

Appendix C Symbols

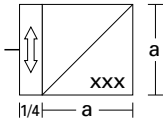
General information

The overall symbol consists of a square of side length “a” into which the individual symbols are entered. The transmission electronics are represented by a rectangle with dimensions a x a/4, which depending on the function of the device, is attached to one or two sides. The “bus arrow” is inserted into the a x a/4 rectangle representing the transmission electronics. Individual symbols are inserted into the square, side length a, to represent the function. These symbols are identical to those of the DIN 40 900 standard.

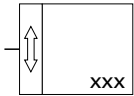
The direction of information flow can, if desired, be represented by arrows on the bus line.

The following symbols should be used for bus devices that cannot be represented by the specified symbols:

Sensor







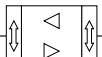


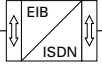
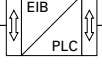








Actuator



xxx = alphanumeric term

Basic components and system components

Product name	Abbrev.	Symbol
Bus coupling unit	BCU	
Choke	CH	
Power supply	PSU	
Power supply with integrated choke Power supply unit	PSUTCH	
Line coupler	LC	
Area coupler	AC	
Repeater	RE	
Data interface RS 232 interface	RS232 (V 24)	
External interface Gateway	GAT	
E.g. to ISDN		
PLC interface		
Field bus interface		

Product name	Abbrev.	Symbol
DCF77 interface		
Application controller Application control Control element Scene element Logic element Linking element Time profile control		
Connector		
Band stop		
Phase coupler / repeater		

Sensors

n = number of inputs [1, 2, 3,...]

Product name	Abbrev.	Symbol
Sensor, general a) Field to identify the application software b) Field for physical input quantities to identify the input channels		
Sensor, general – With auxiliary supply		
Binary sensor Binary input Binary device Input terminal Pushbutton interface b) Field for physical input quantities to identify the input channels		
e.g. for DC		
e.g. for AC		
e.g. 2 inputs, AC		
Binary / analogue sensor Binary / analogue input Binary / analogue device		

Product name	Abbrev.	Symbol
Analogue sensor Analogue input Analogue device		
Touch sensor Pushbutton		
Dimming sensor Dimming push button		
Control touch sensor Control push button		
Blind sensor Blind push button		
IR transmitter		
IR receiver		
IR receiver with n-way pushbutton		
IR decoder		
IR receiver / decoder		
Brightness sensor		
Brightness detector Brightness value switch Twilight push button		

Product name	Abbrev.	Symbol
Temperature sensor		
Temperature detector Temperature value switch Room thermostat		
Movement sensor PIR = Passive Infrared US = Ultrasound		
Movement detector		
Clock Time sensor		
Timer Time value push button		
Wind speed sensor		
Switch lock		
Automatic cutout monitoring		

Actuators

n = number of outputs [1, 2, 3,...]

Product name	Abbrev.	Symbol
Actuator, general		
Actuator with auxiliary supply		
Actuator, general with time delay		
Switching actuator Switching device Binary output Binary device Output terminal		
Blind actuator Blind switch		
Dimming actuator Switching / dimming actuator		
Display panel Display unit Display terminal Info display, e.g. 8-way		
Analogue actuator Analogue output Analogue device Regulator Control unit		

Product name	Abbrev.	Symbol
Pulsed switch e.g. for electrical heating/heating valve *) Function: Switching output ON/OFF (0-100%); i.e. if 60% is entered as an analogue value, the output is at ON for 60% of the time and at OFF for 40% of the time. (Time units of approx. 64 seconds are used.)		
Valve Proportional valve positioner		
Binary display		

Combination devices

n = number of inputs/outputs [1, 2, 3,...]

