



Flight control/nose wheel steering System Electro Hydraulic Servovalves (EHSV's)



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IN-LHC proposes a range of two-stage EHSV's essentially developed with the jet pipe technology. This technology provides an optimized reliability regarding pollution and also reduces the consumption of the first stage with equivalent results.

It furthermore eliminates the risk of mechanical jamming of the first stage. Our equipments are designed to meet the international standard ARP490 or developed according to specific customer requirement. It is possible to integrate a position sensor.





Hydraulics and controls

Flight control/nose
wheel steering System
Electro Hydraulic
Servovalves (EHSVs)

Features

Type: 3 or 4 ports.
Nominal rated flow: 1 to 200 l/mn.
Nominal supply pressure: up to 350 bar.
Fluid: MIL-H 5606/83282 or Phosphate Ester.
Current supply: \pm 8 mA.
Option: LVDT sensor for spool position monitoring.

Applications

Airbus A340-500/600, CRJ700 / 900
BD 100 / Continental
Dash 8-400
ERJ 170 / 190
RJ 200
Falcon 50, 900, 2000

New applications

A380
A400M
F7X

Notes



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Brake pressure control Electrohydraulic servovalves



IN-LHC uses the flapper nozzle technology for the pressure EHSV's integrated into the brake-by-wire system and part of:

- anti-skid circuit,
- main and emergency circuits.

Our technical offer is based on two main architectures:

- simple retroactive pressure effect for business jet and single aisle Aircraft,
- retroactive pressure and flow effect for wide body Aircraft.

New concept

IN-LHC has developed a low leakage equipment in order to meet the requirements of the new high pressure braking systems.





Hydraulics and controls

Brake pressure control
Electrohydraulic servovalves

Features

Type: 3 ports.

Nominal rated flow: 18 l/mn under 14 bar differential pressure.

Nominal supply pressure: up to 350 bar.

Fluid: MIL-H 5606/83282 or Phosphate Ester.

Current supply: 0 to 40 mA.

Applications

Airbus A300, A310, A319, A320, A321, A330, A340, A340-500/600, Falcon 900, 2000.

New applications

A380, Cessna Mustang, Falcon 7x.

Notes



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Hydraulic manifolds



The sub-systems developed by IN-LHC use the know-how acquired in the development of our other product lines.

As a matter of fact, steering manifolds, fuel or power packs, landing gears or radar cooling manifolds... call for components such as servovalves, pumps, solenoid valves, pressure switches...





Features

Hydraulic of fuel manifolds can also include complementary functions/equipment such as:

- electropumps,
- flow transducers,
- check valves.

Nominal rated flow: 3 to 50 l/mn.

Pressure: 5 to 210 bar.

Applications

Mirage 2000, Falcon
TBM 700
Super Puma
UAV.

New applications

Falcon 7X
Mustang.

Notes



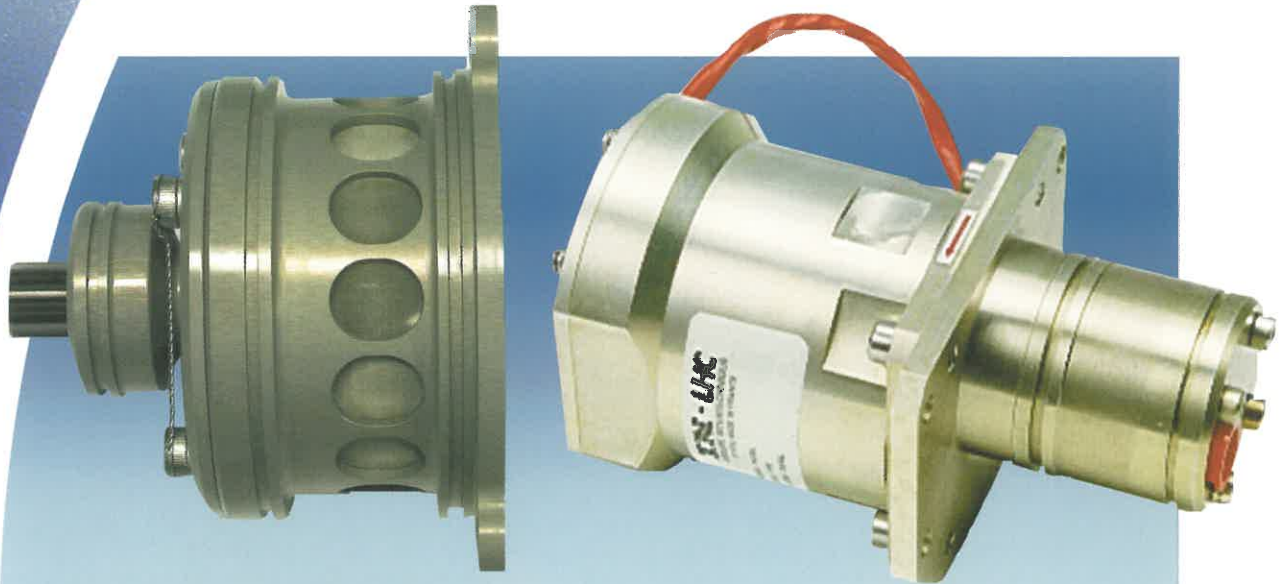
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Pumps and electropumps



