

# TUCKERBILT®

## 6-Yard Concrete Transport Vehicle *T-644*



## OPERATION AND MAINTENANCE MANUAL

Revised: June 26, 2018



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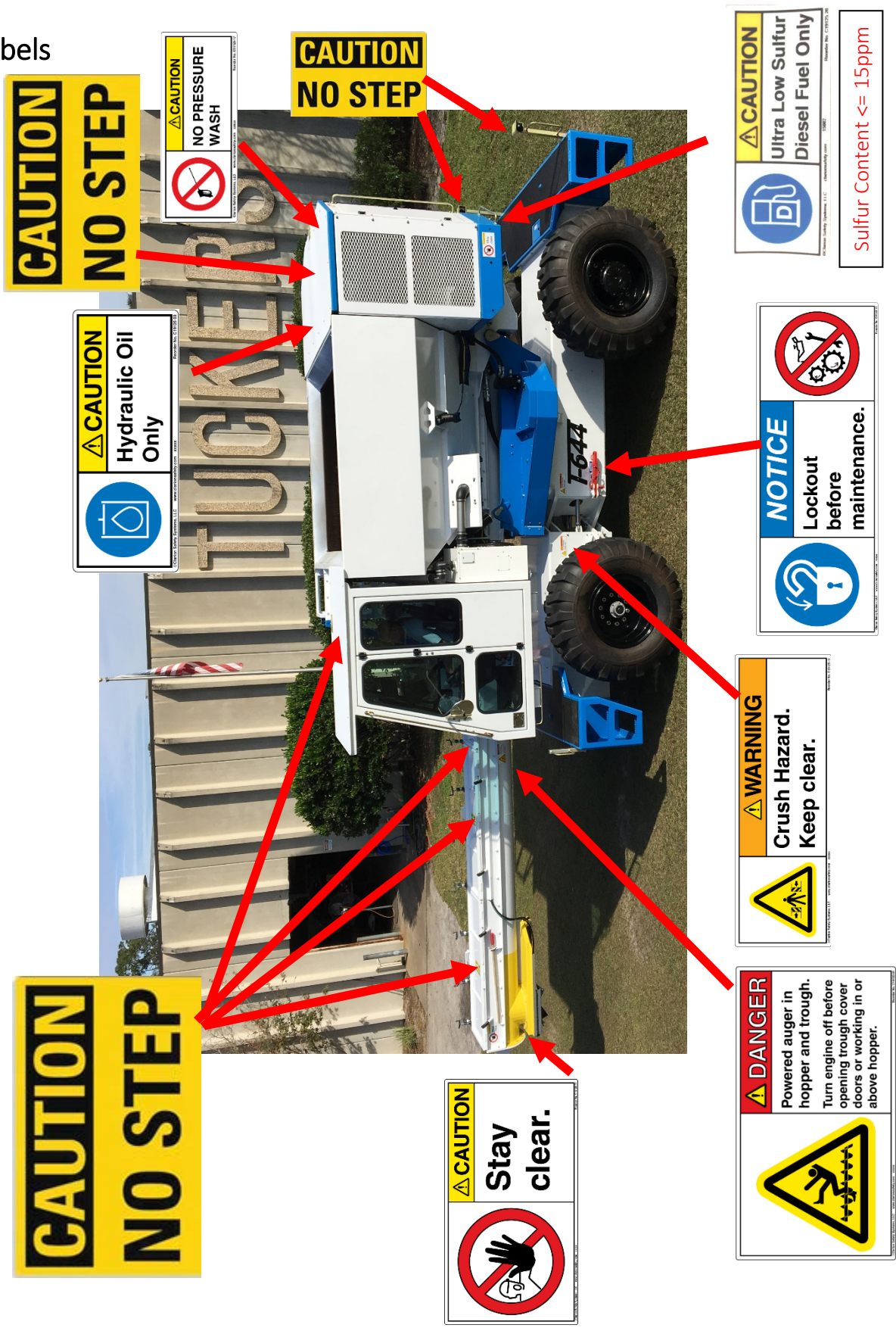
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Safety Labels



**CAUTION**  
**NO STEP**

**CAUTION**  
Hydraulic Oil  
Only

**CAUTION**  
NO PRESSURE  
WASH

**CAUTION**  
**NO STEP**

**CAUTION**  
**NO STEP**

**CAUTION**  
Stay  
clear.

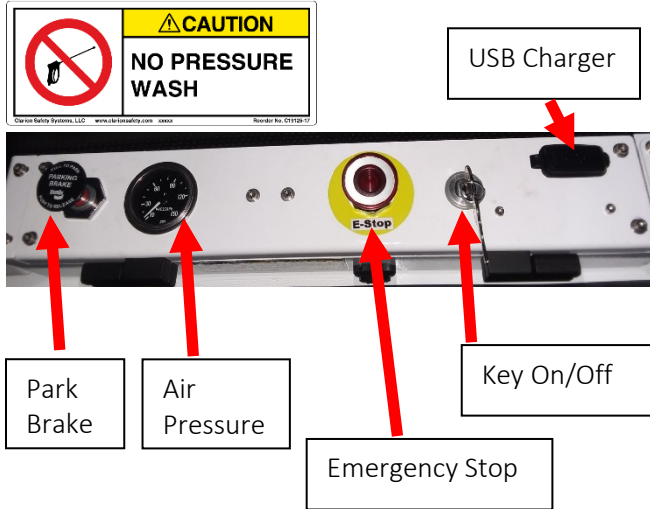
**DANGER**  
Powered auger in  
hopper and trough.  
Turn engine off before  
opening trough cover  
doors or working in or  
above hopper.

**WARNING**  
Crush Hazard.  
Keep clear.

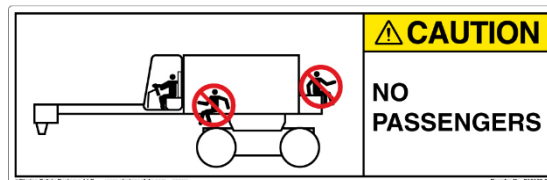
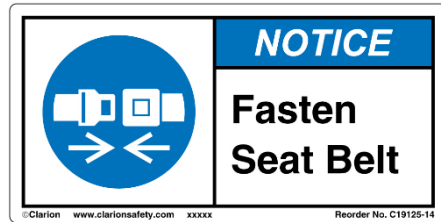
**NOTICE**  
Lockout  
before  
maintenance.

**CAUTION**  
Ultra Low Sulfur  
Diesel Fuel Only  
Sulfur Content <= 15ppm

# Safety Labels Inside Cab



Cab Pressurizer Monitor. Alerts when Cab is not Pressurized.





# Inside Cab

Hopper aligned straight when centered between Green Lines.



3 Cameras Screen  
Left, Right, and Rear Facing



DP720 Display  
Details start on page 30

Windshield Washer



Left Joystick  
Details on page 68



Right Joystick  
Details on page 69

# Inside Cab, page 2



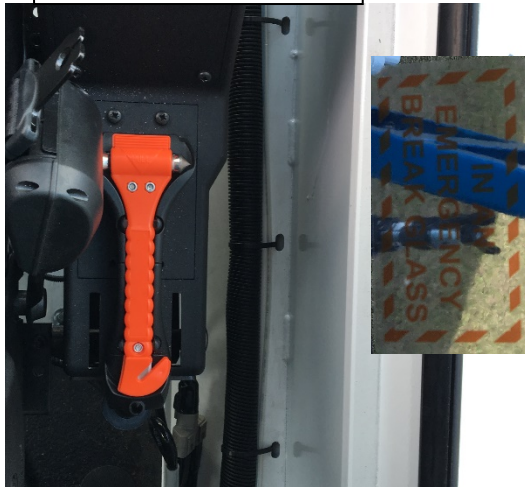
Fire Extinguisher

Tucker Model & Serial Plate

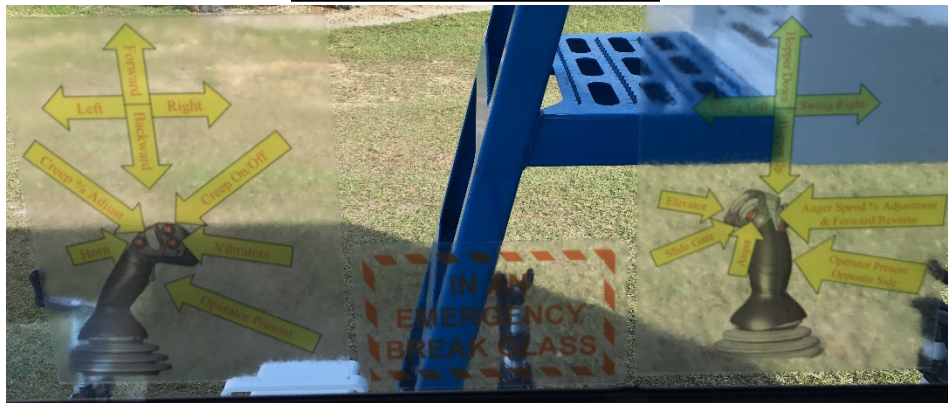
Left Door opener - exit



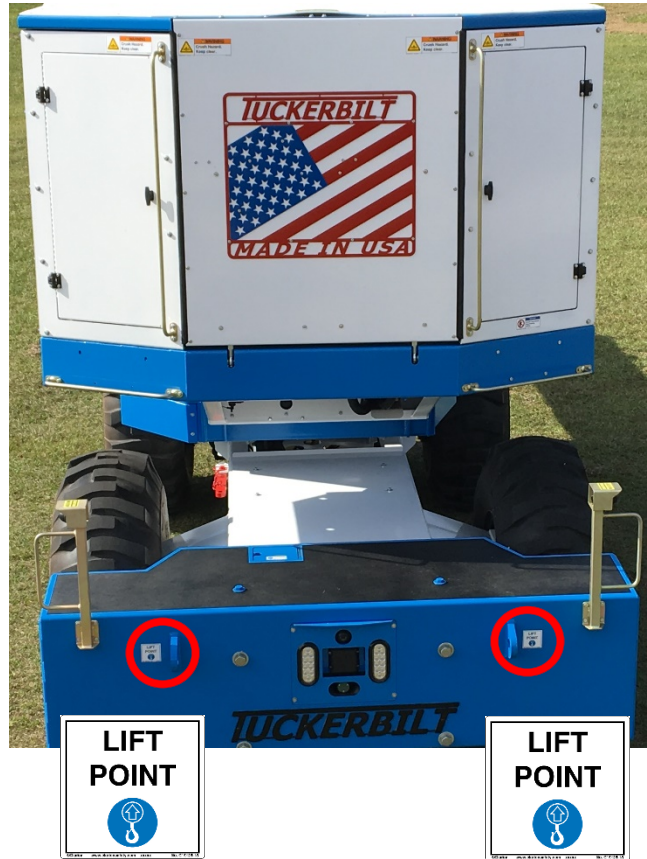
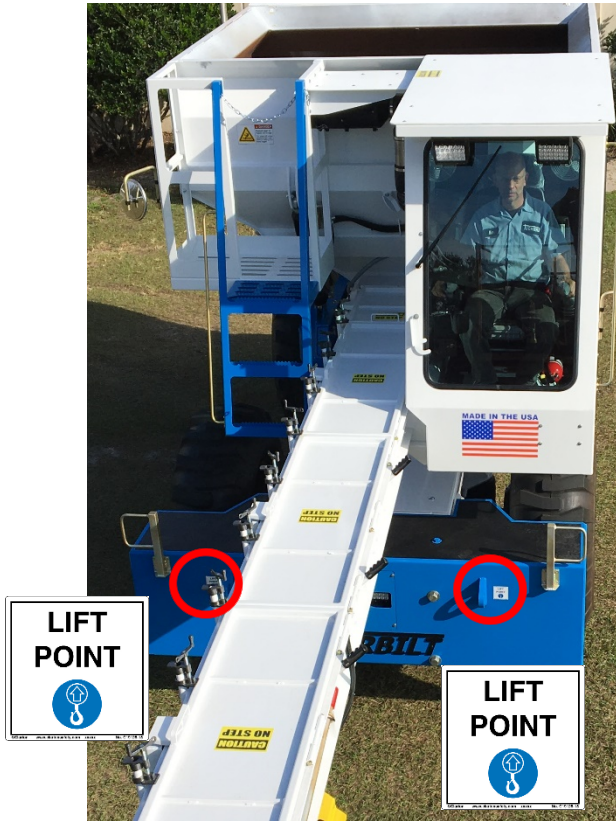
Right Window opener. In An Emergency Break Glass



Right Window decals



# Lift Points



2 Lift Points Front, 2 Lift Points Rear. Approximately 25,000 Lbs

# T-644 Operation and Maintenance Manual

Keep this manual in your T-644 as a ready reference.

## Forward

The SAFE and EFFICIENT operation of the T-644 depends on the skill and alertness of the operator. To safely use and maintain the T-644, the operator must:

1. Know the working capabilities of the T-644.
2. Know the make-up of the T-644.
3. Thoroughly read and understand: Tuckerbilt® T-644 Concrete Transporter CAN Bus Operations
4. Thoroughly read, understand and comply with the maintenance, safe-driving and load-handling procedures of the T-644 described in this manual.

It is critical that a qualified individual, experienced in T-644 operation, guide any new operator(s) through several driving and pouring operations before the new operator attempts to operate the T-644 on their own. It is the responsibility of the employer to make sure the operator they designate can see, hear and has the physical and mental ability to operate the T-644 safely.

This manual contains information necessary for the operation and daily maintenance of the T-644.

*NOTE: Optional equipment is sometimes installed which can change the operating characteristics described in this manual. Before operating any T-644, make sure the necessary instructions for any optional equipment installed on your T-644 are available, have been studied and are completely understood.*

All information, specifications, and illustrations in this manual are based on the latest data available at the time of publication. The specifications, torques, pressures, measurements, adjustments, illustrations, and instructions can change at any time. These changes CAN Affect operating procedures and the service required by the product. Obtain the most complete and current information from your Tuckerbilt® dealer before starting any job. Additional manuals are available from your Tuckerbilt® dealer. T-644 operator training is provided through your Tuckerbilt® dealer. They will be glad to answer any questions you have about operating or maintaining your new T-644.

Tucker's Machine & Steel Service, Inc.  
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Leesburg, FL 34749-2810  
(352) 787-3157  
Fax (352) 365-1732

Shipping:  
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Leesburg, FL 34748

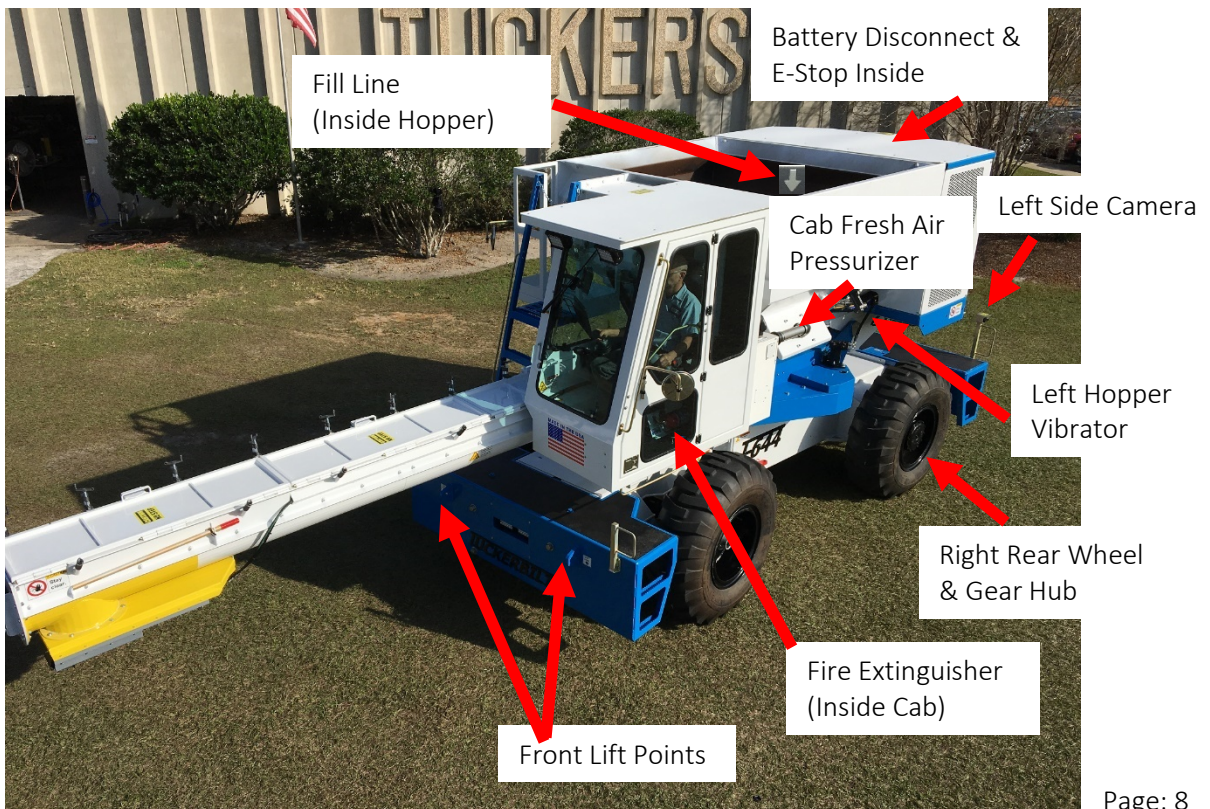
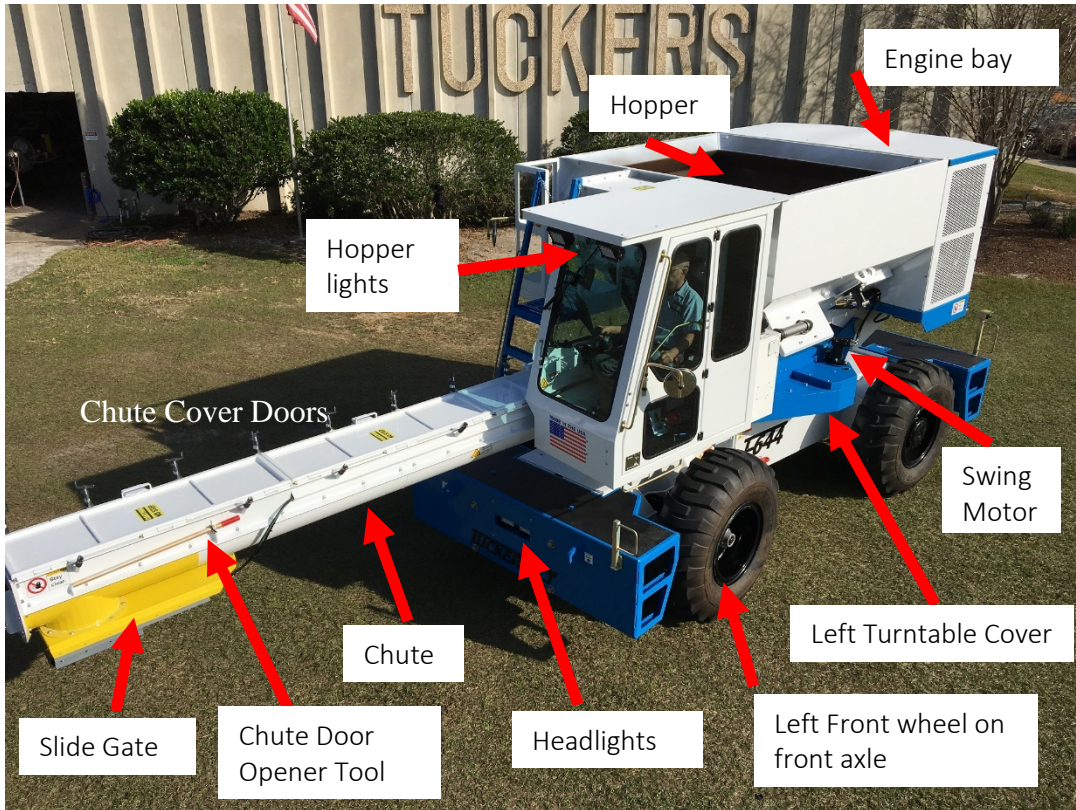
## T-644 Authorized Use and Limitations

- Modifications, changes, or additions to the T-644 must be factory approved.
- The T-644 is not intended for and should never be operated on public roads.
- When pouring concrete using the T-644 it is critical that the machine be on flat, stable ground.
- Moving in a straight path, parallel to the angle of the incline, a loaded T-644 can negotiate a + 6° grade with the hopper level to the frame.
- Do not turn or attempt to maneuver the T-644 unless it is on flat, stable ground.

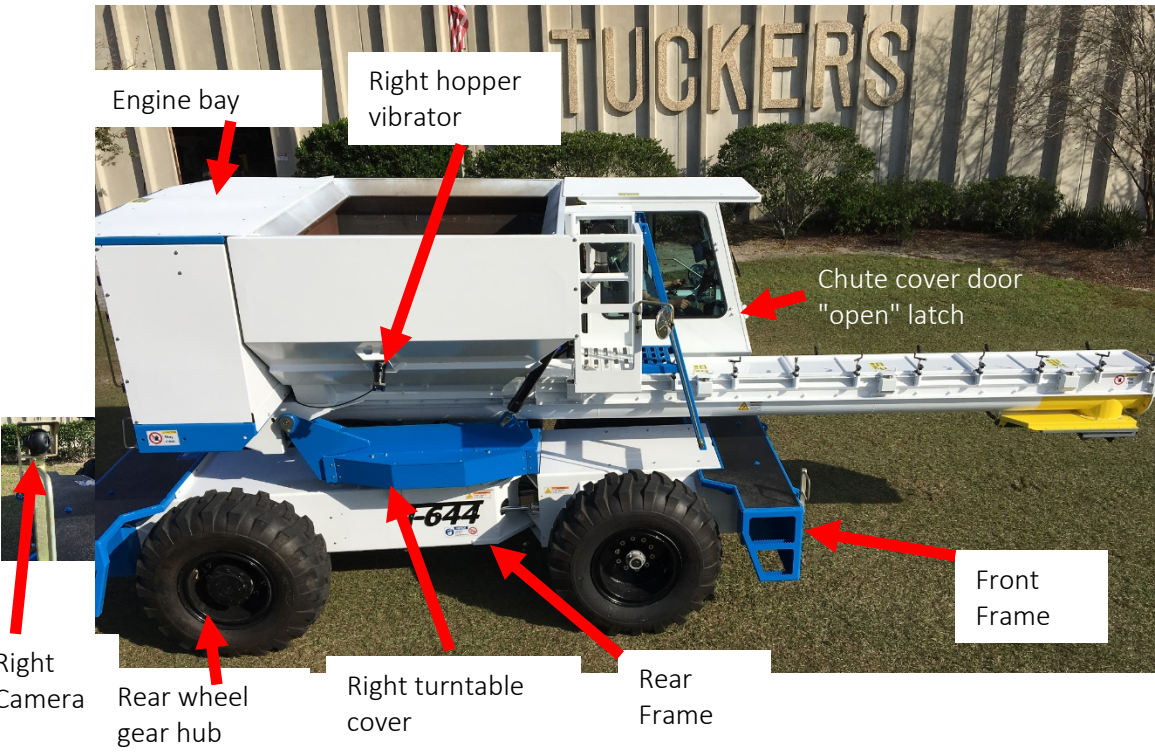
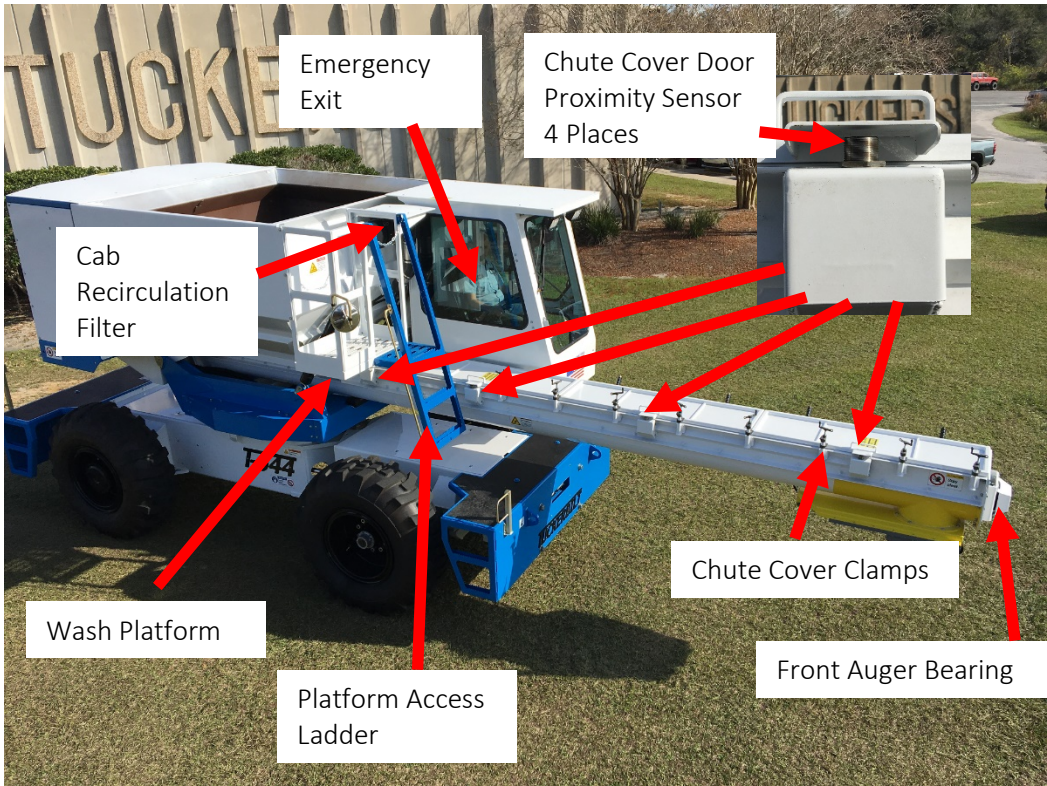
The T-644 Concrete Transporter is designed to collect concrete from a batch plant and discharge it into nearby forms efficiently and safely. That is the T-644's sole purpose and those are the only functions for which the T-644 is authorized to be used. Any use of the T-644 other than transporting concrete between batch plant and forms is an unsafe and unauthorized use of this equipment and may result in injury or death to operators, crewmembers or bystanders and damage the T-644. The manufacturer assumes no liability whatsoever for improper or unauthorized use(s) or operation(s) of the T-644 Concrete Transport Vehicle.

