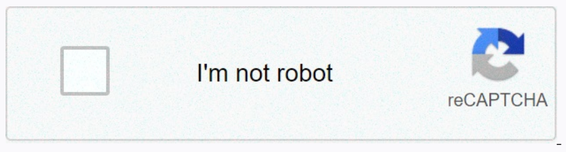
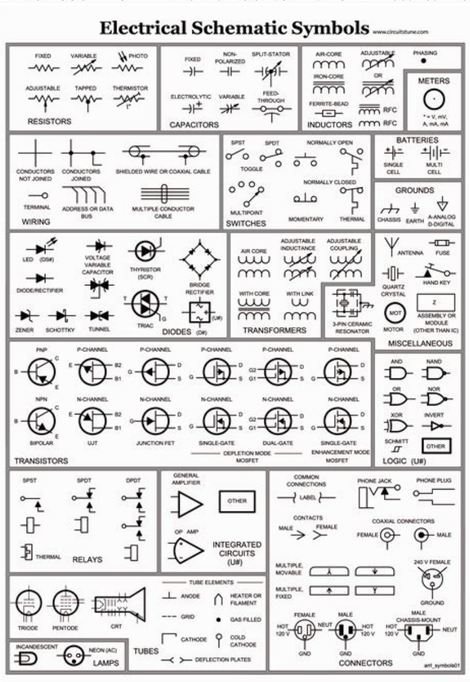


I'm not robot!

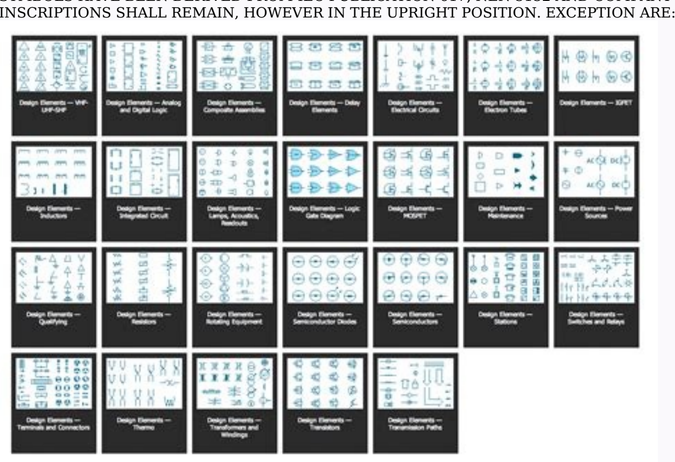
Iec 60617 electrical symbols pdf

Iec standards for electrical symbols. List of iec standards for electrical pdf.

ID. NO. ISSUE 1 SHEET 1 of 40 DOC.NO. BN-DS-E2 Electrical Design Standard Symbols ID. NO. ISSUE 1 SHEET 2 of 40 DOC.NO. BN-DS-E2 DOCUMENT NUMBERS INDEX SYMBOLS PAGE 501-502 KEY DIAGRAMS, M. V. AND L.



V. ONE LINE DIAGRAMS 4 - 16 503 CONTROL AND WIRING DIAGRAMS 17 - 28 506 COMMUNICATION SYSTEMS 29 510 POWER LAY-OUTS 30 - 38 520 LIGHTING LAY-OUTS 30 - 38 530 EARTHING LAY-OUTS 30 - 38 550 CATHODIC PROTECTION 30 - 38 LOGIC SYMBOLS 39 - 40 ID. NO. ISSUE 1 SHEET 3 of 40 DOC.NO. BN-DS-E2 NOTES 1. SYMBOLS HAVE BEEN DERIVED FROM IEC PUBLICATION 617, NEN 5152 AND COMPANY STANDARDS. EXAMPLE ON SYMBOLS. PUBLICATION EXAMPLE IEC 617 : 03-01-02 A 123 IEC COMPANY SEQUENCE INDEX NEN 5152 : NEN-K-13 NON STANDARD (NORM) : NS-52 2. ALL SYMBOLS MAY BE DRAWN IN ANY POSITION, THE INSCRIPTIONS SHALL REMAIN, HOWEVER IN THE UPRIGHT POSITION. EXCEPTION ARE: A.

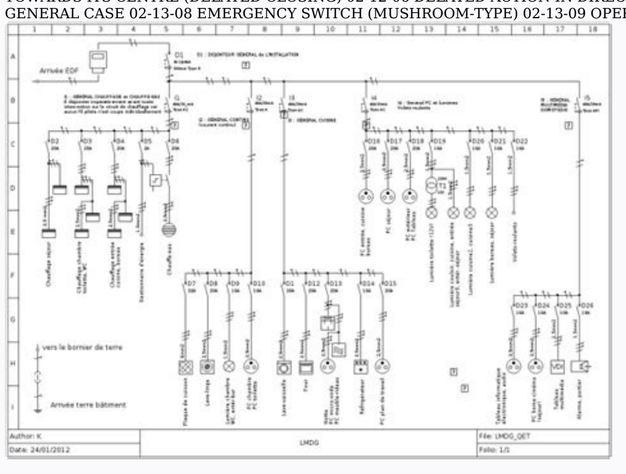


RELAYS, CONTACTS AND SWITCHES SHALL BE SHOWN SUCH THAT THE MODE OF OPERATION IS FROM LEFT TO RIGHT OR FROM BOTTOM TO TOP.

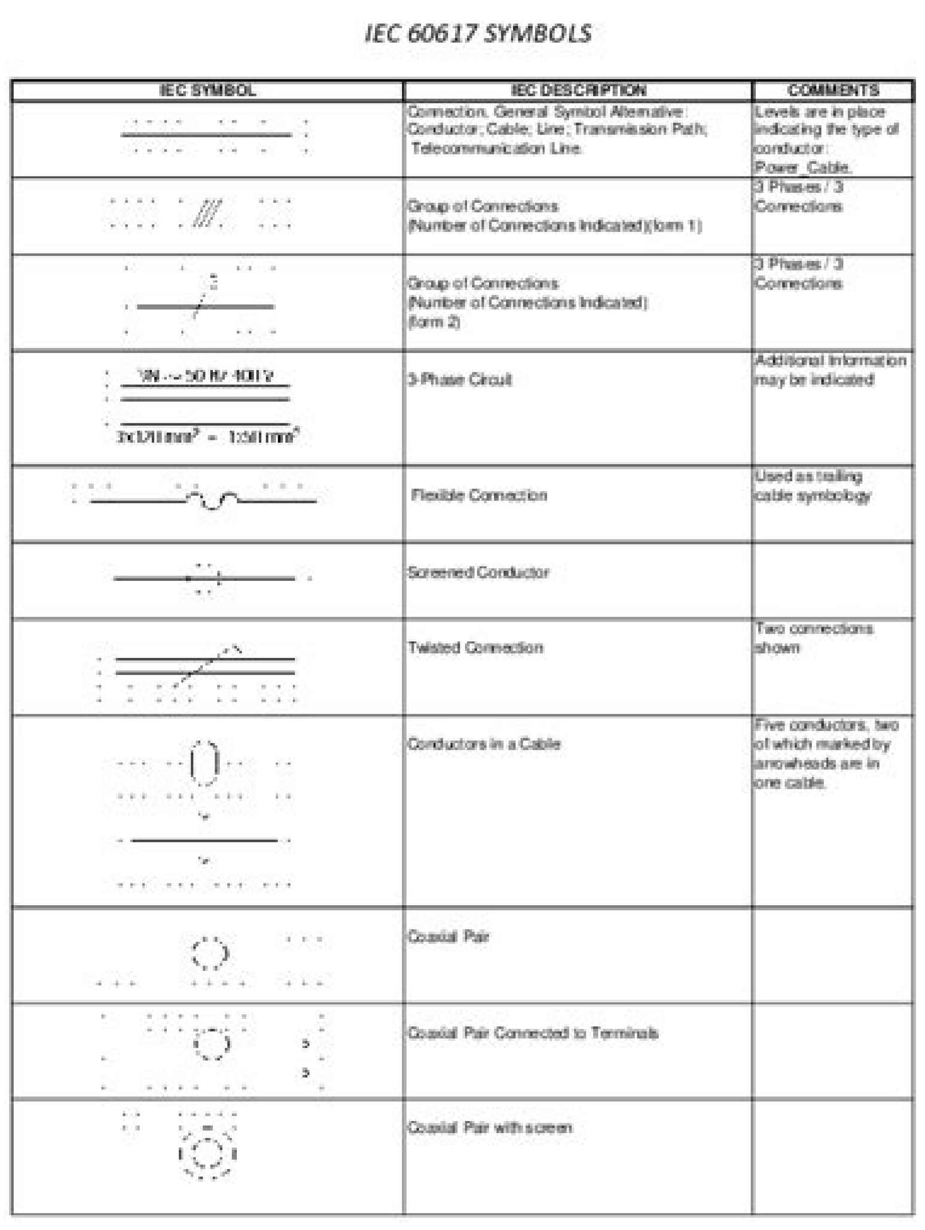
Βασικά τυποποιημένα σύμβολα κατά IEC 60617

