




# POSITION TRACKING SYSTEMS INC.

## Standard Posi-Stop Operation & Maintenance Training

# Presentation Overview

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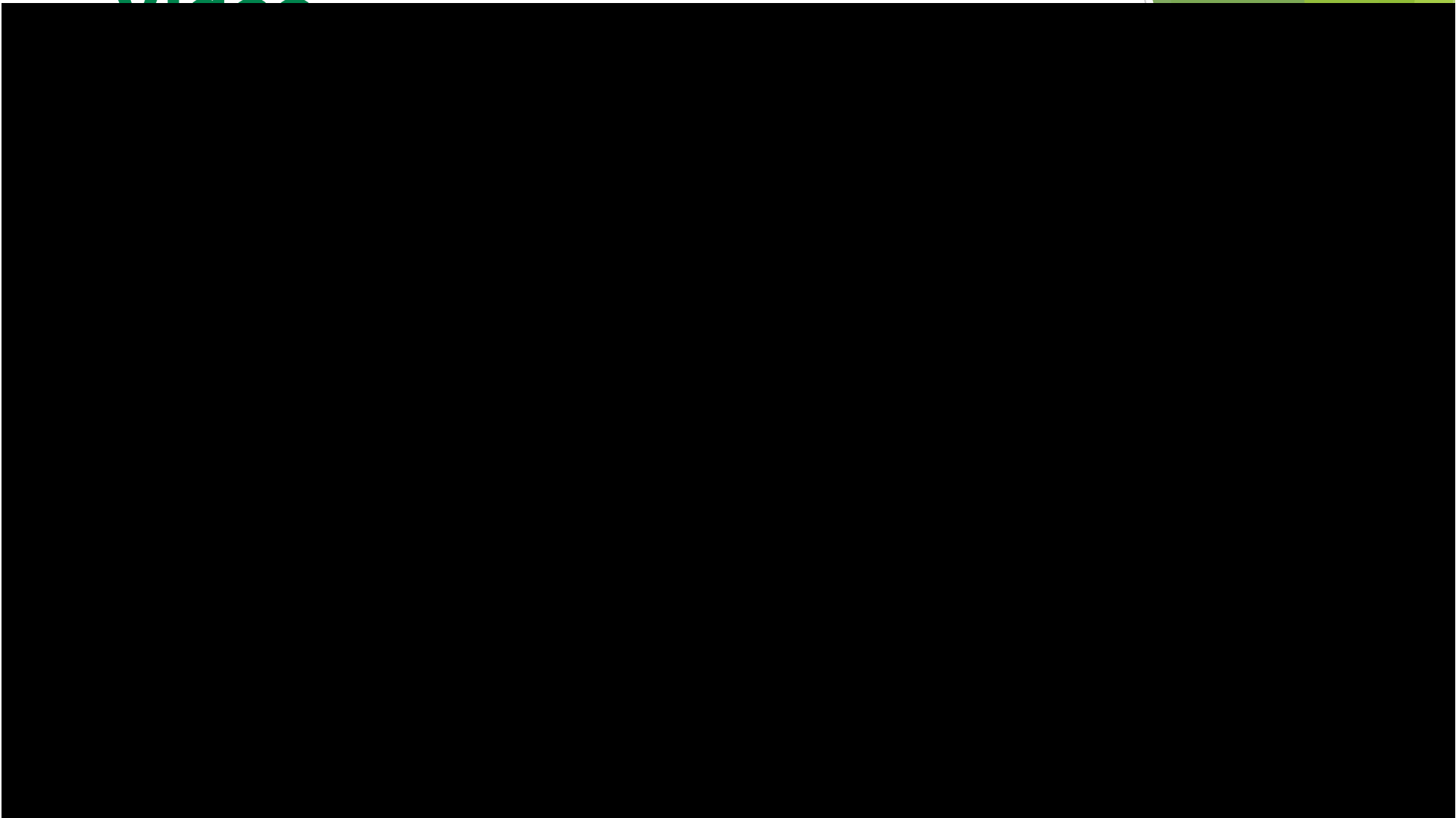
# Posi-Stop Purpose


