



# DVG AUTOMATION

**the EXCELLENCE**  
in FLOW CONTROL AUTOMATION



# HISTORY

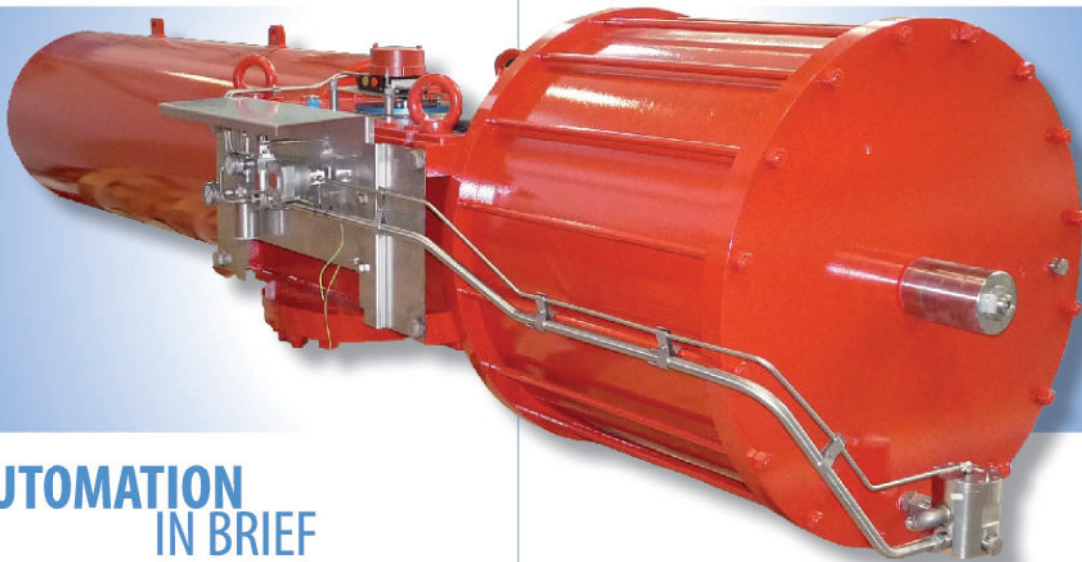
DVG Automation was founded in 2007 by the challenging entrepreneurial initiative of GIVA GROUP.

DVG core business is the production of tailor made technologies and innovative solutions in the Flow Control Process Automation Field dedicated to the Energy Market.

The GIVA Group is an industrial, family-owned Group who has been working for more than 40 years in Forgings and Steel production.

Experience and innovation are the peculiarities which best identify the Group's activities.

DVG Plant is located in the town of Cortemaggiore, a place historically tied up with the Italian Energy Market and related Industrial Technologies.



## DVG AUTOMATION IN BRIEF

Only a few years since its establishment, DVG has already become a world leader in the Valve Automation field, representing for its Customers:

- A young, dynamic and flexible Company, with a proven extensive experience in the Automation field;
- A company with solid financial background;
- Technical Innovation (Patented Piston Type Actuators, Complete 360° product range), suitable to satisfy any Project requirements;
- Complete Product & Company Certifications;
- Market neutrality;
- High Production Capacity of Customized & individually Tested Actuators.


## PLANT


DVG plant has been designed to include future doubling of capacity for both assembly and testing areas.

- Operation site includes a 6000 square meters shop floor area, and a 1,600 square meters office space.;
- Full steam production level is 15,000 units per annum, fully customized and individually tested.



# PRODUCT RANGE

 <b>ACTUATOR QUARTER TURN &amp; LINEAR</b>	<b>CONTROLS SYSTEM &amp; ACCESSORIES</b>
Hydraulic (Up to 350 barg) Single/Double Acting	Pneumatic Control System
Pneumatic (Up to 12 barg) Single/Double Acting	Hydraulic Control system
Gas Over Oil (Up to 110 barg) Single/Double Acting	ESDV, BDV, XV Application
Direct Gas (Up to 110 barg)	HIPPS System
Electro Hydraulic (Up to 350 barg) Single/Double Acting	Partial Stroke Test Devices
Quick Acting	Direct Gas and Gas Hydraulic control unit
ON- OFF Service	Line Break System
Modulating Service	Electro Hydraulic Power Unit
	Smart Valve Monitoring System
	Pneumatic Positioner
	Dampening system
	Mechanical & Hydraulic override
	Backup tank/accumulator for emergency stroke/s according to int. std.

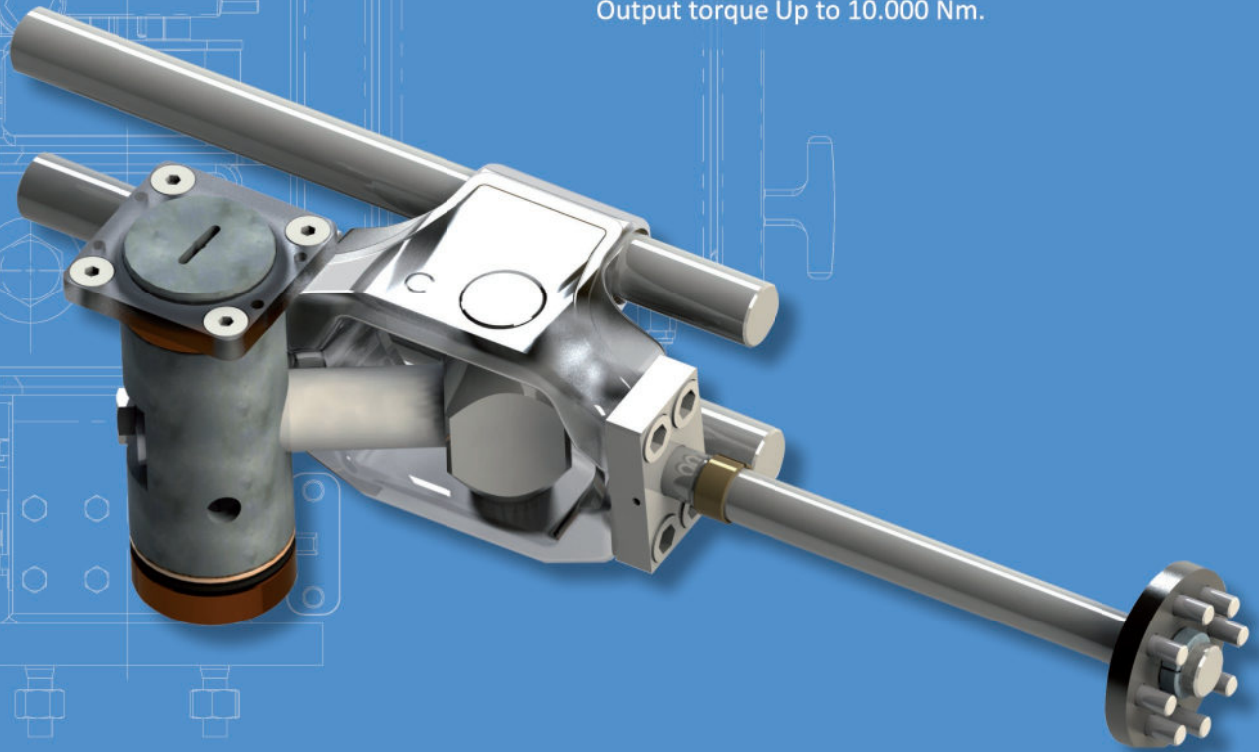
 <b>PNEUMATIC AND HYDRAULIC COMPONENTS (LOW &amp; HIGH PRESSURE)</b>	<b>ELECTRONIC &amp; ELECTRIC DEVICES</b>
Volume Boosters	ITVC – Intelligence Total Valve Controller
Pneumatic Pilot Valves	Limit Switch Box
Pneumatic Non Return Valves	Partial Stroke Test
Quick Exhaust Valves	Junction Box
Flow Regulator Valves	
Hydraulic Pressure Switches	
Torque Limiting Devices	
Hydraulic Power Valves	
Pneumatic Switches	
Hydraulic Local Remote Selectors	
Line Break Pressure Switches	



# PISTON TYPE ACTUATOR FAMILY BY DESIGN FEATURE

Scotch Yoke (BY series): Patent Nr. PR2008A000007

Patented Scotch Yoke Mechanism which eliminates mechanical clearance between cylinder piston rod and drive module. Output torque Up to 10.000 Nm.



Scotch Yoke (QT series): Patent Nr PR2008A000006

Patented mechanism which introduces three main features: Multiple Hard Chromium Plated Guide Bar minimizing guide block swing thus extending piston rod lifespan; it also avoids side loads on the valve stem. Excellent surfaces finish and self lubricated bearings accomplish higher overall efficiency. Closed Drive Yoke Wings for all housing sizes; Piston Rod – Guide Block new connection design. Output Torque Up to 800.000 Nm.



