

Graphical symbols for components of servo-mechanisms —

Part 2: General Servo-mechanisms

Confirmed
December 2011

Co-operating organizations

The Instrument Industry Standards Committee, under whose supervision this British Standard was prepared, consists of representatives from the following Government departments and scientific and industrial organizations:

- Association of Scientific Workers
- British Clock and Watch Manufacturers' Association
- British Electrical and Allied Manufacturers' Association*
- British Industrial Measuring and Control Apparatus Manufacturers' Association*
- British Iron and Steel Federation*
- British Nautical Instrument Trade Association
- British Railways Board
- British Scientific Instrument Research Association*
- Council of British Manufacturers of Petroleum Equipment*
- Electrical Research Association
- Electricity Council, The Generating Board and the Area Boards in England and Wales
- Electronic Engineering Association*
- Engineering Equipment Users' Association*
- Gauge and Tool Makers' Association
- Institute of Physics and the Physical Society
- Institution of Chemical Engineers*
- Institution of Electrical Engineers*
- Institution of Heating and Ventilating Engineers
- Institution of Mechanical Engineers
- Iron and Steel Institute
- Meteorological Office
- Ministry of Health
- Ministry of Housing and Local Government
- National Coal Board
- National Physical Laboratory (D.S.I.R.)*
- Oil Companies Materials Association*
- Scientific Instrument Manufacturers' Association*
- Society of Instrument Technology*
- War Office*
- Water-tube Boilermakers' Association*

The Government departments and scientific and industrial organizations marked with an asterisk in the above list, together with the following, were directly represented on the committees entrusted with the preparation of this standard:

- Admiralty
- Air Ministry
- Institution of Gas Engineers
- Ministry of Aviation
- Society of British Aircraft Constructors Ltd.
- United Kingdom Atomic Energy Authority

This British Standard, having been approved by the Instrument Industry Standards Committee and endorsed by the Chairman of the Engineering Divisional Council, was published under the authority of the General Council on 28 February 1964

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The following BSI references relate to the work on this standard:
Committee references INE/1/2 and INE/1/2/2
Draft for comment AA(INE) 9313

ISBN 0 580 34405 3

Amendments issued since publication

Amd. No.	Date	Comments

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Foreword

This standard makes reference to the following British Standards:

BS 108, *Graphical symbols for general electrical purposes.*

BS 530, *Graphical symbols for telecommunications.*

BS 1523, *Glossary of terms used in automatic controlling and regulating systems — Section 5: Components of servo-mechanisms.*

BS 2917, *Graphical symbols for use in diagrams for fluid power transmission and control systems.*

BS 3238, *Graphical symbols for components of servo-mechanisms — Part 1: Transducers and magnetic amplifiers.*

This British Standard tabulates graphical symbols for general servo-mechanisms and is the second section of a publication prepared to serve as a companion standard to BS 1523, “*Glossary of terms used in automatic controlling and regulating systems*”, Section 5:1954, “*Components of servo-mechanisms*”. The first section (BS 3238-1:1960) has already been published and deals with graphical symbols for transducers and magnetic amplifiers.

Not all the general servo-mechanism terms in BS 1523 are considered to need graphical symbols, for various reasons; e.g. the item defined can often be most suitably shown by a composite diagram built up from basic components which in some cases are not specified due to the wideness of the definition.

While compiling this standard several other standards already published on graphical symbols for particular purposes, e.g. for the electrical industry, the machine tools industry and the aircraft industry, have been kept closely in mind. The object of this standard is to develop standard symbols which allow the functioning and interconnections of general servo-mechanisms to be indicated on a single diagram even though the mechanisms may be, and usually are, a combination of electrical, mechanical, and hydraulic or pneumatic devices. It is this type of diagram that is required by the servo-mechanism manufacturer and user.

An Appendix is included by way of example to illustrate the use of the symbols in diagrams of relatively simple servo-mechanisms.

As far as is known no previous attempt has been made to standardize the graphical symbols for a large number of the components mentioned in BS 1523, and special consideration has had to be given to the degree of detail which would be desired by users. In this respect it is felt that two main requirements exist, firstly, graphical symbols for use in diagrams which show all the interconnections of the servo-mechanism and convey the principle of functioning of the mechanism in reasonable detail; secondly, a very much simpler type of symbol for use in block diagrams which are often required to facilitate explanation of the system.

