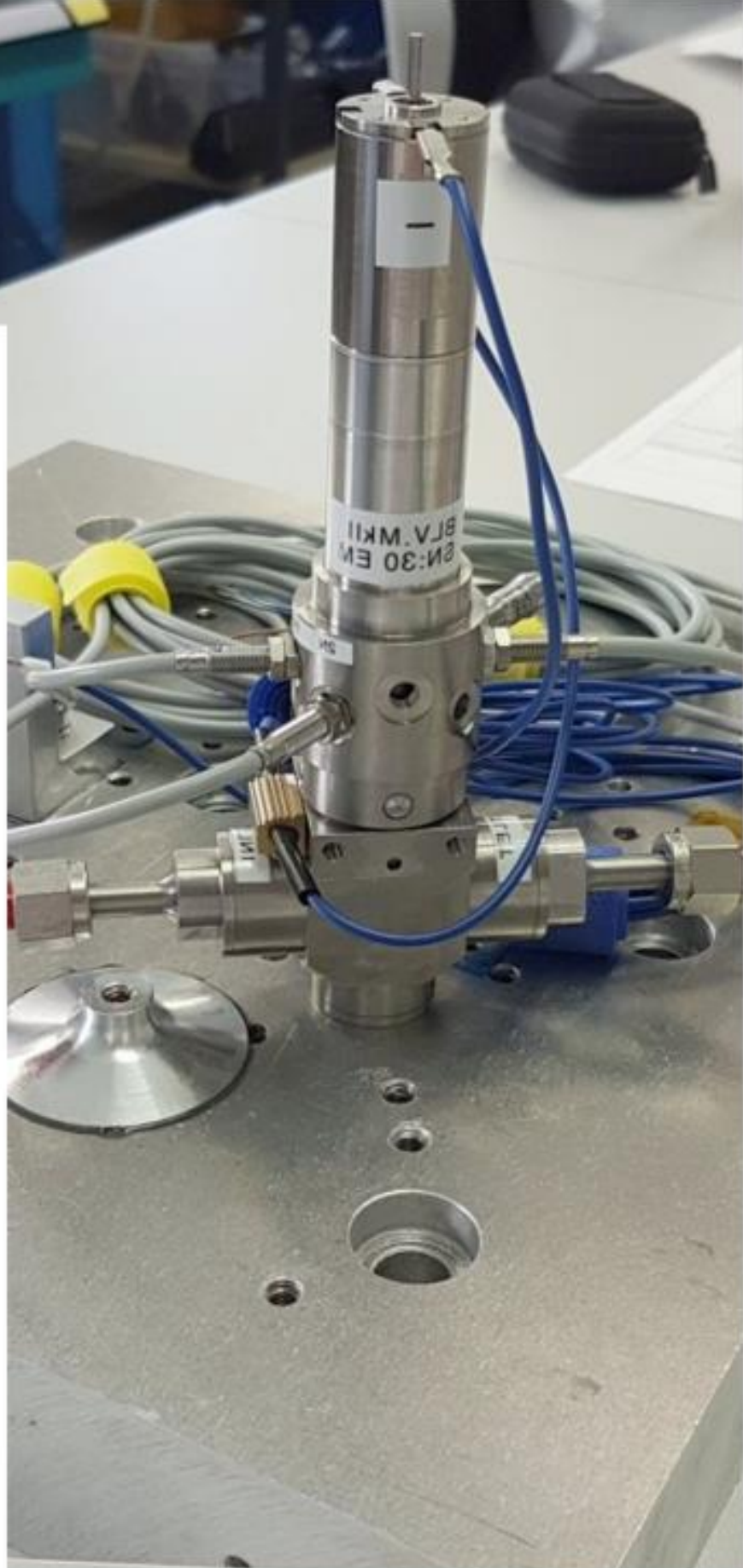


Space propulsion components

Product catalogue

MAR 2021

OMNIDEA-RTG



To better understand the level of development on our component catalogue a simple tag system was implemented



Components with **Flight Model** have heritage and have undergone a full ESA qualification. They can be purchased OTS and flown without any development needed, whenever full specification compliance exists.



Components with **Qualification Model** tag are components currently undergoing qualification in accordance with ESA ECSS requirements, including full documentation suite.



Components with the **Engineering Model** tag are components where, due to potential issues such as parts obsolescence (or outdated manufacturing processes) a significant qualification campaign is needed before the component can be integrated into the satellite. In some cases these components have flight heritage.

