UDC 744·4 : 531·1 : 003·62

Indian Standard (Reaffirmed 1999)

GRAPHICAL SYMBOLS FOR ELEMENTS OF KINEMATIC DIAGRAMS, PART 1

(ISO Title : Kinematic Diagrams — Graphical Symbols — Part 1)

Drawings Sectional Committee, EDC 20; Drawing Subcommittee, EDC 20 : 1 [Ref : Doc : EDC 20 (4085)]

National Foreword

This Indian Standard (Part 1), which is indentical with ISO 3952/1-1981 Kinematic diagrams — Graphical symbols — Part 1, issued by the International Organization for Standardization (ISO), was adopted by the Indian Standards Institution on recommendation of the Drawings Sectional Committee and approved by the Engineering Division Council.

Wherever the words ' International Standard ' appear, referring to this standard, they should be read as ' Indian Standard '.

Additional Information

This standard is the national implementation of ISO 3952/1-1981, as such only the English text has been reproduced. If the French and Russian texts are required, reference should be made to the original ISO publication.

This standard includes a number of parts, each identical with the corresponding part of the International Standard ISO 3952, as follows:

Part 1 (ISO 3952/1)	Motion of links of mechanisms Kinematic pairs Links and connection of their components N-bar linkages and their components
Part 2 (ISO 3952/2)	Friction and gear mechanisms Cam mechanisms
Part 3 (ISO 3952/3 (	Geneva and ratchet mechanisms Couplings and breaks

Introduction

The purpose of this International Standard is the creation of a system of graphical symbols for kinematic diagrams. The creation of such a system will simplify the preparation of kinematic diagrams and will facilitate the execution and understanding of such diagrams by specialists of different countries.

Scope and field of application

The International Standard establishes the graphical symbols for elements of kinematic diagrams of products in all branches of industry. The symbols established by the International Standard are to be used in diagrams ln technical documentation, as well as in technical and educational literature.

The International Standard is being published in three parts, as follows:

Part 1

1 Motion of links of mechanisms
2 Kinematic pairs
3 Links and connections of their components
4 N.bar linkages and their components

Part 2

5 Friction and gear mechanisms
6 Can mechanisms

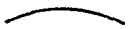
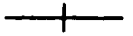
Part 3

7 Geneva and ratchet mechanisms
8 Couplings and brakes

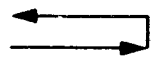
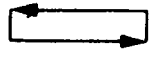
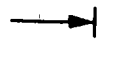
Adopted 16 August 1984 | | Gr 7

INDIAN STANDARDS INSTITUTION
MANAK BHAVAN, 9 BAHADUR SHAH ZAFAR MARG
NEW DELHI 110002

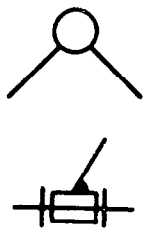
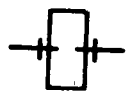
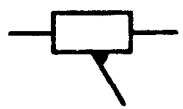
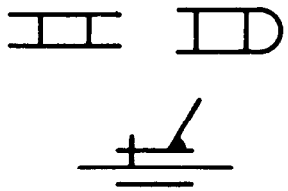
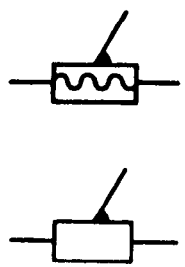
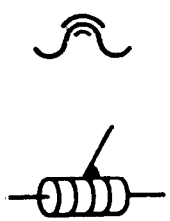
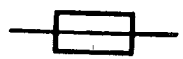
1 Motion of links of mechanisms

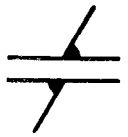
No.	Designation	Definition	Basic symbol	Permissible symbol	Notes
1.1	Trace of motion	Trace or part of trace of some point on link			For straight line motion For rotational motion
1.2	Direction of motion				Direction of motion shows to which side point moves along trace
1.3	Instantaneous stop at intermediate position	Instantaneous stop without changing direction of motion	 		For straight line motion For rotational motion
1.4	Dwell at intermediate position	Dwell without changing direction of motion			
1.5	Dwell at extreme position	Dwell followed by changing of direction of motion			
1.6	Partial reverse motion	Motion of link generally in one direction but with partial reversal at some point	 		Straight line Rotational
1.7	Stop	End of motion			

