/ AB SMART SERVICES · TECHNICAL DATASHEET

PROBE™ Multilayer Downhole Monitoring System

One tool. Continuous, real-time zonal pressure, temperature, flowrate, and water cut for every producing interval — without additional cables, downhole interventions, or repeated wireline logging runs.



FIG. 01 · PROBE™ INSTRUMENTS · 3D RENDER

KEY FIGURES

±0.02% Pressure accuracy, sapphire crystal sensor	**388 days** Memory mode at 1-second sampling
150°C Operating temperature	**11,600 psi** Operating pressure (80 MPa)

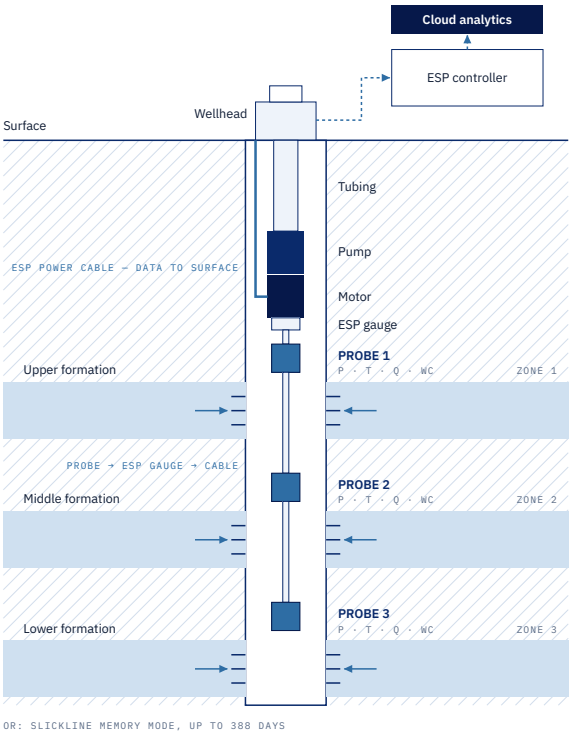
01 · OVERVIEW

PROBE is a compact downhole monitoring tool that provides continuous measurement of the four key reservoir parameters — pressure (P), temperature (T), total liquid flowrate via spinner (Q), and water cut via capacitance sensor (WC) — from each individual producing zone in a multilayer well. Tools are installed directly above each producing formation, providing independent measurement of inflow from every interval without interference from adjacent zones.

Managing production from multilayer wells demands accurate, continuous knowledge of what each zone is contributing. Periodic well logging provides only discrete snapshots — at high cost per run. PROBE was developed to solve this, transmitting live data to surface or recording it autonomously downhole.

This versatility means PROBE can serve as both a long-term reservoir monitoring solution and a real-time production management tool in ESP-equipped wells, installed during a scheduled ESP workover rather than a dedicated one. The first deployment of this technology in Kazakhstan was performed by AB Smart Services at the Arystanovskoye field.

02 · HOW IT WORKS — TWO DEPLOYMENT MODES



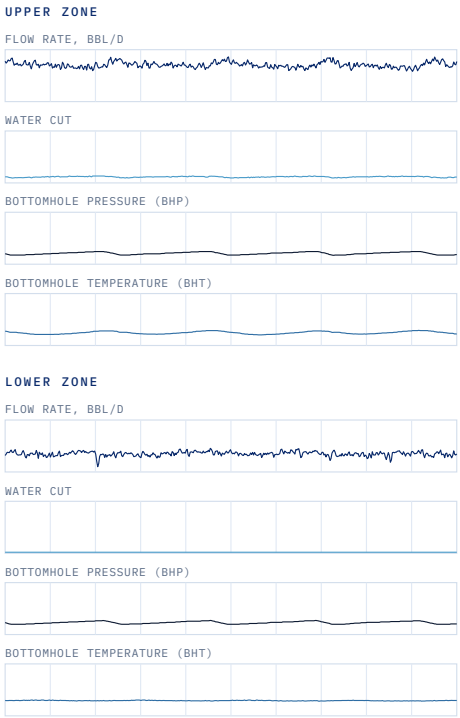


FIG. 03 · REAL-TIME DATA FROM THE TWO PROBE INSTRUMENTS, UPPER AND LOWER ZONE · TRENDS; THE SOURCE GIVES NO SCALES

Memory mode

Run on slickline, records high-resolution data autonomously for up to 388 days at 1-second sampling before retrieval. No additional cables, surface modifications, or workover required.

