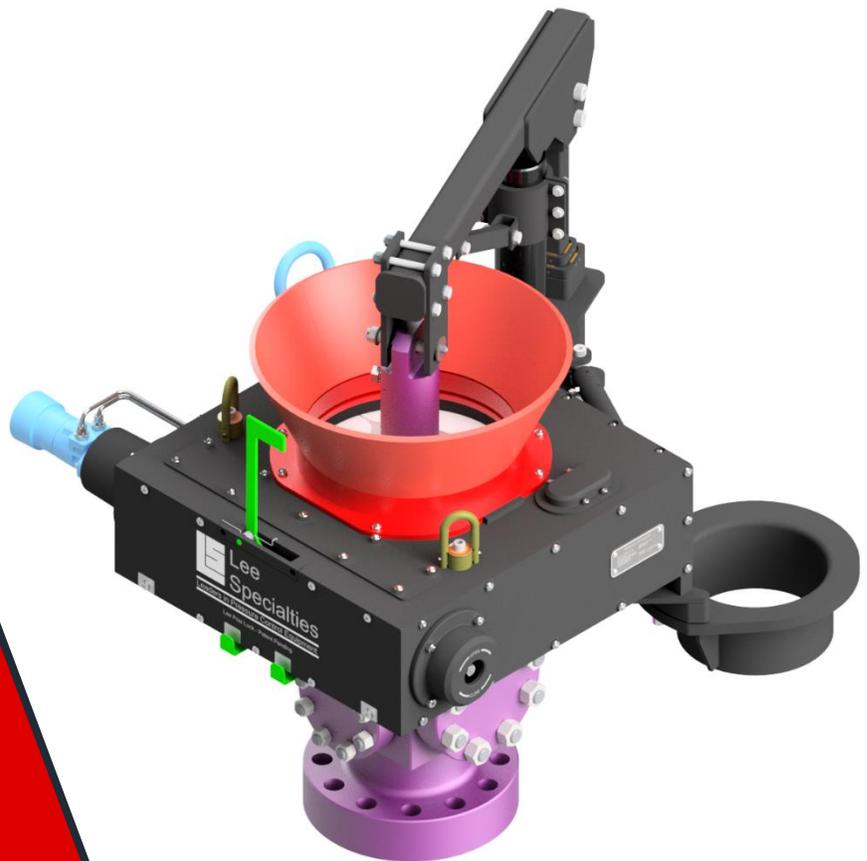




Leaders in Pressure Control Equipment

The Lee Posi Lock



The Lee Posi Lock System

Lee Posi Lock systems are available for purchase and/or rental at the following Lee Specialties locations:

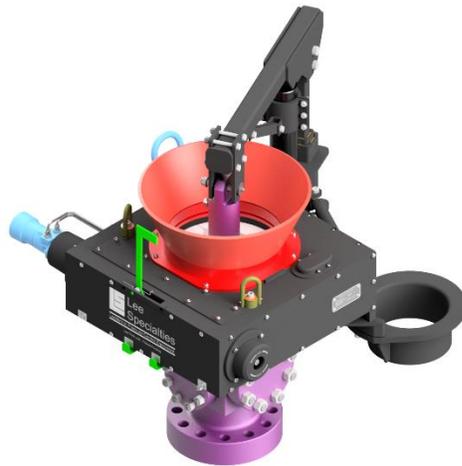
Blackfalds, AB
(403) 346-4487

Red Deer, AB
(403) 346-0770

Grande Prairie, AB
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Houston, TX
(281) 519-1719

