

# *new* explosion-proof for hazardous areas

Atos offer a full range of electrohydraulic ISO standard components for applications in potential explosive environments with presence of flammable gas or dust.

They conform to international safety rules and are largely applied in thousands of systems worldwide, offering high reliability and withstanding extreme temperatures, corrosive fluids and aggressive conditions

**oil & gas  
energy  
mining  
chemical  
offshore  
marine**

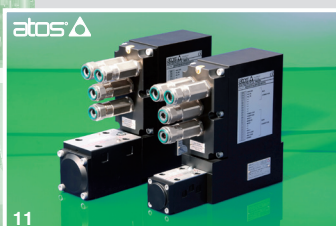


Ex-proof solenoid valves  
on-off & proportional

## **ex-proof solenoid valves** table 801, 803

Atos ex-proof solenoids - of original design, integral and consistent to valves - have been developed together with related valves to maximize functionality and modularity.

They are designed to contain the explosion inside the enclosure, and to limit their external temperature, according to the certified class, in order to avoid self ignition of the explosive mixture in the environment



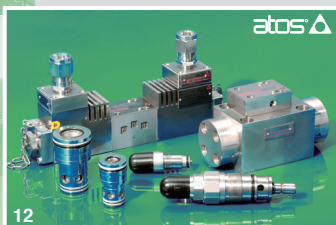
Ex-proof proportional valves  
with ex-proof digital driver

## **ex-proof proportional valves** table 802, 803

Proportional valves modulate hydraulic and motion parameters according to electronic reference signals.

Their ex-proof execution is available in a full range, performing directional, pressure and flow controls, in open or closed loop.

New proportionals with integral ex-proof digital driver (fig. 11) offer excellent motion control, and optimal fieldbus interface



Stainless steel valves, also  
suitable for water hydraulics

## **stainless steel ex-proof valves** table 804, 805

New line of electrohydraulic controls in stainless steel for corrosive environments: rugged inoxizable design, suitable for use with mineral oils, water glycol and special hydraulic fluids. Also available in special execution for water hydraulics applications.

Original stainless steel solenoids are explosion-proof type, with possible ATEX or UL ex-proof certification



Intrinsically safe valves for  
hazardous atmospheres

## **intrinsically safe on-off solenoid valves** table 806

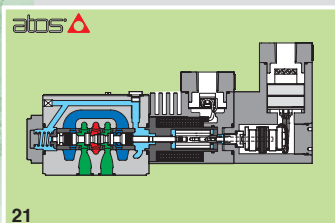
Intrinsically safe specification is based on the principle of limiting the energy of electric circuits in environments with hazardous atmospheres. To limit the max input current, the solenoids must be powered through specific "safety barriers": in fact the intrinsically safe circuit must be unable to produce electrical surges or thermic effects which could cause explosion in a break-down situation

# explosion proof valves

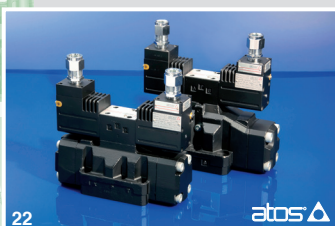
- ATEX 94/9/EC standard protection mode:
  - Ⓔ II 2 GD Ex d IIC T6/T4/T3, Ex tD A21 IP67 (**group II** for surface plants, category 2, zone 1 and 2) - code **A**
  - Ⓔ I M2 Ex d I (**group I** for mining) - code **A/M**
- IECEx scheme as per ATEX - code **A/IE** (surface) **A/IEM** (mining)
- Russian Certification Rostechnadzor - code **A/RU**
- Multicertification ATEX, IECEx, Rost
- UL 1002 american standards, Class I, Groups C&D - code **A/UL**
- MA Chinese Mining Certification, only on/off valves - code **A/MA**



Ex-proof valves  
pressure & directional



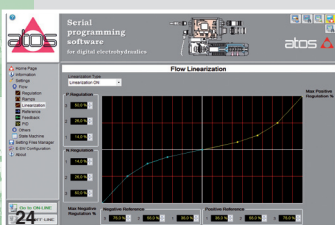
Ex-proof proportional valve  
closed loop



