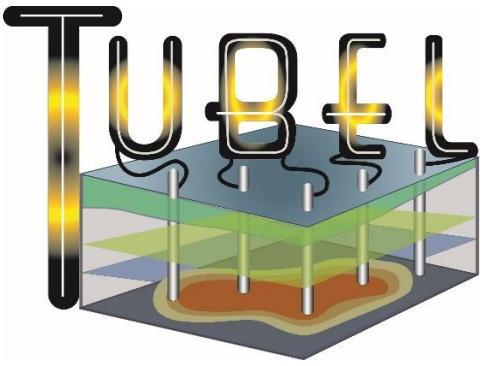
2015

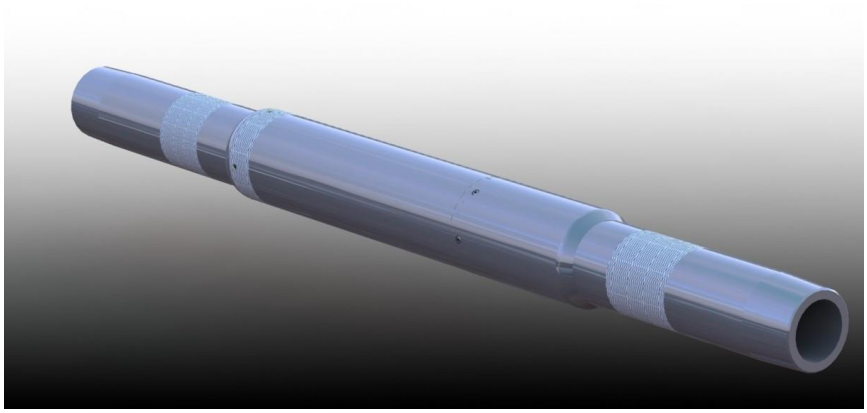
Tubel Energy Tools Catalog



TUBEL ENERGY | 25907 Oakridge Dr. The Woodlands, Texas 77380 | 713.504.3759 | www.tubelenergy.com

PRODUCT DATASHEET

HPHT Wireless Gauge for Packer Leak Monitoring in Deepwater



KEY FEATURES

- Deepwater Applications
- Gauge available for 4.5 and 5.5 inch string
- Monitor Packer Leak
- Permanent deployment
- Multi-year data acquisition
- Tubing and Annulus Pressure and Temperature monitoring
- 25,000 psi rated

APPLICATIONS

- Annulus pressure monitoring between upper and lower completion packers
- Production Pressure Monitoring
- Build up tests for formation evaluation
- HPHT applications in Deepwater

Tubel Energy provides a HPHT Wireless System to monitor pressure and temperature inside a wellbore. The Wireless gauge can be used to monitor the zone outside the pipe between the upper and lower completion packers for pressure changes. The wireless gauge is deployed as part of the completion string and it collects data before, during and after the system is deployed in a well. The wireless gauge operates for 3 years using battery power.

The HPHT Wireless System stores the downhole acquired data in its memory and transfers the information to a Wireless Receiver module when the receiver is in range for communications downhole. Pressure and temperature information is recorded during the pressure build up above the upper completions packer. If there is a change in pressure below the packer it may be an indication that the packer may be leaking.

A SCADA system obtains the data from the Wireless Receiver once the receiver is returned to the surface. The data is loaded into a PC for processing.

Specifications

Pressure	
Sensor	Strain
Standard Ranges	1,500 to 40,000 psi
Maximum Overpressure	20% Full Scale
Accuracy	0.1% Full Scale
Long Term Stability	0.1% Full Scale
Drift	< 3 psi / year
Resolution	0.025% Full Scale
Response Time	Instantaneous
Temperature	
Standard Ratings	250˚F
Accuracy	±1.0 ˚F
Resolution	0.01% Full Scale
Power	
Source	Battery
Data Acquisition	
Record Contents	Time, Pressure, Temperature
Sample Location	Tubing and Annulus
Sample Interval	1.0 Second
Transfer Rate	Real time from gauge to receiver
Downhole Comm.	Wireless
Surface Comm.	Wireless
Software	Windows Compatible
Gauge Housing	
4 ½ inch Pipe	
OD	7.60 inches
ID	3.60 inches
Length	50.50 inches
Material	13 Cr

