



# 2226 Directional Drill

Model No. 23803—Serial No. 40000000 and Up

## Software Guide

Software Versions: A.5, A.6, and Rev B

## Introduction

Read this information carefully to learn how to operate and maintain your product properly and to avoid injury and product damage. You are responsible for operating the product properly and safely. Read your *Operator's Manual* for more information.

## Product Overview

### Display Screen Buttons

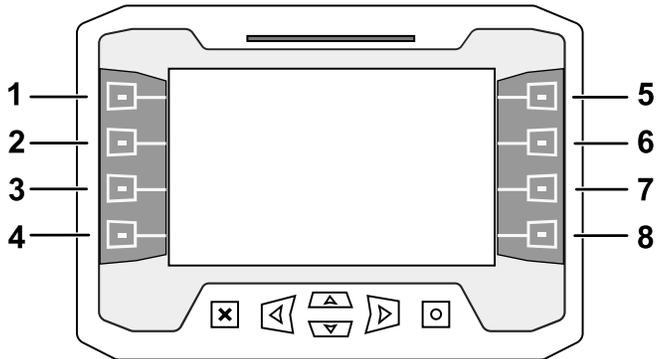


Figure 1

g277422

- |             |             |
|-------------|-------------|
| 1. Button 1 | 5. Button 5 |
| 2. Button 2 | 6. Button 6 |
| 3. Button 3 | 7. Button 7 |
| 4. Button 4 | 8. Button 8 |

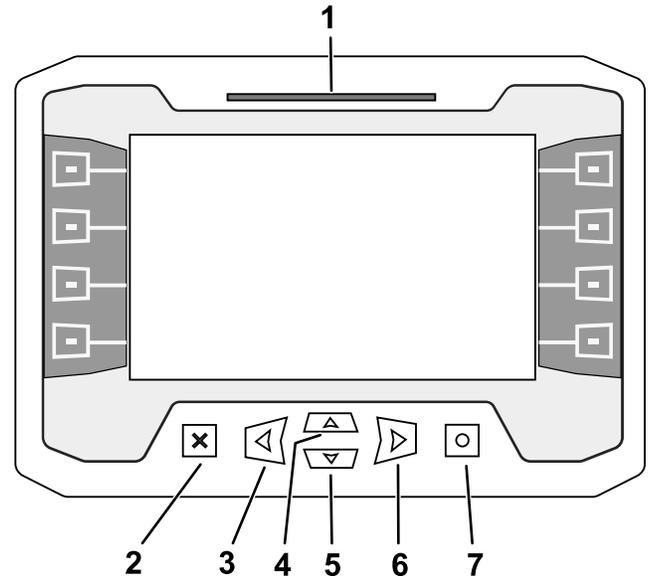


Figure 2

g277423

- |                      |                       |
|----------------------|-----------------------|
| 1. Status bar        | 5. Down arrow button  |
| 2. Escape button     | 6. Right arrow button |
| 3. Left arrow button | 7. OK button          |
| 4. Up arrow button   |                       |

## Exit-Side Lockout Disabled Startup Screen

**Note:** Software version A.5 and above.

This exit side lockout disabled warning will appear if you disabled the exit side lockout system.



Figure 3

g270157

See [Exit Side Lockout Settings \(page 18\)](#) to enable the exit side lockout system



# Home Screens

## Main Information Screen

This is the first screen that appears after the initial splash screen. To navigate between screens, use the left and right arrows.

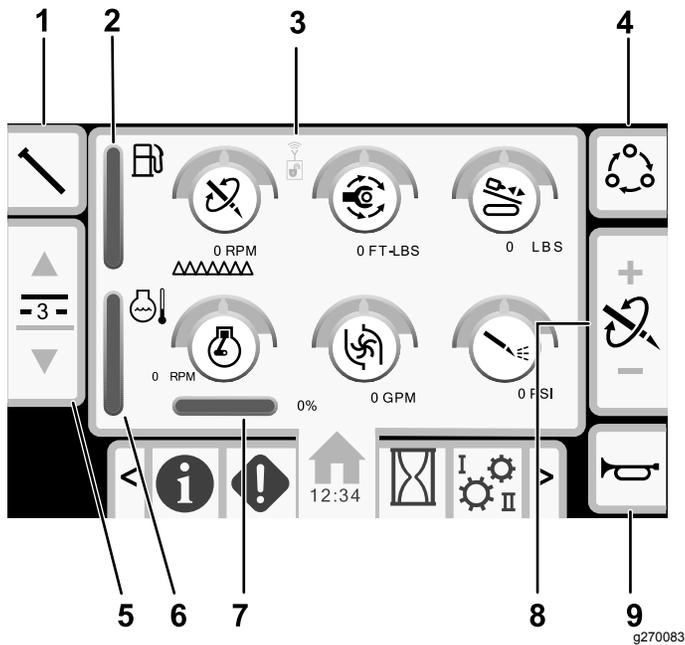


Figure 4

- |                                       |                                                                       |
|---------------------------------------|-----------------------------------------------------------------------|
| 1. Pipe functions                     | 6. Engine temperature gauge                                           |
| 2. Fuel gauge                         | 7. Engine load                                                        |
| 3. Exit side lockout status indicator | 8. Thrust force, drill speed (rpm), or rotary torque limit adjustment |
| 4. Limit setting options              | 9. Horn                                                               |
| 5. Select pipe row                    |                                                                       |

The pipe functions icon (Figure 4) will turn green when Smart Touch is turned on; refer to [SmartTouch™ Home Screen](#) (page 8).

### Exit side lockout status indicator:

Disabled (black)	Enabled (green)

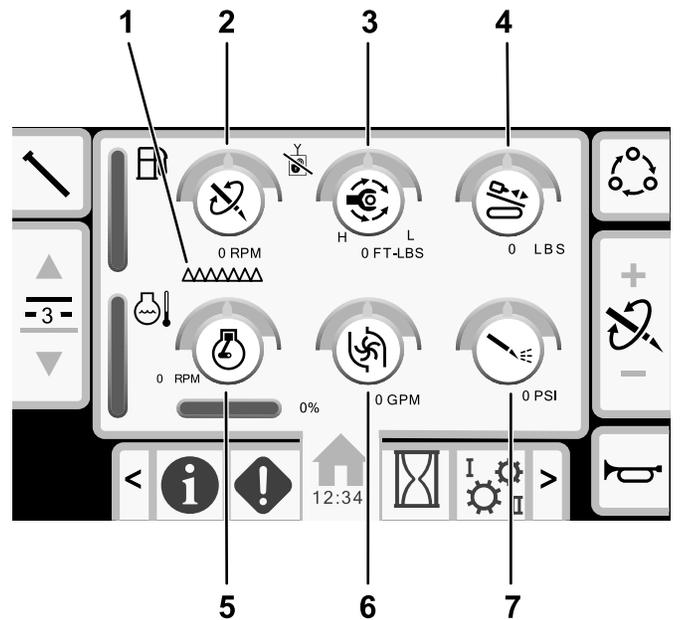


Figure 5

- |                       |                             |
|-----------------------|-----------------------------|
| 1. Carriage indicator | 5. Engine speed (rpm)       |
| 2. Drill speed (rpm)  | 6. Drilling-fluid flow rate |
| 3. Rotary torque      | 7. Drilling-fluid pressure  |
| 4. Thrust force       |                             |

Push button 1 to switch between the pipe functions: pull pipe, push pipe, neutral, or manual pipe loading.

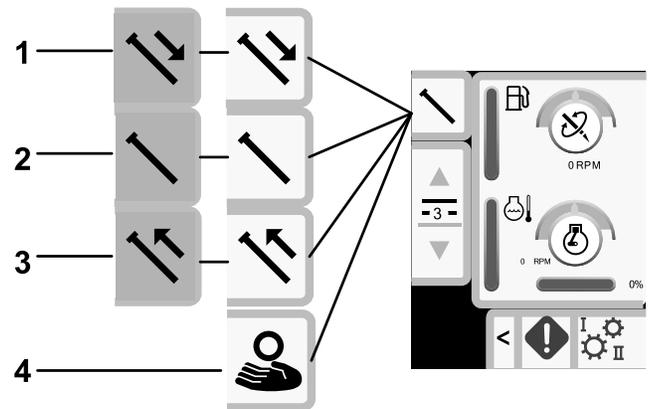
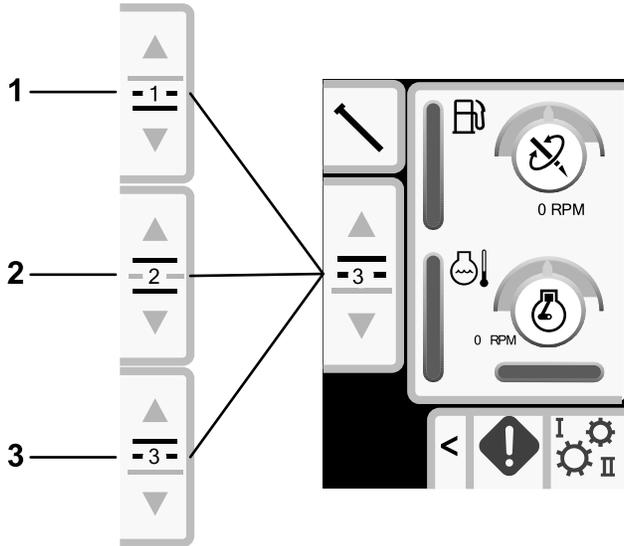


Figure 6

- |              |                        |
|--------------|------------------------|
| 1. Push pipe | 3. Pull pipe           |
| 2. Neutral   | 4. Manual pipe loading |

Push buttons 2 and 3 to switch choose a row.

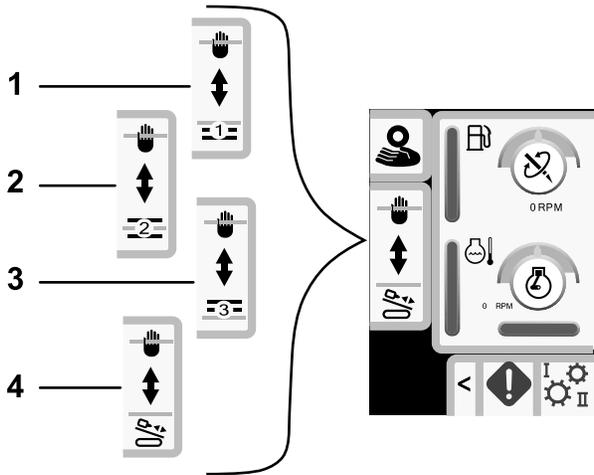


**Figure 7**

g236827

- 1. Row 1
- 2. Row 2
- 3. Row 3

In manual pipe loading mode, use buttons 2 and 3 to choose a row or to load the pipe to the drill string; refer to [Manual Pipe Loading \(page 13\)](#).



**Figure 8**

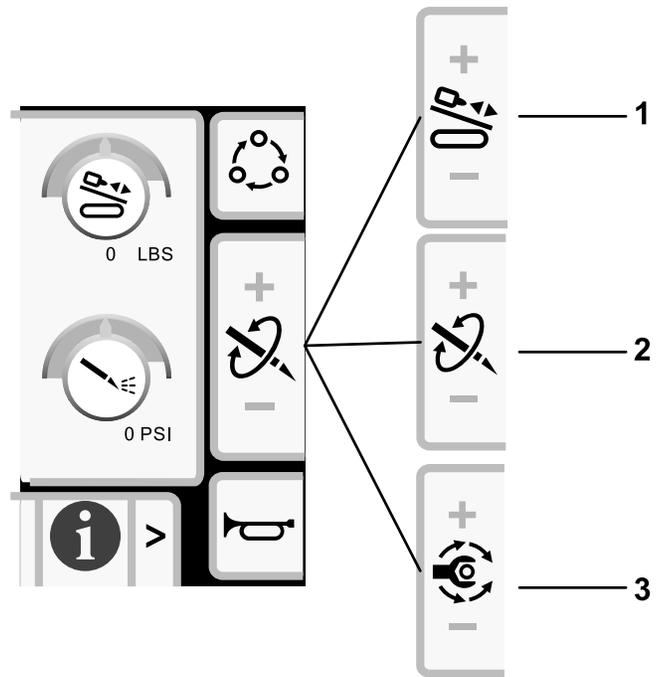
g236825

**Manual Pipe Loading Options**

- 1. Row 1
- 2. Row 2
- 3. Row 3
- 4. Load the pipe to the drill string

Push button 5 to switch between thrust force, drill speed (rpm), and rotary torque.

Use buttons 6 and 7 to set limits for the drill speed (rpm), rotary torque, and thrust force.



**Figure 9**

g236824

- 1. Thrust force
- 2. Drill speed (rpm)
- 3. Rotary torque

**Setting the Rotary Speed**

Use the OK (O) button on the display ([Figure 2](#)) to set the rotary speed.

Push the button to choose between high speed / low torque or low speed / high torque.

# Cruise Mode and Screen

Software version Rev B and up.

Cruise mode is identified by this icon: 

Cruise mode provides hands-free operation for rotary and thrust, set by the operator.

**Note:** Use Cruise mode for pull back only. Using cruise mode in thrust could cause damage.

You can only use cruise mode with clockwise functions.

## Accessing the Cruise Screen

Push the cruise button on the joystick ([Figure 10](#)) or push button 4 on the home screen to access the cruise screen.

