

Pioneer Petrotech Services Inc.



PPS33LR

RemoteWatcher Multi-Sensor
Wireless Monitoring System

www.pioneerps.com

PPS33LR RemoteWatcher

PPS33LR RemoteWatcher is a low-power multi-sensor monitoring system designed for applications that require simultaneous multipoint pressure, differential pressure, temperature and/or flow monitoring. The system is highly adaptive and cost effective. Customers can choose from multiple sensor and surface unit configurations based on the number of sensors needed and the transmission distance required.

Wireless Systems

The Gateway-sensor configuration allows customers to use the PPS Gateway and up to 16 sensors as a network. The Gateway is capable of transferring data to a computer and other devices, through USB and RS232/485 communication. The Gateway also has a 2 GB (15,000,000 samples at 60 sec/sample) SD memory card as backup in the unlikely event of a power interruption.

The Gateway Surface Unit System also allows customers to use the PPS Gateway and up to 16 sensors as a network, with the key difference being the LCD display with keypad and 16 real time status

indicators. This allows customer to easily monitor sensor readings from the display panel, as well as check each sensor's signal strength and battery remaining. The status indicators clearly show which sensors are online or offline.

Data Transmission

Any of the PPS33LR RemoteWatcher configurations can work with customer SCADA or satellite and cellular phone transmission systems to offer real-time information to clients working off site. PPS has also designed its own proprietary data transmission service, which transmits data to a secure server via a GSM network. Clients can now view, download and chart their data 24 hours a day, seven days a week.

900 MHz Frequency Protocol

The PPS Gateway is typically tuned to operate using 900 MHz (902-928MHz) radio frequency. However alternative frequency bands are available upon request making PPS33 RemoteWatcher globally compatible. Usually the distance over which data

System Applications

- Wellhead Stimulation Monitoring
- Wellhead Pressure Buildup and Production Monitoring
- Injection Pressure Monitoring
- Well Testing Monitoring
- Perforation Monitoring
- Pipeline Monitoring
- Plant Monitoring



can be transmitted depends significantly on things such as transmitter power, receiver quality, type, size, and height of antenna, mode of transmission, noise, and interfering signals.

With PPS's high performance design for the wireless transceiver and antenna, there is a reduction in noise and interference allowing for greater distances to be achieved. With an unobstructed line of sight data can be received up to seven kilometers (4.4 miles) away, and by adding a high gain antenna the distance can be increased up to 15 km (9.3 miles). Gateway provides reliable, long range, wireless data transmission.