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(432) 561-8188



With the Lee Posi Lock System, you can operate safely and efficiently when moving tool strings from well to well. This remotely operated well head connection uses a large entry guide to allow for simple execution of placing the stinger (which connects to the end of the lubricator string), directly into the body of the Lee Posi Lock where it is then locked into place by a hydraulically driven clamp, similar in design to an API 16A clamp (subsea). A hydraulic brake on the motor ensures a positive lock with equal force applied on the tapered lug while a secondary visual indicator in the form of a flag rises to the vertical position. Available in 10K

and 15K working pressures, the Lee Posi Lock comes in at 3,075 lbs. with a length of 51.4", a height of 42.5", and a width of 48.5" (dimensions based on 15K version) along with a nightcap extractor. One hydraulic cylinder is utilized to lift the nightcap while another is used to rotate the nightcap into the docking station. The system also includes built in BX-152 and BX-154 flanges for 1502/2202 ports and quick test port, effectively reducing the overall stack height and allowing for confirmation of well connection. Manual operation of the Lee Posi Lock is an option should circumstances arise where it is needed.

Overall Design Advantages	Safety Advantages
Large steel entry guide	Impact resistance. Competitors versions utilize a composite material which isn't as durable.
Compact overall height of 42.5"	Shorter system minimizes risk of damage during mobilization and deployment.
Built-in 2" BX-152 1502 port and 3" BX-154 2202/1502 port.	The BX-152 port eliminates the flow-tee in the stack, effectively reducing overall height while the BX-154 port can be used as a ball launching port and is unique to the Lee Posi lock.
Built-in quick test ports with pressure transducers for each.	The quick test port confirms well connection and decreases stack height. The connection can be tested at the Lee Lock and can be used to monitor if the seal fails. Once the quick test port is bled off, any increase in pressure indicates that the first o-ring has failed and pressure is now being held by the second.
Manual flag on top table as well as lower table for confirmation of lock position (flag shown in red in the above image).	Triple indication. 2 manual and 1 electronic (via control unit w/ green indicator lights). The flag is vertical when clamp is closed and lower indicator displays clamp movement.
Pressure transducer in bottom flange for lock out with well pressure.	The clamp cannot be opened with pressure on the Lee Posi Lock/wellhead. The pressure transducers can also be used to monitor pressure during wireline operations via the included Android/IOS app .

The Lug and Clamp Design

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The lug and clamp design is inspired by the API 16A design of connections used on Subsea risers. This connection has been proven through decades of trial to be a dependable means of coupling equipment in high-pressure situations. The design is also simple and contains a minimal amount of moving pieces which simply means less maintenance and less chance of parts failing. The clamp can be opened or closed within 30 seconds which allows for the o-ring to be seated smoothly. Additional safety considerations are in place, including a brake on the hydraulic motor which locks the worm gear from rotating while in closed position, as well as a twin screw efficiency low enough to self-lock and not backdrive. Manual operation is available if hydraulics should fail.

Lug and Clamp Advantages	Safety Advantages
Lug design is inspired by the tried and tested API Subsea design.	Utilizing a design that is proven through decades of usage in high-pressure operations inspires confidence in operators and customers.
Locking lugs are 28" x 23.5"	Robust clamp design covering more surface area relative to competitors designs.
Minimal moving pieces	Less maintenance = less parts to fail
Clamp profile seats o-rings into lower flange on connection	10-30 seconds operation allows for smooth o-ring seating
Brake on hydraulic motor locks worm gear from rotating in closed position.	Second positive lock to hold worm gear from rotation.
Lead screw profile is self-locking (well pressure will not open clamps).	Backdriving: Acme screws are commonly used to convert rotary motion into linear motion. Backdriving is the result of the load pushing axially on the screw or nut to create rotary motion. Generally, a nut with efficiency greater than 50% will have a tendency to backdrive. Self-locking occurs with efficiencies below 35%. The Lee Posi Lock's twin screw efficiency is 24% with a brake on the hydraulic motor to prevent vibrations from backdriving the screw.
Worm gear can be manually operated if hydraulic's are lost.	A secondary, backup means of assist in the event of hydraulic loss.

