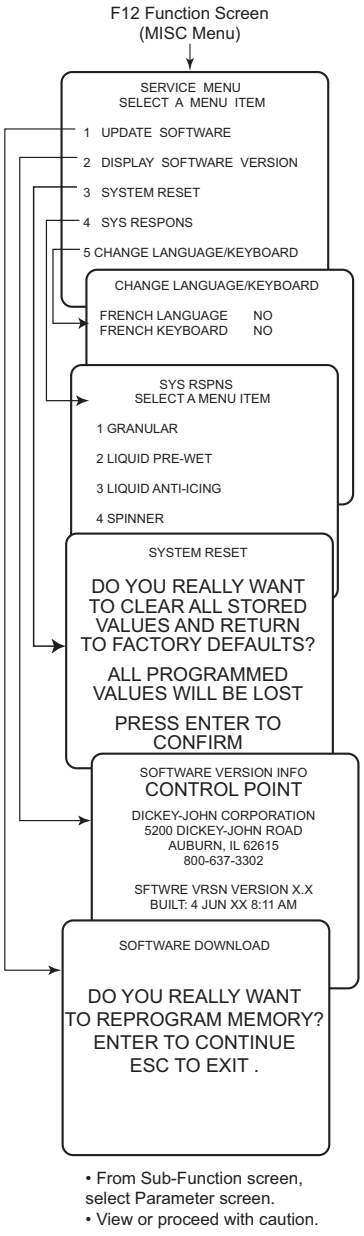


SERVICE MENU

6. Select F12 to return to the Misc Menu and select the SERVICE MENU screen pressing the 5 key, refer to (Figure 23).

Figure 23

Viewing the Service Menu Items



This menu is not intended for general customer use but for ice personnel to incorporate future product enhancements, troubleshooting, and to identify the currently installed software version.

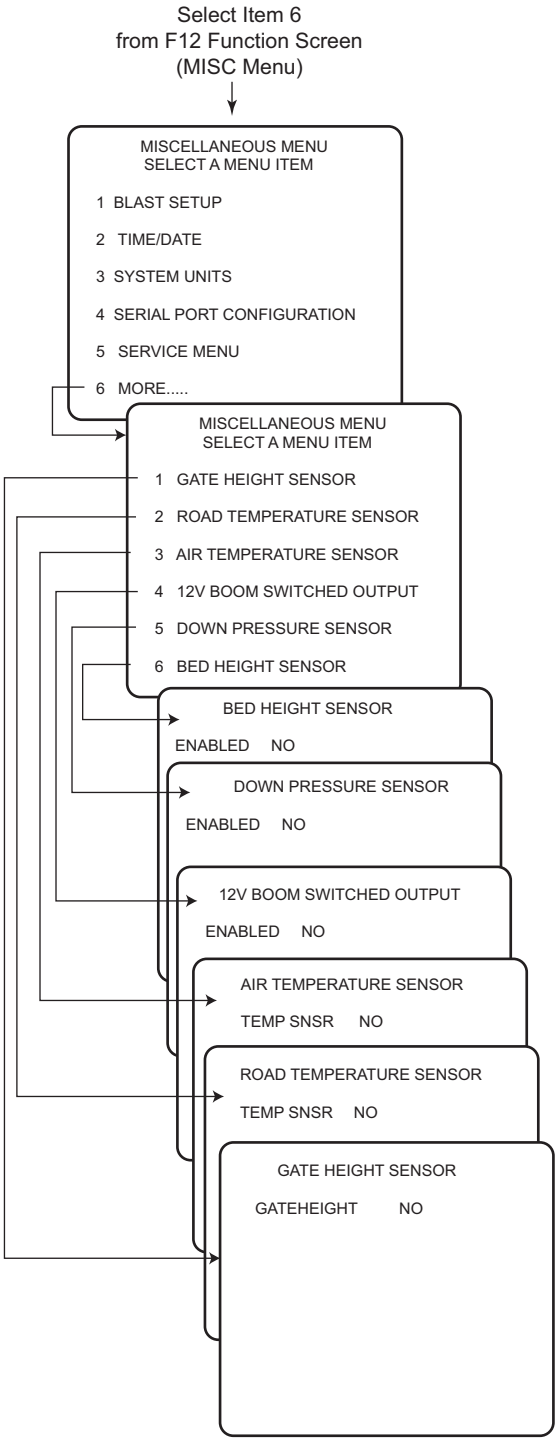
- **UPDATE SOFTWARE** – Used by qualified personnel to install new software or updates.
- **DISPLAY SOFTWARE VERSION** – Displays the current installed software version.
- **SYSTEM RESET** – Can be used to return all parameters to factory setting. This is useful in starting over when the present settings

become uncertain or confused.

- **SYS RESPONS –** Displays System Response data which is useful for troubleshooting. This screen can be viewed but not changed.
- **CHANGE LANGUAGE/KEYBOARD** - Select a language and keyboard from the screen. The system displays English and one other language, usually French Canadian. Contact DICKEY-john for available alternative languages. Select KEYBOARD from the screen. N (NO) selects an English keyboard, Y (YES) selects French.

Figure 24

Sensor Configuration Screen



SENSOR SELECTION

7. Select F12 to return to the Misc Menu and select the MORE MENU screen pressing the 6 key, refer to (Figure 24).

GATE HEIGHT SENSOR

The Gate Height Sensor compensates for changes from the original calibrated gate setting by adjusting the conveyor speed allowing for a more accurate granular material application. If the gate height is increased, the conveyor speed will decrease and decreasing gate height will increase conveyor speed.

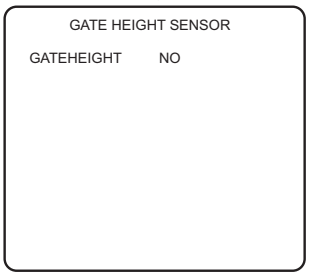
The Gate Height Sensor connects to the main harness lead labeled GATE on the current Control Point® harnesses and Pressure on the earlier harness versions. Software Versions 6.10 and higher have removed pressure control from the Control Point®. The software now utilizes the pressure sensor input for the Gate Height. Pressure-controlled liquid systems cannot use the 6.10 or higher version software.

When enabled, the Gate Height will display to the nearest .1 of an inch or 1 centimeter in the lower right corner of the Operate screen.

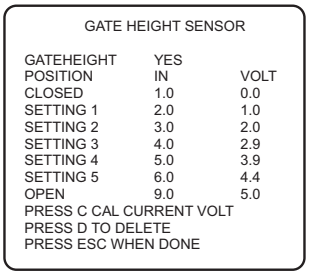
Figure 25

Gate Height Screens

No Gate Height Sensor



Gate Height Sensor



GATE HEIGHT CALIBRATION

There are seven user-definable Gate Heights to enter that will aid in Gate Height calibration. Enter seven Gate Height settings that will be used when spreading material.

Calibration Steps:

1. From the Gate Height Sensor screen, position the arrow at the Closed position.
2. Set the Gate to Closed.
3. Measure the height at the Closed position and enter the Gate Height value for the closed setting.
4. Press C to capture the current gate height voltage at the closed setting.
5. Move the arrow to Setting 1.
6. Set the Gate to the lowest operating Gate Height setting.
7. Measure the height at Setting 1 and enter the Gate Height value for Setting 1.
8. Press C to capture the current Gate Height Voltage for Setting 1.
9. Repeat 5-8 steps for the Settings 2-5 starting with the next lowest setting.

10. Move the cursor on the calibration screen to the Open setting.
11. Set the Gate to the Full Open height.
12. Measure the height at the Full open position and enter the Gate Height for the Open setting.
13. Press "C" to capture the current Gate Height voltage at the Open setting.
14. Press Esc when complete.

OPERATOR NOTES:

If the sensor voltage is outside the range between the Closed and Open position values, the display will state Gate Low or Gate High. If Gate Low displays, the signal from the sensor is exceeding the open voltage. In either case, an alarm will activate. The Gate Height should be checked and set at the granular calibration it was ran for on that granular channel.

If the Gate Height is enabled and has been calibrated, all of the desired granular materials that are enabled must be re-calibrated through a material drop test. Refer to **Calibrating Granular Materials** section. If enabled materials are not calibrated, the Control Point® will alarm.

ROAD TEMPERATURE SENSOR

Select F12 to return to the Misc Menu and select the MORE MENU screen pressing the 2 key.

The Road Temperature Sensor monitors road temperature changes. Three temperature alarm settings can be programmed.

The Road Temperature sensor connects to the Temperature Sensor Adapter (466492000S1) or Adapter (46649210051) which is connected to the main harness lead labeled Temperature.

For earlier versions of Control Point® harnesses, the adapter connects to the mating connector in the adapter harness (466492040S1).

When enabled, the road temperature displays in the lower left side of the Operate screen.

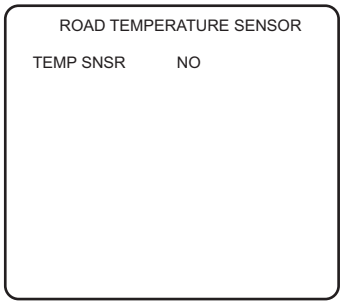
CONFIGURATION

Road Temperature default is set for no temperature sensors. To change configurations, press Y (Yes) or N (No).

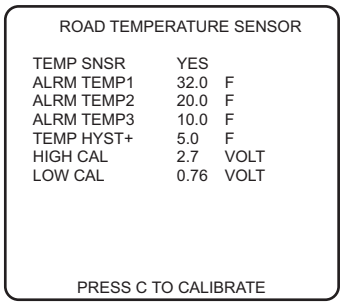
Figure 26

Road Temperature Screens

No Temperature Sensor



Road Temperature Sensor



Alarm Temp 1-3

There are three user-definable temperature alarms to alert of road temperature changes and that application rate or material changes may be required. The temperatures must be entered in descending order with Alarm Temp 1 the highest setting and Alarm Temp 3 the lowest setting.

Temp Hyst+

Temperature Hysteresis indicates the positive temperature changes that has to occur above the active alarm temperature to clear the alarm. If Alarm Temp 1 is 20 degrees F and the Temp Hyst+ is 5 degrees F, the alarm activates when the temperature drops below 20 degrees F but clears when the temperature reaches 25 degrees F.

High & Low Cal

High & Low Cal values are created from the calibration routine and are for reference only and cannot be edited.

TEMPERATURE SENSOR CALIBRATION

Press C to start the Temperature Sensor Adapter automatic calibration procedure. Calibration lasts approximately 10 -20 seconds. Calibration is complete when the Road Temperature Sensor menu displays.

IMPORTANT: The RoadWatch™ temperature sensor or Surface Patrol™ temperature sensor must be disconnected and the Temperature Sensor Adapter connected to the main harness for successful calibration. If the Temperature Sensor Adapter is disconnected when calibration is performed, an error screen will display.

NOTE: Road Watch™ is a registered trademark of Commercial Vehicle Group™. Surface Patrol technology is a registered trademark of Control Products, Inc.

AIR TEMPERATURE SENSOR

Select F12 to return to the Misc Menu and select the MORE MENU screen pressing the 3 key.

The Air Temperature Sensor monitors air temperature changes. Three temperature alarm settings can be programmed. The Air Temperature Sensor connects to the Temperature Sensor Adapter (466492100S1). The Temperature Sensor Adapter connects to the main harness on the lead labeled Temperature. For earlier versions of Control Point® harnesses, the adapter connects to the mating connector in the adapter harness (466492040S1).

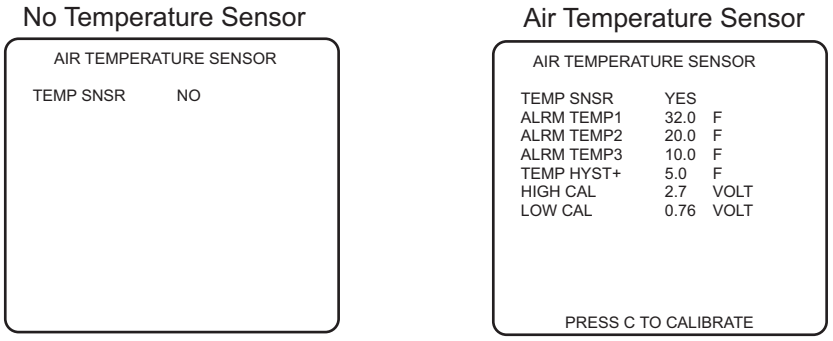
When enabled, the Air Temperature will replace the date in the lower left side of the Operate screen.

CONFIGURATION

Air Temperature default is set for no temperature sensors. To change configurations, press Y (Yes) or N (No).

Figure 27

Air Temperature Sensor Screens



Alarm Temp 1-3

There are three user-definable temperature alarms to alert of air temperature changes and that application rate or material changes may be required. The temperatures must be entered in descending order with Alarm Temp 1 the highest setting and Alarm Temp 3 the lowest setting.

Temp Hyst+

Temperature Hysteresis indicates the positive temperature changes that has to occur above the active alarm temperature to clear the alarm. If Alarm Temp 1 is 20 degrees F and the Temp Hyst+ is 5 degrees F, the alarm activates when the temperature drops below 20 degree F but clears when the temperature reaches 25 degrees F.

High & Low Cal

High & Low Cal values are created from the calibration routine and are for reference only. These values cannot be altered.

AIR TEMPERATURE SENSOR CALIBRATION

Press C to start the Temperature Sensor Adapter automatic calibration procedure. Calibration lasts approximately 10-20 seconds. Calibration is complete when the Air Temperature Sensor menu displays.

IMPORTANT: The RoadWatch™ temperature sensor or Surface Patrol™ temperature sensor must be disconnected and the Temperature Sensor Adapter connected to the main harness for successful calibration. If the Temperature Sensor Adapter is disconnected when calibration is performed, an error screen will display.

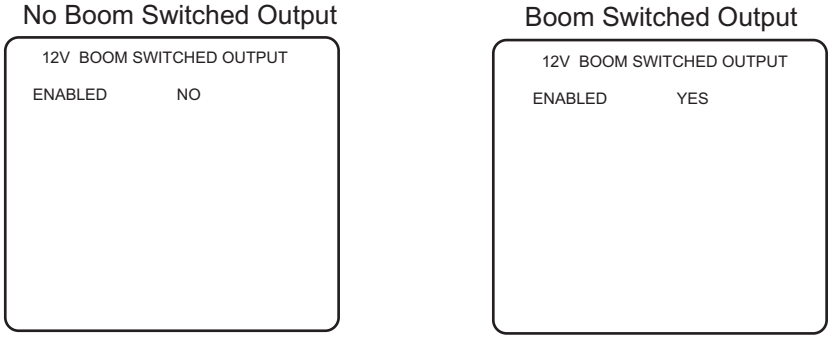
12V BOOM SWITCHED OUTPUT

Select F12 to return to the Misc Menu and select the MORE MENU screen pressing the 4 key.

The 12 Volt Switched Output provides a 12V output signal for a valve driver to control a boom shut off relay. The default value for Switched Output is NO. Connect the valve driver to the main harness lead labeled Switched +12V. For earlier versions of Control Point® harnesses, connect the valve driver using the adapter harness (466492040S1) connecting the switched 12V drive signal to pin 9 of the 16 pin granular valve connector.

Figure 28

12V Boom Switched Output Screens



The 12V Boom Switched Output functionality varies for different versions of the hardware console.

To Verify Software Version:

Press Miscellaneous (F12), Service Menu (5), Display Software Version (2).

Any consoles with no hardware version number indicated or the version is found in a different location than described above is also a Version 1 software.

Hardware Version 1 consoles require the following conditions for the 12V Boom Switched Output to function correctly:

- All granular channels disabled.
- If Boom 5 is configured to utilize an anti-ice/pre-wet switch, the switch must be in anti-ice mode.
- Anti-ice only mode.

