



AXS

AXS 500

HIGH POWER DENSITY SERVO DRIVE

COMPACT, LIQUID-COOLED INVERTER FOR ADVANCED MOTION AND ENERGY CONVERSION SYSTEMS

The **AXS 500** is a high-performance servo drive specifically designed for demanding mobile and industrial applications where space, weight, and environmental robustness are critical. Featuring advanced **Silicon Carbide (SiC)** technology, the AXS 500 delivers outstanding switching efficiency, enabling compact and lightweight power conversion with reduced thermal load and improved performance at high frequencies.

Its **direct liquid cooling system** ensures stable operation even under high current loads, making it ideal for integration in propulsion systems, electric traction, and hybrid aviation. With a wide DC bus voltage range (50–800 Vdc), support for **encoderless PMSM operation**, and a fully **programmable onboard PLC**, the AXS 500 is not just a power stage—it's a smart, flexible building block for decentralized automation and high-reliability energy conversion.

Developed by Phase Motion Control, the AXS 500 combines rugged hardware (IP65-rated) with a rich set of interfaces including RS422, CAN/CANOpen, EtherCAT, and the proprietary EtherPMC bus, ensuring seamless integration in both standard and custom architectures.

Key Features

- **High Power Density:** Compact and lightweight design enabled by SiC technology
- **Direct Liquid Cooling:** For high continuous current and efficient heat dissipation
- **Three-Phase Full-Bridge SiC MosFET Stage:** High-speed switching and reduced losses
- **Programmable On-board PLC:** Enables decentralized logic and automation
- **Encoderless Operation:** Supports PMSM motor control without sensors
- **Ruggedized Design:** IP65 enclosure, resistant to shocks and vibrations
- **Selectable PWM Frequency:** Configurable from 2 to 64 kHz
- **Multi-Drive Synchronization:** Ideal for coordinated motion systems
- **Advanced Protection:** Safe Torque Off (dual-channel), overcurrent, overvoltage, and thermal fault detection
- **Versatile Interfaces:** RS422, CAN/CANOpen, EtherCAT, EtherPMC; supports EnDat, SSI, BiSS, Tamagawa, HiperFace sensors

APPLICATIONS

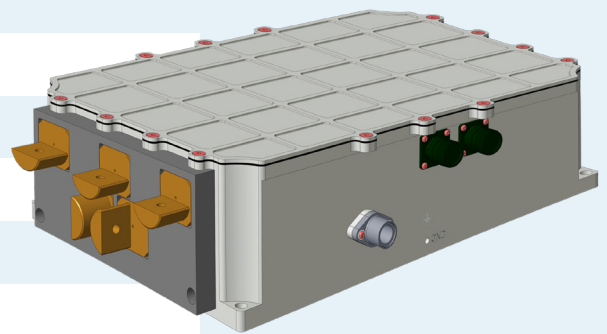
ELECTRIC PROPULSION (BOATS, SUBMARINES, PUMPS, ACTUATORS)

