Terminology[1]

For the purposes of this guidebook and for Building Automation and Control Systems (BACS) in general, the following terms and definitions apply.

3-point control
control function with a three-position output that can assume only three discrete values: zero and two values with opposite signs to position with two binary signals providing three control states

EXAMPLE:

  a) opening, stopped, closing;

  b) more, neutral, less;

  c) heating, neutral, cooling.

acceptance
decision and act of signing the handover document during the completion phase

NOTE: The transfer of the responsibility for the system(s) from the supplier to the customer or their representative can be a legal act.

access control
<BACS> method for determining or restricting access to system and network resources [SOURCE: ISO 16484-5]

Note 1: cf. security, operator authentication, access control system

Note 2: Data privacy protection is the framework conditions protecting personal data from being used by anyone other than the owner (regulated by national law).

Note 3: Data security are the framework conditions to protect data from direct or indirect manipulation or unauthorized use. Data manipulation includes loss of data, destruction or falsification of data.

Note 4: Data security means are the measures and equipment to secure and maintain the safety of data.

access control system
<BACS> dedicated special system for security

Note: cf. access control

access control system
<security> automatic checking of access rights under organizational measures and barrier/door control for buildings/rooms, including registration of events

Note: An access control system belongs to security systems.

acknowledge
<BACS> recognition and/or registration of an event (e.g. alarm) by an operator

Note: An acknowledgement can be invoked by an operator using a physical device, or by using a human system interface e.g. selecting an Icon on a VDU.

acknowledgement

<communications> function that allows a destination node to inform a sending node of the receipt of a protocol-data-unit [SOURCE: ISO/IEC 7498-1:1994]

actuator (1)

<BACS> field device that interfaces to control a plant process, operated electrically, pneumatically, or hydraulically.

Note 1: c.f. positioning actuator

Note 2: It influences the mass flow or energy flow.

Note 3: A control valve is the combination of a valve with its operating element.

Note 4: A regulating element (functional unit), or a final controlling element (physical unit) [IEV 351], i.e. a damper, a valve is often referred to as positioning actuator.

actuator (2)

<HBES> analogue or binary output device connected to a communication bus or network to control a load, a contactor, or a positioner.

Note 1: c.f. switched actuator

Note 2: A binary actuator sometimes also is referred to as switched actuator (on/off type).

address

<BACS> unique object identifier and/or device identifier within a system or combined systems.

Note 1: cf. point address and user address.

Note 2: In BACS, each data point has an identifier named point address.

Note 3: In BACS, each communications object has properties named object identifier and object name.

addressing system

address scheme.

unique structured method for data point identification to address the information provided in BACS, consisting of a scheme and the semantics of the elements.

Note 1: cf. user address

Note 2: This scheme can apply throughout a plant, a complete BACS, or the entire customer premises as appropriate.

alarm

<BACS> warning of the presence of a hazard to a property or the environment, in security systems also to life [SOURCE: ISO 16484-5]

Note 1: The warning is an annunciation either audible or visual or both that alerts an operator to an abnormal condition, which can require corrective action.

Note 2: An event dedicated as an alarm can be derived from an abnormal condition detected by a device or controller that implements a rule or logic specifically designed to look for that condition, e.g. 'frost alarm'.

algorithm

calculation that results in an output value by evaluating the value(s) of input variable(s)

alphanumeric

character set, that consists at least of decimal digits and letters

Note: It is advisable to specify the extent of the character set in each case.

analogue input/output

part of the hardware pertaining to a control device for measuring or positioning

analogue value

information containing a numerical represented quantity

application

set of functions that together form a logical unit supporting a process [SOURCE: ISO 8649, ISO 16484-5]

Note: A BACS supports many different applications.

application object

object located within the BACS device's application process

Note: cf. object, object type.

application specific controller

ASC

controller

customized device fulfilling the requirements of a specified application

Note: In BACS, a controller is any device capable of controlling/automation and possibly monitoring other devices and units.

architecture

<BACS> structure and means by which components and devices of a system are connected to intercommunicate

automation

SEE control

Note: cf. processing functions

automation network (US)

AN

control network (GB)

CN

connections between controllers, operator stations / panels, programming units, data interface units, and data processing devices

Note: A schematic diagram is shown in EN ISO 16484-2, Figure 1.

auxiliary energy

electrical energy used by technical building systems to support energy transformation to satisfy energy needs [SOURCE: prEN ISO 52000-1:2015]

Note 1: This includes energy for fans, pumps, electronics etc., Electrical energy input to the ventilation system for air transport and heat recovery is not considered as auxiliary energy, but as energy use for ventilation.

Note 2: In EN ISO 9488 the energy used for pumps and valves is referred to as "parasitic energy".

backup (1)
<general> supporting services

backup (2)
<data processing> process to copy/export data to the data storage of an external backup device to retrieve and restore this data in case of a storage fault. The copy is referred to as backup copy.

backup power operation
operating mode using reserve power supply systems for building operation

BACS application program
software to perform one or more tasks of a BACS

BACS commissioning
project and system-specific process of calibrating field devices, testing data points, adjusting parameters, verifying sequences of operation and other functionalities for the various elements of a BACS application

Note 1: The BACS commissioning is a part of the engineering services, according to ISO 16484-2 and includes commissioning activities at the installation phase.

Note 2: Commissioning reports are proof of the completeness of tasks and work.

Note 3: There are country variations in the naming of the term "commissioning" and variations in the tasks covered by this term.

BACS function list
BACS FL

information list (deprecated)

spreadsheet list for documentation and summing up BACS functions, defined in EN ISO 16484-3

Note: A BACS points list (BACS PL) in some countries refers to the physical I/O only.

BACS network
building automation and control system network to exchange information between binary/digital, analogue, and other communication objects in different devices

binary
signal that represents the state of a single binary coded digital information

Note 1: The state can be logic 0 and I and represent on/off.

Note 2: It applies to input and output functions of a BACS.

Note 3: In BACS, a digital value is a variable that represents the value of digitally coded analogue or binary information. It applies to shared/network data points.

