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**Industrial valves — Part-turn actuator  
attachments**

*Robinetterie industrielle — Raccordement des actionneurs à  
fraction de tour*

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# Contents

	Page
Foreword .....	iv
Introduction .....	v
<b>1 Scope</b> .....	<b>1</b>
<b>2 Normative references</b> .....	<b>2</b>
<b>3 Terms and definitions</b> .....	<b>2</b>
<b>4 Maximum flange torques</b> .....	<b>3</b>
<b>5 Flange dimensions</b> .....	<b>4</b>
<b>6 Designation</b> .....	<b>6</b>
<b>7 Dimensions and torques</b> .....	<b>7</b>
7.1 General .....	7
7.2 Drive by key(s) .....	7
7.3 Drive by parallel or diagonal square head .....	10
7.4 Drive by flat head .....	11
7.5 Drive by improved flat head .....	13
7.6 Drive by involute spline .....	15
7.7 Drive by bi-square .....	16
<b>8 Position of driven components at interface below part-turn actuator</b> .....	<b>17</b>
8.1 Drive by key(s) .....	17
8.2 Drive by parallel or diagonal square head or bi-square .....	19
8.3 Drive by flat head .....	20
<b>9 Dowel pins</b> .....	<b>20</b>
<b>Annex A (informative) Explanation of calculation</b> .....	<b>22</b>
<b>Bibliography</b> .....	<b>24</b>

## 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.

The procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part 1. In particular the different approval criteria needed for the different types of ISO documents should be noted. This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2 (see [www.iso.org/directives](http://www.iso.org/directives)).

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights. Details of any patent rights identified during the development of the document will be in the Introduction and/or on the ISO list of patent declarations received (see [www.iso.org/patents](http://www.iso.org/patents)).

Any trade name used in this document is information given for the convenience of users and does not constitute an endorsement.

For an explanation on the voluntary nature of standards, the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the World Trade Organization (WTO) principles in the Technical Barriers to Trade (TBT) see the following URL: [www.iso.org/iso/foreword.html](http://www.iso.org/iso/foreword.html).

This document was prepared by Technical Committee ISO/TC 153, *Valves*.

This second edition cancels and replaces the first edition (ISO 5211:2001), which has been technically revised with the following changes:

- a) introduction of new flange sizes;
- b) introduction of improved flat head;
- c) introduction of involute spline;
- d) introduction of bi-square;
- e) adjustment of [Clause 6](#) on designation;
- f) positions of 180° keys on the driven component.

## Introduction

The purpose of this document is to establish certain basic requirements for the attachment of part-turn actuators, in order to define the interface between actuator and valve.

This document has, in general, to be considered in conjunction with the specific requirements which may be agreed between the parties concerned.

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# Industrial valves — Part-turn actuator attachments

## 1 Scope

This document specifies requirements for the attachment of part-turn actuators, with or without gearboxes, to industrial valves.

The attachment of part-turn actuators to control valves in accordance with the requirements of this document is subject to an agreement between the supplier and the purchaser.

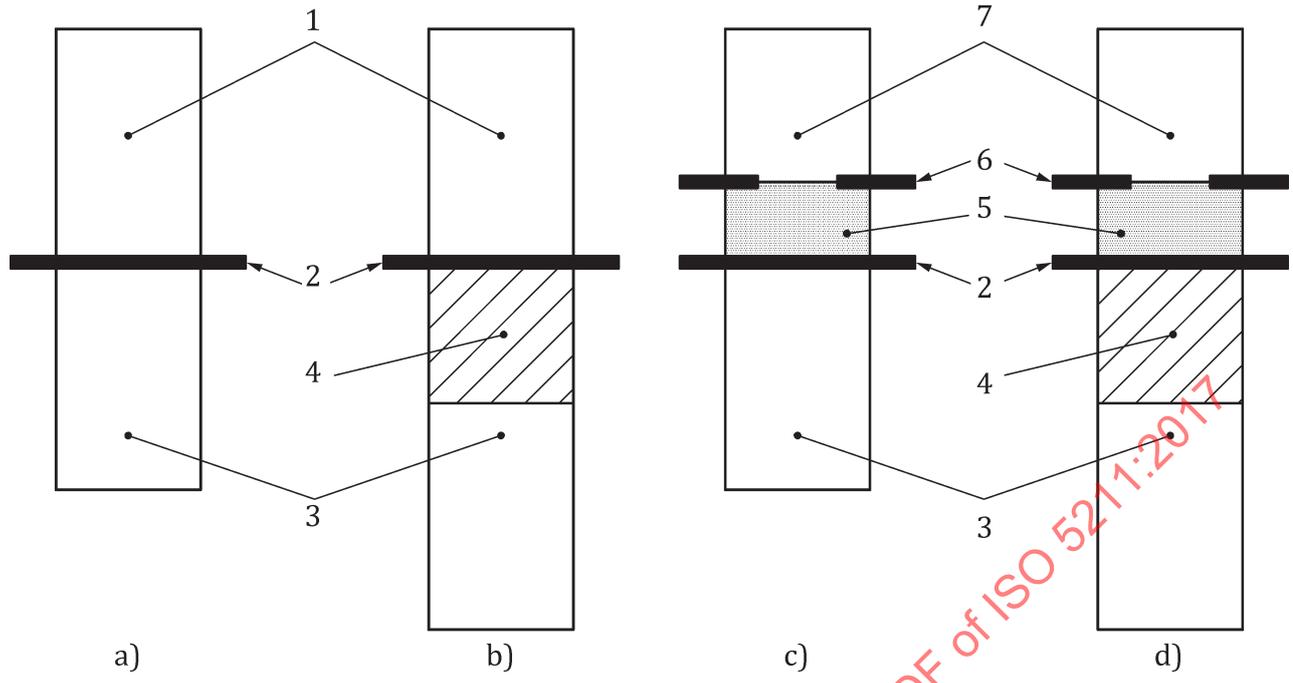
This document specifies:

- flange dimensions necessary for the attachment of part-turn actuators to industrial valves [see [Figures 1 a\)](#) and [1 c\)](#)] or to intermediate supports [see [Figures 1 b\)](#) and [1 d\)](#)];
- driving component dimensions of part-turn actuators necessary to attach them to the driven components;
- reference values for torques for interfaces and for couplings having the dimensions specified in this document.

