PPS71 Geothermal Tools

www.pioneerps.com
PPS71 Geothermal Tools are designed for extreme, high temperature downhole conditions. The robust electronics combined with vacuum flask technology allow these products to perform at 350 °C (662 °F) continuously, for four hours.

The tool measures pressure, temperature, casing collar location, flow profile (optional) and gamma ray (optional), when configured as either a memory tool or surface read out tool.

By combining the downhole measurements with a depth recorder, such as the PPS36 DepthWatcher, customers have the capability to create synchronized profile logs. Additionally the temperature and pressure profiles created in SmartLog, PPS’s proprietary software, can be opened in any commercial logging software.

For more information on the PPS71 Tools, and to discover the best configuration of this tool for specific applications, please contact PPS.

**Tool Applications**

- Steam Injection Profile Logging
- Geothermal Well Test
- Real-time Pressure Build-Up Tests
- Real-time Pressure and Temperature Gradients
- Tubing and Casing Leak Detection
- Fluid Production/Injection Profiles
Components:

1. Casing Collar Locator
2. Gamma Ray Detector
3. Fast Response RTD Sensor
4. Pressure Sensor
5. Spinner
6. Bowspring Centralizer (Optional)
7. Flask Housing (Regular housing is also available)
8. SRO interface between the tool and the field laptop
9. SRO module
10. PPS36 DepthWatcher (Optional)

- Real time (SRO) and memory logging capabilities
- Fast data transfer @10 samples/sec
- Features robust electronics and vacuum flask technology for outstanding performance at 350°C (662°F)
- Creates complete profile logs when used in conjunction with PPS36 DepthWatcher
- Performs as an exceptional pressure and temperature tool when ordered without gamma and spinner
- Advanced customer support with online maintenance and software tutorials are available
- Can be used as regular temperature tool with regular housing (up to 177°C)
- Data is always saved in downhole tool as backup when running in SRO mode
- The tool automatically recognizes bidirectional flow
Specifications

Pressure Measurement
Sensor Type: Silicon-Sapphire
Pressure Range: 5K psi | 10K psi
Accuracy: ± 0.03% FS
Resolution: 0.0003% FS

Temperature Measurement
Sensor Type: RTD (Pt1000; 4-wire)
Temperature Range: 300 °C (572 °F) | 350 °C (662 °F)
Accuracy: ± 0.5 °C
Resolution: 0.01 °C

Flow Measurement
Sensor Type: Reed switch/magnetic
Flow Rate Range: 5 – 7,000 RPM
Accuracy (≥ 20 RPS): ± 0.5 revolution
Accuracy (≤ 20 RPS): ± 0.25 revolution
Resolution (≥ 20 RPS): 0.5 RPS
Resolution (≤ 20 RPS): 0.1 RPS

Gamma Measurement
Sensor Type: Crystal, NaI (scintillation type)
Sensitivity: 1.0 CPS/API

Data Storage
Sampling Rate: 0.1 s – 1.8 hrs/per sample
Datasets: Time / Pressure / RTD / CCL / Gamma Ray / Flow Profile (optional)
Memory Capacity: 2,000,000 datasets

SRO Transmitter
Sampling Rate: 0.1 s – 1.8 hrs/per sample
Communication Distance: 7,000 meters

Environmental
Module Temperature Rating: 177 °C (350 °F) with standard housing; or 300 °C (572 °F) OD 1.56” | 350 °C (662 °F) OD 1.75” with Flask housing
Electronics Rating: 177 °C (350 °F)
Downhole Time (OD 1.75”): 4 hours at 350 °C (662 °F) / 6 hours at 300 °C (572 °F) / 8 hours at 250 °C (482 °F) / 10 hours at 200 °C (392 °F) / 12 hours at 180 °C (356 °F)
Downhole Time (OD 1.56”): 4 hours at 300 °C (572 °F) / 5.5 hours at 250 °C (482 °F) / 7.5 hours at 200 °C (392 °F) / 10 hours at 180 °C (356 °F)
<table>
<thead>
<tr>
<th>Feature</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Operation Voltage</strong></td>
<td>2.7 – 3.9 VDC</td>
</tr>
<tr>
<td>Battery</td>
<td>180 °C (356 °F) C-size Li-battery (5 A hr/3.6 V)</td>
</tr>
<tr>
<td>Power Consumption</td>
<td>Operation current 5 mA, Idle 3 mA</td>
</tr>
<tr>
<td>Connector</td>
<td>Lemo 6 pin with locker</td>
</tr>
<tr>
<td><strong>Power supply (with Gamma)</strong></td>
<td>5.5 – 7.2 VDC</td>
</tr>
<tr>
<td>Battery</td>
<td>165 °C (329 °F) Two C size Li-battery (5 A hr/7.2 V)</td>
</tr>
<tr>
<td>Power Consumption</td>
<td>Operation current 40 mA, Idle 35 mA</td>
</tr>
<tr>
<td>Connector</td>
<td>Lemo 4 pin with locker</td>
</tr>
<tr>
<td><strong>Memory Tool Communication</strong></td>
<td></td>
</tr>
<tr>
<td>Interface</td>
<td>USB</td>
</tr>
<tr>
<td>Rate</td>
<td>115,200 bits/s</td>
</tr>
<tr>
<td><strong>Surface SRO Interface</strong></td>
<td>9,600 bits per second via standard electrical cable</td>
</tr>
<tr>
<td>Data Transmission Rate</td>
<td>Up to 7,000 meters via standard electrical cable</td>
</tr>
<tr>
<td>Data Transmission Distance</td>
<td>USB 2.0 to PC</td>
</tr>
<tr>
<td>Communication Port</td>
<td>100 - 240 VAC</td>
</tr>
<tr>
<td>Power Input</td>
<td>+60 VDC</td>
</tr>
<tr>
<td>Surface Unit Power Output</td>
<td>-40 °C (-40 °F) to 85 °C (185 °F)</td>
</tr>
<tr>
<td>Working Temperature</td>
<td>90%</td>
</tr>
<tr>
<td>Humidity</td>
<td>No</td>
</tr>
<tr>
<td>Condensation</td>
<td></td>
</tr>
<tr>
<td>Material</td>
<td>Aluminum</td>
</tr>
<tr>
<td>Connectors</td>
<td>1 AC Power Connector, 1 DC Power Connector, 1 USB Port and 1 Gauge Interface</td>
</tr>
<tr>
<td>Dimensions–inches</td>
<td>7.75 (196 mm) x 4 (101 mm) x 3.25 (82 mm)</td>
</tr>
<tr>
<td>Interface</td>
<td>USB 2.0</td>
</tr>
<tr>
<td><strong>Mechanical and Materials</strong></td>
<td></td>
</tr>
<tr>
<td>Service</td>
<td>H₂S</td>
</tr>
<tr>
<td>Outside Diameter–inches</td>
<td>1.56 (39 mm)</td>
</tr>
<tr>
<td>Overall Length without Gamma–inches</td>
<td>67 (1,702 mm)</td>
</tr>
<tr>
<td>Overall Length with Gamma–inches</td>
<td>82.5 (2,095 mm)</td>
</tr>
<tr>
<td>Housing Material</td>
<td>Inconel 718</td>
</tr>
</tbody>
</table>

PPS71 Specifications (Memory Rev. 01, 2015-04-02 & SRO Rev. 01, 2015-06-24)

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www.pioneerps.com
Smart Gauges and Simple Software

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