

GeoPulse Compact (Towed)



GeoAcoustics



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 250m. The Towfish can be deployed from easy-to-handle Kevlar[®] reinforced soft Tow Cable or industry standard ¼" armoured cable.

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 a Towfish, an Interface Box (complete with accessories), a Kevlar[®] reinforced 30m Tow Cable and a fully featured version of Chesapeake's SonarWiz[®] software.

The Towfish 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 on a small diameter single coax Tow Cable up to 500m in length.

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 at various water depths
- Extremely wide frequency range
- Wide-beam reception on Transducer for pipeline detection
- Single coax Tow Cable operation (up to 500m length)
- 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

- Over-the-side mount adaptor for Towfish
- Range of soft-tow or ¼" armoured cable lengths
- Cable reel (soft tow) or electric winch (armoured)
- Deck Cable
- Laptop for SonarWiz® software (Standard or ruggedised)
- Towfish body (for alternative deployment)
- System spares kit
- Custom "Chirp" waveforms

TECHNICAL SPECIFICATIONS

Interface Box (Model GP01)	Towfish (Model GP06)
Mechanical: Anodised Aluminium case Weight: 7kg Dims: 350mm(W) x 103mm(H) x 268mm(D) (Excluding connectors)	Mechanical: Anodised Aluminium/Acetal construction Fibreglass shell covers Weight: 44kg (including ballast) Dims: 1090mm x 700mm x 376mm(H) All parts 1000m depth rated
IP66 rated (including mating connectors) IP66 rated connector covers supplied	Transmit
Environmental: 10% - 95% RH, non-condensing 0°C - 40°C (operation), -20°C - 75°C (storage)	Output Power: 1kW peak (adjustable as % of full scale)
Connectors: Power In, Deck/Towcable, 3 x Serial PPS input, External Trigger Input (OTS only)	Frequency: 1.5kHz – 18kHz
Indicators: One for each of: Power in, HV, Time sync Sonar link	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
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	Rep Rate: Up to 20pps (waveform dependent)
AC Input: Mains Adaptor Supplied Input: 90V _{AC} – 305V _{AC} , 47Hz – 63Hz Output: 24V _{DC} nom, 120W capable Short circuit & overcurrent protected IP65 rated	Receive
Serial: 3x RS232 with overvoltage protection Range of baud rates selectable	Acquisition: Dual channel, 800kHz front end sampling 50 / 100kHz sample output, 24bit
PPS: TTL level, protected, edge selectable	Acoustic
Acquisition Software (SonarWiz®)	Source Level: Up to 196dB ± 3dB re 1uPa @ 1m
Version: Fully featured SBP with control interface (locked for use with GeoPulse Compact)	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
Features: Control of all system parameters Full range of processing tools Data export in industry standard formats 1 year of maintenance included	Resolution: 6cm (using 15kHz "Chirp" sweep)
	Penetration: Up to: 80m (fine clay) 20m (sand)

Specifications subject to change without notice. E&OE