



BS 3939: Part 10: 1985
IEC 617-10: 1983

UDC 003.62: 621.3.061

© British Standards Institution. No part of this publication may be photocopied or otherwise reproduced without the prior permission in writing of BSI

British Standard Guide for
**Graphical symbols for electrical power,
telecommunications and electronics diagrams**
Part 10. Telecommunications: transmission

[IEC title: Graphical symbols for diagrams
Part 10: Telecommunications: Transmission]

Symboles graphiques pour schémas d'électrotechnique, de télécommunications et
d'électronique
Partie 10. Télécommunications: transmission

Schaltzeichen für Diagramme in der Elektrotechnik, Nachrichtentechnik und Elektronik
Teil 10. Nachrichtentechnik: Übertragung

BS 3939: Part 10: 1985

National foreword

This Part of BS 3939, prepared under the direction of the General Electrotechnical Engineering Standards Committee, recommends graphical symbols, with definitions, for telecommunications, transmission for use in electrical power, telecommunications and electronics diagrams. It is identical with the English text in IEC Publication 617-10: 1983 'Graphical symbols for diagrams', Part 10 'Telecommunications: Transmission' published by the International Electrotechnical Commission (IEC), except that the English text has been rearranged typographically as a consequence of deleting the corresponding French text.

Together with Part 1*, Parts 2 to 9 and Parts 11 to 13, this Part of BS 3939 supersedes the previous edition which is withdrawn in its entirety.

The titles of the other Parts in the BS 3939 series are as follows:

- Part 1 General principles*
- Part 2 Symbol elements, qualifying symbols and other symbols having general application
- Part 3 Conductors and connecting devices
- Part 4 Passive components
- Part 5 Semiconductors and electron tubes
- Part 6 Production and conversion of electrical energy
- Part 7 Switchgear, controlgear and protective devices
- Part 8 Measuring instruments, lamps and signalling devices
- Part 9 Telecommunications: switching and peripheral equipment
- Part 11 Architectural and topographical installation plans and diagrams
- Part 12 Binary logic elements
- Part 13 Analogue elements

Titles to any further Parts will be added in due course.

To take account of the development of computer draughting, the symbols have been designed to a grid. A transparent over-lay with this grid will be included in Part 1.

Terminology and conventions. The text of the international standard has been approved for publication as a British Standard without deviation. Some terminology and certain conventions are not identical with those used in British Standards.

Cross-references

International standard	Corresponding British Standard
IEC 617-2: 1983	BS 3939 Guide for graphical symbols for electrical power, telecommunications and electronics diagrams
	Part 2: 1985 Symbol elements, qualifying symbols and other symbols having general application (Identical)

The ITU Radio Regulations, to which reference is made in the text, are available from the International Telecommunications Union, Place des Nations, CH 1211, Geneva 20, Switzerland.

Compliance with a British Standard does not of itself confer immunity from legal obligations.

Contents

National foreword	Page
Committees responsible	Inside front cover
List of symbols	Back cover
 CHAPTER I: TELECOMMUNICATION CIRCUITS	 2
Section 1: Lines and circuit usage	2
Section 2: Amplified circuits	3
 CHAPTER II: ANTENNAS AND RADIO STATIONS.	 4
Section 3: Qualifying symbols	4
Section 4: General symbol and examples of use	4
Section 5: Specific types of antennas and parts of antennas.	6
Section 6: Radio stations	8
 CHAPTER III: MICROWAVE TECHNOLOGY.	 10
Section 7: Transmission paths	10
Section 8: One- and two-port devices	11
Section 9: Multi-port devices	13
Section 10: Couplers and probes	16
Section 11: Masers and lasers	17
 CHAPTER IV: MISCELLANEOUS BLOCK SYMBOLS	 18
Section 12: Qualifying symbols for the types of pulse-modulation	18
Section 13: Signal generators	18
Section 14: Changers	19
Section 15: Amplifiers	20
Section 16: Networks with several pairs of terminals	20
Section 17: Threshold devices.	22
Section 18: Terminating sets and hybrid transformers.	23
Section 19: Modulators, demodulators, discriminators	24
Section 20: Concentrators, multiplexers	25
 CHAPTER V: FREQUENCY SPECTRUM DIAGRAMS	 26
Section 21: Symbol elements	26
Section 22: Examples of frequency spectrum diagrams	28
 CHAPTER VI: FIBRE OPTICS.	 30
Section 23: Transmission line	30
Section 24: Transmission devices.	30

BS 3939: Part 10: 1985

British Standard Guide for

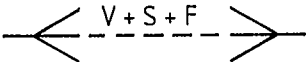
Graphical symbols for electrical power, telecommunications and electronics diagrams

Part 10. Telecommunications: transmission

CHAPTER 1: TELECOMMUNICATION CIRCUITS

SECTION 1—LINES AND CIRCUIT USAGE

1.1 Symbol 03-01-01 is used to represent a line or other telecommunication circuit. The usage of circuits may be indicated by letters, symbols 10-01-01 to 10-01-04.