Hardware Version 2 consoles require a liquid channel to be enabled for the 12 Boom Switched output to function correctly.

Once the above conditions have been met and the Control Point® initiates liquid application, the 12V output will be turned on. There will be no visual indication from the Operator screen that this feature is enabled or active. The 12V switched output is not a high-current line so to control a solenoid valve, a power driver is required. The output will then activate the valve driver to control the valve.

Contact DICKEY-john for information on the driver and the adapter harness.

DOWN PRESSURE SENSOR

The Down Pressure Sensor monitors the relative pressure applied to the under body belly scraper. The sensor uses the same input as the Tank Level Sensor.

Connect the Down Pressure Sensor to the main harness lead labeled Tank or use an adapter harness (466492040S1) for earlier Control Point® harness versions to connect the Down Pressure sensor signal to pin 13 of the 16-pin granular valve connector.

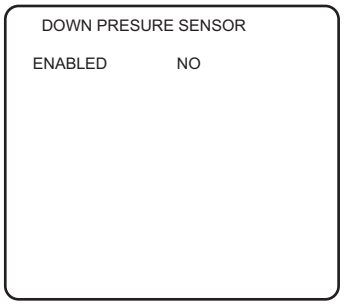
The Down Pressure sensor feature must be enabled in the Console to become active. When enabled, a bar graph with a digital percentage readout representing the down pressure displays. When the Down Pressure sensor is enabled, the tank level is automatically disabled. If granular is enabled, the spinner bar graph and the down pressure bar graph share its portion of the Operate screen.

NOTE: The Tank Level Sensor and the Down Pressure Sensor cannot be configured or used at the same time.

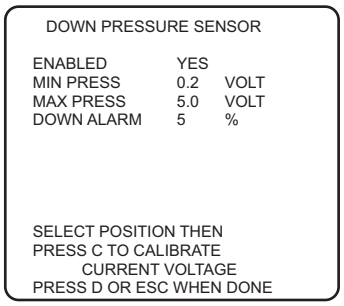
Figure 29

Down Pressure Sensor Screens

Down Pressure Sensor Disabled



Down Pressure Sensor Enabled



CONFIGURATION

The initial down pressure screen has a Yes or No option for sensor configuration. Down Pressure Sensor default is NO. Refer to (Figure 29) for Enabled and Disabled Down Pressure Sensor screens.

DOWN PRESSURE SENSOR CALIBRATION

Minimum and maximum pressures can be entered manually or automatically captured. The minimum pressure sensor indicates minimum pressure allowed when the underbody scraper is off the pavement. The maximum pressure sensor indicates the maximum pressure allowed with the scraper completely down.

For Manual Entry - Select the Min Press text and enter the minimum pressure voltage from the pressure sensors manufacturer's specifications.

For Automatic Entry - The belly scraper MUST be off the ground and the sensor installed prior to automatic entry. Select the Min Press text and press "C" to capture sensor voltage.

Down Alarm is a user-definable percentage value of the maximum pressure. An alarm activates when the pressure exceed the alarm limit.

BED HEIGHT SENSOR

The Bed Height sensors activates when the bed has exceeded the recommended operating height.

⚠CAUTION

The operator must inspect and maintain all mechanical linkage of the sensor on a regularly scheduled interval to insure proper operation of the bed height alarm. Visual inspection of the bed height must be maintained as the primary indicator of safe bed height operation. The alarm should only be used as a secondary convenience indicator. The operator assumes all risk in using this feature. DICKEY-john assumes no responsibility for alarm failure to indicate an unsafe operating height.

BED HEIGHT SENSOR CONNECTION

Current Versions: Connect the Gate input on the current version main harnesses.

Earlier Versions: Connect the Bed Height sensor to the Pressure input on earlier versions of Control Point® main harnesses.

If the Gate Height is configured and the Bed Height sensor is enabled, the Gate Height sensor automatically is disabled. The Bed Height sensor feature must be enabled in the Control Point® console for activation.

Bed Height Sensor Activation: (F12) Misc, (6) More, (6) Bed Height Sensor

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NOTE: The Bed Height and Gate Height sensors use the same input, therefore both sensors cannot be configured at the same time.

Figure 30

Bed Height Sensor Screens

Bed Height Sensor Disabled

```
BED HEIGHT SENSOR

ENABLED          NO
```

Bed Height Sensor Enabled

```
BED HEIGHT SENSOR

ENABLED          YES
BED DOWN         0.2    VOLT
BED ALARM        5.0    VOLT


SELECT POSITION THEN
PRESS C TO CALIBRATE
      CURRENT VOLTAGE
PRESS D OR ESC WHEN DONE
```

BED HEIGHT SENSOR CALIBRATION:

The Bed Down value indicates sensor voltage when the bed is completely down. This value can be entered manually or automatically captured.

Manual Entry - Select the Bed Down text and enter the voltage from the sensor when the dump bed is completely down.

Automatic Entry - The Dump bed must be completely down and the sensor installed for automatic entry. Select the Bed Down text and press "C" to capture the sensor voltage.

Bed Alarm indicates the voltage when the bed has exceeded normal operating height and can be entered manually or automatically captured.

Manual Entry - Select the Bed Alarm text and enter the voltage when the bed exceeds the normal operating height.

Automatic Entry - The dump bed must be near the maximum operating height and the sensor installed before automatic entry can occur. Select the Bed Down text and press "C" to capture sensor voltage.

The alarm will activate regardless of the master switch position.

ACCESSING THE OPERATE MODE (F1)

F1 accesses the **Operate** screens anytime during programming to verify selections. No programming parameters are available from this screen. The following information is a brief outline of the Operate mode screens. For full details, see the **Startup & Familiarization** section.

OPERATE screen – Shows programmed values ready for spreading product in a normal fashion with keyboard connected.

MATERIAL/MANUAL SPEED SELECT screen – A dual screen showing only items configured. The MATERIAL SELECT half displays if more than one granular and/or liquid products are enabled in the Granular (F2) and Liquid (F4) Application Rate functions. The MANUAL SPEED SELECT appears if MANUAL DRIVER is programmed YES in the Ground Speed Configuration function (F7, selection 1).

CURRENT TOTALS screen – Shows totals accumulated for each product dispensed since the last reset (See Accumulator Function - F9). These totals are those products selected on the Material/Manual Speed Select Screen. To see other totals, select those products from that screen.

SEASON TOTALS screen – Shows the amount of material applied, miles traveled during application, and hours elapsed this season for each product in both the AUTO and BLAST modes. The season totals can only be cleared from the Accumulator function (F9).

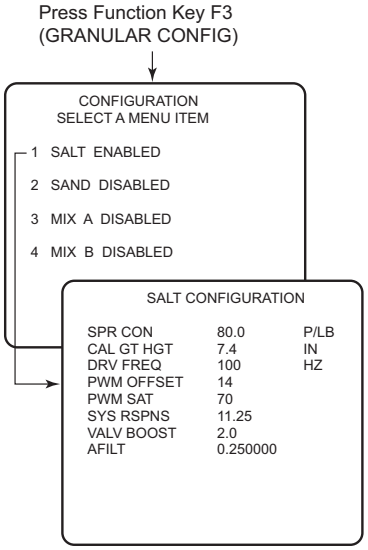
SETTING UP GRANULAR CONFIGURATION (F3)

Configuration parameters specify types of hydraulic valves and sensors used and related performance specifications. To prepare for system calibration, the granular configuration parameters for each granular material used must be verified or programmed. These parameters do not change unless system hardware changes or related calibration routines are rerun.

1. From the keyboard, press Function key F3 to obtain the GRANULAR CONFIG screen (refer to Figure 28). Four (4) granular product names appear with each followed by the word ENABLED or DISABLED. Products are enabled/disabled from the GRANULAR APPL RATE (F2) screen.
2. Select a material using the corresponding number key.
3. Edit the parameters on the screen.

Figure 31

Configuring the Granular Channel



Check each following item for a desired setting.

- **SPR CON** (Spreader Constant) – Represents the number of pulses generated by the application rate sensor per pound of material (P/LB) discharged from the spreader.
  The spreader constant differs for each granular material, spreader vehicle, and gate height setting. If the spreader constant is known, keyboard enter the value so that running the GRANULAR CALIBRATION routine for this material is unnecessary. If the spreader constant is unknown, leave the displayed value. The correct value is automatically corrected later, during GRANULAR CALIBRATION.
- **CAL GT HGT** (Calibration Gate Height) - Displayed only if optional Gate Height Sensor is Enabled. If Enabled, the Calibration Gate Height valve displayed is the setting of the gate height in inches when the spreader was calibrated. Refer to page 77 for the Spreader Calibration procedure.
  Changing the original calibrated gate setting by adjusting the conveyor speed provides a more accurate granular material application. Increased Gate Height decreases conveyor speed; Decreased Gate Height increases conveyor speed.
- **DRV FREQ** (Drive Frequency) – Represents the valve manufacturer's suggested drive frequency, as shown on the valve specification sheet.

The following configuration constants (PWM OFFSET, PWM SAT, SYS RSPNS, VALV BOOST, and AFILT) are for descriptive purposes only. The correct parameters automatically calculate during GRANULAR SYSTEM RESPONSE calibration. Factory defaults are adequate until calibration is run. These values can be adjusted any time to fine tune system performance.

- **PWM OFFSET** – Identifies the minimum amount of PWM valve drive required to start the granular mechanism moving.
- **PWM SAT** (PWM Saturation) – Identifies the amount of drive the granular valve system requires to operate a PWM valve at full speed. This value is not displayed when SRVO DRV is set to YES.
- **SYS RSPNS** (System Response) – Adjusts the control system response time to the hydraulic and mechanical systems of the granular control channel on each particular spreader vehicle.
- **VALV BOOST** (Valve Boost)– Increases the amount of system response initially applied to the granular control to reach final operating speed as quickly as possible.
- **AFILT** (A Filter) – Filters the feedback signal to minimize effects of electrical noise and mechanical vibrations. The smaller the number the greater degree of filtering.

4. Press F3 to return to the GRANULAR CONFIG screen.
5. If using other granular materials with known SPR CON (spreader constant), enter those values now.

Note: The system has only one granular control channel, so only one configuration parameter (PWM hydraulic valve) is used. All four materials remain the same except for the SPR CON.

PROGRAMMING GRANULAR APPLICATION RATES (F2)

The APPLICATION RATE menu lists four granular materials. Each material screen contains a set of values for product application rate, APR steps, min/max limits, and blast rate. The pre-programmed values are usually the same for all granular materials but may be edited and modified as required.

1. From the keyboard, press Function key F2 to obtain the GRANULAR APPLICATION RATES screen, refer to (Figure 32). Four (4) granular product names appear, each followed by the word ENABLED or DISABLED.
2. Select a material using the corresponding number key.
3. Edit the parameters on the screen.

Check each following item for the desired setting.

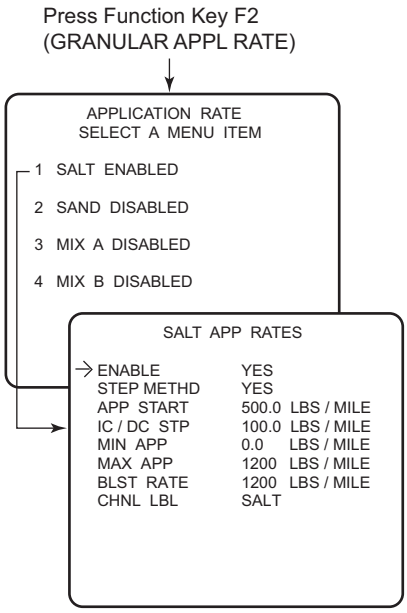
- **ENABLE** - When enabled, the material appears on the MATERIAL/MANUAL SPEED SELECT screen of the Operate mode for selecting. Enter Y for YES (enabled), N for NO (disabled).
  At least one granular material must be enabled unless console is used for anti-icing, then all granulars can be disabled. All products can be programmed (and calibrated) now and selected from the Operate mode later.
- **STEP METHD** - Y (YES) selects the Step method or N (NO) the Rate method to specify application rates (APRs). Since each method performs essentially the same function, the choice becomes a personal preference. However, the parameters for each method are different and all items below change with the selection (See Figure 33 for Rate Method screens).

  Changing from one APR method to the other for any material automatically clears all previous rates from that method.

  The STEP method permits the APR to be changed by a fixed increment using the "+/–" switch on the Switch Module. The RATE method allows programming of up to ten (10) different APRs - RATE 1 through RATE 10. If less than ten rates are chosen, enter a zero (0) for each rate following the last one programmed. The initial rate displayed in the OPERATE mode is RATE 1. Other rates are selected by pressing the "+/–" switch on the Switch Module.

Figure 32

Setting Granular Application Rates (Step Method)

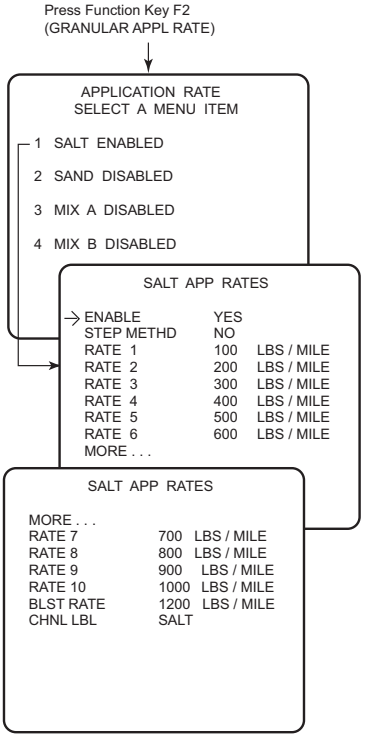


- **APP START** (Step method) – Defines the APR starting point.
- **IC/DC STP** (Step method) - Sets the increase/decrease step value.
- **MIN APP** (Step method) – Defines the minimum APR limit for the product.
- **MAX APP** (Step method) – Defines the maximum APR limit for the product.
- **RATE 1 through RATE 10** (Rate method) – Defines up to ten individual APR rates.
- **BLAST RATE** (Step or Rate method) – Defines a higher than normal, spot-application rate applied when the red BLAST button is pressed.
- **CHNL LBL** (Channel Label) (Step or Rate method) – Any product material name of up to nine (9) characters can be keyed in. Pressing the ENTER key stores the name for display on all granular screens including the OPERATE screen wherever that material appears in the event there is a data download.

4. Press F2 to return to the GRANULAR APPL RATE screen. If other granular materials require programming, repeat the above procedures for those materials.

Figure 33

Setting Granular Application Rates (Rate Method)



LIQUID CONFIGURATION SETUP (F5)

Configuration parameters specify types of actuators and sensors used including performance specifications. To prepare for system calibration, the liquid configuration parameters for each liquid material used must be verified or programmed. These parameters do not change unless system hardware changes or related calibration routines are rerun.