Ball Latch Valves

Electric Venting Valve

Propellant Filter

Fill and Vent Valve

Pressurant Filter

Relief Valve

Transition Joints

Three Way Valves

Cold Gas Thruster

Throttleable Flow Control Valve

Equipments, Services and Facilities

Company Description

Ball Latch Valve

(P/N BLV.S3)

Description:

Motor driven ball valve, stable in open and closed position and including redundant position indication sensors.

Functional Performance:

- Operating Media: Inert Gases, Hydrazine, UDMH, MMH
- MEOP: 26bar (qualified)
- Leakage Rate (He): $1,0 \times 10^{-4}$ scc/s (internal)
- Leakage Rate (He): $1,0 \times 10^{-6}$ scc/s (external)
- Flow Rate: 30 g/s at $\Delta P < 0,1$ Bar; > 180 g/s at $\Delta P < 2$ Bar
- Opening Speed: 4 s with 1526:1 gear (0,4s with 111:1 gear)
- Life cycles: 1500 cycles

Electrical Requirements:

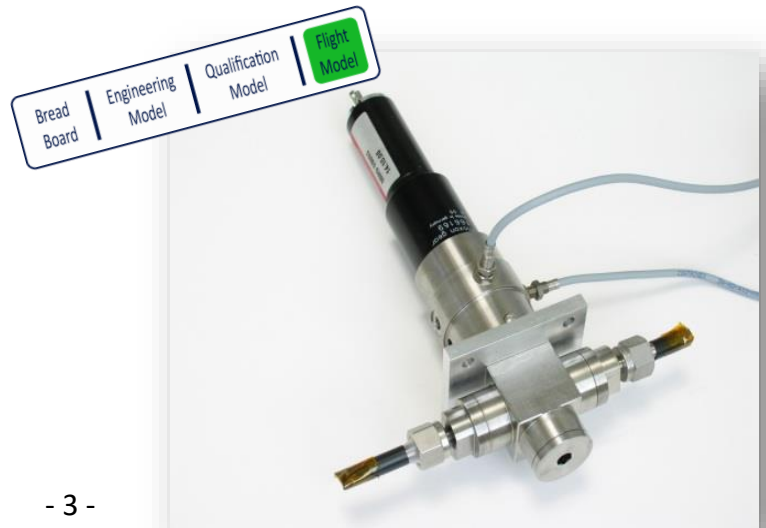
- Power Supply: 28 ± 4 V_{DC} and 10-30V_{DC} for position indicators
- Power Consumption: < 10 W
- Connector Type: 2m cables for motor and sensors

Mechanical Interface Requirements:

- Mass: 842 g
- Dimensions: 133 x 50 x 220 mm
- Materials: Ti6Al4V and Stainless steel
- Pressure port: $\frac{1}{4}$ " welding studs Ti6Al4V

Remarks:

- Status: Qualified and flown
- Heritage: SAR-Lupe, Formosat-5, Sentinel-3, GökTürk, EnMAP
- ITAR-free



Ball Latch Valve - 2nd generation (P/N BLV.MkIIa)

Ball Latch Valves

Electric Venting Valve

Propellant Filter

Fill and Vent Valve

Pressurant Filter

Relief Valve

Transition Joints

Three Way Valves

Cold Gas Thruster

Throttleable Flow Control Valve

Equipments, Services and Facilities

Company Description

Description:

Motor driven ball valve, bi-stable and inc. redundant position indication sensors. Water hammer avoidance with priming position function (with redundant sensors). Back Pressure relief function available as optional.

Functional Performance:

- Operating Media: Inert Gases, N₂H₄
- MEOP: 28bar
- Leakage Rate (He): 1,0 x 10⁻⁵ scc/s (internal)
- Leakage Rate (He): 1,0 x 10⁻⁶ scc/s (external)
- Flow Rate: ≈60g/s at ΔP=0,05 Bar; > 180 g/s at ΔP < 2 Bar
- Opening Speed: 3,1s with 1526:1 gear
- Life cycles (performed in qualification): 1.000 cycles

Electrical Requirements:

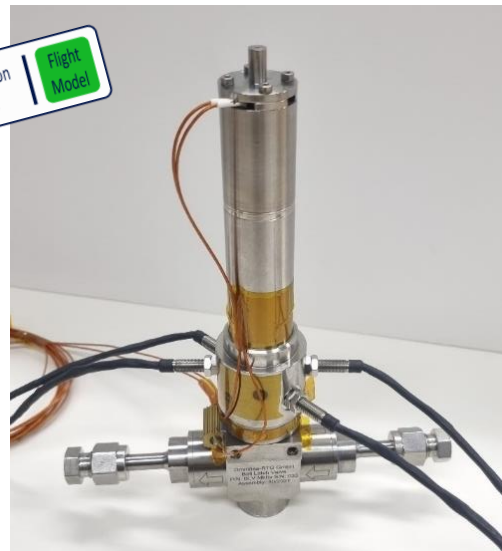
- Power Supply: 28 +/- 4 V_{DC} and 10-30V_{DC} for position indicators
- Power Consumption: < 10W
- Connector Type: 2m cables for motor and sensors

