854 SPRAYER CONTROL

USER MANUAL

Software Version 1.20.

TeeJet® TECHNOLOGIES

A Subsidiary of Spraying Systems Co.®

Copyrights
© 2013 TeeJet Technologies. All rights reserved. No part of this document or the computer programs described in it may be reproduced, copied, photocopied, translated, or reduced in any form or by any means, electronic or machine readable, recording or otherwise, without prior written consent from TeeJet Technologies.

Trademarks
Unless otherwise noted, all other brand or product names are trademarks or registered trademarks of their respective companies or organizations.

Limitation of Liability
TEEJET TECHNOLOGIES PROVIDES THIS MATERIAL “AS IS” WITHOUT WARRANTY OF ANY KIND, EITHER EXPRESSED OR IMPLIED. NO COPYRIGHT LIABILITY OR PATENT IS ASSUMED. IN NO EVENT SHALL TEEJET TECHNOLOGIES BE LIABLE FOR ANY LOSS OF BUSINESS, LOSS OF PROFIT, LOSS OF USE OR DATA, INTERRUPTION OF BUSINESS, OR FOR INDIRECT, SPECIAL, INCIDENTAL, OR CONSEQUENTIAL DAMAGES OF ANY KIND, EVEN IF TEEJET TECHNOLOGIES HAS BEEN ADVISED OF SUCH DAMAGES ARISING FROM TEEJET TECHNOLOGIES SOFTWARE.

Table of Contents

CHAPTER 1 - INTRODUCTION 4

Power On the Console 4
Power Off the Console 4

CHAPTER 2 - OEM PROGRAM MODE 5

Number of Boom Section Switches On the Console 5
Lane Width (GLM Working Units) 5
Regulation Parameters 5
Minimum Regulating Valve Voltage 5
Regulation Stop Band 6
Rotation Time of Regulating Valve 6
Display Stabilization 7
Data Display Screen Options 7
Calibrate Tip Level Percent 7
Digital Output #2 7
Dual Boom Regulation Mode 8
Fill Valve Default 8
Auto Power Down 9

TEEJET COMMUNICATION SYSTEM (TCS) CONFIGURATION 9

Job Operating System 9
Console Identification Number 9
Maximum Speed Achieved 9
Hidden Area Counter 10
Hidden Volume Counter 10

PRESSURE TRANSDUCER CALIBRATION (P HI) 10

Memory Save Function 11

CHAPTER 3 - SYSTEM SETUP MODE 12

Selection of Working Units 12
Reset to Defaults 12
Speed Sensor Calibration 12
Proximity/Magnetic Pulses 12
Automatic Calibration 12
Distance Counter 13
Pressure Hold 13
Pressure Sensor Installed 13
Pressure Transducer Low Pressure Calibration (P Ref) 14
Automatic Calibration 14
Pressure Transducer Maximum Rating (P HI) 14
Flow Meter Installed 14
Flow Meter Pulses 15
Manual Entry 15
Automatic Calibration 15
Flow Sensor Minimum Flow Capacity 16
Sensor Selection 16

Section Valve Type 16
Pressure Regulating Mode 17
Regulating Valve Capacity 17
Regulating Valve Speed - Coarse Adjustment 17
Regulating Valve Speed - Fine Adjustment 18
Tank Volume 18
Low Tank Volume Alarm 18
Fill Flow Meter Calibration 18
Manual Entry 18
Automatic Calibration 19
Communications 19
Printing Memory Contents 20
Using GPS 20
Communicating With a Laptop Running Fieldware Software 21
Logging Information to a Laptop running Logging Software 21
GPS Speed 21
Use External Rate 21
Simulated Ground Speed 21
Low Speed 22
High Speed 22
Auto Master Off - Speed 22
Minimum Pressure Setting 22
Maximum Pressure Setting 22
Audible Alarm 23
Dual Boom On Setting 23
Memory Reload Function 24

CHAPTER 4 - APPLICATION PRESET SETUP MODE 25

Tip Spacing 25
Number of Tips Per Boom Section 25
Density 25
Alternate Density Used 25
Density Value 25
Tip Selection 25
Target Application Rate 26
Calculation Steps 26
Known Pressure Calculation 26
Known Speed Calculation 26

CHAPTER 5 - OPERATIONS 27

Sprayer Evaluation 27
Spraying 27

CHAPTER 6 - FEATURES 28

Area/Volume Display 28
Memory Feature 28
Viewing Memory Information 28
Clearing Memory Locations 28
Saving Information to Memory 28

Tank Feature 29
Auto Tank Filling 29
Tank Volume Feature 29
Viewing Remaining Tank Volume *29*
Resetting Tank Volume *30*
Application Alarm 30
Sensor LED Alarms 30
No Speed Alarm 30
No Flow Alarm 30
No Pressure Alarm 31
Flow/Pressure Discrepancy Alarm 31
Boost Mode 31
Boost Up 31
Boost Down 31
Auto Power Down 32
Smart Sensing 32

854 Sprayer Control

CHAPTER 1 - INTRODUCTION

This User Guide provides information for software version 1.20.

Make sure that all hardware components are properly installed and tested. Before starting the programming process, confirm that the console and all sensors are working properly.

IMPORTANT! Before beginning, review the following Program Guidelines that control the programming process.

To exit any Setup Mode, press and hold the PROGRAM Ⓟ key for 3 seconds. The inputs are stored and the computer will exit Program Mode.

To increase the value of a programmable digit, press the PLUS ⊕ key. To decrease the value, press the MINUS ⊖ key. These keys are located directly to the right of the display. For some program steps, press and hold the PLUS ⊕ and MINUS ⊖ keys to quickly change the values. Press the PLUS ⊕ and MINUS ⊖ keys once to increment/decrement the values by one unit.

Press and hold the AUTO/MAN ↔ key to reset the value to "0" or restore factory default settings during some steps.

Press the PROGRAM Ⓟ key to advance the system to the next program step. After the final program step is complete, the console will finish the programming loop and return to the initial programming step.

System Setup mode contains the options that customize the controller to the sprayer or sprayer components. These include calibration steps and parameters that seldom change once programmed.

Application Setup mode contains settings that are frequently changed (tip spacing, number of tips per boom section, density, nozzles used, and target application rate).

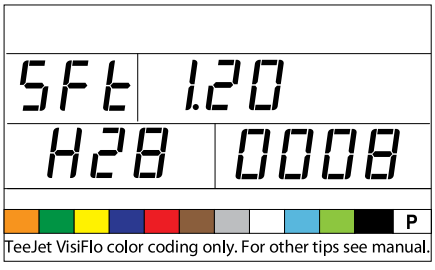
Figure 1: 854 Console

Power On the Console

The 854 console can be powered on by pressing the PROGRAM Ⓟ key one time. The console will initially display the software version at the top of the screen and the serial number of the console at the bottom of the screen. After approximately 5 seconds, the console will enter into swath width view.

Press the PROGRAM Ⓟ key to advance to normal Operations mode.

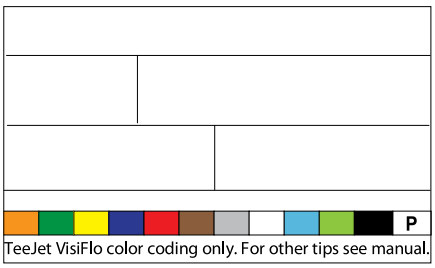
Figure 2: Power On the Console



Power Off the Console

To power off the 854 console, press and release the MINUS ⊖ and PROGRAM Ⓟ keys simultaneously. The console will save new information (area and volume counters) to memory before it powers down. The console also has an automatic power down feature. This is described in further detail in the Features section of this User Guide.

Figure 3: Power Off the Console

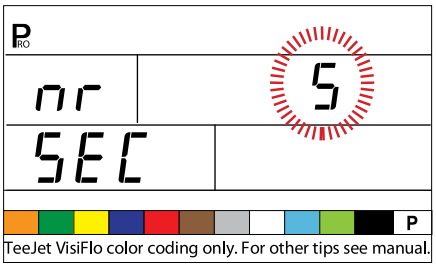


CHAPTER 2 - OEM PROGRAM MODE

The OEM Program Mode contains configuration steps for the console. The console is typically pre-configured before being shipped. Changing the configurations is not recommended unless instructed to do so as it may adversely affect the performance of the controller.

- To enter the OEM Program Mode:
- Begin with the console powered “Off”.
- Press the MINUS ⊖ key and the PROGRAM Ⓟ key simultaneously to turn the console “Off” if required.
- Press and hold the PLUS ⊕ and MINUS ⊖ keys. While still holding them, press the PROGRAM Ⓟ key 4 times.
- Release all keys.

Figure 4: Entering OEM Program Mode



Number of Boom Section Switches On the Console

The number of individual boom section switches actually present on the control console (regardless of the number of boom sections that are on the sprayer) can be programmed.

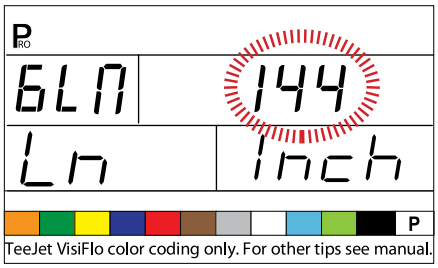
- Use the PLUS ⊕ or MINUS ⊖ keys to modify the value.
- 1 to 11 switches can be programmed.
- This number will determine the number of spray tips per boom section during the System Setup Mode.
- Press and hold the AUTO/MAN ↔ key for 3 seconds to set the value to “1”.
- Press the AUTO/MAN ↔ key once to reset the value to the default value of “5”.
- Press the PROGRAM Ⓟ key to accept the value and advance to the next program step.

Lane Width (GLM Working Units)

When Gallons per Lane Mile “GLM” is selected as the working units, this screen will allow the operator to enter the lane width in inches.

- Use the PLUS ⊕ or MINUS ⊖ keys to modify the value.
- Press the Program Ⓟ key to accept the value and advance to the next program step.

Figure 5: Lane Width (GLM Working Units) Window



Regulation Parameters

The regulation algorithm is configured with the next three parameters:

1. Minimum Regulating Valve Voltage: the minimum voltage that can drive the regulating valve.
2. Regulation Stop Band: the maximum allowed application error rate.
3. Rotation Time of Regulating Valve: the total time required to close the regulating valve at maximum speed.

These three OEM parameters depend on the regulating valve used.

Minimum Regulating Valve Voltage

The console uses variable voltages to drive the regulating valve. Select the minimum voltage that the regulating valve needs to make it turn at its slowest rotation speed (i.e., if the motor of the regulating valve turns with a minimum of 3.5v, the number should be used in this location).

The affect of this parameter on the regulation behavior is illustrated in Figure 2-4. This value must match the actual operation of the regulating valve used. Check with the valve manufacturer for the value.

- Use the Plus ⊕ or MINUS ⊖ keys to change the voltage.
- Press and hold the AUTO/MAN ↔ key for 3 seconds to set the value to “0.0”.
- Press the AUTO/MAN ↔ key once to set to the default value of 3.5v.
- Press the PROGRAM Ⓟ key to accept the value and advance to the next program step.

NOTE: Standard TeeJet Technologies regulating valve minimum voltage is 3.5v.

If 12v is selected as a minimum voltage, no variable voltage regulation occurs. Instead, a pulse regulation occurs. This is necessary when using solenoid operated regulating valves (i.e., a Ramsay valve).

Figure 6: Minimum Regulating Valve Voltage

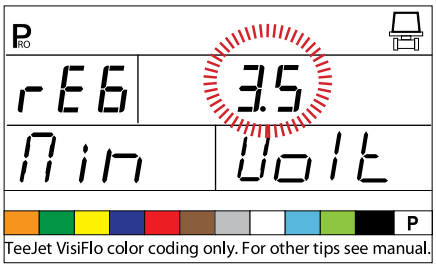
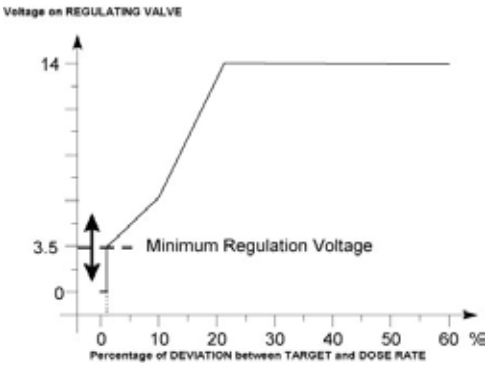


Figure 7: Voltage Comparison



Regulation Stop Band

The Regulation Stop Band is the maximum error percentage allowed on the application rate before the regulating valve reacts (i.e., if a stop band of 1.5% is selected, there is no action on the regulating valve if the actual application rate is within 1.5% of the target rate). This minimum percentage prevents the regulating valve from oscillating in a narrow band around the target point.

- Use the PLUS ⊕ or MINUS ⊖ keys to change the regulation stop band (value is expressed in error percentage). The maximum value is 10.0%.
- Press and hold the AUTO/MAN ↔ key for 3 seconds to set the value to “0.0”.
- Press the AUTO/MAN ↔ key once to set the value to the default setting of “1.5%”.
- Press the PROGRAM Ⓟ key to accept the value and advance to the next program step.

Figure 8: Regulation Stop Band

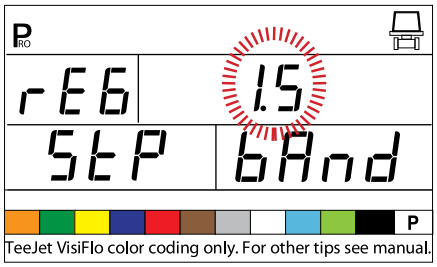
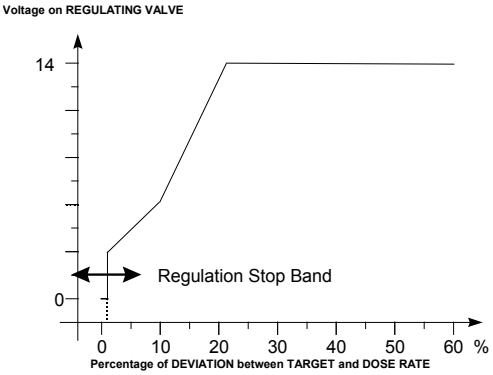


Figure 9: Effects of Parameters



Rotation Time of Regulating Valve

The Rotation Time of Regulating Valve is the number of seconds the regulating valve needs to turn from the complete closed position to the complete open position at the nominal voltage (i.e., 14v).

