

FLUIDS IDENTIFICATION

**OPTICAL FOR GAS HOLD UP**

Liquid/gas discrimination by refractive index measurement  
Embedded computation of gas hold ups and bubble count  
Integrated coupler  
Dynamic thresholds  
302°F (150°C) - 15 kPsi



**ELECTRICAL FOR WATER HOLD UP**

Patented multi electrode technology  
Embedded computation of water hold ups and bubble counts  
Reliable in fresh water or high salinity brine  
302°F (150°C) - 15 kPsi



**TRIPHASIC OPTICAL**

Liquid/water/gas discrimination by amplification of the reflectance response in liquids  
Directly outputs oil, water and gas hold ups  
302°F (150°C) - 15 kPsi



**CAPACITANCE**

Water/hydrocarbon discrimination using capacitance measurement  
Embedded computation of water hold ups  
302°F (150°C) - 15 kPsi



**ULTRASONIC SAND DETECTION**

Counts the sand grains  
Early detection of sand production  
302°F (150°C) - 15 kPsi



**ELECTRICAL-CAPACITANCE**

Water/hydrocarbon discrimination combining electrical and capacitance technology  
Embedded computation of water hold ups  
302°F (150°C) - 15 kPsi



**DIRECT OIL DETECTION**

Direct oil detection by fluorescence analysis  
Oil hold ups  
Enables chemical fluid analysis in post-processing  
212°F (100°C) - 10 kPsi



**RESONANT DENSITY SENSOR**

Range: 0.1 to 2 g/cc  
Accuracy: 1% of FS  
302°F (150°C) - 15 kPsi



FLOW RATE

**MINIATURE DOPPLER TRANSDUCER**

Computation of velocities from ultrasonic Doppler shift  
Qualitative information on very early fluid entries  
Detects particles down to the size of a few tens of microns  
302°F (150°C) - 15 kPsi



**MINI SPINNERS**

OD 7/16 to 3/4 in (11 or 19mm)  
Fluid velocities:  
Minimum velocity threshold: 2cm/s  
Maximum spinning rate: 10m/s  
Smart magnetic detection  
302°F (150°C) - 15 kPsi



P&T

**ULTRA FAST FLUID TEMPERATURE**

Accuracy 0.3°C  
Resolution 0.01°C  
Data rate 16 Hz  
Enables high resolution temperature imaging  
302°F (150°C) - 15 kPsi



**PRESSURE AND TEMPERATURE**

OPENFIELD MEMS  
Pressure sensor  
Accuracy 1.5 Psi / 0.3°C  
Resolution 0.01 Psi / 0.01°C  
Tube shape  
302°F (150°C) - 15 kPsi



