



SLOVENSKI STANDARD
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Industrijski ventili - Pogoni - 5. del: Pnevmatični linearni pogoni za industrijske ventile - Osnovne zahteve

Industrial valves - Actuators - Part 5: Pneumatic linear actuators for industrial valves — Basic requirements

Industriearmaturen - Antriebe - Teil 5: Pneumatische und hydraulische Antriebe - Grundanforderungen

Robinetterie industrielle - Actionneurs - Partie 5 : Actionneurs linéaires pneumatiques - Prescriptions de base

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23.060.20 Zapirni ventili (kroglasti in pipe) Ball and plug valves

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Industrial valves - Actuators - Part 5: Pneumatic linear actuators for industrial valves - Basic requirements

Robinetterie industrielle - Actionneurs - Partie 5 :
Actionneurs linéaires pneumatiques - Prescriptions de
base

Industriearmaturen - Antriebe - Teil 5: Pneumatische
und hydraulische Antriebe - Grundanforderungen

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If this draft becomes a European Standard, CEN members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for giving this European Standard the status of a national standard without any alteration.

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COMITÉ EUROPÉEN DE NORMALISATION
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European foreword

This document (prEN 15714-5:2019) has been prepared by Technical Committee CEN/TC 69 “Industrial valves”, the secretariat of which is held by AFNOR.

This document is currently submitted to the CEN Enquiry.

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1 Scope

This document provides basic requirements for piston type pneumatic linear actuators for industrial valve, both double acting and single acting, used for on-off and modulating control duties.

It includes criteria, method and guidelines for design, qualification, corrosion protection, control and testing.

It does not apply to diaphragm actuators and to pneumatic actuators which are integral parts of control valves.

Other requirements, or conditions of use, different from those indicated in this document, are subject to negotiations, between the purchaser and the manufacturer/supplier, prior to order.

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

EN ISO 5210:2017, *Industrial valves - Multi-turn valve actuator attachments (ISO 5210:2017)*

EN 12570, *Industrial valves - Method for sizing the operating element*

EN 60529, *Degrees of protection provided by enclosures (IP Code)*

ISO 5599-2, *Pneumatic fluid power — Five-port directional control valves — Part 2: Mounting interface surfaces with optional electrical connector*

3 Terms and definitions

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For the purposes of this document the terms and definitions given in EN 15714-1 and the following apply.

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

- IEC Electropedia: available at <http://www.electropedia.org/>
- ISO Online browsing platform: available at <http://www.iso.org/obp>

3.1

stroke

single and complete movement from one end of travel to the other

3.2

output thrust

minimum guaranteed output thrust capability of the actuator, in both directions, at specified supply pressures conditions as provided by the manufacturer/supplier

Note 1 to entry: Where the output thrust varies along the stroke, in a linear or nonlinear relationship with pressure, tabulated data and/or thrust versus stroke diagram shall be provided at significant pressure values for each direction of movement.

3.2.1 Nominal thrust

3.2.1.1

double acting version

minimum guaranteed output thrust of the actuator, at any point of the stroke, with nominal supply 5,5 bar

prEN 15714-5:2019 (E)**3.2.1.2****single acting version**

guaranteed output thrust of the actuator with pneumatic nominal supply 5,5 bar at the beginning of the stroke in the direction to compress the spring

3.2.2**start thrust**

actuator output thrust at the beginning of the stroke in the direction of movement

3.2.3**maximum thrust**

for double acting version, output thrust of the actuator when the pressure of the power supply corresponds to the maximum allowable pressure; for single acting version, maximum output thrust between the thrust at the beginning of the stroke when the pressure of the power supply corresponds to the maximum allowable pressure and the thrust generated by the spring at the end of specified compression stroke

Note 1 to entry: The maximum thrust value shall be indicated by the manufacturer/supplier. The value shall be not lower than 1,45 times the nominal thrust.

3.3 Single acting version**3.3.1****Air Starting Thrust****AST**

output thrust, at defined pressure value, at the beginning of the stroke in opposition to the spring

3.3.2**Air Ending Thrust****AET**

output thrust, at defined pressure value, at the end of the stroke when spring is at its maximum compression

3.3.3**Air Running Thrust****ART**

any output thrust value between AST and AET at defined pressure value

3.3.4**Spring Ending Thrust****SET**

output thrust generated by the spring at the end of its stroke with no air in the cylinder

3.3.5**Spring Starting Thrust****SST**

output thrust generated by the spring at its maximum compression with no air in the cylinder

3.3.6**Spring Running Thrust****SRT**

any output thrust value between SST and SET

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3.4

operating time

moving times for the guaranteed stroke in each direction of movement

Note 1 to entry: Requested values shall be defined between the purchaser and the actuator manufacturer/supplier considering the ancillaries (6.1) mounted on the actuator, the supply flow rate and the presence or not of external load.

