

Elektro PPU NG2

Versatile and Modular
Power Processing Unit (PPU)
for a wide range of Propulsion
Subsystems (Hall Effect Thrusters and
Fluidics Management Systems)



P o w e r



PPU NG2 in a
5.1kW configuration

The Power Processing Unit (PPU) is the central component of the Electric Propulsion System (EPS). It provides power conditioning and control for the Hall Effect Thruster and the Fluidic Management System (Xenon / Krypton).

ELEKTRO PPU NG2 is a competitive PPU for Hall Effect thrusters:

- Multi thruster
- Multi voltage
- Multi fluidic
- Multi power

ELEKTRO PPU NG2 is Airbus Space Products' new modular and versatile PPU, **compatible with all state-of-the-art Fluidics Management Systems (FMS) and all Hall Effect Thrusters (HET).**

ELEKTRO PPU NG2 is based on **Airbus Space Products' unique flight-proven heritage and expertise** with Elektro NG1 and PureLine TOPAZ products.

ELEKTRO PPU NG2 offers a **50% cost reduction and a 30% mass reduction** in comparison to existing products in an equivalent configuration.

ELEKTRO PPU NG2 offers the **best compromise between ISP and Thrust.** Relying on its modular architecture, it can address any thruster **from 1 to 20kW, and a large voltage range of 300V to 600V.**

ELEKTRO PPU NG2 embeds **patented innovations and disruptive technologies** to provide a breakthrough in the propulsion market:

- Disruptive reliable rad-hardened design with automotive **COTS components**
- State-of-the-art design based on **GaN, SiC, integrated magnetics and digital control**
- Excellent **95% Anode efficiency**
- **Automatic handling** of firing sequences, telemetries and faults
- **Large production capacity** thanks to our automated assembly chain
- **Optimised lead times**

Building on the success of current Elektro NG1 and PureLine TOPAZ products, PPU NG2 is a reliable, innovative, versatile and modular New Space unit for thrusters from 1kW to 20kW.

KEY FEATURES

- **New Space**, next generation PPU for HET thrusters
- **Rad-hardened COTS highly reliable design**
- **Dual mode operating range** 300V-600V
- Filter Unit **integrated** into the PPU
- Virtually **all parameters adjustable in flight**, including thrust level
- **Handles all functions** required to drive an HET and its FMS:
 - Generates and monitors the voltages and currents to the EPS
 - Performs start-up, nominal operation and shutdown sequences
 - Handles faults automatically and allows investigation
- Optimised DFM/DFT for **fully automatic production**
- Self-diagnostics & **self-tests**
- **Patented innovations** & disruptive technologies (GaN, SiC, integrated magnetics, digital control, etc.)

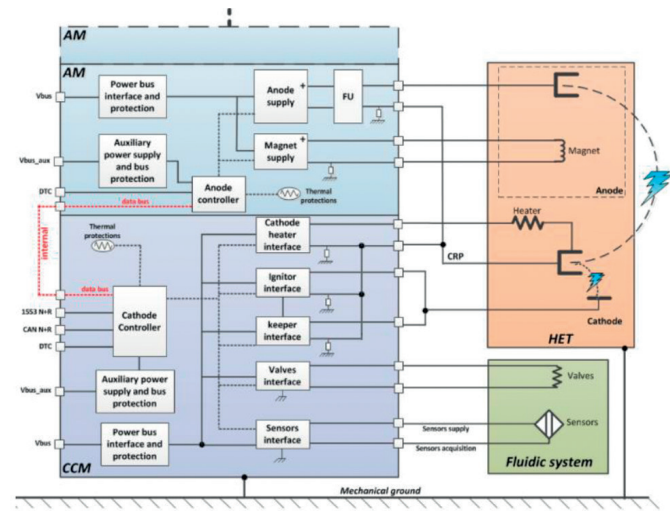
BUDGETS

- Mass: 15kg (5.1kW configuration)
- Volume: 386mm x 173mm x 252mm (5.1kW conf.)
- Typical efficiency: **95%**

ARCHITECTURE

PPU NG2 is built around 2 modules: the Anode Module (AM) and the Cathode and Control Module (CCM).

- The CCM is in charge of supplying the thruster's Cathode, the fluidics system, sequencing the unit and communicating with the platform.
- The AM is in charge of supplying the thruster's Anode and Magnet.



PPU NG2 block diagram (independent Magnet shown here)

VERSATILITY

- **MAGNET:**
 - Independent
 - In series (with trimming)
- **ANODE:**
 - 300V to 600V
- **CATHODE:**
 - Ignitor (adjustable)
 - Keeper
- **HEATER**
- **PRESSURE SENSORS**
- **FMS HEATER**
- **FLUIDICS:**
 - Bang-bang
 - Proportional valve
 - Thermo-throttle
- **COM BUS:**
 - 1553
 - CAN
- **INPUT BUS:**
 - 100V regulated
 - 70V unregulated

INTERFACES

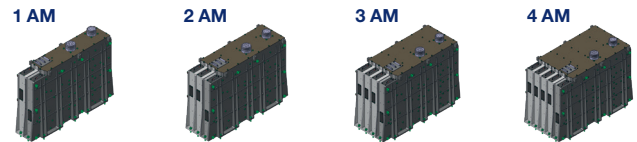
- **Input Power bus**
 - 100V regulated, compatible with 70V unregulated
- **ComBus**
 - MIL 1553 (N&R), compatible with CAN (N&R)
- **Direct TeleCommand & TeleMetry signals**
- **Power Output**
 - 5.1kW for the {1CCM + 3AM} configuration
 - Other configurations exist to power thrusters from 1kW to 20kW (see "Modularity" below)
 - Programmable and protected voltage and current sources
- **FMS compatibility**
 - Bang-bang/Proportional valve/Thermo-throttle
- **Magnet configuration**
 - Independent Magnet
 - Magnet in series with the anode supply (Magnet trim available)

ENVIRONMENT / RELIABILITY

- Missions: **GEO, MEO orbits**
- **>15-year lifetime**
- Qualification Temperature: [-35°C; +70°C]
- SEP tolerant, latchup immune
- Robust design compatible with quick start after launch (**10Pa robust design**)

MODULARITY

The PPU NG2 is designed to be compatible with configurations from 1 Anode Module (AM) to 12 AM, i.e. for thrusters from 1kW to 20kW. There is always 1 CCM and as many AM as needed (1.7kW of Anode power and 3.2A of Magnet current per AM).



PPU NG2 scalability and modularity from 1.7kW to 6.8kW and beyond... **... 20kW**

KEY FIGURES

Function	Performance
Anode supply	300-600V 1.7kW per AM
Magnet supply	3.2A per AM Up to 40V
Ignitor	Up to 320V high voltage pulses 250mJ guaranteed per pulse @ 320V
Keeper supply	Up to 6A Up to 35V
Cathode Heater	Up to 18A Up to 20V Up to 250W 600s max

DESIGN FOR MANUFACTURE & TEST

The unit is designed to be compatible with a **fully automated assembly and test process**. This means a large production capacity and optimised lead times.