

Pneumatic Rotary Actuators AP/APM series versions SR (single acting) DA (double acting)

MAN-AP-ATEX - Rev.03 – 01.2020 - ANNEX

Additional safety instructions for use of the pneumatic actuators series AP and APM in potentially explosive atmospheres (ATEX Directive 2014/34/EU)

GENERAL INFORMATION

- 1) Before proceeding with any operation, carefully read the User and Installation Maintenance manual supplied together with the actuator, including the following additional instructions for the use of pneumatic actuators in a potentially explosive atmosphere.
- 2) Check that the product received fully meets the requirements of the application in which it is to be installed.
- 3) Check that the packaging, upon receipt, is intact, free from damage due to knocks or falls that may have occurred during transportation. In this instance, verify the integrity of the product.
- 4) In the event that the actuator must be stored for a long period of time, it is preferable not to remove it from its packaging. For storage it is advisable to choose places that are clean, free from dust and/or humidity, with temperatures of between -10°C and +60°C. If it is necessary to leave the actuators packed outdoors for a short period (e.g. a few days on a construction site waiting for them to be assembled) make sure that they are covered and protected from dust, rain or snow.
- 5) Remember that each individual actuator is carefully checked and tested before being shipped. A few simple precautions, such as those listed above, will keep it intact and functional for a long time.

MARKING and CLASSIFICATION of ACTUATORS

- An adhesive data plate is affixed to the actuator body indicating:
- the manufacturer's name and address
 - the model of the AP actuator
 - the no. of springs (if 00 = Double Acting)
 - CR traceability code
 - production year
 - assembly variation
 - maximum operating pressure
 - temperature operating range
 - ATEX marking (indicating the parameters for use in a potentially explosive atmosphere)
 - CE symbol of compliance with European standards/directives
 - EAC symbol
 - degree of protection: IP67

ATEX marking KEY:

CE	Conformity with the Directive
Ex	Mark for use in pot. dangerous atmospheres
II	Membership group
2	Membership category
G, D	Gases, Dusts
Ex h	Type of protection (NON-electrical appliances)
IIC, IIIC	Explosive groups classification
T6...	Temperature class (range)
T80°C...	Maximum surface temperature (range)
Gb, Db	EPL (Equipment, Protection, Level)
X	Particular use conditions

The temperature class is determined according to Table 1. Information relating to the max. process and/or environment temperature are shown in the ATEX marking or in the technical documentation such as the safety instructions. The operating temperatures of the actuators are:

- 20°C ÷ +80°C (o-ring in NBR) in standard config.
- 50°C ÷ +95°C (o-ring in SILICON) in special config.*
- 20°C ÷ +145°C (o-ring in VITON) in special config.*

The special executions are provided only at the explicit request of the customer. The relative operating temperature ranges are shown on the identification label of the actuators. Intense use of the actuator, in which it is pushed to the limits of maximum operating speed and without pause between one cycle and the next, can generate a temperature increase (maximum) of the external surfaces of the actuator of 5°C (ΔT of friction) with respect to the normal temperatures resulting from the ambient temperature or the temperature of the pilot fluid.

TABLE 1

Ratio between Tproc./amb. – Class T – Max surf. temp.				
o-ring materials	Tmax (proc./amb.)	Surf. temp (G)	Class (T)	Surf. temp (D)
NBR, SILICON, VITON	75	85	T6	80
	80	90	T5	85
SILICON, VITON	95	105	T4	100
VITON	125	135	T4	130
	145	155	T3	150

FURTHERMORE:

- The maximum surface temperature does not depend on the pneumatic actuator but above all on the temperature of the control fluid and/or on the ambient temperature at which it is located.
 - the operating temperature range indicated on the actuator identification plate is valid for both the ambient temperature and the temperature of the control fluid.
 - Use of the actuator at temperatures below the maximum temperature indicated on the actuator and in Table 1 can result in variation of the temperature class.
 - The actuators are suitable for use on Group II, Category 2 equipment, suitable in areas classified with the presence of combustible gases and/or dusts:
 - Zone 1 and 2 for GAS / 21 and 22 for Dusts (see Table 2)
 - Temperature class: T6-T5-T4-T3
 - Type of protection Ex h (for NON-electric appliances)
 - Gas Group: "II C" (thickness painting ≤ 0.2mm)
 - Dust Group: III C
 - EPL: Gb for Gases, Db for Dusts
 - before installing the actuator in environments with a potentially dangerous atmosphere containing gases or dusts, check that the minimum ignition temperatures of the gases or of the dusts themselves are higher than those of the maximum surface temperatures of the actuators.
- The pneumatic actuators are designed and manufactured in compliance with the requirements of the following standards:

EN 1127-1 / EN ISO 80079-36 / EN ISO 80079-37

TABLE 2

Report: Dangerous areas, Substances, Categories, EPL			
Dangerous areas		Category	EPL
Gases, vapours or mists	Area 0	1G	Ga
Gases, vapours or mists	Area 1	2G or 1G	Ga or Gb
Gases, vapours or mists	Zone 2	3G, 2G or 1G	Gc, Gb or Ga
Dusts	Area 20	1D	With
Dusts	Area 21	2D or 1D	Da or Db
Dusts	Area 22	3D, 2D or 1D	Dc, Db or Da

SAFETY INSTRUCTIONS FOR THE USE OF AP/APM SERIES ACTUATORS IN A POTENTIALLY HAZARDOUS ATMOSPHERE

- 1) Pneumatic actuators are devices that are defined without their own functionality. Their application and use conditions are innumerable; it is therefore essential that the user performs a

- precise risk analysis aimed at the specific use in order to reduce the risk to an acceptable level for the class of use.
- 2) It is advisable to always operate in SAFE conditions for all phases of installation, use and maintenance.
- 3) Always observe the general safety rules envisaged in the various work areas. Always wear personal protection equipment (P.P.E.).
- 4) The actuator is not suitable for containing potentially explosive mixtures. Use only NON-corrosive, NON-explosive fluids for its operation. These fluids must be cleaned and filtered (max filter size 20 microns).
- 5) The actuator is supplied with sufficient lubrication for use in normal working conditions. If the actuator is subjected to heavy use, it is advisable to use a LUBRICATED supply fluid with substances that do not tend to carbonise and become explosive. The supply fluid must be sucked into the SAFE AREA and similarly for the fluid in the spring compartment of the single-acting actuators (AP SR - APM SR). It is advisable to use pilot valves equipped with an ETS (exhaust to spring) function or to keep the spring chambers pressurised at a pressure of 0.2-0.3 bar to prevent the actuator from sucking in the surrounding air.

ATTENTION:

If the supply fluid is a group IIA gas (such as natural gas), the compartment must be pressurised using the same gas used as the supply fluid. The user has the task and responsibility of creating a circuit that DOES NOT generate explosive mixtures inside the actuator. In addition, before using a control fluid other than compressed air and which is certainly not an inert gas, the user must check its chemical compatibility with all the components of the actuator.

- If the actuator uses the IIA group gas supply fluid, before each maintenance operation, perform a number of inert gas cleansing cycles, in the SR version, also in the rooms where the springs are housed.
- Use of the pneumatic actuator subjects it to a process of wear and deterioration of the properties of the gaskets (o-rings) and guides; this can compromise the functionality of the actuator causing pressure losses and therefore a lowering of the developed torques.
- Verification and maintenance of the actuators must be planned and carried out periodically, in accordance with what is specified in the product user and maintenance manual. The higher the risk class of the fluid intercepted, the greater the importance of the maintenance interventions being precise and frequent over time.
- 6) As required by EN 1127-1, the rotating elements, in order to avoid the ignition of dust/air mixtures due to sparks of mechanical origin, must have peripheral speeds that are lower than or equal to 1 m/s.
- The AP and APM series pneumatic actuators meet this requirement as peripheral speeds of 0.015 m/s were detected for the smaller actuator mod. AP0 and at 0.058 m/s for the larger actuator mod AP12. The user must verify that

installation of the actuator on their system maintains the rotation speeds in a safe state.