A/A	Αριθ. IEC	Σύμβολο	Έννοια
		Σύμβολα ηλεκτρικών μηχανών	
87	06-02-06		Τριφασικό τύλιγμα σε σύνδεση τριγώνου.
88	06-02-07		Τριφασικό τύλιγμα σε σύνδεση αστέρα.
89	07-14-06		Εκκινητής αστέρα – τριγώνου για κινητήρα.
90	06-08-01		Τριφασικός κινητήρας βραχυκυκλωμένου δρομέα.
91	06-08-03		Δακτυλιοφόρος τριφασικός κινητήρας.
92	06-09-01		Μετασχηματιστής με δύο τυλίγματα, γενικό σύμβολο (Μορφή 1).
93	06-09-02		Μετασχηματιστής με δύο τυλίγματα, γενικό σύμβολο (Μορφή 2).
94	06-09-06		Αυτομετασχηματιστής, γενικό σύμβολο (Μορφή 1).
95	06-09-07		Αυτομετασχηματιστής, γενικό σύμβολο (Μορφή 2).
96	06-10-07		Τριφασικός μετασχηματιστής σε σύνδεση τριγώνου – αστέρα.

B. INSCRIPTION ON CIRCUIT AND CABLES SHALL BE WRITTEN ALONG THE SYMBOLS AND SHALL BE READ FROM LEFT TO RIGHT OR FROM BOTTOM TO TOP. 3. CONTACTS OF ELECTRICAL OPERATED DEVICES SHALL BE SHOWN IN THE DE- ENERGIZED POSITION. SWITCHES SHALL BE DRAWN IN THE OFF-POSITION OR NOT-ACTIVATED (NO PRESSURE, FLOW, ETC.) ID. NO. ISSUE 8 SHEET 4 of 40 DOC.NO. BN-DS-E2 SYMBOL FOR KEY DIAGRAM, M.V. AND L.V. ONE LINE DIAGRAMS COMPANY DOCUMENT NS 501-502. CAD NAME DESCRIPTION SYMBOL 07-13-02 CONTACTOR 07-13-05 CIRCUIT BRACHER 07-13-02 DISCONNECTOR (ISOLATOR) OFF LOAD 07-13-08 SWITCH-DISCONNECTOR ON LOAD 07-21-08 FUSE-DISCONNECTOE OFF LOAD 07-21-09 FUSE SWITCH-DISCONNECTOR ON LOAD 07-14-04 VOLTAGE INDICATOR CAPACITIVE ID. NO. ISSUE 8 SHEET 5 of 40 DOC.NO.
BN-DS-E2 SYMBOL FOR KEY DIAGRAM, M.V. AND L.V. ONE LINE DIAGRAMS COMPANY DOCUMENT NS 501-502. CAD NAME DESCRIPTION SYMBOL NEN-B-45A SINGLE-POLE SWITCH NEN-B-45B TWO-POLE SWITCH NEN-B-45C THREE-POLE SWITCH NEN-B-45D TWO-POLE SWITCH WITH SWITCHED NEUTRAL CONDUCTOR NEN-B-45F FOUR-POLE SWITCH WITH SWITCHED NEUTRAL CONDUCTOR ID. NO. ISSUE 8 SHEET 6 of 40 DOC.NO. BN-DS-E2 SYMBOL FOR KEY DIAGRAM, M.V. AND L.V. ONE LINE DIAGRAMS COMPANY DOCUMENT NS 501-502. CAD NAME DESCRIPTION SYMBOL 02-12-05 DELAYED ACTION IN DIRECTION OF MOVEMENT FROM THE ARC TOWARDS ITS CENTRE (DELAYED CLOSING) 02-12-06 DELAYED ACTION IN DIRECTION OF MOVEMENT FROM THE ARC TOWARDS ITS CENTRE (DELAYED OPENING) 02-12-17 MECHANICAL COUPLING DISENGAGED 02-12-18 MECHANICAL COUPLING ENGAGED 02-12-20B OPERATED BY BRAKE 02-13-01 MANUAL OPERATED CONTROL, GENERAL CASE 02-13-08 EMERGENCY SWITCH (MUSHROOM-TYPE) 02-13-09 OPERATED BY HANDWHEEL 02-13-11 OPERATED BY LEVER 02-13-12 OPERATED BY REMOVABLE HANDLE 02-13-13 OPERATED BY KEY 02-13-14 OPERATED BY CRANK NOTE: ONLY ACTION IS DESCRIPTED AND A SWITCH IS SHOWN FOR CLARIFICATION.



SYMBOL CAN ALSO BE USED FOR CIRCUIT BREACKERS, ISOLATORS A.S.O. ID. NO. ISSUE 8 SHEET 7 of 40 DOC.NO. BN-DS-E2 SYMBOL FOR KEY DIAGRAM, M.V. AND L.V. ONE LINE DIAGRAMS COMPANY DOCUMENT NS 501-502.