Product name	Abbrev.	Symbol
Combination of sensor functions in one device E.g. Temperature sensor and time value switch		
Switching device E.g. binary input and binary output		
Switching device E.g. dimmer and binary input		
Bus coupling unit module with timer and light intensity switch (with brightness sensor)		
Switching actuator with n-way infrared receiver		
Switching actuator with n-way pushbutton		
Dimming actuator with n-way pushbutton		
Blind actuator with n-way pushbutton		

Appendix D *Regulations, standards and requirements*

DIN VDE 1000-10	Safety requirements for persons working in the field of electrical engineering
DIN VDE 0100	Erection of power installations with rated voltages below 1000 V
-200	– Definitions
-410	– Protective measures; protection against electric shock
-420	– Protective measures; protection against thermal effects
-430	– Protective measures; protection of cables and cords against overcurrent
-510	– Selection and erection of equipment; common rules
-520	– Selection and erection of equipment; wiring systems
-610	– Verification; initial verification
-725	– Auxiliary circuit
DIN EN 501 10-1	Operation of power installations
DIN VDE 0105	(operation of electrical installations)
-1	– General requirements
DIN VDE 0106	Protection against electric shock
-1	– Classification of electrical and electronic equipment
-100	– Actuating members positioned close to parts liable to shock
-101	– Basic requirements for protective separation in electrical equipment

DIN VDE 0110 -1	Insulation co-ordination for equipment within low-voltage systems – Fundamental requirements
DIN VDE 0160	Electronic equipment for use in electrical power installations and their assembly into electrical power installations
DIN VDE 0185 -1 V-100 E-102 E-103 V-110	Lightning protection system – General data with regard to installation – Protection of structures against lightning (tentative standard) – General principles; guide; planning, set-up, maintenance, testing – Protection against electromagnetic lightning pulses (LEMP) – Manual for testing lightning protection systems (tentative standard)
DIN VDE 0207	Insulating and sheathing compounds for cables and flexible cords
DIN VDE 0470-1 EN 60529 DIN EN 50102 VDE 0470-100	Degrees of protection provided by enclosures (IP code) Degrees of protection provided by enclosures for electrical equipment against external mechanical loads (IK code)
DIN VDE 0472-508	Dielectric test on cables, wires and flexible cords for power installations.
DIN VDE 0603 -1	Consumer units and meter panels, 400VAC – Consumer units and meter panels

DIN VDE 0604 -1	Ducts mounted on walls and ceilings for electrical installations – General requirements
DIN EN 50086-1 VDE 0605-1	Conduits and fittings for electrical installations
DIN VDE 0606 -1	Connecting material up to 600 V – Installation boxes for accommodation of equipment and/or connecting terminals
DIN EN 60999 DIN VDE 0609-1	Connection material; safety requirements for terminal screw points and screwless terminal points for electrical copper wire
DIN VDE 0641-11	Circuit breakers for overcurrent protection for household and similar applications
DIN EN 60099 DIN VDE 0675 -1 E-6	Guiding principles for overvoltage protective devices – Non-linear resistor-type lightning arresters for alternating voltage networks – Surge arresters for use in a.c. supply systems with rated voltages ranging from 100 V to 1000 V
DIN VDE 0800 -1 -2 -4	Telecommunications – Requirements and tests for the safety of facilities and apparatus – Earthing and equipotential bonding – Erection of telecommunication lines
DIN VDE 0815	Installation cables and lines for telecommunications and information processing systems

DIN EN 50090	Home and Building Electronic Systems (HBES)
-2-1	– System overview; System architecture
-2-2	– System overview; General technical requirements
DIN V VDE 0829	
-100	– Standardization structure; Definitions
-230	– System overview; General technical requirements for installation devices
-240	– Technical report – Guidelines for the specialised laying of cables with twisted pairs, class 1
-521	– Twisted pair class 1; Safety layer
-522	– Bus line with twisted pair class 1
DIN EN 50081 / VDE 0839-81	Electromagnetic compatibility (EMC); Generic emission standard
-1	– Residential, commercial and light industry
-2	– Industrial environment
DIN EN 50082 / VDE 0839-82	Electromagnetic compatibility (EMC); Generic noise immunity standard
-1	– Residential, commercial and light industry
-2	– Industrial environment
DIN VDE 0845	Protection of telecommunications systems against lightning, electrostatic discharges and overvoltages from electric power installations
-1	– Provisions against overvoltages
E-2	– Requirements and tests of overvoltage protection devices and telecommunication apparatus