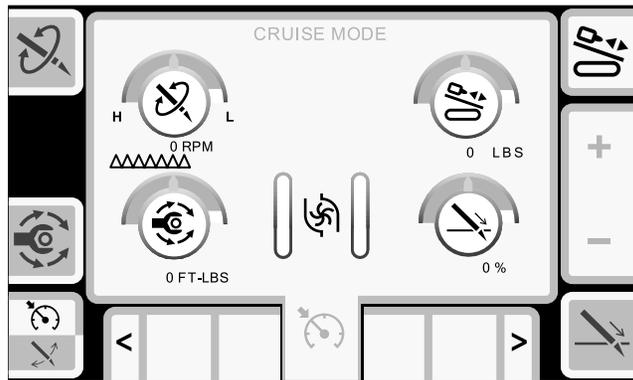
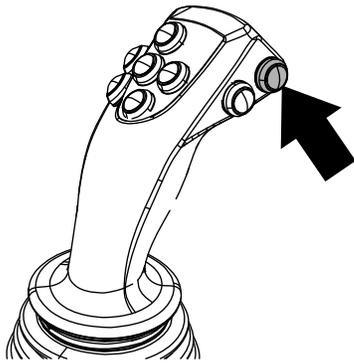


Figure 10

g290820

Push button 4 to switch between cruise and carve modes.

## Activating Cruise

1. If necessary, set the machine limits; refer to the [Main Information Screen \(page 2\)](#).
2. Hold the joystick(s) in the active position for the amount of thrust and rotation speed you want and push the cruise button on the right joystick ([Figure 10](#)), then release the joysticks.

Once set, use the cruise screen to adjust the settings ([Figure 10](#)).

1. Push buttons 1, 3, 5, or 8 to select the setting to adjust.

**Note:** The icon turns green and a green circle highlights the option you select ([Figure 11](#)).

2. Push button 6 or 7 to increase or decrease the value of the selected setting.

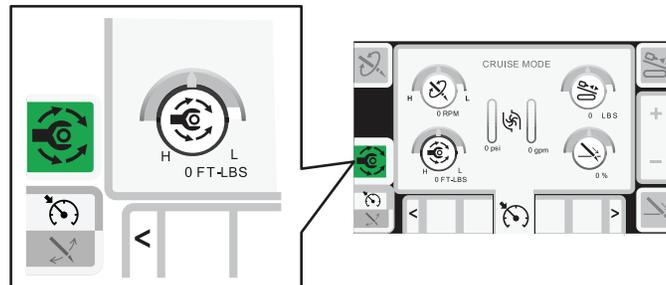


Figure 11

g298902

The following table describes the function values affected when another function is given priority.

The priority is the function with the highest value, not the value selected in the screen.

All values are dependent on the available engine horse power.

Button	Priority	Icon	Description
1	Pipe rotation speed (Rotary RPM)		The set rotary RPM is maintained unless the set rotary torque is exceeded, then the rotary rpm is reduced.
3	Rotary Torque		The set rotary torque value is maintained unless the maximum set rotary RPM is exceeded, then the torque value is reduced.
5	Thrust force (Carriage Thrust)		The set carriage thrust is maintained unless the carriage rate (speed) is exceeded, then the thrust force is reduced.
8	Thrust rate (Carriage Rate/Speed)		The set carriage rate (speed) is maintained unless the maximum set carriage thrust is exceeded, then the speed is reduced.

Push the X button to return to the [Main Information Screen \(page 2\)](#).

## Deactivating Cruise

Push the cruise button to deactivate the cruise mode or push the joystick as follows:

- Mode I: the right joystick in any direction
- Mode II: the right or left joystick in forward or reverse.

**Note:** The settings reset when the key is turned off or when you switch to carve mode.

## Resuming Cruise

Push the cruise button on the joystick to resume the functions with the same settings.

**Note:** The settings reset when the key is turned off or when you switch to carve mode.

# Carve Mode and Screen



Carve mode is identified by this icon:

Carve mode can only be set in thrust, not pullback.

## Accessing the Carve Screen

Push the carve button on the joystick (Figure 12) or push button 4 on the home screen to access the carve screen.

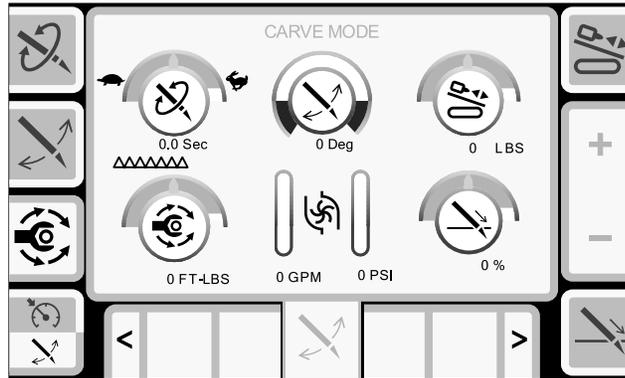
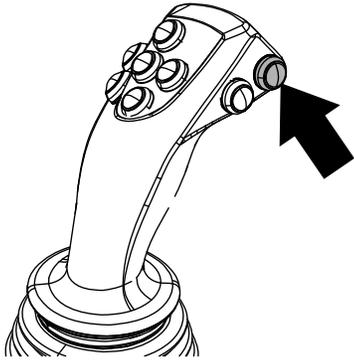


Figure 12

g298903

Push button 4 to switch between cruise and carve modes.

## Activating Carve

1. Position the drill bit in the direction (clock position) that you need to steer/carve.
2. Return the joysticks to the neutral position.
3. Access the carve screen using the display.
4. Push button 2 to select the sweep angle. Use buttons 6 and 7 to adjust the level.
5. Set the rotation speed, rotary torque, and thrust force using the carve screen on the display.
6. Push the carve button on the joystick (Figure 12).

**Note:** The drill string should start to rotate back and forth.

7. Push button 8 to access the thrust setting.

**Note:** The icon turns green and a green circle highlights the option you select (Figure 13).

8. Push button 6 to slowly increase the thrust rate to the desired setting.
9. Push button 6 or 7 to increase or decrease the value of the selected setting.

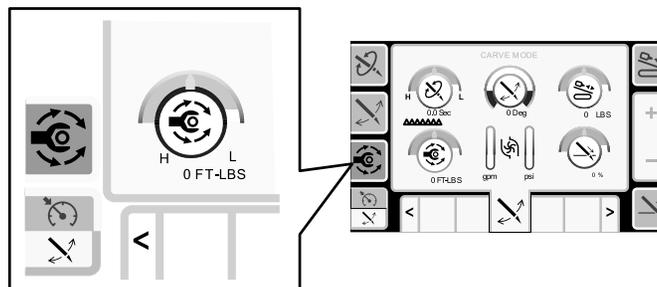


Figure 13

g291902

The following table describes the function values affected when another function is given priority.

The priority is the function with the highest value, not the value selected in the screen.

All values are dependent on the available engine horse power.

Button	Priority	Icon	Description
1	Pipe rotation speed (Rotary RPM)		The set rotary RPM is maintained unless the set rotary torque is exceeded, then the rotary rpm is reduced.
2	Sweep angle		<b>When not drilling:</b> change the arc angle degree. The arc angle will increase or decrease by 18°.
			<b>When actively drilling:</b> change the center of the pipe rotation. Button 6 is clockwise. Button 7 is counter clockwise. The pipe adjusts by 18° clockwise or counterclockwise for each button press.
3	Rotary torque		The set rotary torque value is maintained unless the maximum set rotary RPM is exceeded, then the torque value is reduced.
5	Thrust force (Carriage thrust)		The set carriage thrust is maintained unless the carriage rate (speed) is exceeded, then the thrust force is reduced.
8	Thrust rate (Carriage Rate/Speed)		The set carriage rate (speed) is maintained unless the maximum set carriage thrust is exceeded, then the speed is reduced.

Push the X button to return to the [Main Information Screen \(page 2\)](#).

## Deactivating Carve

Push the carve button to deactivate the carve mode or push the joystick as follows:

- Mode I: the right joystick in any direction
- Mode II: the right or left joystick in forward or reverse.

**Note:** The settings reset when the key is turned off or when you switch to cruise mode.

## Resuming Carve

Push the carve button on the joystick to resume the functions with the same settings.

**Note:** The settings reset when the key is turned off or when you switch to cruise mode.

# SmartTouch™ Home Screen

SmartTouch mode allows the operator to load and unload pipes from the pipe box with less joystick operation to reduce operator fatigue.

Use the [Carriage Settings Screen \(page 17\)](#) to turn SmartTouch mode on and off.

**Note:** The Push/Pull Icon has a green background when SmartTouch mode is on and a ribbon appears at the bottom of the screen showing a sequence of the steps.

**Important:** Never switch between Push/Pull modes during the chosen operation. Use neutral (manual) mode to switch between Push/Pull; refer to [Carriage Settings Screen \(page 17\)](#) to turn SmartTouch mode off.

## Pulling Pipe in SmartTouch Mode

Start the SmartTouch mode with the cam assembly in the park position.

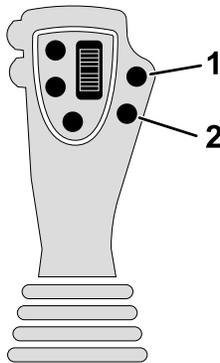


Figure 14

g236957

1. Go to the previous step
2. Go to the next step

1. Push button 1 to select the pull pipe option ([Figure 15](#)).
2. Push buttons 2 and 3 to select the row where you want to place the pipe ([Figure 15](#)).

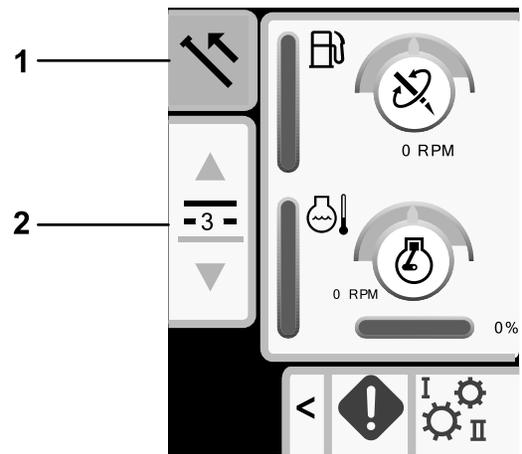


Figure 15

g238157

1. Pull pipe
2. Select pipe row

3. Hold the lower right button on the left joystick ([Figure 14](#)) until the display moves to box 2 ([Figure 16](#)) and the elevator lowers, the cam assembly rotates toward the operator station, and the arms fully extend ([Figure 17](#)).

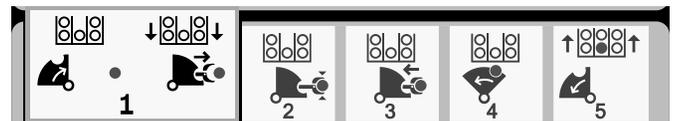


Figure 16

g236958

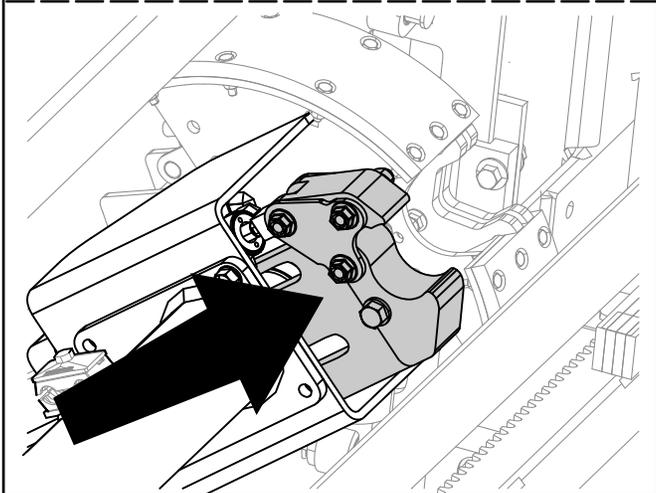
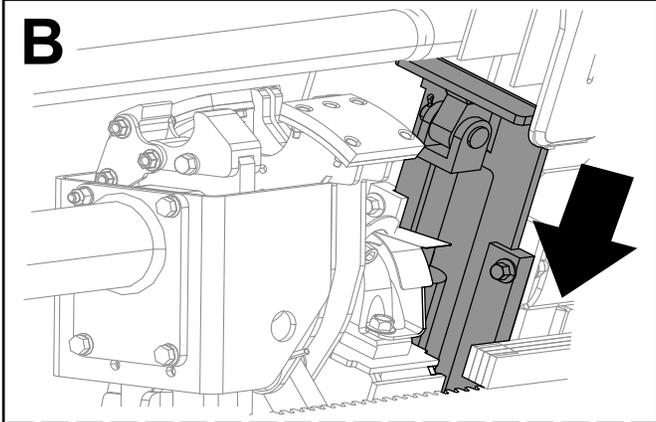
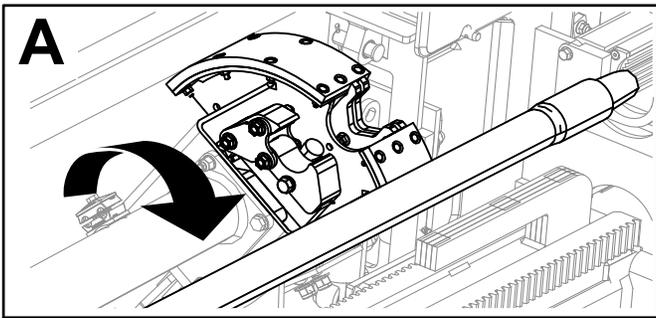
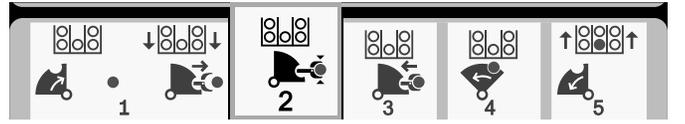


Figure 17

g239743

4. Release the button to proceed to the next step in the sequence (Figure 18).



g236959

Figure 18

5. Break the pipe connection; refer to Removing Drill Pipes in the *Operator's Manual*.
6. Hold the lower left button on the left joystick to grip the pipe (Figure 19 and Figure 20) and release the button.