Note 4: Devices with a number of binary inputs/outputs are often referred to as digital (DDC).

binary input/output

hardware pertaining to control devices for state processing or switching

Note: The function is referred to as binary input state and output switching.

bridge

device that connects two or more segments of a network at the physical and data link layers of the ISO-OSI basic reference model [SOURCE: ISO 16484-5]

Note: This device can also perform message filtering based on MAC layer addresses.

building

large volume individual fixed structure other than industrial structures, i.e. commercial, industrial, or commercial residential premises

Note 1: cf. house

Note 2: BACS can be employed also for other structures, as e.g. house, tunnel, railway, ship.

building automation and control

BAC

description for products, software, and engineering services for automatic controls, monitoring and optimization, human intervention, and management to achieve energy – efficient, economical, and safe operation of building services equipment

Note: The trade designation and the industry branch are also referred to as building automation and/or building control.

building automation and control system

BACS

system, comprising all products and engineering services for automatic controls (including interlocks), monitoring, optimization, for operation, human intervention, and management to achieve energy – efficient, economical, and safe operation of building services

Note 1: The use of the word 'control' does not imply that the system/device is restricted to control functions. Processing of data and information is possible.

Note 2: If a building control system, building management system, or building energy management system complies with the requirements of the EN ISO 16484 standard series, it should be designated as a building automation and control system (BACS).

building energy management system

BEMS

functional part of a BACS that comprises data collection, logging, alarming, reporting and analysis of energy usage

Note: The system is designed to reduce the energy consumption, improve the utilization, increase the reliability, and predict the performance of the technical building systems, as well as to optimize energy usage and reducing its costs.

building management

BM

totality of services involved in the management, operation and monitoring of buildings including structural properties and technical systems based on integral strategies [Derived from: CEN/TS 15379:2006]

Note 1: cf. technical building management

Note 2: Building management can be assigned as part of facility management.

Note 3: BM is structured in:

— technical building management (TBM);

— infrastructural building management;

— commercial building management;

There are interfaces to area and facility management.

Note 4: A BACS is the essential tool for TBM.

building management system
BMS

products, software and engineering services for human intervention and management of technical, infrastructural and financial building services to achieve energy-efficient, economical, and safe operation

Note 1: cf. building automation and control system

Note 2: Energy management is part of technical building management.

building performance
set of measurable building characteristics

Note 1: This includes energy efficiency, indoor air quality, moisture management and thermal comfort.

Note 2: This is also influenced by building construction and utilization, installed technical services and their operation.

building services
See building systems

building systems
building services
BS

utilities and installations supplied and distributed within a building [Derived ISO 16484-2:2004]

EXAMPLE: Installations for electricity, gas, heating, air conditioning, ventilating, water and communications.

bus
communication medium and method between two or more devices with interface for serial data transfer

Note 1: A line-form network topology often is referred to simply as a bus.

Note 2: A bus is also called a trunk in the US.

cascade control

output signal or value of a master control loop is used as set-point input to the slave control loop(s) [Derived from IEC 60050-351]

change of state

COS

event that occurs when a measured or calculated Boolean or discrete enumerated value changes

Note: cf. change of value

change of value

COV

event that occurs when a measured or calculated analogue value changes by a predefined amount

Note: cf. change of state

class

category or rank attributed to entities having the same function as their use but are subject to quality demands

Note: The entity is the item under consideration defined according to function and scope.

client

system or device that uses another device for a particular purpose via a service request instance.

A client requests a service from a server [SOURCE: ISO 16484-5, 3.2.10]

Note: The customer (landlord) also is referred to as a client.

closed loop control

system where the output acts upon the process in such a way as to reduce the difference between the measured value and the desired set-point value to zero.

Note 1: cf. interlocks and open loop control

Note 2: The control action describes the control algorithm (i.e. proportional, integral, derivative) as a relationship between the input signal and the output signal of a control function.

commissioning

project and system-specific process of calibrating field devices, testing data points, parameters, functions, and system software — as part of the engineering services — for the various functional elements of a BACS application

Note 1: To take out of commission/to commission: To put a system out of service/into service for an undefined time.

Note 2: Commissioning electrical switchgear and control gear is referred to as putting into operation or service.

Note 3: For automation and IT systems and mechanical plants, commissioning is also referred to as taking into service, system startup, startup procedure.

Note 4: Commissioning reports are proof for the completeness of tasks and work.

commissioning process
systematic application of processes and procedures designed to ensure that the project objectives are achieved and maintained throughout the building lifetime

Note: The commissioning process begins at project conception and continues through to the pre-design, design, construction, start-up, turnover and occupancy to the operation phase.

commissioning authority
CxA

entity identified by the owner who leads, plans, schedules, and coordinates the commissioning team to implement the commissioning process

Note: In some countries, there are "certified commissioning authorities".

communications
transfer of information, in accordance with pre-established protocols

communication interface
specification of physical and electrical requirements for the connection components of communicating products

compatibility
capability of devices of different types and from different manufacturers to operate in a specific network under the same conditions and rules

Note 1: cf. interoperability

Note 2: For electromagnetic compatibility/interference see EN ISO 16484-2, Annex A.

completion
project phase where, when handover and finalization are achieved, the implementation of the BACS project can be considered as completed

compliance
adherence to the requirements of a standard or the necessary consistency between the individual standards within a family of standards [SOURCE: ISO/IEC 10746-2]

configuration (1)
configuring

<BACS> site-specific information related to physical and functional units, entered during system engineering that generally does not change once the system is functioning

Note: The result is the system configuration.

configuration (2)
configuring

<IT> host and target computers, any operating system(s) and software used to operate a processor

Note: IT refers to devices/systems of information technology providing services at their interfaces.

control function

BAC effect of programs and parameters

Note 1: BAC functions are referred to as control functions, I/O, processing, optimization, management and operator functions. They are listed in the BAC FL (function list) for a specification of work.