Use the PLUS ⊕ or MINUS ⊖ keys to change the rotating time of the regulating valve in seconds (minimum “0’s”, maximum “50’s”).

Press and hold the AUTO/MAN ↔ key for 3 seconds to set the value to “0.0”.

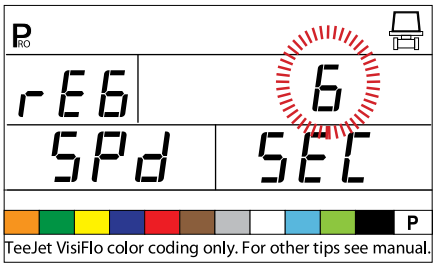
Press the AUTO/MAN ↔ key once to set the value to the default setting of “6 seconds”.

Press the PROGRAM Ⓟ key to accept the value and advance to the next program step.

NOTE: Standard TeeJet regulating valve rotation time is 6 seconds.

The console uses this parameter to control the regulation speed. The value must match the actual operation of the regulating valve used. Check with the valve manufacturer for this value.

Figure 10: Rotation Time of Regulating Valve



Display Stabilization

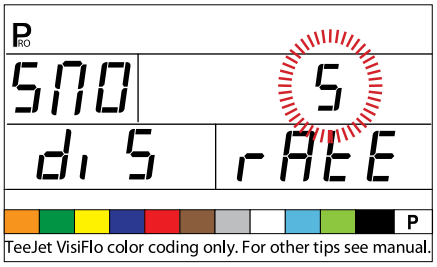
Display Stabilization establishes the stabilization rate that steadies the Application Rate displayed during minor adjustments of the control system. The controller will continue to make the required adjustments at all times. Enter the percentage of allowable change from the target rate in this step.

For example, the system has a target rate of 20 GPA with 5% programmed for Display Stabilization. The display will indicate 20 GPA at any time the actual rate is +/- 5%, or:

- Use the PLUS ⊞ or MINUS ⊟ keys to change the value.
- Press and hold the AUTO/MAN ↔ key for 3 seconds to set the value to “0.0”.
- Press the AUTO/MAN ↔ key once to set the value to the default setting of “5%”.
- Press the PROGRAM Ⓟ key to accept the value and advance to the next program step.

NOTE: The Display Stabilization value is limited to 20%. A value of 0% will disable the setting.

Figure 11: Display Stabilization



Data Display Screen Options

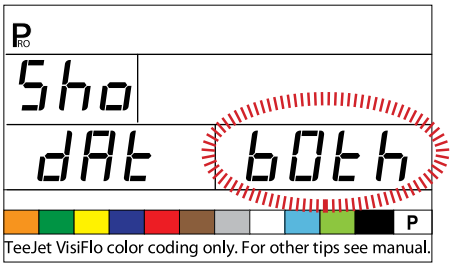
The lower right hand display used during normal operations mode can be customized to display:

- volume sprayed
- area covered
- both volume sprayed and area covered (alternating every 3 seconds)

To customize the data display options:

- Use the PLUS ⊞ or MINUS ⊟ keys to change the data to be displayed.
- Press the PROGRAM Ⓟ key to accept the value and advance to the next program step.

Figure 12: Data Display Screen



Calibrate Tip Level Percent

If both a pressure sensor and a flow meter are installed and being used, the 854 uses one sensor to cross check the other for system errors.

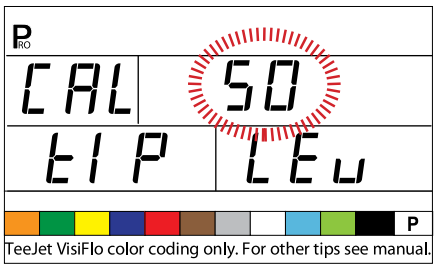
Select the primary sensor (used for regulation) in the Sensor Select step of System Setup Mode. The opposite sensor will automatically perform the cross-checking function.

The Calibrate Tip Level % will establish the % of allowable error between the sensors before an alarm is activated. All sprayer systems have some discrepancy between pressure and flow due to pressure drops and positioning of sensors.

- Use the PLUS ⊞ or MINUS ⊟ keys to change the % of allowable error.
- Press the PROGRAM Ⓟ key to accept the value and advance to the next program step.

NOTE: It is recommended that this value remain at 50% unless instructed otherwise.

Figure 13: Calibrate Tip Level %



Digital Output #2

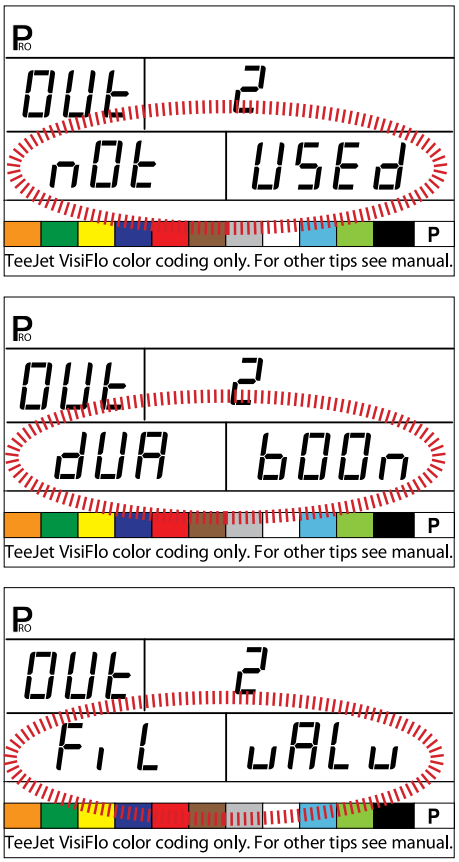
The primary output from the console computer drives the pressure regulating valve. A second output is available and can be configured for the following uses:

- Not Used - the second digital output is not used
- Dual Boom - used to control a shutoff valve on a second boom line that is automatically activated based on speed and pressure
- Fill Valve - used to automatically shut off a valve or switch during a tank filling operation when used with a tank fill flow meter

To establish the Digital Output settings:

- Use the PLUS ⊞ or MINUS ⊟ keys to change the value.
- Press the PROGRAM Ⓟ key to accept the value and advance to the next program step.

Figure 14: Digital Output # 2a



Dual Boom Regulation Mode

NOTE: This step will only be displayed if "Dual Boom" was selected during the DIGITAL OUTPUT #2 step.

Dual Boom Regulation Mode is used to regulate the dual boom feature by either speed (SPD) or pressure (PRS).

If speed is used to regulate the mode, when the vehicle reaches the designated speed, the second boom line will turn On/Off.

If pressure is used to regulate the mode, when the pressure reaches the designated amount, the second boom line will turn On/Off.

- Use the PLUS ⊕ or MINUS ⊖ keys to change the value.
- Press the PROGRAM Ⓟ key to accept the value and advance to the next program step.

The value selected will determine how programming steps appear during System Setup Mode. Specific speed or pressure values to be used during operation are selected during the System Setup Mode.

Figure 15: Dual Boom Regulation Mode - Speed

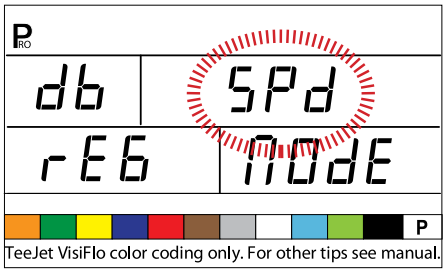
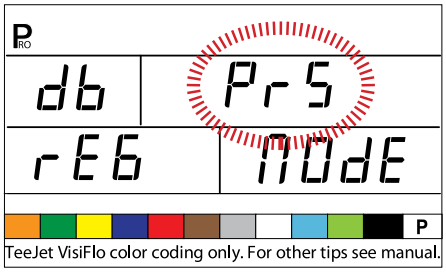


Figure 16: Dual Boom Regulation Mode - Pressure



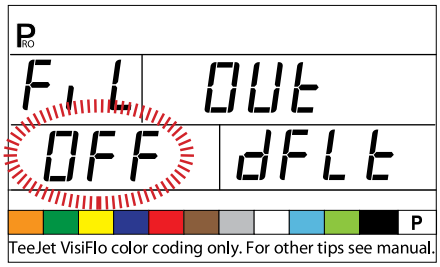
Fill Valve Default

NOTE: This step will only be displayed if "Dual Boom" was selected during the DIGITAL OUTPUT #2 step.

The Fill Valve Default establishes the normal operating state of the fill valve being used. If the fill valve requires a +12v signal during the spraying operation, the valve default is "On". If the fill valve requires a +12v signal during the filling operation, the valve default is "Off".

- Use the PLUS ⊕ or MINUS ⊖ keys to change the value.
- Press the PROGRAM Ⓟ key to accept the value and advance to the next program step.

Figure 17: Fill Valve Default



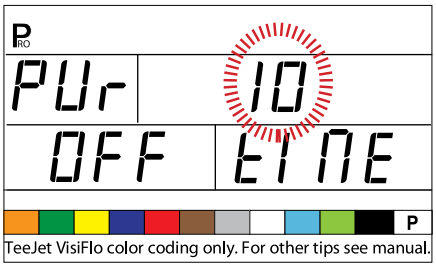
Auto Power Down

The 854 console is designed to automatically power down after 10 minutes of inactivity from the sensor or operator. To adjust the length of time:

- Use the PLUS ⊕ or MINUS ⊖ keys to change the value of the power down time.
- Press the PROGRAM Ⓟ key to accept the value and advance to the next program step.

NOTE: If the Power Down Time is set to "0", the Auto Power Down feature will be disabled.

Figure 18: Auto Power Down



TEEJET COMMUNICATION SYSTEM (TCS) CONFIGURATION

NOTE: If the TeeJet Communication System (TCS) package was not purchased for this console, the next 2 programming steps DO NOT pertain to your spraying operation. IF THIS IS THE CASE, THESE VALUES SHOULD BE LEFT AT THE DEFAULT SETTINGS.

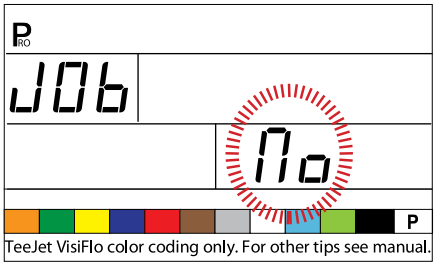
Job Operating System

- Job No (Default) - the console uses application parameters entered by the operator only
- Job Only - the console uses application parameters entered from the TeeJet Communication System only
- Job Both - the console accepts application parameters for both the operator and the TeeJet Communication System

To establish the Job Operating System settings:

- Use the PLUS ⊕ or MINUS ⊖ keys to change the value.
- Press the PROGRAM Ⓟ key to accept the value and advance to the next program step.

Figure 19: Job Operating System

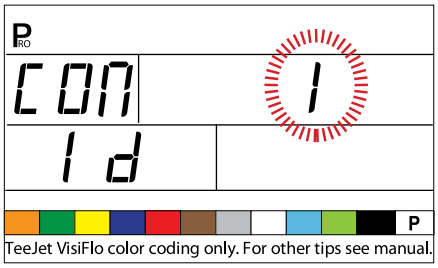


Console Identification Number

The TeeJet Communications System (TCS) is capable of monitoring and communicating with several consoles at one time. Therefore each console communicating with a single TCS must be assigned a unique identification number. THE DEFAULT NUMBER IS "1".

- Use the PLUS ⊕ or MINUS ⊖ keys to change the value.
- Press the PROGRAM Ⓟ key to accept the value and advance to the next step.

Figure 20: Console Identification Number

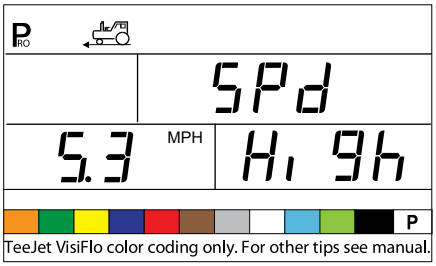


Maximum Speed Achieved

The Maximum Speed Achieved feature records the maximum speed achieved by the sprayer. This value can only be cleared by an authorized TeeJet Dealer, Distributor, or Representative.

- Press the PROGRAM Ⓟ key to advance to the next step.

Figure 21: Maximum Speed Achieved

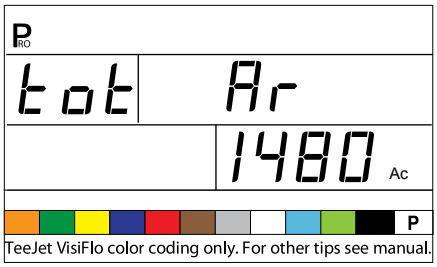


Hidden Area Counter

The Hidden Area Counter can only be viewed and cleared during this step. This value can only be cleared by an authorized TeeJet Dealer, Distributor, or Representative.

- Press the PROGRAM (P) key to advance to the next step.

Figure 22: Hidden Area Counter

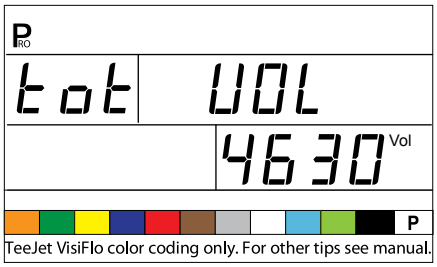


Hidden Volume Counter

The Hidden Volume Counter can only be viewed and cleared during this step. This value can only be cleared by an authorized TeeJet Dealer, Distributor, or Representative.

- Press the PROGRAM (P) key to advance to the next step.