While it is not considered that the size of the symbols should be rigidly specified, for the guidance of users and to assist in the production of stencils should these be required, it is mentioned that the scale used for the symbols in the body of this draft is that recommended for general use in diagrams.

In general the presentation of the symbols detailed in this standard should be so that the “cause to effect” is shown from left to right. However, different arrangements of symbols may be used where this principle cannot be followed, as for example in feedback loops, the standard symbols may then be turned in any direction to obtain the best presentation.

Where it is desired to show that certain items of a servo-mechanism system are grouped together either functionally or physically the symbols for these items may be enclosed within a chain dotted boundary.

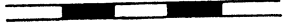
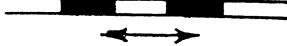
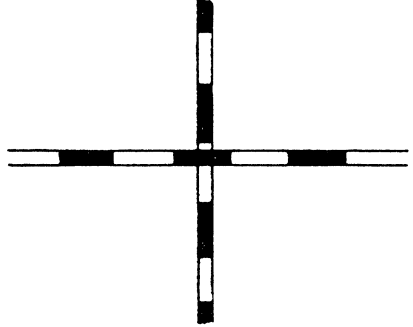
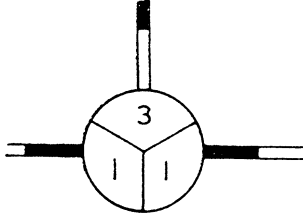
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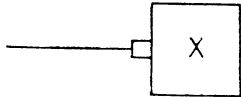
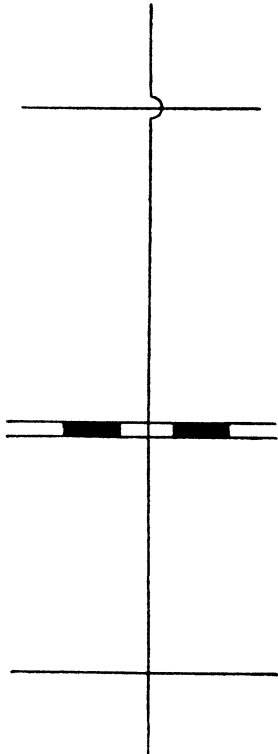
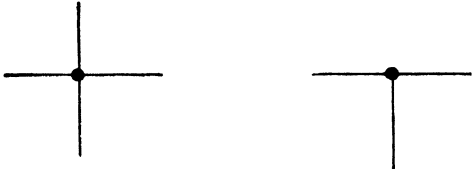
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Summary of pages

This document comprises a front cover, an inside front cover, pages i to iv, pages 1 to 19 and a back cover.

This standard has been updated (see copyright date) and may have had amendments incorporated. This will be indicated in the amendment table on the inside front cover.

Item number and description	Number in BS 1523 Section 5	Further description and Notes	Symbol
Shafts	1	General symbol The black and white portions are equal in length and should be approximately four times the diameter of the shaft. NOTE A In block diagrams where it is desired to show multiple drives from a single shaft they may be represented by means of tee-junctions. (See Appendix, Figure 1). NOTE B There is no significance in the position of any component either on a shaft or receiving a shaft in relation to the shaft illustration.	
	2	Direction of cause to effect (here, left to right).	
	3	Rotation and direction of rotation	
	4	The symbol for indicating limited rotation is a constant length arc, the limits being defined by writing in the angle, when known.	
	5	Translatory motion Where it is important to specify the limits of this motion they shall be defined by writing them in an appropriate position along-side the symbol.	
	6	Shafts crossing, but not connected	
	7	Connected shafts. The number of sectors inside the circle shall be equal to the number of shafts coupled to the gear box. Numbers in the sectors indicate the speed ratio between two shafts.	

Item number and description	Number in BS 1523 Section 5	Further description and Notes	Symbol
Pipes	8	General symbol. NOTE To improve the clarity of composite diagrams, pipes may be drawn thicker than electrical conductors.	
	9	Where necessary, to distinguish between pipes and electrical conductors to a single piece of equipment, where a pipe is attached to any mechanism a "nipple" may be shown. As an example a pipe is shown here attached to a mechanism X signified by the square.	
	10	Pipes crossing <i>a. Pipes</i> NOTE This is an additional method of differentiating between pipes and electrical conductors. <i>b. Shafts</i> <i>c. Electrical conductors</i>	
11		Connected pipes NOTE The connector dot should be approximately five times the width of the associated lines.	
Electrical conductors	12	General symbol.	
	13	Electrical conductors crossing, but not connected.	