

Robertson Geo brings a proven global reputation for delivering the highest quality calibrated data from the most challenging renewable energy locations both onshore and offshore.



**ROBERTSON
GEO**

RENEWABLES

Unlocking Your GeoData

Renewables

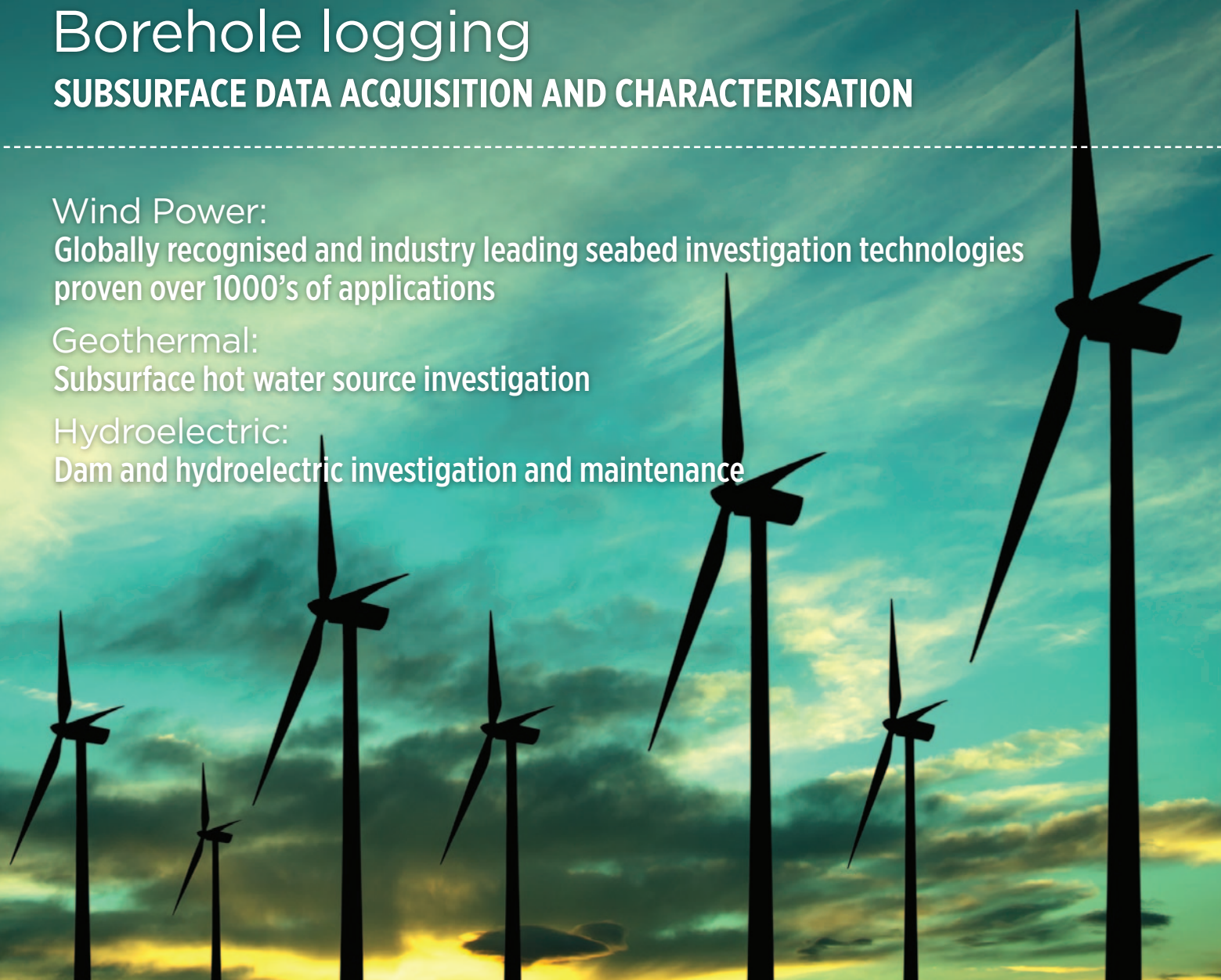
Publication No: 004 RGO/25b

Borehole logging SUBSURFACE DATA ACQUISITION AND CHARACTERISATION

Wind Power:
Globally recognised and industry leading seabed investigation technologies proven over 1000's of applications

Geothermal:
Subsurface hot water source investigation

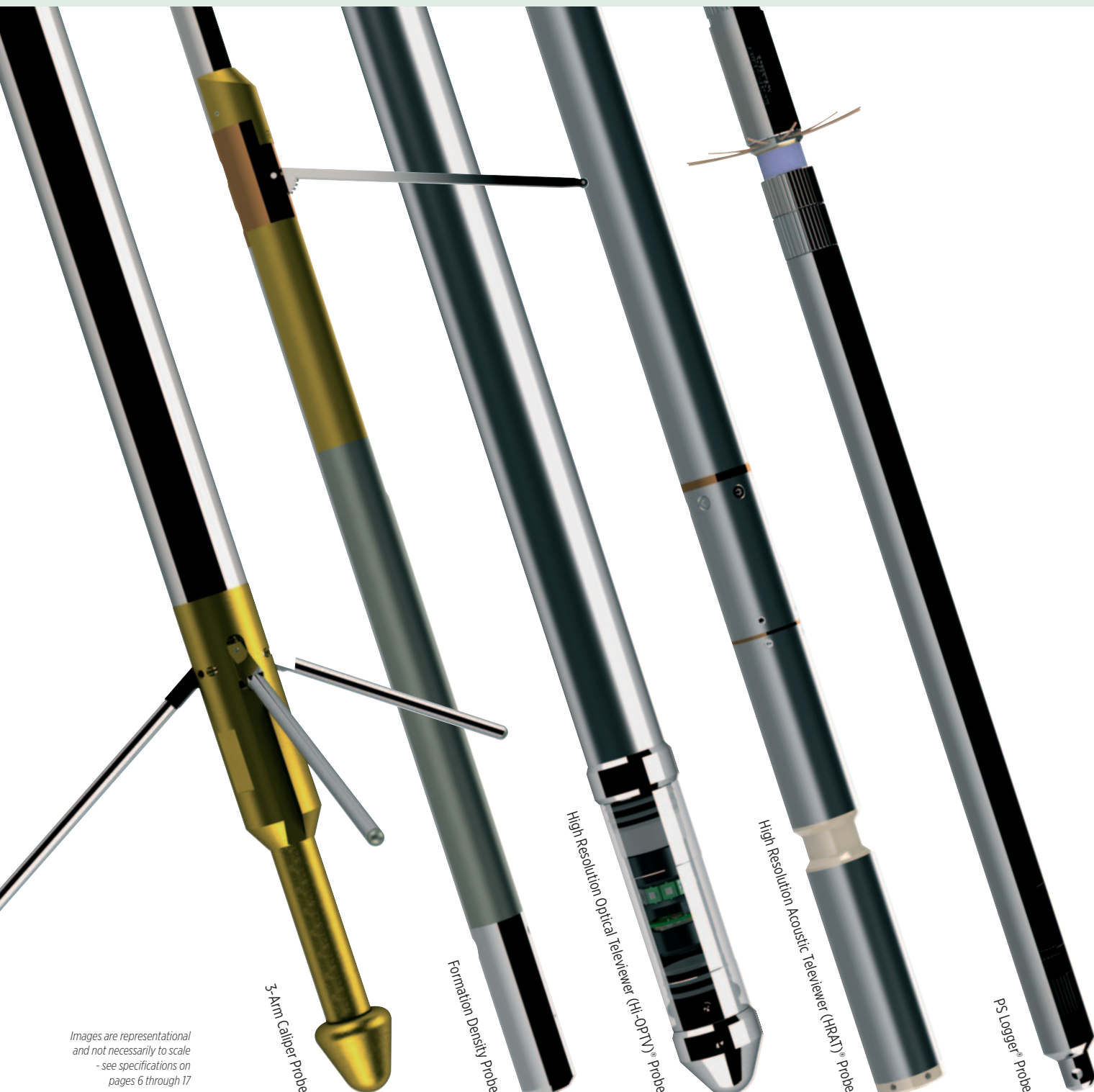
Hydroelectric:
Dam and hydroelectric investigation and maintenance



*The new generation of offshore wind turbines will be 10-12 MW units with increasingly larger masts.
Robertson Geo is the first choice provider for the essential demand of increased quality data and frequency of seabed and onshore subsurface investigations.*

Renewables

Robertson Geo is the market leader and globally the largest supplier of wireline logging instrumentation systems with its comprehensive offer of geophysical probes and supporting surface equipment purpose designed and built in-house.



*Images are representational
and not necessarily to scale
- see specifications on
pages 6 through 17*

Since 2007 Robertson Geo has extensive international experience as a specialist provider of services and equipment to the renewable energy markets with a proven results-based record of reliability in securing the highest quality calibrated data from both on-shore and with systems suitable for heave compensated drill ships or jack-up rigs from the harshest of offshore locations.