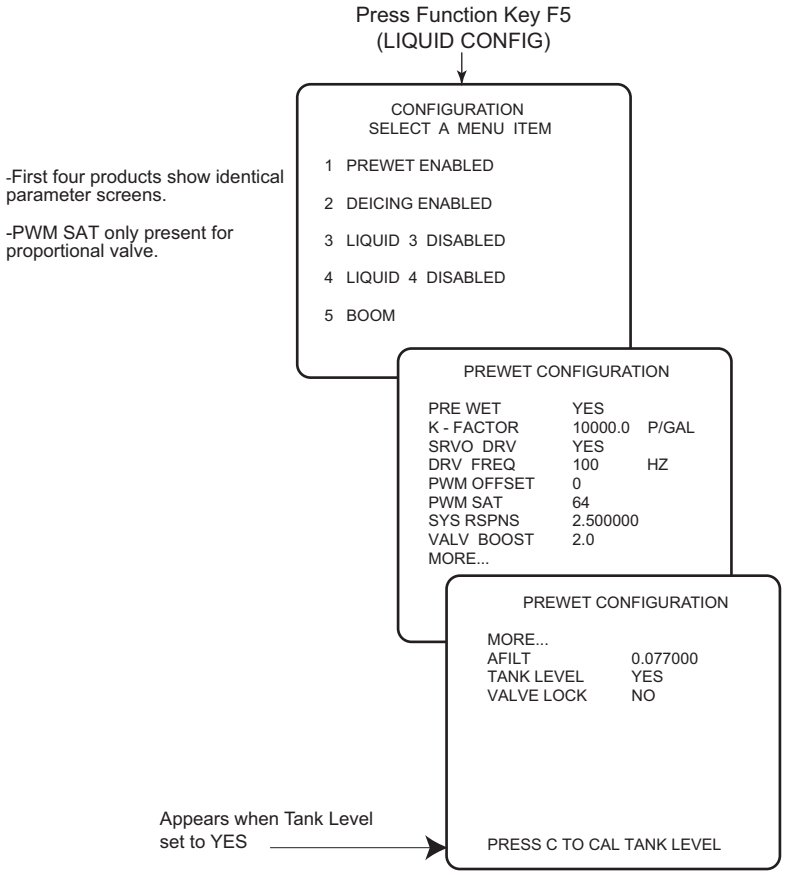
1. From the keyboard, press Function key F5 to obtain the LIQUID CONFIG screen, refer to (Figure 34). Four (4) liquid material names appear with the option to ENABLE or DISABLE. Products are enabled/disabled from the LIQUID APPL RATE screen (F4).

SETTING LIQUID CONFIGURATIONS

2. Select a material using the corresponding number key.

Figure 34

Liquid Configuration Main Screen



3. Edit the parameters on the screen for the desired setting.
   - **PRE WET -** If spraying with the pre-wet spray bar, press Y (YES). If used with the anti-icing boom, press N (NO).
   - **K-FACTOR** (Flowmeter Constant) - Represents the number of flowmeter pulses generated per gallon (P/GAL) of dispersed liquid (for pre-wet and anti-icing liquids).
     The K-FACTOR number stamped on the flowmeter body is sufficiently accurate for keyboard entry if the viscosity of the liquid is near that of water.

     If the flowmeter constant is unknown, leave the displayed default value shown. A corrected value automatically calculates and enters during LIQUID CALIBRATION.

   - **SRVO DRV** (Servo/Proportional) - If using a servo drive, press Y (YES). For a proportional valve, select N (NO).
   - **DRV FREQ** (Drive Frequency) - Represents the valve manufacturer's suggested drive frequency, as shown on the valve specification sheet.
   - **PWM OFFSET** - Represents the valve operating range starting point (position flowmeter begins generating pulses). This constant

automatically calculates and enters during a LIQUID SYSTEM RESPONSE routine (F11-2 and F11-3) or can be keyboard entered. Anti-icing boom liquids may have a different offset constant than pre-wet bar liquids because of different plumbing components.

- **PWM SAT** (Proportional valve only) - Represents the end point of the valve operating range (maximum flowmeter pulse frequency). The value calculates automatically during the LIQUID SYSTEM RESPONSE routines or can be keyboard entered. Liquids dispensed from the anti-icing boom may have different constants than those from the pre-wet bar because of different plumbing components.
- **SYS RSPNS** (System Response) - Adjusts the control system response time to the hydraulic and mechanical systems of the liquid control channel for each particular spreader vehicle. The value calculates automatically during calibration routines but can be fine-tuned anytime for optimum performance by keyboard entry.
- **VALV BOOST** (Valve Boost) - Increases the amount of system response initially applied to reach final operating speed as quickly as possible.
- **AFILT** (A Filter) - Filters the feedback signal to minimize effects of electrical noise and mechanical vibrations. The smaller the number the greater degree of filtering.
- **TANK LEVEL SENSOR** - Monitors the liquid level for the pre-wet or anti-ice systems.
- **VALVE LOCK** - When Valve Lock is set to Yes, the valve is locked in the last operating position when only the boom sections are turned off and the master switch is left on. Valve Locking maintains constant pressure so a quick spray pattern can resume when the boom solenoids are turned back on.

4. Press F5 to return to the LIQUID CONFIGURATION screen. If other liquid materials require programming, repeat the above procedures for those materials. All pre-wet liquids should be programmed first to avoid confusion.

TANK LEVEL SENSOR CONFIGURATION

5. The Tank Level Sensor monitors the liquid level for pre-wet or anti-ice systems.
   The sensor connects to the main harness with the lead labeled Tank or to an adapter harness (466492040) that ties the tank level signal to pin 13 of the 16-pin granular valve connector on earlier versions of Control Point® main harnesses. The tank level sensor feature must be enabled in the Control Point® console before it is activated. It can be enabled for one of the four liquid materials.The tank level will display only when enabled and the selected material that it was enabled under is active. (If liquid 1 is set for prewet (Yes) with tank level enabled and liquid 2 is anti-ice (prewet No), the tank level will only display when liquid 1 prewet is active.

   If the Control Point® has been configured for use with anti-ice/prewet switch input on Boom 5 to automatically switch between liquid 1 preset

and liquid 2 anti-ice, the tank level will only display when the switch is in prewet mode. If the switch is in anti-ice mode, the tank level will not display.

If the tank level is set for liquid 2, enable tank level under the liquid 2 configuration screen. This will disable the tank level on liquid 1. When the tank level is enabled, a bar graph with a digital percentage readout (bargraph YES) or an approximate material remaining readout will display (bargraph NO). If granular is enabled, the spinner bar graph will share its portion of the Operate screen with the tank level. If the tank level is disabled, the spinner bar graph will display across the lower section of the Operate screen.

ENABLING TANK LEVEL SENSOR

6. Press Function key F5 Liquid Configuration and select a material 1-4. The default for Tank Level is NO. When Tank Level is changed to YES, the text PRESS C TO CAL TANK LEVEL appears at the bottom of the screen. Press C to begin calibration. When complete, press D or Escape key (refer to Figure 35).

TANK EMPTY AND TANK FULL

Both the Tank Empty and Tank Full values can be entered manually or automatically captured.

Manual Entry: Select the Tank Empty text and enter the empty voltage from the manufacturer's specifications.

Automatic Entry: Verify the tank is empty and the sensor is installed and connected. Select the Tank Empty text and Press "C" to capture the sensor voltage.

TANK ALARM

The Tank Alarm is a user-definable value that informs the driver when the tank level has reached the alarm limit. The value has a 5% hysteresis tolerance to prevent random alarming due to varying tank levels while driving.

Example 1: If the Tank Alarm is set for 10%, the alarm will activate when the level drops below 10%, but will not be cleared until the level reaches 15%).

Example 2: If the Tank Alarm is set for 100 gallons on a 1000 gallon capacity, the alarm will activate when the level drops below 100 gallons, but will not be cleared until the level reaches 150 gallons).

The alarm will sound for the first five seconds, then the text will flash on the screen until the condition is cleared or another alarm is issued.

TANK CAPACITY

Tank Capacity indicates the maximum holding capacity of the tank. The alarm is only active when the master switch is in the AUTO position. The alarm will activate audible and visual signals when the tank level drops below the Tank Alarm. When the master switch is turned OFF and then returns to AUTO, the alarm will not be re-issued until the level goes above the Tank Alarm plus the 5% hysteresis or until the unit has been turned off.

Figure 35

Tank Level Calibration Screen

Bar Graph

```
TANK LEVEL CALIBRATION

BARGRAPH        YES
TANK EMPTY      0.2    VOLT
TANK FULL       5.0    VOLT
TANK ALARM      5



SELECT POSITION THEN
PRESS C TO CALIBRATE
      CURRENT VOLTAGE
PRESS D OR ESC WHEN DONE
```

No Bar Graph

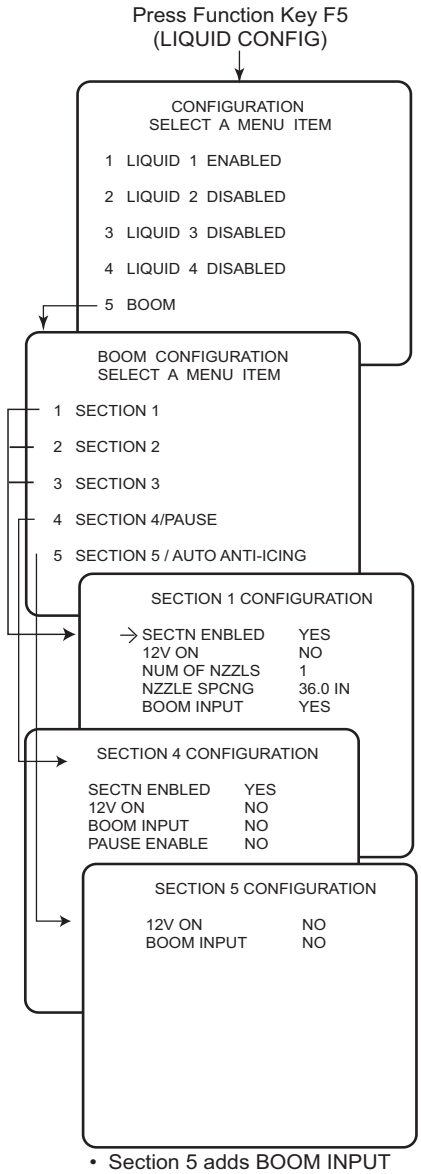
```
TANK LEVEL CALIBRATION

BARGRAPH        NO
TANK EMPTY      0.2    VOLT
TANK FULL       5.0    VOLT
TANK ALARM      25.0   GAL
CAPACITY        500.0  GAL



SELECT POSITION THEN
PRESS C TO CALIBRATE
      CURRENT VOLTAGE
PRESS D OR ESC WHEN DONE
```

BOOM CONFIGURATION

7. Press the F5 Function Key to return to Liquid Configuration screen. Select the 5 key to display the Boom Configuration screen.

Figure 36

Liquid Channel Boom Sections Configuration



- Section 5 adds BOOM INPUT selection.

8. Select a Boom Section and press a number key for the desired SECTION CONFIGURATION screen (refer to Figure 36).

The parameters for this screen are as follows:

Section 1-4

- **SECTN ENBLED** (Section Enabled) - Enter Y (YES) to enable the boom section, N (NO) to disable.
- **12V On** - Entering Y (YES) indicates +12 volts activates the section solenoid. N(NO) means grounding activates the section solenoid.
- **NUM OF NZZLS** (Number of Nozzles) - Enter the number of nozzles in the boom section.
- **NZZLE SPCNG** (Nozzle Spacing) - Enter the distance between nozzles.

Section 4/Pause

- **BOOM INPUT**- This parameter only appears for Section 4. Entering N (NO) activates Pause Enable that senses the position of an optional add-on Pause Switch and its position.
- **PAUSE ENABLE** - The Pause switch will turn the material application ON and OFF. Enter Y (YES) when using a customer-supplied Pause Switch used to turn the material application ON and OFF. Each time the pause switch shuts on and off, an event occurs that tracks mileage with on/off time in the On/Off History (F10) screen and is downloaded in the full spread report.

  NOTE: Boom Input and Pause Enable cannot both be set to Yes.

Section 5/Auto Anti-Icing

If the boom has been enabled to sense the position of a Pre-wet/Anti-ice Switch, the Liquid channel (while in the OPERATE mode) automatically switches between Liquid 1 (Pre-Wet) and Liquid 2 (Anti-ice) to avoid having to use the Material Select Screen to make the change.

To use the Pre-wet/Anti-icing auto switch input feature, SECTION 5/AUTO ANTI-ICING configuration must be set as follows:
–12V ON NO
–Boom Input NO

To use Section 5 for monitoring section 5 of a 5 section sprayer bar, set as follows:

–Boom Input YES

Prewet/Anti-icing Switch and the Monitor Sprayer Section 5 cannot be utilized simultaneously.

PROGRAMMING LIQUID APPLICATION RATES (F4)

The Application Rate screens list four liquid materials. Each material screen contains a set of values for product application rate, APR steps, min/max limits, and blast rate. The pre-programmed values for these parameters are usually the same for all liquid pre-wet materials and the same for all liquid anti-icing materials. Each screen should be edited and modified as required. **Note:** F5 should be used to select between liquids, pre-wet and anti-ice before proceeding.

1. From the keyboard, press F4 to obtain the Liquid Application Rates screen, refer to (Figure 37). Four (4) liquid product names are shown, each followed by the word ENABLED or DISABLED.
2. Select a material using the corresponding number key.
3. Edit the parameters on the selected screen. Check each following item for desired settings.

NOTE: The Material Selection screen has been updated to limit the display of prewet and anti-ice materials to only the active type when the Boom 5 input is configured for prewet/anti-ice selection. For example, if materials 1 and 2 are prewet and 3 and 4 are anti-ice with the Boom 5 switch in the prewet mode, only materials 1 and 2 will appear. Changing the switch to anti-ice at the operate screen, only materials 3 and 4 will display.

- **ENABLE** - When enabled, the material appears on the Material/ Manual Speed Select screen in the Operate mode to allow selecting for use. Enter Y for YES (enabled), N for No (disabled).

  At least one liquid product must be enabled. If the controller is granular only, all liquids can be disabled. All products can be programmed (and calibrated) now and enabled later.

- **STEP METHD** - Y (Yes) selects the Step Method or N (No) the Rate method to specify application rates (APRs). The parameters for each method are different and all items below change with the selection (Refer to Figure 33 for Rate Method screen).

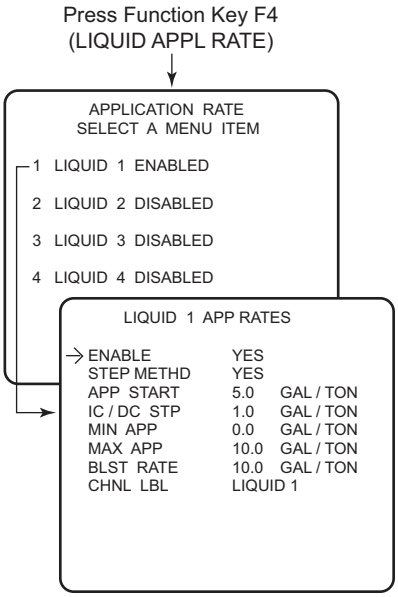
  Changing from one APR Method to the other for any material automatically clears all previous rates from that method.

  The STEP Method permits the APR to be changed by a fixed increment using the "+/–" switch on the Switch Module. The Rate method allows programming of up to ten (10) different APRs - Rate 1 through Rate 10. If less than ten rates are chosen, enter a zero (0) for each rate following the last one programmed. The initial rate displayed in the Operate mode is Rate 1. Other rates are selected by pressing the "+/–" switch on the Switch Module.

- **APP START** (Step Method) – Defines the start-point APR.
- **IC/DC STP** (Step Method) - Sets the increase/decrease step value.
- **MIN APP** (Step Method) – Defines the minimum APR limit for the product.

Figure 37

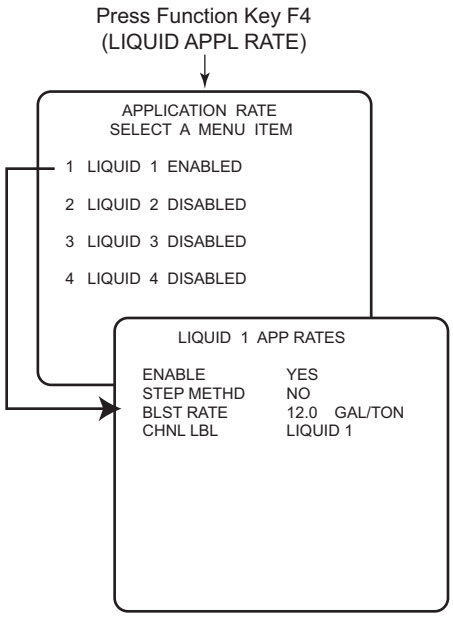
Liquid Application Rates Setup (Step Method)



- **MAX APP** (Step Method) – Defines the maximum APR limit for the product.
- **RATE 1 through RATE 10** (Rate Method) – Defines up to ten individual application pre-wet rates (Gallons/Ton).
- **BLAST RATE** (Step or Rate Method) – Defines a higher than normal, spot-application rate applied when the red BLAST button is pressed.
- **CHNL LBL** (Channel Label) (Step or Rate Method) – Any product material name of up to nine (9) characters can be keyed in. Pressing the Enter key stores the name for display on all granular screens including the Operate screen wherever that material appears.