* Range up to and over one km requires an unobstructed line of sight

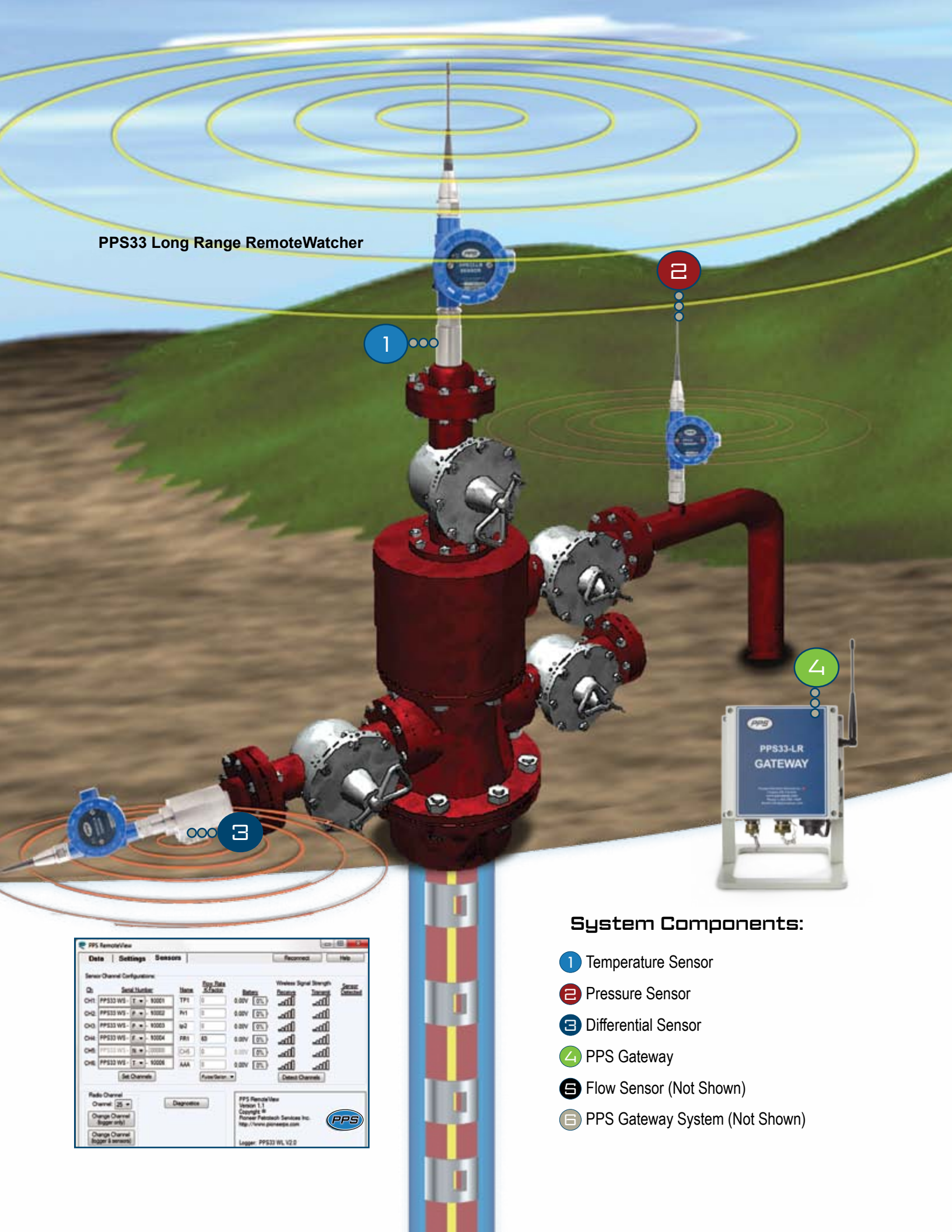
- **Maximize return on investment with the option to expand the PPS33 system as requirements change**
- **Designed for multiple types of applications**
- **Highly accurate sensors to ensure precise measurements**
- **ZigBee is compliant in the 2.4GHz ISM band for global application**
- **902-928 MHz ISM band and other band frequencies available**
- **Integrated antenna and battery**



The diagram illustrates the PPS33 Long Range RemoteWatcher system. A central red wellhead is equipped with various sensors: a temperature sensor (1) at the top, a pressure sensor (2) on a side line, and a differential sensor (3) at the base. A PPS33-LR Gateway (4) is connected to the wellhead via a red pipe. The gateway is shown in a separate view on the right. A software interface, PPS RemoteView, is shown at the bottom left, displaying sensor data and settings. The system is labeled 'PPS33 Long Range RemoteWatcher' at the top left.

System Components:

- ① Temperature Sensor
- ② Pressure Sensor
- ③ Differential Sensor
- ④ PPS Gateway
- ⑤ Flow Sensor (Not Shown)
- ⑥ PPS Gateway System (Not Shown)



- 1 Temperature Sensor
- 2 Pressure Sensor
- 3 Differential Sensor
- 4 PPS Gateway
- 5 Flow Sensor (Not Shown)
- 6 PPS Gateway System (Not Shown)

- 1 Temperature Sensor
- 2 Pressure Sensor
- 3 Differential Sensor
- 4 PPS Gateway
- 5 Flow Sensor (Not Shown)
- 6 PPS Gateway System (Not Shown)

PPS33LR Wireless Sensors

Sensor	Pressure (P+T) Sensor	Temperature Sensor	Turbine Flow Sensor**	Differential Pressure Sensor
Type	Silicon-Sapphire Quartz (Optional)	RTD	Turbine	Silicon-Sapphire
Range	3K 6K 10K 15K psi*	-50°C to 100°C Certified* OR -50°C to 200°C	15-1500 pulse/sec	Line: 2.9kpsi; Diff: 290 psi
Accuracy	±0.03% full scale	±1 °C	±1%	1.5 psi
Resolution	0.0003%FS	0.01°C	One Pulse	0.01 psi @ 1sec
Drift-psi/yr	<±3 psi/year	N/A	N/A	<±3 psi/year
Calibration	9-point			9-point
Dimension–inch	15 x 4 x 3.75	17.5 x 4 x 3.75	15.5 x 4 x 3.75	18 x 4 x 3.75
Weight	3.3 lbs (1.5 kg)	3.5 lbs (1.6 kg)	3.5 lbs (1.6 kg)	9.3 lbs (4.2 kg)
Transducer Material	Hastelloy	N/A	N/A	Hastelloy
Connection	1/2" NPT	1/2" NPT	1" NPT	1/8" NPT Female
Data Set	Time / Pressure	Time / Temperature	Time / Flow Rate	Time / Differential Pressure