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Unlocking Your GeoData

Wind turbines

Wind power is increasingly moving out to sea. In our seas the only limitation on size will be the engineering technology with offshore turbines, today increasing in size even faster than the past decade of onshore turbines.

These new generation of wind turbines will be 10-12 MW and ever larger masts will require more frequent subsurface investigation and more and better quality data. The equipment of choice for this type of work is the PS Logger® probe and its ongoing development for use in harsh environments; it has successfully been deployed to collect data in thousands of offshore boreholes worldwide. *See page 6*

Geothermal

As geothermal projects gain momentum globally, Robertson Geo equipment is increasingly used for logging and investigation of subsurface hot water sources. Applications include geothermal projects for water supply to homes in rural areas (heating and hot water) and also for heating greenhouses to protect crops in harsh winters. The temperature requirement for geothermal water supply and heating is typically 45-55° but the resources can be up to 2,000m deep, well within the capabilities of our logging tools.

Hydroelectric

Projects involving dams and other hydroelectric infrastructure, such as shafts and tunnels, are often located in remote, mountainous terrain. Robertson Geo equipment is highly portable and well suited for these types of applications, which include the identification of suitable hydroelectric sites, and fracture detection, prior to tunnelling (vertically and horizontally). Our acoustic and optical Televue® are typically used for these types of investigations.

Logging services

Robertson Geo engineers are experienced, highly trained and fully certified for offshore working and can be deployed to any global location.

The complete catalogue of equipment is available on a service basis operated by these field crews. They are capable of prolonged service logging operations with minimum outside support and are expert in data processing and interpretation.

These are very cost effective contracting services in circumstances where projects do not justify purchasing equipment and the necessary back up facilities.

Equipment supply

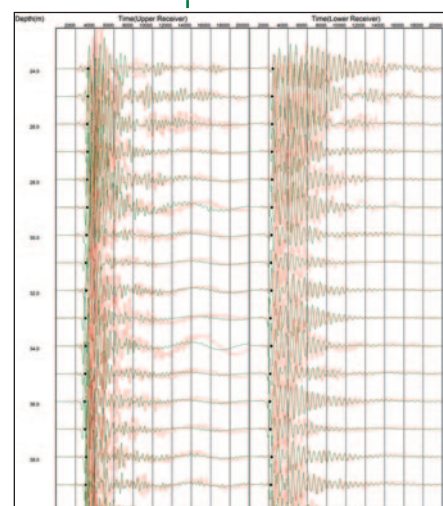
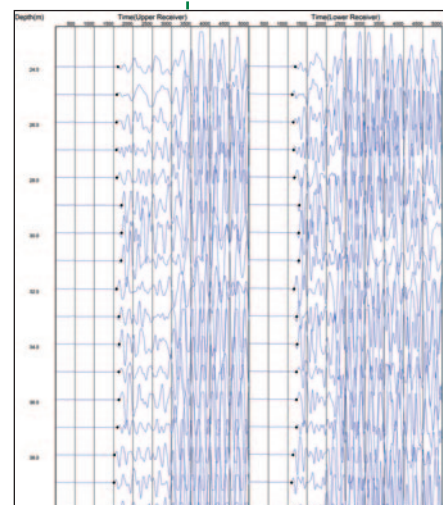
All Robertson Geo probes are fully tested and calibrated at the Conwy facility prior to dispatch, eliminating testing time on site and ensuring the probes are fully operational prior to downhole use.

Depending on customer needs operational and customised training can be provided; this for winch use, probe deployment, logging techniques, data capture and equipment maintenance and troubleshooting.

Equipment rental

Robertson Geo equipment is available to rent with a minimum rental period of 3 days in the USA or 15 days elsewhere. Full systems (including winches) or individual probes can be rented as required with borehole and classroom based training made available for rental customers.

In-house processing service can be supplied for rented equipment and all offshore systems come complete with spare probes and surface units together with essential spares to eliminate problems and expensive vessel downtime.



Example of data created by the PS Logger® Probe.

Further data examples are shown with each specification page for probes and where applicable surface equipment on pages 6 through 17.

Robertson Geo is the only logging services provider with a QMS certified to ISO 9001, comprehensively calibrating all of its logging systems and uniquely using an on-site borehole for testing at its Conwy test well and calibration facility.

Probes

PS Logger®: the go to probe for investigating seabed strength, providing measurements within a single borehole of high resolution shear-wave and compressional velocity data in rock and soils down to 500m. *See page 6*

Formation Density: uses dual shielded detectors to provide a borehole-compensated density measurement with good bed-boundary resolution. *See page 7*

High Resolution Acoustic Televiewer (HRAT)®: provides a continuous high-resolution oriented ultrasound image of the borehole wall. *See page 8*

High Resolution Optical Televiewer (Hi-OPTV)®: provides a continuous very high resolution oriented image of the borehole walls using a conventional light source. *See page 9*

4-Arm Caliper: can replace the 3-Arm Caliper with an advantage where the borehole cross-section deviates from circular and provides a single continuous log of borehole diameter as recorded by two independent pairs of linked arms in contact with the borehole wall. The caliper is a useful first log to determine the borehole conditions before running more costly probes or those containing radioactive sources. *See page 10*

3-Arm Caliper: provides a single continuous log of borehole diameter as recorded by three mechanically coupled arms in contact with the borehole wall. *See page 11*

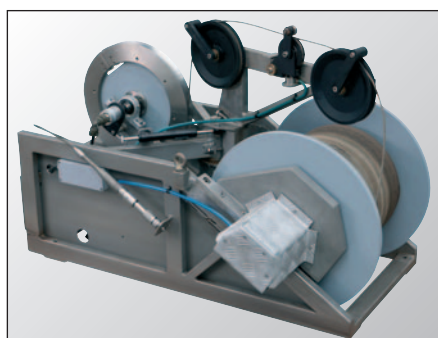
Natural Gamma: measure the activities of naturally occurring or man-made isotopes. *See page 12*

Surface equipment

Micrologger2: surface interface system for handling logging data acquisition, which supports all Robertson Geo probes, including acoustic and imaging tools. *See page 13*



Winlogger: MS Windows based operating system for the Micrologger2, provides field acquisition capability. In-house processing, interpretation and reporting is undertaken. *See page 13*

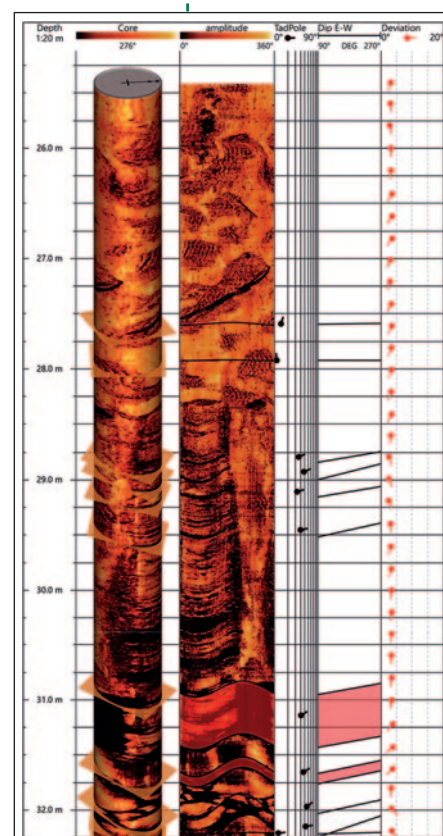


Winches: Robertson Geo designs and builds its own range of winches of varying capacities for deploying subsurface probes on 4-core or co-axial cable.

- Mini Winch
- 500m Winch
- 600m Winch
- 1000m/2000m Winch
- 2000m Marine Winch
- 3000m Winch

See pages 14-16

Sheaves: Wireline sheaves are designed for logging operations with all Robertson Geo winches. *See page 17*



Example of data created by the HRAT® probe.

Further data examples are shown with each specification page for probes and where applicable surface equipment on pages 6 through 17.



Renewable Energy Applications

Representative examples to show **Essential**, **Intermediate** and **Advanced** systems as a benchmark for identifying the level of data and interpretation required for individual locations and characteristics.

