



DVG AUTOMATION

PRODUCT RANGE

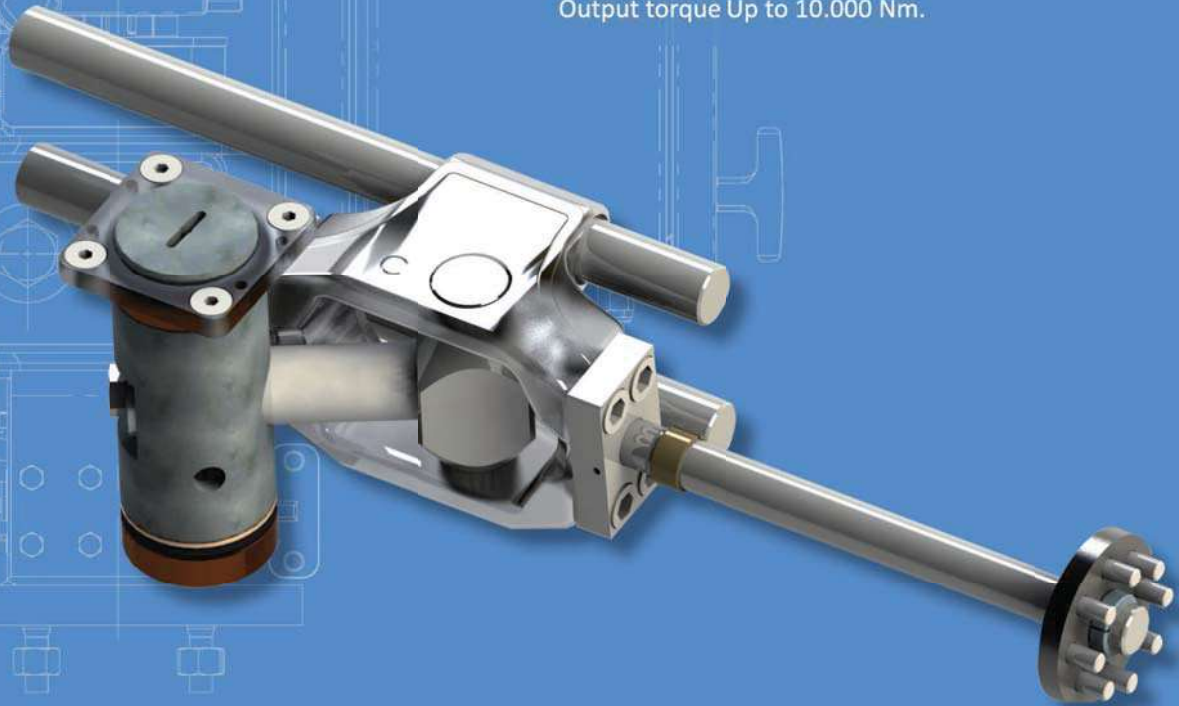
 ACTUATOR QUARTER TURN & LINEAR	CONTROLS SYSTEM & ACCESSORIES
Hydraulic (Up to 350 barg) Single/Double Acting	Pneumatic Control System
Pneumatic (Up to 12 barg) Single/Double Acting	Hydraulic Control system
Gas Over Oil (Up to 110 barg) Single/Double Acting	ESDV, BDV, XV Application
Direct Gas (Up to 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.

 PNEUMATIC AND HYDRAULIC COMPONENTS (LOW & HIGH PRESSURE)	ELECTRONIC & ELECTRIC DEVICES
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



- 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





LINE BREAK

Typical application: Gas Hydraulic, Direct Gas actuator.

The ITVC includes a rechargeable lithium-ion battery, which ensures the system functionality of the actuator within 15 days from loss of supply voltage. Diagnostic function.

Data can be called up as graph within 6 months from event (data logger).

Up to 2003 pressure detection system SIL3.