Stinger and Night Cap Extractor

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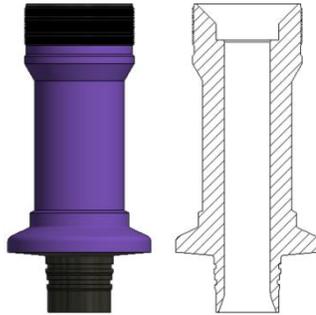
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The Lee Posi Lock stinger connects to the pin union at the bottom of the pressure control stack and allows for insertion into the funnel of the lock and further into the lock where it is then clamped. It contains a built-in wireline re-entry guide from 6.5" to 5.125". The stinger is available in most common hand union and flanged connections. Each Lee Lock system comes with one stinger (additional stingers available upon order).



The telescoping night cap extractor arm provides a simple and effective way to add or remove the night cap from the Lee Posi Lock. A docking station is attached to hold the night cap when not in use. With the telescoping design, as long as the lubricator remains above the funnel, it will not swing into the Lee Lock.

Stinger	Safety Advantages
Built-in re-entry guide from 6.5" to 5.125"	The re-entry guide is not attached to a string that falls to the ground.
Night Cap Extractor Advantages	Safety Advantages
Night cap allows for secondary seal at the wellhead connection.	The quick test port pressure transducer can be used to monitor if the first o-ring is leaking. After the QTS is bled off, if there is a pressure increase on the QTS pressure transducer it means that the first o-ring is leaking.
Night cap extractor is below the funnel.	The telescoping design of the extractor arm means that as long as the lubricator is above the funnel it will not swing into the Lee Lock.
Hydraulic multi-coupling plate on Lee Lock.	One action makes all hydraulic connections and electrical connections providing a simple and safe means of connection. Hydraulic lines cannot get crossed and lead to the operation of incorrect circuits.
Worm gear can be manually operated if hydraulic's are lost.	A secondary, backup means of assist in the event of hydraulic loss.

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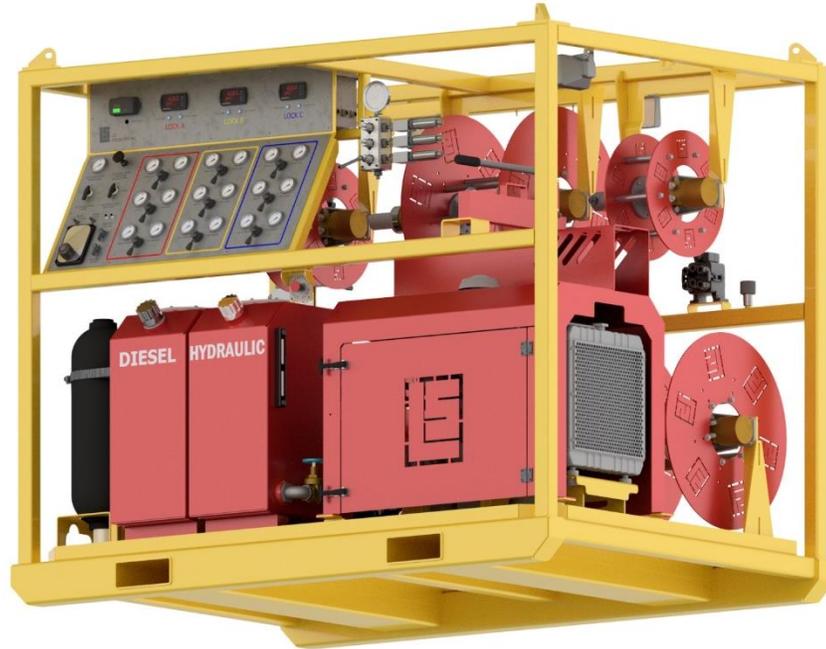
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The Lee Posi Lock Control Unit is a simple, straight-forward diesel driven design containing a built-in 20 gallon accumulator, one hand pump for quick test sub operation, motorized reels, and **WiFi for an IOS/Android app** that records and displays both pressure and lock status. The control unit is available in 3 or 4 lock configurations and can be configured as an air driven version if required.