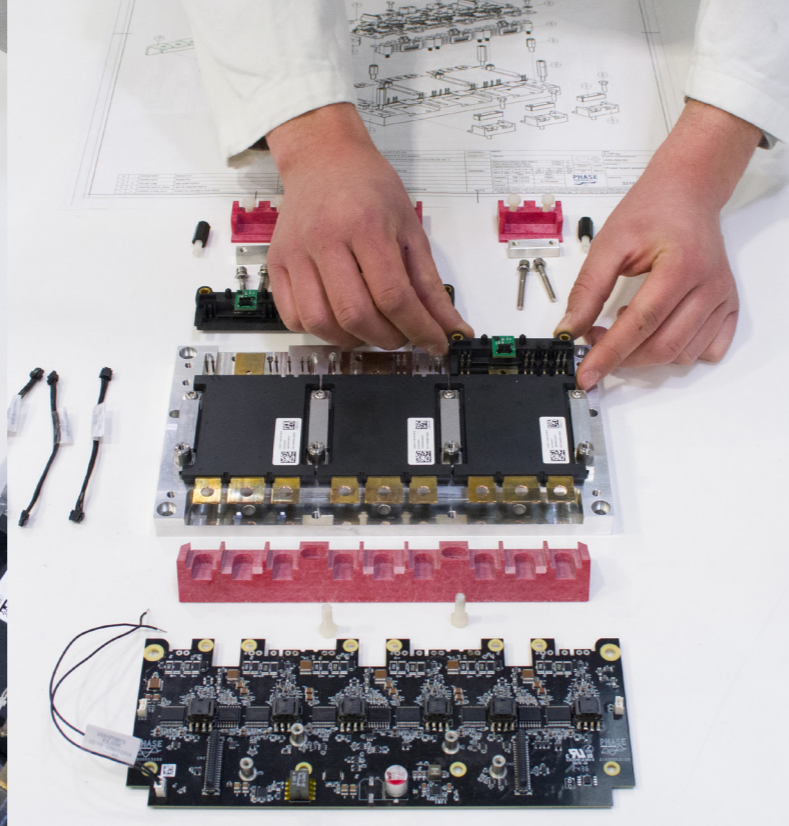
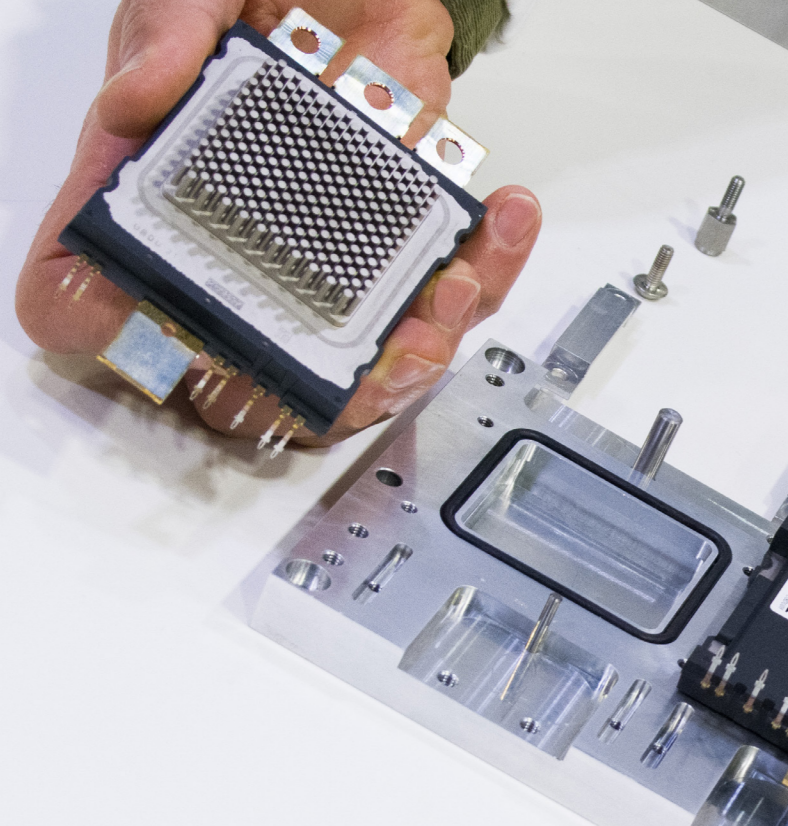
GROUND VEHICLES (TRUCKS, BUSES, EARTH-MOVING MACHINERY)

ELECTRIC REPLACEMENT OF HYDRAULIC ACTUATORS

ELECTRIC AND HYBRID AVIATION

POWER CONVERSION SYSTEMS: AC/DC, DC/AC, OR DC/DC





Electrical Data

Spec	Value	Units
Continuous AC Current @ 800VDC, Tw=60°C, 16kHz	400	Arms
Peak AC Current (1 sec) @ 800VDC, Tw = 60°C, 16kHz	500	Arms
Max Continuous DC Link Operating Voltage	800	Vdc
Overtoltage threshold	900	Vdc
Non-Operating DC Link Withstand Voltage	1150	Vdc
DC Link Capacitance	380	uF
Maximum PWM Frequency	64	kHz
Nominal flow rate, water glycol 60/40	10	L/min
Logic section voltage input range	9-36	V
Logic section load power	20	W