Figure 23: Hidden Volume Counter



PRESSURE TRANSDUCER CALIBRATION (P HI)

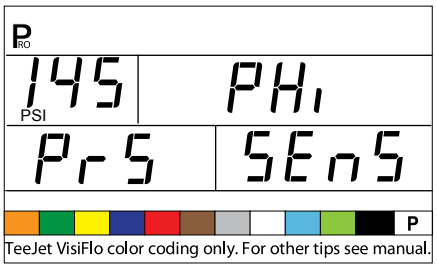
NOTE: This step may not appear if the console has not been programmed during System Setup Mode for use with a pressure sensor.

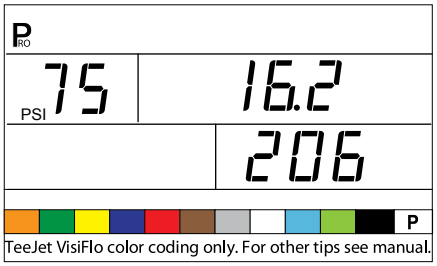
WARNING! It is not recommended that this calibration procedure be initially performed. It should ONLY be performed if a known pressure drop exists between the Pressure Transducer and the spray tips and if a TeeJet representative recommends performing it.

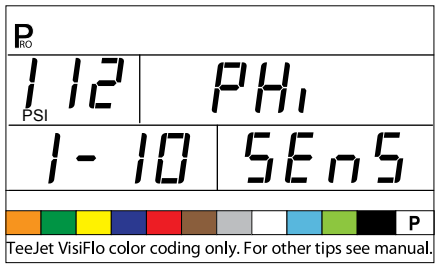
The pressure sensor can be automatically calibrated to compensate for pressure loss between the pressure transducer and the spray tips.

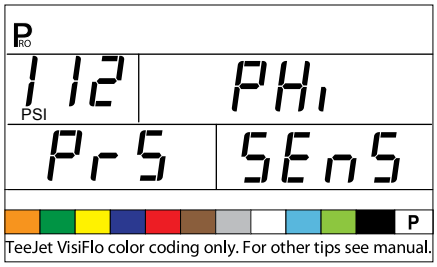
- Press and hold the PLUS (+) and MINUS (−) keys to start the Auto Calibration process. The lower left hand screen will go blank.
- Place an accurate manual pressure gauge in the spray line, as close to the spray tips as possible.
- Activate the pump and boom sections to be used for calibration.
- Turn the Master Switch to the “On” position.
- Press the PLUS (+) or MINUS (−) keys to adjust the pressure on the manual pressure gauge near the tips to the desired pressure to be used for the calibration. The higher the pressure the better.
- Turn the Master Switch to the “Off” position.
- Use the PLUS (+) or MINUS (−) keys to adjust the displayed pressure to match the actual calibration pressure.
- Activate the pump and boom sections to be used for calibration.
- Confirm that the actual pressure matches the displayed pressure.
- Press the PROGRAM (P) key to begin calibration.
- The console will display “0-10” during the calibration process.
- The new Pressure Transducer Maximum Rating will be displayed. The value is automatically carried over to the System Setup Mode.
- Press the PROGRAM (P) key to advance to the next step.

Figure 24: Pressure Transducer Calibration









Memory Save Function

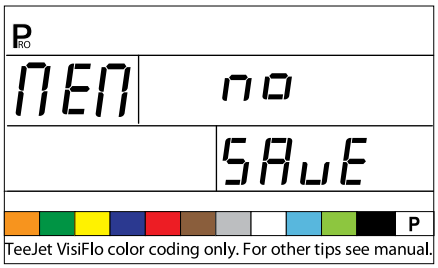
The Memory Save Function allows for a custom set of programming parameters. Typically, this is performed after all three programming sections have been completed for the console.

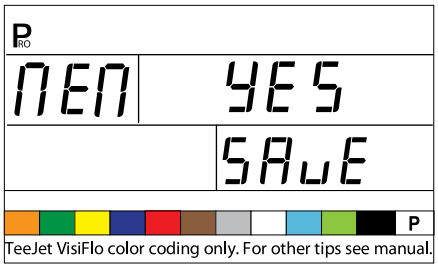
Select “Yes” to save all program settings to memory. These settings can be recalled in the System Setup Mode during the Mem Load function.

This function is typically used to get the console back to the starting point after unknown changes have been made to the program modes.

- Use the PLUS ⊕ or MINUS ⊖ keys to select either “Yes” or “No”.
- Press the PROGRAM Ⓟ key to accept the value and advance to the next step.

Figure 25: Memory Save Function





The OEM Programming Mode of the 854 is now complete. Press the PROGRAM Ⓟ key to return to the beginning step of the process. Press and hold the PROGRAM Ⓟ key to exit and save the OEM Setup Mode. This can be performed at any time during OEM programming. The console will exit the OEM programming and return to normal operations.

CHAPTER 3 - SYSTEM SETUP MODE

The System Setup Mode contains the programming steps that customize the controller to the sprayer components. These include the calibration steps and parameters that seldom change once programmed.

To enter into System Setup Mode, power on the unit. Press and hold the PROGRAM key for 3 seconds while in operating mode.

Selection of Working Units

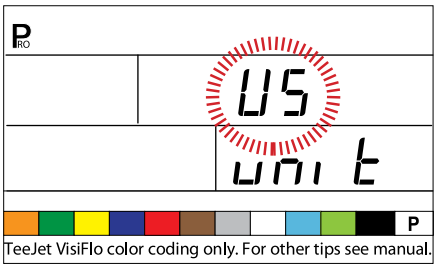
The 854 is capable of working in units of:

- US (US Gallons Per Acre)
- TRF (Turf) (US Gallons/1000 ft2)
- IMP (Imperial Gallons Per Acre)
- NH3 (Pounds of N per Acre)
- GLM (US Gallons Per Lane Mile)
- SI (Metric Liters Per Hectare)

To establish the selection of working units:

- Press the PLUS ⊕ or MINUS ⊖ keys to select the appropriate units.
- Press the PROGRAM key to accept the value and advance to the next program step.

Figure 26: Selection of Working Units



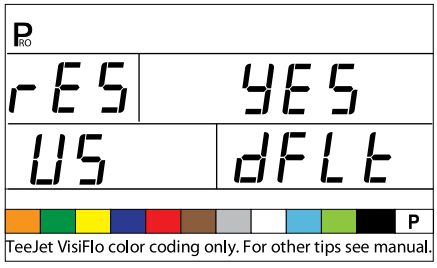
Reset to Defaults

NOTE: If no changes were made to the units, this step is skipped and setup will automatically advance to the Speed Sensor Calibration Step.

If changes have been made to the units during the first programing step, the console will inquire if all the program parameters should be reset to the defaults specified for the units chosen.

- Press the PLUS ⊕ or MINUS ⊖ keys to select either “Yes” or “No”.
- Press the PROGRAM key to accept the value and advance to the next program step.

Figure 27: Reset Defaults



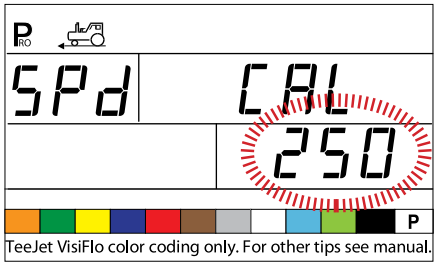
Speed Sensor Calibration

NOTE: During Speed Sensor Calibration, the 854 automatically senses whether a Wheel Speed or Radar Speed Sensor is being used.

Proximity/Magnetic Pulses

The speed sensor must be calibrated to provide the proper speed and area readings. The value for this step is the number of pulses generated by the speed sensor in 300 feet (100 meters).

Figure 28: Proximity/Magnetic Pulses



Automatic Calibration

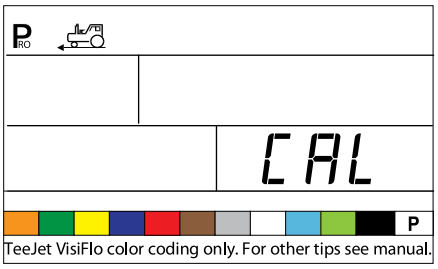
NOTES: When the Automatic Calibration Mode is activated, “CAL” is displayed on the lower right of the display.

It is best to perform the automatic speed calibration process at least twice and use the average of the speed calibration numbers.

The auto speed calibration process should take place with the sprayer tank 1/2 full.

- Mark off a distance of exactly 300 feet (100 meters).
- Press and hold the PLUS ⊕ and MINUS ⊖ keys simultaneously for 3 seconds to activate the auto calibration mode.
- Start driving toward the start point of the 300 feet (100 meter) course.
- As the starting point is crossed, press the PLUS ⊕ keys once to begin the calibration process.
- The 854 will count the pulses generated while the course is driven.
- As the ending point is crossed, press the PLUS ⊕ key once. The number displayed on the screen is the speed calibration number.
- If the console determines that a radar speed sensor is connected, it will display “rAd” on the lower left part of the display.

Figure 29: Automatic Calibration

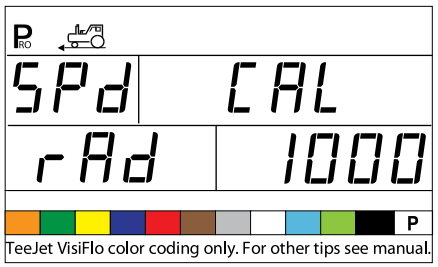


Once the calibration number has been determined, it must be entered into the console.

- Press the PROGRAM Ⓟ and PLUS ⊕ keys simultaneously to put the console into Radar Mode. When the control console is in Radar Mode, it will display “rAd” in the lower part of the console display.
- Use the PLUS ⊕ or MINUS ⊖ keys to adjust the value.
- Pressing the AUTO/MAN ↔ key will reset the speed calibration to the default value.
- Once the correct vale has been entered, press the PROGRAM Ⓟ key to validate the value and advance to the next step.

NOTE: When the Automatic Calibration Mode is activated, no other functions are possible until the console receives pulses for calibration. To deactivate the Automatic Calibration Mode, press the Plus ⊕ key until a number is displayed.

Figure 30: Radar Calibration



Distance Counter

The Distance Counter feature is not a calibration step. No specific value must be entered here for the controller to operate correctly. This feature measures distance in feet (meters). It can be used to confirm Automatic Speed Calibration.

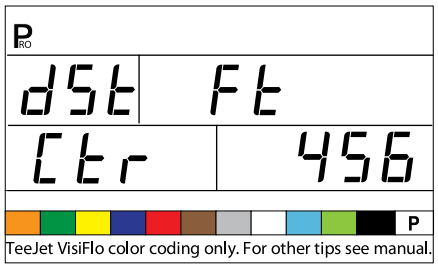
- To activate the counter, turn the Master Boom Switch “On”.

NOTE: To avoid spraying during this process, toggle the individual boom sections “Off”.

- To stop the counter, turn the Master Boom Switch “Off”.
- To clear an existing distance value, press and hold the AUTO/MAN ↔ key for 3 seconds.

NOTE: To confirm Automatic Speed Calibration, first complete the calibration procedure. Advance to the Distance Counter step. Drive the vehicle across the same 300 feet (100 meters) course, turning the Master Switch “On” at the starting point and “Off” at the finish point. The distance measured should be 300 feet (100 meters) (+/- 6 feet) (+/- 1.8 meters).

Figure 31: Distance Counter



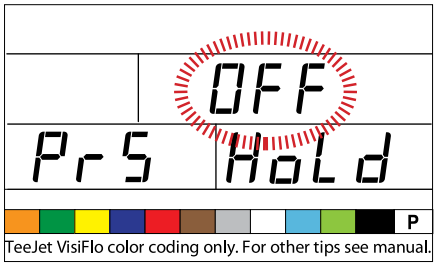
Pressure Hold

NOTE: This step will appear if “GLN” was selected for Working Units instead of Pressure Sensor.

The Pressure Hold setting will determine whether the sprayer will hold a constant pressure, regardless of ground speed, or adjust to pressure according to ground speed.

- Use the PLUS ⊕ or MINUS ⊖ keys to select “Off” or “On”.
- Select “Off” to have the sprayer hold a constant pressure.
- Select “On” to have the sprayer adjust the pressure according to ground speed.
- Press the PROGRAM Ⓟ key to accept the value and advance to the next step.

Figure 32: Pressure Hold



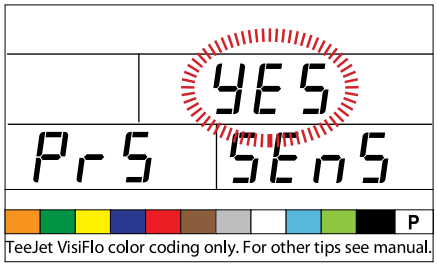
Pressure Sensor Installed

NOTE: If “No” is selected in this step, the next two screens/steps in this User Guide will not be displayed on the console during programming.

The Pressure Sensor Installed step indicates to the console whether or not a pressure sensor has been installed on the sprayer.

- Use the PLUS ⊕ or MINUS ⊖ keys to select “Yes” or “No”.
- Select “Yes” if a pressure transducer is installed.
- Select “No” if a pressure transducer is not being used.
- Press the PROGRAM Ⓟ key to accept the value and advance to the next step.

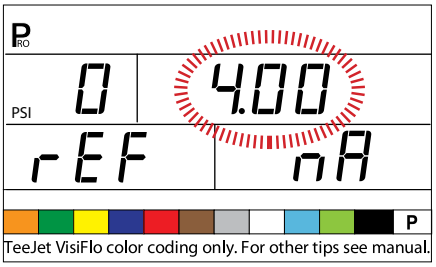
Figure 33: Pressure Sensor Installed



Pressure Transducer Low Pressure Calibration (P Ref)

This function is used to calibrate the Zero Pressure setting of the pressure transducer installed on the system. The pressure transducer used with the 854 is a current type transducer and uses a 4-20 mA reading. “4.0 mA” represents “Zero” pressure.

