

Summary of Atos stainless steel components

Atos stainless steel components are electro-hydraulic equipment for industrial and mobile applications, designed to operate in corrosive and potentially explosive environments, such as oil & gas, marine, offshore, etc. and with special fluids HFA-E, HFA-S, HFB, HFC having a high percentage of water or 100% pure water.

1 PRODUCTS RANGE

Atos stainless steel range includes a consistent line of hydraulic valves and actuators among the largest ones used in applications that require high corrosion resistance: directional valves, pressure relief valves, cylinders and servocylinders.

Up to three stainless-steel executions are available to satisfy the most demanding applications:

X FULL STAINLESS STEEL execution with all parts made in stainless steel offers the complete protection for external and internal surfaces. It is the ideal choice for applications combining aggressive atmospheres and water-based fluids.

XS EXTERNAL STAINLESS STEEL execution with only external parts made in stainless steel. It is specifically designed to provide the best surface protection to aggressive atmosphere, while the operating fluid is standard mineral oil, HLP type or similar. All internal parts in contact with the fluid are made in carbon steel to reduce the costs respect to the full stainless steel execution.

XW INTERNAL STAINLESS STEEL execution with only internal parts made in stainless steel, specific for systems operated with water-based fluids but not subjected to aggressive atmosphere. These components are available on request. Technical tables are not present in KTW catalog, but in supplementary components range available on www.atos.com

Valves type **X**, **XS** and **XW** are standard equipped with NBR low temperature seals suitable for temperature range -40 to +70°C

Valves type **X** with option **BBT** are equipped with FMVQ fluorosilicon seals suitable for temperature range -60°C to +70°C

1.1 ON-OFF DIRECTIONAL VALVES

Stainless steel directional valves range includes 4-way spool type valves or 3-way popper type leak free.

Solenoid operated valves are equipped with ex-proof solenoids designed to operate in hazardous environments with presence of flammable liquids, gases, vapors or combustible dust, and certified to major international standards, see section [3](#)

XW execution is available with Ex-proof or standard solenoids

Component	Execution	Solenoid	SIL (1)	Ex-proof certification						Tech. table	
				Environment	Multicertification			North American	Marking		
					ATEX	IECEX	EAC				PESO
4-way, spool type, direct, solenoid operated	X, XS, XW	Ex-d	●	Gas	●	●	●	●	●	See section 5.1 and 5.2	EW010
				Dust	●	●	●	-	-		
	XW	standard	-	-	-	-	-	-	-	-	TE135
3-way, poppet type, direct, solenoid operated	X, XS, XW	Ex-d	●	Gas	●	●	●	●	●	See section 5.1 and 5.2	EW020
				Dust	●	●	●	-	-		
	XW	standard	-	-	-	-	-	-	-	-	TE135
3-way, poppet type, piloted, solenoid operated	X, XS, XW	Ex-d	-	Gas	●	●	●	●	●	See section 5.1 and 5.2	EW050
				Dust	●	●	●	-	-		
	XW	standard	-	-	-	-	-	-	-	-	TE135
3-way, poppet type, piloted, hydraulic operated	X, XS, XW	-	●	-	-	-	-	-	-	-	EW100

(1) Valves are SIL compliance with IEC 61508 (TÜV certified). They meet the requirements of SC3 (systematic capability) up to SIL 3

1.2 ON-OFF PRESSURE RELIEF VALVES

Stainless steel pressure relief valves range includes screw-in, ISO cartridge and modular executions.

Screw-in type are also available in Safety execution conforming to PED Directive 2014/68/EU.

Component	Execution	PED Directive	Marking	Tech. table
Screw-in cartridges	X, XS			CW010
	X, XS	●	See section 6	CWY010
Modular	X, XS			DW010
ISO functional cover	X, XS			HW010
ISO cartridge	X			

1.3 HYDRAULIC CYLINDERS & SERVOCYLINDERS

Stainless steel, round heads cylinders and servocylinders with tie-rods.

