

Graphical symbols for diagrams —

Part 10: Telecommunications: transmission

The European Standard EN 60617-10:1996 has the status of a
British Standard

ICS 01.080.30; 33.040.20

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- Consumer Policy Committee of BSI
- Federation of the Electronics Industry
- GAMBICA (BEAMA Ltd.)
- Transmission and Distribution Association (BEAMA Ltd.)

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National foreword

This British Standard has been prepared by Technical Committee GEL/3. It is the English language version of EN 60617-10:1996, *Graphical symbols for diagrams Part 10: Telecommunications: Transmission*, published by the European Committee for Electrotechnical Standardization (CENELEC). It is identical with IEC 617-10:1996 published by the International Electrotechnical Commission (IEC).

This British Standard replaces BS 3939-10:1985 which is withdrawn.

NOTE The French language version of the alphabetic index has not been included.

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Summary of pages

This document comprises a front cover, an inside front cover, pages i and ii, the EN title page, pages 2 to 61 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.

ICS 01.080.30

Descriptors: Electric diagram, electrical symbol, telecommunication, data transmission

English version

Graphical symbols for diagrams Part 10: Telecommunications: Transmission

(IEC 617-10:1996)

Symboles graphiques pour schémas
Partie 10: Télécommunications: Transmission
(CEI 617-10:1996)

Graphische Symbole für Schaltpläne
Teil 10: Schaltzeichen für die
Nachrichtentechnik:
Übertragungseinrichtungen
(IEC 617-10:1996)

This European Standard was approved by CENELEC on 1996-03-05. CENELEC members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for giving this European Standard the status of a national standard without any alteration.

Up-to-date lists and bibliographical references concerning such national standards may be obtained on application to the Central Secretariat or to any CENELEC member.

This European Standard exists in three official versions (English, French, German). A version in any other language made by translation under the responsibility of a CENELEC member into its own language and notified to the Central Secretariat has the same status as the official versions.

CENELEC members are the national electrotechnical committees of Austria, Belgium, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Luxembourg, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and United Kingdom.

CENELEC

European Committee for Electrotechnical Standardization
Comité Européen de Normalisation Electrotechnique
Europäisches Komitee für Elektrotechnische Normung

Central Secretariat: rue de Stassart 35, B-1050 Brussels

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Foreword

The text of document 3A/388/FDIS, future edition 2 of IEC 617-10, prepared by SC 3A, Graphical symbols for diagrams, of IEC TC 3, Documentation and graphical symbols, was submitted to the IEC-CENELEC parallel vote and was approved by CENELEC as EN 60617-10 on 1996-03-05.

The following dates were fixed:

- latest date by which the EN has to be implemented at national level by publication of an identical national standard or by endorsement (dop) 1997-02-01
- latest date by which the national standards conflicting with the EN have to be withdrawn (dow) 1997-02-01

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Introduction

This part of IEC 617 forms an element of a series which deals with graphical symbols for diagrams.

The series consists of the following parts:

- *Part 1: General information, general index. Cross-reference tables;*
- *Part 2: Symbol elements, qualifying symbols and other symbols having general application;*
- *Part 3: Conductors and connecting devices;*
- *Part 4: Basic 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 10: Telecommunications: Transmission;*
- *Part 11: Architectural and topographical installation plans and diagrams;*
- *Part 12: Binary logic element;*
- *Part 13: Analogue elements.*

The scope and the normative references for this series are given in IEC 617-1.

Symbols have been designed in accordance with requirements given in the future ISO 11714-1¹⁾. The module size $M = 2,5 \text{ mm}$ has been used. For better readability smaller symbols in this standard have been enlarged to double size and are marked “200 %” in the symbol column. To save space larger symbols have been reduced to half size and are marked “50 %” in the symbol column. In accordance with the future ISO 11714-1, clause 7, symbol dimensions (for instance height) may be modified in order to make space for a greater number of terminals or for other layout requirements. In all cases, whether the size is enlarged or reduced, or dimensions modified, the thickness of the original line should be maintained without scaling.

The symbols in this standard are laid out in such a way that the distance between connecting lines is a multiple of a certain module. The module 2M has been chosen to provide enough space for a required terminal designation. The symbols have been drawn to a size convenient for comprehension, using the same grid consistently in the representation of all symbols.