Figure 38

Liquid Application Rates Setup (Automatic Granular Reduction)



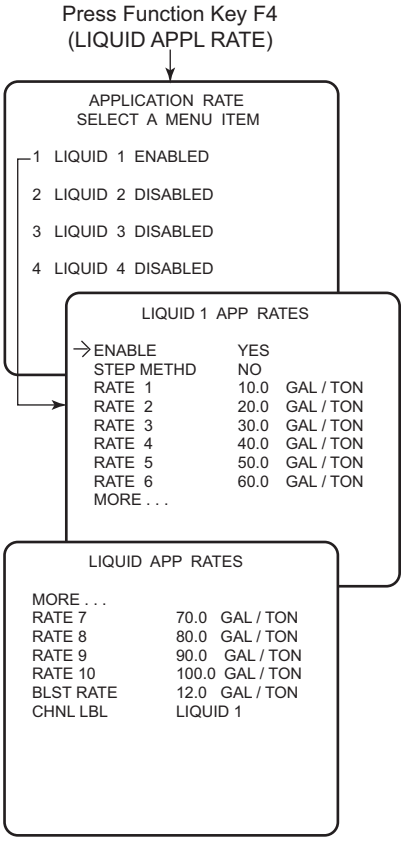
4. Press F4 to return to the Liquid Appl Rate screen. If other liquid materials require programming, repeat the above procedures for those materials.

Note: All liquid parameter definitions are the same as granular except APR measurements are in GAL/TON. If the liquid channel is anti-ice, APR units are GAL/MILE instead.

IMPORTANT: Calibration is discussed in the next section. All calibration constants not entered during programming must be determined by performing the related calibrations in the next section.

Figure 39

Liquid Application Rates Setup (Rate Method)

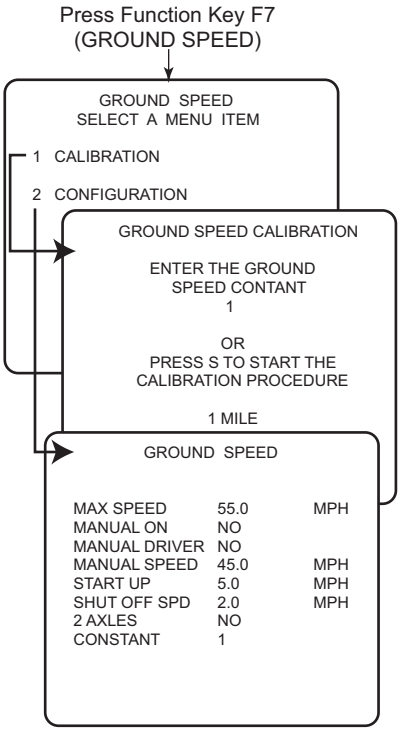


GROUND SPEED CONFIGURATION (F7)

1. From the keyboard, select Function key F7 to display the Ground Speed screen, refer to (Figure 40).
2. Press 2 to edit parameters on the screen.
   - **MAX SPEED** - Indicates the maximum speed the operator can drive in the AUTO mode before a "MAX SPEED EXCEEDED" warning appears and the alarm sounds. The value entered is arbitrary based upon knowledge of the highest speed giving acceptable system performance. If a zero (0) is entered, the function is disabled.
   - **MANUAL ON** - If the ground speed sensor becomes damaged, an internally-generated ground speed signal can be substituted temporarily to continue operation. The artificial ground speed signal activates by entering Y (Yes). This signal is also useful for testing, troubleshooting, or calibrating the vehicle while stationary.
   - **MANUAL DRIVER** - Y (Yes) enables the operator to activate the manual speed mode by adding Manual Speed selection to the bottom of the Material/Manual Speed Select screen. N (No) removes the choice.
   - **MANUAL SPEED** - Represents the ground speed in miles per hour (MPH) to be simulated with an artificial, internally-generated signal. The operator must attempt to maintain vehicle speed near this Manual Speed value to ensure materials are spread near the target APR.
   - **START UP** - Represents the speed the system begins when ground speed sensor pulses start. Until this threshold is crossed, the start up ground speed signal is used.
   - **SHUT OFF SPD -** Shut-off speed is the minimum ground speed allowed before the system stops operation. It is recommended that shut-off speed be set at 0.0 unless speed appears from a mechanical sensor.
   - **2 AXLES** - If the vehicle is equipped with a two-speed axle, enter Y (Yes). Two constants will appear at the bottom of the screen.
   - **CONSTANT** (Constant 1 and Constant 2) - Defines the number of pulses received from the ground speed sensor per mile of travel. If known, this constant can be keyboard entered. If unknown, the value automatically calculates during ground speed calibration. Those vehicles equipped with a two-speed axle require two constants, Constant 1 and Constant 2. Depending upon axle-shifter polarity, Constant 1 may be either the Lo-speed axle or the Hi-speed axle.

Figure 40

Ground Speed Sensor Configuration



GROUND SPEED CALIBRATION (F7-1)

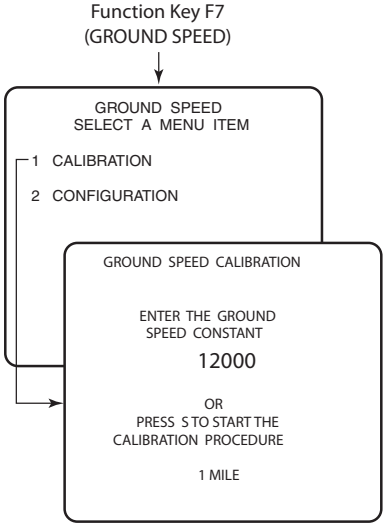
Ground speed calibration establishes a ground speed constant(s) for the vehicle. The constant is determined by counting the number of ground speed sensor pulses generated in a distance of one (1) mile. For those vehicles having two-speed axles, two ground speed constants must be determined, CONSTANT 1 and CONSTANT 2.

To Determine a Correct Constant:

1. Accurately measure one mile, plainly marking the start and finish points. Markers should be plainly visible from the cab while driving past. Alternatively, two highway mileage markers may be used.
2. Press F7 and then the 1 key to obtain the GROUND SPEED CALIBRATION screen, refer to (Figure 40).The screen appearing allows keyboard entry of the ground speed constant, if the correct value is known. To enter a number, key in the value and press ENTER. If ENTER is not pressed, a prompt screen appears asking for a Y (YES) or N (NO) before proceeding. To calculate the constant, proceed to the next step.
3. Drive up to the start of the course at a minimum speed of 5 MPH (8 Km/hr). When exactly even with the start marker, press "S" on the keyboard as prompted. The number on the screen resets to zero (0) and begins counting as the vehicle is moving.
4. Continue driving at a speed typical of normal operation. At the finish marker press "S" again to stop pulse counting. The accumulated number on the screen is the new ground speed constant. For better accuracy, it is recommended to slow down at 2nd marker so reaction time is better when pressing "S" to stop.
5. To ensure accuracy, repeat the calibration procedure three times and average the results. Keyboard enter the average value.
6. Record the GROUND SPEED CONSTANT on the CALIBRATION DATA RECORDS sheets at the rear of this manual.

Figure 41

Ground Speed Calibration, Single Speed Axle

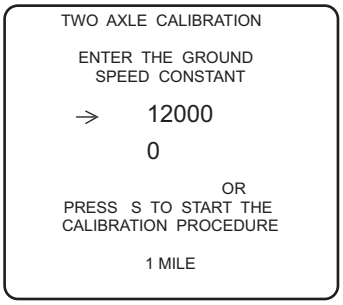


• If known, manually enter constant and press ENTER key.

7. On vehicles equipped with a 2-speed axle, the ground speed calibration procedure must be performed in both the Hi-speed and Lo-speed axle settings, refer to (Figure 42). The console automatically detects when the axle ratio has been changed. To calibrate, simply change the axle ratio and rerun.
8. Press the ESC key or any F key to leave the Calibration screen.

Figure 42

Ground Speed Calibration, Two Speed Axle



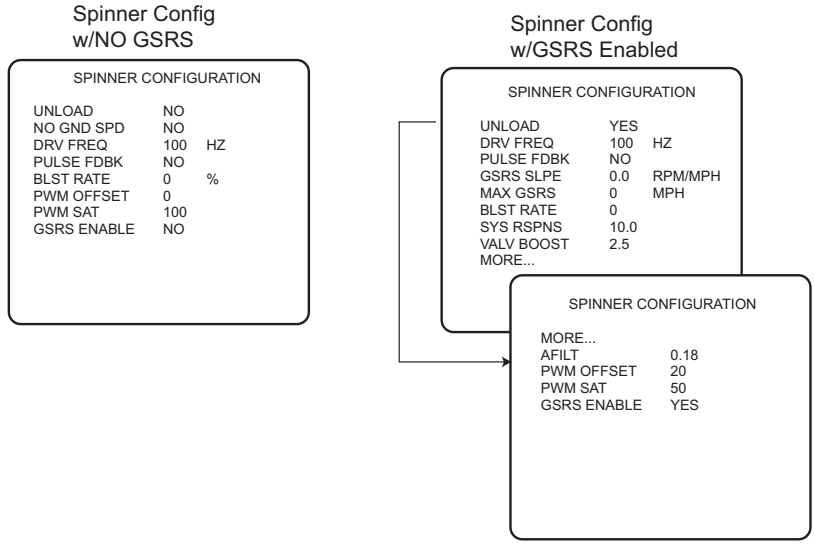
SPINNER CHANNEL CONFIGURATION (F8)

Configuration parameters specify actuators and sensors used along with performance specifications. These values do not change unless the system hardware changes or the related calibration routines are rerun.

1. From the keyboard, press F8 to display the Spinner Configuration screen.
2. Edit the parameters on the screen.
   - **UNLOAD** - YES enables or NO disables the spinner during unloading.
   - **NO GND SPD** - YES enables spinner operation when ground speed is zero; NO disables at zero speed.
   - **DRV FREQ** (Drive Frequency) - Represents the valve manufacturer's suggested drive frequency, as shown on the valve specification sheet.
   - **PULSE FDBK** (Pulse Feedback) - YES indicates a pulsed feedback sensor for closed loop control. NO indicates an open loop control.
   - **SPIN CON -** Number of pulses per spinner revolution.
   - **BLST RATE** (Blast Rate) - If set to 0%, the SPREAD WIDTH ADJUST knob position determines the spinner speed. Other values indicate the percentage of maximum spinner speed when Blast is pressed, regardless of knob setting.
   - **SYS RSPNS** (System Response) - Adjusts the control system response time to the hydraulic and mechanical systems for a particular spreader vehicle.
   - **VALV BOOST** (Valve Boost) - Increases the system gain initially applied to the control channel to reach final operating speed (target APR) as quickly as possible.
   - **AFILT** - (A Filter) - Minimizes the effects of electrical noise and mechanical vibrations on the feedback signal. The smaller the number, the greater the degree of filtering. The value can be manually fine tined for best results.
   - **PWM OFFSET** – Defines valve operating starting point.
   - **PWM SAT** – Defines valve operating end point (maximum position). PWM OFFSET and PWM SAT are manually set for proportional valves. The Proportional Valve Spinner Procedure determines the actual values (See System Calibration section).
   - **GSRS Enable -** The GSRS Mode (Ground Speed Related Spinner) enables the Control Point® to regulate the spinner speed related to ground speed and run closed loop. By controlling the spinner according to ground speed, the material can be dispersed at zero velocity.
   - **GSRS SLOPE -** Spinner revolutions per MPH.
   - **MAX GSRS -** Determines the scaling of the spinner bar graph on the Operate screen. A full bar graph indicates the max GSRS speed has been exceeded. No alarm is associated with this constant.

Figure 43

Spinner Channel Configuration Screen



MONITOR & RESET ACCUMULATORS (F9)

Accumulators store current run and season run totals of distance traveled, material amount, and time spent spreading materials in both the AUTO and BLAST modes. Separate totals are accumulated for each material. All of the current and season accumulators can be cleared (zeroed) from this mode (F9).

1. From the keyboard, press Function key F9 to display the Accumulators screen, refer to (Figure 44). Four selections appear - Granular, Liquid, Pause and Enable Clr from Current Total Screen.
2. Press 1 for GRANULAR or 2 for LIQUID to monitor the accumulators for corresponding materials. When pressing either the 1 or 2 key, four materials display for monitoring.
3. Press 3 PAUSE to display the current and season miles/hours driven in a Pause state.
4. Press 4 to enable/disable the clearing of the CURRENT TOTALS screen in the Operate mode.
5. If GRANULAR or LIQUID is selected from Step 2 above, select the material by pressing the corresponding key. A divided screen appears showing CURRENT totals (top half) and SEASON totals (bottom half).

   To clear CURRENT totals, press C. To clear both CURRENT and SEASON totals, press S. The season totals cannot be cleared separately.

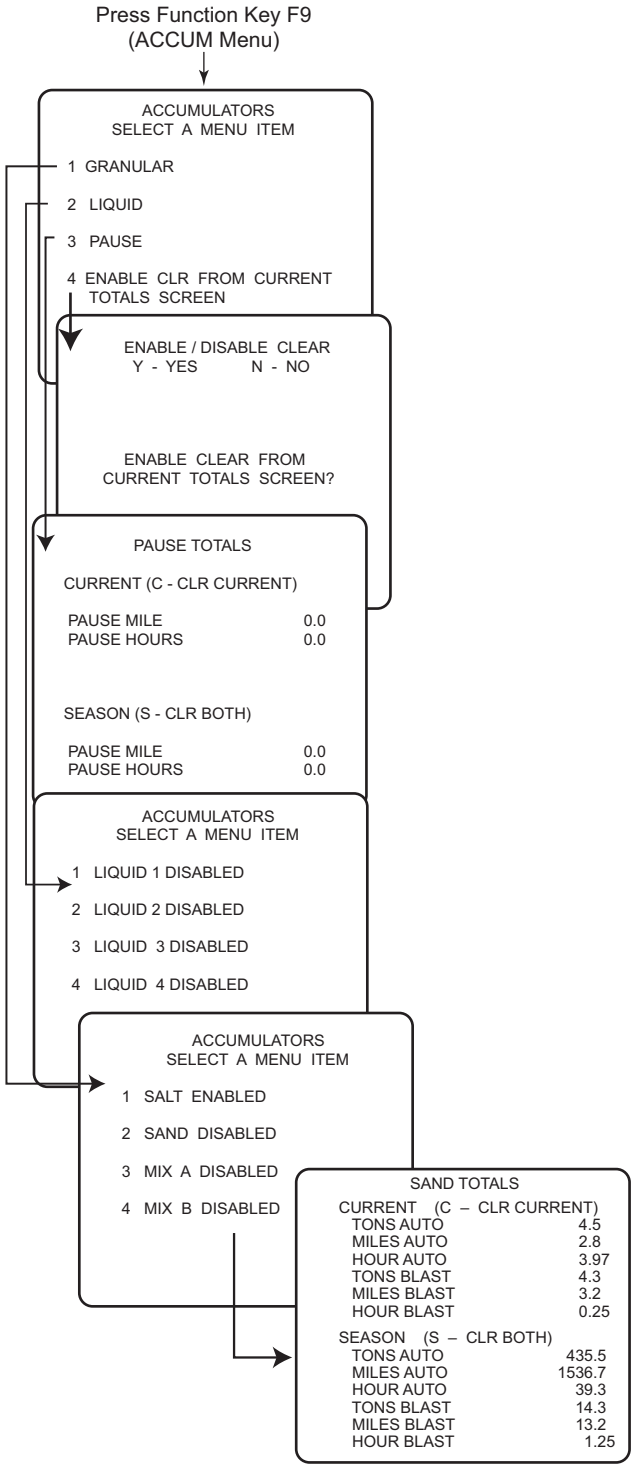
   To clear accumulators for other materials, press F9 to return to the ACCUMULATOR screen and select the next material. Continue as before to clear the totals.