# T-644 Components

## Left Side & Front 1



*Right Side & Front*

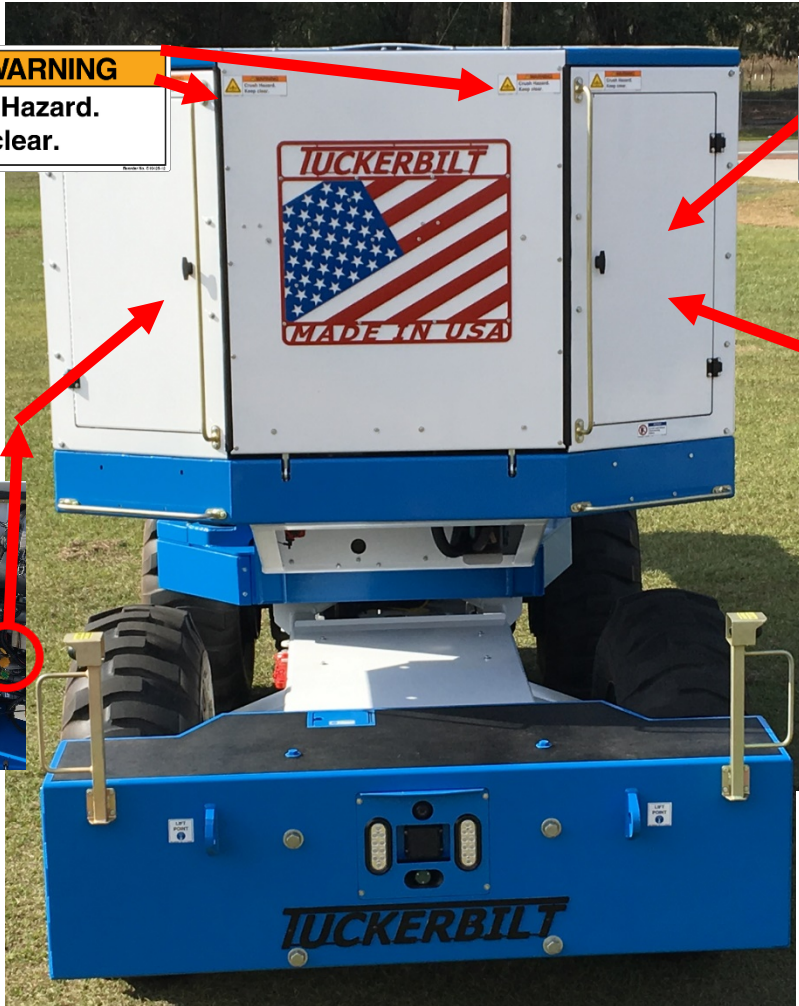


Rear, Access Doors, Battery Disconnect, Oil Dipstick, Main Fuses

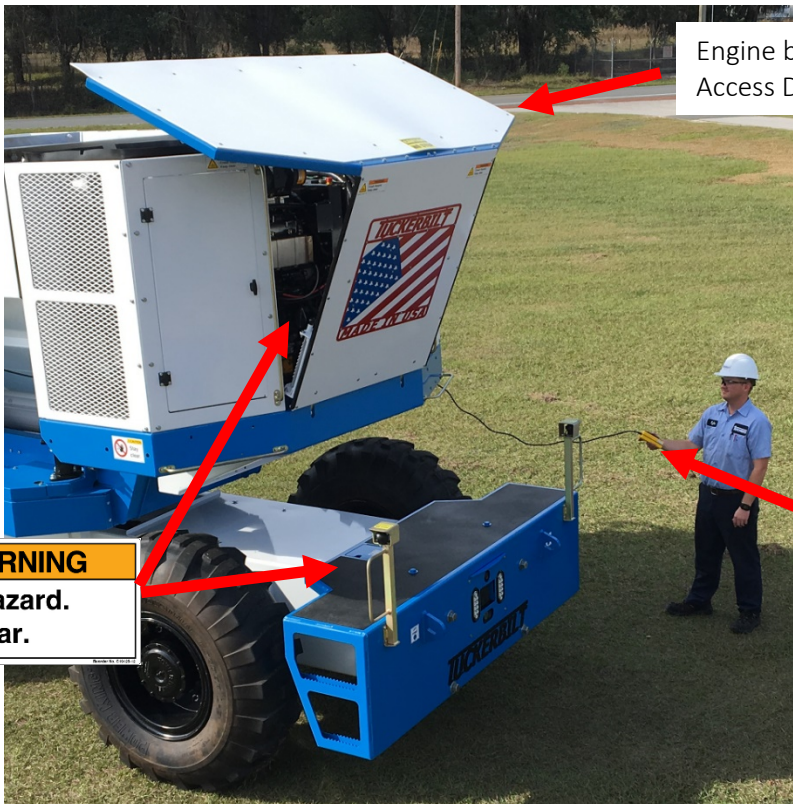
**WARNING**  
Crush Hazard.  
Keep clear.

**NOTICE**  
Do NOT weld without disconnecting battery.

Engine Oil Check behind door



Batteries, Battery Disconnect, Main Fuses and Compartment Door Opener Pendant Access



Engine bay Main Access Door

Compartment Door Opener Pendant Stand Clear!



**WARNING**  
Crush Hazard.  
Keep clear.



## Rear Engine Platform

Engine Service Platform



Service Platform Access Ladder



Always maintain 3 points of contact while accessing the service platform

Rear Engine Platform Safety Straps

1

**DANGER**

Install and lock 4 Service Platform Safety Straps when working on platform



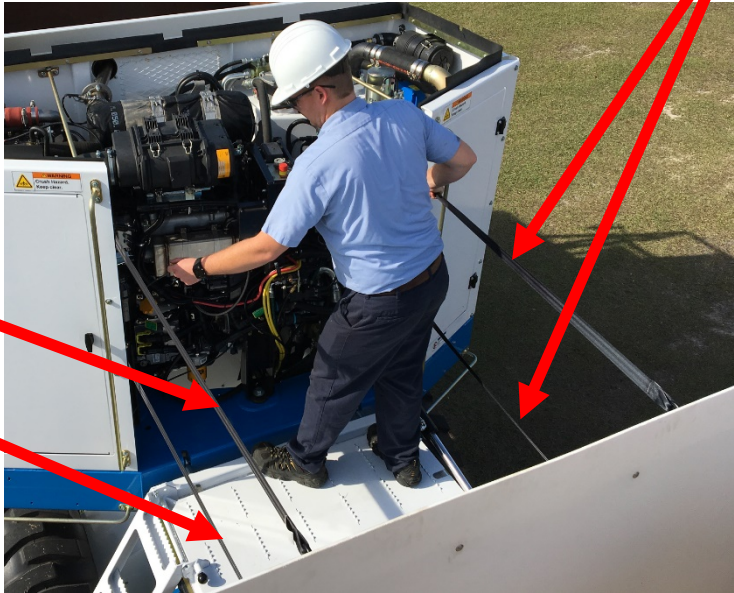
3

4

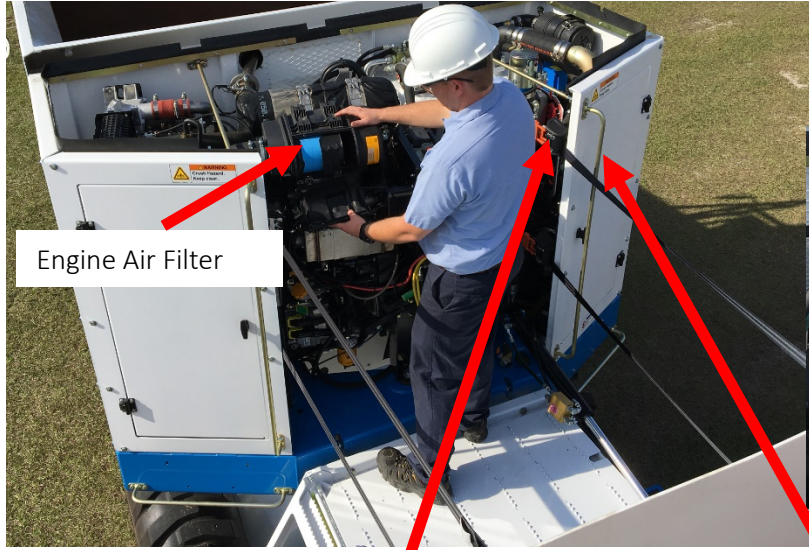
2

Install and lock 4 Service Platform Safety Straps when working on platform

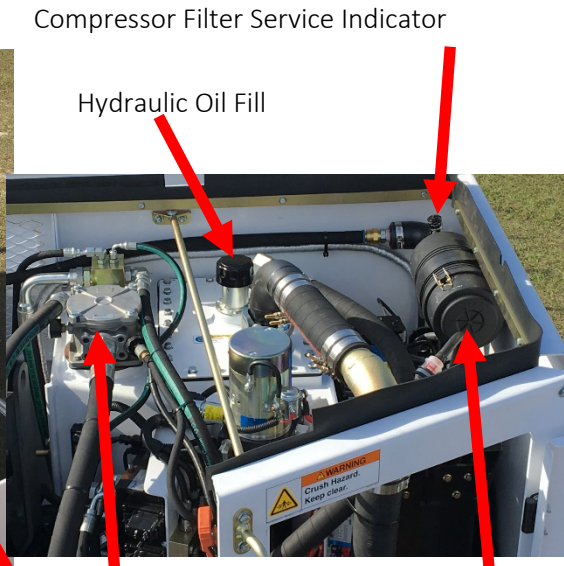
Install and lock 4 Service Platform Safety Straps when working on platform



# Rear Engine Bay Components



Engine Air Filter

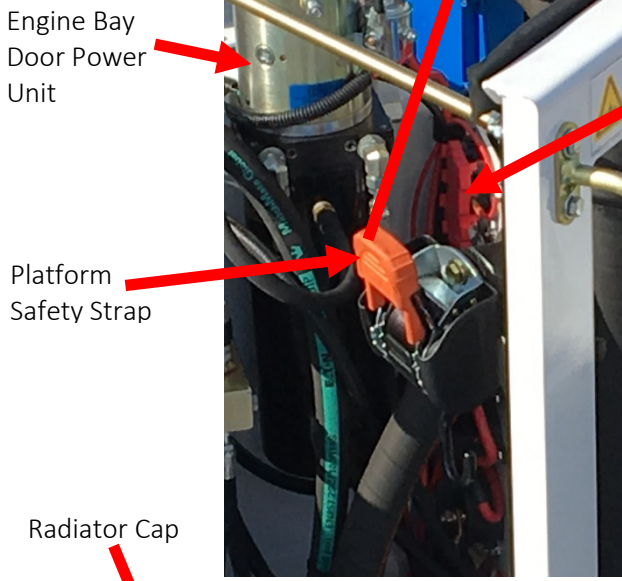


Compressor Filter Service Indicator

Hydraulic Oil Fill

Hydraulic Return Filter

Compressor Air Filter



Engine Bay Door Power Unit

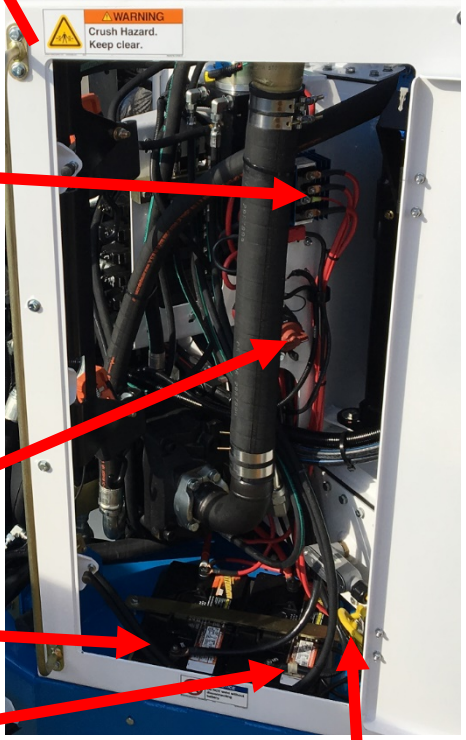
Platform Safety Strap

Radiator Cap

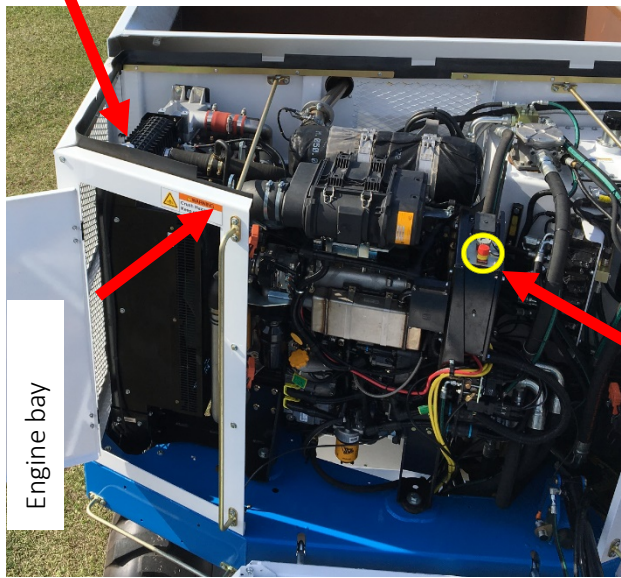
Fuses

Dual Battery Charging Isolator

Battery Disconnect



Battery 1, Main Crank  
Battery 2, Electronics



Engine bay



Electrical Junction Box & Fuses

Engine CAN Port

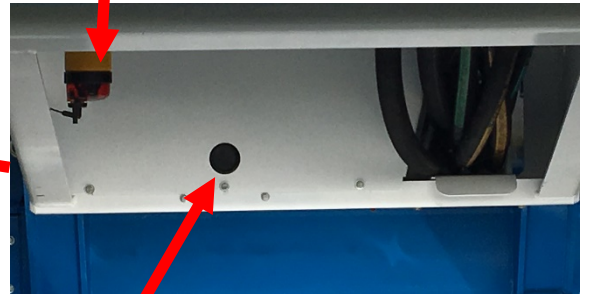
E-Stop

Hydraulic Tank Heater Plug

*Rear, Auger Chain, Back Up Radar, Lights Horn, Cameras*



Fuel Lift Pump w/Water Separator



Auger Chain Drive Access Panel & Chain Tension check port

Left rear camera. Similar on Right



**CAUTION  
NO STEP**

Rear facing camera

Radar Alert Sensor for Backing

Right facing camera

Left facing camera

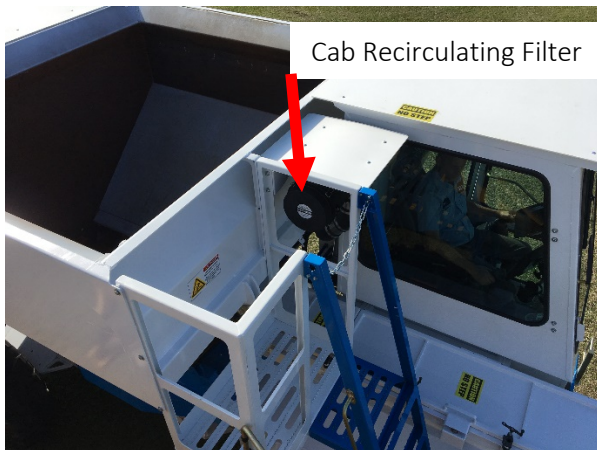
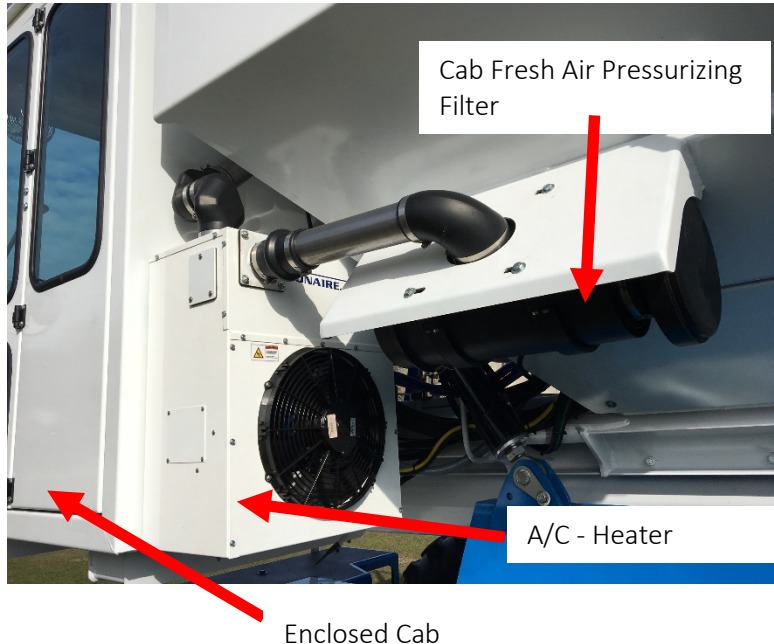
Back up lights

Back up warning horn



## Climate Controlled Cab

The Cab Fresh Air Pressurizing Filter creates positive pressure in the Cab at all times, keeping outside unfiltered air from entering the Cab. The A/C-Heater unit allows temperature control while the Cab Recirculation Filter continually recirculates and filters the Cab air. The Sy-Klone Pressure Monitor System mounted in the Cab will alert the operator if Cab pressure drops too low.



## Safety Guidelines for T-644 Operators

The safety rules and regulations in this section are representative of some, but not all rules and regulations that apply to the T-644. The most effective way of preventing serious injuries or death, to yourself and others is for you to know how to maintain and operate the T-644 properly. Drive carefully and avoid maneuvers or conditions that can cause accidents. Do not operate the T-644 if it needs maintenance, repair or appears to be unsafe in any way. Report all unsafe conditions immediately to your supervisor and contact your authorized Tuckerbilt® dealer. Do not attempt any adjustments or repairs unless you are trained and authorized to do so. All maintenance and repair operations should be undertaken on flat, stable ground.

Continuing improvement and advancement of product design may have caused changes to your T-644, which may not be included in this publication. Whenever a question arises regarding your T-644, or this publication, please consult your Tuckerbilt® dealer for the latest available information.

All T-644 users should be familiar with their local, regional, and national regulations.

### Directional Terms:

The directions “left,” “right,” “front” and “rear” used in this manual are given from the viewpoint of the operator facing forward as he sits in the cab of the T-644.

### Important Warning Symbols

The following safety signs and notices are used in this manual to emphasize important and critical instructions.

- These are the safety alert symbols. They are used to call your attention to potentially serious personal injury hazards. Obey all safety messages that follow these symbols to avoid serious injury or death.

**DANGER**

Indicates an imminently hazardous situation, which, if not avoided, will result in death or serious injury.

**WARNING**

Indicates a potentially hazardous situation, which, if not avoided, could result in death or serious injury.



Indicates a potentially hazardous situation which, if not avoided, may result in minor or moderate injury or damage to your machine.

**Warning: Protect yourself from injury. Use proper safety equipment, including safety glasses, hardhat, and hearing protection when required.**

# Hand Signals

Forward



Reverse



Stop All



Steer Left



Steer Right



Swing Left



Swing Right



Raise Chute



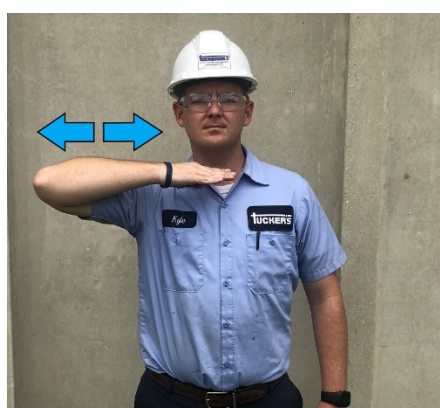
Lower Chute



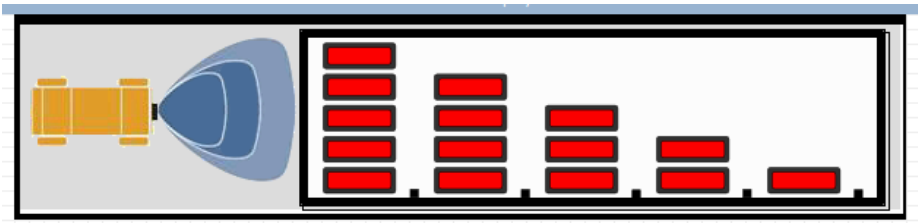
Discharge



Stop Discharge



## Passive Alert System for Backing Safety



Anytime reverse propel is initiated:

- Radar Screen is shown.

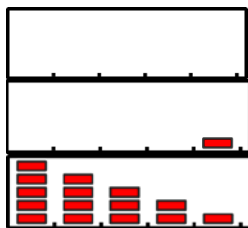
- In Cab beeper starts to sound.

- Back Up beeper at the rear of the machine starts to sound.

If the area behind the machine is clear, only the first bar to the right may show, or maybe none. The In Cab beeper will beep slowly. The Back Up beeper at the rear will not be very loud, but steady.

As the machine backs toward an object, or something approaches the machine, the Bars on the screen will start from right to left, increasing as the gap closes. The In Cab beeper beeps more rapid. The Backup beeper gets louder.

All designed to alert an operator before a collision occurs, or the rear Back Up beeper getting louder to alert the approaching person or machine.



No threats detected.

Someone or something into range.

Maximum caution required. Very close.



## Automatic Seat Safety Circuit

The T-644 is equipped with a seat safety circuit that will activate if the operator leaves the driver's seat for more than 2 seconds.

Activation of the seat safety circuit immediately has the following effects on the T-644:

- Air supply to the operator cab is shut off.
- The parking brake is automatically engaged.
- Propel is immediately disabled, stopping forward or backward machine travel.
- The engine speed reduces to idle (if in Auto Mode)
- All hydraulic functions are disabled, except A/C.

Because activation of the seat safety circuit will automatically engage the parking brake, it must be manually released (pushed in) by the operator when he returns to the seat to resume operating the machine.



While operating the T-644 the operator must keep the seat belt securely fastened across their lap to prevent rising out of the driver's seat and inadvertently activating the seat safety switch. The sudden stop caused by activation of the seat safety switch can cause injury, death or tip-over of the T-644 — especially but not limited to times when the T-644 is carrying a load of concrete.

### *Seat Safety Override*

**DANGER**

In the event of a defective seat switch or wiring issue, an override has been provided to be able to operate the T-644 for 5 minutes. The override requires you to acknowledge the Danger of enabling the override (Safety Warning, page 84) and enter a password (Safety Override Pass Code, page 85) to get to the override screen. Upon selecting the Seat Override, you still must confirm by pressing Yes. For the duration of the override, the following popup screen is displayed and counts down from 300 seconds. When 10 seconds are left, the machine will slow to a stop and idle. At 0 Sec. the brakes will lock, and hydraulic functions are no longer active except A/C.



The 5-minute time can be restarted by going through the entire override procedure again. This is meant as an emergency procedure to allow emptying the hopper and/or return to maintenance to fix the issue.

## Chute Cover Door Proximity Sensors



Chute doors must remain closed for the Auger to turn. The Chute Cover Door Proximity Sensors will stop Auger rotation if a door is opened. Keep their surface clean and avoid impact for maximum sensor life. 3/8" gap is standard.

### *Chute Cover Door Proximity Sensor Override*

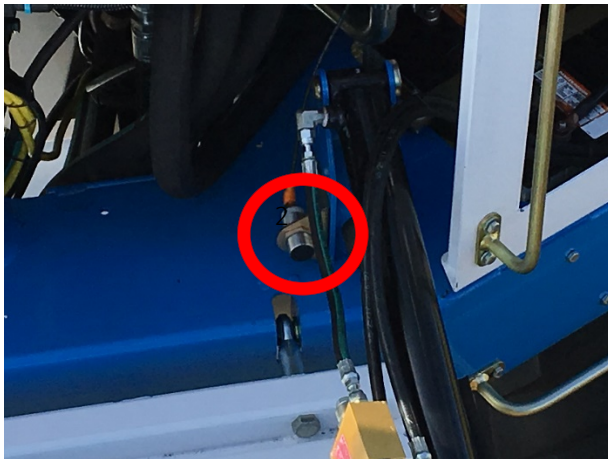
**DANGER**

In the event of a defective proximity sensor or wiring issue, an override has been provided to be able to operate the Auger for 2 minutes. The override requires you to acknowledge the Danger of enabling the override (Safety Warning, page 84) and enter a password (Safety Override Pass Code, page 85) to get to the override screen. Upon selecting the Auger Override, you still must confirm by pressing Yes. For the duration of the override, the following popup screen is displayed and counts down from 120 seconds.



The 2-minute time can be restarted by going through the entire override procedure again. This is meant as an emergency procedure to allow emptying the hopper and/or return to maintenance to fix the issue.

## Engine Compartment Proximity Sensor



This sensor only alerts you the engine compartment door is open, or maybe not fully closed. The additional swing radius when the door is open can cause severe damage to the engine door. Be alert if needing to move the unit when this door is open.

## Maintenance and Inspections

A well-maintained machine is a safer machine. The key to maintaining your T-644 properly is to follow the instructions in this manual faithfully, completely and at the proper intervals. Do not operate the T-644 until you know it is safe to do so and all inspections and maintenance requirements have been fulfilled. Do not permit unauthorized or unqualified personnel to operate, service or maintain this machine. Always operate and perform any maintenance of the machine on a level surface.

### Prior to any Service or Maintenance:

Shut engine off, remove ignition keys and take the keys with you before dismounting.

Place Keys in Pocket

Keep keys with you so that no one else can start machine while you are servicing or inspecting it.

Never leave keys in an unoccupied cab.

Lock the Articulate Safety Lock Bar (Figure 1.)

#### WARNING

- **Unintended movement of the machine** or any component system of the T-644 may cause injury to the technician or bystanders. To protect against unintended movement, secure the machine and disable the specific component while you are servicing it.
- **Some cleaning solvents are flammable.** To avoid possible fire, do not use cleaning solvents in an area where a source of ignition may be present.
- **Fluid under pressure.** Relieve pressure in the hydraulic system before removing hoses, fittings, gauges, or components



Figure 1

**Escaping hydraulic fluid under pressure can have sufficient force to penetrate your skin causing serious injury and/or infection. This fluid may also be hot enough to cause burns. Use caution when dealing with hydraulic fluid under pressure. Never use your hand or any other body part to check for leaks in a pressurized line. Seek medical attention immediately if you are cut by hydraulic fluid.**

## Inspect Daily:

1. Oil, fuel or coolant leaks (see **Fluid under pressure** warning on page 21.)
2. Batteries
3. Head lights and work lights
4. Back up alarm operation
5. Back up lights
6. Clean and inspect all 3 cameras.
7. Brake pedal & service brakes
8. Parking brake
9. Inspect Joysticks
10. Seat belt
11. Seat adjustment
12. Horn

## Daily Service:

1. Grease all fittings. See pages 25-27 for locations.
2. Grease turntable on left side. The turntable cover was removed in the picture on the left for clarity only. All fittings can be reached without removing the cover. The 2 fittings on the channel above the cover (right picture) grease the turntable itself.



- a. Check chain tension on turntable swing motor by removing inspection plug.  $\frac{1}{4}$ "-  $\frac{1}{2}$ " of play is acceptable. If necessary to adjust, remove cover and loosen swing motor bolts. Adjust with tensioning bolt indicated in photo. (Figure 2.) Re-tighten motor and replace cover and inspection plug.

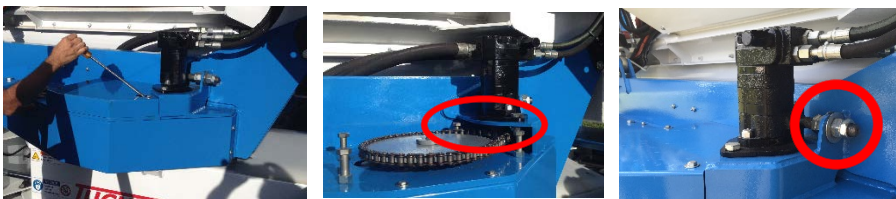


Figure 2

- b. Check auger drive chain tension. (Figure 3) Up to 1/2" of play is acceptable. If it is necessary to adjust the chain tension, loosen 2 auger motor bolts. Then adjust the nuts on the outside or inside of the auger chain box as necessary, lock all 4 nuts tight. Re-tighten the 2 auger motor bolts.



Auger Chain Adjustment

Figure 3

- c. Check turntable main chain tension. There should be no play. Adjust chain tension if necessary using a wrench on turnbuckle fitting shown in photo. (Figure 4.)



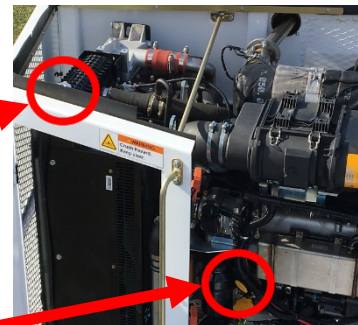
Figure 4

- 3. Check Air Compressor air breather indicator. Replace filter if required.



- 4. **With engine cold**, check engine water level and top off if necessary. Do not open radiator cap when engine is hot or warm. Severe injury may occur.

Radiator Cap



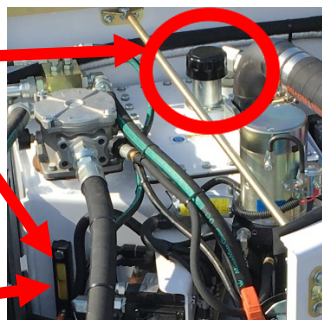
- 5. Check engine oil level and top off if necessary. Check engine manual provided separately for oil specifications.

Engine Oil Dipstick

- 6. Check hydraulic level

Add Hydraulic Oil only to top of Glass

Check Hydraulic Level in Sight Glass



See Appendix: Hydraulic Oil Specifications: page 106 for Hydraulic Oil information.

7. Check oil level in front axle on left and right sides and add gear lube if necessary.



Level Lines Visible  
85W-140 Gear Lube

8. Fuel the T-644 with Ultra-Low Sulfur Diesel Only.



9. Check tire pressure to confirm it is 65 PSI (4.48 Bars). You may skip this if your T-644 is equipped with urethane-filled tires.

