Wellhead Management System (WMS)
Wellhead Management System

ABB tackles the two greatest current challenges in our production industry with an integrated solution that both optimizes wellhead production and chemical usage at the same time in one enclosure.

ABB introduces a cost effective package solution for managing your artificial lift & management needs. The ABB Wellhead Management System (WMS) is a single box solution that can allow you to locally and remotely control multiple artificial lift systems. The WMS is built to monitor, inventory, alarm, and control your chemical injection systems with proven measurement techniques and electronic controls.

The system is designed for expansion that will also allow you to add our industry leading tools for plunger lift, gas lift, and gas assisted plunger lift in a single unit. The unit is built to scale up from 1 to 4 tanks/wells and can provide you with all of your artificial lift needs. By combining industry leading technologies and field proven applications, you’ve never had this much control at your fingertips.
Chemical management and control solution
Operational efficiency

ABB has engineered an all-in-one solution for managing your chemicals in the field. This solution includes the ability to monitor level and inventory of your tanks through the use of the new ultra-low powered non-contact LST100 level system. Incorporated with monitoring and alarming software, the controller also gives you direct access locally and remotely to the injection schemes, that allows you to effectively and efficiently deliver chemicals to your production.

Monitoring and inventory
The LST100 is a first of its kind in the oil & gas industry. A low cost monitoring solution that can create real-time inventory of one of the largest lease operating expense (LOE) consumables for nearly all operating assets. Utilizing ultrasonic technology, you now have the ability to monitor and inventory every chemical tank in your field, as well as have alarms in the controller monitoring for leaks, refill alarm set points for re-order of product, tank fill notifications when the product is delivered, and volume calculations.

Control
Combined with the ABB Well Management System, that includes injections controls, you will have an entire management solution at your fingertips. In addition, an electro-magnetic flow meter verifies accurate chemical volumes down to the milliliter will be delivered according to the ratio you define as the owner. Current injection schemes available are:

Manual mode
Manual setpoint for Chemical injection rate (Qts/D) which sets the chemical injection target rate (or setpoint). The tuning logic will then adjust pump injection time (secs) based on current measured chemical injection flowrate to meet the chemical injection target rate every minute.

Ascend mode
Automated chemical injection based on direct scaling between user input chemical injection volume max/min limits (Qts/D) and user input flowrate max/min limits (Qts/D). The tuning logic will then adjust pump injection time (secs) based on current measured chemical injection flowrate to meet the auto scaled chemical injection target rate every minute.

Descend mode
Automated chemical injection based on inverted scaling between user input chemical injection volume max/min limits (Qts/D) and user input flowrate max/min limits (Qts/D). The tuning logic will then adjust pump injection time (secs) based on current measured chemical injection flowrate to meet the auto inverted scaled chemical injection target rate every minute.
Artificial Lift application
Intelligent optimization

Plunger Lift Application

Based on the simple idea presented in the ‘Plunger Lift Circle of Life’ below, the system will react according to the well’s ability to produce.

Set the expected time for the “Plunger Fall Delay” – and wait for the plunger to reach bottom. Set one or more conditions in the “Waiting to Open” phase and the system will automatically open when conditions are optimum. Select one option or all, the first one to happen will move you to the next step. You can choose options such as timer based control to more advanced pressure control.

During the “Plunger Arriving” state, simply set the normal arrival windows according to your depth and fluid load. If adjustments are needed, the system will help you during the next cycle to achieve the optimum balance.

Once the plunger is up, there are a variety of options that will assist in determining if the optimum condition has been achieved, from advanced casing pressure monitoring to traditional rate controls.

When combined with the ABB Plunger Analysis Software, you will have the most powerful, intelligent, and cost effective solution available.
Artificial Lift application
Intelligent optimization

Gas Lift Application

Multiple mode gas lift options

**Manual rate control**
Simple manual control based on user specified injection rate.

**Auto inject based on critical**
Dynamic control based on a critical multiplier (Turner flow rate calculation) to maintain flow above critical rate.
Calc: MCR-ProdRate=Target Rate Inject

**Intermittent injection**
Manual control over injection rate, injection period, and off time.

**Step rate testing**
Control injection tests using varying injection rates and injection periods to determine the optimal multiplier to keep flow above critical rate.