   To enable clearing the CURRENT TOTALS screen in the OPERATE mode, press F9 to return to the ACCUMULATORS screen and then the 4 key to select the ENABLE/DISABLE CLR FROM CURRENT TOTALS SCREEN

6. To change status from enable or disable: YES causes the ENABLE/DISABLE CLEAR selection to alternate. A setting of NO leaves the ENABLE/DISABLE CLEAR status unchanged.

Figure 44

Access and Reset Accumulators

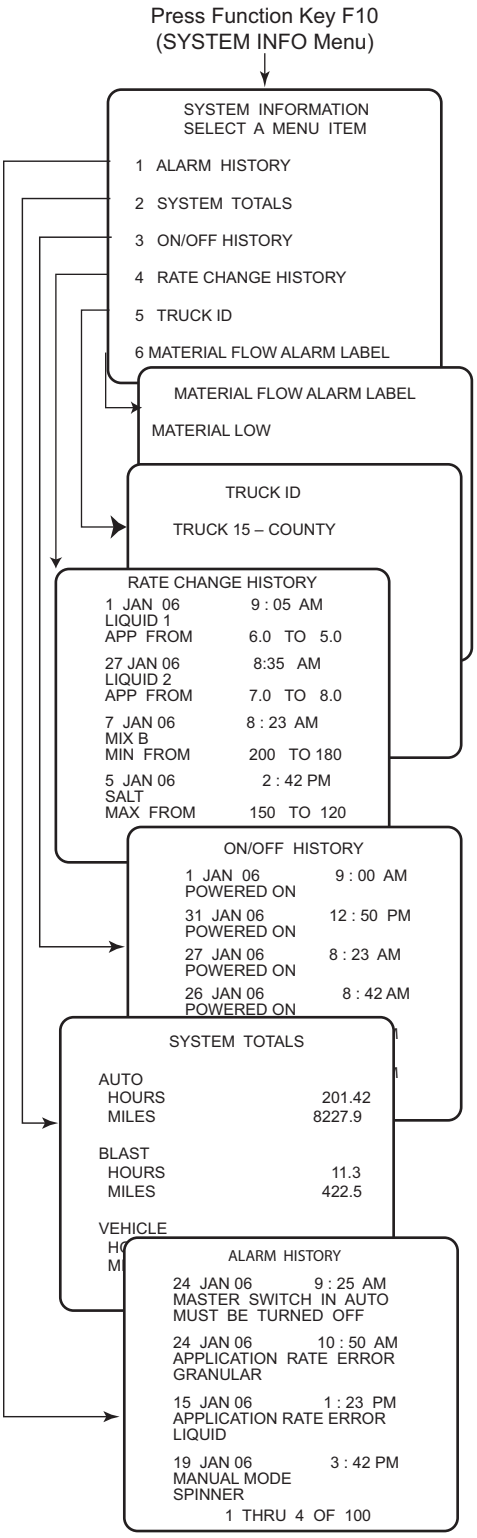


READING SYSTEM INFORMATION (F10)

1. From the keyboard, press F10 to display the SYSTEM INFORMATION screen, refer to (Figure 45).
2. Select and press the corresponding number key to view and edit the related screen.
   - **ALARM HISTORY** - Records all alarms encountered by the system including the time and date of each occurrence with a brief alarm description. A maximum of the latest 100 error events are logged with the oldest ones dropping out as new ones occur. The up/down arrow keys scroll the events for viewing.
   - **SYSTEM TOTALS** - Displays time and distance totals for all materials combined. Totals display for three categories - AUTO, BLAST, and VEHICLE. These totals are ongoing and cannot be reset.
   - **ON/OFF HISTORY -** Lists each occurrence for power on, power off, manual speed, MASTER Switch module on/off, and channel on/off with time and date for each event. A maximum of the latest 100 events are logged with the oldest events dropping out as new events occur. The up/down arrow keys scroll the events for viewing and the bottom line of the screen indicates the group of events displaying.
   - **RATE CHANGE HISTORY -** Records each occurrence with time and date of target application rate (APR) changes. A maximum of the latest 100 events are logged with the oldest dropping out as new ones occur. The up/down arrow keys scroll the events for viewing.
   - **TRUCK ID -** This screen allows entering an identifying name for the truck which can be changed at anytime. The entry is changed by typing the new name and then pressing the ENTER key to accept the change. A Truck ID is a required entry when using a wireless switch module.
   - **MATERIAL FLOW ALARM LABEL**- An alarm indication that indicates low material levels when a Hopper Lever sensor of material flow sensor is used. The Material Flow Alarm Label is user-definable up to 22 characters.

Figure 45

Accessing System Information



PERFORMING SYSTEM RESPONSE (F11)

After all configuration constants have been entered for a given vehicle, the SYSTEM RESPONSE must be performed in preparation for spreading materials as described in the System Calibration section.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SYSTEM CALIBRATION

Due to the many combinations of hydraulic/liquid pumps, valves and motors plus the different material delivery systems, each spreader truck becomes unique. System calibration defines the spreader configuration characteristics for optimum accuracy of the Control Point® system. Performing the following procedures in the order outlined ensures the greatest accuracy when finished.

RECORDING CALIBRATION DATA

After finishing each routine, record the calibration constant on the CALIBRATION DATA RECORD sheets at the rear of this manual. If console replacement becomes necessary, most system parameters can be quickly transferred to the new unit via wireless transfer (Control Point® version 7.27 or higher with wireless base station) or keyboard entry.

If additional sheets are required, make copies and keep them with this manual.

REPEATING CALIBRATION RUNS

To minimize operator and other procedural errors, most tests should be repeated several times (three times), average the results, and keyboard enter the constants. The SYSTEM RESPONSE CALIBRATION does not require repeating.

MAINTAINING CALIBRATION ACCURACY

The below conditions should be followed to maintain accurate system calibration.

1. If a new material is added and the spreader, nozzle, or flowmeter constant is not accurately known, the GRANULAR or LIQUID CALIBRATION routine must be run.
2. If wear of the conveyor/auger mechanism, actuator valves, flowmeter, nozzles, or other system components is suspected, a new catch test (GRANULAR or LIQUID CALIBRATION) should be performed to re-establish APR accuracy.
3. After installing new or different tires, the GROUND SPEED CALIBRATION should be repeated.
4. Each known physical (mechanical) change in the system should be followed immediately by a SYSTEM RESPONSE calibration on the related control channel (granular, liquid pre-wet, liquid anti-ice, or spinner).
5. Repair or replacement of any system components, including hydraulic hoses, fluid changes and even normal wear, make it necessary to periodically recalibrate the system.
6. Even without known changes, the SYSTEM RESPONSE CALIBRATIONS should be performed at minimum intervals of one year. A good rule of thumb is to recalibrate all three control channels at the start of each spreader season.


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CALIBRATION SYSTEM RESPONSE (F11)

These constants adjust the response time of the Control Point® system to the hydraulic and mechanical systems. This procedure determines the System Response (SYS RSPNS) and related constants (VALV BOOST, PWM OFFSET, and AFILT) for each of the three control channels (granular, liquid, and spinner).

Constants normally vary slightly each time a SYSTEM RESPONSE CALIBRATION is run. Manual fine-tuning for optimum performance is permissible (See paragraph "Fine-tuning System Response Parameters"). To maintain a performance history, always record new constants on the CALIBRATION DATA RECORD sheets each time a routine is run or fine-tuned.

- **GRANULAR -** During calibration, a set of values for SYS RSPNS, VALV BOOST, PWM OFFSET, and AFILT automatically calculate, store, and display on the GRANULAR CONFIGURATION screens for all (up to four) granular materials.
- **LIQUID PR-WET -** The pre-wet spray bar and anti-icing boom liquids require separate procedures due to differences in flowmeters, nozzles, and plumbing components. Calibration establishes a similar set of parameters as above for all pre-wet liquid materials.
- **LIQUID ANTI-ICING -** Calibration establishes a similar set of parameters as above for all anti-ice materials used on the system.
- **SPINNER -** Calibration determines the spinner channel parameters and correlates the fully clockwise position of the WIDTH ADJUST knob with the 100% mark on the SPREAD WIDTH bar display.

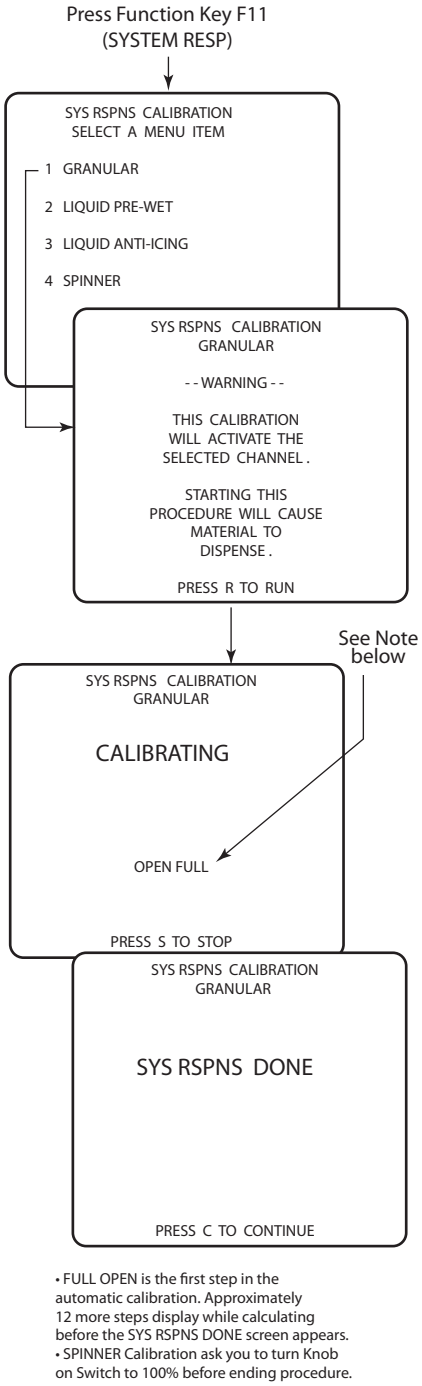
GRANULAR SYSTEM RESPONSE CALIBRATION

Liquid prewet and liquid anti-ice channels are very similar and, therefore, not specifically described or shown.

1. Press F11 to obtain SYSTEM RSPN CALIBRATION menu. Four choices display, refer to (Figure 46).
2. Press 1 to select GRANULAR. A warning screen states CALIBRATION WILL ACTIVATE THE SELECTED CHANNEL when the test begins.
3. When ready to start, press “R” on the keyboard. A screen appears to indicate CALIBRATING. When finished, a screen appears stating SYS RSPNS DONE.

Figure 46

System Response Calibration Screens



• FULL OPEN is the first step in the automatic calibration. Approximately 12 more steps display while calculating before the SYS RSPNS DONE screen appears.
• SPINNER Calibration ask you to turn Knob on Switch to 100% before ending procedure.

4. When the calibration is complete, press the "C" key to continue as prompted at the bottom of the screen. The resulting values automatically record in the proper locations. Access the GRANULAR CONFIG Function (F3) and copy the numbers to the CALIBRATION DATA RECORD SHEET in the rear of the manual.

5. Repeat this procedure for the remaining control channels. Multiple runs and averaging results are unnecessary. Liquid must be primed before running a system response. The UNLOAD feature can be used to prime the pump.

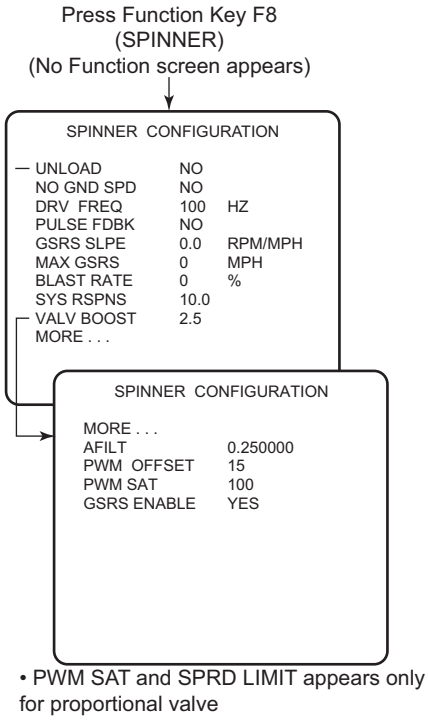
FINE TUNING SYSTEM RESPONSE CONSTANTS

The Automatic System Response routines are not necessarily exact. Operators may want the system to respond faster or slower than calculated by the automatic routines. These values can be adjusted slightly to tailor the response to operator needs.

IMPORTANT: Automatic routines must always be run prior to modification to establish basic values. The following are a few general guidelines.

Figure 47

Proportional Valve Spinner Calibration Screens



SYS RSPNS CONSTANT

If the control system responds slowly to changes in speed and is slow to start, the SYS RSPNS value should be increased. If the system is oscillating around the target APR, the SYS RSPNS may be too large and should be decreased. Excessive oscillation should be limited to ±5% of the target APR to minimize wear on the PWM valve. Most systems can be tuned by altering only this value.

VALV BOOST

This value increases SYS RSPNS only at start-up to more quickly start system spreading. The value does not affect stability when operating at the target APR and does not normally require changing.

AFILT

This value defines the amount of feedback noise rejection. The smaller the number, the greater the filtering. Noisy feedback sensors cause the APR's to randomly jump around. Decreasing the AFILT may reduce the problem but also can cause the system to become more sluggish. Typically, this value does not require changing, but check the response time if fine tuning becomes necessary.

PROPORTIONAL VALVE SPINNER CALIBRATION

This calibration determines appropriate values for PWM OFFSET and PWM SAT when using a proportional valve with no feedback sensor to drive the spinner channel, refer to (Figure 47).

1. With the spinner width adjust knob fully counterclockwise (CCW), verify the spinner is not rotating. These checks must be performed in the Operate mode. Rotate the spinner width adjust knob clockwise (CW) one position and verify spinner rotates slowly. If it rotates too fast, decrease OFFSET by one (1). If it rotates too slowly, increase OFFSET by one (1).
2. With the spinner width adjust knob fully clockwise (CW), verify the spinner is running at full speed. If it is rotating too slowly, increase the SAT value by one (1) and recheck. Repeat as necessary. The maximum value for SAT is 100.
3. If the spinner turns too fast, decrease the SAT value until a satisfactory maximum speed is obtained. The SAT value must be greater than the OFFSET value.

GRANULAR MATERIALS CALIBRATION (F6)

The GRANULAR CALIBRATION determines the spreader constant (SPR CON) for a given granular material. The spreader constant is the number of pulses generated by the application rate sensor per pound of granular material discharged. A separate calibration routine must be run for each granular material used.

GRANULAR CALIBRATION (also referred to as a granular "catch test") causes the control system to run the conveyor/auger mechanism, dispensing material while the vehicle is stationary. When a sufficient amount of material has been discharged, the operator stops the spreader mechanism, weighs the material discharged, and keyboard enters the amount. The system then calculates, stores, and displays the SPR CON.