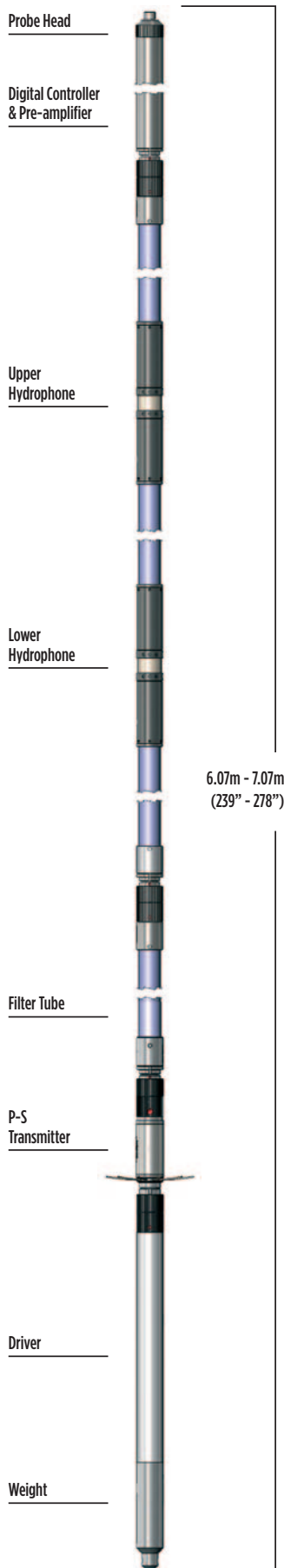
Robertson Geo support teams are always available for further information and discussion when considering system applications at support@robertson-geo.com

Essential
Micrologger2
Winch (Mini/500m/600m/2,000m marine)
PS Logger® Probe

Intermediate
Micrologger2
Winch (Mini/500m/600m/2,000m marine)
PS Logger® Probe
4-Arm Caliper Probe (recommended)
3-Arm Caliper Probe (optional)
High Resolution Acoustic Televiwer® Probe
Natural Gamma Probe

Advanced
Micrologger2
Winch (Mini/500m/600m/2,000m marine)
PS Logger® Probe
4-Arm Caliper Probe (recommended)
3-Arm Caliper Probe (optional)
High Resolution Acoustic Televiwer® Probe
Natural Gamma Probe
Pressure Meter
Formation Density Probe
High Resolution Optical Televiwer® Probe

See probe and surface equipment specifications pages 6 through 17



PS Logger® Probe

The PS Logger® probe is a low-frequency acoustic probe designed to measure compressional and shear-wave velocities in soils and soft rock formations.

It operates using indirect excitation rather than mode conversion as in a conventional sonic. It is capable of acquiring high resolution P and S wave data in borehole depths of up to 600m in water.

Principle of Measurement:

The PS Logger® probe contains a unique design of powerful hammer source and two receivers, separated by acoustic damping tubes. To acquire data, the probe is stopped at the required depth and the source is fired under surface command. Firing causes a solenoid-operated shuttle aligned across the borehole axis to strike plates on opposite sides of the probe in turn, setting up a pressure doublet in the surrounding fluid. The resultant fluid motion produces a tube wave at the borehole wall with velocity close to the shear velocity of the formation together with a compressional wave.

As the waves propagate parallel to the borehole axis, they set up corresponding fluid movements that are detected by the two neutral buoyancy 3D hydrophone receivers and geophones, allowing the wave velocity to be determined.

The facility to stack multiple shots and filter the data as in normal seismic data acquisition is included in the operating software.

SPECIFICATION:

Features

- High energy shear-wave source has typically 20x power of conventional sonic probes
- Low-frequency measurement, more representative of engineering situations
- Stacking of multiple shots
- Probe separates for shipping
- Real-time wavelet (wiggle) display
- Compatible with Robertson Geo Micrologger2

Measurements

- Formation compressional wave velocity
- Formation shear-wave velocity

Applications

- Site Investigation - foundation studies, windfarms, offshore structures, dam safety
- Physical properties of soil/rock - shear modulus, bulk modulus, compressibility and Poisson's ratio
- Earthquake engineering - characterization of strong motion sites
- Velocity control for seismic reflection surveys
- Engineering

Operating Conditions

- Borehole type: open-hole, water-filled
- Recommended Logging Speed: Static measurements

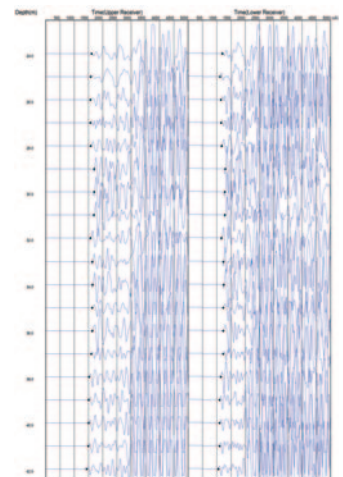
Specifications

- Diameter: 50mm
- Assembled length: 6.07m - 7.07m (1 or 2m filter)
- Shipping case length: 1.45m (4.75ft)
supplied in two transport cases
- Assembled weight: 26.5kg - 28kg (1 or 2m filter)
- Max. temperature: 70°C
- Max. pressure: 6.5MPa
- Transducer type: solenoid and hammer
- Receiver type: 3D hydrophones (p), geophones (s)
- Receiver spacing: 1000mm (3.28ft)
- Waveform acquisition period: 5.12mS to 409.6mS
- Sampling: 2.5µs minimum
- Down-hole gain: 0db to 42db (surface control)

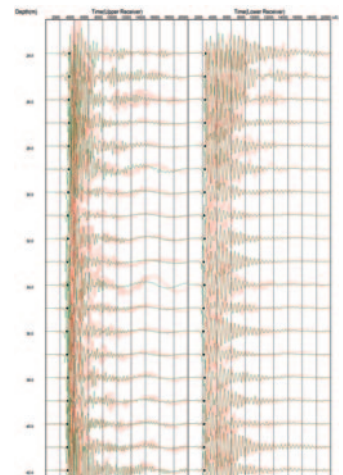
Part Numbers

- 1002244 PS Logger® probe in carrying case

P Waves

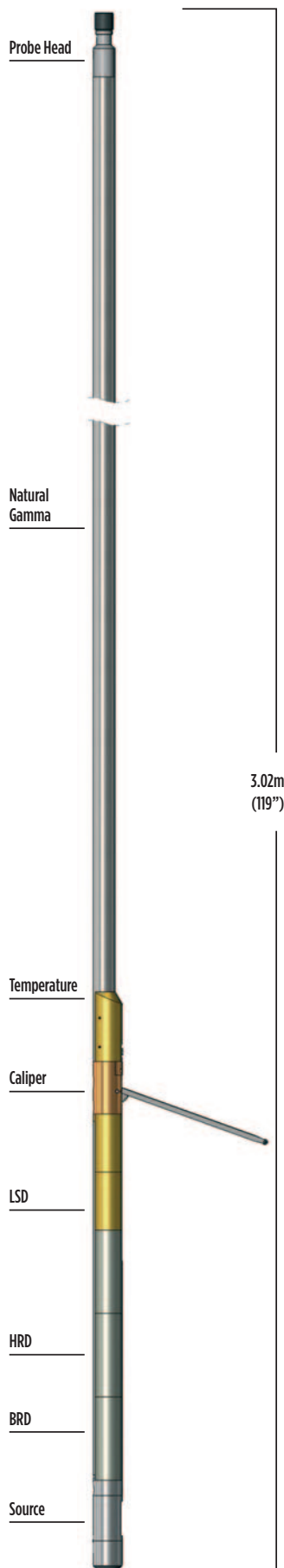


S Waves



Examples of logging data

Formation Density



Formation Density Probe

The Formation Density probe provides a calibrated, borehole-compensated density measurement using a detachable ^{137}Cs gamma source and dual shielded detectors.

The far spaced detector (LSD) is calibrated, giving the best estimate of formation density as borehole wall effects are minimised. A shorter spaced detector (HRD) is also calibrated which provides improved vertical resolution. An optional shorter spaced third detector (BRD) provides a qualitative log with excellent vertical resolution for bed boundary delineation.

Principle of Measurement:

The source and detectors are held in contact with the borehole wall by a spring-loaded caliper arm measuring diameter for borehole compensation. Gamma radiation from the source is back-scattered (Compton effect) in the formation, reaching the detectors where the relative counts are measured using sodium iodide scintillation detectors. Calibration constants are determined using a water tank and an aluminium block which has previously undergone a primary calibration. The calibration constants are combined with the gamma counts and diameter readings in the supplied software to give a calibrated density in g/cc.