DIN 18015	Electrical installations in residential buildings
-1	– Fundamentals of planning and design
-2	– Type and scale of minimum equipment
-3	– Layout of cabling and electrical equipment
DIN 19226	Automatic control engineering
-1	– Definitions, fundamentals
supplement 1	– Keyword index
DIN 19246	Measurement, logic and sequence control, closed-loop control; project handling; terminology
DIN 31051	Maintenance; terms and measures
DIN 32541	Operation of machines and comparable technical equipment; terms used for operator activities and functions
DIN V 32734	Digital automation for technical installations in buildings; General requirements for design, planning and execution (digital building services automation)
DIN 40719	Connection diagrams
-2	– Identification of electrical equipment
DIN 40900	Graphical symbols for wiring documents (symbols for contact units and switching devices)
DIN 43871	Small distribution boards for built-in devices up to 63A

DIN 43880	Built-in devices for electrical installation; Enclosure and mounting dimensions
DIN 49073	Apparatus sockets made of metal or insulating materials for the connection of installation equipment of up to 16A, 250V
-1	– Main dimensions
DIN EN 50022	Industrial low-voltage switchgear; Mounting rails, DIN rails, 35 mm width for snap-on mounting of devices
DIN EN 61082	Documents in electrical engineering
-1	– General rules
FTZ 731 TR1	Distributing pipes and other concealed conduits for telecommunication lines in buildings; Technical description
VBG 4	Rules for prevention of accidents, "Electrical Installations and Equipment"

Please note:**Draft standard (e.g. DIN E VDE)**

Recommendation for a standard. It is generally used as a basis to raise objections to, to vote on or to approve a standard.

Because the intended standard may differ from the existing draft, such drafts are used at one's own responsibility and must be specially arranged.

Tentative draft (e.g. DIN V VDE)

A tentative draft is the result of a standards session, which because of certain reservations concerning the content or DIN having taken up a position opposed to it, has not been issued as a standard. Tentative standards deal with subjects that are in need of being standardised. Linked to this is the expectation that tentative standards will at some point be converted into accepted standards after the necessary changes according to the usual procedures, or alternatively withdrawn.

International standard (e.g. DIN EN)

Standard that has been accepted by an international standardisation committee and is available to the public.



Appendix E Selection of relevant literature on the subject of electrical installations

Title	ISBN	Publishing house
<i>EIB</i> manual Project Engineering for <i>EIB</i> Installations, Basic principles		WFE, Frankfurt, Germany
<i>EIB</i> manual Project Engineering for <i>EIB</i> Installations, Applications		WFE, Frankfurt, Germany
Mathematical and Electrotechnical Fundamentals*	3-8023-1571-5	Vogel
Electrical Installation Technology*	3-8023-1525-1	Vogel
Household Appliances, Lighting and Air Conditioning Technology*	3-8023-1580-4	Vogel
Electrical Measurement and Closed-Loop Control*	3-8023-1463-8	Vogel
Digital Technology*	3-8023-1440-9	Vogel

Title	ISBN	Publishing house
Microprocessor Technology*	3-8023-1453-0	Vogel
Electrical Control and Drive Technology*	3-8023-1556-1	Vogel
Taking Measurements, Protective Measures DIN VDE 0100*	3-7905-0702-4	Pflaum
Electrical Installation in Practice*	3-7905-0519-6	Pflaum
<i>EIB</i> Building Systems Engineering*	3-7905-0712-1	Pflaum
Modern Electrical Installations*	3-7785-2410-0	Hüthig
Compliant Electrical Installations in Residential, Commercial and Industrial Buildings*	3-7785-2410-0	Hüthig
Building Systems Engineering in Residential and Functional Buildings with <i>EIB</i> *	3-7785-2391-0	Hüthig
Electrical Installations in Residential Buildings, VDE Regulations*	3-8007-2108-2	VDE