Common Characteristics

Service	H ₂ S/CO ₂ Services
Environmental Temperature	-40 °C (-40 °F) to 70 °C (158 °F)
Humidity	0-100%
Memory	4 million data sets
Battery Type	Lithium Size D 3.6V
Battery Life	Up to 1.4 years @ 25 °C
Power Consumption	1.3mA to 23mA
External Power	9-28VDC (Optional)
Sample Rate	1 sec to 60 sec/sample
Housing Material	Aluminum (copper free) or SS316
Other Material	SS17-4 Inconel718
Safety Rating	Designed for Class I, Division 1, Groups CD T4
IP Ingression	NEMA4 or IP66 construction
Method	902-928MHz (Other frequency available upon request)
Wireless Transmission Distance	7 km Line of Sight, further w/high gain antenna
Antenna	2.5dB Whip (Standard), other options available upon request
Transmission Power	+24dBm (250mW) Software selectable
Certification Marking	Applies to Pressure & 100 °C models only; Ex ia IIB T4 Ga Class I, Zone 0, AEx ia IIB T4 Ga I.S. Class 1, Division 1, Groups CD, T4 -40°C ≤ Ta ≤ 60°C

*Other pressure ranges available upon request, please review certification markings.

**Transmitter limits only

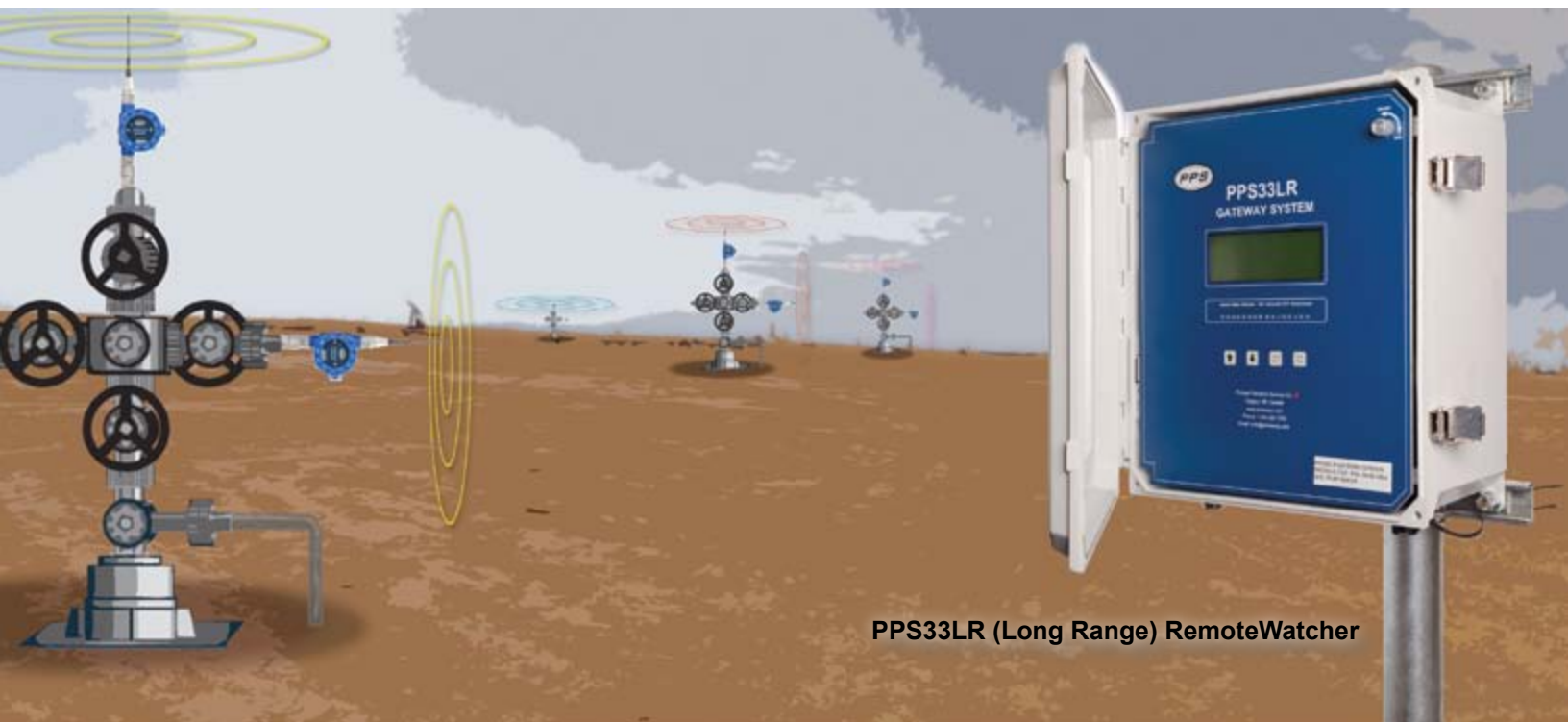
Specifications

PPS33LR Gateway V1 & V2

Environmental Temperature	-40 °C (-40 °F) to 70 °C (158 °F) -20 °C (-4 °F) to 70 °C (158 °F) for LCD Display on V2 Model
Humidity	0-100%
Power Source	External: 5V(USB) or 9-28VDC Internal V2 Option: 2x D-size batteries
Enclosure Dimension–inch	6.3 x 6.3 x 3.19
Material	Powder Coated Aluminum, EN 1706 ENAC-AISI12(Fe)
Ingression Protection	NEMA4 IP66 construction
Safety Rating	Designed for Class I Division 2
Sensors Supported	Connect up to 16 Sensors
Sample Rate	1 to 60 sec/sample (1-8 Sensors: 1 second; 9-16 Sensors: 2 seconds)
Data Set	Time / Pressure / Temperature / Flow Rate
Method	902-928MHz (Other frequencies available upon request)
Wireless Transmission Distance	7 km Line of Sight
Antenna	2.5dB Whip(Standard), 3dBm Dome (Standard on V2 Model) other options available upon request
Transmission Power	+24dBm (250 mW) Software selectable
Interface	RS485 / RS232 USB
Interface Protocol	MODBUS / Push USB
Diagnostics / Configuration	By Software or MODBUS
