

## SYSTEM OVERVIEW

The Posi-Trac Sand Line monitor system (US Patent 6,745,487) provides accurate electronic digital depth measurement for sand line operations. In addition, the system provides the operator with accurate digital load measurement. This feature reduces the possibility of exceeding the load capacity of the sand line, which often results in breaking the line. Several functions are also incorporated into the system that provides the operator with sand line depth and speed alarms along with sand line load limit alarms. Data acquisition is an option that can be provided to the operator. All parameters from the Posi-Trac system can be date and time stamped and incorporated into the operator's database with our optional proprietary data retrieval system and interface software.

The Sand Line monitor system consists of the following components:

- 1.) Display monitor
- 2.) Signal Generator
- 3.) Digital Weight Gauge
- 4.) Electronic Load Pin

The Display monitor consists of two LCD panels and three data entry switches. The LCD panels provide the operator with sand line depth, speed, and load parameters. The data entry switches allow the operator to set alarm points and depth variables.

A Signal Generator attached to the sand line draw works shaft transmits electronic signals relative to the shaft rotation to a microprocessor in the Display monitor. The depth and line speed can be in either Imperial or Metric units. A load pin is mounted on the sand line crown sheave and transmits a 4 – 20 Ma signal to a digital weight gauge. This signal is received by a microprocessor in the display monitor and a LCD panel displays this signal as sand line load in pounds or Kg's.

## INSTALLATION

### GENERAL INSTALLATION REQUIREMENTS

The system is connected to the rig 12 VDC power.

An ON/OFF switch is located on the front of the Sandline console and is used to turn the system on or off. When the system is first turned on, the audible alarm sounds and can be turned off by operating the Increase switch located on the front of the Sandline console.

### MONITOR

The Display monitor must be mounted in a location where the operator can readily see the LCD panels and reach the data entry switches. Four mounting holes are provided to allow the monitor to be located on a bracket, if required. Alternative mounting locations could include the operator's control console.

### SIGNAL GENERATOR

The Signal Generator is connected to the end of the sand line shaft. The cable from the Signal Generator must be routed in a safe and protected manner from the Signal Generator to the Display monitor. The Signal Generator cable has a 7-pin connector that attaches to the corresponding connector at the Display monitor.

### Load Pin

The load pin is a direct replacement for the Sandline crown sheave pin. This load pin is machined to match the dimensions and rating of the crown sheave pin. Remove the existing sheave pin and install the load pin. Do not hammer on or otherwise force the load pin into position as the electronics in the load pin may be damaged. Carefully route the cable from the load pin down the derrick to the Sandline digital weight gauge.