3.5

displacement volume

internal actuator displaced volumes (in liter) for each direction, including the dead volumes, for the maximum stroke without any external limitation

4 Classification/Designation

4.1 Duty classification

4.1.1 General

According to their intended function, two versions of linear valve actuators are defined by this Standard: on-off duty and modulating duty.

4.1.2 On-off duty

The actuator is required to drive the valve through its entire travel from the fully open position to the fully closed position or vice-versa.

4.1.3 Modulating duty

The actuator is required to continuously drive the valve to any position between fully open and fully closed.

4.2 Action

4.2.1 Double Acting (DA)

This actuator requires the supply of motive energy to operate in both travel directions.

4.2.2 Single Acting (SA)

This actuator requires external power to operate the valve in one direction only, the return stroke being powered by an alternative form of stored energy (Fail Safe actuators).

For the purpose of this document, the stored energy shall be supplied by a mechanical spring.

4.3 Motive energy

4.3.1 Operating medium

The operating medium shall be compressed instrument air, unless otherwise specified.

Other compressed gases may be used, on agreement between the purchaser and manufacturer/supplier, ensuring they are compatible with all the parts in contact with the fluid including the lubricants.

4.3.2 Quality

Humidity of the operating medium shall be Class 2 according to ISO 8573-1:2010, Table 2.

For ambient temperature conditions different from the standard stated at 5.5.1, the dew point shall be at least 10 °C below the minimum operating ambient temperature.

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It is recommended that the content of particles per cubic meter in the operating medium shall not exceed Class 5 according to ISO 8573-1:2010, Table 1.

Particles up to a maximum 40 µm size are acceptable in the operating medium provided that a right analysis of the behaviour of the ancillaries (6.1), when mounted on the actuator, is done.

4.3.3 Pressure general information

As a general information the manufacturer/supplier shall indicate, for each actuator model, the pressure limits including the maximum allowable pressure or the minimum moving pressure (for double acting actuators) and design pressure.

The minimum moving pressure for a single acting actuator is the minimum pressure required at ambient temperature to complete the specified stroke (3.1), starting from not pressurized conditions, without external load.

4.3.4 Pressure values

Nominal supply pressure, to define the reference data, shall be 5,50 bar.

The maximum allowable pressure shall be at least 8 bar, unless otherwise specified.

Design pressure shall be at least 1,10 times the maximum allowable pressure.

The recommended minimum design pressure is 10 bar. The design pressure value shall be used to determine the structural resistance of the pressure retaining parts of the actuator.

4.3.5 Structural test pressure

The minimum structural test pressure value for pressurized parts shall be 1,43 times the design pressure for steel enclosures and a minimum of 2,00 times the design pressure for cast steel, spheroidal cast iron and cast aluminium enclosures.

Duration time under test pressure shall be at least 60 s after pressure stabilization.

No external leakage or permanent deformations are accepted after this test.

Specific procedure to carry out this test, including the percentage of tested units for mass production, shall be established by the manufacturer/supplier.

4.4 Actuator performance data**4.4.1 Double acting version**

Data and dimensions of double acting actuator shall be in accordance with Table 1.

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Table 1 — Data and dimensions of double acting actuator

| Preferred nominal internal cylinder diameter mm | Actual nominal thrust ^a "X" kN | Thrust rating (MOT) ^b kN | Flange type ISO 5210 ^c | ISO 5210 nominal Thrust kN | Minimum stroke mm |
|--|---|--|-----------------------------------|-------------------------------|----------------------|
| 80 | 2,7 | 4 | F05 | ≤ 10 | 20 |
| 100 | 4,1 | 6 | F05 | ≤ 10 | 20 |
| 125 | 6,5 | 10 | F05 | ≤ 10 | 20 |
| 160 | 10,6 | 16 | F07 | ≤ 20 | 40 |
| 200 | 16,6 | 25 | F10 | ≤ 40 | 60 |
| 250 | 26,0 | 38 | F10 | ≤ 40 | 60 |
| 300 | 36,6 | 53 | F12 | ≤ 70 | 60 |
| 400 | 66,5 | 95 | F14 | ≤ 100 | 80 |
| 500 | 101,5 | 148 | F16 | ≤ 150 | 100 |
| 600 | 146,0 | 215 | F25 | ≤ 200 | 120 |
| 700 | 199,0 | 290 | F30 | ≤ 350 | 140 |
| 900 | 329,0 | 480 | F35 | ≤ 700 | 160 |
| 1 100 | 495,0 | 715 | F35 | ≤ 700 | 160 |

^a Actual nominal thrust, piston side, is based on 5,5 bar nominal pressure and includes friction factor.
^b Maximum operating thrust (MOT) at maximum allowable pressure = 8 bar.
^c Different flange type may be used upon agreement between purchaser and manufacturer/supplier.

4.4.2 Single acting version

Data and dimensions of single acting actuator shall be in accordance with Table 2.