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RAIL

SERVICE BULLETIN

MAINTENANCE OF WAY EQUIPMENT

DATE: 5-18-2012 **BULLETIN NO:** 12-009

TITLE: DRONE TAMPER SOFTWARE UPDATES

RATING:

| | |
|---|---|
| <input type="checkbox"/> DIRECTIVE (Action Is Required) | <input type="checkbox"/> ALERT (Potential Problem) |
| <input type="checkbox"/> INFORMATION (Action Is Optional) | <input checked="" type="checkbox"/> PRODUCT IMPROVEMENT (Enhance Product) |

PRODUCT SERIES / MODEL: DRONE TAMPER

SERIAL NO: All Models with Jupiter II Software Version v2-00, v2-10 or v2-11

SUMMARY: There are currently two different types of slider cylinders (with transducer) and encoders that are being used on the Drone Tampers. It is possible that a replacement slider cylinder (with transducer) or an encoder would not be the same as the one it replaces and would be incompatible on the machine.

OPERATIONAL IMPACT: A new software version v2-12 is now available with a feature to select either type of slider cylinders (with transducer) and/or encoder that is installed to make it compatible on the machine. In addition, this new software version also includes some new operating features such as; Ramp Climb Mode, Modified Handheld Remote Mode and Improved Work Speed Control.

ACTION: Check the Jupiter II software version of your Drone Tamper. If the Version is one of the versions listed above, contact the Engineering Controls Department or Service Department at Harsco Rail to order the new v2-12 software release and to arrange installation of the new software. After installation of the new software, follow the instructions in this Service Bulletin to use the new software features.

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SAFETY INFORMATION



- FOLLOW APPLICABLE RAILROAD LOCKOUT - TAGOUT PROCEDURE TO REMOVE MACHINE FROM ENERGY SOURCES. FAILURE TO COMPLY COULD RESULT IN SEVERE BODILY INJURY.

CHECKING SOFTWARE VERSION - See Figure 1

1. After a successful Jupiter boot-up, press the Alarm Panel on the Jupiter monitor to display the Expanded Alarm Panel. Verify the current Jupiter software version (shown outlined in red on the expanded alarm panel). It may be necessary to use the Page Up (1) and/or Page Down (2) Buttons to find the current software version.

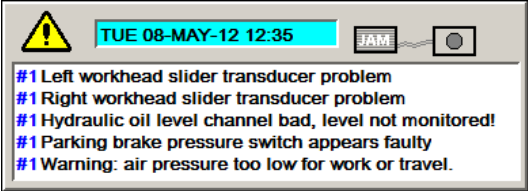
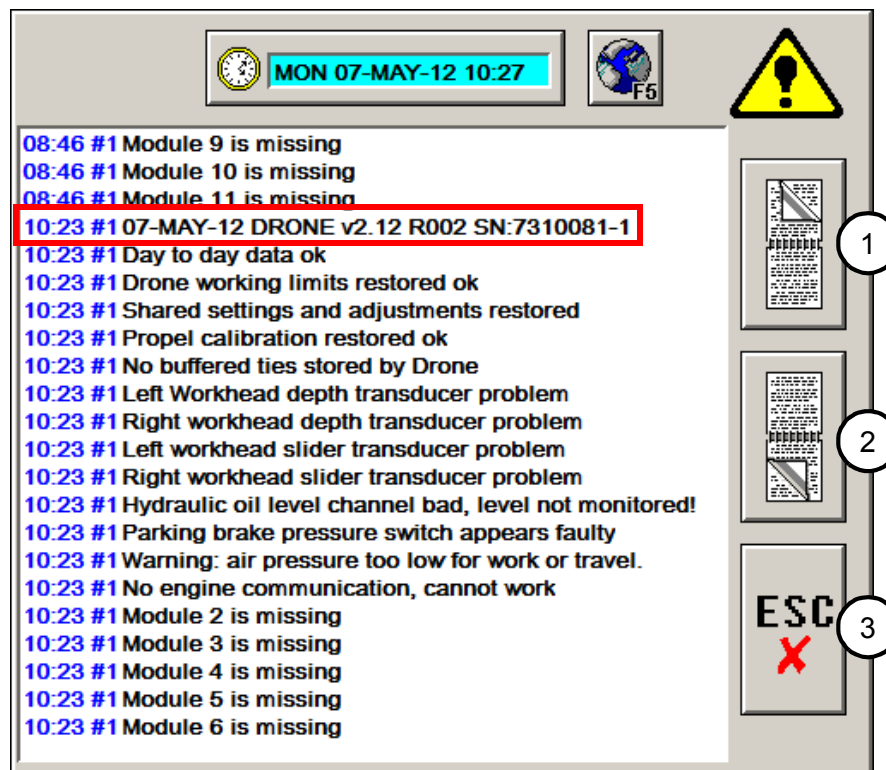

2. If the current Jupiter software version is v2-00, v2-10 or v2-11, contact the Engineering Controls Department or Service Department at Harsco Rail to order a new v2-12 software release and to arrange installation of the new software.
3. Press the Escape Button (3) to remove this panel from the screen.
4. After installation of the new software, follow the instructions in this Service Bulletin to use the new software features.

