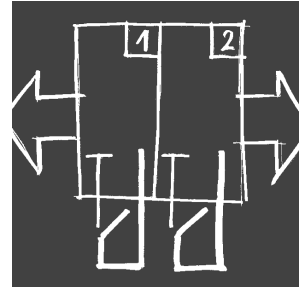


VISONIK®

## I/O module points

Function sheet

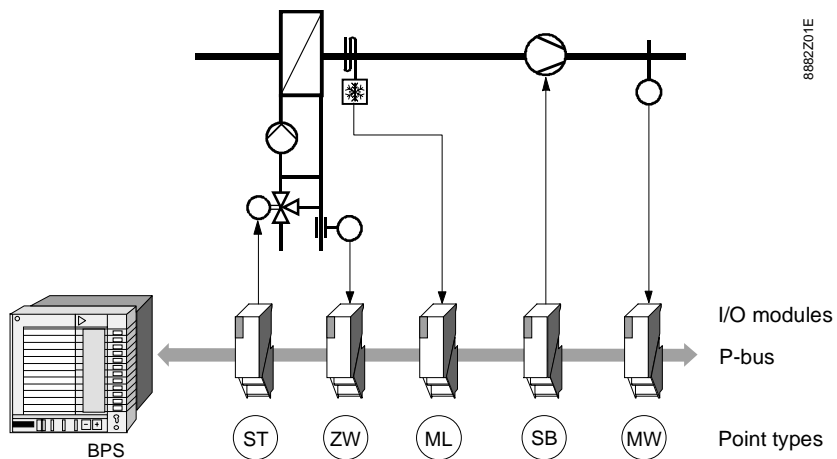


All information points in a VISONIK system establishing a connection between the building services system and the BPS by means of I/O modules and P-bus are called "I/O module points". They fulfil the physical basic functions: Signalling, measuring, counting, and positioning.

### Use

#### Example

The following illustration shows a few typical I/O module points:



### Explanation

I/O module points and I/O modules in VISONIK are differentiated by their physical basic functions and the information in data points is imaged from the associated point type. The I/O modules transform the signals of the associated transmitters in the plant to uniform signals of the BPS and vice versa. The following table provides an overview of the points and signals:

I/O module points	Point type	Signal	Transmitter in the plant (examples)
Signalling points	ML	Digital Input	Contact for frost protection thermostat
Measuring points	MW	Analogue Input	Resistance signal from the sensor
Counting points	ZW	Counter Input	Counting pulse transmitter for flow
Switching points	SB	Digital Output	Switching contactor for fan
Positioning points	SE	Analogue Output	Fan actuator with positioning input of 0..10 V

The following pages contain descriptions of the individual I/O module points.

## Signalling points

### Definition

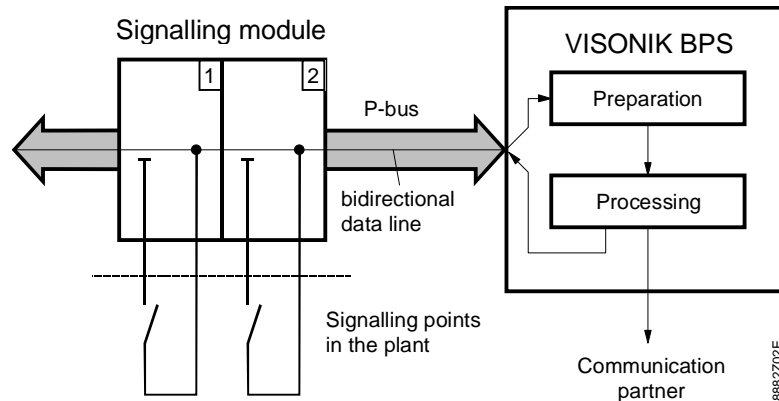
Signalling points are digital input information points. Any status changes directly result from the processes in the building services system.  
Signalling points are also referred to as digital input (DI) points.

### Design

On the building services system side, the signalling points correspond to the contacts of field devices such as thermostats, flow monitors, level monitors, etc. They supply the binary input information 0 or 1 to the automation station.

### Signalling module processing

The signals from the signalling points, i.e., the status changes of the contacts are recorded in VISONIK by the signalling modules. The VISONIK BPS cyclically polls the signalling modules via the P-bus and processes the information in accordance with the associated program.