## BY SERIES

- Quarter Turn SCOTCH YOKE Mechanism
- Double and Single Acting
- Symmetric or Canted Yoke Available
- Modular design concept for EASY on site service operation and EASY fail safe changing action
- Pneumatic (12BARG) and Hydraulic (350BARG) power supply
- Output Torque up to 10.000Nm
- Standard temperature range -30°C +93°C

- Low temperature version -60°C + 85°C
- PED 97/23/EC compliant
- ATEX 94/9/EC compliant
- IP66, 67, 67M, NEMA 4, 4X, 6
- SIL3 Capable IEC 61508; TUV certified
- Corrosion resistant cylinder
- Pneumatic version with separate spring pack module on request



- Mechanical and Hydraulic Manual override available
- Protected travel stops are standard
- Modular concept: Cylinder / Spring cartridge preassembled and separately tested
- All actuator in carbon steel  
NO Aluminium, NO Cast Iron
- Quick Acting <0.5 sec

## QT SERIES

- Quarter Turn SCOTCH YOKE Mechanism
- Double and Single Acting
- Symmetric or Canted Yoke available
- Modular design concept for EASY on site service operation
- Pneumatic (12BARG) and Hydraulic (350BARG) power supply
- Output Torque up to 800.000Nm
- Standard temperature range -30°C +93°C
- Low temperature version -60°C + 85°C

- PED 97/23/EC compliant
- ATEX 94/9/EC compliant
- IP66, 67, 67M, NEMA 4, 4X, 6
- SIL3 Capable IEC 61508; TUV certified
- Corrosion resistant cylinder
- Mechanical and Hydraulic Manual override available
- Protected travel stops are standard
- Modular concept: Cylinder / Spring cartridge preassembled and separately tested
- All actuator in carbon steel – NO Aluminium, NO Cast Iron
- Quick Acting < 1 sec





# ELECTRO HYDRAULIC ACTUATORS

Electro Hydraulic power unit is custom engineered and manufactured to meet the most stringent requirements and project specifications.

- Offshore and corrosive resistant materials of construction.
- Electric Power consumption according with project requirement.
- Max Operating Pressure up to 350 Barg (35MPag)
- Low temperature down to -60°C
- High temperature up to +65°C
- Nitrogen bottles and accumulator in accordance with ASME VIII div1 or required applicable standard (PED, AS, BS, ..).
- Piston or bladder type accumulator.
- Electrical classification according to ATEX or comparable UL/FM standards.
- Mineral based oil or biodegradable hydraulic fluid.
- Relay based control logic or termination to interface with Motor Control Centre customer logic.
- Manual Hydraulic Hand Pump for emergency operation to be used either to recharge accumulator or to stroke the actuator.

## STANDARD FEATURE FOR ON-OFF SERVICE

- Single or Dual motor and pump power source
- Self standing frame of various materials according to customer requirements.
- Accumulator sized for "N" off piston strokes.
- Stainless Steel oil reservoir with inlet filling filter, dehydrator and relief valve.
- Manual hydraulic hand-pump for emergency operation
- Manifold mounted controls to minimize tubing and potential leakage.
- Heavy duty components for severe service.

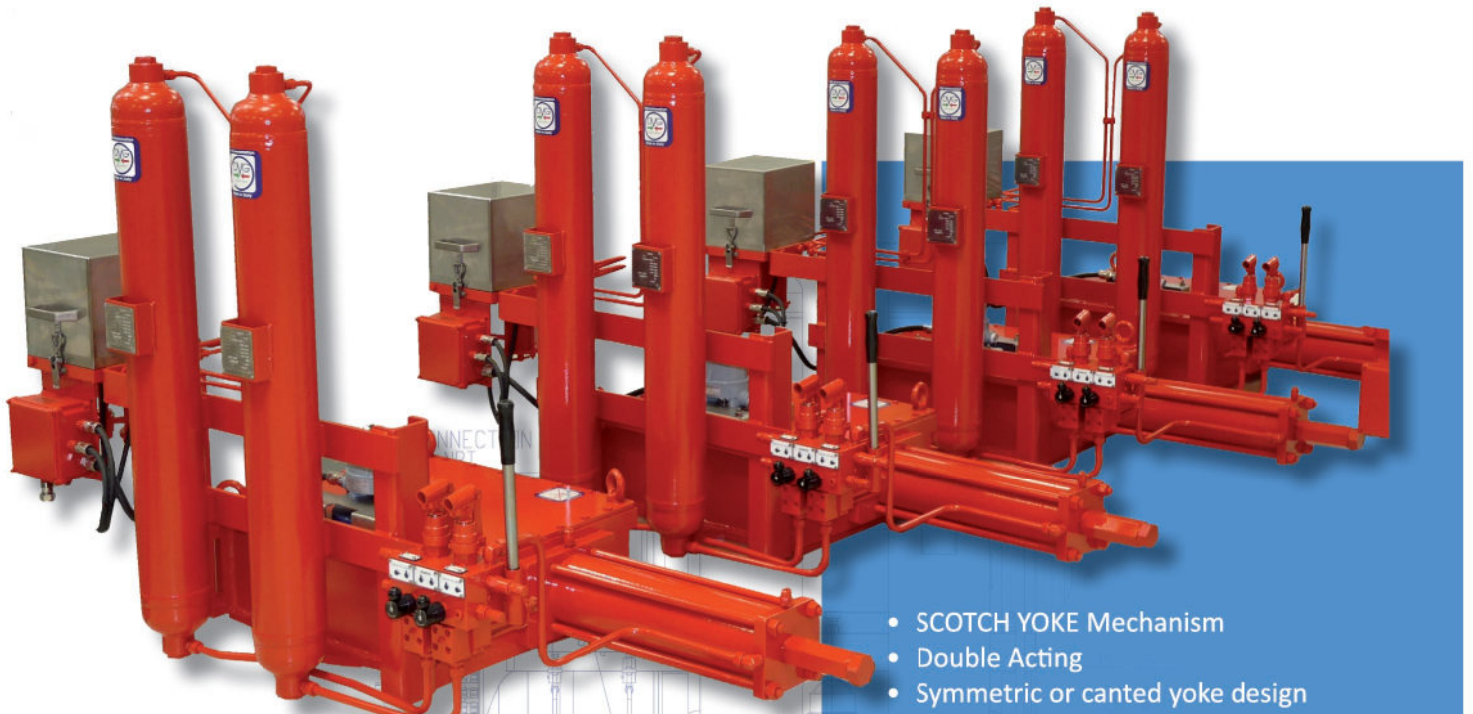
## OPTION

- Low oil level switch.
- Oil temperature monitoring.
- Hydraulic pressure monitoring
- Indication lamps / local electric control





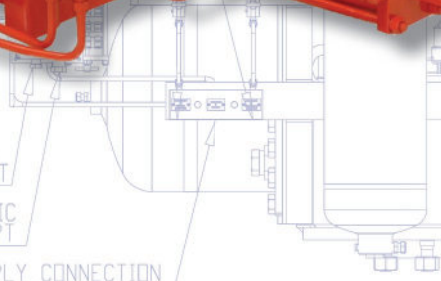
# GAS OVER OIL ACTUATORS



PLUGGED ELECTRIC CONNECTION 3/4" NPT

PLUGGED ELECTRIC CONNECTION 1" NPT

LBG SUPPLY CONNECTION 2" NPT



- 10
- 9
- 7
- 3
- 4
- 1



- SCOTCH YOKE Mechanism
- Double Acting
- Symmetric or canted yoke design
- 160 BARG Max power supply
- Output Torque Up to 800.000 Nm
- Standard temperature range -30°C +93°C
- Low temperature version -60°C + 85°C
- PED 97/23/EC Compliant
- ATEX 94/9/EC Compliant
- IP66, 67, 67M, NEMA 4, 4X, 6
- Corrosion resistant cylinder
- Protected travel stops are standard
- Sweet Gas – Sour Gas supply ( $H_2S \leq 6\%$  /  $CO_2 \leq 10\%$ )
- Actuator in carbon steel – NO Aluminium NO Cast Iron
- Hydraulic or Pneumatic Torque limiting device
- Local - Remote Control Group designed by DVG Automation
- High Pressure Pneumatic Limit Pilot Switch designed by DVG Automation
- Line break Device designed by DVG Automation both gas or electronic version available
- ESD – Opening prevention – Manual reset designed by DVG Automation



# DIRECT GAS ACTUATORS

- SCOTCH YOKE Mechanism
- Double and Single Acting
- Symmetric or canted yoke design
- 105 BARG Max power supply
- Output Torque Up to 800.000 Nm
- Standard temperature range -30°C +93°C
- Low temperature version -60°C + 85°C
- PED 97/23/EC Compliant
- ATEX 94/9/EC Compliant
- IP66, 67, 67M, NEMA 4, 4X, 6
- Corrosion resistant cylinder
- Standard travel stops protected
- Sweet Gas – Sour Gas supply ( $H_2S \leq 6\%$  /  $CO_2 \leq 10\%$ )
- Actuator in carbon steel – NO Aluminium  
NO Cast Iron
- Gas Torque limiting device (Direct Gas)
- Local / Remote Control Group designed by DVG Automation
- High Pressure Pneumatic Limit Pilot Switch designed by DVG Automation
- Line break Device designed by DVG Automation both gas and electronic version available
- ESD – Opening prevent – Manual reset designed by DVG Automation