All symbols are designed within a grid in a computer-aided draughting system. The grid which was used has been reproduced in the background of the symbols.

The older symbols which were included in appendix A of the first edition of IEC 617-10 for a transitional period, are no longer part of this second edition, as they will definitely be withdrawn from use.

The indexes in Annex A, B and C include an alphabetic list of symbol names and their corresponding number. The symbol names are based on the description of the symbols of this part. A general index including an alphabetic list of symbols of all parts is given in IEC 617-1.

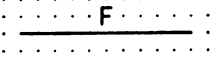
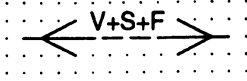
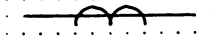
¹⁾ At present, at the stage of Draft International Standard (document 3/563/DIS).

Chapitre I: Circuits de télécommunication
Section 1 — Lignes et affectation de circuits

1.1 Le symbole 03-01-01 est utilisé pour représenter une ligne ou un autre circuit de télécommunication. L'affectation d'un circuit peut être précisée en utilisant des lettres, symboles 10-01-01 à 10-01-04.

Chapter I: 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.	Symbole Symbol	Légende	Description
10-01-01		Téléphonie	Telephony
10-01-02		Télégraphie et transmission de données	Telegraphy and transmission of data
10-01-03		Canal vidéo (télévision)	Video channel (television)
10-01-04		Canal son (télévision ou radiodiffusion)	Sound channel (television or radio broadcasting)
10-01-05		EXEMPLES: Ligne ou circuit téléphonique Un trait tireté peut être dessiné pour distinguer une liaison radioélectrique d'une liaison de télécommunication. Le symbole d'antenne (10-04-01) peut être dessiné à chaque extrémité du symbole de la liaison radioélectrique.	EXAMPLES: Telephone line or circuit A dashed line may be used to identify a radio link or any radio section of a circuit. The antenna symbol (10-04-01) may be placed at the radio terminal points.
10-01-06		Liaison radioélectrique utilisée pour la télévision (vidéo et son) et pour la téléphonie	Radio link carrying television (video and sound) and telephony
10-01-07		Ligne pupinisée	Coil-loaded line Inductively loaded line

Section 2 — Circuits amplifiés

Section 2 — Amplified circuits

No.	Symbole Symbol	Légende	Description
10-02-01		Circuit à deux fils avec amplification dans un seul sens	Two-wire line with unidirectional amplification
10-02-02		Circuit à deux fils avec amplification dans les deux sens	Two-wire line with both-way amplification
10-02-03	Forme 1 	Circuit à quatre fils avec amplification dans les deux sens	Four-wire circuit with both-way amplification
10-02-04	Forme 2 		
10-02-05		Circuit assimilé à un circuit à quatre fils à partage de fréquences	Four-wire type circuit with frequency separation
10-02-06	Forme 1 	Circuit à quatre fils avec amplification terminale dans les deux sens et suppression d'écho	Four-wire circuit with both-way terminals amplification with echo suppression
10-02-07	Forme 2 		

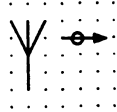
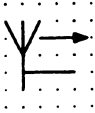
**Chapitre II: Antennes et stations ou postes
radioélectriques**
Section 3 — Symboles distinctifs

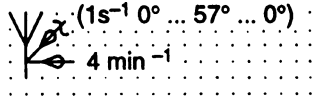
Chapter II: Antennas and radio stations
Section 3 — Qualifying symbols

No.	Symbole Symbol	Légende	Description
10-03-01		Polarisation dans un plan Pour indiquer la polarisation horizontale (verticale) une flèche doit être tracée perpendiculairement (parallèlement) à la ligne centrale du symbole d'antenne.	Plane polarization Horizontal (vertical) polarization shall be indicated by an arrow shown perpendicular (parallel) to the stem of the antenna symbol.
10-03-02		Polarisation circulaire	Circular polarization
10-03-03		Direction de rayonnement fixe en azimuth	Direction of radiation fixed in azimuth
10-03-04		Direction de rayonnement orientable en azimuth	Direction of radiation variable in azimuth
10-03-05		Direction de rayonnement fixe en site	Direction of radiation fixed in elevation
10-03-06		Direction de rayonnement orientable en site	Direction of radiation variable in elevation
10-03-07		Direction de rayonnement fixe en azimuth et en site	Direction of radiation fixed in azimuth and elevation
10-03-08		Radiogoniomètre ou radiophare	Direction finder or radio beacon