SPECIFICATION:

Features

- Compensated density output in engineering units (g/cc)
- Short-spacing detector for high vertical resolution
- Tungsten shielding reduces borehole effects
- Standard calibration blocks for field or base use

Measurements

- Bulk density
- Dual-calibrated density channels (LSD & HRD)
- Natural gamma
- Caliper
- Options:** Bed-resolution density (BRD) and Temperature

Applications

Minerals:

- Density and porosity
- Lithology
- Bed thickness and boundary location
- Coal ash and moisture content

Engineering:

- Rock strength and elasticity parameters (with sonic log)
- Detection of weathered or fractured zones

Water:

- Location of aquifer and aquitard
- Detection of cavities and missing cement

Operating Conditions

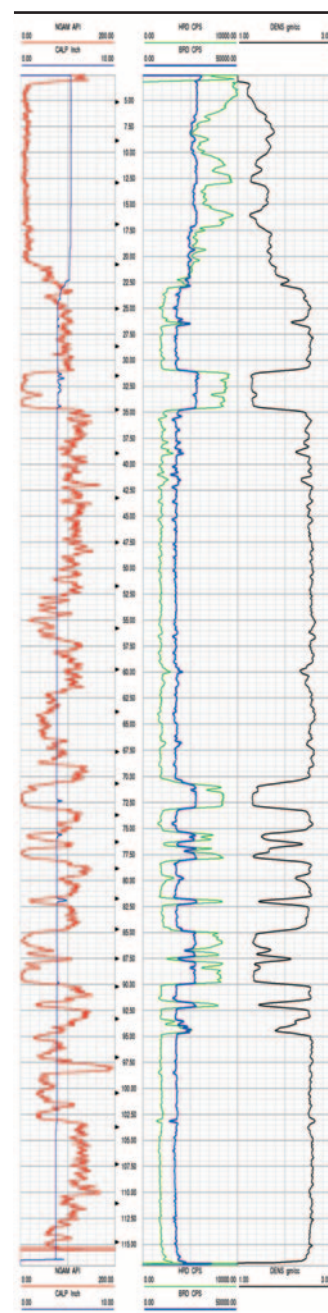
- Borehole type: All, including air filled (qualitative measurement only)
- Recommended Logging Speed: 3m/min

Specifications

- Diameter: 51mm
- Length: 3.02m
- Weight: 24kg
- Temperature: 0-70°C (extended ranges available)
- Max. pressure: 20MPa
- Density range: 1.1 to 2.95g/cc
- Caliper range: 51mm to 300mm

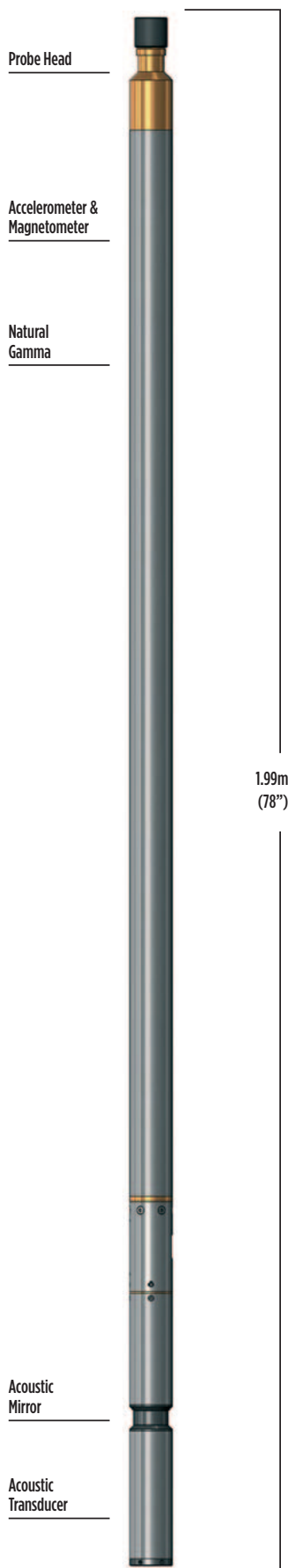
Part Numbers

- 1002013 Formation Density probe
- 1002016 – includes BRD and temperature



Example of logging data

High Resolution Acoustic Televiewer (HRAT)[®]



High Resolution Acoustic Televiewer (HRAT)[®] Probe

The High Resolution Acoustic Televiewer (HRAT)[®] provides a continuous high-resolution oriented ultrasound image of the borehole wall.

The probe uses a fixed acoustic transducer and a rotating acoustic mirror to scan the borehole walls with a focussed ultrasound beam. The amplitude and travel time of the reflected acoustic signal are recorded as separate image logs.

Features such as fractures reduce the reflected amplitude and appear as dark sinusoidal traces on the log. The travel-time log is equivalent to a 360-arm caliper and shows diameter changes within open fractures and 'break-outs'. Directional information is also recorded and used to orient the images in real time.

GeoCAD[®] Televiewer Module: is a Windows-based package for processing, interpreting and displaying acoustic and optical televiewer image logs. Standard log presentations include tadpole and stick plots, stereographic projections of poles to planes and azimuth frequency diagrams. The synthetic core display allows convenient comparison of log and field data for orientation of fractured or incomplete core sections.

SPECIFICATION:

Applications

- Fracture identification and orientation
- Stratigraphic studies
- Local stress studies (break-out)
- Core orientation
- Cased-hole studies

Operating Conditions

- Borehole Type: Fluid filled
- Recommended Logging Speed: 2.5m/min

Specifications

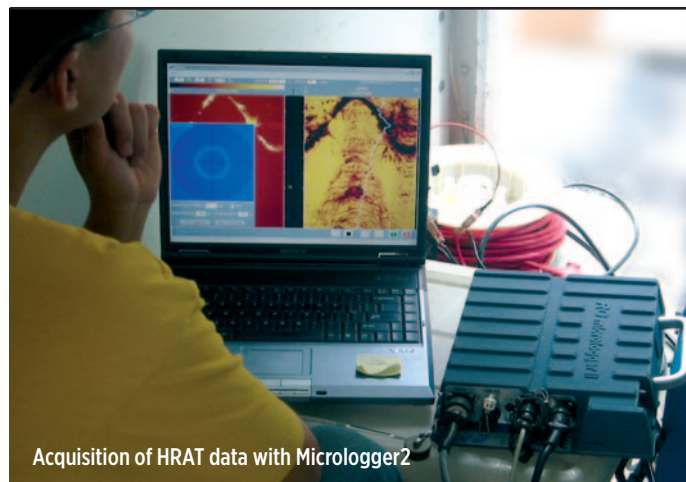
- Diameter: 42mm
- Length: 1.99m
- Weight: 5kg
- Temperature (max): 70°C
- Transducer type: 1.5MHz piezo-composite
- Rotation rate: 5 – 20rev/s
- Sample rate: up to 360/rev

Part Numbers

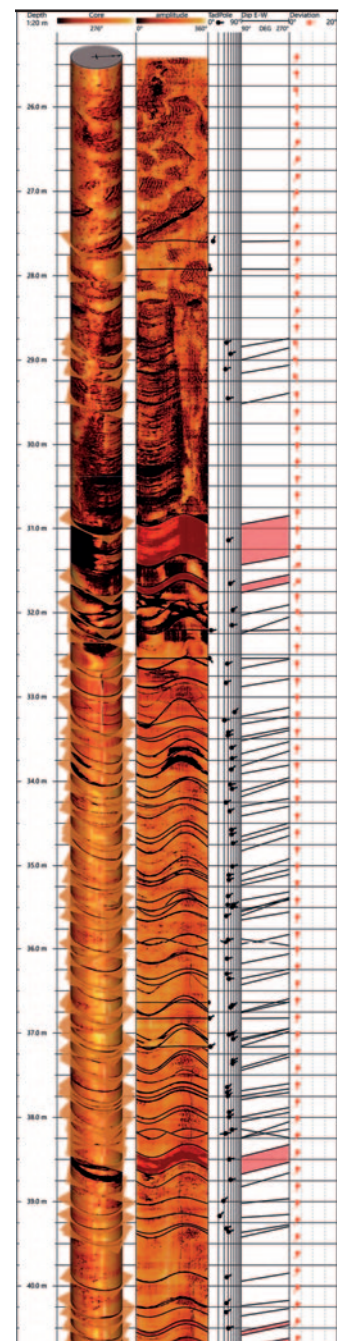
- I002184 HRAT[®] probe
- I002192 HRAT[®] including natural-gamma

GeoCAD[®] Televiewer Module

- I020248 GeoCAD[®] Televiewer Module

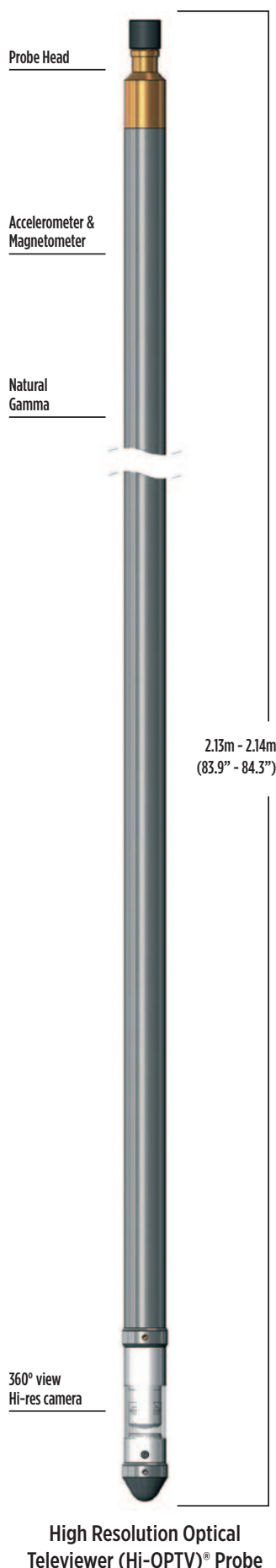


Acquisition of HRAT data with Micrologger2



Example of logging data

High Resolution Optical Televiewer (Hi-OPTV)[®]



The High Resolution Optical Televiewer (Hi-OPTV)[®] provides a continuous very high resolution oriented image of the borehole walls using a conventional light source.

