

Operating and maintenance information

for intrinsically safe on-off valves

This operating and maintenance information applies to Atos intrinsically safe on-off valves and is intended to provide useful guidelines to avoid risks when the valves are installed in a system operating in hazardous areas with explosive or flammable environment. The prescriptions included in this document must be strictly observed to avoid damages and injury. The respect of this operating and maintenance information grant an increased working life, trouble-free operation and thus reduced repairing costs. Information and notes on the transport and storage of the valves are also provided.



1 SYMBOL CONVENTIONS

This symbol refers to possible danger which can cause serious injuries

2 GENERAL NOTES

The operating and maintenance information is part of the operating instructions for the complete machine but it cannot replace them.

This document is relevant to the installation, use and maintenance of on-off directional and pressure control valves equipped with intrinsically safe solenoids, for application in explosive hazardous environments.

Due to the low power consumption, the intrinsically safe circuit is virtually protected against electrical sparks or thermal effects that could cause the ignition of the explosive atmosphere, also in case of failure. The protection is ensured only if the whole system is in compliance with the requirements of IEC/EN 60079-25 (Ex-i systems).

2.1 Warranty

All the intrinsically safe valves have 1 year warranty; the expiration of warranty results from the following operations:

- unauthorized mechanical or electronic interventions
- the intrinsically safe valves are not used exclusively for their intended purpose as defined in these operating and maintenance instructions

Service work performed on the valve by the end users or not qualified personnel invalidates the certification

3 CERTIFICATIONS AND PROTECTION MODE

The intrinsically safe solenoids subject of this operating and maintenance information are certified ATEX and IECEx. They are in compliance with following protection mode:

Group II
ATEX

II 1G Ex ia IIC T6 Ga

II 1G Ex ia IIC T5 Ga

IECEx

Ex ia IIC T6 Ga

Ex ia IIC T5 Ga

Group I (mining)

ATEX

I M1 Ex ia I Ma

IECEx

Ex ia I Ma

4 HARMONIZED STANDARDS

The Essential Health and Safety Requirements are assured by compliance to the following standards:

ATEX

EN 60079-0 Electrical apparatus for explosive atmospheres - Part 0: general requirements

EN 60079-11 Equipment protection by intrinsic safety 'i'

IECEx

IEC 60079-0 Electrical apparatus for explosive atmospheres - Part 0: general requirements

IEC 60079-11 Equipment protection by intrinsic safety 'i'

5 GENERAL CHARACTERISTICS

Ambient temperature	Standard = -20°C ÷ +60°C / PE option = -20°C ÷ +60°C / BT option = -40°C ÷ +60°C
Storage temperature range	Standard = -20°C ÷ +80°C / PE option = -20°C ÷ +80°C / BT option = -40°C ÷ +70°C
Seals, recommended fluid temperature	NBR seals (standard) = -20°C ÷ +60°C, with HFC hydraulic fluids = -20°C ÷ +50°C FKM seals (/PE option) = -20°C ÷ +80°C HNBR seals (/BT option) = -40°C ÷ +60°C, with HFC hydraulic fluids = -40°C ÷ +50°C
Surface protection	Zinc coating with black passivation
Compliance	Intrinsically safe protection "Ex ia" RoHs Directive 2011/65/EU as last update by 2015/863/EU REACH Regulation (EC) n°1907/2006

6 HYDRAULIC CHARACTERISTICS

See technical tables relevant to the specific components, listed in section 12

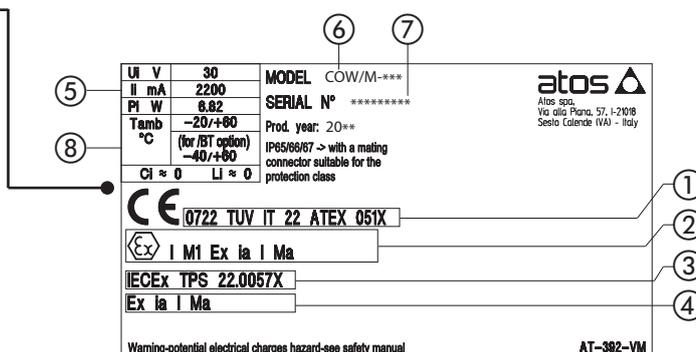
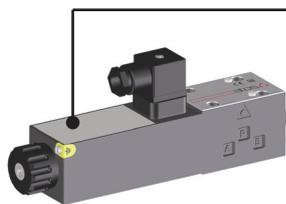
7 CERTIFIED ELECTRICAL CHARACTERISTICS