7) Direct installation of the actuator on the valve. Carefully avoid a situation whereby the connection between actuator and valve is watertight. In fact, in the event that there is a leak from the rod, the fluid intercepted by the valve must be able to flow freely in the actuator-valve connection area and to exit outwards. If this is not the case, the fluid which has reached the actuator-valve connection could pressurise, reaching the pressure in the pipe and therefore penetrating into the cylinder chambers, thus creating possible causes of ignition.

8) Always check that the actuator is connected to earth. Use the actuator only and exclusively with valves equipped with antistatic devices. The connection between the actuator shaft and the valve shaft must be made using electrically conductive materials (preferably stainless steel). Check that there is good conduction between the actuator shaft and the valve body connected both during the first installation phase and through maintenance-preventive interventions to be carried out at least every 6 months. At the same time make sure that the valve body is properly connected to the earth equipotential line. For further information see point 23.

9) The presence or subsequent application of coatings (e.g. paint) **must NOT be:**

> 2mm in the case of group IIB gases and/or vapours

> 0.2mm in the case of group IIC gases and/or vapours

10) Dust deposits that persist for a long time between the interstices of moving parts could become a potential trigger over time, even if the moving parts have very low rotation speeds.

The upper part of the rod that exits the actuator body does not have particular cavities or interstices that are difficult to access, so a simple periodic cleaning operation (related to the conditions of dustiness of the environment) can be performed in order to maintain a high standard of safety.

If there are particularly severe conditions regarding the level of environmental dust and/or difficulty in accessing the actuator to perform cleaning operations (due to narrow spaces or great heights that are not accessible), it is advisable during the installation phase to protect with caps or with other covers, for which the user is responsible, the pneumatic cylinder and the connection area between valve and actuator (pin and pole). If a direct mounting connection is made, the level of protection from dust deposits is to be considered sufficiently safe. In any case, it should be remembered that the connection of an actuator to a valve, both accompanied by a declaration of conformity with ATEX Directive 2014/34/EU, DOES NOT exempt the user from performing the risk assessment of the engagement induced by the interface mechanics applied to the devices, in compliance with the directive itself and with the related harmonised standards.

11) **OPENING THE ACTUATOR:** every operation or intervention on the actuator must be performed by qualified and specialist personnel who have been duly trained. (If the actuator is still covered by warranty, this operation automatically invalidates the same, unless previously authorised by Sirca International S.p.A.). Make sure that there is no supply pressure in the device and that the valve

connected to it is in a safe condition (open or closed according to the usage specifications). If the actuator is of the return spring SR type, make sure that the actuator is in such a position that these are NOT in the compression phase, but in the relaxation phase.

ATTENTION: even in the absence of compressed air, a single-acting SR actuator could be in the condition of having its springs compressed due to the valve connected to it being mechanically locked or due to a possible device that prevents its free rotation in the position of extended springs.

Carry out all maintenance operations in safe areas.

If the intervention must be performed in an environment with the possible presence of explosive mixtures, **AVOID** the use of tools and/or working methods (e.g. grinding, polishing, etc.) which could generate sparks and therefore be causes of ignition.

The device, if not pressurised and with the springs extended, even when open, does not have its own ignition sources.

12) **DO NOT** modify or tamper with the actuator in any way.

13) Use only and exclusively original spare parts supplied by Sirca International S.p.A.

14) Use handling, lifting and support systems that are suitable for large actuators.

15) Before installing the actuator in areas subject to seismic risk or extreme climatic conditions, contact the technical-commercial service of Sirca International S.p.A.

16) Apply electrical accessories and not only if they comply with ATEX Directive 2014/34/EU, accompanied by declarations of conformity demonstrating adequate classification for the installation area. Check with each added accessory if the risk analysis required by the ATEX Directive is required.

17) If the actuator is installed in environments with extreme conditions (very high or very low temperatures) it is the responsibility of the user to provide and create adequate insulating covers.

18) Installation of the actuators must be performed professionally in order to avoid subjecting the device to linear, torsional or bending stresses not foreseen in the normal functionality of the actuator.

19) Do not use the actuator outside the environmental and performance operating conditions or outside the characteristics declared by the manufacturer.

20) Use adequate devices to protect the actuators from possible overpressures caused by the use of unstable supply fluids or by possible overpressures due to the generation of a fire.

