Power Converter Products
For Naval, Aviation and Land Applications
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Today, advanced electronic power supply equipment supports critical systems such as data processing, navigation, communication, control and monitoring systems almost everywhere in the world – on land, at sea and in the air. A reliable and precise electrical source is crucial to ensuring equipment operation and can often make the difference in a life or death situation.

Since 1962, Wärtsilä JOVYATLAS EUROATLAS has been developing and manufacturing customer specified power converter products for military and demanding commercial applications. Today, our advanced electronic equipment for data processing, navigation, communication, control, and monitoring can be found almost everywhere - on land, on sea and in the air.

A reliable and precise electrical source for such equipment is essential. In fact, it can determine human survival. That’s why the conception, design, production, and logistic support for power supplies should be performed by experts like us – with more than 50 years of experience.

Our area of know-how ranges from the smallest matchbox sized DC/DC-Converters to big and heavy shore supplies for submarines. We design, develop, and manufacture these power conversion products for Navy, Army and Air Force use, as well as for commercial aviation, special industrial, and railway applications. Our strength is our ability to apply versatile competences and deep experience in solving challenging power supply problems for the benefit of our customers. Most of our products are customer-specified. EUROATLAS maintains a high quality standard, which has been certified according to EN 9100:2018 based on ISO 9001:2015 for many years.

Power Conversion System

Model 1026 is designed for the installation on submarines and to supply all consumers on-board.

The power conversion system is housed in painted stainless steel cabinets, where the inverter contains units and components for the required power conversion. All units and components are removable from the front.

The power conversion system converts:
- an input voltage of 360-560 Vdc into an output voltage of 3 x 230 V/60 Hz and
- an input voltage of 360-560 Vdc into an output voltage of 24 Vdc with galvanic insulation as required for sensitive equipment like electronic controls, weapon systems etc.
**3-phase Converter**

**440 VAC/60 Hz to 350 VDC, Model 2038**

The AC/DC converter module has a total output power of 35 kW and is designed for 19” rackmount. The converter was a customer specific development for the APAR (Active Phased Array Radar) which is a shipborne Multifunction Radar (MFR) manufactured by THALES Nederland. It is the first active electronically scanned array MFR employed on an operational warship. 5 water-cooled converter modules are installed in a rack system and operate in parallel. Wärtsilä supplied the converter for the German F124 frigates, Dutch frigates, De-Zeven-Provinciën-class and the Danish frigates Iver Huitfeldt-class.

Each power conversion system consists of three equal inverter cabinets designed to be able to take-over the full load of another set of inverters.

In normal mode two inverters are working at a time while the third remains in stand-by mode. In case of a faulty productive inverter, the stand-by inverter automatically starts up in parallel with the one still running.

Any of the inverters may act as a stand-by cabinet.

During change-over time the running inverter is capable of taking the 200% load required.

A Water Cooling system is placed at the rear inside part of each cabinet.

The required water is provided on board via ball valves situated on top of the cabinets.

If the Water Cooling is unavailable and air cooling becomes necessary, an Emergency Cooling drawer between the DC/DC Converter and the Output Transformer, may be pulled out and the manual lid on top of the converter may be opened to guarantee further cooling.

A connector for a Fire Extinguisher is situated in front of each door of the cabinets for emergency purposes. If the fire extinguisher is used, a small flap on top of the cabinet will open to allow the extra volume of the CO₂ used to escape.

Several converter fault detection circuits are provided to assist maintenance personnel in trouble shooting. The summary of all logic circuits for generating and processing fault messages, mainly implemented by a PLD, is called FDL (fault detection, processing and indication logic).

The FDL is the technical implementation of BIT (built-in test) functions and fulfils the BIT-requirements of fault detection, fault assessment, fault indication (top priority indicated) and system protection.

Monitoring Panels are mounted at the front door of the inverter cabinet, which allows monitoring and control the equipment without opening the cabinet. Power available indications and measurements for output voltage and current are part of this monitoring panel. Respective signal shall be given to the hard wired connected integrated monitoring control system.