Electrical characteristics (max values)	Metod of protection			
	Group II			Group I (Mining)
	Ex II 1G Ex ia		Ex ia	Ex I M2 Ex ia I Mb
	IIC T6 Ga	IIC T6 Ga	IIC T5 Ga	
Ui [V]	30	30	30	30
Ii [mA]	800	2200	2200	2200
Pi [W]	3	6,82	6,82	6,82
Ci, Li	≅ 0			
Tamb [°C]	-20 ÷ +60 -40 ÷ +60 (/BT version)	-20 ÷ +45 -40 ÷ +45 (/BT version)	-20 ÷ +60 -40 ÷ +60 (/BT version)	-20 ÷ +60 -40 ÷ +60 (/BT version)

8 NAMEPLATES

8.1 ATEX and IECEx certification

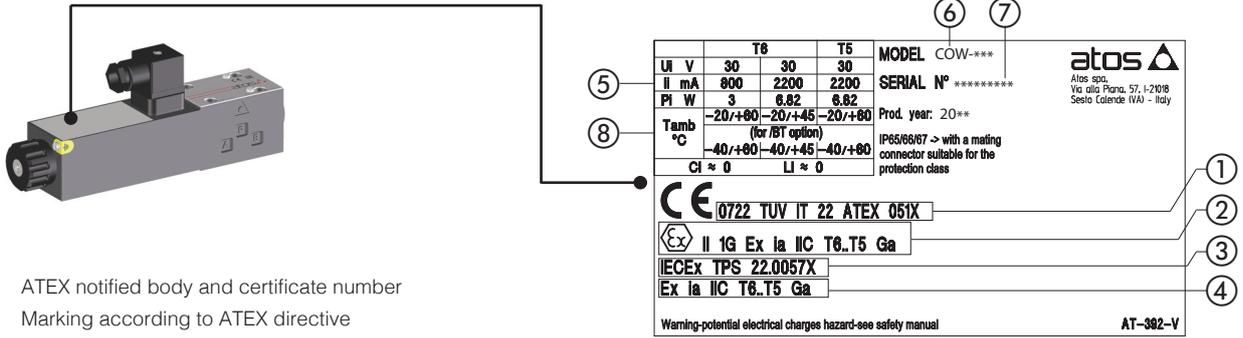
Gas - group I M1 - Mining



- 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 Electric characteristics
- ⑥ Solenoid model code
- ⑦ Solenoid serial number
- ⑧ Ambient temperature

	Mark of conformity to the applicable European directives
	Mark of conformity to the 2014/34/EU directive and to the relevant technical norms
I M1	Solenoid for mining (or relevant surface plants) which could be exposed to gas and / or flammable dust. Category M1: the equipment remains operative in case of explosive atmosphere.
Ex ia	Intrinsically safe solenoid, category "ia"
I	Equipment of group I
Ma	Equipment protection level, high level protection for explosive atmospheres
0722	Number of the Certified Body authorized for the production quality system certification: 0722 = CESI
TUV IT 22 ATEX 051X IECEx TPS 22.0057X	Certificate number
Ui, Ii, Pi, Ci, Li	Max input parameters of the equipment (relevant to the intrinsically safe)
T amb.	Ambient temperature range (min. -20°C and -40°C for /BT version, max. +60°C)

8.2 ATEX and IECEx certification
Gas - group II 1G - Zone 0, 1, 2



- 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 Electric characteristics
- ⑥ Solenoid model code
- ⑦ Solenoid serial number
- ⑧ Ambient temperature

CE	Mark of conformity to the applicable European directives
Ex	Mark of conformity to the 2014/34/EU directive and to the technical norms
II 1 G	Solenoid for surface plants with gas or vapours environment, category 1, suitable for zone 0 and with redundancy for zone 1 and 2
Ex ia	Intrinsically safe solenoid, category "ia"
II C	Group II C equipment suitable for substances (gas) for group II C
T6 / T5	Solenoid temperature class (maximum surface temperature)
Ga	Equipment protection level, very high level protection for explosive Gas atmospheres
0722	Number of the Certified Body authorized for the production quality system certification: 0722 = CESI
IECEx TPS 22.0057X	Certificate number
Ui, Ii, Pi, Ci, Li	Max input parameters of the equipment (relevant to the intrinsically safe)
T amb.	Ambient temperature range (min. -20°C and -40°C for /BT version, max. +60°C)

Notes:

The group IIC solenoids are suitable for IIA and IIB environments.

The T6 temperature class solenoids are suitable for all the substances having higher temperature class (T5, T4, T3, T2, T1).

The T5 temperature class solenoids are suitable also for all the substances having higher temperature class (T4, T3, T2, T1).

9 SAFETY NOTES

9.1 Improper use

Any improper use of the components is not admissible.

