MICRO R³

Configuration: 030

Building on the heritage of the legacy NANO propulsion system, Enpulsion has developed a scaled version of the technology to target small and medium size spacecrafts. The **MICRO R³** is engineered in a modular approach to form building blocks that can be arranged for various mission profiles.

The first model was successfully operated in space in Q1 2021.

Modular Package With High Total Impulse

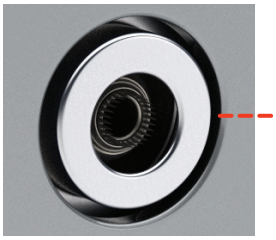
One module and its tank only take up a volume of 2.1 L and can provide up to 26,000 Ns at 2,700 s I_{sp} at nominal thrust. The module is simply bolted to the outside of the spacecraft and is used as a standalone unit.

Debris Safety

Even during active operation, no part of the thruster is pressurized, and no chemical energy is stored. This means that in case of a collision or impact, there will not be an explosive reaction which could harm the spacecraft and create debris.

Heritage Electronics

The Power Processing Unit is based on the heritage electronics used in the ENPULSION NANO, leveraging exhaustive on-orbit and testing heritage, as well as introducing component lot control and heritage in EEE part selection.



4 Emitters:
Reservoir for 1.25 kg of indium.

Mature Technology

The ENPULSION MICRO R³ is a scaled technology of the ENPULSION NANO with a developmental history of over 15 years.

Dynamic Precise Thrust Control

Thrust can be controlled through the electrode voltage, which provides excellent controllability, down to a precision of 0.5 mN with low thrust noise.

Controllable Specific Impulse Up To 3,600 S

With its efficient ionization process the ENPULSION MICRO R³ can deliver higher specific impulse than any other ion propulsion system currently on the market. The thruster is capable of a range of Isp from 2,700 s to 3,600 s.

Stacked Configuration

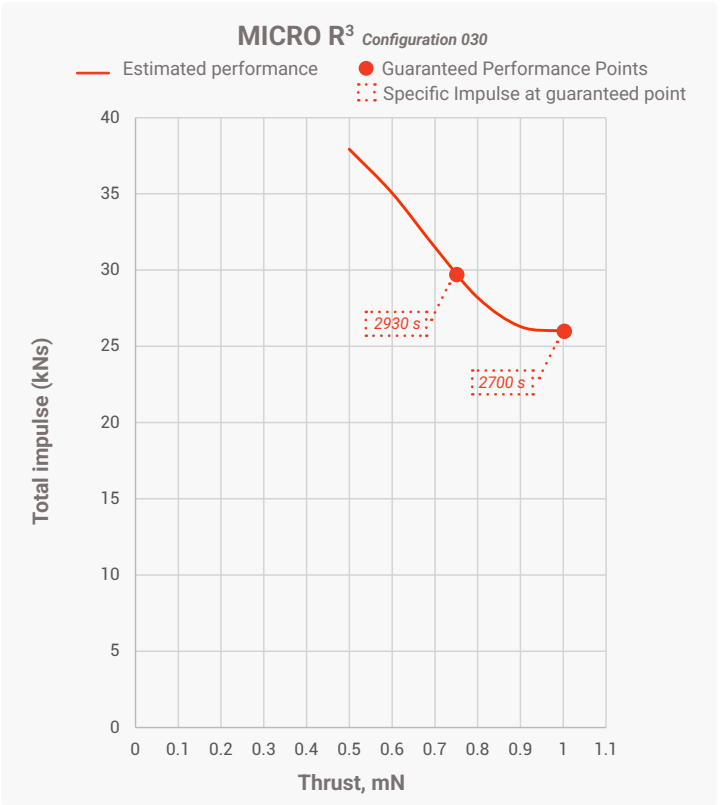
The ENPULSION MICRO R³ is a fully integrated propulsion system in a stacked configuration, with the PPU situated directly underneath the thruster head, with the same footprint.

Properties and Performance

Since the company was founded in 2016 we have delivered hundreds of thrusters from the combined NANO and MICRO product line to customers worldwide, more than 300 of which are currently in space. Therefore we have developed an empirical understanding of the intrinsic variation of the performance and parameters of emitters in these thrusters in their production process and in their application in different types of missions.

MICRO R³ *Configuration 030*

DYNAMIC THRUST RANGE[1,2]	0.5 - 1 mN
NOMINAL THRUST[3]	1 mN
SPECIFIC IMPULSE AT 1mN	2,700 s
PROPELLANT MASS	1.25 kg
TOTAL IMPULSE AT 1mN	26 kNs
TOTAL SYSTEM POWER AT THRUST RANGE	64 - 120 W
POWER AT NOMINAL THRUST	110 W
OUTSIDE DIMENSIONS Excluding protrusions Including protrusions	 140 x 120 x 126.5 mm 140 x 120 x 131.5 mm
MASS (DRY / WET) INCLUDING PPU	2.6 kg / 3.85 kg
HOT STANDBY POWER[4]	12 - 18 W
COMMAND INTERFACE	RS422 / RS485
SUPPLY VOLTAGE	28 V



[1] *The ENPULSION MICRO R³ can be operated at a wide range of thrust and specific impulse, depending on the power level available. The operational envelope is based on total system power including typical heater and neutralizers consumption.*

[2] *If the mission thrust requirements are lower than the two guaranteed operational points, the available bus power shall still be dimensioned to deliver up to 120W for 20 minutes. For further information and support please contact ENPULSION.*

[3] *75% of nominal thrust guaranteed at EOL*

[4] *Dependent on accommodation and resulting thermal environment*