Pioneer Petrotech Services Inc.

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PPS33 & 33LR RemoteWatcher

Multi-Sensor Wireless Monitoring System

www.pioneerps.com

PPS33 & 33LR RemoteWatcher

PPS33 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 logger–sensor configuration allows customers to use one logger and up to six sensors as a network. The logger acts as a central stand-alone node, receiving data from the sensors. The logger is capable of displaying real-time data on an LCD screen, storing data into an SD card plus internal memory, and supporting MODBUS communication.

The router–sensor solution, on the other hand, allows customers to use a router and up to 60 sensors as a network. The router is capable of transferring data to a computer and other devices, through USB and RS232/485 communication.

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 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–sensor surface unit configuration 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 PPS33 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.

Select your system

	System Configuration	Sensors Supported	Transmission Distance	Transmission Power	Power Source	Memory	Safety Rating	Interface	Sample Rate
PPS33	Sensors + Logger	6	100 m Zigbee® Standard or 1.1 km Zigbee® Pro*	+1 dBm Zigbee® Standard or +10 dBm Zigbee® Pro	Two lithium size D batteries	2 GB SD card & 4Gbits Flash memory	Class I Div 2 Grp ABCD, T4 (-40 °C to 60 °C)	USB/RS485	1 to 120 sec/sample
	Sensors + Router	60	100 m Zigbee® Standard or 1.1 km Zigbee® Pro*	+1 dBm Zigbee® Standard or +10 dBm Zigbee® Pro	DC 9-32 V	N/A	N/A	USB/RS232 /RS485	1 to 120 sec/sample
PPS33LR	Sensors + Gateway	16	7 km*	+24 dBm (250mW)	5V(USB) or 9-28VDC	2 GB SD card	Designed for Class I Division 2	USB/RS232 /RS485	1 to 60 sec/sample
	Sensors + Gateway Surface Unit	16	7 km* or 15 km with high gain antenna * unobstructed line of sight	+24 dBm (250mW)	9-28VDC, 90-260VAC optional solar power station	2 GB SD card	Designed for Class I Division 2	MODBUS TCP/IP | PPS Remote Data Access | Wireless Repeater	1 to 60 sec/sample

Frequency Protocol & Data Transmission

ZigBee® Protocol

ZigBee® is a low-power, wireless networking standard. The ZigBee® protocol is designed to transmit data through volatile radio frequency environments. With an enhanced multi-channel configuration there is a low probability of interference. ZigBee® is typically used in low data rate applications that require long battery life and secure networking. The technology defined by the ZigBee® protocol is intended to be simpler and less expensive than other wireless personal area networks (WPANs), such as Bluetooth or Wi-Fi.

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 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