A unique optical system based on a fisheye lens allows the probe to survey 360 degrees simultaneously. This information is processed in real time to produce a complete 'unwrapped' image of the borehole oriented to magnetic north. The probe offers superior resolution to the High Resolution Acoustic Televiewer (HRAT)[®] and produces images in real colour. While, unlike the HRAT[®], it can operate in air-filled boreholes, it is unsuitable for boreholes containing mud or cloudy fluids.

GeoCAD[®] Televiewer Module: is a Windows-based package for processing, interpreting and displaying acoustic and optical televiewer image logs. Standard log presentations include tadpole and stick plots, stereographic projections of poles to planes and azimuth frequency diagrams. The synthetic core display allows convenient comparison of log and field data for orientation of fractured or incomplete core sections.

SPECIFICATION:

Applications

- Fracture identification and orientation
- Stratigraphic studies
- Local stress studies (break-out)
- Core orientation
- Cased hole studies

Operating Conditions

Borehole Type: Air filled or clear fluid
Recommended Logging Speed: 3m/min

Specifications

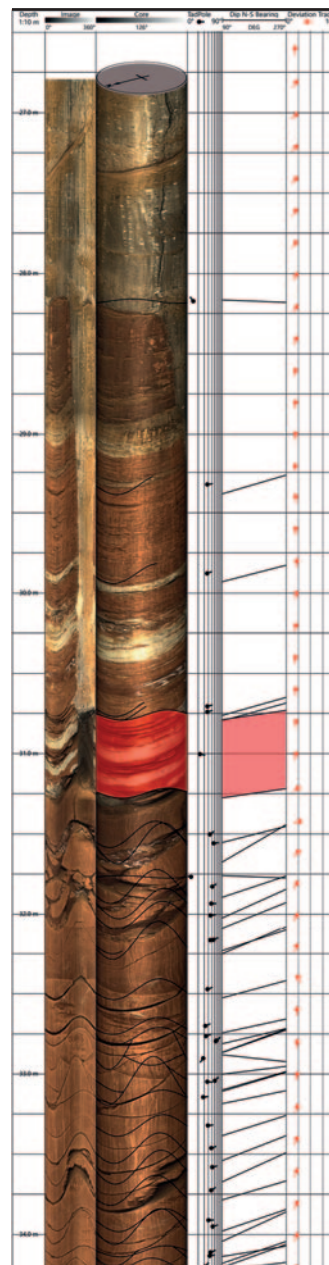
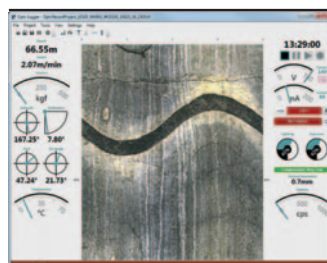
Length: 2.13m - 2.14m (10MPa/20MPa window)
Diameter: 46mm (10MPa) & 58mm (20MPa)
Weight: 6kg (10MPa) or 7.2kg (20MPa)
Temperature (max): 60°C
Circular resolution: user definable 360/540/720 /900/1080/1260/1440 pixels
Sensor type: 1280 x 1024 pixels CMOS image sensor
Colour resolution: 24 bit RGB

Part Numbers

I017187 Hi-OPTV[®] probe (46mm)
I017188 Hi-OPTV[®] probe (46mm) with gamma
I017125 Hi-OPTV[®] probe (58mm)
I017216 Hi-OPTV[®] probe (58mm) with gamma
I015464 Gamma Test Blanket

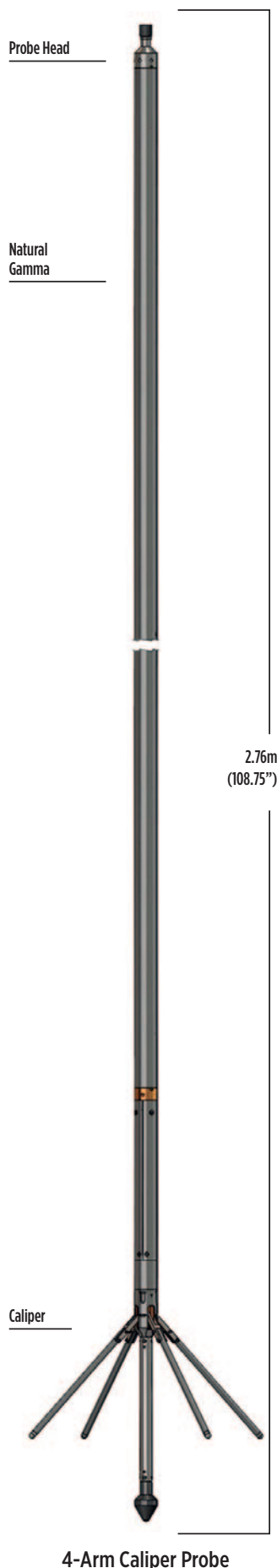
GeoCAD[®] Televiewer Module

I020248 GeoCAD[®] Televiewer Module



Examples of logging data

4-Arm Caliper



The 4-Arm Caliper can replace the 3-Arm Caliper with an advantage where the borehole cross-section deviates from circular and provides a single continuous log of borehole diameter as recorded by two independent pairs of linked arms in contact with the borehole wall.

The caliper is a useful first log to determine the borehole conditions before running more costly probes or those containing radioactive sources.

Principle of Measurement:

Opening and closing of the motor-driven caliper arms is by surface command, allowing the probe to run into the borehole with the arms retracted. Once opened, the spring-loaded arms respond to borehole diameter variations as the probe is raised up the borehole. The long and short axis values are recorded.

SPECIFICATION:

Features

Sensitive X-Y caliper

Measurements

X and Y calipers
Borehole volume (derived)
Natural gamma

Applications

Water/minerals/engineering
Borehole diameter in two axes
Cracks, fissures and casing defects

Operating Conditions

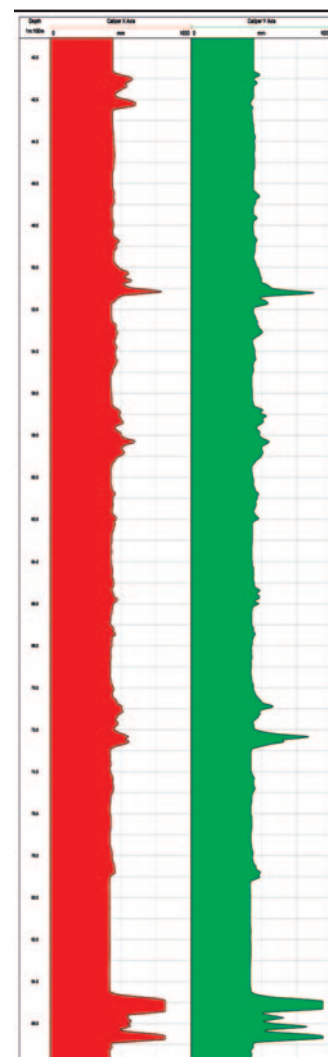
Borehole type: open/cased, water/air-filled
Centralisation: recommended
Recommended Logging Speed: 5m/min

Specifications

Diameter: 60mm
Length: 2.76m
Weight: 19kg
Temperature: 0-70°C (extended ranges available)
Max. pressure: 20MPa
Caliper range: 75mm to 700mm

Part Numbers

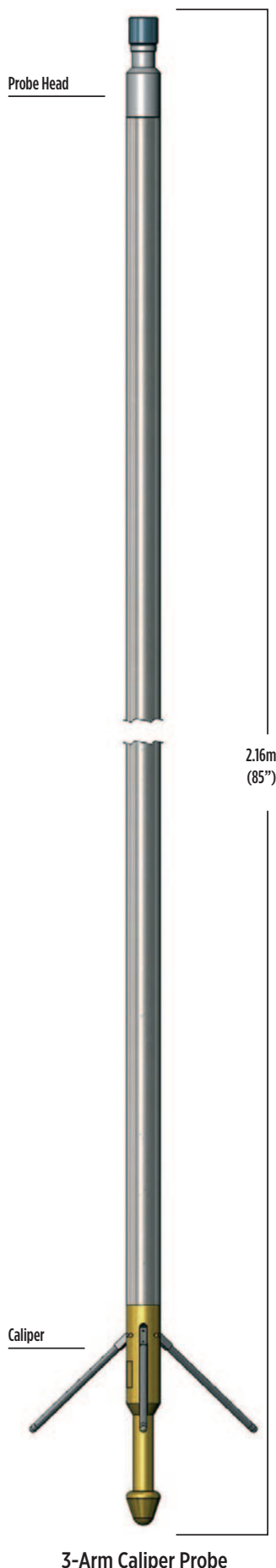
I018484 4-Arm Caliper



Example of logging data

3-Arm Caliper

710mm, 1000mm and 1500mm ranges



The 3-Arm Caliper probe provides a single continuous log of borehole diameter as recorded by three mechanically coupled arms in contact with the borehole wall.