Note 2: Function is a program unit that delivers exactly one data element, which can be a multiple value (i.e. an array or a structure). Functions can be an operand in a program [EN 61131–3:2003].

confirmation

a representation of an interaction in which a performing function confirms the completion of some procedure previously invoked

Note: cf. feedback (variable), checkback (signal) and response

conformance

conformity

fulfilment of specified conformance requirements by a product, protocol, process, or service. If an incorporated system meets the required specification, this is termed conformance (conformity) [SOURCE: ISO/IEC/TR 13233 and ISO Guide 2]

conformity

SEE conformance

control (1)

purposeful action on or in a process to meet specified objectives [SOURCE: ISO 60050-351]

Note 1: cf. automation

Note 2: The term control is often used not only for the process in a control system, it is also used for the system itself that performs the control functions.

Note 3: To automate employs means to enable self-acting functions in a system, whereas the term automation depicts the ready to use state [Derived from ISO 60050-351].

Note 4: An automaton is a self-acting artificial system, the behaviour of which is governed either in a step-wise manner by given decision rules or continuously by defined relations and the output variables of which are created from its input and state variables [SOURCE: ISO 60050-351].

Note 5: Control of an operation by human intervention is referred to as manual control [SOURCE: ISO 5598, IEC 60050-351].

Note 6: The functional areas in control technology differ in the French and German language as follows:

a) (en) closed loop control, (fr) régulation en boucle fermée, (https://www.br-automation.com/fr/technologie/regulation-en-boucle-fermee/), (de) Regeln;
b) (en) open loop control / positioning, (fr) régulation en boucle ouverte, (de) Stellen (analog Steuern / Stellen);
c) (en) interlocks, (fr) Asservissements, (de) Steuern (Steuerlogik, Verknüpfung);
d) (en) <BACS> control (automation USA), (fr) <GTB> Surveillance (automation), (de) <GA-System> Beherrschen; Messen, Steuern, Regeln, Leiten.

control (2)

<BACS> automatic closed-loop control and open-loop control, interlocks, optimization and monitoring, as well as operating of one or more physical values and states for operation of building services

Note: cf. building automation and control

control diagram

process flow diagram (deprecated)

piping and instrument diagram (P&ID) (deprecated)

flow diagram representing the procedure, configuration, and function of a plant for building services including the instrumentation and functions for a BACS

control function

automatic closed loop, open loop and interlock function for a process

Note: cf. processing function

control strategy

diagram and/or software that represents the functional requirements of a BACS application

controller

automation station

outstation (obsolete)

device for regulation and/or logic control as well as monitoring and processing of information, e.g. temperature, humidity, pressure [SOURCE: EN ISO 16484-5]

Note 1: Digital digital controller (DDC) can be subdivided into the following types:

1) fixed-function controller as application-specific controller ASC where the manufacturer supplies one or more fixed control strategies for specific applications;
2) configurable controller where the manufacturer supplies one or more configurable control strategies for specific applications;
3) programmable controller automation station where the control strategies can be programmed.

Note 2: Outstation was the term for remote multiplexer in SCADA systems without control functionality (SCADA = Supervisory Control And Data Acquisition). An outstation with control functionality but without optimization function was referred to as DDC outstation.

Note 3: The use of the word automation/control does not imply that the device/system is restricted to control functions only. Monitoring and processing of other information is possible.

Note 4: <IT> A device that controls the transfer of data between a computer and a peripheral device also is referred to as a controller, e. g. controller for disk drive, display screen, keyboard, printer.

counter input

hardware pertaining to a control device for pulse counting

cycle time

time associated with one complete operation of a repetitive process

data

data is the formalized, prepared representation of information dedicated to communications, interpretation, or automatic processing

Note 1: Data processing is not synonymous with information processing.

data communication protocol

standardized specification for the exchange of information between application processes in a BACS and/or between the BACS and other dedicated special systems

Note 1: Information is transported without interpretation by the building automation and control network resources

Note 2: There are normative and non-normative protocols.

data interface unit

DIU

functional or physical unit for communications between devices of a BACS and devices / systems in other networks, e.g. to comply with the relevant national standards if connected via public data networks

Note 1: The DIU may be of different type, e.g. modem, router, gateway.

Note 2: A repeater is not a DIU.

data point

DP

<BACS> input/output function consisting of all assigned information describing fully the point's semantic meaning

Note 1: There are physical and virtual data points. A physical data point is related to a direct or network connected field device within a homogeneous system. A virtual data point can be derived from the result of a processing function, or it is related to a device within a different system as a shared (networked) data point.

Note 2: The data point's information includes the present value and/or state and parameters (properties and attributes), e.g. signal type, signal characteristics, measured range, unit, and state texts.

Note 3: A point address and/or a point mnemonic, referred to as user address, identifies a data point.

Note 4: A parameter having its own user address is a virtual data point.

Note 5: A BACS FL (function list) enumerates all data points, and outlines and summarizes their functions for a project.

Note 6: A virtual data point can represent the derivation of various processing functions to model the behaviour of a functional unit, e.g. any type of actuator, control device, and human interface. A virtual data-point also can be referred to as a BACS object. The BACS PL can be used for listing physical data-points and communication objects with focus on engineering elements and for BACS objects with focus on modelling the process - see examples in EN ISO 16484-3, Annex B.

Note 7: The data point is a historically evolved term that formerly described only a physical value or state

data processing device
server station
digital computer controlled by internally stored programs to perform arithmetic and logical operations on discrete digital data for one or more user(s)

Note: cf. server

dedicated special system
DSS
system used for a non-BACS application

EXAMPLE: Fire alarm system, intrusion detection system, access control system, lift control system, or system for maintenance, building and facility management, industrial automation.

Note 1: These systems can be provided for with their own dedicated network.

Note 2: cf. foreign system.

delivered energy
energy, expressed per energy carrier, supplied to the technical building systems through the assessment boundary, to satisfy the uses taken into account or to produce the exported energy [SOURCE: prEN ISO 52000-1:2015]

Note: Delivered energy can be calculated for defined energy uses or it can be measured.

device (1)
<BACS> physical product designed and implemented to perform specified or programmable functions

Note: As a rule, a device forms a self-contained physical unit.

device (2)
<electrotechnology> operational equipment

digital
<IT> method for representation, transmission, and processing of information based on numerics (digits)

EXAMPLE: Networked or shared (communication) data point, BCD time signal.