PST function

Typical application: Pneumatic, Hydraulic, Gas Hydraulic, Direct Gas, Electro Hydraulic, either single or double acting, linear or quarter turn and Electric. P.S.T. can be carried out based on the following settings:

- P.S.T. Analogue: continuous position monitoring (4-20mA).
- P.S.T. Digital: limit switch.

- Time.

PST function, can be activated locally or remotely. Automatic test can be carried out at pre-settable time interval. All Data and events can be called up as graph (data logger).

HPU Hydraulic Power Unit controller



The ITVC is the electronic logic controller which can control and activate the main HPU functions (LOCAL / REMOTE OPERATION, ESD FUNCTION, MOTOR/PUMP CONTROL, MONITORS OPERATING PRESSURE AND OIL LEVEL, DIAGNOSTICS, ACTUATOR Solenoid Valve coil test every 8 hour as per the latest requirements of IEC-61508 to achieve SIL 3).

Remote Control: via field protocols OR hardwired.

PST function

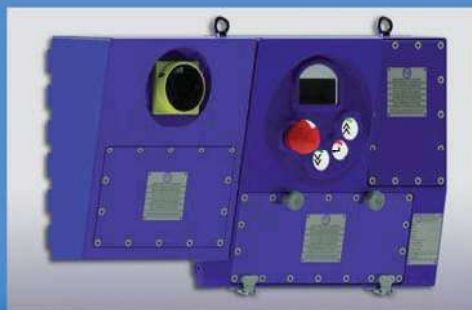
Local control

Local Shutdown / Emergency push button

Line Break



INTELLIGENT UPGRADING for "non intelligent" existing actuators electric and / or piston



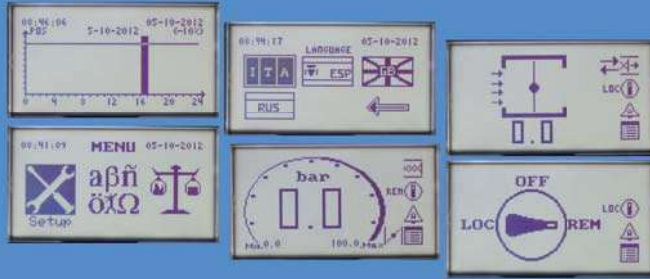
ITVC controls existing actuators using existing 4-20mA analogue position / torque signal or existing position / torque switches

Additional features:

Monitor relay / Local selector status / Limit switch status / P.I.D. Control / PST Function / LINE Break / ESD / Panic Button.

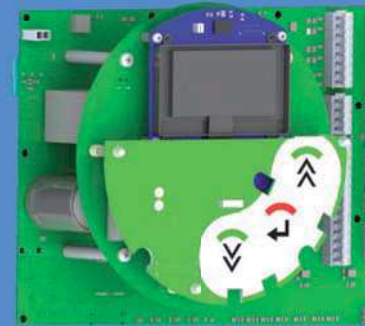
LOCAL INTERFACE

- Local Control through 3 capacitive push button with LED
- LCD Graphic Display 128x64 dots (working temp. range -45°C + 85°C).
- Programmable Panic Button (push or pull to activate)
- New generation Local / REM /OFF Selector, activated with (level 2 or higher) password through the touch push button.



MAIN FEATURE

- New Generation Microprocessor 32bit.
- Safety function components are dual redundant.
- 2 off redundant Microprocessor, with auto monitoring feature (as per the requirements current IEC-61508 SIL 3).
- Internal memory 24Mbit / MRAM Magneto Resistive Random Access Memory with unlimited write endurance .
- All INPUT / OUTPUT Signals are OPTO isolated.
- Data collection via Fieldbus: 485 serial port MODBUS RTU (HART™, Foundation Fieldbus™ and Profibus™ in progress), Bluetooth only for Device configuration.