DPHA-2 ex-proof valves  
pilot operated



Ex-proof digital proportional  
cartridges  
with ex-proof digital driver



Atos unique PC software for  
digital proportionals

## 801 ex-proof on-off valves

control function	ISO sizes	(1)	type code	P max [bar]	Q max [l/min]
directional, 4 way spool type	6	D	DHA	350	70
	10, 16, 25, 32	P	DPHA-1, 2, 4, 6		160, 300, 700, 1000
directional, 2 and 3 way poppet type, leak free	6	D	DLOH-AO	250	12
	6	D	DLOK-AO		30
directional 2 way cartridges	16÷80	P	LIDEW-AO	350	160÷5000
pressure valves with ex-proof venting valve	10÷32	P	AGAM-AO		200÷600
	20, 32	P	ARAM-AO		350, 500

## 802 ex-proof proportional valves

control function	ISO sizes	(1)	type code	P max [bar]	Q max [l/min]
directional, 4 way, spool type	6, 10	D	DHZA, DKZA	350, 315	50, 105
	10, 16, 25, 32	P	DPZA-1, 2, 4, 6	350	100, 200, 450, 600
directional, 4 way, sleeve type	6, 10	D	DLHZA, DLKZA	350, 315	40, 80
flow valves, P compensated	6, 10	D	QVHZA, QVKZA	210	45, 90
throttle cartridges, 2 and 3 way	40÷100	P	LIQZA cartridge	350, 420	1700÷10000
pressure relief, direct & piloted, subplate & modular	6	D, P	RZMA, HZMA	250	4, 40
	10÷32	P	AGMZA	250	200÷600
pressure relief, ISO cartridges	16÷80	P	LIMZA cartridge	250	200÷4500
pressure reducing, direct & piloted, subplate & modular	6, 10	D, P	RZGA, HZGA, KZGA	210, 250	12, 40, 100
	10, 20	P	AGRCZA	250	160÷300
pressure relief, ISO cartridges	16÷32	P	LIRCZA cartridge	250	160÷600

## 803 application data

ATEX, IECEx, Rostechnadzor Certification					
SOLENOID TYPE		PROPORTIONAL		ON-OFF	
Coil	Vdc ±10%	12 DC, 24 DC		12DC, 24DC, 28DC, 48DC, 110DC, 125DC, 220DC	
Voltage	VAC 50/60 Hz ±10%	-		12AC, 24AC, 110AC, 230AC	
Power consumption		35W		8W	
Temperature class (only for Group II)		T4	T3 (option /7)	T6	T4 (option /7)
Surface temperature	Group II (1)	≤ 135°C	≤ 200°C	≤ 85°C	≤ 135°C
	Group I	150°C			
Ambient temperature	Group II	-40 ÷ +40°C	-40 ÷ +70°C	-40 ÷ +45°C	-40 ÷ +70°C
	Group I	-20 ÷ +60°C		-20 ÷ +70°C	

(1) Optional extended ambient temperature range -60°C ÷ +70°C

UL Certification		
SOLENOID TYPE		ON-OFF
Coil	Vdc ±10%	12 DC, 24 DC
Voltage	VAC 50/60 Hz ±10%	12AC, 24AC, 110AC, 220AC
Power consumption	35W	12W
Temperature class (with +70°C ambient temperature)	T4	T6
Surface temperature	≤135°C	≤85°C
Ambient temperature	-40 ÷ +70°C	

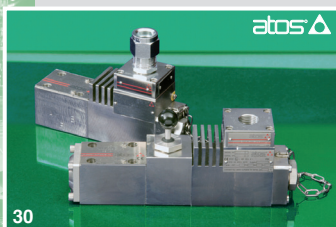


# stainless steel ex-proof valves

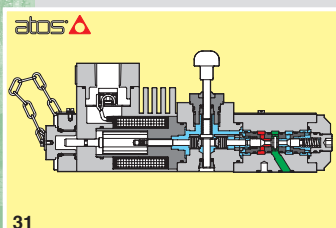
Certifications as per standard ex-proof valves, page 2

Proportional execution available on request.