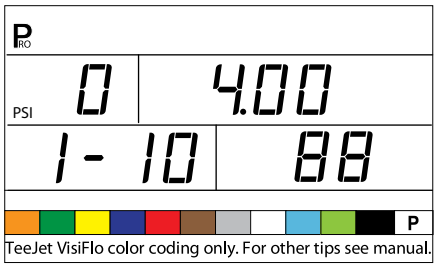
Figure 34: Pressure Transducer

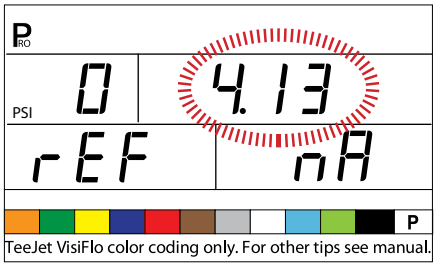


Automatic Calibration

- Make sure that the sprayer pump is turned off and that there is absolutely no pressure in the system (release pressure held by boom control valves and nozzle body check valves).
- In some cases it may be best to remove the sensor from the plumbing system to complete the calibration.
- Press and hold the PLUS ⊞ and MINUS ⊟ keys simultaneously for 3 seconds to activate the automatic calibration feature.
- The lower left portion of the display will count from 1 - 10 during the calibration.
- Once the display finishes counting, it should display a number close to 4.0 (+/- 0.2).
- The low pressure value of the transducer has been calibrated.
- Press the PROGRAM Ⓟ key to advance to the next step.

Figure 35: Automatic Calibration





Pressure Transducer Maximum Rating (P HI)

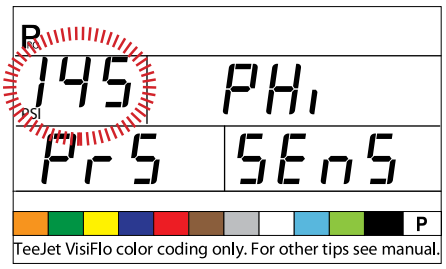
The Pressure Transducer Maximum Rating is used to establish the maximum rating of the pressure transducer in the system. This number can be found stamped on the pressure transducer itself.

- If the transducer has a maximum rating of 145 psi (10 bar) and the number is shown on the display, advance to the next step by pressing the PROGRAM Ⓟ key.
- If the maximum rating is 363 psi (25 bar), use the PLUS ⊞ or MINUS ⊟ keys to change the value.
- Press the PROGRAM Ⓟ key to advance to the next step.

NOTES: Do not change the value to “0” even if there is no pressure sensor installed.

The Maximum Pressure cannot be set lower than the Minimum Pressure.

Figure 36: Pressure Transducer Maximum Rating



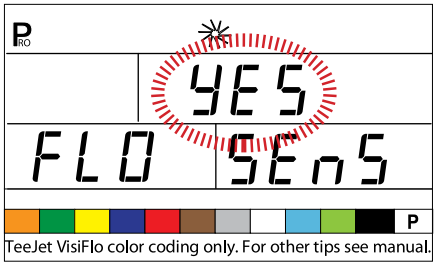
Flow Meter Installed

NOTE: This step may not appear if other programming steps have indicated that a flow sensor is present.

The Flow Meter Installed step indicates to the console whether a flow meter has been installed on the sprayer.

- Use the PLUS ⊞ or MINUS ⊟ keys to adjust the value.
- Select “Yes” if a flow meter is installed. Select “No” if a flow meter has not been used.
- Press the PROGRAM Ⓟ key to advance to the next step.

Figure 37: Flow Meter Installed



Flow Meter Pulses

NOTE: This step may not appear. It only appears if the Flow Meter Installed step is set to "Yes".

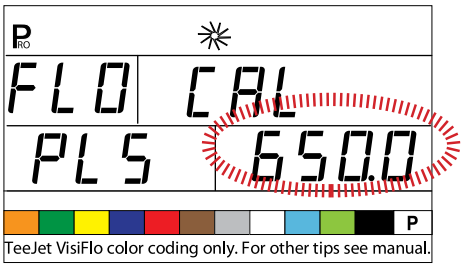
In the Flow Meter Pulses step, the flow meter calibration number can be manually entered from the factory calibrated tag, or an automatic calibration procedure can be started to determine the flow meter pulses based on a known volume of fluid.

NOTE: The automatic calibration procedure is recommended for maximum accuracy.

Manual Entry

- Locate the factory-calibrated flow meter pulse rate tag on the flow meter.
- If this varies from the default value of the console (it typically does), use the PLUS ⊞ or MINUS ⊟ keys to modify the value.
- Press the PROGRAM Ⓟ key to advance to the next step.

Figure 38: Manual Entry

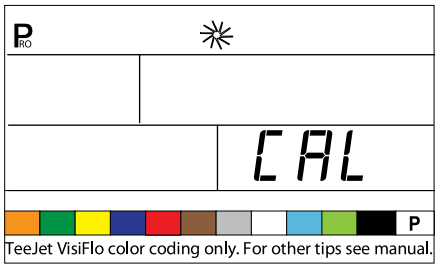


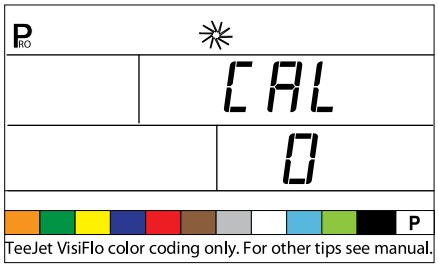
Automatic Calibration

To complete an automatic calibration of the flow meter:

- Press and hold the PLUS ⊞ and MINUS ⊟ keys simultaneously for 3 SECONDS. This will clear the existing value and initiate the calibration procedure.
- "CAL" will be displayed on the screen. This indicates that the controller is ready to begin the calibration process.
- Engage the sprayer pump.
- Press the PLUS ⊞ key to activate the calibration.

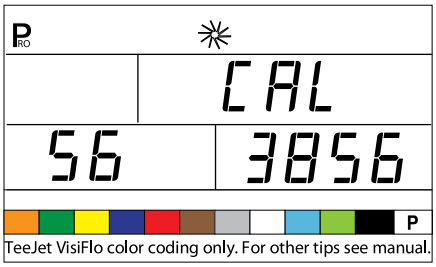
Figure 39: Automatic Calibration





- Turn the boom sections on and begin spraying a known volume of fluid (i.e., 100 gallons) (378.5 liters).
- As the known amount is sprayed, the console will count the pulses.
- After the known volume has been sprayed, turn the Master Switch "Off" to stop counting pulses.

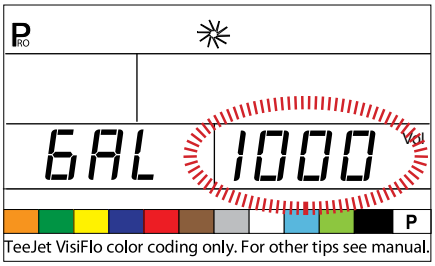
Figure 40: Automatic Calibration (continued)



- Press the PROGRAM Ⓟ key. The console will request what volume was sprayed.
- Use the PLUS ⊞ and MINUS ⊟ keys to adjust the value to match the volume sprayed in gallons/liters.
- Press the PROGRAM Ⓟ key to return to the programming mode.
- The console will display the new flow meter calibration number.
- To accept the value, press the PROGRAM Ⓟ key to advance to the next step.
- To repeat the calibration procedure, refer to the previous steps.

NOTE: A volume of at least 50 gallons (200 liters) should be sprayed during the calibration. The more volume used for calibration, the more accurate the flow meter will be.

Figure 41: Automatic Calibration (continued)



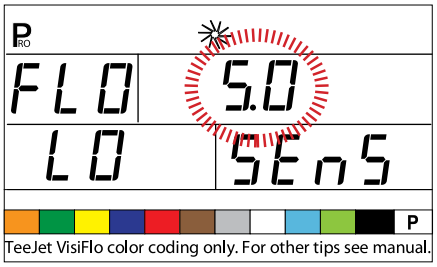
Flow Sensor Minimum Flow Capacity

NOTE: This step may not appear if the console was not previously programmed for use with a pressure sensor.

When both a pressure sensor and flow sensor are installed, the 854 determines when the flow rate has dropped below the capacity of the flow meter being used and automatically switches to pressure-based regulation. When the flow rate once again reaches an acceptable level for the flow meter to regulate, the 854 automatically switches back to flow-based regulation.

- Use the PLUS ⊞ or MINUS ⊟ keys to enter the minimum recommended flow mater, in GPM or LPM, of the flow meter installed on the sprayer.
- This information can be located in the flow meter manufacturer's literature.
- Minimum flow rates for TeeJet flow meters are listed in the following table.
- Press the PROGRAM Ⓟ key to return to accept the value and advance to the next step.

Figure 42: Flow Sensor Minimum Flow Capacity



Flow Meter Rates:

Nominal Flow Meter Size	Minimum Flow Rate in GPM (l/min)
1/2"	0.79 GPM (3 l/min)
3/4"	1.9 GPM (7 l/min)
1"	2.6 GPM (10 l/min)
801-PP-RUB	2.5 GPM (9.5 l/min)
1 1/2"	9.2 GPM (35 l/min)
2"	19 GPM (72 l/min)

Sensor Selection

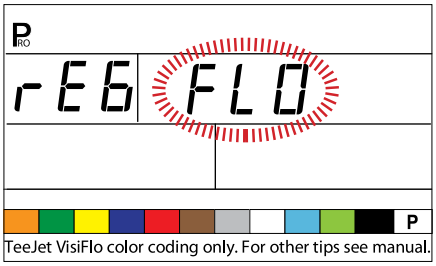
NOTE: This step may not appear. It will only appear if both sensors (pressure sensor and flow sensor) have been installed and programmed.

The 854 system can be used with either a flow meter, pressure transducer, or both. The Sense Selection step instructs the console which type(s) of sensor is/are being used to control the regulation.

- Use the PLUS ⊞ or MINUS ⊟ keys to select either "Flo" for Flow Meter or "PRS" for Pressure Sensor.
- Press the PROGRAM Ⓟ key to advance to the next step.

If both sensors are installed on the sprayer, this process will determine which sensor is used as the primary one for regulation. If "Flo" is selected, the Flow Meter will be used to control flow and the pressure transducer will be used only to display the actual pressure. If "PRS" is selected, the pressure transducer will be used to control the flow and display the actual pressure.

Figure 43: Sensor Selection



Section Valve Type

The Section Valve Type distinguishes the type of On/Off boom control valves installed on the machine. There are 2 types of valves that can be used:

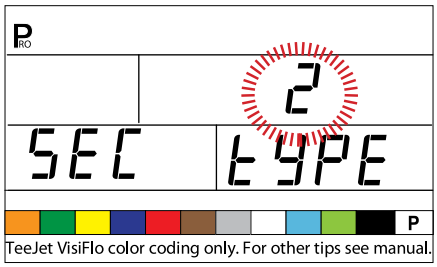
- 2-way valves
- 3-way valves

A 2-way control valve is simply an On/Off valve. Flow is either directed to the boom section(s) or it is blocked.

A 3-way control valve is known as a Bypass valve. Flow continuously passes through this valve. When the valve is activated (on), flow is directed to the boom section(s). When the valve is not activated (off), flow is directed through a bypass port back to the supply tank.

- Change the value if required by pressing the PLUS ⊞ or MINUS ⊟ keys.
- Press the PROGRAM Ⓟ key to accept the value and advance to the next step.

Figure 44: Section Valve Type



Pressure Regulating Mode

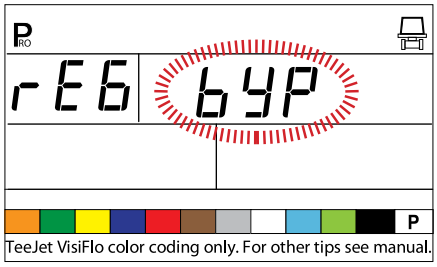
The Pressure Regulating Mode instructs the 854 where the regulating valve is plumbed into the system. Once configured correctly, this value should not change unless the regulating valve is physically moved to a new point in the plumbing.

- The default value is “BYP” which indicates that the pressure regulating valve is plumbed in a bypass line.
- If the setting is correct, press the PROGRAM key to accept the value and advance to the next step.

When programmed in the Bypass Mode, with the controller in Manual Mode “Man”, the pressure regulating valve should:

- Close when the PLUS key is pressed.
- Open when the MINUS key is pressed.

Figure 45: Pressure Regulating Mode



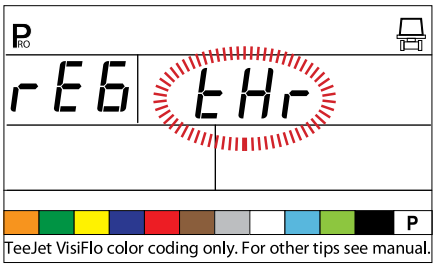
If the pressure regulating valve is plumbed in a supply line to the booms, it is considered in the “throttling” position.

- Use the PLUS or MINUS keys to adjust the value to “thr” (throttling mode). The polarity that the console uses to control the regulating valve will be reversed.
- Press the PROGRAM key to accept the value and advance to the next step.

When programmed in the Throttling Mode, with the controller in Manual Mode “Man”, the pressure regulating valve should:

- Open when the PLUS key is pressed.
- Close when the MINUS key is pressed

Figure 46: Pressure Regulating Mode

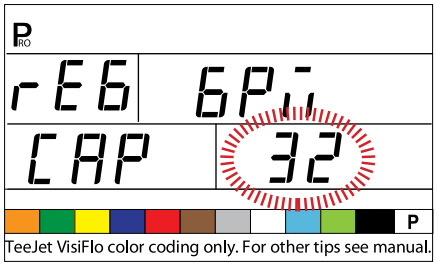


Regulating Valve Capacity

Enter the maximum flow capacity of the regulating valve in Gallons Per Minute (GPM). The valve parameters needed to drive the regulating valve smoothly depend on the size of the valve.

- Use the PLUS or MINUS keys to adjust the valve so that it matches the maximum flow capacity (GPM) of the regulating valve being used.
- Press the PROGRAM key to advance to the next step.