# LINEAR LA SERIES

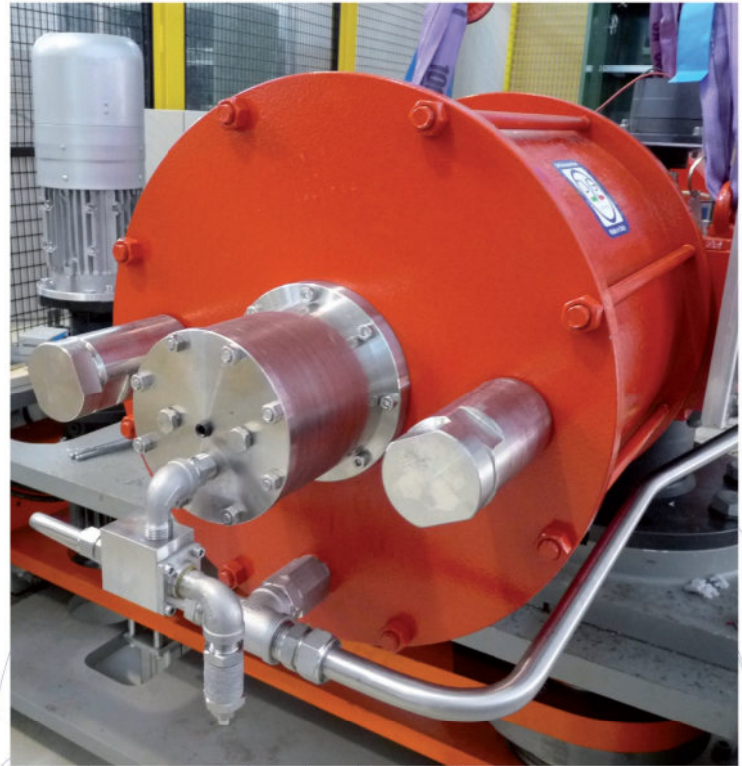
- Compact design
- Suitable to operate every type of linear valve
- Double and single acting
- Pneumatic (12 BARG) and hydraulic (350 BARG) power supply
- ON-OFF or Modulating Service
- Output Trust up to 5.000.000 N (Cylinder)
- Output Trust up to 300.000 N (Spring)
- Standard temperature range -30°C +93°C
- Low temperature version -60°C + 85°C
- PED 97/23/EC Compliant
- ATEX 94/9/EC Compliant
- IP66, 67, 67M, NEMA 4, 4X, 6
- Corrosion resistant cylinder
- Standard travel stops protected
- Hydraulic manual override / Dumping System
- Coupling joint in stainless steel
- Actuator in carbon steel
- Modular concept: Cylinder - Spring cartridge preassembled and separately tested
- QUICK ACTING < 1 Sec.





# QUICK ACTING ACTUATORS HIPPS APPLICATION

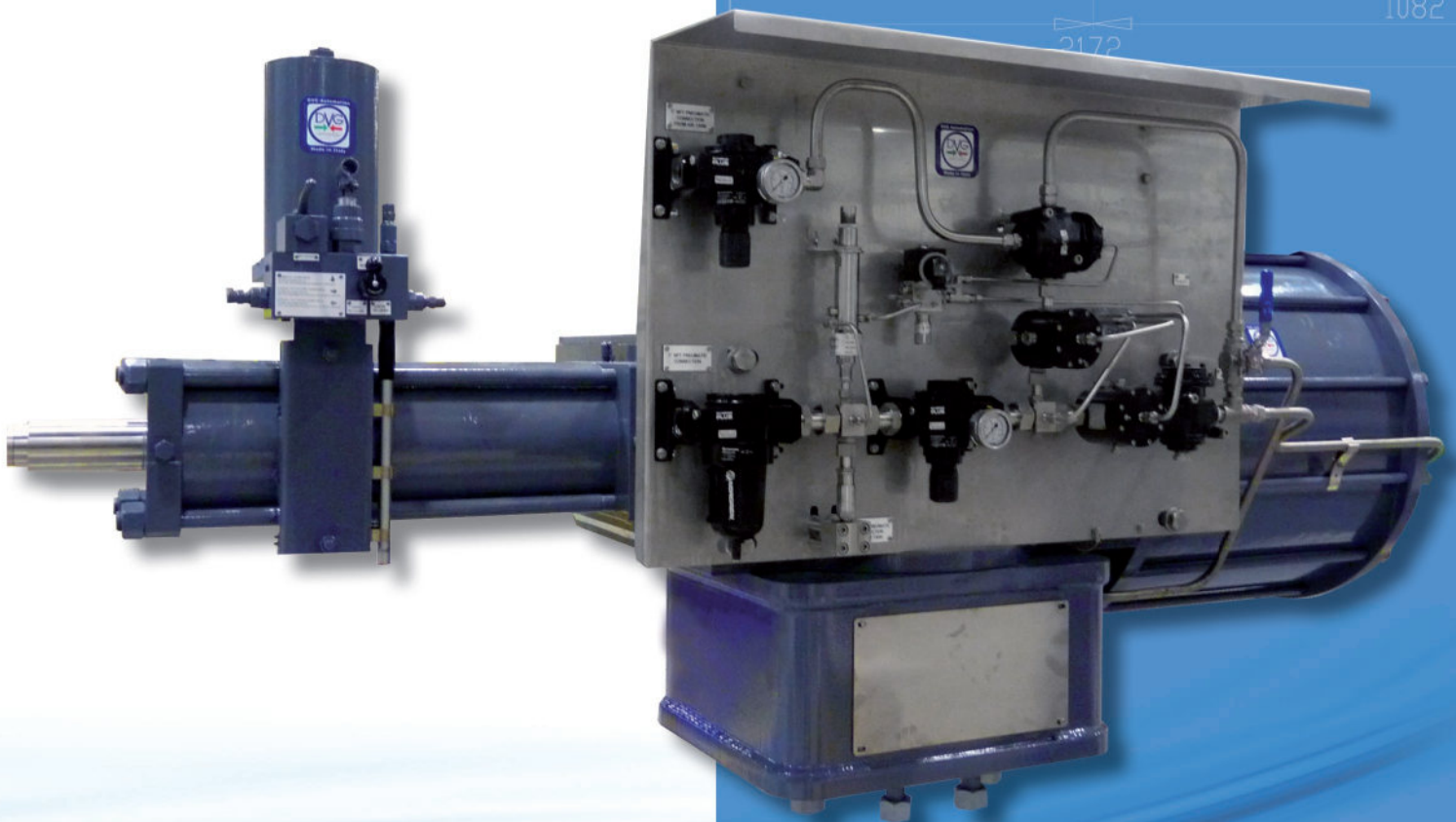
- Symmetric or canted yoke design
- Pneumatic (12 BARG MAX) and hydraulic (350 BARG) power supply
- Output Torque Up to 800.000 Nm
- Standard temperature range -30°C +93°C
- Low temperature version -60°C + 85°C
- PED 97/23/EC Compliant
- ATEX 94/9/EC Compliant
- IP66, 67, 67M, NEMA 4, 4X, 6
- SIL3 Capable IEC 61508; TUV certified
- Corrosion resistant cylinder
- Special Protected travel stops
- Actuator in carbon steel
- Modular concept: Cylinder – Spring cartridge preassembled and separately tested
- Large capacity quick exhaust valve
- Special dampening system
- These systems can be combined to achieve either the ON-OFF fast acting and Modulating Operation
- Operating time (<1 sec)





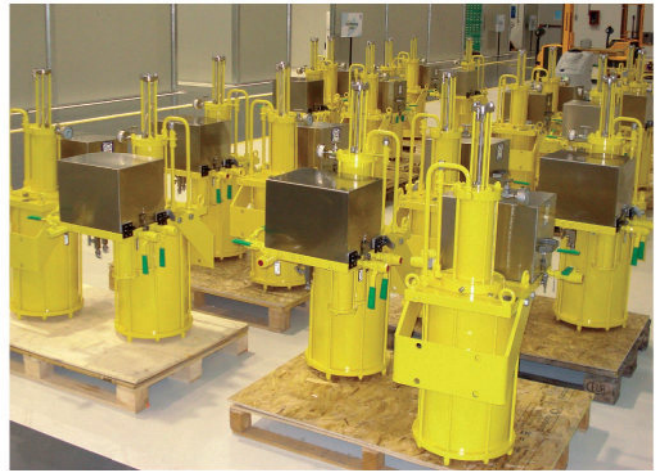
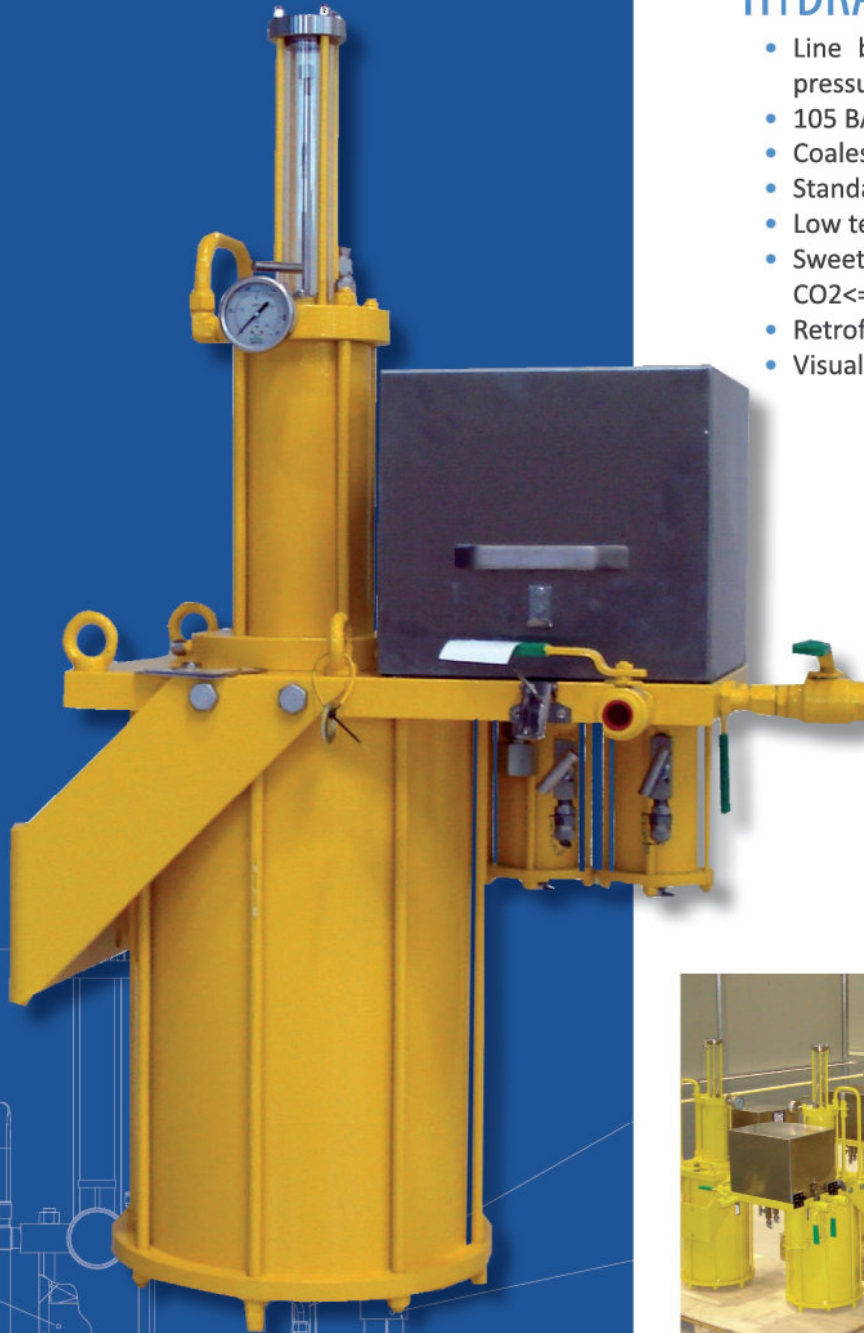
# MODULATING REGULATING SERVICE