The IN-LHC pumps are based on several simple and effective concepts:

- piston pumps (self regulated in pressure),
- gear pumps (either with fixed gap or gap self adjustment),
- centrifugal pumps.

Our pumps are used in several applications such as:

- fuel circulation,
- cooling circuit for RADAR,
- hydraulics circuits (all types).





Features

Displacement: 0,25 to 4 cc/revolution.

Speed: up to 18.000 rpm.

Nominal supply pressure: up to 210 bar (oil), 80 bar (fuel).

Fluids: Fuel (all types), MIL-H 5606/MIL-H 83282 coolanol/ Water Ethylene Glycol.

Temperatures: - 55° C, to + 130° C.

Supply tension: DC or AC.

Applications

Mirage 2000, Rafale, Falcon F7X
NH 90, AB 139, UAV, Super Puma
Racing

New applications

FORMULE 1.

Notes



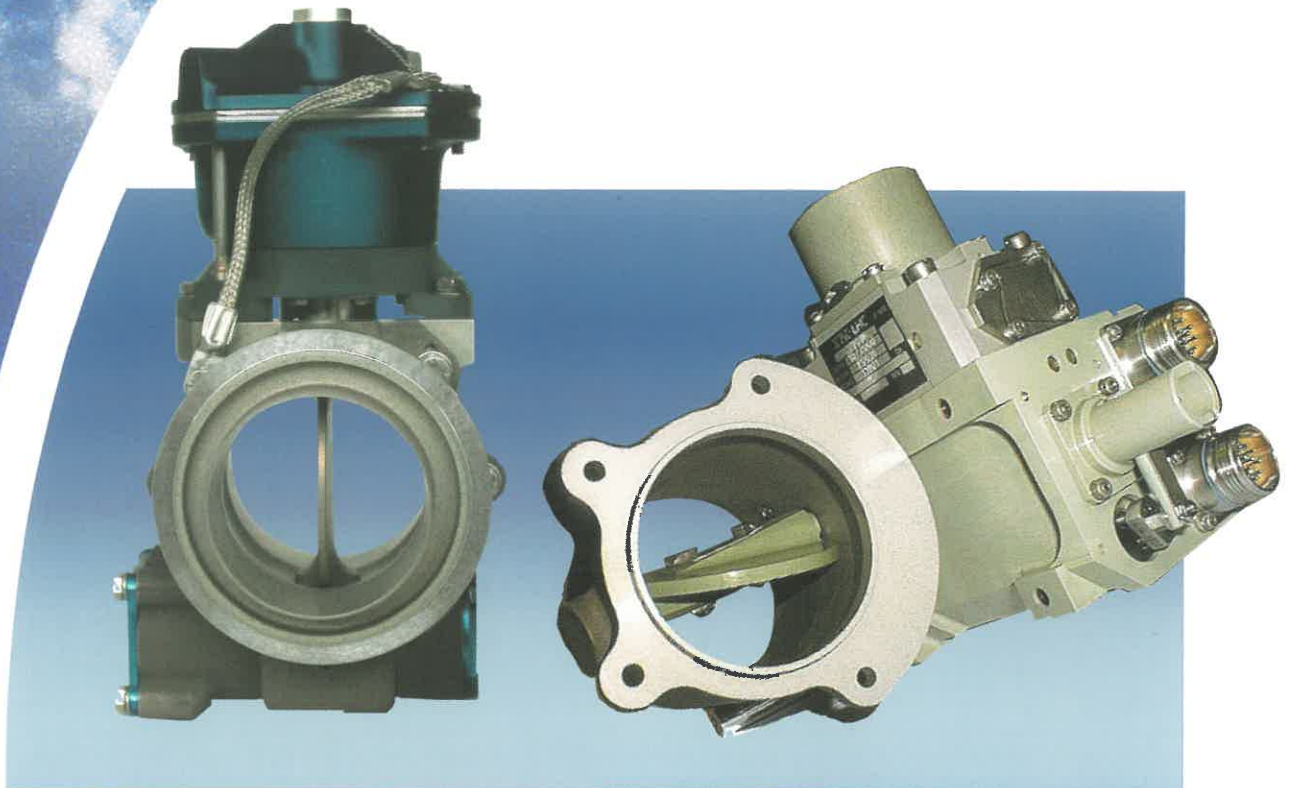
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Control and bleed valves