Threads
15.1# 13 Ch/110 VAM Top

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PRODUCT DATASHEET

Wireless Permanent Frac/ Production Monitoring Gauge

KEY FEATURES

- Wireless Communication
- Gauge available for 4.5 and 5.5 inch string
- Multiple systems deployed in a single well
- Permanent deployment
- Sapphire pressure and temperature sensors
- Tubing and Annulus monitoring
- High speed data – 5,000 samples per second

APPLICATIONS

- Horizontal and Vertical Frac monitoring
- Production Monitoring
- Correlation with micro seismic data for frac evaluation
- Build up tests for formation evaluation
- Zonal isolation monitoring for multistage stimulation treatments

Tubel Energy provides a Wireless Frac System for monitoring pressure and temperature inside a wellbore. The Wireless Frac gauge can be used to monitor all zones fractured in a well or multiple gauges can be deployed for monitoring individual frac zones. The system(s) is deployed as part of the frac string and stays in the well permanently. The system collects data before, during and after the Frac.

The Wireless Frac System stores the acquired data in its memory and transfers the downhole frac pressure and temperature data recorded during the frac job to a Wireless Receiver deployed in the well using slickline, electric line or coil tubing after the Frac is completed. The status of the data transfer is monitored at the surface in real time.

A SCADA system obtains the data from the Wireless Receiver once the receiver is returned to the surface. The data is loaded into a PC for processing.

The Wireless Gauges continue to work in the wellbore collecting production and pressure build up data for the life of the battery at approximately 3 years.

Tubel Energy Smart Systems provide accurate and reliable data in a very cost-effective and convenient package.

Specifications

Pressure	
Sensor	Sapphire
Standard Ranges	1,500 to 15,000 psi
Maximum Overpressure	50% Full Scale
Accuracy	0.1% Full Scale
Long Term Stability	0.1% Full Scale
Drift	< 3 psi / year
Resolution	0.025% Full Scale
Response Time	Instantaneous
Temperature	
Standard Ratings	250˚F
Accuracy	±1.0 ˚F
Resolution	0.01% Full Scale
Power	
Source	AC or Solar
Data Acquisition	
Record Contents	Time, Pressure, Temperature
Sample Location	Tubing and Annulus
Sample Interval	1.0 Second
Other Sample Intervals	Up to 5,000 samples/second
Downhole Comm.	Wireless
Surface Comm.	Wireless
Software	Windows Compatible
Gauge Housing	
4 ½ inch Pipe	
OD	5.8 inches
ID	3.78 inches
Length	36 inches

5 ½ inch Pipe	
OD	7.0 inches
ID	4.775 inches
Length	41 inches

Receiver	
Diameter	1 11/16 inches
Length	20 inches
Interface	Go Connection
Power	Internal Batteries
Storage	2 million samples

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PRODUCT DATASHEET

Wireless Production Monitoring Gauge

KEY FEATURES

- Wireless Communication
- Small diameter for in line tubing deployment
- Multiple systems deployed in a single well
- Permanent or short term deployment with 3 years life in well
- Sapphire pressure and temperature sensors
- Tubing and Annulus monitoring
- High speed data acquisition – 5,000 samples per second

APPLICATIONS

- Production monitoring
- Pressure build up
- Cross well monitoring
- Short term build up tests for formation evaluation
- Outside pipe pressure monitoring for

Tubel Energy provides a Wireless Gauge System to monitor pressure and temperature inside a wellbore. The Wireless Gauge can be used to monitor tubing and/or annulus pressure and temperature. The system(s) is deployed as part of the production tubing and stays in the well permanently operating for an average of 3 years.

The Wireless Gauge stores the acquired data in its memory and transfers the data to a Wireless Receiver deployed in the well using slickline or electric line when required by the operator. The status of the data transfer is monitored at the surface in real time.

A SCADA system receives the data from the Wireless Receiver once the receiver is returned to the surface. The data is loaded into a PC for processing.

The Wireless Gauges can detect when the well is shut in and records data in fast mode during a pressure build up or drawdown. The system continues to work in the wellbore collecting production and pressure build up data for the life of the battery pack. Multiple wireless gauge systems can be deployed in the same tubing string.

Tubel Energy Smart Systems provide accurate and reliable data in a very cost-effective and convenient package.