The procedural steps are as follows:

1. Load the vehicle hopper with the desired material and verify the gate height is adjusted to the proper setting on V-Box spreaders. If tailgate spreads are in use, make sure auger is full. Load enough material to provide a uniform flow throughout the calibration procedure.
2. Position a suitable container or drop cloth to catch all dispensed material from the conveyor/auger. The container must be large enough to obtain a good, representative sample. The larger the sample weighed, the better the accuracy. Alternatively, if a vehicle scale is available, weigh the truck before and after dispensing material.
3. Press Function key F6 to access the CALIBRATION MENU screen. Press the 1 key to select GRANULAR CALIBRATION.
4. Select the granular material for calibration (keys 1 - 4). The words ENABLED and DISABLED after the selected product have no significance to the calibration. (Figure 48) illustrates the SALT CALIBRATION selection. Other selections are equivalent.

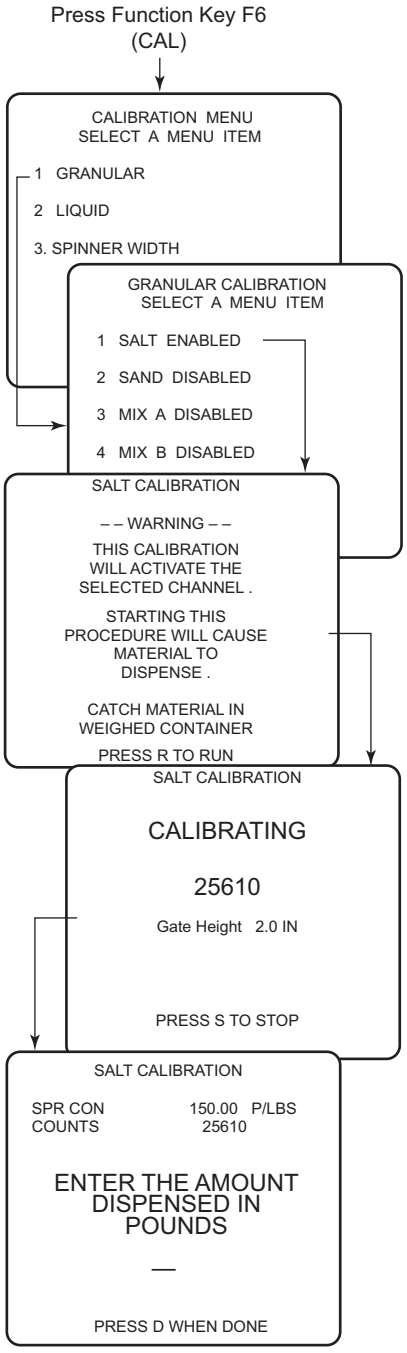
CAUTION

A warning message displays STARTING THIS PROCEDURE WILL CAUSE MATERIAL TO DISPENSE. Ensure all personnel are clear before starting the next step.

IMPORTANT: If using a Gate Height Sensor, calibration must be verified before the Spreader Calibration.

Figure 48

Granular Calibration



5. With the vehicle stationary, engage the hydraulic system. Increase engine RPMs to normal operating range.
6. Press "R" on the keyboard to run the conveyor/auger and start the calibration. The number in the middle of the screen shows the counts accumulating from the APR sensor. If a count is not recorded and stays on "0", stop the test and check the application rate sensor.

7. When a sufficient amount of material has been dispensed, press "S" to stop the system. A screen appears showing the previous SPR CON and the sensor COUNTS accumulated during the current run. The screen asks for an entry of pounds before proceeding. Perform the next step while the screen waits for the results.
8. If using a vehicle scale, reweigh the truck and calculate the amount of material dispensed in pounds.
9. Enter that number into the console and press ENTER. Press "D" when finished. The spreader constant (SPR CON) is now stored and displayed on the SALT CALIBRATION screen and on the GRANULAR CONFIGURATION screen for this material.
10. For maximum accuracy, repeat the entire procedure at least three times. Temporarily write down the resulting SPR CON each time. Average the results and keyboard enter the average as the final SPR CON. Then record the SPR CON for this material on the CALIBRATION DATA RECORDS sheets at the rear of this manual.
11. Repeat this procedure for each granular material used.

GRANULAR CALIBRATION FINE TUNING

If small but consistent application rate errors are observed over a period of time, the spreader constant can be modified to fine-tune application accuracy. See Appendix A for steps required to calculate the new spreader constant, which is then keyboard entered on the (F3) GRANULAR CONFIGURATION screen. Alternatively, the GRANULAR CALIBRATION routine can be repeated to correct this type of APR error.

LIQUID MATERIALS CALIBRATION (F6)

The LIQUID CALIBRATION determines a flowmeter constant (K-FACTOR) for each liquid material used. The K-FACTOR represents the number of pulses generated by the flowmeter per gallon of liquid dispensed. The NZLE CNST is a measure of flow rate through the nozzle at a standard pressure. Separate calibrations are necessary for each liquid material because of viscosity differences.

The LIQUID CALIBRATION routine (also referred to as a liquid "catch test") causes the control system to run the liquid pump, dispensing material while the vehicle is stationary. When a sufficient amount of liquid has been discharged, the operator stops the system, weighs the discharged liquid, and keyboard enters the amount. The system then calculates, stores, and displays the K-FACTOR (NZLE CNST).

The procedural steps are as follows:

1. Load vehicle tank with the material.
2. Position a suitable container to catch all the material dispensed through the liquid pump. The container must be large enough to obtain a good, representative sample. The larger the sample weighed, the higher degree of accuracy. When calibrating a pre-wet liquid material, the pre-wet bar may be removed from its mounting and placed inside the catch container. Alternatively, especially for flowmeter based anti-ice liquid materials, temporarily disconnect an appropriate hose and place inside the catch container.

3. Press Function key F6 to access the CALIBRATION MENU screen. Press the 2 key to select LIQUID for the FLOWMETER CALIBRATION screen, refer to (Figure 49).
4. Select the liquid material for calibration (key 1 - 4).The words ENABLED and DISABLED after the selected product have no significance to the calibration. Figure 39 illustrates the LIQUID 1 CALIBRATION selection. Other selections are equivalent. For pressure based anti-ice systems, it is necessary to enter a target pressure. This should be the nozzle manufactures rating pressure, typically 40 psi (2.75 bar).

Note: If running pressure, make sure booms are drained prior to running "OFFSET".

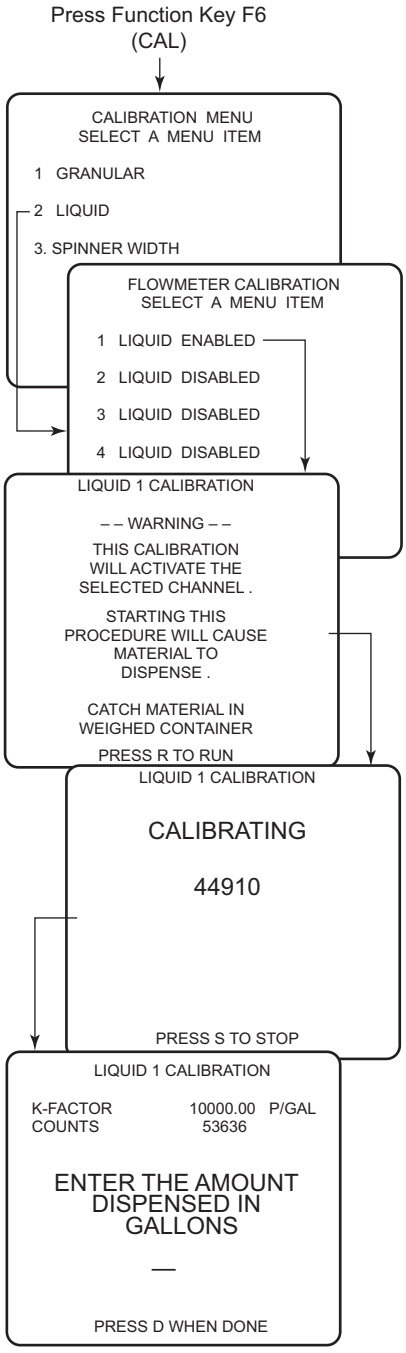
CAUTION

A warning message displays stating STARTING THIS PROCEDURE WILL CAUSE MATERIAL TO DISPENSE. Ensure all personnel are clear before starting the next step.

5. In the case when ONLY the liquid channel is propelled by the hydraulic system, start the engine, keeping the vehicle stationary. Engage the hydraulic system, and increase engine RPMs to normal operating range.
6. Press "R" on the keyboard to run the liquid pump and start the calibration routine. For flowmeter based systems, use the liquid channel "+/-" switch on the Switch Module, as necessary, to obtain an adequate discharge rate. The number displayed indicates the accumulating count from the APR sensor.
7. When a sufficient amount of liquid has been dispensed, press "S" to stop. For a flowmeter based system, a screen appears showing the previous K-FACTOR and the sensor counts accumulated during the current run. For a pressure based system, the previous NZLE CNST and collection time are displayed. The screen asks for an entry of gallons before proceeding. Perform the next step while the screen waits for the results.
8. Weigh the material caught and calculate the amount dispensed in gallons.
9. Enter that number into the console and press "ENTER". Press "D" when finished. The flowmeter constant (K-FACTOR or NZLE CNST) is now stored and displayed on this screen and on the LIQUID CONFIGURATION screen for this material.
10. For maximum accuracy, repeat the entire procedure at least three times. Temporarily write down the resulting K-FACTOR (NZLE CNST) each time. Average the results and keyboard enter the average as the final K-FACTOR (NZLE CNST). Then record the K-FACTOR (NZLE CNST) for this material on the CALIBRATION DATA RECORDS sheets at the rear of this manual.
11. Repeat this procedure for each liquid material used.

Figure 49

Liquid Calibration



LIQUID CALIBRATION FINE TUNING

If, after using a flowmeter or nozzle constant over a period of time, small but consistent application rate errors are observed, its value can be manually changed to fine-tune application accuracy. See Appendix A to calculate the modified flowmeter constant, which is then keyboard entered on the LIQUID CONFIGURATION (F5) screen. Alternatively, the LIQUID CALIBRATION routine can be repeated to correct this type of APR error.

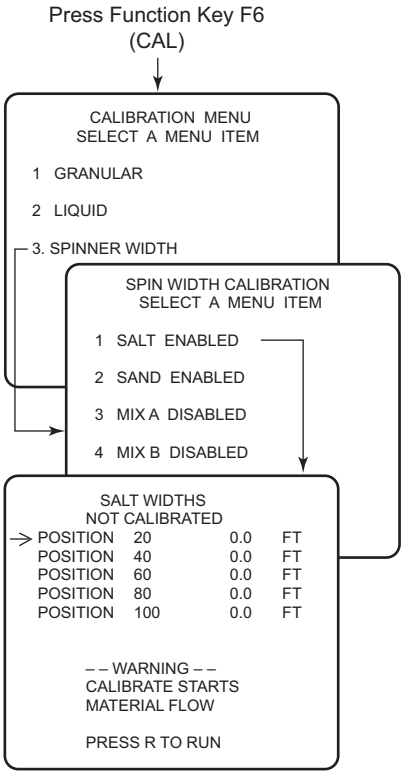
CALIBRATING SPINNER WIDTH (F6)

The spinner width calibration determines the spread width as indicated by the spinner knob position for area based units (i.e. MILE-FEET, SQ FEET, SQ YARD, KILOMETER-METER, and SQ METER). Area based units are selected in the Miscellaneous menu (F12) under SYSTEM UNITS (Item 3). Since vehicles vary, a multi-point calibration is necessary to assure accurate spreading throughout the spinner knob range. Also, material densities vary requiring separate calibrations.

1. Load the vehicle with material.
2. Press Function key F6 to access the CALIBRATION MENU. Press the 3 key to select SPINNER WIDTH.
3. Select a material for calibration (Items 1 through 4). The words ENABLED and DISABLED after the selected product has no significance to the calibration. Figure 50 illustrates SALT CALIBRATION; other selections are equivalent.
4. Place the Spinner Knob at 0 and press R. The spinner mechanism actives after pressing R. Placing the knob at 0 shuts the spinner off. This verifies the valve OFFSET value is correct.
5. Rotate the Spread Width knob to 20. Measure and record the width material is spread. Repeat at 40, 60, 80, and 100. The arrow on the left side of the screen automatically follows the Spread Width knob setting. The arrow position allows measured widths to be entered into the proper location.
6. Press S to stop the routine when finished.

Figure 50

Spinner Width Calibration

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TROUBLESHOOTING

The Control Point® system contains six basic components, each with a specific function. Component failures normally react in predictable ways, making fault isolation relatively easy. If certain components are not operating properly, such as a hydraulic pump or motor, system performance is degraded and the console may incorrectly appear to be at fault.

Table 1. Component Interconnections

Component	Connected To	Function
Console	12VDC vehicle battery and all components of control system.	Compares vehicle ground speed to conveyor/auger and liquid pump speeds and controls the hydraulic valves (or DC motor for liquid) for the desired application rates.
Switch Module	Console	Provides operator controls for system real-time functions.
Vehicle Ground Speed Sensor	Mechanical or electronic speedometer.	Indicates vehicle ground speed to console.
Sensors for Application Rate	Conveyor/auger and spinner or related hydraulic motor shafts, plumbing after liquid pump.	Indicate conveyor/auger speed, spinner speed, and liquid flow and Spinner Speed rate or pressure to Console.
Actuators for Servo or Proportional Valves and Liquid Pump	Conveyor/auger and spinner hydraulic control valves and liquid pump.	Regulate conveyor/auger speed, spinner speed, and liquid flow rate.
Harnesses	All components	Connect all components.

Table 2. Common Spreader Problems (Control System Normal)

Symptom	Probable Cause	Corrective Action
Conveyor/auger does not run in either AUTO or UNLOAD	1. Hydraulic pump off. 2. Manual valve closed. 3. Hydraulic quick-connector loose. 4. Conveyor/auger jammed 5. Relief valve operating at low pressure. 6. Loss of hydraulic oil.	1. Engage pump. 2. Open valve. 3. Reconnect. 4. Clear jam. 5. Adjust or replace. 6. Repair leak and refill oil.
Convey/auger does not reach maximum speed	1. Faulty hydraulic system. 2. Conveyor/auger binding. 3. Relief valve defective or set lower than specified. 4. Material lumping and jamming conveyor/auger. 5. Engine RPM low because using wrong gear or axle.	1. Repair hydraulic system. 2. Eliminate binding. 3. Adjust to proper pressure or replace valve. 4. Clear. 5. Shift to lower gear and/or axle.
Inaccurate application (APR error exceeds 10%)	1. Material density changed from original calibration. 2. Feed-gate setting changed. 3. Inaccurate ground speed input because tire size or axle ratio has been changed.	1. Repeat Granular Calibration. 2. Set gate to position used during Granular Calibration. 3. Repeat Ground Speed Calibration.

CONSOLE DOES NOT POWER ON

Corrective Action

1. Check for blown fuse, located in positive battery lead. If blown, replace with blade-type, same size fuse.
2. Check for poor connections to the battery; remove any corrosion. Also check battery polarity.
3. Check the red ignition wire.
4. Visually inspect power cable from rear of Console to battery. If damaged, replace cable/repair.
5. If no problem can be found with power connection or power cable, console may be at fault. Contact DICKEY-john Technical Support at 1-800-637-3302.

MANUAL MODE FLASHES ON DISPLAY

Probable Cause

If the words "MANUAL MODE" are flashing on the display, the Control Point® system may have reverted to the manual override function to compensate for a sensor failure (liquid flowmeter, conveyor/auger sensor or spinner sensor). If so, the system is operating in open loop control to allow spreading/spraying to continue until sensor repair/replacement is possible.

Corrective Action for Granular System:

1. If material is not spreading (Conveyor or auger stopped).

- Make sure the PTO is engaged.
- Check for lodged obstacles in conveyor or auger.
- Check for a hydraulic system failure (pump, valve, hydraulic motor).

