

**Thief hatches are one of the largest source of methane leaks on a well site. Recent surveys indicate that thief hatches are too often left accidentally open. For average tank batteries, a cumulative thief hatch leak duration of 100 hours or more will vent VOCs in excess of 6 tons per year, which is the limitation set by NSPS OOOO/OOOOa, leading to the shutdown of oil production for the remainder of the year, or the operators will have to pay hefty fines.**

With **NOVENT™**, Cimarron has developed a plug-and-play solution made of individual inclinometers, completely wireless and battery operated, that

communicate each thief hatch status in real time to a central module connected to the cloud. That information is then made available to operators through a dashboard displaying alerts as well as cumulative thief hatch leaks duration for a tank battery.

In addition, Cimarron can provide the full **360 PERFORMANCE MONITORING** of the thief hatches and have fast response service crews address these alert and minimize the time thief hatches are left open. When on site, the service crews can troubleshoot the reasons why thief hatches will pop open randomly, identify plumping issues or liquid traps causing pressure drops, and remediate the problem.

## BENEFITS

### Base Station

- One Cloud & SIM subscription for up to 32 data points
- Solar Powered with 14 days autonomy. No external power required. Solar panel, charger, and battery included.
- User friendly, ready to mount and use, form factor
- Cost effective connectivity of a SignalFire's 900 MHz network to the Cloud
- Send measurements with 900 MHz closer to where there is cellular coverage
- LTE M / NB-IoT ready for broader coverage
- Cloud ready and connectivity with other hosts compatible with MQTT / SparkPlugB

### Wireless Tilt Sensor

- 3 Axis Accelerometer constantly monitors angle and reports status. Will report on state change.
- Hazardous Location Certified – Class 1 Division 1
- Rugged design for outdoor environments
- Magnetic mounting or with built-in installation holes
- Pushbutton zeroing
- Long battery life (greater than 5 years)
- Up to ½ mile range
- Built-in 900MHz radio and antenna
- Operates as a standard wireless node in the SignalFire network

Wireless Tilt Sensor  
Installed on hatch



## BASE STATION TECHNICAL SPECIFICATION

### Environmental

**Operating Temperature:** -40°F to 185°F  
(-40°C to 85°C)

**Humidity:** 0 - 95% non-condensing

### Power:

- Solar Powered (Integrated 10W panel)
- Built-in rechargeable battery & charge controller
- 14 days of autonomy with no sun

### Enclosure Specs & Mounting

- NEMA 4X / IP66, Polycarbonate UV Rated
- 9.8" wide x 14.1" tall x 7.0" deep  
(240mm x 357mm x 178mm)
- 15.3 lbs (6.9 kg)
- 2" U-Bolt mount included
- Antenna (included)
  - Panel mounted omni-directional LTE
  - Panel mounted omni-directional 900 MHz

### 900 MHz Specifications

#### Integrated SignalFire DIN Gateway V2

(see SignalFire DIN Gateway V2 for complete specs.)

**Radio Power/Range:** 500 mW.

(approx. 3 miles line of sight [5 km])