Connections & Interfaces

- **Analog Inputs:** 2 programmable (0–30 V), isolated
- **Digital I/O:** 4 in / 4 out, fully isolated
- **Sensor Interfaces:** EnDat 2.2, SSI, BISS, Nikon, Tamagawa, HiperFace
- **Bus Interfaces:** RS422, CAN/CANOpen, EtherCAT, proprietary EtherPMC
- **Safety:** Dual-channel Safe Torque Off, protection against overvoltage, overcurrent, and overtemperature

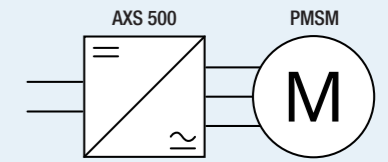
Environmental Requirements

- **Operating temperature:** 0 – 45°C
- **Humidity:** 5% – 95% RH (non-condensing)
- **Altitude:** up to 2000 m (higher on request)
- **EMC Compliance:** CISPR-25

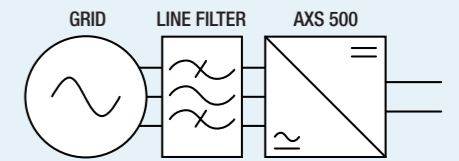
Maintenance & Cooling

- **Nominal coolant flow:** 10 L/min
- **Max inlet pressure:** 350 kPa
- **Coolant type:** Water / Ethylene Glycol (max 50%) with corrosion inhibitors
- **Strainer mesh:** Max 0.7 mm (clean every 6 months)
- **Coolant replacement:** Every 24 months