Note 1: A digital variable may assume one out of a set of discrete values. [SOURCE: IEC 60050-351]

Note 2: Microprocessor-based devices are often referred to as digital devices.

Note 3: In BACS a digital signal is a variable signal that represents the value of digitally coded analogue or binary information respectively of binary coded decimal (BCD) information.

direct digital control
DDC
control of equipment or plant by means of a digital computer or microprocessor

disabled state
state of an item characterized by its inability for any reason to perform a required function
Note: cf. failure and fault

download
particular type of file transfer that refers to the transfer of an executable program, image, or contents of a database to a remote device [SOURCE: EN ISO 16484-5]

dynamic display
current states or values of data points displayed on a user interface

energy carrier
substance or phenomenon that can be used to produce mechanical work or heat or to operate chemical or physical processes [SOURCE: prEN ISO 52000-1:2015]

energy need for heating or cooling
heat to be delivered to or extracted from a thermally conditioned space to maintain the intended space temperature conditions during a given period of time

Note: The energy need can include additional heat transfer resulting from non-uniform temperature distribution and non-ideal temperature control, if they are taken into account by increasing (decreasing) the effective temperature for heating (cooling) and not included in the heat transfer due to the heating (cooling) system.

energy use for space heating or cooling or domestic hot water
energy input to the heating, cooling or hot water system to satisfy the energy need for heating, cooling, dehumidification and domestic hot water [Derived from: prEN ISO 52000-1:2015]

energy efficiency
ratio between an output of performance, service, goods or energy, and an input of energy [SOURCE: CEN/CLC/TR 16103]

Note 1: Both input and output need to be accurately defined in quantity and quality, and be measurable.

Note 2: Energy efficiency is commonly used with the meaning of "Optimum Energy Efficiency", namely: "to operate (an entity) with minimum energy consumption".

Note 3: Commonly used sense of energy efficiency is doing at least the same with less energy.

energy efficiency improvement
increase in energy efficiency as a result of technological, behavioural and/or economic changes [SOURCE: CEN/CLC/TR 16103]

energy use
manner or kind of application of energy [SOURCE: CEN/CLC/TR 16103]

EXAMPLE Lighting, ventilation, heating, processes, transport

Note: The quantity of the energy applied is expressed as energy consumption.

engineering
acquiring and applying technical knowledge to design and implement devices, systems and processes that achieve the desired objective [Derived from: ISO/IEC 2382-1:1993]

Note 1: The tasks to perform include, e.g., system-specific services for planning, configuring and commissioning of the various parts of a BACS.

Note 2: ISO/IEC describes engineering as a systematic application of scientific and technical know-how, methods and experiences for design, implementation, testing, and documentation of software and devices for a system.

entity

something that has a separate and distinct existence [SOURCE: EN ISO 16484-5]

Note: An entity, e. g. a communication object is to be identified and described by a set or collection of properties.

equipment

apparatus (depecated)

aggregation of functional elements or assembly of components and modules, that belong together in one physical unit of plant or in a functional unit of a system

Note 1: From a controls point-of-view, these are, for example, the components and modules of a control device.

Note 2: From the process point-of-view these are, for example, a boiler, a chiller, a preheater, a humidifier, a fan. The components are in this case, for example, a heating coil, control valve, preheater pump, sensor. These are made up of subcomponents, i.e., parts and elements such as actuator, inverter drive, motor protection feature.

event

change of state or value detected for processing and/or reporting

Note: The meaning (value) of an event represents the physical or logical state of a device or equipment.

EXAMPLE: Operational plant states (on/off), limits (high/low), alarm and fault conditions.

facility management

FM

all the services before, during, and after utilization of real estate properties and infrastructure based on a holistic (integral) strategy

Note: cf. building management

failure

termination of an item's ability of an item to perform a required function

Note 1: After a failure, the item has a fault, which can be complete or partial.

Note 2: Failure is an event, as distinguished from fault, which is a state.

fault

state of an item characterized by its inability to perform a required function, excluding inability during preventive maintenance or other planned actions, or due to a lack of external resources

Note 1: A fault is often the result of a failure of the item itself, but can exist without prior failure [IEV 195-04-25].

Note 2: In the field of machinery, the English term 'fault' is commonly used in accordance with the definition in IEV 191–05–01, whereas the French term "défaut" and the

German term "Fehler" are used rather than the terms "Panne" and "Fehlzustand" that appear in the IEV with this definition.

Note 3: The terms fault, failure (for a physical inability to perform) and error (for mistake or mismatch) are often used synonymously.

feedback

<BACS> signal or state which either provides confirmation of a requested action, or provides an indication of some response from a device as a result of a requested action

EXAMPLE: The state feedback of a fan, the positional feedback of a valve.

Note 1: Feedback often is referred to as read back and check back.

Note 2: Check back applies to the command failure algorithm of the command execution check function.

field device

physical connection from the input/output interface of a controller to an item of plant, thereby providing the necessary information or action for the conditions, states, and values of the process

EXAMPLE sensor and actuator, coupling unit, local override/indication device, switch and indication light, operator panel, local monitoring and control device, room device/setting knob

field network

FN

communications connection between actuators/sensors and room devices with control devices

Note: A schematic diagram is shown in EN ISO 16484-2, Figure 1.

finalization

task during the project completion phase where the supplier resolves outstanding items

flow coefficient

K_{vs}

coefficient for mass flow of liquids through a valve at defined operating conditions and when the stroke has reached 100%

Note 1: The K_v (K_{vs}) value is determined as the mass flow in m³/h at the density of 1,000 kg/m³ at 5 to 50°C for a pressure drop of 100 kPa across the valve.

Note 2: A unique procedure to measure the mass flow capacity is determined in IEC 543-4.

foreign system

system in a different network as the considered BACS

format

defined arrangement of data

function

<BACS> effect of programs and parameters

Note 1: Functions within a BACS are referred to as control functions, I/O, processing, optimization, management, and operator functions. Listed in the BACS FL (function list) for a specification of work, they comprise (if required) the complete operational engineering service for a defined function in a project.