IEC 60617 SYMBOLS

IEC SYMBOL	IEC DESCRIPTION	COMMENTS
	Connection, General Symbol Alternative: Conductor; Cable; Line; Transmission Path; Telecommunication Line.	Levels are in place indicating the type of conductor: Power, Cable.
	Group of Connections (Number of Connections Indicated)(form 1)	3 Phases / 3 Connections
	Group of Connections (Number of Connections Indicated) (form 2)	3 Phases / 3 Connections
	3-Phase Circuit	Additional Information may be indicated
	Flexible Connection	Used as trailing cable symbology
	Screened Conductor	
	Twisted Connection	Two connections shown
	Conductors in a Cable	Five conductors, two of which marked by arrowheads are in one cable.
	Coaxial Pair	
	Coaxial Pair Connected to Terminals	
	Coaxial Pair with screen	

CAD NAME DESCRIPTION SYMBOL 02-13-15 OPERATED BY ROLLER 02-13-16 OPERATED BY CAM 02-13-20 OPERATED BY SPRING W 02-13-21 OPERATED BY PNEUMATIC OR HYDRAULIC CONTROL, SINGLE ACTING 02-13-22 OPERATED BY PNEUMATIC OR HYDRAULIC CONTROL, DOUBLE ACTING 02-13-23 OPERATED BY ELECTROMAGNETIC ACTUATOR 02-13-26 OPERATED BY ELECTRIC MOTOR M 02-13-27 OPERATED BY ELECTRIC CLOCK 02-14-01 CONTROL BY FLUID LEVEL 02-14-03 CONTROL BY FLOW NEN-J-92 OPERATED BY PEDAL NOTE: ONLY ACTION IS DESCRIPTED AND A SWITCH IS SHOWN FOR CLARIFICATION. SYMBOL CAN ALSO BE USED FOR CIRCUIT BREACKERS, ISOLATORS A.S.O. ID. NO. ISSUE 8 SHEET 8 of 40 DOC.NO. BN-DS-E2 SYMBOL FOR KEY DIAGRAM, M.V. AND L.V. ONE LINE DIAGRAMS COMPANY DOCUMENT NS 501-502. CAD NAME DESCRIPTION SYMBOL NEN-J-98 OPERATED BY CENTRIFUGAL FORCE NEN-J-102 OPERATED BY BIMETAL NS-01 HAND RESET 07-09-01B TEMPERATURE SENSITIVE SWITCH NEN-J-61 MAGNETIC OVERCURRENT PROTECTION NEN-J-62 THERMAL OVERCURRENT PROTECTION NEN-J-61-62 THERMAL AND MAGNETIC OVERCURRENT PROTECTION NEN-J-74 GROUNDFAULT PROTECTION NEN-J-76 UNDER VOLTAGE PROTECTION 02-12-07 AUTOMATIC RETURN (THE TRIANGLE IS POINTED IN THE RETURN DIRECTION) 02-12-11 MECHANICAL INTERLOCK BETWEEN TWO DEVICES 02-12-12 LATCHING DEVICE NOTE: ONLY ACTION IS DESCRIPTED AND A SWITCH IS SHOWN FOR CLARIFICATION. SYMBOL CAN ALSO BE USED FOR CIRCUIT BREACKERS, ISOLATORS A.S.O. ID. NO. ISSUE 8 SHEET 9 of 40 DOC.NO. BN-DS-E2 SYMBOL FOR KEY DIAGRAM, M.V. AND L.V. ONE LINE DIAGRAMS COMPANY DOCUMENT NS 501-502. CAD NAME DESCRIPTION SYMBOL 07-16-01A 07-16-01B MEASURING RELAY OR RELATED DEVICE 07-16-01C 02-08-05 INDEPENDENT TIME-LAG 07-16-11 INVERSE TIME-LAG CHARACTERISTIC (IDMT) 07-16-03 RESIDUAL VOLTAGE UrsdU 07-17-07 UNDERVOLTAGE U < 07-16-04 REVERSE CURRENT I 07-16-05 DIFFERENTIAL CURRENT Id 07-16-06 PERCENTAGE DIFFERENTIAL CURRENT IdId/I 07-16-07 EARTH FAULT CURRENT I 07-16-08 CURRENT IN THE NEUTRAL CONDUCTOR IIN ID. NO. ISSUE 8 SHEET 10 of 40 DOC.NO. BN-DS-E2 SYMBOL FOR KEY DIAGRAM, M.V. AND L.V. ONE LINE DIAGRAMS COMPANY DOCUMENT NS 501-502. CAD NAME DESCRIPTION SYMBOL 07-17-04B INSTANTANEOUS OVERCURRENT I >> 07-17-04 OVERCURRENT II > 07-17-03 UNDERPOWER IP< NEN-K-13 REVERSE POWER P NEN-K-21 MINIMUM IMPEDANCE Z< 07-17-13 LOCKED ROTOR n O NEN-K-17 TIME t 07-09-01 TEMPERATURE ID. NO.

ISSUE 8 SHEET 11 of 40 DOC.NO. BN-DS-E2 SYMBOL FOR KEY DIAGRAM, M.V. AND L.V. ONE LINE DIAGRAMS COMPANY DOCUMENT NS 501-502. CAD NAME DESCRIPTION SYMBOL 06-09-01 TRANSFORMER WITH TWO WINDINGS 06-10-05 VARIABLE VOLTAGE TRANSFORMER 06-09-06 AUTO-TRANSFORMER 06-09-08 CHOKE / REACTOR 06-09-01B VOLTAGE TRANSFORMER 06-09-10 CURRENT TRANSFORMER 06-13-04 CURRENT TRANSFORMER WITH TWO SECONDARY WINDINGS ON THE CORE NS-41 CORE BALANCE CURRENT TRANSFORMER 06-02-02 OPEN VEE WINDING, V (60) 06-02-05 THREE-PHASE WINDING, DELTA 06-02-07 THREE-PHASE WINDING, STAR 06-02-08 THREE-PHASE WINDING, STAR, WITH NEUTRAL BROUGHT OUT ID. NO. ISSUE 8 SHEET 12 of 40 DOC.NO. BN-DS-E2 SYMBOL FOR KEY DIAGRAM, M.V. AND L.V. ONE LINE DIAGRAMS COMPANY DOCUMENT NS 501-502. CAD NAME DESCRIPTION SYMBOL 06-02-09 THREE-PHASE WINDING, ZIGZAG OR INTERCONNECTED STAR 06-02-09B THREE-PHASE WINDING, ZIGZAG OR INTERCONNECTED STAR, WITH NEUTRAL BROUGHT OUT 08-04-03 KILO WATT-HOUR METER kWh 08-04-15 KILO VAR-HOUR METER kvarh 08-03-01 RECORDING WATTMETER W 08-02-01 VOLTMETER V 08-02-02 AMMETER A 08-02-03 VARMETER var NEN-N-8 WATTMETER W 08-02-05 POWER-FACTOR METER cos 08-02-07 FREQUENCY METER Hz NEN-N-6A VOLTMETER WITH 6 POSITIONS SWITCH (NO OFF POSITION) V 6 ID. NO. ISSUE 8 SHEET 13 of 40 DOC.NO. BN-DS-E2 SYMBOL FOR KEY DIAGRAM, M.V. AND L.V. ONE LINE DIAGRAMS COMPANY DOCUMENT NS 501-502. CAD NAME DESCRIPTION SYMBOL 08-02-08 SYNCHRONOSCOPE 08-02-14 TEMPERATURE 08-08-01 CLOCK 08-05-02 PULSE METER, COUNTING DEVICE NEN-D-12 TERMINAL 03-03-06 PLUG AND SOCKET (MALE AND FEMALE) 03-03-17 CONNECTING LINK, CLOSED 03-03-19 CONNECTING LINK, CLOSED 02-02-03 DIRECT CURRENT 02-02-04 ALTERNATING CURRENT NEN-C-18 BUSDUCT NEN-D-36A CABLE CONNECTION NEN-D-39 CABLE GLAND ID.