No.	Symbol	Description
10-01-01	F	Telephony
10-01-02	T	Telegraphy and transmission of data
10-01-03	V	Video channel (television)
10-01-04	S	Sound channel (television or radio broadcasting)
10-01-05		<i>Example:</i> Telephone line or circuit <i>Notes</i> 1. – A dashed line may be used to identify a radio link or any radio section of a circuit. 2. – The antenna symbol (10-04-01) may be placed at the radio terminal points.
10-01-06		<i>Example:</i> Radio link carrying television (video and sound) and telephony
10-01-07		Loaded line

SECTION 2 – AMPLIFIED CIRCUITS

No.	Symbol	Description
10-02-01		Two-wire line with unidirectional amplification
10-02-02		Two-wire line with both-way amplification
10-02-03	Form 1	Four-wire circuit with both-way amplification
10-02-04	Form 2	
10-02-05		Four-wire type circuit with frequency separation
10-02-06	Form 1	Four-wire circuit with both-way terminal amplification with echo suppression
10-02-07	Form 2	

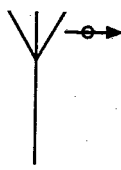
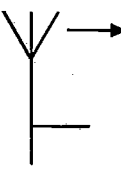
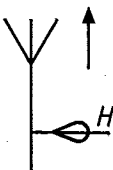
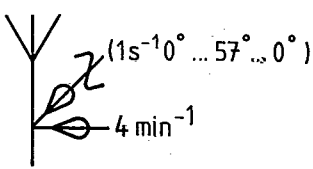
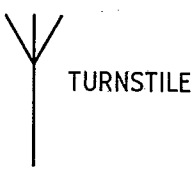
CHAPTER II: ANTENNAS AND RADIO STATIONS

SECTION 3 – QUALIFYING SYMBOLS

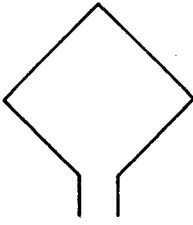
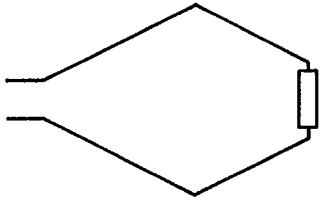
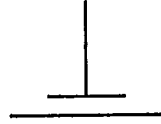
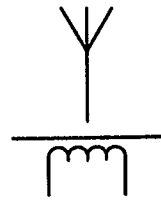
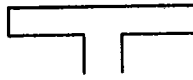
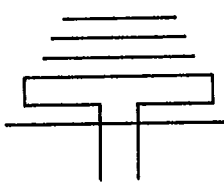
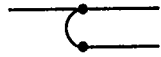
No.	Symbol	Description
10-03-01		Plane polarization <i>Note.</i> – Horizontal (vertical) polarization is indicated by an arrow shown perpendicular (parallel) to the stem of the antenna symbol.
10-03-02		Circular polarization
10-03-03		Direction of radiation fixed in azimuth
10-03-04		Direction of radiation variable in azimuth
10-03-05		Direction of radiation fixed in elevation
10-03-06		Direction of radiation variable in elevation
10-03-07		Direction of radiation fixed in azimuth and elevation
10-03-08		Direction finder or radio beacon

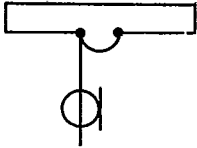
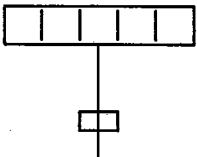
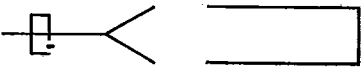
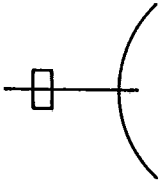
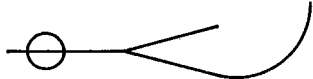
SECTION 4 – GENERAL SYMBOL AND EXAMPLES OF USE

No.	Symbol	Description
10-04-01		Antenna, general symbol <i>Notes 1.</i> – This symbol may be used to represent any type of antenna or aerial array. The stem of the symbol may represent any type of balanced or unbalanced feeder, including a single conductor. 2. – A drawing of the general shapes of the main lobes of the polar diagrams of the antenna may be given adjacent to the antenna symbol. 3. – Supplementary references in figures or letter symbols may be taken from the current Radio Regulations published by the International Telecommunication Union, Geneva. Alternatively a name or a reference may be written adjacent to the general antenna symbol.