10. Check all wheel nuts and rims, front and back, left and right to ensure all hardware is in place and appears tight.

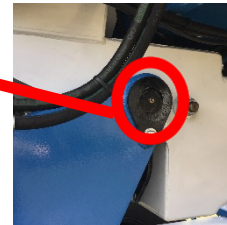


11. Drain air tank.



Air Dryer

# Grease Fittings



1 fitting



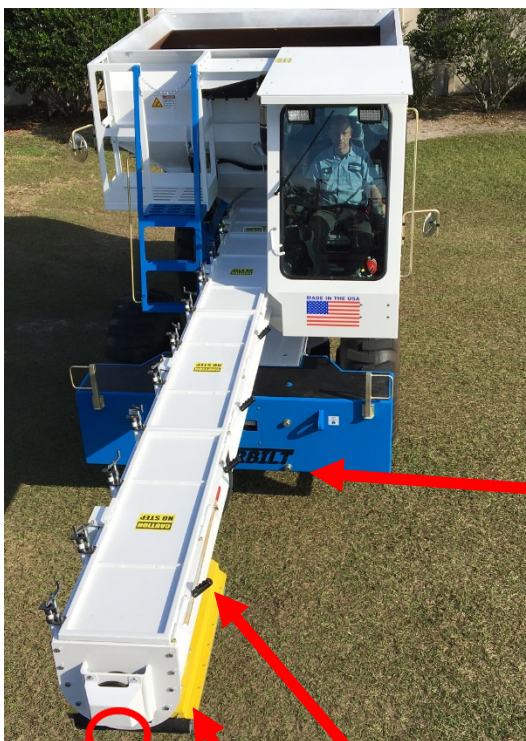
2 fittings



2 fittings



6 fittings

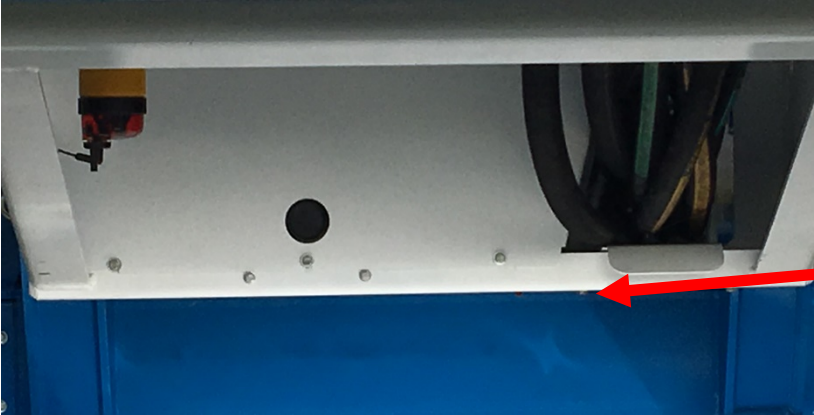


6 fittings  
Front Axle

1 fitting

2 fittings  
On Slide Gate

Rear & Right Side



1 fitting



1 Fitting





*Engine Bay*



2 Fittings  
Engine bay  
Door Cylinder



## Operations:

As noted in Maintenance and Inspections (page 21), always inspect your T-644 prior to operation. Do not operate an unsafe T-644. At the beginning of each shift thoroughly inspect the T-644 and then accurately fill out a daily inspection sheet. A blank copy of a suggested daily maintenance sheet is included at the back of this manual. Check for maintenance problems and have necessary repairs made before you start or operate the T-644.

When entering the cab, always use the 3-point rule: two hands and one foot or both feet and one hand always in contact with the machine. (Figure 5.)



Figure 5

**When in the cab always wear your seat belt.** Make sure it is in good working order. Keep your seat belt on and snugly fastened at all times when sitting in the driver's seat and operating the T-644.



*The T-644 is equipped with a pressure sensitive “seat safety circuit” under the driver’s seat that senses if an operator is properly seated at the controls. When operating the T-644 it is critical that you remain seated and securely belted into place for your safety and to prevent accidental engagement of the seat safety switch. Leaving the seat while the T-644 is in operation will cause a sudden and dangerous automatic engagement of the brakes and the loss of power to all controls.*

## Layout of Cab and Identification of Controls:

Familiarize yourself with the operator area and all controls. Be sure you understand the function of each before starting the T-644. Do not start or operate the T-644 unless you are trained and authorized to do so.

Visually inspect the following items:

- Parking brake – Pull to engage when parking or exiting machine. Push in to unlock park brake for normal travel. (See warning in Automatic Seat Safety Circuit, Page: 19 to avoid automatic brake activation.)
- Air gauge
- Key switch
- A/C Switch

Backup buzzer/warning indicator (see section on Passive Alert System for Backing Safety, page 18)

- Camera Monitor with 3 views
- Danfoss DP720 Monitor
- Confirm Joysticks are in good condition and good working order.
  - Make sure both Joysticks move forward, backward, left, and right easily and all directions return to center.
  - Confirm their rollers move free and snap to center.
  - Confirm the Joystick front triggers pull in easily and snap back out.
  - Confirm all buttons intact and snap out when pushed in.

**DANGER**






**DO NOT OPERATE THE T-644 IF THERE IS ANY MAINTENANCE REQUIRED WITH EITHER JOYSTICK. SEVERE INJURY, DEATH OR PROPERTY DAMAGE COULD OCCUR.**

You don't have to learn all the following pages on the DP720 controller. You should look through them to know where to look back when you need the information.

## Danfoss DP720 Monitor



The DP720 Monitor is the communications interface between the operator and the CAN Bus system used to control machine operations. From Key On until Key Off the DP720 is a constant source of information.




-  Is used to select the option just to the right or left of this symbol. Optionally the Screen is a Touch Screen and selections may be made on the screen itself.
-  Once into the different screens, the X is used to back up one menu at a time, or press and hold the X to quickly return to the DP720 Main Menu, page 37.
-  Used to accept the option directly above it. Most often it is a Check Box:  If not a check box, press and hold from most screens to return to Main Run.
-  Use a quarter or large screwdriver to remove the plug. A USB drive can be inserted to save current Maintenance Logs and Configurations.


The following pages describe the screens available.

## Logo



Software versions for each controller are displayed here.

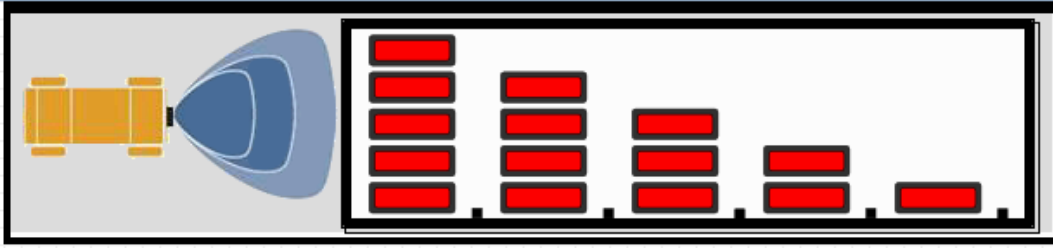
 This symbol is only shown in the manual. In actual use, there should only be  marks when all is well.  will indicate an issue. Throughout the manual, you may see overlapping indicators such as this. One or the other will show during operation.

In this manual most buttons will appear Green.  During usage, most will be Gray:



until actually pushed. Once depressed, the button goes Green. Some are latched (stay depressed until pushed again) and some are momentary (only Green while being held) as appropriate for the task.

## Radar



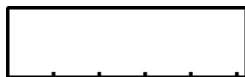
Anytime reverse propel is initiated:

- Radar Screen is shown on the DP720.
- In Cab beeper starts to sound.
- Back Up beeper at the rear of the machine starts to sound.

If the area behind the machine is clear, only the first bar to the right may show, or maybe none. The In Cab beeper will beep slowly. The Back Up beeper at the rear will not be very loud, but steady.

As the machine backs toward an object, or something approaches the machine, the Bars on the screen will start from right to left, increasing as the gap closes. The In Cab beeper beeps more rapid. The Backup beeper gets louder.

All designed to alert an operator before a collision occurs, or the rear Back Up beeper getting louder to alert the approaching person or machine.



No threats detected.

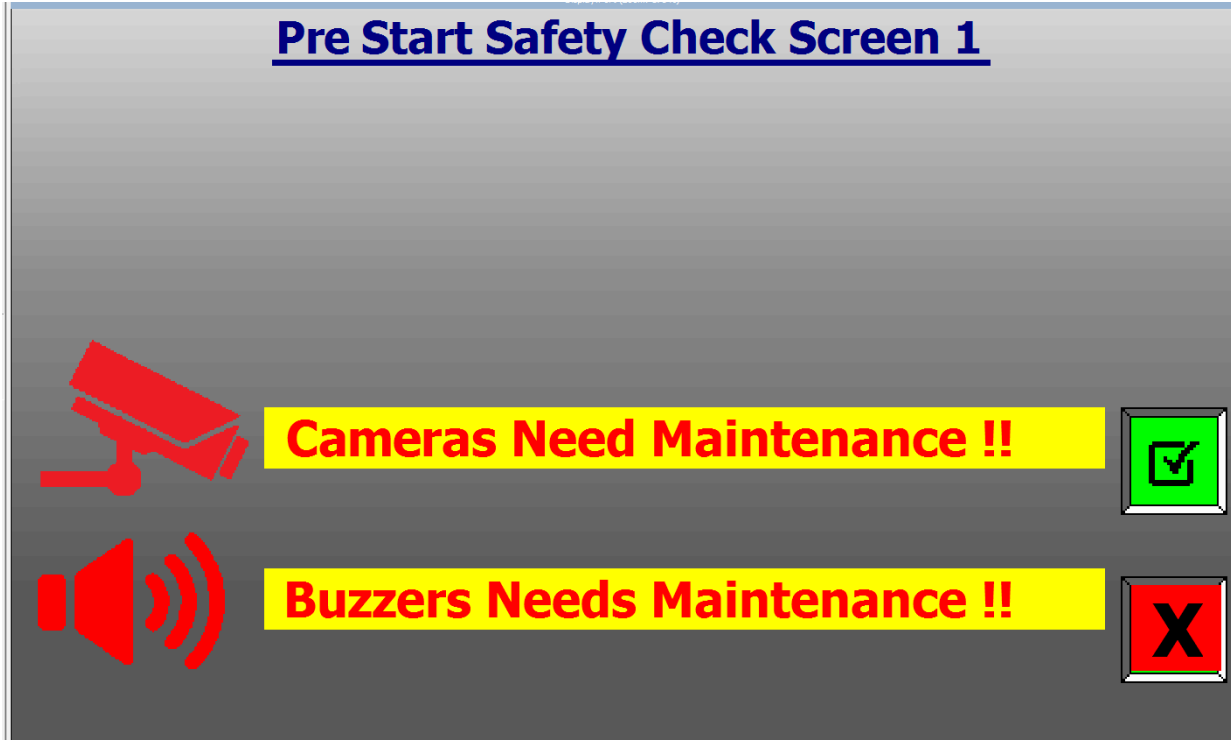


Someone or something into range.



Maximum caution required. Very close.

## Pre Start Safety Checks 1



You will be asked two questions on this screen. Are the Cameras working is the first question.

Reference large monitor with 3 camera view. The upper left of that screen should show the left side of the machine. The upper right should show the right side of the machine. The lower half should show behind the machine.




To confirm all are working.



To indicate camera maintenance is required.

Then the Buzzer question: Is your In Cab beeper working as well as the Back Up beeper at the rear of the machine?

Pressing the  to either question will bring up:

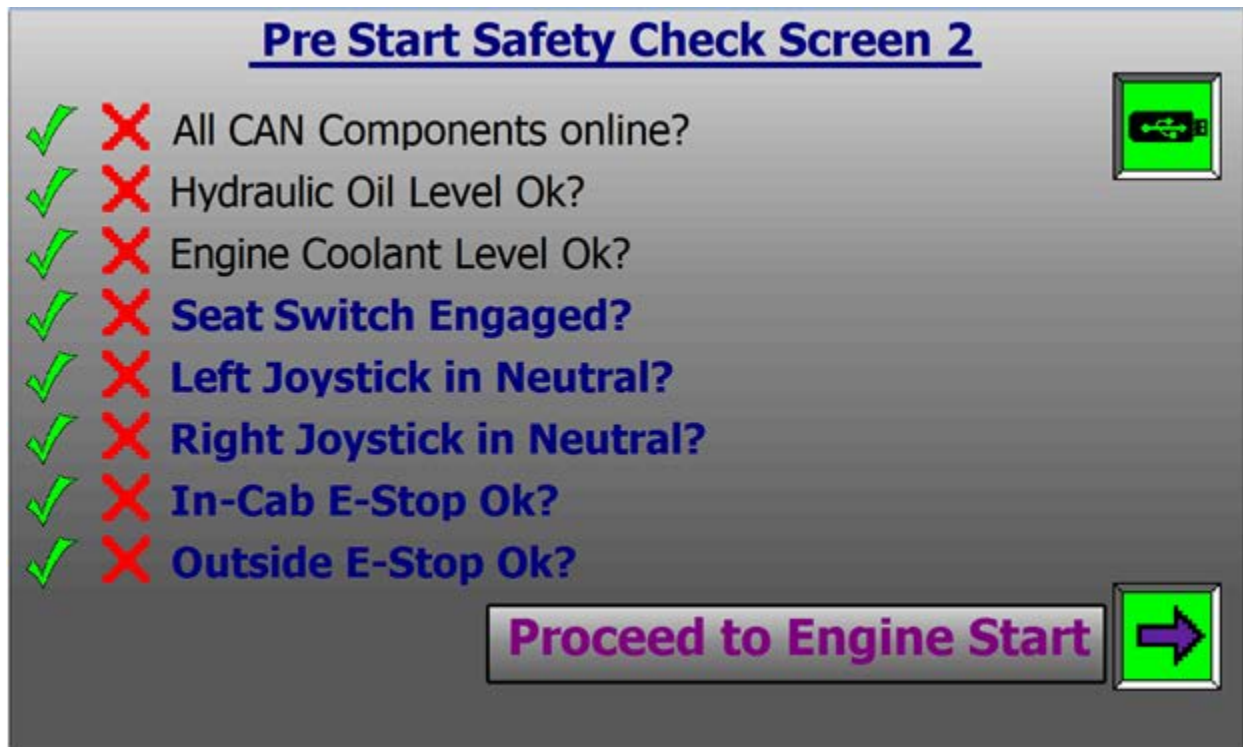
**Cameras Need Maintenance !!**

or


**Buzzers Needs Maintenance !!**

Either way you will proceed.

## Pre Start Safety Checks 2

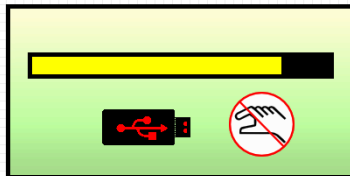


Confirms all components online and ready for machine Start. If all is Ok, only the green checks will be displayed.

If any  appear, the situation should be corrected before proceeding.



On screens with this Icon, a USB drive may be inserted in the DP720 to export a log of the safety checks.



will display during an export to USB. Do not remove until finished.




To Proceed to Engine Start screen.




## Engine Start


**Engine Start**

Battery Power Cycles	0
Engine Power Cycles	0
Engine Hours	0
Peak Volts	0.0
Low Volts	0.0

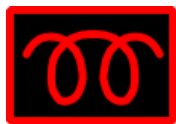


- + 0.0

 **Wait to Start**

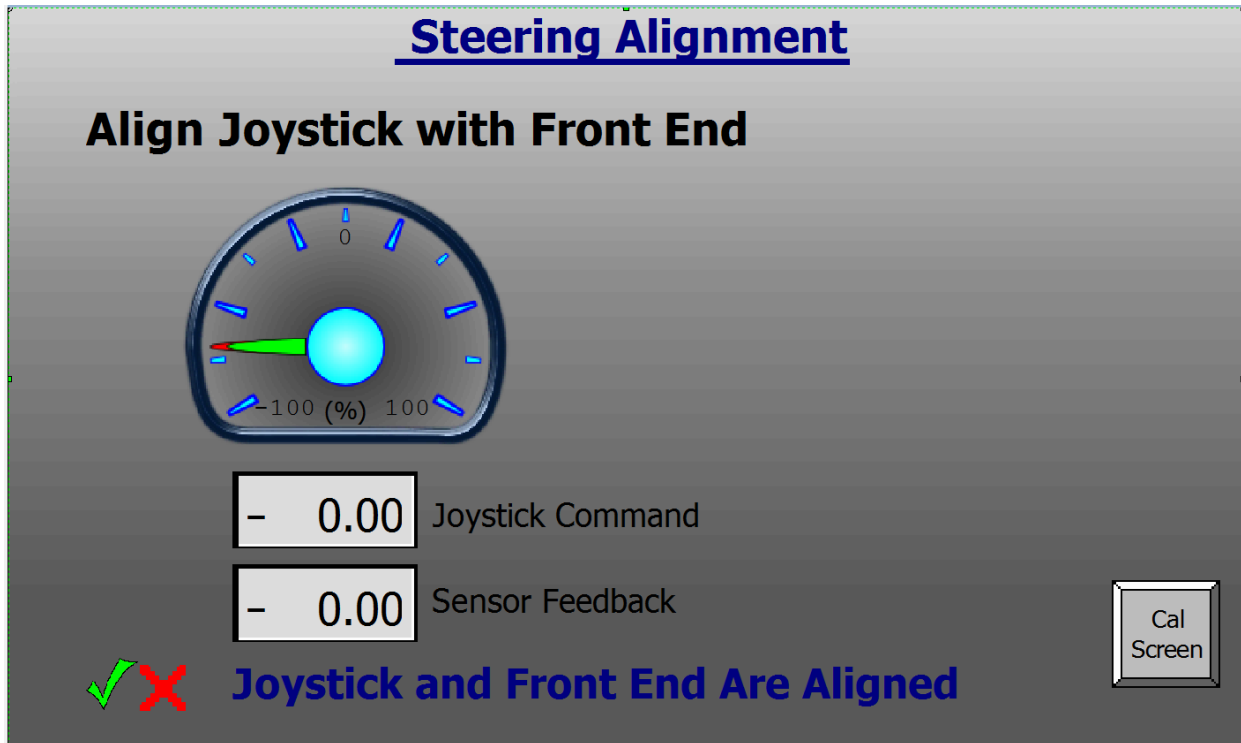
**Engage Starter** 

From this screen you touch  to Start the Engine.



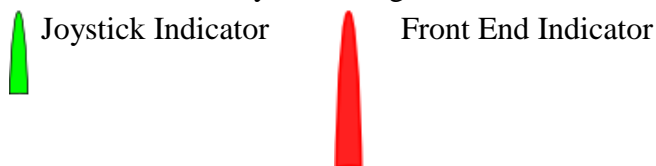
If the Gird Heater symbol is red, and **Wait to Start** is displayed, Engine Pre-heating is required. Wait until it goes back to gray before starting.

## Steering Alignment



This is the next screen after the engine starts. It is to confirm the Front End and Joystick are aligned. If they are in alignment, only the green check will be displayed, and the screen will move on to Main Run.

If they are not in alignment, the red X will be displayed. Pull an operator present trigger on either Joystick. Move the Left Joystick until the Joystick indicator aligns with the front-end indicator. Once they are in alignment, this screen will go away, and Main Run will be displayed.



*No hydraulic functions are available except A/C until the Front End and Left Joystick are in alignment.*

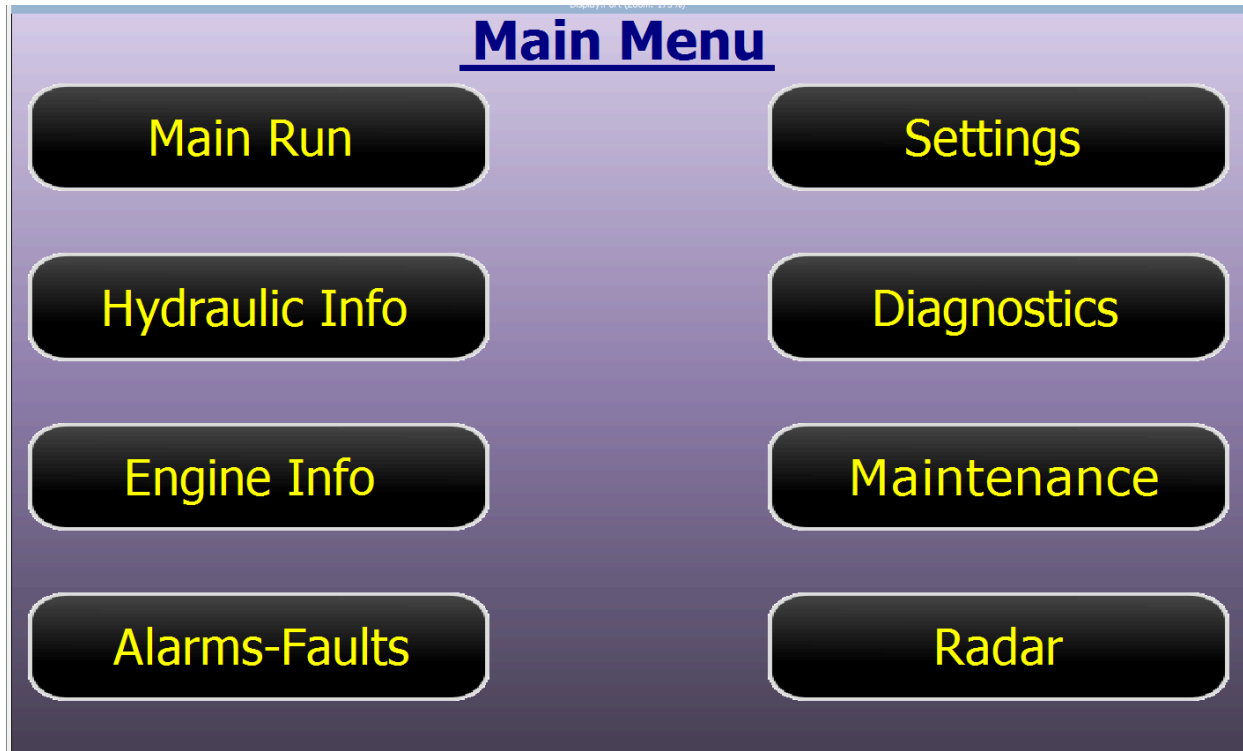


Quick Jump to Steering Calibration Screen.

How does misalignment occur?

Anytime the front end is not straight, and the operator present triggers are released and the Left Joystick is moved from the aligned position, i.e.: Shutting down while the front end is either left or right of center.

## DP720 Main Menu



**Main Run:** Main run is the screen that comes up after a successful start and front-end alignment. It will be the most used screen.

**Hydraulic Info:** Information on hydraulic pressures, temperature, and level

**Engine Info:** Engine information, temperatures, pressures, and conditions.

**Alarms-Faults:** Information and descriptions when an Alarm or Fault occurs.

**Settings:**

- Settings - Preset is Creep and Auger Presets. 4 different Presets can be established for Creep and Auger. Return to Presets, page 61 for quick selection of desired Preset.
- Settings - Display Settings, page 62 allows setting Time and 12/24 Hour format. Set Date, Back Light adjustment, and SAE (US Standard) or Metric format.
- Settings - Steering Calibration, page 64 for Steering Calibration adjustments.

**Diagnostics Menu Select:** CAN Bus, Right JS, Left JS, MC24 in Cab, MC50 Engine Bay, MC50 Lower Frame, PVED Coils, and Icons.

**Maintenance:** Maintenance Pass Code page which takes you to the Maintenance logs. Use this when the service tool light comes on while in the Main Run screen or when major Maintenance has been performed.

**Radar:** Test the Radar is working properly.

## Pop-Up Messages

### Engine Cover Open



Indicates the engine cover is open. It does not stop operation, but caution should be used as the swing radius of the rear grows rapidly the more the door is open. It is very easy to swing the rear into someone or something.

### Release Park Brake.



This message will flash and give 3 short beeps when forward or backward travel is initiated the first time after engine start.

### Low Water Level



A loose or blown radiator hose or heater hose can cause water loss fast enough to damage the engine. Only override this alarm if you have checked for leaky equipment.

## Open Slide Gate Before Engaging Auger

*If you have the Slide Gate option, and try to run the Auger you may see the following message. If you do, with an Operator Present Trigger pulled, roll the Slide Gate Roller down for at least 3 seconds to open the Slide Gate. (Figure 6) The Auger will now be able to run.*

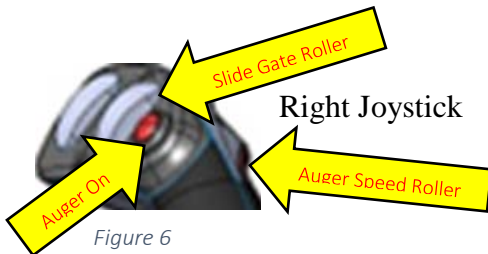
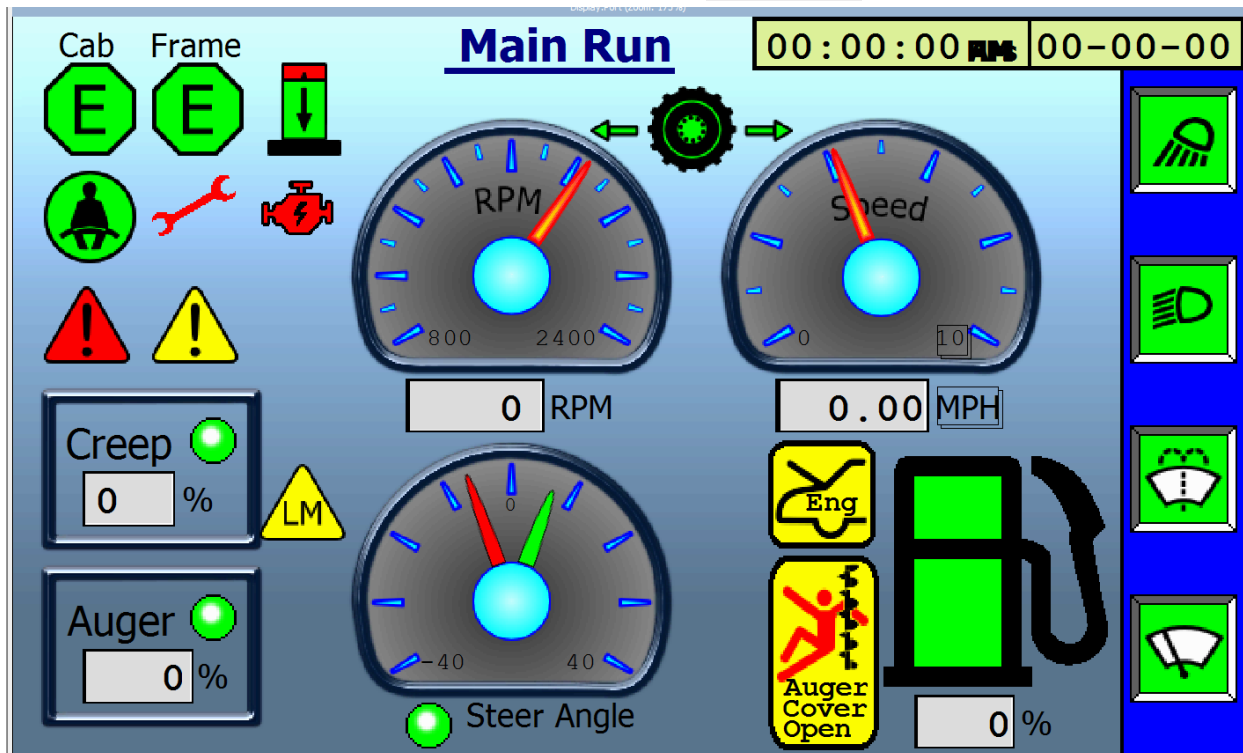



Figure 6


# Main Run – page 1


Automatically after normal start or from Main Menu -


Main Run





 Cab and Frame “E”: Green indicates Cab and Engine Compartment E-Stops are ready to run.

 Elevator Icon: If Elevator option is on the machine, this indicates it is fully down.

 Seated Icon: Indicates operator is in seat. If this Icon turns Red, the operator is out of the seat, or there is an issue with the wiring. Touching the Red Seat Icon will take you to the Safety Warning (page 84) screen where you may start the "Override the Seat Safety Circuit" for 5 minutes emergency override.

 Wrench Icons Is Green when all maintenance tasks are up to date. When the hours have timed out for a scheduled Maintenance, the Wrench will illuminate Red. Touch the icon to go to the Read Only Maintenance Schedule for review to notify maintenance.

 Engine Icon is Green when all systems are normal. If the Icon turns Red, touch it to go to the Engine Info 2 screen, page 50.