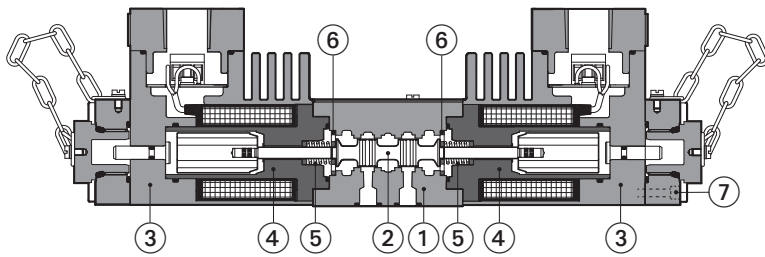
Servocylinders are equipped with low friction seals and position transducer, magnetosonic or inductive type

Component	Execution	Description	Tech. table
Cylinders	X	round heads	BW500
Servocylinders	X	with built-in magnetosonic transducer	
		with built-in inductive transducer	
		with built-in potentiometric transducer	

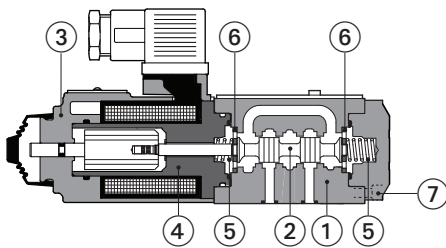
2 STAINLESS STEEL MATERIALS SPECIFICATIONS

Atos stainless steel valves are made by selected stainless steel materials coupling the best corrosion resistance to excellent mechanical characteristics. In the following are listed the AISI classification of stainless steel materials used for the main parts of X, XS and XW valves.

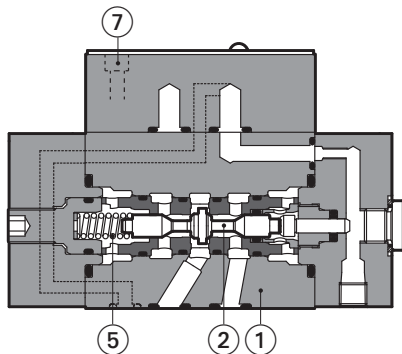
2.1 On-off directional valves



direct, Ex-proof solenoid, X, XS, XW executions
(see Table I)



direct, standard solenoid, XW execution
(see Table I)

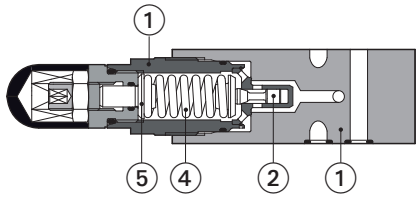


piloted, X, XS executions
(see Table I)

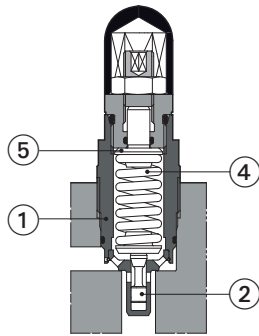
Table I

Item	Component part	Execution		
		X	XS	XW
1	Body and caps	AISI 316L	AISI 316L	AISI 316L
2	Spool, Poppet	AISI 440C	Carbon steel	AISI 440C
3	Solenoid housing	AISI 630	AISI 630	Carbon steel
4	Solenoid tube	AISI 430F	Carbon steel	AISI 430F
5	Springs	AISI 302	AISI 302	AISI 302
6	Washers	AISI 420B	Carbon steel	AISI 420B
7	Screw	AISI 316	AISI 316	Carbon steel

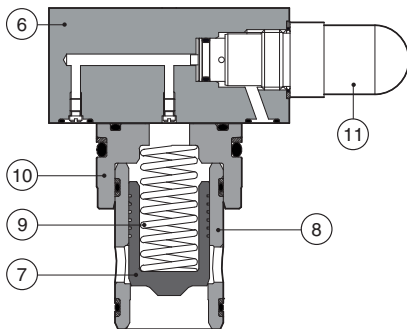
2.2 On-off pressure relief valves



direct, modular, X, XS executions
(see Table II)



direct, screw-in cartridge,
X, XS executions
(see Table II)



piloted, ISO cartridge X, XS executions
(see Table III)

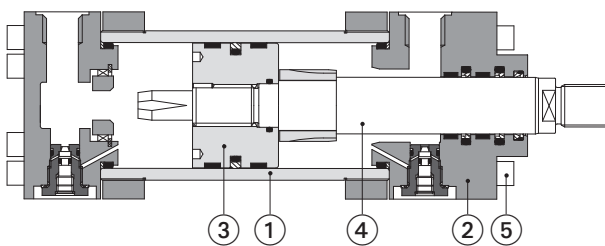
Table II

Item	Component part	Execution	
		X	XS
1	Body	AISI 316L	AISI 316L
2	Poppet	AISI 440C	Carbon steel
3	Sleeve	AISI 420B	Carbon steel
4	Spring	AISI 302	AISI 302
5	Washer	AISI 420B	AISI 420B

