



## KEYSTONE OPERATING AND SAFETY INSTRUCTIONS

### RACK AND PINION, PNEUMATIC ACTUATORS

Before installation these instructions must be fully read and understood

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#### 1 INTRODUCTION

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These products are manufactured and supplied through a fully accredited ISO 9001 quality system and all relevant national and international standards are met as required. Full after sales service and support, complete with high quality replacement parts are available on request.

#### 2 PURPOSE

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Actuators are available in a range of sizes and are designed to be mounted to quarter turn valves either directly or using the correct mounting brackets / adaptors and sizing procedures.

#### 3 GENERAL PNEUMATIC SYSTEMS RECOMMENDATIONS

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To maintain maximum efficiency with this, or other pneumatic actuators, we advise that the following basic system recommendations are followed:

- a. Where air pipelines are subjected to extremes of temperature, the system should be fitted with air drying equipment.
- b. Air control lines should be run to a 'Recommended Piping Practice' and should not have "exaggerated" loops which may trap condensate.
- c. All pipe ends should be thoroughly cleaned and deburred after cutting to ensure that the pipeline is clear of cuttings.
- d. If pipelines are hydraulically tested, then the lines should be "blown down" with high pressure air to clear all water, prior to connecting lines to the actuator.
- e. Where pipe fitting sealants are used, they should be applied to the male threads only. When applied to female threads, excess compound can be transmitted into the actuator control lines.
- f. Where a system is dependent on Air Filter Equipment, the air filters should be situated in positions that allow easy access to maintain and / or drain.

- g. Where pneumatic valve positioners, or pneumatic controllers are fitted to valve actuator assemblies, oil mist lubricated air should not be used unless the manufacturer states specifically that the controllers are compatible with lubricated air.

#### NOTE

Actuators are rated for air pressure in the range 40 psig (2.75 barg) to 120 psig (8.3 barg) and must not exceed 150 psig (10 barg).

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### 4 OPERATION

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Pneumatic actuators deliver torque through the drive-shaft. Double acting actuators require air for both open and closed travel modes. A minimum of 5 psi can operate double acting actuators.

For single acting spring return actuators, air supply needs to overcome the force required to compress the springs. This force is dependent on the spring rating (typically 40 psi up to 100 psi maximum). Once charged, and the springs are fully compressed, the system is held in balance until the air pressure is cut and allowed to decay (i.e. not locked off). The (considerable) spring force is then released and rotates the shaft very rapidly.

Note the following recommendations:

- Take due care and attention that the shaft is not an 'entrapment' risk.
- It can be beneficial to manually check the actuator by use of proper levers or gearboxes, but use extreme caution on spring return units to avoid bounce back.
- Similarly, any valve or accessory must be properly and firmly / safely affixed to ensure that the assembly package remains safe.
- Note that discs of butterfly valves, balls of balls valves, etc, provide an entrapment risk when operating the actuator out of the pipe. Only properly trained and qualified personnel should be allowed to bench test units and assembled packages.
- Always use the correct size, grade and method of fitting products together into a package assembly.
- Always use correctly specified brackets and couplings, when required, and ensure that they are fitted securely.
- Improperly packaged units can rotate - potential for dangerous backlash.
- Take great caution if working on units in situ. Strict isolation of power supplies is recommended.
- When working overhead, use only safe practices and avoid any risk of falling / dropping.
- Ensure all packages are properly supported when fitted into the pipeline.
- Ensure all air connections are made properly to be sealed tight and firmly affixed.

### 5 MAINTENANCE - DOUBLE ACTING AND SINGLE ACTING UNITS

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#### CAUTION

*Remove all air pressure and observe normal safety precautions including the use of eye protection.*

*Always ensure that spring return actuators are in the fail safe position before attempting any maintenance.*

*Pay particular attention to this requirement when manual operators are fitted.*

*For safety reasons DO NOT 'Air Assist' single acting pneumatic actuators.*

All maintenance operations must be undertaken in accordance with the procedures described in the relevant Installation, Operating and Maintenance Instructions. The relevant document reference is: Keystone F89 actuators.

### 6 TRAVEL STOPS (WHEN RELEVANT TO THE MODEL)

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#### WARNING

*Under no circumstances must the travel stop bolts be totally withdrawn from the actuator whilst compressed air is being applied.*

Internal travel stops must not be used for manual override.

### 7 GENERAL INFORMATION

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As standard, clockwise to close rotation, air to Port A will rotate the actuator to the OPEN position. Air to Port B will rotate the actuator to the CLOSE position.

#### WARNING

*For safety reasons, DO NOT 'Air Assist' single acting pneumatic actuators.*

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