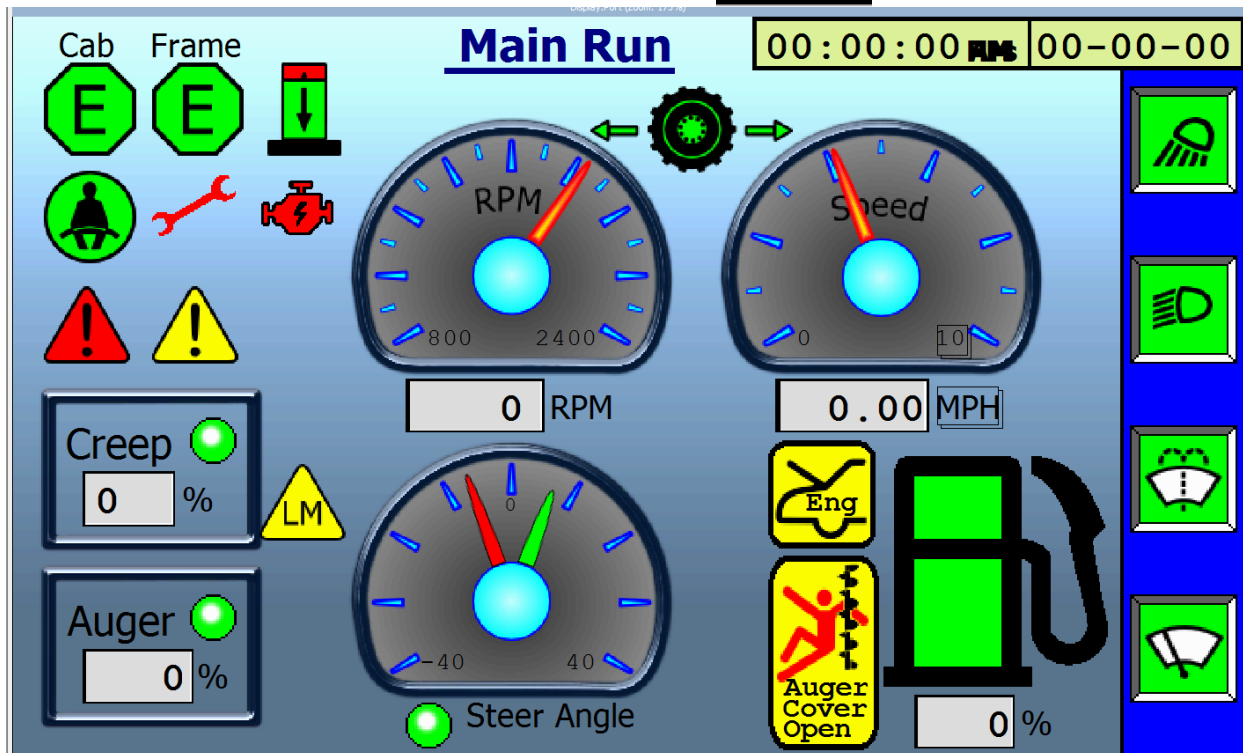
 Red & yellow triangles flash when a Fault (Red) or Alarm (Yellow) occurs. Touch a flashing Icon to go to the appropriate Fault or Alarm screen.

Creep: The current creep % is shown. If the circle is Green, Creep is the Current speed selection. When dark, normal drive speed is active. Touch the Creep square to quickly go to the Presets page and select a different setting.

## Main Run – page 2

Automatically after normal start or from Main Menu -


Main Run

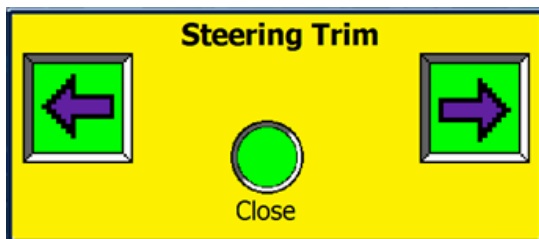


**Load Mode.** When this Icon is displayed, *Load Mode* is active. Use *Load Mode* when loading on a trailer. See full definition on page 46.

**Auger:** The current auger % is shown. Positive % is Forward. Negative % is Reverse. The circle is Green when the Auger is engaged. Touch the Creep square to quickly go to the Presets page and select a different setting.

RPM dial and Speed dial along with digital readout.

**Steer Angle dial:** Shows the relationship between the Left Joystick and the Front End. When properly aligned, the Dot is illuminated Green. The Drive Enabled  icon must be visible for propel. Touching the Steer Angle dial will display the Steering Trim popup.

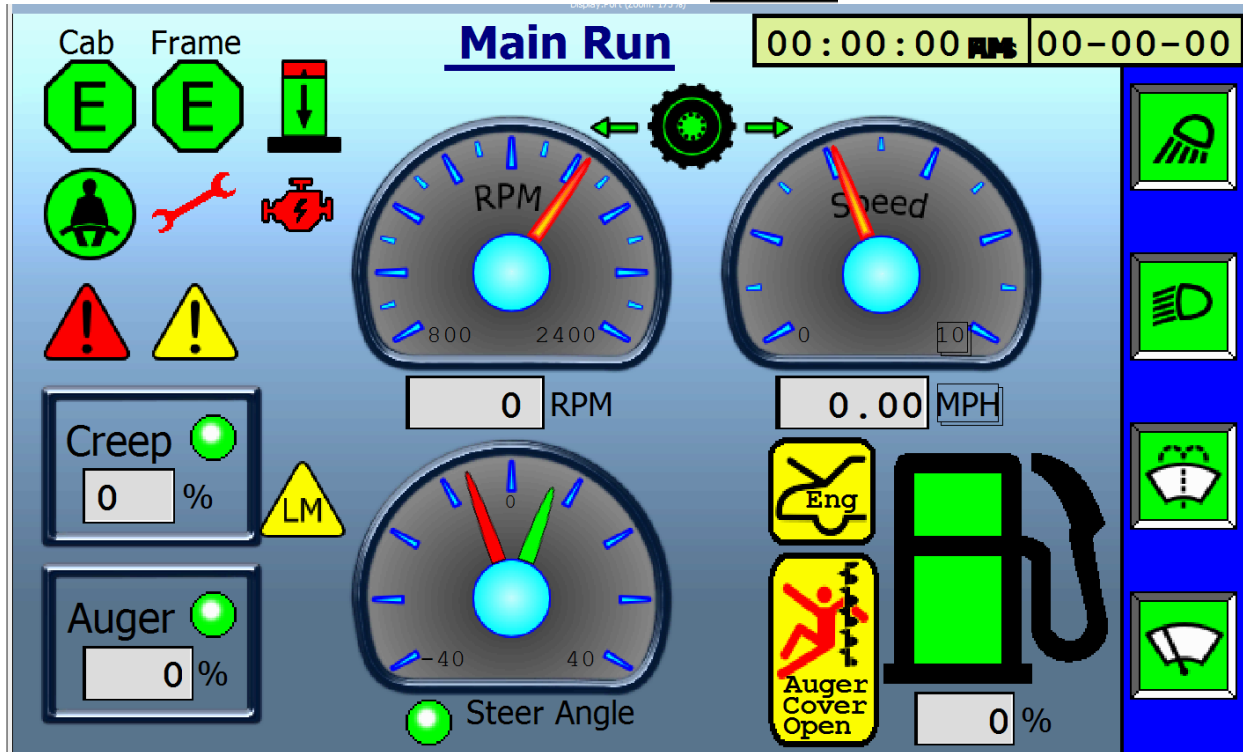


This should be done while traveling straight. Use the

Left or Right Arrow to "Trim" the front end to "True" straight. Then press Close.

# Main Run – page 3

Automatically after normal start or from Main Menu - **Main Run**



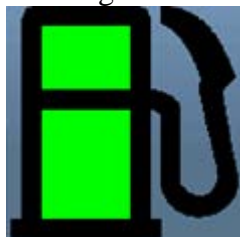
Speed dial displays current travel speed.



When the Engine Cover Open Icon is displayed, the engine cover is open or not fully closed.



When the Auger Cover Open Icon is displayed, one of the Auger Cover Doors is open. Pressing the Icon will display Alarms, page 53 so you can tell which door is open.

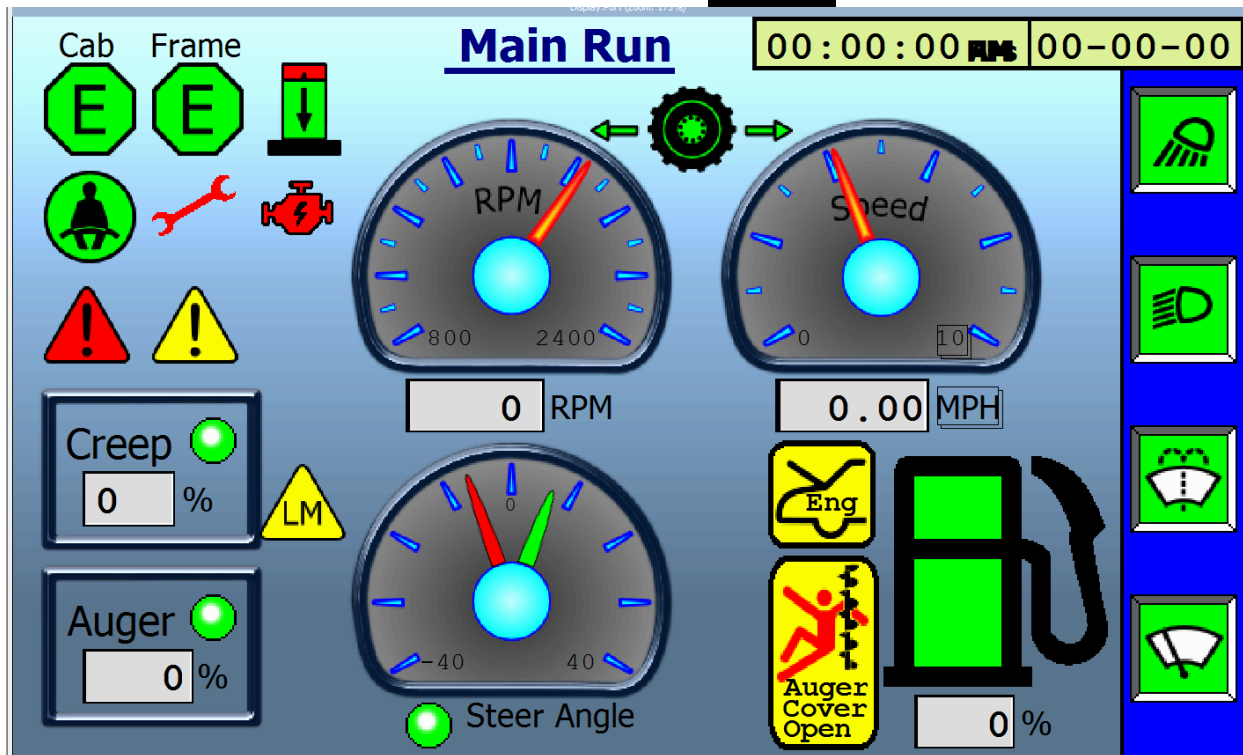


Fuel Level. All Green is Full.



# Main Run – page 4

Automatically after normal start or from Main Menu - **Main Run**



**00:00:00 RPM 00-00-00** Displays the Time and Date. Pressing the Time/Date bar on this screen will take you to Display Settings page 62 to set or adjust Time and Date.



Upper Cab Work Lights



Head Lights



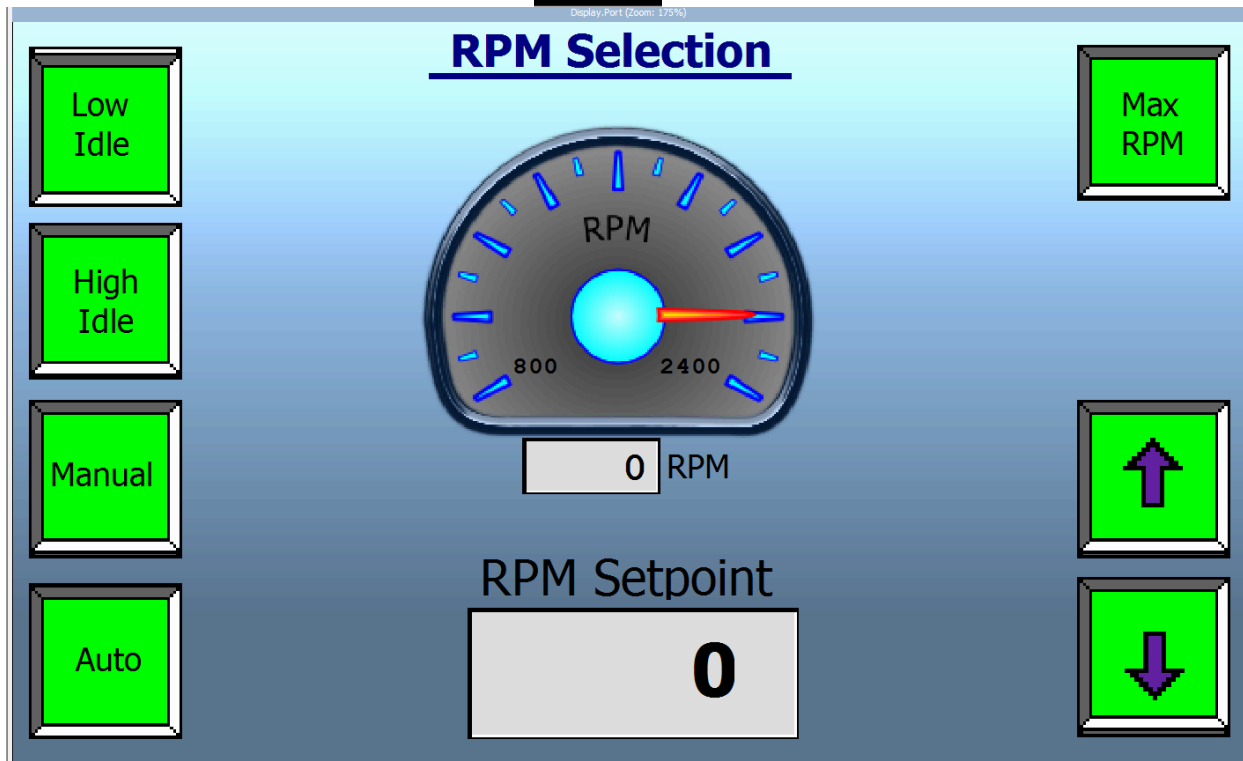
Windshield Wiper



Windshield Washer. Washer will flow as long as depressed. The Windshield Wiper will come on for about 3 seconds.

## RPM Selection

▶ from Main Run. From Main Menu - **Main Run** , ▶



Low Idle: Sets Engine Speed to lowest Idle speed.

High Idle: Sets Engine to High Idle, approximately 1500 rpm.

Manual: Manually adjust the Engine Speed from lowest setting up to 2200 RPM.



used while in Manual Mode to adjust engine speed.

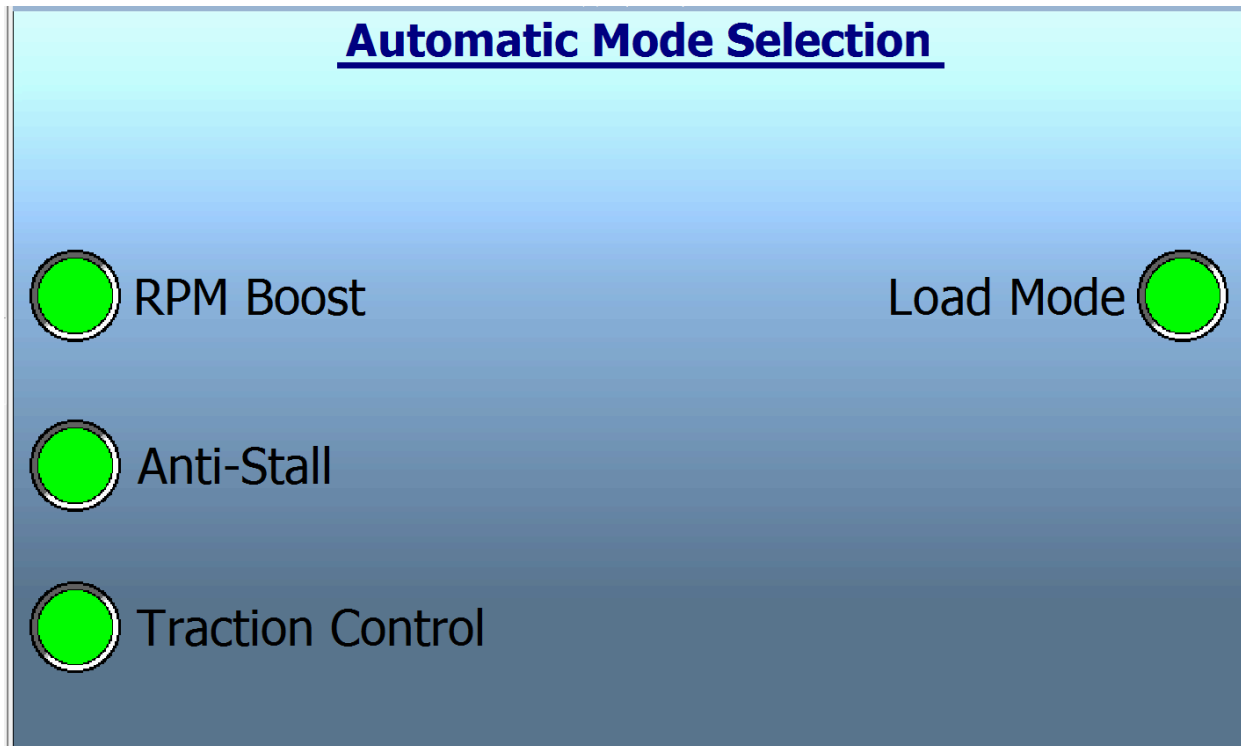
Auto: Engine speed is automatically adjusted based on work requirements.

RPM gauge displays current engine speed.

Max RPM: Sets Engine to 2200 RPM.

## Automatic Mode Selection

▶ from RPM Selection. From Main Menu - **Main Run**, ▶, ▶



**RPM Boost:** When RPM Boost is On (Button is Green), if % Load on the engine gets too high, and engine RPM is not at Max RPM, RPM's will be increased up to Max RPM attempting to reduce engine % load.

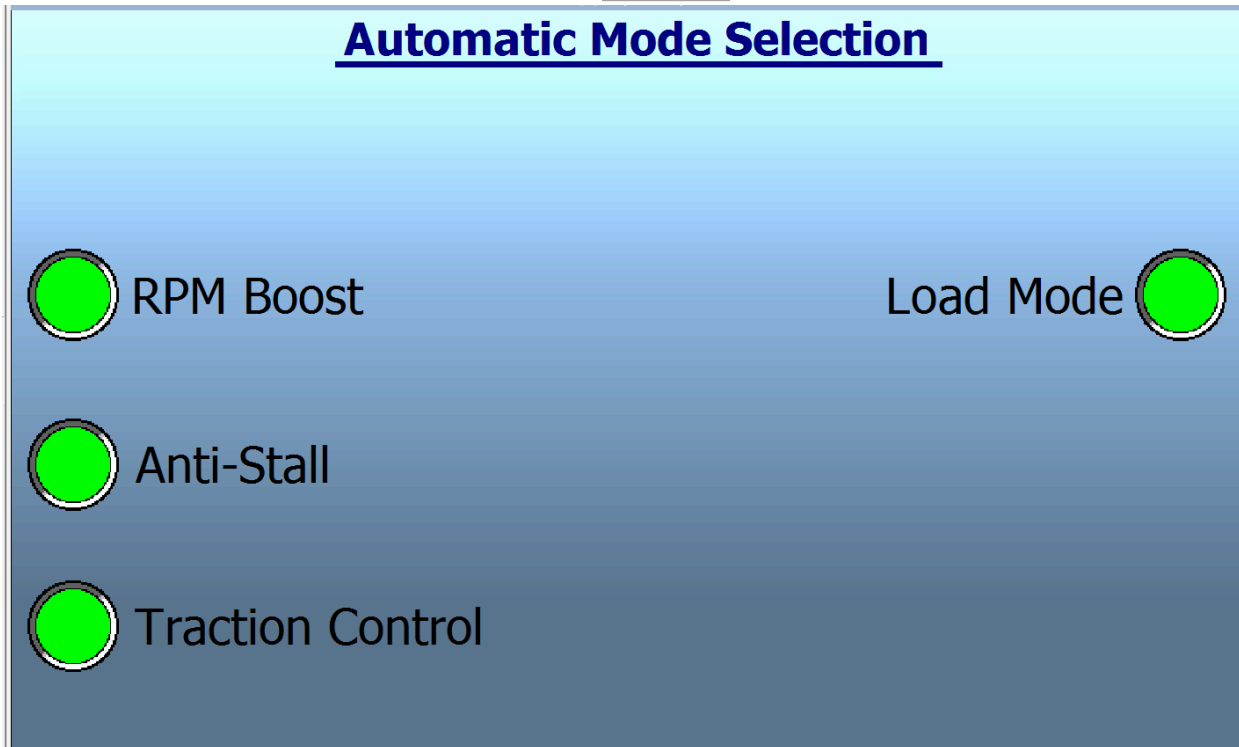
**Anti-Stall:** When Anti-Stall is On (Button is Green), when engine % Load goes above 95%, and already Max RPM, Auger and/or Propel commands are reduced to stay below 95% engine load. The most common example is going up a long grade while loaded and the engine starts to slow down. Hydraulic drive motors and pump will be automatically adjusted to maintain no more than 95% load on engine.

**Traction Control:** When Traction Control is On (Button is Green), if RPM's of one wheel exceed the RPM's of the other wheel by more than 70%, it is assumed the faster wheel is slipping. Traction Control kicks in and slows the fast spinning wheel to force oil to the other wheel. A good example is one wheel gets in a sandy or slippery spot and starts to spin, stopping machine movement. Traction Control will help cause the machine to pull through this condition.

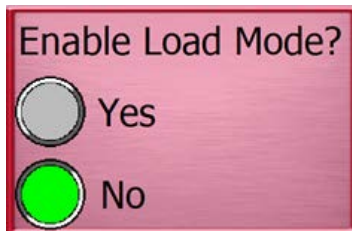
Most common is to leave these three options selected. Their On/Off selection is retained as the default until manually changed.


## Automatic Mode Selection page 2

▶ from RPM Selection. From Main Menu - **Main Run**, ▶, ▶



**Load Mode:** When Load Mode (LM) is selected, the button will turn Green and pop up a confirmation box with "NO" selected will display



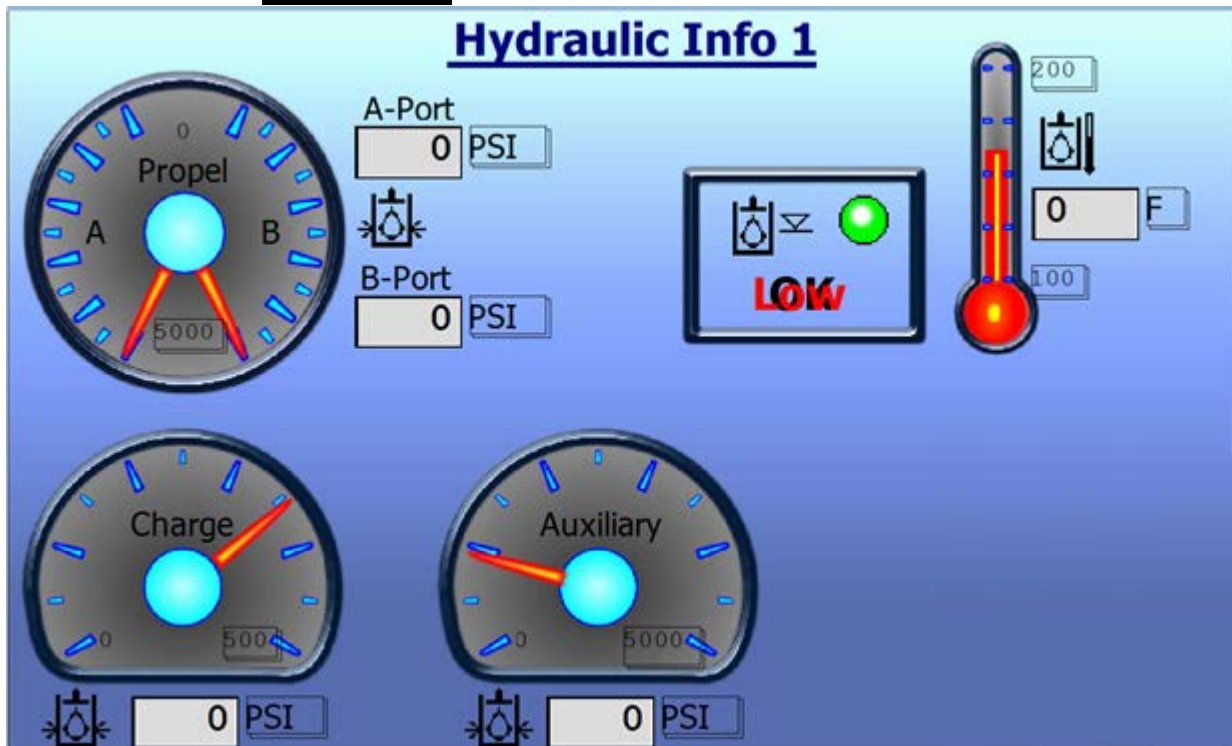
When "Yes" is depressed: Creep is Activated, Steering Angle is LIMITED to 5% either side of straight, the current RPM state is saved and returned to when LM is turned off, the RPM boost is then turned on, the current Traction Control state is saved and returned to when LM is turned off, the Traction Control is turned on.  is displayed on the Main Run screen

When controller Power is cycled, LM will Always be OFF when Power comes up. LM button will be green when LM is active and Grey when LM is off.

Load Mode is to be designed to make loading the T644 onto a trailer or truck ramp safer and easier. As thrust is required to move onto the ramp the traction control should keep both drive tires working. The RPM boost will increase the engine power to prevent a stall and insure the pump is turning fast enough to provide the needed flow. Creep mode will help hold forward speed constant even as the engine changes speed and the load changes. Limiting the steering angle will reduce the possibility of steering off the transporter as one is jostled around.

# Hydraulic Info 1

From Main Menu - **Hydraulic Info**



The T-644 has two pumps. The one mounted directly to the engine is the Propel Pump. The next pump is the Auxiliary Pump. It handles all other functions such as: auger, steer, lift, swing, and so on.

Propel Gauge: A-Port – Forward Drive Pressure. B-Port – Reverse Drive Pressure.

Charge Gauge: Displays the Charge Pressure of the Propel Pump. Approximately 350 PSI is normal. The pressure should maintain during forward or reverse propel.

Auxiliary Gauge: The pressure required to Steer, Auger, Lift, Swing, AC, etc. All functions besides propel. 300-400 PSI on this gauge is normal when at idle.



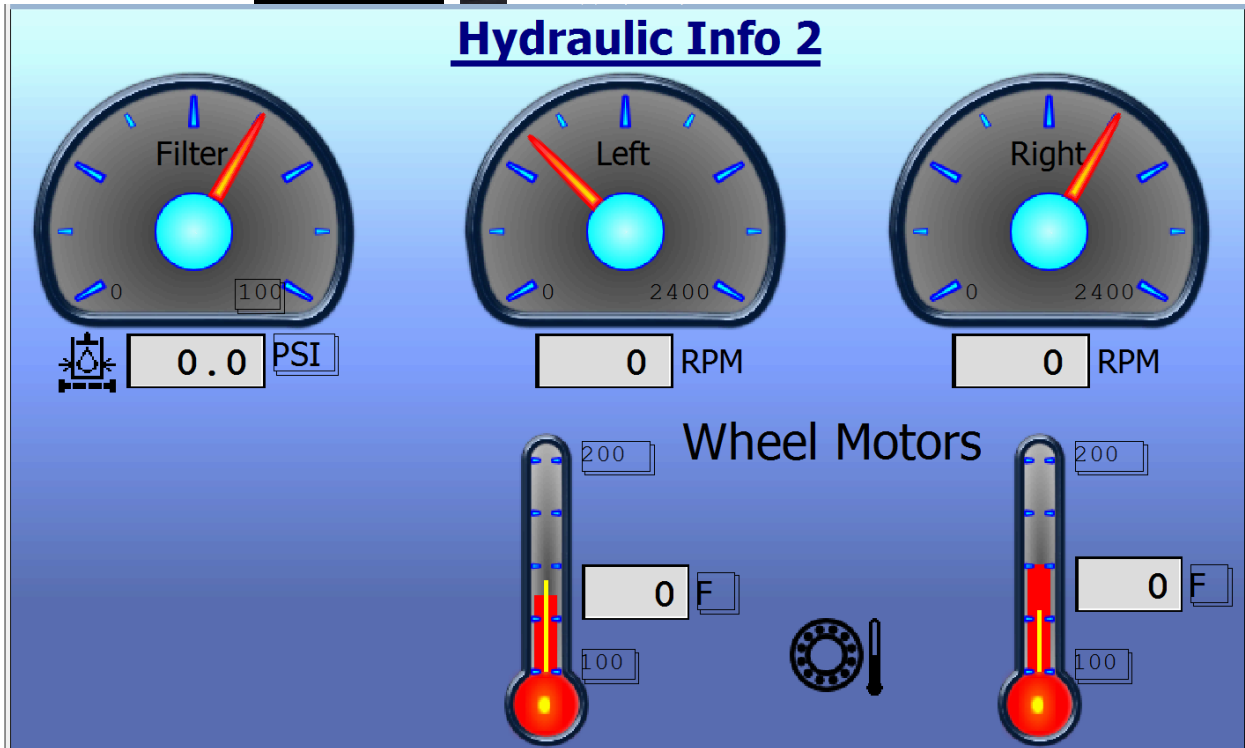
Displays Hydraulic Oil Temperature



Hydraulic Oil Level. If the dot is red, then “Low” hydraulic oil.