Section 4 — Symbole général et exemples d'emploi

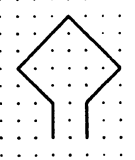
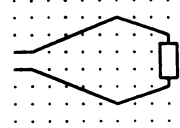
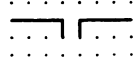
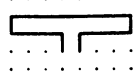
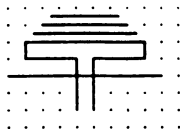
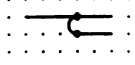
Section 4 — General symbol and examples of use

No.	Symbole Symbol	Légende	Description
10-04-01		Antenne, symbole général Ce symbole peut être utilisé pour représenter une antenne directive ou non. La ligne centrale du symbole peut représenter un type quelconque d'alimentation, symétrique ou asymétrique, y compris un conducteur unique. On peut indiquer sur un diagramme distinct, voisin du symbole de l'antenne, le lobe principal du diagramme de directivité de l'antenne. On peut ajouter des indications supplémentaires (lettres et chiffres) tirées du Règlement des radiocommunications en vigueur, publié par l'Union Internationale des Télécommunications (UIT), Genève. On peut ajouter un nom ou une référence au symbole général de l'antenne.	Antenna, general symbol 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. 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. Supplementary references in figures or letter symbols may be taken from the current Radio Regulations published by the International Telecommunication Union (ITU), Geneva. Alternatively a name or a reference may be written adjacent to the general antenna symbol.
10-04-02		Antenne avec polarisation circulaire	Antenna with circular polarization
10-04-03		Antenne à direction de rayonnement orientable en azimut	Antenna with direction of radiation variable in azimuth
10-04-04		Antenne à direction de rayonnement fixe en azimut, à polarisation horizontale	Directional antenna fixed in azimuth, horizontal polarization
10-04-05		Antenne à direction de rayonnement orientable en site	Antenna with direction of radiation variable in elevation

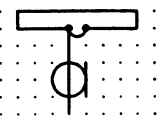
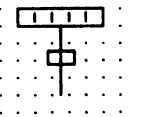
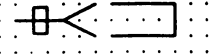
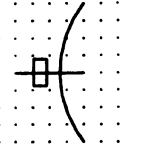
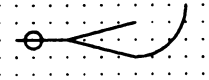
No.	Symbole Symbol	Légende	Description
10-04-06		Antenne radiogoniométrique ou de radiophare	Direction finding antenna (radio goniometric or radio beacon)
10-04-07		Antenne à direction de rayonnement fixe en azimut, à polarisation verticale avec son diagramme de rayonnement dans le plan horizontal	Directional antenna fixed in azimuth, vertically polarized, with horizontal polar diagram
10-04-08		Antenne radar tournant dans un sens en azimut à la vitesse de quatre tours par minute et oscillante en site entre 0° ... 57° ... 0° en 1 s	Radar antenna rotating four times per minute in azimuth and reciprocating in elevation between 0° ... 57° ... 0° in 1 s
10-04-09		Antenne tourniquet	Turnstile antenna

Section 5 — Antennes particulières et
éléments d'antennes

Section 5 — Specific types of antennas and
parts of antennas

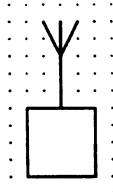
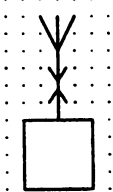
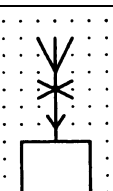
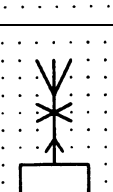
No.	Symbole Symbol	Légende	Description
10-05-01		Cadre	Loop (or frame) antenna
10-05-02		Antenne en losange, figurée terminée par une résistance	Rhombic antenna, shown terminated by a resistor
10-05-03		Contrepoids	Counterpoise
10-05-04		Antenne à noyau magnétique, par exemple de ferrite S'il n'y a pas de risque de confusion, on peut supprimer le symbole général d'antenne.	Magnetic rod antenna, for example ferrite If there is no risk of confusion, the general antenna symbol may be omitted.
10-05-05		Doublet	Dipole
10-05-06		Doublet replié	Folded dipole
10-05-07		Doublet replié, figuré avec trois éléments directeurs et un élément réflecteur	Folded dipole, shown with three directors and one reflector
10-05-08		Symétriseur	Balun (Balancing unit)