710mm, 1000mm and 1500mm range calipers are available to suit a range of well diameters. The caliper is a useful first log to determine the borehole conditions before running more costly probes or those containing radioactive sources.

Principle of Measurement:

Opening and closing of the motor-driver caliper arms is by surface command, allowing the probe to run into the borehole with the arms retracted. Once opened, the spring-loaded arms respond to borehole diameter variations as the probe is raised up the borehole.

SPECIFICATION:

Features

- Small diameter for slim-hole operation
- Extension arms supplied as standard for 38mm version
- Optional natural-gamma measurement
- Optional casing collar locator

Measurements

- CCL (optional)
- Borehole volume (derived)
- Natural Gamma (optional)
- Borehole volume

Applications

- Minerals/Water/Engineering
- Location of borehole collapse or obstructions
- Cement volume calculations for grouting
- Identification of hard and soft lithology
- Location of cracks, fissures, caving, faulting, casing breaks
- Correction of other logs affected by borehole diameter

Operating Conditions

- Borehole type: open/cased; water/air-filled
- Centralisation: recommended in large holes
- Centralisation: recommended in inclined holes
- Recommended Logging Speed: 5m/min

Specifications

- Temperature: 0-70°C (extended ranges available)
- Max. pressure: 20MPa

3-Arm Caliper (710mm range)

- Diameter: 38mm
- Length: 2.18m-2.68m (depending on CCL and extended arms)
- Weight: 7.5kg
- Range: 40-300mm and 40-710mm

3-Arm Caliper (1000mm range)

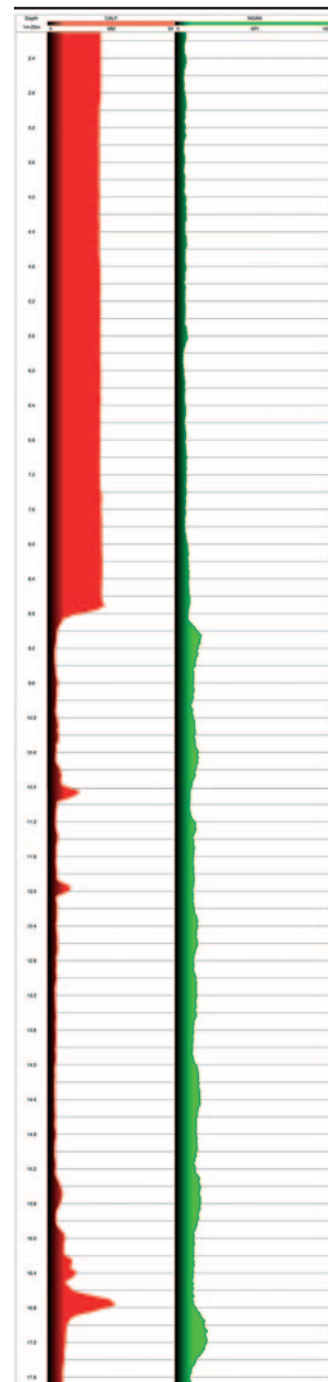
- Diameter: 60mm
- Length: 2.83m
- Weight: 15kg
- Range: 65-1000mm

3-Arm Caliper (1500mm range)

- Diameter: 80mm
- Length: 3.14m
- Weight: 17.5kg
- Range: 100 - 1600mm

Part Numbers

- | | |
|---------|---|
| 1002035 | 3-Arm Caliper (710mm range) with arm extension kit and calibrator |
| 1002037 | - including natural gamma |
| 1002041 | 3-Arm Caliper (1000mm range) with calibrator |
| 1002052 | 3-Arm Caliper (1500mm range) |



Example of logging data

Natural Gamma

Triple Gamma & Ultra-Slim Gamma

Probe Head

2.10m
(82.7")

Natural
Gamma

Natural Gamma Probe

The Triple Gamma and Ultra-Slim Gamma probes measure the activities of naturally occurring or man-made isotopes.

Principle of Measurement:

The probes are based on scintillation gamma detectors. The detectors measure the natural gamma radiation released from potassium and the decay products of uranium and thorium in the borehole.

SPECIFICATION:

Features

- Small diameter for slim-hole operations
- Multiple detectors with different sensitivities

Measurements

Natural Gamma

Applications

- Mineral detection
- Strata correlation between wells

Operating Conditions

- Borehole type: open/cased, water/air-filled
- Recommended Logging Speed: 4m/min (slower in low gamma lithology)

Specifications

Triple Gamma Probe

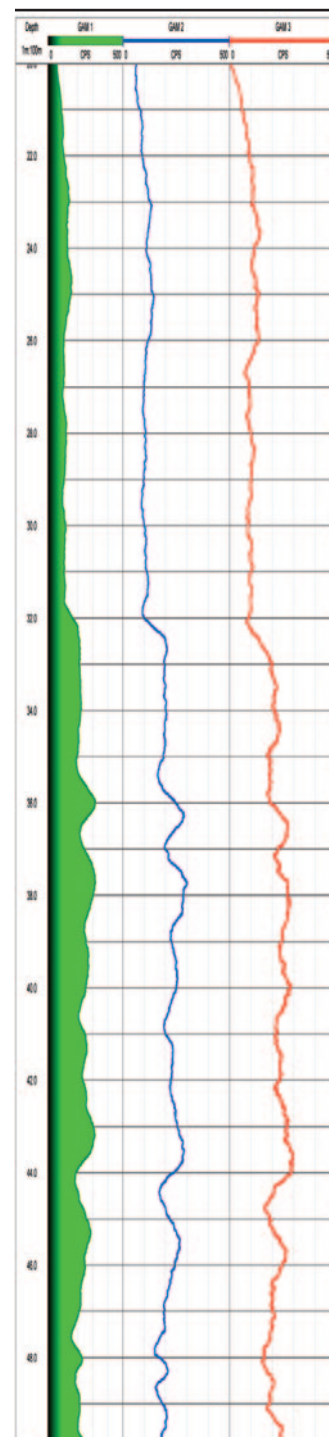
- Diameter: 38mm
- Length: 2.10m
- Weight: 6kg
- Natural-gamma detectors: 25mm x 25mm NaI(Tl)
50mm x 25mm
100mm x 25mm
- Temperature: 0-70°C (extended ranges available)
- Max. pressure: 20MPa

Ultra-Slim Gamma Probe

- Diameter: 27mm
- Length: 0.79m
- Weight: 4kg
- Natural-gamma detectors: 125mm x 17.5mm Cs(Tl)
- Temperature: 0-70°C (extended ranges available)
- Max. pressure: 10MPa

Part Numbers

- 1002009 Triple Gamma probe
- 1002007 Ultra-Slim Gamma probe



Example of logging data

Micrologger2 | Winlogger Software

Micrologger2

Micrologger2 is the surface interface system for handling logging data acquisition. It supports all Robertson Geo probes including acoustic and imaging tools.

Compact and lightweight Micrologger2 is probably the most powerful portable logging system around and with over 600 units used around the globe it has a proven record for its reliability and technology.

SPECIFICATION:

Features

- Logging
- Supports Robertson Geo and many third-party probes
- USB high-speed link to PC Compatible with most winches/cables
- Real-time data display and printing
- Supports Windows™ printers
- Data output in LAS and Robertson Geo formats
- Modular construction for easy field maintenance

Part Numbers

I000184	Robertson Geo USB Micrologger2
I000204	110/220VAC power supply for ML2 and winch (up to 500m)
I000197	Canvas bag for Micrologger2
I013689	Robertson Geo Micrologger2 (video capability installed)
I000192	Micrologger2 12V PSU (Black Box)
I000211	Notebook PC using latest Windows software
I000213	Semi-Ruggedised notebook PC using latest Windows software
I014942	Fast Thermal Printer for continuous plots (Desk Top)
I014946	Fast Thermal Printer for continuous plots (Rack Mounted)

Winlogger Software

Winlogger is the MS Windows based operating system for the Micrologger2, providing field acquisition capability, processing and reporting for the full range of Robertson Geo probes.

It is easy to operate, retaining a standard Windows™ look using familiar tool bars and drop-down menus for all frequently needed functions.

The package incorporates powerful features including a built-in compiler to allow the more advanced user to construct custom 'User Functions' to process multichannel data in real time during logging.

Robertson Geo Winlogger is supplied with a multi-user licence allowing free distribution of the software to any user of Robertson Geo log data.

This policy has proved popular with wireline service companies who may provide Winlogger to clients to allow them to replay or reprocess data in-house without resorting to 3rd-party packages.