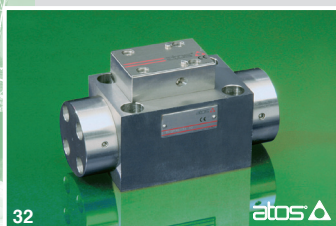
Typical applications: offshore, chemical, minery and subsea plants



Stainless steel ex-proof poppet type valves



Stainless steel poppet valve with manual reset



Stainless steel pilot operated directional valve



On-off & proportionals water electrohydraulics



CNX stainless steel cylinder

## 804 stainless steel on-off valves

control function	ISO sizes	(1)	type code	P max [bar]	Q max [l/min]
4 way, spool type solenoid valves	06 (ISO 4401)	D	DHAX4	350	60
3 way, poppet type, leak free, solenoid valves	06 (ISO 4401)	D	DLOHX6- <b>AO</b> DLOHX4- <b>AO</b>	315 350	10 12
3 way, poppet type, leak free, solenoid valves	06 (ISO 4401)	D	DLOKX4- <b>AO</b>	315	25
3 way, poppet type, leak free, solenoid valves	no	P	DLOPX6- <b>AO</b>	315	220
relief valve direct screw-in	no no no	D	CART-MX-3 CART-MX-6 CART-AREX-20	350 350 400	2.5 40 (60 PED) 120 (150 PED)
relief valve modular	06 (ISO 4401)	D	HMPX-*	350	40
relief valve DIN cartridge	25 (ISO 7368)	P	SC LIX-2531* LIMMX-2/*	350	400

(1) **D** = direct operated; **P** = pilot operated

## 805 stainless steel specification

Valve type	Solenoid housing	Valve body	Internal parts	Springs	Seals std	Seals /PE
DHAX	AISI 630	AISI 316L	AISI 316L, 420B, 440C, 430F	AISI 302	NBR (buna)	FPM (viton)
DLOHX DLOKX	AISI 630	AISI 316L	AISI 316L, 420B, 440C, 430F	AISI 302	NBR (buna)	FPM (viton)
DLOPX	AISI 630	AISI 630	AISI 316L, 420B, 440C, 430F	AISI 302	NBR (buna)	FPM (viton)
CART-*X	-	AISI 316L	AISI 316L, 420B, 630	AISI 302	NBR (buna)	FPM (viton)
HMPX	-	AISI 316L	AISI 316L, 420B, 630	AISI 302	NBR (buna)	FPM (viton)
LIMMX	-	AISI 316L	AISI 316L, 420B, 630	AISI 302	NBR (buna)	FPM (viton)
SC LIX	-	-	AISI 420B, 630	AISI 302	NBR (buna)	FPM (viton)

# water electrohydraulics

Water electrohydraulics is the fluid technology for environments requiring uninflammability or intrinsic fluid eco-compatibility/non toxicity.

The term "water" refers to specific HFA Water based fluids or just pure water instead of common mineral or synthetic oils. The HFA emulsion is generally composed by a minimum of 95% of water and only 5% (or less) of oil.

Atos new "water" valves has been developed to combine the traditional features offered by inoxidizable design together with the plus of standard industrial electrohydraulics, with following results:

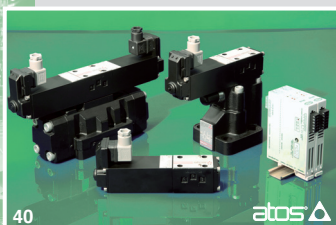
- capability to work and maintain good performances level with any HFA fluid and with water as well
- standard ISO mounting surface to allow the installation of the valves in any manifold
- standard component's design, the same of long lasting tested standard Atos electrohydraulics
- modularity = many component's parts are commonly used in different valves thus reducing the overall required number of parts
- ex-proof execution on request