Improper use of the product includes:

- Wrong installation / installation in areas not approved for the specific component
- Incorrect cleanliness during storage and assembly
- Use of inappropriate or non-admissible hydraulic fluids
- Use outside of the specified performance limits
- Use of inappropriate electrical power supply
- Incorrect transport

9.2 Installation



The installation or use of inappropriate components in explosive hazardous environments could cause personal injuries and damage to property.

For the application in explosion hazardous environments, the compliance of the solenoid with the zone classification and with the flammable substances present in the system must be verified.

The main safety requirements against the explosion risks in the classified areas are established by the European Directives 2014/34/UE (for the components) and 99/92/CE (for the plants and safety of the workers against the risk of explosion).

The classification criteria of the area against the explosion risks are established by the norm EN60079-10.

The technical requirements of the electrical systems are established by the norm EN60079-14 (group II).

Note: the max fluid temperature controlled by the valve must not exceed + 60°C



Ensure that no explosive atmosphere may occur during the valve installation.

Only use the valve in the intended explosion protection area.

The ignition temperature of the hydraulic fluid used must be 50°C higher than the maximum surface temperature of the valve.

Use of the valve outside the approved temperature ranges may lead to functional failures like e.g. overheating of the valve solenoid. This means that the explosion protection is no longer ensured.

Only use the valve within the fluid temperature range.

During operation, touch the valve solenoid only by using protective gloves.

Unload the system pressure before working on the valve.

Danger of serious injury can be caused by a powerful leaking of hydraulic fluid jet.

Before working on the valve, ensure that the hydraulic system is depressurized and the electrical control is de-energized.

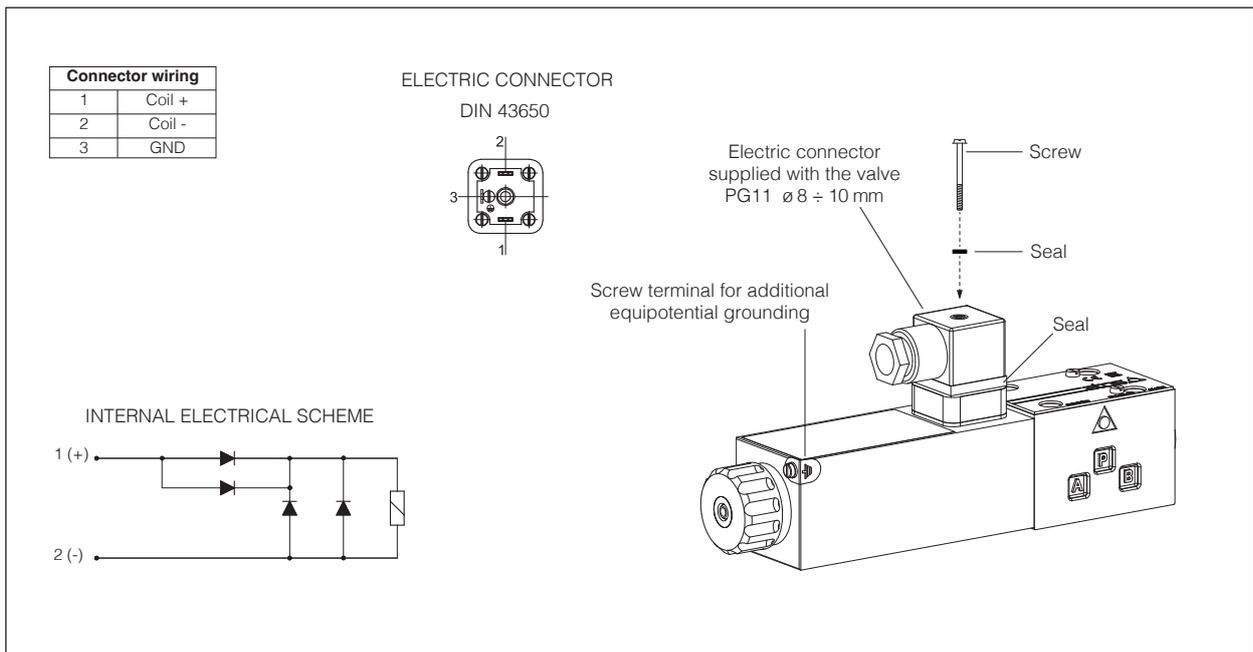
9.3 Electrical connection

For the solenoid application in classified area, specific equipment (safety barriers), certified in conformity to EN60079-11 norms, must be used.

Their electrical output characteristics must be in accordance to the solenoid max input parameters, printed on the solenoid nameplate.

See tech. table GX010 for Atos safety barriers.

