

Digital Command Center Plus Operator's Manual

(Applies to DCC Plus software v4.0 and higher)
Updated 1/16/2006



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1.0 Introduction

What it is

The Digital Command Center Plus (DCC+) is a flexible PLC-based control system for use with ANFO, Heavy-ANFO, Repump, and Blend-Pumper trucks. It provides simple preset-quantity blending and pumping control as well as blend-ratio and totals monitoring. It also adds rate monitoring, integration with a separate product-pump protection device, and a printer option.

The DCC+ is capable of monitoring usage of AN Prill, Emulsion, and Pumped Product. All monitoring and control information is displayed on a backlit LCD touch-screen. Job totals, hole totals, rates and other information are presented in large easy-to-read numbers. The information is presented in simple, context-sensitive screens to reduce information overload. Preset quantities (and other data) are easily entered by way of an on-screen keypad.

The DCC+ makes use of robust and internationally available components. The Siemens PLC and touch-screen display were designed for the toughest industrial environments and are capable of surviving the harsh conditions present in the blasting industry.

What it is not

The DCC+ is not a sophisticated closed-loop control system or data logger. Rather, the control functions of the DCC+ are limited to simple on/off control of the blending and pumping solenoid valves. Since it does not control blending or pumping rates, blend ratios must be set manually via hydraulic flow-divider valves. And despite being based on a modern PLC with a touch-screen display, the DCC+ is programmed to be a simple preset-stop controller – it is simply the next evolutionary step from the original blend truck DCC. For a truly sophisticated multi-component, closed-loop bulk-truck controller with data logging capability, it would be necessary to move up to the “iBlast” control system.

2.0 Displays and Controls Functions

The DCC+ system was designed in a modular fashion to allow it to adapt to different control needs. Rather than have one large control panel with every potentially useful control and display, different control functions have been segregated to separate control boxes. Depending on the truck configuration, a DCC+ system could contain as few as three control boxes or as many as eight. The different control boxes described below have are presented according to the type of truck they would be installed on.

2.1 All Trucks

Regardless of the type of truck, all DCC+ systems contain a Main Display Control box and an Auxiliary Hydraulic Control box.

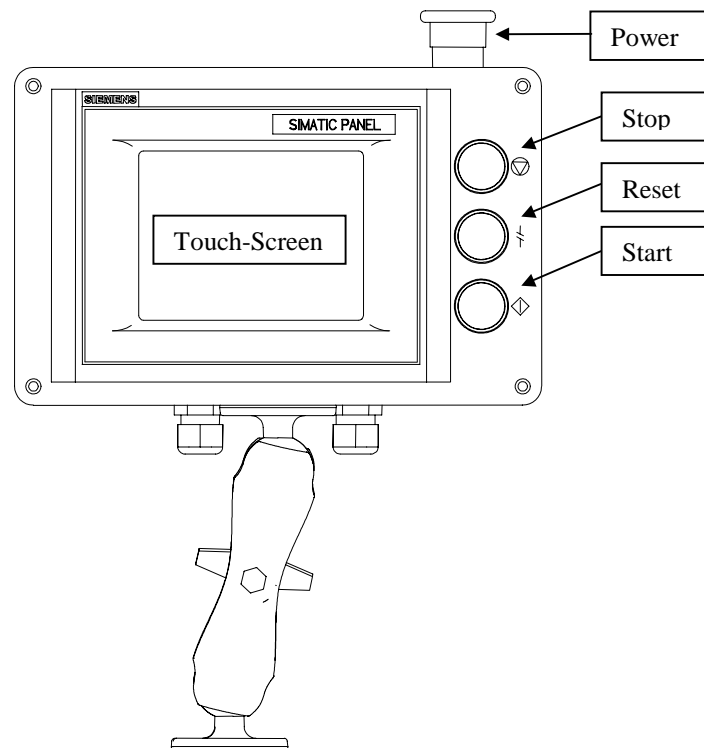


Figure 1 - Main Display Control box

2.11 Main Display Control box

The Main Display Control box shown in figure 1 contains a touch-screen as well as several frequently used push-buttons. If the optional security key switch is included, it will also be mounted in the Main Display Control box.

Touch-Screen

Most of the functionality of the DCC+ is accessed via the touch-screen. Context-sensitive screens display rates, totals, and warning messages. Data (like preset quantities) are entered using pop-up on-screen keyboards (see section 3.13).

Start Button

Whenever a “run-screen” is displayed on the touch-screen, the start button starts the blending or pumping process. A green light will illuminate the button as long as the DCC+ is in run mode (i.e. in the process of blending or pumping).



NOTE: The start button light is an important safety indicator. If the light is illuminated, the DCC+ is in run mode, and even though it may appear that no equipment is running, something could (re)start at any time (see troubleshooting section for more information).

NOTE: For safety reasons, the start button only works when a “run-screen” is displayed.

Stop Button

The stop button stops the currently running equipment and will cause the green start button light to extinguish. Once stopped, the blending/pumping systems will not restart automatically – they must be manually restarted with the start button.

The one exception to the above rule is on blend-pumper trucks where the stop button only stops one system at a time. When pumping with a blend-pumper, the auger-system works independently of the pump-system to ensure that the surge-hopper supplying the product pump is always full. The first press of the stop button stops the pumping system but allows the auger system to continue filling the surge hopper (the start button will remain illuminated). The second press stops the auger system. At this point the entire system is stopped and the start button light will extinguish to indicate that the DCC+ is no longer in run mode.

Reset Button

The reset button is used to clear hole and job totals. Momentarily pressing the reset button will reset all hole totals to zero. Job totals, however, are not reset by a quick button-press. In order to clear job totals, the reset button must be held in for about three seconds.

The optional printer prints totals on a hole-by-hole basis. Since the DCC+ does not log data, hole totals will be printed as the hole totals are reset, and the job totals will be printed when the job totals are reset. See appendix D for a more complete discussion of the DCC+ printer functionality.

Power Button

Also known as the ALL-STOP button, this red, mushroom-shaped power button removes all electrical power to the DCC+ system when pressed. To restart the system, the button must be twisted clock-wise and pulled up. Since the DCC+ system power is generally set to turn on and off with the ignition key, the power button is mostly used as a panic-button or for removing electrical power during electrical troubleshooting.



NOTE: The power button cannot be used to make the bulk truck safe for maintenance. Since pressing this button only removes electrical power, it does not prevent manual operation of the hydraulic control valves. Standard tag-out/lock-out procedures should always be followed before performing truck maintenance.

Key-switch (optional)

The optional security key-switch is not used to prevent operation of the DCC+, but rather to prevent access to certain setup data. The key-switch provides a means to prevent operator access to the calibration and start-delay screens.

2.12 Auxiliary Hydraulic Control box

Although optional, nearly all Tread trucks have hydraulic hose connectors for attaching external hydraulically-driven equipment such as transfer pumps. A manual push-pull diverter valve is pulled-out to redirect hydraulic flow from an existing Unibody component (e.g. vertical and discharge auger circuit on a blend truck) to the auxiliary hydraulic connectors. The auxiliary hydraulic control box provides a way to manually run the external equipment. Since the auxiliary hydraulic control box is hooked directly to a hydraulic solenoid valve, it is not necessary to use the main display control box.

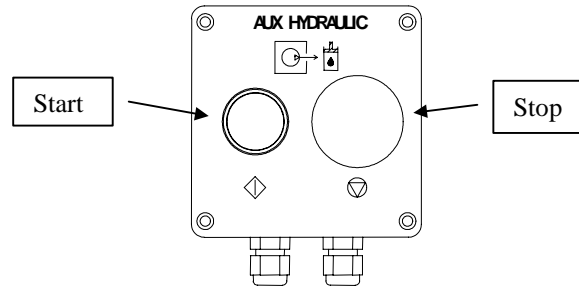


Figure 2 - Auxiliary Hydraulic Control box

Start Button

The start button electrically engages the auxiliary hydraulic circuit. If the push-pull diverter valve was not pulled out first, the applicable Unibody component (e.g. vertical and discharge auger circuit on a blend truck) will run instead of the external hydraulic equipment.

NOTE: The start button is a momentary contact that engages an electrical relay. This arrangement was used instead of a maintained contact –type button to avoid unintended restarts. If the electrical power on the Unibody is lost (or turned off) while the auxiliary hydraulic system is running, the auxiliary hydraulics will stop and will not restart when power is reapplied. In order to restart the auxiliary hydraulic circuit, the start button will have to be pressed again.

Stop Button

The red, mushroom-shaped stop button is used to electrically stop the auxiliary hydraulic circuit. It will not be possible to restart the auxiliary hydraulics until the stop button is twisted clockwise and pulled-out.



NOTE: The auxiliary hydraulic control box provides electrical control of the auxiliary hydraulic circuit only. As long as the truck's PTO is engaged, the auxiliary hydraulic circuit can be controlled manually with the hydraulic control valves.

2.2 ANFO or Heavy ANFO Trucks

In addition to the Main Display and Auxiliary Hydraulic Control boxes, ANFO or Heavy ANFO trucks will have a third box.

2.21 Blend Control Box

The blend control box is installed on any truck with ANFO augers.

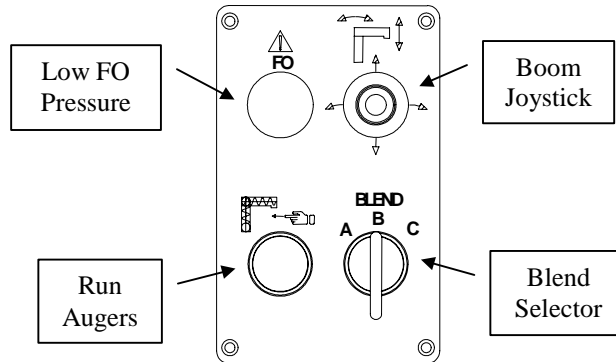


Figure 3 - Blend Control box

Boom Joystick

The boom joystick is used to move the boom auger.