2. If material is spreading (conveyor or auger turning).

- Check for a disconnected or slipping conveyor sensor coupling.
- Unplug connector nearest the conveyor sensor. Check for +12V between the RED and BLK wires and +8V between the GRN and BLK wires. Absence of either voltage indicates a broken or shorted wire within the cable assembly or a corroded pin in the connector. If voltages are present, replace the conveyor sensor.

Corrective Action for Liquid System

1. If liquid is not spraying.

- Check tanks for proper level.
- Check liquid filters for plugging.
- Check pump and wires to pump for corrosion and correct voltage.

2. If liquid is spraying.

- Check flowmeter for debris jamming the paddle wheel.
- Unplug the connector nearest the flowmeter sensor. Check for +12V between the RED and BLK wires and +8V between the GRN and BLK wires. The absence of either voltage indicates a broken or shorted wire

within the cable assembly or a corroded pin in the connector. If voltages are present, repair/replace the flowmeter sensor.

AUTO INOPERATIVE; UNLOAD OPERATES

Probable Cause

If the spreader/sprayer does not function when the MASTER Switch is in AUTO but does in the UNLOAD position, the ground sensor may have failed.

Corrective Action

1. Check the ground speed reading (MPH) on the console. If the ground speed reading is 0 when the truck is moving;
- Check wires and connections between the DICKEY-john ground speed sensor and the console.
- Check wires and connections between the DICKEY-john ground speed sensor and the transmission speed sensor.
2. Check the ground speed calibration number programmed in the console (F7). Compare the number to the original setting. Typically, the constant should be between 35000 to 60000.
3. Next, replace the ground speed sensor.
4. If the failure continues, replace the MASTER switch module and then the console.

IMPORTANT: The Control Point® system can continue operating without a "true" ground speed sensor input by setting the MANUAL SPEED to YES in the GROUND SPEED CONFIGURATION (F7) screen. With this enabled, the console simulates an artificial ground speed signal which appears on the display.

To spread/spray in this mode, set the MASTER Switch to the AUTO position and drive the truck at the displayed SPEED. To stop spreading, switch the MASTER Switch back to the OFF position.

DISPLAYED APR FLUCTUATES

Probable Cause

If the actual APR displaying on console fluctuates more than 5% above and below the target APR while the vehicle maintains a steady speed, the System Response should be investigated.

Corrective Action

1. System Response (SYS RSPNS) constant is too large. See heading "Fine-tuning System Response Constants" in the System Configuration section.
2. Check APR sensor for loose coupling or slipping on shaft.

DISPLAYED APR RESPONDS SLOWLY

Probable Cause

If the actual APR displaying on the console is slow responding to ground speed or target APR changes or stabilizes at the wrong value, the System Response may require fine tuning.

Corrective Action

1. System Response (SYS RSPNS) constant may be too small. Refer to Fine-tuning System Response Constants section.

SPINNER ROTATIONAL SPEED INCORRECT

Corrective Action

1. Check PWM OFFSET and PWM settings in SPINNER mode (F8) for incorrect setting.
2. Check for variations in granular material density dropping onto the spinners from the conveyor/auger.
3. On proportional valves, increases in electrical coil resistance due to heat buildup can cause valve position shifts, resulting in speed changes.
4. Check for drag due to snow and ice buildup.

APPLICATION RATE ERROR

Probable Cause

If an APPLICATION RATE ERROR flashes on the display and the alarm sounds, a fully open valve is indicated but the target APR cannot be achieved.

Corrective Action for Granular System

1. Reduce the truck ground speed to allow the system to catch up and the error to clear.
2. Shift to a lower gear to increase engine RPM and hydraulic pump rotation.
3. Check hydraulic disconnects and filter.
4. Ensure correct spreader constant is programmed into console. Check original setting or run a Granular Calibration (F6).
5. Incorrect PWM SAT setting (See Granular Configuration screen - F3). Compare against original setting or run System Response on the Granular channel (F11) setting.
6. Check for insufficient hydraulic oil flow at normal engine RPM.
7. Check spreader valve, electrical connections to the valve coil, resistance of the coils (See manufacturers specifications), and verify voltage from control console.

Corrective Action for Liquid System

1. Check to see if the liquid tanks are low, shut off valves are partially closed, bypass valves are open too far, or an obstruction is in the liquid tank outlet.
2. Check filters between the liquid tank and suction side of the liquid pump for blockage.
3. Check for plugged nozzles or nozzles that are too small to supply sufficient gallons per minute.
4. If using a electric liquid pump, check that the nozzle pressure (spray bar pressure) does not exceed 40 psi. Some electric pumps have an internal pressure switch to shut pump off high back pressure conditions.
5. Ensure a correct K-FACTOR is programmed. Compare it against the number stamped on the flowmeter body or recorded on the Calibration Data Record Sheet. If original settings are not available, run a Liquid Calibration (F6).
6. Observe the PWM SAT under the Liquid Configuration screen (F5). Compare against original setting. If not available, run a System Response on the Liquid Channel (F11).

SYSTEM DOES NOT OPERATE

Probable Cause

If the system does not respond with the Master switch in Auto or Unload or the Blast button has not effect, the hydraulic valve may not be opening to supply hydraulic oil to the conveyor motor (spreader system) or the pump may not be rotating to supply liquid to the spray bar (liquid system).

Corrective Action

The following four steps describe repair for a pulse width modulated hydraulic valve (Rexroth, Gresen, Vickers, Parker, etc.). Begin by disconnecting the electrical connections at the solenoid coil and then set the MASTER Switch into UNLOAD position to prevent possible damage to the PWM valve driver and coil.

1. Check voltage readings on the granular valve connector of the main harness at pin 16 and 8. Use pin 15 as ground. Pin 16 should read battery voltage (+12V); pin 8 reads a percentage of +12V determined by PWM SAT value entered under Granular Configuration (F3). (i.e. If PWM SAT is 40, then a reading of +4.8 V. –12 x .40 = 4.8 be present).
2. Check voltage readings at the solenoid valve coil. The WHT wire supplies the PWM voltage signal to the coil; the GRY wire is signal ground. Voltage reading should be equal to reading in step above. If voltages are not present, check wiring harnesses for cuts or shorts.
3. If voltages are present a hydraulic valve or hydraulic flow problem is indicated.
4. If the above checks are normal, replace the PWM valve driver. If this does not the solve problem, replace the console.

Corrective Action for Granular Channel

Begin by disconnecting the electrical connections at the solenoid coil. Then set the MASTER switch to the UNLOAD position for the following two steps to prevent possible actuator damage.

1. Check voltage readings on the granular valve connector of the main harness at pins 16 and 8. Use pin 15 as ground. Pin 16 and 8 should read battery voltage (+12V).
2. If voltages are present and actuator does not rotate, replace the actuator.
3. If voltages are not present replace main harness, valve extension cable, or console.

Corrective Action for a Sprayer Channel

If the sprayer system is not spraying, begin by disconnecting the electrical connections at the pump or solenoid coil. Then switch the MASTER switch to the UNLOAD position for the following checks to prevent possible damage to the liquid valve driver and coil.

1. Check voltage reading on the RED and BRN wires at the liquid valve connector of the main harness. Use the BLK wire as ground.

The RED wire should read battery voltage (+12V) and the BRN wire should read a voltage equal to a percentage of +12V determined by PWM SAT value entered under LIQUID CONFIGURATION (F5) (i.e. If PWM SAT is 90, then a reading of +10.8V –12 x .9 = 10.8 should be present).

Check voltage readings at the pump or solenoid coil on the valve. The RED wire supplies the PWM voltage signal to the pump or solenoid coil, while the BLK wire is signal ground. Voltage reading should be equal to those above.

2. If voltages are present but sprayer does not spray, the pump, solenoid coil, hydraulic valve, or hydraulic flow may be faulty.If voltages are not present, check wiring harnesses for cuts or shorts, then replace the liquid valve driver. If this does not solve problem, replace the console.

Figure 51

System Wiring Diagram, Console and Cab Harness

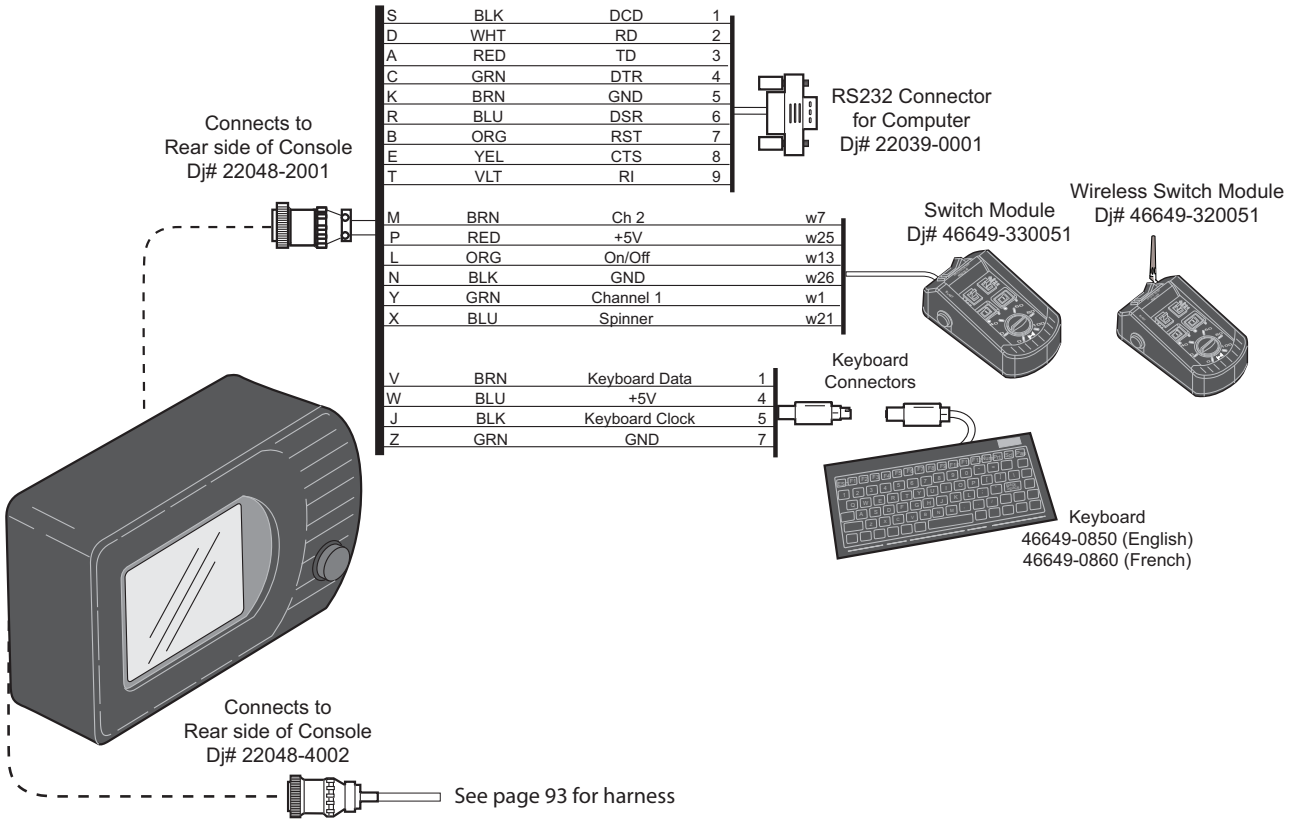


Figure 52

System Wiring Diagram, Truck Harness and Sensors (P/N 46649-0485 and 46649-0486)

Note: Alpha characters in front of pin numbers indicate pin numbers of console connector.

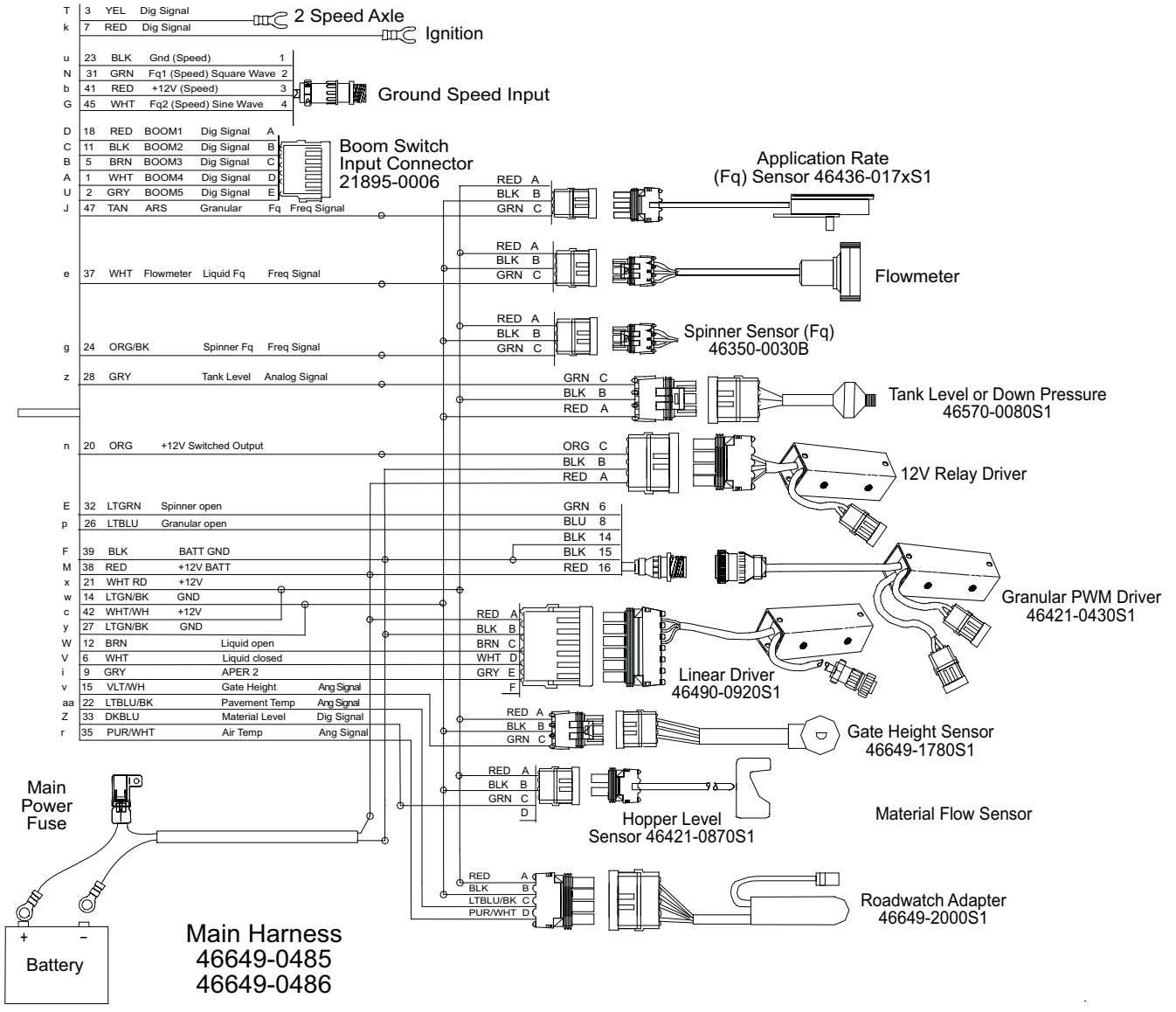
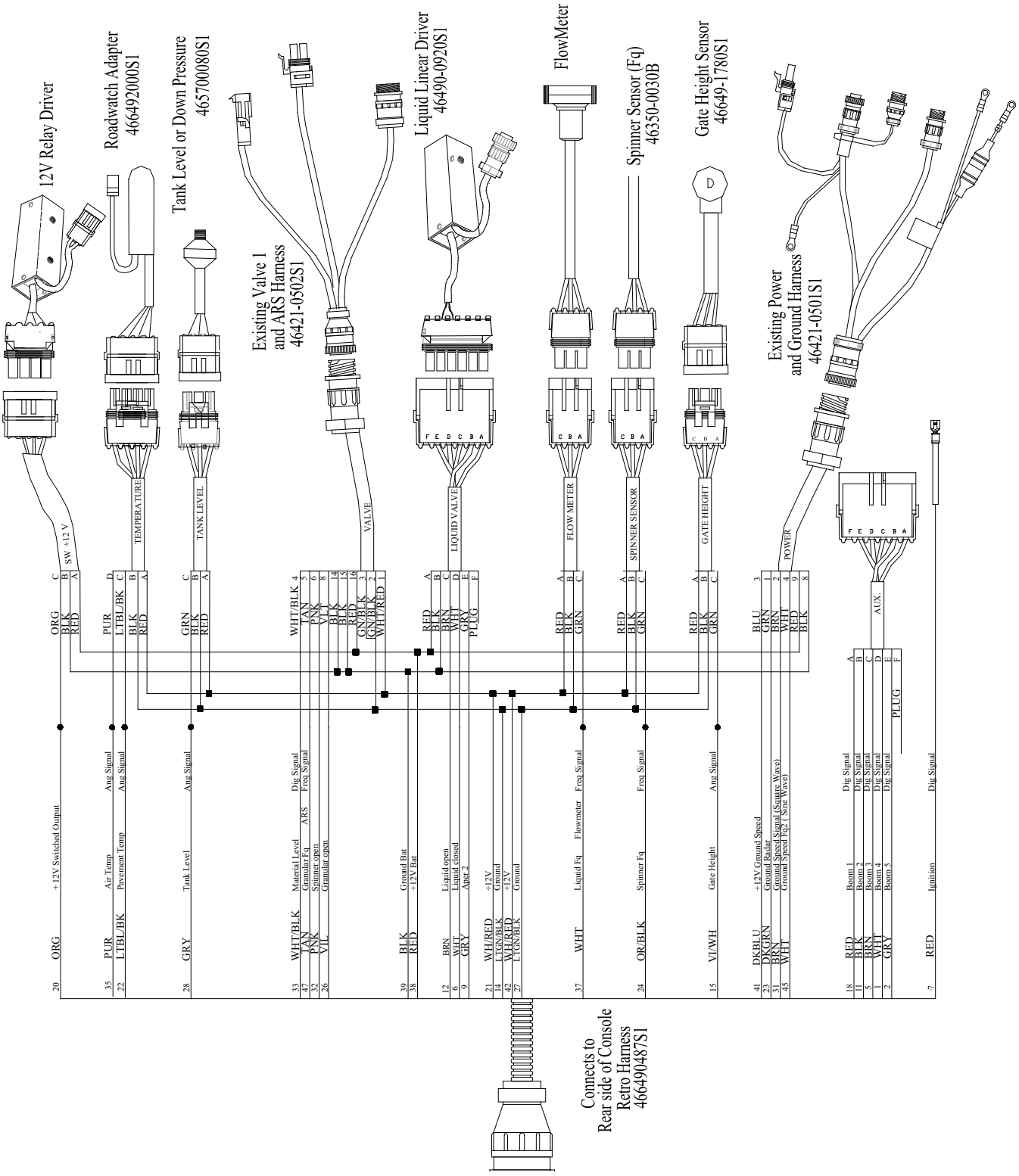