The analysis of the system composed by the electrical equipment, the solenoid and the connection cables has to be performed by trained personnel and it must be in accordance to the requirements of EN 60079-25 (Ex-i systems) concerning to the intrinsically safety systems.



In case of humid or wet environments, water or humidity may penetrate into the electrical connections.

This case may lead to malfunctions at the valve and to unexpected movements of the controlled hydraulic actuator which may result in personal injury and damage to property.

Only use the valve within the intended IP protection class.

Before the assembly ensure that the connector seals are in good condition.

The electric connector must be fully tightened with the relevant screw.

9.4 Hydraulic fluids and operating viscosity range

Mineral oils type HLP having high viscosity index are recommended.

The hydraulic fluids must be compatible with the selected seals.

Make sure that the working fluid is compatible with gas and dust present in the environment.

The type of fluid has to be selected in consideration of the effective working temperature range, so that the fluid viscosity remains at the optimal level.

Hydraulic fluid	Suitable seals type	Classification	Ref. Standard
Mineral oils	NBR, FKM, HNBR	HL, HLP, HLPD, HVLP, HVLPD	DIN 51524
Flame resistant without water	FKM	HFDU, HFDR	ISO 12922
Flame resistant with water	NBR, HNBR	HFC	

Fluid viscosity: 15 ÷ 100 mm²/s - max allowed range 2,8 ÷ 500 mm²/s

9.5 Filtration

The correct fluid filtration ensures a long service life of the valves and it prevent anomalous wearing or sticking.



Contamination in the hydraulic fluid may cause functional failures e.g. jamming or blocking of the valve spool / poppet.

In the worst case, this may result in unexpected system movements and thus constitute a risk of injury.

Ensure adequate hydraulic fluid cleanliness according to the cleanliness classes of the valve over the entire operating range.

Max fluid contamination level:

ISO 4406 class 20/18/15 NAS 1638 class 9

Note: see also filter section at www.atos.com or KTF catalog

10 MAINTENANCE



Maintenance must be carried out only by qualified personnel with a specific knowledge of hydraulics and electrohydraulics

10.1 Ordinary maintenance



Service work performed on the valve by end user or not qualified personnel invalidates the certification

- The valves does not require other maintenance operations except seals replacement
- Results of maintenance and inspection must be planned and documented
- Follow the maintenance instructions of the fluid manufacturer
- Any preventive maintenance should be performed only by experienced personnel authorized by Atos.
- Cleaning the external surfaces using a wet cloth to avoid accumulation of dust layer over 5 mm
- Don't use compressed air for cleaning to avoid any dangerous dust dispersion on the surrounding atmosphere
- Any sudden increment in temperature requires the immediate stop of the system and the inspection of the relevant components

10.2 Repairing

In case of incorrect functioning or beak-down it is recommended to send the valve back to Atos or to Atos authorized service centers which will provide for the reparation.

Unauthorized opening of the valves during the warranty period invalidates the warranty and invalidates the certification tools for repairing.



The intrinsically safe solenoids must not be opened.

Any tampering invalidates the certification and it may cause serious dangerous.

11 TRANSPORT AND STORAGE

11.1 Transport

Observe the following guidelines for transportation of valves:

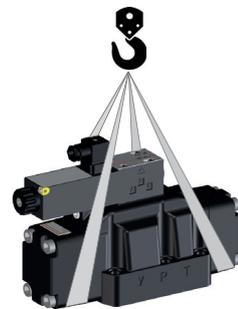
- Before any movement check the valve weight reported in the technical table relevant to the specific component
- Use soft lifting belts to move or lift the heavy valves to avoid damages



Danger of damage to property and personal injuries!

The valve may fall down and cause damage and injuries, if transported improperly:

- Use the original packaging for transport
- Use personal protective equipment (such as gloves, working shoes, safety goggles, working clothes, etc.)



11.2 Storage

Valve's corrosion protection is achieved with zinc coating: this treatment protect the valve to grant a storage period up to 12 months.

Additionally all valves are tested with mineral oil OSO 46; the oil film left after testing ensure the internal corrosion protection.

In case of storage period longer than 12 months please contact our technical office.

Ensure that valves are well protected against water and humidity in case of storage in open air.

12 RELATED DOCUMENTATION

Directional valves

EX110 DHWL8 - direct, spool type

EX120 DLWH - direct, poppet type

EX130 DPHW - piloted, spool type

EX150 LIDEW-WO, LIDBH-WO - piloted ISO cartridges and functional covers

Pressure relief valves

CX030 AGAM-WO, ARAM-WO - piloted, with solenoid valve for venting

Safety barriers

GX010 Y-BXNE Power supply barrier