System Applications

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

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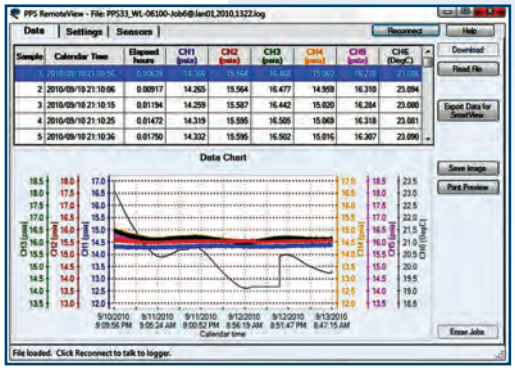
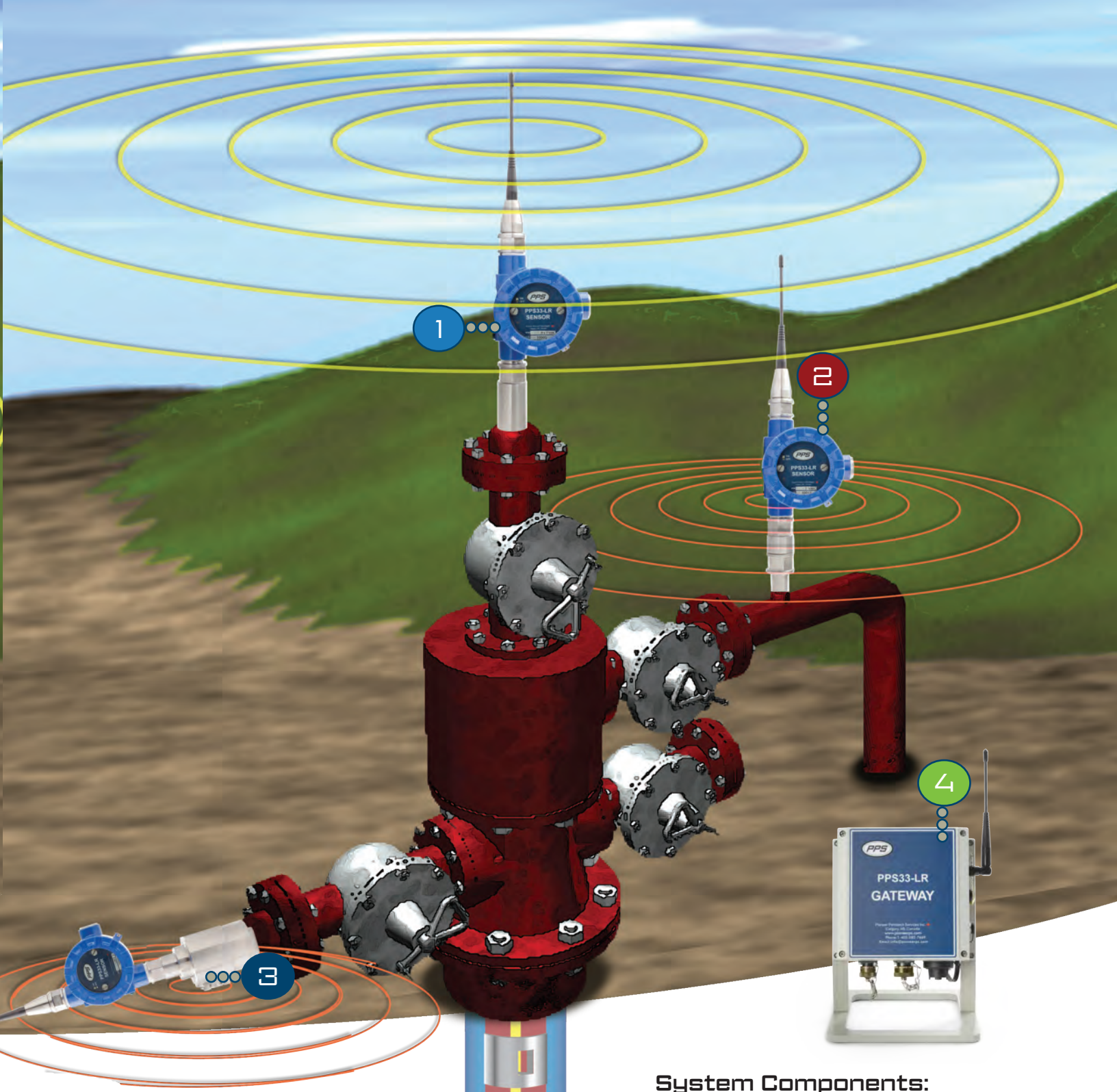
- Maximize return on investment with the option to expand the PPS33 system as requirements change
- Designed for multiple types of applications
- Highly accurate sensors to ensure precise measurements
- ZigBee is compliant in the 2.4GHz ISM band for global application
- 902-928 MHz ISM band and other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

