MARINE SURVEY SYSTEMS

# Geo-Vibro Core 3000 + 6000

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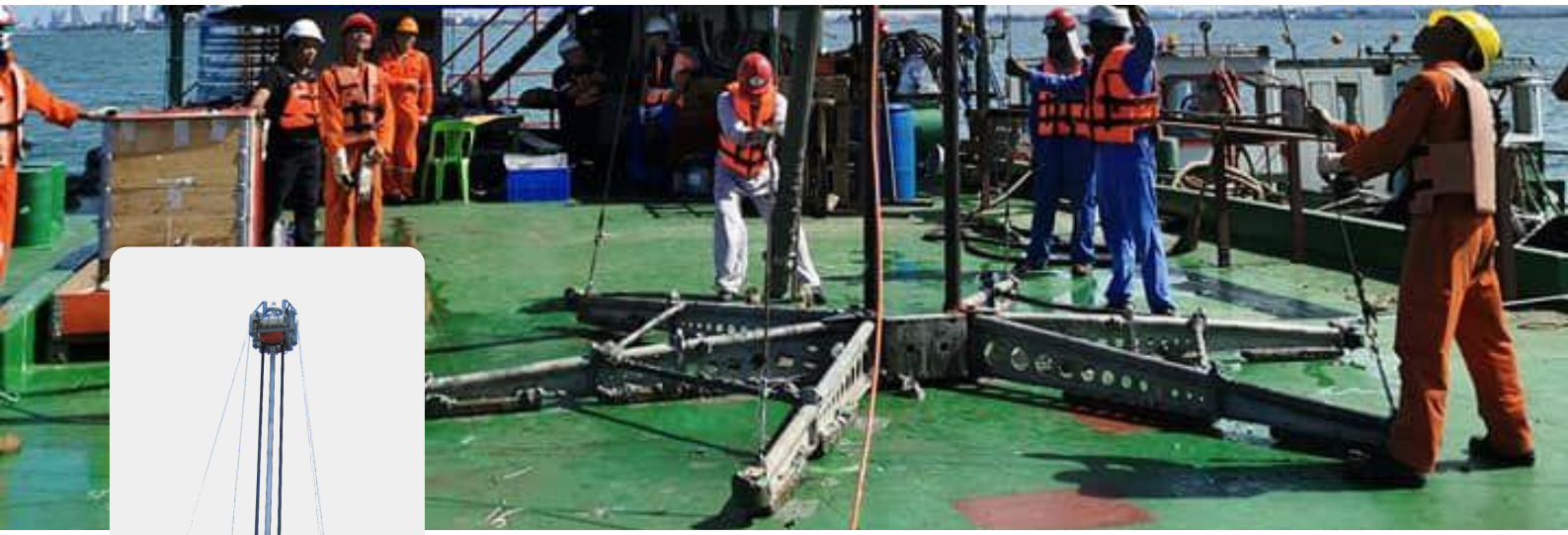



## High Frequency Vibro Coring System.

## Description

**HIGH FREQUENCY VIBRO CORING**
The Geo-Corer 3000 + 6000 is a high frequency (28 Hz), electrically driven vibrocoring system. It can penetrate fast (thereby enhancing the quality of the core) into all common sediment types. Including compact sands, stiff clays and even unconsolidated chalk.

**VARIABLE CORING PARAMETERS**
The two standard configurations are designed to take high quality cores of 6 m or 3 m length, in ordinary PVC liners with an internal diameter of 106 mm.
The penetration force can be adjusted by varying the dead weights on the vibrator head.

**PROVEN PERFORMANCE**
The Geo-Corer 3000 + 6000 has a proven performance over many years, even in extreme conditions. The very fast penetration rate results in high quality cores with a minimum of sediment disturbance.

**LIGHTWEIGHT STRUCTURE ALLOWS SMALL VESSEL OPERATION**
This modular system can be assembled manually in two hours (a crane is required to bring it upright) and can be deployed from a relatively small vessel. Because of its lightweight construction and smart pull-out system, it requires a limited hoisting power of five tonnes maximum. Also, its low overall weight minimizes transportation costs.

**PIVOTING COREL BARREL HEAD**
The pivoting head allows rapid change-out of the core barrel and easy retrieval of the core liner, while the vibrocorer remains in the upright position.