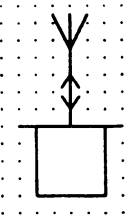
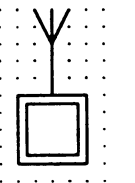
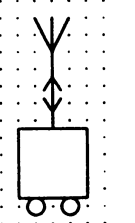
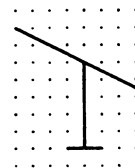
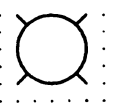
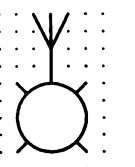


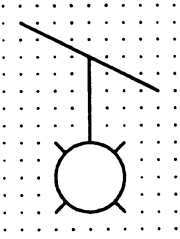
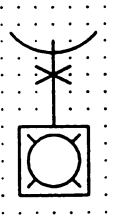
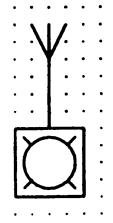
No.	Symbole Symbol	Légende	Description
10-05-09		Doublet replié, figuré avec un symétriseur et une paire coaxiale	Folded dipole, shown with balun and coaxial feeder
10-05-10		Antenne à fentes, figurée avec alimentation par un guide d'ondes de section rectangulaire	Slot antenna, shown with rectangular waveguide feeder
10-05-11		Cornet	Horn antenna Horn feed
10-05-12		Réflecteur en D alimenté par un cornet, figuré avec un guide d'ondes de section rectangulaire	Cheese (box) reflector with horn feed, shown with rectangular waveguide feeder
10-05-13		Antenne parabolique, figurée alimentée par un guide d'ondes de section rectangulaire	Parabolic antenna, shown with rectangular waveguide feeder
10-05-14		Cornet réflecteur, figuré alimenté par un guide d'ondes de section circulaire	Horn-reflector antenna, shown with circular waveguide feeder

Section 6 — Stations ou postes
radioélectriques

Section 6 — Radio stations

No.	Symbole Symbol	Légende	Description
10-06-01		Station ou poste radioélectrique, symbole général Le symbole 02-05-04 ou 02-05-05 est utilisé pour indiquer une station émettrice ou réceptrice. Pour des exemples d'application, voir les symboles 10-06-02 à 10-06-05.	Radio station, general symbol 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		Poste émetteur et récepteur (émission et réception simultanées sur la même antenne)	Transmitting and receiving radio station (simultaneous transmission and reception on the same antenna)
10-06-03		Poste radiogoniométrique récepteur	Direction finding radio receiving station
10-06-04		Poste radiogoniométrique émetteur	Radio beacon transmitting station

No.	Symbole Symbol	Légende	Description
10-06-05		Poste radioélectrique portatif (émission et réception alternées sur la même antenne)	Portable radio station (alternate transmission and reception on the same antenna)
10-06-06		Station radioélectrique de base Station radioélectrique maîtresse	Controlling radio station
10-06-07		Station radioélectrique mobile (émission et réception alternées sur la même antenne)	Mobile radio station (alternate transmission and reception on the same antenna)
10-06-08		Station-relais passive, symbole général	Passive relay station, general symbol
10-06-09		Station spatiale, symbole général	Space station, general symbol
10-06-10		Station spatiale active	Active space station

No.	Symbole Symbol	Légende	Description
10-06-11		Station spatiale passive	Passive space station
10-06-12		Station terrienne seulement pour le radiorepérage d'une station spatiale, exemple figuré avec une antenne parabolique	Earth station only for space station tracking, example shown with a parabolic antenna
10-06-13		Station terrienne d'un service de télécommunication par station spatiale	Earth station for communication with a space station

Chapitre III: Techniques des hyperfréquences

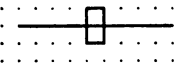
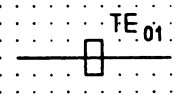
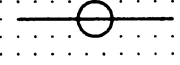
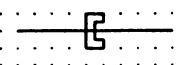
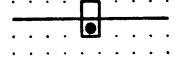
Section 7 — Lignes de propagation