Blend Selector

The blend selector is used to switch between pre-defined blend formulas. Each formula's ratio must be manually set via adjustable-proportional flow-divider valves.

Note: The standard Unibody configuration does not include multiple blend formulas. Up to 2 preset blend formulas can optionally be added to a Unibody, but this requires adding extra hydraulic valves, hoses, solenoids, etc.

Run Augers Button

The run augers button is a momentary-type button that runs the vertical and boom augers for as long as it is depressed. This function is intended to be used to clear the augers before parking the truck at the end of a day.

Low FO Pressure Light

The Low Fuel Oil (FO) pressure light warns when diesel fuel oil is not being delivered at an adequate pressure. A 20-psi pressure switch connected to the fuel-pump outlet will turn the light on whenever the pressure falls below 20 psi. In other words, the light should **only** be OFF when running the fuel pump.

2.3 Front Hosereel Trucks (Blend-Pumper)

In addition to having the same control boxes as ANFO trucks, front hosereel trucks contain several extra controls. The pumping controls for a blend-pumper truck with front hosereel (aka behind-the-cab or narrow hosereel) are generally electric and are located in the cab of the truck.

2.31 Hosereel Control box

Trucks with a behind-the-cab narrow hosereel will have a control box like what's shown below in figure 4.

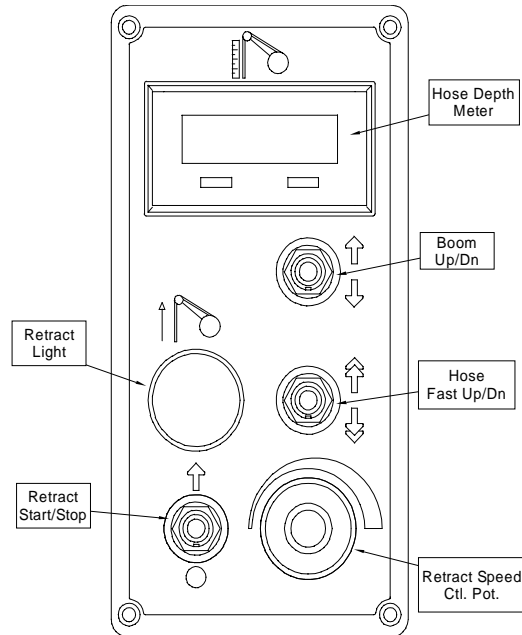


Figure 4 - Hosereel Control box

Hosereel Boom control

For narrow hosereels, a simple spring-centered up/down toggle switch is provided to raise or lower the hosereel boom.

Fast Up/Down Toggle

A spring-centered toggle switch allows momentarily raising or lowering the hose at full speed.

Retract Start/Stop Toggle

This spring-centered toggle switch is used to start and stop the slow retraction of the hose. Pushing the toggle up starts the slow hose retraction, while pushing the toggle down stops it.

Retract Light

As long as the hose is in slow-retract mode, this light will be illuminated.

Adjust Speed Knob

A potentiometer knob is provided to control slow-retract speed. The operator uses this control to match the hose retract speed with the hole-filling rate so that the end of the hose always stays immersed in the rising column of product.

Hose Depth Meter

This meter increments a count whenever the hose is extended or retracted. Pressing the **RST ▲** button will reset the count. See appendix C for calibration instructions.

2.32 Product Pump Control box

Figure 5 shows the product pump control box used on blend-pumper trucks with a front hosereel.

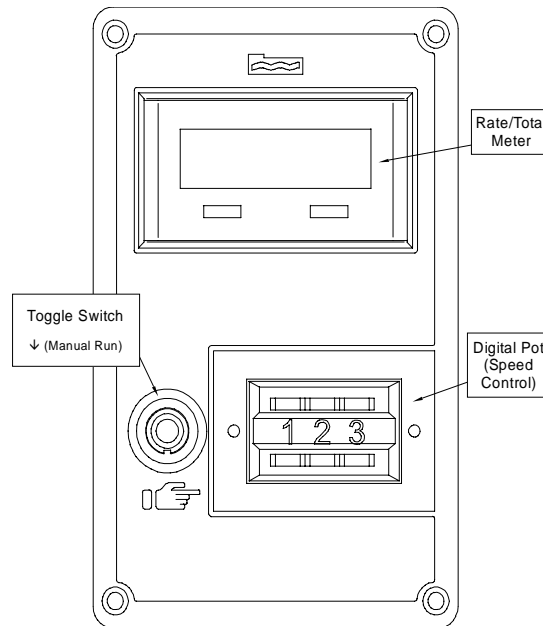


Figure 5 - Product Pump Control box

Toggle Switch

This momentary toggle switch runs the product pump when pressed down. It can be used to clear the surge hopper and product pump at the end of the day. Of course the product pump will only run if the PumpPro is enabled. If the PumpPro is off, or if it has tripped, the product pump cannot be run.

NOTE: For more details on PumpPro functionality, see the PumpPro manual.

Digital Potentiometer

A digital potentiometer is provided to allow setting the product pumping rate. The higher the number – the higher the pumping rate. It should be noted that the setting of this pot does not guarantee a particular pumping rate since changing the engine RPM will increase/decrease the overall speed.

Ratometer/Totalizer

The integrated ratemeter/totalizer is factory-calibrated to show the pump speed in RPM while the pump is running. Pressing the **T/R** button on the meter will toggle between total and rate (although the total is essentially useless). Pressing the **RST** button will reset the water total.

See appendix B for calibration instructions.

NOTE: A calibrated pump rate (lb or kg per minute) can be viewed on the touch-screen of the main control display box.

2.33 Water Pump Control box

This control box is functionally identical to the product pump control box.

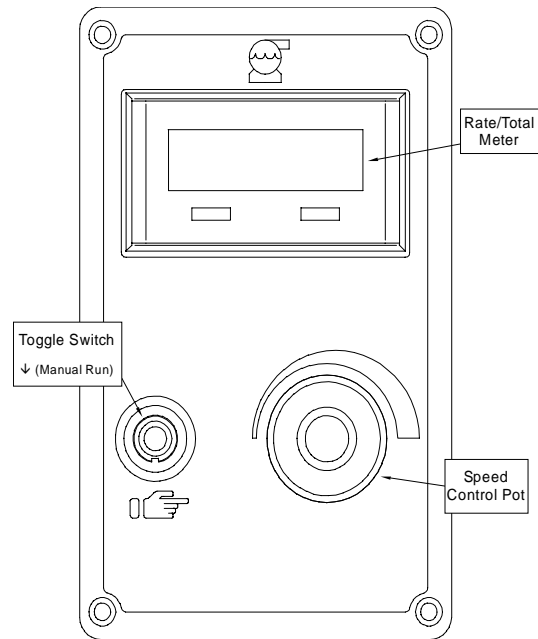


Figure 6 - Water Pump Control box

Toggle Switch

This momentary toggle switch runs the water pump when pressed down.

Digital Potentiometer

A digital potentiometer is provided to allow setting the water pumping rate.

Adjust Speed Knob

A potentiometer knob is provided to control the water pumping rate.

Ratometer/Totalizer

The integrated ratemeter/totalizer shows the water-pumping rate while the pump is running. For trucks sold in the U.S., the meter is factory-calibrated to show flow in gallons per hour (see appendix B for calibration instructions). For other trucks the meters are calibrated in liters per minute. Pressing the **T/R ◀** button on the meter will toggle between total and rate. Pressing the **RST ▲** button will reset the water total.

2.34 Gassing Pump Control box

This control box is nearly identical to the product pump and water control boxes. The main difference is the Auto/Off toggle switch. Depending on the truck, there could be as many as two gassing pump control boxes.

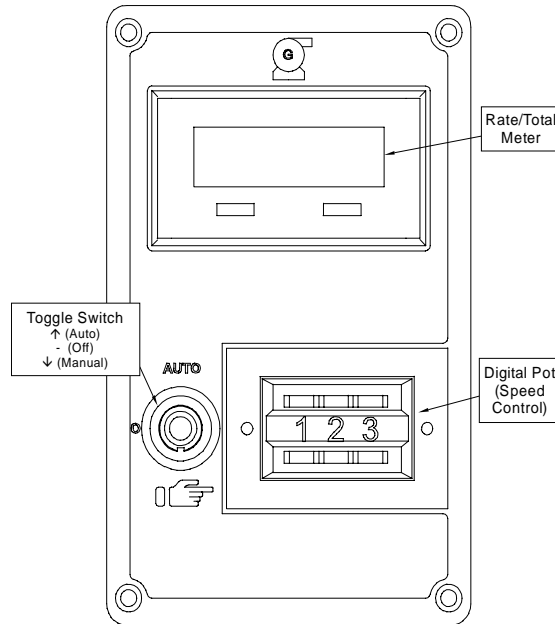


Figure 7 - Gassing Pump Control box

Toggle Switch

This momentary toggle switch runs the gassing pump when pressed down. In the center position the switch prevents the gassing pump from starting when the product pump is run. In the up (Auto) position, the switch causes the gassing pump to run whenever the product pump is run.

Digital Potentiometer

A digital potentiometer is provided to allow setting the gassing pump rate. The higher the number – the higher the pumping rate. It should be noted that the setting of this pot does not guarantee a particular pumping rate since changing the engine RPM will increase/decrease the overall speed.

Ratometer/Totalizer

The integrated ratemeter/totalizer shows gassing-chemical pumping rate while the pump is running. For trucks sold in the U.S., the meter is factory-calibrated (using water) to show flow in gallons per hour (see appendix B for calibration instructions). For other trucks the meters are calibrated in liters per minute. Pressing the **T/R** ◀ button on the meter will toggle between total and rate. Pressing the **RST** ▲ button will reset the gassing-chemical total.

2.4 Rear Hosereel Trucks

A rear-mounted hosereel can be used on either a blend-pumper or repump truck. Both blend-pumper and standard repump trucks have a large 180 degree hosereel. Mini-pumper trucks have one or two small, boom-less hosereels. The pumping controls for such trucks are located to the rear of the truck. Both hydraulic and electric controls are grouped together.