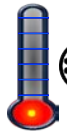
## Hydraulic Info 2

From Main Menu - **Hydraulic Info** , ▶



Hydraulic Return Filter Pressure: Under 20 PSI is normal. Alarm will be set above 20 to indicate time to change the Filter.

Left and Right Wheel Motor RPM's displayed.

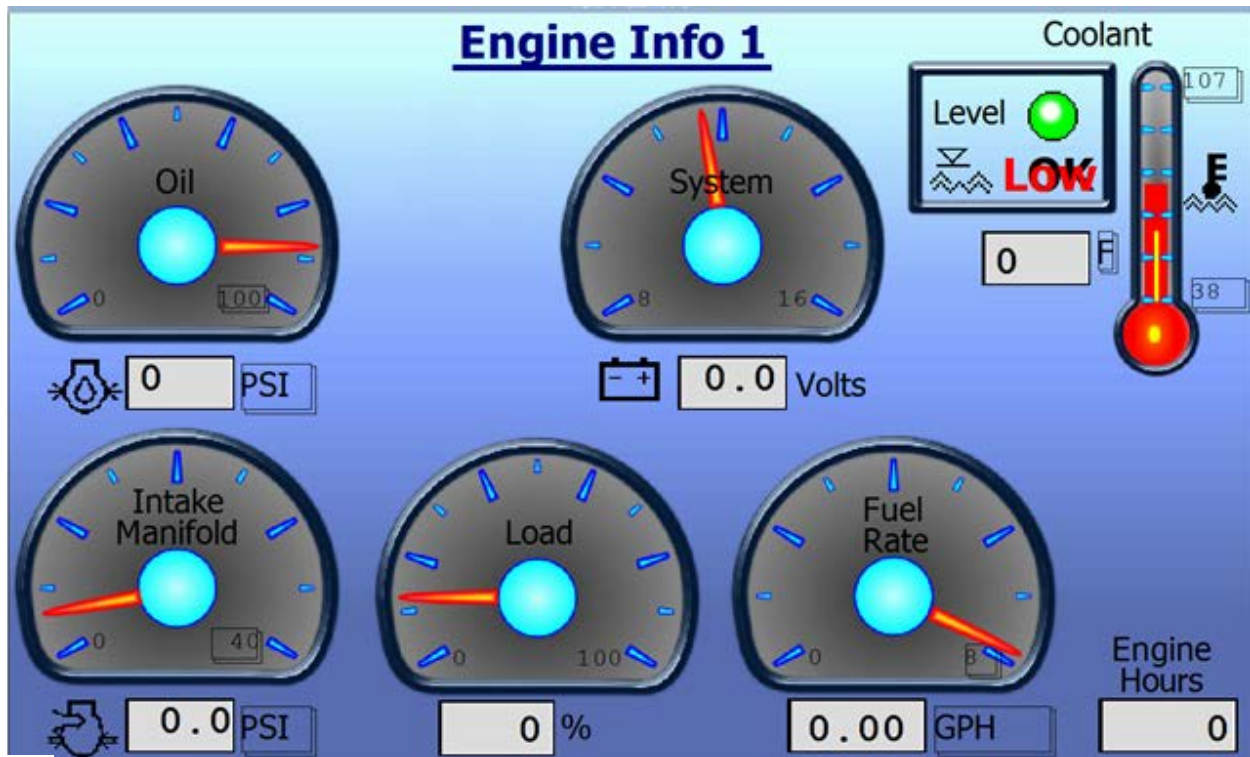


Left and Right Wheel Motor Temperatures

## Engine Info 1

From Main Menu - **Engine Info**

From Main Run - 



 Engine Oil Pressure Gauge

 Engine Intake Manifold Pressure

 Current Battery voltage

 Engine Coolant Temperature.

 Engine Coolant Level.

% Load displays current Load on the engine.

GPH displays the current Gallons Per Hour fuel burn.

Engine Hours are displayed.

Amber, Red, Malfunction, and Protect are Engine Conditions. If all are Ok, their indicators will all be gray. See the Engine Manual for more.

## Engine Info 2

From Main Menu - **Engine Info**, ▶

From Main Run - , ▶

### Engine Info 2

Engine Air Inlet Temperature	<input type="text" value="0"/>	<input type="button" value="C"/>
Charge Air Temperature	<input type="text" value="0"/>	<input type="button" value="F"/>
Engine Charge Air Cooler Outlet Temperature	<input type="text" value="0"/>	<input type="button" value="F"/>
Engine Exhaust Gas Temperature	<input type="text" value="0"/>	<input type="button" value="F"/>
Engine Oil Temperature	<input type="text" value="0"/>	<input type="button" value="F"/>
Fuel Rail Pressure	<input type="text" value="0"/>	<input type="button" value="PSI"/>
Engine Fuel Temperature	<input type="text" value="0"/>	<input type="button" value="F"/>
ECU Temperature	<input type="text" value="0"/>	<input type="button" value="F"/>

Engine diagnostic information



# Engine Faults page 1

From Main Menu - **Engine Info**, , 

From Main Run - , ,  Some portions of this page are Tier 4 Final Only

## Engine Faults

Aftertreatment System Malfunction! Engine torque and speed will be further reduced.

Aftertreatment Catalyst Status Very High. Regen will start when running conditions are favorable. Increase Engine Load! If Engine Load cannot be increased, perform stationary regen once parked and at idle (40 min.)

Stationary regen in progress. Very High Exhaust Temperature. Machine must be parked and at idle for the duration (40 min.)!


Regen


DEF Reservoir Empty.

Active Faults				
Total	#	SPN	FM	OC
0	0	000000	0	0

DEF Level

0 %

  
Prev

  
Next

Clear

History

Most of the messages shown in Red will not be displayed under normal conditions. They will be hidden unless needed.



The Regen Icon

Engine Code Reader. Switch between Active and History Faults

### Active Faults

Total	#	SPN	FM	OC
0	0	000000	0	0

  
Prev

  
Next

Clear

Active

### Fault History

Total	#	SPN	FM	OC
0	0	000000	0	0

  
Prev

  
Next

Clear

History

## Engine Faults page 2

From Main Menu - **Engine Info**, , 

From Main Run - , ,  Some portions of this page are Tier 4 Final Only

### Engine Faults

Aftertreatment System Malfunction! Engine torque and speed will be further reduced.

Aftertreatment Catalyst Status Very High. Regen will start when running conditions are favorable. Increase Engine Load! If Engine Load cannot be increased, perform stationary regen once parked and at idle (40 min.)

Stationary regen in progress. Very High Exhaust Temperature. Machine must be parked and at idle for the duration (40 min.)!

Regen

DEF Reservoir Empty.

Active Faults				
Total	#	SPN	FM	OC
0	0	000000	0	0

DEF Level

0 %

Clear

History



Diesel Exhaust Fluid "DEF" Level in tank.

If any fault occurs that involves the Icons here, this page will automatically display.



MIL (Amber) Lamp



Stop Lamp



DEF level Lamp

# Engine Faults page 3

From Main Menu -   

From Main Run -    Some portions of this page are Tier 4 Final Only

## Engine Faults

Aftertreatment System Malfunction! Engine torque and speed will be further reduced.

Aftertreatment Catalyst Status Very High. Regen will start when running conditions are favorable. Increase Engine Load! If Engine Load cannot be increased, perform stationary regen once parked and at idle (40 min.)

Stationary regen in progress. Very High Exhaust Temperature. Machine must be parked and at idle for the duration (40 min.)!

Regen

DEF Reservoir Empty.

Active Faults				
Total	#	SPN	FM	OC
0	0	000000	0	0

DEF Level

0 %

CHECK



STOP

←  
Prev

→  
Next

Clear

History



 Aftertreatment Lamp, DEF Level Lamp.  
 DEF Level  $\leq$  15% - Aftertreatment Lamp Flashes **Amber**, DEF Lamp Appears and disappears.  
 DEF Level  $\leq$  5% - Aftertreatment Lamp Solid **Amber**. DEF Level Lamp Appears and remains. Maximum available engine torque across the engine speed range commences its reduction at 1% per minute.  
 DEF Level  $\leq$  5% (+25 mins) - Aftertreatment Lamp Flashes **Red**. DEF Level Lamp Appears and remains. Maximum available engine torque across the engine speed range is reduced to 75%  
 DEF Level  $\leq$  0% - Aftertreatment Lamp Solid **Red**, MIL Lamp Solid **Amber**, Stop Lamp Flashing **Red**, DEF Level Lamp Appears and remains. Engine continues reduction to forced Idle



DEF Level  $\leq$  0% (+30 mins) - Aftertreatment Lamp Solid **Red**, MIL Lamp Solid **Amber**, Stop Lamp Solid **Red**, DEF Level Lamp Appears and remains. Engine at forced Idle



# Engine Faults page 4

From Main Menu - **Engine Info**, , 

From Main Run - , ,  Some portions of this page are Tier 4 Final Only

## Engine Faults

Aftertreatment System Malfunction! Engine torque and speed will be further reduced.

Aftertreatment Catalyst Status Very High. Regen will start when running conditions are favorable. Increase Engine Load! If Engine Load cannot be increased, perform stationary regen once parked and at idle (40 min.)

Stationary regen in progress. Very High Exhaust Temperature. Machine must be parked and at idle for the duration (40 min.)!

Regen

DEF Reservoir Empty.

Active Faults				
Total	#	SPN	FM	OC
0	0	000000	0	0

DEF Level

0 %

Prev

Next

Clear

History

Detection of poor quality DEF, interruption of dosing, tampering or emissions system fault



Aftertreatment Lamp

Detection starts - Aftertreatment Lamp Flashes **Yellow**

After 2 hours - Aftertreatment Lamp Solid **Yellow**. Maximum available engine torque across the engine speed range commences its reduction at 1% per minute.

At 2 hours, 25 minutes - Aftertreatment Lamp Flashes **Red**. Maximum available engine torque across the engine speed range is reduced to 75%

3.5 hours - Aftertreatment Lamp Solid **Red**, MIL Lamp Solid **Amber**, Stop Lamp Flashing **Red**, Engine commences reduction to forced Idle



4 hours - Aftertreatment Lamp Solid **Red**, MIL Lamp Solid **Amber**, Stop Lamp Solid **Red**, Engine at forced Idle



# Engine Faults page 5

From Main Menu - **Engine Info**,  

From Main Run - , ,  Some portions of this page are Tier 4 Final Only

## Engine Faults

Aftertreatment System Malfunction! Engine torque and speed will be further reduced.

Aftertreatment Catalyst Status Very High. Regen will start when running conditions are favorable. Increase Engine Load! If Engine Load cannot be increased, perform stationary regen once parked and at idle (40 min.)

Stationary regen in progress. Very High Exhaust Temperature. Machine must be parked and at idle for the duration (40 min.)!

Regen

DEF Reservoir Empty.

Active Faults				
Total	#	SPN	FM	OC
0	0	000000	0	0

DEF Level

0 %

Prev

Next

Clear

History



When lit, Stationary Refresh is Active

SCR Refresh light **Green**, Engine Reports SCR Catalyst Status High. Engine makes available refresh calibration and refresh calibration only triggers when running conditions are favorable.



SCR Refresh light **Yellow**, Engine Reports SCR Catalyst Status Very High. Refresh calibration still available.



SCR Refresh light **Red**, Engine Reports SCR Catalyst Status Critical. Engine signals Inducement Strategy. Refresh Calibration still available. Inducement Commences (Warning). Aftertreatment Lamp **Amber** flashing.



# Engine Faults page 6

From Main Menu - **Engine Info**, , 

From Main Run - , ,  Some portions of this page are Tier 4 Final Only

## Engine Faults

Aftertreatment System Malfunction! Engine torque and speed will be further reduced.

Aftertreatment Catalyst Status Very High. Regen will start when running conditions are favorable. Increase Engine Load! If Engine Load cannot be increased, perform stationary regen once parked and at idle (40 min.)

Stationary regen in progress. Very High Exhaust Temperature. Machine must be parked and at idle for the duration (40 min.)!

Regen

DEF Reservoir Empty.

Active Faults				
Total	#	SPN	FM	OC
0	0	000000	0	0

DEF Level

0 %

Prev

Next

Clear

History

SCR Refresh light **Red**, Aftertreatment Lamp **Amber** solid. 2 hours of engine operation after detection of SCR Catalyst Status Critical. Maximum available engine torque across the engine speed range commences its reduction at 1% per minute.



SCR Refresh light **Red**, Aftertreatment Lamp **Red** flashing. 2 hours, 25 minutes of engine operation after detection of SCR Catalyst Status Critical. Maximum available engine torque across the engine speed range is reduced to 75%.



SCR Refresh light **Red**, Aftertreatment Lamp **Red** solid. MIL (**Amber**) lamp solid. **Red** Stop Lamp flashing. 3.5 hours of engine operation after detection of SCR Catalyst Status Critical. Maximum available engine torque across the engine speed range is reduced to 75%. Maximum available engine torque and engine speed range commences its reduction to forced idle condition.



# Engine Faults page 7

From Main Menu - **Engine Info**, , 

From Main Run - , ,  Some portions of this page are Tier 4 Final Only

## Engine Faults

Aftertreatment System Malfunction! Engine torque and speed will be further reduced.

---

Aftertreatment Catalyst Status Very High. Regen will start when running conditions are favorable. Increase Engine Load! If Engine Load cannot be increased, perform stationary regen once parked and at idle (40 min.)

Stationary regen in progress. Very High Exhaust Temperature. Machine must be parked and at idle for the duration (40 min.)!

Regen

Active Faults

Total	#	SPN	FM	OC
0	0	000000	0	0

DEF Level

0 %

Clear

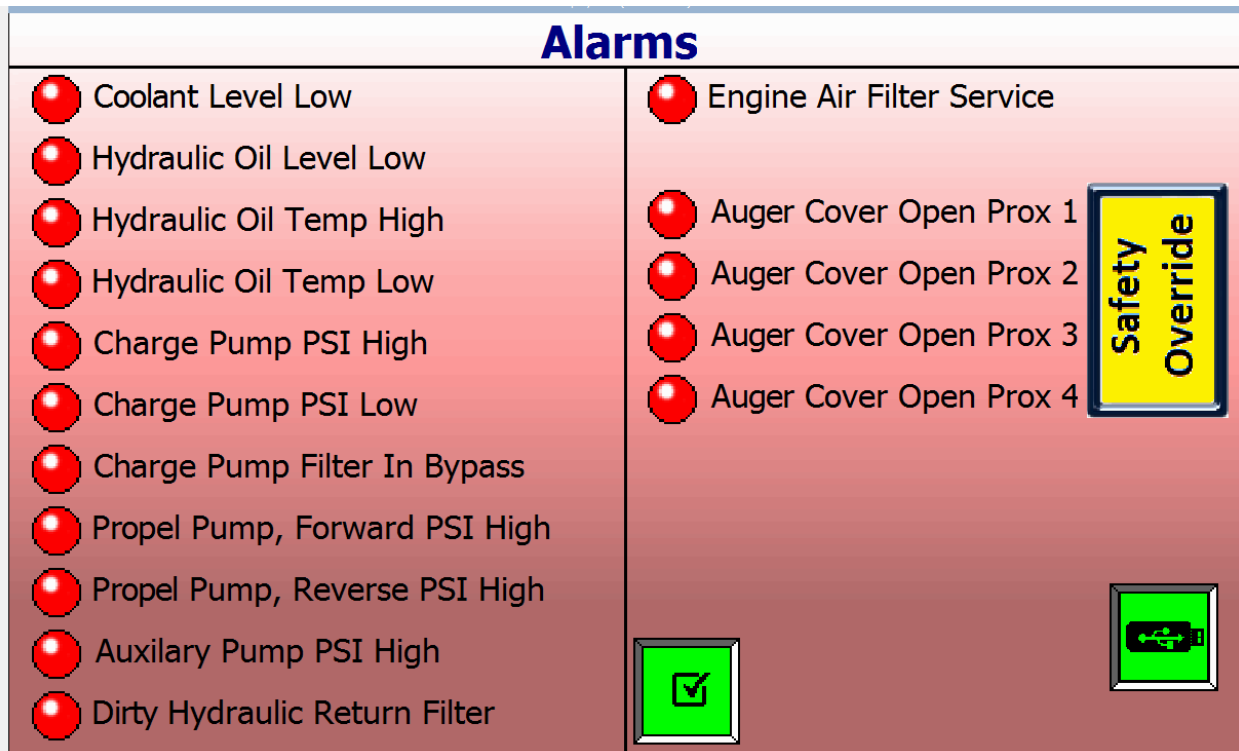
History


SCR Refresh light **Red**, Aftertreatment Lamp **Red** solid. MIL (**Amber**) lamp solid. **Red** Stop Lamp solid. 4 hours of engine operation after detection of SCR Catalyst Status Critical. Engine at forced idle.



# Alarms

From Main Menu - **Alarms-Faults**



Under normal conditions no indicators will be red. Alarms are conditions that require attention. Low Coolant and Hydraulic Oil are obvious. When the condition occurs, the cab buzzer sounds. When you review on this page, the  when pushed will silence the buzzer, and if the condition no longer exists, the indicator will return to gray.

If the condition still exists, the buzzer will be silent for about 5 minutes and then the alarm buzzer and warning will occur again. This will repeat until the condition is resolved.

A good example might be a low hydraulic oil condition. Unless it is obvious a big flood of oil is spraying due to a ruptured hose, the oil level probably just got to a low enough level to sound the alarm. Probably safe to finish a pour, then return to maintenance to fill.

If an Auger Cover Door Sensor is creating the Alarm, this page will tell you which one. In the event of a damaged wire or sensor, use the Safety Override to temporarily allow the auger to run. See Safety Warning page 84.



## Faults 1-64

From Main Menu - **Alarms-Faults**

### System Faults 1-64




1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32
33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48
49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64


1: MC50-Eng Area- Bus A-Off Line

2: MC50-Eng Area-Bus B-Off Line

3: MC50-Chassis-Bus B-Off Line

4: MC24-Cab-Bus B-Off Line

Faults are generally associated with an electrical issue. The  will silence the buzzer. Under normal conditions, no indicators will be red. Touch the number of a red indicator and the list at bottom will scroll to that message number for more information.



Up/Down Arrows will scroll the list.

See Appendix: Faults - 1-65, page 104 for a full list.

## Faults 65-128

From Main Menu - **Alarms-Faults**, 

**System Faults 65-128**




65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80
81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96
97	98	99	100	101	102	103	104	105	106	107	108	109	110	111	112
113	114	115	116	117	118	119	120	121	122	123	124	125	126	127	128


65: MC50-Eng Area-Coolant Low Level Snsr Pwr (C1P42)

66: MC50-Chassis-Left Mot Snsr-Temp Volts Hi (C1P27)

67: MC50-Chassis-Left Mot Snsr-Temp Volts Lo (C1P27)

68: MC50-Chassis-Left Mot Snsr-"A" Zero Hz (C1P18)

Faults are generally associated with an electrical issue. The  will silence the buzzer. Under normal conditions, no indicators will be red. Touch the number of a red indicator and the list at bottom will scroll to that message number for more information.

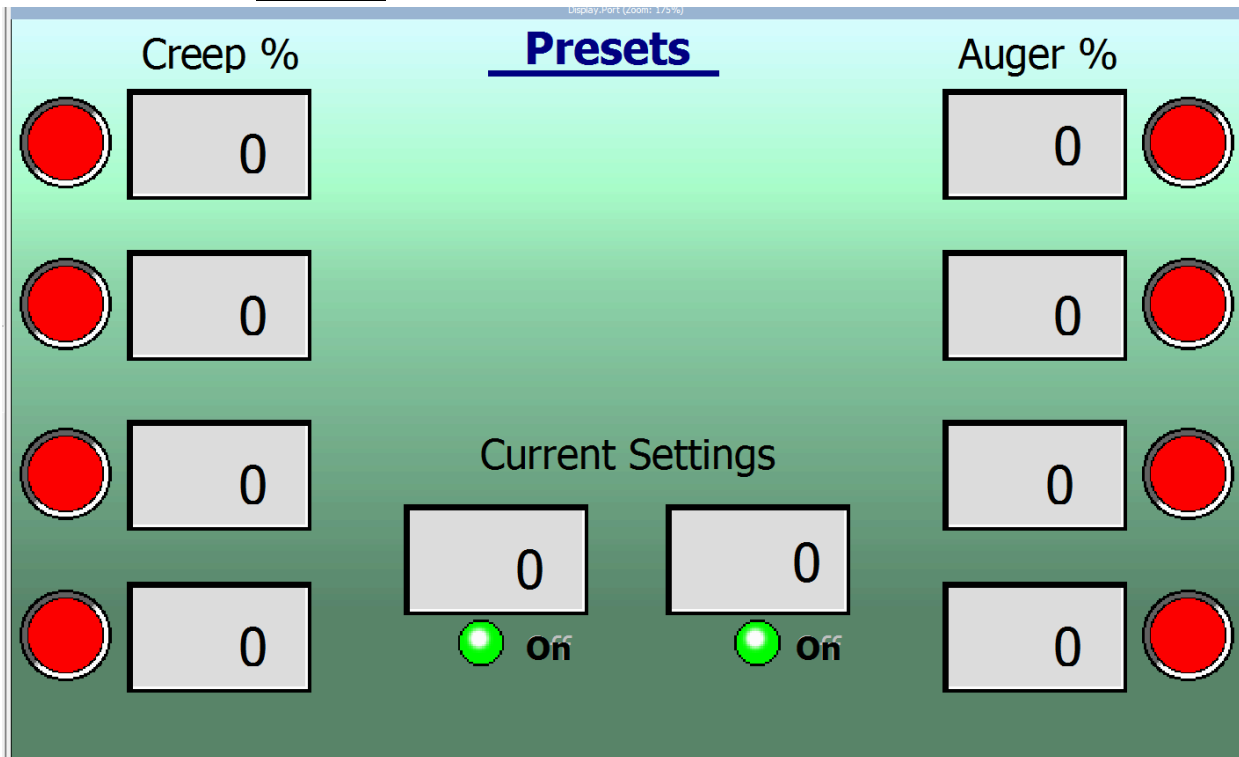


Up/Down Arrows will scroll the list.

See Appendix: Faults – 66-128, page 105 for a full list.

# Presets

From Main Menu - **Settings**



Much like radio buttons in your vehicle, you can save up to 4 favorite Creep and 4 favorite Auger settings. Creep and Auger % can be adjusted from the JS at any time. Get the settings you like for particular beds saved for easy reset at those beds.

To set, adjust on the JS to the % required. To change a Preset, press and hold the corresponding button until it changes. To select a preset to be current, press the desired Preset quickly.

## Display Settings

From Main Menu - **Settings**, ▶

**Display Settings**

Time	00:00:00	AM Hrs PM	12 24
Date	00-00-00		↑
Back Light	0 %		↓
SAE Metric			☑

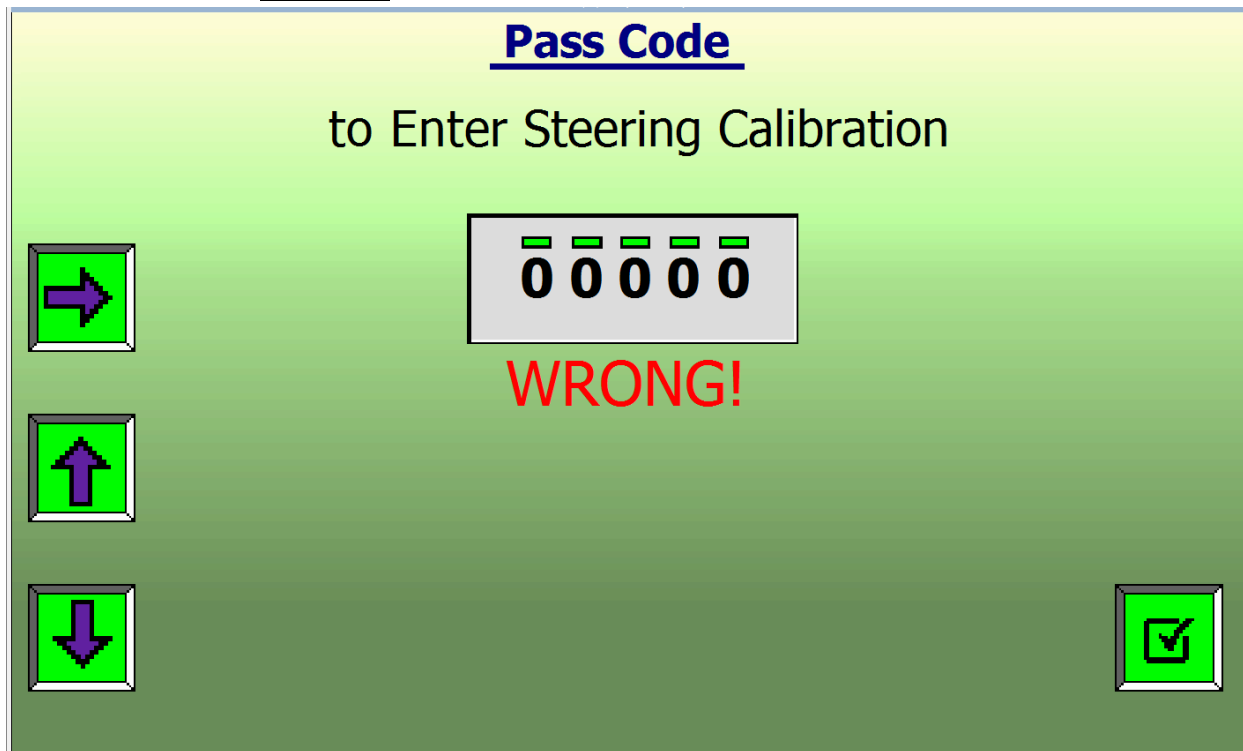
Upon selecting Time, Date, or Back Light, use the arrows to set.

SAE/Metric: Selects US or Metric units of measure.

12/24: Selects time format preference.

## Steering Calibration Pass Code

From Main Menu - **Settings**, , 



*Steering Pass Code:* 12345



Use the Up/Down arrows to increase/decrease the digit under the green bar.



When the desired number shows, use the Right Arrow to move to the next digit.