The attachment of the intermediate support to the valve is out of the scope of this document.

NOTE 1 In this document, the term “valve” may also be understood to include “valve with an intermediate support” [see [Figure 1 b\)](#)].

NOTE 2 When a combination of a multi-turn actuator and separate part-turn gearbox is coupled to form a part-turn actuator, the multi-turn attachment to the gearbox is in accordance with ISO 5210:2017, Figures 1 c) and 1 d). A combination of a multi-turn actuator with integral part-turn gearbox supplied as a part-turn actuator is in accordance with [Figures 1 a\)](#) and [1 b\)](#).



a) Direct interface    b) Intermediate support interface    c) Direct interface (when combination of a multi-turn actuator and a gearbox)    d) Intermediate support interface (when combination of a multi-turn actuator and a gearbox)

**Key**

- |                            |                            |
|----------------------------|----------------------------|
| 1 part-turn actuator       | 5 gearbox                  |
| 2 interface (see ISO 5211) | 6 interface (see ISO 5210) |
| 3 valve                    | 7 multi-turn actuator      |
| 4 intermediate support     |                            |

**Figure 1 — Interface between part-turn actuator and valve**

**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.

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

ISO 4156-1, *Straight cylindrical involute splines — Metric module, side fit — Part 1: Generalities*

**3 Terms and definitions**

For the purposes of this document, the following terms and definitions 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 actuator

any device designed for attachment to a general purpose industrial valve in order to provide for the operation of the valve

Note 1 to entry: 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 and/or thrust.

### 3.2 multi-turn actuator

actuator which transmits torque to the valve for at least one revolution and may be capable of withstanding thrust

Note 1 to entry: An actuator may be a combination of a multi-turn actuator and multi-turn gearbox.

### 3.3 part-turn actuator

actuator which transmits torque to the valve for a rotation of one revolution or less and does not have to withstand axial thrust

Note 1 to entry: A part-turn actuator may be a combination of a multi-turn actuator and part-turn gearbox.

### 3.4 gearbox

any mechanism designed to reduce the torque required to operate a valve

### 3.5 torque

turning moment transmitted through the mounting flanges and connection components

Note 1 to entry: Torque is expressed in newton-metres.

## 4 Maximum flange torques

The flange torque shall comply with the values listed in [Table 1](#) which represent the maximum torques which can be transmitted through the mounting flange.

**Table 1 — Maximum flange torque values**

Flange type	Maximum flange torque Nm
F03	32
F04	63
F05	125
F07	250
F10	500
F12	1 000
F14	2 000
F16	4 000
F25	8 000
F30	16 000
F35	32 000
F40	63 000
F48	125 000

**Table 1** (continued)

Flange type	Maximum flange torque Nm
F60	250 000
F80	500 000
F100	1 000 000

The values specified in [Table 1](#) have been defined on the basis of bolts in tension only at a stress of 290 MPa and a coefficient of friction of 0,2 between the mounting interface. All variations in these defined parameters lead to variations of the transmittable torque values. See [Annex A](#) for more details on the calculation method.

The selection of flange types for a particular application should take into account the additional torques that may be generated because of inertia or other factors.

## 5 Flange dimensions

Flanges for part-turn actuator attachments shall comply with the dimensions shown in [Figure 2](#) and given in [Table 2](#). The method of attachment shall be by means of studs, screws 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, screws or bolts shall be equi-spaced and positioned off-centre (see [Figure 3](#) and [Table 3](#)) and shall conform to the requirements of ISO 273.

The flange on the valve shall have a recess corresponding to the diameter  $d_2$ . A spigot on the part-turn actuator is optional.

The minimum values for dimension  $h_2$  shown in [Table 2](#) apply to flanges having material of proof stress  $R_e \geq 200$  MPa. The minimum values for dimension  $h_2$  applied to flanges having materials of proof stress  $R_e \leq 200$  MPa shall be agreed between manufacturer and purchaser. The minimum values for dimension  $h_3$  shall be at least  $1 \times d_4$ .

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.

The dimensions and bolting material are based on bolts in tension at a maximum stress of 290 MPa. On agreement, between the manufacturer/supplier and purchaser, bolting material with different tensile strength can be used, with no dimensional changes but with potential variation of the transmittable torque.

Above flange type F60 alternative dimensions and/or torque ratings may be used on agreement between manufacturer/supplier and purchaser.

