



LOW PRESSURE AUTOCHOKE CONSOLE

Precise wellbore pressure control for your underbalanced
and managed-pressure drilling operations



High resolution pressure control at your fingertips, during your UBD and MPD applications

APPLICATIONS

Wells employing Underbalanced Drilling (UBD) or Managed-Pressure Drilling (MPD) techniques and wells where it is necessary to hold near-constant bottomhole pressures.

PROBLEMS

The lower pressures and narrow pressure windows common to MPD require finer control and better pressure resolution than are currently available with conventional drilling chokes and control units.

SOLUTIONS

The LPAC* (LOW-PRESSURE AUTOCHOKE CONSOLE*) system gives drillers better control of surface pressures below 1,500 PSI, with better resolution, increased reliability, and faster response. The LPAC unit also makes stripping pipe simpler and safer by maintaining constant casing pressure.

ECONOMIC

Together, the LPAC and AUTOCHOKE units reduce NPT by extending bit life, reducing or eliminating lost circulation and well-control events, and they reduce drilling time by increasing ROP, thus shortening the time for the rig on location. Integrated LPAC backup systems prevent costly well-control problems, even when power or rig air fails.

The LPAC system from M-I SWACO gives drillers a new level of control over the wellbore pressure profile during UBD and MPD operations. The LPAC control system has been specifically engineered to give drillers simple and responsive high-resolution pressure control from our unique AutoCHOKE unit.

The touch screen interface enables the operator to directly set the pressure in the choke with precision, using a high-resolution pressure control interface. As the system consists of a local Hydraulic Power Unit (HPU) console and a remote Human/Machine Interface (HMI) that functions as a second console. The new level of control available simultaneously on the rig floor and the driller's cabin, improves operational coordination, efficiency and safety.

High resolution pressure control at your fingertips, during your UBD and MPD applications

Maintaining tight control of bottomhole pressure is critical to successful application of MPD and UBD techniques.

In MPD applications in particular, the window of operation is typically significantly narrower than in conventionally drilled wells. Keeping the bottom hole pressure above the pore pressure and wellbore stability thresholds and below the formation fracture gradient can often require highly accurate control to avoid losses or damage to the wellbore.

The combination of the LPAC unit and the specially modified AUTOCHOKE unit provides this control. The LPAC unit works at a higher resolution so that choke operators have control of pressure accuracy within a range of +/-50 PSI.

With the LPAC system, you can now be confident that the pressure you set is what you get.





Features

- Accurate control at lower pressures
- Helps to maintain wellbore pressure within narrow limits
- Operates two AUTOCHOKE* units simultaneously
- Small-footprint remote HMI unit in driller's cabin for faster and more reliable communication between the driller and choke operator
- Touch screen panel on both Local HPU and Remote HMI
- Increased gauge resolution and digital readouts
- Accumulator and power backup

Benefits

- Near-constant bottomhole pressure control during UBD/MPD applications
- Precision control for stripping pipe in and out of the hole
- Reduces fluid losses and NPT
- Helps to avoid pressure-control incidents
- Ability to maintain a tighter pressure window while drilling could eliminate the need for an extra casing string
- Ability to seamlessly transition between chokes
- Chokes can continue to operate for up to 2 hours after loss of rig air and 1 hour after loss of rig power
- Remote unit can be placed next to the driller for better communication with the choke operator
- Touch screen allows precise pressure inputs to the chokes
- Digital readouts ensure that errors in pressure readings and pressure inputs are greatly reduced



Three-way control means safety, efficiency, and convenience

In the course of drilling a well, control of the choke should be located where the situation demands. The LPAC system provides the flexibility of control from any one of three places: the rig floor/near the choke manifold, the driller's cabin or off-site. A built-in arbitration scheme prevents conflicts and allows the logical transfer of control from the current controller to the device requesting control.

- **On the rig floor or by the choke manifold.** The local HPU features a touch-screen HMI that provides a digital display of rig mud-pump rate and total-stroke information. It includes drillpipe, casing, pneumatic and hydraulic system pressure gauges.
- **In the driller's cabin.** For added safety and accuracy, control of the AutoChoke unit can switch from the local HPU, normally located either on the rig floor or near the choke manifold, to the smaller remote HMI that is a standard feature of the LPAC system. Every function that can be performed on the local HPU can be

performed on the remote HMI. The remote HMI can be located within the driller's cabin, in close proximity to the driller for clear communications while performing UBD and MPD operations.

- **Off-site monitoring and control.** The LPAC unit has Modbus TCP capabilities to allow communications with, or control from, third-party devices.

Complete pressure stability and reliability

The system also provides independent and simultaneous control for two AutoChokes. In the event of choke failure – or during routine maintenance – operators can switch between chokes while maintaining desired bottomhole pressure.

There are three backup power-storage devices too: an air tank, a hydraulic accumulator (so the unit can continue to operate for up to two hours after loss of rig air) and an uninterruptable power supply that can power the unit for up to one hour after loss of rig power.



Cut-away of the AutoChoke system in operation

Success stories

Data logging is automatic and complete

The LPAC unit tracks and records the following data which can be reviewed in real time or stored for post-well retrieval:

- Choke position
- Hydraulic set-point pressure
- Casing pressure
- Drillpipe pressure
- Strokes per minute



LPAC unit Remote HMI



Operator saves 10 days and \$1 million, using the LPAC system.

The situation

A major operator was looking for a solution that would allow holding backpressure while flow drilling. The plan for the well was to drill a series of laterals underbalanced while holding near-constant bottomhole pressure during connections.

The solution

M-I SWACO supplied the LPAC system, a simplified, technologically advanced method for controlling low surface backpressures.

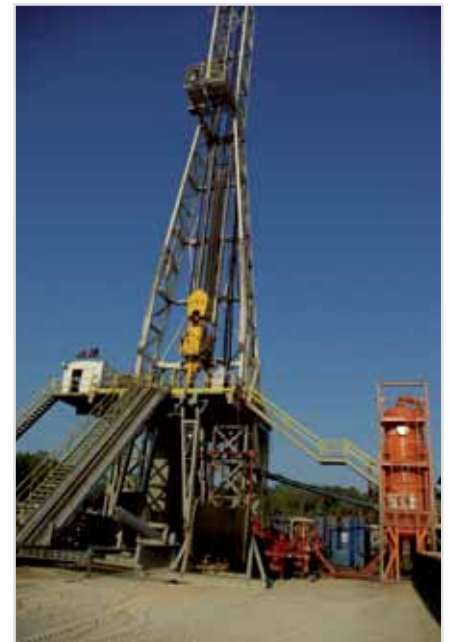


The results

With the LPAC system's ability to hold near-constant wellbore pressure while drilling, the operator increased ROP by 15 to 30 ft/hr, reducing total drilling time by 10 days and saving approximately \$1 million. The system also held a constant 350 PSI on the casing, allowing the operator to strip to the bottom under pressure.

Take the pressure off your next UBD or MPD projects

Discover for yourself how we have helped customers worldwide meet their objectives in the most demanding UBD and MPD applications, contact your local M-I SWACO representative.





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