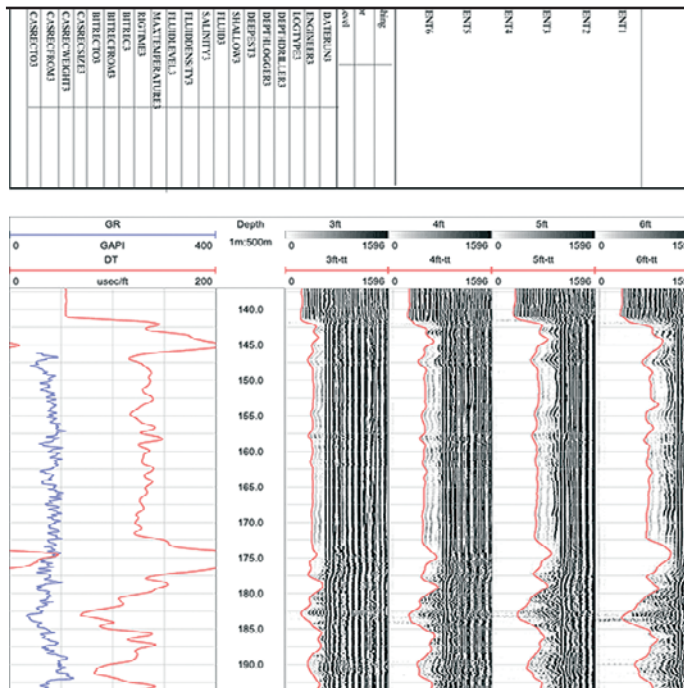
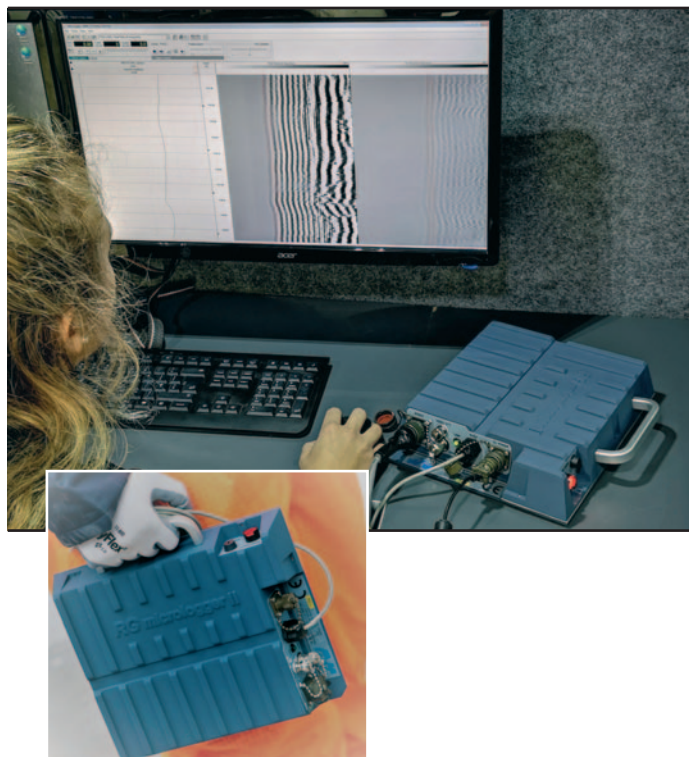
SPECIFICATION:

Features

- Support for all Robertson Geo digital slim-hole probes
- Screen/printer log display in calibrated engineering units
- Selectable depth sample interval (1, 2, 5, 10 cms etc)
- Metric and imperial logs in API format
- Custom logos and headers Data export in ASCII (LAS) format
- Compatible with Windows 10 and earlier OS

Part Numbers

I000466	Winlogger software
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Mini Winch | 500m Winch | 600m Winch

Robertson Geo designs and builds its own range of winches of varying capacities for deploying subsurface probes on 4-core or co-axial cable.

Each winch is precision engineered for reliable use in the most challenging field applications. The winches are fully compatible with the Micrologger2 surface system and the full range of Robertson Geo probes, for depths of up to 3,000m.

Mini Winch

The Robertson Geo Mini Winch is portable, compact and robust. Its basic 'no-frills' design is aimed at long-term reliability under arduous conditions.

SPECIFICATION:

Specifications

Capacity:	175m (575') 4.72, (3/16") cable
Speed:	0 – 17.5m/min (0 – 57ft/min) on full drum (12VDC operation)
Motor:	550W (12 – 24VDC)
Size:	340(w) x 400(l) x 320(h) mm
Weight:	19kg excluding cable

Part Numbers

I013754	Mini Winch includes power and data cables
I001117	Mini Winch Tripod with Encoder



500m Winch

A robust heavy-duty unit, the 500m Winch can be operated from a vehicle battery and is ideal for heavier probes in shallow boreholes.

SPECIFICATION:

Specifications

Capacity:	530m (1738') 3/16" 4-core cable
Speed:	0 – 13m/min (0 – 43ft/min)
Motor:	180W at 12VDC
Size:	582(w) x 482(l) x 414(h) mm
Weight:	52kg excluding cable

Part Numbers

I001019	500m winch including tripod, power and data cable
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600m Winch

Of similar basic construction to the 500m winch, the 600m is mains/generator powered.

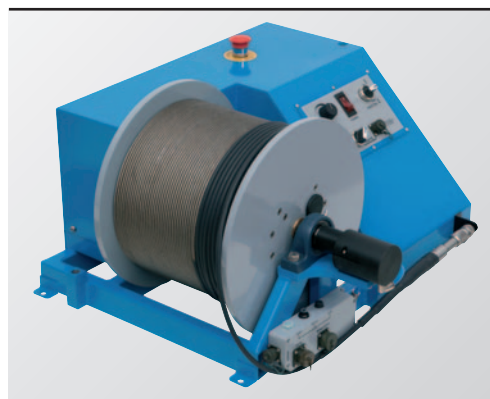
SPECIFICATION:

Specifications

Capacity:	630m (2066') 3/16" 4-core cable
Speed:	0 – 15m/min (0 – 49ft/min)
Motor:	540W at 110/220VAC
Size:	622(w) x 696(l) x 370(h) mm
Weight:	80kg excluding cable

Part Numbers

I001043	600m winch including tripod, power and data cable
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1000m/2000m Winch | 3000m Winch

Robertson Geo designs and builds its own range of winches of varying capacities for deploying subsurface probes on 4-core or co-axial cable.

Each winch is precision engineered for reliable use in the most challenging field applications. The winches are fully compatible with the Micrologger2 surface system and the full range of Robertson Geo probes, for depths of up to 3,000m.

1000m/2000m Winch

The standard unit for truck-mounted operations in deep boreholes, the 2000m winch includes an integral depth wheel and an automatic level wind.

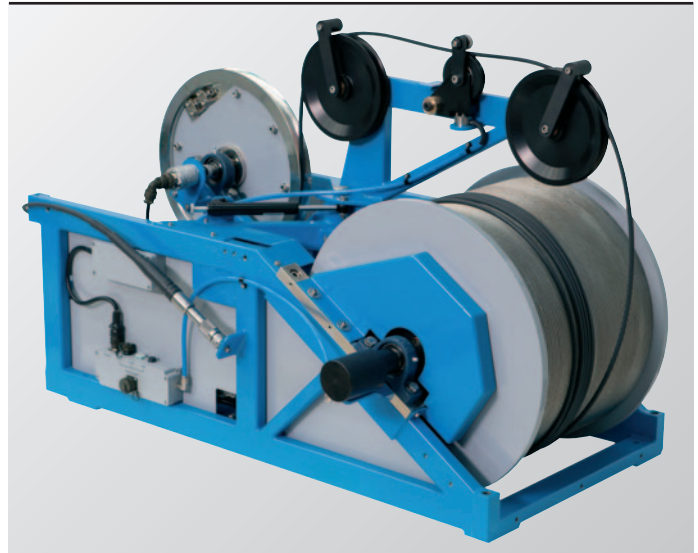
SPECIFICATION:

Specifications

Capacity:	2030m (6658') 3/16" 4-core cable 1030m (3378') 1/4" coaxial cable
Speed:	0 – 30m/min (0 – 99ft/min)
Motor:	2hp (1.5kW) at 110/220VAC
Size:	605(w) x 1060(l) x 735(h) mm
Weight:	142kg excluding cable

Part Numbers

1018194	2000m winch for 3/16" 4-core cable includes tripod, power and data cable
1018193	1000m winch for 1/4" coaxial cable includes tripod, power and data cable



3000m Winch

A heavy-duty electric draw-works designed for deeper hole and oil/gas investigations. *Please note the pressure limits of standard Robertson Geo slimhole tools.*