Mechanical Interface Requirements:

- Mass: < 530g (w/ priming sensors and all cables)
- Dimensions: 133 (L) x 72 (W) x 179 (H) mm (w/ priming sensors)
- Materials: Ti6Al4V and Stainless steel
- Pressure port: ¼" welding studs Ti6Al4V

Remarks:

- Status: Qualified (initial FM's for ESA's CO₂M mission under prod.)
- ITAR-free



Ball Latch Valves

Electric Venting Valve

Propellant Filter

Fill and Vent Valve

Pressurant Filter

Relief Valve

Transition Joints

Three Way Valves

Cold Gas Thruster

Throttleable Flow
Control Valve

Equipments, Services
and Facilities

Company Description

Electric Venting Valve

(P/N EVV)

Description: Solenoid driven valve, stable in closed position with redundant seats for leakage. Fully welded design.

Functional Performance:

- Operating Media: Inert gases, Hydrazine, UDMH, MMH, and NTO
- Opening Pressure: 3,5 barg
- MEOP: 35,6barg
- Leakage Rate (He):
 - Int: $<1 \times 10^{-4}$ scc/s
 - Extern: $<1,0 \times 10^{-6}$ scc/s
- Max. Flow Rate: 250 mg/s
- Life Time: 1.000 cycles

Electrical Requirements:

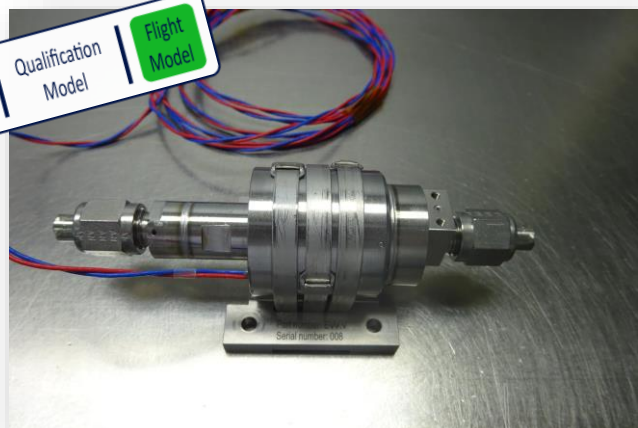
- Power Supply: 24 - 32 V_{DC}
- Power Consumption: < 13,5 W
- Connector Type: 2 meters lead wires

Mechanical Interface Requirements:

- Mass: 0,41 kg
- Dimensions: 105 x 42 x 52 mm
- Materials: Stainless Steel / FFKM / PTFE / Ti6Al4V (bracket)
- Pressure port: as per MS33656-4E

Remarks:

- Status: Qualified
- Heritage: Vega VV_17-20
- ITAR-free



Ball Latch Valves

Electric Venting Valve

Propellant Filter

Fill and Vent Valve

Pressurant Filter

Relief Valve

Transition Joints

Three Way Valves

Cold Gas Thruster

Throttleable Flow Control Valve

Equipments, Services and Facilities

Company Description

Propellant Filter

(P/N LPF)

Description: Inline filter for Hydrazine with 20 µm mesh filter.

Functional Performance:

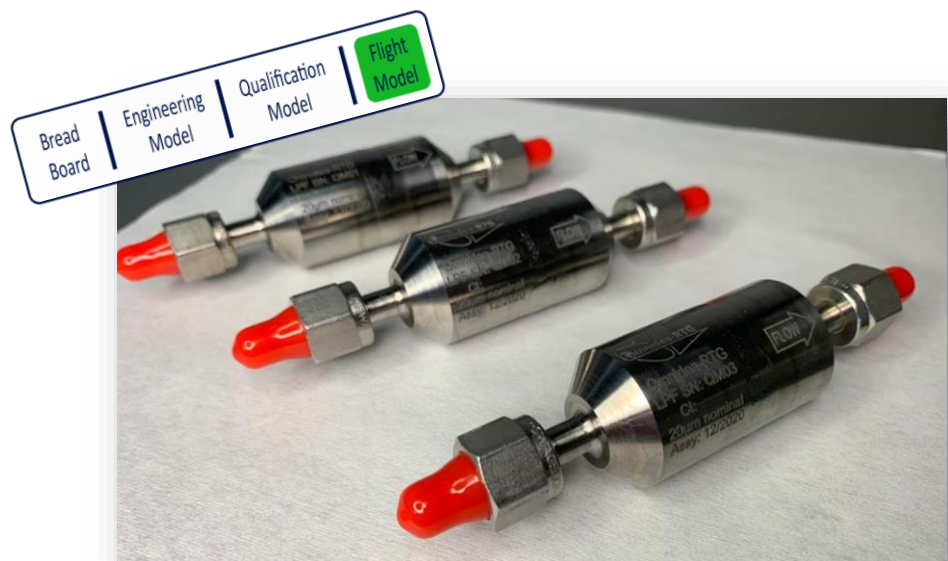
- Operating Media: Hydrazine, UDMH, MMH
- MEOP: 26 bar
- Leakage Rate: all welded design ($< 1,0 \times 10^{-6}$ scc/s)
- Pressure drop: < 0.1 bar at up to 60 g/s
- Nominal filtration rating: 20 µm
- Absolute filtration rating: 22 µm
- Filtration Area: $\approx 38\text{cm}^2$