Data Storage	SD Card 2GB (15,000,000 samples)

PP33LR Gateway System

Environmental Temperature	-40 °C (-40 °F) to 70 °C (158 °F) -20 °C (-4 °F) to 70 °C (158 °F) for LCD Display
Humidity	0-100%
Power Source	9-28 VDC or 90-260 VAC
Enclosure Dimension–inch	16.1 x 14.3 x 8.1
Material	Polyester (SS316 Ex Enclosure available upon request)
Ingression Protection	IP66 construction
Safety Rating	Designed for Class I Division 2
Sensors Supported	Connect up to 16 Sensors
Sample Rate	1 to 60 sec/sample (1-8 Sensors: 1 second; 9-16 Sensors: 2 seconds)
Data Set	Time / Pressure / Temperature / Flow Rate
Method	902-928MHz (Other frequencies available upon request)
Wireless Transmission Distance	7 km Line of Sight
Antenna	3dB Omni (Standard), other options available upon request
Transmission Power	+24dBm (250 mW) Software selectable
Interface	MODBUS TCP/IP PPS Remote Data Access Wireless Repeater
Interface Protocol	MODBUS / Push PPS Remote Data Access USB
Diagnostics / Configuration	By Software / MODBUS / Remote Data Access
Data Storage	SD Card 2GB (15,000,000 samples)



PPS33LR (Long Range) RemoteWatcher

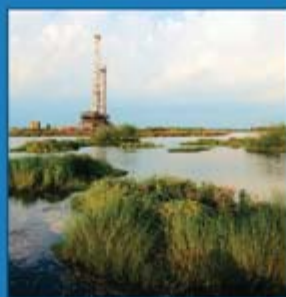
Surface Monitoring

Choose a Wellhead Monitoring System

	Temperature Max.	Pressure Max.	Power Source	Wireless Transmission	Work Mode	Memory Capacity	Safety Rating
PPS31	-20 (-4°F) to 70 (158°F)	up to 15k	Lithium Battery	328' (100m) (Optional)	MRO/ SRO	1M, 2M or 4M data set options	Class I, Division 1, Group A, B, C & D, T4 (CAN and US) Exia IIC T4 (for Canada). LR1624 Class 1, Zone 0 AEx ia IIC T4 (for US only), Ambient Temperature -40°C to +55°C
PPS31M	-30 (-40°F) to 85 (185°F)	up to 20k	Lithium Battery	328' (100m)	MRO	16,000,000	Class I Division 1 Group A, B, C & D, T4 Ex ia IIC T4 (-40 °C–55 °C)
PPS33LR	-50 (-58°F) to 100 (212°F) Certified or -50 (-58°F) to 200 (392 °F)	up to 20k higher available	Lithium Battery	up to 7 km	MRO/ SRO	4,000,000	Sensors designed for Class I Div 1 Surface Units designed for Class I Div 2



Smart Gauges and Simple Software



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