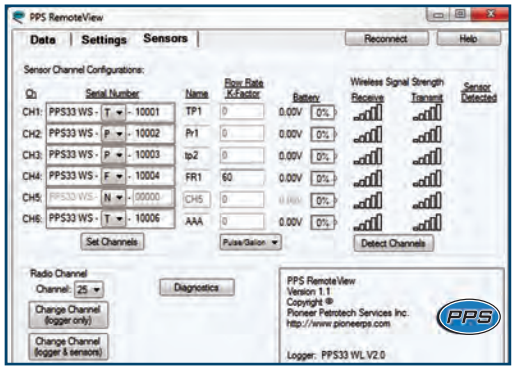
System Components:

1. Wireless Logger
2. Temperature Sensor
3. Pressure Sensor
4. Differential Sensor
5. Flow Sensor (Not Shown)
6. Router (Optional)



PPS33 RemoteView Software





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)

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PPS33 Wireless Sensors

Metrology

Sensor	Pressure (P+T) Sensor	Temperature Sensor	Turbine Flow Sensor	Differential Pressure Sensor
Sensor Type	Silicon-Sapphire	RTD	Turbine	Silicon-Sapphire
Range	1K | 3K | 5K | 10K psi*	-50°C (-59°F) to 200°C (392°F)	15-1500 pulse/sec	Line: 2.9kpsi; Diff: 290 psi
Accuracy	±0.1% FS, (Typically)	±1 °C	±1%	1.5 psi
Resolution	0.01 psi	0.01 °C	One Pulse	0.01 psi @ 1 sec
Drift-psi/yr	<±3 psi/year	N/A	N/A	<±3 psi/year