Title	ISBN	Publishing house
Safety Tests in Electrical Installations with Voltages below 1000 V*	3-8007-2027-2	VDE
Security in Telecommunications and Information Engineering*	3-8007-1716-6	VDE
The Electricians Selection* (with subscription)		VDE
The Electricians Trade, DIN Standards*	3-410-13548-0	Beuth
The ABC of Electrical Installations*	3-87200-309-7	Energie
The Low Energy Manual*	3-87200-685-1	Energie
The ABC of Electric Hot Water Supplies*	3-87200-684-3	Energie
Electrical Installation Handbook	3-8009-4138-4	Siemens

*) Currently only available in German and only valid in countries regulated by VDE. Similar English documentation is planned for English-speaking countries.

Appendix F *EIBA members and licensees*

as at March 1998

Members

ABB Elettrocondutture SpA, Milan/Italy
 ABB STOTZ-KONTAKT GmbH, Heidelberg/Germany
 Albert Ackermann GmbH & Co., KG,
 Gummersbach/Germany
 A. Ahlström Corporation, Strömfors/Finland
 Altenburger Electronic GmbH, Seelbach/Germany
 AMP Deutschland GmbH, Langen/Germany
 ASTRO Strobel GmbH & Co., Bergisch Gladbach/Germany

Gebr. Berker GmbH & Co., Schalksmühle/Germany
 OBO Bettermann OHG, Menden/Germany
 Bosch-Siemens Hausgeräte GmbH, Munich/Germany
 Buderus Heiztechnik GmbH, Lollar/Germany
 Busch-Jaeger Elektro GmbH, Lüdenscheid/Germany
 BTicino spa, Milan/Italy

Caradon Electrical Holdings Ltd. (ex Pillar), Leicester/
 United Kingdom
 CERBERUS-GUINARD S.A., BUC CEDEX/France
 CMC Carl Maier + Cie AG, Schaffhausen/Switzerland
 Crabtree Electrical Industries Ltd., Walsall/United Kingdom

DEHN + SÖHNE GMBH + CO. KG, Neumarkt/Germany
 DIEHL GmbH & Co. Controls Division, Nuremberg/Germany
 DIEM Electronics S.A., Geneva/Switzerland

Eberle Controls GmbH, Nuremberg/Germany
 Electrium (ex Hanson Plc), Willenhall/United Kingdom
 Eltako GmbH, Fellbach/Germany

ELVOX Costruzioni Elettriche Spa, Padova/Italy

Feller AG, Horgen/Switzerland
 FELTEN & GUILLEAUME AG, Cologne/Germany
 Framatome Connectors Deutschland GmbH,
 Erkrath/Germany

GEYER AG, Nuremberg/Germany
 GEWISS SPA, Bergamo/Italy
 GIRA Giersiepen GmbH & Co. KG, Radevormwald/Germany
 Grässlin GmbH & Co. KG, St. Georgen/Germany
 GRUNDIG E.M.V., Fürth/Germany

Hager GmbH / Hager Electro SA., Ensheim/Germany –
 Obernai/France
 Theodor HEIMEIER Metallwerk KG, Erwitte/Germany
 Paul Hochköpper GmbH & Co. KG, Lüdenscheid/Germany

INSTA ELEKTRO GmbH & Co. KG, Lüdenscheid/Germany

Albrecht Jung GmbH & Co. KG, Schalksmühle/Germany

Hermann Kleinhuis GmbH & Co. KG, Lüdenscheid/Germany
 Heinrich Kopp AG, Kahl am Main/Germany