Table III

Item	Component part	Execution	
		X	XS
6	Body	AISI 316L	AISI 316L
7	Poppet	AISI 440C	AISI 440C
8	Sleeve	AISI 420B	AISI 420B
9	Spring	AISI 302	AISI 302
10	Cap	AISI 630	AISI 630
11	Pilot	see above table II	

2.3 Hydraulic cylinders & servocylinders



round heads cylinder X execution
(see Table IV)

Table IV

Item	Component part	Execution	
		X	
1	Housing	AISI 316L	
		AISI 630 17-4 PH (1)	
2	Heads	AISI 316L	
3	Piston	AISI 431	
4	Rod	AISI 431	
		AISI 630 17-4 PH (1)	
5	Tie rods	AISI 316 A4	

(1) Available on request for heavy duty applications

3 CERTIFIED EXECUTIONS FOR EXPLOSIVE ATMOSPHERES

Atos stainless steel ex-proof valves are equipped with ex-proof solenoids engineered and manufactured according to protection method **Ex-d** (code **Ex-t** for dust environments) and certified by independent notified bodies in conformity to following standards:

3.1 Multicertification: ATEX, IECEx, EAC, PESO standards

It is a great plus offered by Atos ex-proof stainless steel valves, where the same component is provided with the following certifications:



ATEX Directive 2014/34/EU, applicable within the European Union



IECEx International Electrotechnical Commission Explosive, required to access international markets



EAC Eurasian Certification

It is applicable to the Customs Union Territory Including Russia, Kazakhstan, Belarus, Armenia and Kyrgyzstan



PESO Petroleum and Explosive Safety Organization (earlier known as CCoE)

It approves products distributed within Indian territory

3.2 cULus North America standards



This type of UL logo indicates compliance with both Canadian and U.S. requirements.

Atos ex-proof components are marked with cULus Listed logo stating that they have been investigated by UL Underwriters laboratory in accordance with following standards:

- UL 1203** Standard for Explosion-Proof and Dust-Ignition-Proof Electrical Equipment for use in Hazardous (classified) locations
- UL 429** Standard for Electrically Operated valves
- CSA C22.2 No. 139-13** Electrically Operated Valves

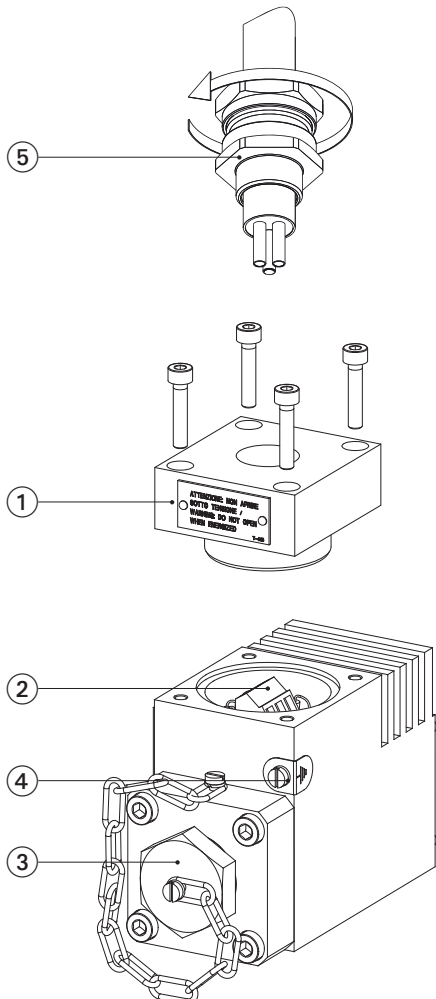
4 FLAMEPROOF ENCLOSURE Ex-d

Technical characteristics

It is characterized by a strong mechanical construction, capable of withstanding the overpressure caused by a potential internal explosion and preventing the spread of flames to the external environment. It permits to dissipate the heat generated by the solenoid, in order to limit the surface temperature within certified classes (T6, T5, etc), to avoid the self-ignition of the surrounding flammable atmosphere.

Internal parts are sealed inside a ruggedized flameproof enclosure, granting high protection to the risk of explosion.

The rugged design of the flameproof enclosure made in AISI 630 (17-4 PH), combined with IP66/67 ingress protection, makes the stainless steel ex-proof valves suited for application in highly corrosive and harsh environments.