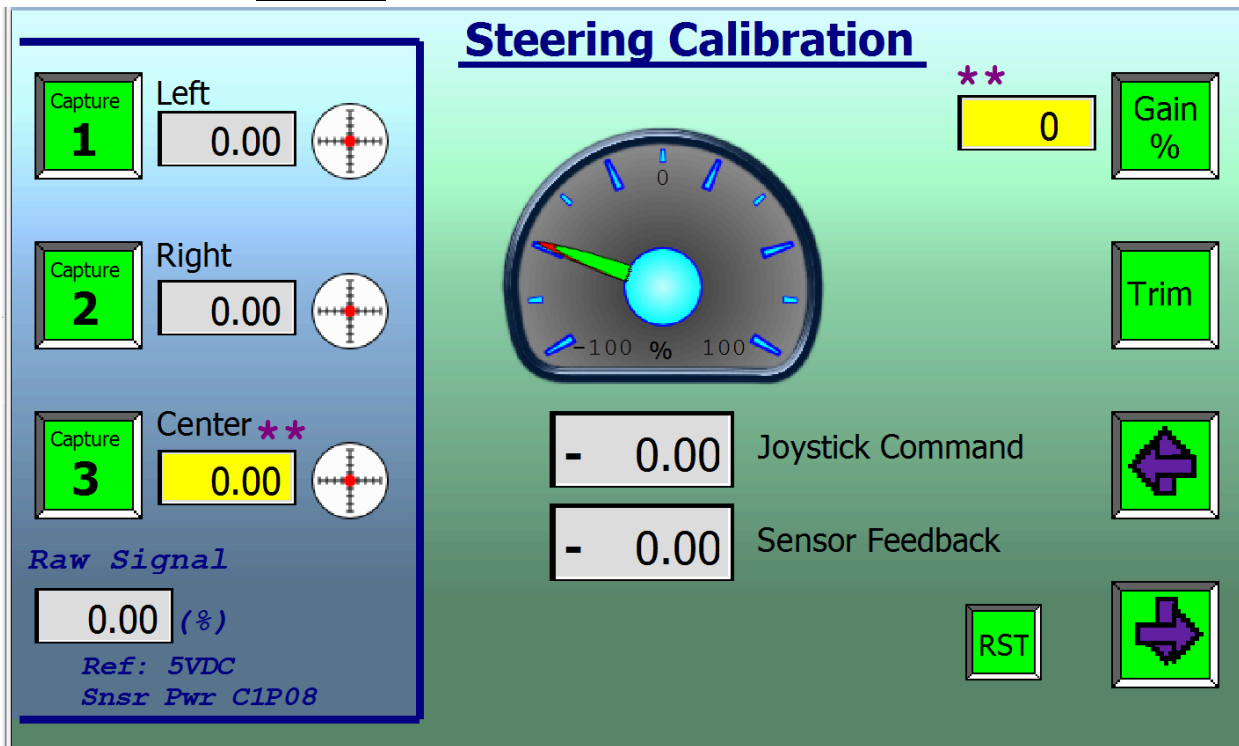


When all 5 digits read the correct passcode, press the Check box to enter Maintenance Logs.

If you enter an incorrect passcode: **WRONG!** will be displayed.

## Steering Calibration

From Main Menu - **Settings**, , , Successful Steering passcode




**Steering Calibration:** Each time the Steering Encoder is installed, calibration is required. The Encoder is mounted just above the lower articulate pin. The Encoder Magnet is on top of the lower articulate pin.

Encoder initial alignment:

- Install Articulate Lock Bar. This should keep the front end aligned with the rear.
- The Encoder Magnet should be installed on the lower articulate pin and snugged, but loose enough to rotate with a wrench.
- Install the Encoder on the bracket mounted to the rear frame above the lower articulate pin finger tight.
- Watch the “Raw Signal” while rotating the Encoder Magnet with a wrench. Adjust until the Raw Signal is 50% +/- 2%. Try to get close.
- Remove Encoder. Hold the Encoder Magnet with a wrench and tighten the Allen screw.
- Re-install Encoder and tighten. While tightening, watch the “Raw Signal” and try to tighten as close to 50% as possible.

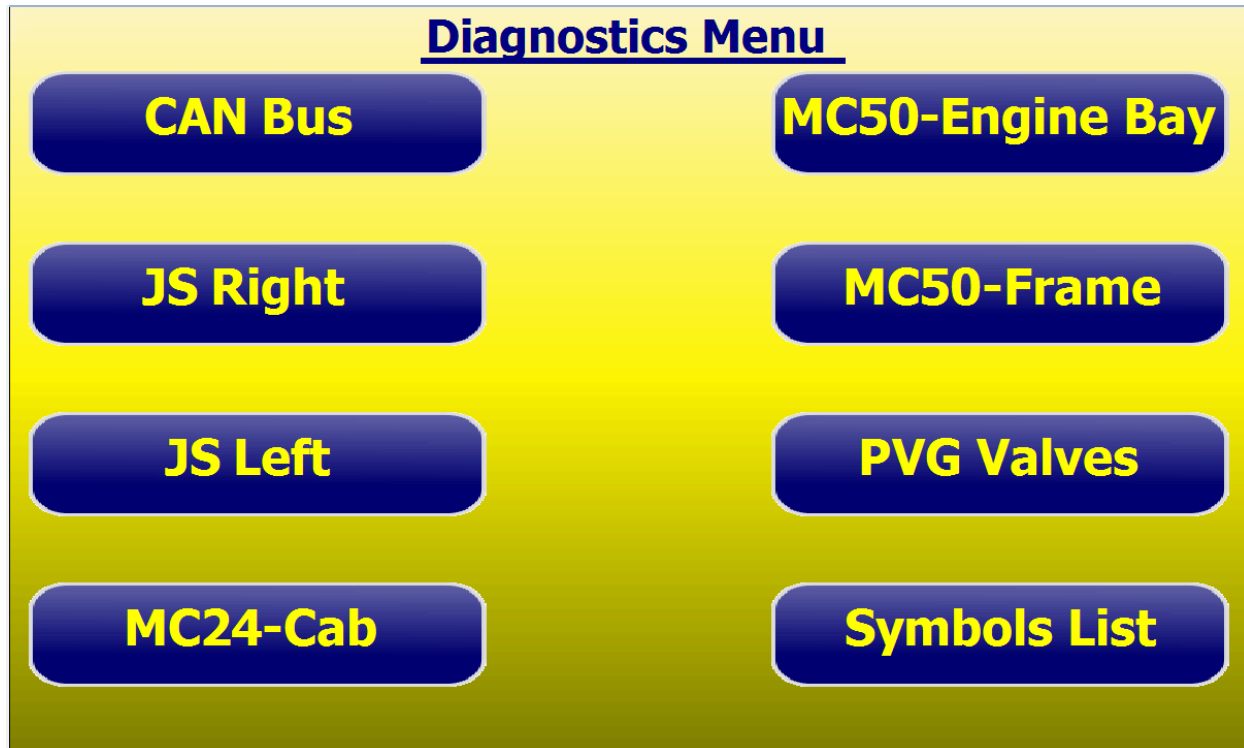
Electronic Alignment after Encoder Installation

- The Cross Hair  should be centered. If not, adjust with the Trim until it is. Then press and hold the Capture # 3 (Center) to lock this setting.
- Remove Articulate Lock Bar.

Steer full Left, Capture # 1 (Left). Steer full Right, Capture #2 (Right). Steering is now aligned.

## Diagnostics Menu

From Main Menu - **Diagnostics**



**CAN Bus:** Graphically displays CAN A and CAN B routing to confirm all components connected properly.

**JS Right:** Explanation of Right JS functions and test page to verify all working as expected.

**JS Left:** Explanation of Left JS functions and test page to verify all working as expected.

**MC24-Cab:** Danfoss MC24 Controller mounted in the cab. Definition of inputs and outputs for this controller.

**MC50-Engine Bay:** Danfoss MC50 Controller mounted in the engine bay. Definition of inputs and outputs for this controller.

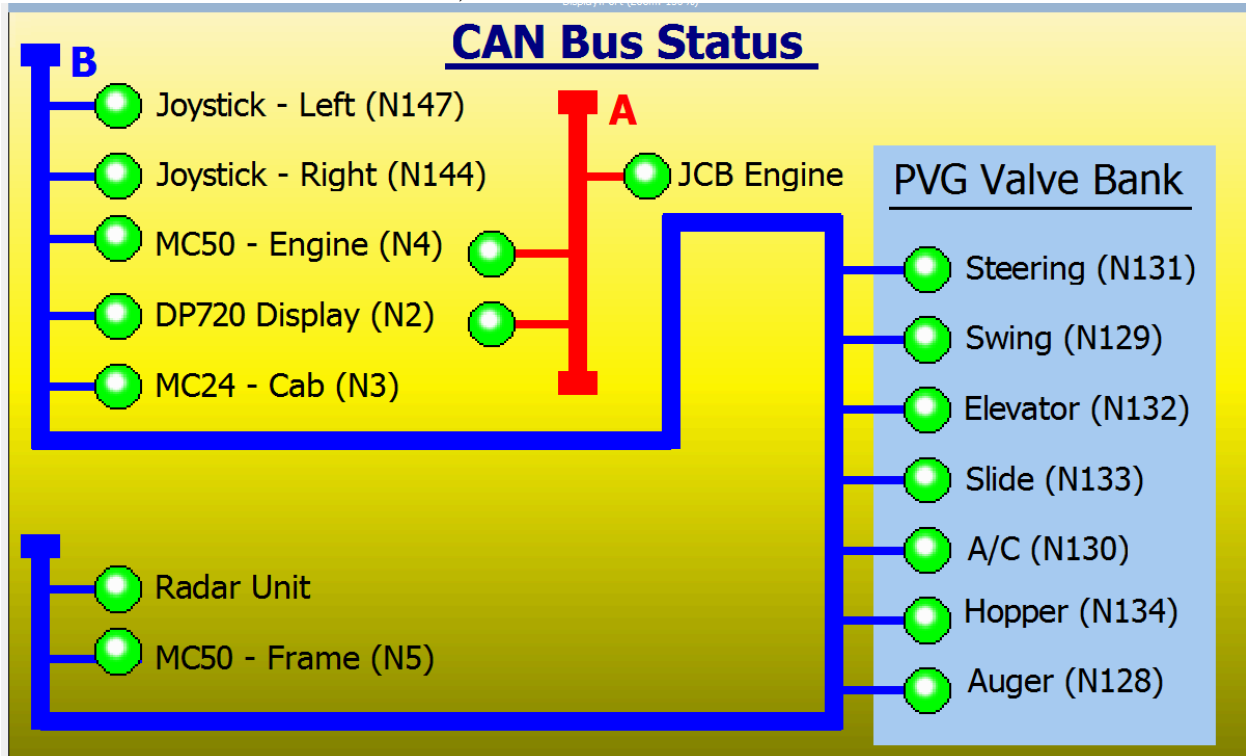
**MC50-Frame:** Danfoss MC50 Controller mounted in the Lower Frame. Definition of inputs and outputs for this controller.

**PVG Valves:** Definition of the hydraulic valves controlling all auxiliary functions.

**Symbols List:** Icon Definitions

# CAN Bus Status- page 1

From Main Menu - **Diagnostics**, **CAN Bus**



Quick check screen to confirm all CAN Bus items are online. All indicators should be green. The numbers in parentheses are the Node numbers on the CAN Bus.

Joystick Left and Joystick Right – The Joystick on each side of the seat. Both on CAN B route.

The T-644 has 3 Danfoss CAN Controllers, as well as the DP720 Monitor Controller and the Engine ECU.



MC50 Engine Bay Controller. CAN A routed to DP720 in Cab and Engine ECU. CAN B routed to all components.



DP720 Cab Display Controller. CAN A routed to MC50 In Engine bay and Engine ECU. CAN B routed to all components.

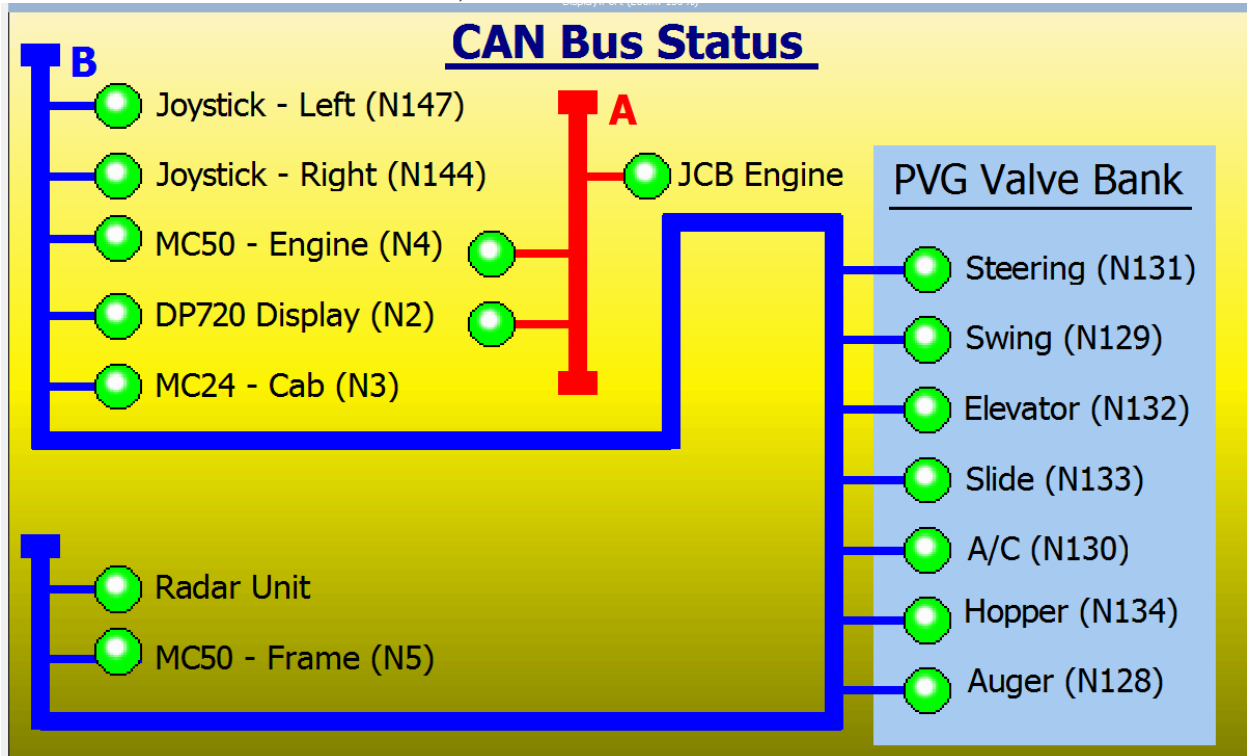


MC24 Cab Controller. On CAN B route.

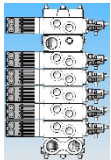


## CAN Bus Status- page 2

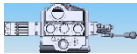
From Main Menu - **Diagnostics**, **CAN Bus**



PVG Valve Bank is both valve groups pictured below. The valves are mounted in the Engine compartment on the CAN B route.



This is referred to as the PVG32. It controls steering, swing, elevator, slide gate, A/C, hopper Up/Down. CAN B.



This is referred to as the PVG100. It controls the auger. CAN B.



MC50 Lower Frame Controller. CAN B.



Radar unit in Lower Frame. CAN B.

# Left JS

From Main Menu - **Diagnostics**, **JS Left**

**Left Joystick (Node 147)** ✓ Offline ✗

- 0 Creep Set Point
- 0 Propel Cmd
- 0 Steer Cmd
- Trigger
- Horn
- Vibrator
- Creep On-Off

*Left Joystick* (JS) commands can be tested and confirmed.



# Right JS

From Main Menu - **Diagnostics**, **JS Right**

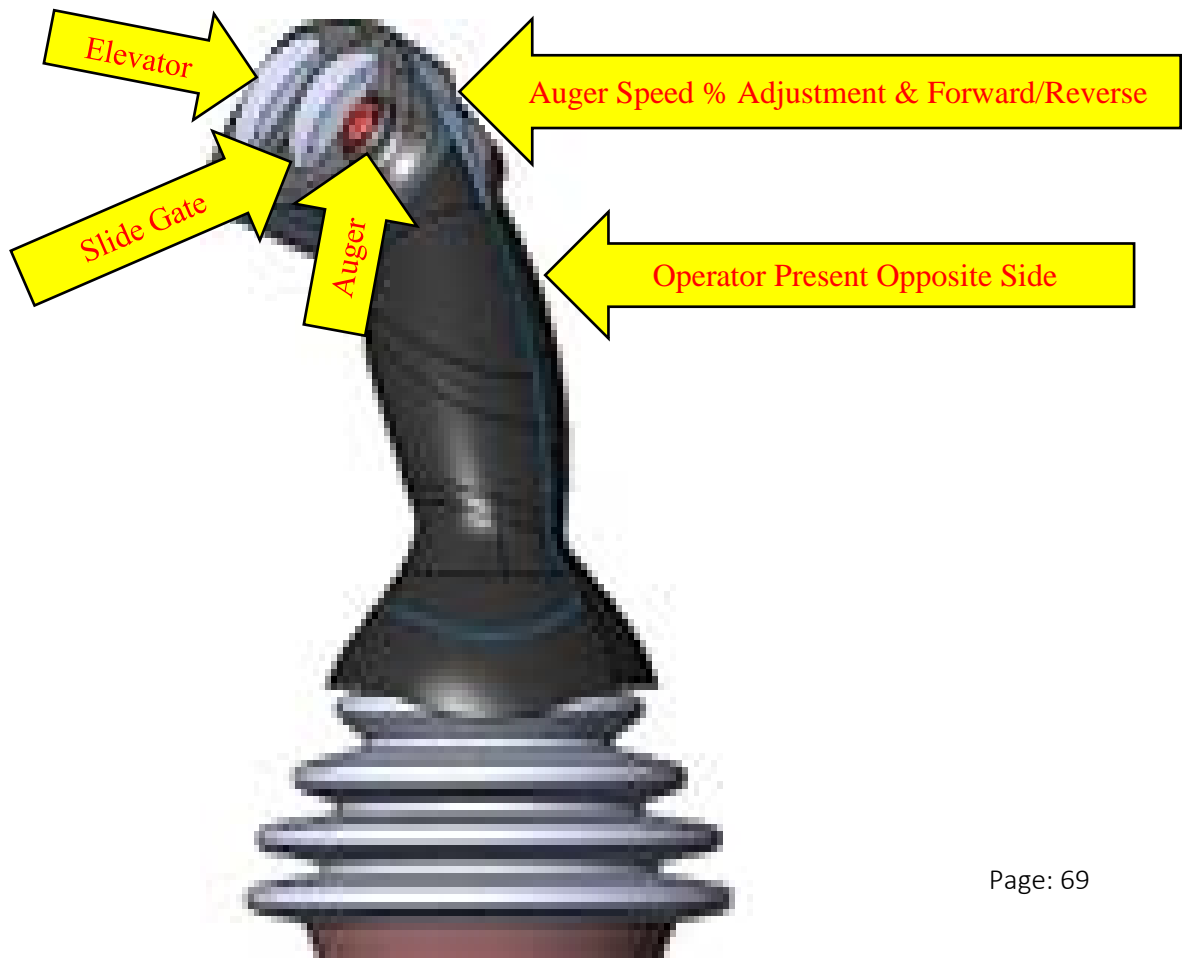
### Right Joystick (Node 144) ✓ Offline ✗

0	Auger Set Point	
0	Elevator Cmd %	
0	Slide Gate Cmd %	
0	Swing Cmd %	
0	Hopper Cmd %	

- Trigger
- Auger On-Off

The diagram shows a joystick with four yellow arrows pointing to specific controls: 'Swing Left' (top left), 'Lower Hopper' (top right), 'Raise Hopper' (bottom left), and 'Swing Right' (bottom right). A central vertical bar has a series of green indicator lights. To the right is a 3D rendering of the joystick.

*Right Joystick* (JS) commands can be tested and confirmed.



## MC24 In Cab

From Main Menu - **Diagnostics**, **MC24-Cab**

MC24-110 in Cab (Node 3) <span style="color: green;">✓</span> Offline <span style="color: red;">✗</span>			
Inputs		Outputs	
<input checked="" type="checkbox"/>	E-Stop OK	C1P06	C2P09 Work Lights-Relay <input checked="" type="checkbox"/>
<input checked="" type="checkbox"/>	Seat Sw	C1P07	C2P10 Windshield Wipers-Relay <input checked="" type="checkbox"/>
<input checked="" type="checkbox"/>	Brake Valve Pres Sw	C1P11	C2P11 Windshield Washer-Relay <input checked="" type="checkbox"/>
<input checked="" type="checkbox"/>	A/C On Sw	C1P12	C2P12 A/C Relay <input checked="" type="checkbox"/>
<input checked="" type="checkbox"/>	Auger Cover Prox 1	C2P01	
<input checked="" type="checkbox"/>	Auger Cover Prox 2	C2P02	
<input checked="" type="checkbox"/>	Auger Cover Prox 3	C2P03	
<input checked="" type="checkbox"/>	Auger Cover Prox 4	C2P04	
<input type="text" value="00.00"/>	System Pwr (V)	C1P02	
<input type="text" value="0.00"/>	Sensor Pwr (V)	C1P08	



Danfoss MC24 Controller mounted in the cab, on the CAN B route monitors:

Cab E-Stop: Must be Pulled Out to run.

Seat Switch: Operator must be in seat for any functions that produce movement. The A/C will run without the Seat Switch on.

Foot Brake Valve Pressure Switch: When propelling and the Foot Brake Valve is pushed, this notifies the CAN Program the operator is trying to slow down and discontinues Propel.

A/C On Switch: Whether the A/C Switch is On.

System Power (V): Actual voltage at this controller.

Sensor Power (V): Many sensors require 5vdc. This verifies 5vdc available.

Work Lights-Relay: Work Lights On/Off. Touch to toggle.

Windshield Wiper-Relay: Wiper On/Off. Touch to toggle.

# MC50 Engine Bay – page 1

From Main Menu - **Diagnostics**, **MC50-Engine Bay**

MC50-110 in Engine Bay (Node 4) <span style="color: green;">✓</span> Offline <span style="color: red;">✗</span>			
Inputs		Outputs	
	E-Stop OK <i>C1P06</i>	<i>C1P39</i>	Air Supply Valve-Coil
	Coolant Level OK <i>C1P07</i>	<i>C1P40</i>	Vibe Motor-Coil
	Hyd Oil Level Ok <i>C1P10</i>	<i>C1P42</i>	Coolant Snsr-Pwr Sply
	Engine Cover Prox <i>C1P12</i>	<i>C1P43</i>	Starter-Relay
<input type="text" value="0.00"/>	Pres Snsr A-Port (V) <i>C1P14</i>	<i>C1P44</i>	Horn-Relay
<input type="text" value="0.00"/>	Pres Snsr B-Port (V) <i>C1P15</i>	<i>C1P46</i>	CCO-Coil
<input type="text" value="0.00"/>	Pres Snsr Aux Pump (V) <i>C1P16</i>	<i>C1P37</i>	H1 Pump Fwd-EDC (A) <input type="text" value="0.00"/>
<input type="text" value="0.00"/>	Pres Snsr Charge Pump (V) <i>C1P17</i>		(Actual) <input type="text" value="0.00"/>
<input type="text" value="0"/>	Hyd Temp Snsr (ohm) <i>C1P27</i>	<i>C1P38</i>	H1 Pump Rev-EDC (A) <input type="text" value="0.00"/>
			(Actual) <input type="text" value="0.00"/>

Danfoss MC50 Engine Bay Controller: CAN A routed to DP720 in Cab and Engine ECU. CAN B routed to all components.



E-Stop Ok: Monitors Engine Compartment E-Stop. Must be out to run.

Coolant Level Ok: Indicator is Green if Coolant Level is Ok.

Hydraulic Oil Level Ok: Indicator is Green if Hydraulic Oil Level is Ok.

Engine Cover Prox: Proximity sensor to confirm Engine Bay door is closed.

Pressure Sensor A-Port and B-Port: Displays the voltage received for the Forward and Reverse pressure transducers on the Propel Pump.

Pressure Sensor Auxiliary Pump: Displays the voltage received for the Auxiliary pressure transducer on the Auxiliary Pump.

Pressure Sensor Charge Pump: Displays the voltage received for the Charge pressure transducer on the Propel Pump.








Hydraulic Temperature Sensor: Displays Ohms from Temperature Sensor.



Touch to display more information, shown on next page.

## MC50 Engine Bay- page 2

From Main Menu - **Diagnostics**, **MC50-Engine Bay**, 

MC50-110 in Engine Bay (Node 4) <span style="color: green;">✓</span> Offline <span style="color: red;">✗</span>			
Inputs		Outputs	
0.00	Pres Snsr Hyd Fltr (V) <i>C1P05</i>	<i>C1P39</i>	Air Supply Valve-Coil 
0	Charge Fltr Bypass (ohm) <i>C1P28</i>	<i>C1P40</i>	Vibe Motor-Coil 
0.00	Eng Cool Level Snsr (V) <i>C1P24</i>	<i>C1P42</i>	Coolant Snsr-Pwr Sply 
0.00	Flow Meter (V) <i>C1P23</i>	<i>C1P43</i>	Starter-Relay 
00.00	System Pwr (V) <i>C1P02</i>	<i>C1P44</i>	Horn-Relay 
0.00	Sensor Pwr (V) <i>C1P08</i>	<i>C1P46</i>	CCO-Coil 
	Eng Air Filter Service <i>C1P11</i>	<i>C1P37</i>	H1 Pump Fwd-EDC (A) <input type="text" value="0.00"/>
			(Actual) <input type="text" value="0.00"/>
		<i>C1P38</i>	H1 Pump Rev-EDC (A) <input type="text" value="0.00"/>
			(Actual) <input type="text" value="0.00"/>

Pres Snsr Hyd Fltr: Hydraulic Return Filter actual voltage.

Charge Fltr Bypass (ohm): Charge Filter sensor resistance.

Engine Cool Level Snsr (V): Coolant Level voltage.

Flow Meter (V): Optional meter not usually installed.

System Power (V): Actual voltage at this controller.

Sensor Power (V): Many sensors require 5vdc. This verifies 5vdc available.

Engine Air Filter Service: If Green, Air Filter Service is required.



Touch to return previous information for the MC50 Engine Bay Controller.

## MC50 Engine Bay- page 3

From Main Menu - **Diagnostics**, **MC50-Engine Bay**

MC50-110 in Engine Bay (Node 4) ✓ Offline ✗			
Inputs		Outputs	
	E-Stop OK	C1P06	C1P39
	Coolant Level OK	C1P07	C1P40
	Hyd Oil Level Ok	C1P10	C1P42
	Engine Cover Prox	C1P12	C1P43
0.00	Pres Snsr A-Port (V)	C1P14	C1P44
0.00	Pres Snsr B-Port (V)	C1P15	C1P46
0.00	Pres Snsr Aux Pump (V)	C1P16	C1P37
0.00	Pres Snsr Charge Pump (V)	C1P17	C1P38
0	Hyd Temp Snsr (ohm)	C1P27	
			Air Supply Valve-Coil
			Vibe Motor-Coil
			Coolant Snsr-Pwr Sply
			Starter-Relay
			Horn-Relay
			CCO-Coil
			H1 Pump Fwd-EDC (A)
			(Actual)
			H1 Pump Rev-EDC (A)
			(Actual)

Air Supply Valve Coil: Indicates if Main Air Supply Valve coil is On/Off.

Vibrator Motor Coil: Indicates if Air Vibrator coil is On/Off.

Coolant Sensor Power Supply: Indicates Coolant Sensor power is On/Off.

Starter Relay: Indicates if Starter Relay is On/Off.

Horn Relay: Indicates if Horn Relay is On/Off.




CCO-Coil: CCO-Coil turns On/Off the Propel pump. When Off, no propel is possible.

H1 Pump is the Propel Pump direct mounted to the engine. EDC – Electronic Displacement Control.

- H1 Pump Forward-EDC (A): Forward Calculated Command Current sent to the EDC.
  - (Actual): Forward Actual Command Current sent to the EDC.
- H1 Pump Reverse-EDC (A): Reverse Calculated Command Current sent to the EDC.
  - (Actual): Reverse Actual Command Current sent to the EDC.

# MC50 Lower Frame – page 1

From Main Menu - **Diagnostics**, **MC50-Frame**

MC50-110 on Lower Frame (Node 5) ✓ Offline ✗			
Inputs		Outputs	
	Elevator Down Lmt Sw	C1P06	C1P39 Back Up Alarm-Relay 
0.00	Steer Psn Snsr (V)	C1P14	C1P40 Head Lights-Relay 
0	Left Motor PPU-A (Hz)	C1P18	C1P37 Left Wheel-EDC (A) 0.00
0	Left Motor PPU-B (Hz)	C1P19	(Actual) 0.00
0	Right Motor PPU-A (Hz)	C1P24	C1P38 Right Wheel-EDC (A) 0.00
0.00	Right Motor PPU-B (Hz)	C1P25	(Actual) 0.00
0.00	Left Mot Temp Snsr (V)	C1P27	
0.00	Right Mot Temp Snsr (V)	C1P28	
0	Fuel Lvl Snsr (ohm)	C1P29	
00.00	System Pwr (V)	C1P02	
0.00	Sensor Pwr (V)	C1P08	



MC50 Lower Frame Controller. CAN B routed to all components.

Elevator Down Limit Switch: Indicates if Elevator Down Limit Switch is Open/Closed.

Steering Position Sensor (V): Voltage received from Steering Encoder.