### Functions

Depending on the programming, information contained in the signalling points may trigger the following functions in VISONIK:

Function	Example
Reports	Single point report "Frost alarm"
Automatic calling	Any fault messages
Status change counting	Fault statistics or analysis
Status time counting	Operating hours count
Logical links to several signalling points	Process controls
Start or stop COLBAS tasks	Programmed in reaction task (TSK253), caused by a signalling point status change
Transfer of information to various communication partners	See "Transfer of module point information", page 7.

## Measuring points

### Definition

Measuring points are analogue input information points. Any status changes directly result from the processes in the building services system. Measuring points are also referred to as measured value points or analogue input (AI) points.

### Design

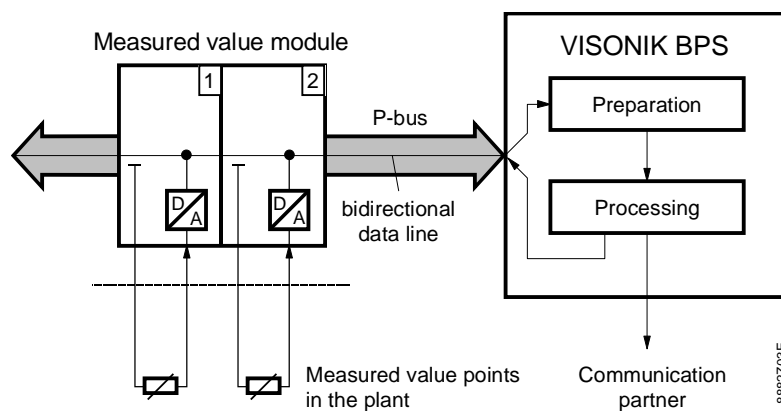
For measuring points, the measured value transmitters are located in the plant. These transmitters supply analogue (modulating, continuous) measuring signals in the form of electrical resistance, current, or voltage signals. Measured value transmitters may be passive (resistance sensors) or active devices (measuring transducer).

### Measured value module processing

In VISONIK systems, measured value modules acquire the measuring signals and conduct analogue to digital conversion (A/D conversion).

The VISONIK BPS periodically polls the digitized measuring signals (raw measured values) via the P-bus and converts them to the corresponding physical variables.

Example: A resistance value is converted to the relative temperature °C.



### Functions

Depending on the programming, measuring signals may trigger the following functions in VISONIK:

Function	Example
Reports	Show plant image of the management station due to violation of the measured value limit
Alarming local and/or central	Violation of the upper or lower measured value limits
Counting the frequency of measured value changes and/or limit value violations	Fault analysis
Logical link to limit value violations and fault states	Frost situation
Mathematical operations in COLBAS	Mean value calculation for several measured values or for a specific period of time
Switching and positioning commands as a response to measured value changes	Sustained plant operation during OSTP setback phase
Measured value activation as control, fault, or reference variable for DDC control	Room, outside, supply air temperature, etc.
Start or stop COLBAS tasks	Dial-up communication (telephony) task
Transfer of information to various communication partners	See "Transfer of module point information", page 7.

## Counting points

### Definition

Counting points are digital input information points. Any status changes directly result from the processes in the building services system. Counting points are also referred to as counter value points or counter input (CI) points.

### Design

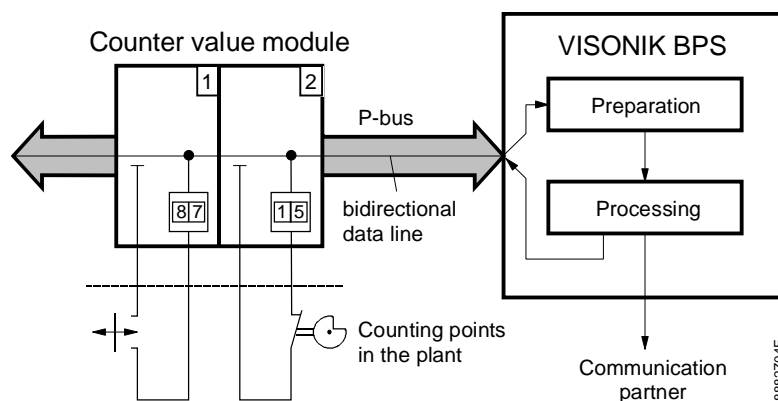
Counting points have transmitters in the plant supplying a pulse sequence to the automation station. In this regard, each pulse is proportional to a specific volume of a physical variable or quantity.