FIGURE 1
JUPITER SOFTWARE VERSION



DRONE TAMPER v2-12 SOFTWARE FEATURES

The new v2-12 software version for the Drone Tamper incorporates the following new features:

1. Hand-Held Remote Release Procedure
2. Ramp Climb Mode
3. Slider Cylinder Transducer and Encoder Direction Selection
4. Verifying Encoder Direction
5. Improved Work Speed Control
6. Cycle Timing / Speed Information

This Service Bulletin covers only the Operation of the new v2-12 software features that are listed above. See your Operator's Manual for all other software Operation Information.

1. HAND-HELD REMOTE RELEASE PROCEDURE - See Figure 2

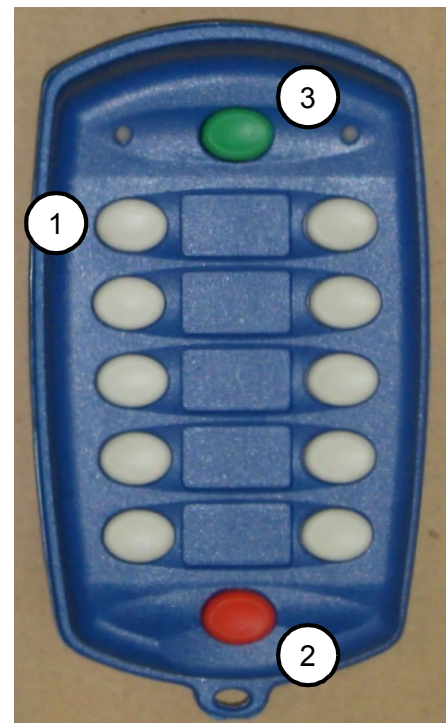
1. After using the hand-held remote, release the remote control by pressing the horn button (1) followed by the red button (2) within one second. Pressing the red button (2) without first pressing the horn button (1), or waiting for more than a second after pressing the horn button (1), will not release the remote control and return control of the Drone Tamper to the Lead Tamper operator.
2. When the hand-held remote is in control, the white strobe light will flash, even if the remote is off, indicating the Drone Tamper will remain immobile. If the white strobe light is off, it must be assumed that the Drone Tamper is under the control of the Lead Tamper operator and may begin working at any time.



- **BE AWARE THAT OPERATION OF WHITE STROBE LIGHT WITH NEW SOFTWARE VERSION INSTALLED IS OPPOSITE OF PREVIOUS SOFTWARE VERSION THAT WAS INSTALLED. FAILURE TO HEED THIS WARNING COULD RESULT IN SEVERE BODILY INJURY.**

3. If the hand-held remote turns off on its own and the Drone Tamper becomes immobile, press the green button (3) to restore the remote power and resume control of the Drone Tamper. Then repeat Step 1 of the Remote Release Procedure to release the remote control and return control of the Drone Tamper to the Lead Tamper operator.

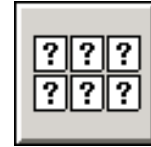
FIGURE 2
HAND-HELD REMOTE



2. RAMP CLIMB MODE - See Figures 3 and 4

The Ramp Climb Mode feature was developed to deal with the limited ability of the Drone Tamper to climb ramps (inclines) due to the pressure drop across the work propel valve. To address this limitation, the Ramp Climb Mode has been introduced that uses the main travel valve in combination with the hand-held remote. This allows the maximum motor stroke to be applied with a negligible loss of available pressure.

1. Press the Miscellaneous Button on the Toolbar Buttons Panel of the Main Work Panel to open the Miscellaneous Panel. Then press the Ramp Climb Mode Button on the Miscellaneous Panel to display the Ramp Climb Mode Panel.



2. Press the Ramp Climb Mode Button (1) to engage the Ramp Climb Mode. When the Ramp Climb Mode is engaged:
 - a. The Warning Icon on the button will flash yellow.
 - b. The travel valve rather than the work propel valve will be used for moving the machine with the hand-held remote.
 - c. Engine high RPM is disabled and limited to 1,000 RPM maximum which limits the machine's travel speed to slightly over 3 miles per hour.
 - d. The forward / reverse buttons on page 1 of the hand-held remote are used to move the machine. The faster / slower buttons will increase / decrease the propel pressure but will not effect the machine speed.
 - e. There is no hydraulic deceleration below 3 miles per hour. Releasing the forward / reverse button will stop the machine by applying the parking brake. Sliding of the wheels may be unavoidable when stopping the machine. For this reason, the Ramp Climb Mode should not be used for any other purpose than climbing ramps (inclines) that are too steep for the standard modes.
 - f. A reduced speed can be achieved by alternating between releasing and holding the direction button on the hand-held remote.
 - g. The other functions on page 1 of the hand-held remote are not available.
3. Press the Ramp Climb Mode Button (1) to disable the Ramp Climb Mode. Then press the Escape Button (2) to remove this panel from the screen.