Note 2: Function is a program unit that delivers exactly one data element, which can be a multiple value (i.e. an array or a structure). Functions can be an operand in a program.

function block
graphical representation of software for a function block type used in a function block diagram as a program element consisting of a data structure divided into input, output, and internal variables

function block–type
programmable controller programming language element consisting of the definition of a data structure partitioned into input, output, and internal variables; and a set of operations to be performed upon the elements of the data structure when an instance of the function block type is invoked

function block diagram
one or more networks of interconnecting graphically represented functions, function blocks, data elements, labels, and elements

functional description
overall description that explains how each part of the system/plant is expected to operate, interact and be interacted with

Note: The description covers material energy and signal flow of a plant or a system. Functions/operations are described as: storing, transmitting, converting, transforming and interlinking.

gateway
device that connects two or more dissimilar networks, permitting information exchange between them

[SOURCE: EN ISO 16484-5]

Note: A gateway function performs any necessary or possible protocol translations for information exchange in all layers of the ISO-OSI Basic Reference Model.

global function
function that applies to a system as a whole

Note: Global is pertaining to all devices or nodes (3.129) on a communication internetwork.

[SOURCE: EN ISO 16484-5]

Note 2: Internetwork is a set of two or more networks interconnected by routers. In a BACS internetwork, there exists exactly one message path between any two nodes.

[SOURCE: EN ISO 16484-5]

handover

formal process that transfers a system or part of a system usage from the supplier to the customer or their representative

Note: The transfer of the operational responsibility for the system from the supplier to the customer can be a legal act or be agreed by contract.

hazardous state

state of an item assessed as likely to result in an injury to persons, significant material damage, or other unacceptable consequences

Note: cf. state

heterogeneous system

system characterized by using components having different behaviour due to products of different make and type, different communication protocols, and engineering tools relative to the overall functionality

Note 1: cf. homogeneous system

Note 2: Interconnecting a gateway or special software makes possible an integration (or combination) of heterogeneous systems, if not all functional units or devices involved conform to the same communications protocol and profile. This does not mean that 100% interoperability can always be achieved.

Note 3: See also open systems interconnection reference model, communication protocol, and system integration.

historical data

<BACS> data that is recorded on a storage medium for an undefined time

Note: The data logging performed by storing historical data is referred to as historical database function.

homogeneous system

<BACS> system characterized by components having unique behaviour relative to the overall functionality, often by employment of a common unique engineering tool for programming

Note: cf. heterogeneous system

Note: As a rule, a homogeneous BACS consists of products from one manufacturer.

Note: See also interoperability, open systems interconnection reference model, and communication protocol.

house

structure designed for lodgings (local dwelling)

[SOURCE: ISO 6707-1:2014]

Note: cf. building

input/output (1)

I/O

function comprising the processing of a value or signal from a sensor or for an actuator of the plant to be controlled. This function also provides specific state/value information for a data point to system users

SEE analogue value, binary signal

Note: An I/O function is a shared I/O function if it is contained within a separate system or device and its information is communicated to or from a distinct system for common use.

input/output (2)

I/O

physical module

SEE analogue input/output, binary input/output, output

individual room / zone control

control of the physical environment in an area of a building

Note 1: cf. room control, room automation

Note 2: This term is evolving to room automation due to the upcoming integration of other technical services such as electrical installation.

Note 3: A zone is a defined area or zone in a building, where a form of control can be executed, e. g. a floor, a section of a floor, a set of rooms or a room.

installation instruction

document that explains how to install a technical device

NOTE 1: There can be several installation instructions for a device, e.g. mechanical, electrical.

NOTE 2: Installation instructions can be found from many sources, e.g. directives, standards, guidelines, professional recommendations, manufacturer's instructions for products.

integrated function

BAC effect of programs, shared data points and parameters for multi-discipline interrelationships between various building services and technologies

integrated building automation and control system

BACS designed to be interoperable and with the ability to be connected to one or more specified third party building automation and control devices/systems through open data communication network or interfaces performed by standardized methods, special services and permitted responsibilities for system integration

EXAMPLE: Interoperability between 3rd party BACS devices/systems for HVAC, domestic hot water, lighting, electrical power distribution, energy metering, elevators and escalators, other plants, as well as systems for communications, access control, security, life safety etc.

information

knowledge concerning an object, a fact, an event, a thing, a process, or an idea, including a notion; and which, in a given context, carries a particular significance

Note: A statement about the process value or state assigned to an address (point address), e.g. a command ON is an item of information, state ON is also an item of information, the measured process value (with unit) is an item of information. One BACS data point, object or function can contain multiple dedicated items of information.

initialization

process of establishing a known state, usually from a power-up condition.

Note: Initialization can require re-establishment of a node's logical or physical address.

installation

physical delivery and connection of mechanical, electrical, and communication services within a building

integration

implementation of specific processes and procedures to enable communications between different systems/units/devices

Note 1: cf. interoperability

Note 2: Integration of heterogeneous BACS is distinct from system combination, the implementation however is referred to as system integration.

integrity

ability of an application to function as designed within a BACS

interface

functional or physical unit as a defined interconnection between a device/system to another device/system or a person

EXAMPLE This standard describes the following interfaces for BACS:

a) communications interface (e.g. communication controller);

b) data interface unit (DIU);

c) human-system interface (HSI) and graphical user interface (GUI);

d) physical I/O interface, e.g., interface module.

interface standard

standard that specifies requirements concerned with the compatibility of products or systems at their points of interconnection. [SOURCE: ISO/IEC Guide 2]

Note 1: Specific applications and functions as well as profiles are represented in interface standards above the ISO/OSI reference model that presents the general basis for communication protocols.