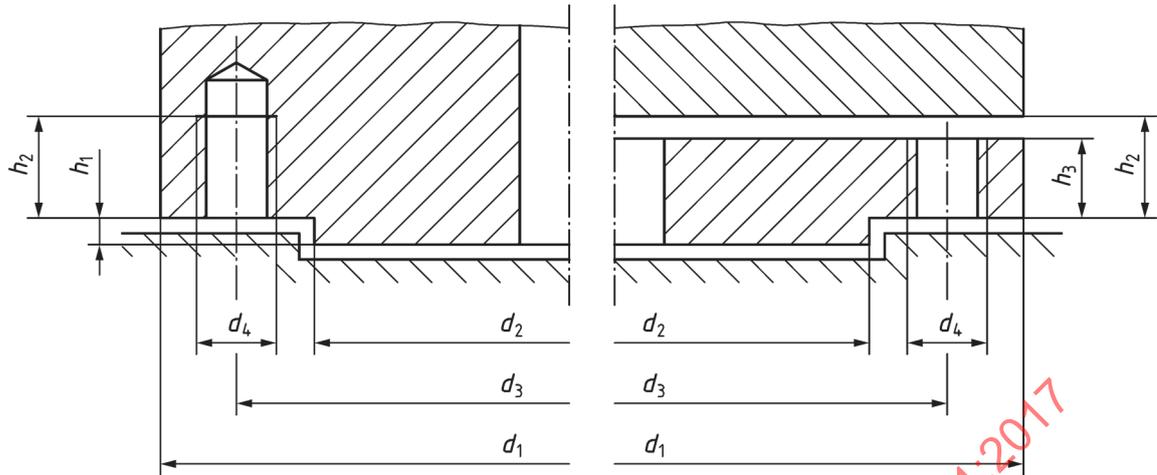


Figure 2 — Flange dimensions

Table 2 — Flange dimensions

Dimensions in millimetres

Flange type	Dimensions							Number of screws, studs or bolts <i>n</i>
	<i>d</i> <sub>1</sub> min.	<i>d</i> <sub>2</sub> <sup>a</sup>	<i>d</i> <sub>3</sub>	<i>d</i> <sub>4</sub>	<i>h</i> <sub>1</sub> max.	<i>h</i> <sub>2</sub> min.	<i>h</i> <sub>3</sub> min.	
F03	Ø46	Ø25	Ø36	M5	3	8	5	4
F04	Ø54	Ø30	Ø42	M5	3	8	5	4
F05	Ø65	Ø35	Ø50	M6	3	9	6	4
F07	Ø90	Ø55	Ø70	M8	3	12	8	4
F10	Ø125	Ø70	Ø102	M10	3	15	10	4
F12	Ø150	Ø85	Ø125	M12	3	18	12	4
F14	Ø175	Ø100	Ø140	M16	4	24	16	4
F16	Ø210	Ø130	Ø165	M20	5	30	20	4
F25	Ø300	Ø200	Ø254	M16	5	24	16	8
F30	Ø350	Ø230	Ø298	M20	5	30	20	8
F35	Ø415	Ø260	Ø356	M30	5	45	30	8
F40	Ø475	Ø300	Ø406	M36	8	54	36	8
F48	Ø560	Ø370	Ø483	M36	8	54	36	12
F60	Ø686	Ø470	Ø603	M36	8	54	36	20
F80	Ø900	Ø670	Ø813	M42	10	63	42	20
F100	Ø1 200	Ø870	Ø1 042	M42	10	63	42	32

<sup>a</sup> *d*<sub>2</sub> shall be manufactured within the diameter tolerance f8.

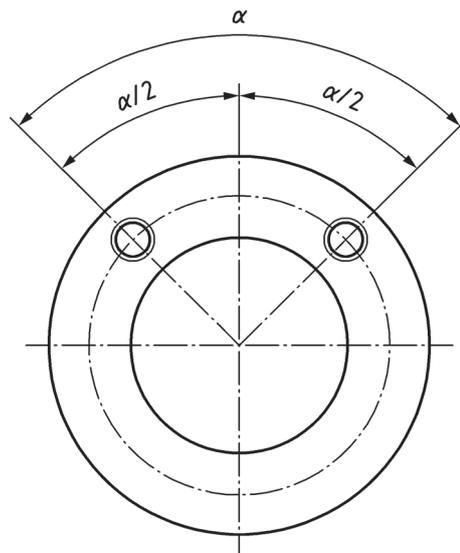


Figure 3 — Position of holes

Table 3 — Position of holes

Flange type	$\alpha/2$
F03 to F16	45°
F25 to F40	22,5°
F48	15°
F60 to F80	9°
F100	5,625°

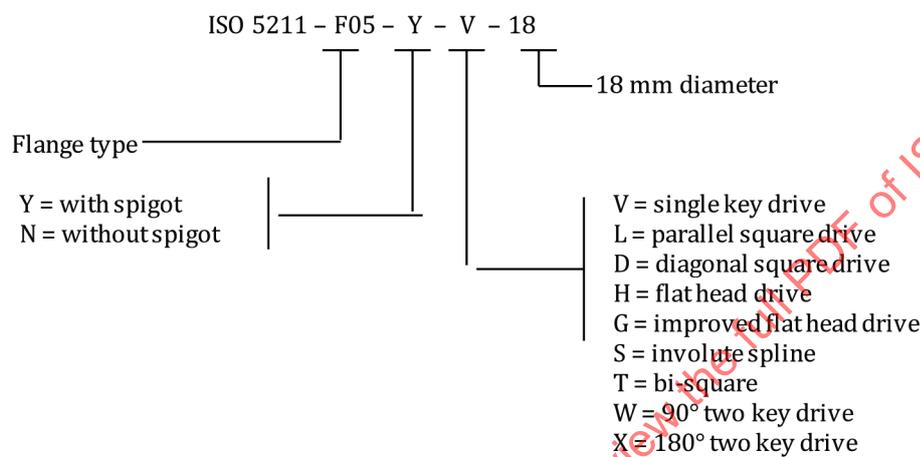
## 6 Designation

Part-turn valve actuator attachments shall be designated as follows:

- flange designation:
  - flange type as per Table 1;
  - a capital letter for spigot identification:
    - Y with spigot;
    - N without spigot;
- drive designation:
  - an additional capital letter for drive identification:
    - V for single-key drive;
    - W for 90° two-key drive;
    - X for 180° two-key drive;
    - L for parallel square drive;
    - D for diagonal square drive;
    - H for flat head drive;

- G for improved flat head drive;
- S for involute spline;
- T for bi-square;
- the actual dimensions of the drive (in millimetres):
  - dimension  $d_7$  for key drives (see [Figure 4](#) and [Table 4](#));
  - dimension  $s$  for square or flat drives (see [Figures 5 or 6](#) and [Table 5](#) or [Figure 7](#) and [Table 6](#));
  - module  $m$  for involute spline (see [Figure 9](#) and [Table 8](#)).

#### EXAMPLE



ISO 5211 - F05 Y - V - 18, identifies a part-turn valve actuator attachment in accordance with this document, with F05 flange type, spigot and single-key drive with 18 mm diameter.

NOTE The designation is not a marking requirement.

## 7 Dimensions and torques

### 7.1 General

To ensure that no interference can occur between the driving component and the driven component, the length of the driven component above the interface shall be limited so that there is a clearance between both parts.