2.41 Rear Pumping Control Station

The pumping control station groups the DCC+ touchscreen and associated electrical controls with hydraulic flow controls as well as mechanical flow and pressure gauges. Figure 8 below shows what the control station would look like for a blend-pumper with dual-component gassing.

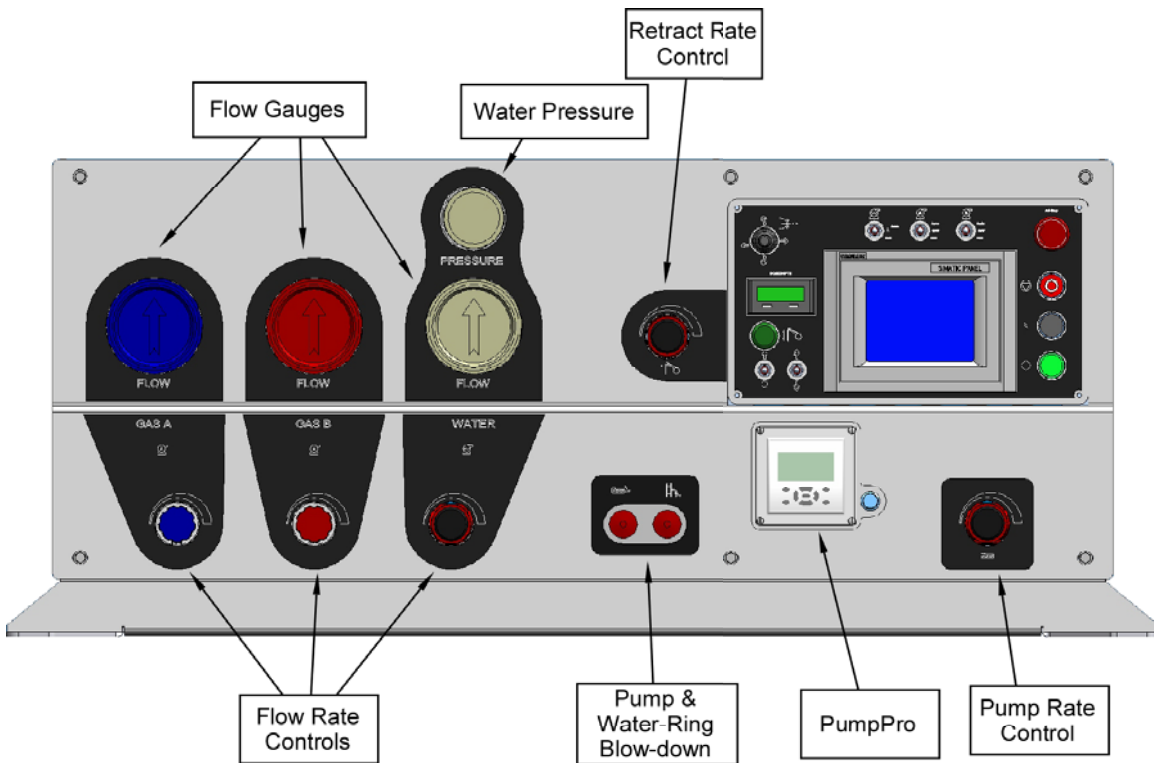


Figure 8 - Gassing Pump Control box

2.42 Rear Pumping Control Panel

The pumping control panel is the part of the pumping control station that houses all of the electrical controls. The control panel contains a touchscreen as well as switches, buttons and other electrical controls. Figure 9 shows what the control panel would look like for a blend-pumper or standard repump truck (the control panel for a mini-pumper is similar but has different hose reel controls).

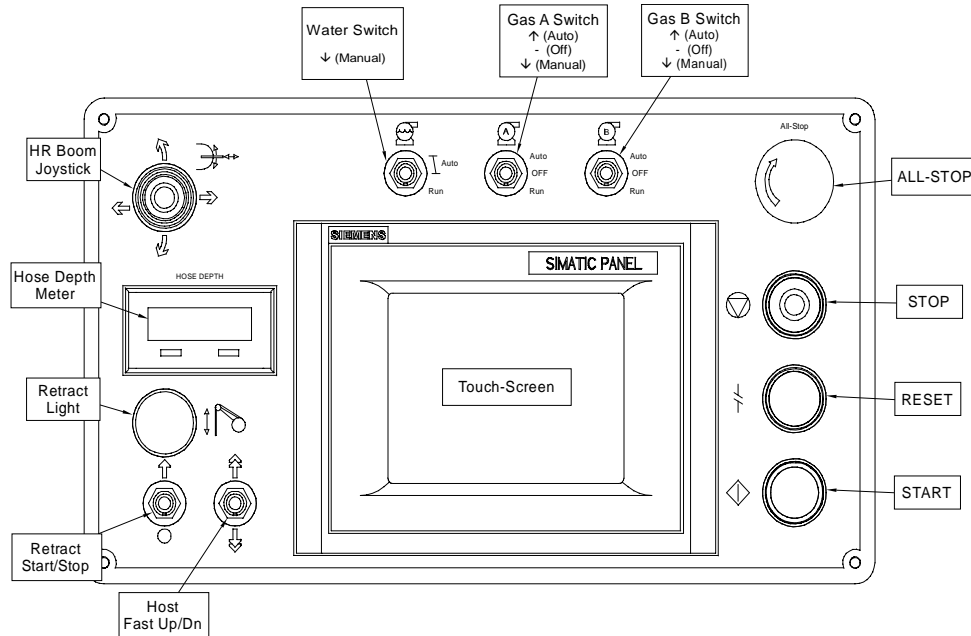


Figure 9 – Rear Pumping Control Panel

Pushbuttons

The START, STOP, RESET, and ALL-STOP buttons duplicate the functionality of the standard in-cab main display control box (see section 2.11).

Hosereel Boom Joystick

The joystick controls the rotation and in/out motion of the hosereel boom.

Fast Up/Down Toggle

A spring-centered toggle switch allows momentarily raising or lowering the hose at full speed.

Retract Start/Stop Toggle

This spring-centered toggle switch is used to start and stop the slow retraction of the hose. Pushing the toggle up starts the slow hose retraction, while pushing the toggle down stops it.

Retract Light

As long as the hose is in slow-retract mode, this light will be illuminated.

Water and Gassing Toggle Switches

These momentary toggle switches run the pump in question when pressed down. The water switch does nothing in the up or center positions. The gassing toggle switches, however, have different settings for center and up positions. In the center position the switch prevents the gassing pump from starting when the product pump is run. In the up (Auto) position, the switch causes the gassing pump to run whenever the product pump is run.

3.0 Operating Procedures

The following section will provide details of how to operate Tread truck with a DCC+. The first section – labeled “All Trucks” – covers issues that apply equally to all truck configurations.

3.1 All Trucks

When the DCC+ is turned on, it will go through a start-up process that lasts about 30 seconds. During that time, a small utility window will appear that has four buttons labeled: *Transfer*, *Start*, *Config*, and *Control*. This window should be ignored – it will go away on its own.

3.11 Main Screen

After the start-up process is complete, the touch-screen will show the main screen (figure 10).

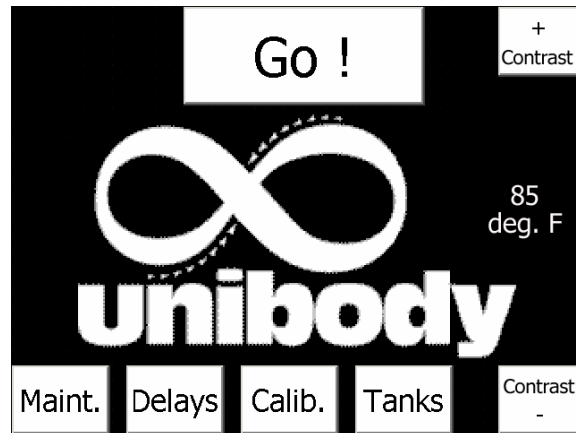


Figure 10 - Main Screen

The white areas on the main screen are “buttons” – pressing them will perform some function or change to another screen. The two contrast buttons on the right of the screen allow adjustment of the screen contrast (i.e. lighter or darker). Since the screen contrast is somewhat temperature sensitive, it may need to be adjusted in the course of a day. The button labeled “Go!” will bring up a run screen. Run screens are discussed in the following truck-specific sections. The left-most four buttons along the bottom of the screen bring up the Maintenance, System Delays, Calibration screens, and Tank Contents.

If your truck is equipped with a digital temperature option, the emulsion temperature will be displayed on the main screen as shown. This is the only place that the emulsion temperature is shown.

3.12 Calibration screen

Pressing the Calib. button on the main screen will bring up the Calibration Screen. If your DCC+ has a security key switch, you will only be able to access this screen with the key.

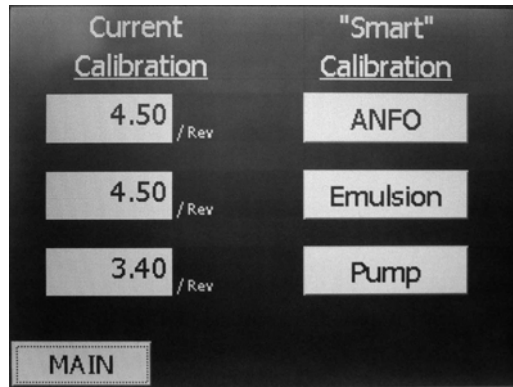


Figure 11 - Calibration Screen

The Calibration screen shown in figure 11 is for a blend-pumper. ANFO, heavy ANFO, and repump trucks will have a similar screen, but with fewer components. The white squares on the left show the calibration factors for the applicable truck components. The buttons on the right bring up the “Smart” Calibration screens for the applicable components. The button labeled “MAIN” returns to the main screen.