The power conversion cabinet is equipped with an anti-condensation heating which will automatically be switched ON.

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**55 kVA UPS 55 kVA, In: 440 V, 60 Hz, Out: 115 V, 60 Hz, Model 4086**

- 55 kVA for 15min.
- UPS status panel
- Single battery monitoring
- Active balancing
- Self-cooling system
- High reliability & efficiency
- Available with vibration or shock mounts
- Fire extinguishing unit (optional available)
- ILS (Integrated Logistic Support)
Transformers

The Transformer, model 9037 and 9038 are designed for the installation on submarines to convert an input voltage of 230 V/60 Hz into an output voltage of 115 V/60 Hz with galvanic insulation.

The 45 kVA transformer model 9037 is water-cooled, supported by two fans installed inside a drawer mounted on top.

In case of water-cooling failure the system offers an emergency air cooling via two plates mounted to the front and rear side of the cabinet, which protect the system from overheating.

The system provides monitoring LEDs which display the current states of the transformer and signals possible faults. The 6.5 kVA transformer, 9038 is air-cooled by a fan mounted at the front side blowing the warm air out of the unit and a filter-protected air inlet at the rear side.

The system provides a monitoring assembly which displays the current states of the Transformer and signals possible faults.

Fuse Inserts and circuit breakers protect the system from overvoltage damage.
**DC/AC Inverter family designed and manufactured for the 209 Submarine Class.**

The static inverters convert a submarine battery voltage of 160 Vdc...320 Vdc into a high quality 120 V / 60 Hz, 120 V / 400 Hz and 230 V / 50 Hz voltage.

Our products consists of static power conversion equipment of the latest available technology. All components fulfill the requirements of naval standards. The electronic are housed in a stainless steel frame cabinet with steel walls according to the general requirements of naval ships. The topology of all three inverter types is equivalent.

**Key features of the inverters**
- High efficiency
- Low noise
- Built-in self test feature
- High reliability (MTBF)
- Modular design
- Low lifecycle cost
- Complete integrated logistic support (ILS)

**Custom options**
- Different output power available as required by the onboard loads
- Input voltage range can be adapted to the submarine type and battery voltage
- Cabinet design can be modified according to the available space
- Output configuration either single phase or three phases
- Various output frequencies available

**Inverters**

The inverters, are housed in steel cabinet (IP43) containing several main units and various components which are necessary for static power conversion. All subassemblies and components are removable from the front.

Inverters are fastened on its mounting surface either per shock absorbers SES 2000 or per attachment rails, depending of the design. The cabinet door contains a monitoring panel which holds the control and indication elements.

The inverters are designed for air cooling by means of integrated fans. Furthermore, the inverters are equipped with an anti-condensation heating.

The outputs are short-circuit protected with constant current behavior and provide an output short current of approx. two times the nominal output current for 5 seconds at erroneous load conditions. Switch-off time was calculated for burning out respective load fuses and for protecting the cabling of the submarine.

Several inverter fault detection circuits are provided to assist maintenance personnel in troubleshooting. The summary of all logic circuits for generating and processing fault messages, mainly implemented by a PLD, is called FDL (fault detection, processing and indication logic).
50 kVA Helicopter Supply, Model 4070.2
3 x 115 / 200 V – 400 Hz
The helicopter supplies are for installation on naval surface vessels. We are offering 28 VDC helicopter starter with up to 1800 A and a new version of 3-phase 115 / 200 V – 400 Hz helicopter supply.