The depth of engagement of the valve driven component into the actuator drive component and the surface area of contact between the faces of the actuator drive component and the faces of the valve driven component should be considered to ensure that the stresses caused by contact do not exceed the capability of the component materials. In some cases, it may be necessary to use materials with superior mechanical properties and/or to reduce the output torque of the actuator.

### 7.2 Drive by key(s)

Dimensions of the drive components for key drive shall meet the requirements of [Figure 4](#) and [Table 4](#).

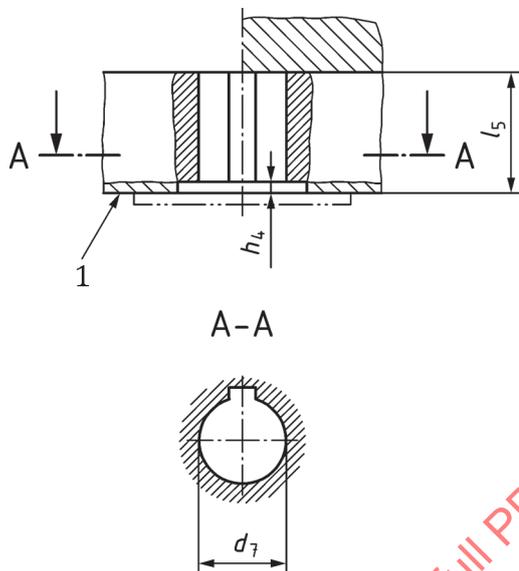
The values of  $d_7$ ,  $h_4$  and  $l_5$  in [Table 4](#) are based on single-key design up to 98 mm shaft diameter.

Where more than one key is required to transmit the torque, the dimensions in [Table 4](#) shall still apply.

The key dimensions shall comply with those given in national standards.

The keyway(s) in the driving component shall correspond to the position of the key(s) supplied on the driven component as specified in 8.1, Figures 11, 12 or 13.

The key(s) shall be secured in position by suitable means.



**Key**  
1 interface

Figure 4 — Drive by key(s)

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Table 4 — Dimensions and torques for drive by key(s)

Dimensions in millimetres

Flange type	Max. flange torque Nm	$h_4$ max.f	$l_5$ min.	$d_7$ a, b, g																						
				Ø12	Ø14	Ø18	Ø22	Ø28	Ø36	Ø42	Ø48	Ø50	Ø60	Ø72	Ø80	Ø98	Ø100	Ø120	Ø160	Ø180	Ø220	Ø280	Ø350	Ø440		
F05	125	3,0	30	Ø12	Ø14	Ø18	Ø22	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	
F07	250	3,0	35	—	Ø14	Ø18	Ø22	Ø28	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	
F10	500	3,0	45	—	—	Ø18	Ø22	Ø28 <sup>c</sup>	Ø36	Ø42	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	
F12	1 000	3,0	55	—	—	—	Ø22	Ø28	Ø36 <sup>c</sup>	Ø42	Ø48	—	—	—	—	—	—	—	—	—	—	—	—	—	—	
F14	2 000	5,0	65	—	—	—	—	Ø28	Ø36	Ø42	Ø48 <sup>c</sup>	—	—	—	—	—	—	—	—	—	—	—	—	—	—	
F16	4 000	5,0	80	—	—	—	—	—	—	Ø42	Ø48	Ø50	Ø60 <sup>c</sup>	—	—	—	—	—	—	—	—	—	—	—	—	
F25	8 000	5,0	110	—	—	—	—	—	—	—	Ø48	Ø50	Ø60	Ø72 <sup>c</sup>	Ø80	Ø98	Ø100	—	—	—	—	—	—	—	—	
F30	16 000	5,0	130	—	—	—	—	—	—	—	—	—	Ø60	Ø72	Ø80	Ø98 <sup>c</sup>	Ø100	Ø120	—	—	—	—	—	—	—	
F35	32 000	5,0	180	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	Ø160	—	—	—	—	—	—	
F40	63 000	8,0	200	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	Ø180	—	—	—	—	—	
F48	125 000	8,0	250	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	
F60	250 000	8,0	310	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	
F80	500 000	10	455	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	Ø350	
F100	1 000 000	10	655	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	
<b>Max. transmissible torque</b> Nmd				32	63	125	250	500	1 000	1 500	2 000	3 000	4 000	6 000	12 000	16 000	—	—	—	—	—	—	—	—	—	e

a For flange types F05 to F30, other dimensions of  $d_7$  between those indicated are permitted.

b For flange types above F30, the given  $d_7$  values correspond to the maximum and any value up to this maximum is permitted, subject to considerations in footnote d.

c Indicates the preferred dimension.

d For flange types F05 to F30, these values are the corresponding torques which can be transmitted by the driving components having the  $d_7$  dimensions. They are based on a maximum allowable torsional stress of 280 MPa for the driven component.

e The maximum transmissible torques shall be determined by calculation.

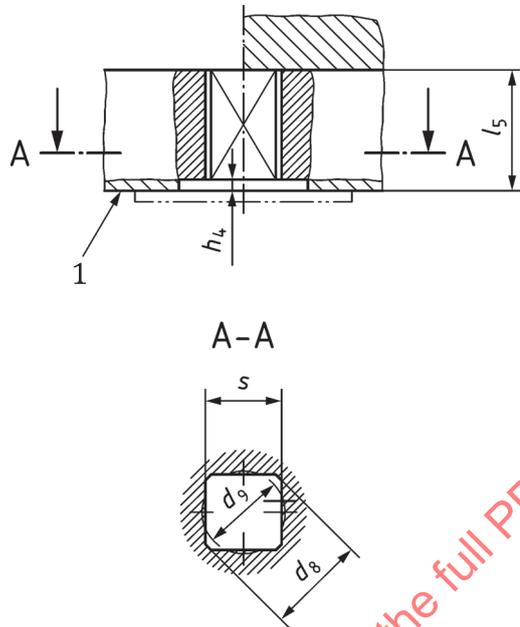
f  $h_4$  min = 0,5 mm.

g  $d_7$  shall be manufactured within the diameter tolerance H9.