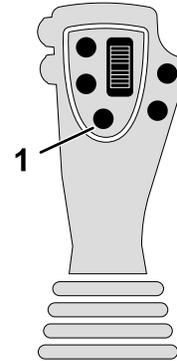


Figure 19

g238156

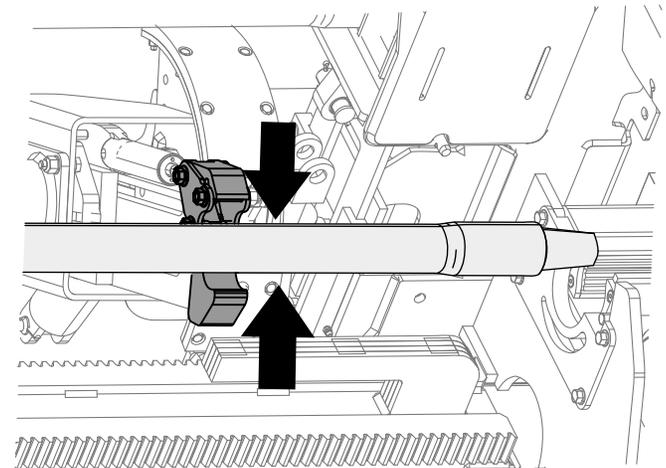


Figure 20

g210519

7. Hold the lower right button on the left joystick (Figure 14) until the arms fully retract (Figure 22).

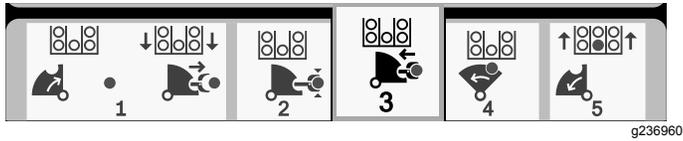


Figure 21

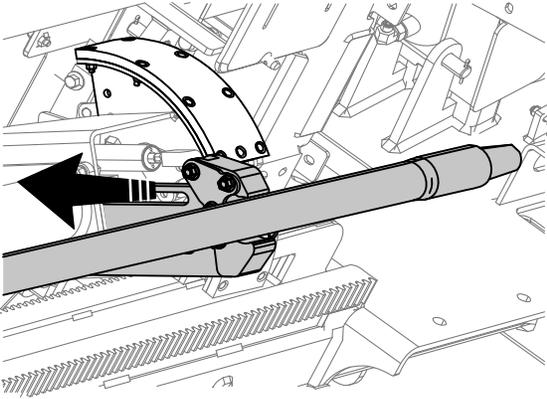


Figure 22

8. Release the button to proceed to the next step in the sequence (Figure 23).

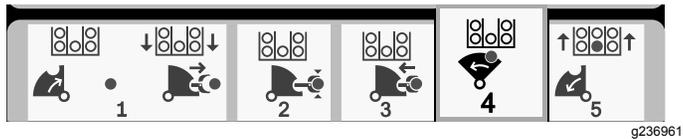


Figure 23

9. Hold the lower right button on the left joystick (Figure 14) until the cam assembly rotates to the selected row under the pipe box (Figure 24).

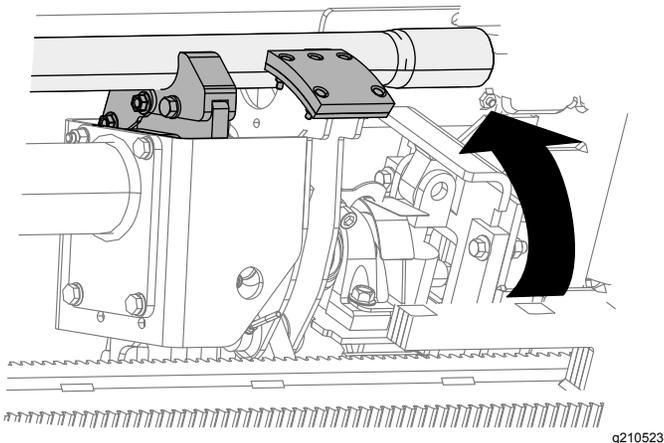


Figure 24

10. Release the button to proceed to the next step in the sequence (Figure 25).

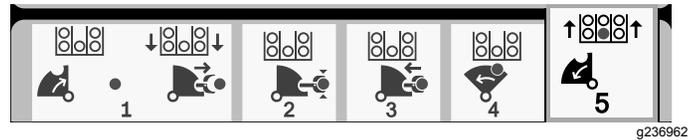


Figure 25

11. Hold the lower right button on the left joystick (Figure 14) until the display moves to box 1 and the elevator puts the pipe back in the pipe box and the cam rotates to the home position (Figure 26).

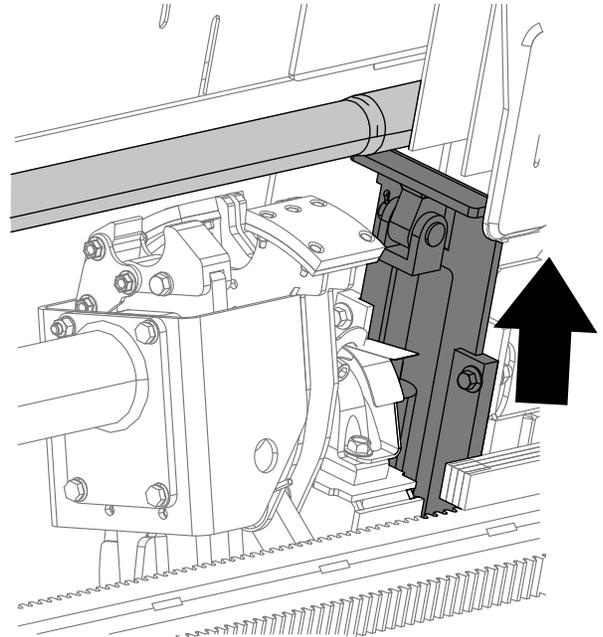


Figure 26

12. Release the button to start the pull-pipe process again.

# Pushing Pipe in SmartTouch Mode

Start the SmartTouch mode with the cam assembly in the park position.

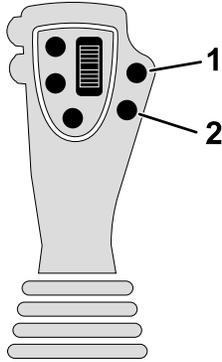


Figure 27

g236957

1. Go to the previous step
2. Go to the next step

1. Push button 1 to select push pipe (Figure 28).
2. Push buttons 2 and 3 to select the row where you want to get the pipe (Figure 28).

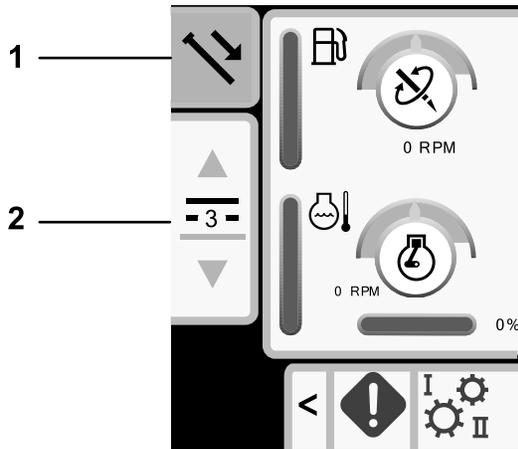


Figure 28

g238158

1. Push pipe
2. Select pipe row

3. Hold the lower right button on the left joystick (Figure 27) until the cam assembly rotates to the selected row and the pipe lowers into the opening (Figure 30).

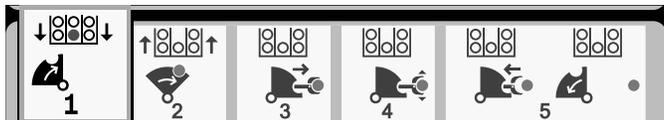


Figure 29

g236963

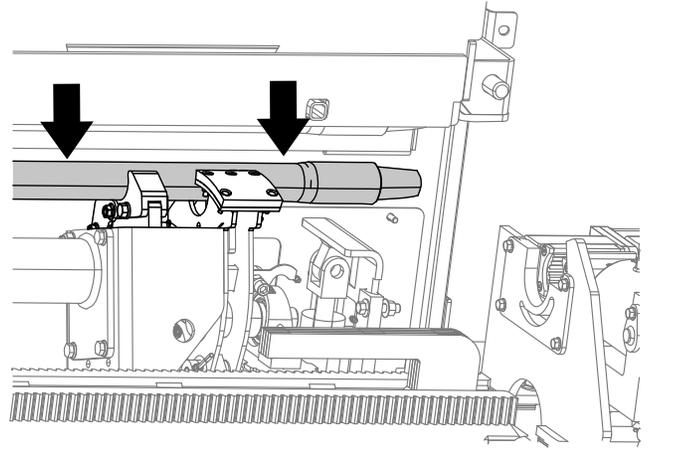


Figure 30

g210463

4. Release the button to proceed to the next step in the sequence (Figure 31).

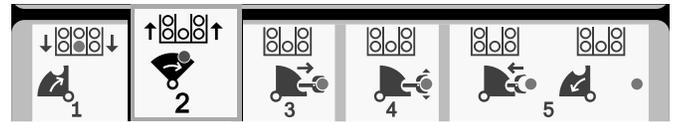


Figure 31

g236964

5. Hold the lower right button on the left joystick (Figure 27) until the display moves to box 3 (Figure 31) and the cam assembly fully rotates forward to the rack and the elevators lift the remaining pipe into the pipe box (Figure 32).

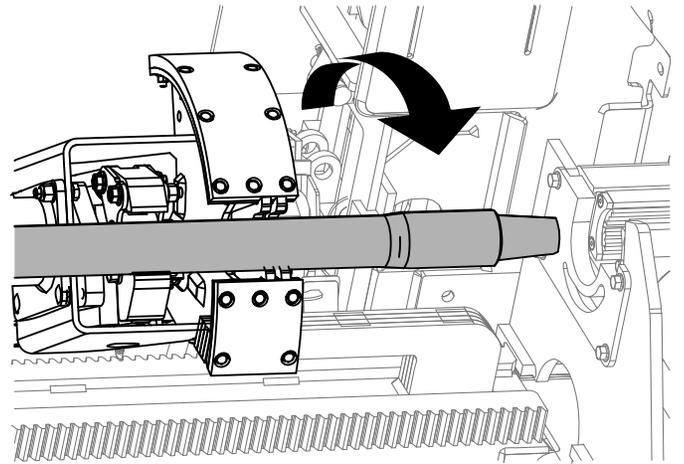


Figure 32

g210465

6. Release the button to proceed to the next step in the sequence (Figure 33).

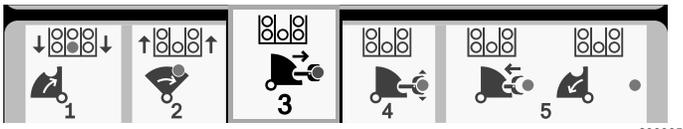


Figure 33

7. Hold the lower right button on the left joystick (Figure 27) until the arms extend (Figure 34).

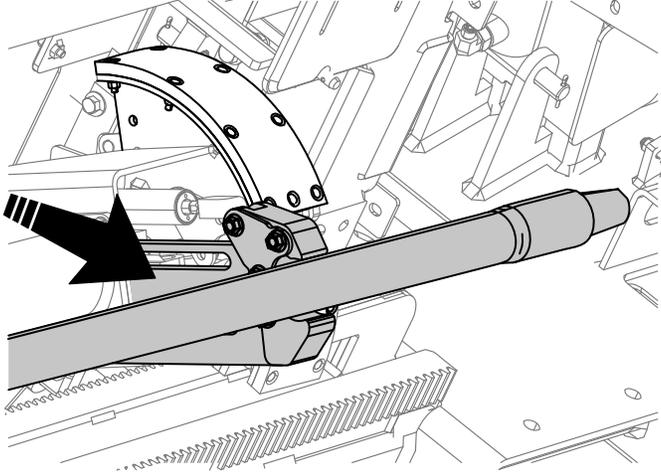


Figure 34

8. Release the button to proceed to the next step in the sequence (Figure 35).

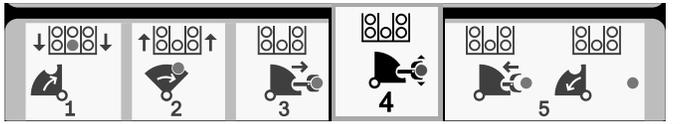


Figure 35

9. Make the pipe connection; refer to Adding Drill Pipes in the *Operator's Manual*.
10. Hold the lower left button on the left joystick (Figure 36) to release the pipe (Figure 37) and release the button.

