POLYAMP

Magnetic and Electric Signature Control

Advanced Degaussing

Influence Minesweep Systems

Range & Prediction Software

UEP/ELFE Measurement Systems

Custom Power Supplies

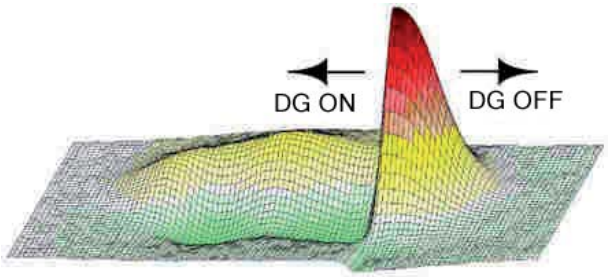
Magnetic and Electric Signature Control

Degaussing systems

Modern influence sea mines detect the magnetic disturbance of a vessel in the Earth's Magnetic Field, this is referred to as the vessels magnetic signature. This Signature is the most significant influences of those used to trigger to the mine.
To minimise this threat naval vessels are fitted with an on-board Degaussing System (DG). The DG reduces the signature with a counter-acting field, generated from a coil system, connected to loop-coil current amplifiers. Typical 90- 95% of the ship's signature can be neutralised with a well designed 3-dimensional DG system.

Polyamp have delivered over 30 DG systems, all of which are computer controlled Advanced Degaussing Systems.

Polyamp offer several types of loop-coil amplifiers for installation on different sizes of vessels. The location of the loop coil amplifiers can either be centralised in racks or distributed close to the coil. The ADG methodology improves the signature performance and the time and effort needed in ranging relative to a system with only a few large amplifiers.



Magnetic signature management

Polyamp specialise in Advanced Degaussing Systems (ADG), which in general terms means that each coil is individually controlled by one loop coil amplifier and that the coil system is 3-dimensional.

Naval operational priorities have shifted from blue water to brown/shallow water. This means that the threat is increased as ships comes much closer to the influence mines. Better degaussing systems than previously used are therefore now required. The answer to this increased threat is ADG.

Typical degaussing equipment

Polyamp ADG advantages:

- **Systems suitable for the smallest vessel´s to aircraft carriers**
- **Turnkey capability including system design, equipment supply and proving trials**
- **Favourable total ownership cost**
- **Efficient signature handling with control, evaluation and prediction**
- **Modular and digital open systems, upgradeable for future threats and CLDG**
- **Cost effective procurement**

Magnetic and Electric Signature Control

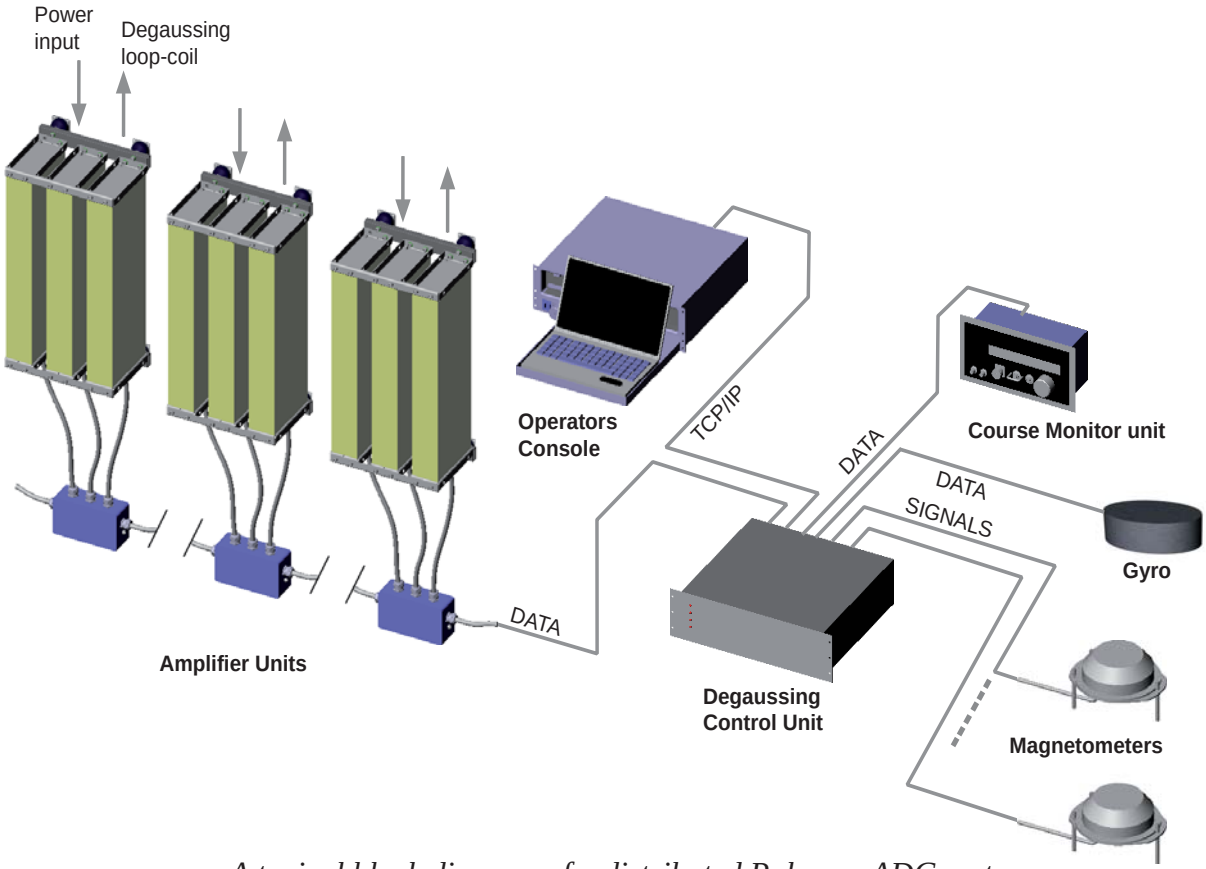
A Polyamp ADG is normally controlled by one or more magnetometers to achieve a low signature. Several fallback control modes are available, including Gyro Geomagnetic map and manual, depending on the system layout.