LEGRAND SA, Limoges/France
 Levy Fils AG, Basle/Switzerland
 Lindner GmbH, Bamberg/Germany
 LK A.S., Ballerup/Denmark

MENNEKES Elektrotechnik GMBH & CO. KG,
 Lennestadt/Germany
 Gebr. Merten GmbH & Co. KG, Wiehl-Bomig/Germany

N.V. NIKO, Sint Niklaas/Belgium
 NIESSEN S.A., San Sebastian/Spain

Philips Licht GmbH, Cologne/Germany
 Phoenix GmbH & Co. KG, Blomberg/Germany
 POPP + Co. GmbH, Bad Berneck/Germany
 Power Controls B.V. (Vynckier), Gent/Belgium

Ritto-Werk Loh GmbH & Co. KG, Haiger/Germany
 RITZENTHALER S.A., Baldenheim/France
 Robert Bosch GmbH, Stuttgart/Germany
 Wilhelm Rutenbeck GmbH & Co., Schalksmühle/Germany

Scharnebecker Electronic Fertigung GmbH,
 Scharnebeck/Germany
 SCHUPA-ELEKTRO-GMBH + CO. KG,
 Schalksmühle/Germany
 Siedle & Söhne Telefon- und Telegrafengeräte Stiftung & Co.,
 Furtwangen/Germany
 Siemens AG, Munich/Germany
 Simon s.a., Barcelona/Spain
 Somfy S.A. / Somfy GmbH, Cluses/France –
 Rottenburg/Germany
 Stiebel Eltron GmbH & Co. KG, Holzminden/Germany
 Striebel & John KG Elektroverteilernetze,
 Sasbach-Obersasbach/Germany

TEGUI Electronica S.A., Pamplona/Spain
 TEHALIT GmbH, Heltersberg/Germany
 THEBEN-Werk Zeitautomatik GmbH, Haigerloch/Germany

Joh. Vaillant GmbH u. Co., Remscheid/Germany
 Gebr. Vedder GmbH, Schalksmühle/Germany
 Viessmann Werke GmbH & Co., Allendorf/Germany
 VIMAR S.R.L., Marostica (Vicenza)/Italy

Wago Kontakttechnik GmbH, Minden/Germany
 Wieland Electric GmbH, Bamberg/Germany
 Winkhaus GmbH, Münster/Germany
 Woertz AG, Muttentz/Switzerland

Zumtobel AG, Dornbirn/Austria

Licensees

Amann GmbH, Oberhaching/Germany
APT GmbH, Scharnebeck/Germany
Ardan Production and Industrial Controls Ltd., Holon/Israel
ATICON Home Automation GmbH, Braunschweig/Germany

BERG-Energiekontrollsysteme GmbH, Gröbenzell/Germany
BÜRK ZEITSYSTEME GmbH, VS-Schwenningen/Germany

Elero GmbH, Beuren/Germany
ELJO AB, Bastad/Sweden
ELKA-Elektronik GmbH, Lüdenscheid/Germany

Hüppe Form Sonnenschutzsysteme GmbH,
Oldenburg/Germany

Intertel, Nova Milanese/Italy
IPAS GmbH, Duisburg/Germany

Landis & Gyr Building Control Corp., Zug/Switzerland

Metec GmbH, Hamburg/Germany
Multronic AG, Dietlikon/Switzerland
Hugo Müller GmbH, Schwenningen/Germany

Elektroanlagen Dieter NAGEL, Kandel/Germany
Netcon GmbH Gebäudeautomation, Radolfzell/Germany

F.W. Oventrop KG, Olsberg/Germany

RCS Realtime Control Systems AG, Rotkreuz/Switzerland

Schaeper Automation GmbH, Hannover/Germany

Sika Systemtechnik GmbH, Kaufungen/Germany
Stengler Gesellschaft mbH, Gütersloh/Germany