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Gas lift – Critical rate based injection

- If production rate rises above critical rate, injection rate = 0
- Well in “Freeflow” condition ABOVE critical rate
- Production rate falls below an auto calculated Critical rate
- Critical – Production = Deficiency
  - In gas is injected until production rate is back above critical rate
  - If production rate rises above critical rate, injection rate = 0

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Multiple mode gas lift options
## System options

**Single chemical tank system***

<table>
<thead>
<tr>
<th>Configurator part number</th>
<th>Plunger lift</th>
<th>Gas lift</th>
<th>Gas assisted plunger lift</th>
</tr>
</thead>
<tbody>
<tr>
<td>2501168-001 C3BOW</td>
<td>Power consumption: 7.5 aH/d</td>
<td>Power consumption: 6.2 aH/d</td>
<td>Power consumption: 8.0 aH/d</td>
</tr>
<tr>
<td></td>
<td>Battery: (1) 110 aH</td>
<td>Battery: (1) 110 aH</td>
<td>Battery: (1) 110 aH</td>
</tr>
<tr>
<td></td>
<td>Solar: (1) 90 watt</td>
<td>Solar: (1) 90 watt</td>
<td>Solar: (1) 90 watt</td>
</tr>
</tbody>
</table>

**Dual chemical tank system***

<table>
<thead>
<tr>
<th>Configurator part number</th>
<th>Plunger lift</th>
<th>Gas lift</th>
<th>Gas assisted plunger lift</th>
</tr>
</thead>
<tbody>
<tr>
<td>2501169-001 C3BOX</td>
<td>Power consumption: 10.4 aH/d</td>
<td>Power consumption: 8.9 aH/d</td>
<td>Power consumption: 11.8 aH/d</td>
</tr>
<tr>
<td></td>
<td>Battery: (2) 110 aH</td>
<td>Battery: (1) 110 aH</td>
<td>Battery: (2) 110 aH</td>
</tr>
<tr>
<td></td>
<td>Solar: (1) 150 watt</td>
<td>Solar: (1) 90 watt</td>
<td>Solar: (1) 150 watt</td>
</tr>
</tbody>
</table>

**Triple chemical tank system***

<table>
<thead>
<tr>
<th>Configurator part number</th>
<th>Plunger lift</th>
<th>Gas lift</th>
<th>Gas assisted plunger lift</th>
</tr>
</thead>
<tbody>
<tr>
<td>2501170-001 C3BOY</td>
<td>Power consumption: 13.3 aH/d</td>
<td>Power consumption: 9.7 aH/d</td>
<td>Power consumption: 15.3 aH/d</td>
</tr>
<tr>
<td></td>
<td>Battery: (2) 110 aH</td>
<td>Battery: (2) 110 aH</td>
<td>Battery: (2) 110 aH</td>
</tr>
<tr>
<td></td>
<td>Solar: (1) 150 watt</td>
<td>Solar: (1) 150 watt</td>
<td>Solar: (1) 150 watt</td>
</tr>
</tbody>
</table>

**Quad chemical tank system***

<table>
<thead>
<tr>
<th>Configurator part number</th>
<th>Plunger lift</th>
<th>Gas lift</th>
<th>Gas assisted plunger lift</th>
</tr>
</thead>
<tbody>
<tr>
<td>2501171-001 C3BOZ</td>
<td>Power consumption: 16.2 aH/d</td>
<td>Power consumption: 11.3 aH/d</td>
<td>Power consumption: 18.5 aH/d</td>
</tr>
<tr>
<td></td>
<td>Battery: (2) 110 aH</td>
<td>Battery: (2) 110 aH</td>
<td>Battery: (2) 110 aH</td>
</tr>
<tr>
<td></td>
<td>Solar: (1) 225 watt</td>
<td>Solar: (1) 150 watt</td>
<td>Solar: (1) 225 watt</td>
</tr>
</tbody>
</table>

*Additional capabilities and initial power sizing requirements. Power sizing requirements may differ based on variations to the core offering.