Electrical wiring of ex-proof Multicertified solenoids

The electrical wiring to the terminal board of ex-proof solenoids, must be performed using stainless steel ex-proof certified cable glands, see tech. table KX800.

Electric cables must be approved for the specific temperature class reported on the ex-proof component's nameplate, refer to specific tech. table of ex-proof valves for cable temperature.

Electrical wiring of ex-proof solenoids certified cULus

The electrical wiring to the terminal board of ex-proof solenoids must be performed using **UL** certified cable glands, or conduit pipe.

Electric cables must be **UL** approved for the specific temperature class reported on the ex-proof component's nameplate, refer to specific tech. table of ex-proof valves for cable temperature.

- ① cover with threaded connection for cable gland fitting
- ② terminal board for cables wiring
- ③ standard manual override protected by cap
- ④ screw terminal for additional equipotential grounding (only Multicertified solenoids)
- ⑤ cable glands (only Multicertified solenoids)

5 NAMEPLATE MARKING FOR EX-PROOF SOLENOIDS

Stainless steel ex-proof valves are provided with a specific nameplate reporting the certificate number, the notified body and the classification according to the relevant certification.

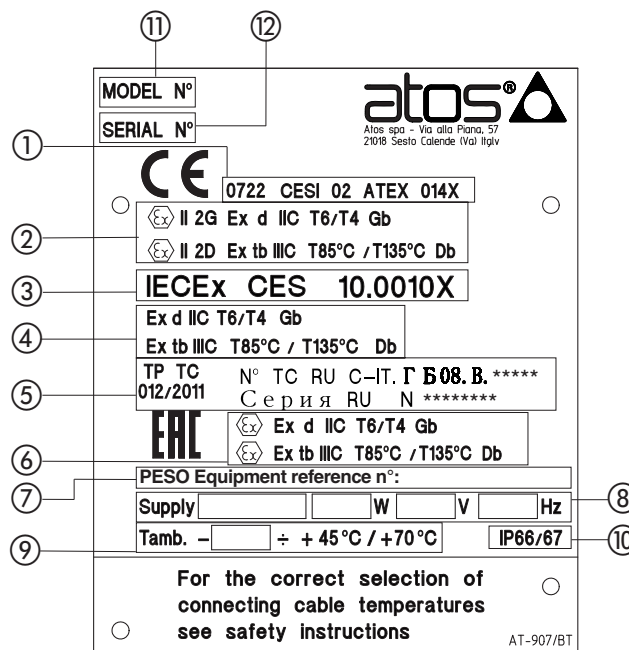
The classification identifies the protection method and the compatibility of the ex-proof component for a specific hazardous environment. The following sections provide a detailed description of the nameplate marking for component categories.

5.1 Ex-proof solenoid multicertified to ATEX, IECEx, EAC and PESO



Gas - group II 2G - Zone 1, 2
Dust - group II 2D - Zone 21, 22

- ① ATEX notified body and certificate number
- ② Marking according to ATEX Directive
- ③ IECEx notified body and certificate number
- ④ Marking according to IECEx Scheme
- ⑤ EAC notified body and certificate number
- ⑥ Marking according to EAC
- ⑦ PESO certificate number
- ⑧ Power supply characteristics
- ⑨ Ambient temperature
- ⑩ Ingress protection:
 -IP66 = no dust ingress, protection against heaving seas or powerful jets of water
 -IP67 = no dust ingress, protection to water immersion
- ⑪ Solenoid model code
- ⑫ Solenoid serial number



ATEX / IECEx / EAC / PESO classification - for Gas group II

II 2 G	Ex	d	IIC	T6 / T4	Gb
Equipment Group II industrial Equipment Category 2 High Protection Suitable for use G Gas	Mark of Explosion Proof	Protection Method d Flameproof enclosure	Gas Group IIC Hydrogen & Acetylene	Temperature Class T6 ≤ 85°C T4 ≤ 135°C	Equipment Protection Level Gb High protection (Gas, Zone1)