NO. ISSUE 8 SHEET 14 of 40 DOC.NO. BN-DS-E2 SYMBOL FOR KEY DIAGRAM, M.V. AND L.V. ONE LINE DIAGRAMS COMPANY DOCUMENT NS 501-502. CAD NAME DESCRIPTION SYMBOL NS-03 TURBINE T NS-04 DIESEL D 06-04-01A GENERATOR G 06-04-01B MOTOR M 06-04-01C MOTOR WITH WINDING TEMPERATURE DETECTOR M 02-17-06 CHARGER / CONVERTER 06-14-03 RECTIFIER 06-14-05 INVERTER 06-14-04 RECTIFIER IN FULL WAVE (BRIDGE) CONNECTION 06-15-03A BATTERY OF ACCUMULATORS OR PRIMARY CELLS 04-02-01A CAPACITOR ID. NO. ISSUE 8 SHEET 15 of 40 DOC.NO. BN-DS-E2 SYMBOL FOR KEY DIAGRAM, M.V. AND L.V. ONE LINE DIAGRAMS BADGER DOCUMENT NS 501-502-510 CAD NAME DESCRIPTION SYMBOL 03-01-02A ONE-CONDUCTOR 03-01-02B NEUTRAL CONDUCTOR 03-01-02C PROTECTIVE CONDUCTOR 03-01-02D TWO-CONDUCTORS 03-01-02E ONE-CONDUCTOR WITH NEUTRAL CONDUCTOR 03-01-02G THREE-CONDUCTORS 03-01-02H ONE-CONDUCTOR WITH NEUTRAL CONDUCTOR AND PROTECTIVE CONDUCTOR 03-01-02 I TWO-CONDUCTORS WITH NEUTRAL CONDUCTOR 03-01-02 J TWO-CONDUCTORS WITH PROTECTIVE CONDUCTOR 03-01-02K TWO-CONDUCTORS WITH NEUTRAL CONDUCTOR AND PROTECTIVE CONDUCTOR 03-01-02L THREE-CONDUCTORS WITH NEUTRAL CONDUCTOR 03-01-02M THREE-CONDUCTORS WITH PROTECTIVE CONDUCTOR 03-01-02N THREE-CONDUCTORS WITH NEUTRAL CONDUCTOR AND PROTECTIVE CONDUCTOR NOTE: WIRE IS ONLY SHOWN FOR CLARIFICATIONS. SYMBOLS CAN ALSO BE USED FOR POWER LAY-OUTS. ID. NO.

ISSUE 8 SHEET 16 of 40 DOC.NO. BN-DS-E2 SYMBOL FOR KEY DIAGRAM, M.V. AND L.V. ONE LINE DIAGRAMS COMPANY DOCUMENT NS 501-502 CAD NAME DESCRIPTION SYMBOL NS-09 ONE FUSE NS-10 TWO FUSES NS-11 THREE FUSES NS-12 ONE VOLTMETER V NS-13 TWO VOLTMETERS V NS-14 THREE VOLTMETERS V NOTE: SYMBOLS ONLY SHOWN FOR CLARIFICATION ID. NO. ISSUE 8 SHEET 17 of 40 DOC.NO. BN-DS-E2 SYMBOL FOR CONTROL AND WIRING DIAGRAMS COMPANY DOCUMENT NS 503 CAD NAME DESCRIPTION SYMBOL 07-02-02 MAKE CONTACT / SWITCH 07-13-02 CONTACTOR (CONTACT OPEN IN THE DEENERGIZED POSITION) 07-13-05 CIRCUIT BREAKER 07-13-06 DISCONNECTOR (ISOLATOR) OFF LOAD 07-13-08 SWITCH-DISCONNECTOR ON LOAD 07-21-08 FUSE-DISCONNECTOR 07-21-09 FUSE SWITCH-DISCONNECTOR (ON-LOAD ISOLATING FUSE-SWITCH) 07-02-03 BREAK CONTACT 07-02-05 TWO-WAY CONTACT WITH CENTRE-OFF POSITION 07-02-04 CHANGE-OVER CONTACT ID. NO. ISSUE 8 SHEET 18 of 40 DOC.NO. BN-DS-E2 SYMBOL FOR CONTROL AND WIRING DIAGRAMS COMPANY DOCUMENT NS 503 CAD NAME DESCRIPTION SYMBOL 02-12-05 DELAYED ACTION IN DIRECTION OF MOVEMENT FROM THE ARC TOWARDS ITS CENTRE (DELAYED CLOSING) 02-12-06 DELAYED ACTION IN DIRECTION OF MOVEMENT FROM THE ARC TOWARDS ITS CENTRE (DELAYED OPENING) 02-12-17 MECHANICAL COUPLING, DISENGAGED 02-12-18 MECHANICAL COUPLING, ENGAGED 02-12-20B OPERATED BY BRAKE 02-13-01 MANUALLY OPERATED CONTROL, GENERAL CASE 02-13-08 EMERGENCY SWITCH (MUSHROOM-TYPE) 02-13-09 OPERATED BY HANDWHEEL 02-13-11 OPERATED BY LEVER 02-13-12 OPERATED BY REMOVABLE HANDLE 02-13-13 OPERATED BY KEY 02-13-14 OPERATED BY CRANK NOTE: ONLY ACTION IS DESCRIPTED AND A SWITCH IS SHOWN FOR CLARIFICATION. SYMBOL CAN ALSO BE USED FOR CIRCUIT BREACKERS, ISOLATORS A.S.O. ID. NO. ISSUE 8 SHEET 19 of 40 DOC.NO. BN-DS-E2 SYMBOL FOR CONTROL AND WIRING DIAGRAMS COMPANY DOCUMENT NS 503 CAD NAME DESCRIPTION SYMBOL 02-13-15 OPERATED BY ROLLER 02-13-16 OPERATED BY CAM 02-13-20 OPERATED BY SPRING W 02-13-21 OPERATED BY PNEUMATIC OR HYDRAULIC CONTROL, SINGLE ACTING 02-13-22 OPERATED BY PNEUMATIC OR HYDRAULIC CONTROL, DOUBLE ACTING 02-13-23 OPERATED BY ELECTROMAGNETIC ACTUATOR 02-13-26 OPERATED BY ELECTRICAL MOTOR M 02-13-27 OPERATED BY ELECTRICAL CLOCK 02-14-01 CONTROL BY FLUID LEVEL 02-14-03 CONTROL BY FLOW NEN-J-92 OPERATED BY PEDAL NOTE: ONLY ACTION IS DESCRIPTED AND A SWITCH IS SHOWN FOR CLARIFICATION. SYMBOL CAN ALSO BE USED FOR CIRCUIT BREACKERS, ISOLATORS A.S.O. ID. NO. ISSUE 8 SHEET 20 of 40 DOC.NO. BN-DS-E2 SYMBOL FOR CONTROL AND WIRING DIAGRAMS COMPANY DOCUMENT NS 503 CAD NAME DESCRIPTION SYMBOL NEN-J-98 OPERATED BY CENTRIFUGAL FORCE NEN-J-102 OPERATED BY BIMETAL NS-01 LOCKING DEVICE, HAND RESET 07-09-01B TEMPERATURE SENSITIVE SWITCH NEN-J-61 MAGNETIC OVERCURRENT PROTECTION NEN-J-62 THERMAL OVERCURRENT PROTECTION NEN-J-61-62 THERMAL AND MAGNETIC OVERCURRENT PROTECTION NEN-J-74 GROUNDFAULT PROTECTION NEN-J-76 UNDER VOLTAGE PROTECTION 02-12-07 AUTOMATIC RETURN (THE TRIANGLE IS POINTED IN THE RETURN DIRECTION) 02-12-11 MECHANICAL INTERLOCK BETWEEN TWO DEVICES 02-12-12 LATCHING DEVICE NOTE: ONLY ACTION IS DESCRIPTED AND A SWITCH IS SHOWN FOR CLARIFICATION. SYMBOL CAN ALSO BE USED FOR CIRCUIT BREACKERS, ISOLATORS A.S.O. ID. NO. ISSUE 8 SHEET 21 of 40 DOC.NO. BN-DS-E2 SYMBOL FOR CONTROL AND WIRING DIAGRAMS COMPANY DOCUMENT NS 503 CAD NAME DESCRIPTION SYMBOL NS-20 ROTARY SWITCH CONTACT POSITION LEFT NS-21 ROTARY SWITCH CONTACT POSITION LEFT AND CENTER NS-22 ROTARY SWITCH CONTACT POSITION LEFT AND RIGHT NS-23 ROTARY SWITCH CONTACT POSITION CENTER AND RIGHT NS-24 ROTARY SWITCH CONTACT POSITION CENTER NS-25 ROTARY SWITCH CONTACT POSITION RIGHT NS-26 ROTARY SWITCH CONTACT POSITION LEFT AND RIGHT NS-27 ROTARY SWITCH CONTACT NS-28 ROTARY SWITCH RIGHT SLIDING CONTACT NS-29 ROTARY SWITCH LEFT SLIDING CONTACT OFF AUTO START ROTARY SWITCH SPRING RETURN FROM START PADLOCKABLE IN OFF POSITION ID. NO. ISSUE 8 SHEET 22 of 40 DOC.NO. BN-DS-E2 SYMBOL FOR CONTROL AND WIRING DIAGRAMS COMPANY DOCUMENT NS 503 CAD NAME DESCRIPTION SYMBOL NS-30 PADLOCKABLE IN LEFT POSITION NS-31 PADLOCKABLE IN CENTER POSITION NS-32 PADLOCKABLE IN RIGHT POSITION NS-34 ROTARY SWITCH NS-35 ROTARY SWITCH LEFT SPRING RETURN NS-36 ROTARY SWITCH RIGHT SPRING RETURN NS-37 ROTARY SWITCH LEFT & RIGHT SPRING RETURN NS-43 SELECTOR SWITCH ID. NO. ISSUE 8 SHEET 23 of 40 DOC.NO. BN-DS-E2 SYMBOL FOR CONTROL AND WIRING DIAGRAMS COMPANY DOCUMENT NS 503 CAD NAME DESCRIPTION SYMBOL 07-16-01A 07-16-01B MEASURING RELAY OR RELATED DEVICE 07-16-01C 02-08-05 INDEPENDENT TIME-LAG 07-16-11 INVERSE TIME-LAG CHARACTERISTIC (IDMT) 07-16-03 RESIDUAL VOLTAGE UrsdU 07-17-07 UNDERVOLTAGE U < 07-16-04 REVERSE CURRENT I 07-16-05 DIFFERENTIAL CURRENT Id 07-16-06 PERCENTAGE DIFFERENTIAL CURRENT IdId/I 07-16-07 EARTH FAULT CURRENT I 07-16-08 CURRENT IN THE NEUTRAL CONDUCTOR IIN ID. NO. ISSUE 8 SHEET 24 of 40 DOC.NO. BN-DS-E2 SYMBOL FOR CONTROL AND WIRING DIAGRAMS COMPANY DOCUMENT NS 503 CAD NAME DESCRIPTION SYMBOL 07-17-04B INSTANTANEOUS OVERCURRENT I << 07-17-04 OVERCURRENT I < 07-17-03 UNDERPOWER P< NEN-K-13 REVERSE POWER P NEN-K-21 MINIMUM IMPEDANCE Z< 07-17-13 LOCKED ROTOR n 0~~ NEN-K-17 TIME t 07-09-01 TEMPERATURE 07-15-01 OPERATING DEVICE, GENERAL SYMBOL (RELAY COIL) 07-15-04 OPERATING DEVICE / RELAY COIL WITH TWO SEPARATE WINDINGS 07-15-07 RELAY COIL OF A TIME DELAYED RELAY ON DEENERGIZING 07-15-08 RELAY COIL OF A TIME DELAYED RELAY ON ENERGIZING NEN-K-38 FLAG-RELAY ID. NO.