Left Wheel Motor PPU-A (Hz): Pulse signal from speed sensor A.

Left Wheel Motor PPU-B (Hz): Pulse signal from speed sensor B.

Right Wheel Motor P (V)PU-A (Hz): Pulse signal from speed sensor A

Right Wheel Motor PPU-B (Hz): Pulse signal from speed sensor B

Left Wheel Motor Temperature Sensor (V): Left Wheel Motor Temperature Sensor Voltage

Right Wheel Motor Temperature Sensor (V): Right Wheel Motor Temperature Sensor Voltage

Fuel Level Sensor (ohm): Actual Ohm's from Fuel Level Sensor

System Power (V): Actual voltage at this controller.

Sensor Power (V): Many sensors require 5vdc. This verifies 5vdc available.



## MC50 Lower Frame- page 2

From Main Menu - **Diagnostics**, **MC50-Frame**

MC50-110 on Lower Frame (Node 5) ✓ Offline ✗			
Inputs		Outputs	
	Elevator Down Lmt Sw	C1P06	C1P39 Back Up Alarm-Relay
0.00	Steer Psn Snsr (V)	C1P14	C1P40 Head Lights-Relay
0	Left Motor PPU-A (Hz)	C1P18	C1P37 Left Wheel-EDC (A) 0.00
0	Left Motor PPU-B (Hz)	C1P19	(Actual) 0.00
0	Right Motor PPU-A (Hz)	C1P24	C1P38 Right Wheel-EDC (A) 0.00
0.00	Right Motor PPU-B (Hz)	C1P25	(Actual) 0.00
0.00	Left Mot Temp Snsr (V)	C1P27	
0.00	Right Mot Temp Snsr (V)	C1P28	
0	Fuel Lvl Snsr (ohm)	C1P29	
00.00	System Pwr (V)	C1P02	
0.00	Sensor Pwr (V)	C1P08	

Back Up Alarm-Relay: Indicates if Back Up Alarm Relay is On/Off. Touch to test.

Head Lights-Relay: Indicates if Head Lights Relay is On/Off. Touch to test.

Left Wheel-EDC (A): Calculated Command Current sent to the EDC.

- (Actual): Actual Command Current sent to the EDC.

Right Wheel-EDC (A): Calculated Command Current sent to the EDC.

- (Actual): Actual Command Current sent to the EDC.

# PVED Coils

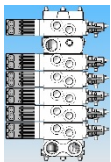
From Main Menu - **Diagnostics**, **PVG Valves**

## PVED-CC Coils on CAN bus

0	Steering (N131)	
0	Swing (N129)	
0	Elevator (N132)	
0	Slide (N133)	
0	A/C (N130)	
0	Hopper (N134)	
0	Auger (N128)	

*A-Port      B-Port*

Activating the Joystick functions will show the valve movement on the appropriate sliders shown above.



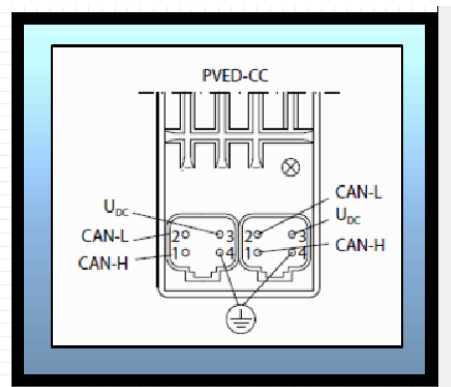
PVG Valve Bank is both valve groups pictured. Mounted in the Engine compartment on the CAN B route.

This is referred to as the PVG32. Steering, Swing, Elevator, Slide Gate, AC, Hopper Up/Down.



PVG100 is the Auger Valve. Also mounted in the Engine compartment on CAN B.

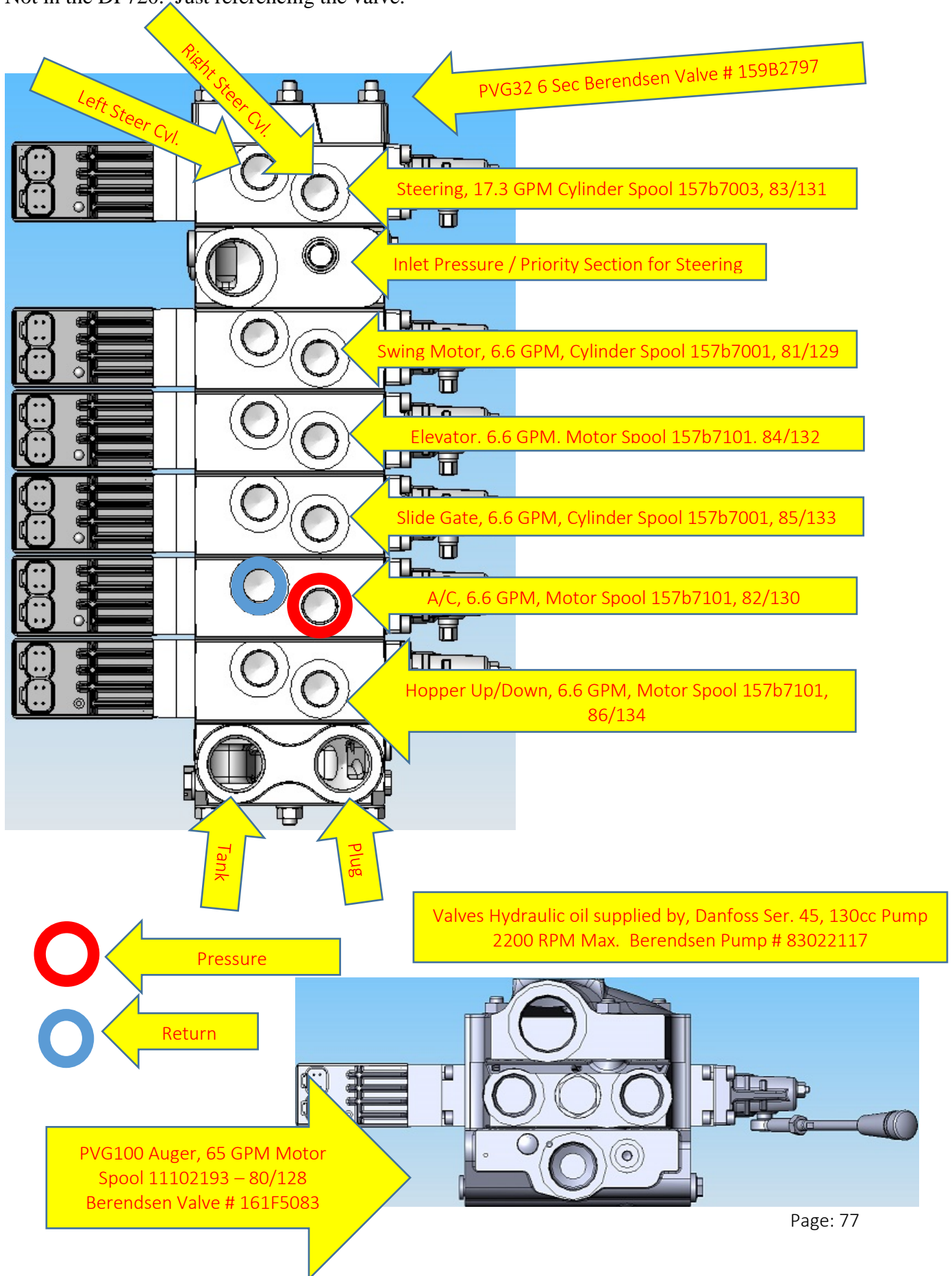
Touch to display the wiring diagram for the electrical connectors to the valves.



See next page for valve descriptions.

# PVED Valve Descriptions

Not in the DP720. Just referencing the valve.

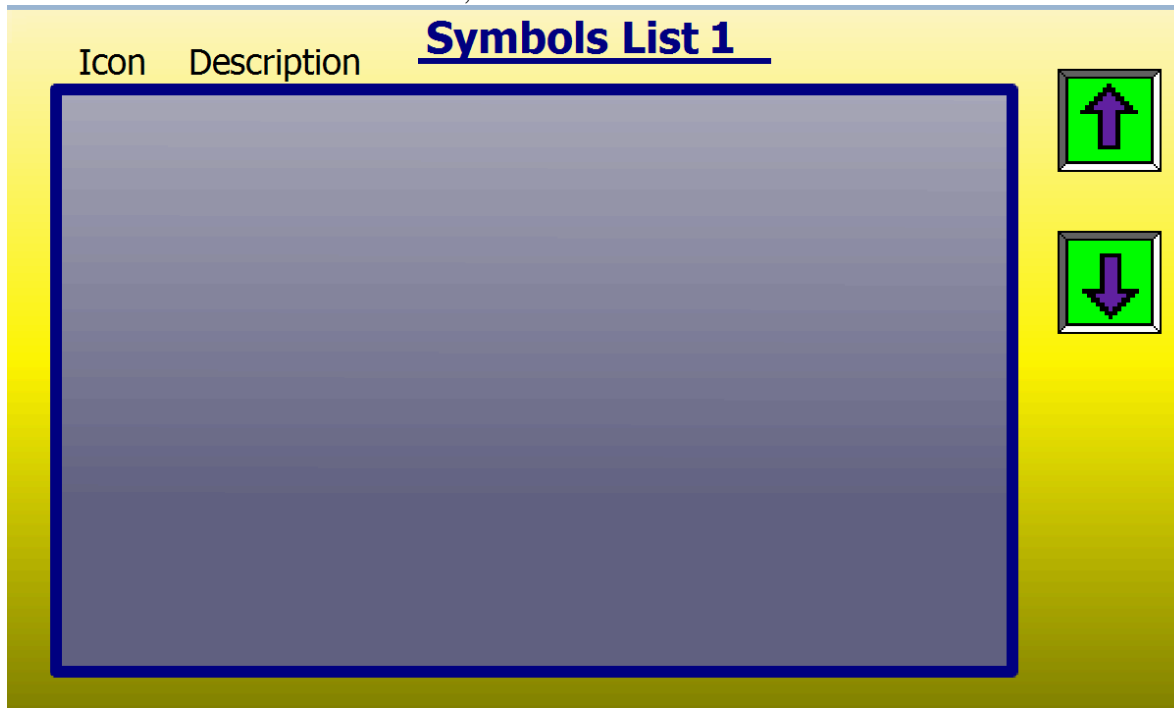


# Symbols List

From Main Menu - **Diagnostics**, **Symbols List**












**Symbols List 1**

Icon	Description
------	-------------



Use   to scroll the Symbols.

## *Symbols 1*

	Hydraulic Oil Pressure
	Hydraulic Oil Temperature
	Flow Rate--Oil or Fuel
	Fluid Level
	Hydraulic Oil
	Battery Voltage
	Engine Coolant Temperature
	Engine Oil Pressure
	Air Intake Manifold Pressure
	Fuel Level
	OK-Checked, Select, Completed

## Symbols 2

From Main Menu - **Diagnostics**, **Symbols List**, 

	Head Lights
	Work Lights
	Windshield Wipers
	Windshield Washer
	E-Stop Tripped--Machine Disabled
	E-Stop OK
	System Faults Active
	Alarm Conditions Present
	Seat Switch Open Circuit
	Seat Switch Satisfied










## Symbols 3

From Main Menu - **Diagnostics**, **Symbols List**,  

	Service Required
	Service Item OK
	USB Flashdrive--Writing to File
	USB Flash Drive--Connected
	USB Flash Drive--Not Connected
	<b>Don't Touch--Don't Remove</b>

## Symbols 4

From Main Menu - **Diagnostics**, **Symbols List**,   









-  Hydraulic Oil Filter Pressure
-  Hydraulic Suction Line Pressure
-  Wheel Motor Bearing Temperature
-  Vibrator
-  Elevator Down
-  Elevator Not Down
-  Glow Plugs Engaged--Do Not Start Engine
-  Check Engine
-  Parameter-In-Range (Ok to Calibrate)




# Service Log, Read Only

From Main Menu - **Maintenance**

From Main Run - 

### Service Log

Service	Interval	Last	
1 Engine Oil Change	0	0	
2 Engine Oil Filter Change	0	0	
3 Eng Crankcase Vent Filter Change	0	0	
4 Fuel Filter#1 Change	0	0	
5 Fuel Filter #2 Change	0	0	
6 Engine Inner/Outer Air Filter Change	0	0	
7 Air Comp. Inner/Outer Filter Change	0	0	
8 Engine Coolant Change	0	0	

Current Engine Hours



Use Up/Down arrows to scroll through the maintenance items to see what to report to maintenance.



Pressing the Edit Icon will display the Maintenance Pass Code screen, page 82.

## Maintenance Pass Code

From Main Menu -  

From Main Run -  



*Maintenance Log Pass Code: 54321*

Enter Maintenance Log to edit the Log from this screen.



Use the Up/Down arrows to increase/decrease the digit under the green bar.



When the desired number shows, use the Right Arrow to move to the next digit.




When all 5 digits read the correct passcode, press the Check box to enter Maintenance Logs.

If you enter an incorrect passcode: **WRONG!** will be displayed.











# Edit Service Log





From Main Menu - **Maintenance**, , successful passcode



From Main Run - , , successful passcode


### Edit Service Log

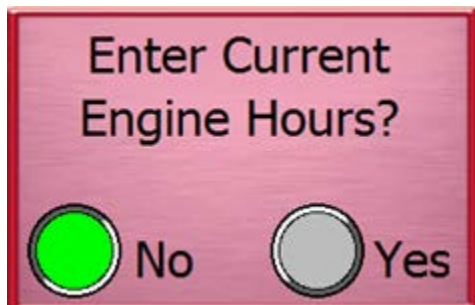
Service	Interval	Last	
1 Engine Oil Change	0	0	
2 Engine Oil Filter Change	0	0	
3 Eng Crankcase Vent Filter Change	0	0	
4 Fuel Filter#1 Change	0	0	
5 Fuel Filter #2 Change	0	0	
6 Engine Inner/Outer Air Filter Change	0	0	
7 Air Comp. Inner/Outer Filter Change	0	0	
8 Engine Coolant Change	0	0	

Current Engine Hours

  Up/Down arrows to scroll to desired maintenance item.

 Pressing the Wrench will pop up a confirmation screen.



Accepting will log the Current Engine Hours to the

highlighted item.

## Safety Warning

From Main Run -



, or 

**Safety Warning !!**



**Overriding safety sensors can cause Death or Serious Injury to yourself or others.  
Intended for emergency situations only.  
Do you understand potential dangers?**

No       Yes

You must confirm your understanding you are overriding features designed for your Safety. This should only be done in emergency situations, such as emptying concrete when a sensor or wiring is bad.



to confirm the override and display the Safety Override Pass Code screen, page 85.

## Safety Override Pass Code

From Main Run -



, or



on Safety Warning Screen



Safety Override Pass Code: 00911.



Use the Up/Down arrows to increase/decrease the digit under the green bar.






When the desired number shows, use the Right Arrow to move to the next digit.



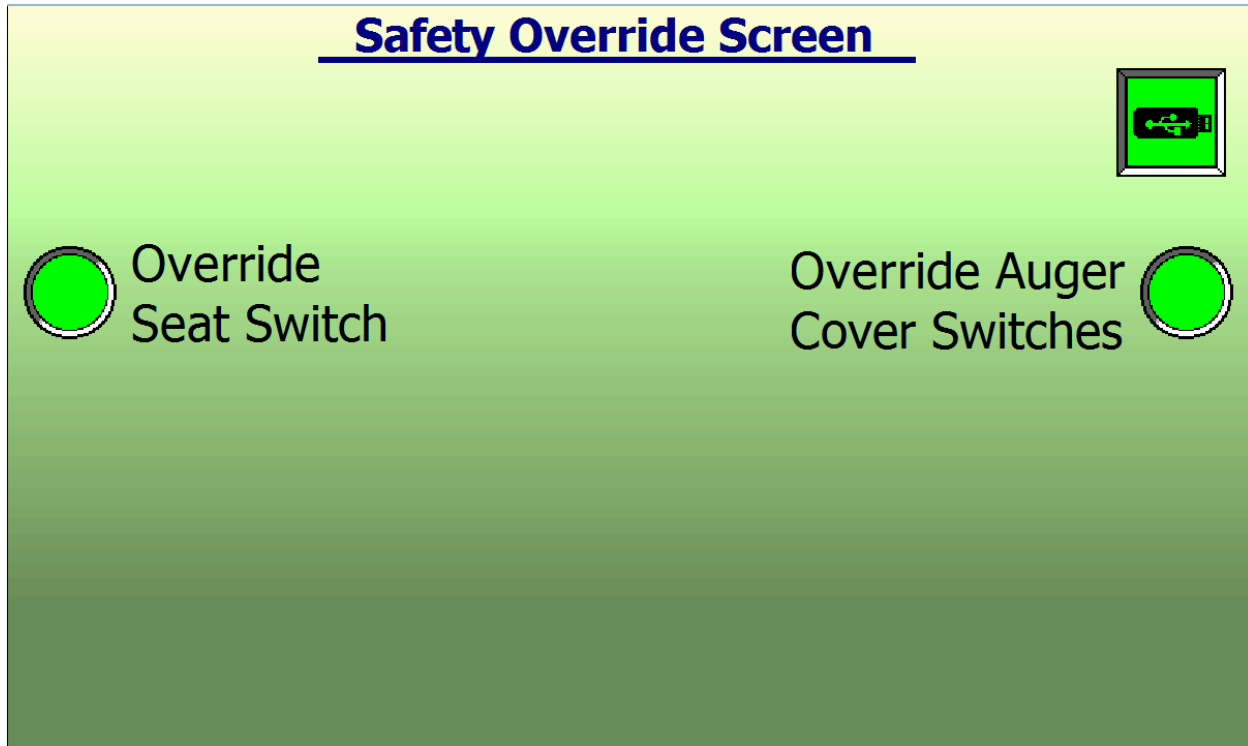
When all 5 digits read the correct passcode, press the Check box to enter Maintenance Logs.

If you enter an incorrect passcode: **WRONG!** will be displayed.

## Safety Override Screen



From Main Run - , or , and pressing  on Safety Warning Screen, then

successful password

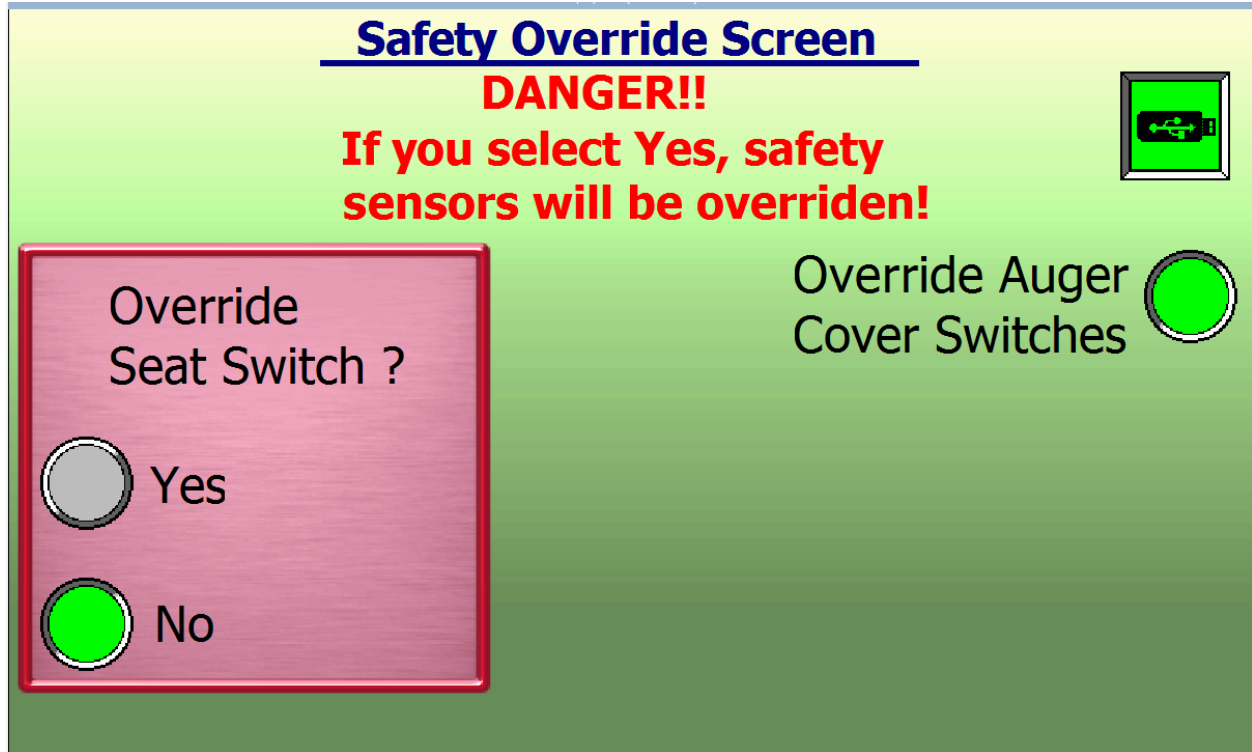


Select the Override required.

## Safety Override Screen, Seat Switch

From Main Run - , or , and pressing  on Safety Warning Screen, then

successful password, and selecting Seat Switch Override.



Select Yes to override a Seat Switch error and the following message will be displayed for 5 minutes, counting down from 300 seconds.






At about 10 seconds to go, the engine and hydraulic functions will slow to idle then stop.

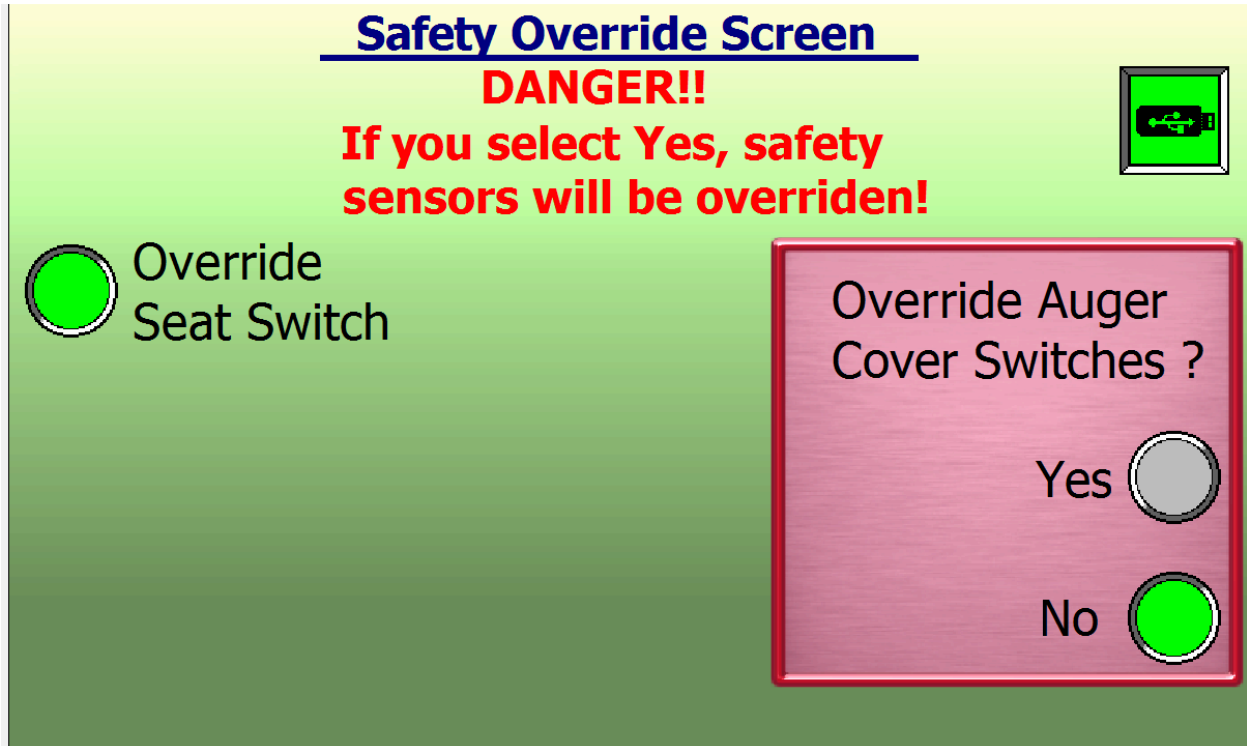
At the 5-minute time out, the machine will not run unless the Safety Override process is started again.

This should only be used to get a machine empty and back to a service area in case of a damaged seat switch or wiring.

## Safety Override Screen, Auger

From Main Run - , or , and pressing  on Safety Warning Screen, then

successful password, and selecting Auger Override.



Select Yes to override an Auger Cover Switch error and the following message will be displayed for 2 minutes, counting down from 120 seconds.

The Auger will run for 2 minutes.




At the 2-minute time out, the auger will not run unless the Safety Override process is started again.

## Starting the T-644

- Before you start the engine, make sure of the following:
- Your seat belt is properly fastened.
- Hearing protection is in place, if required.
- E-Stop is pulled to “out” position.

### Start Sequence

- Turn the key to the “1” (ON) position.
- The DP720 startup sequence begins. The Logo Screen (page 31) is first and lasts about 30 seconds.
- While waiting, visually confirm perimeter of T-644 is clear of personnel or obstructions. Look out front and view camera screens.
- The Camera's Working Screen (Pre Start Safety Checks 1, page 33) is next. Confirm all 3 Camera views are correct.
- Buzzer Working (Pre Start Safety Checks 1, page 33) is next. Confirm the In Cab buzzer and the Beeper at the rear of the machine are working.
- Pre Start Safety Checks 2 (page 34) confirms all safety checks are met. Proceed to Engine Start Screen to start the engine.
- Engine Start (page 35) is where you may start the engine. Beware if the Grid Heater Icon is red,  it means the engine needs to Pre-heat. When the Icon returns to gray, it is safe to Start.
- Steering Alignment (page 36) gives you an opportunity to align the Left JS to the Front End. If it already is, the screen will time out in a few seconds. If it is not aligned, the operator must manually align them. Once alignment is reached, the screen will close and display the Main Run – page 1 (page 40.)
- It may now be safe to move the T-644, but first take another good look in front of the machine and look at all 3 views on the Camera Monitor.

#### **WARNING**

- DO NOT leave the key in the “1” (ON) position when the engine is NOT running. This may cause the battery to run down.
- DO NOT crank the engine for more than 10 seconds at any one time. This may cause damage to the starter and run down the battery.

## Moving the T-644

Make sure the area surrounding the T-644 is clear of personnel and obstructions before moving the machine in any manner. The T-644's maneuverability is due to its articulated steering, but it takes practice to perform properly. When steering the wheels right, the hopper and trough first move left. When steering left, the hopper and trough first move right. Start slowly and give yourself adequate clearances for safe operation!

- Engage Creep Mode, on the Left JS (page 68).



on the Main Run (page 40.)



Indicator will be Green. Adjust setting 20-

40%. Lower is better to begin.

- Look around for obstacles. If all clear, push and hold the parking brake valve to unlock parking brakes.
- The engine should be idling as the DP720 always starts in Auto RPM mode. Engine RPM's will increase automatically as you start to move. This is normal, and being in Creep Mode, your speed will be slower anyway.

*No controls that cause machine movement will be active unless either the Left JS operator present trigger, or the Right JS operator present trigger is pulled and held. Either trigger is Ok, it must be held at all times any movement is desired.*

- Pull and hold an Operator Present Trigger on either JS.
- Slowly push the Left JS forward until the T-644 starts to move. Add more forward movement to increase speed.

**DANGER**

*Always be aware of the end of the Trough movement while steering!*

- Steer the front wheels in the direction the machine must move, and then adjust the hopper if necessary. Glance at the DP720 Main Run (page 40) to help associate your JS movements with the actual Front End movement. It might take a second for the Front End to catch up with the JS.
- Inexperienced operators initially tend to “over steer” the unit until confidence is gained. Practice at a very low speed in a safe, open area.
- Practice maneuvering right and left. Make some slow 180° turns. Practice coming out of your turn in the opposite direction. Make some 360° turns and practice coming out of the turn in the same direction.



**DANGER**

*Always watch your surroundings. Maintain safety awareness!*

- Stop any travel. It is time to practice swinging the hopper left and right.
- Pull and hold an Operator Present Trigger on either JS.
- Move the Right JS Left or Right to Swing the hopper. Go both directions.
- To re-align the hopper for proper straight forward travel. Swing the hopper until the hopper is centered between the Green Lines of the Left and Right camera views.
- Practice slowly raising the hopper up and down, then swing it to the right and left with the hopper raised.
- Once comfortable, swing the hopper left, raise, and then add forward and backward travel.
- Practice swinging the hopper to the right and add forward and backward travel.