FIGURE 3
RAMP CLIMB MODE PANEL

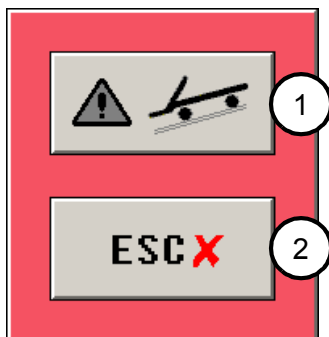
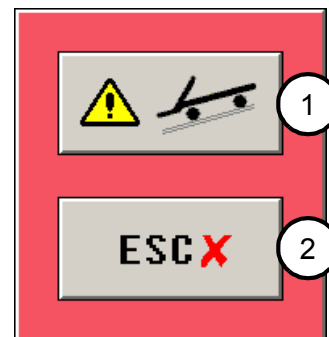


FIGURE 4
RAMP CLIMB MODE PANEL

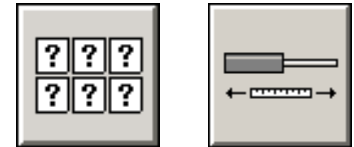


3. SLIDER CYLINDER TRANSDUCER and ENCODER DIRECTION SELECTION

- See Figures 5 and 6

Important: The new v2-12 software version will allow either of the two types of slider cylinders (with transducers) and/or either of the two types of encoders to be used on the same machine. To verify the type of slider cylinder transducer and/or the encoder direction, the engine must be OPERATING, the computer system turned ON, and the machine operating in the WORK mode. When the engine is OPERATING, the Enter Button on this panel is not functional. After the components are verified, the engine must be STOPPED so the Enter Button is functional. Then the Enter Button must be pressed, the computer system turned OFF, the engine RESTARTED, and the computer system REBOOTED (turned back on) to permanently apply any changes made.

1. Press the Miscellaneous Button on the Toolbar Buttons Panel of the Main Work Panel to open the Miscellaneous Panel. Then press the Transducer Selection Button on the Miscellaneous Panel to display the Transducer Selection Panel.



2. To verify the type of slider cylinder transducers on the machine, use the hand-held remote to move the workheads fully toward the rear of the machine. The transducer voltage will be displayed in the Info Boxes (1 - 2) and should be around 5 volts or 9 volts. If the voltage displayed on the Transducer Select Button (3 - 4) does NOT match the transducer voltage displayed in the Info Box (1 - 2), the transducer voltage will need to be changed.
 - a. If the transducer voltage displayed in the Info Box (1 - 2) is around 5 volts, press the Transducer Select Button (3 - 4) next to the Info Box until 5v is displayed on the button.
 - b. If the transducer voltage displayed in the Info Box (1 - 2) is around 9 volts, press the Transducer Select Button (3 - 4) next to the Info Box until 9v is displayed on the button.
3. See 4. Verifying Encoder Direction before changing the encoder direction unless it is already known. If the encoder direction needs to be changed, press the Encoder Button (5) so the arrows on the button highlight yellow.
4. **Important:** Use the keyed Ignition Switch to STOP the engine. The Enter Button (6) on this panel will now be functional.
5. Press the Enter Button (6) to apply any changes made. A Help Information Panel will be displayed. Press the Escape Button on the Help Information Panel to close the Help Information Panel. Then press the Enter Button (6) again to remove this panel from the screen and to apply any changes made after the computer is rebooted.
6. Press the Escape Button (7) to discard any changes made. Then press the Escape Button (7) again to remove this panel from the screen.

3. SLIDER CYLINDER TRANSDUCER and ENCODER DIRECTION SELECTION

- See Figures 5 and 6

7. To apply any changes that were made, turn OFF the computer system. Then RESTART the engine and REBOOT (turn on) the computer system. When the software restarts, any changes that were made will be applied.
8. If a slider cylinder transducer was changed, it will be necessary to use the hand-held remote to re-calibrate the "zero" position.
 - a. To re-calibrate the "zero" position, move the workheads to their most forward position. Press and hold the Slider Forward Button (or buttons for both sides) on page 1 of the hand-held remote until the electric horn starts beeping. Then release the button (or buttons for both sides).