ISSUE 8 SHEET 25 of 40 DOC.NO. BN-DS-E2 SYMBOL FOR CONTROL AND WIRING DIAGRAMS COMPANY DOCUMENT NS 503 CAD NAME DESCRIPTION SYMBOL 06-09-02 TRANSFORMER WITH TWO WINDINGS 06-09-02B ISOLATION TRANSFORMER 06-10-06 VARIABLE VOLTAGE TRANSFORMER 06-09-07 AUTO-TRANSFORMER 04-03-01 INDUCTOR/COIL/CHOKE/WINDING 06-09-11 CURRENT TRANSFORMER / PULSE TRANSFORMER 06-13-05 CURRENT TRANSFORMER WITH TWO SECONDARY WINDINGS ON ONE CORE NS-40 SHORT CIRCUIT DEVICE 04-03-03 INDUCTOR WITH MAGNETIC CORE 06-03-02 SERIES WINDING ID. NO. ISSUE 8 SHEET 26 of 40 DOC.NO. BN-DS-E2 SYMBOL FOR CONTROL AND WIRING DIAGRAMS COMPANY DOCUMENT NS 503 CAD NAME DESCRIPTION SYMBOL 08-04-03 KILO WATT-HOUR METER kWh 08-04-15 KILO VAR-HOUR METER kvarh 08-03-01 RECORDING WATTMETER W 08-02-01 VOLTMETER V 08-02-02 AMPMETER A 08-02-04 VARMETER var 08-02-05 POWER-FACTOR METER 08-02-07 FREQUENCY METER Hz NEN-N-6A VOLTMETER WITH 6 POSITIONS SWITCH V 6 08-02-08 SYNCRONOSCOPE 08-02-14 THERMOMETER (PYROMETER) 08-08-01 CLOCK 08-05-02 PULSE METER, COUNTING DEVICE ID. NO. ISSUE 8 SHEET 27 of 40 DOC.NO.
BN-DS-E2 SYMBOL FOR CONTROL AND WIRING DIAGRAMS COMPANY DOCUMENT NS 503 CAD NAME DESCRIPTION SYMBOL NEN-D-12 TERMINAL 03-03-06 PLUG AND SOCKET (MALE AND FEMALE) 03-03-17 CONNECTING LINK, CLOSED 03-03-19 CONNECTING LINK, OPEN 02-02-03 DIRECT CURRENT 02-02-04 ALTERVATING CURRENT ID.

NO. ISSUE 8 SHEET 28 of 40 DOC.NO. BN-DS-E2 SYMBOL FOR CONTROL AND WIRING DIAGRAMS COMPANY DOCUMENT NS 503 CAD NAME DESCRIPTION SYMBOL 04-01-01 RESISTOR, GENERAL SYMBOL 04-02-01 CAPACITOR 02-03-01 RESISTOR, VARIABLE, LINEAIR 02-03-04 RESISTOR, VARIABLE, NON-LINEAIR 02-03-05 RESISTOR PRE-SET ADJUSTMENT 04-01-12 HEATING ELEMENT 05-03-01 SEMICONDUCTOR DIODE, GENERAL SYMBOL 05-03-02 LIGHT EMITTING DIODE, GENERAL SYMBOL 05-04-04 TRIODE THYRISTOR TYPE UNSPECIFIED 07-21-01 FUSE HRC 07-21-02 FUSE SCREW TYPE DIAZED 08-10-01 (INCANDESCENT) SIGNAL LAMP 05-14-09 PHOTO CELL 05-14-04 VOLTAGE INDICATOR CAPACITIVE ID.

