

DEFENCE AND SPACE
Spacecraft Equipment

Elektro

Power Processing Unit (PPU)
for Hall Effect Thrusters



P o w e r



The Power Processing Unit is the central part of the Electric Propulsion System (EPS). It provides Power conditioning and control for the Hall Effect Thrusters and the Xenon Flow Assembly. Elektro comprises the following functions:

- Power conditioning and control for the HET Thruster and Xenon feed system
- Thruster's electrical supplies: Anode, Ignitor & Keeper, Heater Cathode and Magnet
- Xenon Flow Control system electrical supplies: Thermo-throttle and Valves driver
- System control loop and thruster sequences controller
- TM & TC Interface with OBC via redundant MIL 1553 bus and discrete commands.

ELEKTRO is based on a flexible and modular concept able to interface with up to six thrusters. It is the right solution for 5kW class electric propulsion systems, and its operating point can be configured according to mission needs. ELEKTRO is

compatible with all main HET thrusters in the market without any HW modification and offers the capability to adapt the motor control parameters according to the motor knowledge and or evolutions.

KEY FEATURES

- New generation PPU for 5kW class HET thrusters
- Flexible design able to drive one or several HET
- Compatible to all main HET thrusters
- High level configurability by SW means
- Anode operating capability up to 400V (Isp vs thrust)
- Excellent efficiency over the complete range
- Generate and monitor the voltages and currents to the EPS; to perform start up, nominal operation and shut down sequences, protection management and to respond to thrust commands
- Set and control the EPS to the necessary thrust levels
- Provide TM and TC to command all thruster functions and monitor all relevant EPS parameters
- Power converters are galvanically isolated

BUDGETS

- Mass: from 16.6kg up to 21kg (depending on selected configuration)
- Volume 386 x 270 x 253mm³
- Efficiency > 95%

INTERFACES

- Input Power bus: 100V
- External TM/TC interface: MIL 1553 (N&R), and Direct Telecommand & Telemetry signals
- Internal TM/TC interface: CANBUS interface in the Anode and HKI module
- Power Output:
 - Maximum output operating power: 5kW (P Limit: 5.3kW)
 - Programmable sources in voltage and current
- Valves driving capability

ENVIRONMENTS / RELIABILITY

- Qualification Temperature: [-35°C; +70°C]
- Radiation 15 years in GEO orbit, SEP tolerant, latchup immune
- >15-year lifetime
- Robust design compatible with quick start after launch

CUSTOMERS / APPLICATION

- Selected by E3000 / Eurostar Neo platform and export customers
- Full production running
- Airbus Spacecraft Equipment quality legacy

ELEKTRO building blocks

Elektro is composed by three major building blocks:

- Anode Module
- HKI Module
- FTSU Module or FU Module (for one thruster)

ELEKTRO Functional Diagram & configurations

Thanks to the flexible ELEKTRO design, the product offers different possible configurations: mono-thruster, bi-thruster and multi-thruster configuration.

- **Standard / Mono-thruster and Bi-thruster PPU configuration:** capability to drive two different thruster per PPU.
- **Multi-thruster PPU configuration:** capability to drive up to six different Cathodes and two different Anodes per PPU. PPU offer redundancy for the HKI building block