Specifications

Pressure	
Sensor	Sapphire
Standard Ranges	1,500 to 8,000 psi
Maximum Overpressure	50% Full Scale
Accuracy	0.1% Full Scale
Long Term Stability	0.1% Full Scale
Drift	< 3 psi / year
Resolution	0.025% Full Scale
Response Time	Instantaneous
Temperature	
Standard Ratings	250˚F
Accuracy	±1.0 ˚F
Resolution	0.01% Full Scale
Power	
Source	AC or Solar
Data Acquisition	
Record Contents	Time, Pressure, Temperature
Sample Location	Tubing and Annulus
Sample Interval	1.0 Second
Other Sample Intervals	Up to 5,000 samples/second
Downhole Comm.	Wireless
Surface Comm.	Wireless
Software	Windows Compatible
Gauge Housing	
2 7/8 inch Pipe	
OD	3.68 inches
ID	2.2 inches
Length	42 inches

Receiver	
Diameter	1 11/16 inches
Length	20 inches
Interface	Go Connection
Power	Internal Batteries
Storage	2 million samples

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PRODUCT DATASHEET

Wireless Gas Lift Gauge Systems

KEY FEATURES

- Accurate high accuracy P/T data
- Deployed in existing or new side pocket mandrels
- Multiple systems deployed in a single well
- Wireless communications between gauge and receiver
- Life expectance of 3 years
- Gauges can stay in the well during data transfer

APPLICATIONS

- Horizontal and Vertical Frac monitoring
- Pressure build up tests
- Permanent Well Monitoring
- Gas lift applications
- Injection well monitoring

Tubel Energy provides a Wireless Memory System to monitor pressure and temperature inside a wellbore. The Wireless Systems is deployed in side pocket mandrels for monitoring gas lift applications. The gauge can also be used for monitoring the frac process, for permanent production monitoring and for well injection applications.

The Wireless Gauge System is deployed permanently in the well and it records downhole pressure and temperature information in its memory. The data can be retrieved by deploying a module in the well via slickline. The module interfaces wirelessly to the gauge and the gauge memory data is transferred wirelessly to a receiver module.

The receiver system transfers the data obtained downhole to a SCADA module located at the surface. The data is loaded into a PC for processing.

Multiple Wireless Memory Gauge Systems can be deployed in a single well. The gauges can be deployed in side pocket mandrels as a replacement to existing Memory gauges.

Specifications

Pressure	
Sensor	Strain
Standard Ranges	1,500 to 15,000 psi
Maximum Overpressure	50% Full Scale
Accuracy	0.1% Full Scale
Long Term Stability	0.1% Full Scale
Drift	< 3 psi / year
Resolution	0.025% Full Scale
Response Time	Instantaneous
Temperature	
Standard Ratings	250˚F
Accuracy	±1.0 ˚F
Resolution	0.01% Full Scale
Power	
Source	AC or Solar
Data Acquisition	
Record Contents	Time, Pressure, Temperature
Sample Interval	1.0 seconds
Downhole Comm.	Wireless
Surface Comm.	Wireless
Software	Windows Compatible
System Material	
Housing	4140 Steel
Tubing Diameter	
	1.0 and 1.5 inches

System	
Max operating temperature	250˚F
Max operating Pressure	10,000 psi
Data acquisition rate	Once a second
Life in the well	3 years or more

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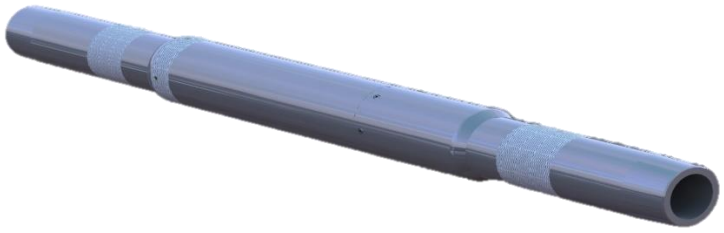
PRODUCT DATASHEET

Wireless High Speed Wellbore Monitoring Gauge



KEY FEATURES

- High speed data acquisition – 5,000 samples per second
- Small diameter for in line tubing deployment
- Multiple systems deployed in a single well
- Permanent or short term deployment with 3 years life in well
- Sapphire pressure, strain, vibration, acoustic and temperature sensors
- Tubing and Annulus monitoring
- Wireless Communication

APPLICATIONS

- Production monitoring
- Pressure build up
- Frac identification with micro seismic data interface
- Pump monitoring
- Excessive strain on pipe during deployment

Tubel Energy provides a Wireless Gauge System for monitoring wellbore parameters such as pressure, pipe strain, temperature downhole sounds and pipe vibration inside a wellbore. The Wireless Gauge can be used to monitor tubing and/or annulus pressure and temperature, sounds generated during a frac or production, strain during pipe deployment in the well and pump vibration. The system(s) is deployed as part of the production tubing and stays in the well permanently operating for an average of 3 years.