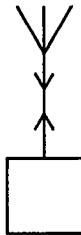
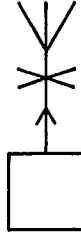
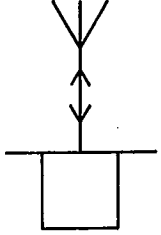
No.	Symbol	Description
10-04-02		Antenna with circular polarization
10-04-03		Antenna with direction of radiation variable in azimuth
10-04-04		Directional antenna fixed in azimuth, horizontal polarization
10-04-05		Antenna with direction of radiation variable in elevation
10-04-06		Direction finding antenna (radio goniometric or radio beacon)
10-04-07		Directional antenna fixed in azimuth, vertically polarized, with horizontal polar diagram
10-04-08		Radar antenna rotating four times per minute in azimuth and reciprocating in elevation between 0°... 57°... 0° in 1 s
10-04-09		Turnstile antenna

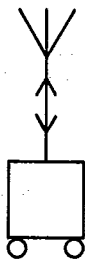
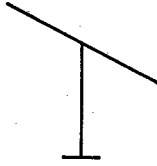
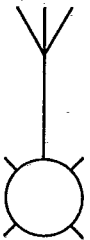
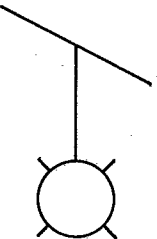
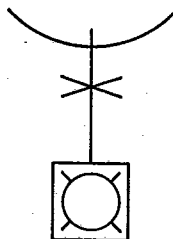
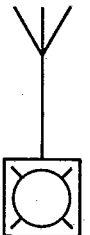
SECTION 5 – SPECIFIC TYPES OF ANTENNAS AND PARTS OF ANTENNAS

No.	Symbol	Description
10-05-01		Loop (or frame) antenna
10-05-02		Rhombic antenna, shown terminated by a resistor
10-05-03		Counterpoise
10-05-04		Magnetic rod antenna, e.g. ferrite <i>Note.</i> – If there is no risk of confusion, the general antenna symbol may be omitted.
10-05-05		Dipole
10-05-06		Folded dipole
10-05-07		Folded dipole, shown with three directors and one reflector
10-05-08		Balun

No.	Symbol	Description
10-05-09		Folded dipole, shown with balun and coaxial feeder
10-05-10		Slot antenna, shown with rectangular waveguide feeder
10-05-11		Horn antenna Horn feed
10-05-12		Cheese (box) reflector with horn feed, shown with rectangular waveguide feeder
10-05-13		Paraboloidal antenna, shown with rectangular waveguide feeder
10-05-14		Horn-reflector antenna, shown with circular waveguide feeder

SECTION 6 – RADIO STATIONS

No.	Symbol	Description
10-06-01		Radio station, general symbol <i>Note.</i> – Symbol 02-05-04 or 02-05-05 is used to indicate a transmitting or receiving radio station. For examples of use, see symbols 10-06-02 to 10-06-05.
10-06-02		Transmitting and receiving radio station (simultaneous transmission and reception on the same antenna)
10-06-03		Direction finding radio receiving station
10-06-04		Radio beacon transmitting station
10-06-05		Portable radio station (alternate transmission and reception on the same antenna)
10-06-06		Controlling radio station

No.	Symbol	Description
10-06-07		Mobile radio station (alternate transmission and reception on the same antenna)
10-06-08		Passive relay station, general symbol
10-06-09		Space station, general symbol
10-06-10		Active space station
10-06-11		Passive space station
10-06-12		Earth station only for tracking a space station, example showing a parabolic antenna
10-06-13		Earth station of a communication service via a space station

CHAPTER III: MICROWAVE TECHNOLOGY

SECTION 7—TRANSMISSION PATHS

7.1 Symbol 03-01-01 is used to represent a transmission path. Recognition symbols may be added at both ends of the transmission path and at intermediate points. The mode of propagation may be shown at the side of the waveguide recognition symbol. Details of structure (e.g. elbows), type, impedance, ratings, etc., may be added adjacent to or within any symbol or in a note.

No.	Symbol	Description
10-07-01		Rectangular waveguide
10-07-02		<i>Example:</i> Rectangular waveguide with propagation in the TE ₀₁ mode
10-07-03		Circular waveguide
10-07-04		Ridged waveguide
10-07-05		Coaxial waveguide
10-07-06		Stripline with two conductors
10-07-07		Stripline with three conductors
10-07-08		Goubau line (single wire transmission line within solid dielectric)
10-07-09		Gas-filled rectangular waveguide
10-07-10	Use symbol 03-01-06	Flexible waveguide
10-07-11		Twisted waveguide
10-07-12		Mode suppression The asterisk shall be replaced by the indication of the mode suppressed
10-07-13		Pair of symmetrical waveguide connectors