21) In the event of a fire, the actuator quickly loses its operational functionality. Provide particular protections or insulation in order to keep it operational in the event of a fire.

22) The actuator is NOT a safety device; it must be monitored and controlled by other devices specifically made and approved as such.

23) **DANGER** of ignition due to electrostatic discharges:

to avoid the accumulation of electrostatic charges on the metal parts of the actuators, the actuators themselves and all the surrounding metal parts must be electrically connected to each other and to the general earthing system. Earth using

conductors insulated with eyelet cable lugs. It is advisable to use eyelets with dimensions that allow their insertion between at least one of the screws that secure the heads to the actuator body.

ATTENTION: Use the actuator only and exclusively with valves equipped with antistatic-device; make the mechanical connection between the actuator shaft and the valve shaft using electrically conductive materials. Check that there is good conduction between the actuator shaft and the valve body connected, both during the first installation phase and through maintenance-preventive interventions to be carried out at least every 6 months. At the same time make sure that the valve body is properly connected to the earth equipotential line.

After connecting the actuator to earth, check the electrical continuity of the connection between the cylinder and the connection point to the earth system and between the latter and the leakage.

Check the continuity between the earth-connected parts and any parts connected to each other by means of insulating joints and if necessary add metal jumpers to short-circuit these parts.

Avoid as far as possible the presence of non-metallic objects near the appliances and if this is not possible, take measures in order to prevent these objects from being electrostatically charged. This precaution is all the more important the wider the surface of non-metallic objects and the more probable the presence of environmental conditions with low humidity. In order to prevent and/or reduce the risk of ignition, make sure that the electrical resistance between connections and the actuator is max 10 Ohm, according to the provisions of UNI EN 12266-2.

INFORMATION FOR THE USE OF TOOLS IN POTENTIALLY EXPLOSIVE ATMOSPHERES

(Ref. EN1127-1:2011 ANNEX A)

Those responsible for operating plants and processes where they potentially explosive atmospheres exist should provide information to all who work on the site about the safe use of hand tools. Two different types of tools can be distinguished:

A) tools which can only cause single sparks when they are used (e.g. screw-drivers, spanners, impact screw-drivers)

B) Tools which generate a shower of sparks when used during sawing or grinding

In Zone 0 and 20, no tools which can cause sparks should be allowed.

In zone 1 and 2, only steel tools according to A) should be allowed. Tools according to B) should only be permissible if no hazardous explosive is present at the workplace.

However, the use of any kind of steel tools should be prohibited in Zone 1 if the risk of explosion exist because of the presence of substances belonging to explosion group II C (according to EN 60079-20, acetylene, carbon disulphide, hydrogen), and hydrogen sulphide, ethylene oxide, carbon monoxide, unless no hazardous explosive atmosphere is present at the work place during the work with these tools.

Steel tools according to A) may be allowed in Zone 21 and 22.

Steel tools according to B) may only be allowed if the

workplace is shielded from the remaining area of Zones 21 and 22 and the following additional measures have been taken:

- Dust deposit have been removed from the workplace or
- The workplace is kept so wet that no dust can be dispersed in the air nor that any smouldering processes can develop.

When grinding or sawing in Zone 21 and 22 or in their vicinity, sparks produced can fly over great distances and lead to the formation of smouldering particles. For this reasons the other areas around the workplace also should be included in the protective measures mentioned.

The use of tools in Zones 1, 2, 21 and 22 should be subject to a "permit to work" system. This should be included in the information for use.

ATTENTION:

Any modification not expressly authorised by Sirca International S.p.A. made to the product after its placing on the market causes forfeiture of the presumption of conformity with the ATEX Directive 2014/34/EU as well as invalidation of the warranty itself.

The data and characteristics shown in this manual can be changed for technical improvement purposes even without notice and, therefore, are not binding for the purposes of the validity of the supply itself.

SIRCA INTERNATIONAL S.p.A.

20060 Trezzano Rosa (Mi) Italy - Via Trieste n°8

Phone ++39 02 92 01 02 04

Fax ++93 02 92 01 19 54 Sales Dep.

Fax ++93 02 92 01 02 16 Purchaser Dep.

E-mail: info@sircainternational.com

website: www.sircainternational.com