**DEEP WATER OPERATION**
The Geo-Corer is rated to a maximum water depth of 300 m. It can be upgraded to the pressure-compensated version for operation in water depths down to 600 m and more.

## Operational Features

→ It only takes 3 minutes to acquire a 6 meter core in dense sands.

→ 30 kN impulse at 30 Hz for fast penetration.

→ Reliable, lightweight & cost effective.

→ Modular construction (cores of 3, 6, 9 OR 12 m).

→ Pivoting core barrel for horizontal retrieval.

→ Water injection for deep cores of 12 m and applications onshore & in transition zone.

→ Optional pre-pressured or compensated model for deep water operation.

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## Deployment Solutions

**- THE GEO-CORER HAS A VARIABLE FOOTPRINT AND A PIVOTING BARREL, WHICH ALLOWS DEPLOYMENT IN ALL KINDS OF SITUATIONS -**

From the stern using the A-frame plus hoisting winch.

From a barge or multi-cat using big crane.

**DEPLOYMENT AND HOISTING BY CRANE**
The 1:4 pulley system of the Geo-Corer generates an barrel extraction force equals to 4 times the hoisting force. This means that a 5 ton crane will meet the maximum design criteria of 20 ton. Most cranes have enough drum capacity to accommodate 100- 200 m.

However, the use of an adequate cable is imperative:
- 14 mm, 35 × 7, anti twist steel cable;
- 18 mm, Dynema, floating kevlar cable.

## Custom Built Winches

**CUSTOM BUILT HOISTING WINCHES**
In collaboration with various specialized manufacturers we able to offer a full range of hydraulic winches, all custom designed to meet the requirements of geotechnical and oceanographic survey:
- from shelf down to oceanic depths;
- autonomous mobile units;
- fixed installations;
- fully certified.

**VIBRO CORE CABLE REEL FOR DEEP WATER**
We also offer the constant tension winch with 1000 m umbilical for deep water.

| | |
|---|---|
| **Frame** | hot dip galvanized |
| **Frame shape** | stackable square box frame |
| **Reel material** | stainless steel |
| **Mode of operation** | manual |
| **Power** | electrically or hydraulically powered |
| **Notes** | Constant tension control, 380 three phase slip rings |

cable reel for deep water.

We are always pushing for improvements, so equipment specifications can change without notice.
Please keep in contact with support to stay in tune with the developments.

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## Technical Specifications

| | |
|---|---|
| **Type** | Geo-Corer 3000 + 6000 |
| **Manufacturer** | Geo Marine Survey Systems |
| **Maximum weight in air** | 1000-1200 kg, depending on ballast weights |
| **Maximum weight in water** | 850-1050 kg, depending on ballast weights |
| **Fully containerized system (optional)** | The system is designed to fit into a standard 20-foot container. The same container is used for the storage of barrels / liners during operation offshore. |
| **Total height** | 7.4 m (6 m core barrel) / 4.5 m (3 m core barrel) |
| **Footprint base frame** | Diameter: 4.7 m (6 m core barrel) / 3.2 m (3 m core barrel) |
| **Corrosion protection / maintenance** | All structural steel parts are hot-dip galvanised |
| **Vibro motor** | Electrically driven double vibrator (5.5 kVA) |
| **Vibrating frequency** | 28 Hz |
| **Vibration swing force** | 30 kN |
| **Dead weights on vibrator head** | Adjustable, from 100 kg to 300 kg |
| **Electric power** | 380 /440 V AC, 3 Phase, 50 / 60Hz Running power 2 A to 6 A, depending on soil type. Minimum Generator Power: 7.5 kVA |
| **Electric power umbilical** | Standard 250 m, Kevlar-reinforced, polyurethane insulated on reel, Optional 100 m version for shallow water, hand deployed |
| **Hand operated cable reel** | Overall diameter 0.9 m, width 0.5 m, mounted on steel A-frame (hot-dip galvanized), with four wheels for easy on deck. |
| **Electric constant tension cable reel** | Option, Special constant tension winch with 750 m umbilical for deep water operations |
| **Electrical control unit** | Rugged HMPE housing, protecting a watertight suspended electric power control unit that contains ampere meter, fuses, start and stop buttons, and green (ON) and red (OFF) LEDs. Automatic end switch when fully penetrated. |
| **ROP measurement** | Acoustic Height Transducer with digital output via USB on control unit |
| **Core barrel and accessories** | ID / OD: 113 mm / 121 mm (stainless steel 316)<br>Length: 6 m or 3 m<br>Core catcher ( stainless steel 316)<br>Cutting shoe (carbon steel)<br>Special anti-return valve<br>Pivoting core barrel head |
| **Core liner** | ID / OD: 106 mm / 110 mm, PVC or transparent PVC<br>length: 5.9 m (6 m barrel), 3.0 m (3 m barrel) |
| **Operational depth** | 300 m for Geo-Corer built after 2010<br>600 m for the pressure-compensated version, using two 5 liter / 200 bar compressed air bottles |
| **Hoisting requirements** | Minimum 5 t crane or A-frame<br>14 mm anti-twist steel cable, type 35 × 7<br>(N.B. The provision of a hoisting cable is optional) |
| **Required height below A-frame** | 8.5 m minimum (6 m core barrel)<br>5.5 m minimum (3 m core barrel) |
| **Required deck space** | Minimum 12 m length for placing the core barrel into horizontal position to extract the core liner |