****WARNING**:** Do not change calibration factors unless you know what you are doing. Bad calibration values can cause unexpected system operation. Calibration is discussed in detail in section 4.0.

3.13 Popup Keypad

Any time you see numbers or letters in a white box like those on the left side of the calibration screen, you can touch the box to change the values. When you touch such a data entry box, the screen will change to a keypad like that shown below in figure 12

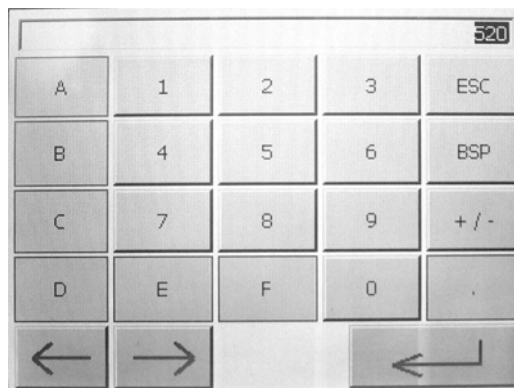


Figure 12 - Popup Keypad

The popup keypad works much like a calculator keypad. After a number has been entered/changed, the “Enter” button in the lower right of the screen will return to the previous screen with the number that you typed. If you start typing a number and realize that you made a mistake, you can press the BSP (“Backspace”) key to erase the last number/letter you typed, or you can press the ESC (“Escape”) to return to the previous screen without keeping what you’ve typed.

3.14 Tank Contents

If your truck is a Unibody, pressing the Tanks button on the main screen will bring up the Tank Contents screen shown in the figure below:

Tank	S.G.	Depth	Contents
A	0.85	40 in	3335 lbs
B	1.20	15 in	16424 lbs
C	1.20	0 in	9927 lbs
D	0.85	30 in	4454 lbs
			Total
			34140 lbs

MAIN

Figure 13 - Tank Contents Screen

This screen allows you to *estimate** the contents of your truck’s main product tanks. The Tank Contents screen can be a useful tool for the operator trying to estimate product usage, but it should not be used for inventory purposes where a certain level of measurement accuracy is desired.

The fields labeled “S.G.” refer to the specific gravity of the product in each tank. The “Depth” fields refer to the distance from the top of the product in a tank to the top (inside) of the tank. Tank A refers to the tank closest to the truck’s cab (for standard-mount bodies), and Tank D is the tank at the rear. If you have a repump truck, the Tank Contents screen will reflect the fact that your truck has only two emulsion tanks.

*Accuracy Note

It is important to realize that the weight estimates provided by the DCC+ are just that – estimates. The DCC+ relies on a large number of variables to produce the final weight calculations that you see on the screen. Each of these variables/measurements has an uncertainty level that makes guaranteeing the accuracy of the final numbers impossible. Consider the following:

- Emulsion density could easily vary by 4% based on temperature. That’s a potential variation of 800 lbs for a 20,000 lb tank.
- Depending on the tank, a difference of only 1 inch in the depth measurement could equate to over 300 lbs difference in the actual weight.
- While the surface of emulsion in a tank is *close* to flat, the surface of AN in a tank is definitely sloped. Deciding where to make a measurement can have a large effect on the resulting accuracy. In essence, the depth measurement relies on the judgement of the person doing the measurement and could easily be off several inches.
- The weight calculations made by the DCC+ do not consider any residual product that :
 - may remain stuck to the tank walls
 - exists in the augers
 - exists in the emulsion plumbing, etc.

3.15 Start Delays

Pressing the Delays button on the main screen will bring up the Start Delays screen shown below in figure 14. If your DCC+ has a security key switch, you will only be able to access this screen with the key.

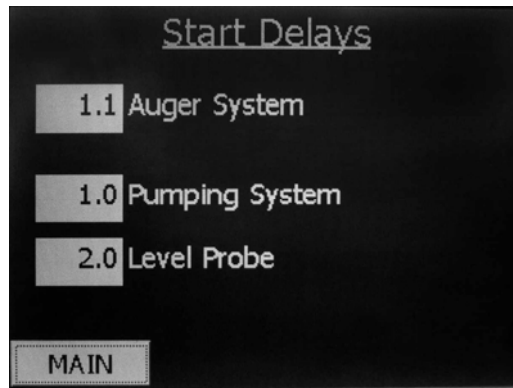


Figure 14 - Start Delays Screen

The screen shown is for a blend-pumper truck. ANFO, heavy ANFO, and repump trucks will only have a single delay. All delays are in seconds.

The start delay function was designed to allow for smoother operation of the truck. The auger system delay allows the vertical and discharge augers to start before the rest of the blend system. By delaying the start of the ANFO bed auger, any product that may have fallen to the bottom of the vertical auger is removed before the bed auger starts pushing ANFO into the bed-to-vertical auger transition – this reduces the potential for auger jamming and improves the initial consistency of the blend leaving the discharge auger. The pumping system delay allows the water pump to start before the product pump. For blend-pumpers with a single-point level probe, the level probe delay defines when the auger-system restarts after the level probe is uncovered (the level probe delay does not apply to four-point level probes).

NOTE: Starting with version 2.9 or the PLC software, the auger system delay was limited to 3 seconds or less. The pumping and level probe delays are limited to 20 seconds or less.

3.15 Maintenance Screen

Pressing the Maint. button on the main screen will bring up the maintenance screen shown below.

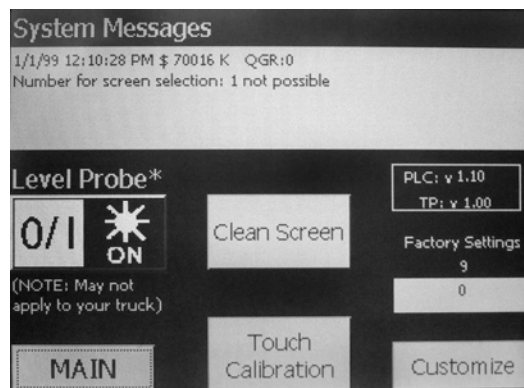


Figure 15 - Maintenance Screen

At the top of the screen you will find the system message window. This window shows warnings and other messages created by the computer hardware (not the DCC+ software). The system message window should generally be ignored since it's really only useful for hardware troubleshooting.

The Level Probe ON/OFF button can safely be ignored if your truck does not have a level probe. However on blend-pumper trucks with a level probe, this button simulates turning off the level probe. With the level probe OFF, all signals from the probe are ignored and the DCC+ defaults to the low level status. The level probe ON/OFF button can be used to bypass a defective level probe – although you will have to manually keep the auger-system from over-filling the surge hopper if the level probe is turned OFF.

The Clean Screen button simply disables all screen input for about 30 seconds so that you can clean the screen. Only use a damp cloth wetted with water or glass cleaner (like Windex) to clean the screen – never use aggressive solvents or scouring power.

The Touch Calibration button enables you to recalibrate the touch input with the display. This calibration should not need to be done unless the display has been reprogrammed or reset.

A small box in the middle right of the screen shows the software versions for the programmable logic controller (PLC) and touch panel (TP). Below that is a display and entry-field for accessing the DCC+ factory settings. In the event that a technician needs to reprogram the DCC+, a one-time access code can be entered here.

In the lower right of the screen is a button labeled “Customize”.

3.16 Customize Screen

Pressing the Customize button on Maintenance screen brings up the Customize screen shown below.

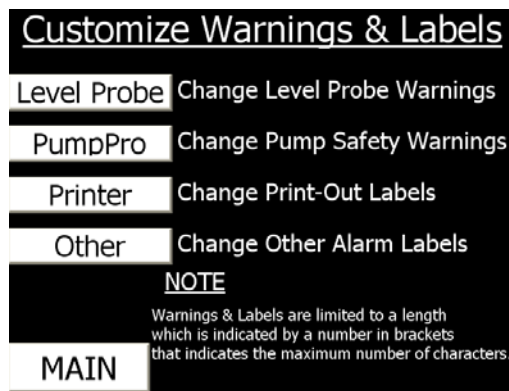


Figure 16 - Customize Screen

While most of the text in the various screens of the DCC+ cannot be changed by the operator, there are a few text labels that can be customized. The level probe and PumpPro warning messages as well as the printer headers can be field-customized. The “Other” labels area allows you to customize the GuardMaster alarm message. Due to size limitations, however, these text labels are limited in length.

3.17 Customize Level Probe Warnings

Pressing the Level Probe button from Customize screen brings up the following screen.

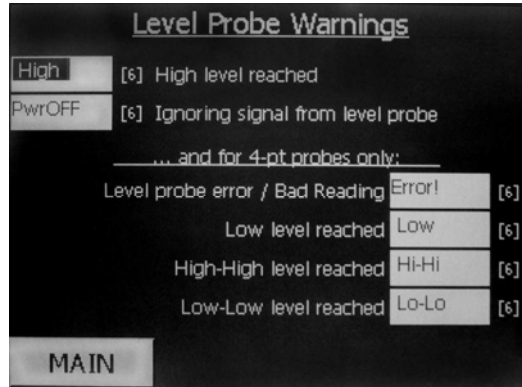


Figure 17 - Customize Level Probe Warnings Screen

The top two warning messages – ‘High’ and ‘Power Off’ – are for blend-pumper trucks with single-point or four-point level probes. The other four warnings messages only apply to trucks with four-point probes.

Note: The number in brackets next to each text field indicates the maximum number of letters (or numbers) that can be used (e.g ‘PwrOFF’ uses the max allowable 6 letters).

3.18 Customize PumpPro Warnings

Pressing the PumpPro button from Customize screen brings up the following screen.