Mechanical Interface Requirements:

- Mass: ≈ 50 g
- Dimensions: 112 x 26 x 26 mm
- Materials: Ti6Al4V housing, 316L Stainless Steel filter mesh and spool
- Pressure ports: $\frac{1}{4}$ " Ti6Al4V welding stubs, 0,41mm thick

Remarks:

- Status: Qualified
- ITAR-free



Ball Latch Valves

Electric Venting Valve

Propellant Filter

Fill and Vent Valve

Pressurant Filter

Relief Valve

Transition Joints

Three Way Valves

Cold Gas Thruster

Throttleable Flow Control Valve

Equipments, Services and Facilities

Company Description

Gas Fill and Vent Valve

(P/N FVV)

Description:

Fill and Vent Valve for inert gas propulsion systems. It comes with an integrated 2 µm filter.

Functional Performance:

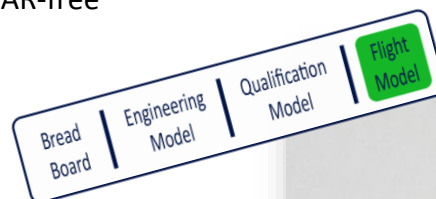
- Operating Media: Inert Gases
- MEOP: 350 bar
- Leakage Rate (He):
 - Intern: <0,5 scc/h uncapped
 - Extern: <1,0 x 10⁻⁶scc/s
- Max. Flow Rate: < 4 l/min GN₂, throttled
- Filter Mesh Size: 2µm
- Life cycles: 100 fuelling

Mechanical Interface Requirements:

- Mass: 0,091 kg
- Dimensions: 76 x 30 x 30 mm
- Materials: Stainless Steel / Ti6Al4V / Viton
- Pressure port: per MS 33656-4 or ¼" Titanium welding stud

Remarks:

- Status: Qualified and flown
- Heritage: Helios, SPAS 01/02, CHAMP, GRACE, SSETI, Formosat-5
- ITAR-free



Ball Latch Valves

Electric Venting Valve

Propellant Filter

Fill and Vent Valve

Pressurant Filter

Relief Valve

Transition Joints

Three Way Valves

Cold Gas Thruster

**Throtttable Flow
Control Valve**

**Equipments, Services
and Facilities**

Company Description

Pressurant Filter

(P/N PF1)

Description: Gas Filter for inert Gases with 9 µm mesh filter.

Functional Performance:

- Operating Media: Inert Gases
- MEOP: 350 bar
- Leakage Rate: 0 scc/s (all welded design)
- Max. Flow Rate: < 17 l/min at ΔP of 1 bar (TBC)
- Filter Mesh Size: 9 µm
- Filter Size: 4,6 cm²

Mechanical Interface Requirements:

- Mass: 0,076 kg
- Dimensions: 50 x 30 x 30 mm
- Materials: Stainless Steel
- Pressure Port: per MS 33656-4 or ¼" Ti6Al4V

Remarks:

- Status: Qualified and flown
- Heritage: CHAMP, GRACE, Formosat-5
- ITAR-free



Ball Latch Valves

Electric Venting Valve

Propellant Filter

Fill and Vent Valve

Pressurant Filter

Relief Valve

Transition Joints

Three Way Valves

Cold Gas Thruster

Throttleable Flow Control Valve

Equipments, Services and Facilities

Company Description

Relief Valve

(P/N RV)

Description: He Relief valve with extreme flow capabilities, for depletion of VEGA-C AVUM's pressurization tanks.