Figure 47: Regulating Valve Capacity



Common Regulating Valves:

Valve	GPM
344AE-2RL	27 GPM
344AE-2RB	30 GPM
344AE-2PR	12 GPM
AA346ZR	85 GPM
AA346ZRB	85 GPM

Regulating Valve Speed - Coarse Adjustment

This step allows for the adjustment of the pressure regulating valve speed to accommodate different application needs. Operating conditions may necessitate a higher or lower response speed for the regulating valve.

The coarse adjustment controls the speed of the valve when large adjustments in flow are required by the controller.

- Use the PLUS or MINUS keys to increase or decrease the response time.

Any number between 0 - 19 can be selected.

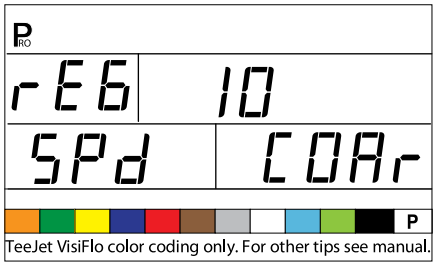
0 = slow
19 = fast

If the regulating valve is plumbed in a bypass line, the valve speed coarse adjustment number of “15” works well in most applications.

If the regulating valve is plumed in the Throttling position (supply line) start with a coarse adjustment speed number of “5” and adjust the number according to application requirements.

- Press the PROGRAM Ⓟ key to accept the value and advance to the next step.

Figure 48: Coarse Adjustment



Regulating Valve Speed - Fine Adjustment

The fine adjustment controls the speed of the valve when small adjustments in flow are required by the controller.

- Use the PLUS ⊕ or MINUS ⊖ keys to increase or decrease the response time.

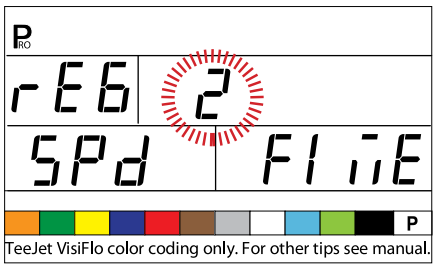
Any number between 0 - 9 can be selected.

0 = slow
9 = fast

Start with a fine adjustment speed of “2”. This works well in most situations. The number may need to be optimized during the spraying operation.

- Press the PROGRAM Ⓟ key to accept the value and advance to the next step.

Figure 49: Fine Adjustment



NOTES: Adjusting agitation volumes can assist the regulating valve operation.

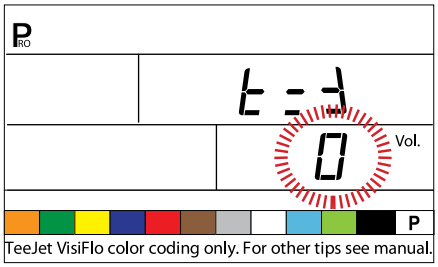
The speed value can be adjusted to optimize system performance. If the valve searches for the programmed application rate by cycling the pressure up and down continuously, reduce the number until the searching is minimized or eliminated. A higher number will increase the valve response speed and increase the rate of adjustment.

Tank Volume

In addition to accumulating the total volume applied, the 854 tracks the volume down from the maximum tank content to 0 gallons (liters). This allows for the monitoring of remaining tank volume.

- Use the PLUS ⊕ or MINUS ⊖ keys to enter the maximum volume of the sprayer tank in gallons (liters).
- Press the PROGRAM Ⓟ key to accept the value and advance to the next step

Figure 50: Tank Volume



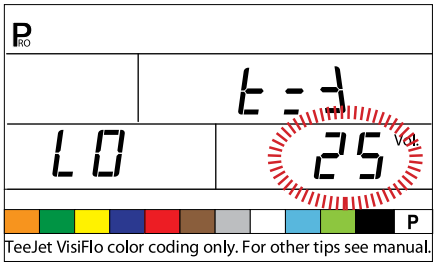
Low Tank Volume Alarm

The 854 console alerts the operator when nearing the end of a tank.

- Use the PLUS ⊕ or MINUS ⊖ keys to enter the volume at which the console should display the alert. A value of “0” will disable the feature.

A visual alarm will be displayed when the low tank level warning is reached.

Figure 51: Low Tank Volume Alarm



Fill Flow Meter Calibration

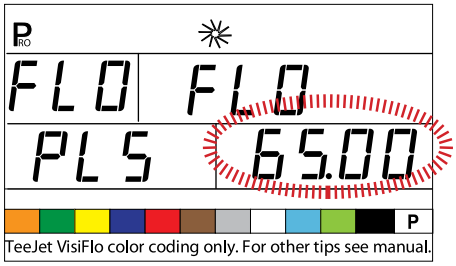
NOTE: This step will not be displayed unless the console has been programmed for use with a fill flow meter.

The 854 console has the capability of reading signals from a second flow meter for tank filling purposes. This feature must be activated by the organization selling the console kit and requires an additional flow meter. The 854 can also be connected to a valve or switch for automatic shutoff of the filling operation.

Manual Entry

- Locate the factory calibrated tag on the flow meter.
- If this varies from the default value (it usually does) use the PLUS ⊕ or MINUS ⊖ keys to modify the value.
- Press the PROGRAM Ⓟ key to advance to the next step.

Figure 52: Manual Entry

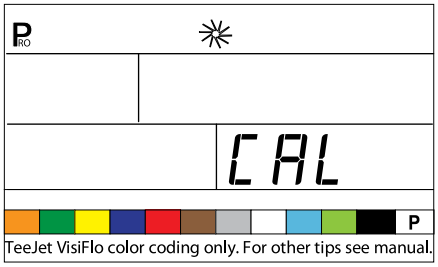


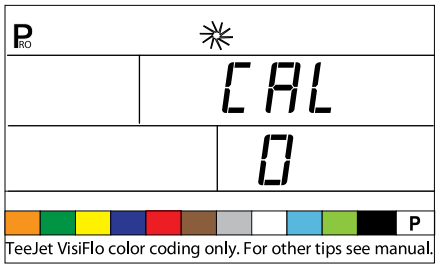
Automatic Calibration

NOTE: To achieve an accurate flow meter calibration, a volume of at least 50 gallons (200 liters) should be pumped during calibration. The more volume used for calibration, the more accurate the flow meter will be.

- Press and hold the PLUS ⊞ and MINUS ⊟ keys simultaneously for 3 seconds. This will clear the existing value and initiate the calibration procedure.
- "CAL" will be displayed on the screen. This indicates that the controller is ready to begin the calibration procedure.
- Press the PLUS ⊞ key to activate the calibration.
- Pump a known volume of fluid (i.e., 100 gallons/liters) through the flow meter in the tank.

Figure 53: Automatic Calibration

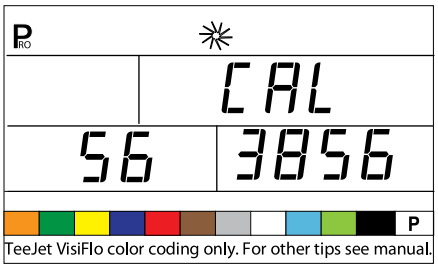




As the known volume is pumped, the console will count the pulses.

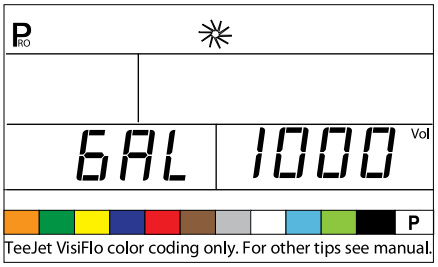
- Once the volume has been pumped, turn the pump (or flow) off to stop counting pulses.

Figure 54: Automatic Calibration (continued)



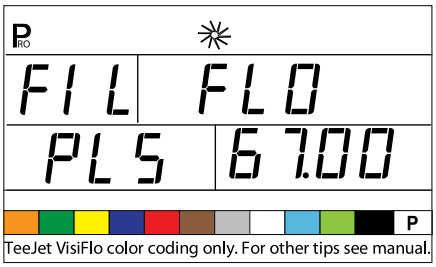
- Press the PROGRAM Ⓟ key. The console will ask what volume was pumped.
- Use the PLUS ⊞ and MINUS ⊟ keys to adjust the value to match the volume pumped (in gallons/liters).

Figure 55: Automatic Calibration (continued)



- Press the PROGRAM Ⓟ key to return to programming mode.
- The new flow meter calibration will be displayed.
- Press the PROGRAM Ⓟ key to accept the value and advance to the next step.
- Follow the same procedures to repeat the calibration process.

Figure 56: Automatic Calibration (continued)



Communications

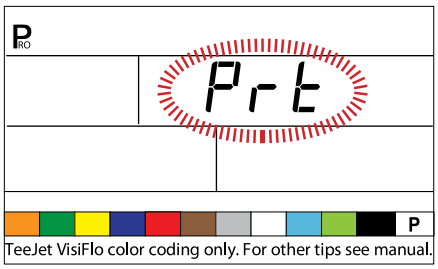
The Communications step allows for the selection of the type of communications (if any) used.

Available choices include:

- NO CON - no external communications
- PRT - memory printing
- GPS - global positioning satellite system/variable rate communication capability
- LOG - downloading to a PC with on-the-go capabilities
- PC - PC link
- Use the PLUS ⊞ and MINUS ⊟ keys select the type of communications being used.

- Press the PROGRAM (P) key to advance to the next step.

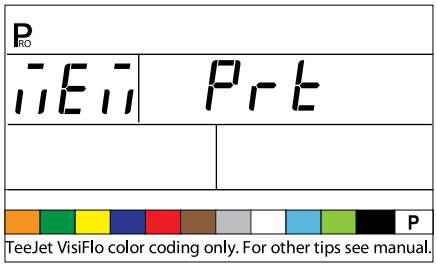
Figure 57: Communications



Printing Memory Contents

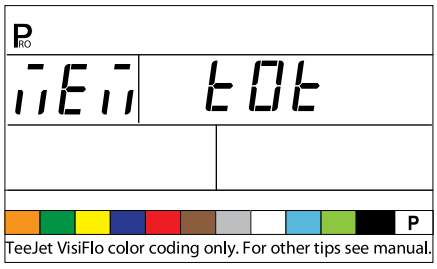
- Connect the 854 console to the 78-20002 printer using a 45-2004 printer cable.
- Select PRT in the Communications Setup step.
- The Boom Master Switch must be set to “Off”.
- Press the MEMORY (MEM) key. The first screen displayed will be the MEM PRN Screen.
- Press the PROGRAM (P) key to advance to the next step.

Figure 58: Printing Memory Contents



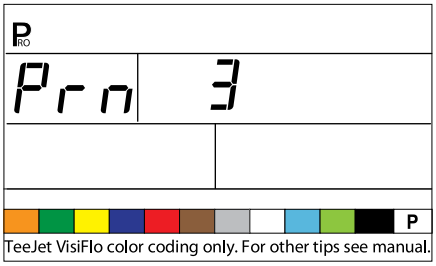
- Only information stored in the memory locations can be printed.
- Press the MEMORY (MEM) key to launch the PRN TOT screen, which will allow for the printing of contents of the Total Memory locations and any individual memory locations (1-9) that contain data.

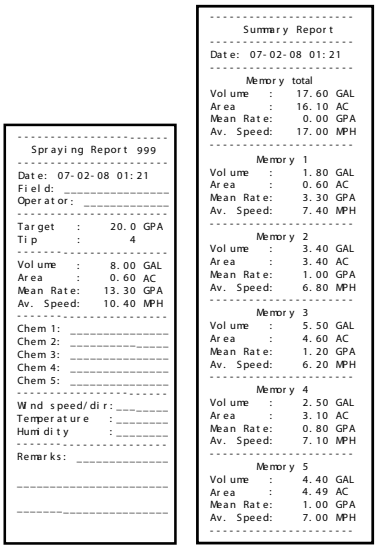
Figure 59: Printing Memory Totals



- Continue pressing the MEMORY (MEM) key to display screens 1-9, which represent memory locations 1-9.
- When the desired location is displayed, press the PROGRAM (P) key to print the report.
- To exit from the Print Menu, press and hold either the MEMORY (MEM) key or the PROGRAM (P) key to return to the Memory Menu.

Figure 60: Printed Report





Spraying Report 999

Date: 07-02-08 01:21
Field: _____
Operator: _____

Target : 20.0 GPA
Tip : 4

Volume : 8.00 GAL
Area : 0.60 AC
Mean Rate: 13.30 GPA
Av. Speed: 10.40 MPH

Chem 1: _____
Chem 2: _____
Chem 3: _____
Chem 4: _____
Chem 5: _____

Wind speed/dir: _____
Temperature : _____
Humidity : _____

Remarks: _____

Summary Report

Date: 07-02-08 01:21

Memory total
Volume : 17.60 GAL
Area : 16.10 AC
Mean Rate: 0.00 GPA
Av. Speed: 17.00 MPH

Memory 1
Volume : 1.80 GAL
Area : 0.60 AC
Mean Rate: 3.30 GPA
Av. Speed: 7.40 MPH

Memory 2
Volume : 3.40 GAL
Area : 3.40 AC
Mean Rate: 1.00 GPA
Av. Speed: 6.80 MPH

Memory 3
Volume : 5.50 GAL
Area : 4.60 AC
Mean Rate: 1.20 GPA
Av. Speed: 6.20 MPH

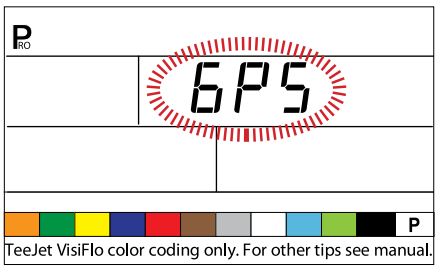
Memory 4
Volume : 2.50 GAL
Area : 3.10 AC
Mean Rate: 0.80 GPA
Av. Speed: 7.10 MPH

Memory 5
Volume : 4.40 GAL
Area : 4.49 AC
Mean Rate: 1.00 GPA
Av. Speed: 7.00 MPH

Using GPS

- The GPS receiver must be sending the GPVTG string at 9600 Baud with a sampling rate of 1 Hz. Additional strings may also be sent.
- Connect the GPS receiver to the 854 console using a 45-20063 serial cable.
- Select “GPS” in the Communications Setup step.
- When the 854 console starts receiving speed information from the GPS receiver, it uses that information for determining vehicle speed. If the 854 console loses communications with the GPS receiver for more than 5 seconds, it will revert back to other sources of speed input.

