

Naval technology



Nothing protects quite like Piller

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About Piller

Since its formation by Anton Piller in 1909, the company Piller has been synonymous with electrical machines of the highest quality and reliability. Today, Piller, from its headquarters in Germany and via its regional offices, representatives and distributors world-wide, continues that tradition into the 21st century.

Piller produces high performance power protection systems and converters. Combined with the highest levels of client support and engineering excellence available anywhere, Piller is internationally recognised as the most respected name in its field.

Piller is a wholly owned subsidiary of the multi-disciplined global UK engineering group, Langley Holdings plc. (www.langleyholdings.com)



Piller headquarters,
Osterode, Germany



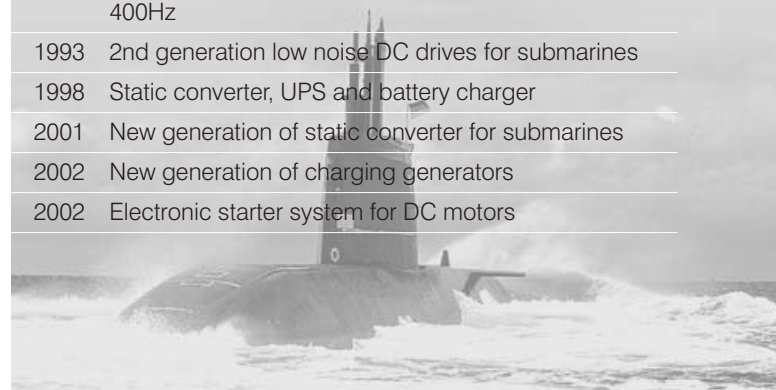
Piller has been a supplier partner in the field of naval technology since 1965. Originally providing only shore connection stations for supplying power to naval vessels, new developments followed, including special fan systems for submarines, rotary and static frequency converters, on-board UPS systems, special purpose DC motors, brushless charging and ship's generators and alternators. In addition to the delivery of hardware, Piller provides highly efficient technical and logistical support and carries out up-to-date training at its training centre in Germany, or directly on site.

Products for naval applications

- Air and water cooled AC generators
- Brushless charging generators
- Rotating and static frequency converters
- UPS systems
- Special purpose DC motors and fans
- Battery charger system
- Electronic starters

Milestones

1965	Design and building of shore-to-ship power supply systems
1968	Special fans for submarines
1970	Frequency converters for ships
1972	60Hz and 400Hz frequency converters and DC drives for submarines
1975	Brushless charging generators for submarines
1980	Hybrid converters 60Hz and 400Hz for special on-board mains supply submarines
1985	2nd generation low noise fans for submarines
1988	Air cooled static 400Hz converters
1990	Water cooled static converters DC to 60Hz and 400Hz
1993	2nd generation low noise DC drives for submarines
1998	Static converter, UPS and battery charger
2001	New generation of static converter for submarines
2002	New generation of charging generators
2002	Electronic starter system for DC motors





Generators

Piller produces mains generators and charging generators for both conventional and nuclear powered submarines and surface vessels, supplying the main propulsion system in diesel/electric operating mode and providing automatic or manually controlled battery charging.

With standard machines ranging in power from 400kW - 1200kW, Piller brushless, multi-phase charging generators have a built in rectifier system within options for enclosed water cooled or air cooled design and emergency operation capability.

Charging generator voltages range from 160V - 340V, 320V - 610V and 650V - 830V. These machines also feature power current and voltage controlled start phasing, over-voltage protection, power control, over-temperature protection for bearing, windings and cooling and parallel operation with equal load sharing. Efficiency ranges from 94% - 97%, depending on size.

On board corvettes and frigates, Piller mains generators provide 50/60Hz electrical supply for the ship's general supply system. Piller machines are suitable for parallel operation and for single operation in sizes 400kVA - 2000kVA.



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Converter and UPS

Static frequency converters

Piller produces static frequency converters for special mains distribution on submarines, frigates and corvettes, typically with a power supply of 50/60Hz and 400Hz. Piller frequency converters are designed with a compact housing, shock mounts and water or air cooled with emergency operation, control and power in modularised power stages, incorporating MOSFET technology, high switching frequency over voltage and over temperature protection, current limiting and remote operation interface for PC or modem connection. Ingress protection is to IP23, IP45 standards.

Uninterruptible power supply (UPS)

Piller supply UPS systems for 60Hz mains distribution on surface vessels including frigates and corvettes. The features comprise power stages in IGBT-technology, micro-processor controls, high switching frequency, high efficiency over entire operating range, 100 % unbalanced load, full protection over-voltage and over temperature control, current limiting, with interface from PC or modem connection. Ingress protection to IP23 standards.





Battery charger and electronic starters

Battery charger system

Designed with universal stainless steel compact housing in a built-in or free-standing version, mounted on anti-shock mounts, the Piller air cooled new generation 24V charger system incorporates 24V DC emergency supply network with battery back up.