TechnoTrend GmbH, Erfurt/Germany
Tridonic Bauelemente Gesellschaft mbH, Dornbirn/Austria

Appendix G Requirements for the EIB bus line

1	Regulation	The bus line must meet the conditions of IEC 189-2 or the equivalent national regulation, if not otherwise stipulated in the following list of requirements.
2	Conductor diameter 1)	Minimum: 0.8 mm, maximum: 1.0 mm
3	Conductor material	Copper, single and multi-wired
4	Line layout	
4.1	External covering	Casing is required
4.2	Wires	2 = One twisted pair 4 = Two twisted pairs Type 1: 2 twisted pairs, paired Type 2: 4 twisted wires, spiral quad All wires should have different colours
4.3	Electric shock	Minimum 5/m
4.4	Shielding	Necessary Shielding should cover the entire circumference Tracer: min. diameter 0.4 mm

5	Capacity conductor/conductor	Max. 100 nF/km (800 Hz, 20°C)
6	Crosstalk attenuation	1 kHz: greater than 80 dB 10 kHz: greater than 70 dB 100 kHz: greater than 60 dB
7	Tension	2-wire line: min. 50 N 4-wire line: min. 100 N
8	Insulating resistance	100 MOhm x km (20°C) or 0.011 MOhm x km (70°C)
9	Testing voltage wire/wire	800 V
10	Additional high-voltage test	Test according to DIN VDE 0472-508, test type A or HD 21.1 S2 and HD 21.2 S2 However: – Testing voltage: 2.5 kV 4 kV 50 Hz – Testing duration: 5 minutes 1 minute – Test set-up: All wires and shielding connected to the external surface of the covering; in a water bath
11	Quality control system of the manufacturer	At least DIN ISO 9002, corresponds to EN 29002, corresponds to ISO 9002

1) A bus connection terminal should be used; see chapter 2.5.1.2.4

Remarks:

The DIN V VDE 0829 standard specifies the value of the testing voltage for the additional high-voltage test at 2.5kV .

The following lines are recommended for the *EIB* application (see chapters 2.5.1.2.2 and 2.5.3):

YCYM 2x2x0.8 Testing voltage 4 kV	<i>EIB</i> specification, for laying arrangements see Table 2.5-2
J-Y(St)Y 2x2x0.8 Testing voltage 2.5 kV	<i>EIB</i> specification, for laying arrangements see Table 2.5-2
JH(St)H 2x2x0.8	Halogen-free line, lay with separation
A-2Y(L)2Y or A-2YF(L)2Y	Underground telecommunications cable, lay outside

Appendix H Load characteristics for EIB powerline

- | | |
|--|---|
| Characteristic K = 1
(devices with low
noise load) | <ul style="list-style-type: none"> – Conventional plugable power supplies – Conventional low-voltage halogen transformers – Filament lamps – Blind and awning drives – <i>EIB powerline</i> devices |
| Characteristic K = 10
(devices with mid-level noise load) | <ul style="list-style-type: none"> – Small electrical devices such as for example, fan heaters, irons and other household devices – Electric ovens – Refrigerators and freezers – Power tools and other small machines – Garden tools (e.g. lawnmower) – Vacuum cleaners – Fans and ventilators – HiFi and video equipment – Fax machines – Energy-saving lamps |
| Characteristic K = 50
(device with high noise load) | <ul style="list-style-type: none"> – Heating controls – Personal computers (PCs) – Monitors – Televisions – Copiers – Electronic transformers – Fluorescent lamps with electronic ballast – Air conditioning units – Solariums |

Characteristic	– Inverters
K = 1000	– Carrier frequency transmission
(critical consumers)	systems, such as for example, mains-based baby intercoms
	– UPS systems

This table only lists a small number of the appliances that could be used in practice. In all situations where critical consumers are included in the system, a field trial will provide information on the quality of transmission.

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