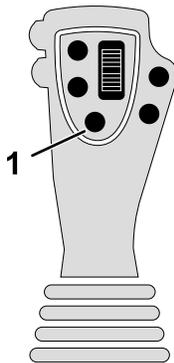


Figure 36

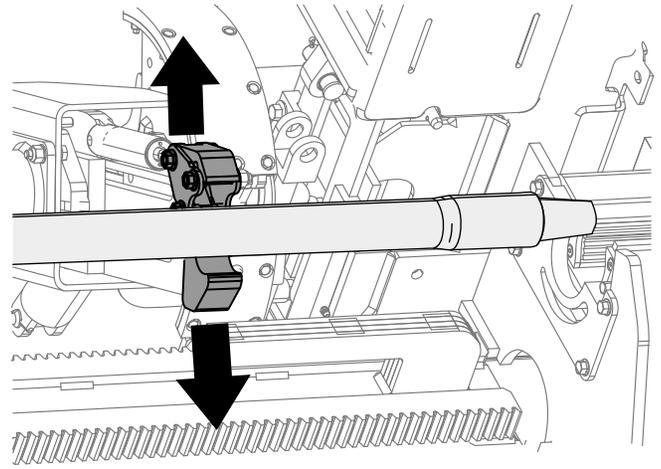


Figure 37

11. Hold the lower right button on the left joystick (Figure 27) until the arms retract and the cam assembly returns to the home position (row 3) (Figure 39).

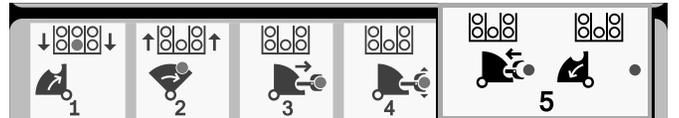


Figure 38

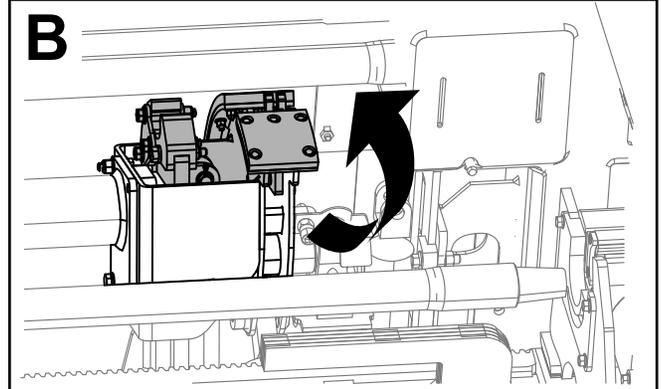
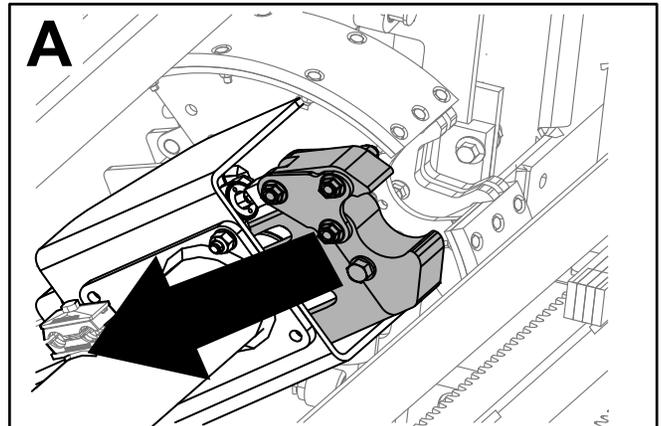


Figure 39

12. Release the button to start the push-pipe process again. The cam assembly goes to the row picked in step 2 of Pushing Pipe in SmartTouch Mode (page 11).

# Manual Pipe Loading

Manual pipe loading mode allows the operators to load and unload pipes from the cam assembly when it is rotated outside the pipe box.

**Note:** Use 2 people to load the pipes into the cam assembly.

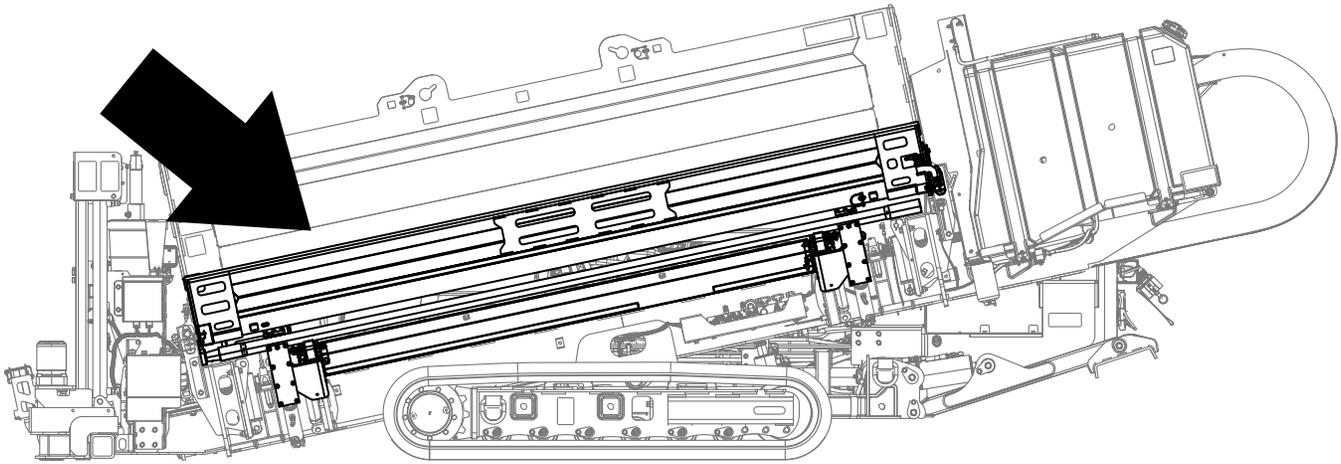


Figure 40

g238408

1. Set the machine to manual pipe loading mode; refer to [Carriage Settings Screen \(page 17\)](#)..
2. Use buttons 2 and 3 to choose where you want the pipe to be placed; a row or the drill string ([Figure 41](#)).

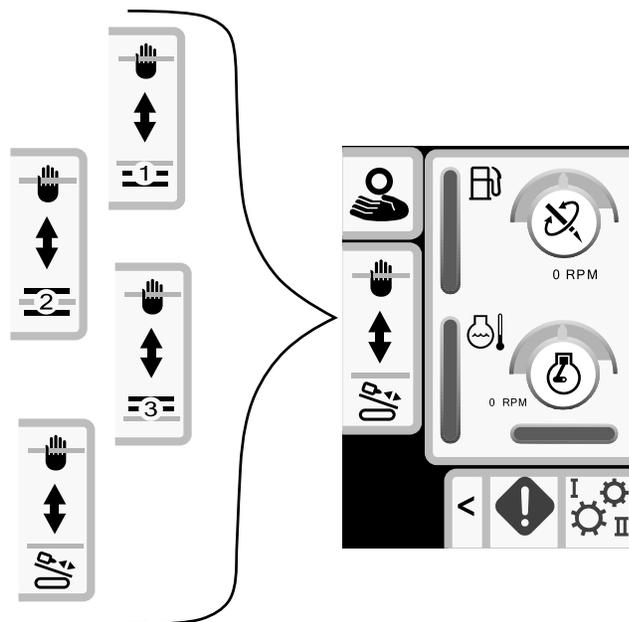
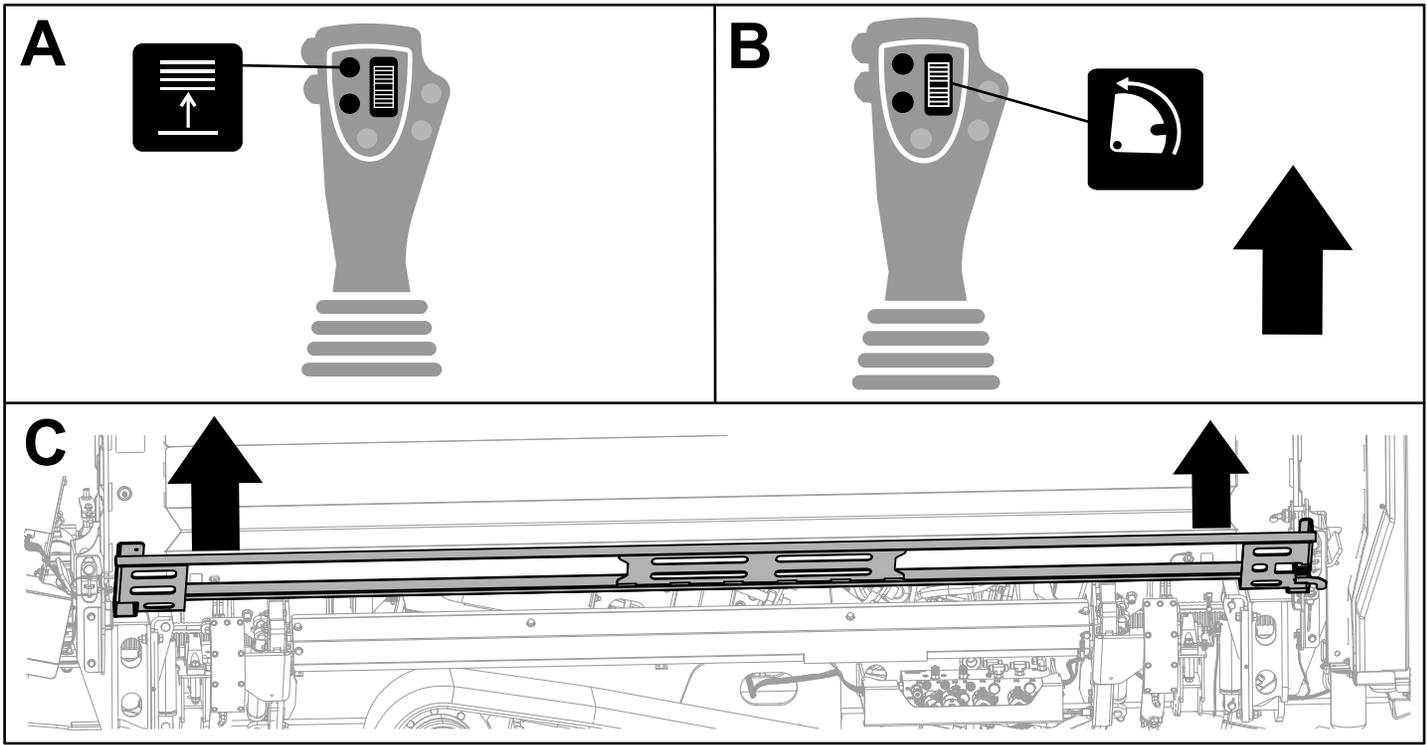


Figure 41

g238311

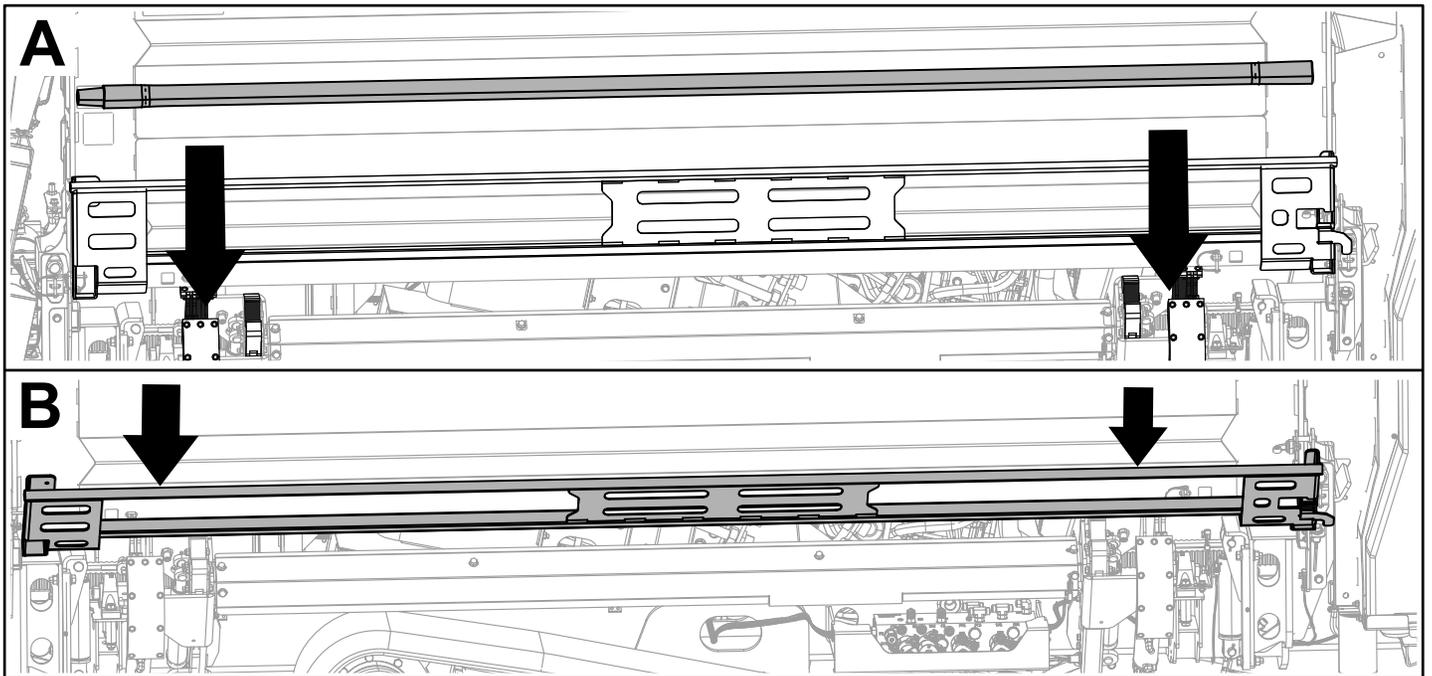
3. Raise the elevator ([Figure 42](#)).
4. Push the cam rotate dial UP to rotate the cam assembly outside of the pipe box ([Figure 42](#)).
5. Raise the pipe loading guard ([Figure 42](#)).