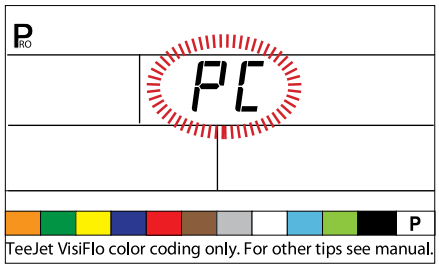
Figure 61: Using GPS Speed



Communicating With a Laptop Running Fieldware Software

- Connect the laptop to the 854 console using a 45-20063 serial cable.
- Select “PC” in the Communications Setup step.
- Press the PROGRAM key to advance to the next step.
- The message “GPS SPEED” will appear only if “PC” was selected in the Communications Setup step. Select “ON” to receiving GPS speed through the laptop. Select “OFF” to use the regular radar or speed sensor input.
- Follow the instructions if the Fieldware manual to set up and run the ARM function. In System/SystemSetup/Control, select the TeeJet854.DRV driver.

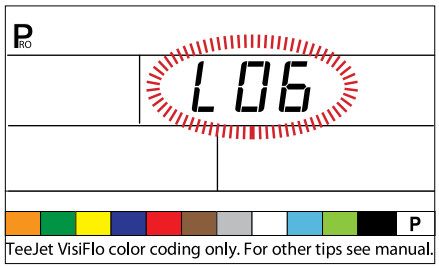
Figure 62: Communicating with Laptop/Fieldware



Logging Information to a Laptop running Logging Software

- Connect the laptop to the 854 console using a 45-20063 serial cable.
- Select “LOG” in the Communications Setup step.
- The LOG mode is an advanced data transfer tool used with specially configured hardware devices only. This mode is not used during normal applications.

Figure 63: Log Mode



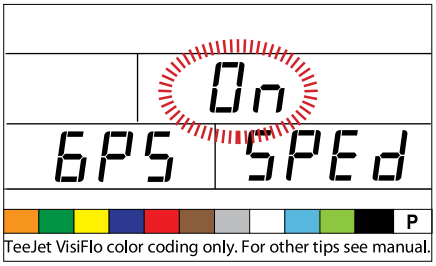
GPS Speed

NOTE: The GPS Speed option is only available when “PC” is selected during the Communications Setup.

GPS Speed allows the 854 to accept speed data from an external GPS source. Select either “On” to use the external GPS Speed input, or “Off” to ignore external speed input.

- Use the PLUS or MINUS keys to adjust the value to either “On” or “Off”.
- Press the PROGRAM key to advance to the Use External Rate step.

Figure 64: GPS Speed Simulation



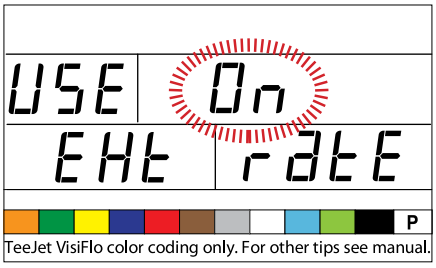
Use External Rate

NOTE: The External Rate option is only available when “PC” is selected during the Communications Setup. This option is typically used with an external GIS computer, such as the Legacy 6000.

External Rate is used to indicate whether local control rates are to be used or ignored. When set to “Off”, the 854 console will ignore the rate coming from the external computer and use its own preset rate. When set to “On”, the 854 will use the rate determined by the external computer (Legacy 6000), usually as determined from a prescription map.

- Use the PLUS or MINUS keys to adjust the value to either “On” or “Off”.
- Press the PROGRAM key to advance to the Simulated Ground Speed step.

Figure 65: External Rate



Simulated Ground Speed

Simulated ground speed allows the verification of console functions and the sprayer without actually moving the sprayer. This should be tested prior to all spraying activity.

The 854 has a low and high simulated ground speed that allows for switching between the two to simulate a speed change. This will ensure that the console is regulating properly during sprayer checkout.

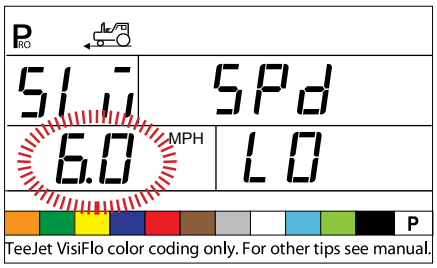
To activate the simulated speed, while in the normal operating mode with the Master Switch “On”:

- Press the PROGRAM and MINUS keys for low simulated speed.
- Press the PROGRAM and PLUS keys for high simulated speed.

Low Speed

- Use the PLUS ⊕ or MINUS ⊖ keys to adjust value.
- Press the PROGRAM Ⓟ key to advance to the High Simulated Speed step.

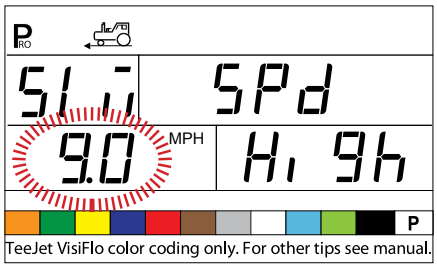
Figure 66: Low Speed Simulation



High Speed

- Use the PLUS ⊕ or MINUS ⊖ keys to adjust value.
- Press the PROGRAM Ⓟ key to advance to High Simulated Speed step.

Figure 67: High Speed Simulation



NOTE: Once the sprayer begins moving and the 854 receives actual speed pulses, simulated speed is deactivated. If a Radar Speed Sensor is being used, disconnect the Radar from the main console. Due to the sensitivity of this speed sensor, any movement can disable simulated speed.

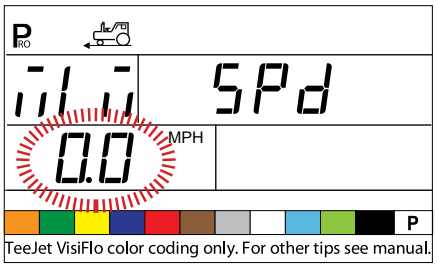
Auto Master Off - Speed

The TeeJet 854 automatically shuts the boom sections off at the programmed speed to eliminate an operator function when slowing to stop or turn around.

- Use PLUS ⊕ or MINUS ⊖ keys to adjust speed value.
- Press the PROGRAM Ⓟ key to advance to next step.

When the sprayer speed exceeds the established Auto Master Off Speed, the boom sections turn back on. Set this value to “0” to disable. This feature is disabled when operating in Manual Mode.

Figure 68: Auto Master Off - Speed



Minimum Pressure Setting

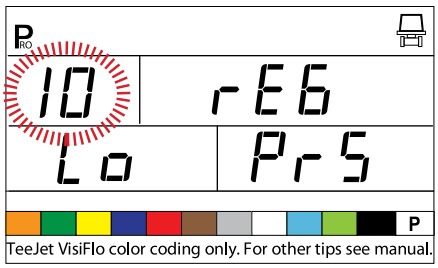
Set the minimum pressure to which the sprayer is allowed to regulate. It is possible that when the sprayer slows down, the control system will regulate the pressure so low that it falls below the manufacturer’s recommended pressure for the spray tip or reduces system flow to the point where the flow meter stalls.

Set the pressure setting to the minimum recommended pressure range for the spray tips being used. (For example, if this is set to 15 psi/10 bar, the console, in automatic mode, does not regulate pressure below 15 psi/10 bar.)

- Use the PLUS ⊕ or MINUS ⊖ keys to adjust the minimum pressure value.
- Press the Program Ⓟ key to advance to the next step.

NOTE: An audible alarm is activated when this feature is enabled. It will provide a steady beep, indicating Medium Priority.

Figure 69: Minimum Pressure Setting



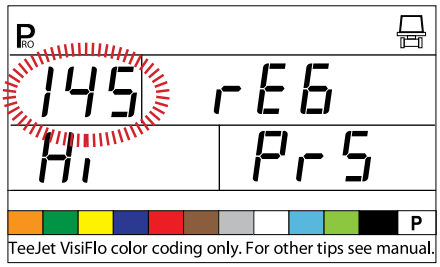
Maximum Pressure Setting

Set the maximum pressure to which the sprayer is allowed to regulate. This will help ensure that the spraying pressure does not exceed the recommended pressure range of the spray tips being used. This step can be used to help prevent spraying applications that contribute to drift.

- Use the PLUS ⊕ or MINUS ⊖ keys to adjust the maximum pressure value.
- Press the PROGRAM Ⓟ key to advance to the next step.

NOTE: An audible alarm is activated when this feature is enabled. It will provide a steady beep, indicating Medium Priority.

Figure 70: Maximum Pressure Setting



Audible Alarm

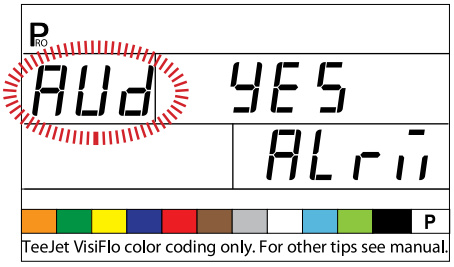
The audible alarm is used to alert the operator to problems with the sprayer control system. It is used in addition to visual alarms on the LCD display and LED sensor alarms above the screen.

- Use the PLUS ⊞ or MINUS ⊟ keys to select "YES" to activate the audible alarm.
- Use the PLUS ⊞ or MINUS ⊟ keys to select "NO" to deactivate the audible alarm.
- Press the PROGRAM Ⓟ key to advance to the next step.

Audible alarms are divided into three priorities:

- Low - a long beep
- Medium - a steady beep
- High - three short beeps

Figure 71: Audible Alarm



Dual Boom On Setting

NOTE: This step will not be displayed unless the dual boom option was selected in the OEM Programming Mode.

The dual boom option is the speed or pressure at which the second boom is SHUT OFF. As the vehicle slows, the system pressure will begin to drop, eventually to a point where the spray tips are no longer able to develop a pattern. The Dual Boom On setting should be adjusted to shut off the second boom line before this condition occurs.

- Use the PLUS ⊞ or MINUS ⊟ keys to adjust the setting.
- Press the PROGRAM Ⓟ key to advance to the next step

Figure 72: Regulating Mode - Speed

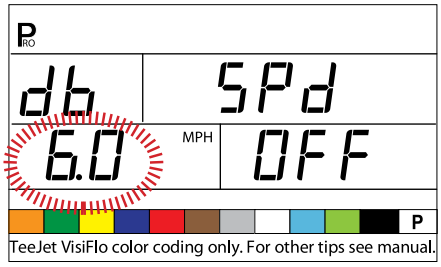
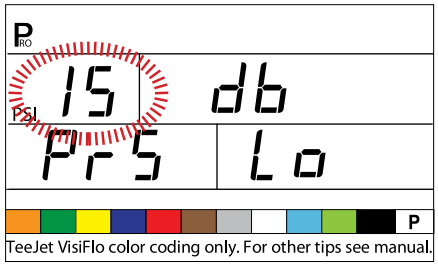


Figure 73: Regulating Mode - Pressure



Memory Reload Function

The memory reload function is used to restore all programming values that were previously set. A sprayer manufacturer can pre-program the console for specific parameters on a sprayer and save the values internally. This step will allow for the return to those pre-programmed values if required.

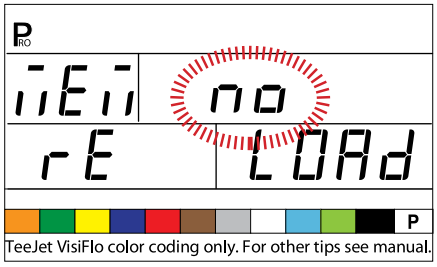
WARNING! It is recommended that this setting be set to "NO" unless otherwise instructed by an authorized TeeJet representative.

Notes: For protection, the 854 console does not automatically power down while in Program Mode. Exit properly as described below to enable the console's auto power down feature.

Cutting the power to the controller while in Program Mode will not save any changes in the computer's memory.

- Use the PLUS ⊞ or MINUS ⊟ keys to select either "YES" or "NO".
- The default of "NO" indicates that programming values are saved as entered.
- Selecting "YES" will change the program values to those programmed and saved by the manufacturer.
- Press the PROGRAM Ⓟ key to advance to the next step. The screen should return to the beginning of Program Mode.
- Press and hold the PROGRAM Ⓟ key for three seconds to exit Program Mode and save the programming information to the console's memory.

Figure 74: Memory Reload Function

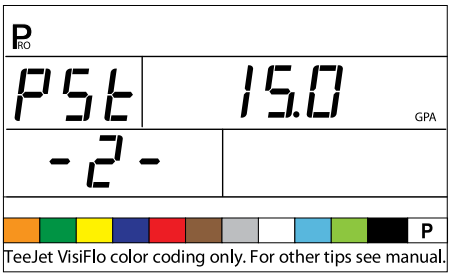


CHAPTER 4 - APPLICATION PRESET SETUP MODE

To access the Application Preset Setup Mode, the Master Switch must be in the "Off" position.

- Press the PRESET key to display the current presets being used.
- Press the PRESET key again within 3 seconds to advance to the next preset. This process can be continued throughout all 5 presets.
- To program a particular preset, press the PROGRAM key while that preset is displayed.