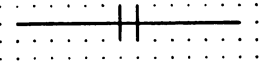
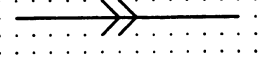
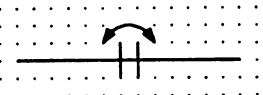
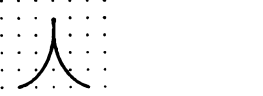
7.1 Le symbole 03-01-01 est utilisé pour représenter une ligne de propagation. Des symboles distinctifs peuvent être dessinés au début et à la fin de chaque ligne de propagation et en des points intermédiaires. Le mode de propagation peut être indiqué à côté du symbole du guide d'ondes. Des indications précisant les structures mécaniques (par exemple angle de coude), les types, les impédances ainsi que des données particulières peuvent être ajoutées à proximité ou à l'intérieur d'un symbole ou dans une note.

Chapter III: Microwave technology

Section 7 — Transmission paths

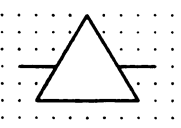
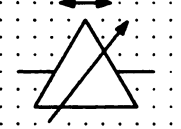
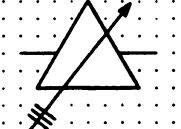
7.1 Symbol 03-01-01 is used to represent a transmission path. Qualifying symbols may be added at both ends of the transmission path and at intermediate points. The mode of propagation may be shown at the side of the waveguide symbol. Details of structure (for example elbows), type, impedance, ratings,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

No.	Symbole Symbol	Légende	Description
10-07-01		Guide d'ondes de section rectangulaire	Rectangular waveguide
10-07-02		EXEMPLE: Guide d'ondes de section rectangulaire avec propagation du mode TE ₀₁	EXEMPLE: Rectangular waveguide with propagation in the TE ₀₁ mode
10-07-03		Guide d'ondes de section circulaire	Circular waveguide
10-07-04		Guide d'ondes à moulure	Ridged waveguide
10-07-05		Guide d'ondes coaxial	Coaxial waveguide
10-07-06		Ligne à rubans à deux conducteurs	Stripline with two conductors
10-07-07		Ligne à rubans à trois conducteurs	Stripline with three conductors
10-07-08		Ligne Goubau (ligne de propagation à un seul conducteur sous diélectrique solide)	Goubau line (single wire transmission line within solid dielectric)
10-07-09		Guide d'ondes de section rectangulaire contenant un gaz	Gas-filled rectangular waveguide
10-07-10		Guide d'ondes flexible	Flexible waveguide

No.	Symbole Symbol	Légende	Description
10-07-11		Guide d'ondes en torsade	Twisted waveguide
10-07-12		Suppression d'un mode de propagation L'astérisque doit être remplacé par l'indication du mode de propagation qui est supprimé.	Mode suppression The asterisk shall be replaced by the indication of the propagation mode suppression.
10-07-13		Paire de connecteurs symétriques pour guide d'ondes	Pair of symmetrical waveguide connectors
10-07-14		Paire de connecteurs asymétriques pour guide d'ondes Le trait n'est pas interrompu à travers la jonction, quel que soit le type d'accouplement.	Pair of asymmetric waveguide connectors This line is not interrupted at the junction regardless of the type of connector.
10-07-15		Joint tournant avec connecteurs symétriques	Rotatable joint, with symmetrical connectors
10-07-16		Résonateur, symbole distinctif	Resonator, qualifying symbol
10-07-17		Réflecteur à réflexion totale, symbole distinctif	Reflector, reflecting totally, qualifying symbol
10-07-18		Réflecteur à réflexion partielle, symbole distinctif	Reflector, reflecting partially, qualifying symbol

Section 8 — Dispositifs à un et deux accès

Section 8 — One- and two-port devices

No.	Symbole Symbol	Légende	Description
10-08-01		Discontinuité à deux accès (introduisant une réflexion d'ondes voulue), symbole général	Discontinuity, two-port (introducing intentional wave reflection), general symbol
10-08-02		Discontinuité variable ou dispositif d'adaptation	Variable discontinuity or matching device
10-08-03		Dispositif d'accord à vis mobile	Slide screw tuner
10-08-04		Dispositif d'accord E-H	E-H tuner
10-08-05		Dispositif d'accord à bras multiple, figuré avec trois bras	Multi-stub tuner, shown with three stubs