INTERNATIONAL STANDARD

ISO 5210

First edition
1991-09-15

Industrial valves — Multi-turn valve actuator attachments

Robinetterie industrielle — Raccordement des actionneurs multitours aux appareils de robinetterie

Reference number
ISO 5210:1991(E)

Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

Draft International Standards adopted by the technical committees are circulated to the member bodies for voting. Publication as an International Standard requires approval by at least 75 % of the member bodies casting a vote.

International Standard ISO 5210 was prepared by Technical Committee ISO/TC 153, *Valves*, Sub-Committee SC 2, *Valve actuator attachment*.

This first edition cancels and replaces the first editions of ISO 5210-1:1977, ISO 5210-2:1979 and ISO 5210-3:1982, of which it constitutes a consolidation and technical revision.

Annex A of this International Standard is for information only.

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Industrial valves — Multi-turn valve actuator attachments

1 Scope

This International Standard specifies the requirements for the attachment of multi-turn actuators to valves.

Throughout this International Standard, "actuator" may be understood as "actuator and/or gearbox".

It specifies

— those flange dimensions which are necessary for the attachment interface of actuators to general purpose industrial valves (see figure 1);

— those driving component dimensions of actuators which are necessary to attach them to the driven components;

— reference values for torque and thrust for flanges having the dimensions specified in this International Standard.

NOTE 1 ISO 5211[1] specifies requirements for part-turn valve actuator attachments.

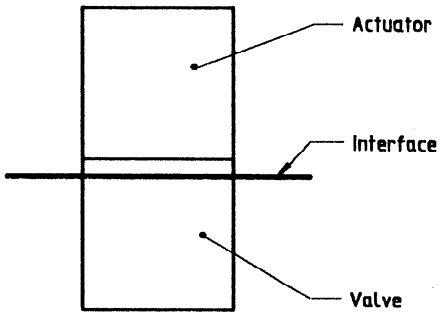


Figure 1 — Interface

2 Normative reference

The following standard contains provisions which, through reference in this text, constitute provisions of this International Standard. At the time of publication, the edition indicated was valid. All standards are subject to revision, and parties to agreements based on this International Standard are encouraged to investigate the possibility of applying the most recent edition of the standard indicated below. Members of IEC and ISO maintain registers of currently valid International Standards.

ISO 273:1979, *Fasteners — Clearance holes for bolts and screws*.

3 Definitions

For the purposes of this International Standard, the following definitions apply.

3.1 actuator: Any device designed for attachment to a general purpose industrial valve in order to provide for the operation of the valve.

The device is designed to operate using motive energy which may be electrical, pneumatic, hydraulic, manual, etc., or a combination of these. Movement is limited by travel, torque or thrust.

3.2 multi-turn actuator: Actuator which transmits torque to the valve for at least one revolution. It may be capable of withstanding thrust.

3.3 torque: Turning moment transmitted through the mounting flanges and couplings. It is expressed in newton metres.

3.4 thrust: Axial force transmitted through the mounting flanges and couplings. It is expressed in kilonewtons.

4 Maximum torques and thrusts

The torque and thrust values listed in table 1 represent the maximum torques and thrusts which can

be transmitted simultaneously through the mounting flanges and couplings; they are based upon specified criteria.

Table 1 — Torque and thrust values

Flange type	Torque N·m	Thrust kN
F07	40	20
F10	100	40
F12	250	70
F14	400	100
F16	700	150
F25	1 200	200
F30	2 500	325
F35	5 000	700
F40	10 000	1 100

The values specified in table 1 have been selected on the basis of the following criteria:

— bolt material: ISO quality class 8.8; yield stress 628 N/mm² *);

— allowable stress in bolt; 200 N/mm²;

— bolts in tension only: no allowance is made for stresses induced by tightening the bolts;

— coefficient of friction between the mounting flanges: 0,3.

All variations in these calculation parameters lead to variations of the transmittable torque and thrust values.

The selection of flange sizes for a particular application should take account of additional torques that may be generated at the valve stem because of inertia or other similar factors.

5 Flange dimensions

Flanges for actuator attachment shall comply with the dimensions shown in figure 2 and given in table 2. The method of attachment shall be by means of studs or through bolting. When through bolting is used, the diameter of the clearance holes shall permit the use of bolts of a size given by the corresponding dimension d_4 in table 2. Holes for the studs/bolts shall be positioned off-centre (see figure 3), be equispaced and shall conform to the requirements of ISO 273.