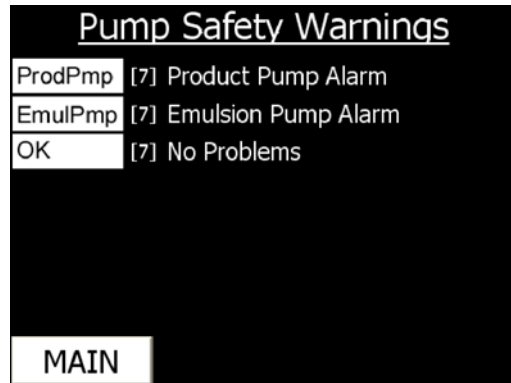


Figure 18 - Customize PumpPro Warnings Screen

3.19 Customize Print-Out Labels

Pressing the Printer button from Customize screen brings up the following screen (see appendix D for an explanation of what a DCC+ print-out looks like).

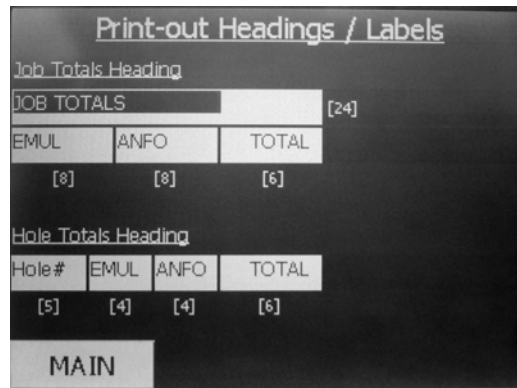


Figure 19 - Customize Print-Out Labels Screen

3.20 Customize “Other” Warning Labels

Pressing the Other button from Customize screen brings up the following screen.

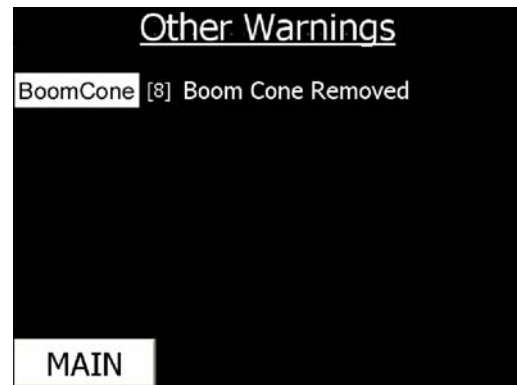


Figure 20 - Customize Print-Out Labels Screen

Currently, there is only one warning message on this screen. The “Boom Cone Removed” message appears when the GuardMaster trips. The GuardMaster safety system uses an interlock switch to prevent operation of the discharge boom auger when the boom cone is not properly installed.

3.2 ANFO or Heavy-ANFO Trucks

Pressing the Go! button on the main screen will bring up the following run screen.

3.21 ANFO Truck Run Screen



Figure 21 - ANFO Truck Run Screen

In order to start augering product with your Unibody, you must always first go to this run screen. From this screen, you can select the whether the Unibody will run ANFO or an ANFO/Emulsion Blend. Touching the Preset box will allow you to set a preset blend amount. You can also monitor the ANFO, Emulsion, and Blend rates and totals. By pressing the small button to the left of any of the three multi-mode displays, you can toggle between:

- t** - Hole Total
- R** - Rate
- T** - Job Total
- C** - RPM
- %** - Component percentage of current Blend (only active while running)

The multi-mode displays in figure 21 are showing the job totals for ANFO (450) and Emulsion (441) components, and the hole total for Blended product (0).

On the newer trucks (incl. Unibody), a new safety-system called GuardMaster has been implemented that prevents operation of the auger system when the boom-cone is not properly installed on the end of the discharge auger. In the event that the GuardMaster is disabling the augers, you will see a warning ('BoomCone') in the top right of the blend screen to let you know why the system is not operational. The message will go away and the augers will resume operationally once the boom cone has been properly fitted.

Note: The multi-mode buttons are not sensitive in their upper-right corners (where 't', 'R', 'T', 'C' and '%' are displayed). Press the buttons in their lower-half for best response.

3.22 Sample Run Procedure

The following section will outline how the DCC+ would be used with a Heavy ANFO truck in a normal day.

- With the DCC+ on and the PTO engaged, go to the run screen.
- Make sure the ANFO and Emulsion multi-mode displays are set to display job totals (the small button to the left of each display should show a capital 'T'). Set the blend multi-mode display to show the hole total (the small button to the left of the display should show a lower-case 't').
- Press the Reset button to clear the hole totals. Hold the reset button for about 3 seconds until the job totals reset to zero also.
- Press the BLEND button to indicate that you plan to run an ANFO/Emulsion blend instead of straight ANFO.
- Touch the Preset quantity field on the touch-screen to enter the amount of blend that you wish to run.
- Notice the FO low-pressure light. It should be on – indicating that the fuel pump is not currently pumping. (If the light is not on, the bulb may have burned-out).
- Use the boom joystick to position the discharge auger over the hole.
- Press the Start button. The vertical and discharge augers should start immediately followed shortly by the ANFO bed auger, fuel pump, and emulsion pump. The green light should illuminate the Start button.
- When the Blend hole total reaches the preset value that you entered, the Unibody will automatically stop and the Start button light will turn off. Note that the actual blend total will not exactly equal the preset quantity. Due to momentum and hydraulic system response issues, you should expect a variation of a few pounds (or kilograms).
- Change the Blend multi-mode display to '%' by pressing the small button to the left of the display. In this mode, the ratio of emulsion in the blend will be displayed while the Unibody is running. Since nothing is currently running, the display will show a zero.
- Press the start button again. The Blend display should show the percentage of emulsion in the currently-running blend formula. The emulsion ratio can only be changed manually using the adjustable flow-divider valve.
- Since the preset quantity has already been reached, the Unibody will continue to run until you press the stop button. Change the Blend display mode to hole total ('t') -- you will see that the total continues to increase beyond the preset value.
- Press the Stop button and then momentarily press the reset button to clear only the hole totals.
- Press the start button to restart the Unibody. Once the Blend hole total reaches the preset quantity, the equipment will once again stop automatically.
- If you toggle any of the multi-mode displays you will see that the job totals are larger than the hole totals. Since the job totals are only reset by holding the Reset button for 3 seconds, you can use the job totals as a way of telling how much product you have used during a day, since refilling, or whatever you wish.
- Note that while the Unibody is running, you can toggle the multi-mode displays without affecting anything. You can also switch between ANFO and Blend while running.
- Also note that setting a preset quantity of zero will effectively tell the DCC+ that there is no preset and will force you to stop the truck yourself with the Stop button.

3.3 Blend-Pumper Trucks

On a blend-pumper truck, pressing the Go! button on the main screen will bring up the Auger run screen.

3.31 Blend-Pumper Auger Run Screen

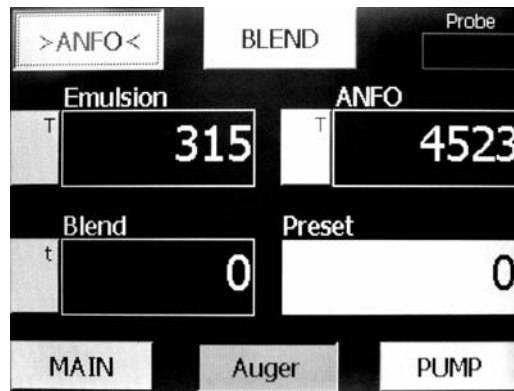


Figure 22 - Blend-Pumper Auger Run Screen

This screen is virtually identical to the run screen on an ANFO truck. The only differences are the addition of a level-probe status display on the top right corner, and the PUMP button in the bottom right corner. For a description of how the DCC+ is used to auger ANFO or a Blend, see section 3.2.

3.32 Blend-Pumper Pump Run Screen

Pressing the PUMP button on the Auger run screen will bring up the following screen.

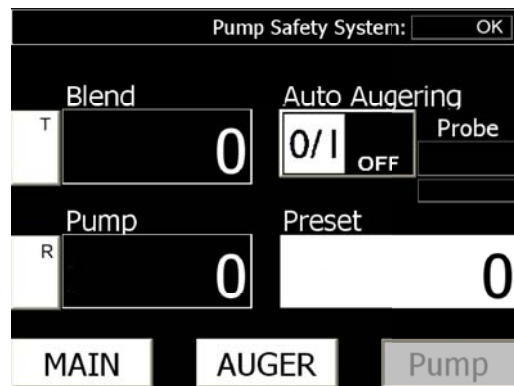


Figure 23 - Blend-Pumper Pump Run Screen

The pump run screen has two multi-mode displays: one for augered blend, and one for pumped product. The preset quantity is used to set how much product should be pumped -- while in pumping mode, it is the pump hole total that is compared to the user-entered preset quantity.

The top of the pump run screen is dedicated to the PumpPro pump protection system. The PumpPro is a totally separate system that prevents the product pump from running if certain unsafe conditions exist (see the PumpPro manual for details). While the DCC+ does not control the PumpPro, it does display a message indicating whether the PumpPro is enabled. For an indication of what caused the PumpPro to trip, simply look at the warning message displayed on the PumpPro screen.

To the right of the multi-mode Blend display is the Auto Augering button. With Auto Augering turned ON, pressing the Start button will start both the pumping-system and the auger-system at the same time. The auger-system will automatically pause when the level in the surge hopper reaches the high point. And if the pumping-system is running, it will restart the auger-system when the level probe allows*. With Auto Augering turned OFF, pressing the Start button will run only the pumping system. The auger-system can

be manually started (while the pump is running) by turning Auto Augering OFF then ON. The augers will again be paused by the level probe.

*For trucks with single-point level-probes, augering will be restarted a certain time after the level in the surge hopper has gone below the high point (this time is configurable in the Delays screen). For trucks with a four-point probe (levels= High, Low, High-High, and Low-Low), the auger system pauses at the High point and restarts at the Low Point – no time delay is involved. Reaching the Low-Low point will stop the product pump but allow the augers to run. The pump can be manually restarted after the Low level has been reached. Reaching the High-High point will stop the augers, and turn Auto Augering OFF.

3.33 Sample Run Procedure

The following section will outline how the DCC+ would be used with a blend-pumper truck in a normal day to pump product.