Functional Performance:

- Operating Media: Helium, Inert gases
- Opening: 39 bar
- MEOP: 44.5 bar
- Leakage Rate: $<4 \times 10^{-3}$ scc/s
- Max. Flow Rate: > 36 g/s He
-

Mechanical Interface Requirements:

- Mass: < 400 g
- Dimensions: $\varnothing 38 \times 100$ mm
- Materials: external: 15-5PH
internal: Ti6Al4V (inner parts), PTFE (O-ring), 301 (spring)
- Pressure Port: MS 33656-4

Remarks:

- Status: under development for VEGA-C
- ITAR-free



Ball Latch Valves

Electric Venting Valve

Propellant Filter

Fill and Vent Valve

Pressurant Filter

Relief Valve

Transition Joints

Three Way Valves

Cold Gas Thruster

Throttleable Flow Control Valve

Equipments, Services and Facilities

Company Description

Titanium to Stainless Steel Transition Joint (P/N TSJ)

Description:

The Titanium to Stainless Steel Transition Joints respond to the need of connecting Stainless Steel components (such as thrusters) to titanium tubing and components, with the exclusive use of fusion welding processes between similar materials.

Their appearance may be simple, but they bring a great mass reduction and an integration comfort to the propulsion subsystems or components compared to classical joining solutions.

Omnidea-RTG's transition joints are being produced in cooperation with our partners at IWS Service GmbH. The qualification has been performed under ESA contract.

Technical Specification:

- Operating Media: inert gases, Hydrazine, MMH and UDMH
- MEOP: 350 bar
- Mass: 7 g
- Length: 50 to 90 mm (TBC with customer)
- Pressure port: ¼" x 0,7mm welding studs
- Materials: Ti6Al4V and 304L

Remarks:

- Status: Qualified and flown (over 300 units sold)
- Heritage: on: Hispasat 36W-1; Biomass, Electra, Heinrich Hertz
- ITAR-free



Ball Latch Valves

Electric Venting Valve

Propellant Filter

Fill and Vent Valve

Pressurant Filter

Relief Valve

Transition Joints

Three Way Valves

Cold Gas Thruster

Throttleable Flow Control Valve

Equipments, Services and Facilities

Company Description

Aluminium to Titanium Transition Joint (P/N ATJ)

Description:

The Aluminium to Titanium Joints respond to the need of connecting Aluminium components (such as tank liners) to titanium tubing and components, with the exclusive use of fusion welding processes between similar materials.

Their appearance may be simple, but they bring a great mass reduction and an integration comfort to the propulsion subsystems or components compared to classical joining solutions.

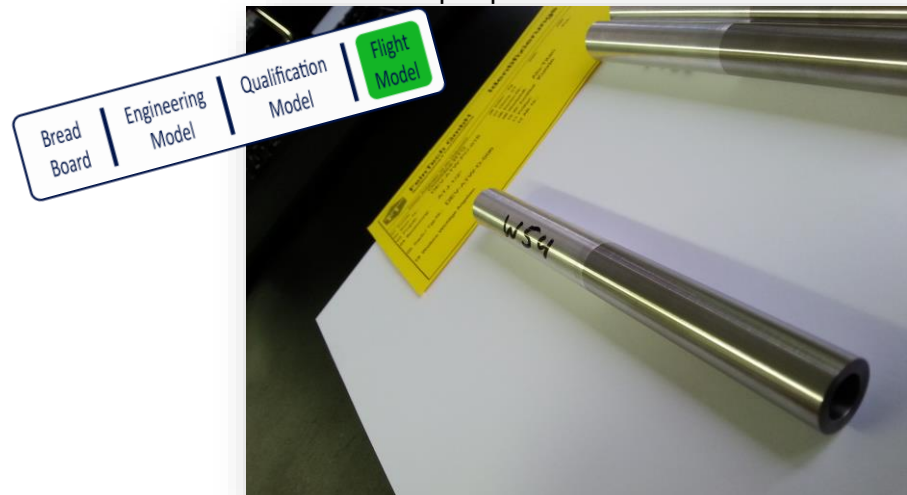
Omnidea-RTG's transition joints are being produced in cooperation with our partners at MTC Ltd. The qualification has been performed under ESA contract.