Water hydraulics is actually used in die-castings, steel plants and mining sectors. The water based fluids are also appreciated in several applications where the final products must not be tainted by the accidental contact with the working device, as for example in food, chemical and pharmaceutical industry

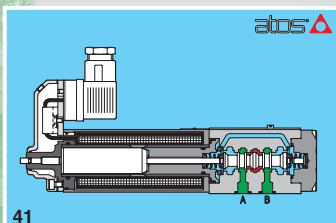
# intrinsically safe solenoid valves

ATEX 94/9/EC standard protection mode

- $\text{Ex}$  II 1 G, Ex ia IIC T6 / T5 (**group II** for surface, category 1, zone 0, 1 and 2) - code **W**
- $\text{Ex}$  I M2 Ex ia I (**group I** for surface, tunnels or mining plants) - code **W/M**
- IECEx scheme as per ATEX - code **W/IE** (surface) **W/IEM** (mining)



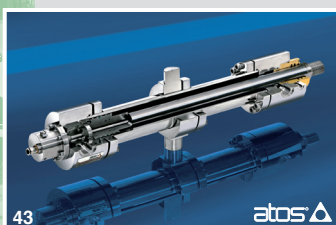
DHW intrinsically safe valve & barrier



DHW directional valve 4 way, spool type



Hydraulic pumps certified to  $\text{Ex}$  II 2/2 GD cbk IIC T6



Stainless steel servocylinder certified to  $\text{Ex}$  II 2 GD ck IIC T6



Stainless steel bench for energy power plants

## 806 intrinsically safe valves

control function	ISO sizes	(1)	type code	P max [bar]	Q max [l/min]
directional, 4 way spool type	06	D	DHW	350	70
	10, 16, 25	P	DPH <b>W</b> -1,2,4		160, 300, 700
directional, 2 and 3 way poppet type, leak free	06	D	DLOH- <b>WO</b>		12
directional 2 way cartridges with ex-proof, pilot valve	16÷63	P	LIDEW- <b>WO</b>		160÷3600
pressure valves with ex-proof venting valve	10÷32	P	AGAM- <b>WO</b>		200÷600
	20, 32	P	ARAM- <b>WO</b>		350, 500

(1) **D** = direct operated; **P** = pilot operated

## 807 application data

ATEX, IECEx Certification							
Gas group		I and IIC		I and IIB	I and IIA	I	
Temperature class		T6		T6	T5	-	
Electrical characteristic	V max [V]	27	19,5	19,11	28	12,2	
	I max [mA]	130	360	360	250	396	2200
	P max [W]	0,9	1,64	1,72	1,8	2,8	6,82
Surface temperature (ambient temperature +60°C)		≤ 85°C			≤ 100°C		150 °C
Temperature class		-40 ÷ +60 °C				-20 ÷ +60 °C	

## ex-proof pumps, cylinders, units

ATEX 94/9/EC certifications are currently available for several hydraulic components, specifically designed or for hazardous areas, like:

- **hydraulic pumps** (fig. 42): vane, piston, fixed & variable displacement
- **hydraulic cylinders and servocylinders**: conforming to ISO 6020-1 (round heads) and ISO 6020-2 (square heads) both in standard and stainless steel execution  
Round heads stainless steel cylinders (fig. 34, 43) have chromium plated rods and are equipped with special seals to ensure zero leakage
- **hydraulic units**: power units, special blocks and manifolds according to safety requirements
- **auxiliary components**: ex-proof pressure transducers, switches, etc.

## ECP Corrosion Protection

Special attention is paid in Atos to corrosion problems: besides stainless steel components, a new ECP (Enhanced Corrosion Protection) treatment is applied to the standard Atos range to grant high rust resistance in salt spray atmosphere through specific 200 hours testing.

A valuable plus, it consists of zinc plating with black passivation, anodizing, Geomet, plastic encapsulation

## Summing up

The continuous research of new solutions for specific sectors has led Atos to the Leadership in electrohydraulic components for hazardous applications: many thousands of these advanced components are successfully operating worldwide

**Atos spa**

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