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- ▶ The Standard Posi-Stop System provides Crown and Floor Protection
- ▶ **WARNING!**: The Posi-Stop system does not replace any function of the operator.
- ▶ The best analogy of the Posi-Stop's purpose is that of a vehicle seat belt. The seat belt does not operate the vehicle in any way. The seat belt does not guarantee the user will avoid injury or death from a collision. But, if the seat belt is properly used the chances of mitigating injury or avoid death is greatly improved than those not wearing a seat belt. Posi-Stop has demonstrated that it can mitigate the severity of an incident when properly used and maintained.
- ▶ **WARNING!**: The block distance travelled from once the Posi-Stop hits a limit is determined by the braking power of the brakes, which can be impacted by, but not limited to, air pressure, alignment of the brake canister and brake pad wear.
- ▶ **All** operators and **all** hands working on a rig with a Posi-Stop installed **must** be informed of the intended use of the Posi-Stop.

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Video




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# Posi-Stop Operation Summary

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- ▶ Operator and Rig Hands **must** be trained on the Posi-Stop System and must have at least a yearly refresher
- ▶ Prior to using the Posi-Stop the operator **must** read the Warning Label attached on both sides of the console.
- ▶ The Operator will Establish the “Upper Limit (or 100% value)” and “Lower Limit (or 0% value),” referenced as “Calibration” in this presentation, by lowering the blocks to the lower set point and moving the Operation switch from “Off” to “Set” then the operator moves the block to the upper limit set point and moves the Operation Switch from “Set” to “On.” Once moved to “On” the system will buzz and the brakes will set.
- ▶ The operator will then press the “Red Button” to release the brakes and then start performing work.
- ▶ As the block travel up and down once the blocks reach 10% or 90% the buzzer will start to sound and the “Amber” light will illuminate. As the blocks near 100% or 0% the buzzer’s beeps will increase in frequency providing the operator an audible notification of the blocks position relative to the set points he/she established during the Calibration.
- ▶ Once the blocks reach the upper or lower limit the Red light will illuminate and the brakes will set. The operator will need to press the Red light to release the brakes to continue work.


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# Posi-Stop Operation Summary

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- ▶ The operator may work above and below the upper and lower limits once they have released the brakes. While working in this zone the Red light will blink.
- ▶ For rigs installed with the “Foot Switch” the operator may bypass the brake setting at the upper and lower limit by pressing down on the footswitch. There is a 10 second timer built into the software that will not allow this bypass to occur if the switch has been depress for more than 10 seconds. This helps ensure that the operator is aware of the rig operation and is intentionally bypassing the limits.
- ▶ For rigs installed with “Shutdown Switch” or ESD the operator can engage the brakes at any block position. Note the speed of the block travel stopping is limited by the brake configuration.

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# The Standard Posi-Stop Kit

Encoder Cable

Console

Solenoid Valve

Encoder

Power/Signal Cable

Solenoid Valve Cable



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# Console User Interface

Block Position Bar Display – Shows the block position relative to the upper and lower limits – Note the bar blinks when above the upper limit or below the lower limit

Red Button – When limits are reached will illuminate. When pressed the brakes will be released. If block is above/below limits it will blink