NO.

ISSUE 8 SHEET 29 of 40 DOC.NO. BN-DS-E2 SYMBOL FOR COMMUNICATION SYSTEMS COMPANY DOCUMENT NS 506 CAD NAME DESCRIPTION SYMBOL 08-10-05 HORN 08-10-06 BELL 08-10-09 SIREN 09-05-01 TELEPHONE SET, 09-09-07 LOUDSPEAKER, 09-05-19 TELEPHONE SET WITH LOUDSPEAKER 10-04-01 ANTENNA, GENERAL SYMBOL 10-15-01 AMPLIFIER 11-10-01 LINE POWER UNIT (AC-TYPE) SHOWN ID. NO.

ISSUE 8 SHEET 30 of 40 DOC.NO. BN-DS-E2 SYMBOL FOR LAY-OUTS COMPANY DOCUMENT NS 510- 511-520-521-531-550 CAD NAME DESCRIPTION SYMBOL NEN-C-5-04 CABLE FLAG FOR MAXIMUM OF 4 CHARACTERS NEN-C-5-05 CABLE FLAG FOR MAXIMUM OF 5 CHARACTERS NEN-C-5-06 CABLE FLAG FOR MAXIMUM OF 6 CHARACTERS NEN-C-5-07 CABLE FLAG FOR MAXIMUM OF 7 CHARACTERS NEN-C-5-08 CABLE FLAG FOR MAXIMUM OF 8 CHARACTERS NEN-C-5-09 CABLE FLAG FOR MAXIMUM OF 9 CHARACTERS NEN-C-5-10 CABLE FLAG FOR MAXIMUM OF 10 CHARACTERS NEN-C-5-11 CABLE FLAG FOR MAXIMUM OF 11 CHARACTERS NEN-C-5-12 CABLE FLAG FOR MAXIMUM OF 12 CHARACTERS NEN-C-5-1 FLAG INDICATION NEN-C-5-2 FLAG INDICATION 03-04-03 BUNDLE INDICATION ID. NO. ISSUE 8 SHEET 31 of 40 DOC.NO. BN-DS-E2 SYMBOL FOR LAY-OUTS COMPANY DOCUMENT NS 510- 511-520-521-531-550 CAD NAME DESCRIPTION SYMBOL NS-05 PACKAGE UNIT PU NS-06 WELDING UNIT W NS-15 MOTOR OPERATED VALVE (MOV) M NS-16 ELECTRICAL DISTRIBUTION PANEL NS-17 INSTRUMENT PANEL OR BOX NS-18 JUNCTION BOX JB 03-04-04 STRAIGHT THROUGH JUNCTION BOX 03-04-06 JUNCTION BOX FOR 3 OR 4 CABLES 03-04-06 REMOTE CONTROL STATION NS-57 SAFETY SWITCH NS-58 PRIMARY SAFETY SWITCH NS-58 EMERGENCY PUSH BUTTON 06-04-01B MOTOR M ID. NO. ISSUE 8 SHEET 32 of 40 DOC.NO. BN-DS-E2 SYMBOL FOR LAY-OUTS COMPANY DOCUMENT NS 510- 511-520-521-531-550 CAD NAME DESCRIPTION SYMBOL 11-12-01 CABLE OR CONDUIT GOING UPWARDS 11-12-02 CABLE OR CONDUIT GOING DOWNWARDS NEN-C-46 CABLE OR CONDUIT COMING FROM DOWNWARDS NEN-C-47 CABLE OR CONDUIT COMING FROM UPWARDS NEN-C-50 CABLE OR CONDUIT PASSING THROUGH VERTICALLY UPWARDS NEN-C-51 CABLE OR CONDUIT PASSING THROUGH VERTICALLY DOWNWARDS NS-59 ARROW FOR STAIR INDICATION 03-02-01 CONNECTION OF CONDUCTORS NS-44 ARROW HEAD ID. NO. ISSUE 8 SHEET 33 of 40 DOC.NO. BN-DS-E2 SYMBOL FOR LAY-OUTS COMPANY DOCUMENT NS 510- 511-520-521-531-550 CAD NAME DESCRIPTION SYMBOL NEN-J-170 SWITCH, SINGLE POLE 11-14-04 SWITCH, TWO POLE 11-14-05 MULTI-POSITION SWITCH, SINGLE POLE (TWO CIRCUIT SWITCH) 11-14-07 TWO-WAY SWITCH, SINGLE POLE 11-14-08 INTERMEDIATE SWITCH 11-14-09 DIMMER SWITCH, SINGLE POLE 11-14-09 PULL-CORD SWITCH, SINGLE POLE 11-13-01 SOCKET OUTLET (POWER) 11-13-04 SOCKET OUTLET (POWER) WITH PROTECTIVE CONTACT NS-49 SOCKET OUTLET CONNECTED TO A SAFETY TRANSFORMER ID. NO. ISSUE 8 SHEET 34 of 40 DOC.NO. BN-DS-E2 SYMBOL FOR LAY-OUTS COMPANY DOCUMENT NS 510- 511-520-521-531-550 CAD NAME DESCRIPTION SYMBOL NEN-M-24H FLUORESCENT LIGHTING FIXTURE, 2X20W NEN-M-24I FLUORESCENT LIGHTING FIXTURE, 2X40W NEN-M-24J FLUORESCENT LIGHTING FIXTURE, 2X65W NEN-M-24K FLUORESCENT LIGHTING FIXTURE, 2X20W (MOUNTED UNDER PLATFORM) NEN-M-24L FLUORESCENT LIGHTING FIXTURE, 2X40W (MOUNTED UNDER PLATFORM) NEN-M-24M FLUORESCENT LIGHTING FIXTURE, 2X65W (MOUNTED UNDER PLATFORM) NS-79 FLUORESCENT LIGHTING FIXTURE, WITH EMERGENCY SUPPLY 05-14-09 PHOTO CELL NOTE: SYMBOLS TO BE SHOWN ON LAYOUTS PROVIDED WITH A CODE FOR IDENTIFICATION EXAMPLE LIGHTING FIXTURE CODING: A - 3 - L2 CONNECTED TO PHASE L2 CONNECTED TO CIRCUIT No. 3 FIXTURE MOUNTING IDENTIFICATION ID. NO. ISSUE 8 SHEET 35 of 40 DOC.NO. BN-DS-E2 SYMBOL FOR LAY-OUTS COMPANY DOCUMENT NS 510- 511-520-521-531-550 CAD NAME DESCRIPTION SYMBOL 11-15-01 INCANDESCENT OR MERCURY VAPOR LIGHTING FIXTURE, CEILING MOUNTED 11-15-09 FLOODLIGHT NS-48 STREET/FENCE LIGHTING FIXTURE, POLE MOUNTED NS-50 ELECTRICAL DISTRIBUTION PANEL NS-51 EMERGENCY HANDLAMP WITH OWN SOURCE NS-52 EMERGENCY EXIT (RIGHT) EXIT NS-53 EMERGENCY EXIT (LEFT) EXIT NS-54 EMERGENCY EXIT (ABOVE DOOR) EXIT NS-55 ILLUMINATED LEVELGAUGE ID. NO. ISSUE 8 SHEET 36 of 40 DOC.NO. BN-DS-E2 SYMBOL FOR LAY-OUTS COMPANY DOCUMENT NS 510- 511-520-521-531-550 CAD NAME DESCRIPTION SYMBOL 02-15-01 EARTH/GROUND 02-15-02 CLEAN EARTH/GROUND 02-15-03 EARTH ELECTRODE IN PIT NEN-D-3 EARTH ELECTRODE NEN-D-2-3 CLEAN EARTH ELECTRODE NEN-D-4 PILE EARTHING 02-15-04 FRAME/CHASSIS 02-15-05 EQUIPOTENTIAL 07-22-03 LIGHTING ARRESTOR NS-45 LIGHTING ROD NS-46 DIVIDING POINT NS-47 CRIMPIT CONNECTION NS-69 SPARK GAP 04-03-01 CHOKE ID. NO. ISSUE 8 SHEET 37 of 40 DOC.NO. BN-DS-E2 SYMBOL FOR LAY-OUTS COMPANY DOCUMENT NS 510- 511-520-521-531-550 CAD NAME DESCRIPTION SYMBOL NS-16 DISTRIBUTION BOX NS-60 RECTIFIER, HAND CONTROLLED H NS-61 RECTIFIER, AUTO CONTROLLED A 02-15-01 EARTHING NS-62 CADWELD CONNECTION AT PIPELINE NS-63 REFERENCE ELECTRODE IN PIT E NS-64 REFERENCE ELECTRODE E NS-65 MEASURING STATION ON POLE NS-66 MEASURING STATION IN PIT NS-67 ANODE FOR IMPRESSED CURRENT (CHEMICAL SYMBOL INDICATES THE MATERIAL A Mg NS-68 SACRIFICIAL ANODE (CHEMICAL SYMBOL INDICATES THE MATERIAL A Mg ID. NO. ISSUE 8 SHEET 38 of 40 DOC.NO. BN-DS-E2 SYMBOL FOR LAY-OUTS COMPANY DOCUMENT NS 510- 511-520-521-531-550 CAD NAME DESCRIPTION SYMBOL NS-69 SPARK GAP NS-70 ISOLATION (GENERAL) NS-71 ISOLATION FLANGE NS-72 ISOLATION COUPLING NS-73 SCREENING PLATE NS-74 SCREENING CONDUIT NS-75 VALVE WITH ISOLATION FLANGE ID. NO. ISSUE 8 SHEET 39 of 40 DOC.NO.

