



# PulseEight Surface Equipment

## Wireless Intelligent Completion for the Digital Oilfield

PulseEight systems can be easily integrated into existing surface pressure monitoring and recording systems. Where these systems are not already in place, Tendeka can offer solutions to extend the wireless capabilities of the system beyond the wellbore.

One of the many benefits of the PulseEight system is its minimal and compact surface equipment requirement. Below are some examples of typical surface equipment that can be used to receive information being transmitted from downhole systems.

### Wireless pressure sensor

Simple pressure measuring capability is required upstream of the production choke. An example of one such option is to utilise a wireless pressure sensor which can easily be connected to surface pipework and can continually send pressure data back wirelessly to the Tendeka Surface Acquisition Unit.

The physical location of the pressure sensor is positioned upstream of the proposed choke or valve required to create the pressure pulse sequence from surface to the tool. The image below provides an example of the compact nature of the sensor, and its ability to easily integrate into the surface equipment via a threaded 1/2" NPT connection. This provides the versatility to situate the sensor at an appropriately accessible position for the specific well and location set-up.

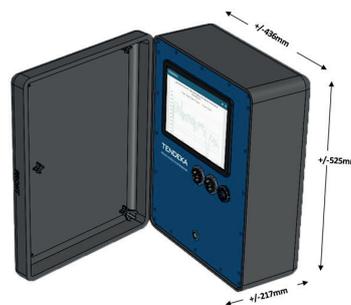


Wireless pressure transducer example

### Surface Acquisition Unit (SAU)

The Tendeka SAU comprises an integral wireless data logger which is the gateway between the wireless pressure sensor and the traditionally wired SCADA network or cloud storage. Telegrams from the downhole tool, contained within the wellhead pressure data, is received via the wireless pressure sensor interface utilising the secure RF signal and is interpreted locally and automatically by the Tendeka SAU.

The SAU can comprise many forms based on the environment in which it is required to be placed, two examples are provided below. Where distances between the wireless pressure sensor and the SAU exceed 100m, an external aerial may be required to ensure adequate signal interface. Other than this the system maintains an extremely compact set-up.

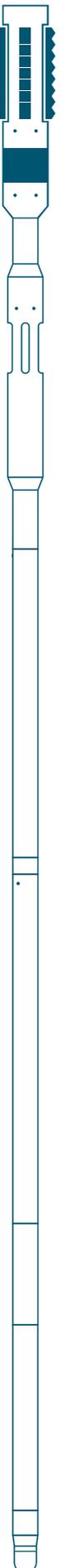


SAU- Weatherproof box c/w vdu



SAU- 3RU rack mount design

Depending upon the location, and units selected, the SAU can upload data to a secure cloud-based system or it can hardwire connect into the LAN at the platform and data is then accessed via client systems. For set-up and maintenance, Tendeka would require remote access to this SAU, but this can be via client systems.

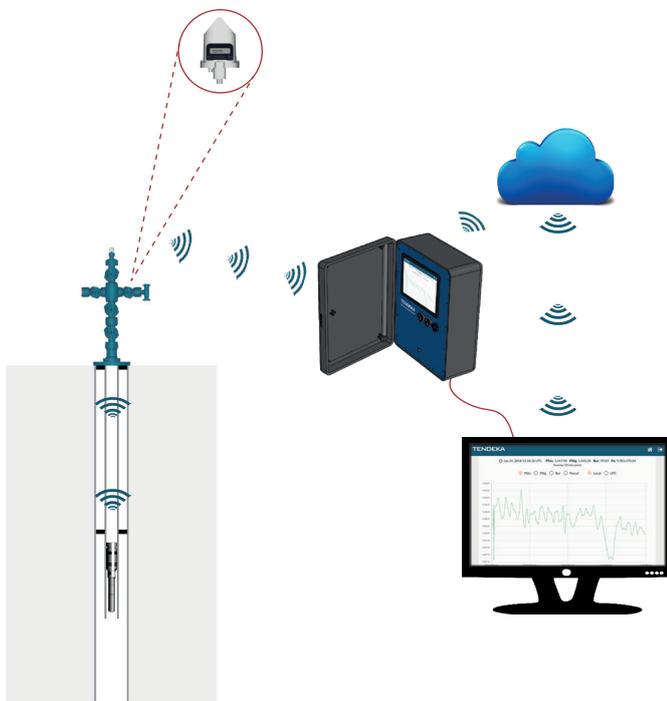




### Benefits

- No wired connection to wellhead
- Ideal for remote locations
- Wireless cloud upload capability

A diagram representation of a possible surface system set-up is provided below. In this case, the system can wirelessly upload to cloud storage such as Tendeka's DataServer or link direct with an existing monitoring system whichever is most appropriate.



Example full system integration

### Technical Specification

Surface Acquisition Unit	
Accuracy	+/- 0.1%
Battery power	Additional option
Mains power	120/220 Volts AC
Inputs/outputs	RS-485 4-20mA Serial MODBUS protocol MODBUS TCP/IP
Sample rate	1sec to hourly
Memory	256MB Compact flash card slot
Wellhead sensor	
Sensor	Gauge pressure
Power	Field replicable integrated battery
Transmission range	1,000ft w/obstructions 3,000ft w/obstructions 2miles w/supporting antennas
Lifetime	3-5 years
Pressure range	0-5,000psi
Temperature rating	-40°C to +70°C