Note 2: It is possible and permissible to structure protocols in interface standards so that individual layers of the ISO/OSI reference model are unused.

interlock
programmable logic for a control sequence that links one equipment to another by means of Boolean logic and on/off actions

Note 1: cf. closed loop control, open loop control

Note 2: Boolean data is represented as a single binary digit.

interoperability
<BACS> the capability of devices of different types and from different manufacturers to exchange information and commands via the communications network

Note: cf. integration

key (1)
<communications> sequence of symbols that controls the operations of encryption and decryption [SOURCE: EN ISO 16484-5]

key (2)
<hardware> device used to open/close and lock an enclosure/control panel

key (3)
<software> method to open/close a lock to access control capabilities

local operation
device or data item that operates within the vicinity of other associated equipment

[SOURCE: EN ISO 16484-5]

Note: Local is pertaining to devices on the same network as the referenced device.

local area network
LAN

network that links a number of nodes within the same locality

Note 1: In general, LANs offer very fast data communication to directly connect computers or other devices.

Note 2: To interconnect different LANs or to communicate long-distance, e.g. gateways/routers/switches can be used.

local override/indication device
LO/ID

local override device

interface to field equipment for limited operation independent of the processing unit providing priority indication, switching, and/or positioning

EXAMPLE For manual operation of fans, valves, dampers, pumps.

Note 1: LO/ID are assigned to field devices.

Note 2: The functionality is referred to as a local override.

logbook (1)

operator activity logbook

record book (one or more) or its electronic equivalent where all relevant details of the operation, the system, its performance, and its maintenance can be entered in a secure manner for subsequent retrieval

logbook (2)

system activity logbook

record book (one or more) or its electronic equivalent where all relevant details of the operation, the system, its performance, and its maintenance can be entered in a secure manner for subsequent retrieval

logical interlock

SEE interlocks

maintenance

combination of all technical, administrative, and managerial actions during the life cycle of an item intended to retain it in or restore it to a state in which it can perform the required function

management function

plant and application specific software for supervising plants, and carrying out application engineering

EXAMPLE: Calculation of energy consumption and operational costs.

Note: The data to transmit for management functions are listed in two columns of the BACS FL.

management network

MN

connection between operator stations and data processing devices, e.g., server stations, programming units, peripheral devices

mean operating time between failures

MTBF

mathematical expectation of the operating time between failures

Note: Also, refer to mean operating time between maintenance (MTBM).

mean operating time between maintenance

MTBM

mathematical expectation of the operating time between two preventive service actions

Note: Also, refer to mean operating time between failures (MTBF).

measured energy rating

energy performance based on measured amounts of delivered and exported energy

[SOURCE: prEN ISO 52000-1:2015]

Note 1: The measured rating is the weighted sum of all energy carriers used by the building, as measured by meters or derived from measured energy by other means. It is a

measure of the in-use performance of the building after correction or extrapolation. This is particularly relevant to certification of actual energy performance.

Note 2: Also, known as "operational rating".

mechanical equipment room
MER

set of controllers

<BACS> location-related consolidation of data points to one or more control devices, for structured presentation of BACS requirements in the BACS function list and in system documentations

EXAMPLE: Basement MER, Penthouse MER

Note 1: The examples Basement MER or Penthouse MER describe rooms where the building service's equipment (e.g. AHU) is installed.

Note 2: The structuring by MER should generally be left to the vendor to select the mix of large and small devices appropriate to the control/monitoring tasks to be performed. However, it is recommended that a single large piece of equipment or a plant, for example, an air handling unit, be controlled by a "single" controller to prevent control problems in the case of a network failure.

Note 3: An MER can comprise several sets of controllers/automation stations.

medium (1)
<BACS> a physical substance (e.g. water, air) that is controlled

medium (2)
<communications> the physical transmission entity. Typical media are twisted-pair wires, fibre optic cable, coaxial cable and air

[SOURCE: ISO 16484-5]

Note: The transmission medium often is referred to as medium only.

medium (3)
<IT> storage medium, the type of device that stores data in a non-volatile manner

Note: The storage medium often is referred to as medium only.

menu
list of options for selection by the operator

message delay
function to disregard any action from an input change-of-state for further action unless the input signal is sustained for a pre-set time

Note: Referred to as change-of-state delay.

message suppression
function to inhibit the propagation of an input change-of-state according to defined criteria under consideration of parameters

Note 1: cf. event

Note 2: Referred to as change-of-state suppression also.

migrate, verb
modernize the implemented software or the hardware under extensive utilization of the present infrastructure

Monitoring
<BACS> system activity, intended to observe the actual state of an item and annunciation of a defined deviation from the normal state as a state message about the event

monitoring and operator unit
MOU

SEE operator station/operator panel

network (1)
<BACS> set of one or more segments interconnected by bridges having the same network address

[SOURCE: ISO 16484-5]

network (2)
<IT> assembly consisting of nodes and the branches that link the nodes

Note: Network segments interconnecting devices are, e.g., nodes, bridges, routers, gateways.

network architecture
method by which a network is structured from the point-of-view of its dimensions

EXAMPLE 1: Client-server architecture, allocated and distributed.

EXAMPLE 2: Local area network (LAN) metropolitan area network (MAN), wide area network (WAN).

EXAMPLE 3: Structure in the shape of a star, a ring, a line (bus), hierarchical, matrix, and free topology.

network-powered device
device that derives its power from the network or bus, (differentiated from a mains powered device)

node (1)
<BACS> point where an addressable device is connected to the communication medium

[SOURCE: derived from ISO 16484-5]

node (2)
<IT> in a network, the point at the extremity of a branch

object (1)
<BACS> set of data with associated functions applicable to it

object (2)
<IT> model of an entity

[SOURCE: ISO/IEC 10746-2]

object type
generic classification of data defined by a set of properties [SOURCE: ISO 16484-5, 3.2.36]

Note 1: cf. application object

Note 2: BACS object types for achieving interoperability are specified in EN ISO 16484-5.

on/off control
two-point control

control method to position an actuator or to switch a plant or device under consideration of a preselected set-point and hysteresis with one signal providing two control states (e.g. on/off, open/close)

Note: A functional on-off element is a two-position element in which one of the two discrete values of the output variable is assigned the value zero.

online
operating in direct connection to the data processing

online help
provides usage of help information in real time from each application program

SEE online

open loop control
mode of action where one or more measured inputs controls the outputs without any influence of feedback from the process

Note: cf. closed-loop control, interlocks

open system
system characterized by using components from different manufacturers using the same public available protocol

Note 1: Also see heterogeneous system and homogeneous system.

open system interconnection reference model
ISO-OSI Basic Reference Model

description of the 7-layer model for open communication

[SOURCE: ISO/IEC 7498-1:1994]

operating system
software to control program operation and to provide the services for resource allocation, task scheduling, I/O control, and data management

operating mode
<BACS> basic designation of a particular mode (among various modes) of plant operation where the controller maintains the preset condition

EXAMPLE: Boost mode, occupancy mode, comfort mode, economy mode, night setback mode.