Figure 75: Application Preset Setup



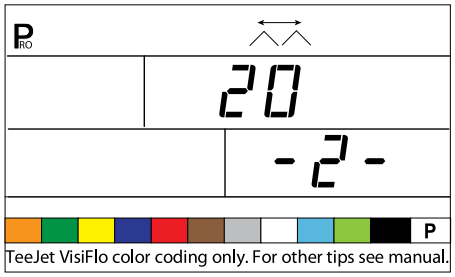
EXAMPLE: To program present #2, press the PRESET *key until "PST - 2 - " is displayed. Press the* PROGRAM *key to program the value.*

Tip Spacing

Enter the spacing between the spray nozzles in inches (cm).

- Use the PLUS or MINUS keys to adjust the value.
- Press the PROGRAM key to advance to the next step

Figure 76: Tip Spacing



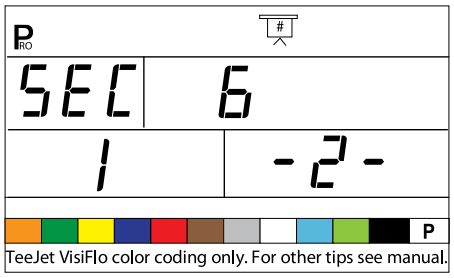
Number of Tips Per Boom Section

Enter the number of tips on the boom section corresponding to boom Section 1. The number of tips entered here is specific to the preset being used (in the following example, preset 2 is being used).

- Use the PLUS or MINUS keys to adjust value.
- Press the PROGRAM key to advance to next step

Once the PROGRAM key has been pressed, pressing the PROGRAM key again will advance the console to Section 2. Continue programming the number of tips for each boom section until all 5 possible boom sections have been programmed. If a particular boom section switch is not used, set the value to "0".

Figure 77: Number of Tips



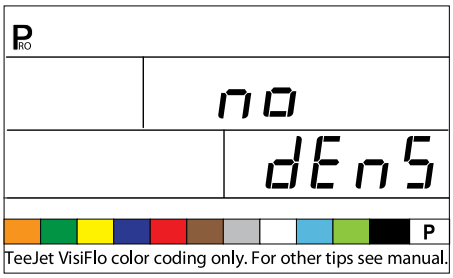
Density

Alternate Density Used

If a product carrier other than water will be used, change this value to "YES". Otherwise, leave at "NO".

- Use the PLUS or MINUS keys to select "YES" or "NO".
- Press the PROGRAM key to advance to the next step

Figure 78: Alternate Density



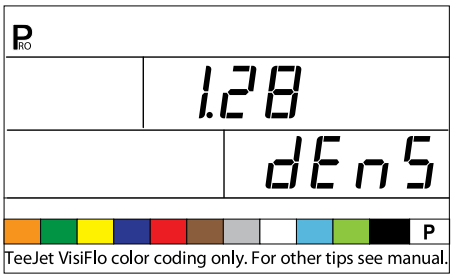
Density Value

NOTE: This screen will only be displayed if Alternate Density Used was set to "YES".

If a carrier other than water (i.e., liquid fertilizer) is being used, enter the density value.

- Use the PLUS or MINUS keys to change the value.
- Press the PROGRAM key to advance to the next step

Figure 79: Density Value



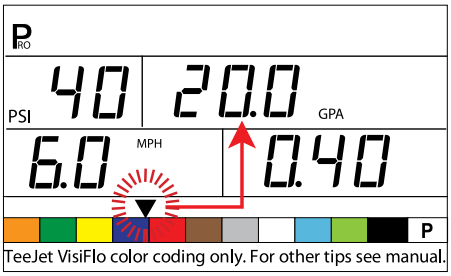
Tip Selection

Select the appropriate color of the spray tip being used.

- Use the PLUS or MINUS keys to move the flashing arrow to the tip's corresponding color tab.

The arrow should be located over the matching color of the tips being used (tips must be ISO color coded). The flow rate of the tip in GLM (LPM) at 40 psi/2 bar will be displayed on the lower right corner of the screen. Press the PROGRAM key to select the color tab and advance to the next step.

Figure 80: Tip Selection

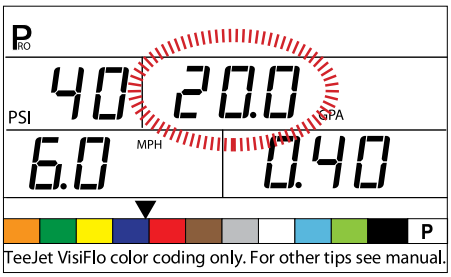


Target Application Rate

Once the tip has been selected, the Target Application Rate display will be flashing. If the display rate is not flashing, press the PROGRAM key three or four times until the Target Application display starts to flash.

- Use the PLUS or MINUS keys to adjust the target rate.
- Press the PROGRAM key to advance to the next step.

Figure 81: Target Application Rate



Calculation Steps

Known Pressure Calculation

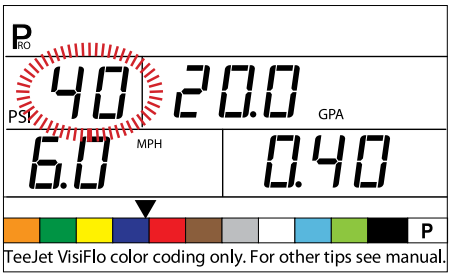
If the approximate operating pressure is known:

- Use the PLUS or MINUS keys to adjust the value.

The 854 will determine what the operating speed must be to achieve the target application rate that the entered pressure. If the indicated speed is too high, a set of smaller nozzles is required. If the indicated speed is too low, a set of larger nozzles is required.

Press the PROGRAM key to advance to the next step.

Figure 82: Known Pressure Calculation



Known Speed Calculation

- Use the PLUS or MINUS keys to adjust the indicated speed to the intended speed.

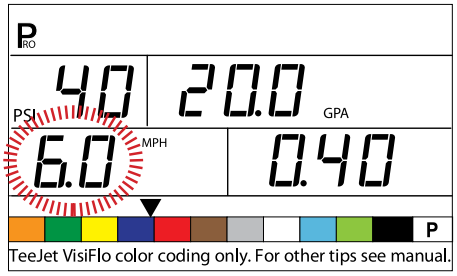
The 854 will calculate what the pressure must be to maintain the target application rate at the entered speed. If the pressure is too high, a set of larger nozzles or a slower speed is necessary. If the pressure is too low, a set of smaller nozzles or a faster speed is necessary.

Continue trying different speed, pressure, and tip combinations until the desired combination is found.

NOTE: In Application Preset Mode, the tip color tab must match the actual tips being used.

- Press the PROGRAM key to save the changes and return to the Tip Selection Step.
- Press and hold the PROGRAM key for 2 seconds to exit Application Preset Mode.

Figure 83: Known Speed Calculation



CHAPTER 5 - OPERATIONS

Sprayer Evaluation

Before spraying, check all connections related to the Sprayer Control System. Particular attention should be given to the sensors to ensure the console received strong, uninterrupted signals. Make sure connections are made and the sensors are working properly.

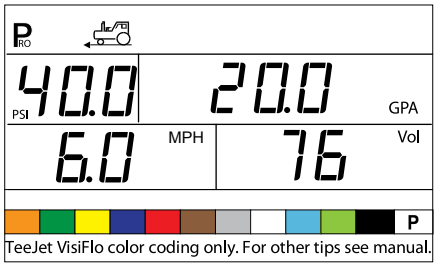
IMPORTANT! When working around a sprayer or chemicals, always wear protective clothing and eye wear.

NOTE: It is recommended that the entire sprayer be calibrated to prepare the machine for operation and to diagnose spray tip wear. Worn tips can contribute to costly chemical waste and inaccurate spraying, regardless of the use of a sprayer control. Calibration is necessary to obtain the benefits associated with a computerized sprayer control.

Partially fill the sprayer tank with water to flush the system. Perform a visual inspection of the spray tips to ensure all tips are delivering a good spray pattern.

- Set the Master Boom Switch to the “Off” position.
- Make sure the tank shutoff valve is open.
- Start the vehicle’s engine, engage the pump, and set the RPM to that being used when spraying.
- Turn the 854 on by pressing the PROGRAM Ⓟ key.
- Ensure that the preset reference flow arrow matches the set of tips being used.
- Verify that the 854 recognizes the simulated speed. If the simulated speed has been disabled (due to vehicle movement) activate the simulated speed by turning the Master Boom Switch “On” and pressing the PROGRAM Ⓟ and MINUS ⊖ keys simultaneously for a Low simulated speed, or by pressing the PROGRAM Ⓟ and PLUS ⊕ keys simultaneously for a High simulated speed.
- Turn each individual spray boom section “On”.

Figure 84: Sprayer Evaluation



- Press the AUTO/MAN ↔ key so that the red LED indicates “MAN” mode.
- Toggle the Master Boom Switch to the “On” position.
- Adjust the pressure with the PLUS ⊕ or MINUS ⊖ keys. The pressure should increase when the PLUS ⊕ key is pressed and decrease when the MINUS ⊖ is pressed.

Check the sprayer to ensure it is activated. Visually ensure spray tip performance.

- Press the AUTO/MAN ↔ key so that the red LED indicates “AUTO” mode. The control console should regulate to the target application rate for the simulated speed.
- While spraying, press the PROGRAM Ⓟ and PLUS ⊕ keys simultaneously for a High simulated speed. The 854 should increase pressure and regulate to the target application rate for the high simulated speed.
- While spraying, press the PROGRAM Ⓟ and MINUS ⊖ keys simultaneously for a Low simulated speed. The 854 should decrease the pressure and regulate to the target application rate for low simulated speed.

To stop spraying, toggle the Master Boom Switch to the “Off” position.

Spraying

Fill the sprayer tank and mix the solution thoroughly. Determine the application rate as well as the nozzles being used. All data is programmed into the 854 console.

- Power up the 854 by pressing the PROGRAM Ⓟ key.
- Toggle the individual boom switches to the “On” position for each of the booms on the sprayer.
- Press the AUTO/MAN ↔ key so that the red LED indicates “AUTO” mode.
- In Auto Mode, with the Master Switch set to the “Off” position, the console will display the target application rate and a target symbol. When the Master Switch is set to the “On” position, the actual rate will be displayed and the target symbol is no longer visible.
- During application, with the Master Switch set to the “On” position, the display will always indicate the actual application rate, vehicle speed, application area covered/total volume applied, and pressure (only if a pressure transducer has been installed).
- When the location to begin spraying has been reached, turn the Master Boom Switch to the “On” position. The spraying operation is now active. Maintain the usual vehicle speed for spraying. Moderate changes in vehicle speed do not affect application rate. Moderate speed fluctuations are compensated for by automatic pressure increases or decreases by the 854.

If it is necessary to stop during application, turn the Master Boom Switch to the “Off” position.

Alarm warnings can occur momentarily while the pressure regulating valve is searching for a new setting (i.e., after the close of a boom section or other change in normal operation). However, if the alarm stays on for a longer period, the valve may have reached its limit and the system is unable to regulate flow beyond the limit.

CHAPTER 6 - FEATURES

Area/Volume Display

WARNING! Clearing the area/volume counter as indicated blow does not save the information. If the information is to be saved for future reference, refer to the Memory Feature of this User Guide.

With the Master Boom Switch in the "On" position, the 854 Sprayer Control counts application area and measures the total volume applied.

The area counter measures treated acres and is dependent on the values programmed for the number of tips per boom section and the tip spacing.

The volume measure is dependent on flow meter pulses, if a flow meter is present. If not, it is calculated based on pressure signals from the Pressure Transducer.

Depending on console programming during OEM Setup Mode, the lower right of the console will display:

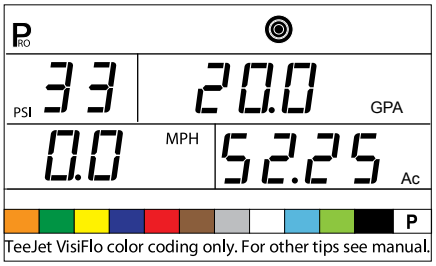
- volume sprayed
- area covered
- both (alternating every three seconds)

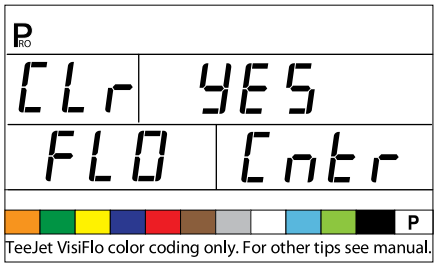
To clear the area counter/volume measure:

- Set the Master Boom Switch to the "Off" position.
- Press and hold the AUTO/MAN ↔ key for three seconds.
- The controller will display a message asking if the field counter should be cleared.
- Use the PLUS ⊕ or MINUS ⊖ keys to select either "YES" or "NO".
- Press the PROGRAM Ⓟ key to accept the change and return to normal operating mode.

NOTE: The area/volume measure can only be cleared from the normal operating mode with the Master Boom Switch in the "Off" position.

Figure 85: Area/Volume Display





Memory Feature

WARNING! Clearing the Total Memory Location will also clear ALL individual memory locations as well.

The TeeJet 854 has nine individual memory locations as well as a Total Memory location. These memory locations store the volume and area accumulated since the last clearing of the display, or since the last memory save function.

Viewing Memory Information

To view information stored in memory locations:

- Press the MEMORY MEM key.
- Continue pressing the MEMORY MEM key to scroll through the different memory locations.

Clearing Memory Locations

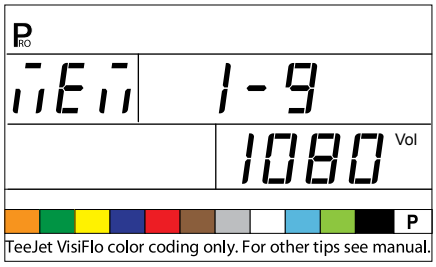
To clear and existing value from a memory location:

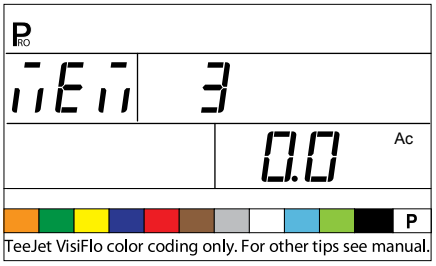
- Press the MEMORY MEM key.
- Continue pressing the MEMORY MEM key to scroll to the desired memory location.
- Press and hold the AUTO/MAN ↔ key for three seconds.