Features:
- 50 kVA with 225% overload for 5 sec.
- Input: 3 x 440 V / 60 Hz
- Output: 3 x 115 V / 200 V / 400 Hz acc. MIL-STD 704F
- Soft start – external sensing
- Remote control panel
- CO2 fire distinguisher connection
- Shock mounts
- RS485 MODBUS interface
- Remote control panel

28 VDC / 300 A
Helicopter Starter, Model 2056
The converter is designed to convert an AC voltage of 440 V / 60 Hz into a 28 VDC voltage. Output voltage control is maintaining the adjusted output voltage even at high pulse loads up to 1800 A for 10 seconds. State-of-the-art control electronic is integrated utilizing programmable logic devices and micro controllers and featuring onboard fault detection.

Features:
- Designed for naval vessels
- Output acc. MIL-STD 704F
- Overload capacity 1.8 kA / 10 sec
- Monitoring & Control TFT display
- DSP control electronic
- Integrated Logistic Support
- Customer specific modifications
Model 2030, 28VDC/125A

The lightweight 28 VDC/125 A transformer rectifier unit has been custom designed for the SAAB multi-role fighter aircraft Gripen. The TRU fulfills exceptional reliability demands and meets all environmental requirements of common military standards for airborne equipment. The TRU supplies onboard electronic systems of the aircraft.

Saab Gripen NG
Scope of supply: TRU 28 VDC/125 A & CRU 37 VDC

Power conversion products, such as AC to DC converters, frequency converters, and DC to AC inverters are major components in almost every aircraft today. All the power supplies currently in production have passed flight certification and through the years have achieved a solid reputation for high quality. The airborne product line includes a series of transformer rectifier units – TRUs – ranging from 20 to 300 A for the MRCA “Tornado”, the Swedish fighter JAS 39 “Gripen”, the “Tiger” helicopter, Indian AEW&C and others.

The purpose is the conversion of the aircraft prime power source of 115 V/200 V, 3 phases, 400 Hz to 28 VDC power. The TRUs have been developed for extreme environmental conditions, minimum space and weight requirements and maximum reliability. We can offer a wide range of solutions for military and commercial aircraft. From the largest mobile ground power supply to the smallest lighting converter, we support our products from the design stage, through the qualification process and the service use.
20 kW Transformer Rectifier Unit, Model 2062

The 20 kW TRU is designed to convert a 3-ph aircraft AC voltage of 115/200 V - 400 Hz into a voltage of 270 VDC. The TRU consists state-of-the-art power conversion components and provides a galvanic isolation and was developed for a US defense program. All components are housed in a modular aluminum cabinet designed according to the general requirements of military aircraft.

Features of the TRU:
- 24 pulse rectifier
- Input EMI suppression filter
- Front panel LED indicators & external monitoring interface connector
- Wide temperature range -40°C to +71°C
- High efficiency > 95%
- Low weight and dimension
- RTCA DO 160G
- MIL-STD 704F
- Galvanic isolation

Key features of the ATRU:
- 18 pulse rectifier
- Input EMI suppression filter
- Output filter
- Build in monitoring electronic
- Front panel LED indicators & external monitoring interface connector
- Power / weight ratio: > 1.0 kW/kg
- High efficiency > 95%
- MTBF: > 75,000 h
- Operating temperature range: -40°C up to +70°C
- High reliability by using passive components
- MIL-STD 810E, 704E

45 kW ATRU, Model 2052

The high efficient & lightweight 45 kW ATRU was designed and developed by Wärtsilä for the Airforce of India for the latest aircraft generation of the EMBRAER 145 AEW & C for powering the onboard aircraft radar system developed by DRDO India.

Key features of the ATRU:
- 18 pulse rectifier
- Input EMI suppression filter
- Output filter
- Build in monitoring electronic
- Front panel LED indicators & external monitoring interface connector
- Power / weight ratio: > 1.0 kW/kg
- High efficiency > 95%
- MTBF: > 75,000 h
- Operating temperature range: -40°C up to +70°C
- High reliability by using passive components
- MIL-STD 810E, 704E
Model 5034, STV-LIE
Model 9023, PDB (power distribution box)
Both units were custom designed and qualified for the Tiger multi-combat helicopter.
Germany, France, Spain and Australia are operating the helicopter which has been proved during several international tasks.
The STV-LIE supplies the onboard weapon system and the power distribution box features various functions and is part of the Trigat weapon system.