- At the beginning of the day, the surge hopper (which feeds the product pump) should be empty. Before starting the product pump, you will need to auger some blend into the surge hopper.
- Using the joystick, maneuver the discharge auger over the surge hopper. Then go to the auger run screen.
- From the auger run screen, choose BLEND (and use the AP-flow divider valve to adjust the emulsion percentage to a pump-able ratio).
- Press and hold the Reset button to clear the hole and job totals.
- Press the Start button and allow the Unibody to auger some blended product into the surge hopper. If you do not have a clear view of the surge hopper, you can watch the level probe status indicator in the upper right corner of the run screen.
- You will have to press the Stop button to stop the auger-system. Even though the auger run screen shows the level probe status, it has no affect on the augers while on the auger run screen (the level probe will not pause the augers while in the auger run screen).
- After you've partially filled the surge hopper, switch to the Pump run screen using the PUMP button in the lower right corner of the auger run screen.
- Enter a preset value to be pumped, and make sure Auto Augering is set to ON.
- Make certain the PumpPro is enabled – push the PumpPro RESET button if necessary.
- Press the Start button. The water pump will come on immediately, followed shortly by the product pump. When the DCC+ gets the signal from the level probe, it will allow the auger system to start automatically.
- When the Pump hole total reaches the preset quantity, the pump-system will automatically stop. The auger-system will continue to run until the level-probe high point is reached. At this point, the auger-system will shut down too. With neither pumping nor augering system running, the DCC+ will be totally shut down (and the green start button light will extinguish).
- Note that the level probe can cause the auger-system to “pause” while the pump-system is running. As long as the DCC+ is still in run mode (as indicated by the green start button light), the augers could restart automatically. As long as the green start button light is not illuminated, you can be assured that the Unibody will not restart automatically.
- Press the Start button to continue pumping.

- While both the auger and pump systems are running, press the Stop button once. The pump-system will stop, but the auger-system will continue to run.
- Press the Stop button again to stop the auger-system as well. The start button light will extinguish, and the truck will not automatically restart until you press the Start button again.
- Now assume it's the end of the day and you want to pump out the last bit of blended product left in the surge hopper -- without the auger-system running.
- To run just the pump-system, simply switch Auto Augering to OFF and press the Start button.
- If you have a single-point level probe, the pump-system will run until either you stop it or the PumpPro stops the product pump.
- If you have a four-point probe, the pump-system will stop when the low-low level is reached. In order to totally empty the surge hopper, you will have to run the product pump using the Run Pump button on the Product Pump Control box (section 2.32).

3.4 Repump Trucks

On a repump truck, pressing the Go! button on the main screen will bring up the pump run screen.

3.41 Repump Truck Run Screen

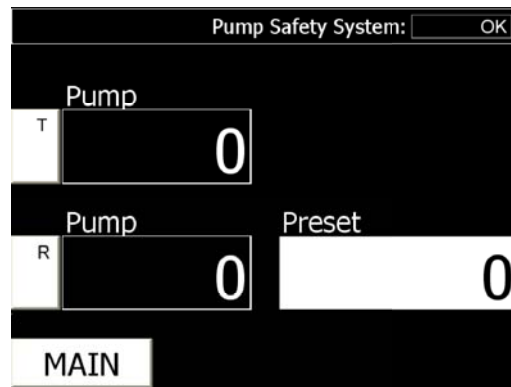


Figure 24 - Repump Truck Run Screen

In order to start pumping product with your Unibody, you must always first go to this run screen. From this screen, you can view pumping rates and totals.

By pressing the small button to the left of either of the multi-mode displays, you can toggle between:

- t - Hole Total
- R - Rate
- T - Job Total
- C - RPM

The top multi-mode display in figure 24 is showing the pump job total (0), while the lower display is showing the pumping rate(0).

The top of the pump run screen is dedicated to the PumpPro pump protection system. The PumpPro is a totally separate system that prevents the product pump from running if certain unsafe conditions exist (see the PumpPro manual for details). While the DCC+ does not control the PumpPro, it does display a message indicating whether the PumpPro is enabled. For an indication of what caused the PumpPro to trip, simply look at the warning message displayed on the PumpPro screen.

3.42 Sample Run Procedure

The following section will outline how the DCC+ would be used with a Repump truck in a normal day.

- With the DCC+ on and the PTO engaged, go to the run screen.
- Make sure the top multi-mode display is set to display the job total (the small button to the left of the display should show a capital 'T'). Set the lower multi-mode display to show the hole total (the small button to the left of the display should show a lower-case 't').
- Press the Reset button to clear the hole total. Hold the reset button for about 3 seconds until the job total resets to zero also.
- Touch the Preset quantity field on the touch-screen and enter the amount of product that you wish to pump.
- Press the Start button. The water pump should start immediately followed shortly by product and gassing pumps. The green light should illuminate the Start button.
- When the hole total reaches the preset value that you entered, the Unibody will automatically stop and the Start button light will turn off. Note that the actual hole total may not exactly equal the preset quantity. Due to momentum and hydraulic system response issues, you should expect a variation of a few pounds (or kilograms).
- Press the start button again.
- Since the preset quantity has already been reached, the Unibody will continue to run until you press the stop button.
- Press the Stop button and then press the reset button to clear only the hole total.
- Press the start button to restart the Unibody. Once the hole total reaches the preset quantity, the equipment will once again stop automatically.
- You will see that the job total is larger than the hole total. Since the job total is only reset by holding the Reset button for 3 seconds, you can use the job total as a way of telling how much product you have used during a day, since refilling, or whatever you wish.

4.0 DCC+ Calibration

Pressing the Calib. button on the main screen will bring up the Calibration Screen. If your DCC+ has a security key switch, you will only be able to access this screen with the key.

4.01 Calibration Screen

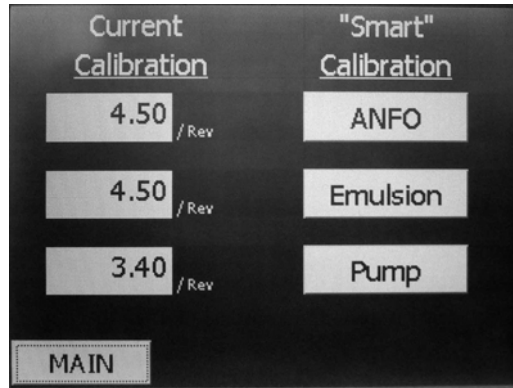


Figure 25 - Calibration Screen

Before the DCC+ is first used, it needs to be calibrated for your particular system and product. The DCC+ does not directly measure the mass of product being augered or pumped; instead it calculates the mass flow by assuming that each rotation of the ANFO bed auger or the pump drive shaft corresponds to a defined quantity of material. The existing calibration factors are shown on the left side of the calibration screen. In figure 25, the calibration factors are shown for a fictional blend-pumper truck. For this particular truck, the ANFO calibration is 4.5 -- which in this case means that approximately 4.5 lbs of ANFO are delivered for each full rotation of the AN bed auger. Since the calibration factor merely specifies a quantity per rotation without mentioning units, you can allow a truck to measure in pounds, kilograms, or even "buckets" simply by changing the calibration factor.

Rather than force you to manually calculate these calibration factors, the DCC+ has the "Smart" calibration feature.

4.02 "Smart" Calibration Screen

Pressing one of the component buttons on the right side of the calibration screen will bring up the "Smart" Calibration screen.

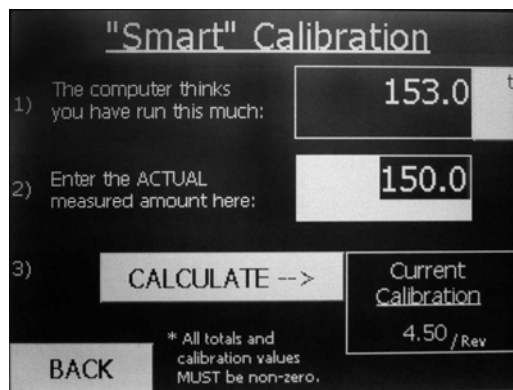


Figure 26 - "Smart" Calibration Screen

In order to use smart calibration, you must follow these steps:

- 1) Reset the job and hole totals (from the run screen)
- 2) Run a reasonable amount of the product you are calibrating*.
- 3) Weigh the material that you have run**.
- 4) The “Smart” Calibration screen will indicate how much product it thinks has been run (based on the existing calibration factor).
- 5) Enter the actual weighed amount in the box indicated on the “Smart” Calibration screen***.
- 6) Press the CALCULATE button, and the DCC+ will automatically recalculate a calibration factor.
- 7) Repeat this process for each component on the truck (e.g. – ANFO, Emulsion, Product Pump)
- 8) That’s it!

*Because problems could be experienced if too little ANFO is augered during the calibration process, it is recommended that at least 150 pounds (68 kg.) of that ANFO be augered. The general rule is: the more product run, the better the results of the calibration.

**For ANFO, the best method for determining how much ANFO is run is to use a truck scale. Weigh the truck before and after running the ANFO. The difference in the before and after weights is the amount of ANFO run. For the emulsion pumps, it is generally easiest to fill a 30-gallon drum and weigh the drum. Calibrating a product pump may pose an issue due to the fully-mixed nature of the product being pumped. In this case it may not be feasible to pump a mixed product into a container. You can alternatively determine the actual total of pumped product by totaling product used during a certain time period. For example, if you pump a truck-full of product, the amount pumped is the total capacity of the truck (subtract the empty-truck-weight from the loaded-truck-weight).

***Components can be calibrated based on either hole or job totals. Make certain that you set the multi-mode display for the appropriate mode.

4.03 Advanced Calibration Information

Since the calibration factor defines the auger or pump output as a constant function of rotational speed, irregularities in product flow can cause inaccuracies in the DCC’s readouts. Although most emulsion pumps are constant volume devices, their output in terms of mass per drive-shaft-rotation may vary slightly at different pressures. For this reason, when calibrating the DCC for emulsion, the normal length of hose should be used to ensure that the pump sees the same pumping pressure (resistance) at its output.