Real-time mode

Integrates into the ESP completion during a scheduled ESP workover and transmits live zonal data to surface through the existing ESP power cable. All data streams into a cloud-based analytics platform for continuous remote monitoring by the operator's team.

03 · SPECIFICATIONS

PROBE — SENSOR SPECIFICATIONS

PARAMETER	VALUE
Pressure sensor type	Sapphire crystal
Pressure accuracy	±0.02%
Pressure resolution	0.015 psi
Temperature sensor type	Platinum RTD
Temperature accuracy	±0.01°C
Temperature resolution	0.003°C
Flowrate measurement	Bi-directional spinner
Flowrate range	19 – 7,550 bbl/day
Impeller diameter	2.4 inches
Water cut sensor type	Capacitance
Water cut range	0 – 100%
Water cut accuracy	±1%

PROBE — PHYSICAL & OPERATING PARAMETERS

PARAMETER	VALUE
Operating pressure	11,600 psi (80 MPa)
Operating temperature	Up to 150°C
Tool length	3.6 ft (1.1 m)
Tool weight	12.8 lbs
Battery life (memory mode)	Up to 388 days at 1-second sampling
H_2S resistance (standard)	6%
H_2S resistance (optional)	25%
Deployment method	Slickline (memory) or ESP cable integration (real-time)
Additional cable required	None — uses existing ESP power cable

SPECIFICATIONS AS PUBLISHED BY AB SMART SERVICES; VALUES MAY BE REVISED AS EQUIPMENT IS UPGRADED.

04 · APPLICATIONS

- Continuous zonal production monitoring from each reservoir layer — identifying which zones are contributing and in what proportion
- Real-time production profiling below ESP systems — enabling immediate optimisation of pump operating modes
- Early detection of water breakthrough and reservoir pressure changes before they become costly production problems
- Rate Transient Analysis (RTA) and well interference studies using high-resolution continuous pressure data
- Improved reservoir management and field development planning based on actual zonal inflow data rather than periodic snapshots
- Replacement of Y-Tool setups and periodic PLT operations — eliminating repeated wireline runs, personnel mobilisation, and associated OPEX

ECONOMIC BENEFITS

- No additional downhole cable or infrastructure required — uses existing ESP power cable
- No dedicated workover — installed during a scheduled ESP workover, with the standard program unchanged
- Eliminates repeated PLT runs, personnel mobilisation costs, and associated OPEX
- Continuous data enables proactive reservoir management and reduces costly unplanned interventions

BEST SUITED FOR

- Multilayer wells where zonal production split is unknown or uncertain
- ESP-equipped wells requiring real-time production profiling
- Fields where periodic PLT programmes represent significant recurring cost
- Operators seeking to optimise ESP performance and extend pump run life

05 · CASE STUDIES

Real-time zonal inflow monitoring with PROBE™ in dual-zone ESP wells

Undisclosed operator · Western Kazakhstan · 2023–2024 ·
absmartservices.com/projects/arystanovskoye-multilayer-monitoring/

55 / 45

MEASURED ZONAL SPLIT, ADOPTED FOR OFFICIAL PRODUCTION ACCOUNTING

> TAKEAWAY
>
> First deployed in Kazakhstan by AB Smart Services at the Arystanovskoye field — where eight instruments across four dual-zone ESP wells eliminated more than 12 PLT surveys over a single pump run, and the measured 55/45 zonal split replaced a 70/30 assumption in official production accounting — PROBE transforms multilayer well management from periodic guesswork into continuous, data-driven decision-making. It goes in during a scheduled ESP workover, with no additional cable and no surface modifications.