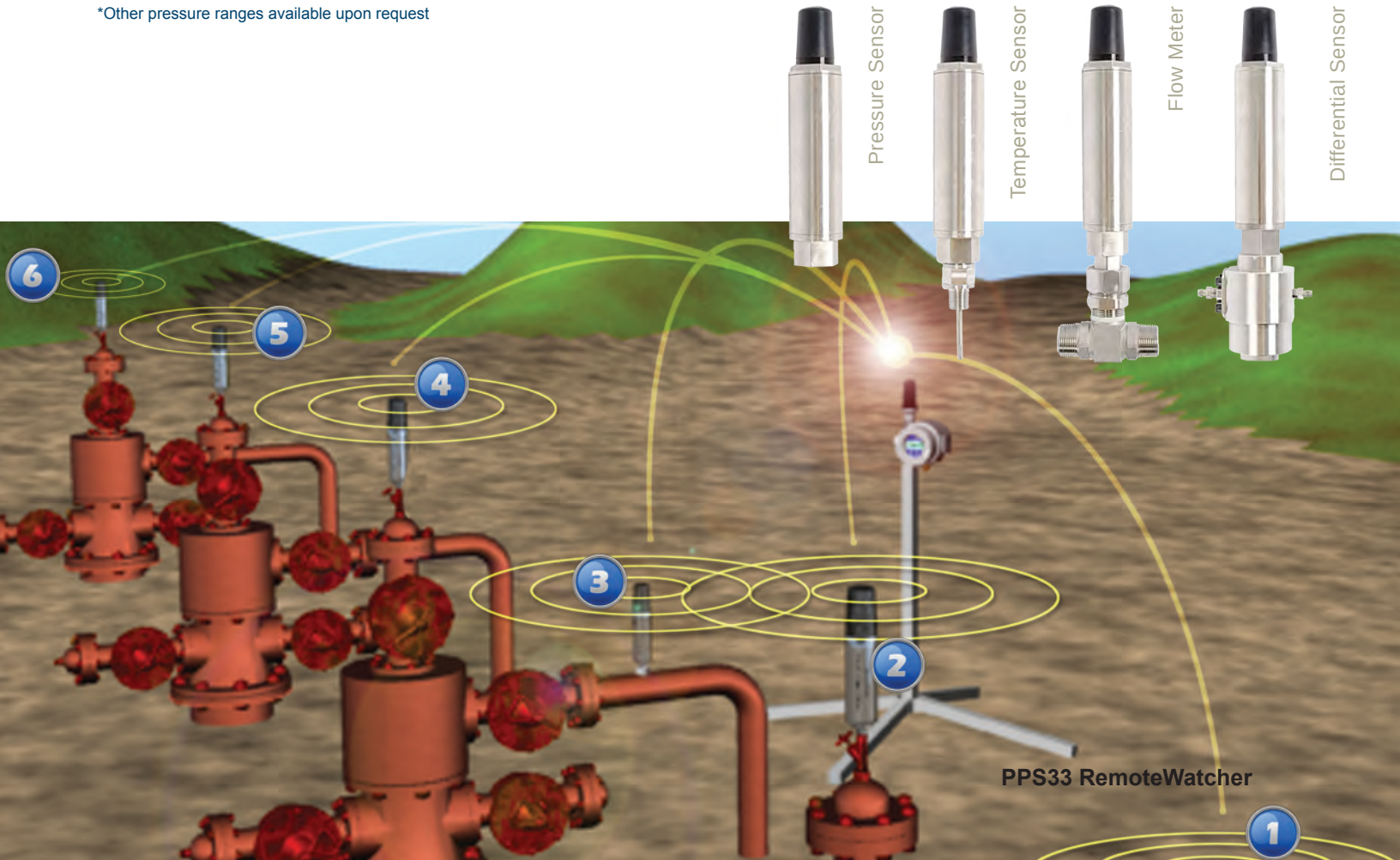
Characteristics

Service	H_2S/CO_2 Services
Environmental Temperature	-40 °C (-40 °F) to 55 °C (131 °F)
Battery Type	Lithium Size C 3.6V
Battery Life	Up to 2 years at 60 seconds sample rate
Sample Rate	1 sec to 120 sec/sample
Dimension–inch	9.65 x 2(OD)
Housing Material	SS316L
Safety Rating	Class I Div1 (Ex ia IIB T4 Gb)
Connection	1/2" NPT | Autoclave

Communication

Data Set	Time / Pressure	Time / Temperature	Time / Flow Rate	Time / Differenial Pressure
Method	ZigBee			
Wireless Transmission Distance	100m Line of Sight (328ft) Standard | 1.1km (0.68 mile) Optional Pro Version			
Transmit Power	+1 dBm Standard / +10 dBm Optional Pro			

*Other pressure ranges available upon request



	PPS33 Logger	PPS33 Router
Characteristics		
Environmental Temperature	-40 °C (-40 °F) to 55 °C (131 °F)	-40 °C (-40 °F) to 80 °C (176 °F)
Humidity	0-100%	0-90% no condensation
Power Source	Two Lithium size D batteries	DC 9-32 V
Battery Life–@ 60 sec sample rate	Up to 2 years	N/A
Dimension–inch	5.7 X 4.625 (OD) (145 mm x 117 mm)	5.9 x 3.2 x 2 (150 mm x 81 mm x 51 mm)
Material	Auminum	Plastic, ABS
Ingression Protection	PI-66 construction	N/A
Safety Rating	Class I Div 2 Grp ABCD, T4 (-40°C to 60°C)	N/A
Communication		
Sensors Supported	Connect up to 6 Sensors	Connect up to 60 Sensors
Sample Rate	1 sec to 120 sec/sample	1 sec to 120 sec/sample
Data Set	Time / Pressure / Temperature / Flow Rate	Time / Pressure / Temperature / Flow Rate
Method	ISM 2.4GHz	ISM 2.4GHz
Wireless Transmission Distance	100m ZigBee® Standard or 1.1km ZigBee® Pro	100m ZigBee® Standard or 1.1km ZigBee® Pro
Antenna	2dB omni	4dB whip
Transmission Power	+1 dBm ZigBee® Standard or +10 dBm ZigBee® Pro	+1 dBm ZigBee® Standard or +10 dBm ZigBee® Pro
Other		
Interface	RS485 | USB	RS485 / RS232 | USB
Interface Protocol	MODBUS / Push	Push
Diagnostics / Configuration	Software / MODBUS	Software
Data Storage	SD Card 2 GB (15,000,000 samples)	N/A
Flash Memory	4 Gbits	N/A