The Wireless Gauge stores the acquired data in its memory and transfers the data to a Wireless Receiver deployed in the well using slickline or electric line when required by the operator. The status of the data transfer is monitored at the surface in real time.

A SCADA system receives the data from the Wireless Receiver once the receiver is returned to the surface. The data is loaded into a PC for processing.

The Wireless Gauges can detect when the well is shut in and records data in fast mode during a pressure build up or drawdown. The system continues to work in the wellbore collecting production and pressure build up data for the life of the battery pack. Multiple wireless gauge systems can be deployed in the same tubing string.

Specifications

Pressure	
Sensor	Sapphire
Standard Ranges	1,500 to 15,000 psi
Maximum Overpressure	50% Full Scale
Accuracy	0.1% Full Scale
Long Term Stability	0.1% Full Scale
Drift	< 3 psi / year
Resolution	0.025% Full Scale
Response Time	Instantaneous
Temperature	
Standard Ratings	250˚F
Accuracy	±1.0 ˚F
Resolution	0.01% Full Scale
Acoustic	
Sensitivity	10 mv/0.15 milli psi
Dynamic Range	150 db/3 nano psi
Vibration	
Range	+/- 70 g's
Frequency Response	2,500 Hz
Power	
Source	AC or Solar
Data Acquisition	
Record Contents	Time, Pressure, Temp, vibration or acoustics
Sample Location	Tubing and Annulus
Sample Interval	1.0 second
Other Sample Intervals	Up to 5,000 samples/second

Acquisition total time	6.6 minutes or 2 million samples
Downhole Comm.	Wireless
Surface Comm.	Wireless
Software	Windows Compatible
Gauge Housing	
2 7/8 inch Pipe	
OD	3.68 inches
ID	2.2 inches
Length	42 inches

Receiver	
Diameter	1 11/16 inches
Length	20 inches
Interface	Go Connection
Power	Internal Batteries
Storage	2 million samples

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PRODUCT DATASHEET

Wireless Through Tubing Flow Control System

KEY FEATURES

- Small diameter for though 4.5 inch tubing deployment
- Multiple systems deployed through tubing
- Permanent or short term deployment with 3 years life in well
- Sapphire pressure temperature sensors
- Tubing and Annulus monitoring
- Wireless Communication
- Battery Operated

APPLICATIONS

- Production Monitoring
- Multilateral flow control on existing wells
- Control Injection Wells

Tubel Energy provides a through tubing Wireless Operated System to control flow inside a wellbore. The Flow Control System acts as a sliding sleeve that can be used to control a production zone in a well or multiple systems can be deployed for monitoring several zones. The operator can control the sliding sleeve by opening and closing sleeves using pressure pulses from the surface.

The Flow Control System stores acquired data in its memory and transfer the data to a Wireless Receiver deployed in the well via slickline, electric line or coil tubing when required by the operator. The status of the data transfer is monitored at the surface in real time.

A SCADA system obtains the data from the Wireless Receiver once the receiver is returned to the surface. The data is loaded into a PC for processing.

The Flow Control Systems continue to work in the wellbore controlling flow and collecting pressure for the life of the battery at approximately 3 years.

Tubel Energy Smart Systems provide accurate and reliable data in a very cost-effective and convenient package.