Engines applications

- Air flow control in order to monitor the turbines stator/ rotor clearance,
- Engineering expertise of « on/off » and proportional valves integrating the feed back position,
- Bleed air valve associated with a servovalve metering the flow between LP and HP compressors.

Airframe applications

- Butterfly valves adapted to high flow circuits & low pressure drop for air conditioning circuits.





Features

Type: butterfly or poppet valve.

Command:

- pneumatic in difference or pressure ratio,
- electromechanical actuator,
- electropneumatic with integrated solenoid valve,
- servo fuel actuator.

Air temperature: up to 350° C.

Ambient temperature: - 55° C to + 150° C.

Pressure: 3 bar, 10 bar for pneumatic control.

Flow duct diameters: 50 to 80 mm.

Applications

Arriel all types
Makila all types
CFM56-5C
Falcon 2000.

Notes



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Pressures switches



IN-LHC has developed a wide range of pressure switches with the following advantages:

- small size,
- low costs,
- simple and rugged designs,
- precision (negative rate disc spring).

Our technical offer is based on two options:

- standard products according to MIL-STD 810 and RTCA-DO-D160,
- development of customer tailored products.

New concept: pressure switch based on a new patented technology.

Specifications

- very high reliability obtained by avoiding mechanical contact;
- excellent resistance to severe environment (vibrations, shocks...).





Features

Types: Absolute, Differential, Relative.

Temperature: - 55° C to +150° C.

Pressure: 1 mbar to 350 bar.

All aeronautic fluids: Air, Kerosene, Oil, Hydraulics fluids.

Applications

Airbus A300, A310, A319, A320, A321, A330, A340, A340-500/600, ATR 42, 72, Casa 295 B 767

Mirage 2000, Rafale, Gripen, Hawk, NH90 Super Puma AS 332, AS 350, AS 366G M53, M88

Arriel, Makila, Arrius RTM 322, MTR 390.

New applications

A380

Notes



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Solenoid valves



IN-LHC proposes a complete range of solenoid valves from two main technologies:

- directly operated solenoid valves,
- pilot operated solenoid valves.

These products work in different environments and with the following fluids:

- air,
- all type of hydraulics fluids,
- kerosene.

Some valves are adequate for no leakage demand. This technology allows to maintain this function in the whole range of temperatures and during the whole product life.

Response time are lower than 15 ms, which is a high standard for this type of product. We have also developed valves in composite materials.





Features

Type: 2, 3 ways; normal or latching; 1 or 2 coils.

Supply pressure: from 3 bar to 270 bar.

Temperature: - 55° C to + 180° C.

Consumption: inferior to 1 A.

Applications

C17-A, M53,
NH 90, Ecureuil, Puma, Super Puma
Arriel, Makila, Arrius
RTM 322, MTR 390.