CLIENT INTERFACE (Remote Digital INPUT - OUTPUT)

- 7 off Digital Input (Voltage 24 V AC / DC to 130 V AC / DC): Open / Close / Stop / Automatic / Interlock, P.S.T. etc.
- 1 off Digital Input (Voltage 24 V AC / DC to 130 V AC / DC) JESD
- 1 off Analogue Input (set point)
 - 2 off Analogue Output configurable (position/ pressure, ...)
 - Monitor Relay
- 4 off Independent and Configurable Relay (Max Pressure Drop, Max Pressure Rise, Warning, Line-Break, High Pressure, Low pressure, Wrong direction, No supply, Position not reached, low battery, low oil level, Selector remote, selector Local, selector Off L/S PST, L/S Open, L/S Close
- Terminal blocks without screws, ideal for applications subject to vibration.
 - Multilanguage menu (Italian, English, Spanish, Russian, ...)
- Menu activated with (level 2 or higher) password through the touch push button



INPUT-OUTPUT I.T.V.C./ACTUATOR

- 4 off (4-20 mA) analogue inputs; i.e. pressure, position, HPU oil temperature, etc...
 - Up to 8 digital output for 24 VDC, solenoid valve control.
- Up to 3 digital output, relay, for other voltages 24VDC - 120 VAC solenoid valve.
 - 4 off digital input (limit switches, ...).

HOUSING MATERIAL

- Painted Anodized aluminium
- Stainless Steel 316L (CF3M)