Performance features include chopped input-rectifier and DC-DC converter, IGBT-technology, high switching frequency sinusoidal input current (THD < 3%), power factor 1 best efficiency and battery management for 2 battery lines (including equalised battery charging). A sophisticated micro-processor controls all functions with serial interface. Ingress protection to IP20 standards.



Electronic Starter

Piller also produces it's own electronic starter and control system for DC motors, facilitating precise speed control and multi-stage operation. The design incorporates a compact housing which is shock proof, air-cooled and lightweight. It's control and power stages feature MOSFET technology high switching frequency, full over-voltage and over-temperature protection with current limiting and remote operating features. Power is upto 40kW; voltage typically 220V DC. Ingress protection is to IP23, IP44 or IP56 standards.



'Piller produces an electronic starter and control system for DC motors, facilitating precise speed control and multi-stage operation'

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Special purpose DC motors and fans

Piller produces a range special purpose direct current (DC) motors for driving machines such as compressors, pumps and air conditioning systems on submarines. Designed for horizontal or vertical operation, with either single or double shaft ends and with power ranges from 1 - 80kW and speeds between 500rpm - 3500rpm, Piller special purpose DC motors operate with voltages typically 160V - 340V, 320V - 610V and 400V - 935V.

Specially designed windings enable a small speed range to be achieved in the specific battery voltage range. For different speed ranges, multi-stage operation is possible by changing the speed (e.g. 1st speed 800rpm; 2nd speed 2500rpm).

Piller's range of special purpose fans are used for standard boat ventilation and ventilation of aggressive air such as the battery room on submarines. These radial fans, are designed with high pressure housings and typically operate with speeds from 1000rpm - 2500rpm.



Unrivalled after sales service

International References

Frigates F122, F123, F124, Germany
 Frigates Nansen, Norway
 MEKO-frigates, e.g. MEKO A-200, A-100
 Fast Patrol Boats S 143, S143A,
 Minesweepers, Mine-Hunter-Killer Vessels
 Tender T404, Germany
 Submarines 206, 206 A, Germany
 Submarines Class 209, TR 1700
 Submarines Class 212 und 214
 ASTUTE Class, UK
 Corvette K130, Germany

Competence and responsiveness are the watchwords of the Piller business. Piller believes that product and service are of equal importance. The best technology is only as good in the long term as the service that underpins it. For this purpose, a global network of qualified service staff is available. The premium quality and technical maturity of all Piller products already guarantees a high degree of functional security but together with quality maintenance, the risk of possible breakdown is reduced further still. Piller offers a comprehensive package of services that can be tailored to client specific requirements:

- **Technical consultation**
- **Operator training**
- **Functional testing**
- **Maintenance**
- **Fault analysis and troubleshooting**
- **Customer training**
- **Remote system diagnosis and support**
- **24/7/365 emergency call out**

Quality

Piller provided technical consultation in the planning and specifying period to comply with national, international and customised construction regulations and specifications including BV31, STANAG 1008, MIL STD 1399, VDE. Lloyds, German Lloyds Register of Shipping, Det Norske Veritas, RINA and ABS.

Accredited to DIN ISO 9001, Piller naval equipment is designed to withstand shock and vibration according to BV 043 and BV 044 and is capable of operating reliably and efficiently in the following extreme environmental conditions:

- **Up to 60 degrees angle of heel**
- **Up to 65 deg.C operating temperatures**
- **Up to 95% humidity**
- **Large fluctuations in air pressure (600hPa - 1400 hPa)**
- **Operating areas affected by oil or diesel fumes**

Service Team Capability

Piller's customer service engineering team is highly qualified and trained on all products and services. As a combined total, field service teams have centuries of experience working on four generations of UPS system. Piller operates a 'best of breed' philosophy in all working practices and is believed to be the market leader in first time resolution of site problems.



Piller Emergency Call Out Service

Piller understands that malfunctions will sometimes occur outside working hours when competent help is also needed quickly. An emergency call out service ensures that a Piller service specialist can be reached quickly. Service centres are strategically positioned in relation to Piller's installed base for the best possible response time and familiarity with every installation.

'on demand 24 hours a day, 365 days a year'

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ROTARY UPS SYSTEMS
HYBRID UPS SYSTEMS
ROTARY DIESEL UPS SYSTEMS
STATIC UPS SYSTEMS
STATIC TRANSFER SWITCHES
KINETIC ENERGY STORAGE
AIRCRAFT GROUND POWER SYSTEMS
FREQUENCY CONVERTERS
NAVAL POWER SUPPLIES
SYSTEM INTEGRATION



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The information contained within this brochure is deemed to be correct at the time of going to press. Due to a policy of continued improvement, we reserve the right to change any specification without prior notice.
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PILLER
Power Systems