g238263

Figure 42

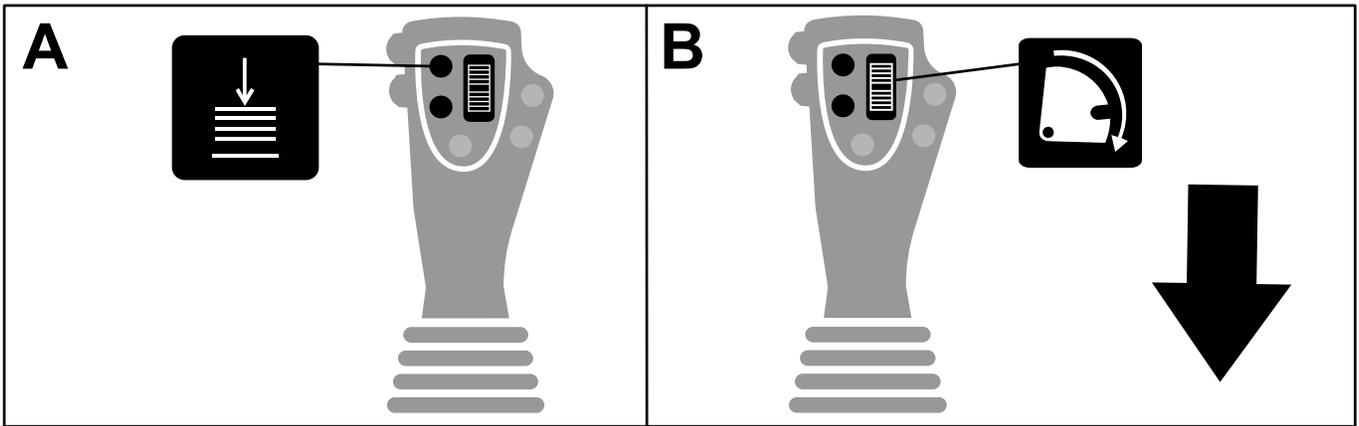
6. Use 2 people to load a pipe into the cam assembly (Figure 43).
7. Lower the pipe loading guard (Figure 43).



g238264

Figure 43

8. Lower the elevator (Figure 44).
9. Push the cam rotate dial DOWN to rotate the cam assembly to the location picked in step 2 (Figure 44).



g238312

Figure 44

10. Loading to the drill string only: Refer to Adding Drill Pipes in the *Operator's Manual*.
11. Repeat steps 3 to 9 to continue loading pipes to the pipe box.

## Hours Screen Options

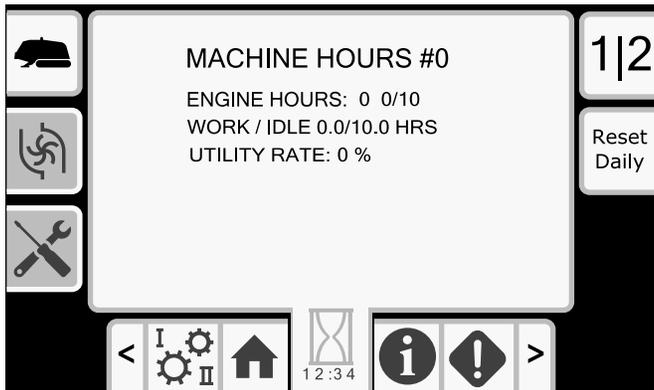
### Machine Hours Screen

To access this screen push button 1 on the Hours screen.

This screen shows the operating hours of the machine. Machine 1 cannot be changed. Machine 2 can be reset.

Button 5 switches between machine 1 and machine 2.

Button 6 resets the daily machine hours.



g236833

Figure 45

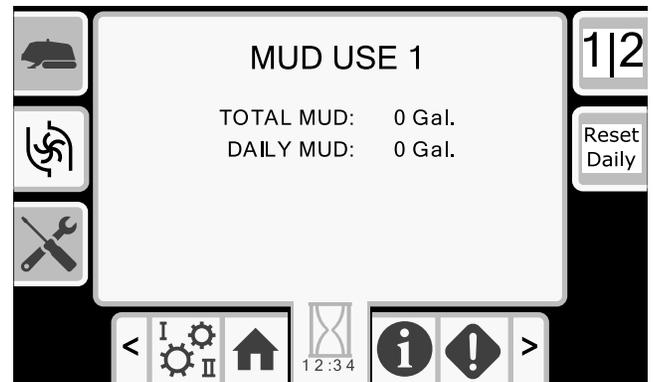
### Drilling Fluid (Mud) Use Screen

To access this screen push button 2 on the Hours screen.

This screen shows the drilling fluid (mud) use of the machine. Total drilling fluid (mud) cannot be changed. Daily drilling fluid (mud) can be reset.

Button 5 switches between mud use 1 and mud use 2.

Button 6 resets the daily mud use.



g236834

Figure 46

# Maintenance Schedule Screens

To access this screen, push button 3 on the Hours screen.

These screens provide the user with the daily maintenance schedules and the 50-hour, 250-hour, 400-hour, and 800-hour increments.

To reset the maintenance interval, refer to [Maintenance PIN Screen \(page 18\)](#).

Push the following buttons to view the following maintenance schedules:

- Button 3—Daily maintenance schedule ([Figure 47](#))
- Button 5—50-hour maintenance schedule ([Figure 48](#))
- Button 6—250-hour maintenance schedule ([Figure 49](#))
- Button 7—400-hour maintenance schedule ([Figure 50](#))
- Button 8—800-hour maintenance schedule ([Figure 51](#))



Figure 49

g236829

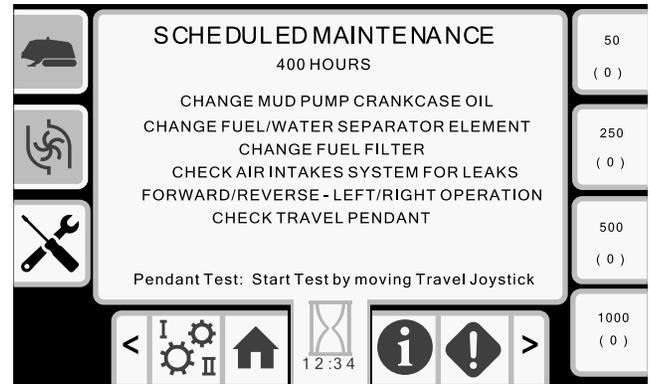


Figure 50

g240193



Figure 51

g240194

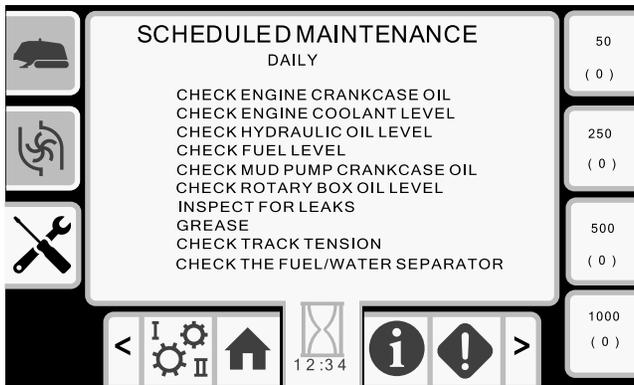


Figure 47

g236832



Figure 48

g236830

# Settings Screen Options

## Carriage Settings Screen

Push button 1 on the Settings screen.

Use this screen to change the carriage settings. Push the OK button to switch between SmartTouch and the manual pipe loader option.

Use the up and down arrows to choose the push, pull, or neutral setting.

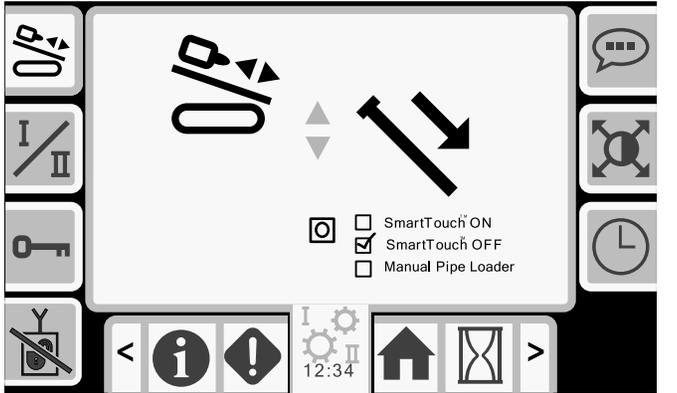


Figure 52

**Push Pipe:** refer to Starting the First Pipe and Adding Drill Pipes in the Drilling the Bore section in your *Operator's Manual* for full instructions.

**Pull Pipe:** refer to Removing Drill Pipes in the Drilling the Bore section in your *Operator's Manual* for full instructions.

**Manual Pipe Loader:** refer to [Manual Pipe Loading \(page 13\)](#).

## Control Mode Screen

Push button 2 on the Settings screen.

Use this screen to select between the 2 joystick control options. Push the up and down buttons to switch between Mode I and Mode II.

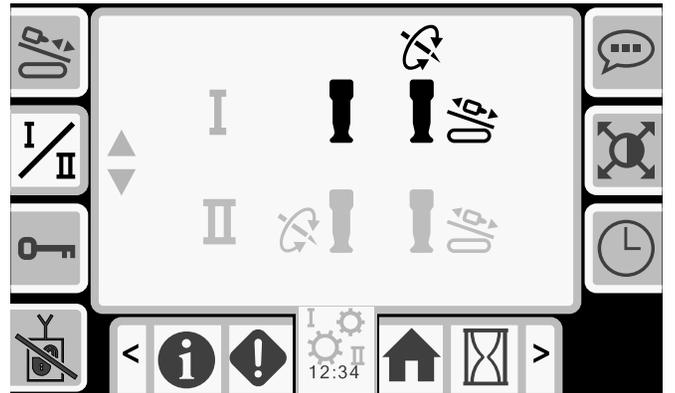


Figure 53

- Mode I—The right joystick controls the thrust and the rotation functions. Refer to [Figure 70](#) on the [Joystick Help Screen \(page 22\)](#) for more information.
- Mode II—The right joystick controls the thrust functions. The left joystick controls the rotation functions. Refer to [Figure 71](#) on the [Joystick Help Screen \(page 22\)](#) for more information.

# Maintenance Options Screen

## Maintenance PIN Screen

Push button 3 on the Settings screen.

Push the OK button to access the PIN screen (Figure 55).

The Maintenance pin number is **12356**.

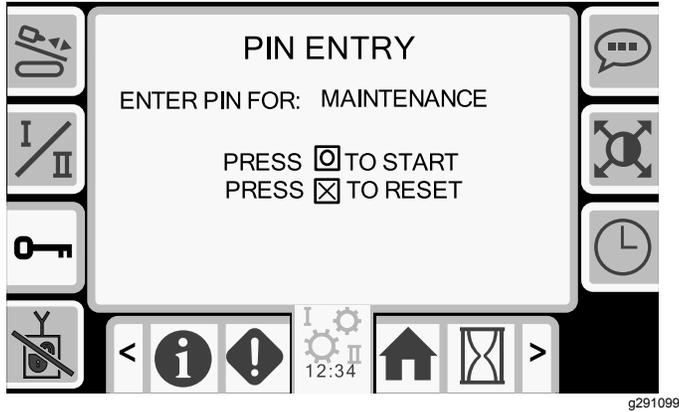


Figure 54

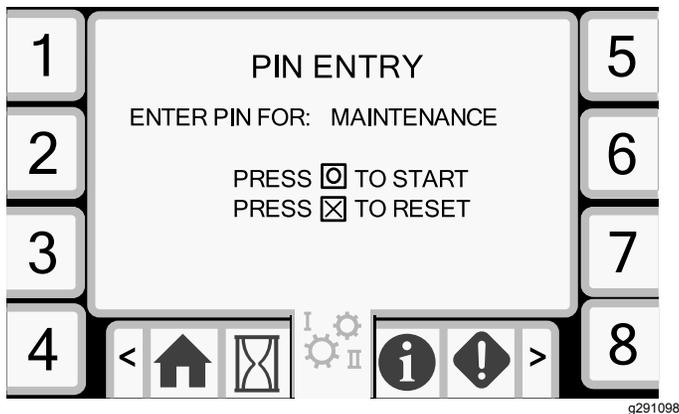


Figure 55

## Resetting the Maintenance Intervals

1. Enter the maintenance PIN and await confirmation of correct PIN message.
2. Push the OK button to start the reset process.
3. Navigate to the [Maintenance Schedule Screens](#) (page 16).
4. Select the interval that you want to reset.
5. Push the interval number 2 more times to reset the interval.