Note: cf. operating state, state and status

operating state
currently active state of a plant or equipment, normally as a result of an active operating mode

Note 1: cf. operating mode, state, status

Note 2: The physical operating state is independent of the operating mode, as the operating mode can be overridden by local manual intervention or remote operation.

operator authentication
the corroboration that the operator logging on to a device is identified as the entity claimed

[SOURCE: ISO 16484-5, 3.2.37]

operator function
plant/application-specific function for a human-system interface to operate the plant(s) via the BACS spanning all operational levels, i.e., graphic, dynamic display, remote messaging, local operation

Note 1: A local override/indication device is not an operator function and not a BACS function.

operator station
operator panel

sum of devices for a user to interface with the operator functions and management functions of a BACS for plant supervision

output (1)
function
SEE analogue value, binary signal, input/output, I/O

output (2)
physical module
SEE analogue output, binary output

peripheral device
<computer> any equipment controlled by a certain computer and communicating with it

EXAMPLE Input/output device, i.e. VDU terminal, printer, external storage device.

person system interface
PSI

boundary that represents the point of physical interaction between a human being and the application platform

[Derived from: ISO/IEC/TR 10000-3:1998 and ISO/IEC/TR 14252:1996]

Note 1: cf. operator function

Note 2: Also, referred to as person/computer interface, PCI, or human interface (deprecated).

Note 3: In the field of machine tools, the user interface often is referred to as man-machine interface, MMI (for BACS deprecated).

point address
<BACS> unique data point identifier within a system used for accessing the point's information

Note 1: cf. address, user address and mnemonic

Note 2: A BACS FL (function list can be used to define the point identifiers or user addresses [mnemonics].

positioning actuator
field device as physical unit consisting of an actuating drive and the related final controlling element

Note: cf. actuator and switched actuator.

process
<BACS> specific method to treat media (e.g. water, air, electric power) in a plant for building services

processing function
<BACS> function comprising engineering service for defined application software and parameters for monitoring, interlocks, closed loop and open-loop control, and optimization of building services

Note 1: cf. control function

Note 2: Processing functions are the main section of the BACS function list, and are specified EN ISO 16484-3, clause 5.5, examples are given in Part 3, annex B.

profile
<BACS> communication object with object classes and properties for application and device-specific distinctions, which identify chosen classes, subsets, options and parameters, conforming to the protocol standard, necessary to accomplish a particular function for a specific application

Note 1: A profile is a part of the respective standard, or it is created and published by the relevant organization.

Note 2: For each different application, the profile for implementation is distinguished by its version number.

Note 3: Profiles refer to applications above the ISO-OSI Basic reference model.

program
syntactic unit following the rules of a certain programming language consisting of agreements and instructions or commands, necessary to carry out special functions or to solve a special task or problem

programming unit
PU

functional unit used in programming a BACS

Note 1: A PU may consist of a specialized device or it can be a function of an operator station or other data processing unit (e.g. server station).

property
particular characteristic of an object type [SOURCE: ISO 16484-5]

proprietary
company specific solution [SOURCE: ISO 16484-5]

Note 1: Proprietary within a standardized communications protocol is any extension of or addition to the object types, properties, private transfer services, or enumerations specified in this standard.

proprietary protocol
usually a company specific communication method, protected by intellectual property rights

Note 1: Proprietary protocols can be subject to special licensing agreements which have to be considered.

protocol
set of rules and formats regulating the information exchange between the elements of a system, including the specification of requirements for the application

Note 1: A communications protocol should be structured in layers referring to the concept of the ISO-OSI - Basic Reference Model.

Note 2: In the ISO/IEC 7498 standard the protocol is related to a specific layer. A set of protocols, the so-called protocol stack, is necessary for a communication between systems.

pulsed signal
signal from a device coupled to a sensor or a meter that produces incremental pulses with a defined value of the measured media

RAID
redundant array of independent disks

realtime
time during which a physical process occurs

redundancy
in an item, the existence of more than one means at a given instant of time for performing a required function

remote operation
device or data item that operates outside the vicinity of other associated equipment

repeater
device that connects two or more physical segments at the physical layer as defined in ISO-OSI Basic Reference Model [SOURCE: ISO 16484-5, 3.2.46]

Note 1: This device/unit amplifies and regenerates signals in a network to extend the range of transmissions between medium attachment points.

report

output of formatted event messages or statistics on a display or a printer

Note 1: In BACS an output of formatted information from data either on VDU or as a list on a printer, normally in chronological order, in some cases is referred to as protocol.

Note 2: cf. protocol

resolution

smallest increment of the measured value in the data content or indicated on the meter index

response

completion of some procedure previously invoked

Note 1: cf. confirmation and feedback

response time

time taken for an action to occur as the result of a requesting or initiating an event

room automation

room control including the electrical and mechanical systems for a certain room

SEE room control

room control

integrated room automation

plant/application-specific devices and functions for single zone or individual room control including integrated monitoring, interlocks, open and closed-loop control, and optimization of combined building services such as HVAC&R, lighting, window blinds/shades control, electrical power distribution, and other trades, by communication functions

Note 1: Individual zone/room control can be a part of integrated room automation.