The area/volume and volume readings will be reset to "0".

To clear the Total Memory Location, follow the same procedure.

Figure 86: Memory Information





Saving Information to Memory

WARNING! Saving information to a Memory Location that has an existing value will result in the SUM of the existing value and the new value being stored in the memory location.

EXAMPLE: 50 Ac (Ha) and 1000 Gal (l) are on the console

Memory Location 1 has 100 Ac (Ha) and 2000 Gal (l) previously saved

If new information is saved to Memory Location 1, the values will be added

50 Ac (Ha) + 100 Ac (Ha) = 150 Ac (Ha)

1000 Gal (l) + 2000 Gal (l) = 3000 Gal (l)

Memory Location 1 will = 150 Ac (Ha) and 3000 Gal (l)

To save information to the memory locations:

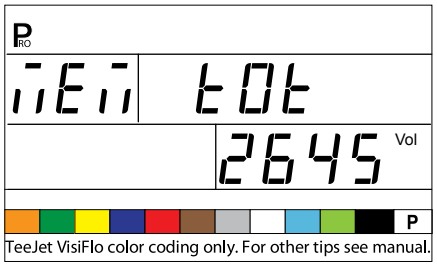
- Press the MEMORY [MEM] key.
- Continue pressing the MEMORY [MEM] key to scroll to the desired memory location.
- Press the PLUS [+] key to save the information

The 854 will automatically exit the Memory Feature and return to normal operating mode. Any information saved to the individual memory locations are added to the Total Memory as well.

To exit the Memory Feature if no changes were made or after clearing a value:

- Press and hold the MEMORY [MEM] key for three seconds.

Figure 87: Saving Information to Memory



Tank Feature

Auto Tank Filling

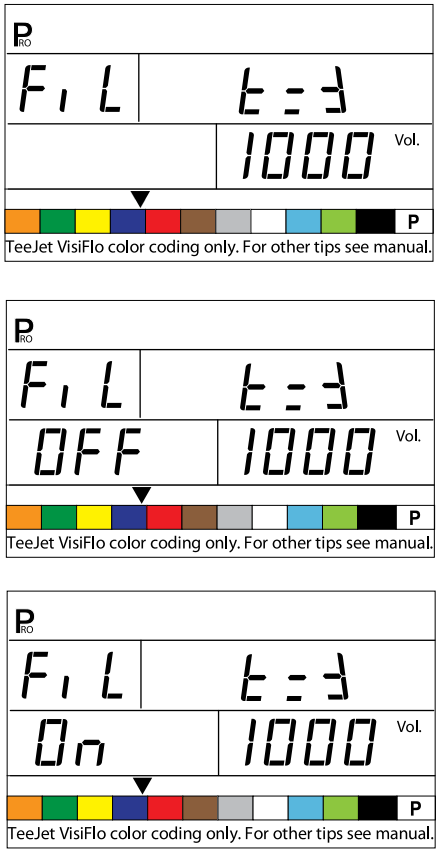
NOTE: The Auto Tank Fill Feature can only be used if "FILL VALVE" was selected in the Digital Out #2 step of OEM Programming.

- Turn the Master Boom Switch to the "Off" position.
- Press the TANK [TANK] key.
- Use the PLUS [+] or MINUS [−] keys to enter the volume to be added to the tank, **OR**
- Press the AUTO/MAN [↔] key to set the volume to the maximum tank content.
- Press the PROGRAM [PRO] key to activate the procedure.
- Turn the Master Boom Switch to the "On" position to activate the Fill Valve (switch).

The tank will begin filling and the console will measure the volume. If it is necessary to stop the filling process for any reason, turn off the Master Boom Switch. Once the console has reached the volume to be filled, it will automatically turn the valve off.

- Once the process is complete, turn the Master Boom Switch "Off".
- Press and hold the TANK [TANK] key for three seconds to return to normal operating mode.

Figure 88: Auto Tank Filling



Tank Volume Feature

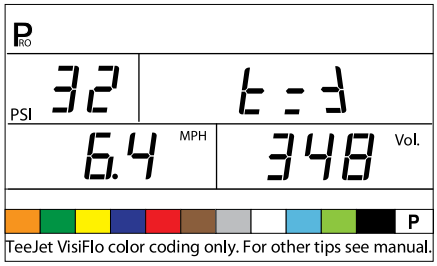
The console will count down the volume remaining in the tank and alert the operator when the Lo Tank Level has been reached. The Lo Tank Level can be programmed by the operator during System Setup Mode.

Viewing Remaining Tank Volume

- While spraying in normal operating mode, with the Master Boom Switch in the "On" position, press and hold the TANK [TANK] key.
- The lower right display of the console will show the volume remaining in the tank.
- When the volume reaches the pre-programmed level, the audible alarm will activate. The display will switch to the Tank Volume Display.
- To acknowledge the alarm, press the TANK [TANK] key or the PROGRAM [PRO] key. This will return the console to normal operating view.

NOTE: An audible alarm is activated when this feature is enabled. It will provide a long beep, indicating Low Priority.

Figure 89: Tank Volume

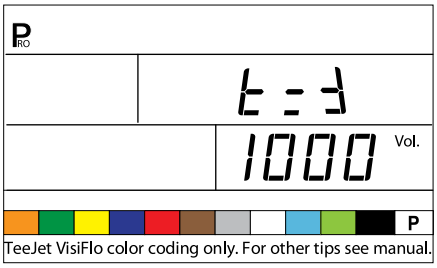


Resetting Tank Volume

To reset the tank volume:

- Press the TANK key.
- Use the PLUS or MINUS keys to enter a partial tank volume
- Press the AUTO/MAN key to reset the tank volume counter to the maximum value of the tank volume.
- Press the TANK key or PROGRAM key to return to normal operating view.

Figure 90: Resetting Tank Volume



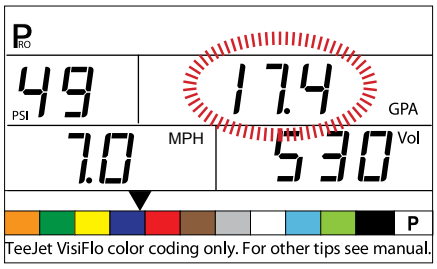
Application Alarm

If the 854 senses a continuous discrepancy of 10% or more between the Target Application Rate and the Actual Application Rate, the application rate window will flash.

This will alert the operator to a problem with the sprayer plumbing, operation, or programming.

NOTE: An audible alarm is activated when this feature is enabled. It will provide three short beeps, indicating High Priority.

Figure 91: Application Alarm



Sensor LED Alarms

The 854 has sensor LED's across the top of the display. These LED's help alert the operator to problems with the sprayer, sprayer control system, or application.

Speed Sensor LED Alarm - LED displays a red light if the console loses speed signals.

Flow Sensor LED Alarm - LED displays a red light if the console loses flow signals.

Pressure Sensor LED Alarm - LED displays a red light if the console loses pressure signals.

General LED Alarm - This LED alarm is used for discrepancies between the flow meter and pressure transducer if both are installed and programmed.

No Speed Alarm

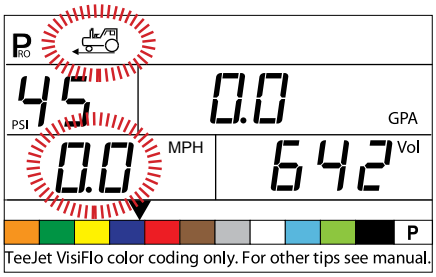
NOTE: This alarm only occurs when the Master Boom Switch is in the "On" position.

If the 854 stops receiving pulses from the speed sensor, the speed display window will flash. The Speed Sensor LED Alarm will be displayed. A tractor symbol will flash at the top of the display.

The Red LED will illuminate over the Speed Sensor Alarm.

NOTE: An audible alarm is activated when this feature is enabled. It will provide a steady beep, indicating Medium Priority.

Figure 92: No Speed Alarm



No Flow Alarm

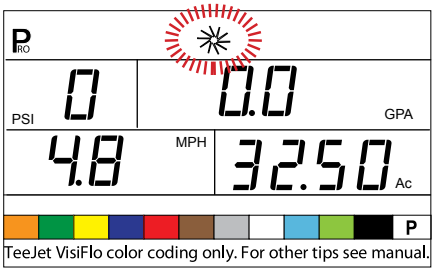
NOTE: This alarm only occurs when the Master Boom Switch is in the "On" position.

This alarm indicates that the flow meter has stalled or there is a problem elsewhere in the system. If the 854 stops receiving pulses from the flow meter, the turbine symbol will flash at the top of the console.

The red LED will illuminate over the Flow Sensor Alarm.

NOTE: An audible alarm is activated when this feature is enabled. It will provide a steady beep, indicating Medium Priority.

Figure 93: No Flow Alarm



No Pressure Alarm

NOTES: This alarm is only active if a Pressure Transducer was installed during System Setup.

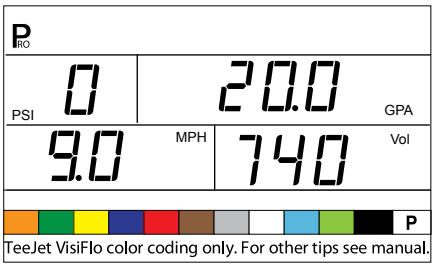
This alarm only occurs when the Master Boom Switch is in the "On" position.

This alarm indicates that the pressure transducer has failed or lost its connection. If the 854 stops receiving a pressure signal, the pressure display window will flash.

The Red LED will illuminate over the Pressure Sensor Alarm.

NOTE: An audible alarm is activated when this feature is enabled. It will provide a steady beep, indicating Medium Priority.

Figure 94: No Pressure Alarm



Flow/Pressure Discrepancy Alarm

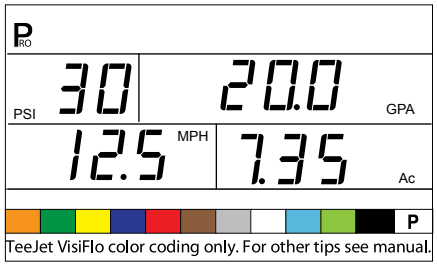
This alarm activates if there is a discrepancy between the flow meter and the pressure transducer. The amount of discrepancy allowed is defined by the Calibrate Tip Level % step in the OEM Setup Mode.

If the 854 finds a discrepancy, the pressure display window will flash. The application rate window will also flash.

The Red LED will illuminate over the General Alarm.

NOTE: An audible alarm is activated when this feature is enabled. It will provide a steady beep, indicating Medium Priority.

Figure 95: Flow/Pressure Discrepancy Alarm



Boost Mode

The 854 is capable of boosting the target application rate either up or down in 10% increments.

Boost Up

To activate boost up mode:

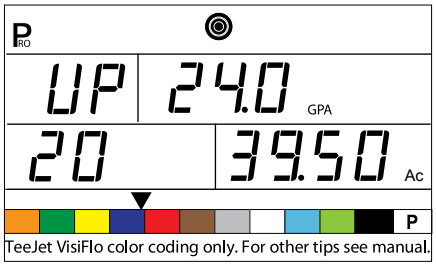
- Press the PLUS ⊞ key.
- Each subsequent pressing of the *Plus* ⊞ key will increase the target rate 10%.

The amount the rate is "boosted" will be displayed for two seconds. The target symbol will flash any time the system is in Boost Mode.

To return to the target application rate:

- Press the MINUS ⊟ key to return in 10% increments.
- Push the PLUS ⊞ and MINUS ⊟ keys simultaneously to return to the target rate immediately.

Figure 96: Boost Up



Boost Down

To activate boost up mode:

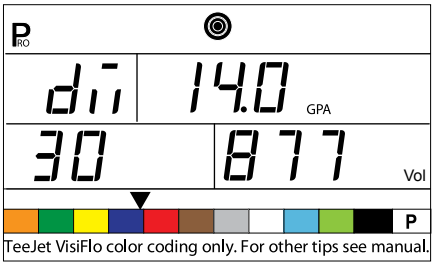
- Press the MINUS ⊟ key.
- Each subsequent pressing of the MINUS ⊟ key will decrease the target rate by 10%.

The amount the rate is "boosted" will be displayed for two seconds. The target symbol will flash any time the system is in Boost Mode.

To return to the target application rate:

- Press the PLUS ⊞ key to return in 10% increments.
- Push the PLUS ⊞ and MINUS ⊟ keys simultaneously to return to the target rate immediately.

Figure 97: Boost Down



Auto Power Down

The 854 console is designed to power itself off after 10 minutes of inactivity (or at the time specified in the Auto Power Down setting in the OEM Setup Mode). This feature keeps the console from draining the battery on the sprayer, if the operator inadvertently leaves the console powered on for an extended period.

Auto Power Down only occurs when the Master Boom Switch is in the "Off" position.

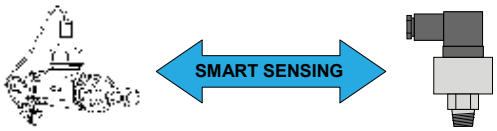
To manually power down the console, refer to Powering Console On/Off.

NOTE: The Auto Power Down feature disables any time the console is in any program mode.

Smart Sensing

With both a pressure and flow sensor installed, the 854 determines when the flow rate has dropped below the capacity of the flow meter being used, and will automatically switch to pressure based regulation. When the flow rate reaches an acceptable level for the flow meter to regulate, the 854 will switch back to flow based regulation.

Figure 98: Smart Sensing



854 SPRAYER CONTROL

USER MANUAL

This User Guide provides information for software version 1.20.

TeeJet Technologies Springfield
1801 Business Park Drive
Springfield, Illinois 62703 USA
www.teejet.com

TeeJet Aabybro
Mølhavevej 2
9440 Aabybro
Denmark

A Subsidiary of Spraying Systems Co.®

98-05051 R4 EN English
© TeeJet Technologies 2013