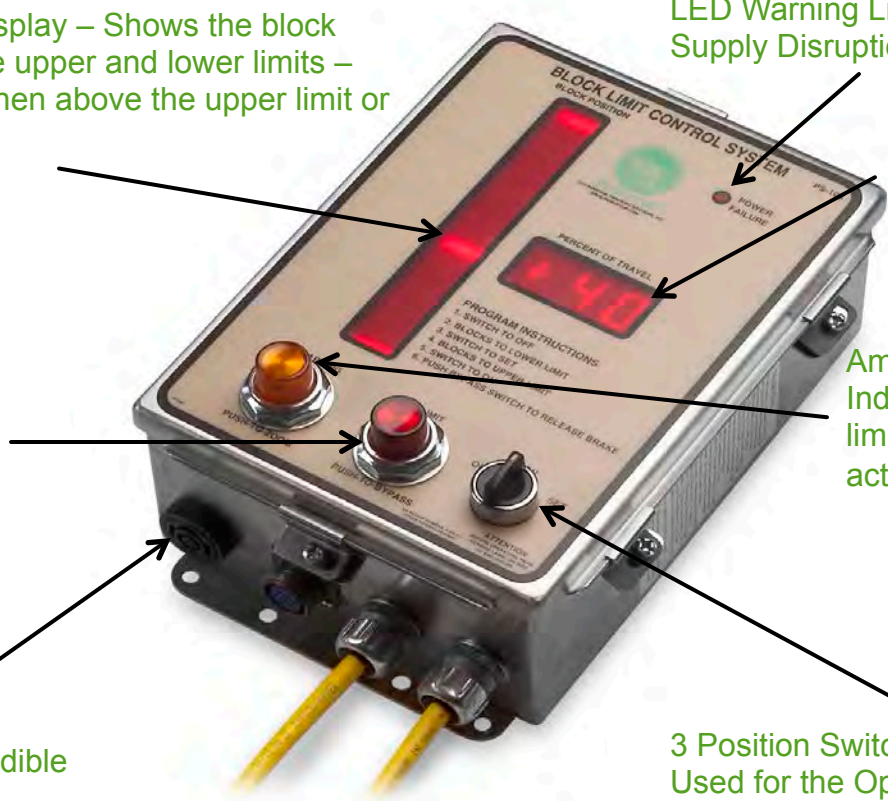
Buzzer – Provides Audible Signals


LED Warning Light – Power Supply Disruption

Block Position Numeric Value in % - Note can display + and - values

Amber Button – Indicates when limits are with 10% actual position

3 Position Switch – On/Off/Set – Used for the Operator to Calibrate the system and to turn off the system when not in use



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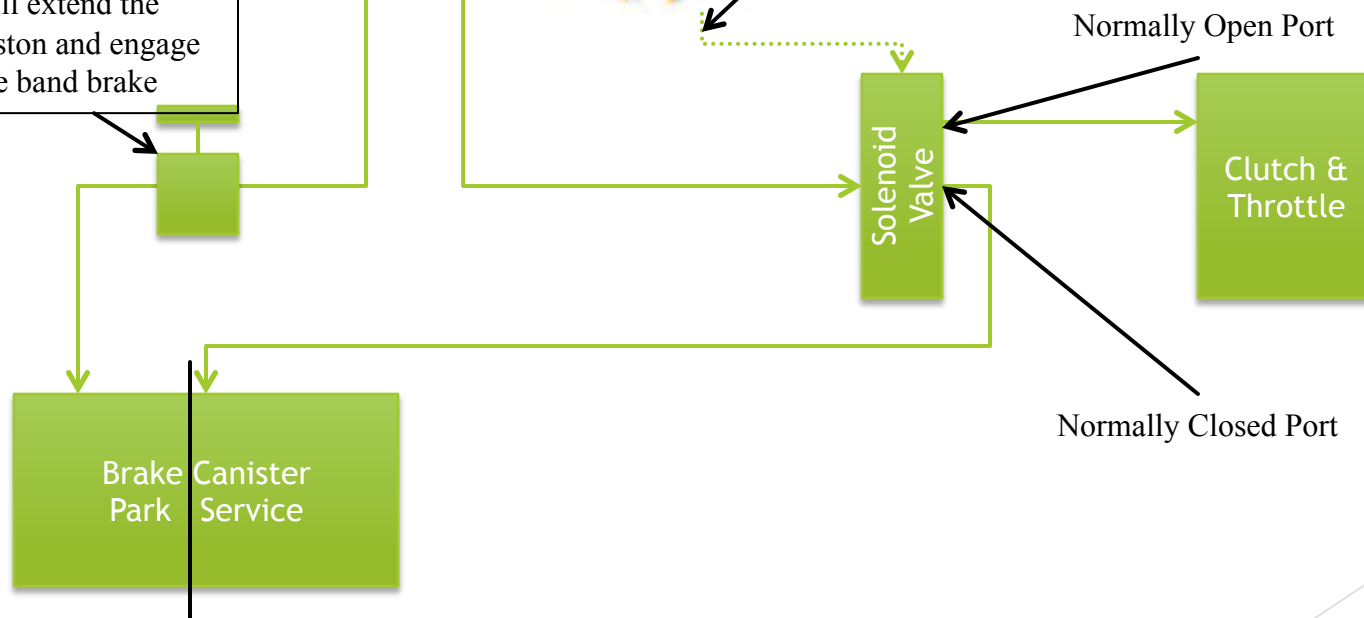