7.3 Drive by parallel or diagonal square head

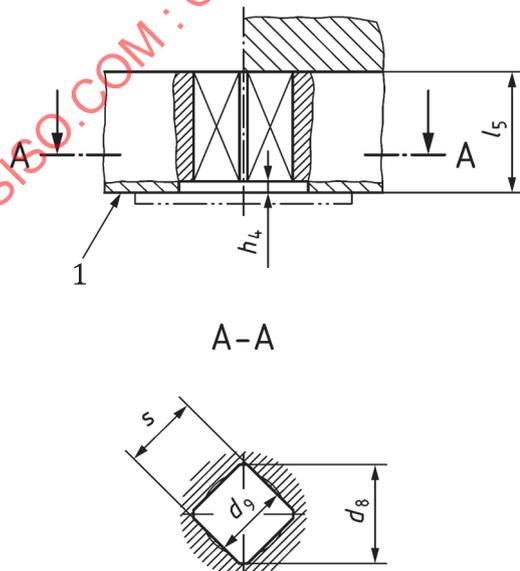
Dimensions of drive components for square heads shall meet the requirements of Figures 5 or 6 and Table 5. The choice of  $d_8$  and  $d_9$  depends on the manufacturing process.

The square drive positions shall be as specified in 8.2, Figures 14 or 15.



Key  
1 interface

Figure 5 — Drive by parallel square head



Key  
1 interface

Figure 6 — Drive by diagonal square head

Table 5 — Dimensions and torques for drive by parallel or diagonal square head

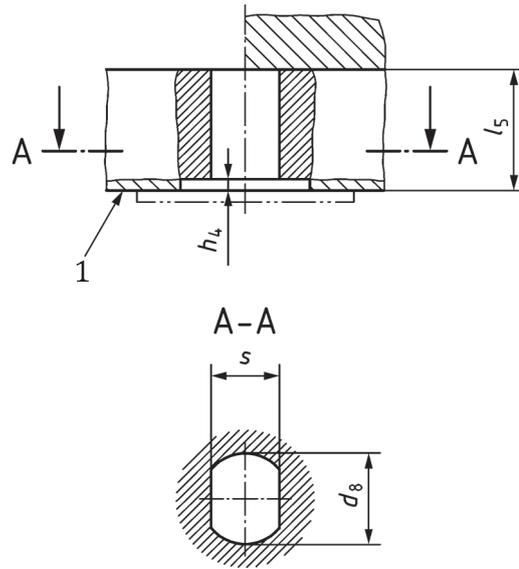
Dimensions in millimetres

Flange typed	Max. flange torque Nm	$h_4$ max.a	$s^e$												
			9	11 <sup>b</sup>	11	14 <sup>b</sup>	17 <sup>b</sup>	17	19	22 <sup>b</sup>	27 <sup>b</sup>	36 <sup>b</sup>	46 <sup>b</sup>	55 <sup>b</sup>	75 <sup>b</sup>
F03	32	1,5	9	—	—	—	—	—	—	—	—	—	—	—	—
F04	63	1,5	9	11 <sup>b</sup>	—	—	—	—	—	—	—	—	—	—	—
F05	125	3,0	9	11	14 <sup>b</sup>	—	—	—	—	—	—	—	—	—	—
F07	250	3,0	—	11	14	17 <sup>b</sup>	—	—	—	—	—	—	—	—	—
F10	500	3,0	—	—	14	17	19	22 <sup>b</sup>	—	—	—	—	—	—	—
F12	1 000	3,0	—	—	—	17	19	22	27 <sup>b</sup>	—	—	—	—	—	—
F14	2 000	5,0	—	—	—	—	—	22	27	36 <sup>b</sup>	—	—	—	—	—
F16	4 000	5,0	—	—	—	—	—	—	27	36	46 <sup>b</sup>	—	—	—	—
F25	8 000	5,0	—	—	—	—	—	—	—	36	46	55 <sup>b</sup>	—	—	—
F30	16 000	5,0	—	—	—	—	—	—	—	—	46	55	75 <sup>b</sup>	—	—
$d_8$ min			Ø12,1	Ø14,1	Ø18,1	Ø22,2	Ø25,2	Ø28,2	Ø36,2	Ø48,2	Ø60,2	Ø72,2	Ø98,2		
$d_9$ max			Ø9,5	Ø11,6	Ø14,7	Ø17,9	Ø20	Ø23,1	Ø28,4	Ø38	Ø48,5	Ø57,9	Ø79,1		
$l_5$ min			10	12	16	19	21	24	29	38	48	57	77		
Max. transmissible torque Nm <sup>c</sup>			32	63	125	250	350	500	1 000	2 000	4 000	8 000	16 000		
<p>a <math>h_4</math> min. = 0,5 mm.</p> <p>b Indicates the preferred dimension.</p> <p>c Maximum transmissible torques are based on a maximum allowable torsional stress of 280 MPa for the driven component.</p> <p>d Further sizes are not considered and may be discussed between supplier and the manufacturer.</p> <p>e <math>s</math> shall be manufactured within the linear tolerance H11.</p>															

#### 7.4 Drive by flat head

Dimensions of drive components for flat head drive shall meet the requirements of [Figure 7](#) and [Table 6](#).

The flat head drive position shall be as specified in [8.3](#) and [Figure 16](#).



