SCOTLAND ELECTRONICS (INTERNATIONAL) LIMITED

Naval and Subsea Motion Products

SEIL are a company that specialise in motion control systems for custom harsh environment applications.

The company have developed and qualified motion products for major blue chip clients in the Naval and Subsea Markets covering numerous applications for Seaborne and Underwater applications. SEIL personnel have worked at the system level in motion control systems and bring the technical and managerial experience to deliver the client's application requirements.

SEIL has developed market relationships with the leading high performance motor manufacturers to provide a low risk sub system solution to meet the market requirements. SEIL has delivered sub system products with the major specialist motor manufacturers on numerous programs with excellent technical and commercial relationships existing between the companies.

The SEIL company strategy is focused on this key area, having been successfully established over the last seven years. The company has personnel and resources, which work as a dedicated focused team to deliver client's motion control requirements with the capital equipment and application tools to develop and deliver the product. SEIL has developed inertial test rigs for system level applications to test the motor in as near to representative system conditions as possible for specific application requirements.

SEIL has internally the full servo system and electronic design and manufacture capabilities to ensure that subcontract activities are limited, which ensures lower risk for delivering the product performance and meeting the delivery schedule requirements.

SEIL's approach is based on utilising proven building blocks to ensure performance is proven and known, while risk is minimised for semi-customised product delivery.

SEIL has developed, manufactured, tested and provided integration support for motion application subsystem product requirements and have managed large scale development program requirements while achieving excellent customer satisfaction levels.

SEIL's scope of work varies depending on our customer requirements and has included simulation of System Performance, Thermal, Reliability, FMECA, Acceptance Test Procedure and Qualification Plan and Reports to meet Verification and Validation requirements. Qualification test activities including Temperature, Vibration, Shock, Humidity, EMC and First Article Inspection have been performed for all major programs. SEIL has fully qualified Naval and Subsea product heritage.

SEIL are ISO9001-2000 accredited and manufacture to IPCA-610C and IPC-WHMA-620.

SEIL Product Overview

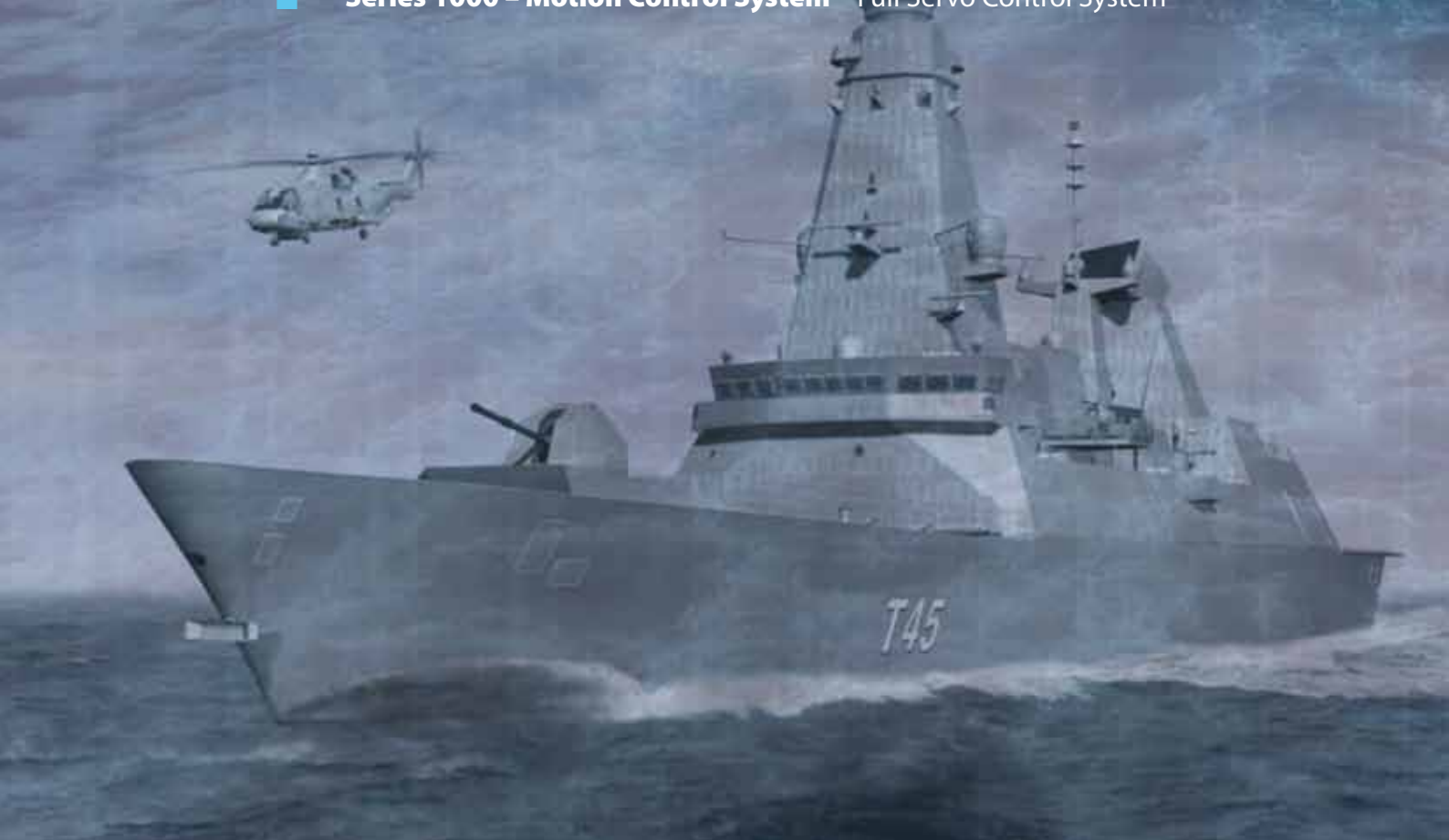
SEIL has developed a series of products to address our target market's specific application requirements.

