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Industrijski ventili - Pogoni - 4. del: Hidravlični pogoni z delnim zasukom za industrijske ventile - Osnovne zahteve

Industrial valves - Actuators - Part 4: Hydraulic part-turn actuators for industrial valves - Basic requirements

Industriearmaturen - Antriebe - Teil 4: Hydraulische Schwenkantriebe für Industriearmaturen - Grundanforderungen

Robinetterie industrielle - Actionneurs - Partie 4: Actionneurs hydrauliques à fraction de tour pour robinetterie industrielle - Prescriptions de base

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Robinetterie industrielle - Actionneurs - Partie 4:
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Industriearmaturen - Antriebe - Teil 4: Hydraulische
Schwenkantriebe für Industriearmaturen -
Grundanforderungen

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COMITÉ EUROPÉEN DE NORMALISATION
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Contents

Page

European foreword.....	4
1 Scope	5
2 Normative references	5
3 Terms and definition	5
4 Classification and designation.....	7
4.1 Duty classification.....	7
4.1.1 General.....	7
4.1.2 On-off duty	7
4.1.3 Modulating duty.....	7
4.2 Action.....	8
4.2.1 Double acting (DA).....	8
4.2.2 Single acting (SA).....	8
5 Motive energy	8
5.1 Operating medium.....	8
5.2 Quality	8
5.3 Pressure.....	8
5.3.1 General.....	8
5.3.2 Maximum allowable pressure (MAP)	8
5.3.3 Design pressure	9
5.3.4 Working pressure	9
5.3.5 Structural test pressure	9
5.3.6 Minimum moving pressure	9
6 Actuator performance data	9
6.1 Minimum moving pressure	9
6.2 Operating time	9
6.3 Displacement volume	9
7 Basic design requirements	10
7.1 Safety requirements.....	10
7.2 Actuator attachment	10
7.3 Angular stroke.....	10
7.4 Endurance of part-turn actuators	10
7.5 Leakage	11
7.6 Environmental conditions	11
7.6.1 Ambient temperature.....	11
7.6.2 Enclosure protection.....	12
7.6.3 Corrosion protection.....	12
7.7 Pressure connections	13
7.7.1 General.....	13
7.7.2 Remotely mounted pilot valves	14
7.7.3 Direct mounted pilot valves	15
7.8 Pressure connections for single acting actuators	16
7.9 Fail safe direction for single acting actuators.....	16
7.10 Structural safety factors	16

7.11	Position indication	17
8	Optional equipment.....	17
8.1	Ancillaries.....	17
8.2	Manual operation	20
8.3	Mechanical end stop adjustment	20
9	Conformity assessment	20
9.1	General	20
9.2	Type tests.....	20
9.3	Control of production process	21
10	Marking	22
10.1	Basic requirements on marking.....	22
10.2	Optional information.....	22
11	Documentation	23
12	Part-turn actuator selection guidelines	23
Annex A (normative) Actuator type test procedure.....		24
A.1	General	24
A.2	Test equipment.....	24
A.3	Test conditions	24
A.4	Test procedure	24
A.4.1	Initial tests	24
A.4.2	Endurance test.....	25
A.4.3	Final tests.....	25
A.5	Acceptance criteria	25
Annex B (informative) Actuator selection guidelines		26
B.1	General	26
B.2	Selection parameters	26
B.2.1	General	26
B.2.2	Valve questions.....	26
B.2.3	Actuator questions	26
B.2.4	Ancillary questions	27
B.2.5	Environmental conditions.....	27
B.3	Actuator selection.....	27
B.3.1	General	27
B.3.2	Torque characteristics for rack and pinion actuators	28
B.3.3	Torque characteristics for scotch yoke actuators (e.g. symmetric system)	29
Bibliography		31

prEN 15714-4:2024 (E)

European foreword

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1 Scope

This document specifies basic requirements for hydraulic part-turn valve actuators, both double acting and single acting, used for on-off and modulating control duties.

It includes guidelines, recommendations and methods for enclosure and corrosion protection, control and testing.

It does not apply to hydraulic actuators which are integral parts of control valves and to hydraulic actuators designed for permanent immersion in fresh or sea water as well as electro-hydraulic actuators.

Other requirements, or conditions of use, different from those indicated in this document can vary upon request.

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 5211, *Industrial valves — Part-turn actuator attachments (ISO 5211)*

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

EN 15714-1, *Industrial valves — Actuators — Part 1: Terminology and definitions*

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

ISO 4401, *Hydraulic fluid power — Four-port directional control valves — Mounting surfaces*

ISO 4406, *Hydraulic fluid power — Fluids — Method for coding the level of contamination by solid particles*

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3 Terms and definition

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

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

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

3.1

part-turn actuator

actuator which transmits torque to the valve for less than one revolution and which does not have the capability of withstanding axial thrust

Note 1 to entry: Part-turn actuators are classified by action and duty.

prEN 15714-4:2024 (E)**3.2****stroke**

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

3.3**end stop**

mechanical part designed to stop the actuator drive train at an end position

Note 1 to entry: End stop can be fixed or adjustable.