Technical Specification:

- Operating Media: inert gases, Hydrazine, MMH and UDMH
- MEOP: 300 bar
- Mass: 6 g (1/4"), 34 g (1/2"), TBC (3/8")
- Length: 100 mm
- Outer diameter and wall thickness:
 - 1/4" x 1,5 mm welding studs
 - 1/2" x 2,5 mm welding studs
 - 3/8" x TBC welding studs
- Materials: Ti6Al4V and AA6082

Remarks:

- Status : Qualified (20 units sold)
- ITAR-free
- Minimum order of 10 units per production batch



Ball Latch Valves

Electric Venting Valve

Propellant Filter

Fill and Vent Valve

Pressurant Filter

Relief Valve

Transition Joints

Three Way Valves

Cold Gas Thruster

Throttleable Flow Control Valve

Equipments, Services and Facilities

Company Description

Low Pressure 3 Way Valve (P/N OXI.LP)

Description:

Three way valve intended to interconnect the tank, fill & drain valve, and thrust system. The valve has been designed to be 100% compatible with oxygen.

Functional Performance:

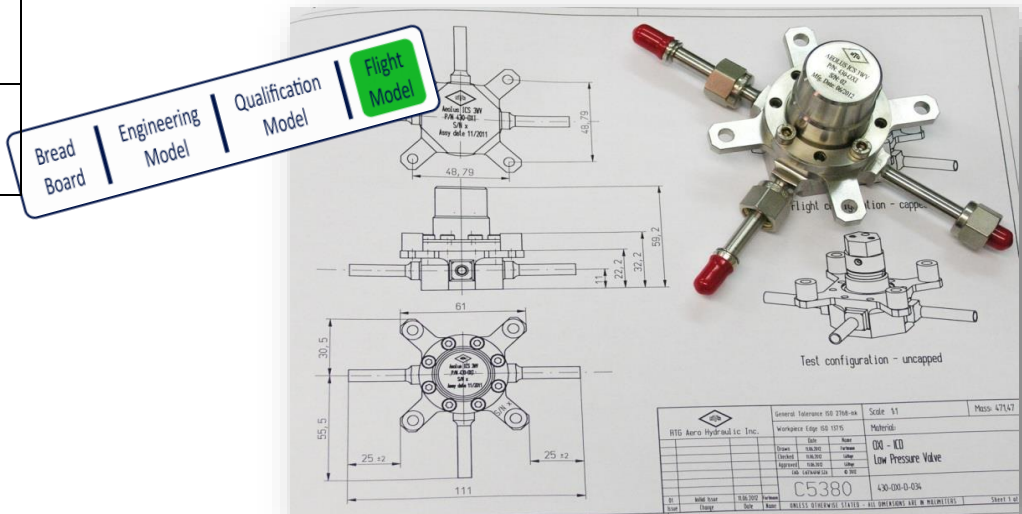
- Operating Media: Inert Gases, Hydrazine, Oxygen...
- MEOP: 5 bar
- Leakage Rate (He, max allowed):
 - o Internal (valve closed): $1,0 \times 10^{-4}$ scc/s
 - o External (valve open): $1,0 \times 10^{-6}$ scc/s
- Max. Flow Rate:
 - o 30 g/s at $\Delta P < 0,1$ Bar
 - o 300 g/s at $\Delta P < 2$ Bar
- Life Time: 300 cycles

Mechanical Interface Requirements:

- Mass: 0,520 kg
- Dimensions: 75 x 50 x 70 mm
- Materials: 304L Stainless Steel / PTFE
- Pressure port: 304L tube welding stud

Remarks:

- Status: Qualified and flown (AEOLUS mission)
- ITAR-free



3-Way Isolation Valve (P/N 3IV)

Ball Latch Valves

Electric Venting Valve

Propellant Filter

Fill and Vent Valve

Pressurant Filter

Relief Valve

Transition Joints

Three Way Valves

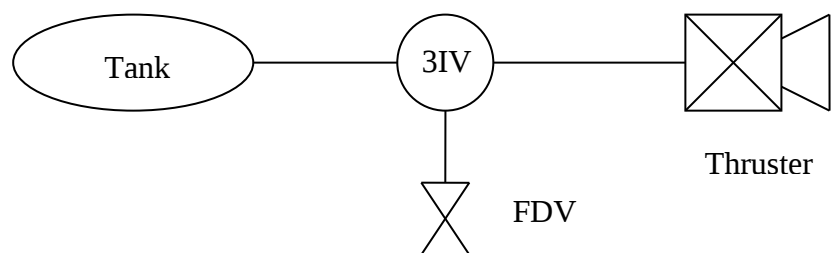
Cold Gas Thruster

Throttleable Flow
Control Valve

Equipments, Services
and Facilities

Company Description

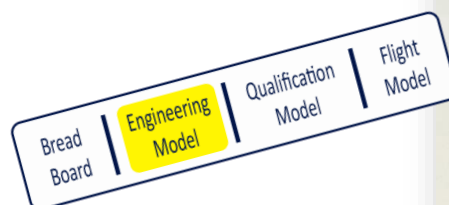
The purpose of the 3-way Isolation Valve (3IV) is to have an isolation valve with 3 ports: one for the tank, one for the thrusters and one for the fill and drain valve. The equipment would then allow to connect two of these ports together with the third one closed. Through the use of the 3IV, the thruster could be connected to the fill and drain valve for ground testing, the tank could be connected to the fill and drain valve for the fuelling operation and finally the tank could be connected to the thrusters for the in-orbit operations.