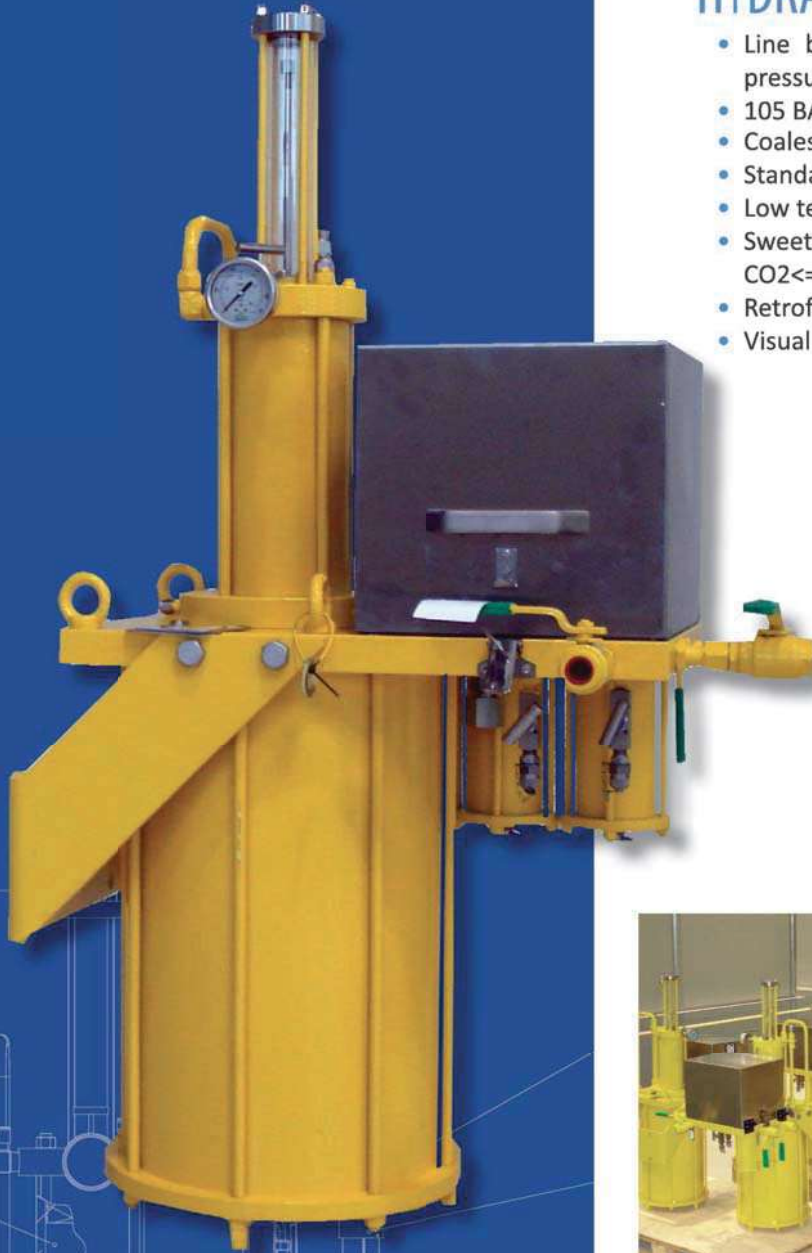
MULTI TENSIONAL DEVICE POWER SUPPLY

- 90 - 260 V AC (+/-10%) - 50 / 60 Hz
- 24 - 110 V DC (+/-10%)



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 (H₂S<=6% / CO₂<=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:

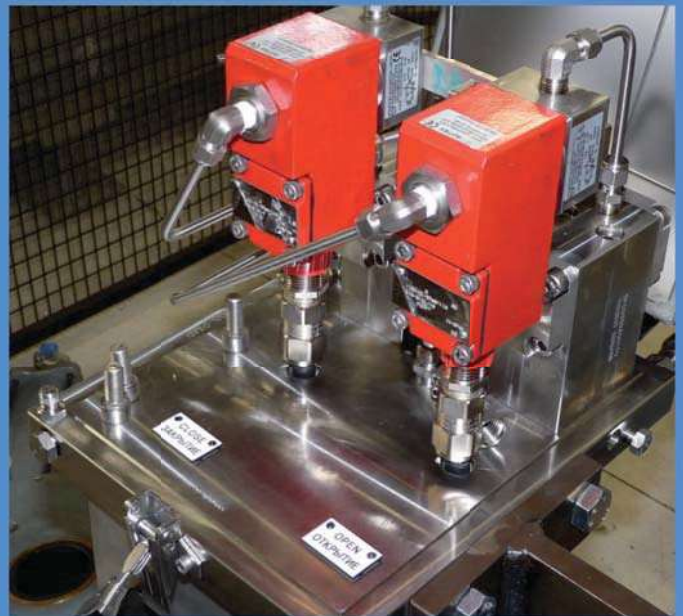
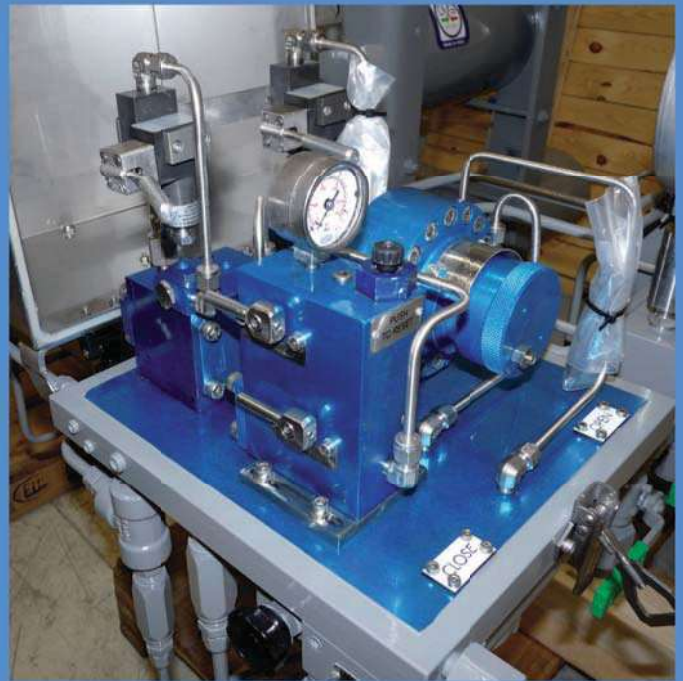
- Pneumatic
- Gas
- Hydraulic
- Electro hydraulic