### Counter value module processing

In VISONIK, counter value modules acquire the pulses sent by the transmitter. They then count the pulses and save them temporarily.

The VISONIK BPS cyclically polls the module for the counter status via the P-bus, adds the value to the existing count and converts the pulses to the related physical variable (e.g., 100 pulses = 1 kWh).

The maximum counter value of the BPS is  $10^{36}$ .



### Functions

Depending on the programming, pulses may trigger the following functions in VISONIK:

Function	Example
Reports	Point status report
Alarming local and/or central	Counter value limit violations
Acquisition of external synchronisation pulses	Synchronisation of the measured period of the maximum demand program is active
Switching of consumers on load monitoring/peak load monitoring	Electricity and gas consumption: Rules during the measured period/limitation on reaching Emax.
Indication of counter status and corresponding energy consumption	Within the measuring period: Daily maximum today/ Daily maximum yesterday
Calculation using measured and/or other counter values	Energy assessment tasks
Transfer of information to various communication partners	See "Transfer of module point information", page 7.

### Note

For applications using measured period synchronisation, an additional signalling module is required as the input for the synchronisation pulse.

## Switching points

### Definition

Switching points are digital output information points. Any status changes result from operator input and program processes. Switching points are also referred to as switching command points or digital output (DO) points.

### Design

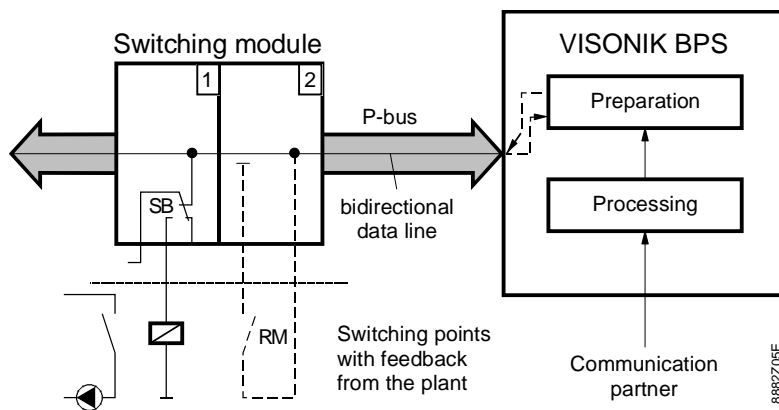
On the plant-side, the switching points consist of:

- One or several electrically switchable elements such as a switching contactor for pumps, fans, etc.
- Optional feedback contacts confirming the switching processes

Additionally, switching points also have a remote/local function which acts on the module in parallel to the auto/manual hand switches.

### Switching module processing

In VISONIK, switching command output and feedback message acquisition occurs via the P-bus and the switching modules or a combination of switching and signalling modules. The feedback message acts on a switching command and is automatically tested.



### Functions

Depending on the programming, switching command changes may trigger the following functions in VISONIK:

Function	Example
Reports	Point status report
Switching status time count	Operating hours count for one or several switching steps
Maintenance reaction	Reaching the operating hours limit
Acquiring the frequency of a specific switching status	Operation analyses
Conduction of logical links between switching and feedback information	Plant supervision such as fan ON, feedback pressure sensor, etc
Triggering further switching commands due to process and link controls	Controlled start-up of a plant, e.g., following power return
Transfer of information to various communication partners	See "Transfer of module point information", page 7.

## Positioning points

### Definition

Positioning points are analogue output information points. Any status changes result from operator input and program processes. Positioning points are also referred to as positioning command points or analogue output (AO) points.