With ADG the signature is adjusted by changing loop-coil currents. Worldwide operation can be maintained without the need to change connections at the junction boxes or to check ranging before entering the operational area. The ADG ranging process is much faster, especially when using SWECADE ranging data acquisition and measurement software with coil modeling.

Remote control from the range office can be achieved, quickly and safely by simply connecting a transceiver to the DG system.

The Polyamp powerful ADG systems enables significant savings on the overall installation cost and weight to be achieved by using less and thinner degaussing coil cables. This is of significant benefit to the shipyard.

The ADG is also ideally suitable for the modern principles of sectional building of ships. The location of the degaussing system components is very flexible and there is no need of a special dedicated operators console to run the ADG. The console function can be one of many other software applications in any suitable PC workstation onboard the vessel.



A typical block diagram of a distributed Polyamp ADG system

Magnetic and Electric Signature Control

Magnetic and Electric Sweep Supply

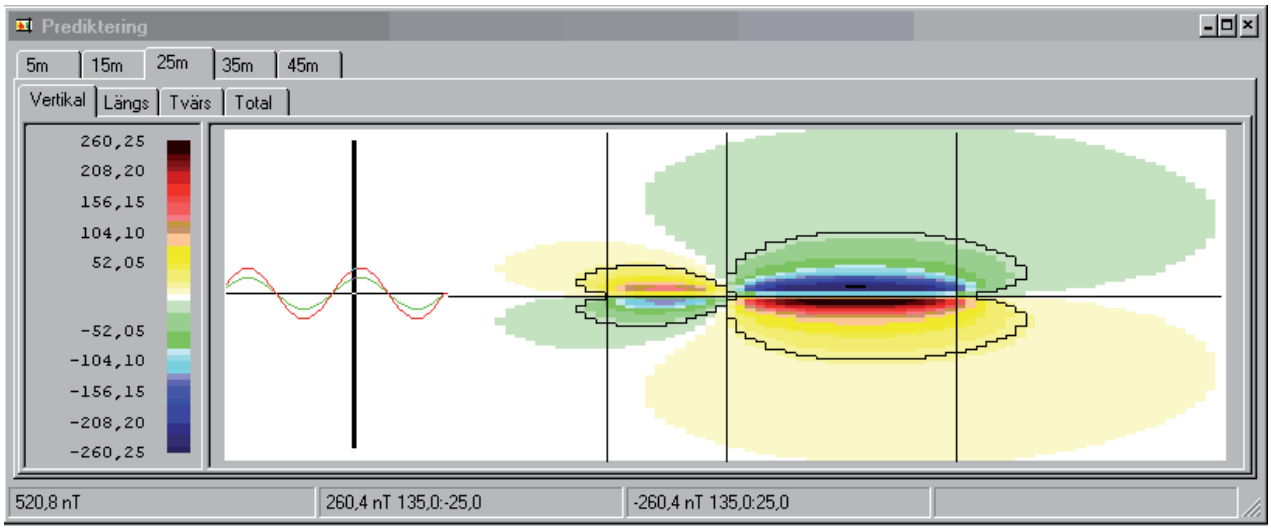
Influence sea mines detect different parameters and the prime trigging parameter is normally the magnetic signature. Modern mines may also use Underwater Electric Potential (UEP) fields as a trigger. An active method to remove the influence mine threat is to sweep safe routes. Influence mine-sweeping replicates ships-like signatures of the magnetic and electric influences that will trigger the modern sea mine.