- Pneumatic and Hydraulic modulating Actuator
- Single and double type available
- Quarter Turn and Linear movement
- Accurate and precise process control for quarter turn butterfly valves ,Cage ball valves, Dampers and linear globe and gate valves
- Output Torque Up to 800.000 Nm
- Output Trust up to 5.000.000 N (Cylinder)
- Electro pneumatic positioner from the most reliable producers
- Communication protocol according to project requirements: Hart, Foundation Fieldbus,...
- Standard temperature range -30°C +93°C
- Low temperature version -60°C + 85°C
- PED 97/23/EC Compliant
- ATEX 94/9/EC Compliant
- IP66, 67, 67M, NEMA 4, 4X, 6
- SIL3 Capable IEC 61508; TUV certified



# GAS HYDRAULIC LINE BREAK

- Line break detector based on “rate of pressure drop”
- 105 BARG Max power supply
- Coalescent Filters
- Standard temperature range -30°C +93°C
- Low temperature version -60°C + 85°C
- Sweet Gas – Sour Gas supply ( $H_2S \leq 6\%$  /  $CO_2 \leq 10\%$ )
- Retrofittable
- Visual indicator





# CONTROL SYSTEMS

DVG produces high integrity actuator control systems in either 316 Stainless Steel panel or cabinet type.

Control systems are produced according to customer specifications by means of pneumatic components designed by DVG or by any other brands specified by customer.

Compact design in modular construction is also available providing customer benefit in terms of:

- Resistance
- Space constrain
- Weight and cost reduction

Control Systems production apply to:

- Pneumatic
- Gas
- Hydraulic
- Electro hydraulic

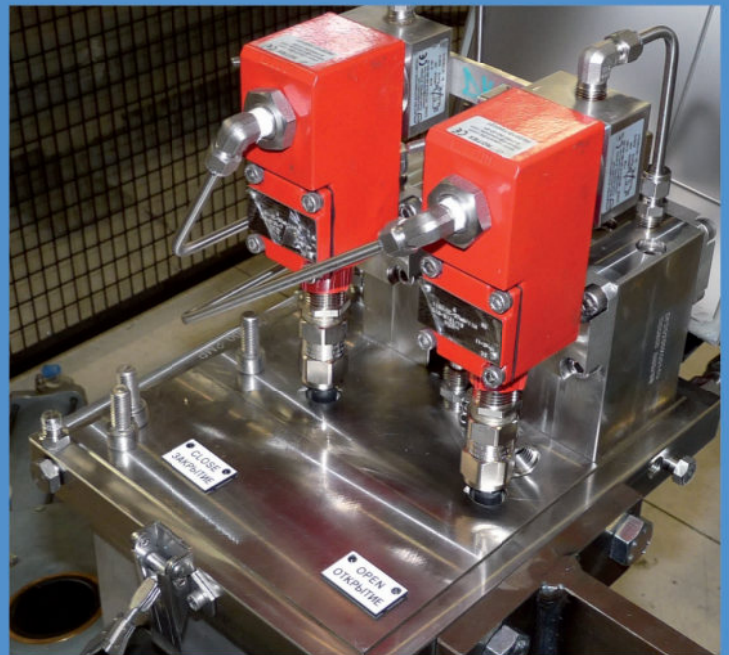




# PNEUMATIC, GAS AND HYDRAULIC COMPONENTS

DVG has also developed a wide range of components employed in its Control Systems, either low or high pressure:

- Volume boosters SIL3 Capable IEC 61508; TUV certified
- Pneumatic Pilot Valves SIL3 Capable IEC 61508; TUV certified
- Pneumatic Non Return Valves
- Quick Exhaust Valves SIL3 Capable IEC 61508; TUV certified
- Flow Regulator Valves
- Hydraulic Pressure Switches
- Torque limiting Devices
- Hydraulic Power Valves
- Pneumatic Switches
- Hydraulic Local Remote Selectors
- Line Break Pressure Switches



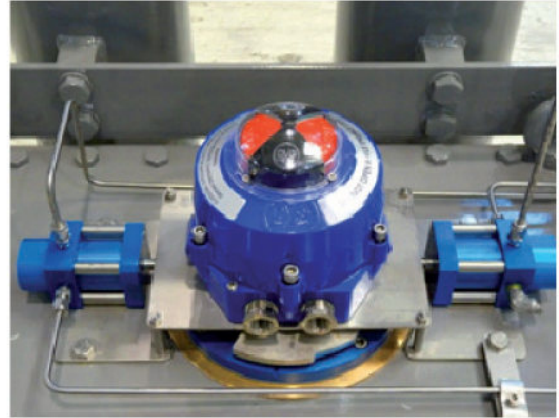


# VALVE POSITION MONITORING

## LIMIT SWITCH BOX "ASB" SERIES

Rotary limit switch boxes provide a visual and remote electrical indication of quarter turn and linear valve/ actuator position.

- Rugged Die-cast Aluminum or Stainless Steel enclosure
- 4÷20mA / HART® position transmitter available on request
- Simple setting of limit switch position
- Visual position indicator high visibility type magnetically coupled to avoid ingress of water / humidity (no passing holes to limit switch box internals)
- Available for standard and low temperature range

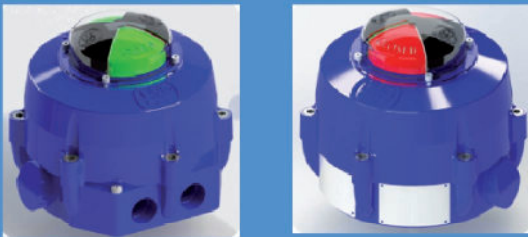


### Specification

Working Temperature	-60° to +85°C
No. of cable entries	Min 2 – Max 6
Cable entry size	ISO M20x1.5 – ISO M25x1.5 ½" NPT – ¾" NPT
Micro switch type	REED – INDUCTIVE – MECHANICAL CAPACITIVE – MAGNETIC



### Construction Material

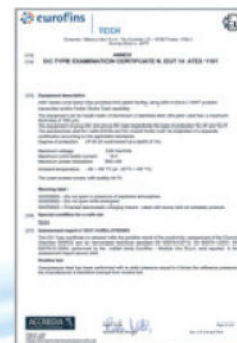


Body	Aluminum or Stainless Steel
Shaft	Stainless steel
Visual Indicator	Clear Polycarbonate
Available Seal Materials	NBR or FMVQ (Fluorosilicone)

### Certification



ATEX certif. No. EUT 14 ATEX 1161	II 2G Ex d IIC T5
IEC Ex certif. No. IECEX EUT 14.0002	II 2G Ex d IIC T5
WP according to EN 60529	IP 68