# Brake System

When the ESD valve is engaged the air supply to the park brake side of the brake canister is removed and the spring will extend the piston and engage the band brake



When the limits are reached the Posi-Stop console will send an electrical current to the Solenoid Valve which will cause the valves actuator to close the air port to the clutch and throttle and open the port to send air to the service brake side of the brake canister. Once air is sent to the brake the brake's piston will extend and engage the band brake




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# How it Monitors Block Position

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- ▶ During the Calibration the system detects the number of pulses generated by the Encoder starting at zero when the operator has lowered the blocks and turned the switch to “Set.” For most encoders there are 96 pulses per rotation of the draw works. As the draw works are raised up to the upper limit the console is counting the number of pulses sent from the encoder until the switch is turned to “On.”
- ▶ If the blocks reach either the lower or upper limit the console activates the solenoid valve.
- ▶ The operator releases the brake by pressing the “Bypass” button and can resume work.

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# Pre Use Inspection

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- ▶ Operator will read the Warning Label
- ▶ Turn system to “On” then look for Power Disruption by looking if the LED light is illuminated. If it is illuminated but the Posi-Stop “works” this is because the system is running on the internal back up battery. This internal battery is only for short power interruptions (no or low power supply) and is not intended for normal operation of the Posi-Stop. Working under these conditions can lead to apparently “normal” operation of the system but not enough voltage to power the solenoid valve’s actuator that could lead to an incident.
- ▶ Check all cables and cable connections to the console and make sure they are free of wear and tear and are firmly connected.
- ▶ If any function of the Posi-Stop appears to be not functioning as expected Management must be notified.

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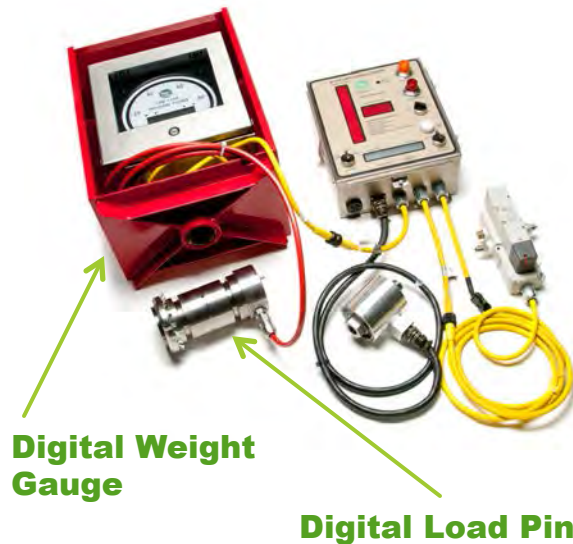
# Calibration Practice

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- ▶ Calibration should be performed when:
  - ▶ Every shift or change of operator
  - ▶ When operator leaves the work platform
  - ▶ Whenever work conditions change
  - ▶ **Attention!** Calibration is the most important inspection as it performs a function test to ensure the brakes will engage when limits are reached.
- ▶ Upper Limit should be set to allow ample space for the block to come to a complete stop. Note the block may travel past the 100% limit as the brake takes time to engage and stop the block's momentum.
- ▶ Lower limit should be set like the lower limit where the lower limit allows block to travel while the brakes are engaged and stop the momentum


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# Options – Posi-Stop Plus



- ▶ The Plus system has a Max weight limit set by the operator. If the detected weight exceeds the set limit then the system will set the brakes and drop the clutch/throttle.


- ▶ Most units in the Permian Basin are the “Standard Posi-Stop,” however there are a few Posi-Stop Plus systems. The Plus system has all the features of the Standard System but has a mast overload protection feature. The Plus system takes a weight signal either from a digital load pin installed on the deadline sheave (pictured) or from a pressure transducer usually installed on the conventional weight gauge.