Overall Design Advantages	Safety Advantages
Motorized hose reel	Easier for operators to spool/unspool lines.
Single mechanical lock for all hose/electrical connections.	Prevents lines from being connected improperly.
Safety pressure interlocks	Ensures that the Lee Lock cannot be opened under pressure.
Safety clamp interlocks	The night cap extractor can't be operated if the clamps are closed.
Mechanical override in the event of a failure.	A unique feature to the Lee Posi Lock.
Mobile app for recording and monitoring Lee Posi Lock status and pressure.	The control unit contains built-in WIFI which allows the available Android/IOS app to record and monitor data from the Lee Posi Lock. You'll receive insight such as lock status and pressure vs. time, which can be stored for later access. Memory is via Micro SD card which can exceed 1000 GB's (far more than would ever be necessary).
Slip ring on hydraulic reels	The slip rings eliminate the need for operators to make electrical connections.
Hydraulic valves have detent pins	Valve locking in the center prevents accidental operation.
Dual battery w/ one isolated for starting engine	Minimizes the risk of the Lee Lock Control Panel killing the battery.

Lee Lock Control Unit

Below are screenshots of the CMT Viewer that can run on a smart phone, tablet, or laptop by connecting to the Wi-Fi which is broadcast from the Lee Posi Lock Programmable Logic Controller (PLC) Box.

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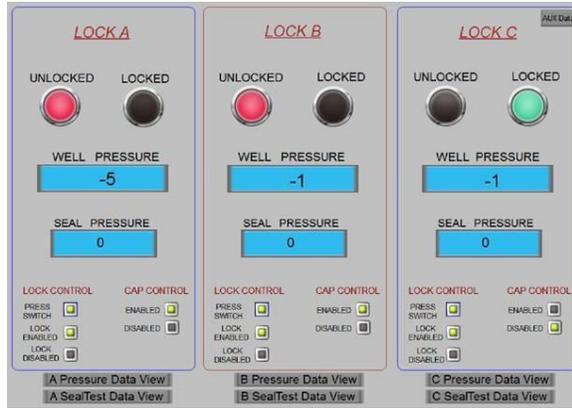
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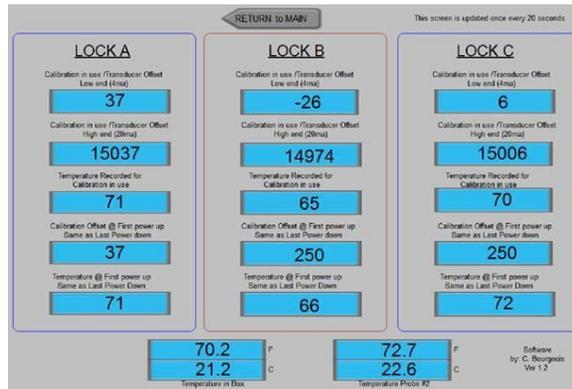
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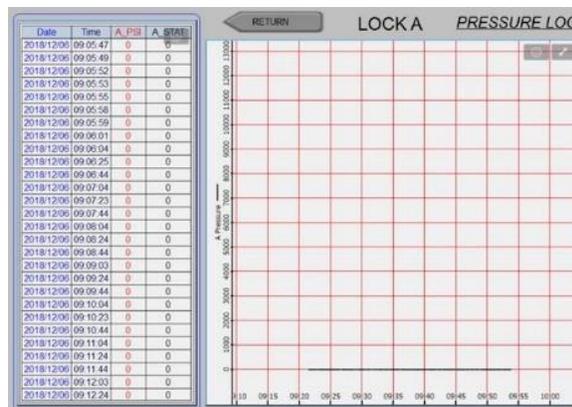
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- This CMT screen emulates what the PLC box displays.



- This CMT screen is the AUX Data window with calibration and temperature data.



- This CMT screen shows the Pressure Data View window.



Leaders in Pressure Control Equipment

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Mountain Standard Time

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