The response of auger systems is even less predictable than emulsion pumps: ANFO slippage between the auger screw and housing can vary at different speeds and the output of a bulk-truck auger is not totally smooth – it can tend to “pulsate”. Furthermore, gravity will cause ANFO in the vertical auger tubes to settle between runs: at startup, a period of no flow is followed by a brief surge of product. In order to get the most accurate calibration for ANFO, a large, continuous amount of ANFO should be run. By basing the calibration on a large continuous run, any flow inconsistencies should average-out. If your truck has load cells or if you have access to reasonably accurate truck scales, you should run an entire truckload of ANFO. A 30-gallon container of product is the absolute bare minimum to insure decent accuracy – anything larger would be better.

Appendix A - Troubleshooting

A.1 Green start button light is on, but nothing appears to be running.

This light turns on whenever the DCC+ is in Run mode.

- Check the PTO. If the truck's PTO is not engaged, the DCC+ may be powering the hydraulic valve solenoids, but nothing will run since the hydraulic pump is not running.
- Check the level probe. If you are operating a blend-pumper truck in pump mode, the level probe may have placed the auger-system in pause mode. Pressing the Stop button should turn off the light.
- Check the start delays. An unrealistically long start delay could make it look like some parts of the Unibody are not starting as they should.

A.2 The red FO pressure light is on all the time.

- This light *should* be on nearly all the time that the DCC+ is powered. The only time it goes out is when the fuel-oil pump is running with an adequate supply of fuel-oil. If the pump runs dry, the light will illuminate. In other words, you should expect the light to turn off shortly after starting the manufacture of ANFO – and only then.

A.3 The Totals or Blend Percentage displayed on the Touch-Screen are wrong.

- Check the calibration. The problem is most likely that one or more components is mis-calibrated. See section 4.0 for calibration information.
- Check the speed sensor(s). A severed cable or mis-adjusted motor sensor could cause bad readings.

A.4 The small Totalizer/Ratemeters are reading incorrectly.

- Check the calibration. The problem is most likely that one or more components is mis-calibrated. See Appendix B for calibration information.
- Check the speed sensor(s). A severed cable sensor cable could cause bad readings. A clogged flowmeter could cause inaccurate (or non-existent) flow readings.

A.5 The Product Pump runs for a while then stops.

- Check the PumpPro alarms. This “problem” is almost caused by the PumpPro. If the PumpPro shuts down the product pump, it is either due to an unsafe condition or mis-calibrated PumpPro sensor. Review the PumpPro manual for more details.

A.6 The AN bed auger frequently jams.

- Check the Auger-System start delay. Increasing the value may help remove settled AN prill from the horizontal-to-vertical transition before the bed auger is started. Normal time delays range between 1 and 2 seconds.

A.7 The blend augers refuse to start when the start button is pressed.

- Check the blend screen for a ‘BoomCone’ warning. If you see this warning displayed, it means that the Guardmaster has disabled the auger system. If you properly fit the boom cone onto the outlet of the discharge auger, the warning should disappear, and the augers should be re-enabled.

Appendix B – Ratemeter Calibration

The DCC+ may have one or more Durant Totalizer / Ratemeters installed to monitor components like water or gassing flow. These meters must be calibrated individually – they cannot be calibrated from the touch-screen.

The calibration form on the following page can be used to calibrate any of the Durant meters for any component on the Unibody. In most cases you will have to disconnect a hose in order to pump into a drum or some other container. However, if you are calibrating fuel-oil (not a standard meter for the DCC+), remove the hose at the point of injection - ***with the injection orifice still attached***. It is important to calibrate the fuel pump with the normal back-pressure caused by the injection orifice. You may wish to have separate hose/injection-orifice for calibration purposes to simplify things.

To make calibration easier, the form on the next page was set up with step-by-step instructions and places on the form to write down information as you collect it. It is recommend that you make a photocopies of the form for each component you will be calibrating (i.e. – gassing, water, etc.), and fill out the blanks on the form copies as you proceed through the calibration process.

Before starting, you will need:

- A large bucket or drum. In general, the more product you run during calibration, the better the results.
- A scale on which to weigh the container. Accuracy of calibration can be no better than the scale's accuracy.

Durant Ratemeter / Totalizer Calibration Form

Metered Units Note

Meters can be calibrated for weight (e.g. lbs or kg) or volume (e.g. gallons or liters). The instructions are given assuming weight will be metered. If you wish to calibrate for volume rather than weight, simply enter volume measurements where the form call for weight measurements.

Meter Calibration Mode

In order to put a meter in calibration mode, you will have to first use a screwdriver to open the electrical enclosure containing the meters. Due to the extremely corrosive nature of ANFO and emulsion, make sure you have clean hands and do not get any ANFO or emulsion on anything in the enclosure. Once the box is opened, you will see either a small switch dangling from the back of the meter, or two small jumper wires ending in an electrical connector. If your meter has the latter, connect the two jumper wires to put the meter in calibration mode. If your meter has a switch, flip the switch. *(Either of these methods puts the meter in calibration mode by making an electrical connection between meter terminals 1 and 5).*

Meter Calibration Screens

After placing a meter in calibration mode, you will have access to the meter's calibration screens. Press and hold the **T/R** key while repeatedly pressing the **RST** key to advance to successive screens. The table below lists the screens:

Totalizer/Ratemeter Calibration Screens	
Screen	Function
1	Count Scale Factor
2	Totalizer Decimal Point
3	Rate Scale Factor
4	Ratemeter Decimal Point
5	Rate x1 / x10
6	Reset Key Enable/Disable

Combination Totalizer/Ratemeter Calibration Form

Line	Number	Instructions	Equation
1		Remove the face of the electrical enclosure containing the meter, but do not put the meter in calibration mode yet.	
2		Run enough product to pre-fill the output path. For example, if you are calibrating a water pump, you need to make sure the hose is full of water.	
3		Reset the Totalizer using the RST key.	
4		← Record the Start Weight of the empty container.	Start Weight
5		Run product into container.	
6		← Record End Weight of container	End Weight
7		← Subtract Start Weight from End Weight to get Actual Weight of product.	$L6 - L4 = \text{Actual Weight}$
8		← Record the totalizer Display weight.	Display Weight
9		← Divide Actual Weight by Display Weight to get the Correction factor.	$L7 \div L8 = \text{Correction Factor}$
10		Place the meter in programming mode (see notes at top of page).	
11		← Record the Count Scale Factor.	Old Count Scale Factor
12		← Multiply the Old Count Scale Factor by the Correction Factor to get the New Count Scale Factor.	$L11 \times L9 =$ New Count Scale Factor
13		Using the T/R key on the meter, you can move the blinking cursor. Pressing the RST key cycles the flashing digit. Using the two buttons, enter the Totalizer's New Count Scale Factor.	<i>Program meter with Count Scale Factor</i>
14		← Multiply the Totalizer New Count Scale Factor by 60 to get the New Rate Scale Factor in Weight per Minute. **If you want the rate to read in weight per Second, just use make the New Rate Scale factor the same as the New Count Scale factor.	$L12 \times 60 =$ New Rate Scale Factor
15		Using the same process described in Line 13, change the value of the meter's Rate Scale Factor to the New Rate Scale Factor.	
16		Remove the meter from calibration mode and reassemble the electrical enclosure. Repeat steps 1-7 to see if the calibration was done accurately. The Actual Weight should be fairly close to the Display Weight.	<i>Program Meter with Rate Scale Factor</i>

Appendix C – Hose Depth Meter Calibration



Metered Units Note

Although meters are generally pre-calibrated at the factory to read in feet, they can be (re)calibrated for any units (e.g. meters).

Meter Program Mode

In order to put a meter in program mode, you will have to first use a screwdriver to open the electrical enclosure containing the meters. Due to the extremely corrosive nature of ANFO and emulsion, make sure you have clean hands and do not get any ANFO or emulsion on anything in the enclosure. Once the box is opened, you will see either a small switch dangling from the back of the meter, or two small jumper wires ending in an electrical connector. If your meter has the latter, connect the two jumper wires to put the meter in program mode. If your meter has a switch, flip the switch. *(Either of these methods puts the meter in program mode by making an electrical connection between meter terminals 1 and 5).*

Screens

There are four program-mode screens. Upon entering the program mode, the counter will display screen 1. Press and hold the  key while repeatedly pressing the  key to advance to successive screens.



Screen	Function
1	Count Scale Factor
2	Count Decimal Point
3	Reset to Offset Value
4	Reset Key Enable / Disable



Calculating the Count Scale Factor

The count scale factor is used to convert the incoming count pulses to the desired unit of measure to be displayed (feet, gallons, etc.) This scaler has six digits available with a fixed decimal point. The easiest way to calibrate a meter is to correct the existing calibration factor.




- 1) With the meter in normal mode (i.e. NOT in program-mode), unreel a good length of hose and reset the total.
- 2) Retract a known amount of hose and make a note of how much hose was actually retracted.
- 3) Divide the actual length of hose retracted by the total on the meter to calculate the correction factor.
Correction Factor = Actual ÷ Metered
- 4) Put the meter in program mode
- 5) The first screen will show the existing count scale factor (CSF). Multiply that number by the ***Correction Factor*** calculated in step 3 to get a corrected count scale factor.
Corrected CSF = Existing CSF × Correction Factor
- 6) Using the process described below, enter the ***Corrected CSF*** into the meter (Screen 1).
- 7) Exit program mode to put the meter back in normal mode. The meter should now be calibrated.

Programming Count Scale Factor

The first screen in the program mode is used to enter the count scale factor: The far right digit will be flashing. Press the  key until reaching the desired digit value. Note: Pressing and holding the  key will cause the numbers to autoscroll.

Next press the  key to move the flashing digit one place to the left. Change this digit to the desired value with the  key. Repeat this process until all digits are set correctly.

