

GeoPulse Compact (Over-the-Side)



LIGHTWEIGHT, RUGGED AND HIGH-PERFORMANCE SUB-BOTTOM PROFILING SYSTEM OPTIMISED FOR SHALLOW WATER OPERATION ON SMALL VESSELS OF OPPORTUNITY

The GeoPulse Compact has been specifically designed for rapid deployment and ease of use, producing repeatable, high quality results time after time, whilst minimising the possibility of user error. Brand new Transducer and Hydrophone designs combine with state-of-the-art, adjacent, transmit and receive electronics to outperform any other system on the market in the same size and weight class. The system is shipped complete with a fully featured, sub-bottom version, of the latest, industry standard, Chesapeake SonarWiz® software, for control, visualisation, and data processing/export.

Summary

The system builds upon GeoAcoustics' countless years of experience with the industry stalwart GeoPulse Pinger system to provide a flexible, reliable and high-performance solution specifically targeted for use in lakes, rivers, harbours, estuaries and seas/oceans with a depth of up to 100m. The towed version of the system can be used to give depth capability of over 250m, depending on Tow-Cable length.

The GeoPulse Compact is suitable for a wide variety of applications including geological, dredging, and environmental surveys as well as pipeline and buried object detection. The unrivalled choice of transmit waveforms allows the user to select appropriately for the task in hand, maximising resolution or penetration as required.

System Components

The standard system comprises an over-the-side (OSM) bubble, an Interface Box (complete with accessories), a 10m Deck Cable and a fully featured version of Chesapeake's SonarWiz® software.

The OSM bubble houses the Transducer and Hydrophone as well as an Electronics Bottle containing the tx/rx electronics.

Interface Box

The Interface Box is a rugged but lightweight IP66 rated enclosure, providing protection from adverse weather when utilised on very small craft. It is powered from low voltage DC and houses an efficient power converter which supplies high voltage to the Electronics Bottle. The system is provided with an adaptor to allow the unit to be mains powered, if desired.

The power converter generates 350V_{DC} and incorporates a range of safety features to protect both the user and the equipment under fault conditions. These include open circuit, short circuit and reverse polarity protection on the Deck Cable connection, as well as an earth fault detection system. Also included is a novel detection system that prevents high voltage being applied if the Electronics Bottle is unplugged.

A low power, yet high performance, single board computer is included for system control and signal processing. The unit accepts standard GNSS strings, together with a 1PPS pulse, for precise timestamping of the received data. The string data is incorporated into the transmitted data stream.

Electronics Bottle

The Electronics Bottle is a 1000m depth rated aluminium unit containing all the necessary electronics to generate the high power transmit waveforms. The transmitter is a highly efficient class-D style amplifier, which allows precise control over the amplitude, frequency, and phase of the transmitted signal.

The dual channel receiver samples the raw Transducer and Hydrophone data at 800kHz, using the very latest low noise semiconductor technology. This, combined with FPGA based signal processing, allows the system to achieve over 100dB of truly usable dynamic range. Data output is via a robust VDSL style digital link, allowing operation over a small diameter single coax Deck Cable.

Transducer

The Transducer is a novel double resonant design, giving unprecedented bandwidth and response in one single lightweight unit. The near flat response over the range 5kHz - 18kHz makes the unit ideal for high resolution "Chirp" pulses. The wide beamwidth at the upper end of the frequency range gives very good pipe detection capability.

FEATURES

- Lightweight & rugged with low power consumption
- Vertical resolution as small as 6cm
- Good results in water as shallow as 1m
- Extremely wide frequency range
- Wide-beam reception on Transducer for pipeline detection
- Small diameter, single coax, Deck Cable
- In-field upgradable firmware
- Fully featured acquisition software included

Hydrophone

The Hydrophone is a rigid unit containing seven high specification elements as well as a built-in pre-amplifier, to achieve the maximum possible signal to noise ratio (SNR). Data can be received on the unit whilst transmit is still in progress, allowing the system to operate in very shallow water, even in "Chirp" mode.

OPTIONS

- OTS Mount (Pole set & Deck Mount)
- External Trigger Input
- Laptop for SonarWiz® software (Standard or ruggedised)
- Alternative length Deck Cables
- Towfish body (for alternative deployment)
- System spares kit
- External 3rd Party heave sensors
- Custom "Chirp" waveforms

TECHNICAL SPECIFICATIONS

Interface Box (Model GP01)	OTS Bubble (Model GP06)
Mechanical: Anodised Aluminium case Weight: 7kg Dims: 350mm(W) x 103mm(H) x 268mm(D) (Excluding connectors) IP66 rated (including mating connectors) IP66 rated connector covers supplied	Mechanical: Anodised Aluminium/Acetal construction Fibreglass shell covers Weight: 24kg Dims: 900mm x 300mm x 280mm(H) All parts 1000m depth rated
Environmental: 10% - 95% RH, non-condensing 0°C - 40°C (operation), -20°C - 75°C (storage)	Transmit
Connectors: Power In, Deck/Towcable, 3 x Serial PPS input, External Trigger Input	Output Power: 1kW peak (adjustable as % of full scale)
Indicators: One for each of: Power in, HV, Time sync Sonar link	Frequency: 1.5kHz – 18kHz
Power Input: 10V _{DC} – 34V _{DC} (24V nominal recommended) Reverse polarity and overvoltage protected Power: 30W typ plus transmitter power Transmitter power usage: 1W – 35W	Waveforms: Pinger (CW), Ricker and "Chirp" Pinger: Frequency and cycles selectable 1 – 32 cycles (in 1 cycle steps) 4 – 15kHz (in 0.1kHz steps) Ricker: Spread spectrum (selectable by highest frequency component) 4kHz – 15kHz (in 0.1kHz steps) Chirp: Range of sweeps available 5, 10 or 15kHz bandwidth 8, 16 or 32ms length Range of wave shapes
AC Input: Mains Adaptor Supplied Input: 90V _{AC} – 305V _{AC} , 47Hz – 63Hz Output: 24V _{DC} nom, 120W capable Short circuit & overcurrent protected IP65 rated	Rep Rate: Up to 20pps (waveform dependent)
Serial: 3x RS232 with overvoltage protection Range of baud rates selectable	Receive
PPS: TTL level, protected, edge selectable	Acquisition: Dual channel, 800kHz front end sampling 50 / 100kHz sample output, 24bit
Acquisition Software (SonarWiz®)	Acoustic
Version: Fully featured SBP with control interface (locked for use with GeoPulse Compact)	Source Level: Up to 196dB ± 3dB re 1uPa @ 1m
Features: Control of all system parameters Full range of processing tools Data export in industry standard formats 1 year of maintenance included	Beamwidth: Along Track (Hydrophone Rx): 35° at 5kHz, 18° at 10kHz, 12° at 15kHz Along Track (Transducer Rx): 45° at 5kHz, 25° at 10kHz, 35° at 15kHz
	Resolution: 6cm (using 15kHz "Chirp" sweep)
	Penetration: Up to: 80m (fine clay) 20m (sand)

Specifications subject to change without notice E&OE