RSwN MCM vessel type Styrsö with the MSS2000 system

Specialized MCM vessels, or remote controlled vessels, performing minesweeping are low signature vessels equipped with a mine sweep power supply system and a towed mine sweep load simulating the target signature vessel.

The Polyamp MSS2000 Mine sweep supply system has a modular design with several power modules which supply multiple sweep loads forming the active target signature. Sweep loads can be modular magnetic coils, acoustic generators, UEP sweep etc. The MSS2000 can also add an AC stray field to form a full ship-like signature with both DC and AC field.

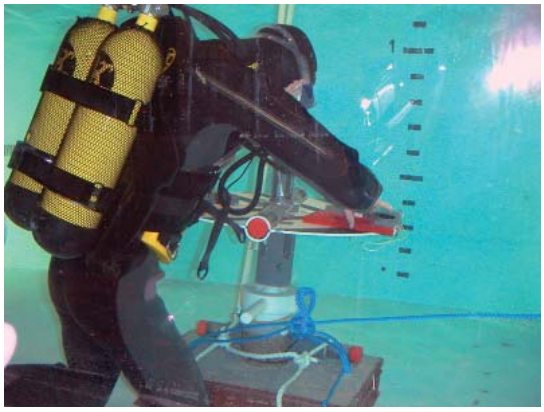
Together with the Polyamp Sweep Profiler software package, real ship-like magnetic signatures can be simulated by the mine sweep. Generated sweep signatures are software controlled and therefore a new target signature can be selected at any moment. Swept route effect data can be transferred to the ships command and control system enabling swept route evaluation in real time.



The Polyamp Sweep Profiler software package showing simulated sweep output

Magnetic and Electric Signature Control

UEP and ELFE Measurement Systems



Underwater Electric Potentials (UEP) are produced by cathodic currents in the ship or submarine hull and also from propeller or other metallic materials in contact with salt water. A ships electric potential signature is therefore generated in a similar way as the magnetic signature. This can also be used as an input or trigger signal in an influence mine. The ships movement also produces a Extra Low Frequency Electric field (ELFE) that can be used for positioning, target evaluating or for reconnaissance.

Polyamp have developed a range of sensors and platforms for the measurement of these electric signatures for use in:

- Upgrading conventional sea ranges
- Transportable sea ranges
- Reconnaissance, fixed or mobile equipments
- Influence sea mines

All the Polyamp sensors and platforms use a unique and patented Polyamp carbon fibre electrode sensor which is very sensitive. The mechanical robustness, handling and life expectancy of sensors using carbon fibre technology make it much more versatile for these applications compared to other electrode types. Polyamp can supply a complete system package with electrodes, very low noise amplifiers, data acquisition, analysis, presentation and documentation with the SWECADE© range software package.

3-axis measurement platforms

Polyamp UEP and ELFE Systems - Key features

- Carbon Fibre Electrodes - Robust Technology
- Very Low Noise Amplifiers - High Sensitivity
- Salinity Independent - Useable for All Waters Instantaniously
- Inert Sensors - Maintenance Free Without Need for Salt Bridges
- Rapid Deployment - No Operational Delays
- High Reliability - Long Life Expectancy
- 3 Axis Platform Designs - Fixed and Transportable Ranges

Magnetic and Electric Signature Control

Signature Management

Underwater signatures from ships, used for mine-fusing and detection should be known and controlled for each naval vessel before entering a mission.