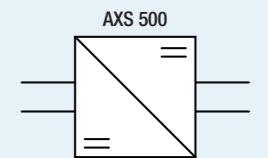
Motor Drive



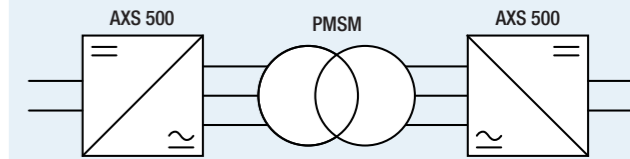
Grid Active Rectifier



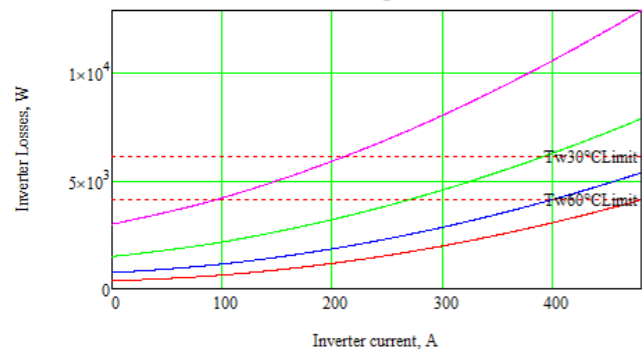
DC/DC Conversion



Isolated DC/DC Conversion

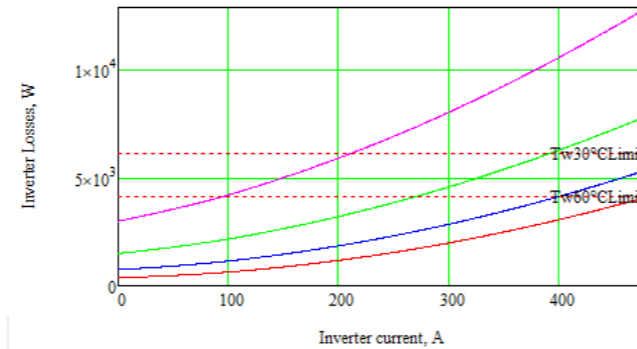


Ploss inverter vs Current @ 800Vdc 8/16/32/64kHz

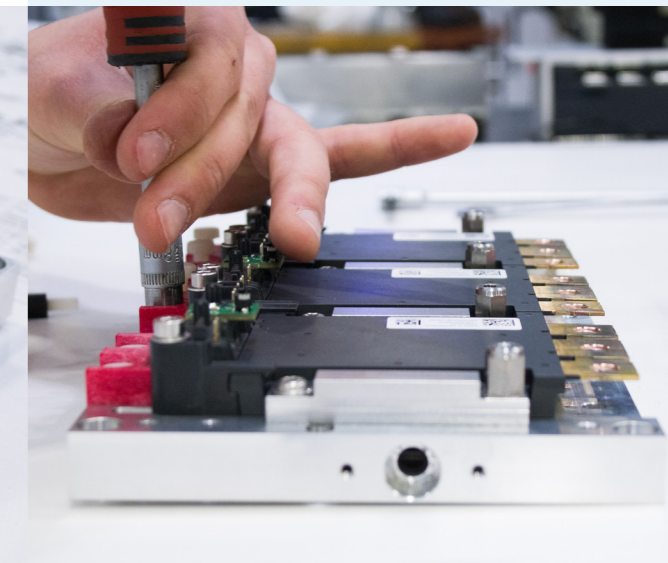
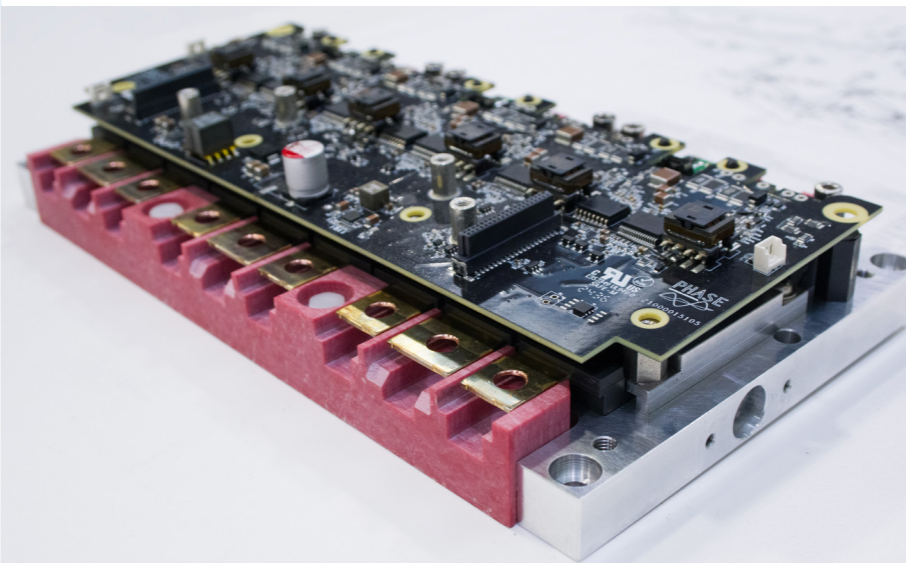


— Losses @ 8kHz
 — Losses @ 16kHz
 — Losses @ 32kHz
 - - - Losses @ 64kHz

Ploss inverter vs Current @ 800Vdc 8/16/32/64kHz

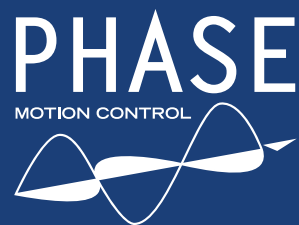


— Losses @ 8kHz
 — Losses @ 16kHz
 — Losses @ 32kHz
 - - - Losses @ 64kHz



For any support need, to reach out to us at the following contacts:
 • support@phase.eu for technical support
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