Hexapod Resistivity Imaging Tool (RIT)

The Hexapod Resistivity Imaging Tool (RIT) is a resistivity imaging instrument. The instrument measures the conductivity of the formation it traverses. The data is presented as high resolution images from which geological information is derived such as fractures, bedding, stratigraphy, dip information, depositional environments, etc. The instrument also provides the best geometric definition of the borehole, derived from six independent mechanical calipers.

**Specifications**

- **Telemetry:** Standard TWT
  - Bandwidth (tool): 190 words per depth sample
  - Mode 2 - 40 Kbits/sec
  - Mode 5 - 104 Kbits/sec
  - Mode 7 - 121 Kbits/sec

- **Sample Interval:**
  - 120 samples/ft: High resolution imaging Mode
  - 120 samples/ft: Extra high resolution imaging Mode
  - 60 samples/ft: Diplog Mode

- **High Resolution Imaging mode:** 20 ft/min
- **Extra high resolution imaging mode:** 10 ft/min
- **Diplog mode:** 50 ft/min
- **NOTE:** The max. logging speeds achievable are governed by the Telemetry and ACQ system capabilities.

- **Data Recorded:**
  - (Min): RAD1 – RAD6
  - (Max): RAD2 – RAD6
  - RAD1: Radius measure from tool axis to each pad (Bucker, Pad, Guard)
  - BTN1-BTN4: Button currents for each of six pads
  - Guard Voltage

- **Plotter/CRT Display:**
  - Auxiliary curves calipers, gains, etc.
  - All buttons as VDL or Wiggle plots

- **Numerical display:**
  - All recorded data

- **Measuring Range:**
  - Caliper RAD1 through RAD6 as allowed by mandrel: 5.5 in. to 21 in.
  - BTN1 through BTN4
  - Resistance 1200 Ohms to 20 MOhms
  - Formation Apparent Resistivity 0.1 to 2000 Ohm-m with theoretical K-factor
  - Actual tool response to be evaluated during field test

- **Borehole coverage:**
  - Resistivity Image: 59% in 7th in. dia. borehole
  - Orientation Sensor Type: Orientation obtained from ORT
  - Accuracy: Caliper ±0.25 inch from 2.15 in. to 10.3 in.
  - BTN1 through BTN4: Resistance Non-calibrated

- **Wireline Requirements:**
  - 7 conductor: 420Vac/30A
  - Tool Bus: 180Vac/20A

- **Pad Characteristics:**
  - Number of buttons: 24 buttons, 2 rows of 12
  - Circumferential spacing: 0.1 in.
  - Longitudinal spacing: 0.3 in.
  - Button size: 0.16 in. diameter

**Supported Combinations:**
- ORT Orientation
- DST Gamma Ray
- TTR Tool
- RTS & RTS-2

**Maximum Temperature:**
- RIT-PD 350°F (176°C)
- RIT-PA 350°F (176°C)
- RIT-MA 350°F (176°C)

**Maximum Pressure:**
- 20,000 psi (137.9 MPa)

**Instrument Weight:**
- RIT-PD 150 lbs (68.3 kg)
- RIT-PA 150 lbs (68.3 kg)
- RIT-MA 300 lbs (136.4 kg)

**Instrument Length:**
- RIT-PD 9.1 feet (2.77 m)
- RIT-PA 9.1 feet (2.77 m)
- RIT-MA 12.5 feet (3.81 m)

**Instrument Diameter:**
- RIT-PD 3.63 in. (92.3 mm)
- RIT-PA 3.63 in. (92.3 mm)
- RIT-MA 5.6 in. (142.9 mm)

**Mechanical Features:**
- Arms: 6 independent
- Pad Force (approx.): 25 - 100 lbs (11.3 - 45.4 kgf) (Adjustable)
- Calipers: 6 independent readings
- Target Borehole Dia: 7 1/2 to 16 inches
- Hole Deviation: Vertical to Horizontal
- Caliper Range: 3.5 in. to 21 in. (15.97 - 53.3 cm)
- Pad Articulation: ±10 degrees (Radially)

**Power Train:**
- RIT-MA: DC Motor w/Power Screw - Torque Output 4500 oz-in

**Motor Power:**
- RIT-MA: 115 VDC -1.0 Amps intermittent duty cycle

**Electrical Isolation:**
- Between RIT-PA and RIT-MA: Built-In top of MA
- Centralization: RIT-MA: 6 Arms Ganged Power Standoff 3.5 inches (8.9 cm) (Radially/Adjustable)

**Mechanical Alignment:**
- RIT-PA: Keyed Joints
- Components Tensile Load Capacity:
  - RIT-PA: 76,000 lbs (34,483 kg)
  - RIT-MA: 41,000 lbs (18,603 kg)
  - RIT-PA: 52,000 lbs (23,593 kg)

- Components Compressive Load Capacity:
  - RIT-PA: 56,000 lbs (25,408 kg)
  - RIT-MA: 41,000 lbs (18,603 kg)
  - RIT-PA: 56,000 lbs (25,408 kg)