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

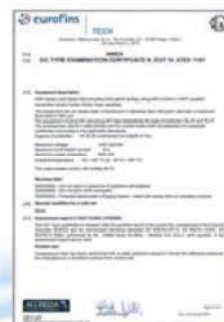


Body	Aluminum or Stainless Steel
Shaft	Stainless steel
Visual Indicator	Clear Polycarbonate
Available Seal Materials	NBR or FMVQ (Fluorosilicone)

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

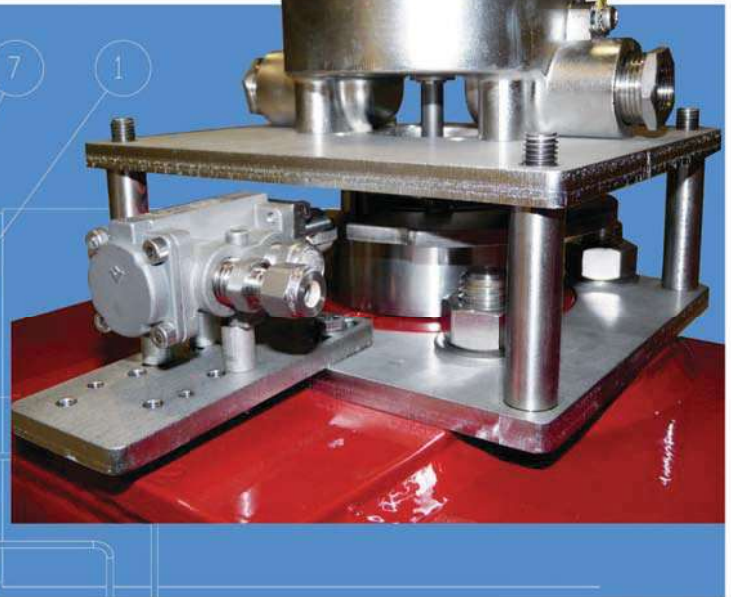
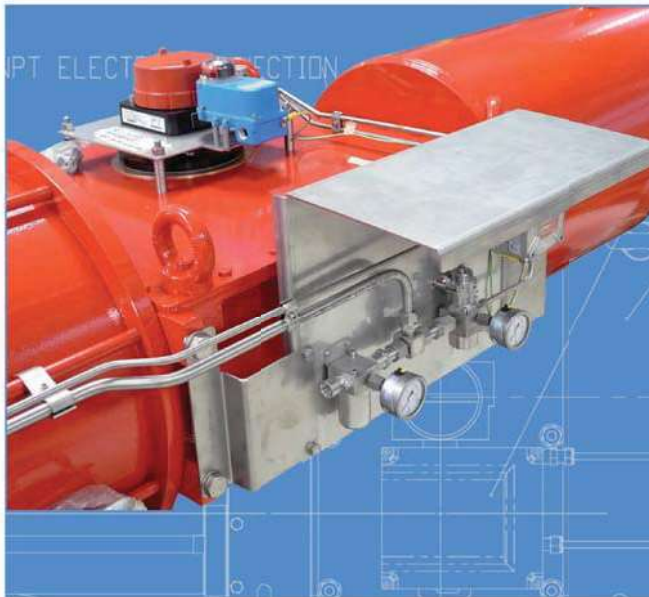
DVG Automation can provide actuators and control system fitted with several Partial Stroke Test systems according to any Customer requirement, this in order to reduce the probability of failure on demand (PFD) and to increase the whole system reliability.

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.