FIGURE 5
TRANSDUCER SELECTION PANEL

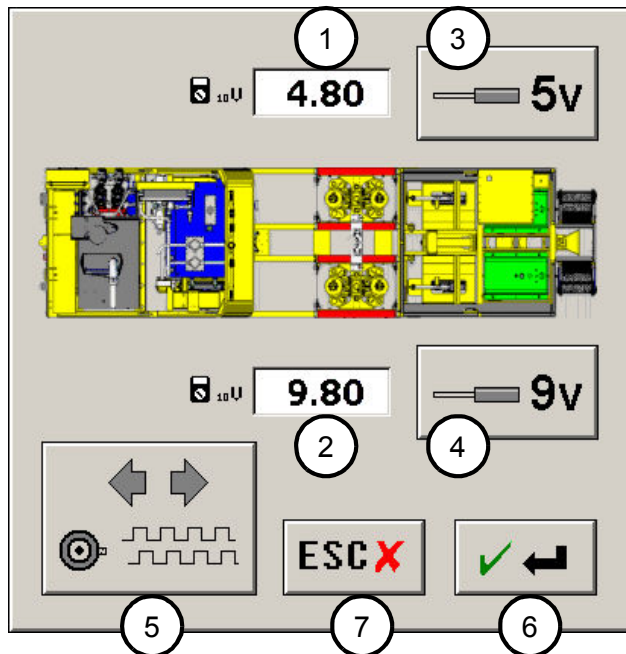
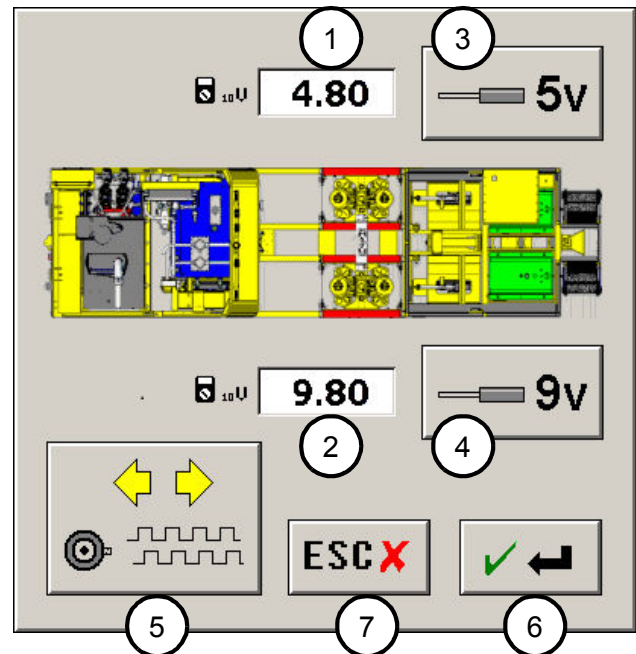
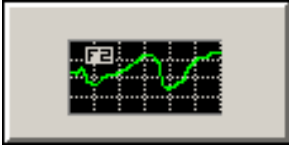