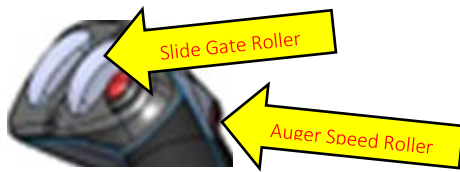


- The Auger button on the Right Joystick can be depressed while practicing. Anytime the Auger button is depressed, the Engine will automatically rev to Max RPM's. However, the T-644 will maintain the current travel speed. This is normal.

If you have the Slide Gate Option, you may see:

**Open Slide Gate Before Engaging Auger**

The DP720 tries to track the last commands of the Slide Gate. It tracks the last command to full open. If this is the first use of the auger of the day it will probably display. Simply roll and hold the Slide Gate Roller to the bottom and hold for at least 3 seconds. The Auger should run now.



**DANGER**

*Get comfortable controlling the machine's motion and operation before moving into close quarters and working near a crew, forms, or a batch plant.*

## Towing the T-644

In the event of an engine problem or other malfunction that prevents the T-644 from moving under its own power, the T-644 may be towed to a suitable nearby location for appropriate service to be performed.

**(Figure 7.) Prior to towing**, both rear wheel gearboxes must be disengaged to prevent possible damage to the hydraulic motors and pump. To disengage rear gear boxes, go to both left and right rear hubs and remove the (2) quarter inch bolts that affix the disengage cap to the center of the gearbox. Once removed, flip the disengage cap over and put it back in place so that the protrusion on the cap pushes into the center of the gearbox and depresses the tip of disengage rod. Replace the (2) quarter inch bolts and tighten them to hold the disengage cap in place. Do this on both the left and right gearboxes.

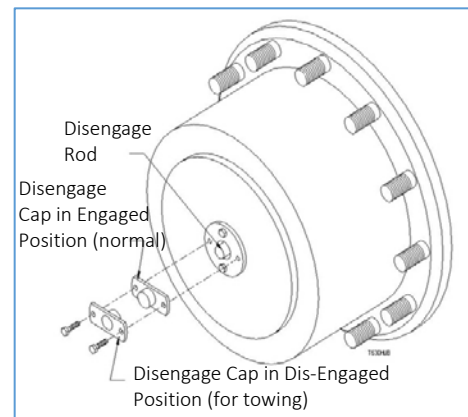


Figure 7

Reverse this procedure on both gearboxes to reconnect the gearbox for driving. It is critical to be sure the disengage rod has returned to the “out” position before reinstalling the disengage cap. You may have to rock the wheel.

The T-644 may be towed from either the front or rear, using appropriate gauge chains and/or hooks attached to the lift points (forward or rear) pictured on page 5. With a full load of concrete, the towing weight of a T-644 will be approximately 52,000 lbs (23.6 metric tons.)

If immobilized for any reason, the pouring chute of the T-644 may be moved back to the travel position by being pushed or pulled into place with a fork lift, loader, or similar large equipment. If you must reposition the chute in this manner, be sure to use planks or wood blocking to protect the chute from damage by the equipment pushing or pulling the chute into position.

**WARNING**

Do not attempt to use a loader bucket or any other lifting equipment under the frame of the T-644 to either push or tow the T-644.  
Never use any kind of equipment to push against the rear frame of the T-644.

## Tip Over Cautions

**DANGER**

Tip over can occur if the T-644 is improperly operated. Injury or death may result. High-speed turns, especially combined with sudden braking, can cause load shift that results in tip over.

### In Case of Tip Over:

The operator should hold on firmly to the joysticks or armrests, brace feet, lean forward and lean away from the point of impact.

### Before Filling the Hopper with Concrete

Apply form oil to the hopper and chute to prevent concrete from sticking (this also makes clean up much easier.)

### Applying Form Oil:

1. Park the T-644 with the hopper straight so the top of the front frame may be used as a standing platform.
  - a. Lower the chute all the way down.
  - b. Turn engine off.
  - c. Remove key from ignition and place it in your pocket.
  - d. Make sure the parking brake engaged before leaving the cab.
2. Exit the cab and proceed to the right side of the T-644
3. Loosen safety clamp handles manually. Turn and loosen each safety clamp head 1/4 turn counter-clockwise so that the safety clamp foot can pivot clear of the door and the door will be free to swing up and open. (Figure 8.)

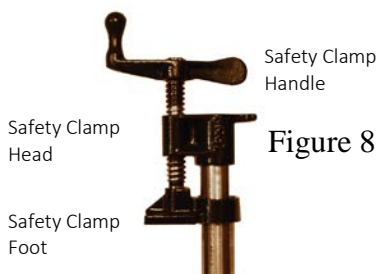


Figure 8

- Using the chute cover door tool mounted on the left front side of the chute, open the two chute doors at the forward end of the chute (farthest away from the operator cab.) (Figure 9.)



Figure 9

- Take the spray can or hose for coating the hopper with form oil to the operator wash platform, always maintaining 3 points of contact. (Figure 10.) Always secure the safety chain while on the cleanout platform.



Figure 10

- On the way to the platform, open the chute cover door next to the operator cab and secure it with the latch on the side of the operator cab. (Figure 11.) Open the cover door closest to hopper and secure it with the latch mounted on the hopper. Then continue to the platform.



Figure 11

- Spray the inside of the hopper with the form oil.

**DANGER** *Any form oil spilled or sprayed onto surfaces where you walk, stand or step will create a potential slipping hazard. Avoid getting form oil on any surface where you will stand, walk or step.*

- Carefully step down to the top of the front frame.
- Spray the underside of the open cover doors, the auger and trough with form oil as far as is easy to safely reach.
- Next, close the chute cover door closest to the hopper. Then, close the chute cover door located beside the operator cab (do so in sequence given.) Turn and tighten the safety clamp head clockwise so that the foot of the clamp is squarely over the chute cover door.

To finish securing the safety clamps and sealing the chute cover doors, tighten the foot of the clamp down onto the surface of the door by turning the handle clockwise until snug.

**Do not position or tighten the 4th safety clamp out from the hopper at this time!**

11. Carefully step down to the ground and apply form oil to the rest of the auger and underneath the cover doors farthest away from the cab. Also spray any funnel or attachment you may be using.
12. Using the chute cover door tool, now close the two forward-most chute cover doors.
13. Turn and tighten the head of all remaining chute cover door safety clamps — turn clockwise (or until snug) to position the foot of the safety clamp squarely over the cover doors. Turn the safety clamp handle(s) clockwise until snug to seal the remaining chute cover doors.
14. If you are using any product to help prevent concrete from sticking to the outside of the machine, now is the time to apply it. **Tucker's does not recommend the use of form oil on the outside of the machine because of the adverse effects on rubber components it may contact.**
15. The T-644 is now ready to fill with concrete.

## Filling the Hopper with Concrete and Operating the T-644 with a Full Load

Before moving the T-644 make sure your path is clear of personnel or other obstacles. Observing all safety procedures and practices previously described, carefully center the hopper of the T-644 under the batch plant discharge chute either by backing under or driving under (as your plant and conditions allow.) Make a mental note of your surroundings and pick a pole, column, or brace to reference your position each time for filling and refilling.



If you have the slide gate option, be sure it is closed before the T-644 is filled from the batch plant.

With hopper level, fill to the bottom of the arrow in the Hopper to obtain load of 6 cubic yards (5.48 m) of concrete. Do not over fill! See Fill Line (page 8.)

When filling is complete, check your surroundings, make sure there are no people or obstacles in the way and slowly drive from under the batch plant.

**DANGER**

Some concrete mixes are very wet. Use extra care and slow speeds when hauling wet loads. Quick stops and sharp turns (especially when a quick stop is performed while turning) may cause a wet load to shift in the hopper and slosh over the sides, the

front, or rear. In extreme cases, too much speed combined with turning or sudden stops may cause the machine to tip over. (See Tip Over Cautions, page 93.)

As you drive to the form, keep a constant lookout for personnel and equipment. Watch in front of you. Glance at your Camera Monitor. Back to the front. Back to the Camera. Back and forth all the time. People and equipment can move into your path unexpectedly. You must always be ready to avoid a collision. Keep your eyes where you are traveling. Keep your hands on the Joysticks. The momentary distraction of waving to a fellow worker is all it takes to miss an approaching hazard.

As you make turns, especially around buildings or stacks of materials, slow down and be sure you can see the path with time to react to unexpected obstructions. Just because this route was clear the last time you traveled it, does not mean it is unobstructed this time. If you feel that you may have run over an unseen obstacle stop the T-644 safely, turn off the machine, safely dismount and check your path. **DO NOT BACK UP OR YOU MAY RUN OVER THE OBSTACLE A SECOND TIME!**

## **Pouring Concrete**

As a T-644 operator, you will become proficient in filling forms utilizing the capabilities of the machine so that the crew has less work spreading and leveling the concrete. The maneuverability of the T-644 and the mobility of the chute allows you to put concrete precisely where it is needed in the form. This saves on manual labor and increases the speed and efficiency of your form filling operation. Caution: Overfilling forms causes the crew to have to shovel out excess concrete. Slightly under-filling forms is recommended because it is quicker and easier to add a bit more concrete using the T-644 than it is to shovel out excess concrete using manpower.

## Caution to Operator!

The T-644 operator is responsible for his fellow workers' safety.



- Always look before swinging chute or moving machine.
- Remain aware of where every crewmember is working or standing. You have a Multi-View Monitor. Check it often.
- Appoint one crewmember as a safety man to help guide you from his position on the ground.
- Do not allow anyone within 3 feet of or under the chute.
- Never pour concrete unless the T-644 is on flat, stable ground.

## Caution to Ground Crew!

Everybody on the crew should contribute to a safe work environment:



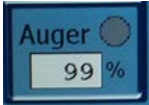
- by paying attention to the designated safety man.
- by being aware of the machine's activity at all times.
- by trying to observe and anticipate what the T-644 operator will do next so they are not in the machine's or the trough's path.

**When approaching the form to fill it with concrete, it is critical that you align the front and rear wheel parallel to the form. This cannot be overstated. If you have the wheels of the T-644 parallel before you start pouring any concrete, the machine will travel straight along the form as you move forward. Failure to begin filling the form with the wheels parallel to the form will cause the T-644 to either move away from the form or into the form as you progress. Either of these is potentially very dangerous.**

When you arrive at the section to be filled, check your surroundings and align the T-644 to the form.



- Left JS, Select Creep Mode.
- Know where the crew is and any other obstacles.
- Check your Camera Monitor often.
- Move the trough into position. Make sure everyone in the crew is ready and is aware of the machines intended movements. Open the Slide Gate (if your machine is so equipped.)

- Verify Auger creep %  is a positive number (for forward auger rotation.)

Adjust if necessary. Depress the auger Button to pour concrete into the form.

- Constantly monitor the position of the trough relative to the form AND the members of the ground crew.
- Maintain safety awareness - stay alert!
- Check your Camera Monitor often.
- Move the chute and the T-644 forward or backward as needed to fill the form, while staying aware of your co-workers and any equipment or obstacles that are near or are getting closer to your area of operation.
- Constantly monitor your surroundings.

When the hopper and trough start to run empty, press the Vibrator Button to shake remaining concrete into the auger while continuing to run the auger. Only run the vibrators in 20-30 second bursts, allowing a 20-30 second pause in between.



- Never run the vibrators with a full load of concrete in the hopper. This can cause the aggregate to settle, or the load to compact so tightly it will not auger out. Improper use of the vibrators may cause the mix to “bridge” over the auger and fail to leave the hopper.
- Do not run the vibrators more than 30 seconds at a time. The air tank can be drained and the parking brakes will lock.

When the hopper and trough are empty, check to be sure it is safe and then swing the chute straight and align the hopper for straight travel. To re-align the hopper for proper straight forward travel, swing the hopper until the hopper is centered between the Lines of the Left and Right camera views. After making sure the crew is clear of the machine and your route is clear of equipment and debris, slowly move away from the form and cautiously proceed to the batch plant for another cycle.

### Clean Up/Wash Out Procedures:

**DANGER**

Follow all safety procedures carefully during clean up and wash out to avoid injury or death to you, fellow workers or damage to the machine.



1. Empty any excess concrete from the hopper and trough in an approved area and proceed to wash out area.
2. Park the T-644 with the hopper straight so the top of the front frame may be used as a standing platform.
  - a. Leave the chute elevated slightly, but low enough to safely exit the cab.
  - b. Close the Slide Gate.
  - c. Turn engine off.
  - d. Remove key from ignition and place it in your pocket.
  - e. Make sure the parking brake engaged before leaving the cab.
3. Exit the cab and proceed to the right side of the T-644
4. Get wash down hose and ascend to the wash out platform. Always maintain 3 points of contact. (Figure 12.) Always secure the safety chain while on the cleanout platform.



Figure 12

5. Once in the wash out platform above and to the right of the operator cab with water hose, spray out the hopper, allowing water to build up inside hopper.

**DANGER** *WATER SPRAYED OR SPILLED ON ANY SURFACE WHERE YOU MUST STAND, WALK OR STEP - ESPECIALLY IF COMBINED WITH FORM OIL - WILL CREATE A SLIPPING HAZARD. BRACE WELL. DO NOT ATTEMPT TO WALK WHILE SPRAYING WITH HIGH PRESSURE.*

6. When hopper is clean and there is sufficient water in hopper, return to the operator cab and start engine.

*If you have the Slide Gate option, and try to run the Auger you may see the following message. If you do, with an Operator Present Trigger pulled, roll the Slide Gate Roller down for at least 3 seconds to open the Slide Gate. (Figure 13.) The Auger will now be able to run.*

**Open Slide Gate Before Engaging Auger**

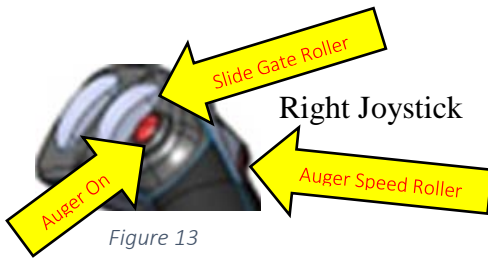


Figure 13

Check the Display for Auger rotation direction. Positive numbers are forward rotation. Negative number are reverse rotation. To run the auger in reverse, roll the Auger Speed Roller all the way back and hold for 1 second and release. (Figure 13.) Now when the Auger On Button is pushed, the auger will run in reverse. To go back to forward, roll the Auger Speed Roller all the way forward and hold for 1 second and release, the auger will now go forward. This can be done while the auger button is held down to quickly change from forward to reverse.

7. Roll the Auger Speed Roller back for 1 second and release. Lower hopper all the way down. When water starts to run out the spout, depress the Auger On Button to begin reverse auger rotation for 10 seconds. This will churn the water in the chute, aiding in cleansing the backside of the auger and the inner surfaces of the chute cover doors.
8. Next, roll the Auger Speed Roller forward for 1 second and release. The auger will run in the forward direction. Allow some water to run out and then repeat the reverse process. Roll the Auger Speed Roller backward and release, then forward and release. Perform this reverse and forward process 5-6 times, then auger the rest of the water from the hopper.
9. Turn off the engine remove and pocket the engine keys. Exit the cab carefully dismounting the machine. Remember, it is wet and slippery. Move to the right side of the machine.
10. Loosen safety clamp handles manually. Turn and loosen each safety clamp head 1/4 turn counter-clockwise so that the safety clamp foot can pivot clear of the door and the door will be free to swing up and open. (Figure 14.)



Figure 14

Using the chute cover door tool mounted on the left front side of the chute, open the two chute doors at the forward end of the chute (farthest away from the operator cab.) Leave the two chute cover doors closest to the cab and the hopper closed at this time. (



11. Figure 15.)



Figure 15

12. Step up and onto the top front frame with the water hose.

13. Loosen the remaining chute cover door safety clamps, first using the handle to back the foot of the clamp off the surface of the door and then turn the head of the clamp 1/4 turn counter clockwise. This will swing the foot of the safety clamp away from the chute cover door, freeing the door to hinge up and open.

14. Open the chute cover door next to the operator cab and secure it with the latch mounted on the side of the cab. (Figure 16.) Open the chute cover door closest to the hopper using the same procedure described above and secure it with the latch mounted on the hopper.



Figure 16

15. Spray the underside of the open chute cover doors, the auger and trough as far as is easy to safely reach with the hose spray.

16. Close the chute cover door next to the hopper, then the chute cover door next to the operator cab (in this sequence.) Turn and tighten the safety clamp head 1/4 turn clockwise (or until snug) to align the safety clamp foot squarely over the chute cover door. To safely secure the main portion of the safety clamp, tighten the clamp handle down snugly by turning clockwise to seal the door. ***Do not position or tighten the 4th safety clamp out from the hopper at this time!***
17. Step down to the ground and rinse the end of the auger and under sides of the cover doors that you could not reach with the hose from the top of the front frame. Also spray off and clean any funnel or attachment you may be using.
18. With the chute cover door tool, now close the two remaining chute cover doors (farthest from the cab.)
19. Turn and tighten the heads of all the chute cover door Safety Clamps 1/4 turn clockwise to align the foot of the safety clamps squarely over the chute cover doors. Manually turn the safety clamp handles clockwise to tighten the foot of the clamps down to seal the chute cover doors. Chute cover doors must be tightly sealed with the safety clamps properly positioned prior to pouring concrete or damage to the machine will occur.

## Inspect Daily

- Battery
- Oil, fuel or coolant leaks (*see fluid under pressure warning on page 9*)
- Head Lights and Work Lights
- Back Up Alarm operation
- Back Up Lights
- Brake Pedal and Service Brakes
- Parking Brake
- Seat Belt
- Seat Adjustment
- Horn
- Camera Monitor with 3 views
- Danfoss DP720 Monitor
- Confirm Joysticks are in good condition and good working order.
  - Make sure both Joysticks move forward, backward, left, and right easily and all directions return to center.
  - Confirm their rollers move free and snap to center.
  - Confirm the Joystick front triggers pull in easily and snap back out.
  - Confirm all buttons intact and snap out when pushed in.

## Service Daily

- Grease all fittings
- Grease turntable on left and right side of machine after opening turntable cover door(s)
- Check turntable main chain tension.
- Check chain tension on turntable swing motor.
- Check auger drive chain tension.
- Check engine oil level and top off if necessary.
- With engine cold, check engine water level and top off if necessary.
- Check hydraulic level
- Check oil level in front axle on left and right sides and add gear lube if necessary.
- Fuel the T-644
- Add DEF (Diesel Exhaust Fluid, Tier 4 Final Engines Only)
- Check Tire Pressure to confirm it is 65 PSI (4.48 Bars). You may skip this if your T-644 is equipped with Urethane-filled tires.
- Check all Wheel Nuts and Rims, front and back, left and right to ensure all hardware is in place and appears tight.
- Drain Air Tank

## Appendix: Faults- 1-65

#	Component	System	Fault
1	MC50-Engine Area	CAN A (Port 1)	No Rx by DP710
2	"	CAN B (Port 0)	No Rx by DP710
3	MC50-Lower Frame	CAN B (Port 0)	No Rx by DP710
4	MC24-Cab	CAN B (Port 0)	No Rx by DP710
5	Engine	CAN A (Port 1)	No Rx by DP710
6	Joystick, Left	CAN B (Port 0)	No Rx by DP710
7	Joystick, Right	CAN B (Port 0)	No Rx by DP710
8	Preco Radar	CAN B (Port 0)	No Rx by DP710
9	PVED-CC Coil, Elevator	CAN B (Port 0)	No Rx by DP710
10	PVED-CC Coil, Auger	CAN B (Port 0)	No Rx by DP710
11	PVED-CC Coil, Swing	CAN B (Port 0)	No Rx by DP710
12	PVED-CC Coil, Steering	CAN B (Port 0)	No Rx by DP710
13	PVED-CC Coil, Slide Gate	CAN B (Port 0)	No Rx by DP710
14	PVED-CC Coil, Hopper	CAN B (Port 0)	No Rx by DP710
15	PVED-CC Coil, AC	CAN B (Port 0)	No Rx by DP710
16	MC50-Engine Area	CAN A (Port 1)	Bus Off
17	"	CAN B (Port 0)	Bus Off
18	MC50-Lower Frame	CAN B (Port 0)	Bus Off
19	MC24-Cab	CAN B (Port 0)	Bus Off
20	DP710	CAN A (Port 1)	Bus Off
21	"	CAN B (Port 0)	Bus Off
22	MC24-Cab	Sensor Power, C1P08	Volts > 5.15
23	"	"	Volts < 4.85
24	"	"	AC Ripple > 100mV
25	MC50-Engine Area	"	Volts > 5.15
26	"	"	Volts < 4.85
27	"	"	AC Ripple > 100mV
28	MC50-Lower Frame	"	Volts > 5.15
29	"	"	Volts < 4.85
30	"	"	AC Ripple > 100mV
31	MC24-Cab	Work Lights Relay, C2P09	Open Circuit
32	"	"	Over Current
33	"	Windshield Wiper Relay, C2P10	Open Circuit
34	"	"	Over Current
35	MC50-Engine Area	PSI Snsr, "Forward", C1P16	Volts too Hi
36	"	"	Volts too Lo
37	"	PSI Snsr, "Reverse", C1P14	Volts too Hi
38	"	"	Volts too Lo
39	"	PSI Snsr, "Charge", C1P17	Volts too Hi
40	"	"	Volts too Lo
41	"	PSI Snsr, "Aux", C1P15	Volts too Hi
42	"	"	Volts too Lo
43	"	Hyd Temp Snsr, C1P27	ohms too Hi
44	"	"	ohms too Lo
45	"	"	Snsr Not Detected (65535 err)
46	"	Flow Meter, C1P23	Volts too Hi
47	"	"	Volts too Lo
48	"	EDC Coil, "Forward", C1P37	Open Circuit
49	"	"	Short Circuit
50	"	"	Current Mismatch
51	"	EDC Coil, "Reverse", C1P38	Open Circuit
52	"	"	Short Circuit
53	"	"	Current Mismatch
54	"	Motor Starter Relay, C1P43	Open Circuit
55	"	"	Over Current
56	"	Vibrator Coil, C1P40	Open Circuit
57	"	"	Over Current
58	"	Vibrator Oil Valve Coil, C1P41	Open Circuit
59	"	"	Over Current
60	"	Air Supply Valve Coil, C1P39	Open Circuit
61	"	"	Over Current
62	"	Horn Relay, C1P44	Open Circuit
63	"	"	Over Current
64	"	Coolant Level Snsr Power Supply, C1P42	Open Circuit
65	"	"	Over Current

## Appendix: Faults – 66-128

#	Component	System	Fault
66	MC50-Lower Frame	Speed Snsr, Left Motor,	Temp Volts too Hi
67	"	(C1P18, C1P19, C1P27)	Temp Volts too Lo
68	"	"	Zero Hz on CH. A
69	"	"	Zero Hz on CH. B
70	"	"	Ch. A Hz ≠ Ch. B Hz
71	"	"	A-B Phase Out of Spec
72	"	"	Ch. A % Duty Out of Spec
73	"	"	Ch. B % Duty Out of Spec
74	"	"	Ch. A Signal Short to Pwr
75	"	"	Ch. A Signal Short to Ground
76	"	"	Ch. A Signal Open
77	"	"	Snsr Open Ground
78	"	"	Snsr Open Pwr
79	"	"	Ch. B Signal Short to Pwr
80	"	"	Ch. B Signal Short to Ground
81	"	"	Ch. B Signal Open
82	"	Speed Snsr, Right Motor,	Temp Volts too Hi
83	"	(C1P23, C1P24, C1P28)	Temp Volts too Lo
84	"	"	Zero Hz on CH. A
85	"	"	Zero Hz on CH. B
86	"	"	Ch. A Hz ≠ Ch. B Hz
87	"	"	A-B Phase Out of Spec
88	"	"	Ch. A % Duty Out of Spec
89	"	"	Ch. B % Duty Out of Spec
90	"	"	Ch. A Signal Short to Pwr
91	"	"	Ch. A Signal Short to Ground
92	"	"	Ch. A Signal Open
93	"	"	Snsr Open Ground
94	"	"	Snsr Open Pwr
95	"	"	Ch. B Signal Short to Pwr
96	"	"	Ch. B Signal Short to Ground
97	"	"	Ch. B Signal Open
98	"	Fuel Level Snsr, C1P29	ohms too Hi
99	"	"	ohms too Lo
100	"	"	Snsr Not Detected (65535 err)
101	"	EDC Coil, "Left Wheel", C1P37	Open Circuit
102	"	"	Short Circuit
103	"	"	Current Mismatch
104	"	EDC Coil, "Right Wheel", C1P38	Open Circuit
105	"	"	Short Circuit
106	"	"	Current Mismatch
107	"	Back-Up Alarm Relay, C1P39	Open Circuit
108	"	"	Over Current
109	"	Head Lights, Relay, C1P40	Open Circuit
110	"	"	Over Current
111	Joystick, Left	CAN Device	Component, Sys, Setup, Cal Flt
112	Joystick, Right	"	"
113	Preco Radar	"	"
114	PVED-CC Coil, Elevator	"	"
115	PVED-CC Coil, Auger	"	"
116	PVED-CC Coil, Swing	"	"
117	PVED-CC Coil, Steering	"	"
118	PVED-CC Coil, Slide Gate	"	"
119	PVED-CC Coil, Hopper	"	"
120	PVED-CC Coil, AC	"	"

## Appendix: Hydraulic Oil Specifications:

### Kendall

#### *Hyken•052 Farm Tractor Lubricant*

Kendall® Hyken 052 is a multifunctional fluid specially formulated for use in farm tractors and other off-highway equipment requiring one lubricant for the transmission, final drive, wet brakes and hydraulic systems. It meets the performance requirements of all major brands of farm tractors and other farm equipment that utilize a common fluid reservoir.

Hyken 052 is formulated to provide excellent oxidation resistance, excellent wear protection, protection against rust and corrosion, and resistance to foaming. It has carefully balanced frictional properties to ensure proper operation of wet brakes and transmission clutches.

#### ***Applications***

Hyken 052 is recommended for use where the equipment manufacturer specifies:

- AGCO (Deutz-Allis) Power Fluid 821XL
- AGCO (White Farm) Q-1826, Q-1802 (Type 55 Fluid), Q-1766B
- Case IH MS1210, MS1209, MS1207, MS1206
- Case New Holland (CNH) MAT3525 (134-D Fluid), MAT3509, MAT3506, MAT3505
- Caterpillar TO-2 (obsolete)
- Denison Hydraulics HF-0, HF-1, HF-2
- Ford ESN-M2C134-D, ESN-M2C86-C, ESN-M2C86-B, ESN-M2C41-B
- Ford-New Holland FNHA-2-C-201.00
- John Deere JDM J20C, J14C (Type 303 Fluid)
- Kubota UDT Fluid
- Landini Tractor II Hydraulic Fluid
- Massey Ferguson CMS M1145, M1143, M1141, M1135, M1129A
- Sundstrand Hydrostatic Transmission Fluid
- Vickers (Eaton) M-2950-S, I-286-S
- Volvo VME WB 101 (VCE 1273.03)
- ZF TE-ML 03E, 05F, 06E, 06K, 17E

Hyken 052 also meets API GL-4 performance requirements.

#### ***Features/Benefits***

- Excellent oxidation resistance and thermal stability
- Excellent wear protection for clutches, gears and hydraulic pumps
- Prevents brake chatter and grabbing
- Protects against rust and corrosion
- Excellent seal compatibility
- Good foam resistance
- Suitable for year-round use in most climates



## Hyken® 052 Farm Tractor Lubricant Properties

### Typical Properties

Specific Gravity @ 60°F	0.872
Density, lbs/gal @ 60°F	7.26
Color, ASTM D1500	305
Flash Point (COC), °C (°F)	210 (410)
Pour Point, °C (°F)	-43 (-45)
Viscosity, Brookfield cP @ -20°C (Brookfield) cP @ -35°C (Brookfield)	2,800 26,700
Viscosity, Kinematic cSt @ 40°C cSt @ 100°C	61.0 9.3
Viscosity Index	146
Ash, Sulfated, ASTM D874, wt %	1.41
Total Base Number (TBN), ASTM D2896	9.6
Zinc, wt %	0.149

### Health and Safety Information

For recommendations on safe handling and use of this product, please refer to the Material Safety Data Sheet via <http://w3.conocophillips.com/NetMSDS>.

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