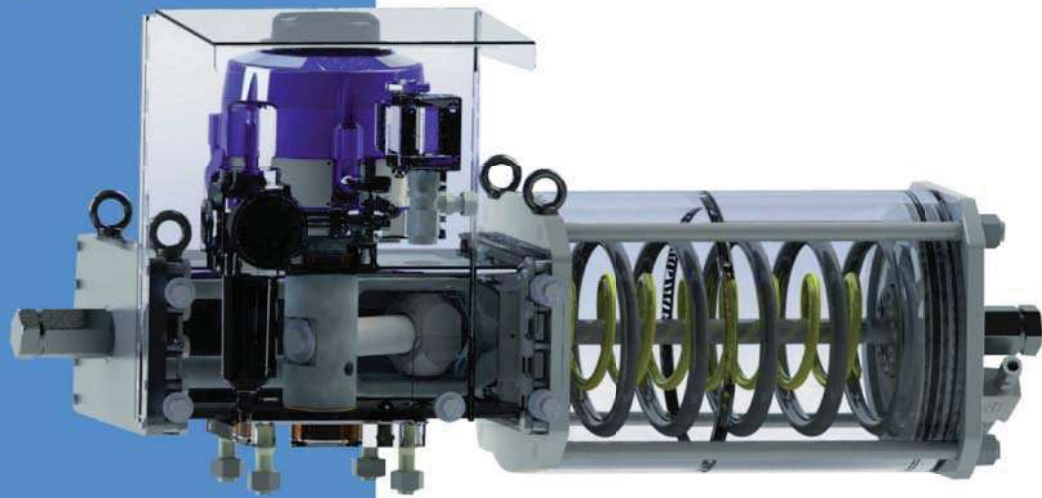


HYDRAULIC DAMPER

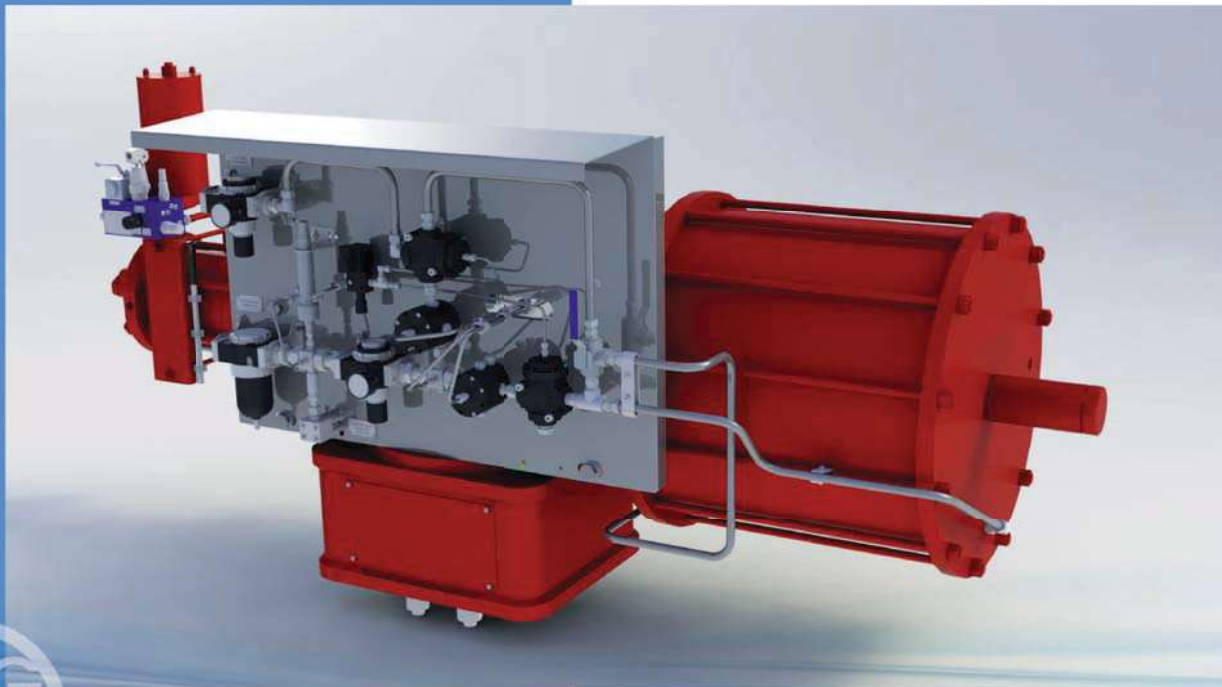
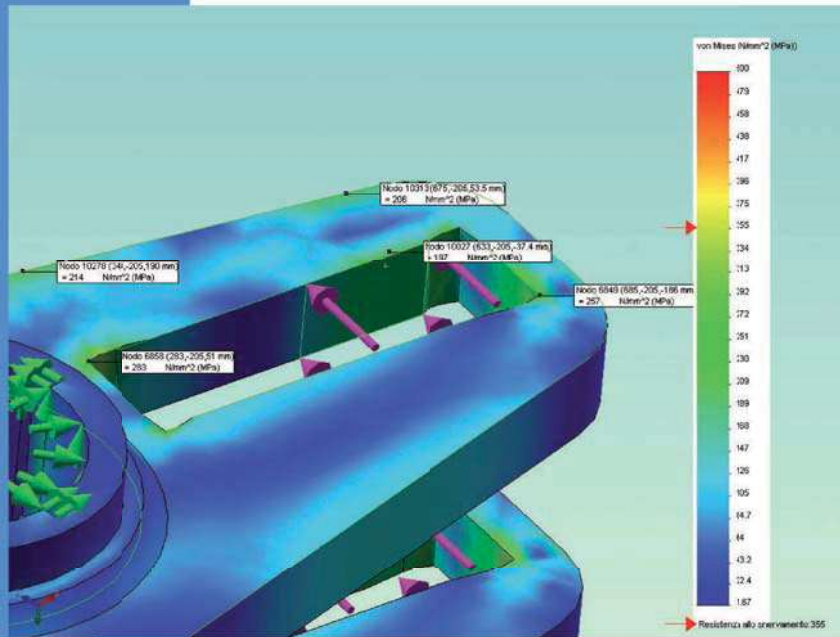
- Hydraulic dumper to reduce travel speed and provide smooth end of stroke dampening in critical application.



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.



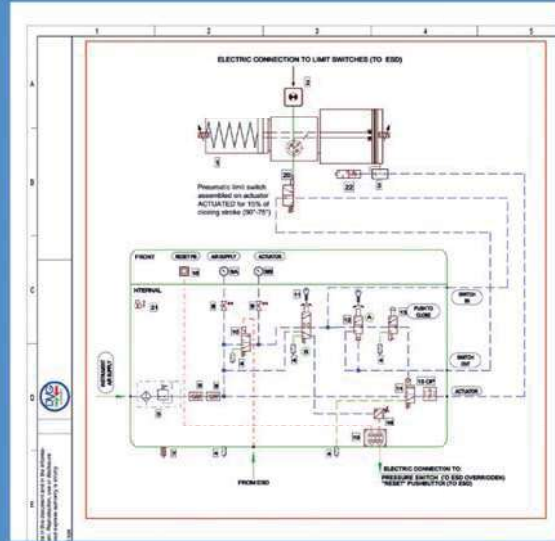
MANAGEMENT TOOLS

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.

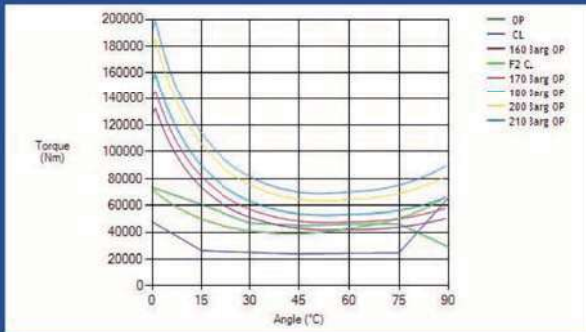
- The installed Modules include:
- SD Sales & Distribution,
 - PP Production Planning & Control,
 - MM Material Management,
 - FI Financial Accounting,
 - CO Controlling,
 - QM Quality Management



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.