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## Working Principle & And Pressure Compensation

**- THE SYSTEM MAIN PARTS AND RELATED NUMBERS ARE IN THE DIAGRAM OVERLEAF -**

→ The main structure of the vibrocorer consists of the base frame (2), which can be folded together for transportation; the two guiding poles (5); the sliding frame (11) with the vibromotor (12); and up to six deadweights (13) that allow the adjustment of the downward penetration force. A high density polyethylene block (4), in the base frame, guides the core barrel during penetration.

→ The standard length of the guiding poles for 3 m coring is 4.5 m; for 6 m coring, a shorter pole of 2.9 m is added to the standard pole. (N.B. The maximum pole length of 4.5 m fits easily into a 20-foot container.) Both guiding poles are connected at their top to a rigging head (15), which is kept in place by four stainless steel stays (6) secured to the spider base frame.

→ The vibromotor is driven by a 5.5 kVA / 3-phase AC motor located in the centre of its housing, and is powered from the vessel via the underwater power umbilical (17). Two gearboxes, with gearwheels of eccentric weights, are mounted at the sides of the housing. The vertical vibration force is created by the centrifugal force of the rotating eccentric weights; the horizontal components of the centrifugal force cancel each other out, but the vertical components reinforce each other. The resulting up/down motion (a sinusoidal motion of 28 Hz) of the vibromotor is transmitted by two springs (14) to the sliding frame and deadweights, thereby providing the downward penetrative force.

→ The core barrel (7) is made of stainless steel 316, and contains a PVC liner of 106 mm inner diameter and wall thickness of 2 mm. The core barrel is connected to the barrel pivot (10) by two locking bolts - this pivotal connection allows the core barrel to be positioned horizontally for extracting the core liner.

→ The core barrel is provided with a carbon steel cutting shoe (3), which fixes the core catcher and core liner in position. The liner and its core sample can be easily extracted after unscrewing the cutting head. Liner caps are used to close the liner sections.

→ The combined effect of the vibration motion and the non-return valve (9) at the top of the core barrel produce an under-pressure directly above the core sample. This is the “suction effect”.

→ Once the barrel has penetrated the seabed, this closing of the upper part of the core barrel helps to prevent the core sample from moving backwards during the pull-out from the seabed.

→ Thanks to the unique internal core extraction system, the available force for pulling the core barrel out of the seabed is four times the hoisting force. This is achieved by passing the steel hoisting cable through two sheaves in the sliding frame and one sheave in the rigging head - resulting in a fourfold increase of the hoisting force available for extraction.

→ For example, a three-tonne total hoisting force gives a two-tonne net hoisting force, (after correction for the system’s own weight), which would increase fourfold to an eight-tonne extraction force. This increased force also means that the system is much less sensitive to bending of the core barrel during extraction - the main extraction force is always applied vertically, even if the vessel is not directly above the corer.

→ A galvanised anti-twist steel hoisting cable diameter 14 mm (16) is used to deploy and recover the vibrocorer from the vessel, using a suitable crane or an A-frame plus winch, depending on available means, water depth, etc.

→ The electric motor of the vibrator unit is operated (switched on/off) from the surface via the power cable and the control unit. The performance of the vibrator can be monitored via the ampere meter on the control unit.