BN-DS-E2 LOGIC SYMBOL CAD NAME DESCRIPTION SYMBOL 12-27-01 OR GATE >1 12-27-02 AND GATE & 12-28-02 NOR GATE >1 12-28-01 NAND GATE & 12-27-11 NEGATOR 1 12-31-01 SCHMITT TRIGGER 12-44-02 MONOSTABLE ELEMENT, SINGLE SHOT 1t 12-40-01 DELAY ELEMENT WITH SPECIFIED DELAY TIMES 12-40-02 DELAY ELEMENT 12-40-02B VARIABLE DELAY ELEMENT ID. NO. ISSUE 8 SHEET 40 of 40 DOC.NO. BN-DS-E2 LOGIC SYMBOL CAD NAME DESCRIPTION SYMBOL 10-15-02 AMPLIFIER/REPEATER 12-07-01 NEGATION INDICATOR (INPUT) 12-07-02 NEGATION INDICATOR (OUTPUT) 12-07-03 POLARITY INDICATOR (INPUT) 12-07-04 POLARITY INDICATOR (OUTPUT) 12-10-01A INPUT WHICH DOES NOT CARRY LOGIC INFORMATION 12-10-01B OUTPUT WHICH DOES NOT CARRY LOGIC INFORMATION NS-76 CONVERSION FROM DEVICE TO LOGIC LEVEL NS-77 INTERMEDIATE RELAY R Pictogram used to represent various electrical and electronic devices or functions Common circuit diagram symbols (US ANSI symbols) An electronic symbol is a pictogram used to represent various electrical and electronic devices or functions, such as wires, batteries, resistors, and transistors, in a schematic diagram of an electrical or electronic circuit.

These symbols are largely standardized internationally today, but may vary from country to country, or engineering discipline, based on traditional conventions. Standards for symbols The graphic symbols used for electrical components in circuit diagrams are covered by national and international standards, in particular: IEC 60617 (also known as BS 3939). There is also IEC 61131-3 – for ladder-logic symbols. JIC JIC (Joint Industrial Council) symbols as approved and adopted by the NMTBA (National Machine Tool Builders Association). They have been extracted from the Appendix of the NMTBA Specification EGPl-1967.

ANSI Y32.2-1975 (also known as IEEE Std 315-1975[1] or CSA Z99-1975). IEEE Std 91/91a: graphic symbols for logic functions (used in digital electronics). It is referenced in ANSI Y32.2/IEEE Std 315. Australian Standard AS 1102 (based on a slightly modified version of IEC 60617; withdrawn without replacement with a recommendation to use IEC 60617). The number of standards leads to confusion and errors.[2] Symbols usage is sometimes unique to engineering disciplines, and national or local variations to international standards exist. For example, lighting and power symbols used as part of architectural drawings may be different from symbols for devices used in electronics. Common electronic symbols Symbols shown are typical examples, not a complete list.[3][4] Traces Wire crossover symbols for circuit diagrams. The CAD symbol for insulated crossing wires is the same as the older, non-CAD symbol for non-insulated crossing wires. To avoid confusion, the wire "jump" (semi-circle) symbol for insulated wires in non-CAD schematics is recommended (as opposed to using the CAD-style symbol for no connection), so as to avoid confusion with the original, older style symbol, which means the exact opposite. The newer, recommended style for 4-way wire connections in both CAD and non-CAD schematics is to stagger the joining wires into T-junctions. The large dot signifies an electrical connection. Trace connection(IEC-style) Trace junction(IEC-style) Trace crossing (unconnected) Trace crossing(hand drawn schematics) Grounds The shorthand for ground is GND. Optionally, the triangle in the middle symbol may be filled in. General ground(IEC-style) Signal/low-noise ground (the asterisk is not part of the symbol) Chassis ground(IEC-style) Sources Battery, single-cell Battery, multi-cell Solar cell (photovoltaic cell) DC voltage source Controlled DC voltage source Current source Controlled current source AC voltage source Resistors See also: Resistor It is very common for potentiometer and rheostat symbols to be used for many types of variable resistors, including trimmers. ANSI-style: (a) Resistor, (b) Rheostat,(c) Potentiometer / Trimmer IEC-style: (a) Resistor, (b) Rheostat,(c) Potentiometer / Trimmer Photoresistor (ANSI) Thermistor (ANSI).[5]Use -t for NTC symbol.Use +t for PTC symbol. Varistor (ANSI) Capacitors See also: Capacitor General capacitor(IEC-style) Polarized capacitor(American-style) Variable capacitor Ganged (co-moving) variable capacitors(IEC-style) Trimmer variable capacitor Diodes See also: Diode Optionally, the triangle in these symbols may be filled in. Note: The words anode and cathode typically aren't part of the diode symbols.