**Key**  
1 interface

**Figure 7 — Drive by flat head**

**Table 6 — Dimensions and torques for drive by flat head**

Dimensions in millimetres

Flange type <sup>d</sup>	Max. flange torque Nm	$h_4$ max. <sup>a</sup>	$s^e$										
			9	11 <sup>b</sup>	14 <sup>b</sup>	17 <sup>b</sup>	19	22 <sup>b</sup>	27 <sup>b</sup>	36 <sup>b</sup>	46 <sup>b</sup>	55 <sup>b</sup>	75 <sup>b</sup>
F03	32	1,5	9	—	—	—	—	—	—	—	—	—	—
F04	63	1,5	9	11 <sup>b</sup>	—	—	—	—	—	—	—	—	—
F05	125	3,0	9	11	14 <sup>b</sup>	—	—	—	—	—	—	—	—
F07	250	3,0	—	11	14	17 <sup>b</sup>	—	—	—	—	—	—	—
F10	500	3,0	—	—	14	17	19	22 <sup>b</sup>	—	—	—	—	—
F12	1 000	3,0	—	—	—	17	19	22	27 <sup>b</sup>	—	—	—	—
F14	2 000	5,0	—	—	—	—	—	22	27	36 <sup>b</sup>	—	—	—
F16	4 000	5,0	—	—	—	—	—	—	27	36	46 <sup>b</sup>	—	—
F25	8 000	5,0	—	—	—	—	—	—	—	36	46	55 <sup>b</sup>	—
F30	16 000	5,0	—	—	—	—	—	—	—	—	46	55	75 <sup>b</sup>
$d_8$ min.			Ø12,1	Ø14,1	Ø18,1	Ø22,2	Ø25,2	Ø28,2	Ø36,2	Ø48,2	Ø60,2	Ø72,2	Ø98,2
$l_5$ min.			16	19	25	30	34	39	48	64	82	99	135
<b>Max. transmissible torque</b> Nm <sup>c</sup>			32	63	125	250	350	500	1 000	2 000	4 000	8 000	16 000

<sup>a</sup>  $h_4$  min. = 0,5 mm.

<sup>b</sup> Indicates the preferred dimension.

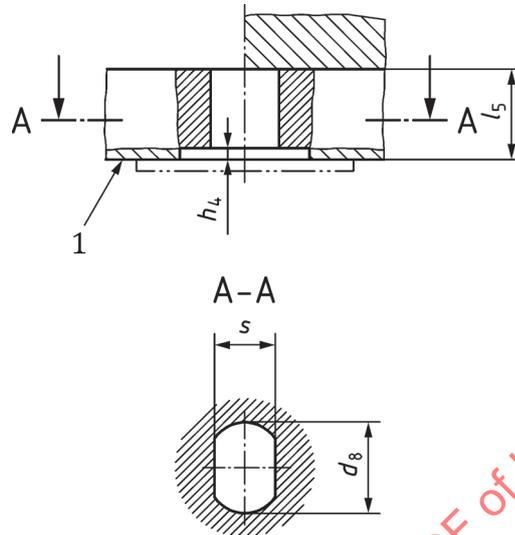
<sup>c</sup> Maximum transmissible torques are based on a maximum allowable torsional stress of 280 MPa for the driven component.

<sup>d</sup> Further sizes are not considered and may be discussed between supplier and manufacturer.

<sup>e</sup>  $s$  shall be manufactured within the linear tolerance H11.

### 7.5 Drive by improved flat head

Dimensions of drive components for improved flat head drive shall meet the requirements of [Figure 8](#) and [Table 7](#). The improved flat head drive position shall be as specified in [8.3](#) and [Figure 16](#).