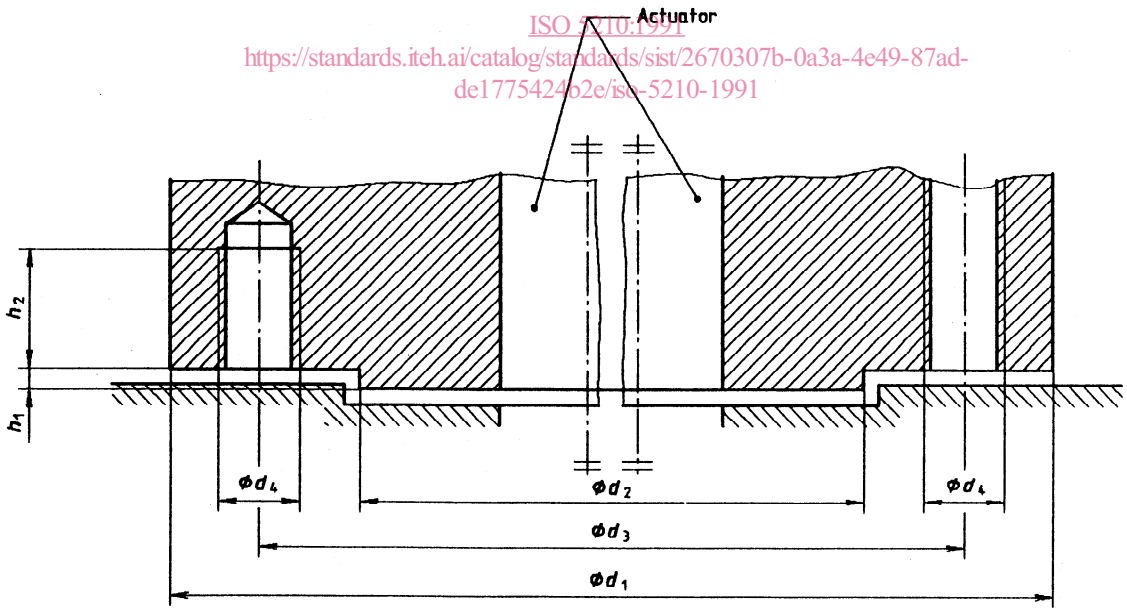


Figure 2 — Flange dimensions

*) 1 N/mm² = 1 MPa

Table 2 — Flange dimensions

Dimensions in millimetres

Flange type	Dimensions						Number of studs or bolts
	d_1	d_2 f8	d_3	d_4	h_1 max.	h_2 min.	
F07	90	55	70	M8	3	12	4
F10	125	70	102	M10	3	15	4
F12	150	85	125	M12	3	18	4
F14	175	100	140	M16	4	24	4
F16	210	130	165	M20	5	30	4
F25	300	200	254	M16	5	24	8
F30	350	230	298	M20	5	30	8
F35	415	260	356	M30	5	45	8
F40	475	300	406	M36	8	54	8

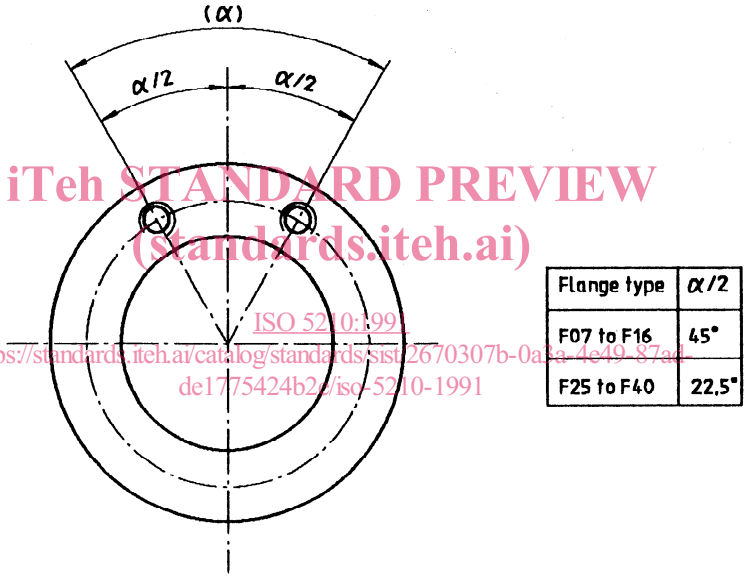


Figure 3 — Positions of the holes for the studs/bolts

The interface on the valve shall have a recess corresponding to the diameter d_2; a spigot on the actuator is optional.