# Exit Side Lockout Settings

**Note:** Software version A.5 and up

If your exit-side-lockout handheld remote loses its signal, runs out of batter power, or gets damaged, you can disable the system in order to continue working.

Push button 4 on the Settings screen to access the screen to enable/disable the exit side lockout system.

Use the up and down arrows to change the setting.

If you disable the exit side lockout, prior to working on the drill string, turn off the machine, remove and take the ignition key to the drill string operator/location. Once the drill string work is complete, you may start the machine and continue drilling.

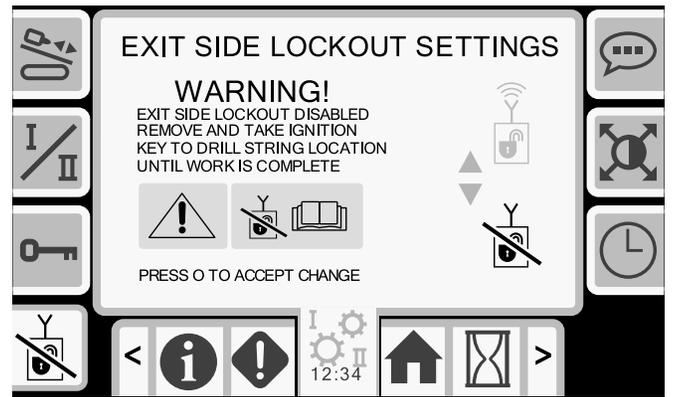


Figure 56

Exit Side Lockout Disabled Screen

Warning message: Exit side lockout disabled. Remove and take ignition key to drill string location until work is complete.

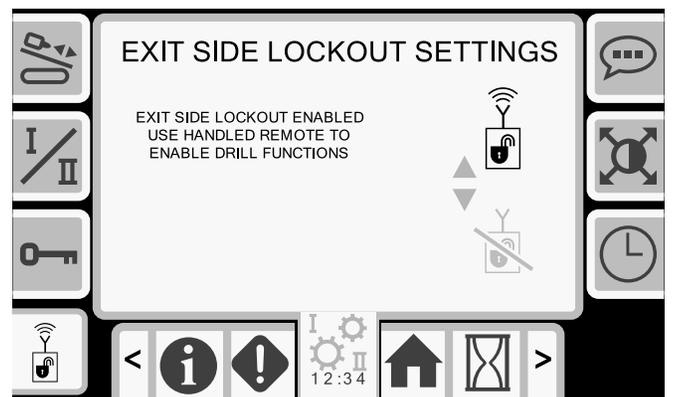


Figure 57

Exit Side Lockout Enabled Screen

## Language and Units Options Screen

Push button 5 on the Settings screen to access the screen to switch between English and metric units. Use the up and down arrow keys to change the language and unit options.

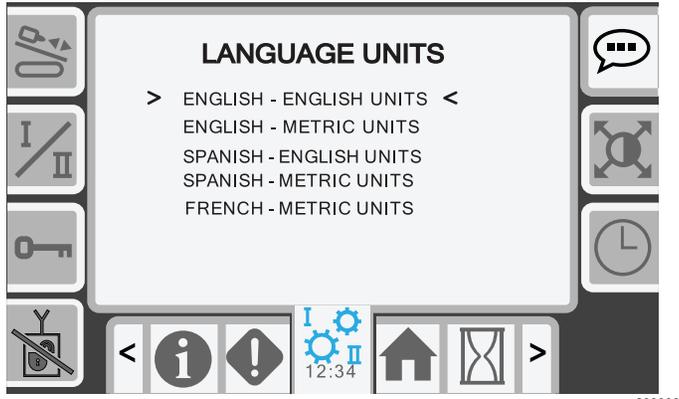


Figure 58

## Clock Settings Screen

Push button 7 on the Settings screen to set the clock settings options.

Once you are on this screen, push button 7 to rotate between date, time, and 12/24.

Use the up and down arrows to adjust the parameters.

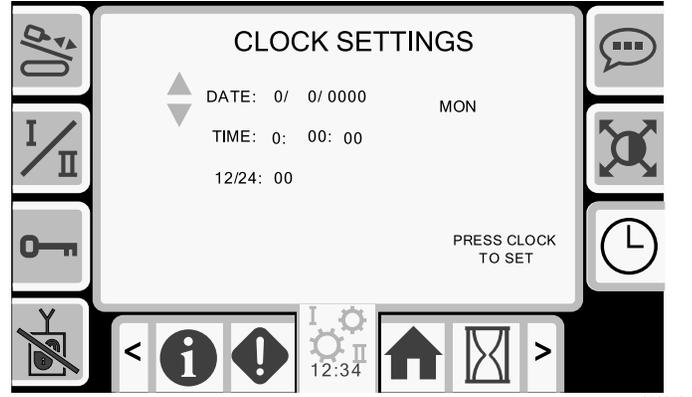


Figure 60

## Screen Settings Screen

Push button 6 on the Settings screen to cycle through the different adjustments. Use the up and down arrows to adjust the parameters.

The Main Drilling Screen zooms into the drilling functions. These settings adjust the delay on how long it takes to zoom.

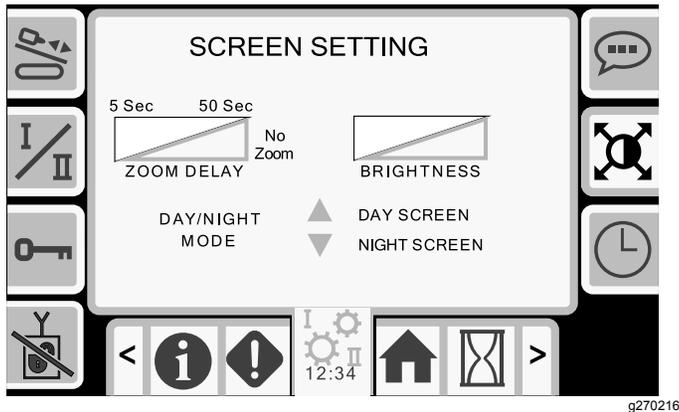


Figure 59

## Mud or Air-Hammer Screens

Push button 8 on the Settings screen to access this screen. Hold the OK (O) button and use the up and down arrows to switch between mud and air hammer modes.

**Important:** Ensure that you set up the valves per your selection. Refer to the *Air Hammer Installation Instructions*.

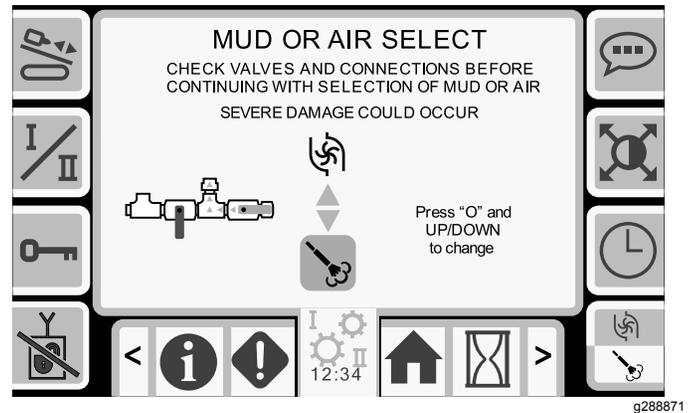
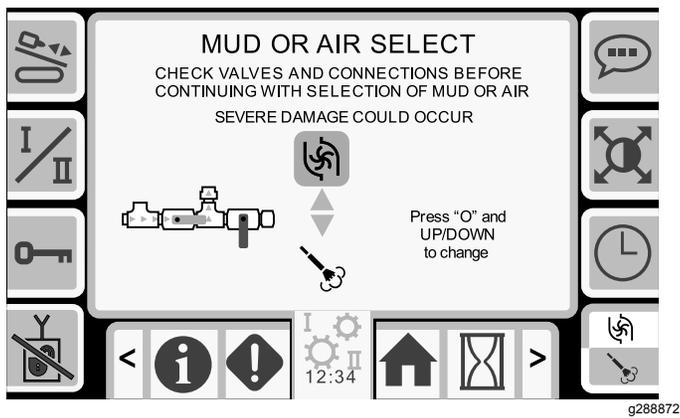


Figure 61  
Air Hammer Selected

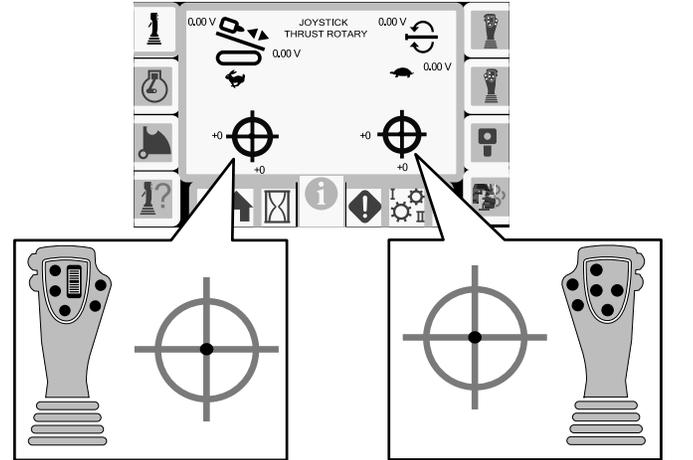


**Figure 62**  
Mud Selected

## Calibrating the Joysticks

Use this screen to check the calibration of the joysticks. Refer to [Calibrating the Travel Pendant](#) (page 24) to calibrate the travel pendant.

The red dot in the center of the targets shows the movement of the left and right joysticks. If the red dot does not reach  $\pm 10,000$ , see your Authorized Service Dealer to service or replace your joystick.



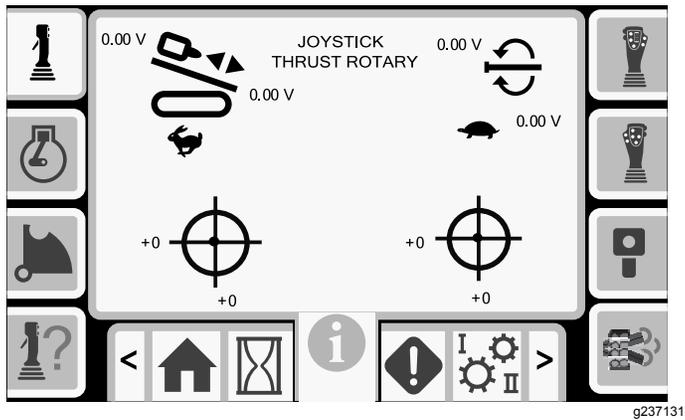
**Figure 64**

## Information (I/O) Screens

### Joystick I/O and Calibration Screen

#### Joystick I/O Screen

Push button 1 on the I/O screen to access the Joystick I/O screen.



**Figure 63**

- The rotary voltage ranges from 0.0 to 8.5 V and be present for either make (upper icon) or break (lower icon) as the selected rotary joystick is moved.
- The carriage indicates a range from 0.0 to 10.0 volts in the joystick selected direction for thrust or pullback.
- The lower left icon indicates if the left joystick is calibrated properly.
- The lower right icon indicates if the right joystick is calibrated properly.

## Engine I/O Screen

To access this screen push button 2 on the I/O screen. This screen displays engine information.

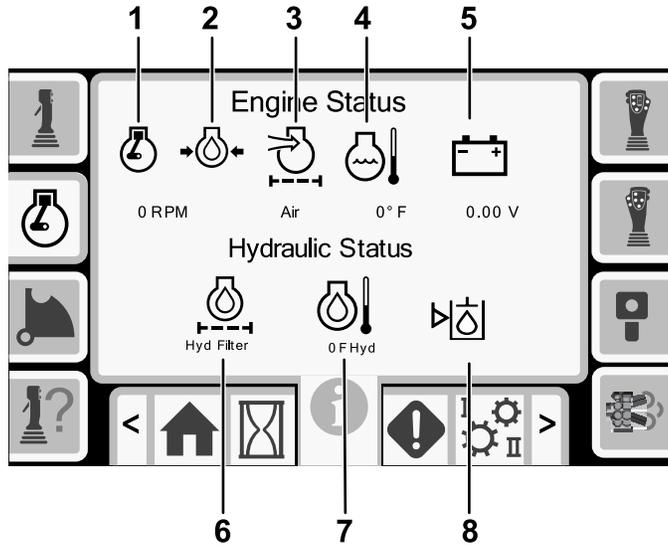


Figure 65

g237125

- |                         |                                 |
|-------------------------|---------------------------------|
| 1. Engine speed (rpm)   | 5. Battery voltage              |
| 2. Engine oil pressure  | 6. Hydraulic fluid filter       |
| 3. Air filter indicator | 7. Hydraulic fluid temp         |
| 4. Engine coolant temp  | 8. Hydraulic fluid level is low |

**Engine speed (rpm):** displays, in steps of 100, the engine speed (rpm).

**Engine oil pressure:** displays the engine oil icon .

**Air filter:** the air filter icon is green unless the filter is plugged then the indicator is red.

**Engine temperature:** displays the engine coolant temperature. The temperature drops to 40°F when the engine is off.

**Battery voltage:** displays the battery voltage. If the engine is off, the voltage is measured by the Toro controller.

**Hydraulic-fluid filter:** the hydraulic fluid filter icon is green unless the filter is plugged then the indicator is red.