# HIGH SPEED - HIGH DETECTIVITY LOCAL PROBES FOR PRODUCTION LOGGING

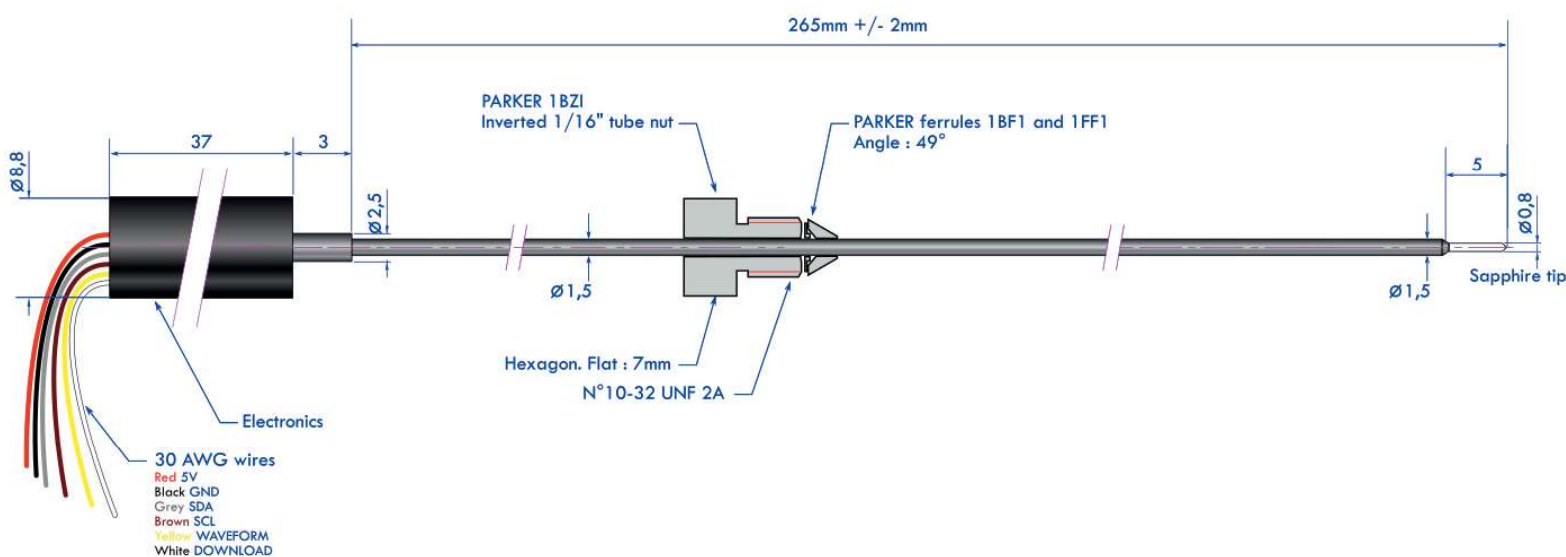
## LOCAL PROBES

Each probe integrates its electronics module with embedded pre-processing, outputting I2C digital data, which are directly ready for flow imaging interpretation. The acquisition can be made through any master board, in memory or real time.

Additionally, a dedicated analog output provides full speed waveforms for fast events analysis.

Thanks to the compact size, low power consumption and smart embedded processing, the local probes offer easy integration into various tools such as array production logging tools or fluid samplers.

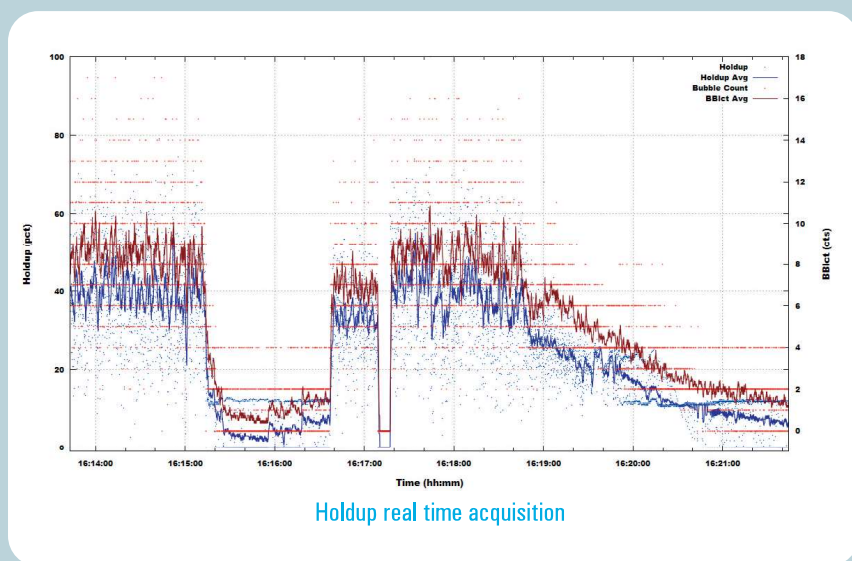
## LOCAL PROBE DIMENSIONS



## SMART MEASUREMENT

**High Speed, High Detectivity** measurement with **digital pre-processing** means outstanding flow imaging interpretation. Electronics modules at the back of the probe digitally communicate on demand the gas or water hold-up, as well as the number of bubbles or water slugs to give you an even finer understanding of your flow conditions.

Additionally, a dedicated analog output provides full speed waveforms for fast events analysis.



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[www.openfield-technology.com](http://www.openfield-technology.com)

13 rue de Limoges - 78000 Versailles - France

633 E. Fernhurst Dr. Ste. #105 - Katy TX 77450 - USA

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