Model	Fluid	Effect	Size	Type	Cylinder	Spring	Function	Accessory
Q1	H	D	180	S	135			

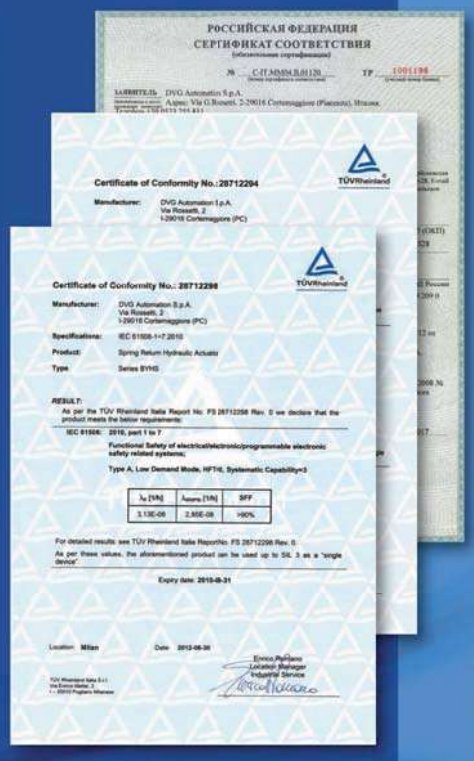
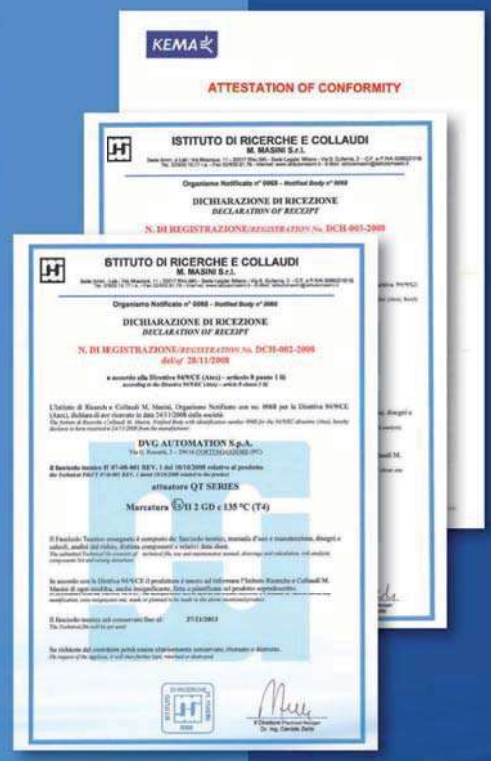
Pos.	160 Barg OP	160 Barg CL	170 Barg OP	170 Barg CL	180 Barg OP	180 Barg CL	200 Barg OP	200 Barg CL	210 Barg OP	210 Barg CL
0°	88,135	68,176	93,678	72,464	99,221	76,751	110,307	85,327	115,850	89,415
10°	71,141	52,417	72,515	52,714	80,081	55,010	81,028	45,401	92,312	58,900
30°	53,342	36,132	54,697	41,993	60,082	44,054	66,742	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°	51,522	38,001	54,888	41,453	60,254	43,906	66,987	48,812	70,353	51,265
75°	44,887	47,927	48,968	50,091	73,049	53,085	81,211	58,983	85,292	61,947
90°	93,246	64,439	91,111	68,492	104,975	72,544	116,704	80,650	122,761	84,703

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.



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