FIGURE 6
TRANSDUCER SELECTION PANEL

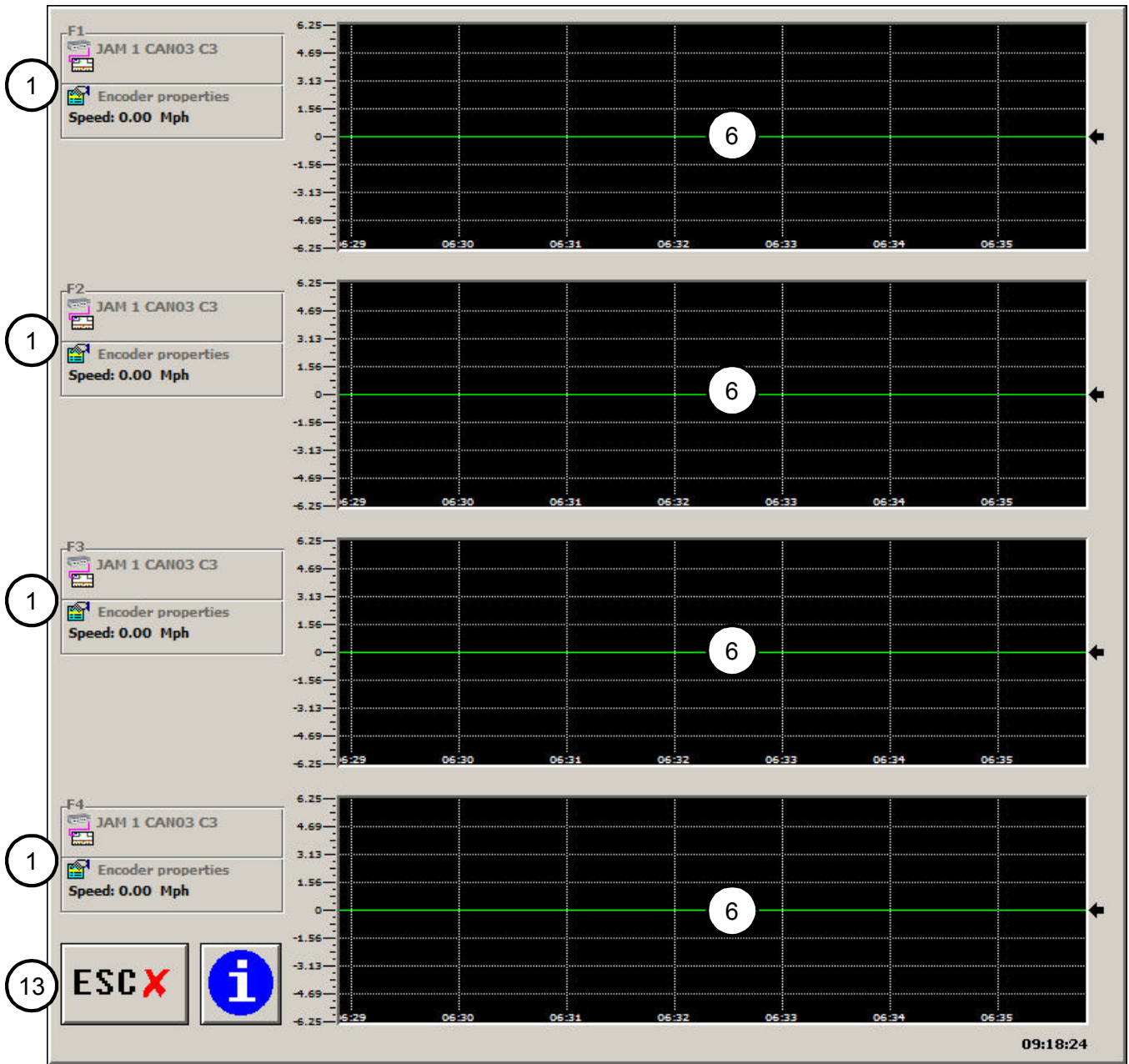


4. VERIFYING ENCODER DIRECTION - See Figures 7, 8 and 9

1. Press the Jupiter Diagnostics Button on the Toolbar Buttons Panel of the Main Work Panel to open any of the Diagnostics Panels. Then press the I/O Graph Button on any of the Diagnostic Panels or the F2 Key on the Computer Keyboard to open the I/O Channel Graph Panel.

2. On the I/O Channel Graph Panel, press any one of the F1 - F2 - F3 - F4 Channel Buttons (1), or any one of the F1 - F2 - F3 - F4 Keys on the Computer Keyboard to display the I/O Channel Selection Panel. On the I/O Channel Selection Panel:
 - a. Use the Page Up (2) and Page Down (3) Buttons to find the CAN03 - C3 - ENCODER PROPERTIES channel (4) and select it so is highlighted yellow.
 - b. Press the Enter Button (5) to remove this panel from the screen and display the Encoder Properties channel on the selected I/O Channel Graph (6).
3. It will be necessary to adjust the I/O Channel Graph (6) so it is easier to see voltage. Press the applicable I/O Channel Graph (6) to display the I/O Channel Graph Adjust Panel. On the I/O Channel Graph Adjust Panel:
 - a. **Note:** The I/O Channel Graph Adjust Panel will automatically close after a few seconds if a button is not pressed
 - b. Use the Line Up (7) or Down (8) Buttons to select and highlight yellow the Speed - Miles Per Hour channel (9) on the Property Selection Table.
 - c. Use the Amplitude Increase (10) Button to adjust the amplitude setting so 0 - 6.25 is displayed on the I/O Channel Graph (6).
 - d. Use the Time Increase (11) Button to adjust the time line so approximately 5 - 6 minutes are displayed on the I/O Channel Graph (6).
 - f. Press the Enter Button (12) or the Enter key on the Computer Keyboard to save any changes and remove this panel from the screen.
4. Use the forward / reverse buttons on page 1 of the hand-held remote to move the machine forward a slight distance and then in reverse a slight distance. Note the encoder channel voltage displayed on the I/O Channel Graph (6) in both directions.
 - a. If the encoder channel voltage is positive (or increases) in the forward direction and negative (or decreases) in the reverse direction, the encoder direction is set correctly.
 - b. If the encoder channel voltage is NOT as described in Step a, the encoder direction is set incorrectly and it **MUST BE CHANGED**. See 3. Slider Cylinder Transducer and Encoder Direction Selection.
5. When finished verifying the encoder direction, press the Escape Button (13) to remove the I/O Channel Graph Panel from the screen.