SWECADE© is a software package for magnetic, electric and pressure signature management. It has been developed in co-operation with FMV (the Swedish Defence Material Administration) to be the main tool in prediction, design and evaluation of non-acoustic underwater ship-signatures.

SWECADE© has been used at all Swedish ranges (Sea and land) since 1995 and, in its present version, it is also adapted for transportable ranges.

SWECADE© runs on any standard PC with Windows NT/2000 and can read sensor values from a file or use ADC-boards for data acquisition.

The three modules in SWECADE© are:

The component signature prediction module offers:

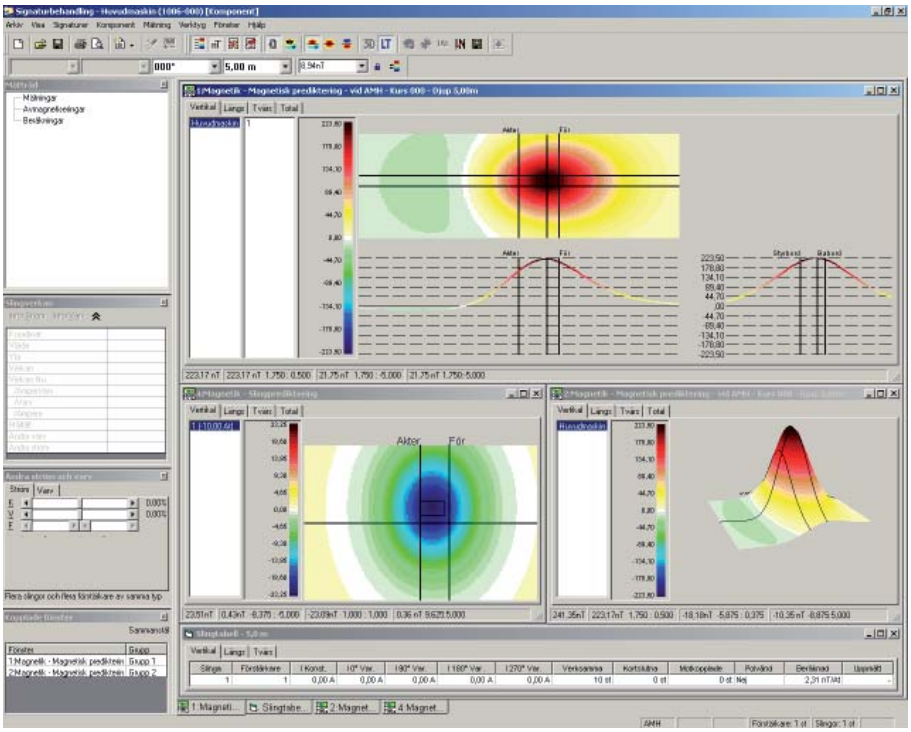
- The calculated magnetic signature at any depth and ambient field
- Modular build up of whole ship set of components (engines, gears etc.)

The loop-coil design package features:

- Design of loop-coils for components, a ship or a ship class
- 3D graphic displays of cable routes
- Prediction of coil-effects at any distance

The range utilities are optimised for :

- Signal processing and data management
- Quick, semi-automatic, coil prediction and definition of optimum settings
- Powerful display and print routines
- Built in training for operators and degaussing technicians



SWECADE© screenshot

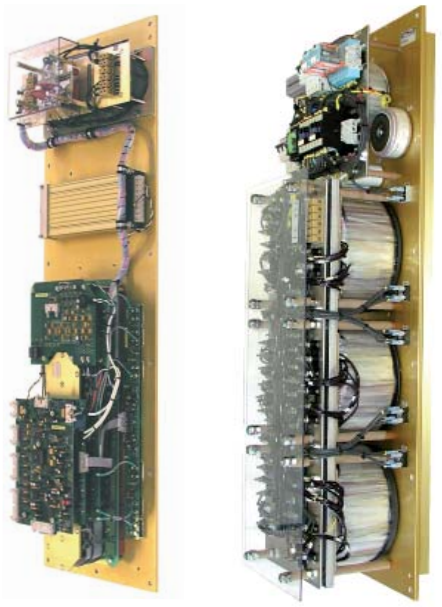
Custom Design Power Supply Systems

Polyamp has a well established capability and expertise in high quality and high reliability switch mode power supplies. Polyamp supplies a comprehensive range of industrial grade DC/DC converters from 40 to 2000W and also develop and deliver Custom Design Power Supply Systems ranging from 100W up to 500kW.
Typical examples are:

Submarine applications

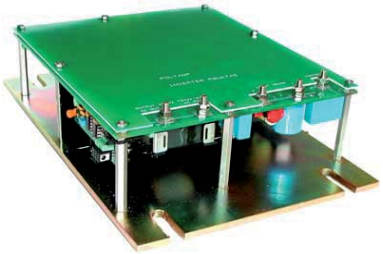
Several DC/DC converters are supplied for industrial and submarine applications. On conventional submarines the efficiency is critical for it's ability to survive, as the submarine propulsion is powered from a lead-acid battery. By supplying equipment directly from the submarine battery, a gain of efficiency, endurance and safety is achieved.
Shown here is the PU1000 440/28, which is supplied from a 440V fuel cell battery (an AIP installation). A fuel cell battery has very different voltage fluctuation characteristics, compared to lead-acid batteries. More common submarine voltages are 220V and higher. Polyamp degaussing coil amplifiers systems are also directly supplied from the submarine battery.

Bipolar power supplies



6kW bipolar 4 quadrant computer controlled current supply unit ±17A @350V. Input voltage 3 phase 400 - 460V, 50/60 Hz low harmonic distortion compliant with MIL-STD 1399, STANAG 1008 & IEC61000-3-4.
Can be used in a degaussing coil amplifiers and as a module in a magnetic sweep power supply. Convection cooled or water cooled units are available. The model shown is convection cooled with an individual Micro Controller and continuous ground fault measurement.
A DC UPS unit supplies an industrial PC computer, internal control voltages and has a battery charging output.
The DC UPS output voltages are +5V 10A, +12V 1.5A, -12V 0.5A, 8V 1A, +5V 1A, +13.8V 1.5A temperature compensated battery charging output.

Inverter supplies

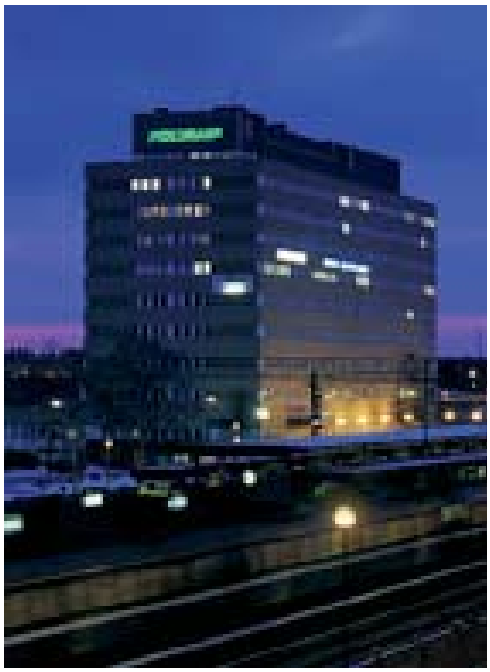


The PBUK 745 inverter supplies square wave 20kHz. The voltage is used for internal voltage distribution to GTO drivers in underground transport systems.
Nominal Input: 36V RIA12 (21-51V & 126Vpeak)
Output: ±30V 20kHz square wave, 500VA.

Magnetic and Electric Signature Control

The Company

Polyamp is a privatly owned business located in Sollentuna , Stockholm, Sweden, with production facilities in Sweden at Åtvidaberg some 240km south of Stockholm and in Switzerland at La Chaux-de-Fonds. Established for over 40 years, the Company has developed from a National Contractor to its present status of an ”International Supplier of high quality Power Electronic equipment”.



Polyamp head office in Sollentuna (Stockholm)

Polyamp main factory in Åtvidaberg

Company assesment

Polyamp is currently operating in accordance with ISO9001, ISO14001, and Health and Security assessment plans stipulated by Swedish and EU laws.

Through Life Support

In addition to the design, manufacture and supply of equipment, the Company also provides a total through life support service:

- Computer modelling for system design signature prediction and trials evaluation
- Installation and setting to work
- Land and sea trials
- Reliability assessment
- Handbooks and documentation
- Spares assessment and supply
- Training courses and equipments
- Maintenance support & repair services

Polyamp AB
Box 925
191 29 SOLLENTUNA
Sweden
Tel: +46 - (8) 594 693 00
Fax: +46 - (8) 594 693 05
info@polyamp.se
www.polyamp.com

www.polyamp.com