

BGS ORIENTED ROCK DRILL

TECHNICAL SPECIFICATIONS

This deep ocean drill was developed for use on the NERC BRIDGE Programme. Rock cores to a length of 0.8 m have been obtained from water depths to 4500 m. Orientation is achieved by scribing the core along its length with a single reference line and then using the two drill mounted compasses to assign a heading to this reference mark. This marking can subsequently be related to a world reference, thereby allowing detailed palaeomagnetic analysis to be carried out.

Whilst in use the drill is monitored by a subsea computer which sends data from the suite of sensors on the drill to a computer on the surface for display. The same subsea computer receives commands from the surface computer enabling sampling to be monitored and controlled in real time. There is a monochrome video camera on the drill which can transmit single frame sea-bed pictures to the surface. This allows the site to be selected or rejected prior to drilling and provides a visual record of the site for archiving purposes.

Limitations imposed by the use of a coaxial cable, means the drill can only be supplied with limited single phase power, onto which all data communications are also transmitted. Using modern compact motor controllers, the drives for rotation, retraction and water flushing are driven directly from 3-phase AC motors. A subsea computer controls all the functions of the drill and in addition monitors a variety of sensors which include:

• **Rotation (rpm) • penetration into the sea bed • water depth • rig orientation - two compasses at different heights • drill flush - water flow • sea-water temperature • subsea computer temperature • motor controllers temperature • subsea AC voltage • subsea AC motor currents • two axis inclination (tilt/roll)**

DETAILS

Core length: up to 0.8 m long rock cores

Core diameter: 35 mm

Weight in air: 1 tonne

Height: 2.40 m

Umbilical: armoured coaxial power and hoist

Drilling speed: up to 300 rpm with power available

Power: 3 kVA; typically 240 VAC, 13 A, 50 Hz

Orientation: orientated core to a world reference

Shipboard control: PC-based for control/ status of all subsea functions

Depth capability: designed for depths to 4500 m

OPERATIONAL REQUIREMENTS

Operations are possible from research or other vessels equipped with a suitable 'A' frame or side gantry, winch and 'NSF – type' co-axial armoured cable or a similar 17.5 mm diameter CTD cable. The cable must be specially terminated and cut again on completion of the work. Dynamic positioning is required. Other systems may be possible but would have to be observed and assessed prior to any operations.



**Left Drill
Deployment.**

Right Scribed core.



**Below Corrugations
on basaltic sea bed.**



**Below View of
computer console.**



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