4. VERIFYING ENCODER DIRECTION


FIGURE 7
I/O CHANNEL GRAPH PANEL




4. VERIFYING ENCODER DIRECTION

FIGURE 8
I/O CHANNEL SELECTION PANEL

| | | | | | |
|-------|-------|-------|----|-----------------------|---------------------------|
| JAM 1 | CAN02 | C7 | P2 | 24 Volt Input | Right Front horn |
| JAM 1 | CAN02 | C7 | P4 | 24 Volt Input | Right Front E-stop |
| JAM 1 | CAN02 | C8 | P1 | 24 Volt Output | Input power |
| JAM 1 | CAN02 | C8 | P2 | 24 Volt Input | Control box horn |
| JAM 1 | CAN02 | C8 | P4 | 24 Volt Input | Control box E-stop |
| JAM 1 | CAN03 | PWR | FP | Field Power | |
| JAM 1 | CAN03 | C1 | P1 | 24 Volt Output | LH AutoMag power |
| JAM 1 | CAN03 | C1 | P2 | 24 Volt Input | Not used |
| JAM 1 | CAN03 | C1 | P4 | 24 Volt Input | Not used |
| JAM 1 | CAN03 | C2 | P1 | 24 Volt Output | RH AutoMag power |
| JAM 1 | CAN03 | C2 | P2 | 24 Volt Input | Not used |
| JAM 1 | CAN03 | C2 | P4 | 24 Volt Input | Not used |
| JAM 1 | CAN03 | C3 | P1 | 24 Volt Output | Encoder field power |
| JAM 1 | CAN03 | C3 | P2 | 24 Volt Input | Encoder phase A |
| JAM 1 | CAN03 | C3 | P4 | 24 Volt Input | Encoder phase B |
| 4 | JAM 1 | CAN03 | C3 | | Encoder properties |
| JAM 1 | CAN03 | C4 | P1 | 24 Volt Output | Front motion alarm |
| JAM 1 | CAN03 | C4 | P2 | 24 Volt Input | Not used |
| JAM 1 | CAN03 | C4 | P4 | 24 Volt Input | Not used |
| JAM 1 | CAN03 | C5 | P1 | 24 Volt PWM Output | LH slider fwd sol |
| JAM 1 | CAN03 | C5 | P2 | 24 Volt Input | Not used |
| JAM 1 | CAN03 | C5 | P4 | 24 Volt Input | Not used |
| JAM 1 | CAN03 | C6 | P1 | 24 Volt PWM Output | LH slider rev sol |
| JAM 1 | CAN03 | C6 | P2 | 24 Volt Input | Not used |
| JAM 1 | CAN03 | C6 | P4 | 24 Volt Input | Not used |
| JAM 1 | CAN03 | C7 | P1 | 24 Volt PWM Output | RH slider fwd sol |
| JAM 1 | CAN03 | C7 | P2 | 24 Volt Input | Not used |
| JAM 1 | CAN03 | C7 | P4 | 24 Volt Input | Not used |
| JAM 1 | CAN03 | C8 | P1 | 24 Volt PWM Output | RH slider rev sol |
| JAM 1 | CAN03 | C8 | P2 | 24 Volt Input | Not used |
| JAM 1 | CAN03 | C8 | P4 | 24 Volt Input | Not used |
| JAM 1 | CAN04 | PWR | FP | Field Power | |
| JAM 1 | CAN04 | C1 | P2 | ±10 Volt Analog Input | LH AutoMag probes channel |
| JAM 1 | CAN04 | C2 | P2 | ±10 Volt Analog Input | RH AutoMag probes channel |
| JAM 1 | CAN04 | C3 | P2 | ±10 Volt Analog Input | Fuel tank level sender |
| JAM 1 | CAN04 | C4 | P2 | ±10 Volt Analog Input | Air pressure sender |
| JAM 1 | CAN04 | C5 | P2 | ±10 Volt Analog Input | LH slider cyl position |
| JAM 1 | CAN04 | C6 | P2 | ±10 Volt Analog Input | RH slider cyl position |
| JAM 1 | CAN04 | C7 | P2 | ±10 Volt Analog Input | LH workhead depth sender |
| JAM 1 | CAN04 | C8 | P2 | ±10 Volt Analog Input | RH workhead depth sender |
| JAM 1 | CAN04 | C8 | | | Tiefinder properties |


2


3






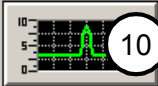

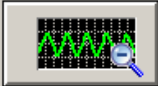
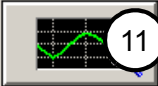

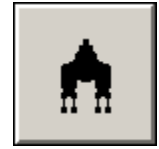
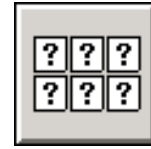

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FIGURE 9
I/O CHANNEL GRAPH ADJUST PANEL

| | | | | | |
|---|---|-----------------------------|--------------------|---|-----------------|
|  |  | Speed 9 | Miles per hour |  | 7 |
|  |  | Channel OK | ON or OFF |  | 8 |
|  |  | Units | Pulses per second |  | 12 |
| | | lost channel | ON or OFF | | |
| | | overspeed | ON or OFF | | |
| | | Position | Feet since boot-up | | |

