

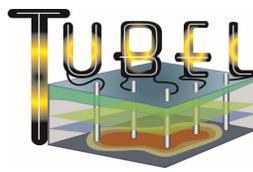
Real Time Wireless Gauges

SHALECOMM – Real time downhole wireless gauge was developed for onshore/offshore applications. The gauge is a pup joint that contains sensors, electronics, batteries and an electrical to acoustic generator. The gauge collects pressure and temperature from downhole and the electronics packs the data into a communications packet for transfer to the surface. The gauge generates acoustic energy based on the electrical packets and couples the acoustic energy to the downhole pipe. The acoustic energy travels to the surface where it is collected and converted back into an electrical signal.

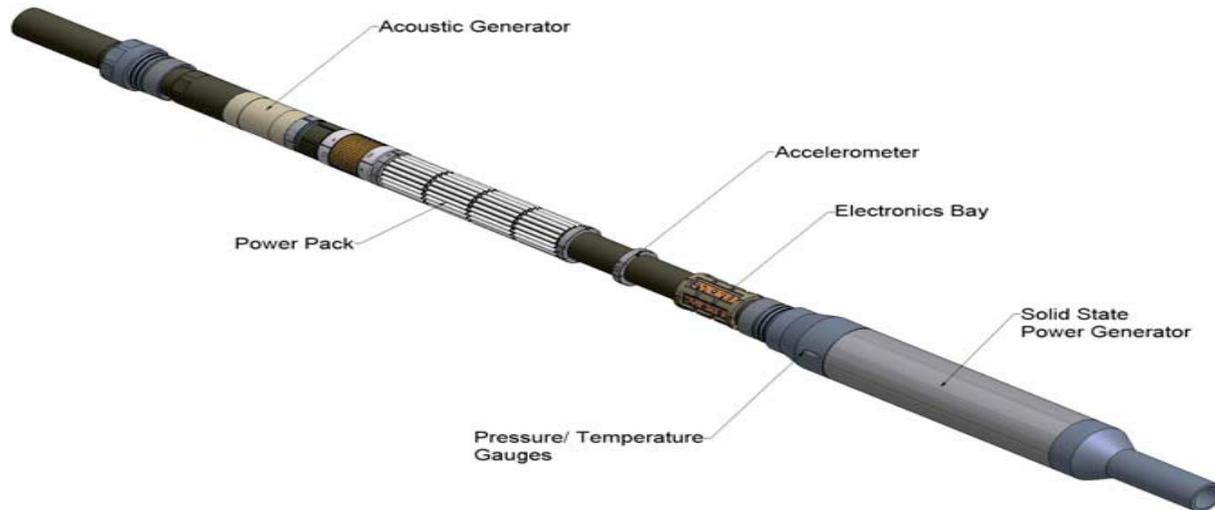
A surface panel processes the data eliminating the production noise and provides the pressure and temperature information to the customer as an Internet, Intranet or RS485 with ModBus software. The data is also stored in the surface panel memory.

SHALECOMM replaces cable based gauges eliminating rig floor installers, downhole cables, clamps, protectors. The wireless system also reduces the installation time and costs significantly since the operator does not have to stop the pipe deployment every 30 feet to deploy a cable protector. The wireless gauge does not require any changes in the pipe deployment procedure and is deployed as a simple pup joint.

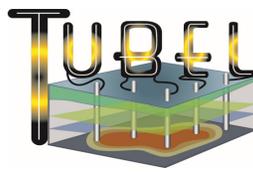
SHALECOMM Wireless gauges can optimize production, artificial lift and gravel/frac pack operations. The wireless systems can also be used to provide real time data.



Specifications for Real Time Wireless Gauges



Transmission Range:	7,000 ft (2,100 meters)
Repeaters:	One each 7,000 ft
Max Operating Temp:	250 F (125 Celsius)
Max Pressure:	10,000 psi
No. of Pressure Sensors:	Two – annulus and tubing
Pressure Resolution:	1.25 psi at 5,000 psi sensor
Temperature Resolution:	1 degree Fahrenheit
Data Acquisition Rate:	4 second
Data Transmission Rate:	10 bits/second
Battery Life:	3 years
Mechanical Specs:	2 3/8 Gauge- OD = 3.7 in, ID= 1.81, length= 87 in.
	2 7/8 Gauge- OD = 4.5 in, ID= 2.375, length= 88 in.
	4.5 Gauge- OD= 6.375 in, ID= 3.85, length= 107



Advantages of Real Time Wireless Gauges to Cable Based Gauges

1. Gauge goes in downhole as an integrated system and it is a simple pup joint to the rig hands. No gauges on the outside of the tubing or casing.
2. Wireless interface allows the test of the gauge just before installation in the well.
3. No personnel from the service company (Tubel Energy) required on the rig floor.
4. No personnel from the service company required when the tubing is removed from the wellbore.
5. No risk of fishing job if cable is cut since no cable is required.
6. Wireless gauge provides pressure and temperature data in real time using the downhole pipe as a conduit to the acoustic energy.
7. No clamps, cable protectors or bolts required in the well for the installation of the wireless real time gauges.
8. There is no need to slow the deployment of pipe in the well to install the cable and clamps.
9. Multiple gauges can be deployed in a single well to monitor multiple zones.
10. No need for feed through packers or hole in the tubing hanger.
11. Gauge can be removed from a well and deployed in another well immediately. No need to buy new downhole cable, clamps, protectors, etc.
11. The real time wireless gauges can be used onshore and offshore.