**Antenna Type:** Omnidirectional.

+2dB gain, -105dB receive sensitivity

**Frequency:** 902-928 MHz

license-free ISM band compliant with FCC Part 15  
and Industry Canada

**Wireless 900 MHz End Nodes:** 32 maximum

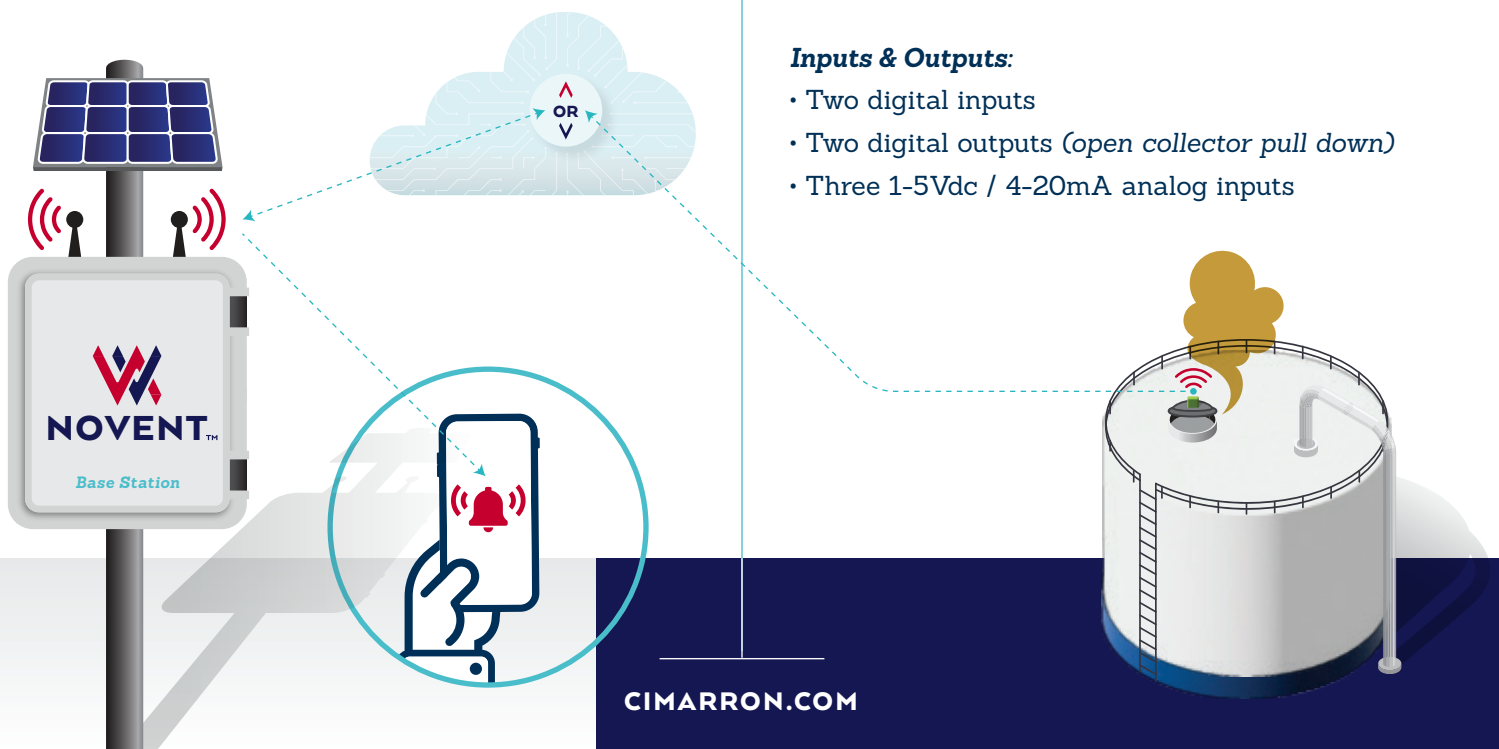
(Depends on number of registers used for each node)

### Internal Diagnostics:

Line voltage, signal strength, error conditions event  
logging, Modbus communications

### Inputs & Outputs:

- Two digital inputs
- Two digital outputs (open collector pull down)
- Three 1-5Vdc / 4-20mA analog inputs



## Cellular Specifications

### Input/Output integrated with RANGER electronics:

- 1 Latching Relay Output.  
(2A @ 30Vdc; 0.3A @ 110Vac; 0.5A @ 125Vac)  
*Failsafe & local automation configurable*
- 2 Digital Inputs report state, total counts, frequency (2kHz max), volume total with K Factor
- Analog Input: 1-5Vdc or 4-20mA.  
*Configurable for flow totalizing mode*

**Data Interface:** LTE CAT M1 / NB-IoT, auto-selectable.

### SparkPlug B messaging:

**Cellular Radio Power:** 23dBm.

### Electrical Connection:

- Pluggable terminal block, 16-30AWG screw terminals
- Local Micro-USB Configuration Port

### Estimated Monthly Data Usage:

Check-in interval dependent » 1 min = 27 MB »  
5 min = 5.4 MB » 15 min = 1.08 MB » 60 min = 0.27 MB

**LTE band support:** Cat-M1 / NB-IoT: B1, B2, B3, B4, B5, B8, B12, B13, B14, B17, B20, B25, B26, B28, B66

### Supports 4FF SIM type:

### Power saving features:

- eDRX
- Secure socket using TLS
- PTCRB Certified

## Tilt Scout Technical Specification

**Operating Temp:** -40 to +176°F

(-40°C to 80°C) Humidity

**Data Interface:** Wireless

Available as Modbus registers at Gateway Reporting:  
Will report every 10 minutes or immediately after a state change.

**NEMA 4X Enclosure Resolution:** <0.1 degree

**Power:** Internal battery pack. Field replaceable

**Battery Life:** > 5 years

## Radio Specifications

**Power:** 40 mW

- Receive Sensitivity: -109 dB
- Encryption: AES 128 bit
- Frequency: 902-928 MHz, FHSS, license-free

### ISM Band Compliant with FCC Part 15 Range:

- Up to 1/2 mile Intrinsically Safe
- Hazardous Location Certified – Class 1 Division 1 is Temp Code T3, Groups C&D.
- Conforms to UL Std. 913, Certified to Can/CSA Std C22.2 No. 157
- Internal Diagnostics: Battery voltage, signal strength, error conditions