Programming Decimal Point (optional)

The second screen is used to enter the decimal point display on the totalizer screen. Press and hold the  key and then press the  key to move from screen one to screen two. Press the  key to move the decimal point to the desired position.

NOTE: The hose depth meter is normally programmed at the factory with a count scale factor of 1.0. The standard hose pulley is about 5 feet in circumference and has 5 magnets. Hence the sensor will produce one pulse per foot of hose run over the pulley.

Appendix D – DCC+ Printer Information

The optional DCC+ printer records totals information on a hole-by-hole basis. Hole totals are printed when the reset button is used to reset hole totals. Job totals print when the reset button is held for 3 seconds to reset the job totals. If the printer is off, or not attached, the DCC+ will continue as though it were not present. Since the DCC+ does not store usage-data internally, if you wish to have a hard-copy record of the day's events, the printer MUST be on while the DCC+ is being used.

Note: The only parts of the print-out that can be customized are the labels.

Customizable Print-Out Labels

JOB TOTALS			
EMUL	ANFO	TOTAL	
3001	3000	6006	

Hole#	EMUL	ANFO	TOTAL
3	1247	1251	2498
2	374	374	747
1	1381	1381	2761

JOB TOTALS			
EMUL	ANFO	TOTAL	
6953	7380	14333	


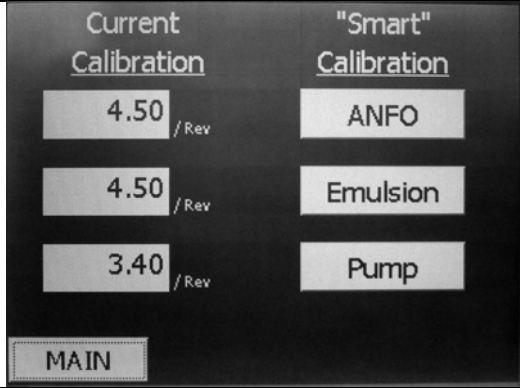
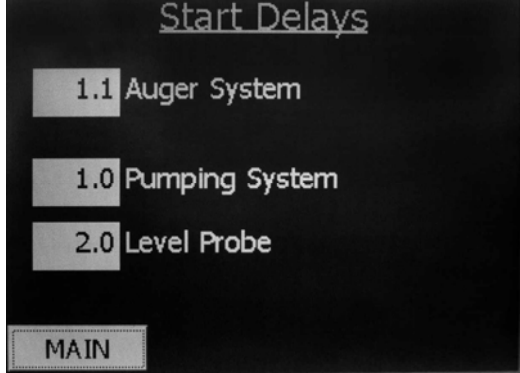
Hole#	EMUL	ANFO	TOTAL
6	149	149	297
5	0	68	68
4	0	356	356
3	621	621	1242
2	P	51
1	P	4712

Appendix E – List of Screen Text

Under some circumstances, Tread will customize the DCC+ for a non-English language. The following table shows the DCC+ screens along with a list of the default (English) text fields that can be translated to another language. Customers who wish to order language-customization services must provide their own translations. The following table should be filled-out and sent to Tread. Be aware that many text fields have length limitations. Use the screen pictures to get an idea of how much space is available for the various text fields.

NOTE:

The font sizes in the various screens are fixed. It is not possible to reduce font sizes to fit more text in a given text-field.

Screen	English Text	Translated Text
	Go !	
	+ Contrast	
	- Contrast	
	Maint.	
	Delays	
	Calib	
	Tanks	
	Current Calibration	
	"Smart" Calibration	
	/Rev	
	ANFO	
	Emulsion	
	Pump	
	MAIN	
	Start Delays	
	Auger System	
	Pumping System	
	Level Probe	

<p>System Messages</p> <p>1/1/99 12:10:28 PM \$ 70016 K QGR:0 Number for screen selection: 1 not possible</p> <p>Level Probe*</p> <p>0/I ON</p> <p>Clean Screen</p> <p>PLC: v 1.10 TP: v 1.00</p> <p>Factory Settings 9</p> <p>(NOTE: May not apply to your truck)</p> <p>0</p> <p>MAIN Touch Calibration Customize</p>	<p>System Messages</p> <p>Level Probe*</p> <p>(Note: May not apply to your truck)</p> <p>Clean Screen</p> <p>Touch Calibration</p> <p>Factory Settings</p> <p>Customize</p>	
<p>Customize Warnings & Labels</p> <p>Level Probe Change Level Probe Warnings</p> <p>PumpPro Change Pump Safety Warnings</p> <p>Printer Change Print-Out Labels</p> <p>Other Change Other Alarm Labels</p> <p>NOTE Warnings & Labels are limited to a length which is indicated by a number in brackets that indicates the maximum number of characters.</p> <p>MAIN</p>	<p>Customize Warnings & Labels</p> <p>Level Probe</p> <p>Change Level Probe Warnings</p> <p>PumpPro</p> <p>Change Pump Safety Warnings</p> <p>Printer</p> <p>Change Print-Out Labels</p> <p>Other</p> <p>Change Other Alarm Labels</p> <p>Note:</p> <p>Warnings and labels are limited to a length which is indicated by a number in brackets that indicates the maximum number of characters.</p>	
<p>Level Probe Warnings</p> <p>High [6] High level reached</p> <p>PwrOFF [6] Ignoring signal from level probe</p> <p>... and for 4-pt probes only:</p> <p>Level probe error / Bad Reading Error! [6]</p> <p>Low level reached Low [6]</p> <p>High-High level reached Hi-Hi [6]</p> <p>Low-Low level reached Lo-Lo [6]</p> <p>MAIN</p>	<p>Level Probe Warnings</p> <p>High level reached</p> <p>Ignoring signal from level probe</p> <p>... and for 4-pt probes only</p> <p>Level probe error / Bad Reading</p> <p>Low level reached</p> <p>High-High level reached</p> <p>Low-Low level reached</p>	
<p>Other Warnings</p> <p>BoomCone [8] Boom Cone Removed</p> <p>MAIN</p>	<p>Other Warnings</p> <p>Boom Cone Removed</p>	

<p>Pump Safety Warnings</p> <p>ProdPmp [7] Product Pump Alarm EmulPmp [7] Emulsion Pump Alarm OK [7] No Problems</p> <p>MAIN</p>	<p>Pump Safety Warnings</p> <p>Product Pump Alarm</p> <p>Emulsion Pump Alarm</p> <p>No Problems</p>															
<p>Print-out Headings / Labels</p> <p>Job Totals Heading</p> <p>JOB TOTALS [24]</p> <table border="1"> <tr> <td>EMUL</td> <td>ANFO</td> <td>TOTAL</td> </tr> <tr> <td>[8]</td> <td>[8]</td> <td>[6]</td> </tr> </table> <p>Hole Totals Heading</p> <table border="1"> <tr> <td>Hole#</td> <td>EMUL</td> <td>ANFO</td> <td>TOTAL</td> </tr> <tr> <td>[5]</td> <td>[4]</td> <td>[4]</td> <td>[6]</td> </tr> </table> <p>MAIN</p>	EMUL	ANFO	TOTAL	[8]	[8]	[6]	Hole#	EMUL	ANFO	TOTAL	[5]	[4]	[4]	[6]	<p>Print-out Headings / Labels</p> <p>Job Totals Heading</p> <p>Hole Totals Heading</p>	
EMUL	ANFO	TOTAL														
[8]	[8]	[6]														
Hole#	EMUL	ANFO	TOTAL													
[5]	[4]	[4]	[6]													
<p>>ANFO< BLEND Probe</p> <table border="1"> <tr> <td>Emulsion</td> <td>ANFO</td> </tr> <tr> <td>T 315</td> <td>T 4523</td> </tr> </table> <table border="1"> <tr> <td>Blend</td> <td>Preset</td> </tr> <tr> <td>t 0</td> <td>0</td> </tr> </table> <p>MAIN Auger PUMP</p>	Emulsion	ANFO	T 315	T 4523	Blend	Preset	t 0	0	<p>ANFO</p> <p>BLEND</p> <p>Probe</p> <p>Emulsion</p> <p>ANFO</p> <p>Blend</p> <p>Preset</p> <p>Auger</p> <p>PUMP</p>							
Emulsion	ANFO															
T 315	T 4523															
Blend	Preset															
t 0	0															
<p>Pump Safety System: OK</p> <table border="1"> <tr> <td>Blend</td> <td>Auto Augering</td> </tr> <tr> <td>T 0</td> <td>0/1 OFF Probe</td> </tr> </table> <table border="1"> <tr> <td>Pump</td> <td>Preset</td> </tr> <tr> <td>R 0</td> <td>0</td> </tr> </table> <p>MAIN AUGER Pump</p>	Blend	Auto Augering	T 0	0/1 OFF Probe	Pump	Preset	R 0	0	<p>Pump Safety System</p> <p>Blend</p> <p>Auto Augering</p> <p>Probe</p> <p>Pump</p> <p>Preset</p> <p>AUGER</p> <p>Pump</p>							
Blend	Auto Augering															
T 0	0/1 OFF Probe															
Pump	Preset															
R 0	0															

Pump Safety System:

Pump
T

Pump Preset
R

"Smart" Calibration

1) The computer thinks you have run this much: t

2) Enter the ACTUAL measured amount here:

3)

* All totals and calibration values MUST be non-zero.

4216 Unibody Tank Contents

Tank	S.G.	Depth	Contents
A	0.85	40 in	3335 lbs
B	1.20	15 in	16424 lbs
C	1.20	0 in	9927 lbs
D	0.85	30 in	4454 lbs
			<u>Total</u>
			34140 lbs

PumpPro Pump Protection	
Reset	
ENABLED	
Pump	
Preset	
"Smart" Calibration	
The computer thinks you have run this much:	
Enter the ACTUAL measured amount here:	
CALCULATE	
Current Calibration	
BACK	
* All totals and calibration values MUST be non-zero.	
Unibody Tank Contents	
Tank	
S.G.	
Depth	
Contents	
Total	