5. IMPROVED WORK SPEED CONTROL - See Figure 10

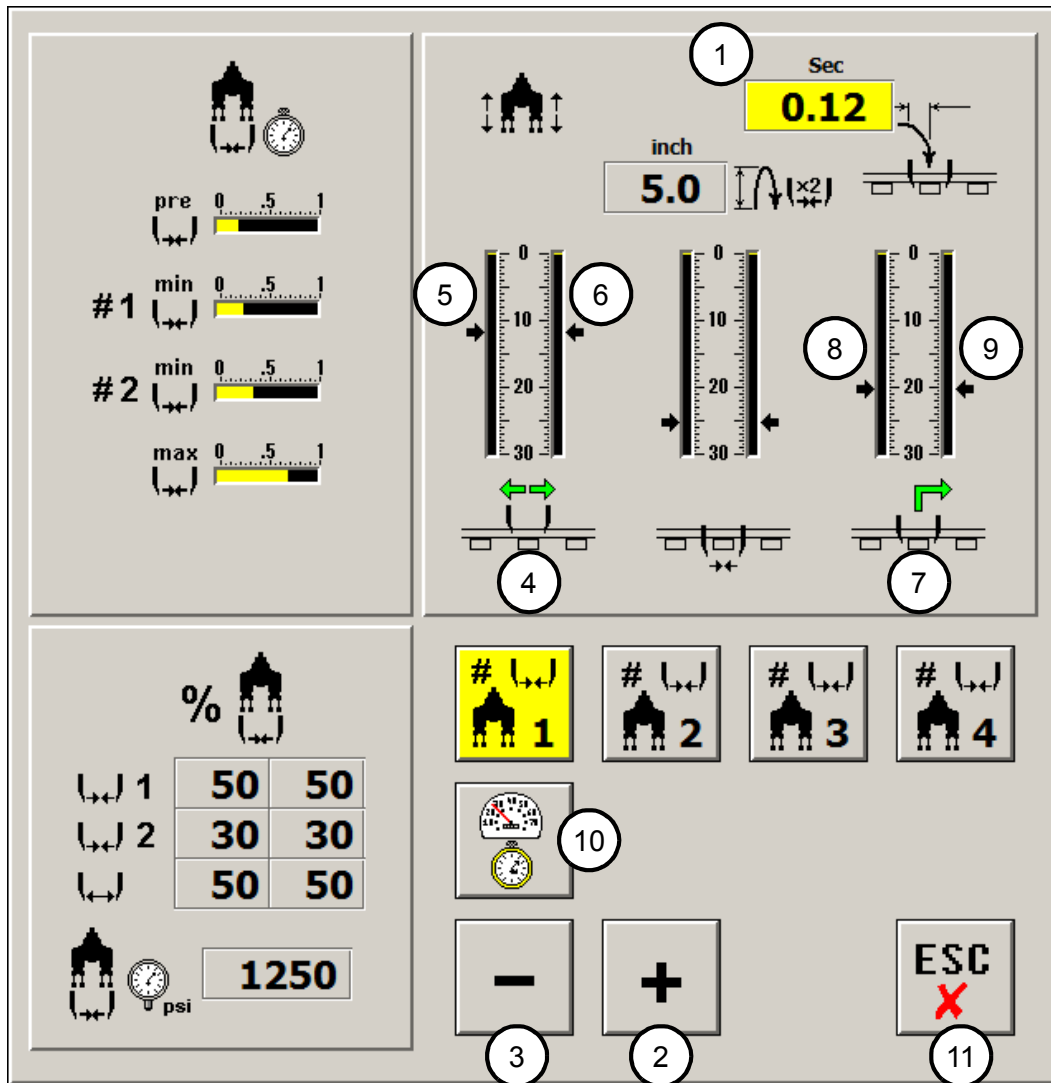
1. Press the Miscellaneous Button on the Toolbar Buttons Panel of the Main Work Panel to open the Miscellaneous Panel. Then press the Workhead Settings Button on the Miscellaneous Panel to display the Workhead Settings Panel.



2. While all adjustments will have some influence, some of the most important adjustments for productivity are the Standby Height (upper limits), the Forward Enable Height (clear limits) and the Launch Timer, which can now be modified.
3. The Launch Timer (1) value should be adjusted for optimal speed so the workheads launch as fast as possible without clipping the ties on the down feeding cycle. If the workheads launch too slow, the production speed can be less by as much as one tie per minute or more.
 - a. To adjust the Launch Timer (1) value, press the Info Box to highlight yellow. Then use the Plus Button (2) to increase the value or the Minus Button (3) to decrease the value.
 - b. Increase the value to launch the workheads earlier (faster).
 - c. Decrease the value to launch the workheads later (slower).
4. The Standby Height (4) value should be adjusted for optimal speed so the tools raise just high enough between the workhead cycles to clear all obstructions on the track as the machine moves forward.
 - a. To adjust the Standby Height, press the applicable left (5) or right (6) Arrow to highlight yellow. Then use the Plus Button (2) to increase the value or the Minus Button (3) to decrease the value.
5. The Forward Enable Height (7) value should be adjusted for optimal speed so the tools just begin clipping the ties as the workheads begin moving forward and then increasing the setting slightly higher to ensure that any clipping does NOT occur.
 - a. To adjust the Forward Enable Height, press the applicable left (8) or right (9) Arrow to highlight yellow. Then use the Plus Button (2) to increase the value or the Minus Button (3) to decrease the value.
6. Press the Cycle Timing / Speed Button (10) to open the Cycle Timing / Speed Panel to provide more detailed information regarding cycle timing, speed and adjustments. See 6. Cycle Timing / Speed Information.
7. Press the Escape Button (11) to remove this panel from the screen.

5. IMPROVED WORK SPEED CONTROL

FIGURE 10
WORKHEAD SETTINGS PANEL



6. CYCLE TIMING / SPEED INFORMATION - See Figure 11

1. Press the Cycle Timing / Speed Button on the Workhead Settings Panel to open the Cycle Timing / Speed Panel. This panel is divided into five different regions (shown outlined in red on the panel) as follows:

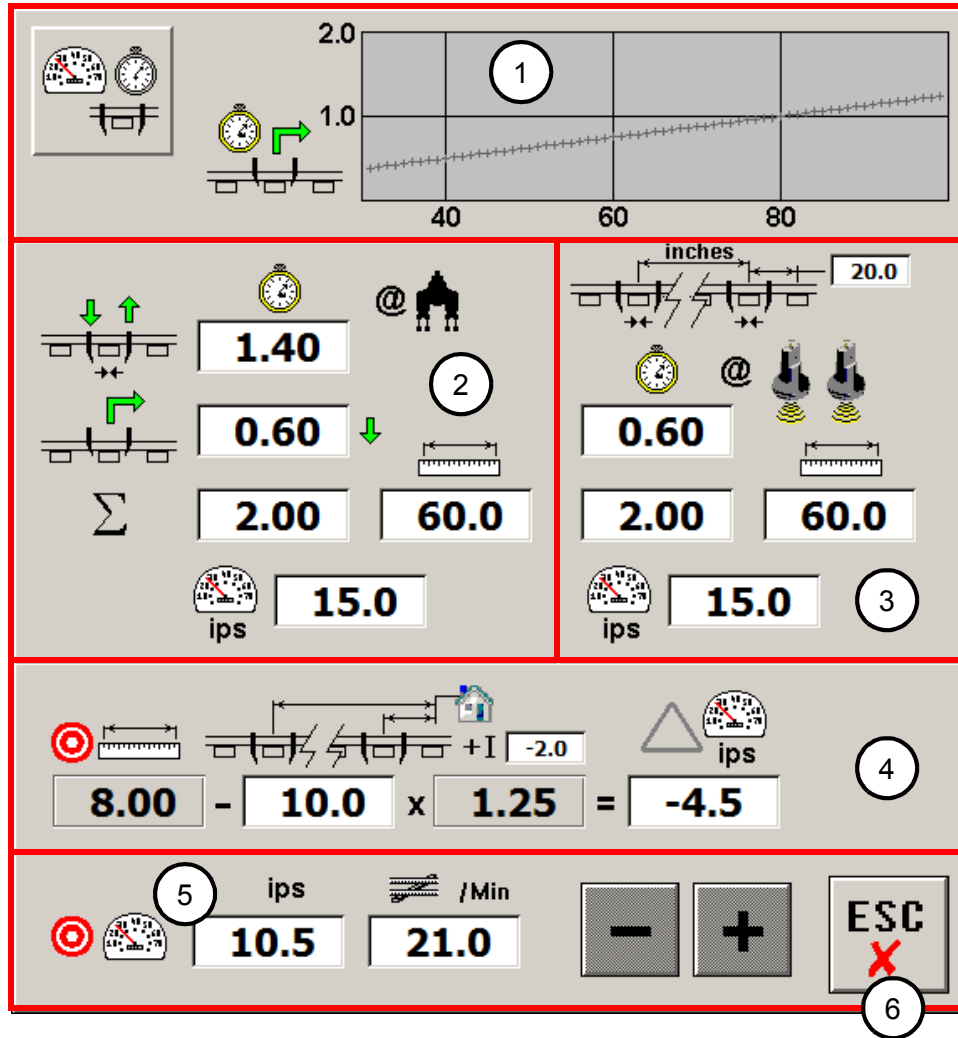


- (1) This region has a graph that shows the empirically established time for moving the workheads forward for two consecutive cycles. The vertical (time, seconds) is the average of two cycles, plotted against the distance in inches for two complete cycles. When tamping two of three ties around 20 inches apart, the relevant portion of this graph will be at around 60 inches. As ties are tamped, this table is refined. The plot points will be shown green when the times are reduced and shown red when the times have increased. When ties are detected by the tie finder, the spacing for two consecutive cycles (at the probes) is computed. The table is then used to estimate the time that will be needed to get the workheads forward (when the workheads reach that track location).
- (2) This region computes the time distance and speed for the two most recently completed cycles. The upper left number is the time spent down-feeding, squeezing and up-feeding averaged over two cycles while the workheads are being held stationary relative to the track. The total time is the average for two cycles from start of down-feed (two cycles before) to start of the most recent down-feed. The upper number is subtracted from the total to get the time available to move the heads forward to the next tie (second number down). The arrow to the right of the forward movement time indicates if this number needs increasing (red) or decreasing (green). This information is used to update the graph in (1) above. The distance on this panel is from the start of down-feed for the current cycle to the start of down-feed two cycles before.
- (3) This region computes the speed for the ties closest to the tie finder probes as they are detected. The number in the small white box at the top right of this region is the average spacing of the last 26 ties. Time from the graph (1), the cycle (2) and spacing (3) are used to compute the target speed displayed at the bottom of this region.
- (4) This region computes a speed correction based on how far the workheads are from the home position at the start of down-feed (averaged over the last two cycles). The target distance (editable by touching) is compared with the actual average. Their subtraction is multiplied by a gain (also editable) to establish a speed correction at the right side of this region. As the workheads get further back, this correction will reduce the target speed. The speed will be increased if the heads get too far forward.
- (5) This region is the total of the speeds computed in (3) and (4) above and is shown both in inches per second and ties per minute based on current tie spacing.

6. CYCLE TIMING / SPEED - See Figure 11

2. When this software first goes into service, it will need to learn the cycle timing and spacing evidenced in the graph (1). This table and other data on this panel will continuously change during work.
3. Press the Escape Button (6) to remove this panel from the screen.

FIGURE 11
CYCLE TIMING / SPEED PANEL



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