### Design

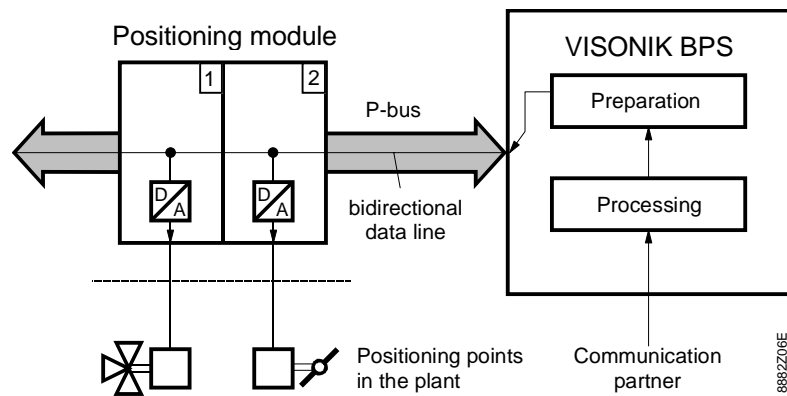
Positioning points in the plant

- Primarily consist of electric actuators for modulating or three-position control such as valve and air damper actuators. These are common positioning signals:
  - Modulating voltage signals (e.g. B. 0..10 V)
  - Modulating current signals (e.g. 4..20 mA)
  - Positioning pulses AC 24 ... 250 V for actuating equipment with three-position response
- Provide feedback to the system on the present position (optional)

Additionally, positioning points also have a remote/local function which acts on the modules in parallel to the auto/manual hand switches.

### Positioning module processing

In VISONIK, the positioning modules electrically adjust the positioning signals, i.e., the digital positioning values transmitted by the VISONIK BPS via the P-bus to the positioning modules are converted to modulating positioning signals (D/A conversion) or positioning pulses (pulse time = runtime) in accordance with the positioning module type.



### Functions

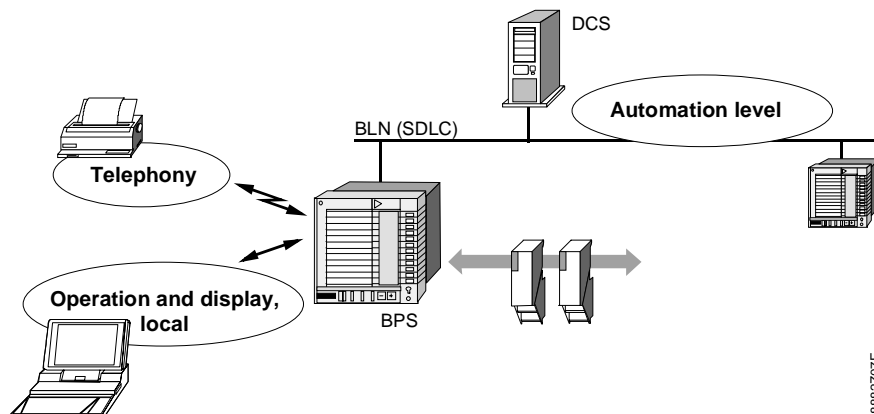
Depending on the programming, positioning command changes may trigger the following functions in VISONIK:

Function	Example
Reports	Point status change
Triggering further positioning commands	Sequence control
Calculation and issue of new positioning commands	Functions POS, MIN, MAX, HYS
Display	Valve position in plant picture
Transfer of information to various communication partners	See "Transfer of module point information" page 7.

## Transfer of module point information

### Communication partner, overview

The module point information processed in the VISONIK BPS can be transmitted to the communication partners on various levels. The illustration below provides an overview of these processes:



### Explanations (illustration)

The following table contains the individual levels combined with the possible partners and elements:

Level	Elements/Partner
Local operation and display	Operating and display elements at the BPS: <ul style="list-style-type: none"> <li>– POPcards (Personal Operating Process Cards)</li> <li>– PC with VISOTOOL Editor (operator program or COLBAS)</li> <li>– Printer at TTY2 interface</li> </ul>
Telephony (dial-up communication)	Teleprinter, Tele-BPS, DCS, ECU, coupled third-party systems, via modems
Automation level	Building Level Network (SDLC ring) with: <ul style="list-style-type: none"> <li>– Data and Communication Server DCS and respectively connected peripheral devices (graphical operation Insight, printer)</li> <li>– Other process stations (BPS, PRV1, EKL-X)</li> <li>– Integrated individual room systems (TEC, Monogyr)</li> <li>– Coupled third-party systems (CFE solutions)</li> </ul>

### DCS as communication partner

In the VISONIK DCS, I/O module point information may trigger the following reactions and functions:

- Process reactions
- Chain reactions
- Maintenance reactions
- Time reactions
- Date reactions
- Alarm and fault messages
- Clear text messages and reports
- Display of colour plant picture on Insight (picture reaction on faults)
- Superposed switching and positioning commands, e.g. for optimisation tasks
- I/O point event storage
- Data processing

### Additional information

Refer to the following documents for more information on this topic:

Document No.	Title
CM2N8301E	BPS User's Guide
CM2Z8567E	VISONIK Point Types and Parameters (expert documentation)