ATEX / IECEx / EAC classification - for Dust

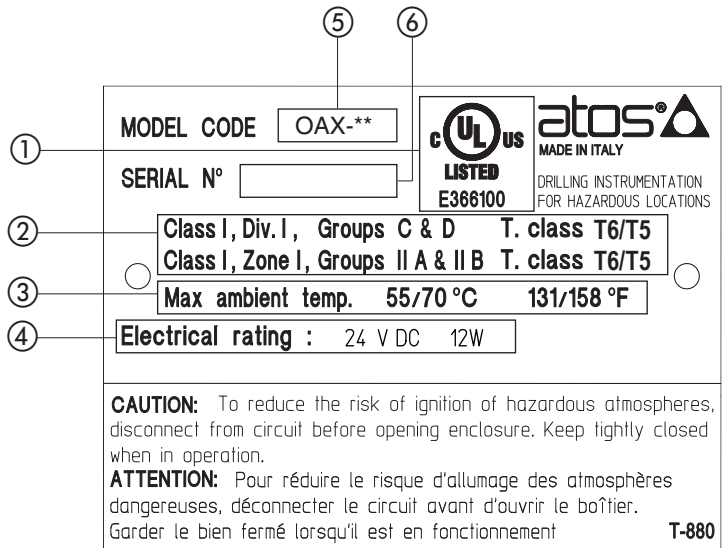
II 2 D	Ex	tb	IIIC	T85 / T135	Db
Equipment Group II industrial Equipment Category 2 High Protection Suitable for use D Dust	Mark of Explosion Proof	Protection Method tb Protection by enclosure	Dust Group IIIC Conductive Dust	Temperature Class T85 ≤ 85°C T135 ≤ 135°C	Equipment Protection Level Db High protection (Dust, Zone21)

RELATED DOCUMENTATION

- EW010** DHAX, DHAXS - on-off, direct, spool type
- EW020** DLAHX, DLAHXS, DLAHMX, DLAHMXS - on-off, direct, spool or poppet type
- EW050** DLAHPX, DLAHPXS, DLAPX, DLAPXS - on-off, piloted, poppet type leak free

Class I, Division I, Groups C & D
Class I, Zone 1, Groups IIA & IIB

- ① cULus marking and certificate number
- ② Marking according to NEC 500 and NEC 505 standards
- ③ Ambient temperature
- ④ Power supply characteristics
- ⑤ Solenoid model code
- ⑥ Solenoid serial number



NEC 500 classification

Class I	Division I	Groups C & D	T6/T5
Class I Equipment for flammable Gas and Vapors	Division I Explosive substances continuously or intermittently present in the atmosphere	Gas Group C Methane, Butane, Petrol, etc. D Ethylene, Formaldehyde, Chloropropane, etc.	Temperature Class T6 ≤ 85°C T5 ≤ 100°C

NEC 505 classification

Class I	Zone 1	Groups IIA & IIB	T6/T5
Class I Equipment for flammable Gas and Vapors	Zone 1 Location where explosive substance are continuously present	Gas Group IIA Methane, Butane, Petrol, etc. IIB Ethylene, Formaldehyde, Chloropropane, etc.	Temperature Class T6 ≤ 85°C T5 ≤ 100°C

RELATED DOCUMENTATION

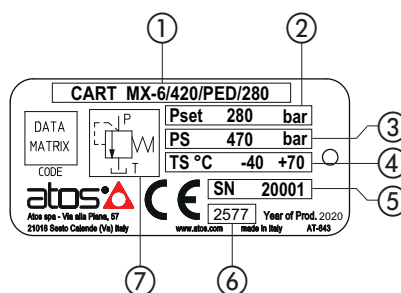
- EW010** DHAX/UL, DHAXS/UL - on-off, direct, spool type
- EW020** DLAHX/UL, DLAHXS/UL, DLAHMX/UL, DLAHMXS/UL - on-off, direct, spool or poppet type
- EW050** DLAHPX/UL, DLAHPXS/UL, DLAPX/UL, DLAPXS/UL - on-off, piloted, poppet type leak free

6 NAMEPLATE MARKING FOR PED PRESSURE VALVES

The PED valves are factory set at the pressure level required by the customer.

The factory pressure setting Pset is marked on the valve nameplate, together with the burst pressure PS and the temperature range

- ① Valve code
- ② Factory pressure setting
- ③ Burst pressure
- ④ Min ÷ Max fluid or ambient temperature range
- ⑤ Valve serial number (1)
- ⑥ Notified body reference number
- ⑦ Hydraulic symbol



(1) Example for serial number:

20	-	001
Year: 20 = 2020		Progressive number

RELATED DOCUMENTATION

PED pressure relief cartridges

CWY010 CART MX*/PED, CART AREX*/PED - stainless steel safety pressure relief valves