**Hydraulic-fluid temperature:** displays the hydraulic fluid temperature.

**Hydraulic-fluid level is low:** the icon is red when the hydraulic fluid level is low

## Cam Arm I/O and Calibration Screen

To access this screen push button 3 on the I/O screen.

Use this screen to calibrate the cam assembly.

1. Push button 3 to toggle the calibration on and off.
2. Push the up and down buttons on the monitor to select the load position and the pipe-row position.
3. Push the OK button 2 times on the desired position to save the calibration.

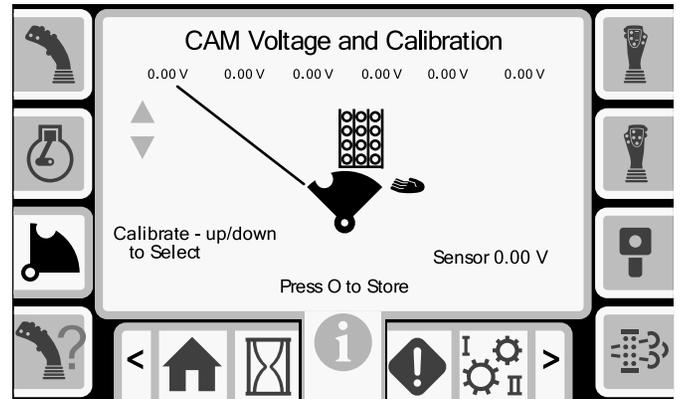


Figure 66

g238451

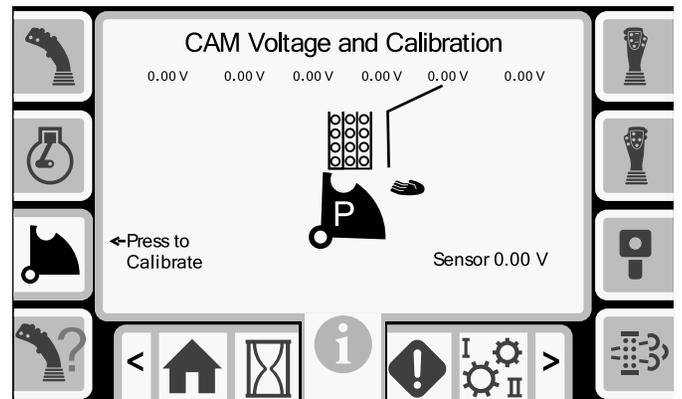


Figure 67

g238452

The voltage on the bottom indicates the cam raw sensor voltage. The voltages range from 1.0 to 4.0 V. Any voltage higher or lower indicates either sensor failure or incorrect calibration.

The other voltages are the calibrated voltages.

# Joystick Help Screen

To access these screens push button 4 on the I/O screen.

These screens show the function of each joystick button.

Push the up and down arrows to scroll through the screens.

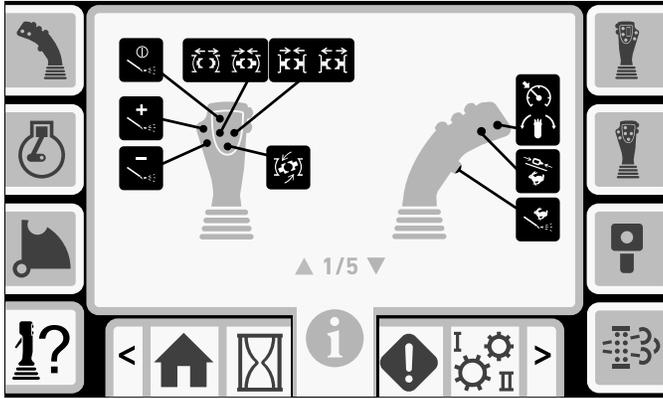


Figure 68

g237126

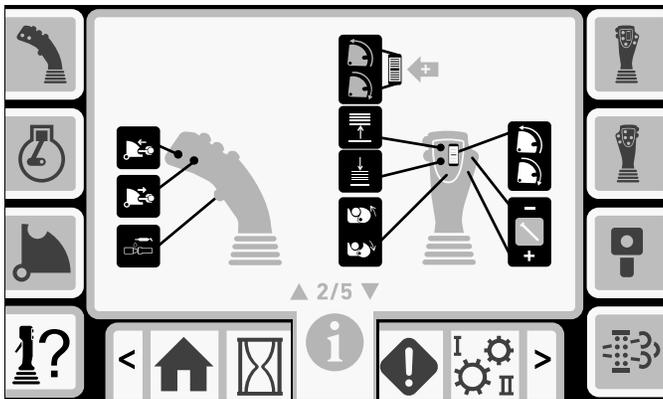


Figure 69

g237127

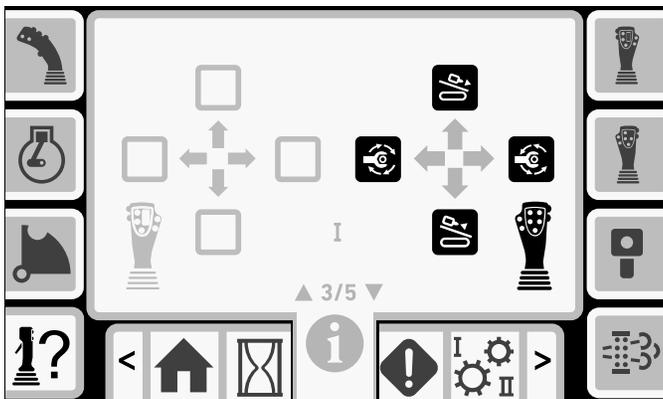


Figure 70

g237128

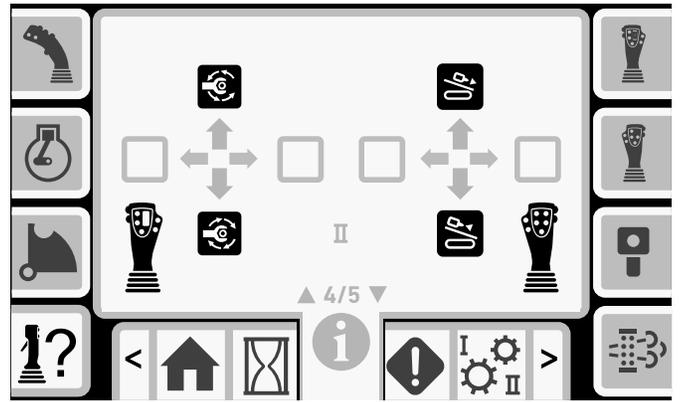


Figure 71

g237129

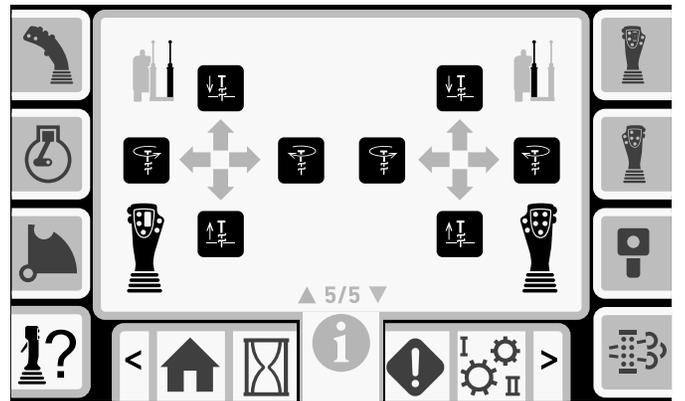


Figure 72

g237130

## Left Joystick I/O Screen

To access this screen push button 5 on the I/O screen.

Push the buttons on the joysticks and ensure that the corresponding icon illuminates.

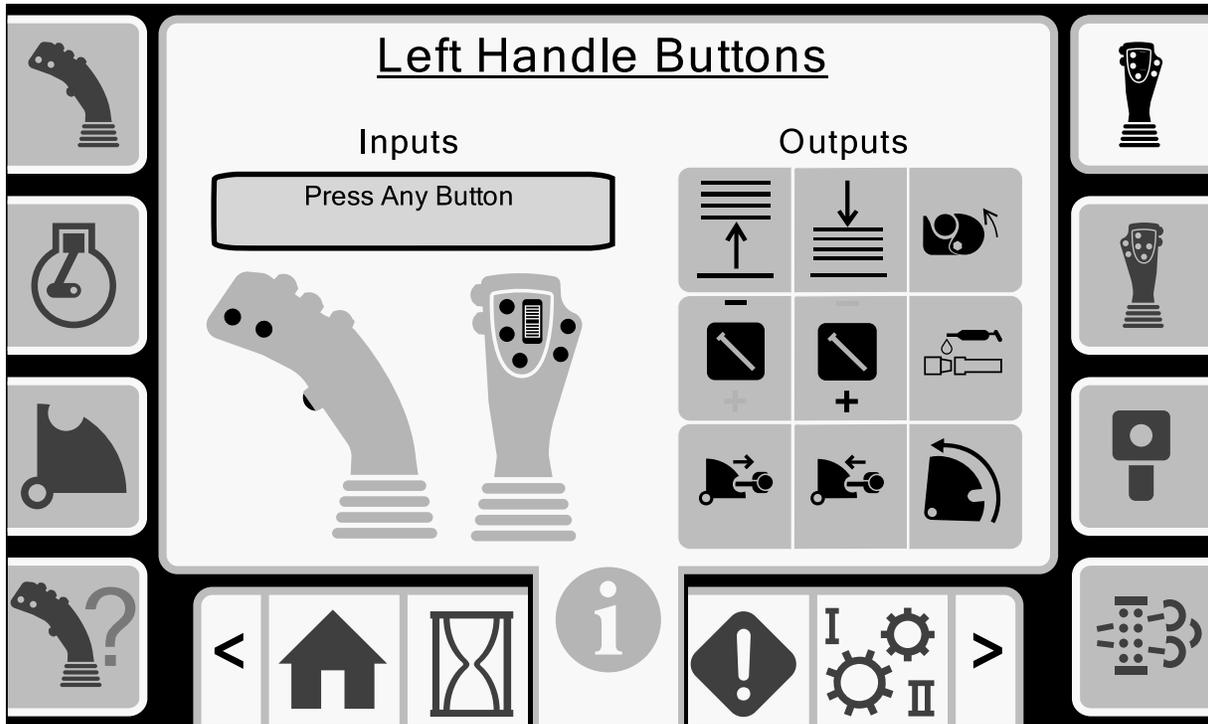


Figure 73

g237132

## Right Joystick I/O Screen

To access this screen push button 6 on the I/O screen.

Push the buttons on the joysticks and ensure that the corresponding icon illuminates.

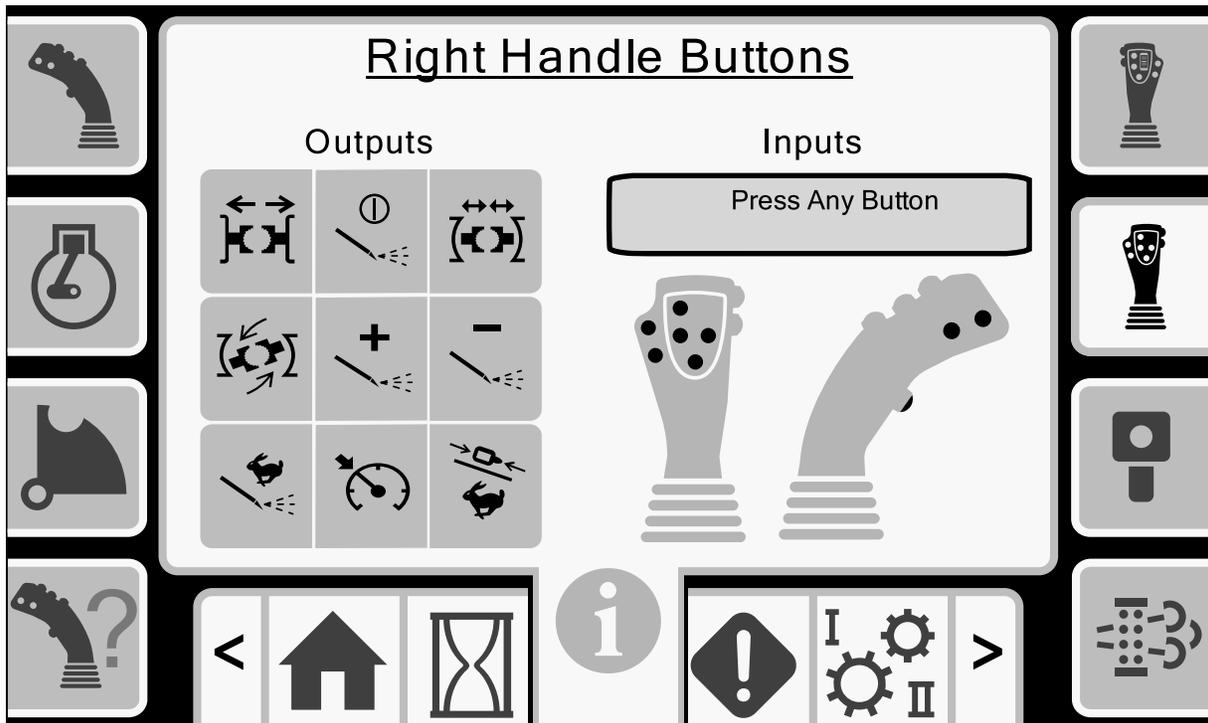


Figure 74

g237133

# Travel Pendant I/O and Calibration Screen

## Travel Pendant I/O Screen

To access this screen push button 7 on the I/O screen.