Note 2: cf. individual room / zone control, room automation

room device

human-system interface device for room occupants to influence operation modes and parameters of the application and or to indicate functions for room control/automation

Note 1: A room device or setting knob can comprise the room temperature sensing element.

router

device that connects two or more networks at the network layer as defined in the ISO-OSI Basic Reference Model

Note 1: Typical application is the connection of local area networks.

security

any of a variety of procedures used to ensure that information exchange is guarded to prevent disclosure to unauthorized individuals

segment (1)

<BACS> a delimited part of a message or of a control program (that can be downloaded) that is too large to be transferred as a single unit

segment (2)
<communications> in networks, a segment consists of one or more physical segments interconnected by repeaters [SOURCE: ISO 16484-5, 3.2.51]

sensor
device or instrument designed to detect or measure a variable

Note 1: There are passive, active, and binary sensors, also for network connection.

Note 2: In BACS, a sensor is a field device for providing the necessary information (signal) about the physical conditions, states, and values of the processing functions to enable the processing functions to perform the programmed operations.

Note 3: The term sensor does not provide a differentiation between a binary or analogue type. The distinctive feature should be stated, e.g., switch/pushbutton sensor (binary), thermostat (binary), temperature sensor (analogue).

Note 4: Sensors also are differentiated by their housing and mounting type (e.g. surface type) and by their purpose.

server
system, software, or device that responds to a service request instance to provide service for some particular purpose to a client [SOURCE: ISO 16484-5]

Note 1: cf. data processing device

set point temperature of a conditioned zone
internal (minimum) temperature, as fixed by the control system in normal heating mode, or internal (maximum) temperature, as fixed by the control system in normal cooling mode

Note 1: The corrected value of a temperature set point is used for the calculation of energy performance. It enables the impact of the accuracy of the control system on the energy performance to be taken into account.

site
in construction, a clearly defined functional and organizational local area for mounting and installation of the devices

EXAMPLE: A building or a group of buildings.

specification
document outlining detailed requirements

EXAMPLE: Product specification, test specification.

Note 1: Specifications are used to define raw materials, in-process materials, products, equipment, plants, and systems.

Note 2: A bill of quantities (BoQ) in the field of bid call, award and billing of construction work forms part of the tender specification. A bid call includes e.g. a specification of work with a bill of quantities that lists in items the number of work items.

Note 3: Each work item of a specification is considered to be a homogeneous unit for pricing purposes (based on its technical characteristics). The BACS functions specified in EN ISO 16484-3 are understood as description of such work items.

state

<BACS> basic description to designate a particular operating state (condition)

Note 1: Also, refer to event, operating mode and status.

Note 2: cf. operating state

status

description of the specific states an entity can have

Note 1: cf. state

stroke

movement of a final controlling element, e.g. for a valve between the two end positions

switched actuator

on-off type actuator

SEE actuator <BACS> and actuator <HBES>

system

in its context, a given arrangement of functional units such as equipment/devices, elements, and programs related to each other. Physical units can put functional units into effect

Note 1: cf. plant

Note 2: The definition indicates system as a functional unit, and plant as a physical unit.

system integration

bringing together subsystems into one system to function together as a system

technical building management

TBM

process(es) and services related to operation and management of buildings and technical building system through the interrelationships between the different disciplines and trades

Note 1: The disciplines and trades comprise all technical building services for the purpose of optimized maintenance and energy consumption.

Note 2: A BACS is the essential tool for TBM.

EXAMPLE: Optimization of buildings through interrelationships ranging from heating, ventilation and air conditioning (HVAC) to lighting and daylighting to life safety and security to electric power systems and energy monitoring and metering; to its services, including communications and maintenance and to its management.

technical building system

TBS

technical equipment for heating, cooling, ventilation, humidification, dehumidification, domestic hot water, lighting and electricity production [SOURCE: prEN ISO 52000-1:2015]

Note 1: A technical building system can refer to one or to several building services (e.g. heating, heating and DHW).

Note 2: A technical building system is composed of different subsystems.

Note 3: Electricity production can include cogeneration and photovoltaic systems.

template
part of a pro forma, which can be used as the basis for developing a complete pro forma
[SOURCE: ISO/IEC 9646-1:1994]

thermally activated building systems
TABS

massive building fabric actively heated or cooled by integrated air or water based systems

test
technical operation that consists of the determination of one or more characteristics or performance of a given product, material, equipment, organism, physical phenomenon, process, or service according to a specified procedure

time stamp
date and time recorded for and accompanying the record of an event or operation
[SOURCE: EN ISO 16484-5]

topology
<network> structure of the communication paths between the medium attachment points

EXAMPLE Network topology forms are line, ring, star, tree and mash.

Note 1: The logical topology is the way that the signals act on the network media.

Note 2: A network's logical topology is not necessarily the same as its physical topology.

transmitter
measuring transducer

signal converter

physical unit that converts an input value into a clear related output value (signal)

Note 1: Transmitters often are referred to as (measuring) transducers.

Note 2: Measuring transducers are higher-precision converters.

trend log
trend diagram

presentation of a set of measured value(s) over time

Note 1: The values are displayed within a timeframe recorded by a fixed time period or by fixed threshold values (do not confuse threshold value with change of value).

Note 2: A trend log with current values is a trend display shown as a curve for the progress of a value over time.

Note 3: A trend log with stored or archived values is a trend history (type of presentation applied to statistical analysis).

upload
process of transferring an executable program, an image, or a database from a remote device in such a manner as to allow subsequent download

Note 1 to entry: Adapted from ISO 16484-5, 3.2.57.

user address

<BACS> the point address used by an operator at the human system interface

Note 1 to entry: cf. address, point address and addressing system

Note 2 to entry: User address often is referred to as mnemonic.

valve authority

ratio of the pressure difference across a fully open control valve to the pressure difference across the entire controlled system including the control valve

watchdog

function that monitors the performance of a software program or other item of a system. SEE monitoring.

Note 1 to entry: In the event of a program failure, a watchdog function can indicate it and/or cause a reset to restart the software program.

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[1] in accordance to ISO/IEC/CEN/CLC rules, requirements for definitions are documented also in DIN 820-2 in 3 languages: Annex D: (normative)