The minimum values for dimension h_2 apply to flanges having materials of proof stress $R_{p\,0,2} \geqslant 200$ N/mm^2.

Dimension d_1 has been based on providing sufficient landing for the nuts and bolt heads where applicable. Such landing is defined as a radius from the bolt hole centre with the dimension $(d_1 - d_3)/2$, and is a minimum. The flange shape of both valve and actuator outside these areas of landing is left to the option of the manufacturer.

6 Designation

Flanges are designated by

— the letter F;

— two digits which correspond to the values of d_3, in principle rounded down, and divided by 10.

7 Dimensions of driving and driven components

The dimensions of the driving and driven components shall comply with the dimensions given in tables 3 and 4.

7.1 Dimensions for assemblies capable of transmitting both torque and thrust: Group A

Dimensions for assemblies of group A shall be as shown in figures 4 and 5, and given in table 3.

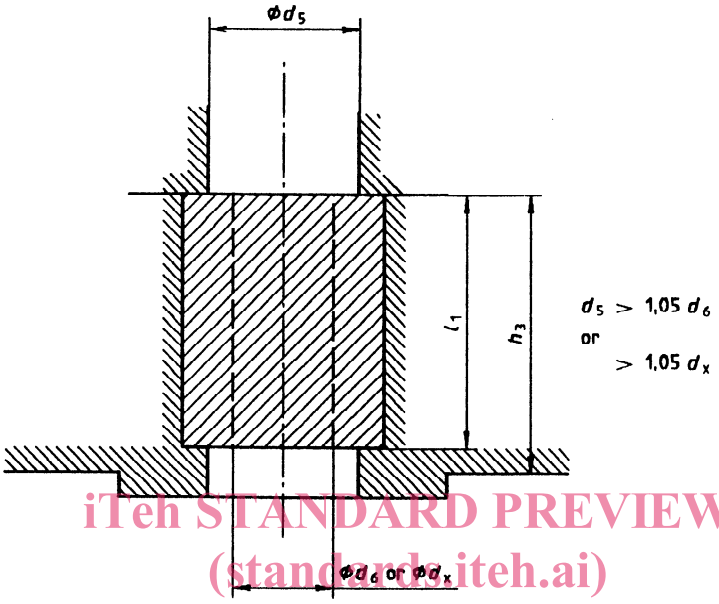
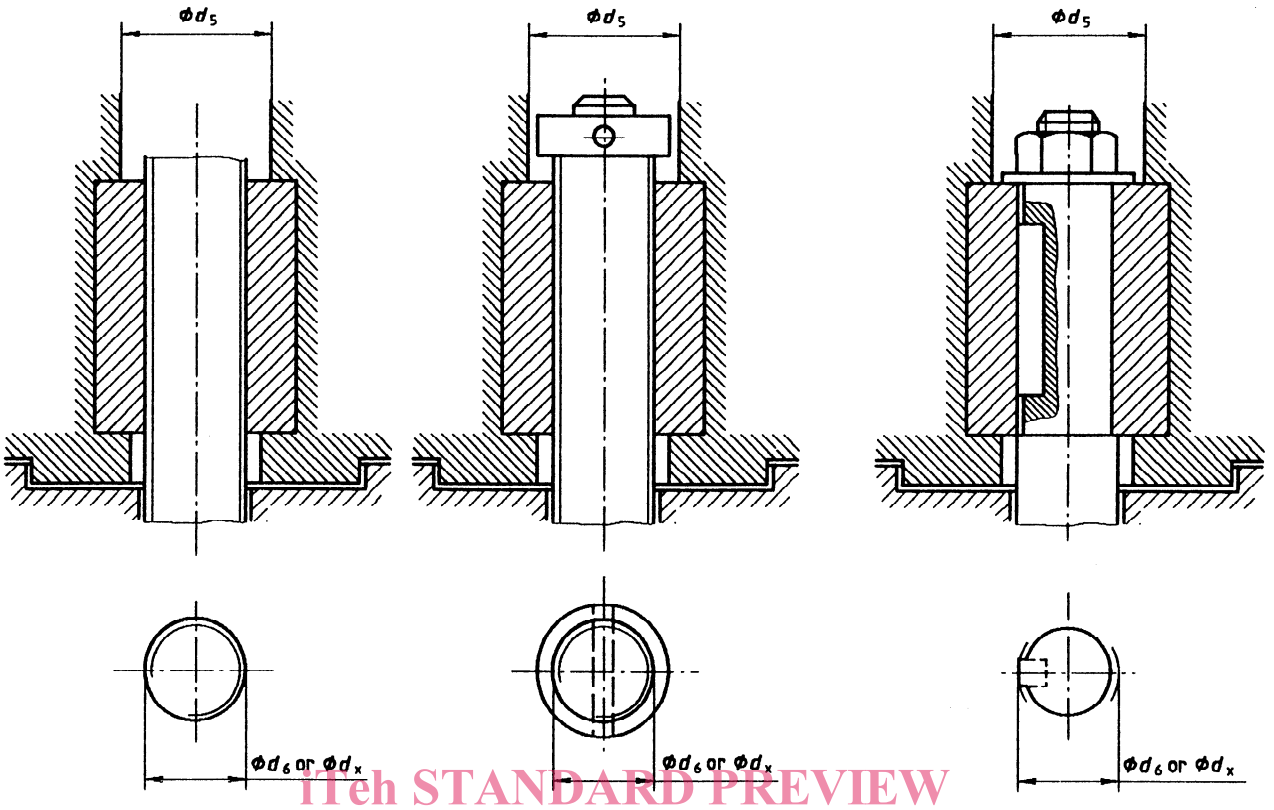