# PARTIAL STROKING TEST

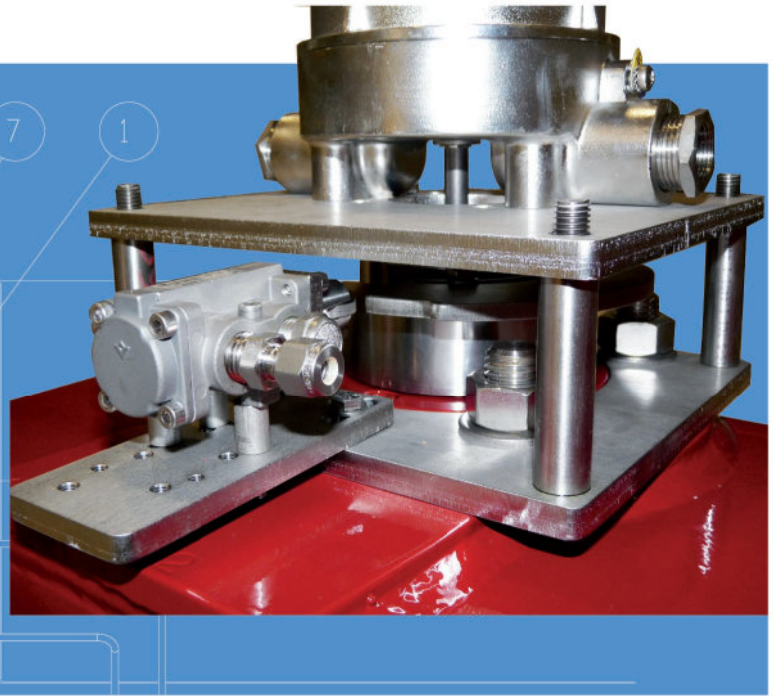
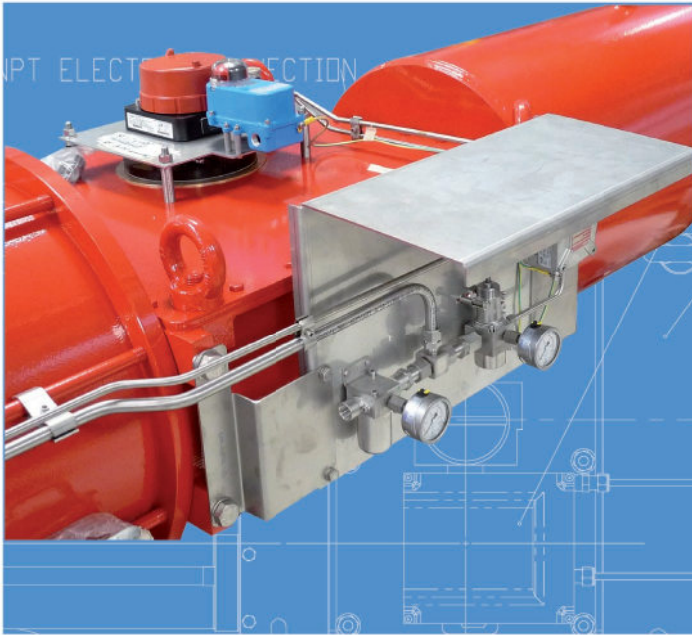
DVG Automation can provide actuators and control system fitted with several Partial Stroke Test systems according to any Customer requirement, this in order to reduce the probability of failure on demand (PFD) and to increase the whole system reliability.

The PST function will allow to partially operate the valve with no impact on the process.

DVG can provide a wide range of PST systems such as:

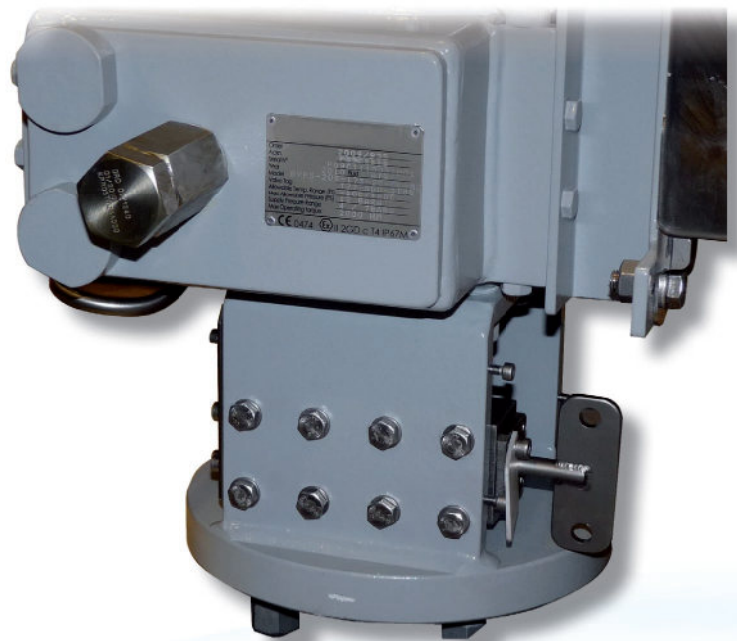
- Mechanical (local only)
- Pneumatic/Hydraulic (local & Remote)
- Electric (local & Remote)
- Smart field device (local & Remote)

Depending on the application (pneumatic low pressure, Gas high pressure or Hydraulic) Smart field device can be either outsourced from the main international producers or by DVG's Intelligent Total Valve Controller (ITVC) unit.

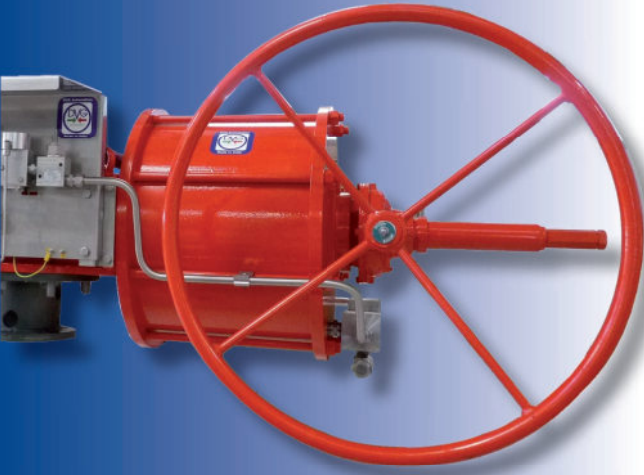


## MECHANICAL LOCKING DEVICES PARTIAL STROKING TEST

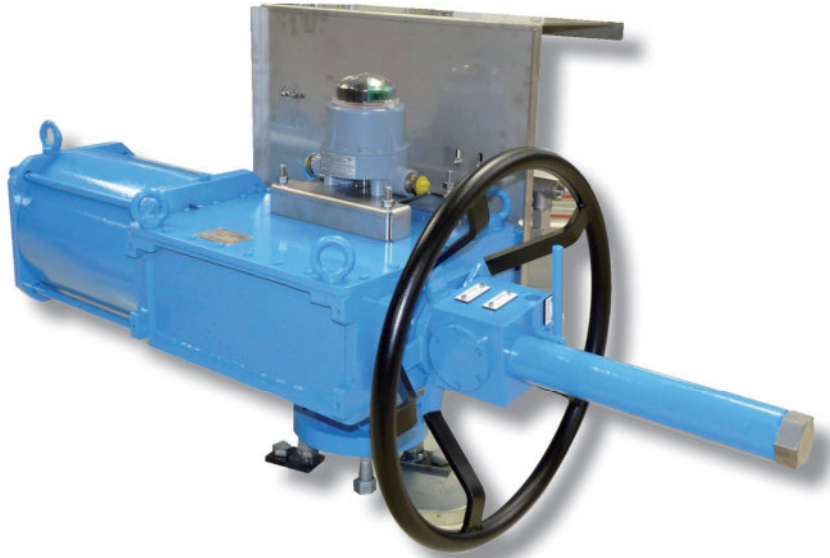
- The mechanical system fully developed by DVG is an external device wafer-mounted between the valve top-works and the actuator
- Normally integrated in valve mounting hardware
- The locking device mechanically limits the valve/actuator assembly stroke to 20deg ( or as per specific Customer request) clockwise or counter-clockwise
- Once disengaged, the complete assembly is free to travel for the entire stroke with no interference
- Remote indication of PST status (engaged or not) can be provided as an option.



## MECHANICAL MANUAL OVERRIDES



- Reduction gear

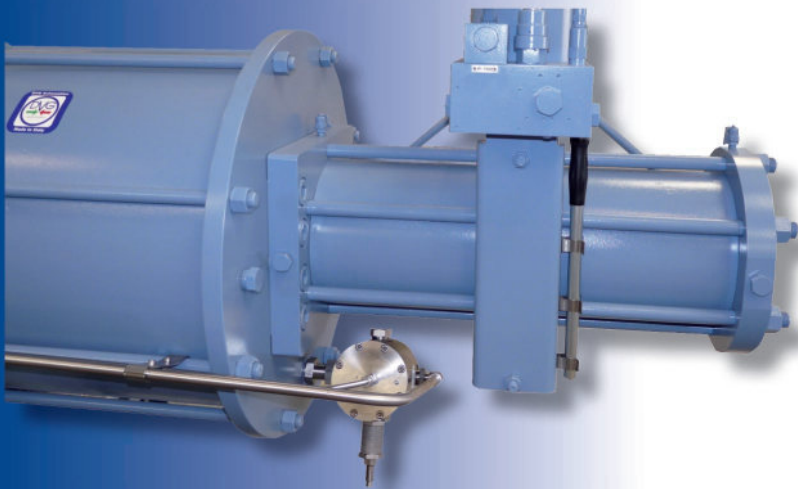


- Jackscrew – Closed type

## HYDRAULIC MANUAL OVERRIDE

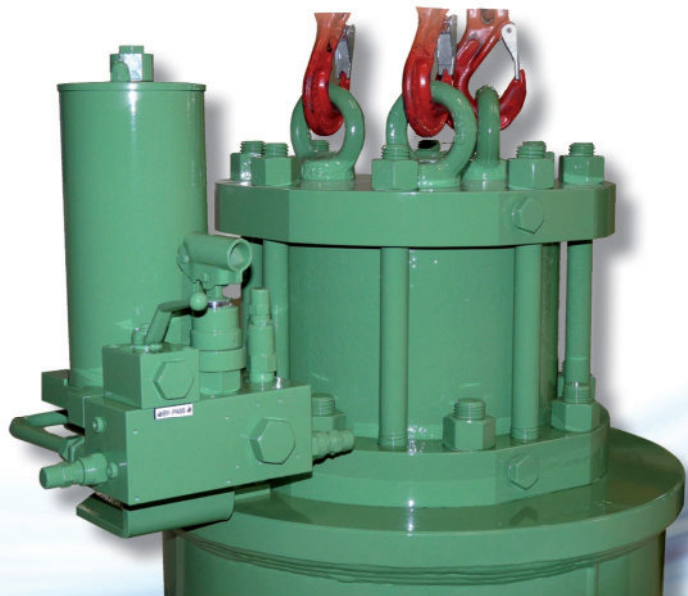
Hydraulic manual override consisting in:

- Hydraulic cylinder mounted directly on actuator
- Driven by a hydraulic control unit inclusive of:
  - hand-pump
  - directional control valve
  - oil tank
  - relief valve
  - one-way flow restrictor.



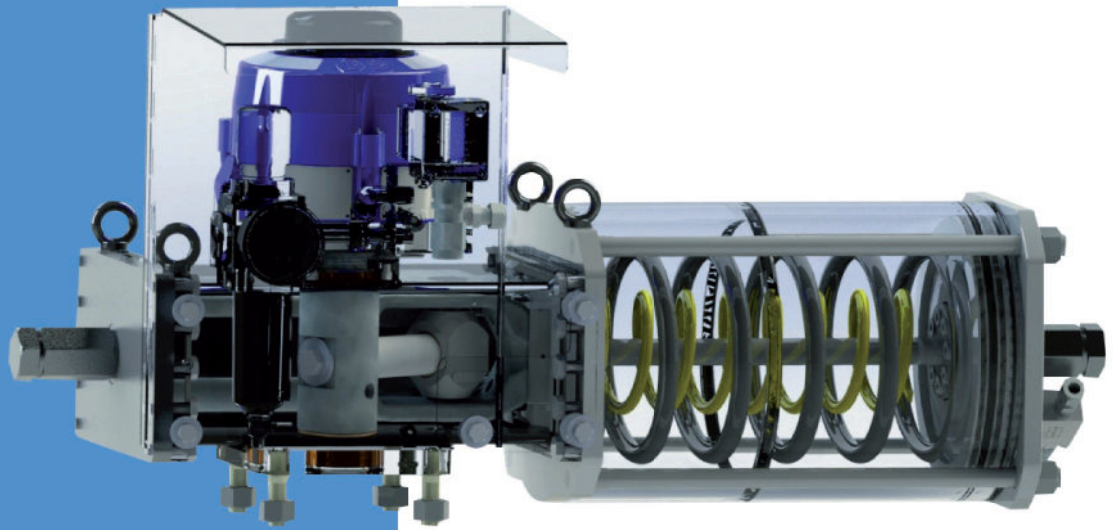
## HYDRAULIC DAMPER

- Hydraulic dumper to reduce travel speed and provide smooth end of stroke dampening in critical application.

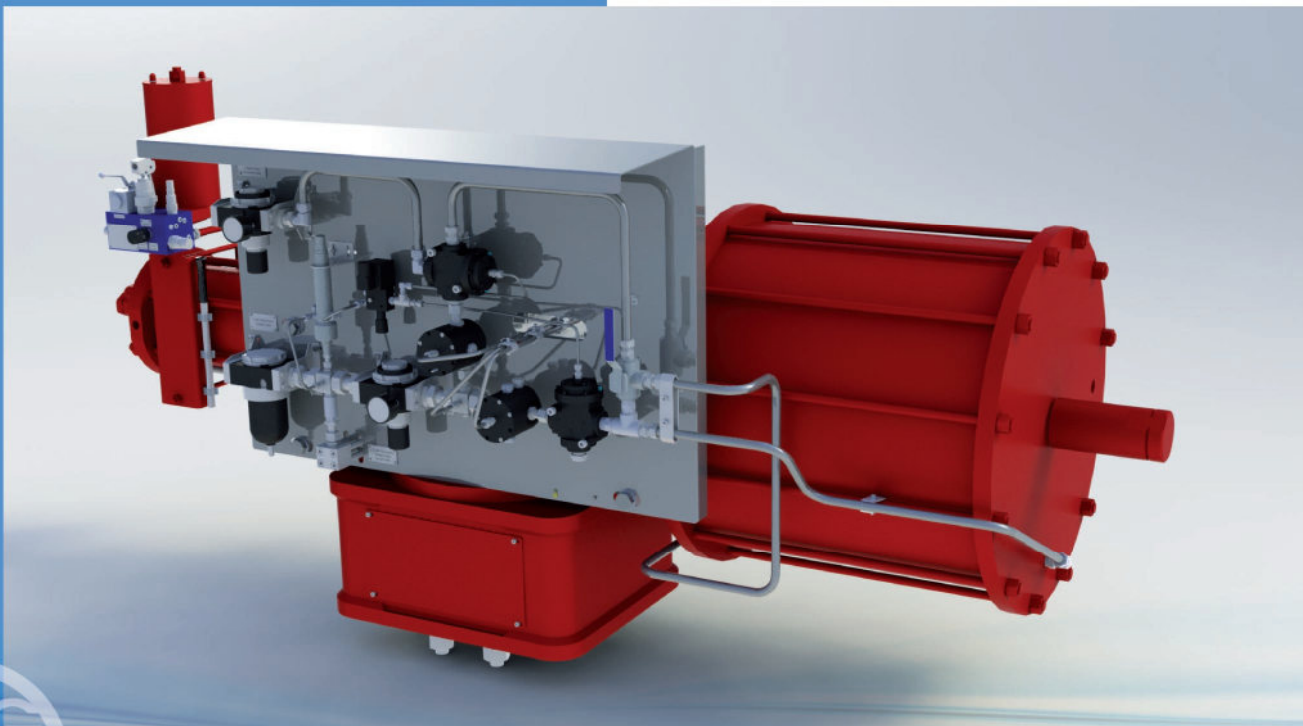
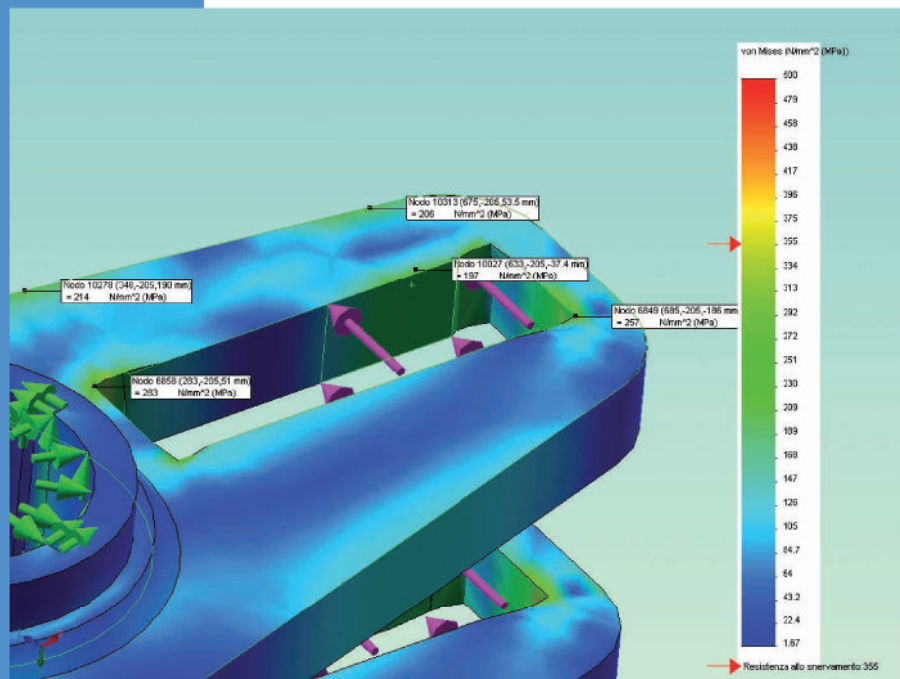




# DESIGN TOOLS



The Design Phase is carried out using Solidworks 3D Mechanical Design Software applications, which allow the development of all the DVG Product Range. The virtual testing and analysis of each new product is performed by the COSMOSWorks Professional Design Validation Software, which offers a wide spectrum of tools, also aimed at predicting the physical behaviour of any part under any loading conditions.