1.8	Examples				
1.8.1	One-sided motion	Motion with constant direction			Straight line Rotational
1.8.2	One-sided motion with instantaneous stop				Straight line Rotational
1.8.3	One-sided motion with dwell				Straight line Rotational
1.8.4	One-sided motion with partial reversal				Straight line Rotational
1.8.5	Oscillating motion	Motion with variable direction			Straight line Rotational

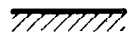
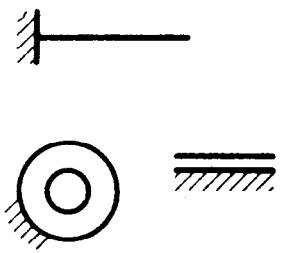
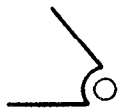
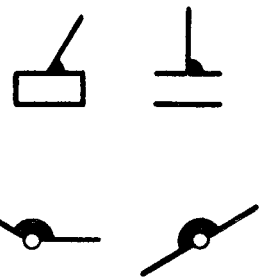
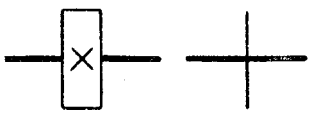
No.	Designation	Definition	Basic symbol	Permissible symbol	Notes
1.8.6	Oscillating motion with dwell at one extreme position				Straight line
					Rotational
1.8.7	Oscillating motion with dwells at both extreme positions				Straight line
					Rotational
1.8.8	Oscillating motion with dwell at intermediate position				Straight line
					Rotational
1.8.9	One-sided motion with partial reversal and dwell				Straight line
					Rotational
1.8.10	End of motion				Straight line
					Rotational

2 Kinematic pairs

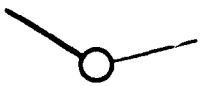
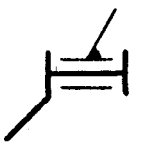
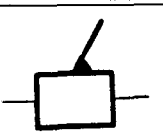
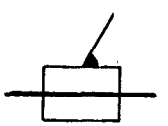
No.	Designation	Definition	Basic symbol	Permissible symbol	Notes
2.1	**Pairs with one degree of freedom**				
2.1.1	Revolute pair : Turning pair a) for planar mechanisms b) for spatial mechanisms	Joint of two links permitting rotational motion of one link relative to the other			
2.1.2	Prismatic pair	Joint of two links permitting rectilinear translation of one link relative to the other			
2.1.3	Screw pair; Helical pair	Joint of two links permitting helical motion (with constant pitch) of one link relative to the other			
2.2	**Pairs with two degrees of freedom**				
2.2.1	Cylindrical pair	Joint of two links permitting cylindrical motion of one link relative to the other			

No.	Designation	Definition	Basic symbol	Permissible symbol	Notes
2.2.2	Spherical pair with pin	Joint of two links permitting rotations about two intersecting axes			
2.3	**Pairs with three degrees of freedom**				
2.3.1	Spherical pair	Joint of two links permitting spherical motion of one link relative to the other			
2.3.2	Planar contact pair	Joint of two links, permitting general planar motion of one link relative to the other			
2.4	**Pairs with four degrees of freedom**				
2.4.1	Ball-and-cylinder pair	Joint of two links made up of a ball within a cylinder			
2.5	**Pairs with five degrees of freedom**				
2.5.1	Ball-and-plane pair	Joint of two links made up of a ball and a plane			