3.4**Torque****3.4.1****output torque**

minimum guaranteed output torque 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 torque varies with the stroke, in a linear or nonlinear relationship with pressure, tabulated data and/or torque versus stroke diagram shall be provided at significant pressure values for each direction of movement.

3.4.2**rated torque**

characterizing figure, indicated by the actuator manufacturer/supplier, used to specify the maximum actuator operating torque

Note 1 to entry: The rated torque corresponds to the maximum torque value developed by the actuator when powered with maximum allowable pressure.

3.4.3**double acting version**

minimum guaranteed output torque of the actuator, at any point of the stroke, with working supply pressure

3.4.4**single acting version**

guaranteed output torque of the actuator with working supply pressure at the beginning of the stroke in the direction to compress the spring

3.4.5**start torque**

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

3.4.6**maximum operating torque****MOT**

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

3.4.7**fluid starting torque****OST**

output torque, at specified pressure value, at the beginning of the stroke in opposition to the spring

3.4.8**fluid ending torque****OET**

output torque, at specified pressure value, at the end of the stroke when spring is at its maximum compression

3.4.9**fluid running torque****ORT**

output torque value between OST and OET at specified pressure value

3.4.10**spring ending torque****SET**

output torque generated by the spring at the end of its stroke with no fluid in the cylinder

3.4.11**spring starting torque****SST**

output torque generated by the spring at its maximum compression with no fluid in the cylinder

3.4.12**spring running torque****SRT**

output torque value between SST and SET

4 Classification and designation

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4.1 Duty classification**4.1.1 General**

According to their intended function, two versions of hydraulic part-turn valve actuators are specified by this document: 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 or vice.

prEN 15714-4:2024 (E)

4.2 Action

4.2.1 Double acting (DA)

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

4.2.2 Single acting (SA)

This is an actuator which 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.

5 Motive energy

5.1 Operating medium

The operating medium shall be hydraulic fluid.

The fluid used shall be selected for pressure compatible with internal actuator parts and shall have lubricant properties.

The flashpoint shall be of not less than 93 °C for pressures below 10 bar and 157 °C for pressures above 10 bar. The chemical and physical properties of the hydraulic fluid shall be suitable for use with the materials used in the design of the actuator and its accessories. The hydraulic fluid shall be suitable for operation of the hydraulic system through the entire temperature range to which it may be subjected in service.

5.2 Quality

The operating medium shall have a contamination level specified to ISO 4406 class 18/16/13 as a maximum.

When necessary, the actuator shall be properly flushed to guarantee an internal cleanliness consistent with the above specified contamination level.

5.3 Pressure

5.3.1 General

As a general information, for each actuator model, the pressure limits, including at least the maximum allowable pressure and working pressure range shall be indicated for a specific application. Other pressure values shall be available on demand.

5.3.2 Maximum allowable pressure (MAP)

This is the pressure not to be exceeded for the supply to the hydraulic actuator. Recommended values for maximum allowable pressure are in Table 1.

Table 1 — Pressure level

	MPa	bar	psi
PN 50	5,5	55	800
PN 100	10,3	103	1 500
PN 200	20,7	207	3 000
PN 350	34,5	345	5 000

5.3.3 Design pressure

The design pressure shall be at least 1,1 times the maximum allowable pressure.

5.3.4 Working pressure

The pressure applied to the actuator to guarantee the performances on a specific application.

5.3.5 Structural test pressure

For structural test under pressure, consider a minimum value 1,5 times the design pressure for a minimum holding period 5 min after pressure stabilization.

Structural test under pressure is carried out to validate the capability of the pressure retaining parts of the actuator to withstand the pressure without permanent deformations.

5.3.6 Minimum moving pressure

The minimum moving pressure required, at ambient temperature, to complete the specified stroke without external load, starting from not pressurized conditions, shall be made available upon request.

6 Actuator performance data**6.1 Minimum moving pressure**

For double acting actuators, the minimum moving pressure, at no load condition and ambient temperature, shall be made available upon request.

For single acting actuators, the minimum starting and release pressure in contrast to the spring at the beginning and ending of the nominal stroke, at no load condition and ambient temperature, shall be made available upon request.

6.2 Operating time

The minimum operating time in both directions, without external load, at working pressure and without any significant external restriction on supply flow rate and exhaust shall be stated.

6.3 Displacement volume

The internal actuator displaced volumes for each direction shall be stated, including the dead volumes, for the maximum stroke without any external limitation.

Displacement volume should be expressed in litres.