10 VA Mini Frequency Converter, Model 4074A
This lightweight solid-state miniature frequency converter is one of our latest developments for commercial aviation industries which is qualified at Airbus. It is used for razor outlets in the A350 and A380.
The technical specification for the converter is applicable also for the A320, A330 and A340 families. The unit converts aircraft primary AC power of 115 volt, 360-800 Hz into 115 and 230 volt, 60 Hz. It is located in the lavatory and in the cabin and crew rest compartments.
The new Advanced Digital Vision System for Degraded Visual Environments (DVE), known as the Wolf Eye Vision System, is modular and can be integrated within various versions of Main Battle Tank(s), Armoured Personnel Carrier (s) (APC) and other special purpose vehicles. A number of different advanced cameras, configurations and packages are possible. Various embedded processing units can be connected to operate in a cluster as a full 360° system.

The digital vision system includes a 120° camera housing, driver sight periscope, image acquisition and processing software.

The 120° camera system can be used at the front or rear of the vehicle and is based on the same embedded processing unit, and uses the same image processing software, as the day & night sight driver periscope.

All components are selected to fulfill the shock and vibration requirements according to MIL-STD-810G tracked vehicle vibrations. The electronics and sensors are housed in a modular body, which is protection class IP68K.

The housings are all weather. At the 120° camera housing the windows can be cleaned with an integrated system with water or air when sand, dust or mud are limiting the view.

The vision system is designed to withstand a sand storm acc. MIL-STD-810F, Method 510.4.

The housing material and surface treatment comply with salt and fog requirements of MIL-STD-810F, Method 509.4.
Custom Specific Developments for Various Applications

Capabilities:
- Customer specified power products for demanding and mission critical applications
- Technical support during customer’s design phase
- Comprehensive technical and commercial offering
- Product design planning, design review and design verification
- In-house production
- Production control, monitoring and continuous improvement process
- Worldwide installation and aftersales support
- ILS (Integrated logistic support)
- Worldwide aftersales service and support.

QM System
The EUROATLAS quality management system is approved and certified by the authorities as stated below to be in compliance with the Quality Management System Standards:

Integrated Logistic Support
Our ILS department ensures coordination, interconnection, integration and networking of logistic support in compliance with applicable standards. Under this approach all data originate from a common data pool and are linked to respective manuals, spare parts lists, reliability analyses, etc., thus ensuring an essential network for all the sub-disciplines of ILS, e.g. spare parts management, operation and maintenance.

The common goal of all EUROATLAS ILS activities is ensuring a maximum availability of the system that is to be supported. The field of work and responsibility of our ILS department is the provision of all instructions, specifications, information and documentation required by customers (end-users) to complete all the tasks (operation, maintenance, repair) related to the lifecycle management (sustainment, life expectancy and renewal) of a technical system.

Our ILS Services Comprise:
- Customized documentation for end-users and training
- Reliability, maintainability and safety engineering
- Optimized provision of spare part support
- Obsolescence Management

The digital camera system provides high performance, low latency, easy and intuitive operation.

Various system features support the driver and chief of section for clearing the vehicle in all directions during day and night. Software features like digital zoom, special image contrast enhancement algorithm which display image details under difficult environmental conditions. Split screen mode where the LWIR and CMOS images are displayed simultaneously or fusion mode, where the both sensor images LWIR and CMOS are fused into one full screen image.

A recording function is integrated with several days of recording capability, embedded video date & time stamp. This function can be used for mission analysis and training purpose.
Wärtsilä is a global leader in smart technologies and complete lifecycle solutions for the marine and energy markets. By emphasising sustainable innovation, total efficiency and data analytics, Wärtsilä maximises the environmental and economic performance of the vessels and power plants of its customers.

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