Moreover, this valve would still be an isolation valve that would be the third barrier between the tank and the thrusters. Therefore, the valve presents leakage requirements within 10^{-6} scc/s for intern and extern with Helium.

In order to control the position of the valve with its three open and three closed positions, Omnidea-RTG is planning to use either Hall sensor technology or switch technology. Both proved themselves reliable during breadboard and engineering model phases. This development was performed under ESA contract.

- Status: **Under Development**



Ball Latch Valves

Electric Venting Valve

Propellant Filter

Fill and Vent Valve

Pressurant Filter

Relief Valve

Transition Joints

Three Way Valves

Cold Gas Thruster

Throttleable Flow Control Valve

Equipments, Services and Facilities

Company Description

Cold Gas Thruster, Solenoid actuated (P/N TG1)

Description: Thrust valve actuated by a solenoid producing a thrust between 0,1 - 1 N, through interchangeable nozzle design.

Functional Performance:

- Operating Media: Inert Gases
- MEOP: 5,2 bar
- Leakage Rate (He):
 - o Seat: $1,0 \times 10^{-4}$ scc/s
 - o Extern: $1,0 \times 10^{-6}$ scc/s
- Max. Flow Rate: thrust dependant
- Life Time target: 250.000 cycles

Electrical Requirements:

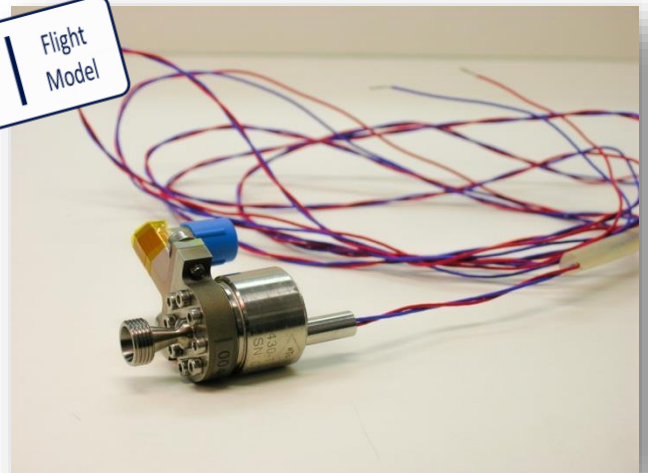
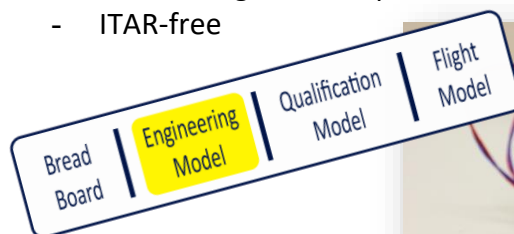
- Power Supply: 24 - 32 V_{DC}
- Power Consumption: 190 mA
- Connector Type: 2 meters lead wires

Mechanical Interface Requirements:

- Mass: 0,089 kg
- Dimensions: 32 x 34 x 26 mm
- Pressure port: Adapter with MS33656-4E

Remarks:

- **Status: under development** from heritage design adaptation (as need for re-design and re-qualification exists)
- ITAR-free