PPS33 Specifications (Rev. 01, 2011-08-12)

PPS33LR Wireless Sensors

Metrology

Sensor	Pressure (P+T) Sensor	Temperature Sensor	Turbine Flow Sensor**	Differential Pressure Sensor
Type	Silicon-Sapphire	RTD	Turbine	Silicon-Sapphire
Range	5K | 10K | 15K psi*	-50°C (-59°F) to 200°C (392°F)	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

Characteristics

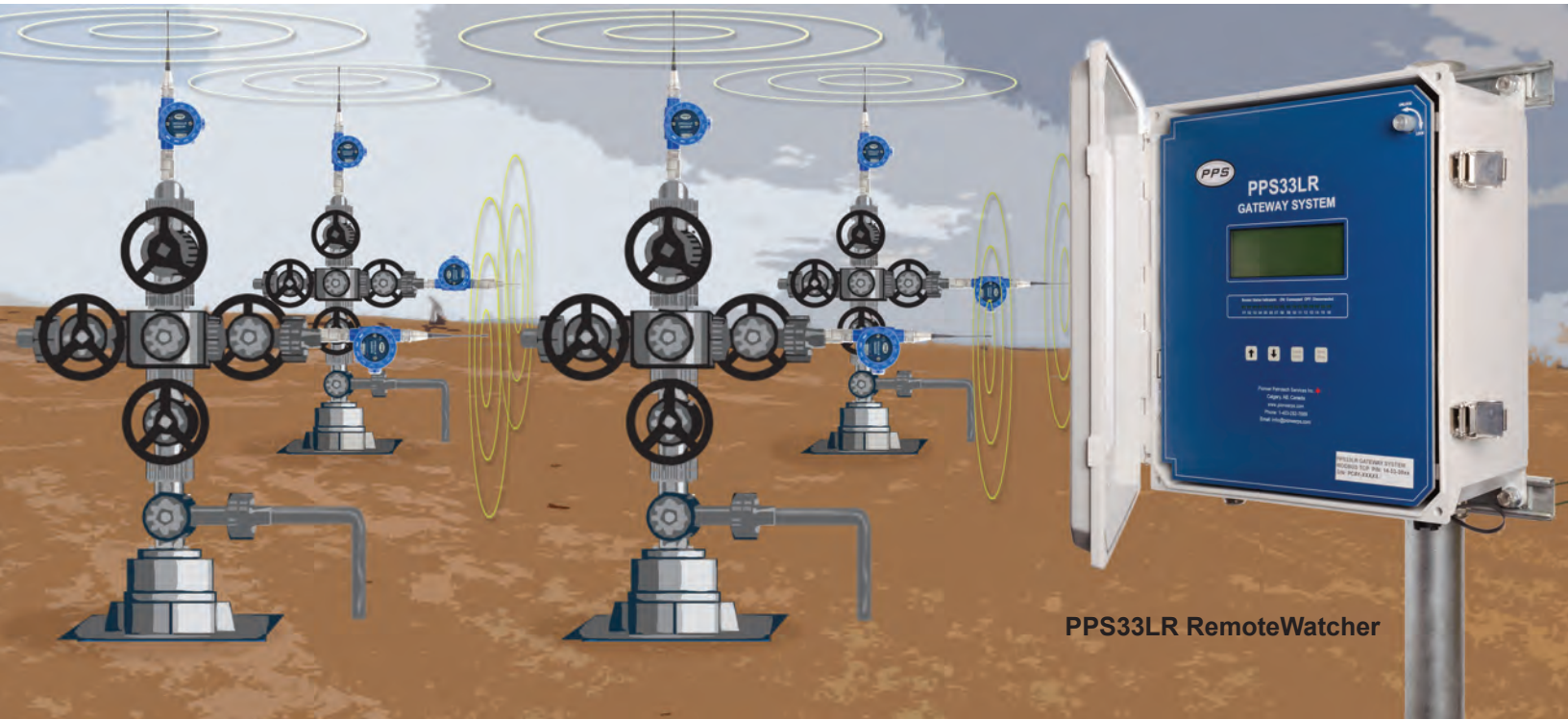
Service	H_2S/CO_2 Services			
Environmental Temperature	-40 °C (-40 °F) to 70 °C (158 °F)			
Humidity	0-100%			
Battery Type	Lithium Size D 3.6V			
Battery Life	Up to 1.4 years @ 25 °C			
External Power	9-28VDC (Optional)			
Sample Rate	1 sec to 60 sec/sample			
Dimension–inch	15 x 4 x 3.75	17.5 x 4 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)
Housing Material	Aluminum (copper free) or SS316			
Other Material	SS17-4 | Inconel718			
Transducer Material	Hastelloy	N/A	N/A	Hastelloy
Safety Rating	Designed for Class I Div1 (Ex ia IIB T4 Ga)			
Connection	1/2" NPT (others by request)		1" NPT	1/8" NPT Female