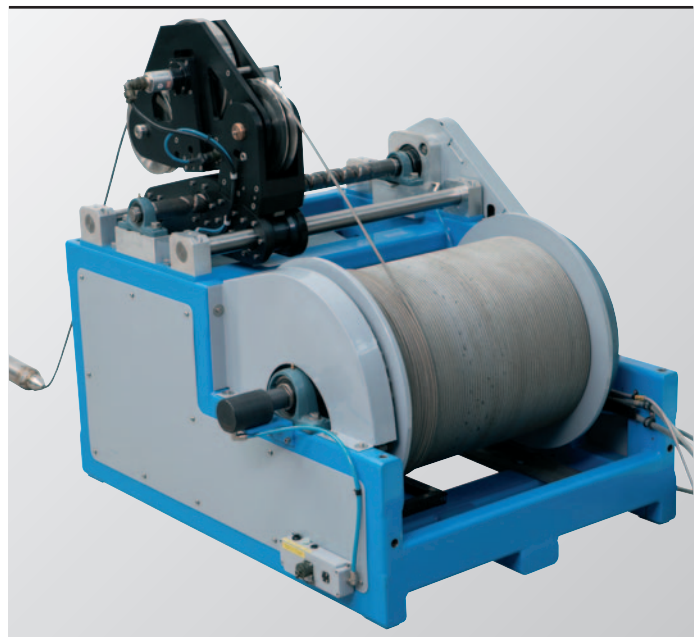
SPECIFICATION:

Specifications

Capacity:	3000m (9840') 3/16" cable
Speed:	0.2 – 34m/min rim: 0.5 – 100m/min
Pull:	1,350kgF Rim: 460kgF
Motor:	440VAC 3-Phase 4kVA
Dimensions:	1000(w) x 1100(l) x 900(h) mm
Weight:	415kg excluding cable

Part Numbers

1013866	3000m winch for 3/16" four-core system includes tripod, power and data cable
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2000m Marine Winch

Robertson Geo designs and builds its own range of winches of varying capacities for deploying subsurface probes on 4-core or co-axial cable.

Each winch is precision engineered for reliable use in the most challenging field applications. The winches are fully compatible with the Micrologger2 surface system and the full range of Robertson Geo probes, for depths of up to 3,000m.

2000m Marine Winch

Working experience by Robertson Geo offshore logging crews has led to the modification of the 2000m Winch and the introduction of a Marine variation to resist corrosive, saline conditions.

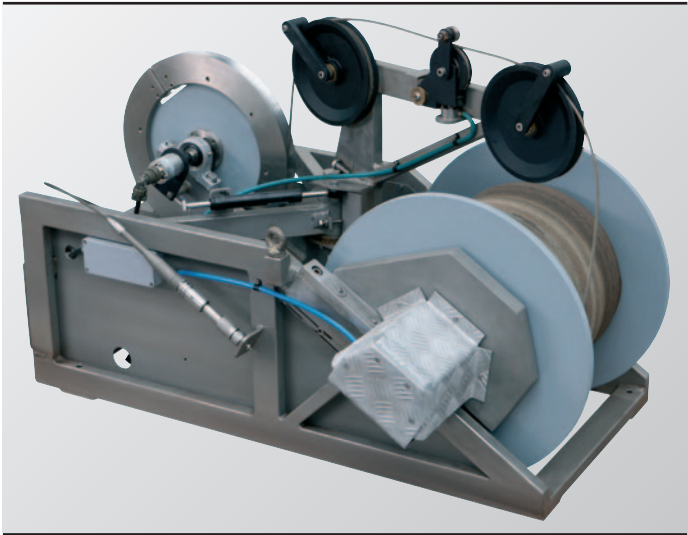
The communications box is waterproofed and filled with silicon to protect the electronics.

Grade 316 stainless steel has been introduced to replace standard steel components. 316 contains the alloy molybdenum, significantly enhancing corrosion resistance, especially for more saline or chloride exposed environments. 316 components include structural frames, depth wheel, panels, spacers, shafts and gears, sprockets and chains.

SPECIFICATION:

Specifications	
Capacity:	2030m (6658') 3/16" 4-core cable 1030m (3378') 1/4" coaxial cable
Speed:	0 – 30m/min (0 – 99ft/min)
Motor:	2hp (1.5kW) at 110/220VAC
Size:	605(w) x 1060(l) x 735(h) mm
Weight:	142kg excluding cable

Part Numbers	
1019167	2000m Marine Winch



2k Sheave | 3k Sheave

GEO Sheave wireline sheaves are designed for logging operations with all Robertson Geo winches.

The sheaves are constructed from stainless steel and marine resistant materials and come supplied in a custom transport case with an optional floor stand.

GEO Sheave 2k is suitable for all winches up to 2,000m capacity, with a maximum suspended load rating of 450kg.

For the 3,000m winch a larger version, GEO Sheave 3k, is available with a maximum suspended load rating of 1,250kg.

GEO sheave 2k



2k Sheave

Rated for 450kg maximum suspended load and suitable for all winches up to 2,000m capacity.

SPECIFICATION:

Specifications	
Type designation:	Wireline Sheave
Safe working load:	900kg
Maximum suspended load:	450kg
Sheave wheel root diameter:	200mm / 8"
Sheave wheel material:	Stainless Steel 316L
Cable types:	Request on sale (Pulley groove design must be altered for different wirelines)
Sheave mass:	9kg
Total mass (Sheave and case):	13.5kg
Transport case:	Included
Sheave overall dimensions:	330mm / 13" Diameter at largest point
Transport case dimensions:	502 x 415 x 246 mm / 19.76 x 16.34 x 9.69"
Operating temperatures:	-20°C to +50°C
Lifting equipment certificate:	Included
Extras:	Floor Stand (for use with the bottom sheave) Spare Guide Pins Spare Shackle

Part Numbers

I020820	GeoSheave 2k for 3/16" (set of two)
I020871	GeoSheave 2k floor stand

Pulley wheels are interchangeable for different cables.

EU REGULATIONS stipulate a new complete assembly must undergo proof load testing, and a new lifting equipment certificate issued. This should be done by Robertson Geo.

GEO sheave 3k



3k Sheave

Rated for 1,250kg maximum suspended load, for use with the Robertson Geo 3,000m winch.

SPECIFICATION:

Specifications	
Type designation:	Wireline Sheave
Safe working Load:	2,500kg
Maximum suspended load:	1,250kg
Sheave wheel root diameter:	360mm / 14.2"
Sheave wheel material:	Westlon M Plastic
Cable types:	Request on Sale (Pulley groove design must be altered for different wirelines)
Sheave mass:	13.5kg
Total mass (Sheave and case):	22kg
Transport case:	Included
Sheave overall dimensions:	360mm / 14.2" Diameter at largest point
Transport case dimensions:	687 x 528 x 276 mm / 27.04 x 20.78 x 10.86"
Operating temperatures:	-20°C to +50°C
Lifting equipment certificate:	Included
Extras:	Floor Stand (for use with the bottom sheave) Spare Guide Pins Spare Shackle

Part Numbers

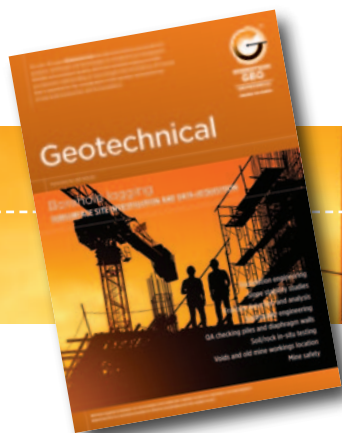
I022744	GeoSheave 3k for 3/16" (set of two)
I022745	GeoSheave 3k floor stand

Pulley wheels are interchangeable for different cables.

EU REGULATIONS stipulate a new complete assembly must undergo proof load testing, and a new lifting equipment certificate issued. This should be done by Robertson Geo.

Notes

Our complete range of brochures:



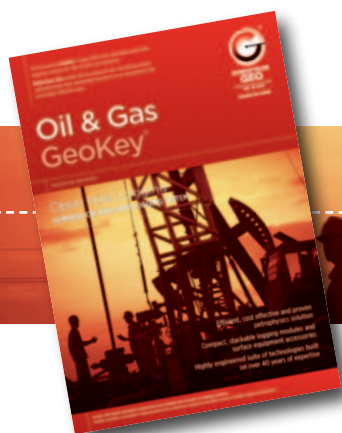
Geotechnical

SUBSURFACE SITE INVESTIGATION AND DATA ACQUISITION



Mining & Minerals

SUBSURFACE RESOURCE EXPLORATION AND MINE SAFETY PLANNING



Oil & Gas GeoKey®

SLIMHOLE OR THRU-PIPE OPEN HOLE LOGGING SYSTEM



Renewables

SUBSURFACE DATA ACQUISITION AND CHARACTERISATION



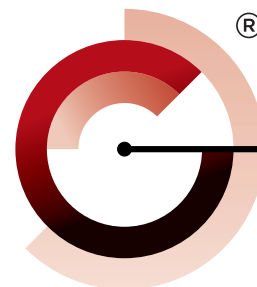
Water & Environmental

SUBSURFACE CHARACTERISATION AND DATA ACQUISITION



Operational Services

COMPREHENSIVE GROUND INVESTIGATION SERVICES, DATA MANAGEMENT AND RENTAL SOLUTIONS



**ROBERTSON
GEO**

Unlocking Your GeoData



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