Figure 53

Retro Harness



APPENDIX A CONVERTING CONSTANTS

FINE TUNING APPLICATION

Adjusting Granular Constants

If small (less than 10%) but consistent granular APR errors (either high or low) are observed over a period of time, fine tuning of the system can be performed by adjusting the value of the spreader constant by the same percentage as follows:

$$\text{New SPR CON} = \text{Old SPR CON} \times \frac{\text{Target APR}}{\text{Actual APR}}$$

EXAMPLE: If SPR CON is 100 and Target APR is 300 LBS?MILE but Actual APR is known to be 315 LBS?MILE, adjust SPR CON using the above formula:

$$\text{New SPR CON} = 100 \times \frac{300}{315} = 95.2$$

NOTE: Keyboard enter the new SPR CON on the appropriate (Granular) configuration screen.

Adjusting Liquid Constants

In a manner similar to that for granular (shown above,), liquid APR errors can be corrected by fine tuning the flowmeter constant (K-FACTOR) as follows:

$$\text{New K-FACTOR} = \text{Old K-FACTOR} \times \frac{\text{Target APR}}{\text{Actual APR}}$$

EXAMPLE: If K-FACTOR is 1,000 and Target APR is 10 GAL?MILE, but Actual APR is known to be 9.5 GAL/MILE, adjust K-FACTOR using the above formula:

$$\text{New K-FACTOR} = 1000 \times \frac{10}{9.5} = 1053$$

CALCULATING SPREADER CONSTANTS

The spreader constant can be calculated if the following is known:

A = Number of pulses per revolution of the sensor shaft.
B = Turns of the sensor shaft for each turn of the final shaft.
C = Pounds of material discharged per revolution of the final shaft.

$$\text{SPR CON} = \frac{A \times B}{C} \text{ Pulses Per Pound}$$

EXAMPLE:

A = 360 pulses per revolution (for Dj sensor p/n 46436-017X).
B = 25 turns of the sensor shaft for each turn of the final shaft.
C = 50 pounds of material discharged per revolution of final shaft.

$$\text{SPR CON} = \frac{360 \times 25}{50} = 180 \text{ P/LB}$$

NOTES:

1. V-Box spreaders have a different SPR CON for each gate setting.
2. The number of pulses per revolution for several Dj shaft sensors are:
   360 for p/n 46436-017X (standard Control Point® shaft sensor).
   60 for p/n 10844-000X
   900 for p/n 10837-00XX

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CALIBRATION DATA RECORD SHEET

SYSTEM STATISTICS

Owner Name _____
Date of Setup _____
Software Revision _____
Display Console Serial Number_____

ACCUMULATORS (F9)

ENABLE CLR	_____
PAUSE (Current Miles)	_____
PAUSE (Current Hours)	_____
PAUSE (Season Miles)	_____
PAUSE (Season Hours)	_____

MISCELLANEOUS (F12)

BLAST SETUP	
BLAST TIMER	_____
BLAST SPEED	_____
SYSTEM UNITS	_____
SERIAL PORT	
BAUD RATE	_____
DATA BITS	_____
PARITY	_____

MISC (F12) WIRELESS

SERIAL PORT (MODEM SETUP)	
CHANNEL	_____
PC ADDR	_____
TRUCK (Address)	_____
TRUCK ID	_____

GRANULAR APPLICATION RATE (F2)

Parameter	Salt	Sand	Mix A	Mix B
Granular Material	_____	_____	_____	_____
STEP METHD	_____	_____	_____	_____
APP START/RATE 1	_____	_____	_____	_____
IC/DC STP/RATE 2	_____	_____	_____	_____
MIN APP/RATE 3	_____	_____	_____	_____
MAX APP/RATE 4	_____	_____	_____	_____
RATE 5	_____	_____	_____	_____
RATE 6	_____	_____	_____	_____
RATE 7	_____	_____	_____	_____
RATE 8	_____	_____	_____	_____
RATE 9	_____	_____	_____	_____
RATE 10	_____	_____	_____	_____
BLST RATE	_____	_____	_____	_____
CHN LBL	_____	_____	_____	_____

GRANULAR CONFIGURATION (F3)

Parameter	Salt	Sand	Mix A	Mix B
Granular Material	_____	_____	_____	_____
SPR CON	_____	_____	_____	_____
CAL GT HGT	_____	_____	_____	_____
DRV FREQ	_____	_____	_____	_____
PWM OFFSET	_____	_____	_____	_____
PWM SAT	_____	_____	_____	_____
SYS RSPNS	_____	_____	_____	_____
VALV BOOST	_____	_____	_____	_____
AFILT	_____	_____	_____	_____

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CALIBRATION DATA RECORD SHEET

GROUND SPEED CONFIGURATION (F7)

MAX SPEED	_____
MANUAL ON	_____
MANUAL DRIVER	_____
MANUAL SPEED	_____
START UP	_____
SHUT OFF SPD	_____
2 AXLES	_____

SPINNER CONFIGURATION (F8)

UNLOAD	_____
NO GND SPD	_____
DRV FREQ	_____
PULSE FDBK	_____
PWM OFFSET	_____
PWM SAT	_____
GSRS ENABLE	_____

LIQUID CONFIGURATION (F5)

Parameter	Liquid 1	Liquid 2	Liquid 3	Liquid 4
Liquid Material	_____	_____	_____	_____
K-FACTOR/DENSITY	_____	_____	_____	_____
DRV FREQ	_____	_____	_____	_____
PWM OFFSET	_____	_____	_____	_____
PWM SAT.	_____	_____	_____	_____
SYS RSPNS	_____	_____	_____	_____
VALV BOOST	_____	_____	_____	_____
AFILT	_____	_____	_____	_____
TANK LEVEL	_____	_____	_____	_____
VALVE LOCK	_____	_____	_____	_____
Boom				
SECN ENBLED	_____	_____	_____	_____
12V ON	_____	_____	_____	_____
NUM OF NZZLS	_____	_____	_____	_____
NZZLE SPCNG	_____	_____	_____	_____
PAUSE ENABLE	_____	_____	_____	_____
BOOM INPUT	_____	_____	_____	_____

LIQUID APPLICATION RATE (F4)

Parameter	Salt	Sand	Mix A	Mix B
Granular Material	_____	_____	_____	_____
STEP METHD	_____	_____	_____	_____
APP START/RATE 1	_____	_____	_____	_____
IC/DC STP/RATE 2	_____	_____	_____	_____
MIN APP/RATE 3	_____	_____	_____	_____
MAX APP/RATE 4	_____	_____	_____	_____
RATE 5	_____	_____	_____	_____
RATE 6	_____	_____	_____	_____
RATE 7	_____	_____	_____	_____
RATE 8	_____	_____	_____	_____
RATE 9	_____	_____	_____	_____
RATE 10	_____	_____	_____	_____
BLST RATE	_____	_____	_____	_____
CHN LBL	_____	_____	_____	_____

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CALIBRATION DATA RECORD SHEET

SYSTEM STATISTICS

Owner Name _____
Date of Setup _____
Software Revision _____
Display Console Serial Number_____

ACCUMULATORS (F9)

ENABLE CLR	_____
PAUSE (Current Miles)	_____
PAUSE (Current Hours)	_____
PAUSE (Season Miles)	_____
PAUSE (Season Hours)	_____

MISCELLANEOUS (F12)

BLAST SETUP	
BLAST TIMER	_____
BLAST SPEED	_____
SYSTEM UNITS	_____
SERIAL PORT	
BAUD RATE	_____
DATA BITS	_____
PARITY	_____

MISC (F12) WIRELESS

SERIAL PORT (MODEM SETUP)

CHANNEL	_____
PC ADDR	_____
TRUCK (Address)	_____
TRUCK ID	_____

GRANULAR APPLICATION RATE (F2)

Parameter	Salt	Sand	Mix A	Mix B
Granular Material	_____	_____	_____	_____
STEP METHD	_____	_____	_____	_____
APP START/RATE 1	_____	_____	_____	_____
IC/DC STP/RATE 2	_____	_____	_____	_____
MIN APP/RATE 3	_____	_____	_____	_____
MAX APP/RATE 4	_____	_____	_____	_____
RATE 5	_____	_____	_____	_____
RATE 6	_____	_____	_____	_____
RATE 7	_____	_____	_____	_____
RATE 8	_____	_____	_____	_____
RATE 9	_____	_____	_____	_____
RATE 10	_____	_____	_____	_____
BLST RATE	_____	_____	_____	_____
CHN LBL	_____	_____	_____	_____

GRANULAR CONFIGURATION (F3)

Parameter	Salt	Sand	Mix A	Mix B
Granular Material	_____	_____	_____	_____
SPR CON	_____	_____	_____	_____
CAL GT HGT	_____	_____	_____	_____
DRV FREQ	_____	_____	_____	_____
PWM OFFSET	_____	_____	_____	_____
PWM SAT	_____	_____	_____	_____
SYS RSPNS	_____	_____	_____	_____
VALV BOOST	_____	_____	_____	_____
AFILT	_____	_____	_____	_____

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CALIBRATION DATA RECORD SHEET

GROUND SPEED CONFIGURATION (F7)

MAX SPEED	_____
MANUAL ON	_____
MANUAL DRIVER	_____
MANUAL SPEED	_____
START UP	_____
SHUT OFF SPD	_____
2 AXLES	_____
CONSTANT	_____

SPINNER CONFIGURATION (F8)

UNLOAD	_____
NO GND SPD	_____
DRV FREQ	_____
PULSE FDBK	_____
PWM OFFSET	_____
PWM SAT	_____
GSRS ENABLE	_____

LIQUID CONFIGURATION (F5)

Parameter	Liquid 1	Liquid 2	Liquid 3	Liquid 4
Liquid Material	_____	_____	_____	_____
K-FACTOR/DENSITY	_____	_____	_____	_____
DRV FREQ	_____	_____	_____	_____
PWM OFFSET	_____	_____	_____	_____
PWM SAT.	_____	_____	_____	_____
SYS RSPNS	_____	_____	_____	_____
VALV BOOST	_____	_____	_____	_____
AFILT	_____	_____	_____	_____
TANK LEVEL	_____	_____	_____	_____
VALVE LOCK	_____	_____	_____	_____
Boom				
SECN ENBLED	_____	_____	_____	_____
12V ON	_____	_____	_____	_____
NUM OF NZZLS	_____	_____	_____	_____
NZZLE SPCNG	_____	_____	_____	_____
PAUSE ENABLE	_____	_____	_____	_____
BOOM INPUT	_____	_____	_____	_____

LIQUID APPLICATION RATE (F4)

Parameter	Salt	Sand	Mix A	Mix B
Granular Material	_____	_____	_____	_____
STEP METHD	_____	_____	_____	_____
APP START/RATE 1	_____	_____	_____	_____
IC/DC STP/RATE 2	_____	_____	_____	_____
MIN APP/RATE 3	_____	_____	_____	_____
MAX APP/RATE 4	_____	_____	_____	_____
RATE 5	_____	_____	_____	_____
RATE 6	_____	_____	_____	_____
RATE 7	_____	_____	_____	_____
RATE 8	_____	_____	_____	_____
RATE 9	_____	_____	_____	_____
RATE 10	_____	_____	_____	_____
BLST RATE	_____	_____	_____	_____
CHN LBL	_____	_____	_____	_____

Dealers have the responsibility of calling to the attention of their customers the following warranty prior to acceptance of an order from their customer for any DICKEY-john product.

DICKEY-john® WARRANTY

DICKEY-john warrants to the original purchaser for use that, if any part of the product proves to be defective in material or workmanship within one year from date of original installation, and is returned to DICKEY-john within 30 days after such defect is discovered, DICKEY-john will (at our option) either replace or repair said part. This warranty does not apply to damage resulting from misuse, neglect, accident, or improper installation or maintenance; any expenses or liability for repairs made by outside parties without DICKEY-john's written consent; damage to any associated equipment; or lost profits or special damages. Said part will not be considered defective if it substantially fulfills the performance expectations. THE FOREGOING WARRANTY IS EXCLUSIVE AND IN LIEU OF ALL OTHER WARRANTIES OF MERCHANTABILITY, FITNESS FOR PURPOSE, AND OF ANY OTHER TYPE, WHETHER EXPRESS OR IMPLIED. DICKEY-john neither assumes nor authorizes anyone to assume for it any other obligation or liability in connection with said part and will not be liable for consequential damages. Purchaser accepts these terms and warranty limitations unless the product is returned within fifteen days for full refund of purchase price.

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CONTROL SYSTEM

Operator's Manual

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