The products use common building blocks to provide custom and semi-custom design solutions which minimise risk for any specific application development and maximise product heritage read across for custom designed product solutions.

The Product Series types have been developed and qualified over a range of application programs.

Products are available as semi or fully customised to meet specific program requirements.

- **Series 50 – Stepper** – deployment and position systems
- **Series 100 - DC Brushed** – Multi purpose applications.
- **Series 200 - Trapezoidal** – Precision Servo Applications
- **Series 300 - 3 phase Sinewave** – Smooth Torque Applications
- **Series 400 - 2 phase Sinewave** - Smooth Torque Applications
- **Series 500 - Sensorless** – Constant Rotation Applications
- **Series 600 – Linear** – Low Power drive Applications
- **Series 1000 – Motion Control System** – Full Servo Control System



Product Picture Portfolio

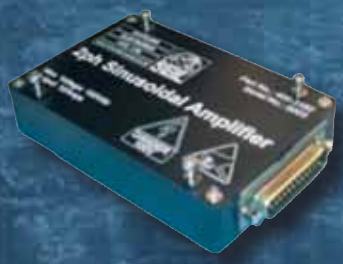
Naval Radar Stabilisation Platform
Dual 2 axis control

- 3 Phase AC Input 400V L-L, 60Hz
  - 3 Phase , Dual Amplifier shown
  - Velocity / Torque Modes
  - 560V DC BUS , Current 25A peak
- Brake Control
- Serial Comms - BITE Reporting

Naval System

- Brushed Motor Drive, 2kW
- 2 axis system with reconfigurable current scaling shown
- Brake Control
- 100V, 30A and 16A transconductance.

A summary is shown demonstrating the diversity of Packages and Power levels provided from the SEIL customised product range for some of our previously delivered Naval and Subsea Applications.

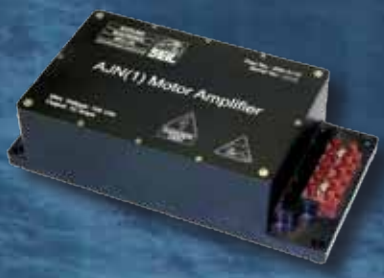


Submersible Pump System

- 2 Phase Motor Drive, 1 kW
- Speed Controler
- 100V , 10A

Submersible Thruster and Pump System

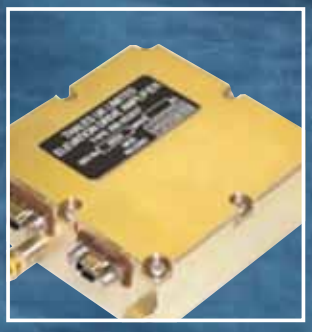
- 3 Phase Motor Drive, 12 kW
- 3 Application Axis Configurable
- CANBus Reporting
- 122V nom, 140A rms



Submersible Deployment System

- 3 Phase Motor Drive, 1 kW
- Speed Controler
- 85V, 10A transconductance

SEIL additionally provide Motor and Drive subsystem delivery with our Motor Partners on specific applications, which can provide and increase the value added service to the customer, options include sub system application delivery tested on semi-customised load rigs.



SEIL Reconfigurable Technical Demonstrator / Bench Test Products

200-3446 270V/ 5A, 3PH Trap Drive

200-3888 28V/ 25A, 3PH Trap Drive

200-3793 28V/ 10A, 3PH Trap Drive

SEIL has available standard, reconfigurable at factory, solutions which provide the ability to deliver a quick turn configured for application solution to meet customer development program requirements.

The products can be delivered as Series 200, 300 or 400 product solutions and are delivered with a unique product identification to provide configured repeatable product.

These products are targeted at customer's requiring a "customised for Application Motor Performance" solution to assist with Technical Demonstrator Program or Bench Test requirements.

The products can be configured for 300V to 28V range of operation and scaled for 5A, 10A or 30A or intermediate values to provide upto 1.5 kW drive capability.

The drives can be configured, as Transconductance or Speed Controllers, and various options exist for system interfacing control and monitor feedback

The heritage program products have been delivered in a two to five week timeframe depending on application customisation requirements.

The units are delivered with a product specific Operator's Manual, ICD and release tested against a product specific Acceptance Test Procedure.

400-3718 270V/ 5A, 2PH Sine Drive

200-3892
270V/ 5A, 3PH Trap Speed Drive

200-3799 270V/ 2A, 3PH Trap Drive

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