Diode (rectifier) Schottky diode Zener diode Transient-voltage-suppression diode (TVS) Light-emitting diode (LED) Photodiode Tunnel diode Varicap Shockley diode Silicon-controlled rectifier (SCR) Diac (may be a varistor in older schematics) Constant-current diode Opto-isolator: LED (left), photo transistor (right) Bridge rectifiers See also: Bridge rectifier There are many ways to draw a single-phase bridge rectifier symbol. Some show the internal diode circuit, some don't. Bridge rectifier Bridge rectifier Bridge rectifier Bridge rectifier Bridge rectifier Three-phase bridge rectifier Inductors See also: Inductor Air-core inductor(IEC-style) Magnetic-core inductor(IEEE-style) Tapped inductor(IEC-style) Ferrite bead(IEEE-style) Transformers See also: Transformer Transformer Transformer with center tap on secondary winding (right side) Transformer with two secondary windings (right side) Current transformer Zero-sequence current transformer (ZSCT) (also known as a window-type current transformer) Bushing-type current transformer Voltage transformer Transistors See also: Transistor Optionally, transistor symbols may include a circle.[6] Note: The pin letters B/C/E and G/D/S aren't part of the transistor symbols. Bipolar See also: Bipolar junction transistor NPN bipolar junction transistor (BJT) PNP bipolar junction transistor (BJT) NPN Darlington transistor PNP Darlington transistor Unipolar See also: Field-effect transistor N-channel junction gate field-effect transistor (JFET) P-channel junction gate field-effect transistor (JFET) Metal–oxide–semiconductor field-effect transistor (MOSFET) Enhancement mode, N-channel MOSFET Enhancement mode, P-channel MOSFET Vacuum tubes See also: Vacuum tube Vacuum tube diode Vacuum tube triode Vacuum tube tetrode(pin letters are not part of the symbol) Vacuum tube pentode Switches See also: Switch Pushbutton, normally open, push-to-make (horizontal line on top) Pushbutton, normally open, push-to-make (IEEE-style) Pushbutton, normally closed, push-to-break (IEEE-style) Pushbutton, normally closed, two circuits (IEEE-style) Switch, 1P1T, SPST (single-pole single-throw) Switch, 1P2T, SPDT (single-pole double-throw) Switch, 2P1T, DPST (double-pole single-throw) Switch, 2P2T, DPDT (double-pole double-throw) Slide switch, 1P3T,break-before-make, nonshorting style Slide switch, 1P4T,break-before-make, nonshorting style Slide switch, 1P4T,make-before-break, shorting style Rotary switch, 1P3T,break-before-make, nonshorting style Rotary switch, 1P4T,break-before-make, nonshorting style Rotary switch, 1P4T,make-before-break, shorting style Reed switch, normally open Relays See also: Relay Note: The pin letters aren't part of the symbols. SPST, SPDT, DPST, DPDT relays(American-style) SPDT relay(IEC-style) Lamps LED is located in diode section. Neon lamp Indicating lamp(IEEE-style) Incandescent lamp Incandescent light bulb (as an indicator) Light bulb Current limiters IEC fuse (b), equivalent symbols (a, c) (IEEE Std 315-1975) Molded-case circuit breaker (MCCB) Fuse: IEC (top) and American (lower two) Electro-acoustic devices Loudspeaker(IEEE-style) Buzzer(IEC-style) Microphone(IEEE-style) Microphone(IEC-style) Antennas See also: Antenna (radio) General antenna(IEC-style) Dipole antenna(IEC-style) Loop antenna(IEC-style) Loop antenna(IEEE-style) Cables See also: Electrical cable Cable, Shielded 1 conductor Cable, 2 conductor Cable, Shielded 2 conductor with shield connected to ground Cable, 5 conductor Cable, Shielded 5 conductor Connectors See also: Electrical connector TRS phone jacks ICs See also: Integrated circuit Logic gates See also: Logic gates For the symbols below: A and B are inputs, Q is output.

Note: These letters are not part of the symbols. There are variations of these logic gate symbols. Depending on the IC, the two-input gates below may have: 1) two or more inputs; 2) infrequently some have a second inverted Q output too. Buffer Inverter (NOT) AND NAND OR NOR XOR XNOR The above logic symbols may have additional I/O variations too: 1) schmitt trigger inputs, 2) tri-state outputs, 3) open-collector or open-drain outputs (not shown). Buffer gate with schmitt trigger input Buffer gate with tri-state output control.(B is the tri-state control) Flip-flops See also: Flip-flops For the symbols below: Q is output, Q is inverted output, E is enable input, internal triangle shape is clock input, S is Set, R is Reset (some datasheets use clear (CLR) instead of reset along the bottom). There are variations of these flip-flop symbols. Depending on the IC, a flip-flop may have: 1) one or both outputs (Q only, Q only, both Q & Q); 2) one or both forced inputs along top & bottom (R only, S only, both R & S); 3) some inputs may be inverted.

Simple SR flip-flop (inverted S & R inputs) Gated SR flip-flop Gated D flip-flop (Transparent Latch) Clocked D flip-flop(Set & Reset inputs) Clocked JK flip-flop Clocked T flip-flop OpAmps Note: The outside text isn't part of these symbols.

Operational amplifier (opamp) Comparator Oscillators See also: Electronic oscillator Crystal oscillator(IEEE-style) Ceramic resonator(3 pins) Miscellaneous devices Hall-effect sensor Gas-discharge tubes (GDT) for ESD discharge Spark gapfor ESD discharge Historical electronic symbols The shape of some electronic symbols have changed over time. The following historical electronic symbols can be found in old electronic books / magazines / schematics, and now considered obsolete. Capacitors (historical) All of the following are obsolete capacitor symbols. Obsolete capacitor(very old style) Obsolete capacitor Obsolete capacitor Obsolete capacitor Obsolete capacitor See also Electronics portal Circuit diagram Reference designator Symbols for appliance classes References

^ "IEEE Standard American National Standard Canadian Standard Graphic Symbols for Electrical and Electronics Diagrams (Including Reference Designation Letters)," in IEEE Std 315-1975 (Reaffirmed 1993), vol., no., pp.i-244, 1993, doi:10.1109/IEEESTD.1993.93397.
^ Guidelines for Drawing Schematics. ^ Circuit Symbols for all Electronic Components. Talking Electronics, 2013. Retrieved 01 Apr 2015. ^ Electrical Symbols & Electronic Symbols. RapidTables, 2012. Retrieved 17 April 2016. ^ "Standards for Resistor Symbols". EePower.
EETech Media. Retrieved September 13, 2021. ^ "A4.11 Envelope or Enclosure". ANSI Y32.2-1975 (PDF). The envelope or enclosure symbol may be omitted from a symbol referencing this paragraph, where confusion would not result Further reading Beginner's Guide to Reading Schematics; 4th Ed; Stan Gibilisco; McGraw-Hill, 224 pages; 2018; ISBN 978-1260031119. How to Read Electronic Circuit Diagrams; 2nd Ed; Brown, Lawrence, Whitson; Tab Books; 214 pages; 1988; ISBN 978-0830628803. How to Read Schematic Diagrams; 4th Ed; Donald Herrington; Sams Publishing; 160 pages; 1986; ISBN 978-0672224577. (2nd Ed in 1967) Engineer's Mini-Notebook : Schematic Symbols, Device Packages, Design and Testing; 1st Ed; Forrest M. Mims III; Radio Shack; 48 pages; 1988. External links Wikimedia Commons has media related to Electrical symbols. IEEE Standard American National Standard Canadian Standard Graphic Symbols for Electrical and Electronics Diagrams (Including Reference Designation Letters) IEC 60617 : Graphical Symbols for Diagrams (2012) - International standard MIL-STD-806B : Graphical Symbols for Logic Diagrams (1962) - U.S. DoD standard Retrieved from "