3 Links and connections of their components

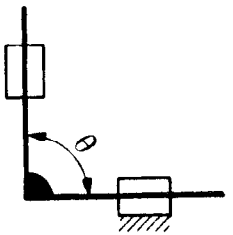
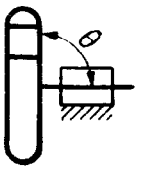
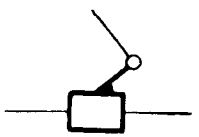
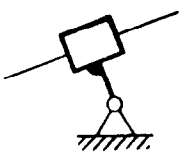
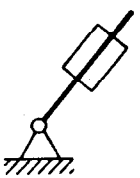
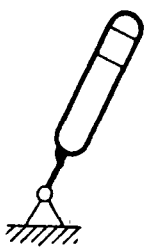
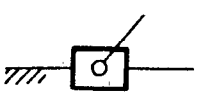
No.	Designation	Definition	Basic symbol	Permissible symbol	Notes
3.1	Frame				
3.2	Shaft; bar; axle				
3.3	Permanent connection of link components			 It is permitted to close the solidly fitted-in region with the straight line 	
3.4	Fixed connection of component to shaft (bar, axle)				
3.5	Adjustable connection of link components				

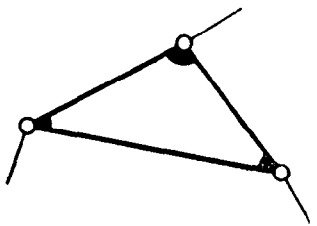
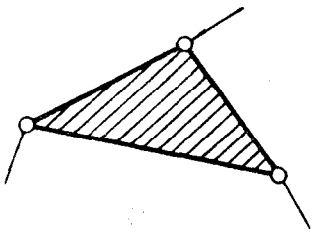
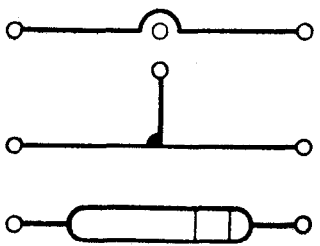
4 N-bar linkages and their components

No.	Designation	Definition	Basic symbol	Permissible symbol	Notes
4.1	Linkages with lower pairs	Mechanisms with links forming parts of lower pairs			By convention, the part of a pair drawn with thin lines belongs to the adjoining link
4.2	Single-element link	The link is a part of a kinematic pair			
4.2.1	The link is a part of a revolute pair				
	a) for planar mechanisms				
	b) for spatial mechanisms				
4.2.2	The frame is a part of a revolute pair				
	a) for planar mechanisms				
	b) for spatial mechanisms				
4.2.3	The link is a part of a prismatic pair				

4.2.4	The link is a part of a cylindrical pair				
4.2.5	The link is a part of a spherical pair				
4.3	Double-element link (binary link)	The link forms the connection between two kinematic pairs			
4.3.1	The link forms the connection between revolute pairs				
4.3.1.1	Coupler	The link forms the connection between kinematic pairs joining moving links only			
	a) for planar mechanisms				
	b) for spatial mechanisms				

No.	Designation	Definition	Basic symbol	Permissible symbol	Notes
4.3.1.2	Crank (or rocker)	Link which can perform complete (or incomplete) rotation around a fixed axis			
	a) for planar mechanisms				
	b) for spatial mechanisms				
4.3.1.3	Eccentric	Disk-shaped link whose centre describes a circular path with respect to a revolute pair. Simultaneously, this centre forms the axis of another revolute pair			
4.3.2	The link forms the connection between two prismatic pairs				
4.3.2.1	Common case				

4.3.2.2	Slider				Angle θ is arbitrary
4.3.3	The link forms the connection between a revolute and a prismatic pair				
4.3.3.1	Common case				
4.3.3.2	Slotted link (slotted lever)	The link is a part of a revolute pair with the frame and a part of a prismatic pair with the moving link	 		
4.3.3.3	Slider	The link is a part of a prismatic pair with the frame			

No.	Designation	Definition	Basic symbol	Permissible symbol	Notes
4.4	Ternary link	The link forms the connection between three kinematic pairs			
4.5	Multi-element link				Symbols are similar to those of binary or ternary link

No.	Designation	Symbol
4.6	Examples	

Printed at New India Printing Press, Khurja, India