Communication

Data Set	Time / Pressure	Time / Temperature	Time / Flow Rate	Time / Differenial Pressure
Method	902-928MHz (Other frequency available upon request)			
Wireless Transmission Distance	7 km Line of Sight			
Antenna	2.5dB Whip (Standard), other options available upon request			
Transmission Power	+24dBm (250mW) Software selectable			

*Other pressure ranges available upon request
**Transmitter limits only

	PPS33LR Gateway	PP33LR Gateway System
Characteristics		
Environmental Temperature	-40 °C (-40 °F) to 70 °C (158 °F)	-40 °C (-40 °F) to 70 °C (158 °F) -20 °C (-4 °F) to 70 °C (158 °F) for LCD Display
Humidity	0-100%	0-100%
Power Source	5V(USB) or 9-28VDC	9-28VDC, 90-260VAC
Enclosure Dimension–inch	6.3 x 6.3 x 3.19 (160 mm x 160 mm x 81 mm)	16.1 x 14.3 x 8.1 (409 mm x 363 mm x 206 mm)
Material	Powder Coated Aluminum, EN 1706 ENAC-AlSi12(Fe)	Polyester (SS316 Ex Enclosure available upon request)
Ingression Protection	NEMA4 | IP-66 construction	IP66 construction
Safety Rating	Designed for Class I Division 2	Designed for Class I Division 2
Communication		
Sensors Supported	Connect up to 16 Sensors	Connect up to 16 Sensors
Sample Rate	1 to 60 sec/sample (1-8 Sensors: 1 second; 9-16 Sensors: 2 seconds)	1 to 60 sec/sample
Data Set	Time / Pressure / Temperature / Flow Rate	Time / Pressure / Temperature / Flow Rate
Method	902-928MHz (Other frequencies available upon request)	902-928MHz (Other frequencies available upon request)
Wireless Transmission Distance	7 km Line of Sight	7 km Line of Sight 15 km with high gain antenna
Antenna	2.5dB Whip(Standard), other options available upon request	3dB Omni (Standard), other options available upon request
Transmission Power	+24dBm (250 mW) Software selectable	+24dBm (250 mW) Software selectable
Other		
Interface	RS485 / RS232 | USB	MODBUS TCP/IP | PPS Remote Data Access | Wireless Repeater
Interface Protocol	MODBUS / Push | USB	MODBUS / Push | PPS Remote Data Access | USB
Diagnostics / Configuration	By Software or MODBUS	By Software / MODBUS / Remote Data Access
Data Storage	SD Card 2GB (15,000,000 samples)	SD Card 2GB (15,000,000 samples)



PPS33LR RemoteWatcher

Smart Gauges and Simple Software

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