Figure 4 — Driving component, group A



Dimension d_5 permits clearance for the rising and non-rotating stem and for any device to restrict the downward travel of the valve stem.

Dimension d_5 permits the clearance of the stem-locking and thrust-taking components of the non-rising and rotating stem.

a) Examples for rising stem

b) Example for non-rising stem

Figure 5 — Driven components, group A

Table 3 — Dimensions for group A drive components

Dimensions in millimetres

Flange type	F07	F10	F12	F14	F16	F25	F30	F35	F40
d_6 1)	20	28	32	36	44	60	80	100	120
d_x 1)	26	40	48	55	75	85	100	150	175
l_1 min.	25	40	48	55	70	90	110	150	180
h_3 max.	60	80	95	110	135	150	175	250	325

1) The driving component shall be capable of accepting a diameter up to and including the values d_6 shown in figure 4. Without being a requirement, the driving component may accept larger diameters up to the values of d_x.

7.2 Dimensions for assemblies capable of transmitting torque only: Group B

Dimensions for assemblies of group B shall be as shown in figures 6 and 7, and given in table 4.

Type B1
$\varnothing d = d_7$ H9

Type B2
$\varnothing d = d_{7,\ max}$

Type B3
$\varnothing d = d_{10}$ H9

Type B4
$\varnothing d = d_{y,\ max}$

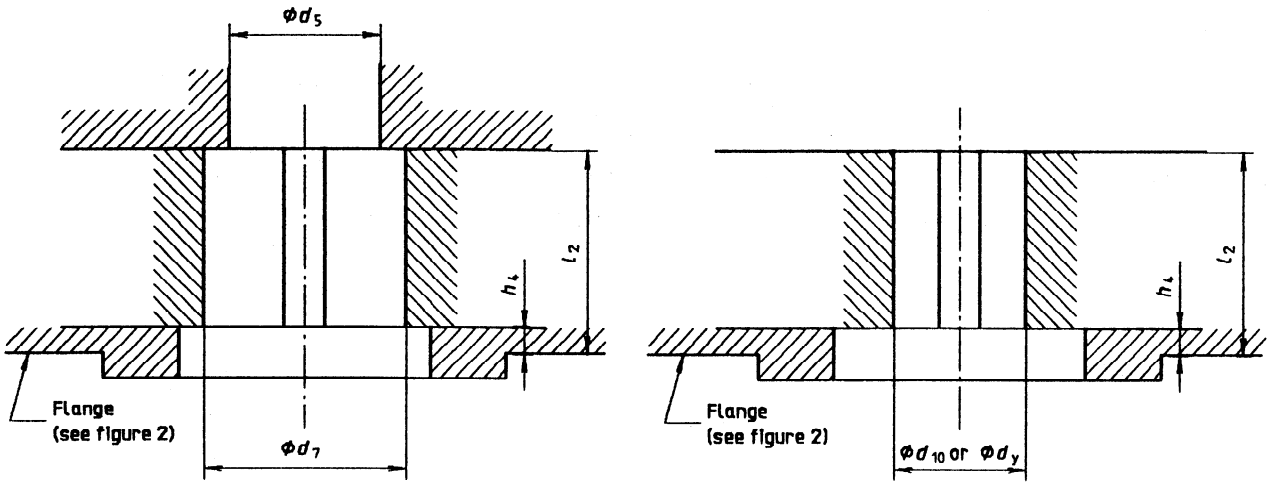
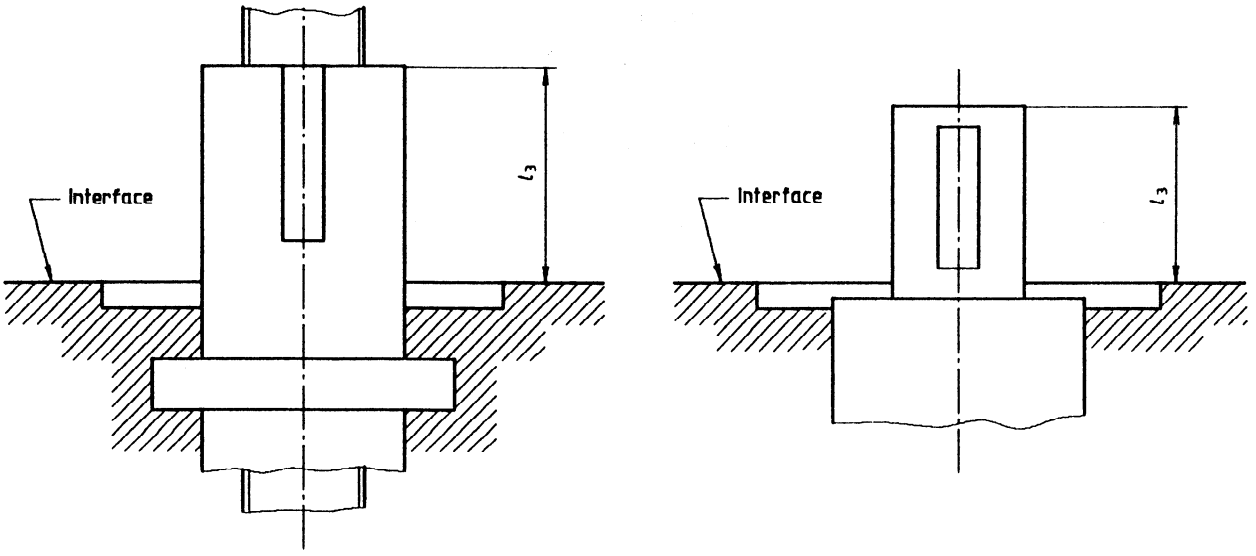


Figure 6 — Driving components, group B



NOTE — In order to ensure that no interference can occur between the driving component and the driven component, it is necessary to limit the length of the driven component l_3 above the interface so that there is an appropriate clearance between both parts.

Figure 7 — Driven components, group B

Table 4 — Dimensions for group B drive components

Dimensions in millimetres

Flange type	F07	F10	F12	F14	F16	F25	F30	F35	F40
d_5 min.	22	30	35	40	50	65	85	110	130
d_7 H9	28	42	50	60	80	100	120	160	180
d_{10} [1] H9	16	20	25	30	40	50	60	80	100
d_y max.	25	35	40	45	60	75	90	120	160
h_4 max.	3	3	3	4	5	5	5	5	8
l_2 min.	35	45	55	65	80	110	130	180	200

1) The driving component shall be capable of accepting a diameter up to and including the values d_{10} shown in figure 6. Without being a requirement, the driving component may accept larger diameters up to the values of d_y.