The travel pendant screen shows the voltage and position of the joystick located on the pendant.

**Note:** The message, Pendant Out Of Range, will appear if the pendant is out of range and cannot be calibrated. Bring the pendant closer to the machine to calibrate it.

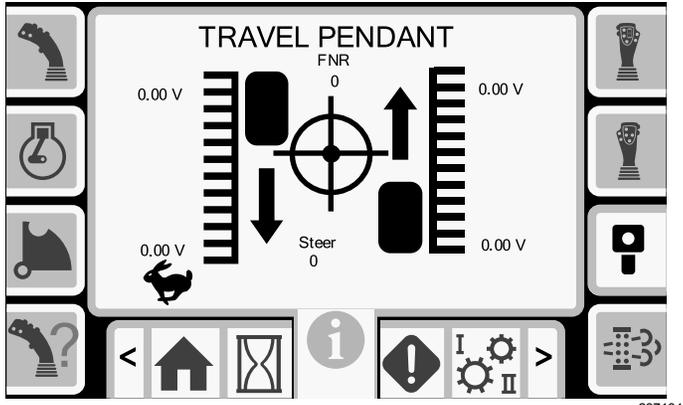


Figure 75

## Calibrating the Travel Pendant

**Service Interval:** Every 400 hours

The red dot is in the center of the target and the FNR (forward, neutral, reverse) and Steer voltage shows 2.5 V prior to allowing the drill to move. If the red dot travels outside of the outermost black ring, service or replace the pendant.

The indicators to the right and left of the circle show the direction of the track travel. The voltages show a range from 0 to 10.0 V.

# Engine DPF I/O Screen

To access this screen push button 8 on the I/O screen.

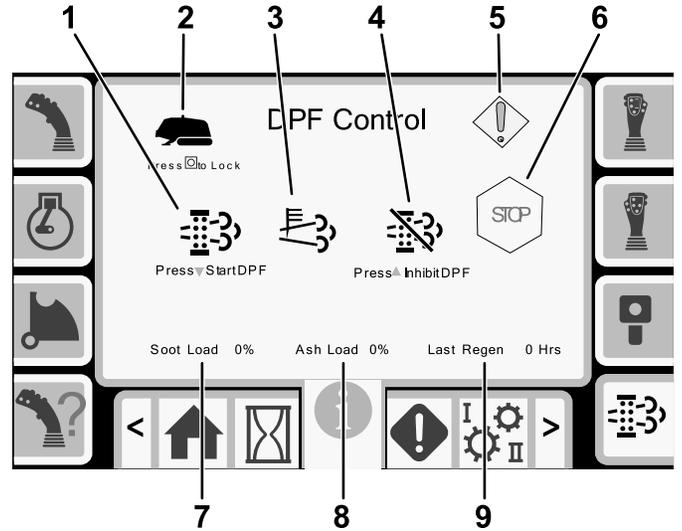


Figure 76

- |                             |                        |
|-----------------------------|------------------------|
| 1. Manual regeneration      | 6. Engine stop warning |
| 2. Regeneration interlock   | 7. Soot load           |
| 3. High exhaust temperature | 8. Ash load            |
| 4. Inhibit regeneration     | 9. Last regeneration   |
| 5. Warning symbol           |                        |

**Manual regeneration (regen):** Push the down arrow to start a regeneration cycle.

**Regeneration interlock:** Push the OK button to lock the machine during a manual regeneration.

**High exhaust temperature:** This icon displays when the exhaust temperature is high.

**Inhibit regeneration:** Push the up arrow to postpone a regeneration cycle.

**Warning symbol:** This icon displays when a regeneration is due or there is an issue with the DPF.

**Engine stop warning:** This icon displays when a regeneration is required. The machine does not function until the process is completed.

**Soot load:** This is the soot load percentage. Perform a regeneration cycle when the soot load is at 50% or above.

**Ash load:** This is the ash load percentage. Perform a regeneration cycle when the ash load is at 10% or above.

**Last regeneration:** This is the number of hours since the last regeneration cycle.

# Troubleshooting

## Errors and Machine Information Screens

### Drill Errors Screens

To access this screen push button 1 on the Errors and Machine Information screen.

This screen displays any drill errors.

Push buttons 5 to page through the errors.

Push button 6 to reset the error messages.

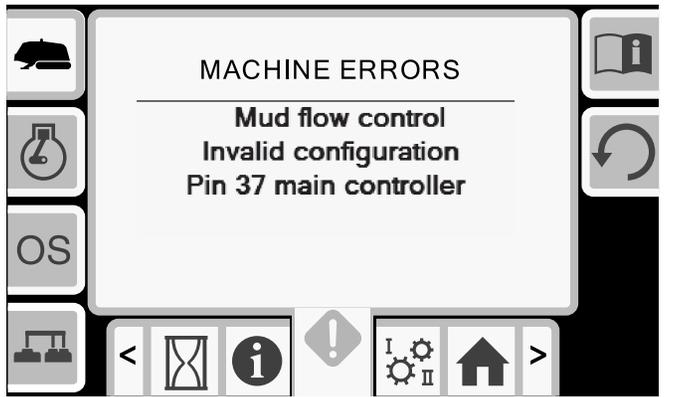


Figure 77

g237122

### Software Information Screen

To access this screen push button 3 on the Errors and Machine Information screen.

This screen displays the machine and software information including the model, serial number, and software version.



Figure 79

g237123

### Engine Errors Screen

To access this screen push button 2 on the Errors and Machine Information screen.

This screen displays any engine errors.

Push buttons 5 to page through the errors.

Push button 6 to reset the error messages.

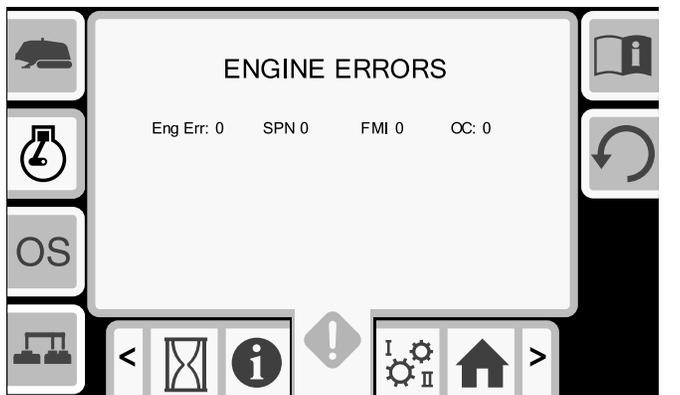
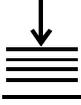
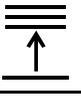
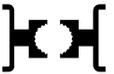
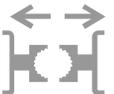
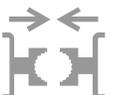
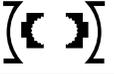
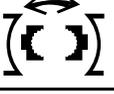


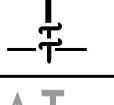
Figure 78

g237121

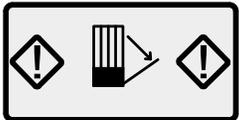


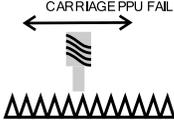
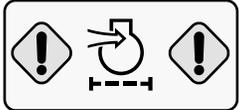
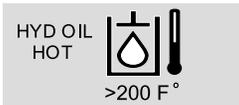
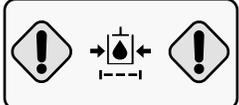
Controller	Icon	Color	Description
Seat Switch		Black	The operator seat is occupied.
		Green	The operator seat is unoccupied.
Pedestrian Gate		Black	The gate is in the correct position for drilling.
		Black	The gate is not in the correct position for drilling.
Exit Side Lockout		Black	The exit side lockout is not in operation.
		Green	The exit side lockout is in operation.
Machine		Green	The machine is active.
Carriage		Green	The carriage is in operation.
Cam Assembly		Black	The cam assembly is in the neutral position.
		Green	The cam assembly is rotating forward.
		Green	The cam assembly is rotating backward.
Cam Arm		Black	The cam arm is not in operation.
		Black and Green	The cam arm is retracting.
		Black	The cam arm extend function is not in operation.
		Black and Green	The cam arm is extending.
Pipe Gripper		Black	The pipe gripper is not in operation.
		Green	The pipe gripper is closing.
		Green	The pipe gripper is opening.

Elevator		Black	The elevator down function is not in operation.
		Green	The elevator is lowering.
		Black	The elevator up function is not in operation.
		Green	The elevator is raising.
Grease		Black	The grease is not in operation.
		Green	The grease is activated.
Vice/Stationary Wrench		Black	The vice/stationary wrench is not in operation.
		Green	The vice/stationary wrench is opening.
		Green	The vice/stationary wrench is closing.
Wrench		Black	The wrench is not in operation.
		Green	The wrench is closing.
		Green	The wrench is opening.
		Black	The wrench make/break function is not in operation.
		Green	The wrench is rotating counter clockwise.
		Green	The wrench is rotating clockwise.

Spray Gun		Black	The spray gun is not in operation.
		Green	The spray gun is activated.
Stake		Black	The stake (left/right) rotation function is not in operation.
		Green	The stake (left/right) is rotating clockwise.
		Green	The stake (left/right) is rotating counter clockwise.
		Black	The stake (left/right) raise or lower function is not in operation.
		Green	The stake (left/right) is being raised.
		Green	The stake (left/right) is being lowered.

## Warning Icons

Warning	Icon	Description	Resolution
Carriage Crash		<ul style="list-style-type: none"> <li>The carriage is in the drill area and you try to operate the loader arm or pipe cam or</li> <li>You try to operate the carriage when the loader arm or pipe cam is not in the home position</li> </ul>	<p>To clear this warning, do the following:</p> <ul style="list-style-type: none"> <li>Move the cam assembly to the home position and/or</li> <li>Reverse the carriage</li> </ul>
Pipe Loading Guard		The pipe loading guard is not in the lowered position.	Lower the pipe loading guard.
Cam Voltage	<p>CAM VOLTAGE</p>  <p>OUT OF RANGE</p>	The cam voltage is above or below the minimum or maximum values.	Check the <a href="#">Cam Arm I/O and Calibration Screen (page 21)</a> and calibrate the cam.
Travel Pendant		<ul style="list-style-type: none"> <li>The operator presence switch is not pressed when trying to tram the machine or</li> <li>The pendant thumb joystick is not centered</li> </ul>	<ul style="list-style-type: none"> <li>Release all of the buttons on the travel pendant, hold down the operator presence switch and continue to tram the machine.</li> <li>The travel pendant requires service; contact your Authorized Service Dealer</li> </ul>

Warning	Icon	Description	Resolution
Carriage		The sensor on the drill carriage has an error.	<ul style="list-style-type: none"> <li>Inspect the wires on the sensor.</li> <li>See your Authorized Service Dealer.</li> </ul>
Engine Air Filter		The air filter is restricted.	Refer to the <i>Operator's Manual</i> to service the air filter.
Cold Hydraulic Oil		The hydraulic oil is colder than 4°C (40° F).	No action required. The engine rpm is limited to no more than 1100 rpm.
Cool Hydraulic Oil		The hydraulic oil is colder than 15°C (60°F).	No action required. The engine rpm is limited to no more than 1800 rpm.
Hot Hydraulic Oil (This icon is replaced in version A.6 and above. See section below.)		The hydraulic oil is hotter than 93°C (200°F).	No action required.
Low Hydraulic Oil		The hydraulic oil is low and needs to be checked and filled.	Refer to the <i>Operator's Manual</i> to service the hydraulic oil.

#### Software version A.5

Exit Side Lockout Disabled		The exit side lockout is disabled	<p>To clear this warning, do the following:</p> <ul style="list-style-type: none"> <li>Press O to acknowledge</li> <li>See <a href="#">Exit Side Lockout Settings (page 18)</a> to enable the exit side lockout system</li> </ul>
----------------------------	------------------------------------------------------------------------------------	-----------------------------------	-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------

#### Software version A.6

Hot Oil Warning		The oil temperature is between 195°F (91°C) and 210°F (99°C). Functionality will be limited until the temperature drops below these levels.	Push the X button to cancel the alarm.
Hot Oil Caution		The oil temperature is over 210°F (99°C). Functionality will be limited until the temperature drops below these levels.	Push the X button to cancel the alarm.

**Notes:**



**Count on it.**