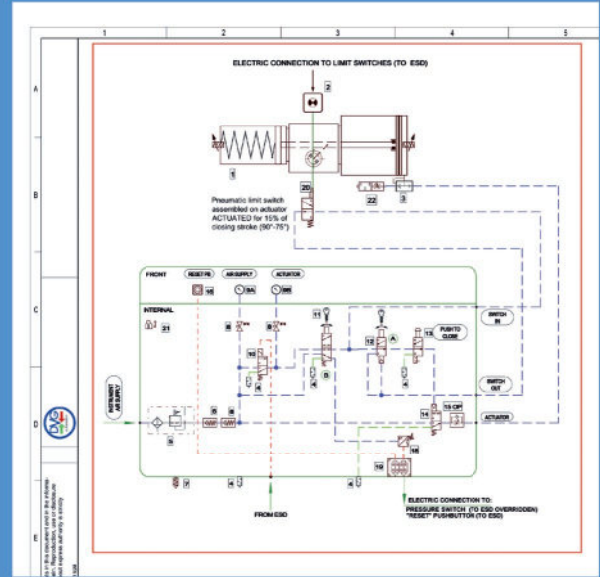
# MANAGEMENT TOOLS

DVG has implemented the ERP SAP® - R3® Management System, developing in particular the "Engineering to Order" Module, which allows a severe though flexible management of both the activities connected with the job orders, and the operations linked with the accounting and/or logistical flows.

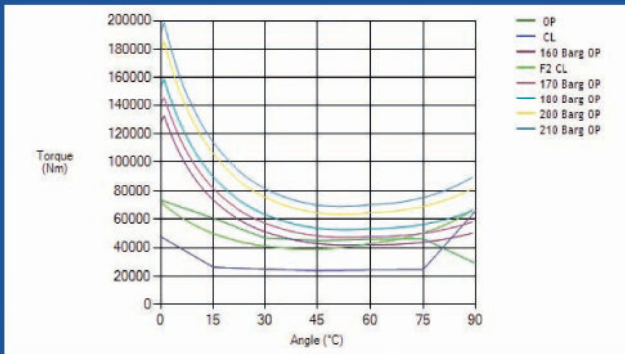
- The installed Modules include:
- SD Sales & Distribution,
  - PP Production Planning & Control,
  - MM Material Management,
  - FI Financial Accounting,
  - CO Controlling,
  - QM Quality Management



# APPLICATION ENGINEERING



DVG disposes of a design application (known as Fluid Cad) which provides complete design automation solutions for all hydraulic, pneumatic and electric diagrams.



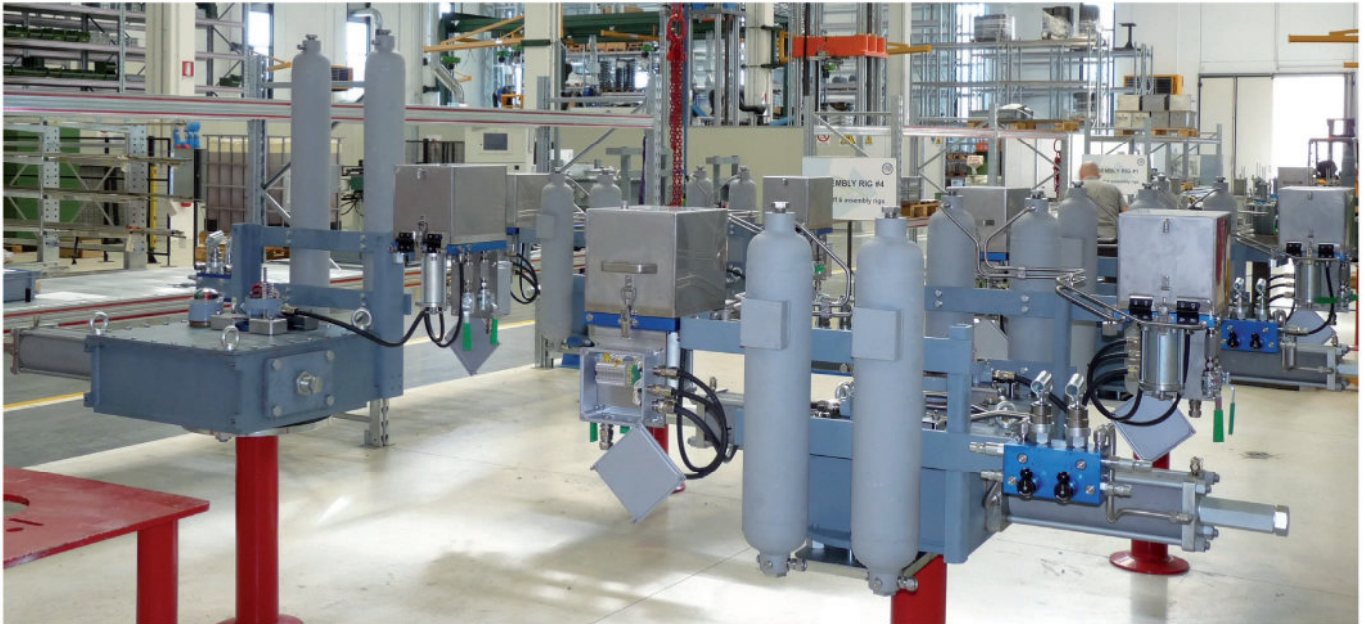
# DVG CONFIGURATOR

Each quote is prepared with the support of a precise Sizing Torque Calculation Program (developed by DVG), which selects the actuator model the closest to the Customer's Technical Specifications.

Pos.	160 Barg OP	160 Barg CL	170 Barg OP	170 Barg CL	180 Barg OP	180 Barg CL	200 Barg OP	200 Barg CL	210 Barg OP	210 Barg CL
0°	88,135	68,176	93,678	72,464	99,221	76,751	110,307	85,327	115,850	89,615
10°	81,141	62,417	85,615	65,714	90,089	69,010	99,038	75,512	100,512	78,900
30°	53,342	39,132	56,697	41,593	60,052	44,054	66,762	48,976	70,117	51,438
45°	50,903	37,217	54,105	39,558	57,306	41,899	63,709	46,580	66,910	48,921
60°	53,522	39,601	56,888	41,453	60,254	43,706	66,987	48,812	70,353	51,265
75°	64,887	47,127	68,968	50,091	73,049	53,053	81,211	58,983	85,292	61,947
90°	93,246	66,439	99,111	68,492	104,975	72,544	116,704	80,450	122,569	84,703



# MANUFACTURING PLANT



LEAN Manufacturing is DVG challenge to be more competitive and to provide a shorter response time to its Customers' requirements. DVG Production System is disposed according to a flow line: no interference or crossing is allowed between the Departments.

The Assembly Department disposes of nr. 6 mounting areas, each provided with nr. 5 working positions, which permits the contemporary fitting out of up to 30 actuators.

State of the art Equipment and Technologies are the heart of DVG Production System.

- Robot units perform structural welding, guaranteeing the perfect repeatability on complex components.
- Press for spring cartridge assembling up to 70 tons, able to measure the effective spring force.



- Highly efficient Horizontal Machining Centre.
- Automated Tubes Bending Machine allows high flexibility and high volumes, while maintaining low process costs.
- High capacity Lifting Equipment.

Painting and surface protection coating activities are fully outsourced to an ISO 9001 certified, NORSOK approved sub-supplier, located nearby DVG factory.



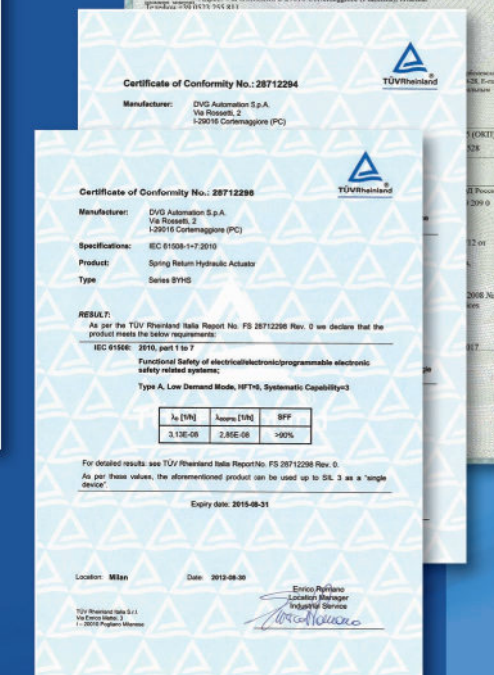
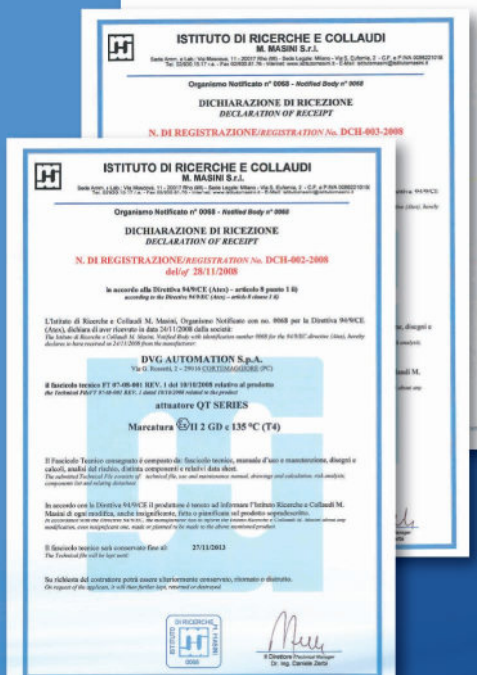
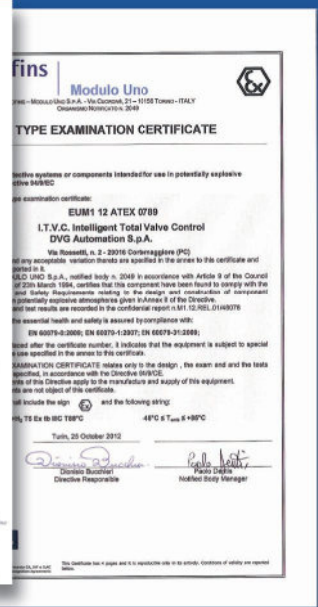


# QUALITY & CERTIFICATION

The Testing Department is among DVG main strengths. DVG Design and Manufacturing activities are managed in accordance with the highest quality and efficiency standards, and through the employment of the most sophisticated equipment and methodologies currently available on the market. DVG is able to offer appropriate services and products in order to serve the marketplace, and to warrant the maximum reliability as well as competitive delivery times and definitely convenient guarantee conditions, in confirmation of the superb quality of its products.