#### Key

1 interface

Figure 8 — Drive by improved flat head

**Table 7 — Dimensions and torques for drive by improved flat head**

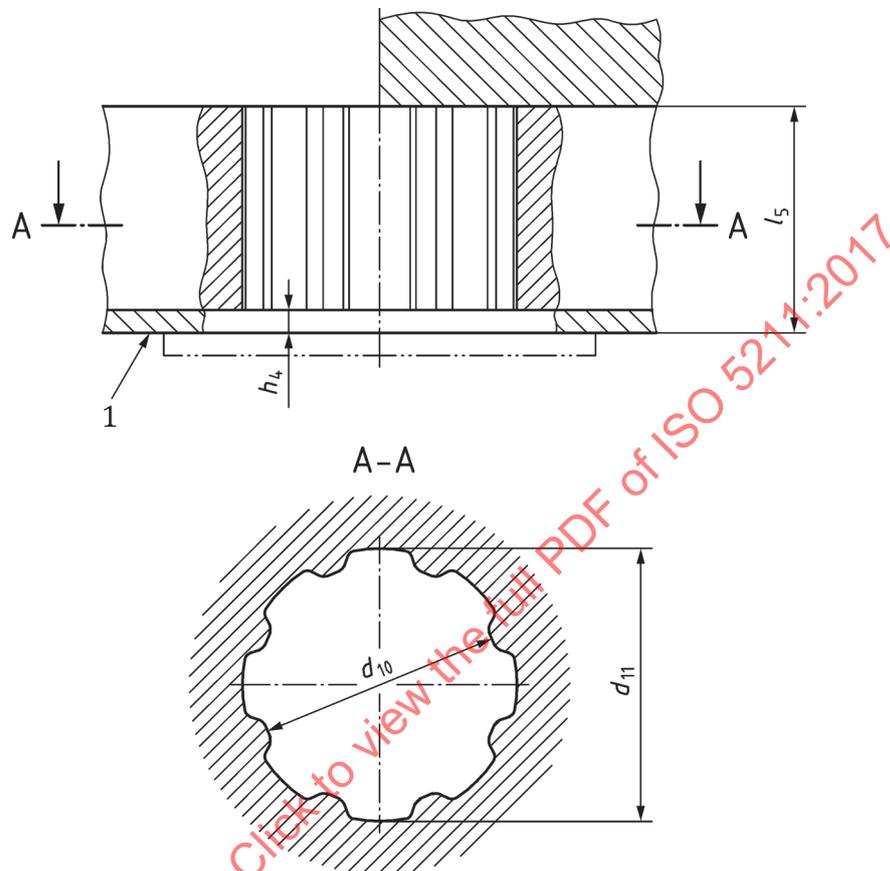
Dimensions in millimetres

Flange type <sup>d</sup>	Max. flange torque Nm	$h_4$ max. <sup>a</sup>	$s$ <sup>b</sup>									
			8	9,5	12	15	19	24	32	40	48	66
F03	32	1,5	8	—	—	—	—	—	—	—	—	—
F04	63	1,5	—	9,5	—	—	—	—	—	—	—	—
F05	125	3,0	—	—	12	—	—	—	—	—	—	—
F07	250	3,0	—	—	—	15	—	—	—	—	—	—
F10	500	3,0	—	—	—	—	19	—	—	—	—	—
F12	1 000	3,0	—	—	—	—	—	24	—	—	—	—
F14	2 000	5,0	—	—	—	—	—	—	32	—	—	—
F16	4 000	5,0	—	—	—	—	—	—	—	40	—	—
F25	8 000	5,0	—	—	—	—	—	—	—	—	48	—
F30	16 000	5,0	—	—	—	—	—	—	—	—	—	66
$d_8$ min.			Ø12,1	Ø14,1	Ø18,1	Ø22,2	Ø28,2	Ø36,2	Ø48,2	Ø60,2	Ø72,2	Ø98,2
$l_5$ min.			12	15	18	22	28	36	40	44	52	70
<b>Max. transmissible torque</b> Nm <sup>c</sup>			32	63	125	250	500	1 000	2 000	4 000	8 000	16 000
<p><sup>a</sup> <math>h_4</math> min. = 0,5 mm.</p> <p><sup>b</sup> <math>s</math> shall be manufactured within the linear tolerance H11.</p> <p><sup>c</sup> Maximum transmissible torques are based on a maximum allowable torsional stress of 280 MPa for the driven component.</p> <p><sup>d</sup> Further sizes are not considered and may be discussed between supplier and manufacturer.</p>												

## 7.6 Drive by involute spline

Dimensions of drive components for involute spline shall meet the requirements of [Figure 9](#) and [Table 8](#).

NOTE Involute spline is according to ISO 4156-1.



### Key

1 interface

Figure 9 — Drive by involute spline

**Table 8 — Dimensions and torques for drive by involute spline**

Dimensions in millimetres

Flange type <sup>d</sup>	Max. flange torque Nm	$h_4$ max. <sup>a</sup>	$d_{11}$ <sup>b</sup>										
			$d_{10}$ min.	1,5	2,0	2,5	3,0	4,0	5,0	6,0	7,0	8,0	10
F03	32	1,5	Ø16,1	—	—	—	—	—	—	—	—	—	—
F04	63	1,5	—	Ø19,1	—	—	—	—	—	—	—	—	—
F05	125	3,0	—	—	Ø24,1	—	—	—	—	—	—	—	—
F07	250	3,0	—	—	—	Ø28,1	—	—	—	—	—	—	—
F10	500	3,0	—	—	—	—	Ø36,1	—	—	—	—	—	—
F12	1 000	3,0	—	—	—	—	—	Ø47,1	—	—	—	—	—
F14	2 000	5,0	—	—	—	—	—	—	Ø60,1	—	—	—	—
F16	4 000	5,0	—	—	—	—	—	—	—	Ø74,1	—	—	—
F25	8 000	5,0	—	—	—	—	—	—	—	—	Ø88,1	—	—
F30	16 000	5,0	—	—	—	—	—	—	—	—	—	Ø116,1	—
$d_{10}$ min.			Ø14,5	Ø17	Ø21,5	Ø25	Ø32	Ø42	Ø54	Ø67	Ø80	Ø106	
Module $m$ (according to ISO 4156-1)			1,5	2,0	2,5	3,0	4,0	5,0	6,0	7,0	8,0	10	
$l_5$ min.			12	15	18	22	28	36	40	44	52	70	
Max. transmissible torque Nm <sup>c</sup>			32	63	125	250	500	1 000	2 000	4 000	8 000	16 000	

<sup>a</sup>  $h_4$  min. = 0,5 mm.

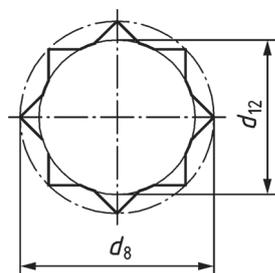
<sup>b</sup>  $d_{11}$  shall be manufactured within the diameter tolerance H9.

<sup>c</sup> Maximum transmissible torques are based on a maximum allowable torsional stress of 280 Pa for the driven component.

<sup>d</sup> Further sizes are not considered and may be discussed between supplier and manufacturer.

### 7.7 Drive by bi-square

Dimensions of drive components for bi-square shall meet the requirements of [Figure 10](#) and [Table 9](#). The choice of  $d_8$  and  $d_{12}$  depends on the manufacturing process.