**PRESSURE COMPENSATION FOR DEEP WATER OPERATION**

→ Pressure compensation for the vibromotor housing becomes necessary at water depths greater than 300 m - the pressure within the housing must be able to withstand the pressure from the surrounding water column.

→ Two standard 5 liter diving bottles are installed on the sliding frame; each bottle is connected to the vibromotor housing via a high pressure hose and pressure-compensated valve. As the vibrocorer is lowered through the water column, the valve opens in response to the increase in the ambient water pressure, allowing the air from the diving bottles to flow into the vibromotor housing and equalise the interior/exterior pressures.

→ When the vibrocorer is recovered to the surface, the high pressure air inside the vibromotor housing is released through an over-pressure bleed valve.

**GEO MARINE SURVEY SYSTEMS**

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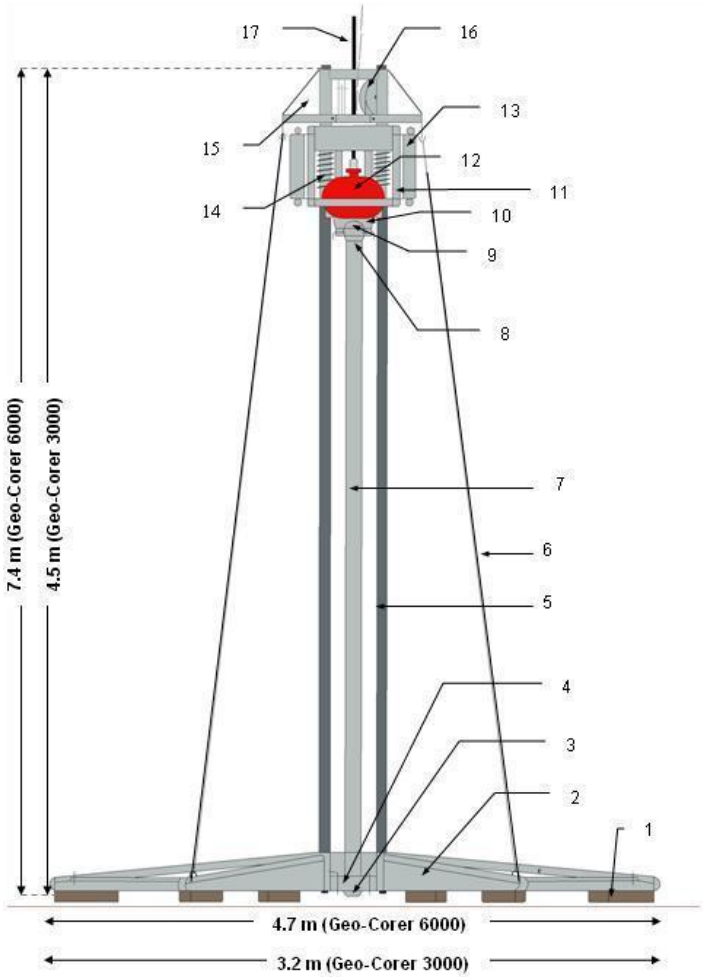


| No. | Item | Material |
|---|---|---|
| 1 | protective anti-slip blocks | high quality waterproof plywood |
| 2 | spider base frame | carbon steel, hot-dip galvanised (can be folded) |
| 3 | core barrel cutting shoe | replaceable cutting shoe, carbon steel, with stainless steel core catcher |
| 4 | core barrel guiding block | HMPE |
| 5 | guiding poles | high strength steel |
| 6 | stays to rigging head | stainless steel 316 |
| 7 | core barrel | ID/OD 113 × 121 mm stainless steel 316 |
| 8 | pivoting core barrel head | stainless steel 316 |
| 9 | non-return valve | Delrin and stainless steel |
| 10 | core barrel pivot | stainless steel, hot-dip galvanised |
| 11 | sliding frame | stainless steel, hot-dip galvanised |
| 12 | vibromotor | 3-phase AC motor, 5.5 kVA |
| 13 | dead weights | adjustable to six pieces of 50 kg each (on vibrator head) |
| 14 | springs | transferring resonant vibration motion to 30 kN |
| 15 | rigging head | hot-dip galvanised |
| 16 | hoisting wire | anti-torsion 14 mm steel cable, type 35 × 7 |
| 17 | underwater power cable | polyurethane, Kevlar-reinforced (12 × 1 $mm^2$) |