DVG Quality System includes the following Certifications:

- ISO 9001:2008 Quality Management System
- ISO 14001:2004 Environmental Management System
- BS OHSAS 18001:2007 Occupational Health and Safety Management System
- PED Certification to 97/23/CE Directive
- ATEX Certification to 94/9/CE Directive
- Kema Attestation of conformity to EN 60529:1991+A1:2000 and NEMA 250-2003
- SIL 3 Capable - Certification by TÜV Rheinland in accordance with IEC 61508: 2010 part 1 to 7
- Russian Certification and Standardization





# TESTING

One of the DVG main strengths is its Testing Department.



All the produced equipment is tested and delivered complete with its own individual Test Certificate according to EN 102043.1. Main equipment include a battery of Dynamic (continuous measurements) and Static (step by step) Test Benches with a torque range from 30.000Nm up to 500.000Nm.

The Testing Equipment is supported by an impressive Compressor Station able to guarantee the contemporary performance of up to 7 actuators' PNEUMATIC test. Installed compressor units allow pressure supplies up to 12bar with a flow rate of 65 litres/sec., and up to 120 bar with a flow rate of 10 litres/sec..

For HYDRAULIC testing DVG disposes of Hydraulic Power Units for a hydraulic supply of up to 350 barg.

Electro-hydraulic Control Units allow to check and inspect the hydraulic actuators, performing complete cycle tests as well as Cleanness Classification in accordance with ISO 4406 and NAS 1638.



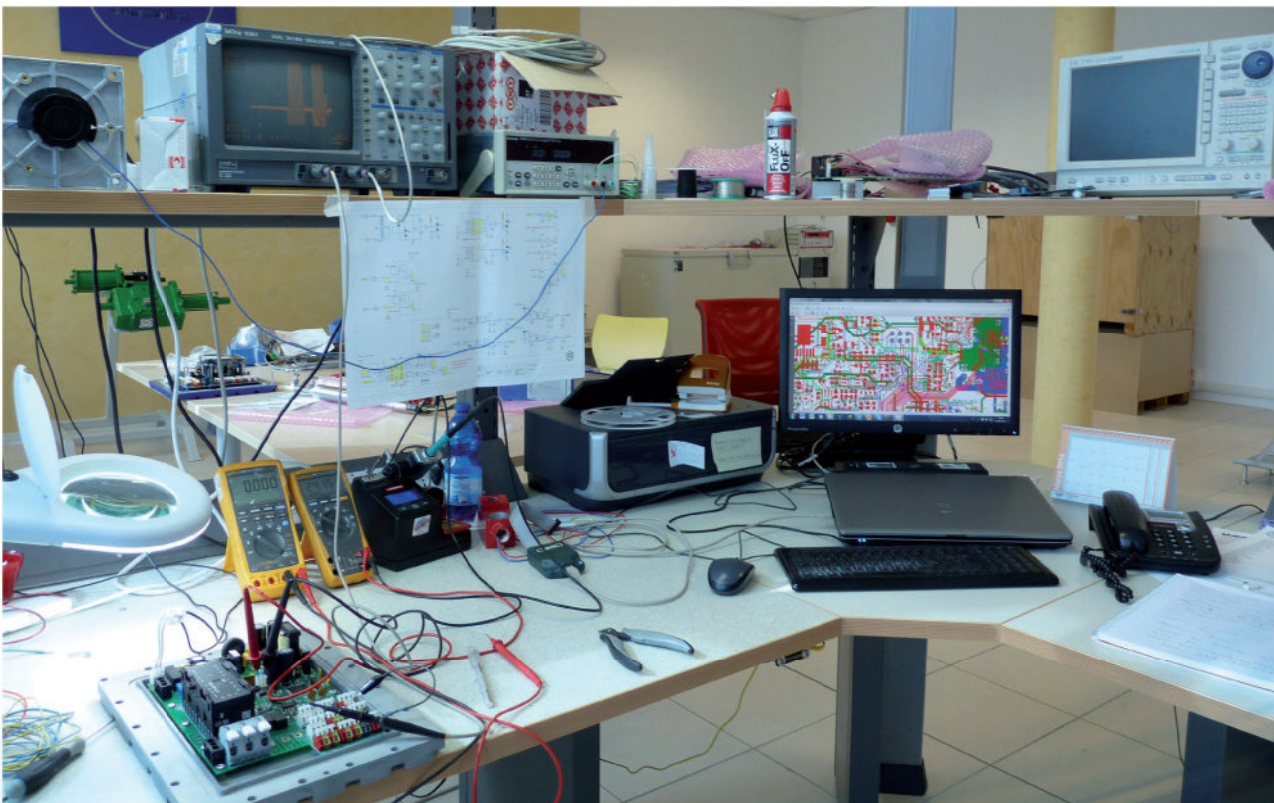
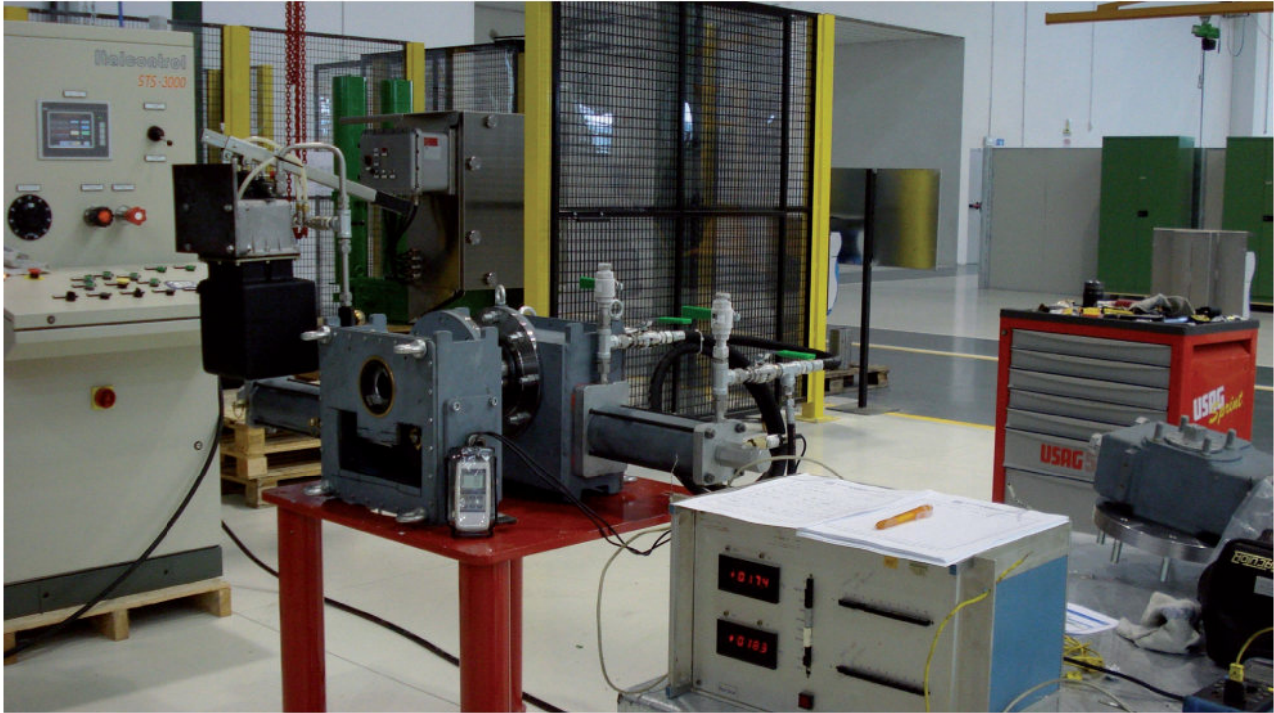


# RESEARCH & DEVELOPMENT

Continuous investment in Research & Development, combined with great experience, is the basis of DVG innovations and success. Thanks to its sophisticated technologies, DVG can design and patent new products, in accordance to the needs and technical specifications of each Customer.

Important and severe temperature and endurance tests have been successfully completed in order to get:

- SIL 3 capability - TUV Certification
- Customer Qualifications





## AFTER SALES SERVICE

DVG Aftersales Dept. provides a worldwide field service response for its customers for all type of actuators and control systems.

Our services include:

- assistance during installation, commissioning and start-up activities
- diagnosis and on-site repair
- upgrading of existing units (retrofitting)
- spare parts supply
- training programs

Our support can be planned or be in response to an emergency situation thanks to our skilled technicians as well as to the support of our VAC eventually present in the territory.

DVG can grant the supply of spare parts for minimum 10 years from customers' orders.











## DVG AUTOMATION S.p.A.

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