Ball Latch Valves

Electric Venting Valve

Propellant Filter

Fill and Vent Valve

Pressurant Filter

Relief Valve

Transition Joints

Three Way Valves

Cold Gas Thruster

Throttleable Flow Control Valve

Equipments, Services and Facilities

Company Description

Throttleable Flow Control Valve

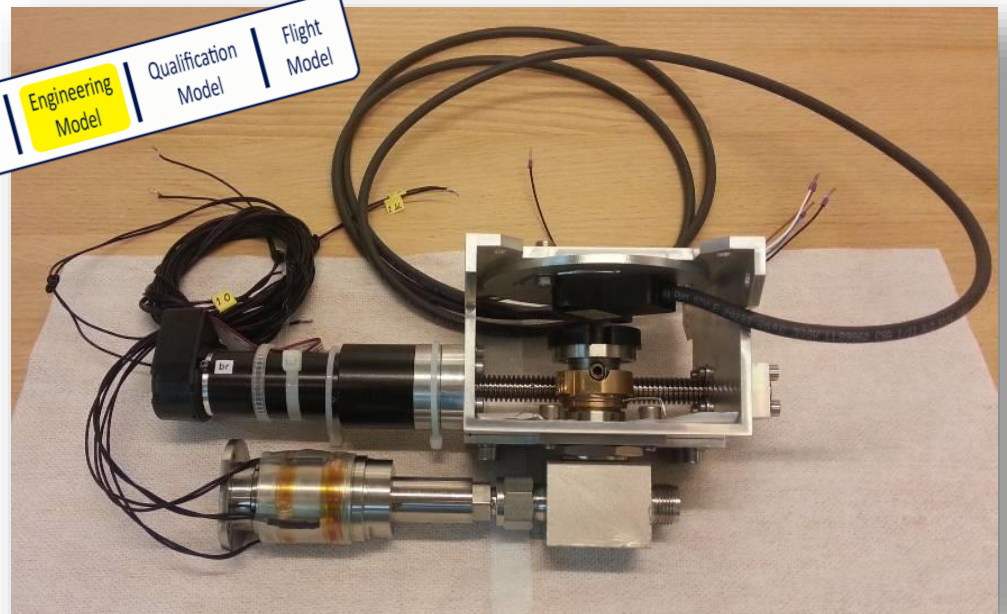
(P/N TFC)

Development of a Throttleable Flow Control Valve for Moon and Mars Lander missions. The valve shall be adaptable for mono- and bi-propellant chemical thrusters and offer the possibility to achieve different thrust levels through regulation of the propellant flow.

This development is performed under ESA contract and passed PDR. Two valve size have been established: a 1/4" sized and a 3/4" sized. Both equipment's are composed of leakage and electrical redundant flow control valve, as well as of flow regulation device composed of a ball valve, a DC motor and a Hall sensor.

Omnidea-RTG will continue this development in order to achieve CDR and a qualified equipment. Future development testing will encompass hot fire testing.

- Status: **Under Development**



Ball Latch Valves

Electric Venting Valve

Propellant Filter

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Relief Valve

Transition Joints

Three Way Valves

Cold Gas Thruster

**Throttleable Flow
Control Valve**

**Equipments, Services
and Facilities**

Company Description

Equipment, Services, and Facilities

Design, Integration and Test of complete Reaction Control Cold Gas Thrust Systems and Hydrazine Thrust Systems

- layout of AOCS thrust systems and testing of completed subsystem
- assistance during engineering phase and design of pipework
- manufacture and supply of all components incl. pipes and fittings according to customer specifications
- integration of AOCS-thrust system at customer's site
- generation of ESA approved documentation

Engineering Support, Development and Qualification of new components according to customer requirements

Facilities:

- 2 Cleanrooms Class 10.000 with Clean bench Class 100 (over 60m²)
- Thermal Cycling Chamber 2,2 m³
- Vacuum Chamber
- He-Leak Tester
- Astro-Arc welding equipment
- Pressurized water tank for liquid components
- Large flow (> 100g/s N₂) gas test bench
- Cleaning facility for Ultra Clean Processes
- Low and High flow meters (Coriolis and Vortex)
- Tube bending devices
- Several Data Acquisition Systems



Ball Latch Valves

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Three Way Valves

Cold Gas Thruster

Throttleable Flow Control Valve

Equipments, Services and Facilities

Company Description

Company Description

Omnidea-RTG GmbH is a German SME located in Stuhr, in the outskirts of Bremen (Germany). Omnidea-RTG is wholly owned by Omnidea Group, a Portuguese Space SME (omnidea.net), which in 2014 acquired the Space division of RTG Aero-Hydraulic, becoming engaged in Space propulsion as manufacturer of satellite chemical propulsion components and supplier of services such as propulsion sub-system assembly and testing.

Through this take-over O-RTG's heritage includes German missions SAR-Lupe, CHAMP, GRACE and EnMAP, while also contributing for ESA projects such as Hispasat-36W, Sentinel-3, Aeolus, VEGA/VEGA-C; O-RTG can also claim heritage on non-European missions such as Galileo (NASA-US), GökTürk (Turkish Space Agency) and Formosat-5 (NSPO-Taiwan).

Since 2015 Omnidea-RTG owns 49% of Pleione SA (pleione-energy.com), a Greek SME operating in Energy, through a joint venture with Adamant Composites Ltd (adamant-composites.gr). Since 2018 Omnidea-RTG owns 100% of Omnidea Ltd (Leicester, UK) dedicated to Electric Propulsion and, since 2021, also 100% of Omnidea-Eastern Europe (Bucharest, Romania) dedicated to small launcher propulsion equipment.