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Sandline Control Console

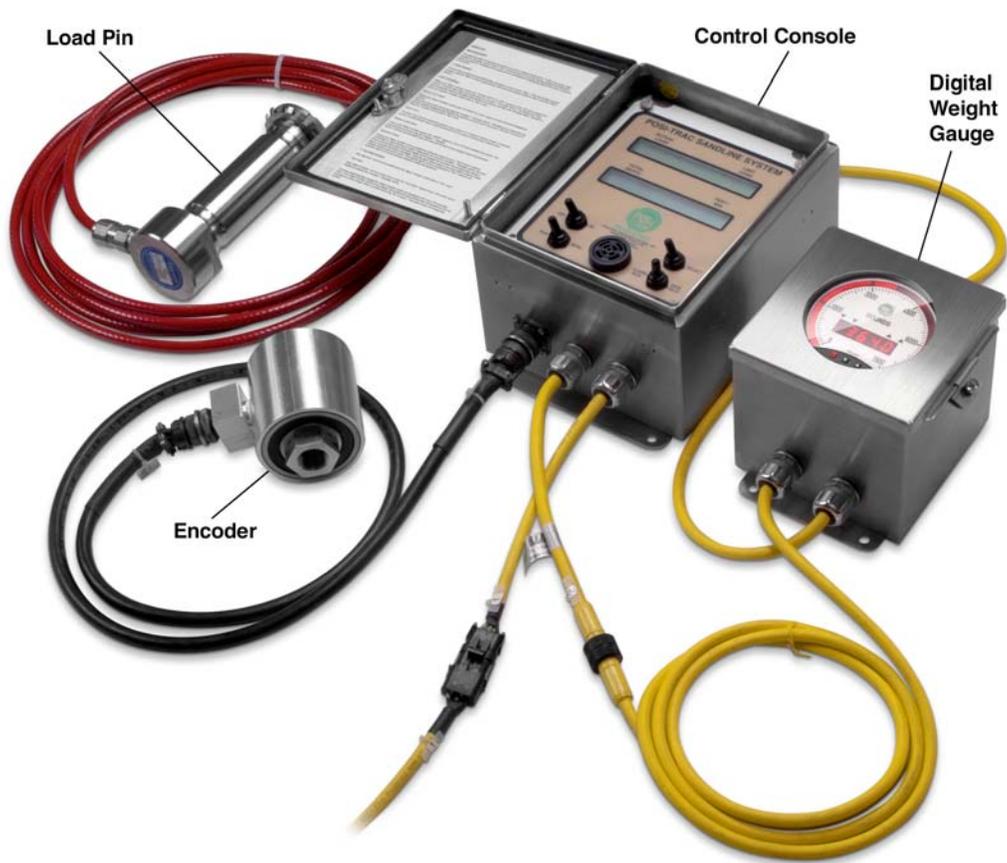
FIGURE 1



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Digital Weight Gauge

FIGURE 2



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Sandline System Components

FIGURE 3

## OPERATION

### Data Entry Functions:

#### Save Current Depth

This feature is useful in the event the Sandline unit power needs to be shut down. To save the current depth, actuate the 'Decrease' switch while in 'Run' mode once the Sand line hoist has been stopped and before the power is turned off. The depth will be saved and will be displayed as the starting depth when power is restored to the system.

#### Run Mode Functions

Data entry functions are accessed using the 'Select Variable' switch when in 'Run' mode:

#### Actual Load

Press 'Select Variable' until the number shown under the 'Actual Load' display blinks. The number can be changed by pressing the 'Increase' / 'Decrease' switch. The Actual Load adjust function allows the operator to calibrate the digital weight gauge to the Sandline LCD display

#### Set Load

Press 'Select Variable' until the number shown under the 'Set Load' display blinks. The number can be changed by pressing the 'Increase' / 'Decrease' switch. This load value is used to provide a signal that can be used to stop the sand line hoist to prevent breaking the line.

#### Total Depth

Press 'Select Variable' until the number shown under the 'Total Depth' display blinks. The number can be changed by pressing the 'Increase' / 'Decrease' switch.

Once the variable has been changed, the 'Select Variable' switch can be pressed until none of the variables blink. If the 'Select Variable' switch is not pressed, the variable will stop blinking after 30 seconds and will not be subject to further change. In order for the changed value to take effect, the variable must not be blinking after the change. When a variable is blinking, the 'Increase' / 'Decrease' switch will change that variable.

## Menu Functions

The following variables can be changed when the selector switch is set to 'Menu'. Once the variable has been changed, press the 'Select Variable' switch to save the new value. Move the selector switch to 'Run' to exit the 'Menu' function.

### Lower Alarm Depth

Pressing the 'Select Variable' switch until 'DOWN DEPTH ALARM' appears on the LCD panel accesses this function. The lower alarm depth can be set using the 'Increase' / 'Decrease' Switch. This feature is of value when the operator wants to be alerted when the sand line reaches a set depth near the target depth. The alarm is turned off using the 'Increase' switch when in 'Run' mode.

### Surface Alarm Depth

Pressing the 'Select Variable' switch until 'UP DEPTH ALARM' appears on the LCD panel accesses this function.

The surface alarm depth can be set using the 'Increase' / 'Decrease' Switch. This feature is of value when the operator wants to be alerted when the sand line reaches a set depth below the surface. The alarm is turned off using the 'Increase' switch while in 'Run' mode.

### Speed Alarm

The Speed Alarm function allows the operator to set a maximum line speed. If line speed equals or exceeds this set value, an alarm sounds until the line speed is reduced below the set value.

### Change Current Depth

Pressing the 'Select Variable' switch until 'DEPTH' appears on the LCD panel accesses this function. The required depth can be set using the 'Increase' / 'Decrease' Switch. Once the required depth is set, this value will be used for any changes in sand line movement.

### Calibration Adjust

Pressing the 'Select Variable' switch accesses the Calibration Adjust function. This function is used to compensate for slight deviations in depth measurement. By using the 'Increase' / 'Decrease' switch, the value shown in the left hand side of the lower display can be changed and will show the corresponding change in depth on the right hand side of the display. Once the depth value is equal to the actual depth, press the 'Select Variable' switch to exit this function. The adjusted depth will then be displayed in 'Run' mode and the calibration factor will be permanently changed to reflect the adjustment.