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# Options – Strobe Light

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- ▶ Some rigs are installed with an amber strobe light that is mounted near the Posi-Stop console. When the Posi-Stop is on the strobe will operate. The strobe provides a visual indicator that the Posi-Stop is on from a distance.
- ▶ Note: Some rigs have the reverse logic in that the strobe operates when the Posi-Stop system is turned off.

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# Options – Interlock

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- ▶ Some rigs are fitted out with an “Interlock” feature. The purpose of this feature is to help ensure the operator sets the Posi-Stop once hoisting activities begin (when the mast is fully rigged up). This system requires the Data Acquisition (DA) box usually mounted in the drivers cabin behind the seat and an Auxiliary box mounted near the Posi-Stop console.
- ▶ The “Interlock” gets a signal that the mast is in position to start hoisting activities. A amber light is installed near the operator and when this light is illuminated then the interlock feature is active. A proximity switch is used to detect the position of the dogs. If the sensor is damaged then the system will assume mast is set and will provide the interlock feature.
- ▶ If the system detects that the mast is in position then the operator has 2 minutes to calibrate the Posi-Stop before the system sets the brakes and drop the clutch/throttle. If the system sets then the operator must turn off the Posi-Stop and set the limits again before 2 minutes elapses.

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# Options - RigsEye

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- ▶ RigsEye is a remote monitoring and alert system.
  - ▶ There is a “Lite” version that provides limited Posi-Stop status such as On & Calibrated, Not On & Calibrated, or Offline. When the status changes a SMS alert can be sent to authorized users. Additionally a web page summary listing all rigs and the current status is also available. The system uses cellular network connection but can also use satellite service.
  - ▶ The full version provides all the Lite system plus:
    - ▶ All Draw works activity (RPM, speed, distance, weight on line, cycle count, etc...)
    - ▶ Engine activity (Engine Hours, Odometer reading, speed, RPM, fuel consumption, fluid levels, gear selected, fluid temperatures, etc...)
    - ▶ Weather conditions
    - ▶ Drilling Activity (tong torque, swivel torque, weight, etc...)


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# Best Work Practices

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- ▶ The Posi-Stop is only effective when it is turned on and set properly. Experience has shown that crew utilization of the system needs improvement. Senior Management's proactive involvement is the best way to implement this safety device. Operation Procedures should include the following:
  - ▶ Ensure Proper training by all users and have at least yearly refreshers. Can integrate with the yearly HSE training program.
  - ▶ Ensure Maintenance program includes the Posi-Stop system. Recommend full testing and inspection every 90 days
  - ▶ Ensure yearly recertification of encoders and consoles.
  - ▶ Ensure proper use of the system using monitoring and auditing practices. RigsEye, cameras, strobe light and Interlock are important features as well as a planned out audit program to have full compliance in the operation of the Posi-Stop.

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# Maintenance

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- ▶ At least a formal 90 Day inspection should be performed of the Posi-Stop System (Electrical and Pneumatic) by a mechanic. PTS Inc. has detailed inspection procedure and check sheet that can be made available.
- ▶ Whenever Brakes are Inspected, the Posi-Stop system should also be inspected.
- ▶ Whenever Brakes pads are replaced or brakes are adjusted, the brake canister alignment must also be checked to ensure full brake force is applied when the Posi-Stop is activated.
- ▶ The brake canister should be replaced every year or when there is visible damage or if there is an air leak from the diaphragm.
- ▶ The internal battery should be replaced every year or if the battery has a “bulge”
- ▶ The encoder and console should be sent to the PTS shop once a year for inspection, testing and recertification.