New applications

A380
Falcon F7X

Notes



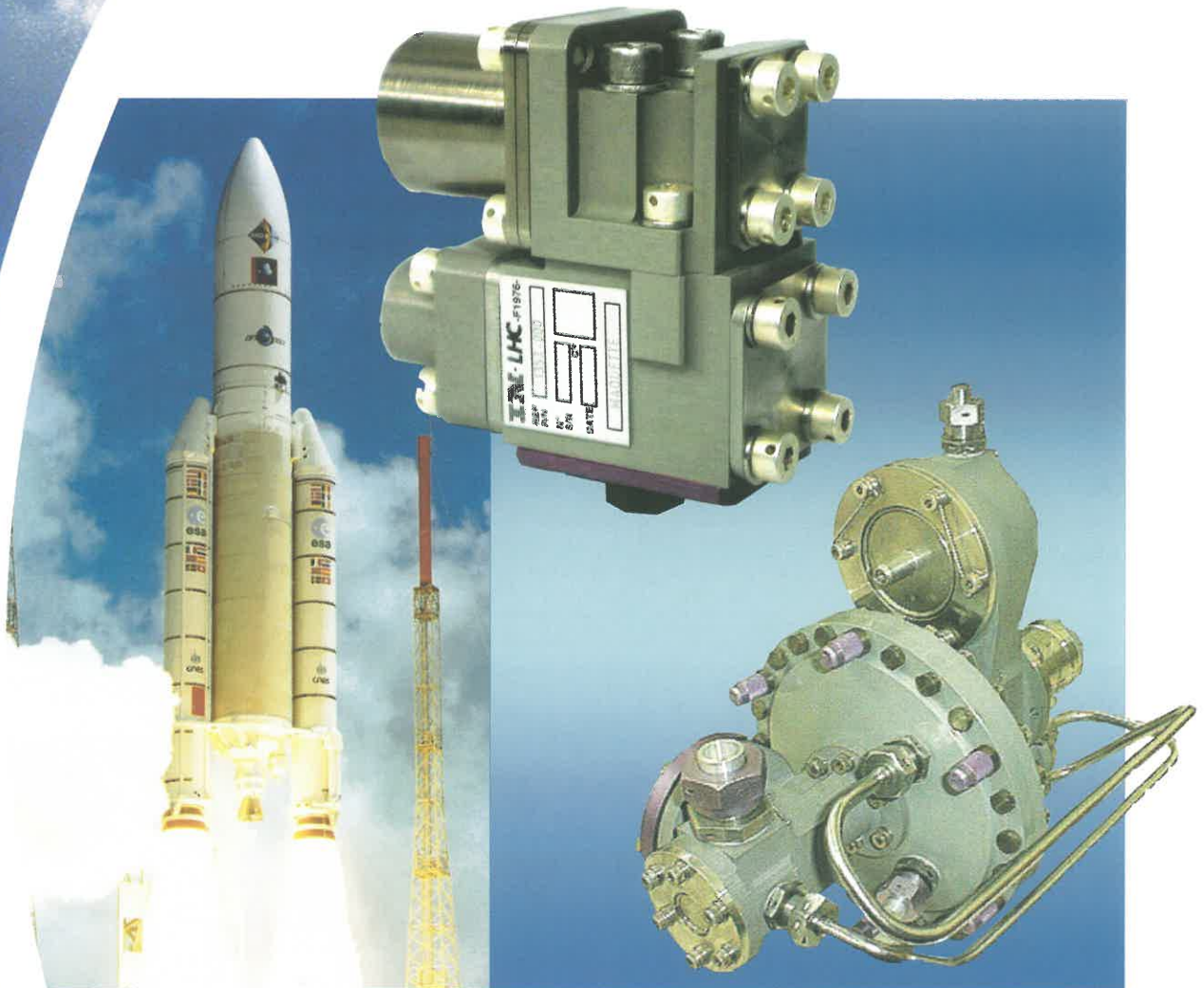
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Space equipment Components for control systems



IN-LHC equipment controls 2 main functions for the Ariane family space launchers:

- on-ground liquid gas tank filling,
- in flight tank pressure regulation and engine control.

Tank filling components

Allowing propellant filling up; scavenge and overflow on the launcher tanks.





Solenoid valves

Activates the cryogenic engine main control valves.

Features

Technology: 2 stages, 3 ways.
Nominal flow: 15 gms/s under 50 bar.
Fluids: Hydrogen, Oxygen, Helium.
Response time: 12 ms.
Temperature: - 180° C to + 50° C.

Pressure control equipment

Pressure reducers and relief valves used for monitoring the pressure of hydrogen and oxygen tanks of cryogenic upper stages.

Features

Nominal supply pressure: 3 to 280 bar.
Temperature: - 180° C to + 50° C.
Pressure control accuracy : 20 mbar.
Fluids : Hydrogen, Oxygen, Helium.

Applications

ARIANE IV – HM7
ARIANE V – HM7 – VINCI.

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