Specifications

Pressure	
Sensor	Sapphire
Standard Ranges	1,500 to 6,000 psi
Maximum Overpressure	50% Full Scale
Accuracy	0.1% Full Scale
Long Term Stability	0.1% Full Scale
Drift	< 3 psi / year
Resolution	0.025% Full Scale
Response Time	Instantaneous
Temperature	
Standard Ratings	250˚F
Accuracy	±1.0 ˚F
Resolution	0.01% Full Scale
Power	
Source	Battery
Data Acquisition	
Record Contents	Time, Pressure and Temperature
Sample Location	Tubing and Annulus
Sample Interval	1.0 second
Other Sample Intervals	Up to 5,000 samples/second
Data Communication	
Wireless EM for Data Transfer	
Pressure Pulses from the Surface for System Actuation	

Total Number of Samples	2 million samples
Downhole Comm.	Wireless
Surface Comm.	Wireless
Software	Windows Compatible
Flow Control Dimensions	
2 7/8 inch Pipe	
Max OD	3.70 inches
Min ID	1.85 inches
Length w/ Coupling	72.2 inches

Data Receiver	
Diameter	1 11/16 inches
Length	20 inches
Interface	Go Connection
Power	Internal Batteries
Storage	2 million samples

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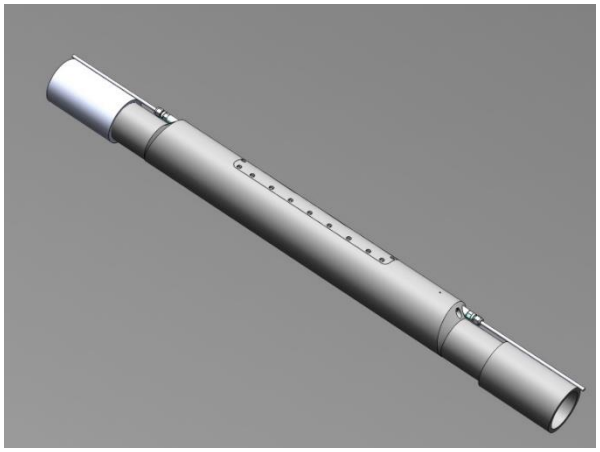
PRODUCT DATASHEET

CABLE-BASED PRESSURE AND TEMPERATURE SYSTEM



KEY FEATURES

- TEC cable for power and communications between downhole and surface
- Multiple systems deployed in the same well and use the same TEC cable
- 2 pressure and 2 temperature sensors built in for tubing and annulus pressure measurements
- Non welded construction
- Metal to metal seals
- Custom configurations
- Pressure testable

APPLICATIONS

- Reservoir monitoring with pressure build up data acquisition.
- Monitor pressure and temperature data during hydrocarbon production in real time
- Pump performance optimization by monitoring intake and discharge pressures.

Tubel Energy provides a cable based pressure and temperature system based on strain sensors for downhole monitoring of pressure and temperature data during production. The system uses a TEC cable to provide data in real time to the surface. The gauge is built as a single mandrel with pressure and temperature sensors for tubing and annulus measurements or for tubing only measurements. The system has been deployed throughout the world successfully.

The system is composed of the following modules:

1. Permanent deployed pressure gauge with TEC cable interface – The system can provide 1 or 2 pressure, 1 or 2 temperature and time stamp data during production. The system can operate in the well for many years with power provided by the surface system through a TEC cable. The system uses FSK communications to provide real time data to the surface.
2. Surface module – This module is permanently deployed at the surface. It can be operated using solar panels and it collects and processes data from downhole in real time. The system can interface with most panels to transfer the data from the well site to a remote location. The system will use Ethernet physical connection with Modbus interface to transfer data to other panels.

Specifications

Pressure	
Sensor	Sapphire
Standard Ranges	15,000 psi
Maximum Overpressure	50% Full Scale
Accuracy	0.1% Full Scale
Long Term Stability	0.1% Full Scale
Drift	< 5 psi / year
Resolution	0.03% Full Scale
Response Time	Instantaneous
Communications	FSK
Style	Master - Slave
Temperature	
Standard Ratings	125 ˚C
Accuracy	±1.0 ˚C
Repeatability	±2.0 ˚C
Resolution	0.01% Full Scale
Power	
Source	DC from TEC cable
Voltage	3VDC
Surface Power	Solar Panels
Data Acquisition	
Record Contents	Time, Pressure, Temperature
Sample Location	Tubing and Annulus

Mandrel	
Tubing	OD: 4.125 inches ID: 2.441 inches
Tensile Strength	105,570 lbs
Collapse	15,000 psi
Burst	15,000 psi
Material	P 110

For More Information contact:

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