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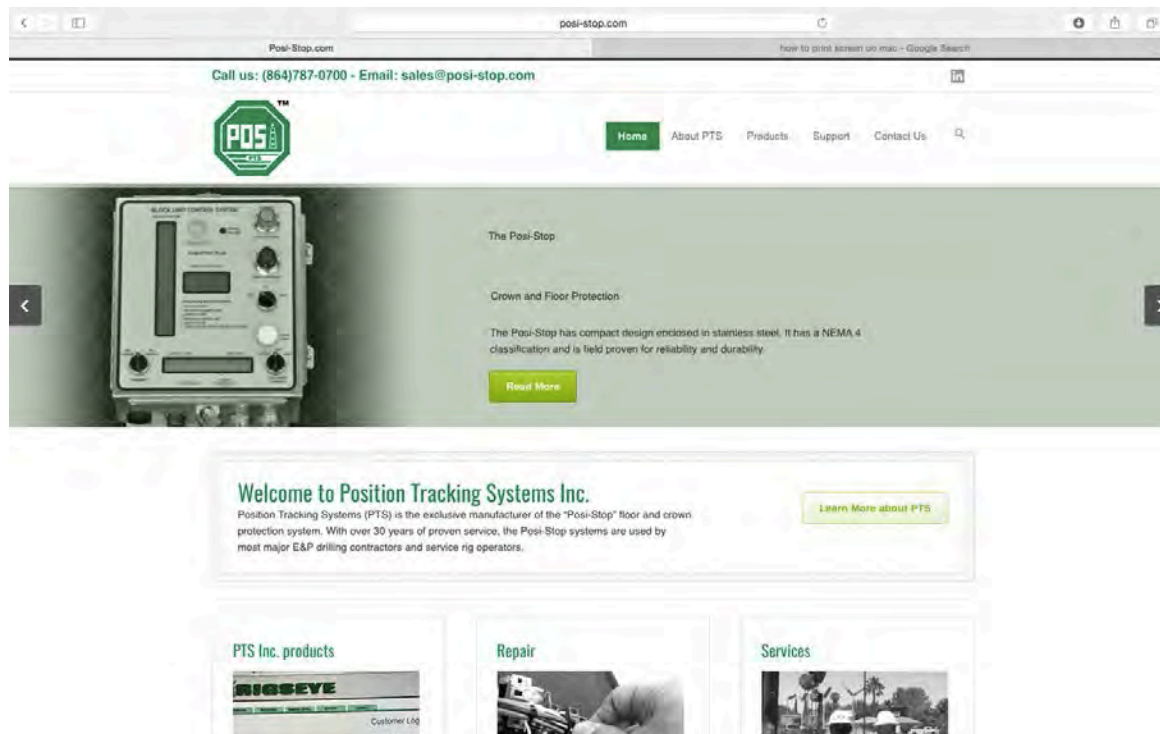
# Troubleshooting


Common Issue	Remedy
Posi-Stop won't turn on	<ul style="list-style-type: none"> <li>* Check Power Cable is connected</li> <li>* Check fuse at power source (Rig Battery/Starter/etc...)</li> <li>* Check Posi-Stop console internal fuses</li> </ul>
Posi-Stop won't stop the blocks at 0 or 100	<ul style="list-style-type: none"> <li>* Check the display if the value is more than 100 or less than 0 then the system is working - the brakes may need adjustment or this is the best it can do with the speed and weight involved - may require adjusting the limit positions</li> </ul>
Buzzer won't work	<ul style="list-style-type: none"> <li>* Diaphragm may be in a "stuck" position - insert a small object up the buzzer and gently push the diaphragm up to "pop" it back into position. If this doesn't work then a new buzzer is required.</li> </ul>
Brake won't set	<ul style="list-style-type: none"> <li>* Make sure the solenoid valve cable is damage free and is connected</li> <li>Check the air lines to the service side of the brake canister is properly connected</li> <li>* Make sure the power LED light is not on. If so then the internal battery does not have enough charge to activate the solenoid valve's actuator</li> </ul>
Posi-Stop loses position	<ul style="list-style-type: none"> <li>* Check that the encoder cable is tightly connected at both ends                             <ul style="list-style-type: none"> <li>• Ensure the encoder is secure to avoid rotating with the draw works either with</li> </ul> </li> <li>* cable ties or a bracket to limit encoder movement.</li> </ul>
Other Issues	Please refer to the detailed "Troubleshooting Guide" see resources section

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# Resources

- ▶ Go to [www.posi-stop.com](http://www.posi-stop.com)
- ▶ Select the Support Tab and all guides and manuals are available for download



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# CONTACT INFORMATION

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- ▶ Alex Nield

- ▶ (864) 404-5308

- ▶ gan@posi-stop.com


- ▶ Shop Address (Send all repairs to this address)

PTS Inc.

112 Cedar Lane Rd

Greenville, SC 29601

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