**Figure 10 — Drive by bi-square**

Table 9 — Dimensions and torques for drive by bi-square

Dimensions in millimetres

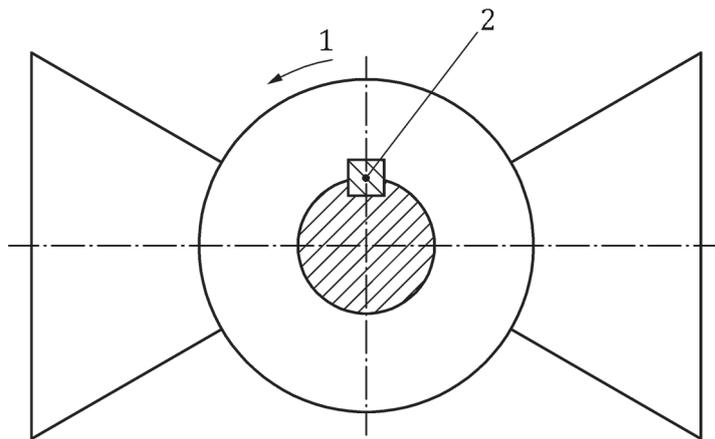
Flange type <sup>d</sup>	Max. flange torque Nm	$h_4$ max. <sup>a</sup>	$s^e$										
			9	11 <sup>b</sup>	14 <sup>b</sup>	17 <sup>b</sup>	19	22 <sup>b</sup>	27 <sup>b</sup>	36 <sup>b</sup>	46 <sup>b</sup>	55 <sup>b</sup>	75 <sup>b</sup>
F03	32	1,5	9	—	—	—	—	—	—	—	—	—	—
F04	63	1,5	9	11 <sup>b</sup>	—	—	—	—	—	—	—	—	—
F05	125	3,0	9	11	14 <sup>b</sup>	—	—	—	—	—	—	—	—
F07	250	3,0	—	11	14	17 <sup>b</sup>	—	—	—	—	—	—	—
F10	500	3,0	—	—	14	17	19	22 <sup>b</sup>	—	—	—	—	—
F12	1 000	3,0	—	—	—	17	19	22	27 <sup>b</sup>	—	—	—	—
F14	2 000	5,0	—	—	—	—	—	22	27	36 <sup>b</sup>	—	—	—
F16	4 000	5,0	—	—	—	—	—	—	27	36	46 <sup>b</sup>	—	—
F25	8 000	5,0	—	—	—	—	—	—	—	36	46	55 <sup>b</sup>	—
F30	16 000	5,0	—	—	—	—	—	—	—	—	46	55	75 <sup>b</sup>
$d_8$ min.			Ø12,1	Ø14,1	Ø18,1	Ø22,2	Ø25,2	Ø28,2	Ø36,2	Ø48,2	Ø60,2	Ø72,2	Ø98,2
$d_{12}$ max.			Ø10	Ø12,2	Ø15,5	Ø18,7	Ø20,9	Ø24,2	Ø29,6	Ø39,3	Ø50,2	Ø59,9	Ø81,6
$l_5$ min.			10	12	16	19	21	24	29	38	48	57	77
Max. transmissible torque Nm <sup>c</sup>			20	40	80	175	225	350	700	1 400	2 800	5 600	11 200
<p>a <math>h_4</math> min. = 0,5 mm.</p> <p>b Indicates the preferred dimension.</p> <p>c Maximum transmissible torques are based on a maximum allowable torsional stress of 280 MPa for the driven component.</p> <p>d Further sizes are not considered and may be discussed between supplier and manufacturer.</p> <p>e <math>s</math> shall be manufactured within the linear tolerance H11.</p>													

## 8 Position of driven components at interface below part-turn actuator

### 8.1 Drive by key(s)

One or two keys may be used. With the valve closed, the key(s) shall be located as shown in [Figures 11, 12](#) or [13](#). If more than two keys are required, their position shall be subject to an agreement between the supplier and the purchaser.

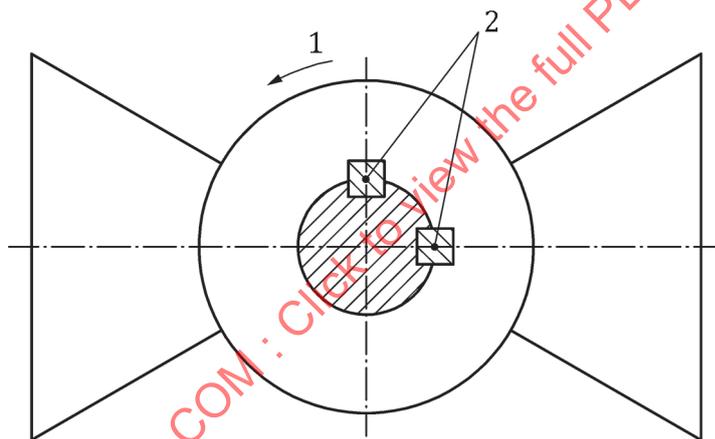
NOTE The standard closing direction is clockwise, as viewed from above the interface.



**Key**

- 1 opening direction
- 2 key

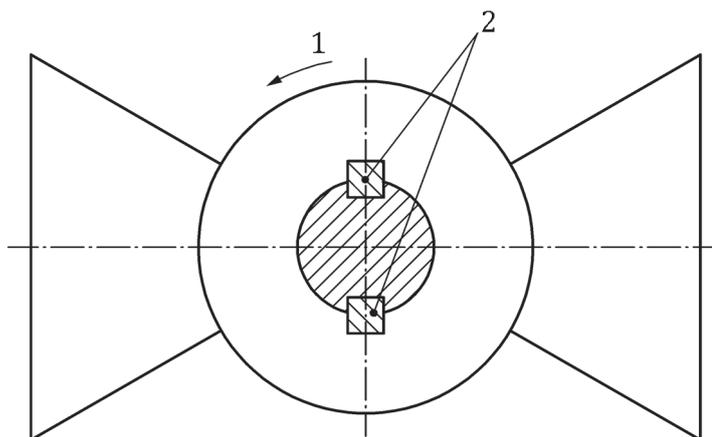
**Figure 11 — Position of key on the driven component**



**Key**

- 1 opening direction
- 2 key

**Figure 12 — Positions of 90° keys on the driven component**

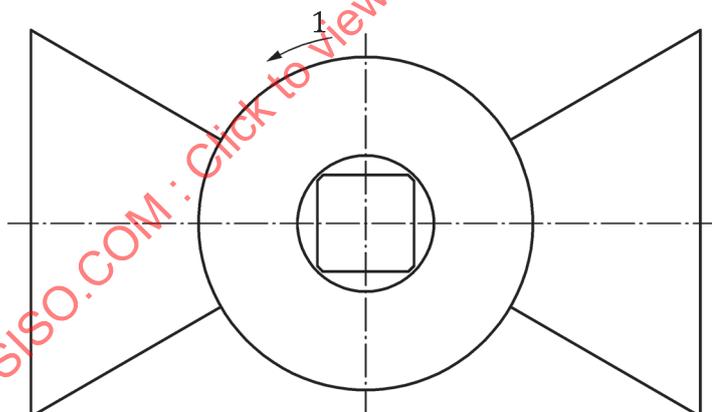
**Key**

- 1 opening direction
- 2 key

**Figure 13 — Positions of 180° keys on the driven component**

## 8.2 Drive by parallel or diagonal square head or bi-square

With the valve closed, the flat sides of the square head drive component shall be located as shown in [Figures 14](#) or [15](#).

**Key**

- 1 opening direction

**Figure 14 — Position of parallel square head driven component**